# MSD Brinny Groundwater Monitoring 2020 IEL

## IEL Monitoring Round 1

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08 June 2020



MSD Ireland Brinny
Innishannon
Co. Cork

## Quality information

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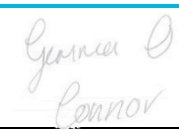
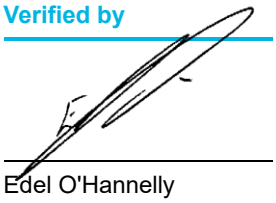
|  |  |  |  |
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## Revision History

| Revision | Revision date | Details | Authorized | Name | Position |
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| Issue 0 | 04 June 2020 | Draft for client review | Yes | Peter Hassett | Associate Director |
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The methodology adopted and the sources of information used by AECOM in providing its services are outlined in this Report. The work described in this Report was undertaken between 06th and 07th April 2020 and is based on the conditions encountered and the information available during the said period of time. The scope of this Report and the services are accordingly factually limited by these circumstances. AECOM disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to AECOM's attention after the date of the Report.

The site reconnaissance consisted of a general external inspection of the site aimed at identifying any obvious signs of geotechnical hazards and potential sources of ground contamination affecting the site. An environmental compliance audit and/or detailed structural inspection of existing buildings were outside the project brief. Similarly, the site visit excluded detailed consideration of the ecological or archaeological aspects of the site, and if such are believed to be of potential significance then it is recommended that specialist advice is sought.

Any risks identified in this Report are perceived risks, based on the information reviewed during the desk study and therefore partially based on conjecture from available information. The study is limited by the non-intrusive nature of the work and actual risks can only be assessed following a physical investigation of the site.

The opinions expressed in this Report concerning any contamination found and the risks arising there from are based on current good practice simple statistical assessment and comparison with available soil guideline values, AECOM generic assessment criteria and other guidance values.

It should be noted that the effects of ground and water borne contamination on the environment are constantly under review, and authoritative guidance values are potentially subject to change. The conclusions presented herein are based on the guidance values available at the time this Report was prepared, however, no liability by AECOM can be accepted for the retrospective effects of any changes or amendments to these values.

Unless otherwise stated in this Report, the assessments made assume that the sites and facilities will continue to be used for their current purpose without significant changes.

Where assessments of works or costs identified in this Report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

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# 1. Introduction

## 1.1 Project Contractual Basis and Personnel

AECOM Ireland Limited (AECOM) is pleased to present this report on results for groundwater monitoring at the MSD facility in Brinny, Innishannon, Co. Cork (the site) conducted on 06 and 07 April 2020. This report has been prepared in accordance with AECOM proposal PR-471091-ACM-PL-EN-001, and authorised by Ms. Berniece Hanrahan, Senior EHS Specialist, MSD, Brinny under PO 8103072637.

The project has been managed from AECOM's Cork office, with:

- Project Director – Edel O'Hannelly, Principal Hydrogeologist
- Project Manager – Brendan McCarthy, Environmental Scientist
- Fieldwork – Gemma O'Connor, Environmental Scientist

Groundwater analysis was conducted by Element Materials Technology Ltd (EMT). EMT is an AECOM-approved laboratory.

## 1.2 Project Background

### 1.2.1 Summary of Monitoring

MSD Brinny has a network of groundwater monitoring wells located across the site, selected wells from this network are routinely sampled.

The site originally operated under an Integrated Pollution Prevention and Control (IPPC) licence (licence number P0005-02), issued by the Environmental Protection Agency (EPA). In December 2013 this was amended by the EPA to an Industrial Emissions Licence (IEL).

Under the terms of the site's IEL, the site is required to conduct groundwater monitoring on a biannual basis from seven wells: MW-1S, MW-1D, MW-2S, MW-3S, MW-3D, MW-4S and MW-4D (Condition 6 and Schedule C.6 of the licence).

In 2018, MSD Brinny applied for a review of its existing IEL (P0005-02) to accommodate manufacturing changes and an extension of the site boundary. The review process was still ongoing at the time of issuing this report.



### 1.2.2 Site Setting and History

The site is situated in County Cork, Ireland, 3.8 kilometres (km) north-west of Innishannon and 5.3 km north-east of Bandon, see Appendix A Figure 1; and comprises a bulk pharmaceutical manufacturing facility including large scale vaccine production, sterile manufacturing and quality control operations. The site is in two plots located to the north-east and south-west of local road L2235, see Appendix A Figure 2.

Prior to its development in the 1970s, land use at the site was agricultural, as is most current land use in the surrounding area, other than a sandstone quarry development (Kilmore Concrete Ltd) and modular building supplier (Spacecab Limited), both approximately 200 m west of the site. There are no other EPA licensed facilities located within a 1 km radius of the facility.

The site is situated at an elevation of between 20 m and 30 m above Ordnance Datum (OD) and land across the site slopes gently to the south-west toward the valley of the River Brinny, with a steep slope along the western site boundary.

The River Brinny flows past the western and southern site boundary, with an old mill race flowing at the base of the steep slope along the western and southern site boundary. The mill race joins the River Brinny south of the site.

The River Sall, which flows from west to east, also joins the River Brinny to the south of the site, just up-stream of Brinny Bridge; and the River Brinny continues to flow south-eastwards, joining the River Bandon 2.5 km down-stream.

Under the Water Framework Directive (WFD), the water quality of the River Brinny in the vicinity of the site (Code IE_SW_20B070100) is classified as *High* (2013 – 2018 data)[1].

The site is underlain by made ground overlying glacial till, derived from sandstone and shale bedrock. Available drilling records for the site indicate that the shallow overburden composition varies from soft, silty clay to gravel, with the deeper overburden consisting of sand and gravel. The bedrock beneath is Carboniferous age sandstones, mudstones and dolomites.

Previous investigations at the site have classified the overburden into a shallow perched gravel aquifer and deeper sand and gravel aquifer, which are separated by a lower permeability silty/clay aquitard.

The deeper gravel unit is classed as a *Locally Important Gravel Aquifer (Lg)* while the bedrock aquifer is classed as *Locally Important Aquifer (Ll) – Bedrock which is moderately productive only in Local Zones*[2].

In addition to a number of supply wells in the general area, the site itself abstracts groundwater for all production and supply purposes on site. Groundwater is abstracted predominantly from the deeper sand and gravel aquifer, but some production wells extend down into the bedrock.

The generalised geologic sequence is:

- 0 – 2 m below ground level (bgl): made ground
- 2 – 5 m bgl: clayey, sandy gravel (perched aquifer)
- 5 – ~10 m bgl: sandy, gravelly, clay and silt (aquitard)
- ~10 m - ~22 m bgl: sand and gravel (with discontinuous silt and clay zones) (aquifer)
- Below ~22 m bgl: mudstone, sandstone and dolomite (bedrock aquifer)



Under natural gradient conditions, groundwater would be expected to mirror the topographic gradient and flow across the site to the west/south-west. Shallow groundwater in the perched aquifer generally appears to do this, and groundwater seepages from the base of the slope are seen. These seepages discharge to the mill race. Continuous groundwater abstraction from the deeper sand and gravel and bedrock aquifers does not appear to affect the direction of groundwater flow in the shallow perched aquifer.

Groundwater in the deeper sand and gravel aquifer is confined by the overlying aquitard, with the vertical hydraulic gradient downwards between the two gravel aquifers.

Groundwater abstraction from the deeper sand and gravel is understood to alternate between three production wells on an approximate 8-hour rotation. Groundwater level monitoring conducted in 2017 indicated that pumping is not continuous during an 8-hour period.

At any given time, groundwater flow in the deeper sand and gravel will converge on whichever well is actively pumping. Over the course of a day, the focus of groundwater flow in the deeper gravel changes depending on which production well is operational. Under natural gradient conditions, it is expected that groundwater in the deeper sand and gravel would discharge to the River Brinny.

Several phases of site investigation have been undertaken at the site. These have been conducted for various reasons, including:

1. Groundwater resource assessment through the installation of trial and abstraction wells;
2. Geotechnical investigations related to construction works on site; and
3. Installation of monitoring wells in the assessment of potential sources of contamination.

[1] https://gis.epa.ie/EPAMaps/- accessed 22 May 2020
[2] www.gsi.ie – accessed 22 May 2020

From available data, it appears that any historical contamination issues on site have been localised and/or of short duration.

An inventory of known wells installed across the site is presented in Appendix C. Monitoring well locations are illustrated in Appendix A Figure 3. An interpretation of available geological data is presented in the cross-section in Appendix A Figure 4.

## 1.3 Project Objectives

The main objectives of the 2020 groundwater monitoring programme are:

1. To maintain the site's compliance with groundwater monitoring obligations under the terms of IEL P0005-02
2. To assess hydrogeological conditions beneath the site during each monitoring round, highlighting changes in the groundwater flow regime and chemistry.

## 1.4 Scope of Works

### 1.4.1 Rationale and Strategy

In 2020, IEL monitoring has continued on a biannual basis with samples analysed for parameters as required under the site's IEL.

The analytical schedule for 2020 is presented in Appendix B Table 1, with sample inventory for April 2020 (Round 1) in Appendix B Table 2.

### 1.4.2 Groundwater Sampling and Monitoring

All fieldwork was conducted under a site-specific Health, Safety and Environment Plan and in accordance with AECOM field procedures, which are based on USEPA and BS standards.

First, a dip round of depth to groundwater measurements was completed at all accessible wells on site. Total well depths were also recorded, to allow the degree of siltation within the well screen section of wells to be determined; and, for wells to be sampled, the volume of standing water in the wells to be calculated.

All dip measurements were taken using an interface probe, which is capable of distinguishing between water and non-aqueous phase liquids (NAPLs), which may accumulate at the top (floating) or base (sinking) of a monitoring well. Many organic liquids can be present as NAPLs in the pure phase; for example, fuel hydrocarbons can form a floating NAPL layer in a well, as they are less dense than water; whereas, chlorinated solvents can sink and accumulate at the base of wells, as they are denser than water.

Before sampling, each well was first purged of between three and five well volumes to ensure that a groundwater sample representative of the aquifer was collected for laboratory analysis.

The monitoring wells sampled are all equipped with dedicated sampling equipment. For some wells, this equipment is a bailer, while for others it is inertial-lift tubing and a foot valve. Bailers have been installed in those wells which have a limited water column and which tend to purge dry, due to the lower permeability of the aquifer material in which they are screened.

During Round 1 2020, some wells purged dry of groundwater before the requisite volume had been purged. In these wells, the water level was allowed to recover for a period of up to two hours before a groundwater sample was collected without further purging. If, within that two hour period, the groundwater level had not recovered sufficiently, then the well was deemed to have purged dry and no sample was collected.

Field measurements of water quality parameters were recorded using a calibrated meter and flow-through cell. Field measurements included pH, electrical conductivity, temperature, dissolved oxygen and redox potential.

To reduce the risk of cross-contamination between sampled wells, field staff wore single-use disposable nitrile gloves, which were changed between wells. Groundwater samples were collected

into laboratory-supplied sample containers and were filtered and preserved in the field, as appropriate.

### 1.4.3 Laboratory Analysis

Laboratory analysis was conducted by EMT in Round 1 2020.

On-site and during transit to the laboratory, samples were stored in chilled cool-boxes. Sample identities and required analyses were logged on the Chain of Custody form which accompanied samples during transit to the laboratory. Laboratory certificates are presented in Appendix D.

The site is required to conduct biannual groundwater monitoring from seven wells (MW-1S to MW-4D) under Condition 6 of its IEL. On a biannual basis, groundwater samples are analysed for a suite of inorganic parameters (major ions and heavy metals), while additional analysis is conducted on an annual basis for priority substances. Analysis for most priority substances was conducted in April 2020 and, following the 2015 relevant hazardous substance review, have included volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH), ethylene glycol, alcohols and acetates.

Analysis for trichloroacetic acid (TCA) is conducted annually and will be included in Round 2 2020. Analysis for TCA will be performed by i2 Analytical.

It should be noted that there was insufficient water in wells MW-1S and MW-3S in Round 1 2020 and they were not sampled. From available historic results, it appears that wells MW-1S are MW-3S are usually not sampled, indicating that they likely contain little or no groundwater. Both monitoring wells are shallow.

A full sample inventory is presented in Appendix B Table 2.



# 2. Results and Discussion of Monitoring Programme

## 2.1 Site Hydrogeology and Groundwater Flow

The site is underlain by the thick sequence of unconsolidated deposits overlying sandstone/shale bedrock. Monitoring wells are screened within the unconsolidated deposits, while production and trial wells are screened within both the deeper sand and gravel and bedrock. An inventory of wells is presented in Appendix C, together with available geological and well construction details from earlier reports and projects.

Depth to groundwater measurements from the dip round and corresponding groundwater elevations are presented in Appendix B Table 3; all accessible wells on site were dipped, i.e. not just those specified in the IEL. A groundwater contour map for the shallow perched aquifer is presented in Appendix A Figure 5, with that for the deeper aquifer in Appendix A Figure 6.

From the available data, the overall direction of groundwater flow in the shallow aquifer beneath the main site appears to be to the south-west toward the mill race. Groundwater elevations were higher than those reported for Round 2 in 2019, reflecting a general increase in groundwater elevations over the winter period. Groundwater elevations for Round 1 2020 were in line with long term averages, see Appendix A Figure 7. The highest groundwater elevation was in well GMW13 (23.99 m), with groundwater flow diverging from this to the north-west, west and south-west across the main site. The horizontal hydraulic gradient appears to be 0.011 as estimated between wells GMW13 and MW-2S.

In the deeper aquifer, groundwater appears to flow to the south and south-west towards well 653 in the centre of the site, however this well was reportedly not actively pumping at the time of the dip round. It is inferred that well 653 was likely pumping shortly prior to the dip round, drawing groundwater radially towards it in the deeper aquifer. The horizontal hydraulic gradient estimated between wells BH01 and 653 is 0.008. Groundwater is also drawn to well 654 which was actively pumping at the time of the dip round. The estimated horizontal hydraulic gradient between GMW5 and pumping well 654 is 0.031.

Available trends in groundwater elevations are presented in Appendix A Figures 7 and 8 for the shallow and deeper wells, respectively. For any given well, the annual range in groundwater

elevations is generally less than 2 m. As can be seen in Figure 8, groundwater elevations in April 2020 were in line with long term average ranges for the deeper wells.

Groundwater elevations for paired shallow and deep wells MW-1S/D, MW-3S/D, MW-4S/D, GMW4S/D, GMW5S/D and GMW10/7 are illustrated in Appendix A Figure 9. For most of these paired well installations, it can be seen that the vertical hydraulic gradient between the two aquifers is downwards across the aquitard in Round 1 2020. For wells GMW4S/D and GMW5S/D the vertically downward hydraulic gradients are 0.173 and 0.170, respectively.

The only pairs of shallow and deep wells for which long-term (since 2006) groundwater elevations are available are MW-4S/D and GMW10/7.

Over the long term in MW-4S/D, the groundwater elevation is generally higher in the shallower well than in the deeper (downward hydraulic gradient). In Round 1 2020 a downward gradient of 0.184 was recorded. Slight upward hydraulic gradients have been observed in the past and generally range between 0.01 and 0.1. Downward hydraulic gradients are more common and range between 0.02 and 0.5.

For wells GMW10/7, the vertical hydraulic gradient is consistently downward. The large fluctuations in elevations during 2007 and 2008 are considered likely to be due to errors in data entry or recording on site, rather than actual fluctuations in elevation, given that groundwater elevations since 2008 have been much less variable.

## 2.2 Groundwater Results

Field observations and measurements are presented in Appendix B Table 3, with analytical results in Appendix B Table 4. Historic IEL monitoring data are presented in Appendix E, including trends for selected parameters over time.



Groundwater results have been compared to relevant published standards, including:

- IGV (Interim Guideline Values), published by the EPA in 2003. The IGVs represent negligible groundwater contamination and were developed using a number of existing water quality guidelines in use in Ireland, including existing national environmental quality standards, proposed common indicators for the groundwater directive, drinking water standards and Geological Survey of Ireland trigger values.
- GTV (Groundwater Threshold Values), were originally published in January 2010 (Statutory Instrument No. 9 of 2010) and amended in 2016 (SI No. 366 of 2016). Exceedance of a threshold value triggers further investigation to confirm whether the criteria for poor groundwater chemical status are being met.
- DWS (Drinking Water Standards), as published in SI No. 122 of 2014. While groundwater from the monitoring wells sampled is not used for potable supply, the groundwater abstraction wells at the site are used for both process and potable use.

### 2.2.1 Field Parameters

Field parameters are presented in Appendix B Table 3.

No NAPL, odour or sheen was observed in any of the monitoring wells.

Groundwater pH was close to neutral in most wells, ranging between 6.6 (MW-1D) and 7.7 (MW-2S). All pH readings were within normal ranges.

Electrical conductivity readings ranged between 249 µS/cm (MW-1D and MW-4D) and 408 µS/cm (MW-3D), all readings were within previously reported ranges.

Groundwater temperature readings were generally above normal (10-12 °C) for Irish groundwater, ranging between 13.3 °C (MW-1D) and 15.3 °C (MW-3D), however the readings were within previously reported ranges for monitoring wells on the site.

There was a wide range in dissolved oxygen readings, ranging from 0.23 mg/L (MW-3D, indicative of oxygen deficient conditions) and 9.64 mg/L (MW-4S, indicative of aerated groundwater). However, well MW-4S was sampled with a bailer and this may explain the high dissolved oxygen reading.

Redox potential readings ranged between 391 mV (MW-3D) and 581 mV (MW-2S). Given the range in dissolved oxygen readings recorded, there would be expected to be a correspondingly marked difference in redox potential readings. It is difficult to measure dissolved oxygen and redox potential accurately in the field, in particular, for those wells that are sampled with bailers and in which it is not possible to use a flow-through cell, such as MW-4S.

### 2.2.2 Laboratory Parameters

Results for laboratory parameters in Round 1 2020 are presented in Appendix B Table 4 and Appendix D, with historic results in Appendix E.

**Major Ions**

Concentrations were generally in line with those of previous monitoring rounds. Concentrations of nitrite, sulphate, sodium, fluoride, calcium, magnesium and total alkalinity did not exceed relevant screening criteria, where defined.

Potassium was detected in groundwater from all five wells sampled. The concentration in groundwater from well MW-2S (7.3 mg/L) exceeded the IGV of 5 mg/L (no DWS or GTV has been defined for potassium). Potassium concentrations in groundwater from all wells were within their previously reported ranges and there does not appear to be long term increasing trends (see the trend graphs in Appendix E). The highest potassium concentration is detected in groundwater from well MW-2S, generally between 10 mg/L and 20 mg/L. This well is located close to the south-western site boundary.



Ammonia (reported as both equivalent nitrogen and ammonium concentrations) was above all screening thresholds in groundwater from well MW-3D (1.48 mg/L as nitrogen). Ammonia concentrations were low to non-detect in the remaining wells, with the exception of a slight exceedance of GTV (0.175 mg/L) and IGV (0.12 mg/L) in MW-4D at 0.19 mg/L.

Compared to previous monitoring results, the ammoniacal-nitrogen concentration as equivalent nitrogen in groundwater from well MW-2S has been at the lower end of its reported concentration range since 2011. From 1995 to 2010 ammoniacal-nitrogen was typically detected between 0.5 mg/L and 3.0 mg/L in groundwater from MW-2S (see Appendix E), but has generally been below 0.3 mg/L since. Since 2013, the ammoniacal-nitrogen concentration in groundwater from MW-3D has been at the higher end of its range, close to 1.0 mg/L. The ammoniacal-nitrogen concentration in groundwater from well MW-3D decreased slightly between September 2019 (1.58 mg/L) and April 2020 (1.48 mg/L).

Historically, the pattern of nitrate detections are generally the opposite of that seen for ammonia. Nitrate tends to be elevated in groundwater from those wells with little or no ammonia (MW-1D, MW-2S, MW-4S and MW-4D). Nitrate concentrations detected in this monitoring round exceeded the IGV (25.0 mg/L) in groundwater from MW-1D (31.9 mg/L), and MW-4S/D (32.4 mg/L), but these results did not exceed the GTV (37.5 mg/L) or the DWS (50 mg/L). These results are generally consistent with historic nitrate concentrations

Phosphate (reported as equivalent phosphorous concentration) was detected in groundwater from three monitoring wells MW-2S (0.03 mg/L), MW-3D (0.05 mg/L) and MW-4D (0.03 mg/L) with the reported concentration in MW-3D above the IGV (0.03 mg/L) and GTV (0.035 mg/L).

Phosphate concentrations were within previously reported ranges, see Appendix E. However, it is difficult to distinguish trends, as many concentrations between 2000 and 2012 were reported as 0.16 mg/L, which, it is suspected, may have been the laboratory reporting limit during that time.

Chloride concentrations ranged between 11.3 mg/L (MW-4S) and 45.0 mg/L (MW-3D). The IGV for chloride of 30.0 mg/L was exceeded in groundwater from wells MW-2S (35.2 mg/L), MW-3D (45 mg/L) and MW-4D (30.7 mg/L) but did not exceed the GTV (187 mg/L) or the DWS (250 mg/L). Chloride concentrations were within previously reported ranges and are relatively stable in groundwater from most of the MW-series monitoring wells. It is only in groundwater from MW-2S that chloride

concentrations above 75 mg/L have been detected, with concentrations above 200 mg/L detected on occasion. However, all concentrations have been below 75 mg/L since March 2015.

Sodium concentrations follow a similar pattern. In Round 1 2020, sodium was detected between 11.5 mg/L (MW-4S) and 43.2 mg/L (MW-3D) in groundwater. The IGV for sodium is 150 mg/L. There is no GTV defined for sodium.

It is noted that concentrations of potassium and sodium in groundwater from MW-3D do not exceed relevant screening criteria.

**Chemical Oxygen Demand (COD)**

In Round 1 2020 COD was detected above the laboratory detection limit (7 mg/L) in groundwater from well MW-3D (8 mg/L) only. This is consistent with results of previous monitoring rounds.

**Organics**

No TPH, VOCs, alcohols or acetates were detected above laboratory reporting limits during Round 1 2020.

**Metals**

Cadmium, chromium, copper, lead and mercury were not detected above the laboratory detection limits.

Arsenic (0.0031 mg/L at MW-3D), cobalt (0.003 mg/L at MW-3D), iron (0.135 mg/L at MW-3D), nickel (0.003 mg/L at MW-3D) and zinc (0.006 mg/L at MW-4S) were detected at low concentrations which did not exceed relevant screening criteria, where defined.

Dissolved manganese was detected above the IGV and DWS (both 0.050 mg/L) in groundwater from MW-3D (5.368 mg/L). Dissolved manganese was also detected in groundwater from wells MW-2S (0.005 mg/L) and MW-4D (0.009 mg/L) below all relevant assessment criteria. As in previous monitoring rounds, the dissolved oxygen in groundwater from well MW-3D was low, 0.23 mg/L, indicating slightly reducing conditions which are conducive to manganese entering into solution from common earth minerals and alteration of nitrogen species to ammonia.



## 2.3 CSM and Potential Pollutant Linkages

As noted in Section 1.2.2, the site is underlain by made ground overlying glacial till derived from sandstone and shales with bedrock aquifer present at least 22 m below ground. Shallow groundwater flow is south-westerly across the site and groundwater flow in the deeper sand and gravel converges on the active pumping well in the central area of the site.

From available data, it appears that contamination issues on site have been localised and/or of short duration.

Potential pollutant linkages are considered viable where there is a source of contamination on site which can migrate via a defined pathway to identified receptors. Receptors can be either environmental or human, and located either within or outside the site boundary.

### 2.3.1 Sources

From a review of the site history, it appears that losses to ground from distinct events are limited to:

- Diesel in 2002
- Ethylene glycol in 2003
- Diesel in 2006

The ethylene glycol spill occurred in the vicinity of the fermentation building, and many of the GMW-series monitoring wells are located in this area. Ethylene glycol analysis was included for all wells sampled in April 2020. Ethylene glycol was not detected in groundwater in April 2020. Therefore, from available monitoring data, it appears that there is no on-going loss of ethylene glycol occurring

and no residual impact from the loss that occurred in 2003. MSD informed AECOM that there is no recent source of ethylene glycol loss to ground.

The diesel losses which occurred appear to have been of limited volume and were addressed by shallow soil excavation to remove the source. While diesel (hydrocarbons, TPH) had not been included in the groundwater analytical suite at the site prior to May 2016, related parameters and constituents would have been detected as part of VOC and PAH analyses, which are conducted annually for all sampled wells (i.e. BTEX and certain PAH compounds). VOC and PAH results for earlier monitoring rounds did not suggest the presence of diesel in groundwater. TPH analysis was included in Round 1 2020, and indicated that hydrocarbons were below detection in groundwater from all of the sampled IEL wells. Therefore, it appears from available data that there is no residual source of diesel in ground impacting on groundwater at the site.

### 2.3.2 Pathways

Losses to ground would migrate vertically downwards to the shallow perched aquifer. Contaminants in perched groundwater would then migrate with groundwater flow down hydraulic gradient.

It appears that perched groundwater flows to the south and west toward the mill race; indeed, seepages of shallow groundwater from the base of the slope between the site and the mill race have been observed historically. The mill race flows from north-west to south-east and joins the River Brinny further to the south-east of the site just up-stream of Brinny Bridge.

Although the vertical hydraulic gradient between the two aquifer units is downward across the lower permeability aquitard, it is considered unlikely that diesel, ethylene glycol or inorganics (major ions) would have impacted/impact the deeper gravel aquifer, as the aquitard provides protection and separates the two aquifer units. The primary groundwater flow path through the perched aquifer would likely follow the horizontal hydraulic gradient.

It is also noted that the three active production wells on site abstract groundwater from the deeper gravel aquifer. It is expected that, under active pumping conditions, the vertically downward hydraulic gradient across the aquitard would increase close to the active pumping well, which would locally increase leakage of groundwater from the perched aquifer to the deeper gravel aquifer.



Under natural gradient conditions, the direction of groundwater flow in the deeper gravel aquifer is expected to be to the south or south-west, i.e. toward the River Brinny. However, active pumping alters this, with each production well becoming the focus for groundwater flow when actively pumping. The three active production wells are located in the centre of the site:

- to the north of the purification building (654)
- to the north-east of the services building (651)
- immediately east of the operations building (653)

The zone of contribution was reassessed in early 2017 and an area of ~2.2 km$^2$ was conservatively delineated, extending from the River Brinny in the west to a local highpoint at Old Chapel Cross Roads in the north-east.

### 2.3.3 Receptors

The site uses groundwater for all water supply requirements on site. The three active production wells on site abstract groundwater, principally from the deeper gravel aquifer, but with a proportion of water also likely to come from deeper bedrock. As noted above, there is a vertically downward hydraulic gradient between the two aquifer units, which is likely to increase in the vicinity of an actively pumping well; however, the aquitard is considered to provide a protective hydraulic barrier between the two aquifer units.

Therefore, the receptors of groundwater from production wells (i.e. site staff using the water for potable supply) are not considered likely to be at risk from potential groundwater contamination in the shallow aquifer zone. It is understood that groundwater from the abstraction wells is sampled on a quarterly basis and analysed for a suite of drinking water parameters; no issue with the potable water quality has been reported since monitoring began.

The five off-site groundwater supply wells identified in the wider area either abstract water from bedrock, or the deeper gravel aquifer, and are beyond the Brinny River, which forms the local hydraulic low point. Therefore, consumption of groundwater from these wells is not considered to be a potential risk to off-site receptors.

The mill race, into which shallow groundwater from the perched aquifer discharges, joins the River Brinny to the south-east of the site. Surface water quality adjacent to the site is classified as *High* indicating that site operations are not having an adverse impact on surface water quality.

Water levels in well MW-1D have been monitored since November 2007 and have not shown any long-term changes in groundwater elevation as a result of changes to the abstraction regime at the site during that time, suggesting that the zone of contribution to the site's abstraction wells does not extend to the north-eastern edge of the site.

### 2.3.4 Summary

Current groundwater data indicate exceedances of relevant assessment criteria for a small number of parameters. These exceedances appear localised and there is no evidence of impact to the adjacent surface water courses; in fact, the quality rating of water in the River Brinny actually increases from up-stream to down-stream of the site.

# 3. Summary, Conclusions & Recommendations

## 3.1 Summary and Conclusions

The Round 1 2020 groundwater monitoring was conducted at the MSD Brinny facility from wells specified under the terms of the site's IEL. The analytical suite in Round 1 2020 included major ions, metals, TPH, VOCs, alcohols and acetates and glycols. Across all monitoring wells sampled in Round 1 2020, results were within ranges reported previously where historic data are available for comparison, and do not indicate a deterioration in groundwater quality.



There are two unconsolidated aquifers beneath the site, a shallow perched gravel aquifer and a deeper sand and gravel aquifer. The deeper bedrock is also classified as an aquifer. The two gravel aquifer units are separated from each other by a lower permeability aquitard. The direction of groundwater flow in the perched aquifer is to the south and west toward the mill race. The site abstracts groundwater from the deeper gravel aquifer from three production wells, some of which also extend into the underlying bedrock aquifer. Under natural gradient conditions, the direction of groundwater flow in the deeper gravel aquifer would be to the south; however, prolonged groundwater abstraction has altered this, with groundwater flow focussing on active production wells when pumping. Long term monitoring indicates that these changes to the groundwater flow pattern in the deeper gravel aquifer due to pumping do not extend as far as the north-eastern site boundary (MW-1D).

## 3.2 Recommended Way Forward

Continued monitoring in line with IEL requirements is recommended. The ammoniacal nitrogen concentration in groundwater from well MW-3D should be kept under review.

# Appendix A – Figures


North



APPROXIMATE SCALE

0km 1km 2km



CLIENT

MSD BRINNY

PROJECT

GROUNDWATER MONITORING 2020

DRAWING TITLE

**FIGURE 1_** SITE LOCATION PLAN

| DRAWN | CHECKED | APPROVED | DATE |
|---|---|---|---|
| GOC | EO'H | KF | MAY 2020 |
| SCALE | DRG NO | | |
| AS SHOWN | PR-471091-ACM-RP-EN-001 | | |

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South West

S W E N

WASTEWATER TREATMENT

ESB SUBSTATION

GENERATOR COMPOUND

BUILDING 18

TANK FARM AREA

BUILDING 13

FIRE WATER PUMPHOUSE

GENERATOR

DIESEL STORAGE TANK

DIESEL STORAGE TANK

BUILDING 7 BOILER, UTILITIES & CHP PLANT

16

17

BUILDING 22 TECH OPS & FREEZER STORAGE

BUILDING 8

API

BUILDING 4 OPERATIONS BUILDING No. 1

UTILITIES

WASTE SEGREGATION AREA

SERVICES BUILDING

BUILDING 19 OPERATIONS BUILDING No. 2

WASTE COLLECTION AREA

SOLVENT STORE

CYLINDER STORE

BUILDING 5 OFFICE & WAREHOUSE

MAIN CAR PARK

OVERFLOW CAR PARK

BUILDING 21

CONTRACTORS COMPOUND



CLIENT

MSD BRINNY

PROJECT

GROUNDWATER MONITORING 2020

DRAWING TITLE

**FIGURE 2**_SITE LAYOUT PLAN

NOTES

APPROXIMATE SCALE

0m 50m

| DRAWN | CHECKED | APPROVED | DATE |
|---|---|---|---|
| GOC | EO'H | KF/COR | MAY 2020 |

| SCALE | DRG NO. |
|---|---|
| N.T.S | PR-471091-ACM-RP-EN-001 |

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South West

S W E N

MW-3S MW-3D

GMW15

GMW16

GMW17

GMW4S

GMW4D

GMW7

GMW10

MW-2S

GMW6

GMW5D GMW5S

WELL 653

GMW14

WELL 654 TW3

WELL 651

TW2

GMW1 MW-4S MW-4D GMW2 GMW3

TW1

BH02 BH04 BH01 BH03

GMW13

GMW12

MW-1S MW-1D

MILL

ESB SUBSTATION

GENERATOR COMPOUND

BUILDING 13

BUILDING 16

BUILDING 7
BOILER, UTILITIES & CHP PLANT

BUILDING 4
OPERATIONS BUILDING No. 1

UTILITIES

BUILDING 19
OPERATIONS BUILDING No. 2

WASTE SEGREGATION AREA

BUILDING 22
TECH OPS & FREEZER STORAGE

BUILDING 8

BUILDING 5
OFFICE & WAREHOUSE

SERVICES BUILDING

API

WASTE COLLECTION

SOLVENT

CYLINDER STORE

MAIN CAR PARK

OVERFLOW CAR PARK

BUILDING 21

CONTRACTORS COMPOUND



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PROJECT
GROUNDWATER MONITORING 2020

DRAWING TITLE
**FIGURE 3**_WELL LOCATIONS

NOTES
- Production Well
- Trial Well Location
- IEL Monitoring Well
- Additional Groundwater Monitoring Well

APPROXIMATE SCALE
0m 50m

| DRAWN | CHECKED | APPROVED | DATE |
|---|---|---|---|
| GOC | EO'H | KF/COR | MAY 2020 |

| SCALE | DRG NO. |
|---|---|
| N.T.S | PR-471091-ACM-RP-EN-001 |

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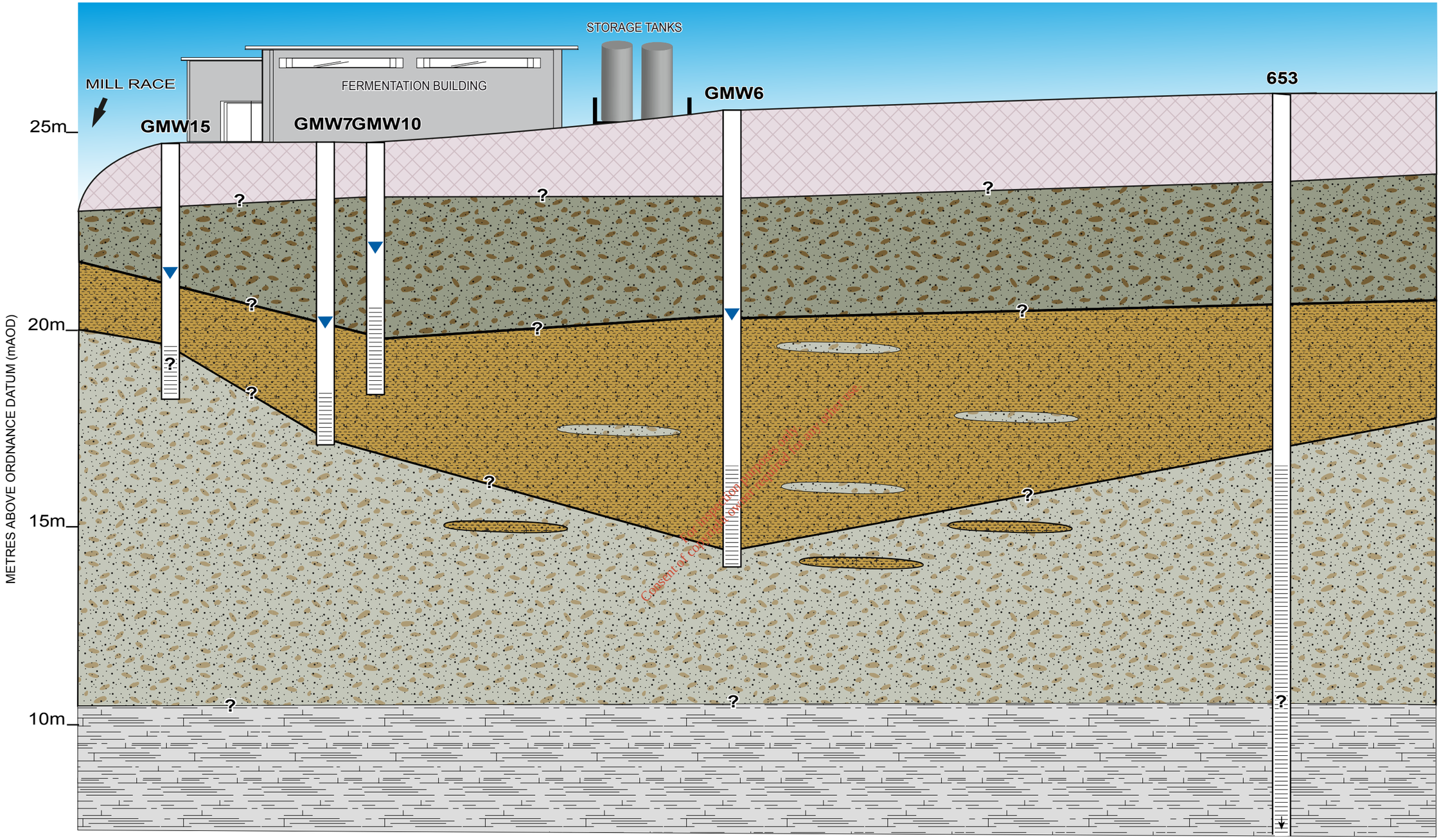
SOUTH

