PFAS Site Profile

PFAS Site Profiles were developed as part of the Environment Agency PFAS Risk Screening Project and represent an understanding of PFAS uses and occurrences from specific industry sectors at the time of writing. This profile focuses on Landfills.

Landfills

1. INTRODUCTION

1.1 Overview

Per- and poly-fluoroalkyl substances (PFAS) are a broad group of more than 12,000 synthetic fluorinated organic chemicals. PFAS have been used in a wide variety of consumer products and industrial applications since the 1940s because of their unique chemical and physical properties, including oil, water and stain repellence, temperature and chemical resistance, and surfactant properties. These properties mean they are also extremely persistent in the environment. Some PFAS are bio-accumulative and toxic, and/or highly mobile.

Increasing awareness of the widespread presence of PFAS has heightened regulatory concerns about their potential risks to human health and the environment. To ensure effective actions are implemented the Environment Agency needs to better understand the potential sources of PFAS, the mechanisms of transport (pathways) and the relative significance of these substances in the environment.

As part of the Environment Agency PFAS risk screening project (Phases 1 to 4 carried out between 2020 to 2025) Jacobs developed individual site profiles for several potential high risk site types. They focus on specific industry sectors, representing potentially important sources of PFAS, whether from use or manufacture, with the potential for release into the environment. The original landfill profile was prepared by Jacobs in 2022 and additional material was added by the Environment Agency in 2025.

The primary aim of these profiles is to help those parties involved in the regulation, investigation and remediation of sites where these problem chemicals present a risk to health and the wider environment. These are not definitive studies, but they introduce some of the technical considerations that need to be borne in mind when assessing a particular type of facility. Representing an understanding of PFAS at the time of writing and with published literature notably increasing continuously as practitioners and regulators seek to improve their understanding of PFAS, users must make their own appropriate assessments with current knowledge and specific to their site.

The reader is referred to Ross and Hurst (2019) and ITRC (2023) for more detailed information on PFAS chemistry, properties, fate and transport, risk assessment and remediation, to Glüge et al. (2020) for a review of the diversity of uses of PFAS, Ross (2023) for an overview of the uses of PFAS to assist with identification of sites of concern, and Defra (2024) for an investigation of PFAS in landfill leachate.

1.2 Site Profile Selection and Preparation

The site types for which site profiles have been developed in this project have been selected to represent potentially important users and sources of PFAS release to the environment in terms of quantity, frequency and historical records available.

Technical and scientific publications, fact-sheets, regulations, product websites, articles and online newspaper reporting interviews on the PFAS discussions were researched and reviewed to obtain information on the use of PFAS, with particular reference to the United Kingdom.

Each site profile includes site background information focused on PFAS use and identification of specific zones (where applicable), description of the processes involving PFAS, types of PFAS likely to be present, and an indication of the impact to water and soil. Brief examples and case studies from the literature are also provided.

For each site type a number of zones or activities have been identified where PFAS may be used. It should be recognised that not every site of this type will have all the activities identified. For example, a fire station site may be anything from a building where fire tenders containing Aqueous Film-Forming Foam (AFFF) are based (but filling, maintenance and training happen elsewhere) to a hub with a wide range of activities such as fire practice training, concentrate storage etc. in addition to vehicle storage.

Site profiles have been created for the following site types identified as potentially important potential sources of PFAS release to the environment:

- Civil and Military Airfields and Airports;
- Control of Major Accident Hazards (COMAH) Regulated Sites;
- Fire-fighting Grounds and Fire Stations;
- Landfills;
- Metal Manufacturing and Finishing;
- Military Bases (other than Air Transport Sites);
- Oil and Gas Industry (onshore exploration and extraction operations);
- Paper and Cardboard Manufacturing;

- Refineries and Fuel Sites;
- Textiles, Upholstery, Leather, Apparel and Carpets (TULAC) Manufacturing; and
- Waste Water Treatment Works.

Additional site profiles which do not relate directly to a particular site type have been developed for the following subject areas, which have potential applications within many different site types:

- Aqueous Film-Forming Foam (AFFF); and
- Fire Suppression Systems.

