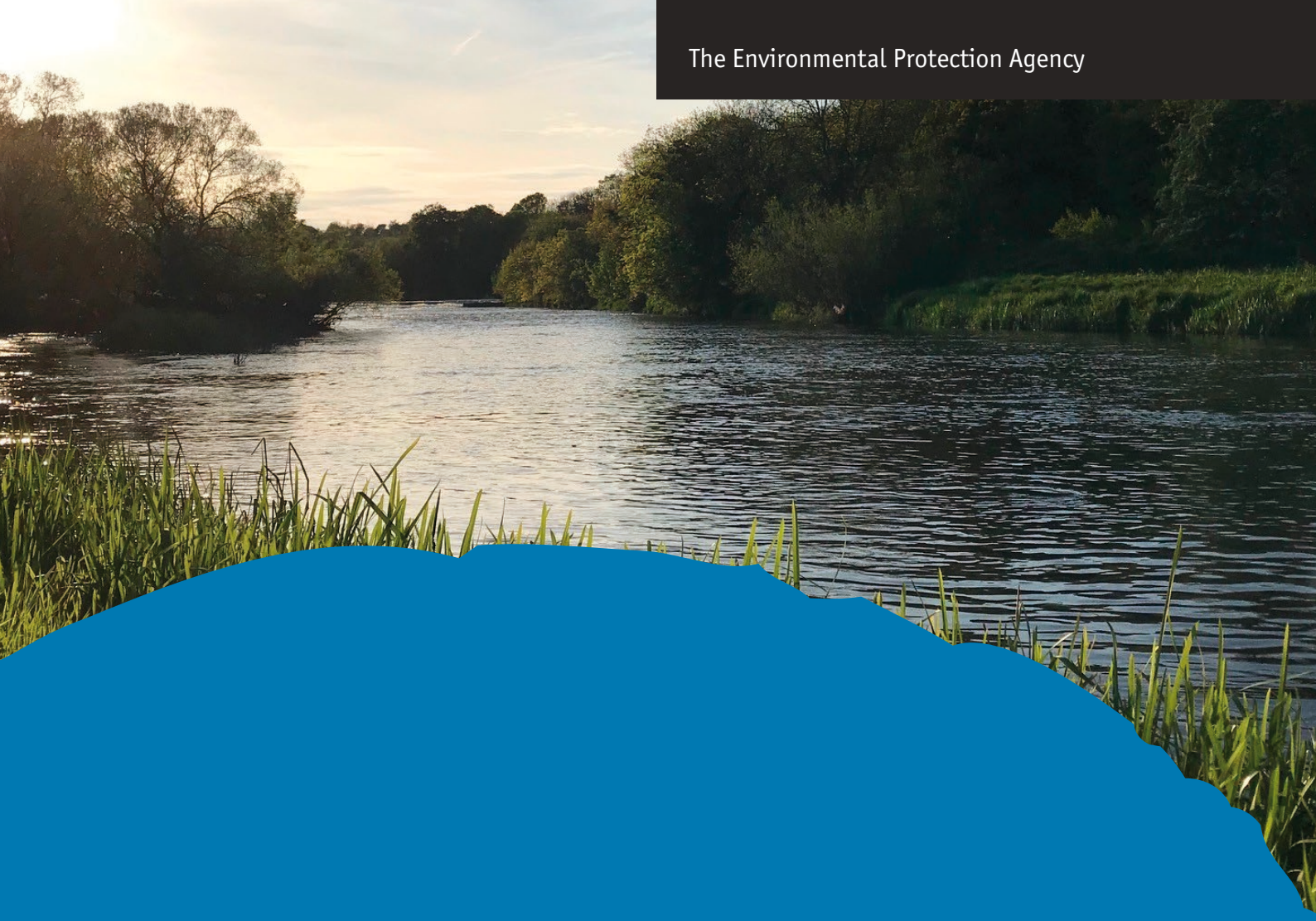

Private Water Supplies Guidance

on the implementation of the European Union (Drinking Water) Regulations for private water supplies

Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

Environmental Protection Agency

The EPA is responsible for protecting and improving the environment as a valuable asset for the people of Ireland. We are committed to protecting people and the environment from the harmful effects of radiation and pollution.

The work of the EPA can be divided into three main areas:

- **Regulation:** Implementing regulation and environmental compliance systems to deliver good environmental outcomes and target those who don't comply.
- **Knowledge:** Providing high-quality, targeted and timely environmental data, information and assessment to inform decision making.
- **Advocacy:** Working with others to advocate for a clean, productive and well-protected environment and for sustainable environmental practices.

Our responsibilities include:

LICENSING

- Large-scale industrial waste and petrol storage activities;
- Urban wastewater discharges;
- The contained use and controlled release of genetically modified organisms;
- Sources of ionising radiation;
- Greenhouse gas emissions from industry and aviation through the EU Emissions Trading Scheme.

NATIONAL ENVIRONMENTAL ENFORCEMENT

- Audit and inspection of EPA-licensed facilities;
- Drive the implementation of best practice in regulated activities and facilities;
- Oversee local authority responsibilities for environmental protection;
- Regulate the quality of public drinking water and enforce urban wastewater discharge authorisations;
- Assess and report on public and private drinking water quality;
- Coordinate a network of public service organisations to support action against environmental crime;
- Prosecute those who flout environmental law and damage the environment.

WASTE MANAGEMENT AND CHEMICALS IN THE ENVIRONMENT

- Implement and enforce waste regulations including national enforcement issues;
- Prepare and publish national waste statistics and the National Hazardous Waste Management Plan;
- Develop and implement the National Waste Prevention Programme;
- Implement and report on legislation on the control of chemicals in the environment.

WATER MANAGEMENT

- Engage with national and regional governance and operational structures to implement the Water Framework Directive;
- Monitor, assess and report on the quality of rivers, lakes, transitional and coastal waters, bathing waters and groundwaters, and measurement of water levels and river flows.

CLIMATE SCIENCE AND CLIMATE CHANGE

- Publish Ireland's greenhouse gas emission inventories and projections;
- Provide the Secretariat to the Climate Change Advisory Council and support to the National Dialogue on Climate Action;
- Support National, EU and UN climate science and policy development activities.

ENVIRONMENTAL MONITORING & ASSESSMENT

- Design and implement national environmental monitoring systems: technology, data management, analysis and forecasting;
- Produce the State of Ireland's Environment and Indicator Reports;
- Monitor air quality and implement the EU Clean Air for Europe Directive, the Convention on Long Range Transboundary Air Pollution and the National Emissions Ceiling Directive;
- Oversee the implementation of the Environmental Noise Directive;
- Assess the impact of proposed plans and programmes on the Irish environment.

ENVIRONMENTAL RESEARCH AND DEVELOPMENT

- Coordinate and fund national environmental research activity to identify pressures, inform policy and provide solutions;
- Collaborate with national and EU environmental research activity.

RADIOLOGICAL PROTECTION

- Monitoring radiation levels and assess public exposure to ionising radiation and electromagnetic fields;
- Assist in developing national plans for emergencies arising from nuclear accidents;
- Monitor developments abroad relating to nuclear installations and radiological safety;
- Provide, or oversee the provision of, specialist radiation protection services.

GUIDANCE, AWARENESS RAISING, AND ACCESSIBLE INFORMATION

- Provide independent evidence-based reporting, advice and guidance to government, industry and the public on environmental and radiological protection topics;
- Promote the link between health and wellbeing, the economy and a clean environment;
- Promote environmental awareness including supporting behaviours for resource efficiency and climate transition;
- Promote radon testing in homes and workplaces and encourage remediation where necessary.

PARTNERSHIP AND NETWORKING

- Work with international and national agencies, regional and local authorities, non-governmental organisations, representative bodies and government departments to deliver environmental and radiological protection, research coordination and science-based decision making.

MANAGEMENT AND STRUCTURE OF THE EPA

The EPA is managed by a full-time Board, consisting of a Director General and five Directors. The work is carried out across five Offices:

- Office of Environmental Sustainability
- Office of Environmental Enforcement
- Office of Evidence and Assessment
- Office of Radiation Protection and Environmental Monitoring
- Office of Communications and Corporate Services

The EPA is assisted by advisory committees who meet regularly to discuss issues of concern and provide advice to the Board.

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ENVIRONMENTAL PROTECTION AGENCY
An Ghníomhaireacht um Chaomhnú Comhshaoil
PO Box 3000, Johnstown Castle, Co. Wexford, Ireland

T +353 53 916 0600 **F** +353 53 916 0699
E info@epa.ie **W** www.epa.ie
LoCall 0818 33 55 99

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ISBN 978-1-80009-377-5 May / 2026 / Website

Acknowledgements

The EPA wishes to gratefully acknowledge the assistance of those who contributed to and reviewed this manual. The revision of the Guidance was carried out by consultants Ryan Hanley Consulting Engineers (now Stantec) on behalf of the EPA. The preparation of this Private Supplies Guidance benefited from inputs and reviews by representatives of Cork County Council, the County and City Management Association (CCMA), Health Service Executive (HSE), Limerick City and County Council, Local Authority Waters Programme (LAWPRO), and the National Federation of Group Water Schemes (NFGWS).

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Glossary

The Regulations	European Union (Drinking Water) Regulations 2023 (S.I No. 99 of 2023) and European Union (Drinking Water) (Amendment) Regulations (S.I No. 673 of 2025)
BPA	Bisphenol A
C_3H_5ClO	Epichlorohydrin
C_3H_5NO	Acrylamide
Ca	Calcium
CFU	Colony forming unit
DBP	Disinfection by-product
DOC	Dissolved organic carbon
DWD	Drinking Water Directive
DWI	Drinking Water Inspectorate
DWSP	Drinking Water Safety Plan
E. coli	*Escherichia coli*
EC	European Commission
EDEN	Environmental Data Exchange Network
EDEN-MDS	Environmental Data Exchange Network – Monitoring Data System
EPA	Environment Protection Agency
EU	European Union
FAQ	Frequently asked questions
GSI	Geological Survey of Ireland
GWS	Group Water Scheme
HAAs	Haloacetic acids
HSE	Health Service Executive
ILI	Infrastructure Leakage Index
IMT	Incident Management Team
INAB	Irish National Accreditation Board
INR	Initial Notification Record
ISO	International Organization for Standardization
K	Potassium
MCPA	2-methyl-4-chlorophenoxyacetic acid
Mg	Magnesium
NaOCl	Sodium hypochlorite
NEHS	National Environmental Health Service

NO_2	Nitrite
NO_3	Nitrate
NTU	Nephelometric turbidity unit
NFGWS	National Federation of Group Water Schemes
OCT	Outbreak Control Team
PAH	Polyaromatic hydrocarbons
PEHO	Principal Environmental Health Officer
PFAS	Per- and polyfluoroalkyl substances
PFBA	Perfluorobutanoic acid
PFBS	Perfluorobutane sulfonic acid
PFCAs	Perfluoroalkyl carboxylic acids
PFDA	Perfluorodecanoic acid
PFDoDA	Perfluorododecanoic acid
PFDoDS	Perfluorododecane sulfonic acid
PFDS	Perfluorodecane sulfonic acid
PFEtS	Perfluoroethanesulfonic acid
PFHpA	Perfluoroheptanoic acid
PFHpS	Perfluoroheptane sulfonic acid
PFHxA	Perfluorohexanoic acid
PFHxS	Perfluorohexane sulfonic acid
PFNA	Perfluorononanoic acid
PFNS	Perfluoronoane sulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonic acid
PFPA	Perfluoropentanoic acid
PFPrA	Perfluoropropanoic acid
PFPrS	Perfluoropropanesulfonic acid
PFPS	Perfluoropentane sulfonic acid
PFSAs	Perfluoroalkyl sulfonic acids
PFTrDA	Perfluorotridecanoic acid
PFTrDS	Perfluorotridecane sulfonic acid
PFU	Plaque forming units
PFUnDA	Perfluoroundecanoic acid
PFUnDS	Perfluoroundecane sulfonic acid
pH	Hydrogen ion concentration
QA/QC	Quality assurance and quality control

RDT	Random daytime
SOP	Standard operating procedure
TFA	Trifluoroacetic acid
TFMS	Trifluoromethanesulfonic acid
The Minister	The Minister for Housing, Local Government and Heritage
The Regulations	European Union (Drinking Water) Regulations 2023 (S.I No. 99 of 2023), as amended by S.I. No. 673 of 2025
THMs	Trihalomethanes
TOC	Total organic carbon
TTHMs	Total trihalomethanes
uPVC	Polyvinyl chloride
UFW	Unaccounted-for water
UV	Ultraviolet
Watch List	As published from time to time by the EU Commission, as per Article 13(8) of the EU Directive 2020/2184
WFD	Water Framework Directive
WHO	World Health Organization
WSA	Water Services Authority

Section 1: The Drinking Water Regulations

1.1 Introduction

The European Union (Drinking Water) Regulations 2023 (S.I No. 99 of 2023) and the amendment European Union (Drinking Water) (Amendment) Regulations (S.I. No. 673 of 2025) – referred to hereafter as 'the Regulations' – fully transpose and implement Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 and Directive (EU) 2020/2184 of the European Parliament and of the Council of 16 December 2020.

These Regulations came into effect on 6 March 2023, when the previous Regulations were revoked.
The Regulations can be accessed at:

https://www.irishstatutebook.ie/eli/2023/si/99/made/en/print

The amendment was published on 17 December 2025 and is located at:

https://www.irishstatutebook.ie/eli/2025/si/673/made/en/pdf

The Guidance is aimed at local authorities and private water suppliers. While the Guidance interprets aspects of the Regulations, it should be read in conjunction with the text of the Regulations. The Guidance does not supersede or alter the Regulations in any way.

The Regulations define a water supplier as any person supplying water intended for human consumption and include the following:

(a) Uisce Éireann, the public water supplier,

(b) Private Suppliers, which can be entities such as:

- a group water scheme (GWS) distributing drinking water, either
  - privately sourced raw water, treated by the GWS or by its contracted Design Build Operate (DBO) agents (called private GWSs), or
  - treated drinking water provided by Uisce Éireann to GWSs, which is distributed by the GWS via the scheme's privately owned networks to its consumers (called public GWSs), and
- private supplies, which supply water:
  - serving business or commercial activities (for example hotels, pubs, nursing homes, creche facilities, food businesses manufacturing or processing products or substances intended for human consumption), or
  - serving buildings used by the public (for example, schools, health centres, community halls).

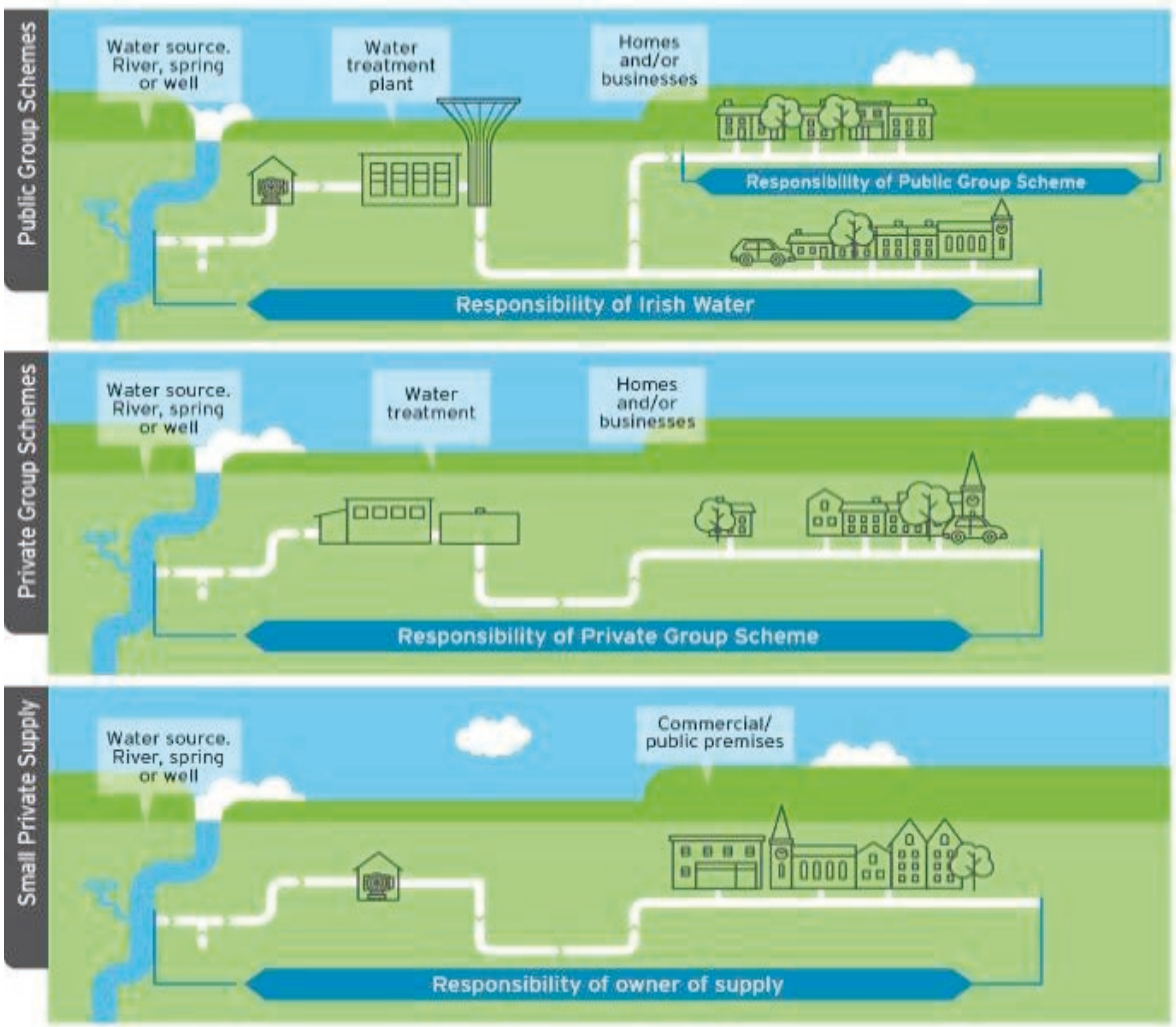
Private supplies where staff or customers have access to, or drink, the tap water are relevant to the consideration of relevant commercial or public activities such as the examples in the list above.

Private water suppliers who supply less than 10 cubic metres of water a day, or serve fewer than 50 persons, with commercial or public activity connected to the supply, are subject to certain parts of the Regulations. These are Regulations 3 ('Exemptions'), 4 ('General obligations'), 5 ('Assessment of water leakage'), 6 ('Quality standards'), 7 ('Point of compliance'), 13 ('Monitoring'), 17 ('Remedial action and restriction of use') and 18 ('Derogations'), and relevant Schedules to this subset of the full Regulations. This category covers many group schemes and other private supplies in Ireland.

Private water suppliers who supply over 10 cubic metres of water a day, or serve over 50 persons, are subject to the full Regulations.

The categories of private water supplies are represented graphically in Figure 1-1.

Figure 1-1: Representation of private supply categories. Source: https://www.epa.ie/



This publication provides guidance in respect of the roles and duties of:

- private water suppliers,
- the relevant local authority as the supervisory authority for private water suppliers,
- the Environment Protection Agency (EPA), with responsibilities for issuing guidelines, performance verification, and as the supervisory authority for public drinking water supplies, and
- the Health Service Executive (HSE), in providing advice for the protection of human health.

1.1.1 Exempted supplies

Some private water supplies are exempted under the Regulations:

- Supplies of less than 10 m^3/d on average or serving fewer than 50 persons, and which **do not** supply a commercial or public activity (such as a hotel, business premises or public building). **Examples are domestic household wells and private supplies under the capacity or population threshold, with no commercial or public use**.
- Individual supplies used only for purposes in which the relevant supervisory authority is satisfied that the quality of the water has no influence, either directly or indirectly, on the health of the consumers concerned. **This may include car washes or water used only for washing yards or equipment**.
- A food business operator's water supply used for the specific purposes of the food business, where the Food Safety Authority of Ireland (FSAI) or its agent under Section 48 of the Food Safety Authority of Ireland Act 1998 (No. 29 of 1998), is satisfied that:
  - the quality of the water supply cannot affect the safety of the foodstuff in its finished form, and
  - the water supply of the food business complies with relevant obligations, in particular under the procedures on hazard analysis and critical control point principles, where applicable, and remedial actions under relevant legislation on food.
  - Further information in relation to such supplies is available on the FSAI website (https://www.fsai.ie/).

Regulation 4 does assign some responsibilities for exempted supplies. Regulations 4(5) and 4(6) require water suppliers to notify the population supplied that the Regulations do not apply to exempted supplies, and inform those consumers of actions that can be taken to protect their health in case of any contamination of the supply. When a potential danger to human health comes to light from an exempted supply, the water supplier must provide appropriate advice promptly to the consumers of that supply. These actions shall be carried out in accordance with guidelines published by the EPA (refer to EPA Advice Note 12: Exempted Drinking Water Supplies and subsequent guidelines that may be published),

1.2 Application of the Regulations

1.2.1 Outline scope of the Regulations

Parts 2 to 4 of the Regulations cover general provisions, risk assessment/management of water supply from source to tap, monitoring of water quality, dissemination of information to consumers, remedial actions in response to drinking water quality incidents and applications to the supervisory authority for derogation from the parametric values specified in Table B of Schedule 1.

In respect of the water quality of private water supplies:

- Part 2 assigns responsibilities as follows in ensuring drinking water compliance and public access to water quality information:
  - the regulated private supplier, as defined in **Section 1** ('The Drinking Water Regulations') of this Guidance,
  - the appropriate local authority as the private supplier's supervisory authority, as defined in Regulation 13(3) and 13(4),
  - the EPA on oversight of local authority monitoring functions in accordance with Regulations 28 and 30. This may include assessing monitoring programmes and registers of supplies, and
  - the Health Service Executive (HSE) on provision of advice to water suppliers and local authorities on the protection of human health,

- Part 3 covers the risk-based approach to which the abstraction, supply, treatment and distribution of water intended for human consumption shall be subject, including:
  - the identification of hazards and potential risks that could cause deterioration of water quality throughout the supply chain, and
  - the management of appropriate control measures for their prevention and mitigation,
- Part 4:
  - specifies the mandatory monitoring protocols, including sampling frequencies, parameters and analysis methods, to ensure compliance with quality standards, and
  - details the procedures for addressing incidents of drinking water regulatory non-compliance, requiring prompt notification of consumers and the development of remedial action plans to restore and maintain water quality.

Table 1-1 presents an outline listing the different parts and sections of the Regulations.

Table 1-1: Outline parts and sections of the Regulations.

Part	Heading
Part 1: Preliminary and General	1. Citation.
	2. Interpretation.
	3. Exemptions.
Part 2: Obligations in relation to water	4. General obligations.
	5. Assessment of water leakage.
	6. Quality standards.
	7. Point of compliance.
	8. Duties in relation to water on premises.
Part 3: Risk	9. Risk-based approach to water safety.
	10. Risk assessment and risk management of catchment areas for abstraction points of water intended for human consumption.
	11. Risk assessment and risk management of supply system.
	12. Risk assessment of domestic distribution systems.

Part	Heading
Part 4: Monitoring and Information	13. Monitoring.
	14. Information to members of the public.
	15. Protection of human health.
	16. Information on monitoring of implementation.
	17. Remedial action and restrictions of use.
	18. Derogations.
Part 5: Minimum Requirements	19. Minimum hygiene requirements for materials that come into contact with water intended for human consumption.
	20. Minimum requirement for treatment chemicals and filter media in contact with water intended for human consumption.
	21. Access to water intended for human consumption.
Part 6: Authorised Officers	22. Authorised officers.
	23. Powers of authorised officers.
Part 7: Penalties and Prosecutions	24. Penalties and prosecutions.
	25. Offences in relation to water.
	26. Offences by bodies corporate
Part 8: Supervisory Authorities	27. Directions of supervisory authorities.
	28. Guidelines: practical guidance for water suppliers and supervisory authorities.
	29. Charges by supervisory authorities.
	30. Intervention, and performance verification, by supervisory authority.
	31. Injunctive relief.
Part 9: Final Provisions	32. Service of directions.
	33. Information sharing.
	34. Transitional provisions.
	35. Revocations.

Part	Heading
Associated Schedules	
Schedule 1: Minimum Requirements for Parametric Values used to assess the quality of water intended for Human Consumption	Table A: Microbiological parameters
	Table B: Chemical Parameters
	Table C: Indicator parameters
	Table D: Parameters relevant for the risk assessment of domestic distribution systems
Schedule 2: Monitoring	Part 1: General objectives and monitoring programmes for water intended for human consumption
	Part 2: Parameters and sampling frequencies
	Part 3: Risk assessment and risk management of the supply system
	Part 4: Sampling methods and sampling points
Schedule 3: Specifications for the Analysis of Parameters	Part 1: Microbiological parameters with specified analysis methods
	Part 2: Chemical and indicator parameters with specified performance characteristics
Schedule 4: Information to the Public	
Schedule 5: Principles for Setting Methodology referred to in Regulation 19	
Schedule 6: Source Protection	

1.2.2 Obligations in relation to water

Part 2 of the Regulations focuses on obligations related to the treatment, quality and distribution of drinking water.

This Part of the Regulations sets out several key requirements:

(a) General Obligations: Water suppliers must ensure that water intended for human consumption is wholesome and clean, meeting the specified quality standards in Schedule 1 of the Regulations.

(b) Quality Standards: The quality of drinking water supplied by each water supplier must meet the parametric values set out in the Regulations and their associated Schedule 1, ensuring the safety and potability of the water supplied.

The range of parametric values in the Regulations has been extended to include limits for additional water quality parameters of concern, watch list substances (with associated guidance values), and new emerging water contaminants, posing a risk to public health, which may be added by the Minister.

(c) Point of Compliance: The locations at which compliance with the quality standards for drinking water must be assessed are specified in the Regulations, typically at the tap or point used for supply of drinking water in a domestic, commercial or public property.

(d) Duties in Relation to Water on Premises: The Regulations place responsibility on premises owners to maintain their premises and its internal distribution system, which is outside the control of water suppliers. Premises owners shall not cause, contribute to, or give rise to a risk of non-compliance of parametric limits in Schedule 1 within their premises, ensuring that drinking water, supplied by the water supplier, remains safe from the connection point to the consumption risk point within the premises.

In the event of non-compliance within a premises, the Regulations set out specific duties including the issuance of advice or direction from the water supplier to the property owners regarding appropriate remedial measures and information dissemination to be undertaken promptly by the premises owners to advise consumers regarding the quality and safety of water within premises.

(e) **Regulation 5** refers to the assessment of leakage from drinking water networks. It requires water suppliers supplying not less than 10,000 cubic metres of water per day or serving not fewer than 50,000 people to (i) undertake an assessment of water leakage levels within their distribution network, and (ii) evaluate the potential for improvements in water leakage reduction within their distribution network using an appropriate method and outlining any action plans necessary for the purpose of reducing the water leakage rate. **These thresholds are very unlikely to be exceeded by a private water supplier and it is considered that Regulation 5 will not apply to any current private water supplier in Ireland.**

1.2.3 Risk-based approach to water abstraction, treatment and distribution

Part 3 of the Regulations introduces a new risk-based approach that covers the whole water supply chain from the catchment area, abstraction, treatment, storage and distribution of drinking water to the point of compliance.

Supervisory local authorities and private water suppliers should be aware of the volume and population served by individual private supplies, as many of them will not be subject to the risk assessment requirements of the Regulations.

Regulation 9 sets out the general principles of a risk-based approach to water safety involving the Drinking Water Safety Plan (DWSP) approach from catchment to tap to enhance drinking water safety. Regulation 9 also requires that the water supplier undertakes:

- risk assessment and management of the catchment areas for abstraction of drinking water for the first time not later than 12 July 2027, and
- risk assessment and management for each supply system, captured on a site-specific basis, using the DWSP approach, as per World Health Organization (WHO) guidelines ('Water safety plan manual: step-by-step risk management for drinking-water suppliers', available at https://www.who.int/) not later than 12 January 2029, subject to regular review at prescribed intervals thereafter.

For more details on the application of Regulation 9, refer to **Section 3** ('Monitoring of Drinking Water Quality') and **Section 10** ('Water Treatment and Related Matters') of this Guidance.

Regulation 10 sets out the risk assessment and risk management approach in respect of catchment areas for drinking water abstraction points. Schedule 6 of the Regulations also sets out the roles and responsibilities of the nominated 'Source Protection Agencies', referred to in Regulation 10, relevant to private water supply abstractions, namely,

- the EPA in its role as a source protection agency,
- the Geological Survey of Ireland (GSI) in respect of ground water abstractions, and
- local authorities in fulfilment of their role under the Water Framework Directive (WFD).

Regulation 10 also details:

- the various elements of risk assessment and risk management of catchments to be supervised by the source protection agencies, based on guidelines published by the Minister ('Drinking Water Source Protection', available at https://www.gov.ie/) outlining the required coordinated approach between the source protection agencies,
- the characterisation of the catchment areas for abstraction points,
- the identification of hazards and hazardous events in the catchment of abstractions and an assessment of the risk they pose,
- the required monitoring of surface water or groundwater, or both, in the catchment areas for abstraction points, or in raw water, of relevant Schedule 1 parameters, substances or pollutants,
- that identified water bodies for abstraction should also meet the objectives of Article 4 of the WFD and the quality standards set out in Article 16 of the WFD following application of the required treatment regime to address the identified raw water quality risks and substances,
- the requirement for the private water supplier to share collated monitoring data with its supervisory authority and report on unusual trends in monitored parameters, substances or pollutants, and
- the responsibility of the source protection agencies to ensure that, in conjunction with appropriate raw water monitoring, the appropriate WFD risk management and preventative mitigation measures are undertaken by polluters, the water supplier and other stakeholders to prevent or control the identified relevant risks.

Refer to **Section 3** ('Monitoring of Drinking Water Quality'), **Section 4** ('Guidance on Sampling'), **Section 5** ('Guidance on Analysis') and **Section 6** ('Failures of standards & guidance values') of this Guidance for more details on the application of Regulation 10.

The EPA has published guidance on conducting and reporting risk assessments and risk management of public and private water supplies at the source, which is available at https://www.epa.ie/publications/compliance--enforcement/drinking-water/advice--guidance/. This guidance should be used by local authorities and private suppliers when undertaking their responsibilities under Regulation 10.

Regulation 11 relates to risk assessment and risk management of supply systems, in addition to setting out what the water supplier should include in a water supply system risk assessment. Regulation 11(3) details the risk management measures that the water supplier should undertake following a risk assessment of a water supply system to include control measures for:

- prevention and mitigation of the risks identified,
- mitigation of risks coming from the catchment areas,
- implementation of a supply-specific operational monitoring programme,
- validation of the disinfection system, and
- verification of the treatment chemical and filter media used.

For more details on applications of Regulation 11, refer to **Section 3** ('Monitoring of Drinking Water Quality') and **Section 9** ('Annual reporting of monitoring results and other information to the EPA') of this Guidance.

1.2.4 Monitoring and information

Part 4 of the Regulations and its **Regulation 13** relate to the establishment and maintenance of sampling and monitoring programmes for private drinking water supplies, as per Schedule 2 of the Regulations, which are representative of the quality of the drinking water consumed throughout the year, with sampling points equally distributed throughout the supply area.

With respect to private water supplies, Regulation 13 also sets out the duties and responsibilities of the following entities:

(a) private water suppliers, with respect to the compliance of treated drinking water supplies with the parametric limit values in Tables A, B and C of Schedule 1,

(b) the local authority, acting as the supervisory authority in accordance with Reg 13(3) or 13(4), in supervising the performance of private water suppliers, ensuring the monitoring of drinking water as per EPA guidelines under Reg 13(12) and enforcing their compliance with the Regulations,

(c) the EPA in assessing the performance of regulatory compliance functions by each local authority. as the local authority is the supervisory authority for private supplies,

(d) the EPA, in relation to directing water suppliers or local authorities to amend monitoring programmes, and

(e) the EPA, the HSE and the local authorities in the development of guidelines for consultations and the scoping of appropriate additional monitoring, mitigation measures and remedial actions, where exceedances of 'Watch List' substances are detected.

For more details on Regulation 13, refer to **Section 3** ('Monitoring of Drinking Water Quality') of this Guidance.

Regulation 14 sets out the duties and responsibilities of the water supplier with respect to the dissemination of information to the supervisory authority and the public. These requirements are covered in more detail in **subsection 1.4** and **Section 8** ('Communications with Consumers and Complaints Handling') of this Guidance.

Regulation 15 sets out the duties and responsibilities of the private water supplier and the local authority, acting as its supervisory authority, with respect to the protection of human health. Refer to **Section 6** ('Failures of Standards & Guidance Values') of this Guidance for more details on Regulation 15.

Where the water supplier or local authority considers that a supply of water intended for human consumption constitutes a potential danger to human health, the water supplier or the local authority is required to consult with the HSE and ensure that:

- the water supply is prohibited or restricted, to protect human health,
- consumers are promptly informed and advised, and
- the relevant local authority is informed promptly.

The water supplier and/or the local authority, with the agreement of the HSE, shall decide on the actions to be taken.

Regulation 16 sets out that the EPA compiles data sets in respect of public and private water supplies with spatial data representation, where possible, based on records of the water supplier and its supervisory authority. These data sets are required as part of the new duties and responsibilities of the EPA in providing the European Commission, the European Environment Agency and the European Centre of Disease Prevention and Control with access to the following information listed in Regulation 16(1):

(a) measures taken to improve access to and promote the use of treated drinking water,

(b) information related to the risk assessment/management of the catchments for abstraction and domestic distribution systems,

(c) compliance monitoring results, in cases of exceedances of the parametric values set out in Tables A and B in Schedule 1,

(d) information on incidents relating to drinking water that have caused risk to human health that lasted for more than 10 consecutive days and that affected not fewer than 1,000 people,

(e) information about the remedial actions taken in accordance with Regulation 17, and

(f) information on all derogations granted in accordance with Regulation 18(1).

Regulation 16 also sets out the timelines for set-up of data sets and specified time intervals required for the regular updating of such data sets by the EPA.

Regulation 17 sets out the following duties and responsibilities of a private water supplier, with respect to remedial action to be taken, following a failure to meet the parametric values in Schedule 1 or detection of pathogens or parasites in its drinking water supply, regarding:

- investigation of the cause of the regulatory non-compliance incident,
- the notification of the local authority concerned, as the supervisory authority, that may issue such directions as it considers appropriate to the relevant water supplier,
- the prompt notification of affected consumers, following consultation with the HSE, where a potential danger to human health exists and the dissemination of necessary advice to consumers on conditions of water consumption and use restriction necessary to protect human health,
- the preparation and submission of a remedial action programme to the local authority concerned for its approval, to secure regulatory compliance of water for human consumption, within the specified timeframe,
- the subsequent regular notification of consumers about conditions of consumption and use of the water once it has been established that there is no longer a potential danger to human health, and
- the maintenance of a record of any incidence of failure to meet the parametric values in Schedule 1, which must be made available on request to the local authority concerned, as supervisory authority.

Regulation 17 also sets out the powers of local authorities to act on ensuring that water suppliers are fulfilling their obligations, and their role in the consultation process for the protection of human health.

Refer to **Section 6** ('Failures of Standards & Guidance Values') and **Section 7** ('Significant Incidents and Emergencies') of this Guidance for more details on Regulation 17.

Regulation 18 allows for a local authority, as supervisory authority for a private water supplier, to apply to the EPA for a derogation from the parametric values set out in Table B in Schedule 1. The HSE must have agreed to the application being made, such derogation must not constitute a potential danger to human health, and it must be the case that the drinking water supply in the area concerned cannot be maintained by any other reasonable means. Such derogations are limited to the following:

- a new abstraction catchment area,
- a new source of pollution detected within the abstraction catchment area, or parameters newly searched for or detected, or
- an unforeseen and exceptional situation in an existing catchment that could lead to temporary limited exceedances of the Table B parametric values.

Regulation 18 also sets out:

- the detailed information that should be submitted to the EPA with a derogation application, and
- The information and advice that the water supplier should ensure is provided to the affected consumers, where a departure is granted.

Refer to **Section 2** ('Standards for Drinking Water Quality') of this Guidance for more details on Regulation 18.

1.2.5 Minimum requirements for materials, treatment chemicals and filter media

Regulations 19 and **20** of Part 5 of the Regulations prescribe that materials, chemicals or filter media that have contact with water intended for human consumption, should not directly or indirectly compromise the protection of human health, adversely affect the colour, odour or taste of the water, enhance microbial growth, or leach contaminants into the drinking water.

