

# Drinking Water Quality in Northern Ireland, 2020

A Report by the Drinking Water Inspectorate for Northern Ireland



*Sustainability at the heart of a living, working, active landscape valued by everyone.*





Northern Ireland Environment Agency

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## Foreword

I am pleased to present the 25th annual report on the quality of drinking water in Northern Ireland. The Drinking Water Inspectorate's (DWI's) primary role is to protect public health through effective drinking water regulation.

In Northern Ireland over 99% of the population receive their drinking water from Northern Ireland Water Limited (NI Water). The remainder is served by private water supplies. This report provides an independent assessment of drinking water quality of both public and private supplies for the calendar year 2020.

Safe, clean drinking water is critical for our health and wellbeing. This has been particularly important during the COVID-19 pandemic, when handwashing has been vital and the criticality of front line health services was, and continues to be to the fore. Many businesses were closed but others, eg food producers, increased production, placing additional demands on supplies.

As well as the COVID-19 response, NI Water dealt with increased domestic usage due to people working from home and as a result of the hot weather. NI Water staff worked tirelessly to ensure water quality was maintained and to keep customers in supply by maintaining water treatment works, the distribution network and critical laboratory services. We collaborated with NI Water to ensure that water quality was maintained, whilst its workforce was protected. I want to take this opportunity to commend the company on its response to the COVID-19 pandemic.

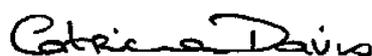
Overall public drinking water quality for 2020 remained high with 99.94% compliance, a slight increase from 2019 (99.90%). Compliance at private water supplies was 99.24%, a slight decrease from 2019 (99.29%).

A comparison of compliance with 2019 is difficult in light of necessary changes to sampling regimes due to COVID-19 restrictions. Compliance is normally assessed at the consumers' tap, and in 2020 NI Water requested permission from DWI to use zonal sampling points as access to dwellings was restricted and many businesses were closed. Through collaboration with NI Water, DWI approved the use of zonal sampling points. This enabled an effective regulatory monitoring regime to continue to ensure the protection of public health and maintain public confidence in the mains water supply. Overall there was a shortfall in sampling for 2020.

Also in 2020, collaboration with all stakeholders progressed to inform NI Water's capital investment programme for PC21 (Price Control 2021-2027). DWI supported NI Water's request for support to improve water quality at nine water treatment works requiring capital investment. The Utility Regulator's (UR) Final Determination for PC21 was published on 13 May 2021.

As well as domestic properties, a number of commercial businesses and public buildings such as food producers, hospitals and health care premises use a private drinking water supply. DWI worked with business owners and local council staff to ensure, where sampling could not be undertaken at private supplies that effective risk management was in place to protect public health. As businesses prepared to re-open, DWI published operational guidance and worked to ensure all premises were sampled prior to opening. The revised private water supplies monitoring programme was delivered in full and I congratulate everyone involved in this achievement.

I trust you will find this report interesting, and a useful insight into drinking water quality in Northern Ireland.



**Catriona Davis**  
**Chief Inspector of Drinking Water**  
**September 2021**

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## Executive Summary

This is the 25<sup>th</sup> report in a series published by the Drinking Water Inspectorate in Northern Ireland, acting in our role as the drinking water quality regulator for both public and private water supplies.

The report provides an independent assessment of the quality of drinking water provided by NI Water Limited (NI Water). It also presents details of the quality of private water supplies for which we have a regulatory responsibility and undertake a monitoring programme.

### COVID-19

As we all know the impact of COVID-19 has been unprecedented. The provision of vital services has been critical in responding to the pandemic. The provision of safe, secure, adequately funded drinking water supplies has been and continues to be vital to our health and well-being; the provision of front line services; supporting industry including the agri-food sector; and economic recovery. More detailed impacts of COVID-19 are outlined in the specific sections of the Report.

### Public Water Supplies

Each year NI Water implements a comprehensive programme of monitoring to assess and verify that the public drinking water supply meets stringent regulatory standards on quality. A number of key tests are conducted on samples collected from water treatment works; service reservoirs; and consumers' taps. In 2020, the COVID-19 restrictions meant that samples could not be collected at consumer taps and DWI issued an Information Letter (I/L 02/2020). This advised NI Water on the approach it should adopt in relation to consumer tap sampling, where access to properties was not possible and where the quality would be representative of that received by the consumer. NI Water also implemented its Analytical Services Contingency Plan, to manage the risk to its own staff, whilst ensuring that the necessary analyses could be conducted to verify the quality of the water supplied.

In 2020 the overall public drinking water compliance remained consistently high at 99.94%, slightly higher than 2019 (99.90%). The 0.06% non-compliance relates to 59 tests that failed to meet the required standard. Surrogate compliance at consumers' taps, measured through zonal sampling in 2020 also remained high at 99.91%, slightly higher than 2019 (99.84%). However, of the 43 regulatory parameters tested, nine did not achieve full compliance. Those parameters failing to meet full compliance were: Nickel, Aluminium, Iron, *Clostridium perfringens*, Enterococci, Taste, Odour, Coliform bacteria, and Pesticides – individual (MCPA).

The parameter with the lowest reported compliance in 2020 was Nickel at 97.50%. Although nickel may occur naturally in some ground waters, it is rarely found in the mains water supply. The main source of nickel is from the metal leaching from modern taps and other plumbing fittings.

Aluminium compliance dropped from 99.40% in 2019 to 99.29% in 2020, representing a five year low. Operational issues at water treatment works can often give rise to aluminium contraventions, which may later result in contraventions at consumers' taps due to disturbance of deposits in the distribution system.

Contraventions of microbiological parameters may indicate a failure in the treatment process or a breach in the integrity of the water supply system. An overall microbiological compliance figure at consumers' taps was reported in 2020 of 99.94% compared to 99.86% in 2019. Coliform bacteria were detected in four samples, and *Clostridium perfringens* and Enterococci both detected in one sample each. The improved compliance recorded for 2020 should be interpreted in light of the changes to sample location from the consumer tap to a fixed point in the water supply zone, considered to be representative of the water supply received by the consumer. There were a number of metals not analysed for, that would be specific to consumer tap compliance, which may have contributed to the overall increased compliance recorded. The inability to monitor for these parameters at consumer taps resulted in a shortfall in sampling for 2020.

All contraventions must be investigated by NI Water, and may in some cases be traced to distribution systems in domestic dwellings or within public buildings. In 2020, three reported contraventions related to internal plumbing systems in domestic properties, namely: two Coliform bacteria and one nickel. NI Water investigated the cause of the contraventions and issued letters to consumers advising them of the contraventions and offering appropriate advice to protect public health. One reported contravention related to odour in a public building.

The total number of water quality events (Annex 2) that occurred in 2020 was lower than in 2019, with 38 events reported to us by NI Water. Of these, we categorised one as Major, three as Serious, 24 as Significant, three as Minor and seven as Not Significant.

The Major event related to the impact of the COVID-19 pandemic on NI Water. Whilst this was outside the control of NI Water, the company response was critical to ensuring the continued protection of public health through the provision of safe, clean drinking water and the ongoing regulatory sampling and analysis to enable the consumer to have confidence in the public water supply. DWI worked closely with NI Water in ensuring the regulatory monitoring was fulfilled as far as possible, and commend the company in the contingencies it implemented in a very short time frame. Of the three Serious events, one related to chlorinous taste and odour following over dosing of chlorine at Fofanny Water Treatment Works (WTW), one to very high network demand in May / June 2020 and the other one to discoloured water following an issue at High Tober Service Reservoir (SR). Nineteen of the 24 Significant events reported related to ten water treatment works and were primarily related to difficulties with the treatment process or a lack of effective treatment relating to aluminium, *Cryptosporidium*, individual pesticides (MCPA), iron, odour and taste, and turbidity contraventions. Where *Cryptosporidium* was detected in drinking water, NI Water sought advice from the Public Health Agency (PHA), however the detections were not of sufficient concern to put restrictions in place. The other five Significant events occurred in distribution and related to discoloured water following operational work at Tullybrannigan South SR; water quality issues following the operation of Ballybriest SR at a very low level; aluminium contraventions following a burst on the Ards trunk main; loss of supply and low pressure after a burst on the Breda trunk main; and aluminium and iron contraventions after Slimero SR was operated at a low level. As part of the event assessment process, NI Water is required to implement mitigations as identified in its risk assessments for the management of its drinking water supplies. This ongoing evaluation should reduce the likelihood of similar future events.

To enable us to evaluate consumer confidence in the quality of drinking water, we receive information relating to consumer concerns and complaints from NI Water. In 2020, 65.1% of contacts related to the visual appearance, a slight increase from 2019 (63.9%). The total

number of consumer contacts reported in 2020 was 5993 compared to 5661 in 2019, an increase of 5.9%.

Where necessary, we take enforcement action (Annex 4), to secure remedial action within specified timeframes. In 2020, one Provisional Enforcement Order (PEO) issued under The Water and Sewerage Services (NI) Order 2006 was closed following the completion of works at Castor Bay WTWs to achieve compliance with the odour standard. Three Notices were issued by DWI against NI Water under The Water Supply (Water Quality) Regulations (Northern Ireland) 2017 (the Regulations). Two were in relation to the individual pesticide MCPA contraventions at Derg WTW and Ballinrees WTWs and one in relation to taste and odour contraventions at Ballinrees WTWs.

NI Water recently announced the commencement of the largest ever drinking water capital investment programme at Derg WTW (£12m). This is designed to achieve compliance with the requirements of the Notice issued by DWI in relation to ongoing contraventions of the regulatory limit for the individual pesticide MCPA.

## Private Water Supplies

The same drinking water quality standards apply for private water supplies as for the public water supply. Although less than 1% of the population receives water from a private supply, many more are exposed to them through their use in both commercial activities and public buildings. A number of premises in Northern Ireland that have a private supply also have a mains supply. Private supplies are used as an alternative to, or in conjunction with the public supply for a range of activities including food processing, holiday accommodation, and public buildings, including hospitals and care homes. A number of private water supplies are in use for economic reasons.

During 2020 our private water supply sampling programme monitored 175 sites, with seven new sites being registered during that period. Samples at private water supplies are collected by Environmental Health staff, acting on our behalf.

Overall compliance for 2020 is reported as 99.24%, a slight decrease from 99.29% reported for 2019. The regulatory requirements were not met on 114 occasions for 21 parameters, namely: Coliform bacteria, Enterococci, *E. coli*, *Clostridium perfringens*, Hydrogen ion (pH), Manganese, Sodium, Iron, Nickel, Boron, Turbidity, Copper, Lead, Sulphate, total Trihalomethanes (THMs), Mercury, Nitrite, Fluoride, Chloride, Individual Pesticides (total Atrazine, Metribuzin and Phenanthrene), and Radon.

Full compliance was achieved for 64% (112 sites) of the private water supplies tested in 2020. Of the 63 sites which did not comply with the regulatory standards, 33% (21 sites) contravened microbiological standards; 54% (34 sites) chemical standards; and 13% (eight sites) failed to comply with both microbiological and chemical standards.

The presence of micro-organisms in a private water supply is indicative of contamination of the water either at source or at some point within the distribution system. In particular, the detection of *E. coli* or enterococci bacteria specifically indicates faecal contamination of a water supply and can be a risk to public health. These faecal indicators were found to be present in 12 supplies during 2020; eight small shared domestic supplies with no treatment and four

commercial / public supplies, two of which had disinfection treatment in place at the time of sampling.

Iron and manganese continue to be chemical parameters with a high incidence of non-compliance at private supplies. In 2020, 15 sites were found to have contraventions for either iron or manganese or both. There were three pesticide contraventions identified at private water supplies in 2020, one each for Atrazine, Phenanthrene and Metribuzin. Atrazine is no longer approved for use in the UK or Europe.

All contraventions at private water supply sites are investigated and action taken dependent on the severity of the failure. In 2020, of the 114 contraventions identified, 60 (47 microbiological; 13 chemical) were notified to the PHA for health advice; resulting in new restrictions on water usage at 11 sites to protect public health.

We continue to work with owners and users of private water supplies and Environmental Health staff to ensure the risk assessment of private water supply sites is progressed to bring the remaining supplies into compliance. Priority is given to advancing improvements in water quality through provision of advice and guidance, agreeing action plans (particularly at the larger commercial / public sites) and promotion of drinking water safety plans for the ongoing management of these supplies. However where necessary we may take formal action to secure compliance to ensure a safe, clean supply of drinking water from private supplies.

## Looking Forward

The challenge of ensuring the provision of safe, clean, sustainable drinking water supplies into 2021 and beyond continues.

Planning for NI Water's next price control process (PC21), commenced in 2019 and a considerable amount of work was invested by all stakeholders throughout 2020 in identifying the priorities for investment by NI Water over the period 2021-2027. DWI played a key role in assessing the nine applications made by NI Water for support in capital investment programmes at WTWs designed to improve water quality. On consideration of the applications, all nine were supported by DWI and the Utility Regulator allocated the appropriate funding for these projects in its Final Determination which was published on 13 May 2021. We will continue to work alongside NI Water, the Utility Regulator, the Department for Infrastructure and the Consumer Council as well as our Northern Ireland Environment Agency (NIEA) colleagues in monitoring the PC21 investment programme. This will ensure NI Water progresses the approved programmes to improve water quality and protect public health. We acknowledge the financial constraints within NI Water's funding model and support the need for sufficient long term funding to ensure public health protection and economic development. We must ensure that the provision of safe, clean drinking water remains a key priority for NI Water.

We will ensure NI Water fully implements effective risk management throughout its network to meet regulatory requirements, with necessary mitigations and action plans identified to protect public health.

[The Long Term Water Strategy for Northern Ireland](#), sets out key targets to maintain and improve drinking water quality, and DWI will continue its work with all stakeholders in the delivery of these goals.

Protecting the catchments from which water is abstracted not only improves the raw water quality and reduces potential contamination risks, it can also reduce the need for additional treatment. We will continue to work with colleagues in the NIEA and NI Water, in implementing the third cycle of the River Basin Management Plans (RBMPs). We will also work within this process in promoting the ongoing management of drinking water protected areas (DWPAs) and safeguard zones. We will continue to be represented on the Project Board for the 'Source to Tap' Interreg VA funded project focusing on the management of the Derg and Erne catchments.

