AECOM Imagine it. Delivered.

# Grenfell Investigation into Potential Land Contamination Impacts

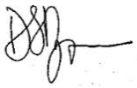
## Technical Note 01: Final Specification for the Stage 1 Investigation

Royal Borough of Kensington and Chelsea

Project number: 60595731

30 August 2019

## Quality information

| Prepared by | Checked by | Verified by | Approved by |
|---|---|---|---|
|  |  |  |  |
| Simon Cole<br>Technical Director | David Dyson | Liz Philp | Liz Philp |

## Revision History

| Revision | Revision date | Details | Authorized | Name | Position |
|---|---|---|---|---|---|
| Original | 03 May 2019 | draft |  | Liz Philp | Technical Director |
| 1 | 25 May 2019 | revision |  | Liz Philp | Technical Director |
| 2 | 14 June 2019 | revision |  | Liz Philp | Technical Director |
| Final | 2 July 2019 | Final |  | Liz Philp | Technical Director |
| | 30 August 2019 | Minor typographical changes | | | |

## Distribution List

| # Hard Copies | PDF Required | Association / Company Name |
|---|---|---|
| Nil | PDF | MHCLG for distribution |
| | | |
| | | |
| | | |

## Prepared for:

Royal Borough of Kensington and Chelsea

## Prepared by:

AECOM Infrastructure & Environment UK Limited
Sunley House
4 Bedford Park, Surrey
Croydon CRO 2AP
United Kingdom

T: +44 20 8639 3500
aecom.com

# Table of Contents



# Figures



# Tables

# 1. Introduction

This technical note sets out AECOM's proposed final specification for the Stage 1 investigation of potential land contamination impacts resulting from the Grenfell Tower fire on 14 June 2017. The proposed specification is based on the original tender specification received by AECOM, and on verbal and written feedback from the Multi Agency Partnership (MAP) and the Scientific Advisory Group (SAG) to previous drafts of this document and AECOM's original tender response. It sets out AECOM's understanding of the objectives of the Stage 1 investigation and the proposed scope of work that AECOM will undertake.

# 2. Objectives

The objectives of the Stage 1 investigation are set out in the UK Government's strategy for this work (Environment Agency, 2018). This section presents AECOM's summary understanding of those objectives. The purpose of the investigation strategy is to investigate potential contamination of land (and water) as a result of the Grenfell Tower fire and to consider the potential risks to public health from the current use of the land surrounding the site. The strategy is based on the risk-based approach to the investigation of land required under the UK Government's Contaminated Land Regime -Part 2A of the Environmental Protection Act 1990. The statutory guidance on Part 2A (Department for Environment, Food and Rural Affairs (Defra), 2012b) sets out the requirements for the risk-based approach, and the investigation strategy will be delivered using the tiered (staged) approach to risk assessment set out in the Environment Agency's Model Procedures for the Management of Land Contamination (CLR11) (Environment Agency, 2004).

The strategy sets out six overarching objectives:

1. Determine whether the levels of contamination found represent a potentially unacceptable risk to human health or the environment.
2. Assess both potential acute and chronic risks.
3. Determine so far as possible the geographical extent of any significant land contamination caused by the fire whilst being clear on the potential for pre-existing soil contamination.
4. Provide evidence to the Multi Agency Partnership to inform existing and future public health advice.
5. Ensure the Scientific Advisory Group is engaged at critical science related decision points and its advice reflected in the approach to the work.
6. Provide recommendations for any additional work or regulatory steps required under Part 2A.

The overarching strategy objective of the Stage 1 investigation is to develop an initial conceptual model of the site. This has been broken down into three key components:

1. Collate background information.
2. Carry out a site reconnaissance and initial exploratory sampling.
3. Identify and prioritise where the main stage of sampling (Stage 2) should be undertaken.

Stage 1 culminates in a preliminary risk assessment report and a separate detailed design for the Stage 2 investigation. It is for Stage 2 to provide the detailed assessment of whether there are actual or potential unacceptable risks to human health or the environment. However, the preliminary risk assessment scope for Stage 1 includes the provision for a small scale "pilot study" on a single parcel of land near to the Tower. The objective of the pilot study is to provide a more rapid indication of the presence of contaminant linkages resulting from the fire.

