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environmental risk assessment

Hydrogeological Risk Assessment for Effluent Discharge

Lower Link Farm
St. Mary Bourne
Hampshire

Final Report – Version 2

on behalf of

Vitacress Ltd.

Report fc37206-4

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EXECUTIVE SUMMARY

Firth Consultants has been commissioned by Vitacress Ltd to conduct a hydrogeological risk assessment (HRA) for the potential infiltration discharge of cress bed and factory wash water effluent to ground at Lower Link Farm, St. Mary Bourne, Hampshire (hereafter referred to as "the site"). This HRA is reported herein and is intended to support an application for an environmental permit variation to review and combine the site's discharge consents into one environmental permit. Note that this version of the HRA supersedes the previous version (issued 21 December 2023).

The site is located in the valley base of the Bourne Rivulet which is a groundwater fed stream that is dry upstream of the site for several months of the year. The site geology comprises topsoil, underlain by several metres thickness of River Terrace Deposits (RTD - gravel and cobbles), underlain by Chalk bedrock (Seaford Chalk underlain by Lewes Nodular Chalk).

The site is located within an inner Source Protection Zone (SPZ1) for a number of on-site abstraction wells that abstract groundwater from the Chalk aquifer. This water is used for irrigating the cress beds and providing water to the factory for salad washing. The cress bed effluent discharges via a number of discharge points to the Bourne Rivulet and the Eastern Carrier/Channel tributary. The factory wash water effluent (following treatment to remove leaf matter and sediment) discharges to the Eastern Carrier via former cress beds B11 and B12. Vitacress plan to construct an ozone treatment plant for treating the factory wash water and this is anticipated to come on line in early 2025.

Groundwater monitoring at the site has shown that groundwater in the RTD is in reasonably good hydraulic continuity with groundwater in the Chalk, although there are slight differences in groundwater level and hydraulic gradient. Groundwater in the RTD flows south-southeast with a hydraulic gradient of approximately 0.004 and groundwater in the Chalk flows to the south-southwest with a hydraulic gradient of approximately 0.005. There is an upwards hydraulic gradient from the Chalk to the RTD in the east of the site and a downwards hydraulic gradient in the west of the site. Groundwater levels fluctuate seasonally, typically by 0.5m, with highest levels occurring in March to June and lowest in November or December. Comparison of groundwater levels with surface water levels shows that groundwater is likely discharging to the Eastern Channel most of the time and discharges to the Bourne Rivulet when groundwater levels are high. A pumping test conducted in the RTD at the site showed that this has a very high hydraulic conductivity (448 to 620 $m.d^{-1}$).

Water quality monitoring conducted at the site shows that the cress bed effluent sometimes contains elevated concentrations of ammoniacal nitrogen (with respect to drinking water standards [DWS] and environmental quality standards [EQS]) and more frequent exceedances of orthophosphate. The exceedances are the result of the use of fertilizers on the cress beds.

Water quality monitoring of the factory wash water shows that this contains pesticides (from the produce being washed). The concentrations of several pesticides in the factory wash water were above surface water and groundwater thresholds set by the Environment Agency. A sub-set of these were detected at lower concentrations in the Eastern Channel downstream of the factory wash water effluent discharge point. Four of the pesticides detected in the factory wash water effluent and Eastern Channel (boscalid, chlorantraniliprole, dimethomorph and fludioxonil) were also detected in groundwater, albeit at significantly lower concentrations. The maximum concentrations of chlorantraniliprole detected in groundwater exceed the groundwater threshold of 0.03 $\mu g.L^{-1}$ but are below the DWS of 0.1 $\mu g.L^{-1}$. All other concentrations of pesticides detected in groundwater were below the surface water and groundwater thresholds.

A conceptual site model (CSM) was developed for the risk to Controlled Waters receptors from infiltration discharge of cress bed and factory wash water effluents. This identified the following plausible contaminant linkages (CL) that required further (quantitative) assessment:

- CL1: Risk to groundwater and on-site abstractions from leakage of cress-bed effluent containing ammoniacal nitrogen and orthophosphate to groundwater;
- CL2: Risk to surface water from leakage of cress-bed effluent containing ammoniacal nitrogen and orthophosphate to groundwater, followed by migration in groundwater and discharge to surface water;
- CL3: Risk to groundwater and on-site abstractions from leakage of factory wash water effluent containing pesticides through the base of the carrier channels (B11, B12 and Eastern Carrier) to groundwater;
- CL4: Risk to surface water from leakage of factory wash water effluent containing pesticides through the base of the carrier channels (B11, B12 and Eastern Carrier) to groundwater, followed by migration in groundwater and discharge to surface water;

The risk to Controlled Waters from these contaminant linkages was further assessed using risk quantification. Orthophosphate, ammoniacal nitrogen and nitrate were selected as the constituents of potential concern (COPC) for the assessment of the cress bed effluent. Eighteen pesticides were selected as COPC for the factory wash water effluent.

A simple dilution approach was used to predict the concentrations of each COPC in groundwater arising from leakage to ground. These were then compared with suitable environmental assessment levels (EALs) to assess risk. DWS and EQS were used as the EALs for the cress bed effluent COPC and the surface water and groundwater thresholds set by the Environment Agency were used as the EALs for the pesticides. The maximum measured concentrations in the cress bed and factory wash water effluent were used as the effluent source concentrations. Modelling was also conducted to assess the risk from the factory wash water with the proposed ozone treatment plant. The factory wash water effluent source concentrations were adjusted to take account of ozone treatment based on the results of the treatment trial.

The predicted concentrations of ammoniacal nitrogen, orthophosphate and nitrate in groundwater were below the EALs and so it was concluded that infiltration of cress bed effluent to ground does not present an unacceptable risk to groundwater or related receptors.

The risk from the factory wash water effluent was modelled with and without ozone treatment. Without ozone treatment, the predicted concentrations in groundwater exceed the surface water thresholds for fludioxonil and spinosad and the groundwater thresholds for ten pesticides (with highest exceedances occurring for fosetyl aluminium). Comparison of the predicted and measured concentrations in groundwater shows that the model significantly over-predicts the concentrations of several pesticides including fludioxonil, spinosad and fosetyl aluminium. Based on information on the University of Hertfordshire pesticides database these pesticides are anticipated to degrade rapidly in the subsurface, which is not accounted for in the risk modelling. The predicted groundwater concentration of chlorantraniliprole (which is likely to be more persistent) are similar to those measured and exceed the groundwater threshold of 0.03 $\mu g.L^{-1}$ but were below the DWS of 0.1 $\mu g.L^{-1}$.

The predicted concentrations in groundwater with ozone treatment are all below the surface water and groundwater thresholds with the exception of fosetyl aluminium. However, as stated above, the model does not account for degradation in the subsurface which is expected to be rapid for fosetyl aluminium. Therefore it is reasonable to conclude that the risks to groundwater and related receptors from infiltration of factory wash water effluent (with ozone treatment) are acceptable.

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1 INTRODUCTION

Firth Consultants has been commissioned by Vitacress Ltd to conduct a hydrogeological risk assessment (HRA) for the discharge of wash water and cress bed through-flow water at Lower Link Farm, St. Mary Bourne, Hampshire (hereafter referred to as “the site”). This HRA is presented herein. Note that this version of the HRA supersedes the previous version (issued 21 December 2023).

1.1 Background

Lower Link Farm is used for the cultivation of watercress and for the washing and preparation of salads prior to distribution to the retail market. The farm continually abstracts groundwater from the Chalk aquifer via a number of abstraction wells. This water is used for irrigating the watercress beds and in the factory as wash water for the salads. Some water is also used for the periodic washing down of the watercress beds.

The irrigation water that passes through the cress-beds is discharged to the Bourne Rivulet and Eastern Channel (a branch of the Bourne Rivulet) via a number of consented outfalls. Prior to July 2022 the wash water from the factory was used to supplement groundwater to irrigate the cress beds in B, C and E Block. In 2022 the salad washing facility was extended and improvements were made to the factory wash water treatment system. The result of this is that factory wash water is no longer used to irrigate cress beds and instead is discharged to the Eastern Channel of the Bourne Rivulet via former cress-beds B11 and B12 which are used, along with connecting pipework, to convey the treated wash water to the consented outfall.

The effluent from the cress-beds can contain nitrogen and phosphorous compounds as a result of the use of fertilisers for the watercress. The factory wash water can contain pesticides due to the residual presence of pesticides on the product being washed. The cress beds (including B11 and B12) are not lined and so there is potential for infiltration of effluent containing these substances through the base of the cress-beds to the underlying groundwater. Note that a new ozone treatment plant is being installed to reduce the concentrations of pesticides in the factory effluent. This is anticipated to come on line in early 2025.

The site currently has two discharge consents for the discharge of effluent from the watercress beds and factory. Vitacress are applying for a permit variation to review and combine these two discharge consents into one environmental permit. Given the potential for discharge of effluent to groundwater (via infiltration) the Environment Agency has advised that an HRA is required to support the application for permit variation.

1.2 Objectives

The objective of the HRA is to assess the risk to groundwater and related receptors from leakage of effluent (both cress bed irrigation water and factory wash water) to groundwater. The HRA will consider the risks from the factory wash water with and without ozone treatment.

1.3 Applicable Guidance

The HRA has been conducted in accordance with the following key guidance:

- EA and Defra, 2018a. Environmental management – guidance. Infiltration systems: groundwater risk assessments. Last updated 3rd April 2018. Available from https://www.gov.uk/guidance/infiltration-systems-groundwater-risk-assessments
- EA and Defra, 2018b. Environmental management – guidance. Groundwater risk assessment for your environmental permit. Last updated 3rd April 2018. Available from https://www.gov.uk/guidance/groundwater-risk-assessment-for-your-environmental-permit
- Environment Agency, 2018c. The Environment Agency's approach to groundwater protection. February 2018. Version 1.2. Available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692989/Envirnment-Agency-approach-to-groundwater-protection.pdf
- EA, 2017a. Protect groundwater and prevent groundwater pollution. Available at https://www.gov.uk/government/publications/protect-groundwater-and-prevent-groundwater-pollution/protect-groundwater-and-prevent-groundwater-pollution Last updated 14 March 2017
- EA, 2017b. Groundwater protection technical guidance. Available at https://www.gov.uk/government/publications/groundwater-protection-technical-guidance/groundwater-protection-technical-guidance Last updated 14 March 2017

1.4 Report Format

Section 2 describes the site setting, including site description, water management, hydrology, geology, hydrogeology and water quality. Section 3 presents the conceptual site model (CSM). Section 4 presents the quantitative risk assessment and Section 5 presents the conclusions.

2 SITE SETTING

2.1 Site Description

The site is located on the west side of the B3048 approximately 1.5 km south-east of St. Mary Bourne, Hampshire. It is centred at National Grid Reference (NGR) 442900,149200 and has a total area of approximately 28 ha. The site location is shown in Figure 1 and the site layout is shown in Figure 2.

The site is bounded by the B3048 to the east, Harroway Road to the south, residential properties to the south east and farmland to the west and north. The Bourne Rivulet passes through the western part of site and a railway viaduct crosses the southern part of the site. The wider area is generally rural farmland. Residential properties are located on the eastern side of the B3048 to the north east of the site and opposite the site entrance on the northern side of the railway viaduct and also on the southern side of the railway viaduct. A group of residential properties are also located to the south east of the site.

Water cress beds occupy an area of approximately 7.6 ha. The remaining area of the site is occupied as follows:

- Factory area in the south east of the site (3.9 ha). This comprises a main building (the “pack house” which houses offices, salad washing and preparation facility and loading bays) with car parking to the south and an area for Heavy Goods Vehicles (HGVs), auxiliary buildings, storage areas and gravel washer to the north. This area is largely hard-covered/covered with buildings. Note that the main building was extended in 2022.
- A field in the north east corner of the site (4.3 ha) (the “northern meadow”) which has been used in the past for the disposal of waste watercress bed gravel. This field is on the eastern side of the Bourne Rivulet.
- A strip of land to the west of the Bourne Rivulet in the north west of the site (1 ha) which has also been used in the past for the disposal of waste watercress bed gravel.
- A field to the south of the railway viaduct (6.5 ha) (the “southern meadow”) which is bounded to the west by the Bourne Rivulet and is crossed by a tributary of the Bourne Rivulet (hereafter referred to as the “Eastern Channel”) which runs north to south across the field.
- Roadways, watercourses and other sundry areas (4.7 ha).

There are a total of 73No. watercress beds grouped into five blocks as described below:

- Block B (3.0 ha) has 24No. beds and is located north of the factory adjacent the B3048. Cress beds B11 and B12 are now used as carrier channels to convey factory wash water to the discharge point and are no longer used to grow watercress.
- Block C (1.0 ha) has 12No. beds and is located in the north of the site to the east of the Bourne Rivulet.
- Block D (1.5 ha) has 13No. beds and is located to the west of the Bourne Rivulet.
- Block E (1.1 ha) has 12No. beds and is located to the west of the factory.
- Block R (1.0 ha) has 12No. beds and is located to the west of Area E and east of the Bourne Rivulet.

Topographically, the site is located in the flat valley base of the Bourne Rivulet. Ground level at the site ranges from approximately 76 mAOD along the northern boundary of the northern meadow to 71.5 mAOD in the southern end of the southern meadow. The watercress beds are generally at a level of between 73 and 74.5 mAOD. Land to the east and west of the site is at a higher elevation, sloping up to 115 mAOD within 300 to 400m of the site boundaries.

2.2 Water Management

2.2.1 Water abstraction

The site abstracts water from the Chalk aquifer underlying the site via a network of 20No. abstraction wells located across the site, two of which are dedicated to supply the factory building for salad washing (Factory boreholes BH1, BH2) and one which can be used as a back-up to supply the factory if required (Farm borehole No.14) and the remainder are used for irrigating the adjoining watercress beds (see Figure 2). Specifically boreholes 1 to 8 are used or irrigating Block B, boreholes 9a, 9b and 10 for Block C, boreholes 11 to 13 for Block D, borehole 14 for Block E and boreholes 15a, 15b and 16 for Blocks E and R. Groundwater is abstracted by 18No. above ground electrical suction pumps (one per borehole, other than borehole pairs 9a/9b and 15a/15b which have one pump each pair). There are two redundant Chalk wells no longer used for abstraction (RBH1 and RBH2), of which RBH1 is now used for monitoring groundwater level.

Abstraction returns for the site for the period April 2020 to March 2022 indicate that weekly groundwater abstraction ranged from 58,974 $m^3.wk^{-1}$ (8,424 $m^3.d^{-1}$) to 152,881 $m^3.wk^{-1}$ (21,840 $m^3.d^{-1}$) and averaged 116,107 $m^3.wk^{-1}$ (16,587 $m^3.d^{-1}$) over that period. The site holds a (recently revised) abstraction license (No. 11/42/18.2/72) to abstract up to a maximum of 7,460,865 $m^3.yr^{-1}$ and 22,285 $m^3.d^{-1}$.

2.2.2 Waste wash water from factory

There are two waste wash water streams from the factory where the salad washing takes place: one from the "old factory" and one from the new factory (completed in 2022). A detailed plan showing the routing of the waste wash water to the consented discharge point is shown in Appendix 1.

Waste wash water from the "old factory" passes through parabolic screens to remove leaf matter and then a silt trap (an above ground settlement tank to allow sediment particles to settle out). The parabolic screens and silt trap are located south of the factory, just north of the viaduct (Figure 2). This water is then conveyed by pipework around the western side of the factory into former cress beds B11 and B12 (Figure 2). From there, the water flows south along the former cress beds into an underground pipe that discharges to the "Eastern Carrier" (an extension the Eastern Channel that was constructed in 2018) at discharge point (DP) 13[1]. The Eastern Carrier then joins the Eastern Channel just north of the viaduct. Note that prior to July 2022, the wash water from the "old factory" was used to irrigate the watercress beds in Blocks B, C and E prior to discharge to the Eastern Channel.

Waste wash water from the new factory passes through a rotary screen (to remove leaf matter) . The water then joins the pipe from the old factory just south of Block C prior to discharge to former cress beds B11 and B12 and continues as described above.

An ozone treatment plant (to remove pesticides) will be constructed, subject to planning permissions, to the south of Block C to treat wash water from both the old and new factories. The water from this treatment plant will be discharged to cress beds B11 and B12 and then conveyed (as it is now) via pipeline to discharge point DP13 on the Eastern Carrier.

Schematic plans showing the historic (prior to July 2022), current and future (i.e. with the ozone treatment plant in operation) effluent routing are provided in Appendix 2.

2.2.3 Irrigation water

The irrigation water that passes through the watercress beds is discharged to the Bourne Rivulet and Eastern Channel via a number of outfall points as summarised below and

[1] Note that the term discharge point here is used to refer to locations where surface water drainage or effluent enters the Bourne Rivulet or adjoining carriers/channels. The numbering used is based on the site's operational naming system and is not related to the numbering of "Outlets" in the Environmental Management Plan.

shown on Figure 2. A detailed plan showing the routing of the effluent from the cress beds to the discharge points is shown in Appendix 1.

- Points 1 & 2 located on Bourne Rivulet (Western Channel): Irrigation water from watercress bed Block D.
- Points 3, 4 & 5 located on Bourne Rivulet (Western Channel): Irrigation water from watercress bed Block R.
- Point 6 & 7 located on a ditch connected to the Eastern Channel close to Point 9: Irrigation water from watercress bed Block E.
- Point 14 located at the head of the Eastern Carrier: Irrigation water from watercress bed Blocks B and C.

As discussed above, factory wash water is no longer used to irrigate the cress beds, only groundwater is now used. Schematic plans showing the historic (prior to July 2022), current and future (i.e. with the ozone treatment plant in operation) effluent routing are provided in Appendix 2.

2.2.4 Watercress bed cleaning

Each watercress bed is cleaned typically three to four times each year (two to three times from February to June and once in August). Bed cleaning involves removing plant residue with a tractor and then washing down the gravel beds with water. The effluent is then directed to an above ground sediment settlement tank prior to being re-used as irrigation water in the watercress beds in Blocks C and E. Gravel removed with plant residue is then washed in the gravel washer (when operational), otherwise it is removed off-site for cleaning. Water from the gravel washer is discharged to Southern Water foul sewer for off-site treatment. The washed gravel is then re-used as cress bed gravel on-site.

2.2.5 Surface water drainage

Surface water drainage (i.e. rainfall runoff) from hardstanding in the HGV area to the north of the Pack House is discharged to the Eastern Carrier/Channel via oil interceptors.

2.2.6 Effluent discharge rate

The effluent discharge rate to the consented outfalls is not measured but is likely to be similar to the amount of water abstracted (albeit that there will be some differences due to discharge of water to sewer and leakage of water through the base of the watercress beds as well as inflow of groundwater into the watercress beds when groundwater levels are high). The amount of water abstracted (shown as average $m^3.d^{-1}$ over each month) for factory wash water and irrigating the cress beds is shown in Figure A below for the period April 2022 to March 2023. Based on these volumes the effluent discharge rates are estimated as shown in Table A below.

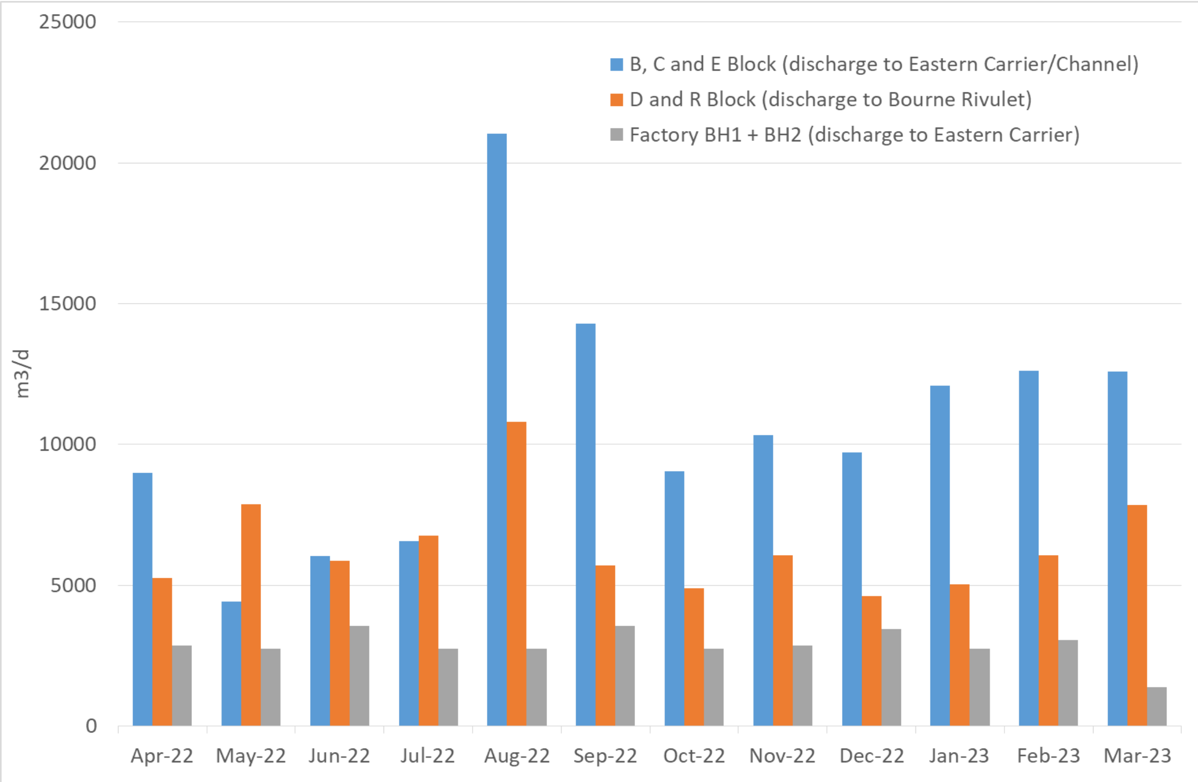

Figure A: Average daily volumes of groundwater abstracted for factory and cress-bed irrigation use

Table A: Estimated effluent discharge rates

Effluent stream	**Discharge rate ($m^3.d^{-1}$)**	
	Range in monthly average	Annual average
Irrigation water from B, C and E Block – discharges to Eastern Carrier/Channel	4,404 – 21,039	10,637
Irrigation water from D and R Block – discharges to Bourne Rivulet	4,608 – 10,805	6,394
Factory wash water – discharges to Eastern Carrier	1,375 – 3,553	2,867

2.3 Site History

The earliest available Ordnance Survey (OS) map dated 1872 shows the site as undeveloped land crossed by several drainage ditches. The buildings of Crystal Abbey are shown immediately north-east of the site and Lower Link Farm (now Derrydown Farm) is shown to the north-west. The railway viaduct that crosses the site is present and Hurstbourne Railway Station is located 200m east of the site.

By 1897 the drainage ditches in the north east of the site had been enlarged to create ponds suggesting that cress production had commenced although it is not until 1910 that Watercress Beds are labelled on the site. Information on the British Geological Survey (BGS) borehole database (see Section 2.5) shows that a number of abstraction wells for watercress production were drilled in 1908 indicating that the site was operational at this time. By 1946 the majority of the site had been developed as cress beds.

The 1978 OS map shows a building labelled as “Lower Link Farm” on the site (to the north of what is now the factory building) which is also seen on the 1982/84 OS map. By this time the distribution of watercress beds is largely as it is today. The main expansion of buildings at the site occurred in 1986 when the pack house was constructed and then more recently in 2022 when the pack house extension was constructed. Since that time there have been various building modifications/expansions.

According to Vitacress the D Block cress beds were constructed in the 1940s, B and C Block were constructed in the 1960s (with new C Block beds added in 1995/6) and R Block was constructed in the 1980s. The cress beds are not lined and are understood to be constructed on a base of compacted gravels with a top layer of 10mm shingle used as a growing medium.

2.4 Hydrology

The Bourne Rivulet flows south through the western part of the site and ultimately joins the River Test approximately 4km south of the site. The Bourne Rivulet is a groundwater fed stream which is generally dry in its upper reaches (north of the site) from late summer to January when groundwater levels in the Chalk aquifer are seasonally low. The Bourne Rivulet flows at all times of the year from a point about half-way down the site where flows are augmented from discharge of water from the watercress beds. The section of the Bourne Rivulet from this point to the northern boundary of the site is typically dry for two months of the year (typically December to late January/early February).

The “Eastern Channel” starts from just north of the railway viaduct in the east of the site and flows south under the viaduct and across the Southern Meadow to join the Bourne Rivulet 280 m south of the viaduct (see Figure 2). The “Eastern Carrier” is an extension of the Eastern Channel that was constructed in 2018 and flows south along the eastern boundary of the site from the northern site entrance to join the Eastern Channel north of the viaduct (see Figure 2). The Eastern Carrier and Eastern Channel flow at all times of the year due to the discharge of effluent from the site and discharge of groundwater (see Section 2.6.5).

The Bourne Rivulet had an ecological quality of "moderate" in 2022. The reason provided for not achieving a "good" ecological status was physical modification. The River Test (downstream of the confluence with the Bourne Rivulet) had an ecological quality of "good" in 2022. Neither the Bourne Rivulet nor the River Test (downstream of the confluence with the Bourne Rivulet) are required to have a chemical status (EA, 2023).

The water level of the Bourne Rivulet measured at the St. Mary Bourne gauging station (located approximately 1.5km north-west of the site) has a typical variation of 76.8 to 78.6mAOD[2]. A topographic survey of the site conducted in 2018 indicates that the bed level of the Bourne Rivulet ranges from approximately 74.5mAOD in the north of the site by the northern meadow to 70.5mAOD in the southern boundary of the field in the south of the site.

According to the "Flood map for planning" (EA, 2019b) much of the site is within Flood Zone 3, an area with a high probability of flooding. In years with high groundwater levels the lower end of the northernmost watercress beds in B and C Blocks can become inundated with groundwater. The last known flooding to have occurred at the site was in 2020 when the Bourne Rivulet over-topped and B and C Blocks were flooded.

Data from the nearest weather station (Middle Wallop, approximately 17.5 km south-west of the site) indicates that the average annual rainfall for the area for the period 1991 to 2020 was 819 mm (Met Office, 2023).

There are no licensed surface water abstractions within 2km of the site however there are six discharge consents to surface waters within 2km of the site which are listed in Table B below and shown on Figure 1.

Table B: Licensed discharge consents to surface water within 2km of the site

Permit No.	Site Name	Discharge Type	Comments	Distance / direction from site
H01674	Barford House	Domestic (single)	To surface water	1.6 km / NW
G01240	New Barn Farm	Domestic (multiple)	To pond with overflow to drainage ditch	1 km / E
P05768	Lower Links Farm	Watercress Farm and Trade Effluent	To surface water	On site
P05767	Lower Links Farm	Watercress Farm Effluent	To surface water	On site
H01679	Chapmansford Farm House	Undefined	To surface water	0.3 km / S
W00220	St Marybourne PS	WPS on sewerage network	To surface water	0.1 km / S

[2] Data from https://www.gaugemap.co.uk/#!Detail/16512/12235

Two of the discharge consents relate to the site. Discharge consent P05767 relates to the discharge of effluent from the watercress beds in D and R Blocks (outlet location at NGR SU 4276 4892). This discharge must comply with the following standards:

- pH shall not be less than 6 or greater than 9;
- Free chlorine shall be absent, (lowest value obtainable using the DPD Comparator Test);
- Total zinc concentration shall not exceed 75 $\mu g.L^{-1}$;
- Suspended solids dried at 105^{o}C shall not exceed 20$mg.L^{-1}$ except as the result of exceptional weather conditions (rainfall rate of 68mm in 72 hours);
- The effluent discharged to controlled waters shall not contain any substance in a concentration such as will cause the waters to be poisonous or injurious to fish or their spawning grounds, spawn or food of fish;
- The effluent discharged to controlled waters shall not contain any solid matter arising from the culture of watercress having a size greater than 5 millimetres in any two dimensions;
- The volume of effluent discharged shall not exceed 9,039 cubic metres in any period of 24 hours; and
- The rate of discharge of the effluent shall not exceed 104.6 litres per second.

Discharge consent P05768 relates to the discharge of trade effluent from the site, specifically rinse water from factory processes, watercress bed effluent (from B, C and E Blocks), process effluent and site drainage (outlet location NGR SU 43013 48996). These discharges must comply with the following standards:

- pH shall not be less than 6 or greater than 9;
- Free chlorine shall be absent (lowest value obtainable using the DPD Comparator Test);
- Total zinc concentration shall not exceed 75 $\mu g.L^{-1}$;
- Suspended solids dried at 105 ^{o}C shall not exceed 20 $mg.L^{-1}$;
- The effluent discharged to controlled waters shall not contain any solid matter arising from the rinsing of salad crops having a size greater than 5 millimetres in any two dimensions.
- The effluent discharged to controlled waters shall not contain any visible traces of oil or grease;

- Hydrocarbons shall not exceed 5 $mg.L^{-1}$;
- The site drainage component shall have passed through an adequately sized petrol / oil separator; and
- The volume of discharge shall not exceed 2,500 cubic metres per day for rinse water from factory processes, 1,140 cubic metres per day for watercress bed effluent and process effluent, and 14,438 cubic metres per day for watercress bed effluent and site drainage.

2.5 Geology

The 1:50,000 solid and drift sheet 283 for Andover (BGS, 2012a) indicates that the majority of the site lies directly on superficial Alluvium described as clay, silt and sand with gravel and organic-rich layers. The exception to this is the north-east half of the northern field where the site is directly underlain by first order River Terrace Deposits (RTD) described as silt, sand and gravel. These are anticipated to extend beneath the Alluvium across the site.

The superficial deposits are underlain by the Seaford Chalk Formation bedrock. The Seaford Chalk is described as firm to moderately hard white chalk with many large nodular flint seams (BGS, 2012). The Seaford Chalk overlies the Lewes Nodular Chalk Formation which comprises moderately hard to very hard off-white nodular chalks with many nodular flint seams and includes the Chalk Rock Member (interbedded hardgrounds and very hard chalk) at its base (BGS, 2012). These two chalk formations are part of what was formerly known as the “Upper Chalk”. The hydrogeological map for the area (IGS & SWA, 1979) shows that the base of the Upper Chalk is at approximately 20 mAOD in the vicinity of the site, i.e. approximately 53 to 55 m below ground level (mbgl).

The younger Newhaven Chalk (also formerly part of the Upper Chalk), although not located beneath the site, outcrops on higher ground on either side of the river valley between 500m to the south-east and 1 km to the south-west of the site largely following the 100m AOD ground level contour.

This local geology is confirmed by the lithological logs of the on-site boreholes obtained from the BGS borehole database (BGS, 2023 – see Appendix 3). The logs for BGS boreholes SU44NW30-38, SU44NW42-45, SU44NW47-48, SU44NW52-61 and SU44SE81-82 indicate that superficial deposits are between 2.5m and 6.7m thick overlying Chalk. “Hard Rock” or “Hard Chalk and Flints” is recorded between 42 and 55.5 mbgl (19.5 and 33 mAOD) which is likely to be the Chalk Rock Member at the base of the Lewes Nodular Chalk. The superficial deposits are largely described as “ballast” which was often used as a term to describe sands and gravels and is assumed to relate to the RTD.

Twelve trial pits (TP19-01 to TP19-12) and five monitoring wells (MW19-01 to MW19-05) were excavated/drilled at the site in 2019 and a further two monitoring wells (MW21-01 and MW21-02) were drilled in 2021. The locations of these trial pits and monitoring wells and are shown on Figure 2 and the lithological logs are provided in Appendix 4. The lithological logs confirm that the geology at the site generally comprises clayey silt topsoil (with waste cress bed gravels in the northern meadow) underlain by gravel and cobbles of flint (RTD) underlain by Chalk bedrock.

The generalised lithology at the site based on the available information is shown in Table C below.

Table C: Generalised Lithology for the Site

<table>
<tr><th>Lithology</th><th>Description</th><th>Depth to base (mbgl)</th><th>Thickness (m)</th></tr>
<tr><td>Topsoil</td><td>Clayey SILT (with waste cress bed gravel in the northern meadow)</td><td>0.2 to 1.0</td><td>0.2 to 1.0</td></tr>
<tr><td>River Terrace Deposits (RTD)</td><td>Angular to sub-angular GRAVEL and COBBLES of flint in a light grey/brown silty matrix.</td><td>2.9 to 7.0</td><td>2.3 to 6.7</td></tr>
<tr><td>Seaford Chalk Formation</td><td>The log for MW21-01 describes this as white silty sandy structureless CHALK to 14.7 mbgl with weak medium to low density CHALK with flint seams and closely spaced sub-horizontal (15^{o}) fractures</td><td>Not proven</td><td rowspan="2">38 to 52</td></tr>
<tr><td>Lewes Nodular Chalk</td><td>Moderately hard to very hard off-white nodular chalks with many nodular flint seams</td><td>42 to 55.5*</td></tr>
</table>

* Based on BGS logs SU44NW30-38

2.6 Hydrogeology

2.6.1 Aquifer Status and Source Protection Zones

The Alluvium and River Terrace Deposits are both classified as Secondary A aquifers[3] and the Chalk is classified as a Principal Aquifer[4] by the Environment Agency (Defra, 2019). The site lies within a groundwater Source Protection Zone 1 (SPZ1), i.e. inner protection zone (Figure 1) which is assumed to be associated with the sites own licensed groundwater

[3] Secondary Aquifers A: permeable strata capable of supporting water supplies at a local rather than strategic scale and in some cases forming an important source of base flow to rivers.

[4] Principal Aquifers (previously called Major): geology that exhibit high permeability and/or provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.

abstractions (see below). A SPZ3 (total catchment) and SPZ2 (outer protection zone) are also located 1 km and 1.1 km respectively to the south-east of the site associated with groundwater abstractions further south in the vicinity of Longparish, approximately 4km from the site.

2.6.2 Groundwater Abstractions

The Environment Agency provided details of licensed groundwater abstractions within 2km[5] of the site. These are listed in Table C below and the locations of abstractions are shown on Figure 1.

Table D: Licensed groundwater abstractions within 2km of the site

License No.	Name of Abstraction Point	Max Annual quantity (m^3)	Max daily quantity (m^3)	Use	Distance / direction from site
11/42/18.2/110	New Barn Farm	8,156	39	General Farming & Domestic	1.5 km / NE
11/42/18.3/119	Middle Wyke Farm	6,819	46	General Farming & Domestic	1.7 km / W
11/42/18.3/490	Lower Wyke Farms	13,638	36	General Farming & Domestic	1.9 km / W
11/42/18.2/72	Lower Link Farm	9,890,485	32,186	Cress Pond Throughflow	On site

As discussed in Section 2.2, groundwater abstraction from the on-site wells ranged from 58,974 $m^3.wk^{-1}$ (8,424 $m^3.d^{-1}$) to 152,881 $m^3.wk^{-1}$ (21,840 $m^3.d^{-1}$) for the period April 2020 to March 2022.

Basingstoke and Deane Borough Council provided NGR coordinates of domestic supply groundwater abstractions located within 2km of the site. These are listed in Table E below and are also shown on Figure 1.

[5] This is considered a reasonable radius to identify plausible groundwater receptors that could potentially be affected by site operations.

Table E: Groundwater abstractions on Basingstoke and Deane Borough Council database within 2km of the site

ID	Easting	Northing	Distance / Direction from site
PWS091	442975	149115	On site
PWS068	442429	149495	0.09 km / NW
PWS023	442387	149898	0.39 km / NW
PWS104	441410	150000	1.4 km / WNW
PWS098	441910	150466	1.2 km / NW
PWS015	441764	150593	1.4 km / NW
PWS097	441548	150638	1.6 km / NW
PWS080	442206	148012	1.3 km / SW

The closest abstraction to the site (other than the on-site abstractions) is located 90m to the northwest of the northern meadow at Derrydown Farm. This unlicensed abstraction is used for domestic water supply and (based on information provided by the property owner) its abstraction rate is unlikely to exceed 1 $m^3.d^{-1}$.

2.6.3 Discharge Consents (To Ground)

There are 6 discharge consents to ground within 2 km of the site. These are listed in Table F below and locations shown on Figure 1.

Table F: Licensed discharge consents to ground within 2km of the site

Permit No.	Site Name	Discharge Type	Comments	Distance / direction from site
G01022	Jamaica Farm	Domestic (single)	To ground via soakaway	1.3 km / NE
G01240	New Barn Farm	Domestic (multiple)	To pond with overflow to drainage ditch	0.9 km / E
G00434	Hurstbourne Station	Trade effluent	To ground via soakaway	0.2 km / E
EPR-CB3190RG	North and South Tugbury Cottages	Domestic (multiple)	To ground	0.2 km / SE
G00130	Hurstbourne Park Estate	Domestic (single)	To ground	1 km SE
EPR-GB3692WX	1 Viaduct Cottages	Domestic (single)	To ground	0.1 km / SE

2.6.4 Regional Groundwater Levels and Flow Direction

The Environment Agency provided an interpreted potentiometric map for the Chalk in the vicinity of the site (Appendix 5). This indicates that regional groundwater is flowing to the south-southwest to the east of the Bourne Rivulet and to the south east to the west of the

Bourne Rivulet with flow converging on the Bourne Rivulet. The regional hydraulic gradient is approximately 0.005.

The Environment Agency provided measured groundwater levels for four monitoring wells located within the vicinity of the site. The locations of these wells are shown in Figure 1 and a hydrograph based on the measured levels from 1967 is presented in Figure B below. Figure C shows the same data for the period from 2000 to present.

The hydrographs show that the groundwater level in the Chalk aquifer varies seasonally. The groundwater level in the St. Mary Bourne Well which is located near the northwest corner of the northern meadow (see Figure 2) typically varies from 74 mAOD to 75 mAOD each year with the highest levels typically occurring in late Spring/early Summer and the lowest levels typically occurring in December/January.

Periodically, the groundwater level in the St. Mary Bourne well drops to 72 mAOD, such as in January 2012 after the drought year of 2011. These periods of lower groundwater level are also recorded in the other nearby wells which are located on higher ground to the east, west and north of the site. The wells located on interfluves (such as Downs Farm and White Floods Stoke) show a larger seasonal fluctuation in groundwater levels than those located within valleys (such as St Mary Bourne).

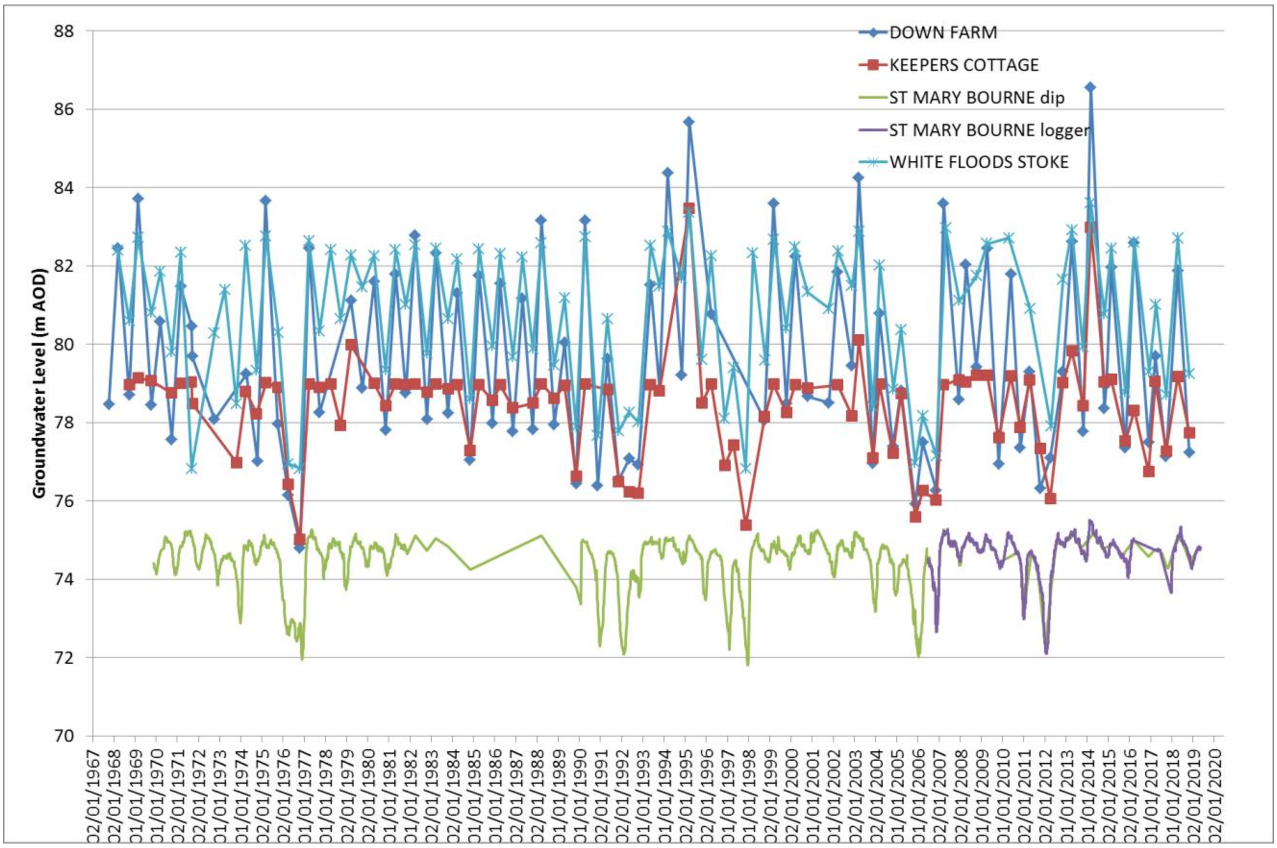

Figure B: Measured groundwater levels in Chalk monitoring wells located near site from 1967 to present

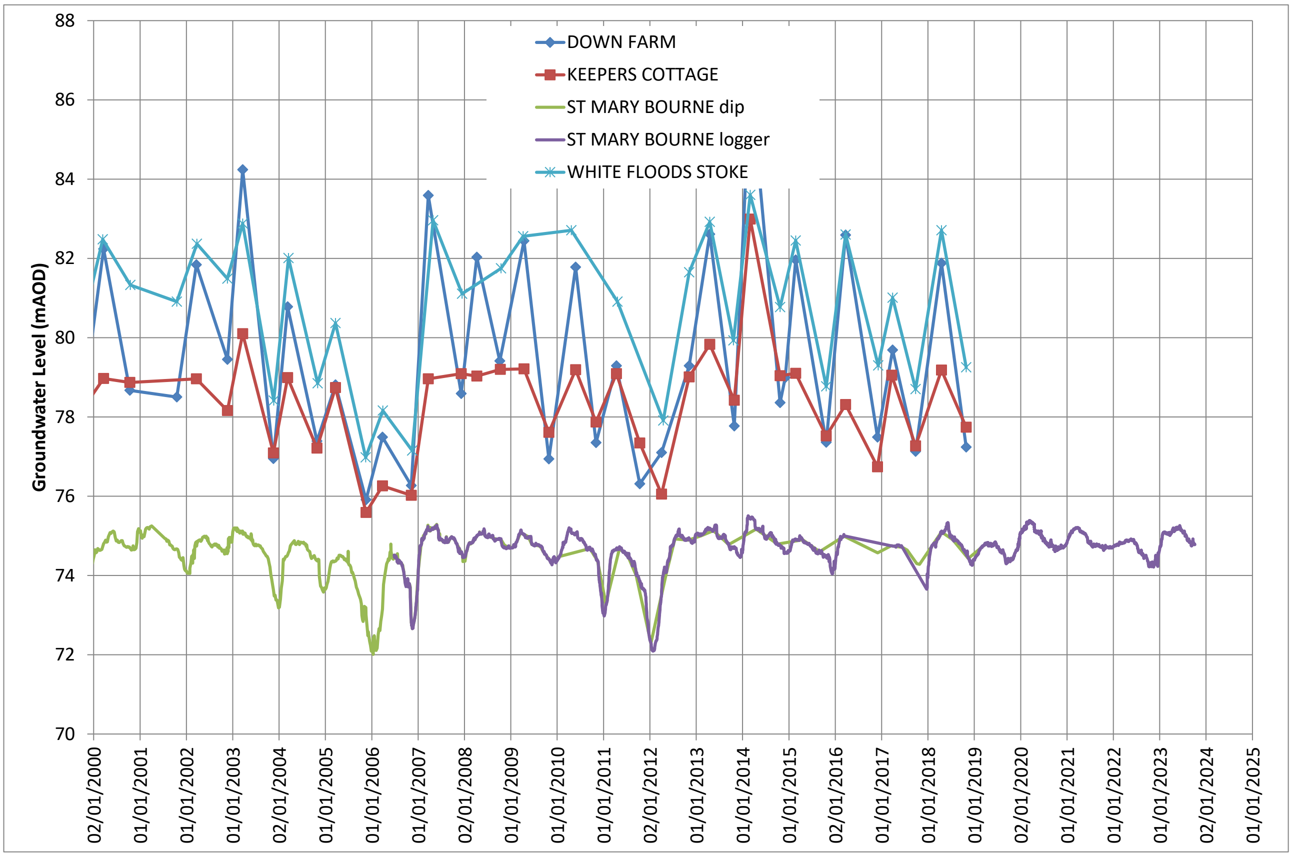

Figure C: Measured groundwater levels in Chalk monitoring wells located near site from 2000 to present

2.6.5 Site Groundwater Levels

Groundwater levels at the site have been monitored via a network of on-site groundwater monitoring wells, six of which are screened in the RTD (MW19-01 to MW19-05 and MW21-02) and one is screened in the Chalk aquifer (MW21-01). The installation details of these wells are provided in the logs in Appendix 4. Groundwater levels in the Chalk are also monitored in a disused abstraction well (RBH1) located near the northern site entrance. The Environment Agency has also made available the groundwater level data for its monitoring well in the northern meadow. Thus, in total, groundwater level data are available for six wells screened in the RTD and three wells in the Chalk. The locations of these wells are shown on Figure 2.

Data loggers to monitor groundwater level have been installed in wells MW19-01 to MW19-05 since November 2019, MW21-01 and MW21-02 since March 2021 (although an error with the logger for MW21-02 resulted in the data prior to June 2022 being lost) and in well RBH1 since June 2022. The monitored groundwater levels (corrected for barometric pressure variation) in these wells are shown in Figure D below. This figure also shows the groundwater levels from the data logger in the Environment Agency’s well in the northern meadow.

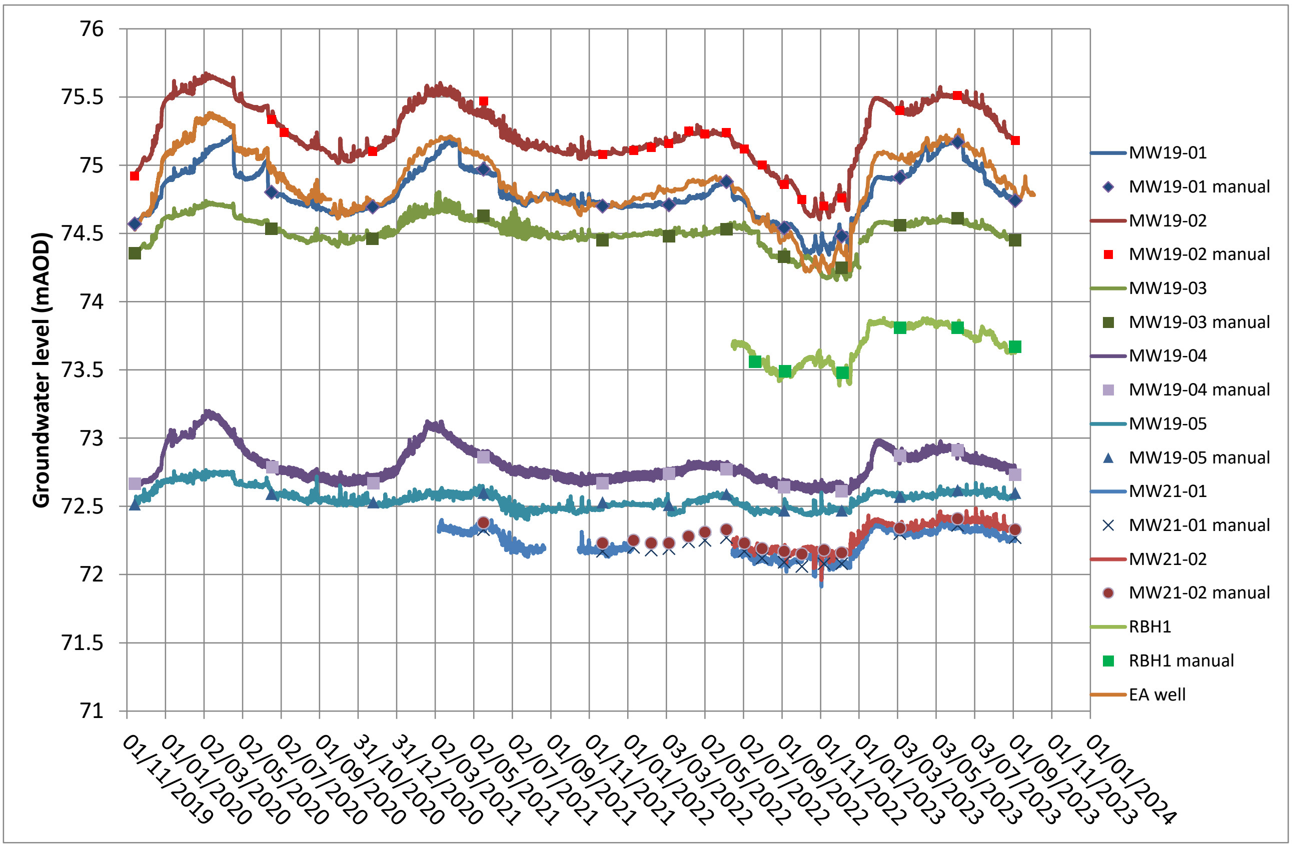

Figure D: Monitored groundwater levels at the site

Figure D shows a very similar pattern between wells indicating that there is likely to be a reasonably good hydraulic connection between the RTD and Chalk aquifers. Seasonal groundwater fluctuation is generally around 0.5m other than wells MW19-05, MW21-01 and MW21-02 located in the south-east of the site where fluctuation is less. Groundwater levels are generally highest in March to June and lowest in November or December.

Figures 3 and 4 show the interpreted piezometry in the RTD and Chalk in December 2022 and June 2023 when groundwater levels are low and high, respectively. Note that the interval between piezometric contours is 0.1m for the RTD and 1m for the Chalk. These figures show that groundwater flow direction is south-southeast (directly down the valley) in the RTD and south-southwest in the Chalk. The hydraulic gradient is approximately 0.004 in the RTD and 0.005 in the Chalk. The flow direction and hydraulic gradient in the Chalk is consistent with the interpreted piezometry provided by the Environment Agency (see Section 2.6.4 and Appendix 5).

Comparison of the interpreted piezometry in the RTD and Chalk shows that groundwater levels in the Chalk are generally higher than in the overlying RTD in the east of the site (at the valley side) and lower than the RTD in the west of the site (valley centre). This implies an upwards hydraulic gradient from the Chalk to the RTD in the east of the site and a downwards hydraulic gradient in the east of the site. The relatively high groundwater levels in the Chalk in the east of the site is apparent at RBH1 which normally has a groundwater level above ground surface (i.e. artesian) and where groundwater is often observed seeping through cracks in the hard standing.

2.6.6 Groundwater Interaction with Cress Beds and Surface Water

Comparison of the groundwater piezometry in Figures 3 and 4 with the surveyed bed levels of the Bourne Rivulet shows that groundwater levels in the RTD are below the river bed level in December 2022 when groundwater levels are low. Under these conditions there may be leakage of river water through the base of the river channel to groundwater. In June 2023, when groundwater levels are high, groundwater levels in the RTD are approximately 0.3 to 0.5 m above the bed level of the Bourne Rivulet. During such periods of high groundwater level it is likely that there is some discharge of groundwater to the river (depending on the water level in the river).

Comparing the groundwater piezometry with the bed and water levels of the Eastern Carrier/Channel shows a more complex pattern which is best illustrated by cross-sections A-A', B-B' and C-C' shown in Figure 5. The locations of the cross-sections are shown on Figure 2. The cross-sections show the profile of the bed of the channel, water level in the channel (as measured on 23 October 2023) and groundwater levels in the RTD representing low (5 December 2022) and high (6 June 2023) conditions.

Cross-section A-A' is drawn across the upper section of the Eastern Carrier near factory wash water effluent discharge point DP13. This shows that groundwater levels are above the water level in the channel during both low and high groundwater conditions. This indicates that groundwater is likely to be discharging to the Eastern Carrier at this location most of the time. This is consistent with the observation that groundwater is normally observed to be seeping from the ground near the old abstraction well RBH1 located just north of this point.

Cross-section B-B' is drawn across the Eastern Carrier near MW19-05. This shows that groundwater is below the water level in the channel under both low and high groundwater level conditions. This indicates that there is potential for leakage from the Eastern Channel to groundwater at this location for most of the time.

Cross-section C-C' is drawn across the Eastern Channel downstream of the viaduct near MW21-01/02. This shows that groundwater level is normally above the water level in the Eastern Channel indicating that groundwater is likely discharging to the Eastern Channel at this location for most of the time.

