

Grenfell Environmental Checks: Stage 2 Results Summary

Summary

- Testing of the soil as well as fruit and vegetables grown around Grenfell tower has found no evidence of harmful contamination due to the fire
- In Treadgold House and Avondale Park Gardens, some soil samples showed higher lead levels than the rest but there was too much variability in the small number of samples taken to be certain of our findings.
- The high results found in these locations could be due to the past industrial use of the land. Further sampling in these two areas will be carried out as well as checks to determine how the land is used so we can assess the level of any risk posed by the lead levels.
- Apart from the higher lead levels in those two areas, the levels of all potential harmful chemicals in the soil were within the range of typical urban areas.

Introduction

Additional environmental checks around Grenfell Tower were announced in October 2018. The investigation has been carried out under a two-stage process which has followed the statutory guidance under Part 2A of the Environmental Protection Act 1990.

Stage 1 was carried out over the spring and summer of 2019. Stage 2 was undertaken during the period of May 2020 to March 2021, with the sampling of soil and crops taking place from October to November 2020. A total of 440 samples were collected for laboratory analysis along with 31 duplicate samples.

We have now published the full Stage 2 report and Non-Technical Summary produced by AECOM [<https://aecom.com/>], the independent environmental specialist company, on behalf of the Multi-Agency Partnership, which is responsible for overseeing the programme.

The full Stage 2 report and appendices containing all the data can be found here: <https://www.gov.uk/guidance/grenfell-environmental-checks-stage-2-report>

The levels of chemicals found across the area of investigation are typical of those generally found in London. The findings show that there is not an elevated risk to anyone's health from potential land contamination because of the Grenfell Tower fire.

The chemicals found are not at high enough concentrations to be considered likely to cause "an unacceptable risk" referred to under the statutory guidance. At forty-three of the forty-five sites tested under both stages, the results indicated "low or no risk" to health. The Grenfell Tower fire regarding soil contamination did not therefore increase the health risk beyond what already existed. The results

of two sites, Treadgold House and Avondale Park Gardens, were more uncertain but this may be due to historic activities of the land rather than the Grenfell Tower fire.

At Treadgold House, some soil concentrations of the lead exceeded the threshold of being designated “low risk”. Close examination of the data indicated that, in the small numbers of samples taken at ground level, levels of lead in the west and south were more elevated than in other parts of the site. In addition, uncertainty about the extent that residents use the site mean that further soil sampling and risk assessment will be undertaken to provide greater certainty about the level of contamination and health risk and to decide whether any clean-up or restrictions on land use are needed.

Similarly, at Avondale Park Gardens, the results at different locations varied significantly but there is uncertainty as very few samples were taken which means that the decision cannot be made on whether the risk is low or whether there is an unacceptable risk, so further soil sampling is recommended to provide greater clarity.

As in Stage 1, the Stage 2 soil sampling programme found that most chemicals were below conservative generic screening criteria (GSC) which means that long-term exposure to these chemicals would represent at most a low risk to health, but in most cases it would represent a minimal or negligible risk. Chemicals at levels below the GSC are “ruled out” of requiring further assessment. Where chemicals have exceeded GSC, they are still within the range of concentration levels generally found in urban areas across England. Those chemicals above GSC normally require further assessment to accurately determine the level of risk.

Following a detailed assessment, lead exceeded the GSC at Treadgold House and Avondale Park Gardens. The existing health advice from Public Health England remains in place. The advice is to follow general good practice for urban soils, for example, washing your hands after gardening, working or playing in soil and washing and peeling home grown fruit and vegetables.

Based on the soil sampling results there is at most a low risk to health identified from soil contamination, but in many cases the risk is minimal or negligible. Further assessment of Treadgold House and Avondale Park Gardens is required. If you have any health concerns, please visit your GP. Enhanced health checks are in place for anyone living in North Kensington. More information on the health offer from the NHS is available here:

https://www.grenfell.nhs.uk/application/files/3716/2446/5412/Enhanced_Health_Checks_North_Ken_June21.pdf

Purpose of Investigation

The purpose of the environmental checks was to identify any significant contamination as a result of the Grenfell Tower fire and assess any health and environmental risks that may have arisen.