NORTH






**NOTE:** HORIZONTAL AND VERTICAL SCALES DO NOT CORRESPOND FOR ILLUSTRATIVE PURPOSES ONLY

CLIENT

MSD BRINNY

DRAWING TITLE

**FIGURE 4 _** CROSS SECTION

PROJECT

GROUNDWATER MONITORING 2020

| DRAWN | CHECKED | APPROVED | DATE |
|---|---|---|---|
| GOC | EO'H | KF/COR | MAY 2020 |
| SCALE | DRG NO. | | |
| N.T.S | PR-471091-ACM-RP-EN-001 | | |

**LEGEND:**

- MADE GROUND
- UPPER SAND AND GRAVEL (PERCHED AQUIFER)
- LOWER SAND AND GRAVEL (MAIN AQUIFER)
- GROUNDWATER ELEVATION APRIL 2020
- SANDY SILTY CLAY
- PRESUMED MUDSTONE & SANDSTONE BEDROCK

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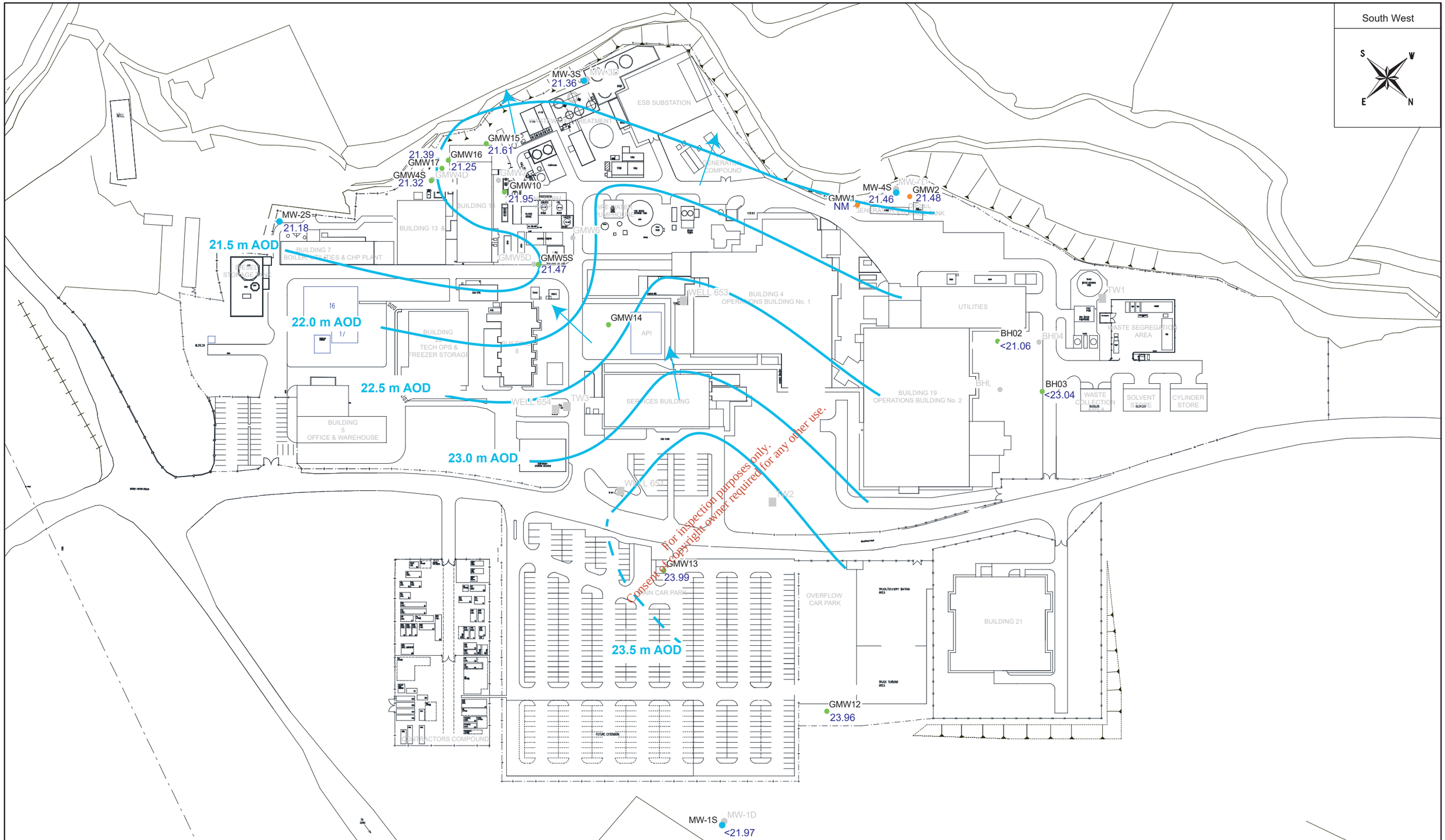


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PROJECT

GROUNDWATER MONITORING 2020

DRAWING TITLE

FIGURE 5_SHALLOW AQUIFER CONTOUR PLAN - MAY 2020

NOTES

- Production Well
- TrialWell Location
- IEL Monitoring Well
- Additional Groundwater Monitoring Well
- Groundwater Monitoring Well in Deep Aquifer

24.11 Groundwater Elevation (m)

Inferred Groundwater Flow Direction

Groundwater Contour

Inferred Groundwater Contour

APPROXIMATE SCALE
0m 50m

| DRAWN | CHECKED | APPROVED | DATE |
|---|---|---|---|
| GOC | BMC | EOH | MAY 2020 |

| SCALE | DRG NO. |
|---|---|
| N.T.S | PR-471091-ACM-RP-EN-001 |

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South West

S W E N

MW-3D 20.03

20.5 mAOD

21.0mAOD

GMW4D 20.37

GMW7 20.35

MW-4D 21.22

GMW6 20.49

GMW5D 20.28

WELL 653 20.09

TW1 21.45

BH04 21.13

BH01 21.36

WELL 654 18.09

TW3 20.43

WELL 651 20.75

TW2

MW-1D 21.60



| | |
|---|---|
| CLIENT | MSD BRINNY |
| PROJECT | GROUNDWATER MONITORING 2020 |
| DRAWING TITLE | FIGURE 6_DEEP AQUIFER CONTOUR PLAN - APRIL 2020 |

NOTES

- Production Well
- TrialWell Location
- IEL Monitoring Well
- Additional Monitoring Well
- Groundwater Monitoring Well in Shallow Aquifer

21.91 Groundwater Elevation (m)

nm Not Monitored

Inferred Groundwater Flow Direction

Groundwater Contour

Inferred Groundwater Contour

APPROXIMATE SCALE 0m 50m

| DRAWN | CHECKED | APPROVED | DATE |
|---|---|---|---|
| GOC | EO'H | KF/COR | MAY 2020 |
| SCALE N.T.S | DRG NO. PR-471091-ACM-RP-EN-001 | | |

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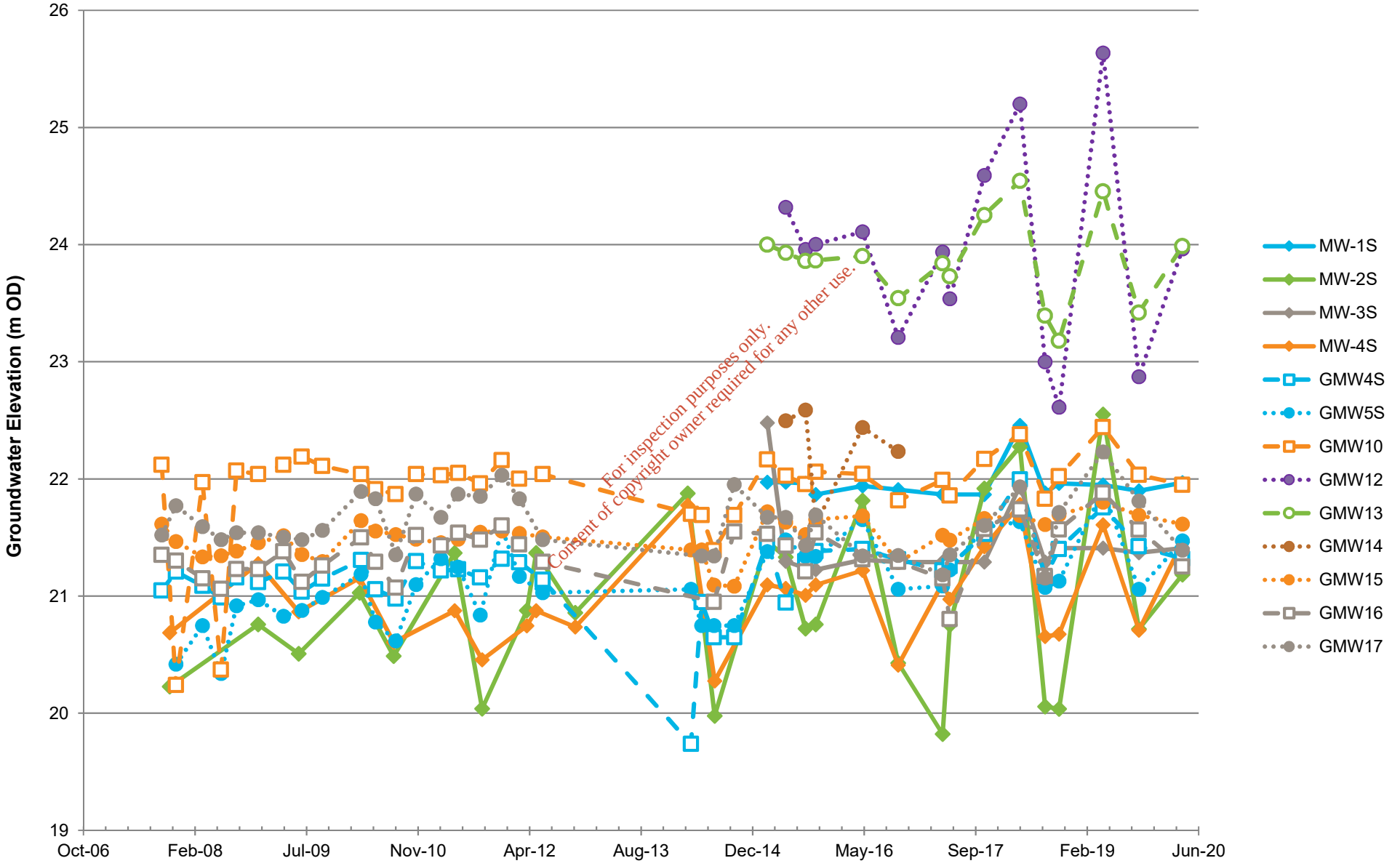
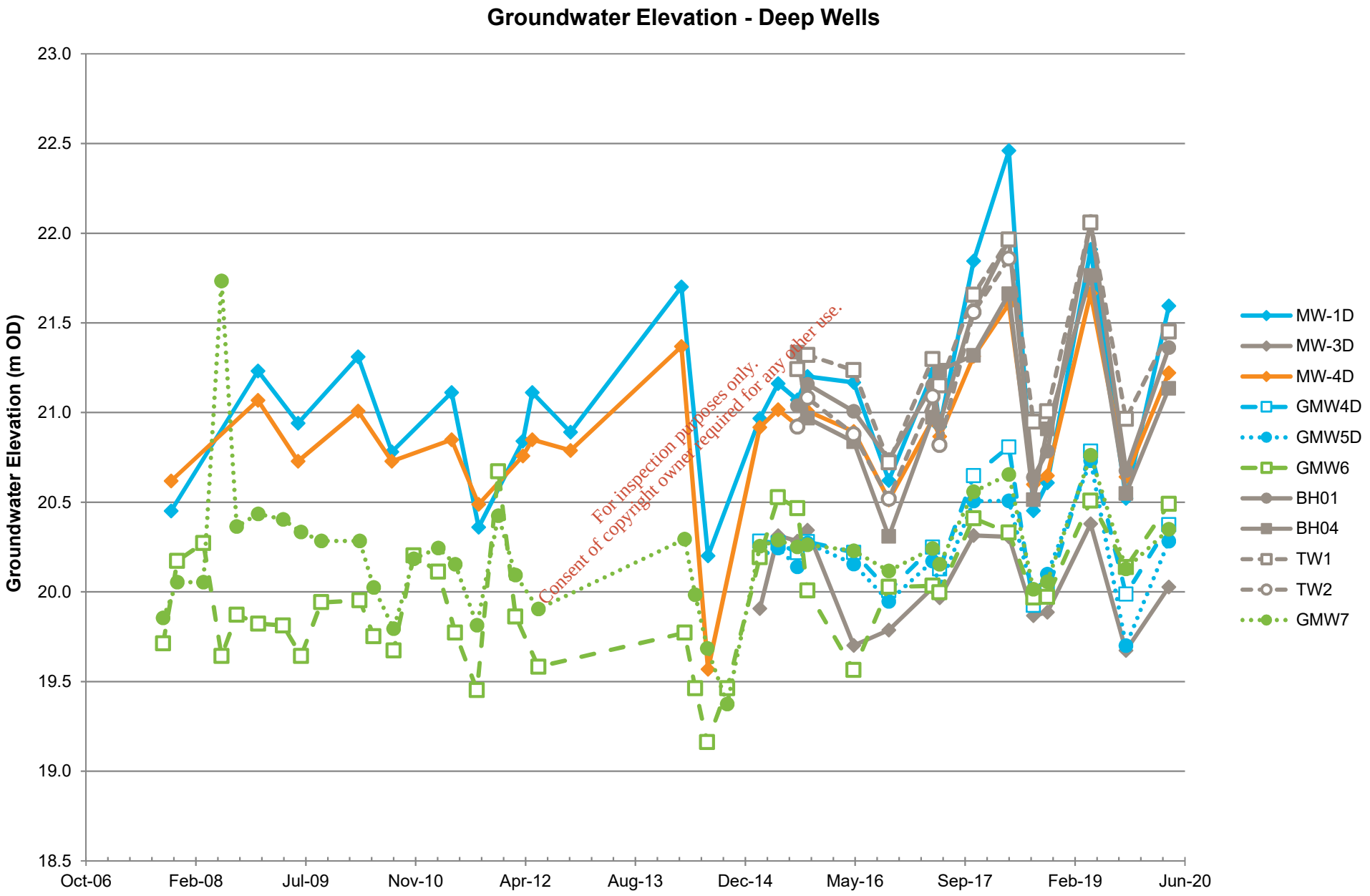
# Figure 7

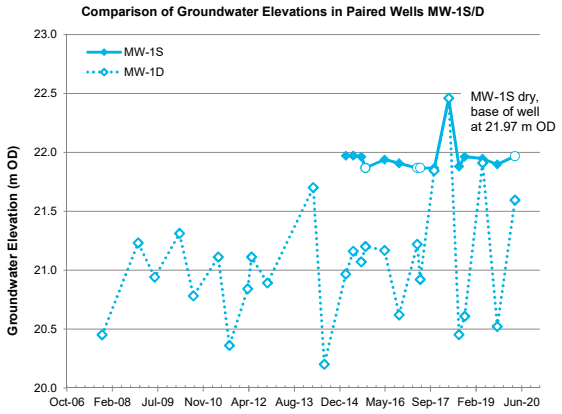
## Groundwater Elevation - Shallow Wells

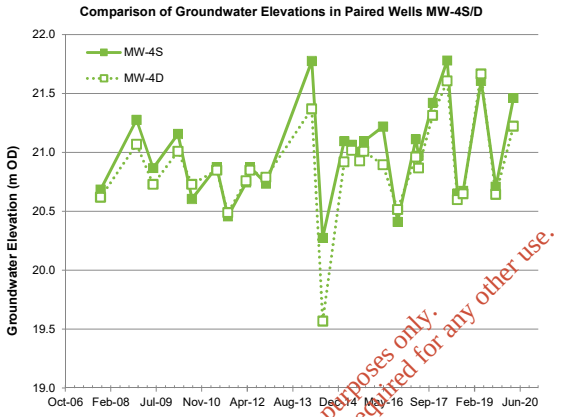


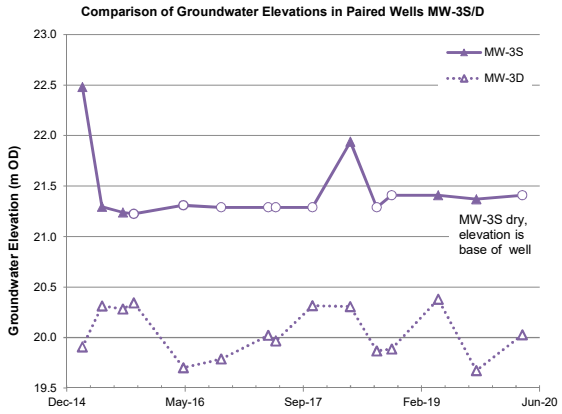
# Figure 8

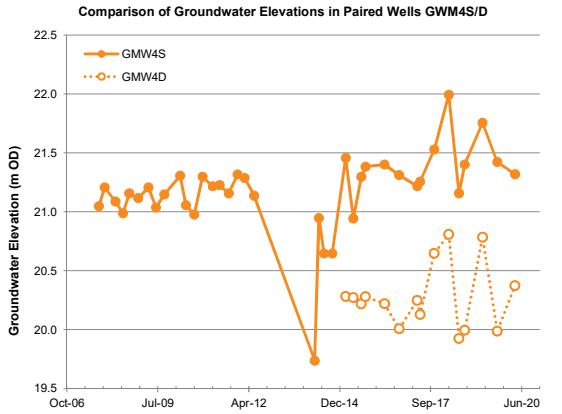


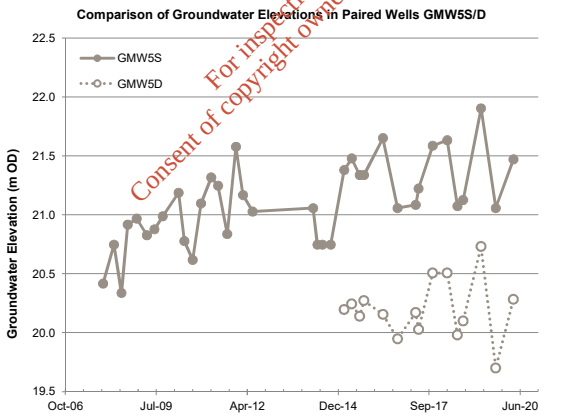
# Figure 9

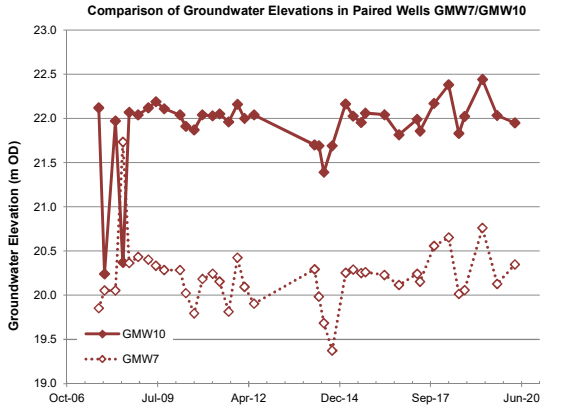


# Appendix B – Tables

# Table 1 - Analytical Schedule
## MSD Brinny Groundwater Monitoring April 2020



| Monitoring Well | | IEL Parameter | | | | | | Additional Parameter | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total Ammonia | Nitrate / Nitrite | Major Ions | Metals | VOCs | Alcohols & Acetates | TCA | TPH | Glycols | COD |
| IEL Wells | MW-1S | B | B | B | B | A | A | A | A | A | B |
| | MW-1D | B | B | B | B | A | A | A | A | A | B |
| | MW-2S | B | B | B | B | A | A | A | A | A | B |
| | MW-3S | B | B | B | B | A | A | A | A | A | B |
| | MW-3D | B | B | B | B | A | A | A | A | A | B |
| | MW-4S | B | B | B | B | A | A | A | A | A | B |
| | MW-4D | B | B | B | B | A | A | A | A | A | B |

**Notes:**

Major Ions: chloride, phosphate, sulphate, fluoride, calcium, potassium, magnesium, manganese, nitrite, sodium and total alkalinity
Metals: arsenic, cadmium, chromium, cobalt, copper, lead, iron, nickel, manganese, mercury and zinc
VOCs: volatile organic compounds
TCA: trichloroacetic acid
TPH: total petroleum hydrocarbons (with aliphatic/aromatic speciation)
Alcohols & Acetates: including: methanol and ethanol
Glycols: including ethylene glycol
COD: chemical oxygen demand
B: sampled and analysed biannually
A: sampled and analysed annually

# Table 2 - Sample Inventory
## MSD Brinny Groundwater Monitoring, April 2020



| Monitoring Well | | IEL Parameter | | | | | | Additional Parameter | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Total Ammonia | Nitrate / Nitrite | Major Ions | Metals | VOCs | Alcohols & Acetates | TPH | Glycols | COD |
| IEL Wells | MW-1S | ns | ns | ns | ns | ns | ns | ns | ns | ns |
| | MW-1D | X | X | X | X | X | X | X | X | X |
| | MW-2S | X | X | X | X | X | X | X | X | X |
| | MW-3S | ns | ns | ns | ns | ns | ns | ns | ns | ns |
| | MW-3D | X | X | X | X | X | X | X | X | X |
| | MW-4S | X | X | X | X | X | X | X | X | X |
| | MW-4D | X | X | X | X | X | X | X | X | X |

**Notes:**

Major Ions: chloride, phosphate, sulphate, fluoride, calcium, potassium, magnesium, manganese, nitrite, sodium and total
Metals: arsenic, cadmium, chromium, cobalt, copper, lead, iron, nickel, manganese, mercury and zinc
VOCs: volatile organic compounds
TPH: total petroleum hydrocarbons (with aliphatic/aromatic speciation)
Alcohols & Acetates: including: acetone, methanol, ethanol and isopropanol
Glycols: including ethylene glycol
COD: chemical oxygen demand
ns: not sampled
X: scheduled for analysis
na: not scheduled for analysis

**Table 3 - Field Observations**
**MSD Brinny Groundwater Monitoring, April 2020**



| Well | | Year Installed | Total Depth | | | Screen Length | Siltation within Screen | Casing Elevation | Depth to Groundwater | Groundwater Elevation | pH | EC | Temperature | Dissolved Oxygen | Field ORP | Eh | LNAPL/ DNAPL Detected | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Drilled | Installed | Measured Apr-2020 | | | | | | | | | | | | | |
| | | | m bgl | m bgl | m bct | m | % | m OD | m bct | m OD | | µS/cm | °C | mg/L | mV | mV | | |
| Production | PW2 | 1975 | 25.6 | ~ | nf | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ |
| | PW4 | 1975 | 20.2 | ~ | nf | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ |
| | 3 | 1974 | 70.1 | ~ | nf | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ |
| | PW3 | 1975 | 26.5 | ~ | nf | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ |
| | 651 | Pre 1992 | 23.0 | 23.0 | nm | 10.0 | ~ | 25.735 | 4.982 | 20.753 | ~ | ~ | ~ | ~ | ~ | ~ | No | Not Pumping |
| | 653 | Pre 1992 | 62.5 | 60.0 | nm | 50.0 | ~ | 26.704 | 6.610 | 20.094 | ~ | ~ | ~ | ~ | ~ | ~ | No | Not Pumping |
| | 654 | 1992 | 23.6 | 18.0 | nm | 6.0 | ~ | 25.059 | 6.972 | 18.087 | ~ | ~ | ~ | ~ | ~ | ~ | No | Pumping |
| Trial or Unused Production | 5 | Pre 1982 | ~ | ~ | nf | ~ | ~ | 25.517 | nf | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | Decommissioned in 2017 |
| | PW6 | 1982 | 23.5 | ~ | nf | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ |
| | 7 | 1974 | 64.0 | ~ | nf | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ |
| | 8 | 1974 | 17.7 | ~ | nf | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ |
| | TW1 | 1992 | 22.0 | ~ | 20.28 | ~ | ~ | 27.301 | 5.850 | 21.451 | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| | TW2 | 1992 | 85.0 | ~ | nm | ~ | ~ | ~ | 6.240 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | No | Flush metal cover, elevation not surveyed |
| | TW3 | 1992 | 17.8 | ~ | 15.67 | ~ | ~ | 25.033 | 4.603 | 20.430 | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| IEL Monitoring | MW-1S | 1991 | ~ | 6.0 | 6.27 | ~ | ~ | 28.137 | 6.170 | 21.967 | nm | nm | nm | nm | nm | nm | No | Dry |
| | MW-1D | 1991 | ~ | 9.0 | 9.26 | ~ | ~ | 28.101 | 6.506 | 21.595 | 6.96 | 249 | 13.3 | 7.75 | 259 | 464 | No | Cloudy brown, silty, NEC |
| | MW-2S | 1991 | ~ | 5.9 | 6.26 | ~ | ~ | 24.877 | 3.695 | 21.182 | 7.65 | 407 | 14.1 | 3.78 | 377 | 581 | No | Cloudy orange/brown, silty, NEC |
| | MW-3S | 2012 | 11.0 | 9.0 | 5.55 | 5.0 | 69% | 26.909 | 5.551 | 21.358 | nm | nm | nm | nm | nm | nm | No | Dry |
| | MW-3D | 2012 | 13.8 | 13.8 | 13.78 | 1.3 | 2% | 26.877 | 6.850 | 20.027 | 7.16 | 408 | 15.3 | 0.23 | 187 | 391 | No | Cloudy brown, silty, NEC |
| | MW-4S | 1992 | 7.5 | 7.5 | 7.80 | 3.0 | 0% | 26.975 | 5.514 | 21.461 | 7.30 | 288 | 14.0 | 9.64 | 220 | 424 | No | Clear, slightly silty , NEC |
| | MW-4D | 1992 | 12.0 | 12.0 | 11.12 | 3.0 | 29% | 27.168 | 5.947 | 21.221 | 6.88 | 249 | 13.9 | 2.98 | 260 | 464 | No | Cloudy brown, silty, NEC |
| Site Investigation and Additional Monitoring | GMW1 | 2001 | 7.0 | 7.0 | nm | 2.0 | ~ | 27.210 | nm | ~ | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| | GMW2 | 2001 | 7.0 | 7.0 | 7.30 | 2.0 | 0% | 27.048 | 5.563 | 21.485 | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| | GMW3 | 2001 | 7.2 | 7.0 | 6.97 | 2.0 | 0% | ~ | 5.375 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| | GMW4S | 2003 | 8.5 | 8.5 | 7.89 | 3.0 | 20% | 24.607 | 3.288 | 21.319 | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| | GMW4D | 2003 | 18.0 | 17.5 | 17.10 | 3.0 | 13% | 25.059 | 4.685 | 20.374 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ |
| | GMW5S | 2003 | 8.0 | 8.0 | 6.71 | 3.0 | 43% | 25.317 | 3.846 | 21.471 | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| | GMW5D | 2003 | 18.0 | 18.0 | 16.66 | 3.0 | 45% | 25.292 | 5.009 | 20.283 | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| | GMW6 | 2003 | 15.0 | 12.0 | 11.54 | 3.0 | 15% | 25.562 | 5.072 | 20.490 | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| | GMW7 | 2003 | 8.0 | 8.0 | 7.35 | 2.0 | 33% | 24.554 | 4.205 | 20.349 | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| | GMW10 | 2003 | 8.0 | 6.0 | 5.32 | 2.0 | 34% | 24.740 | 2.791 | 21.949 | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| | GMW12 | Pre 2006 | ~ | ~ | 8.10 | ~ | ~ | 28.443 | 4.480 | 23.963 | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| | GMW13 | Pre 2006 | ~ | ~ | 6.80 | ~ | ~ | 27.410 | 3.422 | 23.988 | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| | GMW14 | Pre 2006 | ~ | ~ | nf | ~ | ~ | 26.358 | nf | ~ | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| | GMW15 | Pre 2006 | ~ | ~ | 6.18 | ~ | ~ | 24.744 | 3.131 | 21.613 | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| | GMW16 | Pre 2006 | ~ | ~ | 6.84 | ~ | ~ | 24.600 | 3.348 | 21.252 | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| | GMW17 | Pre 2006 | ~ | ~ | 4.92 | ~ | ~ | 24.691 | 3.300 | 21.391 | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| | BH01 | 2009 | 16.1 | 13.0 | 11.97 | 3.0 | 34% | 27.737 | 6.375 | 21.362 | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| | BH02 | 2009 | 11.1 | 8.0 | 5.84 | 4.0 | 54% | 27.443 | dry | <21.69 | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| | BH03 | 2009 | 8.0 | 6.0 | 4.28 | 3.0 | ~ | 28.040 | dry | <23.04 | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |
| | BH04 | 2009 | 15.3 | 15.0 | 14.26 | 6.5 | 11% | 27.474 | 6.340 | 21.134 | ~ | ~ | ~ | ~ | ~ | ~ | No | ~ |



**Notes:**

m OD - Metres to Ordnance Datum, as surveyed 20 August 2015
m bgl - Metres below ground level
m bct - Metres below casing top
nf - Not Found
Dip measurements were taken on 06 April 2020

µS/cm - Microsiemens per centimetre
°C - degrees Celsius
mg/L - milligrams per litre
mV - millivolts
ORP - oxidation-reduction potential

LNAPL - light non-aqueous phase liquid
DNAPL - dense non-aqueous phase liquid
NEC - no evidence of contamination
~ - No data
nm - not measured

WQM - Water quality meter

**Table 4 - Monitoring Results**
**MSD Brinny IEL Groundwater Monitoring, April 2020**



| Screening Threshold | Major Ions | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ammonia-N | Ammonium | Nitrate-N | Nitrate as $NO_3$ | Nitrite as $NO_2$ | Phosphate-P | Chloride | Sulphate | Fluoride | Sodium | Potassium | Calcium | Magnesium | Total Alkalinity as $CaCO_3$ |
| IGV | 0.12 | 0.15 | 5.6 | 25 | 0.1 | 0.03 | 30 | 200 | 1 | 150 | 5 | 200 | 50 | NAC |
| DWS | 0.23 | 0.3 | 11.3 | 50 | 0.5 | - | 250 | 250 | 1.5 | 200 | - | - | - | - |
| GTV | 0.175 | 0.225 | 8.5 | 37.5 | 0.375 | 0.035 | 187.5 | 187.5 | - | - | - | - | - | - |
| IEL Well ID | | | | | | | | | | | | | | |
| MW-1D | <0.03 | <0.039 | 6.3 | 27.8 | <0.02 | <0.02 | 24.5 | 11.9 | <0.3 | 15.2 | 1.9 | 27.8 | 4.5 | 54 |
| MW-2S | <0.03 | <0.039 | 2.4 | 10.5 | <0.02 | 0.03 | 35.2 | 20.6 | <0.3 | 28.4 | 7.3 | 54.2 | 2.3 | 134 |
| MW-3S | | | | | | | | | | | | | | |
| MW-3D | 1.48 | 1.903 | 0.4 | 1.9 | <0.02 | 0.05 | 45.0 | 31.1 | <0.3 | 43.2 | 3.9 | 30.4 | 7.5 | 112 |
| MW-4S | <0.03 | <0.039 | 5.7 | 25.4 | <0.02 | <0.02 | 11.3 | 22.9 | <0.3 | 11.5 | 2.0 | 45.5 | 4.9 | 96 |
| MW-4D | 0.19 | 0.244 | 5.7 | 25.4 | 0.0 | 0.03 | 30.7 | 22.2 | <0.3 | 40.9 | 0.8 | 9.7 | 1.8 | 32 |

**Notes:**

XXXXX Indicates result above interim guideline value (IGV)

XXXXX Indicates result above groundwater threshold value (GTV)

XXXXX Indicates result above IGV and GTV

Blank cell indicates no data

- indicates no screening threshold

< indicates result below reporting limit

NAC indicates no abnormal change

**Table 4 - Monitoring Results**
**MSD Brinny IEL Groundwater Monitoring, April 2020**



| Screening Threshold | Organics and Field Measurements | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOCs | Alcohols & Acetates | Trichloroacetic Acid | Ethylene Glycol | Total Petroleum Hydrocarbons | COD | Electrical Conductivity | | pH | | Temperature | Depth to Groundwater | Groundwater Elevation | Total Depth |
| | | | | | | | µS/cm | µS/cm | | | | | | |
| | | | µg/L | | | | Lab | Field | Lab | Field | | | | |
| **IGV** | various | various | - | - | 10 | - | **1000** | | **6.5** | **9.5** | **25** | - | - | - |
| **DWS** | various | various | - | - | - | - | 2500 | | 6.5 | 9.5 | - | - | - | - |
| **GTV** | various | various | - | - | **10** | - | 800 | **1875** | - | - | - | - | - | - |
| **IEL Well ID** | | | | | | | | | | | | | | |
| MW-1D | ND | ND | | <10 | <10 | <7 | | 249 | | 6.6 | 13.3 | 6.51 | 21.60 | 9.26 |
| MW-2S | ND | ND | | <10 | <10 | <7 | | 407 | | 7.7 | 14.1 | 3.70 | 21.18 | 6.26 |
| MW-3S | | | | | | | | | | | | | | |
| MW-3D | ND | ND | | <10 | <10 | 8 | | 408 | | 7.2 | 15.3 | 6.85 | 20.03 | 13.78 |
| MW-4S | ND | ND | | <10 | <10 | <7 | | 288 | | 7.3 | 14.0 | 5.51 | 21.46 | 7.80 |
| MW-4D | ND | ND | | <10 | <10 | <7 | | 249 | | 6.9 | 13.9 | 5.95 | 21.22 | 11.12 |

