



# Drinking Water Quality in Northern Ireland, 2015

A Report by the Drinking Water Inspectorate for Northern Ireland





Northern Ireland Environment Agency

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## Foreword

We are pleased to present our 20<sup>th</sup> annual report on the quality of drinking water in Northern Ireland. This report provides the Drinking Water Inspectorate's independent assessment of how the regulatory requirements have been met during 2015.

The provision of a safe, clean drinking water supply is an essential service that contributes to the health and well being of the community. Over 99% of the population in Northern Ireland receives its drinking water from NI Water, while the remainder of the population is served by private water supplies.

Overall compliance with the standards set by the European Union Drinking Water Directive for the public water supply is reported as 99.83% in 2015. This provides assurance regarding the overall quality of our drinking water, although at 99.83%, the level of compliance is slightly lower than the 99.86% achieved in 2014. The Directive sets mandatory minimum standards which are required to be complied with, and this means that NI Water is required to take action to address the 0.17% where compliance was not achieved.

To enable us to uphold consumer confidence in the quality of their water supplies, we consider a range of information. This includes water quality events, and the number of consumer contacts made from those who have experienced problems with their drinking water quality.

Once again, we highlight the number of events that are reported, particularly those due to operational issues relating to the ineffective performance of water treatment works. One Serious event occurred in May 2015 following operational work to introduce a new section of trunk main between Castor Bay WTWs and Magheraliskmisk SR. This led to a severe deterioration in water quality in the related supply area.

The majority of consumer complaints received by NI Water throughout 2015 were related to appearance, particularly where drinking water was discoloured. There was a significant increase in the number of such contacts in 2015 but this was mainly due to the Serious event mentioned in the previous paragraph.

The report highlights the ongoing actions required to improve lead compliance which can be influenced by both NI Water, and the consumer. We welcome the development and implementation of NI Water's strategies in tackling lead non-compliance. This includes pro-active lead replacement and its continuing work with other key stakeholders.

Our report also provides information on our responsibilities regarding private water supplies. These supplies are used for a range of purposes (from domestic dwellings to those supplying large commercial and public premises). The quality of some of these supplies is highly variable. During this reporting year, 147 supplies were routinely monitored under the regulations. The overall compliance with the regulatory standards in 2015 is reported as 98.94%, a slight increase in compliance compared to the 98.90% achieved in 2014. As in previous years, this compliance level is notably lower than that for public supplies.

**Drinking Water Inspectorate  
December 2016**

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## Executive Summary

**This is the 20th report in a series published by the Drinking Water Inspectorate, acting in our regulatory role in matters relating to drinking water quality. During 2015, we acted on behalf of the Department for Regional Development (DRD) in respect of public water supplies, and on behalf of the Department of the Environment (DoE) in relation to private water supplies. From 8 May 2016, we are acting on behalf of the newly formed Department of Agriculture, Environment and Rural Affairs (DAERA) in respect of both public and private water supplies.**

Our report gives an independent commentary on our assessment of the quality of drinking water provided by Northern Ireland Water Ltd (NI Water). It also presents details of the quality of private water supplies for which we undertake a regulatory monitoring programme.

### Public Water Supplies

Comprehensive monitoring is undertaken by NI Water to assess public drinking water quality, and compliance is based on the results of tests carried out throughout the water supply chain: from water treatment works; service reservoirs; and consumers' taps.

Overall public drinking water quality remains high with 99.83% compliance reported in 2015.

High levels of compliance were achieved at consumers' taps, but of the 34 mandatory parameters tested, 12 did not achieve full compliance. Those parameters were: lead; iron; aluminium; odour; taste; turbidity; trihalomethanes (THMs); copper; nickel; manganese; the individual pesticide, MCPA; and *E. coli*.

The parameter with the lowest reported compliance in 2015 was lead at 97.94% (97.45% in 2014). The water leaving treatment works and in the distribution system contains only trace amounts of lead. However, where lead has been used for service pipes between the water main and the kitchen tap or in domestic plumbing, there

is a risk of concentrations at the consumer's tap exceeding the lead standard. A significant amount of work is required to improve compliance in the future and we welcome, and continue to work with NI Water in the implementation of its lead strategy.

Compliance with microbiological standards is important as contraventions may indicate a breach in the integrity of the water supply system or a failure in the treatment process. The results reported in 2015, confirm that drinking water supplies remain safe, with overall microbiological quality at 99.89%. There was a high level of consumer tap compliance (99.70 %) achieved in 2015. However, this is a slight decrease from the 99.73% reported in 2014.

Overall compliance was assessed against EU and national standards, and for 2015 there were 167 (0.17%) tests failing to meet them. This is an increase on the figure reported for 2014 of 147 (0.14%) tests not achieving compliance. Compared to 2014 there has been a decrease in the number of tests achieving compliance at consumers' taps, notably for iron and aluminium.

Following investigation by NI Water to identify the cause of contraventions, the necessary corrective action is then required to be put in place to prevent recurrence. The scale of this work varies and it may require planned investment in the water infrastructure; or changes to operational practices.

Where necessary, we take enforcement action to ensure delivery of the required

corrective action within specified timescales. In 2015, one enforcement was put in place to address recurring contraventions of the pesticide, MCPA.

Although there were high levels of compliance for 2015, events that have the potential to affect water quality did occur, and these are required to be reported to the Inspectorate. Of the 60 events reported in 2015: one was categorised as 'Serious'; 31 as 'Significant'; 10 as 'Minor'; and 18 as 'Not Significant'. Twenty-four of the 'Significant' events occurred at water treatment works and were primarily related to a lack of effective treatment, or treatment difficulties at the works.

The serious event occurred after the introduction into supply of a new trunk main between Castor Bay WTWs and Magheraliskmisk SR in May 2015. There were hundreds of consumer complaints regarding discoloured water. Although NI Water's investigations were inconclusive, the deterioration in water quality could only have been caused by disturbance of sediment in the original trunk main and/or lack of adequate flushing of the new main before it was brought into service.

As part of the event assessment process, it is essential that NI Water continues to put learning and appropriate mitigation measures in place through its drinking water safety plan approach. Vigilance is required and good operational practice and management should be applied at every stage in the water supply process.

To enable us to evaluate consumer confidence in the quality of drinking water at their taps, we receive information from NI Water on the complaints and concerns expressed by consumers. The overall number of these reported in 2015 was 7,183 and compared to the 6,331 reported in 2014, this is an increase of 11.9%. However, this was largely due to the Serious Water Quality Event at Magheraliskmisk SR. As with

previous years, the highest percentage of consumer contacts relate to the appearance of their drinking water (68.3% in 2015; 68.8% in 2014) which are mainly attributed to the presence of suspended particles.

During the current price control process (PC15-21), NI Water must continue to use consumer complaints to inform its work programmes in relation to mains rehabilitation. This should gradually achieve improved drinking water quality and lower the level of consumer complaints.

### Private Water Supplies

Although the number of people directly served by a private water supply may be small, many more people are exposed to them through their use in both commercial and public activities. In Northern Ireland, private water supplies are often used as an alternative to, or in conjunction with, the public supply for a range of activities such as: holiday accommodation (hotels, bed and breakfast facilities); public buildings (hospitals, care homes, and universities); or food processors (manufacturers of food and drink products).

The same drinking water quality standards apply for private water supplies as for the public water supply. During 2015, our private water supply sampling programme monitored 147 sites. Overall compliance is reported as 98.94% in 2015, a slight improvement from 98.90% reported in 2014. Full compliance was not achieved for 21 parameters, namely: coliform bacteria; hydrogen ion; manganese; enterococci; iron; *E.coli*; ammonium; *Clostridium perfringens*; total pesticides; turbidity; individual pesticides (MCPA, clopyralid, MCPP); nickel; fluoride; boron; tetra/trichloroethene; sulphate; sodium; lead; and bromate.

Full compliance was achieved for 97 out of 147 (66%) of our registered sites. Of the 50 sites which did not comply with the regulatory standards: 33 use their private supply as the

primary source of drinking water; eight supplies are used for washing equipment and surfaces in contact with food or drink; six use the supply as an ingredient in food and drink; and three are used solely for personal hygiene (showers, wash hand basins).

All private water supply contraventions are investigated and action taken dependent on the severity of the failure. This can include restrictions on the use of the supplies. The implementation of corrective actions may require improved source protection measures; or installation of, or improvements to, treatment systems.

We will continue our work with supply owners and the local councils, with the aim of reducing the contamination risks at these sites and improving their overall water quality. Owners and users of private water supply sites have a responsibility to provide a safe supply of water that complies with the regulatory standards. We continue to assist them in this role by providing technical advice and guidance on the steps necessary to achieve this.

### **Risk Assessments**

As part of managing the risk of contamination through the water supply chain, NI Water is required to undertake appropriate risk assessments. These assessments should characterise the risks to the drinking water supply and detail the controls measures required to mitigate these. It is important that NI Water ensures that its risk assessments are kept under review and are 'live' documents which reflect both current and potential future risks to the water supply.

At the start of the water supply chain, the use of pesticides within the catchment during 2015 has led to a challenge to the treatment processes at seven water treatment works. NI Water continues to carry out work within these catchments to reduce pesticide levels through dedicated programmes of work, both at an operational level, and through ongoing

engagement, and education of the key stakeholders.

For other parts of the supply chain NI Water continues to refine the information it uses to assess risks, in particular in relation to distribution systems. We welcome the work by NI Water in developing a lead strategy which includes a prioritized replacement programme of its lead pipes through targeting lead hotspots.

In relation to private water supplies we continue to work with local councils, along with the cooperation of the owners and users, to complete risk assessments of these water supplies. The development of action plans using a new risk assessment tool should assist in driving the required improvements to remove contamination risks identified at individual private supplies.

### **New Regulations in 2015**

The new European Directive, Euratom 2013/51, has introduced requirements in relation to public health protection with regard to radioactive substances (including radon) in water intended for human consumption. Drinking water regulations were amended on 28 November 2015, to include this requirement, and set a new standard for radon in drinking water of 100 Bq/l.

### **Looking Forward**

There are ongoing challenges to ensure the continuing provision of safe, clean and sustainable drinking water supplies in the future. These include managing the risks that can arise in the water supply chain, and this will remain central to our role in regulating drinking water quality. During 2015 we have worked alongside NI Water, the Utility Regulator, the Department for Regional Development, and the Consumer Council for Northern Ireland, in monitoring the PC15 investment programme. We acknowledge the financial constraints within the PC15 process and the requirement to re-prioritize work



programmes to reflect the level of funding. As we move forward we will continue to input into the ongoing implementation of the PC15 programme to ensure that the provision of safe, clean drinking water remains a key priority for NI Water.

We will continue to work with NI Water in their ongoing management of our drinking water supplies, and provide advice and guidance to ensure risks are identified and controlled effectively. We will actively engage with all stakeholders in the delivery of the goals set within the Department for Infrastructure's Long Term Water Strategy.

It is our objective to improve the safety of private water supplies and to educate the owners and users of the potential risks of using such supplies. We will continue to develop communication strategies to deliver these key messages to private water supplies and will work towards improving the methodologies we use for assessing and recording potential risks at these supplies.

We will continue our advocacy for improving the quality of our abstraction sources through working with our colleagues in the Northern Ireland Environment Agency and NI Water, in the development of the 2nd cycle of the River Basin Management Plans (RBMPs), and to enhance the protection of sources used for abstraction through the identification of drinking water protected areas and safeguard zones. Protecting the catchments from which water is abstracted not only improves the untreated water quality and reduces potential contamination risks, but it can also mitigate against the need for additional treatment and purification processes.

Part 1  
Drinking Water Quality



## Part 1

### Drinking Water Quality

- Overall drinking water quality remains high at 99.83%
- 15 parameters did not achieve full compliance with the regulatory standards
- 60 events reported: 83% occurred at water treatment works
- Enforcement action taken on one occasion in response to regulatory contraventions

NI Water is a government-owned company with responsibility for supplying and distributing public drinking water throughout Northern Ireland. Figure 1.2 provides some details about the company.

#### Drinking Water Quality Testing

Throughout 2015, NI Water sampled drinking water across Northern Ireland to test for compliance with the standards in The Water Supply (Water Quality) Regulations (Northern Ireland) 2007 (as amended). The Regulations require sampling programmes to be in place to ensure that water quality is monitored at: water treatment works (WTWs); service reservoirs (SRs); water supply points; and consumers’ taps in water supply zones (WSZs).

In 2015, 98,378 tests were carried out for a range of different parameters. A description of each and its regulatory limit (or prescribed concentration or value [PCV]) is available on our [website](#).

#### 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. The standards also ensure that water quality meets aesthetic standards and is acceptable to consumers. The overall results confirm that the general safety of drinking water supplies remains good.

Overall drinking water quality in 2015, for the key parameters monitored at water treatment works, service reservoirs and consumers’ taps remains high (99.83%). Of the 98,378 tests we used to assess overall compliance, 167 (0.17%) failed to meet the standards (147; 0.14% in 2014), (Table 1.1 refers).

Compared to 2014 there has been a slight decrease in the percentage of tests achieving full compliance in 2015 (Figure 1.1 refers). This is partly due to the increase in iron, aluminium and coliform bacteria contraventions at consumer taps.

**Figure 1.1: Overall Drinking Water Quality, 2011 – 2015**

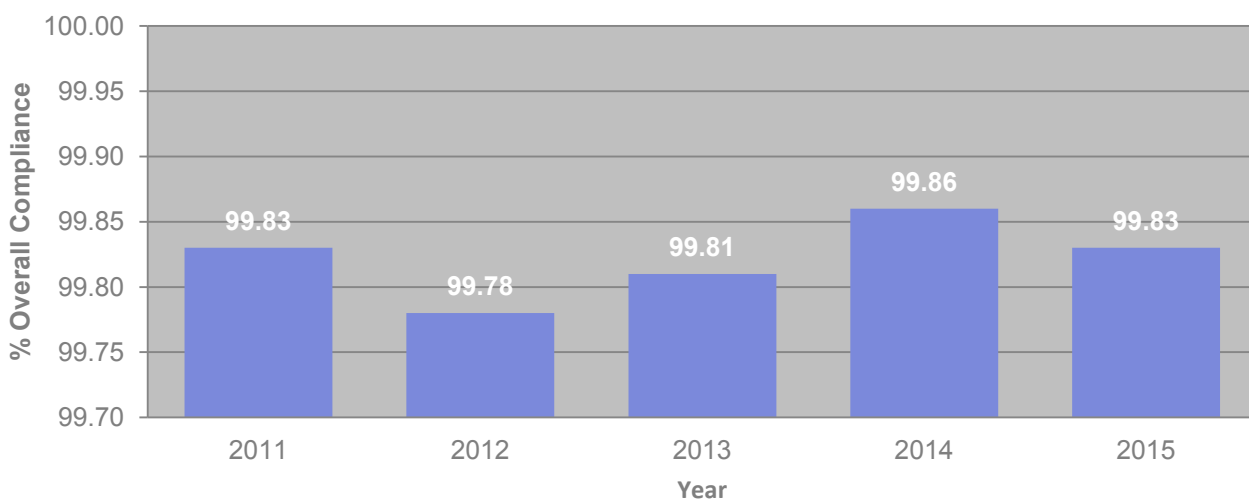


Figure 1.2: NI Water Supply Details, 2015



### Sources

- 34 sources used
- 45.8% impounding reservoirs
- 54.1% rivers and loughs
- 0.1% boreholes



### Treatment

- 25 water treatment works
- 2 < 3,000 m<sup>3</sup>/d
- 11 ≥ 3,000, ≤ 12,000 m<sup>3</sup>/d
- 12 > 12,000 m<sup>3</sup>/d
- 563 MI/day supplied



### Distribution Systems

- 297 service reservoirs
- 179 < 2,000 m<sup>3</sup> capacity
- 89 ≥ 2,000, ≤ 10,000 m<sup>3</sup>
- 29 >10,000 m<sup>3</sup>
- 26,711 km of mains pipe



### Consumers' Taps

- Population of Northern Ireland is 1.8 million
- 825,000 properties connected
- 99.8% of population
- 50 water supply zones

**Table 1.1: Overall Drinking Water Quality in 2015**

	No. of Tests	No. of Tests not Meeting the Standards
<b>Water Leaving Water Treatment Works (WTWs)</b>		
<i>E. coli</i>	6,356	0
Coliform Bacteria	6,356	1
<b>Microbiological Total</b>	<b>12,712</b>	<b>1</b>
Nitrite	60*	0
Turbidity	6,356	20
<b>Chemical Total</b>	<b>6,416</b>	<b>20</b>
<b>Total (Microbiological and Chemical)</b>	<b>19,128</b>	<b>21 (0.11%)</b>
<b>Water in Service Reservoirs (SRs)</b>		
<i>E. coli</i>	15,433	2
Coliform Bacteria	15,433	20
<b>Total</b>	<b>30,866</b>	<b>22 (0.07%)</b>
<b>Water at Consumers' Taps or Supply Points (WSZs)</b>		
<i>E. coli</i>	5,160	1
Coliform Bacteria	5,160	35
Enterococci	388	0
<i>Clostridium perfringens</i>	2,197	3
<b>Microbiological Total</b>	<b>12,905</b>	<b>39</b>
Zone Chemical Analysis	25,808	81
Supply Point Chemical Analysis**	9,671	4
<b>Chemical Total</b>	<b>35,479</b>	<b>85</b>
<b>Total (Microbiological and Chemical)</b>	<b>48,384</b>	<b>124 (0.26%)</b>
<b>Overall Water Quality</b>		
<b>Overall Microbiological Quality</b>	<b>56,483</b>	<b>62 (0.11%)</b>
<b>Overall Chemical Quality</b>	<b>41,895</b>	<b>105 (0.25%)</b>
<b>Overall Drinking Water Quality</b>	<b>98,378</b>	<b>167 (0.17%)</b>

\*Some results were not UKAS accredited and therefore not reported.

\*\*Collected at WTWs as no significant change occurs during distribution.

### Water Quality at Consumers' Taps

Fifteen parameters did not achieve full compliance at consumers' taps in 2015: lead, iron, aluminium, coliform bacteria, odour, taste, turbidity, trihalomethanes (THMs), copper, nickel, *Clostridium perfringens*, manganese, Hydrogen ion, pesticides - individual (MCPA) and *E. coli*. A summary is provided in Table 1.2.

The parameter with the lowest reported compliance in 2015 was lead at 97.94%, a slight improvement on 2014 when compliance was 97.45%. However, it should be noted that the sampling frequency for the lead parameter is relatively low compared to other metals, e.g. aluminium, iron and manganese, so a small number of contraventions has a significant impact on the percentage compliance. The water leaving treatment

**Table 1.2: Parameters Not Meeting Full Compliance at Consumers' Taps in 2015**

Parameter	No. of Samples Taken in 2015	No. of Tests not Meeting the Standards in 2015	% Compliance in 2015	% Compliance in 2014
Lead	388	8	97.94	97.45
Iron	1,876	30	98.40	98.95
Aluminium	1,876	14	99.25	99.79
Coliform bacteria	5,160	35	99.32	99.46
Odour	1,876	12	99.36	99.26
Taste	1,876	5	99.73	99.47
Turbidity	1,876	5	99.73	99.84
Total trihalomethanes	388	1	99.74	98.98
Copper	388	1	99.74	100
Nickel	388	1	99.74	100
<i>Clostridium perfringens</i>	2,197	3	99.86	99.73
Manganese	1,876	2	99.89	99.84
Hydrogen Ion (pH)	1,876	2	99.89	100
Pesticides - individual*	6,960	4	99.94	99.87
<i>E. coli</i>	5,160	1	99.98	99.98
All other analysed parameters	14,223	0	100	100
<b>% Compliance at Consumers' taps</b>	<b>48,384</b>	<b>124</b>	<b>99.74</b>	<b>99.78</b>

\*All pesticides other than aldrin, dieldrin, heptachlor and heptachlor epoxide.

works and in the distribution systems contains only trace amounts of lead. However, where lead has been used for service pipes between the water main and the kitchen tap or in domestic plumbing, there is a risk of concentrations at the consumer's tap exceeding the lead standard.

More information on lead is provided in Part 5 of this report.

### Water Quality Related to Domestic Distribution Systems

NI Water is required to investigate all contraventions of the drinking water quality standards, including those due to the internal distribution system within buildings.

Where these failures are within domestic dwellings, NI Water must inform the owner with the details of the failure and provide appropriate advice in relation to what actions the owner may take to rectify the contravention and, to protect public health.

Following notification to the owner, NI Water is not required to take any further action, unless the failure is related to a breach of The Water Supply (Water Fittings) Regulations (Northern Ireland) 2009. Where a failure is related to such a breach then NI Water must take appropriate action.

In 2015, there were 33 contraventions reported to us which NI Water determined to be due to the internal plumbing within domestic properties. These were related to

the following parameters: 21 coliform bacteria; eight lead; one copper; one nickel and two turbidity.

### The Domestic Distribution System Regulations

At premises where water is made available to members of the public (such as schools, hospitals or restaurants) NI Water is required to investigate the cause of any failure to comply with water quality standards. This should include an assessment of whether the failure is attributed to a breach of the Water Fittings Regulations. If the failure is not attributable to either the water supplied from NI Water, or non-compliance with the Water Fittings Regulations, then we are required to follow-up such failures 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 danger to human health, we may serve a notice in writing to the owner of the premises. A notice would require the owner to undertake the necessary actions to protect public health and bring the supply back into compliance.

In 2015, we received notification from NI Water of two public premises where the contraventions were related to the internal domestic distribution system. We issued a notice to each of these premises, requiring them to put in place the appropriate measures to deal with these contraventions. One contravention was due to odour and, the second was for the presence of lead.

### Events Affecting Drinking Water Quality

We require NI Water to inform us of all events that have affected, or are likely to affect, drinking water quality or sufficiency of supplies, and, where as a result, there may be a risk to consumers' health. This information must be provided according to guidance and agreed reporting procedures.

We also encourage NI Water to notify us of events that may fall outside the criteria, but which could, nonetheless, impact on water quality or cause concern to consumers. We recognize the operational nature of water treatment and supply, and that there is always the potential for events to occur. What is important, is how well NI Water minimizes the risks of occurrence and how well it responds to events as it acts to protect public health at all times. It is important that lessons are learnt from events and any necessary remedial action is undertaken by NI Water. This should be reflected in its risk assessments as part of its drinking water safety plan approach to prevent recurrence of drinking water quality events.

We assess all the information available to determine:

- what caused the problem and whether or not it was avoidable;
- what NI Water did in response and how it handled the situation;
- what lessons can be learned to prevent similar incidents in the future; and
- if there were any contraventions of the Regulations.

The five categories of events in order of increasing severity are: Not Significant, Minor, Significant, Serious and Major.

In 2015, 60 events were reported to us, 83% of which occurred at 21 out of the 25 WTWs. 48% of these were Significant events, and were mostly related to lack of effective treatment or difficulties with the treatment process. While the total number of events has limited use as a meaningful indicator, what is important is the significance of each event. Of the 60 events reported, one was categorised as Serious; 31 as Significant; 10 as Minor; and 18 as Not Significant (Annex 4 provides more details).

**Table 1.3: Comparison of Water Quality Events 2014 and 2015**

Year	DWI Risk Assessment Category					Total
	Not significant	Minor	Significant	Serious	Major	
2015	18 (28.1%)	10 (15.6%)	31 (48.4%)	1 (1.6%)	0	60
2014	9 (14.1%)	19 (29.7%)	34 (53.1%)	1 (1.6%)	1 (1.6%)	64

A summary of the 2014 and 2015 event categorizations is provided in Table 1.3 above.

The **Serious** event occurred on 6 May 2015 following operational work to introduce a new section of trunk main between Castor Bay WTWs and Magheraliskmisk SR. There was insufficient evidence from NI Water to enable a comprehensive assessment of this event to be carried out. However, the severe deterioration in water quality could only have been caused by disturbance of sediment in the original trunk main and/or a lack of adequate flushing of the new main before it was brought into service.

The 31 **Significant** events were as follows:

- 24 (77%) occurred at water treatment works and were caused by a variety of issues including: difficulties with the performance of the coagulation processes; lack of adequate treatment (including pesticide removal treatment); management of operational work; and difficulties caused by Industrial Action. These led to

aluminium, hydrogen ion (pH); iron, pesticide (MCPA), taste and odour, THMs and turbidity contraventions (see Part 3 for more details);

- six (19%) were caused by various issues in the distribution system (see Part 4 for more details); and
- one was related to consumer concern regarding cloudy tap water.

### Overview of Consumer Contacts

Every year NI Water provides us with consumer contact information to help us understand consumers' concerns (Table 1.4 refers). The total number of consumer contacts reported in 2015 was 7,183 compared to 6,331 in 2014, an increase of 852 (13.5%) contacts mostly related to the serious event at Magheraliskmisk SR.