We will continue to be a statutory consultee through NIEA in relation to the planning process in Northern Ireland, ensuring potential impacts to drinking water, particularly for private water supplies are addressed and working in collaboration with NI Water to ensure public water supplies are not put at risk from development.

Further development of our risk assessment application for private water supplies will continue to be taken forward in 2021 through support for users and continuing the delivery of training and the provision of technical guidance to local council staff. This more consistent approach to risk assessment will facilitate effective risk management at these drinking water supplies and provide the foundation for a review of the processes for the regulation of private water supplies.

DAERA's key priorities going forward are COVID-19 recovery, EU Transition and Green Growth. DWI plays a key role, as all activities undertaken by the Department, from farming, food production, and environmental regulation all impact on the quality of the raw water sources used for both our public and private drinking water supplies. The provision of adequate water supplies is highlighted within the Draft Rural Policy Framework and DWI endeavour to commence a scoping exercise in 2021/22 into the quality and sufficiency of private water supplies in rural areas. This will assist in informing future policy in this area and is a key objective of the larger Water Reform Programme within NIEA.

As the UK has left the EU, we need to ensure collaboration with our UK colleagues and all stakeholders to ensure the continued protection of public health through effective regulation of drinking water continues for future generations.

**Section 1**  
Public Water Supplies

**Part 1**  
Drinking Water Quality



## Part 1

### Drinking Water Quality

- Overall drinking water quality compliance remains high at 99.94% (Overall microbiological compliance: 99.96%) \*
  - Water quality at consumers' taps remains high at 99.91% compliance (Microbiological compliance at consumers' taps: 99.94%) \*
  - Nine parameters did not achieve full compliance at consumers' taps
  - Nickel was the parameter with the lowest consumer tap compliance at 97.50%
  - Discoloured water is still the main issue of concern to consumers
- \* Sampling at consumer taps was significantly impacted by the COVID-19 pandemic in 2020. This may have contributed to the increase in consumer tap compliance and hence overall compliance compared to previous years.

NI Water is a government-owned company with responsibility for supplying and distributing public drinking water throughout Northern Ireland.

### Drinking Water Quality Testing

During 2020, NI Water sampled drinking water across Northern Ireland to test for compliance with the standards in The Water Supply (Water Quality) Regulations (Northern Ireland) 2017. The regulations require sampling programmes to be in place to ensure that water quality is monitored at: water treatment works (WTWs); service reservoirs (SRs); supply points<sup>1</sup>; and consumers' taps in water supply zones (WSZs). A summary of the number of sites that were in service in 2020 is shown in Table 1.1.

In 2020, 91,581 tests were carried out for a range of different parameters. A description of each parameter and its regulatory limit (or prescribed concentration or value [PCV]) is available on our [website](#).

**Table 1.1: Number of sites in service in 2020**

Sites	No. in service
Water treatment works	24
Service reservoirs	287
Supply points <sup>1</sup>	24
Water supply zones	51

### Sampling and Analyses Frequencies

NI Water is required to meet specified sampling frequencies in demonstrating the wholesomeness of drinking water supplies. We undertake an assessment of these requirements throughout the water supply chain: at WTWs; SRs; and WSZs.

During 2020, we identified a shortfall of 7,922 individual tests. The shortfall occurred at Consumer Taps in Water Supply Zones due to the COVID-19 sampling restrictions. This represents a non-trivial sampling and analyses shortfall for 2020. However, this was previously agreed with DWI and so we will not be taking any action in relation to this shortfall.

<sup>1</sup> a point, other than a consumer's tap, authorised for the taking of samples for compliance with the Regulations

## Overall Drinking Water Quality

Compliance with the standards is important as contraventions may indicate a failure in the treatment process or a breach in the integrity of the water supply system which could pose a potential risk to human health. It also ensures that water quality meets aesthetic standards and is acceptable to consumers.

Of the 91,581 tests we used to assess overall compliance, 59 (0.06%) contravened the regulatory standards compared to 100 (0.10%) from 99,371 tests in 2019. Table 1.2 provides further information on these contraventions.

**Table 1.2: Overall Drinking Water Quality in 2020**

	No. of Tests	No. of Tests not Meeting the Standards	% Compliance
<b>Water Leaving Water Treatment Works (WTWs)</b>			
<i>E. coli</i>	6422	0	
Coliform bacteria	6422	2	
<b>Microbiological Total</b>	<b>12844</b>	<b>2</b>	<b>99.98</b>
Nitrite	236	0	
Turbidity	6422	4	
<b>Chemical Total</b>	<b>6658</b>	<b>4</b>	<b>99.94</b>
<b>Total (Microbiological and Chemical)</b>	<b>19502</b>	<b>6</b>	<b>99.97</b>
<b>Water in Service Reservoirs (SRs)</b>			
<i>E. coli</i>	14883	0	
Coliform bacteria	14883	13	
<b>Total (Microbiological)</b>	<b>29766</b>	<b>13</b>	<b>99.96</b>
<b>Water at Consumers' Taps or Supply Points (WSZs)</b>			
<i>E. coli</i>	4805	0	
Coliform bacteria	4805	4	
Enterococci	348	1	
<i>Clostridium perfringens</i>	236	1	
<b>Microbiological Total</b>	<b>10194</b>	<b>6</b>	<b>99.94</b>
Zone Chemical Analysis	21687	29	
Supply Point Chemical Analysis	10432	5	
<b>Chemical Total</b>	<b>32119</b>	<b>34</b>	<b>99.89</b>
<b>Total (Microbiological and Chemical)</b>	<b>42313</b>	<b>40</b>	<b>99.91</b>
<b>Overall Water Quality</b>			
<b>Overall Microbiological Quality</b>	<b>52804</b>	<b>21</b>	<b>99.96</b>
<b>Overall Chemical Quality</b>	<b>38777</b>	<b>38</b>	<b>99.90</b>
<b>Overall Drinking Water Quality</b>	<b>91581</b>	<b>59</b>	<b>99.94</b>

The results confirm that overall drinking water quality in 2020, for the key parameters monitored at water treatment works, service reservoirs and consumers’ taps remains high at 99.94%, an increase on last year (99.90%). However, the decreased sampling at consumer taps due to the COVID-19 pandemic may have contributed to the increase in consumer tap and hence overall compliance compared to previous years. Figure 1.1 illustrates the percentage compliance over the last five years.

**Figure 1.1: Overall Drinking Water Quality, 2016 – 2020**



**Water Quality at Consumers’ Taps**

To assess the quality of water that is being supplied to consumers, we assess results of regulatory samples taken by NI Water from consumers’ taps. Table 1.3 shows the percentage compliance for 34 of the Schedule 1 (directive and national) parameters and nine of the Schedule 2 (indicator) parameters. Drinking water quality compliance at consumers’ taps was 99.91% in 2020, an improvement on last year (99.84%). However, the decreased sampling at consumer taps due to the COVID-19 pandemic is likely to have contributed to the increase in consumer tap compliance.

Nine parameters did not achieve full compliance at consumers’ taps in 2020: Nickel, Aluminium, Iron, *Clostridium perfringens*, Enterococci, Taste, Odour, Coliform bacteria, and Pesticides - individual (MCPA).

Table 1.3: Consumer Tap Compliance 2020

Parameter	No. of Samples	No. of Tests not Meeting the Standards	% Compliance
<b>Schedule 1 (Directive and National parameters)</b>			
Nickel	120	3	97.50
Aluminium	1830	13	99.29
Iron	1836	8	99.56
Enterococci	348	1	99.71
Taste	1092	3	99.73
Odour	1097	2	99.82
Other Pesticides	8968	5	99.94
1,2 dichloroethane	236	0	100.00
Antimony	338	0	100.00
Arsenic	345	0	100.00
Benzene	236	0	100.00
Benzo(a)pyrene	399	0	100.00
Boron	345	0	100.00
Bromate	400	0	100.00
Cadmium	345	0	100.00
Chromium	345	0	100.00
Colour	1790	0	100.00
Copper	122	0	100.00
Cyanide	236	0	100.00
E. coli	4805	0	100.00
Fluoride	332	0	100.00
Lead	121	0	100.00
Manganese	1821	0	100.00
Mercury	331	0	100.00
Nitrate	334	0	100.00
Nitrite	334	0	100.00
PAH - Sum of four substances	399	0	100.00
Pesticides - Total Substances	236	0	100.00
Selenium	340	0	100.00
Sodium	341	0	100.00
Tetrachloroethene & Trichloroethene	236	0	100.00
Tetrachloromethane	236	0	100.00
Total Trihalomethanes	399	0	100.00
Turbidity	1830	0	100.00
<b>Total (Schedule 1)</b>	<b>32523</b>	<b>35</b>	<b>99.89</b>
<b>Schedule 2 (Indicator parameters)</b>			
<i>Clostridium perfringens</i>	236	1	99.58
Coliform bacteria	4805	4	99.92
Ammonium	398	0	100.00
Chloride	325	0	100.00
Conductivity	1823	0	100.00
Hydrogen Ion (pH)	1823	0	100.00
Sulphate	332	0	100.00
Indicative Dose	24	0	100.00
Tritium	24	0	100.00
<b>Total (Schedule 2)</b>	<b>9790</b>	<b>5</b>	<b>99.95</b>
<b>Overall Total</b>	<b>42313</b>	<b>40</b>	<b>99.91</b>

## Chemical/Physical Quality

### COVID-19 Restrictions

In 2020 there was a significant reduction in samples taken for copper, lead and nickel as these are samples that must be taken at consumer taps. Less than one third of the scheduled samples were taken for these parameters. Whilst copper has historically achieved high levels of compliance, the lead compliance has fluctuated. In 2020 no regulatory lead contraventions were reported due to the small number and random nature of samples, with only 121 out of the planned 400 samples taken in 2020. It is important that NI Water continue to implement its lead strategy to effectively manage the risk to public health.

### Nickel

In 2020, there was a decrease in Nickel compliance to 97.50% compared to the 99.50% achieved in 2019. As there was less than one third of the scheduled samples for Nickel taken in 2020, the small number of contraventions (three) led to the lowest percentage compliance for a consumer tap parameter. Nickel may occur naturally in some ground waters, but is rarely found in the mains water supply. However, contraventions of the standard (20 µg/l) do occur occasionally and the main source of nickel in drinking water is leaching from modern taps and other plumbing fittings.

### Aluminium

In 2020, aluminium was the chemical parameter which had the highest number of tests failing to comply with the standard. Of the 1,830 samples taken, 13 (0.71%) failed to meet the 200 µg/l standard. This represents a slight decrease in aluminium compliance to 99.29%, compared to the 99.40% reported in 2019. Further discussion on aluminium is contained in Part 2 of this section.

### Iron

The regulatory standard for iron is set for aesthetic reasons as levels above this can give rise to discoloured water. Corrosion of iron water mains is the most common reason for contraventions.

Of the 1,836 iron samples taken, eight (0.44%) failed to meet the 200 µg/l standard. This represents an improvement in the compliance level achieved in 2019 with 22 of the 1,984 tests failing to comply, measuring a failure rate of 1.11%.

These were mostly due to the build-up, and subsequent disturbance, of deposits found within water mains. Where this is identified, there are a number of remedial measures which NI Water carry out. Figure 2.6 in Part 2 provides iron compliance figures for the last five years.

### Enterococci

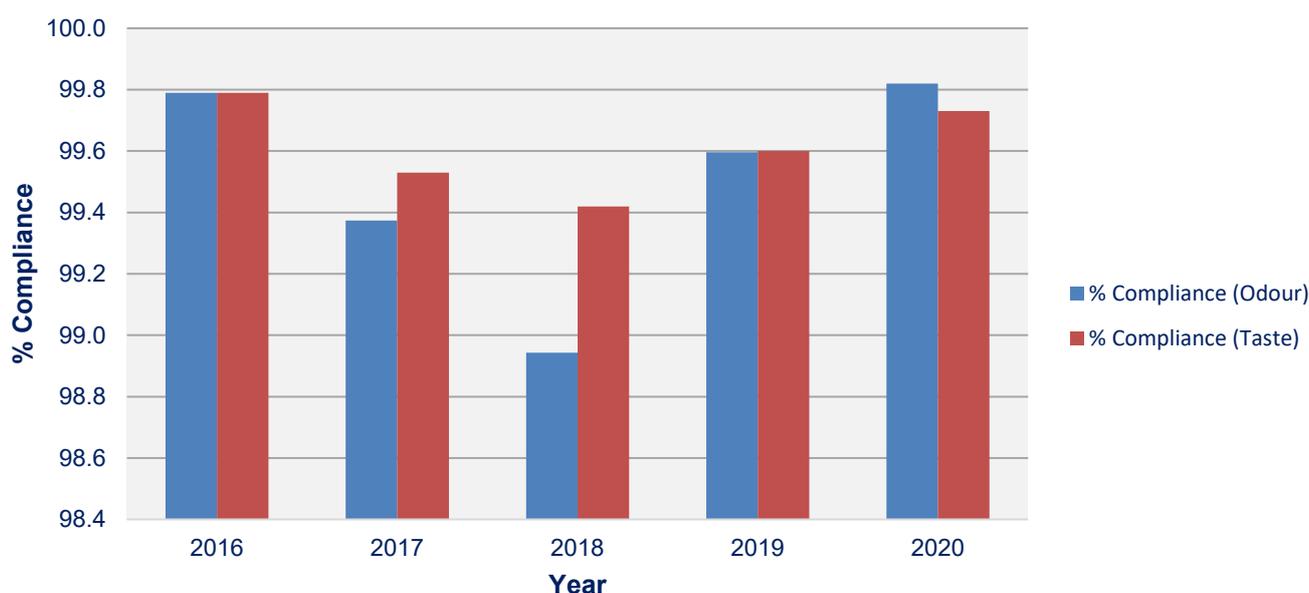
The presence of bacterium such as enterococci is indicative of faecal contamination and should not be found in any drinking water sample. In 2020, one enterococci was detected in one of the 348 samples taken at consumers' taps by NI Water. The cause of this was not determined and all checks were satisfactory.

## Odour & Taste

The regulatory requirement for odour and taste is “Acceptable to consumers and no abnormal change”. DWI has issued guidance to NI Water on the interpretation of this regulatory requirement.

