WHYTES GULLY LANDFILL ANNUAL REPORT 2021/22

WOLLONGONG CITY COUNCIL Waste Services

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1 Introduction

1.1 Background

Wollongong City Council (Council) owns and operates the Wollongong Waste and Resource Recovery Park (the Site), which is located on Reddalls Road, Kembla Grange NSW. The Site is situated at the foothills of the Illawarra Escarpment southwest of the Wollongong central business district on approximately 50 hectares. The Site is formally identified as Lots 50, 52 and 53 of Deposited Plan (DP) 1022266 and Lot 2 of DP 240557. The Site location is shown on Figure 1 of Appendix A and a Site plan provided on Figure 2 of Appendix A.

Council holds an Environmental Protection Licence (EPL) issued by the NSW Environment Protection Authority (EPA) under the Protection of the Environment Operations Act 1997 (POEO Act). The Licence Number is 5862 and authorises the scheduled activity of waste disposal (application to land) at the Site with no limit on the scale of the activity.

A *Landfill Environmental Management Plan (LEMP)* was prepared in 2014 (Golder 2014) on behalf of Council to ensure that environmental compliance is maintained throughout Site operations. This plan has recently been updated and is currently being reviewed by the Department of Planning and Environment (DPE). The management measures provided in the updated LEMP and associated appendices are developed in consideration of *the NSW Environmental Guidelines: Solid Waste Landfills (EPA, 1996)* and address the monitoring and reporting requirements of EPL 5862. The *NSW Environmental Guidelines: Solid Waste Landfills (EPA 1996)* were replaced with the *Environmental Guidelines: Solid Waste Landfills, Second Edition (EPA, 2016*).

1.2 Objectives

The objectives of this Annual Report are to provide the EPA with the following:

- A summary of compliance monitoring data gathered during the reporting period of the 29th of May 2021 to the 28th of May 2022.
- Interpretation of monitoring data to assess the environmental performance of the Site considerate of the conditions of the EPL.

1.3 Scope

1.3.1 Fieldwork

To meet the objectives of the Annual Report the following scope of works was undertaken during the reporting period in accordance with the requirement of EPL 5862:

- Surface gas monitoring at areas where intermediate or final cover has been placed;
- Subsurface gas monitoring of twelve (12) landfill gas monitoring wells;
- Gas accumulation monitoring within all buildings within 250m of deposited waste;
- Water monitoring at three (3) stormwater monitoring points;
- Groundwater monitoring at thirteen (13) monitoring wells;
- Tracking of waste tyres received at the Site; and

- Monitoring of trade wastewater at one (1) sampling point located at the pre-treatment discharge.

1.3.2 Reporting

Section 6 (R1) of EPL 5862 states that Annual Return and an Annual Report must be prepared by the licence holder. In accordance with Section 6 (R1.8) of the EPL this Annual Report provides an assessment of environmental performance relevant to the licence conditions including:

- Tabulated results of all monitoring data required to be collected by this licence;
- A graphical presentation of data from at least the last three years in order to show variability and/or trends;
- An analysis and interpretation of all monitoring data;
- An analysis of and response to any complaints received;
- Identification of any deficiencies in environmental performance identified by the monitoring data, trends or incidents and of remedial action taken or proposed to be taken to address these deficiencies; and
- Recommendations on improving the environmental performance of the facility.

This report has been prepared in accordance with the reporting conditions provided in Section 6 of the EPL and in consideration of the *Environmental Guidelines: Solid Waste Landfills, Second edition* (EPA, 2016) and *Requirements for publishing pollution monitoring data* (EPA, 2013).

The Annual Return proforma for the 2021/2022 reporting period was provided to the NSW EPA via their online lodgement platform E-Connect. Unfortunately, some difficulties in site management and reporting were experienced during this reporting period due to continual heavy rainfall and flooding (leading to a State Natural Disaster declaration in April 2022). Staff shortages due to COVID also posed a challenge.

1.4 Site History and Configuration

1.4.1 Site History

Whytes Gully was developed in the early 1980's as the principal landfill site for Wollongong's domestic and commercial waste streams. Initially, the 'western gully' section was landfilled. The western gully is unlined by modern standards and was used for waste deposition from 1982 to 1993. Initially coal wash refuse was used to provide daily cover, and later steel furnace slag was introduced around 1988 due to its stability in wet weather, as well as Council's inability to source local clean fill in sufficient quantities. The leachate collection network from the western gully passes through a series of rock drains at the centre of each lift. The rock drains connect with a riser and the leachate flows from riser to riser, and eventually to the leachate collection well at the base of the western gully. The western gully section of the landfill has been capped with clay with a thickness between 1m and 4m.

Development of the 'eastern gully' section received consent in approximately 1992, following extensive public consultation. The eastern gully section is lined with a single layer of HDPE smooth liner, over a subsoil drainage layer of 5mm gravel and a corrugated groundwater drainage system. The eastern gully was excavated to rock and was developed in two stages, beginning with the first stage 80 to 100m above the slope from the current toe of the landfill embankment. The leachate is drained from the first stage of the eastern gully via a 300mm corrugated drainage pipe at the base and a 300mm thick sand layer above the liner.

The second stage of the eastern gully is situated in front and above the first stage, with extended leachate drains and HDPE liner. From 2014 to 2016, the eastern gully underwent extensive surface reshaping works in order to reduce rainwater infiltration, increase surface water diversion, to ensure consistent cover depths and to prepare the surface for the new landfill cell base liner.

Construction of Stage 3 of the landfill commenced during August 2013, with the first cell, Cell 1A, completed in 2014 which is situated below the eastern gully. Placement of waste commenced in Cell 1A around March 2015. Council has since constructed Cell 1B in 2015 and completed filling in January 2019. Cell 2 commenced filling in January 2019 and continued through this reporting period.

Leachate is collected from all landfilled areas at the site and treated in a 3 stage process. The leachate is initially collected in a primary holding pond that utilises biological process and aeration primarily to strip the leachate of ammonia. The leachate is then pumped to a smaller, shallower pond with a larger surface area to increase the speed of this process on a batch by batch basis. From the smaller pond the leachate is then pumped to a sequential batch reactor that in conjunction with a filtration system eliminates the residual contaminants in the leachate to a standard that is suitable for acceptance by sewer under the sites Trade Wastewater Agreement with Sydney Water.

The location of each cell and significant Site features such as leachate ponds and shown on Figure 2 of Appendix A.

2 Site Setting

2.1 Topography and Drainage

The Site is situated on a southwest facing slope, which is dominated by a roughly east-west directional ridgeline along the northern boundary. The landfill deposition areas are located within two historical gullies, the western gully landfill and the eastern gully landfill. The eastern gully landfill is the current location of waste deposition with the western gully was historically filled until approximately 1993.

The topography of the Site is subject to variability due to the nature of landfilling, however, in general the Site is characterised by moderate to steep slopes. An elevation profile created utilising Nearmap for an aerial image captured on 21st May 2021 shows that the lowest elevations of the Site are located in the south western portion with an approximate relative level (RL) of 15 m Australian Height Datum (AHD), and the highest elevations are located in the north eastern portion with an approximate RL of 100 m AHD. Approximate contours are shown on Figure 3 of Appendix A.

2.2 Soil and Geology

The *1:100,000 geological map 'Wollongong-Port Hacking'* (Department of Primary Industries, 1985) shows that the Site is on the boundary of two major geological formations. The southern portion of the site is underlain by fluvial sands, silts and clays associated with Dapto Creek, with sandstone of the Budgong formation underlying alluvial soils. The Budgong Sandstone formation typically comprises of red, brown and grey lithic sandstone. The northern portion of the site is underlain by interbedded lithic sandstone, coal, carbonaceous claystone, siltstone and claystone of the Pheasants Nest Formation. It is inferred that the Pheasants Nest formation would mainly be encountered on the ridgelines in the higher elevations of the Site.

A geotechnical investigation completed by Golder Associates (Golder 2012) summarised the Site geology into the following areas:

- **Pheasants Nest Formation**: the Pheasants Nest Formation was noted on the upper slopes across the northern portion the site. The material encountered was generally weathered sandstone that grades into fresh sandstone at depths typically less than 10 m below ground level (bgl). The residual soil is generally less than 2 m thick. Siltstone was encountered in zones throughout the sandstone at depths greater than about 15 m (based on the Maunsell 1992 investigation). Siltstone was not encountered in the Golder 2012 investigation.
- **Budgong Sandstone Formation**: the Budgong Sandstone Formation was located across the southern portion of the site. The sandstone generally had a weathering profile that extended to depths up to 15 m bgl. Zones of weathered siltstone had a maximum thickness of approximately 3m and were located intermittently throughout this formation.
- **Alluvial Soils**: alluvial soils consisted of colluvial / alluvial soil material (silty clay and silt with some sands and sub angular gravels and cobbles) and was located across the middle and south west portion of the site. Zones of alluvial soil had a maximum thickness of approximately 11m. This geological unit was inferred to be underlain by Budgong Sandstone.

- **Capping Layer and Landfill**: landfill and a capping layer are located across the completed areas of landfilling. The capping material consists of generally low to medium plasticity sandy clay and is typically has a thickness less than 1.5m. Landfill waste is located beneath the capping layer consisting predominantly of domestic waste including paper, plastic, wood, rubble and other materials. The depth to the base of the general waste fill was not well defined, however, a review of historical topographic data suggests that the thickness of the fill could be up to 52m within the eastern gully landfill. The landfilled areas were inferred to be underlain by the Pheasants Nest Formation.

2.3 Climate

Climate data for the Site has been taken from the Albion Park (Wollongong Airport) Bureau of Meteorology (BOM) Weather Station (ID 068241). The weather station is located approximately 10 km south of the Site and is considered an accurate representation of the conditions experienced at the landfill during the reporting period. **Table 2-1** summaries the key climatic data from the Albion Park weather station.

Table2-1 Climatic Data – Albion Park Weather Station

	2021							2022				
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Rainfall (mm)	46.6	14.8	73.6	32.8	59.2	152	70.6	151	295.8	670.6	216.8	188.8
Mean max temperature (°C)	17.8	17.5	19.9	21.5	11.7	21.4	24.3	26.4	25.6	24.1	23.1	20.5
Mean min temperature (°C)	7.2	6.4	7.0	8.7	22.2	14.2	15.6	18.8	17.4	17.3	14.2	10.9
Mean 9am wind speed (km/h)	16	14	14	14	12	12	11	10	9	9	9	11
Mean 3pm wind speed (km/h)	16	20	2	23	21	19	20	2	16	15	15	14
Mean 9am relative humidity (%)	76	72	63	53	63	7	73	77	77	88	76	79
Mean 3pm relative humidity (%)	62	52	48	52	57	72	69	71	71	79	70	67

Long-term averages for the Albion Park weather station are shown in **Table 2-2** and have been included for comparative purposes.

Table 2-2 Long Term Averages – Albion Park Weather Station

	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Rainfall (mm)[1]	88.8	54.7	59.1	41.4	67.6	82.4	63.9	80.9	149.4	133.2	76.5	64.9
Mean max temperature (°C)[1]	18.0	17.8	18.8	21.4	23.0	24.1	25.6	27.0	26.3	25.2	23.3	20.6
Mean min temperature (°C)[1]	7.3	6.3	6.5	8.5	10.9	13.4	15.4	17.2	17.2	15.7	12.2	9.0
Mean 9am wind speed (km/h) [2]	13.6	14.4	15.0	15.3	14.4	12.9	12.7	11.6	9.8	8.1	10.7	12.4
Mean 3pm wind speed (km/h)[2]	17.6	18.1	21.8	22.6	20.9	20.9	21.5	21.6	20.0	18.9	17.7	17.1
Mean 9am relative humidity (%)[2]	73	68	61	57	58	67	66	68	74	76	68	69
Mean 3pm relative humidity (%	57	54	49	53	58	63	61	63	67	64	61	58

[1] Data recorded from 1999 – 2022

[2] Data recorded from 1999 - 2010

The climate data showed rainfall occurred in every month, ranging from 14.8 mm in July 2021 to 670.6 mm in March 2022. Total rainfall was 1972.6 mm, leading to a Natural Disaster Declaration in April 2022.

3 Field Investigations

3.1 Fieldwork Methodology

The subsections below describe the frequency of monitoring, monitoring method, monitoring locations and analytes for surface gas, subsurface gas, gas accumulation, stormwater and groundwater. The fieldwork methodologies implemented during the reporting period were developed in consideration of the guidance provided in the NSW EPA *Environmental Guidelines: Solid waste landfills (second edition)* (EPA 2016).

3.1.1 Surface Gas

Surface gas monitoring was completed during the reporting period to assess for potential surface gas emissions of methane emitting from the current and existing landfill areas at the site. Surface gas migration monitoring should demonstrate that the cover material and extraction system is controlling the emission of landfill gas.

The fieldwork methodology for surface gas monitoring is summarised below in **Table 3.1.** The location of each surface gas monitoring location is shown on Figure 3 of Appendix A.

Table 3-1 Surface Gas Monitoring Methodology

Activity	Description
Frequency and Dates of Monitoring	Surface gas monitoring for methane was completed monthly during the reporting period in accordance with Section 5 (M2.2) of EPL 5862.

Activity	Description
Monitoring Method	Methane was measured by a third party contractor, ALS Environmental, using an Inspectra Laser Gas Detector. The instrument used to measure methane concentrations was calibrated prior to each monitoring event. Surface gas monitoring was achieved by testing the atmosphere 5 centimetres above the ground surface in areas with intermediate or final cover where wastes have been placed. The monitoring was completed on calm days (winds below 10km/hr) and on transects with an approximate spacings of 25m.
Monitoring Locations	Surface gas monitoring for methane was undertaken at the following locations: ▪ The current active landfill cell: transects 2, 3, 5, 7 and 10 ▪ The former landfill cell to the north west of the current cell: transects A, C, D, E, F, G, H, and I ▪ Reddalls Road and Farmborough Road fence lines.

3.1.2 Subsurface Gas

Subsurface gas monitoring was completed during the reporting period to detect the potential presence of methane around the perimeter of the landfill cell to assess the potential for offsite migration of methane onto surrounding properties.

The fieldwork methodology for subsurface gas monitoring is summarised below in **Table 3.2.** The location of each subsurface gas monitoring location is shown on Figure 4 of Appendix A.

Table 3-2 Subsurface Gas Monitoring Methodology

Activity	Description
Frequency	Subsurface gas monitoring for methane was completed monthly during the reporting period in accordance with Section 5 (M2.2) of EPL 5862.
Monitoring Method	Subsurface gas monitoring was measured by a third party contractor, ALS Environmental, using an Inspectra Laser Gas Detector. The instrument used to measure methane concentrations was calibrated prior to each monitoring event. Subsurface gas monitoring was achieved by testing the methane concentration in twelve landfill gas monitoring wells (listed below) that are situated around the northern, eastern and southern perimeters of the landfill. The contents of each well was sampled and analysed prior to potential dilution by air.
Monitoring Locations	Subsurface gas monitoring for methane was undertaken at twelve landfill gas monitoring wells, Point 21 (LFG MW1) to Point 32 (LFG MW12), in accordance with Section 5 (M2.3).

3.1.3 Gas Accumulation

Gas accumulation monitoring was completed periodically during the reporting period to demonstrate that gas is not accumulating at dangerous levels in enclosed spaces on or near the landfill.

The fieldwork methodology for gas accumulation monitoring is summarised below in **Table 3.3**. The location of each gas accumulation monitoring location is shown on Figure 4 of Appendix A.

Table 3-3 Gas Accumulation Monitoring Methodology

Activity	Description
Frequency and Dates of Monitoring	Gas accumulation monitoring for methane was completed monthly during the reporting period in accordance with Section 5 (M2.2) of EPL 5862.

Activity	Description
Monitoring Method	Methane was measured by a third party contractor, ALS Environmental, using an Inspectra Laser Gas Detector. The instrument used to measure methane concentrations was calibrated prior to each monitoring event. Gas accumulation monitoring was undertaken in all accessible buildings and other enclosed structures within 250m of deposited waste or leachate storage. Some buildings and structures within 250m were not assessed as they were inaccessible and/or the owner did not permit authority to access the building.
Monitoring Locations	▪ Gas accumulation monitoring was undertaken at the following locations during the reporting period: ▪ Weighbridge ▪ Glengarry Cottage (administrative building)

3.1.4 Stormwater

Stormwater monitoring was undertaken regularly in the reporting period to detect excess sediment loads in stormwater leaving the site and/or potential cross-contamination of stormwater with landfill leachate.

The fieldwork methodology for stormwater monitoring is summarised below in **Table 3.4.** The location of each stormwater monitoring location is shown on Figure 4 of Appendix A.

Table 3-4 Stormwater Monitoring Methodology

Activity	Description
Frequency and Dates of Monitoring	Stormwater sampling was completed annually in accordance with Section 5 (M2.3) of EPL 5862. In total, stormwater was sampled 54 times when overflow occurred. The annual stormwater sampling event took place in February 2022.
Monitoring Method	Stormwater monitoring was completed by a third party contractor, ALS Environmental. Grab samples of water were collected using a scoop at the nominated sampling points (summarised below). The instrument used to measure water quality parameters was calibrated prior to each monitoring event.
Monitoring Locations	Stormwater samples were collected from the following monitoring points in accordance with Section 2 (P1.2) of EPL 5862: ▪ 1 (outlet to Reddalls Road) ▪ 33 (downstream monitoring point) ▪ 34 (upstream monitoring point).
Analytes	In accordance with Section 5 (M2.3) of EPL 5862 each stormwater sample was analysed for: ▪ Alkalinity ▪ Calcium ▪ conductivity ▪ filterable iron ▪ magnesium ▪ pH ▪ sodium ▪ temperature ▪ total phenolics ▪ Ammonia ▪ Chloride ▪ dissolved oxygen ▪ fluoride ▪ nitrate ▪ potassium ▪ sulfate ▪ total organic carbon ▪ total suspended solids

3.1.5 Groundwater

Groundwater monitoring was completed periodically during the reporting period to determine if groundwater was impacted by interactions with leachate.

The fieldwork methodology for groundwater monitoring is summarised below in **Table 3.5.** The location of each groundwater monitoring location is shown on Figure 4 of Appendix A.

Table 3-5 Groundwater Monitoring Methodology

Activity	Description
Frequency and Dates of Monitoring	Groundwater monitoring was completed on a quarterly basis during the reporting period with sampling undertaken on ▪ August 2021 ▪ November 2021 ▪ February 2022 ▪ May 2022
Monitoring Method	Groundwater was sampled by a third party contractor, ALS Environmental, using bailer technique. A pre-calibrated water quality meter used to measure groundwater quality parameters during monitor well purging. The collected groundwater samples were submitted to ALS Environmental for analysis of contaminants and parameters of interest (summarised below). Ground water levels were recorded before purging.
Monitoring Locations	Groundwater bores monitored during the reporting period included EPL monitoring points: 5 (GABH02), 9 (GMW102), 10 (GM103), 11 (GM104), 12 (GM105), 13 (GM106), 14 (GMW108S), 15 (GMW108D), 16 (GMW109S), 17 (GMW110), 18 (GMW111), 19 (GMW109D) and 20 (BH6)
Analytes	In accordance with Section 5 (M2.3) of EPL 5862 groundwater monitoring points 5, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 and 20 were analysed for: ▪ Annually ▪ Metals (aluminium, arsenic, barium, cadmium, chromium (hexavalent and total), cobalt, copper, lead, manganese, mercury, zinc) ▪ Benzene, toluene, ethylbenzene, xylene (BTEX) ▪ Fluoride ▪ Nitrate and nitrite ▪ Organochlorine pesticides (OCP) ▪ Organophosphate pesticides (OPP) ▪ Polycyclic aromatic hydrocarbons (PAH) ▪ Total petroleum hydrocarbons (TPH) ▪ Total phenolics ▪ Quarterly ▪ Alkalinity ▪ Calcium, magnesium, potassium, sodium, chloride, sulfate ▪ pH and conductivity ▪ Standing water level ▪ Total dissolved solids (TDS) ▪ Total organic carbon (TOC) ▪ Nitrogen (ammonia)

3.1.6 Trade Wastewater

Monitoring of trade waste was completed periodically during the reporting period to assess wastewater discharge and confirm that water quality parameters were within the acceptable criteria. Discharge of trade waste to sewer is undertaken in accordance with the *Consent to Discharge Industrial Trade Wastewater* (Sydney Water 2021).

The fieldwork methodology for trade wastewater monitoring is summarised below in **Table 3.5**. The trade waste monitoring location is shown on Figure 4 of Appendix A.

Table 3-6 Trade Wastewater Monitoring Methodology

Activity	Description
Frequency	Trade wastewater sampling was undertaken on the 11th of August 2017 and every 22 days thereafter. If trade wastewater was not discharged on the scheduled day, then the sample was taken on the next day that trade wastewater was discharged. ▪

Activity	Description
Monitoring Method	Trade wastewater was sampled by a third party contractor, ALS Environmental. Composite samples were collected over a 24 hour period using a Composite Auto-sampler, and pre and post monitoring samples were collected as grab samples. ▪ Composite samples were obtained over one full production day by combining equal volumes taken at 30 minute intervals. The volumes collected were at least 5,000 millilitres over the full day. The reading of the flowmeter was obtained at the commencement and conclusion of each sampling day. Discrete samples were collected and tested for pH and temperature at the start and finish of each sample day. The probe used to measure water quality parameters was calibrated prior to each monitoring event and the trade wastewater samples collected were submitted to ALS Environmental for analysis of parameters of interest (summarised below).
Monitoring Locations	In accordance with the *Consent* (Sydney Water, 2021) monitoring of trade wastewater was undertaken at a sampling point located at the pre-treatment discharge, excluding domestic sewage and prior to the point of connection to the Sewer. The specific monitoring location was on Site leachate treatment plant which is shown on Figure 4 of Appendix A.
Analytes	Composite samples were submitted to ALS Environmental for analysis of the following: ▪ Electrical conductivity; ▪ Ammonia (as Nitrogen); ▪ Biochemical oxygen demand; ▪ Suspended solids; and ▪ Total dissolved solids. ▪ Discrete samples were tested on site for pH, electrical conductivity and temperature using a calibrated water quality meter. Additionally, the volume of wastewater discharged was obtained from the reading of the total flow on the flow metering system.

3.1.7 Dust and Odour

Dust monitoring was completed on a continuous basis utilising dust deposition gauges to measure total dust and monthly to measure respirable dust for sensitive receptors.

The fieldwork methodology for dust monitoring is summarised below in **Table 3-7**.

Table 3-7 Dust Monitoring Methodology

Activity	Description
Monitoring Frequency	Total Dust monitoring was undertaken on a continuous basis with dust deposition gauges (DDGs) collected and analysed monthly. Respirable dust monitoring was conducted on or around the 20th of each month.
Monitoring Method	DDGs were installed and sampled by a third party contractor, ALS Environmental in accordance with AS 3580.10.1:2003. DDGs were placed around the site boundaries with DDG bottles collected and swapped out for analysis each month and the contents analysed as per below. Once a month respirable dust sampling was undertaken in two locations utilising a PM_{10} sampler, sampling and analysis were undertaken by a third party contractor, ALS Environmental.
Monitoring Locations	Sampling locations DDG1 to DDG 5 were located on the site perimeter with DDG1 and DDG 2 located on the eastern side of the Site while DDG 3 to DDG 5 are located on the western side of the site. DDG 1 to DDG 2 were selected for respirable dust monitoring due to the proximity to sensitive receptors.
Analytes	DDG contents were analysed for: • Ash Content

Activity	Description
	• Combustible matter • Total insoluble matter • Respirable dust filters were analysed for: • Total suspended particulates • PM_{10}

Odour is managed through regular monitoring of the surrounding areas and investigation of complaints. Regular covering of waste and use of deodorisers is also implemented.

3.1.8 Waste Tyres

Waste tyres are received at the Site from public drop off and from Council's On Call Household Cleanup service. All tyres received at the Site are temporarily stored in a steel bin and subsequently removed for off-site recycling by a tyre recycling contractor (Tyrecycle Pty Ltd). Waste tyres are not disposed of or buried at the Site.

Council display a NSW EPA Fixed QR2id Plate on the inbound weighbridge to enable inbound vehicles disposing waste tyres to exchange information regarding their load to the EPA under Clause 76 of the Waste Regulation. Any vehicles that fail to scan the QR2id plate at the entry to the landfill are reported by Council to the Waste Operations division of the EPA on a monthly basis (no later than 7 days following the end of each month).

Council follow a procedure (Procedure – Reporting un scanned inbound waste tyres to EPA) developed to manage waste tyres in a manner that satisfies their obligations under the POEO (Waste) Regulation 2014. The procedure was prepared in consideration of the *Asbestos and Waste Tyre Guidelines* (EPA 2015).

4 Data Quality Objectives

The NSW EPA (2017) *Guidelines for the NSW Site Auditor Scheme (3rd Edition)*, which is endorsed by the NSW EPA under s105 of the *Contaminated Land Management Act 1997*, requires that Data Quality Objectives (DQOs) are to be adopted for all assessment and remediation programs. The DQO process as adopted by the NSW EPA is described within US EPA (2000) *Guidance for the Data Quality Objectives Process and Data Quality Objectives Process for Hazardous Waste Site Investigations*.

4.1 Data Quality Objectives

The DQO process has been used to establish a systematic planning approach to setting the type, quantity and quality of data required for making decisions based on the environmental condition of the Site. The DQO process involves the following seven steps detailed in **Table 4.1.**

Table 4-1 Data Quality Objectives

Activity	Description
Step 1: State the Problem	An Annual Report is required as a condition of EPL 5862 to assess the environmental performance of the Site during the 2020/2021 reporting period. The Annual Report will determine the type, concentrations, and extent of potential contamination / parameters in the matrices sampled including landfill gas (surface and subsurface), leachate, surface water and groundwater.
Step 2: Identify the decision / goal of the study	The NSW EPA requires an Annual Report to confirm if the environmental performance of the Site meets the licence conditions and regulatory obligations of EPL 5862.
Step 3: Identify the information inputs	The primary inputs to the decisions described above are: ▪ Assessment of landfill gas, leachate, surface water and groundwater in accordance with direction of Section 5 (Monitoring and Recording Conditions) of EPL 5862. ▪ Assessment of management procedures for waste tyres. ▪ Laboratory analysis of samples for the contaminants and parameters of interest defined in Section 5 of EPL 5862. ▪ Assessment of analytical results against applicable performance criteria and Section 3 (Limit Conditions) of EPL 5862. ▪ Review of complaints recorded during the reporting period that relate to odour originating from the Site. ▪ Aesthetic observations material encountered during sampling. Assessment of the suitability of the analytical data obtained, against the Data Quality Indicators (DQIs) outlined below.
Step 4: Define the boundaries of the study	The study site is located at Reddalls Road, Kembla Grange NSW. The lateral extent of the study is the site boundaries, as shown on Figure 2 of Appendix A. The vertical extent of the study extends into the landfill gas and groundwater monitoring wells installed during previous investigations. The temporal boundaries of the study are from the 29th of May 2021 to the 28th of May 2022 (i.e. the reporting period).
Step 5: Develop the analytical approach	The decision rules for the Annual Report include: ▪ The sampling points, contaminants and parameters of interest, frequency of sampling and sampling method will meet the requirements EPL 5862. ▪ Samples requiring laboratory analysis will be analysed at National Association of Testing Authorities (NATA) accredited laboratory.

Activity	Description
	▪ Laboratory QA/QC results will indicate reliability and representativeness of the data set. ▪ Laboratory Limits of Reporting (LORs) will be below the applicable guideline criteria for the analysed contaminants and parameters of interest, where possible. ▪ Applicable guideline criteria will be sourced from EPL 5862 and other NSW EPA endorsed guidelines (as necessary). If the concentration of a contaminant or parameter of interest is outside of the acceptable limit additional works may be required to assess the potential risk.
Step 6: Specify performance or acceptance criteria	To ensure the results obtained are accurate and reliable, sampling and analysis was undertaken in accordance with the guidance provided in EPL 5862. DQIs are used to assess the reliability of field procedures and analytical results. In particular, the DQIs within NSW EPA (2017) are used to document and quantify compliance. DQIs are described below: ▪ Completeness – A measure of the amount of useable data (expressed as %) from a data collection activity. ▪ Comparability – The confidence (expressed qualitatively) that data may be considered to be equivalent for each sampling and analytical event. ▪ Representativeness – The confidence (expressed qualitatively) that data are representative of each media present on the site. ▪ Precision – A quantitative measure of the variability (or reproducibility) of data. ▪ Accuracy (bias) – A quantitative measure of the closeness of reported data to the true value.
Step 7: Develop the Plan for Obtaining Data	Sampling and Analysis has been undertaken in compliance with EPL 5862 by qualified technical staff with analysis completed by a NATA accredited Laboratory. Results are discussed within this report.

4.2 Data Quality Indicators

The following DQIs referenced in Step 6 in **Table 4.2** have been adopted in accordance with the NSW EPA (2017) *Guidelines for the NSW Site Auditor Scheme (3rd Edition)*. The DQIs outlined in **0** assist with decisions regarding the contamination status of the site, including the quality of the laboratory data obtained.

Table 4.2 Summary of Data Quality Indicators

Data Quality Indicator	Frequency	Data Acceptance Criteria
Completeness		
Field documentation correct	Each sampling event	All samples
Suitably qualified and experience sampler	Each sampling event	All samples
Appropriate lab methods and limits of reporting (LORs)	Each sampling event	All samples
Chain of custodies (COCs) completed appropriately	Each sampling event	All samples
Compliance with all sample holding times	All samples	All samples
Comparability		
Consistent standard operating procedures for collection of each sample. Samples should be collected, preserved and handled in a consistent manner	All samples	All samples

Experienced sampler	All samples	All samples
Climatic conditions (temperature, rain, wind etc) recorded and influence on samples quantified (if required)	All samples	All samples
Consistent analytical methods, laboratories and units	All samples	All samples
Representativeness		
Sampling technique appropriate for each media and analytes (appropriate collection, handling and storage)	All samples	All Samples
Samples homogenous	All samples	All Samples
Detection of laboratory artefacts, e.g. contamination blanks	-	Laboratory artefacts detected and assessed
Samples extracted and analysed within holding times	All samples	All samples

Precision		
Laboratory duplicates	1 per 20 samples	<20% RPD Result > 20 × LOR <50% RPD Result 10-20 × LOR No Limit RPD Result <10 × LOR
Accuracy (Bias)		
Surrogate spikes	All organic samples	50-150%
Matrix spikes	1 per 20 samples	70-130%
Laboratory control samples	1 per 20 samples	70-130%
Method blanks	1 per 20 samples	<LOR

5 Performance Criteria

Environmental monitoring data gathered during the reporting period was screened against the applicable criteria for each sample type / matrix as summarised below.

5.1 Surface Gas

The results of surface gas monitoring were screened against the criteria provided in the *Environmental Guidelines* (EPA 2016). Specifically, the threshold level for further investigation and potential action was detection of methane at any point of the landfill above 500 parts per million (ppm).

5.2 Subsurface Gas

The results of subsurface gas monitoring were screened against the criteria provided in the *Environmental Guidelines* (EPA 2016). Specifically, the threshold levels for further investigation and corrective action were detection of methane at concentrations above 1% (volume/volume) and carbon dioxide at concentrations of 1.5% (v/v) above established natural background levels.

5.3 Gas Accumulation

The results of gas accumulation monitoring within enclosed buildings and structures were screened against the criteria provided in the *Environmental Guidelines* (EPA 2016). Specifically, the threshold level for further investigation and corrective action was detection of methane at concentrations above 1% (v/v).

5.4 Water

5.4.1 Stormwater

- In accordance with Section 3 (L1.2) of EPL 5862 the performance criteria for stormwater was no discharge of contaminated stormwater to waters under dry weather conditions (less than 10mm of rainfall within a 24hr period) or a storm event/s of less than 1:10 year, 24 hour recurrence interval (less than 297.4 mm of rainfall within a 24 hour time period).
- On 24 February 2021, Council applied to the EPA with an email containing a new proposed stormwater monitoring location point. This was accepted on the 1st March 2021 as outlined below.

P1.2 The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.

Water and land

EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
1	Stormwater monitoring and discharge point	Stormwater monitoring and discharge point	Outlet at Reddalls Road - Monitoring point labelled 1 on Figure 13 titled "Proposed Surface Water Monitoring Locations" dated 26 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297777 N6183972

Amended to:

Water and land

EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
1	Stormwater monitoring and discharge point	Stormwater monitoring and discharge point	Outlet at Reddalls Road - Monitoring point identified at E297772 N6184025.

- The performance criteria for this stormwater monitoring and discharge point at Reddalls Road, known as Monitoring Point 1 are:
  - pH: a 100 percentile concentration limit of 6.5 to 8.5
  - Total Suspended Solids: a 100 percentile concentration limit of 50 mg/L

In this reporting period, the EPA requested that the leachate seep in February 2020 (which entered into the stormwater management system) be addressed via the following over the next 12 months:

1. complete a preliminary review of the existing stormwater management system;
2. prepare a comprehensive water balance assessment; and
3. conduct an independent assessment of the revised stormwater management system.

These were incorporated into Licence Variation Notice No. 1604123 and included a Pollution Reduction Program requiring Council to submit reports in relation to the management of stormwater at the premises. The first two conditions were met and subsequently approved by the EPA.

5.4.2 Leachate Discharge

In accordance with Section 3 (L1.3) of EPL 5862 the limit for leachate was no discharge of leachate to waters under dry weather conditions (less than 10mm of rainfall within a 24hr period) or a storm event/s of less than the 1:25 Average Return Interval (ARI), 24 hour recurrence interval (less than 371.5 mm of rainfall within a 24 hour time period). The performance criteria adopted for leachate discharges was based on records regarding the timing and nature of leachate discharges during the reporting period.

5.4.3 Groundwater

The selected performance criteria for groundwater samples were based on the recommendations of the *Environmental Guidelines* (EPA 2016) and in consideration of the land use, site setting and the plausible interactions between potential contaminants and human and environmental receptors. A conceptual site model is provided in **Section 8.9** that further discusses these interactions.

The Environmental Guidelines (EPA 2016) screening groundwater analytical results against the *National Environment Protection (Assessment of Site Contamination) Measure* (National Environment Protection Council, 2013), specifically:

- Schedule B1, Table 1C Groundwater Investigation Levels, which summarises trigger values from:
  - *ANZAST* 2018:
- The results were screened against the criteria for 80%, 90% and 95% species protection trigger levels, which refers to the percentage of species expected to be protected. A brief overview of each protection level is provided below:
  - The 80% protection level trigger values apply to ecosystems that are highly disturbed with limited conservation value;
  - The 90% protection level trigger values apply to ecosystems that are moderately disturbed with low conservation value; and
  - The 95% protection level trigger values apply to ecosystems that are slightly to moderately disturbed with a moderate conservation value.
- Each protection trigger level was applied to groundwater data gathered during the reporting period, however, given the high level of disturbance at the site and the predominantly industrial surrounding land use the 90% levels are considered most appropriate to adopt as a performance criteria.
  - *Australian Drinking Water Guidelines* (National Health and Medical Research Council and the Natural Resource Management Ministerial Council, 2011, updated 2014) (ADWG).
- Surface water and groundwater are not utilised for human consumption at the Site, however, it is plausible that groundwater is used for agricultural (irrigation and stock watering). As such the ADWG have been adopted.
- Schedule B1, Table 1A (4) Health Screening Levels groundwater for petroleum hydrocarbons.

5.5 Dust

The results of dust monitoring were assessed against criteria provided within the Environmental: Solid Waste Landfills (2016) which have been derived from Table 7.1 of Approved methods for the modelling and assessment of Air Pollutants in New South Wales (NSW DEC 2005).

5.6 Trade Wastewater

- Trade wastewater analytical results were screened against the criteria provided in the *Consent* (Sydney Water, 2021). The *Consent* provides criteria for a variety of parameters for the long term average daily mass (LTADM) and the maximum daily mass (MDM).
- In addition to analytical performance criteria the *Consent* provides limits for aesthetic properties of trade wastewater including temperature, colour, pH, fibrous materials, gross solids and flammability, and limits to the rate of discharge of wastewater to sewer.

5.7 Waste – Tyres

Section 3 (L3.2) of EPL 5862 states that the licensee must not dispose of any tyres on the premises which:

- Have a diameter of less than 1.2 metres;
- Are delivered at the premises in a load containing more than 5 whole tyres; and
- Became waste in the Sydney Metropolitan Area.
- Section 3 (L3.3) states that tyres stockpiled on the premises must:
- Not exceed fifty tonnes of tyre at one time;
- Be located in a clearly defined area away from the tipping face;
- Be managed to control vermin; and
- Be managed to prevent any tyres from catching fire.

5.8 Odour

In accordance with Section 3 (L4) of EPL 5862 offensive odour must not emit beyond the boundary of the premises. The performance criteria adopted for potential offensive odour emissions was occurrences (if any) of complaints from members of the public relating to odour. Regular odour monitoring is conducted weekly and results are recorded in the Environmental Matrix.

In this reporting period, the number of odour complaints increased by 12. In 2020/21, the EPA had several meetings with Council to express their concerns regarding odour management at Whytes Gully. This resulted in the inclusion of special conditions E1.4 and E1.5 requiring Council to undertake an odour assessment and for submission to the EPA. These conditions were satisfactorily met and resulted in a modification that removed these conditions and replaced them with the following:

> E2.1 The licensee must provide monthly updates on the implementation of the recommendations made in the report titled "Whytes Gully Waste and Resource Recovery Centre - Odour Investigation Assessment – (The Odour Unit 2021).
>
> E2.2 The monthly updates must be provided by the last day of each month, or the next business day if the last day falls on a weekend or public holiday.

6 Results

Monitoring results gathered during the reporting period are provided in the data tables in Appendix B and are summarised in the relevant subsections below. Laboratory certificates of analysis and quality reports have not been appended to this report due to the large number of files, however, they can be provided upon request.

6.1 Gas

6.1.1 Surface Gas

All surface gas results were reported below 500 ppm throughout the reporting period and results from the reporting period are summarised in Appendix B.

6.1.2 Subsurface Gas

All concentrations of methane measured were under 0.1% (v/v), during the reporting period, below the threshold level for further investigation and corrective action of 1% (v/v).

Subsurface gas monitoring results from the reporting period are summarised in Appendix B.

6.1.3 Gas Accumulation

All reported concentration of methane was below the threshold level for further investigation and corrective action of 1 % (v/v). As shown in the graphs in Appendix C, the methane concentrations accumulating into buildings have remained low even though there has been a slight increase in levels over the last reporting period.

Gas accumulation monitoring results from the reporting period are summarised in Appendix B.

6.2 Stormwater

On 15 occasions at Point 1, TSS values were recorded over 50 mg/L. These levels correlate to periods of heavy rainfall and localised flooding (leading to the overflow of the stormwater management system) that were associated with the Natural Disaster Declaration. Two pH breaches were recorded at 8.7 in November 2021and April 2022 respectively.

Upstream and downstream results were influenced by the catastrophic rainfall events in this reporting period . On the 29th March 2022, downstream Point 33 had a TSS recording of 524 mg/L. pH fluctuated slightly, but generally remained stable averaging 7.3. At Point 34, an upstream recording 342 mg/L TSS occurred on 29th March 2022. pH was within limits peaking at 8.1 on the 26th April 2022

Stormwater monitoring results from the annual sampling event are summarised in the Annual Return with the pertinent findings provided below:

- Ammonia was reported at a concentration of 26 mg/L in the stormwater sample collected from Point 1, above the ANZECC 90% protection trigger level of 1.43 mg/L. This is similar to the levels in the last reporting period after the continued extended periods of heavy rainfall.
- The highest reported concentration of TSS was 524 mg/L in the stormwater sample collected from Point 33. The TSS concentration of Point 34 was 342 mg/L, also above the EPL limit. Point 1 was recorded at 330 mg/L.
- pH at Point 1 exceeded the guideline values at 8.7, however was compliant on all other sampling events.

6.3 Leachate

Based on the reported results pertaining to trade wastewater discharged, the facility was in conformance for the 2020-2021 reporting period. Appendix B shows the full results for leachate.

6.4 Groundwater

6.4.1 Groundwater Levels

Groundwater levels measured at the site during the reporting period are summarised in Appendix B and ranged from 0.97 m below ground level (bgl) in groundwater monitoring Point 20 (BH6) to 10.42 m bgl in groundwater monitoring point 12 (GMW105). These have remained at relatively the same levels as the previous reporting period and may be attributed to continual heavy rainfall.

6.4.2 Laboratory Results

Groundwater pH fluctuated throughout the reporting period ranging between 5.8 to 7.4. Electrical Conductivity also varied greatly across the site with the lowest value recorded being 107 µS/L at Point 12 (GMW105) on the 23rd February 2022 sampling event and the highest value recorded being 5070 µS/L at Point 5 (GABHO2) on the 18th May 2022.

Continued heavy rainfall resulted in all bores being active across the site.

Groundwater data tables are provided in Appendix B with the pertinent findings summarised below:

- Benzene, toluene, ethylbenzene and xylenes (BTEX) and TPH were not detected above the laboratory limits of reporting (LORs) in any groundwater sample collected during the reporting period (refer to Appendix B).
- PAH was not detected above the laboratory LORs in any sample.
- A summary of heavy metals results is provided below and tabulated in Appendix B:
  - Aluminium (total) concentrations ranged from 0.08 mg/L in monitoring point 19 to 36.4 mg/L in point 11, with al samples containing aluminium above the ANZECC 90% protection trigger level of 0.08 mg/L the ANZECC 90% trigger level.
  - Arsenic, barium and mercury were reported at concentrations below the adopted performance criteria for all samples.
  - Cadmium (total) concentrations ranged from below the laboratory limit of reporting (multiple samples) to 0.0009 mg/L in monitoring point 16. The concentration recorded for point 16 is above the ANZECC 90% protection trigger level of 0.0004 mg/L but below the ADWG criteria of 0.002 mg/L.
  - Chromium (hexavalent) was not detected above the laboratory limit of reporting in all groundwater samples collected during the reporting period, however, it is noted that the adopted criteria is below the laboratory limit of reporting. Therefore, the results cannot be screened against the performance criteria. Total chromium peaked at 0.025 mg/L in point 16.
  - Copper (total) concentrations ranged from 0.001 mg/L (Point 19) to 0.074 mg/L (point 16) with most results above the ANZECC 90% protection trigger level of 0.0018 mg/L but well below the ADWG criteria of 2 mg/L.
  - Lead (total) concentrations ranged from below the laboratory limit of reporting (multiple samples) to 0.043 mg/L (point 16) with most results above the ANZECC 90% protection trigger level of 0.0018 mg/L but below the ADWG criteria of 2 mg/L.
  - Manganese (total) concentrations ranged from 0.040 (point 9) to 6.43 mg/L (point 16) with 3 samples above the ANZECC 90% protection trigger level of 2.5 mg/L and 3 samples above the ADWG criteria of 0.5 mg/L.
  - Zinc (total) concentrations ranged from 0.011 mg/L (point 19) to 0.242 mg/L (point 16) with sixteen samples above the ANZECC 90% protection trigger level of 0.015 mg/L.

- Specific trigger values were not provided in the adopted performance criteria for calcium, cobalt, magnesium and potassium.

> A summary of inorganics is provided below and tabulated in Appendix B:

- Ammonia concentrations ranged from below the laboratory limit of reporting (multiple samples) to 0.6 mg/L in point 20, with all samples below the adopted performance criteria of 0.9 mg/L.
- Fluoride concentrations ranged from 0.1 mg/L (point 16) to 1.0 mg/L in point 10, with all samples below the adopted performance criteria.
- Nitrate concentrations ranged from under 0.01 mg/L (point 16) to 2.41 mg/L in point 17, with all samples below the adopted performance criteria.
- Specific trigger values were not provided in the adopted performance criteria for alkalinity, chloride, nitrite, sodium, TDS, TOC and sulfate.

> A summary organochlorine pesticides is provided below and tabulated in Appendix B:

- OCP contaminants aldrin and dieldrin, chlordane, dichlorodiphenyltrichloroethane (DDT), endrin, lindane and heptachlor were not detected above the laboratory limit of reporting in any sample, however, it is noted that the adopted criteria were below the laboratory limit of reporting.

> A summary organophosphorus pesticides is provided below and tabulated in Appendix B:

- OPP contaminants azinophos methyl, chlorpyrifos, diazinon, dimethoate, malathion, methyl parathion and parathion were not detected above the laboratory limit of reporting in any sample, however, it is noted that the adopted criteria were below the laboratory limit of reporting.
- Bromophos-ethyl, carbophenothion, chlorfenvinphos, dichlorvos, ethion, fenthion, fethyl parathion, monocrotophos, fenamiphos and pirimphos-ethyl were not detected above the laboratory limit of reporting and were therefore below the adopted performance criteria.

6.5 Trade Wastewater

Trade wastewater monitoring data is provided in Appendix B. Trade wastewater was undertaken 17 times during the reporting period. The results of monitoring showed that on each occasion volume discharge, total dissolved solids, suspended solids, ammonia as N, biochemical oxygen demand and temperature were within the acceptable criteria provided in the *Consent* (Sydney Water, 2021).pH was measured at the commencement and completion of each monitoring event and no non- conformances with the Sydney Water criteria were recorded.

6.6 Waste Tyres

Section 3 (L3.2) of the EPL provides limitations on the size and number of waste tyres that can be disposed at the premises. Council do not dispose of waste tyres on Site but instead receives and temporarily stores them until they are collected by an external contractor, Tyrecycle Pty Ltd, for recycling. As such the license condition L3.2 does not apply to the site operations during the reporting period.

Section 3 (L3.3) of the EPL states a number of requirements relating to tyre stockpiles at the Site. Stockpiles of types on Site during the reporting period were compliant with L3.3, specifically:

> Tyre stockpiles did not exceed fifty tonnes at one time. The tyre storage bin at the site has a capacity of 150 tyres, which when full equates to significantly less than fifty tonnes. Council's Operations team regularly scheduled outbound loads of waste tyres to ensure that the capacity of the bin is not exceeded;

> The tyre stockpile was clearly defined and situated approximately 450m from the tipping face during the reporting period; and

> The tyre stockpile was scheduled for frequent removal mitigating the potential for vermin impact and fire risk.