Refer to **Section 10** ('Water Treatment and Related Matters') and **Section 11** ('Distribution Network and Related Matters') of this Guidance for more details on the application of Regulations 19 and 20.

1.2.6 Access to water

Regulation 21(1) requires that water suppliers take the necessary measures to promote, improve or maintain access to drinking water, identify people without access, assess possibilities for improving access, and take measures to improve and maintain access to drinking water for vulnerable and marginalised groups.

1.2.7 Authorised officers

Regulation 22 relates to the appointment of authorised officers by the local authority concerned, as the supervisory authority for private water supplies.

Regulation 23 sets out the powers of an authorised officer to:

- enter and search any place by reasonable force, if necessary, and seize and retain any books, documents or records,
- require any person who carries on an activity to give an authorised officer their name and any books, documents or records relating to that activity which are in their power or control, and
- inspect and take copies of or extracts from any such books, documents or records as defined therein.

1.2.8 Penalties and prosecutions

Regulations 24 to **26** contained in Part 7 set out the penalties on summary conviction or indictment by persons or bodies corporate who commit an offence under various identified Regulation sections.

1.2.9 Supervisory authorities

Regulations 27, 29 and **30** contained in Part 8 set out additional duties, responsibilities and powers of the relevant local authority, acting as the supervisory authority for private water supplies, to:

- issue such directions as it considers appropriate to fulfil its regulatory functions and/or provide such assistance or support as the supervisory authority considers, in consultation with the water supplier, to be helpful,
- charge for the cost of monitoring drinking water supplies, if necessary, and
- undertake an audit of a private water supply to ensure regulatory compliance, the frequency and content of which shall be in accordance with guidelines prepared by the EPA under Regulation 28.

Regulation 28 sets out the additional powers of the EPA to issue guidelines to:

- the water supplier in relation to exempted supplies under Regulation 4, and
- supervisory authorities in respect of performance verification to be undertaken by the EPA under Regulation 30.

Regulation 31 sets out the recourse of the local authority concerned to seek injunctive relief upon application to the High Court in respect of a person who has failed to comply with a direction or a requirement of, or under, the Regulations.

More details on these Regulations can be found in **Section 12** ('Audit of Water Supplies') of this Guidance.

1.3 EPA guidance on drinking water

The Regulations are supported by a suite of Advice Notes and technical guidance documents published by the EPA relating to drinking water treatment.

Key EPA resources are listed below. These technical guidance documents and advice notes are subject to updates and revisions. The EPA website (https://www.epa.ie) should be consulted for the most up-to-date guidance available.

- Water Treatment Manual: Filtration – This manual provides comprehensive guidance on various filtration methods such as rapid gravity, slow sand, and pressure filtration, aimed at both public and private water supplies,
- Water Treatment Manual: Coagulation, Flocculation and Clarification – This manual outlines the principles and practices for coagulation, flocculation, and clarification in the production of drinking water. It includes detailed descriptions of processes and best practices,
- Water Treatment Manual: Disinfection – This manual offers practical guidance on different disinfection methods, including chlorine and ultraviolet (UV) treatment. It covers maintenance of disinfection performance, prevention of operational issues, and troubleshooting,
- Advice Notes:
  - *E. coli* in Drinking Water,
  - Disinfection By-products in Drinking Water,
  - Turbidity in Drinking Water,
  - Developing Drinking Water Safety Plan,
  - *Cryptosporidium* Sampling and Monitoring,
  - Borehole Construction and Wellhead Protection,
  - Optimisation of Chemical Coagulant Dosing at Water Treatment Works,
  - Enforcement of the European Union (Radioactive Substances in Drinking Water) Regulations 2016, and
  - Service Reservoir Inspection, Cleaning and Maintenance.

1.4 Registration of private supplies

Regulation 14(5) is key for local authority supervisory and monitoring functions. All private suppliers should register with their local authority so their supplies can be monitored. Unregistered supplies are not monitored by the local authorities, creating a potential public health risk for consumers.

Local authorities should take proactive steps to recognise and register all private supplies in their functional areas. They should contact businesses and operators of public buildings that may have a private supply, to ensure that the details of these supplies are on the register. Examples of the types of businesses that should be checked to determine whether they are on a public or private supply are:

- creches,
- nursing homes,
- hospitals and healthcare centres,
- hotels, B&Bs, campsites,
- schools,
- sporting clubs, and
- food businesses: petrol stations with deli counters, cafés, bakeries, artisan food producers.

The information for the register needs to be kept up to date annually and is used by local authorities to plan monitoring programmes and other supervisory activities. The registers should include:

- The name and address of the water supplier.
- The volume of water supplied per day (expressed in either cubic metres or a population equivalent).
- The population supplied.
- The type of water treatment in place.
- The source(s) of the water supply.
- The supply zone code. This is a unique code assigned to each water supply. These were originally allocated in the Drinking Water National Monitoring Programme (as referred to in the Department of the Environment, Community and Local Government circular letter, Reference WSP11/04, dated 17 December 2004), referenced in the Regulations. New private water supplies must be allocated a code by the relevant local authority.

Refer to **Section 9** ('Annual Reporting of Monitoring Results and Other Information to the EPA') of this Guidance for more details.

Section 2: Standards for Drinking Water Quality

2.1 Introduction

Regulation 4 sets out the general obligations of water suppliers (private water suppliers as dealt with in this Guidance, or Uisce Éireann as the public water supplier, as dealt with in the Public Supplies Guidance).

Water suppliers shall ensure that all water intended for human consumption provided by them is wholesome and clean, does not present a risk to human health, and meets the requirements of the Regulations.

Regulation 4(2) defines that water is regarded as 'wholesome and clean' where:

- it is free from any micro-organisms and parasites,
- it is free from any substances which in numbers, or concentrations, constitute a potential danger to human health,
- it meets the quality standards set out in Tables A, B and D in Schedule 1, and
- the water supplier concerned has taken all measures necessary to comply with Parts 2 to 4.

2.2 Parametric values and guidance values

2.2.1 Parametric values

The parametric values for the quality standards applicable to water intended for human consumption, are set out in Regulation 6.

Local authorities, as supervisory authority of private supplies, shall establish appropriate monitoring programmes in respect of the parameters and parametric values for the quality standards set out in Schedule 1 of the Regulations applicable to private water supplies.

The Minister, following consultation with named stakeholders in Regulation 6, may set values for additional parameters, not set out in Schedule 1, where the protection of human health within the State or part of it is required. Such parameters shall, at a minimum, satisfy the requirements of Regulation 4.

2.2.2 Watch list and guidance values

The watch list is a new mechanism, established by the European Commission (EC), as per Article 13(8) of the EU Directive 2020/2184 on the quality of water intended for human consumption. This mechanism has been transposed in the Regulations and it aims to address:

- the presence of new emerging compounds (for example, endocrine-disrupting compounds, pharmaceuticals and microplastics) throughout the whole water supply chain, and
- the public and scientific concern about their potential effects on human health.

The watch list, which will be updated by the European Commission from time to time, contains a series of substances and compounds and their respective guidance values for emerging contaminants of concern to human health. Also presented on the watch list, where necessary, is an economically feasible method of analysis of the substance or compound.

The first watch list was adopted on 19 January 2022 and sets out the monitoring and the respective guidance values of two endocrine-disrupting compounds: nonylphenol and 17-beta-estradiol.

Subsection 2.4 of this Guidance presents the guidance values for the substances and compounds defined in the first (19 January 2022) watch list, as established by the European Commission.

Section 6 ('Failures of standards and guidance values') of this publication provides guidance on what steps should be taken if a parametric value or guidance value is exceeded.

2.3 Parameter categories

2.3.1 Introduction

The minimum requirements for parametric values used to monitor and assess the drinking water quality of all private water supplies subject to the Regulations are presented in Tables A to C in Schedule 1 of the Regulations, as set out in Table 2-1.

Table 2-1: Tables in Schedule 1 of the Regulations and content.

Table in Schedule 1 of the Regulations	Content of the Table
Table A	Microbiological parameters
Table B	Chemical parameters
Table C	Indicator parameters
Table D	If indicated by Regulation 12 risk assessment, and apply to domestic distribution systems within properties

In that context, a brief description for each parameter category is provided in **subsections 2.3.2** to **2.3.5**, as well as the list of parameters and respective parametric values.

2.3.2 Microbiological parameters

2.3.2.1 Escherichia coli (E. coli) *and* intestinal Enterococci

The microbiological parameters and their standards in Table A of Schedule 1 of the Regulations are shown in in Table 2-2.

Table 2-2: Microbiological parameters.

Parameter	Parametric value (number/100 ml)	Comment
Intestinal enterococci	0	Note 1
E. coli	0	Note 1

Note 1: For water put into bottles or containers, the unit is number/250 ml.

The parameter *E. coli* is of paramount importance for the assessment of the microbiological quality of drinking water. It has been used for many years as an indicator of contamination by faecal matter. Properly treated and disinfected water will not contain *E. coli*. If *E. coli* is detected in treated or distributed water, there is a potential risk to human health. The cause of the presence of *E. coli* must be investigated immediately and remedial action must be taken promptly.

The parameter *Enterococci* comprises another group of faecal indicator organisms and its determination complements and supplements that of *E. coli*.

2.3.2.2 Parasites

Regulation 4 requires that water is also free of parasites (for example, *Cryptosporidium* and *Giardia*). The water supplier should ensure that monitoring programmes for parasites are in place where relevant, for example where a contamination or health risk has been identified. Any detection of parasites should be immediately investigated by the water supplier to identify the cause of the failure.

2.3.3 Chemical parameters

These form the largest group of parameters in the Regulations. The parameters range from specific substances such as individual metals and organic compounds to generic substances such as pesticides and disinfection by-products such as trihalomethanes (THMs) and haloacetic acids (HAAs).

The parameters and their values in Table B of Schedule 1 of the Regulations are reproduced and where necessary are augmented to provide further explanation and guidance.

The recast Regulations have introduced additional parameters in Table B, primarily focusing on enhancing water quality standards to protect public health. These updates align with EU Directive 2020/2184. Eight new parameters have been added to Table B (Chemical Parameters) as follows:

- *Bisphenol A (BPA)* is a chemical widely used in manufacturing polycarbonate plastics and epoxy resins used in nearly every industry. Potential health effects include disruption of endocrine functions.
- *Chlorate* may be generated by chlorine dioxide disinfection systems or formed due to the degradation of stored sodium hypochlorite (NaOCl) used for disinfection. The proportion of NaOCl that degrades to chlorate in drinking water will depend on the concentration of product delivered, the duration time of storage and the ambient temperature of the chemical during storage. Water suppliers shall strive to minimise chlorate levels, consequent to the storage and use of NaOCl as a disinfectant.
- *Chlorite:* Similarly to chlorate, chlorite arises primarily from the use of chlorine dioxide, and to a lesser extent from sodium hypochlorite, where these are used as disinfectants and oxidants.
- *Haloacetic acids (HAAs)* are a group of disinfection by-products (DBPs) that form when disinfectants such as chlorine react with naturally occurring organic matter residuals in water. Exposure to HAAs is though consumption of beverages and food that have come in contact with treated water, and through ingestion, dermal and inhalation exposure.
- *Microcystin-LR* is an algal toxin that may be released seasonally in surface source waters intended for human consumption, where blooms containing cyanobacterial algae may be present. When present in water, microcystin-LR is toxic to both humans and animals.
- *PFAS Total* and *Sum of PFAS:* PFAS are per- and polyfluoroalkyl substances. PFAS compounds ('forever chemicals') with strong multiple fluorine atoms bonded to a carbon chain have been used in many domestic products and throughout industry. Urbanisation and industrialisation have increased the risk of source water contamination by these PFAS contaminants through municipal wastewater discharges, effluents and landfill leachates. PFAS compounds do not break down in the environment, can move through soils, contaminate drinking water sources, and bioaccumulate in humans, fish and wildlife. Sum of PFAS' means the sum of per- and polyfluoroalkyl substances considered a concern as regards water intended for human consumption listed in Schedule 3 Part 2 (3).

  In line with Article 13(7) and Part B of Annex 1 of the Drinking Water Directive, Member States may decide to use either one or both of the parameters 'PFAS Total' and 'Sum of PFAS'. Following on from consultation and agreement with the EPA and the HSE in 2024, the EPA will use the parameter 'Sum of PFAS', and thus, at time of writing, private water supplies shall be monitored for the parameter 'Sum of PFAS'.
- *Uranium* is naturally occurring in some geological formations. It enters the environment through natural leaching from deposits, waste from mining operations, emissions from the nuclear industry, burning of coal and other fuels, and the use of phosphate fertilisers containing uranium. Exposure to high levels of uranium can cause kidney damage and increase cancer risk due to its radioactive properties.

The parametric values for the above-listed eight parameters came into on 12 January 2026 as per Regulation 34(1).

The chemical parameters and their parametric limit values in Table B of Schedule 1 of the Regulations are shown in Table 2-3.

Table 2-3: Chemical parameters.

Parameter	Parametric value	Unit	Notes
Acrylamide	0.10	µg/l	Note 1
Antimony	10	µg/l	
Arsenic	10	µg/l	
Benzene	1.0	µg/l	
Benzo(a)pyrene	0.010	µg/l	
Bisphenol A	2.5	µg/l	
Boron	1.5	mg/l	Note 2
Bromate	10	µg/l	
Cadmium	5.0	µg/l	
Chlorate	0.25	mg/l	Note 3
Chlorite	0.25	mg/l	Note 4
Chromium **(Until 11 January 2036)** **(From 12 January 2036)**	 50 25	µg/l	Note 5
Copper	2.0	mg/l	
Cyanide	50	µg/l	
1,2-dichloroethane	3.0	µg/l	
Epichlorohydrin	0.10	µg/l	Note 6
Fluoride	1.5	mg/l	
Haloacetic acids (HAAs)	60	µg/l	Note 7
Lead **(Until 11 January 2036)** **(From 12 January 2036)**	 10 5	µg/l	Notes 8 & 9
Mercury	1.0	µg/l	
Microcystin-LR	1.0	µg/l	Note 10
Nickel	20	µg/l	
Nitrate	50	mg/l	Note 11

Parameter	Parametric value	Unit	Notes
Nitrite	0.50	mg/l	Note 11
Pesticides	0.10	µg/l	Notes 12, 13 & 14
Pesticides – total	0.50	µg/l	Note 15
PFAS total	0.50	µg/l	Note 16
Sum of PFAS	0.10	µg/l	Note 17
Polycyclic aromatic	0.10	µg/l	Note 18
Selenium	20	µg/l	Note 19
Tetrachloroethene and trichloroethene	10	µg/l	Note 20
Trihalomethanes total	100	µg/l	Note 21
Uranium	30	µg/l	
Vinyl chloride	0.50	µg/l	Note 22

Note 1: *The parametric value of 0.10 µg/l refers to the residual monomer concentration in the water as calculated according to specifications of the maximum release from the corresponding polymer in contact with the water.*

Acrylamide is the unit chemical (monomer) from polyacrylamides, used as coagulant aids in drinking water treatment. Additional acrylamide monomer may be present in the treated water when polyacrylamides are used in the waterworks sludge treatment and where the supernatant is returned to the works inlet. Similarly, epichlorohydrin is one of the unit chemicals from which polyamines, used as coagulants and coagulant aids in drinking water treatment or in epoxy resins used to line the internal surfaces of process pipework, service reservoirs, water towers and distribution mains, are prepared.

Water suppliers should use polymers for treatment or in contact with drinking water that have been approved by an European approval scheme, which takes account of the relevant CEN regulations, based on the latest EU Directive: EN 1407:2023 (Chemicals used for the Treatment of Water intended for Human Consumption – Anionic and non-ionic polyacrylamides) and EN 1410:2023 (Chemicals used for the Treatment of Water intended for Human Consumption – Cationic polyacrylamides).

Note 2: *A parametric value of 2.4 mg/l shall be applied when desalinated water is the predominant water source of the supply system concerned or in regions where geological conditions could lead to high levels of boron in groundwater.*

Note 3: *A parametric value of 0.70 mg/l shall be applied where a disinfection method that generates chlorate, in particular chlorine dioxide, is used for disinfection of water intended for human consumption. Where possible, without compromising disinfection, the water supplier shall strive for a lower value. These parameters shall be measured only if such disinfection methods are used.*

Note 4: *A parametric value of 0.70 mg/l shall be applied where a disinfection method that generates chlorite, in particular chlorine dioxide, is used for disinfection of water intended for human consumption. Where possible, without compromising disinfection, the water supplier shall strive for a lower value. These parameters shall be measured only if such disinfection methods are used.*

Note 5: *A parametric value of 25 µg/l shall be met, at the latest, by 12 January 2036. The parametric value for chromium until that date shall be 50 µg/l.*

Note 6: *The parametric value of 0.10 µg/l refers to the residual monomer concentration in the water as calculated according to specifications of the maximum release from the corresponding polymer in contact with the water.*

Note 7: *This parameter shall be measured only when disinfection methods that can generate HAAs are used for the disinfection of water intended for human consumption. It is the sum of the following five representative substances: monochloro-, dichloro- and trichloro-acetic acid, and mono- and dibromo-acetic acid.*

Note 8: *The parametric value of 5 µg/l shall be met, at the latest, by 12 January 2036. The parametric value for lead until that date shall be 10 µg/l.*

Note 9: *After that date, the parametric value of 5µg/l shall be met at least at the point of supply to the domestic distribution system. For the purposes of point (b) of the first subparagraph of Article 11(2) of the EU Drinking Water Directive, the parametric value of 5 µg/l at the tap shall apply.*

Note 10: *This parameter shall be measured only in the event of potential blooms in source water (increasing cyanobacterial cell density or bloom forming potential).*

Microcystin-LR should be measured at Group B frequency where there is a risk of algal bloom in the source water.

Note 11: *A water supplier shall ensure that the condition [nitrate]/50 + [nitrite]/3 < 1, where the square brackets signify the concentrations in mg/l for nitrate (NO3) and nitrite (NO2), is complied with and that the parametric value of 0.10 mg/l for nitrites is complied with ex water treatment works. Nitrates must be monitored at the point of compliance, where 50 mg/l Table B parametric value applies. Nitrites must be monitored at both the point of compliance (where 0.50 mg/l Table B parametric value applies) and in the water leaving treatment works (where a stricter 0.10 mg/l parametric value applies).*

According to the WHO, excess free ammonia in the system can lead to nitrification, increasing nitrate and nitrite levels in drinking water. Nitrite can also be formed chemically by Nitrosomonas bacteria in galvanised steel distribution pipes during stagnation of nitrate-containing and oxygen-poor drinking water, or when chloramination is used as a disinfection method.

Note 12: *'Pesticides' means:*

(a) organic insecticides;

(b) organic herbicides;

(c) organic fungicides;

(d) organic nematocides;

(e) organic acaricides;

(f) organic algicides;

(g) organic rodenticides;

(h) organic slimicides;

(i) related products (inter alia, growth regulators);

and their metabolites as defined in point (32) of Article 3 of Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009, that are considered relevant for water intended for human consumption. A pesticide metabolite shall be deemed relevant for water intended for human consumption if there is a reason to consider that it has intrinsic properties comparable to those of the parent substance in terms of its pesticide target activity or that either itself or its transformation products generate a health risk for consumers.

Note 13: *The parametric value of 0.10 µg/l shall apply to each individual pesticide. In the case of aldrin, dieldrin, heptachlor and heptachlor epoxide, the parametric value shall be 0.030 µg/l.*

Note 14: *The Minister for Agriculture, Food and the Marine shall define a guidance value to manage the presence of non-relevant metabolites of pesticides in water intended for human consumption. Only pesticides that are likely to be present in a given supply need to be monitored. Based on the data reported by the EPA, the European Commission may establish a database of pesticides and their relevant metabolites, taking into account their possible presence in water intended for human consumption.*

MCPA (2-methyl-4-chlorophenoxyacetic acid), used for seasonal control of rushes in marginal lands, is the most common pesticide recorded in sampled Irish drinking water.

Note 15: *'Pesticides total' means the sum of all individual pesticides, as defined in Note 9, detected and quantified in the monitoring procedure.*

Note 16 *'PFAS total' means the totality of per- and polyfluoroalkyl substances. This parametric value shall only apply once technical guidelines for monitoring this parameter are developed by the European Commission in accordance with Article 13(7) of the Directive. The EPA may then decide to use either one or both of the parameters 'PFAS total' and 'Sum of PFAS'.*

Note 17: *Sum of PFAS. 'Sum of PFAS' means the sum of per- and polyfluoroalkyl substances considered a concern as regards water intended for human consumption listed in point 3 of Part 2 of Schedule 3. This is a subset of 'PFAS total' substances that contain a perfluoroalkyl moiety with three or more carbons (i.e. –CnF2n⁻, n > 3) or a perfluoroalkyl ether moiety with two or more carbons (i.e. –CnF2nOCmF2m⁻, n and m > 1).*

Technical guidelines for monitoring 'PFAS total' or 'Sum of PFAS' have been developed by the European Commission in accordance with Article 13(7) of the Directive. The document was published online on 7 August 2024 and can be accessed at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52024XC04910.
At time of writing, the EPA will use the parameter 'Sum of PFAS' to apply to public and private water supplies.

Note 18: *Sum of concentrations of the following specified compounds: benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene and indeno(1,2,3-cd)pyr-ene.*

Note 19: *A parametric value of 30 µg/l shall be applied for regions where geological conditions could lead to high levels of selenium in groundwater.*

Note 20: *The sum of concentrations of these two parameters.*

Note 21: *Where possible, without compromising disinfection, water suppliers shall strive for a lower parametric value. It is the sum of concentrations of the following specified compounds: chloroform, bromoform, dibromochloromethane and bromodichloromethane.*

Humans can be exposed to trihalomethanes through drinking of tap water, consumption of beverages and food that have come in contact with treated water, dermal and inhalation exposure to disinfected water.

Note 22: *The parametric value of 0.50 µg/l refers to the residual monomer concentrations in the water as calculated according to specifications of the maximum release from the corresponding polymer in contact with the water.*

Where unplasticised polyvinyl chloride (uPVC) pipes are used for distribution mains, water suppliers should use only those products that have been approved by a European approval scheme to ensure compliance with the vinyl chloride parametric limit.

2.3.3.1 Changes to parametric values

The Regulations have increased the parametric limits for some Table B parameters (antimony, selenium and boron) in comparison to the values in previous versions of the Regulations.

In the case of the following metal residuals in drinking water at the point of compliance, the Regulations specify the following reduced parametric limits from 12 January 2036:

- chromium to be reduced from the current parametric limit of 50 µg/l to 25 µg/l, and
- lead to be reduced from the current parametric limit of 10 µg/l to 5 µg/l.

2.3.4 Indicator parameters

Indicator parameters in Table C of Schedule 1 are a mixture of microbiological and chemical parameters, parameters indicating water treatment performance and aesthetic characteristics of drinking water supplies. A failure to meet an indicator parameter value does not necessarily mean that there is a human health risk from the supply. A failure is a signal that there may be a problem with the water supply (for example, in raw water, in the treatment plant or in the network) that needs further investigation and consideration of whether the failure is a human health risk.

Further details about the procedures for non-compliance with standards are provided in **Section 6** ('Failures of standards and guidance values') of this Guidance.

The indicator parameters and their respective parametric values are shown in Table 2-4. The parameters and their parametric values in Table C of Schedule 1 are reproduced and where necessary are augmented to provide further explanation and guidance.

Table 2-4: Indicator parameters.

Parameter	Parametric value	Unit	Notes
Aluminium	200	µg/l	
Ammonium	0.50	mg/l	
Chloride	250	mg/l	Note 1
***Clostridium perfringens* (including spores)**	0	number/100 ml	Note 2
Colour	Acceptable to consumers and no abnormal change		
Conductivity	2,500	µS cm^{-1} at 20 °C	Note 3
Hydrogen ion concentration	≥6.5 and ≤9.5	pH units	Notes 3 & 4
Iron	200	µg/l	
Manganese	50	µg/l	
Odour	Acceptable to consumers and no abnormal change		
Oxidisability	5.0	mg/l O_2	Note 5
Sulphate	250	mg/l	Note 1
Sodium	200	mg/l	
Taste	Acceptable to consumers and no abnormal change		
Colony count 22 °C	No abnormal change		
Coliform bacteria	0	number/100 ml	Note 6
Total organic carbon (TOC)	No abnormal change		Note 7
Turbidity	Acceptable to consumers and no abnormal change		

Parameter	Parametric value	Unit	Notes
Water should not be aggressive or corrosive. This applies particularly to water undergoing treatment (demineralisation, softening, membrane treatment, reverse osmosis, etc.). Where water intended for human consumption is derived from treatment that significantly demineralises or softens water, calcium and magnesium salts could be added to condition the water to reduce any possible negative health impact, as well as to reduce the corrosiveness or aggressivity of water and to improve taste. Minimum concentrations of calcium and magnesium or total dissolved solids in softened or demineralised water should be established taking into account the characteristics of water that enters those processes.			

Note 1: *The water should not be corrosive.*

The values of these parameters should be such that the water does not corrode tankage and pipes at the treatment works or corrode downstream iron pipes or lead pipework within the distribution network and within internal lead domestic pipe networks within private premises.

Note 2: *The parameter shall be measured if the risk assessment indicates that it is appropriate to do so.*

In the event of non-compliance with this parametric value, the supply shall be investigated to ensure that there is no potential danger to human health arising from the presence of pathogenic micro-organisms such as Cryptosporidium.

Note 3: *The water should not be aggressive.*

Note 4: *For still water put into bottles or containers, the minimum value may be reduced to 4.5 pH units. For water put into bottles or containers that is naturally rich in or artificially enriched with carbon dioxide, the minimum value may be lower.*

Note 5: *This parameter need not be measured if the parameter TOC is analysed.*

The EPA recommends that TOC is measured rather than oxidisability in all water supplies as it is a more useful parameter and easier to determine.

Note 6: *For water put into bottles or containers, the unit is number/250 ml.*

Note 7: *This parameter need not be measured for supplies of less than 10,000 cubic metres a day.*

The EPA recommends that the total organic carbon (TOC) level in water supplies is evaluated, as TOC is a key indicator of the propensity of THMs to form following chlorination. The operator should measure the TOC levels in the untreated and treated water to determine the efficiency of the treatment process. TOC monitoring results for treated water prior to primary disinfection using chlorine should generally not exceed 2.0 mg/l. More details can be found in the EPA Advice Note No. 4: Disinfection By-Products in Drinking Water.

2.3.5 Parameters relevant for the risk assessment of domestic distribution systems

Uisce Éireann is required to carry out a general risk assessment of domestic distribution systems under Regulation 12. Depending on the outcomes and recommendations of such assessment, risk may be identified in certain types of premises which are then to be communicated with – both property owners and supervisory authorities – for actions, particularly relating to lead or *Legionella*. As a result, this may lead to Table D monitoring requirements for some of these premises: for example, premises with large internal plumbing arrangements such as hospitals or hotels.

Private supplies, or certain priority premises supplied by private supplies, may be required under Regulation 12 to consider various measures to reduce the risks connected with domestic distribution systems. Note that Regulation 12 does not apply to private water supplies of less than 10 m^3/day or fewer than 50 people, where no public or commercial activity is supplied.

The parameters relevant to the Risk Assessment of Domestic Distribution Systems and their respective parametric values are shown in Table 2-5.

Table 2-5: Parameters relevant to the risk assessment of domestic distribution systems.

Parameter	Parametric value	Unit	Notes
Legionella	<1000	CFU/l	This parametric value is set for the purposes of Regulations 12 and 17. Actions provided for in those Regulations could be considered even when the value is below the parametric value, for instance in cases of infections and outbreaks. In such cases, the source of infection should be confirmed, and the species of *Legionella* should be identified.
Lead **(from 12 January 2036, see notes)**	10 5	µg/l	This parametric value is set for the purposes of Regulations 12 and 17. Water suppliers should use their best endeavours to achieve the lower value of 5 µg/l from 12 January 2036.

Legionella is a type of bacteria found in freshwater environments such as lakes and streams. WHO notes that, in the European Union, *Legionella* causes the highest health burden of all waterborne pathogens as it is the cause of a severe form of pneumonia called Legionnaires' disease. The presence of *Legionella* in the environment can become a health concern when it is inhaled by humans, as it grows and spreads in man-made water systems, such as hot water tanks, cooling towers, plumbing systems and showers. It is therefore linked to internal domestic distribution systems of priority premises such as hospitals and conference centres.

Lead in drinking water is a significant health hazard, especially for young children and pregnant women.

2.4 Watch list compounds

The compounds and their respective guidance values from the latest updated watch list as published by the European Commission can be consulted at

https://environment.ec.europa.eu/publications/implementing-decision-drinking-water-directive-watch-list_en

The first watch list is set out in Table 2-6.

Table 2-6: Watch list of substances and compounds of concern for water intended for human consumption.

Compound	Guidance value (ng/l)
17-beta-estradiol	1
nonylphenol	300

The presence of these compounds (17-beta-estradiol and nonylphenol) in drinking water is significant due to their endocrine-disrupting properties and the risk that they may pose to human health.

- 17-beta-estradiol is a natural steroid hormone found in human and animal excretion. It can enter water through agricultural runoff from livestock and certain pharmaceuticals.
- Nonylphenol is an organic compound used in industrial detergents, emulsifiers and pesticides. It can reach water sources via industrial wastewater, agricultural runoff and the breakdown of products containing nonylphenol ethoxylates.

2.5 Overview of derogations

Regulation 18 allows for a local authority, as supervisory authority for a private water supplier, to apply to the EPA for a derogation from the parametric values set out in Table B in Schedule 1 ('Chemical Parameters'). The HSE must have agreed to the application being made, such derogation must not constitute a potential danger to human health, and it must be the case that the supply of drinking water cannot be maintained by any other reasonable means.

Changing the frequency of monitoring is covered separately under Part 3 ('Risk') of the Regulations.

Derogations are limited to the following cases:

- A new abstraction catchment area,
- A new source of pollution detected within the abstraction catchment area, or parameters newly searched for or detected, or
- An unforeseen and exceptional situation in an existing catchment that could lead to temporary limited exceedances of the Table B parametric values.

Regulation 18 also sets out

- The detailed information that should be submitted to the EPA with a derogation application,
- The information and advice that the water supplier should ensure is provided to the affected consumers, where a departure is granted.

Section 3: Monitoring of Drinking Water Quality

3.1 Introduction

The definition of 'Monitoring' in Part 1 of the Regulations includes the auditing, inspection, measurement, sampling or analysis of drinking water. Monitoring frequency is defined as periodic or continuous during a period of time.

Monitoring of drinking water for human consumption against quality standards is set out in Regulation 13.

The Regulations define the supervisory authority of water intended for human consumption supplied by any person other than Uisce Éireann, namely private supplies, as the local authority in whose functional area the water is supplied.

Under Regulation 13, the EPA has a supervisory role over the performance of each local authority in respect of its monitoring functions. This includes the role of the EPA in assessing local authorities' monitoring programmes and registers of supplies. The EPA may issue directions to a local authority to require compliance with local authority obligations under the Regulations.

Regulation 13(12) states that the EPA may also issue guidelines on the manner, frequency and method by which parameters set out in Schedule 1 shall be monitored, as well as appropriate monitoring points. This Guidance provides guidance under Regulation 13(12).

Local authorities shall supervise and monitor private drinking water supplies situated within their functional area. Regulated supplies are defined as satisfying at least one of the following conditions:

- serving at least 50 persons or at least 10 m^3/d, or
- having a commercial or public activity, regardless of size or volume.

Note: Where a flowmeter is not available, local authorities should establish alternative technical methods, through their water services programme, to quantify the daily volume of drinking water supplied. These methods may include, but are not limited to, estimating based on venue capacity (for instance, data from the Fire Officer) or using engineering measures such as pump capacity size.

All private suppliers should register with their local authority so their supplies can be monitored annually. Local authorities should take proactive steps to recognise and register all private supplies in their functional areas. Unregistered supplies are not monitored by the local authorities, creating a potential public health risk for consumers.

Each local authority has the following main duties and responsibilities in relation to the private water suppliers under its supervision:

- Monitoring private water supplies for the parameters set out in Tables A, B and C in Schedule 1 (refer to **Section 2** ('Standards for Drinking Water Quality') of this Guidance).
- Taking all measures necessary to ensure that monitoring of the quality of water intended for human consumption is carried out in accordance with the regulations and with guidelines issued by the EPA.

- Local authorities are responsible for specifying the sampling points for analysis and for establishing monitoring programmes for each private water supply in their functional area. Local authorities may liaise with water suppliers for information on representative sample locations, supply boundaries, etc. Supplies exempted from this requirement can be found in **Section 1** ('The Drinking Water Regulations') of this Guidance.
- Additionally, due to its role as the source protection agency for private supplies, the local authority concerned should ensure that raw water monitoring is conducted in the context of the risk assessment required for certain supplies under Regulation 10.
- Local authorities should issue results of all monitoring to the relevant water suppliers as soon as the results are available.

The local authority must submit monitoring programmes to the EPA for review, at such times as the EPA may require. The EPA carries out periodic audits of these monitoring programmes, which include an overview of the local authority's register of private supplies and detailed assessment of the compliance monitoring and sampling, as well as recommendations and follow-up actions required by the local authority concerned. Reports of these audits are available online at: https://www.epa.ie/.

3.2 Point of compliance

In accordance with Regulation 7, the evaluation of drinking water quality compliance in private water supplies applies to different points of compliance, depending on specified cases, as presented in Table 3-1.

Taps at graveyards, council depots, farmyards or sheds should not be used in monitoring as they are not points of compliance and may not be representative of water used for human consumption.

Table 3-1: Description of different points of compliance for various cases, as set out in Regulation 7 and applied to private water supplies. EPA notes in italic.

Case	Point of Compliance
Water intended for human consumption supplied from a distribution network or a private source	Point within a premises where it emerges from the tap or taps normally used for human consumption *Example: kitchen taps*
Water supplied by tanker or similar means	Point at which it emerges from the tanker
Risk points in a domestic distribution system	An outlet or tap fitting. *Risk points in a domestic distribution system are those that should be sampled to test for proliferation of Legionella and the water's suitability for human consumption and compliance with the Regulations. These samples may be taken by the property owner or occupier. Refer to* **subsection 4.5.5** *'Sampling at risk points for proliferation of Legionella' of this Guidance for more details.*
Drinking water used in a food business	Point at which the water is used

3.3 Monitoring programmes

The Regulations require that appropriate monitoring programmes for all water intended for human consumption shall be established, in accordance with Part 1 of Schedule 2.

The monitoring programmes established by local authorities for the private supplies under their supervision should be tailored to the specific characteristics of the water supply and should consider the implications of the following:

- The risk assessments undertaken at different points within the water supply chain, from catchment to abstraction through supply systems to distribution, as set out in Part 3 of the Regulations,
- The potential hazards and/or hazardous events identified within the abstraction catchment area, at the abstraction point as well as at various points within the supply systems to the point of compliance, that could pose a risk to human health or drinking water quality. This should consider risks consequent to climate change, leakage and leaking pipework.

The EPA is required to ensure that such monitoring programmes are reviewed on an ongoing basis and not less than once every six years.

The following are the general objectives of monitoring programmes for drinking water:

- Ensure that the measures to control risks to human health throughout the entire water supply chain (namely from abstraction through treatment, and from storage to distribution) are functioning effectively, and that the water intended for human consumption is wholesome and clean at the point of compliance,
- Provide information on compliance with the quality standards outlined in Regulation 6 of the Regulations, and
- Assist the identification of the most suitable means of mitigating human health risks.

Regulation 13 (13) sets out the elements to be included in monitoring programmes, as summarised in Table 3-2.

Table 3-2: Required elements for a monitoring programme.

Monitoring element	Section in Guidance	Regulations reference
Parameters set in accordance with quality parametric values	**Section 2** ('Standards for Drinking Water Quality')	Regulation 6 Tables A, B, and C in Schedule 1
Substances and compounds included in the watch list in accordance with quality standards	**Subsection 2.4** ('Watch list compounds') **Subsection 3.4** ('Monitoring of substances and compounds included in the watch list')	Regulation 13(14)(a)
Monitoring programmes requirements	**Subsection 3.3** ('Monitoring Programmes')	Schedule 2, Part 1
Parameters set in accordance with operational monitoring requirements	**Subsection 3.3.1** ('Operational Monitoring Programme')	Schedule 2, Part 1, Point 3
Compliance monitoring requirements	**Subsection 3.3.2** ('Compliance Monitoring')	Schedule 2, Part 2
Monitoring for the purpose of risk assessment	**Subsection 3.5** ('Risk assessment monitoring')	Part 3, 'Risk'

Schedule 2 Part 1 (2) sets out that monitoring programmes shall include discrete sampling (collection and analysis of grab samples), continuous monitoring, or a combination of the two. In addition, it sets out that monitoring programmes may consist of inspection actions, as follows:

- inspections of water treatment equipment – for example, equipment such as UV and/or chlorine disinfection equipment, including records of their functionality and maintenance status, and
- inspections of the abstraction area and infrastructure (treatment, storage and distribution) – for instance, river/lake abstraction points or wells, and reservoirs.

