



APPENDIX AE - GROUNDWATER MONITORING AND MANAGEMENT PLAN



Isaac Downs Extension

Groundwater Monitoring and Management Plan

Stanmore ID Extension Pty Ltd

Level 32/12 Creek St
Brisbane City QLD 4000

Prepared by:

SLR Consulting Australia Pty Ltd

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Basis of Report

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Table of Contents

Basis of Report	i
1.0 Introduction	5
2.0 Site Setting	7
2.1 Topography and Drainage	7
2.2 Climate	9
3.0 Hydrogeological Setting	10
3.1 Hydrostratigraphic Units	10
3.1.1 Quaternary Alluvium	10
3.1.2 Regolith (Unconsolidated Sediments <30 m)	11
3.1.3 Permian Coal Measures (Rangal Coal Measures)	11
3.2 Groundwater Receptors	15
3.2.1 Groundwater Dependent Ecosystem	15
3.2.2 Landholder Bores	18
3.3 Groundwater Environmental Values	22
3.4 Groundwater Quality	24
4.0 Predicted Groundwater Impacts	25
4.1 Overview	25
4.2 Impacts on Groundwater Levels	25
4.2.1 Predicted Groundwater Inflow	25
4.2.2 Predicted Groundwater Drawdown	27
4.2.3 Landholder Bores	30
4.2.4 Groundwater Dependent Ecosystems	35
4.3 Impacts on Groundwater Quality	37
4.3.1 Groundwater Movement Induced Quality Changes	37
4.3.2 Potential Sources of Contamination During Mining	37
4.3.3 Potential Sources of Contamination Post-Mining	37
4.3.4 Characterisation of Potential Groundwater Quality Impacts	38
5.0 Groundwater Monitoring and Management Program	39
5.1 Overview	39
5.2 Monitoring Network	39
5.3 Monitoring Regime – Baseline and During Mining	47
5.3.1 Groundwater Levels	47
5.3.2 Groundwater Quality	49
5.4 Monitoring Regime – Post-Mining	50
6.0 Quality Assurance / Quality Control	51



6.1	Field Procedures	51
6.1.1	Qualified Personnel	51
6.1.2	Equipment Calibration	51
6.1.3	Equipment Decontamination	51
6.1.4	Groundwater Level Measurement Procedure	51
6.1.5	Groundwater Quality Sampling Procedures	51
6.1.6	Factual Field Work Reporting	54
6.1.7	Sample Analysis Quality Assurance and Laboratory Procedures	54
6.1.8	Data Storage, Management and Processing	55
7.0	Groundwater Impact Criteria, Triggers and Investigation Procedures	57
7.1.1	Groundwater Level Triggers	57
7.1.2	Groundwater Quality Limit Derivation	60
7.1.3	Groundwater Exceedance Criteria and Investigation Procedure	65
7.2	Mitigation.....	65
7.2.1	General	65
7.2.2	Impacts to Third Party Groundwater Users.....	66
8.0	Reporting, Review and Improvement Process	67
8.1	Annual Groundwater Monitoring Reports.....	67
8.2	Groundwater Monitoring and Management Program Review.....	68
8.3	Monitoring Network Maintenance	69
9.0	References.....	70

Tables

Table 2-1	Average Monthly Rainfall	9
Table 3-1	Available details of water supply bores within 5 km of the Project Area	19
Table 4-1	Predicted Drawdown Impact on Landholder Bores	31
Table 5-1	Project GMMP Monitoring Network	40
Table 5-2	GMMP Bore Data Logger Status.....	48
Table 5-3	Proposed Groundwater Quality Parameters to be Monitored.....	49
Table 7-1	Groundwater Level Reference Values.....	58
Table 7-2	Groundwater Level Trigger Thresholds.....	59
Table 7-3	Proposed Parameters for Groundwater Quality Limits.....	63
Table 7-4	Interim Groundwater Quality Limits for Compliance Bores	64



Figures

Figure 1-1 Project Location	6
Figure 2-1 Topography and Drainage	8
Figure 2-2 Long-term Monthly Rainfall and CRD from the mean monthly rainfall 1958 – 2025) at SILO data point data Latitude: -22.10 and Longitude: 148.20	10
Figure 3-1 Surface Geology	13
Figure 3-2 Solid Geology	14
Figure 3-3 Watermark Eco (2026a) GDE Mapping	17
Figure 3-4 Registered and Landholder Bores within 5km of Project Area.....	21
Figure 3-5 Water Quality Objective Zones.....	23
Figure 4-1 Predictive Incremental Mine Groundwater Inflows during Active Mining	25
Figure 4-2 Predicted Maximum Water Table Drawdown (Incremental).....	28
Figure 4-3 Predicted Maximum Drawdown (Incremental) – Alluvium (Layer 1).....	29
Figure 4-4 Landholder Bore Locations and 2 m Drawdown Uncertainty – Regolith (Layer 2)	32
Figure 4-5 Landholder Bore Locations and 5 m Drawdown Uncertainty – Vermont Seam (Layer 7)	33
Figure 4-6 Landholder Bore Locations and 5 m Drawdown Uncertainty – Fort Cooper Coal Measures.....	34
Figure 4-7 Uncertainty in Predicted 1m Incremental Drawdown – Alluvium (End of Recovery)	36
Figure 5-1 Alluvial Bores and 1 m Drawdown Uncertainty (Alluvium).....	42
Figure 5-2 Regolith Bores and 1 m Drawdown Uncertainty (Regolith).....	43
Figure 5-3 Leichhardt Coal Seam Bores and 1 m Drawdown Uncertainty (Leichhardt Coal Seam).....	44
Figure 5-4 Vermont Coal Seam Bores and 1 m Drawdown Uncertainty (Vermont Coal Seam)	45
Figure 5-5 Fort Cooper Coal Seam Bores and 1 m Drawdown Uncertainty (Fort Cooper Coal Seam).....	46

Appendices

Appendix A	Groundwater Level Summary Statistics
Appendix B	Testing of Groundwater Level Triggers
Appendix C	Groundwater Quality Statistics
Appendix D	Testing of Groundwater Quality Triggers



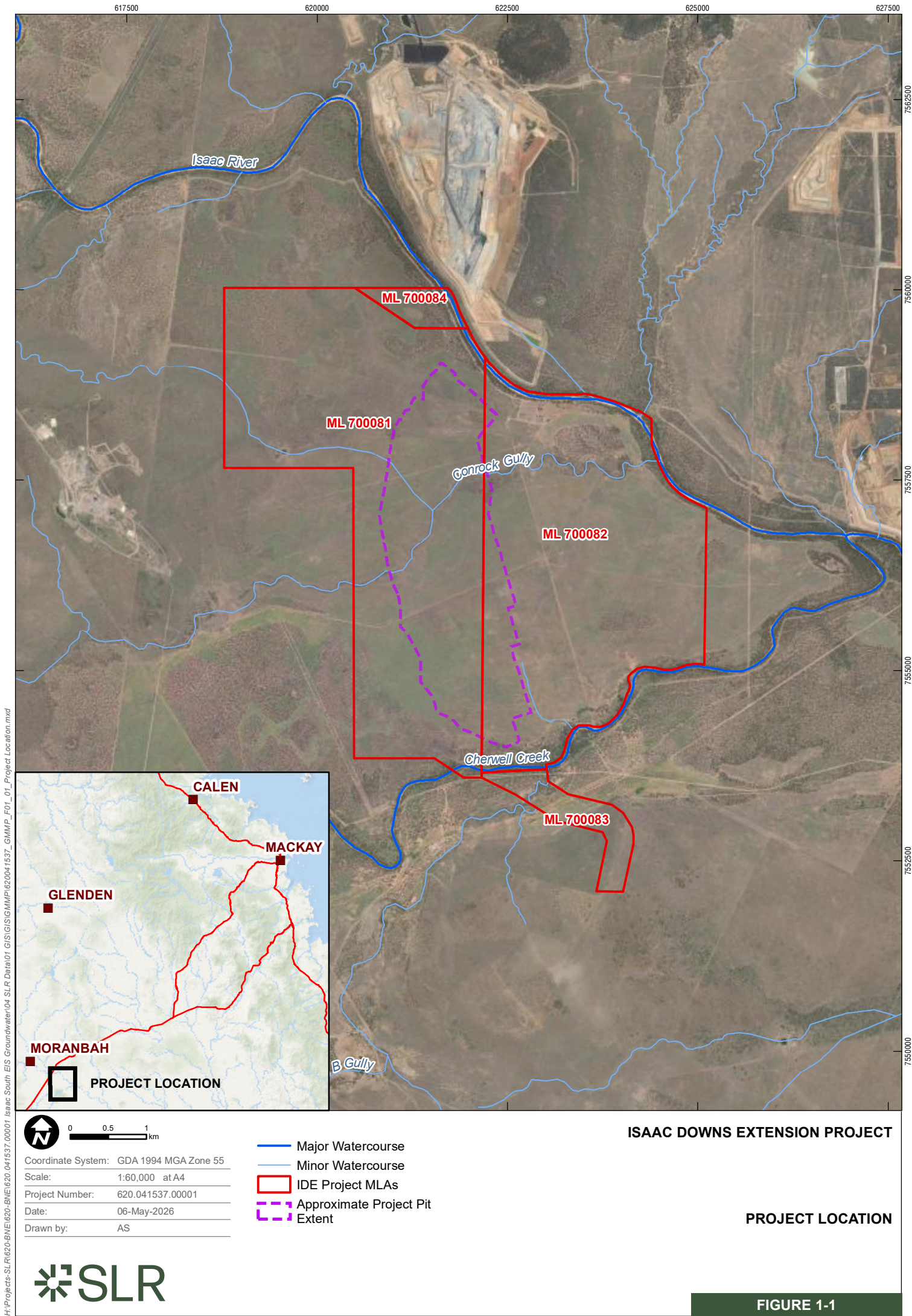
1.0 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been engaged by the Stanmore ID Extension Pty Ltd, a subsidiary of Stanmore Resources Limited (Stanmore), to develop a Groundwater Monitoring and Management Plan (GMMP) for the Isaac Downs Extension (IDE) project (the Project).

This GMMP is intended to support a number of environmental approvals related to groundwater at the Project. This GMMP has been prepared to monitor and manage the potential impacts on groundwater at and surrounding the Project. It outlines the groundwater monitoring plan for the Project and associated groundwater impact limits and triggers that will invoke further assessment and groundwater impact management during the life of the Project and in the early years post-closure.

The Project is a proposed open-cut coal mine located approximately 15 kilometres (km) southeast of Moranbah, within the Bowen Basin mining region. The Project will be integrated into Stanmore's Isaac Plains Complex (IPC), comprising Isaac Downs Mine (IDM) and Isaac plains Mine (IPM), with the Project located to the south of IDM. Stanmore applied for four mining leases (MLs) for the Project in June 2025 (ML application (MLA) 700081, MLA 700082, MLA 700083 and MLA 700084) (**Figure 1-1**).





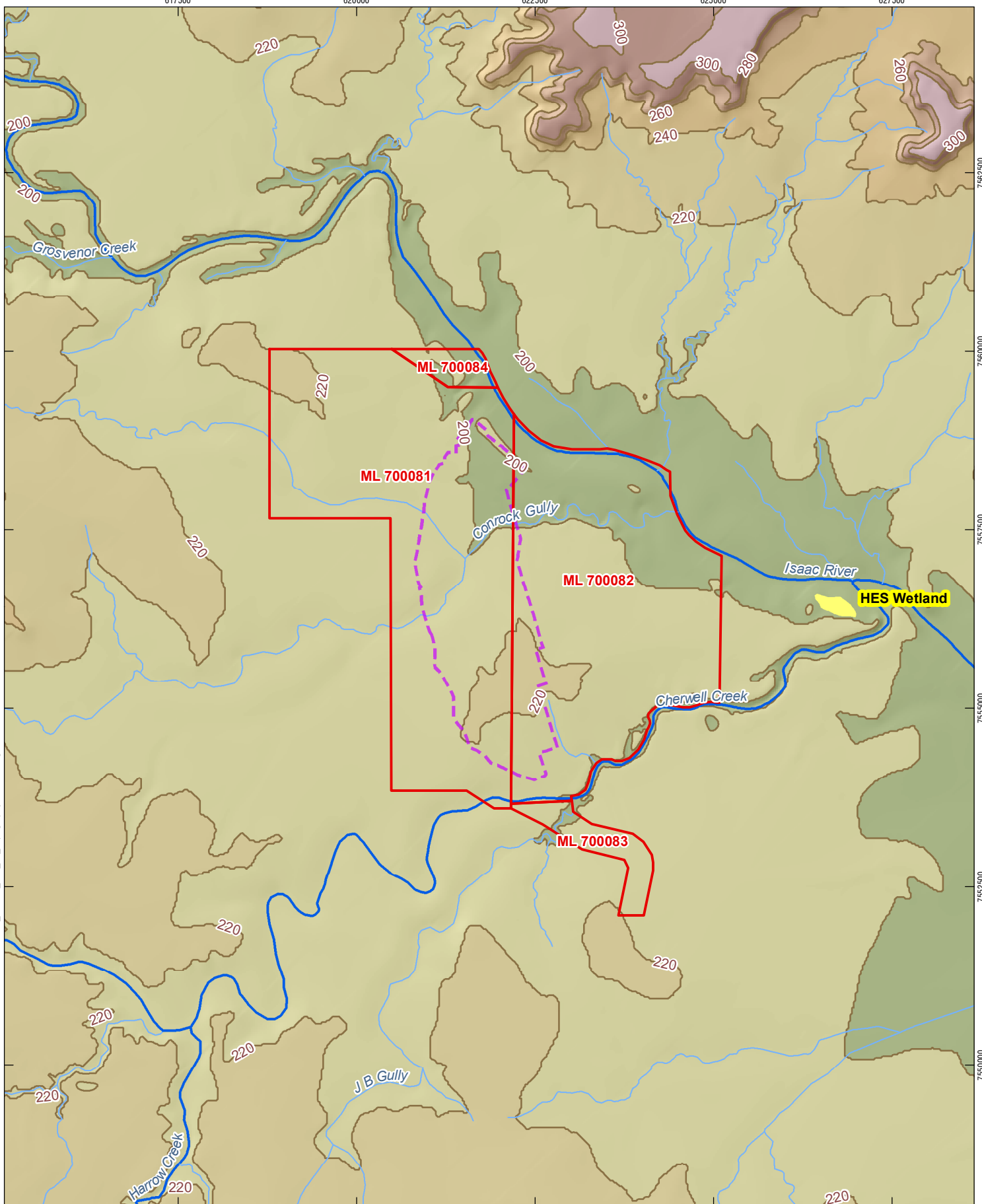
2.0 Site Setting

2.1 Topography and Drainage

The Study Area, defined as the 15 km buffer area around the mining leases, is characterised by gently undulating topography that slopes from the elevated Harrow Range, located approximately 15 km west of the Project Area, toward the Cherwell Creek and Isaac River systems in the south-southeast (**Figure 2-1**), with elevations decreasing from approximately 225 m AHD in the central Project Area to around 195 m AHD along the eastern floodplains.

The Project Area lies within the Upper Isaac surface water catchment, specifically the Isaac River Sub-basin of the Fitzroy Basin, and surface drainage is dominated by the Isaac River along the northern boundary and Cherwell Creek along the southern boundary (**Figure 2-1**), together with several minor ephemeral drainage features, including Conrock Gully, that only convey flow during significant rainfall events. A wetland mapped as being of High Ecological Significance under the *Queensland Environmental Protection Regulation 2008* is located near the confluence of the Isaac River and Cherwell Creek, approximately 1.5 km west of the Project Area, and is the only significant wetland identified within the Study Area (**Figure 2-1**). High-resolution 5 m LiDAR data is available for the Project Area.





0 0.5 1 km

Coordinate System: GDA 1994 MGA Zone 55

Scale: 1:70,000 at A4

Project Number: 620.041537.00001

Date: 06-May-2026

Drawn by: AS



- Major Watercourse
- Minor Watercourse
- Topographic Contour (20mAH)
- IDE Project MLAs
- Approximate Project Pit Extent
- High Ecological Significance Wetland

Elevation (mAH)

	180 - 200
	200 - 220
	220 - 240
	240 - 260
	260 - 280
	280 - 300
	300 - 320

ISAAC DOWNS EXTENSION PROJECT

TOPOGRAPHY AND DRAINAGE

FIGURE 2-1

2.2 Climate

The general climate of the Study Area is characterised according to the Köppen-Geiger climate zones (Beck et. al., 2018) as a “BSh” climate zone. BSh is a hot semi-arid climate zone and experiences hot to extremely hot summers, and warm to cool winters, with some to minimal precipitation. SILO Grid point data (Latitude: -22.10, Longitude: 148.20) was used to assess long-term rainfall trends in the vicinity of the Project Area. This dataset is interpolated from quality checked observational timeseries data collected at nearby stations by BoM. Data from January 1958 (when routine digitisation of data was first begun by BoM) until December 2025 was used to assess the long-term rainfall trends. From this data, the average annual site rainfall is 575 millimetres (mm). The highest annual rainfall was recorded for 2010, with 1,046 mm falling that year. The minimum annual rainfall occurred in 1982 with 259 mm. Monthly averages for the Booroondarra station as well as the SILO grid point are listed in **Table 2-1**. Low relative annual rainfall was measured at the Dysart Post Office station, owing to the relatively short time period this was in operation aligning with relatively low precipitation.

Table 2-1 Average Monthly Rainfall

Rainfall (mm)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
SILO Grid Point Data	99.7	90.9	62.7	35.3	30.2	22.3	19.9	20.0	10.7	30.7	63.0	89.8	575
Booroondara	116.9	96.8	71.5	34.4	35.8	25.5	24.2	23.0	16.7	40.5	57.7	103.2	646
Moranbah Airport	96.7	92.9	76.8	25.7	30.6	23.1	35.9	13.9	13.3	24.6	66.2	61.4	561.2
Dysart Post Office	77	73.6	41.1	24	35.1	21.9	6.8	26.9	8.1	38.9	48.4	103.3	505.1
Dysart Station	121	124	58.3	33.2	29.8	19.8	20.2	15.0	15.4	32.1	46.6	94	609.4

Source: <http://www.bom.gov.au/climate/data/index.shtml>

Note: SILO Grid point data coordinates are Latitude: -22.10 and Longitude: 148.20.

