LICENCE REF. NO.	RISK ASSESSMENT METHODOLOGY STAGE & STEP	REPORT VERSION
P0404-02	Groundwater Monitoring Report **Q3-2022**	**ISSUE**

Dairygold Mitchelstown, Co. Cork

Castlefarm & Clonmel Road Complex

Groundwater & Surface Water Monitoring Report

for submission to the Environmental Protection Agency

(Q3-2022)

(LICENCE No.P0404-02)

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LIMITATION

There was no significant deviation from the original proposed scope of works in the undertaking of this groundwater/surface water monitoring report for the Dairygold Castlefarm Complex and Clonmel Road Complex in Mitchelstown, Co. Cork. The scope of this report was based on the investigation and assessment of groundwater information for the site, including historical and Q3-2022 data.

This report has been prepared by IE Consulting with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the Client. IE Consulting have assumed that all work previously reported to the Agency by other parties is in good standing and the data holds through.

This report is for the exclusive use of Dairygold (Mitchelstown, Co. Cork) for submission to the EPA; no warranties or guarantees are expressed or should be inferred by any third parties.

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES

TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

EXECUTIVE SUMMARY

Concentrations of the main Contaminants of Potential Concern (COPC's), **Ammonia** and **Electrical Conductivity** have been determined from groundwater samples collected from the Castlefarm Complex, Effluent Plant and Clonmel Road Complex. The River Gradoge is also sampled as part of the routine monitoring schedule.

Castlefarm Complex

Interpretation of reduced groundwater levels at BH4 suggests there is a localised groundwater mound in this area. The reasons for the groundwater mound are not immediately clear.

BH6 and BH7 continue to report good water quality.

BH9 continues to display elevated nitrate concentrations.

There is a localised zone of groundwater contamination in the vicinity of the main processing area, as detected at BH3, BH4 and BH8.

- Elevated temperature continues to be reported at BH3. However, it is expected that this will improve in future monitoring rounds, as a leaking sump has been repaired.
- BH4 has the poorest groundwater quality across the site with the highest ammonia concentrations reported in Q3-2021.
- BH3, BH4 and BH8 are showing an improving trend with respect to COD, BOD, pH, sodium, potassium and chloride since these works commenced. pH has stabilised as BH4. Sulphate is showing a downward trend at BH3. This is attributed to the infrastructure upgrade programme undertaken between 2016-2021.

Hydrocarbons were detected at BH4 in Q3-2022, and these are displaying a strong downward trend.

BH11 reported poor water quality. Ammonia, chloride and potassium are displaying a downward trend, while electrical conductivity is displaying an upward trend. BH11 appears to be intercepting the eastern edge of the plume detected at BH8.

BH10 reports good water quality, which suggests the plume originating from the main processing area is not migrating towards the River Gradoge. The plume continues to be intercepted by the Mill Stream, which is dammed and all the water is pumped back to the effluent plant for treatment.

Overall, the localised area of groundwater contamination at the Castlefarm Complex is showing an improvement with downward trends in key parameters of concern.

Clonmel Road Complex

The shallow groundwater quality at the Clonmel Road Complex, in the saturated gravels which sit on top of the locally important bedrock aquifer was identified as being the most vulnerable from licenced operations.

Overall, the groundwater quality at the Clonmel Road Complex was deemed to be good in Q3-2022.

BH1 monitors upgradient, background water quality which was reported to be good in Q3-2022.

The Q3-2022 downgradient ammonia result at BH5S (8.90 mg/l) is higher than the upgradient BHXS (1.05 mg/l) result. This suggests that there is a source of contamination between BH5S and BHXS, which is suspected to be the mains Irish Water sewer running east – west along the R665 road.

Deep groundwater quality was found to be good in Q3-2022 at BHXI and BH5D.

No hydrocarbons were reported at the Clonmel Road Complex in Q2-2022.

River Gradoge

The River Gradoge reported good water quality in Q3-2022. Key indicator parametes of BOD, ammonia and chloride were reported to be low. There is no evidence to suggest that the licenced activites or landfill are having a negative impact on the River Gradoge.

	PA Contaminated Land & Groundwater Risk Assessment Methodology	Report Reference	Report Date	Status
	STAGE 1: SITE CHARACTERISATION & ASSESSMENT			
1.1	PRELIMINARY SITE ASSESSMENT	Clonmel Rd. GES 01/02/01 Castlefarm GES 01/02/01	2001 2001	
1.2	DETAILED SITE ASSESSMENT	Clonmel Rd. 1051_DFI C. Farm P. Conroy Hydro. Investigation C. Farm OCM Hydro. Assessment C. Farm OCM Updated Hydro. Assessment	2013 2013 2018 2020	
1.3	QUANTITATIVE RISK ASSESSMENT	Clonmel Rd. IE Consulting Castlefarm IE Consulting	2022 2022	
	STAGE 2: CORRECTIVE ACTION FEASIBILITY & DESIGN			
2.1	OUTLINE CORRECTIVE ACTION STRATEGY			
2.2	FEASIBILITY STUDY & OUTLINE DESIGN			
2.3	DETAILED DESIGN			
2.4	FINAL STRATEGY & IMPLEMENTATION PLAN			
	STAGE 3: CORRECTIVE ACTION IMPLEMENTATION & AFTERCARE			
3.1	ENABLING WORKS			
3.2	CORRECTIVE ACTION IMPLEMENTATION & VERIFICATION			
3.3	AFTERCARE			

1. INTRODUCTION

1.1. PROJECT CONTRACTUAL BASIS & PERSONNEL INVOLVED

IE Consulting are retained by Dairygold Ingredients, Mitchelstown, Co. Cork to collect groundwater and surface water samples and comment on the results of analysis from monitoring points on the Castlefarm Complex and the Clonmel Road Complex at Mitchelstown, Co. Cork as per a proposal dated 28th July 2021 (IE090/KM/JK/5047).

The consultants involved in this project are listed below:

Kevin Murphy

BSc. Geology, MSc. Hydrogeology & Water Management - with 4 years' experience.

Jerome Keohane

BSc. Geology, MSc. FCIWEM, MIEI - with 38 years' experience.

A hydrogeologist from IE Consulting visited Dairygold, Mitchelstown on the 24th and 25th August 2022 2022 to carry out the quarterly groundwater and surface water sampling.

The samples were analysed at the Dairygold Ingredients Laboratory located at Clonmel Road, Mitchelstown, Co. Cork. Additional samples were sent to Element Materials Technology Laboratory, Deeside, UK to undergo analysis for parameters which could not be analysed for by the internal Dairygold Laboratory.

This report details the Q3-2022 monitoring results and associated trends for the Castlefarm complex, the Effluent Plant, the Clonmel Road complex and the River Gradoge.

1.2. BACKGROUND INFORMATION

Dairygold Mitchelstown has operations in Mitchelstown at both the Clonmel Road Complex and the Castlefarm Complex. Both sites are located in different areas of Mitchelstown, but are regulated under the same EPA licence. The monitoring is undertaken as a condition of the IPPC Licence (P0404-02) issued by the Environmental Protection Agency (EPA) for the site.

The processing plant at Castlefarm produces whole milk, skim milk, filled milk powders, casein, caseinate, lactose powders, whey powders and concentrates.

The processing plant at Clonmel Road produces cheddar cheese.

The original borehole network was established as part of a hydrogeological assessment undertaken at the site in December 2000 - January 2001 and described in a report prepared by GES Ltd. (01/02/01).

Additional boreholes (BH5D, BH7, BH9, BHXS, BHXD, BH11, BH12) were installed in August and September 2016.

1.3. MONITORING SCHEDULE

The Dairygold Mitchelstown campus consists of the Castlefarm Complex (which includes the Effluent Plant) and the Clonmel Road complex. There is also a landfill located to the west of the Effluent Plant.

The Contaminants of Potential Concern (COPC) are Ammonia and Electrical Conductivity across all of the Dairygold Mitchelstown sites.

The Groundwater Monitoring Well Network for the Castlefarm Complex is shown in Figure 1 and for the Clonmel Road site is shown in Figure 2.

In summary, the monitoring network consists of:

- Castlefarm Complex: 5 boreholes
- Effluent Plant: 3 Boreholes
- Clonmel Road: 4 Shallow Boreholes
- Clonmel Road: 4 Deep Boreholes
- Landfill: 6 Boreholes
- River Gradoge: 5 grab samples

The monitoring schedule is outlined in Table 1.

Table 1 – Monitoring Schedule

Complex	Target	Monitoring Point	Monitoring Frequency	Parameters
Castlefarm Complex (including Effluent Plant)	**Groundwater** (both shallow & deep)	BH3 BH4 BH6 BH7 BH8 BH9 BH10 BH11	**Quarterly**	pH Electrical Conductivity COD BOD Nitrate as NO_3 Ammonia Total Nitrogen Orthophosphate Chloride Sulphate as SO_4 Manganese Nickel Potassium Sodium Odour Colour Turbidity Extractable Petroleum Hydrocarbons (EPH) Total Coliforms Entero Bacteria E. Coli Groundwater Level
Clonmel Road Complex	**Groundwater** (both shallow & deep)	BH5S BH2 BHXS BH1 BH5D BHXI BH12 # BHXD #	**Quarterly**	
River Gradoge	**Surface Water**	SW1 – Upstream of Clonmel Road Complex SW2 – Downstream Clonmel Road Complex SW3 – Upstream Irish Water WWTP Overflow Outlet SW4 – Downstream Irish Water WWTP Overflow Outlet SW5 – Downstream Effluent Plant/Landfill/ Mill Stream	**Quarterly**	COD BOD Nitrate as NO_3 Total Ammonia as N Orthophosphate Total Nitrogen Chloride pH Electrical Conductivity Coliforms Entro Bacteria E. Coli
Landfill § Castlefarm Complex	**Landfill Leachate** Perched Water Table within Landfill	LF1 LF2 LF3 LF4 LF5 LF6	**Annual**	pH Electrical Conductivity COD BOD Nitrate as NO_3 Ammonia Total Coliforms Entero Bacteria E. Coli
# Deep groundwater – not monitored as per instructions from EPA **§** The landfill is monitored on an annual frequency. The landfill monitoring is reported separate to the Castlefarm Complex, Clonmel Road Complex and River Gradoge monitoring programme				

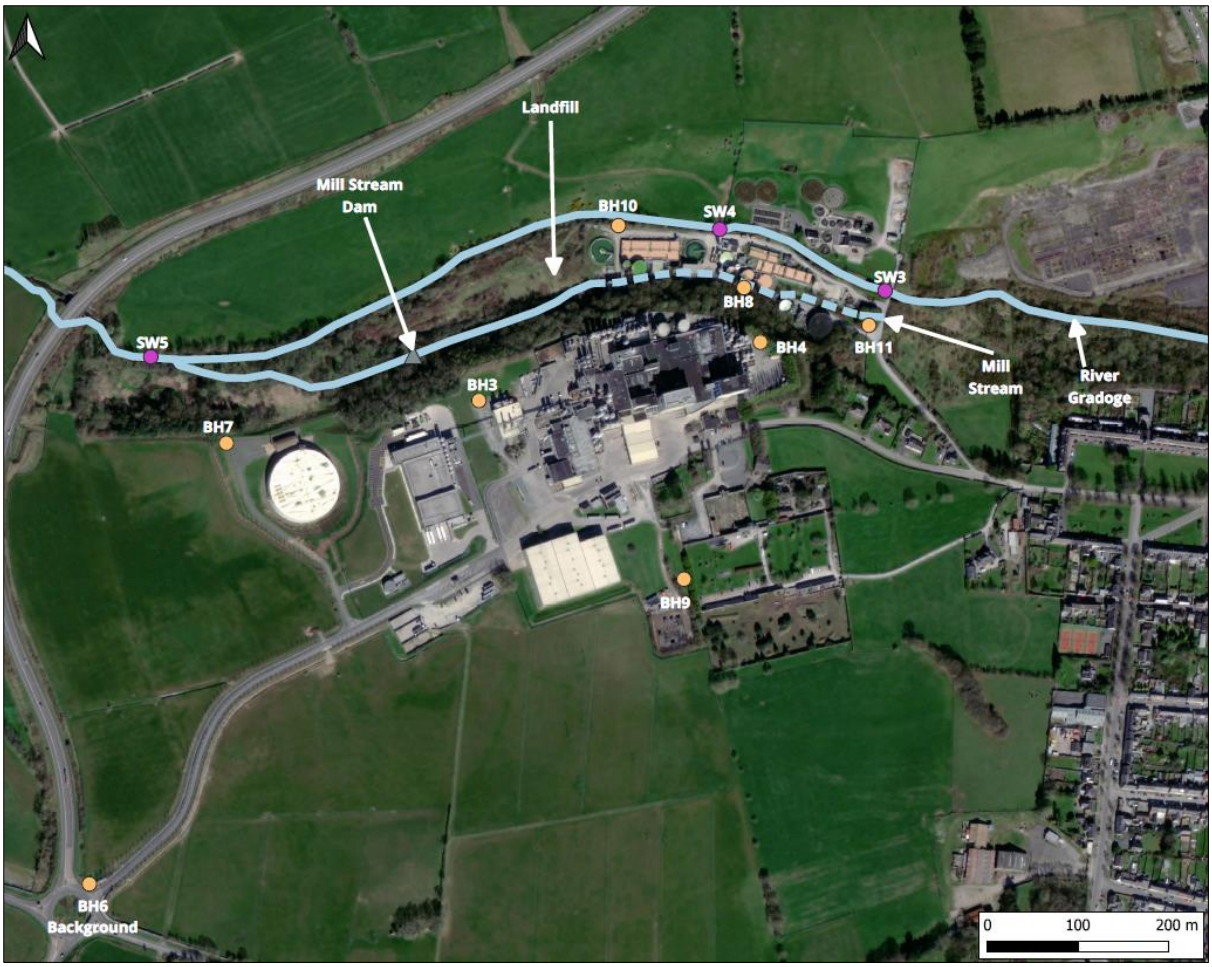


Figure 1 – Castlefarm Complex Monitoring Network

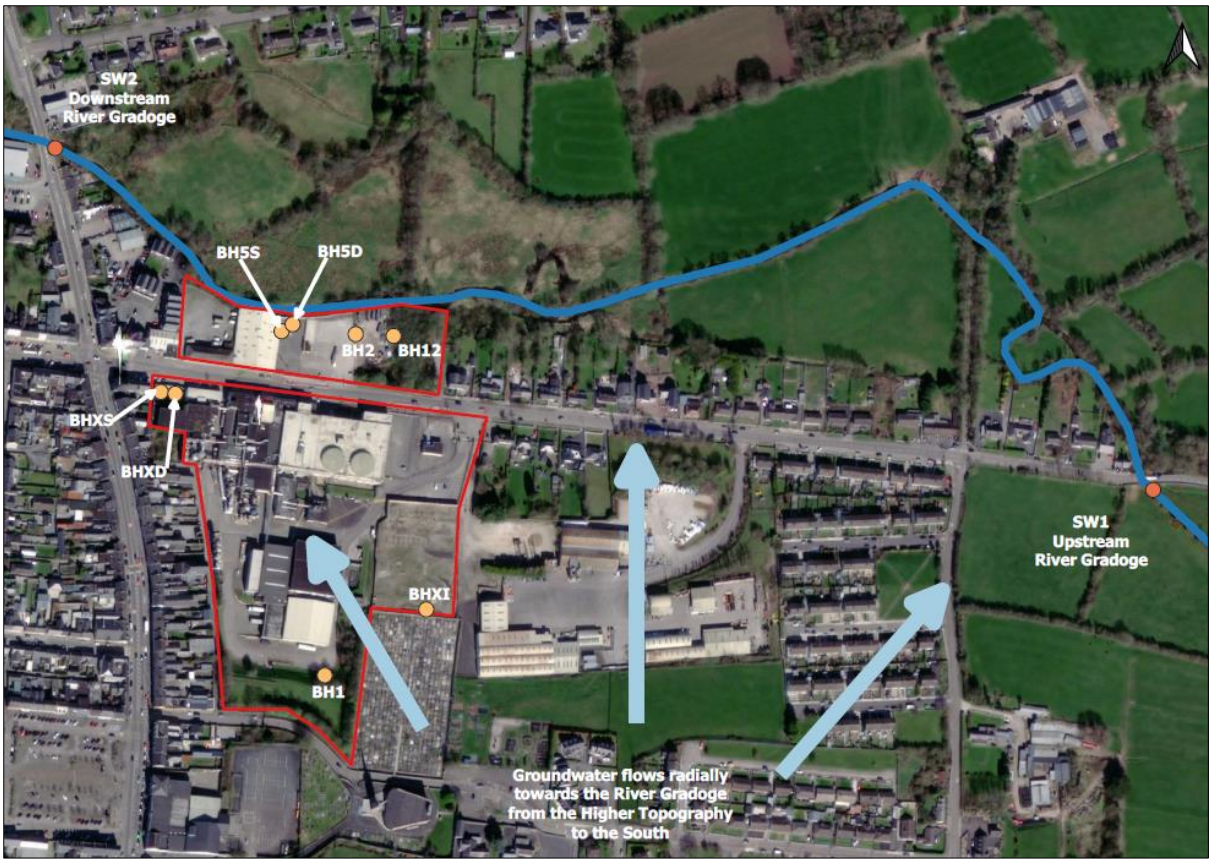


Figure 2 - Clonmel Road Groundwater Monitoring Network

1.4. ENVIRONMENTAL SETTING

Topography – Castlefarm

The landscape falls gently from the south (140 mOD) to the north along the top of an escarpment at 90-100 mOD. The main processing area of the Castlefarm Complex is located at an elevation of 85 – 95 mOD. The landfill, effluent plant and River Gradoge are located in a steep, narrow valley, bounded to the south by a subvertical escarpment at 70 – 80 mOD.

The present day location of the Castlefarm Complex was once the site of Mitchelstown Castle and Estate. The castle was demolished to make way for the industrialisation of the site in the late 1920s/early 1930s.

The estate housed several ornamental fish ponds along the banks of the River Gradoge. A famine grave yard is present onsite, which has been shielded from industrialisation.

Topography – Clonmel Road Complex

The Clonmel Road complex slopes gently from 100 mOD northwards down to the River Gradoge floodplain at c. 95 mOD (OSI, 2020).

OSI Historical Mapping shows the southern portion of the Clonmel Road Complex was once occupied by a brewery and thereafter a creamery/milk processing plant, up to the present day (OSI, 2022

The OSI 6 inch Cassini mapping shows a Mill Race from the River Gradoge, originating in the east and running westwards parallel to the R665 road. The Mill Race appears to have once occupied the northern portion of the now work shop and car park/HGV parking area of the Clonmel Road Complex.

A review of aerial imagery from 2022 shows that the Mill Race has been progressively filled in over the past few decades with increasing urban development along the R665/R513.

Subsoil – Castlefarm Complex

The GSI Quaternary mapping shows the subsoils around the Castlefarm Complex to be dominated by Till derived from Devonian sandstones. A band of alluvium is mapped along the flood plain of the River Gradoge, deposited by the river in historic times during flooding. Groundwater monitoring well drilling has confirmed the GSI mapping. The vast majority of the footprint of the Castlefarm Complex is now covered in paving (concrete or tarmac). A small area around the effluent treatment plant has been repaved with compacted 804 fill material.

Subsoil – Clonmel Road Complex

The vast majority of the footprint of the Clonmel Road complex is covered in paving (concrete or tarmac). The GSI Quaternary mapping shows the regional subsoil to be dominated by Till derived from Devonian sandstones. A band of alluvium is mapped along the flood plain of the River Gradoge, which was deposited by the river in historic times during flooding. A gravel lens was encountered in boreholes extending from the River Gradoge southwards to BH12 and BHXD. The thickness of the gravel lens is variable; however a review of the drill logs shows that the lens is water bearing.

Bedrock Geology – Castlefarm

The Castlefarm Complex is underlain by the Rathronan, Croane and O'Mahonys Rock Formation. These formations consist of limestone.

The site is located on a regional fault zone, running east – west. It is possible that the fault may coincide with the escarpment. A second fault zone is mapped to the east of the Castlefarm Complex, striking north – south which has juxtapositioned several formations across the region.

Pure bedded limestones (Rathronan/O'Manhony Fm) are more susceptible to karstification, than the impure limestone (Croane Fm). It is possible that karstification has enhanced the permeability of the limestone within the Rathronan/O'Manhony Formations.

Bedrock Geology – Clonmel Road

The Croane Formation is mapped as underlying the Clonmel Road Complex. This formation consists of dark shale and fine cherty limestone (GSI, 2022). The drill logs confirm the GSI bedrock mapping; however localised areas of dolomitization were identified during the groundwater monitoring well drilling at BHXI and BH5D.

The Rathronan Formation (CDRATH) which consists of pale-grey, massive, muddy limestone is mapped in contact with the Croane Formation to the north and south of the Clonmel Road Complex.

A large north – south striking fault is mapped <400 m to the west of the Clonmel Road Complex (GSI, 2022). An anticline axis is mapped striking west – east on the site.

The bedrock is expected to be highly fractured and broken as a result of folding and faulting. This will in turn allow for the development of pathways for the movement of groundwater within the bedrock.

Regional Hydrogeology

The Castlefarm and Complex Road Complex are located in the Mitchelstown Groundwater Body (GWB), the characteristics of which are summarised below:

The Mitchelstown GWB (IE_SW_G_082) was assigned a poor status for the 2013-2018 WFD monitoring and assessment period. The GWB is deemed to be ''at risk'' of not achieving good status in the next monitoring period. The 3rd Cycle of the Blackwater Munster Catchment Report (draft, Feb. 2022) identified agriculture and forestry as significant pressures on the Mitchelstown GWB.

Local Hydrogeology – Castlefarm Complex

A **Locally Important Aquifer** (LI) is located directly south of the main processing area.

The northern and southern portions of the Castlefarm Complex are mapped as **Regionally Important Aquifers** (RkD) which have undergone karstification.

The generalised groundwater flow direction is expected to be south – north for the Castlefarm Complex, towards the River Gradoge.

The River Gradoge is likely the main discharge zone for deeper, regional groundwater flow. It is likely that significant base flow occurs to the river during and after periods of rainfall. The Mill Stream will also intercept a minor component of baseflow from the regionally important aquifer along its southern bank.

Numerous ephemeral natural springs are known to emerge after prolonged periods of rainfall at the base of the escarpment, and are captured in the Mill Stream. The spring discharges are intermittent and are understood to be associated with rainfall.

Local Hydrogeology – Clonmel Road Complex

The Clonmel Road Complex is located in a **Locally Important Aquife**r - Bedrock which is Moderately Productive. The gravel deposits encountered in BHXS, BHXD, BH12, BH2 and BH5D do not constitute an aquifer in terms of a groundwater resource

The Clonmel Road Complex is located on the northern slope of an area of topographically high ground, which falls towards the River Gradoge from the west, around to the south east. The River Gradoge is the main controlling feature in terms of the groundwater flow direction.

Plotting reduced groundwater levels shows the groundwater flow is from the South East (BHXI/BH1) towards the North West (BH5S/BH5D). The groundwater flow on the Clonmel Road Complex is generally towards the River Gradoge where it will discharge as baseflow.

Groundwater is expected to discharge upwards into the gravels from the underlying bedrock aquifer. Upwelling into the gravel will rapidly exhaust any storage within the gravels and the gravels will discharge groundwater to the River Gradoge as baseflow. Therefore, the River Gradoge is considered to be a discharge boundary for groundwater flow in the bedrock aquifer and the subsoil underlying the northern portion of the Clonmel Road Complex

Groundwater Vulnerability – Castlefarm Complex

The mapped groundwater vulnerability on the Castlefarm Complex increases from moderate to extreme, moving from south to north towards the edge of the escarpment where bedrock is exposed.

The moderate groundwater vulnerability rating for the southern portion of the site/agricultural lands is confirmed by the presence of 13 m of moderately permeable till overlying bedrock at BH9.

The majority of the site is covered in an impermeable surface (reinforced concrete or tarmac). Therefore, the risk of groundwater contamination from activities above ground is considered low.

Groundwater Vulnerability – Clonmel Road Complex

The GSI vulnerability mapping shows the Clonmel Road complex is mapped as High Groundwater Vulnerability based on the nature and thickness of the subsoils. Site specific ground investigation data confirms the groundwater vulnerability mapping.

The majority of the site is covered in an impermeable surface (reinforced concrete or tarmac). Therefore, the risk of groundwater contamination from activities above ground is considered low due to a large covering of an impermeable surface

Hydrology

The Castlefarm and Clonmel Road Complexes are located in the Blackwater (Munster) catchment (HA: 18). Locally, the sites are located within the Funshion sub-catchment (010).

The River Gradoge (IE_SW_18G130200) flows along the northern boundary of both plants. The River Gradoge flows westwards and discharges to the River Funshion. The River Funshion is a tributary of the River Blackwater (Munster), which discharges to the Celtic Sea in Youghal, Co. Cork

The most recent assessment of the River Gradoge by the EPA Catchment Science Unit assigned a ''poor WFD status'' to the River Gradoge, and it is deemed to be at risk of not achieving ''good status'' in the next monitoring period.

The River Gradoge is known to receive discharges of combined sewer overflows from the Irish Water municipal mains sewer throughout the wider urban area of Mitchelstown.

The 3rd Cycle of the Blackwater Munster Catchment Report (draft, Feb. 2022) has flagged combined sewer overflows as a significant pressure (urban pressure) on the River Gradoge's water quality. The report states that the municipal drainage network and Mitchelstown WWTP treatment plant are due to be upgraded in 2024.

The Irish Water Mitchelstown Wastewater Treatment Plant is located on the northern bank of the River Gradoge, opposite the Dairygold effluent plant. The treated effluent from both the Dairygold effluent plant and the Irish Water Plant are discharged through a pipeline to the River Funshion.

The overflow/spillway for the Irish Water Mitchelstown WWTP is located on the opposite bank to the Dairygold effluent plant.

1.5. PROJECT OBJECTIVES

The project objectives are as follows:

- Collect samples of groundwater and surface water at the frequency specified by the EPA.
- Analysis of the samples collected for the parameters listed on the EPA Licence No. P0404-02.
- Monitor the groundwater quality on and in the immediate vicinity the Castlefarm Complex and Clonmel Road Complex.

- Assess trends in COPCs to establish if there is an improvement in water quality.
- Monitor the River Gradoge to establish if the licenced activities are impacting on its water quality.

2. SAMPLING PROTOCOL

2.1. SAMPLING PROCEDURE

The wells were sampled as follows:

1. Assess the well head condition (check for cracks, vandalism and damage).
2. Measure the water level – the top of the plastic casing is used as a datum reference point.
3. Measure the depth of the monitoring well.
4. Set up pump – for flush cover wells a submersible Wattera Wasp Pump was deployed.

   For wells with a metal casing up stand/'stick up' – a PP1 Petrol Power Pack Pump was used to collect the sample. The PP1 Power Pack Pump attaches to dedicated submersible tubing installed in each well. The dedicated submersible tubing prevents cross contamination between wells.

   Refer to Table 2 for further details.
5. Calculation of the well volume to purge.
6. Preparation of bottles for sample collection.
7. Purge three times the volume of the water contained in the well.
8. Collection of pH, temperature and electrical conductivity readings for every 10 litres of water purged from the well. The colour, odour and turbidity are recorded at the time of sample collection.
9. Using sterile techniques, the sample bottles are filled.
10. All equipment is sterilised using Decon 90 to prevent cross contamination between wells.

Surface water samples are collected using a grab sampler with sterile procedures adhered to.

The following bottles are supplied by Dairygold for sampling: 1 litre plastic bottle and a 250 ml sterile bottle (for biological analysis).

The bottles required for the analysis completed by Element Materials Technology Laboratories are: a 500 ml plastic bottle, a 500 ml plastic BOD bottle, a 250 ml bottle with nitric acid (filtered onsite), a 500 ml green glass bottle, and two 40 ml glass vials.

Table 2 outlines the pump required for sample collection.

Table 2 – Pumps Required for Specific Boreholes

Pump Type	Borehole
PP1 Power Pack	BH3; BH4; BH9 Obtain final sample from BH4 with bailer
Wasp Pump	BH7; BH8; BH10; BH11 BH1; BH2; BH5S; BHXS; BHXI, BH5D
Raw Water Sample Tap in Pump House	BH6

2.2. LABORATORY ANALYSIS

The samples are dropped off at the Effluent Plant Managers office, and placed in a fridge for delivery to the Dairygold laboratory at Clonmel Road.

Samples which are analysed by Element Materials Technology are placed in a secure cooler box with frozen icepacks and a temperature blank, for delivery to Deeside, UK by an overnight express courier. To ensure the samples are delivered within the required holding time, an overnight courier service is used to transport the samples to the laboratory. Element Materials Technology is a UKAS accredited laboratory.

BOD analysis is subcontracted to Tel Labs, Tullow, Co. Carlow by Element Materials Technology. IE Consulting deliver the BOD samples to Tel Labs after sampling.

The laboratory also reports a visual (colour), odour and turbidity assessment in a qualitative context prior to the samples undergoing analysis. These parameters are also recorded on site, at the time of sample collection by the hydrogeologist.

Table 3 outlines the laboratories which completed the analysis for each parameter.

Table 3 – Laboratory Analysis Schedule

Dairygold Internal Laboratory Mitchelstown, Co. Cork	Element Materials Technology Laboratory Deeside, UK	Tel Labs Tullow, Co. Carlow
Odour Colour Turbidity Orthophosphate as PO_4 Chloride Nitrate as N Total Ammonia as N pH Electrical Conductivity Chemical Oxygen Demand (COD) Coliforms E. Coli Entero Bacteria	Manganese Nickel Potassium Sodium Sulphate as SO_4 Chloride Total Nitrogen Biological Oxygen Demand (BOD) Extractable Petroleum Hydrocarbons (EPH) with banding	Biological Oxygen Demand (BOD)

Nitrate is reported as Nitrate as N. This is converted to Nitrate as NO_3, for screening against the relevant threshold values.

Certificates of Laboratory Analysis are contained in Appendix D.

2.3. DATA MANAGEMENT

Dairygold Mitchelstown sends the laboratory results electronically to IE Consulting where they are first checked by a hydrogeologist for any inconsistencies in analysis. The results are then input to a database, maintained by IE Consulting, at their offices in Carlow. A back up of the database is maintained at all times, in case of file corruption.

All field sheets tabulated with data collected on site (water level, depth of well, pH, temperature, electrical conductivity, visual/olfactory observations) are archived and stored for future reference.

Historical Groundwater Monitoring Data is contained in Appendix B.

Historical Surface Water Monitoring Data is contained in Appendix C.

2.4. COMPARSION TO REGULATIONS

The results of the groundwater analysis were compared to the following regulations:

- S.I. No. 366/2016 - European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016.
- Environmental Protection Agency (EPA) Interim Guideline Values (IGVs) 2003.

The results of the surface water analysis were compared to the following regulations:

- S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009
- S.I. No. 77/2019 - European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019

Dairygold employ voluntary threshold values, across the site for the following parameters:

- BOD (groundwater): 10 mg/l
- COD (groundwater): 25 mg/l

Where a result exceeded more than one standard/guideline, then the result was highlighted against the lower (more stringent) standard.

Historical Groundwater Monitoring Data tabulated to the relevant regulations is contained in Appendix B

Historical Surface Water Monitoring Data tabulated to the relevant regulations is contained in Appendix C.

2.5. REPORTING

IE Consulting prepare a report on the monitoring, and issue to the Effluent Plant Manager at Dairygold, Mitchelstown for review.

3. RESULTS & DISCUSSION OF MONITORING PROGRAMME

3.1. WATER LEVELS & UNSTABLE HYDROCHEMICAL PARAMETERS

The onsite unstable hydrochemical parameters recorded onsite at the time of sample collection are presented in Table 4.

The water level data presented are reduced water levels.

The datum's for the monitoring network were referenced from the *Updated Hydrogeological Risk Assessment* by OCM (November 2020) for the Castlefarm and Effluent Plant Complex.

The datum's used to calculate reduced groundwater levels for the Clonmel Road were referenced from the February 2017 report by Hidrigeolaiocht Ui Chonair Teo – *Follow up Response to EPA Comments on the Technical Amendment B Hydrogeological Assessment after Completion of Additional Site Investigation*.

Table 4 –Water Levels & Unstable Hydrochemical Parameters.

Monitoring Period	Monitoring Point	Date	Sample Type	Complex	Water Level (MOD)	Total Depth (mbtoc)	Temperature (°C)	Electrical Conductivity (uS/cm)	pH (pH units)	Visual, Odour & Turbidity Assessment (at time of sample collection)
Q3 2022	**BH3 #**	25/08/2022	Groundwater	**Castlefarm**	77.00	22.25	16.2	955	8.21	Brown, no odour, no sheen, moderate turbidity
	BH4	25/08/2022			**83.77**	37.08	13.8	3999 ∞	7.28	Clear with strong black hue. Oily sheen and oily odour noted. Globules of free product visible on surface of purged standing water with iridescent sheen. No turbidity evident.
	BH6	25/08/2022			~	~	16.6	603	7.14	Clear, no odour, no sheen, no turbidity
	BH7	24/08/2022			75.58	12.80	14.1	737	7.75	Milky grey, highly turbid, no odour, no sheen
	BH8	24/08/2022			77.21	6.30	15.3	635	7.47	Clear, no odour, no sheen, no turbidity
	BH9 #	25/08/2022			81.39	26.08	12.0	986	7.53	Milky grey, no odour, no sheen and highly turbid
	BH10	24/08/2022			76.49	9.82	13.5	638	7.33	Clear, no odour, no sheen, no turbidity
	BH11	24/08/2022			79.10	8.00	12.2	1661	7.02	Clear, no turbidity, no sheen, slight ammonia odour
	BH1	24/08/2022	Groundwater	**Clonmel Road**	84.81	8.23	11.9	702	7.25	Clear, slightly turbid, no odour, no sheen
	BH2	24/08/2022			80.92	9.44	13.5	935	6.85	Clear, no odour, no sheen, no turbidity
	BHXS	24/08/2022			81.94	4.30	16.2	769	6.71	Clear, no odour, no sheen, no turbidity
	BH5S	24/08/2022			80.61	4.71	15.2	894	6.81	Clear with black hue, no turbidity, no odour, no sheen
	BH5D	24/08/2022			80.47	10.34	13.7	531	6.89	Clear, no odour, no sheen, no turbidity
	BHXI	24/08/2022			84.27	19.00	12.6	737	7.17	Milky grey, highly turbid, no odour, no sheen
	SW1	24/08/2022	Surface Water	**River Gradoge**	-	-	15.4	317	8.09	Clear, no odour, no sheen, no turbidity
	SW2	24/08/2022			-	-	15.2	386	8.63	Clear, no odour, no sheen, no turbidity
	SW3	24/08/2022			-	-	14.4	422	8.15	Clear, no odour, no sheen, no turbidity
	SW4	24/08/2022			-	-	14.3	420	8.13	Clear, no odour, no sheen, no turbidity
	SW5	24/08/2022			-	-	14.8	421	8.23	Clear, no odour, no sheen, no turbidity

*Sampled by effluent plant manager – no onsite hydrochemical data available

Went dry – left recover and collected sample

∞ Max (upper) limit of detection of water quality probe used on site – true value is greater than value reported

~ Production well – pumped water level and depth of well unknown. Sample collected from tap at well head.

The reduced water level data collected in Q3-2022 shows that there is a localised groundwater mound or groundwater high in the vicinity of BH4.

The monthly rainfall data for Q3-2022 is outlined in Table 5. The data is from Teagasc Moore Park, in Fermoy, Co. Cork c. 16 km south of Mitchelstown (Met Eireann, 2022).

Table 5 – Rainfall Data (Met Eireann, 2022)

Quarter	Month	Month (mm)	Long Term Average (mm)
Q3-2022	June 2022	73.4	69.3
	July 2022	33.5	62.0
	August 2022	27.6	83.6

Rainfall for June 2022 was slightly above the long term average.

Rainfall for July and August 2022 was significantly below the long term average.

3.2. CASTLEFARM COMPLEX – PERIPHERAL MONITORING POINTS

The Castlefarm Complex is surrounded by wells outside the main processing area: BH6, BH9 and BH7. These monitoring points generally display good groundwater quality.

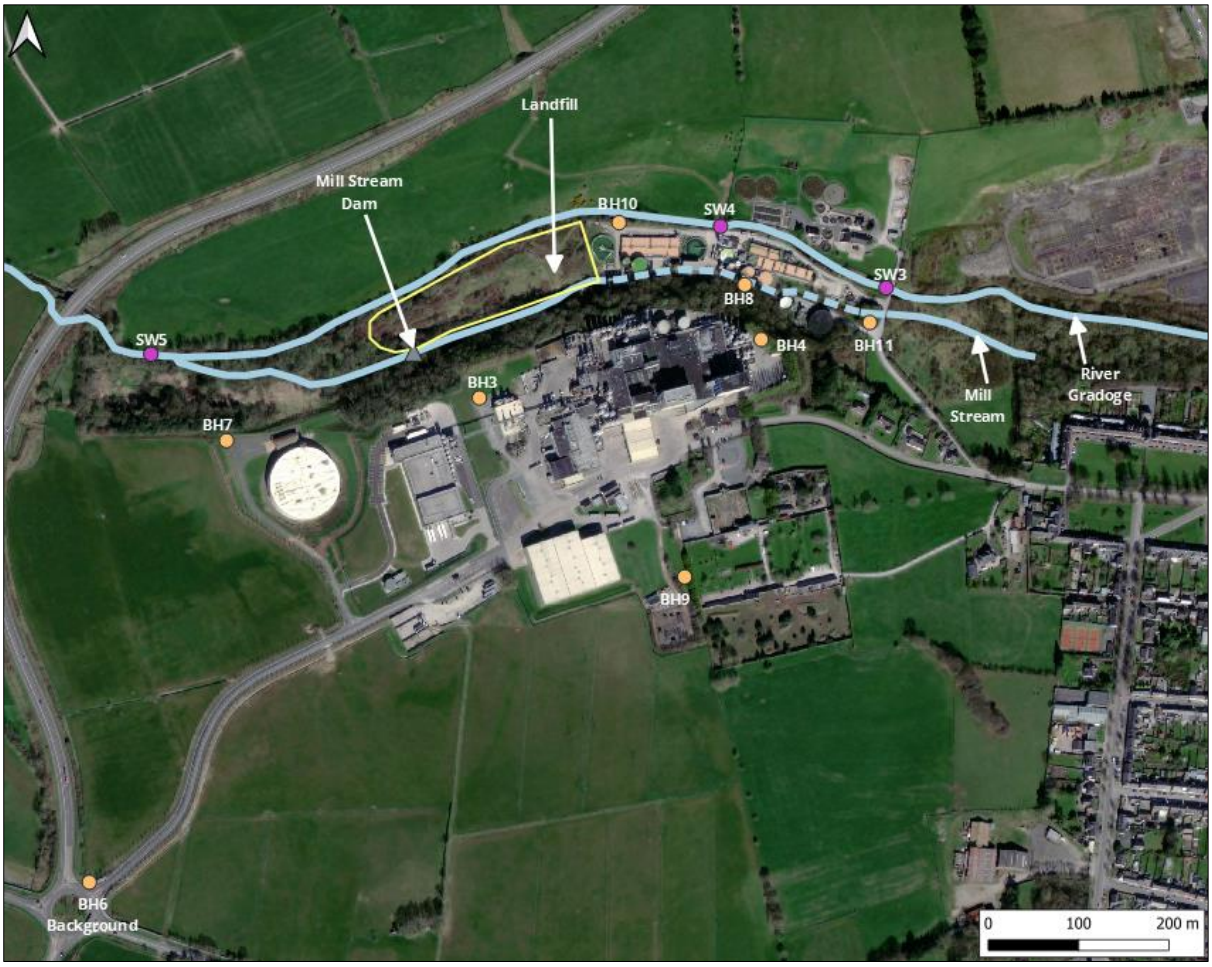


Figure 3 – Castlefarm Complex Groundwater Monitoring Network

Historical Groundwater Monitoring Data is contained in Appendix B.

Hydrochemical parameters, water levels and well depths are outlined in Table 4.

3.2.1. BH6

BH6 is considered to be up hydraulic gradient of the Castlefarm Complex. This borehole is actively pumped as a water supply well to the Castlefram Complex. The well is located within a pump house, just off the site access road from the N73.

Ammonia has been reported as stable, at 0.02 mg/l in BH6, since Q1-2021. Ammonia has been reported below the GTV of 0.065 mg/l since Q4-2020.

Electrical Conductivity was reported at 531 uS/cm in Q3-2022. Electrical Conductivity has been reported below the SI366/2016 lower GTV of 800 uS/cm since monitoring commenced in February 2007. Overall, Electrical Conductivity is fluctuating.

Orthophosphate was reported at 0.10 mg/l, slightly below the SI366/2016 TV of 0.107 mg/l.

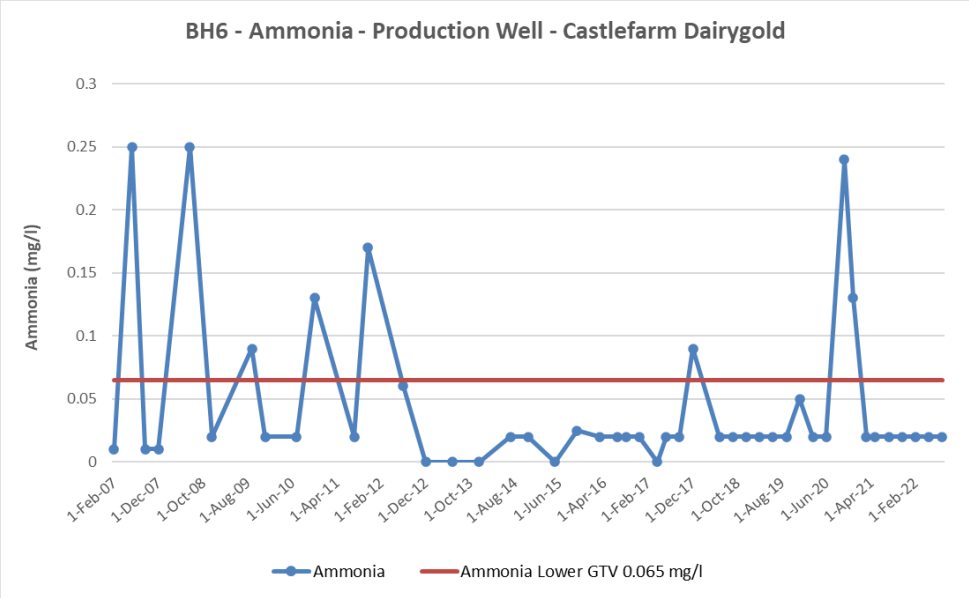
Chloride was reported at 51.8 mg/l in Q3-2022. This is elevated, as typical background chloride concentrations in Irish aquifers generally range from 20 – 30 mg/l. However, as BH6 is a production well which supplies water for processing, the reported concentration is below the 250 mg/l drinking water threshold value. Chloride may be slightly influenced by road salting on the adjacent N73 road.

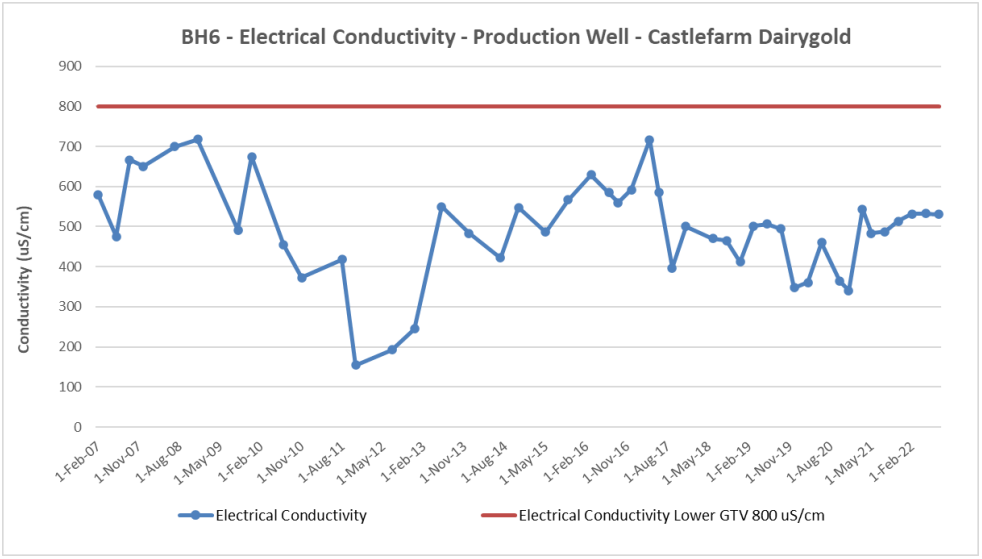
The sodium – potassium ratio is a good indicator of groundwater quality. A ratio of >0.4 indicates contamination by soiled water. The ratio was calculated as 0.07 which suggests the groundwater is free from contamination by septic tanks and organic wastes.

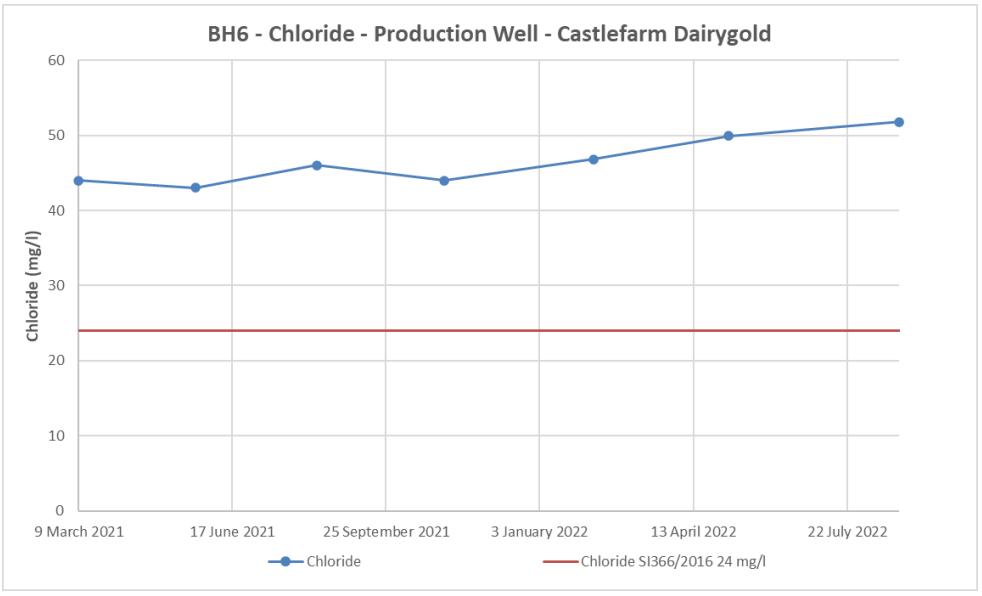
Potassium was reported at back background concentrations (1.4 mg/l).

Sodium was reported at 21.3 mg/l, slightly above the general background concentration of 10 – 15 mg/l for Irish aquifers.

Overall, the water quality continues to be reported as good at BH6.


BH6 - Ammonia - Production Well - Castlefarm Dairygold
Ammonia (mg/l)
0.3
0.25
0.2
0.15
0.1
0.05
0
1-Feb-07
1-Dec-07
1-Oct-08
1-Aug-09
1-Jun-10
1-Apr-11
1-Feb-12
1-Dec-12
1-Oct-13
1-Aug-14
1-Jun-15
1-Apr-16
1-Feb-17
1-Dec-17
1-Oct-18
1-Aug-19
1-Jun-20
1-Apr-21
1-Feb-22
Ammonia
Ammonia Lower GTV 0.065 mg/l


BH6 - Electrical Conductivity - Production Well - Castlefarm Dairygold
Conductivity (uS/cm)
900
800
700
600
500
400
300
200
100
0
1-Feb-07
1-Nov-07
1-Aug-08
1-May-09
1-Feb-10
1-Nov-10
1-Aug-11
1-May-12
1-Feb-13
1-Nov-13
1-Aug-14
1-May-15
1-Feb-16
1-Nov-16
1-Aug-17
1-May-18
1-Feb-19
1-Nov-19
1-Aug-20
1-May-21
1-Feb-22
Electrical Conductivity
Electrical Conductivity Lower GTV 800 uS/cm


BH6 - Chloride - Production Well - Castlefarm Dairygold
Chloride (mg/l)
60
50
40
30
20
10
0
9 March 2021
17 June 2021
25 September 2021
3 January 2022
13 April 2022
22 July 2022
Chloride
Chloride SI366/2016 24 mg/l

3.2.1. BH7

BH7 was installed in 2016. This is located west of the milk processing plant, adjacent to the anaerobic digester plant. Historically, a piggery, holding tanks and a farm yard were located in the general area south of the current anaerobic digester. Monitoring commenced in March 2017. Overall, the water quality at BH7 is good.

Ammonia was reported at 0.02 mg/l in Q3-2022, which is low. Overall, ammonia fluctuates at BH7.

Electrical Conductivity was reported at 676 uS/cm in Q3-2022. Electrical conductivity has been reported below the SI366/2016 TV of 800 uS/cm since Q1-2018. Electrical conductivity is displaying a semi stable trend.

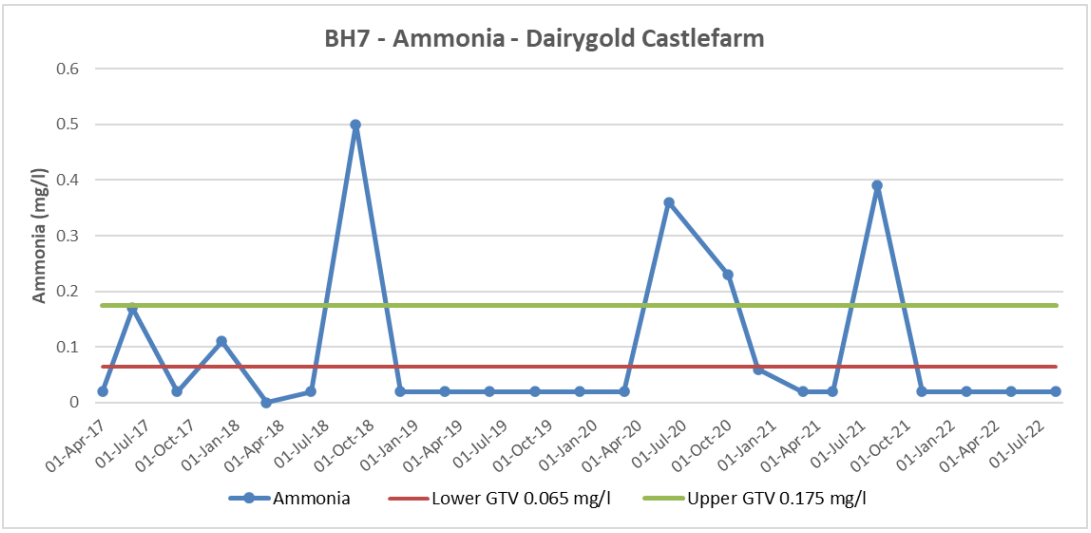
Orthophosphate was reported at 0.07 mg/l in Q3-2022, which is below the SI366/2016 GTV of 0.107 mg/l.

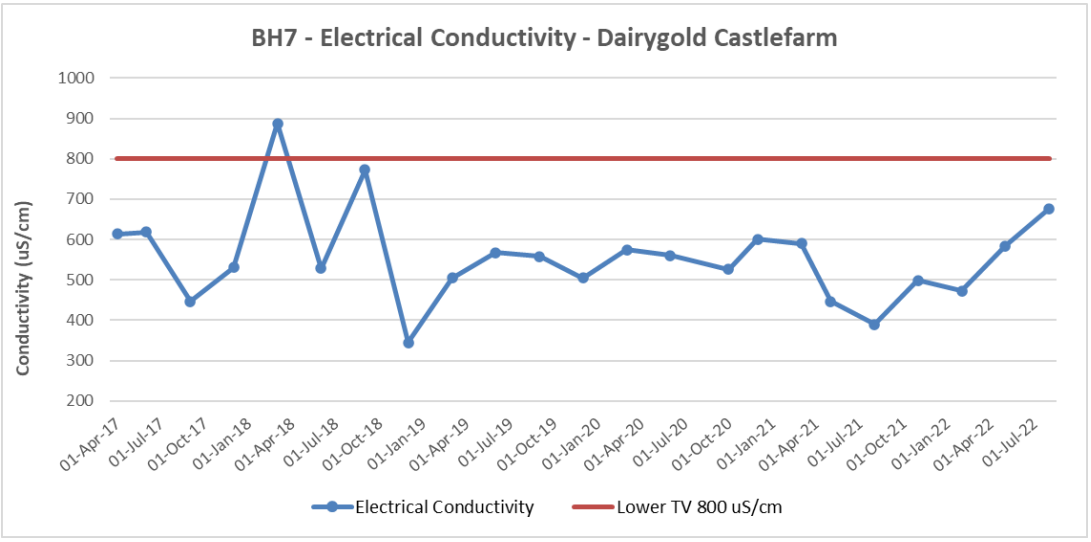
Chloride was reported at 24.4 mg/l which is low, in comparison to the background concentration of 51.8 mg/l.

