

# Grenfell Investigation into Potential Land Contamination Impacts

Technical Note 02: Proposed protocol for desk-based  
evidence reviews for the collation of background  
information to inform Stage 1 investigation

Royal Borough of Kensington and Chelsea

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### Quality information

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## 1. Introduction

The Tier 1 specification and associated programme requires a rapid assessment of available published information on a number of topics to inform the design of the main (Tier 2) investigation into potential land contamination impacts resulting from the Grenfell Tower fire in 2017. These topics are:

- Fire chemistry – what chemicals are likely to have been emitted during the fire that have the potential to adversely affect human health?
- Chemical and debris dispersion and deposition – what was the likely dispersion, deposition, and spread of the chemicals and debris emitted during the fire?
- What is the likely environmental fate of the chemicals and debris emitted?
- What is the toxicity of the chemicals and debris emitted?
- What are the baseline / background concentrations of these chemicals in urban London soils?
- What are the potential sources of these chemicals in urban London soils?

These topics will be assessed through a combination of an Evidence Review (ER) approach and alternative approaches as shown below.

**Table TN02-01. Division of scope between QSR approach and other sources**

Topic	ER Approach Scope	Alternative Approach Scope
Fire chemistry	Identification of Chemicals of Potential Concern (COPC) emitted during the fire	N/A
Chemical and debris dispersion and deposition	N/A	Atmospheric dispersion and deposition of finer particles. This task is largely contingent on the scope and content of the Met Office air modelling report (E. L. Kendall, 2019). The principal objective of this task is to use the air modelling data to help define the investigation area. Dependent on the Met Office report it might be possible to undertake further modelling to better define potential areal deposition rates. The review is to be undertaken by AECOM's air modelling team.  The fate of large pieces of debris that fell from the building – the nature and location of the clean-up operation immediately after the fire. This evidence will be obtained via discussions with GSMT, RBKC and community representatives and is intended to be reported visually using annotated GIS output where possible.
Environmental fate of the chemicals and debris emitted	COPC environmental fate and transport	N/A
Toxicity of the chemicals and debris emitted	COPC toxicity	N/A
Baseline / background concentrations of these chemicals in urban London soils	Urban background concentrations of COPC	Local baseline data on soil concentrations of COPC. Ground investigation reports submitted to RBKC under the Planning Regime will be reviewed for location and

Topic	ER Approach Scope	Alternative Approach Scope
		relevance of soil sample analysis reported. It is anticipated that we will focus on reports for the KAA redevelopment and other reports within 500m radius of the tower, but this will be dependent on the number and quality of the reports.
Potential sources of these chemicals in urban London soils	Potential sources of COPC in urban soil	Spatial mapping of historic and current land-uses. This task will be completed using commercial environmental searches, historical aerial photographs, and information from RBKC's GIS, with information gathered for the subject areas as specified in the preliminary risk assessment reporting checklist from the Environment Agency (EA) (2010) Guiding Principles for Land Contamination

## 2. Evidence Review Approach

Guidance on evidence reviews (ER) was published by Defra in 2015 in the form of two reports (Collins, 2015) and (DEFRA, 2015). These describe four types of ER, spanning from literature reviews (LR), quick scoping reviews (QSR), and rapid evidence assessments (REA), to systematic reviews (SR). It is proposed that the QSR approach is used for this work for the following reasons:

- The intent of the work is to provide a general understanding of the evidence base; identifying the evidence available and summarising it.
- A critical appraisal of the robustness of individual published studies is not required.
- Evidence bias is sufficiently mitigated by the review approach – focusing on common consensus in studies from independent sources.
- It involves the search and review of a selection of sources, which is compatible with the programme for this work. It does not require an extensive review of all possible sources of evidence.

## 3. ER Protocols

ER protocols are provided for each of the separate reviews below.

**Table TN02-02. Fire Chemistry**

### Protocol Element

Authors:	AECOM
Background rationale:	Requirement to understand the range of chemicals that may have been emitted during the fire and what the potential long-term soil contamination and associated human health risk might be.
Objective:	Identify the chemicals of potential concern (COPC) that were likely to have been emitted during the fire, from a public health perspective.
Scope:	Focus on studies on building fires and building materials, and on identifying chemicals likely to remain in debris or in particulate or residue form. No geographic restriction. Date restricted to papers published after the (Wakefield, 2010) review. Limited to English language only.