The checks involved an investigation into land contamination which followed a statutory process under Part 2A of the Environmental Protection Act 1990.

Air quality monitoring has been in place since June 2017 and has not identified any cause for concern. The air around Grenfell Tower is monitored continuously and the data is reviewed and analysed at least once per day. Like many parts of London, air quality around Grenfell can be affected by pollution, such as that due to heavy traffic and gas-fired boilers. You can find out more here:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/998243/environmental_monitoring_the_grenfell_tower_fire_210701.pdf

The environmental soil checks involve a two-stage process. In Stage 1, the independent environmental specialist, AECOM, gathered background information, undertook exploratory sampling and a pilot study to inform a preliminary risk assessment. The full results from Stage 1 were published in October 2019 and can be found here: <https://www.gov.uk/guidance/grenfell-environmental-checks-stage-1-report>

Stage 1 also informed the design for Stage 2 which included further soil sampling and a detailed health risk assessment to provide final conclusions and recommendations.

Key Results

The results of the exploratory soil sampling undertaken during Stage 1 informed the plan of which contaminants to test for under Stage 2.

Stage 1 found that most chemicals tested for were at concentrations below screening levels. Some chemicals potentially associated with fires, such as brominated flame retardants, were either not found at all or only in very few of the samples at concentrations many times lower than the screening levels.

The Stage 2 sampling plan included the chemicals associated with fires that were detected at Stage 1 in order to address any links between the Grenfell Tower fire and any contamination found in the soil. To support this process an independent literature review of fire-related chemicals was commissioned from Edinburgh and Strathclyde universities <https://www.gov.uk/government/publications/grenfell-environmental-checks-review-of-combustion-related-fire-products>

Stage 2 also focused on lead and polycyclic aromatic hydrocarbons (PAHs) which were found in the Stage 1 exploratory samples above screening levels. These contaminants are commonly found in urban areas and in most cases the levels found in both Stage 1 and Stage 2 were within the normal background range for London.

Contamination caused by the fire

The Stage 2 sampling did not identify concentrations of chemicals that can be linked to the fire. This does not mean that chemicals from the fire have not entered the soil, but any that did, were at levels indistinguishable from existing contamination or below the levels that can be measured by using standard soil testing methods.

Human Health Risk

The human health risk assessments for all the sampling sites except two concluded that the chemicals of concern found were at concentrations where long-term exposure would represent at most a low risk to health, but in most cases would represent a minimal or negligible risk to health.

For two of the sites tested, Treadgold House and Avondale Park Gardens, the results indicate that the risk might be greater than a low risk. Higher soil concentrations of lead were only found in the south and west of the site at Treadgold House and due to the limited number of samples taken at both sites we are currently uncertain of whether the levels are representative of these areas. There was also some uncertainty about the way the land is used, which is one of the factors used to assess the level of health risk.

Given this uncertainty, there was not enough information from the results available to decide whether there is an unacceptable risk to health. This is why the Stage 2 investigation has recommended further soil sampling and risk assessment is undertaken around Treadgold House and Avondale Park Gardens to resolve the health risk uncertainty.

Stage 1 and 2 Activities

a) Information gathering

1. For both stages this process consisted of gathering information on contaminants likely to have been released from the fire and contaminants likely to be present in urban soil. AECOM looked at published studies on the range of chemical concentrations found in urban soils in the UK to understand pre-fire background levels, as well as information from public authorities and other organisations into emissions from the Grenfell Tower fire to understand what could have been released from the fire and deposited in the soil. In addition, AECOM looked at sensitivity analysis by the Met Office [published here <https://www.metoffice.gov.uk/research/library-and-archive/publications/science/weather-science-technical-reports>] into the smoke plume that was produced by the fire and where particles were most likely to have been deposited on the ground.

AECOM also considered the independent literature review of fire-related chemicals which was commissioned for this investigation and provided by Edinburgh and Strathclyde universities. Antimony, which was identified by the review as a chemical associated with fire emissions was included in the suite of chemicals to test for under Stage 2.