# 3. Scope of Work

The scope has been split into six tasks:

- Task 1 Joint start up workshop with MAP and SAG.
- Task 1a Q&A session with community representatives.
- Task 2 Desk study and exploratory sampling (incorporating pilot study).
- Task 3 Preliminary risk assessment and reporting (incorporating detailed design of Stage 2.
- Task 4 Close out workshop with MAP and SAG.
- Task 4a Community workshop to present findings of Stage 1.

## 3.1 Task 1 – Start Up Workshop

A start- up workshop will be held during which AECOM will present our understanding of the Stage 1 contract requirements in terms of objectives, task scope, and programme.

[Task 1 was held on the 21st March at the Royal Borough of Kensington and Chelsea Town Hall with representatives from AECOM, MAP and SAG present.]

The discussions during the workshop, and feedback from MAP and SAG following that workshop will inform the final Stage 1 specification.

## 3.2 Task 1a – Q&A Community Sessions

Community liaison will be led by MHCLG. AECOM will support MHCLG in provision of information to the community and the organisation and delivery of community engagement events associated with Stage 1. Two community engagement events will be organised by MHCLG with the objectives of presenting to the community the plans (as they stand) for Stage 1, and enabling the community to comment on those plans and provide information to AECOM, MAP and SAG on what parcels of land should be considered during the investigation works – areas of particular concern to the community either from the perspective of current land use and/or where debris/smoke particle deposition from the fire is known to have occurred.

[Community sessions were held on the 25th and 27th April, attended by representatives of AECOM, MAP and SAG].

## 3.3 Task 2 – Desk Study and Exploratory Sampling

The first objective of this task is to gather information from desk-based sources for the purpose of further development of the potential fire-related source (contaminant)-pathway-receptor linkages that form the basis of the preliminary risk assessment. This includes information on:

- Fire effluents that are chemicals of potential concern (COPC).
- The potential geographic extent of COPC deposition from the fire.
- Other historic and/or background sources of COPC in urban soil that should be taken into account.
- The likely environmental fate and transport of COPC since the fire (in terms of their likely migration and persistence in the soil and consequent relevant exposure pathways.

The second objective is to design and carry out exploratory sampling to collect soil samples for laboratory testing to inform and corroborate the information obtained in the desk study. Specifically informing on the potential geographical extent of the debris/smoke particle deposition from the fire by identifying the presence of fire effluent COPC in shallow soil. This exploratory sampling is to be constrained in extent (both geographic spread and number of samples taken) because it is not intended to be the main soil investigation – that is for Stage 2.

To provide a structure to the desk study and enable timely review of the information as it is collated, the desk study has been split into a number of sub-tasks, each of which is defined by a written output

in the form of a Technical Note. These notes will be largely factual in nature, presenting a summary of the information collated by the desk study, they will be appended to the main Stage 1 report, and will provide the reference base for the data interpretation which will form the main part of the Stage 1 report.

Evidence review protocols will be developed for each desk study sub-task which will set out the intended data review process for each element. The reviews will be constrained in their scope and commensurate with the level of effort required to provide data suitable for contaminated land risk assessment in accordance with UK contaminated land good practice. They therefore will not be exhaustive and will be designed to meet the programme requirements of Stage 1. They are therefore designed to be completed by one researcher over a period of two weeks. They will include the collation of information defined in CLR11 (Environment Agency, 2004) that is required to complete a preliminary risk assessment, specifically the information identified in Figure 2A and Inputs 1, 2 and 3 of CLR11. Where necessary to inform the design of subsequent stages more detailed information will be collated taking in to account Figure 2B and Inputs 1, 2, and 3 of CLR11.

For the purposes of Stage 1 the geographical extent of the area of interest is defined as land within a 1km radius of the Tower (shown in Figure TN01-01 Stage 1 Investigation Extent, appended). This is a judgement based on practicality and current knowledge on debris and smoke particle deposition and community concerns. It does not preclude a different area of interest being identified for Stage 2. Further detail on the proposed sub-tasks for Task 2 are provided below:

### 3.3.1 Collation and review of background information on the fire event

To include:

- Request and review of relevant information from RBKC on the Authority-led clean-up efforts in the aftermath of the fire, specifically information relating to areas of fire debris and management of public areas such as parks, community gardens and other pubic open spaces.
- Request and review of relevant information from the Grenfell Site Management Team (GSMT) on the site management activities that have occurred since the fire and organise a site visit of the current cordon area.
- Review of the Met Office report (E. L. Kendall, 2019) on the air dispersion modelling of the smoke plume during the fire to inform the potential geographical extent of the investigation.
- Collation of community information from community engagement events, site reconnaissance, and that provided via other MHCLG and RBKC community information channels specifically related to fire debris and smoke particle deposition

### 3.3.2 Collation and review of background information on fire effluents

To include:

- Search for and review of published scientific papers, reports, and books on fire chemistry and chemical emissions from large fires.
- Review of known previous reviews of this subject, including those published by Public Health England.
- Search for and review of published scientific papers, reports and books on the environmental fate, transport and toxicity of fire effluent COPC.

