# Drinking Water Audit Report

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| **County:** | Co. Meath | **Date of Audit:** | 28/06/2016 |
| **Plant(s) visited:** | Meadowview Housing Estate Water Treatment Plant (WTP)<br>Scheme Code<br>2300PUB1004 | **Date of issue of Audit Report:** | 07/07/2016 |
| | | **File Reference:** | DW2016/22 |
| | | **Auditors:** | Ms Ruth Barrington<br>Ms Pauline Gillard |
| **Audit Criteria:** | • The *European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014).*<br>• *The EPA Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies (ISBN: 978-1-84095-349-7)*<br>• The recommendations specified in the EPA *Drinking Water Report*.<br>• EPA Drinking Water Advice Notes Nos. 1 to 15. | | |

### MAIN FINDINGS

i. **The Meadowview Housing Estate PWS uses UV treatment as primary disinfection. The UV unit in place at the plant is unvalidated and duty only with no plant automatic shutdown in the event of failure, which does not meet the required disinfection criteria.**
ii. **Irish Water should take urgent action to improve the treatment provided for this water supply in light of exceedances of *Enterococci*, ammonium, nitrite, iron and manganese which have been detected in samples taken during 2016.**

## 1. INTRODUCTION

Under the *European Union (Drinking Water) Regulations 2014* 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 in response to the notifications by Irish Water dated 07/06/2016, 15/06/2016 and 22/06/2016 of the failure to meet the *Enterococci*, ammonium, nitrite and manganese parametric values (as specified in Tables A, B and C of Part 1 of the Schedule of the Regulations) in the Meadowview Housing Estate Clonard PWS.

The Meadowview Housing Estate WTP abstracts raw water from two boreholes located within the estate. Treatment consists of pre-chlorination (to assist in iron and manganese removal), two iron and manganese removal filters, and disinfection via a single UV unit. The supply serves around 80 people in an estate of 28 houses on the outskirts of Clonard village in Co. Meath.

The opening meeting commenced at 10.30 a.m. at Meadowview WTP. The scope and purpose of the audit were outlined at the opening meeting. The audit process consisted of interviews with staff, review of records and observations made during an inspection of the treatment plant. The audit observations and recommendations are listed in Section 2 and 4 of this report. The following were in attendance during the audit.

Representing Irish Water:

Ms Gráinne Carey – Drinking Water Compliance Analyst
Mr John Leamy - Drinking Water Compliance Specialist
Mr Shane Tynan – Water Engineer

Representing Meath County Council:

Ms Helen McDonnell – Executive Environment Technician
Mr Joseph Cleary - Caretaker
Mr Michael Smith - Environmental Technician
Mr John Gilsenan- Meath County Council

Representing the Environmental Protection Agency:

Ms Ruth Barrington – Inspector
Ms Pauline Gillard – Inspector

## 2. AUDIT OBSERVATIONS

*The audit process is a random sample on a particular day of a facility's operation. Where an observation or recommendation against a particular issue has not been reported, this should not be construed to mean that this issue is fully addressed.*

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| **1.** | **Source Protection**<br>a. The two boreholes have been in place for a number of years- up to 30 years for the original well at the treatment plant and 15 years for the newer borehole to the front of the estate. No records of the borehole logs or construction details have been located during the investigation of the exceedances. The pump depth and borehole depth was unknown.<br>b. Both boreholes are located within the residential area of the housing estate. Septic tanks have been identified in the vicinity at the school and a neighbouring garage and house. The wastewater from Meadowview housing estate is pumped to Abbeyfields housing estate nearby where there is a wastewater treatment plant serving both housing estates. |
| **3.** | **Filtration**<br>a. The filter media in the Osmonics iron and manganese removal filters, made up of filter sand plus carbon and manganese dioxide, is replaced annually and was last replaced on 04/01/2016, i.e. before the initial iron exceedance in a sample taken on 20/01/2016.<br>b. It was stated that the iron failure in the sample of 20/01/2016 was due to the failure of the pre-chlorination system due to a blockage in the dosing line. The manganese failure in the sample of 02/06/2016 was disputed by Irish Water as iron was compliant and historically an iron failure would be detected before a manganese failure. |
| **4.** | **Disinfection**<br>a. A Spektron Type 6 UV unit was installed at the plant in 2009 to achieve primary disinfection for the water supply.<br>b. There is no means of secondary disinfection on the supply to ensure maintenance of adequate disinfection in the network.<br>c. Irish Water has informed the EPA that the UV unit operating on-site does not have a validation certificate.<br>d. There is a single UV unit in place at the plant. There is no automatic shut down on pumping in the event of lamp failure or inadequate dose.<br>e. There is no data logger on the UV unit so trends cannot be accessed. An instantaneous readout ($W/m^2$) is available on the unit display but this is not the default home screen and was not accessible by staff during the audit.<br>f. A Meath County Council contractor is available for maintenance (scheduled and reactive) |