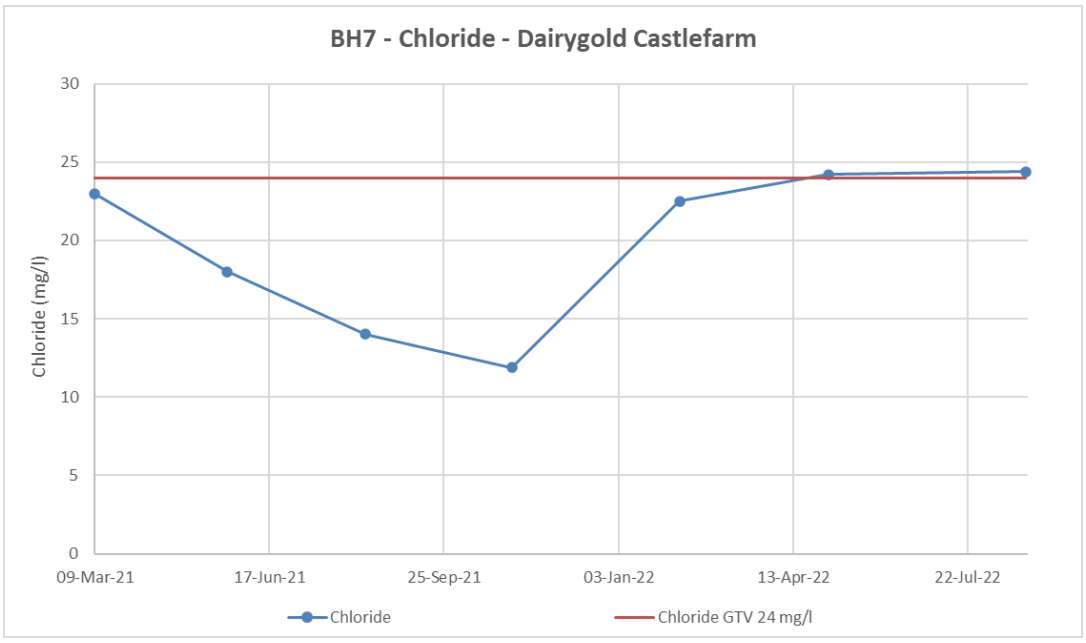
Sodium was reported at 113.7 mg/l in Q3-2022, which is elevated when compared to the background concentration of 21.3 mg/l at BH6.

Coliforms, E. Coli and Entero were reported at BH7 in Q2-2022.

Hydrocarbons were not detected at BH7 in Q2-2022.


BH7 - Ammonia - Dairygold Castlefarm
Ammonia (mg/l)
0.6
0.5
0.4
0.3
0.2
0.1
0
01-Apr-17
01-Jul-17
01-Oct-17
01-Jan-18
01-Apr-18
01-Jul-18
01-Oct-18
01-Jan-19
01-Apr-19
01-Jul-19
01-Oct-19
01-Jan-20
01-Apr-20
01-Jul-20
01-Oct-20
01-Jan-21
01-Apr-21
01-Jul-21
01-Oct-21
01-Jan-22
01-Apr-22
01-Jul-22
Ammonia
Lower GTV 0.065 mg/l
Upper GTV 0.175 mg/l


BH7 - Electrical Conductivity - Dairygold Castlefarm
Conductivity (uS/cm)
1000
900
800
700
600
500
400
300
200
01-Apr-17
01-Jul-17
01-Oct-17
01-Jan-18
01-Apr-18
01-Jul-18
01-Oct-18
01-Jan-19
01-Apr-19
01-Jul-19
01-Oct-19
01-Jan-20
01-Apr-20
01-Jul-20
01-Oct-20
01-Jan-21
01-Apr-21
01-Jul-21
01-Oct-21
01-Jan-22
01-Apr-22
01-Jul-22
Electrical Conductivity
Lower TV 800 uS/cm


BH7 - Chloride - Dairygold Castlefarm
Chloride (mg/l)
30
25
20
15
10
5
0
09-Mar-21
17-Jun-21
25-Sep-21
03-Jan-22
13-Apr-22
22-Jul-22
Chloride
Chloride GTV 24 mg/l

3.2.2. BH9

BH9 was installed in 2016. This is located to the south of the Castlefarm complex, and can be considered to be up-hydraulic gradient of the Castlefarm Complex. Monitoring commenced in April 2017. BH9 is positioned in an area where for a former farm yard and dung stead operated.

Ammonia was reported at 0.13 mg/l in Q3-2022, which is above the TV of 0.065 mg/l. Ammonia peaked in March 2019 (1.75 mg/l). Ammonia fluctuates at this monitoring point.

Electrical Conductivity was reported at 929 uS/cm in Q3-2022. The electrical conductivity value is above the 800 uS/cm TV. Electrical conductivity fluctuates at this monitoring point.

Nitrate as NO^3 was reported at 73.93 mg/l in Q3-2022, which is an increase from Q3-2022 (57.57 mg/l). Nitrate concentrations are in excess of the SI366/2016 TV of 37.5 mg/l and the SI122/2014 drinking water TV of 50 mg/l. Nitrate is displaying an upward trend and the Q3-2022 value is the highest reproted to date.

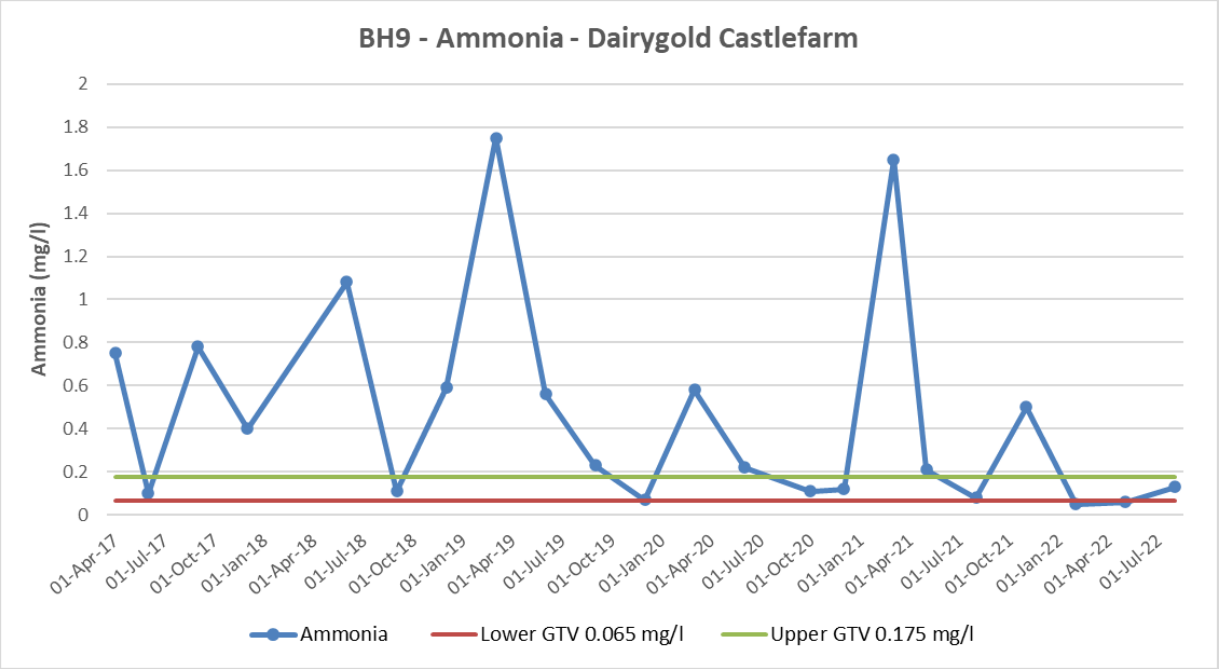
Orthophosphate was reported at 0.70 mg/l in Q3-2022, above the SI366/2016 TV of 0.107 mg/l.

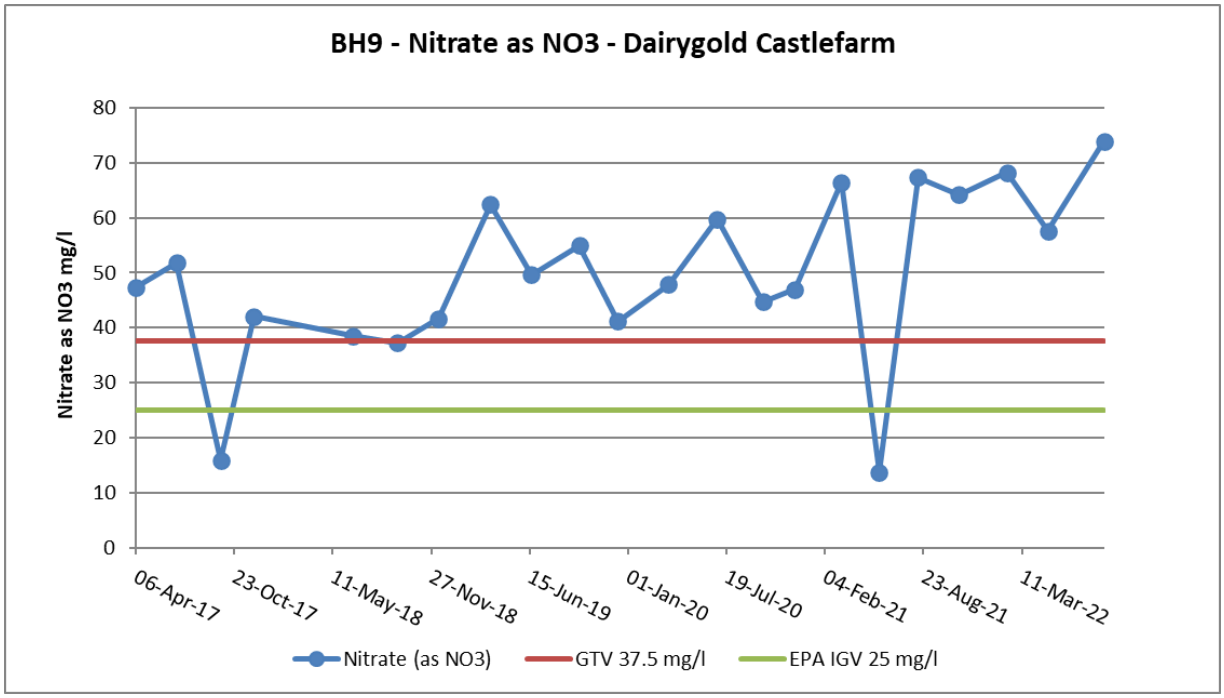
Chloride was reported at 23 mg/l in Q3-2022, which is low in comparsion to BH6 (51.58 mg/l). BH9 may be more representative of background chloride concentrations than BH6.

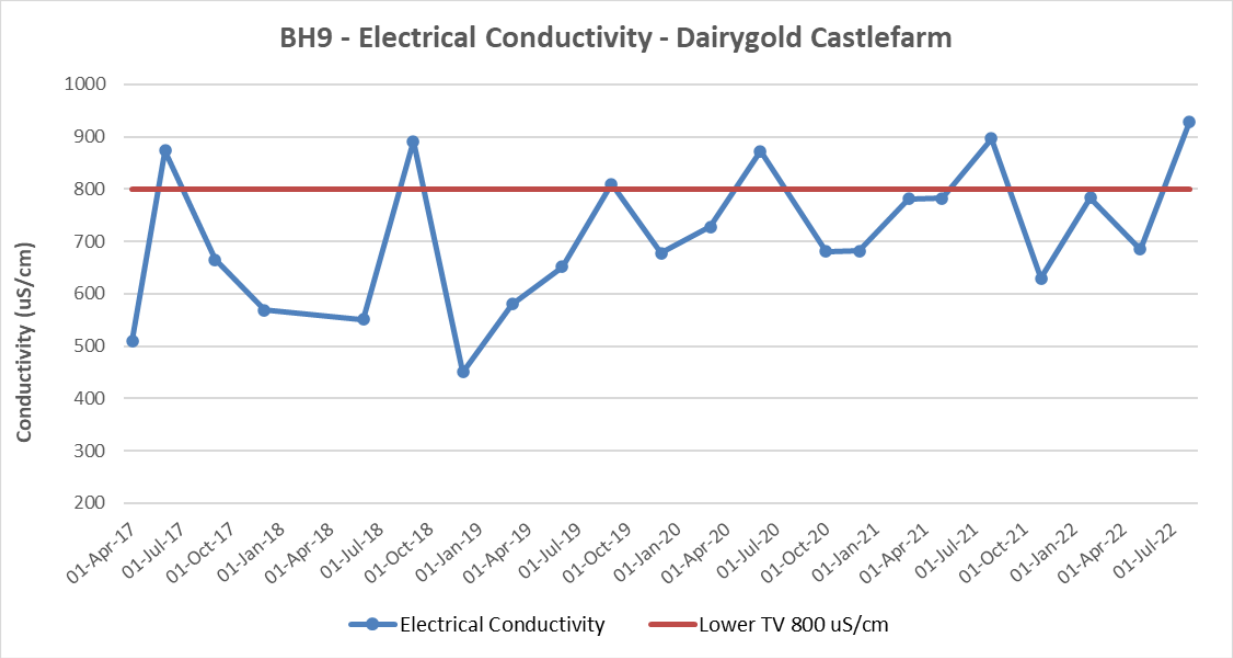
Potassium was reported at 36.6 mg/l in Q3-2022, up from 26.2 mg/l in Q2-2022. Potassium concentrations are significantly elevated at BH9 in comparison to the background concentration reported at BH6 (1.4 mg/l).

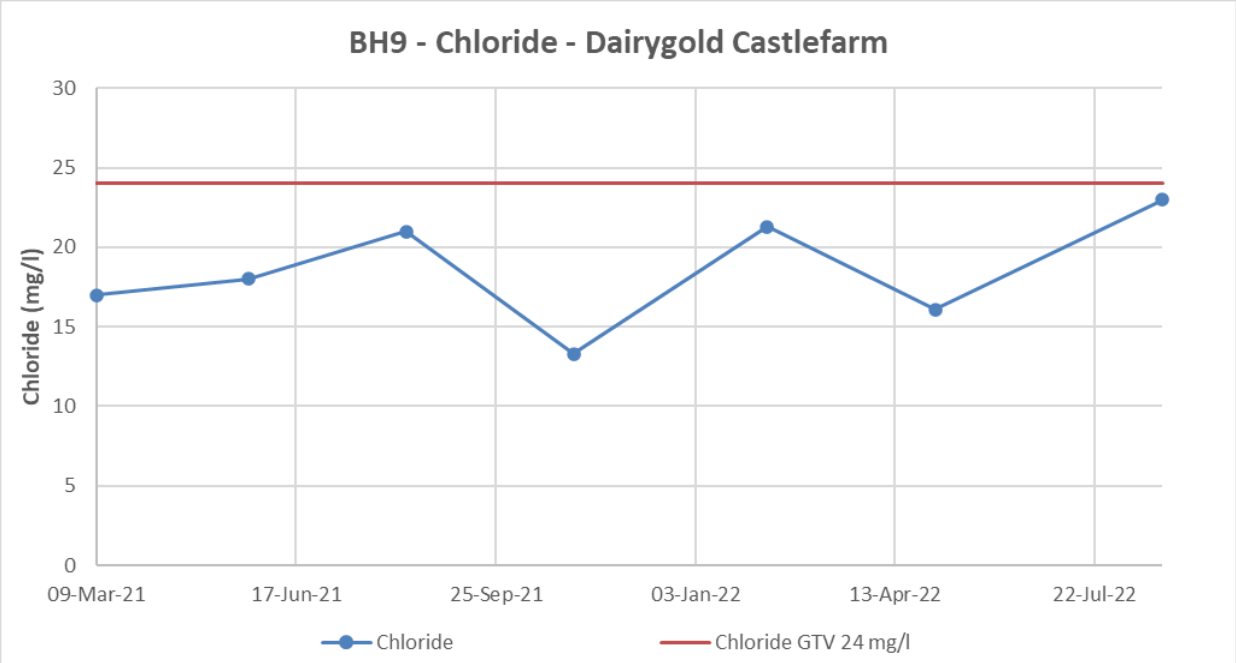
Coliforms, E. Coli and Enterobacteria were reported at BH9 in Q3-2022.

Hydrocarbons were not detected at BH9 in Q2-2022.


BH9 - Ammonia - Dairygold Castlefarm
Ammonia (mg/l)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
01-Apr-17
01-Jul-17
01-Oct-17
01-Jan-18
01-Apr-18
01-Jul-18
01-Oct-18
01-Jan-19
01-Apr-19
01-Jul-19
01-Oct-19
01-Jan-20
01-Apr-20
01-Jul-20
01-Oct-20
01-Jan-21
01-Apr-21
01-Jul-21
01-Oct-21
01-Jan-22
01-Apr-22
01-Jul-22
Ammonia
Lower GTV 0.065 mg/l
Upper GTV 0.175 mg/l


BH9 - Nitrate as NO3 - Dairygold Castlefarm
Nitrate as NO3 mg/l
80
70
60
50
40
30
20
10
0
06-Apr-17
23-Oct-17
11-May-18
27-Nov-18
15-Jun-19
01-Jan-20
19-Jul-20
04-Feb-21
23-Aug-21
11-Mar-22
Nitrate (as NO3)
GTV 37.5 mg/l
EPA IGV 25 mg/l


BH9 - Electrical Conductivity - Dairygold Castlefarm
Conductivity (uS/cm)
1000
900
800
700
600
500
400
300
200
01-Apr-17
01-Jul-17
01-Oct-17
01-Jan-18
01-Apr-18
01-Jul-18
01-Oct-18
01-Jan-19
01-Apr-19
01-Jul-19
01-Oct-19
01-Jan-20
01-Apr-20
01-Jul-20
01-Oct-20
01-Jan-21
01-Apr-21
01-Jul-21
01-Oct-21
01-Jan-22
01-Apr-22
01-Jul-22
Electrical Conductivity
Lower TV 800 uS/cm


BH9 - Chloride - Dairygold Castlefarm
Chloride (mg/l)
30
25
20
15
10
5
0
09-Mar-21
17-Jun-21
25-Sep-21
03-Jan-22
13-Apr-22
22-Jul-22
Chloride
Chloride GTV 24 mg/l

3.3. CASTLEFARM COMPLEX – MAIN PROCESSING AREA

A localised zone of contamination is present within the footprint of the main processing area, as identified in BH3, BH4, BH8 and to a lesser extent, BH11.

The plume of contamination originating in this area is migrating with groundwater flow both to the north and northwest. The groundwater flow dispersal is influenced by a groundwater mound around BH4.

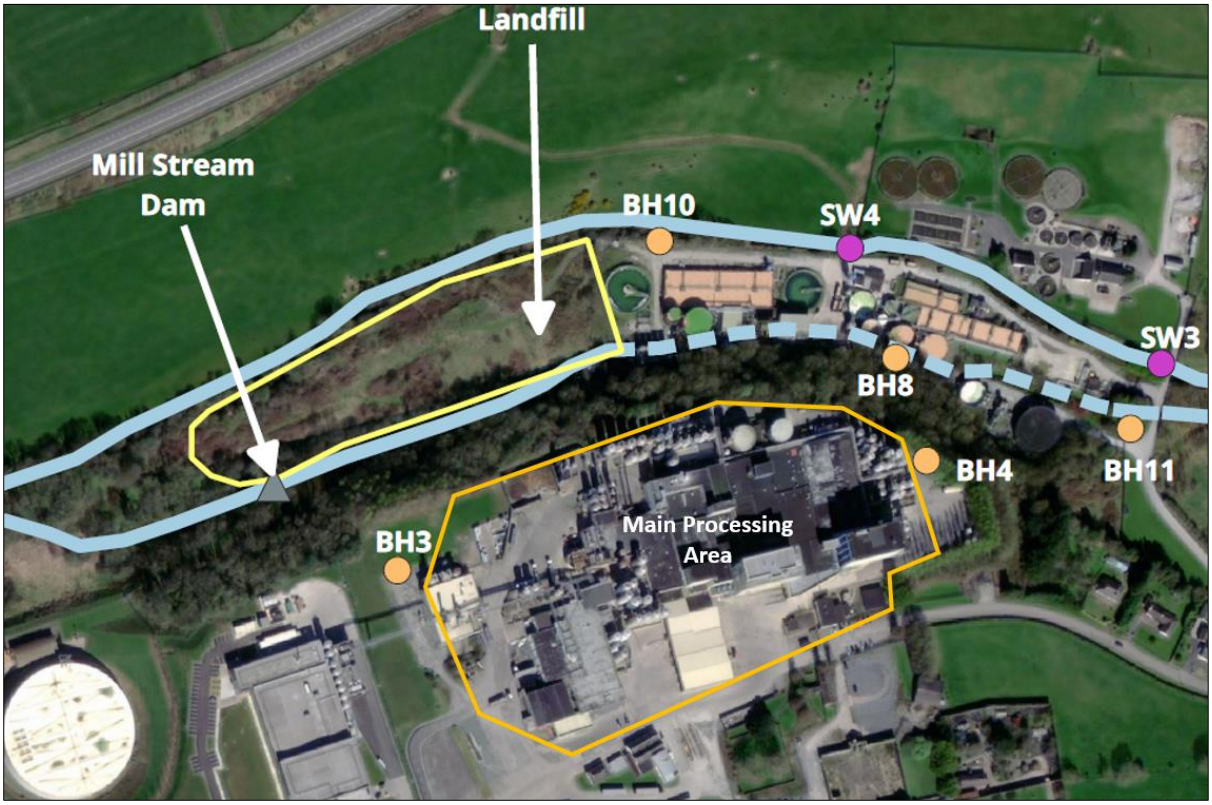


Figure 4 – Main Processing Area Monitoring Points

Historical Groundwater Monitoring Data is contained in Appendix B.

Hydrochemical parameters, water levels and well depths are outlined in Table 4.

3.3.1. BH3

BH3 is located to the north of the milk drying/processing plant, at the edge of the escarpment. It has shown considerably poor groundwater quality since monitoring commenced in February 2007. BH3 is to the west of BH4.

Ammonia was reported at 0.35 mg/l in Q3-2022. Ammonia has continually exceeded the GTV's since monitoring commenced. Ammonia peaked in December 2016 when 19 mg/l was reported. Ammonia concentrations fluctuate at BH3. However, an improvement in ammonia concentrations is emerging.

Total Nitrogen was reported at 1.24 mg/l for BH3 in Q3-2022.

Electrical Conductivity was reported at 851 uS/cm in Q3-2022. The Q3-2022 conductivity value slightly exceeded the lower TV of 800 uS/cm. Overall, since Q1-2017 conductivity has fluctuated below the upper GTV of 1875 uS/cm. The high chloride/sodium concentration is contributing to the elevated electrical conductivity reported at BH3.

Orthophosphate increased from 0.10 mg/l in Q3-2022, close to the TV of 0.107 mg/l.

Chloride was reported at **101.3 mg/l** in Q3-2022, down from 155.8 mg/l in Q2-2022. Overall, chloride concentrations are elevated, and fluctuate, with no apparent upward trend evident. Chloride is elevated in comparison to BH9 (23 mg/l).

Potassium was reported at **6.2 mg/l** in Q3-2022, which is slightly above the EPA IGV of 5 mg/l. Potassium is displaying a semi-stable trend.

Sodium was reported at **188.9 mg/l** in Q3-2022. This is above the EPA IGV of 150 mg/l, but significantly above the background concentration reported at BH6 (21.3 mg/l). Sodium is displaying a semi-stable trend.

Sulphate as SO_4 was reported at 22 mg/l in Q3-2022, down significantly from a peak of 176.5 mg/l in Q1-2021. Sulphate is used as part of the CHP operation. Elevated sulphate is attributed to a leaking sump associated with the CHP.

Manganese was reported as elevated, at **111 ug/l** - above the EPA IGV of 50 ug/l. This is attributed to the bedrock geology of the wider Castlefarm area but may be exaggerated by the localised contamination.

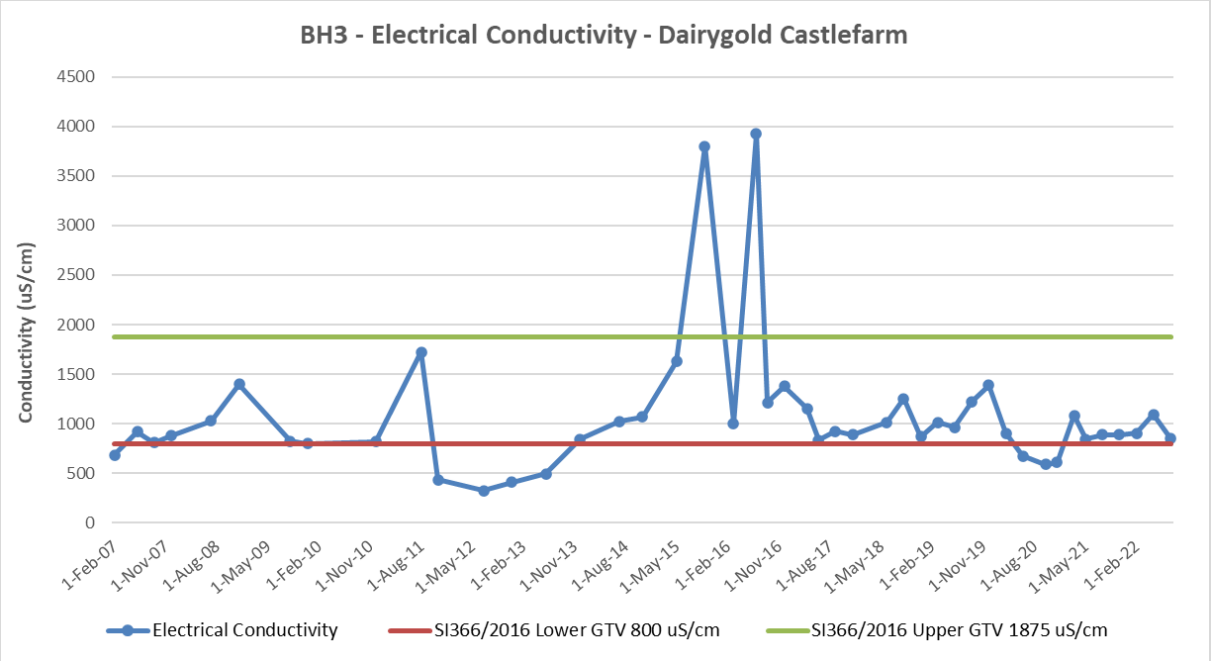
COD was reported at 50.8 mg/l, above the voluntary TV of 25 mg/l.

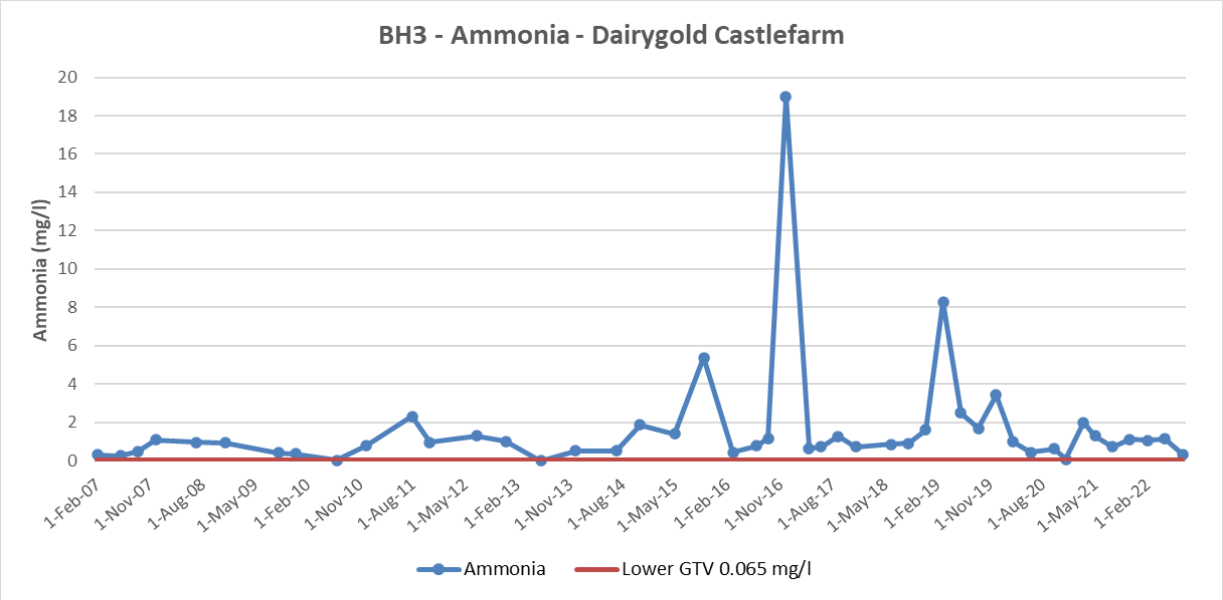
Nickel was reported at 33 ug/l in Q3-2022, which is in excess of the 20 ug/l EPA IGV.

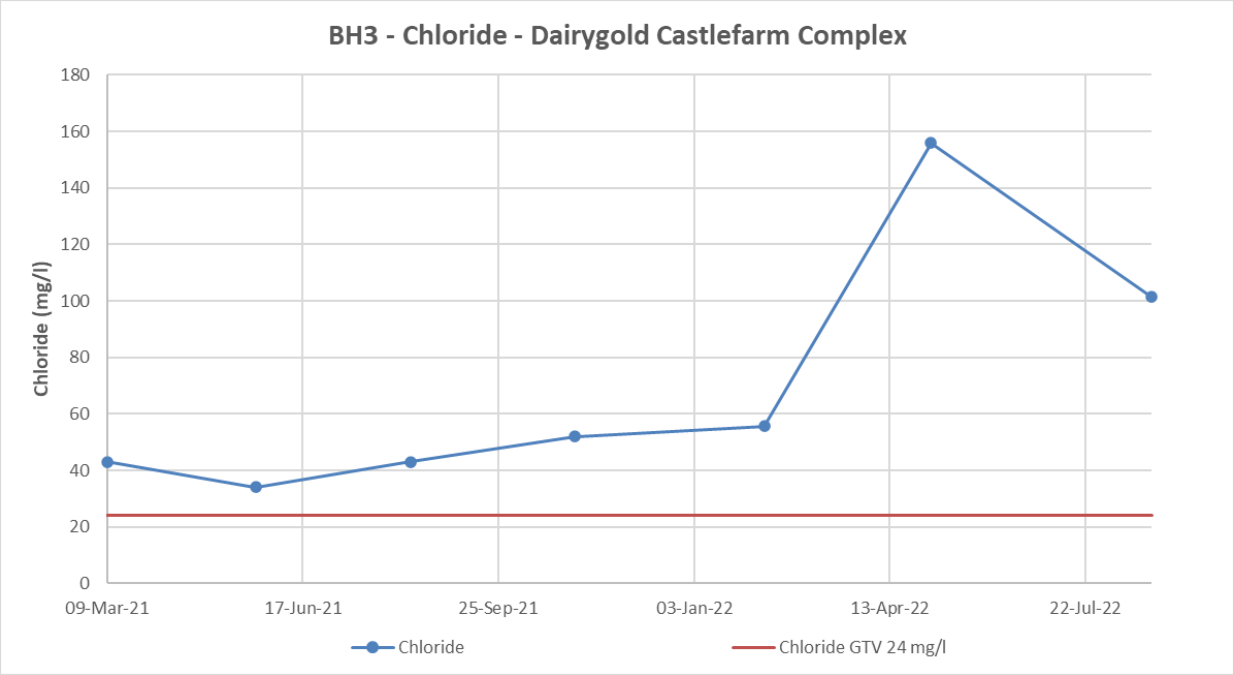
Hydrocarbons were not detected at BH3 in Q3-2022.

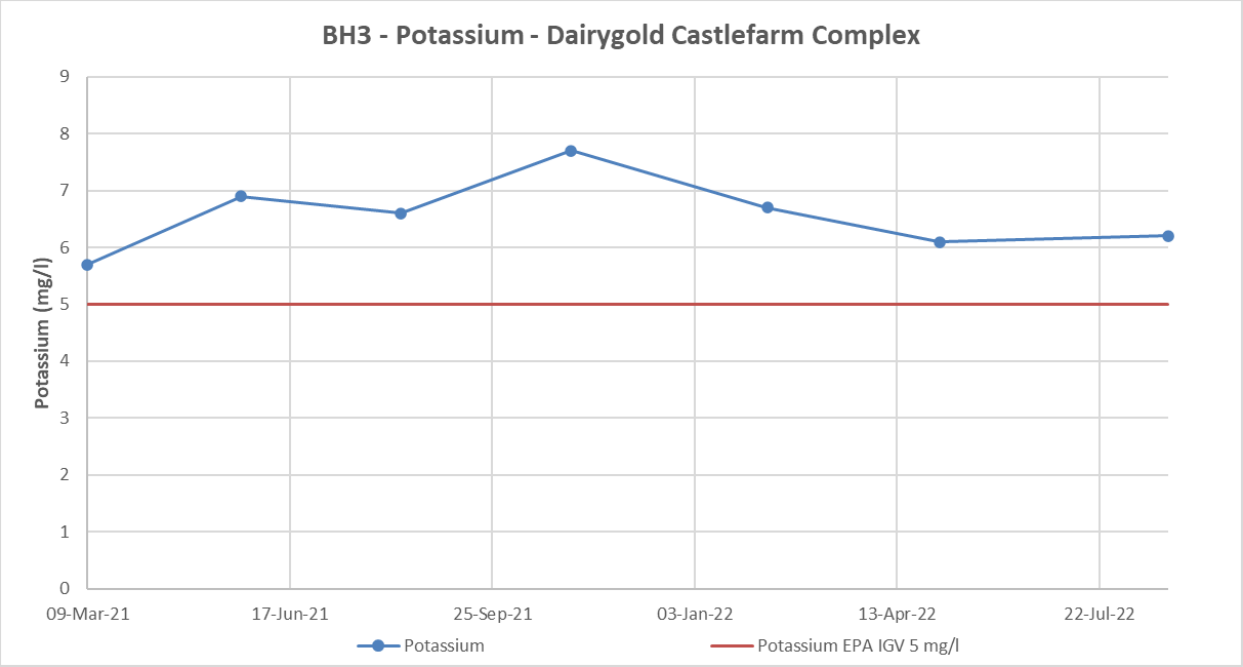
Coliforms, E. Coli and Enterobacteria were reported at BH3 in Q2-2022 in low count numbers.

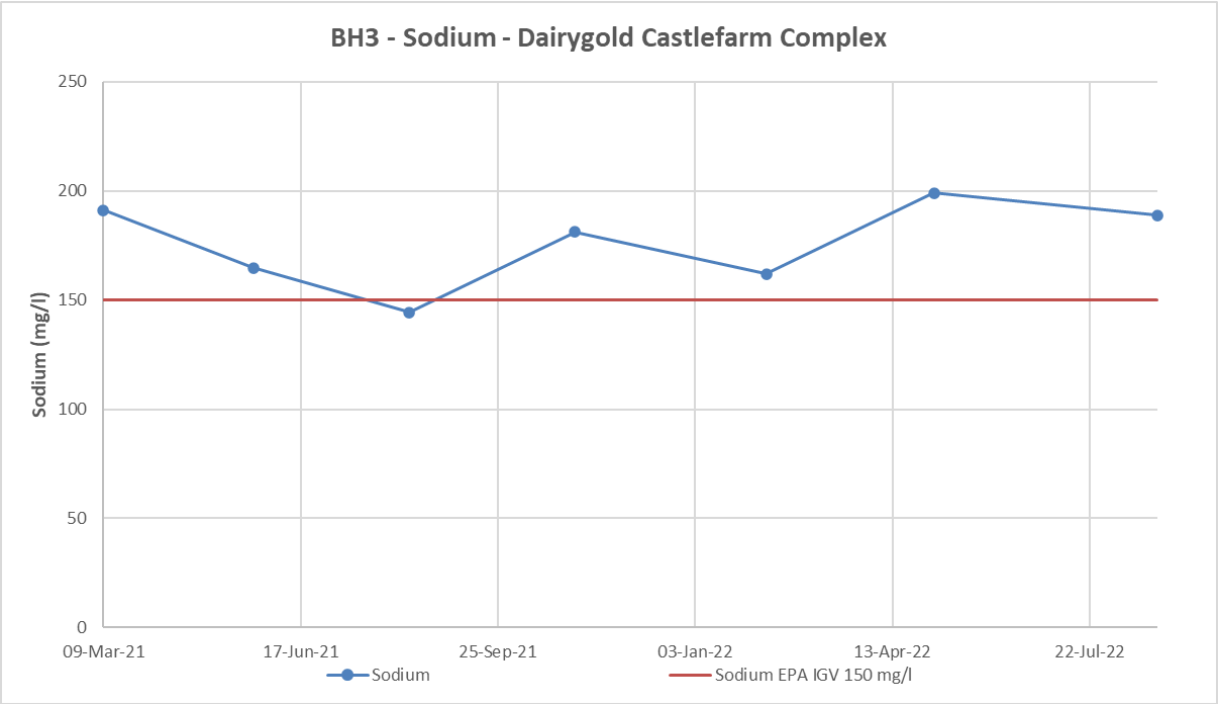
Temperature The onsite (field) temperature measurement recorded on the day of sampling for Q3-2022 was 16.2℃.

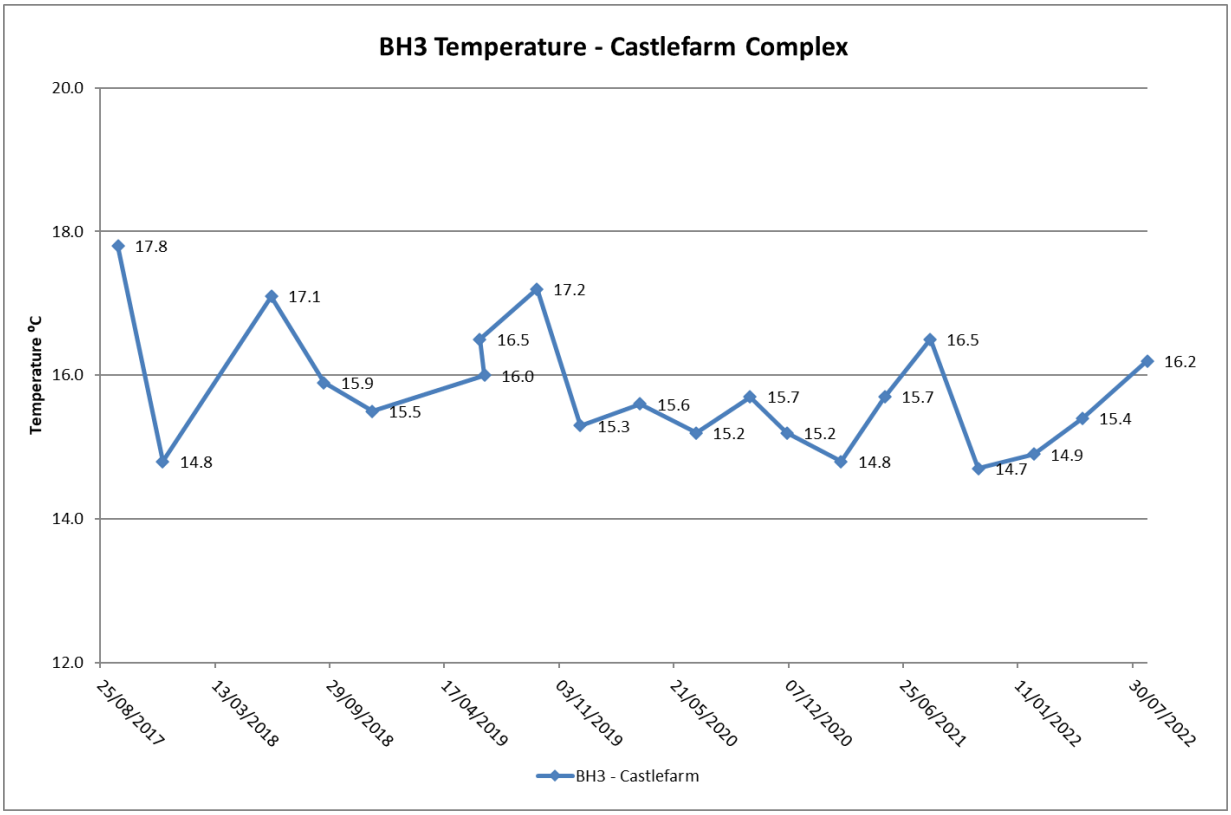





BH3 - Chloride - Dairygold Castlefarm Complex
Chloride (mg/l)
180
160
140
120
100
80
60
40
20
0
09-Mar-21
17-Jun-21
25-Sep-21
03-Jan-22
13-Apr-22
22-Jul-22
Chloride
Chloride GTV 24 mg/l


BH3 - Potassium - Dairygold Castlefarm Complex
Potassium (mg/l)
9
8
7
6
5
4
3
2
1
0
09-Mar-21
17-Jun-21
25-Sep-21
03-Jan-22
13-Apr-22
22-Jul-22
Potassium
Potassium EPA IGV 5 mg/l


BH3 - Sodium - Dairygold Castlefarm Complex
Sodium (mg/l)
250
200
150
100
50
0
09-Mar-21
17-Jun-21
25-Sep-21
03-Jan-22
13-Apr-22
22-Jul-22
Sodium
Sodium EPA IGV 150 mg/l


BH3 Temperature - Castlefarm Complex
Temperature °C
20.0
18.0
16.0
14.0
12.0
17.8
14.8
17.1
15.9
15.5
16.5
16.0
17.2
15.3
15.6
15.2
15.7
15.2
14.8
15.7
16.5
14.7
14.9
15.4
16.2
25/08/2017
13/03/2018
29/09/2018
17/04/2019
03/11/2019
21/05/2020
07/12/2020
25/06/2021
11/01/2022
30/07/2022
BH3 - Castlefarm

3.3.2. BH4

BH4 is located to the north of the milk drying/processing plant, at the edge of the escarpment. It has shown considerably poor groundwater quality since monitoring commenced in February 2007. BH3 is 'along gradient' (to the west) of BH4.

Ammonia continued to decrease from its peak of 128.4 mg/l in Q4-2021, reported at **41.1 mg/l** in Q3-2022. The Q4-2021 concentration was the highest ammonia concentration reported in the records available which extend back to 2007. BH4 reports the highest ammonia concentrations on the Castlefarm site.

Total Nitrogen was reported as 19.48 mg/l at BH4 – the highest across the Castlefarm Complex.

Electrical Conductivity was reported at **3866 uS/cm** in Q3-2022, down from 4546 uS/cm in Q2-2022. The Q3-2022 conductivity value is in excess of the 1875 uS/cm TV. The high concentrations of salt detected at BH4 is contributing to the elevated electrical conductivity values. Overall, conductivity fluctuates widely, with steep peaks and deep troughs.

COD was reported at **48.7 mg/l** in Q3-2022, above the voluntary TV of 25 mg/l.

Orthophosphate was reported at **3.08 mg/l** in Q3-2022, above the SI366/2016 TV of 0.107 mg/l.

Chloride was reported at **635.6 mg/l** in Q3-2022, down from 552.8 mg/l in Q2-2022. Chloride is display a downward trend. Chloride was reported at 23 mg/l at BH9.

Potassium was reported at **358.2 mg/l** in Q3-2022, which is elevated when compared to the background concentration of 1.4 mg/l at BH6. There is no clear trend with respect to potassium. Further monitoring will confirm the trend pattern going forward.

Sodium was reported at **281.1** mg/l in Q3-2022, down from 634.1 mg/l in Q2-2022. This is significantly above the 150 mg/l EPA IGV. The background sodium concentration reported at BH6 was 21.3 mg/l in Q3-2022. Sodium is displaying a downward trend.

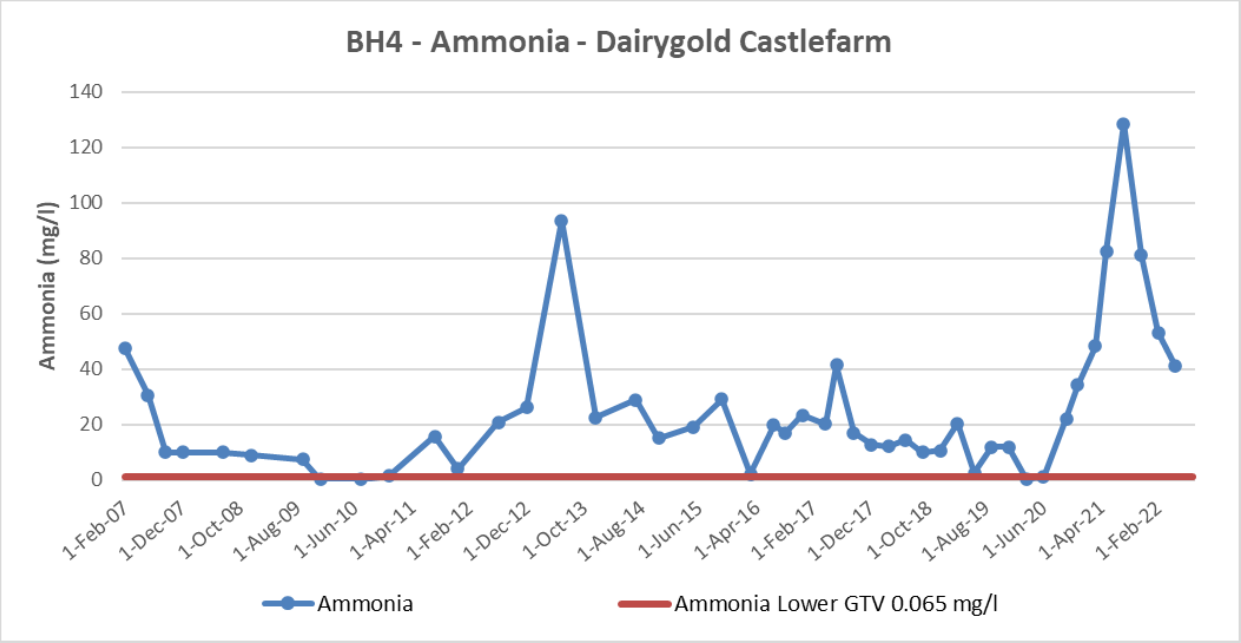
Manganese was reported at **900 ug/l** at BH4 in Q3-2022.

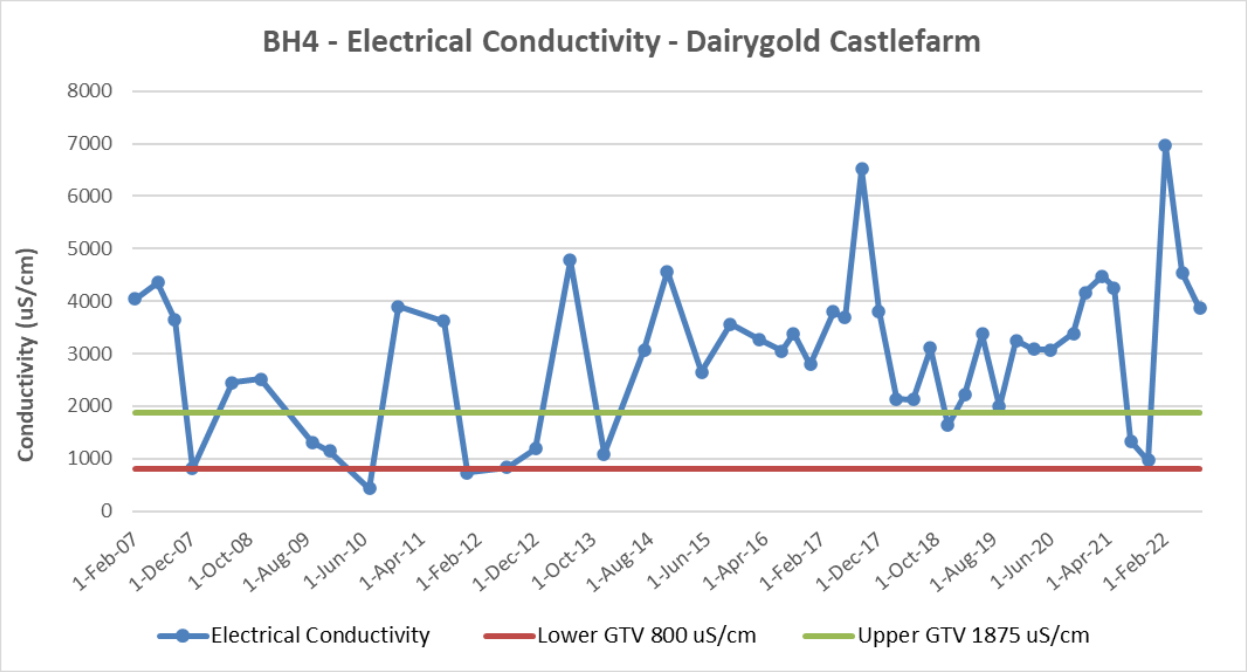
Nickel was reported at **423 ug/l** in Q3-2022.

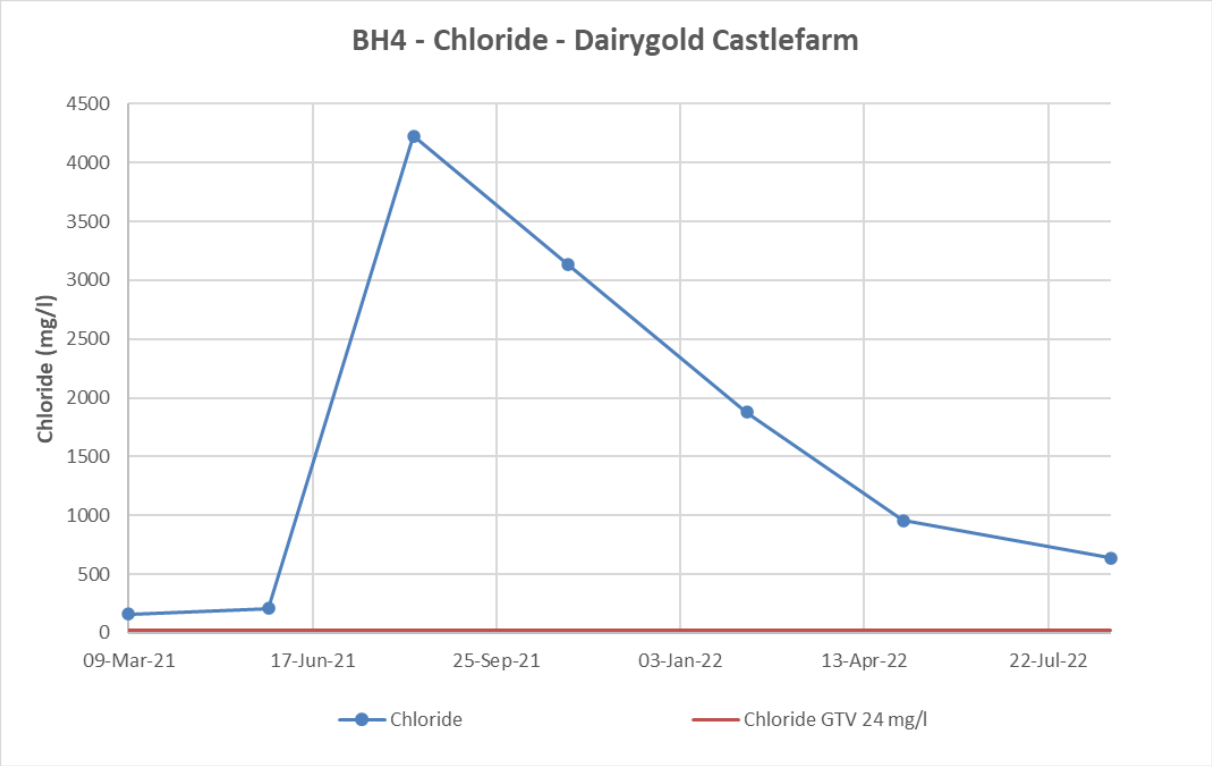
Coliforms, E. Coli and Entero bacteria were reported at BH4 in Q3-2022.

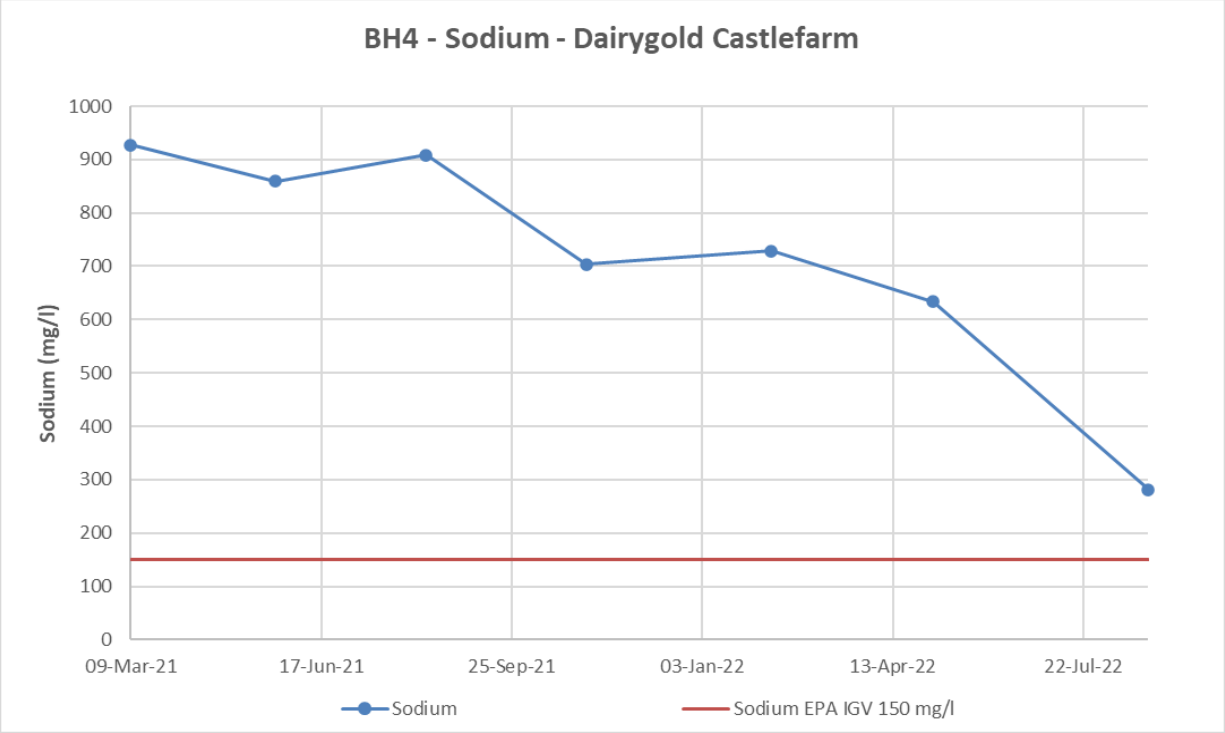
Hydrocarbons were detected at BH4 in Q3-2022. The banding shows heavier hydrocarbons are present C21-C35: 470 ug/l and C35-C40: 70 ug/l. Overall, there has been a significant reduction in hydrocarbon concentrations detected at BH4.

