# Site Visit Report

Under the European Union (Drinking Water) Regulations 2014 as amended, the Environmental Protection Agency is the supervisory authority in relation to Irish Water and its role in the provision of public water supplies. This Audit was carried out to assess the performance of Irish Water in providing clean and wholesome water to the visited public supply.

The audit process is a sample on a given date of the facility's operation. Where a finding against a particular issue has been reported this should not be construed to mean that this issue is fully addressed.

## Water Supply Zone

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| **Name of Installation** | Bailieboro RWSS |
| **Organisation** | Irish Water |
| **Scheme Code** | 0200PUB0102 |
| **County** | Cavan |
| **Site Visit Reference No.** | SV25920 |

## Report Detail

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| **Issue Date** | 20/09/2022 |
| **Prepared By** | Lisa Noone |

## Site Visit Detail

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| **Date Of Inspection** | 18/08/2022 | **Announced** | Yes |
| **Time In** | 11:00 | **Time Out** | 15:13 |
| **EPA Inspector(s)**<br><br>**Additional Visitors** | Ruth Barrington<br>Lisa Noone | | |
| **Company Personnel** | Irish Water: Peter Gallagher, Pat Collins<br><br>Cavan County Council (operating under service level agreement to Irish Water): Peter Crosby, Vincent Craig, Elizabeth Doherty | | |

## Summary of Key Findings

1. Irish Water have upgraded the Bailieborough Water Treatment Plant in line with the Remedial Action List (RAL) Action Programme bringing improvements to the management, operation, and control of the plant to enhance water quality.

2. The treatment and monitoring of water to ensure compliance with the manganese parametric value has also been improved at the plant. The upgrades include enhanced systems of alarms and inhibits for CFC/filtration, greater operational control on the CFC process to allow for the early capture of dosing issues and installation of a new potassium permanganate dosing system for manganese treatment. The audit found that the upgrades were effective in improving water quality for the Bailieborough Public Water Supply.

## Introduction

The Bailieborough Public Water Supply (PWS) serves a population of 7,225 with 2,367 m3/day treated water produced at the plant. The treatment at the plant comprises pH adjustment, manganese removal (via potassium permanganate), coagulation, flocculation, clarification by dissolved air flotation (DAF), rapid gravity filtration (RGF), chlorination and fluoridation. The raw water abstraction is from Skeagh Lough, a spring-fed lake with neighbouring agricultural and woodland land use.

The supply is on the EPA's Remedial Action List (RAL) since 2019 due to observations raised during an EPA audit on 12/12/2019 relating to operational, management and treatment issues at the plant, and for failure to comply with the manganese limit specified in the *European Union (Drinking Water) Regulations 2014 as amended*. The main purpose of the audit was to verify completion of the RAL action programme works as part of the EPA's assessment of suitability of the supply for removal from the RAL, focusing on the treatment upgrades undertaken at the plant since the previous audit.

## Supply Zones Areas Inspected

Treatment processes upgraded under the RAL Action Programme were inspected on-site, along with supporting information on alarms, controls and monitoring results.

The disinfection process was not assessed, and the raw water abstraction and treated water reservoirs were not visited at the time of the audit. A separate audit assessing the disinfection process was carried out by the EPA on 19/05/2022.

## 1. Coagulation Flocculation and Clarification (CFC) Stage

| | | Answer |
|---|---|---|
| 1.1 | Are the CFC processes appropriately controlled? | No |

**Comment**

1. Liquid aluminium sulphate (Alum) is used as both a coagulant and to suppress the pH to the desired flocculation rage of pH 5.4 to 6. Alum was dosed on a manually controlled flow proportional basis at the time of the audit. The alum pumps were due to be replaced with an order time of 14 weeks from the date of the audit, as pumps initially supplied were faulty. The new smart pumps will allow for automatic dosing.

2. Polyelectrolyte (Poly) is dosed into the flocculation tank via a 5 hole spreader bar prior to entry into one of two DAF units. At the time of the audit, 2 of the 5 injection nozzles for poly dosing were observed to be blocked despite regular maintenance. this issue was raised at the previous EPA audit on 12/12/2019.