As with previous years, the highest percentage of contacts and concerns continues to relate to the appearance of drinking water, with 68.3% in 2015.

**Table 1.4: Comparison of Consumer Contacts Relating to Appearance, 2014 and 2015**

Year	Overall Number of Contacts	% of all Contacts Relating to Appearance	% of Appearance Category Relating to Colour
2015	7,183	68.3	64.8
2014	6,331	68.8	63.0



Looking more closely at the number of consumer contacts made relating to the appearance of drinking water, Figure 1.3 illustrates the high percentage of contacts relating to colour. Discoloured water can arise when the water appears orange or brown due to suspended particles of iron, or black due to suspended particles of manganese. Iron and manganese may be present due to inadequate treatment or from corrosion of cast-iron distribution mains.

Ongoing and planned long-term mains rehabilitation programmes need to target these consumer concerns. More detail on consumer concerns is provided in Part 5.

### The Technical Audit Process

The technical audit process is the term used to describe how we check NI Water’s compliance with its statutory obligations. The audit process also allows us to observe whether good practice is being followed. We operate a risk-based approach to technical audit which takes into consideration factors such as water quality monitoring, events and

previous audits. This enables us to prioritize and focus the technical audit work to have the most benefit. Any corrective action that follows on from our recommendations and suggestions following the audit process is monitored to ensure satisfactory completion. A summary of the 2015 Technical Audit Programme is detailed in Annex 5.

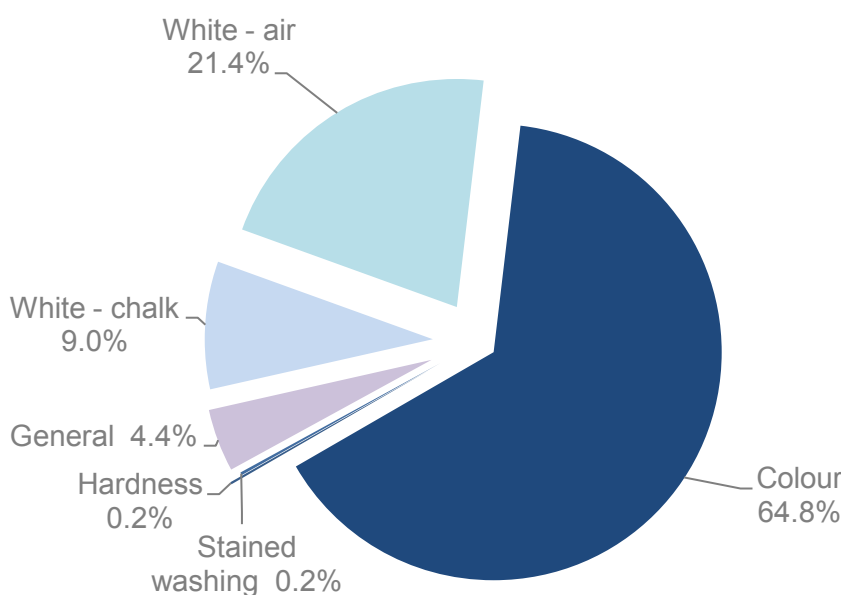
### Regulatory Processes

#### Risk Management

In fulfilling its regulatory requirements, NI Water must carry out a risk assessment, which is part of the drinking water safety plan (DWSP) approach adopted at every treatment works, associated catchment and supply system. This process is required to be kept under review based on NI Water’s ongoing assessment of risk.

These assessments identify and quantify the inherent risks throughout individual water supply systems and detail mitigation measures, and the adoption of effective controls to protect drinking water quality.

Figure 1.3: Percentage of Consumer Contacts in the Appearance Category, 2015



These control measures may involve actions relating to: minimizing the potential for contamination of source waters; reducing or removing contaminants through appropriate treatment processes; and measures preventing contamination within the distribution network and domestic water systems within buildings.

NI Water's quantification of the risks within the water supply system is fundamental to ensuring that NI Water identifies its current and future investment planning needs to secure high quality drinking water through the Price Control (PC) programmes of work.

The individual sections that follow in this report provide more detail on how the risk assessment process is undertaken in the specific parts of the water supply chain. This covers from catchment through to treatment, and onward within the distribution system to the consumer's tap.

### Enforcement Orders

Where NI Water has failed to comply with its regulatory duties, there are a range of statutory processes to ensure that compliance is achieved.

Details of our Enforcement and Prosecution Policy are available on our website. The enforcement process may be initiated with the issue of a 'Consideration of Provisional Enforcement Order' (CPEO), where, NI Water is requested to submit an Undertaking on the steps it is taking, or plans to take, to ensure compliance with the requirements of the Regulations.

The next stage of enforcement would be to issue a Provisional Enforcement Order (PEO). A PEO would require NI Water to undertake certain remedial measures or actions; failure to comply with a PEO would result in a further escalation of enforcement, with the issuing of an Enforcement Order.

We may also issue Regulation 28 Notices where we determine that a risk assessment has identified a significant risk of supplying water which would constitute a potential danger to human health. This would require NI Water to immediately undertake specified measures to protect human health.

During 2015, we issued one CPEO:

- **CPEO/15/01** - to ensure remedial measures were put in place to deal with MCPA (pesticide) contraventions at Derg WTWs.

Undertakings relating to two CPEOs, one PEO and one Regulatory Notice issued in 2014 were completed during 2015:

- **CPEO/14/01** - to ensure remedial measures were put in place to deal with Hydrogen ion (pH) contraventions within the distribution system around Straid Road, New Road, and Ballymontenagh Road, Ahoghill;
- **CPEO/14/02** - to ensure remedial measures were put in place to deal with manganese contraventions at Camlough WTWs and its associated water supply area;
- **PEO/14/01** - to require remedial measures to be put in place to prevent the potential for a recurrence of a failure to disinfect the water leaving Drumaroad WTWs; and
- **Regulation 28 Notice** - requiring NI Water to implement a series of remedial measures to ensure appropriate controls were in place in the operation of the disinfection process at Rathlin WTWs.

Full details on these enforcements, including the remedial measures undertaken by NI Water, are contained within Annex 6 of this report.

## Investment Planning

### Price Control Process

The Price Control (PC) process is the mechanism by which NI Water secures its funding and investment priorities for the coming years. We continued to actively engage with NI Water; the Utility Regulator; the Department for Regional Development; the Consumer Council; and the Northern Ireland Environment Agency as part of the investment planning process to identify funding priorities in the current and future PC processes.

The funding priorities for drinking water quality for NI Water during the period of our report form part of the PC10 process. This initially covered the period 2010-2013 but was subsequently extended until 2015.

During 2015 we have been involved, along with other stakeholders, in agreeing the drinking water quality priorities within the next price control process PC15, which covers the six year period 2015-2021. We recognize the competing priorities which exist within this process, along with the funding constraints which are in place. As the drinking water quality regulator, our primary objective is to identify programmes of work that are necessary to secure compliance with drinking water standards. This work assists in identifying and targeting infrastructure and operational improvements required by NI Water to maintain and enhance its operations in delivering safe, clean drinking water supplies.

**Part 2**  
**Catchment**



## Part 2

### Catchment

- Seven supplies had pesticide levels above the regulatory limit in 2015
- MCPA continues to be the most common pesticide detected during 2015
- NI Water has continued to engage with key stakeholders in promoting best practice in the management of its catchments

This section of the report looks at the catchment. This is the start of the ‘water supply chain’ from which NI Water abstracts water before it is treated and distributed onwards to consumers’ taps. We look at how catchments are managed as part of the drinking water safety plan approach to provide safe, clean drinking water.

In Northern Ireland, public water supplies are abstracted from surface water sources, with the exception of the water supply to Rathlin Island, which is supplied from a borehole. The nature and structure of the landscape, together with a well distributed rainfall pattern, have meant upland and lowland impounding reservoirs and direct river abstractions are the primary water sources used in Northern Ireland.

Surface water sources contain naturally occurring organic materials as well as other potential contaminants which need to be removed by suitable water treatment processes. It is these risks which are identified within NI Water’s catchment management plans, and suitable control measures are documented within its drinking water safety plans.

Water quality can vary between sources due to factors such as: the nature of the rock types, soil, and vegetation; and land use. These are important factors that may have an impact on the properties of a drinking water supply, such as taste, hardness, acidity (pH), organic and mineral content. These factors will also determine the type of treatment required within the water treatment works.

### Water Abstraction

In Northern Ireland any major abstraction of raw water from rivers, reservoirs, or loughs is controlled by the Water Abstraction and Impoundment (Licensing) Regulations (Northern Ireland) 2006 which require a licence to be obtained from the Northern Ireland Environment Agency (NIEA). NI Water is authorised to abstract up to 1,075 MI/d under license from NIEA and, in 2015, water was abstracted from 34 sources across Northern Ireland.

NI Water is required to have a strategic plan to ensure there are appropriate resources to maintain drinking water supplies for predicted usage up to the year 2035. This is detailed in the Water Resource Management Plan (WRMP) and takes account of population changes, housing and water usage, as well as predicted changes to our climate.

#### Figure 2.1 Raw Water Abstraction Point



Source: NIEA

## Catchment Risk Assessment

As part of managing the risk of contamination from 'source to tap', NI Water is required to assess all the potential risks within its catchments and keep these risk assessments under review. These assessments detail the arrangements in place to mitigate against these risks in order to protect the catchment and preserve the quality of its source waters. In the management of these risks, NI Water has a duty to undertake a monitoring programme of raw water quality throughout the year. This programme should take account of the level of risk as identified within each catchment.

NI Water must scope for potential contaminants, including those listed under EU priority substances. Where it has identified these could be present, it is required to monitor for these substances at a set frequency, based on the population served by the water treatment works.

Monitoring is also important for operational management of water treatment works to ensure treatment processes provide an effective barrier against contaminants, for example in monitoring for seasonal changes in the level of pesticides in catchments.

Throughout 2015, NI Water continued to liaise closely with key stakeholders, including the environmental regulator in NIEA, the Department of Agriculture and Rural Development (DARD), and Forestry Service. This ensured appropriate lines of communication remained in place for exchanging information on risks and associated control measures.

## Potential Contaminants in NI Water's Catchments

Both natural and human factors have the potential to influence the raw water quality in catchments:

- **Natural factors** - include wildlife, climate, topography, geology, vegetation; and
- **Human factors** - include point sources (e.g. waste water treatment works discharges) and non-point sources (e.g. surface run-off from agricultural activities such as pesticide usage).

Harmful bacteria can be present within drinking water sources, and it is important that adequate treatment is in place to prepare the water for effective disinfection to make it safe. In some catchments the presence of certain algae may cause taste and odour issues, and specific treatment would be required to ensure the water is acceptable to consumers. Other factors, for example, increased run-off from the surrounding catchment from heavy rainfall or snow melt, can affect the characteristics of the water. In dealing with such issues, NI Water is required to have robust monitoring and controls in place to enable treatment processes to deal effectively with changes in raw water quality. The ability of the process to adapt quickly to changing water quality within the catchment is important to ensure the ongoing provision of safe, clean drinking water.

As the potential list of contaminants within catchments is diverse, NI Water must risk assess each catchment to determine the specific risks, and to ensure appropriate mitigation is in place.

## Pesticides

Pesticides are a group of substances that include insecticides, herbicides, fungicides and algicides that are commonly used as part of land management practices in catchments. The Regulations set the standards and sampling frequencies within water supply zones for individual pesticides as well as the 'total pesticide' standard. NI Water is required to undertake a monitoring programme for

pesticides within the catchment, informed by the level of risk. Water sources may contain traces of pesticide residues as a result of agricultural use (e.g. pest control on crops) and non-agricultural use (e.g. herbicide for weed control on roads).

## Radon

The new European Directive, Euratom 2013/51, has introduced requirements for public health protection with regard to radioactive substances (including radon) in water intended for human consumption. Drinking water regulations were amended on 28 November 2015, to include this requirement, and set a new standard for radon in drinking water of 100 Bq/l. In advance of this new regulatory requirement NI Water undertook a survey of the levels of radon in its drinking water sources. This indicated that the levels within the raw water sources were extremely low and were significantly below the new standard. These results reflect the prominent use by NI Water of surface water sources. NI Water has one groundwater source at Rathlin WTWs and results from this supply indicate that levels of radon are also below the new standard. However, given that risks of radon in water are higher from groundwaters further monitoring will be undertaken to gather the necessary information to provide a full assessment.

## Final Water Compliance Sampling Programme for Pesticides

During 2015, 30 individual pesticides were monitored for under the regulatory compliance sampling programme. This resulted in a total of 6,960 pesticide determinations, from the 232 compliance samples taken. From these samples, four contravened the individual pesticide standard of 0.1 µg/l for MCPA: two occurred at Derg WTWs; one at Ballinrees WTWs; and one at Killyhevlin WTWs.

MCPA is a herbicide widely used in Northern Ireland for controlling broadleaved weeds in

grass and cereal crops, and in the clearing of rushes.

## Operational Sampling Programme for Pesticides

In addition to the compliance sampling programme for pesticides, NI Water also undertakes an operational monitoring programme. The outputs from this are used to inform its risk assessments and ensure treatment and catchment control measures are effective.

This operational monitoring programme during 2015 identified pesticides above the regulatory limit in the water going into supply from Belleek WTWs, Camlough WTWs, Derg WTWs, Killyhevlin WTWs; Moyola WTWs and Seaghan WTWs.

All water treatment works with pesticide detections, both regulatory and operational from 2012 to 2015 are summarized within Table 2.1.

## Follow-up Actions on Pesticides

The number of pesticide contraventions in 2015 is lower than for 2014, however there remain a number of catchments where NI Water has assessed pesticides as a high or medium risk.

NI Water is required to investigate and report pesticide contraventions. Each investigation will include liaison with the NIEA's Pollution Control Team regarding pesticide usage and control within the relevant catchments. The investigation will also trigger a review of the identified control measures within the catchment, and the water treatment works processes. Where there is an identified ongoing risk within a catchment, NI Water should have an effective treatment barrier in place.

There are a range of mitigation and control measures NI Water has in place within the catchment and treatment processes at Water Treatment Works, these include:

**Table 2.1: Pesticides Detected above the Regulatory Standard, 2012 – 2015**

Water Treatment Works (WTWs)	2015	2014		2013	2012				
	MCPA	Clopyralid	MCPA	MCPA	Linuron	MCPA	Mecoprop	Metoxuron	Total Pesticides
Moyola WTWs	✓								
Lough Fea WTWs		✓				✓			
Dungonnell WTWs		✓							
Ballinrees WTWs	✓					✓			
Clay Lake WTWs		✓		✓		✓		✓	
Seagahan WTWs	✓			✓		✓	✓		
Camlough WTWs	✓		✓						
Carran Hill WTWs						✓			
Dorisland WTWs		✓	✓	✓		✓			
Caugh Hill WTWs					✓				✓
Derg WTWs	✓		✓	✓		✓			
Killyhevlin WTWs	✓	✓	✓	✓		✓			
Belleek WTWs	✓		✓						

- measures to influence the usage / application and disposal of pesticides within the catchment (e.g. land use management, liaison with stakeholders through local working groups);
- developing Catchment Management Plans and implementing sustainable catchment management solutions;
- use of monitoring data and risk assessments in balancing flows and abstraction points to reduce the impact of increased pesticides during periods of high risk (e.g. following heavy rainfall); and
- installing, maintaining and optimizing treatment for the removal of pesticides (e.g. Granular Activated Carbon Filters).

**Catchment Protection**

The protection of the catchments is key to both reducing the risks from contamination and ensuring the delivery of safe, clean drinking water. There are a number of key

measures which influence how catchments are protected and managed.

- **The Water Framework Directive (WFD)** - requires River Basin Management Plans (RBMPs) to be in place for each water body and has a further requirement to ensure Drinking Water Protected Areas (DWPAs) are established and monitored. These provisions help protect catchments through having in place programmes of measures. These measures should ensure there is no deterioration, and where possible, improve the quality of our water bodies. It also provides for a monitoring regime to establish baselines and to monitor for changes in water quality. The protection of areas from which drinking water is abstracted helps maintain water quality and can also mitigate against the need for additional water treatment and purification processes; and
- **NI Water Measures** - the company has in place a series of measures to help



protect and improve the water quality within its catchments. Catchment Management Plans assess the condition of its catchments and identify actions to maintain and enhance water quality. Some of these measures will form part of its SCaMP programme, which includes long term sustainable solutions to improve water quality.

NI Water and NIEA work together in developing their plans in protecting drinking water catchments, they also actively engage with other key stakeholders through working groups to ensure a collaborative approach in bringing forward catchment protection measures.

One such group is The Water Catchment Partnership (WCP) which was established in 2013 to help address significant water quality issues related to pesticides. The WCP is a working partnership established from representatives of Ulster Farmers Union, Northern Ireland Water, Northern Ireland Environment Agency, Department of Agriculture, Environment and Rural Affairs, College of Agriculture, Food and Rural Enterprise and the Voluntary Initiative.

The aim of the partnership is to promote a message which incorporates the ethos from all organisations to effectively tackle the problem of pesticides in the water environment, particularly in drinking water catchment areas.

In 2015 they produced and distributed a leaflet '[Stop and think about the water you drink](#)' to agricultural householders across Northern Ireland (see Figure 2.2).

### Drinking Water Protected Areas (DWPAs)

Surface waters which are abstracted for the production of drinking water for both public and private drinking water supplies are required to be identified and mapped within NIEA's river basin management plans. These areas are termed Drinking Water Protected Areas (DWPAs). Under Article 8 of the Water

Framework Directive (WFD), there is a requirement to put in place an appropriate sampling programme to monitor substances discharged within DWPAs that may cause deterioration in the status of the water body.

As part of the WFD requirements, NIEA has in place three River Basin Management Plans (RBMPs) which cover Northern Ireland: the North Eastern; the North Western; and the Neagh Bann. These plans detail the water environment within each area. They also provide information on the Programme of Measures (POMs) that are required to be put in place to monitor and improve the status of the water body.

**Figure 2.2 Information Leaflet on Pesticide use**



There are nine surface water bodies and 48 river systems designated as DWPAs in Northern Ireland. NIEA may designate safeguard zones within a DWPA as part of its cycle of monitoring and review, in order to address specific identified contamination risks.

NI Water is required to have a risk assessment in place for each water supply system, which is reviewed as part of the cycle of assessing the monitoring data from the raw water source, along with the ongoing assessment of risks within the catchment. It is important that NI Water's risk assessments, associated catchment management plans, and raw water sampling programmes are closely aligned to provide a holistic approach to the management of its catchments.

**Part 3**  
**Water Treatment**



## Part 3

### Water Treatment

- 25 water treatment works (WTWs) were in operation producing high quality drinking water
- Of the 19,128 compliance tests at WTWs, 99.89% met the required standards
- 50 events occurred at WTWs, 24 of which were categorised as Significant
- Treatment related issues remain the primary reason for contraventions at WTWs

NI Water must ensure that the treatment processes it has in place at each water treatment works (WTWs) are robust and designed to deal with the range of raw water quality which could occur within the water source.

In Northern Ireland, surface waters are the main source of drinking water supplies. Water treatment processes are used as barriers to control the risk of contaminants entering our drinking water supplies.

Water treatment processes include the physical removal of potential contaminants by using chemical coagulation/flocculation, sedimentation or flotation, and filtration to prepare the water for disinfection. Figure 3.1 shows the flotation stage, and Figure 3.2 the primary filtration stage of the treatment process. The primary aim of water treatment is to eliminate any pathogenic micro-organisms and provide a safe, clean drinking water supply.

The drinking water safety plan (DWSP) approach requires an assessment to be

made between the source water and the type of water treatment in place at each water treatment works. This assessment should identify and quantify the risks within the source water and ensure that appropriate remediation measures are in place to reduce these risks. The water treatment processes must be appropriate to deal with the specific risks within each source. They should take into account the wide variations in the quality of the source water caused by seasonal change and adverse weather. The risk assessment should also take account of the risks which may be encountered within the treatment processes and proper controls should be in place to mitigate these.

One 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 and entering distribution. In Table 3.1, groupings of two sets of parameters are used to describe the effectiveness of water treatment processes: process control parameters; and disinfection parameters.

**Figure 3.1: Flotation Stage**



Source: NIEA

**Figure 3.2: Primary Filtration Stage**



Source: NIEA

## Process Control Parameters

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

In 2015, results from the regulatory monitoring programme, shown in Table 3.1, report non-compliances for two of the process control parameters, aluminium and trihalomethanes (THMs).

The implementation of best practice in the operation of WTWs is critical in ensuring a high quality of drinking water is produced regardless of variations in the raw water quality. It is important that there is appropriate monitoring and control of the treatment processes in place and that appropriate levels of maintenance are maintained.

### Aluminium

Aluminium compliance, which is measured at consumers' taps, significantly decreased in 2015. There were 14 contraventions (0.75%) compared with the four (0.21%) that occurred in 2014. NI Water attributed four contraventions directly to treatment difficulties: three at Drumaroad WTWs; and one at Killylane WTWs. Nine others were attributed to mains disturbances supplied

wholly or partly from Drumaroad WTWs, while the remaining contravention was attributed to disturbance of mains deposits in a zone supplied from Altnahinch WTWs.

Operational sample results and traces from on-line monitors often highlight elevated aluminium levels at WTWs before they become apparent in distribution. In many cases the remedial measures taken by NI Water in response to these early detections, limit the impact of a water quality event. Overall, there were eleven Significant events at WTWs in 2015 relating to elevated levels of aluminium. Although these events do not always directly correlate with regulatory contraventions in zones, they can contribute to the accumulation of aluminium in the distribution system and contribute to contraventions at a later date. Figure 3.3 demonstrates the levels of aluminium compliance over the last five 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 microbiologically safe to drink. Effective treatment removes most of the organics, and reduces the level of THMs that occur in the final water.

**Table 3.1: Water Quality at Water Treatment Works, 2015**

Parameters	Place of Sampling	Total No. of Tests in 2015	No. of Tests not Meeting the Standards in 2015	% of Tests Meeting the Standards	
				2015	2014
<b>Process Control Parameters</b>					
<b>Aluminium</b>	<b>WSZ</b>	<b>1,876</b>	<b>14</b>	<b>99.25</b>	<b>99.79</b>
<b>Trihalomethanes</b>	<b>WSZ</b>	<b>388</b>	<b>1</b>	<b>99.74</b>	<b>98.98</b>
<b>Disinfection Parameters</b>					
<b>Coliform</b>	<b>WTWs</b>	<b>6,356</b>	<b>1</b>	<b>99.98</b>	<b>99.97</b>
<i>E. coli</i>	WTWs	6,356	0	100	100
<b>Turbidity</b>	<b>WTWs</b>	<b>6,356</b>	<b>20</b>	<b>99.69</b>	<b>99.83</b>
<b>Indicator Parameter</b>					
<b><i>Clostridium perfringens</i></b>	<b>WTWs</b>	<b>2,197</b>	<b>3</b>	<b>99.86</b>	<b>99.73</b>

WSZ = Water Supply Zone (consumer tap sample)

THM compliance improved in 2015, with only one sample (0.26%) contravening the standard (100µg/l), compared to four (1.02%) in 2014. NI Water must fully consider the formation of THMs and other disinfection by-products as part of its overall disinfection policy. NI Water must continue to keep all disinfection by-products, including THMs, to as low a level as possible, but without compromising disinfection. Figure 3.3 displays the levels of THM compliance at consumers' taps over the last five years. These figures indicate the upward trend has continued, but good operational practices and robust treatment process must be in place to prevent any regression.