Rainfall trends for the Study Area since 1958 are analysed with the Cumulative Rainfall Departure (CRD) for monthly rainfall data which is useful in assessing medium- and long-term climatic trends (**Figure 2-2**). Positive gradients on this curve (rising limbs) indicate wetter than average conditions whilst a negative gradient (falling limbs) indicates drier than average conditions. This plot has been generated to show long term climate trends (1958-2025). **Figure 2-2** shows that, over the past 50 years, the wettest periods occurred during 1973-1979, and in 2010-2011 (albeit the latter being over a short period). The driest periods were 1961-1970, 1991-1998, 2001-2007 and 2018-2020. Between 2017 and 2021 Project area experienced drier than average conditions after which wetter than average condition prevailed between 2022-2023. More recently, average rainfall conditions prevailed between 2023-2024 and wetter than average conditions in 2025.



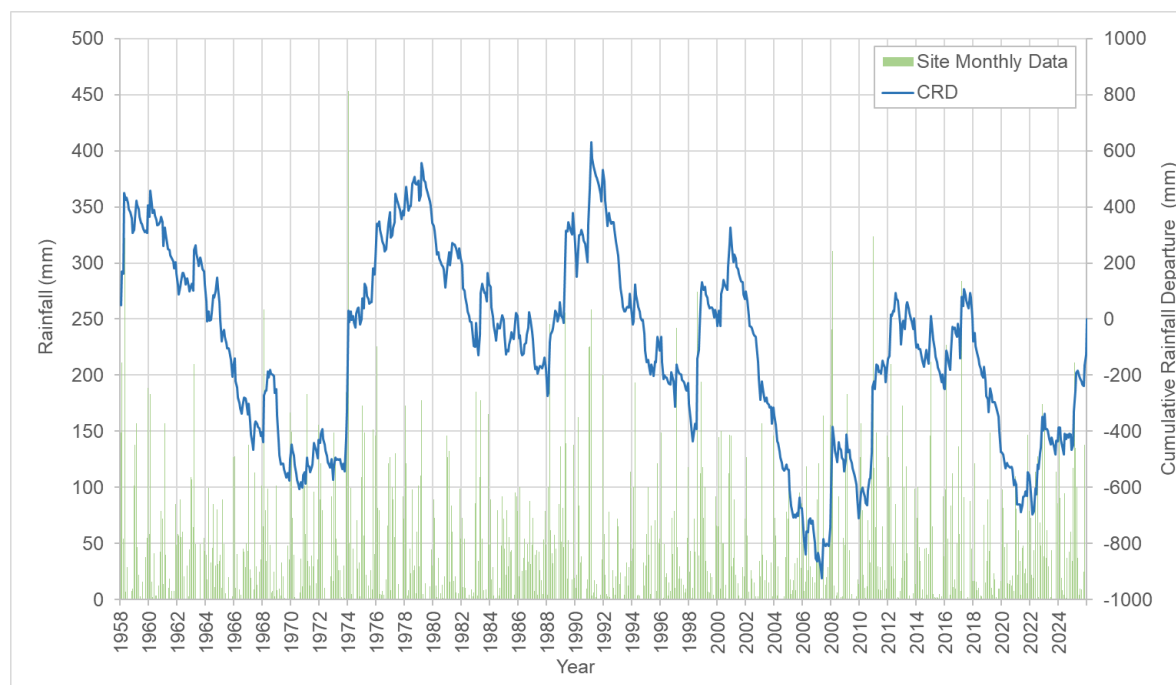


Figure 2-2 Long-term Monthly Rainfall and CRD from the mean monthly rainfall 1958 – 2025) at SILO data point data Latitude: -22.10 and Longitude: 148.20

3.0 Hydrogeological Setting

The hydrogeological setting at the Project is summarised below for relevance to this GMMP and is based on that reported in the hydrogeological conceptualisation for the Project, being the Groundwater Impact Assessment (SLR, 2026a).

3.1 Hydrostratigraphic Units

The surface geology and underlying solid geology at the Project are shown on **Figure 3-1** and **Figure 3-2**, respectively. The following presents a summary discussion of the hydrogeological characteristics of the local geology, with the purpose of describing the groundwater bearing units relevant to this GMMP.

3.1.1 Quaternary Alluvium

Quaternary Alluvium forms the unconfined alluvial aquifer (sporadically water bearing strata of permeable unconsolidated sand or gravel with interlayered clays and silts) localised to major ephemeral drainage line channels (Isaac River and Cherwell Creek) at the Project Area.

Perched groundwater systems occur within the Alluvium. These are discrete groundwater units sitting above the alluvial aquifer and are separated by unsaturated zone. Downward percolation of groundwater in these perched systems is restricted by a material of localised low permeability such as a clay lens. It should be noted that none of the bores intersect and monitor any perched systems. As such groundwater monitoring and modelling presented in this report do not relate to any perched groundwater systems but rather present the groundwater conditions in the Alluvial Aquifer as defined above. Perched groundwater systems are associated with the GDEs and discussed in **Section 3.2.1**

Thickness of the alluvium is highly variable, typically 5–20 m but locally thickening within palaeochannels (where gravelly sands may reach greater depths). The local distribution and thickness of alluvium have been refined using drilling data and electrical resistivity imaging



(SLR, 2026a), which demonstrate that saturated alluvial sediments are localised and discontinuous, rather than forming a laterally extensive aquifer.

Hydrogeologically, the alluvial aquifer forms a shallow, unconfined aquifer where saturated, with groundwater commonly occurring at depths of approximately 10–12 m below ground level near active channels. Hydraulic conductivity is highly variable due to heterogeneity in grain size, ranging from ~0.3 to 10 m/day, with higher values associated with coarse channel sands and gravels. Away from channels, finer floodplain sediments commonly remain unsaturated.

Recharge to the alluvial aquifer occurs primarily through episodic infiltration of streamflow and floodwaters (losing creek and river systems), with some contribution from direct rainfall infiltration where clay layers are absent. Long-term recharge rates are low overall but variable, reflecting the heterogeneous nature of the deposits. Discharge is limited and occurs mainly through evapotranspiration, minor interflow back to surface channels following large recharge events, and local abstraction. Regional groundwater flow within saturated alluvium broadly follows surface drainage patterns, trending southeast along the Isaac River and northeast along Cherwell Creek.

3.1.2 Regolith (Unconsolidated Sediments <30 m)

Outside the limits of Quaternary alluvium, the Project Area is covered by a veneer of regolith, generally less than 30 m thick. This unit comprises unconsolidated to semi-consolidated Tertiary and Quaternary sediments, including colluvium, older alluvium, and highly weathered Permian and Triassic rocks. Lithologies are heterogeneous and include clay, clayey sand, siltstone, weathered sandstone and mudstone. Although Tertiary basalt occurs regionally, it is absent within the Project Area.

The regolith forms an unconfined, shallow water-table aquifer where saturated, typically hosting groundwater at depths of ~9 to 14 mBGL, although saturation is spatially variable and many regolith bores are intermittently dry. Hydraulic conductivity is generally lower than the alluvium, reflecting clay-rich materials, and ranges from approximately 0.15 to 2.5 m/day.

Recharge to the regolith occurs via diffuse infiltration of rainfall but is strongly limited by low-permeability clay horizons. Estimated long-term recharge rates are low (generally <3% of average annual rainfall). Discharge occurs mainly through evapotranspiration, with minor localised seepage where saturated regolith is intersected by excavations. Vertical leakage to deeper formations is restricted by underlying low-permeability strata. Groundwater flow within the Regolith, where it is saturated, is generally towards the south-southeast, following regional topographic gradients and the drainage direction of the Isaac River and Cherwell Creek.

3.1.3 Permian Coal Measures (Rangal Coal Measures)

The Permian Blackwater Group forms the principal bedrock sequence beneath the Project and hosts the economic coal resources. The Rangal Coal Measures (RCM), approximately 100 m thick, overlie the Fort Cooper Coal Measures and contain the Leichhardt and Vermont coal seams, which are typically 1 to 2 m thick and separated by 30 to 40 m of interburden. The coal measures dip gently (~2 to 6) to the east-northeast and are compartmentalised by regional faulting, including the Isaac Thrust Fault, which acts predominantly as a hydraulic barrier.

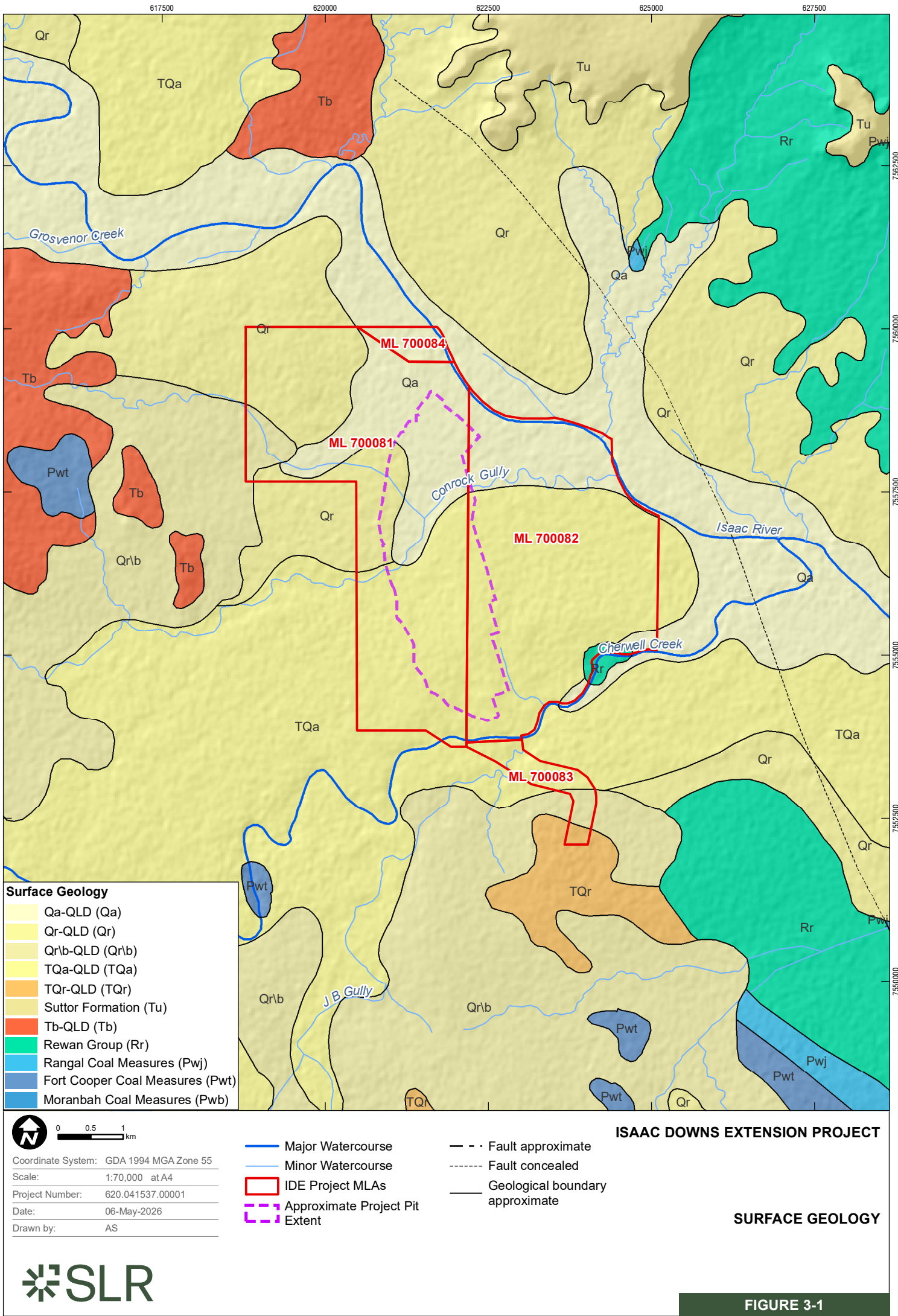
Hydrogeologically, the Permian coal seams are confined to sub-artesian aquifers, with groundwater flow dominated by secondary porosity (fractures and cleats within coal). The surrounding interburden and overburden sandstones, siltstones and mudstones have very low permeability and act as aquitards. Hydraulic conductivity within the coal seams is variable but generally higher than the interburden, while fault cores exhibit significantly reduced permeability.



Recharge to the coal measures is very limited and occurs primarily where seams subcrop or via slow vertical leakage through overlying strata. Long-term recharge rates are low (typically less than 1% of annual rainfall). Groundwater flow within the coal measures is predominantly horizontal along the coal seams, controlled by seam continuity, structure, and compartmentalisation by faults. Discharge from the system occurs mainly via mine dewatering and pit interaction, with minimal natural discharge to overlying units under baseline conditions.



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- Surface Geology**
- Qa-QLD (Qa)
 - Qr-QLD (Qr)
 - Qr\l-b-QLD (Qr\l-b)
 - TQa-QLD (TQa)
 - TQr-QLD (TQr)
 - Suttor Formation (Tu)
 - Tb-QLD (Tb)
 - Rewan Group (Rr)
 - Rangal Coal Measures (Pwj)
 - Fort Cooper Coal Measures (Pwt)
 - Moranbah Coal Measures (Pwb)

Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:70,000 at A4
Project Number: 620.041537.00001
Date: 06-May-2026
Drawn by: AS

- Major Watercourse
- Minor Watercourse
- IDE Project MLAs
- Approximate Project Pit Extent

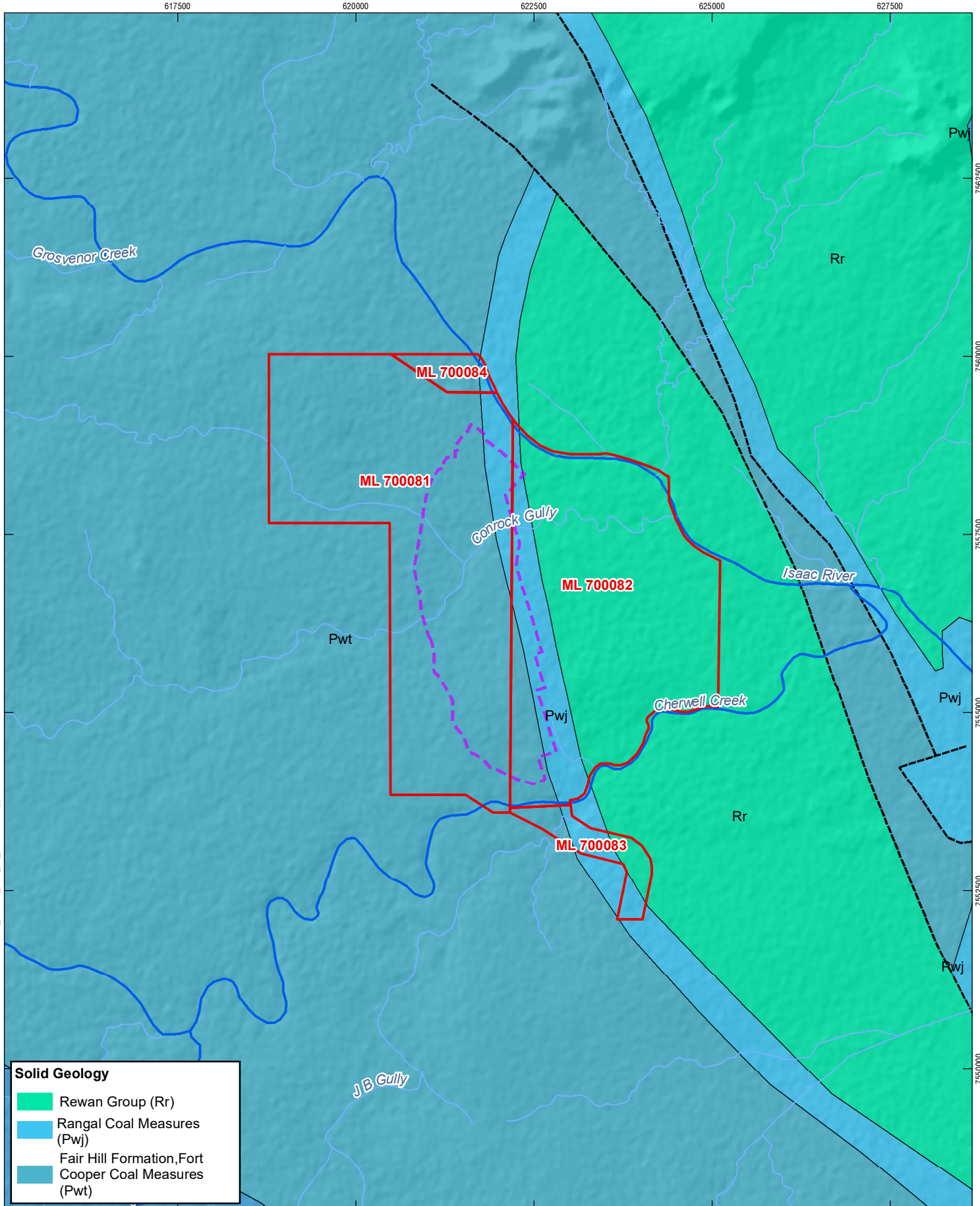
- Fault approximate
- Fault concealed
- Geological boundary approximate

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SURFACE GEOLOGY

FIGURE 3-1

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Solid Geology

- Rewan Group (Rr)
- Rangal Coal Measures (Pwj)
- Fair Hill Formation, Fort Cooper Coal Measures (Pwt)



0 0.5 1 km

Coordinate System: GDA 1994 MGA Zone 55

Scale: 1:70,000 at A4

Project Number: 620.041537.00001

Date: 06-May-2026

Drawn by: AS

Major Watercourse

Minor Watercourse

IDE Project MLAs

Approximate Project Pit Extent

Structure Geology

Fault

Geological Boundary

ISAAC DOWNS EXTENSION PROJECT

SOLID GEOLOGY



FIGURE 3-2

3.2 Groundwater Receptors

As reported in SLR (2026a) and based on the findings presented in SLR (2024a), SLR (2024e), AGE (2022), and other relevant local investigations, there are two primary groundwater receptors in the Project Area:

- Potential GDEs, with emphasis on those associated with the Isaac River, its floodplain, and lower reaches of connected tributary systems.
- Private groundwater bores used predominantly for agricultural purposes, particularly stock watering; and

Figure 3-3 shows the location of auger holes completed for the groundwater dependent ecosystem (GDE) field assessments and **Figure 3-4** shows the location of the registered and landholder bores within 5km of Project Area.

3.2.1 Groundwater Dependent Ecosystem

A groundwater dependent ecosystem (GDE) is a natural ecosystem that requires access to groundwater to meet all or part of its water requirements on a permanent or intermittent basis in order to maintain ecosystem structure, function and associated services (Richardson, et al., 2011). Potential GDEs in the vicinity of the Project have been previously identified through desktop assessments and site-based investigations undertaken for other mining projects within the Isaac River catchment. These studies have consistently indicated that groundwater discharge does not maintain surface water features in the area, and that aquatic GDEs are absent due to the ephemeral nature of the drainage systems and lack of persistent groundwater-supported pools.

