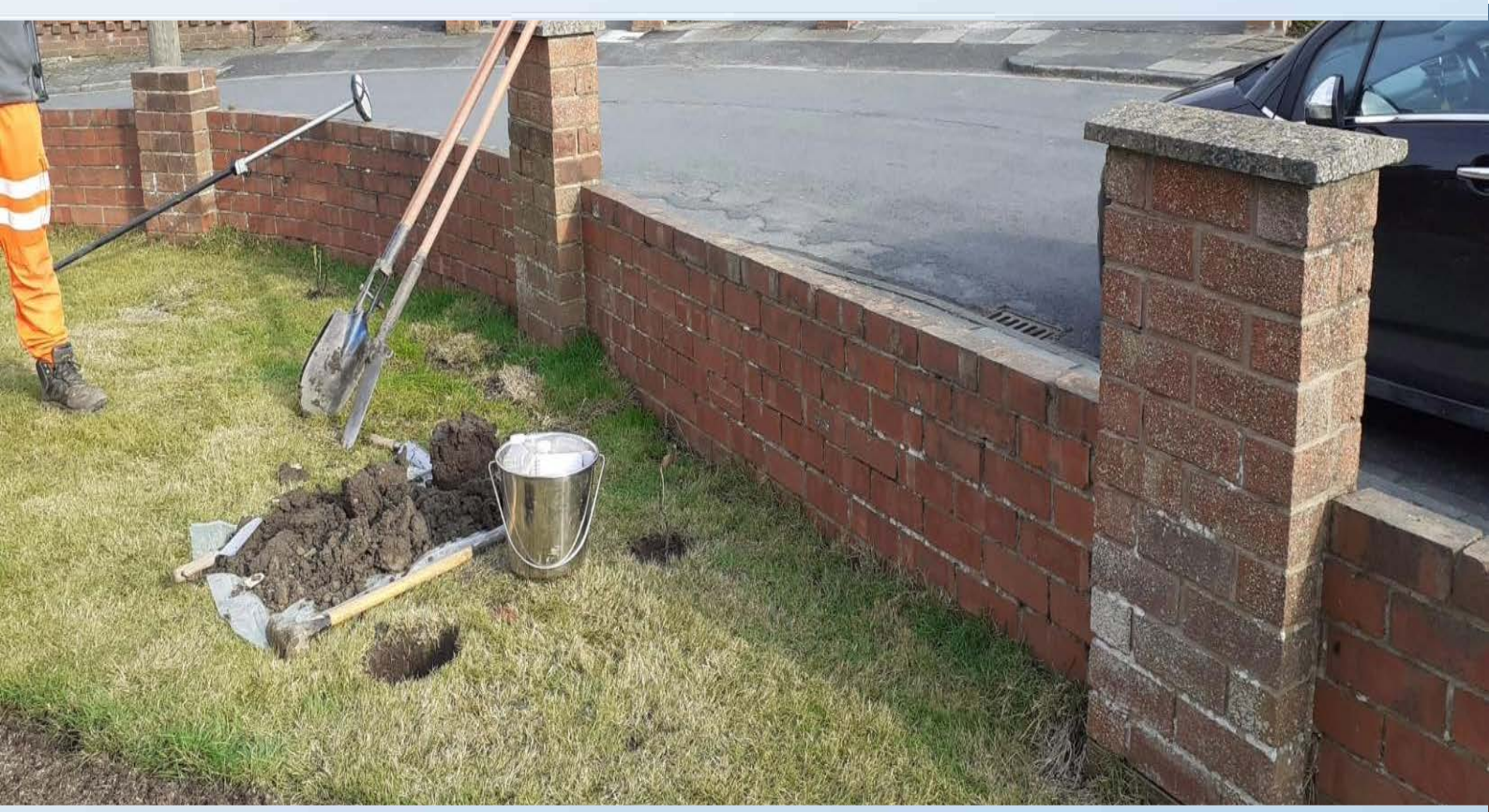
Environment Agency

LAND AT THORNTON-CLEVELEYS

Interpretative Report from Phase 2 Grid-Based Soils Investigation



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MARCH 2026

CONFIDENTIAL

Environment Agency

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Interpretative Report from Phase 2 Grid-Based Soils Investigation

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1 INTRODUCTION

1.1 TERMS OF REFERENCE

WSP UK Ltd (WSP) was instructed by the Environment Agency (EA, 'the Client') to develop an interpretative report based upon the Phase 2 Grid-based Soils Investigation of land at Thornton-Cleveleys, completed by WSP between February and March 2025.

The purpose of the Phase 2 grid-based soils investigation was to build upon the results of the Phase 1 sampling works (undertaken in 2024), to further the understanding of the impacts of legacy aerial emissions of PFOA associated with historical activities undertaken at the AGC Chemicals Europe (AGCCE) Limited Thornton-Cleveleys site (also known as the 'AGCCE facility'). As part of the instruction from the Client, WSP was tasked with discussing the findings of the Phase 2 grid-based soil investigation, and completing a generic human health risk assessment, to inform the requirements for further works, and where possible inform recommendations on the Part 2A status of the site. These works form the basis of this interpretative report.

1.2 PROJECT CONTEXT

The investigation findings and quantitative risk assessment presented herein form part of a Part 2A inspection focused on the AGCCE facility (including current and former site uses) and the surrounding land. The EA is leading the inspection on behalf of Wyre Council (the Local Authority).

The wider investigation is being undertaken through a two tracked, phased and iterative approach, defined as follows:

- Track 1 refers to the wider assessment of contaminant dispersion across the area; and
- Track 2 is a targeted, Part 2A compliant assessment of specific parcels of land where evidence indicates a potentially unacceptable risk.

As part of an earlier (Track 1) phase of works, a number of plausible contaminant linkages were identified attributed to legacy operations that warrant further investigation or quantification in accordance with EA, 2020. Land Contamination Risk Management (LCRM) and to be compliant with investigation requirements under Part 2A of the Environmental Protection Act, 1990.

In accordance with previous findings, including reference to an independent air dispersion modelling assessment undertaken by the EA Air Quality Modelling & Assessment Unit (AQMAU) in August 2023, the contaminant linkage identified as a priority for further consideration was the potential risk to human health from legacy deposition of PFOA in shallow soils, which formed the basis of the WSP Phase 2 Grid-based Soils Investigation, pertinent Figures from which are included as Appendix A.

Whilst this interpretative report considers contaminant linkages associated with health risks from potential soil contamination, the Part 2A inspection also includes other linkages of concern, including the risk to the water environment.

1.3 REMIT

The purpose of this interpretative report is to consider the findings of the Phase 2 grid-based soils investigation (included as Appendix B), undertake a generic quantitative human health risk assessment, and make a recommendation with regards to whether further sampling works are warranted.

It is recognised that the investigation into offsite impacts and their significance in the context of Part 2A, forms part of a phased / iterative process. The soil sampling strategy for the Phase 2 grid-based soils investigation was designed to obtain a robust dataset of PFOA concentrations in soil, and their distribution attributed to legacy air emissions from the facility, to facilitate the recommendation for further works, as deemed necessary, and where possible inform recommendations on the Part 2A status.

1.4 SCOPE OF WORK

The scope of works for this interpretative report comprises the following:

- Summary of Phase 2 grid-based soils investigation.
- Discussion of PFOA distribution in soils within 500 m of the AGCCE facility.
- Generic Quantitative Human Health Risk Assessment.
- Discussion of uncertainty.
- Conclusions and recommendations.

1.5 LEGISLATIVE CONTEXT AND GUIDANCE

This assessment was undertaken in general accordance with the following standards and guidance documents:

- EA, 2020. Land Contamination Risk Management (LCRM).
- Part 2A of the Environmental Protection Act, 1990.
- Defra, 2012. Contaminated Land Statutory Guidance.

1.6 LIMITATIONS

The report is addressed to and may be relied upon by the EA, as “the Client” within the meaning given to that phrase within the agreement and subject to the terms and conditions contained therein.

This report has been completed with regard to generally accepted consulting practices and may not be relied upon by any other party without the explicit written agreement of WSP. No other third-party warranty, expressed or implied, is made as to the professional advice included in this report. This report must be used in its entirety.

Unless WSP has actual knowledge to the contrary, WSP has assumed the correctness and completeness of third-party information supplied and shall have no liability in respect of any inaccuracy, defect or omission in any information or materials provided, anecdotally or otherwise, by the Client or any other third party to WSP. WSP does not assume any liability for misrepresentation of information or for items not visible, accessible, present or supplied at the time of the study.

WSP’s General Limitations are included in Appendix C.

2 PHASE 2 GRID-BASED SOILS INVESTIGATION

2.1 SUMMARY OF PHASE 2 GRID-BASED SOIL SAMPLING INVESTIGATION

A detailed account of the Phase 2 Grid Investigation, completed by WSP in 2025, is provided within the Factual Report, included as Appendix B. The works are summarised below.

2.1.1 WORKS UNDERTAKEN

For the Phase 2 Grid Investigation, a total of 63 No. sample points (130 No. hand pits) were distributed on a regular 100 m / 150 m grid spacing (sample prefix GR), or in areas of public open space (sample prefix POS) within a 500 m radius of the AGCCE facility. A plan showing the sampling points within the investigation area is presented as Figure 1 within Appendix A, and the sampling strategy is discussed in detail within the Factual Report (included as Appendix B).

To ensure the shallow profile was targeted whilst continuing to align with the exposure assumptions for different land uses, at each identified sampling point the collection of three shallow, hand dug soil samples were collected between ground level and 0.6 m bgl (below ground level). In total, 291 No. soil samples were scheduled for analysis for a specified suite of contaminants, including PFAS Broad Suite, soil organic matter (SOM), and pH. Whilst, for the purpose of the investigation, PFOA was identified as the principal contaminant of concern, a wider suite of PFAS analysis was undertaken which offered the lowest limits of detection.

In addition, the collection and analysis of quality assurance / quality control (QA/QC) samples was undertaken in the form of rinsate samples of field equipment. In total 28 No. rinsate samples were taken from selected sample locations (equating to ~10% of soil samples collected). Trace concentrations of PFHxDA were identified within rinsate sample GR01-SP227, which is not considered to be significant in the context of the dataset. Overall, the QA/QC processes were deemed effective.

2.1.2 RESULTS - PFOA

The investigation confirmed the presence of PFOA above the limit of detection in 287 out of 291 No. samples, representing a detection frequency of 99%. The detected concentrations ranged between 0.73 µg/kg and 144 µg/kg, with an average concentration of 4.13 µg/kg. Two notable concentrations of 41.7 µg/kg and 144 µg/kg were recorded within samples GR01-SP221 and GR01-SP232, respectively.

In accordance with previous findings, average PFOA concentrations appear to increase within depth across the dataset.

2.1.3 RESULTS – OTHER PFAS

As part of the wider PFAS Broad Suite, a collection of 52 No. PFAS compounds were analysed. Table 2-1 provides a summary of the concentrations of wider PFAS observed across the soil dataset, above the laboratory LOD. A wide range of PFAS compounds were detected in the samples, with PFOA being the dominant compound, making up 82% of the total. Other detected compounds included linear PFOS (4.7%), PFPA (4.4%) and 6:2 FTAB (3.3%). The average concentrations for PFOA were 4.13 µg/kg, while average concentrations across remaining PFAS compounds typically ranged between 0.7 µg/kg and 2.07 µg/kg.