Extrapolating the interpreted piezometry in the RTD into the southern meadow and comparing with the surveyed bed level of the Eastern Channel shows that groundwater level is likely to be between 0.4 to 0.5m above the base of the Eastern Channel under low groundwater level conditions and 0.6 to 0.7m above the base of the Eastern Channel under high groundwater level conditions. These levels are above typical water depths in the Eastern Channel (typically 0.3 to 0.4m) and indicates that groundwater is likely to be discharging to the Eastern Channel in the southern meadow most of the time.

Comparing the groundwater piezometry with the bed levels of the cress beds shows that groundwater level is below the cress beds during low groundwater conditions and is at or above the base of the cress beds during high groundwater conditions. Thus, during low groundwater conditions there is potential for leakage from the cress beds to groundwater. During high groundwater conditions there is potential for groundwater to discharge to the cress beds, particularly in the north of Blocks B and C where the greatest difference between groundwater levels and cress bed levels is observed.

A comparison of bed levels and water levels in former cress beds B11 and B12 (which are now used to convey factory wash water to the Eastern Carrier) with groundwater level in the RTD is shown in cross sections D-D and E-E' in Figure 6 which are drawn across the top (north) and bottom (south) of B11 and B12. This figure shows that groundwater level is typically below the water level in the carriers indicating that there is a potential for leakage to groundwater most of the time.

Flow measurements were made in order to estimate leakage to groundwater from the cress beds. The measurements were conducted in Block D on 23 September 2022 when groundwater levels were low (see Figure D) and approximately one month after bed cleaning (see Section 2.2.4) which removes silt and therefore likely increases infiltration rate. Comparison of the cress bed levels in Block D with groundwater level showed that groundwater levels were below the base of the cress beds and thus there was potential for leakage to groundwater at that time. The flow measurements were made in D block as this was the easiest block to measure inflows and outflows and was the least disruptive to farming operation.

The flow measurements were conducted on the northern two thirds of the cress beds (beds D1 to D8). Water is supplied to these cress beds via groundwater wells Nos. 11 and 12. Nivus flow meters on the discharge pipes from these wells showed that they were abstracting a combined rate of 0.031 $m^3.s^{-1}$ on 23 September 2023. Some of this water by-passes beds D1 to D8 via a carrier channel. The flow in the “by-pass” channel was estimated using a Valeport electromagnetic flow meter (Model 801). This was used to measure flow velocity at six locations across the rectangular channel cross-section (left, middle and right at two depth intervals). The flow rate of 0.014 $m^3.s^{-1}$ was then calculated by multiplying the channel width (0.51 m) by water depth (0.125 m) by average flow velocity (0.22 $m.s^{-1}$). Thus the total flow rate of water into cress beds D1 to D8 was 0.017 $m^3.s^{-1}$ (0.031 minus 0.014).

The flow rate out of the cress beds was measured in the exit carrier channel using the same method as the by-pass channel. This gave a calculated flow rate of 0.017 $m^3.s^{-1}$ (0.15 $m.s^{-1}$ x 0.91 m width x 0.125 m depth), i.e. the same as the inflow (to two significant figures precision). Based on these measurements it is reasonable to assume that leakage through the base of the cress beds was less than 0.001 $m^3.s^{-1}$. The total area of cress beds D1 to D8 is 6904 m^2, and thus this equates to an infiltration rate (infiltration per unit area) of less than 1.4×10^{-7} $m.s^{-1}$ (< 0.012 $m.d^{-1}$).

2.6.7 Aquifer Properties

Chalk aquifer

Chalk is a fractured rock with a very fine-grained matrix. Much of the water is held within small pores which cannot be drained by gravity, therefore groundwater flow, and the aquifer properties of the Chalk are controlled by fractures and larger pores and also the amount of flint bands and marl bands where dissolution can occur. As a result, fracture frequency and size and number of flint bands have a strong influence on the permeability of the Chalk. The fracture frequency is controlled by the lithology and is higher in harder less marly chalks where principal flow horizons can develop (Environment Agency and BGS, 1997).

Fracture frequency and size is also affected by the topography and where water movement is concentrated (such as in river valleys) causing enlargement of the discontinuities (i.e. surface layers and close to the water table). This means that transmissivity values in the Chalk can vary considerably. Within the Hampshire area transmissivity of the Chalk is reported to range from 0.55 to 29,000 $m^2.d^{-1}$ with a geometric mean of 1600 $m^2.d^{-1}$ and a median of 2600 $m^2.d^{-1}$ (Environment Agency and BGS, 1997). Studies within the Hampshire basin report that the majority of the flow within the Chalk aquifer is in the upper horizons with very little flow below 40 to 50 m depth (Environment Agency and BGS, 1997). Using the geometric mean transmissivity of 1600 $m^2.d^{-1}$ and assuming an effective aquifer thickness of 50m, the hydraulic conductivity of the Chalk is estimated to be 32 $m.d^{-1}$.

Groundwater flow velocity in the Chalk is likely to be high due to the dominance of fracture flow. Flow velocity can be estimated using the following equation (based on Darcy's Law):

$$v_{gw} = \frac{K \times i}{n_e}$$

Where

V_{gw} = groundwater flow velocity (m.d^{-1})

K = hydraulic conductivity (m.d^{-1})

n_e = effective porosity (dimensionless)

Using the estimated hydraulic conductivity of 32 m.d^{-1}, hydraulic gradient of 0.005 (see Section 2.6.5) and assuming an effective porosity of 0.01 (typical for Chalk), the flow velocity in the Chalk is estimated to be 16 m.d^{-1}.

Superficial Deposits

Falling head tests were undertaken by Firth Consultants on 14 November 2019 on MW19-01 to MW19-05, all of which are screened within the RTD. Three of the wells (MW19-01, MW19-04 and MW19-05) recovered significantly slower than would be anticipated for the gravel and cobble geology encountered and it is believed that the geosock screen wraps for these wells became clogged by Chalk silt during installation. These were the first three wells constructed and it was found that drilling into the Chalk resulted in the borehole becoming filled with thick muddy water which made installation of the gravel pack difficult. On development the thick muddy water would have formed a silt skin around the geosock decreasing the efficiency of the well. The falling head test results for these wells are therefore not considered valid.

This problem was rectified during drilling of MW19-02 and MW19-03 in the northern meadow by limiting the depth of penetration of the Chalk. The falling head tests conducted in these wells showed complete recovery within 1 or 2 seconds, indicating that the hydraulic conductivity of the gravel and cobbles is likely to be greater than 30 m.d^{-1}.

A pumping test was conducted on MW19-03 on 15 October 2021. The pumping test was conducted using a suction pump to abstract the water into a 5.7 m^3 capacity bowser. The suction pump inlet hose was connected to a 35 mm diameter stainless steel tube for insertion in the (50mm diameter) monitoring well. A data logger was fixed to the end of the steel tube to record water level at one second intervals during the test. After recording the initial water level the suction pump was switched on and the bowser was filled which took 17.83 minutes (equating to an average abstraction rate of approximately 460 m^3.d^{-1}). The pump was then switched off and the recovery monitored (via the data logger).

The recorded water levels showed that a steady state drawdown of only 0.04m was achieved after approximately 5 minutes pumping (see Figure E), despite the relatively high abstraction rate, confirming the high permeability of the RTD.

Aquitest software was then used to analyse the pumping and recovery test data to estimate the hydraulic conductivity of the RTD (see Appendix 6). The pumping test data was analysed using the Cooper and Jacob straight line method which gave an estimated hydraulic conductivity of 7.18×10^{-3} $m.s^{-1}$ (620 $m.d^{-1}$). The recovery test data was analysed using the Theis and Jacob straight line method which gave an estimated hydraulic conductivity of 5.18×10^{-3} $m.s^{-1}$ (448 $m.d^{-1}$).

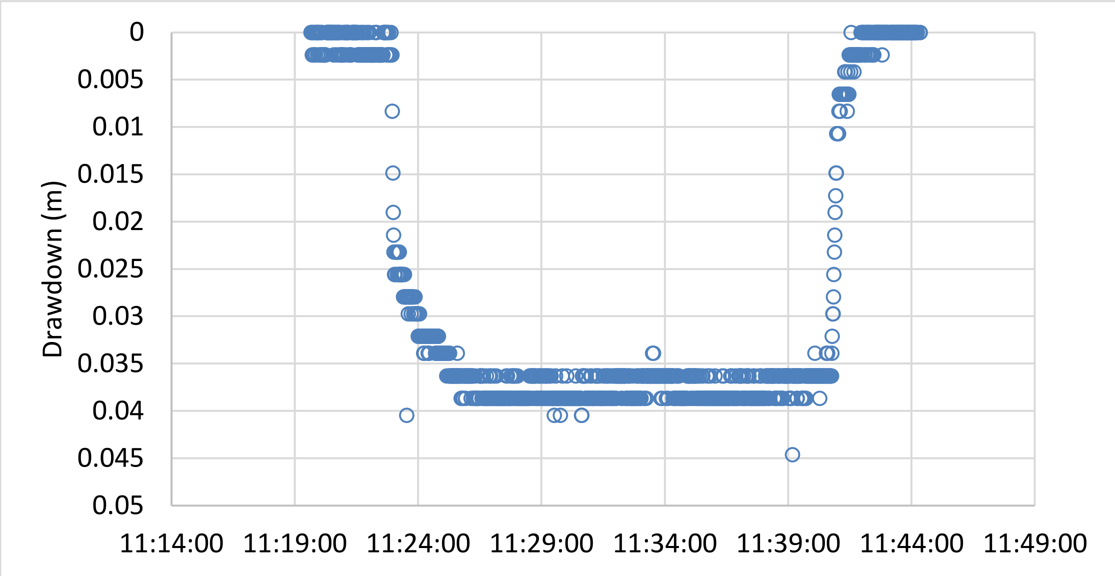

Figure E: Monitored drawdown during pumping and recovery tests in MW19-03

Using the equation given above with the average of the estimated hydraulic conductivities for the RTD of 534 $m.d^{-1}$, hydraulic gradient of 0.004 (see Section 2.6.5) and assuming an effective porosity of 0.25 (typical for gravel), the flow velocity in the RTD is estimated to be approximately 9 $m.d^{-1}$.

2.7 Water Quality

2.7.1 Cress Bed Effluent Monitoring

Vitacress conduct routine monthly sampling of the water entering and leaving watercress beds B and D (sample points denoted as B in, B out, D in and D out) and have also sampled water entering and leaving cress beds E and R on occasion. The measured concentrations are provided in Table 1 and summarised in Table G below. Table G also shows available DWS and freshwater EQS for comparison.

Table G: Summary of monthly water quality sampling data of watercress beds

Analyte	Units	Range in measured concs.		Number of data points	DWS [1]	EQS [2]	No. samples above DWS or EQS (location)
		Inflows	Outflows				
Nitrate (as N)	$mg.L^{-1}$	5.67-7.49	0.81-12.2	364	11.3	-	1 > DWS (D out)
Nitrite (as N)	$mg.L^{-1}$	<0.001-0.32	<0.004-0.451	364	0.152	-	5 > DWS (B out [2], D out [2], R in [1])
Nitrogen: Total oxidised (as N)	$mg.L^{-1}$	5.7-8.2	0.83-12.2	360	-	-	-
Ammoniacal Nitrogen (as N)	$mg.L^{-1}$	<0.015-1.2	<0.015-1.4	364	0.389	0.25 [3]	18 > EQS (B in [1], B out [5], D out [9], E out [1], R in [1], R out [1]) 13 > DWS (B in [1], B out [5], D out [5], R in [1], R out [1])
Phosphate: Total (as P)	$mg.L^{-1}$	<0.02-0.18	<0.02-1.88	280	-	-	-
Orthophosphate (Filtered as P)	$mg.L^{-1}$	0.013-0.128	0.01-2.3	361	-	-	-
Orthophosphate Reactive (as P)	$mg.L^{-1}$	<0.01-0.13	<0.01-1.03	280	-	0.045 [4]	63 > EQS (B in [6], B out [35], D out [22], E out [4], R in [1], R out [3])
Solids, Suspended @105°C	$mg.L^{-1}$	<2-33	<2-92	360	-	-	-
Zinc	$\mu g.L^{-1}$	<0.4-9.9	<1-108	356	-	18.7 [5]	2 > EQS(B out, D out)
Iron	$\mu g.L^{-1}$	<4-173	5-601	364	200	1000	3 > DWS (B out [1], D out [2])
Magnesium	$mg.L^{-1}$	1.44-1.97	1.2-6.1	356	-	-	-
Potassium	$mg.L^{-1}$	0.736-2.33	0.102-79.2	356	-	-	-

1. DWS from the Water Supply (Water Quality) Regulations 2018, Statutory Instrument 2018 No. 647
2. EQS from the Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 unless otherwise stated. EQS is the average annual/long-term mean unless stated otherwise
3. Common Monitoring Standard Guidance (CSMG) agreed favourable condition target for the River Test. Concentration is the maximum allowable 90th percentile concentration for ammoniacal nitrogen (as N).
4. Common Standards Monitoring Guidance (CSMG) Progress Goal for orthophosphate for the River Test.
5. EQS for zinc of 18.7 $\mu g.L^{-1}$ calculated using the mBAT tool and using pH of 7.55, dissolved organic carbon (DOC) of 0.83 $mg.L^{-1}$ and calcium of 107 $mg.L^{-1}$ which are the average measured values in the Bourne Rivulet immediately upstream of the Vitacress site based on Environment Agency monitoring data from 2002 to 2014 (pH) and 2002 to 2003 (calcium and DOC). The ambient background concentration for the River Test catchment of 2 $\mu g.L^{-1}$ then added to the calculated predicted no effect concentration.

The monthly sampling data shows that there have been very occasional slight exceedences of the DWS and/or EQS for nitrate, nitrite, zinc and iron in the water discharging from the watercress beds. There have been occasional exceedences of the EQS and DWS of ammoniacal nitrogen and frequent exceedences of the EQS of orthophosphate (reactive as P) in the water discharging from the watercress beds. Graphs showing concentration of ammoniacal nitrogen and orthophosphate (reactive as P) versus time are shown in Figures F and G, respectively.

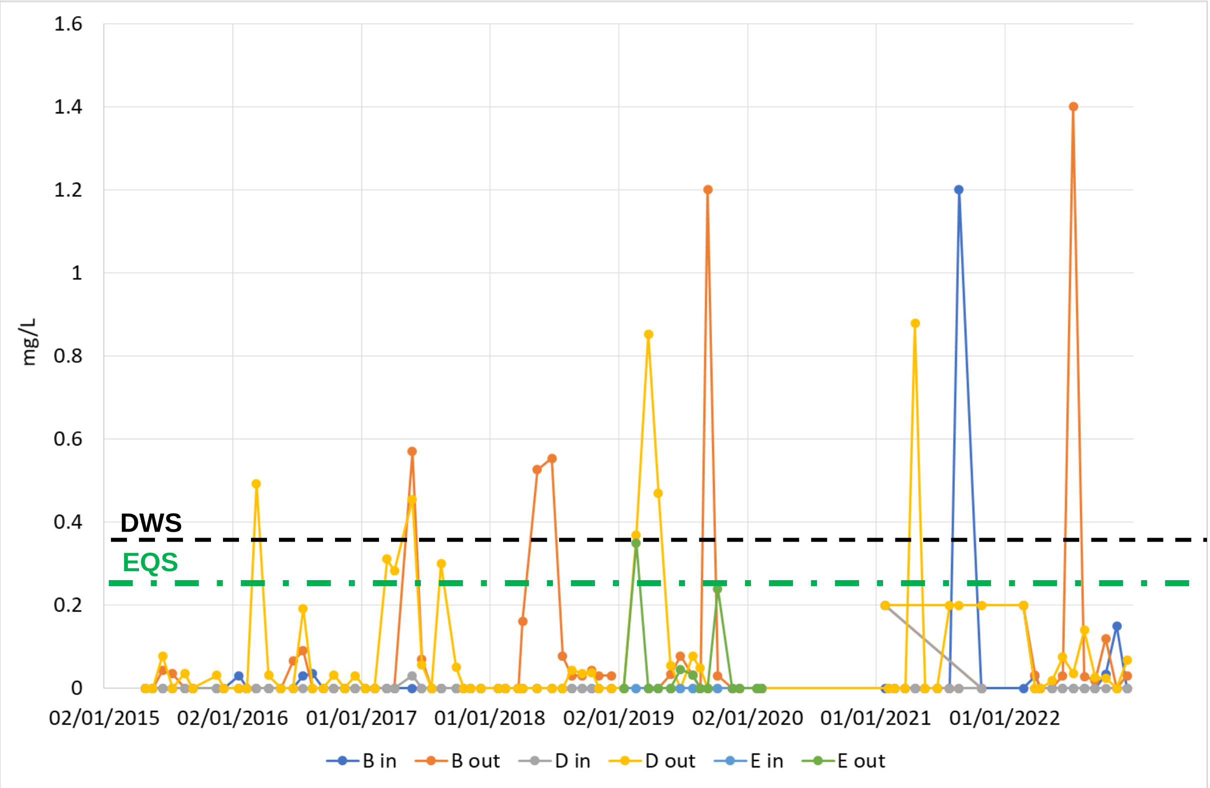

Figure F: Concentrations of ammoniacal nitrogen (as N) in cress bed effluent

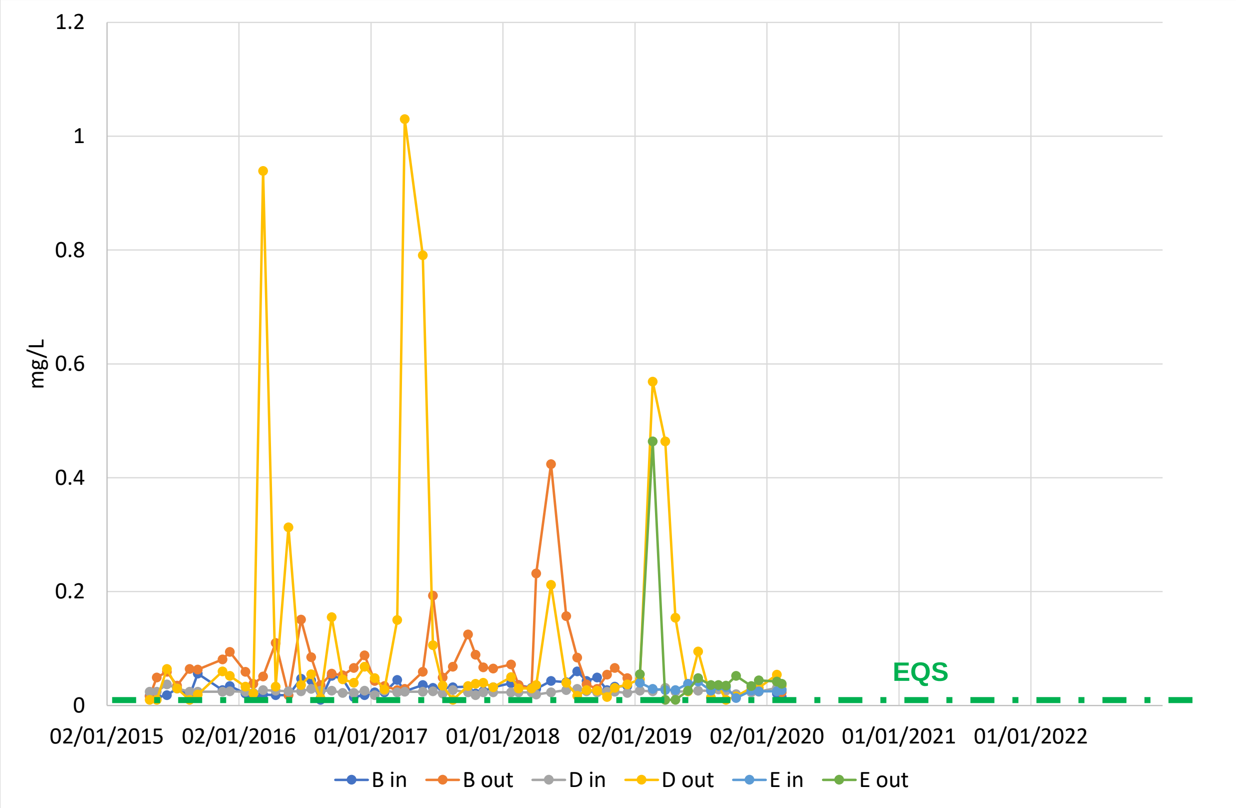

Figure G: Concentrations of orthophosphate (reactive as P) in cress bed effluent

The temporal variation in concentrations of ammoniacal nitrogen and orthophosphate in the cress bed effluent is due to seasonal variation in fertiliser application, with peak concentrations tending to occur in the period March to June when fertiliser application rates are highest.

It should be noted that the EQS for ammoniacal nitrogen is the maximum allowable 90th percentile concentration. The 90th percentile concentration of ammoniacal nitrogen at locations B out and D out where the exceedences occurred are 0.2 mg.L^{-1} (below the EQS) and 0.3 mg.L^{-1} (slightly above the EQS), respectively.

2.7.2 Groundwater Monitoring

Monitoring Wells

Groundwater samples have been obtained from monitoring wells MW19-01 to MW19-05 and MW21-01 and MW21-02 on a regular basis since their installation. Sampling was conducted initially on an approximately six monthly basis but has been quarterly since 2022. In addition, wells MW19-02 (up-hydraulic gradient of the site) and MW21-01 and MW21-02 (down-hydraulic gradient of the site) were sampled monthly in 2022 as part of the pesticide sampling programme (see Section 2.7.3 below).

Groundwater samples have been analysed for a range of parameters including metals, ammoniacal nitrogen, nitrate, nitrite, orthophosphate and polycyclic aromatic hydrocarbons

(PAHs). Pesticide analysis has also been conducted and is discussed further in Section 2.7.3 below. The analytical results are presented in Table 2 and summarised in Table H. This table also shows DWS and EQS for comparison.

Table H: Summary of water quality data for key determinants in samples from the on-site monitoring wells

Analyte	Units	Range in measured concs.	DWS [1]	EQS [2]	No. samples above DWS or EQS
pH	pH units	7.3 – 8.22	6.5 – 9.5	6 - 9	0
Conductivity	µS.cm^{-1}	330 – 496	2500	-	0
Ortho-phosphate as P	mg.L^{-1}	<0.02 – 0.0617	-	0.045 [8]	5 > EQS (MW19-05, MW21-01 & MW21-02)
Ammoniacal Nitrogen as N	mg.L^{-1}	<0.015 – 0.451	0.389	0.25 [3]	1 > DWS (MW19-04) 3 > EQS (MW19-01, MW19-04 & MW19-05) all in Nov 2019
Nitrate as NO3	mg.L^{-1}	13.9 – 35.6	50	-	0
Nitrite as NO2	mg.L^{-1}	<0.05 – 0.244	0.5	-	0
Arsenic	µg.L^{-1}	<0.5 – 0.664	10	50	0
Cadmium	µg.L^{-1}	<0.08	5	0.25	0
Chromium	µg.L^{-1}	<1	50	3.4 [4]	0
Copper	µg.L^{-1}	<0.3 – 3.48	2000	2.99 [5]	1 > EQS (MW19-03)
Iron	µg.L^{-1}	<19 – 47	200	1000	0
Lead	µg.L^{-1}	<0.2 – 2.91	10	1.2	1 > EQS (MW19-04)
Manganese	µg.L^{-1}	<3 – 1180	50	524 [5]	4 > DWS (MW19-01, MW19-02, MW19-04 & MW19-05) 2 > EQS (MW19-01, & MW19-05)
Mercury	µg.L^{-1}	<0.01	1	0.07	0
Nickel	µg.L^{-1}	<0.4 – 3.31	20	9.3 [5]	0
Zinc	µg.L^{-1}	<1 – 12	-	18.7 [5]	0
Naphthalene	µg.L^{-1}	<0.01 – 1.79	-	2	0
Acenaphthene	µg.L^{-1}	<0.005 – 0.832	-	-	-
Acenaphthylene	µg.L^{-1}	<0.005 – 0.777	-	-	-
Fluoranthene	µg.L^{-1}	<0.005 – 16.7	-	0.0063	5 > EQS (MW19-01, MW19-04 & MW19-05
Anthracene	µg.L^{-1}	<0.005 – 1.84	-	0.1	1 > EQS (MW19-05)
Phenanthrene	µg.L^{-1}	<0.005 – 7.98	-	-	-
Fluorene	µg.L^{-1}	<0.005 – 0.971	-	-	-
Chrysene	µg.L^{-1}	<0.005 – 9.9	-	-	-
Pyrene	µg.L^{-1}	<0.005 – 16.1	-	-	-
Benzo(a)anthracene	µg.L^{-1}	<0.005 – 8.73	-	-	-
Benzo(b)fluoranthene	µg.L^{-1}	<0.005 – 17.2	0.1 [6]	- [7]	1 > DWS (MW19-05)
Benzo(k)fluoranthene	µg.L^{-1}	<0.005 – 7.13	0.1 [6]	- [7]	-
Benzo(a)pyrene	µg.L^{-1}	<0.002 – 11.2	0.01	0.00017	4 > DWS (MW19-04 & MW19-05 5 > EQS (MW19-01, MW19-04 & MW19-05)
Dibenzo(a,h)anthracene	µg.L^{-1}	<0.005 – 2.33	-	-	-
Benzo(g,h,i)perylene	µg.L^{-1}	<0.005 – 9.25	0.1 [6]	- [7]	-
Indeno(1,2,3-cd)pyrene	µg.L^{-1}	<0.005 – 7.62	0.1 [6]	- [7]	-

1. DWS from the Water Supply (Water Quality) Regulations 2018, Statutory Instrument 2018 No. 647

2. EQS from the Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 unless otherwise stated. EQS is the average annual/long-term mean unless stated otherwise
3. Common Monitoring Standard Guidance (CSMG) agreed favourable condition target for the River Test. Concentration is the maximum allowable 90th percentile concentration for ammoniacal nitrogen (as N).
4. EQS for hexavalent chromium (lower than EQS for trivalent chromium).
5. EQSs calculated using the mBAT tool and using pH of 7.55, dissolved organic carbon (DOC) of 0.83 $mg.L^{-1}$ and calcium of 107 $mg.L^{-1}$ which are the average measured values in the Bourne Rivulet immediately upstream of the Vitacress site based on Environment Agency monitoring data from 2002 to 2014 (pH) and 2002 to 2003 (calcium and DOC). The ambient background concentration for the River Test catchment of 2 $µg.L^{-1}$ then added to the calculated predicted no effect concentration for zinc.
6. Sum of benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene and indeno(1,2,3-cd)pyrene,
7. Benzo(a)pyrene can be considered as a marker compound for these PAHs for comparison with the annual average.
8. Common Standards Monitoring Guidance (CSMG) Progress Goal for orthophosphate for the River Test.

The majority of analytes are recorded at concentrations below the DWS and EQS. The exceptions to this are as follows:

- The EQS for orthophosphate was exceeded in three wells, namely MW19-05, MW21-01 and MW21-02. These are located in the south east, down-hydraulic gradient of the factory and cress beds.
- The DWS for ammoniacal nitrogen was exceeded in one well (MW19-04) and the EQS was exceeded in three wells, namely MW19-01, MW19-04 and MW19-05. All the exceedances occurred in November 2019. Concentrations recorded during all subsequent monitoring rounds have been lower than both DWS and EQS and are largely recorded below the method detection limit;
- Copper exceeded the EQS in one sample taken from MW19-03 in November 2020. All other samples analysed in this well have had concentrations below EQS;
- Lead exceeded the EQS in one sample taken from MW19-04 in November 2019. All subsequent samples recorded samples less than the EQS;
- Concentrations of manganese exceed the DWS in four wells (MW19-01, MW19-02 MW19-04 and MW19-05) and the EQS in two wells (MW19-01 and MW19-05) in either November 2019 or June 2020. Subsequent monitoring has recorded concentrations below both DWS and EQS, and;
- Elevated PAHs are recorded in MW19-05 and to a lesser degree in MW19-04 and MW19-01 in 2019 and 2020. Concentrations of PAHs in subsequent monitoring rounds in all wells have been recorded below method detection limits.

With the exception of orthophosphate there have been no exceedances of DWS or EQS in the groundwater samples taken from 2021 onwards and it is assumed that the initial exceedances were due to the residual effects of drilling and not representative of groundwater concentrations at the site.

It’s possible that the occurrence of elevated concentrations of orthophosphate in MW19-05, MW21-01 and MW21-02 in the south east of the site is due to leakage of water from the cress beds. However, it is also possible that the elevated concentrations in groundwater are due to leakage from the Southern Water foul sewer which is located close to these wells and which has been known to leak in the past.

Factory Abstraction Wells

Affinity Water tests the water quality of the factory abstraction wells (BH1, BH2 and farm well 14) at the site on a routine basis. The analytical suite includes most of the determinants listed in the Water Supply (Water Quality) Regulations 2018. The analytical results are presented in Table 3 and a summary of the concentrations for key determinants are presented in Table I below.

The measured concentrations in the factory abstraction wells were all below DWS and EQS with the exception of a slight exceedance of the zinc EQS of 18.7 µg.L^{-1} in two samples.

Table I: Summary of water quality data for key determinants in samples from the on-site factory water abstraction wells

Determinant	Units	Number of data points	Min	Max	Average
Alkalinity	mg.L^{-1}	25	279	297	287
Aluminium (dissolved)	µg.L^{-1}	25	<5	<5	<5
Ammoniacal nitrogen as N [1]	mg.L^{-1}	25	<0.031	<0.0389	<0.0389
Antimony	µg.L^{-1}	25	<0.2	<0.2	<0.2
Arsenic	µg.L^{-1}	25	<1	<1	<1
Boron	µg.L^{-1}	23	<100	<100	<100
Bromide	µg.L^{-1}	25	34	43	39.2
Cadmium	µg.L^{-1}	25	<0.2	<0.2	<0.2
Chloride	mg.L^{-1}	25	14	17	15.4
Chromium	µg.L^{-1}	25	<0.5	<2	<0.5
Copper	µg.L^{-1}	25	<10	<19	<19
Conductivity at 20C	uS/cm	25	405	494	468
Fluoride	mg.L^{-1}	25	0.052	0.078	0.063
Hardness as CaCO3 [2]	mg.L^{-1}	25	250	295	269
Iron (dissolved)	µg.L^{-1}	25	<15	<15	<15
Lead	µg.L^{-1}	25	<1	<1	<1
Manganese	µg.L^{-1}	25	<1	<1	<1
Mercury	µg.L^{-1}	14	<0.1	<0.1	<0.1
Nickel	µg.L^{-1}	25	<2	2.36	<2.05
Nitrate as N [3]	mg.L^{-1}	19	6.57	7.61	7.13
Nitrite as N [3]	mg.L^{-1}	25	<0.0021	<0.0024	<0.0024
pH	pH	25	6.9	7.3	7.16
Sodium	mg.L^{-1}	25	5.29	7.09	6.18
Sulphate as SO4	mg.L^{-1}	25	9	11	9.6

Determinant	Units	Number of data points	Min	Max	Average
Zinc	$\mu g.L^{-1}$	25	10.5	23.9	14.7

Environment Agency data

The Environment Agency provided groundwater quality data for the period October 2003 to February 2019 for one well (reference G0006041) located within the same 1 km grid square occupied by the site (SU4249)[6]. The Environment Agency could not supply a more accurate location (due to data protection issues) but confirmed that the well is to the north, up-hydraulic gradient, of the site. The analytical suite includes major ions, metals, chlorinated solvents, hydrocarbons, pesticides and herbicides. The concentrations of chlorinated solvents, hydrocarbons, pesticides and herbicides were below detection limits with the exception of trace detections of ethylbenzene, xylenes, bendiocarb, dichlobenil, propachlor, atrazine, cypermethrin and simazine. A summary of the measured concentrations of metals and other inorganics is provided in Table J below.

Table J: Summary of Environment Agency groundwater quality data for sample location G0006041

Determinant	Units	Number of data points	Min	Max	Average
Aluminium (dissolved)	$\mu g.L^{-1}$	21	<10	12.6	<10.2
Ammoniacal nitrogen as N	$mg.L^{-1}$	50	<0.03	0.031	<0.03
Antimony	$\mu g.L^{-1}$	8	<1	<1	<1
Arsenic	$\mu g.L^{-1}$	4	<1	<1	<1
Barium	$\mu g.L^{-1}$	21	11.6	13.9	12.9
Beryllium	$\mu g.L^{-1}$	8	<1	<1	<1
Boron	$\mu g.L^{-1}$	21	<100	<100	<100
Cadmium	$\mu g.L^{-1}$	19	<0.01	<0.1	<0.1
Chloride	$mg.L^{-1}$	50	12.7	15.1	13.8
Chromium	$\mu g.L^{-1}$	19	<0.5	0.7	<0.5
Cobalt	$\mu g.L^{-1}$	8	<1	<1	<1
Copper	$\mu g.L^{-1}$	19	1.24	10.3	3.59
Conductivity at 20C	$\mu S.cm^{-1}$	11	426	539	510
Fluoride	$mg.L^{-1}$	41	0.055	0.103	0.078
Hardness as CaCO3	$mg.L^{-1}$	46	241	284	260
Iron (dissolved)	$\mu g.L^{-1}$	28	<30	<30	<30
Lead	$\mu g.L^{-1}$	10	0.104	<2	<2
Magnesium	$\mu g.L^{-1}$	21	1.4	1.82	1.51
Manganese	$\mu g.L^{-1}$	28	<10	<10	<10
Mercury	$\mu g.L^{-1}$	4	<0.01	<0.01	<0.01
Malathion	$\mu g.L^{-1}$	13	<0.002	<0.005	<0.0025

[6] Note that there is too much data to reproduce in Appendix 5

Determinant	Units	Number of data points	Min	Max	Average
Nickel	$\mu g.L^{-1}$	18	<1	1.6	<1
Nitrate as N	$mg.L^{-1}$	50	5.34	7.45	6.5
Nitrite as N	$mg.L^{-1}$	50	<0.004	<0.008	<0.004
Orthophosphate	$mg.L^{-1}$	50	<0.02	0.045	<0.024
Oxygen (dissolved)	%	50	61	106.8	89.4
pH (in-situ)	pH	48	6.46	8.19	7.46
Sodium	$mg.L^{-1}$	21	5.82	8.98	6.47
Sulphate as SO4	$mg.L^{-1}$	8	<10	10.5	<10
Vanadium	$\mu g.L^{-1}$	8	<2	<2	<2
Zinc	$\mu g.L^{-1}$	22	4.22	19.7	10.5

The measured concentrations in this well were all below DWS and EQS with the exception of a slight exceedance of the zinc EQS of 18.7 $\mu g.L^{-1}$ in one sample and exceedance of the copper EQS of 2.99 $\mu g.L^{-1}$ in eight samples (maximum concentration 10.3 $\mu g.L^{-1}$).

Comparison with Table I shows that the groundwater chemistry in the Environment Agency sample location is very similar to the factory abstraction wells on-site.

2.7.3 Pesticide Sampling

Vitacress undertook a comprehensive programme of water sampling and analysis for pesticides at the site in 2022. The sampling plan and analytical suite and detection limits were agreed with the Environment Agency prior to undertaking the works. Water samples were obtained from the following seven locations:

- River US: Bourne Rivulet from next to the northern boundary of the site (upstream sample)
- BH1: Factory abstraction borehole BH1 (abstracting from the Chalk aquifer)
- Factory: Factory wash water effluent taken from the parabolic screens to the south of the factory
- East: Eastern Channel just north of the viaduct
- MW19-02: Monitoring well screened in the RTD in the north (up-hydraulic gradient) of the site
- MW21-01: Monitoring well screened in the Chalk in the south east (down-hydraulic gradient) of the site
- MW21-02: Monitoring well screened in the RTD in the south east (down-hydraulic gradient) of the site

Samples were obtained from locations River US, BH1, Factory and East on a weekly basis from January to March and June to November when pesticides are being used on the crops. Samples were obtained from monitoring wells MW19-02, MW21-01 and MW21-02 on a monthly basis.

The pesticides included in the analytical suite are those potentially used on Vitacress farms that could reside on the foliage of the salads being washed. A total of 90 pesticides and breakdown products were included in the analytical suite as listed in Appendix 7.

The Environment Agency supplied predicted no effect concentrations (PNECs) for aquatic life for the majority of the 90 pesticides and breakdown products analysed and set a surface water threshold value for each substance at 30% of the PNEC. The surface water threshold values are also listed in Appendix 7. The Environment Agency set a groundwater threshold value for each substance at 30% of the DWS for individual pesticides of 0.1µg.L^{-1}, i.e. 0.03 µg.L^{-1} and 0.15 µg.L^{-1} for total pesticides (approximately 30% of the DWS for total pesticides of 0.5 µg.L^{-1}).

The pesticide analysis was conducted by Fera laboratories. A summary of the measured concentrations along with the analytical limits of detection achieved by Fera is provided in Appendix 7.

No pesticides were detected above the analytical limit of detection at sample locations River US, MW19-02 and BH1. Pesticides were detected in at least one sample from each of the other locations. A summary of these detections are presented in Tables K to O below. These tables also present the surface water threshold (SWT) and groundwater threshold (GWT) for comparison and show how many samples exceed the thresholds.

Table K: Detected pesticides at Factory

Pesticide	Number of detections	Max. Conc. (µg.L^{-1})	Surface water threshold (µg.L^{-1})	Ground-water threshold (µg.L^{-1})	No. samples exceeding thresholds (SWT / GWT)
Acetamiprid	11	0.1367	0.15	0.03	0 / 5
Azadirachtin	4	0.2957	0.141	0.03	1 / 1
Azoxystrobin	8	0.453	1.32	0.03	0 / 5
Boscalid	20	1.239	3.75	0.03	0 / 14
Chlorantraniliprole	12	0.77	0.075	0.03	5 / 8
Difenoconazole	3	0.0228	0.168	0.03	0 / 0
Dimethomorph	4	0.5533	1.68	0.03	0 / 2
Fludioxonil	20	7.7	0.15	0.03	9 / 16
Fluopicolide	3	0.04537	4.65	0.03	0 / 1
Fluopyram	2	0.03794	4.05	0.03	0 / 1
Fosetyl aluminium	11	18.662	30	0.03	0 / 11

Pesticide	Number of detections	Max. Conc. (μg.L^{-1})	Surface water threshold (μg.L^{-1})	Ground-water threshold (μg.L^{-1})	No. samples exceeding thresholds (SWT / GWT)
Fosetyl aluminium (sum)	8	28.477	30	0.03	0 / 8
Fosetyl-aluminium product; phosphonic acid	11	9.2785	-	0.03	- / 11
Mandipropamid	21	4.2845	15	0.03	0 / 14
Metalaxyl	2	0.0322	36	0.03	0 / 1
Propamocarb-HCL	10	0.4051	189	0.03	0 / 8
Pyraclostrobin	5	0.060577	0.12	0.03	0 / 2
Spinosad	19	2.5	0.036	0.03	15 / 17
Spirotetramat product: spirotetramat enol	6	0.09316	-	0.03	- / 1
Trifloxystrobin	2	0.1182	0.09	0.03	1 / 1
Total Pesticides	28	41.30356	-	0.15	- / 24

Table L: Detected pesticides at East

Pesticide	Number of detections	Max. Conc. (μg.L^{-1})	Surface water threshold (μg.L^{-1})	Ground-water threshold (μg.L^{-1})	No. samples exceeding thresholds (SWT / GWT)
Acetamiprid	4	0.0336	0.15	0.03	0 / 1
Azoxystrobin	5	0.06783	1.32	0.03	0 / 1
Boscalid	17	0.08488	3.75	0.03	0 / 7
Chlorantraniliprole	15	0.1495	0.075	0.03	1 / 3
Dimethomorph	4	0.1038	1.68	0.03	0 / 1
Fludioxonil	17	0.2322	0.15	0.03	4 / 10
Fosetyl aluminium	11	1.8	30	0.03	0 / 11
Fosetyl aluminium (sum)	5	2.0979	30	0.03	0 / 5
Fosetyl-aluminium product; phosphonic acid	5	0.9194	-	0.03	- / 5
Mandipropamid	16	0.759	15	0.03	0 / 11
Propamocarb-HCL	4	0.0131	189	0.03	0 / 0
Spinosad	1	0.064	0.036	0.03	1 / 1
Spirotetramat product: spirotetramat enol	3	0.0264	-	0.03	- / 0
Total Pesticides	23	3.20898	-	0.15	- / 12

Table M: Detected pesticides at MW21-01

Pesticide	Number of detections	Max. Conc. (µg.L^{-1})	Surface water threshold (µg.L^{-1})	Ground-water threshold (µg.L^{-1})	No. samples exceeding thresholds (SWT / GWT)
Boscalid	6	0.0183	3.75	0.03	0 / 0
Chlorantraniliprole	5	0.0441	0.075	0.03	0 / 2
Dimethomorph	1	0.01474	1.68	0.03	0 / 0
Total Pesticides	7	0.0624	-	0.15	- / 0

Table N: Detected pesticides at MW21-02

Pesticide	Number of detections	Max. Conc. (µg.L^{-1})	Surface water threshold (µg.L^{-1})	Ground-water threshold (µg.L^{-1})	No. samples exceeding thresholds (SWT / GWT)
Boscalid	9	0.0213	3.75	0.03	0 / 0
Chlorantraniliprole	6	0.0535	0.075	0.03	0 / 2
Fludioxonil	1	0.0109	0.15	0.03	0 / 0
Total Pesticides	9	0.0748	-	0.15	- / 0

The highest concentrations and number of pesticides detected occur in the factory wash water effluent. Given that pesticides have not been detected in the factory borehole BH1 which supplies water to the factory, it can be assumed that the occurrence of pesticides in the wash water is due to the presence of pesticides on the produce to be washed. A sub-set of the pesticides detected in the factory wash water are detected in the Eastern Channel (downstream of the factory wash water discharge point) but at lower concentrations. The lower number and concentration of pesticides detected in the Eastern Channel is likely largely due to dilution with other water entering the channel, i.e. effluent from the cress beds, surface water drainage and groundwater, although attenuation (sorption, volatilisation and biodegradation) between sample points may also play a role.

The pesticides with most frequent exceedances and highest concentrations relative to the thresholds are boscalid, chlorantraniliprole, fludioxonil, fosetyl aluminium, mandipropamid and spinosad. Graphs showing how the concentrations of these pesticides vary with time are shown in Appendix 8. Peak concentrations of these pesticides occur in the factory wash water in February and November for boscalid, November for chlorantraniliprole, February for fludioxonil, fosetyl aluminium and mandipropamid and June, July and September for spinosad.

The highest exceedances of the groundwater threshold occur for fosetyl aluminium (maximum concentration is 950 times the threshold), fludioxonil (maximum concentration is 260 times the threshold) and mandipropamid (maximum concentration is 143 times the threshold). The highest exceedances of the surface water threshold occur for spinosad (maximum concentration is 71 times the threshold), fludioxonil (maximum concentration is 51 times the threshold) and chlorantraniliprole (maximum concentration is 10 times the threshold).

Four pesticides have been detected in groundwater downstream of the site at MW21-01 (Chalk) and MW21-02 (RTD): boscalid, chlorantraniliprole, dimethomorph and fludioxonil. The peak concentrations of these four pesticides in groundwater are significantly lower than in the factory wash water and Eastern Channel. Dimethomorph and fludioxonil have only been detected in one groundwater sample each and at concentrations only slightly above the limit of detection of 0.01 $\mu g.L^{-1}$. As such it is possible that the detections of dimethomorph and fludioxonil are false positives.

The concentrations of pesticides detected in groundwater are all below the surface water and groundwater thresholds with the exception of chlorantraniliprole which has been detected at concentrations slightly above the groundwater threshold on two occasions. The highest concentration of chlorantraniliprole detected in groundwater (0.0535 $\mu g.L^{-1}$) is below the DWS for individual pesticides of 0.1 $\mu g.L^{-1}$.

The time series graphs in Appendix 8 show that peak concentrations of boscalid and chlorantraniliprole in groundwater occur two to four weeks after the peak concentrations in the factory wash water. This indicates that the occurrence of pesticides in groundwater is likely directly related to the presence of pesticides in the factory wash water. It is noted that MW21-01 and MW21-02 are approximately 270m down-hydraulic gradient of former cress beds B11/B12 where infiltration of factory wash water effluent could occur. As discussed in Section 2.6.7, groundwater velocity in the RTD is estimated to be 9 $m.d^{-1}$. Thus, groundwater is expected to take 30 days to travel from beds B11/B12 to MW21-01/02. This is consistent with the time between peak concentrations of pesticides in the factory wash water and groundwater at MW21-01/02.

2.7.4 Water Quality Summary

In summary:

- The cress bed effluent contains occasional elevated concentrations of ammoniacal nitrogen (with respect to DWS and EQS) and more frequent elevated concentrations of orthophosphate (with respect to EQS). This is due to seasonal use of fertilizer on the watercress beds;

- Other than some initial detections (likely due to the residual effects of drilling), ammoniacal nitrogen has generally not been detected in groundwater at the site. Orthophosphate has been detected in groundwater but generally at concentrations below the EQS other than in the south east of the site at MW19-05, MW21-01 and MW21-02 where concentrations have slightly exceeded EQS. It's possible that the elevated concentrations of orthophosphate in this part of the site is due to leakage through the base of the cress beds but it may also be due to leakage from Southern Water's foul sewer which passes close to this area (and has been known to leak in the past);

- The factory wash water effluent contains pesticides. The number, type and concentrations of pesticides detected varies throughout the year depending on seasonal use of pesticides on the farms where the produce is grown. The pesticides with most frequent exceedances and highest concentrations relative to the groundwater and surface water thresholds are boscalid, chlorantraniliprole, fludioxonil, fosetyl aluminium, mandipropamid and spinosad.

- These same pesticides have been detected in the Eastern Channel near the viaduct, with maximum concentrations coinciding with peak concentrations in the factory wash water. The lower number and concentration of pesticides detected in the Eastern Channel is likely largely due to dilution with other water entering the channel, i.e. effluent from the cress beds, surface water drainage and groundwater.

- Boscalid, chlorantraniliprole, fludioxonil and dimethomorph have all been detected in at least one sample in groundwater down-hydraulic gradient of the majority of the site, albeit at concentrations significantly lower than in the factory wash water effluent. The maximum concentrations of boscalid and chlorantraniliprole in groundwater occur two to four weeks after peak concentrations were detected in the factory wash water indicating that the occurrence of pesticides in groundwater is likely directly related to the presence of pesticides in the factory wash water.

3 CONCEPTUAL SITE MODEL

A CSM has been developed for the risk to groundwater and related receptors from the potential discharge of effluent to groundwater via leakage though the base of the cress beds and carrier channels. The CSM identifies potential sources, pathways and Controlled Waters receptors and determines which combination of these are plausible linkages. Plausible contaminant linkages are then qualitatively assessed to determine whether or not further risk assessment is required.

Note that this risk assessment does not consider the risk to surface water from direct discharge to surface water. This risk is considered further in the H1 surface water risk assessment being conducted by others.

3.1 Sources

There are two effluent streams that are conveyed in such a way that discharge (leakage) to ground could occur:

- Cress bed effluent. This can contain elevated concentrations of ammoniacal nitrogen (with respect to DWS and EQS) and, more frequently, orthophosphate (with respect to EQS) as a result of use of fertilizer on the cress beds. The concentrations vary throughout the year, being highest when fertilizer is being applied;
- Factory wash water. This can contain elevated concentrations of pesticides (with respect to surface water and groundwater thresholds) as a result of the presence of pesticides on the produce being washed in the factory. The concentrations, type and number of pesticides detected vary throughout the year, depending on pesticide usage at the source farms.

3.2 Receptors

Potential receptors considered for this assessment are water resources and users of those resources. These are discussed below:

- **Groundwater**. The Chalk that underlies the site is classified as a Principal Aquifer and the RTD is classified as a Secondary A aquifer. The Chalk and RTD aquifers are considered potential receptors.
- **Groundwater Abstractions / users of Abstractions.** The site lies within SPZ1 associated with the on-site groundwater abstractions which are used for irrigation and food production (salad washing). The on-site abstractions are considered as a potential receptor. Whilst there are a number of other abstractions located within 2

km of the site, the majority of these are up- or cross-hydraulic gradient of the site and unlikely to be at risk from contamination at the site. The most plausible off-site groundwater abstraction receptors are likely to be those associated with the SPZ located 1.1km south east of the site.

- **Surface water.** The Bourne Rivulet, which flows along the west of the site and the Eastern Channel tributary are considered potential surface water receptors.

3.3 Pathways

Potential pathways linking the potential on-site sources to the identified receptors are discussed below:

- **Leakage through the base of the cress beds**. The cress beds comprise various layers of compacted gravel and are not lined. Therefore, there is potential for leakage through the base of the cress beds to groundwater. Such leakage is likely to be limited and will only occur when the water level in the cress beds is above groundwater level. As discussed in Section 2.6.6, these conditions occur when groundwater levels are seasonally low (typically September to January). Contaminants in water that leaks through the base of the cress beds will become diluted with groundwater flow in the RTD.

  Factory wash water is no longer used to irrigate the cress beds and so this pathway now only applies to the cress bed effluent. Note that prior to July 2022 (when factory wash water was used to irrigate cress beds in Blocks B, C and E) this pathway would have applied to both the cress bed effluent and factory wash water.

- **Leakage through the base of carrier channels B11 and B12**. Former cress beds B11 and B12 are now used as carrier channels to convey factory wash water to the Eastern Carrier. The beds are not lined and so there is potential for leakage through their bases to groundwater. As discussed in Section 2.6.6 groundwater level is normally below the water level in these carrier channels and so there is potential for leakage most of the time. Contaminants in water that leaks through the base of the carrier channels will become diluted with groundwater flow in the RTD.

- **Leakage through the base of the Eastern Carrier**. The Eastern Carrier is not lined and so there is potential for leakage of surface water to groundwater when groundwater levels are low. As discussed in Section 2.6.6, in the upper section of the carrier groundwater levels are normally above surface water level resulting in groundwater discharging to the carrier. Leakage to groundwater is unlikely from this upper section. Further downstream, groundwater level is slightly below surface water level and so leakage to groundwater could occur. Contaminants in water that leaks through the base of the carrier will become diluted with groundwater flow in the RTD.

- **Leakage through the base of the Eastern Channel**. As discussed in Section 2.6.6 groundwater level is typically above surface water level in the Eastern Channel where it crosses the southern meadow. As such, there is unlikely to be significant leakage to groundwater from the Eastern Channel, rather, groundwater is likely to discharge to the Eastern Channel. This is therefore not considered a likely pathway for discharge of contaminants to groundwater.
- **Dissolved phase migration in groundwater**. The groundwater level information indicates that groundwater flow at the site is down the river valley to the south (approximately). Contaminants that enter groundwater in the RTD are therefore likely to migrate south with groundwater flow. There may be a component of downwards migration into the Chalk followed by subsequent abstraction by the on-site abstraction wells but given the very high permeability of the RTD this is unlikely to be significant and there is no indication in the analytical data from the factory boreholes that this is occurring. The principal attenuation processes in groundwater are likely to be dispersion and dilution. Whilst some attenuation by retardation and degradation could occur, this is unlikely to be dominant due to the very high permeability and likely rapid flow velocities of the RTD and Chalk aquifers.
- **Migration in surface water.** Any contaminants that are discharged to the Bourne Rivulet or Eastern Channel could migrate downstream with surface water flow.

3.3.1 Qualitative Risk Assessment

Table O lists the possible source-pathway-receptor combinations and makes a qualitative assessment of the risk from each. Contaminant linkages rated with a risk of “low” are considered highly unlikely to create an unacceptable risk and do not require further consideration. Contaminant linkages rated with a risk of “medium” or “high” require further assessment or risk mitigation.

Table O: Assessment of contaminant linkages

Source	Pathway	Receptor	Risk	Justification
Cress bed effluent – ammoniacal nitrogen and orthophosphate	Leakage through base of cress beds to groundwater followed by migration in groundwater	Groundwater and on-site groundwater abstractions	Low to **Medium**	Given there have been relatively few exceedances of DWS in the effluent the hazard posed to groundwater is low. Furthermore, the limited leakage rates recorded together with the high permeability of the RTD will mean that dilution in groundwater will be significant limiting risk.
		Off-site groundwater abstractions	Low	The nearest groundwater abstraction down-hydraulic gradient of the site is located 4km to the south. Given the low hazard the effluent poses to groundwater, the likely significant dilution in groundwater and the distance to the receptor, the risk to off-site abstractions is considered to be low.
	Leakage through base of cress beds to groundwater followed by migration and discharge to surface water	Surface water	Low to **Medium**	Groundwater in the RTD likely discharges to the Bourne Rivulet (when groundwater levels are high) and the Eastern Channel. Thus, leakage of cress bed effluent to groundwater followed by discharge to surface water is a plausible contaminant linkage. However, dilution in groundwater and surface water will likely limit the risk to surface water.
Factory wash water – pesticides	Leakage through base of B11/B12 carriers or Eastern Carrier to groundwater followed by migration in groundwater	Groundwater and on-site groundwater abstractions	Low to **Medium**	Based on the estimation of leakage rates for Block D, leakage through carrier beds B11 and B12 is likely to be limited. Leakage through the base of the Eastern Carrier is not known but given that the area of channel where leakage could occur (i.e. where groundwater level is below surface water level) is small (relative to the area of beds B11 and B12) and the difference between surface water and groundwater levels is relatively small (0.1 to 0.2m) leakage from the Eastern Carrier is likely to be far less than that from B11 and B12. The limited leakage rates together with the high permeability of the RTD will mean that dilution in groundwater is likely to be significant, limiting risk to groundwater. This is confirmed by the relatively low concentrations of pesticides detected in groundwater in well MW21-01 and MW21-02 located down-hydraulic gradient of B11/B12 and the Eastern Carrier relative to the concentrations detected in the factory wash water.