**Notes:**

**XXXXX** Indicates result above interim guideline value (IGV)

**XXXXX** Indicates result above groundwater threshold value (GTV)

**XXXXX** Indicates result above IGV and GTV

Blank cell indicates no data

- indicates no screening threshold

< indicates result below reporting limit

NAC indicates no abnormal change

**Table 4 - Monitoring Results**
**MSD Brinny IEL Groundwater Monitoring, April 2020**



| Screening Threshold | Metals | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Arsenic | Cadmium | Chromium | Cobalt | Copper | Iron | Lead | Manganese | Mercury | Nickel | Zinc |
| IGV | 0.01 | 0.005 | 0.03 | - | 0.03 | 0.2 | 0.01 | 0.05 | 0.001 | 0.02 | 0.1 |
| DWS | 0.01 | 0.005 | 0.05 | - | 2 | 0.2 | 0.01 | 0.05 | 0.001 | 0.02 | - |
| GTV | 0.0075 | - | 0.0375 | - | 1.5 | - | 0.0075 | - | 0.00075 | - | 0.075 |
| IEL Well ID | | | | | | | | | | | |
| MW-1D | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | <0.003 |
| MW-2S | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | 0.005 | <0.001 | <0.002 | <0.003 |
| MW-3S | | | | | | | | | | | |
| MW-3D | 0.0031 | <0.0005 | <0.0015 | 0.0030 | <0.007 | 0.14 | <0.005 | 5.368 | <0.001 | 0.003 | <0.003 |
| MW-4S | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | 0.006 |
| MW-4D | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | 0.009 | <0.001 | <0.002 | <0.003 |

**Notes:**

| | | |
|---|---|---|
| XXXXX | Indicates result above interim guideline value (IGV) | Blank cell indicates no data |
| XXXXX | Indicates result above groundwater threshold value (GTV) | - indicates no screening threshold |
| XXXXX | Indicates result above IGV and GTV | < indicates result below reporting limit |

# Appendix C – Well Inventory and Available Geological and Well Construction Logs

| Well | | Year Installed | Year Decommissioned | Location Co-ordinate, as surveyed 21 August 2015 | | Elevation | | | | | Diameter | | Total Depth | | | Screen Interval | | | | Geological Unit | Yield | Hydraulic Conductivity | Well Condition | Sources of Information |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Ground | | Casing | | | Borehole | Well | Drilled | Installed | Measured Apr-2020 | Top | | Base | | | | | | |
| | | | | Easting | Northing | m SD | m OD | m SD | m SD [6] | m OD | mm | mm | m bgl | m bgl | m bct | m bgl | m bct | m bgl | m bct | | $m^3/hr$ | m/d | | |
| Production | PW2 | 1975 | ~ | 151630 | 59320 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | 25.6 | ~ | nf | ~ | ~ | ~ | ~ | Gravel, bedrock at 24 m bgl | 61.4 | ~ | Not found. | 1, 12 |
| | PW4 | 1975 | ~ | 151690 | 59290 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | 20.2 | ~ | nf | ~ | ~ | ~ | ~ | Gravel, bedrock at 18 m bgl | 13.6 | ~ | Not found. | 1, 12 |
| | 3 | 1974 | ~ | 151660 | 59340 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | 70.1 | ~ | nf | ~ | ~ | ~ | ~ | Bedrock at 9.1 m bgl | 22.7 | ~ | Not found. | 1, 12 |
| | PW3 | 1975 | ~ | 151590 | 59290 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | 26.5 | ~ | nf | ~ | ~ | ~ | ~ | Bedrock at 24.5 m bgl | 27.3 | ~ | Not found. | 1, 12 |
| | 651 | Pre 1992 | na | 551549.71 | 559544.43 | 28.450 | 27.204 | 27.500 | 39.060 | 27.204 | 350 | 250 | 23.0 | 23.0 | nm | 13.0 | ~ | 23.0 | ~ | Gravel and bedrock | 39.5 | 80 | Well located in pump house, sealed, upright headworks. | 3, 4, 5, 6 |
| | 653 | Pre 1992 | na | 551461.08 | 559509.14 | 29.050 | 26.574 | 29.300 | 40.030 | 26.574 | 350 | 250 | 62.5 | 60.0 | nm | 10.0 | ~ | 60.0 | ~ | Gravel and bedrock | 39.5 | 17 | Well located in pump house, sealed, upright headworks. | 3, 4, 5, 6 |
| | 654 | 1992 | na | 551538.85 | 559498.76 | 27.700 | 24.450 | 27.700 | 38.370 | 24.450 | 350 | 250 | 23.6 | 18.0 | nm | 12.0 | ~ | 18.0 | ~ | Gravel, bedrock at 19 m bgl | 39.5 | 60 | Well located in pump house, sealed, upright headworks. | 3, 4, 5, 6, 12 |
| Trial or Unused Production | 5 | Pre 1982 | na | ~ | ~ | 28.25 | ~ | 28.25 | 38.58 | 25.517 | ~ | ~ | ~ | ~ | nf | ~ | ~ | ~ | ~ | Gravel and bedrock | ~ | ~ | Well decommissioned in 2017 | 1, 4, 6 |
| | PW6 | 1982 | ~ | 151520 | 59450 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | 23.5 | ~ | nf | ~ | ~ | ~ | ~ | Gravel | 67.0 | 50 | Not found. | 1, 12 |
| | 7 | 1974 | ~ | 151620 | 59290 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | 64.0 | ~ | nf | ~ | ~ | ~ | ~ | Gravel and bedrock, bedrock at 9.1 mbgl | 2.3 | 50 | Not found. | 1, 12 |
| | 8 | 1974 | ~ | 151630 | 59450 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | 17.7 | ~ | nf | ~ | ~ | ~ | ~ | Gravel, bedrock at 14 m bgl | 1.2 | ~ | Not found. | 1, 12 |
| | TW1 | 1992 | na | 551334.59 | 559663.06 | ~ | 27.414 | ~ | ~ | 27.301 | ~ | 150 | 22.0 | ~ | 20.280 | ~ | ~ | ~ | ~ | Bedrock at 20 m bgl | 2.0 | ~ | Upright cover. Latch is loose and will need to be repaired. | 5, 12 |
| | TW2 | 1992 | na | 551509.04 | 559602.39 | ~ | ~ | ~ | ~ | 27.101 | ~ | ~ | 85.0 | ~ | nm | ~ | ~ | ~ | ~ | Bedrock at 23.5 m bgl | 30.3 | ~ | Needs to be re-surveyed in, well not at same height as previous monitoring rounds. | 5, 12 |
| | TW3 | 1992 | na | 551534.59 | 559499.43 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | 17.8 | ~ | 15.670 | ~ | ~ | ~ | ~ | Bedrock at 17 m bgl | 38.5 | ~ | Locked, upright cover, good condition. | 5, 12 |
| IEL Monitoring | MW-1S | 1991 | na | 551643.10 | 559681.20 | 27.908 | 28.058 | 28.228 | 41.440 | 28.137 | ~ | 50 | ~ | 6.0 | 6.270 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | Locked, labelled as 1D on upright cover. | 2, 6, 8 |
| | MW-1D | 1991 | na | 551642.38 | 559681.00 | 27.903 | 28.058 | 28.273 | 41.410 | 28.101 | ~ | 50 | ~ | 9.0 | 9.260 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | Locked, labelled as 1S on upright cover, good condition. | 2, 6, 8 |
| | MW-2S | 1991 | na | 551553.65 | 559337.24 | 24.771 | 24.891 | 24.885 | 37.900 | 24.877 | ~ | 50 | ~ | 5.9 | 6.260 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | Labelled upright cover, no lock hole. | 2, 6, 8 |
| | MW-3S | 1991 | 2012 | 151441 | 59342 | 26.049 | ~ | 26.331 | 39.300 | ~ | ~ | 50 | ~ | 5.9 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | Labelled, upright cover, good condition. PVC bailer installed. | 2, 6, 7, 8 |
| | | 2012 | na | 551409.95 | 559406.97 | ~ | 26.871 | ~ | ~ | 26.909 | 150 | 50 | 11.0 | 9.0 | 5.550 | 4.0 | ~ | 9.0 | ~ | Sandy silt and clay | ~ | ~ | | 7 |
| | MW-3D | 1991 | 2012 | 151441 | 59342 | 26.067 | ~ | 26.232 | 39.160 | ~ | ~ | 50 | ~ | 9.1 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | Upright cover, good condition. | 2, 6, 7, 8 |
| | | 2012 | na | 551408.74 | 559407.47 | ~ | 26.865 | ~ | ~ | 26.877 | 150 | 50 | 13.8 | 13.8 | 13.780 | 12.5 | ~ | 13.8 | ~ | Gravel | ~ | ~ | | 7 |
| | MW-4S | 1992 | na | 551356.88 | 559555.00 | 27.027 | 27.177 | 27.217 | 40.000 | 26.975 | 200 | 50 | 7.5 | 7.5 | 7.800 | 4.5 | 4.69 | 7.5 | 7.69 | Silty sand | ~ | ~ | Locked, labelled upright cover, good condition. | 2, 6 |
| | MW-4D | 1992 | na | 551356.48 | 559554.66 | 27.020 | 27.177 | 27.210 | 40.200 | 27.168 | 200 | 50 | 12.0 | 12.0 | 11.120 | 9.0 | 9.19 | 12.0 | 12.19 | Gravel | ~ | ~ | Locked, labelled upright cover, good condition. | 2, 6 |
| Site Investigation and Additional Monitoring | GMW1 | 2001 | na | 551373.80 | 559544.91 | 28.940 | 27.073 | 29.190 | ~ | 27.210 | 200 | 50 | 7.0 | 7.0 | nm | 5.0 | ~ | 7.0 | ~ | Silty sand | ~ | ~ | Upright cover, good condition. No lock. | 3 |
| | GMW2 | 2001 | na | 551354.97 | 559561.61 | 28.880 | 27.216 | 28.900 | ~ | 27.048 | 200 | 50 | 7.0 | 7.0 | 7.300 | 5.0 | ~ | 7.0 | ~ | Silty sand | ~ | ~ | Upright cover, good condition. No lock. | 3 |
| | GMW3 | 2001 | na | ~ | ~ | 28.850 | ~ | 28.760 | ~ | ~ | 200 | 50 | 7.2 | 7.0 | 6.970 | 5.0 | ~ | 7.0 | ~ | Silty sand | ~ | ~ | Flush cover, no label, chamber filled with mud, no lock. | 3 |
| | GMW4S | 2003 | na | 551492.88 | 559380.67 | 27.740 | 24.886 | 27.440 | 37.630 | 24.607 | 150 | 50 | 8.5 | 8.5 | 7.890 | 5.5 | 5.20 | 8.5 | 8.20 | Sand, silt and clay | ~ | ~ | Locked, labelled upright cover, good condition. | 4, 6 |
| | GMW4D | 2003 | na | 551492.16 | 559380.87 | 27.740 | 24.879 | 27.350 | 37.670 | 25.059 | 150 | 50 | 18.0 | 17.5 | 17.100 | 14.5 | 14.11 | 17.5 | 17.11 | Sandy gravel | ~ | ~ | Locked, labelled upright cover, good condition. | 4, 6 |
| | GMW5S | 2003 | na | 551491.73 | 559445.30 | 27.980 | 25.235 | 28.150 | 38.700 | 25.317 | 150 | 50 | 8.0 | 8.0 | 6.710 | 5.0 | 5.17 | 8.0 | 8.17 | Sand, silt and clay | ~ | ~ | Locked, labelled upright cover, good condition. | 4, 6 |
| | GMW5D | 2003 | na | 551492.63 | 559443.97 | 27.980 | 25.164 | 28.120 | 38.670 | 25.292 | 150 | 50 | 18.0 | 18.0 | 16.660 | 15.0 | 15.14 | 18.0 | 18.14 | Sandy gravel | ~ | ~ | Labelled upright cover, good condition. | 4, 6 |
| | GMW6 | 2003 | na | 551471.51 | 559450.04 | 28.360 | 25.620 | 28.400 | 38.870 | 25.562 | 150 | 50 | 15.0 | 12.0 | 11.540 | 9.0 | 9.04 | 12.0 | 12.04 | Sand, silt and clay and sandy gravel | ~ | ~ | Locked, labelled upright cover, good condition. | 4, 6 |
| | GMW7 | 2003 | na | 551472.41 | 559405.20 | 27.700 | 24.654 | 27.700 | 37.580 | 24.554 | 100 | 50 | 8.0 | 8.0 | 7.350 | 6.0 | ~ | 8.0 | ~ | Boulder clay | ~ | ~ | Locked, labelled upright cover, good condition. | 6, 8, 9 |
| | GMW8 | 2003 | 2004 | ~ | ~ | 27.700 | ~ | 27.715 | ~ | ~ | 100 | 50 | 8.0 | 8.0 | ~ | 6.0 | ~ | 8.0 | ~ | Boulder clay | ~ | ~ | Well decommissioned. | 8, 9 |
| | GMW9 | 2003 | 2004 | ~ | ~ | 27.700 | ~ | 27.710 | ~ | ~ | 100 | 50 | 8.0 | 8.0 | ~ | 6.0 | ~ | 8.0 | ~ | Boulder clay | ~ | ~ | Well decommissioned. | 8, 9 |
| | GMW10 | 2003 | na | 551475.09 | 559411.06 | 27.700 | 24.734 | 27.720 | 37.590 | 24.740 | 150 | 50 | 8.0 | 6.0 | 5.315 | 4.0 | ~ | 6.0 | ~ | Silty sand | ~ | ~ | Labelled upright cover, good condition. PVC bailer installed. | 6, 8, 9 |
| | GMW11 | 2003 | 2004 | ~ | ~ | 27.700 | ~ | 27.710 | ~ | ~ | 150 | 50 | 8.0 | 8.0 | ~ | 6.0 | ~ | 8.0 | ~ | Sand | ~ | ~ | Well decommissioned. | 8, 9 |
| | GMW12 | Pre July 2004 | na | 551569.91 | 559685.71 | ~ | 28.368 | ~ | 41.740 | 28.443 | ~ | ~ | ~ | ~ | 8.100 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | Labelled upright cover, good condition. No lock. | 6 |
| | GMW13 | Pre July 2004 | na | 551567.06 | 559583.00 | ~ | 27.325 | ~ | 40.720 | 27.410 | ~ | ~ | ~ | ~ | 6.800 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | Labelled upright cover, good condition. | 6 |
| | GMW14 | Pre July 2004 | na | 551493.04 | 559489.20 | ~ | 26.402 | ~ | 39.660 | 26.358 | ~ | ~ | ~ | ~ | nf | ~ | ~ | ~ | ~ | ~ | ~ | ~ | Capped under a new building. | 6 |
| | GMW15 | Q4 2004 | na | 551462.61 | 559389.92 | ~ | 24.817 | ~ | 37.690 | 24.744 | ~ | 50 | ~ | ~ | 6.180 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | Labelled upright cover, good condition. | 6 |
| | GMW16 | Q4 2004 | na | 551480.25 | 559380.88 | ~ | 24.726 | ~ | 37.630 | 24.600 | ~ | 50 | ~ | ~ | 6.840 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | Locked, labelled upright cover, good condition. | 6 |
| | GMW17 | Q4 2004 | na | 551485.17 | 559380.96 | ~ | 24.745 | ~ | 37.720 | 24.691 | ~ | 50 | ~ | ~ | 4.920 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | Locked, labelled upright cover, good condition. | 6 |
| | BH01 | 2009 | na | 551399.09 | 559652.91 | ~ | 27.483 | ~ | ~ | 27.737 | 200 | 50 | 16.1 | 13.0 | 11.970 | 10.0 | ~ | 13.0 | ~ | Sand and gravel | ~ | 11 - 25 | Locked. labelled upright cover. | 10 |
| | BH02 | 2009 | na | 551381.75 | 559637.40 | ~ | 27.443 | ~ | ~ | 27.723 | 200 | 50 | 11.1 | 8.0 | 5.840 | 4.0 | ~ | 8.0 | ~ | Sand, clay and gravel | ~ | 0.08 - 0.18 | Locked. labelled upright cover. | 10 |
| | BH03 | 2009 | na | 551387.25 | 559668.85 | ~ | 27.443 | ~ | ~ | 28.040 | 200 | 50 | 8.0 | 6.0 | 4.280 | 3.0 | ~ | 6.0 | ~ | Clay | ~ | 7 | Labelled upright cover but this is loose and not affixed to the ground. | 10 |
| | BH04 | 2009 | na | 551370.118 | 559653.074 | ~ | 27.474 | ~ | ~ | 27.942 | 200 | 50 | 15.3 | 15.0 | 14.280 | 8.5 | ~ | 15.0 | ~ | Gravel | ~ | 3 | Labelled upright cover. | 10 |



**Sources of Information:**

1 - KT Cullen, 1982: Report on the Possible Effect on Local Groundwater Levels due to Increased Abstractions at Chemibiotic (Irl.) Ltd., Brinny, Co. Cork
2 - KT Cullen, 1992: Groundwater Monitoring Well Installation and Sampling, Schering-Plough, Brinny, Innishannon, Co. Cork FINAL
3 - KT Cullen, 2002: Environmental Investigation, Schering-Plough (Brinny) Company, Innishannon, Co. Cork FINAL, # 3037
4 - WYG, 2003: Environmental Assessment Phase II, Schering-Plough (Brinny) Company, Innishannon, Co. Cork DRAFT, # C002681/2
5 - WYG, 2004: Schering-Plough (Brinny) Company Source Protection Study, # C001697
6 - WYG, 2006: Groundwater Level Investigation at Schering-Plough Pharmaceutical Plant, Brinny, Co. Cork, # CE05101
7 - WYG, 2012: The Relocation of Groundwater Monitoring Boreholes MW3S & MW3D due to Site Expansion Works, # CE08805
8 - WYG, CE08805 project file
9 - WYG, CE02681 project file
10 - WYG, 2009: Geotechnical Interpretive Report, # CE06761
11 - WYG, 2010 IPPC Licence Application
12 - Geological Survey of Ireland website, www.gsi.ie

**Notes:**

m OD - Metres to Ordnance Datum, as surveyed 21 August 2015
m SD - Metres to site datum, as originally reported
m SD [6] - Top of well casing elevations as re-surveyed in 2006
m bgl - Metres below ground level
m bct - Metres below casing top
$m^3/hr$ - Cubic metres per hour
m/d - Metres per day
na - Not applicable
nf - Not found
nm - Not measured due to access
~ - No data
Bold - Indicates data for decommissioned well

# Appendix D – Laboratory Documentation

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

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781
W: www.element.com

AECOM
1st Floor, Montrose House
Carrigaline Road
Douglas
Cork
Ireland

| | |
|---|---|
| **Attention :** | Brendan McCarthy |
| **Date :** | 3rd June, 2020 |
| **Your reference :** | PR-471091 |
| **Our reference :** | Test Report 20/5202 Batch 1 |
| **Location :** | Brinny |
| **Date samples received :** | 9th April, 2020 |
| **Status :** | Final report |
| **Issue :** | 1 |



Five samples were received for analysis on 9th April, 2020 of which five were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

**Authorised By:**

**Simon Gomery BSc**
**Project Manager**



Element Materials Technology Environmental UK Limited
Registered in England and Wales
Registered Office: 10 Lower Grosvenor Place, London, SW1W 0EN
Company Registration No: 11371415

**Client Name:** AECOM
**Reference:** PR-471091
**Location:** Brinny
**Contact:** Brendan McCarthy
**EMT Job No:** 20/5202

**Report : Liquid**

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

| EMT Sample No. | 1-6 | 7-12 | 13-18 | 19-24 | 25-30 | | | | | | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | MW1D | MW2S | MW3D | MW4S | MW4D | | | | | | | | |
| Depth | | | | | | | | | | | | | |
| COC No / misc | | | | | | | | | | | | | |
| Containers | V H HN P G | V H HN P G | V H HN P G | V H HN P G | V H HN P G | | | | | | | | |
| Sample Date | 07/04/2020 | 07/04/2020 | 07/04/2020 | 07/04/2020 | 07/04/2020 | | | | | | | | |
| Sample Type | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water | | | | | | | | |
| Batch Number | 1 | 1 | 1 | 1 | 1 | | | | | | | | |
| Date of Receipt | 09/04/2020 | 09/04/2020 | 09/04/2020 | 09/04/2020 | 09/04/2020 | | | | | | | | |
| Dissolved Arsenic # | <2.5 | <2.5 | 3.1 | <2.5 | <2.5 | | | | | | <2.5 | ug/l | TM30/PM14 |
| Dissolved Cadmium # | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | | | | | | <0.5 | ug/l | TM30/PM14 |
| Dissolved Calcium # | 27.8 | 54.2 | 30.4 | 45.5 | 9.7 | | | | | | <0.2 | mg/l | TM30/PM14 |
| Total Dissolved Chromium # | <1.5 | <1.5 | <1.5 | <1.5 | <1.5 | | | | | | <1.5 | ug/l | TM30/PM14 |
| Dissolved Cobalt # | <2 | <2 | 3 | <2 | <2 | | | | | | <2 | ug/l | TM30/PM14 |
| Dissolved Copper # | <7 | <7 | <7 | <7 | <7 | | | | | | <7 | ug/l | TM30/PM14 |
| Total Dissolved Iron # | <20 | <20 | 135 | <20 | <20 | | | | | | <20 | ug/l | TM30/PM14 |
| Dissolved Lead # | <5 | <5 | <5 | <5 | <5 | | | | | | <5 | ug/l | TM30/PM14 |
| Dissolved Magnesium # | 4.5 | 2.3 | 7.5 | 4.9 | 1.8 | | | | | | <0.1 | mg/l | TM30/PM14 |
| Dissolved Manganese # | <2 | 5 | 5368 | <2 | 9 | | | | | | <2 | ug/l | TM30/PM14 |
| Dissolved Mercury # | <1 | <1 | <1 | <1 | <1 | | | | | | <1 | ug/l | TM30/PM14 |
| Dissolved Nickel # | <2 | <2 | 3 | <2 | <2 | | | | | | <2 | ug/l | TM30/PM14 |
| Dissolved Potassium # | 1.9 | 7.3 | 3.9 | 2.0 | 0.8 | | | | | | <0.1 | mg/l | TM30/PM14 |
| Dissolved Sodium # | 15.2 | 28.4 | 43.2 | 11.5 | 40.9 | | | | | | <0.1 | mg/l | TM30/PM14 |
| Dissolved Zinc # | <3 | <3 | <3 | 6 | <3 | | | | | | <3 | ug/l | TM30/PM14 |
| Methyl Tertiary Butyl Ether # | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | | | | | | <0.1 | ug/l | TM15/PM10 |
| Benzene # | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | | | | | | <0.5 | ug/l | TM15/PM10 |
| Toluene # | <5 | <5 | <5 | <5 | <5 | | | | | | <5 | ug/l | TM15/PM10 |
| Ethylbenzene # | <1 | <1 | <1 | <1 | <1 | | | | | | <1 | ug/l | TM15/PM10 |
| m/p-Xylene # | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| o-Xylene # | <1 | <1 | <1 | <1 | <1 | | | | | | <1 | ug/l | TM15/PM10 |
| Surrogate Recovery Toluene D8 | 92 | 91 | 89 | 91 | 96 | | | | | | <0 | % | TM15/PM10 |
| Surrogate Recovery 4-Bromofluorobenzene | 105 | 97 | 97 | 97 | 100 | | | | | | <0 | % | TM15/PM10 |
| Methyl Ethyl Ketone (MEK) | <100 | <100 | <100 | <100 | <100 | | | | | | <100 | ug/l | TM15/PM10 |
| TPH CWG | | | | | | | | | | | | | |
| **Aliphatics** | | | | | | | | | | | | | |
| >C5-C6 # | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM36/PM12 |
| >C6-C8 # | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM36/PM12 |
| >C8-C10 # | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM36/PM12 |
| >C10-C12 # | <5 | <5 | <5 | <5 | <5 | | | | | | <5 | ug/l | TM5/PM16/PM30 |
| >C12-C16 # | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM5/PM16/PM30 |
| >C16-C21 # | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM5/PM16/PM30 |
| >C21-C35 # | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM5/PM16/PM30 |
| Total aliphatics C5-35 # | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM5/TM36/PM12/PM16/PM30 |

Please see attached notes for all abbreviations and acronyms

**Client Name:** AECOM
**Reference:** PR-471091
**Location:** Brinny
**Contact:** Brendan McCarthy
**EMT Job No:** 20/5202

**Report : Liquid**

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

| EMT Sample No. | 1-6 | 7-12 | 13-18 | 19-24 | 25-30 | | | | | | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | MW1D | MW2S | MW3D | MW4S | MW4D | | | | | | | | |
| Depth | | | | | | | | | | | | | |
| COC No / misc | | | | | | | | | | | | | |
| Containers | V H HN P G | V H HN P G | V H HN P G | V H HN P G | V H HN P G | | | | | | | | |
| Sample Date | 07/04/2020 | 07/04/2020 | 07/04/2020 | 07/04/2020 | 07/04/2020 | | | | | | | | |
| Sample Type | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water | | | | | | | | |
| Batch Number | 1 | 1 | 1 | 1 | 1 | | | | | | | | |
| Date of Receipt | 09/04/2020 | 09/04/2020 | 09/04/2020 | 09/04/2020 | 09/04/2020 | | | | | | | | |
| TPH CWG | | | | | | | | | | | | | |
| **Aromatics** | | | | | | | | | | | | | |
| >C5-EC7 # | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM36/PM12 |
| >EC7-EC8 # | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM36/PM12 |
| >EC8-EC10 # | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM36/PM12 |
| >EC10-EC12 # | <5 | <5 | <5 | <5 | <5 | | | | | | <5 | ug/l | TM5/PM16/PM30 |
| >EC12-EC16 # | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM5/PM16/PM30 |
| >EC16-EC21 # | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM5/PM16/PM30 |
| >EC21-EC35 # | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM5/PM16/PM30 |
| Total aromatics C5-35 # | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM5/TM36/PM12/PM16/PM30 |
| Total aliphatics and aromatics(C5-35) # | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM5/TM36/PM12/PM16/PM30 |
| Fluoride | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | | | | | | <0.3 | mg/l | TM173/PM0 |
| Alcohols/Acetates | | | | | | | | | | | | | |
| Methyl Alcohol (Methanol) | <500 | <500 | <500 | <500 | <500 | | | | | | <500 | ug/l | TM83/PM10 |
| Ethyl Alcohol (Ethanol) | <500 | <500 | <500 | <500 | <500 | | | | | | <500 | ug/l | TM83/PM10 |
| i-Propyl Alcohol (Isopropanol) | <100 | <100 | <100 | <100 | <100 | | | | | | <100 | ug/l | TM83/PM10 |
| n-Propyl Alcohol | <100 | <100 | <100 | <100 | <100 | | | | | | <100 | ug/l | TM83/PM10 |
| n-Butyl Alcohol | <100 | <100 | <100 | <100 | <100 | | | | | | <100 | ug/l | TM83/PM10 |
| n-Pentyl Alcohol | <100 | <100 | <100 | <100 | <100 | | | | | | <100 | ug/l | TM83/PM10 |
| n-Hexyl Alcohol | <100 | <100 | <100 | <100 | <100 | | | | | | <100 | ug/l | TM83/PM10 |
| n-Heptyl Alcohol | <100 | <100 | <100 | <100 | <100 | | | | | | <100 | ug/l | TM83/PM10 |
| Methyl Acetate | <100 | <100 | <100 | <100 | <100 | | | | | | <100 | ug/l | TM83/PM10 |
| Ethyl Acetate | <100 | <100 | <100 | <100 | <100 | | | | | | <100 | ug/l | TM83/PM10 |
| i-Propyl Acetate | <100 | <100 | <100 | <100 | <100 | | | | | | <100 | ug/l | TM83/PM10 |
| n-Propyl Acetate | <100 | <100 | <100 | <100 | <100 | | | | | | <100 | ug/l | TM83/PM10 |
| n-Butyl Acetate | <100 | <100 | <100 | <100 | <100 | | | | | | <100 | ug/l | TM83/PM10 |
| Tetrahydrofuran | <1 | <1 | <1 | <1 | <1 | | | | | | <1 | ug/l | TM83/PM10 |
| Sulphate as SO4 # | 11.9 | 20.6 | 31.1 | 22.9 | 22.2 | | | | | | <0.5 | mg/l | TM38/PM0 |
| Chloride # | 24.5 | 35.2 | 45.0 | 11.3 | 30.7 | | | | | | <0.3 | mg/l | TM38/PM0 |
| Nitrate as NO3 # | 27.8 | 10.5 | 1.9 | 25.4 | 25.4 | | | | | | <0.2 | mg/l | TM38/PM0 |
| Nitrite as NO2 # | <0.02 | <0.02 | <0.02 | <0.02 | 0.03 | | | | | | <0.02 | mg/l | TM38/PM0 |
| Ortho Phosphate as PO4 # | <0.06 | 0.10 | 0.16 | <0.06 | 0.09 | | | | | | <0.06 | mg/l | TM38/PM0 |
| Monoethylene glycol | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM179/PM0 |
| Propylene glycol | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM179/PM0 |
| Diethylene glycol | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM179/PM0 |
| Triethylene glycol | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM179/PM0 |
| Thiodiglycol | <10 | <10 | <10 | <10 | <10 | | | | | | <10 | ug/l | TM179/PM0 |
| Total Ammonia as N # | <0.03 | <0.03 | 1.48 | <0.03 | 0.19 | | | | | | <0.03 | mg/l | TM38/PM0 |

Please see attached notes for all abbreviations and acronyms

**Client Name:** AECOM
**Reference:** PR-471091
**Location:** Brinny
**Contact:** Brendan McCarthy
**EMT Job No:** 20/5202

**Report : Liquid**

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

| EMT Sample No. | 1-6 | 7-12 | 13-18 | 19-24 | 25-30 | | | | | | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | MW1D | MW2S | MW3D | MW4S | MW4D | | | | | | | | |
| Depth | | | | | | | | | | | | | |
| COC No / misc | | | | | | | | | | | | | |
| Containers | V H HN P G | V H HN P G | V H HN P G | V H HN P G | V H HN P G | | | | | | | | |
| Sample Date | 07/04/2020 | 07/04/2020 | 07/04/2020 | 07/04/2020 | 07/04/2020 | | | | | | | | |
| Sample Type | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water | | | | | | | | |
| Batch Number | 1 | 1 | 1 | 1 | 1 | | | | | | | | |
| Date of Receipt | 09/04/2020 | 09/04/2020 | 09/04/2020 | 09/04/2020 | 09/04/2020 | | | | | | | | |
| Total Alkalinity as CaCO3 # | 54 | 134 | 112 | 96 | 32 | | | | | | <1 | mg/l | TM75/PM0 |
| COD (Settled) # | <7 | <7 | 8 | <7 | <7 | | | | | | <7 | mg/l | TM57/PM0 |

Please see attached notes for all abbreviations and acronyms





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

**Client Name:** AECOM
**Reference:** PR-471091
**Location:** Brinny
**Contact:** Brendan McCarthy
**EMT Job No:** 20/5202

**VOC Report :** **Liquid**

| EMT Sample No. | 1-6 | 7-12 | 13-18 | 19-24 | 25-30 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | MW1D | MW2S | MW3D | MW4S | MW4D | | | | | | | |
| Depth | | | | | | | | | | | | |
| COC No / misc | | | | | | | | | | | | |
| Containers | V H HN P G | V H HN P G | V H HN P G | V H HN P G | V H HN P G | | | | | | | |
| Sample Date | 07/04/2020 | 07/04/2020 | 07/04/2020 | 07/04/2020 | 07/04/2020 | | | | | | | |
| Sample Type | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water | | | | | | | |
| Batch Number | 1 | 1 | 1 | 1 | 1 | | | | | | | |
| Date of Receipt | 09/04/2020 | 09/04/2020 | 09/04/2020 | 09/04/2020 | 09/04/2020 | | | | | | | |

Please see attached notes for all abbreviations and acronyms

| | | | | | | | | | | | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VOC MS | | | | | | | | | | | | | |
| Dichlorodifluoromethane | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| Methyl Tertiary Butyl Ether # | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | | | | | | <0.1 | ug/l | TM15/PM10 |
| Chloromethane # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| Vinyl Chloride # | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | | | | | | <0.1 | ug/l | TM15/PM10 |
| Bromomethane | <1 | <1 | <1 | <1 | <1 | | | | | | <1 | ug/l | TM15/PM10 |
| Chloroethane # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| Trichlorofluoromethane # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| 1,1-Dichloroethene (1,1 DCE) # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| Dichloromethane (DCM) # | <5 | <5 | <5 | <5 | <5 | | | | | | <5 | ug/l | TM15/PM10 |
| trans-1-2-Dichloroethene # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| 1,1-Dichloroethane # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| cis-1-2-Dichloroethene # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| 2,2-Dichloropropane | <1 | <1 | <1 | <1 | <1 | | | | | | <1 | ug/l | TM15/PM10 |
| Bromochloromethane # | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| Chloroform # | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| 1,1,1-Trichloroethane # | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| 1,1-Dichloropropene # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| Carbon tetrachloride # | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| 1,2-Dichloroethane # | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| Benzene # | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | | | | | | <0.5 | ug/l | TM15/PM10 |
| Trichloroethene (TCE) # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| 1,2-Dichloropropane # | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| Dibromomethane # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| Bromodichloromethane # | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| cis-1-3-Dichloropropene | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| Toluene # | <5 | <5 | <5 | <5 | <5 | | | | | | <5 | ug/l | TM15/PM10 |
| trans-1-3-Dichloropropene | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| 1,1,2-Trichloroethane # | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| Tetrachloroethene (PCE) # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| 1,3-Dichloropropane # | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| Dibromochloromethane # | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| 1,2-Dibromoethane # | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| Chlorobenzene # | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| 1,1,1,2-Tetrachloroethane # | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| Ethylbenzene # | <1 | <1 | <1 | <1 | <1 | | | | | | <1 | ug/l | TM15/PM10 |
| m/p-Xylene # | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| o-Xylene # | <1 | <1 | <1 | <1 | <1 | | | | | | <1 | ug/l | TM15/PM10 |
| Styrene | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| Bromoform # | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| Isopropylbenzene # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| 1,1,2,2-Tetrachloroethane | <4 | <4 | <4 | <4 | <4 | | | | | | <4 | ug/l | TM15/PM10 |
| Bromobenzene # | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| 1,2,3-Trichloropropane # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| Propylbenzene # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| 2-Chlorotoluene # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| 1,3,5-Trimethylbenzene # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| 4-Chlorotoluene # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| tert-Butylbenzene # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| 1,2,4-Trimethylbenzene # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| sec-Butylbenzene # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| 4-Isopropyltoluene # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| 1,3-Dichlorobenzene # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| 1,4-Dichlorobenzene # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| n-Butylbenzene # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| 1,2-Dichlorobenzene # | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| 1,2-Dibromo-3-chloropropane | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| 1,2,4-Trichlorobenzene | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| Hexachlorobutadiene | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| Naphthalene | <2 | <2 | <2 | <2 | <2 | | | | | | <2 | ug/l | TM15/PM10 |
| 1,2,3-Trichlorobenzene | <3 | <3 | <3 | <3 | <3 | | | | | | <3 | ug/l | TM15/PM10 |
| Surrogate Recovery Toluene D8 | 92 | 91 | 89 | 91 | 96 | | | | | | <0 | % | TM15/PM10 |
| Surrogate Recovery 4-Bromofluorobenzene | 105 | 97 | 97 | 97 | 100 | | | | | | <0 | % | TM15/PM10 |