The monitoring programme shall enable compliance with the specifications for the analysis of parameters specified in Schedule 3, as presented in **Section 5** ('Guidance on Analysis') of this Guidance.

3.3.1 Operational monitoring programme

As presented in Table 3-2, the monitoring programmes established by local authorities should include supply-specific operational monitoring, which should involve collaboration with the water supplier and be conducted in accordance with Schedule 2 Part 1 (3) of the Regulations.

The main objective is to provide a framework for the rapid identification of operational performance issues and water quality problems, to quickly enable remedial actions to be taken (see **Section 6** ('Failures of Standards & Guidance Values') of this Guidance). Additionally, it should confirm the effectiveness of all control measures across various stages of the water supply process, including abstraction, treatment, distribution and storage.

Where the supply is subject to the risk assessment elements of the Regulations (Regulations 9, 10 and 11), operational monitoring programmes may offer opportunity for a water supplier to assess and manage certain risks on an ongoing basis. Refer to **subsection 3.5** ('Risk assessment monitoring') of this Guidance for more details on risk assessment.

Some supplies will not be subject to the risk assessment elements of the Regulations (Regulations 9, 10 and 11). However, some extent of operational monitoring is recommended at every supply where a treatment process is used (for example a disinfection system), to ensure it is working as intended.

The operational monitoring programme shall regularly assess the performance of the disinfection system, for example by monitoring of chlorine levels or UV system performance, turbidity and pH. Further information on disinfection verification can be found in the *EPA Water Treatment Manual: Disinfection*, available at https://www.epa.ie.

The operational monitoring programme shall regularly assess the 'turbidity' parameter at the water treatment plant. The evaluation of turbidity at various points in a treatment process ensures that the efficacy of physical removal of contaminants is regularly assessed. This allows greater control over verification of filtration and disinfection performance. Further information on monitoring turbidity to verify treatment performance may be found in the *EPA Water Treatment Manual: Filtration*, available at https://www.epa.ie.

It should be noted that the *EPA Water Treatment Manual: Disinfection* emphasises the requirement for compliance with 1 NTU turbidity operational value to verify disinfection at all drinking water supplies regardless of whether filtration is in place or not.

The reference value and the frequency of sampling/analysis of final water turbidity in final filtered water are set out in Schedule 2, Part 1 and are specified in Table 3-3. The frequency is a function of the volume of water within the supply zone, which is defined in the Regulations as a 'geographically defined area within which water intended for human consumption comes from one or more sources and within which the water quality can be considered as being approximately uniform'.

Table 3-3: Operational monitoring for regular control of the efficacy of physical removal by filtration processes, as depicted in Schedule 2 Part 1 of the Regulations.

Operational parameter	Reference value
Turbidity at the drinking water supply post-filtration	≤0.3 NTU in 95% of samples and none to exceed 1 NTU
Volume of water distributed or produced within a supply zone	**Minimum frequency of sampling and analysis**
≤1,000 m^3/d	Weekly
>1,000 m^3/d to ≤10,000 m^3/d	Daily
>10,000 m^3/d	Continuous

The Regulations also require that the operational monitoring programme includes monitoring of somatic coliphages in the raw water, as presented in Table 3-4.

Table 3-4: Operational monitoring parameter to control the efficacy of treatment processes to address microbiological risks based on Schedule 2 Part 1 of the Regulations.

Operational parameter	Reference value	Unit	Notes
Somatic coliphages	50 (for raw water)	Plaque forming units (PFU)/100 ml	The water supplier must monitor somatic coliphages in raw water as an operational parameter, where it is indicated by a risk assessment specified in Schedule 2 Part 1 (refer to **subsection 3.5** ('Risk assessment monitoring') of this Guidance for more details). This is to control the efficacy of the treatment processes against microbiological risks. If the concentration of this parameter exceeds the reference value, the parameter should be analysed after each treatment process to determine log removal by the barriers in place and to assess whether the risk of pathogenic virus breakthrough is adequately controlled.

Somatic coliphages are a type of bacteriophage virus that infect *E. coli* via attachment to the cell wall, and are naturally present in environments contaminated with faeces. Their behaviour closely mimics that of harmful enteric viruses and their quantification is usually easy and rapid, making them reliable surrogates for studying viral persistence in different water environments.

3.3.1.1 Total organic carbon (TOC) operational monitoring

Residual TOC in raw water and treated water following water treatment is a key operational monitoring parameter in the production of treated water at all water treatment plants, indicative of the existence or otherwise of precursors of disinfection by-products in drinking water (for instance, total trihalomethanes and haloacetic acids), for which parametric limits are also set out in Table C of Schedule 1 and performance characteristics are set out in the Regulations.

UV transmissivity (UVT) can be used as an operational surrogate parameter for TOC and the efficacy of its removal during water treatment

3.3.2 Compliance monitoring

The regulatory requirements for the compliance monitoring in the case of private suppliers are based on Schedule 2 Part 2 of the Regulations, which establishes two lists of water quality parameters, namely Group A and Group B, and their respective sampling frequencies.

In addition to the Group A and Group B parameters listed in the sections below, the EPA recommends that local authorities should determine the need for monitoring parasites (*Cryptosporidium* and *Giardia*) in private water supplies.

Details of parameters within each Group are provided below.

3.3.2.1 Group A parameters

The following compliance monitoring parameters are included in Group A:

- *Escherichia coli* (*E. coli*) and intestinal enterococci are considered 'core parameters'. They shall be monitored not less than at the frequencies set out in Table 3-5, and their monitoring frequencies shall not be the subject of a reduction due to a risk assessment of the supply system (refer to sub**section 3.5** ('Risk assessment monitoring') of this Guidance)
- Coliform bacteria.
- Colony count 22 °C.
- Colour.
- Turbidity.
- Taste.
- Odour.
- pH (hydrogen ion concentration).
- Conductivity.
- Other parameters identified as relevant to a monitoring programme, in accordance with:
  - The parameters set out in Regulation 6.
  - Where relevant, parameters identified following a risk assessment of the supply system as set out in Regulation 11 and Part 3 of this Schedule (refer to **subsection 3.5** ('Risk assessment monitoring') of this Guidance).

Moreover, the following parameters shall be added to Group A under specific circumstances:

- Where chloramination is used as a treatment process, ammonium and nitrite shall be added in the Group A list. Chloramination involves the addition of ammonia (NH3) following chlorination to form monochloramine (NH2Cl), which is primarily utilised as a secondary disinfectant (EPA, 2011).
- Where aluminium and iron salts are used as water treatment chemicals, aluminium and iron shall be added in the Group A list.

3.3.2.2 Group B parameters

Parameters not analysed under Group A, but which were set in accordance with Regulation 6, shall be monitored to ensure compliance with all parametric values set out in the Regulations, the exception being parameters set out in Table D in Schedule 1, in respect of 'Parameters relevant for the risk assessment of domestic distribution systems' (refer to **subsection 3.5** ('Risk assessment monitoring') of this Guidance).

The monitoring frequency shall be not less than the frequencies set out in Note 2 to Table 3-5. However, based on a risk assessment of the supply system undertaken, in accordance with Regulation 11 and Part 3 of Schedule 2, a different sampling frequency might be determined (refer to **subsection 3.5** ('Risk assessment monitoring') of this Guidance).

3.3.2.3 Sampling frequencies of Group A and Group B parameters

The minimum frequency of sampling and analysis for compliance monitoring is presented in Table 3-5 and Table 3-6, which are based on the table presented in Schedule 2 Part 2 (2) of the Regulations.

Monitoring frequencies for a supply are based on the volume of water distributed by the supply. If the volume distributed is not accurately known, then monitoring frequencies may be based on the population served by the supply, assuming a water consumption factor of 200 l/(day*capita) for inhabitants, as depicted in the Regulations.

The Regulations do not specify a water consumption factor for business premises. The EPA recommends that the monitoring frequency for such cases may be estimated based on the number of staff and/or customers.

Table 3-5: Minimum frequency of sampling and analysis for compliance monitoring of Group A parameters (more frequent).

Volume of water distributed within a supply zone (m^3/d)	Equivalent population served	Group A monitoring Number of samples per year
<10	<50	2 (where water is supplied as part of public or commercial activity)
≥10-≤100	≥50-≤500	2
>100-≤1,000	>500-≤5,000	4
>1,000-≤2,000	>5,000-≤10,000	7
>2,000-≤3,000	>10,000-≤15,000	10
>3,000-≤4,000	>15,000-≤20,000	13
>4,000-≤5,000	>20,000-≤25,000	16
>5,000-≤6,000	>25,000-≤30,000	19
>6,000-≤7,000	>30,000-≤35,000	22
>7,000-≤8,000	>35,000-≤40,000	25
>8,000-≤9,000	>40,000-≤45,000	28
>9,000-≤10,000	>45,000-≤50,000	31
>10,000-≤100,000	>50,000-≤500,000	Add a further 3 samples for every additional 1,000 m^3/d, or part thereof, over and above the first 10,000 m^3/d

Table 3-6: Minimum frequency of sampling and analysis for compliance monitoring of Group B parameters (less frequent).

Volume of water distributed within a supply zone (m^3/d)	Equivalent population served	Group B monitoring Number of samples per year
<10	<50	1 (where water is supplied as part of public or commercial activity)
≥10-≤100	≥50-≤500	1
>100-≤1,000	>500-≤5,000	1
>1,000-≤5,500	>5,000-≤27,500	2
>5,500-≤10,000	>27,500-≤50,000	3
>10,000-≤100,000	>50,000-≤500,000	Add a further 1 sample for every additional 10,000m^3/d, or part thereof, over and above the first 10,000m^3/d

The notes below are as detailed in Schedule 2, Part 2 (2) of the Regulations:

- A supply zone is a geographically defined area within which water intended for human consumption comes from one or more sources and within which the water quality can be considered as being approximately uniform.
- The volumes are calculated as averages taken over a calendar year. The number of inhabitants in a supply zone may be used instead of the volume of water to determine the minimum frequency, assuming water consumption of 200 l/(day*capita).
- The frequency indicated is calculated as follows: 4,300 m^3/d = 16 samples for Group A parameters (four of the first 1,000 m^3/d + 12 for additional 3,300 m^3/d).
- For water suppliers, where an exemption has not been granted under Regulation 3(2), the EPA shall lay down the minimum sampling frequency for parameters of Group A and B, provided that core parameters are monitored not less than once per year.
- The EPA may reduce the sampling frequency provided that all parameters set in accordance with Regulation 6 are monitored not less than once every six years and are monitored in cases where a new water source is integrated into the water supply system or changes to that system, as a result of which a potentially adverse effect on the quality of water is to be expected, are made.

For private water supplies serving <10 m^3/d, supplied as part of a commercial or public activity:

- *E. coli* and intestinal enterococci (as 'core parameters') must be monitored twice a year (minimum) for this supply category. It is not permissible to exclude them from monitoring based on a risk assessment, and
- Group A parameters must be monitored twice per year (minimum) and Group B parameters once per year (minimum).

3.4 Monitoring of substances and compounds included in the watch list

The private supplier, having consulted with the local authority and with the HSE, shall monitor in the supply for watch list substances and compounds. at relevant points of the supply chain to ascertain the potential presence of the substances or compounds that are included in the watch list.

Where a substance or compound included in the watch list is detected in concentrations exceeding the guidance values set out in the watch list, the private supplier, in consultation with the HSE and the local authority, shall ensure that the following measures are undertaken:

- preventative measures, mitigation measures or appropriate monitoring of raw water in catchments upstream of abstraction points,
- evaluation of whether existing treatment is adequate to reach the guidance value and, where necessary, to optimise the treatment, and
- remedial actions, in accordance with Regulation 17, where the local authority or the HSE considers such remedial action necessary to protect human health.

3.5 Risk assessment monitoring

The risk assessment framework set out in Part 3 of the Regulations focuses on a comprehensive approach to identifying and managing risks, ensuring the effectiveness of control measures, and maintaining transparency and compliance with regulatory standards to protect public health. Additional monitoring may be needed to prepare or act on risk assessments.

The risk assessment framework is not applicable to all private water supplies. Exempt supplies, and those to which Regulation 3(1) applies, (less than 10 m^3/day or serve fewer than 50 people, and serving a commercial or public activity), are not subject to Regulations 9 to 12, which cover the risk assessments.

3.5.1 Adjustments to compliance monitoring frequencies

Based on the outcome of risk assessment of the supply system (Regulation 11), Schedule 2 Part 3 (1) states that the list of parameters to be considered by local authorities in their monitoring shall be extended, and the sampling frequencies increased, where any of the following conditions is fulfilled:

(a) The list of parameters or frequencies set out in Schedule 2 of the Regulations is not sufficient to fulfil the obligations imposed under Regulation 13(2).

(b) Additional monitoring is required for the purposes of Regulation 13(11), which states:

'A supervisory authority shall ensure that additional monitoring is carried out on a case-by-case basis (whether by itself or the relevant water supplier) of substances and micro-organisms for which no parametric value has been set out in Schedule 1, if there is reason to suspect that such substances or micro-organisms may be present in amounts or numbers that constitute a potential danger to human health, and may direct a water supplier to carry out such monitoring as it considers necessary for this purpose, and, where so directed, the water supplier shall comply with such direction within such time as set out in the direction or, where no such time is set out, in a timely manner.'

(c) It is necessary to provide the assurances set out in paragraph 1(a) of Part 1, which states:

'Monitoring programmes established pursuant to Regulation 13(13) for water intended for human consumption shall -

(a) verify that the measures in place to control risks to human health throughout the water supply chain from the abstraction area through treatment and storage to distribution are working effectively and that water intended for human consumption at the point of compliance is wholesome and clean.'

(d) Increasing the sampling frequencies is necessary pursuant to Regulation 10(10).

Based on the outcome of risk assessment of the supply system (Regulation 11), Schedule 2 Part 3 Paragraph 2 states that in relation to local authorities' monitoring of private suppliers, the list of parameters and the sampling frequencies set out in Part 2 may be reduced, provided that the following conditions are met:

(a) the location and frequency of sampling is determined in relation to the parameter's origin, as well as the variability of, and long-term trend regarding, its concentration, taking into account Regulation 7,

(b) as regards reducing the sampling frequency of a parameter, the results obtained from samples collected at regular intervals over a period of not less than three years, from sampling points representative of the whole supply zone, are all less than 60% of the parametric value,

(c) as regards removing a parameter from the list of parameters to be monitored, the results obtained from samples collected at regular intervals over a period of not less than three years, from sampling points representative of the whole supply zone, are all less than 30% of the parametric value,

(d) as regards removing a parameter from the list of parameters to be monitored, the decision is based on the outcome of the risk assessment that takes into account the results of monitoring of sources of water intended for human consumption and confirms that human health is protected from the adverse effects of any contamination of water intended for human consumption, as laid down in Article 1 of the Drinking Water Directive 2020/2184, and

(e) as regards reducing the sampling frequency of a parameter or removing a parameter from the list of parameters to be monitored, the risk assessment confirms that no factor that can be reasonably anticipated is likely to cause deterioration of the quality of the water intended for human consumption.

Section 4: Guidance on Sampling

4.1 Introduction

Sampling is a very important part of the monitoring procedure and is essential for ensuring appropriate drinking water quality for consumers. If the samples are not representative of the water supplied or are not taken or handled correctly, in accordance with specified sampling methods, there may be no point in carrying out expensive analysis because such results would be of little use.

This section provides guidance on sampling for drinking water, focusing on the methods mandated by the Regulations. **Subsection 4.2** outlines the necessary sampling points. The required sampling parameters are detailed in **subsection 4.3**. **Subsection 4.4** outlines sampling frequencies, with further details provided in **Section 3** ('Monitoring of Drinking Water Quality') of this Guidance. Finally, **subsection 4.5** presents the sampling methods for the required parameters.

Schedule 2 Part 4 of the Regulations prescribes the use of the following International Organisation for Standardization (ISO) standards with respect to the sampling points and sampling methods to be used and for the handling and transport of samples for subsequent analysis:

- ISO 5667-5 Water Quality – Sampling – Part 5: Guidance on sampling of drinking water from treatment works and piped distribution systems, and
- I.S. EN ISO 19458 Water Quality – Sampling for microbiological analysis.

The documentation for ISO 5667-5 and I.S. EN ISO 19458 is available at the ISO website: https://www.iso.org/standards.html.

The National Federation of Group Water Schemes (NFGWS) also provides guidance on sampling specifically aimed at group water schemes in Section 3 of its Quality Assurance Implementation Manual. The manual is available online at https://nfgws.ie/.

4.2 Sampling points

The Regulations require samples to be taken within private water supplies for analysis in respect of the following:

- source water, as required under Regulation 10,
- drinking water, intended for human consumption, to verify compliance with the parametric values set out in Schedule 1, and with limit values for additional parameters that the Minister may set, following consultation with defined stakeholders, in accordance with Regulation 6 (4), and
- supply-specific sampling for operational monitoring, considering the outcomes of the identification of hazards and hazardous events and the risk assessment of abstraction and the supply system undertaken.

In accordance with Regulation 13(6), the local authority in collaboration with the water supplier concerned should specify the points at which samples shall be taken for analysis and establish a related monitoring programme in accordance with Parts 1, 2 and 4 of Schedule 2, or ensure that such a monitoring programme is established for each private water supply, other than exempted supplies, in its functional area. Sampling points shall meet the relevant requirements under Regulation 13(17) and set out in Schedule 2 Part 4 of the Regulations.

Where water intended for human consumption is supplied from a distribution network, compliance with the parametric values set out in Schedule 1, Tables A, B and C, shall be measured at the following points of compliance:

- the point within a premises at which it emerges from the tap or taps that are normally used for the provision of water for human consumption (referred to as the 'point of compliance' in the Regulations),
- the point at which it emerges, where water is supplied by tanker or similar means,
- risk points within a domestic distribution system (for Regulation 12 and Table D, where relevant), and
- the point at which the water is used in that business, where water is used in a food business.

Part 4 of Schedule 2 of the Regulations requires that 'as far as possible, the number of samples shall be distributed equally in time and location' in respect of the parameters and their sampling frequency also set out in Schedule 2, Part 4.

To this end, the EPA recommends that the local authority should adopt the following approach.

- With respect to sampling locations for regulatory compliance monitoring:
  - Samples taken should be distributed evenly throughout each supply's distribution network and throughout the year. Samples should not be taken in the same location year after year, and the sampling point(s) should be representative of the water distributed throughout the supply.
  - Within each water supply, premises should be selected for sampling from domestic dwellings, public buildings and food production undertakings, in proportion to the numbers of domestic dwellings, public buildings and food production undertakings in the water supply.
  - Samples from normal domestic residential premises must be taken from the kitchen tap, as samples taken from outside taps may not be representative of water used for human consumption. Other outside taps on the network, such as taps at graveyards, farmyards or council depots, should not be used.
  - Samples for a small private supply, such as a B&B or creche, should be taken at points where customers or service users have access to drinking water, for instance kitchen or classroom taps.
  - The relevant local authorities should liaise with the private water supplier, who will have relevant local knowledge, when compiling or revising its list of sampling points.

Private suppliers/local authorities may also take additional sampling of water at various points within the supply system (treatment works, storage and distribution mains) for the following verification and risk management purposes.

- Operational monitoring (see **subsection 3.3.1** of this Guidance) within treatment works at various locations to verify that:
  - the water treatment works is functioning optimally in its removal of the source contaminants, identified by risk assessments in catchments for abstraction, upstream of abstraction points,
  - the efficacy of the disinfection system(s), forming part of the preparation and distribution of drinking water, in their inactivation of waterborne microbiological pathogens (bacteria, viruses and protozoa) in the protection of the health of consumers,
  - any contamination from disinfection by-products is kept as low as possible without compromising the disinfection process,
  - any contamination from treatment chemicals used in the treatment process is kept as low as possible, and
  - all materials, treatment chemicals and filter media in contact with water do not adversely affect the quality of drinking water, leach contaminants into the water or compromise the protection of human health.

- Operational monitoring of the treated drinking water within the distribution systems, comprising storage facilities and distribution networks. Sampling kiosks may be suitable locations for some of this monitoring. This operational monitoring is to ensure that the supply system operates effectively in delivering drinking water. It also facilitates continued compliance at all points defined in Regulation 7, in accordance with Table A and B regulatory parametric values and Table C indicator parameters.
- Monitoring of the substances and compounds included in the watch list, in accordance with Regulation 13(14)(a).

Key additional guidance relating to the sampling point locations in respect of quality parameters are:

- microbiological parameters are set out in Section 3 of I.S. EN ISO 19458 'Water quality – Sampling for microbiological analysis', and
- non-microbiological parameters at treatment plant service reservoirs and disinfection plants and within distribution mains are set out in Section 5 of ISO 5667-5, 'Water quality – Sampling, Part 5: Guidance on sampling of drinking water from treatment works and piped distribution systems'.

4.3 Sampling parameters

The requirements for compliance monitoring of private supplies are based on Schedule 2 Part 2 of the Regulations, which establishes two lists of water quality parameters, namely Group A and Group B, together with their respective sampling frequencies for water supplies, based on the daily volumes produced or distributed.

Details of the parameters within each Group are provided in **Section 3** ('Monitoring of Drinking Water Quality') of this Guidance and are reiterated below.

4.3.1 Group A parameters

The following compliance monitoring parameters are included in Group A:

- *Escherichia coli* (*E. coli*) and intestinal enterococci,
  - Note: *E. coli* and intestinal enterococci are considered 'core parameters'. They shall always be monitored not less than at the frequencies set out below, and, thus, their monitoring frequencies shall *not* be the subject of a reduction due to a risk assessment of the supply system (refer to **Section 3** ('Monitoring of Drinking Water Quality') of this Guidance).
- coliform bacteria,
- colony count 22 °C,
- colour,
- turbidity,
- taste,
- odour,
- pH (hydrogen ion concentration),
- conductivity, and
- other parameters identified as relevant to a monitoring programme, in accordance with:

- those parameters set out in Regulation 6 (refer to Tables A-D of Schedule 1, listed in **subsection 2.3** ('Parameter categories') of this Guidance),
- additional parametric values, not previously set out in Schedule 1, which will be set by the Minister from time to time, where the protection of human health within the State or part of it so requires, to satisfy the requirements of Regulation 4 – General Obligations, and
- where relevant, parameters identified following a risk assessment of the supply system, as set out in Regulation 11 and Schedule 2 Part 3 of the Regulations (refer to **Section 3** ('Monitoring of Drinking Water Quality') of this Guidance).

In addition, the following parameters shall be added under the following specific circumstances:

- where chloramination is used as a treatment process, ammonium and nitrite shall be added to the Group A list, and
- where aluminium and iron salts are used as water treatment chemicals, aluminium and iron shall be added to the Group A list.

4.3.2 Group B parameters

All other parameters not analysed under Group A but which were included under Regulation 6 shall be monitored to ensure compliance with all parametric values set out in the Regulations. The exception is parameters set out in Table D of Schedule 1, in respect of 'Parameters relevant for the risk assessment of domestic distribution systems' (refer to **subsections 2.3.5** and **3.3** of this Guidance).

4.4 Sampling frequencies

The number of samples required per year for Group A and Group B parameters, which depends on the volume of water distributed or produced each day within the water supply, is set out in **Section 3** ('Monitoring of Drinking Water Quality') of this Guidance.

When the risk assessments required under Regulations 9 to 12 come into effect, adjustments to the monitoring frequencies may apply (refer to **subsection 3.5.1** ('Adjustments to compliance monitoring frequencies') of this Guidance).

Additional guidance relating to sampling frequencies in respect of non-microbiological parameters is set out in Section 8 of ISO 5677-5.

4.5 Sampling methods

4.5.1 Introduction

With reference to the ISO standards outlined in **subsection 4.1** of this Guidance, Schedule 2 Part 4 of the Regulations sets out specific sampling methods to be employed in respect of the different purposes of samples to be taken by private water suppliers and/or the local authority, as described in **subsections 4.5.2** and **4.5.3** below.

The National Federation of Group Water Schemes (NFGWS) provides guidance on sampling specifically aimed at group water schemes in Section 3 of its Quality Assurance Implementation Manual. The manual is available online at https://nfgws.ie/.

Staff taking samples on behalf of water suppliers and of local authorities should be appropriately trained in relevant sampling procedures and the requirements of the relevant national or international standard as referred to in this Guidance.

4.5.2 Microbiological compliance sampling

As stated in Schedule 2, Part 4 (2(b) and 4) of the Regulations, the private supplier is required to take and handle samples for subsequent compliance testing and analysis of microbiological parameters (see Table A in Schedule 1 for the Regulations), in accordance with I.S. EN ISO 19458.

I.S. EN ISO 19458 ('Water Quality – Sampling for microbiological analysis') is an international standard that provides guidelines for sampling water for collection and handling of drinking water samples at the point of use to properly assess microbiological quality.

I.S. EN ISO 19458 covers various purposes of sampling, including:

- Purpose A, which pertains to microbiological water quality sampling in the distribution network, and
- Purpose B, which pertains to the assessment of microbiological water quality at the points of compliance, defined in Regulation 7.

Key aspects of Section 4 of I.S. EN ISO 19458, relating to the microbiological sampling technique, are as follows:

(a) Section 4.2.1 sets out general requirements relating to sampling containers, such as:
  - In the case of sampling by immersion in clean waters, bottles should be sterile both inside and outside and well protected.
  - Immediately before immersion, the outside of the sample bottle may be disinfected using a suitable disinfectant, such as isopropanol. The bottle should be allowed to dry before use.
  - In general, 500 ml bottles are adequate for sampling, considering that each category of microorganisms requires inoculation of a maximum of 100 ml, and fewer than five categories of microorganisms are measured.

(b) Section 4.2.2 sets out guidance with respect to the sterilisation of sampling containers.

(c) Section 4.2.3 sets out guidance with respect to the required inactivation of disinfection chemicals in the water, thereby stopping action of the disinfectant once the sample is taken to facilitate assessment of the microbiological quality of the water.

(d) Section 4.2.4 sets out guidance with respect to the quality control of sample bottles used with respect to their sterility, the presence of inactivating agents or toxicity therein.

(e) Section 4.3 itemises the reagents, apparatus and materials that sampling personnel may require.

(f) Section 4.4.1.1 relating to Purpose B sampling at the consumer tap, recognises 'that taps capable of disinfection by flaming are not always available and other disinfection methods [application of hypochlorite solution, ethanol or isopropanol] need to be considered'.

(g) Section 4.4.1.4 sets out the following guidance with respect to Purpose B sampling to ensuring the quality of drinking water as it is delivered to the consumer's tap and the elimination of contamination from the outer surface of the tap reaching the sample:

- Before filling the bottles, any dirt that could fall off should be scraped off (such as scale, slime, grease, other extraneous matter).
- Taps with leaking spindles should not be sampled.
- Any nozzle or other attachment or insert should be removed.
- Tap disinfection should be done preferably by flaming.
- The water should be allowed to flow long enough to ensure that the sample is free from any residual thermal or disinfectant effect.
- The sampling bottle should be placed under the tap at a continuous flow, that is, without closing and reopening the tap.

(h) Sections 4.4.1.2 and 4.4.1.3 provide additional guidance relating to Purpose A microbiological sampling within treatment works, storage tanks and distribution mains.

(i) Section 5 and Annex B set out additional guidance relating to the transport and storage and the time delay between microbiological sampling and analysis including transport, registration and processing in the laboratory, so as not to reduce the reliability of the analysed sample results.

By following these guidelines, sampling personnel will ensure that samples are representative and reliable, helping to identify and address potential contamination in drinking water systems at the point of compliance from distribution systems, domestic plumbing and other issues. This standard is essential for maintaining public health and ensuring that drinking water meets safety standards.

4.5.3 Non-microbiological sampling

As stated in Schedule 2, Part 4 (4) of the Regulations, the private supplier is required to take and handle non-microbiological samples in the supply area and distribution mains for subsequent physiochemical testing/analysis, in accordance with ISO 5667-5 ('Water Quality – Sampling – Part 5: Guidance on sampling of drinking water from treatment works and piped distribution systems').

Key aspects of ISO 5667-5 relating to the non-microbiological sampling techniques are outlined, as follows:

(a) Section 6 sets out guidance with respect to the cleaning, disinfection and flushing at sampling points, prior to sample collection at the following locations:

- sampling taps within treatment plants, at service reservoirs and within distribution systems, and
- sampling at hydrants or dip sampling in tanks where there is no more appropriate alternative.

(b) Section 9 sets out guidance with respect to rigorous sampling quality programmes for the collection and handling of samples prior to delivery to laboratories for analysis:

- the precautions to be taken during sampling collection to minimise contamination, and the order in which samples are collected to prevent potential cross-contamination or other adverse effects of cleaning disinfection methods, and
- the preservation, holding times, handling and transport of samples to the analysing laboratory.

(c) Section 12 sets out guidance with respect to the identification of collected sampling containers and the record-keeping requirements in relation to collected samples.

(d) Section 13 relates to quality assurance and quality control (QA/QC) programmes to be employed by the private supplier's laboratories or private laboratories contracted by them, including:

- the training of all sampling personnel employed by the supplier or by contracted laboratories, and
- verification checking of the collection, handling, temporary storage and transportation of collected samples.

4.5.4 Compliance testing for certain chemical parameters (copper, lead and nickel)

Chemicals from internal communications pipework and plumbing within private properties supplied by private supplies may leach into the drinking water, resulting in failures of the parametric values set out in Schedule 1 of the Regulations. The regulatory parametric values, set out in Schedule 1 Table B, are lead (10 µg/l, decreasing to 5 µg/l on 13 January 2036), nickel (20 µg/l) and copper (2 mg/l).

Schedule 2 Part 4 (2) of the Regulations prescribes that the private supplier shall take compliance samples for certain chemical parameters, in particular copper, lead and nickel, at consumers' taps without prior flushing, using either of the following sampling methods:

- random daytime sampling of one litre volume, or
- fixed stagnation time methods that better reflect their national situation (for instance, the average weekly intake by consumers), provided that, at the level of the supply area, this does not result in fewer cases of non-compliance than using the random daytime method.

These two sampling methods are detailed in **subsections 4.5.4.1** and **4.5.4.2** of this Guidance.

4.5.4.1 Random daytime (RDT) sampling

RDT samples are taken directly from the tap normally used for drinking without flushing the tap. The sampler takes the sample at a random time during the day, taking the first litre of water from the tap following entry into an identified sampling location.

The purpose of this type of sampling for compliance monitoring is to replicate how people consume water during the day (that is, at random times without flushing the tap) and it is representative of the weekly average ingested by consumers, taking account of the occurrence of peak levels that may cause adverse effects on human health.

By collecting samples at various times of the day, the RDT method can provide a more comprehensive picture of water quality variations that may not be captured with fixed-time stagnation sampling. The use of random sampling times helps to avoid bias that could be introduced by sampling at the same times repeatedly The RDT method can also help identify problems in the distribution systems, such as copper, lead and nickel leaching from pipes, that might not be apparent with other sampling strategies.

Issues to be considered in the implementation of an RDT sampling approach include:

- ensuring that sampling teams are prepared to visit multiple locations at different times, which can be more complex than fixed-time stagnation sampling,
- the need for coordination and communication with households or locations to ensure access for sample collection, and
- the need to efficiently manage the data collected, including times, locations and analysis results, to ensure accurate interpretation.

4.5.4.2 Fixed time stagnation sampling

Stagnation sampling allows the water to stagnate in the pipes for a set period before the sample is taken. The water is fully flushed prior to the stagnation period.

In general, this period should be at least 30 minutes, but to get the 'worst case' scenario the samples can be taken first thing in the morning before any taps are used. This is usually accomplished by the sampler leaving sample containers with the occupier of the house the previous day.

Using a fixed stagnation period approach ensures consistency across samples, making it easier to compare results and identify trends, ensuring compliance with public health standards. Where this approach is used for operational monitoring, longer stagnation periods, such as overnight, represent worst-case scenarios for contaminant leaching, providing critical data for risk assessment of mitigation measures.

Issues to be considered in the implementation of a fixed time stagnation sampling approach include:

- The need to inform households or facilities in advance about the sampling procedure to ensure they do not use water during the stagnation period,
- Strict adherence to the specified stagnation time to maintain the integrity of the sampling method, and
- The recording of sampling details regarding the exact time the water was left stagnant and the time of sample collection, along with any other relevant details.

4.5.5 Sampling at risk points for proliferation of *Legionella*

Uisce Éireann is required under Regulation 12 to carry out a general risk assessment of domestic distribution systems, products and materials nationally, which may include sampling of Table D parameters at priority premises (*Legionella* and lead). Once that risk assessment is complete and the results communicated by Uisce Éireann to supervisory authorities and property owners, private supplies may be required under Regulation 12 to consider various measures to reduce the risks connected with domestic distribution systems. Exempt supplies, and those to which Regulation 3(1) applies, (less than 10 m^3/day or serve fewer than 50 people, and serving a commercial or public activity), are not subject to Regulation 12.

Where it is necessary to sample for *Legionella* under Regulation 12, the sampler must use an accredited sampling method.

Analysis of water samples for *Legionella* should be carried out by an accredited laboratory that takes part in an external quality assessment scheme for the isolation of *Legionella* from water and is operating in accordance with the international standard ISO 17025.

Sampling methods should be in accordance with international standards, such as ISO 11731 'Water quality – detection and enumeration of *Legionella*'. This standard provides advice on best practice for the collection, transportation and storage of samples. Not all *Legionella* species are culturable; therefore, the methods described in that document do not recover all species of *Legionella*.

Section 5: Guidance on Analysis

5.1 Introduction

In the context of monitoring of drinking water quality, Regulation 13(6) states that local authorities shall ensure that monitoring programmes are established for private water supplies in accordance with Parts 1, 2 and 4 of Schedule 2 of the Regulations. In practice, local authorities often carry out or subcontract the sampling and analysis of private water supplies on behalf of the supplier.

Regulation 13(9) states that monitoring programmes must adhere to specifications for the analysis of drinking water parameters, as outlined in Schedule 3 of the Regulations. Methods of analysis include laboratory, field and online methods used for the purposes of monitoring programmes.

Schedule 3 of the Regulations sets out the specifications for the analysis of parameters.

The main requirement for private supplies, set out in Schedule 3, is that they should ensure that the methods of analysis used for the purposes of monitoring and demonstrating compliance with the Regulations are validated and documented according to I.S. EN ISO/IEC 17025 ('General requirements for the competence of testing and calibration laboratories') or other internationally accepted equivalent standards. The only parameter exempted from this requirement is turbidity.

Additionally, private suppliers must ensure that laboratories or contracted parties are accredited in conformity with the quality management system practices in line with I.S. EN ISO/IEC 17025 or other internationally accepted equivalent standards. The documentation for I.S. EN ISO/IEC 17025 is available at the International Organization for Standardization (ISO) website: https://www.iso.org/.

Where the local authority is carrying out or subcontracting the sampling and analysis of private water suppliers, certificates of analysis should be provided promptly to the water supplier to demonstrate compliance with the above standards.

Assessment for compliance with I.S. EN ISO/IEC 17025 is carried out in Ireland by the Irish National Accreditation Board (INAB). Details on accreditation of laboratories are provided below in **subsection 5.2**.

For the purposes of compliance monitoring, laboratories must obtain ISO/IEC 17025 accreditation for the range of parameters to be tested for and be compliant with the requirements of the Regulations and this Guidance in **subsection 5.3**.

For operational monitoring, private suppliers are not required to carry out the analysis in accredited laboratories but should follow the requirements as set out further in **subsection 5.4**.

Subsection 5.5 presents some recommendations regarding records of laboratory analysis and integrity of results.

A brief description on reporting of monitoring results of private water supplies to the EPA is presented in **subsection 5.6** below and detailed in **Section 9** ('Annual reporting of monitoring results and other information to the EPA') of this Guidance.

5.2 Accreditation of laboratories

Assessment for compliance with I.S. EN ISO/IEC 17025 standards is carried out in Ireland by INAB. Accredited laboratories may be verified by consulting INAB's online portal in the following hyperlink: https://www.inab.ie/.

Accreditation certificates on INAB's online database usually include the following elements, as a minimum:

- the laboratory's registration number,
- the scope of accreditation,
- the date of award of accreditation,
- the expiry date of the certificate of accreditation, and
- if applicable, the date of last renewal of accreditation.