Table 2-1 – Summary of Detected PFAS Compounds in Soils

Detected PFAS Compound	Limit of Detection (LOD) (µg/kg)	Reported Range in Detected Result (µg/kg)	No. of Samples >LOD (*Detection Frequency DF*)	Average (µg/kg)	Median (µg/kg)
Perfluroalkylated carboxylic acids (PFCAs) in order of increasing chain length					
PFBA	0.5	0.66 – 1.43	13 *(4%)*	0.92	0.89
PFPA	0.5	0.61 – 2.58	55 *(19%)*	1.19	0.99
PFHxA	0.5	0.65 – 3.60	5 *(2%)*	1.73	0.97
PFHpA	0.5	0.70	1 *(0.3%)*	0.70	0.70
PFOA	0.5	0.73 - 144	287 *(99%)*	4.13	2.71
PFNA	0.5	0.93	1 *(0.3%)*	0.93	0.93
PFDA	0.5	0.68 – 1.42	13 *(4%)*	1	0.94
PFUnA	0.5	0.66 – 1.82	9 *(3%)*	1	0.89
PFDoA	0.5	0.83 – 2.26	6 *(2%)*	1.27	1.08
PFTrDA	0.5	0.98 – 4.69	6 *(2%)*	1.90	1.37
PFTeA	0.5	0.62 – 3.52	2 *(0.6%)*	2.07	2.07
PFOSA	0.5	0.82 - 1.71	2 *(0.7%)*	1.27	1.27
PFHxDA	0.5	1.94	1 *(0.3%)*	1.94	1.94
PFODA	0.5	1.35	1 *(0.3%)*	1.35	1.35
N-EtFOSA	0.5	0.69 – 0.69	1 *(0.3%)*	0.69	0.69
Perfluroalkylated sulfonic acids (PFSAs) in order of increasing chain length					
Linear PFOS	0.6	0.76 – 12	40 *(14%)*	1.74	1.12
Branched PFOS	0.6	0.91 – 4.92	*7 (2%)*	1.70	0.98
Total PFOS	0.5 / 0.6	0.76 –16.9	41 *(14%)*	1.99	1.07
Fluorotelomers					
6:2 FTAB	10	15 – 34.3	2 *(0.7%)*	24.65	24.65

2.2 SUMMARY OF PHASE 1 AND PHASE 2 SOIL SAMPLING WORKS

2.2.1 PFOA DISTRIBUTION

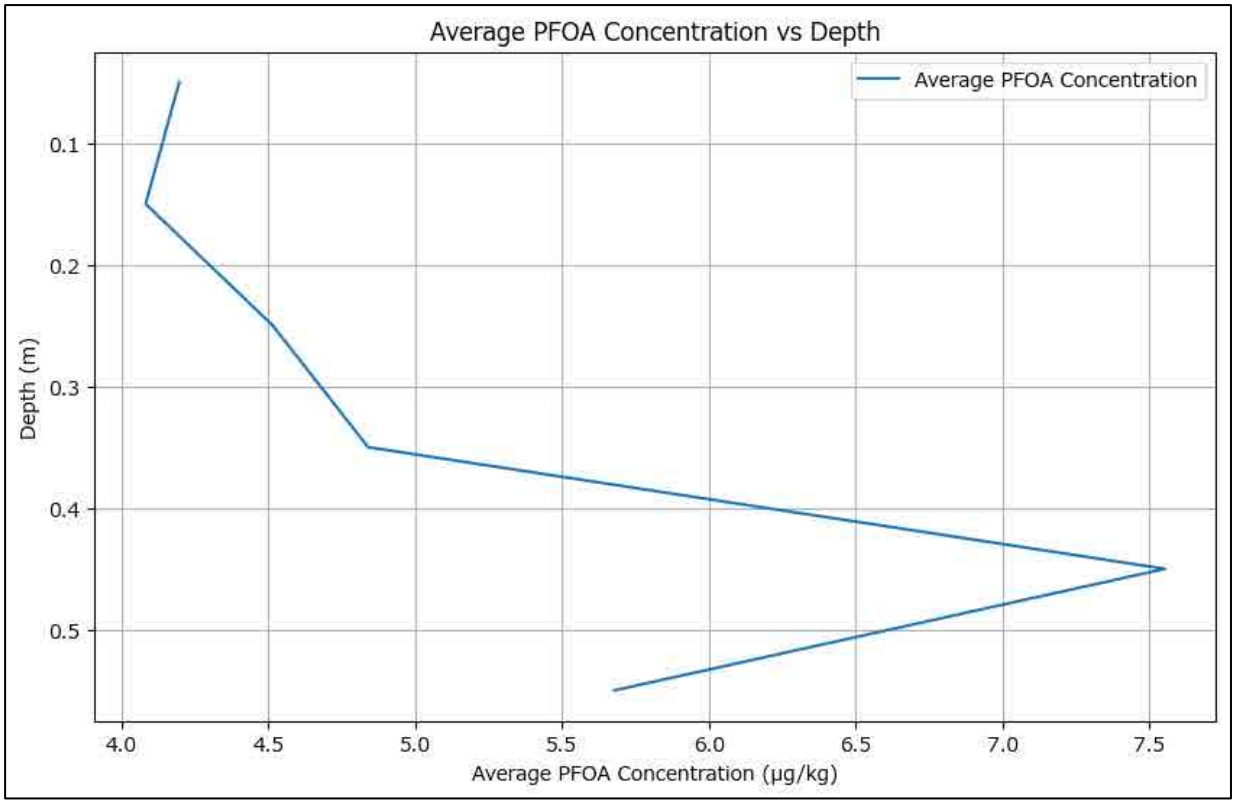
The combined soil dataset from the two phases of intrusive sampling works completed in 2024 and 2025 comprises a total of 489 No. samples. Figure 4A, contained within Appendix A, plots average PFOA concentrations for each sample location across the survey area. Figure 4B plots the same data, highlighting sampling locations closer to the AGCCE facility (within 1 km).

The PFOA data appears to align with the model predictions from the AQMAU (August 2023).

2.2.2 PFOA CONCENTRATION DEPTH PROFILE

A 2023 study on a fluoropolymers factory located in Dordrecht, The Netherlands confirmed the deposition of PFOA to soils within a 50 km radius of the factory (Gerardu, Thomas et al, 2023). PFOA had been historically emitted to the atmosphere from this site between 1970 and 2012, comparable to the known history of the AGCCE facility. The study identified that PFOA from atmospheric deposition gradually migrates vertically through the soil profile over time, towards groundwater. The PFOA concentration depth profile of the data showed a distinct bell-shaped pattern, with the highest concentrations between 0.2 and 0.5 m bgl, and lower concentrations both at the surface and at greater depths.

Insert 2-1, below, plots the PFOA soil depth profile (average concentrations) from the Phase 1 and Phase 2 sampling works.



Insert 2-1 – PFOA Soil Depth Profile

The PFOA concentration depth profile, as illustrated within Insert 2-1 and Table 2-2 (below) appears to correlate with the reported findings from The Netherlands.

Table 2-2 – PFOA Concentration Depth Profile – Phase 1 and 2 Sampling Works (µg/kg)

Depth Range (m BGL)	No. of Samples	Minimum	Average	Maximum
0.0 - 0.1	139	<0.5	4.2	27.4
0.1 - 0.2	64	<0.5	4.1	22.7
0.2 - 0.3	68	<0.5	4.5	19.7
0.3 - 0.4	72	0.86	4.8	18
0.4 - 0.5	79	<0.5	7.6	144
0.5 - 0.6	67	<0.5	5.7	35.1

3 HUMAN HEALTH QUANTITATIVE RISK ASSESSMENT

3.1 CONTEXT

The remit of the WSP Phase 2 Grid-based Soils Investigation was to obtain a robust dataset of PFOA concentrations in soil, and their distribution attributed to legacy air emissions from the AGCCE facility. The sampling strategy was not designed to specifically target high risk exposure scenarios (i.e. residential properties). Instead, sample collection was completed following an unbiased sampling strategy, in accordance with Environment Agency R&D Technical Report P5-066/TR. As a result, the dataset is considered to be suitable for statistical assessment.

The sampling density of the grid-based investigation works was not designed to enable a detailed Part 2A assessment to be made on potential risks to health at any / all of the individually sampled land parcels. Therefore, to facilitate the completion of a generic human health risk assessment, the full soils dataset has been screened against Generic Assessment Criteria (GAC) protective of residential and public open space land uses, to provide context to the soil concentrations observed.

Allotment sites within proximity to the AGCCE facility have been subject to separate, detailed soil investigation works and therefore require no further commentary within this report.

3.2 CONCEPTUAL SITE MODEL

The potentially significant source-pathway-receptor linkages (SPRLs) relating to human health risks attributed to the aerial deposition of PFOA, for consideration within this assessment, are detailed within Table 3-1.

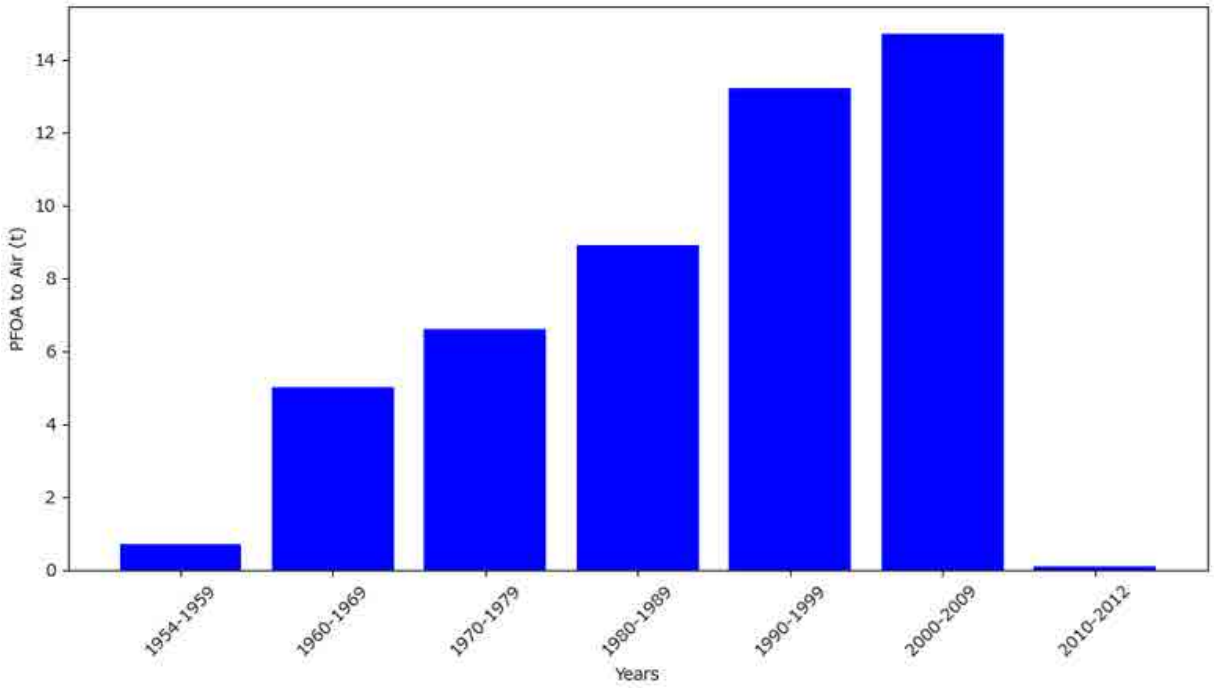
Historically, APFO (ammonium perfluorooctanate) was used at the AGCCE facility as a surfactant in the reaction process before it was phased out by 2012 and replaced with EEA-NH_4. APFO is the ammonium salt of PFOA and readily dissociates in water to give the ammonium and perfluorooctanoate ions and whilst APFO / PFOA have subtly different properties it would still be appropriate to assume APFO = 100% PFOA once it reaches the environment.

PFOA is a PFCA (perfluoroalkyl carboxylic acid) with the chemical formula of $C_8HF_{15}O_2$. The sensitive health effects identified in humans by authoritative bodies such as the European Food Standards Agency (EFSA) and the Agency for Toxic Substances and Disease Registry (ATSDR) include those in the liver, cardiovascular system, immune system and within the developing foetus. PFOA has been classified as a Group 1 carcinogen (carcinogenic to humans) by the International Agency for Research on Cancer (IARC).

3.2.1 THE SOURCE

The source comprises PFOA present in shallow soils in land surrounding the AGCCE facility.

The PTFE manufacturing process at the AGCCE facility has been operational since 1954, and as part of historic operations undertaken at the facility, mass balance calculations indicate approximately 49 tonnes of PFOA were released to air. A detailed account of current and historical manufacturing processes at the facility is provided within the WSP 2024 Desk Study, and detailed information regarding historical releases of PFOA from the AGCCE facility is summarised in Insert 3-1, and within Appendix E.



Insert 3-1 – Historical PFOA Emissions to Air (AGC-CE data) from the AGCCE facility

PFOA emissions to air increased steadily from 1954, to a peak output of 14.7 tonnes between 2000 and 2009. Furthermore, peak concentrations of PFOA in air of 0.823 ng/m^3 were detected at Lancaster University's Hazelrigg Meteorological Station (located approximately 25 km northeast of the AGCCE facility) during 2005 – 2006 (Dalmijn, Joost, 2025). The use of PFOA at the AGCCE facility ceased after Q1 in 2012.

Jacobs (2007) identified the presence of APFO within shallow soils across the AGCCE facility and concluded that this was likely due to deposition of atmospheric emissions from oven stacks.

A modelling and dispersion assessment undertaken by the EA AQMAU (August 2023) indicated that land adjacent to the facility may have been affected by the historical deposition of PFOA, via atmospheric dispersion. A more detailed commentary on atmospheric modelling at the facility to date is provided within the WSP 2024 Desk Study.

Known historical PFOA emissions to air from the AGCCE facility are the most likely source of the elevated concentrations of PFOA detected within shallow soils.

3.2.2 THE PATHWAYS

Direct exposure pathways (soil and dust ingestion, dermal contact with soil), inhalation of dust, consumption of homegrown produce, and attached soil.

3.2.3 POTENTIAL RECEPTORS

Human health - neighbouring land users (including residents with private gardens, school attendees and public open space users).

Allotment sites in proximity to the AGCCE facility are subject to separate, detailed site investigation works and are therefore outside the scope of this assessment.