**Disinfection Parameters and Disinfection Statements**

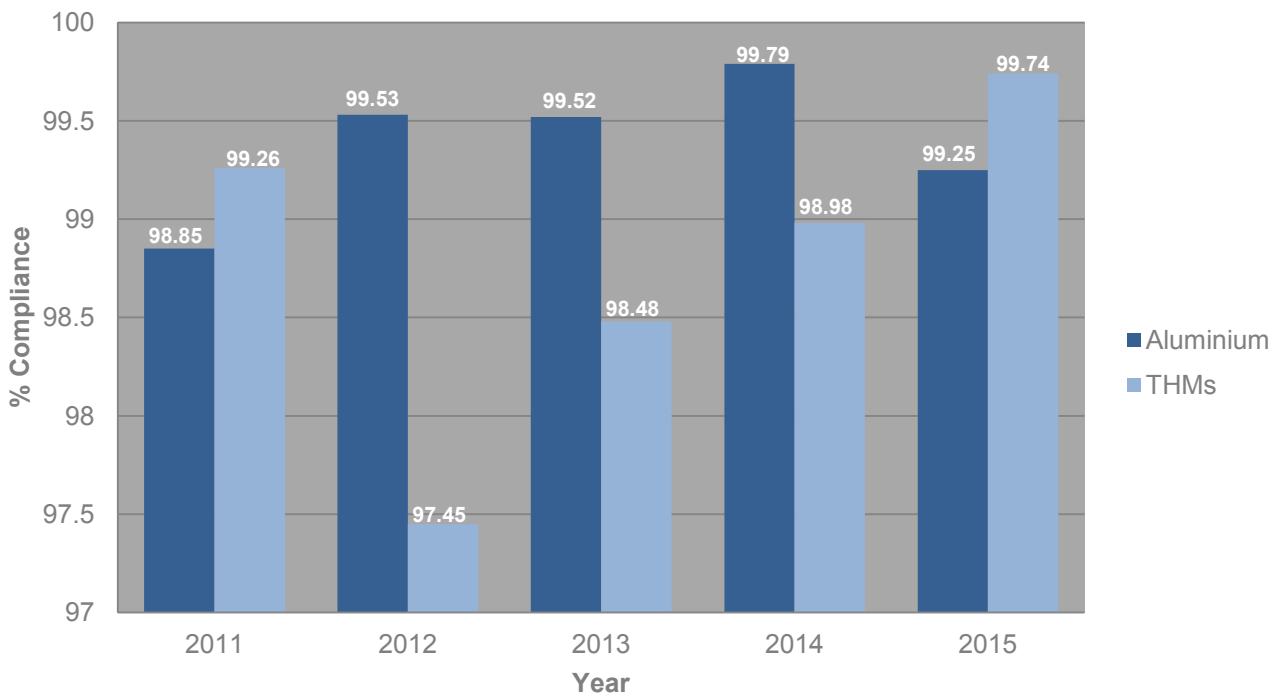
The coliform bacteria, *E. coli* and turbidity parameters (Table 3.1 refers) look at the effectiveness of disinfection and pathogen removal. To safeguard consumers from the risk of microbiological organisms being present in drinking water, effective

disinfection is fundamental to treatment works' operation. NI Water must achieve its regulatory duty of disinfecting drinking water before it is supplied to consumers.

NI Water has disinfection statements in place at each water treatment works which detail the necessary requirements to ensure effective disinfection. During 2015, NI Water has been investigating the development of its disinfection statements to cover the distribution systems related to each WTWs. These extended statements should consider where NI Water boosts chlorination within the distribution system and operational practices in relation to retention times and cleaning regimes within the distribution system.

There were two enforcements relating to the disinfection process, which were closed during 2015 following the completion of remedial measures. These were in relation to a failure to adequately disinfect water leaving Drumaroad WTWs; and insufficient controls on the disinfection process at Rathlin WTWs.

**Figure 3.3: Percentage Compliance for Aluminium and THMs at Consumers' Taps, 2011 – 2015**



### *E. coli* and Coliform Bacteria

Testing for *E. coli* and coliform bacteria at water treatment works provides a level of assurance that water is being treated adequately to remove bacterial and viral pathogens. In addition, NI Water should also monitor and review its operational practices and other control measures, such as its disinfection statements for each WTWs to ensure disinfection processes are adequately maintained and are effective.

In 2015, NI Water reported 100% compliance for *E. coli* and 99.98% compliance for coliform bacteria at water treatment works.

### Turbidity

The finely suspended particles which cause turbidity in water must be removed by effective water treatment in preparation for the disinfection process. If treatment is inadequate these particles may increase turbidity levels in the partially treated water prior to chlorination.

As well as being a regulatory requirement, it is also considered good operational practice to ensure that a turbidity value below 1 NTU is achieved post treatment to ensure effective disinfection. There was a slight decrease in compliance with the turbidity standard in 2015 (99.69% in 2015 compared to 99.83% in 2014). Turbidity contraventions occurred at 12 (50%) water treatment works in 2015. Of the 6,356 samples taken for turbidity analysis from WTWs, 20 (0.31%) failed to meet the standard.

Of these failures, NI Water’s subsequent investigations indicated that fourteen were due to unrepresentative sampling and/or analyses; two were caused by treatment difficulties; two were caused by tanks running low; one occurred during WTWs maintenance; and the cause of one was not determined. Automated turbidity analysis, as carried out at NI Water’s drinking water quality laboratory is shown in Figure 3.4.

**Figure 3.4: Turbidity Analysis**



Source: NIEA

### Indicator Parameter

#### *Clostridium perfringens*

The Regulations require monitoring for *Clostridium perfringens* as an indicator parameter. It can be used in association with other parameters to assess the efficiency 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 2015, 2,197 tests were carried out for *Clostridium perfringens* on samples collected from water treatment works. Three (0.14%) contravened the standard: one each at Drumaroad, Dunore Point and Fofanny WTWs. Investigations by NI Water were unable to identify the cause of the contraventions at these WTWs. There were no related contraventions and no issues identified with the water treatment processes. All follow-up samples were satisfactory.

### Events

During 2015, 50 events were notified to us that related to water quality going into supply from water treatment works. 24 of these were categorised as Significant; and 26 categorised as Minor or Not Significant.

There were 24 Significant events at 14 (56%) WTWs in 2015: Altnahinch; Ballinrees; Belleek; Camlough; Caugh Hill; Derg; Dorisland; Drumaroad; Dungonnell; Killyhevlin; Killylane; Moyola; Rathlin; and Seagahan. The majority of these were related to difficulties with the performance of the coagulation processes, or deficiencies at the WTWs which led to: aluminium; hydrogen ion (pH); iron; pesticide (MCPA); taste and odour; THMs; and turbidity contraventions.

### Industrial Action

The Industrial Action by some NI Water staff affected water quality from a number of water treatment works over the December 2014 – January 2015 period. This was categorised as a Major water quality event and information on it was provided in last year’s report. However three water quality events in 2015 were related to this Industrial Action as can be seen in Figure 3.5.

Details of all water quality events that occurred in 2015 are provided in Annex 4.

## Drinking Water Quality Improvements

### Enforcement Action at WTWs

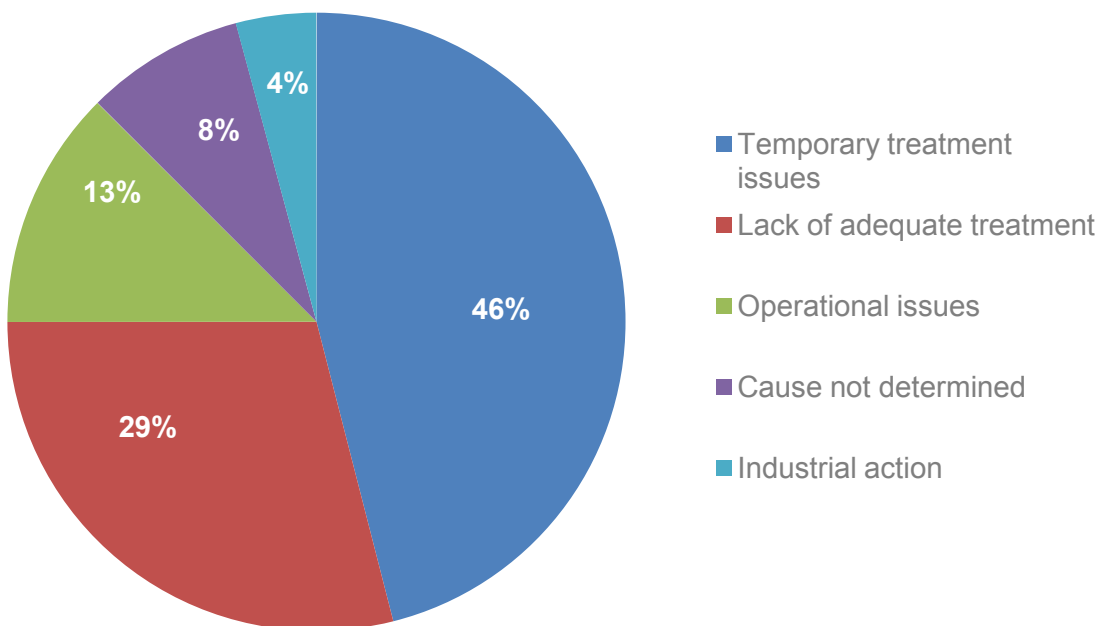
In 2015, we issued one Consideration of Provisional Enforcement Order (CPEO) to address recurring MCPA contraventions at Derg WTWs.

Further details on our enforcement action are provided within Annex 6.

### Treatability Studies

Within its submission to the Utility Regulator for PC15, NI Water has identified 13 WTWs where treatability studies are to be undertaken during the six year investment period from 2015 to 2021. These have been prioritised by NI Water based on the risk assessments for each WTWs.

**Figure 3.5: Main cause of Significant Events at WTWs in 2015**





**Part 4**  
**Water Distribution**  
**Systems**



Image: Northern Ireland Water

## Part 4

### Water Distribution Systems

- Service Reservoir water quality remains high - overall microbiological compliance of 99.93%
- NI Water continues to rationalize its Service Reservoirs and deliver its mains rehabilitation programme to improve its distribution network

The water distribution system in Northern Ireland is an extensive and complex network, consisting of 297 service reservoirs (SRs) and approximately 26,700 km of mains pipe. The 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.

The water quality in the distribution system depends on the structural integrity of the distribution system, the materials it comes into contact with and the nature of the water itself. For example, service reservoirs whose structural integrity has not been maintained are at risk from ingress of contaminants, and old cast-iron pipes which have corroded over time may result in sediment being deposited under low flow conditions. An increase in flow rate or operational activity can cause

disturbance to the mains network, which may result in discoloured water at the tap. Monitoring the quality of the water is important for identifying potential deficiencies regarding the integrity of the service reservoirs, and within water supply zones (WSZs). In Table 4.1 two measures are used to describe the water quality within a distribution system: reservoir integrity, and distribution networks.

#### Microbiological Quality

Water entering the distribution systems must be microbiologically safe. The distribution system itself must have sufficient controls in place to prevent contamination of drinking water supplies, as the water is delivered to the consumer. Figure 4.1 shows a typical service reservoir.

A disinfectant residual is maintained throughout the distribution network to provide

**Table 4.1: Water Quality Indicators within the Distribution System**

Parameters	Place of Sampling	No. of Tests in 2015	No. of Tests not Meeting the Standards in 2015	% of Tests Meeting the Standards in 2015	% of Tests Meeting the Standards in 2014
<b>Reservoir Integrity</b>					
Coliform bacteria	SR	15,433	20	99.87	99.89
<i>E. coli</i>	SR	15,433	2	99.99	99.97
<b>Distribution Networks</b>					
Turbidity	WSZ	1,876	5	99.73	99.84
Iron	WSZ	1,876	30	98.40	98.95
Manganese	WSZ	1,876	2	99.89	99.84

ongoing protection against recontamination and limit the potential for microbial growth problems.

NI Water carries out additional disinfection (often referred to as ‘secondary disinfection’) through chlorine boosting at selected service reservoirs, particularly those with long distribution networks. This additional disinfection is necessary to maintain bacteriological water quality, but NI Water must ensure its disinfection policy limits the formation of disinfection by-products e.g. trihalomethanes (THMs).

**Figure 4.1: Service Reservoir**



Source – NIEA

It is imperative that this ‘secondary disinfection’ does not disguise a more fundamental problem such as compromised reservoir integrity because of the structural condition of the reservoir or the hydraulic flow of water through the system.

***E. coli* at Service Reservoirs**

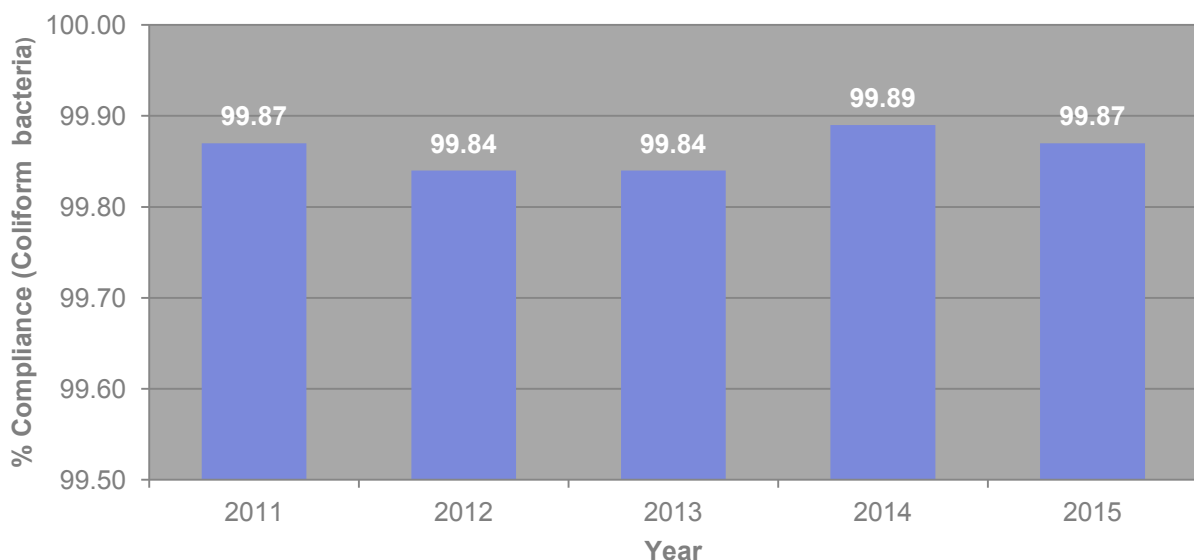
In 2015, a total of 15,433 samples for *E. coli* testing were collected at service reservoirs across Northern Ireland. *E. coli* was detected in samples on two occasions at two different service reservoirs. This marks an improvement from four occasions at four different service reservoirs in 2014.

On detecting *E. coli*, NI Water must act promptly to protect public health and ensure that the water being received by consumers is safe. NI Water linked both contraventions to external contamination at the time of sampling but chlorine boosting was carried out at one of the reservoirs as a precaution. There have been no further contraventions at these reservoirs to date.

**Coliform Bacteria at Service Reservoirs**

Samples are collected weekly at every service reservoir in Northern Ireland. It is a regulatory requirement that at least 95% of samples collected annually from each service reservoir are free from coliform bacteria. All 297 service reservoirs sampled in 2015 met this regulatory requirement. However, coliform bacteria were detected on 20 occasions at 20 (6.7%) different service reservoirs. This is a slight increase in detections from 2014, when coliform bacteria were found on 17 occasions at 17 service reservoirs (see Figure 4.2).

**Figure 4.2: Percentage Compliance of Coliform Bacteria at Service Reservoirs, 2011–2015**



## Reservoir Integrity

We assess reservoir integrity based on the microbiological quality of the water. The detection of microbial pathogens may suggest that the structure of the reservoir has been breached and these instances should be investigated further by NI Water. NI Water must have a programme in place to ensure all service reservoirs are cleaned and checked for integrity on a regular basis. NI Water must also have a disinfection policy in place that ensures a residual disinfection is maintained throughout the distribution system for the protection of human health. This has been incorporated by NI Water within its drinking water safety plans and disinfection statements for individual WTWs.

## Distribution Networks - Iron

NI Water has an extensive network of iron water mains across Northern Ireland, stretching for almost 27,000 kilometres. In 2015 a total of 1,876 samples taken from consumers' taps were tested for iron. Of these, 30 (1.60%) contravened the regulatory standard of 200µg/l. This is a

reduction in compliance from 2014 when 20 (1.05%) contravened the standard (see Figure 4.3).

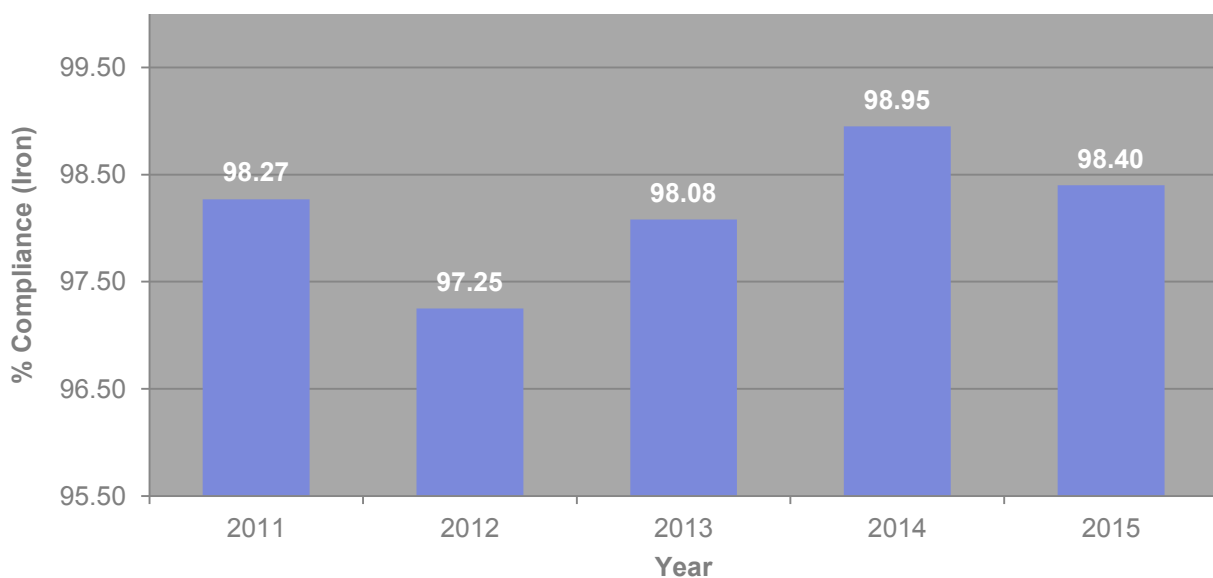
Water quality issues frequently arise in the network due to problems caused by the corrosion of older iron water mains. NI Water has an ongoing Water Mains Rehabilitation Programme in which water supply zones that experience water quality and other supply problems are subjected to detailed zonal studies. This enables corrective action to be taken on a priority basis to improve the water quality being supplied to consumers.

## Drinking Water Quality Improvements

### Mains Rehabilitation Programme

NI Water's mains rehabilitation programme restores or replaces the existing water mains pipe work (see Figure 4.4). The criteria by which pipe work is prioritized for replacement under this programme takes into consideration many factors, including water quality, water pressure, leakage, bursts, consumer complaints and sufficiency of supply.

**Figure 4.3: Percentage Compliance of Iron in Distribution, 2011 - 2015**



Many of the mains delivering water to consumers' taps are made of cast iron and the deterioration of older water mains may result in consumers receiving discoloured drinking water due to the presence of iron and manganese.

#### Figure 4.4: New Mains Installation



Source: NIEA

#### Enforcement Action within Distribution Systems

In order to protect, maintain and improve drinking water supplies, NI Water continues to complete infrastructure, treatment and distribution projects. These programmes of work although mainly driven by NI Water's assessment of need may also be driven by remedial actions relating to, Enforcement Orders, Notices and other regulatory processes.

During 2015, a Consideration of Provisional Enforcement Order (CPEO/14/01) issued in 2014 was completed. This CPEO addressed Hydrogen Ion (pH) contraventions related to a section of the mains pipework within the Dungonnell Ahoghill water supply zone (refer to Annex 6 for further details).

Part 5  
Consumers' Taps



## Part 5

### Consumers' Taps

- Overall water quality at consumers' taps remains high at 99.74% compliance
- 15 parameters did not achieve full compliance at consumers' taps
- A high level of microbiological quality was achieved at 99.70% compliance
- Lead remains the parameter with the lowest compliance at 97.94%
- Consumer contacts on drinking water quality increased by 13.5% and discoloured water remains the main issue of concern to consumers

Once water has passed through NI Water's distribution network, it comes into contact with water systems within buildings. These systems can be in domestic properties or in larger commercial or public premises. In undertaking its risk assessments, NI Water must take account of the potential for the water it supplies to become contaminated by these systems through, for example, the condition and maintenance of the pipe-work or storage facilities. NI Water's sampling programme within water supply zones is randomly generated to take samples from consumers' properties. NI Water must keep a record of the type of property the sample was taken from (e.g. a residential property or a public building).

The Regulations require that sampling must take place at consumers' drinking water taps. Some of the parameters such as lead, copper, and nickel that are monitored at consumers' taps may be influenced by the nature and condition of water distribution systems in buildings.

In instances where water quality issues have been identified as being caused by the distribution system within a building, NI Water is required to investigate to determine the cause. Where there is a water quality issue within a building where water is available to the public (such as a school, hospital or restaurant) remedial action is required to be taken by the owners to ensure that the water supply is safe and clean. This requirement is

administered through either the Water Fittings Regulations, or the Domestic Distribution Systems Regulations.

#### Drinking Water Quality

To assess the overall quality of water that is being supplied to consumers, we look at the results of regulatory samples taken by NI Water from consumers' taps. In Table 5.1 we record the percentage compliance for 34 of the Schedule 1 (mandatory) parameters and nine of the Schedule 2 (indicator) parameters. The other four schedule 1 parameters i.e. the pesticides Aldrin, Dieldrin, Heptachlor and Heptachlor epoxide are not currently required to be monitored by NI Water under a waiver issued by DWI as their use is banned in the UK. Overall drinking water quality at consumers' taps has dropped slightly from 99.78% in 2014 to 99.74% in 2015.

#### Chemical/Physical Quality

##### Lead

In 2015, lead was the parameter with the lowest percentage compliance (97.94%), an improvement from 97.45% in 2014. However lead compliance is prone to fluctuations due to the low sampling frequency required by the regulations.

All water supplies in Northern Ireland, with the exception of Rathlin Island, are modified

Table 5.1: Consumer Tap Compliance 2015

	Number of Samples	Number of samples not Meeting the Standards	% Compliance
<b>Schedule 1 (Mandatory parameters)</b>			
Lead	388	8	97.94
Iron	1,876	30	98.40
Aluminium	1,876	14	99.25
Odour	1,876	12	99.36
Taste	1,876	5	99.73
Turbidity	1,876	5	99.73
Total Trihalomethanes	388	1	99.74
Nickel	388	1	99.74
Copper	388	1	99.74
Manganese	1,876	2	99.89
Pesticides - individual	6,960	4	99.94
<i>E. coli</i>	5,160	1	99.98
1,2 Dichloroethane	388	0	100
Antimony	388	0	100
Arsenic	388	0	100
Benzene	388	0	100
Benzo(a)pyrene	388	0	100
Boron	388	0	100
Bromate	388	0	100
Cadmium	388	0	100
Chromium	388	0	100
Colour	1,876	0	100
Cyanide	232	0	100
Enterococci	388	0	100
Fluoride	388	0	100
Mercury	388	0	100
Nitrate	388	0	100
Nitrite	0*	0	N/A
PAH - Sum of four substances	388	0	100
Pesticides - Total Substances	232	0	100
Selenium	388	0	100
Sodium	388	0	100
Tetrachloroethene/Trichloroethene - Sum	388	0	100
Tetrachloromethane	388	0	100
<b>Total (Schedule 1)</b>	<b>34,252</b>	<b>84</b>	<b>99.75</b>
<b>Schedule 2 (Indicator parameters)</b>			
Coliform bacteria	5,160	35	99.32
<i>Clostridium perfringens</i>	2,197	3	99.86
Hydrogen Ion (pH)	1,876	2	99.89
Ammonium	1,876	0	100
Chloride	388	0	100
Conductivity	2,197	0	100
Sulphate	388	0	100
Total Indicative Dose	25	0	100
Tritium	25	0	100
<b>Total (Indicator parameters)</b>	<b>14,132</b>	<b>40</b>	<b>99.72</b>
<b>Overall Total</b>	<b>48,384</b>	<b>124</b>	<b>99.74</b>

\*Nitrite analysis was not UKAS accredited and therefore not reported.



through the addition of orthophosphoric acid in the treatment process. This enables a protective coating to form over lead pipes which minimises levels of lead in the water supply. When a lead sample taken at a property exceeds the regulatory limit of 10µg/l, NI Water is required under the Regulations to inform the occupier in writing. NI Water is also required to modify or replace the section of lead pipe to the boundary of the property but it is the responsibility of the property owner to replace any lead pipe within their property.