6.7 Odour and Dust

Council received a total of 109 complaints from the public during the reporting period pertaining to offensive odours noted outside the facility's boundary. This increase in complaints followed on from the previous reporting period that also saw a substantial rise. Prolonged wet weather during both reporting periods has posed a continuing challenge to odour management.

One dust complaint was received; however this was anonymous.

EPA continues to work with Council to quantify and manage odours within the catchment. All complaints are followed up with the complainant, logged and an incident report sent through to the EPA (or included in the monthly update).

7 Quality Assurance / Quality Control

A summary of the results of the QA/QC performance are included in this section.

7.1 Laboratory QA/QC

The selected analytical laboratory, ALS Environmental, undertake internal QA/QC procedures which include the analysis of method blanks, internal duplicate samples, laboratory control samples, matrix spikes and surrogate recovery. Additionally, laboratory QA/QC measures include receipt, logging, storage, preservation, holding time and analysis of samples within the method specified.

A review of the laboratory QA/QC procedures indicates that laboratory QA/QC procedures were within specified ranges for all samples with the exception of three duplicates, four laboratory control samples and four matrix spikes. In addition, five matrix spike recoveries were unable to be determined as the background level was greater than or equal to the four times the spike level.

Samples were received and stored appropriately and all samples were analysed within the specified holding time.

7.2 Data Useability

The data validation process of laboratory QA/QC data indicates that the reported analytical results are representative of the conditions at the sample locations and that the analytical data can be relied upon for the purpose of the Annual Report for EPL 5862.

8 Discussion

The data and information gathered during the reporting period is discussed below in consideration of the performance criteria. In addition, and in accordance with Section 6 (R1.8) of EPL 5862, historical laboratory results have been tabulated and presented in graphical format that compares data from at least three years (where available).

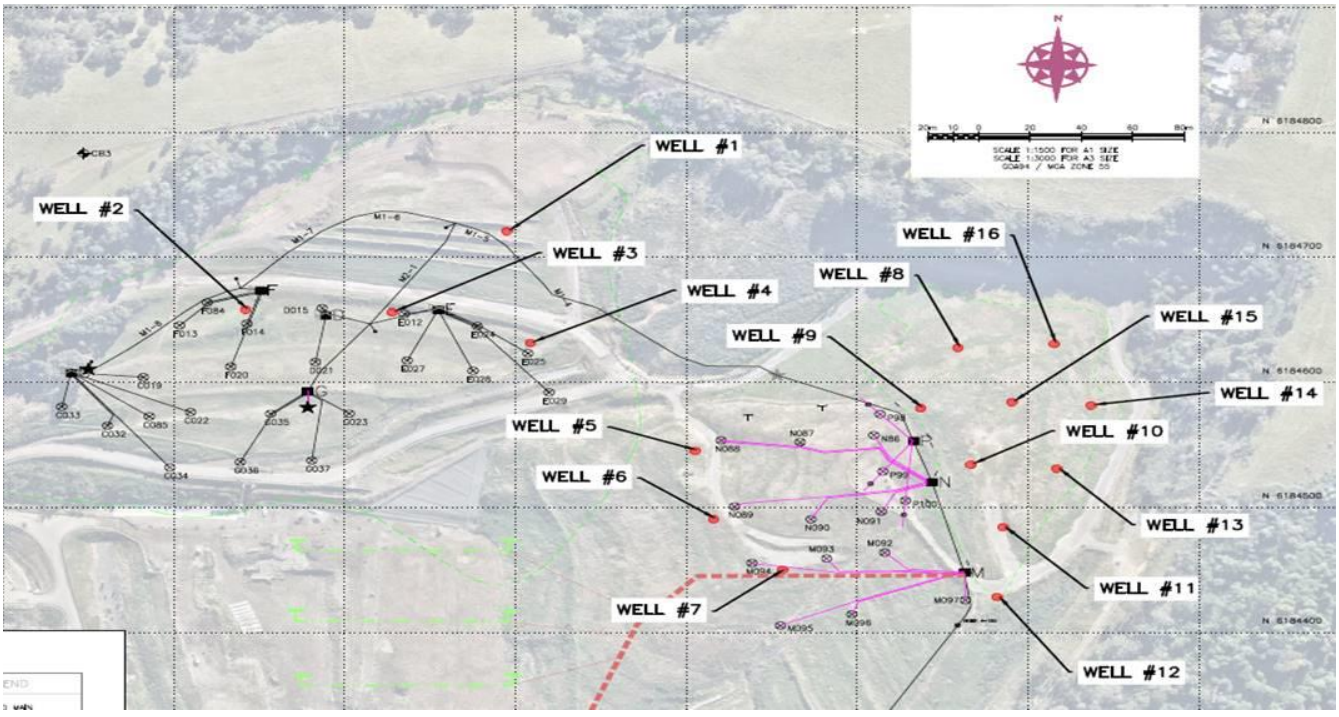
Trend graphs are provided in Appendix c and summarised below. Where there is insufficient data to establish trends (i.e. results predominately below LOR), then no trend graph has been prepared.

8.1 Surface Gas

Surface gas monitoring completed during the reporting identified no exceedances.

Four readings over 500 ppm were reported in the last reporting period. These occurred after heavy rainfall events. At the time of measurement, the ground was fully saturated, and it is noted that these higher levels of methane were associated with the uncapped areas of the landfill covered by Transect 9.

In this reporting period, additional gas infrastructure has been installed to collect methane gas throughout the site (see site plan below). This may have resulted in lower levels of surface gas emissions.



8.2 Gas

Subsurface gas monitoring completed during the reporting period did not identify subsurface methane at concentrations that exceeded the threshold level. As such non-conformances of the EPL did not occur during the reporting period with respect to subsurface gas.

8.3 Gas Accumulation

Gas accumulation monitoring completed during the reporting period did not identify methane at concentrations that exceeded the threshold level. As such non-conformances of the EPL did not occur during the reporting period with respect to gas accumulation.

8.4 Stormwater

8.4.1 Trend Analysis

A series of graphs showing trends in stormwater contaminant and parameter levels are provided in Appendix C and are discussed below.

The continual heavy rainfall significantly influenced pH, ammonia and TSS in the stormwater system. The other parameters were also influenced but remained within threshold limits. In general, it can be seen that the water column remains unbalanced with fluctuating levels of dissolved oxygen, nutrients and almost all other parameters.

8.5 Groundwater

8.5.1 Groundwater Levels

Interpretation of groundwater levels across the Site from the reporting period indicate that the inferred groundwater flow direction is from the north east to the south west, which is consistent with the local topography and is shown on Figure 4 of Appendix A. Groundwater is situated at the greatest depths in the higher elevations of the Site toward the north eastern corner and is shallowest in the south eastern boundary in close proximity to the nearest surface water body, Dapto Creek.

It is noted that the water table remained high throughout the reporting period with samples collected at all sampling events.

8.5.1.1 Trend Analysis

A series of graphs showing groundwater level trends are provided in Appendix C and discussed below. It can be seen that there has been significant movement in the levels of groundwater parameters including nitrate, ammonia, total organic carbon, pH and conductivity as water enters the groundwater system and soluble analytes are mobilised. It is hard to discern any trends until heavy rainfall stops and groundwater levels and flow stabilise under normal climatic conditions.

8.5.2 Laboratory Results

Groundwater analysis completed during the reporting period showed that the majority of contaminants and parameters of interest specified in EPL 5862 were below the laboratory LORs or the performance criteria, including BTEX, TPH, PAH, ammonia, fluoride and nitrate.

Performance criteria are not provided for alkalinity, chloride, nitrite, sodium, TDS, TOC and sulfate however the results were generally comparable with historical data and are not considered unusual or concerning in the context of the Site and surrounding land use. EPA monitoring points 5, 17, 18 and 20 are located in the lower elevations of the Site toward the western and southern western boundary and generally had the highest concentrations. EPA monitoring points 9, 10, 12 and 13 generally contained the lowest levels of the parameters, with the wells located in the higher elevations toward the northern and eastern boundary. This indicates that wells situated down gradient of buried waste have the relatively higher concentrations.

Numerous heavy metal concentrations were reported as elevated during the reporting period including aluminium, cadmium, copper, lead, manganese and zinc. The concentrations reported were for total metals in accordance with the EPL requirement, however, it is important to note that the adopted screening criteria recommended by the *Environmental Guidelines* (EPA 2016) are intended for application to concentrations of dissolved metals. As such the exceedances are not necessarily indicative of environmental concern with the contaminant concentrations most likely attributed to the presence of sediment in unfiltered samples

8.5.2.1 Trend Analysis

A trend graph and discussion has not been provided for OCP, OPP, PAH, BTEXN or Phenolics as these contaminants have never been reported above the laboratory limit of reporting.

A series of graphs showing trends in groundwater contaminant and parameter levels for annual monitoring are provided in Appendix C and are discussed below.

The trend graphs from the annual groundwater monitoring event shows that contaminant and parameter concentrations have remained steady and relatively consistent with the three years prior, with a general decline in contaminant concentrations. It is noted that several monitoring wells were dry during the annual monitoring event and therefore trend analysis was unable to be completed for the entire well network.

8.6 Trade Wastewater

Trade wastewater was discharged into the sewer network in accordance with the Consent (Sydney Water 2021) with one non-conformance during the reporting period. Based on the monitoring data over the reporting period, there was one breach in maximum daily mass of ammonia at 29 kg/day on 3/02/2022. Interestingly, this level is now only non-compliant under the new Trade Waste Agreement which lowered the limit from 36 kg/day to 28.3 kg/day. All other parameters were compliant.

8.7 Waste Tyres

Waste tyres received at the site are managed in accordance with a procedure that satisfies Councils obligations under the POEO (Waste) Regulation 2014. Tyres are temporarily stored at the site before being collected by a third party contractor for recycling.

Non-conformances of the EPL did not occur during the reporting period with respect to waste tyres.

8.8 Odour

Section 3 (L4) of EPL 5862 states that offensive odour must not emit beyond the boundary of the premises. A total of 109 complaints relating to odour were received from members of the public during the reporting period.

In response to odour concerns in the catchment, Council worked with EPA to assess the Site's odour management and address the Special Conditions. The "Wollongong Waste and Resource Recovery Park (WWRRP) – Odour Investigation Assessment was undertaken by specialist consultants, The Odour Unit Pty Ltd. This assessment met the requirements of EPA Licence No. 5862- Licence Variation No. 1604123 (Special Conditions E1.4 and E1.5) outlined in the table below.

Special Condition E1.4	*The licensee must engage a suitably qualified and experienced odour specialist to assess odour emissions from the premises and on the performance and effectiveness of the odour mitigation measures. Provide the EPA with a copy of this assessment by 30th April 2021.*

Special Condition E1.5	*1) Undertake a detailed risk assessment of the premises to identify all significant odour generating sources at the premises.* *2) The risk assessment must be informed by site specific odour monitoring. All monitoring must be undertaken in accordance with the NSW EPA's Approved Methods for the Sampling and Analysis of Air Pollutants in NSW.* *3) Where measured, site specific odour emission rates are significantly different to those previously adopted in the odour modelling report by Pae Holmes (June 2012), the modelling be revised to include site specific data.* *4) Undertake a detailed feasibility study to consider and evaluate options to reduce odour emissions from the highest ranked odour generating sources.* *5) The study should evaluate the expected change in offsite odour impact via a revised odour impact assessment.*

Based on the Assessment findings, the following recommendations were made based on proactive mitigation measures to manage the risk of adverse conditions:

1. Adopt the use of biocover material for the management of problematic areas where fugitive gas leakage pathways are identified. A biocover layer is designed to reduce landfill gas emissions of targeted areas, with its efficacy at reducing odour emissions well-documented by TOU at other landfill operations. It can be applied as either a temporary or permanent layer on the targeted area. A site-specific biocover management strategy will need to be developed to determine how the biocover material can be integrated into the existing operations and ensure its effective application.

2. Upgrade the capacity and capability of the current leachate management system. This includes upgrading the existing aeration capability of the leachate management system to provide enhanced leachate treatment flow capacity for future growth. This will assist in the optimisation of landfill gas capture.

3. Undertake an evaluation of the existing efficacy of the landfill gas management system as a means of identifying opportunities for improvement and optimisation. It is understood that this is already being undertaken by an external contractor. The intent of this exercise is to increase the landfill gas capture rate as a means of actively minimising fugitive landfill gas emissions. This is also part of a continuous improvement program and commensurate with the future waste volumes landfill cells may be assigned. This improvement program should encompass all existing landfill cells, where technical capability and economically achievable;
   ▪

4. Continue to implement the current Vegetation Management and Landscape Plan to create and maintain a vegetate buffer screen to conceal the waste management operations and as a means of future odour management.

5. Update the current air quality and odour management plan to ensure that it is in-line with industry best practice and reflects the current and future management protocols. A key component of this update will be, amongst others, the enhancement of the current landfill gas monitoring strategy by increasing the resolution of the monitoring plan to best practice.

6. If community complaints persist, develop, and implement a monitoring program consisting of field ambient odour assessment (FAOA) surveys conducted at both on-site and off-locations using calibrated assessors. If triggered, the assessment area will include the localities of community odour complaints, during different weather conditions, including potential worst-case scenarios (i.e. early mornings, late-evenings). The monitoring program can also include additional on-site odour emissions assessments to evaluate the odour generating sources under different scenarios (e.g. seasonal conditions or during high odour complaint periods).

To address these recommendations, Council developed a 4-year Infrastructure Delivery and Operational Program which will assist odour management, during times of increased risk. This will include:

- $350 000 allocated toward leachate treatment system upgrade.
- $400 000 allocated to leachate pond upgrades.
- $100 000 allocated to stormwater pond upgrades.

- $50 000 allocated to landfill cover upgrades.
- An enclosed Small Vehicle Transfer Station..
- Trialling of Biocover to improve localised gas management.
- Phase 3 of the Landfill Gas extraction project is continuing with a further 16 wells scheduled for installation in the next 12 months.
- Vegetation Management Plan implementation – enhancing vegetation buffer plantings and increasing maintenance along the property boundary.

8.9 Conceptual Site Model

Generally, a conceptual site model (CSM) provides an assessment of the fate and transport of contaminants of potential concern (CoPC) relative to site specific subsurface conditions with regard to their potential risk to human health and the environment. The CSM takes into account site-specific factors including:

> Source(s) of contamination;

> Identification of CoPC associated with past (and present) source(s);

> Vertical, lateral and temporal distribution of CoPC;

> Site specific lithologic information including soil type(s), depth to groundwater, effective porosity, and groundwater flow velocity; and

> Actual or potential receptors considering both current and future land use both for the site and adjacent properties, and any sensitive ecological receptors.

Based on the results discussed in this report a CSM has been developed. Additional details are included in the sections that follow as necessary.

Table 8-1 Conceptual Site Model

CSM Element	Description
Contaminant Sources	Known contaminant sources at the site include: ▪ Historical site use as a landfill since the early 1980's for deposition of domestic and commercial waste streams. ▪ Leachate resulting from degradation of buried waste and interaction with groundwater.
Site Current and Future Use	The site is an operational landfill that receives waste from the Wollongong City Council local government area. It is anticipated that the landfill will remain operational and continue to receive waste for the foreseeable future with a projected lifespan of at least 40 years based on current landfilling rates.
Site Geology	A geotechnical investigation (Golder 2012) indicates that the site is situated on two geological units. The Pheasants Nest Formation was noted on the upper slopes across the northern portion the site. The material encountered was generally weathered sandstone that grades into fresh sandstone at depths typically less than 10 m below ground level. The Budgong Sandstone Formation was located across the southern portion of the site. The sandstone generally had a weathering profile that extended to depths up to 15 m bgl. In addition to the natural geology the historical and current landfill cells have been covered with a capping layer typically comprising low to medium plasticity sandy clay with a thickness less than 1.5m. Underlying the landfill cap is predominantly domestic waste including paper, plastic, wood, rubble and other materials.
CoPCs	The CoPC listed in EPL 5862 include heavy metals (aluminium, arsenic, barium, cadmium, chromium (hexavalent and total), cobalt, copper, lead, manganese, mercury, zinc), polycyclic aromatic hydrocarbon, total petroleum hydrocarbons, benzene, toluene, ethylbenzene, xylenes, naphthalene, organochlorine pesticides, organophosphate pesticides and phenolics. In addition to CoPC the EPL identifies potentially hazardous landfill gasses including methane and carbon dioxide.

Extent of Impacts	The extent of potential contamination would primarily be located immediately below and down gradient of the tip face. Monitoring undertaken during the reporting period indicates that contaminants above the adopted criteria are limited to heavy metals aluminium, cadmium, copper, lead, manganese and zinc. Other CoPC were reported below the laboratory limit of reporting or the adopted criteria, however, it is noted that several contaminants including PAHs, OCPs and OPPs were unable to be screened against the adopted criteria as the laboratory LORs was reported higher than the criteria. Methane was detected during the reporting period atop the current and previous tip face (surface gas), subsurface and within enclosed structures, however, the concentrations were below the threshold level for further investigation and corrective action.
Potential Human Receptors	Potential human receptors include: ▪ Employees working at the tip face in earthworks plant and machinery; ▪ Employees working within enclosed structures including the weighbridge and office; ▪ Trespassers who illegally access the site; ▪ Contractors constructing the new landfill cell; ▪ Contractors undertaking scheduled environmental monitoring (surface water, groundwater and landfill gas); and ▪ Individuals working or living near the site.
Potential Ecological Receptors	Potential ecological receptors include: ▪ Dapto Creek which is the nearest offsite down gradient surface water body and the downstream surface water bodies including Mullet Creek and Lake Illawarra; ▪ Groundwater under the site being impacted as a result of the vertical migration of contaminants from leachate and buried waste; and ▪ Flora and fauna on the site interacting with contaminants in the soils including birds scavenging from the tip face.
Potential Contaminant Pathways	Potential contaminant pathways include: ▪ Dermal contact with contaminated materials including soil, waste and hazardous building materials; ▪ Dermal contact with contaminated media including surface water, groundwater and leachate; ▪ Inhalation of hazardous landfill gases emanating from buried waste and leachate; ▪ Inhalation of volatile contaminants and/or asbestos fibres; ▪ Ingestion of contaminant impacted materials including soil, waste and hazardous building materials; ▪ Potential contaminant uptake by vegetation; and ▪ Potential ingestion of contaminant impacted fresh produce (fruit and vegetables) grown down gradient of the site.

8.9.1 Data Gaps and Uncertainties

The assessment of potential contamination at the site was based on a site inspection and review of available historical reports and information. As such, the lateral and vertical extent of potential contamination in soil is unknown.

9 Conclusions and Recommendations

9.1 Conclusions

The following can be concluded based on the monitoring undertaken during the reporting period:

- The continued COVID19 restrictions and Natural Disasters within in this reporting period made it extremely challenging to undertake environmental monitoring and compliance activities. Although a number of exceedances and non-compliances were identified during this time, Council responded as best as possible in the circumstances and as result, material harm to the community and the environment was kept to a minimum.
- Council implemented an environmental monitoring program during the 2021/22 reporting period that generally satisfied the conditions and requirements of EPL 5862 and the *Consent to Discharge Industrial Trade Wastewater* (Sydney Water, 2021).
- Surface gas readings were compliant during this reporting period compared to the previous reporting period. This may be influenced by the installation of addition gas infrastructure.
- Management and handling of waste tyres at the Site was undertaken in a manner that was compliant with the EPL conditions.
- Complaints from the public relating to offensive odours originating from the Site were received during the reporting period. Each complaint was investigated by Council to confirm the nature of the complaint and to identify suitable corrective actions. An assessment of odour management at Whytes Gully was completed and approved during this reporting period in accordance with EPA requirements.

9.2 Recommendations

Based on the conclusions of this report for the last reporting period, there are two key recommendations:

1. Meet with the EPA to review progress of the EPL 5862: Pollution Reduction Program in lieu of the heavy rainfall conditions and flooding that continued throughout 2021/22 and put forward an action plan for stormwater and leachate management in the future.

2. Continue to implement odour management and mitigation at Whytes Gully. Provide monthly updates to the EPA and review progress against milestone recommendations in the next reporting period.

10 Limitations

This assessment has been undertaken in accordance with Environmental Protection Licence 5862.

The assessment may not identify contamination occurring in all areas of the site, or occurring after sampling was conducted. Subsurface conditions may vary considerably away from the sample locations where information has been obtained.

11 References

ANZAST (2018), Australian Water Quality Guidelines, 2018

Australian Standards (1999), AS 4482.2-1999 Guide to the Sampling and Investigation of Potentially Contaminated Soil - Volatile Substances, 1999

Golder Associates (2012), Geotechnical Investigation, Whytes Gully Landfill, 2012

Golder Associates (2014), Landfill Environmental Management Plan, Whytes Gully Landfill, 2014 NEPC (2013), National Environment Protection (Assessment of Site Contamination) Measure, 2013 NHMRC (2014), Australian Drinking Water Guidelines, 2014)

NSW EPA (1996), NSW Environmental Guidelines: Solid Waste Landfills, 1996 NSW EPA (2013), Requirements for publishing pollution monitoring data, 2013 NSW EPA (2015), Asbestos and Waste Tyre Guidelines, 2015

NSW EPA (2016), Environmental Guidelines: Solid Waste Landfills (Second Edition), 2016 NSW EPA (2017), Guidelines for the NSW Site Auditor Scheme (3rd Edition), 2017

NSW DPI (1985), 1:100,000 geological map Wollongong-Port Hacking, 1985 Sydney Water (2017), Consent to Discharge Industrial Trade Wastewater, 2017

US EPA (2000), Guidance for the Data Quality Objectives Process and Data Quality Objectives Process for Hazardous Waste Site Investigations, 2000.

APPENDICIES

Appendix A

Figure 1 : Locality Plan

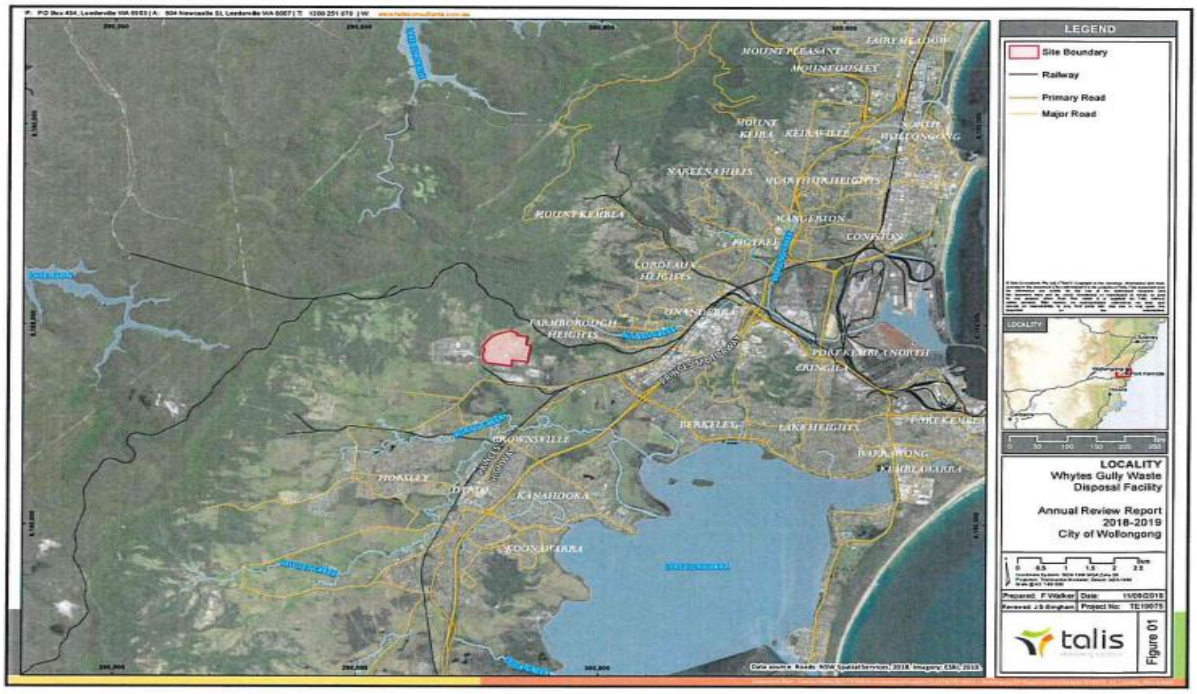


Figure 2 : Site Aerial Plan

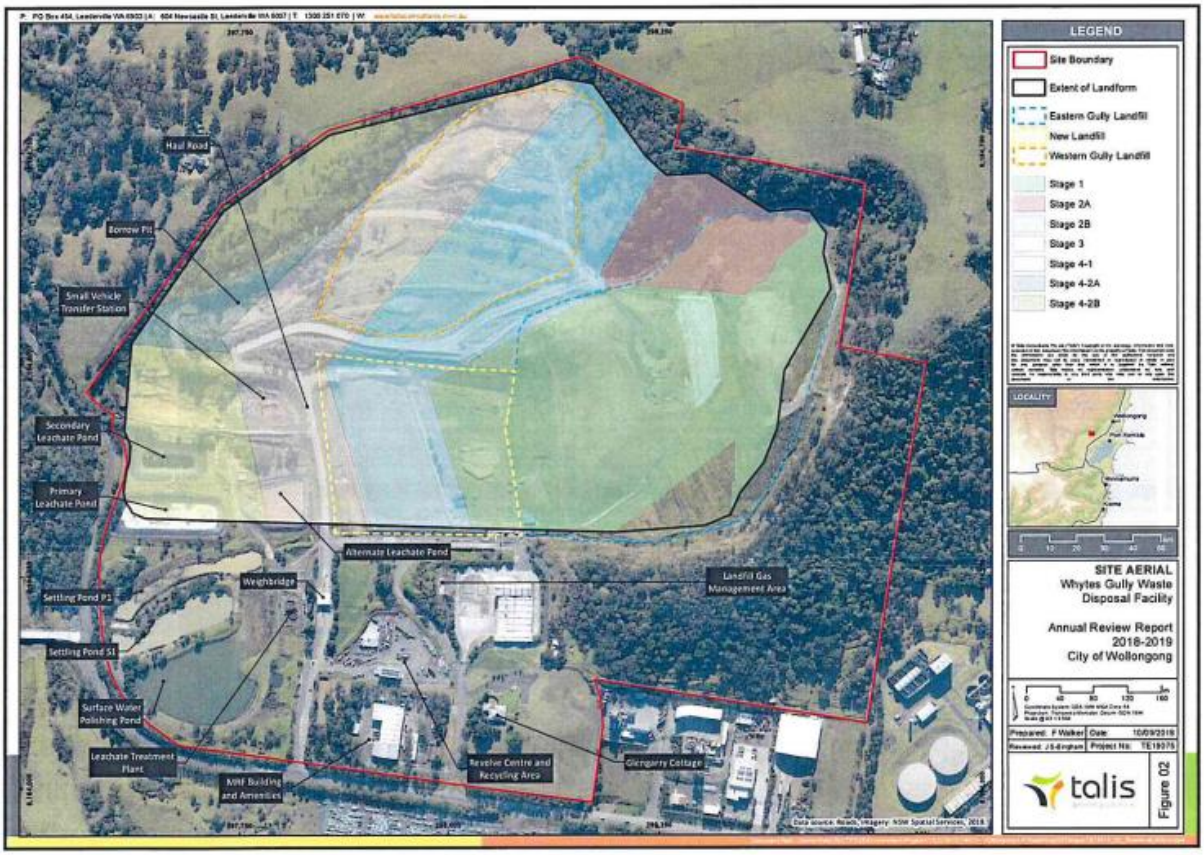


Figure 3: Groundwater Sampling Locations

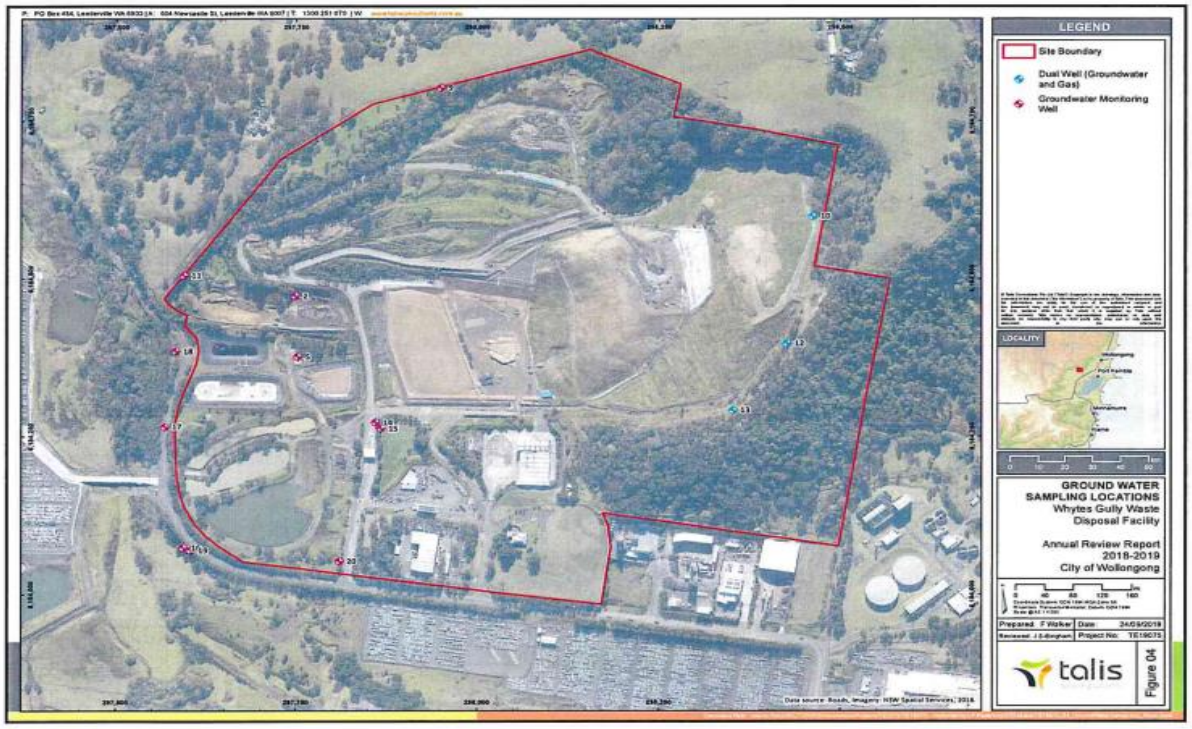


Figure 4: Wastewater and Leachate Sampling Locations

Figure 5: Landfill Gas Monitoring Locations

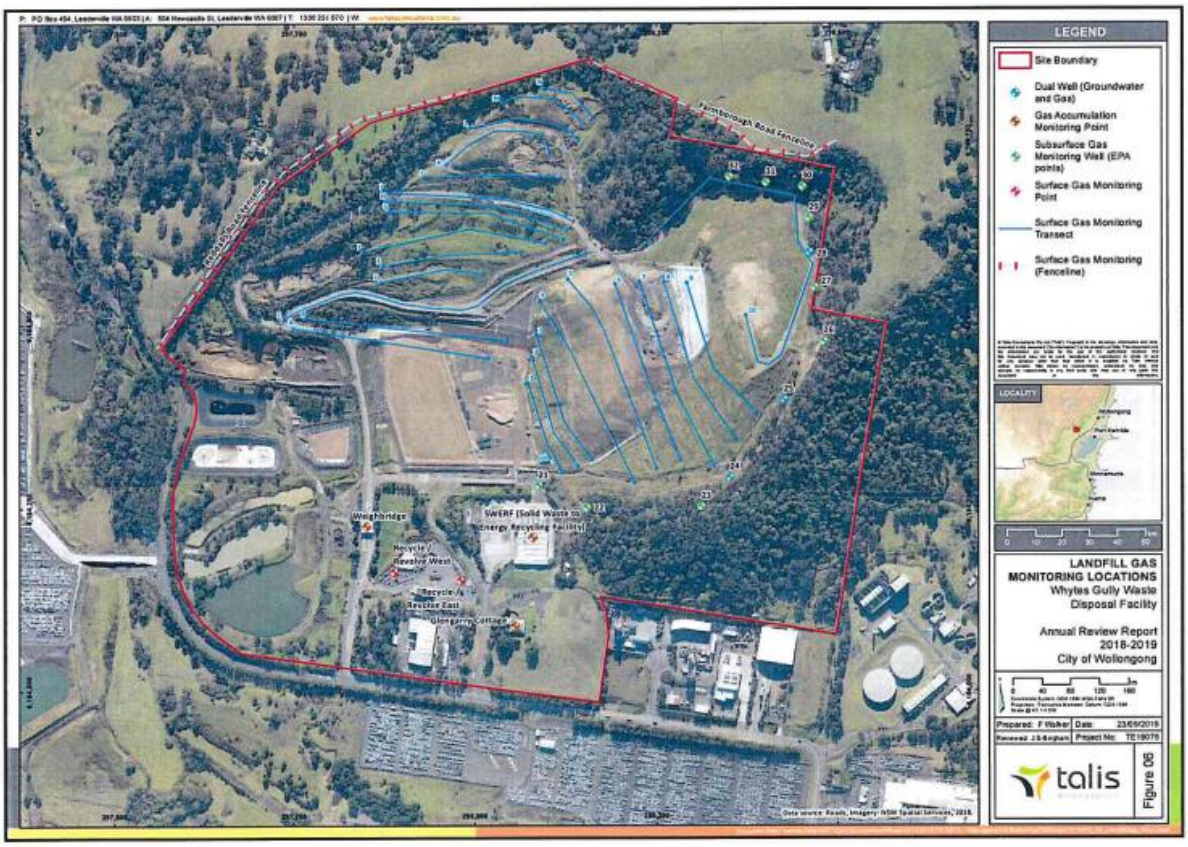


Figure 6: Dust Monitoring Locations

Appendix B

Table 1: Groundwater Results 2021-2022 Reporting Period

		Alkalinity	Aluminium	Ammonia	Arsenic	Barium	Benzene	Cadmium	Calcium	Chloride	Chromium (hexavalent)	Chromium (Total)	Cobalt	Conductivity	Copper	Depth	Ethyl benzene	Fluoride	Lead
Units		mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm	mg/L	Meters	µg/L	mg/L	mg/L
Site Name	Sample Date																		
(Point 5) - GABH02	16/08/2021	985		0.37					227	842				4150		4.91			
	01/11/2021	729		0.32					247	876				4410		5.09			
	23/02/2022	907	1.47	0.38	0.002	0.049	<1	<0.0001	278	898	<0.01	0.004	0.006	4440	0.005	4.67	<2	0.4	0.003
	18/05/2022	1070		0.18					285	995				5070		3.99			
(Point 9) - GMW102	01/11/2021	86		<0.01					23	21				287		4.01			
	23/02/2022	122	2.59	0.21	<0.001	0.032	<1	<0.0001	29	18	<0.01	<0.001	<0.001	256	0.005	2.42	<2	0.2	<0.001
	18/05/2022	94		0.06					15	13				235		2.37			
(Point 10) - GMW103	16/08/2021	571		<0.01					130	188				1680		7.68			
	01/11/2021	534		<0.01					151	221				1740		7.52			
	23/02/2022	612	0.52	0.05	<0.001	0.012	<1	<0.0001	139	109	<0.01	<0.001	<0.001	1610	0.004	6.76	<2	1.0	0.003
	18/05/2022	556		<0.01					96	78				1410		5.33			
(Point 11) - GMW104	16/08/2021	400	7.32	0.01		0.048		<0.0001	49	88		0.004	0.005	973	0.012	7.07			0.005
	01/11/2021	352	8.58	<0.01		0.070		<0.0001	52	102		0.014	0.016	1060	0.030	7.29			0.012
	23/02/2022	141	6.96	0.01	<0.001	0.016	<1	0.0001	37	52	<0.01	0.002	0.006	486	0.017	6.57	<2	0.6	0.006
	18/05/2022	100	36.4	<0.01		0.086		<0.0001	18	70		0.018	0.020	463	0.050	5.66			0.023
(Point 12) - GMW105	16/08/2021	47		0.02					7	42				245		11.3			
	01/11/2021	30		0.03					5	34				221		11.2			
	23/02/2022	52	5.63	0.02	<0.001	0.017	<1	<0.0001	6	21	<0.01	0.003	0.003	107	0.008	10.42	<2	0.3	0.003
	18/05/2022	42		0.06					5	32				210		7.92			
(Point 14) - GMW108S	16/08/2021	451		0.14					115	518				2400		2.83			
	01/11/2021	243		0.06					58	224				1290		2.69			
	23/02/2022	157	4.85	0.03	0.001	0.153	<1	<0.0001	34	24	<0.01	0.003	0.003	374	0.015	1.52	<2	0.2	0.005
	18/05/2022	241		0.07					41	55				610		1.95			
(Point 15) - GMW108D	16/08/2021	564		0.02					135	714				3160		2.26			
	01/11/2021	352		0.04					127	632				2930		2.24			
	23/02/2022	223	2.72	0.04	<0.001	0.067	<1	<0.0001	44	119	<0.01	0.002	0.002	780	0.007	1.52	<2	0.3	0.005
	18/05/2022	362		0.11					121	466				2310		1.33			
(Point 16) - GMW109S	16/08/2021	229	1.24	0.30		0.141		0.0004	70	235		0.001	0.026	1290	0.014	3.42			0.011
	01/11/2021	191	19.6	0.32		0.414		0.0009	78	246		0.025	0.056	1450	0.074	3.49			0.043
	23/02/2022	202	2.24	0.32	0.002	0.106	<1	0.0002	47	78	<0.01	0.002	0.021	785	0.025	2.92	<2	0.1	0.018
	18/05/2022	391	1.17	0.39		0.114		<0.0001	115	124		0.001	0.027	1510	0.006	2.89			0.002
(Point 17) - GMW110	16/08/2021	653		<0.01					202	901				4100		4.13			
	01/11/2021	588		<0.01					206	902				4260		4.14			
	23/02/2022	537	6.05	<0.01	<0.001	0.020	<1	<0.0001	210	830	<0.01	0.003	0.005	3890	0.012	3.91	<2	0.4	0.006
	18/05/2022	574		<0.01					189	809				4060		3.46			
(Point 18) - GMW111	16/08/2021	766		0.48					132	810				3500		6.32			
	01/11/2021	578		0.28					147	793				3770		6.59			
	23/02/2022	578	2.60	0.14	<0.001	0.055	<1	<0.0001	151	811	<0.01	0.002	0.002	3720	0.006	6.38	<2	0.4	0.003
	18/05/2022	644		0.27					132	766				3950		5.85			
(Point 19) - GMW109D	16/08/2021	260		0.10					105	512				1920		3.09			
	01/11/2021	225		0.09					106	512				1980		2.16			
	23/02/2022	202	0.08	0.04	<0.001	0.142	<1	<0.0001	110	514	<0.01	<0.001	<0.001	1950	0.001	2.85	<2	0.3	<0.001
	18/05/2022	221		0.08					103	496				2000		2.48			
(Point 20) - BH6	16/08/2021	694		0.34					73	272				1890		1.63			
	01/11/2021	347		0.60					67	179				1450		1.50			
	23/02/2022	358	0.76	0.41	0.003	0.065	<1	<0.0001	46	233	<0.01	0.002	0.005	1330	0.006	1.30	<2	0.5	0.004
	18/05/2022	387		0.28					43	259				1590		0.97			

		Magnesium	Manganese	Mercury	Nitrate as N	Organochlorine Pesticides	Organophosphate Pesticides	pH	Polycyclic aromatic hydrocarbons	Potassium	Sodium	Sulfate	Toluene	Total Dissolved Solids	Total organic carbon	Total Phenolics	Xylene	Zinc
Units		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pH	µg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	µg/L	mg/L
Site Name	Sample Date																	
(Point 5) -	16/08/2021	134						6.7		18	499	126		2410	10			
GABH02	01/11/2021	133						6.8		16	453	114		2600	6			
	23/02/2022	145	5.88	<0.0001	0.06	<0.5	<0.5	6.9	<0.5	15	520	114	<2	2500	10	<0.05	<2	0.019
	18/05/2022	163						6.8		9	538	132		3000	9			
(Point 9) -	01/11/2021	7						6.7		<1	27	12		244	4			
GMW102	23/02/2022	9	0.040	<0.0001	0.09	<0.5	<0.5	6.4	<0.5	<1	26	17	<2	234	4	<0.05	<2	0.031
	18/05/2022	5						6.6		<1	24	10		171	3			
(Point 10) -	16/08/2021	52						7.0		<1	172	97		1080	3			
GMW103	01/11/2021	48						7.2		<1	150	89		953	<1			
	23/02/2022	53	0.078	<0.0001	0.18	<0.5	<0.5	7.1	<0.5	<1	177	71	<2	954	3	<0.05	<2	0.015
	18/05/2022	41						7.1		5	147	60		784	3			
(Point 11) -	16/08/2021	29	0.454					7.2		<1	132	52		648	3			0.020
GMW104	01/11/2021	30	1.16					7.4		<1	128	52		633	<1			0.065
	23/02/2022	22	0.478	<0.0001	0.10	<0.5	<0.5	7.0	<0.5	1	61	32	<2	340	5	<0.05	<2	0.037
	18/05/2022	11	1.17					7.3		<1	52	22		303	6			0.094
(Point 12) -	16/08/2021	3						5.8		<1	37	13		230	4			
GMW105	01/11/2021	2						6.2		<1	32	10		392	5			
	23/02/2022	4	0.147	<0.0001	1.19	<0.5	<0.5	6.0	<0.5	<1	27	7	<2	143	2	<0.05	<2	0.026
	18/05/2022	2						6.1		<1	32	11		195	3			
(Point 14) -	16/08/2021	75						6.7		4	304	154		1450	4			
GMW108S	01/11/2021	33						6.8		3	147	68		1010	7			
	23/02/2022	15	0.108	<0.0001	0.07	<0.5	<0.5	6.9	<0.5	6	44	4	<2	380	11	<0.05	<2	0.018
	18/05/2022	16						6.8		4	67	15		394	7			
(Point 15) -	16/08/2021	88						6.6		2	447	205		1900	2			
GMW108D	01/11/2021	75						6.7		3	348	171		1720	3			
	23/02/2022	23	0.178	<0.0001	0.02	<0.5	<0.5	7.0	<0.5	6	99	35	<2	518	10	<0.05	<2	0.016
	18/05/2022	59						6.8		5	239	117		1340	5			
(Point 16) -	16/08/2021	41	2.95					6.1		1	112	158		962	4			0.055
GMW109S	01/11/2021	47	4.33					6.2		2	112	122		890	6			0.242
	23/02/2022	35	2.01	<0.0001	<0.01	<0.5	<0.5	6.4	<0.5	2	83	100	<2	476	6	<0.05	<2	0.086
	18/05/2022	51	6.43					6.6		2	121	210		894	20			0.021
(Point 17) -	16/08/2021	154						6.6		2	494	341		2620	2			
GMW110	01/11/2021	146						6.9		2	441	336		2600	<1			
	23/02/2022	146	0.176	<0.0001	2.41	<0.5	<0.5	6.8	<0.5	2	470	304	<2	2550	6	<0.05	<2	0.029
	18/05/2022	133						6.8		2	432	303		2440	4			
(Point 18) -	16/08/2021	112						7.2		2	502	171		2150	6			
GMW111	01/11/2021	109						7.0		2	476	210		2160	2			
	23/02/2022	115	1.23	<0.0001	0.02	<0.5	<0.5	7.0	<0.5	2	527	195	<2	2310	4	<0.05	<2	0.024
	18/05/2022	109						7.1		2	514	226		2230	4			
(Point 19) -	16/08/2021	55						6.8		1	213	25		1730	4			
GMW109D	01/11/2021	51						6.8		1	190	25		1210	<1			
	23/02/2022	54	0.174	<0.0001	0.17	<0.5	<0.5	7.1	<0.5	2	205	25	<2	1320	<1	<0.05	<2	0.011
	18/05/2022	51						6.9		1	188	25		1300	1			
(Point 20) - BH6	16/08/2021	49						7.0		2	308	68		1260	2			
	01/11/2021	34						6.9		3	181	34		820	12			
	23/02/2022	35	0.985	<0.0001	0.04	<0.5	<0.5	6.8	<0.5	2	214	17	<2	726	12	<0.05	<2	0.017
	18/05/2022	30						7.0		2	226	22		863	18			