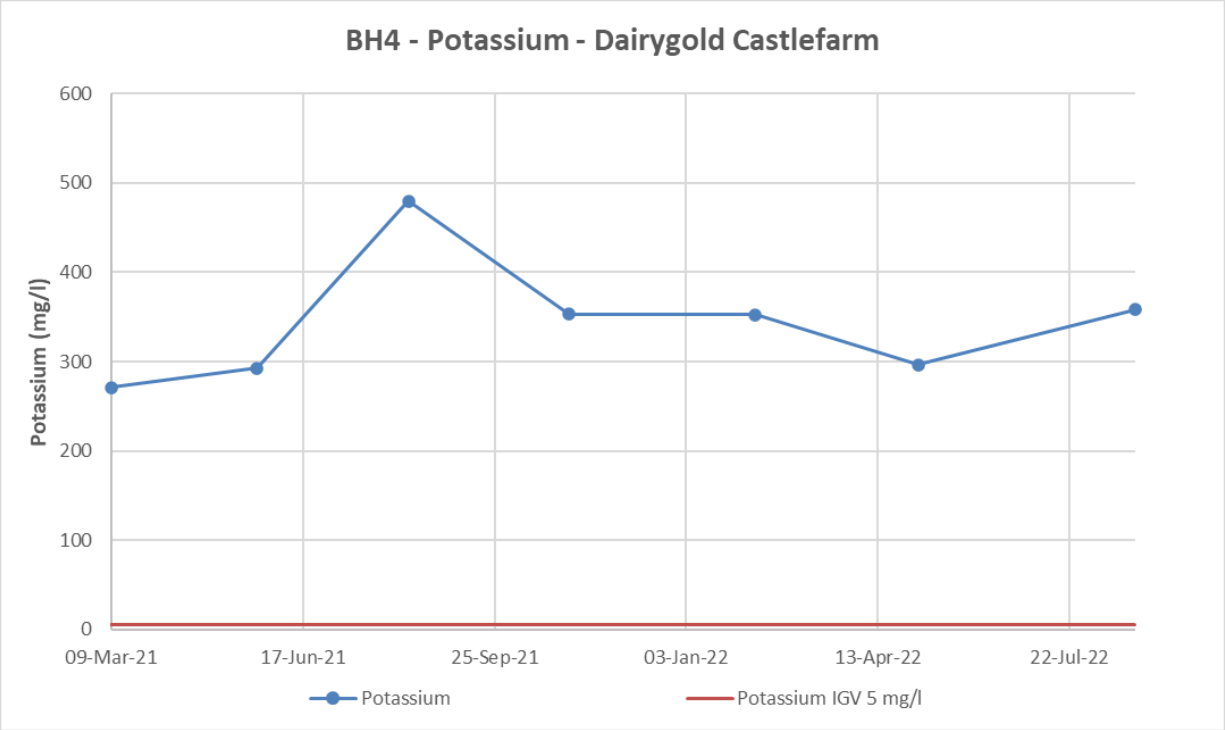
Groundwater level data shows the presence of a localised groundwater mound in the vicinity of BH4.


BH4 - Ammonia - Dairygold Castlefarm
Ammonia (mg/l)
140
120
100
80
60
40
20
0
1-Feb-07
1-Dec-07
1-Oct-08
1-Aug-09
1-Jun-10
1-Apr-11
1-Feb-12
1-Dec-12
1-Oct-13
1-Aug-14
1-Jun-15
1-Apr-16
1-Feb-17
1-Dec-17
1-Oct-18
1-Aug-19
1-Jun-20
1-Apr-21
1-Feb-22
Ammonia
Ammonia Lower GTV 0.065 mg/l


BH4 - Electrical Conductivity - Dairygold Castlefarm
Conductivity (uS/cm)
8000
7000
6000
5000
4000
3000
2000
1000
0
1-Feb-07
1-Dec-07
1-Oct-08
1-Aug-09
1-Jun-10
1-Apr-11
1-Feb-12
1-Dec-12
1-Oct-13
1-Aug-14
1-Jun-15
1-Apr-16
1-Feb-17
1-Dec-17
1-Oct-18
1-Aug-19
1-Jun-20
1-Apr-21
1-Feb-22
Electrical Conductivity
Lower GTV 800 uS/cm
Upper GTV 1875 uS/cm


BH4 - Chloride - Dairygold Castlefarm
Chloride (mg/l)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
09-Mar-21
17-Jun-21
25-Sep-21
03-Jan-22
13-Apr-22
22-Jul-22
Chloride
Chloride GTV 24 mg/l


BH4 - Sodium - Dairygold Castlefarm
Sodium (mg/l)
1000
900
800
700
600
500
400
300
200
100
0
09-Mar-21
17-Jun-21
25-Sep-21
03-Jan-22
13-Apr-22
22-Jul-22
Sodium
Sodium EPA IGV 150 mg/l


BH4 - Potassium - Dairygold Castlefarm
Potassium (mg/l)
600
500
400
300
200
100
0
09-Mar-21
17-Jun-21
25-Sep-21
03-Jan-22
13-Apr-22
22-Jul-22
Potassium
Potassium IGV 5 mg/l

3.3.3. BH8

BH8 is located immediately north of the escarpment, downgradient of the main processing area and to the south of the Mill Stream. BH8 monitors groundwater in the bedrock aquifer migrating northwards towards the River Gradoge.

Ammonia was reported at 0.45 mg/l in Q3-2022, down from 15.4 mg/l in Q3-2022. The maximum reported ammonia concentration was 43.5 mg/l (Q4-2017). Overall, ammonia is exhibiting a long term downward trend at BH8.

Total nitrogen was reported as 2.87 mg/l in Q3-2022.

Electrical Conductivity was reported at 587 uS/cm in Q3-2022. The Q3-2022 conductivity value is below the SI366/2016 800 uS/cm TV. Overall, electrical conductivity is displaying a downward trend. The high chloride, sodium and potassium concentrations account for the elevated electrical conductivity values reported at BH8.

Orthophosphate was reported at 0.59 mg/l in Q3-2022, above the SI366 2016 GTV of 0.107 mg/l.

Chloride was reported at **41.8 mg/l** in Q3-2022, down significantly from 552.8 mg/l in Q3-2022. The Q3-2022 concentration is in excess EPA IGV of 30 mg/l. This is the lowest chloride concentration reported to date. Chloride is displaying a downward trend.

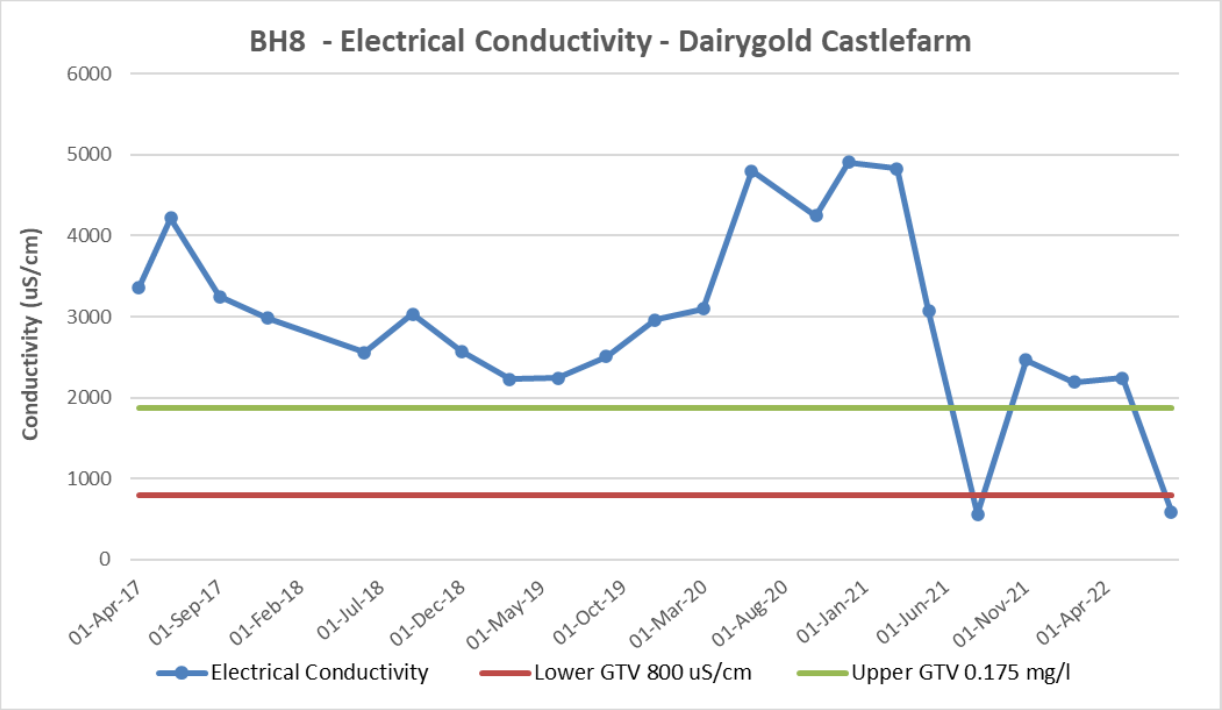
Potassium was reported at **14.90 mg/l** in Q3-2022, above the EPA IGV of 5 mg/l. Potassium is displaying a downward trend and the Q3-2022 concentration is the lowest reported to date.

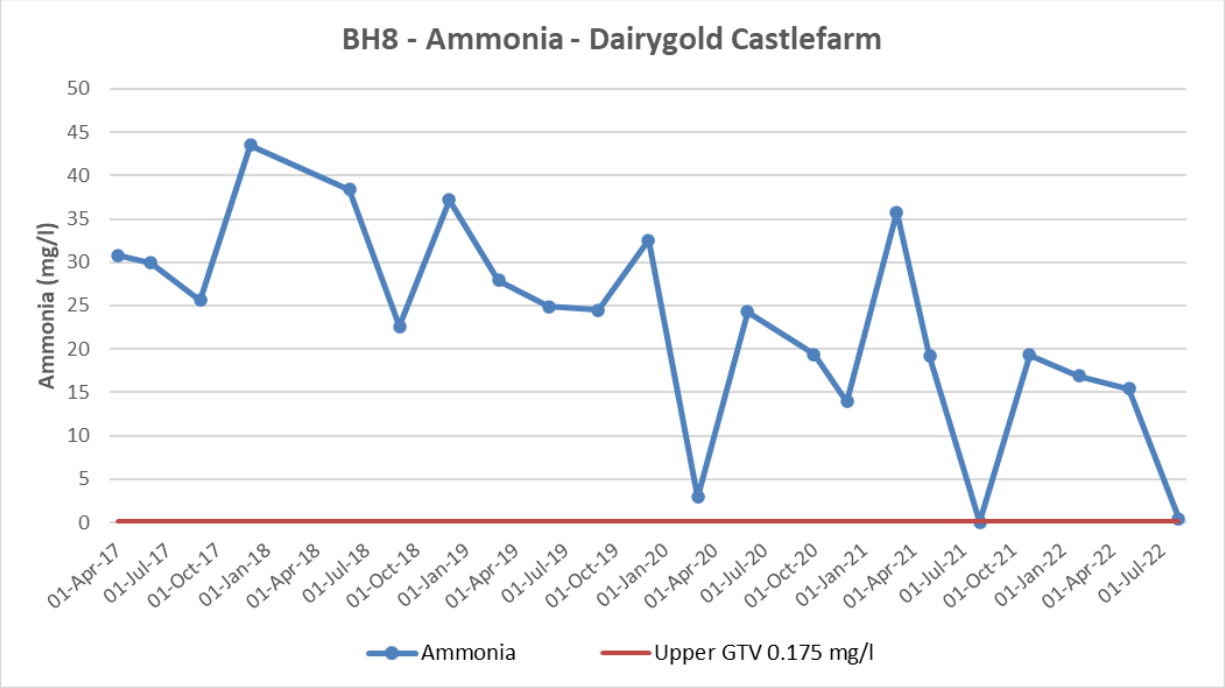
Sodium was reported at 29.10 mg/l in Q3-2022. This is the lowest concentration reported to date, and sodium is displaying a downward trend.

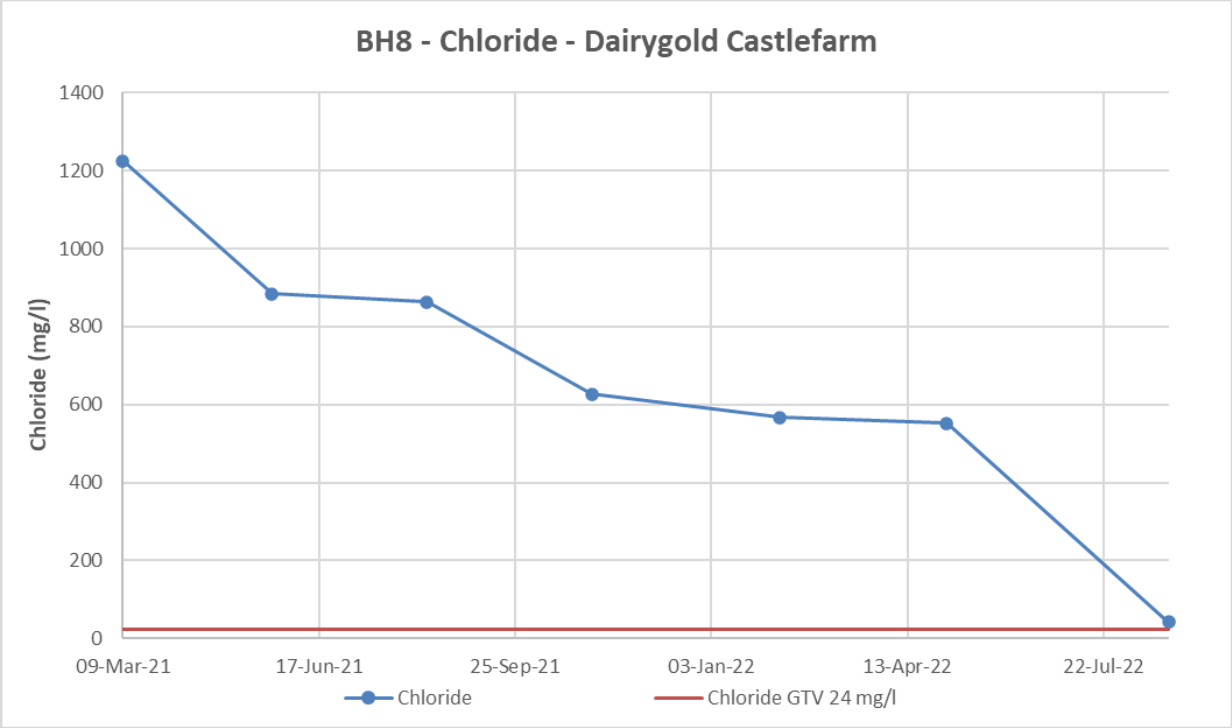
Manganese was reported at 107 ug/l in Q3-2022, which is attributed to the underlying bedrock geology.

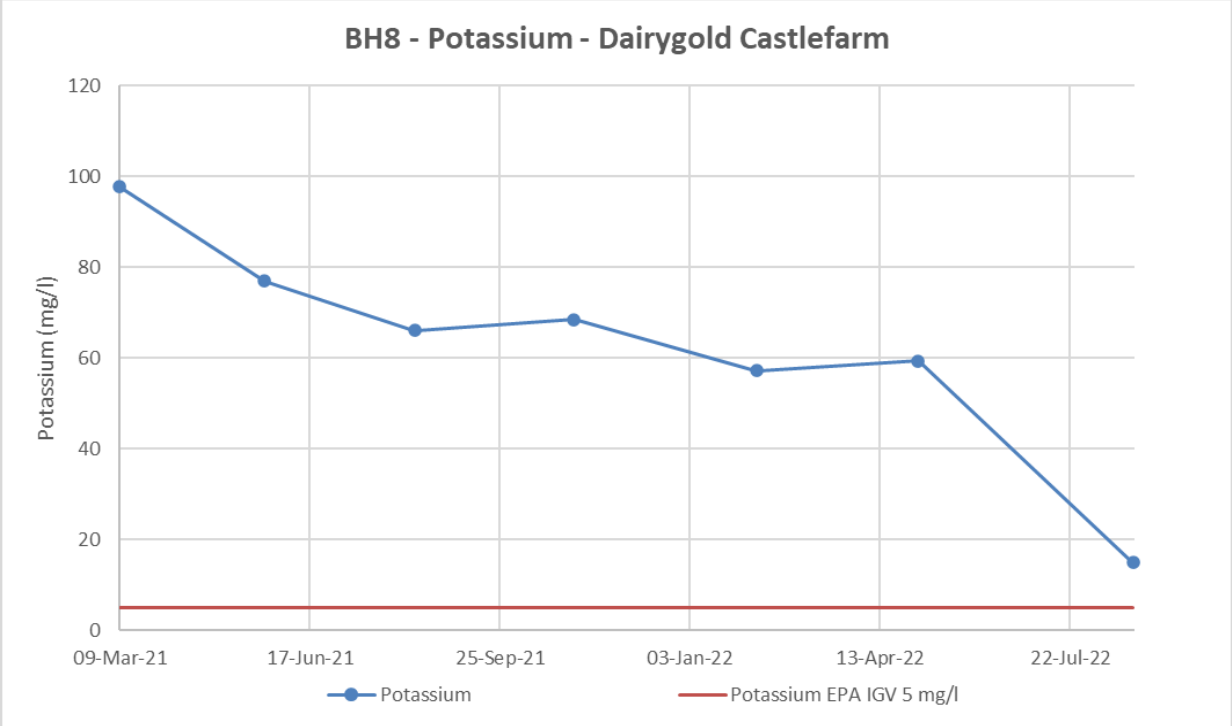
Coliforms, E. Coli and Enterobacteria were reported at BH8 in Q3-2022.

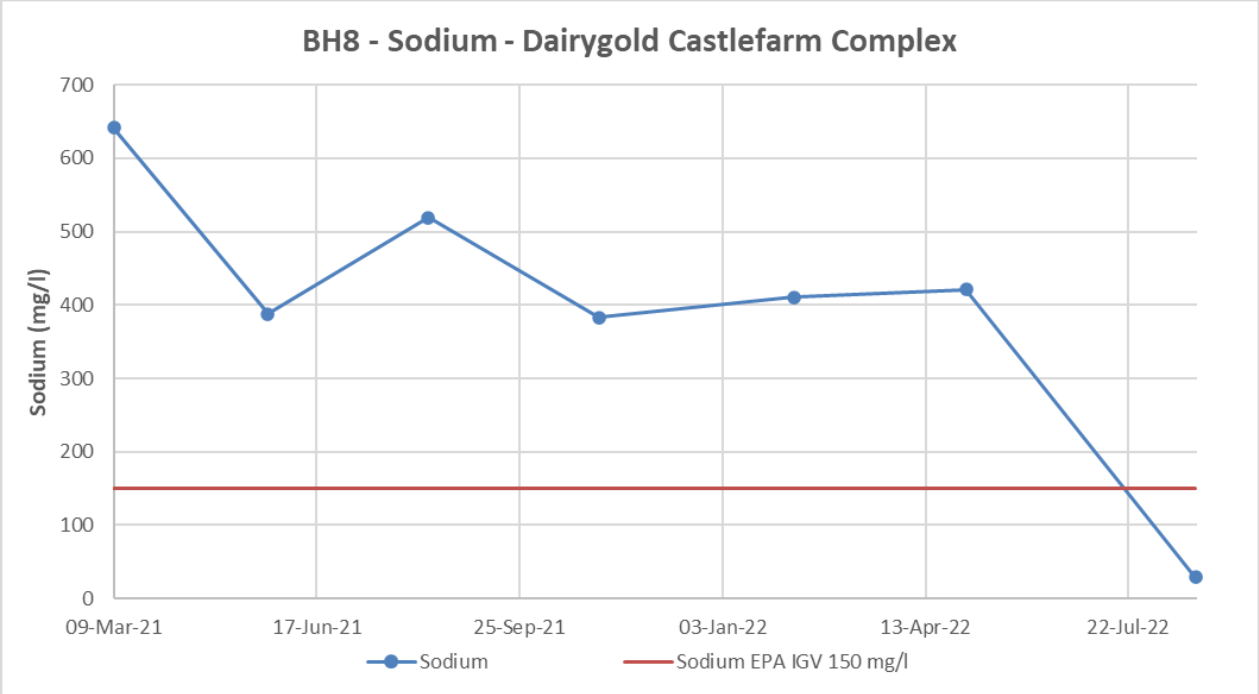
Hydrocarbons were not detected at BH8 in Q3-2022.


BH8 - Electrical Conductivity - Dairygold Castlefarm
Conductivity (uS/cm)
6000
5000
4000
3000
2000
1000
0
01-Apr-17
01-Sep-17
01-Feb-18
01-Jul-18
01-Dec-18
01-May-19
01-Oct-19
01-Mar-20
01-Aug-20
01-Jan-21
01-Jun-21
01-Nov-21
01-Apr-22
Electrical Conductivity
Lower GTV 800 uS/cm
Upper GTV 0.175 mg/l


BH8 - Ammonia - Dairygold Castlefarm
Ammonia (mg/l)
50
45
40
35
30
25
20
15
10
5
0
01-Apr-17
01-Jul-17
01-Oct-17
01-Jan-18
01-Apr-18
01-Jul-18
01-Oct-18
01-Jan-19
01-Apr-19
01-Jul-19
01-Oct-19
01-Jan-20
01-Apr-20
01-Jul-20
01-Oct-20
01-Jan-21
01-Apr-21
01-Jul-21
01-Oct-21
01-Jan-22
01-Apr-22
01-Jul-22
Ammonia
Upper GTV 0.175 mg/l


BH8 - Chloride - Dairygold Castlefarm
Chloride (mg/l)
1400
1200
1000
800
600
400
200
0
09-Mar-21
17-Jun-21
25-Sep-21
03-Jan-22
13-Apr-22
22-Jul-22
Chloride
Chloride GTV 24 mg/l


BH8 - Potassium - Dairygold Castlefarm
Potassium (mg/l)
120
100
80
60
40
20
0
09-Mar-21
17-Jun-21
25-Sep-21
03-Jan-22
13-Apr-22
22-Jul-22
Potassium
Potassium EPA IGV 5 mg/l


BH8 - Sodium - Dairygold Castlefarm Complex
Sodium (mg/l)
700
600
500
400
300
200
100
0
09-Mar-21
17-Jun-21
25-Sep-21
03-Jan-22
13-Apr-22
22-Jul-22
Sodium
Sodium EPA IGV 150 mg/l

3.3.4. BH11

BH11 is located to the east of the effluent plant. BH11 is located in the area of a former landfill and south of the Mill Stream. BH11 may be influenced somewhat by septic tanks associated with the properties to the south. Groundwater quality is consistently poor at this monitoring point.

Ammonia was reported at **13.40 mg/l** in Q3-2022, up from 9.10 mg/l in Q2-2022. Ammonia concentrations have exceeded the SI366/2016 GTV of 0.065 mg/l in all monitoring rounds. Ammonia is displaying a downward trend from a peak of 22.6 mg/l in Q3-2021.

Total Nitrogen continues to be reported as elevated at BH11 (**13.04 mg/l**).

Electrical Conductivity was reported at **1593 uS/cm** in Q3-2022. Electrical conductivity is displaying a long term upward trend.

Orthophosphate was detected at 2.54 mg/l in Q3-2022. This concentration is above the SI366/2016 TV of 0.107 mg/l.

Chloride was reported at **104.4 mg/l** in Q3-2022. This is a significant increase from 27.9 mg/l in Q2-2022, and elevated in comparison to BH9 (23 mg/l). Overall, a downward trend is apparent for chloride. Further monitoring will confirm the long term trend.

Sodium was reported at **255.5 mg/l**, up from 159.1 mg/l in Q2-2022. This is elevated in comparison to BH9 (15.3 mg/l). Further monitoring will confirm the trend in sodium concentrations at BH11.

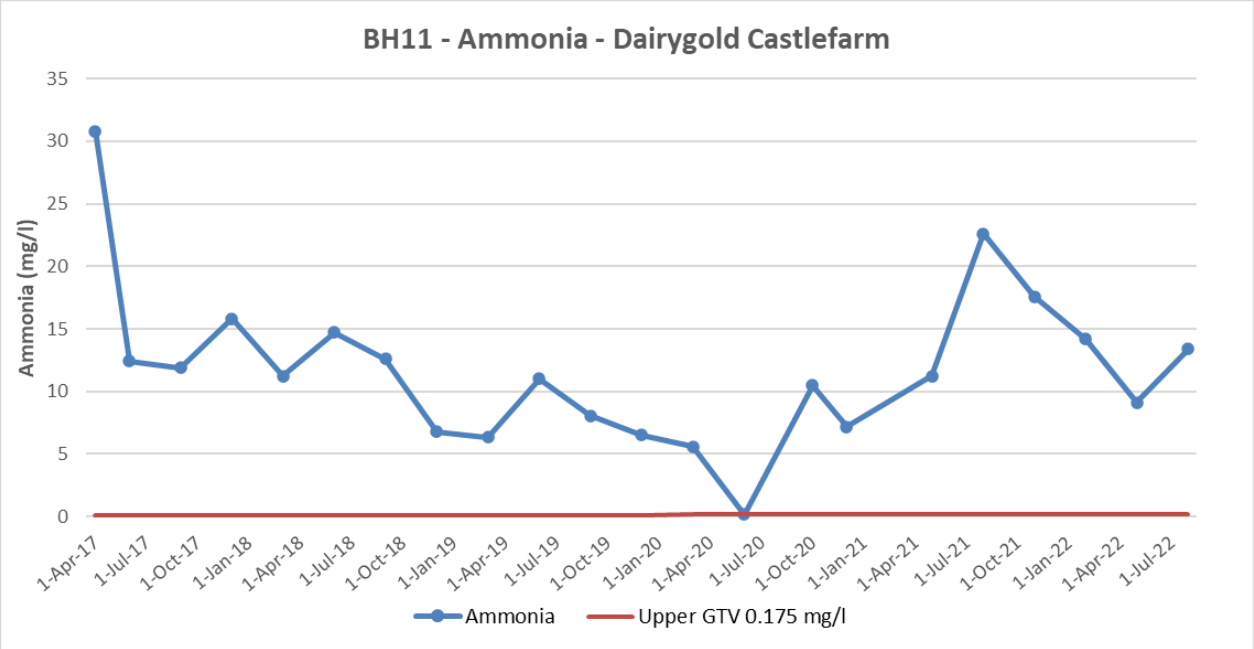
Potassium was reported at **19.9 mg/l** in Q3-2022, which is lower than BH9 (15.3 mg/l). Potassium is showing a slight downward trend.

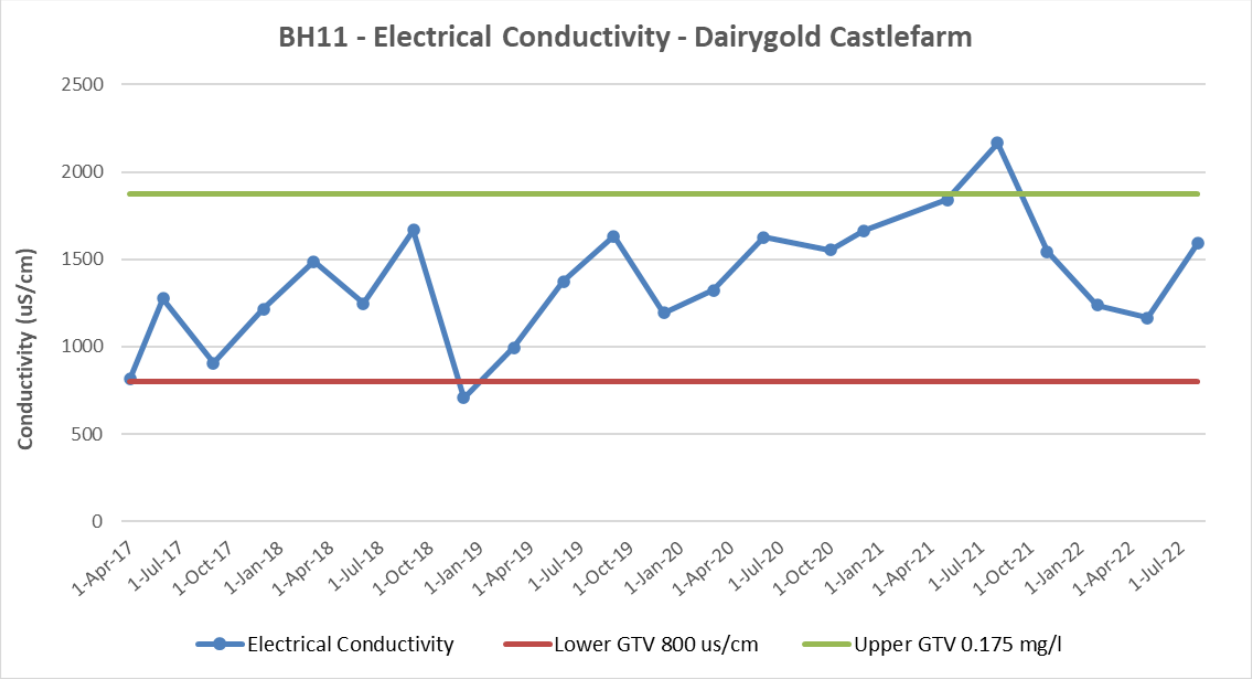
Manganese was reported at 1697 ug/l in Q3-2022 – above the EPA IGV of 50 ug/l.

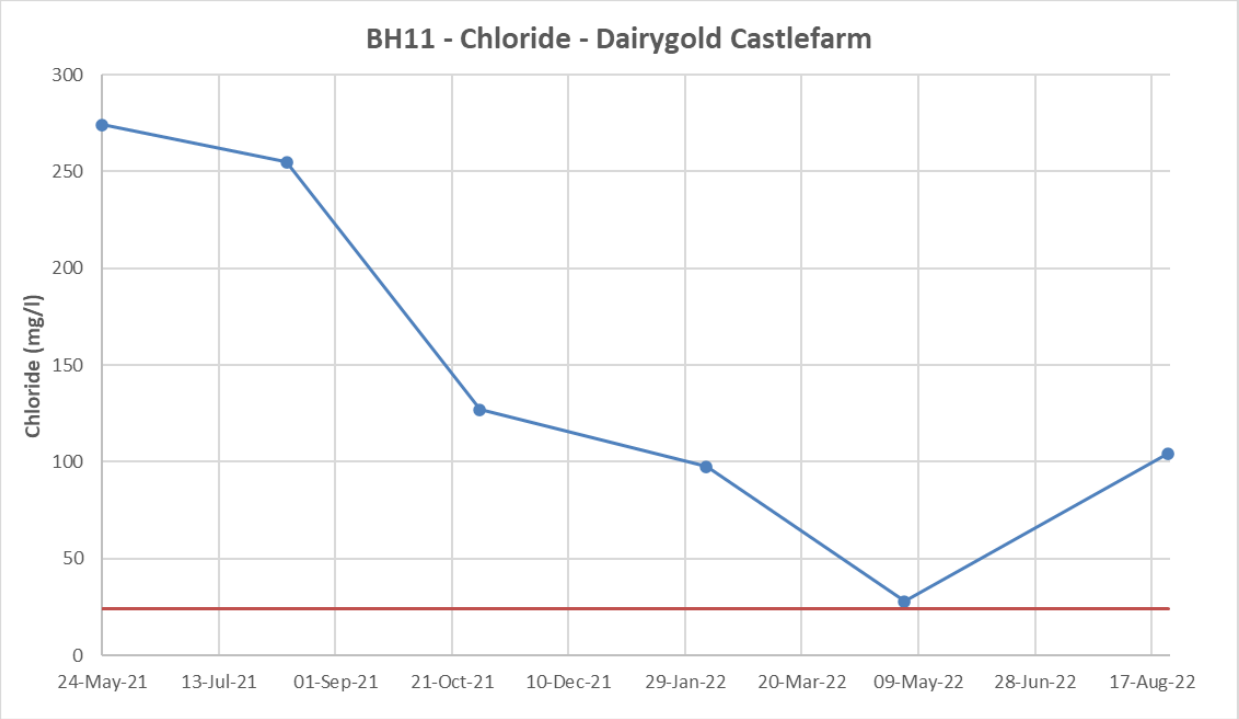
Nickel was reported at 90 ug/l in Q3-2022 - above the EPA IGV of 20 ug/l.

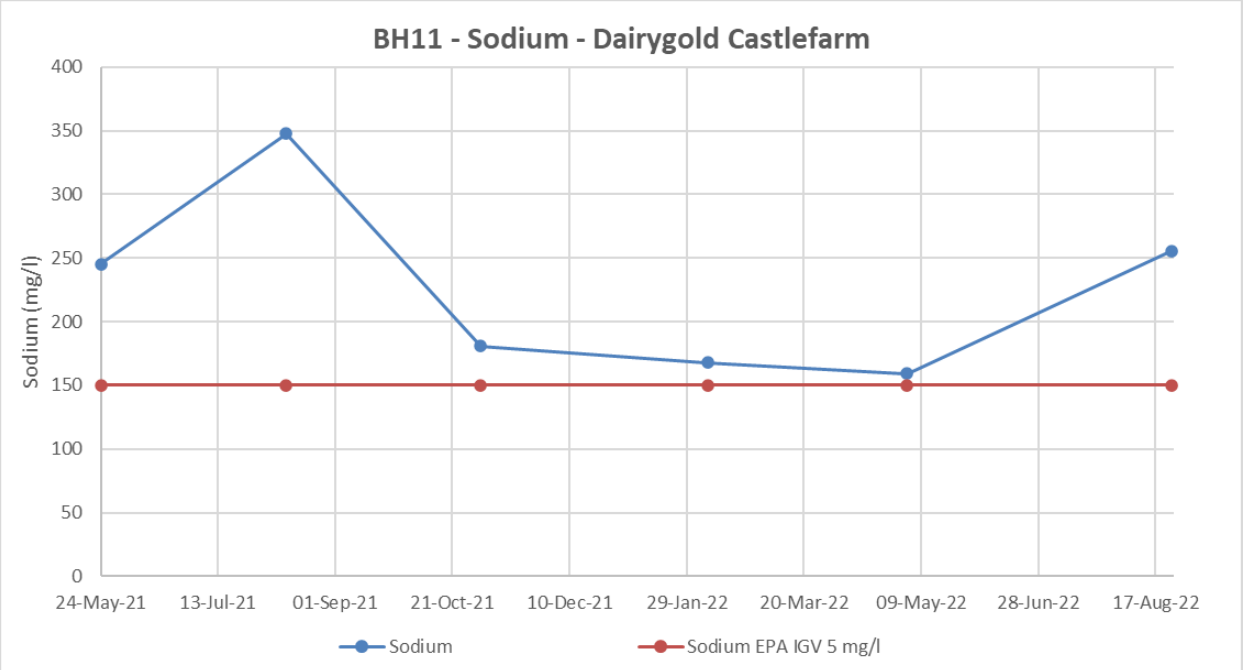
Coliforms and E. Coli were reported at BH11 in Q3-2022.

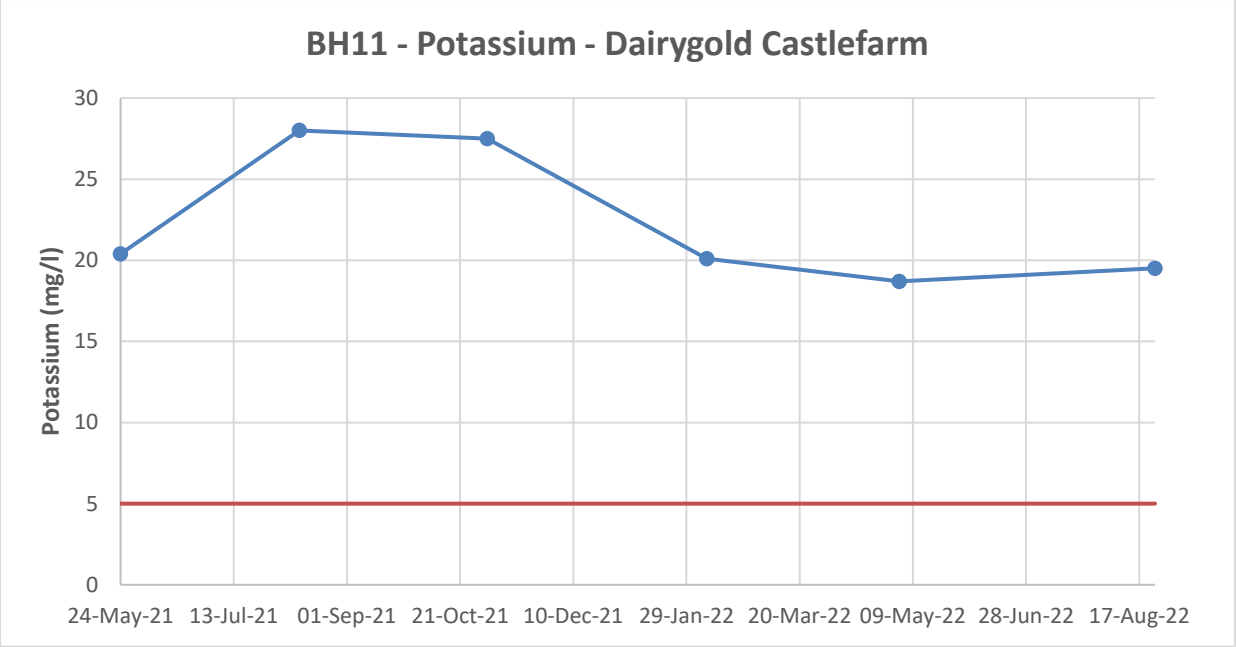
Hydrocarbons were not detected at BH11 in Q3-2022.


BH11 - Ammonia - Dairygold Castlefarm
Ammonia (mg/l)
35
30
25
20
15
10
5
0
1-Apr-17
1-Jul-17
1-Oct-17
1-Jan-18
1-Apr-18
1-Jul-18
1-Oct-18
1-Jan-19
1-Apr-19
1-Jul-19
1-Oct-19
1-Jan-20
1-Apr-20
1-Jul-20
1-Oct-20
1-Jan-21
1-Apr-21
1-Jul-21
1-Oct-21
1-Jan-22
1-Apr-22
1-Jul-22
Ammonia
Upper GTV 0.175 mg/l


BH11 - Electrical Conductivity - Dairygold Castlefarm
Conductivity (uS/cm)
2500
2000
1500
1000
500
0
1-Apr-17
1-Jul-17
1-Oct-17
1-Jan-18
1-Apr-18
1-Jul-18
1-Oct-18
1-Jan-19
1-Apr-19
1-Jul-19
1-Oct-19
1-Jan-20
1-Apr-20
1-Jul-20
1-Oct-20
1-Jan-21
1-Apr-21
1-Jul-21
1-Oct-21
1-Jan-22
1-Apr-22
1-Jul-22
Electrical Conductivity
Lower GTV 800 us/cm
Upper GTV 0.175 mg/l


BH11 - Chloride - Dairygold Castlefarm
Chloride (mg/l)
300
250
200
150
100
50
0
24-May-21
13-Jul-21
01-Sep-21
21-Oct-21
10-Dec-21
29-Jan-22
20-Mar-22
09-May-22
28-Jun-22
17-Aug-22


BH11 - Sodium - Dairygold Castlefarm
Sodium (mg/l)
400
350
300
250
200
150
100
50
0
24-May-21
13-Jul-21
01-Sep-21
21-Oct-21
10-Dec-21
29-Jan-22
20-Mar-22
09-May-22
28-Jun-22
17-Aug-22
Sodium
Sodium EPA IGV 5 mg/l



3.3.5. BH10

BH10 is located to the north of the Effluent Plant, on the banks of the River Gradoge. BH10 is screened into the bedrock limestone aquifer, to monitor baseflow to the River Gradoge.

Ammonia was reported at 0.02 mg/l in Q3-2022, which is below the SI366/2016 TV of 0.065 mg/l. Overall, ammonia is displaying a stable trend at BH10.

Total Nitrogen was reported as 1.89 mg/l at BH10 in Q3-2022. This is in contrast to 2.87 mg/l reported at BH8 in Q3-2022.

Electrical Conductivity was reported at 562 uS/cm in Q3-2022. Electrical Conductivity has been reported below the lower GTV of 800 uS/cm since monitoring began in April 2017.

COD and BOD were reported below their respective TV's in Q3-2022 at BH10.

Orthophosphate was reported at 0.03 mg/l, below the SI366/2016 TV of 0.107 mg/l.

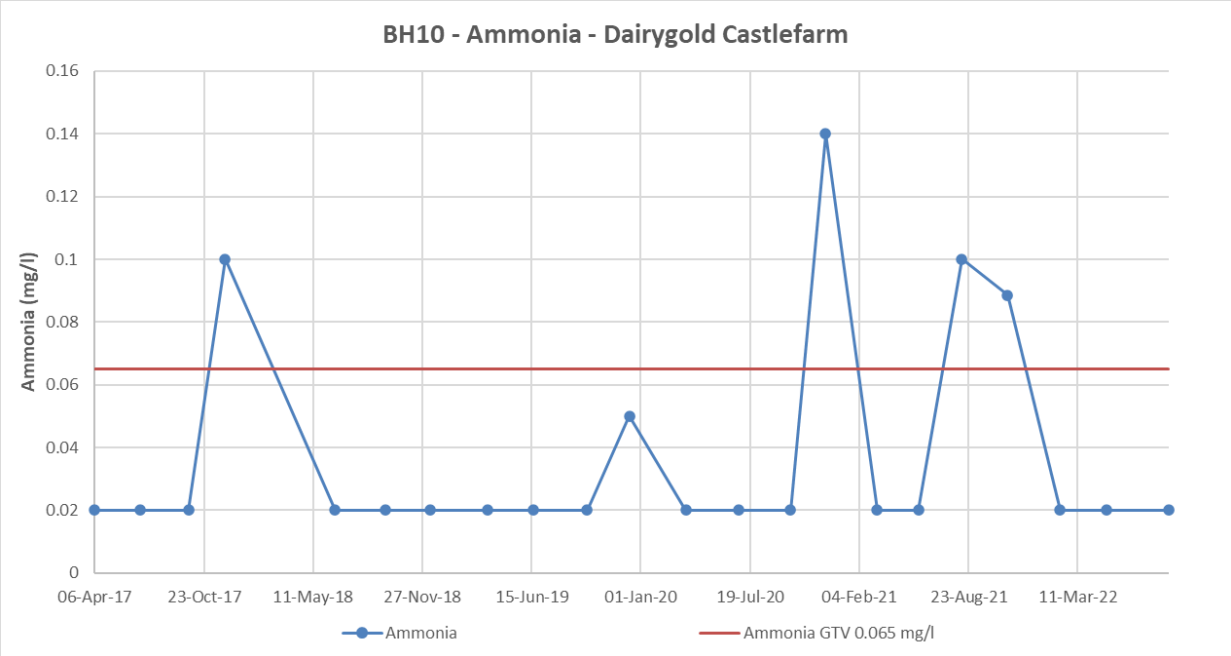
Chloride was reported at 29 mg/l in Q3-2022. This is above the SI366/2016 GTV of 24 mg/l. However, chloride is significantly lower at BH10, in comparison to BH8 (41.8 mg/l), which is to the south of the effluent plant.

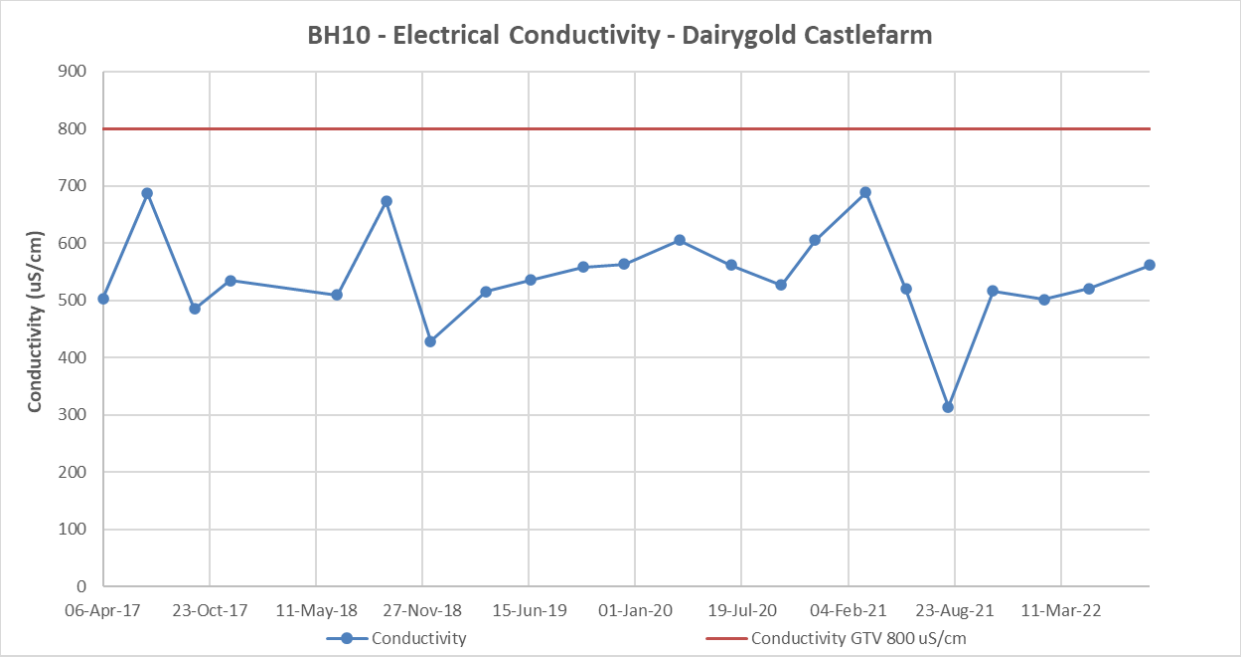
Sodium was reported at 18.50 mg/l in Q3-2022, which is lower than the concentration reported at BH8 (29.1 mg/l).

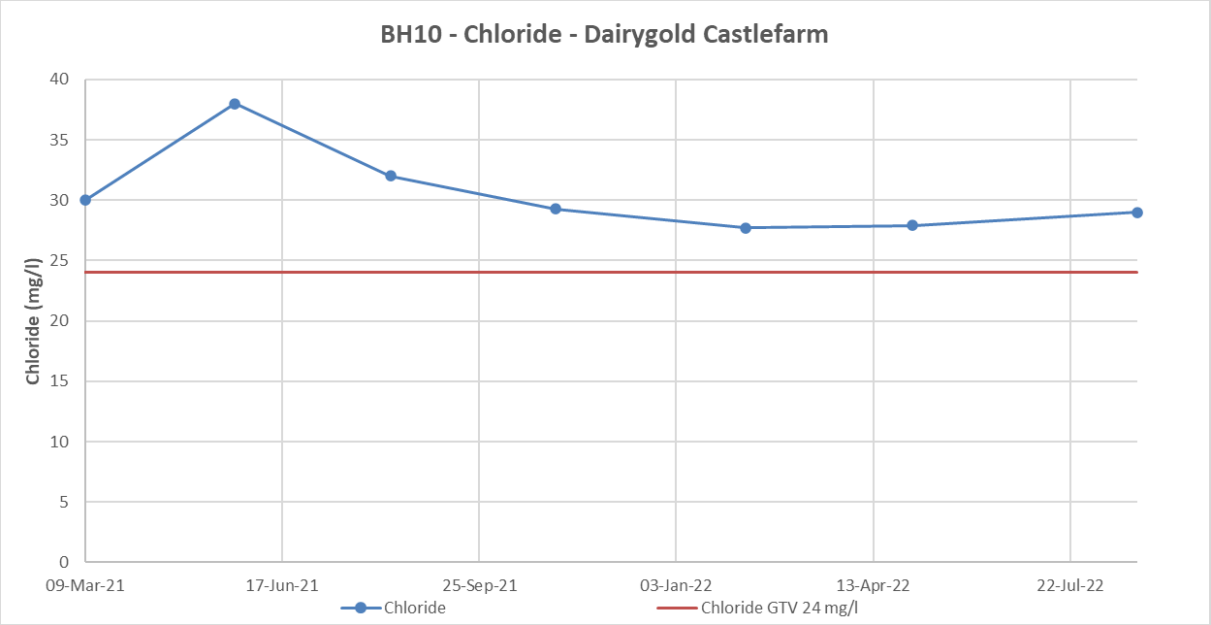
Potassium was reported at 1.80 mg/l in Q3-2022, which is lower than the concentration reported at BH8 (14.90 mg/l).

Coliforms were reported at BH10 in Q3-2022 in elevated numbers.

Hydrocarbons were not detected at BH10 in Q3-2022.






BH10 - Chloride - Dairygold Castlefarm
Chloride (mg/l)
40
35
30
25
20
15
10
5
0
09-Mar-21
17-Jun-21
25-Sep-21
03-Jan-22
13-Apr-22
22-Jul-22
Chloride
Chloride GTV 24 mg/l

4. CLONMEL ROAD COMPELX

The Clonmel Road Complex consits of 8 groundwater monitoring points, as outlined in Figure 5.

Shallow groundwater is monitored at the Clonmel Road complex. The frequency of monitoring at the Clonmel Road complex increased from biannual to quarterly from Q1-2021.

From Q2-2021 onwards, one deep up gradient borehole (BHXI – Deep), and one deep down gradient borehole (BH5D – Deep) have been monitored on a quarterly basis at the Clonmel Road Complex, as per the instructions issued by the EPA in May 2021.

The site conceptual model was refined and updated with the data from the 2016/2017 groundwater monitoring well drilling by IE Consulting as part of the DQRA (IE2531-5417). The source-pathway-receptor component of the conceptual model showed that the shallow, saturated gravels beneath the Clonmel Road Complex site and the River Gradoge were the main receptors onsite.

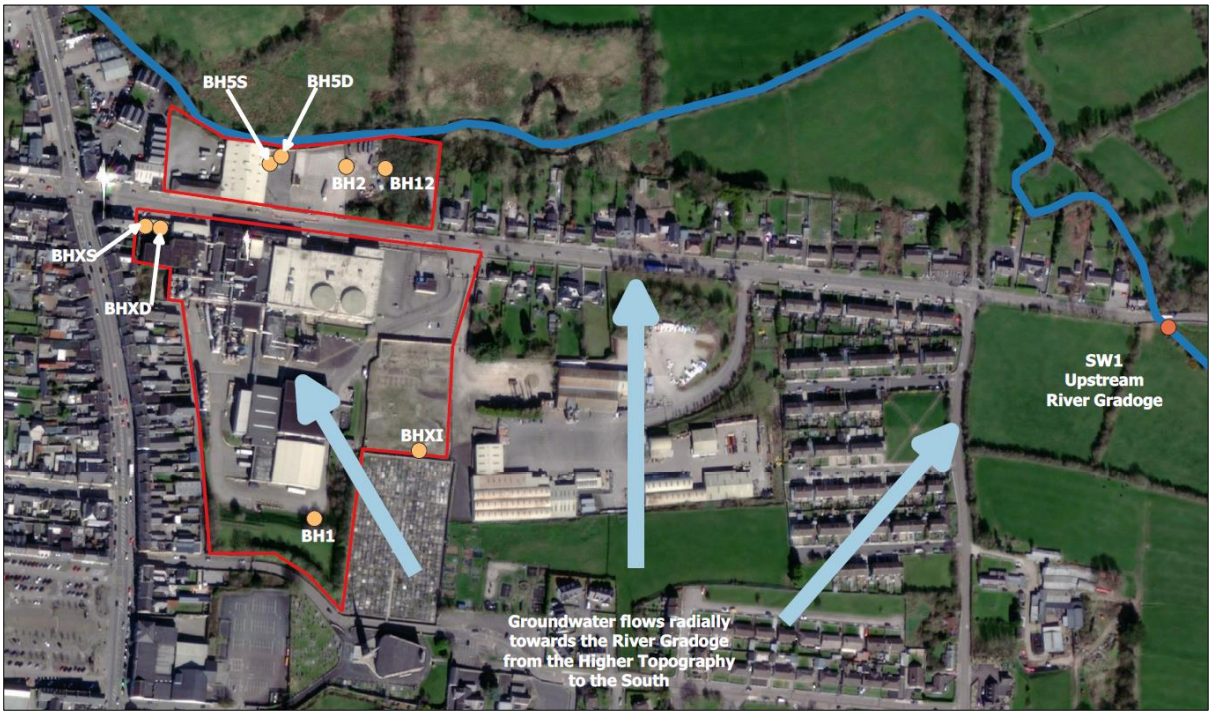


Figure 5 – Clonmel Road Groundwater Monitoring Network

Hydrochemical parameters, water levels and well depths are outlined in Table 4. Historical Groundwater Monitoring Data is contained in Appendix B.

4.1.1. BH1

The water quality at BH1 (Shallow) is similar to the background water quality at BH6 – at the Castlefarm Complex. BH1 is located immediately down hydraulic-gradient of a cemetery and is considered to be up-gradient of the Clonmel Road complex. Overall, the groundwater quality at BH1 is good.

Ammonia was reported at 0.02 mg/l in Q3-2022, remaining stable since Q1-2020. Ammonia has been reported below the lower SI366/2016 TV of 0.065 mg/l since October 2015. Ammonia is displaying a long term stable trend.

Electrical Conductivity was reported at 688 uS/cm in Q3-2022. Electrical Conductivity has been reported below the lower GTV of 800 uS/cm since Q4-2016. Electrical Conductivity is displaying a fluctuating trend.

Orthophosphate was reported at 0.06 mg/l in Q3-2022, which is below the SI366/2016 TV of 0.107 mg/l.

Nitrate as NO_3 continues to be reported as low, at 11.5 mg/l in Q3-2022.