In 2020, odour compliance was 99.82% and taste compliance 99.73%, an improvement on the 2019 compliance (99.60% for odour and taste). Odour and taste compliance over the last five years is shown in Figure 1.2. There is further information on odour and taste in the “Consumer Contacts” section later in this part of the report.

**Figure 1.2: Percentage of Regulatory Tests Meeting the Odour & Taste Standards, 2016 – 2020**



## Other pesticides – MCPA

The pesticide 2-methyl-4-chlorophenoxyacetic acid (MCPA) is a powerful, selective, widely used herbicide. MCPA is used in agriculture to control broad-leaf weeds and rushes. In 2020, of the 8,968 “other pesticide” samples taken, five (0.06%) failed to meet the 0.1 µg/l standard. All five pesticide contraventions related to MCPA. This represents a decrease in pesticide compliance to 99.94%, compared to the 99.98% reported in 2019. Further discussion on MCPA is contained in Part 2 of this section.

## Microbiological Quality

The overall safety of drinking water at consumers’ taps in 2020 is confirmed with a high level of microbiological compliance (99.94%), (see Table 1.2). This is an increase in compliance from the 99.86% reported in 2019. However the majority of consumer tap samples scheduled in 2020 had to be taken at upstream SRs due to the pandemic. This is likely to have had a positive impact on the compliance figure. Coliform bacteria were detected in four samples scheduled to be taken at consumer taps in 2020, three were taken at consumer taps and one from a SR.

*Clostridium perfringens* were found in one sample taken in 2020 (99.58% compliance) an improvement on the two detections in samples taken in 2019 (compliance 99.15%).

Enterococci were detected in one sample taken at an upstream service reservoir instead of a consumer's tap in 2020 due to the pandemic compared to none in 2019.

### **Domestic Dwellings Distribution Systems**

NI Water's investigation into contraventions must determine if they are due to the internal distribution systems within domestic dwellings. Where this is identified it must inform the owner with details of the failure and provide appropriate advice in relation to actions the owner may take to rectify the contravention and protect public health. The investigations, where appropriate, should also ensure consumers' internal plumbing is compliant with The Water Supply (Water Fittings) Regulations (Northern Ireland) 2009.

In 2020, there were three contraventions reported to us which NI Water determined were due to the internal plumbing within domestic properties. These were related to the following parameters: two Coliform bacteria and one Nickel. These contraventions were investigated by NI Water and letters sent to consumers advising them of the contraventions and offering appropriate advice to protect public health.

### **Public Buildings Distribution Systems**

At premises where water is made available to members of the public (such as schools, hospitals or restaurants) there were 105 samples taken during 2020. Of these, one contravened the odour standard.

NI Water must take appropriate action to rectify the failure where it is attributable to either the water supplied by it, or is a contravention of the Water Fittings Regulations. For any other failures within such premises, we are required to follow-up with the owners under The Water Supply (Domestic Distribution Systems) Regulations (Northern Ireland) 2010. If we assess the failure as likely to recur, or if it constitutes a potential risk to human health, a notice may be served on the owner to undertake the necessary actions to protect public health and bring the supply back into compliance.

### **Consumer Contacts**

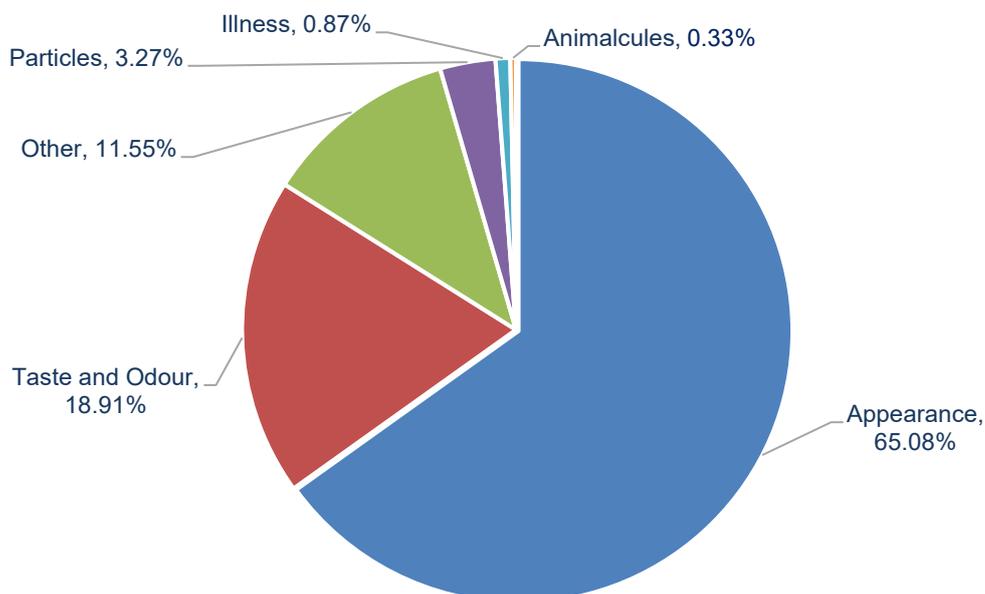
NI Water provides us with consumer contact information to help us assess consumers' satisfaction of their drinking water quality (Table 1.4 refers). The total number of consumer contacts reported in 2020 was 5993 compared to 5661 in 2019, an increase of 332 (5.9%). We will continue to monitor the trends in consumer concerns.

**Table 1.4: Water Quality Contacts received by NI Water in 2020**

Contact Category	Contact Sub-Category	Number of Contacts
Appearance	Colour	2807
	General	80
	Hardness	8
	Stained Washing	3
	White - Air	641
	White - Chalk	361
Taste and Odour	Chlorinous	558
	Earthy/Musty	216
	Other	298
	Petrol/Diesel	23
	TCP	38
Illness		52
Particles		196
Animalcules		20
Boil Water Notice		0
Other	Water Quality Concern - Campaigns	1
	Water Quality Concern - Incident Related	104
	Water Quality Concern - Lifestyle	0
	Water Quality Concern - Pets/Animals	2
	Water Quality Concern - Sample	369
	Water Quality Concern - Lead	200
	Water Quality (No Concern) Fluoride	0
	Water Quality (No Concern) Other Information	12
	Water Quality (No Concern) Water Hardness	1
	Water Quality (No Concern) Water Quality Report	3
<b>TOTAL</b>		<b>5993</b>

The highest percentage of contacts and concerns continued to relate to the appearance of drinking water, with 65.1% in 2020 (63.9% in 2019). This is illustrated in Figure 1.3.

**Figure 1.3: Consumer Contacts and Concerns received by NI Water in 2020**



### Appearance

Within the overall appearance categories there are a number of different sub-categories that are a cause of concern for consumers.

#### Colour

In 2020, as in every year, the majority of appearance concerns (72%) related to discoloured water. The most common cause of discoloured water concerns is an orange, brown or black discoloration caused by suspended particles of iron (orange/brown) and manganese (black).

Iron discoloration may occur through natural iron present in the raw water passing through inadequate treatment, from the treatment process, or from corrosion of cast-iron distribution mains as discussed earlier. Manganese is naturally present in some raw waters and may not be fully removed if treatment is inadequate.

#### White Water

'White water' is mainly caused by air dissolved in the water, making it appear cloudy or milky white. It can be caused by internal plumbing, burst water mains or when NI Water has been carrying out maintenance work on pipes. Where air is the cause, the cloudy appearance will clear in a glass of water from the bottom up.

Another cause of white water may be chalk. Chalk has a white powdery appearance and is made up of natural minerals found in water which forms what is known as 'hardness'. A glass of water containing chalk will take up to an hour to clear from the top downwards, leaving fine white sediment in the bottom of the glass.

'White water' accounted for 25.7% of appearance concerns in 2020.

## Taste and Odour

All water sources contain naturally occurring minerals. Water also contains dissolved gases, such as oxygen and carbon dioxide, which give tap water a characteristic taste. One substance, which is added to drinking water for disinfection, is chlorine, and this can give rise to consumer complaints (see next section on Chlorinous).

Other taste and odours should not be present in drinking water for aesthetic reasons e.g. TCP or earthy/musty, or for health reasons e.g. petrol/diesel.

Taste and odour complaints accounted for 18.9% of the total consumer contacts in 2020.

### *Chlorinous*

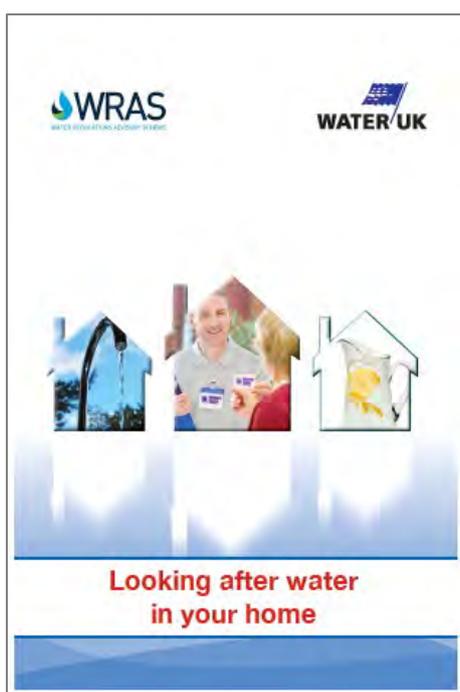
Some individuals are more sensitive than others to the taste and odour of chlorine which is used to maintain hygienic conditions within the water supply network. 49% of taste and odour consumer contacts in 2020 were related to a chlorinous taste and odour in the water (47% in 2019). This marks a further slight increase in chlorinous taste and odour complaints following a significant increase in 2019. NI Water should investigate the reasons why almost half of all taste and odour complaints are related to a chlorinous taste and odour.

## Consumer Advice

A useful consumer guide, (Figure 1.4) '[Looking after water in your home](#)', was produced by the water industry to help you maintain and enjoy the quality of tap water once it enters your home.

It contains a number of household tips, from how to reduce unwanted taste and odours and address appearance issues, to advice on water filters and storage tanks.

**Figure 1.4: Looking after Water Your Home Guide**



**Section 1**  
Public Water Supplies

**Part 2**  
The Drinking Water Cycle



## Part 2

### The Drinking Water Cycle

- Catchment: There was an increased number of MCPA detections in 2020
- Events: There was one Major, three Serious and 24 Significant Events reported in 2020
- Aluminium continues to be the process control parameter of concern
- Trihalomethanes (THMs) achieved full compliance in 2020

This part of the report details our assessment of how NI Water manages the drinking water cycle, from the **catchment** to the **treatment** processes at Water Treatment Works (WTWs), through Service Reservoirs (SRs) and into the **distribution network** to supply **consumers**. It also summarises the risk management approach adopted by NI Water in ensuring that water supplies remain safe and wholesome throughout their journey to homes and businesses.

#### Catchments

NI Water mainly abstracts its raw water from 38 sources including rivers and loughs (54.4%), impounding reservoirs (45.5%), and one borehole which supplies a small population on Rathlin Island (0.1%).

A risk assessment of the catchment must be completed as part of the overall 'source to tap' approach. NI Water liaises with the Northern Ireland Environment Agency (NIEA) and a range of other stakeholders through Water Catchment Partnerships to identify and put mitigations in place to manage risks within the catchment. The Catchment Management Plans developed by NI Water throughout PC15 are due to be implemented in PC21. Where catchment solutions alone are unable to reduce the risks sufficiently, NI Water must ensure that it has appropriate treatment processes in place.

As the potential list of contaminants within catchments is diverse, it must risk assess each catchment individually to determine the specific risks, and identify appropriate mitigations to reduce or adequately control the risks. Where a risk is identified, NI Water must consider if water quality monitoring is required within the catchment and at its abstraction points.

This monitoring plays an important role in providing information on the risks within the catchment and for the operational management of water treatment works to ensure treatment processes provide an effective barrier against the identified levels of contaminants.

#### Pesticides

During 2020, 38 individual pesticides were monitored by NI Water under its sampling programmes. There are two separate sampling programmes in place. The compliance programme is based on the set regulatory frequencies required to be monitored by NI Water for assessing compliance. There is also the operational programme to identify potential risks and assist in the operation of its treatment processes.

Within the compliance programme there were 236 samples taken for pesticides giving a total of 8968 individual determinations. In 2020, five samples contravened the standard for MCPA – three at Derg WTW, and two at Carmoney WTW.

Where contraventions arise, DWI may require NI Water to implement enhanced operational sampling to monitor an ongoing risk. During 2020, within the operational programme, NI Water reported 13 MCPA contraventions. Nine of these were at Derg WTW, where enhanced monitoring is ongoing and DWI has a Notice in place requiring NI Water to install treatment to achieve compliance with the regulatory limit for MCPA in the final water. Two of the 13 contraventions were recorded at Clay Lake WTW, one at Glenhordial WTW, and one at Killyhevlin WTW. A Notice previously in place relating to remedial works at Glenhordial WTW was completed in February 2019 and results from this works will be closely monitored, with further action taken if deemed necessary. Although there were no contraventions at Ballinrees WTW in 2020, a Notice is in place following the 12 contraventions for MCPA in 2017 which requires remedial works to be completed within a timeframe agreed with DWI.

Water treatment works with contraventions for pesticides, both regulatory and operational, from 2016 to 2020 are summarised within Table 2.1.

There was a total of 18 MCPA contraventions reported from both compliance and operational sampling in 2020, an increase on the 13 contraventions in 2019.

**Table 2.1: Pesticides Detected above the Regulatory Limit, 2016 – 2020**

Water Treatment Works		2020	2019	2018	2017	2016	
		MCPA	MCPA	MCPA	MCPA	MCPA	Clopyralid
W1701P	Ballinrees				12		
W2308P	Castor Bay						1
W2509	Clay Lake	2					
W2802	Carran Hill						1
W4301	Carmoney	2					
W4501	Derg	12	12	5	6	7	
W4541	Glenhordial	1	1		4		
W4701	Killyhevlin	1					
<b>All WTWs</b>		<b>18</b>	<b>13</b>	<b>5</b>	<b>22</b>	<b>7</b>	<b>2</b>

## Water Treatment

Water treatment processes normally include the physical removal of potential contaminants by using chemical coagulation/flocculation, clarification (Figure 2.1), and filtration. Filters require periodic backwashing to operate effectively (Figure 2.2). Additional treatments such as ozone dosing and GAC (Granular Activated Carbon) filtration or PAC (Powdered Activated Carbon) dosing can also be required to remove unpleasant tastes and odours, and for pesticide reduction. The final stage of treatment is disinfection.