Table 2 – Stormwater Results 2021-2022 Reporting Period

		Alkalinity (as calcium carbonate)	Ammonia	Calcium	Chloride	Conductivity	Dissolved Oxygen	Filterable iron	Fluoride	Magnesium	Nitrate as N	pH	Potassium	Sodium	Sulfate	Temperature	Total organic carbon	Total Phenolics	Total suspended solids
Units		mg/L	mg/L	mg/L	mg/L	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	pH	mg/L	mg/L	mg/L	°C	mg/L	mg/L	mg/L
Site Name	Sample Date																		
(Point 1)	05/11/2021	113	8.71	26	18	359	5.68	0.08	0.2	7	0.19	7.4	4	22	17	19.1	11	<0.05	14
	06/11/2021	222	0.26	36	162	1030	8.36	<0.05	0.4	28	0.75	8.1	13	131	61	21.9	14	<0.05	10
	08/11/2021	212	0.12	45	110	827	6.04	<0.05	0.3	23	0.57	7.4	7	91	38	22.5	14	<0.05	34
	15/11/2021	188	0.03	31	140	900	9.01	<0.05	0.4	26	0.44	8.4	11	118	52	18.2	15	<0.05	42
	18/11/2021	176	0.04	28	135	899	9.10	<0.05	0.4	26	0.13	8.4	11	112	44		16	<0.05	5
	22/11/2021	186	0.04	27	125	816	8.85	<0.05	0.3	25	0.23	8.7	10	102	43	21.2	13	<0.05	12
	25/11/2021	225	0.19	30	123	840	8.11	<0.05	0.4	26	0.20	7.9	11	107	38	21.0	17	<0.05	44
	26/11/2021	118	0.04	28	26	379	5.80	0.07	0.2	10	0.15	7.6	4	34	17	19.4	9	<0.05	20
	11/01/2022	190	0.06	23	76	631	7.47	<0.05	0.4	17	0.09	7.6	10	65	21	25.5	14	<0.05	14
	20/01/2022	190	0.30	27	47	523	6.96	0.07	0.3	17	0.04	7.6	11	52	15	23.4	16	<0.05	10
	02/02/2022	353	1.03	71	170	1070	5.46	<0.05	0.3	37	0.06	7.8	10	110	13	21.0	14	<0.05	64
	28/02/2022	144	0.29	35	38	496	5.90	<0.05	0.2	16	0.35	7.6	10	48	21	23.7	14	<0.05	16
	01/03/2022	175	0.41	29	36	487	6.92	0.13	0.2	14	0.17	7.7	8	42	20	23.1	16	<0.05	11
	02/03/2022	164	0.88	32	27	390	7.42	0.21	0.2	13	<0.01	7.8	8	35	12	20.7	18	<0.05	70
	03/03/2022	124	0.80	28	23	326	6.34	0.13	0.2	11	<0.01	7.8	7	28	11	20.7	15	<0.05	69
	04/03/2022	146	1.60	36	28	339	5.41	0.06	0.2	14	<0.01	7.7	10	34	11	24.3	31	<0.05	38
	05/03/2022	138	1.90	32	26	434	4.67	0.28	0.4	12	<0.01	7.6	7	34	10	23.0	28	<0.05	24
	06/03/2022	163	2.91	33	30	471	4.66	0.22	0.2	13	<0.01	7.7	9	40	9	22.1	29	<0.05	20
	07/03/2022	176	7.43	32	40	547	5.87	0.14	0.2	14	<0.01	7.8	13	52	8	23.5	32	<0.05	65
	08/03/2022	164	9.50	27	33	462	6.43	0.11	0.2	11	<0.01	7.9	13	42	6	21.8	34	<0.05	76
	09/03/2022	242	12.7	29	48	614	5.69	0.18	0.2	12	<0.01	7.8	16	54	7	21.7	42	<0.05	64
	10/03/2022	242	15.6	30	62	695	3.71	0.36	0.1	13	<0.01	7.8	16	59	6	20.3	38	<0.05	58
	11/03/2022	286	17.1	34	63	756	2.28	0.47	0.2	15	<0.01	7.8	22	71	1	21.1	43	<0.05	104
	12/03/2022	293	17.8	34	67	796	2.32	0.49	0.3	15	<0.01	7.9	20	68	5	19.6	44	<0.05	34
	13/03/2022	308	18.5	34	73	835	3.20	0.43	0.3	15	<0.01	7.9	21	71	2	20.1	40	<0.05	27
	29/03/2022	277	15.7	39	80	899	7.37	0.18	0.2	20	<0.01	8.0	22	85	13	20.4	27	<0.05	39
	30/03/2022	261	12.2	38	62	791	4.32	0.12	0.2	17	<0.01	8.1	18	72	14	21.3	25	<0.05	52
	31/03/2022	310	16.2	40	84	911	3.45	0.24	0.2	19	<0.01	8.1	24	87	14	20.1	34	<0.05	46
	01/04/2022	349	26.0	45	95	1020	1.09	0.38	0.2	22	<0.01	8.0	29	106	12	19.0	31	<0.05	330
	02/04/2022	345	20.7	44	93	1030	1.47	0.34	0.3	20	<0.01	7.9	30	112	12	18.5	29	<0.05	30
	03/04/2022	342	20.5	44	106	1020	1.44	0.33	0.3	20	<0.01	7.9	30	109	13	18.3	32	<0.05	26
	04/04/2022	373	22.4	42	96	996	3.28	0.28	0.7	19	<0.01	7.9	28	104	12	23.4	34	<0.05	20
	05/04/2022	380	11.0	64	154	1190	0.83	2.28	0.4	31	<0.01	7.4	14	118	26	19.4	19	<0.05	200
	06/04/2022	345	16.7	39	87	920	8.49	0.26	0.3	19	<0.01	8.7	27	96	12	21.0	31	<0.05	20
	08/04/2022	189	9.26	26	40	503	3.29	0.24	0.2	11	<0.01	8.2	15	45	14	19.0	18	<0.05	81
	09/04/2022	240	13.4	27	55	627	5.77	0.14	0.2	12	0.01	8.2	20	58	13	18.8	18	<0.05	60
	10/04/2022	288	19.0	34	75	860	3.89	0.21	0.5	15	<0.01	8.4	26	78	14	19.3	35	<0.05	30
	11/04/2022	296	17.0	37	73	813	0.24	0.44	0.2	16	<0.01	7.1	24	76	14	22.0	34	<0.05	18
	12/04/2022	302	14.8	40	77	838	0.24	0.56	0.4	16	0.01	7.9	23	78	14	21.2	30	<0.05	28
	13/04/2022	281	16.7	40	88	867	0.26	0.50	0.2	16	0.02	7.9	24	80	13	19.8	29	<0.05	20
	14/04/2022	276	13.9	45	66	821	0.62	0.33	0.4	17	0.02	8.0	19	76	17	19.9	24	<0.05	24
	19/04/2022	335	4.00	68	196	1240	3.02	4.18	0.6	34	0.05	7.2	6	132	33	19.6	15	<0.05	29
	21/04/2022	321	18.2	35	94	938	7.46	0.38	0.8	16	<0.01	8.4	25	91	10	19.8	34	<0.05	6
	22/04/2022	335	17.6	41	95	936	4.85	0.52	0.7	23	0.04	8.1	26	97	10	17.6	32	<0.05	49
	26/04/2022	310	5.66	68	121	987	2.97	1.07	0.3	31	<0.01	7.4	11	98	22	17.7	13	<0.05	30
	12/05/2022	269	8.40	38	96	898	8.28	0.42	0.2	20	0.60	8.3	23	100	20	18.8	25	<0.05	11
	24/05/2022	292	12.8	39	103	999	5.92	0.20	0.2	20	0.56	8.0	27	100	22	14.7	29	<0.05	72
	25/05/2022	307	13.6	40	105	978	6.33	0.20	0.4	20	0.82	8.2	29	109	19	14.4	30	<0.05	28
	26/05/2022	296	14.4	38	108	1010	5.18	0.19	0.3	19	0.65	8.1	29	105	21	13.7	30	<0.05	46
	27/05/2022	312	11.3	45	107	1010	4.98	0.20	0.2	21	0.54	8.0	33	108	20	15.5	29	<0.05	52

		Alkalinity (as calcium carbonate)	Ammonia	Calcium	Chloride	Conductivity	Dissolved Oxygen	Filterable iron	Fluoride	Magnesium	Nitrate as N	pH	Potassium	Sodium	Sulfate	Temperature	Total organic carbon	Total Phenolics	Total suspended solids
Units		mg/L	mg/L	mg/L	mg/L	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	pH	mg/L	mg/L	mg/L	°C	mg/L	mg/L	mg/L
Site Name	Sample Date																		
(Point 33)	05/11/2021	104	0.02	25	42	378	6.71	0.18	0.2	11	0.11	8.0	3	36	13	18.0	9	<0.05	13
	06/11/2021	104	0.12	25	29	312	6.65	0.18	0.1	10	0.08	7.4	2	25	13	20.1	5	<0.05	5
	08/11/2021	95	0.01	23	29	302	6.50	0.06	<0.1	8	0.05	7.4	2	27	11	23.1	3	<0.05	6
	15/11/2021	72	0.02	22	28	275	7.70	0.08	0.1	7	0.07	7.4	2	24	11	16.7	4	<0.05	6
	22/11/2021	84	0.02	20	35	323	7.86	0.06	0.1	9	0.14	7.5	3	28	15	19.3	6	<0.05	8
	25/11/2021	120	0.01	23	35	336	6.92	0.23	0.1	10	0.05	7.4	3	32	14	22.6	5	<0.05	<5
	26/11/2021	89	0.03	24	38	382	7.58	0.10	0.1	11	0.06	7.5	3	37	15	19.6	6	<0.05	20
	11/01/2022	91	0.02	20	26	301	6.40	<0.05	0.2	8	0.05	7.4	2	26	14	24.6	5	<0.05	49
	20/01/2022	124	0.02	23	34	337	7.61	0.07	0.2	11	0.04	7.4	3	27	12	22.4	5	<0.05	6
	02/02/2022	194	0.08	39	54	512	4.48	0.30	0.2	18	0.10	7.4	6	51	14	23.6	8	<0.05	<5
	28/02/2022	75	0.02	22	30	273	7.62	0.11	0.1	10	0.19	7.3	3	25	16	21.0	7	<0.05	<5
	01/03/2022	87	0.02	17	27	261	8.17	0.22	0.1	8	0.16	7.2	3	22	15	21.1	11	<0.05	14
	02/03/2022	52	0.07	11	16	152	7.82	0.37	<0.1	5	0.31	7.0	5	14	5	19.8	16	<0.05	174
	03/03/2022	46	0.04	14	20	175	8.43	0.22	<0.1	6	0.29	7.3	4	16	11	20.3	9	<0.05	102
	04/03/2022	53	0.08	15	23	200	7.70	0.18	0.2	7	0.29	7.0	4	17	12	22.2	9	<0.05	48
	05/03/2022	60	0.09	16	24	237	7.75	0.46	0.2	8	0.26	7.2	3	19	12	20.8	8	<0.05	24
	06/03/2022	56	0.09	16	24	238	7.36	0.20	0.1	8	0.20	7.2	3	19	11	20.3	9	<0.05	34
	07/03/2022	46	0.46	11	15	160	7.51	0.31	<0.1	5	0.21	7.1	4	14	6	22.6	11	<0.05	146
	08/03/2022	46	0.46	11	17	169	7.27	0.26	<0.1	5	0.30	7.0	4	14	10	21.1	8	<0.05	91
	09/03/2022	58	0.76	13	23	214	7.49	0.20	<0.1	7	0.29	7.2	4	18	11	20.7	8	<0.05	56
	10/03/2022	79	1.22	16	30	274	8.50	0.15	0.1	8	0.31	7.7	3	20	14	18.7	7	<0.05	22
	11/03/2022	86	1.15	20	31	275	8.30	0.12	0.1	10	0.30	7.3	4	24	15	19.8	6	<0.05	17
	12/03/2022	92	1.36	19	34	322	8.78	0.25	0.1	10	0.28	7.5	4	23	15	17.6	6	<0.05	8
	13/03/2022	100	1.36	21	35	331	8.39	0.13	0.1	10	0.26	7.5	4	24	16	18.6	6	<0.05	9
	29/03/2022	49	0.37	13	14	162	8.16	0.28	<0.1	6	0.19	7.4	6	14	<1	19.1	12	<0.05	524
	30/03/2022	75	0.89	16	24	271	7.81	0.20	0.1	8	0.26	7.5	4	23	13	19.5	9	<0.05	43
	31/03/2022	74	0.81	16	25	264	8.33	0.22	0.1	8	0.18	7.3	4	23	12	17.9	8	<0.05	49
	01/04/2022	84	1.32	18	31	305	8.35	0.36	0.1	9	0.22	7.4	4	26	13	18.5	6	<0.05	20
	02/04/2022	84	0.91	22	37	312	8.06	0.14	0.1	10	0.18	7.3	4	28	14	16.0	5	<0.05	18
	03/04/2022	89	0.84	22	40	324	8.09	0.12	0.1	10	0.26	7.3	3	28	16	16.5	4	<0.05	13
	04/04/2022	93	0.88	24	35	330	7.77	0.11	0.2	11	0.26	7.3	4	30	16	17.9	5	<0.05	6
	05/04/2022	96	0.19	22	35	327	8.13	0.11	0.3	11	0.21	7.2	3	24	17	17.0	4	<0.05	8
	06/04/2022	70	0.29	17	27	241	8.09	0.14	0.1	8	0.41	7.3	6	21	11	18.1	10	<0.05	214
	08/04/2022	66	0.64	14	25	218	8.12	0.24	0.1	8	0.34	7.0	4	20	14	18.8	5	<0.05	42
	09/04/2022	54	0.54	12	20	177	8.64	0.27	<0.1	6	0.24	7.4	4	16	9	18.7	6	<0.05	97
	10/04/2022	67	1.18	15	26	274	8.25	0.27	0.3	8	0.26	7.3	4	22	13	18.4	6	<0.05	25
	11/04/2022	76	0.50	17	30	243	7.89	0.31	0.1	10	0.30	7.4	4	23	16	18.3	4	<0.05	10
	12/04/2022	78	0.30	19	30	284	8.34	0.22	0.2	9	0.28	7.3	3	22	15	18.3	4	<0.05	10
	13/04/2022	80	0.22	21	33	290	8.69	0.10	0.1	10	0.27	7.3	3	23	16	17.2	4	<0.05	11
	14/04/2022	78	0.40	20	36	305	8.66	0.09	0.1	10	0.26	7.2	3	24	16	16.6	4	<0.05	14
	19/04/2022	90	0.06	25	42	359	8.66	0.09	0.1	12	0.22	7.6	2	31	20	20.5	4	<0.05	5
	22/04/2022	134	1.87	29	55	452	7.78	0.17	0.4	17	0.35	7.5	8	38	18	17.4	8	<0.05	6
	26/04/2022	90	0.13	29	40	389	8.85	0.25	0.1	14	0.20	7.6	3	32	18	17.1	4	<0.05	7
	12/05/2022	83	0.81	18	29	293	8.47	0.22	0.1	8	0.48	7.3	5	27	12	18.7	9	<0.05	42
	24/05/2022	90	0.88	19	33	310	9.29	0.12	0.1	9	0.67	7.7	4	27	14	14.6	8	<0.05	9
	25/05/2022	82	0.91	18	26	281	9.37	0.24	0.2	9	0.61	7.8	5	26	12	14.5	8	<0.05	57
	26/05/2022	85	0.67	18	32	317	9.59	0.18	0.1	8	0.67	7.5	3	25	13	13.3	6	<0.05	18
	27/05/2022	81	0.26	21	34	315	9.68	0.09	0.1	10	0.37	7.3	3	24	15	14.0	5	<0.05	10

		Alkalinity (as calcium carbonate)	Ammonia	Calcium	Chloride	Conductivity	Dissolved Oxygen	Filterable iron	Fluoride	Magnesium	Nitrate as N	pH	Potassium	Sodium	Sulfate	Temperature	Total organic carbon	Total Phenolics	Total suspended solids
Units		mg/L	mg/L	mg/L	mg/L	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	pH	mg/L	mg/L	mg/L	°C	mg/L	mg/L	mg/L
Site Name	Sample Date																		
(Point 34)	05/11/2021	160	<0.01	47	54	554	8.28	<0.05	0.1	21	0.10	7.7	4	38	35	18.1	3	<0.05	<5
	06/11/2021	168	0.03	46	57	544	7.84	0.13	0.1	19	0.08	7.5	3	39	34	17.9	3	<0.05	<5
	08/11/2021	159	0.01	47	58	563	7.32	<0.05	0.1	19	0.04	7.5	3	40	33	22.4	2	<0.05	<5
	15/11/2021	128	<0.01	41	48	495	9.15	<0.05	0.1	17	0.12	7.6	3	37	28	17.0	3	<0.05	6
	22/11/2021	110	0.01	30	39	395	9.02	<0.05	0.1	12	0.30	7.6	3	29	23	19.0	6	<0.05	9
	25/11/2021	160	0.02	38	43	469	7.74	0.07	0.1	16	0.11	7.3	3	35	27	19.5	4	<0.05	<5
	26/11/2021	118	<0.01	34	40	428	9.04	0.09	0.1	13	0.11	7.8	4	34	24	18.1	11	<0.05	44
	11/01/2022	125	0.02	34	35	425	7.94	<0.05	0.2	16	0.11	7.2	3	33	26	21.2	4	<0.05	6
	20/01/2022	143	0.01	31	42	426	9.51	<0.05	0.1	16	0.07	7.6	3	30	22	19.9	4	<0.05	6
	02/02/2022	192	0.05	47	47	514	7.02	<0.05	0.1	20	0.09	7.6	4	36	27	21.1	3	<0.05	<5
	28/02/2022	70	0.04	21	32	291	10.1	0.11	<0.1	11	0.19	7.6	3	24	17	23.0	7	<0.05	18
	01/03/2022	74	0.02	17	30	268	9.75	0.24	0.1	8	0.19	7.7	3	22	17	20.0	8	<0.05	35
	02/03/2022	39	0.05	11	17	139	9.54	0.24	<0.1	5	0.35	7.2	4	12	8	20.7	11	<0.05	250
	03/03/2022	33	0.01	10	17	122	9.91	0.38	<0.1	5	0.21	7.8	4	12	6	19.6	10	<0.05	282
	04/03/2022	44	0.04	15	27	203	9.24	0.18	<0.1	8	0.24	7.4	4	18	14	21.1	8	<0.05	160
	05/03/2022	55	0.02	16	27	245	9.24	0.48	0.1	8	0.20	7.5	3	20	14	19.9	7	<0.05	60
	06/03/2022	52	0.05	16	27	242	9.42	0.21	0.1	8	0.18	7.5	3	20	14	19.5	8	<0.05	62
	07/03/2022	39	0.07	11	18	168	9.00	0.30	<0.1	6	0.24	7.4	4	15	11	21.6	10	<0.05	175
	08/03/2022	42	<0.01	12	22	188	9.26	0.24	<0.1	6	0.27	7.3	4	16	15	20.2	7	<0.05	123
	09/03/2022	54	0.04	16	28	226	9.42	0.17	0.1	8	0.24	7.4	4	18	16	19.3	6	<0.05	190
	10/03/2022	63	0.02	18	33	282	10.3	0.10	<0.1	9	0.23	7.8	3	20	20	17.8	4	<0.05	48
	11/03/2022	79	0.03	22	36	315	10.4	0.05	0.1	11	0.22	7.7	3	24	22	18.9	5	<0.05	26
	12/03/2022	86	0.07	23	40	344	10.8	<0.05	0.1	11	0.21	7.7	3	24	24	16.7	4	<0.05	14
	13/03/2022	86	0.06	25	41	355	10.8	<0.05	0.1	12	0.21	7.8	3	25	24	17.3	4	<0.05	28
	29/03/2022	43	0.04	12	14	160	9.57	0.36	<0.1	6	0.41	7.8	4	13	4	18.8	10	<0.05	342
	30/03/2022	60	0.02	16	26	266	9.27	0.18	<0.1	9	0.25	7.8	3	21	19	18.8	9	<0.05	48
	31/03/2022	69	1.00	17	29	276	9.89	0.18	0.1	9	0.86	7.7	3	22	16	17.3	6	<0.05	54
	01/04/2022	74	0.02	19	32	304	9.85	0.21	0.1	10	0.19	7.4	3	24	19	18.3	5	<0.05	36
	02/04/2022	81	0.04	24	44	325	9.94	0.07	0.1	12	0.18	7.3	3	28	21	15.7	4	<0.05	39
	03/04/2022	88	0.02	25	47	353	9.89	<0.05	0.1	12	0.17	7.5	3	28	23	16.3	3	<0.05	18
	04/04/2022	98	0.04	30	41	376	9.83	<0.05	0.1	14	0.16	7.4	3	31	24	18.0	4	<0.05	13
	05/04/2022	100	<0.01	30	42	395	9.92	<0.05	0.1	14	0.16	7.5	2	28	26	16.5	3	<0.05	14
	06/04/2022	56	0.01	12	20	179	10.1	0.23	0.2	6	0.34	7.4	4	14	8	17.7	11	<0.05	273
	08/04/2022	64	0.01	15	30	246	9.82	0.21	0.1	9	0.30	7.3	3	21	17	18.1	4	<0.05	43
	09/04/2022	43	0.07	10	19	160	9.58	0.30	<0.1	6	0.19	7.4	4	14	9	18.6	6	<0.05	312
	10/04/2022	64	0.02	16	29	268	9.47	0.16	0.1	9	0.21	7.5	3	21	18	18.6	4	<0.05	28
	11/04/2022	64	0.02	20	34	299	9.64	0.25	0.1	11	0.20	7.3	3	24	21	18.6	3	<0.05	18
	12/04/2022	86	0.02	22	36	328	9.55	0.07	0.1	11	0.19	7.4	3	24	23	18.9	4	<0.05	18
	13/04/2022	91	0.03	27	54	356	10.0	<0.05	0.1	12	0.20	7.5	3	27	24	17.1	3	<0.05	14
	14/04/2022	90	0.02	25	42	342	10.2	0.06	0.1	12	0.18	7.3	3	26	22	16.5	4	<0.05	19
	19/04/2022	113	<0.01	30	51	424	9.91	<0.05	0.1	14	0.14	7.7	2	30	29	17.4	3	<0.05	6
	22/04/2022	118	<0.01	36	57	451	10.5	<0.05	0.2	20	0.11	7.6	3	31	30	17.0	3	<0.05	<5
	26/04/2022	122	<0.01	38	58	466	10.7	0.05	0.1	17	0.08	8.1	3	37	28	17.0	3	<0.05	<5
	12/05/2022	65	0.02	17	26	244	9.37	0.21	<0.1	8	0.48	7.3	3	20	16	18.9	8	<0.05	43
	24/05/2022	84	0.01	21	36	317	10.6	0.09	0.1	11	0.30	7.7	2	25	19	14.6	5	<0.05	14
	25/05/2022	96	0.02	19	28	279	10.6	0.20	0.1	10	0.32	7.7	3	24	17	14.4	5	<0.05	18
	26/05/2022	83	0.01	21	36	340	11.0	0.11	0.1	10	0.25	7.5	2	25	18	13.2	5	<0.05	12
	27/05/2022	90	0.04	27	42	376	10.4	<0.05	0.1	13	0.22	7.6	3	29	22	15.0	4	<0.05	14

Table 3: Trade Waste Results 2021-2022

		Ammonia	Biochemical Oxygen Demand	Electrical Conductivity @ 25°C	Temperature	Total Dissolved Solids (Calc.)	Total suspended solids	Volume Discharged	Meter Reading (start)	Meter Reading (finish)	pH (start)	pH (finish)
Units		mg/L	mg/L	µS/cm	°C	mg/L	mg/L	kL	kL	kL	pH	pH
Site Name	Sample Date											
11205 Comp - Composite	01/06/2021	35.0	77	5200		3380	48	316	72316.50	72632.29		
	22/06/2021	18.5	11	3820		2480	26	384	79889.73	80274.10		
	13/07/2021	0.6	12	8620		5600	36	127	83024.20	83150.87		
	03/08/2021	1.1	8	10100		6560	50	79.0	84830.21	84909.26		
	31/08/2021	<0.1	10	10200		6630	38	76.4	86848.65	86925.08		
	06/10/2021	<0.1	7	10700		6960	46	56.5	89349.67	89406.21		
	26/10/2021	5.9	12	7910		5140	37	185	91603.16	91788.13		
	17/11/2021	1.2	3	6470		4200	18	150	95407.91	95558.01		
	29/11/2021	9.5	37	5280		3430	28	204	98912.83	99117.16		
	17/12/2021	29.7	28	5360		3480	35	256	103582.66	103838.87		
	11/01/2022	5.0	23	2110		1370	53	259	107484.02	107743.31		
	03/02/2022	92.4	102	5980		3890	36	314	114004.38	114317.95		
	23/02/2022	72.8	20	6370		4140	10	247	119437.13	119683.95		
	16/03/2022	62.8	26	2680		1740	30	278	124806.93	125085.30		
	10/04/2022	26.6	39	2290		1490	42	271	131870.16	132141.33		
	28/04/2022	47.1	42	3290		2140	23	269	137211.11	137480.24		
	19/05/2022	52.7	66	4710		3060	28	312	142925.94	143237.91		
11205 Dis - Discrete Start	31/05/2021										7.6	
	21/06/2021										8.5	
	12/07/2021										7.3	
	02/08/2021										7.1	
	30/08/2021										7.2	
	05/10/2021										7.3	
	25/10/2021										7.4	
	16/11/2021										7.2	
	30/11/2021										7.8	
	16/12/2021										7.6	
	10/01/2022										7.7	
	02/02/2022										8.3	
	22/02/2022										8.2	
	15/03/2022										8.2	
	09/04/2022										7.6	
	27/04/2022										8.0	
	18/05/2022										8.2	
11205 Dis fin - Discrete Finish	01/06/2021				14							8.5
	22/06/2021				14							7.6
	13/07/2021				16							7.4
	03/08/2021				19							7.3
	31/08/2021				17							7.2
	06/10/2021				18							7.3
	26/10/2021				25							7.4
	17/11/2021				19							7.4
	30/11/2021				22							7.7
	17/12/2021				25							7.4
	11/01/2022				28							7.7
	03/02/2022				26							8.3
	23/02/2022				27							8.0
	16/03/2022				22							8.1
	10/04/2022				22							8.0
	28/04/2022				21							8.2
	19/05/2022				19							7.8
Composite	20/07/2021	16.8				793	<5	20.8	52808.21	52829.06		
	31/08/2021	7.0				610	14	0.100	53012.99	53013.09		
	26/10/2021	5.9				586	53	0.090	53018.94	53019.03		
	08/12/2021	<0.5				682	<5	0.100	53298.77	53298.87		
	16/02/2022	26.0				1030	<5	24.6	53773.57	53798.14		
	14/04/2022	4.5				871	<5	87.3	58522.47	58609.75		
DISCRETE FINISH	20/07/2021				16							6.7
	31/08/2021				17							6.9
	25/10/2021				22							6.7
	08/12/2021				20							7.1
	16/02/2022				25							6.8
	14/04/2022				18							7.3
Discrete Start	19/07/2021										6.8	
	30/08/2021										6.8	
	26/10/2021										6.7	
	07/12/2021										6.8	
	16/02/2022										6.7	
	13/04/2022										7.2	

Table 4: Subsurface Gas Results 2021-2022

			Bal	Baro	CH4	CH4 Peak	CO	CO2	CO2 Peak	Flow	H2S	Relative Pressure	SWL	Well Depth
Units			%	hPa	%v/v	%v/v		%v/v	%v/v	l/h			Meters	Meters
Monitoring Point ID	Sample ID	Sample Date												
21	LFG MW1	7/06/2021	79.2	1018	0	0	0	0	0	0	0	0	2.55	10.2
		16/07/2021	79.2	990	0	0	0	0.1	0.1	0	0	0.05	2.81	10.2
		23/08/2021	79.8	1003	0	0	0	0.1	0.4	1.5	0	0.03	5.18	10.2
		16/09/2021	80	1023	0	0	0	0.2	0.2	0	0	0.07	3.59	10.2
		25/10/2021	78.9	1015	0	0	2	5.1	5.2	0	0	0.03	3.6	10.2
		15/11/2021	79	1006	0	0	1	2.1	2.4	0	0	0.03	3.37	10.2
		13/12/2021	78.8	1014	0	0	0	1.1	1.4	0	0	0.03	2.99	10.2
		24/01/2022	77.9	1007	0	0	0	0.9	0.9	2.8	0	0.05	3.19	10.2
		15/02/2022	79.4	1017	0	0	1	0.2	0.2	0	0	0.05	2.81	10.2
		17/03/2022	79.5	1011	0	0	0	0.1	0.1	0	0	0.03	1.75	10.2
		20/04/2022	79.2	1007	0	0	2	0.1	0.6	0	0	0.02	1.4	10.2
		18/05/2022	78.2	1025	0	0	0	0	0.3	0	0	0.02	1.54	10.2
22	LFG MW2	7/06/2021	80	1017	0	0	0	0.8	0.8	0.1	0	0.03	9.84	10.36
		16/07/2021	80	990	0	0	0	0.7	0.7	0	0	0.02	DRY	10.36
		23/08/2021	79.6	1003	0	0	0	0.1	3.8	0.1	0	0.05	0	10.36
		16/09/2021	81.1	1021	0	0	0	0.5	0.5	0.1	0	0.05	DRY	10.36
		25/10/2021	83.1	1013	0	0	1	1.5	1.5	0.1	0	0.1	DRY	10.36
		15/11/2021	84.7	1005	0	0	1	2.5	2.7	0.1	0	0.03	DRY	10.36
		13/12/2021	82.8	1012	0	0	0	1.7	1.7	0	0	0.03	10.04	10.36
		24/01/2022	78.9	1007	0	0	0	0.02	0.03	0.2	0	-0.02	9.67	10.36
		15/02/2022	80.7	1017	0	0	0	0.8	0.8	0.1	0	0.05	10.28	10.36
		17/03/2022	85.4	1011	0	0	0	3.2	3.2	0	0	0.02	8.91	10.36
		20/04/2022	80.2	1007	0	0	1	0.4	0.7	0	0	0.02	8.75	10.36
		18/05/2022	78.5	1023	0	0	0	0.1	0.2	0	0	0.07	8.89	10.36
23	LFG MW3	7/06/2021	79.5	1013	0	0	0	3.3	3.3	0.1	0	0.09	5.51	10.52
		16/07/2021	79.8	987	0	0	0	4	4	0	0	0.02	5.41	10.52
		23/08/2021	81.6	1003	0	0	0	3.7	9.8	0	0	0.05	7.52	10.52
		16/09/2021	81.6	1017	0	0	0	3.7	3.7	0	0	0.05	5.75	10.52
		25/10/2021	82.4	1009	0	0	1	1.6	1.6	0	0	0.07	5.44	10.52
		15/11/2021	80.1	1001	0	0	0	0.4	0.4	0	0	0.03	5.24	10.52
		13/12/2021	82.9	1009	0	0	0	3.6	3.7	0	0	0.02	5.72	10.52
		24/01/2022	83.7	1007	0	0	0	4.9	4.9	0.2	0	0.05	6.01	10.52
		15/02/2022	83.5	1017	0	0	1	5.5	5.5	0.1	0	0.02	5.28	10.52
		17/03/2022	85.4	1011	0	0	0	2.7	2.7	0	0	0	3.3	10.52
		20/04/2022	84.6	1007	0	0	2	6.5	6.5	0	0	0	5.11	10.52
		18/05/2022	79.9	1016	0	0	0	2.2	2.2	0	0	0.07	3.44	10.52
24	LFG MW4	7/06/2021	82.4	1013	0	0	0	7.9	7.9	0.1	0	0.09	DRY	9.27
		16/07/2021	84	986	0	0	0	11.8	11.8	0.1	0	0.09	DRY	9.27
		23/08/2021	84.5	1003	0	0	0	10.7	10.7	0.1	0	0.02	0	9.27
		16/09/2021	79.9	1016	0	0	0	0.2	0.3	0	0	0.03	DRY	9.27
		25/10/2021	81.8	1004	0	0	1	2.9	2.9	0.1	0	0.05	DRY	9.27
		15/11/2021	80.3	999	0	0	0	0.8	0.8	0	0	0.05	DRY	9.27
		13/12/2021	82.1	1008	0	0	0	3.6	3.6	0	0	0.02	DRY	9.27
		24/01/2022	82.8	1007	0	0	0	6.8	6.8	0.2	0	0	DRY	9.27
		15/02/2022	82.1	1017	0	0	0	4.1	4.1	0	0	-0.05	DRY	9.27
		17/03/2022	85.8	1011	0	0	0	9.2	9.2	0	0	0.07	DRY	9.27
		20/04/2022	79.4	1007	0	0	1	0	0	0	0	0	DRY	9.27
		18/05/2022	78.9	1016	0	0	0	0	1.6	0	0	0	DRY	9.27
25	LFG MW5	7/06/2021	84.6	1012	0	0	0	10.1	10.1	0.1	0	0.05	8.52	12.03
		16/07/2021	85.4	985	0	0	0	10.4	10.4	0.1	0	0.02	10.03	12.03
		23/08/2021	79.7	1003	0	0	0	0	3.7	0.1	0	0	12.4	12.03
		16/09/2021	79.8	1015	0	0	0	9.5	9.5	0	0	-0.09	11.31	12.03
		25/10/2021	79.1	1007	0	0	1	8.3	8.3	0	0	0.05	11.11	12.03
		15/11/2021	82.1	999	0	0	1	9.7	9.8	0	0	0.02	10.61	12.03
		13/12/2021	84.4	1007	0	0	0	9.3	9.3	0	0	0.02	10.61	12.03
		24/01/2022	79.5	1007	0	0	0	0.8	0.8	0.1	0	0.07	10.37	12.03
		15/02/2022	79.5	1017	0	0	1	0.4	0.4	0	0	0.09	10.4	12.03
		17/03/2022	81.1	1011	0	0	0	2.4	2.4	0	0	0.03	8.07	12.03
		20/04/2022	79.8	1008	0	0	1	0.2	0.2	0	0	0.02	7.82	12.03
		18/05/2022	79.9	1016	0	0	0	1	1	0	0	0	8.07	12.03
26	LFG MW6	7/06/2021	80	1012	0	0	0	1.4	1.4	0.1	0	0.01	DRY	10.85
		16/07/2021	81.5	986	0	0	0	6.8	6.8	0.1	0	0.02	DRY	10.85
		23/08/2021	81.7	1003	0	0	0	4	4	0.1	0	0.03	0	10.85
		16/09/2021	80.7	1015	0	0	0	0.2	0.2	0.1	0	0.09	DRY	10.85
		25/10/2021	80.8	1007	0	0	1	1.6	1.6	0	0	0.05	DRY	10.85
		15/11/2021	79.5	998	0	0	1	0.1	0.1	0	0	0.03	DRY	10.85
		13/12/2021	80.3	1006	0	0	0	3.4	3.4	0	0	0.03	DRY	10.85
		24/01/2022	80	1007	0	0	1	3.1	3.1	0.1	0	0.05	DRY	10.85
		15/02/2022	79.4	1017	0	0	1	0.1	0.1	0	0	0.05	DRY	10.85
		17/03/2022	79.7	1011	0	0	0	0.3	0.3	0	0	-0.02	DRY	10.85
		20/04/2022	80.3	1008	0	0	1	0	0	0	0	0.03	DRY	10.85
		18/05/2022	79	1017	0	0	0	0.1	0.3	0	0	0.02	DRY	10.85
27	LFG MW7	7/06/2021	80.1	1012	0	0	0	0.5	0.6	0.1	0	0.05	7.1	12.33
		16/07/2021	79.7	987	0	0	0	1.1	1.1	0.1	0	0.03	7.25	12.33
		23/08/2021	80.7	1003	0	0	0	1	1.1	0	0	0.05	9.69	12.33
		16/09/2021	80.7	1015	0	0	0	0.7	1.4	0	0	0	7.93	12.33
		25/10/2021	80.3	1000	0	0	1	0.1	0.5	0.1	0	0.05	7.97	12.33
		15/11/2021	80.1	999	0	0	1	0.4	0.5	0	0	0.07	7.9	12.33
		13/12/2021	80.2	1007	0	0	0	0.8	0.8	0	0	0.02	7.65	12.33
		24/01/2022	81	1007	0	0	0	2.5	3.1	0.2	0	0.07	8.38	12.33
		15/02/2022	79.9	1017	0	0	0	0.1	0.1	0	0	0.08	7.25	12.33
		17/03/2022	79.9	1011	0	0	0	1.1	1.6	0	0	0.05	6.18	12.33
		20/04/2022	80.2	1008	0	0	1	0.5	1.1	0	0	0.02	5.72	12.33
		18/05/2022	78.8	1017	0	0	0	0.3	1.4	0	0	0	6.18	12.33
28	LFG MW8	7/06/2021	79.3	1013	0	0	0	0.1	0.1	0	0	0.03	7.5	10.37
		16/07/2021	79	987	0	0	0	0.4	0.5	0	0	0	7.55	10.37
		23/08/2021	80	1003	0	0	0	0.1	0.1	0	0	0.03	9.23	10.37
		16/09/2021	79.4	1016	0	0	0	0.5	0.6	0	0	0.05	7.65	10.37
		25/10/2021	79.9	1008	0	0	1	0.3	0.3	0	0	0.01	7.4	10.37
		15/11/2021	79.5	1000	0	0	0	0.1	0.2	0	0	0.07	7.09	10.37
		13/12/2021	79.7	1007	0	0	0	0.1	0.1	0	0	0.03	6.52	10.37
		24/01/2022	78.9	1007	0	0	0	0.1	0.4	0.1	0	0.03	7.16	10.37
		15/02/2022	79.1	1017	0	0	0	0.1	0.1	0	0	-0.03	6.69	10.37
		17/03/2022	78.1	1011	0	0	0	2.3	2.3	0	0	0.03	5.37	10.37
		20/04/2022	79.6	1008	0	0	0	0.1	0.1	0	0	0.07	4.99	10.37
		18/05/2022	78.6	1017	0	0	0	0	0.2	0	0	0.12	5.38	10.37
29	LFG MW9	7/06/2021	78.3	1013	0	0	0	2.4	2.4	0.1	0	0.1	6.16	10.7
		16/07/2021	78.8	987	0	0	0	1.1	1.1	0.1	0	-0.02	6.1	10.7
		23/08/2021	79.4	1003	0	0	0	0.8	1.2	0.1	0	-0.05	9.58	10.7
		16/09/2021	79.4	1016	0	0	0	1.1	1.1	0	0	0.07	6.62	10.7
		25/10/2021	80.4	1008	0	0	0	1.6	1.6	0	0	0.1	5.56	10.7
		15/11/2021	79.5	1000	0	0	0	0.1	0.1	0.1	0	0.05	4.15	10.7
		13/12/2021	80	1007	0	0	0	1.3	1.3	0	0	0.02	4.72	10.7
		24/01/2022	81.9	1007	0	0	0	3.2	3.3	0.1	0	0.12	5.17	10.7
		15/02/2022	80.5	1017	0	0	0	2.1	2.1	0.1	0	0	4.64	10.7
		17/03/2022	86.4	1011	0	0	0	3.2	3.2	0.1	0	0.02	2	10.7
		20/04/2022	80.2	1008	0	0	0	1.3	1.3	0	0	0.02	3.42	10.7
		18/05/2022	78.4	1017	0	0	0	1.6	1.6	0	0	0	3.32	10.7
30	LFG MW10	7/06/2021	79.3	1014	0	0	0	1.1	1.1	0	0	0	9.57	12.38
		16/07/2021	79.5	988	0	0	0	1.4	1.4	0	0	0.02	9.96	12.38
		23/08/2021	79.4	1003	0	0	0	1.1	1.1	0	0	0.05	12.14	12.38
		16/09/2021	79.8	1016	0	0	0	1.4	1.4	0.1	0	0.02	9.28	12.38
		25/10/2021	82.2	1008	0	0	0	2.1	2.1	0	0	0.1	10.12	12.38
		15/11/2021	80.6	1000	0	0	0	3.2	3.2	0	0	0.02	9.92	12.38
		13/12/2021	81	1007	0	0	0	3.1	3.1	0	0	0.03	9.85	12.38
		24/01/2022	81.9	1007	0	0	1	3.3	5.7	0.1	0	0.12	10.61	12.38
		15/02/2022	82	1017	0	0	0	3.9	3.9	0	0	0	9.88	12.38
		17/03/2022	80.3	1011	0	0	0	1.5	1.5	0.1	0	0.02	9.32	12.38
		20/04/2022	90.9	1008	0	0	0	2.3	2.3	0	0	0	9.04	12.38
		18/05/2022	80.8	1018	0	0	0	2.2	2.3	0	0	0.03	8.88	12.38
31	LFG MW11	7/06/2021	78.8	1014	0	0	0	1.8	1.8	0	0	0.05	5.28	9.36
		16/07/2021	79.7	988	0	0	0	2.4	2.4	0	0	0	5.08	9.36
		23/08/2021	80.8	1003	0	0	0	1.5	4.4	0	0	0.07	7.46	9.36
		16/09/2021	81.4	1016	0	0	0	3.3	3.3	0.1	0	-0.03	5.38	9.36
		25/10/2021	83.6	1009	0	0	1	6.1	6.1	0	0	0.03	6.76	9.36
		15/11/2021	84.4	1000	0	0	1	10.5	10.5	0	0	0.02	4.59	9.36
		13/12/2021	81	1008	0	0	0	7.7	7.7	0	0	0.05	4.84	9.36
		24/01/2022	80.5	1007	0	0	0	6	6	0	0	0.02	5.44	9.36
		15/02/2022	79.3	1017	0	0	1	7.8	7.8	0.1	0	-0.02	4.66	9.36
		17/03/2022	83	1011	0	0	0	3.2	3.2	0	0	<0.03	3.95	9.36
		20/04/2022	83	1008	0	0	0	3.2	3.2	0	0	0.02	4.81	9.36
		18/05/2022	81.5	1018	0	0	0	2.3	2.3	0	0	0	3.77	9.36
32	LFG MW12	7/06/2021	83.6	1015	0	0	0	7.1	7.1	0	0	0.03	4.98	10.46
		16/07/2021	81.4	988	0	0	0	8	8	0	0	0.03	4.89	10.46
		23/08/2021	82.2	1003	0	0	0	4.6	4.6	0	0	0.02	6.96	10.46
		16/09/2021	84.2	1016	0	0	0	7	7	0	0	0.03	5.1	10.46
		25/10/2021	87.6	1009	0	0	0	7.2	7.2	0	0	-0.03	4.84	10.46
		15/11/2021	86.3	1000	0	0	0	6.4	6.4	0.1	0	0.1	4.48	10.46
		13/12/2021	83.8	1008	0	0	0	6.2	6.2	0.1	0	0.02	4.75	10.46
		24/01/2022	83.4	1007	0	0	0	4.8	4.8	0	0	-0.02	5.61	10.46
		15/02/2022	83	1017	0	0	0	6.6	6.6	0	0	0.03	4.73	10.46
		17/03/2022	91.9	1012	0	0	0	5.6	5.6	0	0	<0.02	4.49	10.46
		20/04/2022	91.5	1008	0	0	0	4.5	4.5	0.1	0	0	4.5	10.46
		18/05/2022	90	1018	0	0	0	4.5	4.5	0	0	0	3.9	10.46

Table 5: Surface Gas Results 2021-2022

		8/06/2021	14/07/2021	30/08/2021	17/09/2021	18/10/2021	16/11/2021	17/12/2021	31/01/2022	22/02/2022	22/03/2022	20/04/2022	19/05/2022
Units		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Location	Sample Number												
Transect 2	1				7.1	1.5	1.4	1.2	2.2				
	2				5.8	2.3	1.3	1.5	2.5				
	3				10.5	8.3	1.4	1.5	2.3				
	4				6.8	6.9	1.2	1.4	2				
Transect 3	1			1.1	6.6	10.4	1.5	2.2	3.9				
	2			5.8	8.5	5.9	1.6	4.2	57.8				
	3			3.1	1.6	7.9	1.3	2.2	2.6				
	4			1.5	7	5.4	1.2	1.8	2.2				
	5			1.5	10.2	16.6	1						
Transect 4	1	15.6	9.7	2.9	8.4	6.6	1.4	2.1	2.7				
	2	10.5	13	2.1	8.4	4.2	1.3	1.4	2.4				
	3	12.5	8.9	1.6	1.6	2.4	1.2	1.3	2.2				
	4	12.5	11.7	0.9	1.6	1.9	1.6	0.9	2.3				
	5		10.2	1.2									
	6		12.8										
	7		5.5										
Transect 5	1		24.9	4.1	7.1	2.1	1.2	2.7					
	2		4.1	3.4	6.3	0.9	1.4	2.5					
	3		3.2	10.8	9.3	1.2	1	2.3					
	4		6.2	2.1	4.9	12.3	1.3	2					
	5		6.3			2.2							
	6		15.2										
Transect 6	1	45.3	12.1	160	4.2	2.5	3.1	1.9	4.4				
	2	13.6	12.6	1.6	4.1	13.1	1.4	3	3.1				
	3	9.8	15.8	6.4	7.1	3.3	1	3.6	3.5				
	4	9.7	12.6	6.2	7.8	5.3	1.2	2.2	3.3				
	5	18	13.3	4.6	14.6	5.6	1.2	3.3	3.3				
	6		13.7	3.4		11.5							
	7		16.5			10.2							
Transect 7	1		1005	40.9	13.3	86.9	1.6						
	2		138.6	20.2	9.4	9.9	1.9						
	3		16.8	7.3	10.3	22.3	2.9						
	4		14.7	13.1	9.1	3.1	6.3						
	5		15.8	4		17.8	1.6						
	6		13.7			19.6							
Transect 8	1	213.6	53.8			16.1							
	2	29.3	38.4			11.2							
	3	42.9	45.9			17.1							
	4	430.3	19.6			16.9							
	5		72.1			18.3							
	6		36.3										
Transect 9	1		33.9										
	2		32.5										
	3		168										
	4		26.2										
	5		13.1										
	6		21.2										
Transect 10	1	3.1	2.2	1	3.3	2.9	3.3	1.4	2	9.8	2.4	0	7.9
	10	29.6	15.4	2	6.2	15.9	0.4	8.9	2.5	12	2.6	1.7	9.1
	11	6.3	7.1	2.1	2.7	3.4	0.3	1.8	2.3	4.2	2.5	0	14
	12	13.6	2.6	1.6	2.3	2.5	0.6	1.6	2.2			0	4.8
	13	4.7	2.6	3.1	2.5	3.4	0.6					13.1	2.8
	14			1.6			0.6					0	11.2
	15						2.3					0	4
	16						10.9						
	2	3.4	2.2	0.9	3.6	2.9	0.6	1.3	2	3.4	2.4	14.5	7.3
	3	17.3	2.3	0.8	3.3	2.2	0.6	1.4	2.1	2.8	2.7	13.9	5.8
	4	10.9	12.9	1.7	3.2	1.4	1.2	1.8	2	2.7	2.3	13.1	2.8
	5	29.5	2.9	1.1	6.8	6.5	0.8	1.7	2	2.7	18	0	4.5
	6	24.7	19.6	5	6.7	3.5	1.3	15.6	33.6	6.1	2.5	0	3.9
	7	12.4	6.8	2.2	5	47.7	73.4	3	2.2	11.3	5.4	0	3.6
	8	18.2	14.1	1.9	5.5	1.6	0.6	6.5	2.2	7.2	5	0	2.7
	9	8.7	11.2	45.2	3.6	2.8	0.2	2.2	3.3	4.3	3.1	0	5.5
Transect 11	1	8.9	11.9	2.4	5.8	1.1	1.2	1.7	2.4	9.2	3.8	0	3.9
	2	17.2	4.2	2	8.1	5.7	1.9	1.4	2.8	4.6	18	13.8	12.2
	3	11.6	14.5	4.5	1.1	45.8	3.3	3.9	2.9	3.4	12.1	10	12.5
	4	10.3	11	10.2	8.3	16.8	3.6	5.5	2.3	28.2	36.5	64.9	4.3
	5	12.8	17.3	4.6	4.6	6.8	14.3	5.7	20.6	21.6	6.1		28.2
	6	40.6	12.4	1.6	19.8	14.2	5.9	2.4	9.2	11	13.6		
	7	50.3	16.3	2.9	6.1	8.8	4.7	1.4	5.8				
	8	22.6	25.8		7.1	20.6	3.9	74.3	2.6				
Transect 12	1	20.3	20.8	14.2	4.2	10.3	12	12.3	5.2	43.4	29.9	75.1	33.1
	2	16.3	21.8	23.7	7.1	11.5	18.8	12.5	7.3	33.1	30	30.6	40.1
	3	28.9	213	110.1	6.8	15.1	7.9	17.8	5.4	10.6	128	60	35
	4	16.4	37.6	12.6	5.6	24.2	2.5	5.5	14.5	23.1	20	20.8	20.6
	5	16.2	12.4	7.6	6.6	12.5	6.3	10.3	6.6	16.6	11.8	26.4	8.3
	6	23.4	5		8.9	31.8	23.3		9.7	27.8	7.2	13.6	
	7	25.2	49.1		8.4	92.7	33.4					13.3	
	8		23.6		9.4	1.7							
Transect A	1	3.1	2.2	8.6	1.6	1.3	5.8	17.1	2.5	2.3	2.3	0	2.1
	2	3.3	2.2	4.3	1.8	7.2	4.6	2.8	2.9	2.3	2.3	0	1.9
	3	3.1	2.2	3.8	1.9	1.3	4.6	2.3	3.2	2.3	2.3	0	2
	4	3.2	2.2	5.3	2.1	1.3	2.5	0.8	2.8	2.3	2.2	0	2
	5	3.1			2.5	1.2						0	2
	6												2
Transect C	1	3	2.1	3.9	2.4	1.3	1.9	1.5	2.8	2.3	2.4	0	2.4
	2	3	2.1	3.7	2.8	1.3	4.6	1	2.3	2.3	2.4	0	2.2
	3	2.8	2.1	4.8	3.6	1.1	4	0.8	4.8	2.2	2.4	0	2.2
	4	3.7	2.1	2	3	1.1	4.2	0.8	3.3	2.5	2.7	0	2.8
	5	3	2.2	17.1	3.2	1.1	14.3	2.5	12.6	2.2	2.4	0	3.6
	6	3	2.4	4.5	3.4	5.2	6.3	6.5	12.2	2.2	2.3	0	3.9
	7	3.7	2.2	19.1	2.4	31.3	6.8	1	11.1	2.2	2.7	0	3.9
	8	3.2	2.2	5.7	2.2	15.6	1.2	0.9	7.4	2.2	2.3	0	3.3
	9		2.6										
Transect D	1	2.9	2.5	1.4	1.8	3.3	3.5	1.3	10.5	2.1	2.3		
	2	3.3	2.6	1.3	2	5.1	2.5	1.2	5.3	2.1	2.3		
	3	3.3	2.5	1.5	2.5	11.8	4	0.8	7.6	2.1	2.4		
	4	3.2	2.7	1.7	4.2	5.9	2.1	1	3.5	2.2	7		
	5	5.1	2.3	1.5	3	9.1	2.6	0.8	4.9	2.2			
	6					2.3	2.3						