### 3.3.3 Collation and review of baseline (background) levels of soil contaminants in urban environments

To include:

- Search for and summary of soil contaminant data from ground investigation reports submitted to RBKC under planning.
- British Geological Survey regional and national soil surveys (including London Earth).
- Environment Agency Soil and Herbage Survey (Environment Agency, 2007)

- Defra Science Project SP1008 on normal background concentrations for soil contaminants (Department for Environment, Food and Rural Affairs (Defra), 2011).
- Search for and review of published scientific papers on soil quality in London.
- Search for and review of published scientific papers on soil quality in urban areas.
- Search for and review of published scientific papers on potential sources of contaminants in urban soils.
- Review of historical and current land-use mapping using RBKC's GIS and proprietary environmental search information and historical mapping records.

### 3.3.4 Site Reconnaissance

A site walkover will be organised by MHCLG and supported by AECOM. This is expected to include a visit to all the proposed soil sampling locations for the exploratory sampling and pilot study tasks. This should facilitate community engagement in the selection of the locations and identify/provide information on the practical constraints/considerations for the planning and undertaking of the soil sampling at these locations.

### 3.3.5 Exploratory soil sampling

The objective of the exploratory soil sampling task is to identify what fire effluent COPC are present in soil and at what concentrations within the geographical area of interest. The locations of the soil samples will be decided based on the desk study information and the site reconnaissance but are anticipated to be areas of publicly-accessible space where the soil has not been significantly disturbed or altered since the fire. The detail of the sampling task will be provided in the form of a Sampling Plan in accordance with relevant British Standards.

The original specification for Stage 1 did not specify the number of exploratory soil samples to be taken but did specify 120 soil samples should be taken for the pilot study. The number of soil samples necessary for the pilot trial is dependent on the parcel of land chosen (to be determined as part of Task 2) and it is proposed that greater benefit would be gained from taking more exploratory samples across a larger area of interest than taking the same or similar number in just one area. Further detail on the balance of sample numbers and locations to be provided in the Sampling Plan with the limitation that the combined total for the soil samples should not exceed that originally proposed (i.e. the exploratory sampling and pilot study remain limited in extent, with the main sampling exercise being carried out at Stage 2). The purpose of the exploratory sampling is not to provide a detailed characterisation of any one location, therefore the sampling point at each location should be selected randomly. In order to assist in the design of the Stage 2 investigation two samples should be taken from each location to provide some evidence of spatial variability in soil concentrations, and duplicate samples should be taken in accordance with the requirements of British Standard BS10175 (British Standards Institute, 2017a).

### 3.3.6 Pilot Study Soil Sampling

The objective of the pilot study is to identify local spatial variability in COPC concentrations, distinct from the variability on the wider exploratory sampling scale and provide a dataset that enables the Part 2A-risk assessment process to be rehearsed and provided as an example, such that the output and learnings from that exercise can be factored into the design for Stage 2.

The scope of the pilot trial will be:

- A grid-based sampling exercise across one parcel of land. This land parcel should ideally be public open space close to the Tower, be used by the local community, be accessible in the timescales required for Stage 1, have been subject to debris and/or smoke particle deposition, and provide an area of open space that has not been significantly disturbed since the fire.
- The sampling approach will be the same as for the exploratory sampling but should include multiple sampling depths.

### 3.3.7 Laboratory Analytical Specification

The analytical specification will be informed by the desk-based review of fire effluent chemistry, but as a minimum will be consistent with British Standard BS ISO 26367 (British Standards Institute, 2017b). Consideration of the environmental fate and transport of the COPC will be taken into consideration, but if that is uncertain, COPC will be tested for where possible. Laboratory testing will be carried out by United Kingdom Accreditation Service (UKAS) accredited laboratories that specialise in the testing of soil samples for contaminants. Test methods will be UKAS ISO 17025 (IOC/IEC, 2017) accredited where possible. This may not be possible for all contaminants. Where this is not possible method validation data will be sort from the laboratory.