1.3 Methodology for Calculating Source Potential

For the purposes of the risk prioritisation project for which these site profiles were originally developed, an overall source potential has been developed for each site profile, based on professional judgment informed by the literature review. The source potential is constructed considering the magnitude and likelihood of PFAS presence and use in site profile zones.

The magnitude has been developed with a score of 1–5 (1 – low; 5 – high) based on the expected quantum of PFAS in the activity in the zone. For example, fire training practice using AFFF is recorded as high magnitude, because of the high volume and concentration of PFAS in this activity. Aircraft maintenance using hydraulic fluids containing PFAS is low magnitude because of the relatively low volume and concentration.

The likelihood for each activity is scored 1–5 (1 – low; 5 – high) based on the likelihood of a release to the environment occurring, taking into account frequency of activities where release may occur, and likelihood of loss of containment. For example, fire training practice using AFFF is likely to take place regularly at the same location over a period of years, with potential loss to ground or surface water, so is scored high. Although aircraft maintenance is likely to be undertaken all the time, significant accidental loss of containment is likely to be infrequent, so this is scored low.

The magnitude and likelihood are then multiplied to give the source potential (scored 1–25). It should be noted that these scores are generic and subjective and are based on professional judgment and should continue to be refined as more information becomes available. Further refinement could include expansion to consider changes in practice over the years as pollution prevention practices have improved.

2. BACKGROUND TO LANDFILLS

Landfills are potential receivers of PFAS-containing waste materials from domestic, commercial and industrial sources. This site profile focuses on landfills accepting non-hazardous municipal solid wastes (MSW) and the potential type of PFAS encountered at this type of site.

The composition and make up of wastes have changed significantly over the last 70 years. In the mid-20th century it was common practice to burn household waste producing large quantities of ash. With the introduction of greater use of chemicals and plastics in the latter half of the century the composition of waste changed. Shifts in government policies aimed at adopting greater reliance on recycling and later the drive towards a circular economy has again changed the composition of the wastes disposed of in landfills. Landfill design and engineering have also developed over time with engineered systems being introduced during the late 20th century. As a result, the risk posed by landfills varies greatly between sites, each need to be considered individually when assessing and managing the risks.

3. CASE STUDIES

Numerous studies from around the world have been undertaken to measure and assess landfill leachate, including MSW landfills, construction and demolition landfills and landfills which have received industrial waste (Lang et al., 2017); (Gallen et al., 2017); (Gallen et al., 2016); (Knutsen et al., 2019); (Fuertes et al., 2017); (Busch et al., 2010). These studies have demonstrated the ubiquitous presence of PFAS in landfill leachates. A summary of the key findings from these studies is presented below:

- A study by Lang et al. (2017) measured the concentration of 70 PFAS in 95 samples of leachates from US landfills containing waste of different ages and in varying climates. The emphasis of the sampling strategy was to collect raw leachate as it leaves the landfill for offsite treatment at a Waste Water Treatment Plant (WWTP). All leachates contained PFAS compounds, with PFHxA, PFHpA, PFOA and PFHxS detected in all samples. The highest individual PFAS concentration was of 5:3 FTCA, with the mean 5:3 FTCA concentration at least three times higher than PFOA and PFOS combined. Younger waste was found to have higher concentrations of PFNA, 8:2 FTCA, 5:3FTCA and PFBS, which was thought could either be due to reduction in concentrations over time or changes in the types of PFAS used in products, for example PFBS and PFNA used as alternatives to PFOS and PFOA.
- A similar study was undertaken in Australia of measurements of nine PFAS (PFCAs and PFSAs) in leachate from 27 landfills (Gallen et al., 2017). The findings suggested PFHxA was the predominant PFAS, and mean PFAS concentrations were higher in leachate in current operational municipal landfills compared to closed ones. It was also reported that landfills accepting primarily construction and demolition wastes produced leachate that had higher mean PFAS concentrations than municipal landfills. Gallen et al. (2017) concluded that the contribution of leachate to the total load of PFAS entering WWTPs in Australia is minor compared to domestic waste water sources.
- Knutsen et al. (2019) investigated the presence of four short-chain PFAS and twenty-four long-chain PFAS in leachate and sediment from ten Norwegian landfills, receiving primarily MSW and in some cases industrial waste, contaminated soil and sewage sludge. Sampling of leachate was conducted as close as possible to where the leachate left the landfill and included both raw leachate and raw leachate diluted with storm water or groundwater. PFAS were ubiquitous, being detected in all landfill leachate samples. There was a