		8/06/2021	14/07/2021	30/08/2021	17/09/2021	18/10/2021	16/11/2021	17/12/2021	31/01/2022	22/02/2022	22/03/2022	20/04/2022	19/05/2022
Units		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Location	Sample Number												
Transect E	1	2.3	2.3	1.4	2.6	4	3.7	1	5.1	2.1	2.6		
	2	2.4	2.2	1.2	2.3	6.1	2.1	1.2	7.4	2.1	2.4		
	3	2.5	2.2	2.3	1.8	3.9	2.8	1.2	5.4	2.1	2.3		
	4	2.5	2.3	1.7	1.7	8.5	2.4	1.1	6.9	2.2			
	5	2.6	2.4	1.9	1.5	9.1	2.6	1	8.4	2.2			
	6	2.7	2.3	1.3	1.5	7.6	6.2	1	6.6				
	7				2.1	7.3							
Transect F	1	3.1	2.4	1	2.4	1.6	10.4	0.8	4.2	2	2.2		
	2	3	2.4	1	2	1.5	2.4	1.1	2.4	2	2.2		
	3	2.4	2.4	1.2	2.1	1.3	3	1.1	2.4	2	2.5		
	4	2.2	2.6	1	2.1	1.4	1.7	1.4	2.6	2	2.2		
	5	2.1	4.7	1.1	2.3	7.2	1.3	1.5	2.5	2	2.4		
	6	2.1	2.6	1.2	2.2	1.9	2.8	1.3	2.3	2.1			
	7	2.6	2.3	1.2	2.1	3.3	2.2	1.5	2.3	2.1			
	8		2.2	1.1	2.3	3.3	2		2.4	2.1			
Transect G	1	44.3	3.2	0.6	2.4	1.2	2.5	1	3	2	2		
	2	2.5	3	0.7	3.7	1.2	3.1	0.9	4.9	2	2		
	3	2.7	2.3	0.7	1.6	3.7	2.2	1.1	2.6	2			
	4	1.9	2.3	0.7	1.7	7.8	5.3	1.3	3.6	2			
	5	1.7	2.3	1.3	1.8	1.6	2.2	1.2	3.8	2			
	6	2.2	2.8	0.7	2.6	1.4	2.4	1.2	3.6	2			
	7	1.9	3.6	0.7		1.6	2.1						
	8	2					4.4						
Transect H	1	3.6	3	0.6	2.5	3.9	4	0.8	2.4	2.4	2.3	0	17
	2	3.3	2.6	0.7	2.5	2	4.5	0.9	5.9	5.9	2.3	0	2.5
	3	3.6	2.3	0.4	2.8	2.2	5.3	0.9	5.1	5.1	2.3	0	2.3
	4	3.3	2.5	0.3	2.3	1.5	2.4	2.5	4.3	4.3	2.3	0	2.1
	5	3.2	2.4	0.6	2.6	1.8	3.8	1.2	2.9	2.9	2.3	0	2
	6	3.4	13.3	0.3	2.4	1.6	3.5	1	4	4	2.3	0	2.7
	7				2.6		1.7		3.2				
Transect I	1	98.8	6.8	1.8	3.2	8.4	2	1.6	5.2	2.3	2.6	0	7.8
	2	2.6	2.3	1.4	2.5	1.9	3.6	0.8	2.3	2.2	2.3	0	8
	3	2.1	2.2	1.5	2.2	1.9	4.6	0.5	2.4	2.2	2.3	0	7.2
	4	2.6	2.2	1.3	2.1	2.7	2	0.5	2.8	2.2	2.3	0	7
	5	2.5	2.2	1.3	2.2	1.7	2.6	0.9	2.3	2.2	5.8	0	11.2
	6	2.3	3.7	1.3	2	2.6	3.4	0.7	2.6	2.2	2.4	0	18.2
	7								2.2				24.2
Transect J	1	6.3	16.4	1.8	2.3	1.2	4.1	0.9	2.3	2.3	2.5	0	4.9
	2	3.5	2.3	1.9	1.6	1.3	3.9	0.9	2.5	2.3	4	0	3.4
	3	2.8	2.2	1.7	1.5	1.4	4.5	1.6	2.7	2.2	2.8	0	3.3
	4	2.4	3.1	1.7	1.4	1.4	1.8	0.9	2.7	2.2	2.5	0	3.2
	5	2.4	2.1	1.7	1.4	1.4	1.6	0.8	2.8	2.2	2.7	0	3.2
	6			1.7	1.3	1.5	1.4	1			2.6	0	3.8
	7											0	7.1
Transect K	1	4.3	5.3	2.2	2.5	1.2	4.1	1.6	2.6	2.6	2.5	0	3.3
	2	2.9	2.5	1.9	1.6	1.4	3.9	1.2	2.6	2.6	2.5	0	7
	3	2.1	30.3	3.2	5.1	1.2	4.5	69.9	10.8	10.8	2.4	0	8.8
	4	7	2.5	1.6	1.9	0.8	1.8	1.3	2.3	2.3	8.6	0	13.8
	5	2	228	2	2.4	0.8	1.6	1	2.5	2.5	2.4	0	4.3
	6	88.8	2.4	2.3	2	1.2	1.4	0.9		2.3	2.7	0	3.6
Transect L	1	2.2	3.3	1.9	1.9	0.8	1.2	0.9	2.4	2.2	2.9	0	15.4
	2	3.3	37.9	5.1	19.8	9.8	1.2	160	2.4	2.1	3	0	4.9
	3	16.6	2.2	92	2.2	9.9	2.1	3.3	2.2	2.1	2.6	0	37.1
	4	436	6.9	68.2	2.5	6	1.3	3.4	2.2	2.1	16.5	0	3.7
	5	105.3	25.5	18.2	8.3	96.3	1.5	3.7	2.7	2.1		0	5.5
	6	104.1	45.2			1.2	1.5			2.1		0	3.7
Transect M	1	7.8	2.7	8.4	2.1	3	1.4	3.9	5.1	2	3	0	4.1
	2	46.5	2.1	4.1	1.9	73.2	1.4	8.8	7.6	2	25	0	5
	3	2.6	2.2	35.9	2.1	1.2	2.9	1.3	12.3	2.1	2.4	0	5.1
	4	2.5	2.8	0.9	1.9	1.6	1.4	50.7	2.6	2.5	25.2	0	4.1
	5	2.1	2.1	0.7	2.1	9.4	1.4	3.2			2.5	0	3.1
	6	2.1	2.2			1.4	1.4	1.8			2.9	0	
Transect N	1	1.9	2.1	1.2	4	1.6	2	1.9	2.9	2.1	2.4	0	5
	2	1.9	2.1	0.8	2.2	4.6	1.8	1.4	2.5	2.1	2.4	0	3.1
	3	1.9	2.2	3.5	2	2	1.6	1.3	7.8	2	2.4	0	3.5
	4	1.9	2.1	5.7	2.2	2.2	2	4.5	4.3	2	2.4	0	3.1
	5	18	2.6	2.1	2	2.5	2.3	8.8			2.4	0	5.7
	6		94.3		1.9	2.6		1.8			8.1	0	
181 Reddalls Rd, fenceline adjoining landfill	1	2.2	2.3	1.4	2.2	1.4	1.3	1					3.7
	3	2.2	2.2	1.6	2	1.6	1.2	1					6.6
	5	2.4	2.3	1.6	2.2	1.7	1.2	0.9					3
	7	2.5	2.3	1.8	1.8	1.4	1.1	0.5					3.2
	8	2.5	2.3	1.8	2.1	1.4	1.2	0.6	2.1				3.3
181 Reddalls Rd, Immediate gardens max value	1	2.4	2.3	1.9	2	1.5	1.1	0.7	2.1				3.3
	2	2.2	2.2	1.4	2.1	1.5	1.2	1.1					4.6
	4	2.3	2.3	1.5	2	1.6	1.1	1					4.3
	6	2.4	2.3	1.7	2.1	1.5	1	0.6					4.1
Methane Blank (Post testing)	1	2.9	2.2	2.2	2.1	1.1	1	1.1	1.8	2.1	2.8	0	2.5
Methane Blank (Pre testing)	1	2.8	2.3	2.3	2.1	1	0.8	1.1	1.9	2.3	2.7	0	2.2

Table 6: Respirable Dust Results 2021-2022

Site Name			Glengarry Cottage PM10	Glengarry Cottage TSP	Landfill PM10	Landfill TSP
Sample Date	Chemical Name	Units				
19/05/2022	PM10	µg/m³			2.2	
	PM10 (mass per filter)	mg/filter			3.5	
	Total Suspended Particulates	µg/m³				8.6
	Total Suspended Particulates (mass per filter)	mg/filter				13.4
18/05/2022	PM10	µg/m³	6.3			
	PM10 (mass per filter)	mg/filter	9.7			
	Total Suspended Particulates	µg/m³		20.0		
	Total Suspended Particulates (mass per filter)	mg/filter		30.9		
20/04/2022	PM10	µg/m³			2.9	
	PM10 (mass per filter)	mg/filter			4.3	
	Total Suspended Particulates	µg/m³				6.8
	Total Suspended Particulates (mass per filter)	mg/filter				10.3
19/04/2022	PM10	µg/m³	11.1			
	PM10 (mass per filter)	mg/filter	16.4			
	Total Suspended Particulates	µg/m³		20.9		
	Total Suspended Particulates (mass per filter)	mg/filter		31.3		
17/03/2022	PM10	µg/m³			15.5	
	PM10 (mass per filter)	mg/filter			22.8	
	Total Suspended Particulates	µg/m³				27.9
	Total Suspended Particulates (mass per filter)	mg/filter				41.4
16/03/2022	PM10	µg/m³	12.7			
	PM10 (mass per filter)	mg/filter	19.0			
	Total Suspended Particulates	µg/m³		38.6		
	Total Suspended Particulates (mass per filter)	mg/filter		58.6		
03/02/2022	PM10	µg/m³			13.0	
	PM10 (mass per filter)	mg/filter			19.2	
	Total Suspended Particulates	µg/m³				21.7
	Total Suspended Particulates (mass per filter)	mg/filter				32.4
02/02/2022	PM10	µg/m³	12.4			
	PM10 (mass per filter)	mg/filter	18.4			
	Total Suspended Particulates	µg/m³		35.4		
	Total Suspended Particulates (mass per filter)	mg/filter		53.1		
11/01/2022	PM10	µg/m³			14.7	
	PM10 (mass per filter)	mg/filter			21.7	
	Total Suspended Particulates	µg/m³				21.1
	Total Suspended Particulates (mass per filter)	mg/filter				31.5
10/01/2022	PM10	µg/m³	25.7			
	PM10 (mass per filter)	mg/filter	37.8			
	Total Suspended Particulates	µg/m³		52.9		
	Total Suspended Particulates (mass per filter)	mg/filter		78.7		

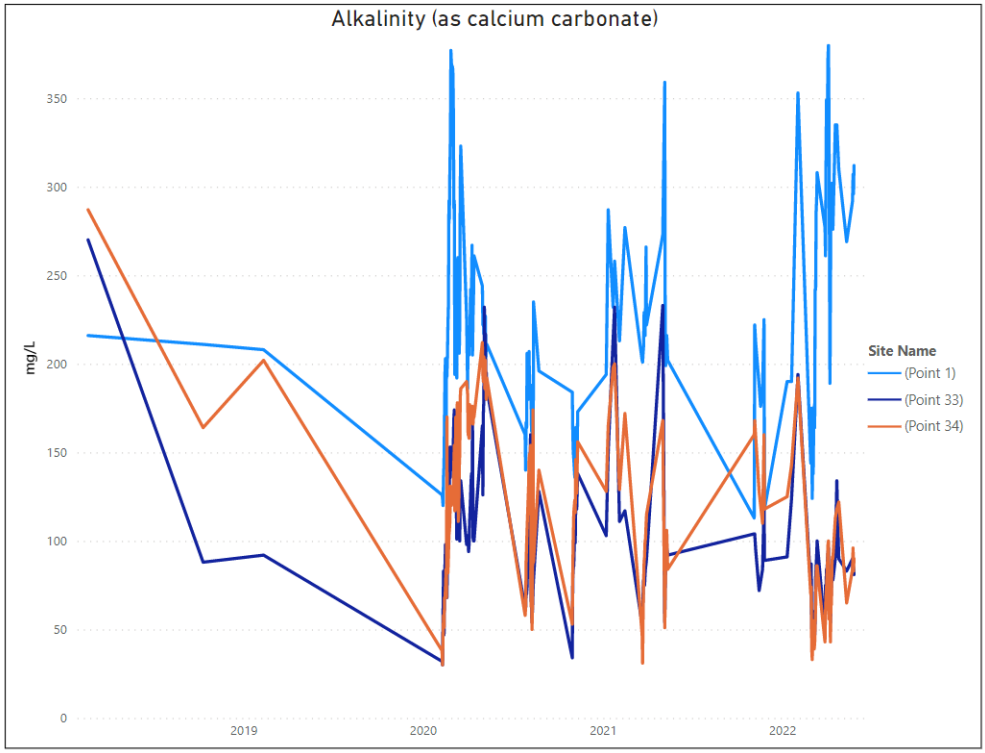
Site Name			Glengarry Cottage PM10	Glengarry Cottage TSP	Landfill PM10	Landfill TSP
Sample Date	Chemical Name	Units				
02/12/2021	PM10	µg/m³			13.3	
	PM10 (mass per filter)	mg/filter			19.5	
	Total Suspended Particulates	µg/m³				24.7
	Total Suspended Particulates (mass per filter)	mg/filter				36.6
01/12/2021	PM10	µg/m³	20.9			
	PM10 (mass per filter)	mg/filter	31.1			
	Total Suspended Particulates	µg/m³		45.0		
	Total Suspended Particulates (mass per filter)	mg/filter		67.4		
16/11/2021	PM10	µg/m³			7.9	
	PM10 (mass per filter)	mg/filter			11.9	
	Total Suspended Particulates	µg/m³				18.4
	Total Suspended Particulates (mass per filter)	mg/filter				28.0
15/11/2021	PM10	µg/m³	7.8			
	PM10 (mass per filter)	mg/filter	11.8			
	Total Suspended Particulates	µg/m³		17.0		
	Total Suspended Particulates (mass per filter)	mg/filter		25.7		
26/10/2021	PM10	µg/m³			11.8	
	PM10 (mass per filter)	mg/filter			17.7	
	Total Suspended Particulates	µg/m³				27.7
	Total Suspended Particulates (mass per filter)	mg/filter				41.9
25/10/2021	PM10	µg/m³	16.3			
	PM10 (mass per filter)	mg/filter	24.7			
	Total Suspended Particulates	µg/m³		37.7		
	Total Suspended Particulates (mass per filter)	mg/filter		57.6		
16/09/2021	PM10	µg/m³			3.8	
	PM10 (mass per filter)	mg/filter			5.8	
	Total Suspended Particulates	µg/m³				10.3
	Total Suspended Particulates (mass per filter)	mg/filter				15.8
15/09/2021	PM10	µg/m³	3.9			
	PM10 (mass per filter)	mg/filter	6.0			
	Total Suspended Particulates	µg/m³		10.9		
	Total Suspended Particulates (mass per filter)	mg/filter		16.9		
25/08/2021	PM10	µg/m³			0.8	
	PM10 (mass per filter)	mg/filter			1.3	
	Total Suspended Particulates	µg/m³				3.8
	Total Suspended Particulates (mass per filter)	mg/filter				5.8
23/08/2021	PM10	µg/m³	10.7			
	PM10 (mass per filter)	mg/filter	16.1			
	Total Suspended Particulates	µg/m³		24.0		
	Total Suspended Particulates (mass per filter)	mg/filter		36.2		
13/07/2021	PM10	µg/m³			5.7	
	PM10 (mass per filter)	mg/filter			8.6	
	Total Suspended Particulates	µg/m³				8.9
	Total Suspended Particulates (mass per filter)	mg/filter				13.5
12/07/2021	PM10	µg/m³	14.6			
	PM10 (mass per filter)	mg/filter	22.4			
	Total Suspended Particulates	µg/m³		36.2		
	Total Suspended Particulates (mass per filter)	mg/filter		56.1		
08/06/2021	PM10	µg/m³			3.2	
	PM10 (mass per filter)	mg/filter			4.8	
	Total Suspended Particulates	µg/m³				6.7
	Total Suspended Particulates (mass per filter)	mg/filter				10.2
07/06/2021	PM10	µg/m³	19.9			
	PM10 (mass per filter)	mg/filter	30.3			
	Total Suspended Particulates	µg/m³		48.0		
	Total Suspended Particulates (mass per filter)	mg/filter		73.5		

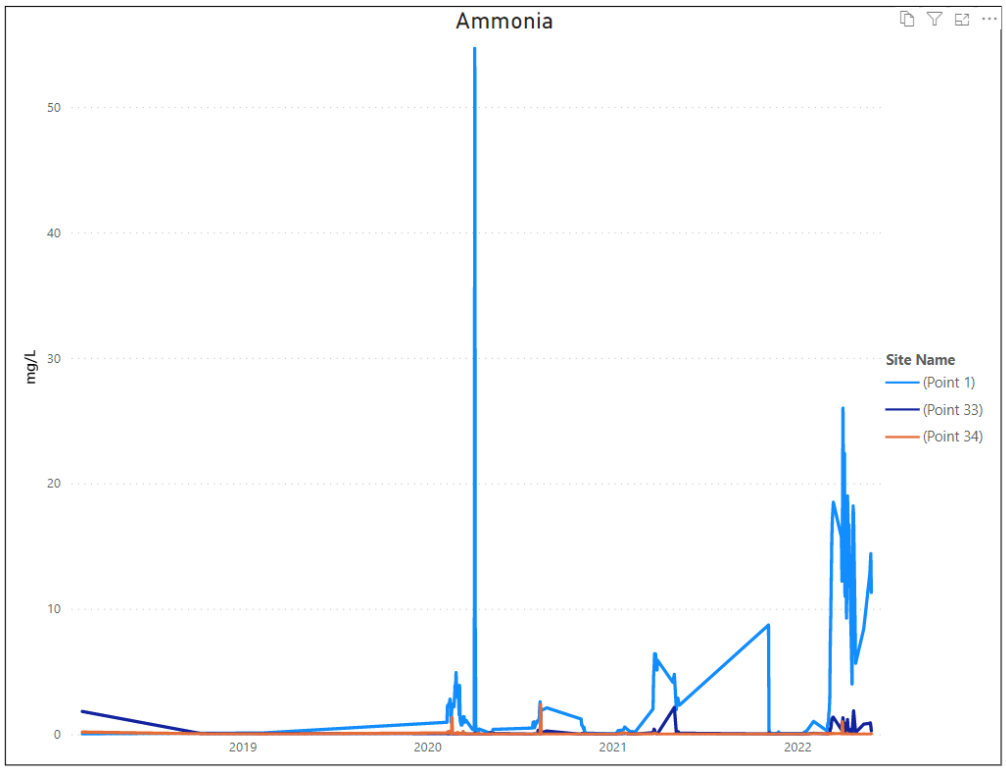
Table 7: Dust Deposition Results 2021-2022

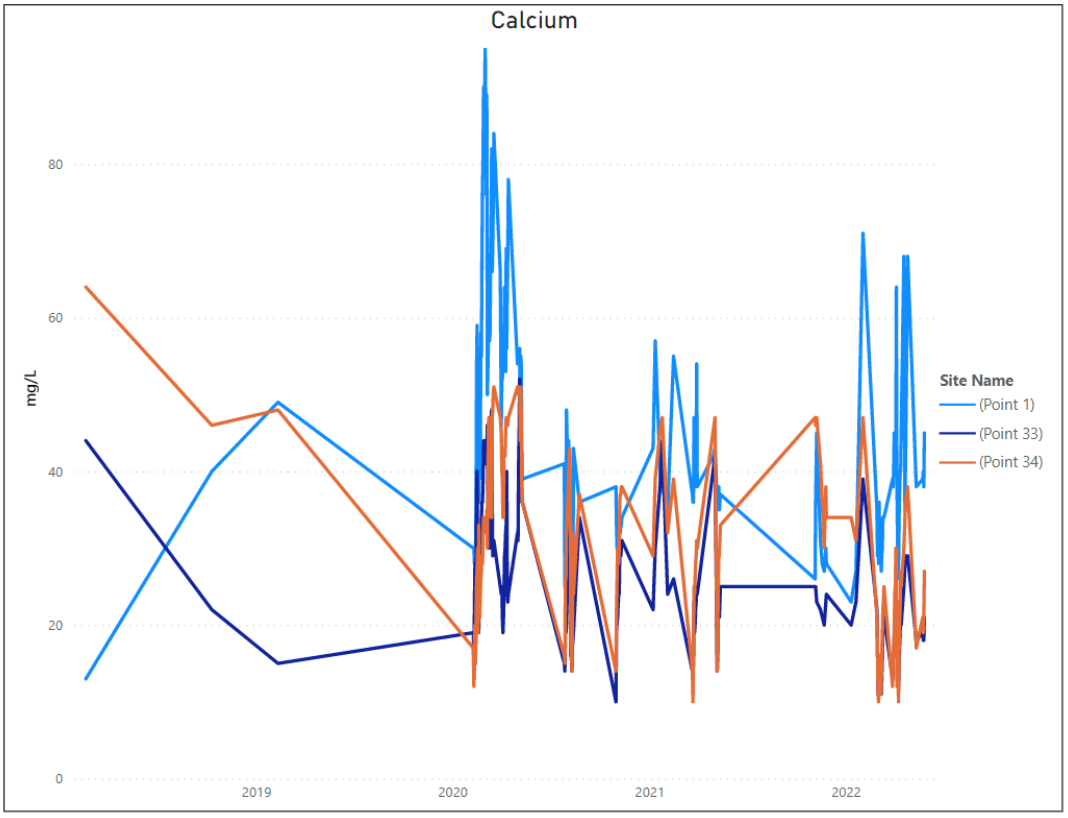
Site Name			DDG 1	DDG 2	DDG 3	DDG 4	DDG 5
Sample Date	Chemical Name	Units					
04/05/2022	Ash Content	g/m².month	0.5	0.3	0.2	0.2	0.1
	Ash Content (mg)	mg	9	5	4	3	2
	Combustible Matter	g/m².month	0.4	0.2	0.6	0.1	<0.1
	Combustible Matter (mg)	mg	6	3	10	2	<2
	Total Insoluble Matter	g/m².month	0.9	0.5	0.8	0.3	0.1
	Total Insoluble Matter (mg)	mg	15	8	14	5	2
07/04/2022	Ash Content	g/m².month	0.7	0.4	0.2	0.1	0.1
	Ash Content (mg)	mg	14	8	5	2	<2
	Combustible Matter	g/m².month	0.6	0.2	0.3	0.3	<0.1
	Combustible Matter (mg)	mg	10	3	5	5	<2
	Total Insoluble Matter	g/m².month	1.3	0.6	0.5	0.4	0.1
	Total Insoluble Matter (mg)	mg	24	11	10	7	2
07/03/2022	Ash Content	g/m².month	0.4	0.7	0.4		0.2
	Ash Content (mg)	mg	7	12	7		4
	Combustible Matter	g/m².month	0.4	0.3	0.4		0.4
	Combustible Matter (mg)	mg	7	5	8		6
	Total Insoluble Matter	g/m².month	0.8	1.0	0.8		0.6
	Total Insoluble Matter (mg)	mg	14	17	15		10
07/02/2022	Ash Content	g/m².month	0.3	0.7	0.4	0.2	0.3
	Ash Content (mg)	mg	5	11	7	3	5
	Combustible Matter	g/m².month	0.3	0.4	0.7	0.3	0.2
	Combustible Matter (mg)	mg	6	8	12	5	4
	Total Insoluble Matter	g/m².month	0.6	1.1	1.1	0.5	0.5
	Total Insoluble Matter (mg)	mg	11	19	19	8	9
10/01/2022	Ash Content	g/m².month	2.0	1.2	0.4	0.5	0.3
	Ash Content (mg)	mg	37	23	7	10	6
	Combustible Matter	g/m².month	0.6	0.9	0.6	0.7	0.2
	Combustible Matter (mg)	mg	12	16	12	12	4
	Total Insoluble Matter	g/m².month	2.6	2.1	1.0	1.2	0.5
	Total Insoluble Matter (mg)	mg	49	39	19	22	10
09/12/2021	Ash Content	g/m².month	0.5	1.1	0.4	0.5	0.3
	Ash Content (mg)	mg	10	23	9	9	6
	Combustible Matter	g/m².month	0.2	0.7	0.5	0.6	0.2
	Combustible Matter (mg)	mg	4	14	11	13	5
	Total Insoluble Matter	g/m².month	0.7	1.8	0.9	1.1	0.5
	Total Insoluble Matter (mg)	mg	14	37	20	22	11
05/11/2021	Ash Content	g/m².month	0.5	0.9	0.4	0.6	0.3
	Ash Content (mg)	mg	9	16	9	11	6
	Combustible Matter	g/m².month	0.1	0.1	0.3	0.6	0.1
	Combustible Matter (mg)	mg	3	2	6	11	1
	Total Insoluble Matter	g/m².month	0.6	1.0	0.7	1.2	0.4
	Total Insoluble Matter (mg)	mg	12	18	15	22	7
05/10/2021	Ash Content	g/m².month	0.3	0.9	0.3	0.2	0.2
	Ash Content (mg)	mg	7	19	7	4	4
	Combustible Matter	g/m².month	0.2	0.2	0.7	0.1	0.1
	Combustible Matter (mg)	mg	4	4	15	1	3
	Total Insoluble Matter	g/m².month	0.5	1.1	1.0	0.3	0.3
	Total Insoluble Matter (mg)	mg	11	23	22	5	7
01/09/2021	Ash Content	g/m².month	0.6	0.4	0.3	0.2	0.1
	Ash Content (mg)	mg	10	7	5	4	2
	Combustible Matter	g/m².month	0.2	0.2	0.2	0.3	0.1
	Combustible Matter (mg)	mg	5	4	4	4	1
	Total Insoluble Matter	g/m².month	0.8	0.6	0.5	0.5	0.2
	Total Insoluble Matter (mg)	mg	15	11	9	8	3
03/08/2021	Ash Content	g/m².month	0.3	0.5	0.6	0.1	0.2
	Ash Content (mg)	mg	5	9	13	1	4
	Combustible Matter	g/m².month	0.1	<0.1	0.5	<0.1	0.1
	Combustible Matter (mg)	mg	2	1	9	<1	1
	Total Insoluble Matter	g/m².month	0.4	0.5	1.1	0.1	0.3
	Total Insoluble Matter (mg)	mg	7	10	22	1	5
02/07/2021	Ash Content	g/m².month		0.6	0.7	0.2	0.1
	Ash Content (mg)	mg		12	13	3	1
	Combustible Matter	g/m².month		0.2	0.4	<0.1	<0.1
	Combustible Matter (mg)	mg		3	7	<1	<1
	Total Insoluble Matter	g/m².month		0.8	1.1	0.2	0.1
	Total Insoluble Matter (mg)	mg		15	20	3	1
01/06/2021	Ash Content	g/m².month	3.8	0.3	0.3	0.1	0.2
	Ash Content (mg)	mg	134	10	10	4	6
	Combustible Matter	g/m².month	0.5	0.2	0.2	0.2	0.1
	Combustible Matter (mg)	mg	17	6	6	8	6
	Total Insoluble Matter	g/m².month	4.3	0.5	0.5	0.3	0.3
	Total Insoluble Matter (mg)	mg	151	16	16	12	12

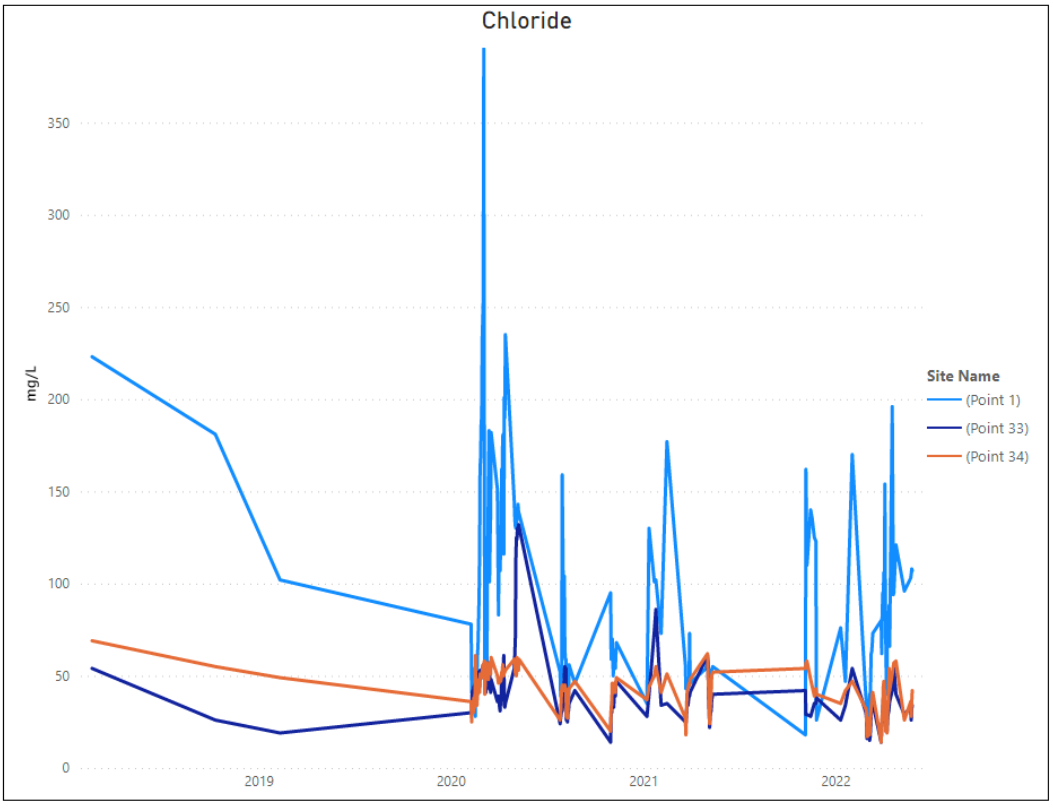
Appendix C

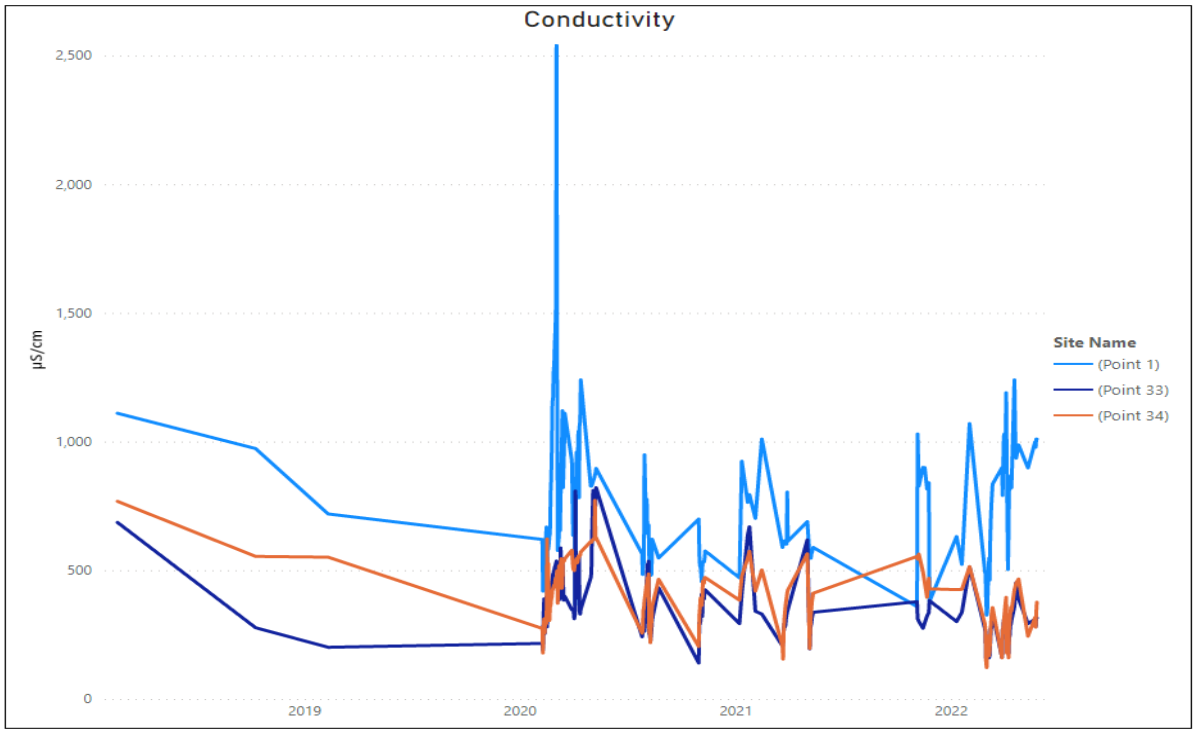
Surface Water Results 2021-2022

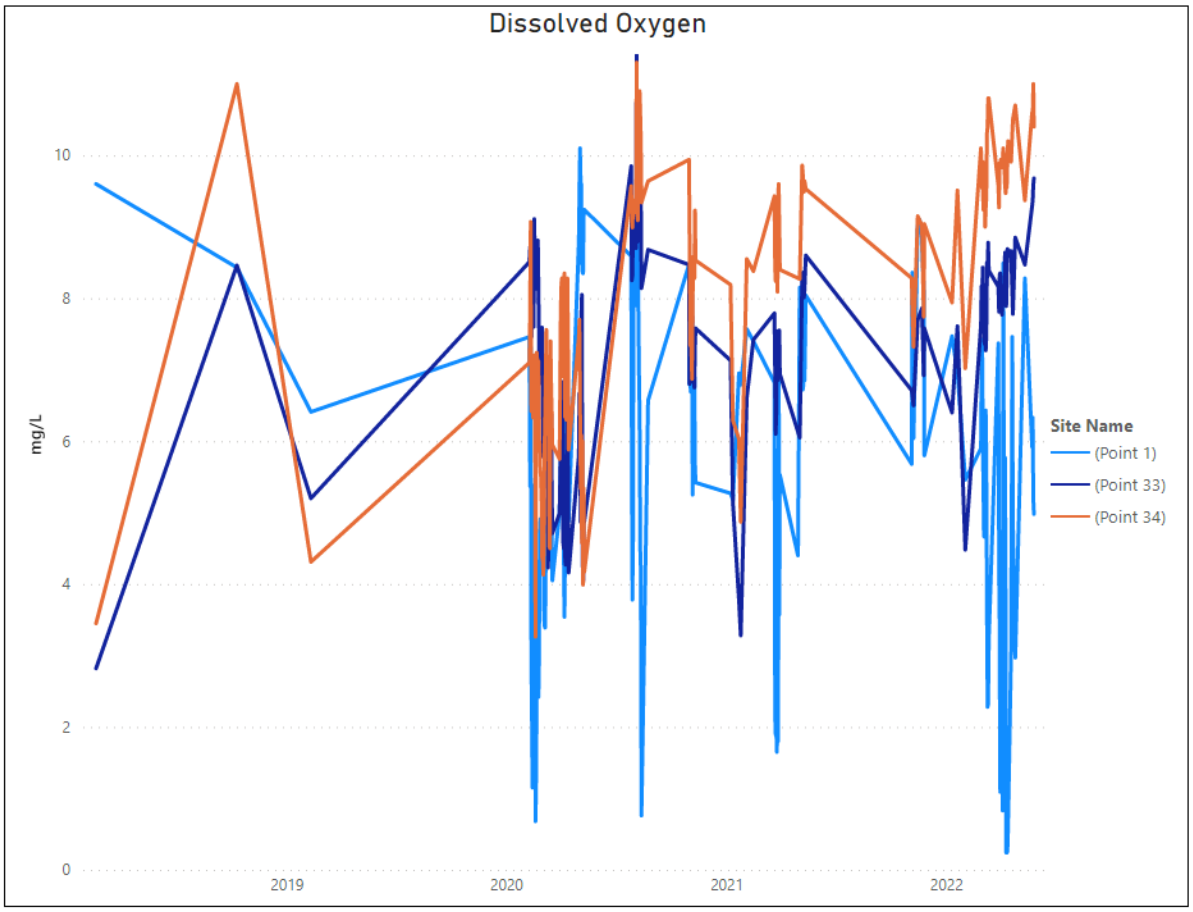


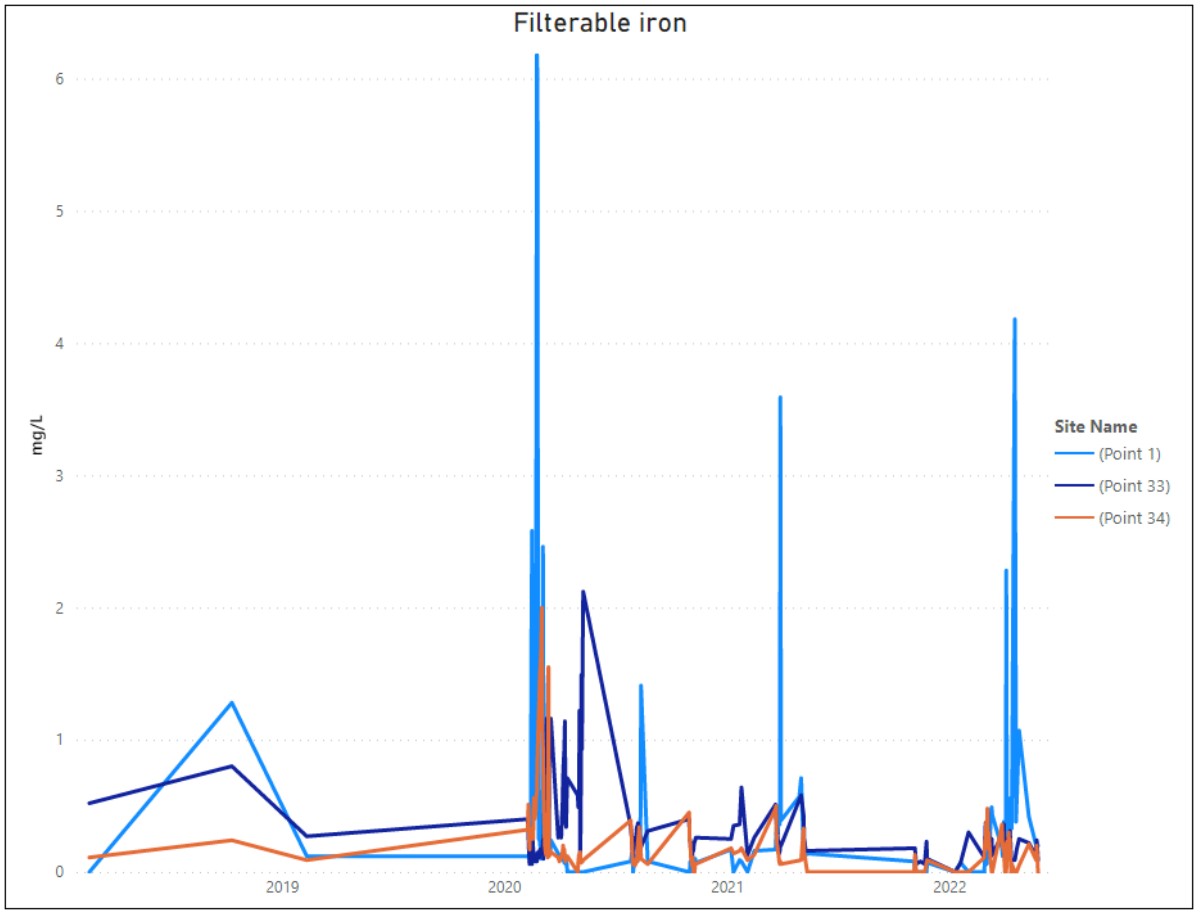


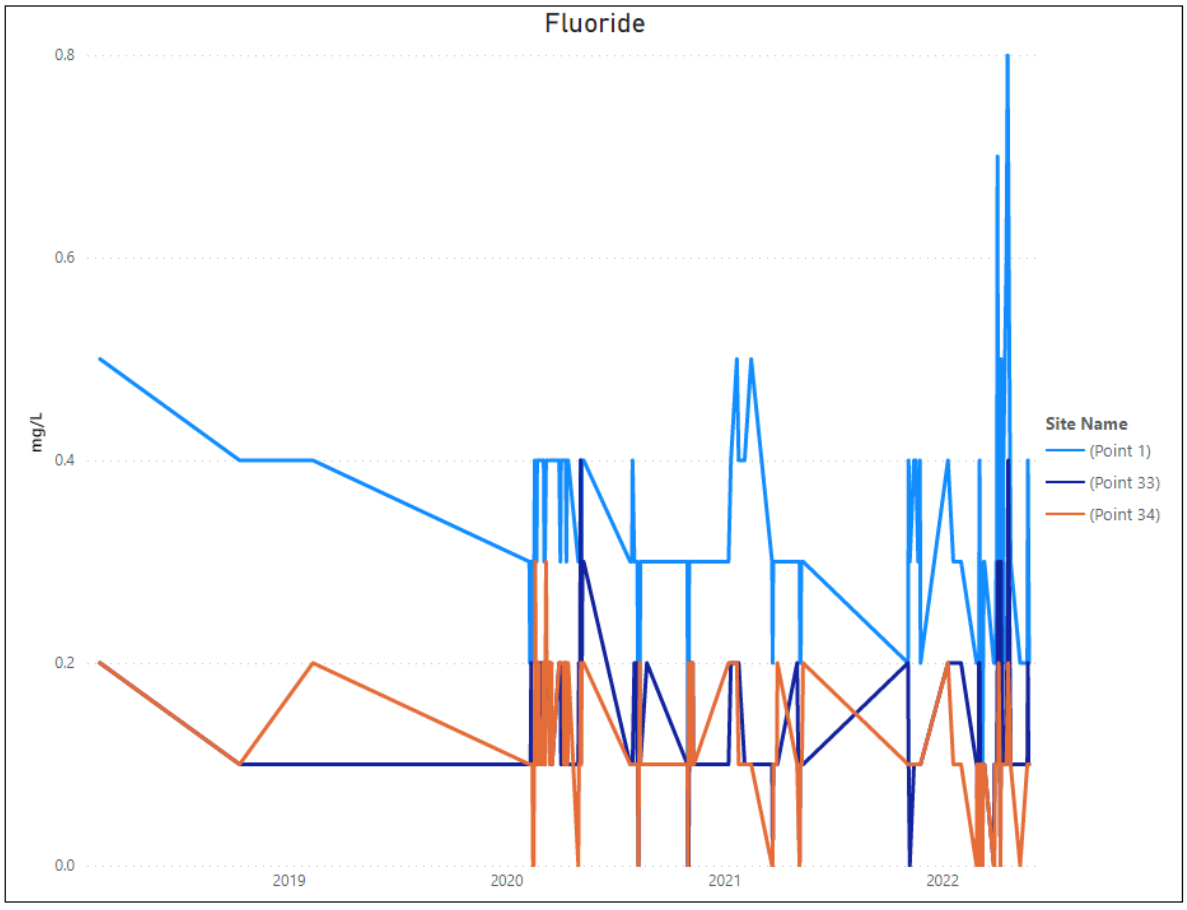

Calcium
mg/L
80
60
40
20
0
2019
2020
2021
2022
Site Name
(Point 1)
(Point 33)
(Point 34)