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

# Element Materials Technology

**Notification of Deviating Samples**

**Client Name:** AECOM
**Reference:** PR-471091
**Location:** Brinny
**Contact:** Brendan McCarthy

| EMT Job No. | Batch | Sample ID | Depth | EMT Sample No. | Analysis | Reason |
|---|---|---|---|---|---|---|
| No deviating sample report results for job 20/5202 | | | | | | |



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

# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

***EMT Job No.:*** 20/5202

**SOILS**

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

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

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

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

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

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

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

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

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

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

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

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

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

**WATERS**

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

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

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

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



**DEVIATING SAMPLES**

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

**SURROGATES**

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

**DILUTIONS**

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

**BLANKS**

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

**NOTE**

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

**REPORTS FROM THE SOUTH AFRICA LABORATORY**

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

**Measurement Uncertainty**

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

**ABBREVIATIONS and ACRONYMS USED**

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

**EMT Job No:** 20/5202

| Test Method No. | Description | Prep Method No. (if appropriate) | Description | ISO 17025 (UKAS/SANAS) | MCERTS (UK soils only) | Analysis done on As Received (AR) or Dried (AD) | Reported on dry weight basis |
|---|---|---|---|---|---|---|---|
| TM5 | Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present. | PM16/PM30 | Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex. | Yes | | | |
| TM5/TM36 | please refer to TM5 and TM36 for method details | PM12/PM16/PM30 | please refer to PM16/PM30 and PM12 for method details | Yes | | | |
| TM15 | Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS. | PM10 | Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis. | | | | |
| TM15 | Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS. | PM10 | Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis. | Yes | | | |
| TM30 | Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP | PM14 | Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified | Yes | | | |
| TM36 | Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE re | PM12 | Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis. | Yes | | | |
| TM38 | Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993 (comparabl | PM0 | No preparation is required. | Yes | | | |
| TM57 | Modified US EPA Method 410.4. (Rev. 2.0 1993) Comparable with ISO 15705:2002. Chemical Oxygen Demand is determined by hot digestion with Potassium Dichromate and measured spectrophotometerically. | PM0 | No preparation is required. | Yes | | | |
| TM75 | Modified US EPA method 310.1 (1978). Determination of Alkalinity by Metrohm automated titration analyser. | PM0 | No preparation is required. | Yes | | | |
| TM83 | Modified USEPA method 8260B v2:1996. Determination of Alcohols, Acetates, Acetone, Fuel Oxygenates, THF and Cyclohexane by Headspace GC-MS | PM10 | Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis. | | | | |

**EMT Job No:** 20/5202

| Test Method No. | Description | Prep Method No. (if appropriate) | Description | ISO 17025 (UKAS/SANAS) | MCERTS (UK soils only) | Analysis done on As Received (AR) or Dried (AD) | Reported on dry weight basis |
|---|---|---|---|---|---|---|---|
| TM173 | Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 9214 - 340.2 (EPA 1998) | PM0 | No preparation is required. | | | | |
| TM179 | Determination of Glycols using LCMS | PM0 | No preparation is required. | | | | |
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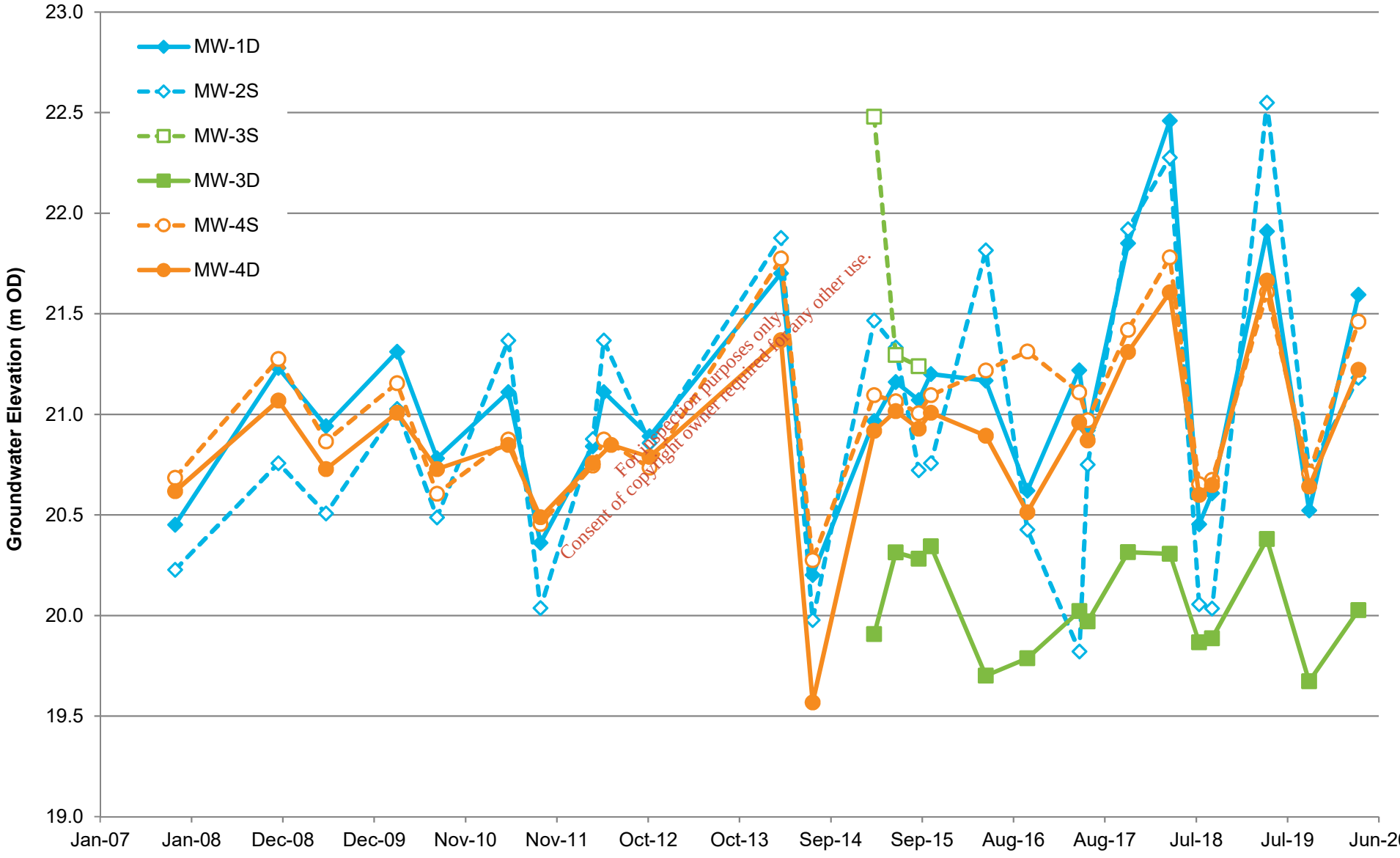
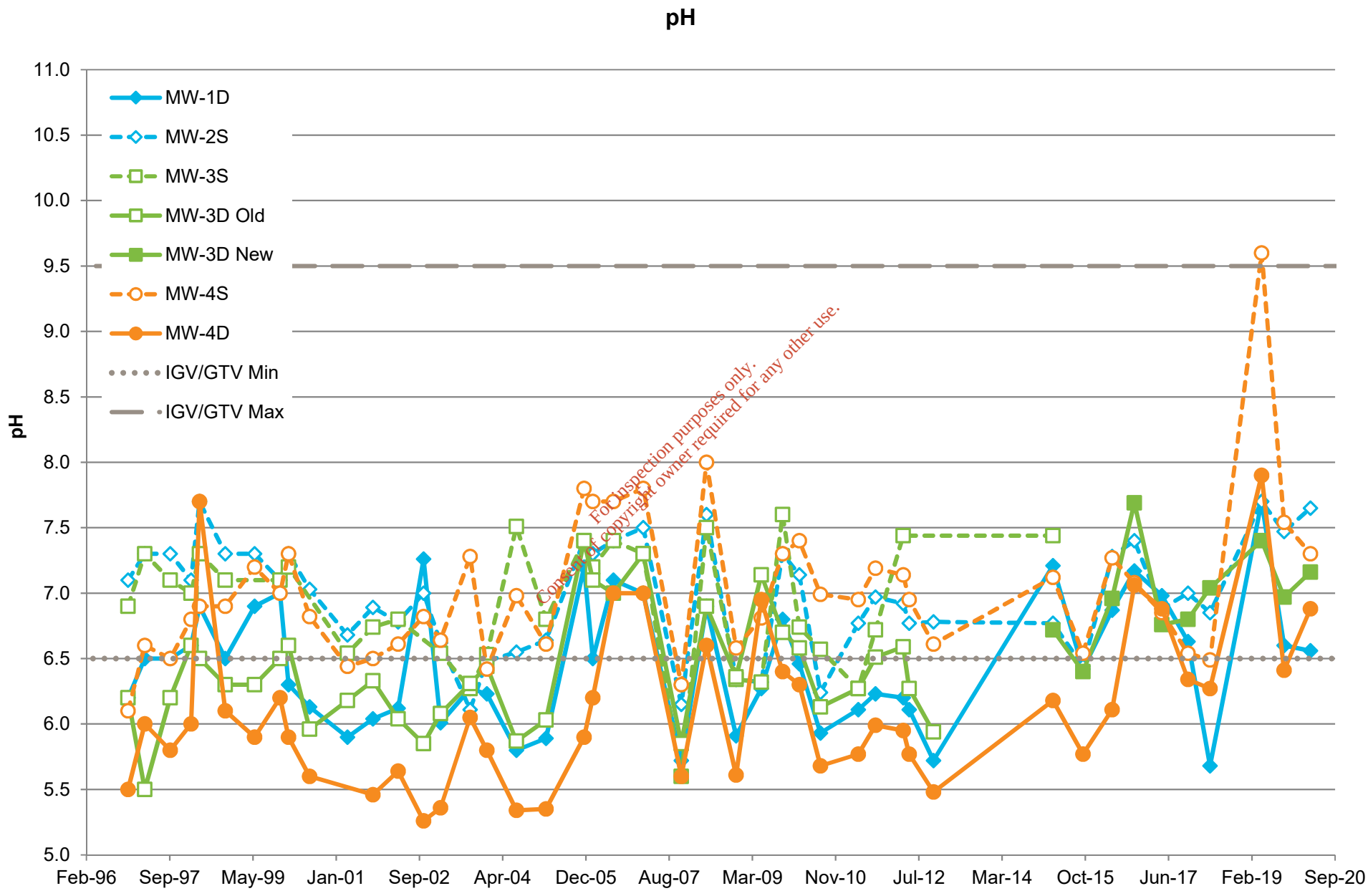
# Appendix E – IEL Monitoring Data

**Appendix E - IEL Monitoring Trends**
**MSD Brinny**

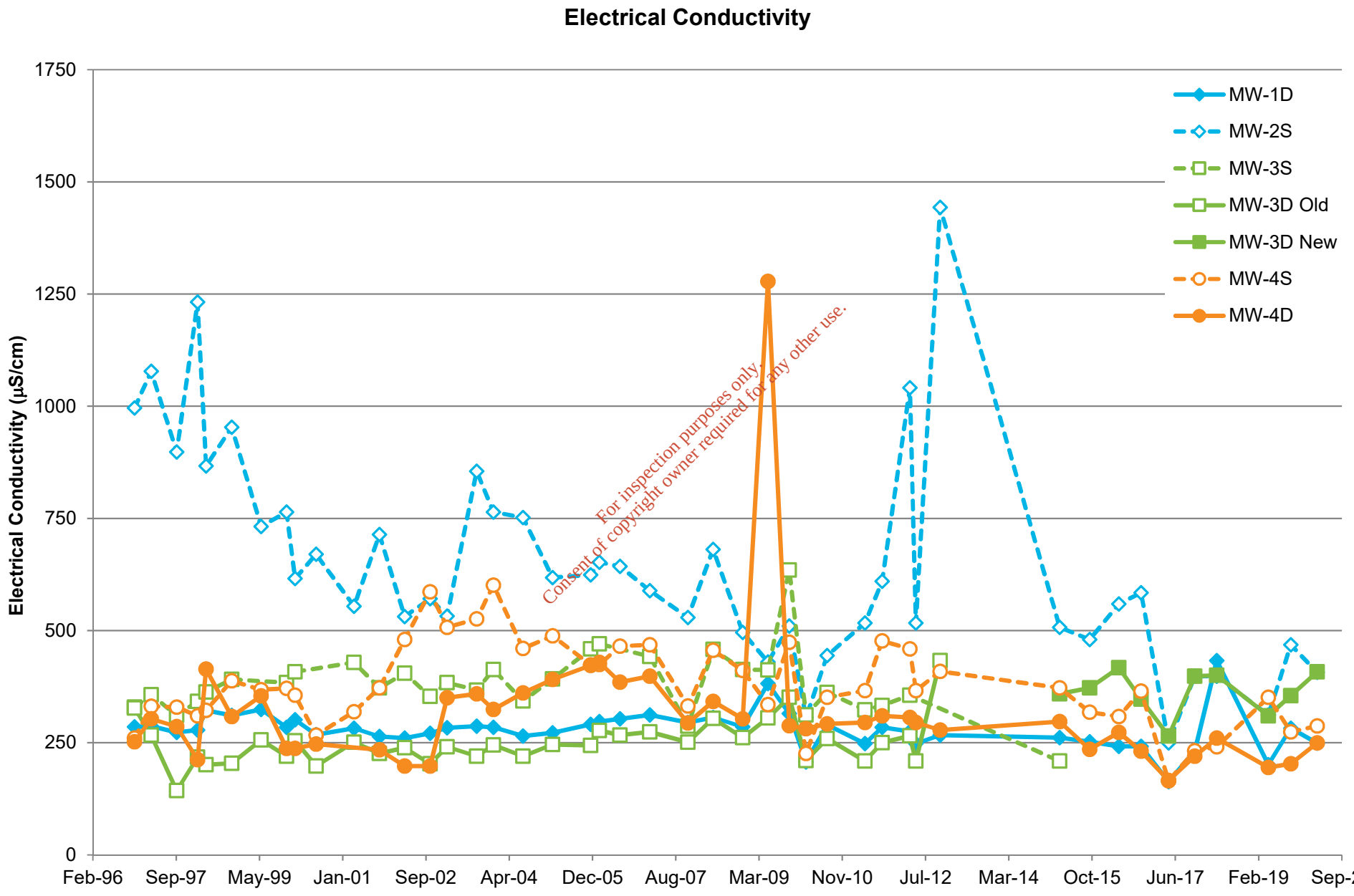
## Groundwater Elevation



**Appendix E - IEL Monitoring Trends**
**MSD Brinny**

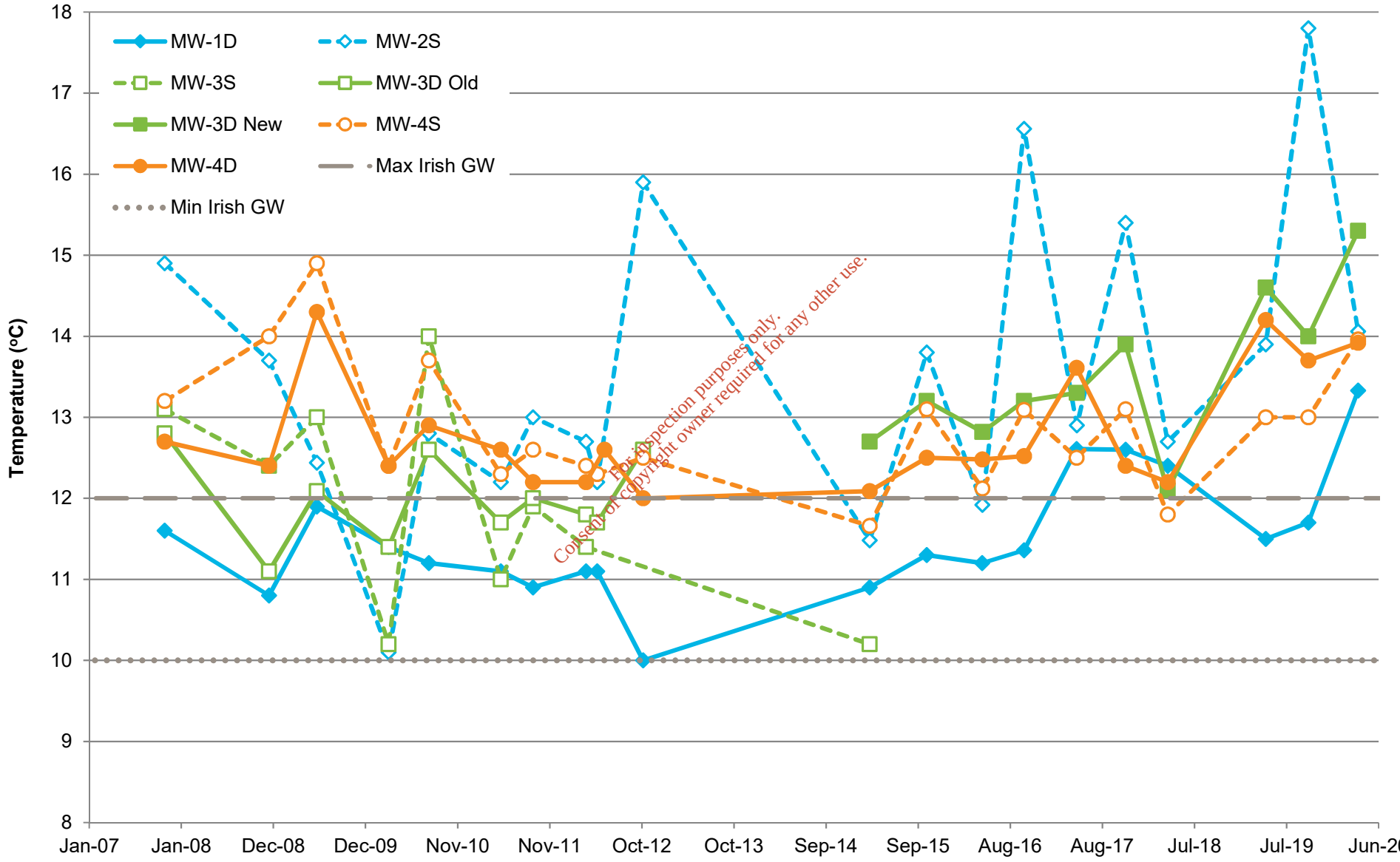


**Appendix E - IEL Monitoring Trends**
**MSD Brinny**

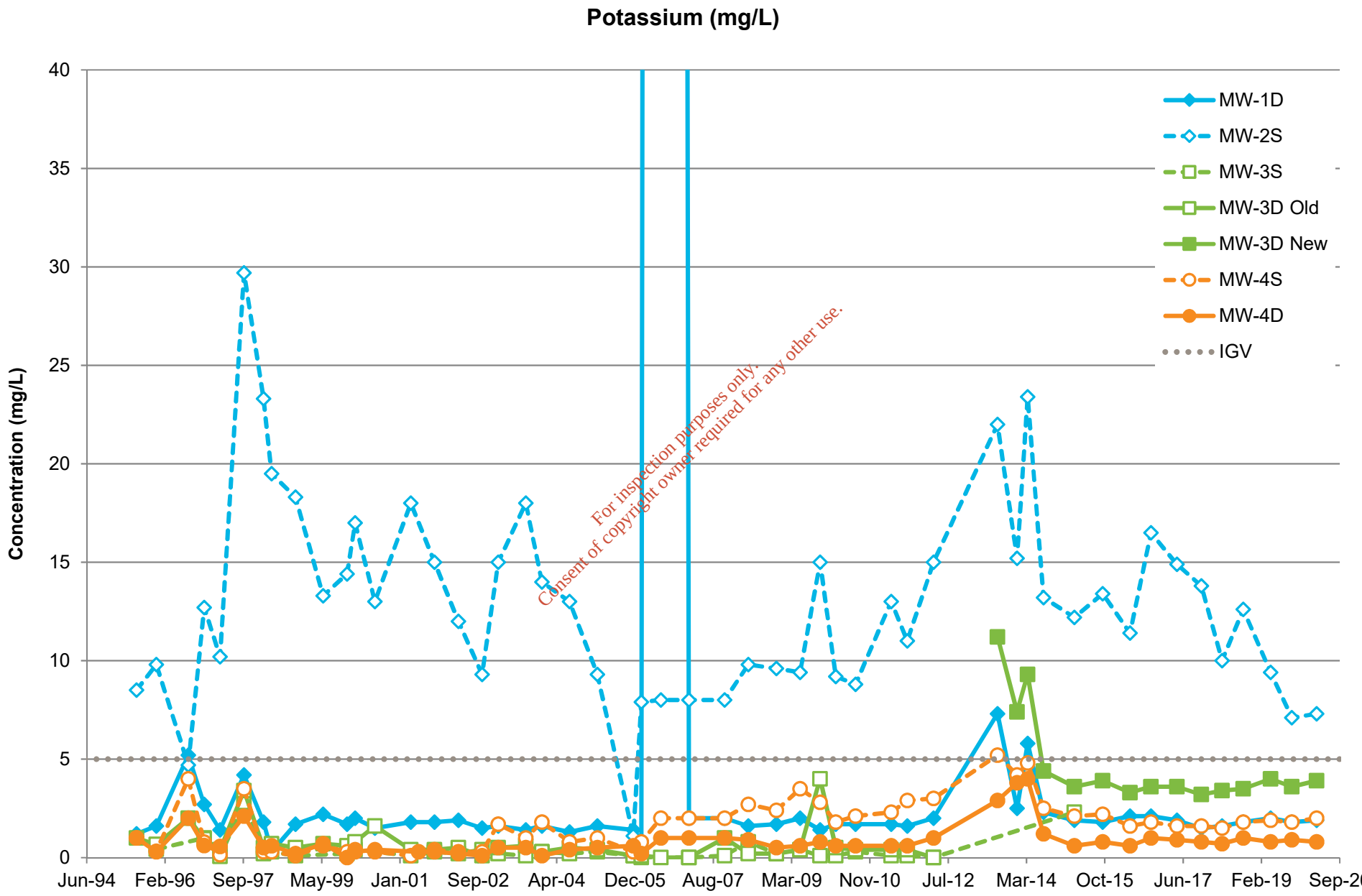


**Appendix E - IEL Monitoring Trends**
**MSD Brinny**

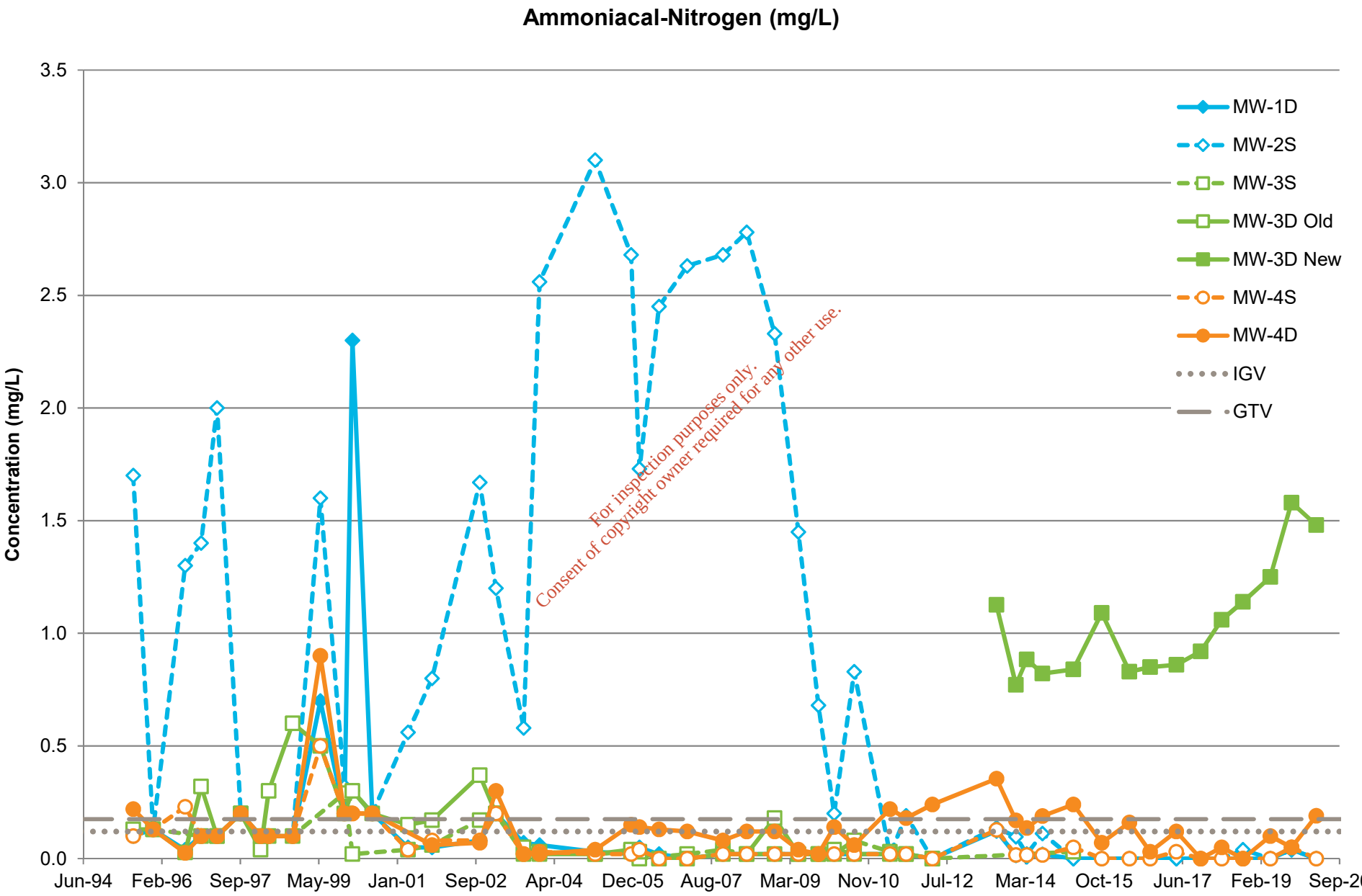
## Groundwater Temperature



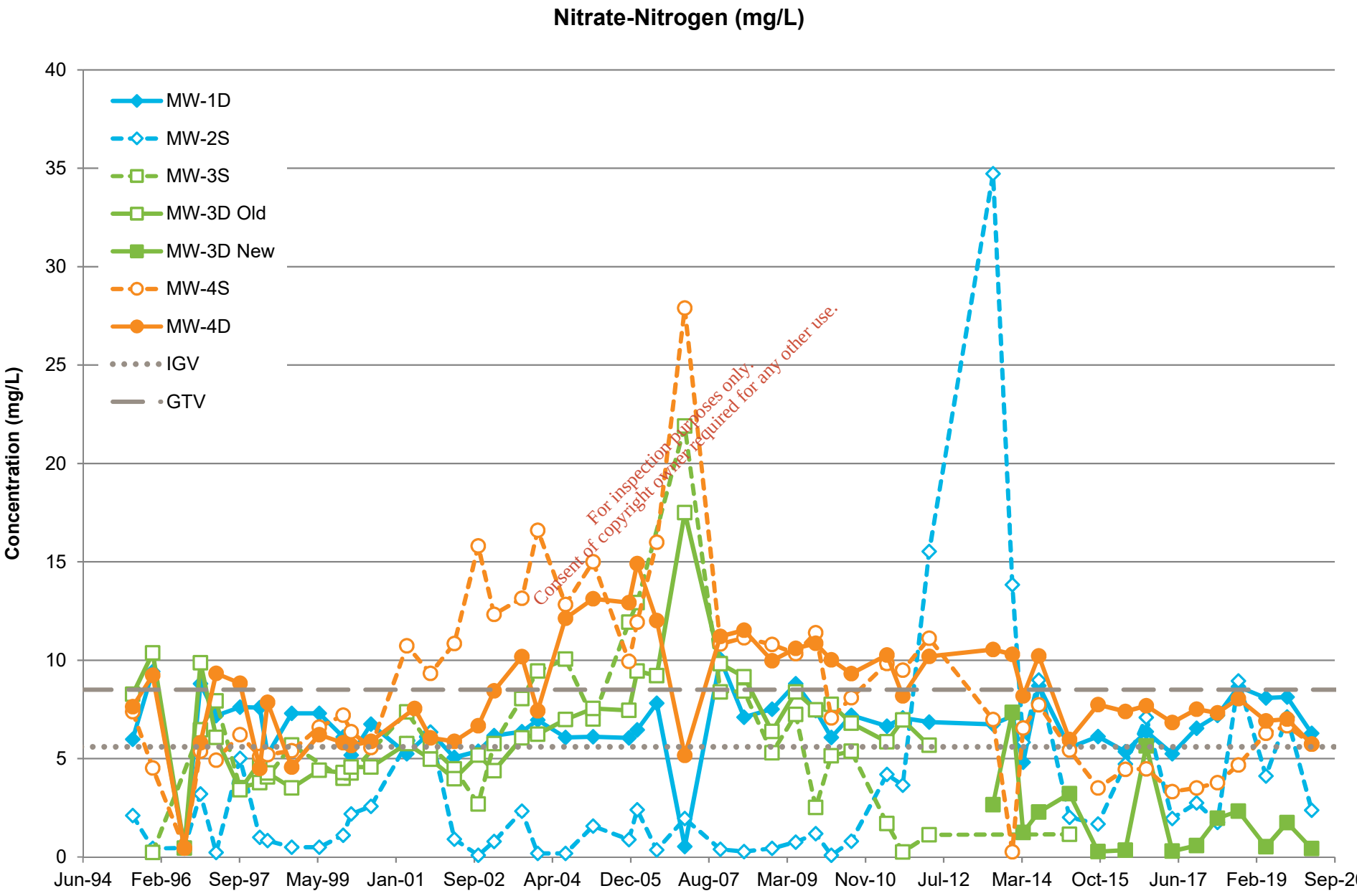
**Appendix E - IEL Monitoring Trends**
**MSD Brinny**



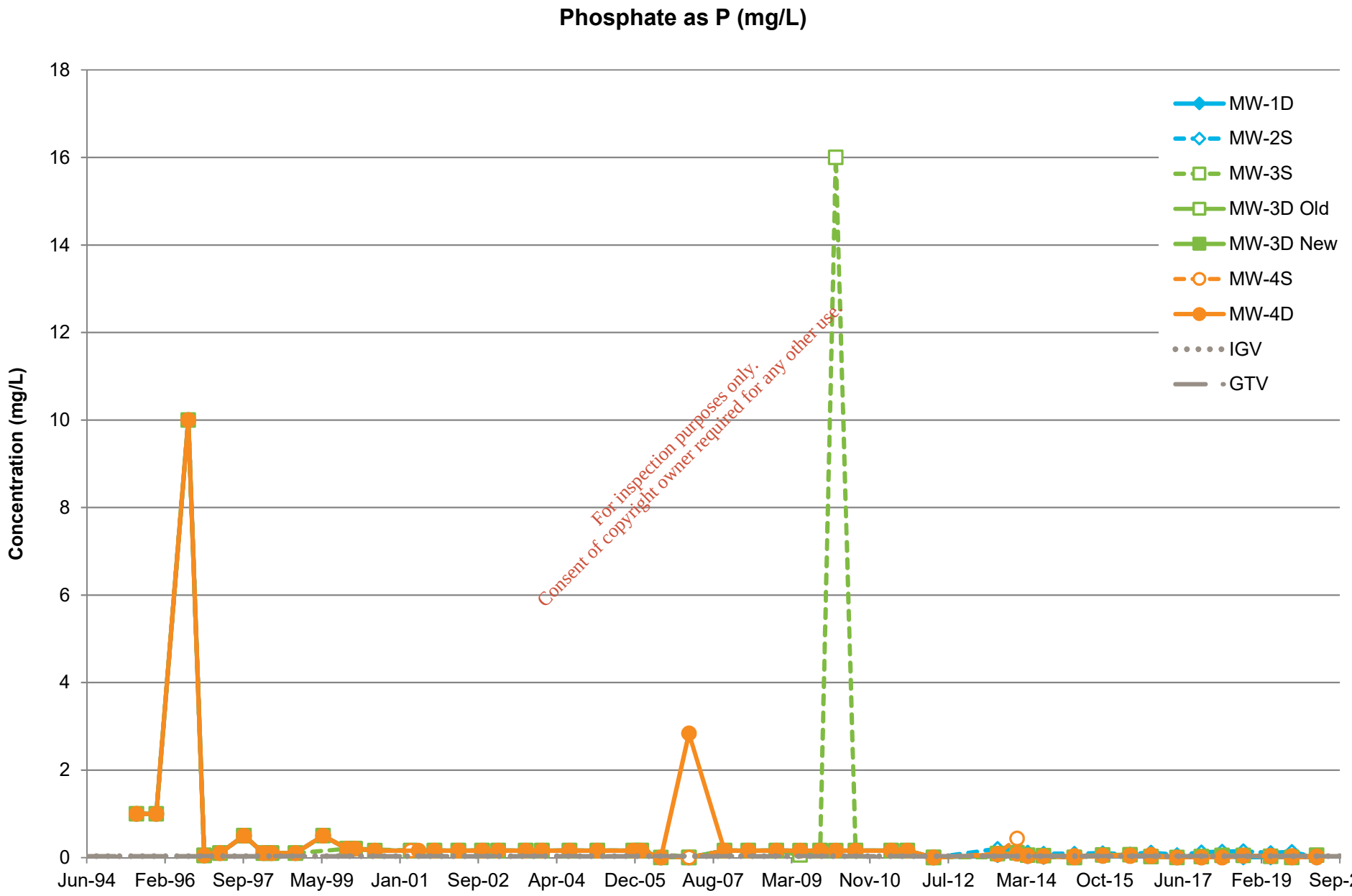
**Appendix E - IEL Monitoring Trends**
**MSD Brinny**