Table 3-1 – Preliminary Conceptual Site Model (taken from 2024 WSP Desk Study)

SPRL	Potential Source	Pathway	Receptor	Probability	Consequence	Preliminary Risk Rating
SPRL 2	PFOA in shallow soil (legacy aerial emissions of PFOA associated with historical activities undertaken at the AGCCE facility).	Soil and dust ingestion. Dermal contact with soils. Inhalation of dust.	Human Health - Neighbouring land users (including residents with private gardens, school attendees and public open space users).	High likelihood	Medium	**High**
SPRL 3	PFOA in shallow soil (legacy aerial emissions of PFOA associated with historical activities undertaken at the AGCCE facility).	Consumption of homegrown produce, and soil attached to homegrown produce.	Human Health - Neighbouring land users (residents with private gardens and consumers of homegrown produce).	High likelihood	Medium	**High**

3.3 SOIL DATASET

Current best practice for the human health risk assessment of PFAS compounds is based upon combined exposure to the sum of PFOA, PFOS (perfluorooctanesulfonic acid), PFHxS (perfluorohexane sulfonate) and PFNA (perfluorononanoic acid). As a result, soil results (comprising a total of 291 No. samples) for these four PFAS are discussed in more detail below.

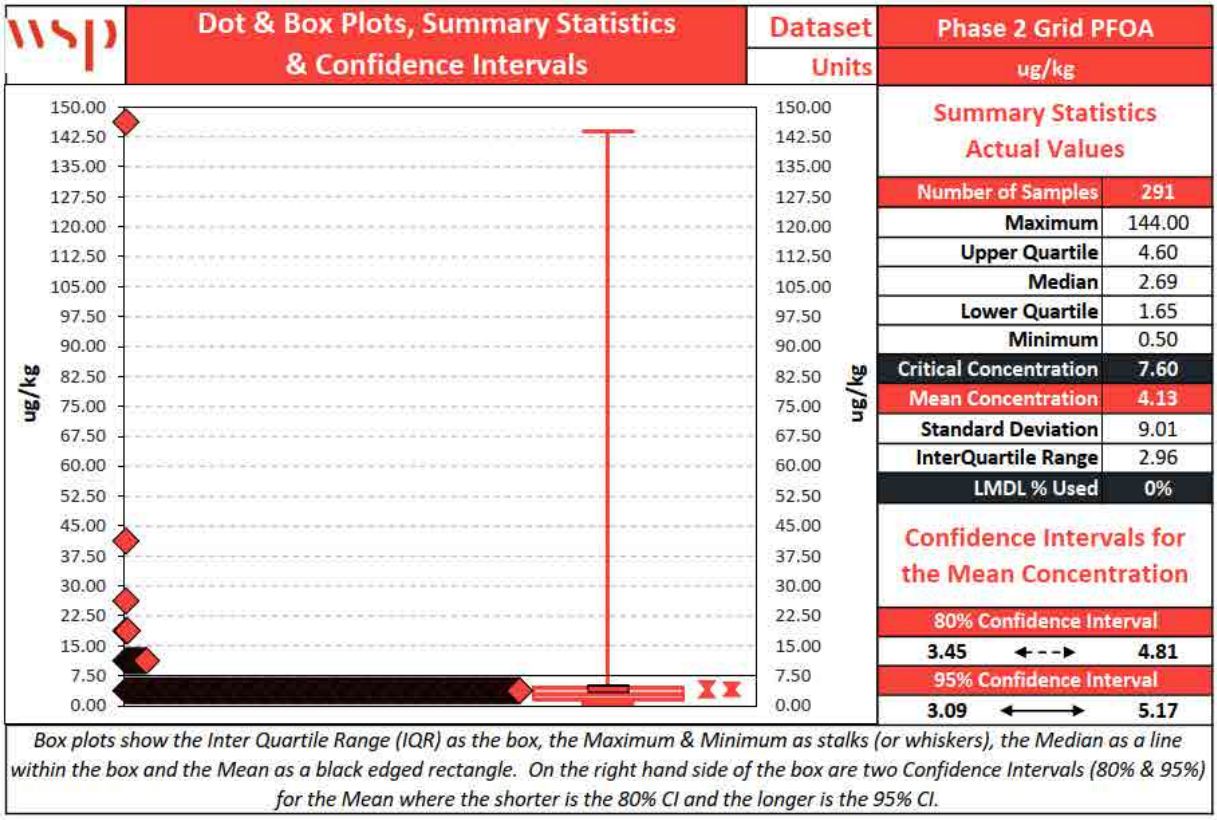
3.3.1 PFOA

Samples were collected at depths ranging from ground level to 0.6 m bgl, and the PFOA results are presented in Insert 3-2.

Soil PFOA concentrations were reported in excess of the method detection limit of 0.5 µg/kg in 287 of the 291 No. samples, at concentrations ranging from <0.5 to 144 µg/kg.

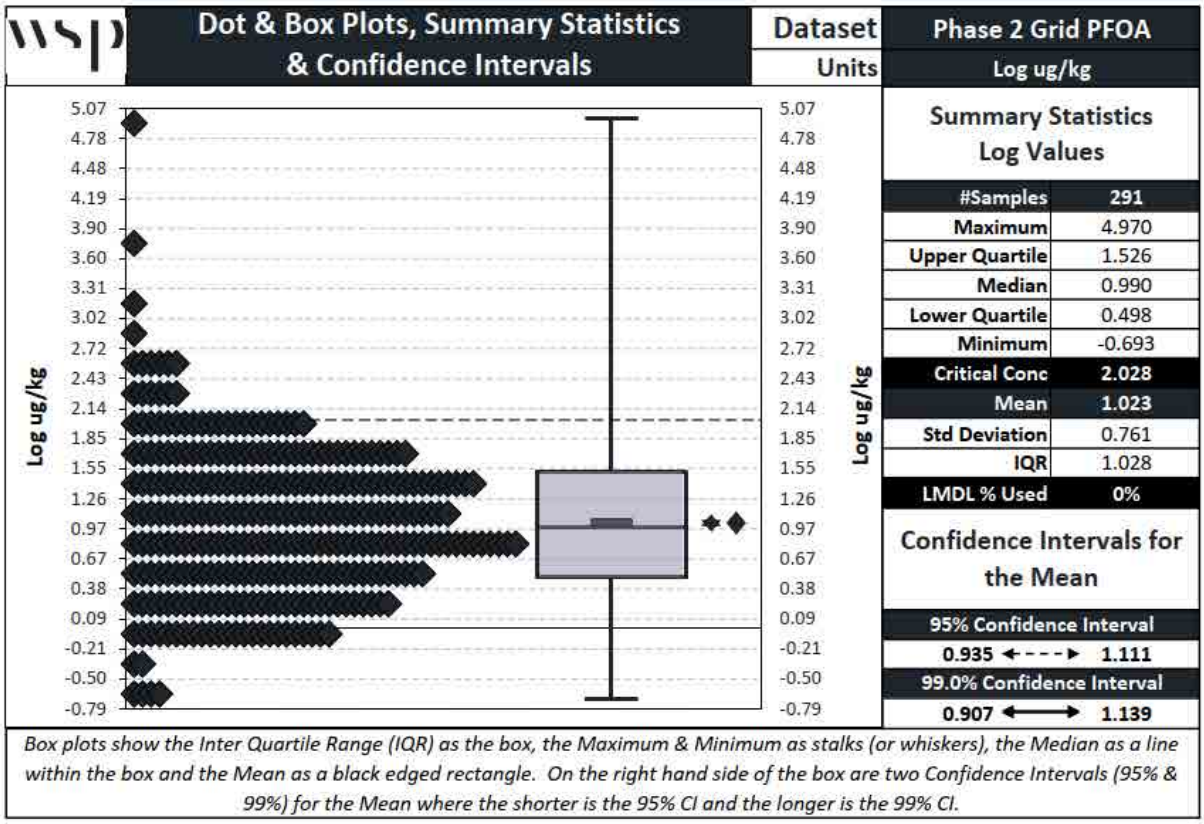
The PFOA dataset has a mean concentration of 4.13 µg/kg, and confidence intervals for the mean concentration are:

- 3.45 – 4.81 µg/kg (80% confidence interval); and
- 3.09 – 5.17 µg/kg (95% confidence interval).



Insert 3-2 – PFOA Soil Dataset

Log values for the dataset are plotted below in Insert 3-3, showing that the soil dataset is symmetric.



Insert 3-3 – PFOA Soil Dataset (Log values)

3.3.2 PFOS

A total of 23 No. samples contained PFOS above the method detection limit of 0.5 µg/kg; the maximum reported PFOS concentration was 2.41 µg/kg.

3.3.3 PFHXS

All 291 No. samples were reported below the method detection limit of 0.5 µg/kg.

3.3.4 PFNA

One of the 291 No. samples reported a PFNA concentration above the method detection limit of 0.5 µg/kg (0.927 µg/kg).

3.4 SELECTION OF CRITICAL ASSESSMENT CRITERIA

The quantitative risk assessment presented herein forms part of a Part 2A inspection focused on the AGCCE facility and the surrounding land. Samples have been assessed against the Interim Category 4 Screening Level (C4SL) for per- and polyfluoroalkyl substances (PFAS), as summarised in Table 3-2.

In April 2012, the Department of Environment, Food and Rural Affairs published updated statutory guidance which introduced a four-category approach to determining whether land in England and Wales is contaminated or not on the grounds of significant possibility of significant harm. Category 1 and 2 land constitutes Contaminated Land. Category 3 and 4 land does not.

C4SL are screening criteria derived to help local authorities (and others) when deciding to stop further assessment of a site in the context of Part 2A of the Environmental Protection Act (1990), on the grounds that it falls within Category 4 (Human Health). Category 4 Screening Levels are intended to be more pragmatic than generic assessment criteria, whilst remaining strongly precautionary. C4SL criteria are not 'SPOSH (significant possibility of significant harm) levels', and exceeding a C4SL is not an indicator of unacceptable intake. Exceeding a C4SL requires further inspection and assessment, to ascertain whether or not any risk is acceptable.

Soil results are to be assessed against the interim C4SL by use of a Hazard Index approach described as follows:

The hazard index approach requires that a hazard quotient (HQ) is first calculated for each of the four PFAS for each soil sample. The hazard quotient is the ratio of the measured soil concentration to the relevant C4SL. The hazard index (HI) for the soil sample is then the sum of the hazard quotients for the four PFAS: HI = HQPFOA + HQPFOS + HQPFHxS + HQPFNA.

The risk is considered acceptable (subject to consideration of uncertainties) provided that the hazard quotient for each individual PFAS and the hazard index do not exceed 1. A hazard quotient or index of greater than 1 (again, subject to consideration of uncertainties) signifies that further assessment or consideration of the risk is required.

Table 3-2 – Interim C4SL for PFAS (µg/kg)

Exposure Scenario	PFOA	PFOS	PFHxS	PFNA
Residential with consumption of homegrown produce	7.6	13	8.1	7.3
Residential without consumption of homegrown produce	41	41	41	41
Public Open Space (residential)	79	79	79	79
Public Open Space (park)	170	170	170	170

It is important to note that the C4SL for per- and polyfluoroalkyl substances is categorised as 'interim' due to concerns raised by the Committee on Toxicity (COT). In particular, the COT stated that there was considerable uncertainty as to:

(a) *The appropriateness of the derivation of the Tolerable Weekly Intake (TWI) by EFSA; and*

(b) *The biological relevance of the decreased vaccine response on which it is based.*

The Low Level of Toxicological Concern (LLTC) may therefore need to be revised in the future, following the completion of further work by the COT and others (such as the IARC, who have classified PFOA as a Group 1 carcinogen (carcinogenic to humans)).

Despite these concerns, the interim C4SL has been adopted within this risk assessment, as it is deemed to be the most appropriate, authoritative assessment criteria available at this time.

3.5 THE OBSERVED DATA

3.5.1 RESIDENTIAL WITH HOMEGROWN PRODUCE

The results of the assessment are summarised below in Table 3-3, and full results are provided within Table A, Appendix D.

Table 3-3 – Generic Risk Assessment – Residential with Homegrown Produce

Minimum HI	Average HI	Maximum HI
0.0	0.56	19.02

Where the hazard index exceeds 1.0, the selected assessment criteria (the interim C4SL) is exceeded. The hazard index exceeds 1.0 in 21 of the 291 No. samples and exceeds 2.0 in five of the samples. Considering each of the four PFAS separately:

- Reported PFOA concentrations exceed the interim residential with homegrown produce C4SL of 7.6 µg/kg in 20 of the 291 No. samples;
- PFOS concentrations exceed the interim C4SL of 13 µg/kg in one sample (16.9 µg/kg);
- One sample exceeds the method detection limit of 0.5 µg/kg for PFNA, but does not exceed the interim C4SL of 7.3 µg/kg; and
- No concentrations of PFHxS were reported above the method detection limit, and the interim C4SL of 8.1 µg/kg was not exceeded.

3.5.2 RESIDENTIAL WITHOUT HOMEGROWN PRODUCE

The consumption of homegrown produce and attached soil pathways are the dominant contributors to exposure for the residential with homegrown produce exposure scenario, as identified within Table 4.2 of the CL:AIRE (Contaminated Land: Applications In Real Environments) C4SL report for PFAS. They account for 81.22 % of exposure from soil sources (not accounting for background exposure). Consequently, the interim C4SL for a residential without homegrown produce land use is significantly higher (41 µg/kg).

Two samples contain PFOA at concentrations that exceed this threshold:

- 41.7 µg/kg PFOA at sample location GR01-SP221 (0.4 – 0.5m bgl); and
- 144 µg/kg PFOA at sample location GR01-SP232 (0.4 – 0.5m bgl).