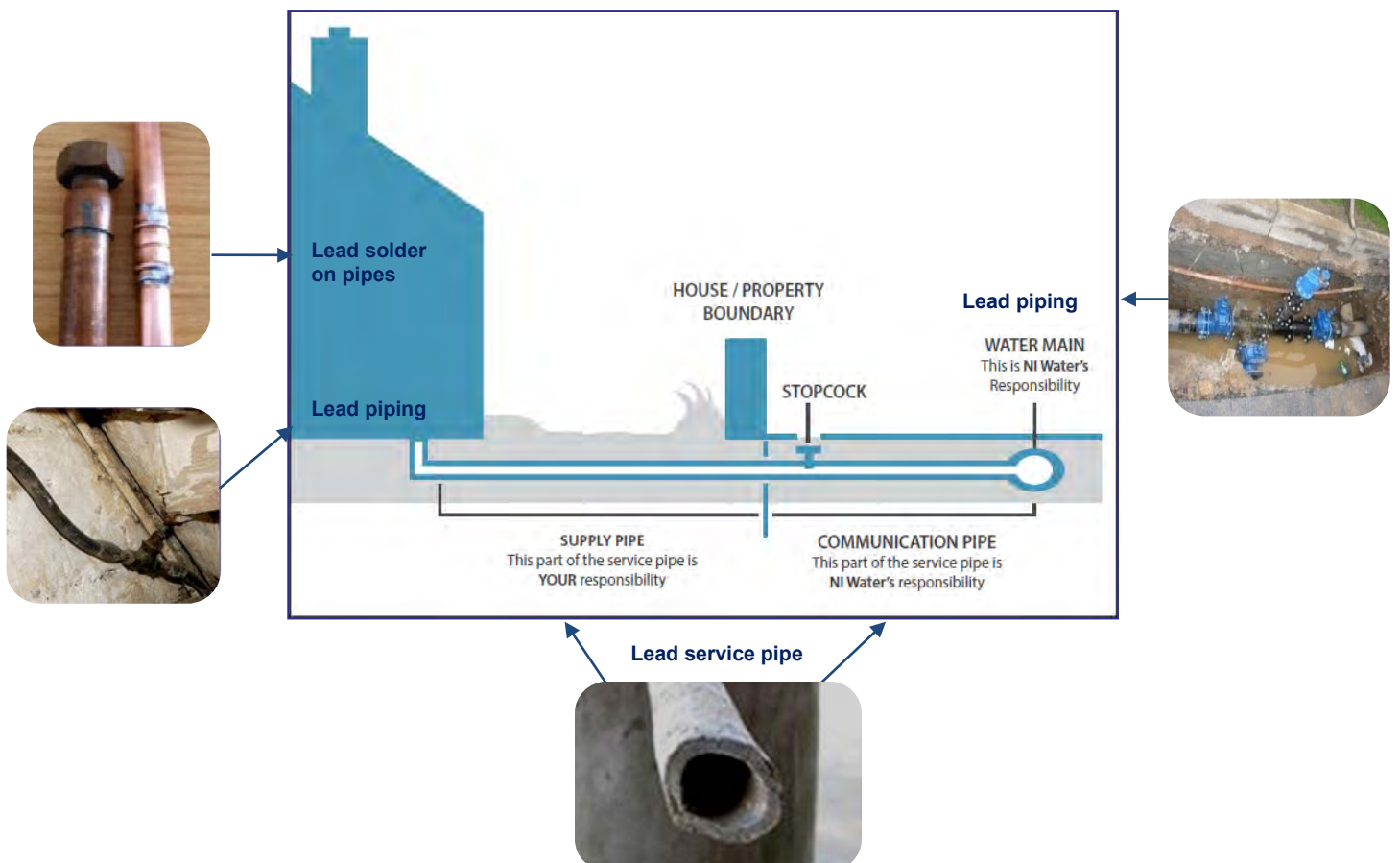
Meeting the lead standard can be difficult to resolve, as it can require action to be taken by both NI Water and the building owner. Many older properties still have service pipes and internal plumbing, wholly or partly, comprised of lead (the installation of lead pipes has been banned since the early seventies) or have lead solder on copper pipes (the use of lead solder on pipes used for drinking water has been banned since the

eighties). Whether or not the lead standard is contravened at a particular tap depends on a number of factors, an important one being the plumbosolvency of the water (the tendency for lead to dissolve in water).

In 2015, of the 388 tests carried out for lead, eight (2.06%) contravened the standard of 10µg/l. Four contraventions were related to lead pipe-work and/or fittings belonging to both NI Water and the consumer and four were related to lead pipework and/or fittings belonging solely to the consumer.

When a sample has contravened the standard and investigations show the property's service pipe contains lead, NI Water notifies the consumer, offering advice on what action they may take, and also notifies the local Environmental Health Officer. It is the owner's decision whether or not to replace their supply pipe and other lead pipes within their property. (Figure 5.1 refers).

Figure 5.1: Potential Sources of Lead detected at Consumer Taps



### Improving Compliance with the Lead Standard

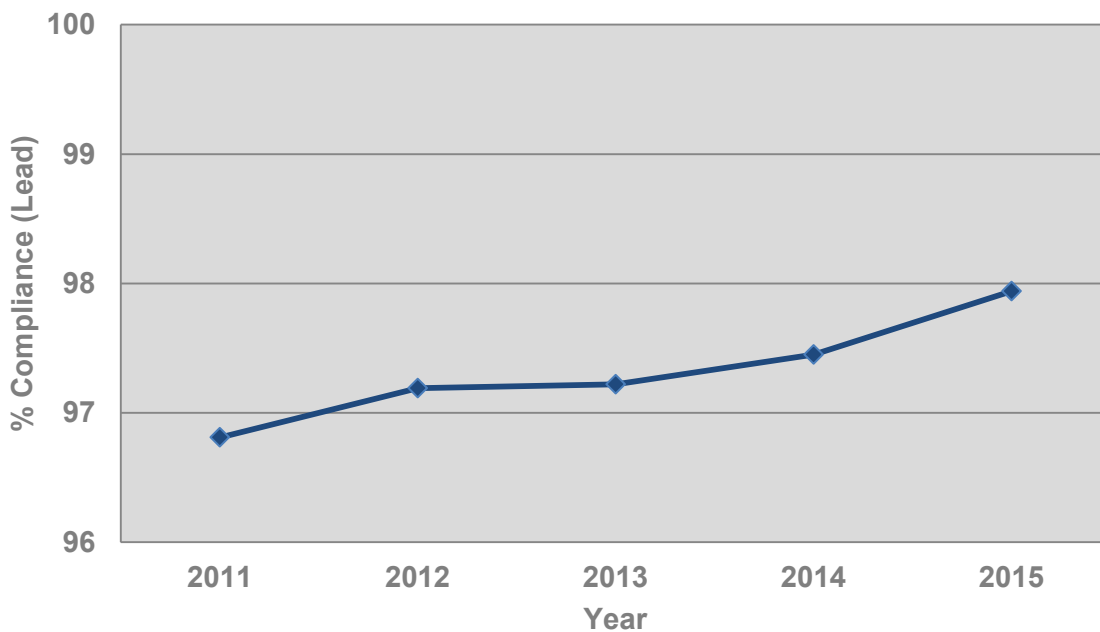
The Regulations require NI Water to reduce the tendency of water supplies to pick up lead from pipes and fittings. A plumbosolvency strategy to deliver improved compliance for lead introduced orthophosphate treatment at all the major water treatment works (WTWs) and this has been ongoing since 2004. Through the use of treatment and lead pipe replacement, the strategy involves:

- optimisation of orthophosphoric acid dosing and pH control at WTWs;
- monitoring phosphate levels throughout the distribution networks;
- continued opportunistic replacement of lead service pipes;
- replacing lead pipe work at the request of the consumer or due to a regulatory requirement; and
- replacing lead pipe work as part of the mains rehabilitation programme

Looking at the overall trend in lead compliance in Figure 5.2, there is a gradual trend upwards. However, a significant amount of work is required to further improve compliance with the lead standard in 2016 and beyond.

In addition to the sampling requirements for lead compliance in the Regulations, NI Water undertakes an extensive operational sampling programme. Results from this sampling programme highlight those water supply areas which have not achieved the optimisation target of 98%. Six of the 25 lead zones (24%) did not achieve the 98% target: Castor Bay in County Armagh; Dorisland, Dunore, and Dunore/Drumaroad in County Antrim; Glenhordial in County Tyrone; and Seagahan in County Armagh. The majority of lead contraventions occurred in the greater Belfast area (87.5%). NI Water needs to review its treatment processes, including orthophosphate dosing and pH control, to ensure they are optimized and effective.

Figure 5.2: Percentage of Tests Meeting the Lead Standard, 2011 - 2015



## Iron

The regulatory standard for iron has been set for aesthetic reasons because levels above the standard can give rise to discoloured water. The presence of excessive iron may make the appearance and taste of the water unacceptable to consumers. There are various reasons why iron might be present in the water: it may be present in the raw water; it may originate from iron compounds used in the water treatment process; or it can be released as a consequence of the corrosion of iron water mains.

Corrosion of iron water mains is the most common reason for iron contraventions. In 2015, iron was the chemical parameter for which there was the greatest number of tests failing to comply with the regulatory standard. Of the 1,876 samples taken, 30 (1.60%) failed to meet the 200µg/l standard. This is an increase on 2014 when 1.05% contravened the standard (see Part 4 for more details). Investigations showed these contraventions were mostly due to the build up, and subsequent disturbance, of deposits found within water mains. Where this is identified, NI Water may carry out scheduled flushing programmes to prevent or reduce further occurrences.

## Aluminium

Aluminium can occur naturally in many water sources, particularly those derived from upland areas. Aluminium compounds may also be used as a coagulant during the water treatment process. The regulatory standard for aluminium is based on aesthetic considerations because high concentrations in water may cause discolouration.

In 2015, a total of 1,876 samples were tested for aluminium of which fourteen (0.75%) contravened the 200µg/l regulatory standard. This means the compliance level has decreased from 2014 when 0.21% contravened the standard. Twelve of these contraventions occurred in zones supplied

wholly or partly from Drumaroad WTWs: NI Water concluded from their investigations that three occurred directly as part of a water quality event following treatment difficulties at the WTWs; the other nine were linked to localised disturbances of mains deposits within Drumaroad supply areas. Of the other two contraventions, one occurred as a result of an event at Killylane WTWs following treatment difficulties and the other occurred in Altnahinch Bushmills Water Supply Zone due to a disturbance of mains deposits.

It is important to note that all aluminium contraventions at consumer taps originate from issues at the WTWs – there are no sources of aluminium in the networks. However, in some cases the aluminium has entered the distribution network at some point in the past. NI Water must maintain control of its treatment processes to limit the levels of aluminium entering the distribution system.

## Microbiological Quality

To protect public health, microbiological standards have to be met at consumers' taps. The significance of the individual test results for each microbiological parameter cannot be fully interpreted without other information including details of the follow-up investigation. Samplers used by NI Water to collect samples from consumers' taps are trained and accredited to ISO 17025 and DWTS (Drinking Water Testing Standard).

Results confirm the overall safety of drinking water supplies, with a high level of microbiological quality compliance (99.70%) being achieved in 2015. This is a slight decrease in compliance from the 99.73% reported in 2014 as shown in Table 5.2.

A Provisional Enforcement Order (PEO) was issued by the Inspectorate for Drumaroad WTWs and associated Water Supply Area for Loss of Disinfection on 12 December 2014. Remedial measures to prevent recurrence were completed on schedule and a 'Completion of Undertaking'

notice for the PEO was issued on the 14 April 2015.

The Inspectorate issued a Regulation 28 Notice for Rathlin Island WTWs and Water Supply Zone on 26 September 2014 which set out remedial measures and improved controls to be put in place to ensure adequate disinfection for water leaving the WTWs. Work was completed on 12 August 2015, and the Notice was 'Revoked' on the 10 September 2015.

In 2015 there has been an decrease in compliance with the coliform bacteria standard at consumers' taps. The level of compliance has decreased from 99.46% in 2014 to 99.32% in 2015. Of the 35 occasions coliform bacteria were detected in 2015, *E. coli* was also detected on one occasion. The presence of bacterium such as, *Clostridium perfringens*, *E. coli* and Enterococci is indicative of faecal contamination and they should not be found in any drinking water sample.

*Clostridium perfringens* were found in three (0.14%) of the 2,197 samples tested in 2015. This marks an improvement in compliance compared to 2014 when *clostridium perfringens* were found in six (0.27%) of the 2,261 samples lifted. NI Water's investigations were unable to identify reasons for these contraventions. The water treatment works involved all appeared to be operating normally at the time and all follow-up samples were satisfactory.

A total of 5,160 samples were tested for the presence of *E. coli* and one (0.02%) tested positive. NI Water was unable to determine a cause for the contravention and all investigations showed water quality to be satisfactory. The level of *E. coli* compliance in 2015 (99.98%) has been maintained. (Table 5.2 refers).

Enterococci were not detected in any of the 388 samples taken at consumers' taps by NI Water in 2015.

### NI Water Consumer Contacts

Each year, NI Water provides us with information on the complaints and concerns of its customers. This enables us to make an assessment of consumer confidence in drinking water quality. The total number of consumer contacts reported in 2015 was 7,183 compared to 6,331 in 2014, an increase of 13.5 % (Table 5.3 refers). This increase was largely due to the Serious Water Quality Event at Magheraliskmisk SR in May 2015 affecting the acceptability of the drinking water supply to consumers in the Castor Bay Lurgan Water Supply Zone (see Annex 4 for details).

As with previous years, the highest percentage (68.31%) of contacts and concerns continues to relate to the appearance of drinking water (Figure 5.3 refers).

**Table 5.2: Microbiological Quality at Consumers' Taps**

Parameter	Number of Tests	Number of Tests not Meeting the Standards	% of Tests Meeting the Standards in 2015	% of Tests Meeting the Standards in 2014
Coliform bacteria	5,160	35	99.32	99.46
<i>Clostridium perfringens</i>	2,197	3	99.86	99.73
<i>E. coli</i>	5,160	1	99.98	99.98
Enterococci	388	0	100	100
<b>Total</b>	<b>12,905</b>	<b>39</b>		
<b>% Compliance</b>			<b>99.70</b>	<b>99.73</b>

**Table 5.3: Water Quality Contacts received by NI Water in 2015**

Contact Category	Contact Sub-Category	Number of Contacts
Appearance	Colour	3,179
	General	218
	Hardness	8
	Stained Washing	10
	White - Air	1,048
	White - Chalk	444
Taste and Odour	Chlorinous	369
	Earthy/Musty	137
	Other	420
	Petrol/Diesel	62
	TCP	60
Illness		77
Particles		189
Animalcules		5
Boil Water Notice		1
Other	Water Quality Concern - Campaigns	9
	Water Quality Concern - Incident Related	24
	Water Quality Concern - Lifestyle	5
	Water Quality Concern - Pets/Animals	3
	Water Quality Concern - Sample	478
	Water Quality Concern - Lead	353
	Water Quality (No Concern) Fluoride	1
	Water Quality (No Concern) Other Information	20
	Water Quality (No Concern) Water Hardness	46
	Water Quality (No Concern) Water Quality Report	17
<b>TOTAL</b>		<b>7,183</b>

## Appearance

Within the overall appearance categories we look closer at the different sub-categories and the reasons for the contact from consumers.

### Colour

Within the appearance category, the main concern relates to discoloured water. The most common cause of coloured 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. Manganese is present in some raw waters and may not be removed if treatment is inadequate.

Figure 5.4 illustrates the level of consumer contacts regarding discoloured water throughout Northern Ireland in 2015. It shows the highest rate of contacts was in the Castor Bay Lurgan zone. Most of these contacts related to the serious event which occurred after the new trunk main from Castor Bay

WTWs to Magheraliskmisk SR was brought into service in May 2015.

### White Water

'White water' is mainly caused by air dissolved in the water, making it appear cloudy or milky white. A number of causes include burst mains, malfunctioning pumps, and consumer stop taps. Where air is the cause of white water, 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 form 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.

### 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. There may be other substances present in the water which can give rise to consumer complaints. One such substance, which is intentionally added to drinking water, is chlorine, which accounts for the highest number of taste and odour complaints reported by consumers in Northern Ireland.

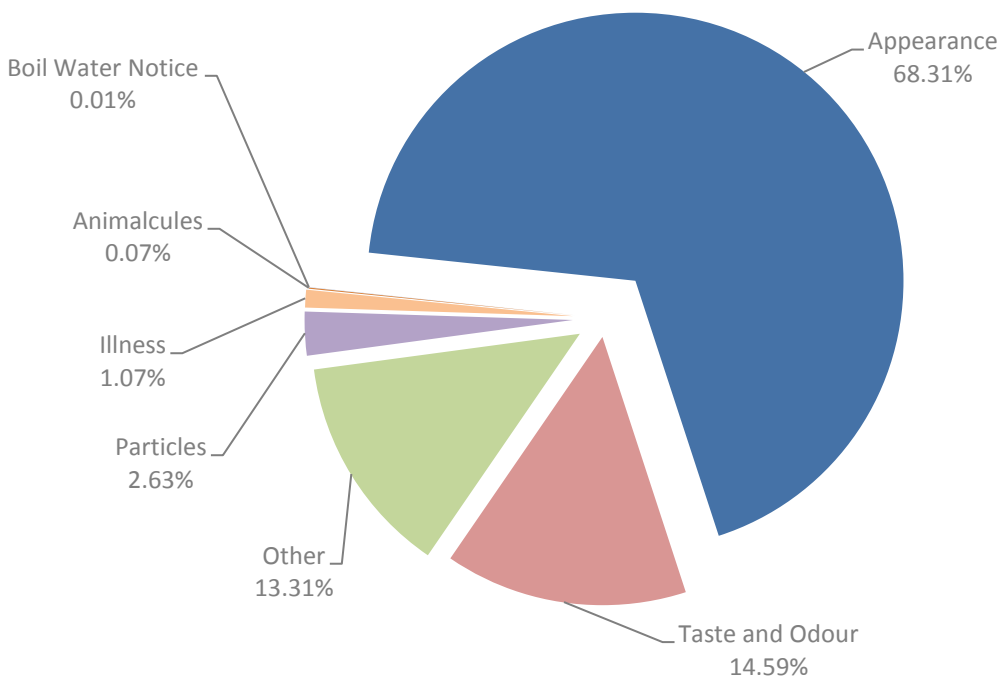
Other taste and odours should not be present in drinking water for aesthetic reasons (e.g. TCP or earthy/musty) or health reasons (e.g. petrol/diesel).

### Chlorinous

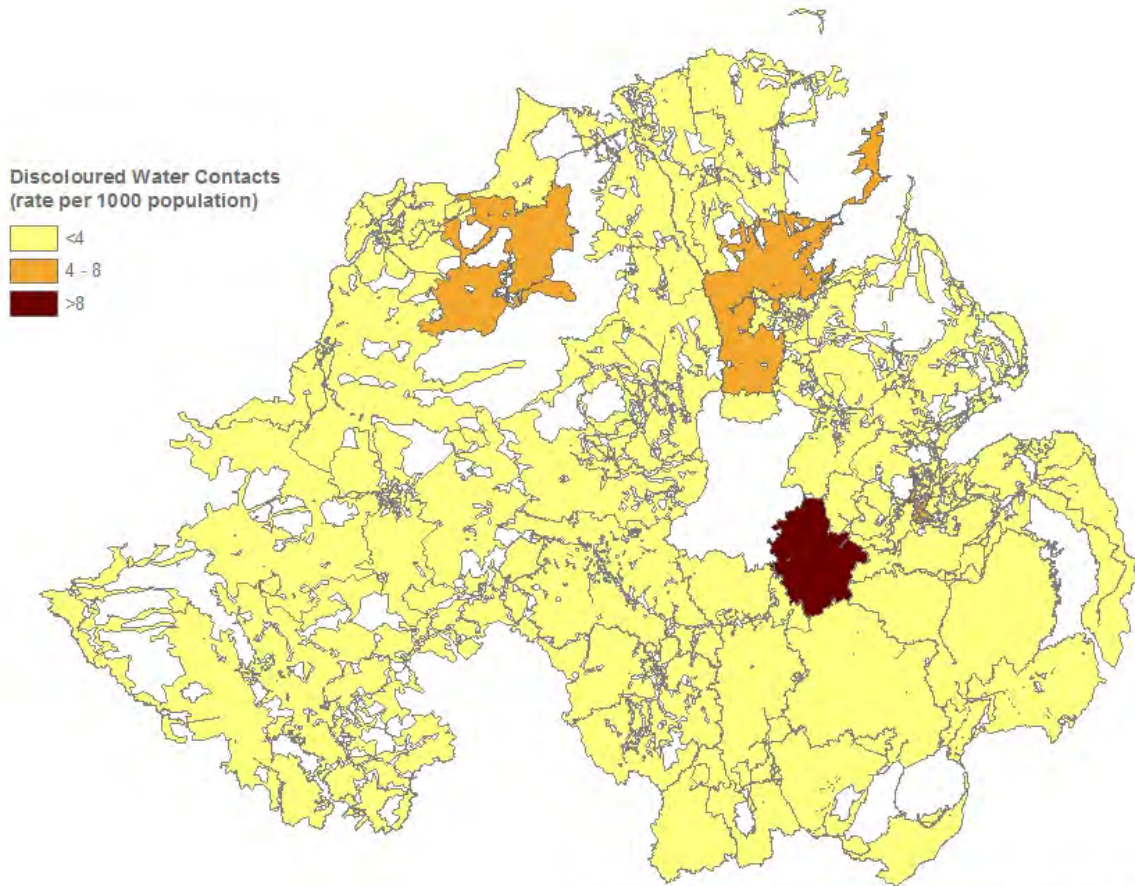
Some people are sensitive to the taste and odour of chlorine which is used to maintain hygienic conditions within the water supply network. Forty-two per cent of taste and odour consumer contacts in 2015 were related to a chlorinous taste and odour in the water.

Advice on steps you can take to reduce the effect of chlorinous taste and odours on your household water supply can be obtained from the leaflet, ['Looking after water in your home'](#).

Figure 5.3: Consumer Contacts and Concerns Received by NI Water in 2015



**Figure 5.4: Consumer Contacts per 1,000 Population Reporting Discoloured Water in 2015**



**Samples at Public Buildings**

NI Water is required to randomly select addresses from which to take compliance samples and some of these locations will be public buildings. In 2015, 304 samples were identified as having been taken within public buildings. Of these, 17 contravened the drinking water quality standards: three for coliform bacteria; two for aluminium; six for iron; one for lead; one for nickel; two for odour; one for taste; and one for turbidity.

**Sampling and Analysis Frequencies**

The Regulations set out sampling frequencies for a list of parameters. NI Water is required to meet these requirements in demonstrating the wholesomeness of drinking water supplies. We undertake an assessment of these requirements throughout the water

supply chain: at water treatment works; at service reservoirs; and in water supply zones.

If a water supply zone has a standard annual sampling frequency for a parameter set below 50, we assess any shortfall in the sampling programme as non-trivial. Where the annual sampling frequency is set for 50 samples or more, a shortfall of 2% of the total will be assessed as non-trivial.

During 2015, out of the 48,384 determinations carried out on samples taken from consumers' taps, we identified a non-trivial shortfall of 388 determinations. This deficiency was for the nitrite parameter. Whilst nitrite sampling and analysis was carried out at the required frequency and the correct numbers of samples were collected, the results were subsequently determined to be unaccredited and therefore could not be reported.

## Risk Management

NI Water is required to undertake a risk assessment of potential issues within the distribution system and this includes general risks which may be identified within properties. Some of these control measures are the responsibility of NI Water whereas others such as internal plumbing at domestic households are the responsibility of the owner.

If there is a potential risk to the drinking water supplies from internal pipe work within domestic, industrial or other properties, NI Water are required to provide advice to the owner. This covers the necessary steps they can take to safeguard their supply of drinking water, and, where required, to protect public health.

To prevent potential contamination, the Water Fittings Regulations require that all plumbing systems, water fittings and equipment connected to the public water supply are of an appropriate quality and are installed correctly. The Water Fittings Regulations apply from the point where water leaves the water main and enters the property’s service pipe.

Owners and occupiers of premises and anyone who installs plumbing systems or water fittings must comply with these Regulations. More information on the Water Fittings Regulations is available from NI Water’s website:

[www.niwater.com/water-fittings-regulations](http://www.niwater.com/water-fittings-regulations)

## Further Sources of Information for Consumers

If you want to find out about the quality of drinking water to your home or workplace, or if you have a concern or complaint, then you should first contact NI Water at its Customer Service Unit on 03457 440088 (further details can be found in Annex 9).

If you have discussed your concerns with NI Water and feel that the issue has not been satisfactorily resolved, you may contact the Consumer Council for Northern Ireland on 0800 1216022 (see Annex 9 for further details).

For advice on how to maintain the quality of tap water in your home, a guide called ‘Looking after WATER in your home’ is available from NI Water’s website: [www.niwater.com/information-leaflets](http://www.niwater.com/information-leaflets).

Looking for a plumber - WaterSafe is the new online search facility and assurance scheme for sourcing a qualified plumber (see Annex 8 for more details).