The primary laboratory will be Exova Jones Environmental based in Deeside. Certain specialist analysis will be subcontracted to other UK-based laboratories as required. Details will be included in the Sampling Plan.

Provision is to be made for taking duplicate soil samples which will be held by the laboratory and not tested. These samples will be made available for future independent or additional testing should it be required and subject to ongoing agreement with the analytical laboratory.

## 3.4 Preliminary Risk Assessment and Reporting

### 3.4.1 Technical Notes

Factual technical notes setting out the completed activities undertaken, and the factual data acquired will be drafted for review by MAP and SAG on a rolling basis as the project progresses. This will be programmed such that the factual information is available to inform dependent tasks in the programme and facilitate informed discussion on data interpretation. The intention is that each of the technical notes could form either a chapter or sub-chapter in the PRA report, or form an appendix to that report without substantial change.

The current planned order of the technical notes is as follows:

**Table TN01-01. List of Technical Notes**

| Number | Title |
|---|---|
| 1 | Finalised specification |
| 2 | Protocol for evidence reviews |
| 3 | Protocol for initial soil sampling exercises |
| 4 | Fire chemistry and identification of COPC |
| 5 | Fate of debris – deposition, spread, clean-up |
| 6 | Atmospheric dispersion and deposition of finer particles |
| 7 | COPC fate & transport in the environment |
| 8 | COPC toxicity |
| 9 | Published data on national and regional urban background soil concentrations |
| 10 | Local baseline data on soil concentrations of COPC |
| 11 | *Technical Note removed but numbering preserved to avoid referencing issues* |
| 12 | Spatial mapping of historic and current land uses |
| 13 | Potential source contributions to urban soil pollution |
| 14 | Collated community information |
| 15 | Factual data from initial exploratory sampling and pilot study |
| 16* | Preliminary risk assessment |
| 17* | Part 2A risk assessment for pilot study |
| 18* | Stage2/3 design |

*Technical Notes 15-17 are expected to coincide with the drafting of the Preliminary Risk Assessment (PRA) report and therefore are not planned to be issued separately.

The PRA report will be a consolidated report detailing all tasks undertaken and structured in accordance with CLR 11 Output 2 and the reporting checklist detailed in GPLC3 (Environment Agency, 2010). To include:

- Non-technical summary.
- Desk study environmental search and evidence reviews.
- Baseline/background soil levels.
- Site reconnaissance and community engagement information.
- Preliminary conceptual site model for human exposure to affected environmental media.
- Factual details of initial exploratory sampling.
- Comparison of reported concentrations to those reported in previous studies.
- Assessment of sample COPC compositions to evaluate potential source origin and spatial differentiation.

### 3.4.2 Preliminary Risk Assessment Report

The preliminary risk assessment will seek to identify the relevant contaminant-pathway-receptor linkages for all identified land-uses within the assessment area, having consideration for relevant current use as defined in the Part 2A statutory guidance. These C-P-R (contaminant) linkages will be described using a combination of text, tabular and graphical formats to best explain and present the information in an accessible way.

Each contaminant linkage will be considered qualitatively, drawing on guidance in CIRIA C552 (Rudland, 2001), EA/NHBC R&D66 (NHBC and Environment Agency, 2008) and NIGLQ (Nuclear Industry Group for Land Quality, 2012) guidance but adapted to the Part 2A requirements for identifying significant contaminant linkages. This requires consideration of whether a linkage could be associated with a significant possibility of significant harm. Each linkage will be considered within the context of the four categories of land defined in the statutory guidance, with those linkages with little or no evidence of being associated with an unacceptable risk being placed in Category 4, and those linkages with some evidence for a potentially unacceptable risk to be placed in Categories 2 or 3 – indicating a requirement for further Stage 2 assessment. The value/usefulness of including this approach in the final report will be discussed with MAP and SAG.

### 3.4.3 Pilot Study Report

A standalone report detailing the factual outcomes of the pilot study sampling exercise, and a Part 2A-compliant human health risk assessment (so far as the data permits). The data from the pilot study, and the wider exploratory sample data will be used to explore the potential public health significance if such data was representative of different land-uses within the investigation area, and therefore what that might mean in terms of the prioritisation and focus for the Stage 2 investigation.