None of the remaining 289 No. samples within the soil dataset approached this threshold.

3.5.3 PUBLIC OPEN SPACE (RESIDENTIAL)

The interim C4SL for public open space (residential) is 79 µg/kg. One sample contains PFOA in excess of this threshold:

- 144 µg/kg PFOA at sample location GR01-SP232 (0.4 – 0.5 m bgl).

3.5.4 PUBLIC OPEN SPACE (PARK)

The interim C4SL for public open space (park) is 170 µg/kg. None of the samples within the soil dataset exceed this threshold.

3.6 DISCUSSION

3.6.1 PUBLIC OPEN SPACE

Only one of the 291 No. soil samples contained PFOA in excess of the interim C4SL for POS (residential), and this sample was collected at a depth of 0.4 – 0.5 m bgl. There are no plausible exposure pathways to soils at this depth in a public open space exposure scenario. This is further supported by the PFOA depth profile, as summarised within Section 2.2.

Therefore, based upon the results of the Phase 2 grid-based soils investigation, including the apparent PFOA soil depth profile, and assuming that the available dataset is representative of wider soil concentrations, it is considered unlikely that PFOA (and PFAS) concentrations within shallow soils represent a significant risk to the health of individuals using public open spaces within 500 m of the AGCCE facility.

3.6.2 RESIDENTIAL

In the context of Part 2A of the Environmental Protection Act, and the definition of ‘current use’, it is considered plausible that any resident could choose to grow produce within their private garden in the future. Therefore, potential risks in the context of Part 2A will be considered assuming a residential with homegrown produce exposure scenario for all properties.

Figure 3 (Appendix A) plots the calculated hazard index results for each of the Phase 2 sample locations, calculated for a residential with homegrown produce exposure scenario. A hazard index of 2.0 or above was calculated for five samples, and their distribution appears consistent with the results of the modelling and dispersion assessment undertaken by the EA AQMAU. Whilst the sampling works undertaken are considered to be robust, there is still the potential that worst case conditions have not been captured, due to the density of the sampling strategy.

The maximum PFOA concentration of 144 µg/kg (hazard index 19.02) was reported in GR01-SP232, at a depth of 0.4 – 0.5 m bgl. There is some uncertainty associated with this result. WSP noted the presence of a plastic bag within the soil at this sample location and contacted ALS Global to ask that they re-examine the sample. They confirmed via email on 02 May 2025 that there did not appear to be a plastic bag / rag within the soil remaining following the completion of the scheduled analysis. Should a plastic bag have been present within the sample, this may have affected the PFOA result. However, elevated PFOA concentrations relative to the interim C4SL were also reported in the overlying (shallow) soils at this location (15.2 µg/kg, 0.3 – 0.4 m bgl). Furthermore, reported concentrations of PFOS, PFHxS and PFNA in this sample were not elevated, and consequently the reported PFOA concentration of 144 µg/kg may be genuine.

Based upon the results of the Phase 2 grid-based soils investigation, and assuming that the available dataset is representative of wider soil concentrations, it is not possible at this stage to rule out potential risks to the health of residents living within 500 m of the AGCCE facility, or beyond.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS

WSP completed a grid-based shallow soil investigation within a 500 m radius to the south and west of the AGCCE facility in 2025. The works confirmed the presence of PFOA above the LOD in 287 out of 291 No. samples collected, with a maximum PFOA concentration of 144 µg/kg. Based upon the available dataset, incorporating the results from the Phase 1 sampling works (2024), and accepting the limitations of the sampling strategy, the distribution of PFOA within shallow soils appears to align with the results of the modelling and dispersion assessment undertaken by the EA AQMAU (as illustrated on Figures 4A and 4B, Appendix A).

The PFOA soil depth profile appears to correlate with published data from a fluoropolymers site in The Netherlands, with average concentrations showing a distinct bell-shaped pattern.

A generic quantitative risk assessment was undertaken, using the interim C4SL for PFAS as the basis of a hazard index assessment to assess potential risks to public open space and residential receptors within 500 m of the AGCCE facility. Allotment sites have been subject to separate, detailed soil investigation works and therefore require no further commentary within this report.

Only one of the 291 No. soil samples contained PFOA in excess of the interim C4SL for POS (residential), and this sample was collected at a depth of 0.4 – 0.5 m bgl. There are no plausible exposure pathways to soils at this depth in a public open space exposure scenario. Assuming that the available dataset is representative of wider soil concentrations, and acknowledging the PFOA soil depth profile, it is considered unlikely that PFOA (and PFAS) concentrations within shallow soils represent a significant risk to the health of individuals using public open spaces within 500 m of to the AGCCE facility.

With respect to the residential with homegrown produce exposure scenario, the hazard index exceeds 1.0 in 21 of the 291 No. soil samples; and exceeds 2.0 in five samples (to a maximum hazard index of 19.02). Based upon these results, the sampling uncertainty and the apparent correlation between the maximum reported PFOA concentrations and the modelling and dispersion assessment undertaken by the EA in 2023, we are unable to rule out the potential for significant risks to human health at this time. Further works are warranted.

4.2 RECOMMENDATIONS

It is recommended that the next phase of soil sampling works is focussed on targeting individual properties, and sampling at a higher density, to improve understanding and confidence in PFOA sample variability at these locations.

Sampling works are to be undertaken primarily at properties located down-wind (south-east) of the AGCCE facility, targeting areas where historical aerial deposition is considered to have been greatest (as per the EA AQMAU modelling works). Properties located within 1 km of the AGCCE facility are to be targeted. Extending the sampling area beyond 500 m is necessary, as the maximum PFOA concentration within soils has been reported at a distance of 500 m from the facility.

Sampling works up-wind (north-west) of the AGCCE facility are considered lower priority at this stage, despite the elevated concentrations of PFOA reported within soils (as per Figure 4B, Appendix A), due to the lack of residential properties in this area.

It is proposed that a small number of residential properties are targeted to the south-west and-west of the AGCCE facility, to increase confidence in PFOA soil variability in areas of suspected lower aerial deposition. Sampling works are to be undertaken where soil investigation works to date have reported PFOA concentrations below the interim C4SL (residential with homegrown produce).

The Animal and Plant Health Agency (APHA) have provided a list of registered poultry keepers within 1 km of the AGCCE facility. The sampling and analysis of eggs for PFAS would provide useful information for the further assessment of potential risks to health and is recommended if practicable.

5 REFERENCES

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6 GLOSSARY AND ABBREVIATIONS

The following terms and abbreviations have been used throughout the enclosed statement. All may be considered as common terms used on an everyday basis by Contaminated Land professionals, their definitions are presented to assist the reader and avoid ambiguity.

Above Ordnance Datum (AOD).

Air Dispersion Modelling is the use of mathematical formulations to simulate atmospheric processes and predict the dispersion of pollutants.

Analytical Quality Control (AQC) refers to the procedures adopted by the performing laboratory to ensure that analytical measurements are of adequate accuracy for their intended purpose.

Ammonium perfluorooctanate (APFO) is the ammonium salt of perfluorooctanoic acid (PFOA) and readily dissociates in water to give the ammonium and perfluorooctanoate ions. Whilst APFO and PFOA have subtly different properties it considered appropriate to assume APFO = 100% PFOA once it reaches the environment.

Asbestos Containing Material (ACMs). Products that have asbestos in them. Asbestos is a mineral that has been used for its fireproofing and insulation properties. Examples include: construction and insulation materials, such as fireproofing, pipes, boilers, roofing, plaster, wallboard, and cement; friction products, such as brakes and clutches; heat-resistant fabrics, packaging, gaskets, and coatings.

Below ground level (BGL).

Committee on Toxicity (COT). The Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) is an independent scientific committee that provides advice to the Food Standards Agency, the Department of Health and Social Care, and other Government Departments and Agencies on matters concerning the toxicity of chemicals.

CL:AIRE. Contaminated Land: Applications In Real Environments

Conceptual Site Model (CSM). A representation of the characteristics of the site in diagrammatic or written form that shows the possible Pollutant linkages between Contaminants, Pathways and Receptors.

Contaminant. A substance that is in, on or under the land and that has the potential to cause harm or to cause pollution to the water environment.

Contaminant linkage. The relationship between a contaminant, pathway and receptor, which is identified by developing the conceptual site model (‘CSM’). See also source-pathway-receptor linkage.

Contaminant of concern (CoC). Contaminants that pose an unacceptable risk to human health and the environment, as identified in the risk assessments.

Contaminated Land. Contaminated Land: defined in section 78A(2) of the Environmental Protection Act [1] as: ‘any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that - ‘(a) significant harm is being caused or there is a significant possibility of such harm being caused, or; ‘(b) pollution of controlled waters is being, or is likely to be, caused.’ OR with respect to radioactive contamination

defined in section 78A(2)(as modified) as ‘any land which appears to the local authority in whose area it is situated to be in such a condition, by reasons of substances in, on or under the ground, that: (a) harm is being caused, or (b) there is a significant possibility of such harm being caused.’

Construction Phase Plan (CPP) is a document that sets out the health and safety management arrangements for a project. It is a key document that details the health and safety risks associated with the construction phase of the project and the control measures that will be implemented to minimise risks or where possible, eliminate them. The Construction Phase Plan is an explicit requirement under CDM 2015.

The Construction (Design and Management) Regulations, 2015 (CDM 2015). A set of rules that aim to improve health and safety in the construction industry by managing risks from start to finish.

European Food Standards Agency (EFSA).

Harm. This means adverse impacts on the health of living organisms or other interference with the ecological systems of which they form a part and, in the case of man, includes harm to property. (Defined in section 78A(4) of the Environmental Protection Act 1990)

Hazard. A property or situation that in particular circumstances could lead to harm or pollution.

IARC. The International Agency for Research on Cancer is the specialized cancer agency of the World Health Organisation (WHO).

LLTC (Low Level of Toxicological Concern). An LLTC should represent an intake of low concern that remains suitably protective of health, and definitely does not approach an intake level that could be defined as SPOSH.

LOD or Limit of Detection. The lower limit achievable detection as reported by the smallest amount (concentration) that can be detected with reasonable certainty using a specific analytical procedure.

Natural drift, or Superficial deposits (formerly known as 'drift' by British Geological Survey) are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 2.6 million years from the present. They rest on older deposits or rocks referred to as bedrock.

Part 2A: Part 2A of the Environmental Protection Act 1990 [1].

Pathway. A route or means by which a receptor could be, or is exposed to, or affected by a Contaminant.

Per- and polyfluoroalkyl substances (PFAS). A group of synthetic organofluorine chemical compounds that have multiple fluorine atoms attached to an alkyl chain.

- Perfluorooctanesulfonic acid (PFOS)
- Perfluorooctanoic acid (PFOA)
- Perfluorosulfonic acids (PFSAs)
- Perfluoroalkyl carboxylic acids (PFCAs)
- Perfluoropentanoic acid (PFPA / PFPeA)
- Perfluorohexane sulfonate (PFHxS)
- Perfluorohexanoic acid (PFHxA)

- Perfluoroheptanoic acid (PFHpA)
- Perfluoroheptyl sulphonate (PFHpS)
- 5:3 Fluorotelomer carboxylic acid (5:3 FTCA)
- Fluorotelomers (FTS)
- 6:2 fluorotelomer sulfonamidoalkyl betaine (6:2 FTAB)
- Perfluoroalkyl acids (PFAAs)

Plausible Contaminant Linkage. A contaminant linkage that may plausibly be significant but requires further quantification or investigation to confirm or refute in the context of Part 2A.

Quality Assurance / Quality Control (QA/QC).

Receptor. In general terms, something that could be adversely affected by contamination (e.g., people, an ecological system, property or a water body).

Risk. A combination of the probability, or frequency of occurrence of a defined hazard and the magnitude of the consequences of the occurrence.

Risk Assessment. The formal process of identifying, assessing and evaluating the health and environmental risks that may be associated with a hazard.

Site Investigation (SI). The collection and analysis of soil, surface water, groundwater, soil gas and other media as a means of further understanding the condition of the site and to inform the risk assessment. This investigation may be undertaken in a single stage, or a number of successive stages.

Site of Special Scientific Interest (SSSI).

Soil organic matter (SOM). The organic matter component of soil, consisting of plant and animal detritus at various stages of decomposition, cells and tissues of soil microbes, and substances that soil microbes synthesize.

Source-Pathway-Receptor linkage. The relationship between a Contaminant, Pathway and Receptor, which is identified by developing the CSM. See also Pollutant linkage.

Significant Possibility of Significant Harm (SPOSH) (a formal term within Part 2A Legislation). The following health effects should always be considered to constitute significant harm to human health: death; life threatening diseases (e.g., cancers); other diseases likely to have serious impacts on health; serious injury; birth defects; and impairment of reproductive functions. Other health effects may be considered by the local authority to constitute significant harm. For example, a wide range of conditions may or may not constitute significant harm (alone or in combination) including physical injury; gastrointestinal disturbances; respiratory tract effects; cardio-vascular effects; central nervous system effects; skin ailments; effects on organs such as the liver or kidneys; or a wide range of other health impacts. In deciding whether or not a particular form of harm is significant harm, the local authority should consider the seriousness of the harm in question: including the impact on the health, and quality of life, of any person suffering the harm; and the scale of the harm.