substantial variation in leachate concentrations observed between landfills, with the total sum of 28 PFAS per landfill ranging from 320–11,000 ng/l. PFBS and PFOS were the most abundant short chain and long chain PFAS measured respectively. Knutsen concluded that the relatively high abundance of short chain PFAS, particularly PFBS, in leachate demonstrates that considerable amounts of PFBS (and PFBS precursor) containing waste have been disposed of in Norwegian landfills. In addition, the presence of PFOS in leachate indicates that the phase-out in new commercial products had not reduced their concentrations in leachate entirely, due to both the presence in waste being currently deposited at the landfills, and the lag-time of leaching from waste previously landfilled (Knutsen et al., 2019).

- Fuertes et al. (2017) assessed PFAS in leachates from four municipal solid waste landfill sites located across northern Spain. Data were collected on the occurrence and concentration of eleven perfluoroalkyl carboxylates (PFCAs) and five perfluoroalkyl sulfonates (PFSAs). Total PFASs in raw leachates had a maximum concentration of 1378.9 ng/l, while PFAS in treated samples were twice as high, with total PFAS concentrations up to 3162.3 ng/l. PFCAs accounted for the majority of the detected PFAS, with perfluorooctanoic acid (PFOA) the dominant compound in raw leachates (42.6%), followed by shorter chain PFHxA (30.1%), PFPeA and PFBA. It was concluded that the overall increase of the PFAS content as well as the change in the PFAS profile after leachate treatment, could be explained by the possible degradation of PFAS precursors such as fluorotelomer alcohols or fluorotelomer sulfonates (Fuertes et al., 2017).
- A study in Germany sampled and analysed untreated and treated leachate from 22 landfill sites for 43 polyfluoroalkyl compounds (Busch et al., 2010). The dominating compounds in untreated leachate were PFBA (mean contribution 27%) and PFBS (24%). The following were also present at more than 1% of the sum polyfluoroalkyl compounds concentration; PFHxA (15%), PFOA (12%), PFPeA (6.0%), PFHpA (4.0%), 6:2 FTS (3.7%), PFOS (2.7%) and PFHxS (2.3%).
- Harrad et al. (2019) collected leachate samples from 40 landfills across the Republic of Ireland. These samples were tested for PFAS including PFBS, PFHxS, PFOS, PFOA, PFNA and various perfluorinated sulfonamides. PFOA and PFNA were detected in all samples, and PFBS, PFHXS and PFOS were detected in at least 80% of samples. The highest overall concentrations were observed of PFBS. Higher overall concentrations of PFAS were detected in landfills which had operated more recently and were lined. It was concluded the higher concentrations in lined landfills are likely related to the fact that lined landfills are found to retain organic matter leading to a higher organic content of leachate from such landfills (Harrad et al., 2019).

The various studies from around the world have indicated that PFAS are routinely detected in landfill leachate due to consumer products and other waste streams containing PFAS which have been disposed to landfill. Short chain (C4 – C7) PFCAs, such as PFBS, are commonly more abundant than longer-chain ones. This was suggested by some of the studies to be due to the possible degradation and/or biotransformation of PFAS precursors such as fluorotelomer alcohols or fluorotelomer sulfonates. The fate and transformation of PFAS inside landfills are complex, affected by combinations of external (e.g. climate, waste input) and internal (e.g. biodegradation, sorption) factors (Hamid et al., 2018).