All this information helped to determine what to test for, and where to test. AECOM also considered background information, such as local historical land use and previous ground investigations into contamination (mainly planning applications),

to identify likely pre-fire conditions, as well as the clean-up operation following the fire to inform their understanding of the site and possible sources of contamination.

The Stage 2 Investigation was carried out by AECOM between the period of May 2020 and April 2021, with the sampling activities taking place between September and November 2020. As with Stage 1, the work was carried out under Part 2A of the Environmental Protection Act 1990. The supporting Part 2A Statutory Guidance sets out the framework on how the investigation should be undertaken and how the results from that investigation should be interpreted.

b) Sampling

2. The Stage 2 sampling plan was informed by the chemicals of concern found under Stage 1. It was also informed by the local community who were able to highlight particular sites of concern. The choice of sampling sites was finalised following a site walkover, which was completed between the 18th August and 7th September 2020. Thirty-nine sites were sampled which included schools and nurseries, community kitchen gardens, allotments and public open spaces. A full list of both the Stage 1 and Stage 2 sampling sites (45 in total) is provided in Appendix A of AECOM's Non-Technical Summary here [insert link]. An interactive map showing where all the samples were taken is available here: <https://communities.maps.arcgis.com/apps/webappviewer/index.html?id=7d57af657cb44ba493258b79ed936b69>

440 samples were taken along with 31 duplicate samples. Whilst the majority of samples under Stage 1 were taken from a depth of 5cm, the Stage 2 samples were taken at different depths depending on the type of ground surface i.e. turf and undisturbed ground, disturbed ground and fruit and vegetable growing areas. Deeper soil samples were taken in five sites to test whether differences in chemical concentrations could be found between shallow samples and those collected at depth.

52 soil samples were tested for lead bioaccessibility and 12 samples were tested for PAH bioaccessibility. Bioaccessibility testing involves measuring the amount of chemicals in the soil that are capable of being released from the soil when it is ingested by the human body and assessing the resultant health risk for this fraction of the chemical only.-

Crop sampling

In order to address the community's concerns about any health risks associated with home-grown fruit and vegetables, 59 fruit and vegetable samples were collected from 12 of the 39 different sites identified under Stage 2, with corresponding soil samples collected in the root zone at a depth of 0m-0.2m. The sampling and analysis of crops was carried out before the main soil sampling programme to coincide with the growing season to ensure a viable quantity of crops was available for sampling. The process involved collecting a variety of different fruit and vegetables across the sampling sites.

35 crop samples were tested at accredited laboratories for potential contaminants which had been identified from the results of the exploratory sampling undertaken under Stage 1. These potential contaminants included lead and polycyclic aromatic hydrocarbons. The crop samples were sent to the testing laboratory of Fera Science Limited on the advice of the Food Standards Agency. This has meant that the crop samples have been tested to the same standards used for the regulatory testing of food products. Additional soil samples from the crop root zones were also tested by Fera to maintain testing consistency for this part of the assessment.

Preliminary, Generic and Detailed Quantitative Human Health Risk Assessments

a) Preliminary risk assessment

A preliminary risk assessment was carried out by AECOM mostly conducted under Stage 1, which is described here, but with some additional refinement undertaken at Stage 2. This involved an evaluation of the links between the levels of contaminants found in the soil (known as the 'source'), the people or environment that could be affected (known as the 'receptor') and how people or the environment might come into contact with the contaminants (known as the 'pathway'), for example, breathing in soil dusts and vapours or touching the soil. The level of contaminants found in the soil were compared against generic screening levels and also against local, regional and national background soil levels, where this information was available.

For a risk of harm to exist all three elements need to be present (the contaminant, the pathway, and the receptor) and a linkage between them. Where these linkages may be present, they are called 'potential contaminant linkages' (PCLs). The purpose of the preliminary risk assessment is to identify these potential contaminant linkages.