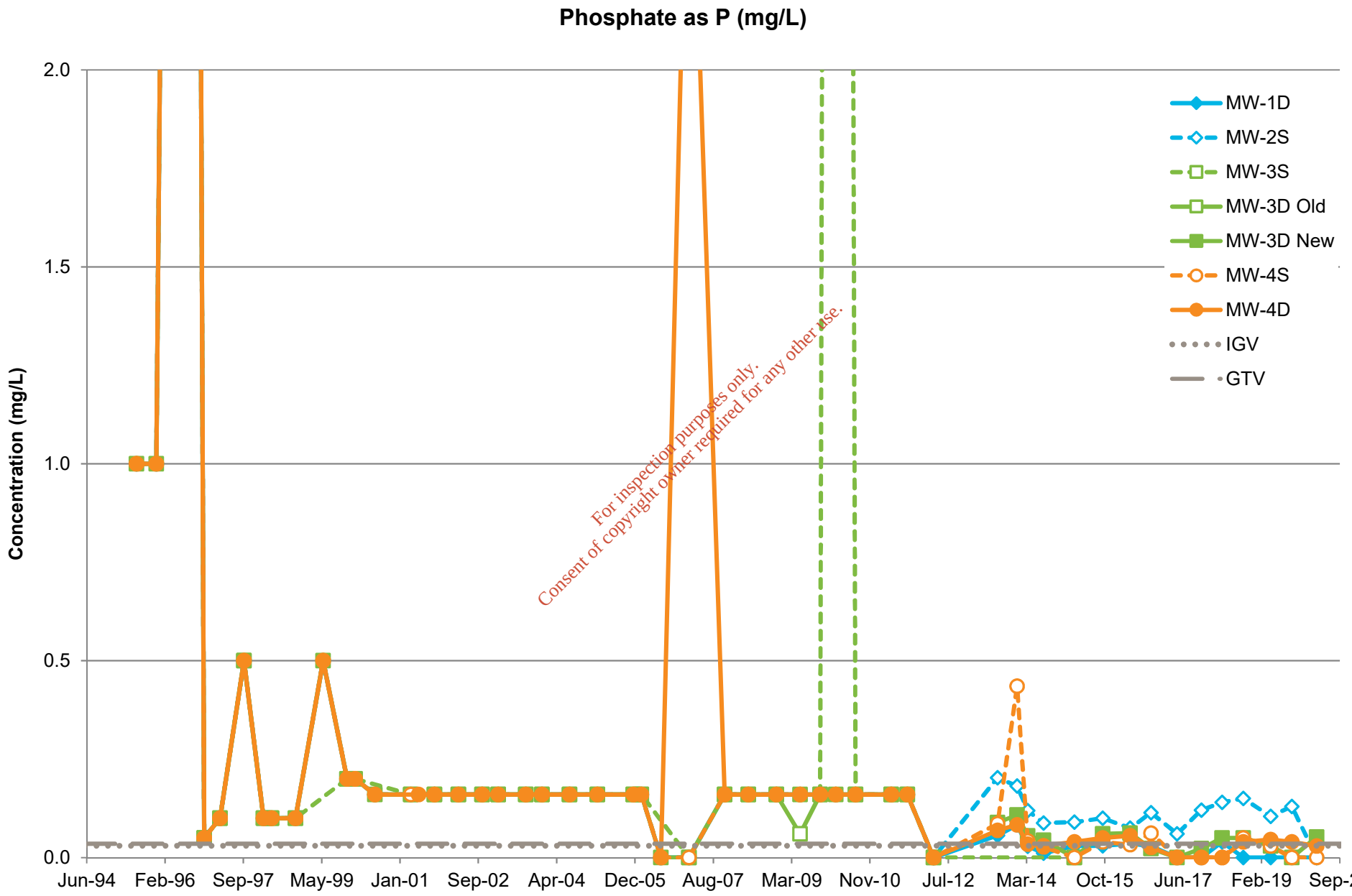
**Appendix E - IEL Monitoring Trends**
**MSD Brinny**



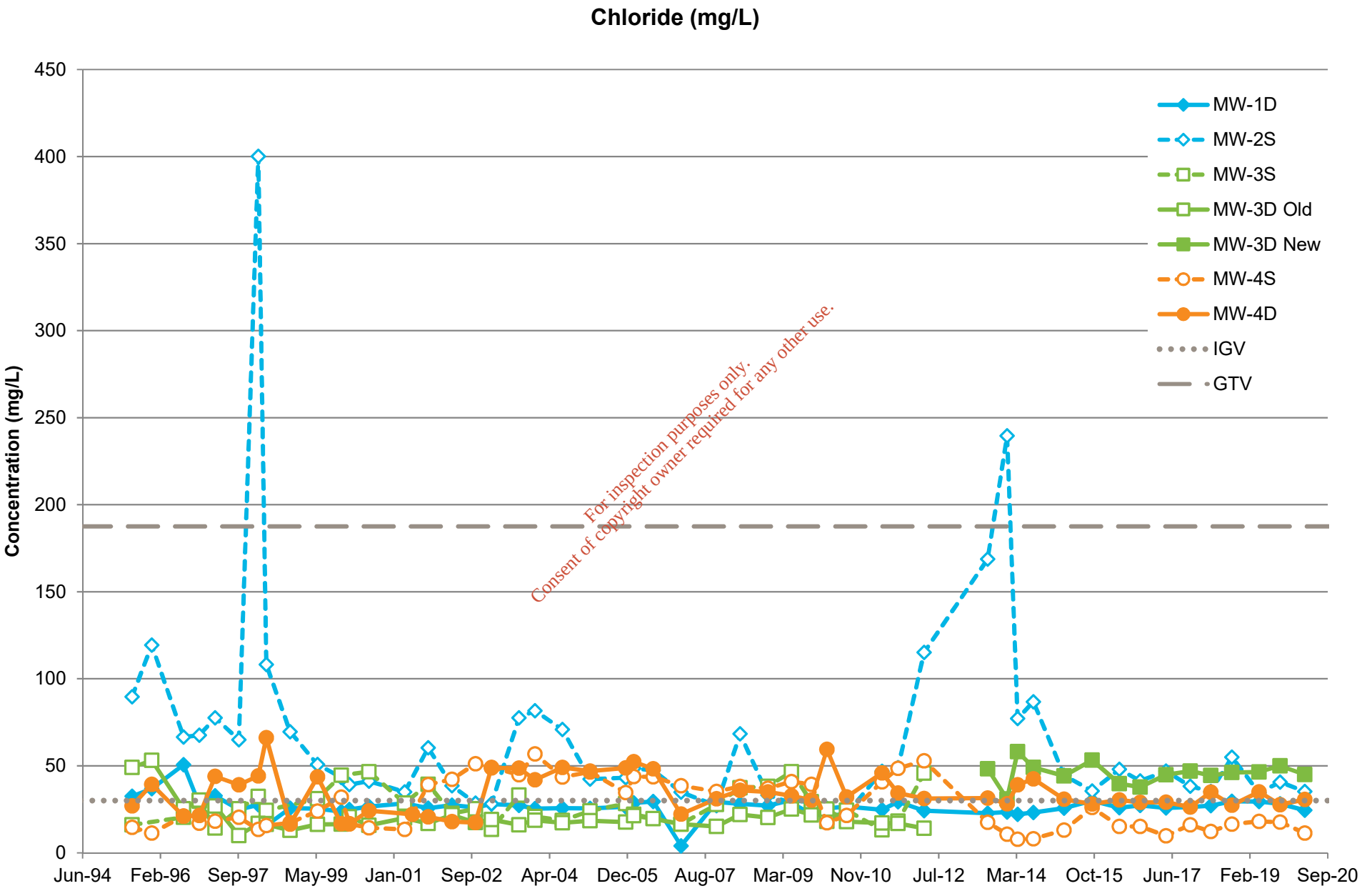
**Appendix E - IEL Monitoring Trends**
**MSD Brinny**



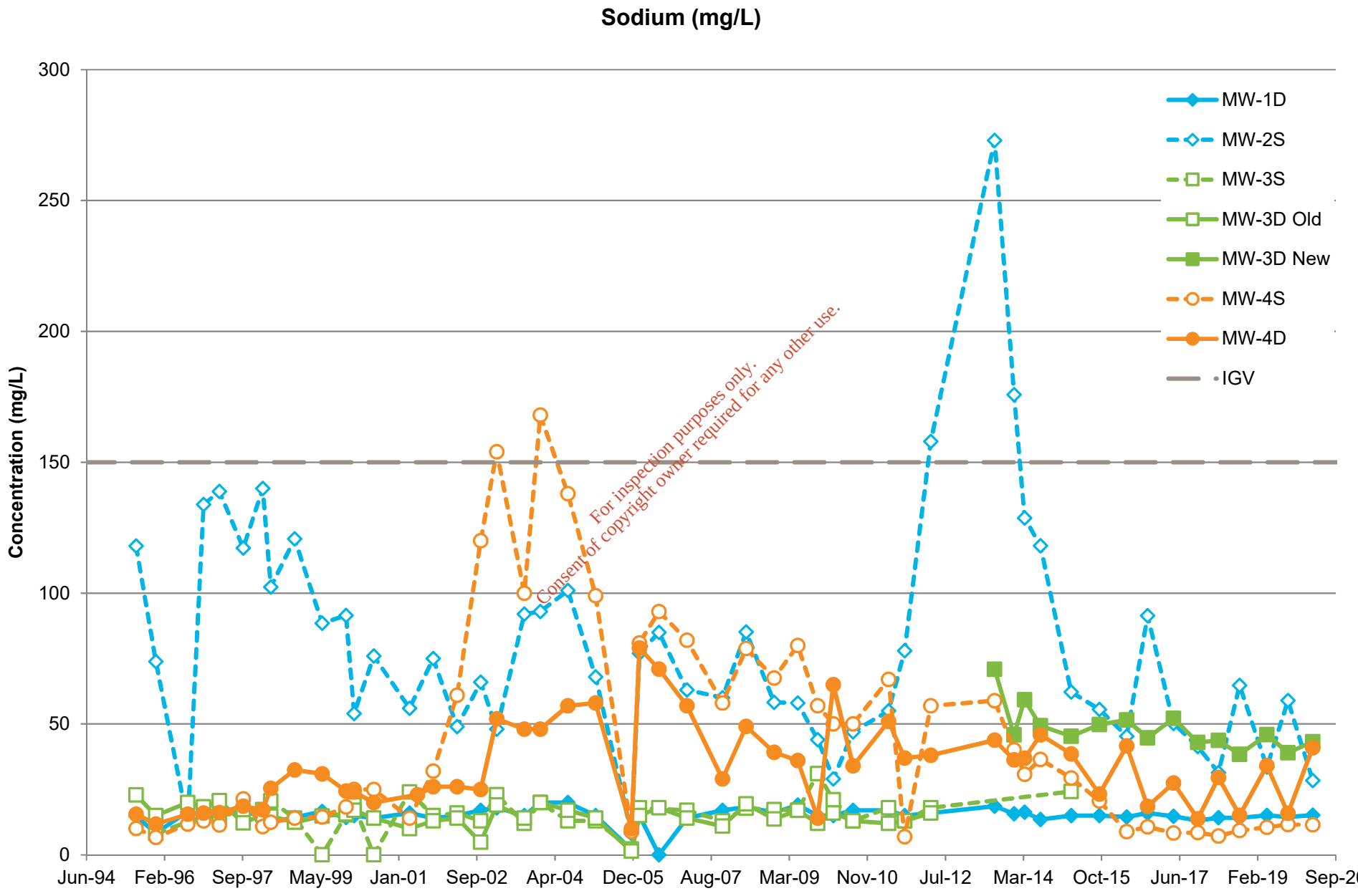
**Appendix E - IEL Monitoring Trends**
**MSD Brinny**



**Appendix E - IEL Monitoring Trends**
**MSD Brinny**

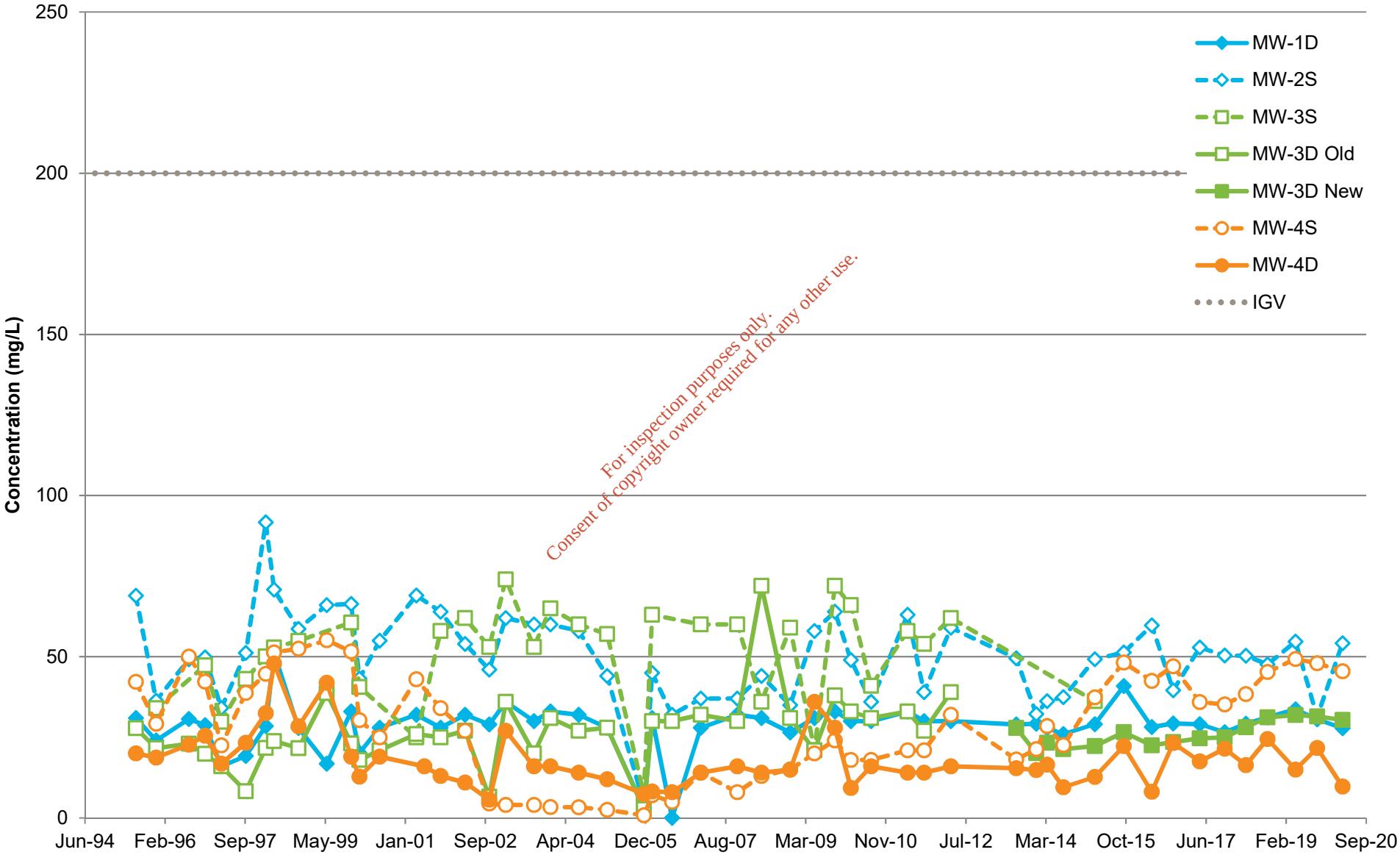


**Appendix E - IEL Monitoring Trends**
**MSD Brinny**



**Appendix E - IEL Monitoring Trends**
**MSD Brinny**

## Calcium (mg/L)



| MW-1D | Major Ions | | | | | | | | | | | | | | Organics and Field Measurements | | | | | | | | | | | | Metals | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ammonia-N | Ammonium | Nitrate-N | Nitrate as $NO_3$ | Nitrite as $NO_2$ | Phosphate-P | Chloride | Sulphate | Fluoride | Sodium | Potassium | Calcium | Magnesium | Total Alkalinity as $CaCO_3$ | VOCs | Alcohols & Acetates | Trichloroacetic Acid | Ethylene Glycol | Total Petroleum Hydrocarbons | COD | Electrical Conductivity µS/cm | | pH | | Temperature | Depth to Groundwater | Groundwater Elevation | Total Depth | Arsenic | Cadmium | Chromium | Cobalt | Copper | Iron | Lead | Manganese | Mercury | Nickel | Zinc |
| | | | | | | | | | | | | | | | | | | | | | Lab | Field | Lab | Field | | | | | | | | | | | | | | | | |
| | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | µg/L | µg/L | µg/L | µg/L | µg/L | mg/L | | | | | °C | m bct | m OD | m bct | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| **IGV** | 0.12 | 0.15 | 5.6 | 25 | 0.1 | 0.03 | 30 | 200 | 1 | 150 | 5 | 200 | 50 | NAC | various | various | - | - | 10 | - | 1000 | | 6.5 | 9.5 | 25 | - | - | - | 0.01 | 0.005 | 0.03 | - | 0.03 | 0.2 | 0.01 | 0.05 | 0.001 | 0.02 | 0.1 |
| **DWS** | 0.23 | 0.3 | 11.3 | 50 | 0.5 | - | 250 | 250 | 1.5 | 200 | - | - | - | - | various | various | - | - | - | - | 2500 | | 6.5 | 9.5 | - | - | - | - | 0.01 | 0.005 | 0.05 | - | 2 | 0.2 | 0.01 | 0.05 | 0.001 | 0.02 | - |
| **GTV** | 0.175 | 0.225 | 8.5 | 37.5 | 0.375 | 0.035 | 187.5 | 187.5 | - | - | - | - | - | - | various | various | - | - | 10 | - | 800 | 1875 | - | - | - | - | - | - | 0.0075 | - | 0.0375 | - | 1.5 | - | 0.0075 | - | 0.00075 | - | 0.075 |
| **Date** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Jul-95 | 0.100 | 0.129 | 6.0 | 26.5 | | 1.000 | 33 | 21 | | 15 | 1.2 | 31 | 5.6 | | | | | | | | | | | | | | | | | | | | 0.020 | 10.800 | | 1.410 | | | 0.030 |
| Dec-95 | 0.130 | 0.167 | 9.4 | 41.7 | | 1.000 | 37 | 14 | | 8 | 1.6 | 24 | 4.2 | | | | | | | | | | | | | | | | | | | | 0.010 | 0.020 | | 0.090 | | | 0.020 |
| Aug-96 | 0.040 | 0.051 | 0.5 | 2.0 | | 10.000 | 51 | 19 | | 17 | 5.2 | 31 | 6.1 | | | | | | | | | | | | | | | | | | | | 0.010 | 4.200 | | 0.040 | | | 0.010 |
| Dec-96 | 0.100 | 0.129 | 8.8 | 39.0 | | 0.050 | 28 | 18 | | 15 | 2.7 | 29 | 4.5 | | | | | | | | 285 | | 6.2 | | | | | | | | | | 0.030 | 0.040 | | 0.040 | | | 0.180 |
| Apr-97 | 0.100 | 0.129 | 7.2 | 31.8 | | 0.100 | 33 | 20 | | 16 | 1.4 | 16 | 4.2 | | | | | | | | 287 | | 6.5 | | | | | | | | | | 0.030 | 0.040 | | 0.060 | | | 0.060 |
| Oct-97 | 0.200 | 0.257 | 7.6 | 33.7 | | 0.500 | 25 | 13 | | 17 | 4.2 | 19 | 4.0 | | | | | | | | 273 | | 6.5 | | | | | | | | | | 0.030 | 0.810 | | 0.040 | | | 0.020 |
| Mar-98 | 0.100 | 0.129 | 7.6 | 33.6 | | 0.100 | 28 | 13 | | 14 | 1.8 | 29 | 4.9 | | | | | | | | 278 | | 6.6 | | | | | | | | | | 0.030 | 0.040 | | 0.040 | | | 0.050 |
| May-98 | 0.100 | 0.129 | 5.2 | 23.0 | | 0.100 | 16 | 44 | | 13 | 0.3 | 51 | 3.3 | | | | | | | | 322 | | 6.9 | | | | | | | | | | 0.030 | 0.040 | | 0.040 | | | 0.160 |
| Nov-98 | 0.100 | 0.129 | 7.3 | 32.3 | | 0.100 | 26 | 12 | | 14 | 1.7 | 28 | 4.8 | | | | | | | | 311 | | 6.5 | | | | | | | | | | 0.030 | 0.040 | | 0.040 | | | 0.100 |
| Jun-99 | 0.700 | 0.900 | 7.3 | 32.3 | | 0.500 | 25 | 12 | | 17 | 2.2 | 17 | 5.1 | | | | | | | | 324 | | 6.9 | | | | | | | | | | 0.030 | 0.040 | | 0.040 | | | 0.200 |
| Dec-99 | 0.200 | 0.257 | 6.1 | 27.0 | | 0.200 | 24 | 11 | | 14 | 1.7 | 33 | 4.7 | | | | | | | | 284 | | 7.0 | | | | | | | | | | 0.002 | 0.002 | | 0.007 | | | 0.086 |
| Feb-00 | 2.300 | 2.957 | 5.2 | 22.9 | | 0.200 | 25 | 11 | | 15 | 2.0 | 20 | 5.3 | | | | | | | | 301 | | 6.3 | | | | | | | | | | 0.018 | 0.002 | | 0.003 | | | 0.234 |
| Jul-00 | 0.200 | 0.257 | 6.8 | 29.9 | | 0.160 | 27 | 45 | | 14 | 1.5 | 28 | 3.8 | | | | | | | | 268 | | 6.1 | | | | | | | | | | 0.002 | 0.100 | | 0.003 | | | 0.053 |
| Apr-01 | 0.050 | 0.064 | 5.2 | 23.2 | | 0.160 | 28 | 12 | | 16 | 1.8 | 32 | 4.2 | | | | | | | | 282 | | 5.9 | | | | | | | | | | 0.002 | 0.100 | | 0.040 | | | 0.057 |
| Oct-01 | 0.050 | 0.064 | 6.3 | 28.1 | | 0.160 | 26 | 11 | | 14 | 1.8 | 28 | 4.5 | | | | | | | | 264 | | 6.0 | | | | | | | | | | 0.002 | 0.100 | | 0.002 | | | 0.007 |
| Apr-02 | | | 5.1 | 22.4 | | 0.160 | 27 | 16 | | 15 | 1.9 | 32 | 5.0 | | | | | | | | 260 | | 6.1 | | | | | | | | | | 0.002 | 0.100 | | 0.002 | | | 0.007 |
| Oct-02 | 0.080 | 0.103 | 5.4 | 23.8 | | 0.160 | 26 | 26 | | 17 | 1.5 | 29 | 3.6 | | | | | | | | 271 | | 7.3 | | | | | | | | | | 0.003 | 0.100 | | 0.006 | | | 0.073 |
| Feb-03 | 0.200 | 0.257 | 6.2 | 27.3 | | 0.160 | 28 | 22 | | 18 | 1.6 | 36 | 4.4 | | | | | | | | 283 | | 6.0 | | | | | | | | | | 0.002 | 0.100 | | 0.003 | | | 0.053 |
| Sep-03 | 0.070 | 0.090 | 6.4 | 28.2 | | 0.160 | 27 | 20 | | 15 | 1.4 | 30 | 3.7 | | | | | | | | 287 | | 6.3 | | | | | | | | | | 0.002 | 0.100 | | 0.003 | | | 0.079 |
| Jan-04 | 0.060 | 0.077 | 7.0 | 30.8 | | 0.160 | 25 | 38 | | 20 | 1.6 | 33 | 5.6 | | | | | | | | 284 | | 6.2 | | | | | | | | | | 0.002 | 0.100 | | 0.003 | | | 0.110 |
| Aug-04 | | | 6.1 | 26.9 | | 0.160 | 26 | 12 | | 20 | 1.3 | 32 | 4.2 | | | | | | | | 265 | | 5.8 | | | | | | | | | | 0.002 | 0.100 | | 0.002 | | | 0.255 |
| Mar-05 | 0.030 | 0.039 | 6.1 | 27.1 | | 0.160 | 26 | 13 | | 15 | 1.6 | 28 | 4.3 | | | | | | | | 272 | | 5.9 | | | | | | | | | | 0.002 | 0.100 | | <0.100 | | | 0.049 |
| Dec-05 | 0.020 | 0.026 | 6.1 | 26.8 | | 0.160 | 26 | 12 | | 2 | 1.4 | 3 | 4.0 | | | | | | | | 286 | | 7.2 | | | | | | | | | | 0.002 | 0.100 | | 0.022 | | | 0.002 |
| Feb-06 | 0.050 | 0.064 | 6.5 | 28.6 | | 0.160 | 29 | 13 | | 15 | 0.5 | 31 | 3.1 | | | | | | | | 297 | | 6.5 | | | | | | | | | | 0.002 | 0.300 | | 0.211 | | | 0.150 |
| Jul-06 | 0.020 | 0.026 | 7.8 | 34.6 | | <0.16 | 29 | 13 | | <0.1 | 721.0 | <0.1 | 0.1 | | | | | | | | 303 | | 7.1 | | | | | | | | | | <0.002 | 0.100 | | 0.148 | | | 0.002 |
| Feb-07 | <0.02 | <0.026 | 0.5 | 2.3 | | <0.16 | 4 | 8 | | 14 | 2.0 | 28 | 4.0 | | | | | | | | 312 | | 7.0 | | | | | | | | | | <0.002 | <0.100 | | 0.003 | | | 0.160 |
| Nov-07 | 0.020 | 0.026 | 10.0 | 44.4 | | 0.160 | 29 | 13 | | 17 | 2.0 | 32 | 4.0 | | | | | | | | 297 | 295 | 6.7 | 5.7 | 11.6 | 7.65 | 20.45 | 9.20 | | | | | 0.002 | 0.100 | | 0.003 | | | 0.091 |
| May-08 | 0.020 | 0.026 | 7.1 | 31.4 | | 0.160 | 28 | 19 | | 18 | 1.6 | 31 | 5.0 | | | | | | | | 306 | | 6.9 | | | | | | | | | | 0.001 | 0.038 | | 0.001 | | | 0.003 |
| Dec-08 | 0.020 | 0.026 | 7.5 | 33.2 | | 0.160 | 27 | 12 | | 16 | 1.7 | 27 | 4.4 | | | | | | | | 280 | 285 | 6.8 | 5.9 | 10.8 | 6.87 | 21.23 | 9.46 | | | | | 0.001 | 0.002 | | 0.001 | | | 0.019 |
| Jun-09 | 0.020 | 0.026 | 8.8 | 39.0 | | 0.160 | 30 | 12 | | 19 | 2.0 | 31 | 5.6 | | | | | | | | 299 | 382 | 6.5 | 6.3 | 11.9 | 7.16 | 20.94 | 9.42 | | | | | 0.002 | 0.100 | | 0.002 | | | 0.002 |
| Nov-09 | 0.020 | 0.026 | 7.4 | 32.9 | | 0.160 | 29 | 12 | | 15 | 1.4 | 33 | 4.3 | | | | | | | | 315 | | 6.8 | | | | | | | | | | 0.002 | 0.100 | | 0.002 | | | 0.002 |
| Mar-10 | 0.020 | 0.026 | 6.1 | 26.9 | | 0.160 | 26 | 12 | | 15 | 1.7 | 30 | 4.4 | | | | | | | | 287 | 207 | 6.6 | 6.5 | 11.4 | 6.79 | 21.31 | 9.24 | | | | | 0.002 | 0.100 | | 0.002 | | | 0.002 |
| Aug-10 | 0.020 | 0.026 | 7.2 | 31.9 | | 0.160 | 27 | 10 | | 17 | 1.7 | 30 | 4.8 | | | | | | | | 330 | 290 | 6.5 | 5.9 | 11.2 | 7.32 | 20.78 | 9.24 | | | | | 0.002 | 0.100 | | 0.003 | | | 0.002 |
| May-11 | 0.020 | 0.026 | 6.7 | 29.4 | | 0.160 | 25 | 11 | | 17 | 1.7 | 33 | 5.2 | | | | | | | | 296 | 248 | 6.6 | 6.1 | 11.1 | 6.99 | 21.11 | 9.24 | | | | | 0.002 | 0.100 | | 0.007 | | | 0.003 |
| Sep-11 | 0.020 | 0.026 | 7.1 | 31.3 | | 0.160 | 29 | 12 | | 15 | 1.6 | 30 | 4.6 | | | | | | | | 288 | 284 | 6.6 | 6.2 | 10.9 | 7.74 | 20.36 | 9.24 | | | | | 0.002 | 0.100 | | 0.002 | | | 0.010 |
| Mar-12 | <0.020 | 0.026 | 6.9 | 30.4 | | <0.16 | 24 | 11 | <0.1 | 16 | 2.0 | 30 | 5.0 | | ND | | | | | | 288 | 275 | 6.6 | 6.2 | 11.1 | 7.26 | 20.84 | 9.24 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.1 | <0.002 | <0.002 | | <0.002 | 0.003 |
| May-12 | | | | | | | | | | | | | | | | | | | | | | 248 | | 6.1 | 11.1 | 6.99 | 21.11 | 9.24 | | | | | | | | | | | |
| Oct-12 | | | | | | | | | | | | | | | | | | | | | | 267 | | 5.7 | 10.0 | 7.21 | 20.89 | 9.22 | | | | | | | | | | | |
| Jul-13 | 0.122 | 0.157 | 6.7 | 29.8 | | 0.056 | 23 | 8 | | 19 | 7.3 | 29 | 7.3 | | | | | | | | | | | | | | | | | | | | 0.052 | 0.148 | | 0.032 | | | 0.060 |
| Dec-13 | 0.014 | 0.018 | 7.2 | 31.7 | | 0.083 | 23 | 7 | | 16 | 2.5 | 29 | 5.0 | | | | | | | | | | | | | | | | | | | | <0.003 | <0.02 | | 0.002 | | | 0.010 |
| Mar-14 | 0.008 | 0.010 | 4.8 | 21.3 | | 0.029 | 22 | 11 | <0.1 | 16 | 5.8 | 28 | 4.6 | | 0.9 | | | | | | | | | | | 6.40 | 21.70 | 10.40 | 0.0003 | <0.0001 | <0.001 | <0.001 | 0.005 | <0.020 | <0.0003 | <0.001 | <0.00002 | <0.0005 | 0.005 |
| Jul-14 | 0.019 | 0.024 | 8.7 | 38.5 | | 0.011 | 23 | 9 | <0.1 | 14 | 2.3 | 26 | 4.1 | | 18.3 | | | | | | | | | | | 7.90 | 20.20 | 9.80 | 0.0002 | <0.0001 | <0.001 | <0.001 | <0.003 | <0.02 | <0.0003 | <0.001 | 0.00004 | <0.0005 | 0.004 |
| Mar-15 | <0.03 | <0.039 | 5.6 | 24.6 | <0.02 | 0.030 | 26 | 9 | <0.3 | 15 | 1.9 | 29 | 4.9 | 76 | ND | ND | | <1 | | <7 | | 261 | | 7.2 | 10.9 | 7.13 | 20.97 | 9.26 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | 0.005 | <0.001 | <0.002 | <0.003 |
| May-15 | | | | | | | | | | | | | | | | | | | | | | | | | | 6.94 | 21.16 | | | | | | | | | | | | |
| Aug-15 | | | | | | | | | | | | | | | | | | | | | | | | | | 7.03 | 21.07 | 9.25 | | | | | | | | | | | |
| Oct-15 | <0.03 | <0.039 | 6.1 | 27.1 | <0.02 | 0.030 | 30 | 22 | <0.3 | 15 | 1.8 | 41 | 4.9 | 82 | | | | <1 | | <7 | | 252 | | 6.4 | 11.3 | 6.90 | 21.20 | 9.26 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | 0.004 | <0.001 | <0.002 | 0.003 |
| May-16 | <0.02 | <0.032 | 5.4 | 23.7 | <0.02 | 0.036 | 26 | 8 | <0.3 | 15 | 2.1 | 28 | 4.4 | 58 | ND | ND | <10 | <1 | <10 | <7 | | 242 | | 6.9 | 11.2 | 6.93 | 21.17 | 9.27 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | <0.003 |
| Oct-16 | <0.03 | <0.039 | 6.4 | 28.2 | <0.02 | 0.029 | 27 | 9 | <0.3 | 16 | 2.1 | 29 | 4.9 | 68 | | | | | | <7 | | 242 | | 7.2 | 11.4 | 7.48 | 20.62 | 9.20 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | <0.003 |
| Apr-17 | <0.03 | <0.039 | 5.3 | 23.2 | <0.02 | <0.03 | 26 | 11 | <0.3 | 15 | 1.9 | 29 | 4.9 | 84 | ND | ND | <10 | <1 | ND | <7 | | 163 | | 7.0 | 12.6 | 6.88 | 21.22 | 9.22 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | <0.003 |
| May-17 | | | | | | | | | | | | | | | | | | | | | | | | | | 7.18 | 20.92 | | | | | | | | | | | | |
| Oct-17 | <0.03 | <0.039 | 6.5 | 29.0 | <0.02 | <0.02 | 26 | 12 | <0.3 | 13 | 1.5 | 27 | 4.5 | 78 | | | | | | <7 | | 231 | | 6.6 | 12.6 | 6.26 | 21.85 | 9.22 | <0.0025 | <0.0005 | <0.0015 | <0.002 | 0.008 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | <0.003 |
| Apr-18 | <0.03 | <0.039 | 7.2 | 31.9 | <0.02 | 0.040 | 27 | 10 | <0.3 | 14 | 1.6 | 29 | 5.1 | 70 | ND | ND | | <10 | <10 | <7 | | 433 | | 5.7 | 12.4 | 5.64 | 22.46 | 9.22 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | <0.003 |
| Jul-18 | | | | | | | | | | | | | | | | | | | | | | | | | | 7.65 | 20.45 | | | | | | | | | | | | |
| Sep-18 | <0.03 | <0.039 | 8.7 | 38.3 | <0.02 | <0.03 | 30 | 12 | <0.3 | 14 | 1.8 | 31 | 4.6 | 58 | | | <10 | | | <7 | | | | | | 7.49 | 20.61 | 9.22 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | <0.003 |
| Apr-19 | <0.03 | <0.039 | 8.1 | 35.8 | <0.02 | <0.02 | 29 | 10 | <0.3 | 15 | 2 | 34 | 5.3 | 78 | ND | ND | | <10 | <10 | <7 | | 201 | | 7.7 | 11.5 | 6.19 | 21.91 | 9.21 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | <0.003 |
| Sep-19 | 0.040 | 0.051 | 8.1 | 36.0 | <0.02 | <0.03 | 28 | 11 | <0.3 | 15 | 1.8 | 31 | 4.9 | 70 | | | <10 | | | <7 | | 282 | 6.6 | | 11.7 | 7.58 | 20.52 | 9.23 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | <0.003 |
| Apr-20 | <0.03 | <0.039 | 6.3 | 27.8 | <0.02 | <0.02 | 25 | 12 | <0.3 | 15 | 1.9 | 28 | 4.5 | 54 | ND | ND | <10 | <10 | <7 | <7 | | 249.11 | | 6.6 | 13.3 | 6.51 | 21.60 | 9.26 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | <0.003 |

**Notes:**

XXXXX Indicates result above interim guideline value (IGV)

XXXXX Indicates result above groundwater threshold value (GTV)

XXXXX Indicates result above IGV and GTV

Blank cell indicates no data

- indicates no screening threshold

< indicates result below reporting limit

ND indicates nothing detected in suite

NAC indicates no abnormal change

| MW-1D Old Data | Phosphorous | PAHs | BOD | Total Organic Carbon | Aluminium | Antimony | Barium | Beryllium | Boron | Selenium | Silver | Tin |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mg/L | µg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| **IGV** | - | various | - | NAC | **0.2** | - | **0.1** | - | **1** | - | - | - |
| **DWS** | - | 0.1 | - | - | 0.2 | 0.005 | - | - | 1 | 0.01 | - | - |
| **GTV** | - | **0.075** | - | - | **0.15** | - | - | - | - | - | - | - |
| **Date** | | | | | | | | | | | | |
| Mar-12 | | | <2 | <5 | <0.002 | <0.002 | 0.005 | <0.002 | | <0.002 | <0.002 | <0.002 |
| Mar-14 | | 0.11 | | | 0.009 | <0.0001 | 0.009 | <0.001 | | 0.0006 | <0.001 | 0.001 |
| Jul-14 | | 0.41 | | | <0.005 | <0.0001 | 0.009 | <0.001 | | 0.0007 | <0.001 | <0.001 |
| Mar-15 | 0.031 | <0.195 | <2 | <2 | <0.02 | <0.002 | 0.007 | <0.0005 | 0.016 | <0.003 | <0.005 | <0.005 |
| Oct-15 | 0.020 | | <4 | <2 | <0.02 | <0.002 | 0.006 | <0.0005 | 0.015 | <0.003 | <0.005 | <0.005 |