The risk assessment will be based on the establishment of multiple lines of evidence, and anticipated to include:

- Comparison to locally reported and published national/regional soil concentrations (including the “normal background concentrations” reported in Defra Science Project SP1008 (Department for Environment, Food and Rural Affairs (Defra), 2011)).
- Generic Quantitative Risk Assessment: Comparison to published screening criteria (generic land-use specific criteria such as LQM/CIEH S4ULs (Nathanail, McCaffrey, Gillett, & Ogden, 2015) and Defra C4SLs (Department for Environment, Food and Rural Affairs (Defra), 2012a)).
- Sensitivity analysis to explore the uncertainties and conservatisms in the generic assumptions that form the basis of the screening criteria and adopting site-specific parameter values (for

example bioaccessibility). An exhaustive sensitivity assessment of all possible assessment options is not proposed.

- Assessment of the presence of contaminant linkages and the implications for the Stage 2 design.

### 3.4.4 Design of Stage 2 Site Investigation

The details of the design of the Stage 2 investigation will be contingent on the outcome of Stage 1. The design will consider the:

- Requirements of the statutory guidance for Part 2A for robust evidence that is scientifically-based, authoritative, relevant to the assessment, and appropriate to Part 2A decision making.
- Requirements of relevant standards and good practice, specifically BS 10175:2011+A2:2017 (British Standards Institute, 2017a) and BS ISO 18400 (British Standards Institute, 2016) series for soil sampling, and BS ISO 26367-2:2017 for assessing the environmental impact of fire effluents (British Standards Institute, 2017b).
- Requirements of MAP, SAG and the community.
- Data requirements for the detailed assessment of the identified contaminant linkages (data quality objectives).
- Data acquisition methods needed.
- Required spatial extent of the investigation, and the priority areas to target.

# 4. References

British Standards Institute. (2016). *BS ISO 18400 Series.*

British Standards Institute. (2017a). *Investigation of potentially contaminated sites – Code of Practice, BS 10175:2011+A2:2017.*

British Standards Institute. (2017b). *BS ISO 26367-2:2017 Guidelines for assessing the adverse environmental impact of fire effluents. Part 2: Methodology for compiling data on environmentally significant emissions from fires.*

Department for Environment, Food and Rural Affairs (Defra). (2011). *Establishing data on background levels of contamination - SP1008.* Retrieved from DEFRA.

Department for Environment, Food and Rural Affairs (Defra). (2012a). *Development of Category 4 Screening Levels for assessment of land affected by contamination - SP1010.*

Department for Environment, Food and Rural Affairs (Defra). (2012b). *Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance.*

E. L. Kendall, M. C. (2019). *Grenfell Tower fire: modelling smoke plume dispersion and air quality impact using NAME.* The Met Office.

Environment Agency. (2004). *CLR11, Model Procedures for the Management of Land Contamination.*

Environment Agency. (2007). *Science project: SC000027. UK Soil & Herbage Pollutant Survey (reports 1-10).* Retrieved from .GOV.

Environment Agency. (2010). *Guiding Principles for Land Contamination, Volume 3.*

Environment Agency. (2018). *Strategy for investigation into potential land contamination impacts from Grenfell Tower Fire.*

IOC/IEC. (2017). *General requirements for the competence of testing and calibration laboratories. ISO/IEC 17025:2017.* International Organisation for Standardisation. Retrieved from UKAS.

Nathanail, C., McCaffrey, C., Gillett, A., & Ogden, R. &. (2015). *The LQM/CIEH S4ULs for Human Health Risk Assessment.* Land Quality Press, Nottingham. Retrieved from LQM.

