PFAS in the World's Oceans

The concentrations of PFAS in the world's oceans have been measured during numerous research cruises, and these data have recently been comprehensively collated and reviewed.(Muir and Miaz 2021) Most measurements derive from the surface ocean, where sampling is logistically straightforward and PFAS concentrations are relatively higher than in the deep oceans. The highest PFAS concentrations occur along the world's industrialised coasts: surface-water levels typically fall in the low- to mid-ng/L range, with hotspots reaching tens of ng/L for legacy compounds such as PFOS and PFOA. The Bohai and Yellow Seas of China exhibit the highest global medians, often exceeding 10 ng/L, while Western European coastal waters (North Sea, Baltic Sea, Rhine delta, northern Adriatic) also display similarly elevated concentrations. In contrast, open-ocean concentrations lie in the tens to low hundreds of pg/L, with the Northern Hemisphere more contaminated than the Southern Hemisphere. Because PFAS concentrations in the open ocean are so low, large seawater volumes, often tens to hundreds of litres, are typically required to achieve quantification above method detection limits.

In a recent research cruise where PFAS were sampled along a transect from the UK to Chile, the first stations sampled were immediately south of the UK, in the English Channel / adjacent North Atlantic.(Savvidou, Sha et al. 2023) These near-Channel stations showed some of the highest PFAS concentrations in the entire transect (224 pg/L for ∑PFAS), confirming that the English Channel is a PFAS-influenced region. The PFAS profile at these stations was dominated by C6–C9 PFCAs (especially PFHpA, PFOA, and PFNA), with PFHxS and PFOS also detected, which is consistent with typical Northern Hemisphere coastal signatures. The median ∑PFAS concentration for the wider North Atlantic was lower at 105 pg/L. Notably, Savvidou et al. also demonstrated that PFAS are detectable throughout the deep ocean, with PFAS measurements extending to 5 km depth, indicating that PFAS have already penetrated the abyssal ocean.(Savvidou, Sha et al. 2023)

Although the English Channel and nearby North Atlantic have been sampled repeatedly, there are no previously published PFAS data for the coastal waters around Jersey. The island's coastal waters lie within a semi-enclosed, tidally energetic region influenced by both UK and continental European coastal waters, as well as by local sources on the island.

PFAS in the Surface Microlayer, Natural Foams, and Sea Spray Aerosols: Implications for Human Exposure

PFAS are among the most surface-active chemicals humans have produced.(Buck, Franklin et al. 2011) Their amphiphilic structure drives strong partitioning to air-water interfaces, leading to disproportionate accumulation in the sea-surface microlayer (SML),(Sherman-Bertinetti, Kostelnik et al. 2024) natural foams,(De Brouwere, Gemoets et al. 2023, Miljøstyrelsen 2023, Sherman-Bertinetti, Kostelnik et al. 2024, Enders, Weed et al. 2025) and sea-spray aerosols (SSA).(Johansson, Salter et al. 2019, Sha, Johansson et al. 2024) The SML is the ocean's extremely thin "skin" (typically the uppermost 1–1000 micrometres of the water column) where the water meets the air. This layer naturally enriches organic material released by algae and decaying plants, but it also accumulates human-made chemicals such as PFAS. The underlying "bulk" seawater contains PFAS as well, though at lower concentrations; typically in the order of hundreds of pg/L (see above review).

When waves and wind disturb the sea surface, air becomes mixed into the surface water, forming countless tiny bubbles. Natural surfactants stabilise these bubbles, allowing them to accumulate and form natural foams. It is important to note that PFAS do not create sea foam; natural surfactants such as lipids, proteins, and polysaccharides occur at far higher concentrations and are the primary drivers of foam formation and stability, with PFAS merely partitioning into the foam once it exists. In clean waters these foams are harmless, but in PFAS-impacted regions the bubble surfaces act as powerful concentrators, enriching PFAS to levels thousands of times higher than in seawater.(Sherman-Bertinetti, Kostelnik et al. 2024, Enders, Weed et al. 2025) When bubbles rise and burst, either at the surface or within foam, they release tiny airborne droplets known as sea-spray aerosols (SSA).(Johansson, Salter et al. 2019, Sha, Johansson et al. 2024) These droplets carry whatever is concentrated on the bubble surface, including PFAS, and can be transported by wind to coastal regions and inland.(Johansson, Salter et al. 2019, Sha, Johansson et al. 2024) Natural foams and SSA are natural phenomena that incidentally move PFAS from water into the air, onto beaches, and further inland, creating exposure pathways that would not exist from seawater alone. Recent field studies, combined with advances in understanding PFAS aerosolisation, show that both PFAS-rich foam and PFAS-bearing SSA can act as major concentrators and vectors for human exposure in coastal environments.(Johansson, Bolinius et al. 2024, Sha, Johansson et al. 2024) This short review synthesises the latest findings and their implications for public health.

1. Mechanisms of PFAS Enrichment

PFAS enrichment at the air–water interface follows classical surfactant behaviour: the hydrophobic perfluorinated tail orients toward air while the polar headgroup remains in water. The SML offers limited interfacial area and is continually disrupted by turbulence, which constrains enrichment. In contrast, natural foams consist of densely packed bubble films that provide orders of magnitude more interfacial area, enabling much higher accumulation. Dissolved organic matter further stabilises these films and co-enriches with PFAS, acting as a natural surfactant that enhances interfacial partitioning.

Across aquatic systems, field studies reveal a consistent hierarchy of enrichment: bulk water < SML < natural foam < SSA. This hierarchy reflects increasing interfacial area and the efficiency with which bubble films transfer PFAS into both foams and aerosols. Enrichment is typically quantified using an *enrichment factor* (EF), which expresses how much more concentrated PFAS become at an interface, such as the SML, foam, or SSA, relative to the underlying source water. For example, an EF of 100 means the interface contains one hundred times more PFAS than the water below it.

Enrichment in the SML is generally modest. A recent study reported EFs in the SML below two for most PFAS, with PFOS and FOSA (FOSA or perfluorooctanesulfonamide is a legacy perfluoroalkyl sulfonamide and a known precursor to PFOS) showing the highest values (1.4–2.4).(Sherman-Bertinetti, Kostelnik et al. 2024) These values indicate that the SML alone cannot explain the very high PFAS levels observed in foams or aerosols. In contrast, because foam consists of densely packed bubble films with enormous interfacial area, EFs can reach thousands to hundreds of thousands; far higher than those observed in the SML. SSA can be even more highly enriched because the tiny film droplets produced when bubbles burst originate almost entirely from the bubble's surface layer, giving them an extremely high surface-area-to-volume ratio and therefore a disproportionately large share of the PFAS adsorbed at the interface.

2. Environmental Occurrence and Enrichment of PFAS in Sea Foam

Because foam is mostly air, researchers analyse collapsed foam, i.e., the small volume of liquid remaining after drainage. Field measurements from multiple regions confirm that PFAS-rich sea foam is widespread and often extremely contaminated. A US study quantified 36 PFAS in water, the SML, and natural foams from 43 rivers and lakes in Wisconsin, USA. PFAS were shown to partition to foams with concentrations ranging from 2300 to 328,200 ng/L in waters, corresponding to sodium-normalized EFs ranging from <50 to >7000. (Sherman-Bertinetti, Kostelnik et al. 2024) In North Carolina, measured PFOS concentrations approaching 8,000,000 ng/L in coastal sea foam have been reported, implying EFs of 10,000–100,000. (Enders, Weed et al. 2025) Marine foams along the Danish west coast contained 17,000–250,000 ng/L PFAS, corresponding to EFs of roughly 3,000–120,000 relative to local seawater.(Miljøstyrelsen 2023) Belgian coastal foams showed similarly extreme behaviour: a study by VITO (the Flemish Institute for Technological Research) reported collapsed-foam concentrations of 8,700–2,400,000 ng/L total PFAS, implying EFs of approximately 400–500,000, dominated by PFOS and PFOA.(De Brouwere, Gemoets et al. 2023) Together, these datasets demonstrate that very high PFAS levels in natural foams occur across a wide range of environments, from freshwater lakes to open coasts, and that extreme concentrations are a consistent and reproducible feature wherever PFAS contamination is present. Enrichment appears to be higher in sea foams than in freshwater foams, consistent with the greater surface activity and ionic strength of marine systems.

3. Impact of SSA on Coastal Regions

Field measurements from the Atlantic Ocean show that PFAS can be enriched more than one hundred thousand times in SSA compared with the underlying seawater.(Johansson, Salter et al. 2019, Sha, Johansson et al. 2024) This means that even when PFAS levels in seawater are relatively low, the aerosols produced from that water can contain much higher concentrations. Once airborne, SSA can be transported by wind along the coast and inland. A recent study estimates that the global oceans emit 49 tonnes of PFOA and 26 tonnes of PFOS each year through SSA; amounts comparable to or greater than all other known atmospheric sources combined.(Sha, Johansson et al. 2024) Although only a small fraction of global SSA production occurs in coastal waters, these regions contribute a disproportionately large share of PFAS emissions because coastal seawater often contains much higher PFAS concentrations than the open ocean. Model results indicate that 20–40% of global PFAS emissions on SSA originate from coastal provinces, and that 15–30% of these emissions are ultimately deposited onto land, with the highest deposition occurring near coastlines.(Sha, Johansson et al. 2024)

For coastal communities, this means that PFAS can move from the sea into the air and then back onto land, contributing to elevated PFAS levels in coastal soils, vegetation, and surface waters, as demonstrated in a recent Danish study.(Region-Syddanmark 2023) This atmospheric pathway helps explain why PFAS contamination is often detected inland even when the primary source is offshore. For regions like Jersey, where strong winds and wave action are common, SSA represents a significant and previously under-recognised mechanism linking marine PFAS contamination to impacts on land and potential human exposure.

4. Human Exposure Pathways

PFAS-rich foam and aerosols create exposure pathways that differ from those associated with bulk water. Direct contact with foam can lead to ingestion of foam droplets, which risk assessments identify as the dominant exposure route during recreational activities.(De Brouwere, Gemoets et al. 2023) Under reasonable-worst-case scenarios, i.e., frequent contact and multiple “slugs” of foam ingestion, exposures have been estimated to exceed EFSA’s tolerable weekly intake for PFOS, PFOA, PFNA, and PFHxS.(De Brouwere, Gemoets et al. 2023)

Aerosol inhalation represents an additional exposure pathway. SSA may be a significant inhalation source, particularly for coastal populations, because the combination of very high EFs and high aerosol fluxes means that inhalation could rival or even exceed dermal exposure, although quantitative exposure estimates remain uncertain. The first biomonitoring study of surfers found no association between annual surfing hours and serum PFAS concentrations.(Madsen, Møller et al. 2025) However, the study was conducted in a region with relatively low seawater PFAS, and surfers may not have been exposed frequently enough to PFAS-rich SSA to produce a detectable biomonitoring signal. Foam contact frequency was also not quantified. The authors note that aerosol inhalation and foam ingestion remain plausible exposure routes, especially in high-PFAS regions where SSA and foam concentrations are substantially higher, and the authors recommend that further research is conducted.(Madsen, Møller et al. 2025)

5. Conclusions and Recommendations

Across freshwater and marine systems, PFAS are consistently and often massively enriched at air-water interfaces. Natural foams routinely contain PFAS concentrations thousands to tens of thousands of times higher than bulk water, and in some cases even more. SSA formation transfers these enriched interfaces to the atmosphere, providing an efficient mechanism for PFAS to move from the ocean to coastal air and land. Together, these processes create exposure pathways that are not captured by traditional water-based assessments and are particularly relevant for coastal communities.

Human exposure can occur through both foam ingestion and inhalation of PFAS-bearing aerosols, with the relative importance of each pathway depending on local contamination levels, meteorological conditions, and individual behaviour. Existing biomonitoring data are limited to one study. Further research is needed to quantify realistic exposure doses, especially in coastal regions where exposure to PFAS-rich foam and SSA are more likely. Although occasional beach visits are unlikely to pose major risks, people who spend extended time in the surf zone or regularly engage in water sports may encounter PFAS-rich foam or aerosols more often. Practical, precautionary guidance can therefore help reduce unnecessary exposure while maintaining access to coastal environments. Dermal exposure to PFAS is considered low so recommendations regarding skin contact are es especially precautionary.

- Avoid direct contact with sea foam in affected regions, especially thick or persistent accumulations of foam.
- Discourage children and pets from playing in or ingesting foam.
- Rinse skin, wetsuits, and equipment after contact with foam or after water sports in foamy conditions.

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PFAS in food available in Jersey

This chapter reports PFAS testing in a selected set of foods (both Products of Animal Origin (POAO) and seasonal fruit/vegetables) sampled from Jersey and the UK. The UK samples serve two functions; firstly, much of Jersey's food is imported from the UK and so it is important to reflect the foods Islanders are actually eating and secondly they serve as a comparator in some cases.

Further detail on PFAS types and laboratories used for testing are appended in Appendix xxxx.

In total, 43 POAO samples and 33 fruit/vegetable samples were tested (including retests). Most fruit/vegetable samples were reported as not detected (ND); where PFAS was detected above ND, it was mainly in potatoes (with a small number of low detections in locally grown bell peppers and tomatoes). The results for all fruits/vegetables were below the EU indicative level of 0.04 µg/kg.

For POAO, most results were well below EU maximum concentrations, with two exceedances triggering resampling: Jersey pork liver and a UK brown crab meat product. The crab meat resample fell below the EU maximum, while the pork liver resample was similarly elevated; the producer then voluntarily removed the product from the market. Eggs were all below the EU maximum, and further egg retesting across Jersey producers is underway at this time. One sample of milk was marginally above the EU indicative level but all other samples were below the reporting limit for the laboratory. A retest is underway.

Foods where no PFAS are detected or PFAS are below reporting limit

Figure 1, below lists foods where all samples; both from Jersey and the UK do not contain reportable levels of PFAS. Because some foods have PFAS levels that are undetectable or below the reporting limit in one origin but have detections in another (or in another sample set), they are not included here and are presented in subsequent tables (e.g., potatoes, tomatoes, bell peppers, milk, beef, pork).

Figure 1 - Foods where Sum of 4 PFAS is too low to report across all samples

Food	**Country/Origin**
Asparagus	Jersey; UK
Cabbage	Jersey; UK
Cauliflower	Jersey; UK
Courgettes	Jersey; UK
Strawberries	Jersey; UK

Foods where PFAS are below EU statutory maximum levels

For some foodstuffs, the European Union has set mandatory maximum levels of PFAS (EU, 2023). Figure 2, below, shows the foods where the measured level of PFAS is below that maximum.