## 2. Disinfection

| | | Answer |
|---|---|---|
| 2.1 | Is there a chlorine residual ≥0.1 mg/l throughout the network? | No |

**Comment**

1. The EPA recommended during a Disinfection Audit on 19/05/2022 that Irish Water carry out monitoring of residual chlorine at different points in the network including network extremities several times a week.

2. Network chlorine residuals from May 2022 to present were examined prior to and during the audit. Low chlorine residuals of 0.05mg/l and 0.06mg/l were recorded on 17/08/2022 at Mountain Road and Tierworker respectively. Cavan County Council staff stated that the monitoring locations at Mountain Road and Tierworker were previously supplied by a Group Water Scheme having recently been taken in charge by Irish Water.

## 3. Management and Control

| | | Answer |
|---|---|---|
| 3.1 | Are suitable plant shutdowns/inhibits in place to prevent the entry of inadequately treated water entering the distribution network? | No |

**Comment**

1. In general the plant inhibits are set at suitable levels to prevent the entry of inadequately treated water into the network.

2. Continuous turbidity monitors have been installed on the outlet of each of the three filters, two DAF streams, and at final water to assess the performance of the treatment and quality of the water being produced.

3. Failure to meet the desired final turbidity of 0.3 NTU for 15 minutes will result in a plant shutdown meeting the requirement of the *EPA Water Treatment Manual: Filtration*.

4. An alarm signal is in place for a turbidity of 1 NTU for 3 minutes, however there is no additional automatic plant shutdown in place to protect the regulatory limit should the turbidity rise above 1 NTU in the final water for 3 minutes.

## 4. Drinking Water Quality

| | | Answer |
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| 4.1 | Have relevant failures to comply with the requirements of the European Union (Drinking Water) Regulations 2014, as amended, been notified to the EPA? | No |

**Comment**

1. Records for the monitoring of manganese in raw and treated water and in the network were inspected during the audit. A manganese failure of 58ug/l in the treated water on 30/06/2022 was noted which had not been notified to the EPA.

2. Operational Procedures provided by Irish Water prior to the audit state that where manganese results exceed the 50ug/l parametric value, the caretaker will escalate the incident as per the Incident Notification Process.

## 5. Supply on the Remedial Action List

| | | Answer |
|---|---|---|
| 5.1 | Do the audit findings support progress made with the Remedial Action List upgrades? | Yes |

**Comment**

1. Bailieborough Water Treatment Plant has undergone improvements on the operation, control and treatment of the plant under the RAL action programme to enhance water quality as follows:

- Operational procedures have been put in place to escalate incidents appropriately.
- Automated process in place which alarms and inhibits the works at the appropriate levels to ensure all treated water achieves full primary disinfection.
- Alarms and shutdowns have been linked to the plant SCADA system with cascade call-out system to alert plant operators to any malfunction of the water treatment process, incident or parametric value failure.
- Raw, process and filtered water monitoring is in place for pH, turbidity and manganese.
- Existing CFC/RGF works are aligned so that dosing issues are captured up front allowing automated action using Floc pH and DAF turbidities.
- Filters are backwashed based on a cascade of time/headloss/turbidity with associated turbidity controls ensuring that a log 3 credit can be applied to the plant.
- Filters are not brought back into service after backwash until a sufficient run to waste step has been achieved.
- Treatment for the removal of manganese has been enhanced at Bailieborough Water Treatment Plant (see Section 6.1).

2. Some final elements of the WTP upgrade works remain to be completed, including the replacement of the alum dosing smart pumps and the transfer of the potassium permanganate dosing control to the Programmable Logic Controller (PLC).

## 6. Site Specific Issues

| | | Answer |
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| 6.1 | Have manganese levels been returned to compliance in the Bailieborough Public Water Supply? | Yes |

**Comment**

1. No manganese exceedances of the *European Union (Drinking Water)* parametric value of 50ug/l have been recorded in the Bailieborough WTP final water or in the Bailieborough PWS network since 26/11/2021, bar the exceedance of 58ug/l in the final water on 30/06/2022 noted during the audit (Section 4.1 refers).