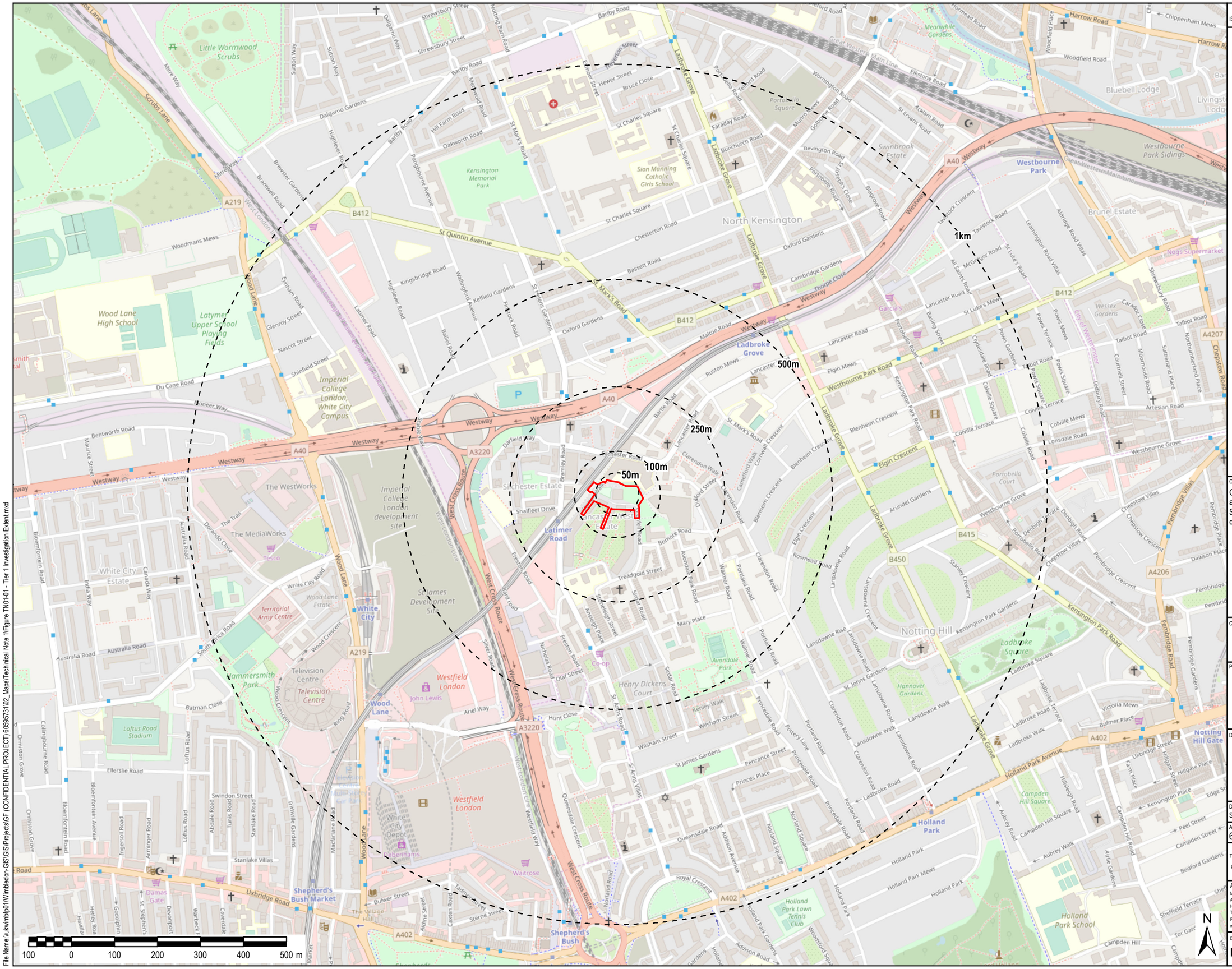
NHBC and Environment Agency. (2008). *Guidance for the safe development of housing on land affected by contamination.* NHBC, Environment Agency & CIEH.

Nuclear Industry Group for Land Quality. (2012). *Qualitative risk assessment for land contamination, including radioactive contamination.*

Rudland, D. L. (2001). *Contaminated land risk assessment. A good practice guide. CIRIA C552.* CIRIA.

# Figures

**Figure TN01-01. Stage 1 Investigation Extent**




THIS DRAWING IS TO BE USED ONLY FOR THE PURPOSE OF ISSUE THAT IT WAS ISSUED FOR AND IS SUBJECT TO AMENDMENT

**LEGEND**

- Tower Cordon
- Radial Distance from Tower



Client
ROYAL BOROUGH OF KENSINGTON & CHELSEA

Project Title
GRENFELL PART 2A ASSESSMENT

Drawing Title
STAGE 1 INVESTIGATION EXTENT

| Drawn | Checked | Approved | Date |
|---|---|---|---|
| SM | DD | DD | 19/06/2019 |

| AECOM Internal Project No. | Scale @ A3 |
|---|---|
| 60595731 | 1:8,000 |



AECOM
Midpoint
Alencon Link, Basingstoke
Hampshire, RG21 7PP
Telephone (01256) 310200
Fax (01256) 310201
www.aecom.com

Drawing Number
**FIGURE TN01-01**

Rev
**01**

File Name:\\ukwimfp01\Wimbledon-GIS\GIS\Projects\GF (CONFIDENTIAL PROJECT)\60595731\02_Maps\Technical Note 1\Figure TN01-01 - Tier 1 Investigation Extent.mxd