3.1 Environment Agency Landfill Sampling

The Department for Environment Food and Rural Affairs (Defra) and the Environment Agency are currently evaluating the sources and extent of PFAS and other Persistent Organic Pollutant (POP) contamination in landfills in England. To date, this programme of work has consisted of a number of phases:

Defra (2019 – 2022) Landfill Leachate Survey:

- Phase 1 - included a literature review, confirmation of site selection for a survey of landfill leachate and analytical method development and optimisation (Defra, 2019).
- Phase 2 - included the site selection, sampling methodology, collection, and analysis of raw and treated landfill leachates samples from 17 permitted operational and closed landfill sites accepting predominantly MSW (Defra, 2024).

Environment Agency (2020-2022) PFAS Risk Screening Project:

- Phase 3 - included the site selection, sample collection, and analysis of raw and treated landfill leachates samples from 10 permitted operational and closed non-hazardous and 15 non-permitted historic non-hazardous landfill sites accepting predominantly MSW.

The objectives of the studies mentioned above were:

- to build an overall picture of chemical substances present in landfill leachates that are known to be, or suspected to be, harmful to the environment;
- to explore their potential removal during on-site leachate treatment processes; and
- to provide initial data on potential exposure pathways that may arise from discharge of raw and treated leachates into the environment.

Raw and treated leachate samples were analysed for 17 PFAS, namely, PFBA, PFPA, PFHxA, PFHpA, PFOA, PFNA, PFBS, PFPS, PFHxS, PFHpS, PFOS, 5:3 FTCA, 6:2 FTS, 8:2 FTOH, Gen-X (HFPO-DA) F-53B, PFECHS and sum of PFAS. Specific sampling methodologies were adopted to avoid cross contamination. A summary of the main findings is provided below and provides a snapshot of targeted PFAS identified in landfill leachates in England:

- Five compounds account for about 85 to 90 per cent of the total PFAS measured and there is a consistent order of prevalence, namely: **PFBS > 5:3 FTCA > PFHxA > PFOA ≈ PFBA**.
- PFAS concentrations in leachates show a strong correlation with two leachate strength indicators, namely ammoniacal-nitrogen (NH_3-N) and Chemical Oxygen Demand (COD). This suggests they are released during the biodegradation of degradable organic materials, and this is consistent with other studies (Gallen, 2017; Harrad et al., 2019).

- The PFAS data are left censored and right skewed, due to frequent non-detects and outliers within the dataset. This makes statistical analysis and data presentation more challenging.
- The highest individual concentrations recorded were PFBS (maximum 87.10 µg/l), PFBA (maximum 32.50 µg/l) and PFOA (maximum 26.90 µg/l).
- Raw leachate and treated leachates generally contain the highest sums of PFAS. Raw leachates generally contain higher proportions of PFBS, PFBA, PFPA, PFHpA, PFOA, PFHxS and 5:3 FTCA whereas treated leachates generally containing smaller proportions of 5:3 FTCA.
- There was a high percentage removal of 5:3 FTCA during aerobic biological treatment (SBR), averaging 98.2% at fourteen facilities (range 98.0% to 99.9%). There was also some removal or more likely biotransformation of other fluorotelomers during aerobic biological treatment (SBR).
- Downgradient groundwater samples typically contain greater sums of PFAS than upgradient groundwater samples. Downgradient groundwater samples typically detect similar PFAS as observed in leachate samples. Exceptions to this may be a sign of other sources or that other PFAS are leaching from elsewhere within the landfill.
- Landfills whose infill dates are post-Landfill Directive (2001) generally have higher percentages of PFBS in treated leachates, with PFBS being the dominant PFAS in most cases. The post-Landfill Directive treated leachates generally contain similar percentages of a number of PFAS and generally have similar substances detected. Landfills whose infill dates are pre-Landfill Directive have more variation in the proportions of PFAS detected in treated leachates. Similar patterns are observed when looking at the landfill status. This is potentially due to the general likelihood of operational landfills to be pre/post- or post-Landfill Directive and closed landfills to be pre-Landfill Directive.
- Raw leachates are more varied in the proportions of PFAS than treated leachates. PFBS is generally dominant in pre/post- and post-Landfill Directive sites. 5:3 FTCA, which was not detected in many of the treated leachates is well represented in the raw leachate samples. Similar to the treated leachates the raw leachates from pre-Landfill Directive sites tend to be more variable in terms of PFAS proportions and types. 5:3 FTCA is also not well represented in the groundwater samples.
- The PFAS detected are more variable between downgradient groundwater samples in pre- and pre/post-Landfill Directive sites. Generally, fewer varieties are detected in pre-Directive landfills, with PFOA and PFBS being relatively common. Pre/post-Directive sites generally detect higher percentages of PFPA, PFBS and PFOS.