Figure 2 - Foods where PFAS are detectable in at least one sample and results are below the EU maximum

Food	Country/Origin	Cut / Notes	Sum of 4 PFAS (µg/kg)	EU maximum (µg/kg)
Eggs	Jersey	Free range	0.00–0.783	1.7
Eggs	UK	Free range	0.076–0.101	1.7
Beef	Jersey	Meat	0.032	1.3
Beef	Jersey	Offal – Kidney	0.446	8
Beef	Jersey	Offal – Liver	1.202	8
Beef	UK	Meat	<RL	1.3
Beef	UK	Offal – Kidney	0.087	8
Beef	UK	Offal – Liver	0.745	8
Pork	Jersey	Meat	0.147	1.3
Pork	Jersey	Offal – Kidney	0.797	8
Pork	UK	Meat	<RL	1.3
Pork	UK	Offal – Liver	0.072	8
Oysters	Jersey	Aquaculture	0.075	5
Oysters	UK	Aquaculture	0.099	5
Crab	Jersey	Chancre, wild caught	0.363	5
Crab	Jersey	Spider, wild caught	0.953	5
Lobster	Jersey	Wild caught	0.211	5
Scallops	Jersey	Wild caught	0.117	5
Crab meat	UK	Wild caught	1.93	5
Black bream	Jersey	Fillet	0.092	5
Bass	UK / EU	Farmed, fillet	0.108	8
Seabass	Jersey	Wild caught	0.66	8
Mackerel	Jersey	Wild caught	0.64	2

Foods where there is no statutory maximum level and PFAS are below EU indicative level

While there are enforceable maximum levels for certain foods (EU, 2023), for many there are no maximum levels but rather indicative levels that act as a guide (EU, 2022). Figure 3, below, shows those foods that are below the indicative level.

Figure 3 - Foods that have PFAS levels below EU indicative level

Food	Country/Origin	Notes	Sum of 4 PFAS (µg/kg)	EU indicative level (µg/kg)
Potatoes	Jersey	Early season Jersey Royals	0.00751–0.0258; plus ND results	0.04
Potatoes	UK	Early season	ND	0.04
Potatoes	Jersey	Main crop	0.00221; plus ND results	0.04
Potatoes	UK	Main crop	0.00175	0.04
Milk	UK	Fresh	0.108	0.14
Milk	Jersey	Raw	<RL	0.14
Milk	Jersey	1.0%	<RL	0.14
Milk	Jersey	2.5%	<RL	0.14
Milk	Jersey	Whole	<RL	0.14

Foods where there is no EU maximum or indicative level

For foods where there is no guidance or regulation, levels are shown in Figure 4, below. They are all below the indicative or regulatory levels that apply to similar foodstuffs.

Figure 4 - Levels in food where no guideline or regulation exists

Food	Country/Origin	Notes	Sum of 4 PFAS (µg/kg)	EU indicative level	EU maximum
Bell peppers	Jersey	—	0.00122	no indicative level established	no limit established
Bell peppers	UK / NL	—	ND	no indicative level established	no limit established
Tomatoes	Jersey	—	0.00751; plus ND result	no indicative level established	no limit established
Tomatoes	UK	—	ND	no indicative level established	no limit established
Cod	UK	Fillet	0.243	no indicative level established	no limit established

Foods that exceed EU indicative levels

Only one result in the provided table falls into this category, it is shown in Figure 5, below. This shows one of several milk samples marginally above the guideline level. All other milk samples were below the reporting limit.

Figure 5 - Foods that exceed EU guidance level

Food	Country/Origin	Notes	Sum of 4 PFAS (µg/kg)	EU indicative level (µg/kg)
Milk	Jersey	Fresh, whole	0.162	0.14

Foods that exceed the EU statutory maximum level

As Figure 6 shows, below, two foods exceed the EU statutory maximum levels; a sample of UK-sourced crab meat which slightly exceeds the maximum and which was below the maximum on retesting and a sample of Jersey-sourced pork liver that was markedly higher than the permitted maximum and even higher on retesting. The producer has voluntarily withdrawn it from sale.

Figure 6 - Foods that exceed the EU mandatory maximum level for PFAS

Food	Country/Origin	Notes	Sum of 4 PFAS (µg/kg)	EU maximum (µg/kg)
Pork	Jersey	Offal – Liver	22.744–25.35	8
Crab meat	UK	Wild caught	5.429	5

International context

Local versus international comparisons

There are several options for comparing measured levels of PFAS in food samples in Jersey: Comparing them to comparable food samples grown or caught outside Jersey and imported for sale in Jersey and analysed in the same laboratory; comparing them to legal or advisory limits; and comparing them to typical levels measured in published surveys of food contamination.

Direct comparisons in specific samples collected in Jersey supermarkets have the advantage of being the most comparable, but numbers of samples are limited and so may not capture the true means. Legal advisory and/or advisory limits are available from the EU but only for some food items. There are numerous publications of measurements in food samples in different countries, but given trends of PFAS levels over time, only the most recent publications are useful for this purpose.

EU guidance

The EU has issued some limits for application in EU member states, I general derived on the basis of aiming to keep total intake under the 4.4 ng/ng/week EFSA recommendation for food intake. These fall into two categories – some maximum levels in a regulation and some advisory recommended maximum levels which were not transposed into the regulation.

Figure 7, below, is a summary of the table of maximum levels set out in the EU regulation. This is taken from table 4.2 in Annex 1 and for clarity, some clarification notes as specific fish species unlikely to be encountered in Jersey have been dropped in this version of the table. To look for all species mentioned and notes to the table, consult the original (EU 2023). Figure 8, below, lists the advisory limits suggested for other categories of food, presented for each of the four specific PFAS (EU 2023). The right-hand column is simply the sum of the four individual recommended limits.

Figure 7 - Summary of Maximum levels for food items set by the EU

Perfluoroalkyl substances	Maximum level (µg/kg)				
	PFOS	**PFOA**	**PFNA**	**PFHxS**	**Sum of PFOS, PFOA, PFNA and PFHxS**
Meat and edible offal					
Meat of bovine animals, pig and poultry	0.30	0.80	0.20	0.20	1.3
Meat of sheep	1.0	0.20	0.20	0.20	1.6
Offal of bovine animals, sheep, pig and poultry	6.0	0.70	0.40	0.50	8.0
Meat of game animals	5.0	3.5	1.5	0.60	9.0
Offal of game animals	50	25	45	3.0	50
Fishery products and bivalve molluscs					
Fish meat					
Muscle meat of fish, except as below:	2.0	0.20	0.50	0.20	2.0
Muscle meat of a list of specific fish, including Baltic Herring, Flounder, Plaice, Sardine, Seabass, Wild Salmon and Wild Trout	7.0	1.0	2.5	0.20	8.0
Muscle meat of a list of specific fish, including: Anchovy, Bream, Eel, Whitefish	35	8.0	8.0	1.5	45
Crustaceans and bivalve molluscs	3.0	0.70	1.0	1.5	5.0
Eggs	1.0	0.30	0.70	0.30	1.7

Figure 8 - Summary of recommended indicative maximum levels for food items set by the EU

Perfluoroalkyl substances	Indicative concentration limits (µg/kg)				
	PFOS	**PFOA**	**PFNA**	**PFHxS**	**Sum of PFOS, PFOA, PFNA and PFHxS**
fruits, starchy roots and tubers, vegetables (except wild fungi)	0.10	0.10	0.005	0.015	0.220
wild fungi	1.5	0.010	0.005	0.015	1.530
milk	0.020	0.010	0.050	0.060	0.130
baby food	0.050	0.050	0.050	0.050	0.200

International comparisons

In a recent review of many global published studies, Seafood, especially shellfish and freshwater fish, emerged as a primary exposure route, with PFOS and PFOA as dominant contaminants. Animal-derived foods like eggs and milk also contribute significantly, particularly from contaminated regions. Plant-based foods typically show lower PFAS concentrations, although irrigation and soil pollution can increase their levels. (Souza & Domingo, 2025) For comparison with expected levels we draw on recent surveys in the UK and in Europe.

With regard to seafood, two recent sampling campaigns have reported PFAS in caught fish:

- In fish samples collected in Britain detailed results are presented by fish species collected in 2022 (FERA, 2025). There is no aggregate estimate for fish overall but taking some of the results for species with the most measurements and then taking the average level of PFAS, we find the following: for the sum of 4 PFAS average concentrations were 0.46 µg/kg for Sardines, 0.65 for Crab and 0.63 for Cod, 0.4 for sea bass, 0.75 µg/kg for lobster. Mackerel were mainly below the detection limit of 0.45. A second survey of over 300 fish sampled during 2020 to 2024, reported average concentrations in fish by specific PFAS (Junque et al., 2026). The means were much higher than the averages as represented by the medians as a few high outliers can skew the means. Taking the medians, and adding across the four compounds, the total for the 4 PFAS was, 0.74 µg/kg. By specific species, results shown in a figure suggest that Sea Bass is higher than average, with values around 7 µg/kg for the sum of 4 PFAS.
- Recent survey data from Sweden indicate lower average levels (Livsmedelsverket, 2024). Data presented for fish samples collected in 2022 were subdivided into lean and fatty fish with median levels of 0.3 and 0.08 µg/kg respectively. For other specific fish species a recent publication in Croatia provides further detail, with sea bream averaging 0.11 and scallops 0.073(Bilandžić, 2025). For oysters a recent paper assessing PFAS marine contamination near Portsmouth including analyses of 3 oyster samples (Ford & Ginley, 2024). All values were below the limit of detection (0.1 for most PFAS) except for one PFOA result of 0.19 µg/kg.

For eggs, recent data from Germany in 2024 give average PFAS levels as 0.06 µg/kg (BFR, 2025). Similar data were reported in the Netherlands (Biesterbos & den Braver, 2025), with commercial eggs averaging 0.044 µg/kg, but home grown eggs were much higher averaging 1.4 µg/kg.

Some sampling of fish and meat in Poland allowed comparison between different types (Surma et al., 2023), chicken, pork and beef gave averages for the sum of 4 PFAS of 0.08, 0.07 and 0.09 µg/kg respectively. Pork liver was higher at 2.6 µg/kg. These comparison values are summarised in the following table.

Figure 9 - Summary of some indicative international recent published food concentrations

Item	country	**Sum of PFOS, PFOA, PFNA and PFHxS**
seafood		
oysters	England	<0.1
crab	GB	0.65
lobster	GB	0.75
Scallops	Croatia	0.073
Bream	Croatia	0.11
Cod	GB	0.63
Sea bass	GB	0.4
Mackerel	GB	<0.45
Sardines	GB	0.46
meats		
Chicken	Poland	0.08
Pork	Poland	0.07
Beef	Poland	0.09
Pork Liver	Poland	2.6
eggs	Germany and NL	0.04 to 0.06

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PFAS in soil and soil enrichment in Jersey

Across Jersey, 53 soil samples were taken from a mix of agricultural fields, control sites (woodland/meadow/field), and a valley, to give a snapshot of PFAS in topsoil under different land uses and management histories. 29 samples were "not detected (ND)" for the sum of 4 PFAS, while 24 samples showed detections. Detections clustered in two main contexts: fields within the area of known contamination from the airport and fields outside the area of known contamination (AKC) with soil-enhancing product histories (notably biosolids/filter sludge). The full detail of land testing, including data on specific PFAS types is in Appendix xxx.

For this analysis, only the Sum of Four PFAS (µg/kg) is used (individual PFAS are ignored), and these thresholds are applied:

- **4 µg/kg** for agricultural or sensitive land. Below this level, the land is considered not contaminated.
- **8 µg/kg** for recreational, industrial or residential land. Below this level, the land is considered not contaminated.
- **20 µg/kg** for other land; a trigger for source investigation consideration for mitigation and restriction of activities

Within the area of known contamination, all samples had detectable sums, ranging 1.69–23 µg/kg; 9 of 13 AKC samples exceed the 4 µg/kg agricultural threshold. Outside the AKC, PFAS were not detected at most sites. At the sites where they were detected sums range 1.01–5.31 µg/kg, and only 2 samples exceed their relevant threshold.

Findings outside the area of known contamination

Figure 1, below summarises the sites tested outside the area of known contamination that either have no PFAS detected or have a level of PFAS detected that is below the threshold for that land type where it may be considered uncontaminated. Site by site details, including levels of different PFAS types are in Appendix xxxx. In most of these sites, PFAS of concern were not detected.

Figure 1 - Summary table of locations outside the area of known contamination that are below the relevant threshold for land type

Parish	**Land type**	**Threshold (µg/kg)**	**Samples below threshold (n)**	**Total samples (n)**
Grouville	Agricultural field	4	6	6
St Brelade	Beauport, Control	4	1	1
St Brelade	Valley (recreational)	8	2	2
St Clement	Agricultural field	4	1	1
St Clement	Meadow, Control	4	1	1
St John	Agricultural field	4	5	5

Parish	Land type	Threshold (µg/kg)	Samples below threshold (n)	Total samples (n)
St Lawrence	Agricultural field	4	4	5
St Martin	Agricultural field	4	3	3
St Martin (St Catherines)	Woodland, Control	4	1	1
St Mary	Agricultural field	4	7	7
St Ouen	Agricultural field	4	1	2
St Ouen	Woodland, Control	4	1	1
St Peter	Woodland, Control	4	1	1
Trinity	Agricultural field	4	4	4
Total			**38**	**40**

Figure 2, below, summarises the two fields outside the area of known contamination, where PFAS levels are higher than the threshold for uncontaminated agricultural land. Both of them had received biosolid application in the past. There are no other exceedances outside the area of known contamination.

Figure 2 - Summary table of locations outside the area of known contamination that are above the relevant threshold for land type

Parish	Land type	Notes	Sum of 4 PFAS (µg/kg)	Threshold (µg/kg)	Exceeds?
St Lawrence	Agricultural field	Filter sludge application	5.31	4	**Yes**
St Ouen	Agricultural field	Biosolid application	5.21	4	**Yes**

Findings within the area of known contamination

Figure 3, below, summarises the places sampled within the area of known contamination that are below the relevant threshold for the land type. Of thirteen sampled locations, four remain below the threshold to be considered uncontaminated.

Figure 3 - Summary table of locations within the area of known contamination that are below the relevant threshold for land type

Parish	Land type	Threshold (µg/kg)	Samples below threshold (n)	Total samples (n)
St Peter	Agricultural field, within AKC	4	4	13

Even where AKC samples are below 4 µg/kg, they remain detectable, consistent with the overall pattern that the AKC-area soils have broadly elevated background levels compared with the many ND results outside the AKC.

Figure 4, below, summarises the fields within the area of known contamination which exceed the threshold below which they would be considered uncontaminated. Nine of the thirteen fields sampled in this area exceed the threshold, in some places considerably.

Figure 4 - Summary table of locations within the area of known contamination that are above the relevant threshold for land type

Parish	**Land type**	**Description**	**Notes**	**Sum of 4 PFAS (µg/kg)**	**Threshold (µg/kg)**
St Peter	Agricultural field, within AKC	Some historic produce growth	No record of application	23.0	4
St Peter	Agricultural field, within AKC	Used for growing produce	Received Biosolids 2018	13.2	4
St Peter	Agricultural field, within AKC	Used for growing produce	Received Biosolids 2019	11.7	4
St Peter	Agricultural field, within AKC	Some historic produce growth	No record of application	9.71	4
St Peter	Agricultural field, within AKC	Some historic produce growth	No record of application	9.0	4
St Peter	Agricultural field, within AKC	Used for growing produce	Received Biosolids 2019	6.38	4
St Peter	Agricultural field, within AKC	Used for growing produce	Received Biosolids 2019	6.34	4
St Peter	Agricultural field, within AKC	Some historic produce growth	No record of application	6.01	4
St Peter	Agricultural field, within AKC	Used for growing produce	Received Biosolids 2019	5.97	4

Overall, AKC-area agricultural land shows frequent exceedances (9 of 13 samples) and a much higher upper range (up to 23 µg/kg) than anything observed outside the AKC (maximum 5.31 µg/kg).