An important measure of the effectiveness of treatment is the assessment of the water quality throughout the treatment process and the quality of the final water leaving the works.

**Figure 2.1: Clarification Stage****Figure 2.2: Backwashing a Filter**

In Table 2.2, results are outlined for two sets of parameters that are used to assess the effectiveness of water treatment processes: process control parameters; and disinfection parameters.

**Table 2.2: Water Quality at Water Treatment Works, 2020**

Parameters	Place of Sampling	Total No. of Tests in 2020	No. of Tests not Meeting the Standards in 2020	% of Tests Meeting the Standards	
				2020	2019
<b>Process Control Parameters</b>					
Aluminium	WSZ	1830	13	99.29	99.40
Trihalomethanes	WSZ	399	0	100.00	99.00
<b>Disinfection Parameters</b>					
Coliform bacteria	WTW	6422	2	99.97	99.98
<i>E. coli</i>	WTW	6422	0	100.00	100.00
Turbidity	WTW	6422	4	99.94	99.89
<b>Indicator Parameter</b>					
<i>Clostridium perfringens</i>	WTW	236	1	99.58	99.15

WSZ = Water Supply Zone (consumer tap sample)

### Process Control Parameters

Process control parameters are used to measure the effectiveness of treatment, and are based on a selection of chemical parameters relevant to the processes in place at the water treatment works.

In 2020, results from the compliance monitoring programme, shown in Table 2.2, reported continuing non-compliances for one of the process control parameters, aluminium. No trihalomethanes (THMs) non-compliances were reported in 2020.

#### *Aluminium*

Aluminium compliance, which is measured at consumers' taps, was slightly lower in 2020 with 13 regulatory contraventions (0.71%) reported compared to 12 (0.60%) in 2019. Figure 2.3 displays the levels of aluminium compliance over the last five years.

Operational sample results and outputs from on-line monitors often highlight elevated aluminium levels at WTW before they become apparent in distribution. In many cases the remedial measures taken by NI Water in response to these early detections prevent, or limit the impact of, water quality events.

Overall, there were nine Significant events at five water treatment works in 2020 relating to elevated levels of aluminium – see Annex 2 for details. Although these events do not always directly correlate with regulatory contraventions at consumers' taps at the time of the event, they can lead to the accumulation of aluminium in the distribution system and contribute to contraventions at a later date.

It is concerning to note that the trend in aluminium compliance continued downwards in 2020, to the lowest level of compliance for five years. NI Water must constantly review its operational practices at its treatment works and take whatever measures are necessary to improve this level of compliance. Improvements to the treatment processes at WTWs which have been identified for funding in the PC21 price control process should result in an improving level of aluminium compliance over the next six years.

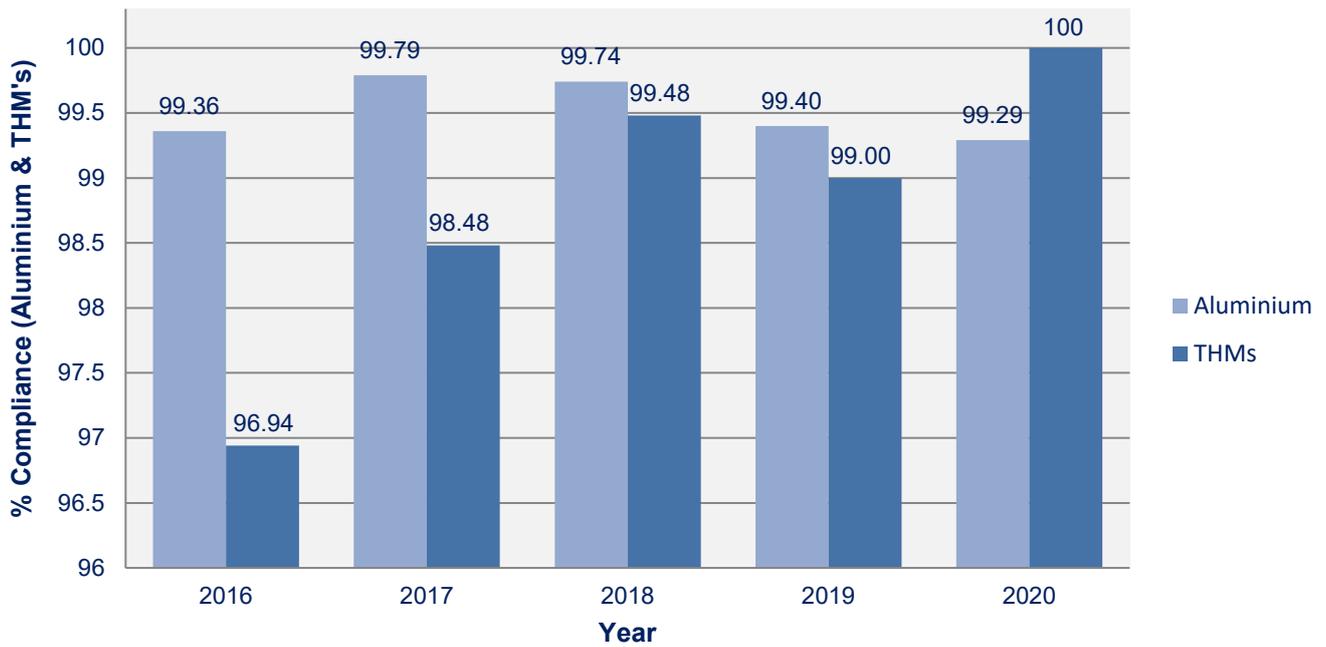
### *Trihalomethanes (THMs)*

THMs are a group of disinfection by-products that form when naturally occurring organic substances combine with chlorine, which is added to disinfect the water and make it safe to drink. There are a number of reasons for THM non-compliance including: the quality of the raw water; the performance of the water treatment works; the condition of the networks; and the length of time water spends in the distribution system (residence time). Effective and well managed treatment processes reduce the levels of these organics, which are directly related to the level of THMs that occur in the final water.

Figure 2.3 displays the levels of THM compliance over the last five years. Full compliance was achieved in 2020 with all samples tested meeting the standard of 100 µg/l. This compares to 2019 when four samples (1.0%) contravened the standard. However, as THM levels are known to increase in the distribution system, and contraventions often occur at or near the end of distribution systems, the decreased sampling at consumer taps due to the COVID-19 pandemic may have contributed to the 100% compliance. A further reason for the improved compliance was the completion of a new treatment process at Rathlin WTW in November 2019 following enforcement by DWI.

NI Water must ensure that good operational practices prevail within the catchments and at water treatment works. It is also important that there is careful management of the storage levels in service reservoirs and the distribution network is adequately maintained to control the formation of THMs.

**Figure 2.3: Percentage Compliance for Aluminium & THMs at Consumers' Taps, 2016 – 2020**



### Disinfection Parameters

The parameters, coliform bacteria, *E. coli* and turbidity (Table 2.2 refers) reflect at the effectiveness of disinfection and pathogen removal. Effective disinfection is fundamental to the treatment process in order to safeguard consumers from the risk of microbiological organisms being present in drinking water. Testing for *E. coli* and coliform bacteria at water treatment works provides assurance of adequate treatment and the provision of safe, clean drinking water. In 2020, NI Water reported 100% compliance for *E. coli* and 99.97% compliance for coliform bacteria at its water treatment works.

Turbidity is caused by finely suspended particles in the water which must be reduced to below 1 NTU to enable adequate disinfection to take place. There was a slight increase in compliance with the turbidity standard in 2020 (99.94% compared to 99.89% in 2019). Four turbidity contraventions occurred at three water treatment works in 2020. Of these, one was assessed as being a Significant event. This event also involved an aluminium contravention following treatment difficulties.

### Indicator Parameter

#### *Clostridium perfringens*

*Clostridium perfringens* can be used in association with other parameters to assess the effectiveness of the water treatment processes. This organism is a spore-forming bacterium that is exceptionally resistant to unfavourable conditions in the water environment such as extremes of temperature and pH; and disinfection by chlorination.

In 2020, of the 236 tests carried out for *Clostridium perfringens*, one contravened the standard. NI Water investigated but was unable to determine a cause for this contravention.

## Distribution

The water distribution network in Northern Ireland is extensive, consisting of 287 service reservoirs (SRs) and 26,958 km of mains pipe. Water mains transfer drinking water from the water treatment works to service reservoirs and onwards to the consumer. Service reservoirs provide storage close to the point of distribution to help ensure that sufficient water is available to meet the varying demands of consumers.

In Table 2.3, two measures are used to assess the water quality within a distribution system: reservoir integrity and distribution networks.

**Table 2.3: Water Quality Indicators within the Distribution System, 2020**

Parameters	Place of Sampling	No. of Tests in 2020	No. of Tests not Meeting the Standards in 2020	% of Tests Meeting the Standards in 2020	% of Tests Meeting the Standards in 2019
<b>Reservoir Integrity</b>					
Coliform bacteria	SR	14883	13	99.91	99.91
<i>E. coli</i>	SR	14883	0	100.00	100.00
<b>Distribution Networks</b>					
Turbidity	WSZ	1830	0	100.00	99.95
Iron	WSZ	1836	8	99.56	98.89
Manganese	WSZ	1921	0	100.00	99.90

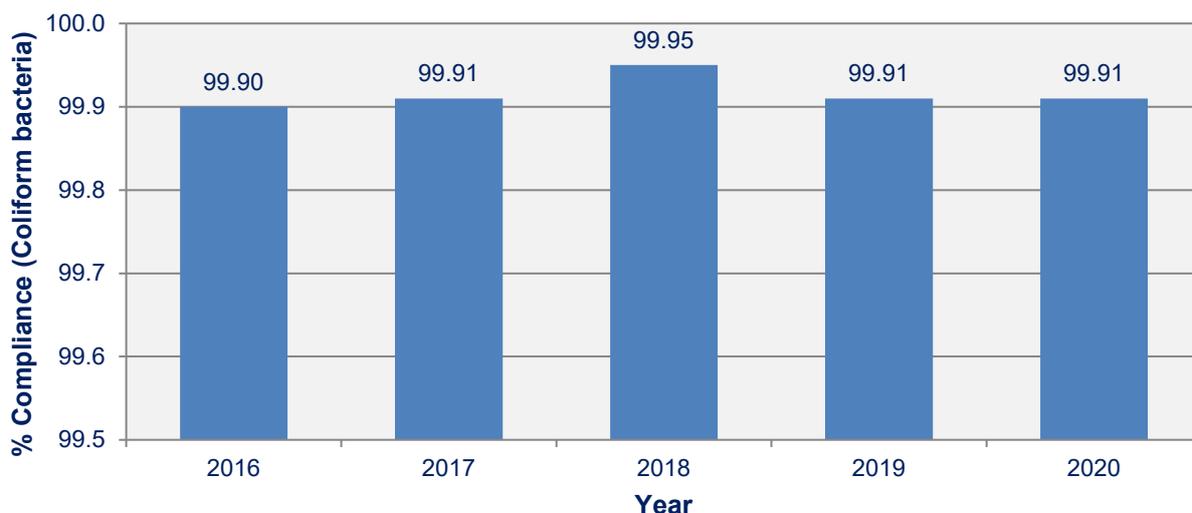
### Service Reservoirs

Samples are collected weekly at every service reservoir in Northern Ireland. One such Service Reservoir is shown in Figure 2.4. It is a regulatory requirement that at least 95% of samples collected annually from each reservoir are free from coliform bacteria. The 287 reservoirs sampled in 2020 all met this requirement. Figure 2.5 shows coliform bacteria compliance was 99.91% in 2020, the same figure as for 2019. Coliform bacteria were detected on 13 occasions at 13 (4.53%) different service reservoirs which is the same number of contraventions as was reported in 2019. *E. coli* was not detected at any service reservoirs in 2020. This replicated the 100% compliance also achieved in 2019.

**Figure 2.4: Service Reservoir**



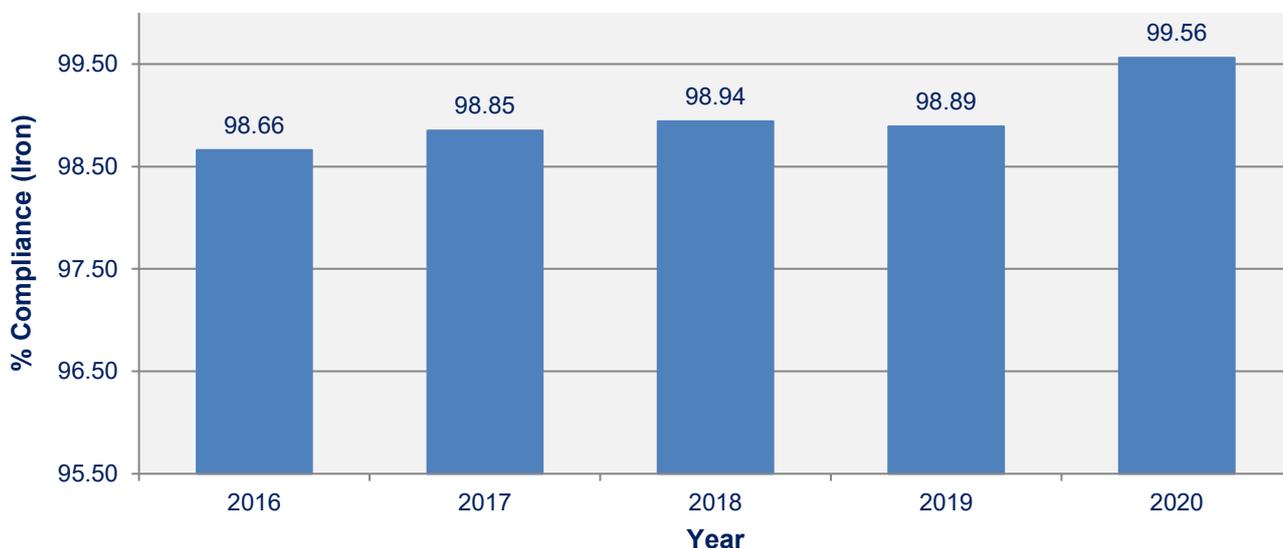
**Figure 2.5: Percentage Compliance of Coliform Bacteria at Service Reservoirs, 2016 – 2020**



### Water Mains

In 2020 a total of 1836 samples taken from consumers’ taps were tested for iron. Of these, eight (0.44%) contravened the regulatory standard of 200 µg/l. This reflects an increase in compliance from 2019 when there were 22 (1.11%) contraventions reported as illustrated in Figure 2.6. Manganese and turbidity both reported 100% compliance in 2020. As contraventions of these three parameters are closely related to the mains network, it is likely that the decreased sampling at consumer taps due to the COVID-19 pandemic contributed to these higher than normal compliance figures.