2. The audit verified that treatment processes, controls and operations have been upgraded at Bailieborough WTP to improve the removal of manganese at the plant;

- New potassium permanganate makeup and dosing unit.
- Raw water is dosed with sodium hydroxide and potassium permanganate ahead of a blend tank to achieve a desired pH of 9 to allow precipitation of the manganese ahead of the DAF stream.
- All three potassium permanganate pumps on standby – rotating on an 8 hour basis.
- Jar tests completed in 2019 to form the basis of dosing and creation of a dosing matrix.
- 24/7 manganese oxidation stage within the process to allow manganese to be oxidised and in turn to be removed either in the DAF or during the filtration cycle.
- Daily treated water sampling for assessment of manganese treatment performance.
- 3-hourly raw water monitoring for assessment of changes in raw water quality.
- Weekly network monitoring for manganese and other parameters in the network.
- Development of protocols to allow for early intervention when elevated levels are determined in the network or at the works.
- Oxidation Reduction Potential (ORP) and a raw water manganese monitor currently being trialled on site.

3. Actions remain to be completed by Irish Water to further improve operational management and control of the manganese treatment processes include the transfer of the new potassium permanganate dosing system data to the Programmable Logic Controller (PLC). At present, the old potassium permanganate dosing system is on standby and dosing is controlled via the system screen which cannot be accessed remotely.

| | | Answer |
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| 6.2 | Has the property-specific BWN for coliform bacteria been lifted within the Bailieborough distribution network? | No |

**Comment**

1. A property specific Boil Water Notice (BWN) was placed on a private commercial premises within the Bailieborough distribution network on 17/06/2022 due to the presence of total coliform bacteria in excess of 100 per 100ml. Irish Water and Cavan County Council's investigation into the exceedance cited internal plumbing issues in the consumer's premises as the cause and a Regulation 6(1) letter under the *European Union (Drinking Water) Regulations 2014, as amended* was issued to the premises.

## Recommendations

| Subject | Bailieborough Audit Recommendations (18/08/2022) | Due Date | 20/10/2022 |
|---|---|---|---|
| Action Text | **Recommendations**<br><br>**Irish Water is responsible for ensuring a safe and secure supply of drinking water. To address these issues, Irish Water should implement the following recommendations without delay.**<br><br>1. Irish Water should ensure that the current alum pumps are replaced to allow for automatic dosing.<br><br>2. Irish Water should check the poly dosing spreader bar on a regular basis to ensure all injection nozzles are free from blockage for the equal distribution of coagulant over the entire coagulation basin.<br><br>3. Irish Water should continue frequent residual chlorine monitoring in the network and consider additional measures to maintain an adequate free chlorine residual throughout the network.<br><br>4. Irish Water should ensure that a plant inhibit controlled by the regulatory 1 NTU turbidity on final treated water is provided at Bailieborough Water Treatment Plant, as detailed in the *EPA Water Treatment Manual: Filtration.*<br><br>5. Irish Water and Cavan County Council should ensure that all relevant notifications are made in a timely manner following an incident or exceedance of a parametric value.<br><br>6. Irish Water should ensure that the new potassium permanganate dosing system data is transferred to the PLC as planned.<br><br>7. Irish Water should provide an update when available regarding the proposed internal plumbing works and follow-up sampling for the private commercial property on a Boil Water Notice.<br><br>**Follow-Up Actions required by Irish Water**<br><br>During the audit, Irish Water representatives were advised of the audit findings and that action must be taken as a priority by Irish Water to address the issues raised.<br><br>This report has been reviewed and approved by Ruth Barrington, Drinking Water Team Leader.<br><br>Irish Water should submit a report to the Agency on or before 20/10/2022 detailing how it has dealt with the issues of concern identified during this audit.<br><br>The report should include details on the action taken and planned to address the various recommendations, including time frame for commencement and completion of any planned work.<br><br>The EPA also advises that the findings and recommendations from this audit report should, where relevant, be addressed at all other treatment plants operated and managed by Irish Water. | | |