PFAS in biosolids and the associated levels in soil where they are applied

Several different types of biological material have a history of being used in Jersey for soil enrichment in agriculture. Three types of these materials have been analysed:

- Washwater cake, which is produced from water treatment processes and contains powdered activated carbon (PAC)
- Sewage biosolids, which are produced through treatment steps including thickening, pasteurisation and digestion
- Seaweed, largely bladderwrack and sea lettuce, which is harvested from tidal zones.

All are used to provide nutrients and organic matter to soils.

This section summarises the levels of PFAS in these materials and looks at the association between their use and the levels in soil. A more detailed analysis, with variation over time and individual PFAS types is available in Appendix xxxx and Appendix YYYY. Sampling has been limited so it would be unwise to overinterpret time trends or seasonal variation. For that reason, we have only included overall averages and latest sample data. The seaweed was sampled at two sites; one within the area of known contamination and one control area.

Figure 5, below, shows the mean and the range of sum of 4 PFAS across all samples and all time periods.

Figure 5 - Overall levels across all time periods by material (averages and ranges)

Material	Sampling window	n	Average sum of 4 PFAS (µg/kg)	Range (µg/kg)
Washwater plant cake (biosolids)	(Aug 2024–Oct 2025)	11	50.0	23.2–93.5
Enhanced treated sewage biosolids (biosolids)	(May 2024–Nov 2025)	7	34.1	14.1–60.4
Seaweed (biosolids)	Summer 2025	3	0.028	0.009–0.054

Figure 6, below, shows the results of the most recent testing for each of the types of biosolids.

Figure 6 - Most recent testing results

Material	Most recent date/period	Most recent sum of 4 PFAS (µg/kg)
Washwater plant cake (biosolids)	13 Oct 2025	34.2
EnhAKCed treated sewage biosolids (biosolids)	17 Nov 2025	19.9
Seaweed applied to land	Summer 2025 (3 samples)	Range 0.009–0.054 (mean 0.028)

Elsewhere in this report we calculate the extent to which the addition of biosolids as an agricultural enrichment might also impact the level of PFAS in that land. This was important in assessing how best biosolids should be disposed of and also when, if they are being applied to land, such application should be stopped.

Figure 7, below, looks at those fields that have been sampled and where biosolids are known to have been used and assesses what the level of the sum of 4 PFAS is, and whether that level exceeds the panel's recommendations on what should be considered uncontaminated for that land type.

There appears to be a clear difference between sites in the area of known contamination and those outside that area. Outside the area, most samples do not detect PFAS at all and only two of nine exceed the threshold for agricultural land and then only marginally. Within the area, however, all five of the fields that have received biosolids exceed the threshold, in two cases, by a considerable margin.

Figure 7 - Biosolids-applied land: whether the relevant threshold is exceeded

Parish	**Land type**	**In AKC?**	**Biosolids note**	**Sum of 4 PFAS (µg/kg)**	**Threshold (µg/kg)**	**Exceeds?**
St Mary	Agricultural field	No	Multiple biosolid applications	1.04	4	No
St Clement	Agricultural field	No	Multiple biosolid applications	ND	4	No
St Martin	Agricultural field	No	Biosolid application TBC	ND	4	No
St Martin	Agricultural field	No	Biosolid application	ND	4	No
St Ouen	Agricultural field	No	Biosolid application	5.21	4	**Yes**
St Mary	Agricultural field	No	Biosolid application	ND	4	No
St Mary	Agricultural field	No	Biosolid application	1.92	4	No
St John	Agricultural field	No	Biosolid application	ND	4	No
Trinity	Agricultural field	No	Received JW sludge in 2025	2.86	4	No
St Lawrence	Agricultural field	No	Filter sludge application	5.31	4	**Yes**
St Peter	Agricultural field, within AKC	Yes	Received Biosolids 2019	6.34	4	**Yes**
St Peter	Agricultural field, within AKC	Yes	Received Biosolids 2019	6.38	4	**Yes**
St Peter	Agricultural field, within AKC	Yes	Received Biosolids 2019	11.7	4	**Yes**
St Peter	Agricultural field, within AKC	Yes	Received Biosolids 2018	13.2	4	**Yes**
St Peter	Agricultural field, within AKC	Yes	Received Biosolids 2019	5.97	4	**Yes**

Figure 7, above, shows that the mean level in fields that have received biosolids and are outside the area of known contamination is 1.63μg/kg (assuming non detects have a zero value). This is comparable to the average levels in Jersey. Likewise the average level of fields inside the area of known contamination is 8.72μg/kg that have received biosolids is comparable to the mean levels in that area.

International context

PFAS are now globally ubiquitous in soils due to long-range atmospheric deposition, and agricultural soils may receive additional inputs through the application of biosolids. When placed in an international context, the PFAS concentrations measured in Jersey soils fall well within the expected global pattern. A review of global soil levels by Brusseau et al. is used to help make this comparison.(Brusseau et al., 2020) The vast majority of soils outside the area of known contamination (non-detect to ~5 μg/kg) align closely with typical global background levels, where median maximum concentrations for PFOS and PFOA are around 2.7μg/kg and only a small minority of studies report values above 10μg/kg. In contrast, soils within the area of known contamination (up to 23μg/kg) are clearly elevated relative to background but remain far below the tens to hundreds of micrograms per kilogram commonly observed at contaminated sites worldwide, such as fire-training areas, airports, and industrial facilities. Jersey's precautionary agricultural threshold of 4μg/kg (sum 4 PFAS) therefore sits at the protective end of international practice, and exceedances in the area of known contamination represent moderate contamination by global standards, while the rest of the island's soils fall squarely within the range of normal environmental variation.

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Environmental waters, foams and sewage treatment

This chapter summarises the data from testing across Jersey as well as some routine data from Jersey Water. The results are available in detail in appendix xxxx

Surface water and freshwater foam

Surface water

Stream sampling has been carried out regularly since 2020 at the streams that may be abstracted for drinking-water purposes, with analysis for a 48-compound PFAS suite at a UK ISO 17025 accredited laboratory. The summary provided gives average results since 2020 for PFHxS, PFNA, PFOS and PFOA, and therefore the sum of 4 PFAS (ng/L) for each stream.

Looking specifically at sum of 4 PFAS (ng/L) averages across the 19 streams listed:

- The full range is 5.8-247.7 ng/L. The 247.7 ng/L value (Pont Marquet Stream) is a major outlier relative to the rest.
- Excluding Pont Marquet, stream averages sit between 5.8 and 37.5 ng/L, with a median around18.0 ng/L and a mean of 19.5 ng/L (based on the listed sums). Including Pont Marquet, the median becomes 19.6 ng/L while the mean is pulled up to approximately 31.5 ng/L.
- Most streams cluster in the low tens: excluding Pont Marquet, 9/18 sites fall between 10 and 20 ng/L, and 7/18 fall between 20 and <30 ng/L. Only one site is <10 ng/L (Fernlands Stream at 5.8 ng/L) and one is ≥30 ng/L (Handois East Stream at 37.5 ng/L).

It's also notable that where sum is higher, it is often because one or two components dominate. Pont Marquet's very high sum is driven by very high PFOS (and high PFHxS), whereas several "mid-range" streams (roughly 20-30 ng/L sum of 4 PFAS) reflect combinations of PFOS and PFOA in single-digit to low-teen ng/L averages.

Freshwater foam (and paired freshwater)

A freshwater foam event was sampled in Autumn 2025 at the former Simon Sand Quarry main lagoon, where foam had previously been reported. A paired sub-surface water sample was taken at the same location..

Results (all in ng/L, sum of 4 PFAS):

- Foam: 276,850 ng/L
- Paired lagoon water: 868.51 ng/L
- Foam was therefore ~319× higher than the paired water sample on a sum-of-4 basis.

It is known that that foam can massively concentrate PFAS compared with the underlying freshwater; so foam measurements are not simply a "proxy" for the bulk water concentration; they behave like a distinct, enrichment-prone matrix.

Seawater and sea foam

Seawater (coastal sites and an offshore reference)

Six seawater samples were collected in Summer 2025 from several coastal locations chosen for specific reasons: two sites in St Aubin's Bay in the area of sewage treatment works discharge, control sites on the north coast and far north-east, and La Braye (St Ouen's Bay) selected for proximity to the area of known PFAS contamination, with a duplicate also taken there. Seawater was collected 1 m below the surface, and additional precautions were taken to reduce cross-contamination risk.

All six Summer 2025 seawater samples (including the La Braye duplicate) reported sum of 4 PFAS = 0 ng/L. However, the laboratory noted that the La Braye sample and duplicate had greater dilution applied than the others, resulting in higher LODs for those two samples; despite this, no PFAS were detected above LOD.

An additional offshore seawater sample was collected at Les Minquiers Reef in Autumn 2024 (taken approximately 25 cm below the surface from a boat in rough sea conditions), and it also reported sum of 4 PFAS = 0 ng/L (below detection).

Sea foam

Sea foam sampling is opportunistic because it requires suitable wave and wind conditions to produce enough foam for collection. Two sea foam samples were collected in Winter 2026 at Le Grouet Slipway (near Corbière) and St Brelade's Bay. The tail end of Storm Chandra helped generate large volumes of persistent foam at St Brelade's Bay (wind driving foam up the beach), while at St Ouen's Bay foam was reportedly too short-lived to collect; hence the use of Le Grouet as a practical sampling site close to St Ouen's Bay but with favourable conditions (slipway/rockpools + wind/wave balance).

Sea foam results (sum of 4 PFAS, ng/L):

- Le Grouet Slipway: 1,806 ng/L
- St Brelade's Bay: 1,005 ng/L

Putting this alongside the seawater results from Summer 2025 and the offshore sample: seawater was reported as non-detect (0 ng/L sum of 4 PFAS) across sampled sites, but sea foam contained PFAS at approx1,000-1,800 ng/L. The overall pattern matches the freshwater pairing: foam acts as a strong concentrating medium for PFAS, and can show substantial PFAS levels even when the surrounding water samples are below detection for the same analyte set.

Groundwater and private water supplies

Below (Figure 1) is a parish-level summary of the groundwater PFAS table, showing average and range for sum of 4 PFAS (ng/L) and sum of 48 PFAS (ng/L). The sums are weighted averages, with non-detects counted as 0 and with the mid-point of and specific site range used.

Figure 1 - Groundwater PFAS by parish (averages and ranges)

Parish	**Total samples (n)**	**Avg sum of 4 PFAS (ng/L)**	**Range sum of 4 PFAS (ng/L)**	**Avg sum of 48 PFAS (ng/L)**	**Range sum of 48 PFAS (ng/L)**
Grouville	1	13.0	13	15.0	15
St Brelade	14	357.9	5-2,871	480.2	5-3,207
St Clement	3	47.5	46-49	65.5	64-67
St Helier	6	8.7	<LOD-21	13.3	<LOD-32
St John	3	150.5	39-262	188.0	39-337
St Lawrence	7	16.9	5-46	42.9	11-105
St Martin	4	12.5	4-27	18.5	4-45
St Mary	4	10.8	5-21	14.8	5-37
St Ouen	10	47.2	4-196	69.2	5-262
St Peter	18	1,728.7	3-20,644	2,217.5	3-24,470
Trinity	4	18.2	9-27	28.2	18-44

As you can see from Figure 1, above, St Peter stands out with by far the highest average and the widest range for both sum of 4 PFAS (ng/L) and sum of 48 PFAS (ng/L) (maxima in the tens of thousands ng/L). St Brelade is the next most elevated overall, with a wide spread from low single digits up to the thousands ng/L, which strongly pulls up the parish average. Neither of these are surprising, given the location of the area of known contamination.

Several parishes (e.g., St Lawrence, St Martin, St Mary, Trinity) have averages in the 10-20 ng/L range for sum of 4 PFAS (ng/L), although their ranges still extend into higher values in some cases.

Private water supplies

Private supplies are widely used: around 6,693 people are connected to them for drinking water, and the compiled dataset indicates 1,759 properties use a borehole and 485 use a well for drinking water. The usage (where known) of wells and boreholes is outlined in Figure 2, below. Not all landowners choose to disclose the way their private water supply is used, which is why the data are incomplete.

Figure 2 - Number of boreholes and wells by use in Jersey

Usage	**Boreholes (n)**	**Wells (n)**
Agriculture	18	3
Amenity	15	4
Business	122	9
Garden and pool	107	21
Garden watering	508	223
Garden, business	5	2
House and Business	52	12
House and garden	815	178
House and pool	30	2
House supply	630	258
House, Garden, Business	21	3
House, Garden, Other	12	7
House, garden, pool	199	25
Licensed	117	3
Total	**2,651**	**750**
Properties using a private water supply for drinking water	**1,759**	**485**

Only a subset of boreholes and wells could be sampled in the timeframe for this report. The sample data includes 55 place-entries (some with repeated sampling shown as a range).

- 4/55 entries have sum of 4 PFAS ≤ 4 ng/L
- 8/55 entries have sum of 4 PFAS > 4 ng/L but sum of 48 PFAS ≤ 10 ng/L
- 43/55 entries have sum of 4 PFAS > 4 ng/L and sum of 48 PFAS > 10 ng/L

It is difficult to draw any inference from this as it is not clear which of these (if any) are used for drinking water.

Sewage treatment works

This section reports PFAS at the sewage treatment works (STW) for what's entering (influent) and exiting (effluent), with concentrations reported in ng/L and focusing here on the sum of four PFAS (ng/L).

Figure 3 - Summary statistics for sum of four PFAS in sewage treatment (ng/L)

STW stream	Number of samples	Average sum of four PFAS (ng/L)	Median sum of four PFAS (ng/L)	Reported range (ng/L)	Latest result (date → sum of four PFAS)
Influent	5	96.5-106.5	64.2	20.2-298.5 (plus one <50)	17 Nov 2025 → 20.2
Effluent	5	37.6-47.6	33.3-43.0	27.2-84.7 (plus one <50)	17 Nov 2025 → <50

As Figure 3, above, shows; influent sum of four PFAS varies widely over time, from 20.2 ng/L up to 298.5 ng/L. Effluent sums are generally lower than influent on the same dates with comparable reporting, but still span 27.2-84.7 ng/L.

As discussed above, sea water samples near the effluent outflow show PFAS below the limit of detection, as is the case in seawater elsewhere in Jersey.