**Figure 2.6: Percentage Compliance of Iron in Distribution, 2016 – 2020**



Many of the mains delivering water to consumers' taps are made of cast iron and the deterioration of older mains may result in consumers receiving discoloured drinking water due to the presence of iron and manganese. NI Water has an ongoing Water Mains Rehabilitation Programme and this enables corrective action to be taken on a priority basis to improve the water quality being supplied to consumers. New mains are also installed or upgraded as required for new developments. A typical new mains installation is shown in Figure 2.7.

**Figure 2.7: New mains installation**



*Photo courtesy of NI Water*

## Events and Risk Management

### Drinking Water Quality Events

NI Water inform us of events that have affected, or are likely to affect, drinking water quality or sufficiency, and subsequently where there may be a risk to consumers' health. Each event is assessed into one of five categories based on increasing severity: Not Significant, Minor, Significant, Serious or Major. It is important that lessons are learnt from events and any necessary remedial action is undertaken. For events categorised as Significant or above the risk assessments in place for each water supply system are required to be reviewed.

38 events were reported to us in 2020. Of these, we categorised one as Major; three as Serious; 24 as Significant; three as Minor; and seven as Not Significant.

The Major event was the effect of the COVID-19 pandemic on NI Water. The government restrictions in place had a direct impact on the NI Water's regulatory requirements regarding sampling and analyses. NI Water is to be commended on the swift actions taken (in consultation with DWI) to ensure the continued protection of public health whilst mindful of the health and well-being of its own staff.

The three Serious events involved: complaints of chlorinous taste and odour in the Kilkeel, Ballymartin and Annalong areas following over-dosing of chlorine at Fofanny WTW; the very high network demand in late May, early June 2020; and discoloured water in the Ballymoney area following the malfunction of the inlet valve at High Tober SR. DWI issued a Warning Letter to NI Water regarding the event at Fofanny WTW.

There were 19 Significant events at ten WTWs (Ballinrees; Carmoney; Clay Lake; Derg; Dorisland; Drumaroad; Glenhordial; Killyhevlin; Killylane; and Rathlin) in 2020. The majority of these events were due to treatment difficulties or lack of adequate treatment relating to aluminium, *Cryptosporidium*, individual pesticide (MCPA), iron, odour & taste, and turbidity contraventions.

The other five Significant events occurred in the distribution network: discoloured water in the Newcastle area following operational work at Tullybrannigan South SR; water quality issues after Ballybriest SR was operated at a very low level; aluminium contraventions following a burst on the Ards Trunk Main; loss of supply and low pressure after a burst on the Breda Trunk Main; and aluminium and iron contraventions after Slimero SR was operated at low level.

Annex 2 provides further information on the one Major, three Serious and 24 Significant events in 2020.

## Risk Management

As part of the drinking water safety plan (DWSP) approach, NI Water is required to carry out a risk assessment of each water supply system. Informed by the information generated from the catchment risk assessment, this supports the 'source to tap' approach in the management and control of the potential risks. The assessments must be kept under review, to ensure ongoing risks are adequately controlled and any new or emerging risks are properly identified. We monitor these plans to ensure, where risks are identified, there are control measures in place to ensure the protection of public health. There are 23 risk assessments in place covering all of NI Water's drinking water supplies.

## Regulatory Control

### The Technical Audit Process

DWI normally conducts a risk based technical audit programme to check NI Water's compliance with statutory obligations and best practice. However, in 2020, due to COVID-19 restrictions, site visits were suspended to protect critical NI Water staff and ensure continued operation of water treatment works. An audit of the Laboratory Information Management System was carried out remotely. This is detailed in Annex 3.

### Enforcement Action

In order to protect, maintain and improve drinking water supplies, NI Water's large capital investment needs are prioritised through the Price Control Process (PC). 2020 was the last full year of the PC15 (2015 - 2021) investment programme and a lot of work was completed in preparation for the PC21 (2021 - 2027) capital investment programme in collaboration with a full range of stakeholders.

Although it is better to be able to plan investment through the PC process, there are occasions when it is necessary for DWI to take enforcement action against NI Water to secure compliance and protect public health.

In 2020, a Provisional Enforcement Order (PEO) issued under The Water and Sewerage Services (Northern Ireland) Order 2006 was closed in May following completion of Undertakings by NI Water. DWI issued three Notices under The Water Supply (Water Quality) Regulations (Northern Ireland) 2017 (the Regulations). The details of these enforcements are contained in Annex 4. One of the Notices issued by DWI, as discussed in the Pesticides section of this report (page 19), led to NI Water's recent announcement of the largest ever investment (£12m) in a drinking water capital programme at Derg WTW. This is primarily required to upgrade the works and ensure future compliance with the regulatory limits for the pesticide MCPA.

**Section 2**  
Private Water Supplies



Image: NIEA

## Section 2

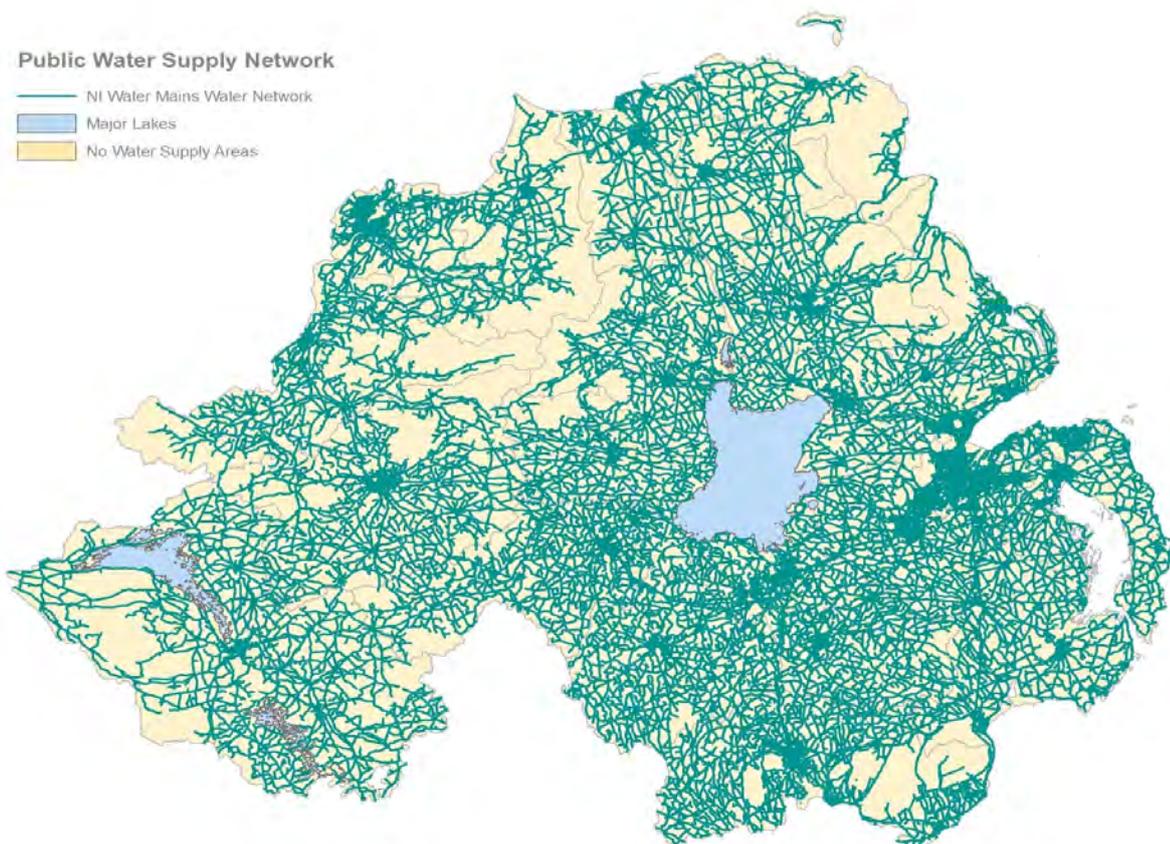
### Private Drinking Water Supplies

- 175 registered private water supplies monitored in 2020, including seven new supplies
- 82% are commercial / public supplies; and 18% are small domestic supplies
- 99.4% of the supplies are from groundwater sources
- Of the 14,982 tests carried out, 99.24% complied with the regulatory standards
- Full compliance was achieved at 64% of registered private water supply sites
- 33% of non-compliant sites showed microbiological contraventions, 54% chemical contraventions and 13% had both microbiological and chemical contraventions

NI Water supplies water to over 99% of the Northern Ireland population; the remainder is served by private water supplies. The extent of the NI Water mains network is shown in Figure 1.1. The areas of no water supply are those where domestic properties are most likely to be served by a private water supply.

Consumers often assume the water they are drinking is from the public water supply. However, although the number of people directly served by a private supply may be small, many more people are exposed to them through their use in both commercial activities and public buildings.

**Figure 1.1: NI Water Mains Network (and no water supply areas)**



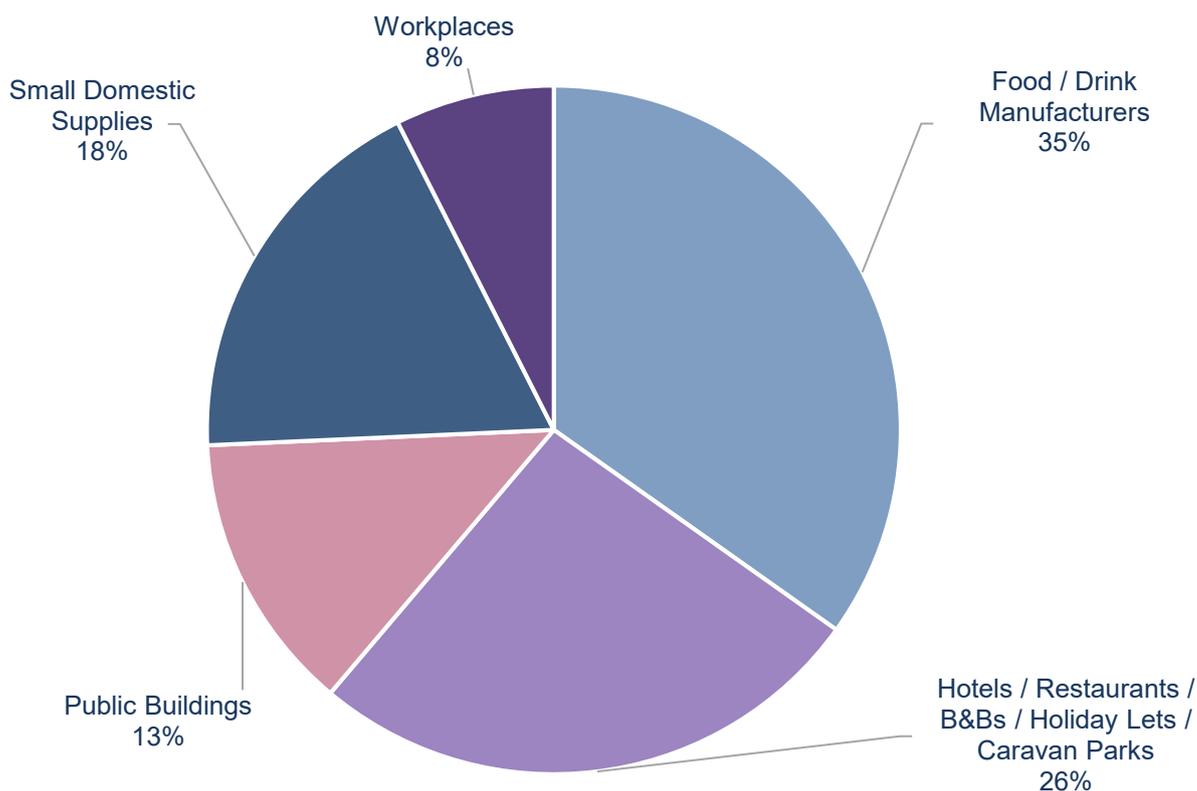
Private water supplies are often used as an alternative to or in conjunction with the public water supply at a range of sites such as:

- food and drink manufacturers;
- public buildings including hospitals, workplaces and universities; and
- within the hospitality industry such as hotels, restaurants, or tourist accommodation.

### Register of Supplies

There was a total of 175 private water supplies on our register in 2020 which required monitoring under The Private Water Supplies Regulations (Northern Ireland) 2017. The categories of these supplies are presented in Figure 1.2. It is estimated there are approximately a further 1200 supplies to single private dwellings which are not required to be monitored under the Regulations. The Environmental Health Departments of local councils test these supplies on request.

**Figure 1.2: Categories of Private Water Supplies in Northern Ireland in 2020**



Private water supplies may be drawn from either surface or groundwater sources. Surface sources can include streams, rivers and reservoirs; groundwater sources include wells, boreholes and springs. Presently, 99.4% of registered private supplies in Northern Ireland are from groundwater sources, most commonly, boreholes.

## Monitoring of Supplies

An annual sampling programme is in place for each registered supply. The frequency of the sampling and the range of parameters tested for are determined by the type of the supply and the volume of water used or population served. Samples at private water supplies are collected by Environmental Health staff, acting on our behalf.

Of the 175 private water supplies on our monitoring schedule for 2020, 82% are commercial or public supplies; and 18% are small domestic supplies (groupings of two or more houses). A breakdown of the numbers and sizes of private water supplies in 2020 is shown in Table 1.1.