Following the award of accreditation, local authorities, private suppliers, and their in-house or contract accredited laboratories, regardless of their size or the scope of their testing activities, should ensure that testing for all parameters for compliance monitoring meets the requirements of ISO 17025 and that all test results are reported as accredited results.

Other key requirements of ISO 17025 accreditation are a quality management system as designated in ISO/IEC 17025 include: document control of all procedures and analytical methods used in the laboratory; standards for subcontracting analysis to another laboratory; procedures for dealing with complaints about the service; satisfactory laboratory accommodation; a self-assessment process including internal audit and management review, integrity and impartiality; valid test procedures; competence of personnel; and traceability of measurements.

5.3 Guidance on analysis for compliance monitoring in private water supplies

Laboratories must obtain ISO/IEC 17025 accreditation for the range of parameters to be tested for the purposes of compliance monitoring. Such laboratories shall also be compliant with the requirements set out in the Regulations and as specified in the subsections below.

5.3.1 Specifications for methods of analysis of microbiological and indicator parameters

For microbiological methods based on the culturing principle, the equivalence of alternative methods with those specified in Part 1 of Schedule 3 may be assessed by laboratories or their contracted parties, in accordance with standard I.S. EN ISO 17994.

Alternatively, for methods based on principles other than culturing, standard I.S. EN ISO 16140 or any similar internationally accepted protocols may be used.

Part 1 of Schedule 3 of the Regulations sets out the specifications for the required methods of analysis for microbiological parameters. The ISO specifications appropriate to each respective parameter in Part 1 are presented in Table 5-1.

Table 5-1: Microbiological compliance and indicator parameters for which methods of analysis are specified as described in Part 1 of Schedule 3 for the Regulations.

Parameter	Standard/Method	Purpose
***Escherichia coli* (*E. coli*)**	I.S. EN ISO 9308-1 or I.S. EN ISO 9308-2	For compliance with the value set out in Table A in Schedule 1
Intestinal enterococci	I.S. EN ISO 7899-2	For compliance with the value set out in Table A in Schedule 1
Coliform bacteria	I.S. EN ISO 9308-1 or I.S. EN ISO 9308-2	For operational monitoring with the value set out in Table C in Schedule 1
Colony count or heterotrophic plate counts at 22°C	I.S. EN ISO 6222	For operational monitoring of any abnormal changes with respect to the value set out in Table C in Schedule 1
***Clostridium perfringens* including spores**	I.S. EN ISO 14189	For risk-based operational monitoring with the value set out in Table C in Schedule 1, in determining the need for investigation of the potential danger to human health from other pathogens (for instance, *Cryptosporidium.*)
Somatic coliphages	I.S. EN ISO 10705-2 and I.S. EN ISO 10705-3	For operational monitoring, Part 1 of Schedule 2

Alternative methods of analysis of microbiological parameters, other than those presented in Table 5-1, may be used only under two conditions:

(i) where the appropriate local authority, as supervisory authority for the private supply concerned, is satisfied that the results obtained are at least as reliable as those produced by the specified methods in Part 1 of Schedule 3 (Table 5-1), and

(ii) where the European Commission is provided with all relevant information about these alternative methods and their equivalence.

The appropriate local authority, where it satisfies itself with the condition described in item (i), shall be responsible for forwarding to the Minister all relevant information, relating to its comparative evaluation of the equivalent method. In turn, the Minister shall forward the information to the European Commission.

5.3.2 Specified performance characteristics for certain chemical and indicator parameters

The Regulations list in Schedule 3 Part 2 sets out certain chemical and indicator parameters for which performance characteristics are specified, rather than a specific method of analysis. The parameters and their respective performance characteristics are presented below in Table 5-2, as transcribed from the Table in Schedule 3.

The analysis method used for monitoring the parameters set out in Table 5-2 must comply with the following conditions:

(i) as a minimum, the method must be capable of measuring concentrations equal to the parametric value with a limit of quantification of 30% or less of the relevant parametric value and an uncertainty of measurement as specified in Table 5-2,

(ii) the analysis results must be expressed with at least the same number of significant figures as the parametric values in Tables B and C in Schedule 1, and

(iii) the uncertainty of measurement specified in Table 5-2 cannot be used as an additional tolerance to the parametric values set out in Schedule 1.

The Regulations refer to Article 2 of Commission Directive 2009/90/EC of 31 July 2009 in regard to some relevant definitions, as follows:

- 'limit of detection' refers to 'the output signal or concentration value above which it can be affirmed, with a stated level of confidence that a sample is different from a blank sample containing no determinant of interest',
- 'limit of quantification' refers to 'a stated multiple of the limit of detection at a concentration of the determinant that can reasonably be determined with an acceptable level of accuracy and precision […]', and
- 'uncertainty of measurement' is defined in Note 1 in the Table in Part 2 of Schedule 3 as 'a non-negative parameter which characterises the dispersion of the quantity values being attributed to a measure, based on the information used'.

The performance criterion for the uncertainty of measurement (stated in Note 1 as coverage factor k = 2, that is, 95% confidence level) is a percentage of the parametric value (as set out in the second column in Table 5-2 below), or any stricter value**.**

The Regulations allow that any alternative method of analysis for the parameters in Part 2 of Schedule 3 (refer to the first column in Table 5-2) may be used, provided that such method meets the requirements set out therein. In the absence of any analytical method meeting the minimum performance criteria, the private water supplier must ensure that monitoring is conducted using the best available techniques, provided that it does not entail excessive costs.

Table 5-2: Chemical and indicator parameters for which performance characteristics are specified, as described in Part 2 of Schedule 3 for the Regulations.

Parameter	Uncertainty of measurement (Note 1) as % of the parametric value (except for pH)	Notes
Acrylamide	30	
Aluminium	25	
Ammonium	40	
Antimony	40	
Arsenic	30	
Benzo(a)pyrene	50	Note 2
Benzene	40	
Bisphenol A	50	
Boron	25	
Bromate	40	
Cadmium	25	
Chlorate	40	
Chloride	15	
Chlorite	40	
Chromium	30	
Copper	25	
Cyanide	30	Note 3
1,2-Dichloroethane	40	
Epichlorohydrin	30	
Fluoride	20	
Haloacetic acids (HAAs)	50	
Hydrogen ion concentration (pH)	0.2	Note 4
Iron	30	
Lead	30	

Parameter	Uncertainty of measurement (Note 1) as % of the parametric value (except for pH)	Notes
Manganese	30	
Mercury	30	
Microcystin-LR	30	
Nickel	25	
Nitrate	15	
Nitrite	20	
Oxidisability	50	Note 5
Pesticides	30	Note 6
PFAS	50	
Polycyclic aromatic hydrocarbons	40	Note 7
Selenium	40	
Sodium	15	
Sulphate	15	
Tetrachloroethene	40	Note 8
Trichloroethene	40	Note 8
Trihalomethanes – total	40	Note 7
Total organic carbon (TOC)	30	Note 9
Turbidity	30	Note 10
Uranium	30	
Vinyl chloride	50	

Note 1: *Uncertainty of measurement is a non-negative parameter characterising the dispersion of the quantity values being attributed to a measure and based on the information used. The performance criterion for measurement uncertainty (k = 2) is the percentage of the parametric value stated in the table or any stricter value. The uncertainty of measurement shall be estimated at the level of the parametric value, unless otherwise specified.*

Note 2: *If the value of uncertainty of measurement cannot be met, the best available technique should be selected (up to 60%).*

Note 3: *The method determines total cyanide in all forms.*

Note 4: *The value of the uncertainty of measurement is expressed in pH units.*

Note 5: *Reference method: I.S. EN ISO 8467.*

Note 6: *The performance characteristics for individual pesticides are given as an indication. Values for the uncertainty of measurement as low as 30% can be achieved for serval pesticides, while higher values up to 80% may be allowed for a number of pesticides.*

Note 7: *The performance characteristics apply to individual substances, specified at 25% of the parametric value set out in Table B in Schedule 1.*

Note 8: *The performance characteristics apply to individual substances, specified at 50% of the parametric value set out in Table B in Schedule 1.*

Note 9: *The uncertainty of measurement should be estimated at the level of 3 mg/l of the TOC. EN 1484 Guidelines for the determination of TOC and dissolved organic carbon (DOC) shall be used for the specification of the uncertainty of the test method.*

Note 10: *The uncertainty of measurement should be estimated at the level of 1.0 NTU (nephelometric turbidity units), in accordance with I.S. EN ISO 7027 or another equivalent standard method.*

5.3.3 Parameters for which methods of analysis or performance criteria were not included in the Regulations

For some indicator parameters in Table C of Schedule 1, there is no numerical indicator parameter value but there is a descriptive value, either 'no abnormal change' or 'acceptable to consumers and no abnormal change'. For these parameters an analytical method or the performance to be achieved by an analytical method is not specified.

For those parameters, the EPA advises the following:

- Colour: qualitative assessments of the colour of water on different sampling occasions are unlikely to enable 'no abnormal change' to be detected. Private suppliers and their contract accredited laboratories should use an appropriate quantitative method for determining colour in mg/l Pt/Co that has an uncertainty of measurement equal to or better than 2 mg/l Pt/Co.
- Odour and taste: quantitative assessments of the odour and taste of water are time-consuming and require a specialist panel of persons to smell and taste samples. Qualitative assessments by an experienced analyst are likely to be able to detect abnormal changes and therefore be able to determine whether the regulatory requirement of 'no abnormal change' has been met. Analysts carrying out qualitative assessments of odour and taste must avoid in a period prior to the assessment activities that could affect the assessment, such as smoking, drinking and eating, and wearing excessive cosmetics. Taste assessments should not be carried out on any supply that is not disinfected or where disinfection is practised but may not be effective.
- Total organic carbon (TOC): Private suppliers and their treatment process contractors should ensure that accredited laboratories use an appropriate quantitative method for determining TOC in mg/l that has a measurement of uncertainty equal to or better than specified in the performance characteristics for TOC, set out in Table 5-2.
- Turbidity: The EPA recommends that laboratories should use an appropriate quantitative method for determining turbidity that has a measurement of uncertainty equal to or better than specified in the performance characteristics for turbidity, set out in Table 5-2.

5.3.3.1 Analysis of substances and compounds in the first watch list established by the European Commission

The first watch list was adopted on 19 January 2022 and sets out the monitoring of two endocrine-disrupting compounds: nonylphenol and 17-beta-estradiol. The limit of quantification and the possible methods of analysis for those compounds are set out in the Annex to the Commission Implementing Decision (available at https://eur-lex.europa.eu/eli/dec_impl/2022/679/oj/eng). This is transcribed as Table 5-3.

Table 5-3: Watch list of substances and compounds of concern for water intended for human consumption, and respective limit of quantification and possible methods of analysis, as established by the European Commission in the first watch list adopted on 19 January 2022.

Name of substance/compound	Limit of quantification (ng/l)	Possible method of analysis
17-beta-estradiol	≤1	–
nonylphenol	≤300	EN ISO 18857-2

5.3.3.2 Analysis of perfluoralkyl and polyfluoralkyl substances (PFAS)

In line with Article 13(7) of the Drinking Water Directive and following consultation of the Member States, the European Commission has established the technical guidelines on the methods of analysis for monitoring PFAS under the *PFAS Total* and *Sum of PFAS* parameters set by the recast Drinking Water Directive. These guidelines from the European Commission outline the most suitable analytical methods and approaches for monitoring PFAS substances, based on a technical and socio-economic evaluation[1].

The guidelines are available at:

https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:C_202404910

As per Regulation 34(1), the PFAS parametric value will not come into force until 12 January 2026.The EPA has chosen the parameter 'Sum of PFAS' for compliance monitoring and reporting purposes. In accordance with the above-mentioned European Commission's guidelines, there are 20 substances that shall be analysed under the 'Sum of PFAS' parameter, as follows:

1. Perfluorobutanoic acid (PFBA)
2. Perfluoropentanoic acid (PFPA)
3. Perfluorohexanoic acid (PFHxA)
4. Perfluoroheptanoic acid (PFHpA)
5. Perfluorooctanoic acid (PFOA)
6. Perfluorononanoic acid (PFNA)
7. Perfluorodecanoic acid (PFDA)
8. Perfluoroundecanoic acid (PFUnDA)
9. Perfluorododecanoic acid (PFDoDA)
10. Perfluorotridecanoic acid (PFTrDA)
11. Perfluorobutane sulfonic acid (PFBS)

1 Final report on the support for developing and drafting technical guidelines on PFAS substances under the recast Drinking Water Directive, Service contract No. 090202/2023/890359/SER/ENV.C.2

12. Perfluoropentane sulfonic acid (PFPS)
13. Perfluorohexane sulfonic acid (PFHxS)
14. Perfluoroheptane sulfonic acid (PFHpS)
15. Perfluorooctane sulfonic acid (PFOS)
16. Perfluorononane sulfonic acid (PFNS)
17. Perfluorodecane sulfonic acid (PFDS)
18. Perfluoroundecane sulfonic acid (PFUnDS)
19. Perfluorododecane sulfonic acid (PFDoDS)
20. Perfluorotridecane sulfonic acid (PFTrDS).

The 'Sum of PFAS' substances contain a perfluoroalkyl moiety with three or more carbons (i.e. $–CnF2n^–$, $n \geq 3$) or a perfluoroalkyl-ether moiety with two or more carbons (i.e. $–CnF2nOCmF2m^–$, n and $m \geq 1$). The overall chain length comprises four to 13 carbon atoms with 10 perfluoroalkyl carboxylic acids (PFCAs) and 10 perfluoroalkyl sulfonic acids (PFSAs).

Due to this definition in the Drinking Water Directive, the ultrashort-chain PFAS compounds with two or three carbon atoms (for instance, trifluoroacetic acid (TFA), perfluoropropanoic acid (PFPrA), trifluoromethanesulfonic acid (TFMS), perfluoroethanesulfonic acid (PFEtS) and perfluoropropanesulfonic acid (PFPrS)) are excluded from the 'Sum of PFAS' parameter.

Those substances shall be monitored when the risk assessment and risk management of the catchment areas for abstraction points carried out in accordance with Regulation 10 conclude that they are likely to be present in a water supply.

An overview of these substances is presented in Table 1 of the European Commission's guidelines. This classification is transposed from the European Commission's guidelines as Table 5-4.

Table 5-4: PFAS listed in paragraph 3 of Part B of Annex III to the Water Framework Directive that are to be analysed for the reporting of the parametric value of 'Sum of PFAS'.

Carbon chain length	Perfluoroalkyl carboxylic acids (PFCAs)	Perfluoroalkyl sulfonic acids (PFSAs)
4	Perfluorobutanoic acid (PFBA)	Perfluorobutane sulfonic acid (PFBS)
5	Perfluoropentanoic acid (PFPA)	Perfluoropentane sulfonic acid (PFPS)
6	Perfluorohexanoic acid (PFHxA)	Perfluorohexane sulfonic acid (PFHxS)
7	Perfluoroheptanoic acid (PFHpA)	Perfluoroheptane sulfonic acid (PFHpS)
8	Perfluorooctanoic acid (PFOA)	Perfluorooctane sulfonic acid (PFOS)
9	Perfluorononanoic acid (PFNA)	Perfluorononane sulfonic acid (PFNS)
10	Perfluorodecanoic acid (PFDA)	Perfluorodecane sulfonic acid (PFDS)
11	Perfluoroundecanoic acid (PFUnDA)	Perfluoroundecane sulfonic acid (PFUnDS)*
12	Perfluorododecanoic acid (PFDoDA)	Perfluorododecane sulfonic acid (PFDoDS)*
13	Perfluorotridecanoic acid (PFTrDA)	Perfluorotridecane sulfonic acid (PFTrDS)*

Source: European Commission's Technical guidelines regarding methods of analysis for monitoring of per- and polyfluoroalkyl substances (PFAS) in water intended for human consumption (C/2024/4910).

** Abbreviation not mentioned in the Directive*

5.3.3.3 Analysis of microplastics

Article 13(6) of EU Drinking Water Directive 2020/2184 grants the European Commission the authority to adopt delegated acts to create a methodology for measuring microplastics (refer to **Section 2** ('Standards for Drinking Water Quality') of this Guidance). This is with the aim of including microplastics on the watch list mentioned in Article 13(8) once the conditions specified in that paragraph are met.

Accordingly, in March 2024 the EU Commission published a delegated decision with a methodology to be used by Member States to measure microplastics in water intended for human consumption. The document can be accessed at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202401441

At the time of publication, the date from when monitoring must commence and the watch list status were not set.

5.4 Guidance on analysis for operational monitoring

Monitoring programmes established for private water supplies shall include an operational monitoring programme that provides rapid insight into operational performance and water quality problems and that allows rapid pre-planned remedial action. As specified in Part 1 of Schedule 2 for the Regulations, such operational monitoring programmes shall be *supply-specific, taking into account the outcomes of the identification of hazards and hazardous events and risk assessment of the supply system, and shall be intended to confirm the effectiveness of all control measures in abstraction, treatment, distribution and storage*.

The operational monitoring samples need not be analysed in accredited laboratories. However, the EPA recommends that they can be analysed in small laboratories/benches at treatment works provided that the methods are properly calibrated and subject to analytical quality control.

For some samples and parameters, the private water supplier may have the simple equipment and facilities available to carry out the analysis either at the sampling site or in a small 'laboratory' or 'bench' at a treatment works. These parameters could include a number of important operational parameters, for example:

- coliforms and *E. coli* using the Idexx (Colilert 18) Quanti-TrayTM method,
- turbidity using a nephelometric turbidity meter,
- pH value using a pH meter,
- total and free chlorine using a colorimetric test kit,
- conductivity using a conductivity meter, and
- residual aluminium using a colorimetric test kit.

5.4.1 Basic principles

It is not practical or necessary to apply stringent analysis and analytical quality control measures to operational monitoring analysis, as is required for analysing parameters for compliance monitoring. But it is important to apply some basic principles to ensure that there is confidence in the results and that they are reasonably accurate. As a minimum, private water suppliers and their personnel using these analysis procedures need to:

- have written procedures for each of the methods, including the regular calibration of each method, and follow these procedures rigorously,
- fully train the personnel carrying out the analysis (the supplier of the equipment or the appropriate local authority's laboratory may offer such training),
- keep all equipment used in the methods scrupulously clean,
- store any reagents used in the methods in appropriate conditions such as cool and dry,
- check the calibration of each method on each day the method is used using certified calibration standards provided by the supplier of the equipment or standards supplied by an accredited laboratory, such as the appropriate local authority's laboratory – if the calibration is not satisfactory, the private water supplier should consult a competent analyst (for example at the appropriate local authority's laboratory),
- ensure that all reagents and calibration standards are within their 'use-by date' – if they are out of date or do not have a use-by date, they must not be used,
- record all observations (readings), all calculations and the final result in a workbook or method sheet,
- report any failed results or unusual or unexpected results to a supervisor so that any necessary action can be taken,

- arrange to have the equipment serviced, maintained and checked by the supplier at appropriate intervals, for example every six months or every year, and
- analyse from time to time analytical quality control samples, for example provided by the appropriate local authority's laboratory or contract laboratory, to check that the method is still working satisfactorily and the person using the method is performing satisfactorily.

For any samples and parameters for which the private water supplier does not have the facilities to carry out the analysis, they should arrange for the relevant contract laboratory or another competent laboratory (preferably accredited) to carry it out This may apply to analysis for example for microbiological parameters; organic chemical parameters; many inorganic parameters, such as metals, chlorates, chlorites and bromate; and organic disinfection by-products such as trihalomethanes and haloacetic acids.

5.4.2 Suitability of analytical equipment for in-house laboratory analyses

Some private suppliers may use in-house laboratories, e.g. for operational monitoring. The analytical equipment (including the principal apparatus and all standard laboratory apparatus such as balances, glassware, thermometers, incubators) should be of the type specified in the analytical method and it should comply with each of the following criteria before it can be regarded as suitable for the purpose:

- located and used in appropriate conditions,
- maintained and serviced according to the manufacturer's or supplier's instructions or recommendations or equivalent procedures that are auditable,
- operated according to the manufacturer's or supplier's instructions or recommendations or equivalent procedures that are auditable,
- calibrated according to the manufacturer's or supplier's instructions or recommendations or equivalent procedures that are auditable,
- have a current calibration that is both valid and traceable to national or international standards, and
- all system suitability and analytical quality control criteria.

Further guidance is given in ISO/IEC Standard 17025.

5.5 Records of in-house laboratory analyses

Private suppliers using in-house laboratories should keep adequate records of key aspects of analytical procedures and the results. It is suggested that these records be kept for at least three years. As a minimum these records should include:

- all key instrument installation, commissioning, maintenance and repair records, including any instrument log or diary,
- all basic calibration records (including proof of traceability), method suitability checks and any other record necessary to demonstrate the suitability of any equipment used at the time of the analysis,
- the analytical procedure used,
- all initial method performance testing data, including raw data, and similarly for any re-determination of performance,

- routine internal and external analytical quality control (AQC) data, including charts, investigations of out-of-control conditions and corrective action, and
- raw data for the whole analytical run and all calculations to obtain the final result of the analysis.

5.6 Calibration of analytical systems

Calibration of systems at specified frequency is recommended by equipment suppliers to deliver accurate and reliable results. These calibrations may be carried out by the water supplier or by their contractor, with reference to the advice below and to any supplier's or manufacturer's instructions.

It is essential that the calibration procedure for each analytical system or method is fully documented and is sufficient to establish fully or check fully the calibration each time the system or method is used. The procedure will vary with the system or method used and the parameter being analysed, but in all cases the calibration should be established or checked over the entire range of the method and all results of analysis falling outside the applicable calibration range of the method should be rejected.

Instrumental systems of analysis (such as chromatography, absorption and emission spectroscopy and automated colorimetric analysis) often require full calibration each time they are used. At least three calibration points are required to demonstrate a straight line. Generally, the more complicated the calibration, the greater the number of calibration points required. With long instrument runs it is essential that the validity of the calibration throughout the run is demonstrated and therefore as a minimum a repeat measurement of one of the calibration standards should be made at the end of the run.

It is also essential that all other apparatus (apart from the analytical systems covered in the above paragraphs) used in the analytical procedure are calibrated at appropriate intervals. Such apparatus includes, but is not limited to, balances and weights, volumetric equipment including micro-syringes and micropipettes, and thermometers.

5.7 Annual reporting to the EPA of monitoring results of private water supplies

The requirement for local authorities to report annually to the EPA the results of monitoring of private water supplies under their supervisory authority is covered fully in **Section 9** ('Annual reporting of monitoring results and other information to the EPA') of this Guidance. That section sets out the format for the submission of the required information including monitoring results, supply information, sample information, analysis information and the timing for submission of this information.

Section 6: Failures of Standards and Guidance Values

6.1 Introduction

Regulation 4(1) obliges the water supplier to supply water intended for human consumption that is wholesome and clean, that does not present a risk to human health, and that meets the requirements of the Regulations.

This section provides guidance on what to do if a risk to human health is identified, or if a parametric value or a guidance value for a watch list substance is exceeded.

Regulations 15 and 17 focus on the responsibilities of water suppliers and their supervisory authorities to ensure human health protection and remedial actions, where the water supply poses a potential risk to human health or does not meet the specified standards and indicator parametric or watch list guidance values. In the case of private supplies, the Regulations apply to private suppliers and to local authorities as their supervisory authorities. This section also covers:

- consultation between local authorities and the Health Service Executive (HSE) in relation to protection of human health,
- the investigation of failures,
- necessary restrictions on use of a private water supply,
- the scoping of action programmes, and
- information to be provided to consumers.

Regulation 15(5) enables the local authorities, as supervisory authorities of private supplies, to also issue guidelines to assist the water supplier to fulfil its obligations under Regulation 15, for example using leaflets or website-based information. The Regulations allow the EPA to issue guidelines in relation to the nature and timing of remedial, enforcement or other relevant action related to failures of standards, as set out in Regulation 17(8). These EPA guidelines are presented in this section of the Guidance.

The EPA recommends that each private water supplier should have written procedures as part of a Quality Assurance System (QAS) (such as that advocated by the National Federation of Group Water Schemes, NFGWS) for dealing with non-compliances with the standards for parametric values in Tables A, B and C in Schedule 1 of the Regulations. These procedures should cover the protection of human health, investigations of non-compliances and remedial action. Each private water supplier should have arrangements with the relevant local authority for immediate notification of any result that does not comply with the parametric values.

The Regulations make provision for Regulation 15 responsibilities to be performed by the local authority as supervisory authority, or by the private water supplier. **The EPA recommends that local authorities have procedures for their own use, and guidance for the private water suppliers within their functional area, setting out the division of responsibilities in this regard.** This will improve the speed and consistency of response in the event of a failure.

6.2 Regulation 15: Protection of human health

6.2.1 Overview

In situations where the local authority or the water supplier considers that a water supply intended for human consumption constitutes a danger to human health, Regulation 15 requires that the water supplier or the local authority shall consult with the Health Service Executive (HSE) and, with the agreement of the HSE, decide what actions to protect human health are to be taken. Appropriate actions may be, but are not limited to,

- Restrictions on use of the water supply, or prohibition of supply of such water, examples of these actions being do not consume notices and boil water notices,
- Prompt dissemination of information and necessary advice to affected consumers.

Where monitoring is undertaken by the local authority and results show a parametric failure, the local authority should initiate consultation with the HSE as well as informing the water supplier of the result. Where a failure or incident is first discovered by the water supplier (such as breakdown of disinfection equipment), it should initiate consultation with the HSE.

Any issue identified by the private supplier that may cause a risk to human health should be promptly notified to the local authority. Such issues may for example be a parametric failure or a breakdown of treatment (for example, chlorination or UV disinfection failure) at the plant detected by the water supplier. The HSE website contains useful information and guidance with respect to drinking water quality issues affecting human health. This includes guidance in relation to the initial notification of a drinking water issue of potential danger to human health ('Management of Initial Notification of a Drinking Water Issue of Potential Danger to Human Health'), published in 2024 and available at https://www.hse.ie/.

Regulation 15(4) also stipulates that the local authority concerned, as supervisory authority, may give direction to the water supplier regarding any actions to be taken to protect the health of drinking water consumers.

6.2.2 Consultation with the HSE

Regulation 15(1) requires that the water supplier or the local authority should consult initially with the HSE when it considers that a drinking water supply constitutes a potential danger to human health. This could apply to, but is not limited to, a tested water sample failing to meet the parametric values for any parameters in Schedule 1 or the guidance values of substances included on the watch list. It can also apply to failure of a treatment process such as disinfection, where the failure may put public health at risk. Parametric failures may be detected at any point in the water supply (including at treated final water, reservoirs or points of compliance) and the HSE should be consulted on any such failures constituting a potential risk to human health.

Indicator parameters may also have an impact on human health or on treatment processes designed to protect human health, for example manganese and turbidity. Regulation 17(4) as amended in 2025 requires that for Table C parameters of Schedule 1, the water supplier or the local authority, in consultation with the HSE, shall consider whether non-compliance with a particular parametric value or specification poses a risk to human health. Where it is determined that such risk to human health exists, the local authority shall ensure that the water supplier takes steps to secure compliance as soon as possible. Refer to **subsection 6.5** for details on action programmes to secure compliance.

In accordance with Regulation 17(11), where the non-compliance with the parametric values is a potential danger to human health, the water supplier, in consultation with the relevant local authority and the HSE, shall:

- Notify all affected consumers of the cause of the parametric value exceedance and the remedial actions taken, including prohibition or restriction of use or other action,
- Regularly update the necessary advice to consumers on conditions of consumption and use of the water, taking account of population groups with increased water-related health risks,
- Inform consumers once it has been established that there is no longer a potential danger to human health.

The water supplier and the local authority should use the HSE protocols that facilitate such initial consultations in a structured manner, as set out in Figure 6-1 and Figure 6-2. The HSE's Initial Notification Record (INR) template to be filled with relation to private supplies can be found in Appendix 6.1: Initial Notification Record (INR) template for private supplies. Procedures, including relevant phone and email contact details, to deal with out-of-hours incidents that may cause a risk to human health should be available to local authority staff and water suppliers in their functional areas.

Figure 6-1: High-level process flow diagram for local authority and HSE consultation for Regulations 15 and 17, in the event of parametric failure or incident. Adapted from Algorithm A in HSE (2024).

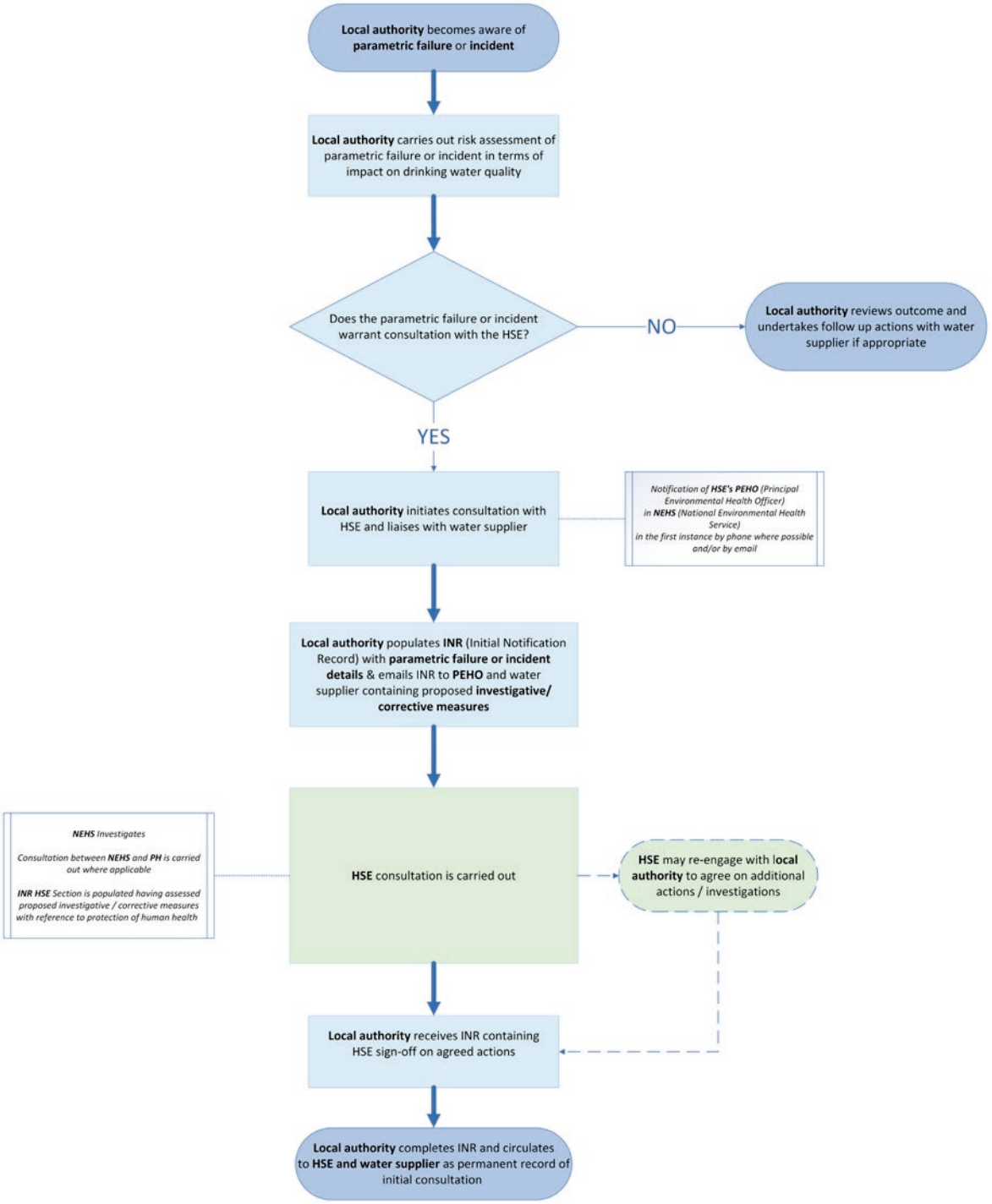
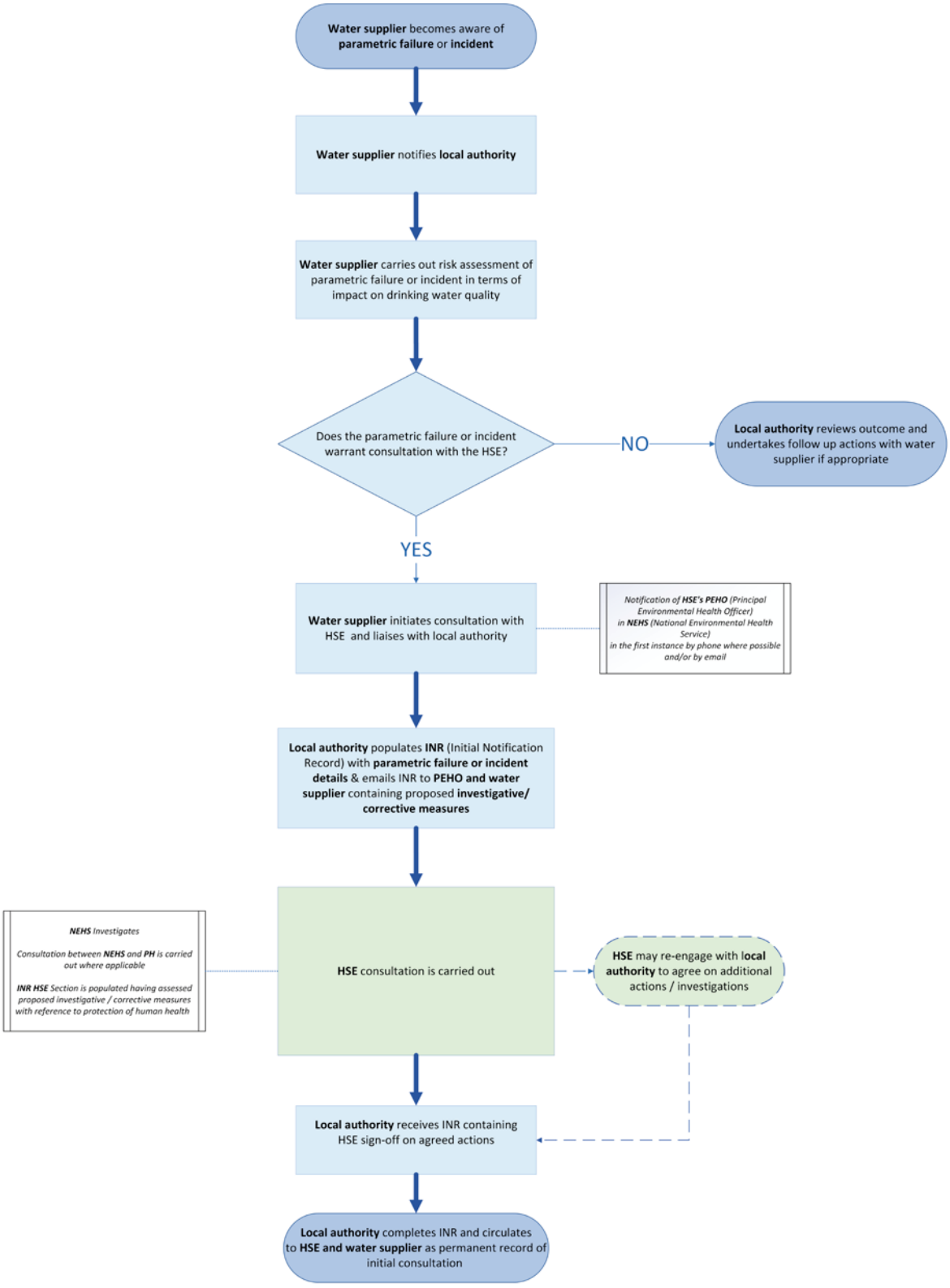


Figure 6-2: High-level process flow diagram for water supplier and HSE consultation for Regulations 15 and 17, in the event of parametric failure or incident. Adapted from Algorithm A in HSE (2024).



Following the consultation and with the agreement of the HSE, the water supplier/local authority should ensure that:

(a) the supply of water is prohibited, or the use of such water is restricted, or such other action is taken as is necessary to protect human health,

(b) consumers are informed promptly and given the necessary advice relating to the remedial action proposed,

(c) the local authority is informed promptly (if not already done) of the proposed actions agreed with the HSE together with any restrictions on drinking water use to protect human health, and

(d) the advice to the consumer is updated to reflect any changes and as corrective actions are completed.

Regulation 15(2) requires that the outcome of the consultation between the water supplier or local authority and the HSE must consider the risks to human health due to the interruption of the supply or a restriction in the use of water intended for human consumption.