International context

Across all environmental aquatic samples taken, PFAS levels in Jersey fall well within the broad global ranges reported in recent international reviews, with a few localised hotspots reaching the upper end of what is seen worldwide. Typical surface-water concentrations in Jersey (low-tens ng/L, with one outlier at 247.7 ng/L) are comparable to the "ND–70.1 ng/L PFOS and 0.2–1630.2 ng/L PFOA" reported across 41 cities globally, as summarised in a critical review of worldwide PFAS pollution.(Kurwadkar et al., 2022) Groundwater in most parishes (10–20 ng/L) aligns with the typical background concentrations detectable in pg L^{-1} to low ng L^{-1}, while the highly elevated values in St Peter and St Brelade (thousands to tens of thousands ng/L) match the levels observed near point-source contamination sites internationally, including those affected by AFFFs or industrial releases. (Gobelius et al., 2018)

Seawater around Jersey was below detection, consistent with global ocean datasets showing that open and coastal waters generally contain PFAS in the pg L^{-1} to low-ng L^{-1} range.(Savvidou et al., 2023) Jersey's sea-foam concentrations (1,005–1,806 ng/L) are lower than the extreme values reported internationally, e.g., Belgian foams reached 8,700–2,400,000 ng/L total PFAS, with North Carolina reporting PFOS approaching 8,000,000 ng/L.

Finally, PFAS in sewage influent and effluent (tens to low-hundreds ng/L) are consistent with the global wastewater literature, which identifies WWTPs as major secondary sources and reports similar concentration ranges worldwide.(Kurwadkar et al., 2022) Overall, Jersey's environmental PFAS profile mirrors global patterns: low background levels in most waters, strong enrichment in foams, and high concentrations only in areas affected by historical contamination.

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Infrastructure and Environment

Waste Regulation

Waste export and import controls with specific mention of PFAS

15/02/2026

Government of Jersey

Contents

Introduction

This paper describes the legal and policy basis for regulating the movements of wastes between jurisdictions.

It provides some context to the PFAS issue and work of the PFAS Scientific Advisory Panel and their recommendations for the management of PFAS contaminated materials and materials used in the treatment of PFAS.

It outlines the statutory basis for regulation as set out in the Waste Management (Jersey) Law 2005, and other applicable Conventions and Regulations (the Basel Convention, OECD Decision, Regulation (EU) 2024/1157 on shipments of waste, Regulation (EU) 1013/2006 on shipments of waste (as retained by the UK Government following UK departure from the EU (Brexit)).

Summary

The export of GAC contaminated by PFAS from water treatment may either be

- Exported as **'not waste'** because there is a contract in place for the supply and both Jersey / UK competent authorities accept that this can happen.
- Exported as waste going for ***recovery*** (to regenerate the carbon and put this back into supply / use, with the PFAS destroyed by high temperature incineration (or another destruction technique as part of the regeneration process or separately).
- Exported as waste going for ***disposa****l*, by high temperature incineration, if it is part of the 'Duly Reasoned Request' (DRR) agreement between Jersey and the UK.

It is possible to export waste out of Jersey in accordance with the applicable waste export controls. For the export of waste GAC containing PFAS from Jersey to be dealt with elsewhere will depend on the concentrations of other contaminants in the waste.

The options that Jersey Water, Ports of Jersey have to treat waste, will impact the constituents in the waste and how it is defined. This in turn dictates the export controls required.

Background

About the controls governing the export and import of wastes between jurisdictions

The regulatory regimes to regulate movements of waste between jurisdictions have their roots in global conventions, implemented through legislation at the EU, UK and Jersey levels. They are designed to ensure the environmentally sound management of waste and encompass the principles of;

- Proximity (deal with waste as close as possible to where is arises)
- Priority for ***recovery*** (of waste as opposed to ***disposal***)
  - (note in the case of PFAS containing wastes, disposal and preferably destruction to ensure they do not get back into the environment, is the objective)
- Self-sufficiency, in capacity to deal with the waste produced.

Competent authorities in jurisdictions are charged with implementing the waste export controls. In Jersey the Minister for the Environment is the competent authority. In England, UK, the Environment Agency are the competent authority.

Conventions & Legislation

The multilateral environmental agreements (conventions) and laws that control waste movements are listed below

International

- Basel Convention Basel Convention - Home Page
- OECD Decision 221.en.pdf

European Union

- Regulation (EC) No 1013/2006 on shipments of waste Regulation - 1013/2006 - EN - EUR-Lex
- Regulation (EU) 2024/1157 of the European Parliament and of the Council of 11 April 2024 on shipments of waste, amending Regulations (EU) No 1257/2013 and (EU) 2020/1056 and repealing Regulation (EC) No 1013/2006 on shipments of waste Regulation - EU - 2024/1157 - EN - EUR-Lex (most provisions will apply from 21 May 2026 and most export rules will apply from 21 May 2027. Until then, the provisions of Waste Shipment Regulation 1013/2006 continue to apply.)

UK

- The Transfrontier Shipment of Waste Regulations 2007
- Regulation (EC) No 1013/2006 on shipments of waste Regulation - 1013/2006 - EN - EUR-Lex (retained by the UK Government following departure from the EU)

Jersey

- Waste Management (Jersey) Law 2005

Jersey Context

As a crown dependency, Jersey introduced legislation (the Waste Management (Jersey) Law 2005) to allow the UK Government to seek ratification of the Basel Convention on Jersey's behalf.

Jersey is largely self-sufficient in dealing with its waste (domestic, construction & demolition, organic waste, asbestos etc.) but where wastes need to be exported, then export controls apply, and this is regulated (by Regulation in Jersey and by UK Regulators where most of the waste is exported).

The export / import controls follow guidelines, legislation and the UK Government policy for waste shipments UK plan for shipments of waste. The legislation is implemented jointly by competent authorities in exporting and importing jurisdictions. i.e. decisions are not Jersey's alone to make, the UK competent authority will have a view on their implementation of laws and their policy.

The UK Government has produced guidance which helpfully consolidates the waste types listed in the Conventions & Legislation above available here Unofficial consolidated version of Annexes III, IIIA, IIIB, IV and IVA of the relevant regulations on shipments of wastes - GOV.UK

There are three broad types of export controls applicable to different wastes and management options. These are described below along with comments on their applicability in Jersey and the complexity of the questions regarding PFAS contaminated materials or residues used in the treatment of PFAS contaminated substances and water.

Types of waste Export

1. Non-hazardous waste exports for recovery

Certain wastes, exported for RECOVERY, can be exported without export controls, only record keeping. And example of a waste type on this list is paper.

B3020 Paper, paperboard and paper product wastes.

Waste that can be exported are listed in Annex III List of wastes subject to the general information requirements laid down in Article 18 (green listed waste).

This list includes
B2060 Spent activated carbon not containing any Annex I constituents to an extent they exhibit Annex III characteristics. For example, carbon resulting from the treatment of potable water and processes of the food industry and vitamin production (note the related entry on list A A4160).

Granular Activated Carbon (GAC) will adsorb pesticides, VOC's and heavy metals as well as PFAS and this detail may influence which definition under Basel etc will be applicable and therefore which waste export control applies.

2. Hazardous and other waste exports for recovery

Certain hazardous and other wastes exported for RECOVERY need export controls and the prior informed consent e.g. lead acid vehicle batteries, incinerator bottom ash.

A1160 Waste lead-acid batteries, whole or crushed.
Y47 Residues arising from the incineration of households wastes.

When Jersey exports waste it must seek the agreement of the importing jurisdiction through the notification and prior informed consent process.

Waste that can be exported are listed in Annex IV List of wastes to the procedure of prior written notification and consent (amber listed waste).

This list includes entries for

A4160 *Spent activated carbon not included on list B (note the related entry on list B, B2060)*
And
AD120 *Ion exchange resins*

Granular Activated Carbon (GAC) will adsorb pesticides, VOC's and heavy metals as well as PFAS and this detail may influence which definition under Basel etc will be applicable and therefore which waste export control applies.

The presence of PFAS in the waste is not on it's own, likely to require a definition under A4160.

The inclusion of AD120 ion exchange resins in this list means that the export of such will require the procedure of prior written notification and consent for this waste.

3. Hazardous and other waste exports for disposal

Certain hazardous and other wastes exported for *disposal* to the UK, need the specific periodic agreement of the UK Environment Agency as well as export controls and the prior informed consent. This process is known as the 'duly reasoned request' (DRR) agreement, which can last for up to 3 years.

A list of specific waste types can be exported from Jersey for disposal is agreed through this process. e.g. chemicals and biocides requiring high temperature incineration to dispose of them has historically been accepted on the DRR agreement for some years. This is because the UK Government accepts that it is not economically viable for Jersey to build a high temperature incinerator for the relatively small quantities requiring disposal.

Regulation are at the moment negotiating the next DRR period to 2028. The opinion of the UK Environment Agency about the import of wastes containing PFAS for treatment or disposal, has been sought. This is only likely to be accepted with a lot more explanation of the wastes types and reasons why Jersey cannot deal with the waste locally in an environmentally sound manner. The inability to acquire appropriate waste facilities and the economic viability of building them are relevant factors.

The UK Government policy for waste shipments is set out in the UK plan for shipments of waste. Imports of waste to the UK for disposal are prohibited. However exemptions to this rule can be made for shipments of waste into the UK from a party to the Basel Convention where a UK competent authority has acceded to a duly reasoned request.

Where it can be agreed that wastes containing PFAS can be included on the DRR and be exported to the UK for disposal, the procedure of prior written notification and consent will have to be followed.

Waste definitions – what is a waste and what is not a waste?

Waste shipment controls only apply if the material being transported is waste. Where something is not a waste, none of the waste controls apply to the export or movement of such materials between jurisdictions.

Where competent authorities disagree on whether something is waste the material will always be waste.

Parties managing waste have a legal duty of care if they produce, carry, import, keep, recover or dispose of waste. It is a waste producer's responsibility to classify waste correctly and ship it under the correct controls.

Waste is defined in legislation and in case law. In the Waste Framework Directive (2008/98/EC), waste is defined as any substance or object that the holder discards, intends to discard, or is required to discard. Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste

In Jersey's Waste Management (Jersey) Law 2005 "waste" means – (a) any substance or object, that is discarded; (b) any substance or object, in a person's possession or control, that the person intends to discard; or (c) any substance or object, in a person's possession or control, that the person is required by a national law to discard, but does not mean a gaseous effluent that is emitted into the atmosphere, and does not mean waste water that is not waste in liquid form.

Waste is normally defined by the act of or intention to discard. The meaning of discard is interpreted using case law. Definitions, guidance and case law cover

- by-products that have a use (not waste) and
- the process of "end-of-waste" (when waste ceases to be waste) as well as
- contractual arrangements that mean that waste is not discarded but remains within a commercial chain of utility.

It may be possible for GAC used in treatment of PFAS compounds to be defined and exported as **'not waste'** because there is a contract in place for the supply and both Jersey / UK /other competent authorities accept that this can happen.

The regeneration of GAC is mentioned in the Phase 2 interim report and carbon suppliers advertise this capability (see Reactivation | Puragen). It has been discussed by the PFAS Scientific Panel in relation to European sites supplying and regenerating carbon.

Where spent ion exchange resins can be regenerated for reuse, similar concepts may apply.

PFAS in hazardous waste definitions

PFAS does not occur naturally in the environment and are extremely persistent because they resist degradation processes. They are often referred to as forever chemicals.

With current understanding of hazardous waste definitions in relation to PFAS compounds, as described below, these **would not** be defined as hazardous wastes.

The Waste Framework Directive (2008/98/EC) (WFD) sets out what waste is and how it should be managed. The WFD considers some wastes to be hazardous waste.

> Article 3 of the WFD defines hazardous waste as **"waste which displays one or more of the hazardous properties listed in Annex III"** to the WFD.
>
> The application of this is determined by the List of Wastes Decision in that the waste must be **"waste classified as hazardous waste featuring on the list established by Commission Decision 2000/532/EC …."**

Commission Decision 2000/532/EC is the List of Wastes Decision (also known as the European Waste Catalogue or EWC). Guidance on the List of wastes, EWC and hazardous definitions from the UK Government is here Waste_classification_technical_guidance_WM3.pdf

Since PFAS are not specifically mentioned in the List of Wastes they will not be defined as hazardous waste.

Persistent Organic Pollutants

PFAS are Persistent Organic Pollutants (POP's). The regulation of POP's is via the Stockholm Convention, EU Council Decisions (2006/507/EC) and Regulation (EU) 2019/1021.

The UK Government has provided guidance on complying with POP's Regulation including which PFAS are POP's waste, how to describe and classify POP's wastes and when POP's in waste must be destroyed (Identify and classify waste containing persistent organic pollutants (POPs) - GOV.UK). Concentration.

PFOS above a concentration of 50 mg/Kg would define the waste as POP's waste and the POP's in the waste must be destroyed (or irreversibly transformed).

Competent authorities for imported waste will be considering the implications of POP's legislation as well as waste export controls.

Infrastructure and Environment

PFAS Testing in Jersey: Testing & Results Summary V2.0

04/02/2026

Government of Jersey

INTRODUCTION

This paper sets out the PFAS testing work commissioned and undertaken by the Government of Jersey to inform Report Four by the Independent PFAS Scientific Advisory Panel (the Panel).

The paper presents the main testing streams that contributed to the Panel's assessment and records the evidence base that will inform the Panel's report.

The paper details the testing undertaken under the PFAS Testing Protocol and related monitoring work. It presents PFAS levels in food, soils (including fields with and without biosolids application), biosolids and Sewage Treatment Works (STW) operations, private water supplies (primarily boreholes), and testing undertaken in connection with planning applications. The data includes both newly commissioned sampling and existing datasets where these meet the same quality standards.

The purpose of the paper is to provide the Panel with a clear and transparent account of how data have been generated and assembled, including the main limitations. Interpretation of the findings, including health or regulatory conclusions, will be undertaken by the Panel and is not undertaken in this paper.

1. TESTING METHODOLOGY

The testing described in this paper has been undertaken according to the Government of Jersey's PFAS Testing Protocol and associated sampling procedures, including the published Testing Methodology. This sets out how samples were selected, collected, stored and transported, and how laboratories were commissioned. Accredited laboratories with experience in ultra-trace PFAS analysis were used, and standard quality assurance measures were applied, including field and laboratory blanks, duplicate samples. This included documented chain-of-custody from collection through to reporting.

For each sample, laboratories measured a defined set of PFAS compounds using analytical methods with very low detection limits. Results are reported as measured concentrations for individual compounds and, where relevant, as the sum of selected PFAS'.

In this paper, 'not detectable' (ND) or 'less than reporting limit' (<RL) are used to indicate where the concentration of a PFAS compound in a sample is below the laboratory's reporting detection limit for that test. 'Not detectable' or 'less than reporting limit' does not mean that the compound is completely absent, but rather that it is at a level too low to be accurately measured by the analytical method used. Different labs were used depending on the category of the items being sampled, above each of the results tables will indicate which lab was used and what the reporting detection limit is for those specific samples.

When testing adheres to the same quality standards, new sampling results have been combined with historic datasets. This allows the Panel to compare findings and place Jersey's results within a broader body of evidence.

2. PFAS Levels in Food

Per- and polyfluoroalkyl substances (PFAS) are persistent pollutants that are known to accumulate in both the environment and the food chain. The European Food Safety Authority (EFSA) identified certain foods as the main sources of dietary exposure, leading to targeted monitoring and the addition of PFAS to existing EU food contaminants regulations.

According to EFSA, the primary dietary sources of PFAS exposure are foods of animal origin, including seafood, meat, eggs, and dairy. Given these established exposure risks, a selected range of such products from both Jersey and the UK were sampled for comparison, recognising that the majority of foods consumed in Jersey are imported from the UK.