The landfill type and waste categories are not varied enough to be able to draw any meaningful conclusions from at this stage. Further refining of the waste types and more sampling from hazardous sites, as well as more information about any leachate control measures at each landfill would allow further statistics to be run.

3.2 English Landfill Considerations

A review of landfill types within England was completed during PFAS Phase 2. The review identified two main groups of landfill types in England, permitted post-Landfill Directive, (i) engineered non-hazardous and hazardous, and (ii) historic non-engineered landfill, and PFAS risk evaluation was completed based on the landfill dataset downloaded from the Defra Data Services Platform.

PFAS presence in landfills can be related to type and date of waste input. Co-disposal landfills with waste input dates that range from pre-1976 to end of 2001 and which were licensed to accept household, commercial, industrial (now classified as non-hazardous wastes) and special (now hazardous) wastes. These waste types included liquid wastes commonly co-disposed with solid wastes. It is more likely that these earlier landfills will have received wastes containing PFAS. Other landfill types permitted to receive waste categorised as non-biodegradable wastes and inert wastes are considered less likely to have received PFAS containing waste.

Based on information obtained from the Defra Data Service analysed in PFAS Phase 2 some consideration has been given based on input dates, type of waste, and the presence of leachate control. Historical landfills with a last-recorded input date after 1960 and with no leachate control have a higher likelihood of having received PFAS-containing waste. Historical landfills with a date of last input of waste pre-1960 were excluded on the basis that PFAS were unlikely to have been used in England at that time. Landfills receiving inert waste only were also considered less likely to have PFAS-containing waste.

4. PROCESS

PFAS may be present in a wide range of waste streams disposed of to landfill including consumer products and domestic waste, manufacturing and packaging waste, and building and construction waste. The fate and transformation of PFAS inside landfills are complex, affected by combinations of external (e.g. climate, waste input) and internal (e.g. biodegradation, sorption) factors. Release of most of the PFAS from waste to leachate is thought to occur as a result of biodegradation, closely associated with onset of the methanogenic phase (Defra, 2024). The methane yielding stage also results in higher pH (>7) of leachate which appears to correlate with greater mobility of PFAS (Hamid et al., 2018). Leachate containing PFAS can either be directly discharged to ground (from older landfills without engineering containment measures, which was common practice in the 1970s and 1980s in the UK), or be collected for treatment in engineered/contained modern landfills.

5. KEY PFAS CONTAMINANTS OF CONCERN

Many types of PFAS may be present in UK landfills. The type of PFAS present in municipal waste is likely to include short chain PFAS such as PFBS, as well as long chain PFOS and PFOA, which are no longer registered for use in new products, but will continue to be present in household articles. For example, carpets and furniture treated with PFOS containing stain protection when manufactured in the 1980s or 1990s, being disposed of to landfills in later decades.

Table 1. Site Profile Zone Source Potential.

Site Profile – Zones	Magnitude	Likelihood	Source Potential	PFAS presence and use
Historic non-engineered landfill, co-disposal sites accepting non-hazardous and hazardous wastes	5	5	25	Dilution and dispersal through sidewalls and base. Likely to be present in downgradient groundwater.
Post-Landfill Directive engineered non-hazardous and hazardous landfill accepting predominantly MSW	5	5	25	Leachate collection system; off-site tankering of waste leachate; effluent from on-site treatment plants. Many of the leachate treatment systems currently available do not effectively remove PFAS, therefore some discharges can still contain PFAS after treatment and its release may contribute to surface water and groundwater contamination (via onward release from Waste Water Treatment Works).
Post-Landfill Directive inert landfill	5	1	5	Pre-Landfill Directive inert waste landfills containing construction and demolition waste can contain PFAS. These types of landfills do not produce significant quantities of leachate as the material disposed cannot be biologically or chemically reactive to meet the requirements of inert waste. Therefore, inert landfills rarely have active leachate management systems. Modern post-Landfill Directive inert landfills are required to have an engineered barrier on the base and sides of the landfill which is of a suitable standard to prevent migration of contaminants. As such the potential release of PFAS to the environment from inert landfills is considered to be significantly less than hazardous and non-hazardous landfills.