The local authority should have written procedures for issuing advice to consumers. The local authority should also have template pamphlets that use straightforward language, and in certain situations it may be necessary to provide the information in languages other than English (for instance, in Irish and other languages).

Such advice from the local authority to consumers should be used to communicate:

- the nature of interruption to the water supply, for instance boil water notice, do not consume notice,
- details of the availability of an alternative supply,
- for boil water notices, guidance on how to boil the water and what to use the boiled water for,
- in the case of notices to not consume water, advice not to use water for drinking and food preparation with details of the availability of an alternative supply in tankers or containers,
- what other purposes the water can be used for, such as washing clothes, flushing toilets,
- advice for vulnerable consumers, for example instructions with respect to the use of medical devices by such consumers and details regarding access to bottled water,
- precautions to be taken to remove the water that has stagnated in the pipework, for example by running the tap until clear or for a certain period of time,
- when withdrawal of any of the above advice is deemed appropriate, and
- the methods to be used to contact the water supplier and local authority for further information.

Once the water supplier or the local authority has established, in consultation with the HSE, that there is no longer a potential danger to human health, it should inform the consumers that the restriction has been lifted.

6.2.3 Notification of failures to the local authority

Local authorities carry out the compliance monitoring of private water suppliers. Therefore, it is often the case that the local authority is the first to know of a failure to comply with a parametric value or guidance value for watch list substances. However, in some cases, for example failure detected by process monitoring, or operational monitoring carried out by the water supplier, the private supplier may be the first to recognise a parametric failure or incident posing a risk to public health. In those cases, the private water supplier must notify the relevant local authority under Regulation 15(1) without delay. Failures may be detected at any point in the water supply (including at treated final water, reservoirs or points of compliance) and any such failures should be notified to the local authority as the supervisory authority over private supplies.

The notification should include proposed remedial actions to be taken, proposed prohibition or restrictions to drinking water use and communications protocols. Local authorities should have systems in place to recognise and manage such notifications and to ensure corrective actions are taken to restore compliance. Local authorities should have a dedicated email or phone line for these notifications and share these with private water suppliers in their functional area.

Notifications from water suppliers should be made by 11:00 a.m. on the following working day using a system and in a form specified by the local authority. Water suppliers should also inform a designated member of local authority staff via telephone if a water supply is to be prohibited or restricted.

6.2.4 Directions under Regulation 15

In cases where the local authority, as supervisory authority, is not satisfied with the actions proposed to protect human health in the above notification or those subsequently being undertaken by the water supplier, the local authority may issue a direction to the water supplier under Regulation 15(4) in respect of any action to be taken under Regulation 15(1).

6.2.5 Offences under Regulation 15

Under Regulation 15(6), a private water supplier commits an offence if they fail to comply with a direction from the local authority under Regulation 15(4).

6.3 Regulation 17: Remedial action and restrictions of use

6.3.1 Overview

Regulation 17 outlines the responsibilities of the water supplier and the local authority, as their supervisory authority, regarding remedial actions and water use restrictions, when a failure to meet any of the following is detected:

- the parametric values set out in Schedule 1, or
- parametric values for additional parameters to be set by the Minister, in accordance with Regulation 6(4), or
- following detection of pathogenic micro-organisms or parasites in the water supply, or
- following a supply restriction issued under Regulation 15.

The requirements of Regulation 17 apply whether the sample was taken as part of compliance, operational or investigative monitoring.

The private supplier is required to promptly inform the local authority if it discovers a failure of the parametric values specified in Schedule 1 of the Regulations or detects pathogenic micro-organisms or parasites in a private supply.

The water supplier should also notify the local authority if it becomes aware of any exceedances of the watch list guidance values.

Notifications from water suppliers should be made by 11:00 a.m. on the following working day using a system and in a form specified by the local authority. Water suppliers should also inform a designated member of local authority staff via telephone without delay if a water supply system may need to be prohibited or restricted.

6.3.2 Consultation with the HSE

Refer to **subsections 6.2.2** and **6.4** of this Guidance for information on the consultation process.

6.3.3 Notification of failures to the local authority

According to Regulation 17(2), the water supplier is required to promptly notify the relevant local authority if it discovers a failure of the parametric values specified in Schedule 1 of the Regulations or detects pathogenic micro-organisms or parasites in a water supply (see **Section 2** ('Standards for Drinking Water Quality') of this Guidance).

Local authorities carry out the compliance monitoring of private water suppliers. Therefore, it is often the case that the local authority is the first to know of a failure to comply with a parametric value or guidance value for watch list substances. However, in some cases, for example failure detected by process monitoring, or operational monitoring carried out by the water supplier, the private supplier may be the first to recognise a parametric failure. In those cases, the private water supplier must notify the relevant local authority under Regulation 17(2) without delay.

In relation to indicator parameters (Table C), water suppliers should notify the local authority of any repeat failure (namely more than one failure in the previous 12 months) to meet the indicator parametric values. Table C failures must however be considered for their potential risk to human health by consultation between the water supplier or the local authority and the HSE. If a health risk is determined by the consultation, the failure becomes notifiable.

Monitoring of indicator parameters provides important information on the operational processes and on the quality of the final water. At high levels, certain indicator parameters can also pose a risk to human health, for example:

- High levels of iron, manganese or aluminium failures where these are a potential danger to human health.
- Elevated turbidity at the water treatment plant indicating a lack of operational control or turbidity at levels (>1 NTU) at the point of disinfection. These high turbidity levels compromise disinfection.
- Non-compliance with an indicator parameter value caused by incidents or not adhering to operational practice or procedures at the treatment plant.

Local authorities should have systems in place to recognise and manage notifications and to ensure that corrective actions are taken to restore compliance.

Notifications from water suppliers should be made by 11:00 a.m. on the following working day using a system and in a form specified by the local authority. Water suppliers should also inform a designated member of local authority staff via telephone if a water supply is to be prohibited or restricted.

Following notification by the water supplier, Regulation 17(3) requires that the local authority exercise the following functions as the water supplier's supervisory authority:

- ensure that the necessary remedial action is taken by the water supplier as soon as possible to restore the quality of the water,
- give priority to an enforcement action, having regard to the extent to which the relevant parametric value has been exceeded and to the potential danger to human health, and
- direct the water supplier to prepare an action programme and to submit it for the approval of the local authority.

Regulation 17(6) states that the local authority concerned may amend an action programme submitted to it before approving it.

Regulation 17(7) sets out that the water supplier should ensure that any action programme prepared under Regulation 17(3) includes interim measures as may be appropriate and has regard to the provision of any Water Services Strategic Plan made by the relevant local authority.

Regulation 17(10) requires the water supplier to maintain a record of any failure to meet the parametric values set out in Tables A, B and C of Schedule 1 of the Regulations. Regulation 17(12) requires that the water supplier shall make such records available to the local authority following its written request.

The local authority may request more information from the water supplier in response to a notification. Typically, these requests may cover details of the investigation, the likely cause of the failure and the corrective actions to be taken to restore compliance. Local authorities should make any relevant water services strategic plans available to water suppliers to assist suppliers in preparing action programmes under Regulation 17(3).

6.3.4 Directions under Regulations 17

In the event of a failure of the parametric values specified in Schedule 1 of the Regulations or detection of pathogenic micro-organisms or parasites in a water supply, Regulation 17(3) sets out that the local authority, as the supervisory authority, shall carry out the following, and may issue directions to the water supplier to:

- ensure that the necessary remedial action is taken as soon as possible to restore the quality of the water, and
- prepare an action programme and submit it to the local authority for its approval for implementation within timescales set out in Regulation 17(3) in relation to parametric values that present a risk to human health.

6.3.5 Offences under Regulations 17

Under Regulation 17(14), the water supplier commits an offence if it fails to:

- notify the relevant local authority in accordance with Regulation 17(2), or
- comply with a direction issued under Regulation 17(3)(a) or (c), or
- inform consumers in accordance with Regulation 17(9), or
- maintain a record for the purpose of Regulation 17(10), or
- make a record available to the local authority on request under Regulation 17(12).

6.4 Exceedances of the watch list guidance values

6.4.1 Overview

Regulation 13(15) sets out actions to be taken when a substance or compound in the watch list (as established and updated by the European Commission in accordance with Article 13(8) of the Directive) exceeds the guidance value. Regulation 13(16) states that guidelines for consultations under paragraph (15) shall be jointly developed by the EPA, the HSE and the local authority in relation to the management of watch list substances.

The local authority or the water supplier should use the HSE protocols, which facilitate such initial consultations in a structured manner, as set out in Figure 6.3. The HSE's Initial Notification Record (INR) template to be filled with relation to private supplies can be found in Appendix 6.1: Initial Notification Record (INR) template for private supplies.

6.4.2 Consultation with the HSE and local authorities

Consultation between the HSE, the local authority and the water supplier should consider and undertake the following measures as relevant:

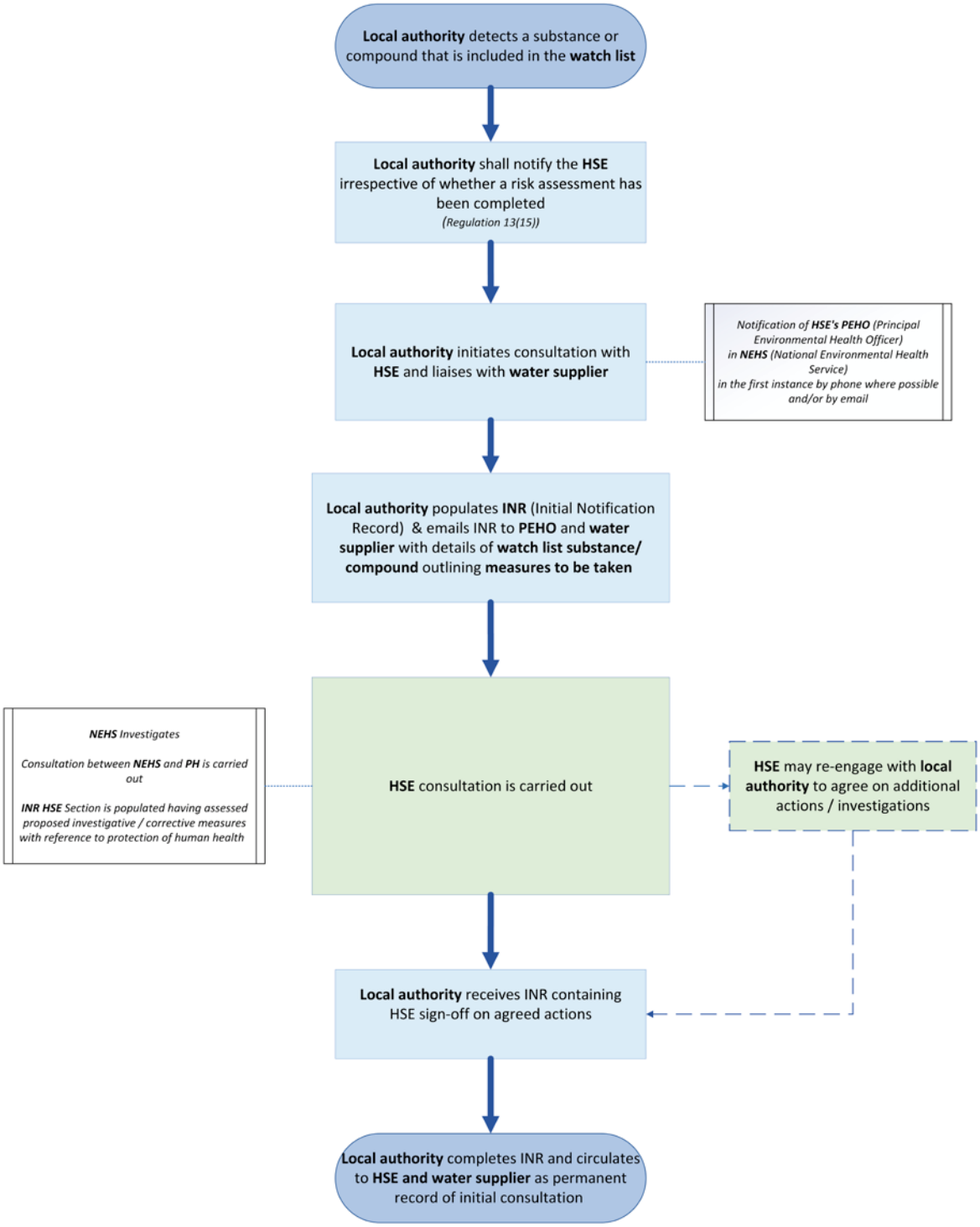
(a) preventative measures, mitigation measures or appropriate monitoring in the catchment areas for abstraction points or in raw water as set out in Regulation 10(10),

(b) carry out monitoring of those substances or compounds, in accordance with Regulation 10(13),

(c) check whether treatment is adequate to reach the guidance value and, where necessary, to optimise the treatment, and

(d) carry out remedial actions where the local authority or the HSE considers them necessary to protect human health.

Figure 6-3: High-level process flow diagram for local authorities and HSE consultation for Regulation 13, in the event of detection of watch list substances or compounds. Adapted from Algorithm B in HSE (2024).



6.5 Investigations and action programmes

6.5.1 Overview

Where the water supplier discovers a failure to meet the values set out in Schedule 1 or detects pathogenic microorganisms or parasites in its water supply, Regulation 17(2) requires that the supplier shall notify the local authority for that supply in accordance with EPA guidelines. This Guidance forms the EPA's guidance referred to in Regulations 17(3) and 17(8).

Under Regulation 17(1), the water supplier should immediately investigate any failures related to:

- the parametric values listed in Schedule 1 of the Regulations, or
- the guidance values for substances on the watch list, or
- the detection of pathogenic micro-organisms or parasites affecting its water supply.

The investigation should aim to identify the cause of such failure. The local authority, as supervisory authority, has the responsibility to ensure that private water suppliers within its functional area carry out the requirements of Regulation 17(1).

Section 6.5 provides guidance from the EPA to the water supplier and local authorities on remedial, enforcement or other relevant actions to be taken to restore the quality of the water. These actions should be undertaken as soon as possible to restore compliance. This Guidance is considered to be the EPA guidance under Regulation 17(8), which may be used by local authorities in place of the timebound steps set out in Regulation 17(3).

Once the cause or suspected cause of failure is identified, the water supplier needs to outline precise actions aimed at preventing, reducing, eliminating or mitigating the issue. Depending on the nature of the failure and the scale of the private supply, the local authority may consider a subset of these actions as necessary. The local authority should use its powers under Regulation 17(1)(b) to ensure the failure is investigated.

The water supplier should maintain a system including documented procedures for investigating failures or incidents. The scale of the procedures may be tailored according to the size and nature of the private water supply and the risks associated with it. These procedures should provide a framework for the following investigations:

- A review of previous results for the failure parameter in question at the same sampling point where the failure was detected and at other representative locations within the water supply to help identify risks or trends.
- A review of the operation of the water treatment plant, storage reservoir or distribution network to identify the possible cause associated with the failure parameter.
- To establish a baseline for investigation of the failure and to assess the treatment performance, samples should be taken from the treated water as it exits the drinking water treatment plant.
- Where there is a microbiological failure, an evaluation of the effectiveness of treatment processes to remove, and the disinfection process(es) to inactivate, the pathogen should be undertaken. The evaluation should include a review of results, trends and, if relevant, residual chlorine levels within the supply area for at least three days each side of the non-compliant date. If UV disinfection is used, the performance of the system against its certified validation envelope should be assessed over a similar time period.
- A review of any known supply area event prior to the failure or an assessment of risks of an event by liaising with relevant stakeholders in the catchment, where necessary.
- The scoping and planning of a suitable monitoring programme to take further samples for testing. For example, undertaking investigative sampling at neighbouring properties.to assess the scale of the failure.

- Where the failure is suspected to be linked to the condition of the consumer's tap, additional samples should be collected from relevant points to determine if the issue stems from the condition of the pipework and fittings within the consumer's premises. Inspection of the consumer's tap, pipework and fittings might be required.
- When there is a microbiological failure in a sample taken from a consumer's tap, samples must be taken both before and after disinfecting the tap, as well as a swab sample from the surfaces of the tap that is in contact with water.

The EPA has a set of Advice Notes, Treatment Manuals and technical guidance that should be referred to when undertaking an investigation into a parametric failure or an incident, at https://www.epa.ie.

6.5.2 Preparation of an action programme

When preparing an action programme, Regulation 17(7) stipulates that the water supplier shall include such interim measures as may be appropriate, which shall have regard to the provisions of any water services strategic plan made by the water supplier.

The EPA recommends that, as a minimum, the following list of details be included in action programmes to address failures, where relevant.

- actions taken/to be taken to identify the cause of the failure,
- actions taken/to be taken to address the cause of the failure, including details of any enforcement and source protection measures proposed/implemented,
- actions taken/to be taken to improve the efficacy of treatment process at the plant,
- a proposed increased monitoring programme for the parameter that did not meet the standards throughout the duration of the action programme,
- temporary measures implemented or planned to prevent, limit, eliminate or mitigate the risk of failure in the immediate future,
- proposed timescales and reporting frequencies for all planned actions,
- details of the documented management and control system in place, and
- details of how consumers are to be informed of the implemented or planned actions.

This is not an exhaustive list, and other information may be required on a case-by-case basis.

Regulation 17(6) states that the local authority may amend an action programme submitted to it under Regulation 17(3)(c) before approving it, and that the action programme, thus amended and approved, shall be regarded as the action programme for the purposes of the Regulations.

6.5.3 Action programme timescales

Regulation 17(3)(c) requires the local authority to issue a Direction to the water supplier within 14 days of receiving a failure, for the water supplier to prepare and submit an action programme to improve drinking water quality in compliance with the Regulations to the local authority within 60 days.

The water supplier should take necessary steps to restore water quality compliance with the Regulations as soon as possible and not later than one year from the date of the action programme approval by the local authority in relation to water quality standards in Table A and B in Schedule, concerning matters that present a risk to human health. The action programme in relation to all other water quality standards in Table B in Schedule 1 should be completed within two years.

However, the timescales specified under Regulation 17(3)(c) may not always be practical, and local authorities may follow the guidance in this Guidance and take steps to ensure that the water supplier restores compliance as soon as possible, as allowed by Regulation 17(8). The extent of the failure and consequences (for example on health risks) should inform the timescale set for compliance where additional works or infrastructure is required.

6.5.4 Interim measures

As it is unacceptable for parametric failures to persist throughout the entire period of an action programme's implementation, Regulation 17(7) requires water suppliers to include interim measures in their action programme to minimise failure and protect human health.

Examples of interim measures might include:

- the installation of temporary treatment,
- the temporary use of an alternative water supply, and
- the placing of restrictions on the supply (in terms of both water conservation and restrictions/prohibitions on consumption), in consultation and agreement with the HSE.

6.5.5 Informing consumers of the action programme

Under Regulations 17(9) and 17(11), the water supplier has a duty to inform consumers about the remedial actions it will be taking to improve the water supply and ensure it meets the parametric standards required by the Regulations.

The water supplier must make all reasonable efforts to ensure that all consumers are informed of the action programme, as follows:

- a summary of the parametric failure(s) and the possible cause(s) of such failure(s),
- a summary of remedial actions taken by the water supplier, including any prohibition or restrictions of use in accordance with Regulation 17(13),
- necessary advice to consumers on the conditions of consumption and use of the water, taking particular account of population groups with increased water-related health risks,
- details of where consumers and members of the public can get access to the action programme, and
- an indication to consumers as to when the supply is likely to be returned to compliance and informing them that the service has returned to normal, once it has been established that there is no longer a potential danger to human health.

Communications may include a local press advertisement and/or a public notice on the local authority's website. Additional methods like leaflet drops, radio announcements or notices in visible places may also be considered.

Regular updates should be provided, and local elected representatives should be kept informed about the Programme where relevant.

6.5.6 Microbiological and parasite failures

Exceedance of microbiological parametric values or detection of protozoal parasites may arise due to inadequate treatment processes to remove or inactivate these organisms. Investigations of such failures should include the following points.

Where UV treatment is used to provide primary disinfection or to address a protozoal parasite risk in the abstracted water, the performance of the UV system should be assessed to verify the UV dose. Note that the EPA does not recommend sampling for *Cryptosporidium* or *Giardia* where there is a validated UV system in operation, unless that system is operating outside its validation.

Where chlorination disinfection is used:

- There should be adequate chlorine contact time before the water supply reaches the first consumers. The World Health Organisation guidelines' recommendation of 30 minutes' contact time at a minimum of 0.5 mg/l free chlorine must be achieved in all supplies before water is supplied to consumers. A contact tank of suitable size should be provided to ensure that there is adequate chlorine contact time before the water supply reaches the first consumers. This may be a particular difficulty in small water supplies. The local authority or the water supplier should undertake a calculation of contact time having regard to Chapter 5 of the *EPA Water Treatment Manual: Disinfection*, and
- Primary disinfection is often supplemented by downstream secondary disinfection to maintain a residual level of disinfectant within the distribution system and up to the consumer's tap. Residual free chlorine levels throughout the supply system need to be monitored and managed to ensure a minimum free chlorine of 0.1 mg/l throughout the network (including at extremities). The operation of booster chlorination facilities should also be assessed, where these are used.

High turbidity levels (>1 NTU) can interfere with the effectiveness of disinfection processes. An assessment of turbidity and pH should be included in investigations of microbiological and parasite failures, along with the operation of the chlorination or UV systems.

The local authority and the water supplier should ensure that their investigations, outlined above and in **subsection 6.5.1** of this Guidance, are carried out in a logical manner and recorded to identify the cause and/or the contributory factors leading to the parametric limit failure.

The water supplier should also consider that microbiological parameters, such as *E. coli* or coliform bacteria, can be affected by the condition of the pipework and fittings, especially the design, cleanliness and location of the consumer's tap. As stated in **Section 4** ('Guidance on Sampling') of this Guidance, outside taps among others should not be used for the purposes of regulatory sampling and they may return misleading sample results if used for chlorine residual surveys or microbiological sampling.

The results of the additional analysis outlined above and in **subsection 6.5.1** of this Guidance may yield crucial insights into whether the failure can be linked to the condition of the pipework and fittings. It strongly suggests that the failure is due to the pipework and fittings when:

- the failure reoccurs in the subsequent sample from the initial consumer's tap, whereas all other samples in the supply zone adhere to the applicable standards or indicator parameter values, or
- the failure reoccurs in a sample taken from the original consumer's tap before disinfection of the tap but is absent in a sample taken after disinfection, or
- the residual free chlorine is adequate in both the original sample and any additional samples that failed for a microbiological parameter.

6.5.6.1 Action to deal with microbiological failures

When a microbiological parameter fails to meet the standard, the water supplier should assess and make changes to the following, to improve the performance of disinfection system(s) for the protection of human health:

- disinfection system(s) processes and procedures to ensure that they meet the EPA's minimum disinfection requirements, outlined in:
  - *EPA Water Treatment Manual: Disinfection* and
  - *EPA Advice Note No. 3: E. coli in Drinking Water*,
- further risk management measures for disinfection required by Regulation 11(3)d, for relevant water supplies (>10 m^3/day or over 50 persons), applicable from 12 January 2029.

Further information for suppliers and for local authorities on investigating and troubleshooting the operation of disinfection systems may be found in *EPA Water Treatment Manual: Disinfection and EPA Advice Note 3*.

6.5.6.2 Action to deal with detections of protozoal parasites

Where protozoal parasites such as *Cryptosporidium* or *Giardia* are detected in a private drinking water supply, the water supplier should notify the local authority and the HSE, and take action to:

- carry out source protection measures such as restricting animal access or preventing borehole infiltration, and
- optimise the operation of existing treatment in removing or inactivating *Cryptosporidium* from the drinking water produced, such as adequacy of filtration, UV systems or backwash recirculation where relevant.

In consultation with the HSE and the local authority, the water supplier must outline measures aimed at improving source protection, the treatment and/or disinfection processes in its removal or inactivation of identified pathogenic protozoal parasite. Such measures may include:

- Increased monitoring of raw water for the presence of *Cryptosporidium*.
- The optimisation of treatment processes to improve protozoa removal performance within water treatment plant.
- The upgrading of treatment plant infrastructure to meet the recommendations of the *EPA Water Treatment Manual: Filtration*.
- The provision of a UV disinfection process, upstream of the chlorination disinfection, to inactivate any pathogenic protozoa present in the water following treatment.
- Improved maintenance at the treatment plant.

- Provision of additional training for plant operators.
- Establishment and review of the risk assessment and risk management of the catchment areas for abstraction points of water intended for human consumption. Regulation 9(4) requires this to be done for the first time for relevant water supplies by 12 July 2027.

Refer to **subsection 6.5.10** for more details on actions to improve source protection.

6.5.7 Chemical and indicator parametric failures

Failures of chemical and indicator parametric values may be linked to the following issues.

1. The presence of naturally occurring inorganic compounds in the source water (for example, arsenic, selenium, chlorides, iron and manganese or sulphates).
2. The presence of inorganic or organic compounds in the source water, due to human, agricultural, industrial or commercial activities within the catchment (total organic carbon (TOC), pesticides, ammonium, PFAS, nitrates or the algal toxin microcystin-LR).
3. Carryover of chemicals from water treatment processes into final treated water (for instance, aluminium, chlorides, sulphates, acrylamide, fluoride), indicating inadequate treatment processes.
4. Exceedances in the treated water (for instance, colour, turbidity, TOC, and taste and odour compounds), indicative of inadequate treatment of the source water.
5. Exceedances of byproducts of a disinfection process (for example, chlorine dioxide forming chlorates and chlorites) or formed by degradation of chlorination chemicals (for instance, sodium hypochlorite degrading to chlorates) or formed due to the interaction of chlorine with residual organic compounds in the source water (for example, bromate, trihalomethanes (THMs), haloacetic acids (HAAs)).
6. Exceedances of disinfection by-products and other parametric values formed within distribution networks and reservoirs or generated by corrosion within networks (for instance, THMs, HAAs, colour, manganese).
7. Metals that can leach from distribution pipework or plumbing fittings (for example, lead, copper, nickel and iron). Water chemistry including alkalinity, pH and low conductivity can contribute to higher levels of metals dissolving from pipework.

The investigation of chemical parametric limit failures by the water supplier and the local authority may require a combination of the following:

- an assessment of the geology and hydrogeology of the source surface water or groundwater to determine the cause of parametric failures and the scope of necessary remediation works, in the case of issues under no. 1 above,
- an identification of potentially polluting activities in the catchment, involving interaction with other stakeholders within the catchment in the case of water quality issues no. 2 above, including the identification and assessment of the following activities in the catchment
  - discharges from wastewater treatment plants,
  - storm overflows from wastewater collection system,
  - discharges from septic tanks or on-site wastewater treatment plants,
  - discharges from facilities authorised by the EPA or by local authorities,
  - discharges from industrial activities, such as waste management, mining, quarrying,
  - discharges from agricultural or forestry activities.

- in the case of water quality issues numbered 3, 4 and 5 above, assessments of the operation of the treatment plant should be undertaken to evaluate the performance of a water treatment process:
  - review of recent daily operational monitoring results at the water treatment plant, relating to the nature, frequency and duration of source water quality variation,
  - review of recent monitoring results taken within the distribution network and at the water treatment plant,
  - review of operational treatment procedures at the plant including recent jar testing results, chemical dosages used, dose control methodology, filter operation (backwashing arrangements and media adequacy), disinfection, operational monitoring frequency,
  - a review of recent operational changes made to the treatment plant including adjustment of chemical dosing, flows, pumps, pipework and filter media, and
  - a review of recent operational problems including critical process alarms (which should be recorded in the plant operator's manual records and/or on the plant's Supervisory Control and Data Acquisition (SCADA) system).

    Note: Such investigations will assist in the determination of the cause of parametric failures and will facilitate process optimisation and identify process modifications or additional works required to restore compliance.

Further guidance on what to do if there is a fluoride failure is provided separately in the Irish Expert Body on Fluorides and Health's 'Code of Practice on the Fluoridation of Drinking Water', which is available online at https://www.fluoridesandhealth.ie/assets/files/pdf/cop_fluoridation_of_drinking_water_2016.pdf.

- In the case of water quality issues listed in no. 6 above, where failures develop within the distribution system, for example THM, colour or manganese, if the cause of the failure is suspected to be a problem within the water distribution network, the following assessment of the operation of the network and chlorination boosting stations, and, where appropriate, of the corrosive nature of the final treated water should be undertaken:
  - a review of consumer complaints about drinking water quality (appearance, taste, odour),
  - a review of changes to the operation of the distribution network such as introducing water from a different works or part of the network, flow reversals and pressure changes,
  - assessment of the condition of the network, for example aging cast iron pipework giving rise to iron failures,
  - a review of the flushing/scouring regime utilised within the distribution system,
  - assessment of possible contamination following leakages, burst repairs or recent pipe replacement,
  - a review of secondary chlorination dosages at booster stations within the network, and
  - a review of dead ends, and the operation of service reservoirs or other vulnerable parts of the network, affecting chlorination dosages, necessary to provide a minimum chlorine residual 0.1 mg/l at the extremities of the network.

6.5.7.1 Action to deal with turbidity failures

Turbidity is an indicator of treatment plant's performance relating to filtration efficacy, prior to disinfection processes. The water supplier should immediately investigate instances where the plant is not operating in accordance with the turbidity or log performance criteria as outlined in the *EPA Water Treatment Manual: Filtration* and take appropriate action, as summarised in **subsection 6.5.12** of this Guidance.

For supplies not using filtration processes, *EPA Advice Note 5: Turbidity* quotes the World Health Organization's criterion of turbidity less than 1 NTU for disinfection (both chlorination and UV) to be effective.

Table C in the Regulations requires turbidity as an indicator parameter to be 'acceptable to consumers and no abnormal change'.

The water supplier is required to have an operational monitoring programme to monitor turbidity at the water supply plant treating surface water sources, in order to regularly control the efficacy of physical removal by filtration processes, in accordance with the reference values (0.3 NTU in 95% of samples and none to exceed 1 NTU) and the sampling frequencies set out in the Table of Schedule 2 Part 1 of the Regulations. Refer to **Section 2** ('Standards for Drinking Water Quality') and **Section 3** ('Monitoring of Drinking Water Quality') of this Guidance for more details.

It should be noted that these reference values and sampling frequencies, set out in Table of Schedule 2 Part 1 of the Regulations, are not applicable for groundwater sources where turbidity is caused by iron and manganese, which should be removed by specialist processes ahead of conventional treatment and/or filtration.

6.5.7.2 Action to deal with disinfection by-product failures

Disinfection by-products (DBPs) should be kept as low as possible without compromising disinfection. The Regulations set parametric limits for a number of organic DBPs (total trihalomethanes and haloacetic acids) and inorganic DBPs (bromates, chlorates, chlorites), in Schedule 1, Table B.

Where there are DBP parametric failures, the water supplier should take the following actions to restore compliance:

- in the case of inorganic DBPs, such as chlorates, chlorites and bromates, the water supplier should consult the *EPA Water Treatment Manual: Disinfection* with respect to:
  - the concentration and storage conditions for sodium hypochlorite to limit chlorate formation due to its degradation,
  - the propensity of chlorine dioxide disinfection systems to generate chlorites and chlorates when used as either a pre-oxidant or a disinfectant,
  - the use of low bromide hypochlorite where there are elevated background bromide levels in source water, and
  - the use of low bromide salt where on-site electrolytic chlorination is used to generate sodium hypochlorite for disinfection,
- In the case of DBPs formed from the reaction of chlorination chemicals with residual organic compounds in the water, the water supplier should consult the *EPA Drinking Water Guidance on Disinfection Byproducts: Advice Note 4, Rev 2* for recommendations on evaluating and minimising DBP formation.

6.5.8 Failures linked to domestic plumbing conditions

Microbiological parameters, such as *E. coli* or coliform bacteria, can be affected by the state of the pipework and fittings, especially the design, cleanliness and location of the consumer's tap. The results of the investigation outlined in **subsection 6.5.1** above may yield insights into whether the non-compliance can be linked to the condition of the pipework and fittings. It strongly suggests that the non-compliance is due to the pipework and fittings when:

- the non-compliance reoccurs in the subsequent sample from the initial consumer's tap, whereas all other samples in the supply zone adhere to the applicable standards or indicator parameter values, or
- the non-compliance reoccurs in a sample taken from the original consumer's tap before disinfection of the tap but is absent in a sample taken after disinfection,
- the residual free chlorine is adequate both in the original sample and in any additional samples that failed for a microbiological parameter.

Investigations of a failure may reveal that the sample point was fed from a storage tank or via undersink filter or water softener. Regulation 8 places responsibilities on a property owner where a commercial or public activity operates on the premises. Such owners must maintain the internal plumbing within their premises so it does not cause a risk of parametric failure.

Regulation 8(3) as amended by the 2025 Regulations makes provision for the water supplier or the local authority to issue advice, or a legally binding Direction, to the premises owner to reduce or eliminate the risk of parametric failures. The advised measures could include providing water for human consumption by direct feed from the mains rather than a storage tank or servicing a domestic side water filter.

Failures to meet the standards for copper, lead and nickel at the consumer's tap may arise from interactions of treated drinking water with the consumer's pipework and fittings, or with the water supplier's infrastructure where the characteristics of the distributed drinking water interact with copper or lead pipes (or solders), brass fittings and nickel-plated taps.

The water supplier's investigation should determine if these metals are found in its own pipework or whether they are present only in the consumer's pipework and fittings. The water supplier should also establish whether such parametric failures also occur in similar premises within the water supply zone.

If there is failure of the lead parametric standard, then the water supplier should refer to the National Lead Strategy, which is available at https://www.gov.ie/.

One aspect that parametric failure investigation must determine is whether the failure of tested drinking water samples to meet the standard or indicator parameter value is attributed to the condition of the tap, pipework and fittings within the premises (that is, the domestic distribution system) or other factors.

The local authority should only attribute failures to pipework and fittings if the water supplier provides a thorough investigation with supporting evidence demonstrating that the consumer's plumbing is likely to be the root cause of the failure. Parameters more likely to be influenced by the domestic distribution system are metals such as lead, copper and nickel.

6.5.9 Actions to deal with failures caused by the distribution network

In cases where exceedance of parametric values is suspected to be caused within the distribution network, the water supplier should follow guidance given in **Section 4** ('Guidance on Sampling') of this Guidance for evaluation.

Where the cause of the failure may be contamination within the distribution network, the guidance on water distribution and related matters provided in **Section 11** ('Distribution Network and Related Matters') of this Guidance should be followed. Flushing and reservoir cleaning may be sufficient to deal with lower levels of some substances' build-up in networks, such as iron or manganese.

Where the issue is due to inadequate treatment at the water treatment plant, compounded by time in the distribution network (for instance, organics carry-over leading to THM failure, or manganese oxidising in the network), treatment upgrades may be required to improve removal of precursors.

In relation to lead failures, note that in June 2015, the Department of Environment, Community and Local Government and Department of Health set out the Government's 'National Strategy to Reduce Exposure to Lead in Drinking Water'. The document can be accessed at https://www.gov.ie/.

Generally, it can be assumed that any mains, service connections and properties constructed after the 1970s will not contain lead pipes, unless a private water supplier has specific information or monitoring results to indicate otherwise. Any lead mains identified by private suppliers should be notified to the local authority and within the National Lead Strategy, there is scope for replacement of these using the Multi Annual Rural Water Programme Funding.

The private water supplier should consult the relevant local authority for advice on lead in drinking water as the local authority may have a Frequently Asked Questions leaflet or have appropriate advice on its website.

It should be noted that Table B of the Regulations will change the current parametric value of 10 µg/l to a lower limit of 5 µg/l to be met, at the latest, by 12 January 2036. This timescale for introduction of this new parametric limit will increase the urgency for the replacement of all lead pipework (public and private side) as the long-term solution to eliminate lead from drinking water.

In all cases where lead has been detected at levels above the parametric value or where lead pipework is discovered in a private supply, the private water supplier or the local authority should promptly consult with the HSE to determine whether there is a potential danger to human health. The local authority should inform the HSE of the type of sampling method used. Following such consultation and advice from the HSE, the local authority should inform consumers and give them the appropriate advice.

6.5.10 Actions to improve source protection

Where the cause of the parametric failure has been identified as originating from pollution within the surface water catchment or the groundwater source of the supply, the local authority should take action on any identified source of pollution, either by using its own powers or by liaising with other enforcement bodies. The water supplier and the local authority should establish whether the pollution is ongoing and whether further treatment or other intervention is necessary to protect public health and restore compliance.