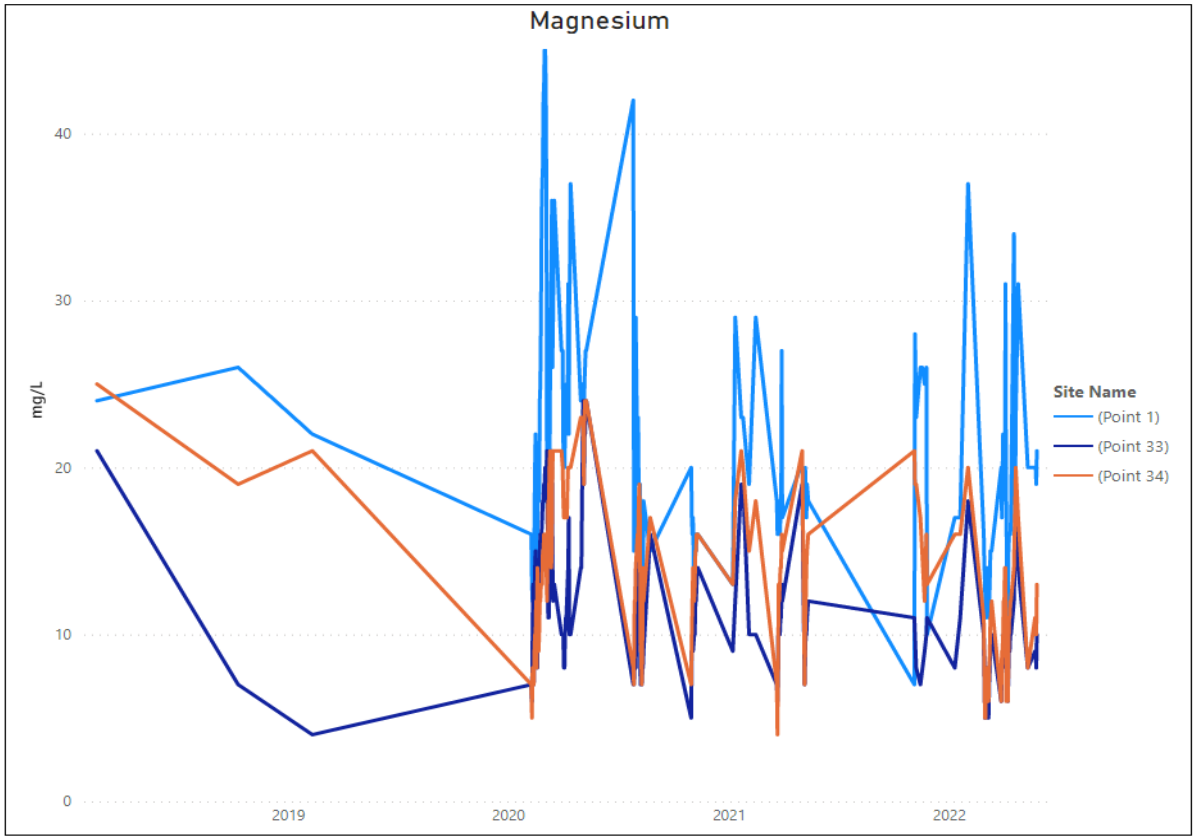

Chloride
mg/L
350
300
250
200
150
100
50
0
2019
2020
2021
2022
Site Name
(Point 1)
(Point 33)
(Point 34)

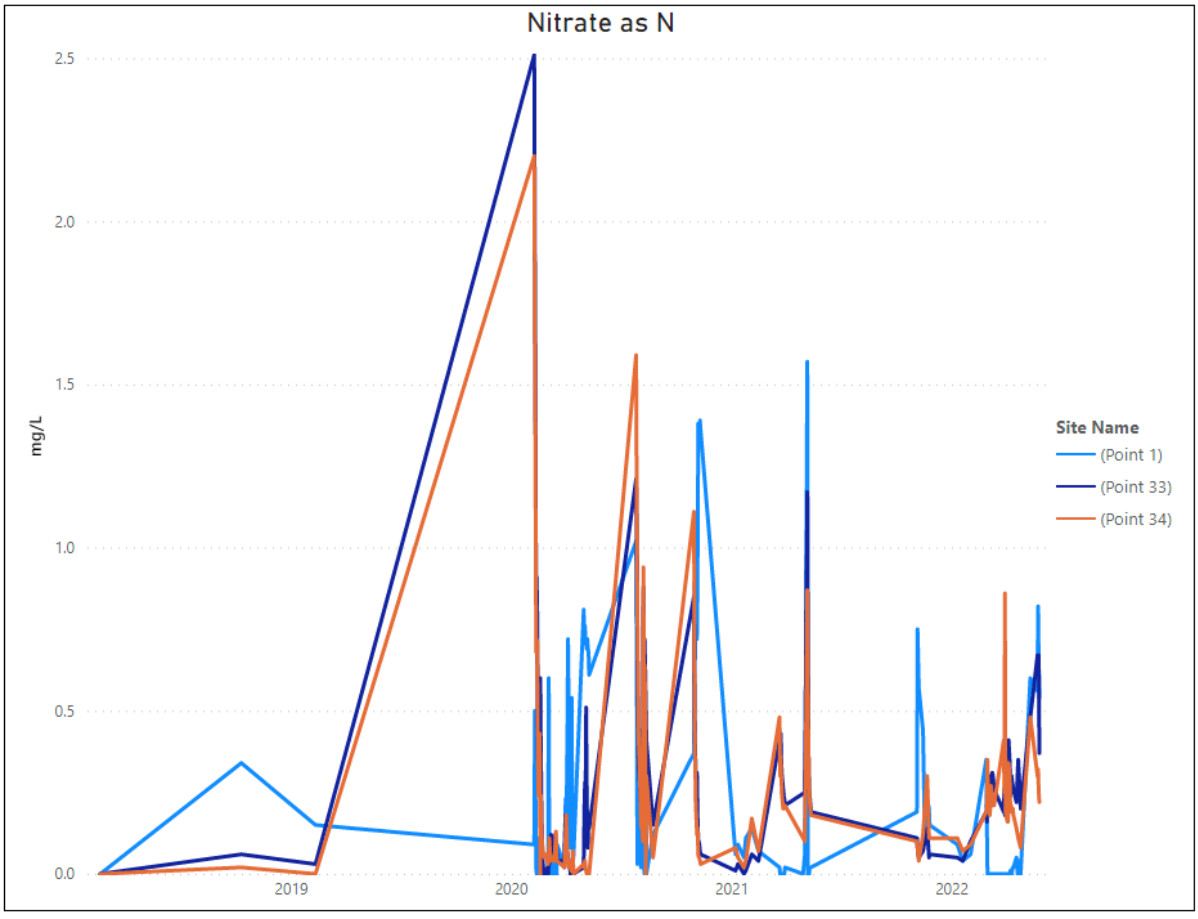

Conductivity
2,500
2,000
1,500
1,000
500
0
µS/cm
2019
2020
2021
2022
Site Name
(Point 1)
(Point 33)
(Point 34)

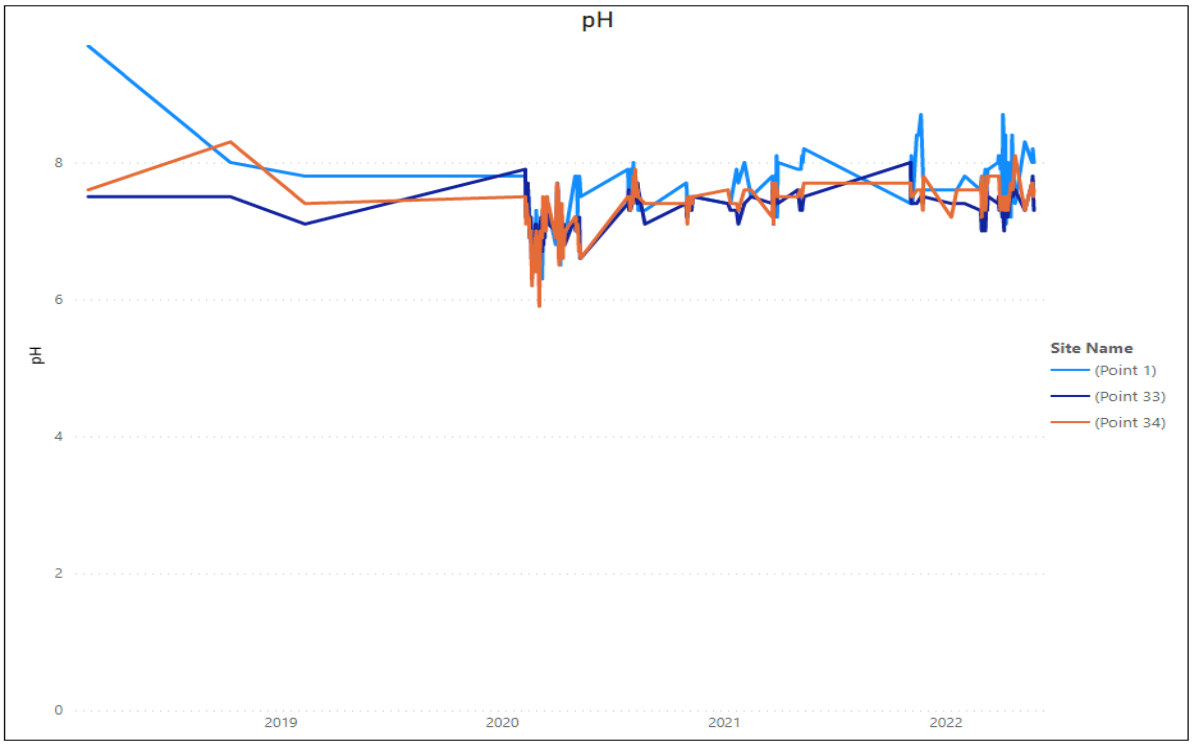

Dissolved Oxygen
10
8
6
4
2
0
mg/L
2019
2020
2021
2022
Site Name
(Point 1)
(Point 33)
(Point 34)

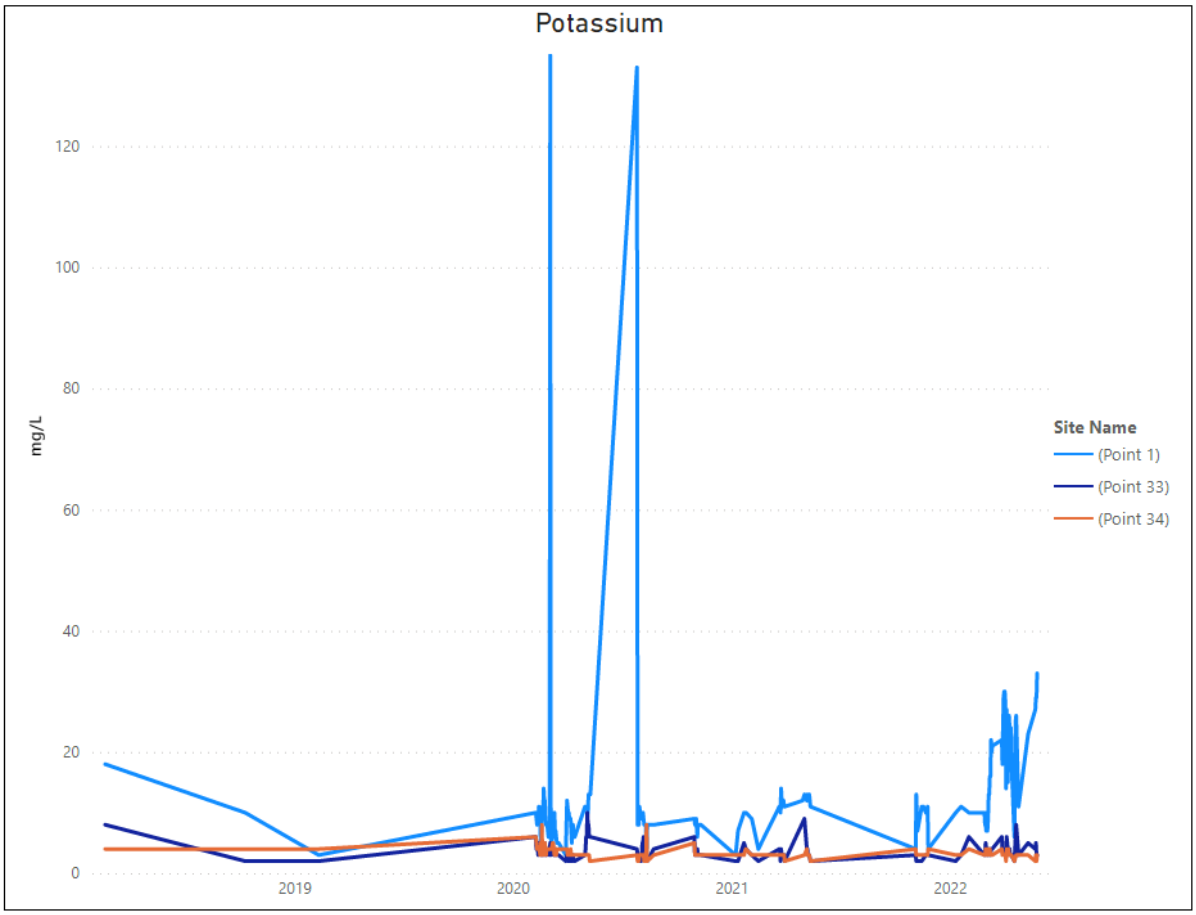

Filterable iron
mg/L
6
5
4
3
2
1
0
2019
2020
2021
2022
Site Name
(Point 1)
(Point 33)
(Point 34)

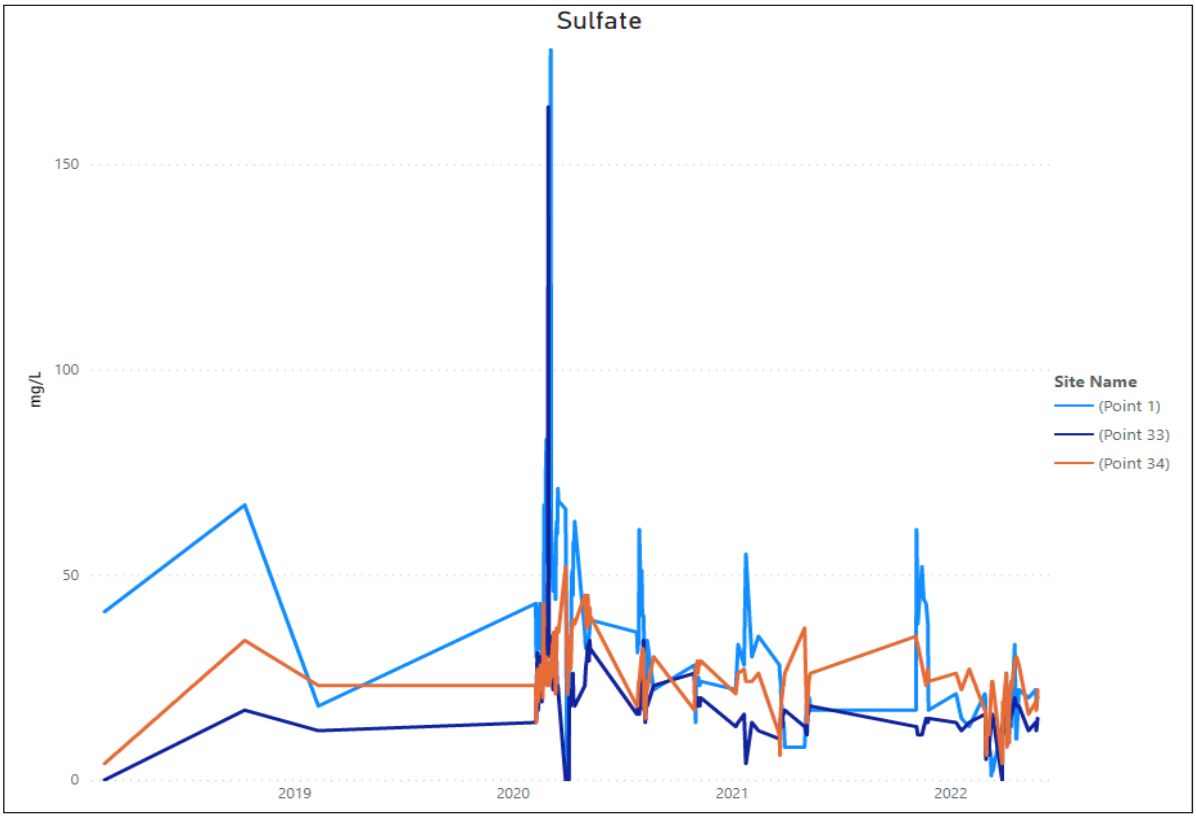

Fluoride
mg/L
0.8
0.6
0.4
0.2
0.0
2019
2020
2021
2022
Site Name
(Point 1)
(Point 33)
(Point 34)

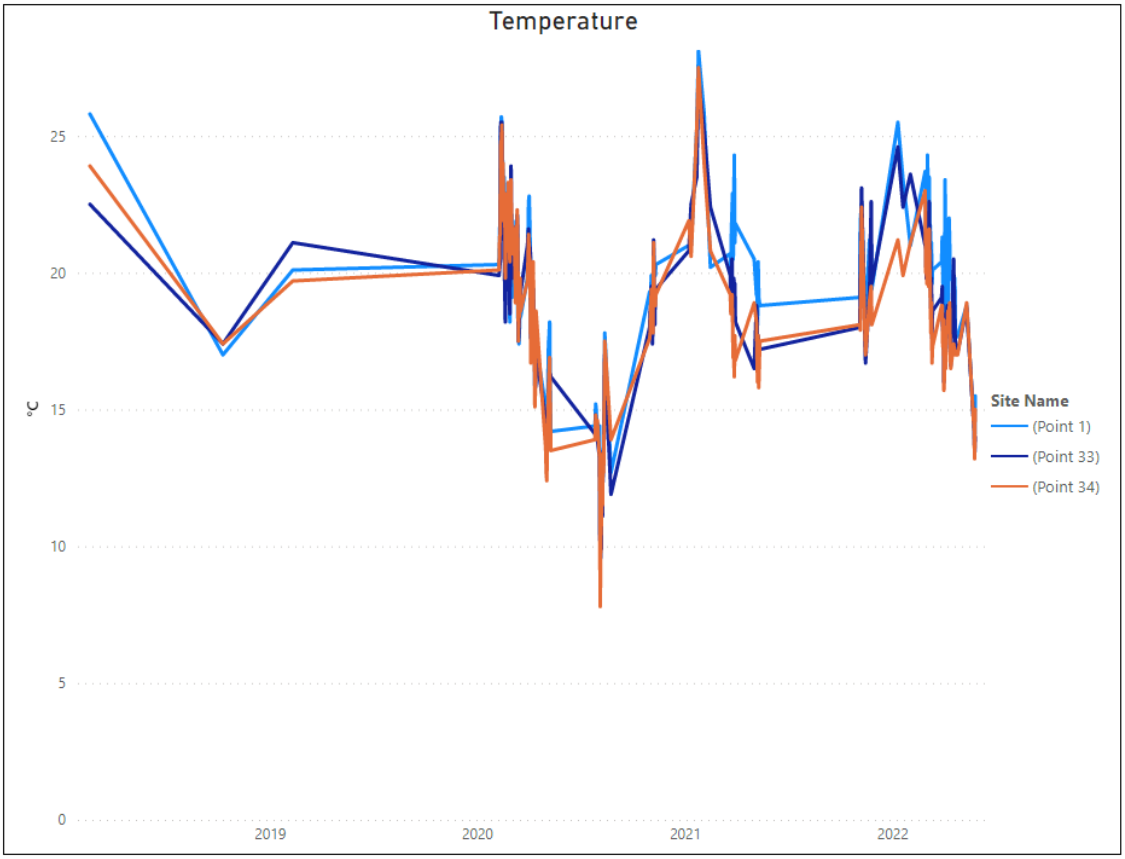

Magnesium
40
30
20
10
0
mg/L
2019
2020
2021
2022
Site Name
(Point 1)
(Point 33)
(Point 34)

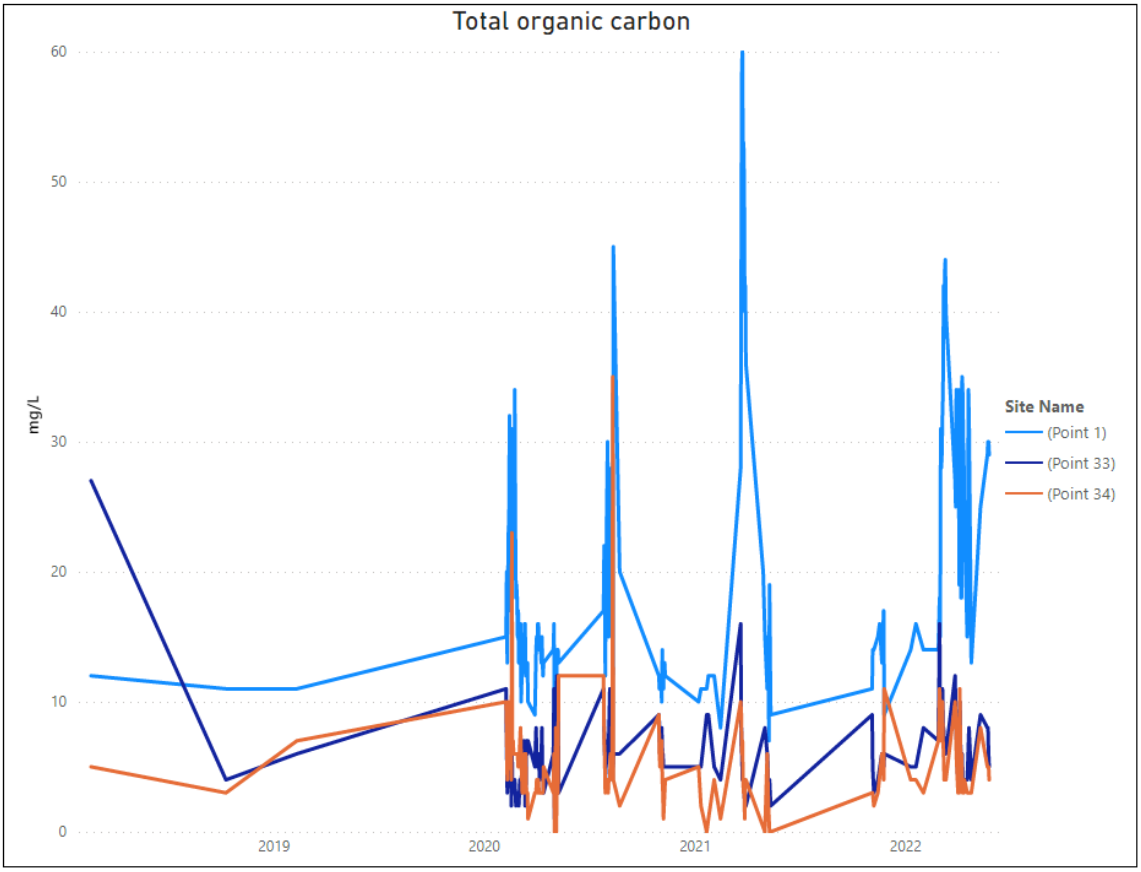

Nitrate as N
2.5
2.0
1.5
1.0
0.5
0.0
mg/L
2019
2020
2021
2022
Site Name
(Point 1)
(Point 33)
(Point 34)

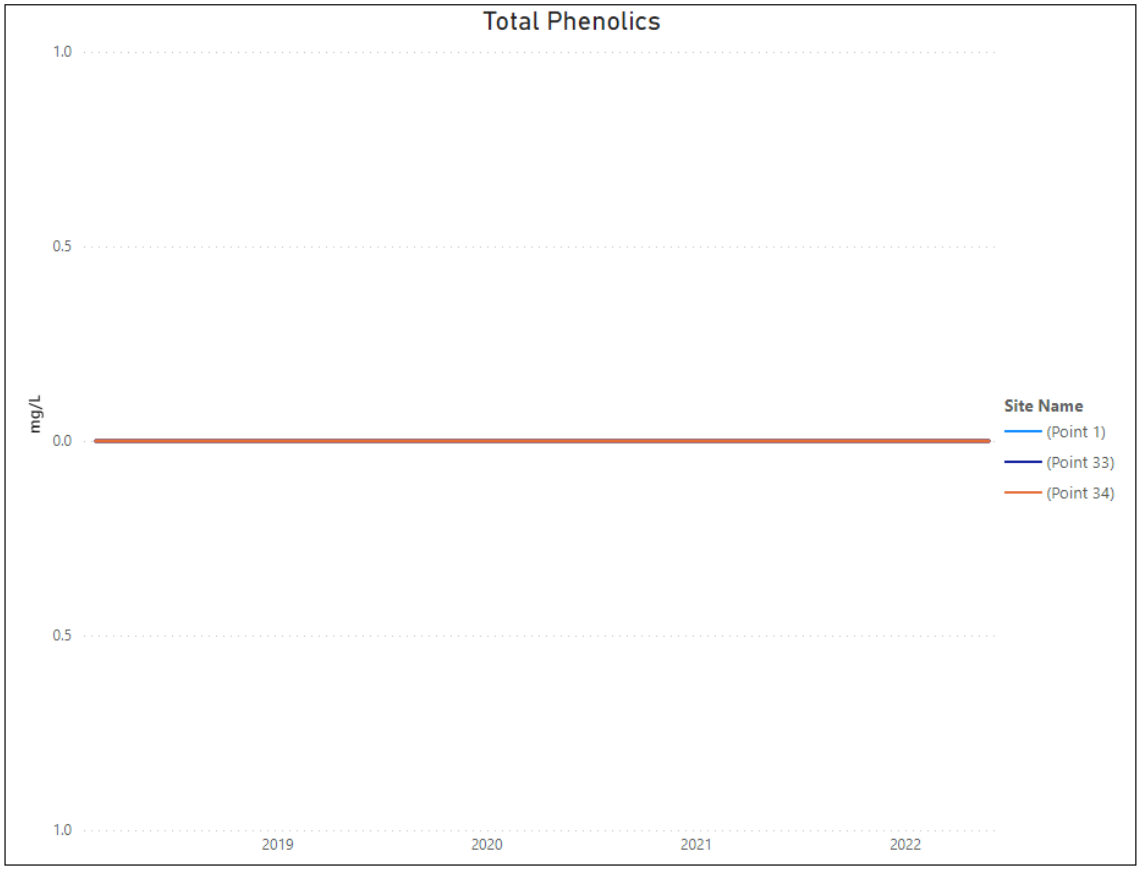

pH
8
6
4
2
0
pH
2019
2020
2021
2022
Site Name
(Point 1)
(Point 33)
(Point 34)

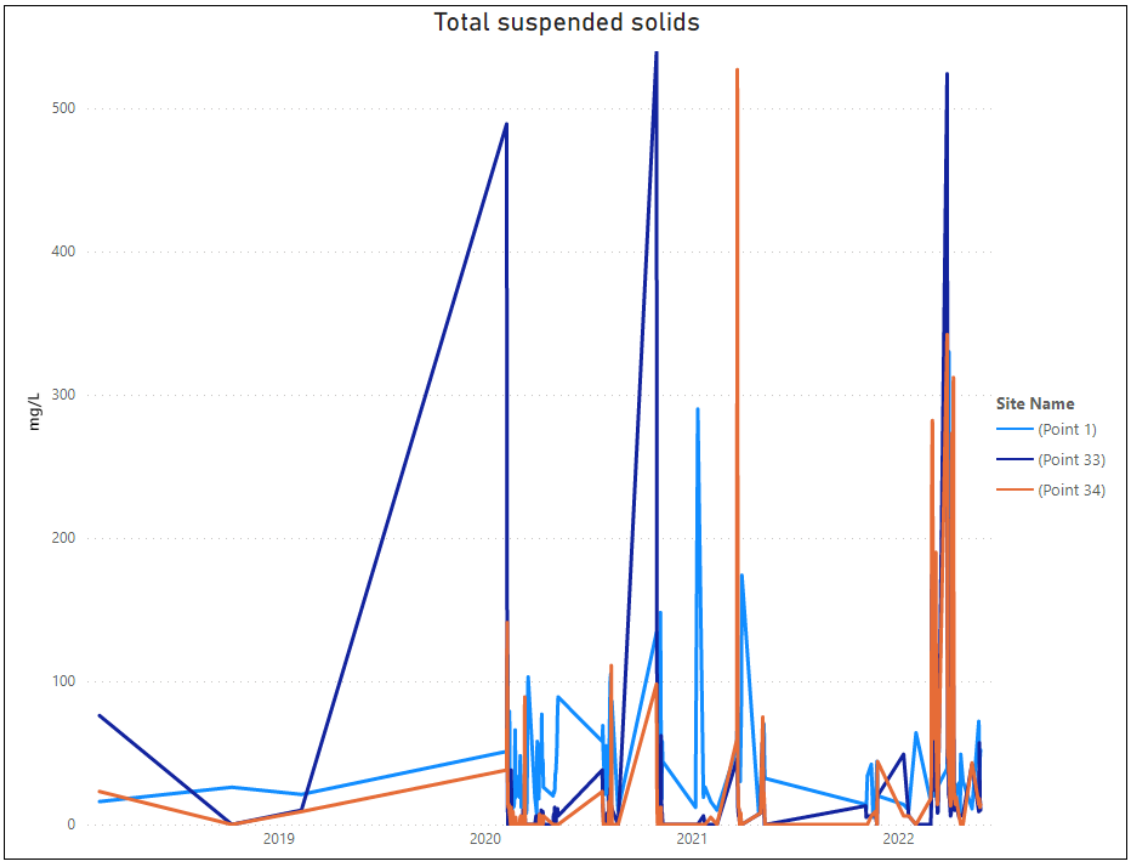

Potassium
120
100
80
60
40
20
0
mg/L
2019
2020
2021
2022
Site Name
(Point 1)
(Point 33)
(Point 34)


Sulfate
150
100
50
0
mg/L
2019
2020
2021
2022
Site Name
(Point 1)
(Point 33)
(Point 34)

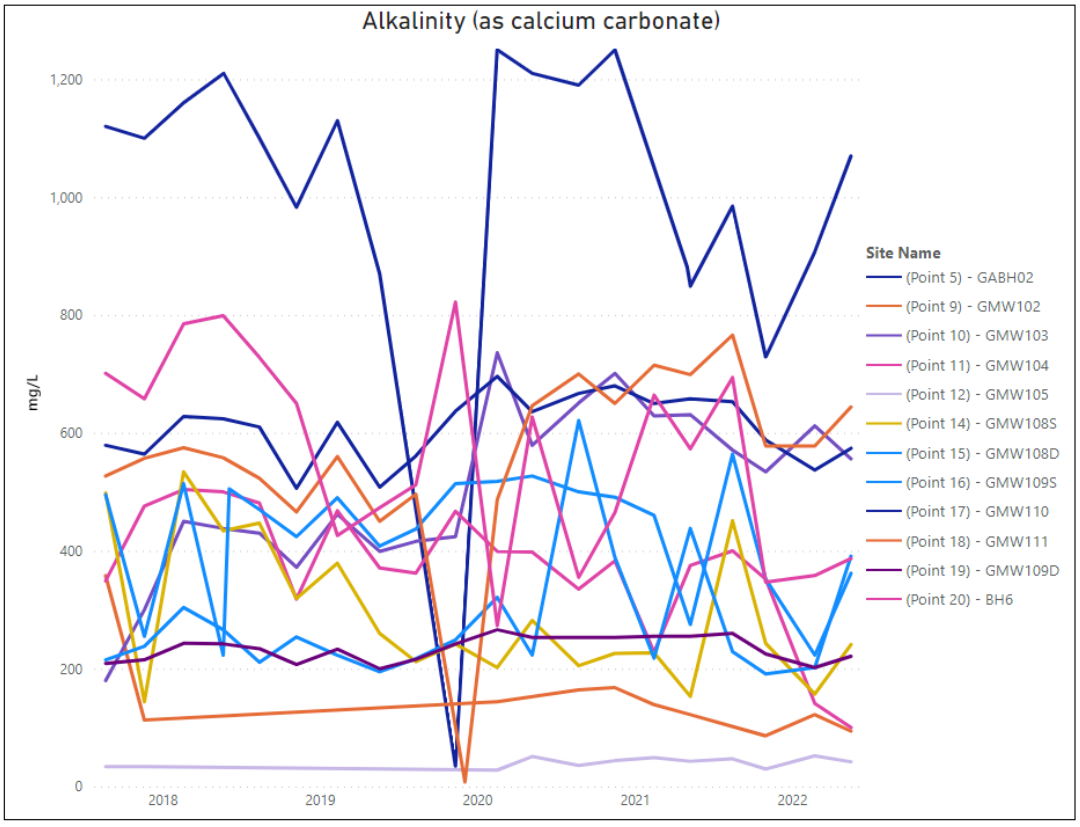

Temperature
25
20
15
10
5
0
°C
2019
2020
2021
2022
Site Name
(Point 1)
(Point 33)
(Point 34)

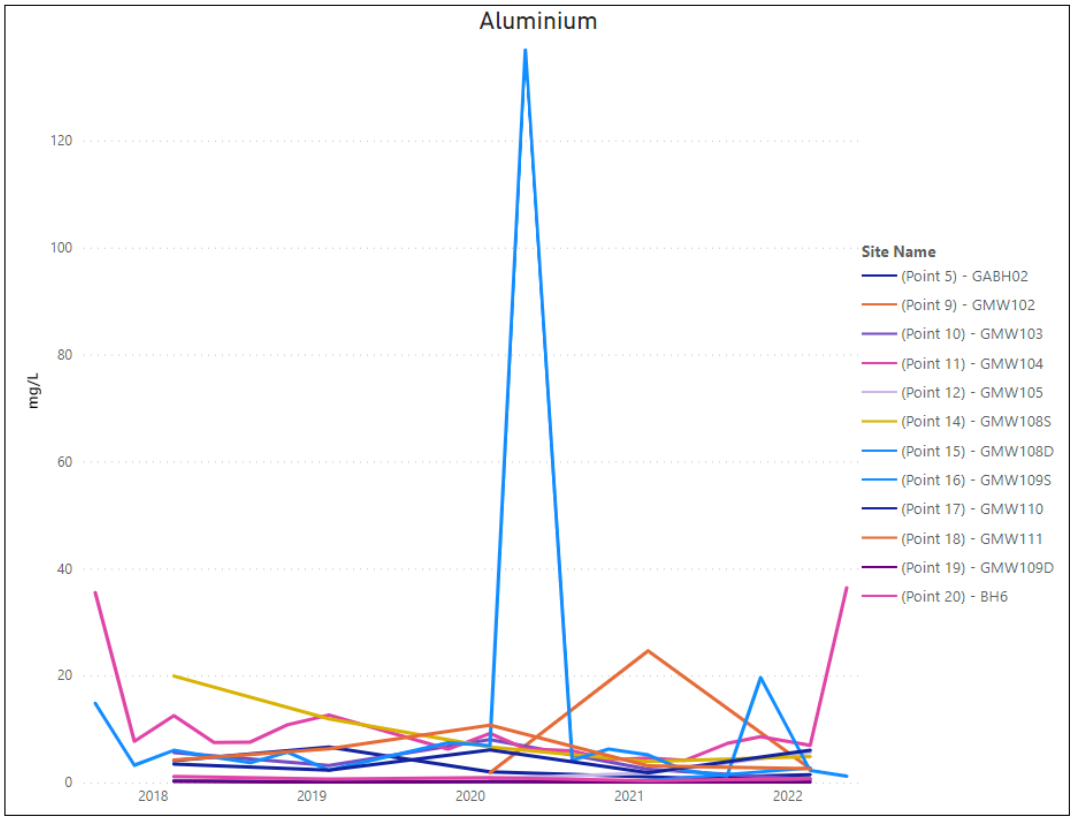

Total organic carbon
60
50
40
30
20
10
0
mg/L
2019
2020
2021
2022
Site Name
(Point 1)
(Point 33)
(Point 34)

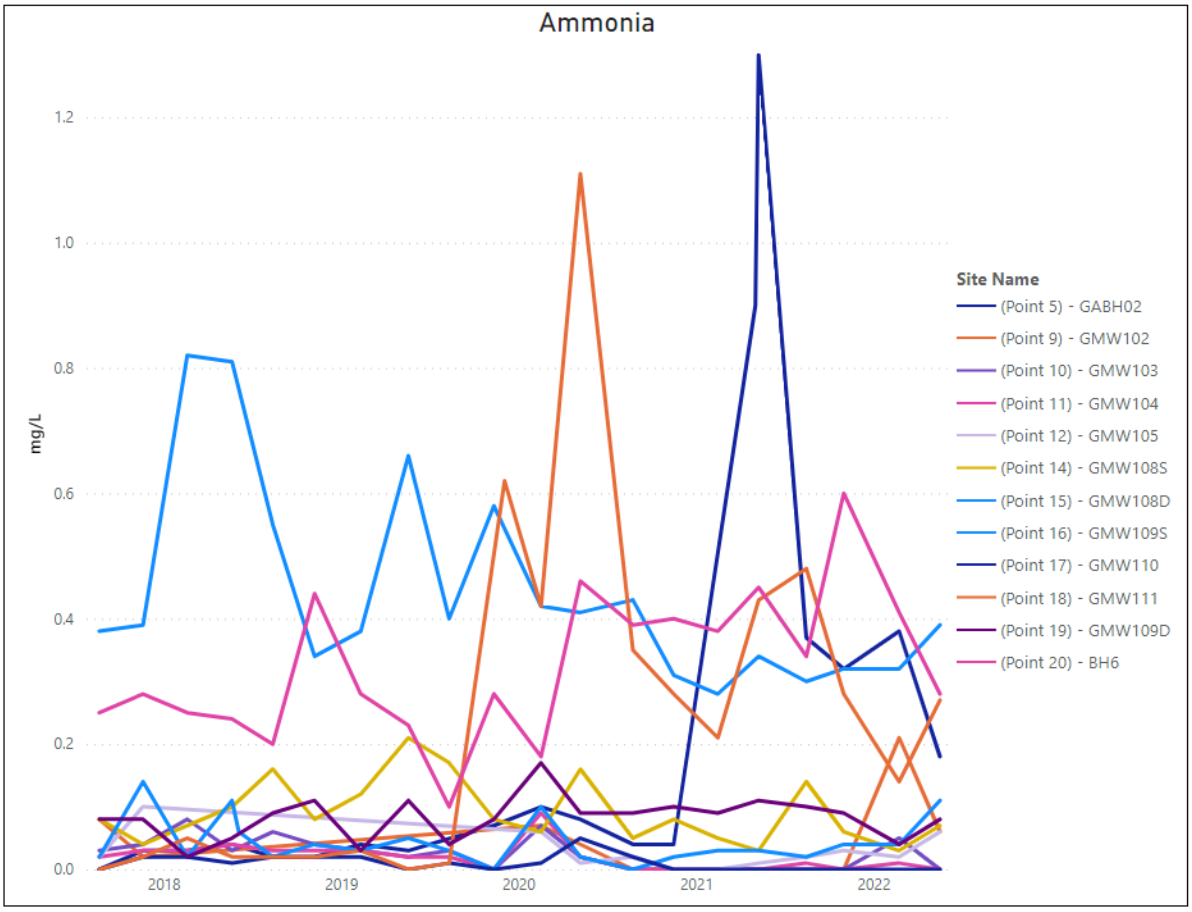

Total Phenolics
1.0
0.5
0.0
0.5
1.0
mg/L
2019
2020
2021
2022
Site Name
(Point 1)
(Point 33)
(Point 34)