Tolerable Weekly Intake (TWI).

Unacceptable risk: means a risk of such a nature that it would give grounds for land to be considered Contaminated Land under Part 2A.

Uncertainty. A lack of knowledge about specific factors in a risk or exposure assessment, including parameter uncertainty, model uncertainty and scenario uncertainty. Parameter uncertainty refers to the uncertainty in the model parameter values, which can be due to uncertainties in the data available. Model uncertainty is uncertainty due to imperfections and idealizations made in the physical model formulation. Scenario uncertainty is uncertainty in the actual conceptual model being assumed for example in the actual exposure duration and frequency of a receptor on a site.

Unexploded Ordnance (UXO). A term for any sort of military ammunition or explosive device that failed to function as intended and still pose a risk of detonation.

Appendix A

FIGURES

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DO NOT SCALE

Legend

- AGCCE Land Ownership - Thornton Facility
- Phase 2 - Residential 100m Grid (S/SE/E)
- Phase 2 - Residential 150m Grid (W/SW/S)
- Phase 2 - Public Open Space
- Phase 2 Allotment Investigation - Jan 25
- Preliminary Phase: Sampled Land Parcels - Sept 2024

DRAWING STATUS: FINAL

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ARCHITECT: WSP UK LIMITED

PROJECT: 70100310
PHASE 2 SAMPLING

LAND AT THORNTON-CLEVELEYS

TITLE: FIGURE 1
PHASE 2 GRID SAMPLING PLAN

SCALE @ A	CHECKED:	APPROVED:
1:0	KG	HDL
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WSP - A2 Landscape	USER	MAY 25
PROJECT No:	**DRAWING No:**	**REV:**
70100310	70100310/P2 -01A	

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0 40 80 160 240 320 Meters

Date: By: UKJXK032

File: G:\#Projects\AGCC\70100310 AGCC Sampling v12 PFOA.Plot.mxd

Drawn By: UKJXK032

DO NOT SCALE

Legend

Average PFOA Concentrations (per Sample Point) GRID

ug/kg

- 1.03 - 7.59
- 7.6 - 12.0
- 12.1 - 34.43
- EA AQMAU - Approximate Extent of Ground Deposition - 2.5 microns (AERMOD)
- AGCCE Land Ownership - Thornton Facility

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0 60 120 240 360 480 Meters

DRAWING STATUS: WORKING

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CLIENT: ENVIRONMENT AGENCY

ARCHITECT: WSP UK LIMITED

PROJECT: 70100310 EA PHASE 4
PHASE 2 INVESTIGATION

THORNTON SITE

TITLE: FIGURE 2
AVERAGE PFOA CONCENTRATIONS UG/KG

SCALE @ A	CHECKED:	APPROVED:
1:0	CHK	APP
CAD FILE: WSP - A2 Landscape	DESIGN-DRAWN: USER	DATE: MAY 25
PROJECT No: 70100310	DRAWING No: 70100310/P2 -02	REV:

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File: G:\#Projects\AGC\70100310 AGC Sampling v14 contour.mxd

Drawn By: UKJXK032

DO NOT SCALE

Legend

Hazard Index - PFAS

Hazard Index

- <1
- 1 - 1.99
- 2 - 10
- >10

EA AQMAU - Approximate Extent of Ground Deposition - 2.5 microns (AERMOD)

AGCCE Land Ownership - Thornton Facility

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0 60 120 240 360 480 Meters

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ARCHITECT: WSP UK LIMITED

PROJECT: 70100310 EA PHASE 4
PHASE 2 INVESTIGATION

THORNTON SITE

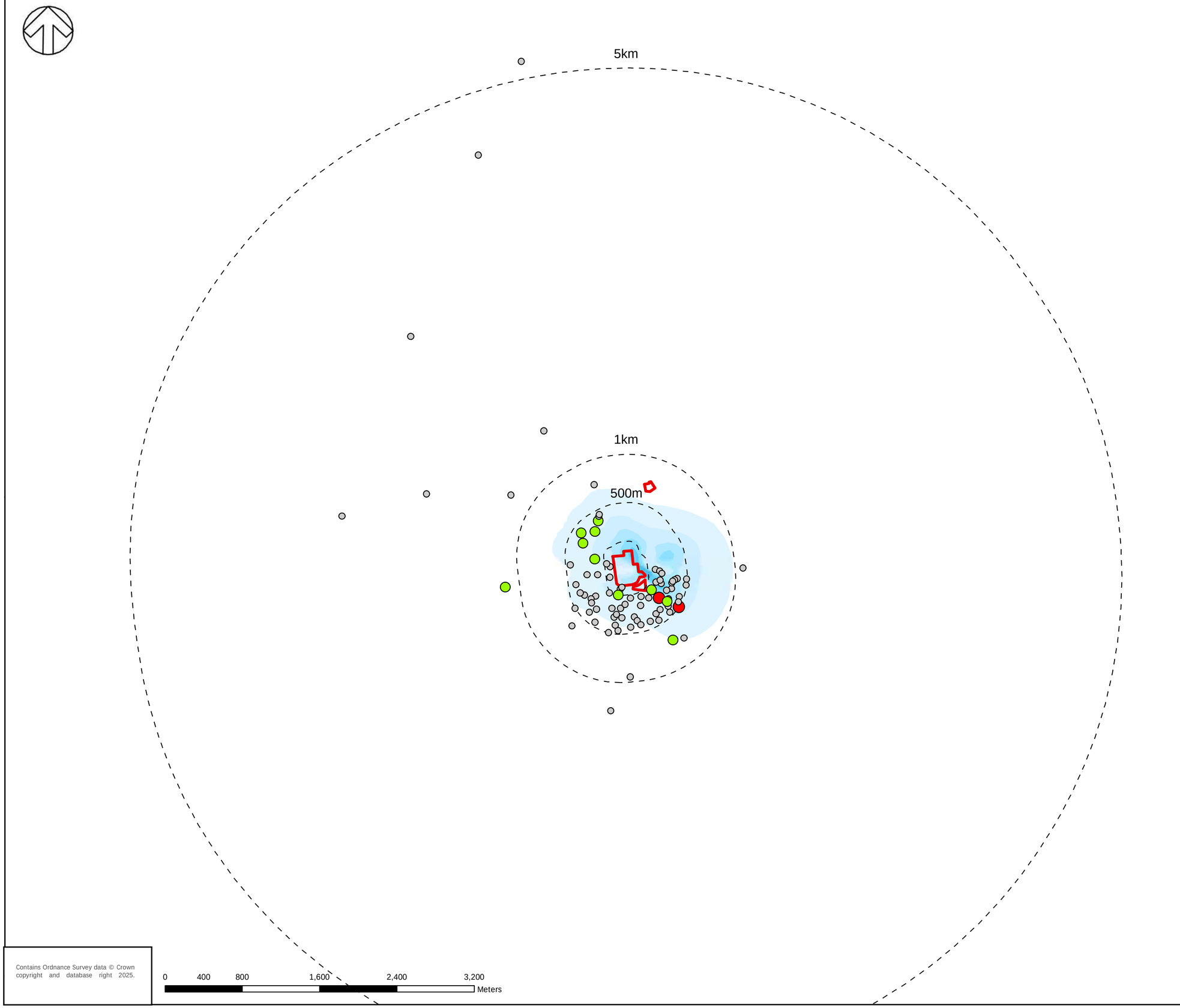
TITLE: FIGURE 3
HAZARD INDEX - PFAS
(PER SAMPLE POINT)

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WSP - A2 Landscape	USER	MAY 25
PROJECT No:	DRAWING No:	REV:
70100310	70100310/P2 -02	

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File: G:\#Projects\AGC\70100310 AGC Sampling v14 contour.mxd

Drawn By: UKJXK032



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DO NOT SCALE

Legend

Average PFOA Concentrations (per Sample Point) ALL

ug/kg

- 0.60 - 7.59
- 7.6 - 12.0
- 12.01 - 34.43
- EA AQMAU - Approximate Extent of Ground Deposition - 2.5 microns (AERMOD)
- AGCCE Land Ownership - Thornton Facility

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ARCHITECT: WSP UK LIMITED

PROJECT: 70100310 EA PHASE 4
PHASE 2 INVESTIGATION

THORNTON SITE

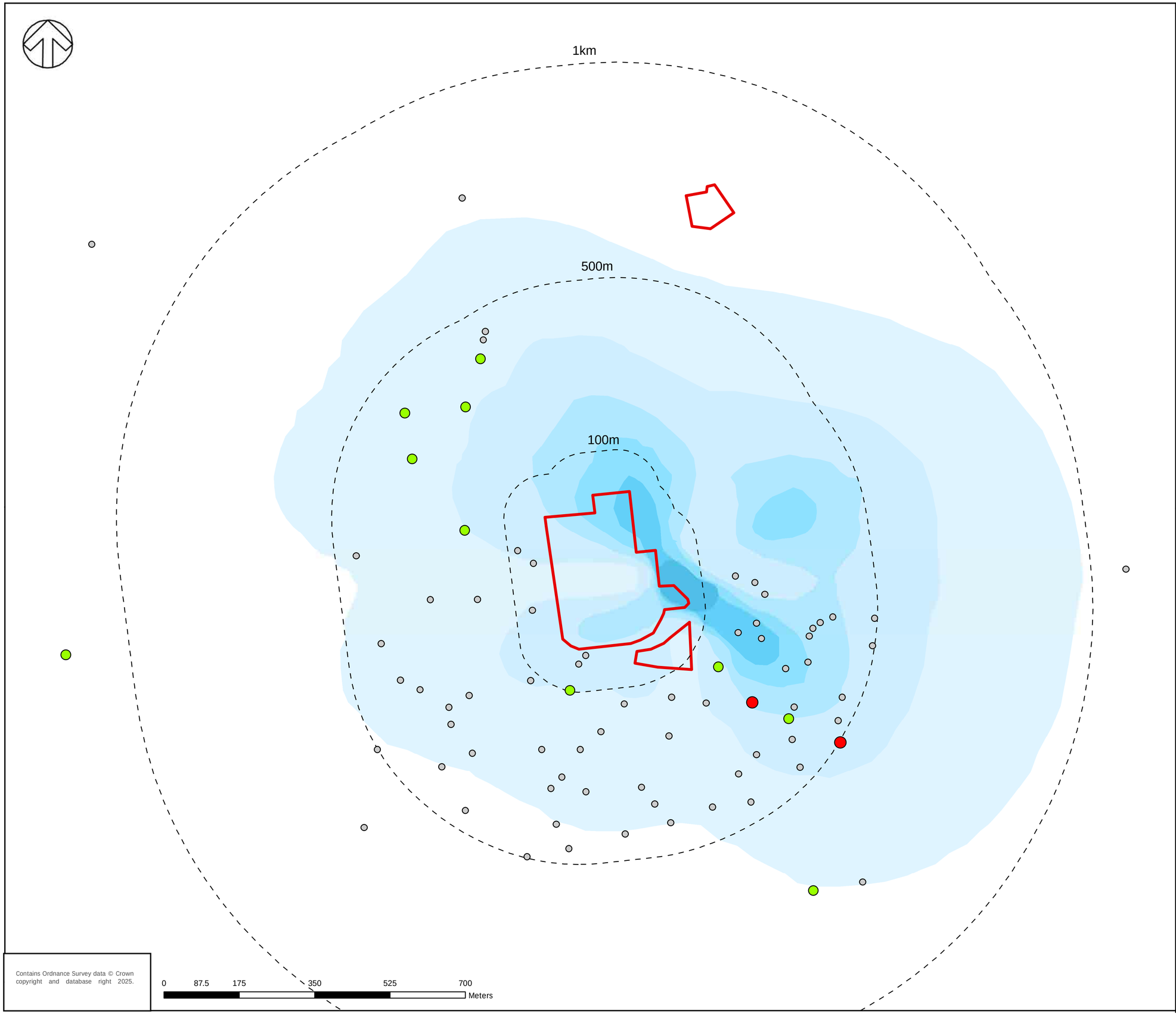
TITLE: FIGURE 4A
AVERAGE PFOA UG/KG
(PRELIM AND PHASE 2 PHASE)

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WSP - A2 Landscape	USER	MAY 25
PROJECT No:	**DRAWING No:**	**REV:**
70100310	70100310/P2 -02	

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File: G:\#Projects\AGC\70100310 AGC Sampling v14 contour.mxd

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DO NOT SCALE

Legend

Average PFOA Concentrations (per Sample Point) ALL

ug/kg

- 0.60 - 7.59
- 7.6 - 12.0
- 12.01 - 34.43
- EA AQMAU - Approximate Extent of Ground Deposition - 2.5 microns (AERMOD)
- AGCCE Land Ownership - Thornton Facility

DRAWING STATUS: WORKING

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ARCHITECT: WSP UK LIMITED

PROJECT: 70100310 EA PHASE 4
PHASE 2 INVESTIGATION

THORNTON SITE

TITLE: FIGURE 4B
AVERAGE PFOA UG/KG (1KM)
(PRELIM AND PHASE 2 PHASE)

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WSP - A2 Landscape	USER	MAY 25
PROJECT No:	**DRAWING No:**	**REV:**
70100310	70100310/P2 -02	

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File: G:\#Projects\AGC\70100310 AGC Sampling v14 contour.mxd

Appendix B

FACTUAL REPORT FROM PHASE 2 GRID BASED SOILS INVESTIGATION

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Appendix C

NOTES AND LIMITATIONS

Confidential

REPORT LIMITATIONS - GROUND AND WATER

GENERAL

1. WSP UK Limited has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed and outlined in the body of the report.

2. Unless explicitly agreed otherwise, in writing, this report has been prepared under WSP UK Limited standard Terms and Conditions as included within our proposal to the Client.