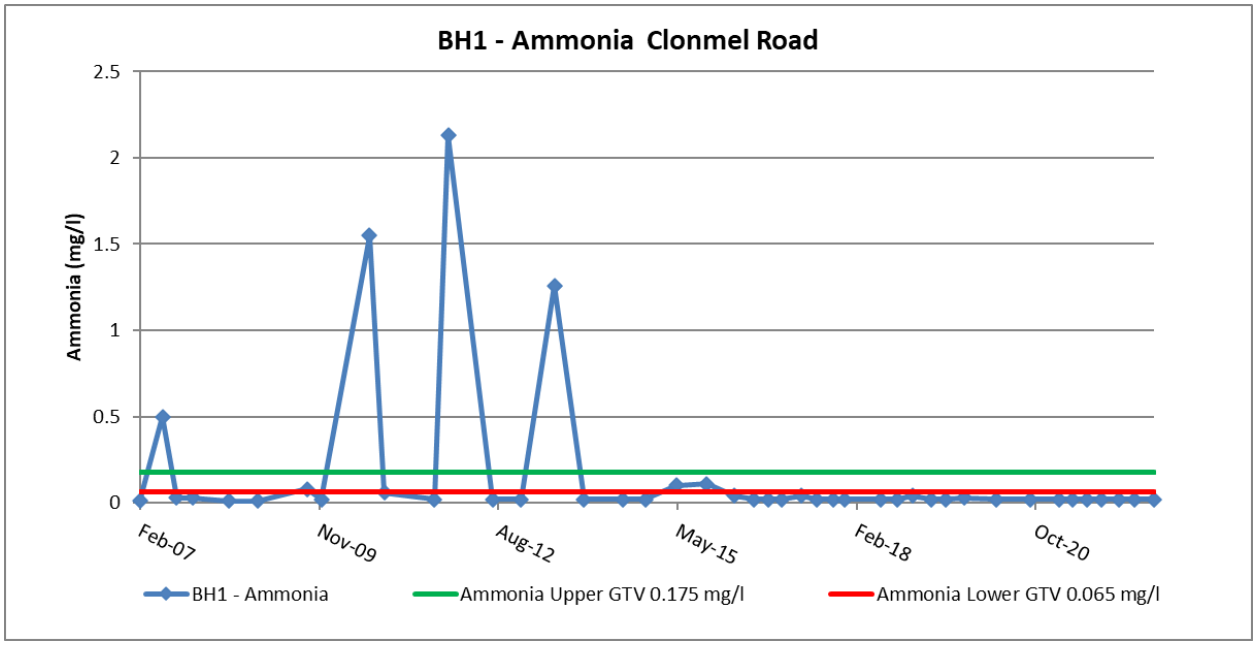
Chloride was reported at 29 mg/l in Q3-2022. This is slightly above the SI366/2016 TV of 24 mg/l. However, this is considered to be a background concentration for chloride, with typical background concentrations ranging from 20 – 30 mg/l in Irish aquifers. Overall, chloride displays a stable trend.

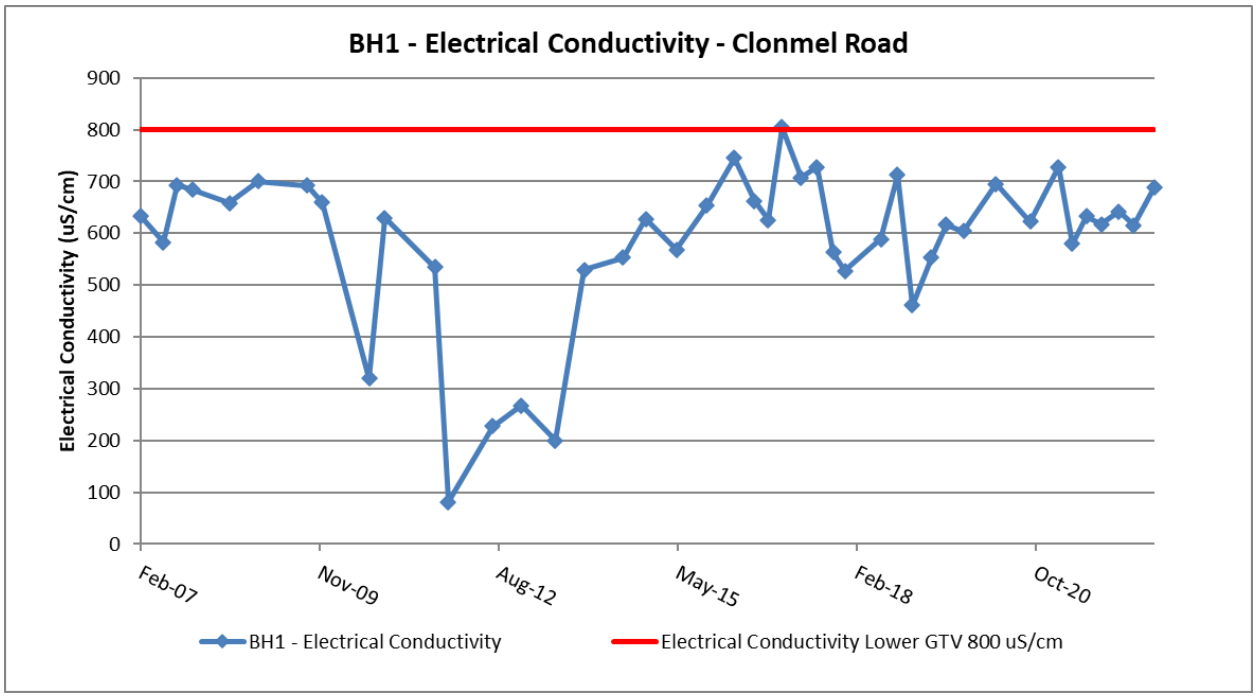
Sodium was reported at 15.2 mg/l in Q3-2022, which is at a the general background concentration for Irish aquifers.

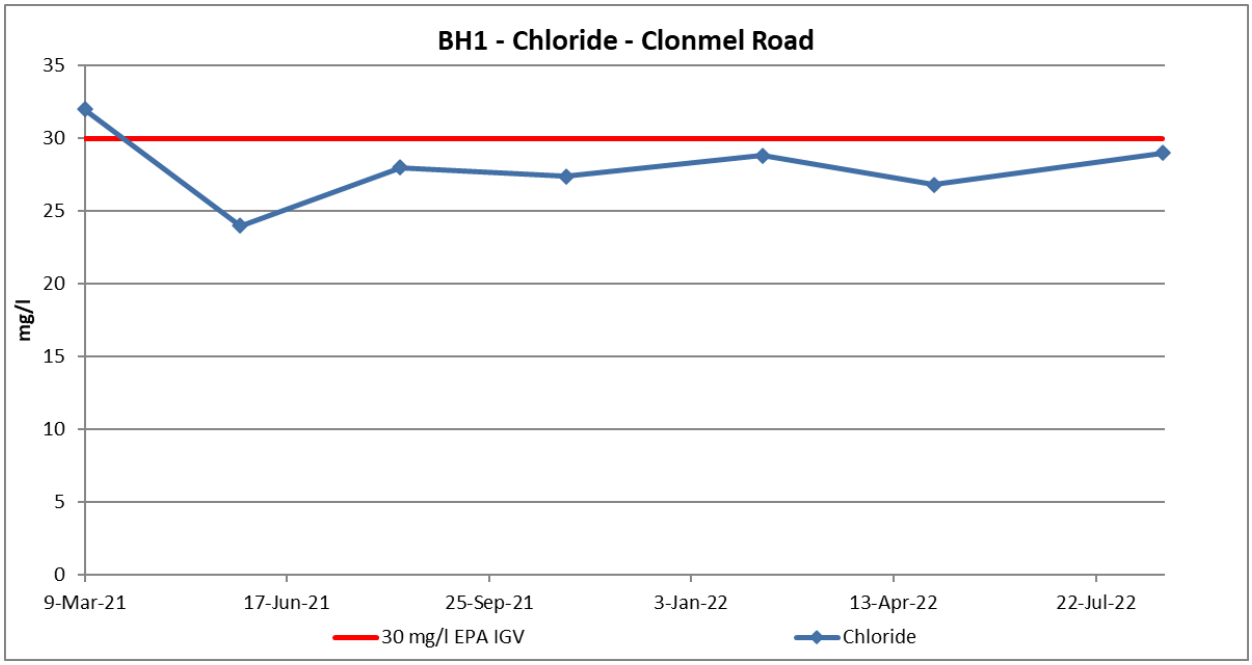
Coliforms were not detected at BH1 in Q3-2022 in elevated count numbers.

Hydrocarbons were not detected at BH1 in Q2-2022.

Overall, the groundwater quality at BH1 is good.


BH1 - Ammonia Clonmel Road
Ammonia (mg/l)
2.5
2
1.5
1
0.5
0
Feb-07
Nov-09
Aug-12
May-15
Feb-18
Oct-20
BH1 - Ammonia
Ammonia Upper GTV 0.175 mg/l
Ammonia Lower GTV 0.065 mg/l


BH1 - Electrical Conductivity - Clonmel Road
Electrical Conductivity (uS/cm)
900
800
700
600
500
400
300
200
100
0
Feb-07
Nov-09
Aug-12
May-15
Feb-18
Oct-20
BH1 - Electrical Conductivity
Electrical Conductivity Lower GTV 800 uS/cm


BH1 - Chloride - Clonmel Road
35
30
25
20
15
10
5
0
mg/l
9-Mar-21
17-Jun-21
25-Sep-21
3-Jan-22
13-Apr-22
22-Jul-22
30 mg/l EPA IGV
Chloride

4.1.2. BHXS

BHXS was drilled along with BHXD in 2016[1]. BHXS (S – Shallow) is located within a concrete paved court yard, accessible only through the plant room. Monitoring commenced in June 2017. Overall, the groundwater quality is reported as good at this monitoring point. This monitoring point runs dry during the summer months.

Ammonia was reported at 1.05 mg/l in Q3-2022. Ammonia has exceeded the SI366/2016 lower GTV of 0.065 mg/l in every monitoring round since monitoring commenced. Overall, ammonia fluctuates at BHXS.

Electrical Conductivity was reported at 676 uS/cm in Q3-2022. Since monitoring commenced in June 2017 all reported electrical conductivity values have been below the lower GTV of 800 uS/cm. Overall, electrical conductivity fluctuates at BHXS.

Chloride was reported at **57 mg/l** in Q3-2022, above the lower TV of 24 mg/l, but below the upper TV of 187.5 mg/l as set out in SI366/2016. The BHXS chloride concentration is twice that reported at the background monitoring point, BH1 (29 mg/l). Overall, chloride is displaying a stable trend at BHXS.

Sodium was reported at **34 mg/l** in Q3-2022, twice that of the concentration reported at the background monitoring point BH1 (15.2 mg/l).

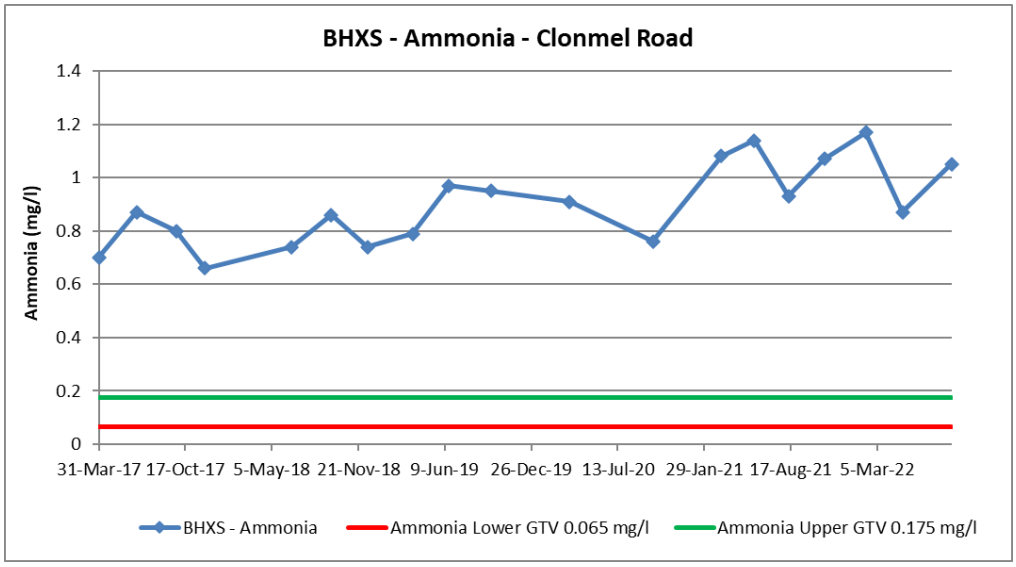
Orthophosphate was reported at 0.14 mg/l in Q3-2022, which is above the SI366/2016 GTV of 0.035 mg/l.

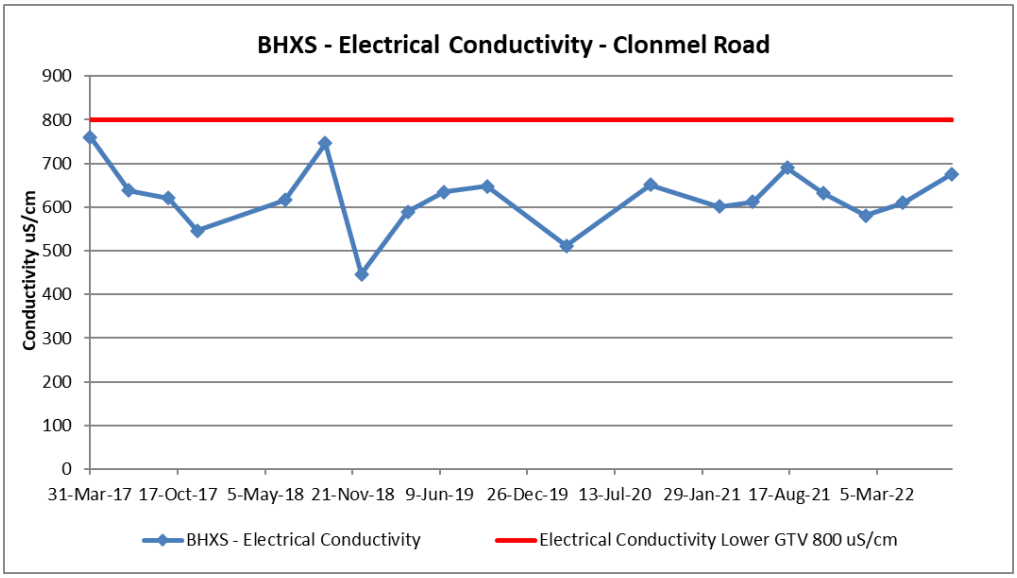
Manganese was reported at **751 ug/**l in Q3-2022, which is significantly above the EPA IGV of 50 ug/l.

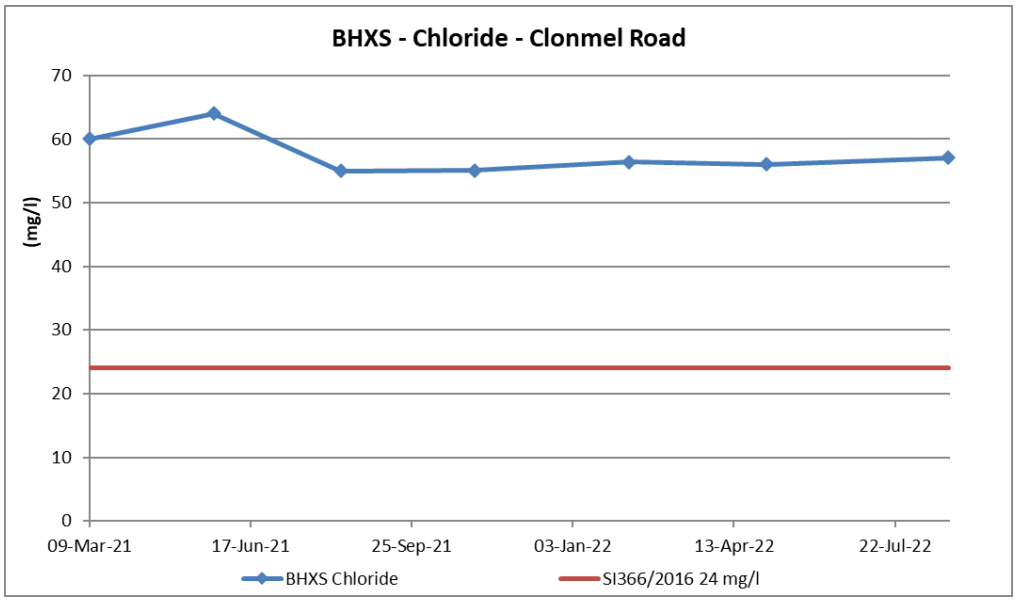
Coliforms were detected at BHXS in Q3-2022.

Hydrocarbons were not detected at BHXS in Q2-2022.

[1] X = 10 – Roman Numerals used to name this borehole. D – Deep. S – Shallow.


BHXS - Ammonia - Clonmel Road
Ammonia (mg/l)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
31-Mar-17 17-Oct-17 5-May-18 21-Nov-18 9-Jun-19 26-Dec-19 13-Jul-20 29-Jan-21 17-Aug-21 5-Mar-22
BHXS - Ammonia
Ammonia Lower GTV 0.065 mg/l
Ammonia Upper GTV 0.175 mg/l


BHXS - Electrical Conductivity - Clonmel Road
Conductivity uS/cm
900
800
700
600
500
400
300
200
100
0
31-Mar-17 17-Oct-17 5-May-18 21-Nov-18 9-Jun-19 26-Dec-19 13-Jul-20 29-Jan-21 17-Aug-21 5-Mar-22
BHXS - Electrical Conductivity
Electrical Conductivity Lower GTV 800 uS/cm


BHXS - Chloride - Clonmel Road
(mg/l)
70
60
50
40
30
20
10
0
09-Mar-21 17-Jun-21 25-Sep-21 03-Jan-22 13-Apr-22 22-Jul-22
BHXS Chloride
SI366/2016 24 mg/l

4.1.3. BH5S

BH5S (S – Shallow) is located in the car park south of the River Gradoge (car space no. 11). The borehole is positioned to act as a shallow down hydraulic-gradient monitoring point for the Clonmel Road complex. It is understood, that the site of the car park was raised with fill material during the early stages of the sites development.

Ammonia was reported at 8.90 mg/l in Q3-2022, up from 0.08 mg/l in Q2-2022.

Ammonia has consistently exceeded the groundwater TV's since monitoring commenced at BH5S in February 2007. The maximum Ammonia concentration reported at BH5S was 40 mg/l in December 2007. Since this peak, Ammonia concentrations have decreased – and fluctuated below 11 mg/l between 2008 and Q3-2022.

The Q3-2022 ammonia concentration is significantly higher at BH5S, than that reported at BHXS (1.05 mg/l). This suggests a contamination source between BHXS and BH5S.

Electrical Conductivity was reported at 823 uS/cm in Q3-2022. This is slightly above the SI366/2016 lower GTV of 800 uS/cm. Overall; electrical conductivity is displaying a stable trend.

Chloride was reported at **63.8 mg/l** in Q3-2022. Chloride has been reported above the lower TV of 24 mg/l, but below the upper TV of 187.5 mg/l as set out in SI366/2016 since monitoring commenced for chloride in Q1-2021. The BH5S chloride concentration is higher than that reported in the background monitoring point, BH1 (29 mg/l) and the monitoring point upgradient of BH5S (BHXS: 57mg/l).

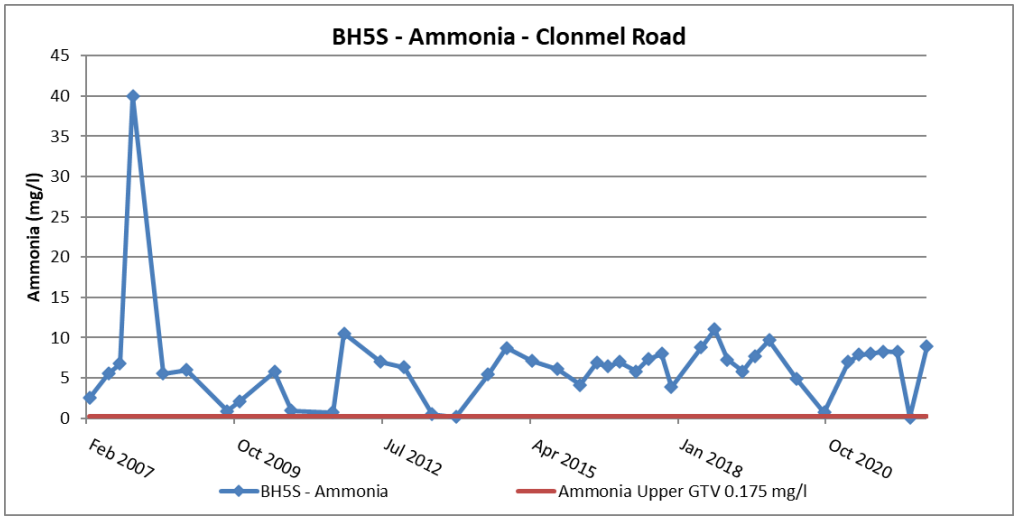
Sodium was reported at **29.4 mg/l** in Q3-2022, above the background concentration of 15.2 mg/l in BH1.

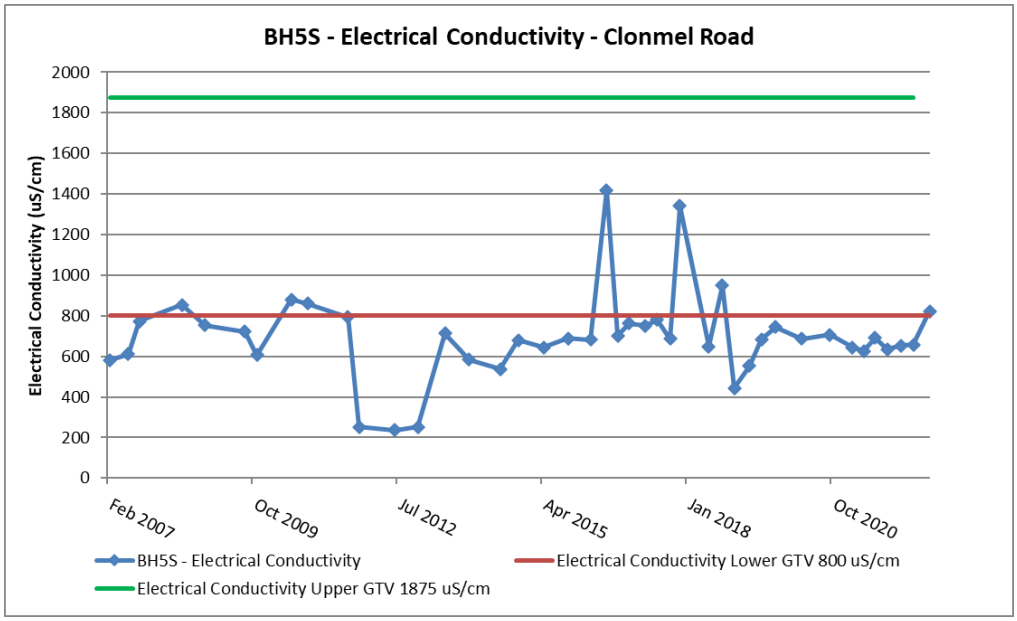
Potassium exceeded the EPA IGV of 5 mg/l, reported at **4.8 mg/l** in Q3-2022.

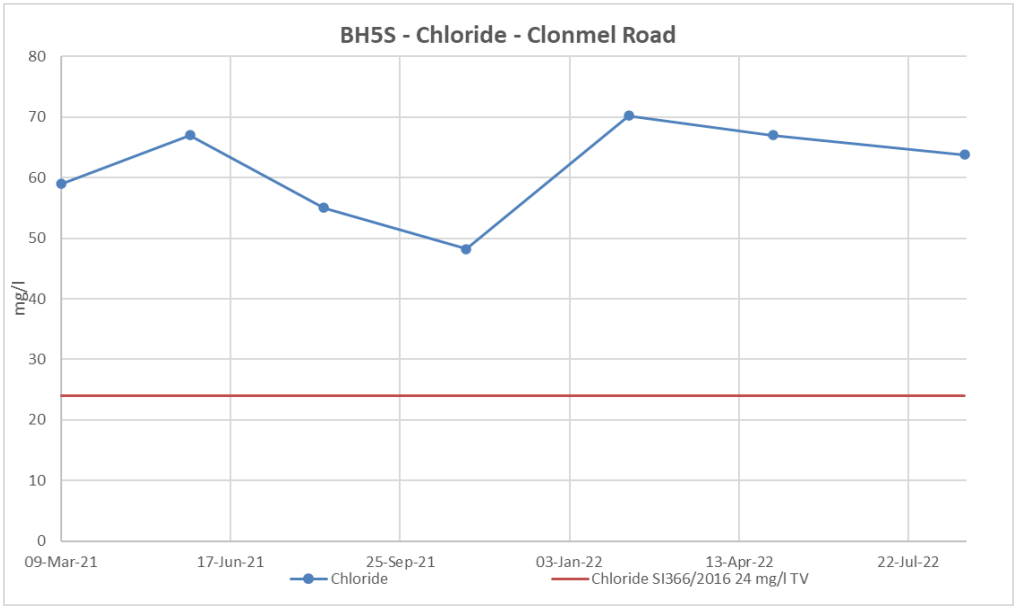
Manganese was reported at **1405 ug/l** in Q3-2022 – above the EPA IGV of 50 ug/l.

COD was reported at 32.5 mg/l in Q3-2022, above the voluntary TV of 25 mg/l.

Hydrocarbons were not detected at BH5S in Q3-2022.


BH5S - Ammonia - Clonmel Road
Ammonia (mg/l)
45
40
35
30
25
20
15
10
5
0
Feb 2007
Oct 2009
Jul 2012
Apr 2015
Jan 2018
Oct 2020
BH5S - Ammonia
Ammonia Upper GTV 0.175 mg/l


BH5S - Electrical Conductivity - Clonmel Road
Electrical Conductivity (uS/cm)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Feb 2007
Oct 2009
Jul 2012
Apr 2015
Jan 2018
Oct 2020
BH5S - Electrical Conductivity
Electrical Conductivity Lower GTV 800 uS/cm
Electrical Conductivity Upper GTV 1875 uS/cm


BH5S - Chloride - Clonmel Road
mg/l
80
70
60
50
40
30
20
10
0
09-Mar-21
17-Jun-21
25-Sep-21
03-Jan-22
13-Apr-22
22-Jul-22
Chloride
Chloride SI366/2016 24 mg/l TV

4.1.4. BH2

BH2 (Shallow) is located down hydraulic-gradient of the Clonmel Road Complex, south of the River Gradoge. The borehole is positioned to act as a shallow, down gradient groundwater monitoring point. The borehole is located in a gravel paved HGV parking area. The well head protection has been improved at this monitoring point, which prevents the ingress of surface water.

Ammonia was reported at **4.68 mg/l** in Q3-2022, up from 4.50 mg/l in Q2-2022. Ammonia has exceeded the SI366/2016 GTV in every monitoring round since March 2017. Ammonia has been displaying an upward trend since December 2013.

Electrical Conductivity was reported at 826 uS/cm in Q3-2022. The maximum Electrical Conductivity value reported was 1007 uS/cm in December 2017. Overall, Electrical Conductivity is displaying an upward trend.

COD was reported at 33.11 mg/l, above the 25 mg/l voluntary TV.

Orthophosphate was reported at 0.48 mg/l in Q3-2022, which is above the SI366/2016 TV of 0.107 mg/l.

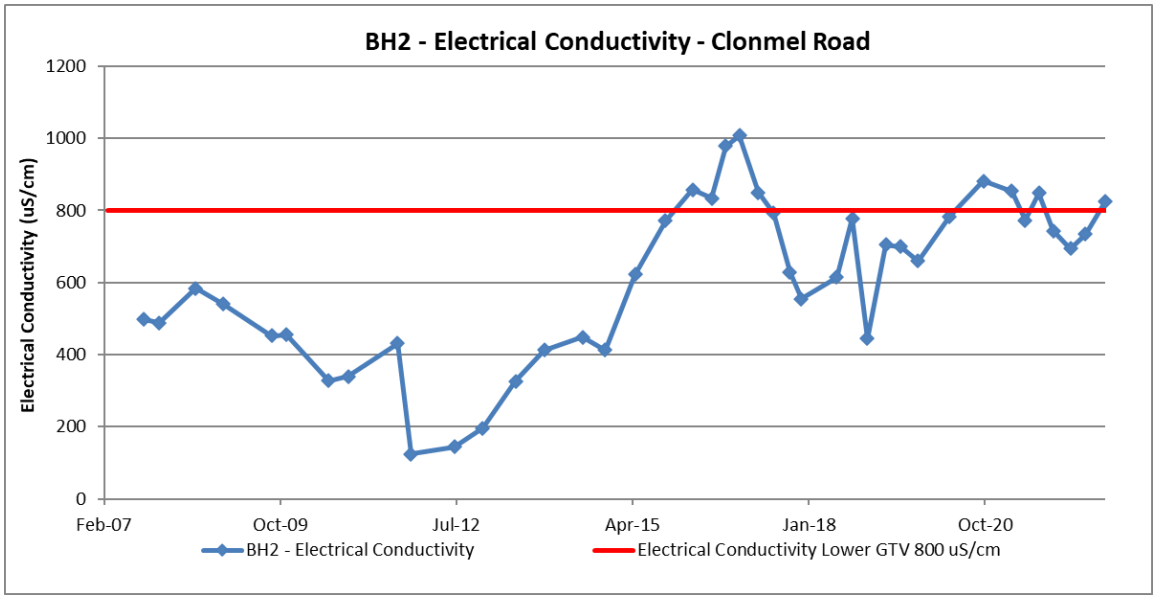
Chloride was reported at **67.5 mg/l** in Q3-2022, above the lower TV of 24 mg/l, but below the upper TV of 187.5 mg/l as set out in SI366/2016. The background concentration of chloride was reported at 29 mg/l in BH1 in Q3-2021.

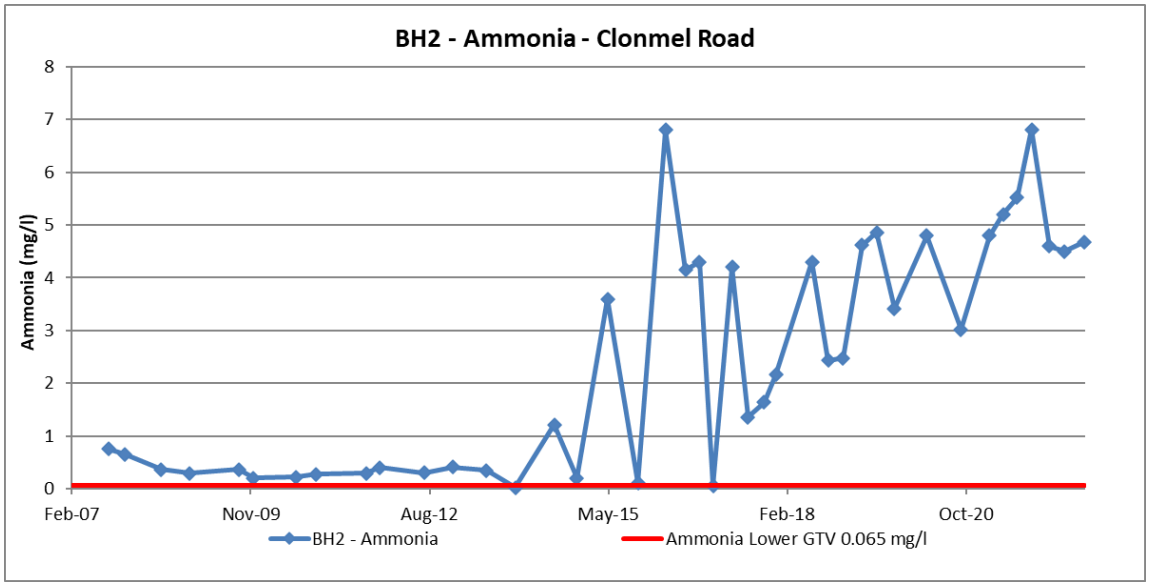
Sodium was reported at **41.8mg/l** in Q3-2022. This is significantly above the background sodium concentration reported at BH1 (15.2 mg/l).

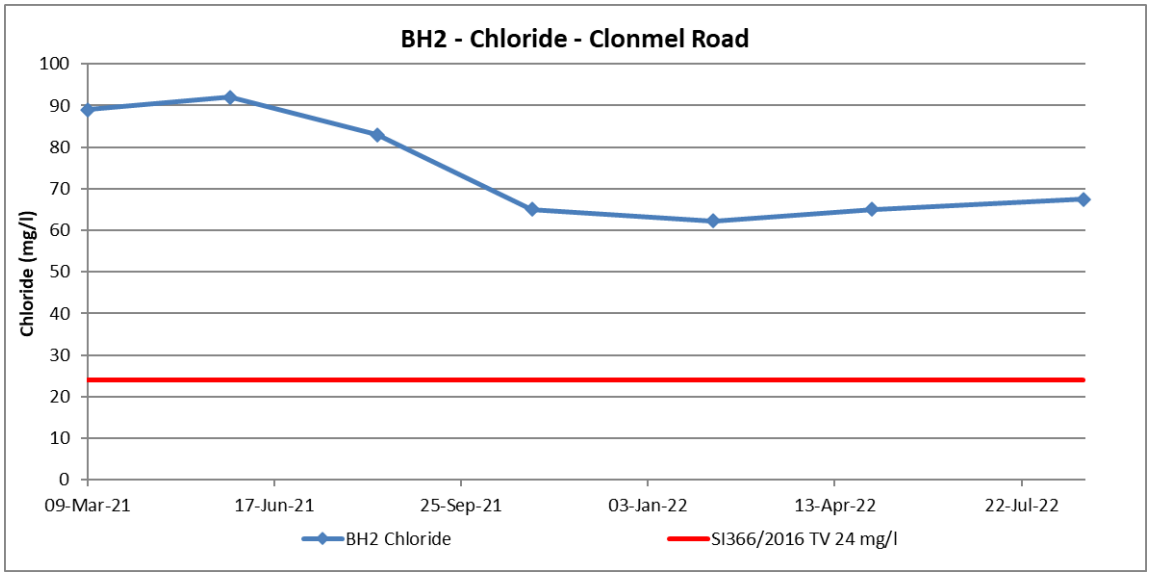
Manganese was reproted at **1155 ug/l** in Q3-2022 – which is in excess of the EPA IGV of 50 ug/l. This is attributed to the underlying bedrock geology.

Potassium was detected at 6.2 mg/l in Q3 2022, slightly above the EPA IGV of 5 mg/l.

Hydrocarbons were not detected at BH2 in Q3-2022.


BH2 - Electrical Conductivity - Clonmel Road
Electrical Conductivity (uS/cm)
1200
1000
800
600
400
200
0
Feb-07
Oct-09
Jul-12
Apr-15
Jan-18
Oct-20
BH2 - Electrical Conductivity
Electrical Conductivity Lower GTV 800 uS/cm


BH2 - Ammonia - Clonmel Road
Ammonia (mg/l)
8
7
6
5
4
3
2
1
0
Feb-07
Nov-09
Aug-12
May-15
Feb-18
Oct-20
BH2 - Ammonia
Ammonia Lower GTV 0.065 mg/l


BH2 - Chloride - Clonmel Road
Chloride (mg/l)
100
90
80
70
60
50
40
30
20
10
0
09-Mar-21
17-Jun-21
25-Sep-21
03-Jan-22
13-Apr-22
22-Jul-22
BH2 Chloride
SI366/2016 TV 24 mg/l

4.1.5. BHXI

BHXI (deep) is positioned to act as a deep, upgradient monitoring point for the Clonmel Road Complex. BHXI was drilled in 2016 and monitoring commenced in April 2017. The monitoring point is located immediately downgradient of a cemetery.

Monitoring recommenced in Q2-2021, as per instructions issued by the EPA in May 2021. Monitoring was paused, as deep groundwater quality was deemed to be satisfactory by the EPA.

Overall, groundwater quality is reported as good at BHXI for Q3-2022, with the key COPCs of ammonia and electrical conductivity reported below their respective TV's.

Ammonia was reported at 0.04 mg/l in Q3-2022 which is below the SI366/2016 GTV of 0.065 mg/l. The maximum ammonia concentration reported at BHXI was 0.33 mg/l in Q2-2017.

Electrical Conductivity was reported at 694 uS/cm in Q3-2022. Electrical conductivity has not exceeded the lower GTV of 800 uS/cm since monitoring commenced.

Orthophosphate was the only parameter reported above the groundwater TV's, at 0.17 mg/l, slightly above the 0.107 mg/l TV.

Chloride was reported at 12.1 mg/l in Q3-2022.

Sodium was reported at 12.2 mg/l in Q3-2022 – within the general background concentration for groundwater in Irish aquifers.

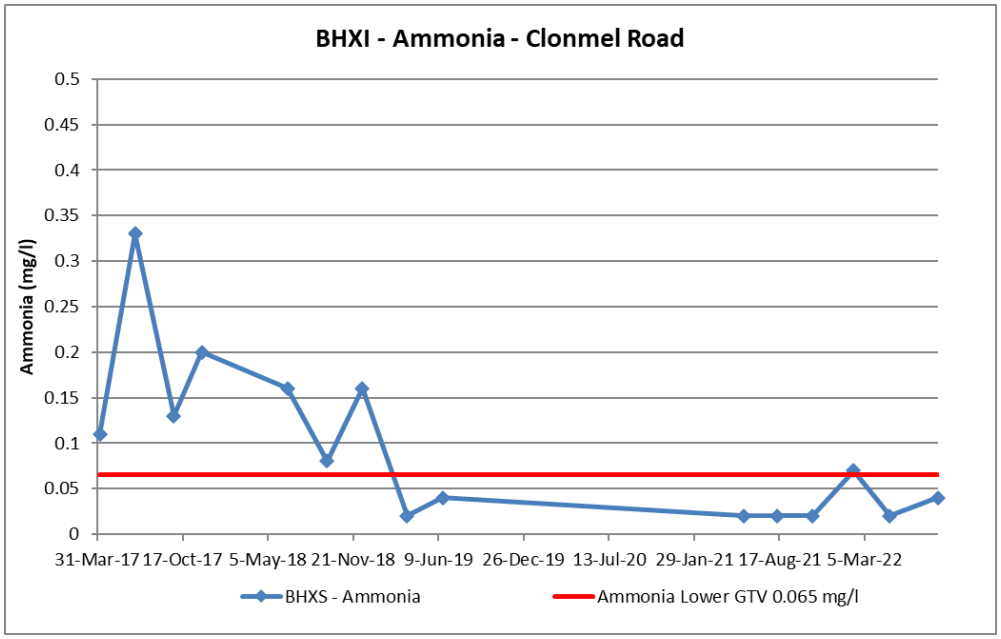
Nickel was reported at 42 ug/l in Q3-2022, above the EPA IGV of 20 ug/l.

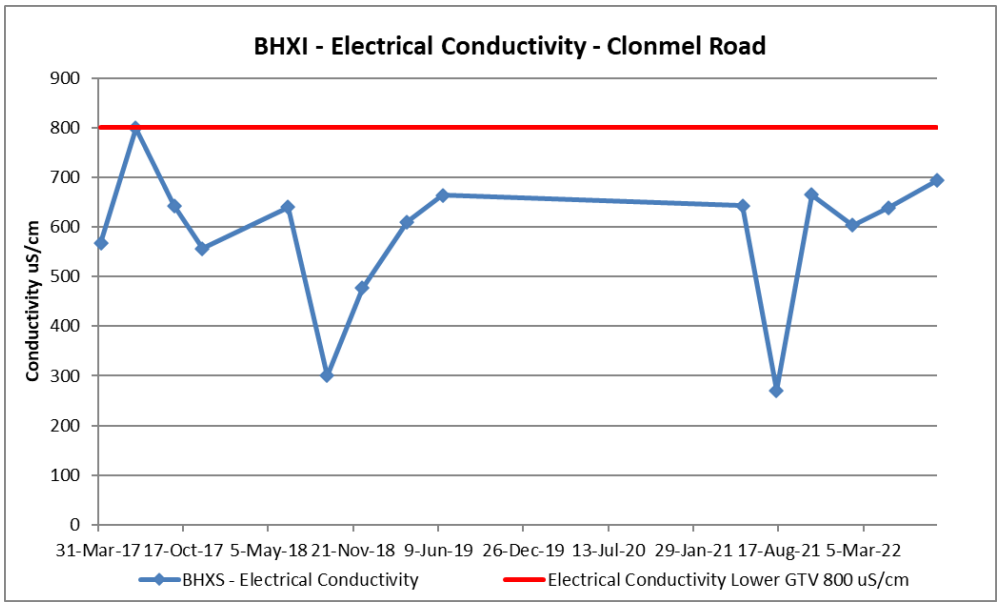
Potassium was reported at 7.7 mg/l in Q3-2022, slightly above the EPA IGV of 5 mg/l.

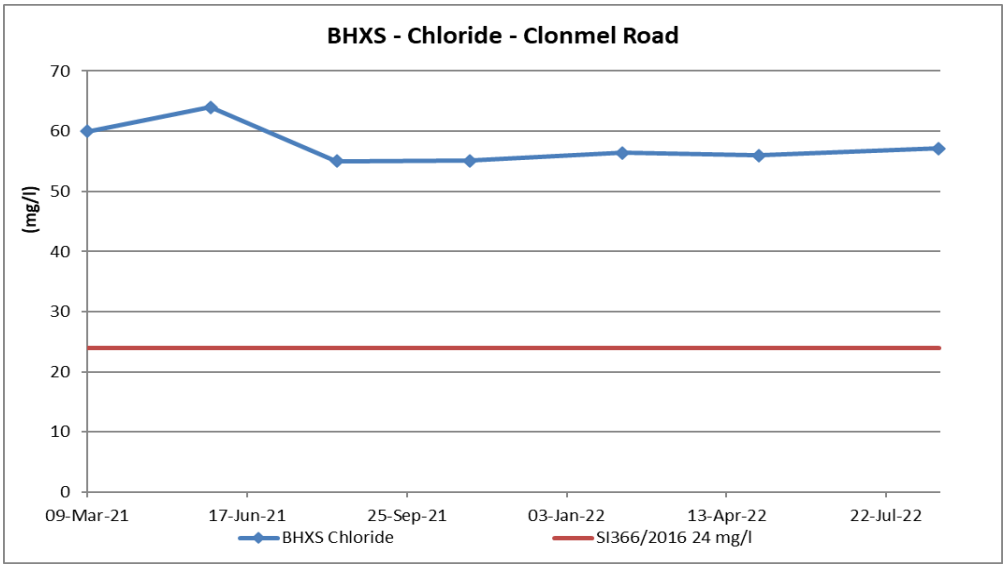
COD and BOD were reported below their voluntary threshold values for Q2-2022.

Coliforms were detected at BHXI in Q3-2022 (117.8 per 1 ml).

Hydrocarbons were not detected at BHXI in Q3-2022.


BHXI - Ammonia - Clonmel Road
Ammonia (mg/l)
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
31-Mar-17 17-Oct-17 5-May-18 21-Nov-18 9-Jun-19 26-Dec-19 13-Jul-20 29-Jan-21 17-Aug-21 5-Mar-22
BHXS - Ammonia
Ammonia Lower GTV 0.065 mg/l


BHXI - Electrical Conductivity - Clonmel Road
Conductivity uS/cm
900
800
700
600
500
400
300
200
100
0
31-Mar-17 17-Oct-17 5-May-18 21-Nov-18 9-Jun-19 26-Dec-19 13-Jul-20 29-Jan-21 17-Aug-21 5-Mar-22
BHXS - Electrical Conductivity
Electrical Conductivity Lower GTV 800 uS/cm


BHXS - Chloride - Clonmel Road
(mg/l)
70
60
50
40
30
20
10
0
09-Mar-21 17-Jun-21 25-Sep-21 03-Jan-22 13-Apr-22 22-Jul-22
BHXS Chloride
SI366/2016 24 mg/l

4.1.6. BH5D

BH5D (deep) is positioned to act as a deep, downgradient monitoring point for the Clonmel Road Complex. BH5D is located adjacent to BH5S (shallow). BH5D was drilled to target the deeper, bedrock aquifer. BH5D is located in a paved tarmac car park, south of the River Gradoge and north of the main processing area at the Clonmel Road Complex/R665 road.

BH5D was drilled in 2016 and monitoring commenced in April 2017. Monitoring recommenced in Q2-2021, as per the instructions issued by the EPA in May 2021. Monitoring was paused, as deep groundwater quality was deemed to be satisfactory by the EPA.

Overall, groundwater quality is reported to be good at BH5D for Q3-2022.

Ammonia was reported at 0.02 mg/l in Q3-2021, which is below the SI366/2016 GTV of 0.065 mg/l. There is no apparent trend evident in ammonia concentrations at BH5D.

Electrical Conductivity was reported at 471 uS/cm in Q3-2022, below the SI366/2016 GTV of 800 uS/cm.

Chloride was reported at 36 mg/l in Q3-2022, which is higher than the background, upgradient concentration (12.1 mg/l at BHXI).

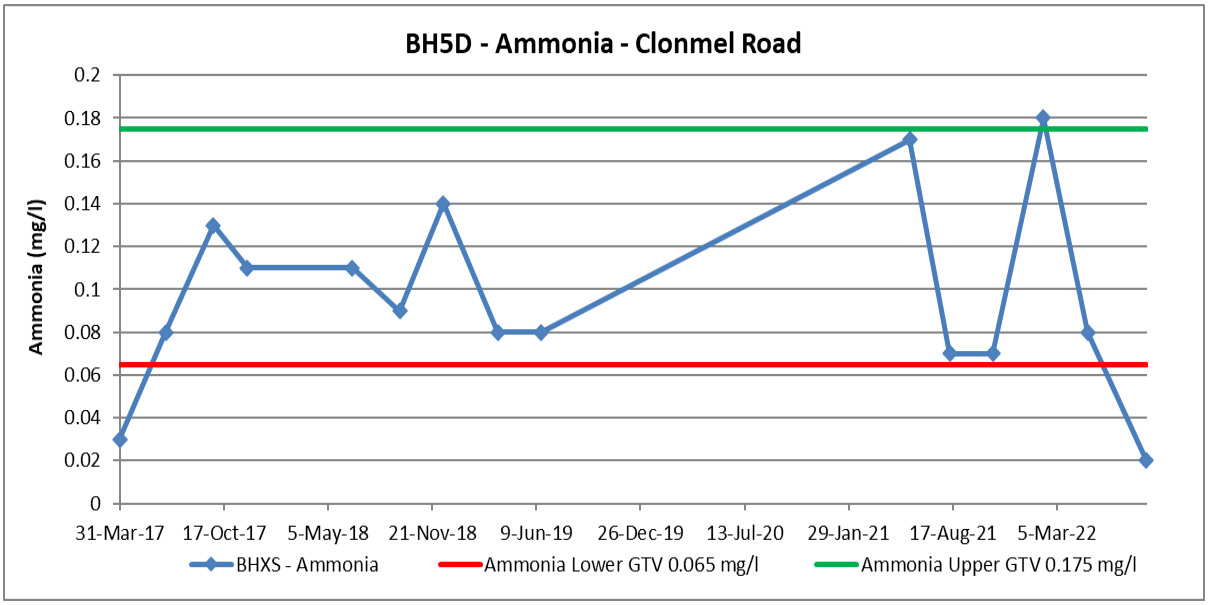
Orthophosphate was reported at 0.20 mg/l in Q3-2022, slightly above the SI366/2016 TV of 0.107 mg/l.

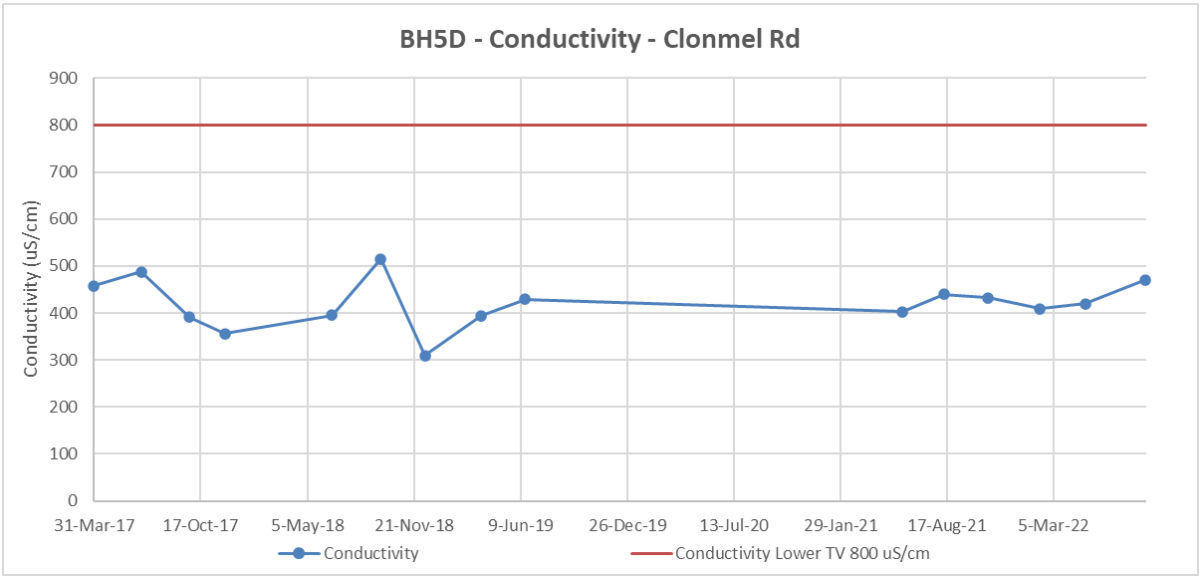
Sodium was reported at 10.30 mg/l in Q3-2022. This is broadly similar to the background sodium concentration for the deep monitoring well: BHXI (12.2 mg/l).

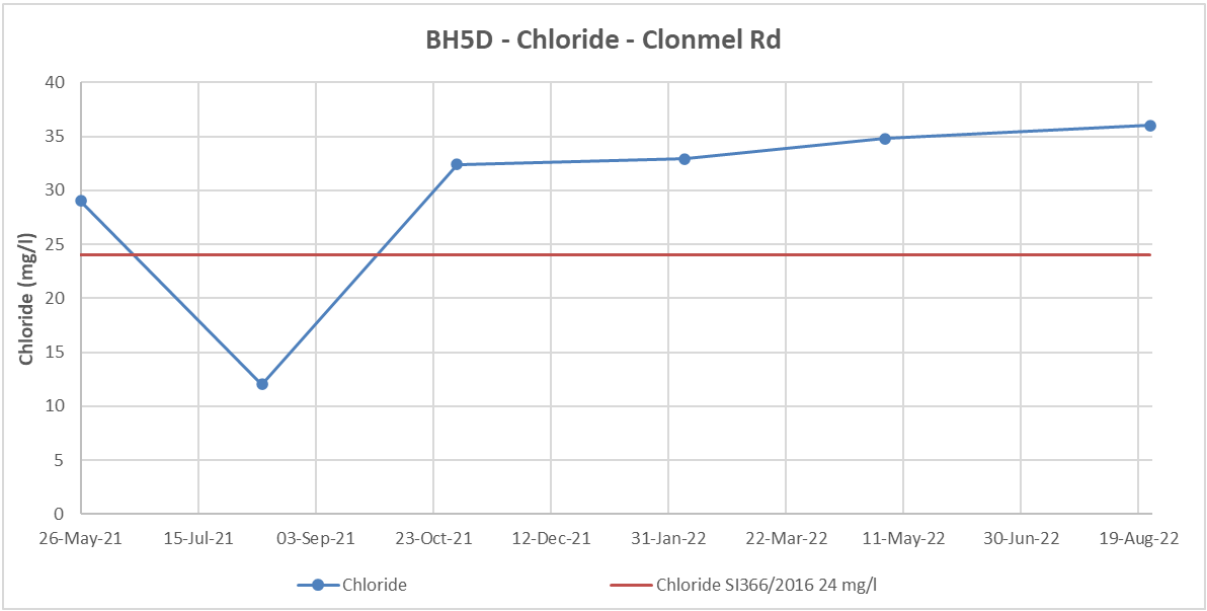
Manganese was detected at 1133 ug/l in Q3-2022 – above the EPA IGV of 50 mg/l. Manganese concentrations are attributed to the underlying bedrock geology.

COD and BOD were reported below their voluntary threshold values for Q3-2022.

Hydrocarbons were not detected at BH5D in Q3-2022.


BH5D - Ammonia - Clonmel Road
Ammonia (mg/l)
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
31-Mar-17
17-Oct-17
5-May-18
21-Nov-18
9-Jun-19
26-Dec-19
13-Jul-20
29-Jan-21
17-Aug-21
5-Mar-22
BHXS - Ammonia
Ammonia Lower GTV 0.065 mg/l
Ammonia Upper GTV 0.175 mg/l


BH5D - Conductivity - Clonmel Rd
Conductivity (uS/cm)
900
800
700
600
500
400
300
200
100
0
31-Mar-17
17-Oct-17
5-May-18
21-Nov-18
9-Jun-19
26-Dec-19
13-Jul-20
29-Jan-21
17-Aug-21
5-Mar-22
Conductivity
Conductivity Lower TV 800 uS/cm


BH5D - Chloride - Clonmel Rd
Chloride (mg/l)
40
35
30
25
20
15
10
5
0
26-May-21
15-Jul-21
03-Sep-21
23-Oct-21
12-Dec-21
31-Jan-22
22-Mar-22
11-May-22
30-Jun-22
19-Aug-22
Chloride
Chloride SI366/2016 24 mg/l

5. SURFACE WATER - CLONMEL ROAD COMPLEX

The River Gradoge is sampled upstream (SW1) and downstream (SW2) of the Clonmel Road Complex.

Dairygold do not discharge any process water or effluent directly to the River Gradoge from the Clonmel Road Complex. All effluent/process water is taken from the Clonmel Road Complex to the Castlefarm Effluent Plant 650 m away via a gravity pipeline.

There are two combined sewer overflow points to the east and west of Dairygold, which are known to surcharge during extreme rainfall events and overflow into the Gradoge.