**Notes:**

**XXXXX** Indicates result above interim guideline value (IGV)

XXXXX Indicates result above groundwater threshold value (GTV)

XXXXX Indicates result above IGV and GTV

Blank cell indicates no data

- indicates no screening threshold

< indicates result below reporting limit

ND indicates nothing detected in suite

NAC indicates no abnormal change

| MW-2S | Major Ions | | | | | | | | | | | | | | Organics and Field Measurements | | | | | | | | | | | | | Metals | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ammonia-N | Ammonium | Nitrate-N | Nitrate as $NO_3$ | Nitrite as $NO_2$ | Phosphate-P | Chloride | Sulphate | Fluoride | Sodium | Potassium | Calcium | Magnesium | Total Alkalinity as $CaCO_3$ | VOCs | Alcohols & Acetates | Trichloroacetic Acid | Ethylene Glycol | Total Petroleum Hydrocarbons | COD | Electrical Conductivity µS/cm | | pH | | Temperature | Depth to Groundwater | Groundwater Elevation | Total Depth | Arsenic | Cadmium | Chromium | Cobalt | Copper | Iron | Lead | Manganese | Mercury | Nickel | Zinc |
| | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | µg/L | µg/L | µg/L | µg/L | µg/L | mg/L | Lab | Field | Lab | Field | °C | m bct | m OD | m bct | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| **IGV** | 0.12 | 0.15 | 5.6 | 25 | 0.1 | 0.03 | 30 | 200 | 1 | 150 | 5 | 200 | 50 | NAC | various | various | - | - | 10 | - | 1000 | | 6.5 | 9.5 | 25 | - | - | - | 0.01 | 0.005 | 0.03 | - | 0.03 | 0.2 | 0.01 | 0.05 | 0.001 | 0.02 | 0.1 |
| **DWS** | 0.23 | 0.3 | 11.3 | 50 | 0.5 | - | 250 | 250 | 1.5 | 200 | - | - | - | - | various | various | - | - | - | - | 2500 | | 6.5 | 9.5 | - | - | - | - | 0.01 | 0.005 | 0.05 | - | 2 | 0.2 | 0.01 | 0.05 | 0.001 | 0.02 | - |
| **GTV** | 0.175 | 0.225 | 8.5 | 37.5 | 0.375 | 0.035 | 187.5 | 187.5 | - | - | - | - | - | - | various | various | - | - | 10 | - | 800 | 1875 | - | - | - | - | - | - | 0.0075 | - | 0.0375 | - | 1.5 | - | 0.0075 | - | 0.00075 | - | 0.075 |
| **Date** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Jul-95 | 1.700 | 2.185 | 2.1 | 9.3 | | 1.000 | 90 | 115 | | 118 | 8.5 | 69 | 4.0 | | | | | | | | | | | | | | | | | | | | 0.020 | | | 4.000 | | | 1.600 |
| Dec-95 | 0.130 | 0.167 | 0.4 | 2.0 | | 1.000 | 119 | 203 | | 74 | 9.8 | 36 | 2.6 | | | | | | | | | | | | | | | | | | | | 0.010 | 0.730 | | 0.090 | | | 0.020 |
| Aug-96 | 1.300 | 1.671 | 0.5 | 2.0 | | 10.000 | 67 | 707 | | 12 | 4.7 | 49 | 6.4 | | | | | | | | | | | | | | | | | | | | 0.010 | 6.400 | | 0.080 | | | 0.020 |
| Dec-96 | 1.400 | 1.800 | 3.2 | 14.2 | | 0.050 | 68 | 302 | | 134 | 12.7 | 50 | 3.8 | | | | | | | | 996 | | 7.1 | | | | | | | | | | 0.030 | 0.040 | | 5.100 | | | 0.140 |
| Apr-97 | 2.000 | 2.571 | 0.2 | 1.0 | | 0.100 | 78 | 140 | | 139 | 10.2 | 34 | 4.3 | | | | | | | | 1078 | | 7.3 | | | | | | | | | | 0.030 | 0.040 | | 5.400 | | | 0.030 |
| Oct-97 | 0.200 | 0.257 | 5.0 | 22.2 | | 0.500 | 65 | 144 | | 117 | 29.7 | 51 | 3.5 | | | | | | | | 898 | | 7.3 | | | | | | | | | | 0.030 | 12.400 | | 8.540 | | | 0.090 |
| Mar-98 | 0.100 | 0.129 | 1.0 | 4.4 | | 0.100 | 400 | 265 | | 140 | 23.3 | 92 | 5.5 | | | | | | | | 1232 | | 7.1 | | | | | | | | | | 0.030 | 0.040 | | 0.040 | | | 0.030 |
| May-98 | 0.100 | 0.129 | 0.8 | 3.7 | | 0.100 | 108 | 126 | | 102 | 19.5 | 71 | 3.0 | | | | | | | | 867 | | 7.7 | | | | | | | | | | 0.030 | 0.040 | | 1.060 | | | 0.160 |
| Nov-98 | 0.100 | 0.129 | 0.5 | 2.2 | | 0.100 | 70 | 149 | | 121 | 18.3 | 59 | 3.8 | | | | | | | | 953 | | 7.3 | | | | | | | | | | 0.030 | 0.040 | | 2.000 | | | 0.060 |
| Jun-99 | 1.600 | 2.057 | 0.5 | 2.2 | | 0.500 | 51 | 122 | | 89 | 13.3 | 66 | 3.0 | | | | | | | | 732 | | 7.3 | | | | | | | | | | 0.030 | 0.040 | | 0.040 | | | 0.280 |
| Dec-99 | 0.320 | 0.411 | 1.1 | 4.9 | | 0.200 | 43 | 96 | | 92 | 14.4 | 66 | 4.0 | | | | | | | | 764 | | 7.1 | | | | | | | | | | 0.002 | 0.023 | | 0.021 | | | 0.050 |
| Feb-00 | 0.300 | 0.386 | 2.2 | 9.7 | | 0.200 | 39 | 72 | | 54 | 17.0 | 43 | 3.6 | | | | | | | | 616 | | 7.3 | | | | | | | | | | 0.007 | 0.002 | | 0.573 | | | 0.079 |
| Jul-00 | 0.200 | 0.257 | 2.6 | 11.4 | | 0.160 | 41 | 139 | | 76 | 13.0 | 55 | 2.3 | | | | | | | | 670 | | 7.0 | | | | | | | | | | 0.002 | 0.100 | | 0.871 | | | 0.062 |
| Apr-01 | 0.560 | 0.720 | 5.8 | 25.5 | | 0.160 | 35 | 102 | | 56 | 18.0 | 69 | 3.0 | | | | | | | | 554 | | 6.7 | | | | | | | | | | 0.002 | 0.100 | | 0.040 | | | 0.082 |
| Oct-01 | 0.800 | 1.028 | 6.3 | 28.1 | | 0.160 | 60 | 64 | | 75 | 15.0 | 64 | 4.0 | | | | | | | | 714 | | 6.9 | | | | | | | | | | 0.002 | 0.100 | | 0.002 | | | 0.002 |
| Apr-02 | | | 0.9 | 4.0 | | 0.160 | 39 | 61 | | 49 | 12.0 | 54 | 3.4 | | | | | | | | 531 | | 6.8 | | | | | | | | | | 0.002 | 0.100 | | 0.002 | | | 0.002 |
| Oct-02 | 1.670 | 2.147 | 0.1 | 0.4 | | 0.160 | 29 | 102 | | 66 | 9.3 | 46 | 2.6 | | | | | | | | 571 | | 7.0 | | | | | | | | | | 0.002 | 0.100 | | 1.223 | | | 0.089 |
| Feb-03 | 1.200 | 1.543 | 0.8 | 3.5 | | 0.160 | 28 | 79 | | 48 | 15.0 | 62 | 2.6 | | | | | | | | 532 | | 6.6 | | | | | | | | | | 0.013 | 0.100 | | 2.896 | | | 0.047 |
| Sep-03 | 0.580 | 0.746 | 2.3 | 10.3 | | 0.160 | 78 | 156 | | 92 | 18.0 | 60 | 2.8 | | | | | | | | 855 | | 6.1 | | | | | | | | | | 0.013 | 0.100 | | 1.848 | | | 0.841 |
| Jan-04 | 2.560 | 3.291 | 0.2 | 0.8 | | 0.160 | 82 | 119 | | 93 | 14.0 | 60 | 4.7 | | | | | | | | 764 | | 6.5 | | | | | | | | | | 0.002 | 0.200 | | 6.008 | | | 0.106 |
| Aug-04 | | | 0.2 | 0.8 | | 0.160 | 71 | 107 | | 101 | 13.0 | 58 | 3.4 | | | | | | | | 752 | | 6.6 | | | | | | | | | | 0.002 | 0.200 | | 3.466 | | | 0.208 |
| Mar-05 | 3.100 | 3.985 | 1.6 | 7.0 | | 0.160 | 42 | 92 | | 68 | 9.3 | 44 | 2.6 | | | | | | | | 618 | | 6.6 | | | | | | | | | | 0.002 | 0.100 | | 1.000 | | | 0.063 |
| Dec-05 | 2.680 | 3.445 | 0.9 | 3.9 | | 0.160 | 43 | 76 | | 8 | 1.1 | 5 | 0.4 | | | | | | | | 623 | | 7.4 | | | | | | | | | | 0.002 | 0.100 | | 0.438 | | | 0.002 |
| Feb-06 | 1.730 | 2.224 | 2.4 | 10.6 | | 0.160 | 49 | 76 | | 77 | 7.9 | 45 | 1.5 | | | | | | | | 652 | | 7.3 | | | | | | | | | | 0.007 | 0.600 | | 0.101 | | | 0.136 |
| Jul-06 | 2.450 | 3.150 | 0.4 | 1.6 | | <0.16 | 47 | 87 | | 85 | 8.0 | 32 | 2.0 | | | | | | | | 643 | | 7.4 | | | | | | | | | | <2 | 0.100 | | 2.131 | | | 0.071 |
| Feb-07 | 2.630 | 3.381 | 2.0 | 8.7 | | <0.16 | 35 | 83 | | 63 | 9.0 | 37 | 3.0 | | | | | | | | 589 | | 7.5 | | | | | | | | | | <0.002 | <0.100 | | 3.874 | | | 0.066 |
| Nov-07 | 2.680 | 3.445 | 0.4 | 1.7 | | 0.160 | 27 | 87 | | 60 | 8.0 | 37 | 2.0 | | | | | | | | 546 | 529 | 7.3 | 6.2 | 14.9 | 4.65 | 20.23 | 6.32 | | | | | 0.002 | 0.100 | | 3.303 | | | 0.061 |
| May-08 | 2.780 | 3.574 | 0.3 | 1.2 | | 0.160 | 68 | 69 | | 85 | 9.8 | 44 | 3.0 | | | | | | | | 681 | | 7.6 | | | | | | | | | | 0.001 | 0.020 | | 0.002 | | | 0.001 |
| Dec-08 | 2.330 | 2.995 | 0.4 | 1.9 | | 0.160 | 33 | 61 | | 58 | 9.6 | 35 | 2.4 | | | | | | | | 491 | 496 | 7.4 | 6.3 | 13.7 | 4.12 | 20.76 | 6.30 | | | | | 0.002 | 0.005 | | 0.534 | | | 0.016 |
| Jun-09 | 1.450 | 1.864 | 0.8 | 3.3 | | 0.160 | 29 | 57 | | 58 | 9.4 | 58 | 2.3 | | | | | | | | 475 | 430 | 7.4 | 6.3 | 12.4 | 4.37 | 20.51 | 6.31 | | | | | 0.002 | 0.100 | | 0.023 | | | 0.002 |
| Nov-09 | 0.680 | 0.874 | 1.2 | 5.2 | | 0.160 | 22 | 43 | | 44 | 15.0 | 64 | 2.7 | | | | | | | | 510 | | 7.3 | | | | | | | | | | 0.002 | 0.100 | | 0.349 | | | 0.002 |
| Mar-10 | 0.200 | 0.257 | 0.1 | 0.4 | | 0.160 | 21 | 34 | | 29 | 9.2 | 49 | 2.3 | | | | | | | | 408 | 306 | 7.6 | 7.1 | 10.1 | 3.85 | 21.03 | 6.27 | | | | | 0.002 | 0.100 | | 0.083 | | | 0.002 |
| Aug-10 | 0.830 | 1.067 | 0.8 | 3.5 | | 0.160 | 23 | 55 | | 47 | 8.8 | 36 | 2.3 | | | | | | | | 489 | 444 | 7.2 | 6.2 | 12.8 | 4.39 | 20.49 | 6.27 | | | | | 0.002 | 0.100 | | 0.608 | | | 0.002 |
| May-11 | 0.020 | 0.026 | 4.2 | 18.6 | | 0.160 | 47 | 50 | | 55 | 13.0 | 63 | 3.0 | | | | | | | | 621 | 517 | 7.2 | 6.8 | 12.2 | 3.51 | 21.37 | 6.27 | | | | | 0.002 | 0.100 | | 0.111 | | | 0.021 |
| Sep-11 | 0.190 | 0.244 | 3.7 | 16.2 | | 0.160 | 49 | 67 | | 78 | 11.0 | 39 | 2.0 | | | | | | | | 618 | 610 | 7.4 | 7.0 | 13.0 | 4.84 | 20.04 | 6.27 | | | | | 0.002 | 0.100 | | 0.135 | | | 0.009 |
| Mar-12 | <0.020 | <0.026 | 15.5 | 68.7 | | <0.16 | 115 | 128 | <0.1 | 158 | 15.0 | 59 | 3.0 | ND | | | | | | | 1067 | 1041 | 7.3 | 6.9 | 12.7 | 4.00 | 20.88 | 6.27 | 0.004 | <0.002 | <0.002 | <0.002 | 0.003 | <0.1 | <0.002 | 0.114 | | <0.002 | 0.016 |
| May-12 | | | | | | | | | | | | | | | | | | | | | | 517 | | 6.8 | 12.2 | 3.51 | 21.37 | 6.27 | | | | | | | | | | | |
| Oct-12 | | | | | | | | | | | | | | | | | | | | | | 1443 | | 6.8 | 15.9 | 4.02 | 20.86 | 6.42 | | | | | | | | | | | |
| Jul-13 | 0.137 | 0.176 | 34.7 | 153.7 | | 0.203 | 169 | 94 | | 273 | 22.0 | 50 | 4.5 | | | | | | | | | | | | | | | | | | | | 0.082 | 0.258 | | 0.508 | | | 0.089 |
| Dec-13 | 0.097 | 0.125 | 13.8 | 61.2 | | 0.182 | 240 | 89 | | 176 | 15.2 | 32 | 1.3 | | | | | | | | | | | | | | | | | | | | 0.008 | 0.025 | | 0.008 | | | 0.003 |
| Mar-14 | 0.020 | 0.026 | 5.8 | 25.8 | | 0.119 | 77 | 55 | <0.1 | 129 | 23.4 | 36 | 1.9 | ND | | | | | | | | | | | | 3.00 | 21.88 | 6.40 | 0.0023 | <0.0001 | <0.001 | <0.001 | 0.007 | <0.02 | <0.0003 | <0.001 | <0.00002 | 0.0009 | 0.010 |
| Jul-14 | 0.111 | 0.143 | 9.0 | 39.8 | | 0.088 | 87 | 86 | <0.1 | 118 | 13.2 | 38 | 1.9 | 0.5 | | | | | | | | | | | | 4.90 | 19.98 | 6.40 | 0.0018 | 0.038 | 0.001 | 0.0010 | 0.004 | 0.027 | 0.0003 | <0.001 | 0.00012 | 0.0012 | 0.002 |
| Mar-15 | <0.03 | <0.039 | 2.0 | 8.9 | <0.02 | 0.090 | 45 | 36 | <0.3 | 62 | 12.2 | 49 | 2.6 | 180 | ND | ND | | <1 | | 8 | | 507 | | 6.8 | 11.5 | 3.41 | 21.47 | 6.28 | 0.0029 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | <0.003 |
| May-15 | | | | | | | | | | | | | | | | | | | | | | | | | | 3.55 | 21.33 | | | | | | | | | | | | |
| Aug-15 | | | | | | | | | | | | | | | | | | | | | | | | | | 4.16 | 20.72 | 6.25 | | | | | | | | | | | |
| Oct-15 | <0.03 | <0.039 | 1.7 | 7.4 | <0.02 | | 36 | 38 | <0.3 | 56 | 13.4 | 51 | 2.4 | 174 | | | | <1 | | 9 | | 480 | | 6.4 | 13.8 | 4.12 | 20.76 | 6.25 | 0.0051 | <0.0005 | <0.0015 | <0.002 | <0.007 | 0.022 | <0.005 | <0.002 | <0.001 | <0.002 | <0.003 |
| May-16 | <0.02 | <0.032 | 4.7 | 20.9 | <0.02 | 0.075 | 48 | 40 | <0.3 | 45 | 11.4 | 60 | 2.8 | 150 | ND | ND | <10 | <1 | <10 | 14 | | 559 | | 7.3 | 11.9 | 3.06 | 21.82 | 6.24 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | 0.002 | <0.001 | <0.002 | <0.003 |
| Oct-16 | <0.03 | <0.039 | 7.1 | 31.4 | <0.02 | 0.114 | 41 | 76 | <0.3 | 91 | 16.5 | 40 | 1.8 | 180 | | | | | | 11 | | 584 | | 7.4 | 16.6 | 4.45 | 20.43 | 6.40 | 0.0030 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | 0.004 | <0.001 | <0.002 | <0.003 |
| Apr-17 | <0.03 | <0.039 | 2.0 | 8.6 | <0.02 | 0.060 | 47 | 61 | <0.3 | 50 | 14.9 | 53 | 2.4 | 156 | ND | ND | <10 | <1 | ND | <7 | | 250 | | 6.9 | 12.9 | 5.06 | 19.82 | 6.25 | 0.0039 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | 0.002 | <0.001 | <0.002 | <0.003 |
| May-17 | | | | | | | | | | | | | | | | | | | | | | | | | | 4.13 | 20.75 | | | | | | | | | | | | |
| Oct-17 | <0.03 | <0.039 | 2.8 | 12.2 | <0.02 | 0.121 | 38 | 32 | <0.3 | 41 | 13.8 | 50 | 2.5 | 178 | | | | | | <7 | | 449 | | 7.0 | 15.4 | 2.96 | 21.92 | 6.25 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | <0.003 |
| Apr-18 | <0.03 | <0.039 | 1.8 | 7.8 | <0.02 | 0.140 | 35 | 25 | <0.3 | 31 | 10.0 | 50 | 2.4 | 144 | ND | ND | <10 | <10 | <10 | 12 | | 398 | | 6.9 | 12.7 | 2.60 | 22.28 | 6.23 | 0.0041 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | <0.003 |
| Jul-18 | | | | | | | | | | | | | | | | | | | | | | | | | | 4.82 | 20.06 | | | | | | | | | | | | |
| Sep-18 | 0.040 | 0.051 | 8.9 | 39.6 | <0.02 | 0.150 | 55 | 33 | <0.3 | 65 | 12.6 | 48 | 1.9 | 158 | | | | | | 12 | | | | | | 4.84 | 20.04 | 6.17 | 0.0026 | <0.0005 | 0.0016 | <0.002 | <0.007 | 0.027 | <0.005 | 0.062 | <0.001 | <0.002 | 0.009 |
| Apr-19 | <0.03 | <0.039 | 4.1 | 18.2 | <0.02 | 0.104 | 35 | 21 | <0.3 | 34 | 9.4 | 55 | 2.3 | 162 | ND | ND | | <10 | <10 | 8 | | 312 | | 7.7 | 13.9 | 2.33 | 22.55 | 6.24 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | <0.003 |
| Sep-19 | 0.040 | 0.051 | 7.1 | 31.5 | <0.02 | 0.130 | 41 | 22 | <0.3 | 59 | 7.1 | 31 | 1.3 | 130 | | | <10 | | | 14 | | 468 | 7.47 | | 17.8 | 4.16 | 20.72 | 6.23 | 0.0028 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | <0.003 |
| Apr-20 | <0.03 | <0.039 | 2.4 | 7.8 | <0.02 | <0.02 | 35 | 21 | <0.3 | 28 | 7.3 | 54 | 2.3 | 134 | ND | ND | | <10 | <10 | <7 | | 407 | | 7.7 | 14.1 | 3.70 | 21.18 | 6.26 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | 0.005 | <0.001 | <0.002 | <0.003 |

**Notes:**

XXXXX Indicates result above interim guideline value (IGV)

XXXXX Indicates result above groundwater threshold value (GTV)

XXXXX Indicates result above IGV and GTV

Blank cell indicates no data

- indicates no screening threshold

< indicates result below reporting limit

ND indicates nothing detected in suite

NAC indicates no abnormal change

| MW-2S Old Data | Phosphorous | PAHs | BOD | Total Organic Carbon | Aluminium | Antimony | Barium | Beryllium | Boron | Selenium | Silver | Tin |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mg/L | µg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| **IGV** | - | various | - | NAC | **0.2** | - | **0.1** | - | **1** | - | - | - |
| **DWS** | - | 0.1 | - | - | 0.2 | 0.005 | - | - | 1 | 0.01 | - | - |
| **GTV** | - | **0.075** | - | - | **0.15** | - | - | - | - | - | - | - |
| **Date** | | | | | | | | | | | | |
| Mar-12 | | | | <5 | 0.007 | <0.002 | 0.038 | <0.002 | | 0.002 | <0.002 | <0.002 |
| Mar-14 | | <0.05 | | | 0.014 | 0.0006 | 0.020 | <0.001 | | 0.0037 | <0.001 | 0.001 |
| Jul-14 | | 0.26 | | | <0.005 | 0.0006 | 0.025 | <0.001 | | 0.0020 | <0.001 | <0.001 |
| Mar-15 | 0.136 | <0.195 | <2 | <2 | <0.02 | <0.002 | 0.024 | <0.0005 | 0.035 | <0.003 | <0.005 | <0.005 |
| Oct-15 | 0.148 | | 2 | 2.00 | <0.02 | <0.002 | 0.017 | <0.0005 | 0.040 | <0.003 | <0.005 | <0.005 |



**Notes:**

**XXXXX** Indicates result above interim guideline value (IGV)

**XXXXX** Indicates result above groundwater threshold value (GTV)

**XXXXX** Indicates result above IGV and GTV

Blank cell indicates no data

- indicates no screening threshold

< indicates result below reporting limit

ND indicates nothing detected in suite

NAC indicates no abnormal change

| MW-3S | Major Ions | | | | | | | | | | | | | | Organics and Field Measurements | | | | | | | | | | | | | | Metals | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ammonia-N | Ammonium | Nitrate-N | Nitrate as $NO_3$ | Nitrite as $NO_2$ | Phosphate-P | Chloride | Sulphate | Fluoride | Sodium | Potassium | Calcium | Magnesium | Total Alkalinity as $CaCO_3$ | VOCs | Alcohols & Acetates | Trichloroacetic Acid | Ethylene Glycol | Total Petroleum Hydrocarbons | COD | Electrical Conductivity µS/cm | | pH | | Temperature | Depth to Groundwater | Groundwater Elevation | Total Depth | Arsenic | Cadmium | Chromium | Cobalt | Copper | Iron | Lead | Manganese | Mercury | Nickel | Zinc |
| | | | | | | | | | | | | | | | | | | | | | Lab | Field | Lab | Field | | | | | | | | | | | | | | | | | |
| | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | µg/L | µg/L | µg/L | µg/L | µg/L | mg/L | | | | | °C | m bct | m OD | m bct | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| **IGV** | 0.12 | 0.15 | 5.6 | 25 | 0.1 | 0.03 | 30 | 200 | 1 | 150 | 5 | 200 | 50 | NAC | various | various | - | - | 10 | - | 1000 | | 6.5 | 9.5 | 25 | - | - | - | 0.01 | 0.005 | 0.03 | - | 0.03 | 0.2 | 0.01 | 0.05 | 0.001 | 0.02 | 0.1 |
| **DWS** | 0.23 | 0.3 | 11.3 | 50 | 0.5 | - | 250 | 250 | 1.5 | 200 | - | - | - | - | various | various | - | - | - | - | 2500 | | 6.5 | 9.5 | - | - | - | - | 0.01 | 0.005 | 0.05 | - | 2 | 0.2 | 0.01 | 0.05 | 0.001 | 0.02 | - |
| **GTV** | 0.175 | 0.225 | 8.5 | 37.5 | 0.375 | 0.035 | 187.5 | 187.5 | - | - | - | - | - | - | various | various | - | - | 10 | - | 800 | 1875 | - | - | - | - | - | - | 0.0075 | - | 0.0375 | - | 1.5 | - | 0.0075 | - | 0.00075 | - | 0.075 |
| **Date** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Jul-95 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dec-95 | 0.130 | 0.167 | 0.2 | 1.0 | | | 16 | 28 | | 8 | 0.4 | 34 | 1.0 | | | | | | | | | | | | | | | | | | | | 0.010 | 0.100 | | 0.090 | | | 0.020 |
| Aug-96 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dec-96 | 0.100 | 0.129 | 6.5 | 28.6 | | 0.050 | 20 | 34 | | 15 | 1.0 | 47 | 1.4 | | | | | | | | 329 | | 6.9 | | | | | | | | | | 0.030 | 0.050 | | 0.020 | | | 0.240 |
| Apr-97 | 0.100 | 0.129 | 7.9 | 35.1 | | 0.100 | 30 | 24 | | 15 | 0.1 | 30 | 1.7 | | | | | | | | 357 | | 7.3 | | | | | | | | | | 0.030 | 0.040 | | 0.040 | | | 0.050 |
| Oct-97 | 0.200 | 0.257 | 3.5 | 15.6 | | 0.500 | 14 | 17 | | 17 | 2.8 | 43 | 5.2 | | | | | | | | 311 | | 7.1 | | | | | | | | | | 0.030 | 16.900 | | 0.500 | | | 0.220 |
| Mar-98 | 0.100 | 0.129 | 3.8 | 16.7 | | 0.100 | 25 | 17 | | 17 | 0.2 | 50 | 1.7 | | | | | | | | 342 | | 7.0 | | | | | | | | | | 0.030 | 0.040 | | 0.050 | | | 0.070 |
| May-98 | 0.100 | 0.129 | 4.1 | 18.0 | | 0.100 | 32 | 19 | | 21 | 0.3 | 53 | 1.7 | | | | | | | | 363 | | 7.3 | | | | | | | | | | 0.030 | 0.040 | | 0.040 | | | 0.210 |
| Nov-98 | 0.100 | 0.129 | 5.7 | 25.2 | | 0.100 | 24 | 14 | | 14 | 0.1 | 55 | 2.1 | | | | | | | | 391 | | 7.1 | | | | | | | | | | 0.030 | 0.040 | | 0.050 | | | 0.080 |
| Jun-99 | | | | | | | | | | Dry | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dec-99 | 0.290 | 0.373 | 4.0 | 17.7 | | 0.200 | 31 | 15 | | 15 | 0.2 | 61 | 2.3 | | | | | | | | 384 | | 7.1 | | | | | | | | | | 0.002 | 0.024 | | 0.003 | | | 0.058 |
| Feb-00 | 0.020 | 0.026 | 4.3 | 18.9 | | 0.200 | 45 | 20 | | 19 | 0.4 | 41 | 2.7 | | | | | | | | 408 | | 7.2 | | | | | | | | | | 0.005 | 0.002 | | 0.008 | | | 0.089 |
| Jul-00 | | | | | | | | | | Dry | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Apr-01 | 0.040 | 0.051 | 7.4 | 32.6 | | 0.160 | 47 | 18 | | 24 | 0.1 | 25 | 2.3 | | | | | | | | 429 | | 6.5 | | | | | | | | | | 0.002 | 0.100 | | 0.040 | | | 0.092 |
| Oct-01 | 0.060 | 0.077 | 5.6 | 25.0 | | 0.160 | 29 | 15 | | 15 | 0.3 | 58 | 2.9 | | | | | | | | 372 | | 6.7 | | | | | | | | | | 0.003 | 0.100 | | 0.003 | | | 0.006 |
| Apr-02 | | | 4.5 | 19.8 | | 0.160 | 39 | 16 | | 16 | 0.2 | 62 | 2.6 | | | | | | | | 405 | | 6.8 | | | | | | | | | | 0.002 | 0.100 | | 0.002 | | | 0.002 |
| Oct-02 | 0.170 | 0.219 | 2.7 | 11.9 | | 0.160 | 23 | 19 | | 13 | 0.4 | 53 | 2.5 | | | | | | | | 353 | | | | | | | | | | | | 0.007 | 0.100 | | 0.003 | | | 0.160 |
| Feb-03 | 0.200 | 0.257 | 5.8 | 25.5 | | 0.160 | 25 | 21 | | 23 | 0.2 | 74 | 2.3 | | | | | | | | 384 | | 6.5 | | | | | | | | | | 0.002 | 0.100 | | 0.004 | | | 0.048 |
| Sep-03 | 0.020 | 0.026 | 8.0 | 35.6 | | 0.160 | 13 | 89 | | 12 | 0.1 | 53 | 2.4 | | | | | | | | 367 | | 6.3 | | | | | | | | | | 0.015 | 0.100 | | 0.018 | | | 0.637 |
| Jan-04 | 0.030 | 0.039 | 9.4 | 41.8 | | 0.160 | 33 | 55 | | 20 | 0.3 | 65 | 3.3 | | | | | | | | 423 | | 6.5 | | | | | | | | | | 0.003 | 0.200 | | 0.007 | | | 0.079 |
| Aug-04 | | | 10.1 | 44.5 | | 0.160 | 21 | 13 | | 13 | 0.2 | 60 | 3.0 | | | | | | | | 343 | | 7.5 | | | | | | | | | | 0.005 | 0.200 | | 0.019 | | | 0.112 |
| Mar-05 | 0.020 | 0.026 | 7.0 | 31.0 | | 0.160 | 19 | 28 | | 13 | 0.3 | 57 | 2.6 | | | | | | | | 392 | | 6.8 | | | | | | | | | | 0.002 | 0.200 | | 0.100 | | | 0.036 |
| Dec-05 | 0.030 | 0.039 | 11.9 | 52.8 | | 0.160 | 24 | 25 | | 2 | 0.1 | 7 | 0.4 | | | | | | | | 459 | | 7.4 | | | | | | | | | | 0.002 | 0.100 | | 0.008 | | | 0.002 |
| Feb-06 | <0.02 | <0.026 | 12.9 | 57.2 | | 0.160 | 28 | 25 | | 18 | <0.1 | 63 | 2.0 | | | | | | | | 470 | | 7.2 | | | | | | | | | | 0.005 | 0.700 | | 0.011 | | | 0.093 |
| Feb-07 | 0.020 | 0.026 | 21.9 | 96.9 | | <0.16 | 22 | 20 | | 17 | <0.1 | 60 | 3.0 | | | | | | | | 442 | | 7.4 | | | | | | | | | | <0.002 | <0.100 | | 0.029 | | | 0.079 |
| Nov-07 | 0.040 | 0.051 | 8.4 | 37.1 | | 0.160 | 16 | 17 | | 13 | 0.1 | 60 | 3.0 | | | | | | | | 382 | 287 | 7.3 | 5.6 | 13.1 | 5.38 | | 6.30 | | | | | 0.003 | 0.100 | | 0.030 | | | 0.132 |
| May-08 | 0.020 | 0.026 | 8.4 | 37.3 | | 0.160 | 28 | 18 | | 18 | 0.8 | 36 | 3.0 | | | | | | | | 458 | | 7.6 | | | | | | | | | | 0.005 | 0.070 | | 0.008 | | | 0.008 |
| Dec-08 | 0.020 | 0.026 | 5.3 | 23.4 | | 0.160 | 37 | 16 | | 17 | 0.2 | 59 | 2.8 | | | | | | | | 394 | 413 | 7.5 | 6.5 | 12.4 | 4.77 | | 6.28 | | | | | 0.003 | 0.005 | | 0.006 | | | 0.016 |
| Jun-09 | 0.020 | 0.026 | 7.2 | 32.0 | | 0.160 | 38 | 15 | | 17 | 0.4 | 21 | 2.9 | | | | | | | | 443 | 412 | 7.2 | 7.0 | 13.0 | 5.44 | | 6.30 | | | | | 0.002 | 0.100 | | 0.002 | | | 0.002 |
| Nov-09 | 0.020 | 0.026 | 2.5 | 11.2 | | 0.160 | 47 | 21 | | 31 | 0.1 | 72 | 2.0 | | | | | | | | 635 | | 7.1 | | | | | | | | | | 0.002 | 0.100 | | 0.002 | | | 0.002 |
| Mar-10 | 0.020 | 0.026 | 5.1 | 22.8 | | 16.000 | 29 | 16 | | 21 | 0.1 | 66 | 2.5 | | | | | | | | 432 | 312 | 7.6 | 6.7 | 10.2 | 4.88 | | 6.21 | | | | | 0.002 | 0.100 | | 0.005 | | | 0.002 |
| Aug-10 | 0.080 | 0.103 | 5.4 | 23.8 | | 0.160 | 18 | 11 | | 13 | 0.3 | 41 | 2.6 | | | | | | | | 329 | 362 | 6.8 | 6.6 | 14.0 | 5.49 | | 6.21 | | | | | 0.002 | 0.100 | | 0.065 | | | 0.002 |
| May-11 | 0.030 | 0.039 | 1.7 | 7.5 | | 0.160 | 24 | 12 | | 18 | 0.1 | 58 | 2.3 | | | | | | | | 404 | 323 | 7.3 | 6.3 | 11.0 | 4.58 | | 6.21 | | | | | 0.002 | 0.100 | | 0.028 | | | 0.004 |
| Sep-11 | 0.020 | 0.026 | 0.3 | 1.1 | | 0.160 | 13 | 8 | | 13 | 0.1 | 54 | 2.3 | | | | | | | | 331 | 333 | 7.1 | 6.7 | 11.9 | 5.23 | | 6.21 | | | | | 0.002 | 0.100 | | 0.024 | | | 0.009 |
| Mar-12 | <0.020 | <0.026 | 1.1 | 5.0 | | <0.16 | 18 | 10 | <0.1 | 18 | <0.1 | 62 | 3.0 | | ND | | | | | | 377 | 356 | 7.2 | 6.4 | 11.4 | 5.12 | | 6.21 | <0.002 | <0.002 | <0.002 | <0.002 | 0.002 | <0.1 | <0.002 | 0.451 | | <0.002 | 0.016 |
| Mar-15 | 0.030 | 0.039 | 1.2 | 5.1 | <0.02 | <0.02 | 46 | 12 | <0.3 | 24 | 2.3 | 36 | 2.2 | 90 | ND | ND | | <1 | | <7 | | 209 | | 7.4 | 10.2 | 4.43 | 22.48 | 5.92 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | 0.026 | <0.005 | 0.004 | <0.001 | <0.002 | 0.004 |
| May-15 | | | | | | | | | | | | | | | | | | | | | | | | | | 5.61 | 21.30 | | | | | | | | | | | | |
| Aug-15 | | | | | | | | | | | | | | | | | | | | | | | | | | 5.67 | 21.24 | 5.69 | | | | | | | | | | | |
| Oct-15 | | | | | | | | | | | | | | | | | | | | | | | | | | dry | <21.22 | 5.69 | | | | | | | | | | | |
| May-16 | | | | | | | | | | | | | | | | | | | | | | | | | | dry | <21.31 | 5.60 | | | | | | | | | | | |
| Oct-16 | | | | | | | | | | | | | | | | | | | | | | | | | | dry | <21.29 | 5.62 | | | | | | | | | | | |
| Apr-17 | | | | | | | | | | | | | | | | | | | | | | | | | | dry | <21.29 | 5.62 | | | | | | | | | | | |
| May-17 | | | | | | | | | | | | | | | | | | | | | | | | | | dry | <21.29 | 5.62 | | | | | | | | | | | |
| Oct-17 | | | | | | | | | | | | | | | | | | | | | | | | | | 5.06 | 21.85 | 5.54 | | | | | | | | | | | |
| Apr-18 | | | | | | | | | | | | | | | | | | | | | | | | | | 4.97 | 21.94 | 5.54 | | | | | | | | | | | |
| Jul-18 | | | | | | | | | | | | | | | | | | | | | | | | | | dry | <21.29 | | | | | | | | | | | | |
| Sep-18 | | | | | | | | | | | | | | | | | | | | | | | | | | dry | <21.41 | 5.50 | | | | | | | | | | | |
| Apr-19 | | | | | | | | | | | | | | | | | | | | | | | | | | 5.17 | <21.41 | 5.55 | | | | | | | | | | | |
| Sep-19 | | | | | | | | | | | | | | | | | | | | | | | | | | dry | <21.41 | 5.54 | | | | | | | | | | | |
| Apr-20 | | | | | | | | | | | | | | | | | | | | | | | | | | 5.55 | <21.36 | 5.55 | | | | | | | | | | | |