The Bureau of Meteorology's National Atlas of Groundwater Dependent Ecosystems (GDE Atlas) (BoM, 2017), identifies areas of low to high potential groundwater interaction along the Isaac River, Cherwell Creek and associated tributaries within and adjacent to the Project Area. As the GDE Atlas is based on regional-scale datasets, a site-specific field assessment was undertaken to ground-truth the mapped potential GDEs and assess actual groundwater dependence in the context of local hydrogeological conditions.

In the areas immediately upstream and downstream of the Project, associated with IDM and PTM respectively, GDE field assessments have been completed by Stanmore in accordance with the methods described in the GDE Toolbox (Richardson et al. 2011) to test and validate the GDE Atlas mapping, with both studies undertaken by 3D Environmental (2020 and 2024).

A detailed local GDE field assessment was subsequently completed by Watermark Eco (2026a) in November 2024, with additional surveys in August - November 2025, within and adjacent to the Project Area. This local assessment overlapped with the previous IDM and PTM GDE assessments (**Figure 3-3**), resulting in a continuous mapping of GDEs within and surrounding the Project area.

The assessment applied multiple lines of evidence, including vegetation condition, soil moisture observations, shallow groundwater investigations, leaf water potential measurements and stable isotope analysis, to determine the likelihood and nature of groundwater dependence. The assessment confirmed that potential terrestrial GDEs are highly localised and confined to riparian vegetation fringing the Isaac River and lower reaches of Cherwell Creek, with no evidence of groundwater dependence extending upstream along tributary watercourses such as Cherwell Creek or smaller unnamed drainage features.

The field assessment identified no aquatic GDEs within the Project Area. Surface water features within the Isaac River and its tributaries were observed to be ephemeral, with any water present during the survey period attributed to recent rainfall or surface water ponding.



Shallow water encountered in isolated locations was interpreted as perched water rather than groundwater discharge from the regional alluvial aquifer. Groundwater monitoring data support this interpretation, indicating that groundwater levels in the alluvial aquifer remain below streambed elevations, confirming the absence of baseflow contribution to surface water systems.

The riparian vegetation along the Isaac River and lower reaches of Cherell Creek, identified as the only potential terrestrial GDE, was interpreted to be supported by a shallow perched groundwater system within the alluvium. This perched system is seasonally recharged, hydraulically disconnected from the underlying alluvial aquifer, and likely to be transient in nature. During wetter periods, perched water may be present within shallow alluvium sediments; however, during extended dry periods this resource is expected to diminish due to evapotranspiration and leakage. As a result, riparian vegetation is considered to exhibit facultative groundwater dependence, with vegetation capable of utilising soil moisture derived from rainfall when perched groundwater is unavailable.

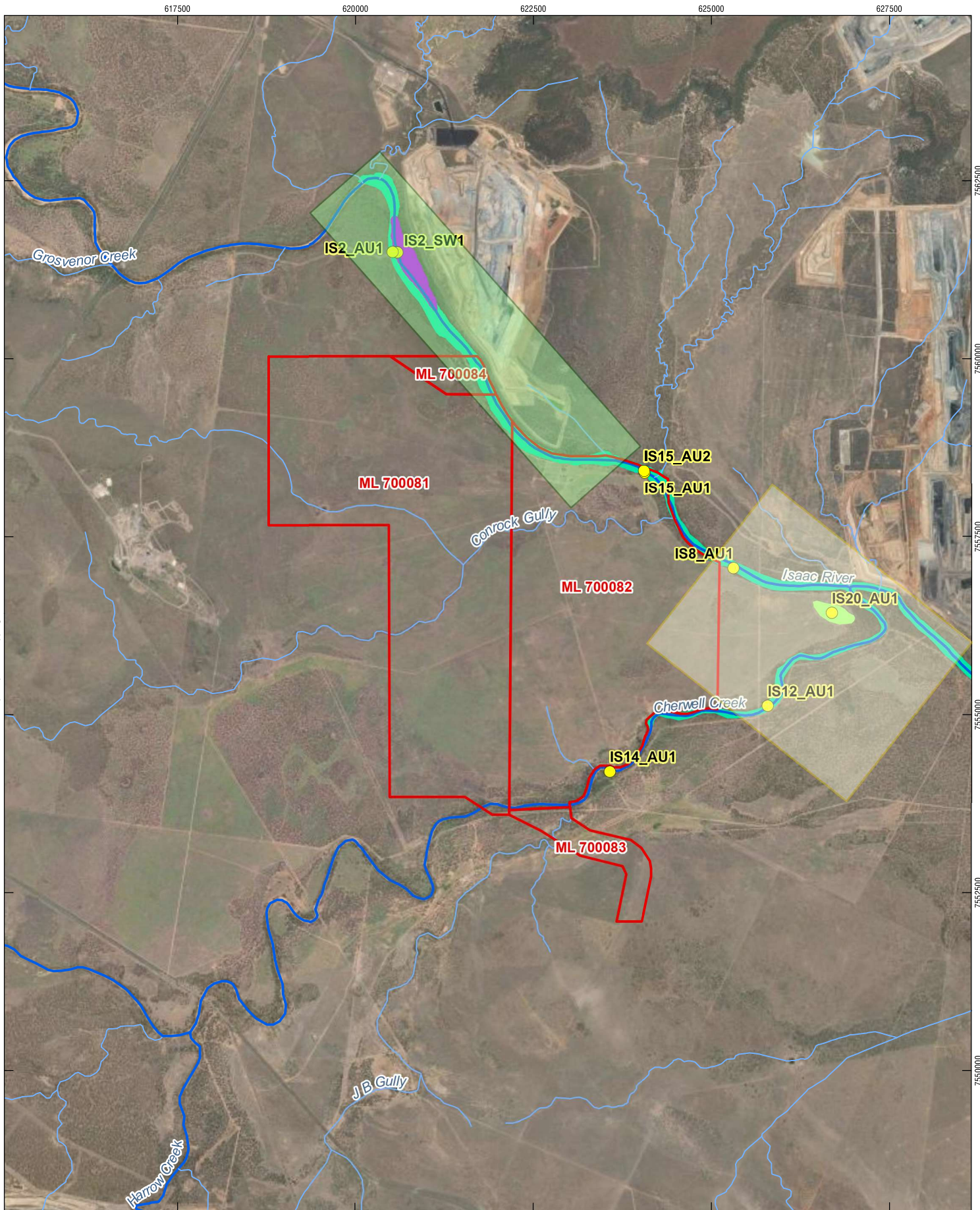
A wetland of High Ecological Significance (HES), located near the confluence of the Isaac River and Cherwell Creek, was also assessed. Field observations and groundwater monitoring indicate that this wetland is not supported by the regional alluvial aquifer. Shallow water present during wetter periods is interpreted to be associated with surface water ponding and a seasonally perched system above a low-permeability clay layer, rather than groundwater discharge.

The assessment further concluded that deeper groundwater systems, including the regolith and Permian coal measure aquifers, do not support GDEs in the Project Area. Groundwater within these units occurs at depths generally greater than 10 m below ground level, which exceeds the effective rooting depth of the dominant vegetation communities present, and therefore is not accessible to plants.

To manage potential risks to terrestrial GDEs, a Groundwater Dependent Ecosystems Monitoring and Management Plan has been prepared for the Project (Watermark Eco, 2026b).



H:\Projects-SLR\620-BNE\620.041537.00001 Isaac South EIS Groundwater Assessment\620041537_IsaacSouth_F05_27_Watermark Eco (2026) GDE Mapping.mxd



0 0.5 1 km

Coordinate System: GDA 1994 MGA Zone 55

Scale: 1:70,000 at A4

Project Number: 620.041537.00001

Date: 01-Oct-2025

Drawn by: AS



- Watermark Eco Auger
- Major Watercourse
- Minor Watercourse
- IDE Project MLAs
- Known/Likely GDE (Watermark Eco, 2026)**
 - Type 1
 - Type 2
 - Type 3

Overlapping Survey

- 3D Environmental (2020)
- 3D Environmental (2024)

ISAAC DOWNS EXTENSION PROJECT

**WATERMARK ECO (2026)
GDE MAPPING**

FIGURE 3-3

3.2.2 Landholder Bores

A search of the Queensland Government's Registered Groundwater Bore Database (GWDB) (DRDMW, 2024) was carried out for registered bores within 5 km of the Project Area. A subsequent bore census was conducted by SLR (2024e). The bore census confirmed a total of 11 landholder supply bores within 5 km of the Project Area. Of these, six (6) were active supply bores, while the remaining five (5) were inactive and not equipped with pumps at the time of the survey. Details of the 11 landholder bores are provided in **Table 3-1**, while **Figure 3-4** shows all GWDB registered bores inspected during the 2024 census, including the 11 landholder bores. Bores RN162815 (unknown aquifer), RN103210 (Permian coal measures), and the 5 Mile Windmill Bore (weathered Triassic / regolith) are stock supply bores, each supplying one or more storage tanks or cattle troughs. Measured flow rates at these bores during the site visit ranged from 0.05 to 0.25 L/s. The Horse Paddock Bore was not operational at the time of inspection, and the landholder was unable to activate the pump. No information regarding the pumping schedules of the stock supply bores was available from the landholder.

Bores RN182871 and RN182872 are active supply bores for a small basalt quarry just west of the Project Area and drilled to 60 mBGL and 80 mBGL respectively, indicating a likely groundwater source within the FCCM. Both are equipped with steel headworks and electro-submersible pumps however no depth or source aquifer information is available. These bores reportedly operate at rates of 0.2 and 0.3 L/s, respectively, for approximately 8 hours per day. Bore RN182871, drilled in October 2024, is more recent than RN182872.



Table 3-1 Available details of water supply bores within 5 km of the Project Area

Bore ID	Easting (AGD84)	Northing (AGD84)	Depth (m)	Geology	Status	Comment	EC (μS/cm)	pH	Pumping rate at time of visit (L/s)
RN162817 (5 Mile Bore)	622783	7558348	36.3	Weathered Triassic strata (regolith)	Inactive Supply Bore	Not equipped	1,776	6.64	-
RN162818 (5 Mile Windmill Bore)	622787	7558347	36.3	Weathered Triassic strata (regolith)	Active Supply Bore	Steel headworks with submersible pump powered by 2 solar panels and an electric box; windmill disconnected; feeds polyline.	7,652	6.646	0.05
RN162815	618369	7555359	59	² Unknown (possibly Fort Cooper Coal Measures)	Active Supply Bore	Steel headworks with submersible pump powered by 2 solar panels and an electric box; feeds polyline to water storage tank	2,306	7.33	0.25
RN182872	616986	7558366	50	² Unknown (possibly FCCM)	Active Supply Bore	Steel headworks with 7A-25 submersible pump powered by generator; feeds 63 mm polyline.	1,872	7.4	0.2
RN182871	617089	7558366	60	² Unknown (possibly FCCM)	Active Supply Bore	Steel headworks with 7A-25 submersible pump powered by generator; feeds 63 mm polyline.	1,755	7.15	0.3
RN162459 (Horse Paddock Bore)	623683	7551993	85	Permian Coal Measures Vermont Coal Measures	Active Supply Bore	Submersible pump with 3 pipes (63 mm polyline) attached to headworks.	1,162	7.72	-
RN103210	616755	7559838	65.53	Permian Coal Measures (possibly FCCM)	Active Supply Bore	Steel headworks with submersible pump powered by 2 solar panels and an electric box; feeds polyline to water storage tank	2,376	7.18	~0.25
RN100254	619554	7556994	>150	² Unknown (possibly FCCM)	Inactive Supply Bore	Not equipped with pump	6,826	8.15	-

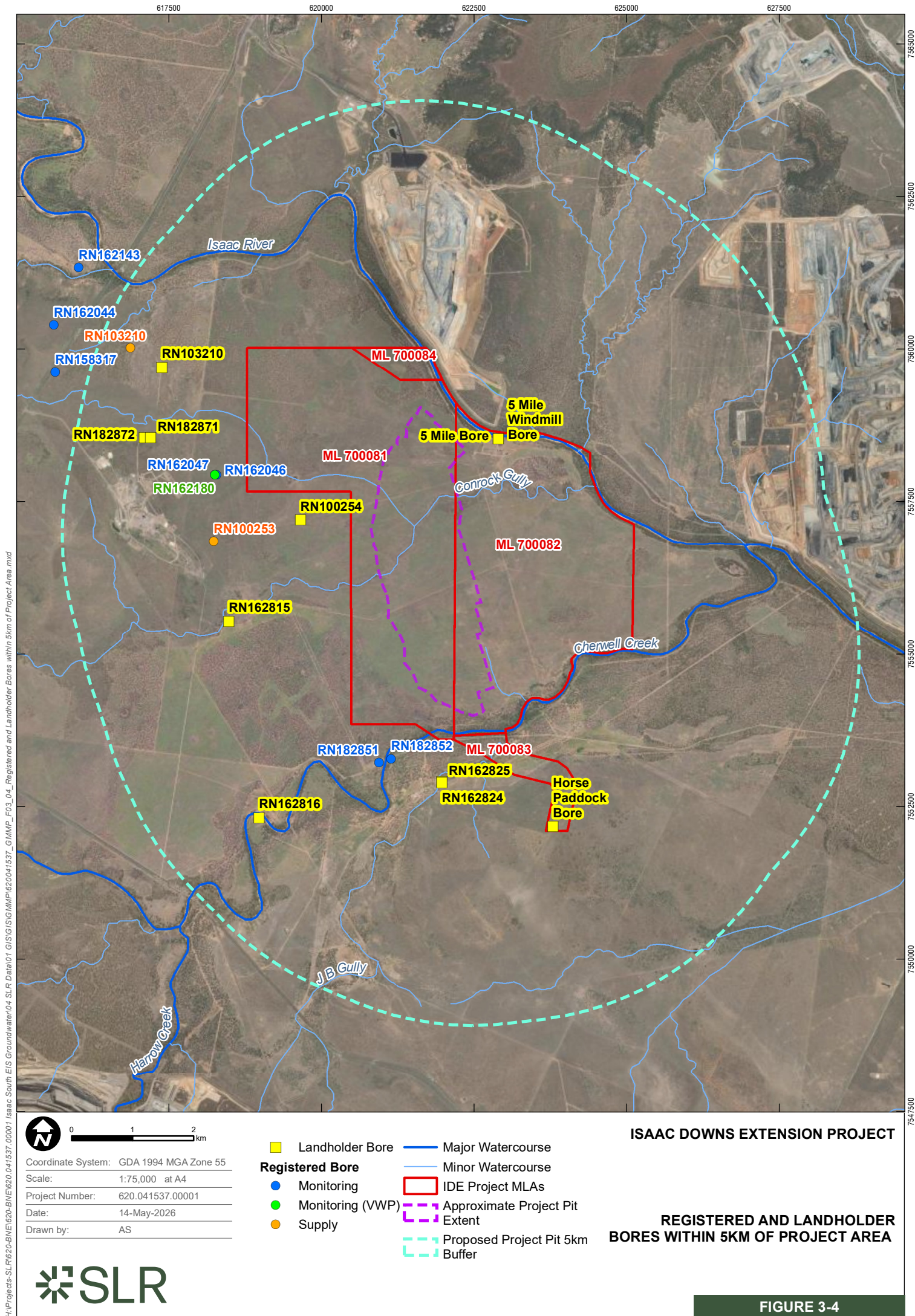


Bore ID	Easting (AGD84)	Northing (AGD84)	Depth (m)	Geology	Status	Comment	EC (μS/cm)	pH	Pumping rate at time of visit (L/s)
RN162825	621858	7552731	40.8	² Unknown (possibly FCCM)	Inactive Supply Bore	Old steel head works not attached to main riser not equipped with pump	3,393	7.09	-
RN162816	618861	7552129	45	² Unknown (possibly FCCM)	Inactive Supply Bore	not equipped with pump	578	6.98	-
RN162824	621858	7552713	15	² Unknown (possibly regolith)	Inactive Supply Bore	not equipped with pump	2,968	6.89	

¹ blocked by pump headworks

² target geology is unknown and has been assigned based on bore depth and model layers





3.3 Groundwater Environmental Values

Water resources in the vicinity of the Project are managed under the *Water Plan (Fitzroy Basin) 2011*. The Plan governs both surface water and groundwater resources, including surface waters associated with the Isaac River (surface water zone WQ1301) and regional groundwater resources of the Fitzroy Basin (groundwater zone WQ1310). The Project Area is located within chemistry zone 34 of the Isaac Connors Groundwater Management Area (GMA) of the Fitzroy Basin (**Figure 3-5**). The Isaac Connors GMA comprises two groundwater units:

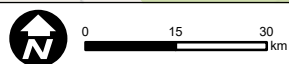
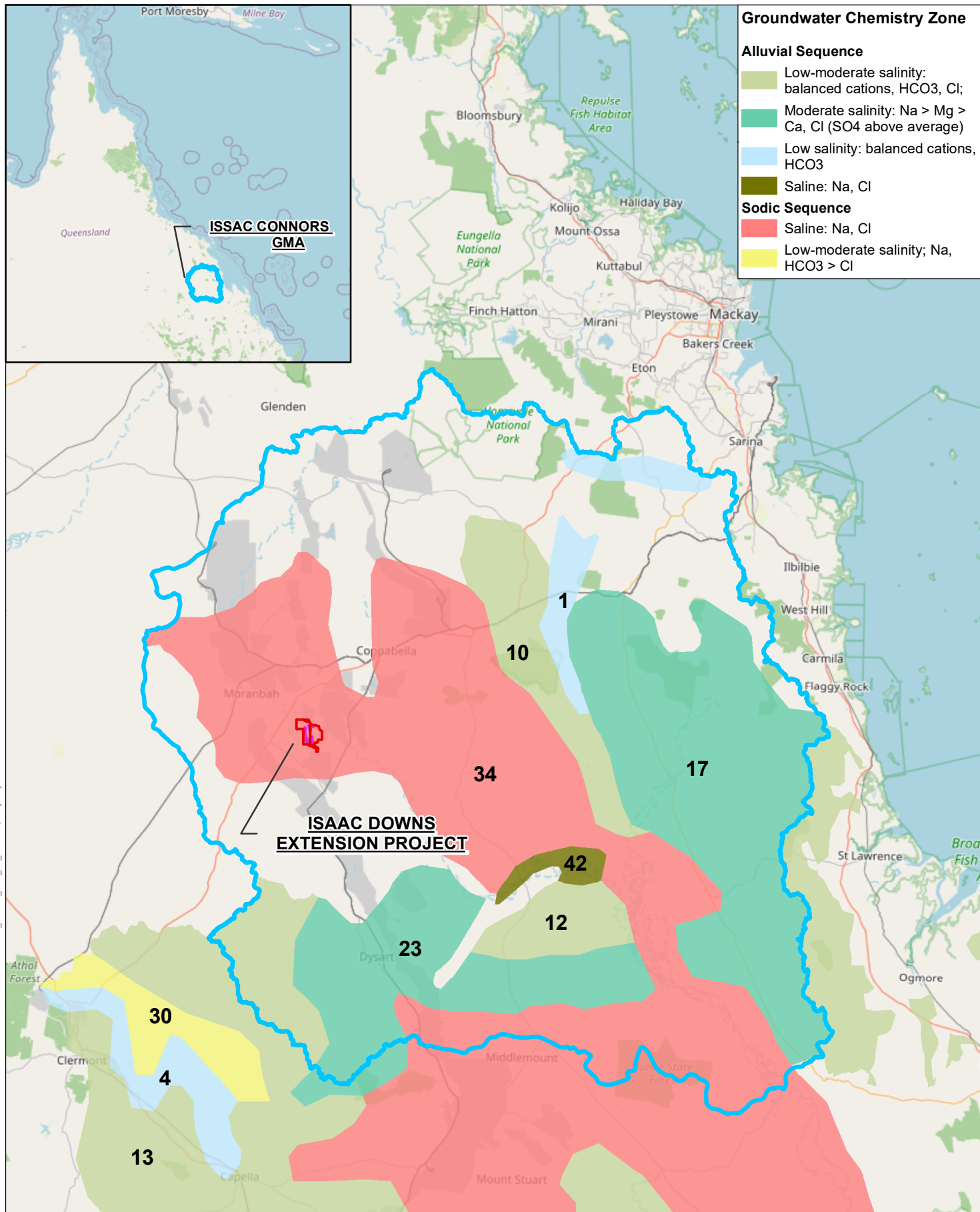
- Groundwater Unit 1, which includes the Quaternary alluvial aquifers of the Isaac Connors Alluvium sub-area; and
- Groundwater Unit 2, which encompasses all sub-artesian aquifers within the Isaac Connors GMA, excluding those assigned to Groundwater Unit 1.