The Environment Agency landfill sampling study detected a wide range of PFAS, including PFBA, PFPA, PFHxA, PFHpA, PFOA, PFNA, PFBS, PFPS, PFHxS, PFHpS, PFOS, 5:3 FTCA, 6:2 FTS, 8:2 FTOH, Gen-X (HFPO-DA,) F-53B and PFECHS. Raw leachate and treated leachates generally contain the highest sums of PFAS. Raw leachates generally contain higher proportions of PFBS, PFBA, PFPA, PFHpA, PFOA, PFHxS and 5:3 FTCA whereas treated leachates generally contain smaller proportions of 5:3 FTCA.

Based on the available literature, it is evident that it is not currently possible to predict the likely PFAS present based on the landfill age or type. The fate and transformation of PFAS inside landfills are complex and are controlled by a wide range of factors (e.g. climate, waste input, biodegradation, sorption) which means there is considerable variability between individual landfills.

6. SOURCE POTENTIAL FOR LANDFILLS

Following the methodology set out in section 1.3, a theoretical source potential has been developed for each site profile zone and is detailed in Table 1.

ACKNOWLEDGEMENTS AND SUGGESTED CITATION

The Landfill PFAS Site Profile was originally prepared by Jacobs for the Environment Agency PFAS Risk Screening Project in 2022. Additional material relevant to English landfills was added by the Environment Agency in 2025. The profile has been edited for publication by CL:AIRE. The Jacobs authors were Jane Thrasher, Francesca Giacomello, Hugh Masters-Williams and Yolande Macklin.

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IMPORTANT NOTES FOR READERS OF THE PFAS SITE PROFILES

The PFAS Site Profiles are based on available online literature and review of readily available technical publications at the time of writing (2020-2024). The authors recognise that additional information may be available that has not been used in this study.

The published literature on PFAS occurrence and distribution is vast and continually expanding. For example, the Interstate Technology and Regulatory Council web resource cited in the PFAS Site Profiles as "ITRC (2023)" was substantially updated in January 2026.

The purpose of the PFAS Site Profiles is to provide regulators and other interested parties with researched advice on how to assess problem sites that may be impacted by legacy use or release of PFAS. The profiles do not seek to address the specific circumstances of each site as these will be unique. As such, the PFAS Site Profiles should be read with the following reservations in mind:

- Practices can vary between different sites and therefore individual sites may not have been exposed to the typical PFAS contaminants of concern as detailed in each site profile;
- Site exposure to PFAS contaminants of concern may vary based on practices and equipment used on site; and
- Given the longevity of PFAS in the environment, site profiles may refer to practices which are no longer followed, and subsequently may omit current practices which avoid contamination.

PFAS Site Profile

DISCLAIMER

The information, views and conclusions drawn concerning the PFAS Site Profiles are based, in part, on information supplied to Jacobs by third parties; and from publicly available information. Jacobs has proceeded in good faith on the assumption that this information is accurate and complete. Jacobs accepts no liability for any inaccurate conclusions, assumptions or actions taken resulting from any inaccurate information supplied to Jacobs by third parties or available from public sources.

All users must make their own appropriate assessments specific to their site (or group of sites).

For the avoidance of doubt none of CL:AIRE, Jacobs or the Environment Agency accept liabilities resulting from the use or interpretation of the contents of the PFAS Site Profiles.

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PFAS Site Profile

ACRONYMS AND ABBREVIATIONS

Note: this list of acronyms and abbreviations includes those used across all the site profiles and therefore may include some acronyms and abbreviations not used within this profile.