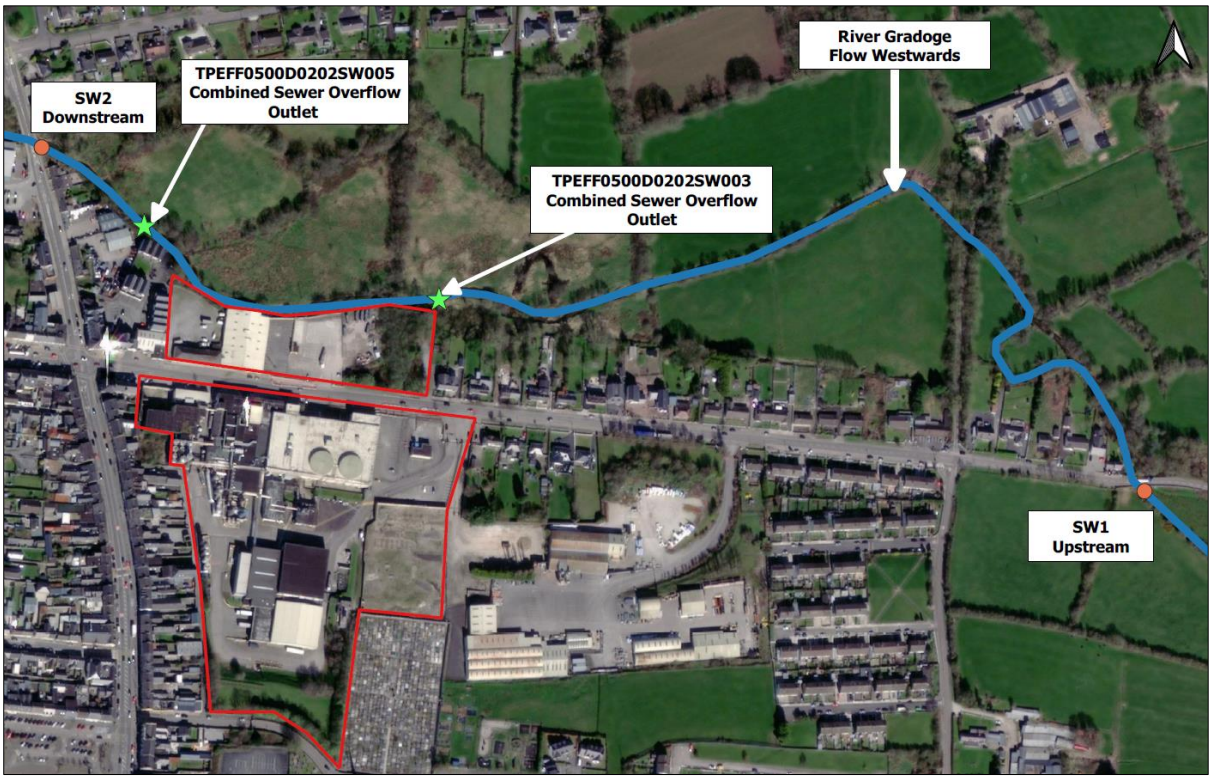


Figure 6 – Clonmel Road Surface Water Monitoring Points

5.1.1. SW1

SW1 is located on the River Gradoge, upstream of the Clonmel Road Complex.

BOD was reported at 1 mg/l, which is low.

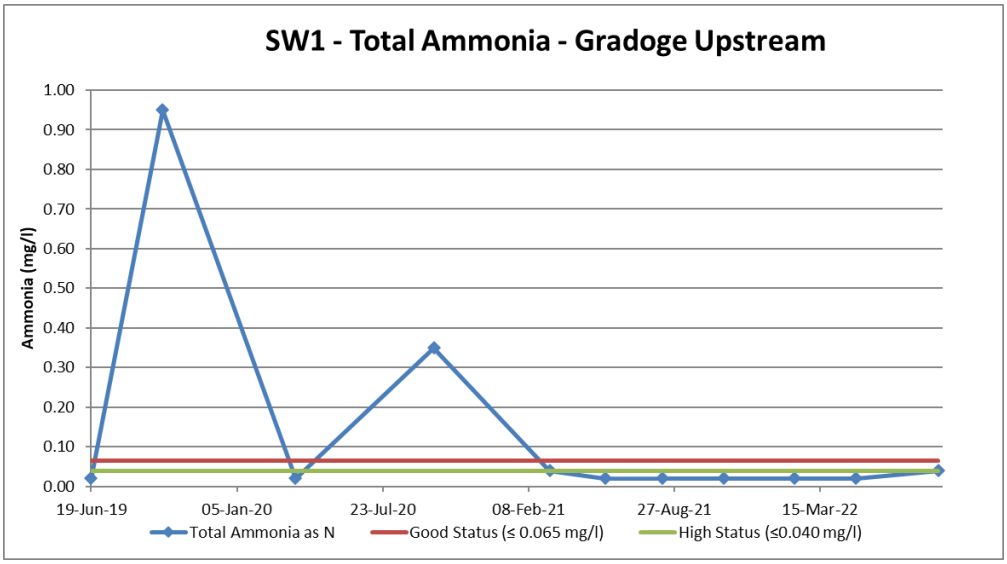
Ammonia was reported at 0.04 mg/l which is low, and within the EQS of high status waters (≤ 0.040 mg/l).

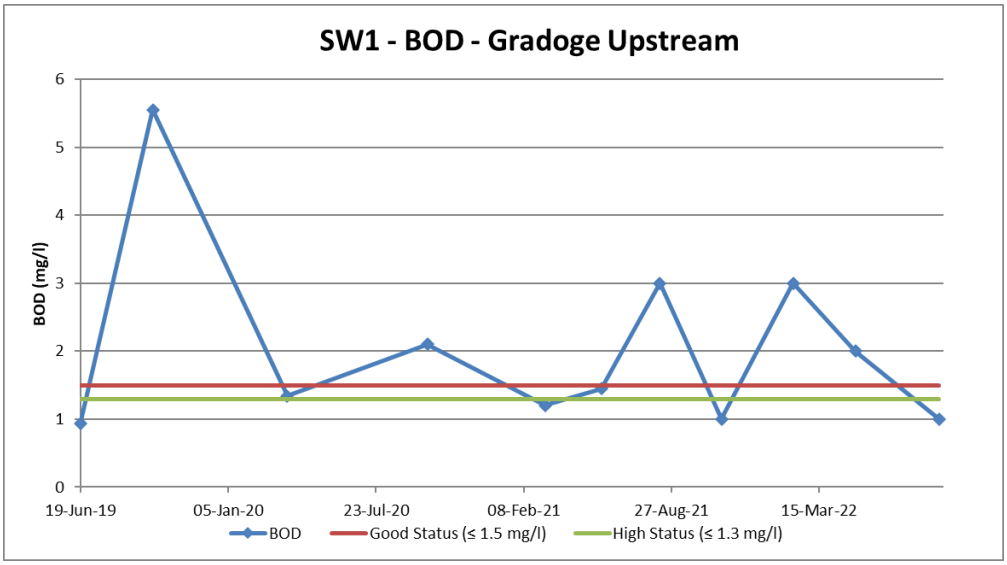
Orthophosphate was reported at 0.14 mg/l. This is above the 0.045 mg/l good status EQS value.

Chloride was reported at 17.7 mg/l which is low for a surface water body.

Nitrate as NO_3 was reported at 19.04 mg/l in Q3-2022 which is low for a catchment dominated by dairy farming.

Overall, SW1 reported good water quality.





5.1.2. SW2

SW2 is located on the River Gradoge, downstream of the Clonmel Road Complex.

BOD was reported at 1 mg/l, which is low.

Ammonia was reported at 0.04 mg/l which is low, and within the EQS of high status waters (≤ 0.040 mg/l).

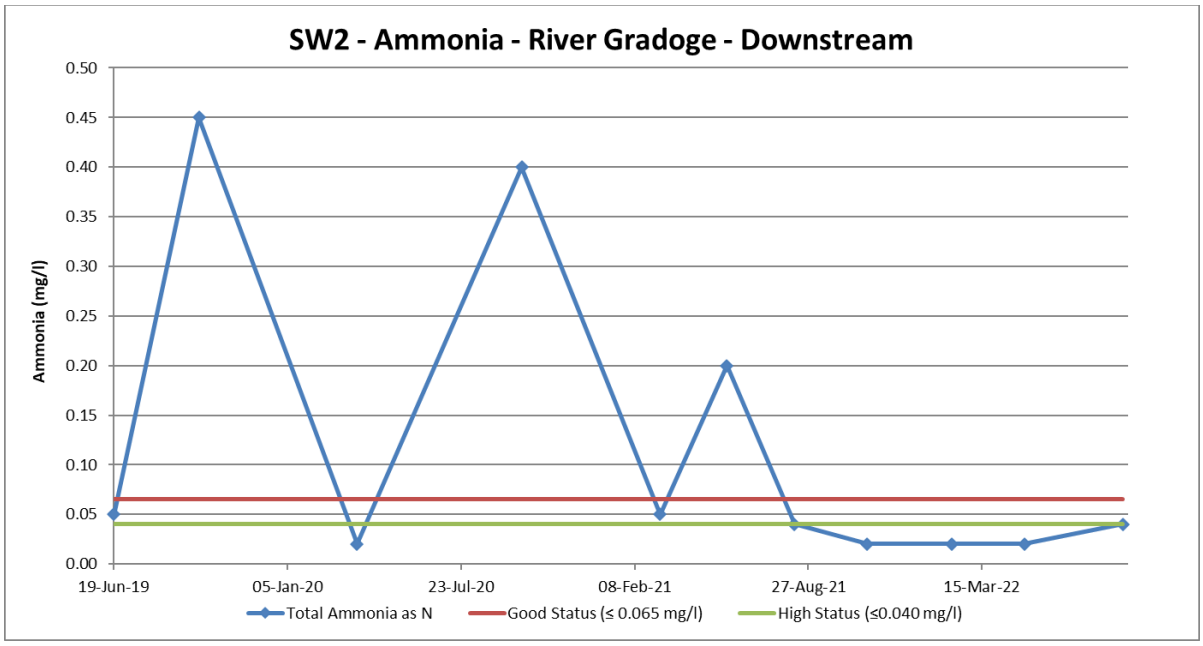
Orthophosphate was reported at 0.06 mg/l, which is low. This is above the 0.045 mg/l good status EQS value. SW2 orthophophsate is lower than the SW1 orthophosphate concencentation.

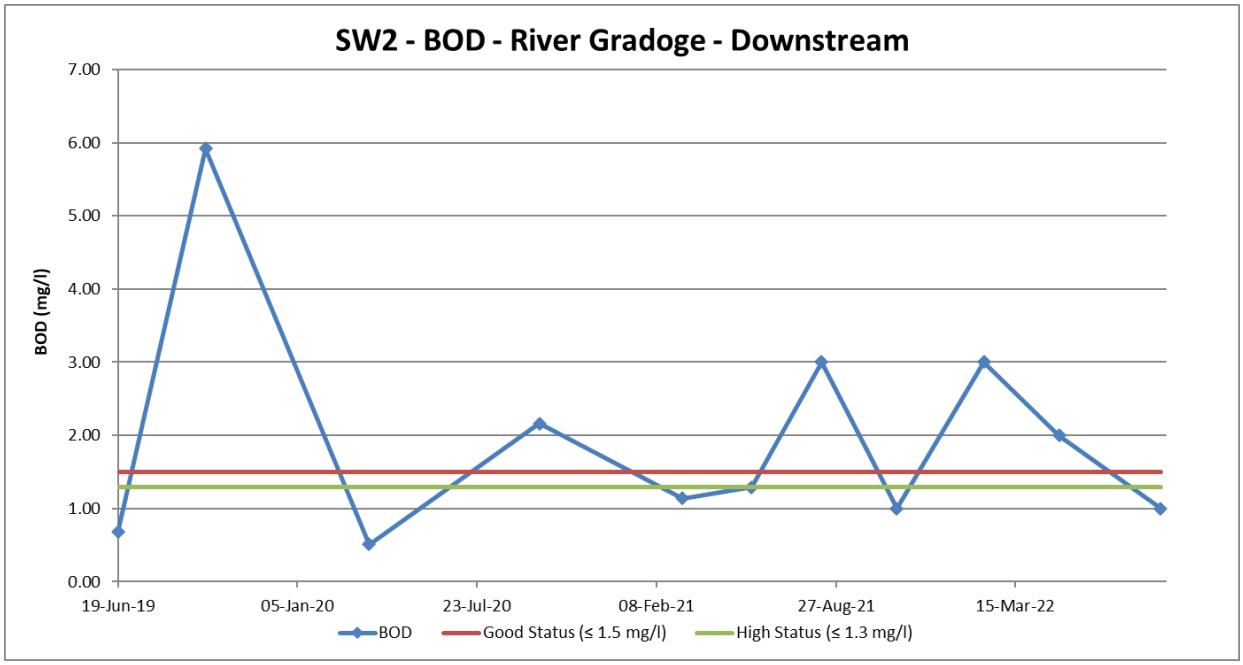
Chloride was reported at 24.6 mg/l which is low for a surface water body.

Nitrate as NO_3 was reported at 18.15 mg/l, which is low.

Overall, SW2 reported good water quality.

There is no major difference in the water quality between SW1 and SW2 at the Clonmel Road Complex. Thus, there is no evidence the Clonmel Road complex is having an impact on the water quality of the River Gradoge.





6. SURFACE WATER - CASTLEFARM COMPLEX

IE Consulting commenced surface water monitoring at the Castlefarm Complex in Q1-2022 at the instruction of Dairygold along the River Gradoge at the Castlefarm Complex. The Mill Stream is dammed, and all water captured behind the dam is pumped to the Dairygold effluent plant for treatment. Once a sufficient databaset is established, trend graphs will be plotted.

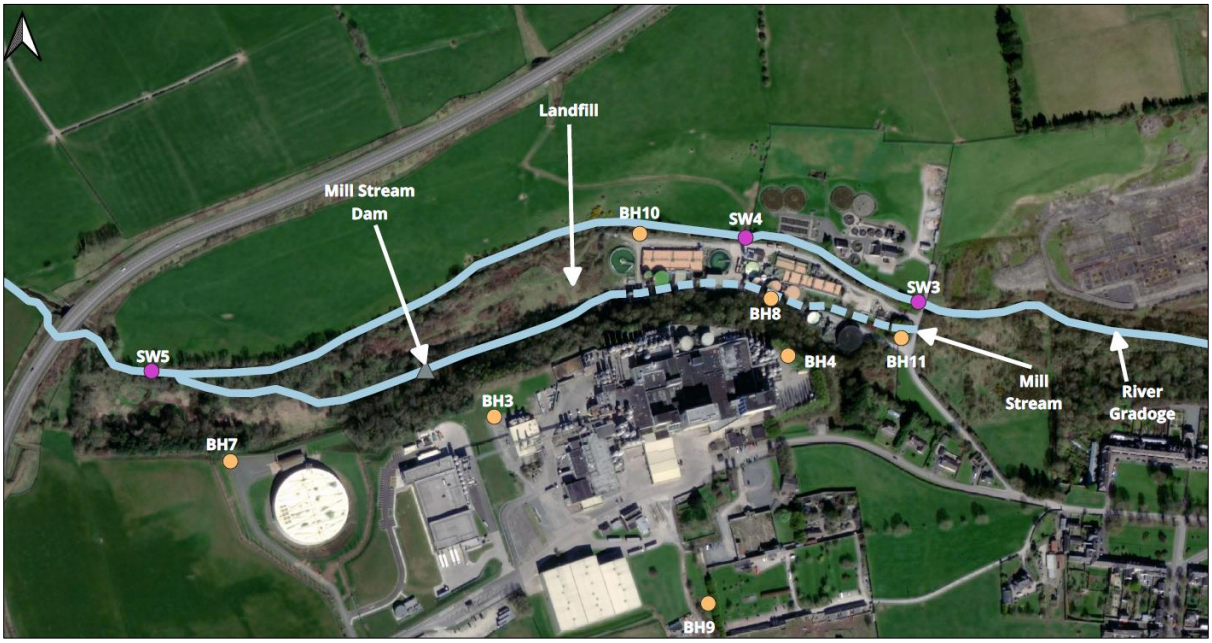


Figure 7 – Castlefarm Surface Water Monitoring Points

6.1.1. SW3

SW3 is located on the River Gradoge, at the bridge into the Irish Water WWTP. SW3 monitors surface water quality upstream of the Irish Water WWTP overflow spillway. The treated effluent from the Irish Water WWTP is discharged to the River Funshion via a pipeline.

BOD was reported at <1 mg/l, which is low.

Ammonia was reported at 0.06 mg/l which is low, and within the EQS of good status waters (≤ 0.065 mg/l).

Orthophosphate was reported at 0.12 mg/l in Q3-2022. This is above the good status EQS value of 0.035 mg/l.

Chloride was reported at 24.3 mg/l which is low for a surface water body.

Overall, SW3 reported good water quality

6.1.2. SW4

SW4 is located on the River Gradoge, at the bridge into Fitzgerald's field. SW4 monitors surface water downstream of the Irish Water WWTP overflow spillway and upstream of the Dairygold landfill. The treated effluent from the Irish Water WWTP is discharged to the River Funshion via a pipeline.

BOD was reported at <1 mg/l, which is low.

Ammonia was reported at 0.02 mg/l which is low, and within the EQS of high status waters (≤ 0.040 mg/l).

Orthophosphate was reported at 0.08 mg/l in Q3-2022. This is above the good status EQS value of 0.035 mg/l.

Chloride was reported at 24.4 mg/l which is low for a surface water body.

Nirate as NO_3 was reported at 15.93 mg/l.

Overall, SW4 reported good water quality.

6.1.3. SW5

SW5 is located downstream of the landfill, the Mill Stream confluence with the River Gradoge and the Castlefarm Stormwater Outfall Point (SW-CF1). The Mill Stream is dammed, and all water in the stream is pumped back to the Dairygold Effluent plant for treatment.

BOD was reported at 1 mg/l, which is low.

Ammonia was reported at 0.03 mg/l which is low, and within the EQS of high status waters (≤ 0.040 mg/l).

Orthophosphate was reported at 0.09 mg/l in Q3-2022. This is above the good status EQS value of 0.035 mg/l.

Chloride was reported at 25 mg/l which is low for a surface water body.

Nitrate as NO_3 was reported at 15.94 mg/l.

Overall, SW5 reported good water quality.

There is no deterioration in surface water quality between SW3, SW4 and SW5 on the River Gradoge. Key indicator parameters of BOD, ammonia and chloride were reported in low concentrations and were largely stable moving downstream of the Irish Water Mitchelstown Wastewater Treatment Plant.

7. DISCUSSION & CONCLUSION

The Castlefarm and Clonmel Road Complex are monitored on a quaterly basis, along with the River Gradoge. The main contaminants of concern are electrical conductivity and ammonia. Salts are also considered to be ''watch list'' parameters.

Castlefarm Complex

BH6 reports good groundwater quality, with high chloride concentrations reported. This is attributed to road salting on the adjacent N73.

BH7 reports good groundwater quality with high sodium detected, which is understood to be associated with a former farm yard and lagoon in this general area.

BH9 reports low chloride, and the highest nitrate concentrations onsite. Nitrate is displaying an upward trend. The source of nitrate is not clear, however it is possible it is associated with intensive agriculture upgradient or the presence of a former farm yard in this general area which was once used as a sludge store c. 40 years ago.

A localised zone of contamination is present within the footprint of the main processing area, as identified in BH3, BH4 and BH8

- BH4 reports the highest total nitrogen, ammonia and chloride concentrations onsite. Ammonia, sodium and chloride are showing downward trends. pH values have stabilised.
- BH8 is downgradienet of the main processing area and is showing an improvement, with ammonia, chloride, sodium and potassium showing downward trends.
- BH3 continues to report poor groundwater quality, despite an improvement in ammonia. Salts are showing signs of a stable/semi stable trend.

BH11 continues to report poor groundwater quality. This may be influenced by residual contamination from former leaking pipes from Cork Marts, septic tanks and its location into the former landfill. Potassium, sodium and ammonia and displaying downward trends.

BH10 reports good groundwater quality.

The plume of contamination originating from the main processing is migrating with groundwater flow both to the north and northwest. The groundwater flow dispersal is influenced by a groundwater mound around BH4.

The outcome of a DQRA in 2022 (IE2531-5488) concluded that intervention would be required to prevent a contamination of the River Gradoge and the wider regionally important aquifer. Dairygold are managing the contamination in two ways:

1. A phased and progressive infrastructure upgrade programme to remove sources of contamination (leaking pipework) and measures to limit mobilisation of any residual contaminants in the ground.
2. There has been a marked downward trend in key parameters such as COD, BOD, pH, sodium, potassium and chloride since these works commenced. pH has stabilised as BH4. This is attributed to the infrastructure upgrade works undertaken since 2016. These works are on-going.
3. The plume of contamination is captured at key discharge points at the base of the escarpment by capturing springs and by using the Mill Stream as an interceptor. The Mill Stream is dammed to stop water entering the River Gradoge and the water is diverted to the effluent plant for treatment.

There is no evidence to suggest that the plume is migrating to the River Gradoge, as indicated by the good groundwater quality at BH10. The Q3-2022 monitoring demonstrates these interventions are sufficient at preventing a deteriaotrion in the groundwater quality in the wider Mitchelstown GWB.

Clonmel Road Complex

Dairygold's infrastructure improvement programme has broken multiple pathways for contamination to enter the subsoil and groundwater through the automation works completed in 2007/2012 and the infrastructure improvement programme from 2015-2021 at the Clonmel Road Complex.

The shallow groundwater quality onsite, in the saturated gravels which sit on top of the locally important bedrock aquifer was identified as being the most vulnerable from licenced operations as part of a DQRA completed in 2022 (IE2531-5417).

BH1 monitors shallow background water quality at the Clonmel Road Complex. Groundwater quality is good at BH1.

BHXS reported elevated ammonia, orthophospahte, chloride and sodium concentations in Q3-2022.

BH5S reported elevated ammonia and chloride concentrations in Q3-2022. The Q3-2022 downgradient ammoina result at BH5S (8.90 mg/l) is higher than the upgradient BHXS (1.05 mg/l) result. This suggests that there is a source of contamination between BH5S and BHXS, which is understood to be the mains Irish Water sewer running east – west along the R665 road.

BH2 reported elevated ammonia, chloride, sodium and potassium in Q3-2022.

Deep groundwater quality is reported as good at the Clonmel Road Complex at BHXI and BH5D.

Groundwater Levels

The generalised groundwater flow direction for the Castlefarm Complex is to the north towards the River Gradoge/Mill Stream. However, the mound may induce some west/north westward flow also.

A groundwater mound continues to be reported at BH4 at the Castlefarm Complex. The reasons for the groundwater mound are not immediately clear.

The groundwater flow direction for the Clonmel Road Complex is South East to the North West, toward the River Gradoge.

Hydrocarbons

Hydrocarbons were not detected at the Clonmel Road Complex.

BH4 is the only monitoring point in the vicinity of the main processing area at the Castlefarm Complex to report hydrocarbons.

Hydrocarbon contamination at BH4 is showing a strong downward trajectory, from 71,740 ug/l in March 2018 to 540 ug/l in August 2021. The DQRA completed in 2022 (IE2531-5488) established that the that the oil is stuck in a fissure system within the limestone bedrock at c. 14.00 mbgl.

When correlated with reduced water levels, hydrocarbons are only detected in the laboratory analysis when the water level rises above 86 mOD / c. 14 mbgl.

When the water level is reported at 85 mOD and below, the laboratory analysis reports all bands at the limit of detection, depsite physical observations suggesting hydrocarbons in the

purged water.

This suggests that when the water level rises above 86 mOD, there is sufficient contact time between the oil and water table for the hydrocarbons to enter the dissolved phase. The laboratory analysis reports hydrocarbons in the dissolved phase.

There is no evidence to suggest that the hydrocarbons are migrating from BH4, with no hydrocarbons deterected at BH8, BH10 or BH11.

BH3 Temperature

BH3 constantly reports the highest temperature. This is attributed to the proximity of BH3 to a subsurface sump, which receives blow down from the CHP plant. The CHP plant is gas powered and is used to generate energy to power the Castlefarm Complex. The blow down waters are cooled to temperatures of around 40°C

IE Consulting understands a new sump was built to capture the blow down. It is suspected that there is a leak from this sump which is understood to account for the high temperature in BH3, the sump and pipe discharges at the base of the escarpment.

The sump was repaired by Dairygold in August 2022. It is expected with time that temperature data should stabilise at BH3. It should be acknowledged that the close proximity of BH3, the sump and pipe to the CHP plant, will result in ground warming and consequently elevated groundwater temperatures are likely unavoidable in this area.

River Gradoge

The River Gradoge displays good water quality, with no evidence of any impact from the licenced operations at the Castlefarm or Clonmel Road Complex or the capped landfill.

The mitigation measures implement by Dairygold at the Castlefarm Complex are successful in preventing groundwater contamination from beneath the main processing area reaching the River Gradoge. These are borne out by surface water sampling on the River Gradoge.

The River Gradoge is more vulnerable to short term contamination spikes from combined sewer overflows and discharge through the Irish Water Mitchelstown WWTP overflow spillway, than the licenced operations at Dairygold.

8. RECOMMENDED WAY FORWARD

The following actions are recommended

1. Quarterly groundwater monitoring is recommended to continue at the Castlefarm Complex, Effluent Plant and the Clonmel Road Complex for the list of parameters contained in the EPA licence and the additional parameters requested in correspondence received in February 2021. Monitoring should also continue at the River Gradoge for these parameters on a quarterly frequency also.

   Reason: to monitor for further deteriorations/improvements in groundwater/surface water quality and to monitor for trends in key parameters of concern (Ammonia and Electrical Conductivity).

oo00oo

Respectfully submitted
On behalf of IE Consulting

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IE Consulting

Jerome Keohane
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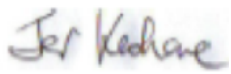

Technical Director
IE Consulting

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Appendix A

Figures & Drawings

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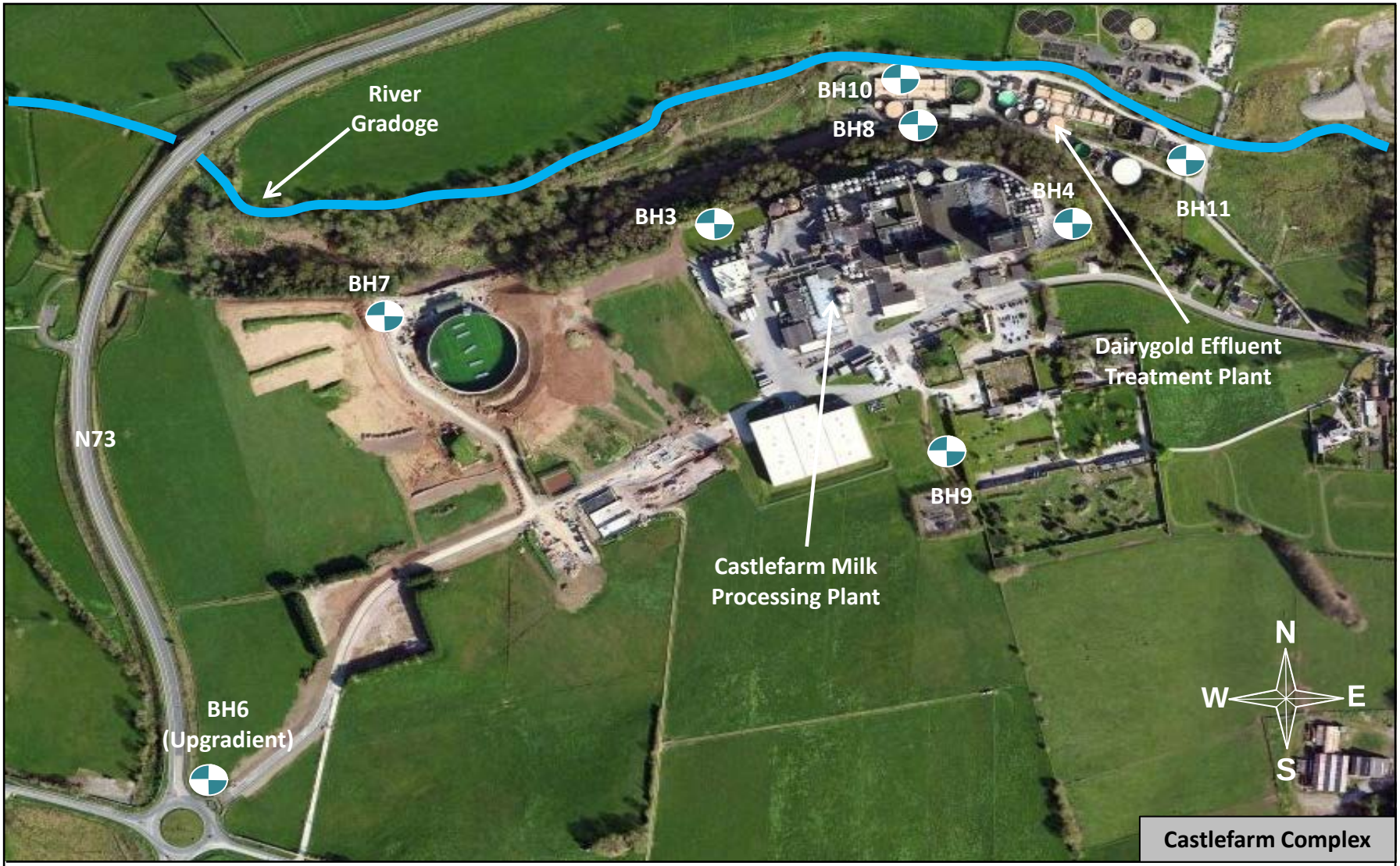
Project Title:	Dairygold Monitoring Report
Project Address:	Mitchelstown, Co. Cork
Client:	Dairgygold Mitchelstown
Drg. Title:	Location Map (OSI, 2020)

Drg. Scale:	Date:	Dwg No:	Job No:	Revision:	Dwg. By :
NTS	14/02/2020	IE1486-001	IE1486	A	KM



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Project Address:	Mitchelstown, Co. Cork
Client:	Dairgygold Mitchelstown
Drg. Title:	Castlefarm & Effluent Plant Monitoring Well Network

Drg. Scale:	Date:	Dwg No:	Job No:	Revision:	Dwg. By :
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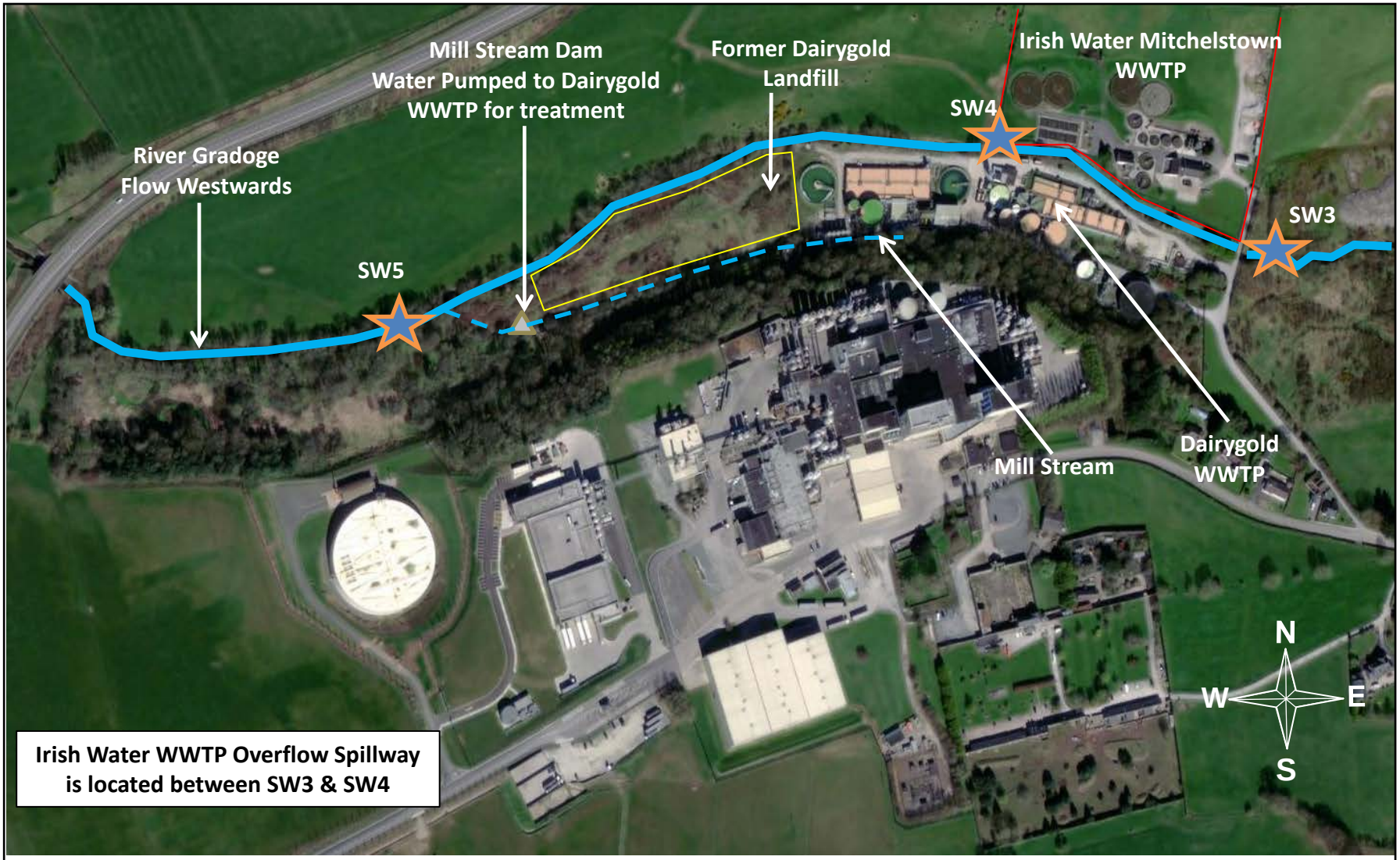

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Project Address:	Mitchelstown, Co. Cork
Client:	Dairgygold Mitchelstown
Drg. Title:	Effluent Plant Surface Water Monitoring Points

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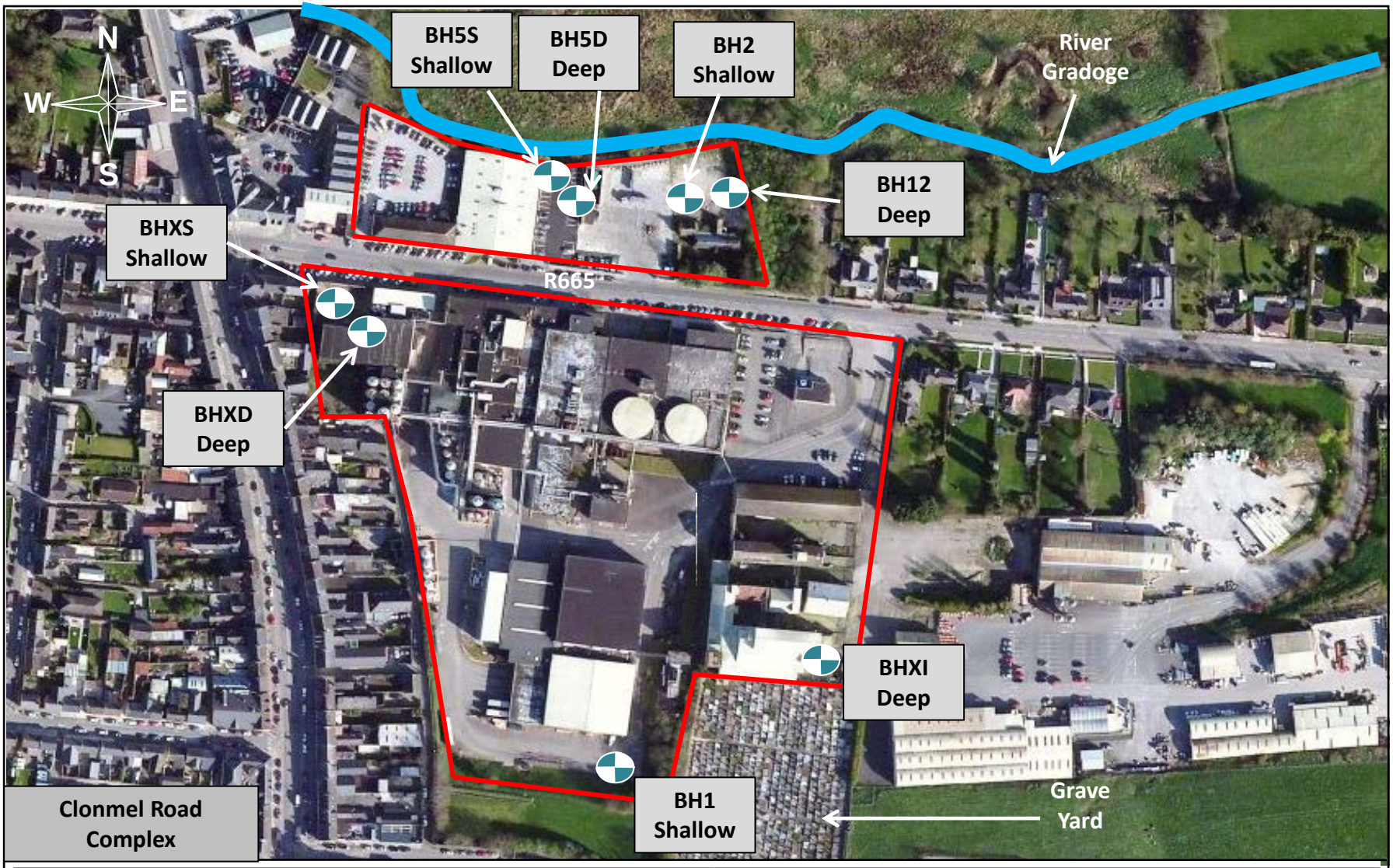

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Client:	Dairgygold Mitchelstown
Drg. Title:	Clonmel Road Complex Groundwater Monitoring Network (Bing, 2020)

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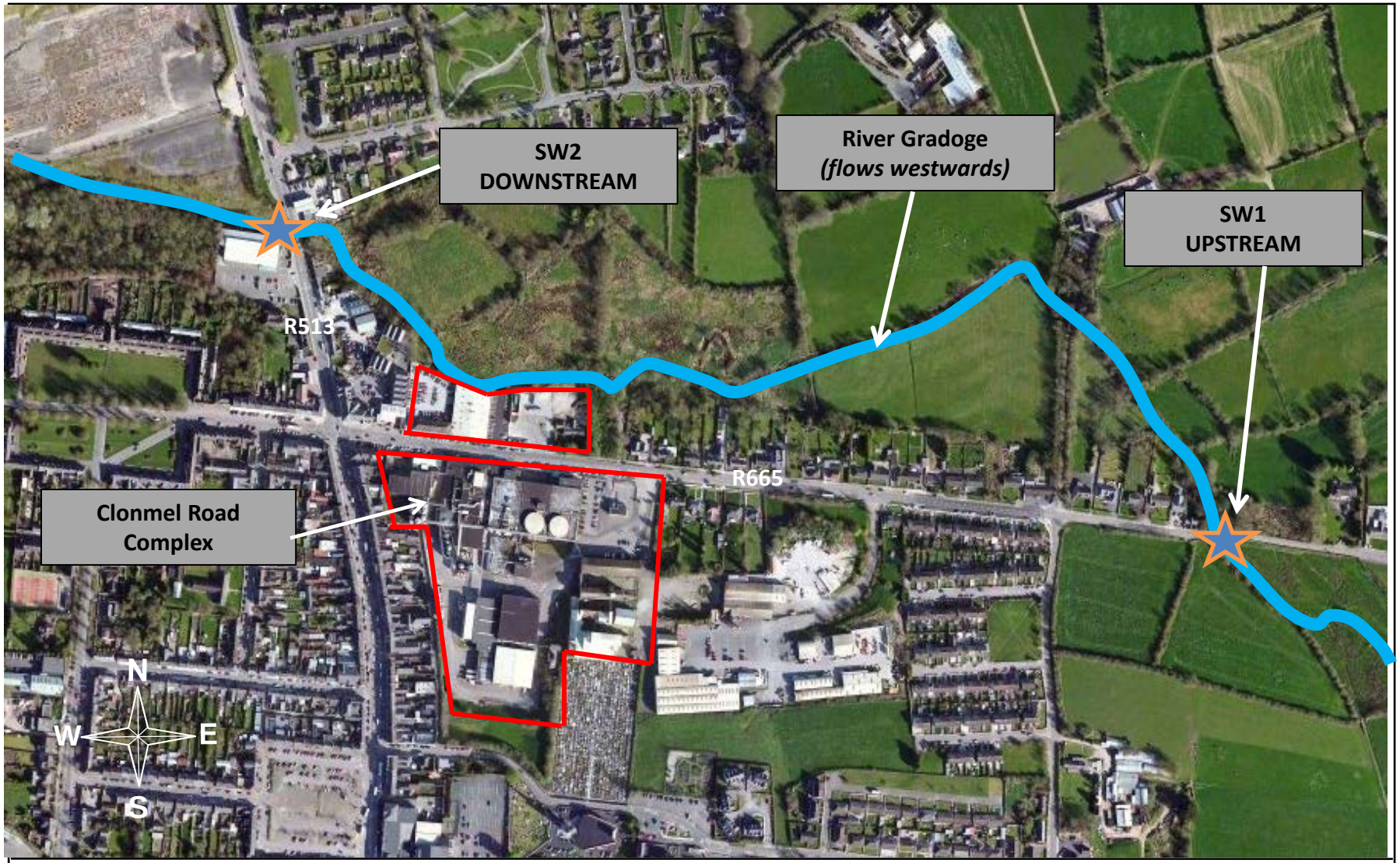

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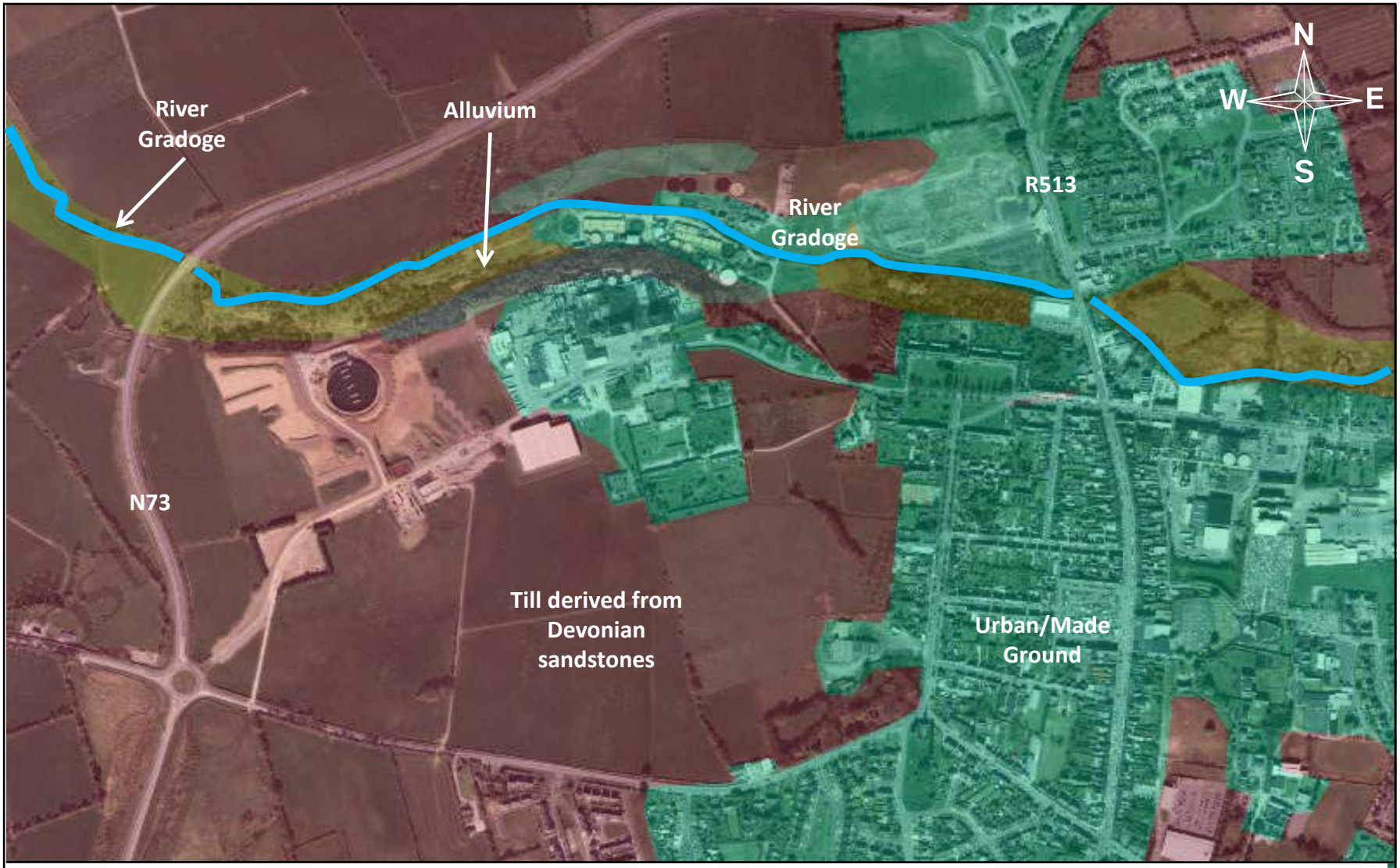

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Client:	Dairgygold Mitchelstown
Drg. Title:	Castlefarm Subsoils (GSI, 2019)

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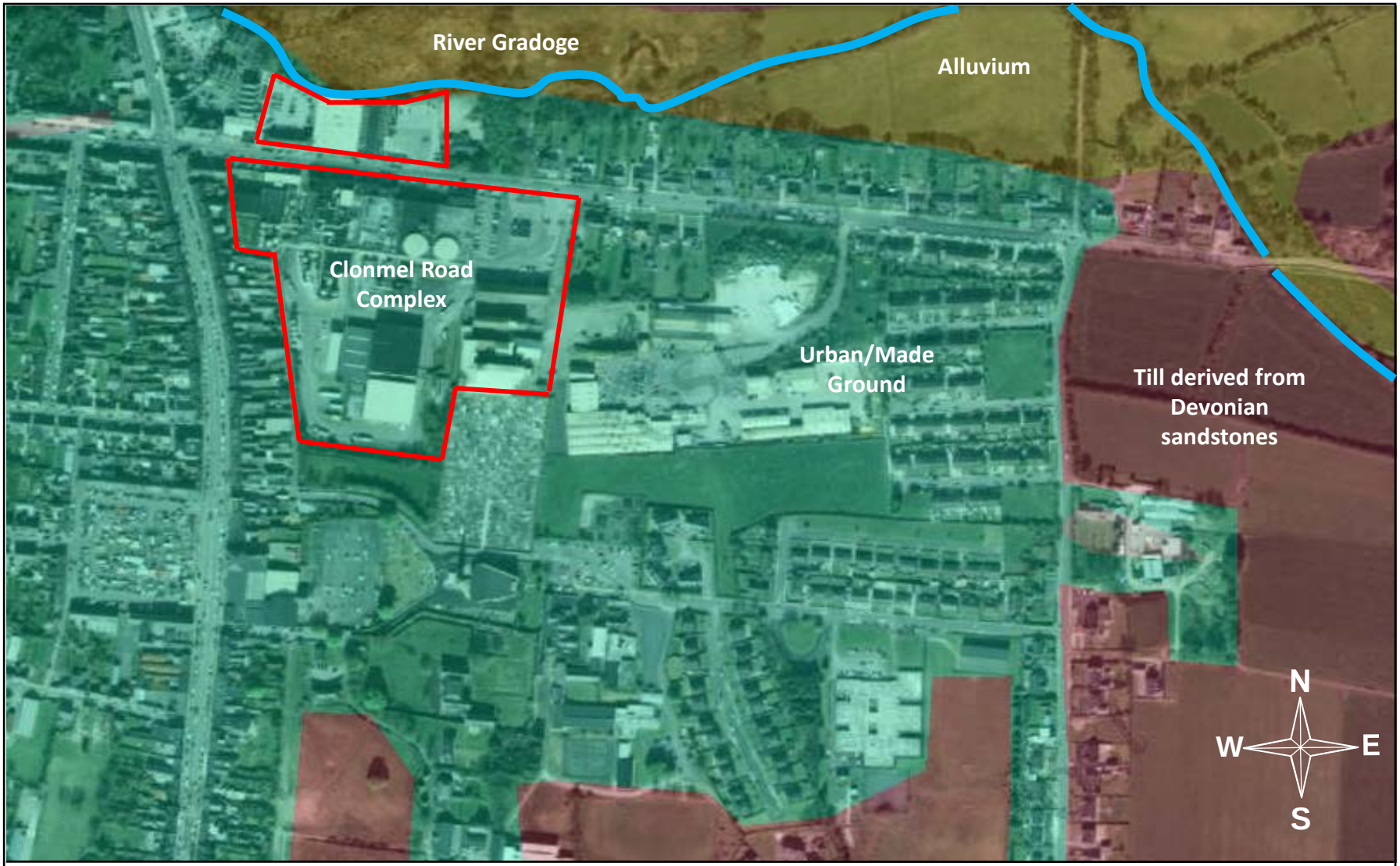

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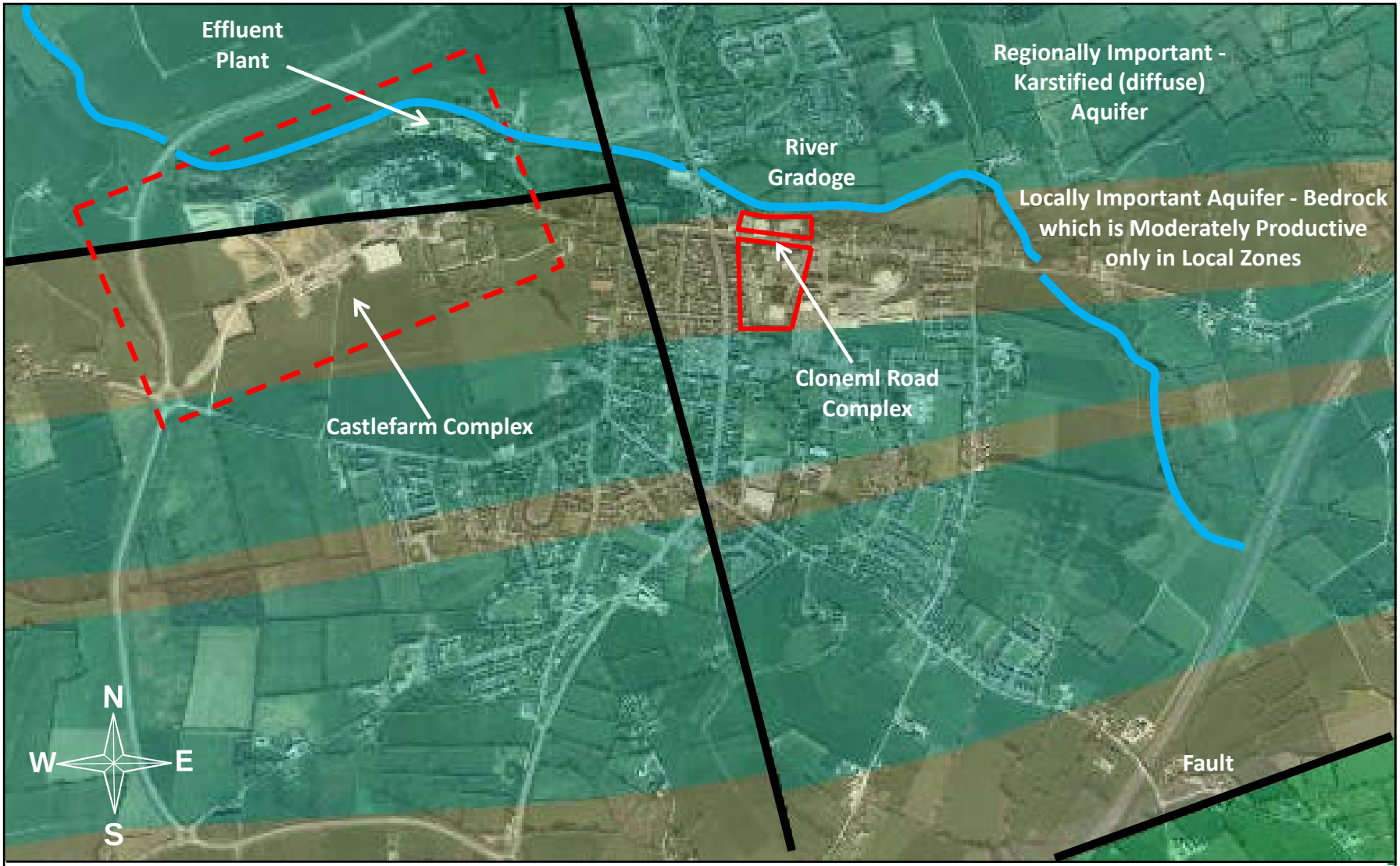

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Project Address:	Mitchelstown, Co. Cork
Client:	Dairgygold Mitchelstown
Drg. Title:	Regional Aquifer Mapping (GSI, 2020)

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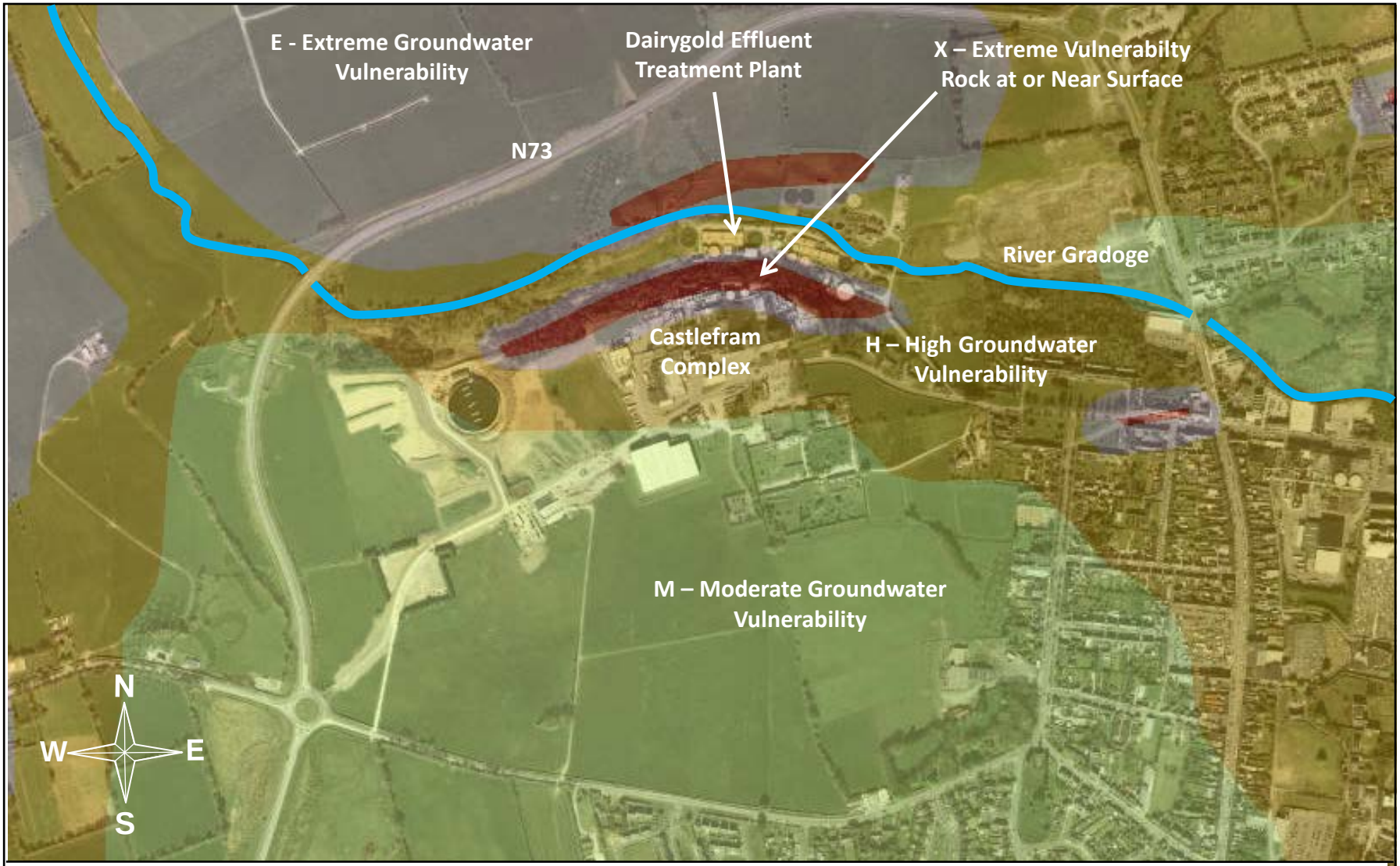