We also selected a range of seasonal fruits and vegetables for testing. PFAS can be present in soil, water, and certain fertilisers, and may therefore be absorbed into crops as they grow. Although concentrations are generally much lower than those found in foods of animal origin, monitoring these levels is important to provide a more comprehensive picture of dietary exposure.

The results from the sampling across the island are presented in Table 1. In total, 43 Products of Animal Origin (POAO) and 33 samples of fruit and vegetables were tested. These totals include retested samples.

Of the 33 fruit and vegetable samples, 22 returned PFAS results that were 'not detected'. Of the 11 that returned results above the 'not detected' level, nine samples were potatoes, with results ranging from 0.00122 to 0.02580µg/kg. All the results for fruit and vegetables were below the EU's indicative level of 0.04µg/kg. Of the remaining fruit and vegetable samples, only locally grown bell peppers and tomatoes returned a result of just above detectable levels of 0.00122 and 0.00751µg/kg respectively, both well below the EU's indicative level of 0.04µg/kg.

Of the 43 products of animal origin (POAO) samples tested, 27 results all returned levels that were well below the EU maximum concentrations. Two samples exceeded the EU limit, one of these was a Jersey pork liver sample and the other being a UK (not Jersey sourced) brown crab meat product. It is not clear whether the elevated samples accurately represent this food type, therefore resampling of a new sample was undertaken. This is normal practice when results are higher than anticipated. The UK crab meat resample resulted in a figure of 1.93µg/kg which is less than half the EU maximum of 5.00µg/kg. The pork liver re-sample resulted in a figure of 25.36µg/kg, higher than the previous figure. Upon notification of these results, the producer voluntarily removed this product from the market.

The levels of PFAS in sampled eggs were all well below the EU maximum of 1.7µg/kg. However, the eggs from all Jersey producers were retested at the retail and production level to provide a more complete picture. This second round of tests returned results that were either below reporting limit or much lower than the first set of results.

Milk has not had a maximum PFAS limit set by the EU. Jersey 'raw' milk returned a level of below the reporting limit (RL) with the Jersey 'whole milk' sample returning a result of 0.162 µg/kg. Since raw was a precursor to whole it was not considered of concern, however a retest was done for completeness and sampling rigour, which returned a level below reporting limit.

The UK milk sample (not Jersey sourced) returned results of 0.162 and 0.108µg/kg respectively.

Resampling using further Jersey milk samples was undertaken to verify and better understand these data. This is the usual practice when results are higher than expected. Four samples of Jersey milk were resampled. These were Raw milk (from silo), 1% fat milk (retail carton), 2.5% fat milk (retail carton), Whole milk (retail carton). All the resampled data resulted in levels below the reporting limit.

Table 1. PFAS levels in Food products from across the island.

The below food category samples were sent to PASS; this lab's detection limit for each of the 4 PFAS are shown in the table heading. This laboratory has a possible +/- variance or margin for error for any sample with a result above detection limits. This detail was not provided in the table below, because it was less than 0.01µg/kg, but can be provided upon request.

Food Category	**Product / Description**	**Source**	**Notes**	**PFHxS** (µg/kg) (ND = <0.00400)	**PFOA** (µg/kg) (ND = <0.00100)	**PFNA** (µg/kg) (ND = <0.00100)	**PFOS** (µg/kg) (ND = <0.00200)	**Sum of Four PFAS** (µg/kg)	**EU indicative levels (EU) 2022/1431**	**EU Maximum (EU) 2023/915**
Seasonal Fruit/Veg	Potatoes	Jersey	Early season Jersey Royals	ND	ND	ND	ND	ND	0.04	no limit established
Seasonal Fruit/Veg	Potatoes	UK	Early season new potatoes	ND	ND	ND	ND	ND	0.04	no limit established
Seasonal Fruit/Veg	Potatoes	UK	Early season new potatoes	ND	ND	ND	ND	ND	0.04	no limit established
Seasonal Fruit/Veg	Potatoes	UK	Main crop	ND	ND	ND	ND	ND	0.04	no limit established
Seasonal Fruit/Veg	Potatoes	Jersey	Early season Jersey Royals	ND	0.00269	ND	0.00713	0.00981	0.04	no limit established
Seasonal Fruit/Veg	Potatoes	Jersey	Early season Jersey Royals	ND	0.00228	ND	0.00523	0.00751	0.04	no limit established
Seasonal Fruit/Veg	Potatoes	Jersey	Early season Jersey Royals	ND	ND	ND	ND	ND	0.04	no limit established
Seasonal Fruit/Veg	Potatoes	Jersey	Early season Jersey Royals	ND	ND	ND	ND	ND	0.04	no limit established
Seasonal Fruit/Veg	Potatoes	Jersey	Early season Jersey Royals	0.0122	0.00173		0.0118	0.0258	0.04	no limit established
Seasonal Fruit/Veg	Potatoes	Jersey	Early season Jersey Royals		0.00332		0.00532	0.00864	0.04	no limit established
Seasonal Fruit/Veg	Potatoes	Jersey	Early season Jersey Royals	ND	ND	ND	ND	ND	0.04	no limit established
Seasonal Fruit/Veg	Potatoes	Jersey	Early season Jersey Royals	ND	ND	ND	ND	ND	0.04	no limit established

Food Category	Product / Description	Source	Notes	PFHxS (µg/kg) (ND = <0.00400)	PFOA (µg/kg) (ND = <0.00100)	PFNA (µg/kg) (ND = <0.00100)	PFOS (µg/kg) (ND = <0.00200)	Sum of Four PFAS (µg/kg)	EU indicative levels (EU) 2022/1431	EU Maximum (EU) 2023/915
Seasonal Fruit/Veg	Potatoes	Jersey	Early season Jersey Royals	ND	0.00219	ND	0.0068	0.00899	0.04	no limit established
Seasonal Fruit/Veg	Potatoes	Jersey	Early season Jersey Royals	ND	0.00578	0.00157	0.012	0.0194	0.04	no limit established
Seasonal Fruit/Veg	Potatoes	Jersey	Early season Jersey Royals	ND	0.00231	0.00135	0.0103	0.014	0.04	no limit established
Seasonal Fruit/Veg	Potatoes	Jersey	Main crop	ND	ND	ND	ND	ND	0.04	no limit established
Seasonal Fruit/Veg	Potatoes	Jersey	Main crop	ND	0.00221	ND	ND	0.00221	0.04	no limit established
Seasonal Fruit/Veg	Potatoes	UK	Main crop	ND	0.00175	ND	ND	0.00175	0.04	no limit established

The below food category samples were sent to PASS, this lab's detection limit for each of the 4 PFAS are shown in the table heading. This laboratory has a possible +/- variance or margin for error for any sample with a result above detection limits. This detail was not provided in the table below, because it was less than 0.01µg/kg, but can be provided upon request.

Food Category	Product / Description	Source	Notes	PFHxS (µg/kg) (ND = <0.00400)	PFOA (µg/kg) (ND = <0.00100)	PFNA (µg/kg) (ND = <0.00100)	PFOS (µg/kg) (ND = <0.00200)	Sum of Four PFAS (µg/kg)	EU indicative levels (EU) 2022/1431	EU Maximum (EU) 2023/915
Seasonal Fruit/Veg	Bell Peppers	Jersey		ND	0.00120	ND	ND	0.00122	no indicative level established	no limit established
Seasonal Fruit/Veg	Tomatoes	Jersey		ND	0.00750	ND	ND	0.00751	no indicative level established	no limit established
Seasonal Fruit/Veg	Tomatoes	Jersey		ND	ND	ND	ND	ND	no indicative level established	no limit established
Seasonal Fruit/Veg	Bell Peppers	UK / NL		ND	ND	ND	ND	ND	no indicative level established	no limit established
Seasonal Fruit/Veg	Tomatoes	UK		ND	ND	ND	ND	ND	no indicative level established	no limit established
Seasonal Fruit/Veg	Courgettes	UK		ND	ND	ND	ND	ND	no indicative level established	no limit established

Food Category	Product / Description	Source	Notes	PFHxS (µg/kg) (ND = <0.00400)	PFOA (µg/kg) (ND = <0.00100)	PFNA (µg/kg) (ND = <0.00100)	PFOS (µg/kg) (ND = <0.00200)	Sum of Four PFAS (µg/kg)	EU indicative levels (EU) 2022/1431	EU Maximum (EU) 2023/915
Seasonal Fruit/Veg	Courgettes	Jersey		ND	ND	ND	ND	ND	no indicative level established	no limit established
Seasonal Fruit/Veg	Cabbage	Jersey		ND	ND	ND	ND	ND	no indicative level established	no limit established
Seasonal Fruit/Veg	Cauliflower	Jersey		ND	ND	ND	ND	ND	no indicative level established	no limit established
Seasonal Fruit/Veg	Cabbage	UK		ND	ND	ND	ND	ND	no indicative level established	no limit established
Seasonal Fruit/Veg	Cauliflower	UK		ND	ND	ND	ND	ND	no indicative level established	no limit established
Seasonal Fruit/Veg	Strawberries	Jersey		ND	ND	ND	ND	ND	no indicative level established	no limit established
Seasonal Fruit/Veg	Strawberries	UK		ND	ND	ND	ND	ND	no indicative level established	no limit established
Seasonal Fruit/Veg	Asparagus	Jersey		ND	ND	ND	ND	ND	no indicative level established	no limit established
Seasonal Fruit/Veg	Asparagus	UK		ND	ND	ND	ND	ND	no indicative level established	no limit established

The below food category samples were sent to FERA, this lab's reporting limit for each of the 4 PFAS are shown in the table heading.

Food Category	Product / Description	Source	Notes	PFHxS (µg/kg) (RL=0.020)	PFOA (µg/kg) (RL=0.025)	PFNA (µg/kg) (RL=0.016)	PFOS (µg/kg) (RL=0.018)	Sum of Four PFAS (µg/kg)	EU indicative levels (EU) 2022/1431	EU Maximum (EU) 2023/915
POAO	Eggs	Jersey	Free range	<RL	0.154	0.027	0.602	0.783	no indicative level established	1.7
POAO	Eggs	Jersey	Free range	<RL	0.11	0.03	0.179	0.319	no indicative level established	1.7
POAO	Eggs	Jersey	Free range	<RL	0.119	0.02	<RL	0.14	no indicative	1.7

Food Category	Product / Description	Source	Notes	PFHxS (µg/kg) (RL=0.020)	PFOA (µg/kg) (RL=0.025)	PFNA (µg/kg) (RL=0.016)	PFOS (µg/kg) (RL=0.018)	Sum of Four PFAS (µg/kg)	EU indicative levels (EU) 2022/1431	EU Maximum (EU) 2023/915
									level established	
POAO	Eggs	UK	Free range	<RL	0.076	<RL	<RL	0.076	no indicative level established	1.7
POAO	Eggs	UK	Free range	<RL	0.084	0.017	<RL	0.101	no indicative level established	1.7
POAO	Eggs	Jersey	Free range, Direct from farm	<RL	<RL	<RL	0.08	0.08	no indicative level established	1.7
POAO	Eggs	Jersey	Free range, Retail	<RL	<RL	<RL	0.19	0.19	no indicative level established	1.7
POAO	Eggs	Jersey	Free range, Retail	<RL	<RL	<RL	<RL	0.00	no indicative level established	1.7
POAO	Eggs	Jersey	Free range, Direct from farm	<RL	<RL	<RL	<RL	0.00	no indicative level established	1.7
POAO	Eggs	Jersey	Free range, Retail	<RL	<RL	<RL	0.05	0.05	no indicative level established	1.7
POAO	Eggs	Jersey	Free range, Direct from farm	<RL	<RL	<RL	<RL	0.00	no indicative level established	1.7

The below food category samples were sent to FERA, this lab's reporting limit for each of the 4 PFAS are shown in the table heading.

Food Category	Product / Description	Source	Notes	PFHxS (µg/kg) (RL=0.020)	PFOA (µg/kg) (RL=0.025)	PFNA (µg/kg) (RL=0.016)	PFOS (µg/kg) (RL=0.018)	Sum of Four PFAS (µg/kg)	EU indicative levels (EU) 2022/1431	EU Maximum (EU) 2023/915
POAO	Milk	Jersey	Fresh, whole	<RL	0.139	0.022	<RL	0.162	0.14	no limit established
POAO	Milk	UK	Fresh	<RL	0.091	0.017	<RL	0.108	0.14	no limit established
POAO	Milk	Jersey	Raw	<RL	<RL	<RL	<RL	<RL	0.14	no limit established
POAO	Milk	Jersey	Raw	<RL	<RL	<RL	<RL	<RL	0.14	no limit established

Food Category	Product / Description	Source	Notes	PFHxS (µg/kg) (RL=0.020)	PFOA (µg/kg) (RL=0.025)	PFNA (µg/kg) (RL=0.016)	PFOS (µg/kg) (RL=0.018)	Sum of Four PFAS (µg/kg)	EU indicative levels (EU) 2022/1431	EU Maximum (EU) 2023/915
POAO	Milk	Jersey	1.0%	<RL	<RL	<RL	<RL	<RL	0.14	no limit established
POAO	Milk	Jersey	2.5%	<RL	<RL	<RL	<RL	<RL	0.14	no limit established
POAO	Milk	Jersey	Whole	<RL	<RL	<RL	<RL	<RL	0.14	no limit established

The below food category samples were sent to FERA, this lab's reporting limit for each of the 4 PFAS are shown in the table heading.

Food Category	Product / Description	Source	Notes	PFHxS (µg/kg) (RL=0.020)	PFOA (µg/kg) (RL=0.025)	PFNA (µg/kg) (RL=0.016)	PFOS (µg/kg) (RL=0.018)	Sum of Four PFAS (µg/kg)	EU indicative levels (EU) 2022/1431	EU Maximum (EU) 2023/915
POAO	Beef	Jersey	Meat	<RL	<RL	<RL	0.032	0.032	no indicative level established	1.3
POAO	Beef	Jersey	Offal - Kidney	0.025	<RL	0.078	0.342	0.446	no indicative level established	8
POAO	Beef	Jersey	Offal - Liver	<RL	<RL	0.126	1.076	1.202	no indicative level established	8
POAO	Pork	Jersey	Meat	<RL	0.055	0.020	0.072	0.147	no indicative level established	1.3
POAO	Pork	Jersey	Offal - Kidney	0.027	0.054	0.074	0.642	0.797	no indicative level established	8
POAO	Pork	Jersey	Offal - Liver	0.176	0.806	1.788	19.974	22.744	no indicative level established	8
POAO	Beef	UK	Meat	<RL	<RL	<RL	<RL	<RL	no indicative level established	1.3
POAO	Beef	UK	Offal - Liver	<RL	<RL	0.061	0.684	0.745	no indicative level established	8
POAO	Beef	UK	Offal - Kidney	<RL	<RL	<RL	0.087	0.087	no indicative level established	8

Food Category	Product / Description	Source	Notes	PFHxS (µg/kg) (RL=0.020)	PFOA (µg/kg) (RL=0.025)	PFNA (µg/kg) (RL=0.016)	PFOS (µg/kg) (RL=0.018)	Sum of Four PFAS (µg/kg)	EU indicative levels (EU) 2022/1431	EU Maximum (EU) 2023/915
POAO	Pork	UK	Meat	<RL	<RL	<RL	<RL	<RL	no indicative level established	1.3
POAO	Pork	UK	Offal - Liver	<RL	<RL	<RL	0.072	0.072	no indicative level established	8
POAO	Pork	Jersey	Offal - Liver	0.23	0.50	0.630	24.010	25.350	no indicative level established	8

The below food category samples were sent to FERA, this lab's reporting limit for each of the 4 PFAS are shown in the table heading.