**Table 1.1: Numbers and Types of Private Water Supplies in 2020**

Types of Private Water Supplies Volume (m <sup>3</sup> /day)	Number of Supplies	Frequency of Sampling (per annum)
<b>(i) Commercial / Public Supplies</b>		
>1000 ≤2000	2	10
>100 ≤1000	22	4
>10 ≤100	56	2
≤10	63	1
<b>(ii) Small Domestic Supplies (two or more dwellings)</b>		
≤10	32	1
<b>TOTAL</b>	<b>175</b>	

During 2020, ten sites were removed from the sampling programme as they no longer met the criteria to be registered (i.e. supply no longer used in production or no longer used for human consumption or sanitation). Some sites were reclassified as necessary throughout the year as the use, volume or distribution was altered (and subsequently the analytical requirements and sampling frequency). In addition, a total of seven new supplies registered with us, these were:

- two food / drink manufacturers;
- one hospital;
- one university;
- one nursing home;
- one holiday rental; and
- one small domestic supply serving two or more properties.

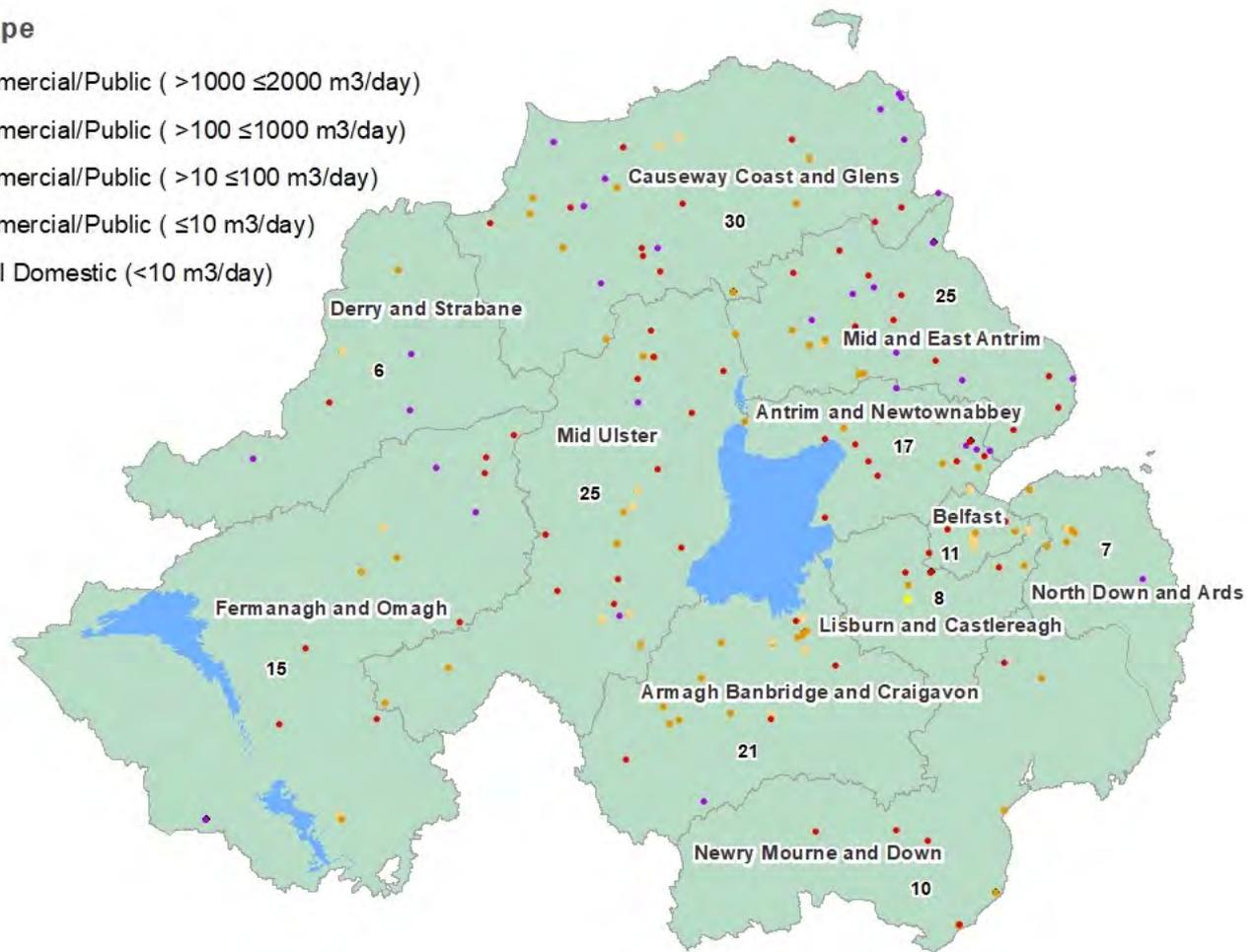
Although the sampling frequency for compliance sampling is set within the Regulations, many supplementary samples are taken throughout the year during follow-up investigations. In addition, where necessary, sites can be put on an increased sampling frequency for a set period of time to monitor any parameters identified as a risk in the supply. During 2020, a total of 74 such samples were collected. The results of the individual tests of these samples are not included in the calculation of the overall compliance for private water supplies.

A breakdown of registered supplies in Northern Ireland in 2020, categorised by size, is shown in Figure 1.3. The 2020 sampling programme included premises using private water supplies in all eleven council areas.

**Figure 1.3: Distribution of Registered Private Water Supplies by Council Area in 2020**

**Supply Type**

- Commercial/Public (>1000 ≤2000 m3/day)
- Commercial/Public (>100 ≤1000 m3/day)
- Commercial/Public (>10 ≤100 m3/day)
- Commercial/Public (≤10 m3/day)
- Small Domestic (<10 m3/day)



● The number of private water supplies in each council area (due to the small scale of the map all sites are not distinguishable)

**Risk Assessment**

The Regulations require a risk assessment to be carried out for each supply to identify areas where there may be potential risks to the water quality. This assessment includes the whole private water supply system, from source to the point where the water is used. These assessments are required to follow the same standard (BS:EN 15975-2<sup>1</sup>) as is used for the risk assessment of the public water supply.

The risk assessments of private water supplies are undertaken by Environmental Health staff, acting on our behalf. To ensure consistency of approach and competency, a web based application developed for the risk assessment of private water supplies was rolled out to local councils in early 2019 and training was subsequently delivered to relevant council staff. DWI provided formal training sessions and ad hoc guidance to councils in 2020 and a total of 75 risk assessments were progressed or completed on the new web application during 2020.

The information gathered through the risk assessment process is used to provide sites with an action plan to mitigate identified risks and to assist sites with the ongoing management of their water supplies. It can also be used to fine-tune the monitoring requirements for each site.

<sup>1</sup> BS:EN 15975-2: Concerning security of drinking water supply, guidelines for risk and crisis management

## Overall Drinking Water Quality

Drinking water regulations in Northern Ireland apply equivalent water quality standards to private drinking water supplies as to public water supplies. Although the number of private water supplies registered with us in 2020 was slightly higher than in 2019, the overall number of parameters analysed was lower than in the previous year. This was due to a reduction in sampling frequency requirements for several sites where the private water supply was not in use for part of the sampling year as a result of COVID-19 restrictions.

The results in Table 1.2 show that, out of a total of 14,982 tests carried out in 2020, 99.24% met the regulatory standards. The regulatory requirements were not met on 114 occasions for 21 parameters, namely: Coliform bacteria, Enterococci, *E. coli*, *Clostridium perfringens*, Hydrogen ion (pH), Manganese, Sodium, Iron, Nickel, Boron, Turbidity, Copper, Lead, Sulphate, Total trihalomethanes (THMs), Mercury, Nitrite, Fluoride, Chloride, Individual pesticides (total Atrazine total, Metribuzin and Phenanthrene) and Radon.

**Table 1.2: Overall Water Quality in Private Water Supplies in 2020**

Parameters	Determinations in 2020		
	Total Number of Tests	Number of Tests not Meeting the Standards	% Compliance
Coliform bacteria	303	27	91.09
<i>Clostridium perfringens</i>	177	7	96.05
<i>E. coli</i>	303	9	97.03
Enterococci	139	3	97.84
<b>Microbiological Total</b>	<b>922</b>	<b>46</b>	<b>95.01</b>
Hydrogen ion (pH)	303	20	93.40
Manganese	265	13	95.09
Sodium	139	5	96.40
Iron	266	9	96.62
Nickel	139	2	98.56
Boron	139	2	98.56
Turbidity	303	3	99.01
Copper	139	1	99.28
Lead	139	1	99.28
Sulphate	139	1	99.28
Trihalomethanes	139	1	99.28
Mercury	139	1	99.28
Nitrite	139	1	99.28
Fluoride	139	1	99.28
Chloride	139	1	99.28
Individual pesticides	7966	3	99.96
Other parameters	3049	0	100
<b>Chemical Total</b>	<b>13681</b>	<b>65</b>	<b>99.52</b>
Radon	106	3	97.17
Radioactivity	273	0	100
<b>Radiochemical</b>	<b>379</b>	<b>3</b>	<b>99.21</b>
<b>Overall Total</b>	<b>14982</b>	<b>114</b>	<b>99.24</b>

Under the private water supplies Regulations, the sampling frequency and suites of parameters analysed at a private water supply may be adjusted based on previous test results and any identified risks. As a consequence, many commercial / public supplies had been analysed for a

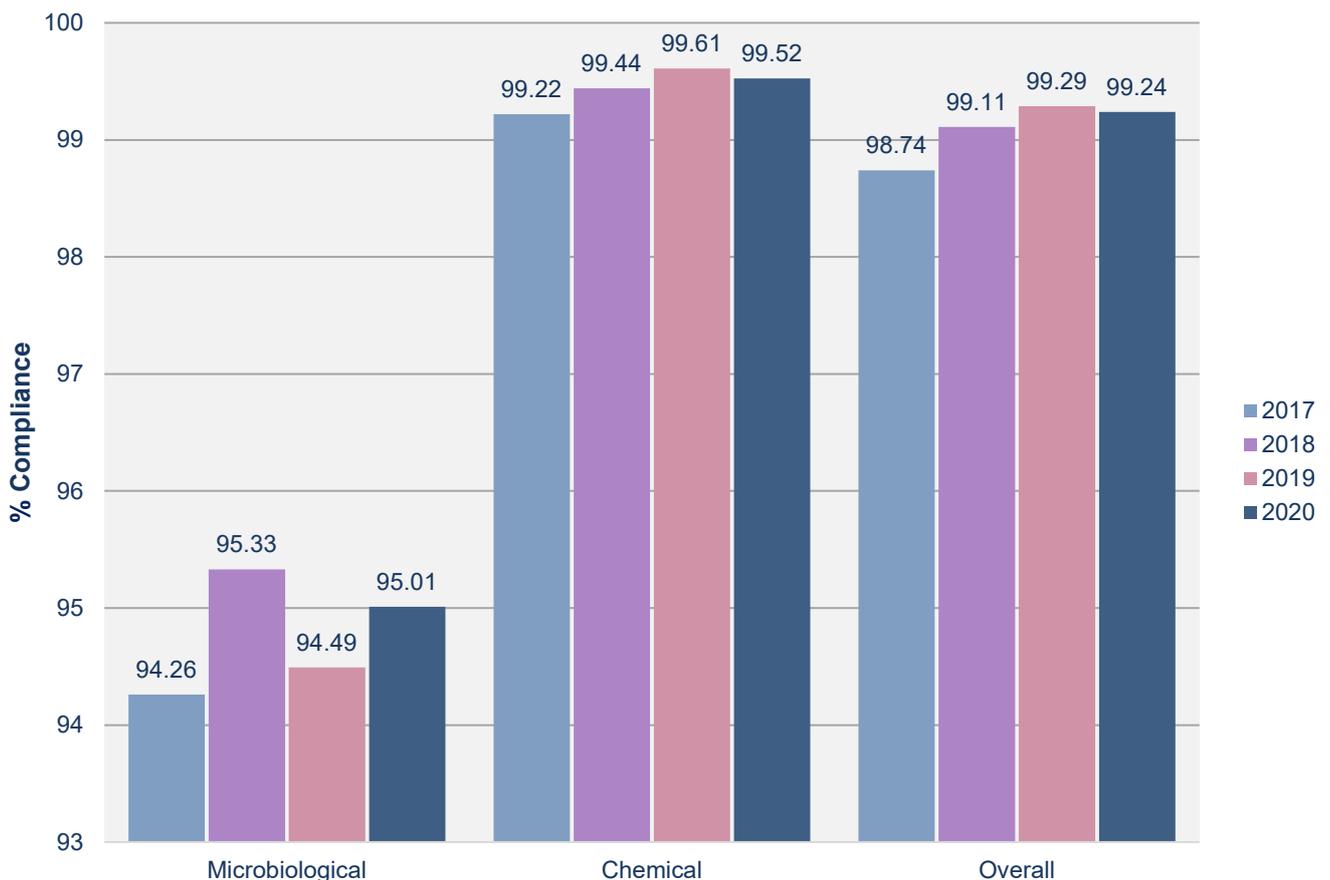
reduced suite of chemical parameters from 2012 to 2017. To carry out a review of this position, all supplies were returned to their full monitoring requirements in 2018 and this continued for 2019 and 2020. Following a review of the monitoring data, a subsequent reduction in parameters was reintroduced for 2021 using a risk based approach to determine the required analysis on a site by site basis.

Microbiological contraventions account for 46 (40.4%) of the 114 contraventions at private water supplies in 2020. There has been an increase in the level of overall microbiological compliance which is reported as 95.01% in 2020 compared to 94.49% in 2019 though it remains below the 95.33% reported in 2018, as illustrated in Figure 1.4.

Contraventions of the chemical standards have been reported for a range of parameters listed in Table 1.2. Overall, the number of chemical contraventions increased from 54 in 2019 to 65 in 2020. Consequently, there was a decrease in chemical compliance for 2020, 99.52% compared with 99.61% in 2019, also illustrated in Figure 1.4.

As with previous years, where the chemical standards have not been met, they relate mainly to contraventions for hydrogen ion, iron, manganese and sodium.