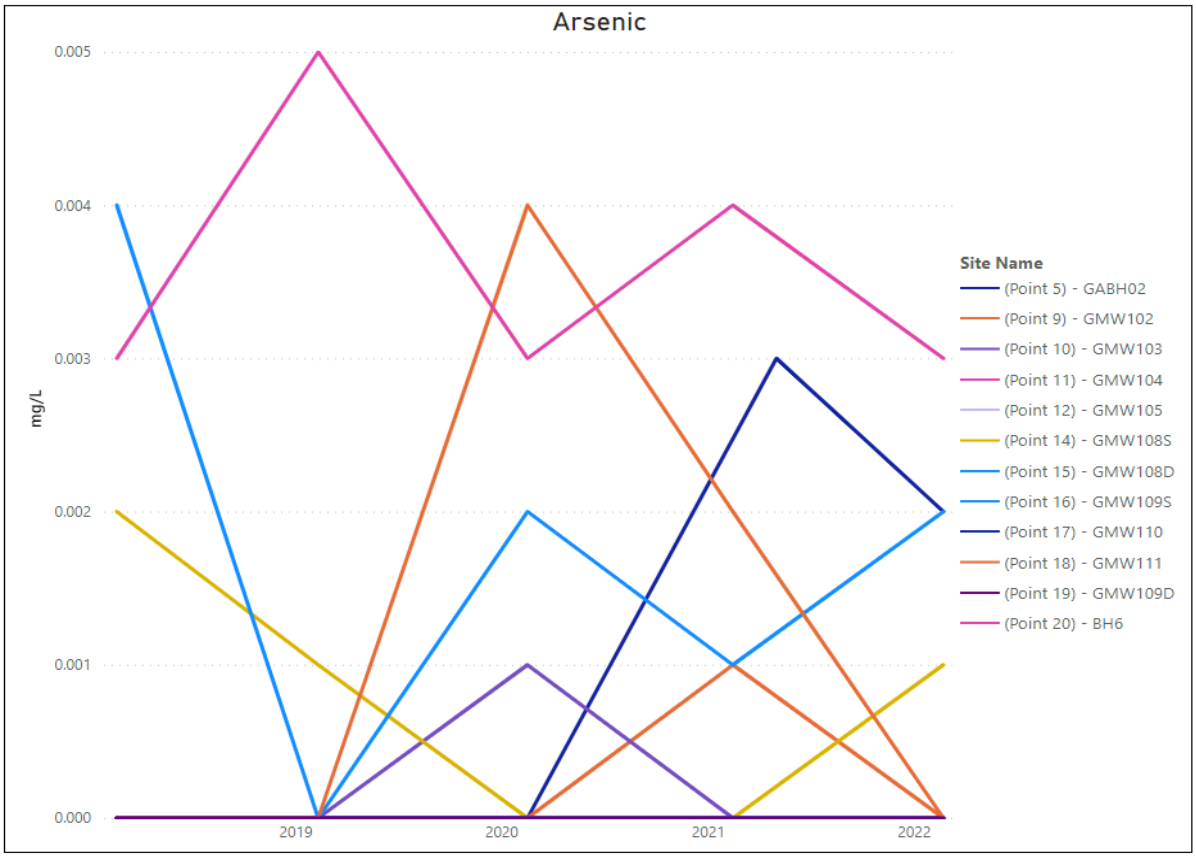


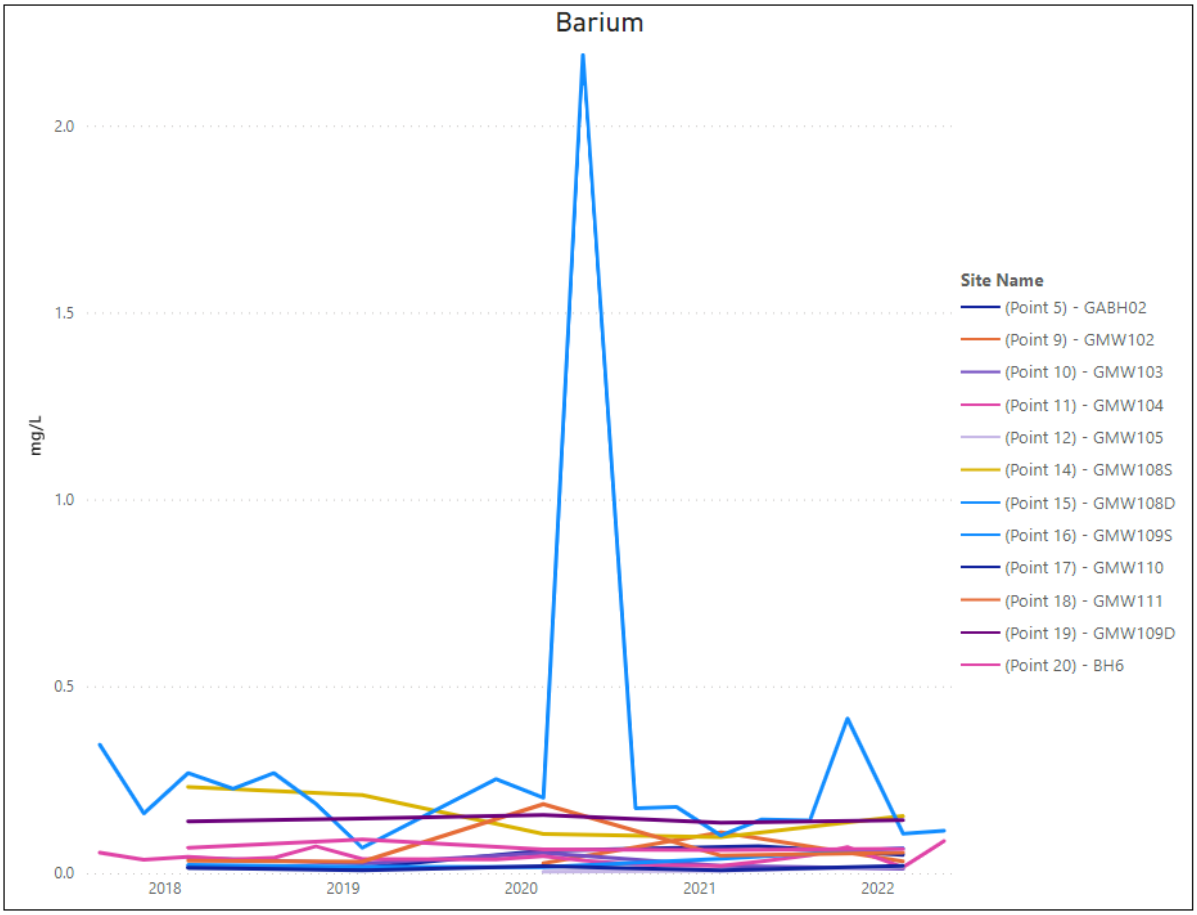
Ground Water Results 2021-2022

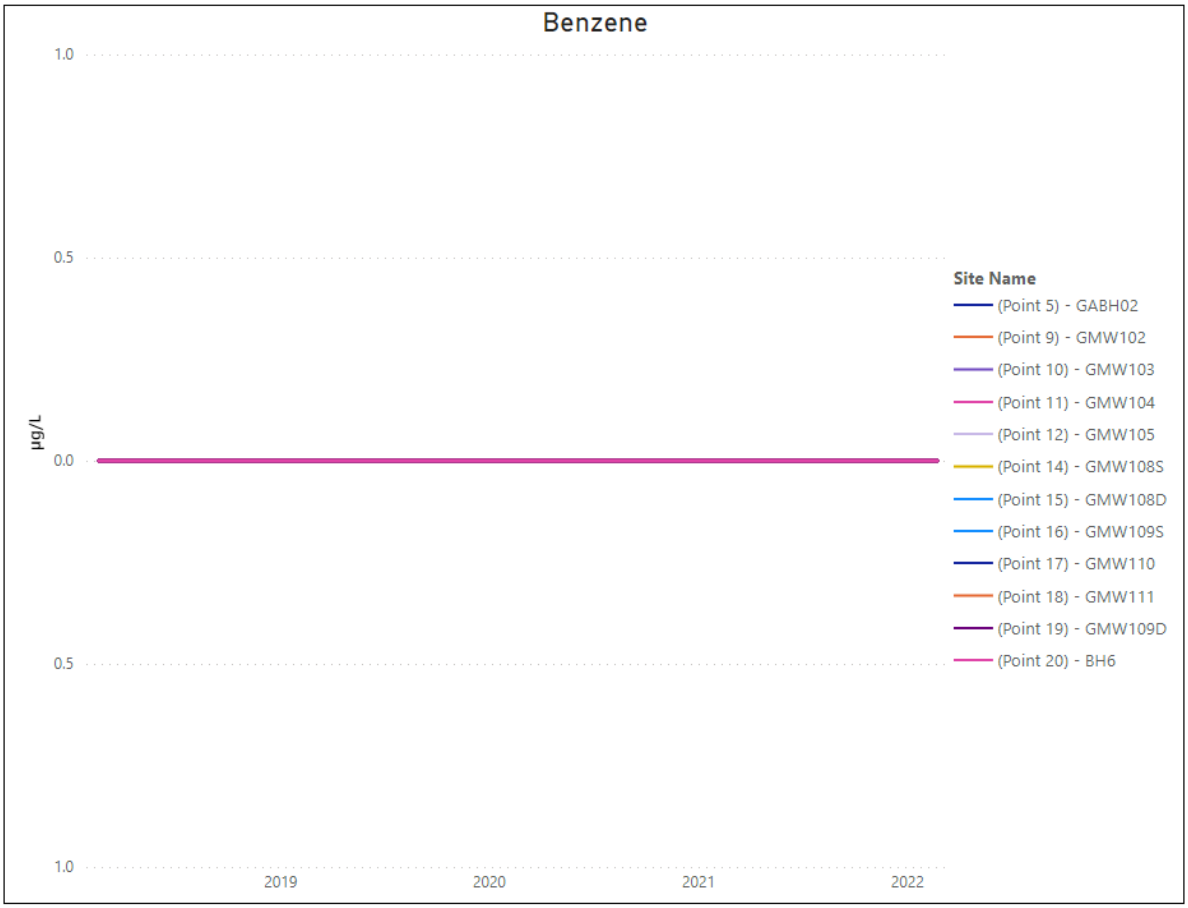


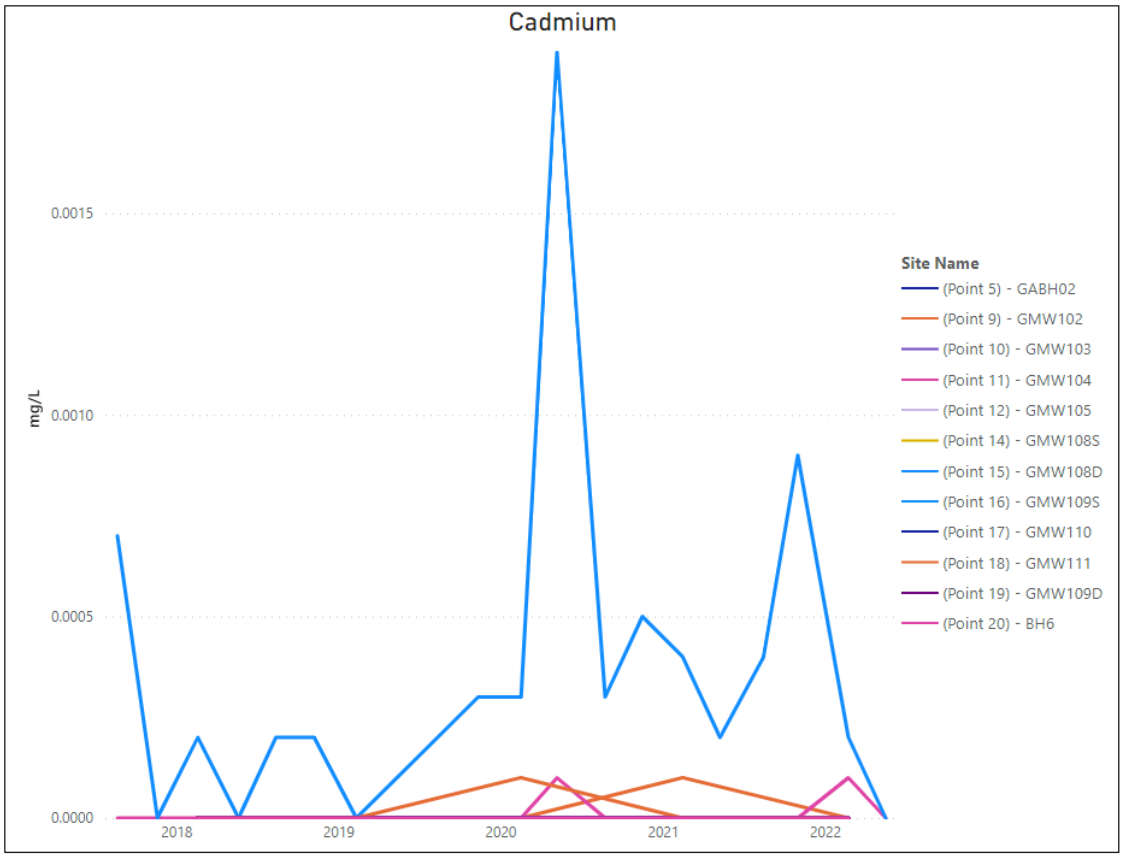

Aluminium
120
100
80
60
40
20
0
mg/L
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

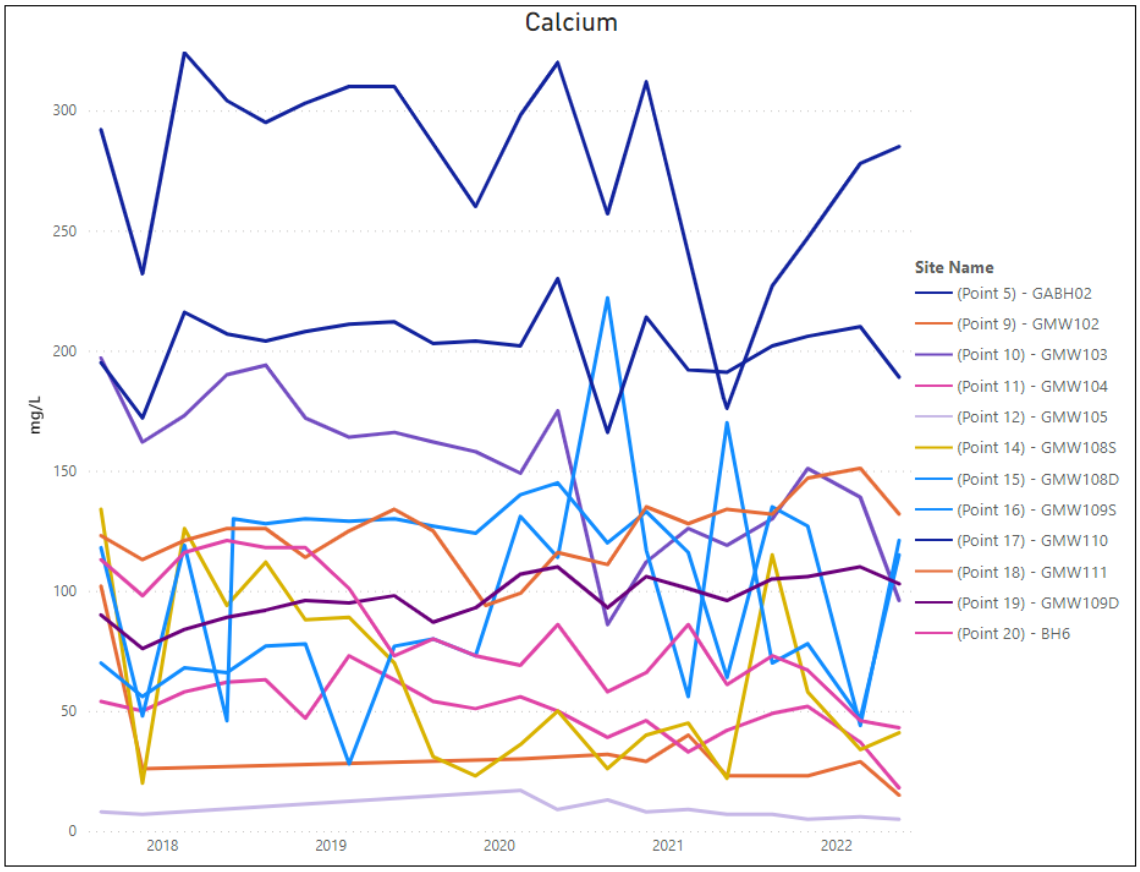

Ammonia
1.2
1.0
0.8
0.6
0.4
0.2
0.0
mg/L
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

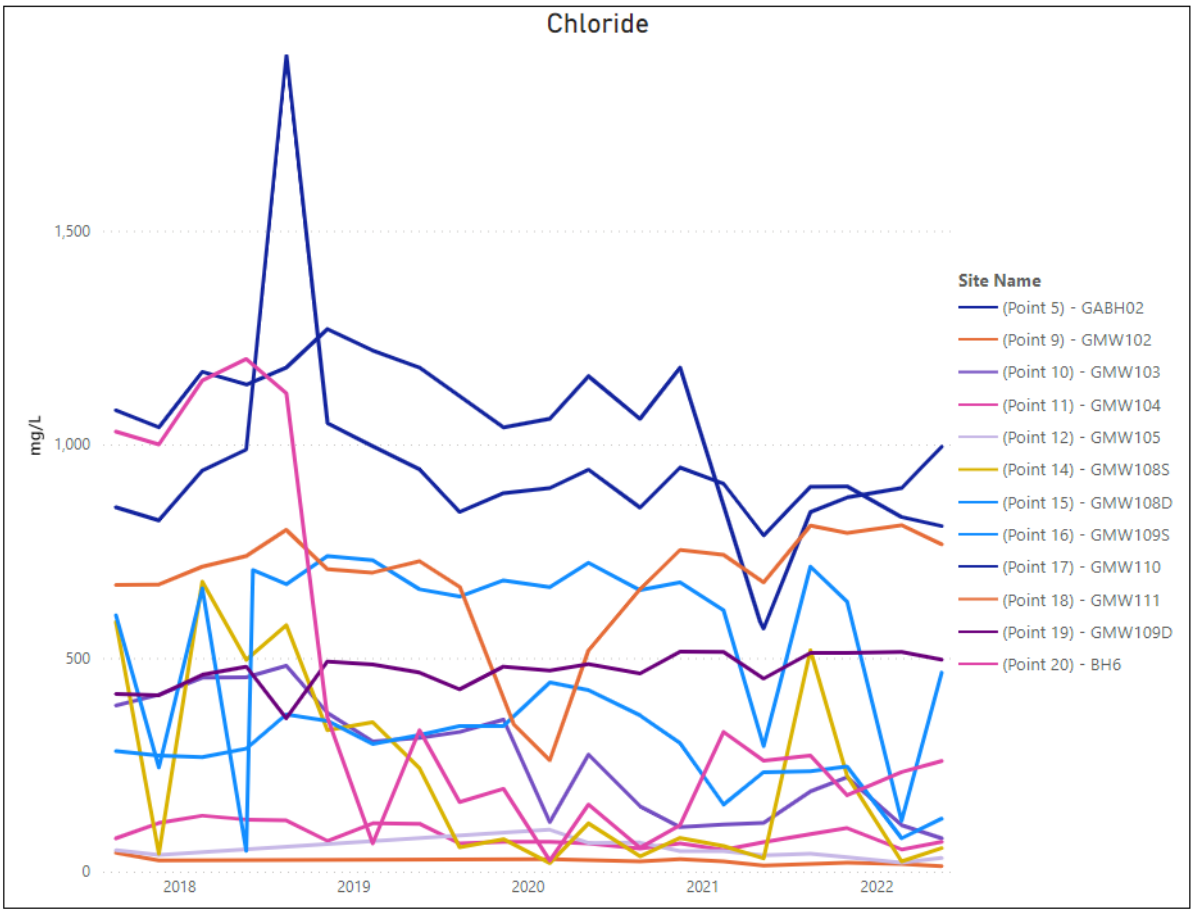

Arsenic
0.005
0.004
0.003
0.002
0.001
0.000
mg/L
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

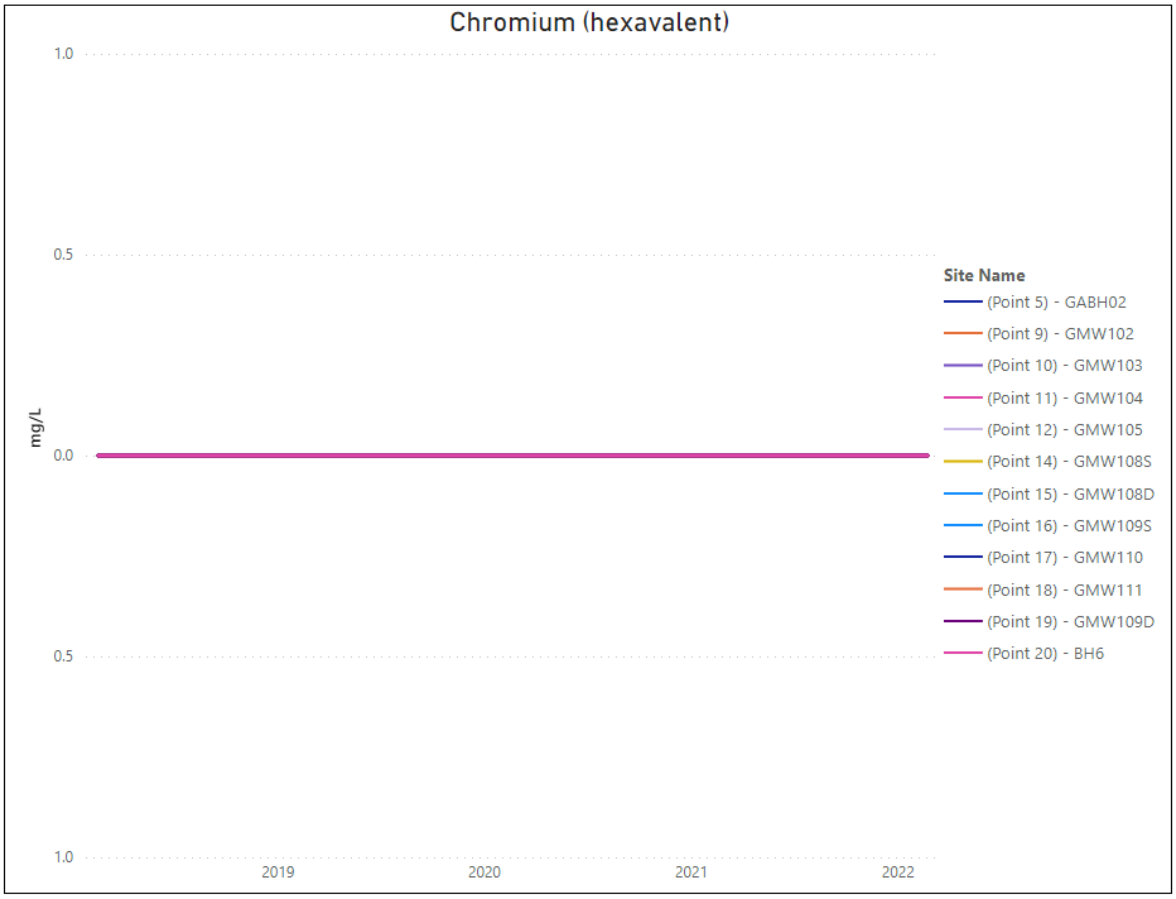

Barium
2.0
1.5
1.0
0.5
0.0
mg/L
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

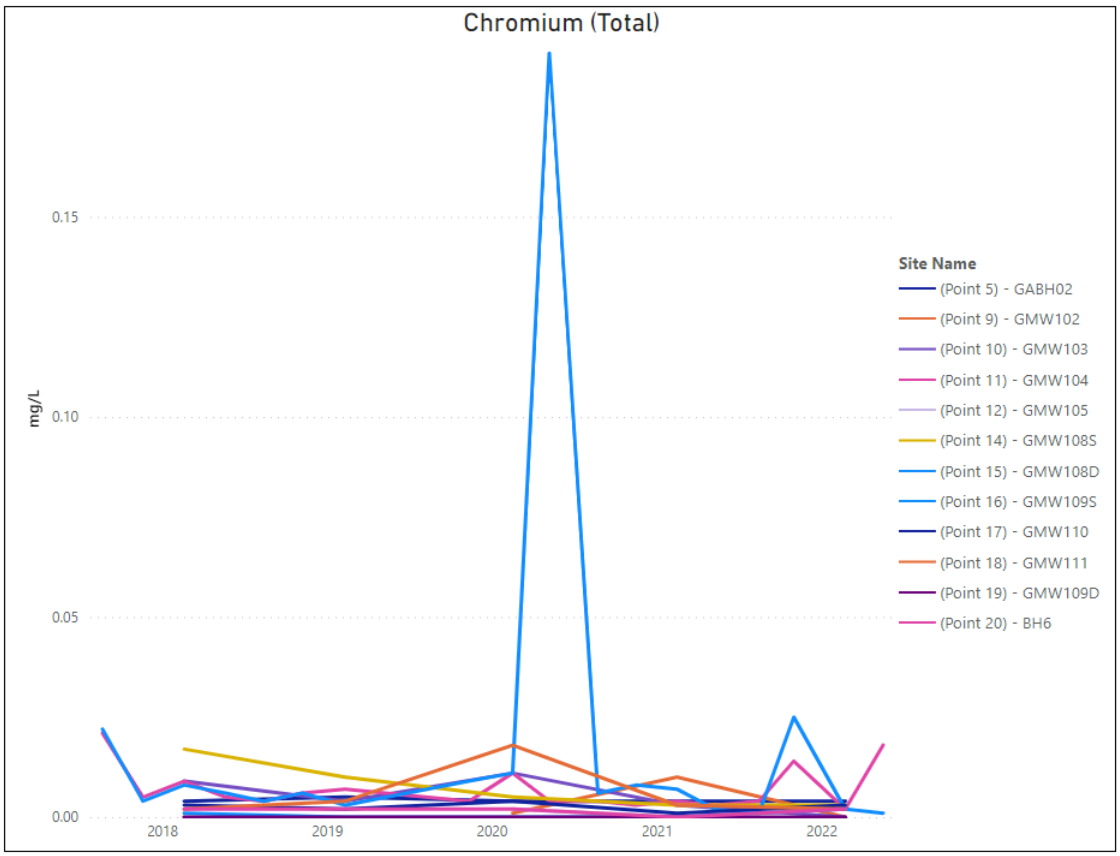

Benzene
1.0
0.5
0.0
0.5
1.0
µg/L
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

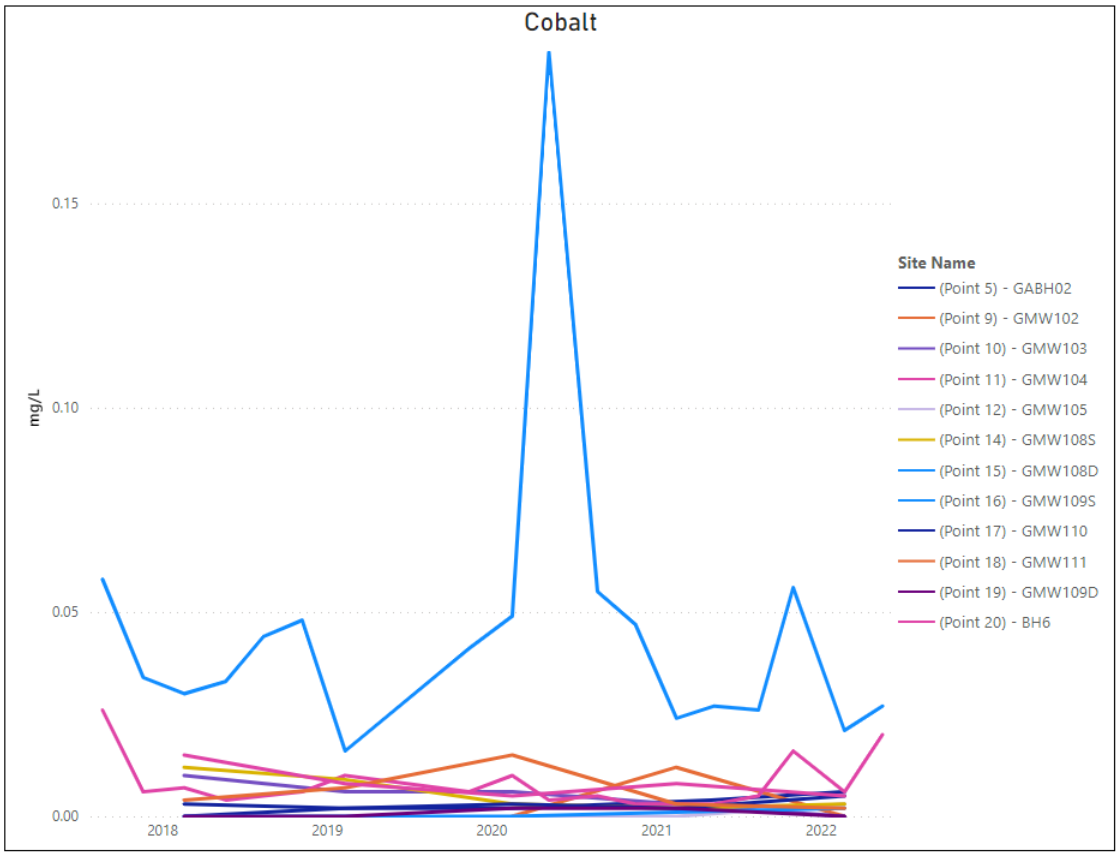

Cadmium
0.0015
0.0010
0.0005
0.0000
mg/L
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

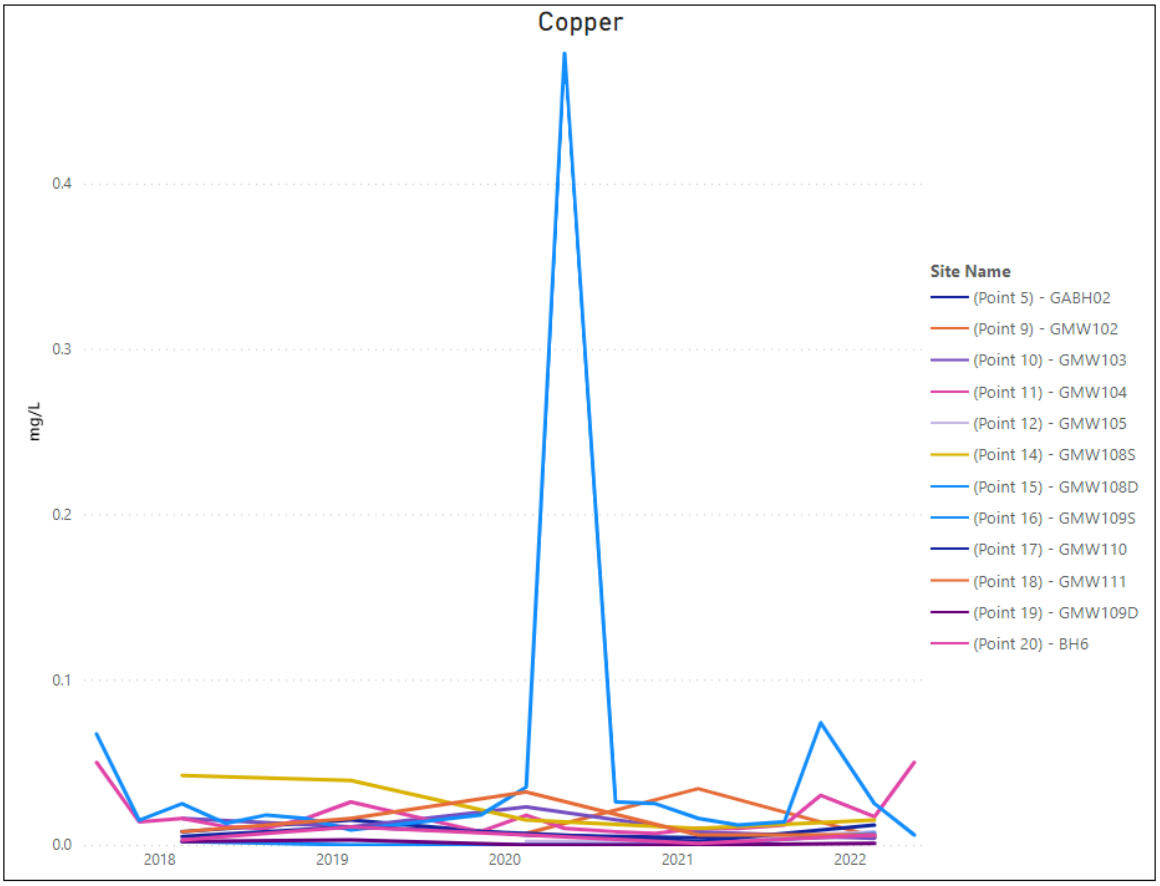

Calcium
mg/L
300
250
200
150
100
50
0
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

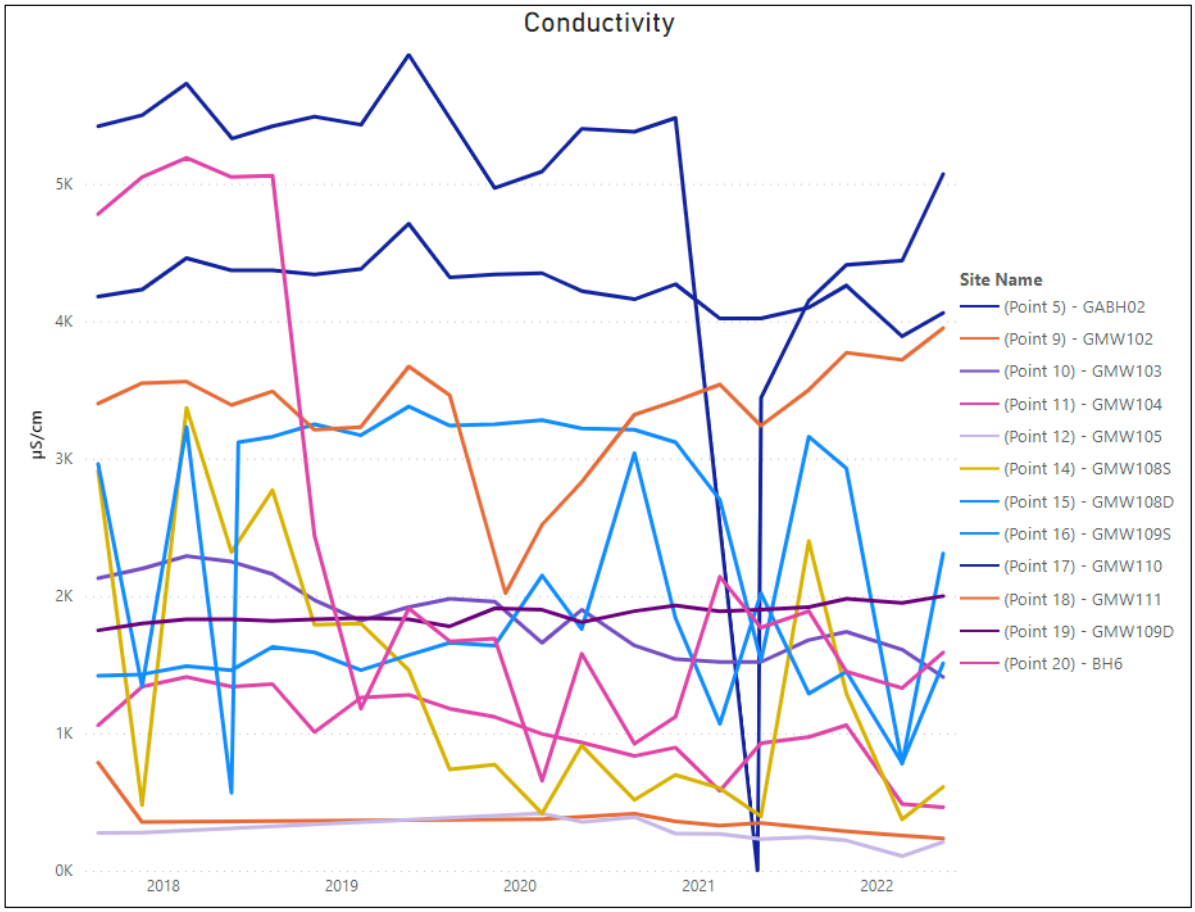

Chloride
mg/L
1,500
1,000
500
0
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

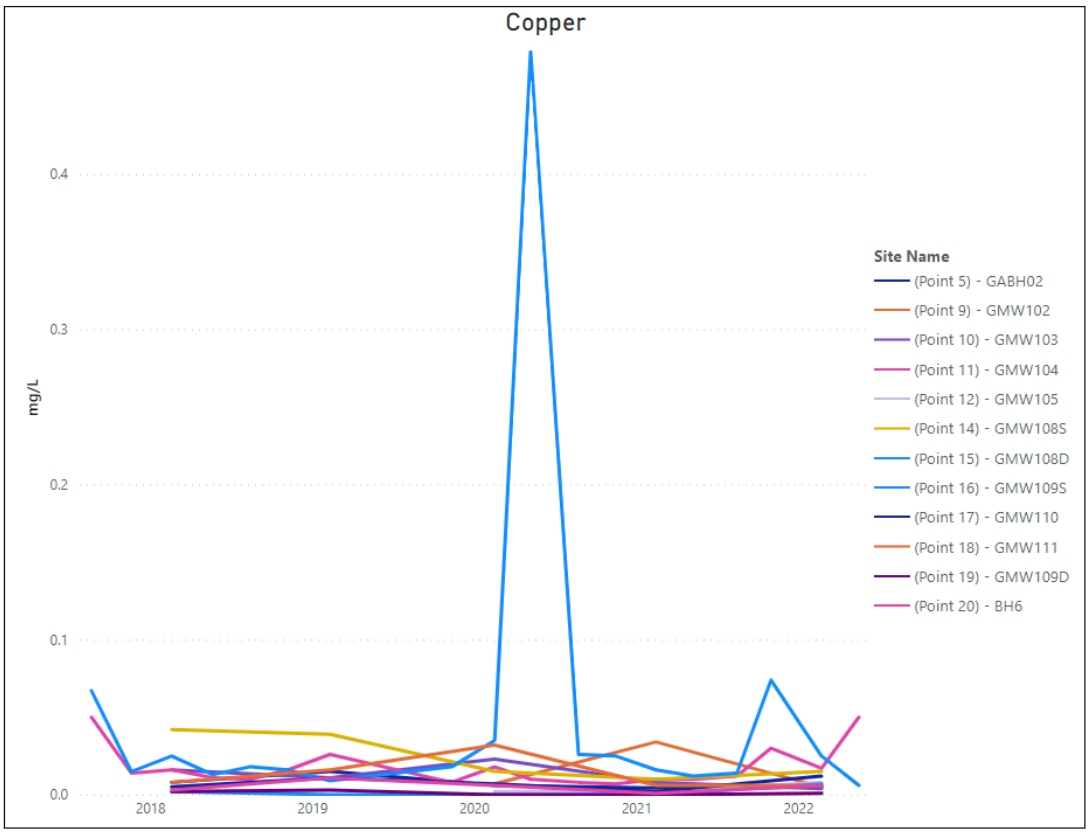

Chromium (hexavalent)
1.0
0.5
0.0
0.5
1.0
mg/L
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

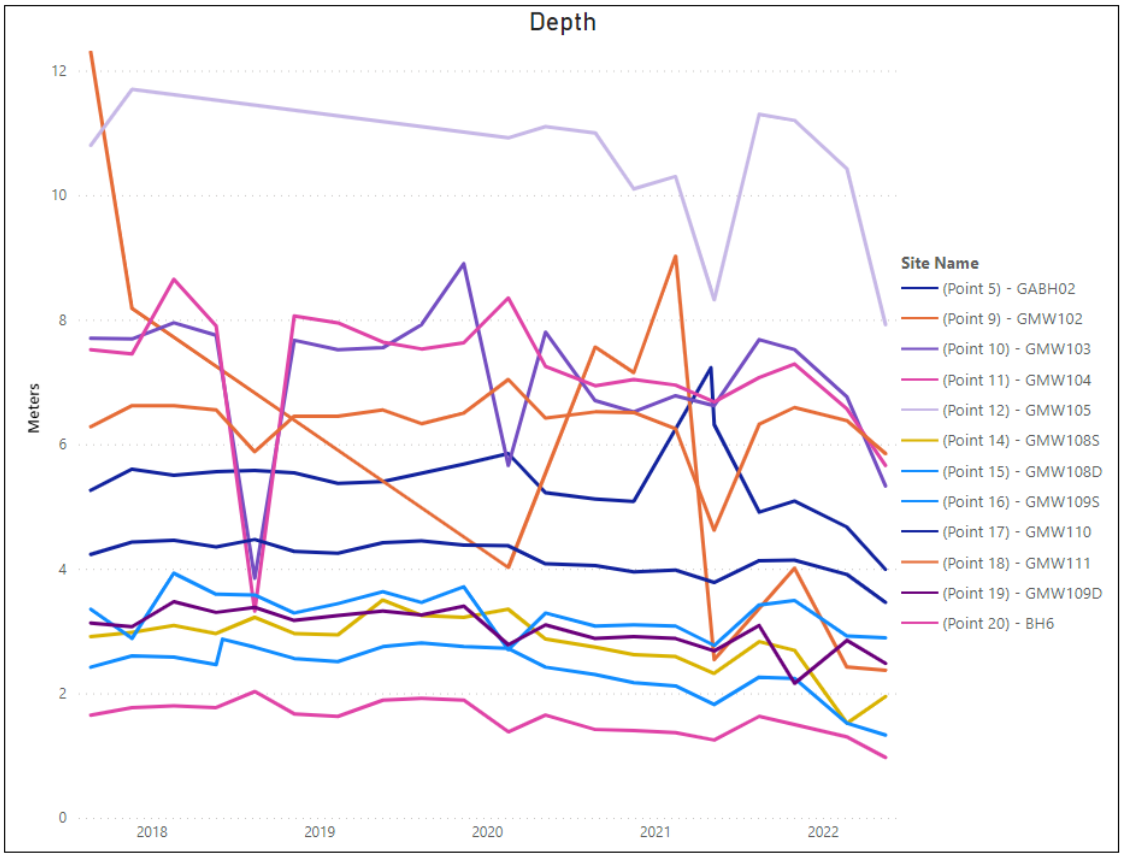

Chromium (Total)
0.15
0.10
0.05
0.00
mg/L
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

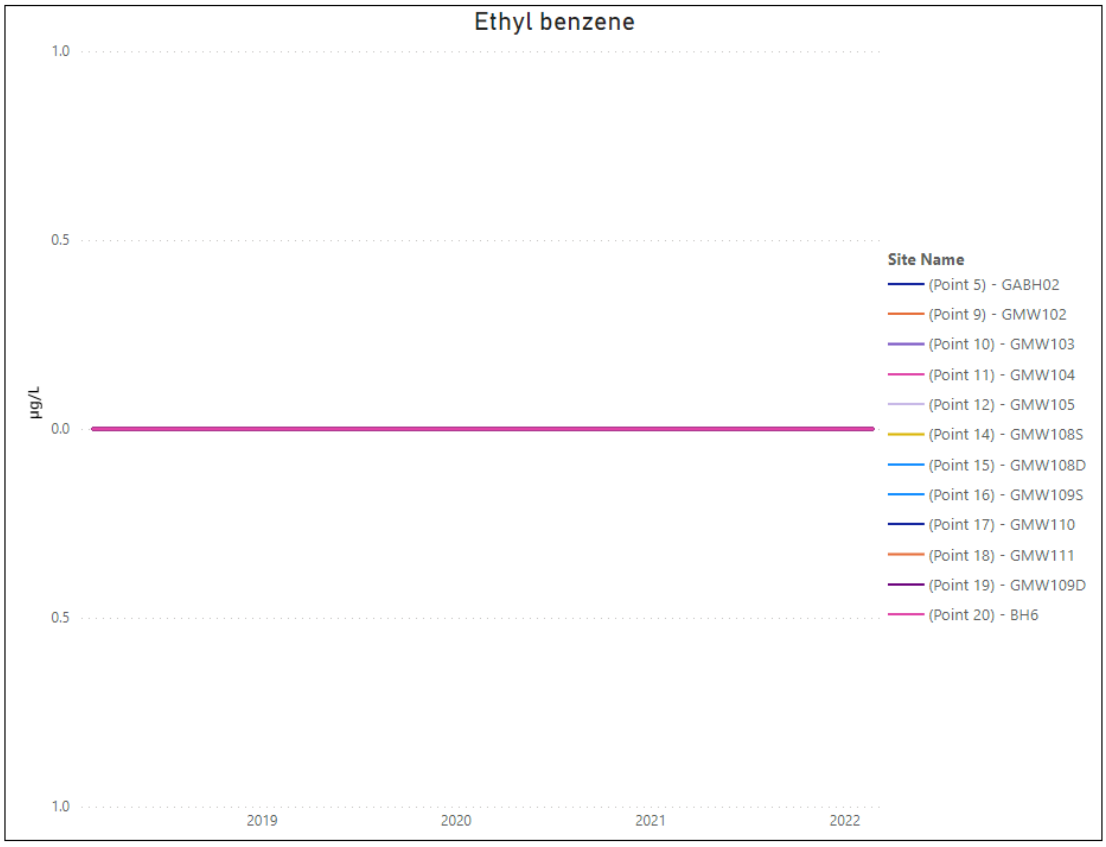

Cobalt
mg/L
0.15
0.10
0.05
0.00
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

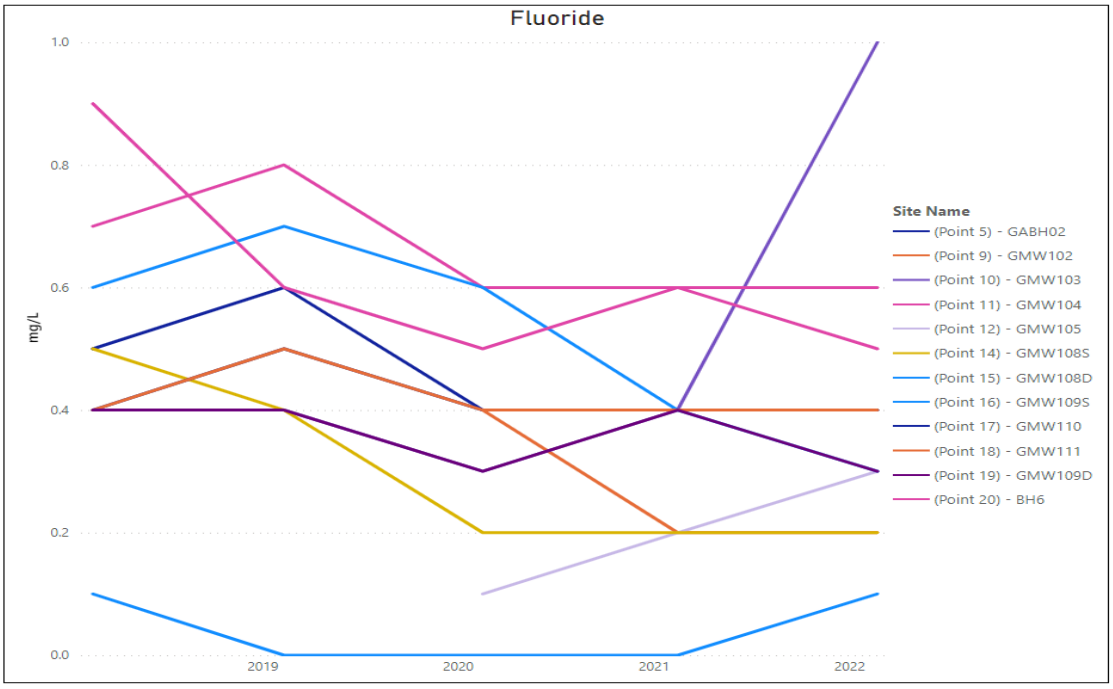

Copper
mg/L
0.4
0.3
0.2
0.1
0.0
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

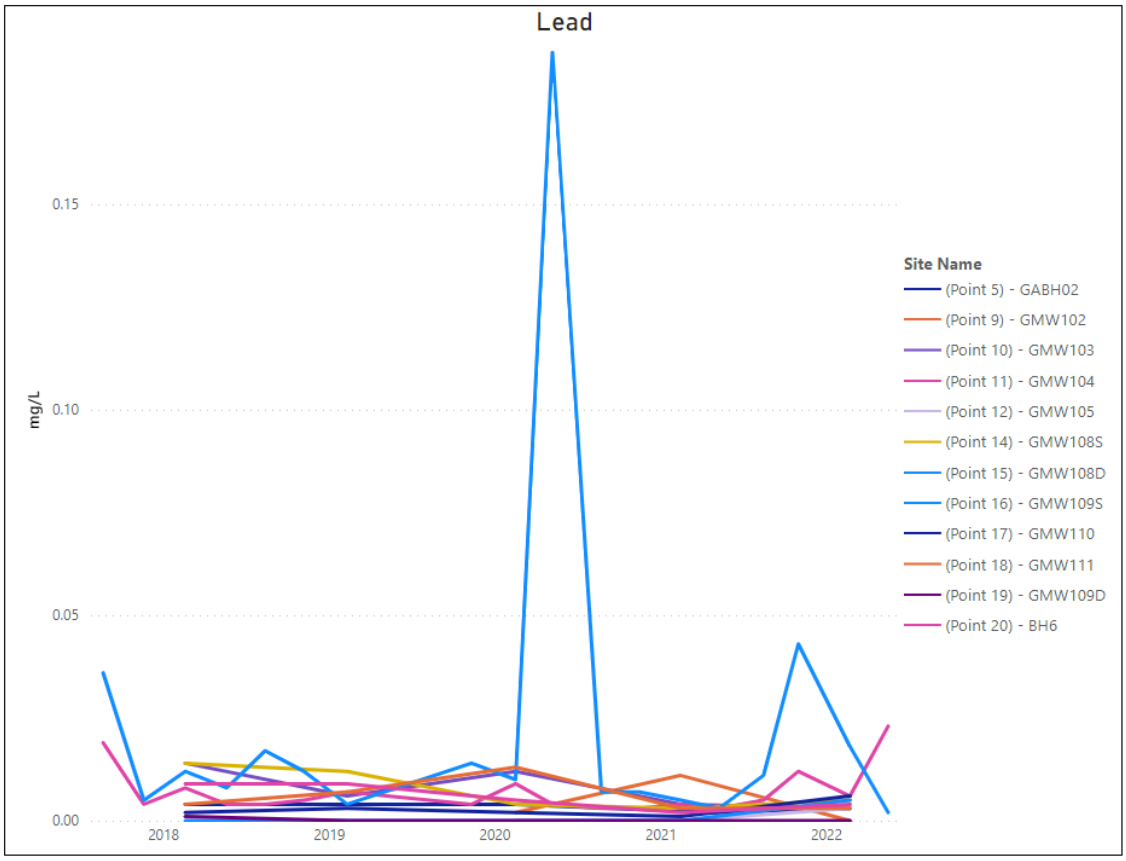

Conductivity
µS/cm
5K
4K
3K
2K
1K
0K
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