Groundwater resources underlying the Project Area are also scheduled under the *Environmental Protection Policy (Water and Wetland Biodiversity)* as Isaac Groundwaters within the Isaac River sub-basin of the Fitzroy Basin Water Plan (WQ1310). The associated legislated environmental values (EVs) for these groundwaters are:

- Biological integrity of aquatic ecosystems;
- Human use EVs:
 - Suitability of water supply for irrigation;
 - Farm water supply/use;
 - Stock watering;
 - Primary recreation;
 - Drinking water supply;
 - Cultural and spiritual values.

The EPP (Water and Wetland Biodiversity) establishes water quality objectives (WQOs) to support and protect these EVs. These objectives represent long-term water quality management targets and are expressed through numerical indicators or narrative criteria for receiving waters, informed by scientific guidelines and refined through consideration of social, cultural and economic factors.





Coordinate System: GDA 1994 MGA Zone 55
 Scale: 1:1,250,000 at A4
 Project Number: 620.041537.00001
 Date: 14-May-2026
 Drawn by: AS

- IDE Project MLAs
- Approximate Project Pit Extent
- Isaac Connors Groundwater Management Area (GMA)

ISAAC DOWNS EXTENSION PROJECT

WATER QUALITY OBJECTIVE ZONES



FIGURE 3-5

3.4 Groundwater Quality

The following provides a summary of groundwater quality, as presented in the Project's conceptual hydrogeological model (SLR, 2026a).

Analysis of the Project's groundwater quality dataset indicates the following:

- Alluvium: Groundwater salinity varies widely from fresh to highly saline (TDS 566–24,800 mg/L; average ~7,727 mg/L), reflecting a heterogeneous and poorly interconnected aquifer system with localised surface-water recharge in some areas and longer residence times with evapoconcentration in others.
- Regolith: Groundwater is brackish to highly saline (TDS 793–23,800 mg/L; average ~4,719 mg/L), with locally lower salinity in shallow, weathered zones indicating recent recharge and relatively short groundwater residence times.
- Permian Coal Measures (Leichhardt and Vermont coal seams): Groundwater is generally brackish to highly saline (TDS 2,710–23,000 mg/L; average ~11,081 mg/L), consistent with limited recharge, restricted connectivity, and longer residence times.
- Fort Cooper Coal Measures (FCCM): Groundwater salinity ranges from moderately fresh to brackish (TDS 915–7,310 mg/L; average ~2,106 mg/L), indicating comparatively lower salinity conditions relative to other coal measure units.

For the purposes of the RGS (2026) study, a subset of the project groundwater quality dataset was used to represent more localised conditions around the void. This subset focuses on bores targeting non-coal interburden that will surround the spoil, as well as selected bores targeting coal seams near the void. Median field electrical conductivity (EC) values were 3,492 $\mu\text{S}/\text{cm}$ for the non-coal interburden and 11,216 $\mu\text{S}/\text{cm}$ for the coal seams.

With respect the above EVs/WQOs mentioned above and existing historical groundwater monitoring data, SLR (2026a) found that:

- Alluvial groundwater: Exceeds several WQOs for Zone 34 Fitzroy Basin WQOs for Aquatic Ecosystem protection (shallow groundwaters <30 m) and the Aquatic Ecosystem EV, however considered generally suitable for supporting the stock watering and irrigation EVs.
- Regolith groundwater: Exceeds several WQOs for Zone 34 Fitzroy Basin WQOs for Aquatic Ecosystem protection (shallow groundwaters <30 m) and Aquatic Ecosystem EV, however considered generally suitable for supporting the stock watering and irrigation EVs.
- Permian coal measures groundwater: Consistently exceeds WQOs for the stock watering, irrigation, and aquatic ecosystem protection EVs.



4.0 Predicted Groundwater Impacts

4.1 Overview

This section describes the potential impacts of Project operations on the groundwater system relevant to this GMMP. The assessment presented below is based on the Project Groundwater Impact Assessment (SLR, 2026a) and numerical Groundwater modelling conducted for the Project (SLR, 2026b)

4.2 Impacts on Groundwater Levels

4.2.1 Predicted Groundwater Inflow

4.2.1.1 During Mining

Total combined predicted groundwater inflows to the Project pit from the groundwater model (SLR, 2026b) are provided in **Figure 4-1**. As shown total groundwater inflows to the pit are predicted to peak in 2038 at 152 ML/year.

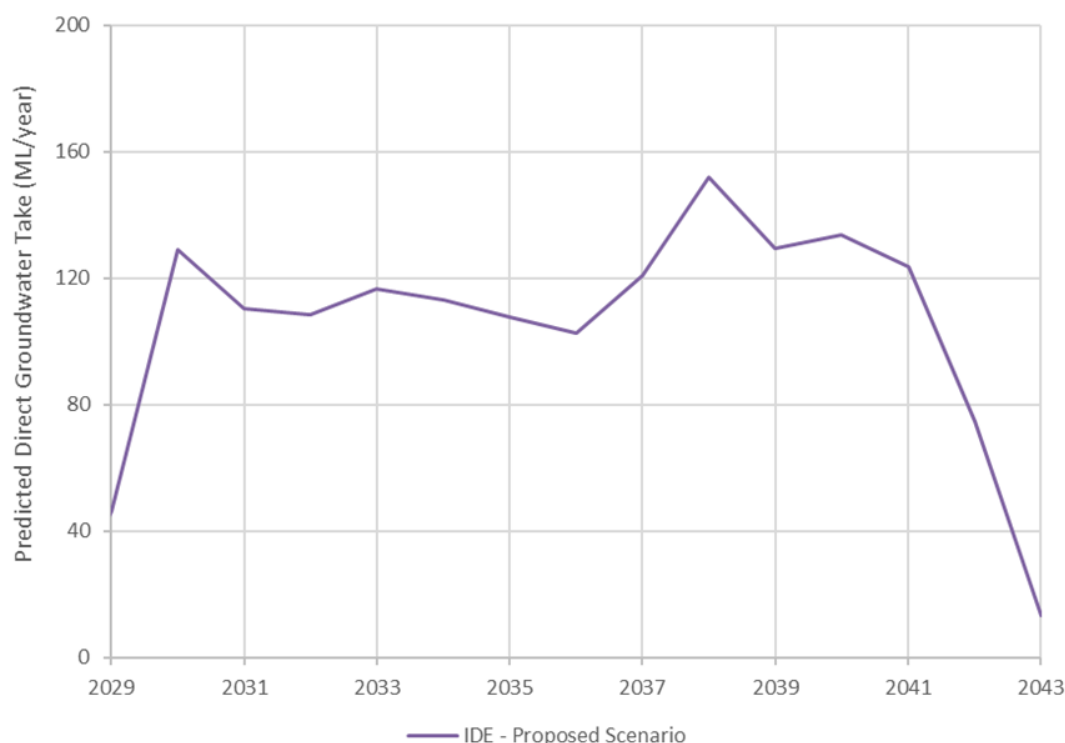


Figure 4-1 Predictive Incremental Mine Groundwater Inflows during Active Mining

Planned mining at the Project targets the Leichhardt and Vermont coal seams of the Rangal Coal Measures. The dominant potential groundwater impact during operations is groundwater level drawdown associated with passive groundwater inflow to active mine pit voids (i.e. associated water take).

As excavation of the active mine pits progresses below pre-mining groundwater levels within the Rangal Coal Measures, groundwater will discharge into the pits targeting the Leichhardt and Vermont seams. This process results in passive dewatering of the Permian coal-measure aquifer, causing localised lowering of groundwater levels within the Rangal Coal Measures in the immediate vicinity of the pit.



In addition to coal-measure impacts, the Project is predicted to result in a minor incremental change in groundwater take from the Isaac River alluvium. This was assessed by comparing net alluvial fluxes under the Proposed Scenario (i.e. with the Project) against the Approved Scenario (i.e. without the Project) (SLR, 2026b).

Between 2029 and the end of mining in 2043, the Project is predicted to result in an attributable loss of water from the alluvial aquifer of approximately 0 to 34.5 ML/year. This represents a negligible impact in the context of regional surface water systems; for example, relative to the mean daily flow of approximately 430 ML/day in the Isaac River at Deverill, this equates to around 0.02% of annual flow.

Predicted cumulative net alluvial flux indicates an overall cumulative loss of approximately 470 to 700 ML over the period from 2029 to 2043. This prediction represents net water flux across the entire regional-scale numerical model and reflects the combined influence of all mining operations represented.

4.2.1.2 Post-Mining

In the post-mining period, ongoing groundwater inflows to the residual void are controlled by the relationship between any the established lake in the post-mining landform, which are dominantly controlled by surface water (rainfall and runoff) inputs, and the recovered groundwater levels in the surrounding aquifers. Where lakes form in the post-mining landform with hydraulic heads below the hydraulic head in the surrounding groundwater system, those lakes may have an inwards flux of water from the groundwater system (groundwater take/ sinks with respect to groundwater). Conversely, an opposite head gradient between the lakes and groundwater would result in the potential for an outwards flux of water to the groundwater system.

Numerical groundwater modelling undertaken for the Project indicates that, under post-mining conditions, the residual void lake remains a hydraulic sink relative to surrounding aquifers. Predicted groundwater levels in the adjacent regolith, alluvium and Permian units remain above void lake levels, maintaining inward hydraulic gradients over the long term. As a result, outward leakage of void lake water to the surrounding groundwater system is not predicted.

Model results further demonstrate that post-mining groundwater inflows to residual void occur predominantly via permeable in-pit and adjacent spoil, with only a minor contribution from surrounding intact geological formations. Spoil materials are more permeable than natural strata and therefore form preferential groundwater flow pathways toward the void. This spoil-dominated inflow mechanism limits hydraulic interaction between the residual void and the broader groundwater system.

The adjacent river system is characterised as a losing stream, with no natural groundwater baseflow contribution. Consistent with this setting, the groundwater model predicts no ongoing Project-specific increase in river leakage or streamflow depletion during the post-mining period. Hydraulic gradients remain directed away from the river and toward mined areas and residual voids, and post-mining groundwater recovery does not induce additional stream leakage beyond pre-existing influent conditions.

Overall, the post-mining groundwater flow regime is characterised by localised inward groundwater flow toward the residual void, controlled by void lake water levels, spoil permeability and low-permeability surrounding strata. Consistent with the groundwater model predictions, groundwater impacts under post-mining conditions are expected to remain spatially constrained, with limited influence beyond the immediate vicinity of the residual void.



4.2.2 Predicted Groundwater Drawdown

The following outlines the key outcomes of the numerical model (SLR, 2026b) as they pertain to groundwater drawdown. Discussion in the following sections makes reference to the maximum incremental groundwater level drawdowns due to the proposed mining at the Project at any point during active future mining through to the end of mining. The maximum incremental drawdown is an aggregate of the maximum groundwater level drawdown values recorded at each model cell at any time during the future active mining years.

Cumulative groundwater drawdown has been assessed by comparing the proposed mining scenario against the Null Run, with the difference representing mining-related drawdown, while incremental post-mining drawdown isolates the specific contribution of the Project relative to regional cumulative impacts from other existing and approved developments.

Analysis and discussion relating to maximum cumulative predicted drawdown (i.e., the difference between the proposed scenario and the Null Run) for both during and post-mining, are discussed in SLR, (2026a).

4.2.2.1 During Mining

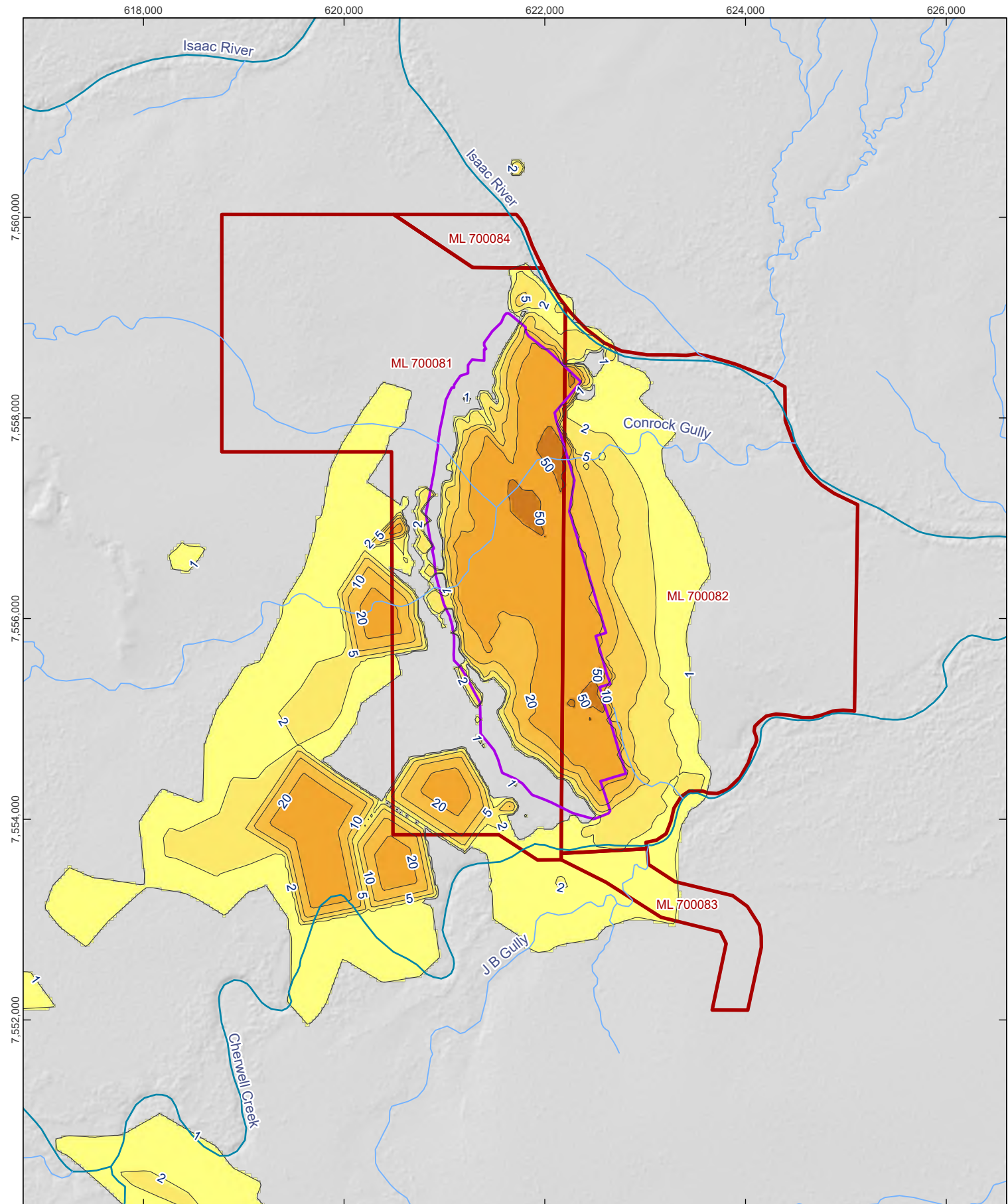
During the life of the Project, groundwater depressurisation of aquifers due to direct take and pit inflow will lead to local drawdown of the water table (in confined units) and potentiometric surfaces (in confined units) around the Project pit. The magnitude of drawdown is greatest close to the pit and reduces with distance, reflecting the generally low permeability of the Permian strata and limited hydraulic connectivity between hydrostratigraphic units.

The Leichhardt and Vermont seams of the Permian Rangel Coal Measures, as the primary mining targets, are predicted to experience the largest groundwater level impacts relative to other units, due to their direct interaction with mining. Drawdown within these seams dominates the overall groundwater response and controls the spatial extent of Project-related depressurisation.

Figure 4-2 shows that the predicted maximum water table drawdown (incremental) is concentrated around the Project mining area.

No incremental drawdown impacts exceeding 1 m are predicted for the Quaternary alluvium as a result of the proposed Project (**Figure 4-3**).