Source	Pathway	Receptor	Risk	Justification
		Off-site groundwater abstractions	Low	The nearest groundwater abstraction down-hydraulic gradient of the site is located 4km to the south. Given the likely significant dilution in groundwater and distance to the receptor, the risk to off-site abstractions is considered low.
	Leakage through base of B11/B12 carriers or Eastern Carrier to groundwater followed by migration and discharge to surface water	Surface water	Low to **Medium**	Groundwater in the RTD in the east of the site (down-hydraulic gradient of B11/B12 and the Eastern Carrier) likely discharges to the Eastern Channel. Thus, leakage of effluent to groundwater, followed by discharge to surface water is a plausible contaminant linkage. However, dilution in groundwater and surface water will likely limit the risk to surface water.

The following contaminant linkages (CL) have been rated with a risk greater than low:

- CL1: Risk to groundwater and on-site abstractions from leakage of cress-bed effluent containing ammoniacal nitrogen and orthophosphate to groundwater;
- CL2: Risk to surface water from leakage of cress-bed effluent containing ammoniacal nitrogen and orthophosphate to groundwater, followed by migration in groundwater and discharge to surface water;
- CL3: Risk to groundwater and on-site abstractions from leakage of factory wash water effluent containing pesticides through the base of the carrier channels (B11, B12 and Eastern Carrier) to groundwater;
- CL4: Risk to surface water from leakage of factory wash water effluent containing pesticides through the base of the carrier channels (B11, B12 and Eastern Carrier) to groundwater, followed by migration in groundwater and discharge to surface water;

The risk to these contaminant linkages will be assessed further using risk quantification in Section 4.

4 QUANTITATIVE RISK ASSESSMENT

A quantitative risk assessment has been conducted to further assess the risk from CL1 to CL4.

4.1 Methodology

A simple dilution approach has been used for the assessment. This equates to a Level 2 assessment of the Environment Agency's Remedial Targets Methodology (RTM) (Environment Agency, 2006) in which groundwater immediately down-hydraulic gradient of the infiltration area is the compliance point. A series of calculations have been conducted to estimate the concentrations of COPC in groundwater at this compliance point. These concentrations have been compared with suitable environmental assessment levels (EALs) to characterise risk. Sensitivity analysis has then been conducted to help assess uncertainty in the model results. The model results are then considered alongside the uncertainties to evaluate the risks in order to determine whether leakage of effluent to ground could create an unacceptable risk to groundwater or related receptors.

Note that the risk from pesticides in the factory wash water effluent has been assessed with and without the proposed ozone treatment.

In accordance with the Environment Agency's RTM, the concentrations of contaminants in groundwater are calculated using the following equation:

$$C_{gw} = C_l / DF$$

Where

C_{gw} = concentration in groundwater (µg.L^{-1})

C_l = concentration in effluent (µg.L^{-1})

DF = dilution factor (see below)

The dilution factor (allowing for a background concentration in groundwater) is calculated using the equation below:

$$DF = \frac{(Q_{gw} + Q_l).C_l}{Q_{gw}.C_u + Q_l.C_l}$$

Where

Q_{gw} = groundwater flow rate within the mixing zone beneath the effluent leakage area (m^3.d^{-1})

Q_l = effluent leakage rate (m^3.d^{-1})

C_u = background concentration in groundwater up-hydraulic gradient of the effluent leakage area ($\mu g.L^{-1}$)

Groundwater flow rate in the groundwater mixing zone is calculated using Darcy's Law:

$$Q_{gw} = K_{gw}.i.W.b$$

Where

K_{gw} = hydraulic conductivity of the aquifer ($m.d^{-1}$)

i = hydraulic gradient in the aquifer ($m.m^{-1}$)

W = width of mixing zone perpendicular to groundwater flow direction (m)

b = thickness of mixing zone (m)

The effluent leakage rate has been estimated using the following equation:

$$Q_l = Inf.A$$

Where

Inf = infiltration rate ($m.d^{-1}$)

A = area over which leakage occurs (m^2)

4.2 Constituents of Potential Concern

Constituents of Potential Concern (COPC) for inclusion in the quantitative risk assessment have been selected by comparing the measured concentrations of constituents in the effluent with suitable EALs. Contaminants with concentrations in the effluent in excess of the EALs are considered as COPC.

4.2.1 Cress bed effluent

For the cress bed effluent the EALs selected are DWS and EQS. The comparison of cress bed effluent concentrations with DWS and EQS has been described in Section 2.7.1. Based on this comparison ammoniacal nitrogen and orthophosphate are considered as the COPC for the cress bed effluent. At the request of the Environment Agency nitrate has also been included as a COPC for the cress bed effluent as groundwater is known to be impacted with nitrate regionally. The EALs selected for the cress bed effluent COPC are given in Table P below. Based on the Joint Agencies Groundwater Directive Advisory Group classifications (JAGDAG, 2018) these are classed as non-hazardous substances for groundwater.

Table P: Cress bed effluent COPC and EALs

COPC	Surface water EAL (µg.L^{-1})	Groundwater EAL (µg.L^{-1})
Orthophosphate as P	45	-
Ammoniacal Nitrogen as N	250	386
Nitrate as N	-	11,300

4.2.2 Factory wash water effluent

The COPC for the factory wash water are considered to be pesticides. The EALs selected for the pesticides are the surface water and groundwater thresholds set by the Environment Agency which are 30% of PNEC and DWS respectively. The factory wash water effluent COPC and EALs are listed in Table Q below.

Table Q: Factory wash water effluent COPC and EALs

COPC	Surface water EAL (µg.L^{-1})	Groundwater EAL (µg.L^{-1})
Acetamiprid	0.15	0.03
Azadirachtin	0.141	0.03
Azoxystrobin	1.32	0.03
Boscalid	3.75	0.03
Chlorantraniliprole	0.075	0.03
Dimethomorph	1.68	0.03
Fludioxonil	0.15	0.03
Fluopicolide	4.65	0.03
Fluopyram	4.05	0.03
Fosetyl aluminium	30	0.03
Fosetyl aluminium (sum)	-	0.03
Mandipropamid	15	0.03
Metalaxyl	36	0.03
Propamocarb-HCL	189	0.03
Pyraclostrobin	0.12	0.03
Spinosad	0.036	0.03
Spirotetramat product	16 [1]	0.03
Trifloxystrobin	0.09	0.03
Total Pesticides	-	0.15

Notes

1. 30% of PNEC for spirotetramat

JAGDAG (2018) have classified dimethomorph as a hazardous substance and fosetyl aluminium, metalaxyl and propamocarb-HCL as non-hazardous substances for groundwater. JAGDAG (2018) have not classified the other pesticides but these will be considered as hazardous for the purposes of this risk assessment.

4.3 Parameter Values

4.3.1 Source Concentrations

The source concentrations are reasonable worst case estimates of the concentrations of COPC in the effluent that could discharge to ground.

Cress Bed Effluent

For ammoniacal nitrogen, the EQS is the allowable 90th percentile concentration in surface water and so the 90th percentile concentration in the cress bed effluent has been used as the source concentration. For orthophosphate, the EQS is the allowable average annual mean concentration in surface water and so the mean concentration in the cress bed effluent has been used as the source concentration. For nitrate the maximum measured concentration in the effluent has been used as the source concentration. The source concentrations used for the cress bed effluent are shown in Table R below.

Table R: Cress bed effluent source concentrations

COPC	Source concentration µg.L^{-1}	Basis
Orthophosphate as P	110	Mean concentration in cress bed effluent in the period 2016 to 2022
Ammoniacal Nitrogen as N	220	90th percentile concentration in cress bed effluent in the period 2016 to 2022
Nitrate as N	12,511	Maximum concentration of total nitrogen (ammoniacal nitrogen, nitrate and nitrite) as N in cress bed effluent recorded in the period 2016 to 2022

Factory Wash Water Effluent

Two scenarios have been modelled for the factory wash water: with and without ozone treatment. For the "without ozone treatment" scenario the maximum measured concentrations in the factory wash water effluent have been used as the source concentrations (see Table L).

For the "with ozone treatment scenario" the maximum measured concentrations in the factory wash water effluent have been multiplied by a treatment factor derived from ozone treatment trials conducted for the factory wash water. In these trials factory wash water was dosed with each pesticide and then treated with ozone at 2 parts per million (ppm), 4 ppm and 6 ppm, respectively. The concentrations of each COPC measured following dosing and treatment are given in Table S. This table also shows the treatment factor, i.e. the ratio of the post treatment concentration to the pre-treatment concentration.

Table S: Results of ozone treatment trials

COPC	Concentration (µg.L-1)					
	Pre-ozone	Treated with 2ppm ozone	Treated with 4 ppm ozone	Treated with 6 ppm ozone	Post ozone (no ozone present)	Treatment factor [1]
Acetamiprid	0.639	0.401	0.304	0.264	0.225	0.35
Azadirachtin	0.173	<0.01	<0.01	<0.01	<0.01	0.058
Azoxystrobin	0.396	<0.01	<0.01	<0.01	<0.01	0.025
Boscalid	0.319	0.0766	0.0179	<0.01	<0.01	0.031
Chlorantraniliprole	0.315	0.0320	<0.01	<0.01	<0.01	0.032
Dimethomorph	0.382	<0.01	<0.01	<0.01	<0.01	0.026
Fludioxonil	0.586	0.100	0.0342	0.0234	0.0113	0.019
Fluopicolide	0.346	0.217	0.166	0.136	0.122	0.35
Fluopyram	0.374	0.265	0.227	0.203	0.185	0.49
Fosetyl aluminium	4.82	3.17	2.06	1.62	1.52	0.32
Fosetyl aluminium (sum)	22.0	3.20	2.1	1.6	1.5	0.068
Mandipropamid	0.383	<0.01	<0.01	<0.01	<0.01	0.026
Metalaxyl	0.373	0.122	0.0509	0.0311	0.0273	0.073
Propamocarb-HCL	0.356	<0.01	<0.01	<0.01	<0.01	0.028
Pyraclostrobin	0.426	<0.01	<0.01	<0.01	<0.01	0.023
Spinosad	3.27	0.0419	0.0216	0.0163	<0.01	0.0031
Spirotetramat product	0.545	0.0295	<0.01	<0.01	<0.01	0.018
Trifloxystrobin	0.180	0.0464	0.0185	<0.01	<0.01	0.056

Notes

1. Ratio of post ozone to pre ozone concentration

The source concentrations used for the factory wash water are shown in Table T below.

Table T: Factory wash water effluent source concentrations

COPC	Source concentration (µg.L-1)	
	Without ozone treatment	With ozone treatment
Acetamiprid	0.137	0.0480
Azadirachtin	0.296	0.0172
Azoxystrobin	0.453	0.0113
Boscalid	1.24	0.0384
Chlorantraniliprole	0.77	0.0246
Dimethomorph	0.553	0.0144
Fludioxonil	7.7	0.146
Fluopicolide	0.0454	0.0159

COPC	Source concentration ($\mu g.L^{-1}$)	
	Without ozone treatment	With ozone treatment
Fluopyram	0.0379	0.0186
Fosetyl aluminium	18.7	5.98
Fosetyl aluminium (sum)	28.5	1.94
Mandipropamid	4.28	0.111
Metalaxyl	0.0322	0.00235
Propamocarb-HCL	0.405	0.0113
Pyraclostrobin	0.0606	0.00139
Spinosad	2.5	0.00791
Spirotetramat enol	0.0932	0.00168
Trifloxystrobin	0.118	0.00661
Total Pesticides	41.3	2.23 *

* Treated concentration based on measured concentrations on 8 February 2022 (when maximum total pesticides concentration occurred multiplied by the treatment factors for those pesticides). Treated concentrations then summed

4.3.2 Effluent Leakage Rates

The effluent leakage rates have been calculated by multiplying the infiltration rate (in $m.d^{-1}$) by the infiltration area (m^2). The flow measurements in Block D indicate that infiltration through the base of the cress beds is less than 0.012 $m.d^{-1}$ (Section 2.6.6). These flow measurements were made in September when groundwater levels were low and approximately one month after bed cleaning, and are therefore likely to represent a reasonable worst case (as infiltration rates are expected to be higher following bed cleaning). The watercress beds at the farm have similar construction and therefore it is reasonable to assume that infiltration from beds B11 and B12 is no higher (per m^2 area) than the beds in D block. Indeed, beds B11 and B12 will be cleaned less frequently than the active watercress beds and so arguably will have a higher silt content and therefore lower infiltration. The infiltration rate of 0.012 $m.d^{-1}$ has therefore been adopted as a reasonable worst case infiltration rate for the assessment of both the cress bed effluent and factory wash water effluent.

Infiltration area for the cress beds is assumed to be the total area of the cress beds (not including B11 and B12) in Blocks B, C, D, E and R (64,400 m^2). Thus, leakage rate for the cress bed effluent is estimated to be less than 773 $m^3.d^{-1}$.

Infiltration area of the factory wash water is assumed to be the area of former cress beds B11 and B12 (2300 m^2). The simplifying assumption is made that the contribution from leakage via the eastern carrier is not significant and so is not included in the calculations.

Thus leakage of factory wash water effluent to ground is estimated to be 28 $m^3.d^{-1}$. Note, however, that the factory typically only operates for 18 hours per day. For the other 6 hours there will be no water discharging to beds B11 and B12 and no infiltration. Thus, the average daily leakage rate will be 21 $m^3.d^{-1}$ (28 x 18 hrs /24 hrs).

4.3.3 Groundwater Flow

The groundwater bearing unit into which effluent would leak is the RTD. The pumping test conducted in MW19-03 gave hydraulic conductivity estimates of the RTD of 620 and 448 $m.d^{-1}$. The average of these two values of 534 $m.d^{-1}$ has been used for the assessment.

The measured hydraulic gradient in the RTD of 0.004 has been used for the assessment and it is assumed that the mixing zone thickness is equal to the saturated thickness of the RTD, which based on site data is estimated to average approximately 5 m.

The width of aquifer perpendicular to groundwater flow depends on the infiltration area. For the cress bed effluent the infiltration area is assumed to be Blocks B, C, D, E and R and the site width (perpendicular to groundwater flow) of 310m has been used for the assessment. For the factory wash water effluent the total width of beds B11 and B12 (20 m) has been used.

Based on these parameter values the groundwater flow rate for the cress bed effluent assessment is calculated to be 3311 $m^3.d^{-1}$ (534 x 0.004 x 5 x 310). The groundwater flow rate for the factory wash water effluent assessment is calculated to be 214 $m^3.d^{-1}$ (534 x 0.004 x 5 x 20).

4.3.4 Background concentrations

The average measured concentrations of orthophosphate and nitrate in up-hydraulic gradient monitoring well MW19-02 have been used as the background concentrations for the assessment (see Table 2). Ammoniacal nitrogen has only been detected in one sample in MW19-02 and the measured concentration in this one sample has been used as the background concentration for ammoniacal nitrogen. Sampling and analysis for pesticides in the factory abstraction well (BH1) and up-hydraulic gradient well MW19-02 did not detect pesticides and so background concentration for the pesticides is assumed to be zero.

The background concentrations in groundwater assumed for the assessment are shown in Table U below.

Table U: Background concentrations in groundwater assumed for the assessment

COPC	Background concentration (µg.L^{-1})	Basis
Orthophosphate as P	28	Average measured concentration in up-hydraulic gradient well MW19-02
Ammoniacal Nitrogen as N	19	Maximum detected concentration in MW19-02
Nitrate as N	7,750	Average measured concentration in MW19-02
Pesticides	0	Pesticides have not been detected in groundwater in factory abstraction well BH1 or up-hydraulic gradient well MW19-02

4.4 Results

4.4.1 Cress Bed Effluent

The calculated dilution factors and predicted concentrations in groundwater arising from infiltration of cress bed effluent are compared with the EALs in Table V below. The predicted concentrations at the groundwater compliance point are all below the EALs.

Table V: Calculated dilution factors and predicted concentrations in groundwater arising from cress bed leakage

COPC	Dilution factor	Predicted concentration in groundwater (µg.L^{-1})	EAL - Surface water (µg.L^{-1})	EAL - Groundwater (µg.L^{-1})
Orthophosphate as P	2.53	44	45	-
Ammoniacal Nitrogen as N	3.86	57	250	386
Nitrate as N	1.45	8651	-	11300

4.4.2 Factory Wash Water Effluent

The dilution factor calculated for the factory wash water is 11.2 for all pesticides. The predicted concentrations in groundwater arising from infiltration of factory wash water effluent without and with ozone treatment are compared with the EALs in Tables W and X below, respectively. These tables also show the hazard quotient for each COPC which is the predicted concentration in groundwater divided by the EAL.

Table W: Predicted concentrations in groundwater arising from factory wash water leakage (without ozone treatment)

COPC	Predicted concentration in groundwater (µg.L^{-1})	EAL (µg.L^{-1})		Hazard quotient	
		Surface water	Ground-water	Surface water	Ground-water
Acetamiprid	0.0122	0.15	0.03	0.082	0.41
Azadirachtin	0.0265	0.141	0.03	0.19	0.88

COPC	Predicted concentration in groundwater (µg.L^{-1})	EAL (µg.L^{-1})		Hazard quotient	
		Surface water	Ground-water	Surface water	Ground-water
Azoxystrobin	0.0405	1.32	0.03	0.031	**1.3**
Boscalid	0.111	3.75	0.03	0.030	**3.7**
Chlorantraniliprole	0.0688	0.075	0.03	0.92	**2.3**
Dimethomorph	0.0494	1.68	0.03	0.029	**1.6**
Fludioxonil	0.688	0.15	0.03	**4.6**	**23**
Fluopicolide	0.00406	4.65	0.03	0.00087	0.14
Fluopyram	0.00339	4.05	0.03	0.00084	0.113
Fosetyl aluminium	1.67	30	0.03	0.056	**56**
Fosetyl aluminium (sum)	2.55	-	0.03	-	**85**
Mandipropamid	0.382	15	0.03	0.025	**13**
Metalaxyl	0.00288	36	0.03	0.000080	0.096
Propamocarb-HCL	0.0362	189	0.03	0.00019	**1.21**
Pyraclostrobin	0.00542	0.12	0.03	0.045	0.18
Spinosad	0.223	0.036	0.03	**6.2**	**7.4**
Spirotetramat enol	0.00833	16	0.03	0.00052	0.28
Trifloxystrobin	0.0105	0.09	0.03	0.117	0.35
Total Pesticides	3.69	-	0.15	-	**25**

Hazard quotient in **bold** exceeds 1 (i.e. predicted concentration in groundwater > EAL)

Table X: Predicted concentrations in groundwater arising from factory wash water leakage (with ozone treatment)

COPC	Predicted concentration in groundwater (µg.L^{-1})	EAL (µg.L^{-1})		Hazard quotient	
		Surface water	Ground-water	Surface water	Ground-water
Acetamiprid	0.00429	0.15	0.03	0.029	0.14
Azadirachtin	0.00154	0.141	0.03	0.0109	0.051
Azoxystrobin	0.00101	1.32	0.03	0.00076	0.034
Boscalid	0.00343	3.75	0.03	0.00092	0.114
Chlorantraniliprole	0.00220	0.075	0.03	0.029	0.073
Dimethomorph	0.00129	1.68	0.03	0.00077	0.043
Fludioxonil	0.0130	0.15	0.03	0.087	0.43
Fluopicolide	0.00142	4.65	0.03	0.00031	0.047
Fluopyram	0.00166	4.05	0.03	0.00041	0.055
Fosetyl aluminium	0.534	30	0.03	0.018	**18**
Fosetyl aluminium (sum)	0.173	-	0.03	-	**5.8**
Mandipropamid	0.00992	15	0.03	0.00066	0.33
Metalaxyl	0.000210	36	0.03	5.83E-06	0.0070

COPC	Predicted concentration in groundwater (µg.L^{-1})	EAL (µg.L^{-1})		Hazard quotient	
		Surface water	Ground-water	Surface water	Ground-water
Propamocarb-HCL	0.00101	189	0.03	5.34E-06	0.034
Pyraclostrobin	0.000124	0.12	0.03	0.00104	0.0041
Spinosad	0.000707	0.036	0.03	0.020	0.024
Spirotetramat enol	0.000150	16	0.03	9.38E-06	0.0050
Trifloxystrobin	0.000591	0.09	0.03	0.0066	0.020
Total Pesticides	0.199	-	0.15	-	**1.3**

Hazard quotient in **bold** exceeds 1 (i.e. predicted concentration in groundwater > EAL)

Table W shows that the predicted concentrations of fludioxonil and spinosad in groundwater (with no ozone treatment) exceed the surface water EAL (hazard indices of 3.8 and 5.2, respectively). The predicted groundwater concentrations of azoxystrobin, boscalid, chlorantraniliprole, dimethomorph, fludioxonil, fosetyl aluminium, mandipropamid, propamocarb-HCL, spinosad and total pesticides (with no ozone treatment) exceed the groundwater threshold, with the highest hazard quotient of 85 occurring for fosetyl aluminium (sum).

Table X shows that with ozone treatment the predicted concentrations in groundwater are below the surface water and groundwater thresholds with the exception of fosetyl aluminium, fosetyl aluminium (sum) and total pesticides which have hazard quotients of 18, 5.8 and 1.3, respectively.

4.5 Sensitivity Analysis

Sensitivity analysis has been undertaken to help assess the effects that uncertainty in the input parameter values has on the results. This has been conducted by varying each parameter between reasonable bounds and assessing what effect this has on the predicted hazard quotients. The sensitivity analysis has been conducted for orthophosphate for the cress bed effluent and fosetyl aluminium (sum) for the factory wash water effluent. These are the COPC with the highest predicted groundwater to EAL ratio for each effluent stream.

The range in parameter values tested is presented in Table Y below and the results of the sensitivity analysis are shown in Tables Z to BB.

Table Y: Range of parameter values tested in sensitivity analysis

Parameter	Base Case	Minimum	Maximum	Basis
Infiltration rate ($m.d^{-1}$)	0.012	0.0012	0.012	Measurements made in Block D indicate that infiltration rate is <0.012 $m.d^{-1}$
Infiltration area – cress beds (m^2)	64,400	58,000	64,400	Base case assumes 100% of cress beds being irrigated at any one time. In reality, utilisation is less than 100%. 90% of total area considered a reasonable minimum
Infiltration area – factory wash water effluent (m^2)	2,300	2,300	2,550	Base case and minimum is area of cress beds B11 and B12. Maximum adds on a 250m^2 allowance (50m length x 5m width) for leakage through the bed of the Eastern Carrier
Aquifer hydraulic conductivity ($m.d^{-1}$)	534	448	620	Range in estimates from pumping test conducted in MW19-03
Aquifer hydraulic gradient ($m.m^{-1}$)	0.004	0.003	0.005	Reasonable range in estimates based on monitoring data
Mixing zone thickness (m)	5	4	6	Reasonable range in estimates of saturated aquifer thickness of the RTD based on site data
Width of mixing zone – cress beds (m)	310	300	320	Reasonable range in estimates of site width perpendicular to groundwater flow
Width of mixing zone – factory wash water (m)	20	20	30	Reasonable range in estimates of width of infiltration zone for factory wash water
Source concentration – orthophosphate ($\mu g.L^{-1}$)	110	97	179	Infiltration unlikely to occur in January to May when groundwater levels are high. Minimum is average concentration in cress bed effluent excluding months of January to May. Maximum is 90th percentile concentration in cress bed effluent
Source concentration – fosetyl aluminium ($\mu g.L^{-1}$) - Without ozone - With ozone	 28.5 1.94	 21.4 1.46	 42.8 2.91	Minimum and maximum based on 0.75x and 1.5x base case as reasonable range in values
Background concentration – orthophosphate ($\mu g.L^{-1}$)	28	24.8	29	Range in measured concentrations in MW19-02

Table Z: Results of sensitivity analysis for cress bed effluent - orthophosphate

Parameter	Predicted concentration in groundwater		
	Base Case	Minimum Parameter Value	Maximum Parameter Value
Infiltration rate	44	30	44
Infiltration area		42	44
Aquifer hydraulic conductivity		46	42
Aquifer hydraulic gradient		47	41
Mixing zone thickness		47	41
Width of mixing zone		44	43
Source concentration		41	57
Background concentration		41	44

Table AA: Results of sensitivity analysis for factory wash water effluent (without ozone treatment) – fosetyl aluminum (sum)

Parameter	Hazard quotient		
	Base Case	Minimum Parameter Value	Maximum Parameter Value
Infiltration rate	85	8.5	85
Infiltration area		85	95
Aquifer hydraulic conductivity		100	74
Aquifer hydraulic gradient		111	69
Mixing zone thickness		104	72
Width of mixing zone		85	58
Source concentration		63	128

Table BB: Results of sensitivity analysis for factory wash water effluent (with ozone treatment) – fosetyl aluminum (sum)

Parameter	Hazard quotient		
	Base Case	Minimum Parameter Value	Maximum Parameter Value
Infiltration rate	5.8	0.58	5.8
Infiltration area		5.8	6.4
Aquifer hydraulic conductivity		6.9	5.0
Aquifer hydraulic gradient		7.7	4.6
Mixing zone thickness		7.3	4.8
Width of mixing zone		5.8	3.9
Source concentration		4.4	8.7

The sensitivity analysis shows that there is relatively little sensitivity of the model results to changes in input parameter values for the majority of parameters. The largest change occurs when infiltration rate is reduced by an order of magnitude. The measurements conducted in Block D showed no discernible difference between inflows and outflows indicating that infiltration through the base of the cress beds is minimal. Allowing for uncertainty due to measurement precision a worst case infiltration rate of 0.012 $m.d^{-1}$ has been assumed. In reality, infiltration rate is likely to be less than this and thus the concentrations in groundwater have likely been over-estimated.

4.6 Risk Evaluation

4.6.1 Cress Bed Effluent

The quantitative risk assessment has shown that the predicted concentrations of ammoniacal nitrogen, orthophosphate and nitrate in groundwater arising from leakage of cress bed effluent are all below DWS and EQS. This is generally consistent with the groundwater monitoring data for the site which shows that the concentrations of ammoniacal nitrogen and nitrate in groundwater wells down-hydraulic gradient of the cress beds (MW19-04, MW19-05, MW21-01 and MW21-02) are below DWS and EQS. Some slight exceedances of the EQS have occurred for orthophosphate in MW19-05, MW21-01 and MW21-02 in the south east corner of the site. However, based on the risk calculations conducted (together with fact that there are no exceedances in MW19-04), these exceedances are considered more likely the result of leakage from the Southern Water foul sewer than leakage from the cress beds. Note that any groundwater discharging to surface water will be significantly diluted by surface water flow. As such, the slight exceedances of EQS in groundwater are unlikely to result in an unacceptable risk to surface water.

Based on the results of the risk assessment the cress bed effluent does not present an unacceptable risk to groundwater or related receptors via infiltration.

4.6.2 Factory Wash Water Effluent

The quantitative risk assessment for the factory wash water effluent has been conducted with and without ozone treatment.

The predicted concentrations in groundwater without ozone treatment exceed the EALs for various pesticides, namely fludioxonil and spinosad for the surface water thresholds and azoxystrobin, boscalid, chlorantraniliprole, dimethomorph, fludioxonil, fosetyl aluminium, mandipropamid, propamocarb-HCL, spinosad and total pesticides for the groundwater thresholds. The maximum exceedance was predicted for fosetyl aluminium (sum) (a non hazardous substance) which had a predicted concentration in groundwater 85 times the groundwater threshold of 0.03 µg.L^{-1}.

The predicted concentrations in groundwater with ozone treatment are below the EALs other than fosetyl aluminium, fosetyl aluminium (sum) and total pesticides which exceed the groundwater thresholds. The maximum exceedance was predicted for fosetyl aluminium which had a predicted concentration in groundwater 18 times the groundwater threshold of 0.03 µg.L^{-1}.

A reality check of the results can be made by comparison of the predicted concentrations in groundwater (without ozone treatment – i.e. current conditions) with the maximum measured concentrations of pesticides in down-hydraulic gradient monitoring wells MW21-01 and MW21-02 (see Table CC). This shows that the predicted concentrations in groundwater are generally higher than the measured concentrations, in particular for fludioxonil, fosetyl aluminium, mandipropamid and spinosad which have predicted concentrations in groundwater more than an order of magnitude above those measured.

Table CC: Comparison of predicted concentrations of pesticides in groundwater (without ozone treatment) with measured concentrations

COPC	Predicted concentration in groundwater (µg.L^{-1})	Maximum measured concentration in groundwater in MW21-01/02 (µg.L^{-1})
Acetamiprid	0.0101	<0.01
Azadirachtin	0.0218	<0.01
Azoxystrobin	0.0333	<0.01
Boscalid	0.0913	0.0213
Chlorantraniliprole	0.0567	0.0535
Dimethomorph	0.0407	0.0145
Fludioxonil	0.567	0.0109
Fluopicolide	0.00334	<0.01
Fluopyram	0.00279	<0.01
Fosetyl aluminium	1.38	<0.1
Fosetyl aluminium (sum)	2.10	<0.5
Mandipropamid	0.315	<0.01
Metalaxyl	0.00237	<0.01
Propamocarb-HCL	0.0298	<0.01
Pyraclostrobin	0.00446	<0.01
Spinosad	0.188	<0.01
Spirotetramat enol	0.00686	<0.01
Trifloxystrobin	0.00868	<0.01

One reason for this over-prediction could be that attenuation is occurring in the subsurface which is not accounted for in the modelling. For example, USEPA (1991) note that fosetyl aluminium degrades rapidly in soil to non-toxic components and as a result "*the potential for ground water and/or surface water contamination by fosetyl-Al is expected to be very low in most cases*".

The University of Hertfordshire Pesticide Properties Database (PPDB, 2023) gives field derived soil degradation half-lives of 0.04 days for fosetyl aluminium, 16 days for fludioxonil and 13.6 days for mandipropamid, whereas the field derived soil half-lives given for azoxystrobin, boscalid and chlorantraniliprole are notably longer (180.7, 254 and 204 days, respectively). Based on these half-lives fostetyl aluminium and (to a lesser extent) fludioxonil and mandipropamid are predicted to degrade rapidly in the subsurface whereas azoxystrobin, boscalid and chlorantraniliprole are expected to be more persistent. This would explain why the modelling significantly over-predicted groundwater concentrations of fostetyl aluminium, fludioxonil and mandipropamid but not azoxystrobin, boscalid and chlorantraniliprole.

Based on the measured concentrations in groundwater the presence of pesticides in the factory wash water are not currently presenting an unacceptable risk to groundwater or related receptors (via infiltration) with the possible exception of chlorantraniliprole which has been detected in groundwater above the groundwater threshold of 0.03 $\mu g.L^{-1}$ (but not above the DWS of 0.1 $\mu g.L^{-1}$).

The risk modelling with ozone treatment shows that the predicted concentrations of all COPC pesticides are below surface water and groundwater thresholds with the exception of fosetyl aluminium and total pesticides. However, as discussed above, the concentrations of fosetyl aluminium (and therefore total pesticides) have likely been significantly over-estimated as degradation of this pesticide in the subsurface (which is likely to be rapid) has not been taken into account. As such, it is reasonable to conclude that factory wash water will not present an unacceptable risk to groundwater or related receptors (via infiltration) when the ozone treatment plant becomes operational.

5 CONCLUSIONS

The following conclusions are drawn from this HRA:

- The risk modelling has shown that infiltration of cress bed effluent to ground does not present an unacceptable risk to groundwater or related receptors;
- The risk modelling has shown a potential unacceptable risk to groundwater and related receptors from infiltration of factory wash water containing pesticides without ozone treatment. However, comparison of the model results with measured concentrations in groundwater shows that the risks have been significantly over-predicted for some pesticides (those that are expected to degrade rapidly in the sub-surface such as fosetyl aluminium). For others, such as chlorantraniliprole, the predicted concentrations in groundwater are similar to those measured. Both the predicted and maximum measured concentrations of chlorantraniliprole in groundwater exceed the groundwater threshold of 0.03 $\mu g.L^{-1}$ but are below the DWS of 0.1 $\mu g.L^{-1}$.
- The risks to groundwater and related receptors from infiltration of factory wash water are predicted to reduce with the implementation of ozone treatment. With ozone treatment the concentrations of pesticides in groundwater are unlikely to exceed surface water and groundwater thresholds, i.e. the risks to groundwater and related receptors will be acceptable.

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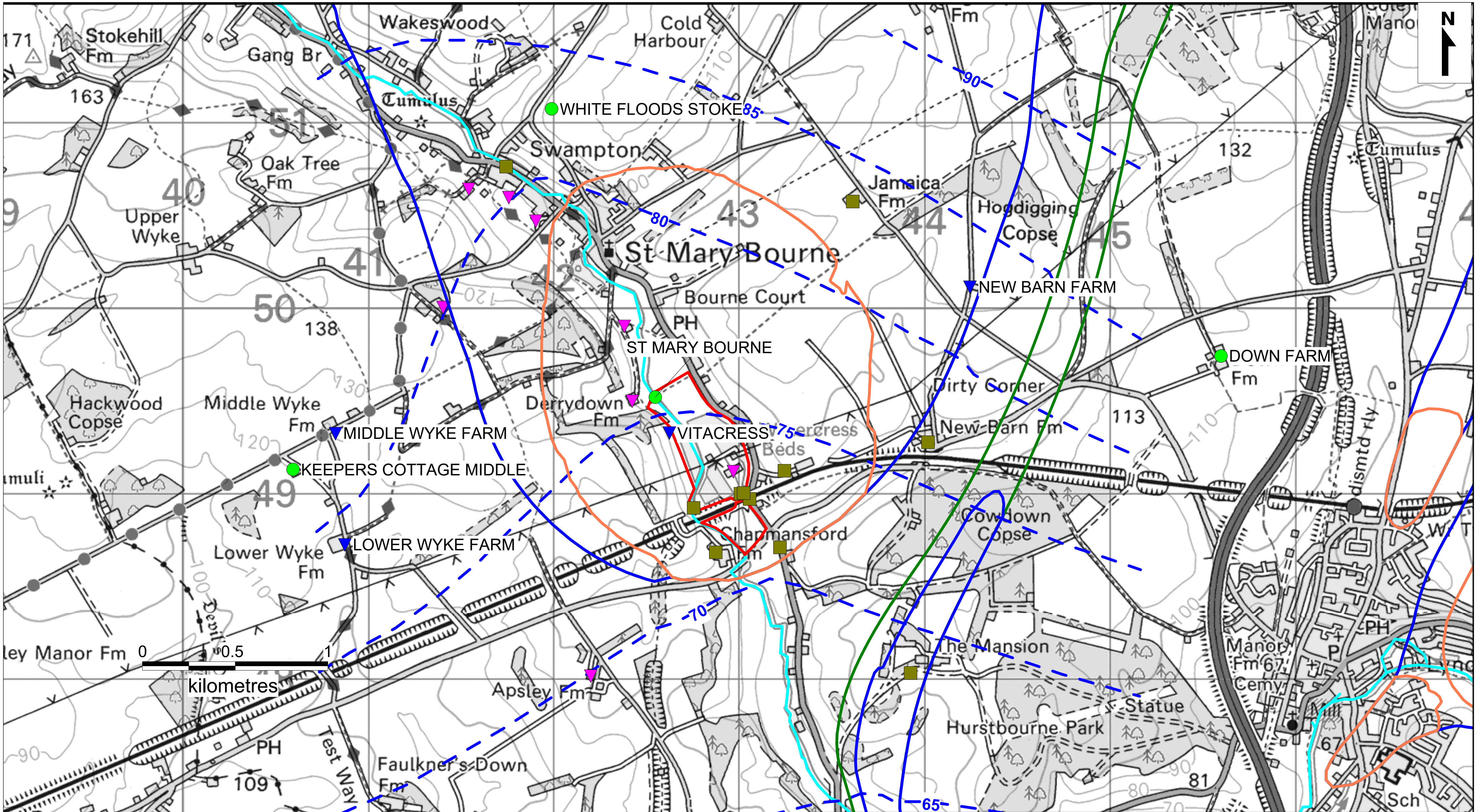
FIGURES



Site boundary	EA intepreted groundwater contour in Chalk (mAOD), Spring 2014
SPZ1	EA groundwater level monitoring point
SPZ2	Consented discharge
SPZ3	Bourne Rivulet
Licensed groundwater abstraction	
Private abstraction	

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Lower Link Farm,
St Mary Bourne

Client: Vitacress Ltd

Figure 1

Scale: as shown

Date: 08/11/23

Site location and other information

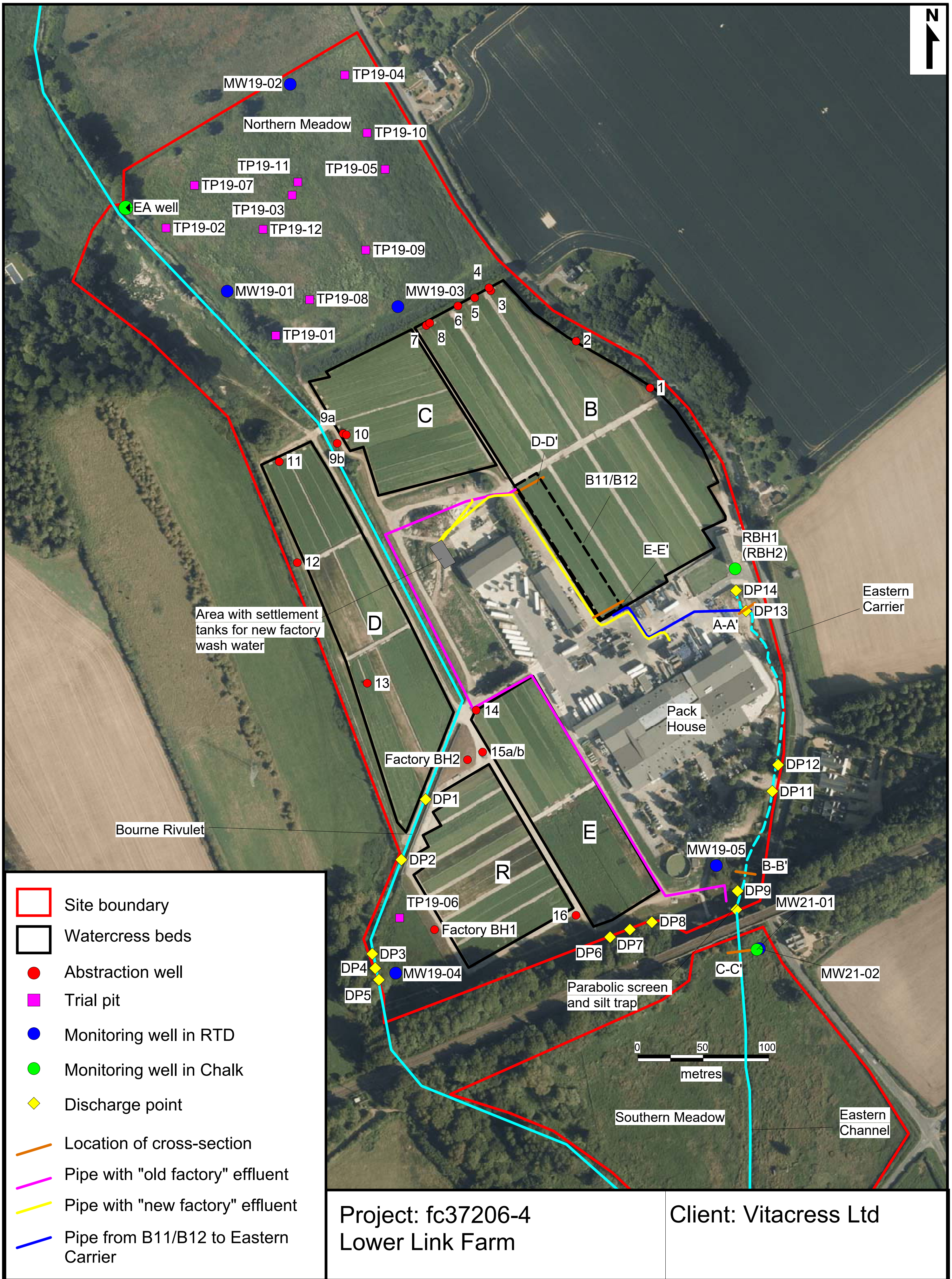

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Figure 2

Scale: as shown

Date: 30/04/24

Site layout and locations of trial pits, wells and discharge points

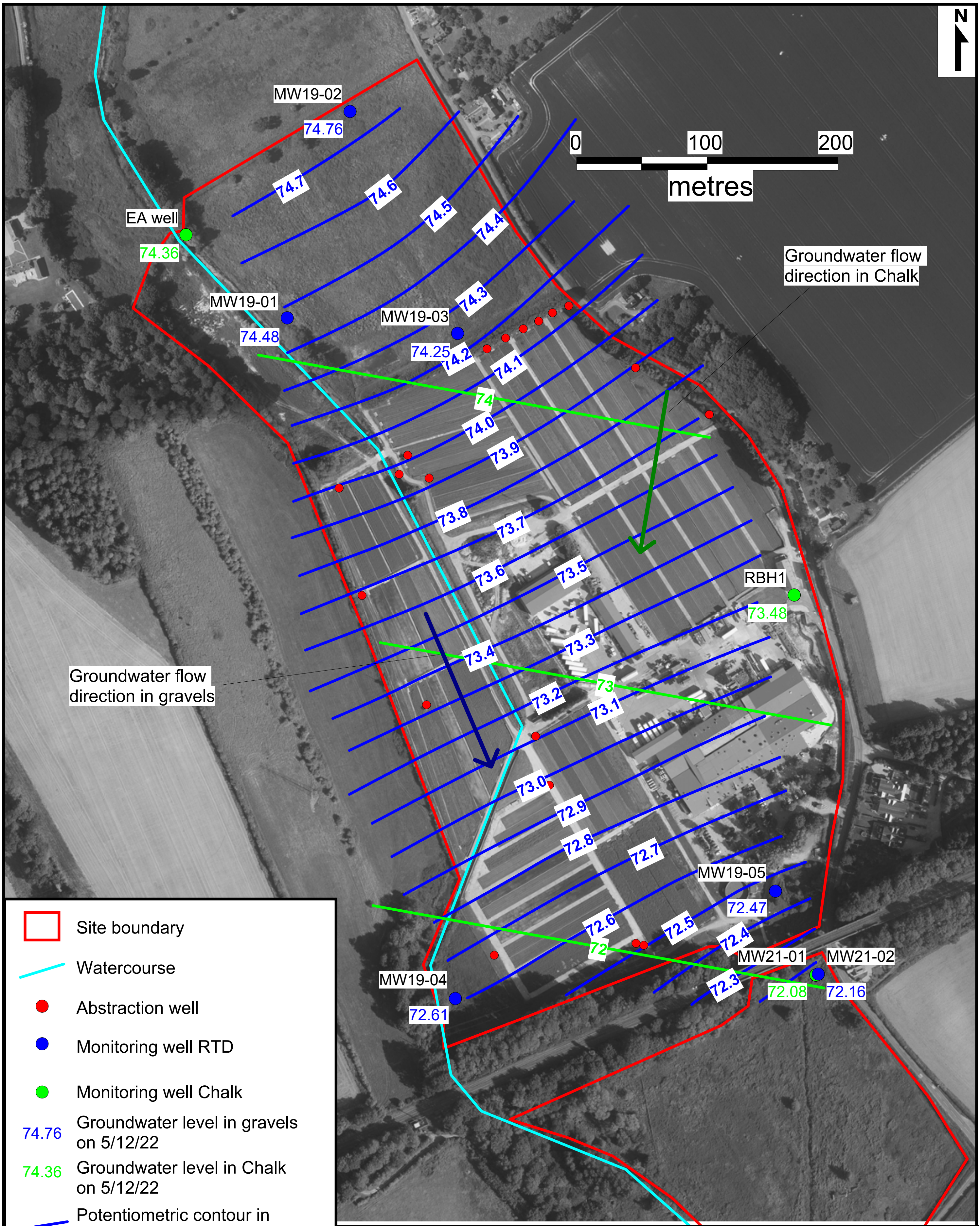

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Figure 3	Interpreted groundwater potentiometry 5 December 2022
Scale: as shown	
Date: 12/10/23	

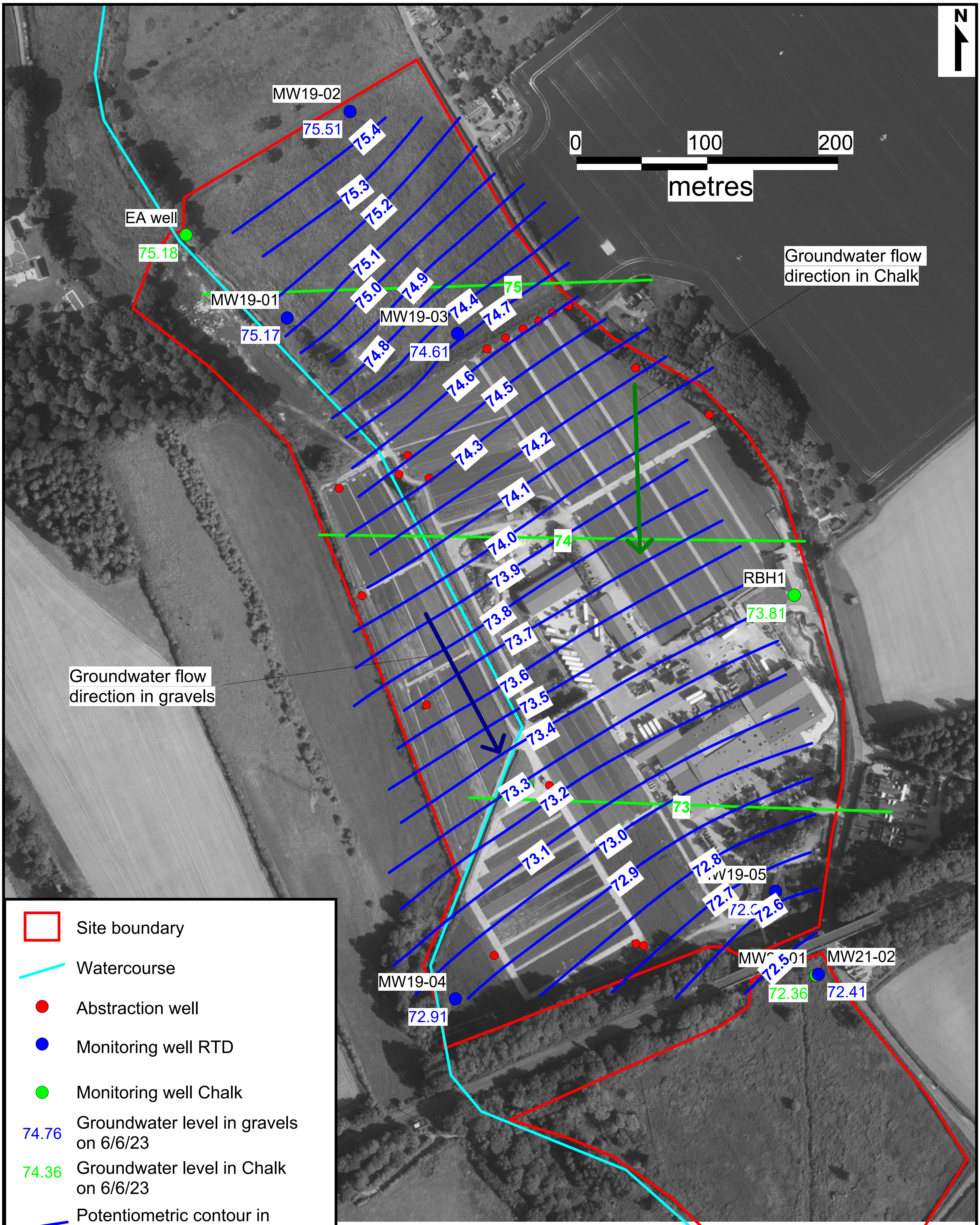

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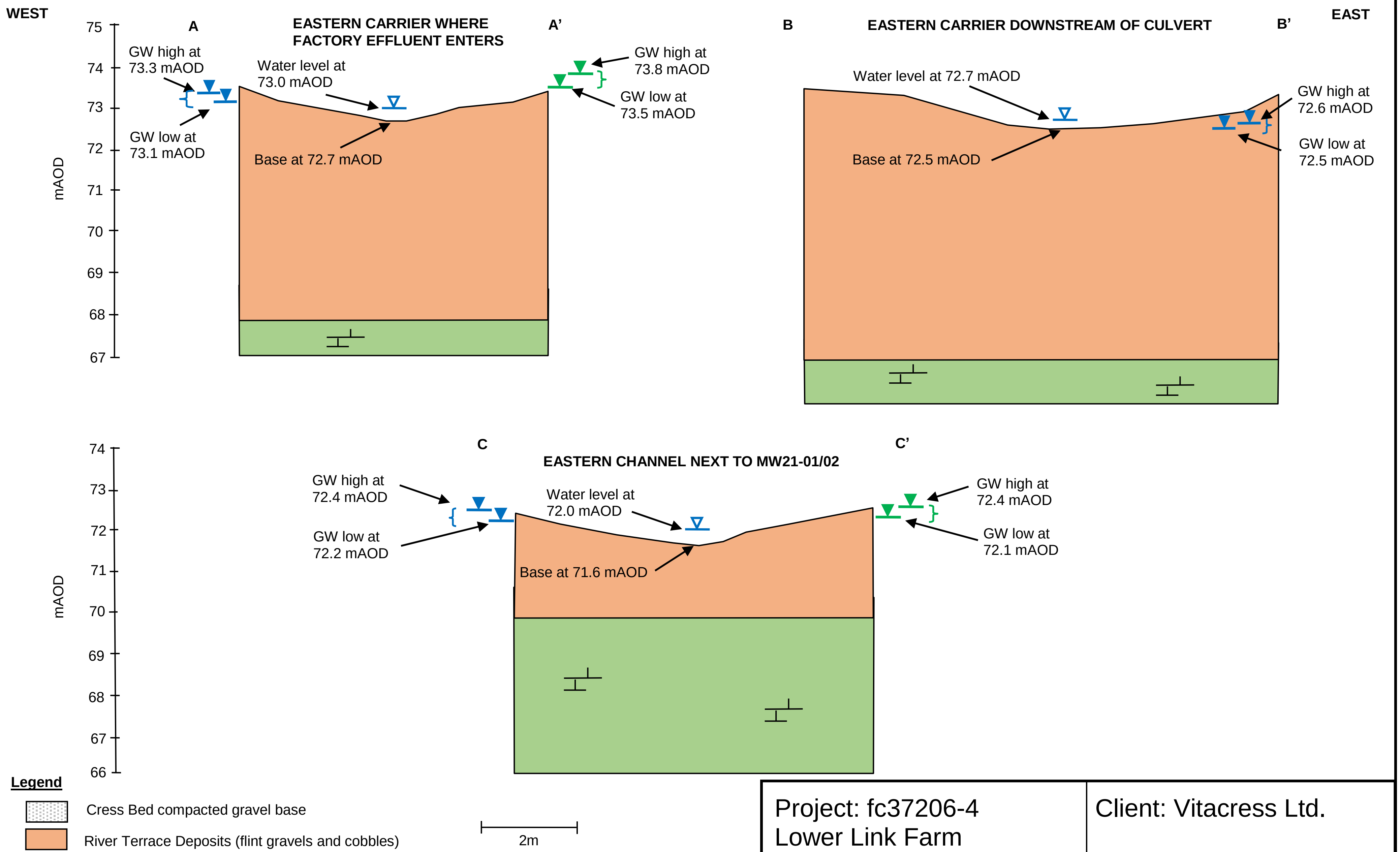
Figure 4	Interpreted groundwater potentiometry 6 June 2023
Scale: as shown	
Date: 12/10/23	



Legend

- Cress Bed compacted gravel base
- River Terrace Deposits (flint gravels and cobbles)
- Chalk
- Water in Channel
- Range of Measured Water Levels in Gravels
- Range of Measured Water Levels in Chalk