NI Water’s website includes a section on water hardness and water quality. To find out the water hardness in your area follow the link [www.niwater.com/water-quality-results/](http://www.niwater.com/water-quality-results/) and enter your postcode. The water hardness results and a link to the latest public register will be displayed for the water supply zone in question.

**Table 5.4: Summary of Non-Trivial Sampling Shortfalls for Nitrite in 2015**

Number of Water Supply Zones	Water Supply Zones with Sampling Shortfalls for Nitrite		Water Supply Zones with Non-Trivial Sampling Shortfalls for Nitrite	
	Number	%	Number	%
50	50	100	50	100



## Section 2 Private Water Supplies



## Section 2

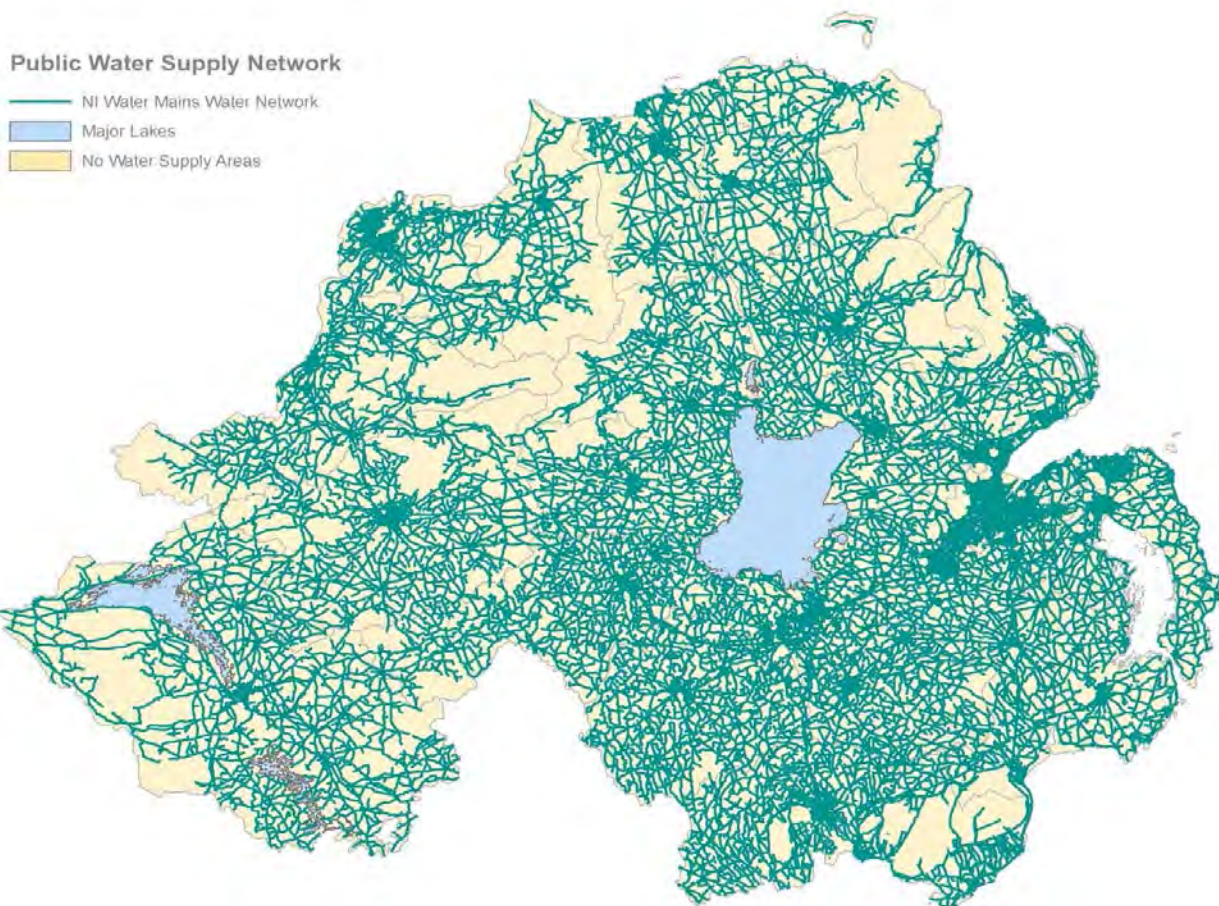
### Private Drinking Water Supplies

- 147 registered private water supplies in 2015, including 19 new supplies
- 88% are commercial / public supplies; and 12% are small domestic supplies
- 99.5% of the supplies are from groundwater sources
- Of the 11,248 tests taken, 98.94% complied with the regulatory standards
- Full compliance was achieved at 66% of registered private water supply sites
- 36% of non compliant sites showed microbiological contraventions, 46% chemical contraventions and 18% 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 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 bed & breakfast facilities.

### Register of Supplies

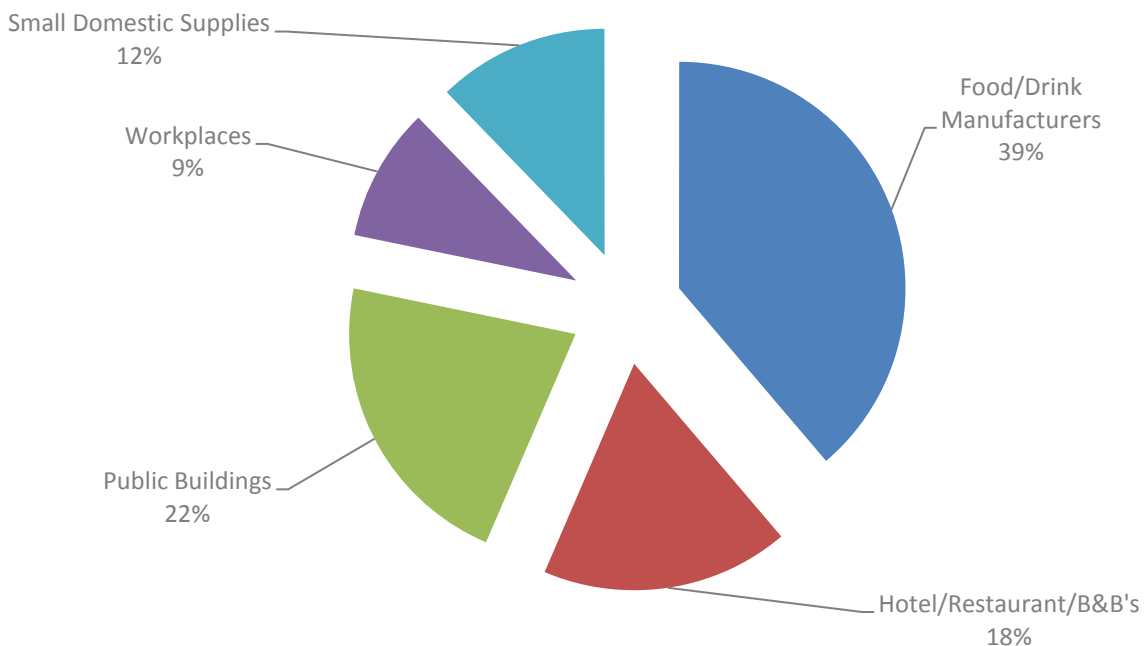
There were a total of 147 supplies on our register in 2015 required to be monitored under The Private Water Supplies Regulations (Northern Ireland) 2009. The categories of these registered supplies are presented in Figure 1.2. It is estimated that there are approximately a further 1,200 supplies to single private dwellings and these are not required to be monitored under the regulations. The Environmental Health departments of local councils may test these supplies on request.

The information held on registered supplies is required to be kept up-to-date and reviewed on an annual basis. During 2015, the private water supplies sampling programme required adjustment where: the nature or purpose of supplies changed; sites switched to the public water supply; or when new supplies were notified to us.

The larger commercial / public premises using private water supplies tend to be located in urban areas or in rural locations where access to the public water supply is also available. Many of these sites maintain a connection to the public water supply as a contingency or operate a dual supply whereby the public water supply is used for certain activities at the site or blended with the private water supply to supplement it. Private water supplies to small domestic properties are usually situated in the more remote, rural parts of Northern Ireland where access to the public water supply is not a feasible option.

New guidance on the quality of water required within primary production (including dairy farms) has been published by the [Food Standards Agency](#).

**Figure 1.2: Categories of Private Water Supplies in Northern Ireland in 2015**



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, 99.5% 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.

Of the 147 private water supplies on our monitoring schedule for 2015, 88% are commercial/public supplies; and 12% are small domestic supplies (groupings of two or more houses). A breakdown of the numbers and sizes of private water supplies in 2015 is shown in Table 1.1.

During 2015, six sites were removed from the sampling programme as they no longer met the necessary criteria to be registered. In addition, a total of 19 new supplies registered with us, these were:

- seven workplaces providing drinking water to customers and staff;
- three hotel/catering facilities;
- three small domestic supplies serving two or more properties;
- two food/drink manufacturers;
- two properties used as B&B/holiday homes;
- one educational/research facility; and
- one leisure facility.

Although the sampling frequency for compliance sampling is set within the regulations, many additional 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 2015, a total of 212 ancillary samples were collected. 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 2015, categorised by size, is shown in Figure 1.3. All local councils had private water supplies included in our 2015 sampling programme.

### Risk Assessment

The regulations require a risk assessment to be carried out for each supply, within six months of registration, 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 follow the same principles used in the risk assessments in place for the public water supply.

The main areas inspected when completing a private water supply risk assessment include the:

- catchment area;
- source type;
- treatment processes;
- distribution network; and
- overall management of the supply.

A number of hazards are considered for each of these aspects of the water supply system. The likelihood of the hazard occurring is determined to provide a risk rating and controls are then put in place to minimise these risks.

A new web based application is being developed for the risk assessment of private water supplies which is to be introduced in 2017.

A total of twelve risk assessments were undertaken in 2015 for newly registered

supplies. The information gathered through this process is used to determine any actions needed to mitigate the risks identified. The risk assessment is required to be updated where there have been significant changes made to the supply or potential new risks identified. There is also a five year review required to be carried out on all risk assessments.

The risk assessments can be used to adjust the monitoring programme at private supplies. In 2015 where the risk assessment and previous results indicated that specific parameters were unlikely to be present, and were of low risk, monitoring for these parameters was removed or reduced. Equally, where a risk was identified additional sampling was undertaken to monitor the risk.

**Table 1.1: Numbers and Types of Private Water Supplies in 2015**

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	20	4
>10 ≤100	53	2
≤10	55	1
<b>(ii) Small Domestic Supplies (two or more dwellings)</b>		
≤10	17	1
<b>TOTAL</b>	<b>147</b>	

**Figure 1.3: Distribution of Registered Private Water Supplies by Council Area in 2015**



## Overall Drinking Water Quality

We have been monitoring the quality of private water supplies since 1999, and 2015 provides the sixth year of monitoring data under the 2009 Regulations. The regulations apply equivalent drinking water quality standards to private water supplies as to the public water supply. There was an increased number of private water supplies registered with us in 2015 than in 2014. Hence, there was an overall increase in the number of parameters analysed for in 2015.

The results in Table 1.2 show that, out of a total of 11,248 tests carried out in 2015, 98.94% met the regulatory standards. The regulatory requirements were not met on 119 occasions for 21 parameters, namely: coliform bacteria; hydrogen ion; manganese; enterococci; iron; *E.coli*; ammonium;

*Clostridium perfringens*; total pesticides; turbidity; individual pesticides (MCPA, clopyralid, MCPP); nickel; fluoride; boron; tetra/trichloroethene; sulphate; sodium; lead; and bromate.

The low compliance figures for sodium, lead, sulphate and bromate are a consequence of the low number of tests performed for these parameters as they were not routinely tested for in all supplies. Apart from newly registered supplies: bromate was only tested at sites where chlorination was in use; sodium was only included where softening was practised; sulphate was only included where a supply had a history of contraventions for this parameter; and lead was only tested at sites where a potential risk was identified.

**Table 1.2: Overall Water Quality in Private Water Supplies in 2015**

Parameters	Determinations in 2015		
	Total Number of Tests	Number of Tests not Meeting the Standards	% Compliance
Coliform bacteria	273	20	92.67
Enterococci	150	9	94.00
<i>E. coli</i>	273	9	96.70
<i>Clostridium perfringens</i>	252	4	98.41
<b>Microbiological Total</b>	<b>948</b>	<b>42 (4.43%)</b>	<b>95.57</b>
Hydrogen ion (pH)	272	19	93.01
Manganese	254	17	93.31
Iron	254	11	95.67
Ammonium	253	5	98.02
Total pesticides	130	2	98.46
Turbidity	272	4	98.53
Other parameters	2088	5	99.79
Individual pesticides	6603	4	99.94
<b>Chemical Parameters</b>			
Sulphate*	15	2	86.67
Sodium*	43	4	90.70
Lead*	75	3	96.00
Bromate*	41	1	97.56
<b>Chemical Total</b>	<b>10300</b>	<b>77 (0.75%)</b>	<b>99.25</b>
<b>Overall Total</b>	<b>11248</b>	<b>119 (1.06%)</b>	<b>98.94</b>

\*Parameters on reduced monitoring frequency

A comparison of the monitoring data since 2010 shows variability in compliance (Figure 1.4 refers). However no trends can be taken from these figures as they are not comparing like with like due to changes in the number and types of supplies and the year-on-year revisions to the sampling programme.

For microbiological results, the number of tests undertaken has increased steadily over recent years, with 733 in 2010 and 948 in 2015. This is due to the steady increase in numbers of private water supplies being registered with us – 116 in 2010 rising to 147 in 2015.

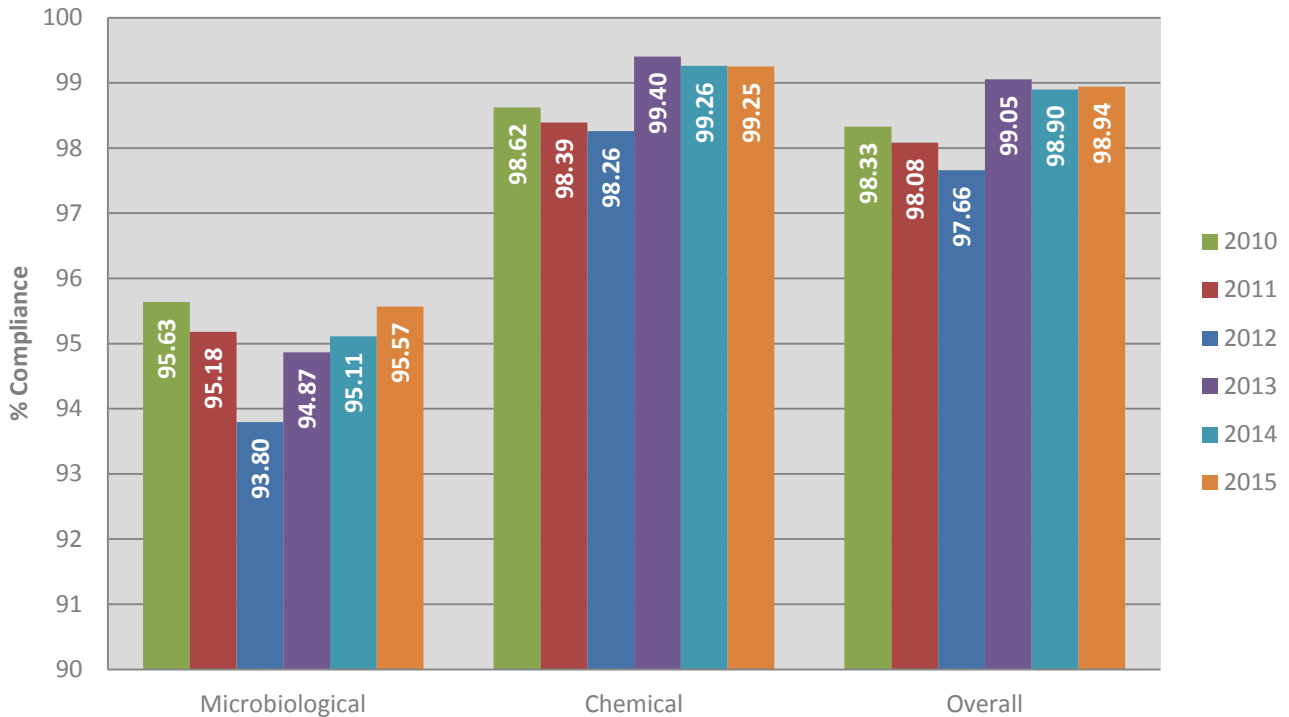
Microbiological contraventions account for 42 (35.29%) of the 119 contraventions at private water supplies in 2015. There has been a slight increase in the level of microbiological compliance reported as 95.57% in 2015,

compared to 95.11% in 2014 and 94.87% in 2013.

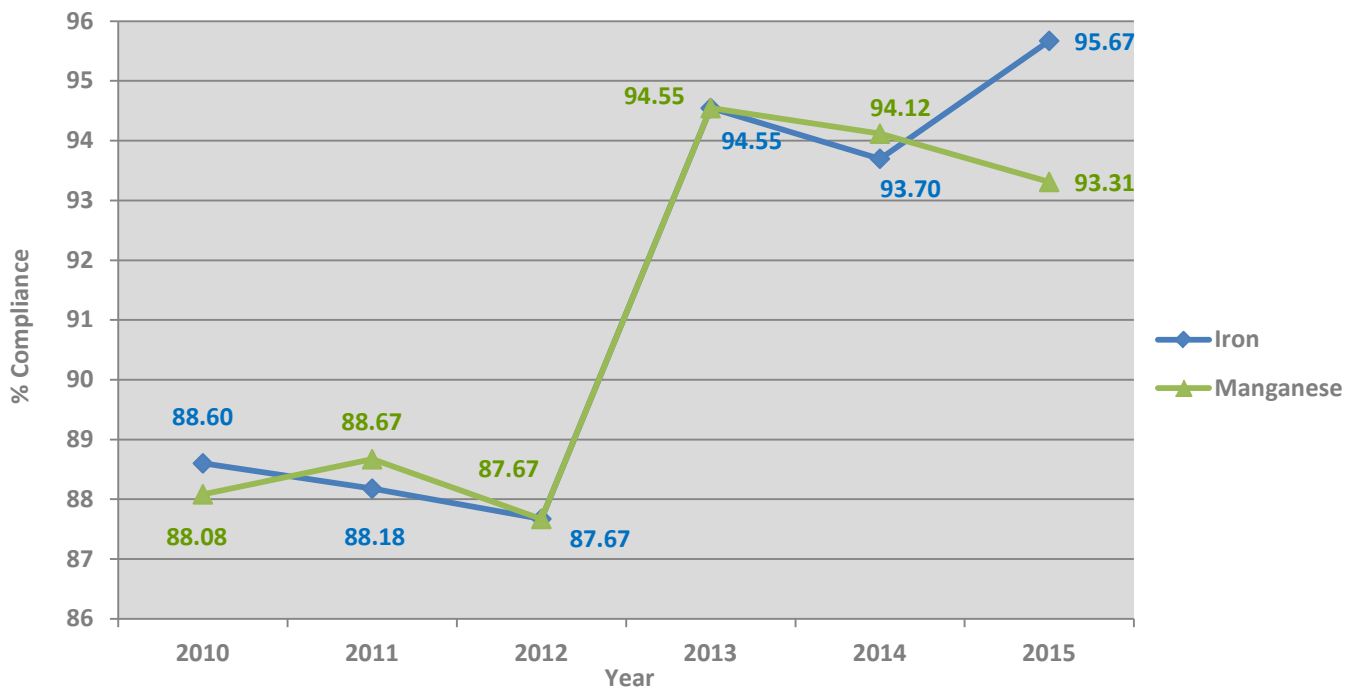
Contraventions of the chemical standards have been reported for a range of parameters listed in Table 1.2. Overall, the number of chemical contraventions has increased from 59 in 2013, 69 in 2014 to 77 in 2015. There has however been no significant change in chemical compliance for 2015, 99.25% compared with 99.26% in 2014

As with previous years, where the standards have not been met, they relate mainly to contraventions for hydrogen ion, manganese and iron. A comparison of the levels of compliance for iron and manganese over the last six years is shown in Figure 1.5. The significant increase in compliance for these parameters, post-2012, is influenced by sites with a history of contraventions for iron and manganese no longer being used as a private water supply.

**Figure 1.4: Comparison of Compliance in Private Water Supplies, 2010 – 2015**



**Figure 1.5: Compliance for Iron and Manganese at Private Water Supplies in 2010 - 2015**



Full compliance was achieved for 66% (97 sites) of the private water supplies tested. Of the 50 sites which did not comply with the regulatory standards, 36% (18 sites) contravened microbiological standards; 46% (23 sites) chemical standards; and 18% (9 sites) failed to comply with both microbiological and chemical standards.

The categories of these non compliant sites, presented in Figure 1.6, show that the chemical only contraventions occurred solely at commercial/public sites such as food/drink manufacturers, hotels, or public buildings whereas for the microbiological only contraventions 50% were at small domestic supplies and 50% were at commercial/public sites.

The significance of each contravention does not only depend on the category or size of the sites but often more importantly the purpose for which the water is used at the sites. In summary,

- 33 use the private water supply as the primary source of drinking water;

- eight use the water for the washing of equipment and surfaces in contact with food or drink;
- six use the supply as an ingredient in food or drink; and
- three are used solely for personal hygiene (showers, wash hand basins).

**Factors Affecting Drinking Water Quality**

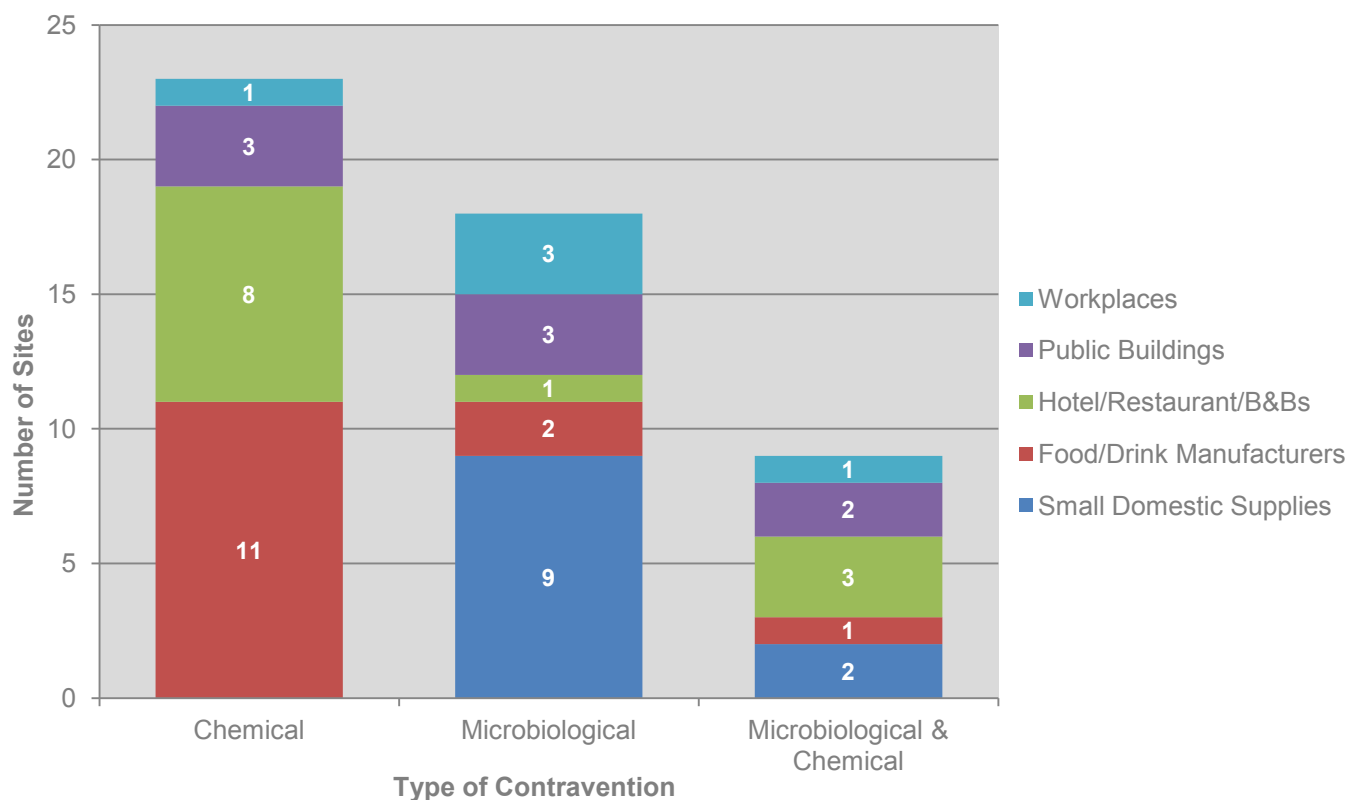
The different aspects of the water supply chain contribute to the microbiological and chemical quality contraventions reported in 2015 such as; catchment (including source protection); treatment; distribution; and sampling point (tap) issues.

