Drinking Water Audit Report

County:	Laois	**Date of Audit:**	23rd June 2016
Plant(s) visited:	Convent Borehole Durrow No. 1 PWS (1600PUB1002)	**Date of issue of Audit Report:**	1st July 2016
		File Reference:	DW2016/119
		Auditors:	Aoife Loughnane Pauline Gillard
Audit Criteria:	• The *European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014)*. • *The EPA Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies (ISBN: 978-1-84095-349-7)* • The recommendations specified in the EPA *Drinking Water Report*. • EPA Drinking Water Advice Notes No.s 1 to 15.		

MAIN FINDINGS

i. **Emergency works were carried out at Convent borehole to raise the well-head following flooding of the borehole during a winter storm in December 2015.**
ii. **Further source protection measures should be carried out to improve the safety and security of Durrow No. 1 PWS, including sealing and capping of the borehole and the decommissioning of three redundant boreholes at the plant.**

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 to assess the performance of Irish Water in providing clean and wholesome drinking water in the Durrow No. 1 public water supply.

Convent Borehole is the raw water source for the Durrow No. 1 public water supply. Treatment consists of disinfection by chlorination. The abstraction rate is 219 m^3/day and the supply serves a population of 744, including two group water schemes at Derreen and Toberboe.

The opening meeting commenced at 12.45 pm at the Convent Borehole. 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. Photographs taken during the audit are attached to this report and are referred to in the text where relevant. The audits observations and recommendations are listed in Section 2 and 4 of this report. The following were in attendance during the audit.

Representing Irish Water: Aoife Lambe, Drinking Water Compliance Analyst, Irish Water John Gavin, SLA Lead, Operations & Maintenance, Irish Water Stan Cullen, Acting Senior Executive Engineer, Laois County Council Larry Gittens, Supervisor, Laois County Council **Representing the EPA:** Aoife Loughnane, Inspector 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.

1.	**Source Protection** a. The Convent borehole is located directly south of the Erkina River and is accessed through the grounds of Castle Durrow. No borehole logs are available. The borehole is not capped but is located in a locked building. b. According to the EPA Groundwater Monitoring Programme Site Information Report (August 2011), the borehole is 10 m deep and is situated in Dinantian Lower Impure Limestones. The aquifer is a regionally important karstified bedrock dominated by diffuse flow (Rkd). The zone of contribution (ZOC) delineated for this raw water source is 1.61 km^2 located mainly to the south of the borehole. Groundwater vulnerability within the ZOC ranges from high to extreme. c. Land use within the ZOC is mainly agricultural with some forestry. d. Laois County Council confirmed there are high background levels of nitrate in the groundwater source (generally in the region of 30 to 40 mg/l) but there have been no nitrate exceedances in the drinking water supply in recent years. e. On 31st December 2015, Laois County Council shut-down the water supply due to concerns about rising flood levels at the Convent borehole during a winter storm. While the ground surrounding the plant was not flooded, some floodwater entered the borehole though shallow subsurface flow. Irish Water notified the EPA that Durrow No. 1 PWS was shut-down from 31st December 2015 to 4th January 2016 due to flooding in the area. The supply was fed by Fermoyle WTP during the shut-down. Prior to bringing the Convent WTP back into supply, the borehole was purged and pumped to waste until the chlorine levels recovered, and microbiological samples of treated water were clear. In subsequent emergency works, Laois County Council raised the well-head by 18 inches to reduce the risk of ingress re-occurring. f. The Convent borehole is included in Irish Water's Raw Water Monitoring Programme to determine the appropriate level of treatment to ensure the safety and security of the water supply. A UVT monitor and *Cryptosporidium* sampler has been installed at the plant and sampling commenced in Q1 2016. There has been no detection of *Cryptosporidium* oocysts to date. g. There are 3 redundant boreholes located within the fenced off area of the site. IE Consulting have been engaged to decommission these boreholes, and the expected timeframe is end of Q3 2016.
2.	**Disinfection** a. Disinfection of the water supply is achieved by dosing sodium hypochlorite, which was switched in recent years from chlorine gas. b. There is a chlorine monitor and alarm in place, and automatic switchover between the duty and standby chlorine dosing pumps.