Where the management and preventative measures are deemed inadequate, the water supplier should take actions, where within its control, or liaise with other statutory bodies that can take appropriate enforcement action to prevent, minimise, eliminate or mitigate such pollution at its origin. These statutory bodies can include the local authority, EPA and teams implementing River Basin Management Plans. These actions include the following:

- implement improvements in wastewater treatment plants' discharges upstream of the abstraction point,
- elimination or relocation of storm water overflows upstream of the abstraction point,
- fencing of the abstraction point(s) to remove animal access, and
- restriction of land spreading within exclusion zones.

While the longer-term target should be to address the underlying cause of the parametric failure in the catchment, improving treatment at the plant may be required to prevent persistent long-term failures to counteract substandard raw water quality and to support a clean and wholesome drinking water supply.

Regulation 10 introduces further requirements for risk assessment and risk management of the catchment areas, which will come into effect by 12 July 2027 for water supplies over the size threshold. A summary of this work may be found in the 2024 Ministerial Guidelines 'Drinking Water Source Protection: Technical Guidance' (available at https://www.gov.ie). This work is also covered in EPA guidance on conducting and reporting risk assessments and risk management of public and private water supplies at the source, which is available at https://www.epa.ie/publications/compliance--enforcement/drinking-water/advice--guidance/.

Reference should also be made if relevant to guidance documentation produced by the NFGWS: 'A Guidance on Source Protection and Mitigation Actions for Farming' (available at https://nfgws.ie/).

6.5.11 Actions to deal with failures caused by natural conditions or source contamination

Parametric failures can occur due to naturally occurring contaminants in the source water abstraction (for example compounds involving natural metals and substances like arsenic, iron, manganese, chloride, sulphate, fluoride, mercury or organic compounds such as high levels of TOC).

As stated in **subsection 6.5.8**, while the longer-term goal should be to eliminate or minimise the root cause of such failures at its source, when the source of failure is natural or persistent, actions to address the root cause of such parametric failure may not be feasible.

In certain instances, the water supplier may have to consider the following actions to restore compliance of drinking water with the Drinking Water Regulations:

- the provision of specialist treatment processes for the targeted removal of inorganics, such as iron, manganese, nitrate or arsenic, not removable by conventional water treatment,
- the provision of specialist treatment processes to reduce seasonally high contaminants such as taste and odour compounds, algal toxins or very high TOC levels in source waters, and
- the replacement of the source water or connection to a more sustainable water supply may be necessary.

6.5.12 Action to improve treatment and treatment plant operation

Where parametric failures result from inadequate treatment plant performance, the water supplier must take actions to improve or enhance the treatment processes.

Examples of such actions may involve:

- additional specialist treatment process(es), as discussed in sub**section 6.5.9**,
- adjustment of chemical dosing protocols for existing treatment, based on jar testing to optimise chemical coagulation, in accordance with *EPA Advice Note 15*, to remove the organic precursors of disinfection byproducts,
- changes to treatment practices and procedures,
- increased monitoring of process performance to inform routine process changes,
- upgrading of treatment plant infrastructure,
- replacement of filter media to meet the minimum requirements, as set out in *EPA Water Treatment Manual: Filtration*,
- provision of duty and standby dosing pumps for critical processes,
- installation of continuous monitoring, alarms and shutdowns, for example on residual free chlorine, turbidity and process pH,
- improved maintenance schedules for the treatment plant, and
- provision of additional training to plant operators.

Appendix 6.1: Initial Notification Record (INR) template for private supplies

TBC by LA	Protocol Ref: TBC		Protocol Name: TBC				Template No.	TBC
	[Enter Template Title]				Incident / Parametric Failure Number:		Is this parametric failure / incident reportable to the EPA?	
To be completed by the Local Authority	Local Authority:		Population Served by Supply:			Water Source Name:		
	Water Supply Zone (WSZ):		Population potentially affected by exceedance:			Water Source Type:		
	WSZ Code:		Date of notification:			Name of Laboratory:		
	Notified by (LA contact name):		Local Authority Contact telephone number:			Local Authority Contact email:		
	Sample date	Monitoring Sample Type	Unique Sample Code ID	Sample Location & Description	Parameter (select from dropdown menu)	Sample Result	Unit of Measurement	Parametric Value Per Regulations
	Have non compliances for this parameter(s) been detected in this supply in the previous 12 months, or previously if relevant?			Provide details (if applicable) of previous parametric failures detected in this supply for the parameter in question:				
	Is there an open EPA file for the supply associated with this parameter(s)?			What other parameters were tested in the sample and were they compliant?				
	Were other samples taken on the same supply on the same day?			Was the treatment process operating normally when the sample was taken / incident occurred? (if not - please describe identified issues)				
	What treatment is in place for the water entering the supply?			Were any works carried out within the supply zone and/or local area which may have contributed to the parametric failure / incident? (if so - please describe)				
	How is the supply disinfected?			Please provide any other relevant details below which may provide more context regarding this parametric failure / incident				
	If disinfection consists of UV - was the unit operating within its validated range at the time of the parametric failure / incident?							
	Free Chlorine level in the sample in question (mg/L):							
	Is there an online Chlorine analyser in place that is operational, within calibration, and maintained?							
	Are there duty & standby Chlorine dosing pumps in place that are operational and maintained?							
	How is the chlorine dosing controlled?							
	Are the chlorine dosing pumps alarmed in the event of a failure?							
	Contact Time for water entering the supply: (C_t - mg.min/L)							
TBC by LA	Immediate corrective action taken in response to the parametric failure / incident:							
	Are further investigations / actions required arising from this parametric failure / incident?			Details of proposed Investigations / Actions:				
	Has the parametric failure / incident been risk assessed with regards to impacts on Water Quality?			Arising from this risk assessment - is it deemed necessary to consult with the HSE?				
TBC by HSE in consultation with LA	The LA is responsible for informing consumers where there is a water quality issue of potential danger to human health. However in the context of the information provided and/or consultation undertaken, does this parametric failure / incident pose a risk to public health of such significance that consumers should be notified immediately?			Summary of reasons:				
	If Yes, what advice / notification is to be issued to consumers?			Summary of reasons and/ or specific advice to be provided:				
	Agreed outcome following LA consultation with the HSE in response to this parametric failure / incident:							
	Date consultation initiated:		HSE consultee (Environmental Health)		Phone number:		email:	
	Date consultation concluded:		HSE consultee (Public Health)		Phone number:		email:	
LA	Completed Consultation Record received and logged by:		Date:		Phone number:		email:	

This appendix contains the template provided by the HSE (2024) for the Initial Notification Record (INR) for dealing with exceedances and incidents in drinking water in relation to private supplies, to be filled by the relevant local authority, as supervisory authority of the private supplier.

Source: HSE (2024) *Management of Initial Notification of a Drinking Water Issue of Potential Danger to Human Health*. September 2024, Revision 3. 31 pp. Available at: www.hse.ie.

Section 7: Significant Incidents and Emergencies

7.1 Introduction

Events can occur that affect or threaten to affect the quality of drinking water supplies in a way that puts human health at risk or causes considerable concern to consumers. These events may be caused by some failure of the water treatment or supply operations or may be outside the water supplier's direct control.

The water supplier has general obligations under Regulation 4 to ensure the water is wholesome and clean, does not present a risk to human health, and meets the requirements of the Regulations. Incidents or emergencies may put one or more of these obligations at risk. Regulation 17 on the investigation of breaches of quality standards may also be relevant in the case of incidents and emergencies. Further information on Regulation 17 requirements can be found in **Section 6** ('Failures of Standards & Guidance Values') of this Guidance.

7.2 Examples of significant incidents and emergencies

This section describes scenarios that may lead to significant incidents and emergencies that local authorities and suppliers should be aware of. Examples are as follows:

- Weather events that impact on a large number of supplies.
- An event that appears to have caused illness in the community where there may be a link to drinking water quality. This can be based on reports of illnesses (including notifiable illnesses listed in *Infectious Diseases Regulations 1981 to 2024*) that could possibly be caused by waterborne pathogens in the water supply, such as gastroenteritis caused by salmonella or rotavirus or cryptosporidiosis; the HSE should be consulted with queries of this nature.
- Where there may be a significant risk to health of consumers due to the quantity or quality of the water supplied.
- An event that has attracted, or is likely to attract, significant local or national publicity.
- Serious pollution of a water source prior to an abstraction point that has caused or threatens to cause difficulty with the treatment process and therefore a significant effect on drinking water quantity or quality.
- Breakdown or failure of an important water treatment process element, such as coagulation/clarification, filtration or disinfection process(es).
- The receipt of a significant number of complaints relating to discoloured water or water with an abnormal or offensive taste/odour from a particular area.
- Contamination originating from the water treatment plant, such as spillage of chemicals or sludge discharge that has the potential to cause a fish-kill, other ecological damage, or damage to the drinking water source.

The water supplier and the local authority may have additional responsibilities in the case of major emergencies such as terrorist threats, national strikes, major power failures or significant flooding of water treatment plants, which necessitate coordination among multiple government departments and stakeholders.

Guidance on management of major emergencies is contained in 'A Framework for Major Emergency Management', published by a Government inter-departmental committee (available at https://www.gov.ie/), which covers:

- hazard analysis/risk assessment,
- mitigation/risk management,
- planning and preparedness,
- delivery of a coordinated response, and
- management of the recovery phase.

Local authorities may also have their own adaptations of the National Framework that set out local management and arrangements in more detail.

7.3 Management of drinking water incident/emergency response

Private water suppliers should have robust incident and crisis management frameworks in place allowing them to quickly respond to unplanned and emergency events. Procedures should be in place to manage and respond to various types of incidents and emergencies.

7.4 Notification of significant incidents and emergencies to the local authority and the HSE

Section 6 ('Failures of Standards & Guidance Values') of this Guidance covers notification of failures of parametric values and/or microbiological and parasite failures to the relevant local authority, as supervisory authority.

The private water supplier should notify the relevant local authority, and the HSE with the details of any significant incident or emergency as soon as possible after it becomes aware of the event. Such notification is to enable the local authority to consider if further regulatory action is necessary, such as sampling (including for protozoal parasites if necessary), undertaking an audit, or other remedial action. The local authority will assess the notification and consult with the HSE if there is a potential risk to human health. If the local authority is the first to become aware of an incident or emergency, it should inform relevant water suppliers of necessary actions as soon as possible, in consultation with the HSE if there is a potential risk to human health. Further guidance on notifications is provided in **subsection 6.3.3** ('Notification of failures to the local authority') of this Guidance.

Where the water supplier or the local authority considers that a supply may pose a risk to health due to an incident or emergency, they must consult with the HSE, which can advise on actions to protect consumers' health. The water supplier and the local authority should use the HSE protocols, which facilitate such initial consultations in a structured manner.

Notifications should include the following information (if some of the information is not available, it should be included as soon as practical).

- the date of the incident, the date and time of the notification and the person making the notification,
- the geographical location, such as the water supply zones affected and, if relevant, the catchment, water treatment works and service reservoirs involved,
- a description of the nature of the incident,

- whether a standard for a parameter has been, or is likely to be, exceeded,
- whether any other element, organism or substance (not a parameter) is of concern and the effect or likely effect on the quality of water supplied,
- the number of people affected,
- the likely cause(s) of the event,
- the action that has been, or is being, taken to rectify the situation,
- details of alternative supplies,
- details of any other relevant organisations notified, for instance HSE, Inland Fisheries Ireland, local authority,
- any advice received from the HSE or any other organisation and any actions taken as a result of the advice, and
- details of numbers and locations of samples taken and results of the analysis.

Once a significant incident or emergency is concluded, the local authority and the water supplier should review the handling of all aspects of the incident to identify any lessons to be learned and update any procedures for dealing with future incidents.

7.5 Incidents involving outbreaks of illness

When drinking water is associated or suspected to be associated with an outbreak of illness in the community, an outbreak investigation may be triggered.

This may involve the convening of an Outbreak Control Team (OCT) by the HSE to manage the outbreak. If requested, the local authority and/or the water supplier should nominate a suitable person to serve on the OCT to provide the members of the OCT with all relevant information relating to the incident involved in the outbreak. The HSE may also request that the water supplier convene an Incident Management Team (IMT) comprising the private supplier, local authority and HSE members. The OCT and the IMT should have some common membership.

Information about IMTs, OCTs and their roles is given in Chapter 6 of the HSE's 2024 guidance on the *Management of Initial Notification of a Drinking Water Issue of Potential Danger to Human Health*, which is available at Management of initial notification of a drinking water issue of potential danger to human health. This guidance applies to both public and private drinking water supplies. When an OCT is operating, a number of organisations are involved in the management of the incident and the outbreak. It is extremely important that consistent and clear messages and information are given to the public and the media. Generally, both the OCT and the IMT (i.e. both the water supplier and the HSE) will be involved. Each should have a dedicated spokesperson for public/media announcements. The OCT and IMT should decide whether any media notices and appearances should be made jointly. While the water supplier has the responsibility to advise all consumers, in some situations the HSE may provide additional advice directly to consumers.

After an incident involving an outbreak of illness is concluded, the OCT should critically review all aspects of its handling of the incident to identify any lessons to be learned and, if necessary, to make any changes to its practices and procedures for future incidents involving outbreaks of illness.

Section 8: Communications with Consumers and Complaints Handling

8.1 Introduction

This section of the Guidance provides guidance to private suppliers on information to be provided to the public, communications with consumers and complaints handling. For members of the NFGWS, useful information on these topics may be found in the NFGWS publication 'Charter of Rights and Responsibilities', available at https://nfgws.ie/.

Accessible and user-friendly information to members of the public about the quality and safety of drinking water supplied by private suppliers is important.

Handling, tracking and action on addressing drinking water quality complaints is crucial as it ensures the protection of public health by maintaining high water quality standards in private supplies. Effective complaint management allows for the timely identification and resolution of water quality issues, preventing potential health risks from contaminants. It also promotes transparency and accountability within water services, fostering public trust and compliance with regulatory requirements.

8.2 Maintenance of records

Relevant private water suppliers are required to maintain adequate and up-to-date records in accordance with Regulation 14 and Schedule 4 of the Regulations. Small private supplies are exempted from Regulations 14 and 15 (refer to Regulation 3(1) on exemptions).

Such records shall be provided to the local authority (as supervisory authority) on written request and may include:

- management and treatment of water intended for human consumption,
- monitoring of compliance with water quality standards or other parametric values set out in Schedule 1,
- corrective action taken following a non-compliance with water quality standards or other parametric values set out in Schedule 1, and
- verification of the efficiency of a disinfection treatment in accordance with the risk assessment carried out at the supply system (Regulation 11(3)).

Upon request from the local authority, as supervisory authority, for the information specified above, the private water supplier shall provide it within six weeks.

In accordance with Regulation 14(14), where a person fails to comply in full with a request within the specified period**,** the local authority may apply to the High Court for an order directing the person concerned to comply with the request. Following a successful application, the High Court may make an order compelling compliance.

More details can be found in **Section 9** ('Annual Reporting of Monitoring Results and Other Information to the EPA') of this Guidance.

8.3 Information to members of the public

The requirements relating to information to members of the public are set out in Regulations 14 and 15 (1)(b) and Schedule 4 of the Regulations. Small private supplies are exempted from Regulations 14 and 15 (refer to Regulation 3(1) on exemptions).

All consumers on each private water supply are entitled to receive information on their supply at least annually, without having to make a request to the private supplier.

The private supplier must deliver such specific information in the most suitable and easily accessible manner, including invoices to commercial customers or other means (for instance smart applications, websites, leaflets or other customer-accessible forms). The following information is required:

(a) Information on the quality of water intended for human consumption, including the indicator parameters. At a minimum this should include the results of regulatory monitoring within the supply.

(b) Where chargeable, the price of water (per litre and cubic metre) intended for human consumption supplied.

(c) The volume consumed by the household, not less than once per year or per statement period. If technically feasible and if this information is available to the water supplier, it shall also provide yearly trends of the household consumption.

(d) Comparisons of the yearly water consumption of the household with an average household consumption, when applicable in accordance with item (c).

(e) A link to the website containing the information set out in Schedule 4 of the Regulations (or access to that information by means appropriate to the private supplier and customer base).

Schedule 4 of the Regulations sets out the minimum information that shall be accessible to consumers. Such information should be available online, in a user-friendly and customised way. Consumers should be able to obtain access to it by other means upon request. Such information should include the following.

1. Identification of the water supplier, general information on the area and number of people supplied, and the method of water production, including the types of water treatment and disinfection applied.
2. The most recent monitoring results for parameters set out in Tables A, B and C in Schedule 1, including monitoring frequency together with any parametric value set in accordance with Regulation 6. At a minimum the results of regulatory monitoring within the supply should be provided. The monitoring results should not be more than one year old, except where the monitoring frequency set by the Regulations allows otherwise.
3. Information on the following parameters not set out in Table C in Schedule 1 and their associated values: including results and interpretation:
   (a) hardness
   (b) minerals, anions/cations dissolved in water
      (i) calcium – Ca
      (ii) magnesium – Mg
      (iii) potassium – K.
4. Information on protection of health and active restriction notices, where a risk to human health has been determined or a water restriction is in place. See **Section 6** ('Failures of Standards & Guidance Values') of this Guidance for further information on the contents of water restriction notices.
5. Relevant information on risk assessment of the supply system.

6. Information aimed at consumers on water conservation and responsible use of water. Details on how to avoid health risks due to stagnant water should also be provided.
7. Consumers shall be given access to historical data for information upon request to the private supplier.
8. Additional requirements of Schedule 4 that apply to water suppliers supplying at least 10,000 m^3/day or 50,000 people are not covered in the Private Supplies Guidance, as there are no private water suppliers of this size in Ireland at the time of writing.

8.4 Complaints handling

8.4.1 Introduction

Complaints about drinking water quality received by the local authority or the water supplier from consumers should be investigated promptly and the results of the investigations should be given quickly to the complainants.

If the cause of the complaints is a problem with the quality of the water, then the private supplier must take prompt action to remedy the problem.

If the cause of the complaint is the condition of the domestic distribution system (the pipework and fittings) within the premises, then the private supplier must give the complainant advice on how to resolve the problem.

The private supplier and the local authority should have comprehensive written procedures for dealing with complaints about the quality of private drinking water supplies.

When the local authority concerned, as supervisory authority, receives a complaint about drinking water quality in a private supply it should investigate promptly and the results of the investigations should be given quickly to the complainants The local authority may take enforcement action as it deems necessary.

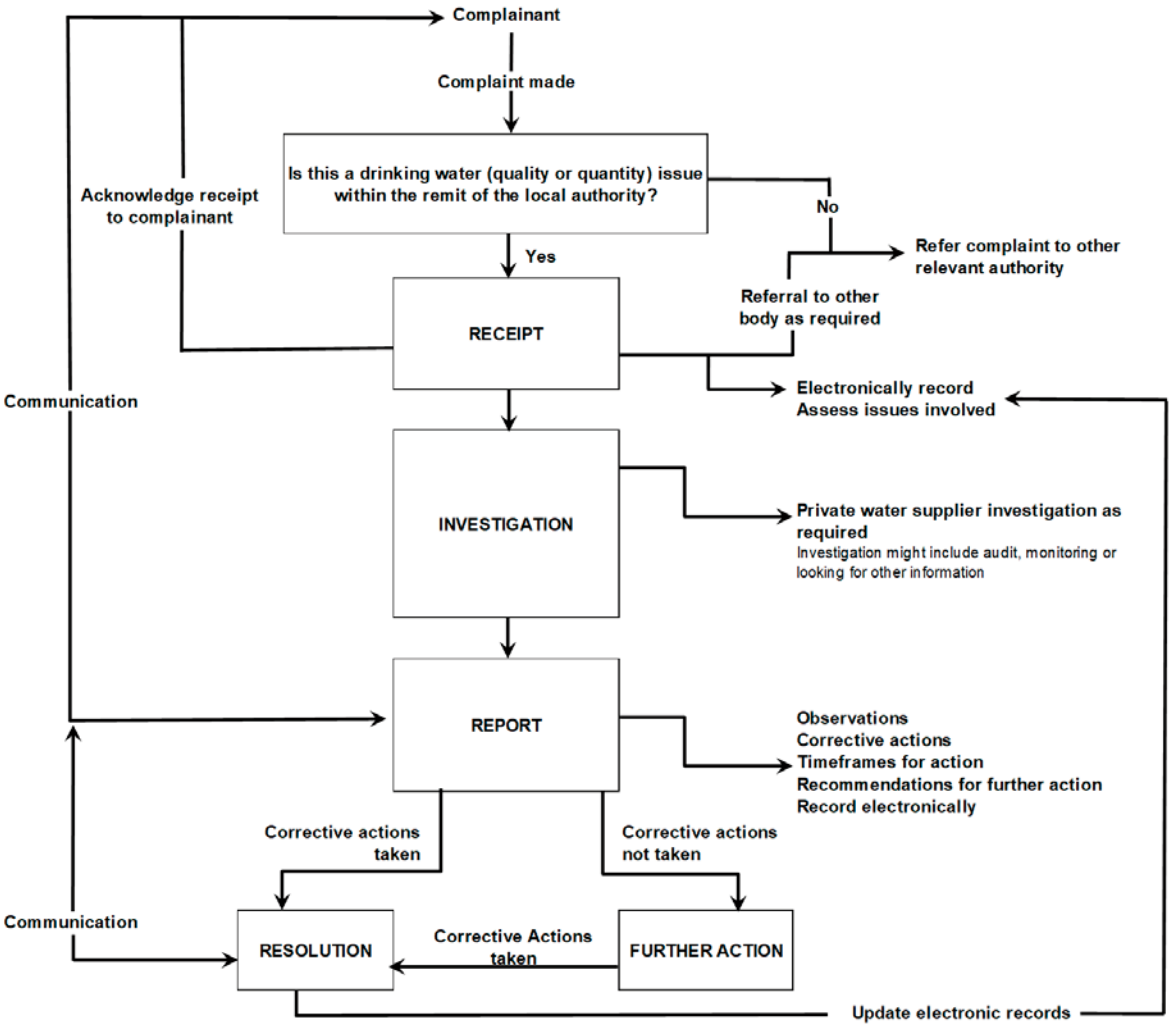
Where the complaint has already been reported to the private supplier and does not appear to have been dealt with in a satisfactory manner, the local authority may request the private supplier to carry out an investigation (or a further investigation) and to report the results to the local authority.

8.4.2 Procedures for dealing with complaints

The Network for Ireland's Environmental Compliance & Enforcement (NIECE) is a network of organisations and individuals involved in the enforcement of environmental legislation, environmental engagement and promotion.

NIECE has developed a flow diagram for handling environmental complaints. While not originally designed for use in drinking water complaint handling, the process flow can be applied for this purpose. This is presented in Figure 8-1.

Figure 8-1: Flow diagram for handling drinking water complaints based on NIECE.



The local authority and private water supplier's written procedures for dealing with complaints about the quality of private drinking water supplies should include as a minimum:

- A system of recording the receipt of telephone, written and personal complaints and for collation of those complaints.
- A procedure for assigning immediately the management of the investigation of the complaint to an appropriate person (who will coordinate the activities of all personnel involved in the complaint). This person should be capable of determining the nature of the problem, determining appropriate investigations to ascertain the cause and assessing whether there could be wider implications.
- A procedure requiring the assigned person to contact the complainant and explain what the private water supplier is doing and when the complainant can expect a response. This person should keep the complainant informed, particularly if there is any delay.

- Guidance on the investigations that should be carried out, which could include as appropriate:
  - Reviewing the recent operation of the water treatment works, service reservoir/water tower and distribution network to determine whether any incident or action may have contributed to the water quality problem.
  - Reviewing the results of recent compliance and operational samples from relevant sampling locations.
  - Taking and analysing samples for appropriate parameters from appropriate locations including the complainant's premises. The private water supplier may need assistance from the relevant local authority with the analysis.
  - Analysing any samples taken by the complainant for appropriate parameters, provided the samples are clearly not compromised (the complainant may have taken a sample in a container that obviously contaminated the sample).
- A procedure for receiving and assessing the results of the investigation and, if necessary, discussing them with the local authority.
- A system for the initiation of any necessary action by the private water supplier:
  - taking any appropriate remedial action when the complaint has been caused by the private water supplier's operations, and
  - giving advice to the complainant on the actions he/she should take when the investigation has established that the cause is associated with the condition of his/her pipework and fittings.
- A system for reporting the outcome to the complainant as quickly as possible in simple terms (avoid the use of scientific or engineering language that the complainant will not understand).
- A system for reviewing from time to time the procedures and modifying them if necessary.
- A system for reviewing periodically all complaints by number, type and location to determine whether there are particular difficulties with some aspect of the private water supplier's operations.

The private water supplier should also have arrangements for checking that the complainant is satisfied with its investigation, explanation of the cause and the action taken. The complainant may not be satisfied, and when this occurs the complainant should have the opportunity of the matter being referred to the local authority concerned. The local authority should review the private water supplier's handling of the initial complaint and, if necessary, initiate further investigations and enforcement action. The outcome of the review should be reported to the complainant as quickly as possible.

Samples taken as part of the investigation into complaints should be recorded and notified to the local authority if they are exceedances of the parametric values. The local authority shall consult with the HSE where a public health risk is determined.

Sometimes, particularly when the cause of the complaint is the private water supplier's operations, there may be several complaints of the same nature from consumers in different premises in the supply zone. If there are a sufficient number of serious complaints, the situation may be regarded as an incident, or even an emergency, affecting drinking water quality. In these circumstances the private water supplier should follow the procedures set out in **Section 7** ('Significant Incidents and Emergencies') of this Guidance.

8.5 Informing consumers of water restrictions

Regulation 15(1)(b) sets out that, where the private supplier or a local authority considers that a supply of water intended for human consumption constitutes a potential danger to human health, the private supplier or the local authority shall consult with the HSE and, following the agreement of the HSE, shall take the following actions:

- ensure that the supply of such water is prohibited, or the use of such water is restricted, or such other action is taken as is necessary to protect human health,
- inform consumers promptly and provide them with the necessary advice, and
- ensure that the relevant local authority is informed promptly.

The private supplier and local authority should ensure that consumers are promptly notified of the advice and that advice is kept up to date. Leaflet drops to individual premises affected, prompt updating to the private supplier website and other means of communications such as social media and radio should all be used.

Where water restrictions are planned (for instance, for planned maintenance at a water treatment plant or in a supply network), advance warning of advice should be given. The estimated conclusion date of the restriction should be provided.

It should be made clear what consumers are affected by use of mapping or Eircodes to define the affected area. Consumers should be notified when restrictions are lifted.

8.5.1 Reporting of failures as a result of investigating a complaint

If the investigation of any complaint finds that there has been a non-compliance with a standard in Table A, B or C of Schedule 1 to the Regulations, or if there is a detection of pathogenic microorganisms or parasites, the private supplier must notify the local authority concerned, in accordance with the procedures laid out in **subsection 6.3** ('Regulation 17: Remedial action and restrictions of use') of this Guidance.

8.5.2 Escalation of complaints

Sometimes the private supplier or the local authority may receive a large number of complaints from consumers in response to a particular issue in a supply. Systems should be in place so that unusual numbers of complaints are quickly identified and screened for potential incidents or emergencies.

For example, taste or odour complaints may occur due to changes in the raw water conditions, or complaints about illness or discoloured water may indicate problems in a supply.

It is important that clusters of complaints are identified and escalated on a supply-wide basis, that remedial actions are taken and that consumers are kept up to date with current investigations and any health advice.

Section 9: Annual Reporting of Monitoring Results and Other Information to the EPA

9.1 Introduction

This section of the Guidance provides comprehensive guidance to local authorities on the information to be reported to the EPA annually and on the format of that information in respect of private water supplies.

Section 58(3) of The Environmental Protection Agency Act, 1992 to 2023 (the Act) requires the Environmental Protection Agency (the EPA) to prepare and submit to the Minister a report on:

- the monitoring, together with an assessment of the monitoring results in relation to compliance with prescribed water quality standards and other parametric values, of water intended for human consumption, and
- the implementation by the EPA of section 58A of the Act:
  - Section 58A describes the role of the EPA in monitoring compliance with prescribed water quality standards and other parametric values of water supplied by a water supplier for human consumption, and
  - enforcing compliance with such standards.

Annual reports include recommendations to local authorities and private water suppliers.

Under Regulation 13 of the Drinking Water Regulations and as described in **Section 3** ('Monitoring of Drinking Water Quality') of this Guidance, each local authority must supervise the performance of private water suppliers in its functional area, including monitoring compliance of water intended for human consumption with the parametric values set out in Tables A, B and C in Schedule 1.The EPA shall supervise the performance by each local authority in respect of its monitoring functions under the Regulations. This includes the role of the EPA in assessing local authority monitoring programmes and registers of supplies.

Local authorities are required to send the results of monitoring and analysis of the private water supplies under their supervision to the EPA each year. Following this, the EPA publishes a Drinking Water Quality Report annually for private water supplies based on the assessment of monitoring results and other relevant information. These Drinking Water Quality Reports can be accessed at https://www.epa.ie/.

9.2 Register of private supplies

Each local authority is required to keep a register to record the details of private water supplies for which it is a supervisory authority, in accordance with Regulation 14(5), This register shall record a minimum of information (such as volume of water supplied, source of water supply, supply zone code). The information for the register shall follow applicable data protection legislation and shall be kept up to date annually.

All private suppliers should register with their local authority so their supplies can be monitored. Unregistered supplies are not monitored by the local authorities, creating a potential public health risk for consumers. Local authorities should take proactive steps to recognise and register all private supplies in their functional areas. They should contact businesses and operators of public buildings that may have a private supply, to ensure that the details of these supplies are on the register. Examples of the types of businesses that should be checked to determine whether they are on a public or private supply are:

- creches,
- nursing homes,
- hospitals and healthcare centres,
- hotels, B&Bs, campsites,
- schools,
- sporting clubs, and
- food businesses: petrol stations with deli counters, cafés, bakeries, artisan food producers.

The information for the registers needs to be provided by private suppliers to the local authority concerned, as supervisory authority, and may specify the following:

- the management and treatment of water intended for human consumption,
- the monitoring of compliance with water quality standards or other parametric values set out in Schedule 1,
- corrective action taken following a non-compliance with water quality standards or other parametric values set out in Schedule 1, and
- verification of the efficiency of a disinfection treatment in accordance with the risk assessment carried out at the supply system (Regulation 11(3)).

Upon request from the local authority concerned for the information specified above, the supplier shall provide the information within six weeks. The local authority concerned may specify a longer timeframe in the request.

In accordance with Regulation 14(14), where a person fails to comply in full with a request within the specified period**,** the local authority concerned may apply to the High Court for an order directing the person concerned to comply with the request. Following a successful application, the High Court may make an order compelling compliance.

9.3 Format for the submission to the EPA

The EPA has developed the Environmental Data Exchange Network (EDEN), which is an online gateway for local authorities to upload data to the EPA. The EDEN system may be accessed through https://www.edenireland.ie/.

Each local authority must submit all annual regulatory compliance monitoring results for the regulated private water supplies in its functional area to the EPA. Local authorities shall also submit relevant supply information to the EPA as part of the annual monitoring returns. This drinking water supply scheme data must be uploaded directly to EDEN.

Guidance for local authorities uploading drinking water (private supply) regulatory compliance data on EDEN is available on the EPA website and can be accessed at https://www.epa.ie/, including a pre-recorded webinar (https://www.epa.ie/our-services/compliance--enforcement/drinking-water/webinar-for-local-authorities-/).

The local authority concerned should designate a person responsible for the sign-off of all supply scheme data and monitoring results before uploading to EDEN. The contact details of the data approver should be included with the annual monitoring results and supply scheme details submitted to the EPA. The EPA may contact the data approver in the event of any queries arising from the submission of the results.

Any technical issues and queries regarding the EDEN system may be dealt with by emailing EDEN Support at eden@epa.ie.

The EPA will collect Group A and Group B regulatory compliance monitoring results and watch list substances results through EDEN. Operational or investigative monitoring results should not be included with this data. Local authorities must ensure that the information inputted to their laboratory information system and uploaded to EDEN is accurate and does not contain errors.

9.4 Information on supplies to be reported to the EPA

Local authorities must ensure that all private water supply schemes' details uploaded to EDEN are correct. If a supply is no longer operational then the date that the supply ceased to operate should be entered. The local authority's designated data approver should review this list.

The designated data approver should also add any new schemes to EDEN.

Once the supply scheme data has been approved by the designated approver, the information is locked and cannot be amended without the approval of the EPA.

Local authorities should ensure consistency between the supplies reported in EDEN and the supplies in their register of private water supplies required under Regulation 14(5). This information must be kept up to date and accurate each year. The registers should include the following information:

- the name and address of the water supplier,
- the volume of water supplied per day (expressed in either cubic metres or a population equivalent),
- the population supplied,
- the type of water treatment in place,
- the source(s) of the water supply, and
- the supply zone code.

The type of water treatment in place (each of the treatment processes) at each treatment plant should be specified by the designated approver. This includes, among other aspects:

- use of coagulants,
- pH adjusting chemicals,
- disinfectants, and
- other chemicals.

A treatment plant that might be described as 'conventional coagulation, clarification, filtration and disinfection' should be more fully described as for example 'Coagulation using aluminium sulphate, clarification, rapid gravity sand filtration followed by disinfection using sodium hypochlorite and pH correction using sodium carbonate (soda ash)'.

Details must be included on whether the supply has:

- continuous residual chlorine monitor and alarm,
- duty/standby chlorine dosing,
- duty/standby UV dosing,
- flow proportional/residual chlorine-based dosing,

- details of the chlorine contact time to the first consumer on the supply, and
- turbidity monitors, and where they are located (after each filter, on the combined filtrate, etc.).

In relation to the source of the water supply, the submission template on EDEN contains a drop-down menu from which one of the following should be selected:

- groundwater, include details of the source aquifer,
- surface water, include details of the source river or lake,
- spring water, include details of the source spring, or
- mixed, include details of the mixed sources.

The Drinking Water National Monitoring Programme (referred to in the Department of Environment, Heritage and Local Government circular letter WSP11/04, dated 17 December 2004) assigned supply zone codes to all water supply zones in Ireland at the time. The database provided to each local authority with that circular contained a mechanism for assigning new supply zone codes for new water supply zones that came into operation after that date.

At present, private suppliers and their relevant local authorities as supervisory authorities should ensure that each private water supply zone is assigned a supply zone code of the format *xxxxPRIyyyy*, where *xxxx* is the *four-digit supplier code* and *yyyy* is the *four-digit unique supply code*.

The local authority's designated data approver should include information on any private water supply that was not used during the reporting period provided it is intended for use in the future. A supply that was not in operation during the reporting period and has been permanently abandoned should not be included.

9.5 Monitoring results to be reported to the EPA

As part of the annual reporting to the EPA, local authorities must report all regulatory compliance monitoring results for private water supplies under their supervision. Local authorities should check as part of this exercise that all regulatory compliance monitoring results have also been sent to the individual water suppliers.

Compliance monitoring consists of taking samples at a defined frequency and analysing for certain parameters. Compliance monitoring includes parameters in Group A and Group B (refer to **Section 3** ('Monitoring of Drinking Water Quality') of this Guidance). The criteria for determining the appropriate number of samples to take, and the appropriate parameters to analyse for, are discussed in detail in **Section 3** of this Guidance.

The frequency of sampling and/or the number of parameters to analyse may only be reduced subject to carrying out a risk assessment and meeting specific criteria set out in the Regulations (refer to **Section 3** of this Guidance for details) and subject to agreement with the EPA.

Private suppliers should also document and report risk assessment and risk management updates, as well as monitoring results for trending purposes and measuring against parametric and guidance values. The EPA 2025 'Implementation Guidance: Risk Assessment and Risk Management of Public and Private Supplies at Source' and associated templates (available at https://www.epa.ie/) should be consulted for guidance on this matter.

9.6 Radioactive substances monitoring

Local authorities are required under the European Union (Radioactive Substances in Drinking Water) Regulations 2016, S.I. 160 of 2016, to monitor and report to the EPA on radioactivity parameters. These 2016 Regulations provide for the monitoring of water intended for human consumption to assess compliance with parametric values and, in the event of an exceedance of the parametric values, the undertaking of remedial action to improve the quality of water for the protection of human health from a radiation protection point of view.

The EPA Advice Note *EPA Drinking Water Advice Note no. 16: Guidance on the Enforcement of the European Union (Radioactive Substances in Drinking Water) Regulations 2016 – S.I. 160 of 2016* was prepared by the EPA in accordance with the 2016 Regulations regarding monitoring drinking water from a radiation point of view. It can be accessed at: http://www.epa.ie/.