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Drg. Title:	Castlefarm Groundwater Vulnerability Mapping (GSI, 2020)

Drg. Scale:	Date:	Dwg No:	Job No:	Revision:	Dwg. By :
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Project Address:	Mitchelstown, Co. Cork
Client:	Dairgygold Mitchelstown
Drg. Title:	Clonmel Road Groundwater Vulnerability (GSI, 2020)

Drg. Scale:	Date:	Dwg No:	Job No:	Revision:	Dwg. By :
NTS	14/02/2020	IE1486-011	IE1486	A	KM

Appendix B

Historical Groundwater Monitoring Database

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex									
Parameter	**Units**	**EPA Interim Guideline Values 2003**	**Groundwater Regulations SI366/2016**	**BH3**				**BH3**					
				22-Feb-07	**28-Jun-07**	**14-Sep-07**	**11-Dec-07**	**3-Jul-08**	**9-Dec-08**	**10-Sep-09**	**2-Dec-09**	**28-Jul-10**	**14-Dec-10**
pH	pH Units	**≥ 6.5 and ≤ 9.5**	-	7.00	7.10	7.80	8.00	7.20	7.50	7.90	8.00	7.80	7.30
Conductivity	µS/cm at 20°C	**1,000 (@ 25°C)**	**800-1875**	684	920	810	880	1028	1400	825	800	#N/A	819
COD	mg/l	-	-	0.8	31	13	6	0.4	17	11	7	18	<3
BOD	mg/l	-	-	1.5	1.4	4	1.5	7	1.4	<1	4	<1	7
Ammonium (as N)	mg/l	**0.12**	**0.065-0.175**	0.3	0.25	0.5	1.1	0.97	0.94	0.42	0.36	0.02	0.78
Nitrate (as NO_3)	mg/l	**25**	**37.50**	6.20	1.77	3.10	0.89	1.77	1.33	3.54	3.54	11.08	0.44
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	**0.09**	**0.107**	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	**30**	**24-187.5**	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	**200**	**187.5**	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	**50**	-	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	**20**	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	**5**	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	**150**	-	-	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	**0**	-	-	-	-	-	-	-	5	N	N	40
E. Coli	per 100ml	**0**	-	-	-	-	-	-	-	-	-	3	P
Total Coliforms	per 100ml	**0**	-	P	P	P	P	P	P	P	N	-	P
S.P.C @ 21°C	per 1ml	-	-	1468	1000	>1000	>1000	400	>1000	>1000	>1000	>1000	>1000
S.P.C @ 37°C	per 1ml	-	-	400	1272	>1000	1000	100	>1000	>1000	600	>1000	>1000
Entero	per 1ml	-	-	N	3	N	N	N	>1000	1	N	1	N
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-

> 25 COD or >10 BOD
P - Positive - present in sample
N - Negative - not present in sample
SPR denotes excessive spreader growth

Castlefarm Complex DQRA
IE Consulting
IE2531

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex									
Parameter	Units	EPA Interim Guideline Values 2003	Groundwater Regulations SI366/2016	BH3									
				24-Aug-11	08-Nov-11	12-Jul-12	18-Dec-12	25-Jun-13	05-Dec-13	10-Jul-14	13-Nov-14	05-May-15	22-Oct-15
pH	pH Units	**≥ 6.5 and ≤ 9.5**	-	7.50	7.80	7.19	7.42	7.29	9.44	7.57	7.76	8.07	9.76
Conductivity	µS/cm at 20°C	**1,000 (@ 25°C)**	**800-1875**	1723	433	323	408	496	843	1026	1070	1630	3800
COD	mg/l	-	-	38	16	222	47	33	21	2	12	21	315
BOD	mg/l	-	-	7	<3	4	5	1.82	2.08	3.93	4.2	#N/A	170.25
Ammonium (as N)	mg/l	**0.12**	**0.065-0.175**	2.31	0.96	1.31	1.02	<0.02	0.53	0.51	1.88	1.4	5.37
Nitrate (as NO_3)	mg/l	**25**	**37.50**	2.22	2.22	38.54	11.08	16.83	29.68	7.09	0.44	6.65	11.52
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	**0.09**	**0.107**	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	**30**	**24-187.5**	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	**200**	**187.5**	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	**50**	-	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	**20**	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	**5**	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	**150**	-	-	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	**0**	-	20	NA	P	-	-	-	-	-	7.3	>2419.6
E. Coli	per 100ml	**0**	-	N	N	3	0	2419.6	4.1	0	5.2	0	0
Total Coliforms	per 100ml	**0**	-	P	P	P	0	0	23.1	187.2	24.3	-	-
S.P.C @ 21°C	per 1ml	-	-	>1000	>1000	>1000	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	>1000	300	100	-	-	-	-	-	-	-
Entero	per 1ml	-	-	N	N	N	-	-	-	72.7	161.6	>2419.6	48.2
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-

> 25 COD or >10 BOD
P - Positive - present in sample
N - Negative - not present in sample
SPR denotes excessive spreader growth

Castlefarm Complex DQRA
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Dairygold Castlefarm Complex				Dairygold Castlefarm Complex									
Parameter	Units	EPA Interim Guideline Values 2003	Groundwater Regulations SI366/2016	BH3							BH3		
				24-Mar-16	13-Jul-16	29-Sep-16	15-Dec-16	06-Apr-17	28-Jun-17	25-Sep-17	01-Dec-17	20-Jun-18	19-Sep-18
pH	pH Units	**≥ 6.5 and ≤ 9.5**	-	7.17	7.41	7.77	7.48	7.74	7.58	7.37	6.94	7.43	7.49
Conductivity	µS/cm at 20°C	**1,000 (@ 25°C)**	**800-1875**	1006	3930	1215	1378	1152	835	925	891	1016	1252
COD	mg/l	-	-	2	38	26	96	8	32	35	23	17	21
BOD	mg/l	-	-	1.68	15.1	7.02	20.7	5.72	16.2	3	9.56	2	8.52
Ammonium (as N)	mg/l	**0.12**	**0.065-0.175**	0.43	0.79	1.16	19	0.66	0.74	1.28	0.72	0.86	0.92
Nitrate (as NO_3)	mg/l	**25**	**37.50**	3.54	7.09	3.10	11.52	4.87	9.75	4.43	3.99	5.31	6.20
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	**0.09**	**0.107**	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	**30**	**24-187.5**	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	**200**	**187.5**	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	**50**	-	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	**20**	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	**5**	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	**150**	-	-	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	**0**	-	179	12.2	>2419.6	18.9	4.1	248.1	24.3	>2419.6	214.3	p
E. Coli	per 100ml	**0**	-	<1	5.2	0	0	0	2	21.3	4.8	61.6	n
Total Coliforms	per 100ml	**0**	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	8.6	56.5	18.1	81.7	18.9	6.2	6.3	17.5	172.2	p
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-

> 25 COD or >10 BOD
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Castlefarm Complex DQRA
IE Consulting
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Dairygold Castlefarm Complex				Dairygold Castlefarm Complex												
Parameter	Units	EPA Interim Guideline Values 2003	Groundwater Regulations SI366/2016	BH3												
				12-Dec-18	27-Mar-19	18-Jun-19	24-Sep-19	11-Dec-19	23-Mar-20	29-Jun-20	01-Oct-20	04-Dec-20	09-Mar-21	24-May-21	11-Aug-21	03-Nov-21
pH	pH Units	**≥ 6.5 and ≤ 9.5**	**-**	7.98	7.46	7.52	7.54	7.59	7.54	7.93	6.89	7.54	7.76	7.48	7.38	7.50
Conductivity	µS/cm at 20°C	**1,000 (@ 25°C)**	**800-1875**	870	1013	964	1221	1387	904	674	588	607	1081	843	890	887
COD	mg/l	**-**	**-**	18	25	85	38	375	20	29	3	3	8	9	14.7	18.73
BOD	mg/l	**-**	**-**	1.96	12.45	21.75	23.76	120.3	5.97	4.8	3.51	0.94	<1	11	7	<1
Ammonium (as N)	mg/l	**0.12**	**0.065-0.175**	1.6	8.3	2.49	1.69	3.42	0.98	0.43	0.62	0.07	2	1.3	0.74	1.13
Nitrate (as NO_3)	mg/l	**25**	**37.50**	22.14	18.16	20.37	15.50	4.43	4.43	14.17	11.51	43.4	2.21	17.26	13.28	16.65
Total Nitrogen	mg/l	**-**	**-**	-	-	-	-	-	-	-	-	-	10.5	4.31	#N/A	3.2
Orthophosphate as PO4	mg/l	**0.09**	**0.107**	-	-	-	-	-	-	-	-	-	0.15	1.54	0.07	0.67
Chloride	mg/l	**30**	**24-187.5**	-	-	-	-	-	-	-	-	-	43	34	43	52
Sulphate as SO4	mg/l	**200**	**187.5**	-	-	-	-	-	-	-	-	-	176.5	120.1	101.9	92
Manganese	ug/l	**50**	**-**	-	-	-	-	-	-	-	-	-	542	384	323	5953
Nickel	ug/l	**20**	**-**	-	-	-	-	-	-	-	-	-	49	36	29	426
Potassium	mg/l	**5**	**-**	-	-	-	-	-	-	-	-	-	5.7	6.9	6.6	7.7
Sodium	mg/l	**150**	**-**	-	-	-	-	-	-	-	-	-	191.2	164.7	144.4	181.2
Odour	-	**-**	**-**	-	-	-	-	-	-	-	-	-	Clear	Clear	Yes	Clear
Colour	-	**-**	**-**	-	-	-	-	-	-	-	-	-	Orange	Orange	Orange	Light Brown
Turbidity	-	**-**	**-**	-	-	-	-	-	-	-	-	-	Turbidity	Turbidity	Turbidity	Yes
Coliforms	per 1ml	**0**	**-**	8.1	<1	>2419.6	29.9	>2419.6	N	78.9	39.9	28.2	<1	4.1	>2419.6	328.2
E. Coli	per 100ml	**0**	**-**	<1	<1	<1	<1	21.3	N	18.5	5.2	1	<1	3.1	>2419.6	1
Total Coliforms	per 100ml	**0**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	**-**	**-**	33.2	45.9	>2419.6	39.5	15.8	P	5.2	P	<1	920.8	1	>2419.6	3.1
EPH Interpretation	-	**-**	**-**	-	-	-	-	-	-	-	-	-	Not Possible	Not Possible	-	-
EPH >C8-C10	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	<10	<10	<10	<10
EPH >C10-C12	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	<10	<10	<10	<10
EPH >C12-C16	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	<10	<10	<10	<10
EPH >C16-C21	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	<10	<10	<10	<10
EPH >C21-C35	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	<10	<10	<10	<10
EPH >C21-C40	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	<10	-	-	-
EPH >C35-C40	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	<10	<10	<10	<10
EPH >C8-C40	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	<10	<10	<10	<10

> 25 COD or >10 BOD

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Castlefarm Complex DQRA
IE Consulting
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Dairygold Castlefarm Complex						
Parameter	**Units**	**EPA Interim Guideline Values 2003**	**Groundwater Regulations SI366/2016**	**BH3**		
				08-Feb-22	**04-May-22**	**25-Aug-22**
pH	pH Units	**≥ 6.5 and ≤ 9.5**	**-**	7.53	7.07	8.29
Conductivity	µS/cm at 20°C	**1,000 (@ 25°C)**	**800-1875**	904	1094	851
COD	mg/l	**-**	**-**	24	11.8	50.8
BOD	mg/l	**-**	**-**	4	6	6
Ammonium (as N)	mg/l	**0.12**	**0.065-0.175**	1.07	1.14	0.35
Nitrate (as NO_3)	mg/l	**25**	**37.50**	16.82	13.28	6.64
Total Nitrogen	mg/l	**-**	**-**	3	1.8	1.24
Orthophosphate as PO4	mg/l	**0.09**	**0.107**	1.1	2.09	0.10
Chloride	mg/l	**30**	**24-187.5**	55.7	155.8	101.3
Sulphate as SO4	mg/l	**200**	**187.5**	98.6	92.9	22
Manganese	ug/l	**50**	**-**	327	443	111
Nickel	ug/l	**20**	**-**	30	36	33
Potassium	mg/l	**5**	**-**	6.7	6.1	6.2
Sodium	mg/l	**150**	**-**	162	199	188.9
Odour	-	**-**	**-**	Clear	Clear	Yes
Colour	-	**-**	**-**	Brown	Orange	Brown
Turbidity	-	**-**	**-**	Yes	Yes	Yes
Coliforms	per 1ml	**0**	**-**	11	19.9	6.3
E. Coli	per 100ml	**0**	**-**	727	<1	1
Total Coliforms	per 100ml	**0**	**-**	-	-	-
S.P.C @ 21°C	per 1ml	**-**	**-**	-	-	-
S.P.C @ 37°C	per 1ml	**-**	**-**	-	-	-
Entero	per 1ml	**-**	**-**	93	<1	27.5
EPH Interpretation	-	**-**	**-**	-	-	-
EPH >C8-C10	ug/l	**-**	**-**	<10	<10	<10
EPH >C10-C12	ug/l	**-**	**-**	<10	<10	<10
EPH >C12-C16	ug/l	**-**	**-**	<10	<10	<10
EPH >C16-C21	ug/l	**-**	**-**	<10	<10	<10
EPH >C21-C35	ug/l	**-**	**-**	<10	<10	<10
EPH >C21-C40	ug/l	**-**	**-**	-	-	-
EPH >C35-C40	ug/l	**-**	**-**	<10	<10	<10
EPH >C8-C40	ug/l	**-**	**-**	<10	<10	<10

> 25 COD or >10 BOD

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Castlefarm Complex DQRA
IE Consulting
IE2531

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex									
Parameters	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH4						BH4			
				22-Feb-07	28-Jun-07	14-Sep-07	11-Dec-07	3-Jul-08	9-Dec-08	10-Sep-09	2-Dec-09	28-Jul-10	14-Dec-10
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	7.8	7.7	7.7	6.9	7.4	6.8	8.2	7.9	7.9	8.9
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	4040	4350	3640	811	2452	2514	1310	1142	437	3900
COD	mg/l	-	-	39	50	33	20	32	27	25	19	96	66
BOD	mg/l	-	-	5.3	15	4	1.7	15	11	8	4	32	101
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	3.9	47.5	30.5	10	10	9.9	8.9	7.4	0.11	0.15
Nitrate (as NO_3)	mg/l	**37.5**	**25**	0.04	0.89	0.44	0.89	0.44	4.4	4.4	4.4	4.43	0.89
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	**24-187.5**	**30**	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	**187.5**	**200**	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	-	**50**	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	-	**20**	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	-	**5**	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	-	**150**	-	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	**0**	-	-	-	-	-	-	100	N	3	1000
E. Coli	per 100ml	-	**0**	-	-	-	-	-	-	-	-	>40	P
Total Coliforms	per 100ml	-	**0**	P	P	P	N	P	P	P	P	-	P
S.P.C @ 21°C	per 1ml	-	-	>1000	>1000	>1000	>1000	500	600	>1000	>1000	>1000	>1000
S.P.C @ 37°C	per 1ml	-	-	600	1106	>1000	20	>1000	700	>1000	500	>1000	>1000
Entero	per 1ml	-	-	200	36	400	2	P	P	38	40	N	200
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-

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Dairygold Castlefarm Complex				Dairygold Castlefarm Complex												
Parameters	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH4								BH4				
				24-Aug-11	19-Dec-11	12-Jul-12	18-Dec-12	25-Jun-13	05-Dec-13	10-Jul-14	13-Nov-14	05-May-15	22-Oct-15	24-Mar-16	13-Jul-16
pH	pH Units	-	≥ 6.5 and ≤ 9.5	7.5	7.9	7.48	7.68	7.11	6.91	7.2	7.29	7.46	8.3	7.58	7.69
Conductivity	µS/cm at 20°C	800-1875	1,000 (@ 25°C)	3620	735	832	1192	4780	1085	3070	4570	2650	3560	3270	3050
COD	mg/l	-	-	52	52	52	65	88	1148	94	45	47	31	22	31
BOD	mg/l	-	-	13	74	15	16	24.25	216.5	33.9	14.96	#N/A	2.6	7.04	6.84
Ammonium (as N)	mg/l	0.065-0.175	0.12	1.37	15.6	3.9	20.7	26	93.6	22.5	28.8	15	19.18	29	2.08
Nitrate (as NO_3)	mg/l	37.5	25	0.89	0.89	35.44	32.78	0.89	4.87	6.20	0.44	16.39	3.10	10.19	1.33
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	0.107	0.09	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	24-187.5	30	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	187.5	200	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	-	50	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	-	20	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	-	5	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	-	150	-	-	-	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	0	>1000	500	200	-	-	-	-	-	>2419.6	>2419.6	2419	>2419.6
E. Coli	per 100ml	-	0	P	P	P	0	1	10.4	3.1	14.4	13.5	1	1	<1
Total Coliforms	per 100ml	-	0	P	P	P	>2419.6	2419.6	>2419.6	>2419	517	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	>1000	>1000	>1000	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	>1000	>1000	100	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	N	N	50	-	-	-	130	325	21.8	3.1	50.4	38.4
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 25 COD or >10 BOD

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Dairygold Castlefarm Complex				Dairygold Castlefarm Complex														
Parameters	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH4									BH4					
				29-Sep-16	15-Dec-16	06-Apr-17	28-Jun-17	25-Sep-17	Dec-17	Mar-18	Jun-18	Sep-18	Dec-18	Mar-19	Jun-19	Sep-19	10-Dec-19
pH	pH Units	-	≥ 6.5 and ≤ 9.5	7.81	7.57	7.91	7.74	10.4	9.33	7.7	7.21	7.43	7.29	7.48	9.6	7.57	9.22
Conductivity	µS/cm at 20°C	800-1875	1,000 (@ 25°C)	3390	2800	3800	3690	6520	3810	2136	2128	3110	1631	2220	3372	1997	3254
COD	mg/l	-	-	26	91	26	29	1840	1234	272	697	88	66	82	409	52	234
BOD	mg/l	-	-	6.92	16.2	23.25	6.33	105	160	74	101	13.8	13.1	12.9	60	9.9	45
Ammonium (as N)	mg/l	0.065-0.175	0.12	19.8	17	23.4	20.2	41.34	17	12.79	12.1	14.4	9.9	10.6	20.25	2.44	11.9
Nitrate (as NO_3)	mg/l	37.5	25	3.10	4.87	1.33	0.89	23.48	7.09	#N/A	4.43	2.21	3.54	6.20	7.97	4.42	0.89
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	0.107	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	24-187.5	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	187.5	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	-	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	-	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	-	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	0	686.7	>2419.6	275.5	>2419.6	<1	>2419.6	-	2149.6	P	>2419.6	13.1	<1	>2419.6	<1
E. Coli	per 100ml	-	0	0	579.4	1	2	<1	135.5	-	<1	n	<1	<1	<1	52.1	<1
Total Coliforms	per 100ml	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	31.3	344.1	74.4	88.2	<1	5.2	-	13.8	P	63.7	56.5	<1	>2419.6	<1
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 25 COD or >10 BOD

P - Positive - present in sample
N - Negative - not present in sample
SPR denotes excessive spreader growth

Castlefarm Complex DQRA
IE Consulting
IE2531

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex											
Parameters	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH4											
				24-Mar-20	29-Jun-20	01-Oct-20	04-Dec-20	09-Mar-21	24-May-21	11-Aug-21	03-Nov-21	08-Feb-22	04-May-22	25-Aug-22
pH	pH Units	-	≥ 6.5 and ≤ 9.5	8.83	8.51	7.95	7.94	7.91	7.52	6.73	6.82	6.91	6.92	7.47
Conductivity	µS/cm at 20°C	800-1875	1,000 (@ 25°C)	3088	3072	3390	4164	4475	4259	1340	972	6960	4546	3866
COD	mg/l	-	-	332	623	108	87.6	68	123	83.7	104.4	62	60	48.7
BOD	mg/l	-	-	158	50	17.55	17.7	15	41	17	13	26	23	2
Ammonium (as N)	mg/l	0.065-0.175	0.12	11.8	0.3	0.95	22.07	34.2	48.25	82.5	128.4	81	53.2	41.1
Nitrate (as NO_3)	mg/l	37.5	25	3.54	5.76	4.43	5.31	2.21	3.10	15.05	4.27	1.77	3.54	3.98
Total Nitrogen	mg/l	-	-	-	-	-	-	39.9	48.96	-	100.6	80.5	59.2	42.3
Orthophosphate as PO4	mg/l	0.107	0.09	-	-	-	-	3.21	3.97	0.28	1.63	0.74	1.54	3.08
Chloride	mg/l	24-187.5	30	-	-	-	-	162	207	4225	3130.9	1875.3	957.7	635.6
Sulphate as SO4	mg/l	187.5	200	-	-	-	-	1.1	62.3	8.7	18.7	58.8	63.1	50.1
Manganese	ug/l	-	50	-	-	-	-	430	853	4520	706	2606	1421	900
Nickel	ug/l	-	20	-	-	-	-	473	439	216	14	255	351	423
Potassium	mg/l	-	5	-	-	-	-	271.2	292.7	479.6	353.4	352.6	296.5	358.2
Sodium	mg/l	-	150	-	-	-	-	927.5	859	908.2	704	728.8	634.1	281.1
Odour	-	-	-	-	-	-	-	Clear	Clear	Clear	Odour	Clear	Odour	Yes
Colour	-	-	-	-	-	-	-	Cloudy	Green	Orange	Orange	Yellow	Yellow	Light Green
Turbidity	-	-	-	-	-	-	-	Turbidity	Turbidity	Turbidity	Yes	Yes	Yes	Yes
Coliforms	per 1ml	-	0	P	>2419.6	>2419.6	>2419.6	<1	>2419.60	1986.3	18.3	5	122.2	222.4
E. Coli	per 100ml	-	0	N	<1	9.8	78.9	<1	<1	14.5	<1	<1	<1	4.1
Total Coliforms	per 100ml	-	0	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	P	>2419.5	P	>2419.6	<1	172	>2419.6	9.5	<1	66.3	210.2
EPH Interpretation	-	-	-	-	-	-	-	Possible Lubricating Oil	Lubricating Oil	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	<10	<20	<10	<10	<10	<10	<10
EPH >C10-C12	ug/l	-	-	-	-	-	-	<10	<20	<10	<10	<10	<10	<10
EPH >C12-C16	ug/l	-	-	-	-	-	-	<10	<20	<10	40	<10	<10	<10
EPH >C16-C21	ug/l	-	-	-	-	-	-	**30**	**530**	**490**	**420**	<10	<10	<10
EPH >C21-C35	ug/l	-	-	-	-	-	-	**1740**	**9690**	**7120**	**5030**	<10	<10	**470**
EPH >C21-C40	ug/l	-	-	-	-	-	-	**2650**	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	**910**	**2810**	**2210**	**940**	<10	<10	**70**
EPH >C8-C40	ug/l	-	-	-	-	-	-	**2680**	**13030**	**9820**	**6430**	<10	<10	**540**

> 25 COD or >10 BOD
P - Positive - present in sample
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Castlefarm Complex DQRA
IE Consulting
IE2531

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex															
Parameter	Units	EPA Interim Guideline Values 2003	Groundwater Regulations SI366/2016	BH6									BH6						
				22-Feb-07	28-Jun-07	14-Sep-07	11-Dec-07	3-Jul-08	9-Dec-08	10-Sep-09	2-Dec-09	28-Jul-10	12-Nov-10	24-Aug-11	08-Nov-11	12-Jul-12	18-Dec-12	25-Jun-13	05-Dec-13
pH	pH Units	≥ 6.5 and ≤ 9.5	-	7.50	7.30	7.50	7.20	7.70	7.50	7.40	7.70	7.50	7.00	6.40	7.20	7.20	7.40	6.84	6.70
Conductivity	µS/cm	1,000 (@ 25°C)	800-1875	579	475	666	650	700	718	491	675	454	373	418	154	193	245	550	483
COD	mg/l	-	-	0.2	2.4	10	0.4	0.4	1	10	0	7	<3	9	9	91	<3	<3	32
BOD	mg/l	-	-	1.5	0.2	1	1	0.7	0.6	1	1	1	-	3	8	3	3	1	1.19
Ammonium (as N)	mg/l	0.12	0.065-0.175	0.01	0.25	0.01	0.01	0.25	0.02	0.09	0.02	0.02	0.13	0.02	0.17	0.06	<0.02	<0.02	<0.02
Nitrate (as NO_3)	mg/l	25	37.5	30.75	20.38	17.72	0.00	#N/A	16.28	25.69	22.15	27.47	24.81	19.49	19.49	71.32	77.08	15.06	15.51
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	0.09	0.107	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	30	24-187.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	200	187.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	0	-	-	-	-	-	-	-	N	N	N	10	N	NA	NA	-	-	-
E. Coli	per 100ml	0	-	-	-	-	-	-	-	-	-	<1	-	N	NA	NA	0	0	0
Total Coliforms	per 100ml	0	-	N	P	P	N	N	N	P	N	-	N	N	N	N	0	>2419.6	8.4
S.P.C @ 21°C	per 1ml	-	-	11	158	>1000	1	N	10	>1000	N	>1000	100	20	3	>1000	-	-	-
S.P.C @ 37°C	per 1ml	-	-	N	35	SPR	N	5	N	N	N	>1000	5	1	N	N	-	-	-
Entero	per 1ml	-	-	N	N	N	N	P	N	N	N	N	-	N	N	N	-	-	-

> 25 COD or >10 BOD

P - Positive - present in sample
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SPR denotes excessive spreader growth

BH6 is a production well
Constantly pumped
Raw water sample tap

Castlefarm Complex DQRA
IE Consulting
IE2531

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex																
Parameter	Units	EPA Interim Guideline Values 2003	Groundwater Regulations SI366/2016	BH6																
				10-Jul-14	13-Nov-14	05-May-15	22-Oct-15	24-Mar-16	13-Jul-16	29-Sep-16	15-Dec-16	06-Apr-17	28-Jun-17	26-Sep-17	Dec-17	Jun-18	Sep-18	Dec-18	Mar-19	Jun-19
pH	pH Units	**≥ 6.5 and ≤ 9.5**	**-**	6.81	6.90	7.06	7.03	6.07	6.80	6.93	6.80	8.04	7.02	6.92	7.33	6.79	6.79	7.58	6.81	7.08
Conductivity	µS/cm	**1,000 (@ 25°C)**	**800-1875**	422	548	486	567	629	585	560	592	717	586	397	500	470	465	412	502	507
COD	mg/l	**-**	**-**	3	7	5	7	11	8	5	17	3	3	10	16	6	3	3	3	3
BOD	mg/l	**-**	**-**	1.3	0.04	#N/A	0.51	1	0.8	0.96	11.32	1.73	1.01	2	1.68	1.54	0.8	2.26	0.66	0.66
Ammonium (as N)	mg/l	**0.12**	**0.065-0.175**	0.02	0.02	<0.02	0.025	0.02	0.02	0.02	0.02	<0.02	0.02	0.02	0.09	0.02	0.02	0.02	0.02	0.02
Nitrate (as NO_3)	mg/l	**25**	**37.5**	21.71	13.29	21.71	15.06	18.61	21.71	24.81	26.14	15.06	23.04	20.82	18.16	20.37	22.59	14.17	20.37	19.49
Total Nitrogen	mg/l	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	**0.09**	**0.107**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	**30**	**24-187.5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	**200**	**187.5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	**50**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	**20**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	**5**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	**150**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Odour	-	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	**0**	**-**	-	-	0	0	<1	<1	0	0	0	<1	<1	<1	<1	n	<1	<1	<1
E. Coli	per 100ml	**0**	**-**	0	0	0	0	<1	<1	0	0	0	<1	<1	<1	<1	n	<1	<1	<1
Total Coliforms	per 100ml	**0**	**-**	1	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	**-**	**-**	0	0	0	1	<1	<1	0	0	0	<1	<1	<1	<1	N	<1	<1	<1

> 25 COD or >10 BOD

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Constantly pumped
Raw water sample tap

Castlefarm Complex DQRA
IE Consulting
IE2531

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex													
Parameter	Units	EPA Interim Guideline Values 2003	Groundwater Regulations SI366/2016	BH6										BH6			
				Sep-19	11-Dec-19	23 March 2020	29 June 2020	1 October 2020	4 December 2020	9 March 2021	24 May 2021	11 August 2021	2 November 2021	7 February 2022	6 May 2022	25 August 2022
pH	pH Units	**≥ 6.5 and ≤ 9.5**	**-**	6.64	8.07	7.3	6.88	7.19	7.53	7.49	6.89	6.82	6.93	6.92	6.74	6.80
Conductivity	µS/cm	**1,000 (@ 25°C)**	**800-1875**	494	348	361	460	364	341	544	483	487	514	532	533	531
COD	mg/l	**-**	**-**	3	3	3	14	3	3		<7	2.57	21.2	9	3.57	7.67
BOD	mg/l	**-**	**-**	0.64	1.38	0.65	0.73	0.51	0.42		2	2	1	2	2	1
Ammonium (as N)	mg/l	**0.12**	**0.065-0.175**	0.02	0.05	0.02	0.02	0.24	0.13	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Nitrate (as NO_3)	mg/l	**25**	**37.5**	24.36	20.81	18.16	24.8	23.91	22.59	19.48	20.36	23.02	19.63	19.48	17.26	22.13
Total Nitrogen	mg/l	**-**	**-**	-	-	-	-	-	-	4.57	3.88	#N/A	3.8	3.8	3.4	3.86
Orthophosphate as PO4	mg/l	**0.09**	**0.107**	-	-	-	-	-	-	0.05	0.07	0.06	0.04	0.07	0.05	0.10
Chloride	mg/l	**30**	**24-187.5**	-	-	-	-	-	-	44	43	46	44	46.8	49.9	51.8
Sulphate as SO4	mg/l	**200**	**187.5**	-	-	-	-	-	-	-	23.2	24.9	25.5	19.7	24.6	29.1
Manganese	ug/l	**50**	**-**	-	-	-	-	-	-	-	2	2	2	3	2	8
Nickel	ug/l	**20**	**-**	-	-	-	-	-	-	-	2	2	2	2	2	2
Potassium	mg/l	**5**	**-**	-	-	-	-	-	-	-	1.3	1.2	1.1	1.7	1.4	1.4
Sodium	mg/l	**150**	**-**	-	-	-	-	-	-	-	18	17	17.4	20.9	20	21.3
Odour	-	**-**	**-**	-	-	-	-	-	-	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Colour	-	**-**	**-**	-	-	-	-	-	-	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Turbidity	-	**-**	**-**	-	-	-	-	-	-	Clear	Clear	Clear	No	No	No	Yes
Coliforms	per 1ml	**0**	**-**	<1	<1	N	<1	<1	<1	>2419.6	<1	<1	<1	<1	<1	<1
E. Coli	per 100ml	**0**	**-**	<1	<1	N	<1	<1	<1	1	<1	<1	<1	<1	<1	<1
Total Coliforms	per 100ml	**0**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	**-**	**-**	<1	<1	N	<1	N	<1	<1	<1	<1	<1	<1	<1	<1

> 25 COD or >10 BOD
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Constantly pumped
Raw water sample tap

Castlefarm Complex DQRA
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IE2531

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex				
Parameters	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH7				
				06-Apr-17	27-Jun-17	25-Sep-17	01-Dec-17	26-Mar-18
pH	pH Units	-	≥ 6.5 and ≤ 9.5	7.07	7.14	7.15	7.27	7.56
Conductivity	µS/cm at 20°C	800-1875	1,000 (@ 25°C)	614	619	447	531	888
COD	mg/l	-	-	3	4	25	13	<7
BOD	mg/l	-	-	1	1	2	1.98	1
Ammonium (as N)	mg/l	0.065-0.175	0.12	0.02	0.17	0.02	0.11	<0.03
Nitrate (as NO_3)	mg/l	37.5	25				14.17	
Total Nitrogen	mg/l	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	0.107	0.09	-	-	-	-	-
Chloride	mg/l	24-187.5	30	-	-	-	-	-
Sulphate as SO4	mg/l	187.5	200	-	-	-	-	-
Manganese	ug/l	-	50	-	-	-	-	-
Nickel	ug/l	-	20	-	-	-	-	-
Potassium	mg/l	-	5	-	-	-	-	-
Sodium	mg/l	-	150	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	0	-	>2419.60	>2419.60	>2419.6	-
E. Coli	per 100ml	-	0	-	>2419.60	172.2	12.2	-
Total Coliforms	per 100ml	-	0	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-
Entero	per 1ml	-	-	-	135.5	6.3	2	-
EPH Interpretation	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-

> 25 COD or >10 BOD

P - Positive - present in sample
N - Negative - not present in sample
SPR denotes excessive spreader growth

Castlefarm Complex DQRA
IE Consulting
IE2531

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex								
Parameters	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH7					BH7			
				20-Jun-18	19-Sep-18	12-Dec-18	27-Mar-19	18-Jun-19	24-Sep-19	11-Dec-19	23-Mar-20	29-Jun-20
pH	pH Units	-	≥ 6.5 and ≤ 9.5	7.15	6.99	7.19	7.05	7.5	7.28	7.33	7.48	7.5
Conductivity	µS/cm at 20°C	800-1875	1,000 (@ 25°C)	528	773	345	505	567	558	505	574	560
COD	mg/l	-	-	4	25	5	3	3	3	3	3	48
BOD	mg/l	-	-	1.52	3.18	1.1	0.55	0.5	0.64	0.93	1.32	3.15
Ammonium (as N)	mg/l	0.065-0.175	0.12	0.02	0.5	0.02	0.02	0.02	0.02	0.02	0.02	0.36
Nitrate (as NO_3)	mg/l	37.5	25	21.70	11.51	10.63	21.26	20.37	20.81	14.61	18.16	28.34
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	0.107	0.09	-	-	-	-	-	-	-	-	-
Chloride	mg/l	24-187.5	30	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	187.5	200	-	-	-	-	-	-	-	-	-
Manganese	ug/l	-	50	-	-	-	-	-	-	-	-	-
Nickel	ug/l	-	20	-	-	-	-	-	-	-	-	-
Potassium	mg/l	-	5	-	-	-	-	-	-	-	-	-
Sodium	mg/l	-	150	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	0	14.3	P	648.8	21.8	95.9	>2419.60	>2419.6	N	>2419.6
E. Coli	per 100ml	-	0	6.3	P	12.2	<1	4.1	>2419.60	11.9	N	410.6
Total Coliforms	per 100ml	-	0	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	<1	P	17.5	<1	1	>2419.60	69.7	N	49.6
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-

> 25 COD or >10 BOD

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Castlefarm Complex DQRA
IE Consulting
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Dairygold Castlefarm Complex				Dairygold Castlefarm Complex								
Parameters	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH7					BH7			
				01-Oct-20	04-Dec-20	09-Mar-21	24-May-21	11-Aug-21	03-Nov-21	07-Feb-22	03-May-22	24-Aug-22
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	7.19	7.36	7.53	7.49	7.53	7.17	7.46	7.17	7.47
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	526	601	590	446	389	499	472	584	676
COD	mg/l	-	-	3	3	<7	<7	9.2	44.3	3	0.49	6.75
BOD	mg/l	-	-	0.73	0.75	1	5	3	1	2	2	1
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	0.23	0.06	0.02	0.02	0.39	0.02	0.02	0.02	0.02
Nitrate (as NO_3)	mg/l	**37.5**	**25**	21.69	8.86	18.15	18.15	18.15	10.24	20.81	19.48	20.81
Total Nitrogen	mg/l	-	-	-	-	4.29	3.56	#N/A	2.4	4.3	4.2	3.24
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	-	-	0.11	0.15	0.28	0.16	0.12	0.02	0.07
Chloride	mg/l	**24-187.5**	**30**	-	-	23.00	18	14	11.9	22.5	24.2	24.4
Sulphate as SO4	mg/l	**187.5**	**200**	-	-	15.90	15.2	10.9	16.4	15.1	16.2	16.4
Manganese	ug/l	-	**50**	-	-	3	12	18	2	6	2	30
Nickel	ug/l	-	**20**	-	-	2.00	2	2	2	2	2	2
Potassium	mg/l	-	**5**	-	-	3.10	3.3	2.4	6.8	3.1	2	2.4
Sodium	mg/l	-	**150**	-	-	98.50	69.6	55.4	10.7	89.1	113	113.7
Odour	-	-	-	-	-	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Colour	-	-	-	-	-	Clear	Clear	Yellow	Cloudy	Cloudy	Clear	Clear
Turbidity	-	-	-	-	-	Clear	Clear	Turbidity	Yes	-	-	Yes
Coliforms	per 1ml	-	**0**	>2419.6	>2419.6	<1	>2419.6	>2419.6	>2419.6	1553	307.6	>2419.6
E. Coli	per 100ml	-	**0**	165.8	14.8	<1	1732.9	>2419.6	133.3	12	14.6	387.3
Total Coliforms	per 100ml	-	**0**	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	P	3.1	<1	48.8	>2419.6	23.3	9	1	12.1
EPH Interpretation	-	-	-	-	-	Not Possible	Not Possible	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C10-C12	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C12-C16	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C16-C21	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C21-C35	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C21-C40	ug/l	-	-	-	-	<10	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C8-C40	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10

> 25 COD or >10 BOD

P - Positive - present in sample
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Castlefarm Complex DQRA
IE Consulting
IE2531

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex										
Parameters	**Units**	**Groundwater Regulations SI366/2016**	**EPA Interim Guideline Values 2003**	**BH9**						**BH9**				
				06-Apr-17	**28-Jun-17**	**25-Sep-17**	**Dec-17**	**Jun-18**	**Sep-18**	**Dec-18**	**Mar-19**	**Jun-19**	**Sep-19**
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	7.08	6.93	7.15	7.22	6.99	6.88	7.79	6.97	7.1	7.11
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	510	873	665	569	551	891	450	580	651	810
COD	mg/l	-	-	3	63	10	3	3	14	3	4	91	10
BOD	mg/l	-	-	1.76	46.35	2	1.97	4.13	0.5	1.27	1.5	1.4	0.95
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	0.75	0.1	0.78	0.4	1.08	0.11	0.59	1.75	0.56	0.23
Nitrate (as NO_3)	mg/l	**37.5**	**25**	47.40	51.83	15.95	42.07	38.53	37.20	41.63	62.44	49.60	54.91
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	**24-187.5**	**30**	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	**187.5**	**200**	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	-	**50**	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	-	**20**	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	-	**5**	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	-	**150**	-	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	**0**	>2419.60	3.1	201.4	>2419.6	344.8	P	770.1	610.8	>2419.6	<2419.6
E. Coli	per 100ml	-	**0**	8.6	<1	27.5	135.5	204.6	P	133.4	3.1	<1	1
Total Coliforms	per 100ml	-	**0**	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	3	86	4.1	17.5	2	P	2	<1	30.5	1
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-

> 25 COD or >10 BOD
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Castlefarm Complex DQRA
IE Consulting
IE2531

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex											
Parameters	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH9											
				Dec-19	23-Mar-20	29-Jun-20	01-Oct-20	04-Dec-20	09-Mar-21	24-May-21	11-Aug-21	03-Nov-21	08-Feb-22	03-May-22
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	7.13	7.05	7.03	6.61	7.08	7.28	7.19	7.12	7.06	7.19	6.89
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	678	728	872	681	682	781	782	896	629	783	685
COD	mg/l	-	-	20	26	20	21	3	<7	<7	90.6	8.08	15	9.13
BOD	mg/l	-	-	1.18	1.96	0.3	1.7	0.63	1	5	2	1	2	2
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	0.07	0.58	0.22	0.11	0.12	1.65	0.21	0.08	0.5	0.05	0.06
Nitrate (as NO_3)	mg/l	**37.5**	**25**	41.19	47.83	59.79	44.71	46.94	66.4	13.72	67.29	64.19	68.17	57.57
Total Nitrogen	mg/l	-	-	-	-	-	-	-	11.4	12.8	#N/A	12.6	14.6	12.5
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	-	-	-	-	-	0.05	0.79	3.71	0.55	0.51	0.61
Chloride	mg/l	**24-187.5**	**30**	-	-	-	-	-	17	18	21	13.3	21.3	16.1
Sulphate as SO4	mg/l	**187.5**	**200**	-	-	-	-	-	41	50.2	56.9	20.9	51.6	30.7
Manganese	ug/l	-	**50**	-	-	-	-	-	2	8	7	4256	2	3
Nickel	ug/l	-	**20**	-	-	-	-	-	2	3	3	352	2	3
Potassium	mg/l	-	**5**	-	-	-	-	-	32	32.6	34.5	21.8	34.6	26.2
Sodium	mg/l	-	**150**	-	-	-	-	-	13.8	14.1	15	10.6	15	11.5
Odour	-	-	-	-	-	-	-	-	Clear	Clear	Clear	Clear	Clear	Clear
Colour	-	-	-	-	-	-	-	-	Yellow	Cloudy	Brown	Dark Brown	Brown	Orange
Turbidity	-	-	-	-	-	-	-	-	Turbidity	Clear	Turbidity	Yes	Yes	Yes
Coliforms	per 1ml	-	**0**	313	P	6.3	>2419.6	>2419.6	<1	45.2	159.7	>2419.6	180	1119.9
E. Coli	per 100ml	-	**0**	63.8	P	<1	816.4	>2419.6	<1	24.1	<1	<1	<1	140.1
Total Coliforms	per 100ml	-	**0**	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	<1	P	<1	P	1	<1	<1	<1	<1	9	<1
EPH Interpretation	-	-	-	-	-	-	-	-	Not Possible	Not Possible	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	<10	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10

> 25 COD or >10 BOD

P - Positive - present in sample
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Castlefarm Complex DQRA
IE Consulting
IE2531

Dairygold Castlefarm Complex				
Parameters	**Units**	**Groundwater Regulations SI366/2016**	**EPA Interim Guideline Values 2003**	**BH9**
				25-Aug-22
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	7.29
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	929
COD	mg/l	-	-	12.8
BOD	mg/l	-	-	1
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	0.13
Nitrate (as NO_3)	mg/l	**37.5**	**25**	73.93
Total Nitrogen	mg/l	-	-	13
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	0.70
Chloride	mg/l	**24-187.5**	**30**	23
Sulphate as SO4	mg/l	**187.5**	**200**	58.4
Manganese	ug/l	-	**50**	30
Nickel	ug/l	-	**20**	3
Potassium	mg/l	-	**5**	36.6
Sodium	mg/l	-	**150**	15.3
Odour	-	-	-	Clear
Colour	-	-	-	Brown
Turbidity	-	-	-	Yes
Coliforms	per 1ml	-	**0**	>2419.6
E. Coli	per 100ml	-	**0**	3
Total Coliforms	per 100ml	-	**0**	-
S.P.C @ 21°C	per 1ml	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-
Entero	per 1ml	-	-	211.1
EPH Interpretation	-	-	-	-
EPH >C8-C10	ug/l	-	-	<10
EPH >C10-C12	ug/l	-	-	<10
EPH >C12-C16	ug/l	-	-	<10
EPH >C16-C21	ug/l	-	-	<10
EPH >C21-C35	ug/l	-	-	<10
EPH >C21-C40	ug/l	-	-	-
EPH >C35-C40	ug/l	-	-	<10
EPH >C8-C40	ug/l	-	-	<10

> 25 COD or >10 BOD

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Castlefarm Complex DQRA
IE Consulting
IE2531

Dairygold, Mitchelstown, Co. Cork				Dairygold Castlefarm Complex					
Parameter	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH8					
				06-Apr-17	01-Jun-17	25-Sep-17	01-Dec-17	20-Jun-18	20-Sep-18
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	7.6	7.38	7.42	7.38	7.22	7.15
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	3360	4220	3250	2980	2560	3030
COD	mg/l	-	-	109	20	42	38	8	14
BOD	mg/l	-	-	71	22.76	5	8.1	3.14	0.5
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	30.8	29.9	25.6	43.5	38.4	22.6
Nitrate (as NO_3)	mg/l	**37.5**	**25**				2.21	0.89	1.77
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	-	-	-	-	-	-
Chloride	mg/l	**24-187.5**	**30**	-	-	-	-	-	-
Sulphate as SO4	mg/l	**187.5**	**200**	-	-	-	-	-	-
Manganese	ug/l	-	**50**	-	-	-	-	-	-
Nickel	ug/l	-	**20**	-	-	-	-	-	-
Potassium	mg/l	-	**5**	-	-	-	-	-	-
Sodium	mg/l	-	**150**	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	**0**	>2419.60	>2419.60	>2419.60	1986.3	235.9	P
E. Coli	per 100ml	-	**0**	84.5	69.1	54.6	<1	6.3	N
Total Coliforms	per 100ml	-	**0**	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	>2419.60	1732.9	307.6	35.9	3	N
EPH Interpretation	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-

> 25 COD or >10 BOD
P - Positive - present in sample
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SPR denotes excessive spreader growth

Castlefarm Complex DQRA
IE Consulting
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Dairygold, Mitchelstown, Co. Cork				Dairygold Castlefarm Complex							
Parameter	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH8				BH8			
				12-Dec-18	27-Mar-19	19-Jun-19	25-Sep-19	11-Dec-19	23-Mar-20	29-Jun-20	01-Oct-20
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	7.27	7.13	7.09	7.38	7.26	7.28	7.11	7.11
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	2570	2230	2240	2508	2959	3093	4801	4249
COD	mg/l	-	-	22	14	14	24	5	3	22	11.6
BOD	mg/l	-	-	8.14	3.32	5.1	7.9	8.38	7.32	2.5	4.09
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	37.2	27.9	24.9	24.5	32.55	2.91	24.3	19.41
Nitrate (as NO_3)	mg/l	**37.5**	**25**	2.21	3.54	1.33	2.65	1.32	1.32	2.66	2.66
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	-	-	-	-	-	-	-	-
Chloride	mg/l	**24-187.5**	**30**	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	**187.5**	**200**	-	-	-	-	-	-	-	-
Manganese	ug/l	-	**50**	-	-	-	-	-	-	-	-
Nickel	ug/l	-	**20**	-	-	-	-	-	-	-	-
Potassium	mg/l	-	**5**	-	-	-	-	-	-	-	-
Sodium	mg/l	-	**150**	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	**0**	8.5	>2419.60	>2419.60	>2419.6	52	P	<1	26.2
E. Coli	per 100ml	-	**0**	<1	5.1	2	3.1	<1	N	<1	2
Total Coliforms	per 100ml	-	**0**	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	<1	44.6	<1	<1	<1	N	<1	N
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-

> 25 COD or >10 BOD
P - Positive - present in sample
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Castlefarm Complex DQRA
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Dairygold, Mitchelstown, Co. Cork				Dairygold Castlefarm Complex							
Parameter	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH8				BH8			
				04-Dec-20	09-Mar-21	24-May-21	11-Aug-21	03-Nov-21	07-Feb-22	03-May-22	24-Aug-22
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	7.07	7.22	7.23	7.33	7.25	7.23	7.06	7.57
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	4906	4830	3067	563	2461	2194	2240	587
COD	mg/l	-	-	3	31	21	1.34	9	3	6.91	4.91
BOD	mg/l	-	-	5.99	12	3	4	9.8	7	6	3
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	13.96	35.8	19.2	0.02	19.3	16.9	15.4	0.45
Nitrate (as NO_3)	mg/l	**37.5**	**25**	2.66	0.89	57.11	13.28	5.31	5.75	1.78	19.48
Total Nitrogen	mg/l	-	-	-	36.60	19.46	#N/A	16.9	16.5	18.2	2.87
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	-	1.95	1.21	0.51	0.28	1.76	2.23	0.59
Chloride	mg/l	**24-187.5**	**30**	-	1225	884	863	628	568	552.8	41.8
Sulphate as SO4	mg/l	**187.5**	**200**	-	1.00	21.60	18.80	18.00	17.10	8.00	34.30
Manganese	ug/l	-	**50**	-	905	818	779	2	571	663	107
Nickel	ug/l	-	**20**	-	74	41	50	2	60	93	11
Potassium	mg/l	-	**5**	-	97.70	77.00	66.10	68.50	57.20	59.40	14.90
Sodium	mg/l	-	**150**	-	641.40	387.70	519.30	383.40	411	421	29.1
Odour	-	-	-	-	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Colour	-	-	-	-	Cloudy	Green	Clear	Cloudy	Cloudy	Light Green	Cloudy
Turbidity	-	-	-	-	Turbidity	Clear	Clear	Turbidity	Turbidity	Turbidity	Turbidity
Coliforms	per 1ml	-	**0**	<1	13.5	<1	344.8	161.6	411	13.1	43.1
E. Coli	per 100ml	-	**0**	<1	1	<1	<1	<1	1	<1	9.6
Total Coliforms	per 100ml	-	**0**	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	<1	<1	<1	<1	<1	<1	<1	2
EPH Interpretation	-	-	-	-	Not Possible	Not Possible	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C10-C12	ug/l	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C12-C16	ug/l	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C16-C21	ug/l	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C21-C35	ug/l	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C21-C40	ug/l	-	-	-	<10	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C8-C40	ug/l	-	-	-	<10	<10	<10	<10	<10	<10	<10

> 25 COD or >10 BOD

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Castlefarm Complex DQRA
IE Consulting
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Dairygold, Mitchelstown, Co. Cork				Dairygold Castlefarm Complex												
Parameter	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH10								BH10				
				06-Apr-17	28-Jun-17	25-Sep-17	01-Dec-17	20-Jun-18	20-Sep-18	12-Dec-18	27-Mar-19	18-Jun-19	25-Sep-19	11-Dec-19	24-Mar-20	29-Jun-20
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	7.26	7.14	7.2	7.14	7.02	7.04	7.5	7.06	7.37	7.27	7.42	7.21	7.37
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	504	687	485	535	510	673	429	516	536	558	564	605	562
COD	mg/l	-	-	3	3	42	12	3	3	3	5	3	3	9	3	14
BOD	mg/l	-	-	1	1.55	2	1.33	5.6	0.76	0.99	0.44	0.67	0.61	0.5	0.98	1.02
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	0.02	0.02	0.02	0.1	0.02	0.02	0.02	0.02	0.02	0.02	0.05	0.02	0.02
Nitrate (as NO_3)	mg/l	**37.5**	**25**					13.73	10.19	12.40	14.61	13.29	13.28	11.07	14.61	14.61
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	**24-187.5**	**30**	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	**187.5**	**200**	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	-	**50**	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	-	**20**	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	-	**5**	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	-	**150**	-	-	-	-	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	**0**	0	307.6	21.1	59.8	<1	P	187.2	2	>2419.6	2419.6	53.7	P	9.8
E. Coli	per 100ml	-	**0**	0	18.9	<1	<1	<1	N	<1	<1	547.5	123.9	<1	<1	<1
Total Coliforms	per 100ml	-	**0**	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	0	1	<1	1	<1	P	<1	<1	<1	13.5	<1	N	<1
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 25 COD or >10 BOD
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Castlefarm Complex DQRA
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Dairygold, Mitchelstown, Co. Cork				Dairygold Castlefarm Complex								
Parameter	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH10					BH10			
				01-Oct-20	04-Dec-20	09-Mar-21	24-May-21	11-Aug-21	03-Nov-21	07-Feb-22	03-May-22	25-Aug-22
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	7.11	7.26	6.66	7.42	7.11	7.29	7.39	7.28	7.44
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	527	605	689	520	314	517	502	521	562
COD	mg/l	-	-	3	3	<7	<7	8.45	0	3	3.13	6.75
BOD	mg/l	-	-	0.75	1.24	1	2	2	1	2	2	1
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	0.02	0.14	0.02	0.02	0.10	0.09	0.02	0.02	0.02
Nitrate (as NO_3)	mg/l	**37.5**	**25**	15.49	14.61	12.84	2.21	3.10	13.28	15.49	11.95	12.84
Total Nitrogen	mg/l	-	-	-	-	2.97	2.32	-	1.90	2.20	2.50	1.89
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	-	-	0.06	0.05	0.02	0.02	0.02	0.02	0.03
Chloride	mg/l	**24-187.5**	**30**	-	-	30	38	32	29	28	27.9	29
Sulphate as SO4	mg/l	**187.5**	**200**	-	-	19.10	20.00	19.50	19.80	19.70	19.10	19.70
Manganese	ug/l	-	**50**	-	-	2.00	2	2	644	2	2	2
Nickel	ug/l	-	**20**	-	-	2.00	2	2	60	2	2	2
Potassium	mg/l	-	**5**	-	-	1.70	1.80	1.70	2.60	1.70	1.80	1.80
Sodium	mg/l	-	**150**	-	-	19.50	18.60	17.40	20.50	19.30	18.90	18.50
Odour	-	-	-	-	-	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Colour	-	-	-	-	-	Orange	Clear	Orange	Clear	Clear	Clear	Clear
Turbidity	-	-	-	-	-	Turbidity	Clear	Clear	No	No	No	No
Coliforms	per 1ml	-	**0**	84.9	>2419.6	<1	<1	75.4	193.5	7.5	461.1	365.4
E. Coli	per 100ml	-	**0**	1	<1	<1	<1	48.8	<1	<1	<1	1
Total Coliforms	per 100ml	-	**0**	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	N	<1	<1	<1	<1	<1	<1	<1	<1
EPH Interpretation	-	-	-	-	-	Not Possible	Not Possible	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C10-C12	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C12-C16	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C16-C21	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C21-C35	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C21-C40	ug/l	-	-	-	-	<10	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C8-C40	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10