**Figure 1.4: Comparison of Compliance in Private Water Supplies, 2017 – 2020**



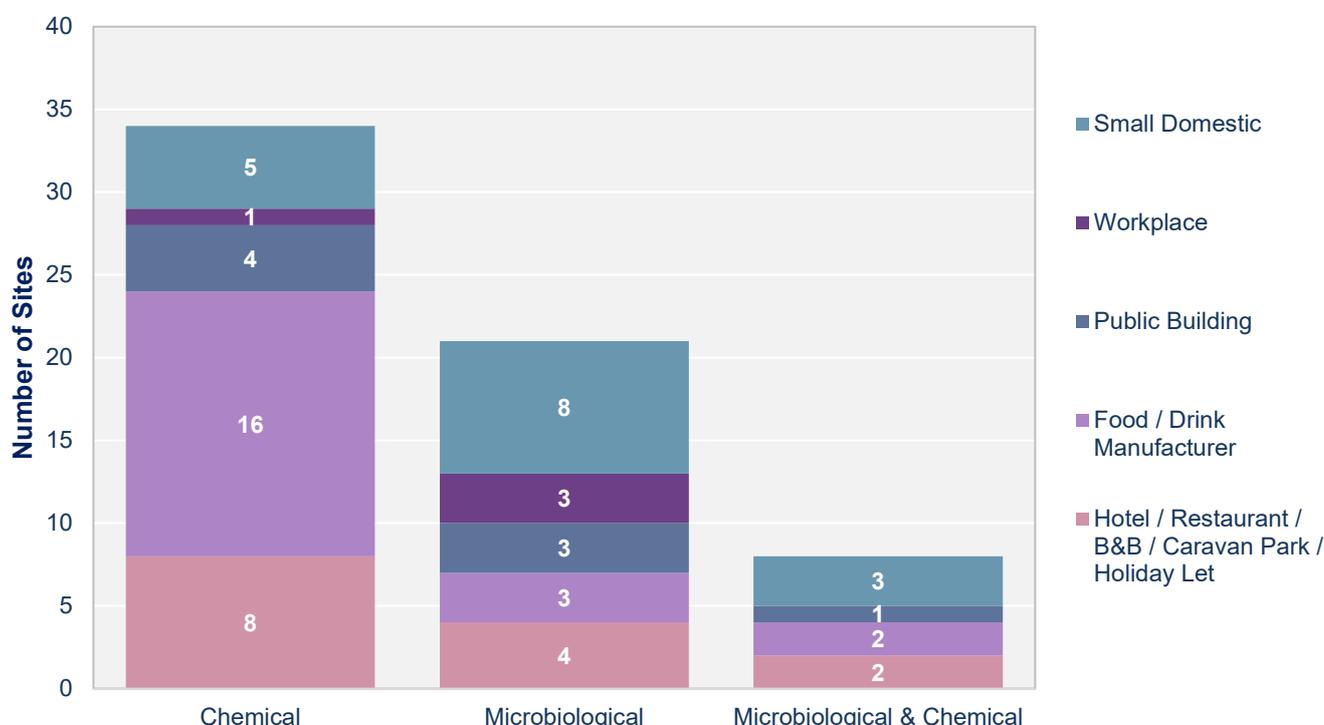
Full compliance was achieved for 64% (112 sites) of the private water supplies tested in 2020. Of the 63 sites which did not comply with the regulatory standards, 33% (21 sites) contravened microbiological standards; 54% (34 sites) chemical standards; and 13% (eight sites) failed to comply with both microbiological and chemical standards.

The categories of these non-compliant sites, presented in Figure 1.5, show that 85% chemical only contraventions occurred at commercial / public sites such as food / drink manufacturers, hotels, or holiday lets whereas for the microbiological only contraventions 38% were at small shared domestic supplies and 62% were at commercial/public sites.

The significance of each contravention not only depends on the category or size of the sites but often, more importantly, on the purpose for which the water is used at the sites. In summary, for the 63 sites which did not comply with all the drinking water quality standards in 2020:

- 47 use the private water supply as the primary source of drinking water;
- 5 use the private water supply as an ingredient in food or drink; and
- 11 use the private water supply for the washing of equipment and surfaces in contact with food or drink.

**Figure 1.5: Categories of Non-Compliant Private Water Supply Sites in 2020**



### Factors Affecting Drinking Water Quality

Different aspects of the water supply chain contributed to the microbiological and chemical water quality contraventions reported in 2020 such as: catchment (including source protection); treatment; distribution; and sampling point (tap) issues. During 2020, many premises were temporarily closed due to COVID-19 restrictions and we published [Guidance](#) to help ensure water quality was maintained when the water supply within the buildings was returned to use. Concurrently, all monitoring of the private water supplies had to be temporarily suspended and the annual monitoring programme was revised. Communication with supply owners focused on risk management and ensuring effective controls were in place, especially with a lower turnover of supply. Conversely, some premises (primarily food production) had to increase usage to meet the ever increasing demand on production.

Our guidance was issued to all public and commercial sites and, upon recommencement of the monitoring programme, only a small number of contraventions in 2020 were considered to be a direct consequence of deterioration in water quality related to temporary closures. Once the appropriate remedial actions were undertaken, as detailed in the guidance, the water quality issues were resolved.

## Micro-Organisms

The presence of micro-organisms in a private water supply is indicative of contamination of the water either at source or at some point within the distribution system. In particular, the detection of *E. coli* or enterococci bacteria specifically indicates faecal contamination of a water supply and can be a risk to public health. These faecal indicators were found to be present in 12 supplies during 2020, eight small shared domestic supplies with no treatment and four commercial/public supplies, two of which had disinfection treatment in place at the time of sampling.

Rural water supplies in the vicinity of where animals graze or manure is spread are most at risk. This is particularly prevalent at times of heavy rainfall, when water may run directly off farmland and carry micro-organisms into unprotected private supplies. Guidance on source protection is available in the [Private Water Supplies Technical Manual](#).

Poor microbiological quality also highlights where there is a lack of suitable treatment or the treatment installed is not being operated and maintained appropriately. The quality of the raw water is a key element in selecting the correct treatment for a private water supply which may require pre-treatment prior to disinfection.

## Metals

Although some brackish groundwaters contain sodium, elevated levels in water supplies are usually related to water softening processes. The regulatory standard is set for aesthetic reasons as elevated levels may give rise to taste problems. In 2020, five sites reported contraventions for sodium, all of which had water softening treatment processes.

Some groundwaters may contain high levels of naturally occurring iron and manganese. Iron levels can also be raised due to deterioration of cast iron pipe work and / or storage tanks within the distribution system. High levels of iron and manganese may affect the appearance, taste or smell of the water resulting in turbidity, colour, taste, and odour contraventions and discoloration or staining of water fittings. It can also affect treatment systems, such as ultra-violet lamps, due to metal deposits causing a reduction in their effectiveness for disinfection. Sites are advised to routinely purge wells / boreholes, clean out storage tanks and flush through pipe work or, where required, replace parts of their distribution network to reduce the levels of iron in their supplies. In 2020, 15 sites reported contraventions for one or both of these metals.

Lead, and other heavy metals such as nickel and copper, are usually detected at elevated levels due to corrosion of pipe work or fittings, especially if the source water is naturally acidic, and / or due to the use of inappropriate fixtures and fittings. In 2020, one site had a copper contravention due to inappropriate plumbing; two sites had nickel or nickel and lead contraventions likely due to reduced water turnover. The Regulations specify that only products and substances approved for use with drinking water supplies should be used.

The Drinking Water Inspectorate for England and Wales has published a list of approved products which are tested and approved under [Regulation 5](#).

## Pesticides

There were three individual pesticide contraventions in 2020: Atrazine (total), a herbicide previously used to control broad-leaved weeds and grasses; Metribuzin, a herbicide used to control weeds in crops; and Phenanthrene, a polycyclic aromatic hydrocarbon used in the production of pesticides which is also found in fossil fuels. Atrazine is no longer approved for use in the UK, and whilst the source was not identified the contravention may be due to historical usage of the herbicide in the vicinity of the site. The Metribuzin contravention was attributed to the spreading of potato processing sludge on lands in the vicinity of a borehole. The Phenanthrene contravention was potentially related to the location of a boiler in the vicinity of pipework for the borehole sample point. In addition to these contraventions, trace levels of a range of individual pesticides, below the regulatory limit of 0.10 µg/l, were also detected at 33 sites.

## Actions in the Event of Failure

Contraventions are investigated through site visits conducted by Environmental Health staff and the collection of follow up samples. Depending on the nature and significance of the contraventions, it may also be necessary for us to carry out a site inspection. Site inspections ensure owners / users of the supply are provided with practical advice on source protection and treatment options and best practice for the management of their water supply to reduce the potential risks of contamination.

Any contraventions at supplies, where the water is used as an ingredient in food production or as drinking water, and that are considered as a potential risk to human health, are reported to the Public Health Agency (PHA) for appropriate health advice. Where necessary, the Regulations contain a provision to issue Notices which can be used to restrict or prohibit the use of a supply.

Out of the 114 contraventions identified in 2020, 60 were notified to PHA for advice: 47 microbiological and 13 chemical. As a consequence, new restrictions on the use of the private water supply were put in place at 11 sites to protect public health. In addition, restrictions on use were initiated at one site as a result of unacceptable odour.

These restrictions of private water supplies can include switching to, or blending with, the public water supply (where this is available), 'Boil Water Before Use' notifications, and 'Do Not Use' instructions.

Removal of these restrictions requires investigation into the cause of the water quality contravention, completion of work to remedy any issues identified and the achievement of two consecutive satisfactory resamples. Accordingly, the restrictions were removed at 11 sites.

We continue to work with the owners and users of private water supplies and Environmental Health staff to bring the remaining supplies into compliance. Priority is given to advancing improvements to the water quality through: provision of advice and guidance; agreeing action

plans (particularly at the larger commercial / public sites); and promotion of Drinking Water Safety Plans (DWSP) for the ongoing management of these supplies.

We have a duty to ensure compliance with the water quality standards in The Private Water Supplies Regulations (Northern Ireland) 2017. Our approach, where there is no known health risk, is initially through informal negotiations. However, where necessary, we may take formal enforcement action to secure compliance and ensure a safe, clean supply of drinking water from private water supplies.

# Annexes

**Annex 1**   **Glossary**

**Annex 2**   **Events**

**Annex 3**   **Technical Audit Programme**

**Annex 4**   **Enforcement Action**



## Annex 1

### Glossary and Definition of Terms

Abstraction Point	The point at which water is abstracted from a lake, river or groundwater source for the purposes of drinking water production.
Aesthetic	Associated with the senses of taste, smell and sight.
Animalcule	A tiny or microscopic life form.
Atrazine (total)	A man made compound used as a herbicide in agriculture. 'Total' includes the relevant metabolites, degradation and reaction products.
Catchment	The area of land that drains into a watercourse.
Clopyralid	An herbicide used for controlling broad-leaved weeds such as docks and creeping thistle in grassland.
<i>Clostridium perfringens</i>	A spore-forming bacterium which is exceptionally resistant to unfavourable conditions in the water environment.
Coagulation	A process employed during drinking water treatment to assist in the removal of particulate matter.
Coliform bacteria	A group of bacteria which may be faecal or environmental in origin.
Contravention	A breach of the regulatory requirement.
Cryptosporidium oocyst	A protozoan parasite.
Determination	An analysis for a specific parameter.
Distribution Network	The system of mains water pipes bringing water from a water treatment works to service reservoirs and onwards to the consumer.
Drinking Water Quality Standards	The prescribed concentrations or values listed in the Regulations.
Drinking Water Safety Plan (DWSP)	A comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer.
Enterococci	A sub-group of faecal streptococci commonly found in the faeces of humans and warm-blooded animals.
<i>Escherichia coli</i> ( <i>E. coli</i> )	A type of faecal coliform bacteria commonly found in the intestines of animals and humans. The presence of <i>E. coli</i> in water is a strong indication of recent sewage or animal waste contamination.

Event	A situation affecting, or with the potential to affect, drinking water quality.
Faecal Coliform	A sub-group of coliforms, almost exclusively faecal in origin.
Faecal Indicators	A group of organisms that indicate the presence of faecal contamination of a water supply eg <i>E.coli</i> .
Filtration	The separation of suspended particulate matter from a fluid.
Flocculation	A process where colloids come out of suspension in the form of a floc.
Granular Activated Carbon (GAC)	An absorbent filtration media used to remove trace organic compounds from water.
Groundwater	Water from aquifers or other underground sources.
Hydrogen ion (pH)	The degree of acidity of the water. A pH of 7 is neutral; values below 7 are acidic and above 7 are alkaline. A low pH water may result in pipe corrosion. This is corrected by adding alkali during water treatment.
Impounding reservoir	A raw water source from which water is abstracted for the purposes of drinking water production.
Incident	An event where there has been a demonstrable deterioration in the quality of drinking water.
Indicator Parameter	Something that is measured to check that the control measures, such as water treatment, are working effectively.
Leaching	To lose, or cause to lose, soluble substances by the action of a percolating liquid.
MCPA	An herbicide used for controlling broad-leaved weeds in grass or cereal crops.
Metribuzin	A broad-spectrum herbicide for control of certain grasses and broadleaf weeds.
Microbiological	Associated with the study of microbes.
m <sup>3</sup> /d	Cubic metres per day.
MI/D	Megalitres per day (one million litres per day).
µg/l	Micrograms per litre (one millionth of a gram per litre).
Parameters	The substances, organisms and properties listed in Schedules 1 and 2, and regulation 2 of the Regulations.
Pathogen	An organism which causes disease.

PC15	The third price control process whereby funding was allocated to NI Water by the Utility Regulator for the 2015 to 2021 period.
PC21	The fourth price control process whereby funding was allocated to NI Water by the Utility Regulator for the 2021 to 2027 period.
Pesticides	Any fungicide, herbicide, insecticide or related product (excluding medicines) used for the control of pests or diseases.
Phenanthrene	A polycyclic aromatic hydrocarbon (PAH) which may be used in the production of pesticides.
Powder Activated Carbon (PAC)	An adsorbent media typically used to remove taste and odour compounds during a water treatment process.
Price Control Process (PC)	The process for the funding of NI Water by the Utility Regulator for a set period.
Prescribed Concentration or Value (PCV)	The numerical value assigned to drinking water standards, defining the maximal or minimal legal concentration or value of a parameter.
Raw Water	Water prior to receiving treatment abstracted for the purpose of drinking water provision.
Remedial Action	The action taken to improve a situation.
Residence Time	The period of time treated water spends in clear water tank, service reservoir or other storage facility.
Service Reservoir	A water tower, tank or other reservoir used for the storage of treated water within the distribution system.
Supply Point	A point, other than a consumer's tap, authorised for the taking of samples for compliance with the Regulations.
Trihalomethanes (THMs)	A group of organic substances comprising, for the purposes of the Regulations, four substances: trichloromethane (also known as chloroform), tribromomethane (also known as bromoform), dibromochloromethane and bromodichloromethane.
Water Supply Zone	A pre-defined area of supply used for establishing sampling frequencies, compliance with standards and information to be made publicly available.
Wholesome/ Wholesomeness	A concept of water quality which is defined by reference to standards and other requirements set out in the Regulations.