**Notes:**

| | |
|---|---|
| **XXXXX** | Indicates result above interim guideline value (IGV) |
| **XXXXX** | Indicates result above groundwater threshold value (GTV) |
| **XXXXX** | Indicates result above IGV and GTV |

Blank cell indicates no data
- indicates no screening threshold
< indicates result below reporting limit
ND indicates nothing detected in suite
NAC indicates no abnormal change

| MW-3S Old Data | Phosphorous | PAHs | BOD | Total Organic Carbon | Aluminium | Antimony | Barium | Beryllium | Boron | Selenium | Silver | Tin |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mg/L | µg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| **IGV** | - | various | - | NAC | **0.2** | - | **0.1** | - | **1** | - | - | - |
| **DWS** | - | 0.1 | - | - | 0.2 | 0.005 | - | - | 1 | 0.01 | - | - |
| **GTV** | - | **0.075** | - | - | **0.15** | | - | - | - | - | - | - |
| **Date** | | | | | | | | | | | | |
| Mar-12 | | | | <5 | 0.042 | <0.002 | 0.005 | <0.002 | | <0.002 | <0.002 | <0.002 |
| Mar-15 | 0.015 | <0.195 | 5 | 3.00 | <0.02 | <0.002 | 0.025 | <0.0005 | <0.012 | <0.003 | <0.005 | <0.005 |



**Notes:**

**XXXXX** Indicates result above interim guideline value (IGV)

**XXXXX** Indicates result above groundwater threshold value (GTV)

**XXXXX** Indicates result above IGV and GTV

Blank cell indicates no data

- indicates no screening threshold

< indicates result below reporting limit

ND indicates nothing detected in suite

NAC indicates no abnormal change

| MW-3D | Major Ions | | | | | | | | | | | | | | Organics and Field Measurements | | | | | | | | | | | | | Metals | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ammonia-N | Ammonium | Nitrate-N | Nitrate as $NO_3$ | Nitrite as $NO_2$ | Phosphate-P | Chloride | Sulphate | Fluoride | Sodium | Potassium | Calcium | Magnesium | Total Alkalinity as $CaCO_3$ | VOCs | Alcohols & Acetates | Trichloroacetic Acid | Ethylene Glycol | Total Petroleum Hydrocarbons | COD | Electrical Conductivity µS/cm | | pH | | Temperature | Depth to Groundwater | Groundwater Elevation | Total Depth | Arsenic | Cadmium | Chromium | Cobalt | Copper | Iron | Lead | Manganese | Mercury | Nickel | Zinc |
| | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | µg/L | µg/L | µg/L | µg/L | µg/L | mg/L | Lab | Field | Lab | Field | °C | m bct | m OD | m bct | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| **IGV** | **0.12** | **0.15** | **5.6** | **25** | **0.1** | **0.03** | **30** | **200** | **1** | **150** | **5** | **200** | **50** | NAC | various | various | - | - | 10 | - | **1000** | | **6.5** | **9.5** | **25** | - | - | - | **0.01** | **0.005** | **0.03** | - | **0.03** | **0.2** | **0.01** | **0.05** | **0.001** | **0.02** | **0.1** |
| **DWS** | 0.23 | 0.3 | 11.3 | 50 | 0.5 | - | 250 | 250 | 1.5 | 200 | - | - | - | - | various | various | - | - | - | - | 2500 | | 6.5 | 9.5 | - | - | - | - | 0.01 | 0.005 | 0.05 | - | 2 | 0.2 | 0.01 | 0.05 | 0.001 | 0.02 | - |
| **GTV** | 0.175 | 0.225 | 8.5 | 37.5 | 0.375 | 0.035 | 187.5 | 187.5 | - | - | - | - | - | - | various | various | - | - | **10** | - | 800 | **1875** | - | - | - | - | - | - | **0.0075** | - | **0.0375** | - | **1.5** | - | **0.0075** | - | **0.00075** | - | **0.075** |
| **Date** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Jul-95 | **0.130** | **0.167** | **8.3** | **36.6** | | **1.000** | **49** | 46 | | 23 | 1.0 | 28 | 1.6 | | | | | | | | | | | | | | | | | | | | 0.010 | **1.600** | | **0.770** | | | 0.040 |
| Dec-95 | **0.130** | **0.167** | 10.4 | 45.9 | | **1.000** | **53** | 46 | | 15 | 0.7 | 22 | 2.1 | | | | | | | | | | | | | | | | | | | | 0.010 | 0.030 | | **0.130** | | | 0.020 |
| Aug-96 | 0.027 | 0.035 | 0.5 | 2.0 | | **10.000** | 25 | 27 | | 20 | 2.0 | 23 | 2.4 | | | | | | | | | | | | | | | | | | | | 0.010 | **0.930** | | 0.010 | | | 0.010 |
| Dec-96 | 0.320 | 0.411 | 9.9 | 43.7 | | **0.050** | **30** | 38 | | 18 | 1.0 | 20 | 1.7 | | | | | | | | 327 | | **6.2** | | | | | | | | | | **0.030** | **0.270** | | **1.130** | | | **0.140** |
| Apr-97 | 0.100 | 0.129 | **6.1** | **26.9** | | **0.100** | 27 | 46 | | 21 | 0.4 | 16 | 1.9 | | | | | | | | 267 | | **5.5** | | | | | | | | | | **0.030** | 0.040 | | 0.040 | | | 0.060 |
| Oct-97 | 0.200 | 0.257 | 3.4 | 15.1 | | **0.500** | 10 | 14 | | 12 | 3.4 | 8 | 1.1 | | | | | | | | 143 | | **6.2** | | | | | | | | | | **0.030** | **1.160** | | **0.110** | | | 0.060 |
| Mar-98 | 0.040 | 0.051 | 4.8 | 21.3 | | **0.100** | 17 | 20 | | 15 | 0.5 | 22 | 1.9 | | | | | | | | 218 | | 6.6 | | | | | | | | | | **0.030** | **7.600** | | 0.040 | | | 0.030 |
| May-98 | 0.300 | 0.386 | 4.3 | 18.9 | | **0.100** | 16 | 20 | | 15 | 0.7 | 24 | 1.7 | | | | | | | | 201 | | 6.5 | | | | | | | | | | **0.030** | 0.040 | | **0.070** | | | **0.180** |
| Nov-98 | 0.600 | 0.771 | 3.5 | 15.5 | | **0.100** | 13 | 17 | | 13 | 0.5 | 22 | 1.6 | | | | | | | | 204 | | **6.3** | | | | | | | | | | **0.030** | 0.040 | | 0.040 | | | 0.080 |
| Jun-99 | 0.500 | 0.643 | 4.4 | 19.5 | | **0.500** | 16 | 37 | | 15 | 0.7 | 39 | 2.1 | | | | | | | | 256 | | **6.3** | | | | | | | | | | **0.030** | 0.040 | | 0.040 | | | **0.340** |
| Dec-99 | 0.200 | 0.257 | 4.3 | 19.0 | | **0.200** | 16 | 19 | | 16 | 0.6 | 23 | 1.9 | | | | | | | | 220 | | 6.5 | | | | | | | | | | 0.002 | 0.002 | | **0.072** | | | 0.095 |
| Feb-00 | 0.300 | 0.386 | 4.6 | 20.2 | | **0.200** | 21 | 33 | | 17 | 0.8 | 18 | 2.4 | | | | | | | | 254 | | 6.6 | | | | | | | | | | 0.016 | 0.002 | | **0.080** | | | 0.090 |
| Jul-00 | 0.200 | 0.257 | 4.6 | 20.2 | | **0.160** | 16 | 48 | | 14 | 1.6 | 21 | 0.5 | | | | | | | | 198 | | **6.0** | | | | | | | | | | 0.002 | 0.100 | | **0.600** | | | 0.036 |
| Apr-01 | **0.150** | **0.193** | **5.8** | **25.5** | | **0.160** | 20 | 120 | | 10 | 0.4 | 26 | 1.5 | | | | | | | | 251 | | **6.2** | | | | | | | | | | 0.002 | 0.100 | | **0.050** | | | 0.063 |
| Oct-01 | **0.170** | **0.219** | 5.0 | 22.0 | | **0.160** | 17 | 11 | | 13 | 0.4 | 25 | 2.1 | | | | | | | | 226 | | **6.3** | | | | | | | | | | 0.002 | 0.100 | | 0.002 | | | 0.002 |
| Apr-02 | | | 4.0 | 17.6 | | **0.160** | 22 | 17 | | 14 | 0.5 | 27 | 2.1 | | | | | | | | 239 | | **6.0** | | | | | | | | | | 0.002 | 0.100 | | 0.016 | | | 0.002 |
| Oct-02 | 0.370 | 0.476 | 5.2 | 22.9 | | **0.160** | 17 | 102 | | 5 | 0.1 | 7 | 0.6 | | | | | | | | 203 | | **5.9** | | | | | | | | | | 0.002 | 0.100 | | 0.032 | | | 0.015 |
| Feb-03 | 0.200 | 0.257 | 4.4 | 19.4 | | **0.160** | 19 | 37 | | 19 | 0.5 | 36 | 2.1 | | | | | | | | 241 | | **6.1** | | | | | | | | | | 0.002 | 0.100 | | **0.064** | | | 0.056 |
| Sep-03 | 0.050 | 0.064 | **6.1** | **26.8** | | **0.160** | 16 | 30 | | 14 | 0.6 | 20 | 1.9 | | | | | | | | 220 | | **6.3** | | | | | | | | | | 0.002 | 0.100 | | 0.044 | | | 0.090 |
| Jan-04 | 0.020 | 0.026 | **6.2** | **27.6** | | **0.160** | 19 | 49 | | 20 | 0.3 | 31 | 2.4 | | | | | | | | 245 | | **6.4** | | | | | | | | | | 0.002 | 0.100 | | **3.458** | | | 0.092 |
| Aug-04 | | | **7.0** | **30.9** | | **0.160** | 17 | 16 | | 17 | 0.5 | 27 | 2.2 | | | | | | | | 220 | | **5.9** | | | | | | | | | | 0.002 | 0.100 | | 0.003 | | | **0.158** |
| Mar-05 | 0.020 | 0.026 | **7.5** | **33.4** | | **0.160** | 18 | 17 | | 14 | 0.4 | 28 | 2.2 | | | | | | | | 246 | | **6.0** | | | | | | | | | | 0.002 | 0.100 | | **0.100** | | | 0.021 |
| Dec-05 | 0.040 | 0.051 | **7.5** | **33.0** | | **0.160** | 18 | 14 | | 1 | 0.1 | 3 | 0.3 | | | | | | | | 243 | | 7.4 | | | | | | | | | | 0.002 | 0.100 | | 0.002 | | | 0.002 |
| Feb-06 | 0.030 | 0.039 | 9.4 | 41.8 | | **0.160** | 21 | 17 | | 15 | 0.1 | 30 | 1.5 | | | | | | | | 277 | | 7.1 | | | | | | | | | | 0.002 | 0.300 | | 0.018 | | | 0.057 |
| Jul-06 | <0.02 | <0.026 | 9.2 | 40.8 | | <0.16 | 20 | 15 | | 18 | <0.1 | 30 | 2.0 | | | | | | | | 267 | | 7.0 | | | | | | | | | | <2 | 0.100 | | 0.012 | | | <2 |
| Feb-07 | <0.02 | <0.026 | 17.5 | 77.5 | | <0.16 | 16 | 15 | | 14 | <0.1 | 32 | 2.0 | | | | | | | | 274 | | 7.3 | | | | | | | | | | <0.002 | <0.100 | | 0.012 | | | 0.031 |
| Nov-07 | 0.020 | 0.026 | 9.8 | 43.5 | | **0.160** | 15 | 14 | | 11 | 1.0 | 30 | 2.0 | | | | | | | | 263 | 251 | 6.6 | **5.9** | 12.8 | 6.00 | | 9.40 | | | | | 0.002 | 0.100 | | 0.013 | | | 0.038 |
| May-08 | 0.020 | 0.026 | 9.2 | 40.5 | | **0.160** | 22 | 15 | | 20 | 0.2 | 72 | 4.0 | | | | | | | | 304 | | 6.9 | | | | | | | | | | 0.002 | 0.020 | | 0.001 | | | 0.004 |
| Dec-08 | 0.180 | 0.231 | **6.4** | **28.2** | | **0.160** | 20 | 12 | | 14 | 0.2 | 31 | 2.4 | | | | | | | | 264 | 261 | 7.0 | **6.4** | 11.1 | 5.52 | | 9.44 | | | | | 0.001 | 0.002 | | 0.001 | | | 0.011 |
| Jun-09 | 0.020 | 0.026 | **8.4** | **37.1** | | **0.060** | 25 | 13 | | 17 | 0.4 | 21 | 2.9 | | | | | | | | 290 | 305 | 6.6 | 7.1 | 12.1 | 5.97 | | 9.46 | | | | | 0.002 | 0.100 | | 0.002 | | | 0.002 |
| Nov-09 | 0.020 | 0.026 | **7.5** | **33.1** | | **0.160** | 22 | 13 | | 12 | 4.0 | 38 | 2.2 | | | | | | | | 351 | | 6.7 | | | | | | | | | | 0.002 | 0.100 | | 0.002 | | | 0.002 |
| Mar-10 | 0.040 | 0.051 | **7.8** | **34.3** | | **0.160** | 25 | 14 | | 16 | 0.5 | 33 | 2.6 | | | | | | | | 286 | 210 | 6.7 | 6.6 | 11.4 | 5.75 | | 9.34 | | | | | 0.002 | 0.100 | | **0.074** | | | 0.004 |
| Aug-10 | 0.020 | 0.026 | **6.8** | **30.1** | | **0.160** | 18 | 11 | | 13 | 0.4 | 31 | 2.7 | | | | | | | | 288 | 259 | 6.8 | **6.1** | 12.6 | 6.43 | | 9.34 | | | | | 0.002 | **0.400** | | **0.077** | | | 0.002 |
| May-11 | 0.020 | 0.026 | **5.9** | **25.9** | | **0.160** | 17 | 11 | | 12 | 0.4 | 33 | 2.7 | | | | | | | | 256 | 209 | 6.7 | **6.3** | 11.7 | 5.48 | | 9.34 | | | | | 0.002 | 0.100 | | **0.128** | | | 0.008 |
| Sep-11 | 0.020 | 0.026 | **7.0** | **30.8** | | **0.160** | 17 | 11 | | 13 | 0.4 | 27 | 2.5 | | | | | | | | 254 | 250 | 6.7 | 6.5 | 12.0 | 5.92 | | 9.34 | | | | | 0.002 | 0.100 | | **0.064** | | | 0.011 |
| Mar-12 | <0.020 | <0.026 | **5.7** | **25.1** | | <0.16 | 14 | 10 | <0.1 | 16 | <0.1 | 39 | 3.0 | ND | | | | | | | 262 | 266 | 7.3 | 6.6 | 11.8 | 5.84 | | 9.34 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.1 | <0.002 | **0.267** | | <0.002 | 0.016 |
| May-12 | | | | | | | | | | | | | | | | | | | | | | 209 | | **6.3** | 11.7 | 5.48 | | 9.34 | | | | | | | | | | | |
| Oct-12 | | | | | | | | | | | | | | | | | | | | | | 433 | | **5.9** | 12.6 | 6.84 | | 13.92 | | | | | | | | | | | |
| Jul-13 | 1.125 | 1.448 | 2.7 | 11.7 | | **0.089** | **48** | 35 | | 71 | **11.2** | 28 | 8.2 | | | | | | | | | | | | | | | | | | | | **0.096** | **0.780** | | **5.835** | | | **0.212** |
| Dec-13 | 0.771 | 0.991 | **7.4** | **32.5** | | **0.108** | **31** | 23 | | 46 | **7.4** | 20 | 4.1 | | | | | | | | | | | | | | | | | | | | <0.003 | <0.02 | | **2.949** | | | 0.003 |
| Mar-14 | 0.884 | 1.136 | 1.2 | 5.5 | | **0.055** | **58** | 35 | 0.3 | 59 | **9.3** | 23 | 5.3 | ND | | | | | | | | | | | | 6.40 | | 13.70 | 0.0005 | 0.0001 | <0.001 | 0.0041 | 0.006 | <0.02 | <0.0003 | **3.781** | <0.00002 | 0.0036 | 0.010 |
| Jul-14 | 0.821 | 1.055 | 2.3 | 10.1 | | **0.044** | **49** | 37 | 0.2 | 49 | 4.4 | 21 | 4.6 | ND | ND | | | | | | | | | | | 7.30 | | 14.00 | 0.0006 | <0.0001 | <0.001 | 0.0038 | <0.003 | <0.02 | <0.0003 | **3.382** | 0.00004 | 0.0033 | 0.005 |
| Mar-15 | 0.840 | 1.080 | 3.2 | 14.2 | <0.02 | <0.02 | **44** | 21 | <0.3 | 45 | 3.6 | 22 | 5.1 | 96 | ND | ND | | <1 | | <7 | 359 | | 6.7 | 12.7 | 6.97 | 19.91 | 13.48 | <0.0025 | <0.0005 | <0.0015 | 0.0030 | <0.007 | <0.02 | <0.005 | **3.256** | <0.001 | <0.002 | 0.008 |
| May-15 | | | | | | | | | | | | | | | | | | | | | | | | | | 6.56 | 20.31 | | | | | | | | | | | | |
| Aug-15 | | | | | | | | | | | | | | | | | | | | | | | | | | 6.60 | 20.28 | 13.62 | | | | | | | | | | | |
| Oct-15 | 1.090 | 1.401 | 0.3 | 1.2 | <0.02 | 0.060 | **53** | 34 | <0.3 | 50 | 3.9 | 27 | 5.6 | 108 | | | | <1 | | 11 | 372 | | **6.4** | 13.2 | 6.53 | 20.34 | 13.62 | <0.0025 | <0.0005 | <0.0015 | 0.0030 | <0.007 | 0.101 | <0.005 | **3.898** | <0.001 | <0.002 | 0.007 |
| May-16 | 0.830 | 1.069 | 0.3 | 1.5 | <0.02 | 0.062 | **40** | 33 | <0.3 | 52 | 3.3 | 23 | 5.0 | 110 | ND | ND | <10 | <1 | <10 | 11 | 417 | | 7.0 | 12.8 | 7.18 | 19.70 | 13.69 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | **3.302** | <0.001 | <0.002 | <0.003 |
| Oct-16 | 0.850 | 1.093 | **5.6** | **25.0** | <0.02 | 0.023 | **38** | 25 | <0.3 | 45 | 3.6 | 24 | 5.5 | 98 | | | | | | <7 | 347 | | 7.7 | 13.2 | 7.09 | 19.79 | 13.78 | <0.0025 | <0.0005 | <0.0015 | 0.0030 | <0.007 | 0.02 | <0.005 | **3.195** | <0.001 | 0.002 | <0.003 |
| Apr-17 | 0.860 | 1.106 | 0.3 | 1.3 | <0.02 | <0.03 | **45** | 31 | <0.3 | 52 | 3.6 | 25 | 5.7 | 130 | ND | ND | <10 | <1 | ND | <7 | 265 | | 6.8 | 13.3 | 6.86 | 20.02 | 13.92 | <0.0025 | <0.0005 | <0.0015 | 0.0030 | <0.007 | <0.02 | <0.005 | **3.750** | <0.001 | 0.003 | <0.003 |
| May-17 | | | | | | | | | | | | | | | | | | | | | | | | | | 6.91 | 19.97 | | | | | | | | | | | | |
| Oct-17 | 0.920 | 1.183 | 0.6 | 2.6 | <0.02 | 0.023 | **47** | 30 | <0.3 | 43 | 3.2 | 25 | 5.9 | 112 | | | | | | 13 | 398 | | 6.8 | 13.9 | 6.56 | 20.32 | 14.03 | <0.0025 | <0.0005 | <0.0015 | 0.0020 | <0.007 | <0.02 | <0.005 | **4.110** | <0.001 | <0.002 | <0.003 |
| Apr-18 | 1.060 | 1.363 | 2.0 | 8.7 | <0.02 | 0.050 | **44** | 29 | <0.3 | 44 | 3.4 | 28 | 6.8 | 112 | ND | ND | <10 | <10 | <10 | 17 | 400 | | 7.0 | 12.1 | 6.57 | 20.31 | 13.76 | <0.0025 | <0.0005 | 0.0016 | 0.0040 | <0.007 | <0.02 | <0.005 | **4.449** | <0.001 | 0.003 | 0.004 |
| Jul-18 | | | | | | | | | | | | | | | | | | | | | | | | | | 7.01 | 19.87 | | | | | | | | | | | | |
| Sep-18 | 1.140 | 1.466 | 2.3 | 10.3 | <0.02 | 0.050 | **46** | 29 | <0.3 | 38 | 3.5 | 31 | 6.6 | 108 | | | | | | 20 | | | | | 6.99 | 19.89 | 13.68 | <0.0025 | <0.0005 | <0.0015 | 0.0030 | <0.007 | <0.02 | <0.005 | **4.765** | <0.001 | 0.002 | 0.004 |
| Apr-19 | 1.250 | 1.607 | 0.5 | 2.3 | <0.02 | 0.029 | **46** | 33 | <0.3 | 46 | 4.0 | 32 | 7.3 | 130 | ND | ND | | <10 | <10 | <7 | 310 | | 7.4 | 14.6 | 6.50 | 20.38 | 13.71 | <0.0025 | <0.0005 | <0.0015 | 0.0030 | <0.007 | <0.02 | <0.005 | **4.702** | <0.001 | 0.003 | <0.003 |
| Sep-19 | 1.580 | 2.031 | 1.7 | 7.7 | 0.12 | <0.03 | **50** | 32 | <0.3 | 39 | 3.6 | 32 | 7.5 | 112 | | | <10 | | | 20 | 315 | 7.0 | | 14.0 | 7.20 | 19.67 | 13.70 | <0.0025 | <0.0005 | <0.0015 | 0.0030 | <0.007 | <0.02 | <0.005 | **4.930** | <0.001 | 0.003 | <0.003 |
| Apr-20 | 1.480 | 1.903 | 0.4 | 1.9 | <0.02 | 0.05 | **45** | 31 | <0.3 | 43 | 3.9 | 30 | 7.5 | 112 | ND | ND | | <10 | <10 | 8 | 408 | | 7.2 | 15.3 | 6.85 | 20.03 | 13.78 | 0.0031 | <0.0005 | <0.0015 | 0.0030 | <0.007 | 0.135 | <0.005 | **5.368** | <0.001 | 0.003 | <0.003 |

**Notes:**

**XXXXX** Indicates result above interim guideline value (IGV)

XXXXX Indicates result above groundwater threshold value (GTV)

XXXXX Indicates result above IGV and GTV

Blank cell indicates no data

- indicates no screening threshold

< indicates result below reporting limit

ND indicates nothing detected in suite

NAC indicates no abnormal change

| MW-3D Old Data | Phosphorous | PAHs | BOD | Total Organic Carbon | Aluminium | Antimony | Barium | Beryllium | Boron | Selenium | Silver | Tin |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mg/L | µg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| **IGV** | - | various | - | NAC | **0.2** | - | **0.1** | - | **1** | - | - | - |
| **DWS** | - | 0.1 | - | - | 0.2 | 0.005 | | - | 1 | 0.01 | - | - |
| **GTV** | - | **0.075** | - | - | **0.15** | - | - | - | - | - | - | - |
| **Date** | | | | | | | | | | | | |
| Mar-12 | | | | <5 | 0.053 | <0.002 | 0.008 | <0.002 | | <0.002 | <0.002 | <0.002 |
| Mar-14 | | <0.05 | | | <0.005 | <0.0001 | 0.007 | <0.001 | | <0.0002 | <0.001 | 0.002 |
| Jul-14 | | 0.13 | | | <0.005 | <0.0001 | 0.008 | <0.001 | | 0.0005 | <0.001 | <0.001 |
| Mar-15 | 0.066 | <0.195 | 4 | <2 | <0.02 | <0.002 | 0.006 | <0.0005 | 0.023 | <0.003 | <0.005 | <0.005 |
| Oct-15 | 0.052 | | 4 | <2 | <0.02 | <0.002 | 0.008 | <0.0005 | 0.023 | <0.003 | <0.005 | <0.005 |



**Notes:**

**XXXXX** Indicates result above interim guideline value (IGV)

XXXXX Indicates result above groundwater threshold value (GTV)