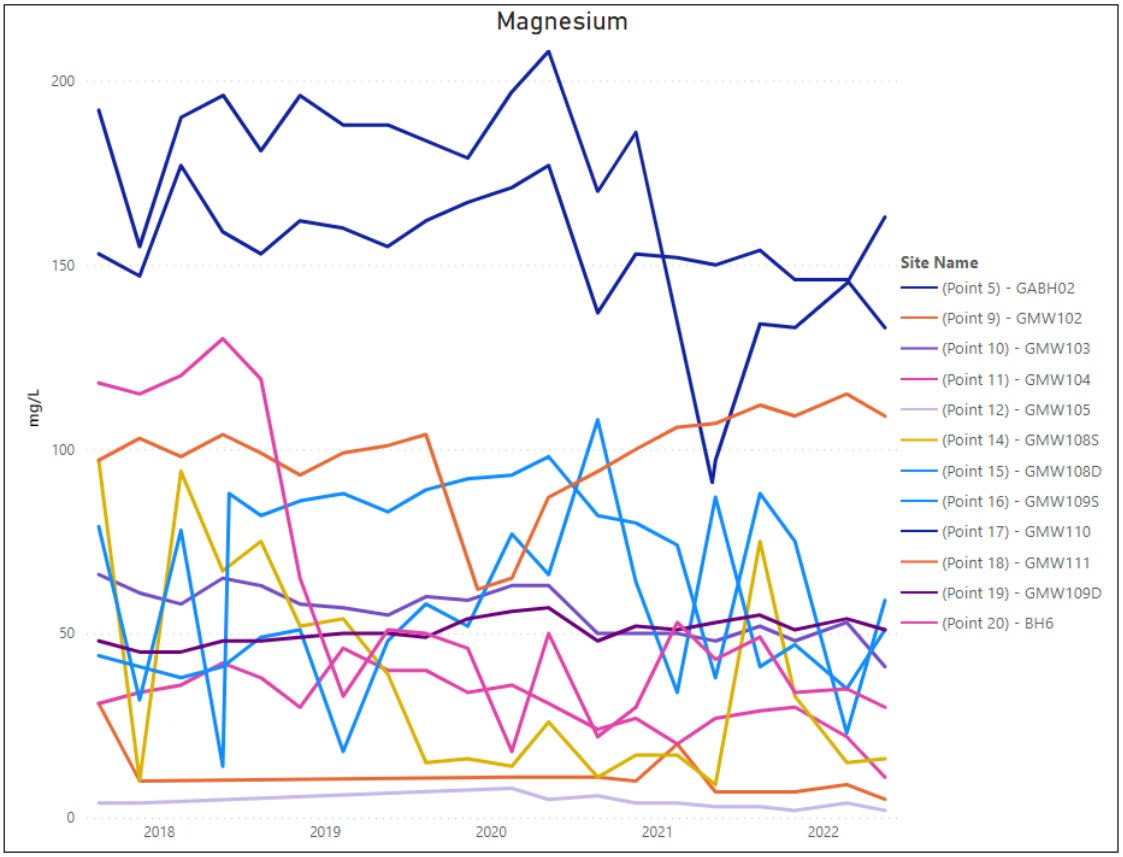

Copper
mg/L
0.4
0.3
0.2
0.1
0.0
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

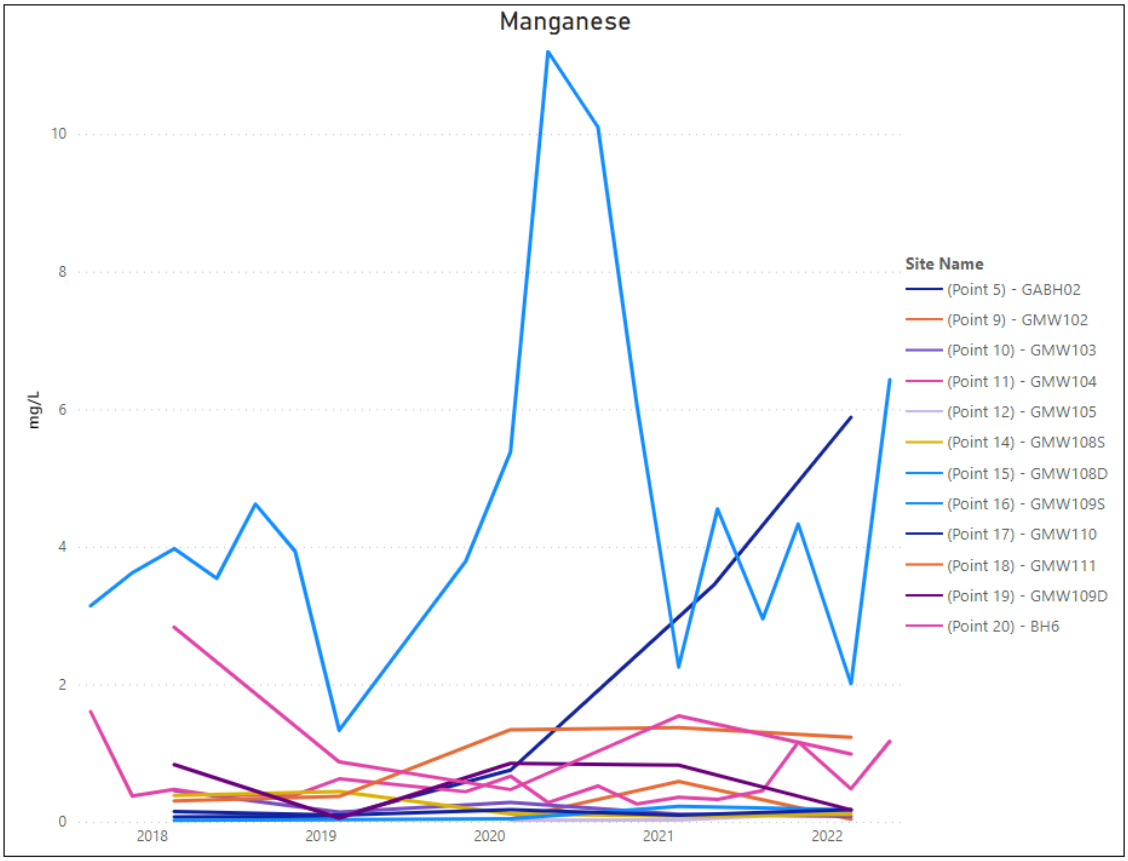

Depth
Meters
12
10
8
6
4
2
0
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

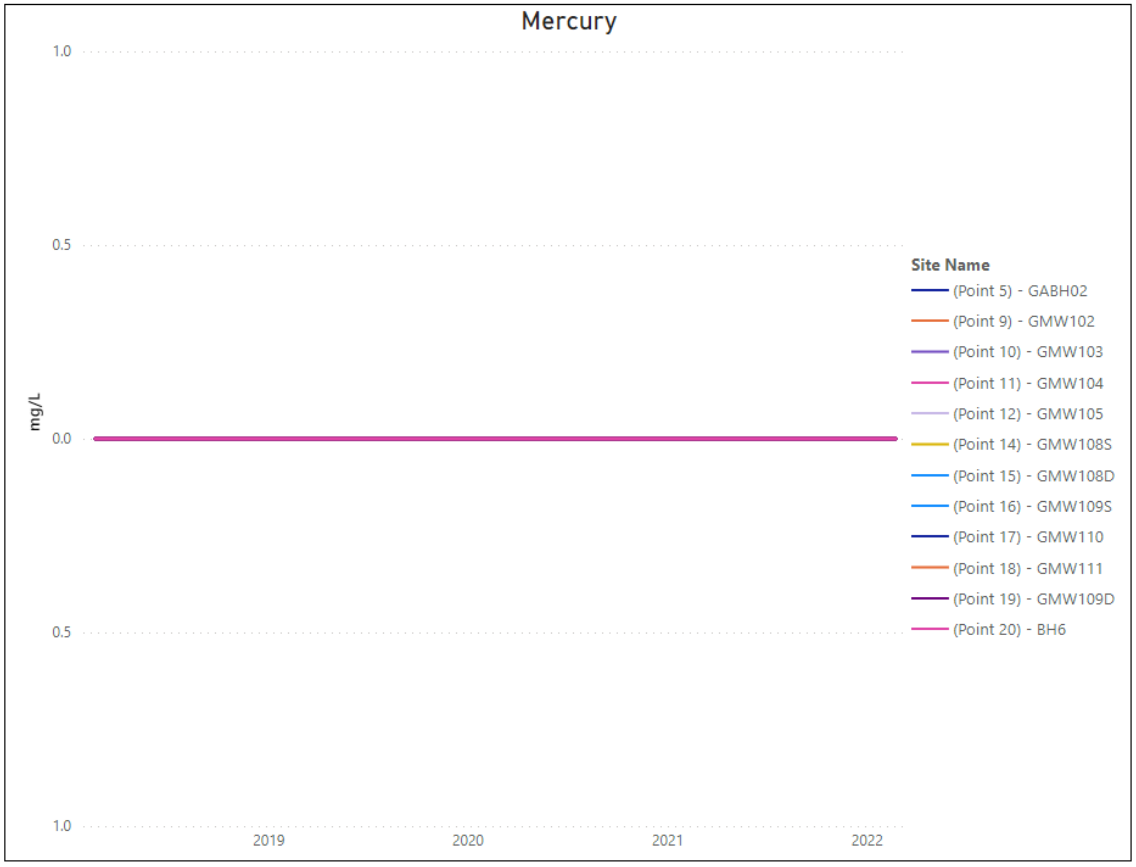

Ethyl benzene
µg/L
1.0
0.5
0.0
0.5
1.0
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

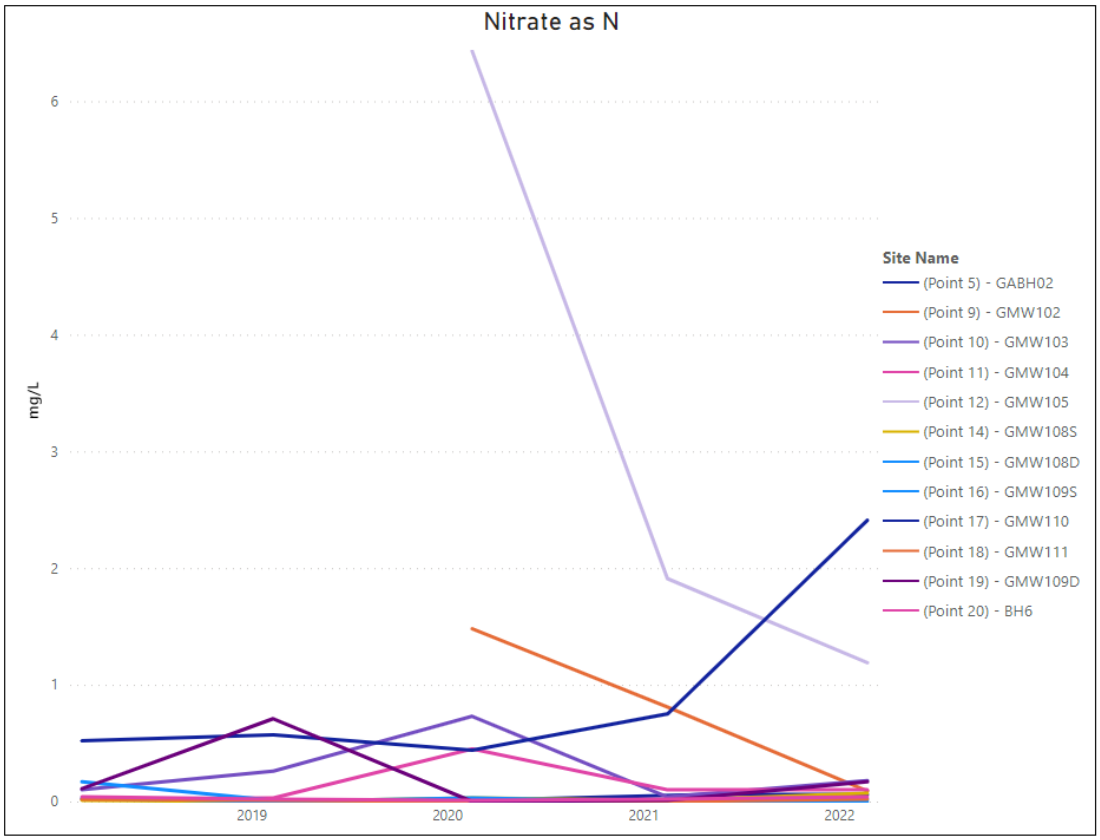

Fluoride
1.0
0.8
0.6
0.4
0.2
0.0
mg/L
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

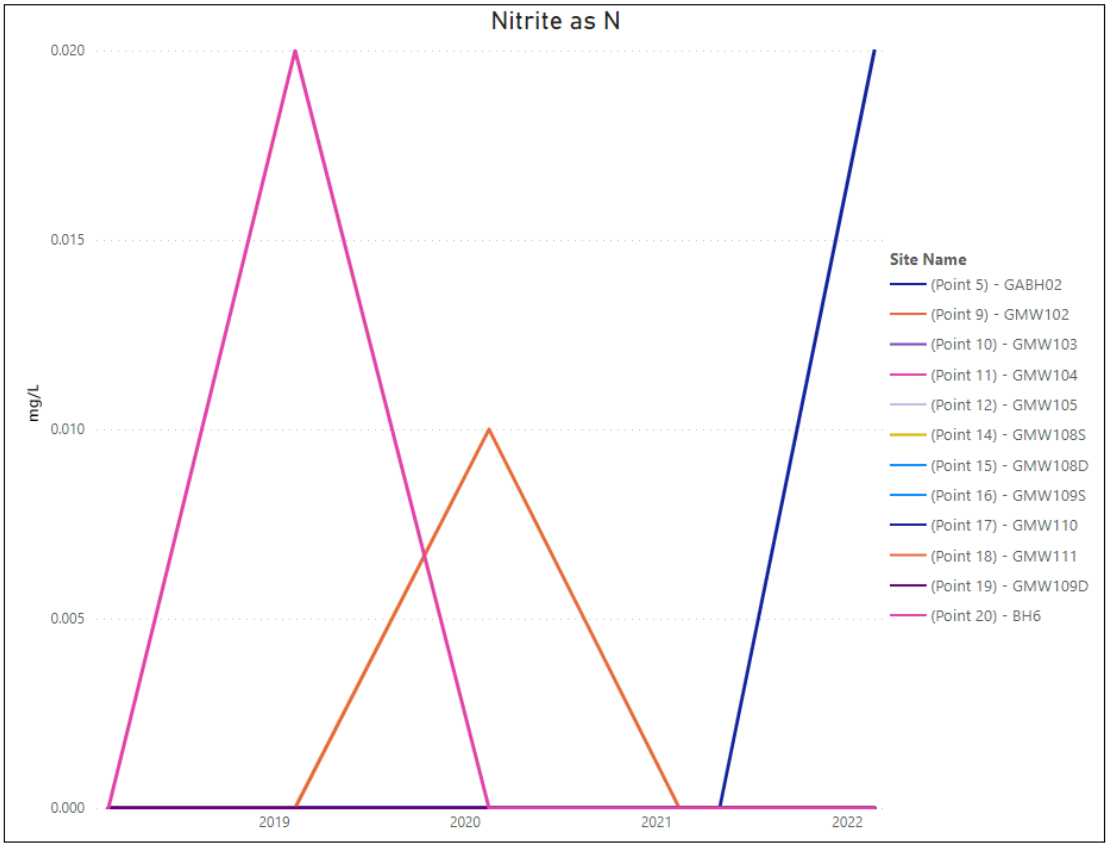

Lead
0.15
0.10
0.05
0.00
mg/L
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

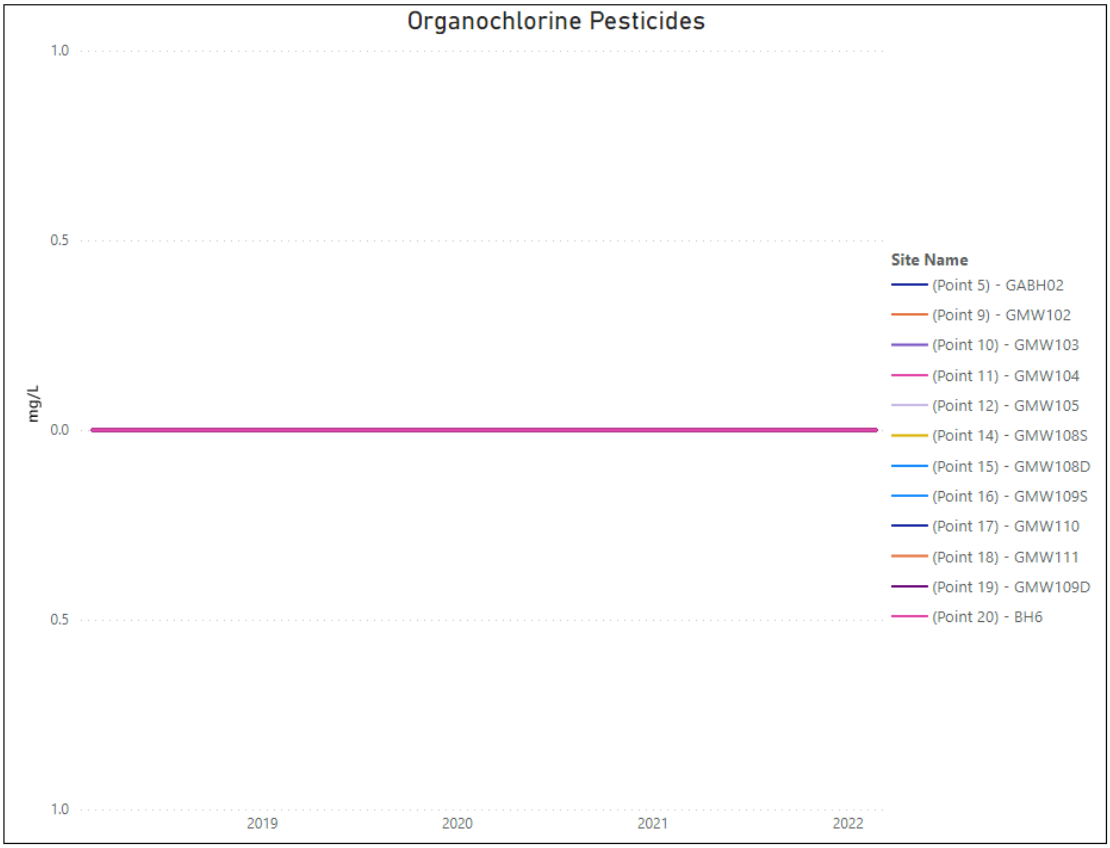

Magnesium
200
150
100
50
0
mg/L
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

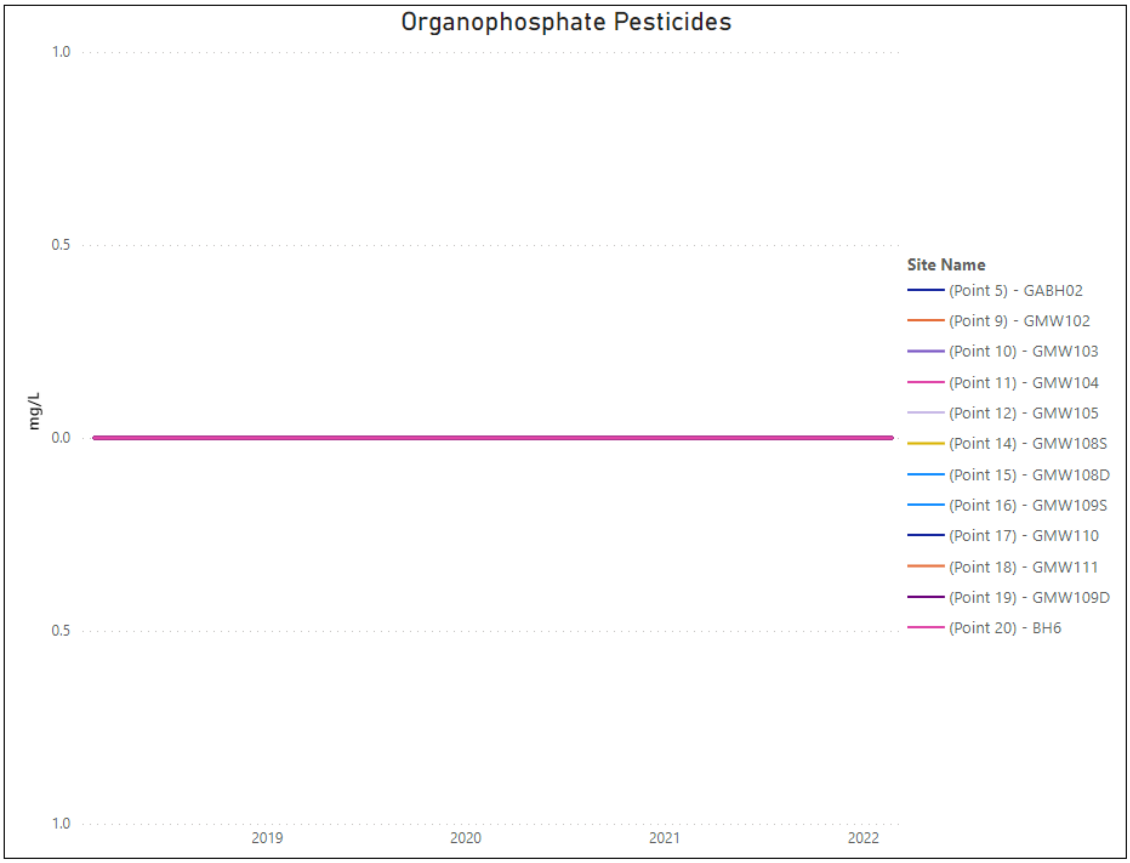

Manganese
10
8
6
4
2
0
mg/L
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

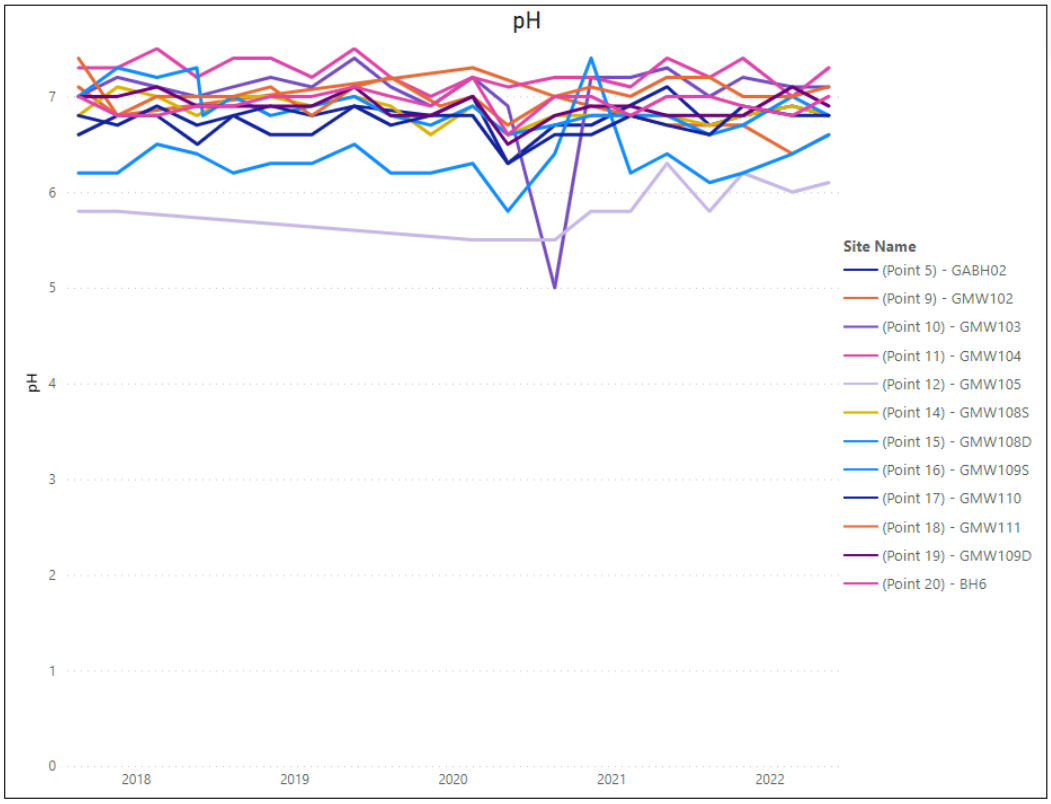

Mercury
1.0
0.5
0.0
0.5
1.0
mg/L
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

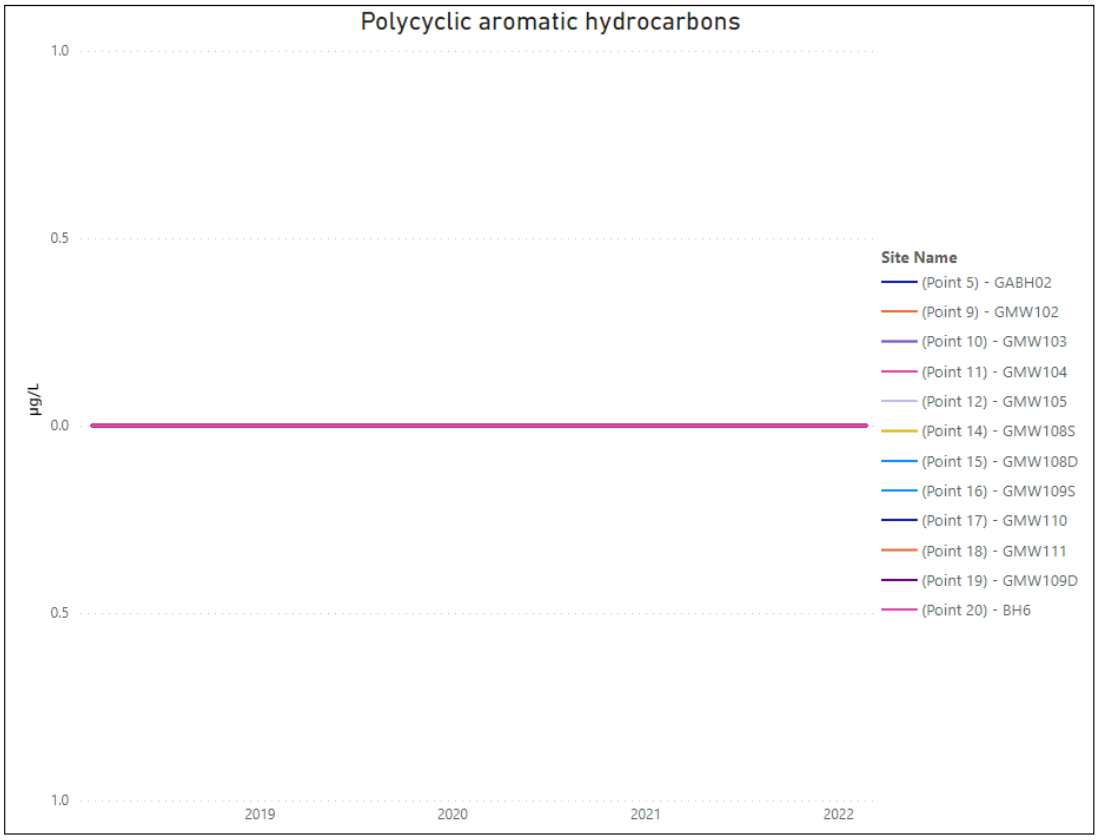

Nitrate as N
6
5
4
3
2
1
0
mg/L
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

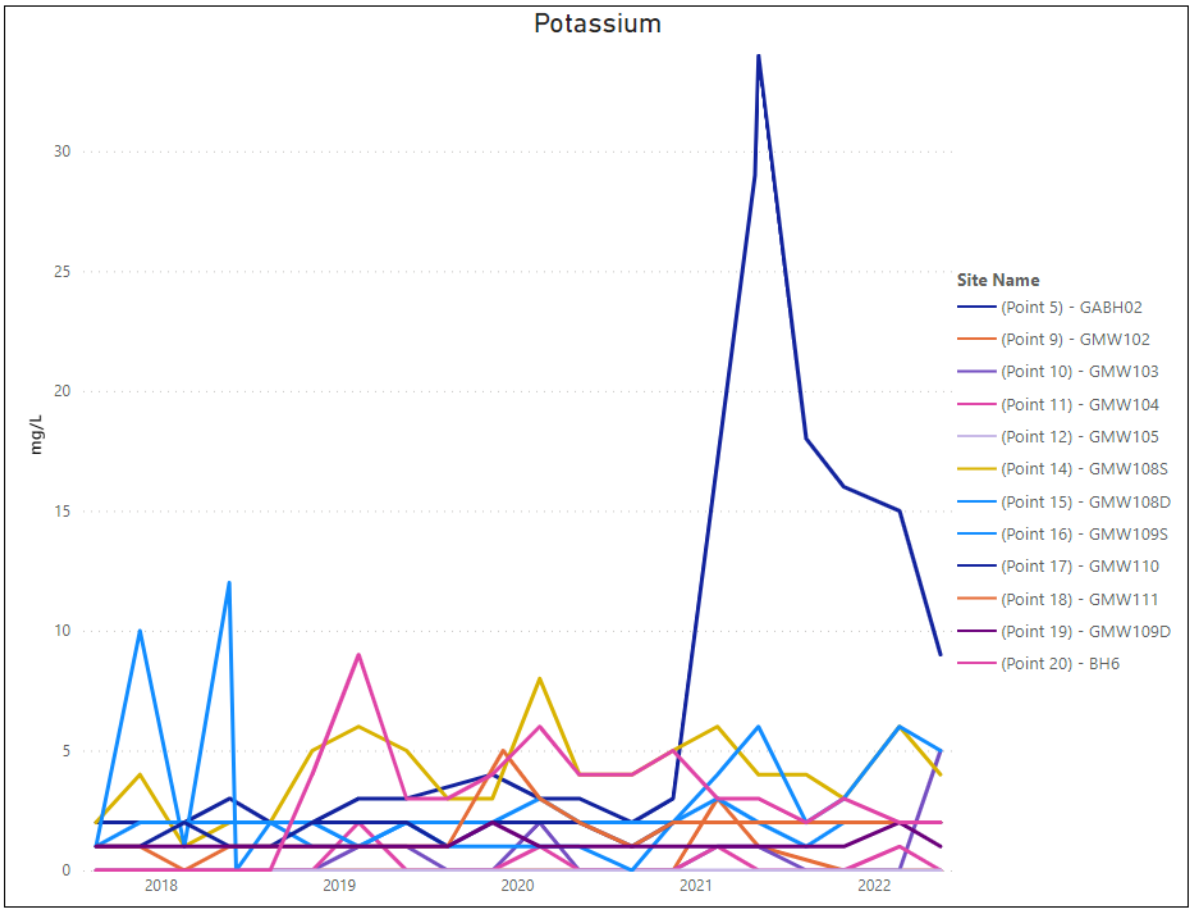

Nitrite as N
0.020
0.015
0.010
0.005
0.000
mg/L
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

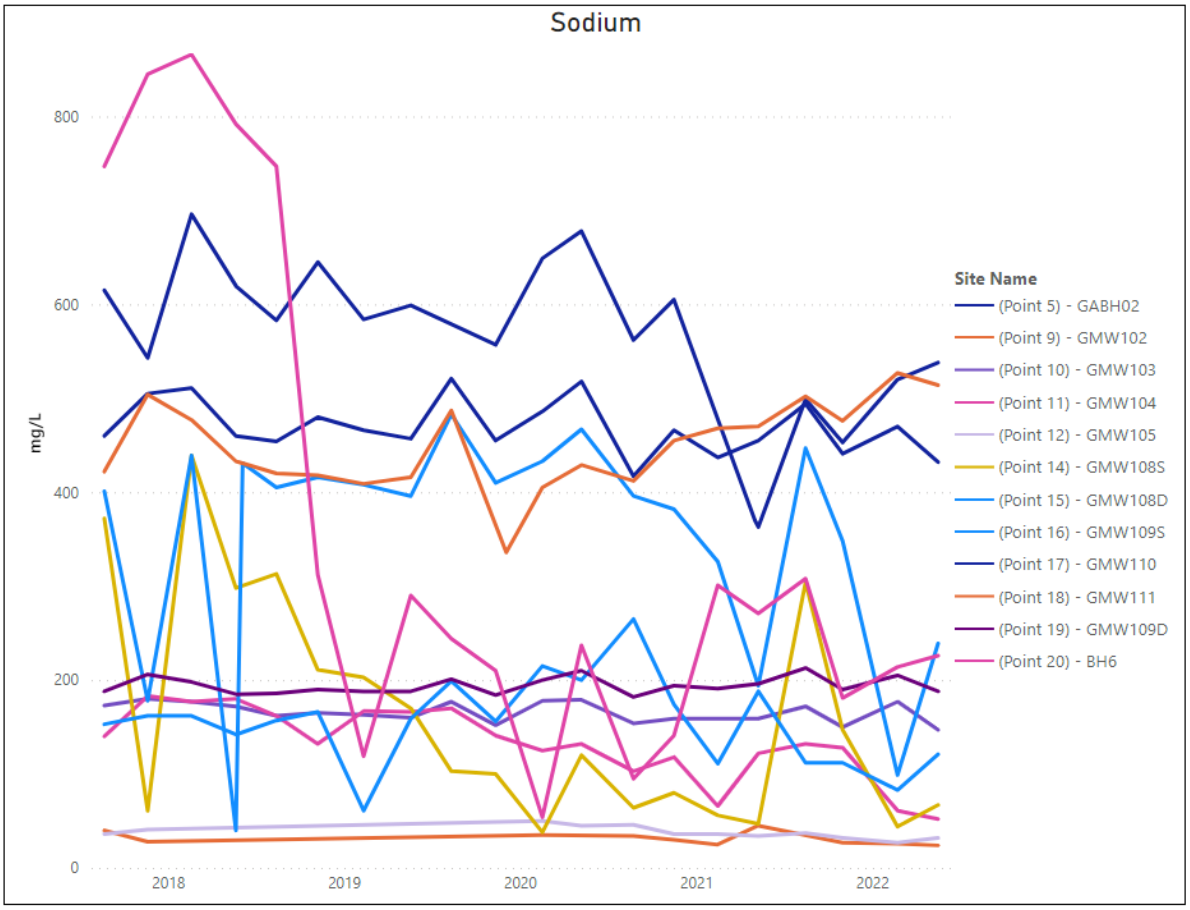

Organochlorine Pesticides
1.0
0.5
0.0
0.5
1.0
mg/L
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

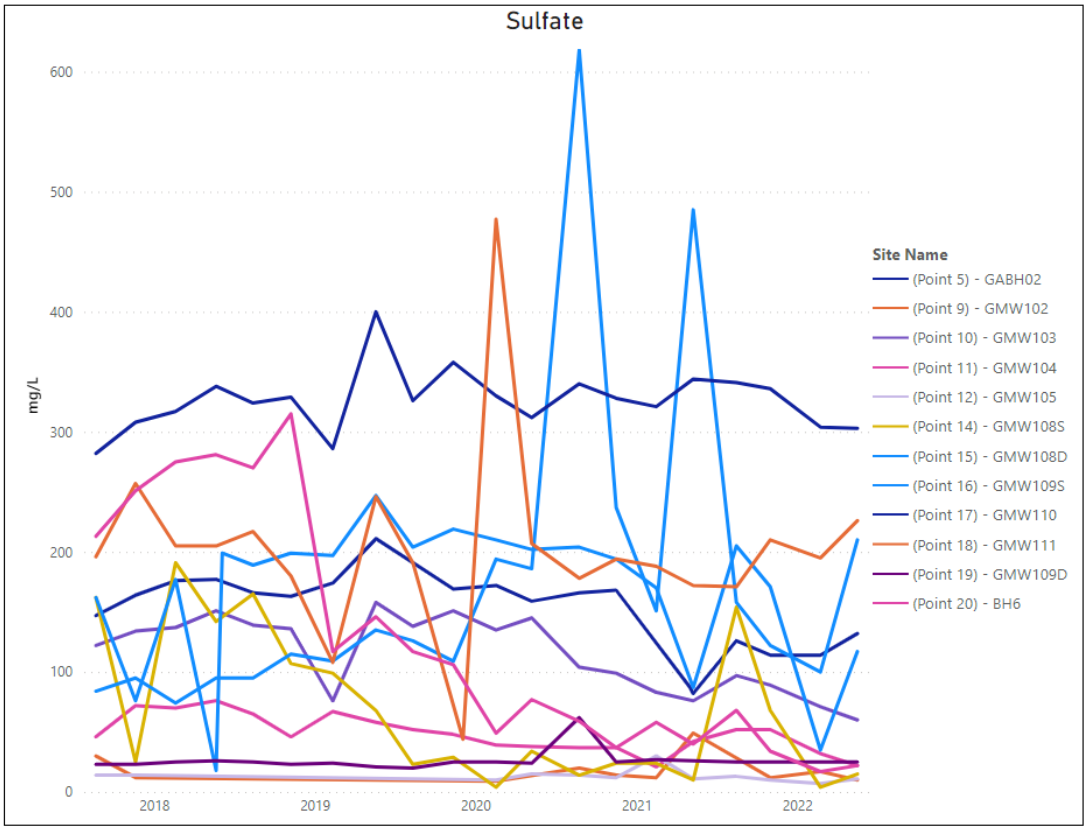

Organophosphate Pesticides
1.0
0.5
0.0
0.5
1.0
mg/L
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

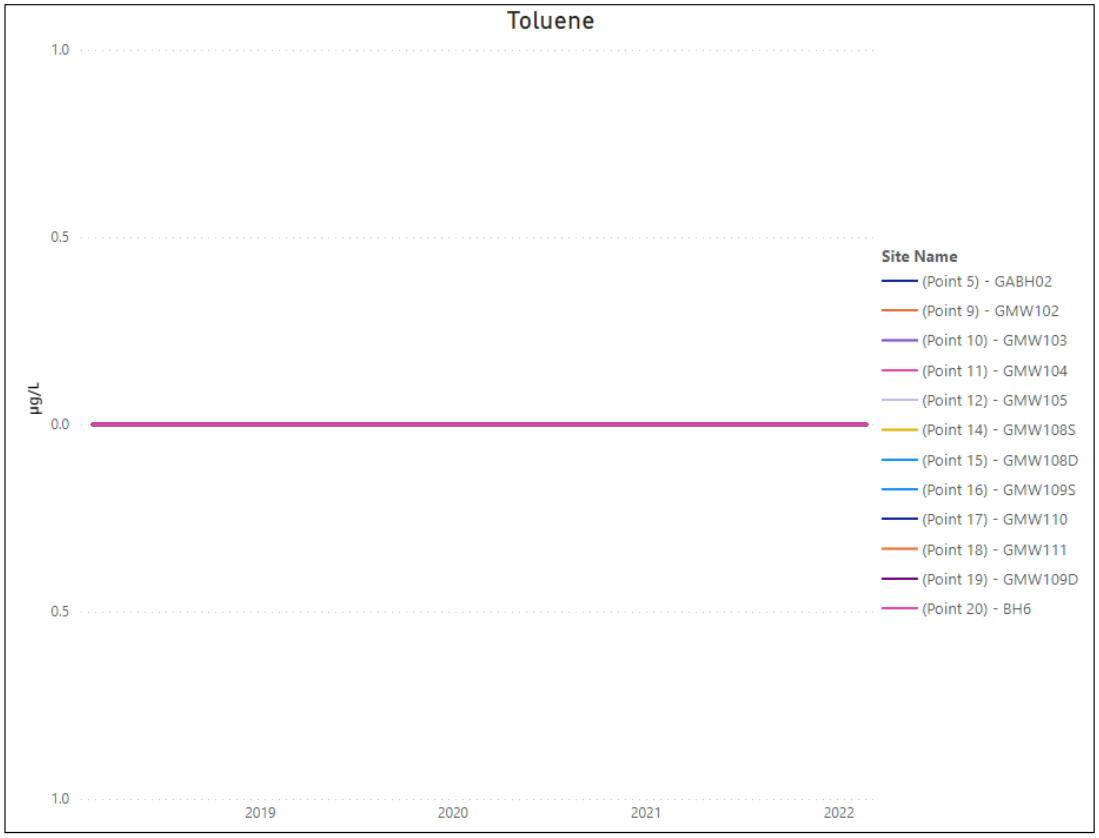

pH
7
6
5
4
3
2
1
0
pH
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

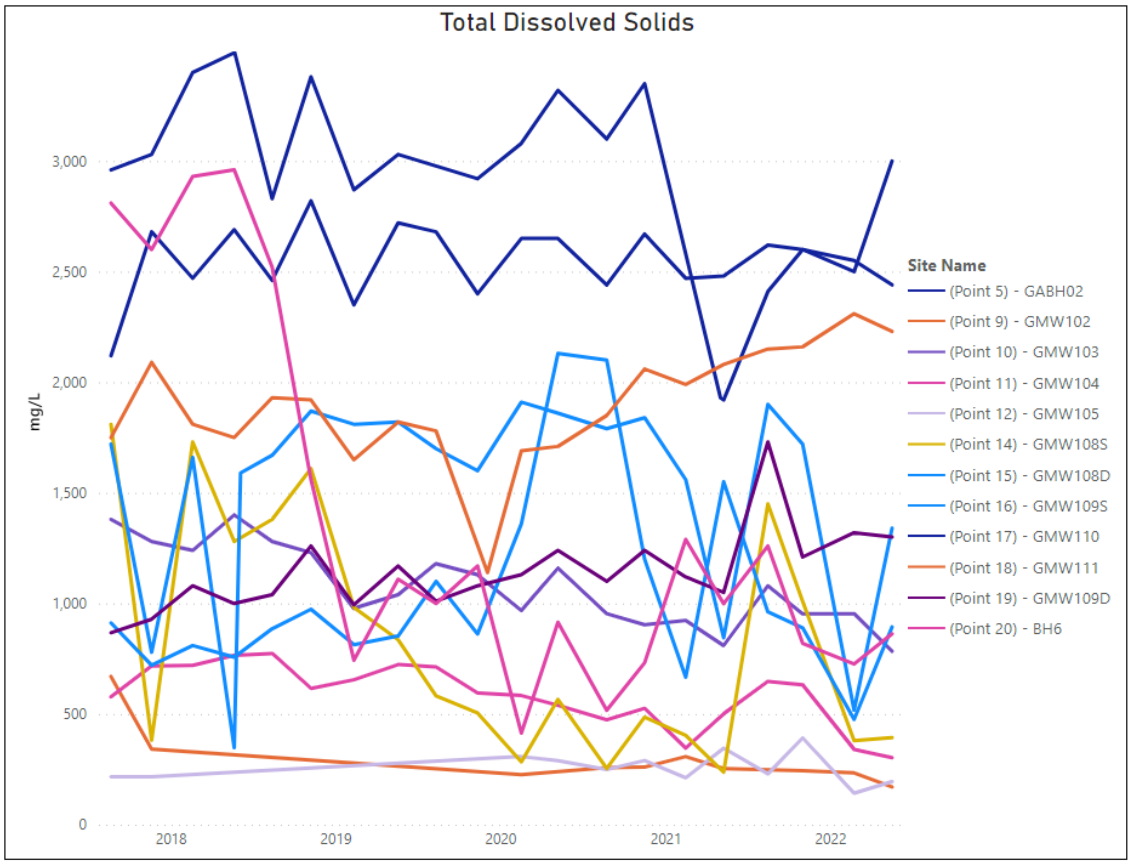

Polycyclic aromatic hydrocarbons
1.0
0.5
0.0
0.5
1.0
µg/L
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

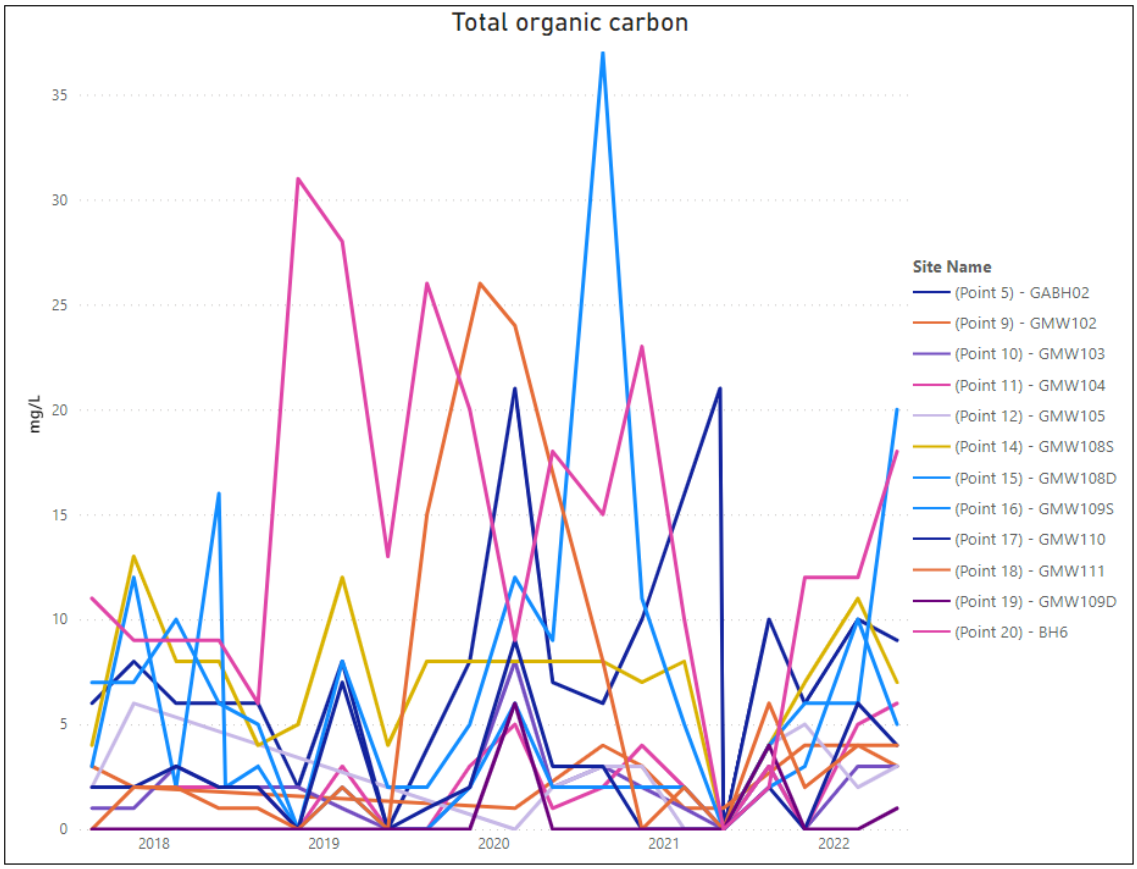

Potassium
30
25
20
15
10
5
0
mg/L
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