General Acronym / Abbreviation	Definition	General Acronym / Abbreviation	Definition
AFFF	Aqueous Film-Forming Foam	HSE	Health and Safety Executive
ALARP	As Low As Reasonably Practicable	ITRC	Interstate Technology and Regulatory Council
AR-FFFP	Alcohol resistant film-forming fluoroprotein foam	LCMS	Liquid Chromatography Mass Spectrometry
BOW	Bilge and oily waste water	LPG	Liquified Petroleum Gas
CA	Competent Authority	MAPP	Major accident prevention policy
CAS	Chemical Abstracts Service	MILSPEC	Military Specification
CAFS	Compressed Air Foam System	MSDS	Material Safety Data Sheets
CDOIF	Chemical and Downstream Oil Industries Forum	NAPL	Non Aqueous Phase Liquid
CIMAH	Control of Industrial Major Accident Hazards	NCM	Nordic Council of Ministers
CIP	Chemicals Investigations Programme	NIHHS	Notification of Installations Handling Hazardous Substances Regulations
CLP	Classification Labelling and Packaging	NORM	Naturally occurring radioactive material
CO_2	Carbon dioxide	OECD	Organization for Economic Cooperation and Development
COMAH	Control Of Major Accident Hazards	ONR	Office for Nuclear Regulation
CPI	Confederation of Paper Industries	PCM	Paper and Cardboard Manufacturing
DoD	Department of Defence (Australia)/Defense (USA)	PNEC	Predicted No-Effect Concentrations
DoE	Department of Environment	PPB	Parts Per Billion
DWS	Drinking Water Standards	PPE	Personal protective equipment
ECF	Electrochemical fluorination	RAAF	Royal Australian Air Force
EOF	Extractable Organic Fluorine	REACH	Registration, Evaluation, Authorization and Restriction of Chemicals
EPA	Environmental Protection Agency (for Denmark)	STM	Surface treatment of metals
EPR	Environmental Permitting Regulations	TOP	Total Oxidisable Precursor
EQS	Environmental Quality Standard	TULAC	Textiles, Upholstery, Leather, Apparel and Carpets
EU	European Union	UBA	Umwelt Bundesamt (German Environment Agency)
FCM	Food Contact Material	UK WIR	United Kingdom Water Industry Research
FFF	Fire-Fighting Foam	UMD	University of Maryland
FFFP	Film-Forming Fluoroprotein	US EPA	United States Environmental Protection Agency
FP	Fluoroprotein	WWTP	Waste Water Treatment Plant
FPP	Fire Prevention Plans	WWTW	Waste Water Treatment Works
FRS	Fire and Rescue Service		

PFAS Site Profile

ACRONYMS AND ABBREVIATIONS

Note: this list of acronyms and abbreviations includes those used across all the site profiles and therefore may include some acronyms and abbreviations not used within this profile.