	c. The residual chlorine monitor is located on the rising main to the reservoir, and was reading 0.61 mg/l at the time of the audit. There are no connections off the rising main and Irish Water confirmed that the contact time provided by the reservoir meets the required minimum of 15 mg.min/l.
3.	**Monitoring of treated water** a. The treated water quality monitors were displaying 0.042 NTU, 6.99 pH, 38.3 mg/l nitrate and 0.61 mg/l chlorine at the time of the audit.
4.	**Treated Water Storage** a. Treated water is pumped to the Cork Road reservoir located approximately 2km south west of Durrow. The reservoir is thought to have been built in the 1930s and has a storage capacity of 120 m^3 in a single cell. The reservoir was visited during the audit. b. The reservoir was partially upgraded in 2015, mainly for health & safety reasons. The upgrade works involved new steps and handrails, covered vents, locked access hatches and new roof and vents on the plate aerator housing structure (see photos 2 & 3). However, the reservoir has not been internally inspected or cleaned in recent times, and an integrity assessment has not been carried out. **c.** Laois County Council has identified this reservoir for inclusion in Irish Water's reservoir remediation programme due to leakage concerns.
5.	**Management and Control** a. The possibility of decommissioning the Convent borehole and supplying Durrow No.1 PWS from the Fermoyle source was discussed during the audit. This would depend on the outcome of the current proposal to deliver a permanent solution to resolve the elevated nitrate levels at Fermoyle, and would also require a significant upgrade of pipework in Durrow. Irish Water stated that there are no confirmed plans at this time. b. The 2015 Drinking Water Returns reported by Irish Water to the EPA incorrectly identified a volume of 1,090 m^3/day for Durrow No.1 PWS.

3. AUDITORS COMMENTS

The auditors acknowledged the actions taken by Irish Water and Laois County Council to prevent the contamination of the Durrow No. 1 PWS last December by shutting down the supply when floodwaters rose and switching to the Fermoyle source, and by carrying out emergency works to raise the well-head to prevent a reoccurrence. Further source protection measures should be carried out to improve the safety and security of Durrow No. 1 PWS, including sealing and capping of the borehole and the decommissioning of three redundant boreholes at the plant.

4. RECOMMENDATIONS

Source Protection

1. Irish Water should ensure that all redundant boreholes are decommissioned in accordance with best practice guidelines, to prevent the risk of presenting a preferential pathway for the entry of contaminants to the aquifer.

2. Irish Water should ensure that all borehole linings, seals and well-heads are installed and maintained in accordance with *EPA Advice Note No. 14: Borehole Construction and Wellhead Protection*.

Treated Water Storage

3. Irish Water should carry out an integrity assessment of the Cork Road reservoir to ensure that there is no ingress into the reservoir.

4. Irish Water should ensure that the Cork Road reservoir is inspected and cleaned out on a regular basis and any maintenance and repairs completed as soon as possible after the need has been identified.

Management and Control

5. Irish Water should ensure that the annual Drinking Water Returns data is up-to-date in EDEN and reflects any changes in population and volume figures, and the level of treatment provided for each public water supply.

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 Mr Darragh Page, Drinking Water Senior Inspector.

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: Aoife Laighnare **Date:** 1st July 2016