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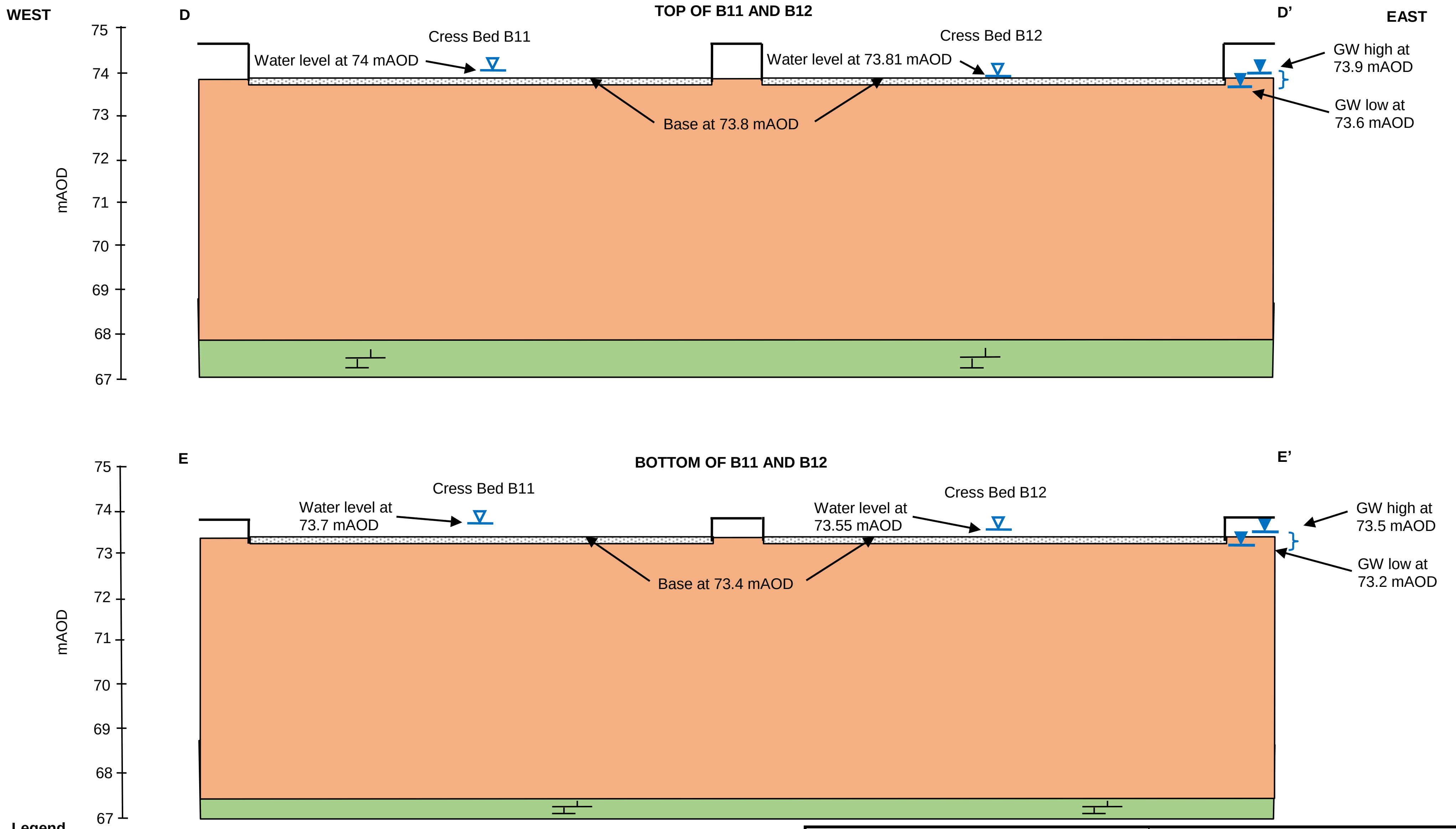
Figure 5
Scale: see key
Date: 12/10/23

Cross Sections A-A', B-B' and C-C'



Legend

- Cress Bed compacted gravel base
- River Terrace Deposits (flint gravels and cobbles)
- Chalk
- Water in Cress Bed
- Range of Measured Water Levels in Gravels

2m

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Figure 6 Scale: see key Date: 12/10/23	Cross Sections D-D’ and E-E’

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TABLES

Table 1: Vitacress Monthly Water Quality Data

							Sampling round	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16
							Date	30/04/2015	20/05/2015	17/06/2015	15/07/2015	19/08/2015	10/09/2015	18/11/2015	08/12/2015	20/01/2016	11/02/2016	09/03/2016	13/04/2016	18/05/2016	22/06/2016	20/07/2016
Analyte	**Units**	**DWS**	**EQS**	**EAL**	**Count**	**Min conc**	**Max conc**															
Block B IN																						
pH	pH Units																					
Conductivity @ 20 deg.C	mS/cm																					
Orthophosphate, Filtered as P	mg/l				76	0.013	0.061	0.024	0.015	0.021	0.025	0.02	0.057	0.029	0.033	0.022	0.02	0.019	0.019	0.016	0.04	0.043
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	77	0.029	1.2	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03
Nitrate as N	mg/l	11.3		11.3	77	6	7.383871	<7.59	<7.73	<7.05	<7.4	<7.23	<6.84	<6.91	<7.13	<6.97	<7.12	<7.22	<7.88	<7.71	<7.01	6.89
Nitrite as N	mg/l	0.152		0.152	77	0.0029	0.076	<0.004	<0.004	<0.004	<0.004	<0.004	0.0058	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.0049
Nitrogen: Total oxidised as N	mg/l				76	6	8.2	7.59	7.73	7.05	7.4	7.23	6.85	6.91	7.13	6.97	7.12	7.22	7.88	7.71	7.01	6.89
Solids, Suspended at 105°C	mg/l				76	2.95	33	<3	<3	<3	<3	<3	17	3.13	<3	<3	<3	<3	<3	<3	5.6	3.67
Zinc	ug/l		18.7	18.7	75	1.88	8.6	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Iron	ug/l	200	1000	200	77	6	173	<30	<30	<30	<30	<30	143	<30	<30	<30	<30	<30	<30	<30	137	72
Magnesium	mg/l				75	1.5	1.97	1.58	1.61	1.61	1.64	1.52	1.7	1.64	1.64	1.61	1.56	1.72	1.61	1.58	1.72	1.71
Potassium	mg/l				75	0.748	2.33	0.772	0.864	0.811	0.778	0.748	1.37	0.928	1.17	0.79	0.884	0.817	0.771	0.883	1.47	1.45
Phosphorus(tot. unfilt)	ug/l				21	45	1400															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	56	0.013	0.06	0.017	0.014	0.018	0.026	0.017	0.056	0.027	0.034	0.021	0.013	0.019	0.018	0.018	0.047	0.044
Phosphate: Total as P	mg/l				56	0.0201	0.089	0.0201	0.0504	0.0215	0.0208	<0.02	0.0621	0.0328	0.0387	0.0262	0.0215	0.0201	<0.02	<0.02	0.0593	0.0594
Block B OUT																						
pH	pH Units																					
Conductivity @ 20 deg.C	mS/cm																					
Orthophosphate, Filtered as P	mg/l				76	0.01	1.3	0.022	0.051	0.044	0.108	0.049	0.06	0.081	0.093	0.05	0.033	0.051	0.107	0.095	0.129	0.067
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	77	0.019	1.4	<0.03	<0.03	0.043	0.035	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.066	0.09
Nitrate as N	mg/l	11.3		11.3	77	0.81	10.70323	5.97	6.58	5.62	6.17	6.31	5.82	6.98	6.9	<7.14	<7.3	<6.65	6.58	5.62	6.24	5.72
Nitrite as N	mg/l	0.152		0.152	77	0.0042	0.2	0.0078	0.0127	0.0167	0.0248	0.021	0.0313	0.0201	0.0214	<0.004	<0.004	<0.004	0.0124	0.0118	0.0421	0.0624
Nitrogen: Total oxidised as N	mg/l				76	0.83	10.8	5.98	6.59	5.64	6.19	6.33	5.85	7	6.92	7.14	7.3	6.65	6.59	5.63	6.28	5.78
Solids, Suspended at 105°C	mg/l				76	2.2	92	<3	3.63	<3	<3	20	3.22	19.7	4.03	<3	<3	3.9	4.63	3.87	6.6	5.27
Zinc	ug/l		18.7	18.7	75	1.4	20.5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Iron	ug/l	200	1000	200	77	7	210	<30	<30	<30	<30	115	<30	<30	<30	30.9	<30	<30	<30	<30	51.8	44.2
Magnesium	mg/l				75	1.2	6.1	1.59	1.65	1.68	1.83	1.65	1.67	1.67	1.65	1.7	1.65	1.74	1.84	1.82	1.79	1.75
Potassium	mg/l				75	0.14	79.2	0.662	1.19	0.852	1.11	0.751	1.15	1.09	1.42	1.23	1.17	1.07	2.05	1.31	2.33	1.99
Phosphorus(tot. unfilt)	ug/l				21																	
Orthophosphate, Reactive as P	mg/l		0.045	0.045	56	0.016	0.95	0.016	0.049	0.059	0.11	0.064	0.063	0.081	0.094	0.059	0.038	0.051	0.11	0.098	0.151	0.085
Phosphate: Total as P	mg/l				56	0.0239	0.97	0.0248	0.0632	0.0602	0.121	0.18	0.0738	0.151	0.102	0.0804	0.0498	0.0529	0.143	0.108	0.21	0.144
Block D IN																						
pH	pH Units																					
Conductivity @ 20 deg.C	mS/cm																					
Orthophosphate, Filtered as P	mg/l				78	0.017	0.128	0.028	0.024	0.037	0.029	0.027	0.024	0.024	0.023	0.025	0.027	0.026	0.024	0.024	0.026	0.03
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	79	0.03	0.2	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Nitrate as N	mg/l	11.3		11.3	79	5.67	7.49	<6.88	<6.87	<6.7	<6.85	<6.84	<6.74	<6.72	<6.54	<6.67	<7.51	<6.71	<6.95	<6.78	<6.90	<6.94
Nitrite as N	mg/l	0.152		0.152	79	0.0013	0.022217	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Nitrogen: Total oxidised as N	mg/l				78	5.7	7.51	6.88	6.87	6.7	6.85	6.84	6.74	6.72	6.54	6.67	7.51	6.71	6.95	6.78	6.9	6.94
Solids, Suspended at 105°C	mg/l				78	3.9	6	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	3.9	<3	<3	<3	<3
Zinc	ug/l		18.7	18.7	77	1.16	9.9	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Iron	ug/l	200	1000	200	79	4	50	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30
Magnesium	mg/l				77	1.44	1.8	1.55	1.56	1.63	1.62	1.53	1.59	1.63	1.56	1.63	1.67	1.65	1.57	1.5	1.62	1.62
Potassium	mg/l				77	0.736	1.2	0.892	0.959	1.02	0.884	0.829	0.848	0.864	0.889	0.869	1	0.886	0.812	0.912	0.863	0.962
Phosphorus(tot. unfilt)	ug/l				21																	
Orthophosphate, Reactive as P	mg/l		0.045	0.045	58	0.018	0.037	0.024	0.024	0.037	0.033	0.024	0.024	0.024	0.025	0.024	0.022	0.027	0.026	0.025	0.025	0.029
Phosphate: Total as P	mg/l				58	0.02	0.0442	0.0282	0.0281	0.0344	0.0277	0.0349	0.0245	0.0267	0.0273	0.0234	0.0328	0.0272	0.0261	0.0285	0.0262	0.0303
Block D OUT																						
pH	pH Units																					
Conductivity @ 20 deg.C	mS/cm																					
Orthophosphate, Filtered as P	mg/l				79	0.01	2.3	0.013	0.011	0.07	0.024	<0.01	0.017	0.058	0.05	0.033	0.022	1.11	0.024	0.297	0.035	0.029
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	79	0.018	0.878	<0.03	<0.03	0.078	<0.03	0.036	<0.03	0.031	<0.03	<0.03	<0.03	0.493	0.031	<0.03	<0.03	0.192
Nitrate as N	mg/l	11.3		11.3	79	3.57	12.2	5.53	5.45	4.51	5.61	5.25	5.33	6.63	6.85	<6.91	<7.08	8.08	4.64	5.62	4.91	5.89
Nitrite as N	mg/l	0.152		0.152	79	0.0043	0.451	0.0204	0.0126	0.0323	0.0142	0.0276	0.0269	0.036	0.0291	<0.004	<0.004	0.0616	0.0196	0.0377	0.0092	0.0473
Nitrogen: Total oxidised as N	mg/l				78	3.59	12.2	5.55	5.46	4.54	5.62	5.28	5.36	6.67	6.88	6.91	7.08	8.14	4.66	5.66	4.92	5.94
Solids, Suspended at 105°C	mg/l				78	2	67.5	26.4	6.63	30.6	<3	6.13	<3	<3	<3	<3	<3	6.9	<3	4.92	<3	<3
Zinc	ug/l		18.7	18.7	77	1.16	108	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Iron	ug/l	200	1000	200	79	5	601	100	<30	77.6	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30
Magnesium	mg/l				77	1.34	3.73	1.6	1.48	1.64	1.69	1.51	1.54	1.56	1.55	1.57	1.55	3.73	1.34	2.17	1.63	1.69
Potassium	mg/l				77	0.114	32.7	0.46	0.601	0.754	0.128	0.114	0.268	0.977	1.12	0.974	1.07	17.3	0.695	3.85	<0.1	0.703
Phosphorus(tot. unfilt)	ug/l				21																	

							Sampling round	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16
							Date	30/04/2015	20/05/2015	17/06/2015	15/07/2015	19/08/2015	10/09/2015	18/11/2015	08/12/2015	20/01/2016	11/02/2016	09/03/2016	13/04/2016	18/05/2016	22/06/2016	20/07/2016
Analyte	**Units**	**DWS**	**EQS**	**EAL**	**Count**	**Min conc**	**Max conc**															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	58	0.01	1.03	<0.01	<0.01	0.064	0.029	<0.01	0.019	0.06	0.052	0.033	0.021	0.939	0.033	0.313	0.036	0.055
Phosphate: Total as P	mg/l				58	0.02	1.88	0.203	0.0401	0.143	0.0341	<0.02	0.0258	0.104	0.0585	0.0346	0.0308	1.09	0.0741	0.402	0.0436	0.0783
Block E IN																						
Orthophosphate, Filtered as P	mg/l				14	0.024	0.066															
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	14	0	0															
Nitrate as N	mg/l	11.3		11.3	14	6.6	7.03															
Nitrite as N	mg/l	0.152		0.152	14	0.0053	0.015															
Nitrogen: Total oxidised as N	mg/l				14	6.6	7.2															
Solids, Suspended at 105°C	mg/l				14	3.1	9.7															
Zinc	ug/l		18.7	18.7	14	5.07	5.07															
Iron	ug/l	200	1000	200	14	33	140															
Magnesium	mg/l				14	1.5	1.94															
Potassium	mg/l				14	1	1.96															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	14	0.013	0.042															
Phosphate: Total as P	mg/l				14	0.024	0.06															
Block E OUT																						
Orthophosphate, Filtered as P	mg/l				14	0.012	0.44															
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	14	0.032	0.35															
Nitrate as N	mg/l	11.3		11.3	14	4.5	8.49															
Nitrite as N	mg/l	0.152		0.152	14	0.0047	0.065															
Nitrogen: Total oxidised as N	mg/l				14	4.5	8.5															
Solids, Suspended at 105°C	mg/l				14	3.3	20															
Zinc	ug/l		18.7	18.7	14	5.7	13															
Iron	ug/l	200	1000	200	14	45	91															
Magnesium	mg/l				14	1.5	1.71															
Potassium	mg/l				14	0.69	2.93															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	14	0.026	0.464															
Phosphate: Total as P	mg/l				14	0.0252	0.488															
Block R IN																						
Orthophosphate, Filtered as P	mg/l				12	0.03	0.041															
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	12	0.65	0.65															
Nitrate as N	mg/l	11.3		11.3	12	6.4	6.9															
Nitrite as N	mg/l	0.152		0.152	12	0.32	0.32															
Nitrogen: Total oxidised as N	mg/l				12	6.3	7.3															
Solids, Suspended at 105°C	mg/l				12	3	3.3															
Zinc	ug/l		18.7	18.7	12	5	5															
Iron	ug/l	200	1000	200	12	30	30															
Magnesium	mg/l				12	1.5	1.61															
Potassium	mg/l				12	1.1	1.5															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	12	0.032	0.13															
Phosphate: Total as P	mg/l				12	0.031	0.18															
Block R OUT																						
Orthophosphate, Filtered as P	mg/l				12	0.011	0.655															
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	12	0.036	0.7															
Nitrate as N	mg/l	11.3		11.3	12	4	6.9															
Nitrite as N	mg/l	0.152		0.152	12	0.005	0.092															
Nitrogen: Total oxidised as N	mg/l				12	4.1	6.9															
Solids, Suspended at 105°C	mg/l				12	4.4	24															
Zinc	ug/l		18.7	18.7	12	6.2	6.2															
Iron	ug/l	200	1000	200	12	30	50															
Magnesium	mg/l				12	1.37	2.2															
Potassium	mg/l				12	0.102	11															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	12	0.011	0.656															
Phosphate: Total as P	mg/l				12	0.02	0.696															

Shading denotes exceedance of EAL

							Sampling round	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17
							Date	15/08/2016	15/09/2016	15/10/2016	15/11/2016	15/12/2016	12/01/2017	08/02/2017	15/03/2017	05/04/2017	25/05/2017	22/06/2017	19/07/2017	16/08/2017	27/09/2017	18/10/2017
Analyte	**Units**	**DWS**	**EQS**	**EAL**	**Count**	**Min conc**	**Max conc**															
Block B IN																						
pH	pH Units																					
Conductivity @ 20 deg.C	mS/cm																					
Orthophosphate, Filtered as P	mg/l				76	0.013	0.061	0.041	0.053	0.051	0.019	0.021	0.024	0.023	0.05	0.026	0.046	0.034	0.034	0.035	0.035	0.025
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	77	0.029	1.2	0.035	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Nitrate as N	mg/l	11.3		11.3	77	6	7.383871	6.47	<6.56	<6.65	<7.29	<6.88	<6.81	<6.81	<7.3	<6.66	6.89	<6.84	<6.6	<6.75	<6.73	<6.4
Nitrite as N	mg/l	0.152		0.152	77	0.0029	0.076	0.0183	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.0428	0.0721	<0.004	<0.004	<0.004	<0.004
Nitrogen: Total oxidised as N	mg/l				76	6	8.2	6.49	6.56	6.65	7.29	6.88	6.81	6.81	7.3	6.66	6.93	6.91	6.6	6.75	6.73	6.4
Solids, Suspended at 105°C	mg/l				76	2.95	33	<3	3.1	4.27	<3	<3	<3	<3	17.8	<3	4.53	7.97	<3	4.52	4.3	<3
Zinc	ug/l		18.7	18.7	75	1.88	8.6	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Iron	ug/l	200	1000	200	77	6	173	92.5	118	144	<30	<30	<30	<30	65.6	<30	33.5	138	<30	74.1	61.7	<30
Magnesium	mg/l				75	1.5	1.97	1.67	1.77	1.8	1.62	1.55	1.52	1.6	1.77	1.58	1.61	1.71	1.67	1.63	1.62	1.6
Potassium	mg/l				75	0.748	2.33	1.59	1.94	1.45	0.912	0.825	0.899	1.04	1.69	1.01	1.46	1.77	1.05	1.28	1.37	0.953
Phosphorus(tot. unfilt)	ug/l				21	45	1400															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	56	0.013	0.06	<0.01	0.052	0.047	0.015	0.018	0.023	0.023	0.045	0.025	0.036	0.031	0.031	0.032	0.033	0.021
Phosphate: Total as P	mg/l				56	0.0201	0.089	0.0609	0.059	0.0565	<0.02	<0.02	0.0257	0.0291	0.0753	0.0288	0.0469	0.0612	0.029	0.0393	0.044	0.0281
Block B OUT																						
pH	pH Units																					
Conductivity @ 20 deg.C	mS/cm																					
Orthophosphate, Filtered as P	mg/l				76	0.01	1.3	0.034	0.057	0.058	0.071	0.088	0.042	0.034	0.031	0.032	0.646	0.191	0.052	0.066	0.118	0.087
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	77	0.019	1.4	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.57	0.07	<0.03	<0.03	<0.03	<0.03
Nitrate as N	mg/l	11.3		11.3	77	0.81	10.70323	5.95	6.07	6.44	6.8	7.33	6.82	7.74	6.96	<6.17	5.4	5.49	5.12	5.48	5.65	6.01
Nitrite as N	mg/l	0.152		0.152	77	0.0042	0.2	0.0199	0.0262	0.0247	0.0153	0.0337	0.0098	0.0044	0.0042	<0.004	0.0553	0.0935	0.0177	0.0178	0.0137	0.033
Nitrogen: Total oxidised as N	mg/l				76	0.83	10.8	5.97	6.1	6.46	6.82	7.36	6.83	7.74	6.96	6.17	5.46	5.58	5.14	5.5	5.66	6.04
Solids, Suspended at 105°C	mg/l				76	2.2	92	3.42	<3	<3	<3	<3	<3	<3	<3	6.1	3.88	9.22	<3	6.47	4.5	<3
Zinc	ug/l		18.7	18.7	75	1.4	20.5	<5	<5	<5	<5	<5	<5	<5	<5	<5	20.5	<5	<5	<5	<5	<5
Iron	ug/l	200	1000	200	77	7	210	36.8	94.6	<30	<30	<30	<30	<30	<30	48.2	99	35.2	<30	52.8	52.9	<30
Magnesium	mg/l				75	1.2	6.1	1.63	1.66	1.69	1.57	1.56	1.51	1.57	1.59	1.58	2.02	1.81	1.7	1.56	1.58	1.66
Potassium	mg/l				75	0.14	79.2	0.97	1.02	1.24	1.57	1.29	0.843	1.16	1.03	1.15	79.2	2.03	0.877	0.947	0.697	1.33
Phosphorus(tot. unfilt)	ug/l				21																	
Orthophosphate, Reactive as P	mg/l		0.045	0.045	56	0.016	0.95	0.036	0.056	0.053	0.066	0.088	0.043	0.034	0.027	0.029	0.059	0.193	0.049	0.068	0.125	0.089
Phosphate: Total as P	mg/l				56	0.0239	0.97	0.092	0.0685	0.0645	0.0784	0.0996	0.0471	0.0474	0.0367	0.0525	0.0829	0.253	0.053	0.109	0.143	0.098
Block D IN																						
pH	pH Units																					
Conductivity @ 20 deg.C	mS/cm																					
Orthophosphate, Filtered as P	mg/l				78	0.017	0.128	0.024	0.027	0.026	0.052	0.023	0.017	0.025	0.024	0.025	0.028	0.028	0.128	0.028	0.024	0.023
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	79	0.03	0.2	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Nitrate as N	mg/l	11.3		11.3	79	5.67	7.49	<6.58	<6.56	<6.67	<6.62	<6.69	<7.25	<7.15	<7.1	<6.73	<6.96	<7.15	<6.52	<6.97	<6.63	<6.16
Nitrite as N	mg/l	0.152		0.152	79	0.0013	0.022217	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.0045
Nitrogen: Total oxidised as N	mg/l				78	5.7	7.51	6.58	6.56	6.67	6.62	6.69	7.25	7.15	7.1	6.73	6.96	7.15	6.52	6.97	6.63	6.16
Solids, Suspended at 105°C	mg/l				78	3.9	6	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Zinc	ug/l		18.7	18.7	77	1.16	9.9	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Iron	ug/l	200	1000	200	79	4	50	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30
Magnesium	mg/l				77	1.44	1.8	1.55	1.56	1.57	1.58	1.51	1.57	1.52	1.6	1.61	1.52	1.57	1.67	1.58	1.61	1.61
Potassium	mg/l				77	0.736	1.2	0.946	0.947	0.936	0.946	0.941	0.778	0.932	0.953	0.979	0.961	0.951	0.984	0.919	0.953	0.976
Phosphorus(tot. unfilt)	ug/l				21																	
Orthophosphate, Reactive as P	mg/l		0.045	0.045	58	0.018	0.037	0.026	0.026	0.022	0.022	0.026	0.018	0.026	0.023	0.024	0.024	0.025	0.021	0.027	0.023	0.018
Phosphate: Total as P	mg/l				58	0.02	0.0442	0.0282	0.0274	0.0272	0.0252	0.0246	0.02	0.0337	0.0248	0.0259	0.0254	0.03	0.0253	0.0284	0.0272	0.0254
Block D OUT																						
pH	pH Units																					
Conductivity @ 20 deg.C	mS/cm																					
Orthophosphate, Filtered as P	mg/l				79	0.01	2.3	<0.01	0.142	0.044	0.024	0.066	0.049	0.027	0.151	1.01	0.062	0.106	0.036	0.088	0.034	0.04
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	79	0.018	0.878	<0.03	<0.03	0.032	<0.03	0.03	<0.03	<0.03	0.311	0.283	0.455	0.057	<0.03	0.3	0.051	<0.03
Nitrate as N	mg/l	11.3		11.3	79	3.57	12.2	5.37	5.88	6.24	6.47	6.66	6.81	6.62	12.2	10.7	5.54	3.57	4.96	5.98	6.42	6.31
Nitrite as N	mg/l	0.152		0.152	79	0.0043	0.451	0.0355	0.0285	0.028	0.0123	0.02	0.0072	0.0043	0.0391	0.022	0.0685	0.0207	0.0263	0.07	0.0454	0.451
Nitrogen: Total oxidised as N	mg/l				78	3.59	12.2	5.41	5.91	6.27	6.48	6.68	6.82	6.62	12.2	10.7	5.61	3.59	4.99	6.05	6.47	6.36
Solids, Suspended at 105°C	mg/l				78	2	67.5	<3	<3	<3	<3	<3	<3	<3	3.1	4	16.3	18.8	<3	10.8	3.15	3.57
Zinc	ug/l		18.7	18.7	77	1.16	108	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	7.59	<5	<5
Iron	ug/l	200	1000	200	79	5	601	<30	311	<30	<30	<30	<30	<30	<30	<30	<30	34.7	<30	<30	<30	<30
Magnesium	mg/l				77	1.34	3.73	1.54	2.04	1.66	1.57	1.5	1.48	1.48	1.91	1.98	1.49	1.53	1.72	1.74	1.55	1.63
Potassium	mg/l				77	0.114	32.7	0.233	1.67	0.586	0.92	1.06	1.07	1.04	5.77	5.78	1.65	1.32	0.596	3.49	1.01	1.44
Phosphorus(tot. unfilt)	ug/l				21																	

Table 1: Vitacress Monthly Water Quality Data

firth consultants

							Sampling round	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17
							Date	15/08/2016	15/09/2016	15/10/2016	15/11/2016	15/12/2016	12/01/2017	08/02/2017	15/03/2017	05/04/2017	25/05/2017	22/06/2017	19/07/2017	16/08/2017	27/09/2017	18/10/2017
Analyte	**Units**	**DWS**	**EQS**	**EAL**	**Count**	**Min conc**	**Max conc**															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	58	0.01	1.03	0.013	0.155	0.046	0.04	0.068	0.048	0.028	0.15	1.03	0.791	0.106	0.035	0.01	0.034	0.038
Phosphate: Total as P	mg/l				58	0.02	1.88	0.0212	0.172	0.0542	0.0472	0.0726	0.0558	0.0396	0.168	1.08	1.88	0.159	0.0413	0.0867	0.0513	0.0724
Block E IN																						
Orthophosphate, Filtered as P	mg/l				14	0.024	0.066															
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	14	0	0															
Nitrate as N	mg/l	11.3		11.3	14	6.6	7.03															
Nitrite as N	mg/l	0.152		0.152	14	0.0053	0.015															
Nitrogen: Total oxidised as N	mg/l				14	6.6	7.2															
Solids, Suspended at 105°C	mg/l				14	3.1	9.7															
Zinc	ug/l		18.7	18.7	14	5.07	5.07															
Iron	ug/l	200	1000	200	14	33	140															
Magnesium	mg/l				14	1.5	1.94															
Potassium	mg/l				14	1	1.96															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	14	0.013	0.042															
Phosphate: Total as P	mg/l				14	0.024	0.06															
Block E OUT																						
Orthophosphate, Filtered as P	mg/l				14	0.012	0.44															
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	14	0.032	0.35															
Nitrate as N	mg/l	11.3		11.3	14	4.5	8.49															
Nitrite as N	mg/l	0.152		0.152	14	0.0047	0.065															
Nitrogen: Total oxidised as N	mg/l				14	4.5	8.5															
Solids, Suspended at 105°C	mg/l				14	3.3	20															
Zinc	ug/l		18.7	18.7	14	5.7	13															
Iron	ug/l	200	1000	200	14	45	91															
Magnesium	mg/l				14	1.5	1.71															
Potassium	mg/l				14	0.69	2.93															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	14	0.026	0.464															
Phosphate: Total as P	mg/l				14	0.0252	0.488															
Block R IN																						
Orthophosphate, Filtered as P	mg/l				12	0.03	0.041															
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	12	0.65	0.65															
Nitrate as N	mg/l	11.3		11.3	12	6.4	6.9															
Nitrite as N	mg/l	0.152		0.152	12	0.32	0.32															
Nitrogen: Total oxidised as N	mg/l				12	6.3	7.3															
Solids, Suspended at 105°C	mg/l				12	3	3.3															
Zinc	ug/l		18.7	18.7	12	5	5															
Iron	ug/l	200	1000	200	12	30	30															
Magnesium	mg/l				12	1.5	1.61															
Potassium	mg/l				12	1.1	1.5															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	12	0.032	0.13															
Phosphate: Total as P	mg/l				12	0.031	0.18															
Block R OUT																						
Orthophosphate, Filtered as P	mg/l				12	0.011	0.655															
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	12	0.036	0.7															
Nitrate as N	mg/l	11.3		11.3	12	4	6.9															
Nitrite as N	mg/l	0.152		0.152	12	0.005	0.092															
Nitrogen: Total oxidised as N	mg/l				12	4.1	6.9															
Solids, Suspended at 105°C	mg/l				12	4.4	24															
Zinc	ug/l		18.7	18.7	12	6.2	6.2															
Iron	ug/l	200	1000	200	12	30	50															
Magnesium	mg/l				12	1.37	2.2															
Potassium	mg/l				12	0.102	11															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	12	0.011	0.656															
Phosphate: Total as P	mg/l				12	0.02	0.696															

Shading denotes exceedance of EAL

Table 1: Vitacress Monthly Water Quality Data

firth consultants

							Sampling round	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19
							Date	08/11/2017	06/12/2017	24/01/2018	14/02/2018	22/03/2018	04/04/2018	15/05/2018	26/06/2018	26/07/2018	21/08/2018	19/09/2018	17/10/2018	07/11/2018	12/12/2018	16/01/2019
Analyte	**Units**	**DWS**	**EQS**	**EAL**	**Count**	**Min conc**	**Max conc**															
Block B IN																						
pH	pH Units																					
Conductivity @ 20 deg.C	mS/cm																					
Orthophosphate, Filtered as P	mg/l				76	0.013	0.061	0.023	0.03	0.04	0.038	0.031	0.033	0.045	0.042	0.04	0.046	0.054	0.028	0.039	0.041	
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	77	0.029	1.2	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
Nitrate as N	mg/l	11.3		11.3	77	6	7.383871	<6.69	<6.77	<7.13	<6.91	<7.08	<7.25	6.72	<6.75	<6.65	<6.61	<6.64	<6.91	<6.76	<6.88	
Nitrite as N	mg/l	0.152		0.152	77	0.0029	0.076	<0.004	<0.004	<0.004	<0.004	0.0049	<0.004	0.0059	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	
Nitrogen: Total oxidised as N	mg/l				76	6	8.2	6.69	6.77	7.13	6.91	7.08	7.25	6.73	6.75	6.65	6.61	6.64	6.91	6.76	6.88	
Solids, Suspended at 105°C	mg/l				76	2.95	33	<3	4.08	4.15	3.67	5.6	<3	7.62	4.73	4.87	9.33	6.98	<3	4.6	7.38	
Zinc	ug/l		18.7	18.7	75	1.88	8.6	<5	<5	<5	<5	3	<5	<5	<5	<5	<5	<5	<5	<5	<5	
Iron	ug/l	200	1000	200	77	6	173	<30	49.5	47.4	<30	41.3	45	173	67.4	78.6	148	62.2	<30	113	104	
Magnesium	mg/l				75	1.5	1.97	1.63	1.64	1.68	1.62	1.61	(1074)	1.97	1.63	1.62	1.7	1.65	1.54	1.7	1.68	
Potassium	mg/l				75	0.748	2.33	1.02	1.24	1.43	1.19	1.27	1.5	1.85	1.39	1.7	1.62	1.43	0.97	1.44	1.63	
Phosphorus(tot. unfilt)	ug/l				21	45	1400															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	56	0.013	0.06	0.025	0.032	0.039	0.036	0.031	0.029	0.043	0.041	0.06	0.043	0.049	0.027	0.033	0.034	
Phosphate: Total as P	mg/l				56	0.0201	0.089	0.0309	0.0361	0.0486	0.0437	0.0517	0.0461	0.0677	0.0482	0.0728	0.051	0.056	0.0378	0.0504	0.0743	
Block B OUT																						
pH	pH Units																					
Conductivity @ 20 deg.C	mS/cm																					
Orthophosphate, Filtered as P	mg/l				76	0.01	1.3	0.066	0.063	0.073	0.034	0.03	0.232	0.394	0.141	0.077	0.038	0.031	0.053	0.072	0.049	
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	77	0.019	1.4	<0.03	<0.03	<0.03	<0.03	<0.03	0.162	0.526	0.554	0.077	0.03	0.03	0.043	0.03	0.03	
Nitrate as N	mg/l	11.3		11.3	77	0.81	10.70323	5.83	6.62	6.99	5.87	5.87	8.37	7.16	1.37	4.16	5.33	5.86	6.52	5.8	6.76	
Nitrite as N	mg/l	0.152		0.152	77	0.0042	0.2	0.0151	0.0239	0.0106	<0.004	0.0044	0.0112	0.0709	0.192	0.0697	0.0075	0.0283	0.0466	0.0457	0.0156	
Nitrogen: Total oxidised as N	mg/l				76	0.83	10.8	5.85	6.64	7	5.87	5.87	8.38	7.23	1.56	4.23	5.34	5.89	6.57	5.85	6.78	
Solids, Suspended at 105°C	mg/l				76	2.2	92	3.95	<3	3.4	4.27	<3	3.97	10.3	6.33	6.07	<3	<3	6.3	<3	<3	
Zinc	ug/l		18.7	18.7	75	1.4	20.5	<5	<5	<5	<5	<5	<5	<5	5.18	<5	<5	<5	<5	<5	<5	
Iron	ug/l	200	1000	200	77	7	210	<30	<30	<30	37.4	<30	<30	97.7	<30	<30	<30	<30	64.3	<30	<30	
Magnesium	mg/l				75	1.2	6.1	1.74	1.62	1.6	1.5	1.51	1.71	2.07	1.36	1.8	1.52	1.63	1.65	1.66	1.6	
Potassium	mg/l				75	0.14	79.2	0.924	1.38	1.36	1.25	1.15	3.11	4.09	3.51	1.1	0.851	0.927	1.12	1.36	1.18	
Phosphorus(tot. unfilt)	ug/l				21																	
Orthophosphate, Reactive as P	mg/l		0.045	0.045	56	0.016	0.95	0.067	0.065	0.072	0.036	0.029	0.232	0.424	0.157	0.084	0.037	0.029	0.054	0.066	0.048	
Phosphate: Total as P	mg/l				56	0.0239	0.97	0.0785	0.071	0.082	0.0444	0.04	0.267	0.581	0.209	0.113	0.0563	0.0376	0.0735	0.091	0.053	
Block D IN																						
pH	pH Units																					
Conductivity @ 20 deg.C	mS/cm																					
Orthophosphate, Filtered as P	mg/l				78	0.017	0.128	0.027	0.021	0.024	0.027	0.027	0.019	0.025	0.027	0.036	0.026	0.026	0.025	0.021	0.024	0.026
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	79	0.03	0.2	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Nitrate as N	mg/l	11.3		11.3	79	5.67	7.49	<6.43	<6.56	<6.99	<7.1	<7.15	<7.28	<6.56	<6.66	<6.71	<6.5	<6.72	<6.54	<6.42	<6.66	<6.81
Nitrite as N	mg/l	0.152		0.152	79	0.0013	0.022217	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Nitrogen: Total oxidised as N	mg/l				78	5.7	7.51	6.43	6.56	6.99	7.1	7.15	7.28	6.56	6.66	6.71	6.5	6.72	6.54	6.42	6.66	6.81
Solids, Suspended at 105°C	mg/l				78	3.9	6	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Zinc	ug/l		18.7	18.7	77	1.16	9.9	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Iron	ug/l	200	1000	200	79	4	50	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30
Magnesium	mg/l				77	1.44	1.8	1.73	1.62	1.58	1.59	1.49	1.54	1.57	1.53	1.53	1.57	1.58	1.55	1.59	1.56	1.52
Potassium	mg/l				77	0.736	1.2	1.11	1.05	1.01	1.01	0.974	0.975	0.998	0.986	0.993	0.972	0.929	0.979	0.942	0.955	0.959
Phosphorus(tot. unfilt)	ug/l				21																	
Orthophosphate, Reactive as P	mg/l		0.045	0.045	58	0.018	0.037	0.023	0.023	0.023	0.023	0.023	0.019	0.023	0.027	0.029	0.025	0.023	0.024	0.024	0.022	0.026
Phosphate: Total as P	mg/l				58	0.02	0.0442	0.026	0.026	0.0267	0.0252	0.0308	0.0285	0.0263	0.0273	0.0259	0.0263	0.0249	0.0313	0.0269	0.0442	0.0248
Block D OUT																						
pH	pH Units																					
Conductivity @ 20 deg.C	mS/cm																					
Orthophosphate, Filtered as P	mg/l				79	0.01	2.3	0.04	0.028	0.052	0.031	0.031	0.036	0.214	0.039	0.012	0.028	0.028	0.013	0.024	0.039	0.035
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	79	0.018	0.878	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.044	0.036	0.038	<0.03	<0.03	<0.03
Nitrate as N	mg/l	11.3		11.3	79	3.57	12.2	5.82	6.6	7.05	6.32	6.43	6.7	5.42	4.9	5.09	4.84	5.2	6.6	6.44	6.66	6.54
Nitrite as N	mg/l	0.152		0.152	79	0.0043	0.451	0.0318	0.0099	0.0148	0.0052	0.0072	0.0086	0.0211	0.014	0.0172	0.076	0.0135	0.0312	0.0377	0.0153	0.009
Nitrogen: Total oxidised as N	mg/l				78	3.59	12.2	5.85	6.61	7.06	6.33	6.44	6.71	5.44	4.91	5.11	4.92	5.21	6.63	6.48	6.68	6.55
Solids, Suspended at 105°C	mg/l				78	2	67.5	<3	<3	<3	4.57	<3	<3	6.02	<3	<3	<3	<3	<3	<3	<3	<3
Zinc	ug/l		18.7	18.7	77	1.16	108	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Iron	ug/l	200	1000	200	79	5	601	<30	<30	<30	<30	<30	32.1	<30	<30	<30	<30	<30	601	<30	<30	<30
Magnesium	mg/l				77	1.34	3.73	1.92	1.58	1.62	1.55	1.44	1.54	1.59	1.52	1.51	1.54	1.56	1.76	1.56	1.55	1.52
Potassium	mg/l				77	0.114	32.7	1.13	0.944	1.14	1.19	1.17	1.41	0.729	0.645	0.398	0.906	1.28	0.904	1	1.01	0.911
Phosphorus(tot. unfilt)	ug/l				21																	

Table 1: Vitacress Monthly Water Quality Data

							Sampling round	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19
							Date	08/11/2017	06/12/2017	24/01/2018	14/02/2018	22/03/2018	04/04/2018	15/05/2018	26/06/2018	26/07/2018	21/08/2018	19/09/2018	17/10/2018	07/11/2018	12/12/2018	16/01/2019
Analyte	**Units**	**DWS**	**EQS**	**EAL**	**Count**	**Min conc**	**Max conc**															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	58	0.01	1.03	0.04	0.032	0.05	0.03	0.03	0.036	0.212	0.04	0.017	0.027	0.026	0.015	0.031	0.037	0.046
Phosphate: Total as P	mg/l				58	0.02	1.88	0.0507	0.0388	0.0569	0.0388	0.0451	0.0641	0.238	0.0616	0.0248	0.0415	0.0357	0.029	0.0347	0.0739	0.0379
Block E IN																						
Orthophosphate, Filtered as P	mg/l				14	0.024	0.066															0.044
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	14	0	0															<0.03
Nitrate as N	mg/l	11.3		11.3	14	6.6	7.03															6.63
Nitrite as N	mg/l	0.152		0.152	14	0.0053	0.015															0.0055
Nitrogen: Total oxidised as N	mg/l				14	6.6	7.2															6.64
Solids, Suspended at 105°C	mg/l				14	3.1	9.7															<3
Zinc	ug/l		18.7	18.7	14	5.07	5.07															<5
Iron	ug/l	200	1000	200	14	33	140															35.5
Magnesium	mg/l				14	1.5	1.94															1.62
Potassium	mg/l				14	1	1.96															1.46
Orthophosphate, Reactive as P	mg/l		0.045	0.045	14	0.013	0.042															0.04
Phosphate: Total as P	mg/l				14	0.024	0.06															0.0466
Block E OUT																						
Orthophosphate, Filtered as P	mg/l				14	0.012	0.44															0.053
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	14	0.032	0.35															<0.03
Nitrate as N	mg/l	11.3		11.3	14	4.5	8.49															6.63
Nitrite as N	mg/l	0.152		0.152	14	0.0047	0.065															0.0087
Nitrogen: Total oxidised as N	mg/l				14	4.5	8.5															6.64
Solids, Suspended at 105°C	mg/l				14	3.3	20															<3
Zinc	ug/l		18.7	18.7	14	5.7	13															<5
Iron	ug/l	200	1000	200	14	45	91															<30
Magnesium	mg/l				14	1.5	1.71															1.54
Potassium	mg/l				14	0.69	2.93															1.17
Orthophosphate, Reactive as P	mg/l		0.045	0.045	14	0.026	0.464															0.055
Phosphate: Total as P	mg/l				14	0.0252	0.488															0.0673
Block R IN																						
Orthophosphate, Filtered as P	mg/l				12	0.03	0.041															
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	12	0.65	0.65															
Nitrate as N	mg/l	11.3		11.3	12	6.4	6.9															
Nitrite as N	mg/l	0.152		0.152	12	0.32	0.32															
Nitrogen: Total oxidised as N	mg/l				12	6.3	7.3															
Solids, Suspended at 105°C	mg/l				12	3	3.3															
Zinc	ug/l		18.7	18.7	12	5	5															
Iron	ug/l	200	1000	200	12	30	30															
Magnesium	mg/l				12	1.5	1.61															
Potassium	mg/l				12	1.1	1.5															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	12	0.032	0.13															
Phosphate: Total as P	mg/l				12	0.031	0.18															
Block R OUT																						
Orthophosphate, Filtered as P	mg/l				12	0.011	0.655															
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	12	0.036	0.7															
Nitrate as N	mg/l	11.3		11.3	12	4	6.9															
Nitrite as N	mg/l	0.152		0.152	12	0.005	0.092															
Nitrogen: Total oxidised as N	mg/l				12	4.1	6.9															
Solids, Suspended at 105°C	mg/l				12	4.4	24															
Zinc	ug/l		18.7	18.7	12	6.2	6.2															
Iron	ug/l	200	1000	200	12	30	50															
Magnesium	mg/l				12	1.37	2.2															
Potassium	mg/l				12	0.102	11															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	12	0.011	0.656															
Phosphate: Total as P	mg/l				12	0.02	0.696															

Shading denotes exceedance of EAL

Table 1: Vitacress Monthly Water Quality Data

							Sampling round	Feb-19	Mar-19	Apr-19	May-19	Jun-18	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Jan-21	Feb-21
							Date	20/02/2019	27/03/2019	24/04/2019	29/05/2019	26/06/2019	31/07/2019	21/08/2019	11/09/2019	09/10/2019	20/11/2019	11/12/2019	30/01/2020	12/02/2020	05/02/2021	24/02/2021
Analyte	**Units**	**DWS**	**EQS**	**EAL**	**Count**	**Min conc**	**Max conc**															
Block B IN																						
pH	pH Units																					8.06
Conductivity @ 20 deg.C	mS/cm																					0.471
Orthophosphate, Filtered as P	mg/l				76	0.013	0.061		0.061	0.049	0.021	0.046	0.013	0.035	0.018	0.049	0.023	0.018	0.016	0.023	0.0395	0.0369
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	77	0.029	1.2		<0.0300	<0.0300	<0.0300	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.2	<0.2
Nitrate as N	mg/l	11.3		11.3	77	6	7.383871		6.92	7.06	<7.13	<6.9	<7.0	7	<6.7	6.9	<6.7	<6.8	<8.1	<8.2	6.62	7.38
Nitrite as N	mg/l	0.152		0.152	77	0.0029	0.076		0.0123	0.008	<0.00400	<0.0040	<0.0040	0.0055	<0.0040	0.025	<0.0040	<0.0040	<0.0040	<0.0040	<0.015	<0.015
Nitrogen: Total oxidised as N	mg/l				76	6	8.2		6.93	7.07	7.13	6.9	7	7	6.7	6.9	6.7	6.8	8.1	8.2	6.64	7.4
Solids, Suspended at 105°C	mg/l				76	2.95	33		6.55	7.85	<3	33	<3	7.9	<3	11	<3	<3	<3	<3	2.95	5.15
Zinc	ug/l		18.7	18.7	75	1.88	8.6		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	2.43	2.62
Iron	ug/l	200	1000	200	77	6	173		65.2	37.5	30.5	<30	<30	80	<30	150	<30	<30	<30	<30	<19	<19
Magnesium	mg/l				75	1.5	1.97		1.88	1.68	1.58	1.5	1.5	1.6	1.5	1.7	1.6	1.6	1.6	1.6	1.56	1.63
Potassium	mg/l				75	0.748	2.33		1.81	1.68	1.04	0.91	1	1.5	0.89	1.8	0.95	0.89	0.92	0.93	1.43	1.5
Phosphorus(tot. unfilt)	ug/l				21	45	1400														70.4	81.3
Orthophosphate, Reactive as P	mg/l		0.045	0.045	56	0.013	0.06		0.026	0.025	0.021	0.021	0.022	0.035	0.019	0.032	0.018	0.017	0.021	0.015		
Phosphate: Total as P	mg/l				56	0.0201	0.089		0.0613	0.0507	0.0248	0.089	0.021	0.042	<0.020	0.057	0.021	<0.020	0.021	<0.02		
Block B OUT																						
pH	pH Units																					8.75
Conductivity @ 20 deg.C	mS/cm																					0.419
Orthophosphate, Filtered as P	mg/l				76	0.01	1.3		0.028	0.01	0.039	0.054	0.041	0.016	0.92	0.026	0.036	0.045	0.038	0.025	0.161	0.091
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	77	0.019	1.4		<0.0300	<0.0300	0.033	0.078	0.031	<0.030	1.2	0.03	<0.030	<0.030	<0.030	<0.030	<0.2	<0.2
Nitrate as N	mg/l	11.3		11.3	77	0.81	10.70323		6.01	5.56	5.05	5.6	5.2	5.5	6.9	5.6	6.5	6.6	7.7	8	6.16	6.53
Nitrite as N	mg/l	0.152		0.152	77	0.0042	0.2		0.0091	0.0213	0.0156	0.11	0.019	0.015	0.017	0.08	0.021	0.021	0.008	0.0043	0.054	0.029
Nitrogen: Total oxidised as N	mg/l				76	0.83	10.8		6.02	5.58	5.07	5.7	5.2	5.5	6.9	5.7	6.5	6.6	7.7	8	6.22	6.57
Solids, Suspended at 105°C	mg/l				76	2.2	92		11.2	17.2	<3	5	3.9	18	<3	<3	<3	13	<3	<3	13.5	7.05
Zinc	ug/l		18.7	18.7	75	1.4	20.5		<5	<5	<5	<5	<5	7.2	<5	<5	<5	<5	<5	<5	4.04	1.71
Iron	ug/l	200	1000	200	77	7	210		42.6	<30	45.8	31	<30	100	<30	<30	<30	<30	<30	<30	<19	<19
Magnesium	mg/l				75	1.2	6.1		1.62	1.47	1.6	1.6	1.5	1.6	1.9	1.6	1.6	1.6	1.6	1.7	1.54	1.5
Potassium	mg/l				75	0.14	79.2		1.1	0.786	0.585	1.4	0.75	0.5	4.2	0.75	1.5	1.3	1.1	1.1	1.45	1.56
Phosphorus(tot. unfilt)	ug/l				21																284	229
Orthophosphate, Reactive as P	mg/l		0.045	0.045	56	0.016	0.95		0.024	<0.0100	0.037	0.06	0.041	0.018	0.95	0.03	0.034	0.043	0.042	0.023		
Phosphate: Total as P	mg/l				56	0.0239	0.97		0.054	0.0239	0.0528	0.13	0.08	0.2	0.97	0.041	0.041	0.052	0.13	0.026		
Block D IN																						
pH	pH Units																					7.63
Conductivity @ 20 deg.C	mS/cm																					0.483
Orthophosphate, Filtered as P	mg/l				78	0.017	0.128	0.023	0.03	0.023	0.027	0.027	0.028	0.03	0.024	0.022	0.024	0.021	0.02	0.029	0.0323	0.0281
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	79	0.03	0.2	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.2	<0.2
Nitrate as N	mg/l	11.3		11.3	79	5.67	7.49	<7.1	<7.04	<6.85	<7.09	<6.7	<6.9	<7.1	<6.6	<6.6	<6.6	<6.8	<7.4	<7.2	6.77419355	7.4516129
Nitrite as N	mg/l	0.152		0.152	79	0.0013	0.022217	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.015	<0.015
Nitrogen: Total oxidised as N	mg/l				78	5.7	7.51	7.1	7.04	6.85	7.09	6.7	6.9	7.1	6.6	6.6	6.6	6.8	7.4	7.2	6.78	7.46
Solids, Suspended at 105°C	mg/l				78	3.9	6	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<2	<2
Zinc	ug/l		18.7	18.7	77	1.16	9.9	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	1.89
Iron	ug/l	200	1000	200	79	4	50	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<19	<19
Magnesium	mg/l				77	1.44	1.8	1.51	1.55	1.44	1.52	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.6	1.46	1.47
Potassium	mg/l				77	0.736	1.2	0.953	0.927	0.921	0.957	0.94	0.96	0.93	0.94	0.95	0.95	0.93	1	1	0.976	0.942
Phosphorus(tot. unfilt)	ug/l				21																38.2	42.1
Orthophosphate, Reactive as P	mg/l		0.045	0.045	58	0.018	0.037	0.025	0.031	0.024	0.025	0.026	0.026	0.028	0.026	0.02	0.023	0.024	0.031	0.028		
Phosphate: Total as P	mg/l				58	0.02	0.0442	0.0222	0.0267	0.0224	0.0286	0.029	0.028	0.029	0.024	0.027	0.025	<0.02	0.03	0.029		
Block D OUT																						
pH	pH Units																					8.09
Conductivity @ 20 deg.C	mS/cm																				0	0.487
Orthophosphate, Filtered as P	mg/l				79	0.01	2.3	0.558	0.48	0.11	0.024	0.095	0.012	0.02	0.01	0.017	0.033	0.03	0.048	0.037	0.0519	0.0959
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	79	0.018	0.878	0.369	0.853	0.47	0.055	<0.03	0.077	0.048	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.2	<0.2
Nitrate as N	mg/l	11.3		11.3	79	3.57	12.2	8.6	6.92	5.26	6.1	5.9	5.6	5.2	6	6.1	6.7	6.7	7.2	<6.8	5.78064516	7.04516129
Nitrite as N	mg/l	0.152		0.152	79	0.0043	0.451	0.0083	0.0088	0.0355	0.112	0.027	0.14	0.056	0.028	0.019	0.011	0.012	0.01	<0.004	<0.015	<0.015
Nitrogen: Total oxidised as N	mg/l				78	3.59	12.2	8.61	6.93	5.3	6.21	5.9	5.7	5.3	6	6.1	6.7	6.7	7.2	6.8	5.8	7.06
Solids, Suspended at 105°C	mg/l				78	2	67.5	<3	12.6	4.85	<3	<3	<3	<3	<3	<3	<3	6	<3	<3	67.5	2
Zinc	ug/l		18.7	18.7	77	1.16	108	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	1.39	3.23
Iron	ug/l	200	1000	200	79	5	601	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<19	<19
Magnesium	mg/l				77	1.34	3.73	1.66	2.02	2.01	1.55	1.5	1.5	1.5	1.5	1.5	1.6	1.5	1.6	1.6	1.34	1.94
Potassium	mg/l				77	0.114	32.7	3.05	8.28	32.7	1.14	0.69	1.1	0.36	0.29	0.6	1.3	1.1	1	1	0.972	2.7
Phosphorus(tot. unfilt)	ug/l				21																372	136