**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. These faecal indicators were



**Figure 1.6: Categories of Non Compliant Private Water Supply Sites in 2015**



found to be present in 13 supplies during 2015, 7 small shared domestic supplies with no treatment and 6 commercial/public supplies, only 2 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 (see Annex 8 for details).

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. In addition, any treatment should be operated in accordance with the manufacturer’s instructions and routinely checked and maintained as required. Failure to adequately protect supplies against microbiological contamination can potentially lead to a public health risk.

The cleanliness and integrity of distribution systems also contribute to the microbiological quality of private water supplies. Plumbing systems should be designed and installed to reduce the risk of contamination of water supplies through inappropriate cross connections or misuse of fittings. The Water Regulations Advisory Scheme provides guidance on this.

Water storage tanks should be adequately sealed and, especially at larger sites, these should be routinely inspected and cleaned as required. Guidance on carrying this out is available in BS 8558:2011: Guide to the

design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages. A document on 'Water Safety in Buildings', published by WHO, is also available and provides guidance for managing water supplies in buildings (see Annex 8 for details).

## Metals

Some groundwaters can 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. In 2015, 15 sites reported contraventions for one or both of these metals.

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 encouraged to 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.

Their presence at high levels can interfere with the disinfection process, such as ultra-violet lamps, due to metal deposits causing a reduction in their ability to disinfect the water supply. There are effective treatments which can be installed to reduce the levels of these metals in private supplies. As with all treatment technologies they should be designed for the changing nature of the raw water, be operated in accordance with the manufacturer's instructions and suitably monitored and maintained. Further information on these treatment options is available in the Private Water Supplies Technical Manual (see Annex 8 for details).

Contraventions were reported for four sites in 2015 due to the use of inappropriate fixtures and fittings, two for nickel and two for lead. The regulations specify that only products and substances approved for use with drinking water supplies should be used. Details of approved products are available through the Drinking Water Inspectorate for England and Wales web site (see Annex 8).

## Pesticides

Pesticide contraventions were identified at two private water supplies in 2015: a golf club and a holiday let. Trace levels of pesticides below the regulatory limit of 0.10 µg/l for individual pesticides, and 0.03 µg/l for heptachlor epoxide, were also detected at 26 other sites. A summary of the pesticide detections in 2015 is presented in Table 1.3; the individual pesticides which were non-compliant are highlighted in bold.

Pesticides should not be stored or sprayed within the vicinity of drinking water sources. It is important that appropriate measures are in place to reduce the risk of pesticides entering the water supply through undertaking good practice in the management of the catchment area and improved source protection.

DARD (now DAERA) is responsible for the legislation on agricultural pesticides and plant protection products in Northern Ireland. The Plant Protection Products (Sustainable Use) Regulations (Northern Ireland) 2012 have a number of provisions aimed at ensuring the sustainable use of pesticides, by reducing risks and impacts on human health and the environment. These include measures on ensuring water bodies are protected, and promotion of low pesticide usage regimes.

A Code of Practice for using Plant Protection Products published by DARD provides practical advice on how to use pesticides and plant protection products safely to meet the legal conditions which cover their use.

**Table 1.3: Pesticide Detections in Private Water Supplies in 2015**

Pesticide	Number of Supplies	Maximum Value Detected (µg/l)
<b>MCPA</b>	<b>12</b>	<b>0.702</b>
Atrazine	8	0.041
<b>MCPP (Mecoprop)</b>	<b>5</b>	<b>4.050</b>
Phenanthrene	4	0.043
Simazine	4	0.042
<b>Clopyralid</b>	<b>3</b>	<b>0.122</b>
Trichlopyr	3	0.016
Diuron	2	0.020
Glyphosate	1	0.060
Bentazone	1	0.025
2,4-Dichlorophenol	1	0.018
2,4-D	1	0.011

### Actions in the Event of Failure

All contraventions of the regulatory standards at private supplies are reported to the owners and users of the supplies through the relevant local council. We work closely with Environmental Health departments in the investigation of contraventions to establish the cause and identify any remedial actions needed to restore a wholesome water supply.

Where the contravention has occurred at a supply used in primary food production, such as meat processing, or in a workplace as drinking water for staff, we also liaise with Veterinary Officers from DARD, and Health and Safety Executive staff respectively.

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 visits 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 risk to 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 119 contraventions identified in 2015, 60 were notified to PHA for advice: 42 microbiological and 18 chemical. As a consequence, new restrictions in the use of the private water supply were put in place at 20 sites to protect public health. These restrictions can include switching to, or blending with, the public water supply (where this was available), boil water before use notifications, and do not use instructions.

We continue to work with the owners and users of private water supplies and Environmental Health staff to bring these 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 water safety plans for the ongoing management of these supplies.

Our Enforcement and Prosecution Policy details the general principles which will be followed in relation to enforcement and prosecution of a person or persons who are legally responsible for ensuring compliance with the private water supplies regulations.

### Legislative Changes

The new European Directive, Euratom 2013/51, has introduced requirements for the protection of the health of the general public with regard to radioactive substances (including radon) in water intended for human consumption. In 2015, the regulations were amended to include these new requirements. The Private Water Supplies (Amendment) Regulations (Northern Ireland) 2015, which came into operation on 28th November 2015, include a new standard for radon in drinking water of 100 Bq/l.

Radon is a natural radioactive gas originating from uranium which is present in variable amounts in rocks and soils. As radon is soluble in water it can be present in groundwater sources. Exposure to radon can therefore be through inhalation of radon in air or ingestion of radon. Inhalation of radon in air is however considered to be the greatest risk to health. Any radon gas present in a drinking water source can escape from the water giving rise to higher levels of radon in the air. Further information on radon is available through the Health & Safety Executive web site at

<http://www.hse.gov.uk/radiation/ionising/radon.htm> .

During 2015, a radon survey was undertaken to gather information on the level of risk from radon in our registered supplies. Four supplies, out of the 144 sites screened for radon, were identified with levels of radon greater than the regulatory standard of 100 Bq/l. The four premises – a hotel, a restaurant and two small shared domestic supplies - are located in the north-west and west of Northern Ireland, correlating with areas known to also have raised levels of

radon in air. We consulted with the PHA regarding these results. Radon in air monitoring was recommended for these four premises to determine any public health risk from radon. We have also liaised with Environmental Health and the Health & Safety Executive to ensure appropriate guidance is available for those who are concerned about the risk of exposure to radon.

Our approach going forward will be to consider the results of this radon survey, together with previous radioactivity screening and radon risk maps for Northern Ireland to determine if any further monitoring is required.

Resources available include the new radon in air mapping for NI which was launched by PHE in August 2015

<https://www.gov.uk/government/publications/radon-indicative-atlas-for-northern-ireland> and the research project on radon in drinking water (which includes NI) published by DWI in England on 12 October 2015, <http://www.dwi.gov.uk/stakeholders/information-letters/2015/05-2015.pdf> .

### New Information

During 2015, we updated our sampling manual for the collection, storage and transportation of samples from private water supplies in accordance with current guidance aimed at maintaining the integrity of the water samples. Version 2 of the 'Private Water Supplies Sampling Manual – A Field Guide' was published in May 2015. This revision includes the new requirement to take a chlorine reading before and after chlorine disinfection and the procedure for radioactivity sampling. It also includes a new section which highlights the importance of health and safety and good hygiene practices for sampling staff.

In June 2015, we delivered training workshops for Environmental Health staff on the new sampling protocols. This also

provided the opportunity to review the content of sampling kits previously issued to the councils, to validate meters used for on-site testing and update our register of trained samplers and warrant card holders. The new sampling manual has also been made available as standard guidance for the rest of the UK through the Private Water Supplies Technical Manual web site, [www.privatewatersupplies.gov.uk](http://www.privatewatersupplies.gov.uk) .

In December 2015, a second issue of our information bulletin, entitled 'What's new in private water supplies?' was published. This provided details on the new requirements being introduced for radon in water intended for human consumption as well as guidance on the protection of pipe work and water storage tanks from damage during the winter months.

### Acknowledgements

We acknowledge the ongoing co-operation and assistance of staff from the Environmental Health Departments of local councils in helping us meet the regulatory requirements for private water supplies.

We also recognize the Public Health Agency for the guidance and advice it continues to provide on the health significance when the water quality standards have been contravened at private water supplies.

# Annexes

**Annex 1 - Glossary and Definition of Terms**

**Annex 2 - The Regulatory Framework**

**Annex 3 - Drinking Water Quality Tables**

**Annex 4 - Events**

**Annex 5 - Technical Audit Programme**

**Annex 6 - Enforcement Orders**

**Annex 7 - Regulation of Private Water  
Supplies**

**Annex 8 - Drinking Water Guidance**

**Annex 9 - Useful Contacts**



## Annex 1

### Glossary and Definition of Terms

<b>Aesthetic</b>	associated with the senses of taste, smell and sight.	<b>Drinking Water Standards</b>	the prescribed concentrations or values listed in the Regulations.
<b>Animalcule</b>	a tiny or microscopic life form.	<b>Enterococci</b>	a sub-group of faecal streptococci commonly found in the faeces of humans and warm-blooded animals.
<b>Catchment</b>	the area of land that drains into a watercourse.	<b><i>Escherichia coli</i> (<i>E. coli</i>)</b>	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.
<b>Clopyralid</b>	a herbicide used for controlling broad-leaved weeds such as docks and creeping thistle in grassland.	<b>Event</b>	a situation affecting, or threatening to affect, drinking water quality.
<b><i>Clostridium perfringens</i></b>	a spore-forming bacterium which is exceptionally resistant to unfavourable conditions in the water environment.	<b>Faecal Coliform</b>	a sub-group of coliforms, almost exclusively faecal in origin.
<b>Coagulation</b>	a process employed during drinking water treatment to assist in the removal of particulate matter.	<b>Filtration</b>	the separation of suspended particulate matter from a fluid.
<b>Coliforms</b>	a group of bacteria which may be faecal or environmental in origin.	<b>Flocculation</b>	a process where colloids come out of suspension in the form of floc or flakes.
<b>Communication Pipe</b>	the connection from the water main to the consumer property boundary (normally at the outside stop tap).	<b>Glyphosate</b>	a herbicide used to control broadleaved weeds and grasses amongst crops.
<b>Compound</b>	a compound consists of two or more elements in chemical combination.	<b>Granular Activated Carbon (GAC)</b>	an absorbent filtration media used to remove trace organic compounds from water.
<b>Contravention</b>	a breach of the regulatory requirement.		
<b>Determination</b>	an analysis for a specific parameter.		

Groundwater	water from aquifers or other underground sources.	mg/l	milligrams per litre (one thousandth of a gram per litre).
Hydrogen ion (pH)	gives an indication of 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.	<p>MI/d</p> <p>µg/l</p> <p>Parameters</p>	<p>megalitres per day (one MI/d is equivalent to 1,000 m<sup>3</sup>/d or 220,000 gallon/d).</p> <p>micrograms per litre (one millionth of a gram per litre).</p> <p>the substances, organisms and properties listed in Schedules 1 and 2, and regulation 2 of the Regulations.</p>
Impounding reservoir	is a reservoir of stored water that may be used when supply is insufficient.		
Indicator Parameter	something that is measured to check that the control measures, such as water treatment, are working effectively.	<p>Pathogen</p> <p>Pesticides</p>	<p>an organism which causes disease.</p> <p>any fungicide, herbicide, insecticide or related product (excluding medicines) used for the control of pests or diseases.</p>
Linuron	a herbicide mainly used to control grasses and other weeds amongst cereal crops and vegetables.	Plumbosolvency	the tendency for lead to dissolve in water.
MCPA	a herbicide used for controlling broad-leaved weeds in grass or cereal crops.	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.
Mecoprop (MCPP)	a herbicide used for controlling broad-leaved weeds in grass or cereal crops.	Raw Water	water prior to receiving treatment abstracted for the purpose of drinking water provision.
Metoxuron	a herbicide used for controlling broad-leaved weeds and some grasses in cereal crops. It is no longer approved for use in the UK since December 2007.	Remedial Action	action taken to improve a situation.
Microbiological	associated with the study of microbes.	Sedimentation	the tendency for particles in suspension to settle out of the water under the influence of gravity.
m <sup>3</sup> /d	cubic metres per day.		



<b>Service Pipe</b>	pipe that connects the consumer’s property to NI Water’s main. It comprises two parts: the communication pipe which is the connection from the water main to the consumer’s property boundary (normally at the outside stop tap); and the supply pipe which runs from the boundary of the property to the consumer’s inside stop tap.	<b>Wholesome/ Wholesomeness</b>	a concept of water quality which is defined by reference to standards and other requirements set out in the Regulations.
<b>Service Reservoir</b>	a water tower, tank or other reservoir used for the storage of treated water within the distribution system.		
<b>Supply Point</b>	a point, other than a consumer’s tap, authorised for the taking of samples for compliance with the Regulations.		
<b>Surface Water</b>	untreated water from rivers, impounding reservoirs or other surface water sources.		
<b>Trihalomethanes (THMs)</b>	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.		
<b>Water Supply Zone</b>	a pre-defined area of supply for establishing sampling frequencies, compliance with standards and information to be made publicly available.		

## Annex 2

### The Regulatory Framework

In Northern Ireland, the primary legislative powers for transposition of the Council Directive (98/83/EC) ("[the Drinking Water Directive](#)") relating to the quality of water intended for human consumption are contained in [The Water and Sewerage Services \(Northern Ireland\) Order 2006](#).

The Drinking Water Inspectorate during the period of this report was a statutory appointee, acting on behalf of the Department for Regional Development in respect of public water supplies, and on behalf of the Department of the Environment in relation to private water supplies. However due to governmental restructuring during 2016, DWI is now part of the newly formed Department of Agriculture, Environment and Rural Affairs (DAERA) which now takes over responsibility for the regulation of both public and private drinking water supplies.

#### Public Water Supplies

Northern Ireland Water Ltd (NI Water) began to operate as a government-owned company from 1 April 2007, and is the sole supplier of public drinking water in Northern Ireland. [The Water Supply \(Water Quality\) Regulations \(Northern Ireland\) 2007](#) have been in operation since that date and implement the requirements of the Drinking Water Directive. They define wholesomeness by setting standards for 38 parameters and a further 12 indicator parameters; and they specify sampling requirements for samples taken, within water supply zones, at service reservoirs and water treatment works.

Regulation 30 controls the application and introduction of products and substances. The Drinking Water Inspectorate for England and Wales provides a technical resource to facilitate this approval in the United Kingdom. The current "[List of Approved Products for use in Public Water Supply in the United](#)

[Kingdom](#)" can be obtained from the Drinking Water Inspectorate for England and Wales.

The 2007 Regulations were amended by the [Water Supply \(Water Quality\) \(Amendment\) Regulations \(Northern Ireland\) 2009](#), which came into operation on 15 July 2009 and included new requirements in relation to disinfection, risk assessment and monitoring of drinking water abstraction points. In addition to implementing the Drinking Water Directive (DWD), they implement parts of Council Directive 2000/60/EC ("the Water Framework Directive") and Council Directive 2008/99/EC ("the Environmental Crime Directive").

They were further amended by [The Water Supply \(Water Quality\) \(Amendment\) Regulations \(Northern Ireland\) 2010](#) which came into operation on 20 April 2010, and include clarification of the Department's responsibilities and powers of enforcement in respect of implementation of the Regulations.

Another set of amendment regulations, [The Water Supply \(Water Quality\) \(Amendment\) Regulations \(Northern Ireland\) 2015](#) came into operation on 28 November 2015. These regulations introduced a requirement to monitor for radon and updated sampling frequencies for tritium and indicative dose. There were also some minor changes regarding construction products.

[The Water Supply \(Domestic Distribution Systems\) Regulations \(Northern Ireland\) 2010](#), which came into operation on 20 April 2010, require NI Water to report [to us] instances of water quality failures caused by the internal distribution system occurring within public buildings. It would then be our responsibility to assess the significance of these failures and, where required, ensure remedial action is undertaken by the person responsible for the building.

[The Water Supply \(Water Fittings\) Regulations \(Northern Ireland\) 2009](#) came into operation on 3 August 2009. These regulations make provisions for preventing contamination of drinking water by ensuring that all plumbing systems, water fittings and equipment connected to the public water supply are of an appropriate quality and standard. These regulations apply from the point where water leaves the water main and enters the property's service pipe. Owners and occupiers of premises and anyone who installs plumbing systems or water fittings must comply with these regulations.

Council Directive 2000/60/EC ("[the EU Water Framework Directive \(WFD\)](#)") came into force on 22 December 2000. Its aim is to protect all surface waters and ground waters and prevent any deterioration in quality. In the protection of drinking water sources, the WFD sets out a requirement to identify points for drinking water abstraction to be included in river basin management plans.

### Private Water Supplies

Private water supplies are defined in [The Water and Sewerage Services \(Northern Ireland\) Order 2006](#) as any supplies of water provided otherwise than by the water undertaker, namely NI Water.

[The Private Water Supplies Regulations \(Northern Ireland\) 2009](#) came into operation on 18 January 2010 and implement Council Directive 98/83/EC on the quality of water intended for human consumption in relation to private water supplies.

They were amended by [The Private Water Supplies \(Amendment\) Regulations \(Northern Ireland\) 2010](#), which came into operation on 20 April 2010 and provide clarification of some aspects of the 2009 Regulations, including the requirement to use only specified products or substances for private water supplies and to limit disinfection by-products to residual levels. They complete

the transposition of Council Directive 98/83/EC.

Another set of amendment regulations [The Private Water Supplies \(Amendment\) Regulations \(Northern Ireland\) 2015](#) came into operation on 28 November 2015. These regulations introduced a requirement to monitor for radon and updated sampling frequencies for tritium and indicative dose. There were also some minor changes in relation to wording, and the requirement to carry out a risk assessment.

Private supplies to single domestic dwellings are not required to be monitored under the 2009 Regulations. We do, however, continue to offer appropriate advice to all private water supply owners and users. The regulations also exclude bottled water suppliers, who are regulated under [The Natural Mineral Water, Spring Water and Bottled Drinking Water Regulations \(Northern Ireland\) 2015](#).

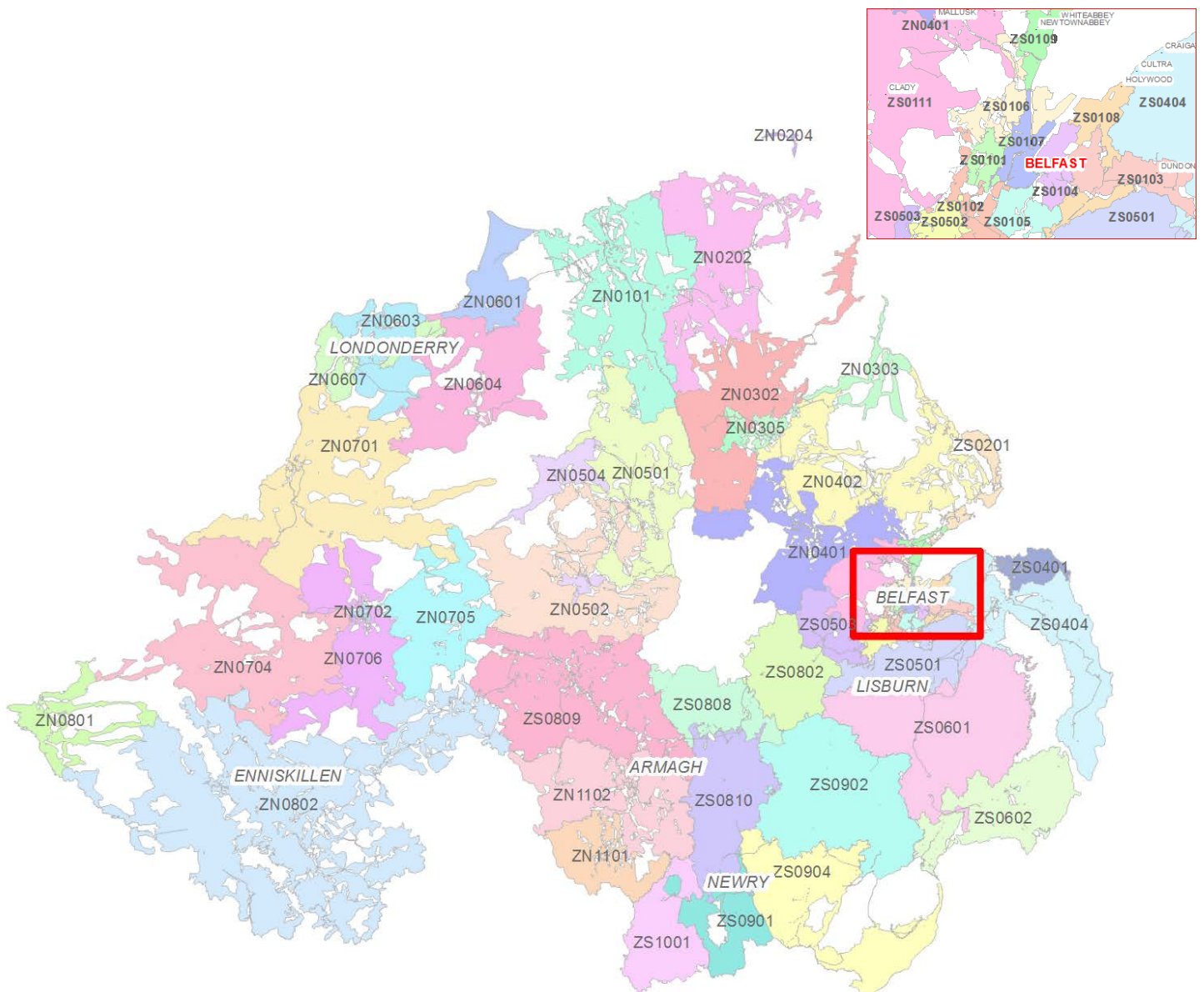
Under Regulation 6 there is a requirement for any newly installed products or substances, used in the provision of a private supply, to be approved for use with drinking water. Details of [approved products](#) are available through the Drinking Water Inspectorate for England and Wales web site.

### Annex 3

## Drinking Water Quality Tables

The following tables provide more detail of where full compliance with the regulatory standards has not been met in the individual water supply zones. The tables present, by parameter, all the contraventions and the ‘% compliance’ that occurred in water supply zones and at supply points at water treatment works during 2015. The map in Figure 3.1 shows the water supply zones from which samples are collected across Northern Ireland. These will, when used in conjunction with the information in the parameter tables that follow, allow the reader to have a more local focus on water quality issues.