The National Surveillance Monitoring Programme for Radioactivity in Drinking Water, implementing the 2016 Regulations, is complete. This survey analysed all relevant supplies for Total Indicative Dose (gross alpha/beta activity) and radon where appropriate.

The EPA operated the programme from 2017 to 2023 to determine whether the monitoring of water supplies is required at the frequencies outlined in Part 2 of the 2016 Regulations. All relevant water supplies were included in the programme. The data from this programme and previous monitoring since the 1990s indicates that the concentrations of naturally occurring radionuclides in water intended for human consumption are low and stable, and therefore the radiological risk to the human health of consumers of Irish drinking water is low.

This provides the basis for Ireland to seek a derogation from the European Commission from the minimum sampling requirements set out in Part 2 of the schedule of S.I. 160 of 2016, Table A. This derogation would allow a new risk-based operational monitoring programme with a reduced sampling frequency to be implemented in Ireland.

9.7 Sample information

The following information is required in respect of all regulatory monitoring samples of private water supplies submitted to the EPA:

- **Scheme Name/Name of Water Supply** – the name of the water supply should be inserted here. Where a supply has multiple colloquial names, one of these names should be settled on and used consistently in returns.
- **Scheme Code** – the complete scheme code should be used. This will be in the format *xxxxPRIyyyy* for private water supplies. Locally used codes (such as county-specific codes) should not be reported to the EPA.
- **Public/Private/Group** – enter 'public group water scheme' or 'private group water scheme' or 'private water supply' as appropriate from the drop-down menu.
- **Location** – the sample location should be provided here. The purpose of this is to confirm that the sample was taken at the 'point of compliance' as defined in Regulation 7 and therefore the information provided here should be sufficient to enable the EPA to confirm this fact.
- **Sample Purpose** – the type of sample analysed should be provided here. The data approver will select either 'Drinking Water Private Monitoring – Group A' or 'Drinking Water Private Monitoring – Group B'. The appropriate mapping for each monitored parameter is presented in Table 9-1.
- **Inv/Op/Surv** – the surveillance option should be selected for all samples as investigative and complaint samples are no longer required to be submitted as part of the annual returns to the EPA.
- **Sample Code** – the unique sample or laboratory code should be inserted here.

Table 9-1: Assignment of 'sample purpose' to each monitoring parameter within the EDEN data collection and management system.

Sample Purpose	Parameter
Drinking Water Private Monitoring – Group A	Aluminium – unfiltered
Drinking Water Private Monitoring – Group A	Aluminium – unspecified
Drinking Water Private Monitoring – Group A	Ammonia-Total (as N)
Drinking Water Private Monitoring – Group A	Ammonia-Total (as NH3)
Drinking Water Private Monitoring – Group A	Ammonia-Total (as NH4)
Drinking Water Private Monitoring – Group A	Apparent colour
Drinking Water Private Monitoring – Group A	Coliform Bacteria (Total)
Drinking Water Private Monitoring – Group A	Colony Count/HPC @ 22°C
Drinking Water Private Monitoring – Group A	Colour
Drinking Water Private Monitoring – Group A	Conductivity @20°C
Drinking Water Private Monitoring – Group A	*E. coli*
Drinking Water Private Monitoring – Group A	*Enterococci* (Intestinal)
Drinking Water Private Monitoring – Group A	Iron – unfiltered
Drinking Water Private Monitoring – Group A	Iron – unspecified
Drinking Water Private Monitoring – Group A	Nitrite (as N)
Drinking Water Private Monitoring – Group A	Nitrite (as NO2)
Drinking Water Private Monitoring – Group A	Nitrite (NO2) (at tap)
Drinking Water Private Monitoring – Group A	Odour
Drinking Water Private Monitoring – Group A	pH
Drinking Water Private Monitoring – Group A	Taste
Drinking Water Private Monitoring – Group A	Turbidity
Drinking Water Private Monitoring – Group A	Turbidity (at tap)
Drinking Water Private Monitoring – Group B	1,2-Dichloroethane
Drinking Water Private Monitoring – Group B	Acrylamide (C3H5NO)
Drinking Water Private Monitoring – Group B	Aluminium – unfiltered

Sample Purpose	Parameter
Drinking Water Private Monitoring – Group B	Aluminium – unspecified
Drinking Water Private Monitoring – Group B	Ammonia-Total (as N)
Drinking Water Private Monitoring – Group B	Ammonia-Total (as NH3)
Drinking Water Private Monitoring – Group B	Ammonia-Total (as NH4)
Drinking Water Private Monitoring – Group B	Antimony – unfiltered
Drinking Water Private Monitoring – Group B	Antimony – unspecified
Drinking Water Private Monitoring – Group B	Arsenic – unfiltered
Drinking Water Private Monitoring – Group B	Arsenic – unspecified
Drinking Water Private Monitoring – Group B	Benzene
Drinking Water Private Monitoring – Group B	Benzo(a)pyrene
Drinking Water Private Monitoring – Group B	Boron – unfiltered
Drinking Water Private Monitoring – Group B	Bisphenol A
Drinking Water Private Monitoring – Group B	Boron – unspecified
Drinking Water Private Monitoring – Group B	Bromate
Drinking Water Private Monitoring – Group B	Cadmium – unfiltered
Drinking Water Private Monitoring – Group B	Cadmium – unspecified
Drinking Water Private Monitoring – Group B	Chlorate
Drinking Water Private Monitoring – Group B	Chlorite
Drinking Water Private Monitoring – Group B	Chloride
Drinking Water Private Monitoring – Group B	Chromium – unfiltered
Drinking Water Private Monitoring – Group B	Chromium – unspecified
Drinking Water Private Monitoring – Group B	*Clostridium perfringens* after 24 hours
Drinking Water Private Monitoring – Group B	Copper – unfiltered
Drinking Water Private Monitoring – Group B	Copper – unspecified
Drinking Water Private Monitoring – Group B	Cyanide (unspecified)
Drinking Water Private Monitoring – Group B	Epichlorohydrin (C_3H_5ClO)

Sample Purpose	Parameter
Drinking Water Private Monitoring – Group B	Fluoride
Drinking Water Private Monitoring – Group B	Haloacetic acids (sum of 5 HAAs)
Drinking Water Private Monitoring – Group B	Iron – unfiltered
Drinking Water Private Monitoring – Group B	Iron – unspecified
Drinking Water Private Monitoring – Group B	Lead – unfiltered
Drinking Water Private Monitoring – Group B	Lead – unspecified
Drinking Water Private Monitoring – Group B	Manganese – unfiltered
Drinking Water Private Monitoring – Group B	Manganese – unspecified
Drinking Water Private Monitoring – Group B	Mercury – unfiltered
Drinking Water Private Monitoring – Group B	Mercury – unspecified
Drinking Water Private Monitoring – Group B	Microcystin-LR
Drinking Water Private Monitoring – Group B	Nickel – unfiltered
Drinking Water Private Monitoring – Group B	Nickel – unspecified
Drinking Water Private Monitoring – Group B	Nitrate (as N)
Drinking Water Private Monitoring – Group B	Nitrate (as NO_3)
Drinking Water Private Monitoring – Group B	Nitrite (as N)
Drinking Water Private Monitoring – Group B	Nitrite (as NO_2)
Drinking Water Private Monitoring – Group B	Nitrite (NO_2) (at tap)
Drinking Water Private Monitoring – Group B	PFAS Total
Drinking Water Private Monitoring – Group B	Polyaromatic Hydrocarbons (PAH) – Sum
Drinking Water Private Monitoring – Group B	Selenium – unfiltered
Drinking Water Private Monitoring – Group B	Selenium – unspecified
Drinking Water Private Monitoring – Group B	Sodium – unfiltered
Drinking Water Private Monitoring – Group B	Sodium – unspecified
Drinking Water Private Monitoring – Group B	Sulphate
Drinking Water Private Monitoring – Group B	Sum of PFAS (sum of 20)

Sample Purpose	Parameter
Drinking Water Private Monitoring – Group B	Tetrachloroethene & Trichloroethene (Total)
Drinking Water Private Monitoring – Group B	TOC (as NPOC)
Drinking Water Private Monitoring – Group B	Total Pesticides
Drinking Water Private Monitoring – Group B	Trihalomethanes – Total
Drinking Water Private Monitoring – Group B	Uranium – unfiltered
Drinking Water Private Monitoring – Group B	Vinyl Chloride
Drinking Water Private – 'Watch list'*	Nonylphenol
Drinking Water Private – 'Watch list'*	17-Beta-Estradiol (E2)

** 'Watch list' substances nonylphenol and 17-beta-estradiol (E2) are not designated as Group A or Group B parameters but should still be reported where monitoring is carried out and set as data theme 'drinking water private'.*

9.8 Analysis information

The local authority concerned should ensure all results of analysis are included and not in separate attachments (with the exception of pesticides – see **subsection 9.9** of this Guidance). The local authority should flag any demonstrated failures that were due to the domestic distribution system (condition of the tap or pipework) within premises that were not under its ownership. When completing the *analysis results* section, the data approver in the appropriate local authority must ensure the following:

- **Results are reported in the correct units** – monitoring results reported to the EPA must be of the units specified in the Regulations. If the local authority obtains results from a laboratory as different units, the results must be converted to the correct units prior to submission to the EPA. An error message will appear in EDEN if the results are in the incorrect units. In particular, the data approver should ensure that nitrate, nitrite and ammonium results are reported as NO3, NO2 and NH4, respectively, and not as N. A full list of the parametric values and associated units is included in **Section 2** ('Standards for Drinking Water Quality') of this Guidance.
- **Methods of analysis are adequate** – Schedule 3 to the Regulations specifies the methods of analysis and the performance characteristics that must be achieved by laboratories carrying out analysis of certain microbiological, chemical and indicator parameters of drinking water. Local authorities must ensure that these characteristics are being met by laboratories carrying out analysis. The EPA recognises that results will be obtained and reported using methods that do not achieve these performance characteristics at present. The EPA requires that all regulatory compliance monitoring results are from accredited laboratories only. Refer to **Section 5** ('Guidance on Analysis') of this Guidance for more details on accreditation of laboratories.
- **Limit of detection** – where results are reported as less than the limit of detection and the limit of detection is either the same as or greater than the parametric value, the results should not be submitted to the EPA (for example if PAH results are reported as <0.10 µg/l when the parametric value is 0.10 µg/l). Where such results are submitted by the local authority's data provider, an error message will appear in EDEN and the data provider will be required to amend the results as it is not possible to determine compliance with the parametric value on the basis of such results.

9.9 Reporting of pesticides

The Regulations set two standards for pesticides:

- for each individual pesticide the standard is 0.10 µg/l:
  - the exception is for aldrin, dieldrin, heptachlor and heptachlor epoxide, for which the standard is 0.030 µg/l,
  - refer to the full list of pesticides in **Section 2** ('Standards for Drinking Water Quality') of this Guidance, and
- for total pesticides the standard is 0.50 µg/l
  - this means the sum of all individual pesticides.

In the annual monitoring returns, the EPA requires that a figure be inserted for total pesticides. This result should be calculated by summing the individual pesticides detected and reporting this result to the EPA. In calculating total pesticides, all individual pesticides present in concentrations less than the limit of detection should be assumed for the purposes of these calculations as being absent (0.0 µg/l). Where all pesticides monitored are reported as less than the limit of detection, the total pesticides figure should be reported on the template as <0.5 µg/l.

In cases where individual pesticides have been detected, the local authority should include all individual pesticides detected. It is not necessary to include individual pesticides that were monitored if they were reported as less than the limit of detection.

9.10 Maintenance of records

Private water suppliers are required to maintain adequate and up-to-date records in accordance with Regulation 14 and Schedule 4 of the Regulations. The records shall be provided to the local authority (as supervisory authority) on written request and may include the following:

- the management and treatment of water intended for human consumption,
- the monitoring of compliance with water quality standards or other parametric values set out in Schedule 1,
- corrective action taken following a non-compliance with water quality standards or other parametric values set out in Schedule 1, and
- verification of the efficiency of a disinfection treatment in accordance with the risk assessment carried out at the supply system (Regulation 11(3)).

Upon request from the supervisory authority for the information specified above, the private water supplier shall provide it within six weeks.

In accordance with Regulation 14(14), where a person fails to comply in full with a request within the specified period, the local authority may apply to the High Court for an order directing the person concerned to comply with the request. Following a successful application, the High Court may make an order compelling compliance.

9.11 Uploading of data to EDEN

The local authority's designated data approver can access the EDEN website at https://www.edenireland.ie/.

Account sign-in is accessed at https://www.edenireland.ie/ for existing accounts. A new account may be created accessing the same website.

If the approver needs assistance to upload data, a comprehensive help facility is available at https://www.edenireland.ie/.

When logging onto EDEN, the approver will also need to request access to EDEN MDS (Monitoring Data System) application. MDS is the centralised application for environmental monitoring data including drinking water data. MDS provides the facility to submit environmental data remotely.

9.12 Assessment of monitoring results by the EPA

The EPA will assess the monitoring results submitted and shall do one of the following actions:

- accept the data as submitted without further queries,
- revert to the local authority concerned with queries about the returns, or
- return the data to the local authority concerned and request amendment of data and resubmission.

The EPA will return all data to the local authority where there are any errors or omissions from the returns to allow the local authority to correct the data and re-upload it through EDEN.

Once the EPA is satisfied that the results are accurate and correct, the EPA will notify the local authority. The EPA will then carry out an analysis of the data to generate statistics for its annual report on drinking water quality. When this analysis is complete, the EPA will send out a copy of the analysis to the local authority for verification. The following files will be sent to the local authority:

- a list of Boil Water Notices and Water Restriction Notices notified to the EPA in the annual returns,
- a list of all failures in all private water supplies in the local authority's functional area,
- a list of all private water supplies in the local authority's functional area,
- a list of any supplies insufficiently monitored for certain parameters, and
- a summary of the statistics for the local authority including the calculations of overall compliance.

The local authority concerned will be given a specified period to comment on the accuracy of these files and the calculations. All valid comments or amendments will be incorporated into the statistics used for the preparation of the report.

9.13 Submission of returns

Local authorities should submit their drinking water quality compliance monitoring results and drinking water scheme details to EDEN before 28 February each year in respect of the previous calendar year.

Schemes that were not operating in the reporting year must have an end date no later than 31 December of the previous year. Otherwise they will show a shortfall in monitoring for the reporting year.

The dates above may change depending on future reporting requirements to the European Commission. Any changes will be communicated to local authorities.

Local authorities may be required to provide more information for certain exceedances and incidents that exceed the reporting threshold, for the purpose of reporting information to the European Commission under Drinking Water Directive (DWD) Article 18 reporting, through the EEA Reportnet 3 platform.

9.13.1 Summary of requirements

Some general pointers for submitting monitoring returns to EDEN are as follows:

- Each regulated private water supply should have its own designated water supply code and associated monitoring station(s) and be listed on EDEN.
- Local authorities should submit its drinking water quality compliance monitoring results and drinking water scheme details to EDEN before 28 February each year in respect of the previous calendar year.
- Schemes that were not operating in the reporting year must have an end date no later than 31 December of the previous year. Otherwise they will show a shortfall in monitoring for the reporting year.
- Metals results must be uploaded as either 'unfiltered' or 'unspecified' only. No other variant can be accepted.
- All results must be reported in the correct units and format as per Schedule 1 of the Regulations. Correct units are also included in **Section 2** ('Standards for Drinking Water Quality') of this Guidance.
- Particular attention should be paid to nitrate, nitrite and ammonium. The units used to report these parameters should be as per the laboratory certificate. Ideally this should be NO3, NO2 and NH4 for nitrate, nitrite and ammonium, respectively. However, a conversion factor is built into EDEN if any of these as N are selected. The data submitter must make sure that the result is correct for the units used.
- Colour results must be uploaded as 'Colour' or 'Apparent Colour only'. No other variant can be accepted.
- Duplicate samples, stations codes or results should not be entered. Duplicates cannot be transferred to the EPA system and EPA will contact the designated approver to ask them to remove the duplicate if one occurs.

Section 10: Water Treatment and Related Matters

10.1 Introduction

This section provides general guidance to local authorities and private water suppliers on water treatment and associated matters. **Section 10.2** outlines general requirements relating to water treatment works. **Section 10.3** covers obligations and general recommendations on raw water monitoring. **Section 10.4** covers the operation of water treatment works. **Section 10.5** provides recommendations for online monitoring and control systems. Lastly, **Section 10.6** presents recommendations on training of operators.

This section applies to the following:

- Private Group Schemes (PGS): These are schemes where the owners of the scheme abstract, treat and distribute water from the raw water source (sometimes a Design, Build and Operate (DBO) contract is in place for the treatment element of the scheme). These schemes are usually owned by the community and are usually managed by a committee or board of representatives of the local community. The National Federation of Group Water Schemes (NFGWS) represents and works with the community-owned rural water services sector in Ireland.
- Small Private Supplies (SPS): This is a large group with different types of supplies which provide drinking water to the public through commercial or public activities, especially in rural areas. Examples of SPS may include supplies serving hotels, pubs, B&Bs, schools, nursing homes and creches, as well as water supplies for some food and drink manufacturing businesses.

This section does not apply to public group water schemes, as these take fully treated water from a public water supply provided by Uisce Éireann and the water is then distributed by the scheme to the consumers supplied. The ongoing regulatory compliance of drinking water to the consumer tap may be adversely affected by continuing development of organic disinfection by-products, such as THMs or HAAs within the public group water scheme's distribution system or consequent to the scheme's re-chlorinating of the water before and/or during distribution, in which case the parts of this section dealing with disinfection (dosage, monitoring and control) apply.

Individual supplies that provide less than 10 m^3/day or supply fewer than 50 persons who are not part of a commercial or public activity are exempted from the Regulations. Private household wells are also exempt from the Drinking Water Regulations 2023.

To ensure drinking water quality, it is vital that water treatment works are designed, operated and maintained properly. This means that private water suppliers should adopt a Quality Assurance System (QAS) approach for the management, operation and maintenance of water treatment works. The QAS should include written procedures such as Standard Operating Procedures (SOP).

Particularly for private group schemes, the QAS adopted by the NFGWS follows the Hazard Analysis & Critical Control Point (HACCP) approach commonly used in the food and drinks sector. The QAS is periodically updated to meet new legislative requirements and to adapt to changes in the group water scheme sector. It encompasses various responses to potential hazards at critical control points from the water source to the tap. It also includes checklists of control measures at each critical point to ensure their effectiveness.

The NFGWS provides training for QAS implementation and has published a QAS Implementation manual to help schemes develop their own specific QAS documentation, which can be accessed at https://nfgws.ie/. It is noted that the Department of Housing, Local Government and Heritage Rural Water Programme provides operational subsidy support for private group schemes to implement QASs and to complete training such as the NFGWS course.

The NFGWS is developing a Drinking Water Safety Plan tool to help GWSs implement risk assessment, risk management approaches in line with the Regulations. The tool will be available on the NFGWS website: https://nfgws.ie/.

10.2 General requirements

Section 1 ('The Drinking Water') of this Guidance sets out general principles of risk assessments required by the Regulations. Regulations 11, 19 and 20 set out requirements for water treatment risk assessment, process and materials. Risk assessments must be done by 12 January 2029. Water suppliers must address the following key points:

- ensure that risk management measures for disinfection required by Regulation 11(3)(d) are taken for relevant water supplies (>10 m^3/day or >50 persons),
- ensure that any contamination from disinfection by-products is kept as low as possible without compromising the disinfection,
- ensure that any contamination from treatment chemicals is kept as low as possible,
- ensure that any substances remaining in the water do not compromise the fulfilment of general obligations within the Regulations, and
- verify that materials, treatment chemicals and filter media that come into contact with water intended for human consumption used in the supply system are compliant with the Regulations.

The water supplier should use suitable treatment chemicals and filter media, having regard to Regulation (EU) No. 528/2012 of the European Parliament and of the Council of 22 May 2012 ('concerning the making available on the market and use of biocidal products') and relevant standards for specific treatment chemicals or filter media, such as the European Committee for Standardization (CEN) (available at https://standards.cencenelec.eu/). The Commission may publish further guidance in relation to this.

The water supplier should document the substances (chemicals), products and materials used at treatment works, to ensure they are approved by the European Commission or an equivalent approval system such as the Drinking Water Inspectorate for England and Wales (a list of approved products can be found on the DWI website: https://www.dwi.gov.uk/) and they are used in accordance with any approval conditions.

More detailed guidance is provided in the Water Treatment Manuals and Advice Notes published by the EPA, which can be freely downloaded from: https://www.epa.ie. A list of relevant guidance can also be found in **Section 1** ('The Drinking Water ') of this Guidance.

10.3 Raw water monitoring

Variation in raw water quality, for example following heavy rainfall, can have a significant effect on the performance of the downstream treatment processes and hence compliance of the drinking water with the parametric limit values set out in in Schedule 1 of the Regulations.

Monitoring of raw water for drinking water purposes is a requirement of the Regulations as part of the introduction of a risk-based approach to water safety. This risk-based approach shall be applied across different stages of the supply system, from catchment to tap. To that purpose, relevant private water suppliers are required to carry out risk assessment and risk management as described in Table 10-1. This requirement does not apply to private water supplies providing less than 10 m^3/day or supplying fewer than 50 persons.

Details on risk assessment monitoring can be found in **subsection 3.5** ('Risk assessment monitoring') of this Guidance.

Table 10-1: Private water supplier responsibilities in raw water risk-based approach elements.

Risk-based approach element	Private water supplier responsibility
Catchment areas for abstraction points of water intended for human consumption (Regulation 10)	■ Carry out a risk assessment and risk management of the catchment areas for abstraction points for the first time not later than 12 July 2027. ■ Suppliers that monitor the catchment areas or raw water must share that data with the appropriate local authorities, as supervisory authorities, or share with other source protection agencies as required. When required, the private supplier must inform the local authority of trends or unusual levels of monitored parameters, substances or pollutants. Separate guidance on the requirements of Regulation 10 was developed in 2025 by the EPA and is presented in the 'Implementation Guidance: Risk Assessment and Risk Management of Public and Private Supplies at Source' (available at https://www.epa.ie/).
Supply system	■ Carry out sampling and analysis of key parameters throughout the water supply system through a monitoring programme (see **Section 3** ('Monitoring of Drinking Water Quality') of this Guidance) to ensure wholesome and clean water at the compliance point and to control risks to human health. ■ The risk assessment and management should: – reflect the water safety approach set out in the World Health Organization (WHO) guidelines ('Water safety plan manual: step-by-step risk management for drinking-water suppliers', available at https://www.who.int/), and – be carried out for the first time not later than 12 January 2029; it must be reviewed by the water supplier at regular intervals, at least once every six years, and updated where necessary. Note: Local authorities should ensure that the risk assessments and risk management are carried out by water suppliers. The EPA may review and assess the risk assessments including drinking water safety plans prepared by water suppliers

Operational monitoring (see **subsection 3.3.1** of this Guidance) is required to confirm the suitability of raw water and the effectiveness of control measures in the supply system, and to enable rapid remedial actions such as adjustments to the operation of treatment This is covered in **Section 6** ('Failures of Standards & Guidance Values') of this Guidance. The scope and frequency of monitoring may need to be amended based on risk assessment outcomes.

10.3.1 Organic contaminants

Key raw water contaminant parameters should be monitored, such as:

- Total Organic Carbon (TOC), using the monitoring of UVT as a surrogate parameter, and
- other parameters such as turbidity and conductivity,

with appropriate generation of alarm signals to give early warning of deteriorating raw water quality where possible.

The monitoring of turbidity as an operational parameter for treated water is required in the Regulations at pre-determined frequencies (as a function of the supplied volume) at the water supply's treatment plant, to regularly control the efficacy of physical removal of contaminants by treatment and subsequent filtration processes.

10.3.2 Somatic coliphages

The private water supplier must monitor somatic coliphages in raw water as an operational parameter, where it is indicated by a risk assessment specified in Schedule 2 Part 1 (for example where *E. coli* is detected in raw water). This is to control the baseline concentration in the raw water and evaluate the efficacy of the treatment processes in inactivating microbiological risks. If the concentration of this parameter exceeds the reference value, the parameter should be analysed after each treatment process to determine log removal by the barriers in place and to assess whether the risk of pathogenic virus breakthrough is adequately controlled. Refer to **subsection 3.5** ('Risk assessment monitoring') of this Guidance for more details.

10.3.3 General guidance

General guidance for private water suppliers is that they should consider the following:

- EPA guidance on disinfection, *E. coli* and turbidity (*EPA Water Treatment Manual: Filtration, Water Treatment Manual: Disinfection*, *EPA Drinking Water Advice Note No. 3, EPA Drinking Water Advice Note No. 5,* available at https://www.epa.ie) provides advice on operational monitoring to identify and reduce microbiological risks.
- EPA guidance on organic disinfection by-products, such as THMs and in drinking water (*EPA Advice Note 4 Rev 2,* available at https://www.epa.ie), providing guidance to water treatment plant operators to ensure that the levels of organic disinfection byproducts (THMs and HAAs) in drinking water are kept as low as possible.
- The appropriate operational monitoring arrangements to ascertain raw water quality, including the parameters to be monitored and the frequency of monitoring. Whenever possible this should include continuous monitoring of key parameters such as turbidity and conductivity, with appropriate alarm levels to give early warning of deteriorating raw water quality.
- Where a source risk is identified that cannot be dealt with by the existing treatment processes, the private water supplier must consider with the source protection agencies whether any controls are possible or if it must improve treatment.

- Liaise with the relevant local authorities as the regulatory supervisory authority to inform them of the results of any sampling and analysis they have carried out on the source water under any relevant Regulation.
- Appropriate treatment processes to treat the raw water, including all reasonably expected variations in raw water quality, to ensure consistent compliance with the parametric values in Schedule 1 to the Regulations, to verify the effectiveness of disinfection and to minimise the formation concentrations of both organic disinfection by-products, such as THMs and HAAs, and inorganic disinfection byproducts such as chlorates, chlorites and bromates in drinking water.
- Written criteria and arrangements for ceasing abstraction of raw water if its quality is such that the installed treatment processes are unlikely to be effective and therefore the treated water quality gives rise to, or is likely to give rise to, a potential danger to human health. If cessation of abstraction is not practical, the private water supplier must consult the appropriate local authority, as supervisory authority, which in turn must consult and agree with the Health Service Executive (HSE) and advise the private water supplier on the arrangements needed to protect consumers.

10.4 Water treatment plant operation

Each water treatment plant site should be secure from unauthorised access. The level of security will depend on the location of the site (urban or rural, etc.) and a risk evaluation of the location. The immediate surroundings of the site should not present a potential risk to the raw water arriving at the works or to the operation of the treatment processes (for example a nearby railway line or road). The site should not present a risk to nearby residents or the environment (for example should there be an accidental release of chemicals used in the treatment and/or disinfection processes).

Chemicals should be appropriately stored and handled in order to protect the health and safety of plant operators and to prevent spillages to the ground or nearby watercourses. Sludge from the treatment plant waste stream should be appropriately handled, treated and disposed of. Similarly, liquid residuals from the treatment plant waste stream should be appropriately treated and clarified prior to permitted discharge to the environment.

Each private water supplier should have a detailed map of the water treatment works site showing clearly the location of chemical storage and transfer infrastructure, each treatment process, including sludge treatment, and the routes of the pipework connecting each process and the location of ancillary equipment such as dosage systems, pumps and valves. There should be a schematic diagram of each process showing the equipment, such as tanks, pumps and valves and chemical dosage systems, needed to operate the process. The diagram should also show the monitoring points to control each process.

Operational monitoring programmes provide a framework for the rapid identification of operational performance issues and water quality problems, and thus may offer opportunity for a water supplier to assess and manage certain risks on an ongoing basis.

Certain private water suppliers will be required to carry out a risk assessment of the water treatment plant, as part of Regulations 9 (‘Risk-based approach to water safety’) and 11 (‘Risk assessment and risk management of supply system’). Where applicable, their DBO operator should be consulted. The purpose is to determine whether there are any risks to the operation of the treatment processes that are not controlled adequately and, if there are, to take appropriate action to reduce the risks.

This risk assessment should include consideration of:

- the effect of seasonal variations in key raw water quality parameters, the frequency and duration of such variations and what actions might be taken, for example adjustments to treatment such as generation of alarm conditions using raw water monitoring, increasing coagulant dose, reducing flow through the works, and reducing intervals between filter backwash,
- the risks of failure of the coagulation/flocculation/clarification (CFC) process and what actions might be taken, such as use of automated coagulation dosing control systems, in response to variation in raw water turbidity or UV transmittance (UVT), as a surrogate for raw water TOC, duplication of coagulation dosing systems (duty/standby), reducing flow through works, etc.,
- the risks of failure of filtration efficacy and what actions might be taken, for example regular inspection of filter media condition for cracks, mud balls, etc., which can reduce effective filtration rates and intervals between necessary backwashing, etc.,
- the risks of failure of the disinfection system, provision of duty and standby dosing and automatic shutdown of the treatment plant in the event of disinfection failure,
- the risk of formation of exceedances in organic disinfection by-products' parametric limits such as THMs and HAAs consequent to the use of chlorination as a primary and secondary disinfectant for inactivation of pathogenic microorganisms (refer to the *EPA Advice Note 4 Rev 2*, available at https://www.epa.ie, for more details), and
- the risk of formation of exceedances in inorganic disinfection by-products' parametric limits such as chlorates and chlorites, consequent to:
  - the degradation of bulk liquid sodium hypochlorite to chlorate when delivered at an inappropriate concentration and stored and used in a sub-optimal manner, and
  - the generation of chlorite when chlorine dioxide is dosed as either a primary disinfectant or a pre-oxidant in advance of a CFC process.

Water suppliers should consult the *EPA Water Treatment Manual: Disinfection* (available at https://www.epa.ie) for further guidance relating to defining and quantifying the above risks relating to inorganic disinfection by-product formation.

The private water supplier should have a detailed procedure, as part of a QAS or of a Performance Management System (PMS), for the operation of each process, and each part of the process, that sets out what the operators should do in normal circumstances and how they should respond to unusual or abnormal circumstances. These procedures should be readily available to the operators at the site.

As part of these procedures, there should be criteria that describe the satisfactory operation of each process, such as a physical or chemical measurement (continuous or intermittent monitoring). These criteria should include warning levels that indicate when the performance of a process is deteriorating and requires investigation and alarm levels that indicate when performance is unacceptable and urgent action needs to be taken. These procedures should set out the tests that the operators are expected to carry out and the frequency of those tests, and the frequency at which the operators should read or check process monitors. The unusual or abnormal circumstances may be a significant change in raw water quality, a problem with the operation of a particular process, a result from a process monitor that is outside the specified criteria, or a failure to meet a drinking water quality parametric limit set out in Schedule 1 of the Regulations.

Operators should keep an operational log of all action taken at the treatment works including, but not restricted to:

- all chemical dosage rates and the reason for any changes to dosage rates,
- all on-site measurements made by operator and routine readings of monitors,
- any other changes made to the operation of processes such as deliberate changes in flow rates,
- records of filter backwashes if initiated manually, and
- other relevant information relating to the processes at the site.

The private water supplier should have a detailed programme for the regular calibration of all dosage systems and monitoring instrumentation and a system for recording the results of calibration. The private water supplier should ensure that:

- detailed schedules for maintenance, undertaken by DBO process contractors, the equipment manufacturers/ suppliers or its own maintenance staff, are recorded in respect of all key items of process equipment, and
- a system for ensuring that these schedules are programmed and met and the system for recording that maintenance has been carried out.

The private water supplier should have robust procedures controlling the use of substances (chemicals), products and materials at treatment works, including the following:

- only products approved by the European Commission or an equivalent approval system such as that of the Drinking Water Inspectorate for England and Wales (http://dwi.gov.uk/) are used, and any conditions associated with the approval are met,
- the person responsible for purchasing products should take into account the recommendations from the European Committee for Standardization (CEN) (available at https://standards.cencenelec.eu/),
- any contractors employed by the private water supplier are aware of the need to use approved products,
- contracts for new treatment works or new equipment at existing treatment plant sites specify that only approved products must be used,
- maintaining an up-to-date list of products approved by the European Commission or an equivalent approval system such as the Drinking Water Inspectorate for England and Wales (www.dwi.gov.uk), and
- acceptance of deliveries to the site, labelling and security of the delivery point and checking the quality of deliveries against the specification.

10.5 Use of online monitors and control systems

Private water suppliers may use online monitors at treatment works to measure raw water quality, to monitor and control individual processes and to monitor the final output of the works. This operational monitoring is important to provide rapid insight into operational performance and water quality problems. It allows rapid pre-planned remedial action if problems occur. **Subsection 3.3.1** ('Operational Monitoring Programme') of this Guidance covers these assessments at the water treatment plant.

Some examples of important online monitors and control systems are:

- Continuous monitoring of turbidity and conductivity in the raw water to provide warning of deterioration of raw water quality so that action can be taken, such as to adjust treatment.
- Discrete monitoring of aluminium or continuous coagulation control using streaming current potential or turbidity or UVT to monitor the performance of the coagulation/clarification process, so that adjustments to coagulation conditions can be made if performance deteriorates.
- Continuous monitoring of turbidity of the filtrate from each individual filter so that attention can be given to filter integrity, operation or backwashing when elevated turbidity is found. If this is not practical, there should be continuous monitoring of the combined filtrate from the filters.
- Continuous monitoring of the pH value of the combined filtrate so that, if necessary, an acid or alkali can be added to ensure that the pH value is optimised for effective disinfection.
- Continuous monitoring of disinfectant residual (usually chlorine) to control the disinfectant dose and to ensure that an appropriate minimum chlorine residual is present in the water entering supply. At some treatment works continuous chlorine monitors are installed at more than one point, such as after the chlorine contact tank and in the final water leaving the works after the treated water reservoir.
- Where UV disinfection is utilised as a primary disinfection barrier, continuous monitoring of key operational data such as UVT, UVI, UV dose, turbidity, flow to ensure that the UV dosage to be delivered by the UV unit for inactivation of the target pathogen(s) always operates within its validated range.

Suppliers should ensure that the trends from the continuous monitoring of the raw and treated water are recorded and easily accessible to operational staff at the treatment works facility to enable visualisation and monitoring of the plant performance (such as stable trends, peaks). Such trended data should also be recorded periodically and be easily available to the site-specific local authority, as supervisory authority under the Regulations.

It is important that the monitors and the control systems are properly set up and calibrated with appropriate control limits when controlling the dosage of chemicals and appropriate warning and alarm limits, so that they adequately monitor the individual processes to detect deterioration in process performance and deterioration of quality.

The private water supplier should have written instructions for the operation of online monitors and the associated control systems that include:

- regular calibration of the monitor with an appropriate calibration range and recording of the results of calibration,
- setting of the control limits and the warning and alarm limits and regular review of those limits,
- regular testing of the treatment plant control system to ensure it responds to out-of-control limits,
- regular testing of the alarm generation system to ensure that it is activated when the pre-set alarm limits are exceeded,

- when used to monitor and control key processes, there are back-up facilities in case of failure of the monitor or control system,
- arrangements to deal with power failures at the works,
- adequate arrangements for responding to alarms, including automatic cascade systems to alert staff, including that:
  - alarms cannot be ignored, switched off or bypassed,
  - key alarms are clearly identified,
  - written procedures exist for responding to alarms and it is clear what each relevant operator is required to do, and
  - records are kept of all alarms, the action taken and the results of that action, and
- monitors, control systems and telemetry systems are maintained regularly by the private water supplier's staff or the manufacturers/suppliers, and all maintenance carried out is recorded.

10.6 Training of operators

All operators employed directly by a private water supplier or by companies contracted by private water suppliers to operate their treatment works should be fully trained in the water treatment and disinfection processes that they are expected to operate. The training should include normal process operation, identification of faults in the process, how to rectify faults and how to react in emergency situations.

Each operator should have a copy of the site-specific schematic diagrams of the processes at the works, the works operating manual and the operating instructions provided by the designer for the relevant processes.

For contracted DBO process contractors with multiple staff members or operators providing water treatment to private water suppliers, a supervisor should review each operator's performance regularly and training needs to be updated. Full records of operator training including the training courses attended, the processes they are trained to operate, the dates of the training and any refresher training should be recorded and provided to the private water supplier when required.

All operators, maintenance staff and samplers (and any contractors and subcontractors) working at the treatment works, where they could come into contact with partially or fully treated drinking water or with equipment that is in contact with drinking water, should have been fully trained in hygienic practices appropriate to their duties. Where appropriate, this training should include the actions required if one of these personnel has an illness (such as typhoid, paratyphoid, dysentery, persistent diarrhoea or vomiting, jaundice or hepatitis (A or E), prolonged unexplained fever) that could pose a risk of contamination of the drinking water supply or spread of the illness to other personnel.