Food Category	Product / Description	Source	Notes	PFHxS (µg/kg) (RL=0.020)	PFOA (µg/kg) (RL=0.025)	PFNA (µg/kg) (RL=0.016)	PFOS (µg/kg) (RL=0.018)	Sum of Four PFAS (µg/kg)	EU indicative levels (EU) 2022/1431	EU Maximum (EU) 2023/915
POAO	Oysters	Jersey	Aquaculture	<RL	0.75	<RL	<RL	0.075	no indicative level established	5
POAO	Oysters	UK	Aquaculture	<RL	0.99	<RL	<RL	0.099	no indicative level established	5
POAO	Crab	Jersey	Chancre, wild caught	<RL	0.124	0.098	0.141	0.363	no indicative level established	5
POAO	Crab	Jersey	Spider, wild caught	0.036	0.568	0.263	0.085	0.953	no indicative level established	5
POAO	Lobster	Jersey	Wild caught	<RL	0.097	0.032	0.082	0.211	no indicative level established	5
POAO	Scallops	Jersey	Wild caught	<RL	0.063	0.018	0.035	0.117	no indicative level established	5
POAO	Crab Meat	UK	Wild caught	<RL	2.674	1.399	1.356	5.429	no indicative level established	5
POAO	Black bream	Jersey	Fillet	<RL	0.076	0.016	<RL	0.092	no indicative level established	45

Food Category	Product / Description	Source	Notes	PFHxS (µg/kg) (RL=0.020)	PFOA (µg/kg) (RL=0.025)	PFNA (µg/kg) (RL=0.016)	PFOS (µg/kg) (RL=0.018)	Sum of Four PFAS (µg/kg)	EU indicative levels (EU) 2022/1431	EU Maximum (EU) 2023/915
POAO	Cod	UK	Fillet	<RL	0.080	0.088	0.075	0.243	no indicative level established	no limit established
POAO	Bass	UK / EU	Farmed, fillet	<RL	0.085	<RL	0.023	0.108	no indicative level established	8
POAO	Crab Meat	UK	Wild caught	<RL	0.960	0.560	0.400	1.930	no indicative level established	5
POAO	Seabass	Jersey	Wild caught	<RL	<RL	<RL	0.66	0.66	no indicative level established	8
POAO	Mackerel	Jersey	Wild caught	<RL	<RL	<RL	0.64	0.64	no indicative level established	2

3. PFAS Levels in Soil

The principal aim of the soil sampling programme is to provide a representative set of test results giving a snapshot of the PFAS levels in the top layer of soil across Jersey. This will provide a better understanding of PFAS levels in soils under different management and exposure conditions. To achieve this, consideration was given to selecting locations across the Island to account for different soil types and environmental conditions. There is no current maximum PFAS concentration set by the EU for soil to compare the island's data to. However, comparison to similar studies elsewhere can be made.

Landowners are not always the operators of any given agricultural field. Lease holders, for example, can apply agricultural/soil enhancing products to land while they hold the lease. These can include soil enhancing products, such as biosolids cake (treated and dried sewage sludge from the sewage treatment works) or filter cake (treated strained waste from the water treatment works).

Tracking the historic use and application of soil enhancing product to fields can be intricate work due to the practice of land swapping where field users will swap fields for a short period of time, to allow rotation between potato and dairy farming without a change in ownership. Tracing the lease holder or landowner of a specific field can be complex as there is no land registry in Jersey and if land has not changed hands recently it will not feature in the land transactions database.

Areas were selected for testing to encompass a known range of historic product applications, from areas with no history of cultivation, to areas currently in use for cultivation. These were then subdivided into fields with no land applications of Biosolids Cake or Filter Cake products, to fields that have received one or both products, in varying amounts and frequencies.

Table 2 presents the results of the soil sampled from 53 fields, woodlands, valleys, and meadows across Jersey, 29 of the soil samples resulted in PFAS levels that were 'not detected'. The remaining 24 soil samples returned with PFAS levels higher than 'not detected', 13 of these were from the affected area around the airport (plume), with the remaining 11 samples of detected results coming from one valley and ten fields that have had a range of biosolids cake or filter cake applied in recent years.

Of the 13 samples of soil tested from fields within the affected area around the airport (plume) we can see that all of them resulted in PFAS levels above 'not detected'. Results of this nature were anticipated given the proximity to the airport fire training grounds and their location within the affected area around the airport. The levels of PFAS in the soil of these fields ranged from between 1.69 to 23 μg/kg. Perhaps unsurprisingly, the sample with the highest level of total PFAS (23 μg/kg) was a field closest to the fire training grounds which again one would expect to see. It is also worth noting that this sample was significantly higher than the next highest sample of 13.2 μg/kg. Again, illustrating the significance of proximity to the fire training grounds in returning elevated results and the subsequent reduction in PFAS concentrations the further away from the airport fire training grounds the samples were taken.

Detected levels of PFAS from filter cake application sites outside the affected area ranged between 1.47 and 5.31μg/kg, and between 1.04 and 5.21μg/kg for biosolid application sites outside of the affected area.

In summary, the results of the soil analysis received so far show no PFAS detected in the uncultivated 'control' areas, low PFAS levels in fields which have received applications of biosolids or filter cake, and higher PFAS levels within the demonstrated affected area around the airport (plume).

Table 2. PFAS levels in soil across the island

The below soil category samples were sent to VERITAS, this lab's reporting limit for each of the 4 PFAS are shown in the table heading.

Land type	**Location** (parish)	**Description**	**Notes**	**PFHxS** (μg/kg) (ND = <1ug/kg)	**PFNA** (μg/kg) (ND = <1ug/kg)	**PFOA** (μg/kg) (ND = <1ug/kg)	**PFOS** (μg/kg) (ND = <1ug/kg)	**Sum of Four PFAS** (μg/kg)
Beauport, Control	St Brelade	Control field - no recent agriculture	No applications to land	ND	ND	ND	ND	ND
Woodland, Control	St Martin (St Catherines)	Untouched woodland area	No applications to land, woodland area	ND	ND	ND	ND	ND
Woodland, Control	St Peter	St Peters valley	No applications to land, woodland area	ND	ND	ND	ND	ND
Woodland, Control	St Ouen	Greve de Lecq	No applications to land, woodland area.	ND	ND	ND	ND	ND
Meadow, Control	St Clement	Control field - no recent agriculture	No applications to land	ND	ND	ND	ND	ND

The below soil category samples were sent to VERITAS, this lab's reporting limit for each of the 4 PFAS are shown in the table heading.

Land type	**Location** (parish)	**Description**	**Notes**	**PFHxS** (µg/kg) (ND = <1ug/kg)	**PFNA** (µg/kg) (ND = <1ug/kg)	**PFOA** (µg/kg) (ND = <1ug/kg)	**PFOS** (µg/kg) (ND = <1ug/kg)	**Sum of Four PFAS** (µg/kg)
Agricultural field	St Mary	Used for growing produce	No applications to land	ND	ND	ND	ND	ND
Agricultural field	St Mary	Used for growing produce	No applications to land	ND	ND	ND	ND	ND
Agricultural field	Trinity	Used for growing produce	No applications to land	ND	ND	ND	2.3	2.3
Agricultural field	St Lawrence	Used for growing produce	No applications to land	ND	ND	ND	ND	ND
Agricultural field	St Lawrence	Used for growing produce	No applications to land	ND	ND	ND	ND	ND
Agricultural field	St Mary	Used for growing produce	Multiple biosolid applications to land	ND	ND	ND	1.04	1.04
Agricultural field	St Clement	Used for growing produce	Multiple biosolid applications to land	ND	ND	ND	ND	ND
Agricultural field	St John	Used for growing produce	Filter sludge application	ND	ND	ND	ND	ND
Agricultural field	St John	Used for growing produce	Filter sludge application	ND	ND	ND	ND	ND
Agricultural field	Trinity	Used for growing produce	Filter sludge application	ND	ND	ND	2.86	2.86
Agricultural field	St Lawrence	Used for growing produce	Filter sludge application	ND	ND	ND	ND	ND
Agricultural field	St Lawrence	Used for growing produce	Filter sludge application	ND	ND	ND	ND	ND
Agricultural field	St John	Used for growing produce	Filter sludge application	ND	ND	ND	ND	ND
Agricultural field	St John	Used for growing produce	Filter sludge application	ND	ND	ND	1.47	1.47
Agricultural field	St Lawrence	Used for growing produce	Filter sludge application	ND	ND	ND	5.31	5.31
Agricultural field	St Martin	Under grass	Biosolid application TBC	ND	ND	ND	ND	ND
Agricultural field	St Martin	Under grass	Biosolid application	ND	ND	ND	ND	ND
Agricultural field	St Ouen	Under Cover Crop	Biosolid application	ND	ND	ND	5.21	5.21
Agricultural field	St Mary	Under grass	Slurry application	ND	ND	ND	ND	ND
Agricultural field	St Mary	Under grass	Biosolid application	ND	ND	ND	ND	ND
Agricultural field	St Mary	Under grass	Biosolid application	ND	ND	ND	1.92	1.92
Agricultural field	St John	Under grass	Biosolid application	ND	ND	ND	ND	ND

Land type	**Location** (parish)	**Description**	**Notes**	**PFHxS** (µg/kg) (ND = <1ug/kg)	**PFNA** (µg/kg) (ND = <1ug/kg)	**PFOA** (µg/kg) (ND = <1ug/kg)	**PFOS** (µg/kg) (ND = <1ug/kg)	**Sum of Four PFAS** (µg/kg)
Agricultural field	Grouville	Used for growing produce	No applications to land	ND	ND	ND	ND	ND
Agricultural field	Grouville	Used for growing produce	No applications to land	ND	ND	ND	ND	ND
Agricultural field	Grouville	Used for growing produce	No applications to land	ND	ND	ND	ND	ND
Agricultural field	Grouville	Used for growing produce	No applications to land	ND	ND	ND	ND	ND
Agricultural field	Trinity	Used for growing produce	No applications to land	ND	ND	ND	ND	ND
Agricultural field	St Martin	Used for growing produce	No applications to land	ND	ND	ND	ND	ND
Agricultural field	Grouville	Used for growing produce	No applications to land	ND	ND	ND	1.91	1.91
Agricultural field	St Ouen	Used for growing produce	No applications to land	ND	ND	ND	1.13	1.13
Agricultural field	Grouville	Currently under cultivation	Agricultural land sampled following crop sample. Currently growing crop.	ND	ND	ND	ND	ND
Agricultural field	Trinity	Currently under cultivation	Agricultural land. Received JW sludge in 2025	ND	ND	ND	2.86	2.86
Agricultural field	St Mary	Currently under cultivation	No applications to land, field currently under cover crop.	ND	ND	ND	ND	ND

The below soil category samples were sent to VERITAS, this lab's reporting limit for each of the 4 PFAS are shown in the table heading.

Land type	**Location** (parish)	**Description**	**Notes**	**PFHxS** (µg/kg) (ND = <1ug/kg)	**PFNA** (µg/kg) (ND = <1ug/kg)	**PFOA** (µg/kg) (ND = <1ug/kg)	**PFOS** (µg/kg) (ND = <1ug/kg)	**Sum of Four PFAS** (µg/kg)
Valley	St Brelade	sides of valley	No applications to land, recreational land	ND	ND	ND	1.01	1.01
Valley	St Brelade	middle of valley	No applications to land, recreational land	ND	ND	ND	ND	ND

The below soil category samples were sent to VERITAS, this lab's reporting limit for each of the 4 PFAS are shown in the table heading.

Land type	**Location** (parish)	**Description**	**Notes**	**PFHxS** (µg/kg) (ND = <1ug/kg)	**PFNA** (µg/kg) (ND = <1ug/kg)	**PFOA** (µg/kg) (ND = <1ug/kg)	**PFOS** (µg/kg) (ND = <1ug/kg)	**Sum of Four PFAS** (µg/kg)
Agricultural field, within plume	St Peter	Fallow	Agricultural land currently lying fallow.	ND	ND	ND	3.49	3.49
Agricultural field, within plume	St Peter	Used for growing produce	Received Biosolids 2019	ND	ND	ND	6.34	6.34

Land type	**Location** (parish)	**Description**	**Notes**	**PFHxS** (µg/kg) (ND = <1ug/kg)	**PFNA** (µg/kg) (ND = <1ug/kg)	**PFOA** (µg/kg) (ND = <1ug/kg)	**PFOS** (µg/kg) (ND = <1ug/kg)	**Sum of Four PFAS** (µg/kg)
Agricultural field, within plume	St Peter	Used for growing produce	Received Biosolids 2019	ND	ND	ND	6.38	6.38
Agricultural field, within plume	St Peter	Used for growing produce	Received Biosolids 2019	ND	ND	ND	11.7	11.7
Agricultural field, within plume	St Peter	Used for growing produce	Received Biosolids 2018	ND	ND	ND	13.2	13.2
Agricultural field, within plume	St Peter	Used for growing produce	Received Biosolids 2019	ND	ND	ND	5.97	5.97
Agricultural field, within plume	St Peter	Some historic produce growth	No record of application to land	ND	ND	ND	9	9
Agricultural field, within plume	St Peter	Some historic produce growth	No record of application to land	ND	ND	ND	3.14	3.14
Agricultural field, within plume	St Peter	Some historic produce growth	No record of application to land	ND	ND	ND	23	23
Agricultural field, within plume	St Peter	Some historic produce growth	No record of application to land	ND	ND	ND	6.01	6.01
Agricultural field, within plume	St Peter	Some historic produce growth	No record of application to land	ND	ND	ND	3.49	3.49
Agricultural field, within plume	St Peter	Some historic produce growth	No record of application to land	ND	ND	ND	9.71	9.71
Agricultural field, within plume	St Peter	Some historic produce growth	No record of application to land	ND	ND	ND	1.69	1.69

4. PFAS Levels in Biosolids

During the sewage treatment process large settlement tanks settle out solids in the sewage. These solids go through several processes including thickening, pasteurisation and digestion to produce biosolids. Biosolids provide nutrients and organic matter for the soil and crops and can be applied to grassland or arable land, where it is ploughed in or cultivated following application.

Biosolids can, and do replace, the need for compound inorganic fertilisers by providing soil nutrients essential for plant growth principally nitrogen (N) and phosphate (P_2O_5), as well as sulphur, magnesium, potassium and trace elements which are not always found in manufactured fertilisers.

The Government of Jersey's Department for Infrastructure and Environment appointed a FACTS[1] qualified specialist to ensure that the properties of applied biosolids align with the characteristics of the receiving soils and the requirements of specific crop rotations.