**Figure 3.1 Map showing Water Supply Zones across Northern Ireland in 2015**



**Table 3.1: Water Supply Zones within each Council area in 2015**

Council	Water Supply Zones*	
Antrim and Newtownabbey Borough	ZN0302 - Dungonnell Glarryford ZN0401 - Dunore Point Antrim ZN0402 - Killylane Ballynure ZS0106 - Dunore Belfast North	ZS0109 - Dorisland Whiteabbey ZS0111 - Dunore Point Hydepark ZS0201 - Dorisland Carrick ZS0503 - Forked Bridge Stoneyford
Ards and North Down Borough	ZS0108 - Belfast Purdysburn ZS0401 - Drumaroad Bangor ZS0404 - Drumaroad Ards	ZS0501 - Drumaroad Lisburn ZS0601 - Drumaroad Ballynahinch
Armagh City, Banbridge and Craigavon Borough	ZN1101 - Clay Lake Keady ZN1102 - Seagahan Armagh ZS0802 - Castor Bay Lurgan ZS0808 - Castor Bay Craigavon	ZS0809 - Castor Bay Dungannon ZS0810 - Castor Bay Tandragee ZS0902 - Fofanny Dromore ZS0904 - Fofanny Mourne
Belfast City	ZS0101 - Dunore Ballygomartin North ZS0102 - Dunore Ballygomartin South ZS0103 - Belfast Ballyhanwood ZS0104 - Dunore Breda North ZS0105 - Dunore Breda South ZS0106 - Dunore Belfast North ZS0107 - Belfast Oldpark	ZS0108 - Belfast Purdysburn ZS0109 - Dorisland Whiteabbey ZS0111 - Dunore Point Hydepark ZS0404 - Drumaroad Ards ZS0501 - Drumaroad Lisburn ZS0502 - Forked Bridge Dunmurry ZS0503 - Forked Bridge Stoneyford
Causeway Coast and Glens Borough	ZN0101 - Ballinrees Coleraine ZN0202 - Altnahinch Bushmills ZN0204 - Rathlin Island ZN0302 - Dungonnell Glarryford ZN0501 - Moyola Magherafelt	ZN0601 - Ballinrees Limavady ZN0603 - Carmoney Eglinton ZN0604 - Caugh Hill Dungiven ZN0607 - Corrody Derry
Derry City and Strabane District	ZN0603 - Carmoney Eglinton ZN0604 - Caugh Hill Dungiven ZN0607 - Corrody Derry	ZN0701 - Derg Strabane ZN0704 - Lough Bradan Drumquin
Fermanagh and Omagh District	ZN0701 - Derg Strabane ZN0702 - Glenhordial Omagh ZN0704 - Lough Bradan Drumquin ZN0705 - Lough Macrory Beragh	ZN0706 - Lough Macrory Killyclogher ZN0801 - Belleek Garrison ZN0802 - Killyhevlin Enniskillen
Lisburn and Castlereagh City	ZN0401 - Dunore Point Antrim ZS0103 - Belfast Ballyhanwood ZS0108 - Belfast Purdysburn ZS0111 - Dunore Point Hydepark ZS0404 - Drumaroad Ards ZS0501 - Drumaroad Lisburn	ZS0502 - Forked Bridge Dunmurry ZS0503 - Forked Bridge Stoneyford ZS0601 - Drumaroad Ballynahinch ZS0802 - Castor Bay Lurgan ZS0902 - Fofanny Dromore
Mid and East Antrim Borough	ZN0302 - Dungonnell Glarryford ZN0303 - Dunore Point Ballymena ZN0305 - Dungonnell Ahoghill ZN0401 - Dunore Point Antrim	ZN0402 - Killylane Ballynure ZS0109 - Dorisland Whiteabbey ZS0201 - Dorisland Carrick
Mid Ulster District	ZN0101 - Ballinrees Coleraine ZN0501 - Moyola Magherafelt ZN0502 - Lough Fea Cookstown ZN0504 - Moyola Unagh Mormeal ZN0705 - Lough Macrory Beragh	ZN0706 - Lough Macrory Killyclogher ZN0802 - Killyhevlin Enniskillen ZN1102 - Seagahan Armagh ZS0809 - Castor Bay Dungannon
Newry, Mourne and Down District	ZN1101 - Clay Lake Keady ZS0601 - Drumaroad Ballynahinch ZS0602 - Drumaroad Downpatrick ZS0810 - Castor Bay Tandragee	ZS0901 - Camlough Newry West ZS0902 - Fofanny Dromore ZS0904 - Fofanny Mourne ZS1001 - Carran Hill Crossmaglen

\* excludes water supply zones with fewer than 40 properties within the council area.

## Water Quality in Water Supply Zones in 2015

### Table 3.2: % Compliance - Lead

Sampling Location - Zones	Number of Samples	Number of Tests not Meeting the Standards per Zone	% Compliance
ZN1102 - Seagahan Armagh	8	1	87.50
ZS0102 - Dunore Ballygomartin South	8	2	75.00
ZS0103 - Belfast Ballyhanwood	8	2	75.00
ZS0108 - Belfast Purdysburn	8	1	87.50
ZS0501 - Drumaroad Lisburn	8	2	75.00
All other zones	348		100
<b>Overall</b>	<b>388</b>	<b>8</b>	<b>97.94</b>

### Table 3.3: % Compliance - Iron

Sampling Location - Zones	Number of Samples	Number of Tests not Meeting the Standards per Zone	% Compliance
ZN0101 - Ballinrees Coleraine	76	1	98.68
ZN0202 - Altnahinch Bushmills	36	3	91.67
ZN0302 - Dungonnell Glarryford	24	2	91.67
ZN0402 - Killylane Ballynure	52	5	90.38
ZN0504 - Moyola Unagh Mormeal	24	1	95.83
ZN0601 - Ballinrees Limavady	24	1	95.83
ZN0604 - Caugh Hill Dungiven	24	1	95.83
ZN0706 - Lough Macrory Killyclogher	24	1	95.83
ZN0802 - Killyhevlin Enniskillen	52	1	98.08
ZN1102 - Seagahan Armagh	36	1	97.22
ZS0102 - Dunore Ballygomartin South	36	1	97.22
ZS0103 - Belfast Ballyhanwood	52	1	98.08
ZS0108 - Belfast Purdysburn	36	1	97.22
ZS0501 - Drumaroad Lisburn	52	2	96.15
ZS0502 - Forked Bridge Dunmurry	52	1	98.08
ZS0601 - Drumaroad Ballynahinch	52	1	98.08
ZS0602 - Drumaroad Downpatrick	36	2	94.44
ZS0802 - Castor Bay Lurgan	24	1	95.83
ZS0808 - Castor Bay Craigavon	76	3	96.05
All other zones	1,088	0	100
<b>Overall</b>	<b>1,876</b>	<b>30</b>	<b>98.40</b>

**Table 3.4: % Compliance - Aluminium**

Sampling Location - Zones	Number of Samples	Number of Tests not Meeting the Standards per Zone	% Compliance
ZN0202 - Altnahinch Bushmills	36	1	97.22
ZN0402 - Killylane Ballynure	52	1	98.08
ZS0105 - Dunore Breda South	52	1	98.08
ZS0108 - Belfast Purdysburn	36	2	94.44
ZS0401 - Drumaroad Bangor	76	1	98.68
ZS0404 - Drumaroad Ards	76	1	98.68
ZS0501 - Drumaroad Lisburn	52	3	94.23
ZS0601 - Drumaroad Ballynahinch	52	1	98.08
ZS0602 - Drumaroad Downpatrick	36	3	91.67
All other zones	1,408		100
<b>Overall</b>	<b>1,876</b>	<b>14</b>	<b>99.25</b>

**Table 3.5: % Compliance - Coliform bacteria**

Sampling Location - Zones	Number of Samples	Number of Tests not Meeting the Standards per Zone	% Compliance
ZN0101 - Ballinrees Coleraine	228	2	99.12
ZN0401 - Dunore Point Antrim	156	1	99.36
ZN0502 - Lough Fea Cookstown	60	1	98.33
ZN0705 - Lough Macrory Beragh	36	1	97.22
ZN0802 - Killyhevlin Enniskillen	192	1	99.48
ZN1102 - Seagahan Armagh	84	1	98.81
ZS0103 - Belfast Ballyhanwood	156	1	99.36
ZS0105 - Dunore Breda South	144	1	99.31
ZS0107 - Belfast Oldpark	108	1	99.07
ZS0111 - Dunore Point HydePark	84	1	98.81
ZS0201 - Dorisland Carrick	108	1	99.07
ZS0401 - Drumaroad Bangor	204	2	99.02
ZS0404 - Drumaroad Ards	204	1	99.51
ZS0501 - Drumaroad Lisburn	144	2	98.61
ZS0503 - Forked Bridge Stoneyford	72	1	98.61
ZS0601 - Drumaroad Ballynahinch	132	2	98.48
ZS0802 - Castor Bay Lurgan	72	2	97.22
ZS0808 - Castor Bay Craigavon	204	2	99.02
ZS0809 - Castor Bay Dungannon	156	3	98.08
ZS0810 - Castor Bay Tandragee	96	1	98.96
ZS0901 - Camlough Newry West	72	2	97.22
ZS0902 - Fofanny Dromore	108	2	98.15
ZS0904 - Fofanny Mourne	156	2	98.72
ZS1001 - Carran Hill Crossmaglen	36	1	97.22
All other zones	2,148		100
<b>Overall</b>	<b>5,160</b>	<b>35</b>	<b>99.32</b>

**Table 3.6: % Compliance - Odour**

Sampling Location - Zones	Number of Samples	Number of Tests not Meeting the Standards per Zone	% Compliance
ZN0302 - Dungonnell Glarryford	24	2	91.67
ZN0601 - Ballinrees Limavady	24	2	91.67
ZN0603 - Carmoney Eglinton	52	4	92.31
ZN0604 - Caugh Hill Dungiven	24	1	95.83
ZN0607 - Corrody Derry	52	1	98.08
ZN0701 - Derg Strabane	36	1	97.22
ZS0601 - Drumaroad Ballynahinch	52	1	98.08
All other zones	1,612		100
<b>Overall</b>	<b>1,876</b>	<b>12</b>	<b>99.36</b>

**Table 3.7: % Compliance - Taste**

Sampling Location - Zones	Number of Samples	Number of Tests not Meeting the Standards per Zone	% Compliance
ZN0302 - Dungonnell Glarryford	24	1	95.83
ZN0601 - Ballinrees Limavady	24	1	95.83
ZN0603 - Carmoney Eglinton	52	2	96.15
ZN0604 - Caugh Hill Dungiven	24	1	95.83
All other zones	1,752		100
<b>Overall</b>	<b>1,876</b>	<b>5</b>	<b>99.73</b>

**Table 3.8: % Compliance - Turbidity**

Sampling Location - Zones	Number of Samples	Number of Tests not Meeting the Standards per Zone	% Compliance
ZN0601 - Ballinrees Limavady	24	1	95.83
ZS0104 - Dunore Breda North	36	1	97.22
ZS0501 - Drumaroad Lisburn	52	2	96.15
ZS0602 - Drumaroad Downpatrick	36	1	97.22
All other zones	1,728		100
<b>Overall</b>	<b>1,876</b>	<b>5</b>	<b>99.73</b>

**Table 3.9: % Compliance - Copper**

Sampling Location - Zones	Number of Samples	Number of Tests not Meeting the Standards per Zone	% Compliance
ZS0802 - Castor Bay Lurgan	8	1	87.50
All other zones	380		100
<b>Overall</b>	<b>388</b>	<b>1</b>	<b>99.74</b>



**Table 3.10: % Compliance - Nickel**

Sampling Location - Zones	Number of Samples	Number of Tests not Meeting the Standards per Zone	% Compliance
ZS0809 - Castor Bay Dungannon	8	1	87.50
All other zones	380		100
<b>Overall</b>	<b>388</b>	<b>1</b>	<b>99.74</b>

**Table 3.11: % Compliance - Total Trihalomethanes**

Sampling Location - Zones	Number of Samples	Number of Tests not Meeting the Standards per Zone	% Compliance
ZN0702 - Glenhordial Omagh	8	1	87.50
All other zones	380		100
<b>Overall</b>	<b>388</b>	<b>1</b>	<b>99.74</b>

**Table 3.12: % Compliance - *Clostridium perfringens***

Sampling Location - Supply Points	Number of Samples	Number of Tests not Meeting the Standards per Supply Point	% Compliance
W2801 - Fofanny	156	1	99.36
W3301P - Dunore Point	312	1	99.68
W3801 - Drumaroad	365	1	99.73
All other supply points	1,364		100
<b>Overall</b>	<b>2,197</b>	<b>3</b>	<b>99.86</b>

**Table 3.13: % Compliance - Hydrogen ion (pH)**

Sampling Location - Zones	Number of Samples	Number of Tests not Meeting the Standards per Zone	% Compliance
ZN0302 - Dungonnell Glarryford	24	2	91.67
All other zones	1,852		100
<b>Overall</b>	<b>1,876</b>	<b>2</b>	<b>99.89</b>

**Table 3.14: % Compliance - Manganese**

Sampling Location - Zones	Number of Samples	Number of Tests not Meeting the Standards per Zone	% Compliance
ZN0601 - Ballinrees Limavady	24	1	95.83
ZN0704 - Lough Bradan Drumquin	24	1	95.83
All other zones	1,828		100
<b>Overall</b>	<b>1,876</b>	<b>2</b>	<b>99.89</b>

**Table 3.15: % Compliance - Pesticides - Individual\***

Sampling Location - Supply Points	Number of Samples	Number of Tests not Meeting the Standards per Supply Point	% Compliance
W1701P - Ballinrees	232	1	99.57
W4501 - Derg	232	2	99.14
W4701 - Killyhevin	232	1	99.57
All other supply points	6,264		100
<b>Overall</b>	<b>6,960</b>	<b>4</b>	<b>99.94</b>

*\*All pesticides other than aldrin, dieldrin, heptachlor and heptachlor epoxide*

**Table 3.16: % Compliance - *E. coli***

Sampling Location - Zones	Number of Samples	Number of Tests not Meeting the Standards per Zone	% Compliance
ZN0401 - Dunore Point Antrim	156	1	99.36
All other zones	5,004		100
<b>Overall</b>	<b>5,160</b>	<b>1</b>	<b>99.98</b>

## Annex 4

### Events

The tables below provide a list of all notified events in 2015. These are presented in the categories: serious (Table 4.1); significant (Table 4.2); minor (Table 4.3); and not significant (Table 4.4).

Table 4.1: **Serious** Drinking Water Quality Events in 2015

Date of Serious Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Serious Event	Associated Council Area(s)
6 - 13 May 2015	Magheraliskmisk SR (29,000 population)	A severe deterioration in water quality occurred after a new trunk main from Castor Bay WTWs to Magheraliskmisk SR was brought into service. The reason for this event was undetermined but it was either caused by disturbance of sediment in the original trunk main and/or a lack of adequate flushing of the new main before it was brought into service.	<ul style="list-style-type: none"> <li>• Armagh City, Banbridge and Craigavon Borough</li> <li>• Lisburn and Castlereagh City</li> </ul>

Table 4.2: **Significant** Drinking Water Quality Events in 2015

Date of Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Significant Event	Associated Council Area(s)
9 to 15 January 2015	Camlough WTWs * (26,000 population)	Contraventions of the turbidity standard in the works final water due to chemical dosing tanks emptying over a weekend, resulting in loss of effective treatment. The event occurred because an operator misinterpreted an alarm.	<ul style="list-style-type: none"> <li>• Newry Mourne and Down District</li> </ul>
11 January 2015	Killylane WTWs (51,000 population)	Two works shutdowns led to aluminium and turbidity contraventions in the works final water. The normal operational response did not occur due to Industrial Action by some NI Water staff.	<ul style="list-style-type: none"> <li>• Antrim and Newtownabbey Borough</li> <li>• Mid and East Antrim Borough</li> </ul>
30 January - 5 February 2015	Killylane WTWs (51,000 population)	Aluminium, iron and turbidity contraventions occurred in the works final water due to a combination of operational issues.	<ul style="list-style-type: none"> <li>• Antrim and Newtownabbey Borough</li> <li>• Mid and East Antrim Borough</li> </ul>
3 February 2015	Mill Road, Larne (200 properties)	Aluminium, iron, manganese and turbidity contraventions occurred due to operational activities by NI Water and Roads Service. There was consumer concern and correspondence from a local representative.	<ul style="list-style-type: none"> <li>• Mid and East Antrim Borough</li> </ul>
17 February 2015	Drumaroad WTWs (515,000 population)	No cause was determined for a contravention of the aluminium standard in the works final water.	<ul style="list-style-type: none"> <li>• Ards and North Down Borough</li> <li>• Belfast City</li> <li>• Lisburn and Castlereagh City</li> <li>• Newry, Mourne and Down District</li> </ul>
5 March 2015	Donaghcloney and Waringstown (6,500 population)	Consumer concern and local media interest in “cloudy water” which was caused by air in the mains water supply following operational work.	<ul style="list-style-type: none"> <li>• Armagh City, Banbridge and Craigavon Borough</li> </ul>

Table 4.2: **Significant** Drinking Water Quality Events in 2015

Date of Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Significant Event	Associated Council Area(s)
10 March 2015	Drumaroad WTWs (515,000 population)	An aluminium contravention occurred in the works final water possibly due to under-performance of filters leading to ineffective treatment.	<ul style="list-style-type: none"> <li>Ards and North Down Borough</li> <li>Belfast City</li> <li>Lisburn and Castlereagh City</li> <li>Newry, Mourne and Down District</li> </ul>
29 - 31 March 2015	Altnahinch WTWs (31,000 population)	Aluminium, iron and turbidity contraventions occurred in the works final water due to treatment difficulties following issues with the coagulant dosing.	<ul style="list-style-type: none"> <li>Causeway Coast and Glens Borough</li> <li>Mid and East Antrim Borough</li> </ul>
2 - 14 April 2015	Belleek WTWs (4,800 population)	A contravention of the individual pesticide standard for MCPA occurred due to lack of adequate pesticide removal treatment.	<ul style="list-style-type: none"> <li>Fermanagh and Omagh District</li> </ul>
28 March - 1 April 2015	Drumaroad WTWs (515,000 population)	Aluminium contraventions occurred in the works final water and related supply area due to treatment difficulties.	<ul style="list-style-type: none"> <li>Ards and North Down Borough</li> <li>Belfast City</li> <li>Lisburn and Castlereagh City</li> <li>Newry, Mourne and Down District</li> </ul>
20 April 2015	Camderry Road, Omagh (6 properties)	A significant contravention of the manganese standard occurred due to back- syphonage from a private bore-well.	<ul style="list-style-type: none"> <li>Fermanagh and Omagh District</li> </ul>
5 May - 22 June 2015	Killyhevlin WTWs (76,500 population)	Lack of adequate pesticide removal treatment led to persistent MCPA contraventions in the works final water. The works has now been upgraded with specific pesticide removal treatment.	<ul style="list-style-type: none"> <li>Fermanagh and Omagh District</li> <li>Mid Ulster District</li> </ul>
6 May - 1 June 2015	Camlough WTWs * (26,000 population)	Lack of adequate pesticide removal treatment led to MCPA contraventions in the works final water.	<ul style="list-style-type: none"> <li>Newry, Mourne and Down District</li> </ul>

Table 4.2: **Significant** Drinking Water Quality Events in 2015

Date of Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Significant Event	Associated Council Area(s)
15 May - 1 June 2015	Seagahan WTWs (34,500 population)	A single contravention of the individual pesticide standard for MCPA occurred in the works final water. No cause was determined.	<ul style="list-style-type: none"> <li>• Armagh City, Banbridge and Craigavon Borough</li> </ul>
18 May - 10 June 2015	Ballinrees WTWs (167,500 population)	Significant increase in taste and odour (earthy/musty) complaints in Ballinrees WTWs supply area.	<ul style="list-style-type: none"> <li>• Causeway Coast and Glens Borough</li> <li>• Derry City and Strabane District</li> </ul>
2 June - 28 October 2015	Derg WTWs (39,000 population)	Contraventions of the individual pesticide MCPA occurred in the works final water. A Provisional Enforcement Order (PEO) has been issued by the Inspectorate.	<ul style="list-style-type: none"> <li>• Derry City and Strabane District</li> <li>• Fermanagh and Omagh District</li> </ul>
26 June 2015 - present	Mealough Road, Carryduff (25 properties)	Contraventions of the hydrogen ion (pH) standard occurred due to cement-lined mains.	<ul style="list-style-type: none"> <li>• Lisburn and Castlereagh City</li> </ul>
10 July 2015	Killylane WTWs (51,000 population)	An aluminium contravention occurred in the works final water due to treatment difficulties following the malfunction of a Programmable Logic Control (PLC) system.	<ul style="list-style-type: none"> <li>• Antrim and Newtownabbey Borough</li> <li>• Mid and East Antrim Borough</li> </ul>
28 - 30 July 2015	Dorisland WTWs (128,500 population)	Iron contraventions occurred in the works final water and related supply area due to treatment difficulties following issues with the acid dosing.	<ul style="list-style-type: none"> <li>• Belfast City</li> <li>• Antrim and Newtownabbey Borough</li> <li>• Mid and East Antrim Borough</li> </ul>
31 July 2015	Camrough WTWs * (26,000 population)	Aluminium contraventions occurred in the works final water and related supply area. No cause was determined.	<ul style="list-style-type: none"> <li>• Newry, Mourne and Down District</li> </ul>
17 August - 28 September 2015	Ballinrees WTWs (167,500 population)	Lack of adequate pesticide removal treatment led to persistent MCPA contraventions in the works final water.	<ul style="list-style-type: none"> <li>• Causeway Coast and Glens Borough</li> <li>• Derry City and Strabane District</li> </ul>

Table 4.2: **Significant** Drinking Water Quality Events in 2015

Date of Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Significant Event	Associated Council Area(s)
19 August 2015	Drumaroad WTWs (515,000 population)	A contravention of the turbidity standard occurred after a power cut at the works and was caused by the disturbance of sediment in a break pressure tank.	<ul style="list-style-type: none"> <li>Ards and North Down Borough</li> <li>Belfast City</li> <li>Lisburn and Castlereagh City</li> <li>Newry, Mourne and Down District</li> </ul>
28 August 2015	Rathlin WTWs (300 population)	A value greater than the World Health Organization Index for trihalomethanes was reported due to naturally occurring bromide in the source water.	<ul style="list-style-type: none"> <li>Causeway Coast and Glens Borough</li> </ul>
18 - 28 September 2015	Moyola WTWs (54,000 population)	Temporary treatment issues led to two successive MCPA contraventions in the works final water.	<ul style="list-style-type: none"> <li>Mid Ulster District</li> </ul>
30 September - 18 October 2015	Carn Road, Meigh (44 properties)	There were significant contraventions of the odour parameter (petrochemical) in the Carn Road area after contamination of the mains by oily water. There was local media interest.	<ul style="list-style-type: none"> <li>Newry, Mourne and Down District</li> </ul>
2 October 2015	Drumaroad WTWs (515,000 population)	Treatment difficulties led to an aluminium contravention above the Health Notification Value in the works final water.	<ul style="list-style-type: none"> <li>Ards and North Down Borough</li> <li>Belfast City</li> <li>Lisburn and Castlereagh City</li> <li>Newry, Mourne and Down District</li> </ul>
16 - 23 October 2015	Moneybrannon Road, Coleraine (2 properties)	A <b>“Boil Water Before Use”</b> notice was issued to 2 properties following recurring coliform bacteria contraventions.	<ul style="list-style-type: none"> <li>Causeway Coast and Glens Borough</li> </ul>
9 November 2015	Ballinrees WTWs (167,500 population)	Treatment difficulties led to an aluminium contravention in the works final water.	<ul style="list-style-type: none"> <li>Causeway Coast and Glens Borough</li> <li>Derry City and Strabane District</li> </ul>
9 November 2015	Caugh Hill WTWs (72,000 population)	Treatment difficulties led to iron and trihalomethane contraventions in the works final water.	<ul style="list-style-type: none"> <li>Causeway Coast and Glens Borough</li> <li>Derry City and Strabane District</li> </ul>

Table 4.2: **Significant** Drinking Water Quality Events in 2015

Date of Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Significant Event	Associated Council Area(s)
23 November 2015	Dungonnell WTWs (30,500 population)	Treatment difficulties led to an aluminium contravention in the works final water.	<ul style="list-style-type: none"> <li>• Causeway Coast and Glens Borough</li> <li>• Mid and East Antrim Borough</li> </ul>
2 December 2015 - present	Glebe Road, Randalstown (30 properties)	Contraventions of the hydrogen ion (pH) standard occurred due to cement-lined mains.	<ul style="list-style-type: none"> <li>• Mid and East Antrim Borough</li> </ul>

\* Camlough WTWs was removed from service in March 2016 and the area is now supplied by Castor Bay WTWs.