3. Linkages for each contaminant were prioritised for further investigation on a ranking basis of highest, high, medium, low and lowest. This helped to identify the contaminants to be assessed further through a generic and detailed risk assessment carried out under Stage 2. You can read more about the Preliminary Risk Assessment in Technical Note 16 here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/837838/Technical_Note_16_PRA.pdf as part of the Stage 1 report.

b. Generic Quantitative Human Health Risk Assessment

The generic quantitative human health risk assessment is a process for assessing risks from land contamination. It involves comparing soil concentrations of chemicals of concern against very conservative assessment criteria, known as generic screening criteria (GSC), which are predictive levels of a chemical in soil considered to pose at most a low risk to health, but in many cases are representative of a minimal or negligible risk to human health based on generic assumptions of exposure and land-use. If soil levels are lower than the GSC then these are typically no longer considered a concern and are ruled out of further investigation. If no PCLs

are still a concern then the investigation is completed. If one or more PCLs remain a concern then the investigation proceeds to the next step.

c. Detailed Quantitative Human Health Risk Assessment

The detailed quantitative human health risk assessment involves additional investigation of contaminants at specific sites, where a concern has not been ruled out by using GSC. These further works aim to better understand potential exposure levels and refine the generic assumptions made by GSC. The outcome from this work should be a clearer understanding of whether the risk is low or potentially unacceptable, or somewhere in-between. Further work may be required to resolve any outstanding uncertainties – for example, further soil sampling to resolve higher than expected variation or unexplained hot-spots in the soil contamination.

You can read more about the risk assessments in the Stage 2 technical report here: <https://www.gov.uk/guidance/grenfell-environmental-checks-stage-2-report>

Detailed results

a) Results of information gathering

The design of the Stage 2 investigation was informed by the information gathered by AECOM under Stage 1 and further information which came to light after Stage 1. Under Stage 1, information from residents identified that debris from the Grenfell Tower fire was deposited within a few hundred metres around the Tower and to the north west to at least a 1km distance. This is consistent with the Met Office plume and deposition modelling of the direction of the fire plume and supported by information from the police, fire brigade, and the council on the locations from where debris was cleared. AECOM therefore set the area for sampling at Stage 1 within 1km of the Tower, as this is where debris is most likely to have potentially caused contamination of the soil.

Stage 1 informed the scope of Stage 2, including which fire-related chemicals to test for and specific land areas to investigate.

The key information from Stage 1 used, included:

- Debris from the Tower during and immediately after the fire was reported to have fallen up to 500m to the south and east.
- The fall out area extended in a north westerly direction to beyond 1km, with one observation from a member of the local community reporting that ash was in the air approximately 3.8km from the Tower in an allotment in Brent.
- The laboratory testing of the exploratory samples did not detect a pattern in the chemicals like fire-retardants or isocyanates that could have been related to the fire. However, the testing did identify lead, polycyclic aromatic hydrocarbons, asbestos, dioxins, furans and dioxin-like polychlorinated biphenyls that were found at background levels and are

known to be commonplace in urban soils. They could have originated from historic sources rather than the fire.

- Information gathered on background levels of contaminants from existing UK surveys and data; planning applications and current land uses.
- An evaluation of historical maps which indicated a range of land uses, such as iron works, garages, roads and railway lines and stations, that could have caused contamination, in addition to potential ground contamination caused by bomb damage during World War Two.
- A data gap assessment.
- Information provided by the community about sites of concern and information from site walkovers to identify suitable sampling locations.
- An independent academic review of chemicals associated with fires was commissioned from the universities of Edinburgh and Strathclyde to inform the soil testing design of Stage 2.

b) Results of Stage 2 soil sampling: impact from the fire

Information on all the chemicals that were found at levels above screening levels at the sampling locations for both stages is available

here: <https://www.gov.uk/guidance/grenfell-environmental-checks-stage-2-report#full-sampling-data>

You can find information on all the chemicals AECOM found at each of the sampling locations and the full sampling data here: <https://www.gov.uk/guidance/grenfell-environmental-checks-stage-2-report#full-sampling-data>

The results of the laboratory analysis of the soil samples did not reveal obvious patterns in the spread of concentration of the contaminants assessed to suggest that they might have originated from the Grenfell Tower fire, rather than being from historic (pre-fire) land uses.

Potential contaminants from the Grenfell Tower fire, such as flame retardants and isocyanates, were not detected or were only rarely detected in Stage 1 and Stage 2 samples.