Table 1: Vitacress Monthly Water Quality Data

							Sampling round	Feb-19	Mar-19	Apr-19	May-19	Jun-18	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Jan-21	Feb-21
							Date	20/02/2019	27/03/2019	24/04/2019	29/05/2019	26/06/2019	31/07/2019	21/08/2019	11/09/2019	09/10/2019	20/11/2019	11/12/2019	30/01/2020	12/02/2020	05/02/2021	24/02/2021
Analyte	**Units**	**DWS**	**EQS**	**EAL**	**Count**	**Min conc**	**Max conc**															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	58	0.01	1.03	0.569	0.464	0.154	0.025	0.095	0.014	0.035	<0.01	0.016	0.031	0.031	0.054	0.035		
Phosphate: Total as P	mg/l				58	0.02	1.88	0.6	0.61	0.207	0.035	0.13	0.034	0.04	0.02	0.028	0.039	0.039	0.057	0.042		
Block E IN																						
Orthophosphate, Filtered as P	mg/l				14	0.024	0.066	0.041	0.066	0.046	0.042	0.041	0.03	0.03	0.034	0.041	0.026	0.026	0.024	0.038		
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	14	0	0	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03		
Nitrate as N	mg/l	11.3		11.3	14	6.6	7.03	6.88	6.98	7.03	6.95	7	6.9	6.9	6.6	6.8	6.8	<6.9	<7.2	<7		
Nitrite as N	mg/l	0.152		0.152	14	0.0053	0.015	0.006	0.0127	0.006	0.0054	0.0053	0.011	0.0079	0.013	0.011	0.015	<0.004	<0.004	<0.004		
Nitrogen: Total oxidised as N	mg/l				14	6.6	7.2	6.89	6.99	7.04	6.96	7	6.9	6.9	6.6	6.8	6.8	6.9	7.2	7		
Solids, Suspended at 105°C	mg/l				14	3.1	9.7	4.2	9.7	6.7	5.53	8.4	3.1	6.3	<3	<3	4.1	3.9	<3	<3		
Zinc	ug/l		18.7	18.7	14	5.07	5.07	<5	5.07	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		
Iron	ug/l	200	1000	200	14	33	140	44.8	83.4	39.9	55.7	57	33	35	61	140	<30	<30	<30	<30		
Magnesium	mg/l				14	1.5	1.94	1.67	1.94	1.75	1.6	1.5	1.6	1.6	1.6	1.7	1.6	1.6	1.6	1.6		
Potassium	mg/l				14	1	1.96	1.59	1.96	1.69	1.61	1.5	1.2	1.2	1.3	1.6	1.6	1.1	1	1.2		
Orthophosphate, Reactive as P	mg/l		0.045	0.045	14	0.013	0.042	0.029	0.027	0.027	0.038	0.042	0.026	0.034	0.032	0.013	0.026	0.025	0.025	0.027		
Phosphate: Total as P	mg/l				14	0.024	0.06	0.0372	0.0551	0.0584	0.06	0.054	0.031	0.037	0.033	0.029	0.035	0.024	0.026	0.027		
Block E OUT																						
Orthophosphate, Filtered as P	mg/l				14	0.012	0.44	0.44	0.012	0.013	0.3	0.048	0.048	0.037	0.037	0.053	0.039	0.044	0.034	0.035		
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	14	0.032	0.35	0.35	<0.03	<0.03	<0.03	0.046	0.032	<0.03	<0.03	0.24	<0.03	<0.03	<0.03	<0.03		
Nitrate as N	mg/l	11.3		11.3	14	4.5	8.49	8.49	5.45	4.55	5.37	5.5	4.5	5.4	5.7	5.7	6.4	6.6	<7.1	6.8		
Nitrite as N	mg/l	0.152		0.152	14	0.0047	0.065	0.0079	0.0058	0.0083	0.0143	0.041	0.02	0.018	0.019	0.065	0.014	0.014	<0.004	0.0047		
Nitrogen: Total oxidised as N	mg/l				14	4.5	8.5	8.5	5.46	4.56	5.38	5.5	4.5	5.4	5.7	5.8	6.4	6.6	7.1	6.8		
Solids, Suspended at 105°C	mg/l				14	3.3	20	<3	8.1	3.45	6.33	<3	<3	20	3.7	3.3	<3	<3	<3	3.5		
Zinc	ug/l		18.7	18.7	14	5.7	13	<5	<5	<5	<5	<5	<5	5.7	<5	<5	<5	<5	<5	13		
Iron	ug/l	200	1000	200	14	45	91	<30	<30	<30	73.4	<30	<30	91	45	<30	<30	<30	<30	<30		
Magnesium	mg/l				14	1.5	1.71	1.67	1.71	1.56	1.56	1.5	1.5	1.6	1.5	1.6	1.6	1.5	1.7	1.6		
Potassium	mg/l				14	0.69	2.93	2.93	1.13	0.742	0.746	0.84	1.3	0.69	0.92	1.2	1.2	1.1	1.7	1.1		
Orthophosphate, Reactive as P	mg/l		0.045	0.045	14	0.026	0.464	0.464	<0.01	<0.01	0.026	0.048	0.036	0.036	0.035	0.052	0.034	0.044	0.042	0.038		
Phosphate: Total as P	mg/l				14	0.0252	0.488	0.488	0.0301	0.0252	0.0859	0.059	0.044	0.19	0.039	0.093	0.095	0.051	0.064	0.039		
Block R IN																						
Orthophosphate, Filtered as P	mg/l				12	0.03	0.041		0.037	0.033	0.038	0.036	0.04	0.041	0.039	0.036	0.035	0.032	0.03	0.032		
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	12	0.65	0.65		<0.0300	<0.0300	<0.0300	0.65	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030		
Nitrate as N	mg/l	11.3		11.3	12	6.4	6.9		<7.07	<6.94	<6.92	6.4	<6.8	<6.3	<6.4	<6.7	<6.8	<6.9	<7.3	6.9		
Nitrite as N	mg/l	0.152		0.152	12	0.32	0.32		<0.00400	<0.00400	<0.00400	0.32	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040		
Nitrogen: Total oxidised as N	mg/l				12	6.3	7.3		7.07	6.94	6.92	6.7	6.8	6.3	6.4	6.7	6.8	6.9	7.3	6.9		
Solids, Suspended at 105°C	mg/l				12	3	3.3		<3	<3	<3	3.3	<3	<3	<3	<3	<3	NoResult	3	3		
Zinc	ug/l		18.7	18.7	12	5	5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	5	5		
Iron	ug/l	200	1000	200	12	30	30		<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	30	30		
Magnesium	mg/l				12	1.5	1.61		1.61	1.52	1.55	1.5	1.6	1.5	1.5	1.6	1.6	1.6	1.6	1.6		
Potassium	mg/l				12	1.1	1.5		1.22	1.16	1.23	1.2	1.1	1.2	1.2	1.1	1.1	1.5	1.2	1.2		
Orthophosphate, Reactive as P	mg/l		0.045	0.045	12	0.032	0.13		0.037	0.032	0.033	0.13	0.039	0.042	0.037	0.034	0.036	0.032	0.036	0.034		
Phosphate: Total as P	mg/l				12	0.031	0.18		0.0349	0.0346	0.0372	0.18	0.039	0.043	0.034	0.042	0.039	0.033	0.036	0.031		
Block R OUT																						
Orthophosphate, Filtered as P	mg/l				12	0.011	0.655		0.024	<0.0100	0.655	0.057	0.034	0.036	0.019	0.03	0.033	0.066	0.014	0.011		
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	12	0.036	0.7		<0.0300	<0.0300	0.7	<0.030	0.059	<0.030	0.036	0.044	<0.030	<0.030	<0.030	<0.030		
Nitrate as N	mg/l	11.3		11.3	12	4	6.9		4.52	4.76	6.49	<6.8	5.2	4	4.7	5.5	6.7	6.9	6.5	6.3		
Nitrite as N	mg/l	0.152		0.152	12	0.005	0.092		0.0125	0.005	0.0323	<0.0040	0.051	0.06	0.092	0.078	0.0065	0.0081	0.0053	0.0053		
Nitrogen: Total oxidised as N	mg/l				12	4.1	6.9		4.53	4.76	6.52	6.8	5.3	4.1	4.8	5.6	6.7	6.9	6.5	6.3		
Solids, Suspended at 105°C	mg/l				12	4.4	24		<3	<3	<3	<3	4.4	<3	<3	<3	<3	<3	24	4.4		
Zinc	ug/l		18.7	18.7	12	6.2	6.2		<5	<5	<5	6.2	<5	<5	<5	<5	<5	<5	<5	<5		
Iron	ug/l	200	1000	200	12	30	50		<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	50	30		
Magnesium	mg/l				12	1.37	2.2		1.37	1.4	2.2	1.8	1.4	1.5	1.5	1.6	1.6	1.6	1.6	1.6		
Potassium	mg/l				12	0.102	11		1.07	0.102	11	5.6	0.46	0.39	0.48	2.1	1	1.2	1.6	1.4		
Orthophosphate, Reactive as P	mg/l		0.045	0.045	12	0.011	0.656		0.023	<0.0100	0.656	0.034	0.048	0.038	0.017	0.026	0.033	0.064	0.011	0.011		
Phosphate: Total as P	mg/l				12	0.02	0.696		0.0318	<0.0200	0.696	0.036	0.085	0.048	0.024	0.046	0.037	0.074	0.068	0.02		

Shading denotes exceedance of EAL

Table 1: Vitacress Monthly Water Quality Data

							Sampling round	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Oct-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22
							Date	25/03/2021	22/04/2021	20/05/2021	24/06/2021	29/07/2021	25/08/2021	28/10/2021	27/01/2021	24/02/2022	28/03/2022	13/04/2022	15/05/2022	15/06/2022	15/07/2022	15/08/2022
Analyte	**Units**	**DWS**	**EQS**	**EAL**	**Count**	**Min conc**	**Max conc**															
Block B IN																						
pH	pH Units							8.05	8.08	8.08	8.08	7.8	7.82	7.69	7.98	8.25	7.8	7.9	8	7.8	8	7.9
Conductivity @ 20 deg.C	mS/cm							0.484	0.506	0.482	0.474	0.49	0.479	0.49	0.482	0.467	0.49	0.44	0.39	0.45	0.48	0.48
Orthophosphate, Filtered as P	mg/l				76	0.013	0.061	0.02	0.02	0.0271	0.02	0.02	0.0551	0.02		0.0379	0.043	<0.02	0.032	0.03	0.034	0.04
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	77	0.029	1.2	<0.2	<0.2	<0.2	<0.2	<0.2	1.2	<0.2	<0.2	<0.2	0.029	<0.015	<0.015	<0.015	<0.015	<0.015
Nitrate as N	mg/l	11.3		11.3	77	6	7.383871	7.11	6.86	6.86	6.66	6.75	6.89	6.91	6.59	6.93	7.22	7.11	6.73	6.2	6.61	6.35
Nitrite as N	mg/l	0.152		0.152	77	0.0029	0.076	<0.015	<0.015	<0.015	0.033	<0.015	<0.015	<0.015	<0.05	0.076	0.026	<0.001	0.0042	0.028	0.0029	0.0092
Nitrogen: Total oxidised as N	mg/l				76	6	8.2	7.13	6.87	6.87	6.7	6.78	6.9		6.6	6.95	7.2	7.1	6.7	6.2	6.6	6.4
Solids, Suspended at 105°C	mg/l				76	2.95	33	<2	4.6	4.9	5.15	<2	4.59		8.05	6.05	< 2.0	4	< 2.0	< 2.0	3	< 2.0
Zinc	ug/l		18.7	18.7	75	1.88	8.6	2.57	1.88	2.69	2.39	3.51	1.89	2.03			4.5	4.7	4.4	8.6	4.7	5.5
Iron	ug/l	200	1000	200	77	6	173	<19	<19	<19	<19	<19	<19	<19	<19	<19	16	26	23	46	21	12
Magnesium	mg/l				75	1.5	1.97	1.82	1.73	1.59	1.71	1.96	1.5	1.71			1.7	1.6	1.7	1.8	1.6	1.8
Potassium	mg/l				75	0.748	2.33	1.7	2.27	1.5	2.33	1.86	1.65	1.96			1.7	1.3	1.2	1.8	1.4	1.6
Phosphorus(tot. unfilt)	ug/l				21	45	1400	123	103	54.8	62.6	46.9	81.4	58.9	67.1	62.4	55	64	51	59	580	45
Orthophosphate, Reactive as P	mg/l		0.045	0.045	56	0.013	0.06															
Phosphate: Total as P	mg/l				56	0.0201	0.089															
Block B OUT																						
pH	pH Units							8.52	8.29	8.22	8.19	8.84	7.94	8.02	7.72	8.37	8.1	8	8.1	7.9	8.2	8.4
Conductivity @ 20 deg.C	mS/cm							0.456	0.41	0.424	0.442	0.47	0.467	0.471	0.47	0.424	0.45	0.43	0.47	0.4	0.42	0.25
Orthophosphate, Filtered as P	mg/l				76	0.01	1.3	<0.02	0.03	<0.02	<0.02	0.478	0.0281	0.048		0.02	<0.02	<0.02	0.033	<0.02	1.3	<0.02
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	77	0.019	1.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	0.2	0.032	<0.015	<0.015	0.03	1.4	0.028
Nitrate as N	mg/l	11.3		11.3	77	0.81	10.70323	6.53	4.92	4.90	4.90	10.70	2.73	4.81	6.63	6.68	6.62	6.88	6.27	5.83	3.79	0.81
Nitrite as N	mg/l	0.152		0.152	77	0.0042	0.2	0.024	0.040	<0.015	0.035	0.092	<0.015	0.037	0.089	<0.05	0.024	0.012	0.0083	0.02	0.12	0.015
Nitrogen: Total oxidised as N	mg/l				76	0.83	10.8	6.56	4.96	4.91	4.94	10.8	2.75		6.68	6.69	6.6	6.9	6.3	5.8	3.9	0.83
Solids, Suspended at 105°C	mg/l				76	2.2	92	<2	58.9	7.65	37	2.2	4		2.62	2.95	3	< 2.0	< 2.0	< 2.0	92	45
Zinc	ug/l		18.7	18.7	75	1.4	20.5	2.08	1.95	<1	1.87	2.39	<1	2.61			5	3.2	4.6	6.2	9.5	3
Iron	ug/l	200	1000	200	77	7	210	<19	<19	<19	<19	<19	42.8	<19	<19	<19	22	36	27	17	210	31
Magnesium	mg/l				75	1.2	6.1	1.75	2.28	1.62	1.69	2.78	1.65	1.65			1.7	1.6	1.7	1.8	6.1	1.2
Potassium	mg/l				75	0.14	79.2	1.25	5.83	0.652	0.895	9.01	0.256	0.382			1.6	1.4	1.2	1.3	19	0.15
Phosphorus(tot. unfilt)	ug/l				21			50.3	359	44.3	29.8	580	39.3	138	105	52.5	30	82	48	34	2600	150
Orthophosphate, Reactive as P	mg/l		0.045	0.045	56	0.016	0.95															
Phosphate: Total as P	mg/l				56	0.0239	0.97															
Block D IN																						
pH	pH Units							7.78	7.76	7.95	8.07	7.6	7.88	7.54	7.84	8.29	7.5	7.4	7.4	7.5	7.5	7.5
Conductivity @ 20 deg.C	mS/cm							0.491	0.496	0.491	0.47	0.498	0.438	0.475	0.462	0.475	0.49	0.44	0.5	0.4	0.47	0.47
Orthophosphate, Filtered as P	mg/l				78	0.017	0.128	0.0261	0.0245	0.0255	0.0287	0.02	0.0333	0.0206		0.02	<0.02	<0.02	0.04	0.022	0.023	0.025
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	79	0.03	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	0.2	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Nitrate as N	mg/l	11.3		11.3	79	5.67	7.49	7.18064516	6.79677419	6.93225806	6.93225806	6.70645161	5.82580645	6.97741935	6.77	7.07	7.23	7.12	6.82	6.51	6.55	6.56
Nitrite as N	mg/l	0.152		0.152	79	0.0013	0.022217	<0.015	<0.015	<0.015	<0.015	<0.015	0.022	<0.015	<0.05	<0.05	<0.001	<0.001	0.0013	<0.001	<0.001	<0.001
Nitrogen: Total oxidised as N	mg/l				78	5.7	7.51	7.19	6.8	6.94	6.94	6.71	5.85		6.78	7.08	7.2	7.1	6.8	6.5	6.6	6.6
Solids, Suspended at 105°C	mg/l				78	3.9	6	<2	<2	<2	<2	<2	<2		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Zinc	ug/l		18.7	18.7	77	1.16	9.9	1.64	<1	1.62	1.37	1.5	1.16	2.14			4.4	2.6	6.3	5.9	2.3	9.9
Iron	ug/l	200	1000	200	79	4	50	<19	<19	<19	<19	<19	<19	<19	<19	<19	13	5	49	16	7	17
Magnesium	mg/l				77	1.44	1.8	1.62	1.51	1.45	1.57	1.75	1.5	1.56			1.6	1.6	1.6	1.6	1.6	1.8
Potassium	mg/l				77	0.736	1.2	1.01	0.902	0.906	1	1.04	0.736	0.904			1	0.84	1	1.2	0.99	0.87
Phosphorus(tot. unfilt)	ug/l				21			43.2	47.5	38	44.9	47.1	50.8	30	46	31.7	39	40	41	34	77	33
Orthophosphate, Reactive as P	mg/l		0.045	0.045	58	0.018	0.037															
Phosphate: Total as P	mg/l				58	0.02	0.0442															
Block D OUT																						
pH	pH Units							8.05	8.44	8.3	8.25	8.02	7.88	7.93	8.33	8.36	7.9	7.8	7.9	7.9	7.7	8.1
Conductivity @ 20 deg.C	mS/cm							0.435	0.44	0.416	0.422	0.48	0.438	0.48	0.459	0.422	0.44	0.37	0.45	0.35	0.47	0.43
Orthophosphate, Filtered as P	mg/l				79	0.01	2.3	0.02	0.02	0.0512	0.0682	0.02	0.0333	0.0343	0.09	0.0424	<0.02	<0.02	0.047	0.071	<0.02	0.024
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	79	0.018	0.878	<0.2	0.878	<0.2	<0.2	0.2	0.2	0.2	0.2	0.2	<0.015	<0.015	0.018	0.075	0.036	0.14
Nitrate as N	mg/l	11.3		11.3	79	3.57	12.2	6.0516129	4.31290323	5.66774194	5.03548387	4.99032258	5.82580645	6.88709677	6.53	6.73	6.41	6.32	5.31	4.09	5.62	4.03
Nitrite as N	mg/l	0.152		0.152	79	0.0043	0.451	<0.015	0.033	0.017	0.066	0.016	0.022	0.034	<0.05	<0.05	0.0077	0.027	0.013	0.025	0.046	0.38
Nitrogen: Total oxidised as N	mg/l				78	3.59	12.2	6.06	4.35	5.69	5.12	5.01	5.85		6.54	6.73	6.4	6.4	5.3	4.1	5.7	4.4
Solids, Suspended at 105°C	mg/l				78	2	67.5	2	3.8	10.4	2.85	2	4.03		< 2.0	< 2.0	< 2.0	6	< 2.0	< 2.0	< 2.0	12
Zinc	ug/l		18.7	18.7	77	1.16	108	2.33	4.88	2.65	3.05	108	1.16	7.68			3	4.3	8.5	7.2	2.2	3.8
Iron	ug/l	200	1000	200	79	5	601	<19	19.1	<19	<19	<19	<19	<19	<19	<19	20	18	15	17	9	16
Magnesium	mg/l				77	1.34	3.73	1.53	1.52	1.67	2.17	1.77	1.5	1.53			1.5	1.5	1.6	1.6	1.6	1.8
Potassium	mg/l				77	0.114	32.7	0.898	1.31	1.03	1.58	0.309	0.736	0.889			1	0.9	0.57	1.6	0.58	0.98
Phosphorus(tot. unfilt)	ug/l				21			32.6	74.6	137	117	36	50.8	49.3	42.9	73.7	38	96	44	97	37	110

							Sampling round	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Oct-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22
							Date	25/03/2021	22/04/2021	20/05/2021	24/06/2021	29/07/2021	25/08/2021	28/10/2021	27/01/2021	24/02/2022	28/03/2022	13/04/2022	15/05/2022	15/06/2022	15/07/2022	15/08/2022
Analyte	**Units**	**DWS**	**EQS**	**EAL**	**Count**	**Min conc**	**Max conc**															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	58	0.01	1.03															
Phosphate: Total as P	mg/l				58	0.02	1.88															
Block E IN																						
Orthophosphate, Filtered as P	mg/l				14	0.024	0.066															
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	14	0	0															
Nitrate as N	mg/l	11.3		11.3	14	6.6	7.03															
Nitrite as N	mg/l	0.152		0.152	14	0.0053	0.015															
Nitrogen: Total oxidised as N	mg/l				14	6.6	7.2															
Solids, Suspended at 105°C	mg/l				14	3.1	9.7															
Zinc	ug/l		18.7	18.7	14	5.07	5.07															
Iron	ug/l	200	1000	200	14	33	140															
Magnesium	mg/l				14	1.5	1.94															
Potassium	mg/l				14	1	1.96															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	14	0.013	0.042															
Phosphate: Total as P	mg/l				14	0.024	0.06															
Block E OUT																						
Orthophosphate, Filtered as P	mg/l				14	0.012	0.44															
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	14	0.032	0.35															
Nitrate as N	mg/l	11.3		11.3	14	4.5	8.49															
Nitrite as N	mg/l	0.152		0.152	14	0.0047	0.065															
Nitrogen: Total oxidised as N	mg/l				14	4.5	8.5															
Solids, Suspended at 105°C	mg/l				14	3.3	20															
Zinc	ug/l		18.7	18.7	14	5.7	13															
Iron	ug/l	200	1000	200	14	45	91															
Magnesium	mg/l				14	1.5	1.71															
Potassium	mg/l				14	0.69	2.93															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	14	0.026	0.464															
Phosphate: Total as P	mg/l				14	0.0252	0.488															
Block R IN																						
Orthophosphate, Filtered as P	mg/l				12	0.03	0.041															
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	12	0.65	0.65															
Nitrate as N	mg/l	11.3		11.3	12	6.4	6.9															
Nitrite as N	mg/l	0.152		0.152	12	0.32	0.32															
Nitrogen: Total oxidised as N	mg/l				12	6.3	7.3															
Solids, Suspended at 105°C	mg/l				12	3	3.3															
Zinc	ug/l		18.7	18.7	12	5	5															
Iron	ug/l	200	1000	200	12	30	30															
Magnesium	mg/l				12	1.5	1.61															
Potassium	mg/l				12	1.1	1.5															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	12	0.032	0.13															
Phosphate: Total as P	mg/l				12	0.031	0.18															
Block R OUT																						
Orthophosphate, Filtered as P	mg/l				12	0.011	0.655															
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	12	0.036	0.7															
Nitrate as N	mg/l	11.3		11.3	12	4	6.9															
Nitrite as N	mg/l	0.152		0.152	12	0.005	0.092															
Nitrogen: Total oxidised as N	mg/l				12	4.1	6.9															
Solids, Suspended at 105°C	mg/l				12	4.4	24															
Zinc	ug/l		18.7	18.7	12	6.2	6.2															
Iron	ug/l	200	1000	200	12	30	50															
Magnesium	mg/l				12	1.37	2.2															
Potassium	mg/l				12	0.102	11															
Orthophosphate, Reactive as P	mg/l		0.045	0.045	12	0.011	0.656															
Phosphate: Total as P	mg/l				12	0.02	0.696															

Shading denotes exceedance of EAL

Table 1: Vitacress Monthly Water Quality Data

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							Sampling round	Sep-22	Oct-22	Nov-22	Dec-22	
							Date	15/09/2022	15/10/2022	15/11/2022	15/12/2022	
Analyte	**Units**	**DWS**	**EQS**	**EAL**	**Count**	**Min conc**	**Max conc**					
Block B IN												
pH	pH Units							7.8	7.5	7.9	7.9	
Conductivity @ 20 deg.C	mS/cm							0.48	0.5	0.49	0.5	
Orthophosphate, Filtered as P	mg/l				76	0.013	0.061	0.022	<0.02	<0.02	0.034	
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	77	0.029	1.2	<0.015	0.033	0.15	<0.015	
Nitrate as N	mg/l	11.3		11.3	77	6	7.383871	6.57	6	7.08	6.49	
Nitrite as N	mg/l	0.152		0.152	77	0.0029	0.076	<0.001	0.047	0.012	0.0044	
Nitrogen: Total oxidised as N	mg/l				76	6	8.2	6.6	6	7.1	6.5	
Solids, Suspended at 105°C	mg/l				76	2.95	33	< 2.0	6	3	< 2.0	
Zinc	ug/l		18.7	18.7	75	1.88	8.6	3.1	2	4.1	< 0.4	
Iron	ug/l	200	1000	200	77	6	173	9	6	6	15	
Magnesium	mg/l				75	1.5	1.97	1.8	1.6	1.7	1.7	
Potassium	mg/l				75	0.748	2.33	1.3	1.2	1.7	1.7	
Phosphorus(tot. unfilt)	ug/l				21	45	1400	510	1400	570	88	
Orthophosphate, Reactive as P	mg/l		0.045	0.045	56	0.013	0.06					
Phosphate: Total as P	mg/l				56	0.0201	0.089					
Block B OUT												
pH	pH Units							8	7.5	8	8	
Conductivity @ 20 deg.C	mS/cm							0.43	0.53	0.49	0.5	
Orthophosphate, Filtered as P	mg/l				76	0.01	1.3	<0.02	0.02	<0.02	0.052	
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	77	0.019	1.4	0.019	0.12	<0.015	0.03	
Nitrate as N	mg/l	11.3		11.3	77	0.81	10.70323	3.09	1.74	6.91	7.24	
Nitrite as N	mg/l	0.152		0.152	77	0.0042	0.2	0.0098	0.2	0.015	0.021	
Nitrogen: Total oxidised as N	mg/l				76	0.83	10.8	3.1	1.9	6.9	7.3	
Solids, Suspended at 105°C	mg/l				76	2.2	92	< 2.0	5	< 2.0	3	
Zinc	ug/l		18.7	18.7	75	1.4	20.5	1.6	1.4	4	1.4	
Iron	ug/l	200	1000	200	77	7	210	20	32	7	16	
Magnesium	mg/l				75	1.2	6.1	1.6	2.4	1.7	1.7	
Potassium	mg/l				75	0.14	79.2	0.14	2.6	1.7	2	
Phosphorus(tot. unfilt)	ug/l				21			530	1200	590	130	
Orthophosphate, Reactive as P	mg/l		0.045	0.045	56	0.016	0.95					
Phosphate: Total as P	mg/l				56	0.0239	0.97					
Block D IN												
pH	pH Units							7.5	7.4	7.5	7.4	
Conductivity @ 20 deg.C	mS/cm							0.48	0.5	0.49	0.49	
Orthophosphate, Filtered as P	mg/l				78	0.017	0.128	0.02	<0.02	<0.02	<0.02	
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	79	0.03	0.2	<0.015	<0.015	<0.015	<0.015	
Nitrate as N	mg/l	11.3		11.3	79	5.67	7.49	6.83	5.67	7.49	7.08	
Nitrite as N	mg/l	0.152		0.152	79	0.0013	0.022217	<0.001	0.014	<0.001	<0.001	
Nitrogen: Total oxidised as N	mg/l				78	5.7	7.51	6.8	5.7	7.5	7.1	
Solids, Suspended at 105°C	mg/l				78	3.9	6	< 2.0	< 2.0	< 2.0	6	
Zinc	ug/l		18.7	18.7	77	1.16	9.9	2.8	<1	3.4	2.3	
Iron	ug/l	200	1000	200	79	4	50	50	<4	<4	4	
Magnesium	mg/l				77	1.44	1.8	1.7	1.6	1.6	1.6	
Potassium	mg/l				77	0.736	1.2	0.99	0.97	0.87	0.91	
Phosphorus(tot. unfilt)	ug/l				21			660	530	590	53	
Orthophosphate, Reactive as P	mg/l		0.045	0.045	58	0.018	0.037					
Phosphate: Total as P	mg/l				58	0.02	0.0442					
Block D OUT												
pH	pH Units							7.8	7.6	8.1	7.9	
Conductivity @ 20 deg.C	mS/cm							0.47	0.49	0.48	0.49	
Orthophosphate, Filtered as P	mg/l				79	0.01	2.3	2.3	<0.02	<0.02	0.076	
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	79	0.018	0.878	0.026	0.025	<0.015	0.067	
Nitrate as N	mg/l	11.3		11.3	79	3.57	12.2	5.71	6.18	6.97	7.15	
Nitrite as N	mg/l	0.152		0.152	79	0.0043	0.451	0.055	0.039	0.035	0.075	
Nitrogen: Total oxidised as N	mg/l				78	3.59	12.2	5.8	6.2	7	7.2	
Solids, Suspended at 105°C	mg/l				78	2	67.5	3	< 2.0	< 2.0	4	
Zinc	ug/l		18.7	18.7	77	1.16	108	5.1	1.3	2.4	< 0.4	
Iron	ug/l	200	1000	200	79	5	601	17	36	5	14	
Magnesium	mg/l				77	1.34	3.73	1.7	1.6	1.6	1.7	
Potassium	mg/l				77	0.114	32.7	0.71	0.24	1	1.7	
Phosphorus(tot. unfilt)	ug/l				21			3100	610	600	130	

							Sampling round	Sep-22	Oct-22	Nov-22	Dec-22	
							Date	15/09/2022	15/10/2022	15/11/2022	15/12/2022	
Analyte	**Units**	**DWS**	**EQS**	**EAL**	**Count**	**Min conc**	**Max conc**					
Orthophosphate, Reactive as P	mg/l		0.045	0.045	58	0.01	1.03					
Phosphate: Total as P	mg/l				58	0.02	1.88					
Block E IN												
Orthophosphate, Filtered as P	mg/l				14	0.024	0.066					
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	14	0	0					
Nitrate as N	mg/l	11.3		11.3	14	6.6	7.03					
Nitrite as N	mg/l	0.152		0.152	14	0.0053	0.015					
Nitrogen: Total oxidised as N	mg/l				14	6.6	7.2					
Solids, Suspended at 105°C	mg/l				14	3.1	9.7					
Zinc	ug/l		18.7	18.7	14	5.07	5.07					
Iron	ug/l	200	1000	200	14	33	140					
Magnesium	mg/l				14	1.5	1.94					
Potassium	mg/l				14	1	1.96					
Orthophosphate, Reactive as P	mg/l		0.045	0.045	14	0.013	0.042					
Phosphate: Total as P	mg/l				14	0.024	0.06					
Block E OUT												
Orthophosphate, Filtered as P	mg/l				14	0.012	0.44					
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	14	0.032	0.35					
Nitrate as N	mg/l	11.3		11.3	14	4.5	8.49					
Nitrite as N	mg/l	0.152		0.152	14	0.0047	0.065					
Nitrogen: Total oxidised as N	mg/l				14	4.5	8.5					
Solids, Suspended at 105°C	mg/l				14	3.3	20					
Zinc	ug/l		18.7	18.7	14	5.7	13					
Iron	ug/l	200	1000	200	14	45	91					
Magnesium	mg/l				14	1.5	1.71					
Potassium	mg/l				14	0.69	2.93					
Orthophosphate, Reactive as P	mg/l		0.045	0.045	14	0.026	0.464					
Phosphate: Total as P	mg/l				14	0.0252	0.488					
Block R IN												
Orthophosphate, Filtered as P	mg/l				12	0.03	0.041					
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	12	0.65	0.65					
Nitrate as N	mg/l	11.3		11.3	12	6.4	6.9					
Nitrite as N	mg/l	0.152		0.152	12	0.32	0.32					
Nitrogen: Total oxidised as N	mg/l				12	6.3	7.3					
Solids, Suspended at 105°C	mg/l				12	3	3.3					
Zinc	ug/l		18.7	18.7	12	5	5					
Iron	ug/l	200	1000	200	12	30	30					
Magnesium	mg/l				12	1.5	1.61					
Potassium	mg/l				12	1.1	1.5					
Orthophosphate, Reactive as P	mg/l		0.045	0.045	12	0.032	0.13					
Phosphate: Total as P	mg/l				12	0.031	0.18					
Block R OUT												
Orthophosphate, Filtered as P	mg/l				12	0.011	0.655					
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	12	0.036	0.7					
Nitrate as N	mg/l	11.3		11.3	12	4	6.9					
Nitrite as N	mg/l	0.152		0.152	12	0.005	0.092					
Nitrogen: Total oxidised as N	mg/l				12	4.1	6.9					
Solids, Suspended at 105°C	mg/l				12	4.4	24					
Zinc	ug/l		18.7	18.7	12	6.2	6.2					
Iron	ug/l	200	1000	200	12	30	50					
Magnesium	mg/l				12	1.37	2.2					
Potassium	mg/l				12	0.102	11					
Orthophosphate, Reactive as P	mg/l		0.045	0.045	12	0.011	0.656					
Phosphate: Total as P	mg/l				12	0.02	0.696					

Shading denotes exceedance of EAL

Table 2: Groundwater Analytical Results

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				Sample Description	MW19-1	MW19-01	MW19-01	MW19-01	MW19-01	MW19-01	MW19-01	MW19-01	MW19-01	MW19-01	MW19-01	MW19-01		MW19-2	MW19-02	MW19-02	MW19-02	MW19-02	MW19-02
				Date Sampled	14/11/19	17/06/20	24/11/20	18/05/21	22/11/21	07/03/22	06/06/22	05/09/22	05/12/22	06/03/23	05/06/23	04/09/23		14/11/19	17/06/20	07/07/20	24/11/20	18/05/21	22/11/21
Analyte	**Units**	**DWS**	**EQS**	**EAL**																			
Datum elevation (cover level)	mAOD				75.96	75.96	75.96	75.96	75.96	75.96	75.96	75.96	75.96	75.96	75.96	75.96		76.67	76.67	76.67	76.67	76.67	76.67
Height of datum point above ground level	m				0.66	0.65	0.595	0.65	0.66	0.65	0.66	0.66	0.63	0.66	0.65	0.66		0.71	0.71	0.71	0.74	0.72	0.72
Depth to water below datum point	m				1.39	1.157	1.265	0.99	1.26	1.25	1.08	1.42	1.48	1.05	0.8	1.21		1.75	1.334	1.43	1.57	1.2	1.59
Groundwater level	mAOD				74.57	74.803	74.695	74.97	74.7	74.71	74.88	74.54	74.48	74.91	75.16	74.75		74.92	75.336	75.24	75.1	75.47	75.08
Total depth	m				5.65	5.68	5.62	5.64	5.64	5.65	5.62	5.6	5.62	5.62	5.62	5.61		5.92	4.85	5.82	5.86	5.76	5.76
Field pH	pH Units	6.5 to 9.5	6 to 9	6 to 9	7.56	7.4	7.5	6.57	7.39	7.25	7.3	7.22	7.39	7.01	7.2	7.1		7.15	7.5		7.4	6.61	7.38
Field electrical conductivity	µS/cm				344.1	550	590	619.3	621.9	602.6	562.7	588.3	585.9	597.4	574	569.2		391.7	480		600	617.3	624.7
Field dissolved oxygen	%							17	60.7	68	22.9	61.8	75.9	44.9	17.4	20.4						62.5	70.6
Field Redox potential	mV							1090	78	-30	412	625	-55	243	267	54						1043	100
Field temperature	oC				9.9	13	11	10.5	10.6	9.1	12	14.3	10.3	8.4	12.9	14.6		9.8	17		10	11.8	10.1
pH	pH Units	6.5 to 9.5	6 to 9	6 to 9	7.71	7.46	7.3			7.57	7.4	7.3	7.4	7.6	7.4	7.4		7.91	7.45		7.44		
Conductivity @ 20 deg.C	mS/cm	2.5		2.5	0.389	0.345	0.484			0.436	0.34	0.47	0.47	0.45	0.48	0.49		0.452	0.392		0.496		
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	0.332	<0.2	<0.2			<0.2	<0.015	<0.015	< 0.015	< 0.015	< 0.015	< 0.015		<0.165	<0.2		<0.2		
Nitrate as NO3	mg/l	50		50	13.9	23.2	32.5			34.0	25.5	30.4	32.0	31.8	23.2	28.2		29.0	31.4		34.3		
Nitrite as NO2	mg/l	0.5		0.5	0.109	<0.05	<0.05			<0.05	0.0043	< 0.0033	< 0.0033	< 0.0033	< 0.0033	< 0.0033		<0.05	<0.05		<0.05		
Phosphate (Ortho as P)	mg/l		0.045	0.045	<0.02	0.0255	0.0297			0.0313	0.035				0.043			0.0281	0.0248		0.0277		
Hardness	mg/l						370														976		
Total Oxidised Nitrogen (TON) as N	mg/l									7.69	5.8	6.9	7.2	7.2	5.2	6.4							
Total Suspended Solids	mg/l									4.5	< 2.0	< 2.0	2	< 2.0	< 2.0	< 2.0							
Arsenic (diss.filt)	µg/l	10	50	10	<0.5	<0.5	<0.5											<0.5	<0.5		<0.5		
Cadmium (diss.filt)	µg/l	5	0.25	0.25	<0.08	<0.08	<0.08											<0.08	<0.08		<0.08		
Chromium (diss.filt)	µg/l	50	3.4	3.4	<1	<1	<1											<1	<1		<1		
Copper (diss.filt)	µg/l	2000	2.99	2.99	0.764	0.739	0.396											0.445	0.717		0.397		
Iron (Dis.Filt)	mg/l	0.2	1	0.2	<0.019	<0.019	<0.019			<0.019	0.043	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004		<0.019	<0.019		<0.019		
Lead (diss.filt)	µg/l	10	1.2	1.2	0.428	<0.2	<0.2											<0.2	<0.2		<0.2		
Manganese (diss.filt)	µg/l	50	524.66	50	1180	29.5	<3											61.3	<3		<3		
Mercury (diss.filt)	µg/l	1	0.07	0.07	<0.01	<0.01	<0.01											<0.01	<0.01		<0.01		
Nickel (diss.filt)	µg/l	20	9.3	9.3	3.31	0.735	<0.4											1.16	0.502		<0.4		
Zinc (diss.filt)	µg/l		18.7	18.7	7.66	1.27	<1			1.64	3.1	3.3	1.8	2	12	2.7		4.92	1.13		1.57		
Acenaphthene (aq)	µg/l				<0.005	<0.005	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.1	<0.005		<0.005		
Acenaphthylene (aq)	µg/l				<0.005	<0.005	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.1	<0.005		<0.005		
Anthracene (aq)	µg/l		0.1	0.1	<0.005	<0.005	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.1	<0.005		<0.005		
Benzo(a)anthracene (aq)	µg/l				<0.005	<0.005	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.1	<0.005		<0.005		
Benzo(a)pyrene (aq)	µg/l	0.01	0.00017	0.00017	<0.002	0.00807	<0.002				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.04	<0.002		<0.002		
Benzo(b)fluoranthene (aq)	µg/l	0.1		0.1	<0.005	0.0112	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.1	<0.005		<0.005		
Benzo(g,h,i)perylene (aq)	µg/l	0.1		0.1	<0.005	<0.005	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.1	<0.005		<0.005		
Benzo(k)fluoranthene (aq)	µg/l	0.1		0.1	<0.005	0.00565	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.1	<0.005		<0.005		
Chrysene (aq)	µg/l				<0.005	<0.005	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.1	<0.005		<0.005		
Dibenzo(a,h)anthracene (aq)	µg/l				<0.005	<0.005	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.1	<0.005		<0.005		
Fluoranthene (aq)	µg/l		0.0063	0.0063	<0.005	0.0135	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.1	<0.005		<0.005		
Fluorene (aq)	µg/l				<0.005	<0.005	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.1	<0.005		<0.005		
Indeno(1,2,3-cd)pyrene (aq)	µg/l	0.1		0.1	<0.005	<0.005	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.1	<0.005		<0.005		
Naphthalene (aq)	µg/l		2	2	<0.01	<0.01	<0.01				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.2	<0.01		<0.01		
Phenanthrene (aq)	µg/l				<0.005	0.00587	<0.082				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.1	<0.005		<0.082		
Pyrene (aq)	µg/l				<0.005	0.0129	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.1	<0.005		<0.005		
PAH, Total Detected USEPA 16 (aq)	µg/l				<0.082	<0.082	<0.005				< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16		<1.64	<0.082		<0.005		
Iron (total)	mg/l	0.2	1	0.2							0.079	0.005	0.029	0.014	0.009	0.008							
Zinc (total)	µg/l		18.7	18.7							13	6.7	4.8	3.7	18	6							
Magnesium (dissolved)	mg/l									1.53	1.7	1.6	1.5	1.5	1.7	1.7							
Potassium (dissolved)	mg/l									0.891	1.4	0.9	0.71	0.84	1	0.9							
Magnesium (total)	mg/l										1.8	1.7	1.6	1.7	1.7	1.7							
Potassium (total)	mg/l										1.6	1	0.73	0.88	1.1	1							
Total Phosphate as P	µg/l											35	< 20	34		38							
Phosphorus (total)	µg/l									57.3	66	640	830	48	79	44							

Shading denotes exceedance of EAL

Table 2: Groundwater Analytical Results

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				Sample Description	MW19-02	MW19-02	MW19-02	MW19-02	MW19-02	MW19-02	MW19-02	MW19-02	MW19-02	MW19-02	MW19-02	MW19-02	MW19-02	MW19-02	MW19-02		MW19-3	MW19-6	MW19-03
				Date Sampled	10/01/22	07/02/22	07/03/22	07/04/22	03/05/22	06/06/22	04/07/22	01/08/22	05/09/22	03/10/22	07/11/22	05/12/22	06/03/23	05/06/23	04/09/23		14/11/19	14/11/19	17/06/20
Analyte	**Units**	**DWS**	**EQS**	**EAL**																			
Datum elevation (cover level)	mAOD				76.67	76.67	76.67	76.67	76.67	76.67	76.67	76.67	76.67	76.67	76.67	76.67	76.67	76.67	76.67		76.02		76.02
Height of datum point above ground level	m				0.71	0.71	0.72	0.715	0.71	0.72	0.71	0.71	0.71	0.72	0.72	0.72	0.71	0.71	0.71		0.76		0.72
Depth to water below datum point	m				1.56	1.54	1.51	1.42	1.44	1.43	1.55	1.67	1.81	1.92	1.97	1.91	1.27	1.17	1.48		1.665		1.484
Groundwater level	mAOD				75.11	75.13	75.16	75.25	75.23	75.24	75.12	75	74.86	74.75	74.7	74.76	75.4	75.5	75.19		74.355		74.536
Total depth	m				5.76	5.77	5.76	5.76	5.75	5.75	5.74	5.75	5.75	5.73	5.74	5.73	5.74	5.74	5.74		7.5		7.05
Field pH	pH Units	6.5 to 9.5	6 to 9	6 to 9	7.32	7.39	7.28	7.33	7.32	7.29	7.33	7.41	7.3	7.22	7.44	7.39	6.98	7.21	7.03		7.21		7.3
Field electrical conductivity	µS/cm				585.3	594.4	603.2	608	609.5	562	607.9	593.3	588.4	599.7	567.4	594.8	600.7	562.9	554.2		394.7		550
Field dissolved oxygen	%				75.3	76.1	78.2	72	67	63.9	64.9	70.4	79.1	83.7	85.5	84.2	67.5	51.8	59.8				
Field Redox potential	mV				257	166	-30	382	191	456	322	706	506	242	321	-28	246	263	30				
Field temperature	oC				9.3	8.9	9.6	9.9	10.7	11.7	12.8	14.1	13.2	11.3	11.2	9.7	8.8	11.6	13.8		10.4		12
pH	pH Units	6.5 to 9.5	6 to 9	6 to 9			7.5			7.3			7.3			7.4	7.4	7.3	7.3		7.52	7.73	7.5
Conductivity @ 20 deg.C	mS/cm	2.5		2.5			0.479			0.34			0.47			0.48	0.45	0.46	0.48		0.464	0.453	0.361
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25			<0.2			<0.015			<0.015			< 0.015	< 0.015	< 0.015	0.019		<0.165	<0.165	<0.2
Nitrate as NO3	mg/l	50		50			33.6			30.8			33.9			32.3	31.7	28.5	32.9		30.4	30.2	31.4
Nitrite as NO2	mg/l	0.5		0.5			<0.05			< 0.0033			< 0.0033			< 0.0033	< 0.0033	< 0.0033	< 0.0033		<0.05	<0.05	<0.05
Phosphate (Ortho as P)	mg/l		0.045	0.045			0.0277			0.029								0.028			0.0352	0.0336	0.0313
Hardness	mg/l																						
Total Oxidised Nitrogen (TON) as N	mg/l						7.59			6.9			7.7			7.3	7.2	6.4	7.4				
Total Suspended Solids	mg/l						<2			< 2.0			< 2.0			2	< 2.0	< 2.0	< 2.0				
Arsenic (diss.filt)	µg/l	10	50	10																	<0.5	<0.5	<0.5
Cadmium (diss.filt)	µg/l	5	0.25	0.25																	<0.08	<0.08	<0.08
Chromium (diss.filt)	µg/l	50	3.4	3.4																	<1	<1	<1
Copper (diss.filt)	µg/l	2000	2.99	2.99																	0.422	<0.3	0.486
Iron (Dis.Filt)	mg/l	0.2	1	0.2			<0.019			0.029			0.004			< 0.004	< 0.004	< 0.004	< 0.004		<0.019	<0.019	<0.019
Lead (diss.filt)	µg/l	10	1.2	1.2																	<0.2	<0.2	<0.2
Manganese (diss.filt)	µg/l	50	524.66	50																	<3	<3	<3
Mercury (diss.filt)	µg/l	1	0.07	0.07																	<0.01	<0.01	<0.01
Nickel (diss.filt)	µg/l	20	9.3	9.3																	<0.4	<0.4	<0.4
Zinc (diss.filt)	µg/l		18.7	18.7			1.92			6.3			3.6			2.7	3.2	9.2	1.9		2.27	1.84	1.54
Acenaphthene (aq)	µg/l									< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.005	<0.005
Acenaphthylene (aq)	µg/l									< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.005	<0.005
Anthracene (aq)	µg/l		0.1	0.1						< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.005	<0.005
Benzo(a)anthracene (aq)	µg/l									< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.005	<0.005
Benzo(a)pyrene (aq)	µg/l	0.01	0.00017	0.00017						< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01		<0.002	<0.002	<0.002
Benzo(b)fluoranthene (aq)	µg/l	0.1		0.1						< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.005	<0.005
Benzo(g,h,i)perylene (aq)	µg/l	0.1		0.1						< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.005	<0.005
Benzo(k)fluoranthene (aq)	µg/l	0.1		0.1						< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.005	<0.005
Chrysene (aq)	µg/l									< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.005	<0.005
Dibenzo(a,h)anthracene (aq)	µg/l									< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.005	<0.005
Fluoranthene (aq)	µg/l		0.0063	0.0063						< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.005	<0.005
Fluorene (aq)	µg/l									< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.005	<0.005
Indeno(1,2,3-cd)pyrene (aq)	µg/l	0.1		0.1						< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.005	<0.005
Naphthalene (aq)	µg/l		2	2						< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01		<0.01	0.0116	<0.01
Phenanthrene (aq)	µg/l									< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.005	<0.005
Pyrene (aq)	µg/l									< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.005	<0.005
PAH, Total Detected USEPA 16 (aq)	µg/l									< 0.16			< 0.16			< 0.16	< 0.16	< 0.16	< 0.16		<0.082	<0.082	<0.082
Iron (total)	mg/l	0.2	1	0.2						0.034			0.005			0.011	0.004	0.006	0.015				
Zinc (total)	µg/l		18.7	18.7						6.4			4.8			5.2	4.1	12	1.9				
Magnesium (dissolved)	mg/l						1.54			1.7			1.6			1.6	1.6	1.7	1.6				
Potassium (dissolved)	mg/l						0.843			1.1			0.8			0.74	1	0.76	0.71				
Magnesium (total)	mg/l									1.8			1.7			1.6	1.6	1.7	1.7				
Potassium (total)	mg/l									3.2			0.81			0.76	2.7	0.82	0.82				
Total Phosphate as P	µg/l												27			< 20	26		30				
Phosphorus (total)	µg/l						51.1			42			590			790	33	47	34				

Shading denotes exceedance of EAL

Table 2: Groundwater Analytical Results

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				Sample Description	MW19-03	MW19-03	MW19-03	MW19-03	MW19-03	MW19-03	MW19-03	MW19-03	MW19-03	MW19-03		MW19-4	MW19-04	MW19-04	MW19-04	MW19-04	MW19-04	MW19-04	MW19-04
				Date Sampled	24/11/20	18/05/21	22/11/21	07/03/22	06/06/22	05/09/22	05/12/22	06/03/23	05/06/23	04/09/23		14/11/19	18/06/20	25/11/20	18/05/21	22/11/21	07/03/22	06/06/22	05/09/22
Analyte	**Units**	**DWS**	**EQS**	**EAL**																			
Datum elevation (cover level)	mAOD				76.02	76.02	76.02	76.02	76.02	76.02	76.02	76.02	76.02	76.02		74.96	74.96	74.96	74.96	74.96	74.96	74.96	74.96
Height of datum point above ground level	m				0.74	0.5	0.76	0.75	0.76	0.76	0.76	0.76	0.76	0.75		0.67	0.67	0.71	0.67	0.67	0.67	0.67	0.67
Depth to water below datum point	m				1.56	1.39	1.57	1.54	1.49	1.69	1.77	1.46	1.42	1.56		2.295	2.173	2.29	2.1	2.29	2.22	2.19	2.32
Groundwater level	mAOD				74.46	74.63	74.45	74.48	74.53	74.33	74.25	74.56	74.6	74.46		72.665	72.787	72.67	72.86	72.67	72.74	72.77	72.64
Total depth	m				7.334	7.61	7.61	7.61	7.62	7.61	7.63	7.63	7.63	7.63		4.95	5.2	5.28	5.3	5.3	5.3	5.29	5.28
Field pH	pH Units	6.5 to 9.5	6 to 9	6 to 9	7.4	6.7	7.37	7.23	7.34	7.19	7.4	7	7.23	7.05		7.38	7.3	7.4	6.51	7.39	7.25	7.27	7.21
Field electrical conductivity	µS/cm				600	621.9	628.2	608.6	562.5	587.8	594.9	597.4	561	555		414	500	580	610.1	631.8	613.3	566.4	595.1
Field dissolved oxygen	%					62.1	68	77.3	63.8	76.5	82.4	69.5	44.1	57.7					73.2	68.8	80	79.5	82.1
Field Redox potential	mV					975	74	-11	535	682	-64	251	255	113					1046	82	-26	316	769
Field temperature	oC				10	10.3	9.6	8.8	11.6	13.8	9.6	8.6	11.7	13.5		10	14	11	11.7	10	10.1	11.8	12.5
pH	pH Units	6.5 to 9.5	6 to 9	6 to 9	7.65			7.94	7.3	7.3	7.4	7.3	7.3	7.3		7.76	7.51	7.45			8.07	7.3	7.4
Conductivity @ 20 deg.C	mS/cm	2.5		2.5	0.496			0.469	0.34	0.48	0.48	0.47	0.47	0.48		0.454	0.362	0.469			0.457	0.33	0.48
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	<0.2			<0.2	<0.015	<0.015	< 0.015	< 0.015	< 0.015	< 0.015		0.451	<0.2	<0.2			<0.2	<0.015	<0.015
Nitrate as NO3	mg/l	50		50	35.3			35.6	30.9	32.6	32.3	31.9	27.7	32.6		28.5	27.2	31.6			32.8	31.1	32.1
Nitrite as NO2	mg/l	0.5		0.5	<0.05			<0.05	< 0.0033	< 0.0033	< 0.0033	< 0.0033	< 0.0033	< 0.0033		0.244	<0.05	<0.05			<0.05	< 0.0033	< 0.0033
Phosphate (Ortho as P)	mg/l		0.045	0.045	0.0284			0.0375	0.038				0.026			<0.02	<0.02	0.0241			0.0274	0.028	
Hardness	mg/l				273													1230					
Total Oxidised Nitrogen (TON) as N	mg/l							8.05	7	7.4	7.3	7.2	6.3	7.4							7.42	7	7.2
Total Suspended Solids	mg/l							<2	< 2.0	< 2.0	3	< 2.0	< 2.0	< 2.0							23.1	< 2.0	8
Arsenic (diss.filt)	µg/l	10	50	10	<0.5											<0.5	<0.5	<0.5					
Cadmium (diss.filt)	µg/l	5	0.25	0.25	<0.08											<0.08	<0.08	<0.08					
Chromium (diss.filt)	µg/l	50	3.4	3.4	<1											<1	<1	<1					
Copper (diss.filt)	µg/l	2000	2.99	2.99	3.48											1.16	1.1	0.831					
Iron (Dis.Filt)	mg/l	0.2	1	0.2	<0.019			<0.019	0.047	< 0.004	0.007	< 0.004	0.004	< 0.004		<0.019	<0.019	<0.019			<0.019	0.038	0.004
Lead (diss.filt)	µg/l	10	1.2	1.2	<0.2											2.91	0.204	<0.2					
Manganese (diss.filt)	µg/l	50	524.66	50	<3											30.7	59.1	4.74					
Mercury (diss.filt)	µg/l	1	0.07	0.07	<0.01											<0.01	<0.01	<0.01					
Nickel (diss.filt)	µg/l	20	9.3	9.3	<0.4											0.866	1.47	0.438					
Zinc (diss.filt)	µg/l		18.7	18.7	3.73			<1	4.7	3.5	4.1	7	3.9	0.9		4.5	4.1	4.59			1.22	5.6	7.7
Acenaphthene (aq)	µg/l				<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.01	<0.01				< 0.01	< 0.01
Acenaphthylene (aq)	µg/l				<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.01	<0.01				< 0.01	< 0.01
Anthracene (aq)	µg/l		0.1	0.1	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.01	<0.01				< 0.01	< 0.01
Benzo(a)anthracene (aq)	µg/l				<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		0.0137	<0.01	<0.01				< 0.01	< 0.01
Benzo(a)pyrene (aq)	µg/l	0.01	0.00017	0.00017	<0.002				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		0.0116	<0.004	<0.004				< 0.01	< 0.01
Benzo(b)fluoranthene (aq)	µg/l	0.1		0.1	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		0.0189	<0.01	<0.01				< 0.01	< 0.01
Benzo(g,h,i)perylene (aq)	µg/l	0.1		0.1	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		0.0128	<0.01	<0.01				< 0.01	< 0.01
Benzo(k)fluoranthene (aq)	µg/l	0.1		0.1	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		0.008	<0.01	<0.01				< 0.01	< 0.01
Chrysene (aq)	µg/l				<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		0.0116	<0.01	<0.01				< 0.01	< 0.01
Dibenzo(a,h)anthracene (aq)	µg/l				<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.01	<0.01				< 0.01	< 0.01
Fluoranthene (aq)	µg/l		0.0063	0.0063	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		0.0169	<0.01	<0.01				< 0.01	< 0.01
Fluorene (aq)	µg/l				<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.01	<0.01				< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene (aq)	µg/l	0.1		0.1	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.01	<0.01				< 0.01	< 0.01
Naphthalene (aq)	µg/l		2	2	<0.01				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.01	<0.02	<0.02				< 0.01	< 0.01
Phenanthrene (aq)	µg/l				<0.082				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.005	<0.01	<0.164				< 0.01	< 0.01
Pyrene (aq)	µg/l				<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		0.0185	<0.01	<0.01				< 0.01	< 0.01
PAH, Total Detected USEPA 16 (aq)	µg/l				<0.005				< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16		0.112	<0.164	<0.01				< 0.16	< 0.16
Iron (total)	mg/l	0.2	1	0.2					0.1	0.01	0.016	0.005	0.017	0.015								0.057	0.018
Zinc (total)	µg/l		18.7	18.7					8.3	4.5	5.2	18	11	3.3								7.5	15
Magnesium (dissolved)	mg/l							1.52	1.7	1.6	1.6	1.5	1.7	1.6							1.57	1.7	1.7
Potassium (dissolved)	mg/l							0.887	1.1	1.1	0.7	1.1	0.89	0.78							1.04	1.5	0.98
Magnesium (total)	mg/l								1.7	1.7	1.6	1.7	1.7	1.6								1.8	1.8
Potassium (total)	mg/l								3.3	1.2	0.72	2.2	0.95	0.87								3.3	1
Total Phosphate as P	µg/l									34	< 20	32		34									25
Phosphorus (total)	µg/l							52.2	63	660	1000	42	55	39							61	140	420