> 25 COD or >10 BOD

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Castlefarm Complex DQRA
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Dairygold, Mitchelstown, Co. Cork				Dairygold Castlefarm Complex												
Parameter	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH11							BH11					
				6-Apr-17	28-Jun-17	25-Sep-17	Dec-17	Mar-18	20-Jun-18	20-Sep-18	12-Dec-18	27-Mar-19	18-Jun-19	25-Sep-19	10-Dec-19
pH	pH Units	-	≥ 6.5 and ≤ 9.5	7.22	7.16	7.26	7.31	7.13	7.05	7.16	7.24	7.13	7.27	7.13	7.41
Conductivity	µS/cm at 20°C	800-1875	1,000 (@ 25°C)	815	1277	907	1217	1486	1246	1666	706	996	1374	1631	1193
COD	mg/l	-	-	21	1	38	36	189	3	33	3	25	16	5	13
BOD	mg/l	-	-	1	2.07	3	8.28	154	7.96	1.92	3.66	5.28	6.9	4.56	0.84
Ammonium (as N)	mg/l	0.065-0.175	0.12	30.8	12.4	11.9	15.8	11.25	14.7	12.6	6.8	6.35	11	8.05	6.52
Nitrate (as NO_3)	mg/l	37.5	25				1.33	#N/A	1.77	1.77	4.87	2.66	0.89	1.33	0.89
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	0.107	0.09	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	24-187.5	30	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	187.5	200	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	-	50	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	-	20	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	-	5	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	-	150	-	-	-	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	0	1	290.9	238.2	>2419.6	-	<1	P	13	344.1	>2419.6	>2419.6	186
E. Coli	per 100ml	-	0	0	<1	7.3	35.5		<1	N	<1	<1	11.9	87.6	<1
Total Coliforms	per 100ml	-	0	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	2	<1	30.9	12.2	-	<1	P	<1	<1	<1	1	<1
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 25 COD or >10 BOD
P - Positive - present in sample
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SPR denotes excessive spreader growth

Castlefarm Complex DQRA
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Dairygold, Mitchelstown, Co. Cork				Dairygold Castlefarm Complex											
Parameter	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH11					BH11						
				25-Mar-20	29-Jun-20	01-Oct-20	04-Dec-20	09-Mar-21	24-May-21	11-Aug-21	02-Nov-21	07-Feb-22	03-May-22	24-Aug-22
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	7.14	7.24	7.11	7.59	No access	7.19	6.96	6.94	7.06	6.99	7.05
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	1322	1627	1554	1665	#N/A	1840	2166	1543	1239	1164	1593
COD	mg/l	-	-	11	18	15.5	2.2	#N/A	34	42.1	11.3	7	9.83	19.01
BOD	mg/l	-	-	5.67	5.93	8.08	0.8	#N/A	41	25	2	19	2	3
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	5.6	0.15	10.5	7.19	#N/A	11.25	22.6	17.6	14.2	9.1	13.4
Nitrate (as NO_3)	mg/l	**37.5**	**25**	1.32	4.43	23.91	2.66	#N/A	23.90	2.21	2.21	2.66	2.65	2.65
Total Nitrogen	mg/l	-	-	-	-	-	-	#N/A	13.44	#N/A	17.2	12.8	2.5	13.04
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	-	-	-	-	#N/A	2.79	5.21	1.27	0.94	2.28	2.54
Chloride	mg/l	**24-187.5**	**30**	-	-	-	-	#N/A	274	255	127	97.6	27.9	104.4
Sulphate as SO4	mg/l	**187.5**	**200**	-	-	-	-	#N/A	0.5	0.5	4.1	0.6	3.9	0.7
Manganese	ug/l	-	**50**	-	-	-	-	#N/A	2139	1974	1864	1631	1709	1697
Nickel	ug/l	-	**20**	-	-	-	-	#N/A	69	66	52	66	67	90
Potassium	mg/l	-	**5**	-	-	-	-	#N/A	20.4	28	27.5	20.1	18.7	19.5
Sodium	mg/l	-	**150**	-	-	-	-	#N/A	245.4	347.9	180.9	168	159.1	255.5
Odour	-	-	-	-	-	-	-		Clear	Yes	Clear	Yes	Clear	Clear
Colour	-	-	-	-	-	-	-		Green	Clear	Light orange	Orange	Orange	Cloudy
Turbidity	-	-	-	-	-	-	-	#N/A	Turbidity	Turbidity	No	Turbidity	Turbidity	Yes
Coliforms	per 1ml	-	**0**	P	32.7	>2419.6	>2419.6	#N/A	>2419.6	>2419.6	>2419.6	205	<1	344.8
E. Coli	per 100ml	-	**0**	<1	1	>2419.6	<1	#N/A	13.2	>2419.6	2	1	<1	33.6
Total Coliforms	per 100ml	-	**0**	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	P	<1	P	<1	-	<1	>2419.6	<1	<1	<1	<1
EPH Interpretation	-	-	-	-	-	-	-	-	Not Possible	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10
EPH >C10-C12	ug/l	-	-	-	-	-	-		<10	<10	<10	<10	<10	<10
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10

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Appendix B = Groundwater Monitoring Database

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex									
Parameter	**Units**	**EPA Interim Guideline Values 2003**	**Groundwater Regulations SI366/2016**	**BH3**							**BH3**		
				22-Feb-07	**28-Jun-07**	**14-Sep-07**	**11-Dec-07**	**3-Jul-08**	**9-Dec-08**	**10-Sep-09**	**2-Dec-09**	**28-Jul-10**	**14-Dec-10**
pH	pH Units	**≥ 6.5 and ≤ 9.5**	-	7.00	7.10	7.80	8.00	7.20	7.50	7.90	8.00	7.80	7.30
Conductivity	µS/cm at 20°C	**1,000 (@ 25°C)**	**800-1875**	684	920	810	880	1028	1400	825	800	#N/A	819
COD	mg/l	-	-	0.8	31	13	6	0.4	17	11	7	18	<3
BOD	mg/l	-	-	1.5	1.4	4	1.5	7	1.4	<1	4	<1	7
Ammonium (as N)	mg/l	**0.12**	**0.065-0.175**	0.3	0.25	0.5	1.1	0.97	0.94	0.42	0.36	0.02	0.78
Nitrate (as NO_3)	mg/l	**25**	**37.50**	6.20	1.77	3.10	0.89	1.77	1.33	3.54	3.54	11.08	0.44
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	**0.09**	**0.107**	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	**30**	**24-187.5**	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	**200**	**187.5**	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	**50**	-	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	**20**	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	**5**	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	**150**	-	-	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	**0**	-	-	-	-	-	-	-	5	N	N	40
E. Coli	per 100ml	**0**	-	-	-	-	-	-	-	-	-	3	P
Total Coliforms	per 100ml	**0**	-	P	P	P	P	P	P	P	N	-	P
S.P.C @ 21°C	per 1ml	-	-	1468	1000	>1000	>1000	400	>1000	>1000	>1000	>1000	>1000
S.P.C @ 37°C	per 1ml	-	-	400	1272	>1000	1000	100	>1000	>1000	600	>1000	>1000
Entero	per 1ml	-	-	N	3	N	N	N	>1000	1	N	1	N
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-

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Dairygold Castlefarm Complex				Dairygold Castlefarm Complex									
Parameter	**Units**	**EPA Interim Guideline Values 2003**	**Groundwater Regulations SI366/2016**	**BH3**					**BH3**				
				24-Aug-11	**08-Nov-11**	**12-Jul-12**	**18-Dec-12**	**25-Jun-13**	**05-Dec-13**	**10-Jul-14**	**13-Nov-14**	**05-May-15**	**22-Oct-15**
pH	pH Units	**≥ 6.5 and ≤ 9.5**	-	7.50	7.80	7.19	7.42	7.29	9.44	7.57	7.76	8.07	9.76
Conductivity	µS/cm at 20°C	**1,000 (@ 25°C)**	**800-1875**	1723	433	323	408	496	843	1026	1070	1630	3800
COD	mg/l	-	-	38	16	222	47	33	21	2	12	21	315
BOD	mg/l	-	-	7	<3	4	5	1.82	2.08	3.93	4.2	#N/A	170.25
Ammonium (as N)	mg/l	**0.12**	**0.065-0.175**	2.31	0.96	1.31	1.02	<0.02	0.53	0.51	1.88	1.4	5.37
Nitrate (as NO_3)	mg/l	**25**	**37.50**	2.22	2.22	38.54	11.08	16.83	29.68	7.09	0.44	6.65	11.52
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	**0.09**	**0.107**	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	**30**	**24-187.5**	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	**200**	**187.5**	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	**50**	-	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	**20**	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	**5**	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	**150**	-	-	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	**0**	-	20	NA	P	-	-	-	-	-	7.3	>2419.6
E. Coli	per 100ml	**0**	-	N	N	3	0	2419.6	4.1	0	5.2	0	0
Total Coliforms	per 100ml	**0**	-	P	P	P	0	0	23.1	187.2	24.3	-	-
S.P.C @ 21°C	per 1ml	-	-	>1000	>1000	>1000	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	>1000	300	100	-	-	-	-	-	-	-
Entero	per 1ml	-	-	N	N	N	-	-	-	72.7	161.6	>2419.6	48.2
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-

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Dairygold Castlefarm Complex				Dairygold Castlefarm Complex										
Parameter	**Units**	**EPA Interim Guideline Values 2003**	**Groundwater Regulations SI366/2016**	**BH3**								**BH3**		
				24-Mar-16	**13-Jul-16**	**29-Sep-16**	**15-Dec-16**	**06-Apr-17**	**28-Jun-17**	**25-Sep-17**	**01-Dec-17**	**26-Mar-18**	**20-Jun-18**	**19-Sep-18**
pH	pH Units	**≥ 6.5 and ≤ 9.5**	**-**	7.17	7.41	7.77	7.48	7.74	7.58	7.37	6.94	-	7.43	7.49
Conductivity	µS/cm at 20°C	**1,000 (@ 25°C)**	**800-1875**	1006	3930	1215	1378	1152	835	925	891	-	1016	1252
COD	mg/l	**-**	**-**	2	38	26	96	8	32	35	23	-	17	21
BOD	mg/l	**-**	**-**	1.68	15.1	7.02	20.7	5.72	16.2	3	9.56	-	2	8.52
Ammonium (as N)	mg/l	**0.12**	**0.065-0.175**	0.43	0.79	1.16	19	0.66	0.74	1.28	0.72	-	0.86	0.92
Nitrate (as NO_3)	mg/l	**25**	**37.50**	3.54	7.09	3.10	11.52	4.87	9.75	4.43	3.99	-	5.31	6.20
Total Nitrogen	mg/l	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	**0.09**	**0.107**	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	**30**	**24-187.5**	-	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	**200**	**187.5**	-	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	**50**	**-**	-	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	**20**	**-**	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	**5**	**-**	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	**150**	**-**	-	-	-	-	-	-	-	-	-	-	-
Odour	-	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-
Colour	-	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	**0**	**-**	179	12.2	>2419.6	18.9	4.1	248.1	24.3	>2419.6	-	214.3	p
E. Coli	per 100ml	**0**	**-**	<1	5.2	0	0	0	2	21.3	4.8	-	61.6	n
Total Coliforms	per 100ml	**0**	**-**	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	**-**	**-**	8.6	56.5	18.1	81.7	18.9	6.2	6.3	17.5	-	172.2	p
EPH Interpretation	-	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-

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Parameter	**Units**	**EPA Interim Guideline Values 2003**	**Groundwater Regulations SI366/2016**	**BH3**									**BH3**			
				12-Dec-18	**27-Mar-19**	**18-Jun-19**	**24-Sep-19**	**11-Dec-19**	**23-Mar-20**	**29-Jun-20**	**01-Oct-20**	**04-Dec-20**	**09-Mar-21**	**24-May-21**	**11-Aug-21**	**03-Nov-21**
pH	pH Units	**≥ 6.5 and ≤ 9.5**	**-**	7.98	7.46	7.52	7.54	7.59	7.54	7.93	6.89	7.54	7.76	7.48	7.38	7.50
Conductivity	µS/cm at 20°C	**1,000 (@ 25°C)**	**800-1875**	870	1013	964	1221	1387	904	674	588	607	1081	843	890	887
COD	mg/l	**-**	**-**	18	25	85	38	375	20	29	3	3	8	9	14.7	18.73
BOD	mg/l	**-**	**-**	1.96	12.45	21.75	23.76	120.3	5.97	4.8	3.51	0.94	<1	11	7	<1
Ammonium (as N)	mg/l	**0.12**	**0.065-0.175**	1.6	8.3	2.49	1.69	3.42	0.98	0.43	0.62	0.07	2	1.3	0.74	1.13
Nitrate (as NO_3)	mg/l	**25**	**37.50**	22.14	18.16	20.37	15.50	4.43	4.43	14.17	11.51	43.4	2.21	17.26	13.28	16.65
Total Nitrogen	mg/l	**-**	**-**	-	-	-	-	-	-	-	-	-	10.5	4.31	#N/A	3.2
Orthophosphate as PO4	mg/l	**0.09**	**0.107**	-	-	-	-	-	-	-	-	-	0.15	1.54	0.07	0.67
Chloride	mg/l	**30**	**24-187.5**	-	-	-	-	-	-	-	-	-	43	34	43	52
Sulphate as SO4	mg/l	**200**	**187.5**	-	-	-	-	-	-	-	-	-	176.5	120.1	101.9	92
Manganese	ug/l	**50**	**-**	-	-	-	-	-	-	-	-	-	542	384	323	5953
Nickel	ug/l	**20**	**-**	-	-	-	-	-	-	-	-	-	49	36	29	426
Potassium	mg/l	**5**	**-**	-	-	-	-	-	-	-	-	-	5.7	6.9	6.6	7.7
Sodium	mg/l	**150**	**-**	-	-	-	-	-	-	-	-	-	191.2	164.7	144.4	181.2
Odour	-	**-**	**-**	-	-	-	-	-	-	-	-	-	Clear	Clear	Yes	Clear
Colour	-	**-**	**-**	-	-	-	-	-	-	-	-	-	Orange	Orange	Orange	Light Brown
Turbidity	-	**-**	**-**	-	-	-	-	-	-	-	-	-	Turbidity	Turbidity	Turbidity	Yes
Coliforms	per 1ml	**0**	**-**	8.1	<1	>2419.6	29.9	>2419.6	N	78.9	39.9	28.2	<1	4.1	>2419.6	328.2
E. Coli	per 100ml	**0**	**-**	<1	<1	<1	<1	21.3	N	18.5	5.2	1	<1	3.1	>2419.6	1
Total Coliforms	per 100ml	**0**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	**-**	**-**	33.2	45.9	>2419.6	39.5	15.8	P	5.2	P	<1	920.8	1	>2419.6	3.1
EPH Interpretation	-	**-**	**-**	-	-	-	-	-	-	-	-	-	Not Possible	Not Possible	-	-
EPH >C8-C10	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	<10	<10	<10	<10
EPH >C10-C12	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	<10	<10	<10	<10
EPH >C12-C16	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	<10	<10	<10	<10
EPH >C16-C21	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	<10	<10	<10	<10
EPH >C21-C35	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	<10	<10	<10	<10
EPH >C21-C40	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	<10	-	-	-
EPH >C35-C40	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	<10	<10	<10	<10
EPH >C8-C40	ug/l	**-**	**-**	-	-	-	-	-	-	-	-	-	<10	<10	<10	<10

> 25 COD or >10 BOD

P - Positive - present in sample
N - Negative - not present in sample
SPR denotes excessive spreader growth

Castlefarm Complex DQRA
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Appendix B = Groundwater Monitoring Database

		Dairygold Castlefarm Complex		Dairygold Castlefarm Complex		
Parameter	**Units**	**EPA Interim Guideline Values 2003**	**Groundwater Regulations SI366/2016**	**BH3**		
				08-Feb-22	**04-May-22**	**25-Aug-22**
pH	pH Units	**≥ 6.5 and ≤ 9.5**	**-**	7.53	7.07	8.29
Conductivity	µS/cm at 20°C	**1,000 (@ 25°C)**	**800-1875**	904	1094	851
COD	mg/l	**-**	**-**	24	11.8	50.8
BOD	mg/l	**-**	**-**	4	6	6
Ammonium (as N)	mg/l	**0.12**	**0.065-0.175**	1.07	1.14	0.35
Nitrate (as NO_3)	mg/l	**25**	**37.50**	16.82	13.28	6.64
Total Nitrogen	mg/l	**-**	**-**	3	1.8	1.24
Orthophosphate as PO4	mg/l	**0.09**	**0.107**	1.1	2.09	0.10
Chloride	mg/l	**30**	**24-187.5**	55.7	155.8	101.3
Sulphate as SO4	mg/l	**200**	**187.5**	98.6	92.9	22
Manganese	ug/l	**50**	**-**	327	443	111
Nickel	ug/l	**20**	**-**	30	36	33
Potassium	mg/l	**5**	**-**	6.7	6.1	6.2
Sodium	mg/l	**150**	**-**	162	199	188.9
Odour	-	**-**	**-**	Clear	Clear	Yes
Colour	-	**-**	**-**	Brown	Orange	Brown
Turbidity	-	**-**	**-**	Yes	Yes	Yes
Coliforms	per 1ml	**0**	**-**	11	19.9	6.3
E. Coli	per 100ml	**0**	**-**	727	<1	1
Total Coliforms	per 100ml	**0**	**-**	-	-	-
S.P.C @ 21°C	per 1ml	**-**	**-**	-	-	-
S.P.C @ 37°C	per 1ml	**-**	**-**	-	-	-
Entero	per 1ml	**-**	**-**	93	<1	27.5
EPH Interpretation	-	**-**	**-**	-	-	-
EPH >C8-C10	ug/l	**-**	**-**	<10	<10	<10
EPH >C10-C12	ug/l	**-**	**-**	<10	<10	<10
EPH >C12-C16	ug/l	**-**	**-**	<10	<10	<10
EPH >C16-C21	ug/l	**-**	**-**	<10	<10	<10
EPH >C21-C35	ug/l	**-**	**-**	<10	<10	<10
EPH >C21-C40	ug/l	**-**	**-**	-	-	-
EPH >C35-C40	ug/l	**-**	**-**	<10	<10	<10
EPH >C8-C40	ug/l	**-**	**-**	<10	<10	<10

> 25 COD or >10 BOD

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Castlefarm Complex DQRA
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Appendix B - Groundwater Monitoring Database												
Dairygold Castlefarm Complex				Dairygold Castlefarm Complex								
Parameters	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH4						BH4		
				22-Feb-07	28-Jun-07	14-Sep-07	11-Dec-07	3-Jul-08	9-Dec-08	10-Sep-09	2-Dec-09	28-Jul-10	14-Dec-10
pH	pH Units	-	≥ 6.5 and ≤ 9.5	7.8	7.7	7.7	6.9	7.4	6.8	8.2	7.9	7.9	8.9
Conductivity	µS/cm at 20°C	800-1875	1,000 (@ 25°C)	4040	4350	3640	811	2452	2514	1310	1142	437	3900
COD	mg/l	-	-	39	50	33	20	32	27	25	19	96	66
BOD	mg/l	-	-	5.3	15	4	1.7	15	11	8	4	32	101
Ammonium (as N)	mg/l	0.065-0.175	0.12	3.9	47.5	30.5	10	10	9.9	8.9	7.4	0.11	0.15
Nitrate (as NO_3)	mg/l	37.5	25	0.04	0.89	0.44	0.89	0.44	4.4	4.4	4.4	4.43	0.89
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	0.107	0.09	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	24-187.5	30	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	187.5	200	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	-	50	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	-	20	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	-	5	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	-	150	-	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	0	-	-	-	-	-	-	100	N	3	1000
E. Coli	per 100ml	-	0	-	-	-	-	-	-	-	-	>40	P
Total Coliforms	per 100ml	-	0	P	P	P	N	P	P	P	P	-	P
S.P.C @ 21°C	per 1ml	-	-	>1000	>1000	>1000	>1000	500	600	>1000	>1000	>1000	>1000
S.P.C @ 37°C	per 1ml	-	-	600	1106	>1000	20	>1000	700	>1000	500	>1000	>1000
Entero	per 1ml	-	-	200	36	400	2	P	P	38	40	N	200
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-

> 25 COD or >10 BOD

P - Positive - present in sample

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Castlefarm Complex DQRA

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Appendix B - Groundwater Monitoring Database

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex											
Parameters	**Units**	**Groundwater Regulations SI366/2016**	**EPA Interim Guideline Values 2003**	**BH4**						**BH4**					
				24-Aug-11	**19-Dec-11**	**12-Jul-12**	**18-Dec-12**	**25-Jun-13**	**05-Dec-13**	**10-Jul-14**	**13-Nov-14**	**05-May-15**	**22-Oct-15**	**24-Mar-16**	**13-Jul-16**
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	7.5	7.9	7.48	7.68	7.11	6.91	7.2	7.29	7.46	8.3	7.58	7.69
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	3620	735	832	1192	4780	1085	3070	4570	2650	3560	3270	3050
COD	mg/l	-	-	52	52	52	65	88	1148	94	45	47	31	22	31
BOD	mg/l	-	-	13	74	15	16	24.25	216.5	33.9	14.96	#N/A	2.6	7.04	6.84
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	1.37	15.6	3.9	20.7	26	93.6	22.5	28.8	15	19.18	29	2.08
Nitrate (as NO_3)	mg/l	**37.5**	**25**	0.89	0.89	35.44	32.78	0.89	4.87	6.20	0.44	16.39	3.10	10.19	1.33
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	**24-187.5**	**30**	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	**187.5**	**200**	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	-	**50**	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	-	**20**	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	-	**5**	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	-	**150**	-	-	-	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	**0**	>1000	500	200	-	-	-	-	-	>2419.6	>2419.6	2419	>2419.6
E. Coli	per 100ml	-	**0**	P	P	P	0	1	10.4	3.1	14.4	13.5	1	1	<1
Total Coliforms	per 100ml	-	**0**	P	P	P	>2419.6	2419.6	>2419.6	>2419	517	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	>1000	>1000	>1000	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	>1000	>1000	100	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	N	N	50	-	-	-	130	325	21.8	3.1	50.4	38.4
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 25 COD or >10 BOD

P - Positive - present in sample

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Castlefarm Complex DQRA

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Appendix B - Groundwater Monitoring Database

Parameters	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	Dairygold Castlefarm Complex BH4 29-Sep-16	15-Dec-16	06-Apr-17	28-Jun-17	25-Sep-17	Dec-17	Mar-18	Jun-18	Sep-18	Dec-18	Mar-19	Jun-19	Sep-19	10-Dec-19
pH	pH Units	-	≥ 6.5 and ≤ 9.5	7.81	7.57	7.91	7.74	10.4	9.33	7.7	7.21	7.43	7.29	7.48	9.6	7.57	9.22
Conductivity	µS/cm at 20°C	800-1875	1,000 (@ 25°C)	3390	2800	3800	3690	6520	3810	2136	2128	3110	1631	2220	3372	1997	3254
COD	mg/l	-	-	26	91	26	29	1840	1234	272	697	88	66	82	409	52	234
BOD	mg/l	-	-	6.92	16.2	23.25	6.33	105	160	74	101	13.8	13.1	12.9	60	9.9	45
Ammonium (as N)	mg/l	0.065-0.175	0.12	19.8	17	23.4	20.2	41.34	17	12.79	12.1	14.4	9.9	10.6	20.25	2.44	11.9
Nitrate (as NO_3)	mg/l	37.5	25	3.10	4.87	1.33	0.89	23.48	7.09	-	4.43	2.21	3.54	6.20	7.97	4.42	0.89
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	0.107	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	24-187.5	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	187.5	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	-	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	-	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	-	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	0	686.7	>2419.6	275.5	>2419.6	<1	>2419.6	-	2149.6	P	>2419.6	13.1	<1	>2419.6	<1
E. Coli	per 100ml	-	0	0	579.4	1	2	<1	135.5	-	<1	n	<1	<1	<1	52.1	<1
Total Coliforms	per 100ml	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	31.3	344.1	74.4	88.2	<1	5.2	-	13.8	P	63.7	56.5	<1	>2419.6	<1
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 25 COD or >10 BOD
P - Positive - present in sample
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Appendix B - Groundwater Monitoring Database

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex										
Parameters	**Units**	**Groundwater Regulations SI366/2016**	**EPA Interim Guideline Values 2003**	**BH4**				**BH4**						
				24-Mar-20	**29-Jun-20**	**01-Oct-20**	**04-Dec-20**	**09-Mar-21**	**24-May-21**	**11-Aug-21**	**03-Nov-21**	**08-Feb-22**	**04-May-22**	**25-Aug-22**
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	8.83	8.51	7.95	7.94	7.91	7.52	6.73	6.82	6.91	6.92	7.47
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	3088	3072	3390	4164	4475	4259	1340	972	6960	4546	3866
COD	mg/l	-	-	332	623	108	87.6	68	123	83.7	104.4	62	60	48.7
BOD	mg/l	-	-	158	50	17.55	17.7	15	41	17	13	26	23	2
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	11.8	0.3	0.95	22.07	34.2	48.25	82.5	128.4	81	53.2	41.1
Nitrate (as NO_3)	mg/l	**37.5**	**25**	3.54	5.76	4.43	5.31	2.21	3.10	15.05	4.27	1.77	3.54	3.98
Total Nitrogen	mg/l	-	-	-	-	-	-	39.9	48.96	#N/A	100.6	80.5	59.2	42.3
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	-	-	-	-	3.21	3.97	0.28	1.63	0.74	1.54	3.08
Chloride	mg/l	**24-187.5**	**30**	-	-	-	-	162	207	4225	3130.9	1875.3	957.7	635.6
Sulphate as SO4	mg/l	**187.5**	**200**	-	-	-	-	1.1	62.3	8.7	18.7	58.8	63.1	50.1
Manganese	ug/l	-	**50**	-	-	-	-	430	853	4520	706	2606	1421	900
Nickel	ug/l	-	**20**	-	-	-	-	473	439	216	14	255	351	423
Potassium	mg/l	-	**5**	-	-	-	-	271.2	292.7	479.6	353.4	352.6	296.5	358.2
Sodium	mg/l	-	**150**	-	-	-	-	927.5	859	908.2	704	728.8	634.1	281.1
Odour	-	-	-	-	-	-	-	Clear	Clear	Clear	Odour	Clear	Odour	Yes
Colour	-	-	-	-	-	-	-	Cloudy	Green	Orange	Orange	Yellow	Yellow	Light Green
Turbidity	-	-	-	-	-	-	-	Turbidity	Turbidity	Turbidity	Yes	Yes	Yes	Yes
Coliforms	per 1ml	-	**0**	P	>2419.6	>2419.6	>2419.6	<1	>2419.60	1986.3	18.3	5	122.2	222.4
E. Coli	per 100ml	-	**0**	N	<1	9.8	78.9	<1	<1	14.5	<1	<1	<1	4.1
Total Coliforms	per 100ml	-	**0**	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	P	>2419.5	P	>2419.6	<1	172	>2419.6	9.5	<1	66.3	210.2
EPH Interpretation	-	-	-	-	-	-	-	Possible Lubricating Oil	Lubricating Oil	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	<10	<20	<10	<10	<10	<10	<10
EPH >C10-C12	ug/l	-	-	-	-	-	-	<10	<20	<10	<10	<10	<10	<10
EPH >C12-C16	ug/l	-	-	-	-	-	-	<10	<20	<10	40	<10	<10	<10
EPH >C16-C21	ug/l	-	-	-	-	-	-	**30**	**530**	**490**	**420**	<10	<10	<10
EPH >C21-C35	ug/l	-	-	-	-	-	-	**1740**	**9690**	**7120**	**5030**	<10	<10	**470**
EPH >C21-C40	ug/l	-	-	-	-	-	-	**2650**	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	**910**	**2810**	**2210**	**940**	<10	<10	**70**
EPH >C8-C40	ug/l	-	-	-	-	-	-	**2680**	**13030**	**9820**	**6430**	<10	<10	**540**

> 25 COD or >10 BOD

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Castlefarm Complex DQRA
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Appendix B - Groundwater Monitoring Database

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex															
Parameter	Units	EPA Interim Guideline Values 2003	Groundwater Regulations SI366/2016	BH6									BH6						
				22-Feb-07	28-Jun-07	14-Sep-07	11-Dec-07	3-Jul-08	9-Dec-08	10-Sep-09	2-Dec-09	28-Jul-10	12-Nov-10	24-Aug-11	08-Nov-11	12-Jul-12	18-Dec-12	25-Jun-13	05-Dec-13
pH	pH Units	≥ 6.5 and ≤ 9.5	-	7.50	7.30	7.50	7.20	7.70	7.50	7.40	7.70	7.50	7.00	6.40	7.20	7.20	7.40	6.84	6.70
Conductivity	µS/cm	1,000 (@ 25°C)	800-1875	579	475	666	650	700	718	491	675	454	373	418	154	193	245	550	483
COD	mg/l	-	-	0.2	2.4	10	0.4	0.4	1	10	0	7	<3	9	9	91	<3	<3	32
BOD	mg/l	-	-	1.5	0.2	1	1	0.7	0.6	1	1	1	#N/A	3	8	3	3	1	1.19
Ammonium (as N)	mg/l	0.12	0.065-0.175	0.01	0.25	0.01	0.01	0.25	0.02	0.09	0.02	0.02	0.13	0.02	0.17	0.06	<0.02	<0.02	<0.02
Nitrate (as NO_3)	mg/l	25	37.5	30.75	20.38	17.72	0.00	#N/A	16.28	25.69	22.15	27.47	24.81	19.49	19.49	71.32	77.08	15.06	15.51
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	0.09	0.107	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	30	24-187.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	200	187.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	0	-	-	-	-	-	-	-	N	N	N	10	N	NA	NA	-	-	-
E. Coli	per 100ml	0	-	-	-	-	-	-	-	-	-	<1	-	N	NA	NA	0	0	0
Total Coliforms	per 100ml	0	-	N	P	P	N	N	N	P	N	-	N	N	N	N	0	>2419.6	8.4
S.P.C @ 21°C	per 1ml	-	-	11	158	>1000	1	N	10	>1000	N	>1000	100	20	3	>1000	-	-	-
S.P.C @ 37°C	per 1ml	-	-	N	35	SPR	N	5	N	N	N	>1000	5	1	N	N	-	-	-
Entero	per 1ml	-	-	N	N	N	N	P	N	N	N	N	-	N	N	N	-	-	-

> 25 COD or >10 BOD

P - Positive - present in sample
N - Negative - not present in sample
SPR denotes excessive spreader growth

BH6 is a production well
Constantly pumped
Raw water sample tap

Castlefarm Complex DQRA
IE Consulting
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Appendix B - Groundwater Monitoring Database

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex																
Parameter	Units	EPA Interim Guideline Values 2003	Groundwater Regulations SI366/2016	BH6									BH6							
				10-Jul-14	13-Nov-14	05-May-15	22-Oct-15	24-Mar-16	13-Jul-16	29-Sep-16	15-Dec-16	06-Apr-17	28-Jun-17	26-Sep-17	Dec-17	Jun-18	Sep-18	Dec-18	Mar-19	Jun-19
pH	pH Units	**≥ 6.5 and ≤ 9.5**	**-**	6.81	6.90	7.06	7.03	6.07	6.80	6.93	6.80	8.04	7.02	6.92	7.33	6.79	6.79	7.58	6.81	7.08
Conductivity	µS/cm	**1,000 (@ 25°C)**	**800-1875**	422	548	486	567	629	585	560	592	717	586	397	500	470	465	412	502	507
COD	mg/l	**-**	**-**	3	7	5	7	11	8	5	17	3	3	10	16	6	3	3	3	3
BOD	mg/l	**-**	**-**	1.3	0.04	-	0.51	1	0.8	0.96	11.32	1.73	1.01	2	1.68	1.54	0.8	2.26	0.66	0.66
Ammonium (as N)	mg/l	**0.12**	**0.065-0.175**	0.02	0.02	<0.02	0.025	0.02	0.02	0.02	0.02	<0.02	0.02	0.02	0.09	0.02	0.02	0.02	0.02	0.02
Nitrate (as NO_3)	mg/l	**25**	**37.5**	21.71	13.29	21.71	15.06	18.61	21.71	24.81	26.14	15.06	23.04	20.82	18.16	20.37	22.59	14.17	20.37	19.49
Total Nitrogen	mg/l	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	**0.09**	**0.107**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	**30**	**24-187.5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	**200**	**187.5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	**50**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	**20**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	**5**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	**150**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Odour	-	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	**0**	**-**	-	-	0	0	<1	<1	0	0	0	<1	<1	<1	<1	n	<1	<1	<1
E. Coli	per 100ml	**0**	**-**	0	0	0	0	<1	<1	0	0	0	<1	<1	<1	<1	n	<1	<1	<1
Total Coliforms	per 100ml	**0**	**-**	1	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	**-**	**-**	0	0	0	1	<1	<1	0	0	0	<1	<1	<1	<1	N	<1	<1	<1

> 25 COD or >10 BOD

P - Positive - present in sample
N - Negative - not present in sample
SPR denotes excessive spreader growth

BH6 is a production well
Constantly pumped
Raw water sample tap

Castlefarm Complex DQRA
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Appendix B - Groundwater Monitoring Database

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex												
Parameter	Units	EPA Interim Guideline Values 2003	Groundwater Regulations SI366/2016	BH6						BH6						
				Sep-19	11-Dec-19	23 March 2020	29 June 2020	1 October 2020	4 December 2020	9 March 2021	24 May 2021	11 August 2021	2 November 2021	7 February 2022	6 May 2022	25 August 2022
pH	pH Units	**≥ 6.5 and ≤ 9.5**	**-**	6.64	8.07	7.3	6.88	7.19	7.53	7.49	6.89	6.82	6.93	6.92	6.74	6.80
Conductivity	µS/cm	**1,000 (@ 25°C)**	**800-1875**	494	348	361	460	364	341	544	483	487	514	532	533	531
COD	mg/l	**-**	**-**	3	3	3	14	3	3	-	<7	2.57	21.2	9	3.57	7.67
BOD	mg/l	**-**	**-**	0.64	1.38	0.65	0.73	0.51	0.42	-	2	2	1	2	2	1
Ammonium (as N)	mg/l	**0.12**	**0.065-0.175**	0.02	0.05	0.02	0.02	0.24	0.13	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Nitrate (as NO_3)	mg/l	**25**	**37.5**	24.36	20.81	18.16	24.8	23.91	22.59	19.48	20.36	23.02	19.63	19.48	17.26	22.13
Total Nitrogen	mg/l	**-**	**-**	-	-	-	-	-	-	4.57	3.88	-	3.8	3.8	3.4	3.86
Orthophosphate as PO4	mg/l	**0.09**	**0.107**	-	-	-	-	-	-	0.05	0.07	0.06	0.04	0.07	0.05	0.1
Chloride	mg/l	**30**	**24-187.5**	-	-	-	-	-	-	44	43	46	44	46.8	49.9	51.8
Sulphate as SO4	mg/l	**200**	**187.5**	-	-	-	-	-	-	-	23.2	24.9	25.5	19.7	24.6	29.1
Manganese	ug/l	**50**	**-**	-	-	-	-	-	-	-	2	2	2	3	2	8
Nickel	ug/l	**20**	**-**	-	-	-	-	-	-	-	2	2	2	2	2	2
Potassium	mg/l	**5**	**-**	-	-	-	-	-	-	-	1.3	1.2	1.1	1.7	1.4	1.4
Sodium	mg/l	**150**	**-**	-	-	-	-	-	-	-	18	17	17.4	20.9	20	21.3
Odour	-	-	-	-	-	-	-	-	-	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Colour	-	-	-	-	-	-	-	-	-	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Turbidity	-	-	-	-	-	-	-	-	-	Clear	Clear	Clear	No	No	No	Yes
Coliforms	per 1ml	**0**	**-**	<1	<1	N	<1	<1	<1	>2419.6	<1	<1	<1	<1	<1	<1
E. Coli	per 100ml	**0**	**-**	<1	<1	N	<1	<1	<1	1	<1	<1	<1	<1	<1	<1
Total Coliforms	per 100ml	**0**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	**-**	**-**	<1	<1	N	<1	N	<1	<1	<1	<1	<1	<1	<1	<1

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Dairygold, Mitchelstown, Co. Cork				Dairygold Castlefarm Complex					
Parameter	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH8					
				06-Apr-17	01-Jun-17	25-Sep-17	01-Dec-17	20-Jun-18	20-Sep-18
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	7.6	7.38	7.42	7.38	7.22	7.15
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	3360	4220	3250	2980	2560	3030
COD	mg/l	-	-	109	20	42	38	8	14
BOD	mg/l	-	-	71	22.76	5	8.1	3.14	0.5
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	30.8	29.9	25.6	43.5	38.4	22.6
Nitrate (as NO_3)	mg/l	**37.5**	**25**	-	-	-	2.21	0.89	1.77
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	-	-	-	-	-	-
Chloride	mg/l	**24-187.5**	**30**	-	-	-	-	-	-
Sulphate as SO4	mg/l	**187.5**	**200**	-	-	-	-	-	-
Manganese	ug/l	-	**50**	-	-	-	-	-	-
Nickel	ug/l	-	**20**	-	-	-	-	-	-
Potassium	mg/l	-	**5**	-	-	-	-	-	-
Sodium	mg/l	-	**150**	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	**0**	>2419.60	>2419.60	>2419.60	1986.3	235.9	P
E. Coli	per 100ml	-	**0**	84.5	69.1	54.6	<1	6.3	N
Total Coliforms	per 100ml	-	**0**	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	>2419.60	1732.9	307.6	35.9	3	N
EPH Interpretation	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-

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Dairygold, Mitchelstown, Co. Cork				Dairygold Castlefarm Complex							
Parameter	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH8							
				12-Dec-18	27-Mar-19	19-Jun-19	25-Sep-19	11-Dec-19	23-Mar-20	29-Jun-20	01-Oct-20
pH	pH Units	-	≥ 6.5 and ≤ 9.5	7.27	7.13	7.09	7.38	7.26	7.28	7.11	7.11
Conductivity	µS/cm at 20°C	800-1875	1,000 (@ 25°C)	2570	2230	2240	2508	2959	3093	4801	4249
COD	mg/l	-	-	22	14	14	24	5	3	22	11.6
BOD	mg/l	-	-	8.14	3.32	5.1	7.9	8.38	7.32	2.5	4.09
Ammonium (as N)	mg/l	0.065-0.175	0.12	37.2	27.9	24.9	24.5	32.55	2.91	24.3	19.41
Nitrate (as NO_3)	mg/l	37.5	25	2.21	3.54	1.33	2.65	1.32	1.32	2.66	2.66
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	0.107	0.09	-	-	-	-	-	-	-	-
Chloride	mg/l	24-187.5	30	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	187.5	200	-	-	-	-	-	-	-	-
Manganese	ug/l	-	50	-	-	-	-	-	-	-	-
Nickel	ug/l	-	20	-	-	-	-	-	-	-	-
Potassium	mg/l	-	5	-	-	-	-	-	-	-	-
Sodium	mg/l	-	150	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	0	8.5	>2419.60	>2419.60	>2419.6	52	P	<1	26.2
E. Coli	per 100ml	-	0	<1	5.1	2	3.1	<1	N	<1	2
Total Coliforms	per 100ml	-	0	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	<1	44.6	<1	<1	<1	N	<1	N
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-

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Dairygold, Mitchelstown, Co. Cork				Dairygold Castlefarm Complex							
Parameter	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH8				BH8			
				04-Dec-20	09-Mar-21	24-May-21	11-Aug-21	03-Nov-21	07-Feb-22	03-May-22	24-Aug-22
pH	pH Units	-	≥ 6.5 and ≤ 9.5	7.07	7.22	7.23	7.33	7.25	7.23	7.06	7.57
Conductivity	µS/cm at 20°C	800-1875	1,000 (@ 25°C)	4906	4830	3067	563	2461	2194	2240	587
COD	mg/l	-	-	3	31	21	1.34	9	3	6.91	4.91
BOD	mg/l	-	-	5.99	12	3	4	9.8	7	6	3
Ammonium (as N)	mg/l	0.065-0.175	0.12	13.96	35.8	19.2	0.02	19.3	16.9	15.4	0.45
Nitrate (as NO_3)	mg/l	37.5	25	2.66	0.89	57.11	13.28	5.31	5.75	1.78	19.48
Total Nitrogen	mg/l	-	-	-	36.60	19.46	#N/A	16.9	16.5	18.2	2.87
Orthophosphate as PO4	mg/l	0.107	0.09	-	1.95	1.21	0.51	0.28	1.76	2.23	0.59
Chloride	mg/l	24-187.5	30	-	1225	884	863	628	568	552.8	41.8
Sulphate as SO4	mg/l	187.5	200	-	1.00	21.60	18.80	18.00	17.10	8.00	34.30
Manganese	ug/l	-	50	-	905	818	779	2	571	663	107
Nickel	ug/l	-	20	-	74	41	50	2	60	93	11
Potassium	mg/l	-	5	-	97.70	77.00	66.10	68.50	57.20	59.40	14.90
Sodium	mg/l	-	150	-	641.40	387.70	519.30	383.40	411	421	29.1
Odour	-	-	-	-	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Colour	-	-	-	-	Cloudy	Green	Clear	Cloudy	Cloudy	Light Green	Cloudy
Turbidity	-	-	-	-	Turbidity	Clear	Clear	Turbidity	Turbidity	Turbidity	Turbidity
Coliforms	per 1ml	-	0	<1	13.5	<1	344.8	161.6	411	13.1	43.1
E. Coli	per 100ml	-	0	<1	1	<1	<1	<1	1	<1	9.6
Total Coliforms	per 100ml	-	0	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	<1	<1	<1	<1	<1	<1	<1	2
EPH Interpretation	-	-	-	-	Not Possible	Not Possible	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C10-C12	ug/l	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C12-C16	ug/l	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C16-C21	ug/l	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C21-C35	ug/l	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C21-C40	ug/l	-	-	-	<10	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C8-C40	ug/l	-	-	-	<10	<10	<10	<10	<10	<10	<10

> 25 COD or >10 BOD
P - Positive - present in sample
N - Negative - not present in sample
SPR denotes excessive spreader growth

Castlefarm Complex DQRA
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Dairygold, Mitchelstown, Co. Cork				Dairygold Castlefarm Complex												
Parameter	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH10								BH10				
				06-Apr-17	28-Jun-17	25-Sep-17	01-Dec-17	20-Jun-18	20-Sep-18	12-Dec-18	27-Mar-19	18-Jun-19	25-Sep-19	11-Dec-19	24-Mar-20	29-Jun-20
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	7.26	7.14	7.2	7.14	7.02	7.04	7.5	7.06	7.37	7.27	7.42	7.21	7.37
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	504	687	485	535	510	673	429	516	536	558	564	605	562
COD	mg/l	-	-	3	3	42	12	3	3	3	5	3	3	9	3	14
BOD	mg/l	-	-	1	1.55	2	1.33	5.6	0.76	0.99	0.44	0.67	0.61	0.5	0.98	1.02
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	0.02	0.02	0.02	0.1	0.02	0.02	0.02	0.02	0.02	0.02	0.05	0.02	0.02
Nitrate (as NO_3)	mg/l	**37.5**	**25**	-	-	-	-	13.73	10.19	12.40	14.61	13.29	13.28	11.07	14.61	14.61
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	**24-187.5**	**30**	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	**187.5**	**200**	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	-	**50**	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	-	**20**	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	-	**5**	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	-	**150**	-	-	-	-	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	**0**	0	307.6	21.1	59.8	<1	P	187.2	2	>2419.6	2419.6	53.7	P	9.8
E. Coli	per 100ml	-	**0**	0	18.9	<1	<1	<1	N	<1	<1	547.5	123.9	<1	<1	<1
Total Coliforms	per 100ml	-	**0**	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	0	1	<1	1	<1	P	<1	<1	<1	13.5	<1	N	<1
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 25 COD or >10 BOD
P - Positive - present in sample
N - Negative - not present in sample
SPR denotes excessive spreader growth

Castlefarm Complex DQRA
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Dairygold, Mitchelstown, Co. Cork				Dairygold Castlefarm Complex								
Parameter	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH10					BH10			
				01-Oct-20	04-Dec-20	09-Mar-21	24-May-21	11-Aug-21	03-Nov-21	07-Feb-22	03-May-22	25-Aug-22
pH	pH Units	-	≥ 6.5 and ≤ 9.5	7.11	7.26	6.66	7.42	7.11	7.29	7.39	7.28	7.44
Conductivity	µS/cm at 20°C	800-1875	1,000 (@ 25°C)	527	605	689	520	314	517	502	521	562
COD	mg/l	-	-	3	3	<7	<7	8.45	0	3	3.13	6.75
BOD	mg/l	-	-	0.75	1.24	1	2	2	1	2	2	1
Ammonium (as N)	mg/l	0.065-0.175	0.12	0.02	0.14	0.02	0.02	0.10	0.09	0.02	0.02	0.02
Nitrate (as NO_3)	mg/l	37.5	25	15.49	14.61	12.84	2.21	3.10	13.28	15.49	11.95	12.84
Total Nitrogen	mg/l	-	-	-	-	2.97	2.32	#N/A	1.90	2.20	2.50	1.89
Orthophosphate as PO4	mg/l	0.107	0.09	-	-	0.06	0.05	0.02	0.02	0.02	0.02	0.03
Chloride	mg/l	24-187.5	30	-	-	30	38	32	29	28	27.9	29.0
Sulphate as SO4	mg/l	187.5	200	-	-	19.10	20.00	19.50	19.80	19.70	19.10	19.70
Manganese	ug/l	-	50	-	-	2.00	2	2	644	2	2	2
Nickel	ug/l	-	20	-	-	2.00	2	2	60	2	2	2
Potassium	mg/l	-	5	-	-	1.70	1.80	1.70	2.60	1.70	1.80	1.80
Sodium	mg/l	-	150	-	-	19.50	18.60	17.40	20.50	19.30	18.90	18.50
Odour	-	-	-	-	-	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Colour	-	-	-	-	-	Orange	Clear	Orange	Clear	Clear	Clear	Clear
Turbidity	-	-	-	-	-	Turbidity	Clear	Clear	No	No	No	No
Coliforms	per 1ml	-	0	84.9	>2419.6	<1	<1	75.4	193.5	7.5	461.1	365.4
E. Coli	per 100ml	-	0	1	<1	<1	<1	48.8	<1	<1	<1	1
Total Coliforms	per 100ml	-	0	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	N	<1	<1	<1	<1	<1	<1	<1	<1
EPH Interpretation	-	-	-	-	-	Not Possible	Not Possible	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C10-C12	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C12-C16	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C16-C21	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C21-C35	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C21-C40	ug/l	-	-	-	-	<10	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C8-C40	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10

> 25 COD or >10 BOD

P - Positive - present in sample
N - Negative - not present in sample
SPR denotes excessive spreader growth

Castlefarm Complex DQRA
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Dairygold, Mitchelstown, Co. Cork				Dairygold Castlefarm Complex											
Parameter	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH11					BH11						
				6-Apr-17	28-Jun-17	25-Sep-17	Dec-17	Mar-18	20-Jun-18	20-Sep-18	12-Dec-18	27-Mar-19	18-Jun-19	25-Sep-19	10-Dec-19
pH	pH Units	-	≥ 6.5 and ≤ 9.5	7.22	7.16	7.26	7.31	7.13	7.05	7.16	7.24	7.13	7.27	7.13	7.41
Conductivity	µS/cm at 20°C	800-1875	1,000 (@ 25°C)	815	1277	907	1217	1486	1246	1666	706	996	1374	1631	1193
COD	mg/l	-	-	21	1	38	36	189	3	33	3	25	16	5	13
BOD	mg/l	-	-	1	2.07	3	8.28	154	7.96	1.92	3.66	5.28	6.9	4.56	0.84
Ammonium (as N)	mg/l	0.065-0.175	0.12	30.8	12.4	11.9	15.8	11.25	14.7	12.6	6.8	6.35	11	8.05	6.52
Nitrate (as NO_3)	mg/l	37.5	25	-	-	-	1.33	-	1.77	1.77	4.87	2.66	0.89	1.33	0.89
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	0.107	0.09	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	24-187.5	30	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	187.5	200	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	-	50	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	-	20	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	-	5	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	-	150	-	-	-	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	0	1	290.9	238.2	>2419.6	-	<1	P	13	344.1	>2419.6	>2419.6	186
E. Coli	per 100ml	-	0	0	<1	7.3	35.5		<1	N	<1	<1	11.9	87.6	<1
Total Coliforms	per 100ml	-	0	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	2	<1	30.9	12.2	-	<1	P	<1	<1	<1	1	<1
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 25 COD or >10 BOD
P - Positive - present in sample
N - Negative - not present in sample
SPR denotes excessive spreader growth

Castlefarm Complex DQRA
IE Consulting
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Dairygold, Mitchelstown, Co. Cork				Dairygold Castlefarm Complex											
Parameter	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	BH11					BH11						
				25-Mar-20	29-Jun-20	01-Oct-20	04-Dec-20	09-Mar-21	24-May-21	11-Aug-21	02-Nov-21	07-Feb-22	03-May-22	24-Aug-22
pH	pH Units	-	≥ 6.5 and ≤ 9.5	7.14	7.24	7.11	7.59	No access	7.19	6.96	6.94	7.06	6.99	7.05
Conductivity	µS/cm at 20°C	800-1875	1,000 (@ 25°C)	1322	1627	1554	1665	-	1840	2166	1543	1239	1164	1593
COD	mg/l	-	-	11	18	15.5	2.2	-	34	42.1	11.3	7	9.83	19.01
BOD	mg/l	-	-	5.67	5.93	8.08	0.8	-	41	25	2	19	2	3
Ammonium (as N)	mg/l	0.065-0.175	0.12	5.6	0.15	10.5	7.19	-	11.25	22.6	17.6	14.2	9.1	13.4
Nitrate (as NO_3)	mg/l	37.5	25	1.32	4.43	23.91	2.66	-	23.90	2.21	2.21	2.66	2.65	2.65
Total Nitrogen	mg/l	-	-	-	-	-	-	-	13.44	-	17.2	12.8	2.5	13.04
Orthophosphate as PO4	mg/l	0.107	0.09	-	-	-	-	-	2.79	5.21	1.27	0.94	2.28	2.54
Chloride	mg/l	24-187.5	30	-	-	-	-	-	274	255	127	97.6	27.9	104.4
Sulphate as SO4	mg/l	187.5	200	-	-	-	-	-	0.5	0.5	4.1	0.6	3.9	0.7
Manganese	ug/l	-	50	-	-	-	-	-	2139	1974	1864	1631	1709	1697
Nickel	ug/l	-	20	-	-	-	-	-	69	66	52	66	67	90
Potassium	mg/l	-	5	-	-	-	-	-	20.4	28	27.5	20.1	18.7	19.5
Sodium	mg/l	-	150	-	-	-	-	-	245.4	347.9	180.9	168	159.1	255.5
Odour	-	-	-	-	-	-	-	-	Clear	Yes	Clear	Yes	Clear	Clear
Colour	-	-	-	-	-	-	-	-	Green	Clear	Light orange	Orange	Orange	Cloudy
Turbidity	-	-	-	-	-	-	-	-	Turbidity	Turbidity	No	Turbidity	Turbidity	Yes
Coliforms	per 1ml	-	0	P	32.7	>2419.6	>2419.6	-	>2419.6	>2419.6	>2419.6	205	<1	344.8
E. Coli	per 100ml	-	0	<1	1	>2419.6	<1	-	13.2	>2419.6	2	1	<1	33.6
Total Coliforms	per 100ml	-	0	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	P	<1	P	<1	-	<1	>2419.6	<1	<1	<1	<1
EPH Interpretation	-	-	-	-	-	-	-	-	Not Possible	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10

> 25 COD or >10 BOD

P - Positive - present in sample
N - Negative - not present in sample
SPR denotes excessive spreader growth

Castlefarm Complex DQRA
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Appendix B - Groundwater Monitoring Database

Parameters	Units	Groundwater Regulations SI366/2016	EPA Interim Guideline Values 2003	Dairygold Castlefarm Complex BH7 31-Mar-17	27-Jun-17	25-Sep-17	01-Dec-17	26-Mar-18
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	7.07	7.14	7.15	7.27	7.56
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	614	619	447	531	888
COD	mg/l	-	-	3	4	25	13	<7
BOD	mg/l	-	-	1	1	2	1.98	1
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	0.02	0.17	0.02	0.11	<0.03
Nitrate (as NO_3)	mg/l	**37.5**	**25**				14.17	
Total Nitrogen	mg/l	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	-	-	-	-	-
Chloride	mg/l	**24-187.5**	**30**	-	-	-	-	-
Sulphate as SO4	mg/l	**187.5**	**200**	-	-	-	-	-
Manganese	ug/l	-	**50**	-	-	-	-	-
Nickel	ug/l	-	**20**	-	-	-	-	-
Potassium	mg/l	-	**5**	-	-	-	-	-
Sodium	mg/l	-	**150**	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	**0**	-	>2419.60	>2419.60	>2419.6	-
E. Coli	per 100ml	-	**0**	-	>2419.60	172.2	12.2	-
Total Coliforms	per 100ml	-	**0**	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-
Entero	per 1ml	-	-	-	135.5	6.3	2	-
EPH Interpretation	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-

> 25 COD or >10 BOD
P - Positive - present in sample
N - Negative - not present in sample
SPR denotes excessive spreader growth

Castlefarm Complex DQRA
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Appendix B - Groundwater Monitoring Database