Soil testing results for other chemicals (lead, polycyclic aromatic hydrocarbons, dioxins & furans) that can result from fires but that are also typically expected to be present at background levels in urban soils were compared to available background datasets published by the Environment Agency and British Geological Survey. They were also compared to data from pre-fire investigations and the comparison did not identify results that exceeded the average background concentrations to an extent that indicated impact from the fire.

The variations in concentrations of contaminants were considered to be attributable to different historic land-uses for different sampling sites, with no pattern in the spread of concentrations to suggest they originated from the Grenfell Tower fire.

The conclusion from the soil sampling is that contamination specifically associated with the fire has not been found. This does not mean there are not small increases in substances from the fire in the surrounding soil. It does mean that such increases, if present, are either below the detection limits of the standard soil testing methods or are not distinguishable from the background levels present before the fire.

c. Results of Human Health Risk Assessment

4. The results of the Preliminary Risk Assessment were described in Stage 1 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/837838/Technical_Note_16_PRA.pdf

Generic Quantitative Human Health Risk Assessment (GQRA) was carried out on all the samples from Stage 2. See link here: <https://www.gov.uk/guidance/grenfell-environmental-checks-stage-2-report#full-sampling-data>

for charts that look at some of the chemicals found, compared with the national guidelines, normal background concentrations and the background data range.

Although individual soil samples were found to contain levels of asbestos, PAHs, metals (arsenic, barium, beryllium, cadmium, lead), and non-dioxin-like PCBs above GSC, the results of the GQRA demonstrated that for most sites the levels of contaminant present posed at most a low risk, but in many cases the health risk was minimal or negligible. Soil contamination was generally consistent with typical urban soil pollution. However, for five sites, the soil levels for one or more chemicals exceeded the GSC and were taken forward to DQRA.

Detailed Quantitative Human Health Risk Assessment

Based on the detailed quantitative human health risk assessment (DQRA) for these sites, the likely level of health risk was concluded to be at most low for three out of five. The two remaining sites were Treadgold House and Avondale Park Gardens. For these two sites, the DQRA could not conclude that the risks were either low or unacceptably high because of large variations in the soil concentrations of lead found at the site, the low number of samples taken, and also gaps in understanding how the land is used by residents, which could appreciably affect the potential soil exposures. In the case of these two sites, further investigation has been recommended to collect additional data for the risk assessment.

Part 2A land categories

- The level of contamination found at each site sampled in Stage 2 has been assessed. In all but two cases, these sites have been allocated to one of four categories, which are defined in the Statutory Guidance to Part 2A of the Environmental Protection Act 1990.

- Category 4 is associated with a range of risk from none to low. Category 3 is associated with a range of risk from “not low” to “not unacceptable”. Categories 1 and 2 are associated with an unacceptable risk.
- Forty-three of the forty-five sampling sites were recommended to be placed in Category 4 indicating no or low risk to human health. Land in Category 4 is safe to use normally and does not require further investigation, assessment or action to reduce the soil concentrations detected.
- For the remaining two sites, at Treadgold House and Avondale Park Gardens, there is still enough uncertainty to be unable to allocate the sites to a final category after Stage 2
- However, the evidence is sufficiently clear to rule out placing either site in Category 1, and for Treadgold House, the communal garden to the south and west of the residential building is not considered Category 4.

Next Steps

Further investigation and assessment is required to reduce the uncertainty and allocate the two outstanding sites to one of the remaining categories: either Category 2 or 3 for Treadgold House, or Category 2, 3 or 4 for Avondale Park Gardens.

Safeguards

The environmental investigation was delivered by an independent specialist, AECOM. They are a global company with proven expertise in land contamination investigations including over 50 Part 2A investigations across the country.

Both the Stage 1 and 2 methodology and results have been independently reviewed by the National Quality Mark Scheme Suitably Qualified Person (SQP), Dr Paul Nathanail, who also observed and reviewed the specialists’ work at each stage. You can view the SQP declaration here: <https://www.gov.uk/guidance/grenfell-environmental-checks-stage-2-report#sqp-sign-off>

The testing process has been overseen by an independent group of scientific experts – the Science Advisory Group (SAG).