PFAS Acronym / Abbreviation	PFAS Definition	PFAS Acronym / Abbreviation	PFAS Definition
10:2 FTOH	10:2 Fluorotelomer alcohol	HFPO-DA	Hexafluoropropylene oxide-dimer acid
10:2 FTS	10:2 Fluorotelomer sulfonate or sulfonic acid	HFPO-TA	Hexafluoropropylene oxide-trimer acid
10:2 FTUCA	10:2 Fluorotelomer unsaturated carboxylic acids	MeFOSAA	Methylperfluorooctanesulfonamidoacetic acid
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B Minor)	PAP	Polyfluorinated alkyl phosphates
12:2 FTS	12:2 Fluorotelomer sulfonate or sulfonic acid	PASF	Perfluoroalkane sulfonyl fluoride substances
14:2 FTS	14:2 Fluorotelomer sulfonate or sulfonic acid	PFA	Perfluoralkoxy polymer
12:2 FTAB	12:2 Fluorotelomer sulfonamido betaine	PFAA	Perfluoroalkyl acid
4:2 FTS	4:2 Fluorotelomer sulfonate or sulfonic acid	PFAS	Perfluoroalkyl and Polyfluoroalkyl Substances
5:3 FTCA	5:3 Fluorotelomer carboxylic acid	PFBA	Perfluorobutanoate or Perfluorobutanoic acid
6:2 FTAB	6:2 Fluorotelomer sulfonamidoalkyl betaine (see also CMDFPAH)	PFBS	Perfluorobutyl sulfonate or Perfluorobutyl sulfonic acid
6:2 FTCA	6:2 Fluorotelomer carboxylic acid	PFC	Perfluorinated Compound
6:2 FTOH	6:2 Fluorotelomer alcohol	PFCA	Perfluoroalkyl carboxylic acid
6:2 FTS	6:2 Fluorotelomer sulfonate or sulfonic acid (see also TDFOSA)	PFDA	Perfluorodecanoate or Perfluorodecanoic acid
6:2 FTUCA	6:2 Fluorotelomer unsaturated carboxylic acids	PFDoA	Perfluorododecanoate or Perfluorododecanoic acid
6:2 diPAP	6:2 Fluorotelomer phosphate diester	PFECA	Perfluoroalkyl ether carboxylic acid
8:2 Cl-PFESA	8:2 Chlorinated perfluoroalkyl ether sulfonic acid	PFECHS	Perfluoroethylcyclohexane sulfonate
8:2 FTOH	8:2 Fluorotelomer alcohol	PFESA	Perfluoroalkyl ether sulfonic acid
8:2 FTS	8:2 Fluorotelomer sulfonate or sulfonic acid	PFHpA	Perfluoroheptanoate or Perfluoroheptanoic acid
8:2 FTUCA	8:2 Fluorotelomer unsaturated carboxylic acids	PFHpS	Perfluoroheptane sulfonate or Perfluoroheptane sulfonic acid
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (F-53B Major)	PFHxA	Perfluorohexanoate or Perfluorohexanoic acid
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	PFHxS	Perfluorohexane sulfonate or Perfluorohexane sulfonic acid
CMDFPAH	Carboxymethyldimethyl-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulphonyl]amino]propylammonium hydroxide; a synonym of 6:2 FTAB used in UKWIR reports	PFNA	Perfluorononanoate or Perfluorononanoic acid
EtFOSA	N-ethyl-perfluorooctane sulfonamide	PFOA	Perfluorooctanoate or Perfluorooctanoic acid
EtFOSAA	N-ethyl-perfluorooctane sulfonamido acetic acid	PFOS	Perfluorooctane sulfonate or Perfluorooctane sulfonic acid
EtFOSE	N-ethyl-N-(2-hydroxyethyl) perfluorooctane sulfonamide	PFOSA	Perfluorooctane sulfonamide (FOSA)
F-53B	Trade name for chlorinated polyfluoroalkyl ether sulfonic acids (9Cl-PF3ONS and 11Cl-PF3OUdS)	PFOSE	Perfluorooctane sulfonamido ethanol
FASA	Perfluoroalkane sulfonamide	PFPA	Perfluoropentanoate or Perfluoropentanoic acid
FBSA	Perfluorobutane sulfonamide	PFPE	Phosphate ester salts
FOSA	Perfluorooctane sulfonamide	PFPeA	Perfluoropentanoic acid
FOSAA	Perfluorooctane sulfonamidoacetic acid	PFPeS	Perfluoropentane sulfonate or Perfluoropentane sulfonic acid
FOSE	Fluorooctane sulfonamido ethanol	PFPS	Perfluoropentane sulfonate
FTCA	Fluorotelomer carboxylic acid	PFSA	Perfluoralkane sulfonic acid
FTMAC	Fluorotelomer methacrylate	PFUnDA	Perfluoroundecanoate or Perfluoroundecanoic acid
FTOH	Fluorotelomer alcohol	POSF	Perfluorooctane sulfonyl fluoride
FTS	Fluorotelomer sulfonate	PTFE	Polytetrafluoroethylene
FTSA	Fluorotelomer sulfonic acid	TDFOSA	3,3,4,4,5,5,6,6,7,7,8,8,8-Tridecafluorooctane-1-sulfonic acid; a synonym for 6:2 FTS used in UKWIR reports
Gen-X	Trade name for HFPO-DA		