 0 0.5 1 km
 Coordinate System: GDA2020 MGA Zone 55
 Scale: 1:50,000 at A4
 Project Number: 620.041537
 Date Drawn: 06-May-2026
 Drawn by: RB

LEGEND

-  Drawdown Contour (m)
-  Major Watercourse
-  Minor Watercourse
-  Pit Extent
-  IDE Project MLAs

Maximum Drawdown (m)

- | | |
|---|---|
|  1 - 2 |  50 - 100 |
|  2 - 5 |  100 - 200 |
|  5 - 10 |  200 - 500 |
|  10 - 20 |  > 500 |
|  20 - 50 | |

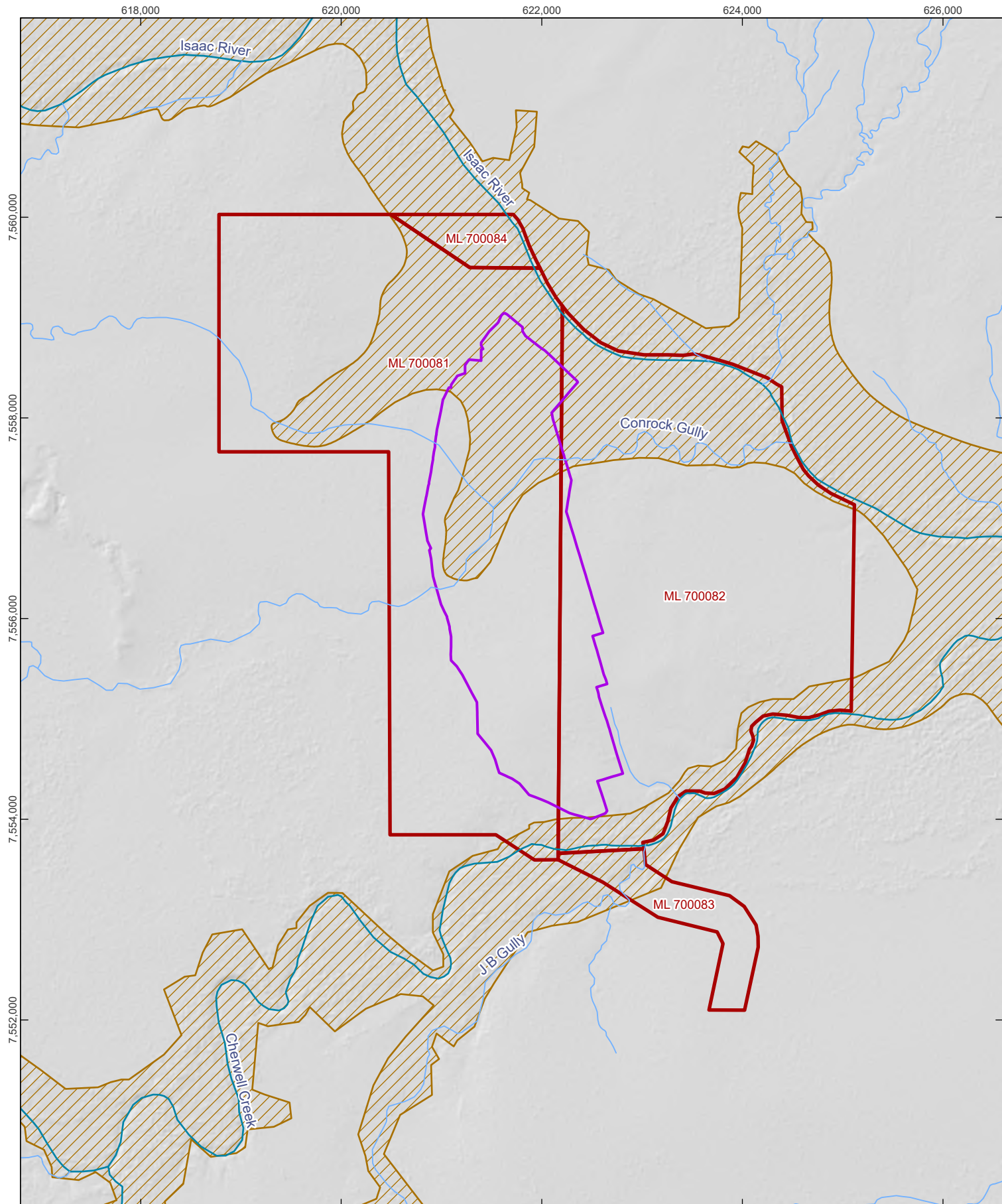
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PREDICTED MAXIMUM WATER TABLE DRAWDOWN (INCREMENTAL)



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FIGURE 4-2




 0 0.5 1 km
 Coordinate System: GDA2020 MGA Zone 55
 Scale: 1:50,000 at A4
 Project Number: 620.041537
 Date Drawn: 06-May-2026
 Drawn by: RB

LEGEND
 Major Watercourse
 Minor Watercourse
 Pit Extent
 IDE Project MLAs
 Alluvium Extent

ISAAC DOWNS EXTENSION PROJECT

**PREDICTED MAXIMUM
 DRAWDOWN (INCREMENTAL) –
 ALLUVIUM (LAYER 1)**



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FIGURE 4-3

4.2.2.2 Post-Mining

Following cessation of mining and the transition to post-mining conditions, groundwater levels are predicted to partially recover as active pit inflows cease and hydraulic gradients relax. However, recovery is incomplete in the vicinity of final void, which remains as persistent hydraulic low within the post-mining landform.

The residual void is predicted to continue to receive groundwater inflows, resulting in ongoing localised drawdown in surrounding groundwater units. The greatest residual drawdown is predicted to occur within the Rangal Coal Measures, reflecting their close hydraulic connection to the final void and their role as the primary pathways for groundwater movement toward the void.

Predicted post-mining groundwater levels indicate that residual drawdown is spatially constrained to areas close to the final void and does not propagate extensively into the wider groundwater system. Overlying units, including the regolith and alluvium, are predicted to experience minimal long-term groundwater level impacts from the Project, consistent with their limited hydraulic connectivity and the dominance of spoil-controlled flow paths.

Overall, the post-mining groundwater regime is characterised by localised and stable drawdown patterns controlled by the residual void acting as long-term hydraulic sink. Groundwater levels beyond the immediate vicinity of the Project are predicted to stabilise at or near baseline conditions.

4.2.3 Landholder Bores

Landholder bore locations and predicted 2 m and 5 m drawdown uncertainty envelopes are presented in **Figure 4-4** to **Figure 4-6**. These drawdown thresholds correspond to the Water Act 2000 trigger levels, with a 2 m drawdown applicable to unconsolidated aquifers and a 5 m drawdown applicable to consolidated aquifers. **Table 4-1** summarises bore details, including location, depth, and target formation. For bores with unknown screen information, formation has been assigned based on bore depth in relation to the modelled layers.

Table 4-1 presents the MLE maximum predicted incremental drawdown at each bore, along with the approximate timeframes in which these peaks are expected to occur. In addition, the table includes the 95th percentile drawdown from the uncertainty analysis, representing a conservative, high-end estimate of groundwater decline that exceeds most modelled outcomes. The periods during which 95th percent drawdown is predicted to exceed the relevant Water Act 2000 thresholds is also presented.

Model results indicate that the MLE maximum incremental drawdown does not exceed the 2 m or 5 m *Water Act* thresholds at any landholder bore. The uncertainty analysis shows that, for most bores, predicted drawdown remains within the 2 m and 5 m envelopes, except at 5 Mile Bore and 5 Mile Windmill Bore. At 5 Mile Bore and 5 Mile Windmill Bore, the 95th percentile drawdown marginally exceeds 5 m, suggesting exceedance is possible at these locations under conservative assumptions. This response is attributed to the proximity to active mining areas and screens located within the shallow regolith, higher transmissivity and a more rapid hydraulic response. Even in these cases, impacts are predicted to remain localised.

Mining is scheduled to commence in 2028 and conclude in 2043, followed by a modelled recovery period from 2044 to 2519. For the majority of landholder bores, maximum incremental drawdown occurs after mining has ceased, typically during the recovery period.

Overall, groundwater impacts are predicted to be limited, with drawdown remaining below regulatory thresholds for the MLE maximum drawdown prediction. Exceedances of the 2 m threshold are confined to 5 Mile Bore and 5 Mile Windmill Bore and occur only under the conservative 95th percentile scenario. The likelihood of widespread exceedances of drawdown thresholds at landholder bores due to the Project is low.



Table 4-1 Predicted Drawdown Impact on Landholder Bores

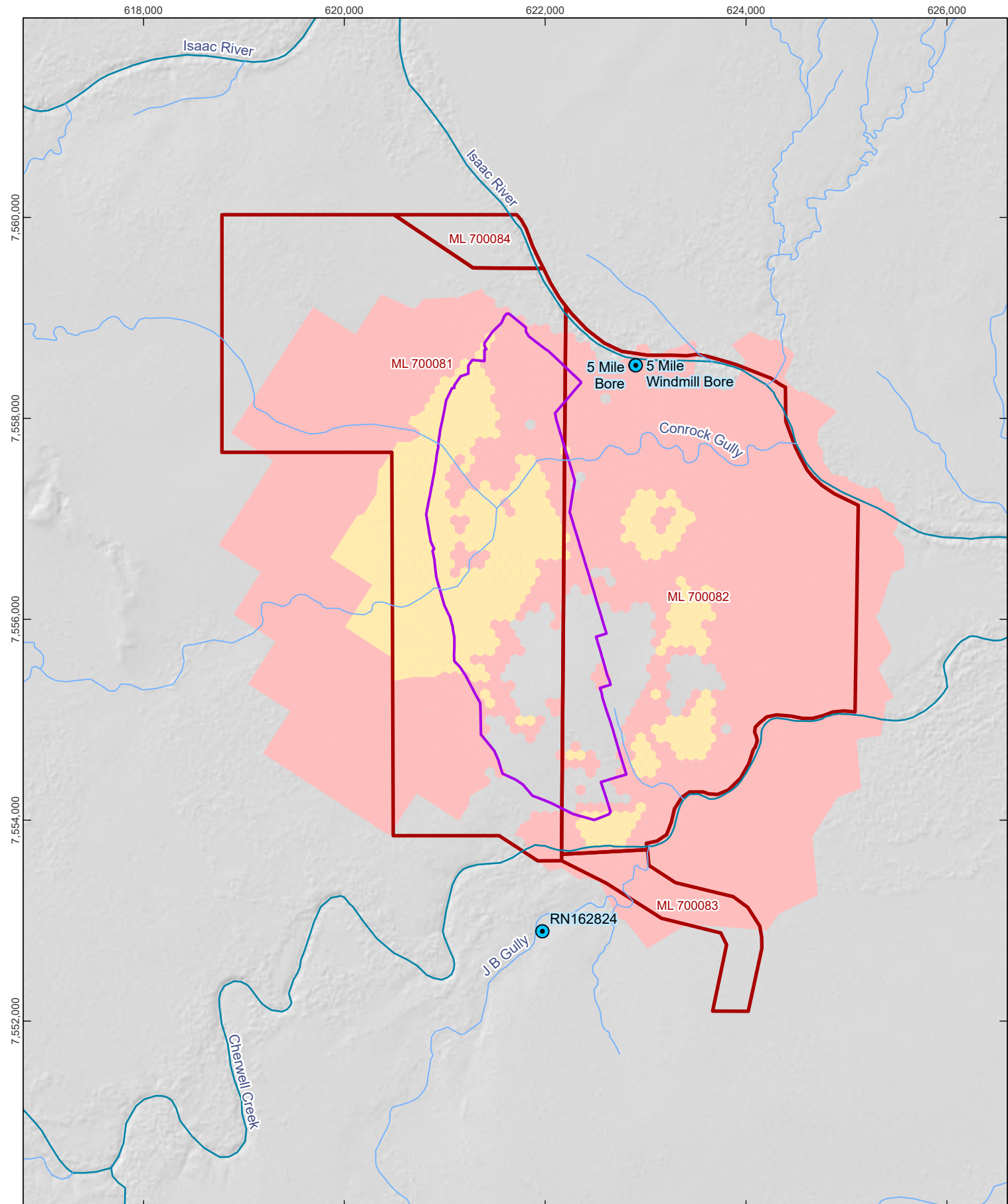
Year	Assumed Formation ¹	Easting (GDA94)	Northing (GDA94)	Bore Depth (m)	Incremental			
					MLE Max Drawdown (m)	95th Percentile Drawdown (m)	Timing of Maximum Incremental Drawdown	Timing of Threshold Exceedance (2 m / 5 m) ^{2,3}
5 Mile Bore	Regolith	622897	7558528	36.3	<0.1	5.22	2050-2059	2044
5 Mile Windmill	Regolith	622901	7558527	36.3	<0.1	5.22	2050-2059	2044
Horse Paddock	Vermont Coal Measures	618483	7555539	85	0.59	2.33	2050-2059	NA
RN100254	Fort Cooper Coal Measures	617100	7558546	>150	0.35	4.23	2050-2059	NA
RN103210	Fort Cooper Coal Measures	617203	7558546	65.53	0.36	1.42	2050-2059	NA
RN162815	Fort Cooper Coal Measures	623797	7552173	59	1.04	2.5	2170-2179	NA
RN162816	Fort Cooper Coal Measures	617383	7559698	45	0.23	1.39	2120-2129	NA
RN162824	Regolith	619659	7557192	15	0.91	1.28	2280-2289	NA
RN162825	Fort Cooper Coal Measures	621975	7552906	40.83	1.43	2.37	2160-2169	NA
RN182871	Fort Cooper Coal Measures	618975	7552309	60	0.29	1.44	2040-2049	NA
RN182872	Fort Cooper Coal Measures	621971	7552892	50	1.27	1.44	2040-2049	NA

¹ Bores assigned to definitive geological unit and model layers based on known geology bore depth

² Chapter 3 of the Water Act 2000 specified drawdown threshold triggers of 2 m for unconsolidated aquifers and 5 m for consolidated aquifers

³ NA=No exceedance to the Chapter 3 of the Water Act 2000 specified drawdown threshold triggers





 0 0.5 1 km
 Coordinate System: GDA2020 MGA Zone 55
 Scale: 1:50,000 at A4
 Project Number: 620.041537
 Date Drawn: 15-May-2026
 Drawn by: RB

LEGEND
 Landholder Bore
 Major Watercourse
 Minor Watercourse
 Pit Extent
 IDE Project MLAs

Maximum Drawdown (m)
 50th Percentile
 95th Percentile

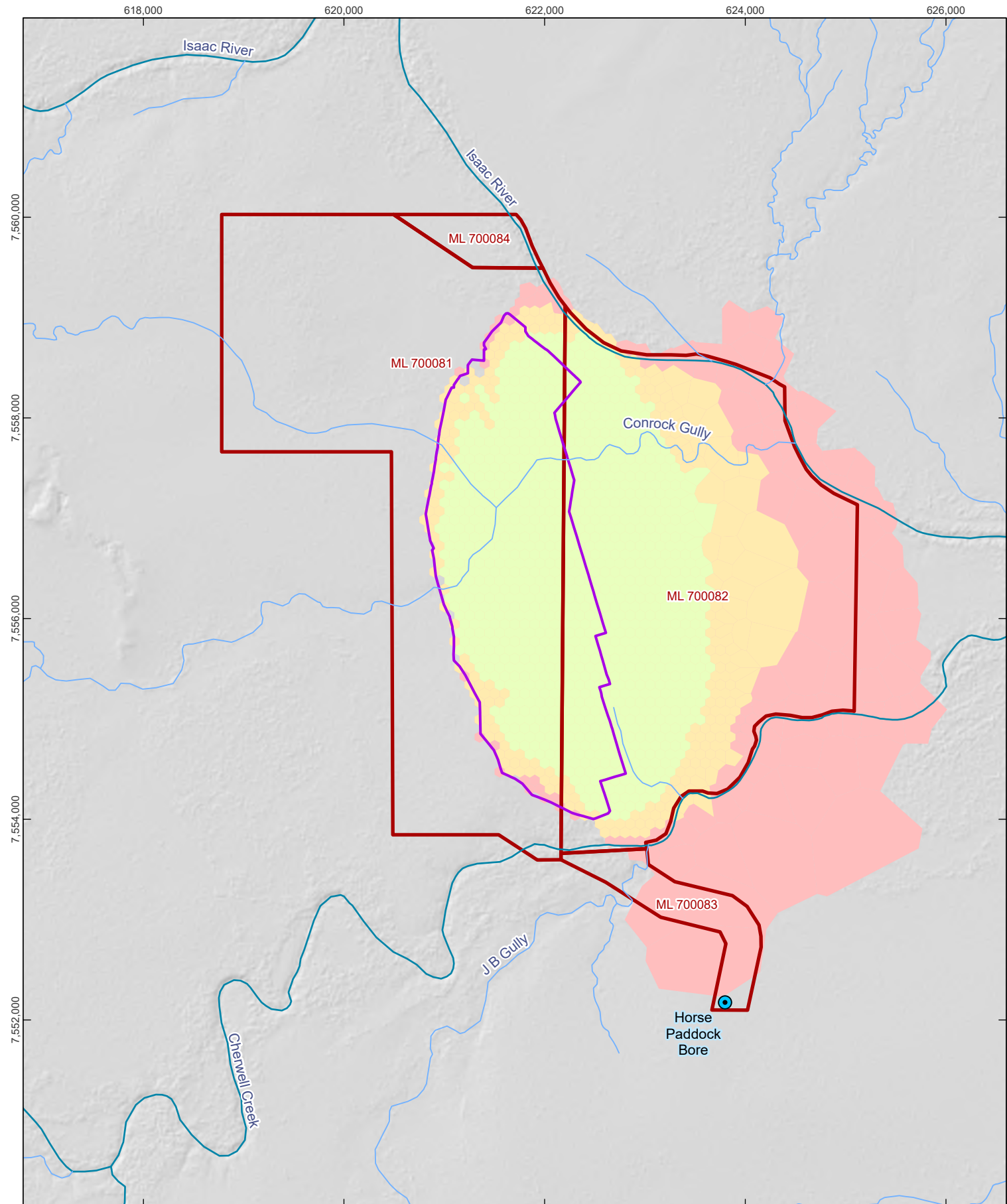
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LANDHOLDER BORE LOCATIONS AND 2 M DRAWDOWN UNCERTAINTY – REGOLITH (LAYER 2)



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FIGURE 4-4



 0 0.5 1 km
 Coordinate System: GDA2020 MGA Zone 55
 Scale: 1:50,000 at A4
 Project Number: 620.041537
 Date Drawn: 15-May-2026
 Drawn by: RB