Shading denotes exceedance of EAL

Table 2: Groundwater Analytical Results

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				Sample Description	MW19-04	MW19-04	MW19-04	MW19-04		MW19-5	MW19-05	MW19-05	MW19-05	MW19-05	MW19-05	MW19-05	MW19-05	MW19-05	MW19-05	MW19-05	MW19-05		MW21-01	MW21-01
				Date Sampled	05/12/22	06/03/23	05/06/23	04/09/23		14/11/19	17/06/20	25/11/20	18/05/21	22/11/21	07/03/22	06/06/22	05/09/22	05/12/22	06/03/23	05/06/23	04/09/23		18/05/21	22/11/21
Analyte	**Units**	**DWS**	**EQS**	**EAL**																				
Datum elevation (cover level)	mAOD				74.96	74.96	74.96	74.96		74.1	74.1	74.1	74.1	74.1	74.1	74.1	74.1	74.1	74.1	74.1	74.1		73.32	73.32
Height of datum point above ground level	m				0.67	0.67	0.66	0.67		0.64	0.85	0.87	0.65	0.65	0.66	0.66	0.65	0.65	0.65	0.65	0.65		0.65	0.62
Depth to water below datum point	m				2.35	2.07	2.03	2.21		1.585	1.509	1.57	1.5	1.57	1.59	1.51	1.63	1.63	1.52	1.48	1.5		0.99	1.15
Groundwater level	mAOD				72.61	72.89	72.93	72.75		72.515	72.591	72.53	72.6	72.53	72.51	72.59	72.47	72.47	72.58	72.62	72.6		72.33	72.17
Total depth	m				5.29	5.28	5.29	5.28		6.6	6.65	6.66	6.65	6.65	6.66	6.64	6.62	6.64	6.65	6.64	6.62		16.67	16.63
Field pH	pH Units	6.5 to 9.5	6 to 9	6 to 9	7.4	6.93	7.16	7.13		7.28	7.3	7.3	6.59	7.49	7.39	7.37	7.17	7.43	6.91	8.01	7.12		6.46	7.22
Field electrical conductivity	µS/cm				598	600.8	558.7	543.6		394	520	600	616	630.3	603.3	562.1	589	594.1	603.6	560	550.1		614.4	633.6
Field dissolved oxygen	%				83.1	81.3	80	75.7					64.2	62.3	72.5	63.6	47.5	49.9	71.5	64.1	58.6		60.5	59.4
Field Redox potential	mV				-67	258	300	695					1020	61	298	328	402	-117	213	362	265		1087	127
Field temperature	oC				10.2	10.8	11.7	13.3		10.2	13	11	10.8	9.7	8.9	12.3	14.6	9.9	9.3	12.3	14.8		11.2	10.6
pH	pH Units	6.5 to 9.5	6 to 9	6 to 9	7.3	7.3	7.4	7.4		7.58	7.49	7.38			7.53	7.4	7.4	7.4	7.4	7.4	7.4			
Conductivity @ 20 deg.C	mS/cm	2.5		2.5	0.49	0.48	0.48	0.48		0.451	0.417	0.482			0.412	0.34	0.48	0.49	0.48	0.47	0.48			
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25	0.022	< 0.015	< 0.015	< 0.015		0.373	<0.2	<0.2			<0.2	<0.015	<0.015	< 0.015	< 0.015	< 0.015	< 0.015			
Nitrate as NO3	mg/l	50		50	32.4	31.0	30.4	29.1		23.9	33.1	34.0			33.6	30.5	28.3	31.0	31.4	31.6	30.9			
Nitrite as NO2	mg/l	0.5		0.5	0.027	< 0.0033	< 0.0033	< 0.0033		<0.05	<0.05	<0.05			<0.05	< 0.0033	< 0.0033	0.243	< 0.0033	< 0.0033	< 0.0033			
Phosphate (Ortho as P)	mg/l		0.045	0.045			< 0.02			0.0333	0.0434	0.062			0.0418	0.045				0.035				
Hardness	mg/l											1040												
Total Oxidised Nitrogen (TON) as N	mg/l				7.3	7	6.9	6.6							7.59	6.9	6.4	7.1	7.1	7.1	7			
Total Suspended Solids	mg/l				5	2	10	11							2.85	< 2.0	4	2	< 2.0	< 2.0	3			
Arsenic (diss.filt)	µg/l	10	50	10						0.664	<0.5	<0.5												
Cadmium (diss.filt)	µg/l	5	0.25	0.25						<0.08	<0.08	<0.08												
Chromium (diss.filt)	µg/l	50	3.4	3.4						<1	<1	<1												
Copper (diss.filt)	µg/l	2000	2.99	2.99						0.432	0.635	0.746												
Iron (Dis.Filt)	mg/l	0.2	1	0.2	< 0.004	< 0.004	0.007	0.006		<0.019	<0.019	<0.019			<0.019	< 0.004	< 0.004	< 0.004	< 0.004	0.006	< 0.004			
Lead (diss.filt)	µg/l	10	1.2	1.2						0.624	<0.2	<0.2												
Manganese (diss.filt)	µg/l	50	524.66	50						643	27.1	<3												
Mercury (diss.filt)	µg/l	1	0.07	0.07						<0.01	<0.01	<0.01												
Nickel (diss.filt)	µg/l	20	9.3	9.3						1.28	0.495	<0.4												
Zinc (diss.filt)	µg/l		18.7	18.7	1.6	1.1	5.6	1.9		4.33	4.91	4.25			1.94	4.2	3.4	1	1.5	7.8	1.5			
Acenaphthene (aq)	µg/l				< 0.01	< 0.01	< 0.01	< 0.01		0.832	<0.005	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
Acenaphthylene (aq)	µg/l				< 0.01	< 0.01	< 0.01	< 0.01		0.777	<0.005	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
Anthracene (aq)	µg/l		0.1	0.1	< 0.01	< 0.01	< 0.01	< 0.01		1.84	0.00653	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
Benzo(a)anthracene (aq)	µg/l				< 0.01	< 0.01	< 0.01	< 0.01		8.73	0.0412	0.00993				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
Benzo(a)pyrene (aq)	µg/l	0.01	0.00017	0.00017	< 0.01	< 0.01	< 0.01	< 0.01		11.2	0.0554	0.0161				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
Benzo(b)fluoranthene (aq)	µg/l	0.1		0.1	< 0.01	< 0.01	< 0.01	< 0.01		17.2	0.0703	0.0267				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
Benzo(g,h,i)perylene (aq)	µg/l	0.1		0.1	< 0.01	< 0.01	< 0.01	< 0.01		9.25	0.0373	0.00599				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
Benzo(k)fluoranthene (aq)	µg/l	0.1		0.1	< 0.01	< 0.01	< 0.01	< 0.01		7.13	0.0323	0.012				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
Chrysene (aq)	µg/l				< 0.01	< 0.01	< 0.01	< 0.01		9.9	0.0432	0.0209				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
Dibenzo(a,h)anthracene (aq)	µg/l				< 0.01	< 0.01	< 0.01	< 0.01		2.33	<0.005	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
Fluoranthene (aq)	µg/l		0.0063	0.0063	< 0.01	< 0.01	< 0.01	< 0.01		16.7	0.0814	0.0294				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
Fluorene (aq)	µg/l				< 0.01	< 0.01	< 0.01	< 0.01		0.971	<0.005	<0.005				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
Indeno(1,2,3-cd)pyrene (aq)	µg/l	0.1		0.1	< 0.01	< 0.01	< 0.01	< 0.01		7.62	0.0325	0.0102				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
Naphthalene (aq)	µg/l		2	2	< 0.01	< 0.01	< 0.01	< 0.01		1.79	<0.01	<0.01				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
Phenanthrene (aq)	µg/l				< 0.01	< 0.01	< 0.01	< 0.01		7.98	0.0268	0.169				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
Pyrene (aq)	µg/l				< 0.01	< 0.01	< 0.01	< 0.01		16.1	0.0789	0.012				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
PAH, Total Detected USEPA 16 (aq)	µg/l				< 0.16	< 0.16	< 0.16	< 0.16		120	0.506	0.0256				< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16			
Iron (total)	mg/l	0.2	1	0.2	0.021	0.037	0.009	0.017								0.026	0.011	0.011	0.015	0.008	0.011			
Zinc (total)	µg/l		18.7	18.7	5	7.2	12	6.6								5.6	8.3	2.9	4.1	11	24			
Magnesium (dissolved)	mg/l				1.5	1.5	1.7	1.6							1.61	1.8	1.7	1.7	1.6	1.7	1.7			
Potassium (dissolved)	mg/l				0.83	0.97	1	0.89							1.13	1.6	1.3	1.2	1.1	1.2	1			
Magnesium (total)	mg/l				1.6	1.7	1.7	1.7								1.8	1.8	1.8	1.8	1.8	1.7			
Potassium (total)	mg/l				0.92	1.1	1.1	1								2.7	1.3	1.2	1.2	1.2	1.1			
Total Phosphate as P	µg/l				< 20	27		30									49	30	39		43			
Phosphorus (total)	µg/l				780	61	46	36							63.7	74	540	840	59	73	50			

Shading denotes exceedance of EAL

Table 2: Groundwater Analytical Results

				Sample Description	MW21-01	MW21-01	MW21-01	MW21-01	MW21-01	MW21-01	MW21-01	MW21-01	MW21-01	MW21-01	MW21-01	MW21-01	MW21-01	MW21-01	MW21-01		MW21-02	MW21-02	MW21-02
				Date Sampled	10/01/22	07/02/22	07/03/22	07/04/22	03/05/22	06/06/22	04/07/22	01/08/22	05/09/22	03/10/22	07/11/22	05/12/22	06/03/23	05/06/23	04/09/23		18/05/21	22/11/21	10/01/22
Analyte	**Units**	**DWS**	**EQS**	**EAL**																			
Datum elevation (cover level)	mAOD				73.32	73.32	73.32	73.32	73.32	73.32	73.32	73.32	73.32	73.32	73.32	73.32	73.32	73.32	73.32		73.23	73.23	73.23
Height of datum point above ground level	m				0.63	0.63	0.65	0.63	0.63	0.63	0.62	0.64	0.64	0.64	0.64	0.64	0.64	0.66	0.66		0.55	0.56	0.55
Depth to water below datum point	m				1.12	1.14	1.13	1.08	1.07	1.05	1.15	1.2	1.23	1.26	1.24	1.24	1.02	0.96	1.05		0.85	1	0.98
Groundwater level	mAOD				72.2	72.18	72.19	72.24	72.25	72.27	72.17	72.12	72.09	72.06	72.08	72.08	72.3	72.36	72.27		72.38	72.23	72.25
Total depth	m				16.6	16.62	16.61	16.61	16.58	16.6	16.56	16.58	16.59	16.57	16.54	16.55	16.57	16.55	16.54		3.29	3.29	3.29
Field pH	pH Units	6.5 to 9.5	6 to 9	6 to 9	7.18	7.33	7.39	7.27	7.26	7.28	7.48	7.48	7.17	7.13	7.41	7.39	6.92	6.61	7.11		6.47	7.28	7.18
Field electrical conductivity	µS/cm				600	602.8	602.6	616.4	611.9	561.4	609.3	602.3	591	598.1	572.1	591.7	600.8	562.2	552.6		611.9	632.4	601.7
Field dissolved oxygen	%				66.5	69.7	74.3	68.9	67.9	63.4	60.6	53.6	48.8	43.1	40.1	46.6	70.5	68.9	60.1		55.8	59.3	65
Field Redox potential	mV				161	135	239	228	77	372	556	544	381	260	422	-82	258	665	894		998	148	143
Field temperature	oC				9.3	9.2	9	10.4	11	12.6	13.7	13.9	14.9	12.9	12.3	10.6	9.7	12.5	16.8		11.4	10.4	9.1
pH	pH Units	6.5 to 9.5	6 to 9	6 to 9			8.06			7.3			7.4			7.4	7.4	7.4	7.4				
Conductivity @ 20 deg.C	mS/cm	2.5		2.5			0.431			0.35			0.48			0.48	0.48	0.47	0.48				
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25			<0.2			<0.015			<0.015			0.02	< 0.015	< 0.015	< 0.015				
Nitrate as NO3	mg/l	50		50			33.7			30.5			29.5			30.3	31.6	32.6	32.6				
Nitrite as NO2	mg/l	0.5		0.5			<0.05			< 0.0033			0.0079			< 0.0033	< 0.0033	< 0.0033	< 0.0033				
Phosphate (Ortho as P)	mg/l		0.045	0.045			0.0421			0.046								0.045					
Hardness	mg/l																						
Total Oxidised Nitrogen (TON) as N	mg/l						7.62			6.9			6.7			6.9	7.1	7.4	7.4				
Total Suspended Solids	mg/l						<2			< 2.0			< 2.0			< 2.0	< 2.0	< 2.0	< 2.0				
Arsenic (diss.filt)	µg/l	10	50	10																			
Cadmium (diss.filt)	µg/l	5	0.25	0.25																			
Chromium (diss.filt)	µg/l	50	3.4	3.4																			
Copper (diss.filt)	µg/l	2000	2.99	2.99																			
Iron (Dis.Filt)	mg/l	0.2	1	0.2			<0.019			0.022			< 0.004			< 0.004	< 0.004	< 0.004	< 0.004				
Lead (diss.filt)	µg/l	10	1.2	1.2																			
Manganese (diss.filt)	µg/l	50	524.66	50																			
Mercury (diss.filt)	µg/l	1	0.07	0.07																			
Nickel (diss.filt)	µg/l	20	9.3	9.3																			
Zinc (diss.filt)	µg/l		18.7	18.7			1.72			2.7			2.6			2.6	1.7	7.3	5				
Acenaphthene (aq)	µg/l									< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01				
Acenaphthylene (aq)	µg/l									< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01				
Anthracene (aq)	µg/l		0.1	0.1						< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01				
Benzo(a)anthracene (aq)	µg/l									< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01				
Benzo(a)pyrene (aq)	µg/l	0.01	0.00017	0.00017						< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01				
Benzo(b)fluoranthene (aq)	µg/l	0.1		0.1						< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01				
Benzo(g,h,i)perylene (aq)	µg/l	0.1		0.1						< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01				
Benzo(k)fluoranthene (aq)	µg/l	0.1		0.1						< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01				
Chrysene (aq)	µg/l									< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01				
Dibenzo(a,h)anthracene (aq)	µg/l									< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01				
Fluoranthene (aq)	µg/l		0.0063	0.0063						< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01				
Fluorene (aq)	µg/l									< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01				
Indeno(1,2,3-cd)pyrene (aq)	µg/l	0.1		0.1						< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01				
Naphthalene (aq)	µg/l		2	2						< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01				
Phenanthrene (aq)	µg/l									< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01				
Pyrene (aq)	µg/l									< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01				
PAH, Total Detected USEPA 16 (aq)	µg/l									< 0.16			< 0.16			< 0.16	< 0.16	< 0.16	< 0.16				
Iron (total)	mg/l	0.2	1	0.2						0.075			<0.004			0.01	0.032	0.01	0.006				
Zinc (total)	µg/l		18.7	18.7						10			4.3			6	3.6	14	14				
Magnesium (dissolved)	mg/l						1.66			1.8			1.7			1.6	1.6	1.8	1.7				
Potassium (dissolved)	mg/l						1.15			1.5			1.3			0.91	1.2	1.2	1				
Magnesium (total)	mg/l									2			1.8			1.7	1.7	1.8	1.7				
Potassium (total)	mg/l									2.7			1.3			0.99	1.2	1.2	1.3				
Total Phosphate as P	µg/l												50			33	39		46				
Phosphorus (total)	µg/l						52.2			63			490			760	56	63	54				

Shading denotes exceedance of EAL

Table 2: Groundwater Analytical Results

Sample Description					MW21-02	MW21-02	MW21-02	MW21-02	MW21-02	MW21-02	MW21-02	MW21-02	MW21-02	MW21-02	MW21-02	MW21-02	MW21-02	MW21-02
Date Sampled					07/02/22	07/03/22	07/04/22	03/05/22	06/06/22	04/07/22	01/08/22	05/09/22	03/10/22	07/11/22	05/12/22	06/03/23	05/06/23	04/09/23
Analyte	**Units**	**DWS**	**EQS**	**EAL**														
Datum elevation (cover level)	mAOD				73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23
Height of datum point above ground level	m				0.55	0.56	0.56	0.55	0.55	0.54	0.55	0.54	0.54	0.54	0.54	0.55	0.54	0.54
Depth to water below datum point	m				1	1	0.95	0.92	0.9	1	1.04	1.06	1.08	1.05	1.07	0.9	0.82	0.9
Groundwater level	mAOD				72.23	72.23	72.28	72.31	72.33	72.23	72.19	72.17	72.15	72.18	72.16	72.33	72.41	72.33
Total depth	m				3.29	3.29	3.29	3.29	3.29	3.28	3.29	3.28	3.29	3.29	3.29	3.28	3.28	3.27
Field pH	pH Units	6.5 to 9.5	6 to 9	6 to 9	7.31	7.32	7.16	7.27	7.28	7.36	7.37	7.19	6.85	7.43	7.4	6.91	6.4	7.1
Field electrical conductivity	µS/cm				603.7	609	619	614.1	560.7	607.7	601.5	589.4	595.9	573.7	594.4	600.7	557.8	548.8
Field dissolved oxygen	%				68.1	69.7	64.4	64.7	58.1	56.1	50.2	45.5	42.6	37.5	45	68.7	61.1	54.5
Field Redox potential	mV				112	162	129	-72	269	415	602	312	625	334	-84	260	940	432
Field temperature	oC				8.6	9.3	10	11	12.6	13.6	14.6	14.7	13	11.9	10.1	9.4	13	15.1
pH	pH Units	6.5 to 9.5	6 to 9	6 to 9		8.22			7.3			7.3			7.4	7.4	7.3	7.3
Conductivity @ 20 deg.C	mS/cm	2.5		2.5		0.479			0.34			0.49			0.49	0.48	0.47	0.48
Ammoniacal Nitrogen as N	mg/l	0.389	0.25	0.25		<0.2			<0.015			<0.015			< 0.015	< 0.015	< 0.015	< 0.015
Nitrate as NO3	mg/l	50		50		34.0			29.9			29.4			31.3	31.8	31.8	31.5
Nitrite as NO2	mg/l	0.5		0.5		<0.05			< 0.0033			< 0.0033			0.0061	< 0.0033	< 0.0033	< 0.0033
Phosphate (Ortho as P)	mg/l		0.045	0.045		0.046			0.050								0.053	
Hardness	mg/l																	
Total Oxidised Nitrogen (TON) as N	mg/l					7.68			6.7			6.6			7.1	7.2	7.2	7.1
Total Suspended Solids	mg/l					<2			< 2.0			< 2.0			< 2.0	< 2.0	< 2.0	< 2.0
Arsenic (diss.filt)	µg/l	10	50	10														
Cadmium (diss.filt)	µg/l	5	0.25	0.25														
Chromium (diss.filt)	µg/l	50	3.4	3.4														
Copper (diss.filt)	µg/l	2000	2.99	2.99														
Iron (Dis.Filt)	mg/l	0.2	1	0.2		<0.019			0.029			< 0.004			< 0.004	< 0.004	< 0.004	0.004
Lead (diss.filt)	µg/l	10	1.2	1.2														
Manganese (diss.filt)	µg/l	50	524.66	50														
Mercury (diss.filt)	µg/l	1	0.07	0.07														
Nickel (diss.filt)	µg/l	20	9.3	9.3														
Zinc (diss.filt)	µg/l		18.7	18.7		2.16			7.4			7.5			1.8	1.3	3.4	1.6
Acenaphthene (aq)	µg/l								< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene (aq)	µg/l								< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01
Anthracene (aq)	µg/l		0.1	0.1					< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene (aq)	µg/l								< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene (aq)	µg/l	0.01	0.00017	0.00017					< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene (aq)	µg/l	0.1		0.1					< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene (aq)	µg/l	0.1		0.1					< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene (aq)	µg/l	0.1		0.1					< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01
Chrysene (aq)	µg/l								< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene (aq)	µg/l								< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene (aq)	µg/l		0.0063	0.0063					< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01
Fluorene (aq)	µg/l								< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene (aq)	µg/l	0.1		0.1					< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01
Naphthalene (aq)	µg/l		2	2					< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene (aq)	µg/l								< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01
Pyrene (aq)	µg/l								< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01
PAH, Total Detected USEPA 16 (aq)	µg/l								< 0.16			< 0.16			< 0.16	< 0.16	< 0.16	< 0.16
Iron (total)	mg/l	0.2	1	0.2					0.06			0.008			0.012	0.009	0.004	0.007
Zinc (total)	µg/l		18.7	18.7					11			15			11	5.7	9.8	19
Magnesium (dissolved)	mg/l					1.61			1.9			1.7			1.6	1.6	1.7	1.7
Potassium (dissolved)	mg/l					1.1			2			1.3			1.1	1.1	1.1	1.1
Magnesium (total)	mg/l								1.9			1.8			1.7	1.8	1.8	1.8
Potassium (total)	mg/l								2.6			1.3			1.2	1.1	1.2	1.2
Total Phosphate as P	µg/l											53			38	45		48
Phosphorus (total)	µg/l					71.7			69			780			780	53	73	54

Shading denotes exceedance of EAL

Table 3: Affinity Water sample data form factory wells

Analyte	Units	BH1	BH1	BH1	BH1	BH1	BH1	BH1	BH1	BH1	BH1		BH2	BH2
		29/01/16	30/07/18	23/01/19	11/05/20	05/11/20	02/02/21	07/10/21	27/04/22	14/11/22	10/01/23		30/07/18	29/10/19
1_1_1-Trichloroethane	ug/l	<0.10	<0.10	<0.10	<0.19	<0.19	<0.19	<0.46	<0.46	<0.46	<0.46		<0.10	
1_1-Dichloroethene	ug/l	<0.09	<0.09		<0.18	<0.18	<0.18	<0.25	<0.25	<0.25	<0.25		<0.09	<0.09
1_2-Dichloroethane	ug/l	<0.04	<0.04	<0.04	<0.09	<0.09	<0.09	<0.14	<0.14	<0.14	<0.14		<0.04	<0.04
Acrylamide	ug/l	<0.005	<0.005	<0.005	<0.005			<0.009	<0.009	<0.009	<0.009		<0.005	<0.005
Alkalinity as HCO3	mg/l	287	289	289	290	289	297	296	289	281	282		291	288
Alpha Radioactivity	Bq	<0.020	<0.033	<0.0320	<0.0200	<0.020	<0.020		<0.020	<0.020	<0.020		<0.030	<0.0200
Aluminium as Al	ug/l	<5.000	<5.000	<5.000	<5.000	<5.000	<5.000	<5.000	<5.000	<5.000	<5.000		<5.000	<5.000
Ammonium as NH4	mg/l	<0.04	<0.04	<0.04	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.04	<0.04
Antimony as Sb	ug/l	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200		<0.200	<0.200
Arsenic as As	ug/l	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000		<1.000	<1.000
Benzene	ug/l	<0.02	<0.02	<0.02	<0.03	<0.03	<0.03	<0.07	<0.07	<0.07	<0.07		<0.02	<0.02
Benzo (a) Pyrene	ug/l		<0.0006	<0.0006	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0012	<0.0012		<0.0006	<0.0006
Benzo (b) Fluoranthene	ug/l		<0.0011	<0.0011	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0016	<0.0016		<0.0011	<0.0011
Benzo (ghi) Perylene	ug/l		<0.0007	<0.0007	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0015	<0.0015		<0.0007	<0.0007
Benzo (k) Fluoranthene	ug/l			<0.0011	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0017	<0.0017			<0.0011
Beta Radioactivity	Bq	0.036	0.02	0.021	0.026	0.027	0.03		0.031	0.02	0.027		0.028	0.019
Boron as B	mg/l	<0.100	<0.100		<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		<0.100	<0.100
Bromate as BrO3	ug/l	<0.5	<0.5	<0.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3		<0.5	<0.5
Bromide as Br	ug/l	43	38	39	38	42	37	41	<9	43	39		34	40
Bromodichloromethane	ug/l	<0.10	<0.10	<0.10	<0.12	<0.12	<0.12	<0.20	<0.20	<0.20	<0.20		<0.10	<0.10
Cadmium as Cd	ug/l	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200		<0.200	<0.200
Chlorate as ClO3	ug/l		<2										<2	
Chloride as Cl	mg/l	16	16	16	17	16	16	16	17	15	16		15	15
Chlorite as ClO2	ug/l		<1.0										<1.0	
Chromium as Cr	ug/l	<2.000	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500		<0.500	<0.500
cis-1_2-Dichloroethene	ug/l	<0.11	<0.11		<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22		<0.11	
Colour	mg/l Pt/Co	<1.0	<1.0	<1.0	<2.5	<2.5	<2.5	<2.5		<2.5	<2.5		<1.0	<1.0
Copper as Cu	mg/l	<0.010	<0.010	<0.010	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019		<0.010	<0.010
Dibromochloromethane	ug/l	<0.07	<0.07	<0.07	<0.14	<0.14	<0.14	<0.17	<0.17	<0.17	<0.17		<0.07	<0.07
Electrical Conductivity @ 20 deg C	uS/cm	478	479	460	471	460	489	485	470	481	469		475	466
Epichlorhydrin	ug_l	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		<0.100	<0.100
Ethyl benzene	ug/l	<0.04	<0.04		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08		<0.04	
Fluoranthene	ug/l	<0.0030	<0.0034	<0.0034	<0.0115	<0.0115	<0.0115	<0.0115	<0.0115	<0.0074	<0.0074		<0.0034	<0.0034
Fluoride as F	mg/l	0.078	0.058	0.059	0.063	0.071	0.056	0.068	0.066	0.07	0.07		0.059	0.061
Hydrogen Ion	pH value	6.9	7.2	6.9	7.2	7.3	7.1	7.1	7	7.2	7.2		7.2	7.2
Indeno (1_2_3 cd) Pyrene	ug/l		<0.0010	<0.0010	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0021	<0.0021		<0.0010	<0.0010
Iron as Fe	ug/l	<15.000	<15.000	<15.000	<15.000	<15.000	<15.000	<15.000	<15.000	<15.000	<15.000		<15.000	<15.000
Lead as Pb	ug/l	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000		<1.000	<1.000
m + p Xylene	ug/l	<0.08	<0.08		<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15		<0.08	
Manganese as Mn	ug/l	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000		<1.000	<1.000
Mercury as Hg	ug/l	<0.100	<0.100	<0.100	<0.100	<0.100							<0.100	<0.100
MTBE	ug/l	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<0.11	<0.11	<0.11	<0.11		<0.05	<0.05
Nickel as Ni	ug/l	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000		2.36	<2.000
Nitrate as NO3	mg/l	31.7	29.1		33.7	31.9	30	29.4	31.4	32.8	33.7		29.2	
Nitrite as NO2	mg/l	<0.008	<0.008	<0.008	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007		<0.008	<0.008
o - Xylene	ug/l	<0.04	<0.04		<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07		<0.04	
Selenium as Se	ug/l	<1.000	<1.000	<1.000		<1.000							<1.000	
Sodium as Na	mg/l	6.22	7.09	5.83	6.93	7	6.46	6.96	6.95	6.21	5.91		6.39	5.29
Sulphate as SO4	mg/l	11	10	10	11	<11	<11	<11	<11	<11	<11		9	9
Tetrachloroethene	ug/l	<0.03	<0.03	<0.03	<0.07	<0.07	<0.07	<0.27	<0.27	<0.27	<0.27		<0.03	<0.03
Tetrachloromethane	ug/l	<0.06	<0.06	<0.06	<0.11	<0.11	<0.11	<0.16	<0.16	<0.16	<0.16		<0.06	<0.06
Toluene	ug/l	<0.05	<0.05		<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09		<0.05	
Total Cyanide as CN	ug/l	<1.0	<1.0	<1.0	<2.7	<2.7	<2.7	<2.7	<1.2	<1.2	<1.2		<1.0	<1.0
Total Hardness as Ca	mg/l	116	111	109	104	109	105	108	101	106	107		113	111
Total Oxidised Nitrogen as NO3	mg/l	31.7	29.1	31	33.7	31.9	30	29.4	31.4	32.8	33.7		29.2	27.8
Total Polycyclic Aromatic Hydrocarbo	ug/l		0		0	0	0	0	0	0	0		0	
Total Trihalomethanes	ug/l	0	0		0	0	0	0	0	0	0		0	
Total Xylene	ug/l	<0.12	<0.12		<0.12	<0.12	<0.12	0	0	0	0		<0.12	
trans-1_2-Dichloroethene	ug/l	<0.09	<0.09		<0.19	<0.19	<0.19	<0.27	<0.27	<0.27	<0.27		<0.09	<0.09
Tribromomethane (bromoform)	ug/l	<0.11	<0.11	<0.11	<0.22	<0.22	<0.22	<0.30	<0.30	<0.30	<0.30		<0.11	<0.11
Trichloroethene	ug/l	<0.03	<0.03	<0.03	<0.06	<0.06	<0.06	<0.43	<0.43	<0.43	<0.43		<0.03	<0.03
Trichloromethane (chloroform)	ug/l	<0.14	<0.14	<0.14	<0.29	<0.29	<0.29	<0.62	<0.62	<0.62	<0.62		<0.14	<0.14
Tritium	Bq/l	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		<5.0	<5.0
Turbidity	NTU	0.24	0.25	0.12	<0.10	0.11	0.19	0.25	0.1	0.13	<0.10		0.21	0.25
Vinyl Chloride	ug/l	<0.06	<0.06			<0.13	<0.13	<0.13		<0.13	<0.13		<0.06	<0.06
Zinc as Zn	ug/l	18.9	13.9	14.1	<10.000	10.7	10.5	<10.000	<10.000	<10.000	<10.000		23.9	<10.000

Note: BH1 & BH2 are Factory boreholes 1 & 2. BH14 is a farm well which is sometimes used to supply factory wash water. AWC is from the factory water silos and is a mixed sample of factory boreholes 1 and 2 (and 14 if this was being used for the factory at the time)

Table 3: Affinity Water sample data form factory wells

Analyte	Units		BH14	BH14	BH14	BH14	BH14?	BH14	BH14	BH14	BH14	BH14		AWC
			31/10/18	23/01/19	09/05/19	29/10/19	07/08/20	02/02/21	20/04/21	07/10/21	27/04/22	14/11/22		02/07/19
1_1_1-Trichloroethane	ug/l		<0.10	<0.10	<0.10		<0.19	<0.19	<0.19	<0.46	<0.46	<0.46		<0.10
1_1-Dichloroethene	ug/l		<0.09		<0.09	<0.09		<0.18	<0.18	<0.25	<0.25	<0.25		<0.09
1_2-Dichloroethane	ug/l		<0.04	<0.04	<0.04	<0.04	<0.09	<0.09	<0.09	<0.14	<0.14	<0.14		<0.04
Acrylamide	ug/l		<0.005	<0.005	<0.005	<0.005	<0.005		<0.009	0.012	<0.009	<0.009		<0.005
Alkalinity as HCO3	mg/l		284	283	282	284	290	288	283	289	283	279		289
Alpha Radioactivity	Bq			<0.0320	<0.020	<0.0200	<0.020	<0.020	<0.021		<0.020	<0.020		
Aluminium as Al	ug/l		<5.000	<5.000	<5.000	<5.000	<5.000	<5.000	<5.000	<5.000	<5.000	<5.000		<5.000
Ammonium as NH4	mg/l		<0.04	<0.04	<0.04	<0.04	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.04
Antimony as Sb	ug/l		<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200		<0.200
Arsenic as As	ug/l		<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000		<1.000
Benzene	ug/l		<0.02	<0.02	<0.02	<0.02	<0.03	<0.03	<0.03	<0.07	<0.07	<0.07		<0.02
Benzo (a) Pyrene	ug/l			<0.0006	<0.0006	<0.0006	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0012		<0.0006
Benzo (b) Fluoranthene	ug/l		<0.0011	<0.0011	<0.0011	<0.0011	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0016		<0.0011
Benzo (ghi) Perylene	ug/l		<0.0007	<0.0007	<0.0007	<0.0007	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0015		<0.0007
Benzo (k) Fluoranthene	ug/l		<0.0011	<0.0011	<0.0011	<0.0011	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0017		<0.0011
Beta Radioactivity	Bq			0.016	0.034	<0.0180	0.028	0.028	0.035		0.04	0.025		
Boron as B	mg/l		<0.100		<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		<0.100
Bromate as BrO3	ug/l		<0.5	<0.5	<0.5	<0.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3		<0.5
Bromide as Br	ug/l		42	39	35	40	38	39	39	40	38	41		<5
Bromodichloromethane	ug/l		<0.10	<0.10	<0.10	<0.10	<0.12	<0.12	<0.12	<0.20	<0.20	<0.20		<0.10
Cadmium as Cd	ug/l		<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200		<0.200
Chlorate as ClO3	ug/l		<2		<2									43
Chloride as Cl	mg/l		15	15	14	14	15	15	16	15	15	15		16
Chlorite as ClO2	ug/l		<1.0		<1.0									<1.0
Chromium as Cr	ug/l		<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500		<0.500
cis-1_2-Dichloroethene	ug/l		<0.11		<0.11			<0.22	<0.22	<0.22	<0.22	<0.22		<0.11
Colour	mg/l Pt/Co		<1.0	<1.0	<1.0	<1.0	<2.5	<2.5	<2.5	<2.5		<2.5		<1.0
Copper as Cu	mg/l		<0.010	<0.010	<0.010	<0.010	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019		<0.010
Dibromochloromethane	ug/l		<0.07	<0.07	<0.07	<0.07	<0.14	<0.14	<0.14	<0.17	<0.17	<0.17		<0.07
Electrical Conductivity @ 20 deg C	uS/cm		463	448	468	481	474	494	468	466	468	479		481
Epichlorhydrin	ug_l		<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		<0.100
Ethyl benzene	ug/l		<0.04		<0.04			<0.08	<0.08	<0.08	<0.08	<0.08		<0.04
Fluoranthene	ug/l		<0.0034	<0.0034	<0.0034	0.0037	<0.0115	<0.0115	<0.0115	0.0118	<0.0115	<0.0074		<0.0034
Fluoride as F	mg/l		0.062	0.057	0.07	0.059	0.057	0.058	0.069	0.066	0.067	0.061		0.069
Hydrogen Ion	pH value		7.1	7.1	7.3	7.1	7.1	7.2	7.1	7.2	7.3	7.2		7.3
Indeno (1_2_3 cd) Pyrene	ug/l		<0.0010	<0.0010	<0.0010	<0.0010	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0021		<0.0010
Iron as Fe	ug/l		<15.000	<15.000	<15.000	<15.000	<15.000	<15.000	<15.000	<15.000	<15.000	<15.000		<15.000
Lead as Pb	ug/l		<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000		<1.000
m + p Xylene	ug/l		<0.08		<0.08			<0.15	<0.15	<0.15	<0.15	<0.15		<0.08
Manganese as Mn	ug/l		<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000		<1.000
Mercury as Hg	ug/l		<0.100	<0.100		<0.100	<0.100							<0.100
MTBE	ug/l		<0.05	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<0.11	<0.11	<0.11		<0.05
Nickel as Ni	ug/l		<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000		<2.000
Nitrate as NO3	mg/l		31.2		32.5		32	30.9	31.6	30.8	32.8	31.6		33.6
Nitrite as NO2	mg/l		<0.008	<0.008	<0.008	<0.008	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007		<0.008
o - Xylene	ug/l		<0.04		<0.04			<0.07	<0.07	<0.07	<0.07	<0.07		<0.04
Selenium as Se	ug/l		<1.000	<1.000			<1.000							<1.000
Sodium as Na	mg/l		5.88	5.41	6.19	5.39	6.01	5.89	6.32	6.36	6.31	5.73		5.88
Sulphate as SO4	mg/l		9	9	9	9	<11	<11	<11	<11	<11	<11		10
Tetrachloroethene	ug/l		<0.03	<0.03	<0.03	<0.03	<0.07	<0.07	<0.07	<0.27	<0.27	<0.27		<0.03
Tetrachloromethane	ug/l		<0.06		<0.06	<0.06	<0.11	<0.11	<0.11	<0.16	<0.16	<0.16		<0.06
Toluene	ug/l		<0.05		<0.05			<0.09	<0.09	<0.09	<0.09	<0.09		<0.05
Total Cyanide as CN	ug/l		3.8	<1.0	<1.0	<1.0	<2.7	<2.7	<2.7	<2.7	<1.2	<1.2		<1.0
Total Hardness as Ca	mg/l		107	103	105	109	102	108	107	102	100	102		118
Total Oxidised Nitrogen as NO3	mg/l		31.2	30.2	32.5	28.5	32	30.9	31.6	30.8	32.8	31.6		33.6
Total Polycyclic Aromatic Hydrocarbo	ug/l		0		0			0	0	0	0	0		0
Total Trihalomethanes	ug/l		0		0			0	0	0	0	0		0
Total Xylene	ug/l		<0.12		<0.12			<0.12	<0.12	0	0	0		<0.12
trans-1_2-Dichloroethene	ug/l		<0.09		<0.09	<0.09		<0.19	<0.19	<0.27	<0.27	<0.27		<0.09
Tribromomethane (bromoform)	ug/l		<0.11	<0.11	<0.11	<0.11	<0.22	<0.22	<0.22	<0.30	<0.30	<0.30		<0.11
Trichloroethene	ug/l		<0.03	<0.03	<0.03	<0.03	<0.06	<0.06	<0.06	<0.43	<0.43	<0.43		<0.03
Trichloromethane (chloroform)	ug/l		<0.14	<0.14	<0.14	<0.14	<0.29	<0.29	<0.29	<0.62	<0.62	<0.62		<0.14
Tritium	Bq/l		<5.0	5.2	<5.4	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		<5.0
Turbidity	NTU		0.18	0.15	0.21	0.17	0.22	0.18	0.19	0.13	0.25	0.18		0.11
Vinyl Chloride	ug/l		<0.06		<0.06	<0.06	<0.13	<0.13	<0.13	<0.13		<0.13		<0.06
Zinc as Zn	ug/l		11.2	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000		<10.000

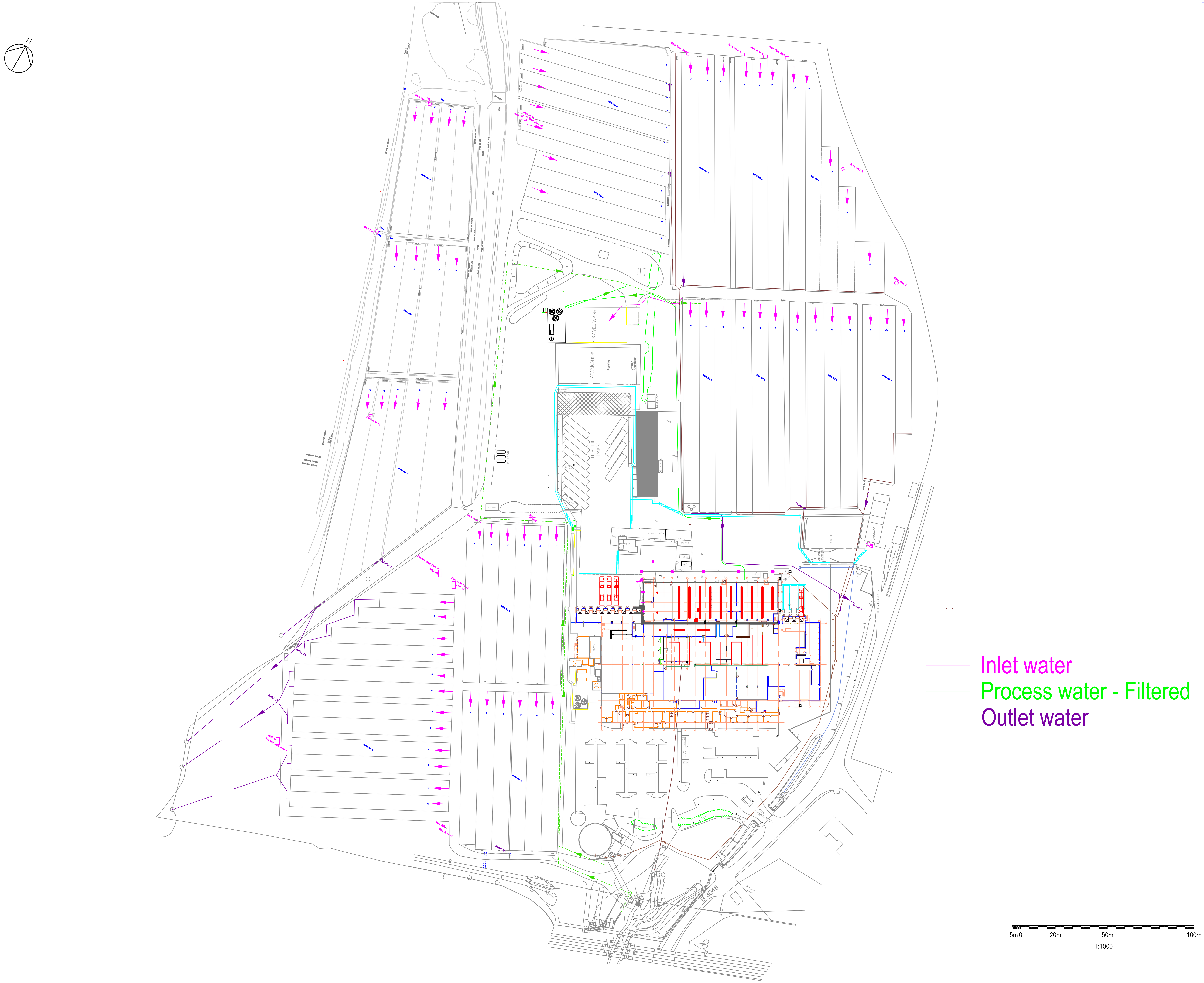
Note: BH1 & BH2 are Factory boreholes 1 & 2. BH14 is a farm well which is sometimes used to supply factory wash water. AWC is from the factory water silos and is a mixed sample of factory boreholes 1 and 2 (and 14 if this was being used for the factory at the time)

Analyte	Units	AWC	AWC
		24/01/20	24/01/20
1_1_1-Trichloroethane	ug/l	<0.19	<0.19
1_1-Dichloroethene	ug/l	<0.18	<0.18
1_2-Dichloroethane	ug/l		
Acrylamide	ug/l	<0.005	<0.005
Alkalinity as HCO3	mg/l	286	283
Alpha Radioactivity	Bq	<0.0200	<0.0230
Aluminium as Al	ug/l	<5.000	<5.000
Ammonium as NH4	mg/l	<0.05	<0.05
Antimony as Sb	ug/l	<0.200	<0.200
Arsenic as As	ug/l	<1.000	<1.000
Benzene	ug/l	<0.03	<0.03
Benzo (a) Pyrene	ug/l	<0.0018	<0.0018
Benzo (b) Fluoranthene	ug/l	<0.0036	<0.0036
Benzo (ghi) Perylene	ug/l	<0.0022	<0.0022
Benzo (k) Fluoranthene	ug/l	<0.0036	<0.0036
Beta Radioactivity	Bq	0.033	0.023
Boron as B	mg/l	<0.100	<0.100
Bromate as BrO3	ug/l	<0.3	<0.3
Bromide as Br	ug/l	39	37
Bromodichloromethane	ug/l	<0.12	<0.12
Cadmium as Cd	ug/l	<0.200	<0.200
Chlorate as ClO3	ug/l		
Chloride as Cl	mg/l	15	15
Chlorite as ClO2	ug/l		
Chromium as Cr	ug/l	<0.500	<0.500
cis-1_2-Dichloroethene	ug/l	<0.22	<0.22
Colour	mg/l Pt/Co	<2.5	<2.5
Copper as Cu	mg/l	<0.019	<0.019
Dibromochloromethane	ug/l	<0.14	<0.14
Electrical Conductivity @ 20 deg C	uS/cm	405	422
Epichlorhydrin	ug_l	<0.100	<0.100
Ethyl benzene	ug/l		
Fluoranthene	ug/l	0.0187	<0.0115
Fluoride as F	mg/l	0.057	0.052
Hydrogen Ion	pH value	7.3	7.3
Indeno (1_2_3 cd) Pyrene	ug/l	<0.0032	<0.0032
Iron as Fe	ug/l	<15.000	<15.000
Lead as Pb	ug/l	<1.000	<1.000
m + p Xylene	ug/l		
Manganese as Mn	ug/l	<1.000	<1.000
Mercury as Hg	ug/l	<0.100	<0.100
MTBE	ug/l	<0.10	<0.10
Nickel as Ni	ug/l	<2.000	<2.000
Nitrate as NO3	mg/l		
Nitrite as NO2	mg/l	<0.007	<0.007
o - Xylene	ug/l		
Selenium as Se	ug/l	<1.000	<1.000
Sodium as Na	mg/l	6.1	5.83
Sulphate as SO4	mg/l	<11	<11
Tetrachloroethene	ug/l	<0.07	<0.07
Tetrachloromethane	ug/l	<0.11	<0.11
Toluene	ug/l		
Total Cyanide as CN	ug/l	<2.7	<2.7
Total Hardness as Ca	mg/l	110	112
Total Oxidised Nitrogen as NO3	mg/l	31.7	31.4
Total Polycyclic Aromatic Hydrocarbo	ug/l		
Total Trihalomethanes	ug/l		
Total Xylene	ug/l		
trans-1_2-Dichloroethene	ug/l		
Tribromomethane (bromoform)	ug/l	<0.22	<0.22
Trichloroethene	ug/l	<0.06	<0.06
Trichloromethane (chloroform)	ug/l		
Tritium	Bq/l	<5.0	<5.0
Turbidity	NTU	<0.10	0.1
Vinyl Chloride	ug/l	<0.13	
Zinc as Zn	ug/l	<10.000	<10.000

Note: BH1 & BH2 are Factory boreholes 1 & 2. BH14 is a farm well which is sometimes used to supply factory wash water. AWC is from the factory water silos and is a mixed sample of factory boreholes 1 and 2 (and 14 if this was being used for the factory at the time)

APPENDIX 1

Detailed Plan Showing Current Water Routing at the Site



Rev	Drwn	Chk'd	App'd	Description	Date
C1	CS	LM	CS	Newly Created	30.04.24

Purpose of Issue: Site Water Flow

Status: P1

Classification: Commercial in Confidence

Contractor

Project: Existing Site Water Flow

Drawing: Vitacress Salad
St Mary Bourne Site
Site Inlet and Outlet points

Scale @ A1 | Drawn | Checked | Approved

Project No. | Date

Drawing Identifier
Project - Originator - Zone - Level - File Type - Role - Number
AND-VIT-ENV-00-DR-Y-0033

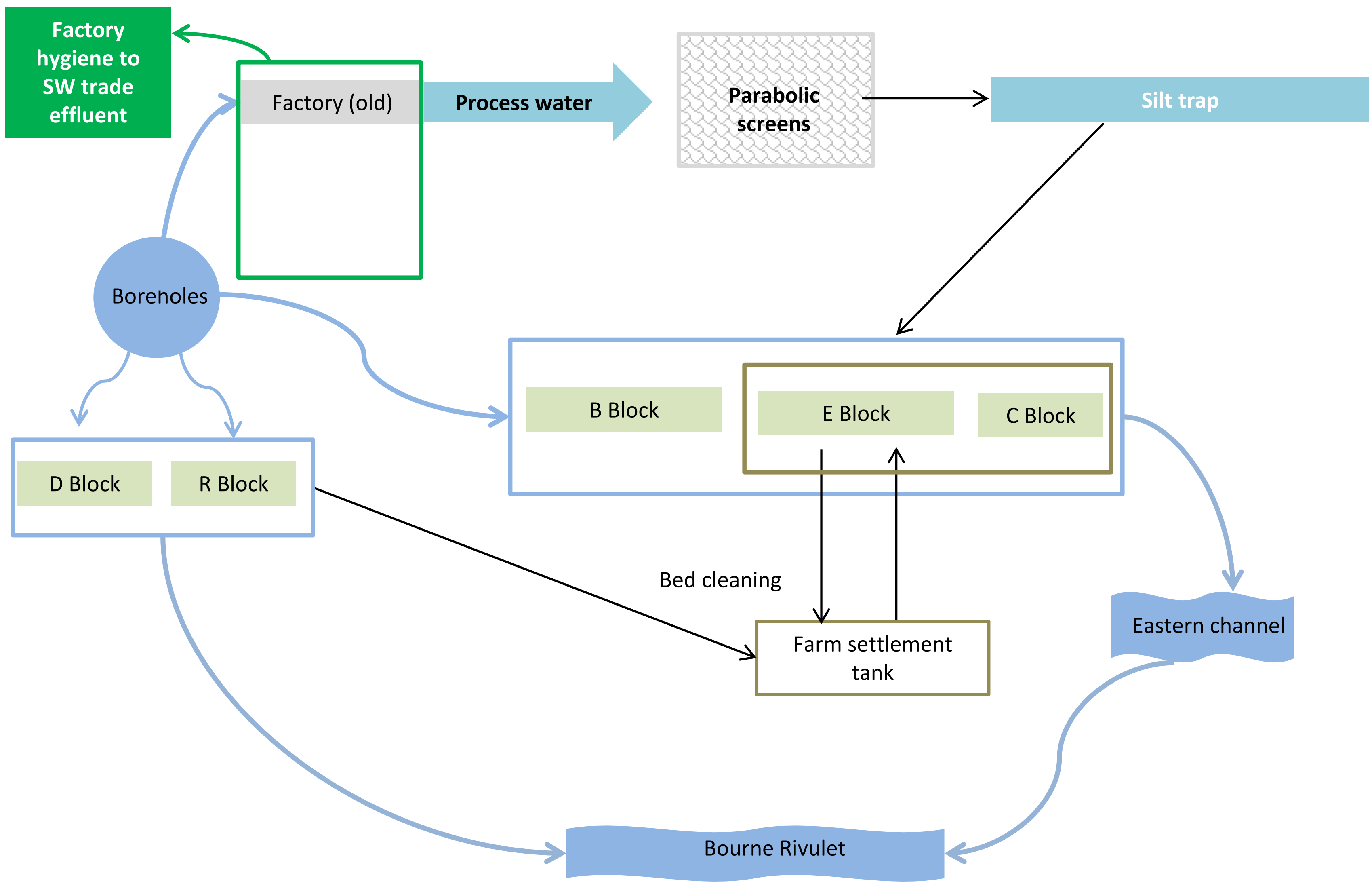
BS1192 Compliant revision: P1

Lower Link Farm, St Mary Bourne, Andover, Hampshire, SP11 6DB
www.vitacress.com Tel. 01264 738766