**XXXXX** Indicates result above IGV and GTV

Blank cell indicates no data

- indicates no screening threshold

< indicates result below reporting limit

ND indicates nothing detected in suite

NAC indicates no abnormal change

| MW-4S | Major Ions | | | | | | | | | | | | | | Organics and Field Measurements | | | | | | | | | | | | | | Metals | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ammonia-N | Ammonium | Nitrate-N | Nitrate as $NO_3$ | Nitrite as $NO_2$ | Phosphate-P | Chloride | Sulphate | Fluoride | Sodium | Potassium | Calcium | Magnesium | Total Alkalinity as $CaCO_3$ | VOCs | Alcohols & Acetates | Trichloroacetic Acid | Ethylene Glycol | Total Petroleum Hydrocarbons | COD | Electrical Conductivity µS/cm | | pH | | Temperature | Depth to Groundwater | Groundwater Elevation | Total Depth | Arsenic | Cadmium | Chromium | Cobalt | Copper | Iron | Lead | Manganese | Mercury | Nickel | Zinc |
| | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | µg/L | µg/L | µg/L | µg/L | µg/L | mg/L | Lab | Field | Lab | Field | °C | m bct | m OD | m bct | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| **IGV** | **0.12** | **0.15** | **5.6** | **25** | **0.1** | **0.03** | **30** | **200** | **1** | **150** | **5** | **200** | **50** | NAC | various | various | - | - | 10 | - | | **1000** | **6.5** | **9.5** | **25** | - | - | - | **0.01** | **0.005** | **0.03** | - | **0.03** | **0.2** | **0.01** | **0.05** | **0.001** | **0.02** | **0.1** |
| **DWS** | 0.23 | 0.3 | 11.3 | 50 | 0.5 | - | 250 | 250 | 1.5 | 200 | - | - | - | - | various | various | - | - | - | - | | 2500 | 6.5 | 9.5 | - | - | - | - | 0.01 | 0.005 | 0.05 | - | 2 | 0.2 | 0.01 | 0.05 | 0.001 | 0.02 | - |
| **GTV** | **0.175** | **0.225** | **8.5** | **37.5** | **0.375** | **0.035** | **187.5** | **187.5** | - | - | - | - | - | - | various | various | - | - | **10** | - | 800 | **1875** | - | - | - | - | - | - | **0.0075** | - | **0.0375** | - | **1.5** | - | **0.0075** | - | **0.00075** | - | **0.075** |
| **Date** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Jul-95 | 0.100 | 0.129 | **7.4** | **32.7** | | **1.000** | 15 | 72 | | 10 | 1.0 | 42 | 4.9 | | | | | | | | | | | | | | | | | | | | | **0.050** | **13.600** | | **2.100** | | | 0.010 |
| Dec-95 | **0.130** | **0.167** | 4.5 | 20.0 | | **1.000** | 11 | 77 | | 7 | 0.3 | 29 | 2.8 | | | | | | | | | | | | | | | | | | | | | 0.010 | 0.020 | | **0.090** | | | 0.020 |
| Aug-96 | **0.230** | **0.296** | 0.5 | 2.0 | | **10.000** | 21 | 62 | | 12 | 4.0 | 50 | 5.9 | | | | | | | | | | | | | | | | | | | | | 0.010 | **4.100** | | 0.040 | | | 0.010 |
| Dec-96 | 0.100 | 0.129 | 5.4 | 23.8 | | **0.050** | 17 | 72 | | 13 | 0.8 | 42 | 3.1 | | | | | | | | | 260 | | **6.1** | | | | | | | | | | **0.030** | 0.040 | | 0.020 | | | **0.280** |
| Apr-97 | 0.100 | 0.129 | 4.9 | 21.8 | | **0.100** | 18 | 70 | | 11 | 0.1 | 23 | 3.9 | | | | | | | | | 331 | | 6.6 | | | | | | | | | | **0.030** | 0.040 | | 0.040 | | | 0.050 |
| Oct-97 | **0.200** | **0.257** | **6.2** | **27.5** | | **0.500** | 20 | 39 | | 21 | 3.5 | 39 | 3.7 | | | | | | | | | 329 | | 6.5 | | | | | | | | | | **0.030** | **2.140** | | **0.050** | | | **0.450** |
| Mar-98 | 0.100 | 0.129 | 5.1 | 22.6 | | **0.100** | 13 | 50 | | 11 | 0.3 | 45 | 3.5 | | | | | | | | | 310 | | 6.8 | | | | | | | | | | **0.030** | 0.040 | | 0.040 | | | 0.020 |
| May-98 | 0.100 | 0.129 | 5.2 | 23.0 | | **0.100** | 16 | 44 | | 13 | 0.3 | 51 | 3.3 | | | | | | | | | 322 | | 6.9 | | | | | | | | | | **0.030** | 0.040 | | 0.040 | | | **0.160** |
| Nov-98 | 0.100 | 0.129 | 5.4 | 23.9 | | **0.100** | 17 | 28 | | 14 | 0.1 | 53 | 3.6 | | | | | | | | | 388 | | 6.9 | | | | | | | | | | **0.030** | 0.040 | | **0.050** | | | 0.070 |
| Jun-99 | **0.500** | **0.643** | **6.6** | **29.2** | | **0.500** | 24 | 36 | | 15 | 0.6 | 55 | 5.0 | | | | | | | | | 368 | | 7.2 | | | | | | | | | | **0.030** | 0.040 | | 0.040 | | | **0.250** |
| Dec-99 | **0.200** | **0.257** | **7.2** | **31.9** | | **0.200** | **32** | 32 | | 18 | 0.3 | 52 | 5.0 | | | | | | | | | 371 | | 7.0 | | | | | | | | | | 0.002 | 0.010 | | 0.005 | | | 0.062 |
| Feb-00 | **0.200** | **0.257** | **6.4** | **28.2** | | **0.200** | 17 | 45 | | 25 | 0.4 | 30 | 3.9 | | | | | | | | | 356 | | 7.3 | | | | | | | | | | 0.004 | 0.002 | | 0.008 | | | **0.150** |
| Jul-00 | **0.200** | **0.257** | **5.6** | **24.6** | | **0.160** | 14 | 46 | | 25 | 0.3 | 25 | 2.9 | | | | | | | | | 267 | | 6.8 | | | | | | | | | | 0.002 | 0.100 | | 0.006 | | | 0.068 |
| Apr-01 | 0.040 | 0.051 | **10.7** | **47.5** | | **0.160** | 13 | 135 | | 14 | 0.1 | 43 | 2.4 | | | | | | | | | 319 | | **6.4** | | | | | | | | | | 0.002 | 0.100 | | 0.040 | | | 0.068 |
| Oct-01 | 0.080 | 0.103 | **9.3** | **41.3** | | **0.160** | **39** | 22 | | 32 | 0.4 | 34 | 4.5 | | | | | | | | | 372 | | 6.5 | | | | | | | | | | 0.002 | 0.100 | | 0.002 | | | 0.002 |
| Apr-02 | | | **10.8** | **48.0** | | **0.160** | **42** | 45 | | 61 | 0.3 | 27 | 2.1 | | | | | | | | | 480 | | 6.6 | | | | | | | | | | 0.002 | 0.100 | | 0.002 | | | 0.002 |
| Oct-02 | 0.080 | 0.103 | **15.8** | **70.0** | | **0.160** | **51** | 45 | | 120 | 0.3 | 5 | 0.5 | | | | | | | | | 586 | | 6.8 | | | | | | | | | | 0.002 | 0.100 | | 0.002 | | | 0.030 |
| Feb-03 | **0.200** | **0.257** | **12.3** | **54.6** | | **0.160** | **49** | 42 | | **154** | 1.7 | 4 | 0.3 | | | | | | | | | 507 | | 6.6 | | | | | | | | | | 0.002 | 0.100 | | 0.002 | | | 0.053 |
| Sep-03 | 0.020 | 0.026 | **13.1** | **58.2** | | **0.160** | **45** | 44 | | 100 | 1.0 | 4 | 0.4 | | | | | | | | | 526 | | 7.3 | | | | | | | | | | 0.007 | 0.100 | | 0.002 | | | **0.948** |
| Jan-04 | 0.030 | 0.039 | **16.6** | **73.5** | | **0.160** | **57** | 83 | | 168 | 1.8 | 3 | 0.3 | | | | | | | | | 601 | | **6.4** | | | | | | | | | | 0.002 | 0.100 | | **3.000** | | | 0.084 |
| Aug-04 | | | **12.8** | **56.8** | | **0.160** | **44** | 30 | | 138 | 0.8 | 3 | 0.3 | | | | | | | | | 460 | | 7.0 | | | | | | | | | | 0.003 | 0.100 | | 0.002 | | | 0.066 |
| Mar-05 | 0.020 | 0.026 | **15.0** | **66.4** | | **0.160** | **46** | 32 | | 99 | 1.0 | 3 | 0.2 | | | | | | | | | 488 | | 6.6 | | | | | | | | | | 0.002 | 0.100 | | <0.100 | | | 0.039 |
| Dec-05 | 0.020 | 0.026 | **9.9** | **44.0** | | **0.160** | **35** | 25 | | 9 | 0.3 | 1 | 0.1 | | | | | | | | | 423 | | 7.8 | | | | | | | | | | 0.002 | 0.100 | | 0.002 | | | 0.002 |
| Feb-06 | 0.040 | 0.051 | **11.9** | **52.8** | | **0.160** | **44** | 25 | | 81 | 0.8 | 7 | 0.4 | | | | | | | | | 424 | | 7.7 | | | | | | | | | | 0.002 | 0.100 | | 0.011 | | | 0.079 |
| Jul-06 | <0.02 | <0.026 | **16.0** | **70.8** | | <0.16 | **44** | 26 | | 93 | 2.0 | 5 | 1.0 | | | | | | | | | 465 | | 7.7 | | | | | | | | | | <2 | <0.100 | | 0.004 | | | 0.017 |
| Feb-07 | <0.02 | <0.026 | **27.9** | **123.5** | | <0.16 | **39** | 26 | | 82 | 2.0 | 14 | <2 | | | | | | | | | 468 | | 7.8 | | | | | | | | | | 0.002 | <0.100 | | <0.002 | | | 0.048 |
| Nov-07 | 0.020 | 0.026 | **10.8** | **47.9** | | **0.160** | **35** | 24 | | 58 | 2.0 | 8 | 1.0 | | | | | | | | | 379 | 332 | **6.3** | 13.2 | 6.29 | 20.69 | 7.65 | | | | | | 0.003 | 0.100 | | 0.002 | | | 0.066 |
| May-08 | 0.020 | 0.026 | **11.1** | **49.3** | | **0.160** | **38** | 26 | | 79 | 2.7 | 13 | 2.0 | | | | | | | | | 456 | | 8.0 | | | | | | | | | | 0.009 | **0.200** | | 0.004 | | | 0.022 |
| Dec-08 | 0.020 | 0.026 | **10.8** | **47.8** | | **0.160** | **37** | 27 | | 68 | 2.4 | 15 | 2.1 | | | | | | | | | 385 | 411 | 7.5 | 6.6 | 14.0 | 5.70 | 21.28 | 7.78 | | | | | 0.001 | 0.003 | | 0.001 | | | 0.013 |
| Jun-09 | 0.020 | 0.026 | **10.3** | **45.8** | | **0.160** | **41** | 29 | | 80 | 3.5 | 20 | 2.4 | | | | | | | | | 433 | 335 | 7.3 | 6.8 | 14.9 | 6.11 | 20.87 | 7.70 | | | | | 0.002 | 0.100 | | 0.002 | | | 0.002 |
| Nov-09 | 0.020 | 0.026 | **11.4** | **50.5** | | **0.160** | **39** | 32 | | 57 | 2.8 | 24 | 2.3 | | | | | | | | | 474 | | 7.3 | | | | | | | | | | 0.002 | 0.100 | | 0.002 | | | 0.002 |
| Mar-10 | 0.020 | 0.026 | **7.1** | **31.3** | | **0.160** | 17 | 32 | | 50 | 1.8 | 18 | 1.8 | | | | | | | | | 337 | 226 | 7.8 | 7.4 | 12.4 | 5.82 | 21.16 | 7.82 | | | | | 0.002 | 0.100 | | 0.003 | | | 0.002 |
| Aug-10 | 0.020 | 0.026 | **8.1** | **35.8** | | **0.160** | 21 | 29 | | 50 | 2.1 | 18 | 2.1 | | | | | | | | | 408 | 351 | 7.4 | 7.0 | 13.7 | 6.37 | 20.61 | 7.82 | | | | | 0.002 | 0.100 | | 0.003 | | | 0.002 |
| May-11 | 0.020 | 0.026 | **9.8** | **43.5** | | **0.160** | **41** | 21 | | 67 | 2.3 | 21 | 2.6 | | | | | | | | | 444 | 366 | 7.7 | 7.0 | 12.3 | 6.10 | 20.88 | 7.82 | | | | | 0.002 | 0.100 | | 0.016 | | | 0.003 |
| Sep-11 | 0.020 | 0.026 | **9.5** | **42.0** | | **0.160** | **48** | 21 | | 7 | 2.9 | 21 | 2.5 | | | | | | | | | 475 | 477 | 7.5 | 7.2 | 12.6 | 6.52 | 20.46 | 7.82 | | | | | 0.002 | 0.100 | | 0.008 | | | 0.011 |
| Mar-12 | <0.020 | <0.026 | **11.1** | **49.2** | | <0.16 | **53** | 27 | <0.1 | 57 | 3.0 | 32 | 4.0 | ND | | | | | | | | 479 | 459 | 7.4 | 7.1 | 12.4 | 6.23 | 20.75 | 7.82 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.1 | <0.002 | 0.005 | | <0.002 | 0.018 |
| May-12 | | | | | | | | | | | | | | | | | | | | | | | 366 | | 7.0 | 12.3 | 6.10 | 20.88 | 7.82 | | | | | | | | | | | |
| Oct-12 | | | | | | | | | | | | | | | | | | | | | | | 409 | | 6.6 | 12.5 | 6.24 | 20.74 | 7.97 | | | | | | | | | | | |
| Jul-13 | **0.128** | **0.165** | **7.0** | **30.9** | | **0.086** | 18 | 22 | | 59 | **5.2** | 18 | 4.5 | | | | | | | | | | | | | | | | | | | | | **0.063** | **0.227** | | **0.050** | | | 0.082 |
| Dec-13 | 0.016 | 0.021 | 0.3 | 1.2 | | **0.435** | 11 | 21 | | 40 | 4.2 | 21 | 2.4 | | | | | | | | | | | | | | | | | | | | | <0.003 | 0.023 | | <0.001 | | | **4.200** |
| Mar-14 | 0.016 | 0.021 | **6.6** | **29.0** | | **0.042** | 8 | 21 | <0.1 | 31 | 4.8 | 29 | 3.0 | ND | | | | | | | | | | | | | 5.20 | 21.78 | 7.90 | 0.0004 | 0.0001 | <0.001 | <0.001 | 0.004 | <0.02 | <0.0003 | <0.001 | <0.00002 | <0.0005 | 0.018 |
| Jul-14 | 0.016 | 0.021 | **7.7** | **34.2** | | 0.027 | 8 | 22 | <0.1 | 37 | 2.5 | 23 | 2.9 | ND | | | | | | | | | | | | | 6.70 | 20.28 | 8.50 | 0.0003 | <0.0001 | <0.001 | <0.002 | <0.003 | <0.02 | <0.0003 | 0.001 | 0.00003 | <0.0005 | 0.003 |
| Mar-15 | 0.050 | 0.064 | 5.4 | 24.0 | <0.02 | <0.02 | 13 | 19 | <0.3 | 29 | 2.1 | 37 | 5.3 | 126 | ND | ND | | | <1 | | <7 | | 372 | | 7.1 | 11.7 | 5.88 | 21.10 | 7.78 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | 0.007 |
| May-15 | | | | | | | | | | | | | | | | | | | | | | | | | | | 5.91 | 21.07 | | | | | | | | | | | | |
| Aug-15 | | | | | | | | | | | | | | | | | | | | | | | | | | | 5.97 | 21.01 | 7.79 | | | | | | | | | | | |
| Oct-15 | <0.03 | <0.039 | 3.5 | 15.5 | <0.02 | 0.040 | 26 | 23 | <0.3 | 21 | 2.2 | 48 | 6.5 | 128 | | | | | <1 | | <7 | | 318 | | 6.5 | 13.1 | 5.88 | 21.10 | 7.78 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | 0.007 |
| May-16 | <0.025 | <0.032 | 4.5 | 19.7 | <0.02 | 0.033 | 15 | 27 | <0.3 | 9 | 1.6 | 43 | 6.3 | 88 | ND | ND | <10 | <1 | <10 | <7 | | | 308 | | 7.3 | 12.1 | 5.76 | 21.22 | 7.79 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | <0.003 |
| Oct-16 | <0.03 | <0.039 | 4.5 | 19.8 | <0.02 | 0.062 | 15 | 37 | <0.3 | 11 | 1.8 | 47 | 6.6 | 108 | | | | | | <7 | | | 365 | | 7.1 | 13.1 | 3.30 | 21.31 | 7.87 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | 0.011 |
| Apr-17 | 0.03 | 0.039 | 3.3 | 14.7 | <0.02 | <0.03 | 10 | 23 | <0.3 | 8 | 1.6 | 36 | 5.0 | 124 | ND | ND | <10 | <1 | ND | <7 | | | 165 | | 6.9 | 12.5 | 5.87 | 21.11 | 7.85 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | 0.006 |
| May-17 | | | | | | | | | | | | | | | | | | | | | | | | | | | 6.01 | 20.97 | | | | | | | | | | | | |
| Oct-17 | <0.03 | <0.039 | 3.5 | 15.5 | <0.02 | <0.02 | 16 | 17 | <0.3 | 9 | 1.6 | 35 | 5.0 | 100 | | | | | | <7 | | | 232 | | 6.5 | 13.1 | 5.55 | 21.42 | 7.78 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | 0.004 |
| Apr-18 | <0.03 | <0.039 | 3.8 | 16.7 | <0.02 | <0.03 | 12 | 21 | <0.3 | 7 | 1.5 | 38 | 5.2 | 100 | ND | ND | <10 | <10 | <10 | <7 | | | 241 | | 6.5 | 11.8 | 5.20 | 21.78 | 7.78 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | 0.005 |
| Jul-18 | | | | | | | | | | | | | | | | | | | | | | | | | | | 6.32 | 20.65 | | | | | | | | | | | | |
| Sep-18 | <0.03 | <0.039 | 4.7 | 20.7 | <0.02 | 0.05 | 16 | 19 | <0.3 | 9 | 1.8 | 45 | 5.8 | 106 | | | | | | <7 | | | | | | | 6.30 | 20.67 | 7.75 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | 0.003 | <0.001 | <0.002 | 0.027 |
| Apr-19 | <0.03 | <0.039 | **6.3** | **27.8** | <0.02 | **0.03** | 18 | 26 | <0.3 | 11 | 1.9 | 49 | 5.6 | 118 | ND | ND | | <10 | <10 | 11 | | | 351 | | 9.6 | 13.0 | 5.37 | 21.61 | 7.79 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | 0.003 | <0.001 | <0.002 | 0.006 |
| Sep-19 | 0.050 | 0.064 | **6.7** | **29.5** | <0.02 | <0.03 | 18 | 25 | <0.3 | 12 | 1.8 | 48 | 7.0 | 112 | | | <10 | | | <7 | | | 274 | 7.5 | | 13.0 | 6.27 | 20.71 | 7.77 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | 0.003 | <0.001 | <0.002 | 0.032 |
| Apr-20 | <0.03 | <0.039 | **5.7** | **25.4** | <0.02 | <0.02 | 11 | 23 | <0.3 | 12 | 2.0 | 46 | 4.9 | 96 | ND | ND | | <10 | <10 | <7 | | | 288 | | 7.3 | 14.0 | 5.51 | 21.46 | 7.80 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | <0.002 | <0.001 | <0.002 | 0.006 |

**Notes:**

**XXXXX** Indicates result above interim guideline value (IGV)

**XXXXX** Indicates result above groundwater threshold value (GTV)

**XXXXX** Indicates result above IGV and GTV

Blank cell indicates no data

- indicates no screening threshold

< indicates result below reporting limit

ND indicates nothing detected in suite

NAC indicates no abnormal change

| MW-4S Old Data | Phosphorous | PAHs | BOD | Total Organic Carbon | Aluminium | Antimony | Barium | Beryllium | Boron | Selenium | Silver | Tin |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mg/L | µg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | | mg/L | mg/L | mg/L |
| **IGV** | - | various | - | NAC | **0.2** | - | **0.1** | - | **1** | - | - | - |
| **DWS** | - | 0.1 | - | - | 0.2 | 0.005 | | - | 1 | 0.01 | - | - |
| **GTV** | - | **0.075** | - | - | **0.15** | - | - | - | - | - | - | - |
| **Date** | | | | | | | | | | | | |
| Mar-12 | | | | <5 | 0.044 | <0.002 | 0.012 | <0.002 | | <0.002 | <0.002 | <0.002 |
| Mar-14 | | <0.05 | | | 0.006 | <0.0001 | 0.003 | <0.001 | | 0.0028 | <0.001 | 0.001 |
| Jul-14 | | <0.05 | | | 0.006 | <0.0001 | 0.004 | <0.001 | | 0.0023 | <0.001 | <0.001 |
| Mar-15 | 0.04 | <0.195 | <2 | <2 | <0.02 | <0.002 | 0.004 | <0.0005 | 0.022 | <0.003 | <0.005 | <0.005 |
| Oct-15 | 0.04 | | <4 | <2 | <0.02 | <0.002 | 0.003 | <0.0005 | 0.020 | <0.003 | <0.005 | <0.005 |



**Notes:**

**XXXXX** Indicates result above interim guideline value (IGV)

XXXXX Indicates result above groundwater threshold value (GTV)

**XXXXX** Indicates result above IGV and GTV

Blank cell indicates no data

- indicates no screening threshold

< indicates result below reporting limit

ND indicates nothing detected in suite

NAC indicates no abnormal change

| MW-4D | Major Ions | | | | | | | | | | | | | | Organics and Field Measurements | | | | | | | | | | | | | Metals | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ammonia-N | Ammonium | Nitrate-N | Nitrate as $NO_3$ | Nitrite as $NO_2$ | Phosphate-P | Chloride | Sulphate | Fluoride | Sodium | Potassium | Calcium | Magnesium | Total Alkalinity as $CaCO_3$ | VOCs | Alcohols & Acetates | Trichloroacetic Acid | Ethylene Glycol | Total Petroleum Hydrocarbons | COD | Electrical Conductivity µS/cm | | pH | | Temperature | Depth to Groundwater | Groundwater Elevation | Total Depth | Arsenic | Cadmium | Chromium | Cobalt | Copper | Iron | Lead | Manganese | Mercury | Nickel | Zinc |
| | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | µg/L | µg/L | µg/L | µg/L | µg/L | mg/L | Lab | Field | Lab | Field | °C | m bct | m OD | m bct | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| **IGV** | **0.12** | **0.15** | **5.6** | **25** | **0.1** | **0.03** | **30** | **200** | **1** | **150** | **5** | **200** | **50** | NAC | various | various | - | - | 10 | - | **1000** | | **6.5** | **9.5** | **25** | - | - | - | **0.01** | **0.005** | **0.03** | - | **0.03** | **0.2** | **0.01** | **0.05** | **0.001** | **0.02** | **0.1** |
| **DWS** | 0.23 | 0.3 | 11.3 | 50 | 0.5 | - | 250 | 250 | 1.5 | 200 | - | - | - | - | various | various | - | - | - | - | 2500 | | 6.5 | 9.5 | - | - | - | - | 0.01 | 0.005 | 0.05 | - | 2 | 0.2 | 0.01 | 0.05 | 0.001 | 0.02 | - |
| **GTV** | **0.175** | **0.225** | **8.5** | **37.5** | **0.375** | **0.035** | **187.5** | **187.5** | - | - | - | - | - | - | various | various | - | - | **10** | - | 800 | **1875** | - | - | - | - | - | - | **0.0075** | - | **0.0375** | - | **1.5** | - | **0.0075** | - | **0.00075** | - | **0.075** |
| **Date** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Jul-95 | **0.220** | **0.283** | **7.6** | **33.8** | | **1.000** | 27 | 33 | | 16 | 1.0 | 20 | 1.6 | | | | | | | | | | | | | | | | | | | | 0.010 | **2.950** | | **1.600** | | | 0.030 |
| Dec-95 | **0.130** | **0.167** | **9.2** | **40.9** | | **1.000** | **39** | 36 | | 12 | 0.3 | 19 | 2.2 | | | | | | | | | | | | | | | | | | | | 0.010 | 0.020 | | **0.150** | | | 0.020 |
| Aug-96 | 0.025 | 0.032 | 0.5 | 2.0 | | **10.000** | 21 | 31 | | 16 | 2.0 | 23 | 1.8 | | | | | | | | | | | | | | | | | | | | 0.010 | 0.010 | | 0.040 | | | 0.010 |
| Dec-96 | 0.100 | 0.129 | **5.8** | **25.7** | | **0.050** | 21 | 22 | | 16 | 0.6 | 26 | 1.6 | | | | | | | | | 252 | | **5.5** | | | | | | | | | **0.030** | 0.040 | | **0.050** | | | **0.160** |
| Apr-97 | 0.100 | 0.129 | **9.3** | **41.3** | | **0.100** | **44** | 30 | | 16 | 0.6 | 17 | 1.8 | | | | | | | | | 303 | | **6.0** | | | | | | | | | **0.030** | 0.040 | | **0.100** | | | **0.140** |
| Oct-97 | **0.200** | **0.257** | **8.8** | **39.1** | | **0.500** | **39** | 27 | | 19 | 2.1 | 23 | 2.0 | | | | | | | | | 286 | | **5.8** | | | | | | | | | **0.030** | **2.200** | | **0.110** | | | **0.120** |
| Mar-98 | 0.100 | 0.129 | 4.5 | 19.9 | | **0.100** | **44** | 32 | | 17 | 0.5 | 33 | 2.3 | | | | | | | | | 212 | | **6.0** | | | | | | | | | **0.030** | 0.040 | | 0.040 | | | 0.020 |
| May-98 | 0.100 | 0.129 | **7.9** | **34.8** | | **0.100** | **66** | 41 | | 25 | 0.6 | 48 | 2.6 | | | | | | | | | 414 | | 7.7 | | | | | | | | | **0.030** | 0.040 | | **0.070** | | | **0.190** |
| Nov-98 | 0.100 | 0.129 | 4.6 | 20.2 | | **0.100** | 16 | 49 | | 32 | 0.2 | 28 | 1.3 | | | | | | | | | 308 | | **6.1** | | | | | | | | | **0.030** | 0.040 | | 0.040 | | | 0.080 |
| Jun-99 | **0.900** | **1.157** | **6.2** | **27.5** | | **0.500** | **44** | 48 | | 31 | 0.7 | 42 | 1.9 | | | | | | | | | 354 | | **5.9** | | | | | | | | | **0.030** | 0.040 | | **0.060** | | | **0.170** |
| Dec-99 | **0.200** | **0.257** | **5.8** | **25.7** | | **0.200** | 17 | 27 | | 24 | 0.0 | 19 | 0.8 | | | | | | | | | 237 | | **6.2** | | | | | | | | | 0.002 | 0.012 | | 0.015 | | | 0.064 |
| Feb-00 | **0.200** | **0.257** | **5.7** | **25.1** | | **0.200** | 17 | 41 | | 24 | 0.3 | 13 | 1.0 | | | | | | | | | 237 | | **5.9** | | | | | | | | | 0.007 | 0.002 | | 0.009 | | | 0.096 |
| Jul-00 | **0.200** | **0.257** | **5.9** | **26.0** | | **0.160** | 24 | 53 | | 20 | 0.4 | 19 | 1.3 | | | | | | | | | 247 | | **5.6** | | | | | | | | | 0.002 | 0.100 | | 0.031 | | | 0.039 |
| Jun-01 | | | **7.5** | **33.4** | | **0.160** | 22 | 30 | | 23 | 0.3 | 16 | 0.7 | | | | | | | | | | | | | | | | | | | | 0.003 | 0.100 | | 0.025 | | | 0.013 |
| Oct-01 | 0.060 | 0.077 | **6.1** | **26.8** | | **0.160** | 21 | 27 | | 26 | 0.3 | 13 | 0.7 | | | | | | | | | 234 | | **5.5** | | | | | | | | | 0.002 | 0.100 | | 0.006 | | | 0.002 |
| Apr-02 | | | **5.9** | **26.0** | | **0.160** | 18 | 24 | | 26 | 0.2 | 11 | 0.4 | | | | | | | | | 198 | | **5.6** | | | | | | | | | 0.002 | 0.100 | | 0.002 | | | 0.071 |
| Oct-02 | 0.070 | 0.090 | **6.7** | **29.5** | | **0.160** | 17 | 26 | | 25 | 0.1 | 6 | 0.3 | | | | | | | | | 198 | | **5.3** | | | | | | | | | 0.006 | 0.100 | | 0.012 | | | 0.032 |
| Feb-03 | **0.300** | **0.386** | **8.4** | **37.4** | | **0.160** | **49** | 47 | | 52 | 0.5 | 27 | 1.4 | | | | | | | | | 350 | | **5.4** | | | | | | | | | 0.002 | 0.100 | | **0.076** | | | 0.045 |
| Sep-03 | 0.020 | 0.026 | **10.2** | **45.1** | | **0.160** | **49** | 44 | | 48 | 0.5 | 16 | 0.9 | | | | | | | | | 359 | | **6.1** | | | | | | | | | 0.004 | 0.100 | | **0.068** | | | **0.123** |
| Jan-04 | 0.020 | 0.026 | **7.4** | **32.9** | | **0.160** | **42** | 68 | | 48 | 0.1 | 16 | 0.8 | | | | | | | | | 324 | | **5.8** | | | | | | | | | 0.002 | 0.100 | | **0.060** | | | **0.107** |
| Aug-04 | | | **12.1** | **53.7** | | **0.160** | **49** | 40 | | 57 | 0.4 | 14 | 1.0 | | | | | | | | | 361 | | **5.3** | | | | | | | | | 0.002 | 0.100 | | **0.050** | | | **0.150** |
| Mar-05 | 0.040 | 0.051 | **13.1** | **58.1** | | **0.160** | **47** | 43 | | 58 | 0.5 | 12 | 0.8 | | | | | | | | | 391 | | **5.4** | | | | | | | | | 0.002 | 0.100 | | **0.100** | | | 0.055 |
| Dec-05 | **0.150** | **0.193** | **12.9** | **57.2** | | **0.160** | **49** | 39 | | 10 | 0.6 | 7 | 0.6 | | | | | | | | | 422 | | **5.9** | | | | | | | | | 0.002 | 0.100 | | 0.048 | | | 0.002 |
| Feb-06 | **0.140** | **0.180** | **14.9** | **66.0** | | **0.160** | **52** | 44 | | 79 | 0.2 | 8 | 0.3 | | | | | | | | | 429 | | **6.2** | | | | | | | | | 0.002 | 0.100 | | **0.217** | | | 0.099 |
| Jul-06 | **0.130** | **0.167** | **12.0** | **53.2** | | <0.16 | **48** | 36 | | 71 | 1.0 | 8 | 1.0 | | | | | | | | | 385 | | 7.0 | | | | | | | | | <0.002 | 0.100 | | **0.199** | | | <0.002 |
| Feb-07 | **0.120** | **0.154** | 5.2 | 22.8 | | **2.840** | 22 | 23 | | 57 | 1.0 | 14 | <2 | | | | | | | | | 398 | | 7.0 | | | | | | | | | <0.002 | <0.01 | | **0.063** | | | 0.083 |
| Nov-07 | 0.080 | 0.103 | **11.2** | **49.6** | | **0.160** | **31** | 27 | | 29 | 1.0 | 16 | 3.0 | | | | | | | | | 292 | 294 | **6.2** | **5.6** | 12.7 | 6.55 | 20.62 | 11.20 | | | | | 0.002 | 0.100 | | 0.030 | | | 0.057 |
| May-08 | **0.120** | **0.154** | **11.5** | **51.0** | | **0.160** | **36** | 28 | | 49 | 0.9 | 14 | 2.0 | | | | | | | | | 342 | | 6.6 | | | | | | | | | 0.001 | 0.030 | | 0.044 | | | 0.004 |
| Dec-08 | **0.120** | **0.154** | **10.0** | **44.1** | | **0.160** | **35** | 24 | | 39 | 0.5 | 15 | 2.6 | | | | | | | | | 280 | 303 | **6.4** | **5.6** | 12.4 | 6.10 | 21.07 | 11.25 | | | | | 0.001 | 0.010 | | 0.032 | | | 0.017 |
| Jun-09 | 0.040 | 0.051 | **10.6** | **46.9** | | **0.160** | **33** | 24 | | 36 | 0.6 | 36 | 3.4 | | | | | | | | | 299 | 1278 | **6.4** | 7.0 | 14.3 | 6.44 | 20.73 | 11.28 | | | | | 0.002 | 0.100 | | 0.015 | | | 0.002 |
| Nov-09 | 0.020 | 0.026 | **10.9** | **48.1** | | **0.160** | **30** | 18 | | 14 | 0.8 | 28 | 4.2 | | | | | | | | | 288 | | **6.4** | | | | | | | | | 0.002 | 0.100 | | 0.008 | | | 0.004 |
| Mar-10 | **0.140** | **0.180** | **10.0** | **44.4** | | **0.160** | **59** | 31 | | 65 | 0.6 | 9 | 1.2 | | | | | | | | | 402 | 281 | 6.8 | **6.3** | 12.4 | 6.16 | 21.01 | 11.04 | | | | | 0.003 | 0.100 | | 0.032 | | | 0.012 |
| Aug-10 | 0.060 | 0.077 | **9.3** | **41.3** | | **0.160** | **32** | 19 | | 34 | 0.6 | 16 | 3.1 | | | | | | | | | 314 | 292 | **6.3** | **5.7** | 12.9 | 6.44 | 20.73 | 11.04 | | | | | 0.002 | 0.100 | | 0.014 | | | 0.002 |
| May-11 | **0.220** | **0.283** | **10.3** | **45.4** | | **0.160** | **46** | 27 | | 51 | 0.6 | 14 | 1.8 | | | | | | | | | 354 | 295 | **6.2** | **5.8** | 12.6 | 6.32 | 20.85 | 11.04 | | | | | 0.002 | 0.100 | | 0.037 | | | 0.014 |
| Sep-11 | **0.180** | **0.231** | **8.2** | **36.3** | | **0.160** | **34** | 23 | | 37 | 0.6 | 14 | 2.4 | | | | | | | | | 301 | 310 | **6.4** | **6.0** | 12.2 | 6.68 | 20.49 | 11.04 | | | | | 0.002 | 0.100 | | 0.002 | | | 0.043 |
| Mar-12 | **0.240** | **0.309** | **10.2** | **45.2** | | <0.16 | **31** | 22 | <0.1 | 38 | 1.0 | 16 | 3.0 | | ND | | | | | | | 309 | 306 | **6.3** | **6.0** | 12.2 | 6.41 | 20.76 | 11.04 | <0.002 | <0.002 | <0.002 | 0.003 | <0.002 | <0.1 | <0.002 | 0.025 | | <0.002 | 0.043 |
| May-12 | | | | | | | | | | | | | | | | | | | | | | | 295 | | **5.8** | 12.6 | 6.32 | 20.85 | 11.04 | | | | | | | | | | | |
| Oct-12 | | | | | | | | | | | | | | | | | | | | | | | 278 | | **5.5** | 12.0 | 6.38 | 20.79 | 11.05 | | | | | | | | | | | |
| Jul-13 | **0.355** | **0.456** | **10.6** | **46.7** | | **0.069** | **31** | 17 | | 44 | 2.9 | 15 | 5.3 | | | | | | | | | | | | | | | | | | | | **0.071** | **0.209** | | **0.064** | | | 0.082 |
| Dec-13 | **0.169** | **0.217** | **10.3** | **45.6** | | **0.083** | 28 | 18 | | 36 | 3.8 | 15 | 2.7 | | | | | | | | | | | | | | | | | | | | <0.003 | <0.020 | | 0.025 | | | 0.007 |
| Mar-14 | **0.136** | **0.175** | **8.2** | **36.3** | | **0.034** | **39** | 20 | <0.1 | 37 | 4.0 | 17 | 0.003 | | 2 | | | | | | | | | | | | 5.80 | 21.37 | 11.30 | 0.0002 | 0.0003 | <0.001 | 0.002 | 0.004 | <0.020 | 0.0003 | 0.021 | 0.00002 | 0.0005 | 0.010 |
| Jul-14 | **0.189** | **0.243** | **10.2** | **45.2** | | **0.030** | **43** | 21 | <0.1 | 46 | 1.2 | 10 | 1.6 | | ND | | | | | | | | | | | | 7.60 | 19.57 | 11.60 | <0.0003 | <0.0001 | <0.001 | 0.002 | <0.003 | <0.020 | <0.0003 | 0.019 | 0.00006 | <0.0005 | 0.013 |
| Mar-15 | **0.240** | **0.309** | **6.0** | **26.4** | <0.02 | **0.040** | **31** | 19 | <0.3 | 39 | 0.6 | 13 | 2.4 | 48 | ND | ND | | <1 | | <7 | | 297 | | **6.2** | 12.1 | 6.25 | 20.92 | 11.00 | <0.0025 | <0.0005 | <0.0015 | 0.002 | <0.007 | <0.020 | <0.005 | 0.019 | <0.001 | <0.002 | 0.010 |
| May-15 | | | | | | | | | | | | | | | | | | | | | | | | | | | 6.15 | 21.02 | | | | | | | | | | | |
| Aug-15 | | | | | | | | | | | | | | | | | | | | | | | | | | | 6.24 | 20.93 | 11.00 | | | | | | | | | | |
| Oct-15 | | | **7.7** | **34.3** | <0.02 | | 28 | 18 | <0.3 | 23 | 0.8 | 22 | 4.4 | 56 | | | | <1 | | <7 | | 235 | | **5.8** | 12.5 | 6.16 | 21.01 | 11.00 | 0.0026 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | 0.007 | <0.001 | <0.002 | 0.009 |
| May-16 | **0.160** | **0.21** | **7.4** | **32.7** | 0.04 | **0.055** | **30** | 20 | <0.3 | 42 | 0.6 | 8 | 1.2 | 42 | ND | ND | <10 | <1 | <10 | 9 | | 273 | | **6.1** | 12.5 | 6.27 | 20.89 | 11.00 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | 0.018 | <0.001 | <0.002 | <0.003 |
| Oct-16 | 0.030 | 0.039 | **7.7** | **34.0** | <0.02 | 0.026 | 29 | 17 | <0.3 | 19 | 1.0 | 23 | 5.3 | 48 | | | | | | <7 | | 231 | | 7.1 | 12.5 | 6.66 | 20.51 | 11.26 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | 0.003 | <0.001 | <0.002 | <0.003 |
| Apr-17 | **0.120** | **0.154** | **6.8** | **30.2** | 0.03 | <0.03 | 29 | 19 | <0.3 | 27 | 0.9 | 18 | 3.7 | 64 | ND | ND | <10 | <1 | ND | <7 | | 166 | | 6.9 | 13.6 | 6.21 | 20.96 | 11.04 | 0.0028 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | 0.009 | <0.001 | <0.002 | <0.003 |
| May-17 | | | | | | | | | | | | | | | | | | | | | | | | | | | 6.30 | 20.87 | | | | | | | | | | | |
| Oct-17 | <0.03 | <0.039 | **7.5** | **33.3** | <0.02 | <0.02 | 26 | 17 | <0.3 | 14 | 0.8 | 22 | 4.8 | 36 | | | | | | 13 | | 220 | | **6.3** | 12.4 | 5.86 | 21.31 | 11.07 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.020 | <0.005 | <0.002 | <0.001 | <0.002 | <0.003 |
| Apr-18 | 0.050 | 0.064 | **7.3** | **32.4** | <0.02 | <0.03 | **35** | 17 | <0.3 | 30 | 0.7 | 16 | 3.4 | 48 | ND | ND | <10 | <10 | <10 | 12 | | 260 | | 6.3 | 12.2 | 5.56 | 21.61 | 11.07 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.020 | <0.005 | 0.009 | <0.001 | <0.002 | 0.004 |
| Jul-18 | | | | | | | | | | | | | | | | | | | | | | | | | | | 6.57 | 20.60 | | | | | | | | | | | |
| Sep-18 | <0.03 | <0.039 | **8.0** | **35.6** | <0.02 | 0.040 | 27 | 16 | <0.3 | 15 | 1.0 | 25 | 4.7 | 38 | | | | | | 8 | | | | | | 6.52 | 20.65 | 11.05 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | 0.002 | <0.001 | <0.002 | 0.006 |
| Apr-19 | 0.100 | 0.129 | **6.9** | **30.6** | <0.02 | **0.046** | **35** | 19 | <0.3 | 34 | 0.8 | 15 | 2.7 | 56 | ND | ND | | <10 | <10 | <7 | | 195 | | **7.9** | 14.2 | 5.50 | 21.67 | 11.02 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | 0.008 | <0.001 | <0.002 | 0.006 |
| Sep-19 | 0.050 | 0.064 | **7.0** | **31.0** | <0.02 | **0.040** | **28** | 19 | <0.3 | 16 | 0.9 | 22 | 4.6 | 52 | | | <10 | | | 11 | | 203 | **6.4** | | 13.7 | 6.53 | 20.64 | 11.01 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | 0.004 | <0.001 | <0.002 | 0.01 |
| Apr-20 | **0.190** | 0.244 | **5.7** | **25.4** | 0.03 | **0.029** | **31** | 22 | <0.3 | 41 | 0.8 | 10 | 1.8 | 32 | ND | ND | | <10 | <10 | <7 | | 249 | | 6.9 | 13.9 | 5.95 | 21.22 | 11.12 | <0.0025 | <0.0005 | <0.0015 | <0.002 | <0.007 | <0.02 | <0.005 | 0.009 | <0.001 | <0.002 | <0.003 |

**Notes:**

**XXXXX** Indicates result above interim guideline value (IGV)

**XXXXX** Indicates result above groundwater threshold value (GTV)

**XXXXX** Indicates result above IGV and GTV

Blank cell indicates no data

- indicates no screening threshold

< indicates result below reporting limit

ND indicates nothing detected in suite

NAC indicates no abnormal change

| MW-4D Old Data | Phosphorous | PAHs | BOD | Total Organic Carbon | Aluminium | Antimony | Barium | Beryllium | Boron | Selenium | Silver | Tin |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mg/L | µg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| **IGV** | - | various | - | NAC | **0.2** | - | **0.1** | - | **1** | - | - | - |
| **DWS** | - | 0.1 | - | - | 0.2 | 0.005 | | - | 1 | 0.01 | - | - |
| **GTV** | - | **0.075** | - | - | **0.15** | - | - | - | - | - | - | - |
| **Date** | | | | | | | | | | | | |
| Mar-12 | | | <2 | <5 | 0.029 | <0.002 | 0.029 | <0.002 | | <0.002 | <0.002 | <0.002 |
| Mar-14 | | <0.05 | | | 0.006 | <0.0001 | 0.025 | <0.001 | | 0.0003 | <0.001 | 0.001 |
| Jul-14 | | <0.05 | | | 0.006 | <0.0001 | 0.332 | <0.001 | | 0.0008 | <0.001 | <0.001 |
| Mar-15 | 0.055 | <0.195 | <2 | 2 | <0.02 | <0.002 | 0.021 | <0.0005 | 0.013 | <0.003 | <0.005 | <0.005 |
| Oct-15 | 0.044 | | 3 | <2 | <0.02 | <0.002 | 0.018 | <0.0005 | <0.012 | <0.003 | <0.005 | <0.005 |



**Notes:**

**XXXXX** Indicates result above interim guideline value (IGV)

**XXXXX** Indicates result above groundwater threshold value (GTV)

**XXXXX** Indicates result above IGV and GTV

Blank cell indicates no data

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ND indicates nothing detected in suite

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