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| | on the UV system, and the alarm on the UV system dials out to this contractor. The alarm settings were not accessible on the control panel during the audit.<br>g. A low dose alarm was triggered during the audit. At this point the display screen switched to show the instantaneous dose of 26.5 W/m$^2$. The maintenance contractor was contacted but had not arrived prior to the end of the audit.<br>h. Some documentation was made available during the audit including a certificate of conformity and generic technical data manual for the UV system. The certificate relates to the EU Machinery Directive and electrical equipment, not to disinfection.<br>i. Monthly checks on the UV system are performed and recorded in a job sheet format. The record sheet is not tailored to the particular site and contains references e.g. to a Trojan UV unit and to bypass of the UV system. |
| **6.** | **Exceedances of the Parametric Values**<br>a. During 2016 a number of samples (one check sample, one audit sample and one investigative sample) have returned exceedances of the parametric values. The failed parameters were ammonium and iron on 20/01/2016; *Enterococci*, nitrite and manganese on 02/06/2016 and ammonium on 16/06/2016. The cause of these exceedances has not yet been determined by Irish Water.<br>b. There are no facilities for ammonia or nitrite removal in the current treatment plant. At elevated levels ammonium is an indicator of faecal contamination, and it can also interfere with other treatment processes such as chlorination and manganese removal, and can lead to elevated nitrite through bacterial processes. |
| **10.** | **Management and Control**<br>a. A daily record sheet template is being developed for use at some of the smaller Co. Meath public water supplies, including Meadowview PWS, to record caretakers' observations and monitoring results in a consistent manner.<br>b. An increased programme of operational monitoring on a weekly basis has been put in place by Irish Water on the Meadowview PWS following the previous exceedances and the concerns over the disinfection system. |

## 3. AUDITORS' COMMENTS

The disinfection system in place at the Meadowview Housing Estate PWS is inadequate, as there is no validation of the existing single UV unit. Furthermore in the event of a fault with the UV unit there is no means of preventing undisinfected water entering distribution. Other exceedances detected during 2016 reflect the lack of adequate treatment at the plant given the raw water quality.

## 4. RECOMMENDATIONS

### General

1. Irish Water shall submit a programme to the EPA for the replacement of the Meadowview supply with an alternative source of clean and wholesome drinking water, or shall implement Recommendation Numbers 2 to 10 below at the existing water treatment plant.

### Source Protection

2. Irish Water should survey the boreholes to assess the construction, depth, and susceptibility to contamination, in the absence of borehole logs and construction details. The survey reports should form part of the assessment of the level of treatment required.

3. Irish Water should liaise with Meath County Council in relation to prioritisation of septic tank/ DWWTS inspections or other catchment inspections in the vicinity of the boreholes, and with Irish Water's own Wastewater Compliance Section with regard to the Abbeyfields wastewater treatment plant.

### Filtration

4. Irish Water should review the operation of the iron and manganese removal filters and the pre-chlorination system to ensure they are operating at all times. A suitable alarm system should be implemented to alert the operator in the event of chlorine dosing failure.

### Disinfection

5. Irish Water should ensure that a UV disinfection system is provided which is validated in accordance with an appropriate internationally accepted validation system, and that the system operates within its validated range at all times.

6. Irish Water should ensure that there are duty and standby UV disinfection arrangements with automatic changeover in the event of failure of one of the UV disinfection units. Alternatively a duty only UV system may be considered in conjunction with programmed automatic shutdown of borehole pumps in the event of the activation of appropriate alarm settings.

7. Irish Water should install an alarm on the continuous UVI monitor at the point of disinfection and this monitor should be alarmed and linked to a recording device to ensure that any deviation of the quality of water outside the validated range for the UV treatment system or a failure of the UV disinfection system is immediately detected.

8. Irish Water should investigate the UVI alarm which was activated during the audit and the follow up response which was made to this alarm. The investigation should include whether undisinfected water entered the distribution system on that occasion, and an assessment of the frequency, duration, impact and response for all UVI alarms triggered during 2016 to date.

### Management and Control

9. Irish Water should implement the planned plant daily record sheets for Meadowview PWS and other proposed supplies.

10. Irish Water should report monthly on the results of the increased operational monitoring, with the exception of any exceedance of microbiological parameters which shall be notified immediately by Irish Water through ODWNS in the usual way.

## FOLLOW-UP ACTIONS REQUIRED BY IRISH WATER

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. This report has been reviewed and approved by Ms Aoife Loughnane, Drinking Water Team Leader.

Irish Water should submit a report to the Agency within one month of the date of this audit report detailing how it has dealt with the issues of concern identified during this audit. The report should include details on the action taken and planned to address the various recommendations, including timeframe for commencement and completion of any planned work.

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.

Please quote the File Reference Number in any future correspondence in relation to this Report.

**Report prepared by:**  **Date:** 07/07/2016

Ruth Barrington

Inspector