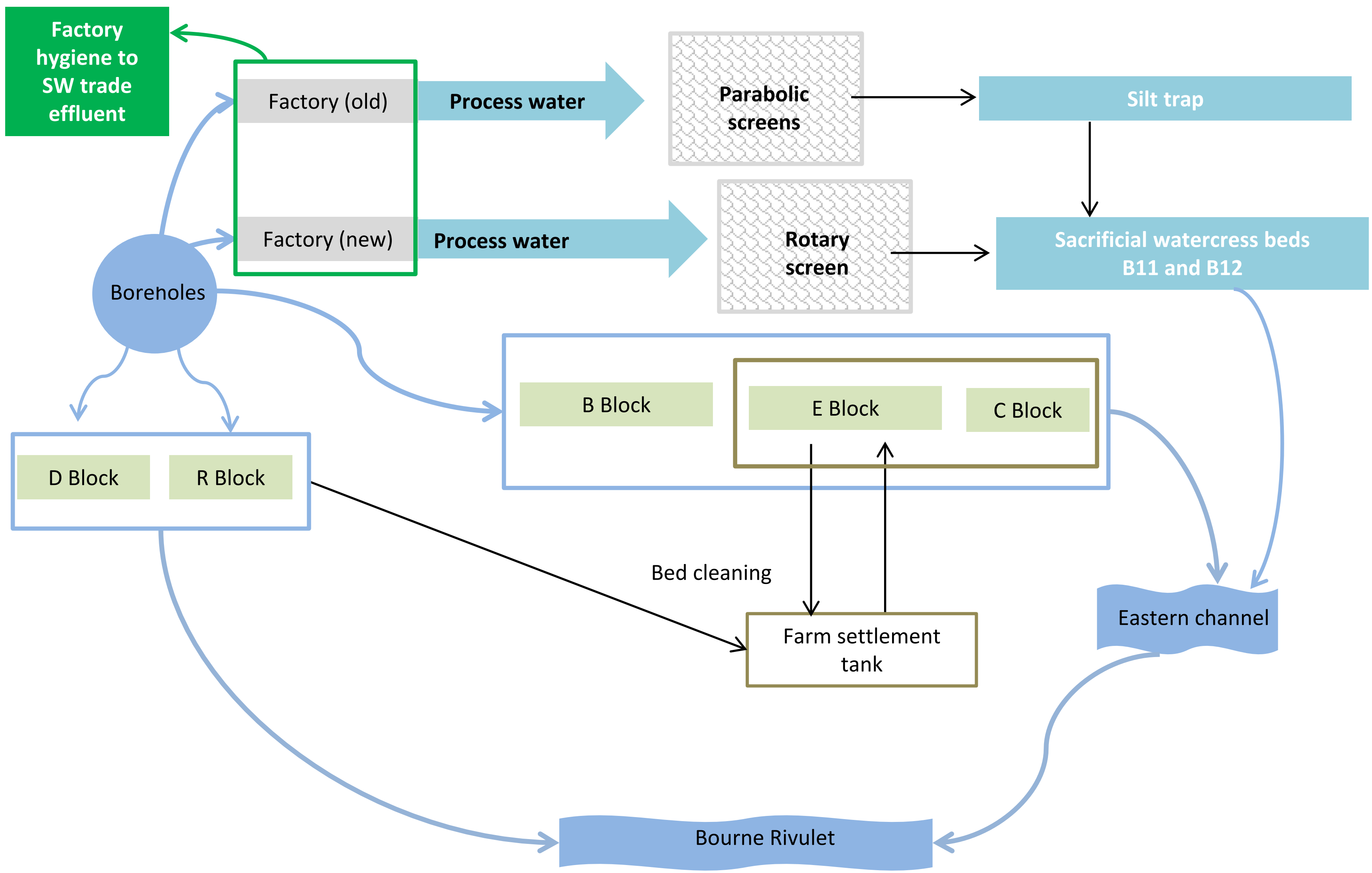
APPENDIX 2

Schematic Plans Showing Water Routing at the Site

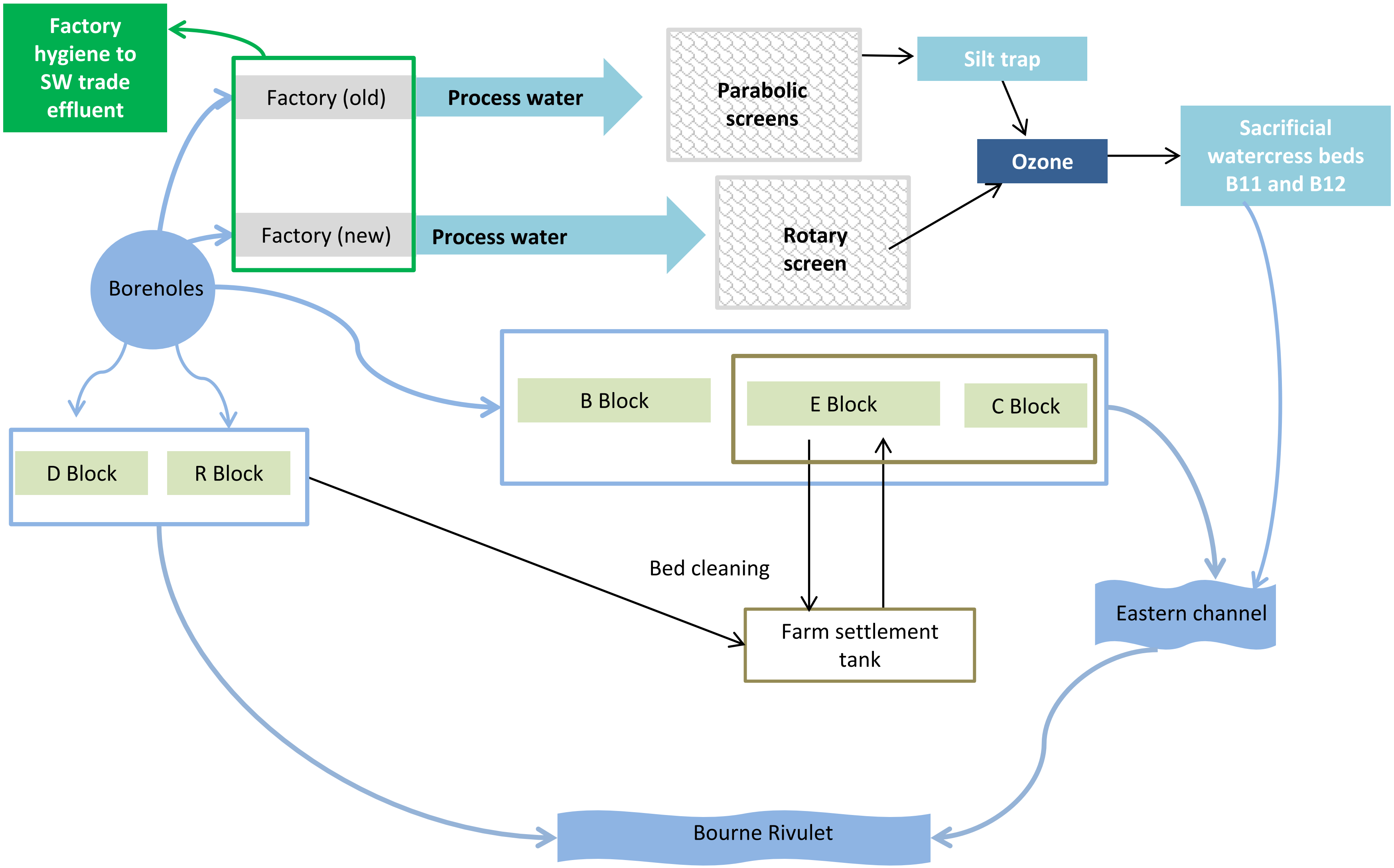
Previous water management (pre July 2022)



Current water management (2023)



Water management with ozone (approx. 2025)



APPENDIX 3
BGS Borehole Logs

SU44 NW/30-38

283/104 E. James and Son, Watercress Beds, St. Mary Bourne

4298 · 4923 (a) Surface +c.245. Bore 80 x c.3 in. Lining tubes: c.15. Overflowed. *Stanbrook, before 1908.*
4290 · 4935 (b) Surface +c.245. Bore c.90 x c.3 in. Lining tubes: c.15. Overflowed. *Stanbrook, before 1908.*
425 · 494 (c) Surface +c.245. Bore 6 in. *Richards, 1922.*
(d) Surface +c.245. Bore 157 x 6 in. *Richards, 1922.*
(e) Surface +c.245. Bore 157 x 6 in. *Richards, 1922.*
(f) Surface +c.245. Bore 185 x 6 in. *Richards, 1922.*
(g) Surface +c.245. Bore 177 x 6 in. *Richards, 1922.*
426 · 493 (h) Surface +c.245. Bore 175 x 6 in. *Richards, 1922.*

427 · 496 k
427 · 495 l
426 · 495 m
426 · 494 n

283/104 (cont.)

426 · 494 p
428 · 490 q

(j) - (l) Surface +c.245. Three bores 185 x 6 in. *Richards, 1922.*
(m) - (p) Surface +c.245. Three bores c.175 x 6 in. *Isler, 1922.*
(q) - (y) Surface +c.245. Nine 6 in bores. Depths unknown. *Before 1942.*
(a) - (y) Overflowed. *Feb. 1942.* Overflowed. *Oct. 1963.*

(c) Drift	...	...	12	12
UCk	...	...	170	182
MCk	...	...	18	200

a) Drift / UCk } 80 80.
b) Drift / UCk } c.90 c.90.

c. No 1.

Ballast. (Drift)	12ft.	12ft.
Hard Chalk & Flints (UCk)	167ft.	179ft.
Hard Rock	3ft.	182ft.
Chalk. (MCk)	18ft.	200ft.

SCAH 23.12.41

d. No 2.

Ballast. (Drift 12)	12ft.	12ft.
Hard Chalk & Flints (UCk 145)	126ft.	138ft.
Grey Chalk.	19ft.	157ft.

e. No 3.

Ballast. (Drift 15)	15ft.	15ft.
Chalk & Flints (UCk 142)	142ft.	157ft.

f. No 4.

Ballast. (Drift 12)	12ft.	12ft.
Chalk & Flints	140ft	152ft.
Hard Rock (UCk / ?MCk 173)	4ft.	157ft
Chalk.	20ft.	185ft.

g. No 5.

Ballast (Drift 14)	14ft	14ft.
Chalk	137ft.	151ft.
Rock. (UCk 163)	4ft.	155ft.
Hard Chalk & Flints	20ft.	175ft.
Grey Chalk	2ft.	177ft.

h. No 6.

Ballast (Drift 17)	17ft.	17ft.
Chalk (UCk 158')	137ft.	154ft.
Rock	4ft.	158ft.
Grey Chalk	17ft.	175ft.

j. No 7.

Ballast (Drift 22)	22ft.	22ft.
Chalk (UCk)	127ft.	149ft.
Hard Rock (?MCk 163)	5ft.	154ft.
Chalk	31ft.	185ft.

No 1. c: Drift 12, UCk 170, ?MCk 18

12/5/65

k. No 8.

Ballast (Drift 8)	8ft.	8ft.
Chalk (UCk)	137ft.	145ft.
Rock (MCk 177)	5ft.	150ft.
Chalk.	35ft.	185ft.

m. No 9.

Ballast (Drift 14)	14ft.	14ft.
Chalk. (UCk)	122ft.	136ft.
Rock (?MCk 171)	7ft.	143ft.
Chalk.	42ft.	185ft.

(l) Drift / UCk / ?MCk } 185 185

283/104

SU44 NW/30-38

ARTESIAN WELLS BORED FOR MRS. JAMES AT HURSTBOURNE BY R. RICHARDS & CO. 19..

No 1.

Ballast.	12ft.	12ft.
Hard Chalk & Flints	157ft.	179ft.
Hard Rock	3ft	182ft.
Chalk.	18ft.	200ft.

No 2.

Ballast.	12ft.	12ft.
Hard Chalk & Flints	126ft.	138ft.
Grey Chalk.	19ft	157ft.

No 3.

Ballast.	15ft.	15ft.
Chalk & Flints	142ft.	157ft.

No 4.

Ballast.	12ft.	12ft.
Chalk & Flints	140ft	152ft.
Hard Rock	4ft.	156ft.
Chalk.	29ft.	185ft.

g **No 5.** Gagman 283/104

Ballast	14ft	14ft.
Chalk	137ft.	151ft.
Rock.	4ft.	155ft.
Hard Chalk & Flints	20ft.	175ft.
Grey Chalk	2ft.	177ft.

h **No 6.**

Ballast	17ft.	17ft.
Chalk	137ft.	154ft.
Rock	4ft.	158ft.
Grey Chalk	17ft.	175ft.

j **No 7.**

Ballast	22ft.	22ft.
Chalk	127ft.	149ft.
Hard Rock	5ft.	154ft.
Chalk	31ft.	185ft.

No 1. c
B/ Drift 12
UCk 170
? MCk 18
12/5/65
dio

k **No 8.**

Ballast	8ft.	8ft.
Chalk	137ft.	145ft.
Rock	5ft.	150ft.
Chalk.	35ft.	185ft.

m **No 9.**

Ballast	14ft.	14ft.
Chalk.	122ft.	136ft.
Rock	7ft.	143ft.
Chalk.	42ft.	185ft.

Telephone Directory 1940: E. James, Watercress grower, Station Rd, St. Mary Bourne, Whitchurch.

(h)	Drift	17	17
	UCk	158	175
(j)	Drift	22	22
	UCk) ?MCk)	163	185

FILMED

* Insert Well Reference Letter, If More Than One Well At Site

P.T.O.

Section 6	Pumping test	Observ. well	Recorder	E.R. log

Geological Survey, Water Department, South Kensington, London, S.W.7.

(416a) Wt.34984/P.S.127 5m 9/63 G.W.B. Gp.563

283/104 E. James and Son, Watercress Beds, St. Mary Bourne SU44/69A-Y

(a) Surface +c.245. Bore 80 × c.3 in. Lining tubes: c.15. Overflowed. *Stanbrook, before 1908.*
(b) Surface +c.245. Bore c.90 × c.3 in. Lining tubes: c.15. Overflowed. *Stanbrook, before 1908.*
(c) Surface +c.245. Bore 6 in. *Richards, 1922.*
(d) Surface +c.245. Bore 157 × 6 in. *Richards, 1922.*
(e) Surface +c.245. Bore 157 × 6 in. *Richards, 1922.*
(f) Surface +c.245. Bore 185 × 6 in. *Richards, 1922.*
(g) Surface +c.245. Bore 177 × 6 in. *Richards, 1922.*
(h) Surface +c.245. Bore 175 × 6 in. *Richards, 1922.*

A. SU 4298 4923
B. SU 4290 4935
C-G SU 425 494
H. SU 4265 4936
J. SU 4273 4960
K. SU 4251 4926
L-P. SU 426 495
Q-Y. SU 428 491

283/104 (cont.)

(j) - (l) Surface +c.245. Three bores 185 × 6 in. *Richards, 1922.*
(m) - (p) Surface +c.245. Three bores c.175 × 6 in. *Isler, 1922.*
(q) - (y) Surface +c.245. Nine 6 in bores. Depths unknown. *Before 1942.*
(a) - (y) Overflowed. *Feb. 1942.* Overflowed. *Oct. 1963.*

(c)	Drift	... ...	12	12
	UCk	... ...	170	182
	MCk	... ...	18	200

a) Drift } UCk 80 80.
b) Drift } UCk c.90 c.90.

283/104

c No 1.

Drift	Ballast.	12ft.	12ft.
UCk	Hard Chalk & Flints	167ft.	179ft.
	Hard Rock	3ft	182ft.
MCk.	Chalk.	18ft	200ft.

SCAH 23.12.41

d. No 2. Drift 12 UCk 145

Ballast.	12ft.	12ft.
Hard Chalk & Flints	126ft.	138ft.
Grey Chalk.	19ft	157ft.

e. No 3. Drift 15 UCk 142

Ballast.	15ft.	15ft.
Chalk & Flints	142ft.	157ft.

f. No 4. Drift 12 UCk } ?MCk } 173

Ballast.	12ft.	12ft.
Chalk & Flints	140ft	152ft.
Hard Rock	4ft.	157ft
Chalk.	29ft.	185ft.

g. No 5. Drift 14 UCk 163

Ballast	14ft	14ft.
Chalk	137ft.	151ft
Rock.	4ft.	155ft.
Hard Chalk & Flints	20ft.	175ft.
Grey Chalk	2ft.	177ft.

h. No 6. Drift 17 UCk 158'

Ballast	17ft.	17ft.
Chalk	137ft.	154ft.
Rock	4ft.	158ft.
Grey Chalk	17ft.	175ft.

j No 7. Drift 22 UCk } ?MCk } 163

Ballast	22ft.	22ft.
Chalk	127ft.	149ft.
Hard Rock	5ft.	154ft.
Chalk	31ft.	185ft.

No 1. c
Drift 12
UCk 170
?MCk 18
12/5/65

k No 8. Drift 8 UCk } ?MCk } 177

Ballast	8ft.	8ft.
Chalk	137ft.	145ft.
Rock	5ft.	150ft.
Chalk.	35ft.	185ft.

m No 9. Drift 14 UCk } ?MCk } 171

Ballast	14ft.	14ft.
Chalk.	122ft.	136ft.
Rock	7ft.	143ft.
Chalk.	42ft.	185ft.

(l) Drift } UCk } ?MCk } 185 185

SU44/69
C-M
283
104

ARTESIAN WELLS BORED FOR MRS. JAMES AT HURSTBOURNE BY R. RICHARDS & CO. 1922.

No 1.

Ballast.	12ft.	12ft.
Hard Chalk & Flints	167ft.	179ft.
Hard Rock	3ft	182ft.
Chalk.	18ft	200ft.

No 2.

Ballast.	12ft.	12ft.
Hard Chalk & Flints	126ft.	138ft.
Grey Chalk.	19ft	157ft.

No 3.

Ballast.	15ft.	15ft.
Chalk & Flints	142ft.	157ft.

No 4.

Ballast.	12ft.	12ft.
Chalk & Flints	149ft	161ft.
Hard Rock	4ft.	165ft
Chalk.	20ft.	185ft.

No 5.

Ballast	14ft	14ft.
Chalk	137ft.	151ft
Rock.	4ft.	155ft.
Hard Chalk & Flints	20ft.	175ft.
Grey Chalk	2ft.	177ft.

No 6.

Ballast	17ft.	17ft.
Chalk	137ft.	154ft.
Rock	4ft.	158ft.
Grey Chalk	17ft.	175ft.

No 7.

Ballast	22ft.	22ft.
Chalk	127ft.	149ft.
Hard Rock	5ft.	154ft.
Chalk	31ft.	185ft.

No 8.

Ballast	8ft.	8ft.
Chalk	137ft.	145ft.
Rock	5ft.	150ft.
Chalk.	35ft.	185ft.

No 9.

Ballast	14ft.	14ft.
Chalk.	122ft.	136ft.
Rock	7ft.	143ft.
Chalk.	42ft.	185ft.

No 1. c
Drift 12
UCk 170
?MCk 18
12/5/65

Telephone Directory 1940: E. James, Watercress grower, Station Rd, St. Mary Bourne, Whitchurch.

1 (1)

283/104

SU44/69 A – Y

104

ST MARY BOURNE

Hants 16 SE/W.

E. James & Son. Watercress Beds.

6in. Hants 16 S.E.(W.) (Field Slip). O.D. + c. 245.
Information from Mr. E. James, who also indicated sites, at his offices in Mitcham, Surrey, January 1942.

S.C.A.H.

---

23 borings ranging in depth from 80 to 210

(a) Bore 80 × 3in. or 4in. Tubed no more than 15ft. Stanbrook, before 1908. Continually overflowing.

(b) Bore c. 90 × 3in or 4in. do. Stanbrook, before 1908. Continually overflowing

(c) (d) (e) (f) (g) (h) (i) k (j) l (k) — 9 bores by Richards, 1922. All × 6in. Uncertain which sites correspond with these. (?g), (?h) and (?i) are 3 bores, average 175ft. which vary a good deal in good or poor supply. (?j) said c 200ft. (?c) depth 200ft. (?d, e) two bores one draining into the other.

m (l), n (m), p (n) — 6in. bores by Isler, 1922. Depth 175 to 180.

q (o), r (p), s (q), t (r), u (s), v (t), w (u), x (v), y (w) — All 6in. bores, by E. James (since c. 1922) [or some ? by Ockenden c. 1917]. Not sited separately. 4 bores give excellent supply (overflow); others in this group and above vary from moderate to poor.

S.C.A.H. 26.2.42.

N.B. The following general information from Mr James re. borings at his watercress Beds on 1inch 283 and 300 (Warnford):

25 by E. James [? only 21 — four at Overton being by Richards] × 6in.
9 " Richards
7 " Isler c. 1922
5 " Ockenden c. 1917 } × 6in
4 " Stanbrook (?) before 1908 — × 3in or 4in. Tubed no more than 15ft. [3 only sited, 4th unknown locality]

Total no of bores: 50
Overton 4
Longparish 1
St Mary Bourne 23
Abbotts Ann 6
Warnford 6
Tufton 5
Southington 4

WG. 22/1/48 "Regarding bores in Hampshire. No pumping equipment used – bores functioning naturally and irregularly. Sometimes they gush freely and at other times there is just a trickle or practically no water flowing at all." R.E.C.

2

ADDITIONAL INFORMATION SHEET

Licence No.

SU 44/69 A-Y

283/104

Date of completion of well catalogue: AUGUST 1965

Date of publication

Additional Sheet No. 1

DATE	*	ADDITIONAL INFORMATION	INIT.
4-10-65.	n	All bores starting in Drift	L.S.T.
	p	passing into Upper Chalk	
	q	varying in depth from 80-210 feet.	
	r		
	s		
	t		
	u		
	v		
	w		
	x		
	y		
20·3·70	(a)	Drift } Uch } 80 80	PP MJC
	(b)	Drift } Uch } 90 90	
	(d)	Drift 12 12	
		Uch 145 157	
	(f)	Drift 12 12	
		Uch } ?MCh } 179 185	
	(g)	Drift 14 14	
		Uch 163 177	
	(h)	Drift 17 17	
		Uch 158 175	
	(j)	Drift 22 22	
		Uch } ?MCh } 163 185	

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* Insert Well Reference Letter, If More Than One Well At Site

P.T.O.

Section 6	Pumping test	Observ. well	Recorder	E.R. log	Geological Survey, Water Department South Kensington, London, S.W.7.

(4130) Wt.34984/P.S.127 5m 9/63 G.W.B.Ltd. Gp.863

3

DATE	*	ADDITIONAL INFORMATION	INIT.
3·10·70	K.	Drift 8 8	pp MJC
		UCh } 177 185	
		? MCh	
	(L)	Drift }	
		UCh } 185 185	
		? MCh	
	m.	Drift 14' 14	
		UCh } 171 185	
		? MCh	
	(e)	Drift 15 15	
		UCh 142 157	
		A – C only. Data Bank	

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Insert Well Reference Letter, If More Than One Well At Site

Additional Information Sheet No.............. Commenced..............

AC NO 46004

ENVIRONMENT AGENCY

SU44/104

Form WR – 381	Ref: formwr381	Agency No.

BOREHOLE RECORD

A. SITE DETAILS

Borehole drilled for:	Vitacress Salads Ltd BOREHOLE 1A		
Location:	Lower Link Farm, St Mary's Bourne, Andover, Hampshire SP11 6DB		
N.G.R.:	SU 430 492		
Ground Level (if known):	SURFACE		
Drilling Company:	W.B. & A.D. MORGAN LTD., PRESTEIGNE, POWYS. LD8 2UF		
Date of Drilling:	**Commenced:** 01/09/08	**Completed:**	12/09/08

B. CONSTRUCTION DETAILS

Borehole datum (if not ground level) GROUNDLEVEL
(Point from which all measurements of depth are taken e.g. flange, edge of chamber, etc.)

Borehole drilled diameter...............	380	mm from	0	to	16	m/depth
	255	mm from	16	to	50	m/depth
		mm from		to		m/depth
Casing material: u.P.V.C diameter and type (e.g. plain steel, plastic slotted)	250	mm from	0	to	16	m/depth
Plain diameter		mm from		to		m/depth
Slotted diameter		mm from		to		m/depth
Plain diameter		mm from		to		m/depth
Slotted diameter		mm from		to		m/depth
Plain diameter		mm from		to		m/depth

Grouting details:	12m	to surface
Water struck at:	30	m (depth below datum – mbd)
Rest water level on completion:	0.7	m (depth below datum – mbd)
Estimated blowout yield:	5000+	Gallons per hour

C. STRATA LOG

Description of Strata	Thickness (m)	Depth (m)
Overburden	0.5	0.5
Flint shingle sand and wets	5	5.5
Soft weathered chalk	8	13.5
Chalk with layers of flint	36.5	50

Other Comments (e.g. gas encountered, saline water intercepted, etc.)			
Ballast Quantity:	4 tonnes	Temp Steel Casing: Depth and Diameter	380mm x 13.5m
Cement:	80 x 25kg =2,000kg		
Rig & Crew:	Klemm, G Barnett, R Davies		

Ac No 48004

ENVIRONMENT AGENCY

SU44/105

Form WR – 381	Ref: formwr381	Agency No.

BOREHOLE RECORD

A. SITE DETAILS

Borehole drilled for:	Vitacress Salads Ltd BOREHOLE 1B		
Location:	Lower Link Farm, St Mary's Bourne, Andover, Hampshire SP11 6DB		
N.G.R.:	SU 430 492		
Ground Level (if known):	SURFACE		
Drilling Company:	W.B. & A.D. MORGAN LTD., PRESTEIGNE, POWYS. LD8 2UF		
Date of Drilling:	**Commenced:** 15/09/08	**Completed:**	26/09/08

B. CONSTRUCTION DETAILS

Borehole datum (if not ground level) GROUNDLEVEL
(Point from which all measurements of depth are taken e.g. flange, edge of chamber, etc.)

Borehole drilled diameter................ 380 mm from 0 to 12 m/depth
255 mm from 12 to 50 m/depth
mm from ____ to ____ m/depth

Casing material: u.P.V.C diameter 250 mm from 0 to 12 m/depth
and type (e.g. plain steel, plastic slotted) OPEN HOLE

Plain diameter ____ mm from ____ to ____ m/depth
Slotted diameter ____ mm from ____ to ____ m/depth
Plain diameter ____ mm from ____ to ____ m/depth
Slotted diameter ____ mm from ____ to ____ m/depth
Plain diameter ____ mm from ____ to ____ m/depth

Grouting details: 12m to surface
Water struck at: 30 m (depth below datum – mbd)
Rest water level on completion: GROUND LEVEL m (depth below datum – mbd)
Estimated blowout yield: 10,000+ Gallons per hour

C. STRATA LOG

Description of Strata	**Thickness (m)**	**Depth (m)**
Overburden	0.5	0.5
Flint shingle sand and wets	5.5	6
Soft weathered chalk	3	9
Chalk with layers of flint	41	50

Other Comments (e.g. gas encountered, saline water intercepted, etc.)			
Gravel Pack Quantity:	10 x 25kg = 250 kg	Temp Steel Casing: Depth and Diameter	380mm x 11.5m
Cement:	5 tonne		
Rig & Crew:	Klemm, G Barnett, R Davies		

APPENDIX 4
Site Investigation Logs

TRIAL PIT LOG: TP19-01

firth consultants

12 Dowry Square, Bristol, BS8 4SH

Project No.:	fc37206	Date:	28/03/2019	Easting:
Site: Lower Link Farm		Logged by:	SF	Northing:
Client: Vitacress		Contractor:	Vitacress	Elevation:

mbgl	Water Strike	Lithology Legend	Lithology Depth	Description	Sample Label	Sample Depth
			0.0 - 0.2	Pea gravel from the water cress beds with chalk and brown SILT topsoil matrix with rootlets		
			0.2 - 0.45	Dark brown slightly clayey SILT with rootlets. Damp		
0.50			0.45 - 0.8	Angular to sub-angular coarse GRAVEL and COBBLES of flint with chalk brown SILT matrix. Wet at 0.6 with a water seepage at 0.75 mbgl.		
			0.8 - 1.0	Angular to sub-angular coarse GRAVEL and COBBLES of flint up to 15cm in diameter		
1.0				TD: 1.0 mbgl		
1.50						
2.0						

Notes:

Standing water level at 0.7 mbgl

Water Strike

Rest Water Level

TRIAL PIT LOG: TP19-02

firth consultants

12 Dowry Square, Bristol, BS8 4SH

Project No.:	fc37206	Date:	28/03/2019	Easting:	
Site: Lower Link Farm		Logged by:	SF	Northing:	
Client: Vitacress		Contractor:	Vitacress	Elevation:	

mbgl	Water Strike	Lithology		Description	Sample	
		Legend	Depth		Label	Depth
			0.0 - 0.4	Pea gravel from the water cress beds with chalk brown SILT topsoil matrix		
0.50			0.4 - 0.7	Dark brown peaty SILT with occasional cobble of light grey / white silty clay chalk		
1.0			0.7 - 1.2	Angular to sub-angular coarse GRAVEL and COBBLES of flint becoming larger cobbles of flint with gravel with depth. Water seepage at 0.8 mbgl.		
1.50				TD: 1.2 mbgl		
2.0						

Notes:

Standing water level at 0.7 mbgl

▽ Water Strike

▼ Rest Water Level

TRIAL PIT LOG: TP19-03

Project No.: fc37206	Date: 28/03/2019	Easting:
Site: Lower Link Farm	Logged by: SF	Northing:
Client: Vitacress	Contractor: Vitacress	Elevation:

mbgl	Water Strike	Lithology Legend	Lithology Depth	Description	Sample Label	Sample Depth
			0.0 - 0.2	Pea gravel from the water cress beds with chalk and brown SILT topsoil matrix		
0.50			0.2 - 1.0	Angular to sub-angular coarse GRAVEL and COBBLES of flint with chalk brown slightly clayey SILT matrix.		
1.0	▽▼		1.0 - 1.3	Angular to sub-angular coarse GRAVEL and COBBLES of flint up to 15cm in diameter. Water seepage at 1.1 mbgl.		
1.50				TD: 1.3 mbgl		
2.0						

Notes:

Standing water level at 1.1 mbgl

▽ Water Strike

▼ Rest Water Level

firth consultants

12 Dowry Square, Bristol, BS8 4SH

TRIAL PIT LOG: TP19-04

Project No.: fc37206		Date: 28/03/2019		Easting:	
Site: Lower Link Farm		Logged by: SF		Northing:	
Client: Vitacress		Contractor: Vitacress		Elevation:	

mbgl	Water Strike	Lithology Legend	Lithology Depth	Description	Sample Label	Sample Depth
			0.0 - 0.2	Dark brown slightly clayey SILT topsoil with rootlets.		
0.50	▽▼		0.2 - 1.4	Angular to sub-angular coarse GRAVEL and COBBLES of flint.		
1.0						
1.50				TD: 1.4 mbgl		
2.0						

Notes:

Standing water level at 0.6 mbgl

▽ Water Strike

▼ Rest Water Level

firth consultants

12 Dowry Square, Bristol, BS8 4SH

TRIAL PIT LOG: TP19-05

Project No.:	fc37206	Date:	28/03/2019	Easting:
Site: Lower Link Farm		Logged by:	SF	Northing:
Client: Vitacress		Contractor:	Vitacress	Elevation:

mbgl	Water Strike	Lithology Legend	Lithology Depth	Description	Sample Label	Sample Depth
			0.0 - 0.2	Dark brown SILT topsoil		
0.50			0.2 - 0.6	Angular to sub-angular coarse GRAVEL and COBBLES of flint with a light brown slightly clayey SILT matrix.		
1.0	▽▼		1.0 - 1.3	Angular to sub-angular coarse GRAVEL and COBBLES of flint. Water strike at 1.1 mbgl.		
1.50				TD: 1.3 mbgl		
2.0						

Notes:

Standing water level at 1.1 mbgl

▽ Water Strike

▼ Rest Water Level

firth consultants

12 Dowry Square, Bristol, BS8 4SH

TRIAL PIT LOG: TP19-06

Project No.:	fc37206	Date:	28/03/2019	Easting:	
Site: Lower Link Farm		Logged by:	SF	Northing:	
Client: Vitacress		Contractor:	Vitacress	Elevation:	

mbgl	Water Strike	Lithology Legend	Lithology Depth	Description	Sample Label	Sample Depth
0.50			0.0 - 0.9	Reworked topsoil from the water cress beds: Loose dark brown slightly clayey SILT topsoil with occasional sub-angular cobbles of flint.		
1.0 / 1.50	Water strike (1.6); Rest water level (1.5)		0.9 - 1.7	Light grey / cream weathered CHALK: sub-angular to angular gravel and cobbles of chalk in a clayey matrix. Water seepage at 1.6 mbgl.		
2.0				TD: 1.7 mbgl		

Notes:

Standing water level at 1.5 mbgl

▽ Water Strike

▼ Rest Water Level

firth consultants

12 Dowry Square, Bristol, BS8 4SH

TRIAL PIT LOG: TP19-07

Project No.: fc37206	Date: 14/11/2019	Easting: 442606.439
Site: Lower Link Farm	Logged by: SF	Northing: 149534.216
Client: Vitacress	Contractor: Vitacress	Elevation: 75.513

mbgl	Water Strike	Lithology Legend	Lithology Depth	Description	Sample Label	Sample Depth
			0.0 - 0.2	MADE GROUND: Dark brown silty topsoil with angular to sub-angular gravel fragments	TP19-07	0.05 - 0.2
0.50			0.2 - 0.65	Angular to sub-angular GRAVEL and COBBLES of flint with a slightly clayey silty matrix.		
				TD: 0.65 mbgl		
1.0						
1.50						
2.0						

Notes:

Water Strike

Rest Water Level

firth consultants

12 Dowry Square, Bristol, BS8 4SH

TRIAL PIT LOG: TP19-08

Project No.:	fc37206	Date:	14/11/2019	Easting:	442694.506
Site: Lower Link Farm		Logged by:	SF	Northing:	149446.714
Client: Vitacress		Contractor:	Vitacress	Elevation:	75.424

mbgl	Water Strike	Lithology		Description	Sample	
		Legend	Depth		Label	Depth
			0.0 - 0.6	MADE GROUND: Angular to sub-angular gravel and cobbles of flint in a dark brown silt matrix	TP19-08	0.1 - 0.6
0.50						
			0.6 - 0.7	Angular to sub-angular GRAVEL and COBBLES of flint		
				0.7 mbgl		
1.0						
1.50						
2.0						

Notes:

Water Strike

Rest Water Level

firth consultants

12 Dowry Square, Bristol, BS8 4SH

TRIAL PIT LOG: TP19-09

Project No.: fc37206 | Date: 14/11/2019 | Easting: 442737.404
Site: Lower Link Farm | Logged by: SF | Northing: 149484.763
Client: Vitacress | Contractor: Vitacress | Elevation: 75.424

mbgl	Water Strike	Lithology Legend	Lithology Depth	Description	Sample Label	Sample Depth
			0.0 - 0.15	MADE GROUND: Dark brown silty topsoil with angular to sub-angular gravel of flint watercress bed gravel	TP19-09	0.05-0.15
			0.15 - 0.3	Dark brown silty TOPSOIL with angular to sub-angular gravel and cobbles of flint		
			0.3 - 0.5	Dark brown Angular to sub-angular GRAVEL and COBBLES of flint with coarse sand		
0.50				TD: 0.50 mbgl		
1.0						
1.50						
2.0						

Notes:

▽ Water Strike

▼ Rest Water Level

firth consultants

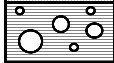
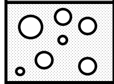
12 Dowry Square, Bristol, BS8 4SH

TRIAL PIT LOG: TP19-10

firth consultants

12 Dowry Square, Bristol, BS8 4SH

Project No.: fc37206	Date: 14/11/2019	Easting: 442738.398
Site: Lower Link Farm	Logged by: SF	Northing: 149574.269
Client: Vitacress	Contractor: Vitacress	Elevation: 75.509

mbgl	Water Strike	Lithology Legend	Lithology Depth	Description	Sample Label	Sample Depth
			0.0 - 0.15	Dark brown silty topsoil	TP19-10	0.05-0.15
			0.15 - 0.3	Light grey/brown mottled silty CLAY with angular to sub-angular GRAVEL and COBBLES of flint		
			0.3 - 0.5	Angular to sub-angular GRAVEL and COBBLES of flint in a grey silty clay matrix.		
0.50				TD: 0.50 mbgl		
1.0						
1.50						
2.0						

Notes:

Water Strike

Rest Water Level

TRIAL PIT LOG: TP19-11

Project No.:	fc37206	Date:	14/11/2019	Easting:	442685.524
Site: Lower Link Farm		Logged by:	SF	Northing:	149536.715
Client: Vitacress		Contractor:	Vitacress	Elevation:	75.639

mbgl	Water Strike	Lithology Legend	Lithology Depth	Description	Sample Label	Sample Depth
			0.0 - 0.25	MADE GROUND: Dark brown silty topsoil with angular to sub-angular gravel fragments (2 - 10 mm)	TP19-11	0.05-0.25
			0.25- 0.5	Angular to sub-angular GRAVEL and large COBBLES of flint in a dark brown silty matrix.		
0.50			0.5 - 0.6	Angular to sub-angular GRAVEL and COBBLES of flint in a light grey/brown silty matrix.		
				TD: 0.6 mbgl		
1.0						
1.50						
2.0						

Notes:

Water Strike

Rest Water Level

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12 Dowry Square, Bristol, BS8 4SH

TRIAL PIT LOG: TP19-12

firth consultants

12 Dowry Square, Bristol, BS8 4SH

Project No.: fc37206	Date: 14/11/2019	Easting: 442658.896
Site: Lower Link Farm	Logged by: SF	Northing: 149500.59
Client: Vitacress	Contractor: Vitacress	Elevation: 76.121

mbgl	Water Strike	Lithology		Description	Sample	
		Legend	Depth		Label	Depth
			0.0 - 0.4	MADE GROUND: Dark brown silty topsoil with angular to sub-angular gravel fragments (2 - 10 mm)	TP19-12	0.05 - 0.4
0.50			0.4 - 0.6	Angular to sub-angular GRAVEL and COBBLES of flint with a slightly clayey silty matrix.		
				TD: 0.60 mbgl		
1.0						
1.50						
2.0						

Notes:

Water Strike

Rest Water Level

firth consultants

12 Dowry Square, Bristol, BS8 4SH

Borehole Name: **MW19-01**

Project No.:	fc37206	Date:	05/11/2019	Easting:	442631.486
Site: Lower Link Farm		Logged by:	SF	Northing:	149453.303
Client: Vitacress		Contractor:	Geotechnical Engineering	Elevation:	75.296 mAOD

Lithology Depth	Description	Sample Label	Sample Depth
0.0 - 0.7	Dark brown clayey SILT with angular gravel and cobbles of flint		
0.7 - 5.0	Angular GRAVEL and COBBLES of flint occasionally up to 15cm in diameter		
5.0 - 5.6	CHALK: Returns of cream coloured silty water with sand sized particles		
	TD: 5.6 mbgl		

Notes:

Drilled using hollow stem auger (200 mm diameter augers)

Installation: 50mm ID HDPE slotted screen with geosock wrap from 5 to 2mbgl with 50mm HDPE pipe to approx. 0.5 m above ground surface. 3-6mm rounded pea gravel from 5 mbgl to 1.7 mbgl. Bentonite pellets from 1.7mbgl to 0.4 mbgl. Metal stick up cover concreted in place.

Water Strike

Rest Water Level

firth consultants

12 Dowry Square, Bristol, BS8 4SH

Borehole Name: **MW19-02**

Project No.:	fc37206	Date:	06/11/2019	Easting:	442679.65
Site: Lower Link Farm		Logged by:	SF	Northing:	149611.511
Client: Vitacress		Contractor:	Geotechnical Engineering	Elevation:	75.947 mAOD

mbgl	Water Strike	Well details	Lithology Legend	Lithology Depth	Description	Sample Label	Sample Depth
				0.0 - 1.0	Brown clayey SILT with angular gravel and cobbles of flint. Becoming less silty with depth		
1.00	∇			1.0 - 5.8	Angular GRAVEL and COBBLES of flint		
2.00							
3.00							
4.00							
5.00				5.8 - 6.3	CHALK: Returns of cream coloured silty water		
6.00					TD: 6.3 mbgl		
7.00							

Notes:

Drilled using hollow stem auger (200 mm diameter augers)

Installation: 50mm ID HDPE slotted screen with geosock wrap from 6.3 to 1.5mbgl with 50mm HDPE pipe to approx. 0.5 m above ground surface. 3-6mm rounded pea gravel from 6.3 mbgl to 1.2 mbgl. Bentonite pellets from 1.2mbgl to 0.4 mbgl. Metal stick up cover concreted in place.

∇ Water Strike

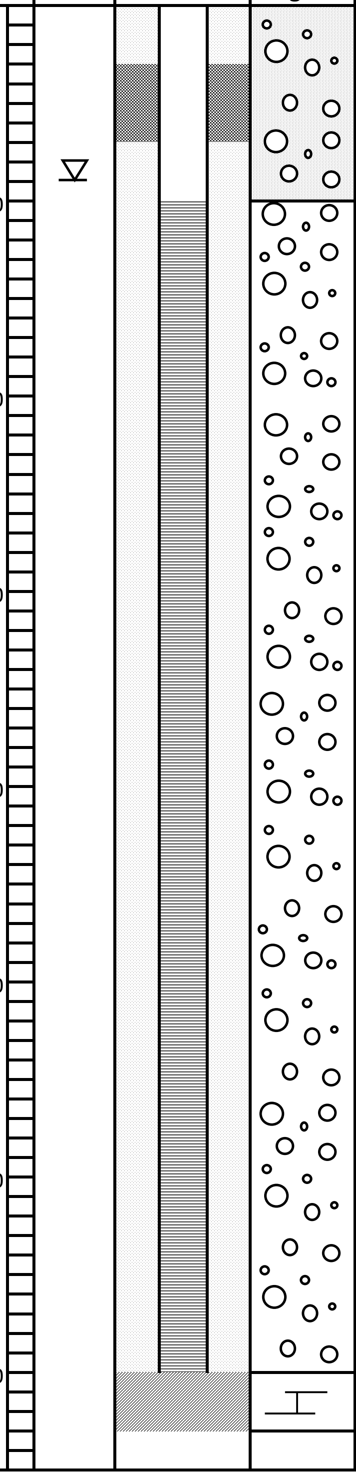
▼ Rest Water Level

firth consultants

12 Dowry Square, Bristol, BS8 4SH

Borehole Name: **MW19-03**

Project No.:	fc37206	Date:	06/11/2019	Easting:	442761.972
Site: Lower Link Farm		Logged by:	SF	Northing:	149441.437
Client: Vitacress		Contractor:	Geotechnical Engineering	Elevation:	75.274 mAOD



mbgl	Water Strike	Well details	Lithology Legend	Lithology Depth	Description	Sample Label	Sample Depth
	∇			0.0 - 1.0	Brown slightly clayey SILT with angular gravel and cobbles of flint. Becoming less silty with depth		
1.00				1.0 - 7.0	Angular GRAVEL and COBBLES of flint		
2.00							
3.00							
4.00							
5.00							
6.00							
7.00				7.0 - 7.3	CHALK: Returns of cream coloured silty water		
					TD: 7.3 mbgl		

Notes:

Drilled using hollow stem auger (200 mm diameter augers)

Installation: 50mm ID HDPE slotted screen with geosock wrap from 7 to 1mbgl with 50mm HDPE pipe to approx. 0.5 m above ground surface. 3-6mm rounded pea gravel from 7 mbgl to 0.7 mbgl. Bentonite pellets from 0.7mbgl to 0.4 mbgl. Metal stick up cover concreted in place.

∇ Water Strike

▼ Rest Water Level

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12 Dowry Square, Bristol, BS8 4SH

Borehole Name:

MW19-04

Project No.:	fc37206	Date:	05/11/2019	Easting:	442760.285
Site: Lower Link Farm		Logged by:	SF	Northing:	148931.727
Client: Vitacress		Contractor:	Geotechnical Engineering	Elevation:	74.258 mAOD

mbgl	Water Strike	Well details	Lithology Legend	Lithology Depth	Description	Sample Label	Sample Depth
				0.0 - 2.9	Brown slightly clayey SILT with angular gravel and cobbles of flint GRAVEL		
1.00	▽						
2.00							
3.00				2.9 - 3.3	Light grey silty CLAY		
				3.3 - 3.6	GRAVELS and COBBLES of flint		
4.00				3.6 - 4.6	CHALK: Returns of cream coloured silty water with sand sized particles		
					TD: 4.6 mbgl		
5.00							
6.00							
7.00							

Notes:

Drilled using hollow stem auger (200 mm diameter augers)

Installation: 50mm ID HDPE slotted screen with geosock wrap from 4.6 to 1.6mbgl with 50mm HDPE pipe to approx. 0.5 m above ground surface. 3-6mm rounded pea gravel from 4.6 mbgl to 1.3 mbgl. Bentonite pellets from 1.3mbgl to 0.4 mbgl. Metal stick up cover concreted in place.

Note: Difficulty in installing gravel pack due to very muddy water caused by drilling into Chalk

▽ Water Strike

▼ Rest Water Level

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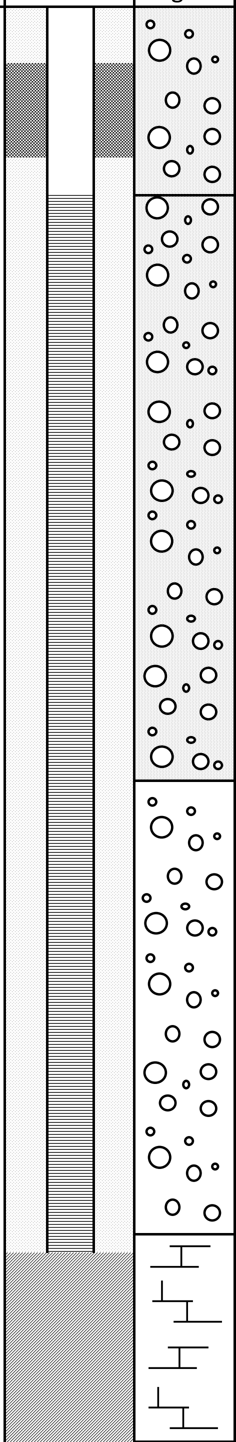
12 Dowry Square, Bristol, BS8 4SH

Borehole Name: **MW19-05**

Project No.:	fc37206	Date:	04/11/2019	Easting:	443005.465
Site: Lower Link Farm		Logged by:	SF	Northing:	149014.048
Client: Vitacress		Contractor:	Geotechnical Engineering	Elevation:	73.449 mAOD



mbgl	Water Strike	Well details	Lithology Legend	Lithology Depth	Description	Sample Label	Sample Depth
	∇ (approx. 0.85)			0.0 - 4.1	Angular GRAVEL and COBBLES of flint with brown clayey SILT matrix		
				4.1 - 6.5	Angular GRAVEL and COBBLES of flint		
				6.5 - 7.6	CHALK bedrock: Returns of cream coloured silty water with sand sized particles		
					TD: 7.6 mbgl		

Depth scale (mbgl): 1.00, 2.00, 3.00, 4.00, 5.00, 6.00, 7.00

Notes:
Drilled using hollow stem auger (200 mm diameter augers)
Installation: 50mm ID HDPE slotted screen with geosock wrap from 6.6 to 1.0mbgl with 50mm HDPE pipe to approx. 0.5 m above ground surface. 3-6mm rounded pea gravel from 6.6 mbgl to 0.7 mbgl. Bentonite pellets from 0.7mbgl to 0.4 mbgl. Metal stick up cover concreted in place.
Note: Difficulty in installing gravel pack due to very muddy water caused by drilling into Chalk

∇ Water Strike
▼ Rest Water Level

Geotechnical Engineering Limited

KEY TO EXPLORATORY HOLE LOGS

Sample type

D Small disturbed	U Undisturbed	L Dynamic	ES Environmental - soil	Cs Core subsample (prepared)
B Bulk disturbed	UT Undisturbed thin wall	C Core	EW Environmental - water	Ls Dynamic subsample (prepared)
LB Large bulk disturbed	P Piston	W Water		

Test type

S SPT - Split spoon sampler followed by uncorrected SPT 'N' Value
C SPT - Solid cone followed by uncorrected SPT 'N' Value
(*250 - Where full test drive not completed, linearly extrapolated 'N' value reported, ** - Denotes no effective penetration). Arrow length reflects test depth range.

H	Hand vane - direct reading in kPa - not corrected for BS1377 (1990). Re* denotes refusal.
M	Mackintosh probe - number of blows to achieve 100mm penetration
Mx	Mexe cone - average reading of equivalent CBR value in %
PP	Pocket penetrometer - calculated reading in kPa
Vo	Headspace vapour reading, uncorrected peak values in ppm, using a PID (calibrated with isobutylene, using a 10.6eV bulb)

Sample/core range/I_f

Dynamic sample | Undisturbed sample - open drive including thin wall. Symbol length reflects recovery

x | x = Total Core Recovery (TCR) as percentage of core run

y | y = Solid Core Recovery (SCR) as percentage of core run. Assessment of core is based on full diameter

z | z = Rock Quality Designation (RQD). The amount of solid core greater then 100mm expressed as percentage of core run

Where SPT has been carried out at the beginning of core run, disturbed section of core excluded from SCR and RQD assessment

I_f - fracture spacing - the modal fracture spacing (mm) over the indicated length of core. Where spacing varies significantly, the minimum, mode and maximum values are also given. NI = non-intact (NA = not applicable

Instrumentation

Porous tip | Perforated standpipe | Inclinometer | Extensometer

Backfill

Granular response zone | Bentonite seal | Cement/ bentonite grout | Soil backfill | Concrete

Cover instru -ment Raised cover | instru -ment Stopcock cover

Stratum boundaries

Estimated boundary | Grading boundary

Logging

The logging of soils and rocks has been carried out in general accordance with BS 5930:2015

Chalk is logged in general accordance with Lord et al (2002) CIRIA C574. Where possible, dynamic samples in chalk have been logged in accordance with CIRIA C574; descriptions and gradings (if presented) should be treated with caution given the potential for sample disturbance.

For rocks the term fracture has been used to identify a mechanical break within the core. Where possible incipient and drilling induced fractures have been excluded from the assessment of fracture state. Where doubt exists, a note has been made in the descriptions. All fractures are considered to be continuous unless otherwise reported.

Made Ground is readily identified when, within the natural make up, man made constituents are evident. Where Made Ground appears to be reworked natural material the differentiation between in situ natural deposits and Made Ground is much more difficult to ascertain. The interpretation of Made Ground within the logs should therefore be treated with caution.

The descriptors "topsoil" and "tarmacadam" are used as generic terms and do not imply conformation to any particular standard or composition.

Rootlets are defined as being less than 2mm in diameter, roots are defined as in excess of 2mm diameter.

General comments

The process of drilling and sampling will inevitably lead to sample disturbance, mixing or loss of material in some soil and rocks.

Indicated water levels are those recorded during the process of drilling or excavating exploratory holes and may not represent standing water levels.

All depths are measured along the axis of the borehole and are related to ground level at the point of entry. All inclinations are measured normal to the axis of the core.

Where provided, the stratigraphical names/geological rock units are for guidance only and may not be wholly accurate.