The Local Authority Services National Training Group (LASNTG) offers training programmes for water treatment works operators and supervisors. Details can be found at the LASNTG website (https://lasntg.ie/). These include the following courses relevant to water treatment works operation:

- 7307 Disinfection of Water for Potable Use,
- 1247 Drinking Water Incident Management,
- 1063 Filters Evaluation Operation Maintenance,
- 2057 Fluoridation of Water Supplies,

- 7108 Hygiene in Water Services,
- 7026 Membrane Technology in Water/Wastewater Plants,
- 1418 Pumps Operation and Maintenance,
- 2110 Quality Assurance Water Treatment Plants,
- 1016 Risk Assessment for *Cryptosporidium*,
- 7030 Safety for Water/Wastewater Workers,
- 7031 Sludge Handling,
- 7032 Taste and Odour Issues in Water Treatment,
- 1419 Water Clarification Process/THM Removal,
- 7035 Water Conservation – Operatives,
- 1140 Water Treatment – Dealing with Problems,
- 2071 Water Treatment – Plant Operators Assessment Course including Practical Assessment, and
- 2084 Water Treatment & Distribution – Appreciation.

The NFGWS also provides a range of training courses tailored for staff and GWS boards. Details can be found on the NFGWS website (https://nfgws.ie/training-courses/) or via the group water scheme's local NFGWS Development Officer. Some courses relevant to water treatment works operation are:

- Quality Assurance System Implementation,
- Introduction to GWS Management & Operations,
- Management Training Programme for GWS Directors, and
- Drinking Water Source Protection.

Alternative courses might be available through other training institutions. Information on operator training is also provided in **Section 11** ('Distribution Network and Related Matters') of this Guidance.

Section 11: Distribution Network and Related Matters

11.1 Introduction

Subsection 11.2 gives an overview of the operation and maintenance of the distribution network, highlighting the importance of compliance, risk assessment and corrective measures to ensure drinking water safety and quality.

Subsection 11.3 presents recommended procedures for handling new, repaired and relined mains, emphasising the need for design, installation, testing and compliance with national and European Union (EU) standards.

Subsection 11.4 discusses the minimum requirements for materials, chemicals and filter media, as depicted in the Regulations.

Details on relevant training applied to the distribution network are provided in **subsection 11.5**.

Subsection 11.6 discusses the need for water leakage assessments and the creation of action plans with the aim of reducing water leakage rates. The requirements of the Regulations with regard to leakage do not apply to the size and scale of current private water supplies in Ireland, but a short overview is provided for information.

The EPA has established detailed guidelines for the inspection, cleaning and maintenance of service reservoirs to ensure the safety and quality of drinking water. These guidelines, outlined in *EPA's Advice Note 10: 'Service Reservoir, Inspection, Cleaning and Maintenance'* (available at https://www.epa.ie), provide best practice and regulatory requirements that water suppliers must adhere to for maintaining reservoir integrity and functionality.

The distribution of water to the point of supply, as part of the supply system (also including abstraction, treatment and storage) defined in the Regulations, is subject to risk assessment and management, as defined in Regulation 11. Relevant local authorities, as supervisory authorities, shall ensure that risk assessment and risk management of the supply system are carried out by each private water supplier. This risk assessment and management requirement does not apply to private water supplies providing less than 10 m^3/day or supplying fewer than 50 persons. More details on risk assessment monitoring can be found in **subsection 3.5** ('Risk assessment monitoring') of this Guidance.

11.2 Operation and maintenance of the distribution network

In terms of operation, three key aspects are highlighted in the Regulations. Firstly, Regulation 7 emphasises the importance of measuring compliance with parametric values at various points. These include within premises at the tap, water supplied by tanker, risk points in domestic distribution systems, and water used in food businesses.

Secondly, water suppliers are mandated to conduct risk assessments and implement risk management practices as per Regulations 9, 10 and 11. This includes the preparation of drinking water safety plans of the supply system by 12 January 2029 (Regulation 9 (6)) and undertaking corrective actions (Regulation 9 (8)) based on feedback from the EPA. Small regulated supplies of less than 10 m^3/day or serving fewer than 50 people are not subject to these requirements.

The NFGWS is developing a DWSP tool to help GWSs implement risk assessment risk management approaches in line with the Regulations. The tool will be available on the NFGWS website: https://nfgws.ie/.

Thirdly, maintenance responsibilities are divided among water suppliers and premises owners. The private water supplier is responsible for maintaining its distribution network to ensure that water complies with the specified parametric values. This includes ensuring that corrective actions are undertaken (Regulation 9(8)) and advising property owners on possible remedial actions (Regulations 8(3)).

Owners of premises supplied with water for human consumption must maintain their domestic distribution systems within their own property boundary to prevent any risk of non-compliance with parametric values (Regulation 8 (2)). They must take appropriate measures to reduce or eliminate risks, including implementing necessary treatment techniques (Regulation 8 (3)).

The private water supplier should have a detailed map and schematic diagram of the distribution network showing the location of any service reservoir, water tower and storage tank, each break-pressure tank, distribution mains, all valves including pressure reducing valves and all hydrants and washouts. It is also vitally important that private water suppliers know, and keep accurate records of, the status and performance of all valves (closed, open, partially open), so that when changes need to be made to the operation of the network, the water travels in the direction intended.

The private water supplier should carry out a risk assessment of the distribution network to determine whether there are any risks in the network that are not controlled adequately and, if there are, to take appropriate action to reduce the risks.

The risk assessment and risk management should be according to Regulations 9(1) and 9(2). This risk assessment should include consideration of, for example:

- the security and integrity of service reservoirs and water towers,
- the length of time water remains in the service reservoirs/water towers and the network – time should be minimised to avoid deterioration of quality and 'stale' water, but consistent with maintaining adequate supplies,
- what might happen if it is necessary to alter the distribution of water in the network, for example flow increases or flow reversals resulting in disturbance of any deposits in the networks causing discoloured water to be supplied to consumers,
- potential back-siphonage of contaminated water into the distribution network from industrial, commercial and domestic premises, and
- unauthorised or improper use of hydrants and washouts resulting in opportunities for direct contamination through the open hydrant or washout or indirect contamination through reduction in pressure in the network.

The EPA may review the risk assessments and risk management plans prepared by water suppliers and may provide feedback. The water supplier must ensure that necessary corrective actions are implemented (Regulation 9 (8)).

Distribution networks inevitably contain some deposits arising from inadequate treatment in the past and from corrosion of the materials of the distribution network. These deposits tend to accumulate in low-flow parts of the distribution network. If they are disturbed, consumers could be supplied with discoloured water containing particulate matter. Private water suppliers should have written procedures for the operation of the network that minimise the risk of disturbance of these deposits.

Before a private water supplier makes any significant change to the operation of the distribution network, it should carry out a risk assessment of the consequences of making that change on drinking water quality, particularly discolouration of water. The risk assessment should lead to a method statement (for example the order of opening and closing valves and the rate at which they are opened and closed) in order to minimise any risk. These operational procedures should include, for example:

- the way in which a new or stand-by treatment works is brought into supply to avoid surges in flow in distribution (increase the flow from the works slowly),
- the way in which the distribution network is managed to satisfy changes in demand to avoid sudden increases in flow and to avoid as far as possible flow reversals (moving of water from one area of the network to another by careful shutting and opening of appropriate valves),
- the way in which the distribution system is managed when it is necessary to change its operation to deal with, for example, internal inspection and repair of a service reservoir/water tower/storage tank, repair of burst mains and mains rehabilitation, to avoid sudden increases in flow and minimise flow reversals, and
- maintaining adequate pressure within the system to avoid ingress of environmental water surrounding the water mains.

Deterioration of water quality during distribution can also occur if the water remains in the distribution network for too long. Typically, the water can develop an offensive taste or odour when it becomes stale and has been in contact for a long time with the materials of the distribution system, any biofilms on the internal surfaces of the system or any deposits in the system. The private water supplier's procedures should include managing the distribution network in a way that minimises the time water is resident within the network or sections of the network.

Automatic continuous chlorine monitors installed at the outlet of the service reservoir/water tower/tank and/or appropriate points in the distribution network with appropriate low chlorine warning and alarm limits can provide a useful guide on whether contamination may have entered the system.

The procedures should also specify that only materials of construction that have been approved by a European Commission system or an equivalent approval system (Drinking Water Inspectorate England and Wales (DWI List) may be sufficient) should be used within the distribution network in contact with water and that any conditions associated with the approval are met.

When it comes to maintenance, the responsibilities are divided among local authorities, water suppliers and premises owners. The water supplier is responsible for maintaining the distribution network to ensure that water complies with the specified parametric values. This includes ensuring that corrective actions are undertaken and advising property owners on possible remedial actions (Regulation 8(3)). The 2025 amendment to the Regulations allows local authorities to direct or advise the property owner to take certain actions within the premises.

The private water supplier should have procedures for the inspection of distribution networks (opening of hydrants to observe any deposits, observing the condition of mains when repairing bursts, etc.) as part of its criteria for deciding when maintenance is needed. Other criteria for determining when maintenance is needed should include the adequacy of residual chlorine from manual testing in the network, the frequency of burst mains, the frequency of consumer complaints about drinking water quality, small animals in the water (*Asellus* spp., *Gammarus* spp., chironomids, worms, etc.) or low water pressure.

The private water supplier should have a programme of routine flushing of the network through washouts that concentrates on parts of the network where deposits are known to accumulate. For parts of the distribution network where there are regular difficulties that cannot be adequately controlled by flushing, the private water supplier will need a mains rehabilitation programme. This programme could include mechanical cleaning of mains, relining of mains and replacement of mains. Advice on the precautions to be taken when carrying out such programmes is given in **subsection 11.3** of this Guidance.

11.3 New mains, repaired mains and relined mains

Whenever work is carried out on the distribution network that involves opening a main, there is a risk of contamination during the process that could result in contamination of the water supply when the main is returned to service. Many drinking water contamination incidents are caused by water suppliers, or their contractors, failing to follow good practice and take adequate precautions during such work to minimise the risk. Such work could involve the installation of a new main, the repair of a burst in an existing main and the cleaning and relining of an existing main.

To minimise the risk of contamination during such operations, it is recommended that the private water supplier has written procedures and instructions for carrying out these processes. The procedures should include:

- checking that the operators or contractors carrying out the work have followed the written procedures and instructions, and
- checking that operators and contractors keep documented records of all actions taken within the distribution network.

Frequently when these processes are carried out on the distribution network, there will be a need to discharge significant quantities of super-chlorinated water (water with higher than normal levels of chlorine used to disinfect the new, repaired or relined mains) or flushing water containing deposits from the cleaning process. Such chlorinated water may kill fish and other aquatic life if discharged to a water course and may interfere with the operation of sewage treatment works if discharged to a sewer or surface drain.

Super-chlorinated water must not be discharged to a water course or to a surface drain. It may be possible to discharge such water following dechlorination. Similarly, super-chlorinated water must not be discharged to a sewer or a surface drain leading to a sewage treatment works. Flushing water containing deposits may deoxygenate or partially deoxygenate a water course or may interfere with sewage treatment processes, and should not be discharged without the consent of the local authority. Any super-chlorinated or flushing water that cannot be dechlorinated or discharged at the working site will need to be taken by tanker to a suitable disposal site.

11.3.1 Installation of new mains

The following aspects are important for avoiding contamination during the installation and for ensuring that the drinking water quality standards are met once the main is brought into service, and they should be included in the private water supplier's procedures:

- the mains are designed and sized carefully so that:
  - they are large enough to meet the demand for water but not so large as to result in excessive residence time of water in the mains,
  - dead ends and water stagnation are avoided, but if this is not possible, adequate flushing points are provided,
  - drainage of chambers for valves, meters, hydrants, etc. takes water away from the mains,
  - air valves are at the highest point in the relevant parts of the distribution network, and
  - the material of the mains in contact with the water is approved by the European Commission or by an equivalent approval system (DWI list of approved products can be found at https://dwi.gov.uk/) and is used in accordance with any approval conditions, and
- following installation, the mains must be cleaned and disinfected,
- disinfection of the service connections if there is any doubt about their cleanliness,
- during and following the cleaning and disinfection process, samples are taken and analysed as quickly as possible, as follows:
  - free chlorine residuals to ensure that an adequate residual has been maintained throughout,
  - qualitative taste and odour of the displacement water for aesthetic suitability before putting the main into supply,
  - visual appearance to check that all samples look satisfactory, and microbiological analysis, particularly of coliforms, from a number of points along the mains including the extremities to check that all samples are free from coliforms before the main is put into supply, and
  - microbiological analysis, particularly coliforms, from a number of points along the mains including the extremities to check that all samples are free from coliforms before the main is put into supply, and
- if all tests are satisfactory, careful introduction of the new mains into supply,
- a nominated person should be responsible for checking that everything has been carried out according to the procedures before giving permission for the new mains to be brought into supply.

11.3.2 Repair of burst mains

The following aspects are important for avoiding contamination during the repair and for ensuring that the drinking water quality standards are met once the repaired main is brought back into service (in some circumstances a main can be repaired while still in service), and they should be included in the private water supplier's procedures.

For repairs that involve cutting open the main, these should include:

- that water should be kept out of the trench surrounding the repair; that special precautions are taken should there be any significant risk of pollution from, for example, sewage because of a nearby sewer,
- if practical, disinfecting the main in a similar manner to new mains but, for example, with a minimum contact period of two hours with 20 mg/l free chlorine or 30 minutes with 50 mg/l chlorine,
- if the above is not practical, disinfecting all surfaces that will come into contact with the treated water with a solution containing, for example, 1000 mg/l chlorine,
- after flushing, taking microbiological samples for coliforms,
- returning the main to service after flushing, provided there is no reason to suspect that contamination has entered the main (no need to wait for the results of microbiological samples),
- when there is reason to suspect that contamination may have entered the main, keeping the main out of service until the results of microbiological samples are available and are satisfactory, and
- making a nominated person responsible for checking that everything has been carried out according to the procedures before giving permission for the main to be returned into supply.

For repairs that involve using a collar and keeping the main in service while the repair is made, these should include:

- disinfecting the collar and the area of the fracture with a solution containing, for example, 1000 mg/l free chlorine, and
- taking a microbiological sample for coliforms to confirm that there was no contamination during the procedure.

11.3.3 Relining of existing mains

A number of generic materials can be used for relining existing mains to prolong their life. The most common ones are polyurethanes, epoxy resins, cement mortar and polyethylene or other type of plastics.

The following aspects are important for avoiding contamination during the relining operation and for ensuring that the drinking water quality standards are met once the relined main is brought back into service, and they should be included in the private water supplier's procedures.

For mains that are relined with polyurethane and epoxy resin materials, particular care must be taken to ensure that the components of these relining materials are thoroughly mixed in the correct proportions and that the applied mixture is adequately cured before the main is returned to service. The procedures should include:

- Using only polyurethane and epoxy resin components that have been approved by the European Commission or an equivalent approval system such as the DWI (list of approved products can be found at https://dwi.gov.uk/), in accordance with any approval conditions.
- Using contractors that are competent to carry out the process. The contractors should apply these approved materials in accordance with strict operational requirements such as those documented in UK Water Industry

Information and Guidance Note IGN 4-02-02, 'Code of Practice: In situ resin lining of water mains', and Water Industry Specification WIS 4-02-01, 'Operational Requirements: In situ resin lining of water mains'. Both documents can be accessed at https://standards-board.water.org.uk/wis-ign/.

- That a nominated person in the private water supplier is responsible for supervising the contractor, checking that all procedures have been followed satisfactorily and giving permission for the relined main to be returned to supply.

Generally, cement mortar relining is suitable for large-diameter mains because the residence time of the water is very short and there is unlikely to be significant leaching of the components of the cement. However, cement mortar relining is not suitable generally for other sizes of mains when the water to be supplied through the mains is soft, with, say, an alkalinity less than about 50 mg/l as calcium carbonate, because components of the cement are likely to be leached out to some extent, causing high pH values. Cement mortar relining is suitable generally for other sizes of mains when the water is hard, above about 50 mg/l as calcium carbonate. Particular care also has to be taken to ensure that the cement mortar is applied and cured properly before the main is returned to service. It is not possible to be specific about the sizes of mains because the suitability of a cement mortar product will depend primarily on its composition, the size of the main and the alkalinity of the water.

The procedures should include:

- Using only cement mortar products that have been approved by the European Commission or an equivalent approval system such as the DWI (list of approved products can be found at https://dwi.gov.uk/) and are used in accordance with any approval conditions.
- Using contractors that are competent to carry out the process. The contractors should apply these approved materials in accordance with strict operational requirements.

11.4 Minimum hygiene requirements for materials, treatment chemicals and filter media

The private water supplier shall ensure that materials that come into contact with water intended for human consumption meet the requirements set out in Regulation 19(1)(2)(3). Regulation 20(1)(2)(3) directs the private suppliers on the minimum requirements for treatment chemicals and filter media that come into contact with water intended for human consumption. The European Commission published in the Official Journal on 23 April 2024, 'the Commission acts on minimum hygiene standards for materials and products that come into contact with drinking water'. There are three Implementing Decisions and three Delegated Regulations, namely 1.IA, 2.IA and 3.DA; 4.IA, 5.DA and 6.DA.They will apply from 31 December 2026 to materials and products intended to be used in new installations for the abstraction, treatment, storage or distribution of water, or for repair works, including supply pipes, valves, pumps, water meters, fittings and taps.

The private water supplier should have robust procedures controlling the use of substances (chemicals), products and materials at treatment works, including:

- that only products certified by an independent third party (approval body) as manufactured in accordance with the relevant European Standard are used,
- that only products approved by the European Commission or equivalent approval system such as DWI (list of approved products can be found at: http://dwi.gov.uk/) or an equivalent European approval system are used, and any conditions associated with the approval are met,
- that the outputs of CEN/TC/164 Working Groups are taken into account,
- that contractors are aware of the need to use approved products,

- that contracts for new treatment works or new equipment at existing treatment works specify that only approved products must be used,
- maintaining an up-to-date list of European approved products and those approved by the DWI, and
- acceptance of deliveries to the site, labelling and security of the delivery point and checking the quality of deliveries against the specification.

11.5 Training of operators

Training for operators in the management and operation of drinking water supply systems is crucial to maintaining water quality and system integrity. These guidelines outline the essential aspects of operator training.

It is advisable that operators responsible for managing drinking water systems participate in training programmes. These should be tailored to the specific elements of a water supply zone (or zones), catchment, water treatment plant and private supply system to safeguard public health.

The Local Authority Services National Training Group (LASNTG) offers training programmes for water treatment plant operators and supervisors. Details can be found at: https://lasntg.ie/. These include the following courses relevant to distribution network operation:

- 7108 Hygiene in Water Services,
- 1418 Pumps Operation and Maintenance,
- 7030 Safety for Water/Wastewater Workers,
- 7035 Water Conservation – Network Management – Leakage Control – Operatives,
- 7036 Water Conservation – Network Management – Leakage Control – Managers,
- 2084 Water Treatment & Distribution – Appreciation,
- 2082 Distribution System Operations and Maintenance, and
- 7094 Distribution System – Unidirectional flushing.

The NFGWS also provides a range of training courses tailored for staff and GWS boards. Details can be found on the NFGWS website (https://nfgws.ie/training-courses/) or via the group water scheme's local NFGWS Development Officer. Two courses relevant to distribution networks are:

- Water Demand Management & Leakage Control, and
- Introduction to GWS Management & Operation.

Alternative courses might be available through other training institutions.

11.6 Assessment of Water Leakage

Regulation 5(1) and 5(2) call for water suppliers supplying not less than 10,000 cubic metres of water per day or serving not fewer than 50,000 people to:

(a) undertake an assessment of water leakage levels within their distribution network, and

(b) evaluate the potential for improvements in water leakage reduction within their distribution network, using the infrastructure leakage index (ILI) rating method or another appropriate method.

The assessment shall take into account relevant public health, environmental, technical and economic aspects and outline any action plans necessary for the purpose of reducing the water leakage rate.

There are no private water supplies of this scale of population or volume in Ireland, so these requirements of Regulation 5 are not currently applicable to the private water supply sector.

It is important that private suppliers should reduce leakage within their distribution networks and maintain low levels of unaccounted-for water (UFW) in order to minimise contamination risk and contribute to climate change mitigation, as well as provide financial savings. The NFGWS has published various materials available on https://nfgws.ie/, such as a guidebook on 'Reducing Water Demand on Distribution Systems' and water conservation toolkits.

Private suppliers are also required under Schedule 4 Point 6 of the Regulations to advise consumers on how to reduce water consumption, where appropriate, how to use water responsibly according to local conditions and how to avoid health risks due to stagnant water.

Section 12: Audit of water supplies

12.1 Introduction

This section includes guidance on the scope and content of audits undertaken by local authorities at private water supplies. This may change from year to year on the basis of enforcement priorities of the local authority.

The requirements regarding supervisory authorities' performance verification of water suppliers are outlined in Regulation 30 of the Regulations. Each local authority is required under Regulation 30(3) to undertake audits of private water supplies to ensure that the provisions of the Regulations are met.

In order to ensure satisfactory compliance of drinking water with relevant water quality standards or other parametric values specified in Schedule 1, local authorities may (i) issue directions to the relevant private supplier, as the local authority considers necessary, and/or (ii) provide assistance or support to the private supplier, under mutually agreed terms and conditions, as deemed helpful by the local authority after consultation with the supplier.

Regulation 15 ('Protection of human health') also sets out enforcement and intervention powers available to local authorities in cases where there is a potential danger to human health.

The EPA undertakes audits of local authority monitoring programmes for private water supplies under Regulation 13. These audits also assess registers of private water supplies and local authority enforcement of failures detected in private water supplies. An overview of the scope of these EPA audits is provided in **subsection 12.4**.

12.2 Audits of private supplies

The EPA recommends that local authorities should undertake site visits, inspections, audits and compliance meetings in respect of private supplies on a regular basis. A risk-based approach for site selection should be used, including a focus on poorly performing or high-risk supplies.

In the case of audits of private water supplies, the effect of the risk-based approach is that supplies that are considered to be higher risk should receive more enforcement action (for example, requirement for provision for more detailed information, more frequent or more detailed audits, or other enforcement tools such as a Direction). Conversely, supplies that are performing better may have a lesser degree of enforcement action.

The EPA recommends that each local authority prepares an annual plan for the audit of water supplies in its functional area. This annual plan should include both scheduled and reactive audits and might include audits of water supplies that:

- have water restrictions (advice to boil water, advice not to drink water, etc.) in place,
- have persistent non-compliance with the standards in Tables A, B or C of Schedule 1 to the Regulations, particularly the microbiological standards,
- have no treatment or have treatment plants operating over capacity,
- have been categorised as high or very high risk in relation to *Cryptosporidium*,

- have had a significant incident notified to the local authority,
- are of significant size in terms of volume or population, and
- require a general assessment of a plant or focus on a particular area of operation or management.

Audits can be announced or unannounced. An announced audit is one that is notified by the local authority to the water supplier in advance, and information may be requested by the local authority to be provided before the audit date so it can be reviewed by the inspector to guide and inform the audit process (for instance, to identify priority processes or areas on-site).

It is important that this information is provided in a timely manner and in the format required by the local authority. Late submission or non-submission of this pre-audit information may lead to a more time-consuming audit and/or a requirement for further enforcement action by the local authority.

In general terms, the audit gives an indication of the performance of a water treatment plant and private water supply on a given date.

12.3 Format of private supply audit report

The format of the audit report will depend on the individual supply and the reason for carrying out the audit.

The EPA recommends that the audit report should contain the following standard information (where applicable):

- water supply information, including name, organisation, scheme code, county and site visit reference number,
- site visit detail, including:
  - inspection date and whether it has been previously announced or not,
  - inspection time start and finish,
  - local authority's inspector(s) and, if it applies, additional visitors,
  - water supplier personnel attending, and
  - report issue date and author,
- introduction,
- scope of audit,
- observations and recommendations.

Depending on the individual supply and the reasons for carrying out the audit, some or all of the following areas may also be included in the audit report:

- incident management,
- source protection and raw water quality,
- management and operation of key treatment processes such as coagulation, clarification, filtration, disinfection, chlorination, UV,
- progress with action programmes (for instance under previous audits or a direction from the local authority),
- disinfection in the distribution network,
- treated water quality results,

- review of monitoring trends, record keeping and reporting of drinking water quality,
- Drinking Water Safety Plans – development and implementation,
- alarms, inhibits and water supplier oversight,
- site-specific issues, and
- any other information considered necessary by the local authority.

The local authority should prepare a final report of the audit as soon as practical after completion of the audit.

The EPA recommends that local authorities maintain copies of their audit reports and subsequent enforcement actions.

12.4 EPA monitoring programme audits

The EPA conducts audits of local authorities' private supply compliance monitoring programmes on a regular basis**.** The EPA will notify the selected local authorities in advance to schedule the audit.

The audits cover the private supply register and the management and implementation of compliance monitoring programmes, including but not limited to:

- the local authority's register of private water supplies in accordance with Regulation 14(5),
- how the register was developed and maintained and evidence of same,
- how the pre-determined compliance monitoring programme was developed,
- the compliance monitoring programme (including Group A/B samples required, sample location, dates of sampling, sample results, etc.),
- maps of each private supply's distribution networks, where relevant, illustrating the sample locations,
- list of any sampling shortfall(s) and reason for the shortfall(s),
- management processes, procedures, responsibilities and controls (including procedures for consultation with HSE, water supplier, etc.), and
- following the audit, the EPA prepares a report of its findings and these audit reports are published on the EPA website (https://www.epa.ie).

Bibliography and References

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Circular L4/09 for Drinking Water Incident Response Plan, 2009 https://www.nfgws.ie

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Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 https://www.irishstatutebook.ie

European Commission's guidelines for microplastics measurement in drinking water https://www.eur-lex.europa.eu

European Commission's guidelines for PFAS monitoring https://www.eur-lex.europa.eu

EDEN website https://www.edenireland.ie

EPA Advice Notes https://www.epa.ie

EPA Treatment Manual: Filtration and the EPA Disinfection Manual https://www.epa.ie

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European Union (Drinking Water) Regulations 2023 (S.I. No. 99 of 2023) https://www.irishstatutebook.ie

FSAI – Food Safety Authority of Ireland https://www.fsai.ie/home

HSE (2024) Management of Initial Notification of a Drinking Water Issue of Potential Danger to Human Health. Revision 3, September 2024. https://www.hse.ie

INAB website https://www.inab.ie

International Organization for Standardization (ISO) website https://www.iso.org

Ministerial Guidelines on Source Protection https://www.gov.ie

National Federation of Group Water Schemes https://nfgws.ie/

National Strategy to Reduce Exposure to Lead in Drinking Water https://www.health.gov.ie

The Irish Expert Body on Fluorides and Health's 'Code of Practice on the Fluoridation of Drinking Water' https://www.fluoridesandhealth.ie

Watch List (European Commission in accordance with Article 13(8) of Directive 2020/2184) https://www.eur-lex.europa.eu

Water Services Act 2014, Water Services Act 2017 https://www.irishstatutebook.ie

World Health Organization https://www.who.int

An Ghníomhaireacht um Chaomhnú Comhshaoil

Tá an GCC freagrach as an gcomhshaol a chosaint agus a fheabhsú, mar shócmhainn luachmhar do mhuintir na hÉireann. Táimid tiomanta do dhaoine agus don chomhshaol a chosaint ar thionchar díobhálach na radaíochta agus an truaillithe.

Is féidir obair na Gníomhaireachta a roinnt ina trí phríomhréimse:

- Rialáil: Rialáil agus córais chomhlíonta comhshaoil éifeachtacha a chur i bhfeidhm, chun dea-thorthaí comhshaoil a bhaint amach agus díriú orthu siúd nach mbíonn ag cloí leo.
- Eolas: Sonraí, eolas agus measúnú ardchaighdeáin, spriocdhírithe agus tráthúil a chur ar fáil i leith an chomhshaoil chun bonn eolais a chur faoin gcinnteoireacht.
- Abhcóideacht: Ag obair le daoine eile ar son timpeallachta glaine, táirgiúla agus dea-chosanta agus ar son cleachtas inbhuanaithe i dtaobh an chomhshaoil.

I measc ár gcuid freagrachtaí tá:

CEADÚNÚ

- Gníomhaíochtaí tionscail, dramhaíola agus stórála peitril ar scála mór;
- Sceitheadh fuíolluisce uirbigh;
- Úsáid shrianta agus scaoileadh rialaithe Orgánach Géinmhodhnaithe;
- Foinsí radaíochta ianúcháin;
- Astaíochtaí gás ceaptha teasa ó thionscal agus ón eitlíocht trí Scéim an AE um Thrádáil Astaíochtaí.

FORFHEIDHMIÚ NÁISIÚNTA I LEITH CÚRSAÍ COMHSHAOIL

- Iniúchadh agus cigireacht ar shaoráidí a bhfuil ceadúnas acu ón GCC;
- Cur i bhfeidhm an dea-chleachtais a stiúradh i ngníomhaíochtaí agus i saoráidí rialáilte;
- Maoirseacht a dhéanamh ar fhreagrachtaí an údaráis áitiúil as cosaint an chomhshaoil;
- Caighdeán an uisce óil phoiblí a rialáil agus údaruithe um sceitheadh fuíolluisce uirbigh a fhorfheidhmiú
- Caighdeán an uisce óil phoiblí agus phríobháidigh a mheasúnú agus tuairisciú air;
- Comhordú a dhéanamh ar líonra d'eagraíochtaí seirbhíse poiblí chun tacú le gníomhú i gcoinne coireachta comhshaoil;
- An dlí a chur orthu siúd a bhriseann dlí an chomhshaoil agus a dhéanann dochar don chomhshaol.

BAINISTÍOCHT DRAMHAÍOLA AGUS CEIMICEÁIN SA CHOMHSHAOL

- Rialacháin dramhaíola a chur i bhfeidhm agus a fhorfheidhmiú lena n-áirítear saincheisteanna forfheidhmithe náisiúnta;
- Staitisticí dramhaíola náisiúnta a ullmhú agus a fhoilsiú chomh maith leis an bPlean Náisiúnta um Bainistíocht Dramhaíola Guaisí;
- An Clár Náisiúnta um Chosc Dramhaíola a fhorbairt agus a chur i bhfeidhm;
- Reachtaíocht ar rialú ceimiceán sa timpeallacht a chur i bhfeidhm agus tuairisciú ar an reachtaíocht sin.

BAINISTÍOCHT UISCE

- Plé le struchtúir náisiúnta agus réigiúnacha rialachais agus oibriúcháin chun an Chreat-treoir Uisce a chur i bhfeidhm;
- Monatóireacht, measúnú agus tuairisciú a dhéanamh ar chaighdeán aibhneacha, lochanna, uiscí idirchreasa agus cósta, uiscí snámha agus screamhuisce chomh maith le tomhas ar leibhéil uisce agus sreabhadh abhann.

EOLAÍOCHT AERÁIDE & ATHRÚ AERÁIDE

- Fardail agus réamh-mheastacháin a fhoilsiú um astaíochtaí gás ceaptha teasa na hÉireann;
- Rúnaíocht a chur ar fáil don Chomhairle Chomhairleach ar Athrú Aeráide agus tacaíocht a thabhairt don Idirphlé Náisiúnta ar Ghníomhú ar son na hAeráide;
- Tacú le gníomhaíochtaí forbartha Náisiúnta, AE agus NA um Eolaíocht agus Beartas Aeráide.

MONATÓIREACHT AGUS MEASÚNÚ AR AN GCOMHSHAOL

- Córais náisiúnta um monatóireacht an chomhshaoil a cheapadh agus a chur i bhfeidhm: teicneolaíocht, bainistíocht sonraí, anailís agus réamhaisnéisiú;
- Tuairiscí ar Staid Thimpeallacht na hÉireann agus ar Tháscairí a chur ar fáil;
- Monatóireacht a dhéanamh ar chaighdeán an aeir agus Treoir an AE i leith Aeir Ghlain don Eoraip a chur i bhfeidhm chomh maith leis an gCoinbhinsiún ar Aerthruailliú Fadraoin Trasteorann, agus an Treoir i leith na Teorann Náisiúnta Astaíochtaí;
- Maoirseacht a dhéanamh ar chur i bhfeidhm na Treorach i leith Torainn Timpeallachta;
- Measúnú a dhéanamh ar thionchar pleananna agus clár beartaithe ar chomhshaol na hÉireann.

TAIGHDE AGUS FORBAIRT COMHSHAOIL

- Comhordú a dhéanamh ar ghníomhaíochtaí taighde comhshaoil agus iad a mhaoiniú chun brú a aithint, bonn eolais a chur faoin mbeartas agus réitigh a chur ar fáil;
- Comhoibriú le gníomhaíocht náisiúnta agus AE um thaighde comhshaoil.

COSAINT RAIDEOLAÍOCH

- Monatóireacht a dhéanamh ar leibhéil radaíochta agus nochtadh an phobail do radaíocht ianúcháin agus do réimsí leictreamaighnéadacha a mheas;
- Cabhrú le pleananna náisiúnta a fhorbairt le haghaidh éigeandálaí ag eascairt as taismí núicléacha;
- Monatóireacht a dhéanamh ar fhorbairtí thar lear a bhaineann le saoráidí núicléacha agus leis an tsábháilteacht raideolaíochta;
- Sainseirbhísí um chosaint ar an radaíocht a sholáthar, nó maoirsiú a dhéanamh ar sholáthar na seirbhísí sin.

TREOIR, ARDÚ FEASACHTA AGUS FAISNÉIS INROCHTANA

- Tuairisciú, comhairle agus treoir neamhspleách, fianaise-bhunaithe a chur ar fáil don Rialtas, don tionscal agus don phobal ar ábhair maidir le cosaint comhshaoil agus raideolaíoch;
- An nasc idir sláinte agus folláine, an geilleagar agus timpeallacht ghlan a chur chun cinn;
- Feasacht comhshaoil a chur chun cinn lena n-áirítear tacú le hiompraíocht um éifeachtúlacht acmhainní agus aistriú aeráide;
- Tástáil radóin a chur chun cinn i dtithe agus in ionaid oibre agus feabhsúchán a mholadh áit is gá.

COMHPHÁIRTÍOCHT AGUS LÍONRÚ

Oibriú le gníomhaireachtaí idirnáisiúnta agus náisiúnta, údaráis réigiúnacha agus áitiúla, eagraíochtaí neamhrialtais, comhlachtaí ionadaíocha agus ranna rialtais chun cosaint chomhshaoil agus raideolaíoch a chur ar fáil, chomh maith le taighde, comhordú agus cinnteoireacht bunaithe ar an eolaíocht.

BAINISTÍOCHT AGUS STRUCHTÚR NA GNÍOMHAIREACHTA UM CHAOMHNÚ COMHSHAOIL

Tá an GCC á bainistiú ag Bord lánaimseartha, ar a bhfuil Ard-Stiúrthóir agus cúigear Stiúrthóir. Déantar an obair ar fud cúig cinn d'Oifigí:

- An Oifig um Inbhunaitheacht i leith Cúrsaí Comhshaoil
- An Oifig Forfheidhmithe i leith Cúrsaí Comhshaoil
- An Oifig um Fhianaise agus Measúnú
- An Oifig um Chosaint ar Radaíocht agus Monatóireacht Comhshaoil
- An Oifig Cumarsáide agus Seirbhísí Corparáideacha

Tugann coistí comhairleacha cabhair don Ghníomhaireacht agus tagann siad le chéile go rialta le plé a dhéanamh ar ábhair imní agus le comhairle a chur ar an mBord.

Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

Headquarters

PO Box 3000,
Johnstown Castle Estate,
County Wexford, Ireland

T: +353 53 916 0600
F: +353 53 916 0699
E: info@epa.ie
W: www.epa.ie
LoCall: 0818 33 55 99

Regional Inspectorate

McCumiskey House,
Richview, Clonskeagh Road,
Dublin 14, Ireland

T: +353 1 268 0100
F: +353 1 268 0199

Regional Inspectorate

Inniscarra, Co. Cork,
Ireland

T: +353 21 487 5540
F: +353 21 487 5545

Regional Inspectorate

Seville Lodge, Callan Road,
Kilkenny, Ireland

T: +353 56 779 6700
F: +353 56 779 6798

Regional Inspectorate

John Moore Road, Castlebar,
Co. Mayo, Ireland

T: +353 94 904 8400
F: +353 94 902 1934

Regional Inspectorate

The Glen, Monaghan,
Ireland

T: +353 47 77600
F: +353 47 84987

Regional Offices

The Civic Centre,
Church St, Athlone,
Co. Westmeath, Ireland

T: +353 906 475722