[1] FACTS, The Fertiliser Advisers Certification & Training Scheme (FACTS) is a nationally validated course developed by the fertiliser industry as a form of self-regulation. It was set up in response to an E.U. investigation into the standards of competence of those advising on fertiliser use.

Of all the components of soil, organic matter is probably the most important and most misunderstood. Soil organic matter serves as a reservoir of nutrients and water in soil, it stimulates the living soil biomass, aids in reducing compaction and surface capping and increases soil water infiltration.

Recycling biosolids/compost to agricultural land increases soil organic matter levels with the following benefits:

- Improved soil organic matter levels increase water and pesticide retention providing more resistance to drought and reducing the likelihood of water run-off and erosion after heavy rainfall. It also improves soil drainage characteristics.
- Improved soil organic matter levels aid soil structure development, increasing soil workability, encouraging crop root development and increasing crop yields.
- Higher soil organic matter levels stimulate life within the soil from microbial activity to earthworms.
- The organic matter from within biosolids/compost stimulates the soil biomass to break down crop residues recycling nutrients essential for plant growth.
- Agricultural fields regularly treated with biosolids/compost are healthier, more productive and easier to work than soils relying solely on inorganic fertilisers.
- Regular biosolids/compost additions increase carbon capture (sequestration) in the soil.

There are strict regulations in place for the use of biosolids in agriculture governed by the Department for Environment, Food and Rural Affairs (Defra), these are followed by the Government of Jersey.

Biosolids are applied in accordance with Water Pollution (Code of Good Agricultural Practice) (Jersey) Order 2015 The Sludge (Use in Agriculture) Regulations and The Code of Practice for the Agricultural Use of Sewage Sludge.

More information on biosolid disposal including the rate of application can be found here: Bellozanne Valley Wastewater Treatment Plant Summary

The Safe Sludge Matrix is followed, this is an agreement between water and sewage operators and major retailers, which stipulates the suitability of biosolids in relation to different crop groups and rotation.

The Safe Sludge Matrix ensures the highest possible food safety giving retailers and the food industry confidence the use of biosolids in agriculture is safe and sustainable.

The Government of Jersey's PFAS Steering Group agreed that the disposal of groundwater from boreholes at the airport fire training ground should be stopped from discharging to Island's foul sewer network. Since the cessation of pumping of this groundwater there has been a significant reduction in PFAS entering the sewer network. On 2 May 2025, the total PFOS concentration from the fire training was 58,100 ng/l dropping to 189 ng/l on 28 October 2025 after the pumping was ceased. This shows a three-hundred-fold reduction.

Stopping this discharge appears to have had a positive effect of lowering PFOS concentrations in the enhanced treated biosolids being produced at Bellozanne with results of the sum of PFAS below dropping from around 50ug/kg to 14.1ug/kg. This result appears lower than typical UK PFAS concentrations in Biosolids.

These data must be treated with caution given the variability of previous data, as the apparent reduction represents only one sample. Further sampling is required to evidence whether this reduction is ongoing.

Table 3. PFAS levels in enhanced treated biosolids produced at the sewage treatment works

Date	**PFHxS** (µg/kg)	**PFNA** (µg/kg)	**PFOA** (µg/kg)	**PFOS** (µg/kg)	**Sum of Four PFAS** (µg/kg)
22 May 2024	<5	<5	<5	46.8	46.8
15 Aug 2024	Not known	Not known	<4	20.9	20.9
11 Dec 2024	Not known	Not known	<1	53.2	53.2
3 April 2025	<1	<1	<1	60.4	60.4
9 July 2025	<0.5	<0.5	<0.5	23.5	23.5
28 Oct 2025	<0.5	<0.5	<0.5	14.1	14.1
17 Nov 2025	<0.5	<0.5	<0.5	19.9	19.9

5. PFAS Levels in Sewage Treatment Works

Samples were taken from what is entering the sewage treatment works (influent) and what is exiting the works (effluent) (Table 4). Due to the low concentrations, these are reported as ng/l rather than ug/l (i.e. 1000 times less).

Table 4. PFAS levels in the influent and effluent from the Sewage Treatment Works

Date	**STW Influent/ Effluent**	**PFHxS** (ng/l)	**PFNA** (ng/l)	**PFOA** (ng/l)	**PFOS** (ng/l)	**Sum of four PFAS** (ng/l)
2 May 2025	Influent	21.1	<10	29.4	248.0	298.5
17 June 2025	Influent	17.3	<5	<3.25	46.9	64.2
9 July 2025	Influent	<50	<50	<32.5	<32.5	<50
28 Oct 2025	Influent	<50	<50	<32.5	99.8	99.8
17 Nov 2025	Influent	8.77	<5	<3.25	11.4	20.2

Date	**STW Influent/ Effluent**	**PFHxS** (ng/l)	**PFNA** (ng/l)	**PFOA** (ng/l)	**PFOS** (ng/l)	**Sum of four PFAS** (ng/l)
2 May 2025	Effluent	6.4	<1	6.9	13.9	27.2
17 June 2025	Effluent	7.7	<1	9.17	16.4	33.3
9 July 2025	Effluent	<10	<10	12.6	30.4	43.0
28 Oct 2025	Effluent	<50	<50	<32.5	84.7	84.7
17 Nov 2025	Effluent	<50	<50	<32.5	<32.5	<50

6. PFAS Levels in Private Water Supplies

Data from Jersey Water suggests that approx. 6,693 people in Jersey are connected to private water supplies for drinking water. Land Resource Management and Pollution Control also compile data on private water supplies in Jersey.

Current data indicates that 1,759 properties consume water from a borehole, while 485 consume water from a well (e.g. drinking water from their private water supply). A breakdown of how private water supplies are used in Jersey

Table 5. The number of boreholes and wells by use in Jersey

Usage	Boreholes	Wells
Agriculture	18	3
Amenity	15	4
Business	122	9
Garden and pool	107	21
Garden watering	508	223
Garden, business	5	2
House and Business	52	12
House and garden	815	178
House and pool	30	2
House supply	630	258
House, Garden, Business	21	3
House, Garden, Other	12	7
House, garden, pool	199	25
Licensed	117	3
Total	**2,651**	**750**
Properties using a private water supply for drinking water	1,759	485

In 2019, in response to initial identification of PFAS in a borehole in St Peter, an Island wide sampling survey for PFOS and PFOA was undertaken by the Government of Jersey on Natural Environment's (NE) groundwater monitoring sites. This data was reported in the Officer Technical Group's interim report of 2019.

This was followed up with a broader suite of 14 PFAS parameters in 2020 at those sites where the highest levels of PFOS/PFOA detected (reported in Officer Technical Group's interim report of 2020).

A subsidised sampling programme was introduced by the Minister for the Environment in 2022 and a further 18 sites were sampled over a six-month period for a fuller suite (27 determinants). Sampling was undertaken upon request at locations within the original plume area (seven) and wider across the Island (11).

In November 2022, a further full Island wide groundwater survey of Natural Environment's routine sampling sites were sampled for 49 PFAS parameters. This was repeated for ten of those sites in May 2023.

The data from the subsidised sampling and wider Island sampling is presented in the table below. Results have been compared against the sum of four PFAS and the sum of forty-eight PFAS. When these samples were analysed, the full 48 parameters were not available, however the notes below indicate how many of the 48 were included.

Site locations include a broad representation of rural, urban, domestic, agricultural and semi-industrial areas which produces a range of individual PFAS demonstrating a variety of potential sources. The table includes sites that are within the Hydrogeological Survey derived plume.

Where sites were sampled on multiple occasions a range of results is provided. The results confirm the ubiquitous and persistent nature of PFAS in the wider environment.

From mid-July 2023, the focus of all sampling concentrated on the Hydrogeological Survey around the Airport. A total of 62 groundwater and surface water sites in the St Ouen's Bay and Pont Marquet catchments were sampled each quarter from July 2023 to April/May 2024 as part of the PFAS-hydrogeological Phase 2 survey. These data are reported separately in the PFAS Hydrogeological Study Phase 2 report.

Forty groundwater and surface water sites were selected for ongoing quarterly monitoring in 2025 (June, September, and November/December). In addition, five new locations were identified and sampled in line with the report's recommendations. The exact number of sites sampled may vary during each period, for example, if a stream or borehole is dry, though such instances are relatively few. Sampling locations include domestic, disused, or monitoring wells and boreholes, as well as streams, ponds and outfalls.

A maximum of 196 groundwater and surface water locations were sampled island-wide for PFAS since 2019, as part of the hydrogeological survey and wider-island background level monitoring. However, some of these will be the same locations across different monitoring programmes. Sites are a mixture of domestic, disused or monitoring well/boreholes and streams, ponds or outfalls and in general terms will be taken before any water treatment is applied. All of this data has been provided to the Panel to seek their view whether this is sufficiently representative of the eight inland water catchment areas.

Key for table

* - in 2022 this suite only included 44 of the 48 parameters which now make up the sum of 48

$ - in 2023 this suite only included 45 of the 48 parameters which now make up the sum of 48

& - in this sampling programme this suite only included 27 of the 48 parameters which now make up the sum of 48

- Plume

<LOD - less than limit of detection

Table 6. Levels of PFAS in groundwater by Parish

Parish	Year of Sample (no. of samples)	Concentration range for sum of 4 PFAS (ng/l)	Concentration range for sum of 48 PFAS (ng/l)	Key
Grouville	2022(1)	13	15	*
St Brelade	2022(1), 2023(1)	99-101	237-242	*$
St Brelade	2022(1)	19	38	*
St Brelade	2022(1)	21	55	*
St Brelade	2022(1)	1319	2162	#*
St Brelade	2022(1)	34	67	*
St Brelade	2022(2)	451-2871	591-3207	#*&
St Brelade	2022(2)	20-27	24-39	&
St Brelade	2022(1)	17	23	&
St Brelade	2022(2)	12-15	15-18	&
St Brelade	2022(1)	5	5	&
St Clement	2022(1), 2023(2)	46-49	64-67	*$
St Helier	2022(1), 2023(1)	<LOD	<LOD	*$

St Helier	2022(1)	8	9	*
St Helier	2022(1)	13	32	*
St Helier	2022(1)	21	29	*
St Helier	2022(1)	10	10	*
St John	2022(3)	39-262	39-337	&
St Lawrence	2022(1)	8	11	*
St Lawrence	2022(1), 2023(1)	31-46	31-48	*$
St Lawrence	2022(1), 2023(1)	9-10	19-48	*$
St Lawrence	2022(1)	9	105	*
St Lawrence	2022(1)	5	38	*
St Martin	2022(1), 2023(1)	11-27	17-45	*$
St Martin	2022(1)	4	4	*
St Martin	2022(1)	8	8	&
St Mary	2022(1)	9	9	*
St Mary	2022(1), 2023(1)	8-21	8-37	*$
St Mary	2022(1)	5	5	*
St Ouen	2022(1)	196	262	#*
St Ouen	2022(1)	28	50	*
St Ouen	2022(1)	31	46	*
St Ouen	2022(1)	10	20	*
St Ouen	2022(1), 2023(1)	70-72	89-93	*$
St Ouen	2022(1)	49	111	*
St Ouen	2022(1)	5	5	&
St Ouen	2022(1)	7	9	&
St Ouen	2022(1)	4	7	&
St Peter	2022(1), 2023(1)	10-12	17-21	*$
St Peter	2022(1)	14	19	*
St Peter	2022(1)	20	38	*
St Peter	2022(1)	18	20	*
St Peter	2022(2)	537-819	880-1291	#*&
St Peter	2022(1)	551	791	#*
St Peter	2022(2)	2074-2125	3089-3150	#*&
St Peter	2022(1)	1767	2117	#&
St Peter	2022(1)	20644	24470	#&
St Peter	2022(2)	36-97	69	167
St Peter	2022(1)	3	3	&
St Peter	2022(1)	326	720	#&
St Peter	2022(1)	170-182	501-548	&
St Peter	2022(1)	1888	2529	#&
Trinity	2022(1)	27	44	*
Trinity	2022(1), 2023(1)	9-11	18-19	*$
Trinity	2022(1)	26	32	*

7. PFAS LEVELS IN THE ENVIRONMENT

The following sampling principles were adopted for all foam, seawater and freshwater sampling by the Water & Air team:

- Samplers wore nitrile powderless gloves which were replaced or "double-gloved" immediately prior to any samples being taken, and additionally wherever necessary to avoid cross-contamination.
- Samplers did not wear PFAS-containing suncream.
- Labelling for all PFAS sampling was completed with PFAS-free Sharpies.
- Any equipment which was not single-use was cleaned with PFAS-free Liquinox.
- Sample containers were supplied by the analysing laboratory or lab supplier and were single-use, therefore no prior rinsing required.
- Samples were stored in chilled cool boxes in the field before being transferred to a fridge prior to shipment.
- Additionally, standard PFAS-sampling procedures were followed, as per training received during the PFAS-hydrogeological survey.

Quality Assurance/Quality Control (QAQC) and sampling principles specific to a methodology are detailed below in their relevant section.

7.1 PFAS LEVELS IN FRESH WATER FOAM

In Autumn 2025 a freshwater foam sample was collected from the main lagoon at the former Simon Sand Quarry, where foam had previously been reported. A corresponding sub-surface water sample was collected at the same location in the lagoon.

The weather conditions were a strong SSW wind, overcast and dry. Foam was accumulating on the water surface on the edges of the western-side of the main lagoon.

Sample location	**What3Words sample location**	**Sample type**
Former Simon Sand Quarry – main lagoon	Along water line between approx.: ///that.tomb.along ///lungs.darkens.shifting	Freshwater foam sample
Former Simon Sand Quarry – main lagoon	///lungs.darkens.shifting	Freshwater sample

Freshwater foam was collected in separate single-use polyethylene (PE) "zip-lock" style bags using a metal spoon. The spoon was cleaned with Liquinox then rinsed with laboratory-supplied PFAS-free deionised water before sampling and at regular intervals. Samplers tried to avoid scooping water or debris into the bagged foam samples as the laboratory would likely need to dilute the samples if sediment was present, raising the limit of detection.

The eight sealed sample bags were hung in a fridge until the foam collapsed into liquid. This took 48 hours. The liquid was directly transferred into bottles provided by the lab, whilst sediment transfer was avoided.

Nitrile powder-free gloves were worn during sampling, bag handling and sample transfer. Gloves were also changed frequently and between sampling locations.

Verified PFAS-free PE bags could not be sourced. Therefore, a Quality Assurance Quality Control (QAQC) rinse blank of the sample collection bag was sent for analysis. PFAS-free DI water (supplied by the lab) was poured into an unused sample bag and left in-situ for the same 48-hour period, to mimic conditions of foam-collected bags. PFAS were not detected above the LOD.

The samples were sent to ALS Laboratories in Hawarden for PFAS Broad Suite analysis by LC-MS/MS. Dilutions were applied as appropriate by the laboratory in accordance with their policies and processes. In the below instance, the lab applied a dilution to the foam sample:

Sample	**Location**	**PFHxS (ng/l)** (LOD = <1)	**PFNA (ng/l)** (LOD = <1)	**PFOS (ng/l)** (LOD = <0.65)	**PFOA (ng/l)** (LOD = <0.65)	**Sum of 4 PFAS (ng/l)**
Foam sample	Simon Sand Quarry Pond	3650	1780	270000	1420	276850
Water sample	Simon Sand Quarry Pond	255	9.71	544	59.8	868.51
QAQC bag rinse blank	N/A	<1	<1	<0.65	<0.65	0

7.2 PFAS Levels in Sea Foam

Sea foam sampling requires certain environmental conditions (including suitable wave and wind direction) to produce enough foam for collection. The same sampling method was employed for sea foam and freshwater foam collection. Method details can be found in the Freshwater Foam section.