3. Project specific appointment documents may be agreed at our discretion and a charge may be levied for both the time to review and finalise appointments documents and also for associated changes to the appointment terms. WSP UK Limited reserves the right to amend the fee should any changes to the appointment terms create an increase risk to WSP UK Limited.

4. The report needs to be considered in the light of the WSP UK Limited proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

PHASE 1 GEO ENVIRONMENTAL AND PRELIMINARY RISK ASSESSMENTS

Coverage: *This section covers reports with the following titles or combination of titles: phase 1; desk top study; geo environmental assessment; development appraisal; preliminary environmental risk assessment; constraints report; due diligence report; geotechnical development review; environmental statement; environmental chapter; project scope summary report (PSSR), program environmental impact report (PEIR), geotechnical development risk register; and, baseline environmental assessment.*

5. The works undertaken to prepare this report comprised a study of available and easily documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the Site and correspondence with relevant authorities and other interested parties. Due to the short timescales associated with these projects responses may not have been received from all parties. WSP UK Limited cannot be held responsible for any disclosures that are provided post production of our report and will not automatically update our report.

6. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only for the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, WSP UK Limited reserves the right to review such information and, if warranted, to modify the opinions accordingly.

7. It should be noted that any risks identified in this report are perceived risks based on the information reviewed. Actual risks can only be assessed following intrusive investigations of the site.

8. WSP UK Limited does not warrant work / data undertaken / provided by others.

REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

INTRUSIVE INVESTIGATION REPORTS

Coverage: *The following report titles (or combination) may cover this category of work: geo environmental site investigation; geotechnical assessment; GIR (Ground Investigation reports); preliminary environmental and geotechnical risk assessment; and, geotechnical risk register.*

9. The investigation has been undertaken to provide information concerning either:

- **i.** The type and degree of contamination present at the site in order to allow a generic quantitative risk assessment to be undertaken; or
- **ii.** Information on the soil properties present at the site to allow for geotechnical development constraints to be considered.

10. The scope of the investigation was selected on the basis of the specific development and land use scenario proposed by the Client and may be inappropriate to another form of development or scheme. If the development layout was not known at the time of the investigation the report findings may need revisiting once the development layout is confirmed.

11. For contamination purposes, the objectives of the investigation are limited to establishing the risks associated with potential contamination sources with the potential to cause harm to human health, building materials, the environment (including adjacent land), or controlled waters.

12. For geotechnical investigations the purpose is to broadly consider potential development constraints associated with the physical property of the soils underlying the site within the context of the proposed future or continued use of the site, as stated within the report.

13. The amount of exploratory work, soil property testing and chemical testing undertaken has necessarily been restricted by various factors which may include accessibility, the presence of services; existing buildings; current site usage or short timescales. The exploratory holes completed assess only a small percentage of the area in relation to the overall size of the Site, and as such can only provide a general indication of conditions.

14. The number of sampling points and the methods of sampling and testing do not preclude the possible existence of contamination where concentrations may be significantly higher than those actually encountered or ground conditions that vary from those identified. In addition, there may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.

15. The inspection, testing and monitoring records relate specifically to the investigation points and the timeframe that the works were undertaken. They will also be limited by the techniques employed. As part of this assessment, WSP UK Limited has used reasonable skill and care to extrapolate conditions between these points based upon assumptions to develop our interpretation and conclusions. The assumption made in forming our conclusions is that the ground and groundwater conditions (both chemically and physically) are the same as have been encountered during the works undertaken at the specific points of investigation. Conditions can change between investigation points and these interpretations should be considered indicative.

16. The risk assessment and opinions provided are based on currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values. Specific assumptions associated

with the WSP UK Limited risk assessment process have been outlined within the body or associated appendix of the report.

17. Additional investigations may be required in order to satisfy relevant planning conditions or to resolve any engineering and environmental issues.

18. Where soil contamination concentrations recorded as part of this investigation are used for commentary on potential waste classification of soils for disposal purposes, these should be classed as indicative only. Due consideration should be given to the variability of contaminant concentrations taken from targeted samples versus bulk excavated soils and the potential variability of contaminant concentrations between sampling locations. Where major waste disposal operations are considered, targeted waste classification investigations should be designed.

19. The results of the asbestos testing are factually reported and interpretation given as to how this relates to the previous use of the site, the types of ground encountered and site conceptualisation. This does not however constitute a formal asbestos assessment. These results should be treated cautiously and should not be relied upon to provide detailed and representative information on the delineation, type and extent of bulk ACMs and / or trace loose asbestos fibres within the soil matrix at the site.

20. If costs have been included in relation to additional site works, and / or site remediation works these must be considered as indicative only and must be confirmed by a qualified quantity surveyor.

EUROCODE 7: GEOTECHNICAL DESIGN

21. On 1st April 2010, BS EN 1997-1:2004 (Eurocode 7: Geotechnical Design – Part 1) became the mandatory baseline standard for geotechnical ground investigations.

22. In terms of geotechnical design for foundations, slopes, retaining walls and earthworks, EC7 sets guidance on design procedures including specific guidance on the numbers and spacings of boreholes for geotechnical design, there are limits to methods of ground investigation and the quality of data obtained and there are also prescriptive methods of assessing soil strengths and methods of design. Unless otherwise explicitly stated, the work has not been undertaken in accordance with EC7. A standard geotechnical interpretative report will not meet the requirements of the Geotechnical Design Report (GDR) under Eurocode 7. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. The report is likely to represent a Ground Investigation Report (GIR) under the Eurocode 7 guidance.

DETAILED QUANTITATIVE RISK ASSESSMENTS AND REMEDIAL STRATEGY REPORTS

23. These reports build upon previous report versions and associated notes. The scope of the investigation, further testing and monitoring and associated risk assessments were selected on the basis of the specific development and land use scenario proposed by the Client and may not be appropriate to another form of development or scheme layout. The risk assessment and opinions provided are based on currently available approaches in the generation of Site Specific Assessment Criteria relating to contamination concentrations and are not considered to represent a risk in a specific land use scenario to a specific receptor. No liability can be accepted for the retrospective effects of any future changes or amendments to these values, associated models or associated guidance.

REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

24. The outputs of the Detailed Quantitative Risk Assessments are based upon WSP UK Limited manipulation of standard risk assessment models. These are our interpretation of the risk assessment criteria.

25. Prior to adoption on site they will need discussing and agreeing with the Regulatory Authorities prior to adoption on site. The regulatory discussion and engagement process may result in an alternative interpretation being determined and agreed. The process and timescales associated with the Regulatory Authority engagement are not within the control of WSP UK Limited. All costs and programmes presented as a result of this process should be validated by a quantity surveyor and should be presumed to be indicative.

GEOTECHNICAL DESIGN REPORT (GDR)

26. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. All the relevant information needs to be provided to allow for a GDR to be produced.

MONITORING (INCLUDING REMEDIATION MONITORING REPORTS)

27. These reports are factual in nature and comprise monitoring, normally groundwater and ground gas and data provided by contractors as part of an earthworks or remedial works.

28. The data is presented and will be compared with assessment criteria.

Appendix D

GENERIC QUANTITATIVE RISK ASSESSMENT – PHASE 2 GRID SAMPLING WORKS

Confidential

TABLE A - GENERIC QUANTITATIVE RISK ASSESSMENT. HAZARD INDICES. RESIDENTIAL WITH HOMEGROWN PRODUCE (INTERIM C4SL)

			Customer Sample ID	GR01-SP201	GR01-SP201	GR01-SP201	GR01-SP202	GR01-SP202	GR01-SP203	GR01-SP203	GR01-SP204	GR01-SP204	GR01-SP205	GR01-SP205	GR01-SP206	GR01-SP206	GR01-SP207	GR01-SP207	GR01-SP208	GR01-SP208	GR01-SP208	GR01-SP209	GR01-SP210	GR01-SP210	GR01-SP211	GR01-SP211	GR01-SP212	GR01-SP213	GR01-SP213	GR01-SP214	GR01-SP214	GR01-SP215	GR01-SP215	GR01-SP215	GR01-SP216	GR01-SP216	GR01-SP216	GR01-SP218	GR01-SP218	GR01-SP219
			Depth	0.00-0.10	0.20-0.30	0.40-0.50	0.30-0.40	0.40-0.50	0.20-0.30	0.40-0.50	0.30-0.40	0.40-0.50	0.00-0.10	0.20-0.30	0.30-0.40	0.40-0.50	0.00-0.10	0.40-0.50	0.00-0.10	0.30-0.40	0.40-0.50	0.00-0.10	0.30-0.40	0.40-0.50	0.00-0.10	0.20-0.30	0.30-0.40	0.00-0.10	0.20-0.30	0.00-0.10	0.30-0.40	0.00-0.10	0.20-0.30	0.40-0.50	0.00-0.10	0.30-0.40	0.40-0.50	0.00-0.10	0.40-0.50	0.00-0.10
Test	**Method**	**Units**	**LOD**																																					
PFOA (335-67-1)	TM440	ug/kg	<0.5	1.65	2.5	4.35	13.8	7.31	1.18	1.46	1.84	2.04	2.46	4.79	4.82	5	1.53	4.9	3.87	3.95	3.71	<0.5	3.1	3.04	0.974	1.43	4.73	2.04	3.75	4.27	4.26	1.51	2.71	2.18	2.82	5.29	4.4	3.06	6.5	0.958
PFOA HQ (C4SL in column to right)	7.60			0.22	0.33	0.57	1.82	0.96	0.16	0.19	0.24	0.27	0.32	0.63	0.63	0.66	0.20	0.64	0.51	0.52	0.49		0.41	0.40	0.13	0.19	0.62	0.27	0.49	0.56	0.56	0.20	0.36	0.29	0.37	0.70	0.58	0.40	0.86	0.13
PFHxS (355-46-4)	TM440	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFHxS HQ (C4SL in column to right)	8.10																																							
PFNA (375-95-1)	TM440	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFNA HQ (C4SL in column to right)	7.30																																							
Total PFOS	TM440	ug/kg	<0.6	1.01	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	2.94	<0.6	<0.6	<0.6	<0.6	<0.6	0.807	<0.6	<0.6	1	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	0.938	<0.6
PFOS HQ (C4SL in column to right)	13.00			0.08															0.23						0.06			0.08											0.07	
HAZARD INDEX				0.29	0.33	0.57	1.82	0.96	0.16	0.19	0.24	0.27	0.32	0.63	0.63	0.66	0.20	0.64	0.74	0.52	0.49	0.00	0.41	0.40	0.19	0.19	0.62	0.35	0.49	0.56	0.56	0.20	0.36	0.29	0.37	0.70	0.58	0.40	0.93	0.13