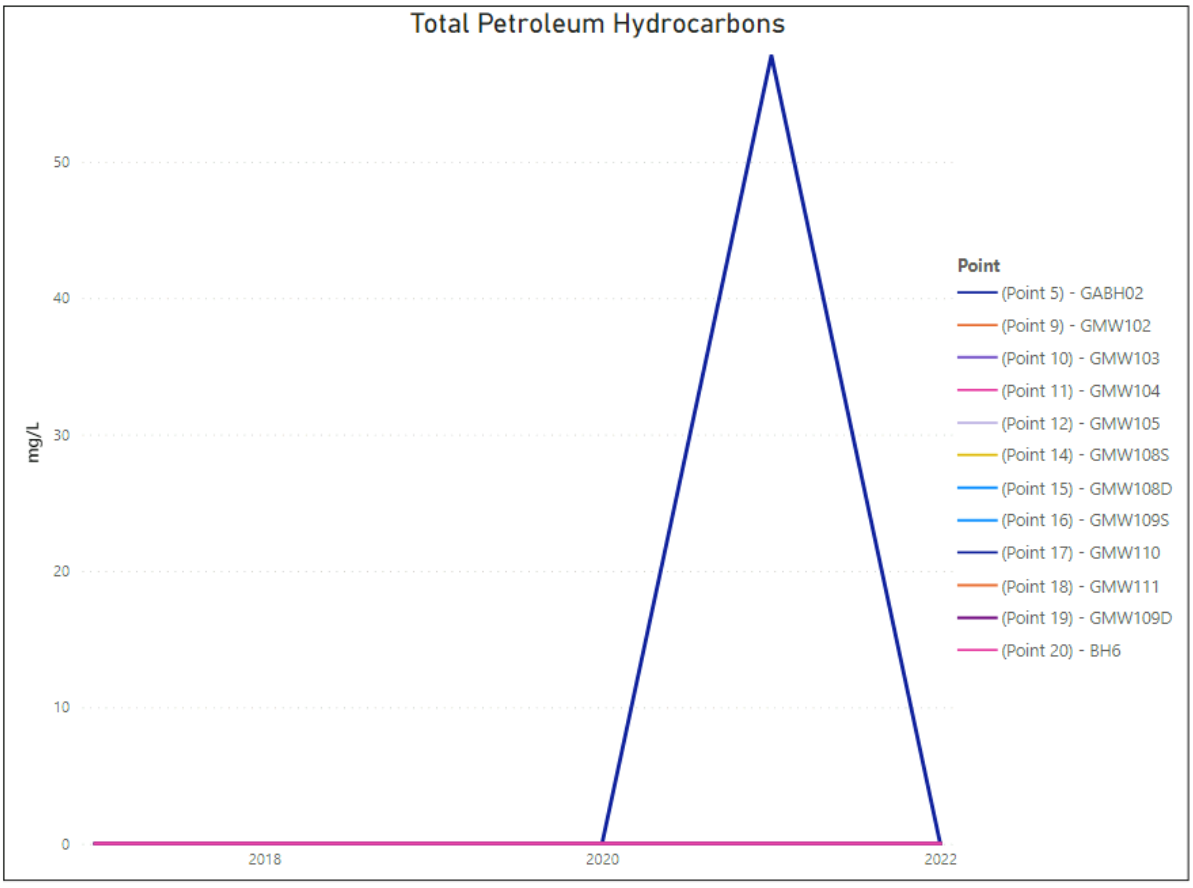

Sodium
mg/L
800
600
400
200
0
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

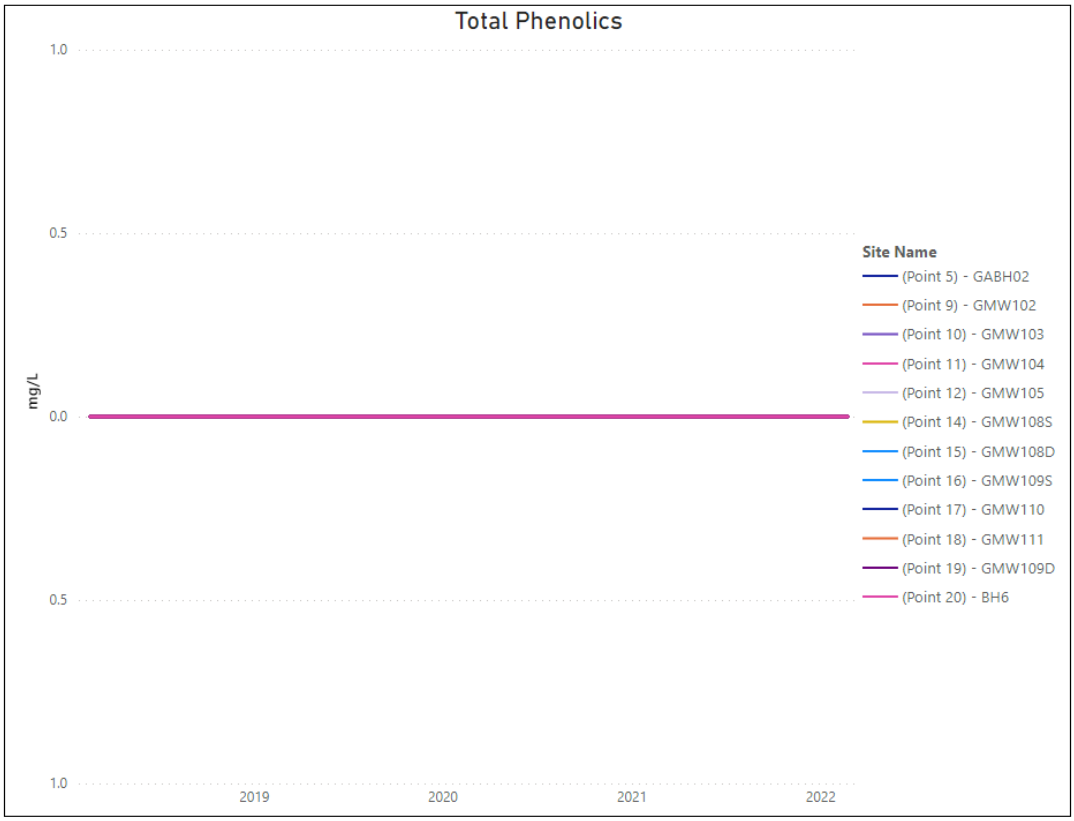

Sulfate
mg/L
600
500
400
300
200
100
0
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

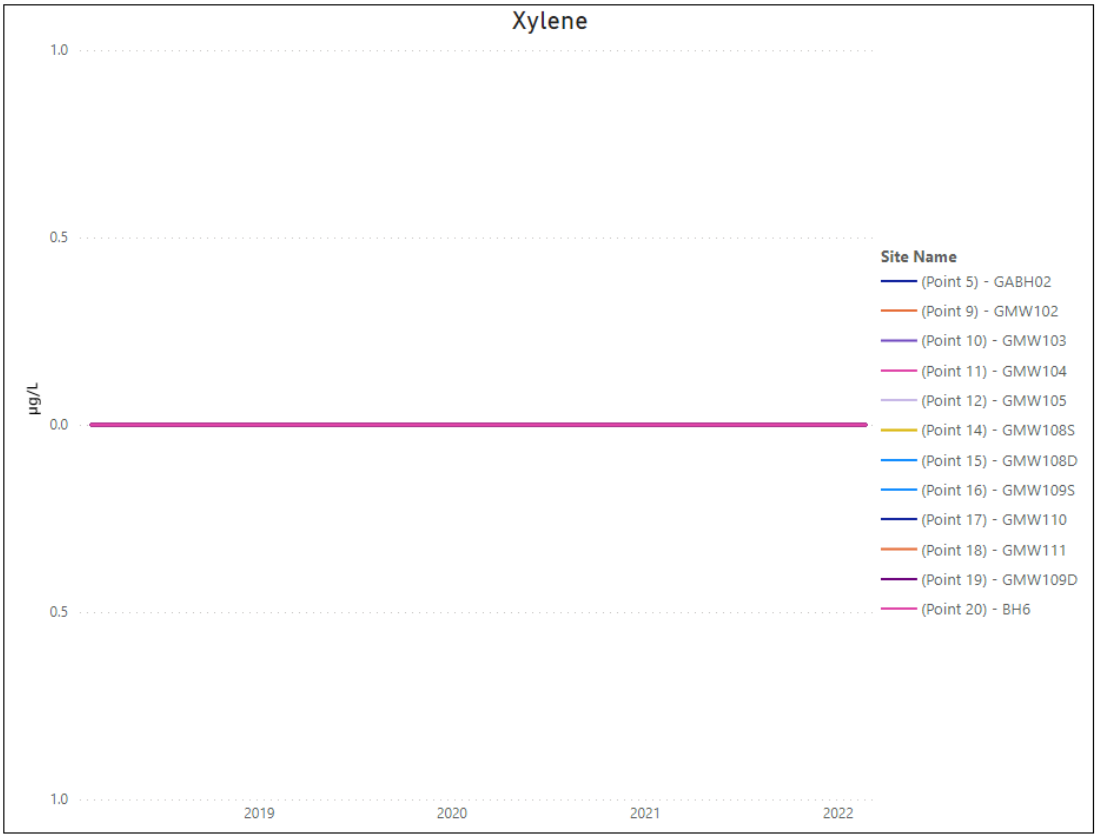

Toluene
1.0
0.5
0.0
0.5
1.0
µg/L
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

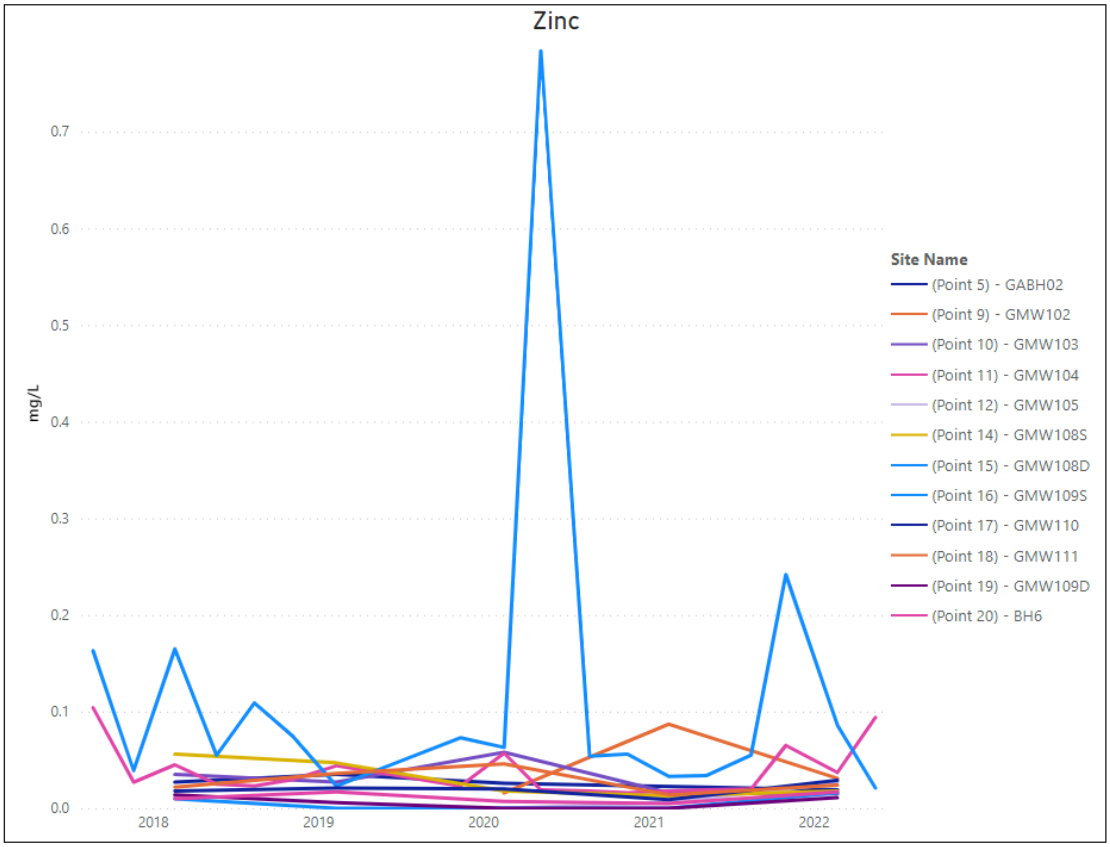

Total Dissolved Solids
3,000
2,500
2,000
1,500
1,000
500
0
mg/L
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6


Total organic carbon
mg/L
35
30
25
20
15
10
5
0
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

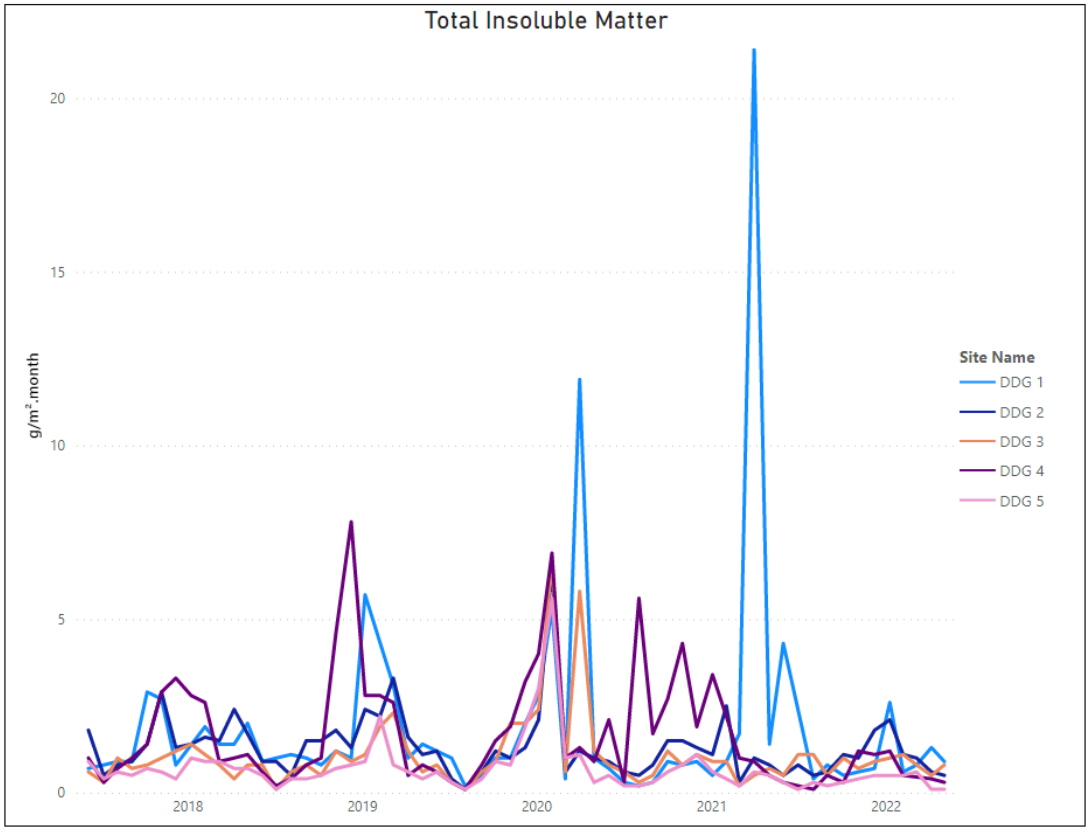

Total Petroleum Hydrocarbons
mg/L
50
40
30
20
10
0
2018
2020
2022
Point
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

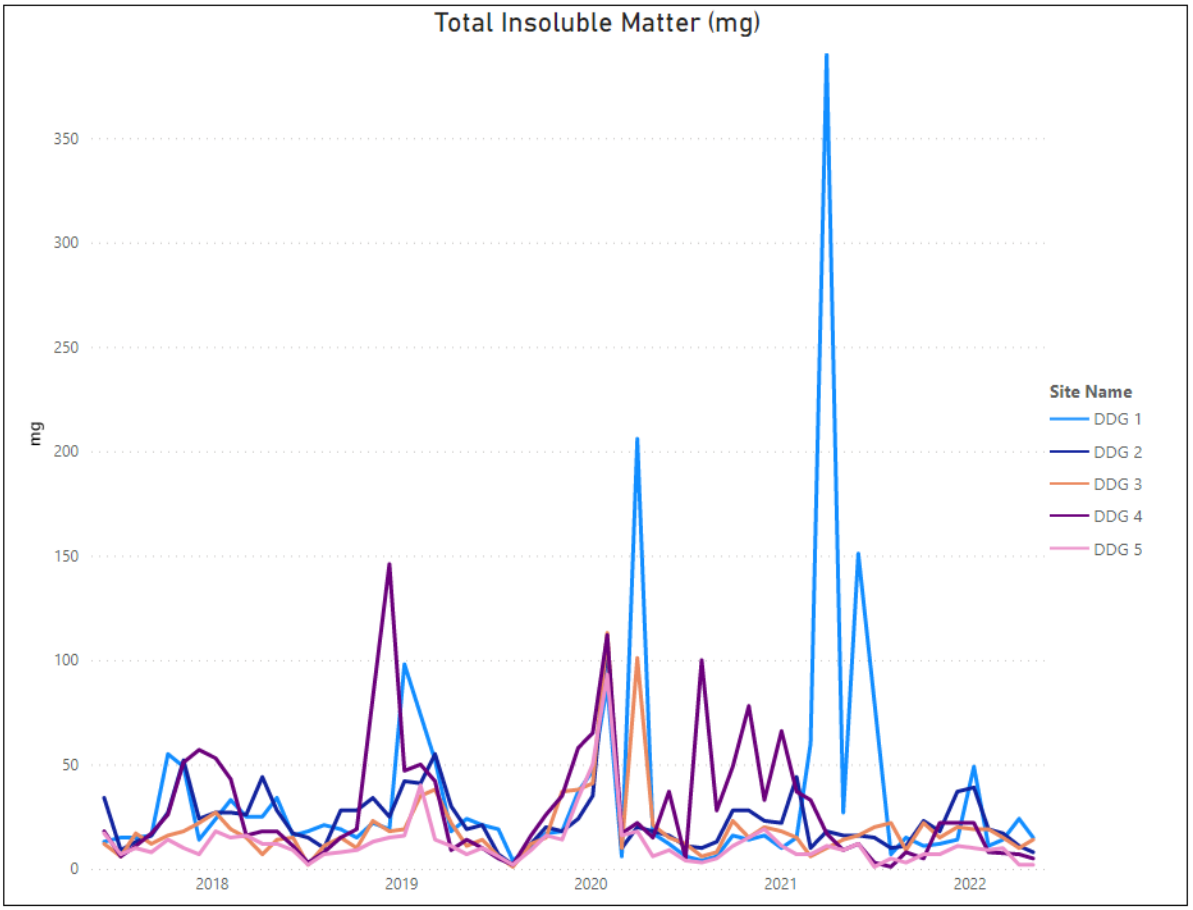

Total Phenolics
1.0
0.5
0.0
0.5
1.0
mg/L
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

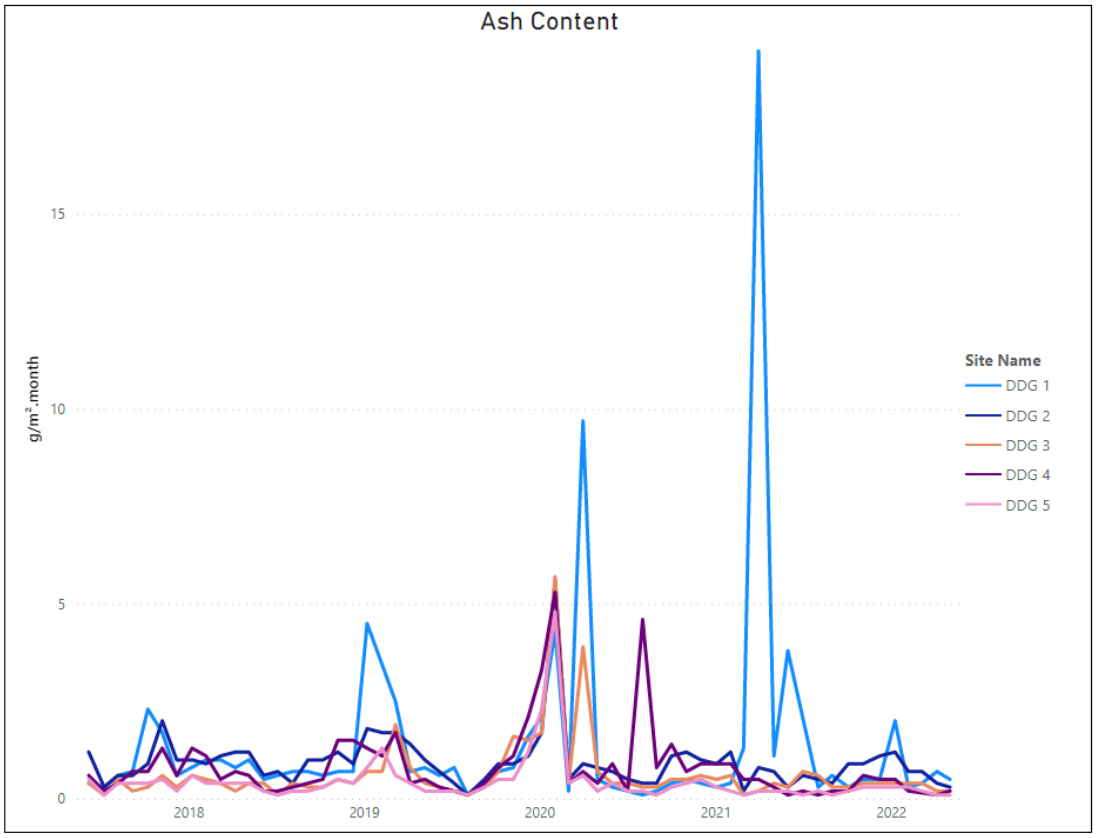

Xylene
1.0
0.5
0.0
0.5
1.0
µg/L
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

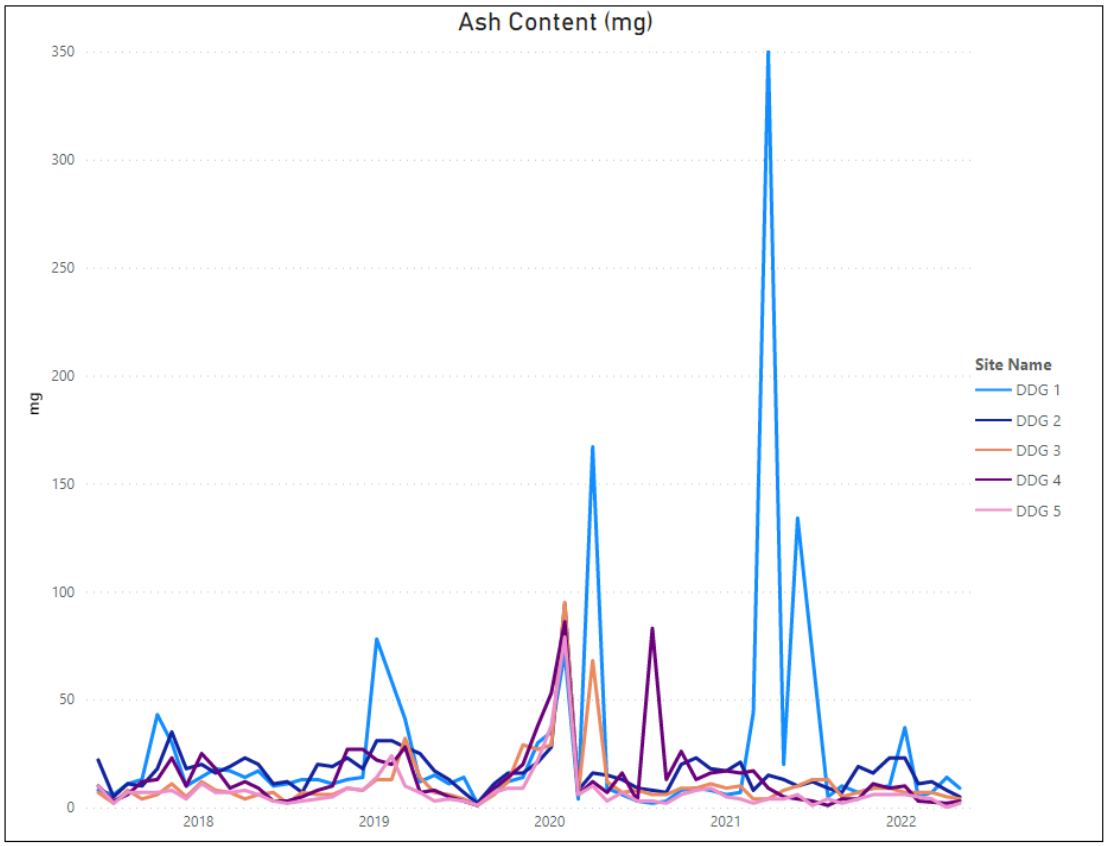

Zinc
mg/L
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
2018
2019
2020
2021
2022
Site Name
(Point 5) - GABH02
(Point 9) - GMW102
(Point 10) - GMW103
(Point 11) - GMW104
(Point 12) - GMW105
(Point 14) - GMW108S
(Point 15) - GMW108D
(Point 16) - GMW109S
(Point 17) - GMW110
(Point 18) - GMW111
(Point 19) - GMW109D
(Point 20) - BH6

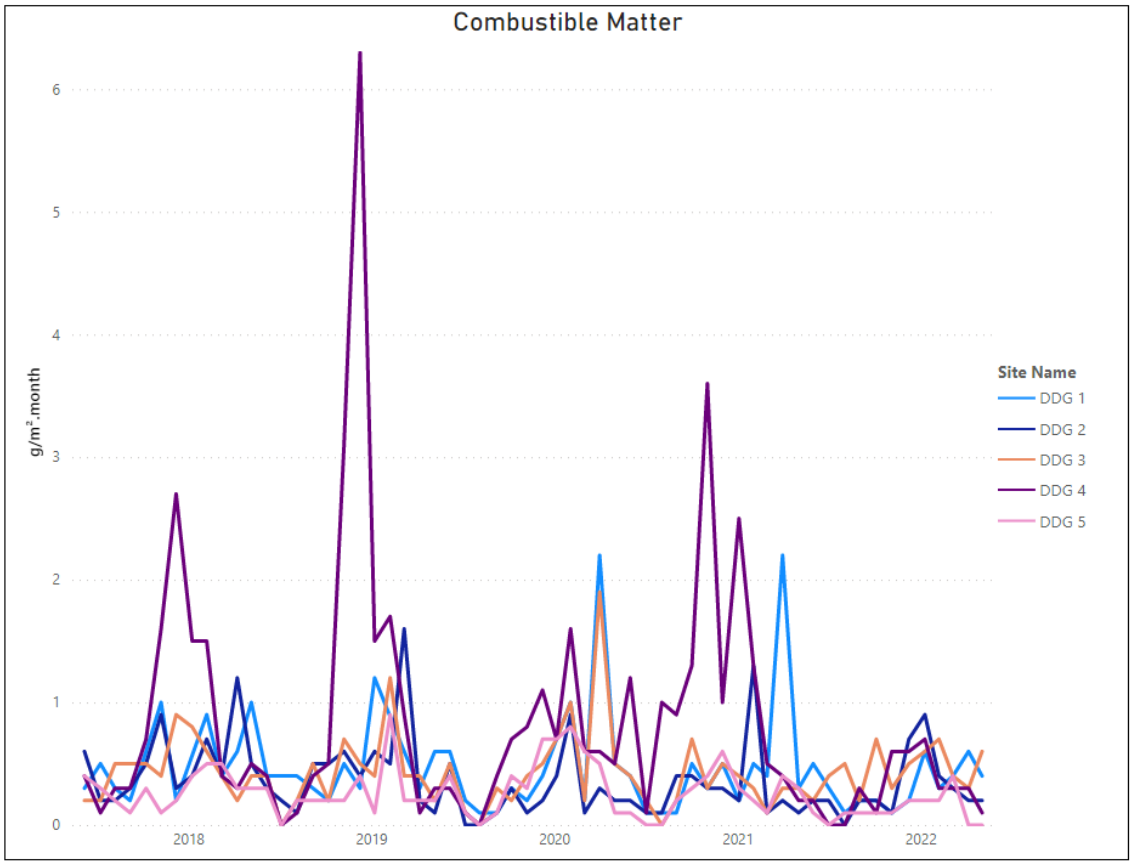
Deposited Dust Results

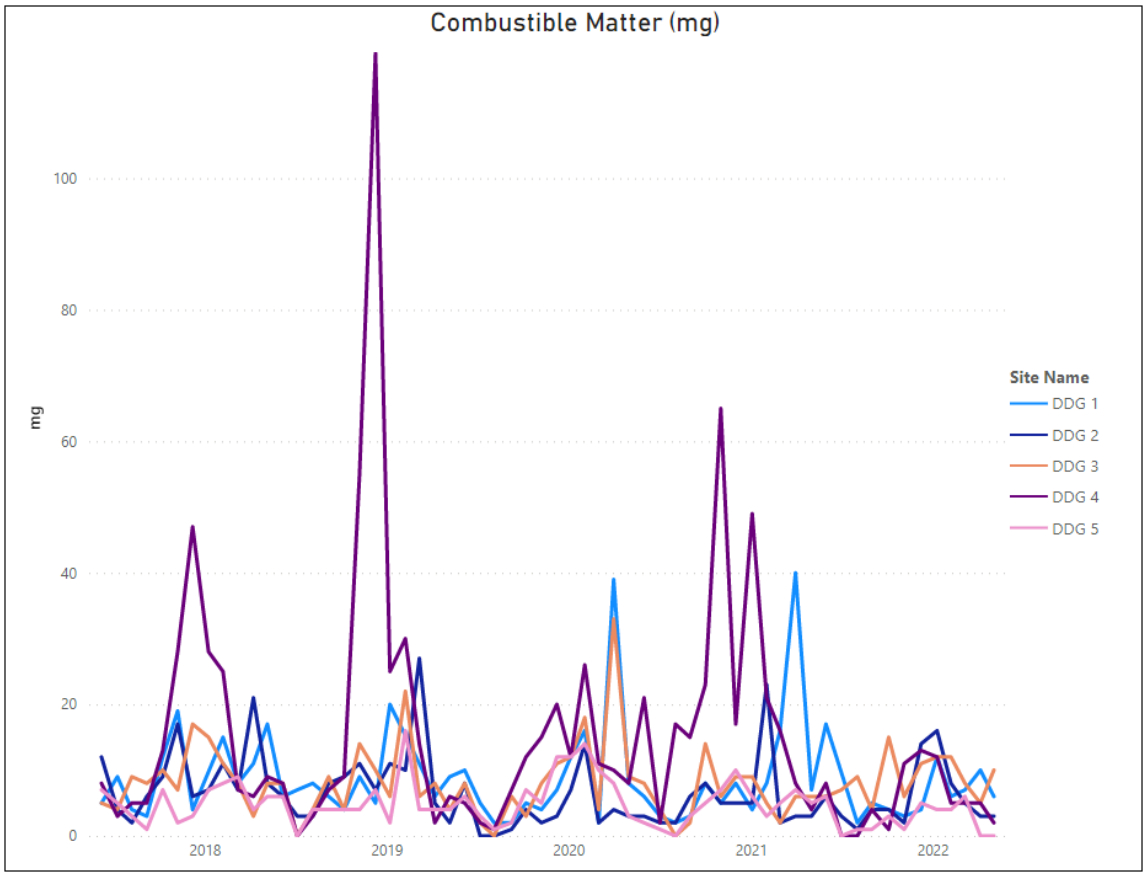




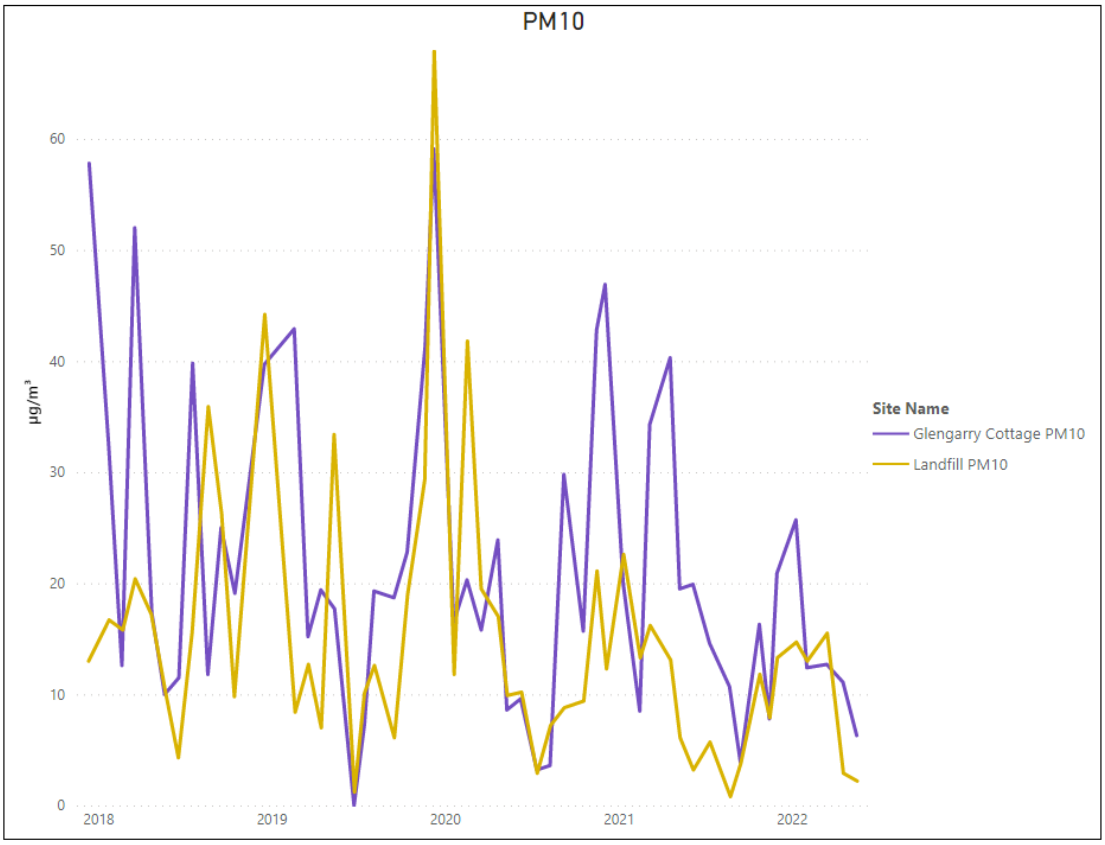

Ash Content
g/m².month
15
10
5
0
2018
2019
2020
2021
2022
Site Name
DDG 1
DDG 2
DDG 3
DDG 4
DDG 5

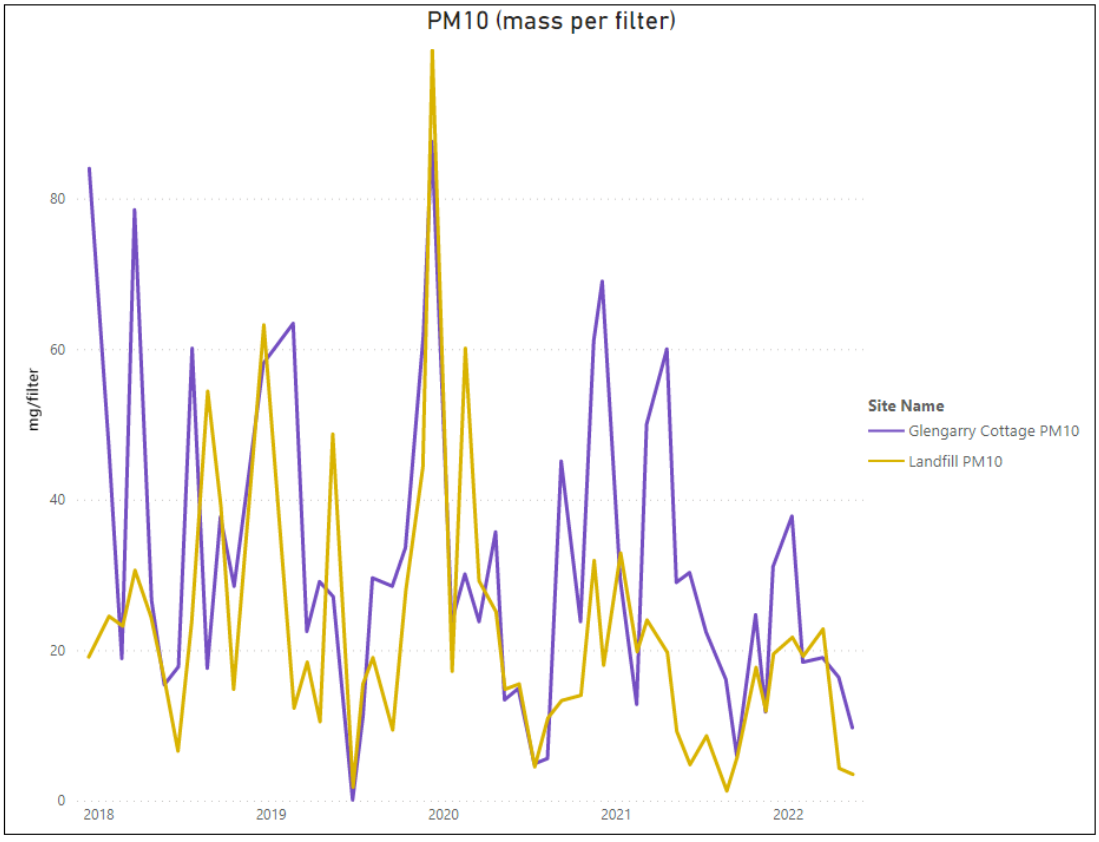

Ash Content (mg)
mg
350
300
250
200
150
100
50
0
2018
2019
2020
2021
2022
Site Name
DDG 1
DDG 2
DDG 3
DDG 4
DDG 5

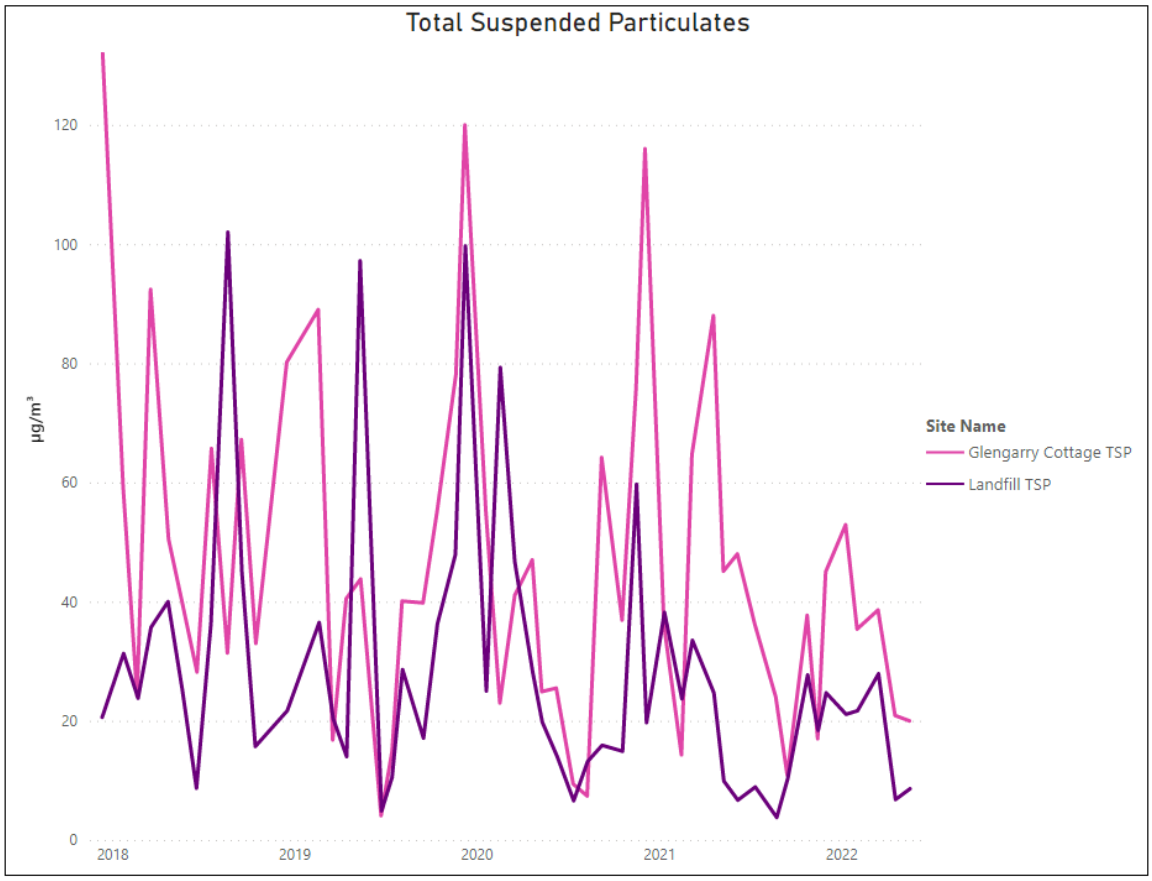

Combustible Matter
g/m².month
0
1
2
3
4
5
6
2018
2019
2020
2021
2022
Site Name
DDG 1
DDG 2
DDG 3
DDG 4
DDG 5

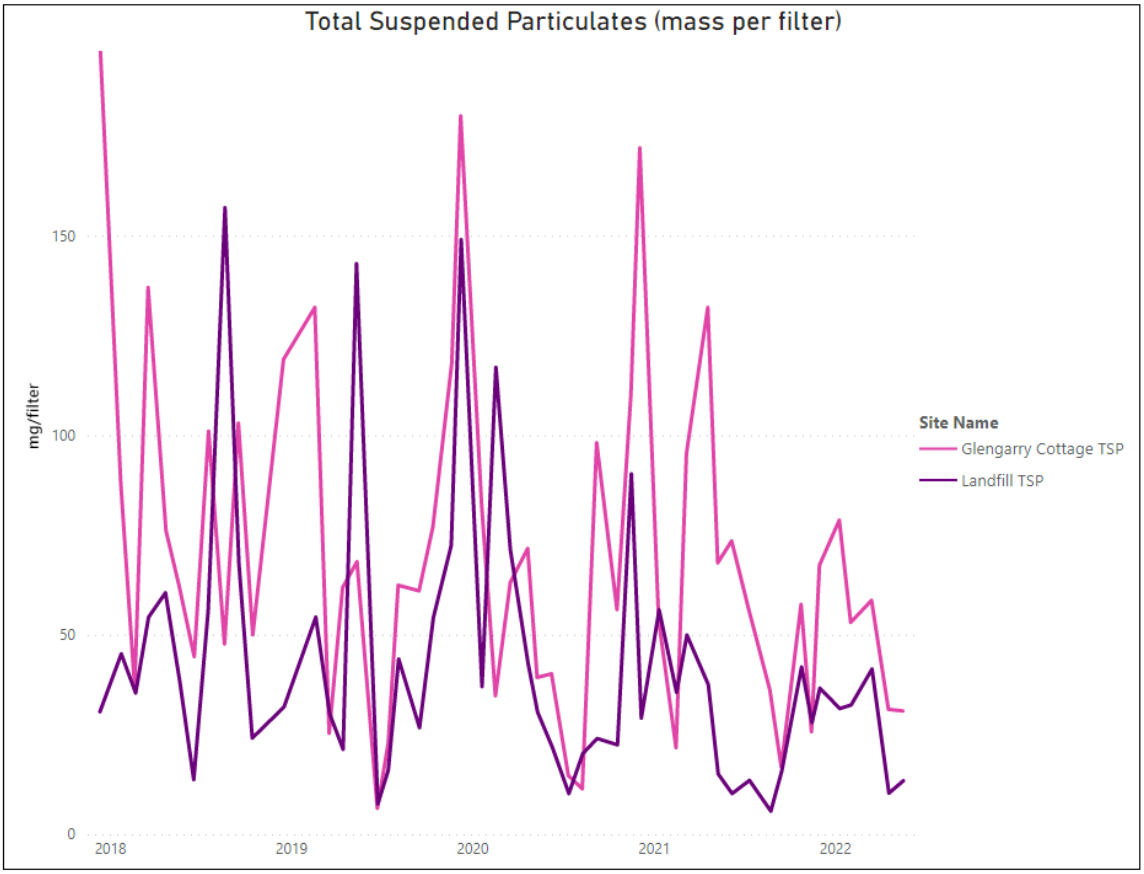

Combustible Matter (mg)
mg
0
20
40
60
80
100
2018
2019
2020
2021
2022
Site Name
DDG 1
DDG 2
DDG 3
DDG 4
DDG 5

High Volume Dust Monitoring






Total Suspended Particulates
µg/m³
120
100
80
60
40
20
0
2018
2019
2020
2021
2022
Site Name
Glengarry Cottage TSP
Landfill TSP


Total Suspended Particulates (mass per filter)
mg/filter
150
100
50
0
2018
2019
2020
2021
2022
Site Name
Glengarry Cottage TSP
Landfill TSP