### Protocol Element

Method: Search keywords	Generic search: Combustion, fire, emission, products, hazard, effluent, smoke, pyrolysis. Specific search: World Trade Center collapse.
Method: Search strategy	Regulatory agencies and international organisations, such as HPA/PHE, Environment Agency, EU JRC, WHO, ATSDR, US EPA, Health Canada, and UNEP Google Scholar search using Boolean search terms constructed from the keywords above. PubMed search as per Google Scholar search. ResearchGate search as per above. Cross reference to published documents referenced in existing HPA/PHE and to Prof Stec papers.
Method: Inclusion and exclusion criteria	Exclude studies on wildfires. Include polyvinyl chloride, insulation materials, flame retardants, cladding.
Method: Information extraction	Initial extraction from abstract only. Selection of full papers to be based on the results of the first phase screening. Information to be recorded as per the evidence template below.
Information synthesis	To include: Descriptive characteristics of evidence identified. A narrative synthesis of the evidence.
Timeline	2 weeks for ER – due end of April 2019.
Deliverable	Concise circa 5 to 10-page technical note to either be a chapter in the Tier 1 Preliminary Risk Assessment (PRA) report or an appendix to that report, with supporting tabular evidence tables as per Evidence Record Templates attached in Appendix TN02-A.

### Table TN02-03. COPC Environmental Fate and Transport

#### Protocol Element

Authors:	AECOM
Background rationale:	Requirement to understand the nature of and differences between fire effluent chemicals in the environment and the relevance to public health.
Objective:	Identify the environmental fate and transport of the COPC identified by the fire chemistry evidence review.
Scope:	Focus on environmental persistence, mobility, and degradation. Qualitative information only. No geographic or date restriction. Limited to English language only.
Method: Search keywords	Environmental fate, persistence, mobility, (bio)degrada(tion)(bility), hazard summary, exposure, [names of COPC]
Method: Search strategy <sup>1</sup>	Published reviews or opinions: Defra, Environment Agency, HPA/PHE, EFSA, LQM/CIEH Searchable chemical databases: US NLM NIH TOXNET HSDB, WHO IPCS INCHEM, PubChem, OECD eChemPortal, ECHA. Inclusion of relevant sources identified in the fire chemistry evidence review.
Method: Inclusion and exclusion criteria	TBC based on fire chemistry evidence review.
Method: Information extraction	Initial extraction from abstract only. Selection of full papers to be based on the results of the first phase screening. Information to be recorded as per the evidence template below.
Information synthesis	To include: Descriptive characteristics of evidence identified.

<sup>1</sup> Note that the evidence review is not designed to fulfil the complete requirements of the guidance in SR2 and C4SL documentation for the derivation of Health Criteria Values and Low Levels of Toxicological Concern

### Protocol Element

	A narrative synthesis of the evidence.
Timeline	2 weeks for ER – due end of May 2019.
Deliverable	Concise circa 5 to 10-page technical note to either be a chapter in the Tier 1 PRA report or an appendix to that report, with supporting tabular evidence tables as per Evidence Record Templates attached in Appendix TN02-A.

### Table TN02-04. COPC Toxicity

#### Protocol Element

Authors:	AECOM
Background rationale:	Requirement to understand the potential toxicity of fire effluent chemicals that are likely to remain in the environment in the medium to long term following a fire.
Objective:	Identify the potential adverse toxicological effects from human exposure to the COPC identified by the fire chemistry evidence review. Identify studies on bioaccessibility or bioavailability of COPC in soil.
Scope:	Focus on qualitative descriptors of toxicity – acute/sub-chronic/chronic, mode of action, and target organ. Qualitative information only. No geographic or date restriction. Limited to English language only.
Method: Search keywords	Toxicity, [names of COPC], soil, bioavailability, bioaccessibility, dermal absorption.
Method: Search strategy <sup>2</sup>	Published reviews or opinions: Defra, Environment Agency, HPA/PHE, EFSA, LQM/CIEH Searchable chemical databases: US NLM NIH TOXNET HSDB, WHO IPCS INCHEM, PubChem, OECD eChemPortal, ECHA. Inclusion of relevant sources identified in the fire chemistry evidence review.
Method: Inclusion and exclusion criteria	Exclude chemicals that do not persist in the environment beyond the time of the fire itself (identified in TN3, the COPC environmental F&T ER).
Method: Information extraction	Initial extraction from abstract only. Selection of full papers to be based on the results of the first phase screening. Information to be recorded as per the evidence template below.
Information synthesis	To include: Descriptive characteristics of evidence identified. A narrative synthesis of the evidence.
Timeline	2 weeks for ER – due end of May 2019.
Deliverable	Concise circa 5 to 10-page technical note to either be a chapter in the Tier 1 PRA report or an appendix to that report, with supporting tabular evidence tables as per Evidence Record Templates attached in Appendix TN02-A.