			Customer Sample ID	GR01-SP219	GR01-SP219	GR01-SP220	GR01-SP220	GR01-SP221	GR01-SP221	GR01-SP222	GR01-SP222	GR01-SP223	GR01-SP223	GR01-SP223	GR01-SP224	GR01-SP224	GR01-SP225	GR01-SP225	GR01-SP226	GR01-SP226	GR01-SP226	GR01-SP227	GR01-SP227	GR01-SP227	GR01-SP228	GR01-SP228	GR01-SP229	GR01-SP229	GR01-SP230	GR01-SP230	GR01-SP231	GR01-SP231	GR01-SP231	GR01-SP232	GR01-SP232	GR01-SP232	GR01-SP233	GR01-SP233	GR01-SP233	GR01-SP234
			Depth	0.20-0.30	0.40-0.50	0.30-0.40	0.40-0.50	0.20-0.30	0.40-0.50	0.00-0.10	0.40-0.50	0.00-0.10	0.20-0.30	0.40-0.50	0.00-0.10	0.40-0.50	0.00-0.10	0.40-0.50	0.00-0.10	0.30-0.40	0.40-0.50	0.00-0.10	0.20-0.30	0.40-0.50	0.00-0.10	0.30-0.40	0.00-0.10	0.40-0.50	0.30-0.40	0.40-0.50	0.00-0.10	0.20-0.30	0.40-0.50	0.00-0.10	0.30-0.40	0.40-0.50	0.00-0.10	0.20-0.30	0.30-0.40	0.30-0.40
Test	**Method**	**Units**	**LOD**																																					
PFOA (335-67-1)	TM440	ug/kg	<0.5	2.24	3.23	1.8	4.23	1.15	41.7	1.86	2.48	1.96	5.36	24.4	1.22	1.92	1.39	1.75	2.01	7.04	4.53	3.6	4.58	3.03	3.29	5.96	2.97	2.25	2.06	0.952	2.12	0.89	0.933	8.09	15.2	144	0.732	1.36	1.5	0.882
PFOA HQ (C4SL in column to right)	7.60			0.29	0.43	0.24	0.56	0.15	5.49	0.24	0.33	0.26	0.71	3.21	0.16	0.25	0.18	0.23	0.26	0.93	0.60	0.47	0.60	0.40	0.43	0.78	0.39	0.30	0.27	0.13	0.28	0.12	0.12	1.06	2.00	18.95	0.10	0.18	0.20	0.12
PFHxS (355-46-4)	TM440	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFHxS HQ (C4SL in column to right)	8.10																																							
PFNA (375-95-1)	TM440	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFNA HQ (C4SL in column to right)	7.30																																							
Total PFOS	TM440	ug/kg	<0.6	<0.6	<0.6	<0.6	<0.6	0.816	0.876	<0.6	<0.6	<0.6	<0.6	<0.6	1.23	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	1.04	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	0.898	<0.6	<0.6	<0.6	<0.6
PFOS HQ (C4SL in column to right)	13.00							0.06	0.07						0.09							0.08														0.07				
HAZARD INDEX				0.29	0.43	0.24	0.56	0.21	5.55	0.24	0.33	0.26	0.71	3.21	0.26	0.25	0.18	0.23	0.26	0.93	0.60	0.55	0.60	0.40	0.43	0.78	0.39	0.30	0.27	0.13	0.28	0.12	0.12	1.06	2.00	19.02	0.10	0.18	0.20	0.12

			Customer Sample ID	GR01-SP235	GR01-SP235	GR01-SP236	GR01-SP236	GR01-SP236	GR02-SP202	GR02-SP202	GR02-SP202	GR02-SP204	GR02-SP205	GR02-SP205	GR02-SP206	GR02-SP206	GR02-SP207	GR02-SP208	GR02-SP208	GR02-SP208	GR02-SP210	GR02-SP210	GR02-SP211	GR02-SP211	GR02-SP213	GR02-SP213	GR02-SP214	GR02-SP214	GR02-SP214	GR02-SP215	GR02-SP215	GR02-SP217	GR02-SP217	GR02-SP217	GR02-SP218	GR02-SP218	GR02-SP218	GR02-SP219	GR02-SP219	GR01-SP201A
			Depth	0.00-0.10	0.20-0.30	0.00-0.10	0.30-0.40	0.40-0.50	0.00-0.10	0.30-0.40	0.40-0.50	0.10-0.20	0.00-0.10	0.40-0.50	0.00-0.10	0.30-0.40	0.00-0.10	0.00-0.10	0.30-0.40	0.40-0.50	0.30-0.40	0.40-0.50	0.00-0.10	0.20-0.30	0.20-0.30	0.40-0.50	0.00-0.10	0.30-0.40	0.40-0.50	0.00-0.10	0.40-0.50	0.00-0.10	0.20-0.30	0.40-0.50	0.00-0.10	0.30-0.40	0.40-0.50	0.00-0.10	0.20-0.30	0.10-0.20
Test	**Method**	**Units**	**LOD**																																					
PFOA (335-67-1)	TM440	ug/kg	<0.5	1.82	2.06	3.66	2.73	6.99	<0.5	0.859	1.36	3.24	1.45	3.44	0.926	4.96	<0.5	2.91	4.17	2.25	4.51	4.45	4.16	6.52	1.78	4.82	4.14	7.36	6.3	3.89	4.4	5.33	8.44	5.85	2.1	4.66	4.2	1.36	2.52	0.923
PFOA HQ (C4SL in column to right)	7.60			0.24	0.27	0.48	0.36	0.92		0.11	0.18	0.43	0.19	0.45	0.12	0.65		0.38	0.55	0.30	0.59	0.59	0.55	0.86	0.23	0.63	0.54	0.97	0.83	0.51	0.58	0.70	1.11	0.77	0.28	0.61	0.55	0.18	0.33	0.12
PFHxS (355-46-4)	TM440	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFHxS HQ (C4SL in column to right)	8.10																																							
PFNA (375-95-1)	TM440	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFNA HQ (C4SL in column to right)	7.30																																							
Total PFOS	TM440	ug/kg	<0.6	<0.6	0.812	<0.6	<0.6	<0.6	4.86	2.31	2.93	1.46	<0.6	<0.6	<0.6	0.762	<0.6	1.04	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	16.9	4.22	<0.6	<0.6	<0.6	<0.6	0.849	<0.6	<0.6	<0.6	<0.6
PFOS HQ (C4SL in column to right)	13.00				0.06				0.37	0.18	0.23	0.11				0.06		0.08												1.30	0.32					0.07				
HAZARD INDEX				0.24	0.33	0.48	0.36	0.92	0.37	0.29	0.40	0.54	0.19	0.45	0.12	0.71	0.00	0.46	0.55	0.30	0.59	0.59	0.55	0.86	0.23	0.63	0.54	0.97	0.83	1.81	0.90	0.70	1.11	0.77	0.28	0.68	0.55	0.18	0.33	0.12

			Customer Sample ID	GR01-SP201A	GR01-SP202A	GR01-SP202A	GR01-SP203A	GR01-SP203A	GR01-SP204A	GR01-SP204A	GR01-SP204A	GR01-SP205A	GR01-SP205A	GR01-SP205A	GR01-SP206A	GR01-SP206A	GR01-SP207A	GR01-SP207A	GR01-SP208A	GR01-SP208A	GR01-SP209A	GR01-SP210A	GR01-SP210A	GR01-SP210A	GR01-SP211A	GR01-SP211A	GR01-SP212A	GR01-SP212A	GR01-SP213A	GR01-SP213A	GR01-SP213A	GR01-SP214A	GR01-SP214A	GR01-SP215A	GR01-SP215A	GR01-SP216A	GR01-SP216A	GR01-SP218A	GR01-SP218A	GR01-SP218A
			Depth	0.50-0.60	0.10-0.20	0.50-0.60	0.10-0.20	0.30-0.40	0.10-0.20	0.20-0.30	0.50-0.60	0.10-0.20	0.30-0.40	0.50-0.60	0.10-0.20	0.20-0.30	0.30-0.40	0.50-0.60	0.10-0.20	0.50-0.60	0.00-0.10	0.00-0.10	0.20-0.30	0.50-0.60	0.10-0.20	0.50-0.60	0.10-0.20	0.50-0.60	0.10-0.20	0.30-0.40	0.50-0.60	0.10-0.20	0.50-0.60	0.10-0.20	0.50-0.60	0.20-0.30	0.50-0.60	0.00-0.10	0.20-0.30	0.50-0.60
Test	**Method**	**Units**	**LOD**																																					
PFOA (335-67-1)	TM440	ug/kg	<0.5	3.51	6.61	3.68	0.892	1.06	2.08	1.98	1.17	4.51	4.45	1.16	3.19	4.86	1.37	1.66	5.53	7.48	1.52	0.949	1.78	0.872	0.993	1.51	5.63	2.58	1.73	1.75	2.12	2.91	10.1	6.72	4.78	1.09	2.14	2.16	3.21	4.62
PFOA HQ (C4SL in column to right)	7.60			0.46	0.87	0.48	0.12	0.14	0.27	0.26	0.15	0.59	0.59	0.15	0.42	0.64	0.18	0.22	0.73	0.98	0.20	0.12	0.23	0.11	0.13	0.20	0.74	0.34	0.23	0.23	0.28	0.38	1.33	0.88	0.63	0.14	0.28	0.28	0.42	0.61
PFHxS (355-46-4)	TM440	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFHxS HQ (C4SL in column to right)	8.10																																							
PFNA (375-95-1)	TM440	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFNA HQ (C4SL in column to right)	7.30																																							
Total PFOS	TM440	ug/kg	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	1.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	1.19	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
PFOS HQ (C4SL in column to right)	13.00																								0.12							0.09						
HAZARD INDEX				0.46	0.87	0.48	0.12	0.14	0.27	0.26	0.15	0.59	0.59	0.15	0.42	0.64	0.18	0.22	0.73	0.98	0.20	0.12	0.23	0.11	0.13	0.20	0.86	0.34	0.23	0.23	0.28	0.38	1.33	0.98	0.63	0.14	0.28	0.28	0.42	0.61

			Customer Sample ID	GR01-SP219A	GR01-SP219A	GR01-SP219A	GR01-SP220A	GR01-SP220A	GR01-SP220A	GR01-SP221A	GR01-SP221A	GR01-SP221A	GR01-SP222A	GR01-SP222A	GR01-SP223A	GR01-SP223A	GR01-SP223A	GR01-SP224A	GR01-SP224A	GR01-SP224A	GR01-SP225A	GR01-SP225A	GR01-SP225A	GR01-SP226A	GR01-SP226A	GR01-SP227A	GR01-SP227A	GR01-SP228A	GR01-SP228A	GR01-SP229A	GR01-SP229A	GR01-SP230A	GR01-SP231A	GR01-SP231A	GR01-SP232A	GR01-SP232A	GR01-SP233A	GR01-SP233A	GR01-SP234A	GR01-SP234A
			Depth	0.10-0.20	0.30-0.40	0.50-0.60	0.10-0.20	0.20-0.30	0.50-0.60	0.10-0.20	0.30-0.40	0.50-0.60	0.20-0.30	0.50-0.60	0.10-0.20	0.30-0.40	0.50-0.60	0.00-0.10	0.20-0.30	0.50-0.60	0.10-0.20	0.30-0.40	0.50-0.60	0.00-0.10	0.50-0.60	0.10-0.20	0.30-0.40	0.00-0.10	0.50-0.60	0.10-0.20	0.50-0.60	0.50-0.60	0.10-0.20	0.50-0.60	0.10-0.20	0.20-0.30	0.10-0.20	0.20-0.30	0.10-0.20	0.20-0.30
Test	**Method**	**Units**	**LOD**																																					
PFOA (335-67-1)	TM440	ug/kg	<0.5	1.38	1.07	0.964	1.47	2.1	1.95	2.25	2.88	12.8	11.4	5.95	2.25	11.1	5.13	1.23	<0.5	1.11	2.25	1.13	2.55	5.44	5.99	3.75	4.02	3.93	12.6	3.05	2.68	4.92	1.85	1.02	2.58	2.27	1.13	0.996	0.969	1.13
PFOA HQ (C4SL in column to right)	7.60			0.18	0.14	0.13	0.19	0.28	0.26	0.30	0.38	1.68	1.50	0.78	0.30	1.46	0.68	0.16		0.15	0.30	0.15	0.34	0.72	0.79	0.49	0.53	0.52	1.66	0.40	0.35	0.65	0.24	0.13	0.34	0.30	0.15	0.13	0.13	0.15
PFHxS (355-46-4)	TM440	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFHxS HQ (C4SL in column to right)	8.10																																							
PFNA (375-95-1)	TM440	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFNA HQ (C4SL in column to right)	7.30																																							
Total PFOS	TM440	ug/kg	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	1.07	<0.6	<0.6	<0.6	<0.6	<0.6	0.897	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
PFOS HQ (C4SL in column to right)	13.00											0.08						0.07																						
HAZARD INDEX				0.18	0.14	0.13	0.19	0.28	0.26	0.30	0.38	1.77	1.50	0.78	0.30	1.46	0.68	0.23	0.00	0.15	0.30	0.15	0.34	0.72	0.79	0.49	0.53	0.52	1.66	0.40	0.35	0.65	0.24	0.13	0.34	0.30	0.15	0.13	0.13	0.15