Two samples were collected in Winter 2026 at Le Grouet Slipway near Corbiere and at St Brelade’s Bay. The south-westerly wind and the tail end of Storm Chandra produced large volumes of sea foam at St Brelade’s Bay which maintained its form, with the wind driving the foam up the beach off the tide line. However, any sea foam produced on St Ouen’s Bay was short-lived, built on the incoming water line and dissipated quickly, meaning samples could not be collected. The wind direction and wind strength, along with the slipway and rockpools at Le Grouet Slipway (1500m SSW from Le Braye) provided a suitable sample collection location between strong wave action, and close to St Ouen’s Bay.

The sea foam sampling locations were:

Sample location	**What3Words sample location**
Le Grouet slipway	///darting.author.drifter
St Brelade’s Bay	///steeps.taillights.compact

The samples were sent to ALS Laboratories in Hawarden for PFAS Broad Suite analysis by LC-MS/MS. The lab is ISO17025 accredited but the method is not accredited for seawater. It should be noted that saline samples sometimes require dilution by the laboratory which will alter the LODs. The analytical results were as follows in ng/l:

Location	PFHxS (ng/l) (LOD = <1)	PFNA (ng/l) (LOD = <1)	PFOS (ng/l) (LOD = <0.65)	PFOA (ng/l) (LOD = <0.65)	Sum of 4 PFAS (ng/l)
Le Grouet Slipway	170	166	966	504	1806
St Brelade's Bay	289	<50	166	550	1005

7.3 PFAS LEVELS IN SEAWEED

Three seaweed samples were collected in Summer 2025 from the following locations:

Sample location	What3Words sample location	Seaweed sample weight	Seaweed type
West Park - St Aubin's Bay	///wage.sweeper.snows	90g	Sea lettuce
Fliquet	///evaded.hardest.bumped	74g	Bladderwrack
La Braye - St Ouen's Bay	///polite.outsize.daily	84g	Bladderwrack

n.b. sea water samples were also taken at the above locations.

Sea lettuce (Ulva species) and bladderwrack (Fucus vesiculosus) (a "vraic") were chosen as both are applied to land in Jersey. The St Ouen's Bay location was chosen for the proximity to the PFAS-plume, at a location where the closest and largest area of rocky substrate for seaweed collection was available. The St Aubin's Bay sea lettuce was free-floating, in a typical area where it is removed from the beach. Fliquet was chosen as a control site with suitable rocky substrate for the presence of bladderwrack.

The entire free-floating sea lettuce frond was collected from the seawater surface or shallow seawater column. Whereas for bladderwrack, a representative sample of the blade tissue (tips) was collected, including the bladders where present and the bladderwrack was attached to rock. However, the base (holdfast) was not sampled to avoid any sediment or encrusting biota.

The laboratory PASS requested a minimum of 50g of seaweed sample to be collected in a polypropylene container. Samples were placed directly into the single-use sample container and labelled with date & time of collection, location and seaweed type.

Sample containers were stored in a chilled cool box in the field, then refrigerated until dispatch in a polystyrene box with cool packs.

Seaweed samples were analysed at PASS for the following "Suite of 4 EU Regulated PFAS" analysis with lower Limit of Quantification (LOQ).

The seaweed analysis results were:

Sample	Location	PFHxS (ug/kg) (LOQ = 0.004)	PFNA (ug/kg) (LOQ = 0.001)	PFOS (ug/kg) (LOQ = 0.002)	PFOA (ug/kg) (LOQ = 0.001)	Sum of 4 PFAS (ug/kg)
Bladderwrack	La Braye - St Ouens Bay	0.00483	0.00150	0.0451	0.00257	0.0540
Bladderwrack	Fliquet	< 0.00400	0.00177	0.00487	0.00206	0.00869
Sea Lettuce	West Park - St Aubin's Bay	< 0.00400	0.00267	0.0162	0.00370	0.0226

7.4 PFAS LEVELS IN SEAWATER

Six seawater samples were collected in Summer 2025 from the following locations:

Sample location	What3Words sample location	Rationale
West Park - St Aubin's Bay	///wage.sweeper.snows	Near former bathing pool and same location as "bathing water" sampling site. In the bay where STW discharges.
La Haule – St Aubin's Bay	///darning.partners.exports	Same location as "bathing water" sampling site. In the bay where STW discharges.
Greve de Lecq	///exonerate.stunned.newscaster	A control site and "bathing water" location.
Fliquet	///router.transcribe.extinction	A control site on far north-east of island.
La Braye - St Ouen's Bay (Duplicate sample in addition)	///venues.power.muscular	For proximity to the PFAS-plume.

Seawater samples were collected 1m below the sea surface, in the same method applied for "bathing water" microbiological sampling. However, for this PFAS sampling, the sampler entered the sea without a wet suit, suncream or body lotions (to reduce any risk of sample cross-contamination). The sampler submerged the sample bottle to 1m below the surface and open/filled/closed the bottle at that depth position.

The samples were sent to ALS Laboratories in Hawarden for PFAS Broad Suite analysis by LC-MS/MS. The lab is ISO17025 accredited but the method is not accredited for seawater. It should be noted that saline samples sometimes require dilution by the laboratory which will alter the LODs. The analytical results were as follows in ng/l:

Location	PFHxS (ng/l) (LOD = <1)	PFNA (ng/l) (LOD = <1)	PFOS (ng/l) (LOD = <0.65)	PFOA (ng/l) (LOD = <0.65)	Sum of 4 PFAS (ng/l)
Fliquet	<1	<1	<0.65	<0.65	0

Location	PFHxS (ng/l) (LOD = <1)	PFNA (ng/l) (LOD = <1)	PFOS (ng/l) (LOD = <0.65)	PFOA (ng/l) (LOD = <0.65)	Sum of 4 PFAS (ng/l)
Greve de Lecq	<1	<1	<0.65	<0.65	0
La Braye – St Ouen's Bay	<5	<5	<3.25	<3.25	0
La Haule – St Aubin's Bay	<1	<1	<0.65	<0.65	0
West Park – St Aubin's Bay	<1	<1	<0.65	<0.65	0
QAQC Duplicate (La Braye)	<5	<5	<3.25	<3.25	0

The results were queried by the sampling team, and the laboratory confirmed that:

(1) The La Braye sample and its duplicate had the same dilutions applied, but a greater dilution compared to the remaining samples in this batch. This means these two sample results have a higher LOD compared to the other samples. No PFAS were detected above LOD for La Braye and its duplicate sample.
(2) For the four remaining samples, no dilutions were applied and these have standard LODs.
(3) However, at two sites, two PFAS compounds have a different less than figure compared to the standard LOD: Greve de Lecq PFPA of <1.5 ng/l and West Park St Aubin's Bay 6:2 FTS of <2 ng/l. The lab stated that, in these two instances, the LOD would have been raised if the qualifying ion did not match, or if the peak shape was poor. Both are below LOD.

Additionally, one seawater sample was taken at Les Minquiers Reef in Autumn 2024 to provide PFAS data for an offshore remote location. The location coordinates were: N48° 57.395'. W002° 03.506' .

The offshore sample was taken at approximately 25cm depth below the sea surface from the side of a boat. The sea was rough and therefore it was difficult to keep a consistent depth, but the sample was collected underwater. The weather conditions were NE F4.

The sample was analysed by the ALS Hawarden lab for PFAS Broad Suite by LC-MS/MS:

Location	PFHxS (ng/l) (LOD = <1)	PFNA (ng/l) (LOD = <1)	PFOS (ng/l) (LOD = <0.65)	PFOA (ng/l) (LOD = <0.65)	Sum of 4 PFAS (ng/l)
Les Minquiers Reef	<1	<1	<0.65	<0.65	0

8. Surface Water (Jersey Water)

Jersey Water have collected samples on a regular basis since 2020 from the streams which it may abstract water for drinking water purposes. The samples are sent to an ISO 17025 accredited laboratory in the UK for analysis. The samples are analysed for 48 different PFAS compounds and a summary of these results are found in their annual Water Quality report (2025-WATER-QUALITY-REPORT.pdf).

The table below provides a summary of the average results, since 2020, for PFOS, PFOA, PFHxS and PFNA, from Jersey Water's stream sampling programme.

It should be noted that due to analytical improvements over time, the limit of detection (LOD) has reduced since 2020 and is currently 1 ng/l.

Location	**PFHxS (ng/l)** LOD = 1 (previously 5 ng/l)	**PFNA (ng/l)** LOD = 1 (previously 5 ng/l)	**PFOS (ng/l)** LOD = 1 (previously 5 ng/l)	**PFOA (ng/l)** LOD = 1 (previously 5 ng/l)	**Sum of 4 PFAS (ng/l)**
Bellozanne Stream	4.1	<5.0	9.8	5.9	20.7
Dannemarche Stream	4.3	<5.0	7.5	5.8	15.1
Fernlands Stream	1.7	<5.0	3.3	2.3	5.8
Grands Vaux Stream	3.8	<5.0	7.1	3.9	16.3
Greve de Lecq Stream	4.3	<5.0	3.2	5.1	12.6
Handois East Stream	6.8	<5.0	11.3	17.3	37.5
Handois West Stream	5.4	<5.0	9.7	6.2	23.1
La Hague Stream	4.3	<5.0	4.5	5.6	15.4
Le Mourier Combined Stream	5.3	<5.0	4.4	7.5	19.6
Little Tesson Stream	3.9	<5.0	13.4	6.3	26.4
Millbrook Stream	4.2	<5.0	10.3	6.7	20.9
Queens Valley Side Stream	1.9	<5.0	6.8	8.5	16.4
Queens Valley Stream	2.8	<5.0	5.2	6.1	14.1
St Catherine Stream	2.4	<5.0	5.9	6.0	14.1
Tesson Stream	5.1	<5.0	6.0	5.0	15.6
Vallee des Vaux Stream	4.8	<5.0	15.5	6.7	26.9

Location	**PFHxS (ng/l)** LOD = 1 (previously 5 ng/l)	**PFNA (ng/l)** LOD = 1 (previously 5 ng/l)	**PFOS (ng/l)** LOD = 1 (previously 5 ng/l)	**PFOA (ng/l)** LOD = 1 (previously 5 ng/l)	**Sum of 4 PFAS (ng/l)**
Val de la Mare East Stream	4.1	<5.0	4.4	12.1	28.2
Val de la Mare West Stream	7.0	<5.0	4.1	10.8	22.4
Pont Marquet Stream	72.1	<5.0	155.9	16.7	247.7

Technical Briefing Note on Jersey Water's washwater plant cake

3 December 2025

Overall Summary

This technical briefing note is in response to the Independent PFAS Scientific Panel request for further information on washwater cake which is produced as part of our water treatment processes. The results from all our testing are attached as an excel spreadsheet with this correspondence, including leachate testing which has been completed on the cake.

Due to the concerns arising in Jersey regarding PFAS and the environment, Jersey Water commissioned Jacobs Ltd to complete a desk-based review to assess whether land application of washwater cake from our drinking water treatment could lead to environmental release of PFAS. The key findings from this report in combination with the limited leachate testing we have completed are:

- PFAS are present in the cake, and are likely to be strongly bound to the powdered activated carbon in the cake, the concentrations are low, and scientific literature suggests this is unlikely to leach or be available for plant uptake
- Any contribution of PFAS from the cake to surface water is likely to be indistinguishable from background concentrations from other sources
- Two leachate tests on the cake have been completed, no PFOS, PFOA and PFHxS have been detected. This indicates any PFAS is strongly bound to the PAC.
- Further testing is advisable to support future decision making.

Washwater Cake Investigations

Dirty washwater is taken from Handois and Augres water treatment works and treated, through dewatering processes at the Handois washwater plant. Further details of this process are attached with this correspondence. Jersey Water dose powdered activated carbon (PAC) as part of the water treatment process, to adsorb pesticides and taste and odour causing compounds, the PAC also adsorbs PFAS. The PAC is removed from the water through the clarification processes. The resulting washwater cake is then spread to land. We produce approximately 4-6m^3 a day of washwater cake, and therefore the ability to spread this product to land is an essential part of our overall operations. It is not currently possible to send the dirty washwater to Bellozane sewage treatment works due to operational constraints at Bellozane.

The PFAS concentrations in our washwater cake have been tested over last 12 months and 10 sample results are available. There is variation in the results which might reflect our PAC dosing strategy and further data is required. In the high-risk season for pesticide run off (January – June) marginally higher concentrations of PAC are dosed (4mg/l).

During the lower risk season (July to December) lower PAC doses are dosed (2mg/l) unless a pollution incident necessitates a higher dose. Our research and testing have identified, even at these low doses of PAC, PFAS are removed from the water although it is noted removal rates are variable. Jersey Water is undertaking further investigations in this area to establish if enhanced PAC dosing is a viable, short-term option to further reduce PFAS concentrations in drinking water, whilst pilot trials of GAC and ion exchange are completed.

Due to the concerns arising in Jersey regarding PFAS and the environment, Jersey Water commissioned Jacobs Ltd to complete a desk-based review to assess whether land application of washwater cake from our drinking water treatment could lead to environmental release of PFAS. Jersey Water is aware that there is evidence of leaching of PFAS from sewage works biosolids and the concern this has caused in Jersey, which has restricted the ability to spread sewage biosolids to land. However, the washwater cake from our processes is a significantly different product due to the presence of activated carbon. It is well documented that activated carbon addition to soil is undertaken to immobilise PFAS (and other compounds), due to the activated carbon properties which adsorb and 'lock in' PFAS and therefore prevent leaching. The Jacobs report was authored by key professionals with international knowledge of PFAS and contaminated land from the UK and Australia.

The conclusions of this report determined that the cake consists of approximately 1% PAC and spreading to land follows the government guidelines to minimise water pollution risks. Due to the quantities spread, the likely PAC content of the soil is approximately 0.03 – 0.04%. Spreading occurs on between 12-17 fields a year and multiple applications are very rare.

Two leachate tests have been completed to date using a standard aggressive leachate test. From this testing, no PFOS, PFOA and PFHxS was detected. In the second test very low concentrations of PFBA and PFPeA were found at and marginally above the detection limits for the analytical method. The leachate testing results are included in the spreadsheet.

In addition to the testing of the cake which is spread to land, Jersey Water also test the water from the washwater plant which is discharged to the local stream. The concentrations of PFAS in the discharge water are comparable or less than, the normal concentrations found in Jersey streams, at our point of abstraction. These results are also included in the spreadsheet.

As part of our wide programme of work associated with PFAS, Jersey Water will continue to monitor and test the washwater cake and evaluate any implications of land spreading.

We note meetings which are scheduled later in December and welcome this opportunity to discuss our programme of work, including this project with the Panel.