### Table TN02-05. Urban background concentrations of COPC

#### Protocol Element

Authors:	AECOM
Background rationale:	Requirement to understand the range in reported concentrations of fire effluent chemicals in urban soils
Objective:	Identify the range of reported urban background soil concentrations for the COPC identified by the fire chemistry ER (TN4).

<sup>2</sup> Note that the evidence review is not designed to fulfil the complete requirements of the guidance in SR2 and C4SL documentation for the derivation of Health Criteria Values and Low Levels of Toxicological Concern

### Protocol Element

Scope:	Focus on large geographical studies for urban areas (i.e. not individual sites). Focus on London. Limited to UK. Limited to English language only Limited to studies from year 2000 onwards
Method: Search keywords	Urban, soil, pollutant, contaminant, concentration, background
Method: Search strategy	Published UK surveys or open source data from UK government organisations or institutions: BGS, Defra, Environment Agency Google Scholar search using Boolean search terms constructed from the keywords above PubMed search as per Google Scholar search ResearchGate search as per above
Method: Inclusion and exclusion criteria	Exclude data before 2000 Exclude data outside UK
Method: Information extraction	Initial extraction from abstract only. Selection of full papers to be based on the results of the first phase screening. Information to be recorded as per the evidence template below
Information synthesis	To include: Descriptive characteristics of evidence identified A narrative synthesis of the evidence Available digital data to be transferred to GIS if available in correct format
Timeline	2 weeks for ER – due end of April 2019
Deliverable	Concise circa 5 to 10-page technical note to either be a chapter in the Tier 1 PRA report or an appendix to that report, with supporting tabular evidence tables as per Evidence Record Templates attached in Appendix TN02-A.

### Table TN02-06. Sources of urban soil pollution

#### Protocol Element

Authors:	AECOM
Background rationale:	Requirement to understand the potential contributing sources to reported concentrations of fire effluent chemicals in urban soils.
Objective:	Identify the potential contributing sources for urban soil pollution for the COPC identified by the fire chemistry ER (TN4).
Scope:	Focus on identification of common sources of urban soil pollution, including air pollution. Limited to English language only. Limited to studies from year 2000 onwards.
Method: Search keywords	Urban, soil, pollutant, contaminant, concentration, background, air.
Method: Search strategy	Published reports from UK government organisations and other institutions: Defra, Environment Agency, HPA/PHE, UNEP. Google Scholar search using Boolean search terms constructed from the keywords above. PubMed search as per Google Scholar search. ResearchGate search as per above.
Method: Inclusion and exclusion criteria	Exclude data before 2000.
Method: Information	Initial extraction from abstract only. Selection of full papers to be based on the results of

## Protocol Element

extraction	the first phase screening. Information to be recorded as per the evidence template below
Information synthesis	To include: Descriptive characteristics of evidence identified A narrative synthesis of the evidence
Timeline	2 weeks for ER – due end of May 2019
Deliverable	Concise circa 5 to 10-page technical note to either be a chapter in the Tier 1 PRA report or an appendix to that report, with supporting tabular evidence tables as per Evidence Record Templates attached in Appendix TN02-A.

## 4. Reference List

- Collins, A. C. D. M. J. K. S., 2015. *The Production of Quick Scoping Reviews and Rapid Evidence Assessments: A How to Guide*. s.l.:s.n.
- DEFRA, 2015. *Emerging Tools and Techniques to Deliver Timely and Cost Effective Evidence Reviews. Final report WT1552*. s.l.:s.n.
- E. L. Kendall, M. C. H. a. C. S. W., 2019. *Grenfell Tower fire: modelling smoke plume modelling smoke plume impact using NAME*. s.l.:Forecasting Research Technical Report No. 633.
- Wakefield, J. C., 2010. *A toxicological review of the products of combustion*, Didcot: Health Protection Agency.

## Appendix TN02-A Evidence Record Template

**Table A. Evidence Record Template – Search Summaries**

Search number	Keyword(s) / word string	Date of Search	Search tool/origin or other tracing information	Hyperlink to origin (URL)	Number of search hits	Number of hits screened	Number of hits taken forward to review (Table B)

**Table B. Evidence Record Template – Summary of Evidence Identified**

Evidence Number	Evidence Reference	Evidence hyperlink (if available)	Evidence Type	Corresponding search number	Brief summary of evidence available from source

**Table C. Evidence Record Template – Evidence Extraction**

Evidence Number (from Table B)	Detailed summary of evidence

**Evidence** Detailed summary of evidence  
**Number**  
**(from**  
**Table B)**

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