LEGEND
 Major Watercourse
 Minor Watercourse
 Pit Extent
 IDE Project MLAs

Maximum Drawdown (m)
 5th Percentile
 50th Percentile
 95th Percentile

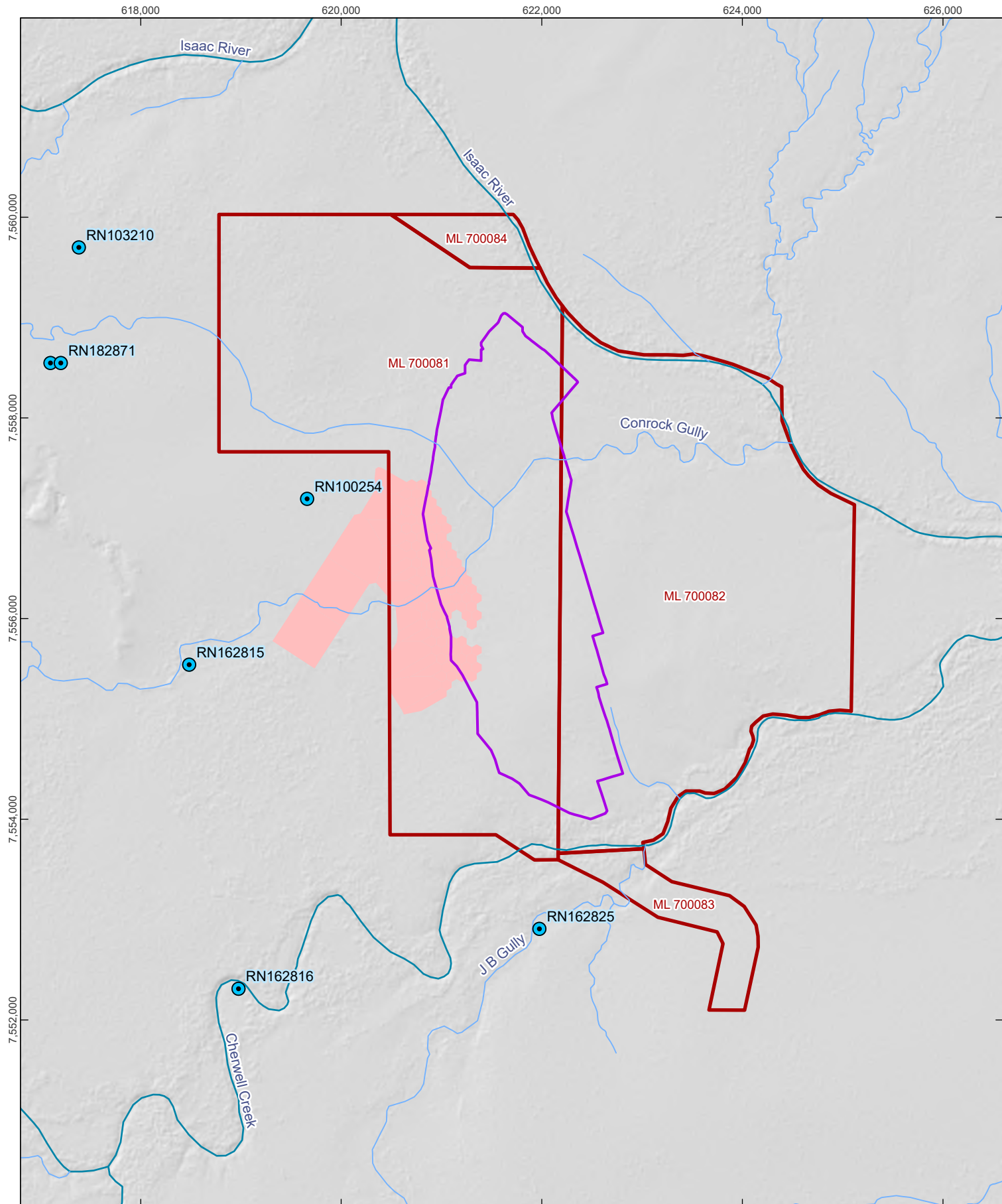
ISAAC DOWNS EXTENSION PROJECT

LANDHOLDER BORE LOCATIONS AND 5 M DRAWDOWN UNCERTAINTY – VERMONT SEAM (LAYER 7)



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FIGURE 4-5




 0 0.5 1 km
 Coordinate System: GDA2020 MGA Zone 55
 Scale: 1:50,000 at A4
 Project Number: 620.041537
 Date Drawn: 15-May-2026
 Drawn by: RB

LEGEND
 Landholder Bore
 Major Watercourse
 Minor Watercourse
 Pit Extent
 IDE Project MLAs

Maximum Drawdown (m)
 95th Percentile

ISAAC DOWNS EXTENSION PROJECT

LANDHOLDER BORE LOCATIONS AND 5 M DRAWDOWN UNCERTAINTY – FORT COOPER COAL MEASURES (LAYER 10)



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FIGURE 4-6

4.2.4 Groundwater Dependent Ecosystems

The presence of potential GDEs in the Project Area is summarised in **Section 3.2.1** and further detailed in Watermark Eco (2026a) and SLR (2026a).

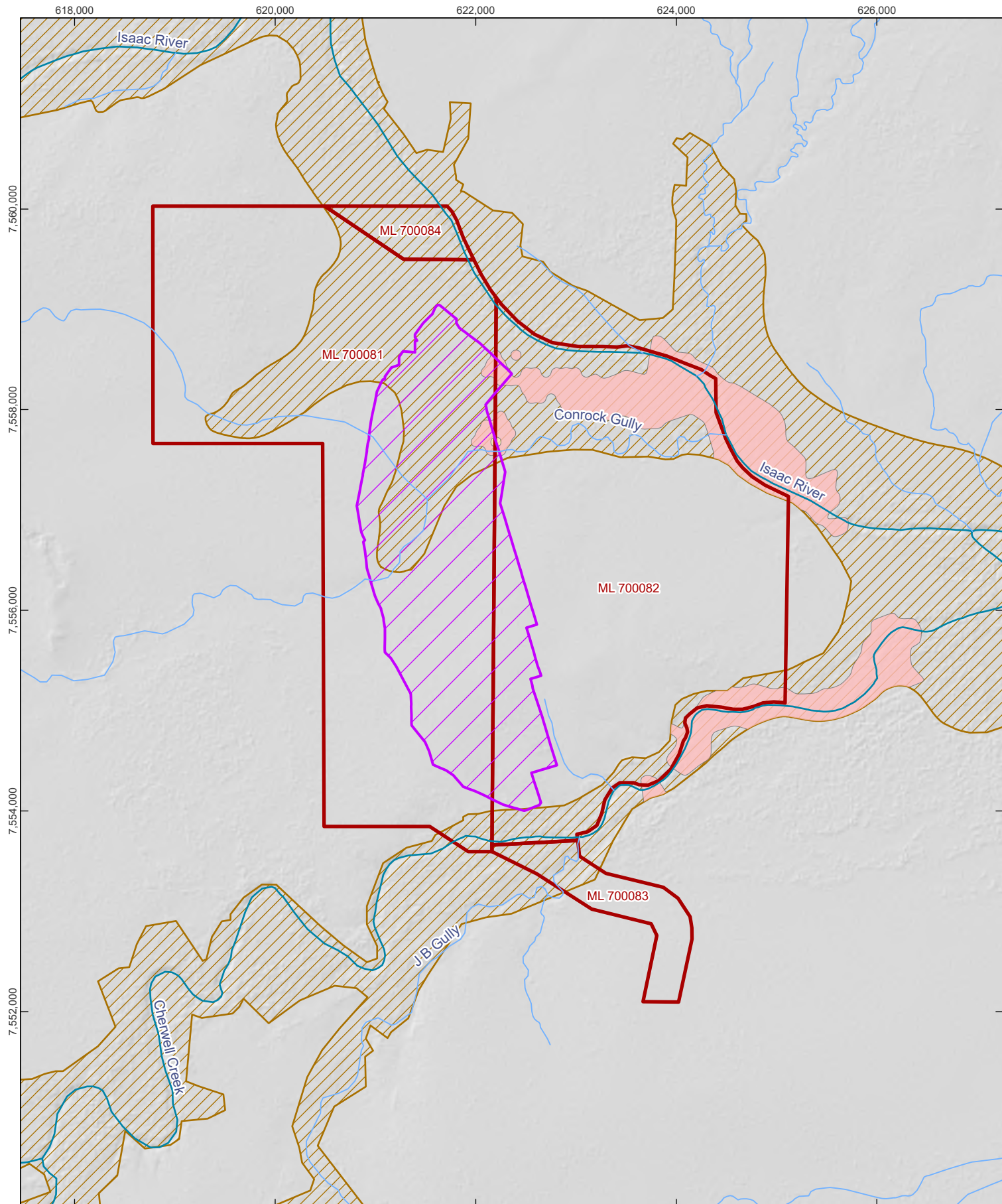
In summary, the results of the Project's GDE study (Watermark Eco, 2026a) show that groundwater within and around the Project Area in the alluvial aquifer or other modelled aquifer units, is highly unlikely to be a source of water for GDEs, with vegetation instead relying predominantly on soil moisture and surface water flows. During wetter periods, rainfall and surface flows can create seasonally perched groundwater above clay layers, which some terrestrial GDEs may opportunistically access. Along the Isaac River, perched groundwater systems within the Alluvium may supplement riparian trees during dry seasons, though availability decreases with elevation and distance from the channel. On older, elevated terraces, deep groundwater levels (>10 m), separation from the alluvium, and variable salinity prevent groundwater uptake. Overall, GDEs in the area show facultative dependence, accessing only the perched groundwater system when available but persisting on rainfall-derived soil moisture during dry periods.

No incremental drawdown impacts exceeding 1 m are predicted for the alluvial aquifer as a result of the Project (**Section 4.2.2**). While modelling predicts minor areas of groundwater drawdown within the Regolith layer (**Section 4.2.2**), the GDE assessment indicates that groundwater in the Regolith is highly unlikely to support GDEs in the Project Area, and the predicted drawdown occurs outside the mapped GDE extent (Watermark Eco, 2026a).

Baseline characterisation indicates that where it occurs, groundwater within the alluvial aquifer is recorded at depths of around 10 to 12 mBGL, typically significantly disconnected from the streambed elevation. All watercourses within the Project Area are highly ephemeral where surface water flow is only sustained for hours to several days following rainfall events. Overall, these factors indicate a lack of groundwater discharge to these watercourses such that there is no groundwater baseflow and therefore no potential for groundwater drawdown to manifest as a decrease in surface water flow. However, the perched groundwater unit that supports GDEs along the Isaac River occurs within active river channel and terrace deposits that are directly connected to channel and overbank flows and experience relatively rapid recharge and discharge. Consequently, changes in surface-flow volume and duration have the potential to affect recharge of the perched groundwater unit and, in turn, the condition of GDEs that rely on this system (Watermark Eco, 2026a) but is not linked to groundwater drawdown.

While no incremental drawdown impacts exceeding 1 m are predicted for the alluvial aquifer as a result of the Project (**Section 4.2.2**), uncertainty analysis indicates that a 1 m drawdown extent may occur under 95th percentile (i.e. highly unlikely) conditions (**Figure 4-7**). The potential impacts to GDEs remain as described above. Although there may be some potential drawdown within the alluvial aquifer, GDEs access shallow perched groundwater systems that are hydraulically separated from the alluvial aquifer (Watermark Eco, 2026a). Consequently, drawdown within the alluvial aquifer would not influence the perched groundwater systems upon which the GDEs facultatively rely.






 0 0.5 1 km
 Coordinate System: GDA2020 MGA Zone 55
 Scale: 1:50,000 at A4
 Project Number: 620.041537
 Date Drawn: 14-May-2026
 Drawn by: RB

LEGEND
 Major Watercourse
 Minor Watercourse
 Pit Extent
 IDE Project MLAs
 Alluvium Extent

Maximum Drawdown (m)
 5th Percentile
 50th Percentile
 95th Percentile

ISAAC DOWNS EXTENSION PROJECT

**UNCERTAINTY IN PREDICTED
 1M INCREMENTAL DRAWDOWN –
 ALLUVIUM
 (END OF RECOVERY)**



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FIGURE 4-7

4.3 Impacts on Groundwater Quality

4.3.1 Groundwater Movement Induced Quality Changes

Potential impacts from Project activities are identified as being primarily related to groundwater level drawdown associated with mining. Groundwater drawdown has the potential to result in groundwater quality changes where changes in potentiometric head gradients alter groundwater flow systems, thereby moving groundwater of differing quality into areas of the hydrogeological system where it was not previously present.

Baseline groundwater quality assessment indicates that groundwater quality across the Project Area (SLR, 2026a) is spatially variable, with generally higher salinity within deeper Permian coal-measure units compared to the shallow regolith and alluvial aquifers. Mining-induced drawdown may therefore result in limited mixing of groundwater of differing quality where hydraulic connectivity exists between units.

Groundwater level drawdown also has a lower-probability potential to result in partial desaturation and oxidation of aquifer materials, particularly within coal-measure strata. Oxidation of sulphide-bearing minerals could result in the mobilisation of dissolved constituents, including sulphate and some metals. However, Terrenus (2026) geochemical testing indicates that sulphur contents are generally low and that acid-forming potential is limited, with sufficient buffering capacity present in most lithologies. As such, acidification of groundwater is not anticipated.

Similar oxidation and geochemical transformation processes may occur within mine spoil materials placed within in-pit or out-of-pit spoil dumps. These effects are expected to be localised, moderated by spoil composition, depth of burial and limited oxygen ingress, and further mitigated through planned spoil handling and rehabilitation practices (Terrenus, 2026).

4.3.2 Potential Sources of Contamination During Mining

During mining, potential sources of groundwater contamination include fuel and chemical storage (i.e. at the go-line area), blasting activities, and the placement of mine spoil within in-pit and out-of-pit dumps. Point-source contamination risks, such as fuel spills, are managed through industry-standard controls and are expected to be minor, localised and remediated promptly.

Blasting has the potential to introduce blast residues (e.g. ammonia and nitrate) to groundwater; however groundwater quality data indicate concentrations consistent with regional coal mining environments, and impacts are expected to be localised and short-term.

Spoil is the primary potential source of groundwater quality impacts. Terrenus (2026) geochemical characterisation indicates spoil materials are generally non-acid forming, with salinity the main parameter of concern. Additionally, during operations, inward hydraulic gradients toward active pits will limit the potential for seepage migration beyond the mining footprint.

4.3.3 Potential Sources of Contamination Post-Mining

Post-mining, in-pit and out-of-pit spoil within the rehabilitated landform will remain potential long-term sources of dissolved constituents to groundwater. Terrenus (2026) assessments indicate seepage is expected to be dominated by salinity-related parameters, with a low risk of acid generation or metal mobilisation.

Perpetual lakes are predicted to form within the residual void. The void lake represent a potential sources of groundwater contamination under unfavourable hydraulic conditions.



However, groundwater modelling indicates that the residual void will act as persistent hydraulic sink, capturing seepage from surrounding spoil dumps and preventing outward migration of lake water to surrounding aquifers. Combined with planned rehabilitation measures, post-mining groundwater quality impacts are expected to remain localised, with unlikely predicted impacts to off-lease receptors or landholder bores.

4.3.4 Characterisation of Potential Groundwater Quality Impacts

At an individual monitoring bore, potential groundwater quality impacts resulting from the Project may be expressed as one or more of the following changes:

- Groundwater salinity, measured as electrical conductivity (EC) or total dissolved solids (TDS). Baseline assessment indicates that salinity is the primary groundwater quality characteristic across the Project Area, with generally higher salinity in deeper Permian coal-measure units compared to the shallow regolith and alluvial aquifers.
- Groundwater pH. Terrenus (2026) indicate groundwater is typically near-neutral to mildly alkaline, reflecting buffering by carbonate minerals. Significant pH changes are therefore not anticipated.
- Ionic composition of groundwater, including relative proportions of major ions such as sodium, chloride, bicarbonate and sulphate. Changes in ionic composition may occur where altered hydraulic gradients mobilise groundwater of differing quality, particularly between sedimentary units.
- Concentrations of metals and metalloids, including iron and manganese, which may increase locally under reducing or oxidising conditions. Terrenus (2026) geochemical characterisation indicates that mobilisation of metals is expected to be limited and localised, with low acid-forming potential.
- Concentrations of nitrogen compounds (nutrients), such as ammonia and nitrate, which may occur locally in association with blasting activities or spoil. Baseline groundwater quality data indicate that nitrogen species are generally low to moderate and consistent with regional coal mining environments.

Based on the geochemical characteristics and assessed seepage behaviour of both in-pit and out-of-pit spoil, Terrenus (2026) concluded that spoil emplacements present a low risk to groundwater quality during operations and post-closure.

Terrenus (2026) also assessed the geochemical risks associated with the post-mining residual void, including groundwater interaction with exposed highwall and floor materials. Terrenus (2026) concluded that water quality within the residual void will be influenced by neutral to alkaline groundwater inflows and spoil interaction, with limited potential for metal mobilisation. The residual void was therefore assessed as posing a low risk to surrounding groundwater resources.



5.0 Groundwater Monitoring and Management Program

5.1 Overview

This Groundwater Monitoring and Management Plan (GMMP) has been prepared for the Project to support the assessment of potential groundwater impacts associated with the proposed mining activities, as described in the preceding sections. Impacts to groundwater will be conditioned as part of the Project's Environmental Authority (EA) and Progressive Rehabilitation and Closure Plan (PRCP) schedule under the Environmental Protection Act 1994 (EP Act).

Accordingly, this GMMP has been developed to inform and support future groundwater-related approvals, including the Project's EA and PRCP schedule, and is intended to provide a framework that can be updated and refined as the Project progresses through the approvals process.

5.2 Monitoring Network

The Project groundwater monitoring network has resulted from extensive field work and the use of collected data to update conceptual modelling as detailed in SLR (2026a).

The groundwater monitoring network includes defined compliance and interpretation bores as shown in **Table 5-1**. Compliance bores are bores that have impact criteria thresholds established in the GMMP, whereas interpretation bores are bores primarily intended to provide for background monitoring data outside of the potential mining impact area that would support the assessment of an exceedance of a limit or trigger at a compliance bore. Bores 205S, 205DSR 593, 594, 592s, 592D are located within the footprint of the pit and will be mined out. and are therefore not included in the Project GMMP monitoring network.

Figure 5-1 to Figure 5-5 presents the proposed GMMP groundwater monitoring network for each aquifer, classifying bores as either compliance or interpretation, and showing the 1 m drawdown for different percentiles in the uncertainty analysis for each respective aquifer.