Inspector

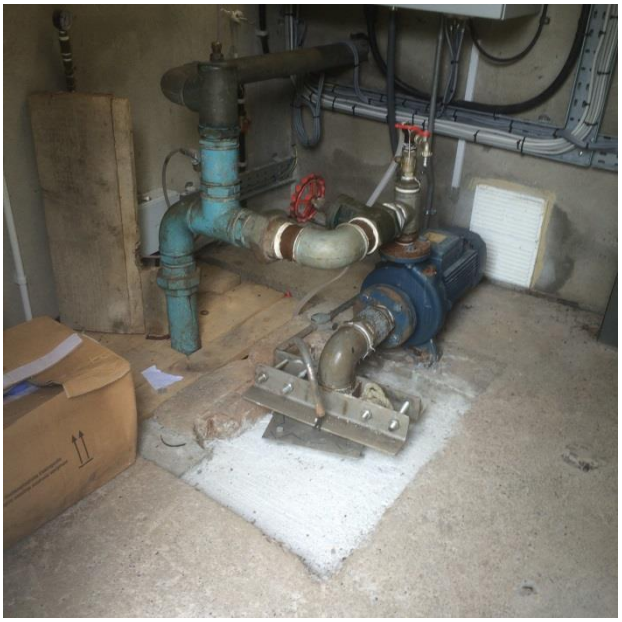

Photo 1: Convent borehole – raised well-head

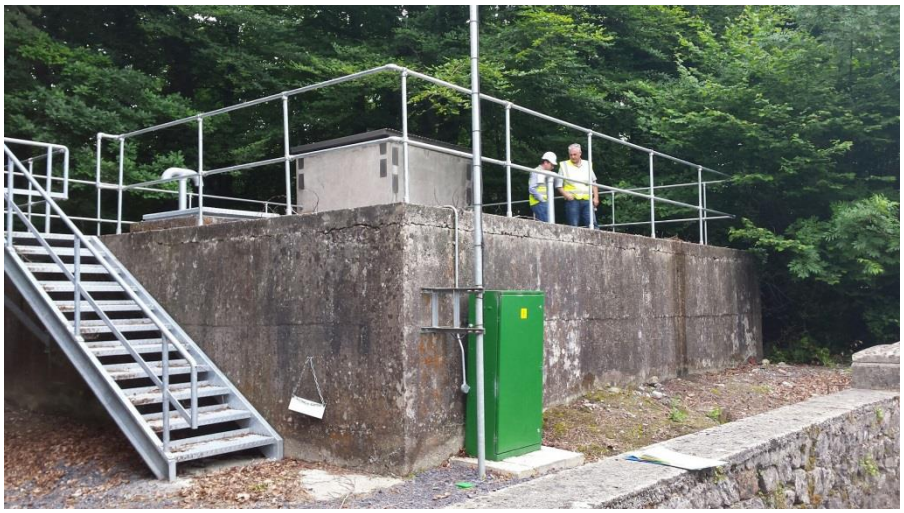

Photo 2: Cork Road Reservoir

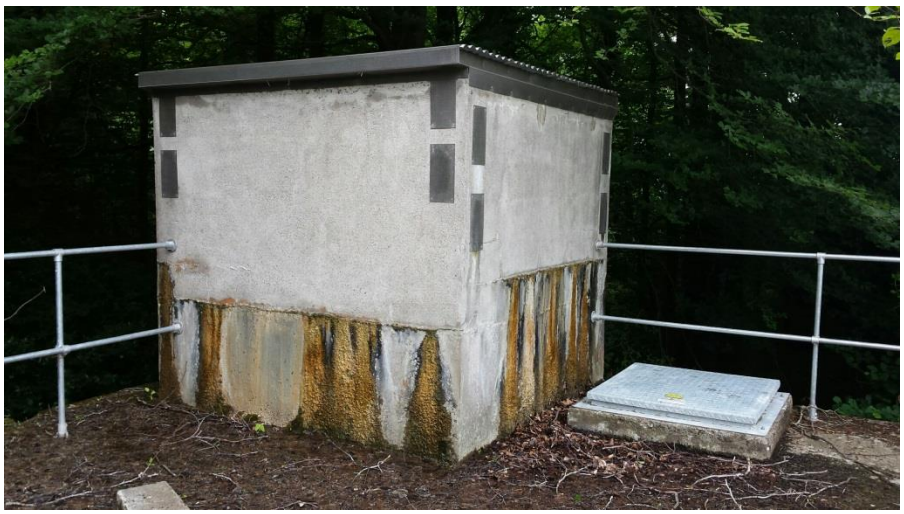

Photo 3: Recent upgrade works to the reservoir's plate aerator housing structure