Table 4.3: **Minor** Drinking Water Quality Events in 2015

Date of Minor Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Minor Event	Associated Council Area(s)
18 January 2015	Carran Hill WTWs (14,000 population)	Local political interest following a newspaper report regarding the contamination of Lough Ross (raw source for Carran Hill WTWs) by illegal fuel laundering operations.	<ul style="list-style-type: none"> <li>• Newry, Mourne and Down District</li> </ul>
4 February 2015	Lough Fea WTWs (24,000 population)	A minor contravention of the hydrogen ion (pH) standard was reported.	<ul style="list-style-type: none"> <li>• Mid Ulster District</li> </ul>
12 February 2015	Lough Fea WTWs (24,000 population)	Hydrogen ion (pH), iron and turbidity contraventions due to low level in the clear water tank.	<ul style="list-style-type: none"> <li>• Mid Ulster District</li> </ul>
11 March 2015	Fofanny WTWs (103,000 population)	No cause was determined for a <i>Clostridium perfringens</i> contravention. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>• Newry, Mourne and Down District</li> </ul>
1 April 2015	Juniper Hill Caravan Park	A coliform bacteria contravention occurred after a mains tie-in.	<ul style="list-style-type: none"> <li>• Causeway Coast and Glens Borough</li> </ul>



Table 4.3: **Minor** Drinking Water Quality Events in 2015

Date of Minor Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Minor Event	Associated Council Area(s)
5 April 2015	Drumaroad WTWs (515,000 population)	No cause was determined for a <i>Clostridium perfringens</i> contravention. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>• Ards and North Down Borough</li> <li>• Belfast City</li> <li>• Lisburn and Castlereagh City</li> <li>• Newry, Mourne and Down District</li> </ul>
16 April 2015	Dunore Point WTWs (513,500 population)	No cause was determined for a <i>Clostridium perfringens</i> contravention. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>• Antrim and Newtownabbey Borough</li> <li>• Ards and North Down Borough</li> <li>• Belfast City</li> <li>• Lisburn and Castlereagh City</li> <li>• Mid and East Antrim Borough</li> </ul>
28 October 2015	Drumaroad WTWs (515,000 population)	No cause was determined for a coliform bacteria contravention. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>• Ards and North Down Borough</li> <li>• Belfast City</li> <li>• Lisburn and Castlereagh City</li> <li>• Newry, Mourne and Down District</li> </ul>
10 November 2015	Donegore SR (190 properties)	Alternative Water Supplies were provided following unsuccessful operational work.	<ul style="list-style-type: none"> <li>• Antrim and Newtownabbey Borough</li> </ul>
22 December 2015	Glenhordial WTWs (33,500 population)	A turbidity contravention occurred due to unrepresentative sampling. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>• Fermanagh and Omagh District</li> <li>• Mid Ulster District</li> </ul>

Table 4.4: **Not Significant** Drinking Water Quality Events in 2015

Date of Not Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Not Significant Event	Associated Council Area(s)
21 January 2015	Caugh Hill WTWs (72,000 population)	A turbidity contravention occurred due to unrepresentative sampling. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>• Causeway Coast and Glens Borough</li> <li>• Derry City and Strabane District</li> </ul>
4 February 2015	Lough Bradan WTWs (47,000 population)	A turbidity contravention occurred due to unrepresentative sampling. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>• Fermanagh and Omagh District</li> <li>• Mid Ulster District</li> <li>• Derry City and Strabane District</li> </ul>
5 February 2015	Dungonnell WTWs (30,500 population)	An iron contravention occurred due to unrepresentative sampling. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>• Causeway Coast and Glens Borough</li> <li>• Mid and East Antrim Borough</li> </ul>
12 February 2015	Killyhevlin WTWs (76,500 population)	A turbidity contravention occurred due to unrepresentative sampling. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>• Fermanagh and Omagh District</li> <li>• Mid Ulster District</li> </ul>
22 February 2015	Caugh Hill WTWs (72,000 population)	A turbidity contravention occurred due to unrepresentative sampling. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>• Causeway Coast and Glens Borough</li> <li>• Derry City and Strabane District</li> </ul>
23 February 2015	Dorisland WTWs (128,500 population)	A turbidity contravention occurred due to unrepresentative sampling. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>• Antrim and Newtownabbey Borough</li> <li>• Belfast City</li> <li>• Mid and East Antrim Borough</li> </ul>
23 February 2015	Clay Lake WTWs (9,000 population)	A turbidity contravention occurred due to unrepresentative sampling. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>• Armagh City, Banbridge and Craigavon Borough</li> <li>• Newry, Mourne and Down District</li> </ul>
23 February 2015	Seagahan WTWs (34,500)	A turbidity contravention occurred due to unrepresentative sampling. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>• Armagh City, Banbridge and Craigavon Borough</li> </ul>
23 February 2015	Carran Hill WTWs (14,000 population)	A turbidity contravention occurred due to unrepresentative sampling. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>• Newry City, Mourne and Down District</li> </ul>

Table 4.4: **Not Significant** Drinking Water Quality Events in 2015

Date of Not Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Not Significant Event	Associated Council Area(s)
24 February 2015	Killyhevlin WTWs (76,500 population)	A turbidity contravention occurred due to unrepresentative sampling. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>Fermanagh and Omagh District</li> <li>Mid Ulster District</li> </ul>
14 March 2015	Derg WTWs (39,000 population)	A turbidity contravention occurred due to unrepresentative sampling. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>Derry City and Strabane District</li> <li>Fermanagh and Omagh District</li> </ul>
16 March 2015	Lough Fea WTWs (43,000 population)	A turbidity contravention occurred due to unrepresentative sampling. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>Mid Ulster District</li> </ul>
16 March 2015	Killylane WTWs (51,000 population)	A turbidity contravention occurred due to unrepresentative sampling. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>Antrim and Newtownabbey Borough</li> <li>Mid and East Antrim Borough</li> </ul>
16 March 2015	Dorisland WTWs (128,500 population)	A turbidity contravention occurred due to unrepresentative sampling. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>Antrim and Newtownabbey Borough</li> <li>Belfast City</li> <li>Mid and East Antrim Borough</li> </ul>
12 August 2015	Glenhordial WTWs (33,500 Population)	An aluminium contravention occurred due to unrepresentative sampling. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>Fermanagh and Omagh District</li> <li>Mid Ulster District</li> </ul>
17 August 2015	Lough Fea WTWs (43,000 population)	An iron contravention occurred due to unrepresentative sampling. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>Mid Ulster District</li> </ul>
5 September 2015	Drumaroad WTWs (515,000 population)	A turbidity contravention occurred due to unrepresentative sampling. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>Ards and North Down Borough</li> <li>Belfast City</li> <li>Lisburn and Castlereagh City</li> <li>Newry, Mourne and Down District</li> </ul>

Table 4.4: **Not Significant** Drinking Water Quality Events in 2015

Date of Not Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Not Significant Event	Associated Council Area(s)
30 November 2015	Glenhordial WTWs (33,500 Population)	A turbidity contravention occurred due to unrepresentative sampling. All resamples were satisfactory.	<ul style="list-style-type: none"> <li>• Fermanagh and Omagh District</li> <li>• Mid Ulster District</li> </ul>

## Annex 5

### Technical Audit Programme

In 2015, the technical audit programme of the public water supplies was satisfactorily undertaken and we acknowledge NI Water's continued co-operation. NI Water has implemented or provided substantive comment on the recommendations and suggestions we provided in our audit reports.

The following table provides a summary of our 2015 Inspection Programme.

**Table 5.1: Summary of the 2015 Inspection Programme**

Location	Audit Activity	Number of Recommendations <sup>1</sup>	Number of Suggestions <sup>2</sup>
'Laboratory Information Management System' (LIMS)	To check that data is adequately managed by the 'Laboratory Information Management System'	5	0
Sampling Procedures and Sample Points	To check that water samples are being collected in accordance with Drinking Water Testing Standards (DWTS). To check that sample points are suitable to ensure that samples are representative of water quality.	6	6
Ballinrees WTWs	To check that good practice in the water treatment process is being operated.	6	10

<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 an aspect of best practice.

## Annex 6

### Enforcement Orders

Table 6.1 provides a summary of enforcement action taken by us under Section 30, and Section 31(3)(a) of The Water and Sewerage Services (Northern Ireland) Order 2006 and under Regulation 28(4) of the Water Supply (Water Quality) Regulations (Northern Ireland) 2007 (as amended).

On our website you can access full details on each Consideration of Provisional Enforcement Order (CPEO) and Provisional Enforcement Order (PEO) and Regulation 28 Notices issued by us. It details the remedial actions to be completed by NI Water, through:

- Undertakings, which are accepted as part of the CPEO process, or as a requirement under a PEO; and
- Regulation 28 Notices, which are issued through our ongoing assessment of NI Water's risk assessments.

**Table 6.1: A Summary of Enforcements closed in 2015**

CPEO/PEO	Water Treatment Works (WTWs) and Associated Water Supply Zones (WSZ)	Reason for Undertaking/Notice	Progress made in 2015
CPEO/14/01	Dungonnell Ahoghill Water Supply Zone.  Properties in Straid Road, New Road & Ballymontenagh Road, Ahoghill	pH (national conditions of use of cement lined mains)	Notice of acceptance of Undertaking letter published 16 June 2014. This detailed the measures in relation to replacing the section of cement main supplying Straid Road / New Road / Ballymontenagh Road, Ahoghill. The main was replaced on the 12 March 2015 and the sampling programme and assessment report were completed on schedule. A 'Completion of Undertakings' notice was issued on the 17 April 2015.
CPEO/14/02	Camrough WTWs and Camrough Newry West Water Supply Zone.	Manganese Contraventions	Notice of acceptance of Undertaking letter published 15 August 2014. This set out the measures required to ensure that the water supplied into Camrough Newry West WSZ is compliant with the drinking water quality standard for manganese. The actions to reduce manganese levels were completed and a 'Completion of Undertakings' notice was issued on 3 November 2015.

**Table 6.1: A Summary of Enforcements closed in 2015 - continued**

CPEO/PEO	Water Treatment Works (WTWs) and Associated Water Supply Zones (WSZ)	Reason for Undertaking/Notice	Progress made in 2015
Reg 28/ Notice/14/01	Rathlin Island WTWs and Rathlin Island Water Supply Zone	Disinfection Statement	Notice of acceptance of Undertakings letter published 26 September 2014. This set out the measures required to mitigate the risk of supplying water from Rathlin WTWs which may not comply with the minimum requirements to ensure adequate disinfection. The action to reassign the service reservoir for Rathlin as a Clear Water Tank was completed on 12 August 2015, and a revised disinfection statement was issued 3 September 2015. The Notice was 'Revoked' on the 10 September 2015.
PEO/14/01	Drumaroad WTWs and associated Water Supply Area	Loss of Disinfection	Notice of acceptance of Undertakings letter published 12 December 2014. This set out the measures required to mitigate the risk associated with the potential for a loss of chlorination at the works. These included appropriate alarms on the storage volume sensors for the duty and stand-by sodium hypochlorite tanks, as well as the provision for an automatic changeover between the two tanks. The Undertakings were completed on schedule and a 'Completion of Undertaking' notice was issued on the 14 April 2015.

**Table 6.2: A Summary of Enforcements issued in 2015**

CPEO/PEO or Reg 28 Notice	Water Treatment Works (WTWs) and/or Water Supply Areas	Reason for Undertaking/Notice	Progress made in 2015
CPEO/15/01	Derg WTWs	Pesticide - MCPA	Notice of acceptance of Undertakings letter published 14 April 2015 set out the measures required to be taken by NI Water. This included carrying out a treatability study, from which a feasibility study was produced detailing the preferred treatment options for dealing with ongoing pesticide contraventions. This work was completed on 31 December 2015 and a Completion of Undertaking notice was issued 26 January 2016.

## Annex 7

### Regulation of Private Water Supplies

Private water supplies are defined as any supplies of water provided otherwise than by the water undertaker, namely NI Water. Private water supplies are diverse in nature and range from those which serve single domestic dwellings through to those supplying large commercial and public premises.

As well as establishing a monitoring programme for all registered private water supplies, the Private Water Supplies Regulations (Northern Ireland) 2009 (as amended) require that a risk assessment is carried out for each supply to identify areas where there may be potential risks of contamination. This assessment includes the whole private water supply system, from source to tap. These assessments are similar to the risk assessments in place for the public water supply.

In the event of a failure, any contraventions of the wholesomeness standards in the regulations must be investigated and followed up to ensure compliance. If compliance cannot be achieved through informal agreement, we can apply more formal mechanisms to secure the required improvement (e.g. Notices). The regulations contain provision for the issuing of Notices which could be used to restrict the use of a supply in circumstances where there is a risk to health from consuming or using the water.

There is a further requirement in the regulations for any newly installed products or substances, used in the provision of a private supply, to be approved for use with drinking water. Details of [approved products](#) are available through the Drinking Water

Inspectorate for England and Wales web site.

#### Roles and Responsibilities

The Drinking Water Inspectorate, acting on behalf of the Department of the Environment in 2015, has a regulatory responsibility for private supplies which are used for drinking, cooking, food preparation or other domestic purposes (including personal hygiene); or those used in commercial food production: the manufacture, processing, preservation, or marketing of food or drink for human consumption.

We implement these regulations with the support of staff from the Environmental Health Department of local councils who collect samples, assist in follow-up investigations and carry out risk assessments at private water supplies.

The regulations require that the sampling and risk assessments of private water supplies are undertaken by a competent person. We have a training programme in place for Environmental Health officers carrying out these duties on our behalf. The '[Private Water Supplies Sampling Manual - A Field Guide](#)', was reviewed and re-issued by us in May 2015. Training courses were delivered in June 2015 which updated Environmental Health staff with details of our standardized sampling methods which have been adopted as best practice throughout the UK.

Persons involved in supplying water from a private water source to others, either as a shared domestic supply or through a supply to public premises or a



food business, share a duty of care for the safety of the water being provided. They also have a responsibility to take any appropriate remedial actions identified by risk assessment or following an investigation into a failure of the supply to meet the drinking water quality standards.

In addition, we offer advice to owners/users of all private supplies, including those to single domestic dwellings, on action that can be taken to protect human health from the potential adverse effects of a contaminated water supply. An advice leaflet, '[Is your private water supply safe?](#)' is available on our website or by contacting us.

### **Register of Supplies**

We are required to hold a register of private supplies to which the regulations apply. The owners/users of private water supplies for commercial or domestic purposes, other than to single domestic dwellings, should register their supply with us by completing a [Private Water Supplies Registration Form](#).

## Annex 8

### Drinking Water Guidance

#### Drinking Water and Health Guidance

The guidance document, '[Drinking Water and Health](#)' is a guide for public and environmental health professionals and for those in the water industry in Northern Ireland. It sets out the roles and responsibilities of the different organizations with an involvement in the safety of drinking water, and was revised during 2015.

#### Guidance on Protection of Drinking Water Sources

This guidance document, '[The Contribution of Drinking Water Quality Regulations to the Implementation of the Water Framework Directive in Northern Ireland](#)' identifies where the requirements of the Drinking Water Quality Regulations complement and support the implementation of the Water Framework Directive. It also provides guidance on practical steps that can be taken to ensure the long-term safety of drinking water supplies.

#### WaterSafe

WaterSafe is a dedicated online search facility to help consumers find the nearest qualified plumbing and heating professionals in their area and promote water safety in the home or in businesses. All contractors featured on the [WaterSafe website](#) must be a member of an Approved Contractors' Scheme, ensuring that they provide a quality service.

WaterSafe is supported by government and all the UK drinking water quality regulators.

#### Guidelines for drinking-water quality

The World Health Organization (WHO) publication '[Guidelines for drinking-water quality](#)' (fourth edition) provides detail on the significance, occurrence and removal of microbial and chemical hazards in drinking water, and the preventive risk management approach for ensuring drinking water quality.

#### Water Safety in your Home

Water UK has produced a consumer's guide to show how to keep water in your home in top condition and avoid potential problems e.g. with taste or quality: [Looking after water in your home \(.pdf 4.82MB\)](#)

#### Water Safety in Buildings

The World Health Organization (WHO) publication '[Water Safety in Buildings](#)' provides guidance for managing water supplies in buildings.

#### Private Water Supplies Technical Manual

This [Manual](#) provides comprehensive guidance for owners/users along with other general information relating to private supplies

## Annex 9

### Useful Contacts

#### Drinking Water Inspectorate for Northern Ireland

The Drinking Water Inspectorate (DWI) is responsible for regulating drinking water quality in Northern Ireland.

Web address: [www.daera-ni.gov.uk/topics/water/drinking-water](http://www.daera-ni.gov.uk/topics/water/drinking-water)

Tel: +44 (028) 9056 9282

E-mail: [dwi@daera-ni.gov.uk](mailto:dwi@daera-ni.gov.uk)  
or [privatewatersupplies@daera-ni.gov.uk](mailto:privatewatersupplies@daera-ni.gov.uk)

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#### Northern Ireland Water Ltd (NI Water)

NI Water is responsible for providing all public water supplies and sewerage services in Northern Ireland.

Web address: [www.niwater.com](http://www.niwater.com)

Tel: 03457 440088

E-mail: [waterline@niwater.com](mailto:waterline@niwater.com)

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#### Utility Regulator

As the independent economic regulator of NI Water, the 'Utility Regulator' focuses on ensuring that consumers receive value for money water and sewerage services.

Web address: [www.uregni.gov.uk/water](http://www.uregni.gov.uk/water)

Tel: +44 (028) 9031 1575

E-mail: [info@uregni.gov.uk](mailto:info@uregni.gov.uk)

#### Local District Councils

District council's Environmental Health Departments can be contacted if you have a private water supply serving a single domestic dwelling.

Web address: [www.nidirect.gov.uk/contacts/local-councils-in-northern-ireland](http://www.nidirect.gov.uk/contacts/local-councils-in-northern-ireland)

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#### Consumer Council for Northern Ireland (CCNI)

The Consumer Council represents consumers on water and sewerage matters.

Web address: [www.consumercouncil.org.uk](http://www.consumercouncil.org.uk)

Tel: +44 (0) 28 90251600 (Enquiries)  
or 0800 121 6022 (Complaints)

E-mail: [info@consumercouncil.org.uk](mailto:info@consumercouncil.org.uk)  
or [complaints@consumercouncil.org.uk](mailto:complaints@consumercouncil.org.uk)

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#### Water Management Unit (WMU)

NIEA has a duty to maintain or improve the quality of surface and underground waters in Northern Ireland.

Web address: <https://www.daera-ni.gov.uk/topics/water/water-management-unit>

Tel: +44 (028) 9262 3181

E-mail: [waterinfo@daera-ni.gov.uk](mailto:waterinfo@daera-ni.gov.uk)

### Public Health Agency (PHA)

PHA has responsibility for a range of functions, including: improvement in health and social wellbeing; health protection; and supporting commissioning health and social care services.

Web address: [www.publichealth.hscni.net](http://www.publichealth.hscni.net)

Tel: 0300 555 0114

Information Request:  
[www.publichealth.hscni.net/contact-us](http://www.publichealth.hscni.net/contact-us)

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### Food Standards Agency (FSA)

FSA protects the public's health and consumer interests in relation to food, including the use of water in food production.

Web address:

[www.food.gov.uk/northern-ireland/](http://www.food.gov.uk/northern-ireland/)

Tel: +44 (028) 9041 7700

E-mail:

[helpline@foodstandards.gsi.gov.uk](mailto:helpline@foodstandards.gsi.gov.uk)

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### DWI (England and Wales)

DWI provides independent reassurance that water supplies in England and Wales are safe and drinking water quality is acceptable to consumers.

Web address: [www.dwi.gov.uk](http://www.dwi.gov.uk)

Tel: +44 (0)30 0068 6400

E-mail: [dwi.enquiries@defra.gsi.gov.uk](mailto:dwi.enquiries@defra.gsi.gov.uk)

### Drinking Water Quality Regulator (DWQR)

DWQR exists to ensure that drinking water in Scotland is safe to drink.

Web address: [www.dwqr.org.uk](http://www.dwqr.org.uk)

Tel: +44 (0)131 244 0190

Information Request: <http://dwqr.scot/contact-us/>

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### Environmental Protection Agency (EPA)

EPA is a statutory body responsible for protecting the environment in Ireland.

Web address: [www.epa.ie](http://www.epa.ie)

Tel: +353 (0) 53 916 0600

Information Request:

[www.epa.ie/about/contactus/form/#d.en.41919](http://www.epa.ie/about/contactus/form/#d.en.41919)

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### Water UK

Water UK is the industry association that represents all UK water and waste water service suppliers at national and European level.

Web address: [www.water.org.uk/home](http://www.water.org.uk/home)

Tel: +44 (0)207 344 1844

Information Request:

[www.water.org.uk/contact-water-uk](http://www.water.org.uk/contact-water-uk)

### UK Water Industry Research (UKWIR)

UKWIR facilitates collaborative research for UK water operators. The UKWIR programme generates sound science for regulation and practice.

Web address: [www.ukwir.org/](http://www.ukwir.org/)

Tel: +44 (0)20 7152 4537

E-mail: [mail@ukwir.org.uk](mailto:mail@ukwir.org.uk)

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### Foundation for Water Research (FWR)

FWR shares and disseminates knowledge about water, waste water and research into related environmental issues.

Web address: [www.fwr.org/](http://www.fwr.org/)

Tel: +44 (0)162 889 1589

E-mail: [office@fwr.org.uk](mailto:office@fwr.org.uk)

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### Water Regulations Advisory Scheme (WRAS)

WRAS is an advisory scheme which aims to promote knowledge of the water regulations throughout the UK.

Web address: [www.wras.co.uk](http://www.wras.co.uk)

Tel: +44 (0) 333 207 9030

E-mail: [info@wras.co.uk](mailto:info@wras.co.uk)

### The Health and Safety Executive for Northern Ireland (HSENI)

HSENI is the lead body responsible for the promotion and enforcement of health and safety at work standards in Northern Ireland.

Web address: [www.hseni.gov.uk](http://www.hseni.gov.uk)

Tel: 0800 0320 121

E-mail: [mail@hseni.gov.uk](mailto:mail@hseni.gov.uk)

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### World Health Organization (WHO)

WHO produces international norms on water quality and human health in the form of guidelines that are used as the basis for regulation and standard setting, in developing and developed countries.

Web address:

[www.who.int/water\\_sanitation\\_health/en/](http://www.who.int/water_sanitation_health/en/)

Information Request:

[www.who.int/about/contact\\_form/en/](http://www.who.int/about/contact_form/en/)

## References

Abstraction Licensing Regulations

[www.legislation.gov.uk/nisr/2006/482/contents/made](http://www.legislation.gov.uk/nisr/2006/482/contents/made)

Code of Practice for using Plant Protection Products (DARD)

[www.daera-ni.gov.uk/articles/code-practice-using-plant-protection-products](http://www.daera-ni.gov.uk/articles/code-practice-using-plant-protection-products)

Guidance on Drinking Water and Health

[www.niwater.com/drinking-water-guidance/](http://www.niwater.com/drinking-water-guidance/)

DWTS (Drinking Water Testing Standard)

[www.ukas.com/download/publications/publications-relating-to-laboratory-accreditation/LAB37%20Edition%203%20Jun%2013%20final.pdf](http://www.ukas.com/download/publications/publications-relating-to-laboratory-accreditation/LAB37%20Edition%203%20Jun%2013%20final.pdf)

EU Priority Substances

[http://ec.europa.eu/environment/water/water-dangersub/pri\\_substances.htm](http://ec.europa.eu/environment/water/water-dangersub/pri_substances.htm)

Euratom Directive

<http://eur->

[lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:296:0012:0021:EN:PDF](http://lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:296:0012:0021:EN:PDF)

Guidelines for drinking-water quality (fourth edition) WHO

[www.who.int/water\\_sanitation\\_health/publications/2011/dwg\\_guidelines/en/](http://www.who.int/water_sanitation_health/publications/2011/dwg_guidelines/en/)

BS 8558:2011: Guide to the design, installation, testing and maintenance of services supplying water for domestic use within buildings and their cartilages

List of Approved Products for use in Public Water Supply in the United Kingdom

<http://dwi.defra.gov.uk/drinking-water-products/approved-products/soslistcurrent.pdf>

The Plant Protection Products (Sustainable Use) Regulations 2012

[www.legislation.gov.uk/ukxi/2012/1657/made](http://www.legislation.gov.uk/ukxi/2012/1657/made)

Private Water Supplies Enforcement and Prosecution Policy

[www.daera-ni.gov.uk/publications/drinking-water-inspectorate-private-water-supply-enforcement-and-prosecution-policy](http://www.daera-ni.gov.uk/publications/drinking-water-inspectorate-private-water-supply-enforcement-and-prosecution-policy)

Public Water Supplies Enforcement and Prosecution Policy

[www.daera-ni.gov.uk/publications/drinking-water-inspectorate-public-water-supply-enforcement-and-prosecution-policy](http://www.daera-ni.gov.uk/publications/drinking-water-inspectorate-public-water-supply-enforcement-and-prosecution-policy)

Private Water Supplies Sampling Manual: A Field Guide

[www.privatewatersupplies.gov.uk/private\\_water/files/PWS\\_sampling\\_manual.pdf](http://www.privatewatersupplies.gov.uk/private_water/files/PWS_sampling_manual.pdf)

Private Water Supplies Technical Manual

[www.privatewatersupplies.gov.uk/private\\_water/files/Full%20Doc.pdf](http://www.privatewatersupplies.gov.uk/private_water/files/Full%20Doc.pdf)

River Basin Management Plans

<https://www.daera-ni.gov.uk/topics/water/river-basin-management>

The Water Regulations Advisory Scheme (WRAS)

[www.wras.co.uk/](http://www.wras.co.uk/)

Water Resource Management Plan

[www.niwater.com/managing-northern-irelands-water-resources](http://www.niwater.com/managing-northern-irelands-water-resources)

Water Safety in Buildings (WHO)

[www.who.int/water\\_sanitation\\_health/publications/2011/9789241548106/en/](http://www.who.int/water_sanitation_health/publications/2011/9789241548106/en/)

## 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; our Annual Drinking Water Quality Report is designed to provide clear information and statistics detailing the quality of drinking water supplies in Northern Ireland.

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

For your convenience we would encourage you to provide feedback 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**



Create prosperity and well being through effective environment and heritage management and regulation.

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)

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

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