Table 5-1 Project GMMP Monitoring Network

Bore	Install Date	Easting (AGD84)	Northing (AGD84)	Surface elevation (mAHD)	Total depth (mBGL)	Screen Top Elevation (mAHD)	Screen Base Elevation (mAHD)	Aquifer	Proposed GMMP Bore	Rationale
MBIS01	13/05/2025	624220	7557525	196.88	22	187.88	184.88	Alluvium	Interpretation	These bores are installed to the base of the alluvium. Recorded as dry since installation. Considered unsuitable as compliance bores but will continue to be monitored as interpretation bores.
MBIS14	11/06/2025	626356	7556261	194.67	11	187.67	184.67	Alluvium	Interpretation	
MBID23	28/06/2020	621681	7559410	198.86	14	191.35	185.35	Alluvium	Compliance	Shallow groundwater monitoring along Isaac River north of the pit.
MBID28	29/06/2020	622797	7558353	198.37	16	186.36	183.36	Alluvium	Compliance	Shallow groundwater monitoring along Isaac River northeast of the pit.
MBIS04	05/05/2025	625445	7556627	195.89	19	183.89	177.89	Alluvium	Compliance	Shallow groundwater monitoring along Isaac River.
MBIS07	15/06/2025	623916	7554568	199.9	19	190.9	187.9	Alluvium	Compliance	Shallow groundwater monitoring along Cherwell Creek southeast of the pit.
MBIS12	21/05/2025	625900	7555541	196.66	20	181.65	178.65	Alluvium	Interpretation	Shallow groundwater monitoring along Cherwell Creek.
MBID05	16/11/2018	622397	7558802	200	18	188	182	Alluvium	Interpretation	These form part of the IDM monitoring network and included as interpretation bores to provide shallow groundwater monitoring north of the Isaac River.
MBID08	17/11/2018	623073	7558644	199	17	188	182	Alluvium	Interpretation	
MBIS20	06/07/2025	623262	7557334	198.88	22	181.88	178.88	Regolith	Compliance	Shallow groundwater monitoring along Conrock Gully east of the pit.
MBIS06	18/11/2022	622094	7553583	185.54	12.4	178.54	175.54	Regolith	Interpretation	These bores are installed to regolith and are intermittently dry with a recent prolonged dry spell. As it is likely that there will be frequently no or insufficient water to sample (i.e. the regolith in this area is dry) they are considered unsuitable as compliance bores but will continue to be monitored as interpretation bores.
MBIS17	11/11/2022	625707	7553156	200.84	23	183.84	180.84	Regolith	Interpretation	
MB06	11/08/12	615903	7561156	206	23	190.18	184.18	Regolith	Interpretation	Located more than 5 km to the northwest and upgradient of the pit shell. Not anticipated to be impacted by Project mining related drawdown (see Figure 5-2).
MB09C	15/06/2012	618252	7557938	213	15	203.68	197.68	Regolith	Interpretation	Located over 1km to the east and upgradient of the pit shell. Not anticipated to be significantly impacted by Project mining related drawdown (see Figure 5-2).
MBID22	26/06/2020	622793	7558352	198.52	37	174.52	162.52	Regolith	Interpretation	Shallow groundwater monitoring along Isaac River northeast of the pit. Groundwater levels are influenced by nearby actively pumping landholder bore. Bore is blocked and unsuitable for sampling.
RN182851	31/05/2021	620826	7553036	208	35	202	174	Regolith	Compliance	Mining impact south of the pit.
MBIS10	26/11/2022	624891	7554950	183.93	24.15	166.42	160.42	Regolith	Compliance	Located 2km to the southeast of the pit shell in a potential zone of Project drawdown.
MBIS02	29/05/2025	624225	7557529	196.98	138	63.97	60.97	Leichhardt coal seam	Compliance	Mining impacts northeast of the pit.



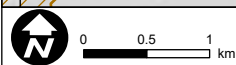
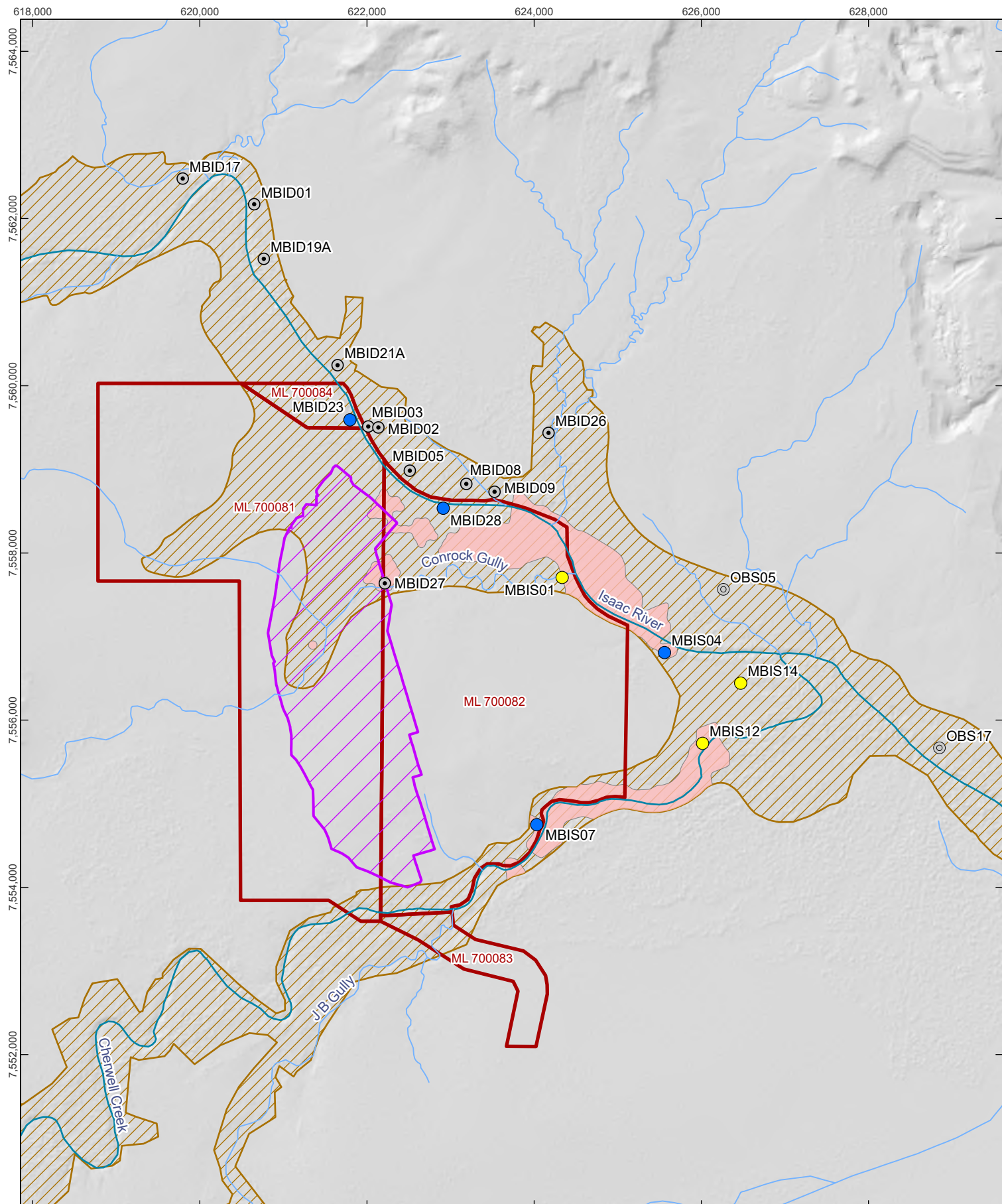
Bore	Install Date	Easting (AGD84)	Northing (AGD84)	Surface elevation (mAHD)	Total depth (mBGL)	Screen Top Elevation (mAHD)	Screen Base Elevation (mAHD)	Aquifer	Proposed GMMP Bore	Rationale
MBIS05	09/05/2025	625449	7556618	195.96	155	47.95	41.95	Leichhardt coal seam	Compliance	Mining Impacts east of the pit.
MBIS08	19/11/2022	623600	7554137	202.53	50	160.53	154.53	Leichhardt coal seam	Compliance	Mining impacts south of the pit.
MBIS11	13/05/2025	624888	7554933	199.15	94	109.14	106.14	Leichhardt coal seam	Compliance	Located 2km to the southeast of the pit shell in a potential zone of Project drawdown.
MBIS13	22/05/2025	625895	7555538	196.71	153	47.70	44.70	Leichhardt coal seam	Compliance	Located 2km to the east of the pit shell in a potential zone of Project drawdown.
MBIS15	12/06/2025	626357	7556255	194.46	52	152.45	143.45	Leichhardt coal seam	Compliance	Shallow groundwater monitoring along Isaac River and HSE Wetland. The bore is located more than 2 km to the east of the pit shell.
MBIS18	16/11/2022	625689	7553154	200.92	150	54.92	51.92	Leichhardt coal seam	Interpretation	Located over 2 km to the southeast of the pit shell outside of Project MLAs.
MBIS03	16/05/2025	624211	7557525	196.66	181	25.66	16.66	Vermont coal seam	Compliance	Mining impacts northeast of the pit
MBIS09	18/11/2022	623585	7554134	202.57	96.41	122.57	110.57	Vermont coal seam	Compliance	Mining impacts south of the pit.
MBIS16	15/11/2022	623748	7552170	213.58	69.19	154.58	146.58	Vermont coal seam	Interpretation	Located over 2 km to the south of the pit shell.
MBIS19	05/08/2025	626565	7555334	197.28	86	118.28	112.28	Isaac Thrust Fault core (RCM)	Interpretation	Monitoring on the Isaac Thrust Fault southeast of the pit outside of Project MLAs.
MB08b	01/09/2012	615524	7559448	228	84.2	157.43	145.43	Fort Cooper Coal Measures	Interpretation	Located more than 2 km to the northwest and upgradient of the pit shell. Not anticipated to be significantly impacted by Project mining related drawdown.
MB09B	15/06/2012	618252	7557938	213	36	188.68	176.68	Fort Cooper Coal Measures	Interpretation	Located over 1km to the east and upgradient of the pit shell. Not anticipated to be significantly impacted by Project mining related drawdown.

Note: mAHD = metres Australian Height Datum

mBGL = meters below ground level

Bores 205S, 205DSR 593, 594, 592s, 592D, shown as black circles in **Figure 5-1** to **Figure 5-4**, sits within the footprint of the pit and will be mined out and therefore not included as the Project GMMP monitoring network.





Coordinate System: GDA2020 MGA Zone 55
 Scale: 1:60,000 at A4
 Project Number: 620.041537
 Date Drawn: 14-May-2026
 Drawn by: RB

LEGEND

— Major Watercourse
 — Minor Watercourse

— Pit Extent

— IDE Project MLAs

Monitoring Bore

● IDE, Compliance
 ● IDE, Interpretation
 ○ IDM, not included
 ○ PTM, not included

— Alluvium Extent

Maximum Drawdown (m)

— 5th Percentile
 — 50th Percentile
 — 95th Percentile

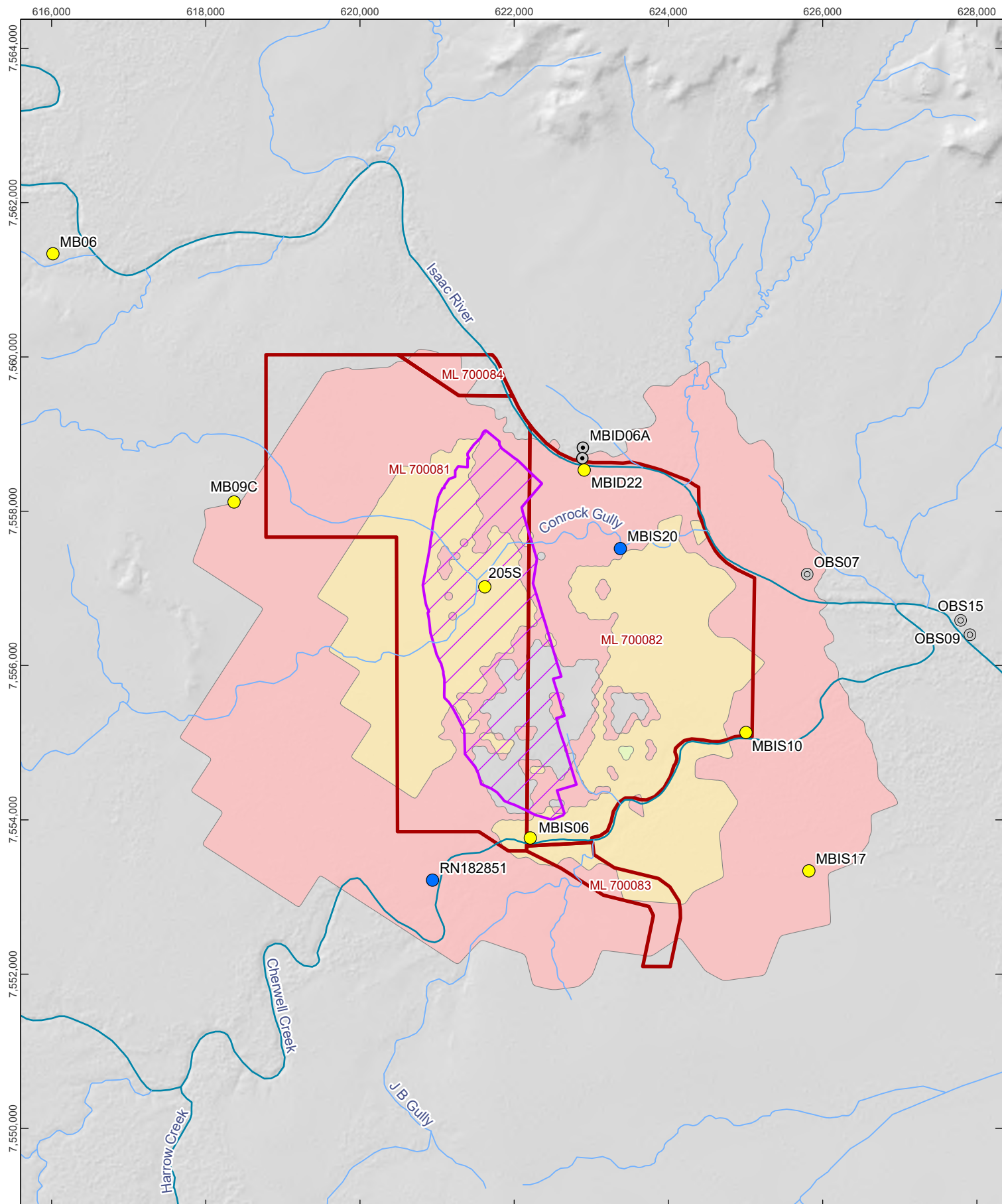
ISAAC DOWNS EXTENSION PROJECT

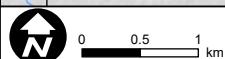
ALLUVIAL BORES AND 1 M DRAWDOWN UNCERTAINTY (ALLUVIUM)



DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding the data's accuracy or reliability for any purpose.

FIGURE 5-1




 Coordinate System: GDA2020 MGA Zone 55
 Scale: 1:65,000 at A4
 Project Number: 620.041537
 Date Drawn: 06-May-2026
 Drawn by: RB

LEGEND

- Major Watercourse
- Minor Watercourse
- MLE
- Pit Extent
- IDE Project MLAs
- Monitoring Bore**
 - IDE, Compliance
 - IDE, Interpretation
 - IDM, not included
 - ⊙ PTM, not included

Maximum Drawdown (m)

- 5th Percentile
- 50th Percentile
- 95th Percentile

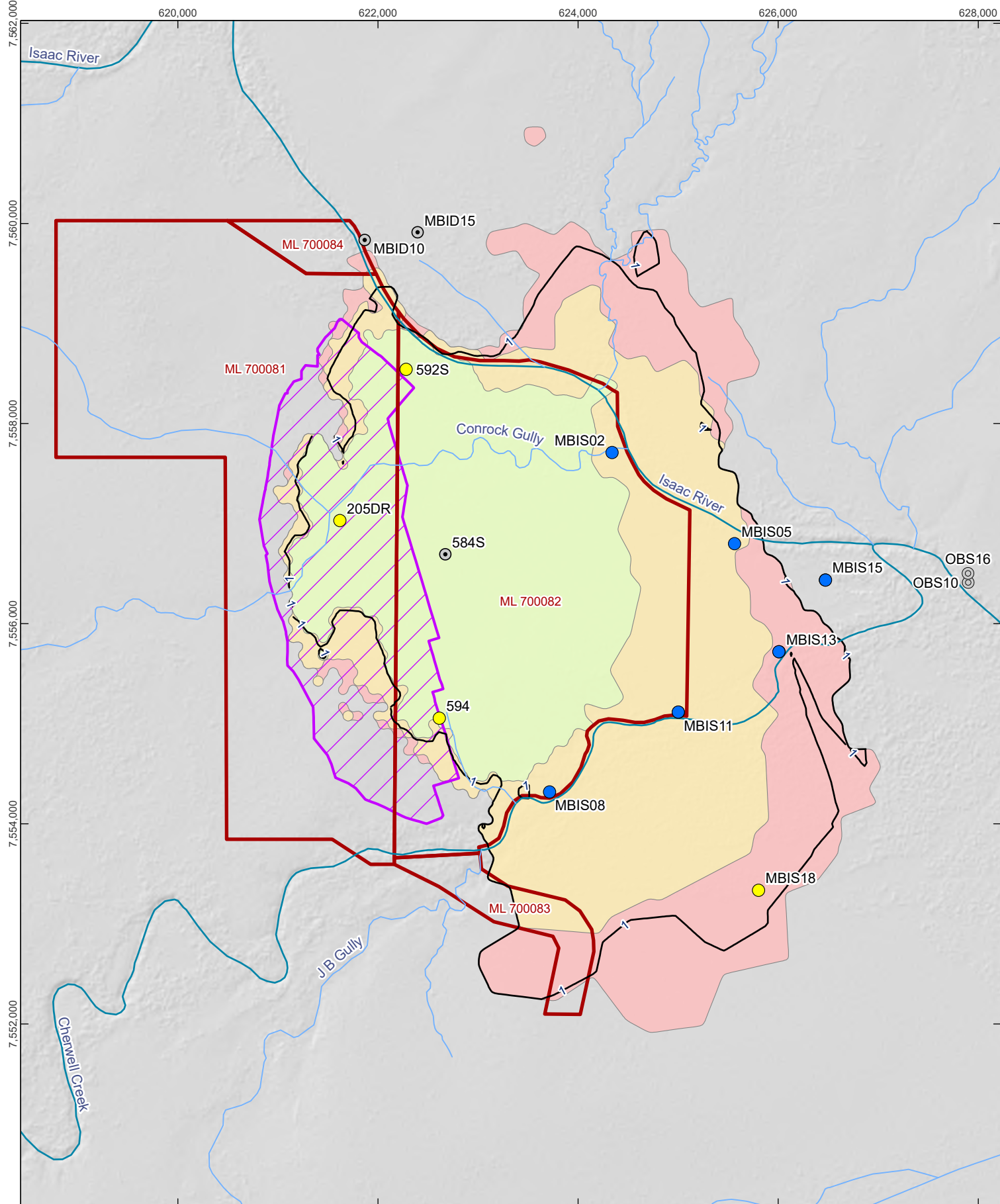
ISAAC DOWNS EXTENSION PROJECT

REGOLITH BORES AND 1 M DRAWDOWN UNCERTAINTY (REGOLITH)



DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding the data's accuracy or reliability for any purpose.