			Customer Sample ID	GR01-SP234A	GR01-SP235A	GR01-SP235A	GR01-SP236A	GR01-SP236A	GR01-SP236A	GR02-SP202A	GR02-SP202A	GR02-SP204A	GR02-SP205A	GR02-SP205A	GR02-SP205A	GR02-SP206A	GR02-SP206A	GR02-SP206A	GR02-SP207A	GR02-SP207A	GR02-SP208A	GR02-SP208A	GR02-SP210A	GR02-SP210A	GR02-SP211A	GR02-SP211A	GR02-SP211A	GR02-SP213A	GR02-SP213A	GR02-SP214A	GR02-SP214A	GR02-SP215A	GR02-SP215A	GR02-SP216A	GR02-SP217A	GR02-SP217A	GR02-SP218A	GR02-SP218A	GR02-SP219A	GR02-SP219A
			Depth	0.50-0.60	0.10-0.20	0.30-0.40	0.00-0.10	0.20-0.30	0.50-0.60	0.10-0.20	0.20-0.30	0.00-0.10	0.10-0.20	0.30-0.40	0.50-0.60	0.00-0.10	0.20-0.30	0.50-0.60	0.30-0.40	0.50-0.60	0.00-0.10	0.50-0.60	0.00-0.10	0.20-0.30	0.10-0.20	0.30-0.40	0.50-0.60	0.10-0.20	0.50-0.60	0.20-0.30	0.50-0.60	0.10-0.20	0.30-0.40	0.00-0.10	0.10-0.20	0.30-0.40	0.00-0.10	0.10-0.20	0.10-0.20	0.30-0.40
Test	**Method**	**Units**	**LOD**																																					
PFOA (335-67-1)	TM440	ug/kg	<0.5	1.12	3.71	5.94	2.5	1.37	3.8	1.64	1.73	2.66	0.74	2.9	3.35	1.51	2.27	1.59	2.22	3.21	1.79	1.94	0.852	2.12	6.67	10.1	6.88	3.67	8.21	7.09	9.26	3.73	3.18	3.92	6.49	5.53	2.04	4.93	1.81	1.75
PFOA HQ (C4SL in column to right)	7.60			0.15	0.49	0.78	0.33	0.18	0.50	0.22	0.23	0.35	0.10	0.38	0.44	0.20	0.30	0.21	0.29	0.42	0.24	0.26	0.11	0.28	0.88	1.33	0.91	0.48	1.08	0.93	1.22	0.49	0.42	0.52	0.85	0.73	0.27	0.65	0.24	0.23
PFHxS (355-46-4)	TM440	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFHxS HQ (C4SL in column to right)	8.10																																							
PFNA (375-95-1)	TM440	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.927	<0.5	<0.5	<0.5	<0.5
PFNA HQ (C4SL in column to right)	7.30																																	0.13				
Total PFOS	TM440	ug/kg	<0.6	<0.6	<0.6	0.87	<0.6	<0.6	<0.6	<0.6	<0.6	0.799	<0.6	<0.6	<0.6	1.85	1.01	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	0.881	<0.6	<0.6	0.829	<0.6	<0.6	<0.6	1.48	<0.6	<0.6	<0.6	<0.6	<0.6	1.23	<0.6	<0.6
PFOS HQ (C4SL in column to right)	13.00					0.07						0.06				0.14	0.08								0.07			0.06				0.11						0.09		
HAZARD INDEX				0.15	0.49	0.85	0.33	0.18	0.50	0.22	0.23	0.41	0.10	0.38	0.44	0.34	0.38	0.21	0.29	0.42	0.24	0.26	0.11	0.28	0.95	1.33	0.91	0.55	1.08	0.93	1.22	0.60	0.42	0.52	0.85	0.85	0.27	0.74	0.24	0.23

			Customer Sample ID	GR01-SP209B	GR01-SP209B	GR02-SP216C	POS-204	POS-204	POS-204A	POS-204A	POS-204A	POS-SP201	POS-SP201	POS-SP201	POS-SP202	POS-SP202	POS-SP203	POS-SP203	POS-SP205	POS-SP205	POS-SP207	POS-SP207	POS-SP207	POS-SP208	POS-SP209	POS-SP209	POS-SP209	POS-SP210	POS-SP210	POS-SP211	POS-SP211	POS-SP212	POS-SP212	POS-SP212	POS-SP213	POS-SP213	POS-SP213	POS-SP214	POS-SP214	POS-SP201A
			Depth	0.30-0.40	0.50-0.60	0.00-0.10	0.00-0.10	0.30-0.40	0.10-0.20	0.20-0.30	0.40-0.50	0.00-0.10	0.20-0.30	0.40-0.50	0.00-0.10	0.40-0.50	0.20-0.30	0.40-0.50	0.00-0.10	0.40-0.50	0.00-0.10	0.20-0.30	0.40-0.50	0.00-0.10	0.00-0.10	0.20-0.30	0.40-0.50	0.00-0.10	0.30-0.40	0.00-0.10	0.40-0.50	0.00-0.10	0.20-0.30	0.40-0.50	0.00-0.10	0.20-0.30	0.40-0.50	0.00-0.10	0.20-0.30	0.10-0.20
Test	**Method**	**Units**	**LOD**																																					
PFOA (335-67-1)	TM440	ug/kg	<0.5	1.26	1.32	2.86	4.9	4.12	4.8	4.16	4.75	2.02	2.25	4.35	6.49	2.71	5.26	2.15	1.86	1.1	9.08	5.24	6.96	4.31	2.4	2.34	2.84	2.31	2.09	2.78	7.15	2.27	2.98	2.71	2.7	1.07	1.65	5.76	4.48	6.82
PFOA HQ (C4SL in column to right)	7.60			0.17	0.17	0.38	0.64	0.54	0.63	0.55	0.63	0.27	0.30	0.57	0.85	0.36	0.69	0.28	0.24	0.14	1.19	0.69	0.92	0.57	0.32	0.31	0.37	0.30	0.28	0.37	0.94	0.30	0.39	0.36	0.36	0.14	0.22	0.76	0.59	0.90
PFHxS (355-46-4)	TM440	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFHxS HQ (C4SL in column to right)	8.10																																							
PFNA (375-95-1)	TM440	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFNA HQ (C4SL in column to right)	7.30																																							
Total PFOS	TM440	ug/kg	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	2	0.987	1.19
PFOS HQ (C4SL in column to right)	13.00																																			0.15	0.08	0.09
HAZARD INDEX				0.17	0.17	0.38	0.64	0.54	0.63	0.55	0.63	0.27	0.30	0.57	0.85	0.36	0.69	0.28	0.24	0.14	1.19	0.69	0.92	0.57	0.32	0.31	0.37	0.30	0.28	0.37	0.94	0.30	0.39	0.36	0.36	0.14	0.22	0.91	0.67	0.99

			Customer Sample ID	POS-SP201A	POS-SP202A	POS-SP202A	POS-SP203A	POS-SP203A	POS-SP205A	POS-SP205A	POS-SP207A	POS-SP207A	POS-SP208A	POS-SP208A	POS-SP209A	POS-SP209A	POS-SP210A	POS-SP210A	POS-SP210A	POS-SP211A	POS-SP211A	POS-SP211A	POS-SP212A	POS-SP212A	POS-SP213A	POS-SP213A	POS-SP214A	POS-SP214A	POS-SP214A	POS-SP211B	POS-SP211B	POS-SP211B	POS-SP211C	POS-SP211C	POS-SP211C
			Depth	0.50-0.60	0.20-0.30	0.50-0.60	0.10-0.20	0.30-0.40	0.10-0.20	0.50-0.60	0.30-0.40	0.50-0.60	0.10-0.20	0.50-0.60	0.30-0.40	0.50-0.60	0.00-0.10	0.20-0.30	0.50-0.60	0.10-0.20	0.30-0.40	0.50-0.60	0.30-0.40	0.50-0.60	0.10-0.20	0.30-0.40	0.10-0.20	0.30-0.40	0.50-0.60	0.00-0.10	0.30-0.40	0.40-0.50	0.10-0.20	0.20-0.30	0.50-0.60
Test	**Method**	**Units**	**LOD**																																
PFOA (335-67-1)	TM440	ug/kg	<0.5	4.19	6.23	3.36	2.8	2.58	2.38	2.68	11.7	4.68	5.35	18.3	1.8	7.75	1.24	1.78	1.31	1.29	1.61	1.99	2.96	1.44	1.13	1.02	2.69	3.06	10.2	1.58	1.16	1.62	1.16	1.03	2.17
PFOA HQ (C4SL in column to right)	7.60			0.55	0.82	0.44	0.37	0.34	0.31	0.35	1.54	0.62	0.70	2.41	0.24	1.02	0.16	0.23	0.17	0.17	0.21	0.26	0.39	0.19	0.15	0.13	0.35	0.40	1.34	0.21	0.15	0.21	0.15	0.14	0.29
PFHxS (355-46-4)	TM440	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFHxS HQ (C4SL in column to right)	8.10																																		
PFNA (375-95-1)	TM440	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFNA HQ (C4SL in column to right)	7.30																																		
Total PFOS	TM440	ug/kg	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	5.45	3.39	0.978	<0.6	<0.6	<0.6	1.29	1.17	3.85
PFOS HQ (C4SL in column to right)	13.00																								0.42	0.26	0.08				0.10	0.09	0.30
HAZARD INDEX				0.55	0.82	0.44	0.37	0.34	0.31	0.35	1.54	0.62	0.70	2.41	0.24	1.02	0.16	0.23	0.17	0.17	0.21	0.26	0.39	0.19	0.15	0.13	0.77	0.66	1.42	0.21	0.15	0.21	0.25	0.23	0.58

Hazard Indices (Residential & Homegrown Produce)

Min	Ave.	Max
0.00	0.56	19.02

Appendix E

HISTORICAL INFORMATION RELATED TO PFOA RELEASES FROM THE SITE

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Regulation 61 Notice – Part 6: Historic information related to releases of PFOA from the site.

Issued 20th December 2023

Environment Agency Request

We require you to provide total mass releases of PFOA to air, land, water and in products from first production (ICI period) on site to 03/10/2023.

PFOA Mass Balance

Ammonium perfluorooctanoate (APFO) is a perfluorinated anionic surfactant. It has a chemical formula of $C_8F_{15}O_2NH_4$.

APFO is referred to as PFOA (perfluooroctanoic acid; $C_8F_{15}O_2H$); this is a similar compound with the difference being that the ammonium counter ion in APFO is replaced by a hydrogen ion. However, in solution, they both dissociate to the same $C_8F_{15}O_2$- anion with APFO being significantly more soluble than PFOA.

APFO was used as a charge stabilising surfactant during the polymerisation of tetrafluoroethylene (TFE) in an aqueous medium to make polytetrafluoroethylene (PTFE) dispersions.

APFO was last used in Q1 2012 and was replaced with SAA-1000 (30% solution of EEA-NH4).

Since first production at the Hillhouse site the total mass releases of PFOA to air, land, water and in product is approximately 178 tonnes. The approximate break down of these emissions is set out below:

- Emission to air 49.1 tonnes
- Emission to land (i.e. landfill) 6.2 tonnes
- Emission to water 54.3 tonnes
- Within product (sent to customers) 63.3 tonnes
- Captured and destroyed through incineration 5.1 tonnes

Table 1 provides a summary of PFOA mass release during period of PFOA use at the Hillhouse site.

Residual PFOA mass emissions from Q2 2012 onwards are already accounted for in the in the 178 tonnes total mass release from legacy PFTE production.

Since Q2 2012 PFOA emission from the Hillhouse site are typically:

- Emission to air <255g per year due to PFOA presence as an impurity in PTFE lubricant grades
- Emission to land approximately 1.2 kg per year to landfill (filter cake from effluent treatment process)
- Approximately 4 kg per year PFOA emission to water (residual effluent contamination from historic use of PFOA and environmental background levels)
- Within product <125g PFOA per year is inadvertently generated in the PTFE lubricant manufacturing process
- Approximately 750g per year PFOA captured in the atmospheric scrubber and then destroyed though high temperature incineration at an external site.

Table 2 provides a summary of PFOA mass release after period of PFOA use at Hillhouse (since Q2 2021 to October 2023).

Table 1: Summary of PFOA mass release during period of PFOA use at Hillhouse

Year	Notes	Air (t)	Land (t)	Water (t)	Product (t)	Captured and incinerated (t)	Total used (t)
1952-1953	Imperial Chemical Industries Ltd. (ICI) commenced TFE & PTFE manufacture at the Hillhouse site in 1952. These were granular products with no APFO use.	-	-	-	-	-	-
1954-1959	ICI development of dispersion polymerisation recipes from 1954 to1958. 20tpa TFE pilot plant operational in 1955 with a 200tpa TFE plant operational from 1956.	0.7	0.1	0.7	0.9	-	2.4
1960-1969	-	5.0	0.5	5.1	6.0	-	16.5
1970-1979	-	6.6	0.6	6.8	7.9	-	22.0
1980-1989	In 1981 ICI established a joint venture with Asahi Glass Co., Ltd. (AGC) - "Asahi ICI Fluoropolymers Co., Ltd."	8.9	0.9	9.0	10.6	-	29.3
1990-1999	In 1999 AGC became the sole owner of the joint venture including the PTFE businesses – "Asahi Glass Fluoropolymers Co., Ltd.".	13.2	1.4	14.2	17.7	-	46.4
2000-2009	Commencement of PFOA capture and destruction by incineration from 2005. In 2007 the UK Hillhouse site and Amsterdam offices merged & became "AGC Chemicals Europe, Ltd." (AGCCE) From 2007 emission to atmosphere reduced by atmospheric scrubber and effluent emission reduced by ion-exchange resin (IER) plant.	14.7	2.6	17.2	18.8	2.1	55.4
2010-2012	From 2011 further IER effluent treatment plant operational. PFOA not used after Q1 2012.	0.1	0.2	1.3	1.4	2.9	5.9
	TOTAL (t)	**49.1**	**6.2**	**54.3**	**63.3**	**5.1**	**178.0**

Table 2: Summary of PFOA mass release after period of PFOA use at Hillhouse

Year	Notes	Air (t)	Land (t)	Water (t)	Product (t)	Captured and incinerated (t)	Total used (t)
Q2 2012 - October 2023	Residual PFOA emission from Q2 2012 onwards is already accounted for in the mass release total from legacy PFTE production emission and is not included in the Table 1 total. Residual PFOA emissions in effluent are from previous use of PFOA and environmental background levels.	0.0	0.0	0.2	0.0	0.0	-



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