Geotechnical Engineering Limited

BOREHOLE LOG

MW21-01

CLIENT	VITACRESS SALADS LIMITED				
SITE	LOWER LINK FARM, ANDOVER			Sheet	1 of 2
Start Date	15 February 2021	Easting	443036.4	Scale	1:50
End Date	16 February 2021	Northing	148949.7 Ground Level 72.65mOD	Depth	16.00 m

sample no & type	sample depth (m) from - to	casing depth (m)	samp. /core range	If	water record depth (m)	instru -ment	test type & value
					0.75		
L	0.80 - 1.20						
1L	1.20 - 2.70	1.20					
2L	2.70 - 4.20	2.70					
3L	4.20 - 5.70	4.20					
4L	5.70 - 7.20	5.70					
5L	7.20 - 8.70	7.20					

description	depth (m)	reduced level (m)	legend
Very soft black and dark brown slightly sandy slightly gravelly silty CLAY with frequent roots (up to 15mm) and frequent rootlets. Gravel is subangular and subrounded fine to coarse flint and quartzite. (MADE GROUND)	0.25	72.40	
Dark brown and grey slightly sandy silty clayey subangular and subrounded fine to coarse flint and rare brick GRAVEL with a low cobble content. (MADE GROUND)	0.50	72.15	
Soft brown slightly sandy peaty CLAY with frequent rootlets.	0.60	72.05	
Dark brown, grey and white silty, sandy subangular and subrounded fine to coarse flint GRAVEL.	0.80	71.85	
Orangish brown, brown and greyish brown slightly sandy angular and subangular fine to coarse flint GRAVEL with a medium cobble content.	2.90	69.75	
Structureless CHALK composed of brownish grey becoming off-white slightly sandy gravelly SILT. Gravel is subrounded and rounded fine to coarse extremely weak and very weak low and medium density white chalk rarely stained orange. (probably CIRIA Grade DM).	3.90	68.75	
Structureless CHALK composed of off-white mottled light greyish brown slightly sandy gravelly SILT with frequent brown wisps and rare shell fossil fragments (up to 8mm). Gravel is subrounded and rounded fine to coarse white very weak low and medium density chalk and rare rinded flint. (probably CIRIA Grade DM). 3.90 - 4.20m: Slightly gravelly.	5.30	67.35	
Structureless CHALK composed of white locally mottled pale brown and cream silty sandy subangular to rounded fine to coarse white chalk and rinded flint GRAVEL occasionally stained yellow. Clasts are very weak low and medium denisty white occcasionally stained yellow. (probably CIRIA Grade Dc). 6.75 - 6.85m: 20deg band of light orangish brown staining (7mm thick). 6.85 - 6.88m: Wisps of pale grey marl.	6.90	65.75	
Structureless CHALK composed of off-white slightly silty sandy subangular to rounded fine to coarse chalk and rare rinded flint GRAVEL. Clasts are very weak low and medium density with rare spots of yellow staining. (probably CIRIA Grade Dc).			

Continued Next Page

HOLE CONSTRUCTION

TOP (m)	BASE (m)	TYPE	PLANT USED
0.00	0.80	Inspection Pit	Hand tools
1.20	14.60	Windowless Sampler	Comacchio 305

WATER STRIKE

DEPTH (m)	CASING (m)	ROSE TO (m)	AFTER (min)	REMARKS
0.75	Nil	0.20	5	

CASING DEPTH

DIAM (mm)	BASE (m)
140	13.20

BACKFILL

TOP (m)	BASE (m)	MATERIAL
0.00	0.30	Concrete
0.30	5.20	Bentonite
5.20	16.00	Gravel

INSTRUMENTATION

DEPTH (m)	TYPE
16.00	Standpipe

AGS

BARREL DIAMETER

DIAM (mm)	BASE (m)
113	14.60
116	16.00

HOLE PROGRESS

DATE TIME	DEPTH (m)	CASING (m)	WATER (m)
15-02-2021 06:00	0.00	Nil	Dry
15-02-2021 19:00	5.70	5.70	0.30
16-02-2021 06:00	5.70	5.70	0.25
16-02-2021 18:30	16.00	13.20	0.25

REMARKS

Installation 50mm diameter and installed with geosock. Raised cover 0.67m above ground level.

CONTRACT **36254**

CHECKED **JH**

Geotechnical Engineering Limited

BOREHOLE LOG

CLIENT VITACRESS SALADS LIMITED

MW21-01

SITE LOWER LINK FARM, ANDOVER

Sheet 2 of 2

Start Date 15 February 2021 Easting 443036.4 Scale 1:50

End Date 16 February 2021 Northing 148949.7 Ground Level 72.65mOD Depth 16.00 m

sample no & type	sample depth (m) from to	casing depth (m)	samp. /core range	If	water record depth (m)	instru -ment	test type & value	description	depth (m)	reduced level (m)	legend
6L	8.70 - 10.20	8.70						Structureless CHALK composed of off-white slightly silty sandy subangular to rounded fine to coarse chalk and rare rinded flint GRAVEL. Clasts are very weak low and medium density with rare spots of yellow staining. (probably CIRIA Grade Dc). 8.10 - 8.15m: Flint cobble (100 x 75 x 65mm). 8.50 - 8.60m: Fragmented flint cobble (100 x 60mm).	9.20	63.45	
7L	10.20 - 11.70	10.20						Structureless CHALK composed of light grey slightly silty slightly sandy subangular to rounded fine to coarse chalk and rinded flint GRAVEL with occasional pockets of sandy silt (up to 40mm). Clasts are very weak medium density rarely stained yellow and pale orangish brown. (probably CIRIA Grade Dc).	10.50	62.15	
8L	11.70 - 13.20	11.70						Structureless CHALK composed of white silty sandy locally slightly sandy locally very silty subangular to rounded fine to coarse chalk and flint GRAVEL. Clasts are very weak medium density rarely stained yellow. (probably CIRIA Grade Dc). 11.90 - 12.05m: Fragmented flint cobble (165 x 100mm).	12.35	60.30	
9L	13.20 - 14.60	13.20						Structureless CHALK composed of white slightly sandy slighly gravelly locally gravelly SILT. Gravel is subangular to rounded fine to coarse extremely and very weak low and medium density chalk. (probably CIRIA Grade Dm). 12.35 - 12.40m: Wisps of grey marl. 12.40 - 12.60m: Gravelly. 13.60 - 13.80m: 60deg band of light orangish brown staining (3mm thick).	14.70	57.95	
10C	14.60 - 16.00	13.20	62 50 27	95 170 200				Very weak medium density locally low density off-white locally stained yellow with black specks CHALK with rare grey marl wisps and rare subangular to rounded fine to coarse rinded flint nodules. Fractures are subhorizontal to 15deg closely spaced planar and undulating rough. (CIRIA Grade A3).	16.00	56.65	
								Borehole Completed at 16.00m			

HOLE CONSTRUCTION

TOP (m)	BASE (m)	TYPE	PLANT USED
14.60	16.00	Rotary Core	Comacchio 305

WATER STRIKE

DEPTH (m) CASING (m) ROSE TO (m) AFTER (min) REMARKS

CASING DEPTH

DIAM (mm) BASE (m)

BACKFILL

TOP (m) BASE (m) MATERIAL

INSTRUMENTATION

DEPTH (m) TYPE

BARREL DIAMETER

DIAM (mm) BASE (m)

HOLE PROGRESS

DATE TIME DEPTH (m) CASING (m) WATER (m)

REMARKS

CONTRACT **36254**

CHECKED **JH**

Geotechnical Engineering Limited

BOREHOLE LOG

MW21-02

CLIENT	VITACRESS SALADS LIMITED			Sheet	1 of 1
SITE	LOWER LINK FARM, ANDOVER				
Start Date	17 February 2021	Easting	443038.3	Scale	1:50
End Date	17 February 2021	Northing	148950.5 Ground Level 72.65mOD	Depth	2.70 m

sample no & type	sample depth (m) from to	casing depth (m)	samp. /core range	If	water record depth (m)	instru -ment	test type & value	description	depth (m)	reduced level (m)	legend
					0.65			Very soft dark brown slightly sandy slightly gravelly silty CLAY with frequent roots (up to 12mm diam) and frequent rootlets. Gravel is angular and subangular fine to coarse flint. (MADE GROUND)	0.20	72.45	
								Dark brown and grey silty sandy angular and subangular fine to coarse flint GRAVEL. (MADE GROUND)	0.65	72.00	
L	0.80 - 1.20							Brown, orangish brown, grey and brownish grey slightly sandy angular and subangular fine to coarse flint GRAVEL.			
1L	1.20 - 2.70	1.20						1.65 - 2.05m: Slightly silty.	2.70	69.95	

Borehole Completed at 2.70m

HOLE CONSTRUCTION

TOP (m)	BASE (m)	TYPE	PLANT USED
0.00	0.80	Inspection Pit	Hand tools
1.20	2.70	Windowless Sampler	Comacchio 305

WATER STRIKE

DEPTH (m)	CASING (m)	ROSE TO (m)	AFTER (min)	REMARKS
0.65	Nil	0.25	5	

CASING DEPTH

DIAM (mm)	BASE (m)
140	2.70

BACKFILL

TOP (m)	BASE (m)	MATERIAL
0.00	0.30	Concrete
0.30	0.70	Bentonite
0.70	2.70	Gravel

INSTRUMENTATION

DEPTH (m)	TYPE
2.70	Standpipe

BARREL DIAMETER

DIAM (mm)	BASE (m)
113	2.70

HOLE PROGRESS

DATE TIME	DEPTH (m)	CASING (m)	WATER (m)
17-02-2021 06:00	0.00	Nil	Dry
17-02-2021 20:00	2.70	2.70	0.25

REMARKS

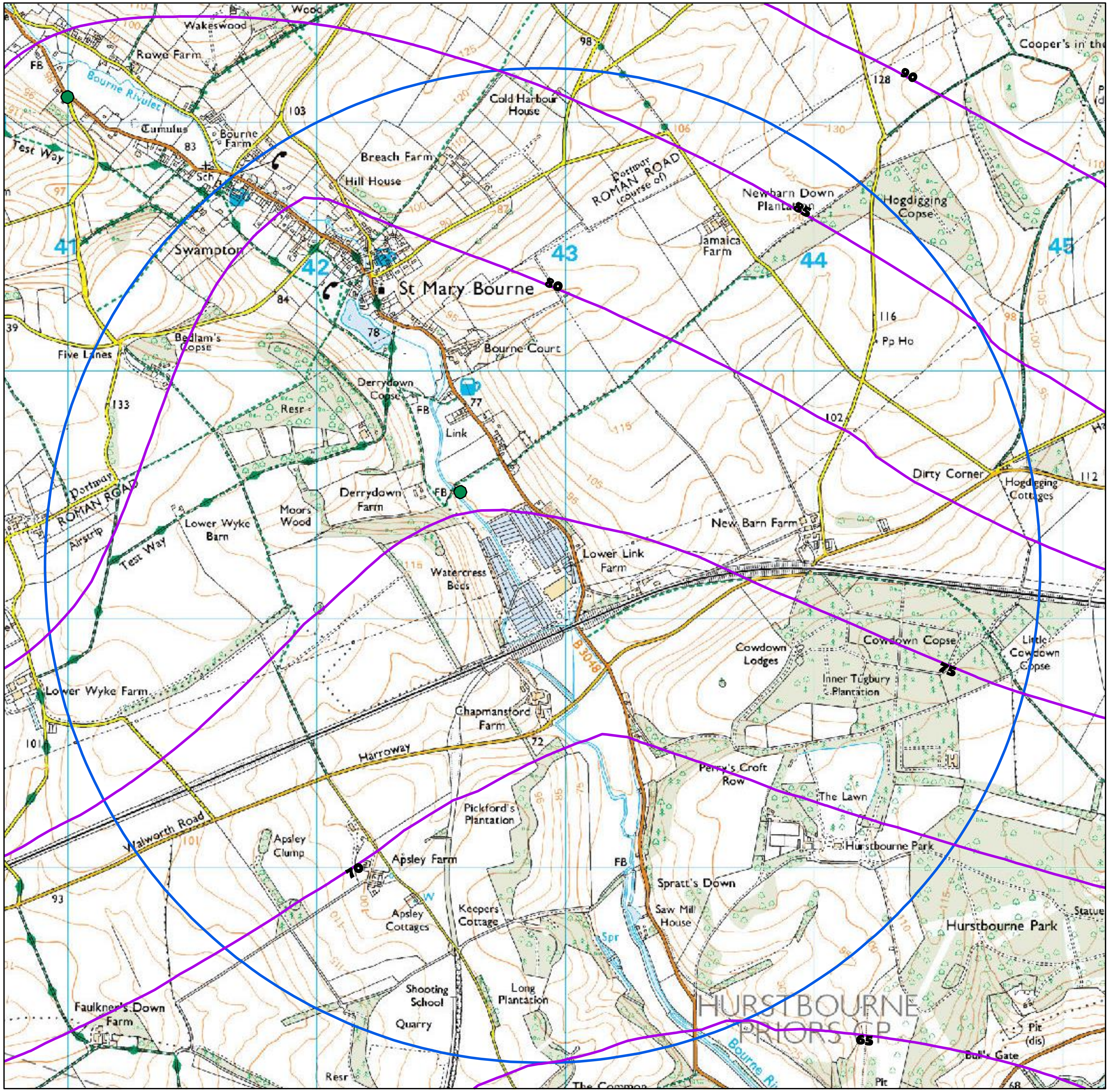
Installation 50mm diameter and installed with geosock. Raised cover 0.58m above ground level.

AGS

CONTRACT **36254**

CHECKED **JH**

APPENDIX 5
Environment Agency Data



Environment Agency

Contour map showing the indicative elevation of the groundwater table within the Chalk during Spring 2014 (in metres above ordnance datum).

This map should be used with caution as it has not been ground truthed (see information document).

The layer is meant to be used to give an indication of groundwater levels at a particular time. Site investigations should be undertaken for accurate site water levels.

Key:

- Points used to create groundwater contour map
- Groundwater elevation contours mAOD
- Site boundary

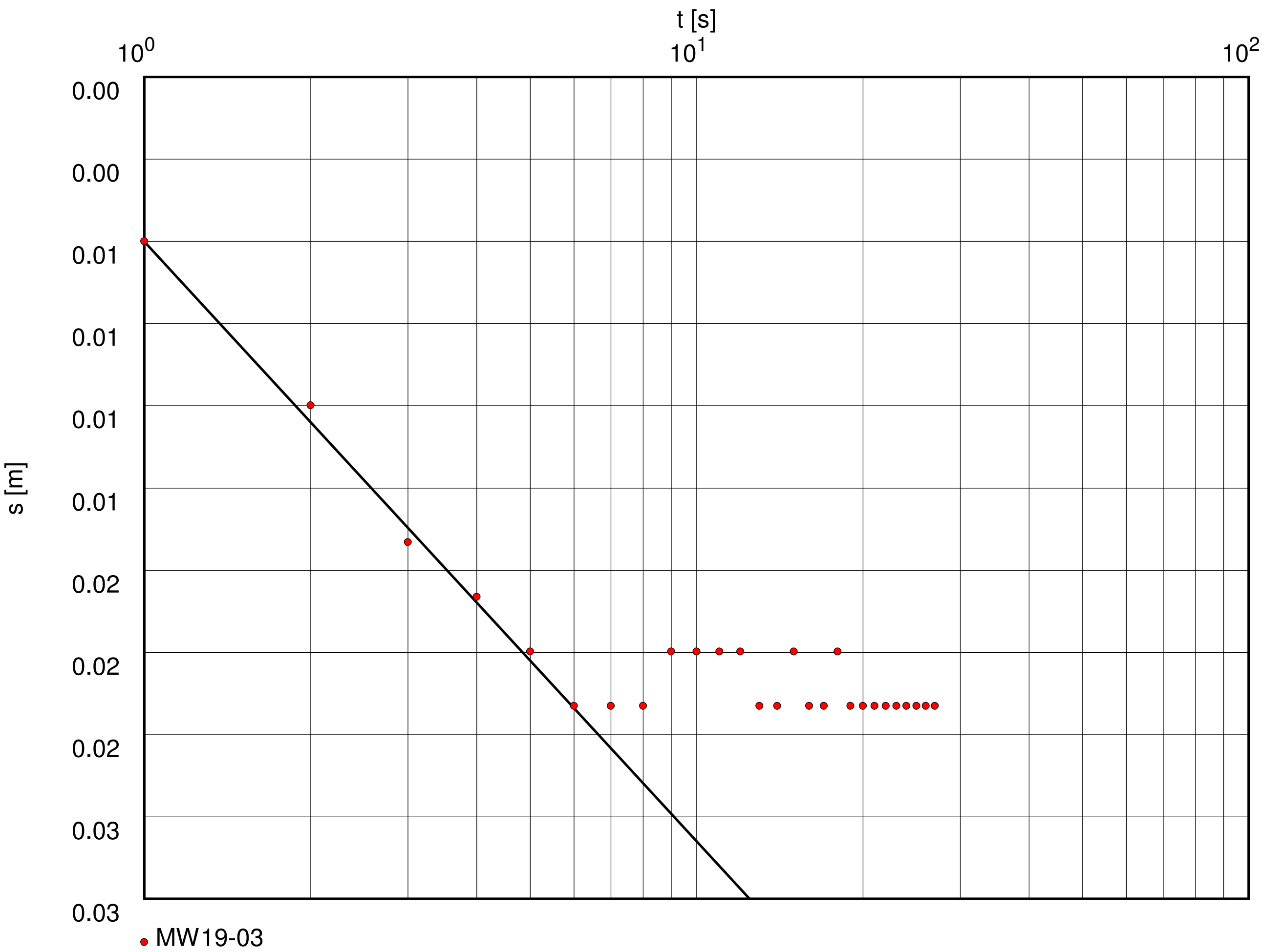
0 0.5 1 Kilometers

APPENDIX 6

Pumping Test Analysis for MW19-03

	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 20.10.2021	Page 1
		Project: Lower Link Farm	
		Evaluated by: FC	

Pumping Test No.	Test conducted on: 15.10.21
MW19-03	
Discharge 5.32 l/s	



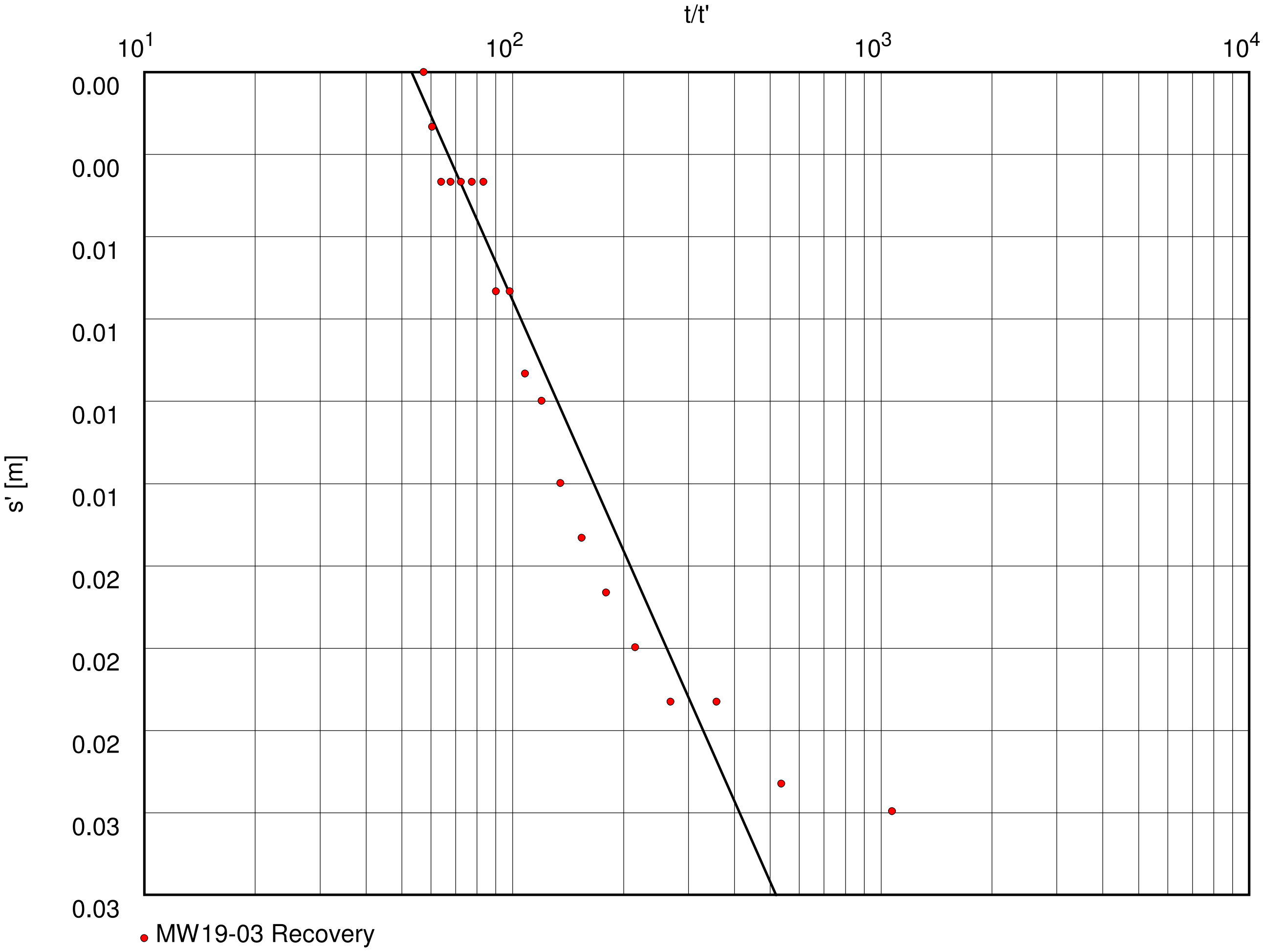
Transmissivity [m²/s]: 4.45×10^{-2}

Hydraulic conductivity [m/s]: 7.18×10^{-3}

Aquifer thickness [m]: 6.200

	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 20.10.2021	Page 1
		Project: Lower Link Farm	
		Evaluated by: FC	

Pumping Test No.	Test conducted on: 15.10.21
MW19-03	
Discharge 5.32 l/s	
	Pumping test duration: 1070 s



Transmissivity [m²/s]: 3.21×10^{-2}

Hydraulic conductivity [m/s]: 5.18×10^{-3}

Aquifer thickness [m]: 6.200

APPENDIX 7

Summary of Pesticide Monitoring Data

2022 Annual average & Max Concentration Seasonal weekly and monthly groundwater (ug/l)

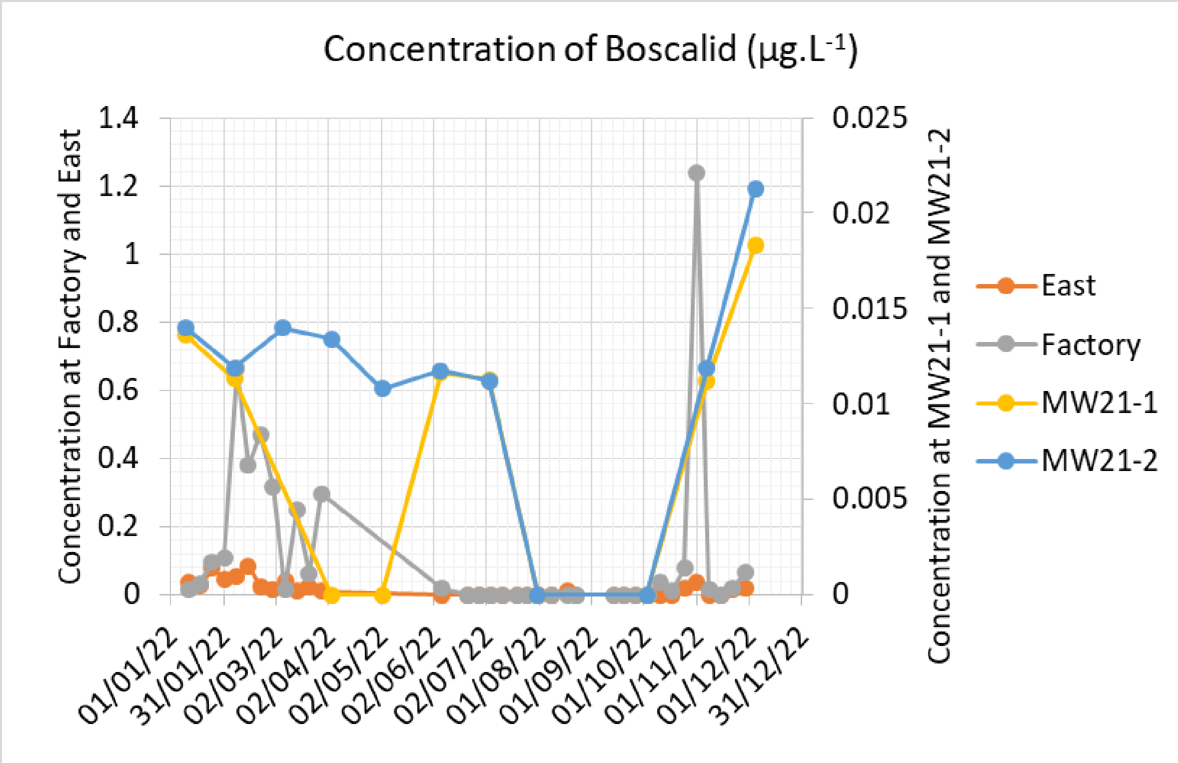
	Weekly seasonal sampling								Monthly groundwater sampling								Notes	
	River US		BH1		Factory		East		MW19-02		MW21-01		MW21-02		EA thesholds (30% PNEC / DWS) µg/L			
Active	**Annual average**	**Max conc.**	**Annual average**	**Max conc.**	**Annual average**	**Max conc.**	**Annual average**	**Max conc.**	**Annual average**	**Max conc.**	**Annual average**	**Max conc.**	**Annual average**	**Max conc.**	**Surface Water**	**Groundwater**	**FERA limit of detection**	**Further investigation**
abamectin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.0003**	0.03	0.01	LOD > SW threshold
acetamiprid	<0.01	<0.01	<0.01	<0.01	0.0229	0.137	0.0113	0.0336	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.15	0.03	0.01	
acibenzolar-S-methyl	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.78	**0.03**	0.2	LOD > GW threshold
acrinathrin	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**0.000096**	**0.03**	0.2	LOD > SW and GW threshold
azadirachtin	<0.01	<0.01	<0.01	<0.01	0.0187	0.296	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.141	0.03	0.01	
azoxystrobin	<0.01	<0.01	<0.01	<0.01	0.043	0.453	0.0127	0.0678	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.32	0.03	0.01	
benfluralin	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.057	0.03	0.005	
boscalid	<0.01	<0.01	<0.01	<0.01	0.124	1.24	0.0207	0.0849	<0.01	<0.01	0.0117	0.0183	0.0127	0.0213	3.75	0.03	0.01	
bupirimate	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	9	0.03	0.01	
bupirimate product; ethirimol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		0.03	0.01	
chlorantraniliprole	<0.01	<0.01	<0.01	<0.01	0.0526	0.770	0.0186	0.150	<0.01	<0.01	0.0167	0.0441	0.0182	0.0535	0.075	0.03	0.01	
chloridazon	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	21.9	0.03	0.01	
chlorothalonil	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.042	0.03	0.005	
chlorpropham	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	9.6	0.03	0.005	
chlorpyrifos	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.003**	0.03	0.005	LOD > SW threshold
clofentezine	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.21	**0.03**	0.1	LOD > GW threshold
clomazone	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	1.5	**0.03**	0.05	LOD > GW threshold
cyazofamid	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	3	0.03	0.01	
cycloxydim	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	300	0.03	0.01	
cyflufenamid	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.72	0.03	0.01	
cyhalothrin-lambda	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.000066**	0.03	0.005	LOD > SW threshold
cymoxanil	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2.01	0.03	0.01	
cypermethrin	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.0009**	0.03	0.005	LOD > SW threshold
cyprodinil	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.264	0.03	0.01	
deltamethrin	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.000123**	0.03	0.005	LOD > SW threshold
difenoconazole	<0.01	<0.01	<0.01	<0.01	0.0106	0.0228	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.168	0.03	0.01	
diflubenzuron	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.0012**	0.03	0.01	LOD > SW threshold
dimethenamid-P	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	37.5	0.03	0.005	
dimethomorph	<0.01	<0.01	<0.01	<0.01	0.0263	0.553	0.0131	0.104	<0.01	<0.01	0.0105	0.0147	<0.01	<0.01	1.68	0.03	0.01	
emamectin benzoate	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		0.03	0.01	
etofenprox	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**0.00162**	0.03	0.02	LOD > SW threshold
etoxazole	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	0.03	0.005	
famoxadone	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.042	0.03	0.01	
fenamidone	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.375	0.03	0.01	
fenhexamid	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	3.03	0.03	0.01	
fenpyroximate	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.0048**	**0.03**	0.1	LOD > SW and GW threshold
flonicamid	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	93	0.03	0.01	
flonicamid product; TFNA	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		0.03	0.02	
flonicamid product; TFNG	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		0.03	0.02	
fludioxonil	<0.01	<0.01	<0.01	<0.01	0.507	7.70	0.044	0.232	<0.01	<0.01	<0.01	<0.01	0.0101	0.0109	0.15	0.03	0.01	
fluopicolide	<0.01	<0.01	<0.01	<0.01	0.0118	0.0454	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	4.65	0.03	0.01	
fluopyram	<0.01	<0.01	<0.01	<0.01	0.011	0.0379	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	4.05	0.03	0.01	
fluxapyroxad	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.08	0.03	0.01	
fosetyl aluminium	<0.01	<0.01	<0.01	<0.01	1.63	18.7	0.245	1.80	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	30	**0.03**	0.1	LOD > GW threshold
fosetyl aluminium (sum)	<0.5	<0.5	<0.5	<0.5	2.92	28.5	0.654	2.10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	30	**0.03**	0.5	LOD > GW threshold
fosetyl-aluminium product; phosph	<0.5	<0.5	<0.5	<0.5	1.34	9.28	0.527	0.919	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		**0.03**	0.5	LOD > GW threshold
imazalil	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.29	0.03	0.01	
imidacloprid	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.063	0.03	0.01	
indoxacarb	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	4.5	0.03	0.01	
kresoxim-methyl	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.39	0.03	0.01	
lenacil	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.3	0.03	0.01	
lufenuron	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.003**	**0.03**	0.05	LOD > SW and GW threshold
malathion	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.0018**	0.03	0.005	LOD > SW threshold

2022 Annual average & Max Concentration Seasonal weekly and monthly groundwater (ug/l)

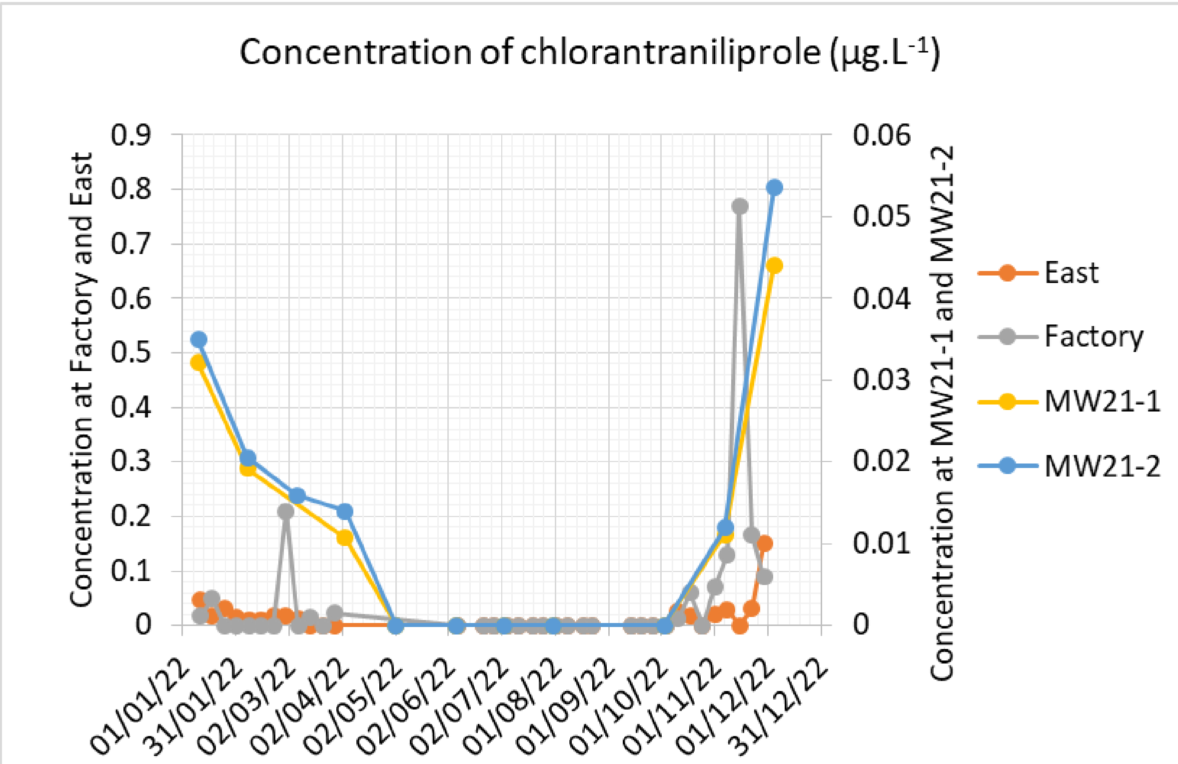
	Weekly seasonal sampling								Monthly groundwater sampling								Notes	
	River US		BH1		Factory		East		MW19-02		MW21-01		MW21-02		EA thesholds (30% PNEC / DWS) µg/L			
Active	Annual average	Max conc.	Annual average	Max conc.	Annual average	Max conc.	Annual average	Max conc.	Annual average	Max conc.	Annual average	Max conc.	Annual average	Max conc.	Surface Water	Groundwater	FERA limit of detection	Further investigation
mancozeb	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**0.066**	**0.03**	0.2	LOD > SW and GW threshold
mandipropamid	<0.01	<0.01	<0.01	<0.01	0.474	4.28	0.0751	0.759	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	15	0.03	0.01	
metalaxyl	<0.01	<0.01	<0.01	<0.01	0.0108	0.0322	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	36	0.03	0.01	
metamitron	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	3	0.03	0.01	
methomyl	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.048	0.03	0.01	
methoxyfenozide	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.195	0.03	0.02	
metrafenone	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	6.75	0.03	0.01	
myclobutanil	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	6	0.03	0.01	
napropamide	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	33	0.03	0.01	
penconazole	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.8	0.03	0.01	
pencycuron	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.5	0.03	0.01	
pendimethalin	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.09	0.03	0.005	
piperonyl butoxide	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	3.6	0.03	0.01	
pirimicarb	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.027	0.03	0.01	
propamocarb-HCl	<0.01	<0.01	<0.01	<0.01	0.0521	0.405	0.0103	0.0131	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	189	0.03	0.01	
propaquizafop	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.57	0.03	0.01	
propyzamide	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	18	0.03	0.01	
pymetrozine	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.75	0.03	0.01	
pyraclostrobin	<0.01	<0.01	<0.01	<0.01	0.0127	0.0606	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.12	0.03	0.01	
pyrethrins	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	7.5	0.03	0.01	
pyrimethanil	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	28.2	0.03	0.01	
pyriproxyfen	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.00045**	**0.03**	0.1	LOD > SW and GW threshold
quizalofop P	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.69	0.03	0.01	
spinosad	<0.01	<0.01	<0.01	<0.01	0.223	2.5	0.0115	0.0640	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.036	0.03	0.01	
spiromesifen	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.0075**	0.03	0.01	LOD > SW threshold
spirotetramat	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	3	0.03	0.01	
Spirotetramat product: spirotetram	<0.01	<0.01	<0.01	<0.01	0.0137	0.0932	0.0112	0.0264	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		0.03	0.01	
tebufenozide	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.87	0.03	0.01	
tebufenpyrad	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0735	0.03	0.01	
tefluthrin	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.00012**	0.03	0.005	LOD > SW threshold
thiacloprid	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.03	0.01	
thiamethoxam	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.3	0.03	0.01	
thiophanate-methyl	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5.4	**0.03**	0.1	LOD > GW threshold
Thiophanate-methyl product: carbe	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		0.03	0.01	
trifloxystrobin	<0.01	<0.01	<0.01	<0.01	0.0133	0.118	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.09	0.03	0.01	

APPENDIX 8

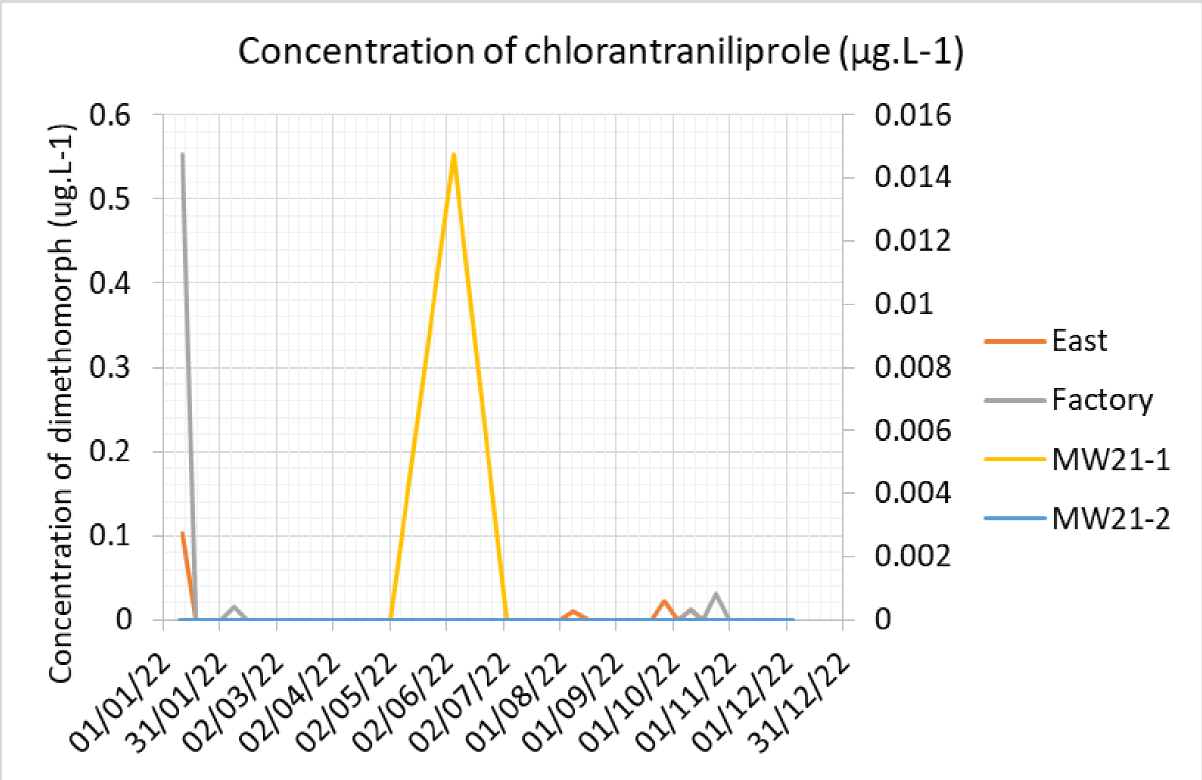
Time Series Graphs of Pesticide Concentrations

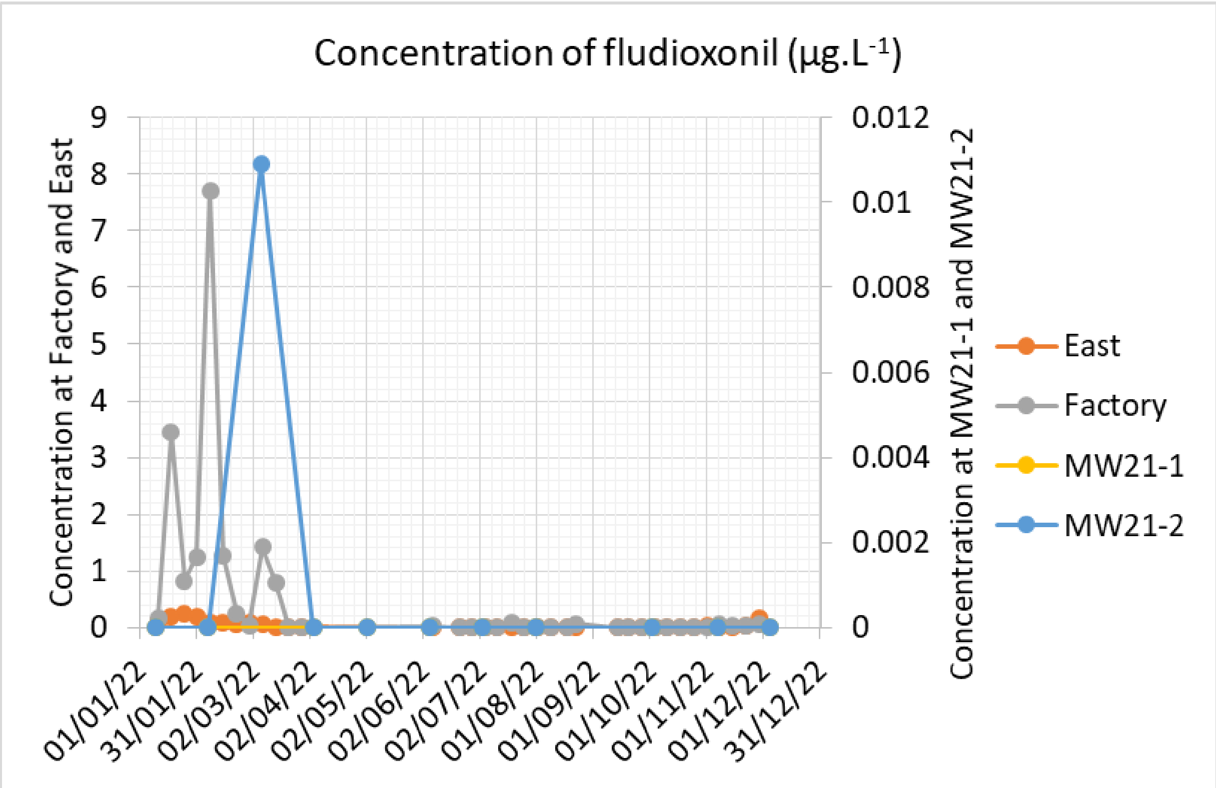


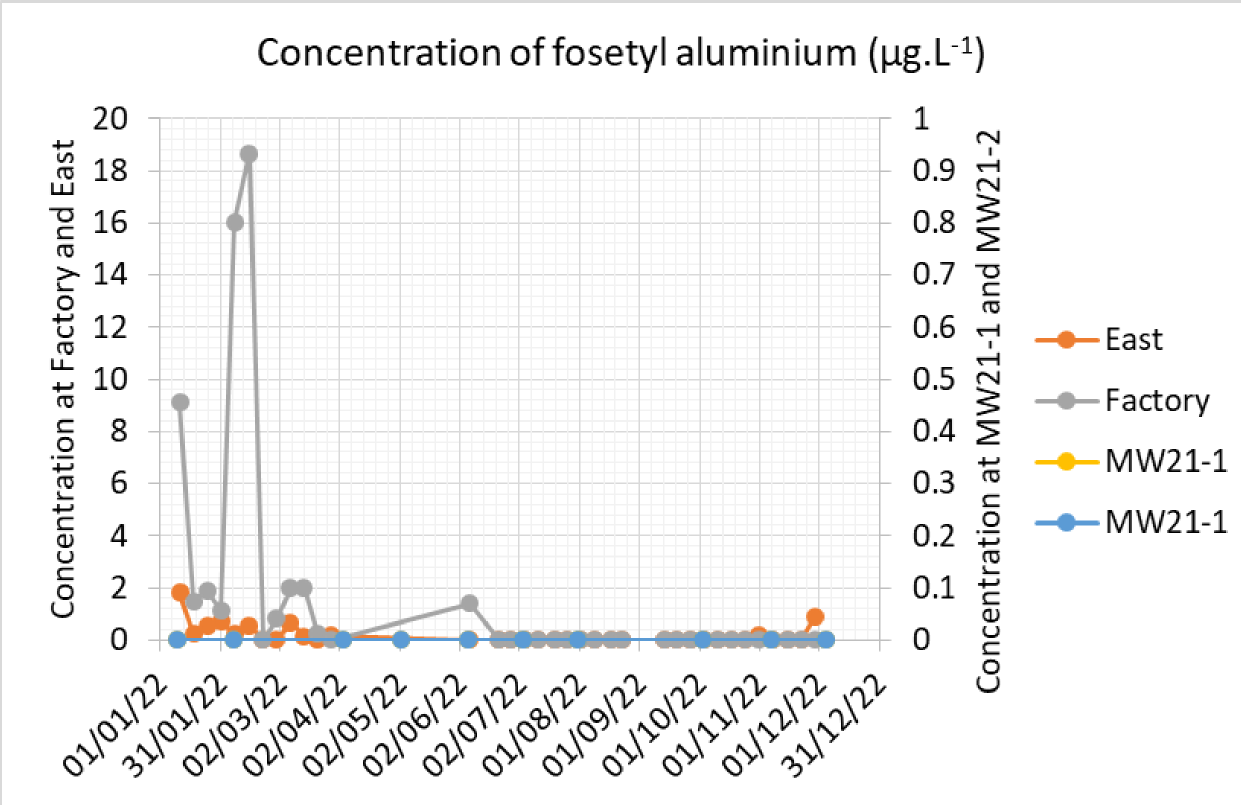
Concentration of Boscalid (µg.L-1)
Concentration at Factory and East
Concentration at MW21-1 and MW21-2
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0.025
0.02
0.015
0.01
0.005
0
01/01/22
31/01/22
02/03/22
02/04/22
02/05/22
02/06/22
02/07/22
01/08/22
01/09/22
01/10/22
01/11/22
01/12/22
31/12/22
East
Factory
MW21-1
MW21-2

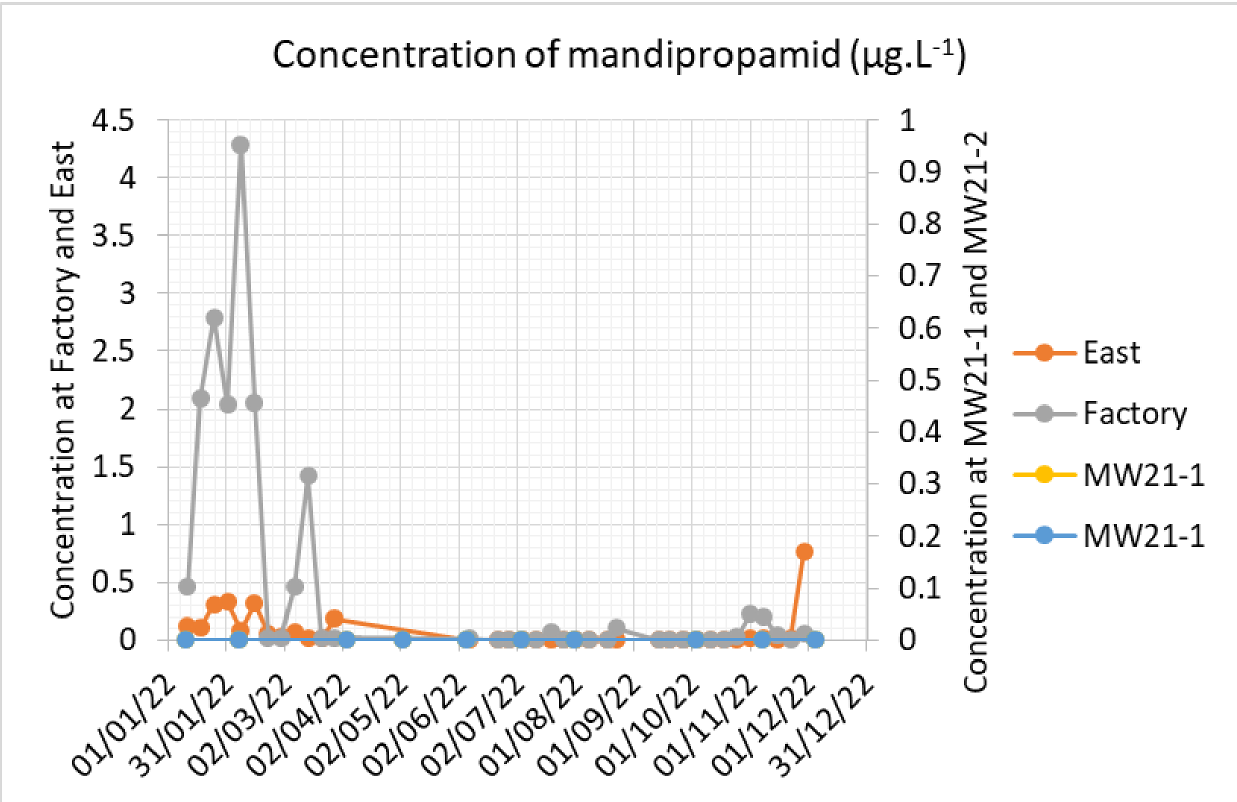


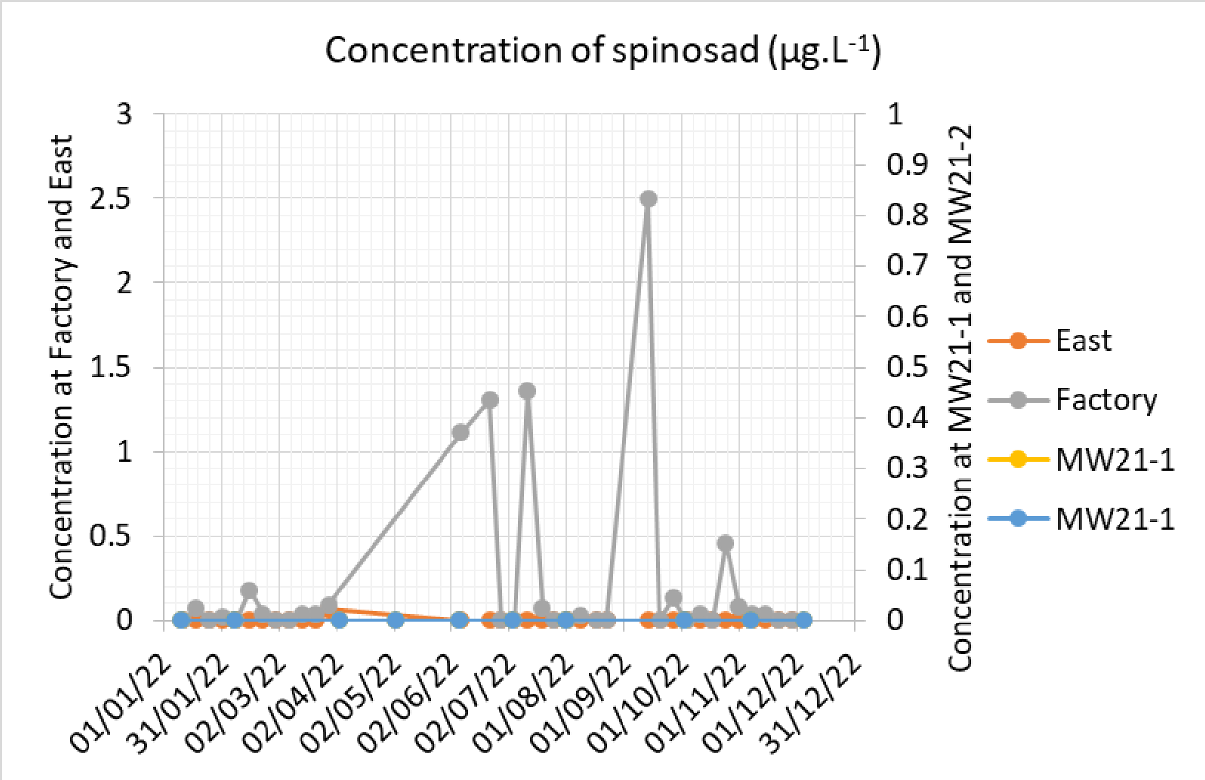
Concentration of chlorantraniliprole (µg.L-1)
Concentration at Factory and East
Concentration at MW21-1 and MW21-2
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.06
0.05
0.04
0.03
0.02
0.01
0
01/01/22
31/01/22
02/03/22
02/04/22
02/05/22
02/06/22
02/07/22
01/08/22
01/09/22
01/10/22
01/11/22
01/12/22
31/12/22
East
Factory
MW21-1
MW21-2


Concentration of chlorantraniliprole (µg.L-1)
Concentration of dimethomorph (µg.L-1)
0.6
0.5
0.4
0.3
0.2
0.1
0
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
01/01/22
31/01/22
02/03/22
02/04/22
02/05/22
02/06/22
02/07/22
01/08/22
01/09/22
01/10/22
01/11/22
01/12/22
31/12/22
East
Factory
MW21-1
MW21-2


Concentration of fludioxonil (µg.L-1)
Concentration at Factory and East
9
8
7
6
5
4
3
2
1
0
Concentration at MW21-1 and MW21-2
0.012
0.01
0.008
0.006
0.004
0.002
0
01/01/22
31/01/22
02/03/22
02/04/22
02/05/22
02/06/22
02/07/22
01/08/22
01/09/22
01/10/22
01/11/22
01/12/22
31/12/22
East
Factory
MW21-1
MW21-2


Concentration of fosetyl aluminium (µg.L-1)
Concentration at Factory and East
Concentration at MW21-1 and MW21-2
East
Factory
MW21-1
MW21-1
01/01/22
31/01/22
02/03/22
02/04/22
02/05/22
02/06/22
02/07/22
01/08/22
01/09/22
01/10/22
01/11/22
01/12/22
31/12/22


Concentration of mandipropamid (µg.L-1)
Concentration at Factory and East
Concentration at MW21-1 and MW21-2
East
Factory
MW21-1
MW21-1
01/01/22
31/01/22
02/03/22
02/04/22
02/05/22
02/06/22
02/07/22
01/08/22
01/09/22
01/10/22
01/11/22
01/12/22
31/12/22



Concentration of spinosad (µg.L-1)
Concentration at Factory and East
Concentration at MW21-1 and MW21-2
3
2.5
2
1.5
1
0.5
0
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
01/01/22
31/01/22
02/03/22
02/04/22
02/05/22
02/06/22
02/07/22
01/08/22
01/09/22
01/10/22
01/11/22
01/12/22
31/12/22
East
Factory
MW21-1
MW21-1