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex								
Parameters	**Units**	**Groundwater Regulations SI366/2016**	**EPA Interim Guideline Values 2003**	**BH7**				**BH7**				
				20-Jun-18	**19-Sep-18**	**12-Dec-18**	**27-Mar-19**	**18-Jun-19**	**24-Sep-19**	**11-Dec-19**	**23-Mar-20**	**29-Jun-20**
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	7.15	6.99	7.19	7.05	7.5	7.28	7.33	7.48	7.5
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	528	773	345	505	567	558	505	574	560
COD	mg/l	-	-	4	25	5	3	3	3	3	3	48
BOD	mg/l	-	-	1.52	3.18	1.1	0.55	0.5	0.64	0.93	1.32	3.15
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	0.02	0.5	0.02	0.02	0.02	0.02	0.02	0.02	0.36
Nitrate (as NO_3)	mg/l	**37.5**	**25**	21.70	11.51	10.63	21.26	20.37	20.81	14.61	18.16	28.34
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	-	-	-	-	-	-	-	-	-
Chloride	mg/l	**24-187.5**	**30**	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	**187.5**	**200**	-	-	-	-	-	-	-	-	-
Manganese	ug/l	-	**50**	-	-	-	-	-	-	-	-	-
Nickel	ug/l	-	**20**	-	-	-	-	-	-	-	-	-
Potassium	mg/l	-	**5**	-	-	-	-	-	-	-	-	-
Sodium	mg/l	-	**150**	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	**0**	14.3	P	648.8	21.8	95.9	>2419.60	>2419.6	N	>2419.6
E. Coli	per 100ml	-	**0**	6.3	P	12.2	<1	4.1	>2419.60	11.9	N	410.6
Total Coliforms	per 100ml	-	**0**	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	<1	P	17.5	<1	1	>2419.60	69.7	N	49.6
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-

> 25 COD or >10 BOD
P - Positive - present in sample
N - Negative - not present in sample
SPR denotes excessive spreader growth

Castlefarm Complex DQRA
IE Consulting
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Appendix B - Groundwater Monitoring Database

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex								
Parameters	**Units**	**Groundwater Regulations SI366/2016**	**EPA Interim Guideline Values 2003**	**BH7**					**BH7**			
				01-Oct-20	**04-Dec-20**	**09-Mar-21**	**24-May-21**	**11-Aug-21**	**03-Nov-21**	**07-Feb-22**	**03-May-22**	**24-Aug-22**
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	7.19	7.36	7.53	7.49	7.53	7.17	7.46	7.17	7.47
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	526	601	590	446	389	499	472	584	676
COD	mg/l	-	-	3	3	<7	<7	9.2	44.3	3	0.49	6.75
BOD	mg/l	-	-	0.73	0.75	1	5	3	1	2	2	1
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	0.23	0.06	0.02	0.02	0.39	0.02	0.02	0.02	0.02
Nitrate (as NO_3)	mg/l	**37.5**	**25**	21.69	8.86	18.15	18.15	18.15	10.24	20.81	19.48	20.81
Total Nitrogen	mg/l	-	-	-	-	4.29	3.56	-	2.4	4.3	4.2	3.24
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	-	-	0.11	0.15	0.28	0.16	0.12	0.02	0.07
Chloride	mg/l	**24-187.5**	**30**	-	-	23.00	18	14	11.9	22.5	24.2	24.4
Sulphate as SO4	mg/l	**187.5**	**200**	-	-	15.90	15.2	10.9	16.4	15.1	16.2	16.4
Manganese	ug/l	-	**50**	-	-	3	12	18	2	6	2	30
Nickel	ug/l	-	**20**	-	-	2.00	2	2	2	2	2	2
Potassium	mg/l	-	**5**	-	-	3.10	3.3	2.4	6.8	3.1	2	2.4
Sodium	mg/l	-	**150**	-	-	98.50	69.6	55.4	10.7	89.1	113	113.7
Odour	-	-	-	-	-	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Colour	-	-	-	-	-	Clear	Clear	Yellow	Cloudy	Cloudy	Clear	Clear
Turbidity	-	-	-	-	-	Clear	Clear	Turbidity	Yes	-	-	Yes
Coliforms	per 1ml	-	**0**	>2419.6	>2419.6	<1	>2419.6	>2419.6	>2419.6	1553	307.6	>2419.6
E. Coli	per 100ml	-	**0**	165.8	14.8	<1	1732.9	>2419.6	133.3	12	14.6	387.3
Total Coliforms	per 100ml	-	**0**	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	P	3.1	<1	48.8	>2419.6	23.3	9	1	12.1
EPH Interpretation	-	-	-	-	-	Not Possible	Not Possible	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C10-C12	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C12-C16	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C16-C21	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C21-C35	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C21-C40	ug/l	-	-	-	-	<10	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C8-C40	ug/l	-	-	-	-	<10	<10	<10	<10	<10	<10	<10

> 25 COD or >10 BOD
P - Positive - present in sample
N - Negative - not present in sample
SPR denotes excessive spreader growth

Castlefarm Complex DQRA
IE Consulting
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Appendix B - Groundwater Monitoring Database

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex									
Parameters	**Units**	**Groundwater Regulations SI366/2016**	**EPA Interim Guideline Values 2003**	**BH9**					**BH9**				
				06-Apr-17	**28-Jun-17**	**25-Sep-17**	**Dec-17**	**Jun-18**	**Sep-18**	**Dec-18**	**Mar-19**	**Jun-19**	**Sep-19**
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	7.08	6.93	7.15	7.22	6.99	6.88	7.79	6.97	7.1	7.11
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	510	873	665	569	551	891	450	580	651	810
COD	mg/l	-	-	3	63	10	3	3	14	3	4	91	10
BOD	mg/l	-	-	1.76	46.35	2	1.97	4.13	0.5	1.27	1.5	1.4	0.95
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	0.75	0.1	0.78	0.4	1.08	0.11	0.59	1.75	0.56	0.23
Nitrate (as NO_3)	mg/l	**37.5**	**25**	47.40	51.83	15.95	42.07	38.53	37.20	41.63	62.44	49.60	54.91
Total Nitrogen	mg/l	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	**24-187.5**	**30**	-	-	-	-	-	-	-	-	-	-
Sulphate as SO4	mg/l	**187.5**	**200**	-	-	-	-	-	-	-	-	-	-
Manganese	ug/l	-	**50**	-	-	-	-	-	-	-	-	-	-
Nickel	ug/l	-	**20**	-	-	-	-	-	-	-	-	-	-
Potassium	mg/l	-	**5**	-	-	-	-	-	-	-	-	-	-
Sodium	mg/l	-	**150**	-	-	-	-	-	-	-	-	-	-
Odour	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms	per 1ml	-	**0**	>2419.60	3.1	201.4	>2419.6	344.8	P	770.1	610.8	>2419.6	<2419.6
E. Coli	per 100ml	-	**0**	8.6	<1	27.5	135.5	204.6	P	133.4	3.1	<1	1
Total Coliforms	per 100ml	-	**0**	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	3	86	4.1	17.5	2	P	2	<1	30.5	1
EPH Interpretation	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	-	-	-	-	-

> 25 COD or >10 BOD
P - Positive - present in sample
N - Negative - not present in sample
SPR denotes excessive spreader growth

Castlefarm Complex DQRA
IE Consulting
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Appendix B - Groundwater Monitoring Database

Dairygold Castlefarm Complex				Dairygold Castlefarm Complex												
Parameters	**Units**	**Groundwater Regulations SI366/2016**	**EPA Interim Guideline Values 2003**	**BH9**									**BH9**			
				Dec-19	**23-Mar-20**	**29-Jun-20**	**01-Oct-20**	**04-Dec-20**	**09-Mar-21**	**24-May-21**	**11-Aug-21**	**03-Nov-21**	**08-Feb-22**	**03-May-22**	**25-Aug-22**
pH	pH Units	-	**≥ 6.5 and ≤ 9.5**	7.13	7.05	7.03	6.61	7.08	7.28	7.19	7.12	7.06	7.19	6.89	7.29
Conductivity	µS/cm at 20°C	**800-1875**	**1,000 (@ 25°C)**	678	728	872	681	682	781	782	896	629	783	685	929
COD	mg/l	-	-	20	26	20	21	3	<7	<7	90.6	8.08	15	9.13	12.8
BOD	mg/l	-	-	1.18	1.96	0.3	1.7	0.63	1	5	2	1	2	2	1
Ammonium (as N)	mg/l	**0.065-0.175**	**0.12**	0.07	0.58	0.22	0.11	0.12	1.65	0.21	0.08	0.5	0.05	0.06	0.13
Nitrate (as NO_3)	mg/l	**37.5**	**25**	41.19	47.83	59.79	44.71	46.94	66.4	13.72	67.29	64.19	68.17	57.57	73.93
Total Nitrogen	mg/l	-	-	-	-	-	-	-	11.4	12.8	#N/A	12.6	14.6	12.5	13
Orthophosphate as PO4	mg/l	**0.107**	**0.09**	-	-	-	-	-	0.05	0.79	3.71	0.55	0.51	0.61	0.70
Chloride	mg/l	**24-187.5**	**30**	-	-	-	-	-	17	18	21	13.3	21.3	16.1	23
Sulphate as SO4	mg/l	**187.5**	**200**	-	-	-	-	-	41	50.2	56.9	20.9	51.6	30.7	58.4
Manganese	ug/l	-	**50**	-	-	-	-	-	2	8	7	4256	2	3	30
Nickel	ug/l	-	**20**	-	-	-	-	-	2	3	3	352	2	3	3
Potassium	mg/l	-	**5**	-	-	-	-	-	32	32.6	34.5	21.8	34.6	26.2	36.6
Sodium	mg/l	-	**150**	-	-	-	-	-	13.8	14.1	15	10.6	15	11.5	15.3
Odour	-	-	-	-	-	-	-	-	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Colour	-	-	-	-	-	-	-	-	Yellow	Cloudy	Brown	Dark Brown	Brown	Orange	Brown
Turbidity	-	-	-	-	-	-	-	-	Turbidity	Clear	Turbidity	Yes	Yes	Yes	Yes
Coliforms	per 1ml	-	**0**	313	P	6.3	>2419.6	>2419.6	<1	45.2	159.7	>2419.6	180	1119.9	>2419.6
E. Coli	per 100ml	-	**0**	63.8	P	<1	816.4	>2419.6	<1	24.1	<1	<1	<1	140.1	3
Total Coliforms	per 100ml	-	**0**	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 21°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S.P.C @ 37°C	per 1ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Entero	per 1ml	-	-	<1	P	<1	P	1	<1	<1	<1	<1	9	<1	211.1
EPH Interpretation	-	-	-	-	-	-	-	-	Not Possible	Not Possible	-	-	-	-	-
EPH >C8-C10	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C10-C12	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C12-C16	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C16-C21	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C21-C35	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C21-C40	ug/l	-	-	-	-	-	-	-	<10	-	-	-	-	-	-
EPH >C35-C40	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
EPH >C8-C40	ug/l	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10	<10

> 25 COD or >10 BOD
P - Positive - present in sample
N - Negative - not present in sample
SPR denotes excessive spreader growth

Castlefarm Complex DQRA
IE Consulting
IE2531

Appendix C

Surface Water Monitoring Database

Surface Water Database
River Gradoge

SW1		Surface Water Regulations	Surface Water Regulations	SW1 Upstream Clonmel Rd Complex				SW1 Upstream Clonmel Rd Complex						
Parameter	**Units**	**SI272/2009**	**S77/2019**	**19-Jun-19**	**25-Sep-19**	**25-Mar-20**	**01-Oct-20**	**09-Mar-21**	**24-May-21**	**11-Aug-21**	**03-Nov-21**	**08-Feb-22**	**03-May-22**	**24-Aug-22**
COD	mg/l	-	-	19	35	3	4.8	15.2	35.5	10.4	23.8	8	7.19	10.43
BOD	mg/l #	High status ≤ 1.3 / Good Status ≤ 1.5 #	High status ≤ 1.3 / Good Status ≤ 1.5 #	0.93	**5.55**	1.34	**2.1**	1.2	1.45	**3**	1	**3**	2	1
Nitrate as NO3	mg/l	-	-	22.13	60.74	20.81	21.25	22.58	15.05	18.15	18.59	21.25	18.15	19.04
Nitrate as N	mg/l	-	-	5	13.72	4.7	4.8	5.1	3.4	4.1	4.2	4.8	4.1	4.3
Total Ammonia as N	mg/l N	High status ≤ 0.040 (mean) & ≤ 0.090 (95%ile) (mg N/l) / Good status ≤ 0.065 (mean) and ≤ 0.140 (95%ile)	High status ≤ 0.040 (mean) & ≤ 0.090 (95%ile) (mg N/l) / Good status ≤ 0.065 (mean) and ≤ 0.140 (95%ile)	0.02	**0.95**	0.02	0.35	0.04	0.02	0.02	0.02	0.02	0.02	0.04
Orthophosphate as PO4	mg/l	High status ≤ 0.025 (mean) & ≤ 0.045 (95%ile) (mg N/l) / Good status ≤ 0.035 (mean) and ≤ 0.075 (95%ile)	High status ≤ 0.025 (mean) & ≤ 0.045 (95%ile) (mg N/l) / Good status ≤ 0.035 (mean) and ≤ 0.075 (95%ile)	-	-	-	-	**0.08**	**0.13**	**0.11**	**0.08**	0.02	0.02	**0.14**
Total Nitrogen	mg/l	-	-	-	-	-	-	5.01	3.02	-	4.00	4.20	3.70	3.28
Chloride	mg/l	-	-	-	-	-	-	19	27	21	16.7	17.9	17.4	17.7
Ph*	pH Units	<6.0 < 9.0	<6.0 < 9.0	7.3	7.24	7.22	7.68	7.53	7.65	7.80	7.54	7.70	7.74	8.09
Total Hardness	mg/l CaCO3	-	-	-	-	-	-	-	-	-	-	-	132	130
Electrical Conductivity	Us/cm	-	-	262	224	279	278	256	228	272	248	275	260	293
Coliforms	CFU/100 ml	-	-	>2419.6	>2419.6	Positive	>2419.6	>2419.6	>2419.6	>2419.6	>2419.6	>2419.6	>2419.6	>2419.6
Entrobacteria	CFU/100 ml	-	-	>2419.6	>2419.6	Positive	285.1	123.9	344.8	488.4	204.8	33.9	26.6	235.9
E.Coli	CFU/100 ml	-	-	>2419.6	>2419.6	Positive	1986.3	114.3	>2419.6	1299.7	67	307.6	>2419.6	107.6
Colour	-	-	-	-	-	-	-	Clear	-	-	Cloudy	Clear	Clear	Clear
Odour	-	-	-	-	-	-	-	Clear	-	-	Clear	Clear	Clear	Clear
Turbidity	-	-	-	-	-	-	-	Clear	-	-	Clear	Clear	Clear	Clear

Notes
BOD comparsion to EQS values limited by laboratory limit of detection
*Ph range for Hard Water with Hardness > 100 mg/l CaCO3

Dairygold Mitchelstown
IE1486

Surface Water Database

River Gradoge

SW2		Surface Water Regulations SI272/2009	Surface Water Regulations SI77/2019	SW2-Downstream Clonmel Rd Complex				SW2-Downstream Clonmel Rd Complex						
Parameter	**Units**			**19-Jun-19**	**25-Sep-19**	**25-Mar-20**	**01-Oct-20**	**09-Mar-21**	**25-May-21**	**11-Aug-21**	**03-Nov-21**	**08-Feb-22**	**03-May-22**	**24-Aug-22**
COD	mg/l	-	-	12	40	3	15.6	7.27	15.9	8.98	15.9	22	2.04	8.28
BOD	mg/l #	High status ≤ 1.3 / Good Status ≤ 1.5 #	High status ≤ 1.3 / Good Status ≤ 1.5 #	0.68	**5.92**	0.51	**2.16**	1.14	1.29	**3**	1	**3**	2	1
Nitrate as NO3	mg/l	-	-	-	**-**	-	**-**	23.46	50.02	17.26	20.36	18.59	18.60	18.15
Nitrate as N	mg/l	-	-	4.9	3.4	6.2	5.3	5.3	11.3	3.9	4.6	4.2	4.2	4.1
Total Ammonia as N	mg/l N	High status ≤ 0.040 (mean) & ≤ 0.090 (95%ile) (mg N/l) / Good status ≤ 0.065 (mean) and ≤ 0.140 (95%ile)	High status ≤ 0.040 (mean) & ≤ 0.090 (95%ile) (mg N/l) / Good status ≤ 0.065 (mean) and ≤ 0.140 (95%ile)	0.05	**0.45**	0.02	**0.4**	0.05	**0.20**	**0.04**	0.02	0.02	0.02	0.04
Orthophosphate as PO4	mg/l	High status ≤ 0.025 (mean) & ≤ 0.045 (95%ile) (mg N/l) / Good status ≤ 0.035 (mean) and ≤ 0.075 (95%ile)	High status ≤ 0.025 (mean) & ≤ 0.045 (95%ile) (mg N/l) / Good status ≤ 0.035 (mean) and ≤ 0.075 (95%ile)	-	-	-	-	**0.11**	**0.09**	**0.13**	**0.05**	0.02	**0.04**	**0.06**
Total Nitrogen	mg/l	-	-	-	-	-	-	5.22	3.43	-	4.3	4.3	4.2	3.2
Chloride	mg/l	-	-	-	-	-	-	21	18	23	18.9	19.4	18.9	24.6
Ph*	pH Units	<6.0 < 9.0	<6.0 < 9.0	7.47	7.35	7.12	7.13	7.46	7.43	7.82	7.7	7.85	8.27	8.04
Total Hardness	mg/l CaCO3	-	-	-	-	-	-	-	-	-	-	-	139	140
Conductivity	Us/cm	-	-	284	244	511	329	321	290	310	287	297	273	341
Coliforms	CFU/100 ml	-	-	>2419.6	>2419.6	Positive	>2419.6	>2419.6	>2419.6	>2419.6	>2419.6	>2419.6	>2419.6	>2419.6
Entro	CFU/100 ml	-	-	47.7	>2419.6	Positive	Positive	46.2	1413.6	>2419.6	547.5	38.6	72.3	>2419.6
E.Coli	CFU/100 ml	-	-	517.2	>2419.6	Positive	>2419.6	1732.9	>2419.6	>2419.6	727	290.9	866.4	461.1
Colour	-	-	-	-	-	-	-	Clear	-	-	Clear	Clear	Clear	Clear
Odour	-	-	-	-	-	-	-	Clear	-	-	Cloudy	Clear	Clear	Clear
Turbidity	-	-	-	-	-	-	-	Clear	-	-	Clear	Clear	Clear	Clear

Notes

BOD comparsion to EQS values limited by laboratory limit of detection

*Ph range for Hard Water with Hardness > 100 mg/l CaCO3

Dairygold Mitchelstown

IE1486

Surface Water Database

River Gradoge

SW3		Surface Water Regulations SI272/2009	Surface Water Regulations SI77/2019	SW3 - Upstream Irish Water WWTP Overflow		
Parameter	**Units**			**08-Feb-22**	**03-May-22**	**24-Aug-22**
COD	mg/l	-	-	12	2.78	0
BOD	mg/l #	High status ≤ 1.3 / Good Status ≤ 1.5 #	High status ≤ 1.3 / Good Status ≤ 1.5 #	**3**	<2	<1
Nitrate as NO3	mg/l	-	-	18.15	19.47	16.38
Nitrate as N	mg/l	-	-	4.1	4.4	3.7
Total Ammonia as N	mg/l N	High status ≤ 0.040 (mean) & ≤ 0.090 (95%ile) (mg N/l) / Good status ≤ 0.065 (mean) and ≤ 0.140 (95%ile)	High status ≤ 0.040 (mean) & ≤ 0.090 (95%ile) (mg N/l) / Good status ≤ 0.065 (mean) and ≤ 0.140 (95%ile)	0.02	0.02	0.06
Orthophosphate as PO4	mg/l	High status ≤ 0.025 (mean) & ≤ 0.045 (95%ile) (mg N/l) / Good status ≤ 0.035 (mean) and ≤ 0.075 (95%ile)	High status ≤ 0.025 (mean) & ≤ 0.045 (95%ile) (mg N/l) / Good status ≤ 0.035 (mean) and ≤ 0.075 (95%ile)	0.02	-	**0.12**
Total Nitrogen	mg/l	-	-	4.2	4.2	2.42
Chloride	mg/l	-	-	19.9	20.2	24.3
Ph*	pH Units	<6.0 < 9.0	<6.0 < 9.0	7.85	8.27	8.01
Total Hardness	mg/l CaCO3	-	-	-	154	163
Conductivity	Us/cm	-	-	304	305	376
Coliforms	CFU/100 ml	-	-	>2419.6	>2419.6	>2419.6
Entro	CFU/100 ml	-	-	159.7	33.6	1119.9
E.Coli	CFU/100 ml	-	-	816.4	816.4	>2419.6
Colour	-	-	-	Clear	Clear	Clear
Odour	-	-	-	Clear	Clear	Clear
Turbidity	-	-	-	Clear	Clear	Clear

Notes

BOD comparsion to EQS values limited by laboratory limit of detection

*Ph range for Hard Water with Hardness > 100 mg/l CaCO3

Dairygold Mitchelstown

IE1486

Surface Water Database
River Gradoge

SW4		Surface Water Regulations SI272/2009	Surface Water Regulations SI77/2019	SW4 - Downstream Irish Water WWTP Overflow		
Parameter	**Units**			**08-Feb-22**	**03-May-22**	**24-Aug-22**
COD	mg/l	-	-	4	2.67	3.31
BOD	mg/l #	High status ≤ 1.3 / Good Status ≤ 1.5 #	High status ≤ 1.3 / Good Status ≤ 1.5 #	**3**	<2	<1
Nitrate as NO3	mg/l	-	-	17.71	19.48	15.93
Nitrate as N	mg/l	-	-	4	4.4	3.6
Total Ammonia as N	mg/l N	High status ≤ 0.040 (mean) & ≤ 0.090 (95%ile) (mg N/l) / Good status ≤ 0.065 (mean) and ≤ 0.140 (95%ile)	High status ≤ 0.040 (mean) & ≤ 0.090 (95%ile) (mg N/l) / Good status ≤ 0.065 (mean) and ≤ 0.140 (95%ile)	0.02	0.02	0.02
Orthophosphate as PO4	mg/l	High status ≤ 0.025 (mean) & ≤ 0.045 (95%ile) (mg N/l) / Good status ≤ 0.035 (mean) and ≤ 0.075 (95%ile)	High status ≤ 0.025 (mean) & ≤ 0.045 (95%ile) (mg N/l) / Good status ≤ 0.035 (mean) and ≤ 0.075 (95%ile)	0.02	-	**0.08**
Total Nitrogen	mg/l	-	-	4.2	3.6	2.39
Chloride	mg/l	-	-	19.7	19.7	24.4
Ph*	pH Units	<6.0 < 9.0	<6.0 < 9.0	7.89	7.89	8.02
Total Hardness	mg/l CaCO3	-	-	-	152	163
Conductivity	Us/cm	-	-	306	306	368
Coliforms	CFU/100 ml	-	-	-	>2419.6	>2419.6
Entro	CFU/100 ml	-	-	-	54.6	1413.6
E.Coli	CFU/100 ml	-	-	-	980.4	>2419.6
Colour	-	-	-	Clear	Clear	Clear
Odour	-	-	-	Clear	Clear	Clear
Turbidity	-	-	-	Clear	Clear	Clear

Notes
BOD comparsion to EQS values limited by laboratory limit of detection
*Ph range for Hard Water with Hardness > 100 mg/l CaCO3
Dairygold Mitchelstown
IE1486

Surface Water Database

River Gradoge

SW5		Surface Water Regulations SI272/2009	Surface Water Regulations SI77/2019	SW5 - Downstream Landfill/Dairygold Effluent Plant		
Parameter	**Units**			**08-Feb-22**	**03-May-22**	**24-Aug-22**
COD	mg/l	-	-	9	2.58	1.54
BOD	mg/l #	High status ≤ 1.3 / Good Status ≤ 1.5 #	High status ≤ 1.3 / Good Status ≤ 1.5 #	**3**	<2	1
Nitrate as NO3	mg/l	-	-	19.04	18.15	15.94
Nitrate as N	mg/l	-	-	4.3	4.1	3.6
Total Ammonia as N	mg/l N	High status ≤ 0.040 (mean) & ≤ 0.090 (95%ile) (mg N/l) / Good status ≤ 0.065 (mean) and ≤ 0.140 (95%ile)	High status ≤ 0.040 (mean) & ≤ 0.090 (95%ile) (mg N/l) / Good status ≤ 0.065 (mean) and ≤ 0.140 (95%ile)	0.02	0.02	0.03
Orthophosphate as PO4	mg/l	High status ≤ 0.025 (mean) & ≤ 0.045 (95%ile) (mg N/l) / Good status ≤ 0.035 (mean) and ≤ 0.075 (95%ile)	High status ≤ 0.025 (mean) & ≤ 0.045 (95%ile) (mg N/l) / Good status ≤ 0.035 (mean) and ≤ 0.075 (95%ile)	0.02	-	**0.09**
Total Nitrogen	mg/l	-	-	4	3.5	2.35
Chloride	mg/l	-	-	20	20.3	25
Ph*	pH Units	<6.0 < 9.0	<6.0 < 9.0	7.98	7.98	7.97
Total Hardness	mg/l CaCO3	-	-	-	153	162
Conductivity	Us/cm	-	-	314	314	370
Coliforms	CFU/100 ml	-	-	>2419.6	>2419.6	>2419.6
Entro	CFU/100 ml	-	-	110.6	25	>2419.6
E.Coli	CFU/100 ml	-	-	517.2	410.6	488.9
Colour	-	-	-	Clear	Clear	Clear
Odour	-	-	-	Clear	Clear	Clear
Turbidity	-	-	-	Clear	Clear	Clear

Notes

BOD comparsion to EQS values limited by laboratory limit of detection

*Ph range for Hard Water with Hardness > 100 mg/l CaCO3

Dairygold Mitchelstown

IE1486

Appendix D

Certificates of Laboratory Analysis

BORE HOLES AUG 2022																			
Groundwater																			
26/08/2022	BH1	BH2	BH3	BH4	BH5D	BH5S	BH6	BH7	BH8	BH9	BH10	BH11	BHXS	BHX1	SW1	SW2	SW 3	SW 4	SW 5
P.H	7.27	6.86	8.29	7.47	7.02	6.87	6.8	7.47	7.57	7.29	7.44	7.05	6.71	7.43	8.09	8.04	8.01	8.02	7.97
Conductivity µs/mS	688	826	851	3866	471	823	531	676	587	929	562	1593	676	694	293	341	376	368	370
COD mg/l	13.8	33.11	50.8	48.7	11.65	32.5	7.67	6.75	4.91	12.8	6.75	19.01	16.25	0	10.43	8.28	0	3.31	1.54
Orthophosphate (P04 ^{3}-) mg/L	0.06	0.48	0.1	3.08	0.2	0.07	0.1	0.07	0.59	0.7	0.03	2.54	0.14	0.17	0.14	0.06	0.12	0.08	0.09
Total Ammonia(as N) mg/L	0.02	4.68	0.35	41.1	0.02	8.9	0.02	0.02	0.45	0.13	0.02	13.4	1.05	0.04	0.04	0.04	0.06	0.02	0.03
Total Nitrogen mg/L	1.79	5.06	1.24	42.3	0.08	9.62	3.86	3.24	2.87	13	1.89	13.04	1.49	3.58	3.28	3.2	2.42	2.39	2.35
Nitrate (NO3- N) mg/L	2.6	0.8	1.5	0.9	0.6	0.6	5	4.7	4.4	16.7	2.9	0.6	0.5	5.2	4.3	4.1	3.7	3.6	3.6
Odour	Clear	Clear	Yes	Yes	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear					
Colour	Cloudy	Orange	Brown	Light Green	Cloudy	Orange	Clear	Cloudy	Cloudy	Brown	Clear	Cloudy	Orange	Cloudy					
Turbidity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Clear	Yes	Yes	Yes					
MICRO																			
Coliform	>2419.6	<1	6.3	222.4	3	<1	<1	>2419.6	43.1	>2419.6	365.4	344.8	195.6	117.8	>2419.6	>2419.6	>2419.6	>2419.6	>2419.6
E.Coli	<1	<1	1	4.1	<1	<1	<1	387.3	9.6	3	1	33.6	1	<1	235.9	>2419.6	>2419.6	>2419.6	>2419.6
Enterococci	<1	<1	27.5	210.2	<1	<1	<1	12.1	2	211.2	<1	<1	<1	<1	107.6	461.1	1119.9	1413.6	488.9

Certificate of Analysis

Revision 1

T.E. Laboratories

Loughmartin Business Park

Templeowen, Tullow
Co. Carlow

Client Code: c00141

Client Name: Element Materials Technology Environmental UK Ltd

Contact:

Address: Element Materials Technology
Unit 3 Deeside Point
Zone 3 Deeside Industrial Park
Deeside
CH5 2UA

Batch Number: 000638

Sample Code: 000638-001

Quotation Number: Q00442

Date Submitted: 26/08/2022

Date Sampled: 24/08/2022

Date Started: 26/08/2022

Sampling Method: Not given

Report Date: 06/09/2022

Sample Type: Surface Water

Sample Description: SW1

BOD Analysis

Other 1: Other 2: Other 3:

Test /Parameter	Sub	SOP	Units	Results	MAC Value*	Accredited	Exceedance Flag
BOD5 *		**TP019**					
BOD5-water			mg/l	<1		INAB	

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TelLab

T.E. Laboratories

Loughmartin Business Park

Templeowen, Tullow
Co. Carlow

Client Code: c00141

Client Name: Element Materials Technology Environmental UK Ltd

Contact:

Address: Element Materials Technology
Unit 3 Deeside Point
Zone 3 Deeside Industrial Park
Deeside
CH5 2UA

Batch Number: 000638
Sample Code: 000638-002
Quotation Number: Q00442
Date Submitted: 26/08/2022
Date Sampled: 24/08/2022
Date Started: 26/08/2022
Sampling Method: Not given
Report Date: 06/09/2022
Sample Type: Surface Water

Sample Description: SW2
BOD Analysis

Other 1: Other 2: Other 3:

Test /Parameter	Sub	SOP	Units	Results	MAC Value*	Accredited	Exceedance Flag
BOD5 *		**TP019**					
BOD5-water			mg/l	1		INAB	

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1067

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T.E. Laboratories

Loughmartin Business Park

Templeowen, Tullow
Co. Carlow

Client Code: c00141

Client Name: Element Materials Technology Environmental UK Ltd

Contact:

Address: Element Materials Technology
Unit 3 Deeside Point
Zone 3 Deeside Industrial Park
Deeside
CH5 2UA

Batch Number: 000638
Sample Code: 000638-003
Quotation Number: Q00442
Date Submitted: 26/08/2022
Date Sampled: 24/08/2022
Date Started: 26/08/2022
Sampling Method: Not given
Report Date: 06/09/2022
Sample Type: Surface Water

Sample Description: SW3
BOD Analysis

Other 1: Other 2: Other 3:

Test /Parameter	Sub	SOP	Units	Results	MAC Value*	Accredited	Exceedance Flag
BOD5 *		**TP019**					
BOD5-water			mg/l	<1		INAB	

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Loughmartin Business Park

Templeowen, Tullow
Co. Carlow

Client Code: c00141

Client Name: Element Materials Technology Environmental UK Ltd

Contact:

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Deeside
CH5 2UA

Batch Number: 000638
Sample Code: 000638-004
Quotation Number: Q00442
Date Submitted: 26/08/2022
Date Sampled: 24/08/2022
Date Started: 26/08/2022
Sampling Method: Not given
Report Date: 06/09/2022
Sample Type: Surface Water

Sample Description: SW4
BOD Analysis

Other 1: Other 2: Other 3:

Test /Parameter	Sub	SOP	Units	Results	MAC Value*	Accredited	Exceedance Flag
BOD5 *		**TP019**					
BOD5-water			mg/l	<1		INAB	

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Co. Carlow

Client Code: c00141

Client Name: Element Materials Technology Environmental UK Ltd

Contact:

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CH5 2UA

Batch Number: 000638
Sample Code: 000638-005
Quotation Number: Q00442
Date Submitted: 26/08/2022
Date Sampled: 24/08/2022
Date Started: 26/08/2022
Sampling Method: Not given
Report Date: 06/09/2022
Sample Type: Surface Water

Sample Description: SW5
BOD Analysis

Other 1: Other 2: Other 3:

Test /Parameter	Sub	SOP	Units	Results	MAC Value*	Accredited	Exceedance Flag
BOD5 *		**TP019**					
BOD5-water			mg/l	<1		INAB	

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Co. Carlow

Client Code: c00141

Client Name: Element Materials Technology Environmental UK Ltd

Contact:

Address: Element Materials Technology
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Zone 3 Deeside Industrial Park
Deeside
CH5 2UA

Batch Number: 000638
Sample Code: 000638-006
Quotation Number: Q00442
Date Submitted: 26/08/2022
Date Sampled: 24/08/2022
Date Started: 26/08/2022
Sampling Method: Not given
Report Date: 06/09/2022
Sample Type: Surface Water

Sample Description: BH1
BOD Analysis

Other 1: Other 2: Other 3:

Test /Parameter	Sub	SOP	Units	Results	MAC Value*	Accredited	Exceedance Flag
BOD5 *		**TP019**					
BOD5-water			mg/l	<1		INAB	

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Co. Carlow

Client Code: c00141

Client Name: Element Materials Technology Environmental UK Ltd

Contact:

Address: Element Materials Technology
Unit 3 Deeside Point
Zone 3 Deeside Industrial Park
Deeside
CH5 2UA

Batch Number: 000638
Sample Code: 000638-007
Quotation Number: Q00442
Date Submitted: 26/08/2022
Date Sampled: 25/08/2022
Date Started: 31/08/2022
Sampling Method: Not given
Report Date: 06/09/2022
Sample Type: Surface Water

Sample Description: BHX1
BOD Analysis

Other 1: Other 2: Other 3:

Test /Parameter	Sub	SOP	Units	Results	MAC Value*	Accredited	Exceedance Flag
BOD5 *		**TP019**					
BOD5-water			mg/l	2		INAB	

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Client Code: c00141

Client Name: Element Materials Technology Environmental UK Ltd

Contact:

Address: Element Materials Technology
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Zone 3 Deeside Industrial Park
Deeside
CH5 2UA

Batch Number: 000638
Sample Code: 000638-008
Quotation Number: Q00442
Date Submitted: 26/08/2022
Date Sampled: 24/08/2022
Date Started: 31/08/2022
Sampling Method: Not given
Report Date: 06/09/2022
Sample Type: Surface Water

Sample Description: BHXS
BOD Analysis

Other 1: Other 2: Other 3:

Test /Parameter	Sub	SOP	Units	Results	MAC Value*	Accredited	Exceedance Flag
BOD5 *		**TP019**					
BOD5-water			mg/l	6		INAB	

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Client Code: c00141

Client Name: Element Materials Technology Environmental UK Ltd

Contact:

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Unit 3 Deeside Point
Zone 3 Deeside Industrial Park
Deeside
CH5 2UA

Batch Number: 000638
Sample Code: 000638-009
Quotation Number: Q00442
Date Submitted: 26/08/2022
Date Sampled: 24/08/2022
Date Started: 31/08/2022
Sampling Method: Not given
Report Date: 06/09/2022
Sample Type: Surface Water

Sample Description: BH2
BOD Analysis

Other 1: Other 2: Other 3:

Test /Parameter	Sub	SOP	Units	Results	MAC Value*	Accredited	Exceedance Flag
BOD5 *		**TP019**					
BOD5-water			mg/l	<2		INAB	

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Co. Carlow

Client Code: c00141

Client Name: Element Materials Technology Environmental UK Ltd

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Zone 3 Deeside Industrial Park
Deeside
CH5 2UA

Batch Number: 000638
Sample Code: 000638-010
Quotation Number: Q00442
Date Submitted: 26/08/2022
Date Sampled: 24/08/2022
Date Started: 31/08/2022
Sampling Method: Not given
Report Date: 06/09/2022
Sample Type: Surface Water

Sample Description: BH5-S
BOD Analysis

Other 1: Other 2: Other 3:

Test /Parameter	Sub	SOP	Units	Results	MAC Value*	Accredited	Exceedance Flag
BOD5 *		**TP019**					
BOD5-water			mg/l	<2		INAB	

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Loughmartin Business Park

Templeowen, Tullow
Co. Carlow

Client Code: c00141

Client Name: Element Materials Technology Environmental UK Ltd

Contact:

Address: Element Materials Technology
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Zone 3 Deeside Industrial Park
Deeside
CH5 2UA

Batch Number: 000638
Sample Code: 000638-011
Quotation Number: Q00442
Date Submitted: 26/08/2022
Date Sampled: 24/08/2022
Date Started: 31/08/2022
Sampling Method: Not given
Report Date: 06/09/2022
Sample Type: Surface Water

Sample Description: BH5-D
BOD Analysis

Other 1: Other 2: Other 3:

Test /Parameter	Sub	SOP	Units	Results	MAC Value*	Accredited	Exceedance Flag
BOD5 *		**TP019**					
BOD5-water			mg/l	<2		INAB	

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Loughmartin Business Park

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Co. Carlow

Client Code: c00141

Client Name: Element Materials Technology Environmental UK Ltd

Contact:

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Zone 3 Deeside Industrial Park
Deeside
CH5 2UA

Batch Number: 000638
Sample Code: 000638-012
Quotation Number: Q00442
Date Submitted: 26/08/2022
Date Sampled: 24/08/2022
Date Started: 31/08/2022
Sampling Method: Not given
Report Date: 06/09/2022
Sample Type: Surface Water

Sample Description: BH11
BOD Analysis

Other 1: Other 2: Other 3:

Test /Parameter	Sub	SOP	Units	Results	MAC Value*	Accredited	Exceedance Flag
BOD5 *		**TP019**					
BOD5-water			mg/l	<3		INAB	

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T.E. Laboratories

Loughmartin Business Park

Templeowen, Tullow
Co. Carlow

Client Code: c00141

Client Name: Element Materials Technology Environmental UK Ltd

Contact:

Address: Element Materials Technology
Unit 3 Deeside Point
Zone 3 Deeside Industrial Park
Deeside
CH5 2UA

Batch Number: 000638
Sample Code: 000638-013
Quotation Number: Q00442
Date Submitted: 26/08/2022
Date Sampled: 24/08/2022
Date Started: 26/08/2022
Sampling Method: Not given
Report Date: 06/09/2022
Sample Type: Surface Water

Sample Description: BH7
BOD Analysis

Other 1: Other 2: Other 3:

Test /Parameter	Sub	SOP	Units	Results	MAC Value*	Accredited	Exceedance Flag
BOD5 *		**TP019**					
BOD5-water			mg/l	<1		INAB	

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TelLab

T.E. Laboratories

Loughmartin Business Park

Templeowen, Tullow
Co. Carlow

Client Code: c00141

Client Name: Element Materials Technology Environmental UK Ltd

Contact:

Address: Element Materials Technology
Unit 3 Deeside Point
Zone 3 Deeside Industrial Park
Deeside
CH5 2UA

Batch Number: 000638
Sample Code: 000638-014
Quotation Number: Q00442
Date Submitted: 26/08/2022
Date Sampled: 25/08/2022
Date Started: 26/08/2022
Sampling Method: Not given
Report Date: 06/09/2022
Sample Type: Surface Water

Sample Description: BH9
BOD Analysis

Other 1: Other 2: Other 3:

Test /Parameter	Sub	SOP	Units	Results	MAC Value*	Accredited	Exceedance Flag
BOD5 *		**TP019**					
BOD5-water			mg/l	1		INAB	

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1067

TelLab

T.E. Laboratories

Loughmartin Business Park

Templeowen, Tullow
Co. Carlow

Client Code: c00141

Client Name: Element Materials Technology Environmental UK Ltd

Contact:

Address: Element Materials Technology
Unit 3 Deeside Point
Zone 3 Deeside Industrial Park
Deeside
CH5 2UA

Batch Number: 000638
Sample Code: 000638-015
Quotation Number: Q00442
Date Submitted: 26/08/2022
Date Sampled: 24/08/2022
Date Started: 26/08/2022
Sampling Method: Not given
Report Date: 06/09/2022
Sample Type: Surface Water

Sample Description: BH6
BOD Analysis

Other 1: Other 2: Other 3:

Test /Parameter	Sub	SOP	Units	Results	MAC Value*	Accredited	Exceedance Flag
BOD5 *		**TP019**					
BOD5-water			mg/l	<1		INAB	

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1067

TelLab

T.E. Laboratories

Loughmartin Business Park

Templeowen, Tullow
Co. Carlow

Client Code: c00141

Client Name: Element Materials Technology Environmental UK Ltd

Contact:

Address: Element Materials Technology
Unit 3 Deeside Point
Zone 3 Deeside Industrial Park
Deeside
CH5 2UA

Batch Number: 000638
Sample Code: 000638-016
Quotation Number: Q00442
Date Submitted: 26/08/2022
Date Sampled: 25/08/2022
Date Started: 31/08/2022
Sampling Method: Not given
Report Date: 06/09/2022
Sample Type: Surface Water

Sample Description: BH3
BOD Analysis

Other 1: Other 2: Other 3:

Test /Parameter	Sub	SOP	Units	Results	MAC Value*	Accredited	Exceedance Flag
BOD5 *		**TP019**					
BOD5-water			mg/l	6		INAB	

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1067

TelLab

T.E. Laboratories

Loughmartin Business Park

Templeowen, Tullow
Co. Carlow

Client Code: c00141

Client Name: Element Materials Technology Environmental UK Ltd

Contact:

Address: Element Materials Technology
Unit 3 Deeside Point
Zone 3 Deeside Industrial Park
Deeside
CH5 2UA

Batch Number: 000638
Sample Code: 000638-017
Quotation Number: Q00442
Date Submitted: 26/08/2022
Date Sampled: 25/08/2022
Date Started: 31/08/2022
Sampling Method: Not given
Report Date: 06/09/2022
Sample Type: Surface Water

Sample Description: BH4
BOD Analysis

Other 1: Other 2: Other 3:

Test /Parameter	Sub	SOP	Units	Results	MAC Value*	Accredited	Exceedance Flag
BOD5 *		**TP019**					
BOD5-water			mg/l	<2		INAB	

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1067

TelLab

T.E. Laboratories

Loughmartin Business Park

Templeowen, Tullow
Co. Carlow

Client Code: c00141

Client Name: Element Materials Technology Environmental UK Ltd

Contact:

Address: Element Materials Technology
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Zone 3 Deeside Industrial Park
Deeside
CH5 2UA

Batch Number: 000638
Sample Code: 000638-018
Quotation Number: Q00442
Date Submitted: 26/08/2022
Date Sampled: 24/08/2022
Date Started: 26/08/2022
Sampling Method: Not given
Report Date: 06/09/2022
Sample Type: Surface Water

Sample Description: BH8
BOD Analysis

Other 1: Other 2: Other 3:

Test /Parameter	Sub	SOP	Units	Results	MAC Value*	Accredited	Exceedance Flag
BOD5 *		**TP019**					
BOD5-water			mg/l	3		INAB	

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1067

TelLab

T.E. Laboratories

Loughmartin Business Park

Templeowen, Tullow
Co. Carlow

Client Code: c00141

Client Name: Element Materials Technology Environmental UK Ltd

Contact:

Address: Element Materials Technology
Unit 3 Deeside Point
Zone 3 Deeside Industrial Park
Deeside
CH5 2UA

Batch Number: 000638
Sample Code: 000638-019
Quotation Number: Q00442
Date Submitted: 26/08/2022
Date Sampled: 24/08/2022
Date Started: 26/08/2022
Sampling Method: Not given
Report Date: 06/09/2022
Sample Type: Surface Water

Sample Description: BH10
BOD Analysis

Other 1: Other 2: Other 3:

Test /Parameter	Sub	SOP	Units	Results	MAC Value*	Accredited	Exceedance Flag
BOD5 *		**TP019**					
BOD5-water			mg/l	<1		INAB	

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1067

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IE Consulting
Innovation Centre
Green Road
Carlow
Co Carlow

Attention :	Kevin Murphy
Date :	3rd November, 2022
Your reference :	IE1486
Our reference :	Test Report 22/13925 Batch 1
Location :	Dairygold Mitchelstown
Date samples received :	30th August, 2022
Status :	Final Report
Issue :	2

Nineteen samples were received for analysis on 30th August, 2022 of which nineteen were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Bruce Leslie
Project Manager

Element Materials Technology Environmental UK Limited
Registered in England and Wales
Registered Office: 3rd Floor Davidson Building, 5 Southampton Street, London WC2E 7HA
Company Registration No: 11371415

Element Materials Technology

Client Name: IE Consulting
Reference: IE1486
Location: Dairygold Mitchelstown
Contact: Kevin Murphy
EMT Job No: 22/13925

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

EMT Sample No.	1	2	3	4	5	6-10	11-15	16-20	21-25	26-30	LOD/LOR	Units	Method No.
Sample ID	SW1	SW2	SW3	SW4	SW5	BH1	BHX1	BHXS	BH2	BH5 - SHALLOW (S)			
Depth													
COC No / misc													
Containers	P	P	P	P	P	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G			
Sample Date	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022			
Sample Type	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	30/08/2022	30/08/2022	30/08/2022	30/08/2022	30/08/2022	30/08/2022	30/08/2022	30/08/2022	30/08/2022	30/08/2022			
Dissolved Manganese #	-	-	-	-	-	10	33	751	1155	1405	<2	ug/l	TM30/PM14
Dissolved Nickel #	-	-	-	-	-	8	42	8	4	<2	<2	ug/l	TM30/PM14
Dissolved Potassium #	-	-	-	-	-	1.2	7.7	3.4	6.2	4.8	<0.1	mg/l	TM30/PM14
Dissolved Sodium #	-	-	-	-	-	15.2	12.2	34.0	41.8	29.4	<0.1	mg/l	TM30/PM14
Total Hardness Dissolved (as CaCO3)	130	140	163	163	162	-	-	-	-	-	<1	mg/l	TM30/PM14
EPH >C8-C10	-	-	-	-	-	<10	<10	<10	<10	<10	<10	ug/l	TM5/PM30
EPH >C10-C12 #	-	-	-	-	-	<10	<10	<10	<10	<10	<10	ug/l	TM5/PM30
EPH >C12-C16 #	-	-	-	-	-	<10	<10	<10	<10	<10	<10	ug/l	TM5/PM30
EPH >C16-C21 #	-	-	-	-	-	<10	<10	<10	<10	<10	<10	ug/l	TM5/PM30
EPH >C21-C35 #	-	-	-	-	-	<10	<10	<10	<10	<10	<10	ug/l	TM5/PM30
EPH >C35-C40 #	-	-	-	-	-	<10	<10	<10	<10	<10	<10	ug/l	TM5/PM30
EPH >C8-C40	-	-	-	-	-	<10	<10	<10	<10	<10	<10	ug/l	TM5/PM30
Sulphate as SO4 #	-	-	-	-	-	27.9	16.5	138.6	3.8	7.1	<0.5	mg/l	TM38/PM0
Chloride #	17.7	24.6	24.3	24.4	25.0	29.0	12.1	57.1	67.5	63.8	<0.3	mg/l	TM38/PM0
BOD*	<1	1	<1	<1	<1	<1	2	6	<2	<2		mg/l	Subcontracted
Fats Oils and Grease	-	-	-	-	-	-	-	-	-	-	<4	mg/l	TM187/PM30
Total Nitrogen	4.2	4.1	3.3	3.1	3.1	2.6	5.5	1.8	4.7	9.4	<0.5	mg/l	TM38/TM125/PM0

Please see attached notes for all abbreviations and acronyms

All solid results are expressed on a dry weight basis unless stated otherwise.

Element Materials Technology

Client Name: IE Consulting
Reference: IE1486
Location: Dairygold Mitchelstown
Contact: Kevin Murphy
EMT Job No: 22/13925

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

EMT Sample No.	31-35	36-40	41-45	46-50	51-52	53-57	58-62	63-67	68-72		LOD/LOR	Units	Method No.
Sample ID	BH5 - DEEP (D)	BH11	BH7	BH9	BH6	BH3	BH4	BH8	BH10				
Depth										Please see attached notes for all abbreviations and acronyms			
COC No / misc													
Containers	V HN P G	V HN P G	V HN P G	V HN P G	HN P	V HN P G	V HN P G	V HN P G	V HN P G				
Sample Date	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022				
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water				
Batch Number	1	1	1	1	1	1	1	1	1				
Date of Receipt	30/08/2022	30/08/2022	30/08/2022	30/08/2022	30/08/2022	30/08/2022	30/08/2022	30/08/2022	30/08/2022				
Dissolved Manganese #	1133	1697	30	30	8	111	900	107	<2		<2	ug/l	TM30/PM14
Dissolved Nickel #	<2	90	<2	3	<2	33	423	11	<2		<2	ug/l	TM30/PM14
Dissolved Potassium #	0.9	19.5	2.4	36.6	1.4	6.2	358.2_{AB}	14.9	1.8		<0.1	mg/l	TM30/PM14
Dissolved Sodium #	10.3	255.5_{AA}	113.7	15.3	21.3	188.9	281.1_{AB}	29.1	18.5		<0.1	mg/l	TM30/PM14
Total Hardness Dissolved (as CaCO3)	-	-	-	-	-	-	-	-	-		<1	mg/l	TM30/PM14
EPH >C8-C10	<10	<10	<10	<10	-	<10	<10	<10	-		<10	ug/l	TM5/PM30
EPH >C10-C12 #	<10	<10	<10	<10	-	<10	<10	<10	-		<10	ug/l	TM5/PM30
EPH >C12-C16 #	<10	<10	<10	<10	-	<10	<10	<10	-		<10	ug/l	TM5/PM30
EPH >C16-C21 #	<10	<10	<10	<10	-	<10	<10	<10	-		<10	ug/l	TM5/PM30
EPH >C21-C35 #	<10	<10	<10	<10	-	<10	470	<10	-		<10	ug/l	TM5/PM30
EPH >C35-C40 #	<10	<10	<10	<10	-	<10	70	<10	-		<10	ug/l	TM5/PM30
EPH >C8-C40	<10	<10	<10	<10	-	<10	540	<10	-		<10	ug/l	TM5/PM30
Sulphate as SO4 #	21.6	0.7	16.4	58.4	29.1	22.0	50.1	34.3	19.7		<0.5	mg/l	TM38/PM0
Chloride #	36.0	104.4	24.4	23.0	51.8	101.3	635.6	41.8	29.0		<0.3	mg/l	TM38/PM0
BOD*	<2	<3	<1	1	<1	6	<2	3	<1			mg/l	Subcontracted
Fats Oils and Grease	-	-	-	-	-	-	<4	-	-		<4	mg/l	TM187/PM30
Total Nitrogen	0.8	12.8	3.8	15.8	4.9	1.1	23.9	4.8	2.8		<0.5	mg/l	TM38/TM125/PM0

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: IE Consulting
Reference: IE1486
Location: Dairygold Mitchelstown
Contact: Kevin Murphy

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 22/13925						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 22/13925

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution
AB	x10 Dilution

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 22/13925

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes			
TM38/TM125	Total Nitogen/Organic Nitrogen by calculation	PM0	No preparation is required.				
TM187	Hexane extractable oil and grease in Waters is determined by IR detection at absorbance 2940cm-1 using calibrated InfraCal 2, ATR-SP	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
Subcontracted	See attached subcontractor report for accreditation status and provider.						

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IE Consulting
Innovation Centre
Green Road
Carlow
Co Carlow

Attention :	Kevin Murphy
Date :	5th October, 2022
Your reference :	IE1486
Our reference :	Test Report 22/15785 Batch 1
Location :	Dairygold Mitchelstown
Date samples received :	28th September, 2022
Status :	Final Report
Issue :	1

One sample was received for analysis on 28th September, 2022 and was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Bruce Leslie
Project Manager

Element Materials Technology Environmental UK Limited
Registered in England and Wales
Registered Office: 3rd Floor Davidson Building, 5 Southampton Street, London WC2E 7HA
Company Registration No: 11371415

Element Materials Technology

Client Name: IE Consulting
Reference: IE1486
Location: Dairygold Mitchelstown
Contact: Kevin Murphy
EMT Job No: 22/15785

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, HN=$HN0_3$

EMT Sample No.	1-3										Please see attached notes for all abbreviations and acronyms		
Sample ID	BH10												
Depth													
COC No / misc													
Containers	V G												
Sample Date	26/09/2022												
Sample Type	Ground Water												
Batch Number	1										LOD/LOR	Units	Method No.
Date of Receipt	28/09/2022												
MTBE #	<5										<5	ug/l	TM36/PM12
Benzene #	<5										<5	ug/l	TM36/PM12
Toluene #	<5										<5	ug/l	TM36/PM12
Ethylbenzene #	<5										<5	ug/l	TM36/PM12
m/p-Xylene #	<5										<5	ug/l	TM36/PM12
o-Xylene #	<5										<5	ug/l	TM36/PM12
TPH CWG													
Aliphatics													
>C5-C6 #	<10										<10	ug/l	TM36/PM12
>C6-C8 #	<10										<10	ug/l	TM36/PM12
>C8-C10 #	<10										<10	ug/l	TM36/PM12
>C10-C12 #	<5										<5	ug/l	TM5/PM16/PM30
>C12-C16 #	<10										<10	ug/l	TM5/PM16/PM30
>C16-C21 #	<10										<10	ug/l	TM5/PM16/PM30
>C21-C35 #	<10										<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35 #	<10										<10	ug/l	TM5/TM36/PM12/PM16/PM30
Aromatics													
>C5-EC7 #	<10										<10	ug/l	TM36/PM12
>EC7-EC8 #	<10										<10	ug/l	TM36/PM12
>EC8-EC10 #	<10										<10	ug/l	TM36/PM12
>EC10-EC12 #	<5										<5	ug/l	TM5/PM16/PM30
>EC12-EC16 #	<10										<10	ug/l	TM5/PM16/PM30
>EC16-EC21 #	<10										<10	ug/l	TM5/PM16/PM30
>EC21-EC35 #	<10										<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35 #	<10										<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35) #	<10										<10	ug/l	TM5/TM36/PM12/PM16/PM30

Client Name: IE Consulting
Reference: IE1486
Location: Dairygold Mitchelstown
Contact: Kevin Murphy

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 22/15785						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 22/15785

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 22/15785

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	Yes			
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			