## Annex 2 – Events

### Major Drinking Water Quality Events in 2020

Date of Major Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Serious Event	Associated Council Area(s)
11/03/20 Ongoing	Northern Ireland (1.9 million)	The ongoing COVID-19 pandemic had a serious impact on NI Water's monitoring programme. All regulatory sampling at consumer taps had to be stopped due to Covid-19 restrictions, with consumer tap samples taken at designated fixed points. Regulatory sampling was maintained at water treatment works and at service reservoirs.	All

### Serious Drinking Water Quality Events in 2020

Date of Serious Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Serious Event	Associated Council Area(s)
10/04/20 – 14/04/20	Fofanny WTW (93,272 population)	Taste and odour complaints were received from the Kilkeel, Ballymartin and Annalong areas due elevated chlorine levels from Fofanny WTW following a plant shutdown. DWI issued NI Water with a Warning Letter in relation to this event.	Newry, Mourne & Down District.
29/05/20 – 04/06/20	Northern Ireland (1.9 million)	High water demand in the network due to a period of particularly warm and dry conditions and exacerbated by the COVID-19 pandemic. A NI Water Category 1 Incident was declared. Alternative water supplies including asset to asset tankering was required.	All
06/08/20 – 14/08/20	High Tober SR (3,258 population)	Consumer complaints of discoloured water were received by NI Water following a malfunction of the inlet valve at High Tober SR. Samples taken in response to this event contravened the aluminium, iron, manganese and turbidity standards and levels above the Health Notification Values (HNVs) were detected.	Causeway Coast & Glens Borough.

## Significant Drinking Water Quality Events in 2020

Date of Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Significant Event	Associated Council Area(s)
05/01/20 - 06/01/20	Drumaroad WTW (427,497 population)	Elevated levels of aluminium occurred in the works final water. Following an investigation, NI Water was unable to identify the cause of the contravention. In our opinion it was most likely due to issues with the treatment process.	Belfast City; Lisburn & Castlereagh City; Newry, Mourne & Down District; and North Down & Ards Borough.
24/01/20 - 07/02/20	Rathlin WTW (296 population)	Contraventions of the taste parameter were reported in the works final water. NI Water's investigation was unable to determine a cause for the contraventions.	Causeway Coast & Glens Borough.
04/02/20 - 05/02/20	Drumaroad WTW (445,087 population)	Elevated levels of aluminium occurred in the works final water due to treatment difficulties following an unplanned shutdown.	Belfast City; Lisburn & Castlereagh City; Newry, Mourne & Down District; and North Down & Ards Borough.
02/03/20 - 05/03/20	Killyhevlin WTW (79,743 population)	<i>Cryptosporidium</i> oocysts were detected on two separate occasions in early March. There was insufficient evidence to determine their origin - they may have come from the raw water or from contamination at the works.	Fermanagh & Omagh District.
14/03/20 - 17/03/20	Tullybrannigan South SR (11,682 population)	A high number of consumer complaints regarding discoloured water were received in the Newcastle area. Samples taken in response to this event contravened the aluminium and manganese standards. Aluminium levels above the Health Notification Value (HNV) were reported. The event was caused by operational work at Tullybrannigan South SR to install a new inlet control valve.	Newry Mourne & Down District.
24/03/20 - 01/04/20	Killylane WTW (54,243 population)	Contraventions of the aluminium and iron parameters were reported in the works final water. Following an investigation, NI Water was unable to identify the cause of the contravention.	Mid & East Antrim Borough.

**Significant Drinking Water Quality Events in 2020**

<b>Date of Significant Event</b>	<b>Area and Estimate of Population/ Properties Potentially Affected</b>	<b>Nature and Cause of Significant Event</b>	<b>Associated Council Area(s)</b>
04/05/20 - 19/10/20	Carmony WTW (56,996 population)	Contraventions of the individual pesticide standard for MCPA occurred in the works final water. Carmony WTW has pesticide removal treatment in place which is normally effective at reducing MCPA levels to below the regulatory limit. The cause of these contraventions is undetermined.	Derry City & Strabane District.
04/05/20 – Ongoing	Derg WTW (38,989 population)	Contraventions of the individual pesticide standard for MCPA occurred in the works final water due to insufficient treatment. A Regulation 31(4) Notice has been issued by DWI in respect of this matter.	Derry City & Strabane District and Fermanagh & Omagh District.
12/05/20 - 28/05/20	Glenhordial WTW (12,040 population)	A contravention of the individual pesticide standard for MCPA occurred in the works final water. The pesticide removal treatment was not in operation at the time of this event.	Fermanagh & Omagh District.
28/05/20 - 29/05/20	Ballybriest SR (273 properties)	Tankering into Ballybriest SR was required after it “ran empty” following a planned shutdown at Lough Fea WTW.	Mid-Ulster District.
11/06/20 - 01/07/20	Ballinrees WTW (180,627 population)	Contraventions of the taste and odour parameters occurred in the works final water and related distribution due to insufficient treatment. A Regulation 31(4) Notice has been issued by DWI in relation to taste and odour contraventions at Ballinrees WTW.	Causeway Coast & Glens Borough & Derry City & Strabane District.
13/06/20 - 19/06/20	Drumaroad WTW/ Ards Trunk Main (186,890 population)	Contraventions of the aluminium parameter were reported in the Drumaroad WTW supply area following a burst on the Ards trunk main.	Newry, Mourne & Down District; and North Down & Ards Borough.
13/07/20 - 14/07/20	Drumaroad WTW (399,177 population)	A contravention of the aluminium parameter occurred in the works final water. Following an investigation, NI Water was unable to identify the cause of the contravention.	Belfast City; Lisburn & Castlereagh City; Newry, Mourne & Down District; and North Down & Ards Borough.

**Significant Drinking Water Quality Events in 2020**

Date of Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Significant Event	Associated Council Area(s)
26/07/20 - 27/07/20	Dorisland WTW (136,954 population)	A contravention of the aluminium parameter occurred in the works final water following a failure of the lime dosing system which led to sub-optimal treatment.	Antrim & Newtownabbey Borough; Belfast City; and Mid & East Antrim Borough.
01/08/20 - 04/08/20	Killylane WTW (54,243 population)	Contraventions of the aluminium and turbidity parameters occurred in the works final water following treatment difficulties.	Mid & East Antrim Borough.
16/08/20 - 17/08/20	Ballinrees WTW (180,627 population)	Elevated levels of aluminium and turbidity occurred in the works final water following treatment difficulties caused by a dosing pump failure. NI Water has made improvements to its on-line monitoring to prevent a recurrence.	Causeway Coast & Glens Borough and Derry City & Strabane District.
18/08/20 - 20/08/20	Breda Trunk Main (9,154 population)	Low water pressure and loss of supply to some consumers including part of the Belfast City Hospital estate occurred following a burst main. NI Water carried out re-zoning exercises and provided Alternative Water Supplies.	Belfast City.
22/08/20 - 24/08/20	Derg WTW (38,989 population)	A contravention of the aluminium parameter occurred in the works final water following an issue with the lime dosing system which led to sub-optimal treatment.	Derry City & Strabane District and Fermanagh & Omagh District.
20/09/20	Killyhevlin WTW (79,743 population)	Following a power cut, a plant shutdown occurred and when the automatic start-up took place there was internal flooding of the main building. This led to a further plant shutdown. A NI Water Category 1 Incident was declared. Asset to asset tankering to Tattinbar and Cavanacross SRs was required to maintain supply.	Fermanagh & Omagh District.
08/10/20 - 09/10/20	Carmoney WTW (56,996 population)	A <i>Cryptosporidium oocyst</i> was detected in the works final water. All subsequent samples were satisfactory.	Derry City & Strabane District.

**Significant Drinking Water Quality Events in 2020**

<b>Date of Significant Event</b>	<b>Area and Estimate of Population/ Properties Potentially Affected</b>	<b>Nature and Cause of Significant Event</b>	<b>Associated Council Area(s)</b>
13/10/20 - 20/10/20	Killyhevlin WTW (79,743 population)	Contraventions of the individual pesticide standard for MCPA occurred in the works final water and two associated service reservoirs. Killyhevlin WTW has pesticide removal treatment but it was by-passed at the time of these contraventions to facilitate work in relation to the installation of UV treatment.	Fermanagh & Omagh District.
26/10/20 - 29/10/20	Killylane WTW (54,243 population)	A contravention of the aluminium parameter occurred in the works final water following an issue with the lime dosing system which led to sub-optimal treatment.	Mid & East Antrim Borough.
11/11/20 – 09/12/20	Clay Lake WTW (9,881 population)	Contraventions of the individual pesticide standard for MCPA occurred in the works final water. Clay Lake WTW has pesticide removal treatment in place which is normally effective at reducing MCPA levels to below the regulatory limit. The cause of these contraventions is undetermined.	Armagh City Banbridge & Craigavon Borough District.
07/12/20 – 18/12/20	Killylane WSZ (626 properties)	Contraventions of the aluminium and iron parameters occurred in a regulatory sample taken at Slimero SR due to COVID-19 restrictions. The contraventions were caused by a low level in the SR.	Mid & East Antrim Borough.

## Annex 3

### Technical Audit Programme

In 2020, most of the technical audit inspection programme had to be suspended due to the COVID-19 pandemic. Only one audit was completed remotely. NI Water has implemented or provided comment on, the recommendations and suggestions we provided in our audit report.

The following table provides a summary of our 2020 Inspection Programme.

**Table 3.1: Summary of the 2020 Inspection Programme**

Date of Audit	Location	Audit Activity	Number of Recommendations <sup>1</sup>	Number of Suggestions <sup>2</sup>
26/11/20	Laboratory Information Management System	To check that data is adequately managed by the 'Laboratory Information Management System'.	2	2

<sup>1</sup> Recommendations are made where, in our opinion, action is required to avoid a foreseeable risk or a breach of a regulatory duty. If such a breach occurs, then we may consider 'enforcement action'. A formal written response from NI Water is required.

<sup>2</sup> Suggestions are made in relation to matters which relate to best practice.

## Annex 4

### Enforcement Action

The DWI Section of the [DAERA website](#) publishes details of all Enforcement actions.

**Table 4.1: Summary of Enforcement Actions 2020**

Type of Enforcement	Water Treatment Works (WTW)	Reason for Undertaking Or Notice	Summary
PEO <sup>1</sup> /18/01	Castor Bay WTW	Contravention of the standard for Odour	The Undertakings were completed on 16/04/20 and the <b>PEO closed</b> in May 2020.
Regulation 31(4) Notice 2020/001	Derg WTW	Contravention of the regulatory standard for the herbicide, MCPA	Requires NI Water to install and have operational, a treatment system at Derg WTW that is effective in the removal or reduction of MCPA to achieve a final water result that meets the maximum regulatory limit of MCPA of 0.10µg/l 2020 <b>by 31 March 2022</b> . This was issued on 30 June 2020 following the revocation of Regulation 31(4) Notice 01/19 on the same date.
Regulation 31(4) Notice 2020/002	Ballinrees WTW	Contravention of the regulatory standard for the herbicide, MCPA	Requires NI Water to install and have operational, a treatment system at Ballinrees WTW that is effective in the removal or reduction of MCPA to achieve a final water result that meets the maximum regulatory limit of MCPA of 0.10µg/l 2020 by 22 December 2023. This was issued on 17 December 2020 following the revocation of Regulation 31(4) Notice 03/19 on the same date.
Regulation 31(4) Notice 2020/003	Ballinrees WTW	Contravention of the regulatory standards for Taste and Odour	Requires NI Water to install and have operational, a treatment system at Ballinrees WTW that is proven to be effective in the treatment of taste and odour parameters to achieve a final water and consumer tap result that is acceptable to the consumer and there is no abnormal change by 22 December 2023. This was issued on 17 December 2020.

<sup>1</sup> PEO is a Provisional Enforcement Order issued under the Water and Sewerage Services (NI) Order 2006.

## Useful Information

(To access the information click on the links below)

[Regulatory Framework](#) – provides details and links to current legislation relating to drinking water quality.

[Drinking Water Quality Tables](#) – provides details of drinking water compliance within individual water supply zones.

Drinking Water Advice and Guidance for [Public](#) and [Private](#) Supplies – provides a list of links for consumers and professionals requiring further information on drinking water quality.

[Useful Contacts](#) – provides a list of organisations and contact details related to drinking water.

## Request for Feedback on this Report

### Did you find what you were looking for?

The Drinking Water Inspectorate is constantly aiming to improve the standard of information provided in this report.

Any views or opinions you may have would be highly valued by us and we would greatly appreciate your feedback.

Any feedback can be provided by either

Email: [dwi@daera-ni.gov.uk](mailto:dwi@daera-ni.gov.uk)

or

Post: **Drinking Water Inspectorate  
Northern Ireland Environment Agency  
Klondyke Building  
Cromac Avenue  
Gasworks Business Park  
Malone Lower  
BELFAST  
BT7 2JA**



Drinking Water Inspectorate for Northern Ireland  
Resource Efficiency Division  
Northern Ireland Environment Agency  
Klondyke Building  
Cromac Avenue  
Gasworks Business Park  
Malone Lower  
Belfast BT7 2JA

Tel: 028 9056 9282

Email: [DWI@daera-ni.gov.uk](mailto:DWI@daera-ni.gov.uk)

Email: [privatewatersupplies@daera-ni.gov.uk](mailto:privatewatersupplies@daera-ni.gov.uk)

[www.daera-ni.gov.uk](http://www.daera-ni.gov.uk)



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