FIGURE 5-2



 0 0.5 1 km
 Coordinate System: GDA2020 MGA Zone 55
 Scale: 1:50,000 at A4
 Project Number: 620.041537
 Date Drawn: 06-May-2026
 Drawn by: RB

LEGEND

- Major Watercourse
- Minor Watercourse
- MLE
- Pit Extent
- IDE Project MLAs

Monitoring Bore

- IDE, Compliance
- IDE, Interpretation
- IDM, not included
- PTM, not included

Maximum Drawdown (m)

- 5th Percentile
- 50th Percentile
- 95th Percentile

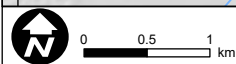
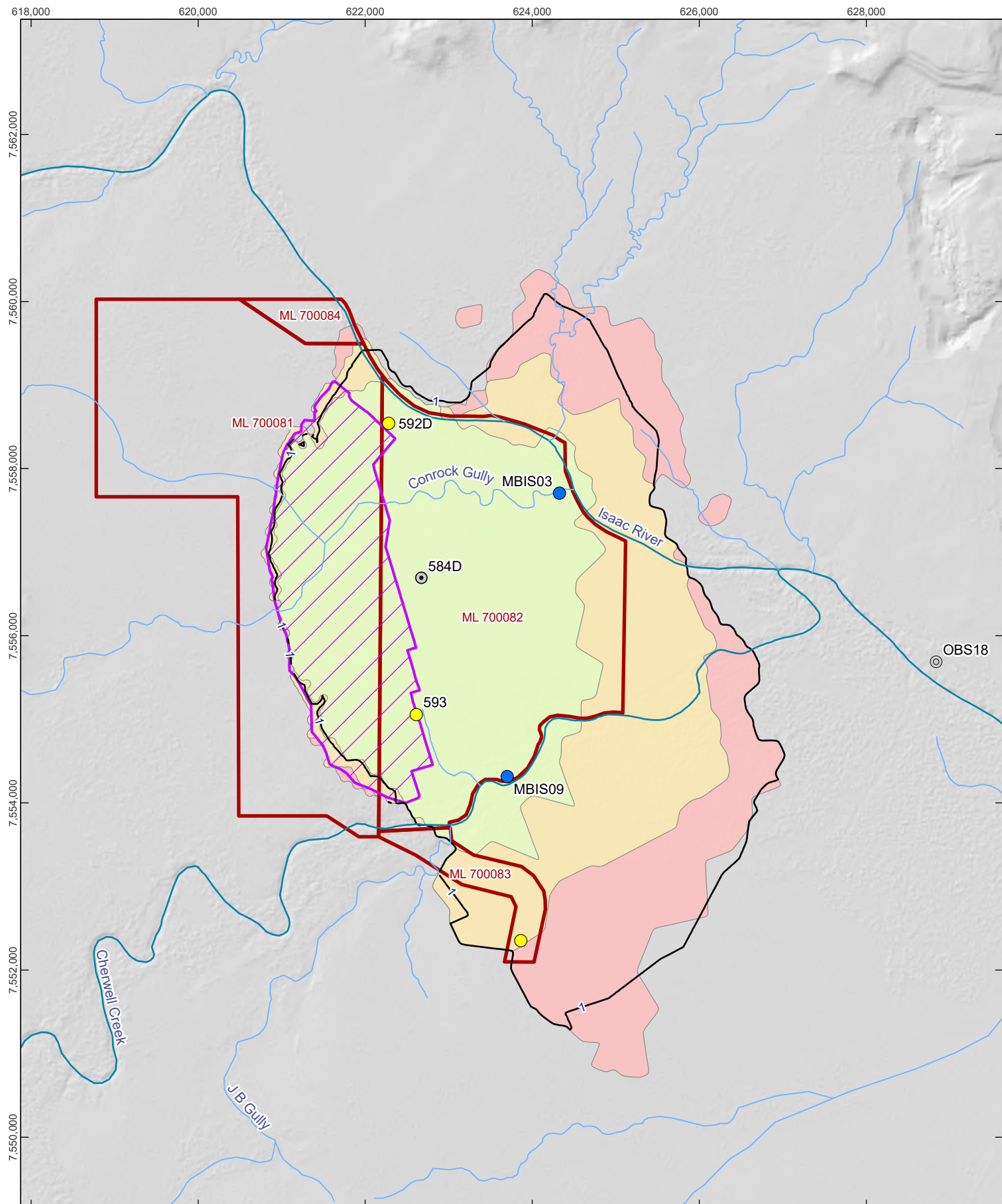
ISAAC DOWNS EXTENSION PROJECT

LEICHHARDT COAL SEAM BORES AND 1 M DRAWDOWN UNCERTAINTY (LEICHHARDT COAL SEAM)



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FIGURE 5-3



Coordinate System: GDA2020 MGA Zone 55

Scale: 1:60,000 at A4

Project Number: 620.041537

Date Drawn: 06-May-2026

Drawn by: RB

LEGEND

- Major Watercourse
- Minor Watercourse
- MLE
- Pit Extent
- IDE Project MLAs

Monitoring Bore

- IDE, Compliance
- IDE, Interpretation
- IDM, not included
- ⊙ PTM, not included

Maximum Drawdown (m)

- 5th Percentile
- 50th Percentile
- 95th Percentile

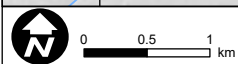
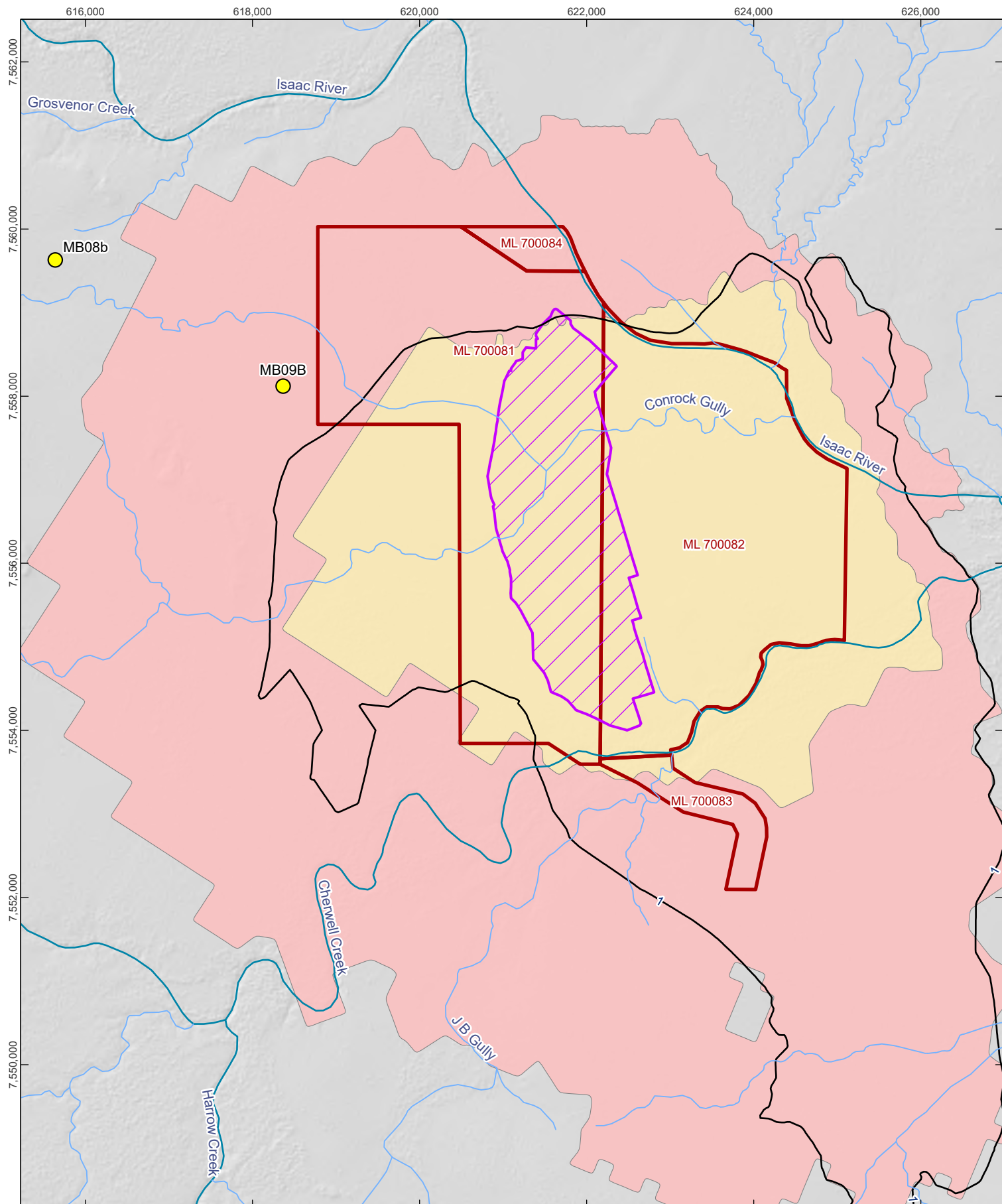
ISAAC DOWNS EXTENSION PROJECT

VERMONT COAL SEAM BORES AND 1 M DRAWDOWN UNCERTAINTY (VERMONT COAL SEAM)



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FIGURE 5-4



Coordinate System: GDA2020 MGA Zone 55
 Scale: 1:60,000 at A4
 Project Number: 620.041537
 Date Drawn: 14-May-2026
 Drawn by: RB

LEGEND

- Major Watercourse
- Minor Watercourse
- MLE
- ▭ Pit Extent
- ▭ IDE Project MLAs
- Monitoring Bore
- IDE, Interpretation

Maximum Drawdown (m)

- 5th Percentile
- 50th Percentile
- 95th Percentile

ISAAC DOWNS EXTENSION PROJECT

FORT COOPER COAL SEAM BORES AND 1 M DRAWDOWN UNCERTAINTY (FORT COOPER COAL SEAM)



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FIGURE 5-5

5.3 Monitoring Regime – Baseline and During Mining

Routine monitoring prior to the commencement of the mining operation (i.e. baseline period) will provide for continued assessment and characterisation of the pre-mining groundwater system, including quantification of natural variability. Continuing to capture data to quantify natural variability is important on the context of allowing the Project to distinguish any future mining related impacts from inherent natural variability or variability from other mining operations, later during the Project's operational and rehabilitation phases. The baseline monitoring program will continue until monitoring during the active mining phase commences.

Routine monitoring during the mining operation will provide early warning of any variation in response of the groundwater system to that predicted. This will enable the Project proponent to undertake mitigation measures, as required, to minimise any potential groundwater related impacts, such as to surrounding groundwater users and the environment, e.g. through the implementation of make-good measures.

5.3.1 Groundwater Levels

5.3.1.1 Manual Measurements

Groundwater level monitoring will be undertaken as follows:

- On a quarterly basis for compliance bores where Groundwater Level Trigger Thresholds and Level Reference Values have been established.
- On a quarterly basis for interpretation bores.

5.3.1.2 Data Loggers

Groundwater levels will be monitored using automated water-level loggers installed in each of the GMMP monitoring bores (**Table 5-1**). The current installation status of data loggers across the monitoring network is summarised in **Table 5-2**. Where bores are currently recorded as dry, loggers will remain installed to enable groundwater level measurements should saturation occur in the future. Routine resetting of loggers in dry bores during quarterly monitoring events will be undertaken to minimise the potential for instrument drift under dry conditions.

Automated loggers will be programmed to record groundwater levels at daily intervals. A dedicated barometric pressure logger is installed in bore MBIS11, and barometric pressure data will be applied to correct groundwater level records prior to analysis.

Data downloads will occur at a minimum frequency of once every three months. During each download event, a manual groundwater level reading will be collected at all accessible bores using a calibrated electronic water-level meter to verify the accuracy of the automated measurements. Any discrepancies identified between logger data and manual measurements will be promptly investigated, and data loggers will be reset or replaced as required to ensure the ongoing reliability of groundwater level data. Where bores remain dry, loggers will be reset during each monitoring event to reduce the risk of measurement drift.



Table 5-2 GMMP Bore Data Logger Status

Bore	Aquifer	Status	Bore Type	Logger installed?
MBIS01	Alluvium	Active	Interpretation	Y
MBIS14	Alluvium	Active	Interpretation	Y
MBID23	Alluvium	Active	Compliance	Y
MBID28	Alluvium	Active	Compliance	Y
MBIS04	Alluvium	Active	Compliance	Y
MBIS07	Alluvium	Active	Compliance	Y
MBIS12	Alluvium	Active	Interpretation	Y
MBID05	Alluvium	Active	Interpretation	N
MBID08	Alluvium	Active	Interpretation	N
MBIS20	Regolith	Active	Compliance	Y
MBIS06	Regolith	Active	Interpretation	Y
MBIS17	Regolith	Active	Interpretation	Y
MB06	Regolith	Active	Interpretation	Y
MB09C	Regolith	Active	Interpretation	Y
MBID22	Regolith	Active	Interpretation	Y
RN182851	Regolith	Active	Compliance	Y
MBIS10	Regolith	Active	Compliance	Y
MBIS02	Leichhardt coal seam	Active	Compliance	Y
MBIS05	Leichhardt coal seam	Active	Compliance	Y
MBIS08	Leichhardt coal seam	Active	Compliance	Y
MBIS11	Leichhardt coal seam	Active	Compliance	Y / Baro logger
MBIS13	Leichhardt coal seam	Active	Compliance	Y
MBIS15	Leichhardt coal seam	Active	Compliance	Y
MBIS18	Leichhardt coal seam	Active	Interpretation	Y
MBIS03	Vermont coal seam	Active	Compliance	Y
MBIS09	Vermont coal seam	Active	Compliance	Y
MBIS16	Vermont coal seam	Active	Interpretation	Y
MBIS19	Isaac Thrust Fault core (RCM)	Active	Interpretation	Y
MB08b	Fort Cooper Coal Measures	Active	Interpretation	Y
MB09B	Fort Cooper Coal Measures	Active	Interpretation	Y



5.3.2 Groundwater Quality

5.3.2.1 Overview

Groundwater quality sampling will be undertaken as follows:

- On a quarterly basis for compliance bores where Groundwater Quality Limits have been established.
- On a quarterly basis for interpretation bores.
- On a bi-monthly (every 2 months) basis for compliance bores where Groundwater Quality Limits are not yet defined, until such time as they are established, or it's determined that a bore is permanently dry.

5.3.2.2 Parameter Suite

The groundwater quality parameter suite identified in **Table 5-3** has been selected to detect the potential changes in groundwater quality outlined in **Section 4.3**.

The following parameters will be monitored as part of the GDEMMP (Watermark Eco, 2026b) at bores relevant to the GDEMMP for the context of vegetation health

- Salinity
- Dissolved oxygen
- pH
- Nitrogen
- Phosphorous
- Organic Carbon

Table 5-3 Proposed Groundwater Quality Parameters to be Monitored

Parameter to be monitored	Justification
Physiochemical parameters	
pH	Standard parameter, identified in DEHP (2011) and ANZG (2018) for the relevant EV's
EC	Standard parameter, identified in DEHP (2011)
TDS	Standard parameter, identified in ANZG (2018) for the stock watering (cattle) EV.
Metal and metalloids (Dissolved)	
Aluminium	Identified in ANZG (2018) for the relevant EV's
Arsenic	Identified in ANZG (2018) for the relevant EV's
Boron	Identified in ANZG (2018) for the irrigation EV
Cadmium	Identified in ANZG (2018) for the relevant EV's
Chromium	Identified in ANZG (2018) for the relevant EV's
Cobalt	Identified in ANZG (2018) for the irrigation EV
Copper	Identified in DEHP (2011) and in ANZG (2018) for the relevant EV's
Iron	Identified in DEHP (2011)
Lead	Identified in ANZG (2018) for the relevant EV's



Parameter to be monitored	Justification
Manganese	Identified in DEHP (2011) and in ANZG (2018) for the relevant EV's
Mercury	Identified in ANZG (2018) for the relevant EV's
Molybdenum	Identified in ANZG (2018) for irrigation EV
Nickel	Identified in ANZG (2018) for the relevant EV's
Uranium	Identified in ANZG (2018) for the relevant EV's
Silver	Identified in ANZG (2018) for the relevant EV's
Zinc	Identified in DEHP (2011) and in ANZG (2018) for the relevant EV's
Major Ions	
Sulphate	Identified in DEHP (2011) and in ANZG (2018) for stock watering (cattle) EV
Calcium	Identified in DEHP (2011) and in ANZG (2018) for stock watering (cattle) EV
Magnesium	Identified in DEHP (2011) and in ANZG (2018) for stock watering (cattle) EV
Potassium	To be monitored for interpretative purposes only, not identified in any relevant guideline for the relevant EV's
Carbonate	To be monitored for interpretative purposes only, not identified in any relevant guideline for the relevant EV's
Bicarbonate	To be monitored for interpretative purposes only, not identified in any relevant guideline for the relevant EV's
Sodium	Identified in DEHP (2011) and in ANZG (2018) for stock watering (cattle) EV
Chloride	Identified in DEHP (2011) and in ANZG (2018) for stock watering (cattle) EV
Non-Metallic Elements	
Nitrate	Identified in DEHP (2011)

5.4 Monitoring Regime – Post-Mining

The GMMP groundwater monitoring program will continue unchanged during the post-mining period until relinquishment of the EA and MLs, except where additional requirements are identified through implementation of the PRCP. As part of the post-mining phase, the monitoring program will also include additional monitoring for the void lake as follows:

- Void Water Level - Quarterly survey consistent with the frequency of groundwater level monitoring at groundwater bores.
- Void Water Quality – Quarterly sampling consistent with the frequency and parameter suite (**Section 5.3.2.2**) for groundwater quality monitoring at groundwater bores.

The GMMP will remain in effect throughout the post-mining period and until ML relinquishment is achieved, in accordance with relevant State regulatory approvals and statutory requirements. This will include demonstrating that risks to groundwater associated with the final landform have been appropriately managed and mitigated.

The PRCP will be developed and implemented in accordance with regulatory requirements and will further refine post-mining monitoring and performance criteria as rehabilitation progresses; however, the GMMP groundwater monitoring program will continue unchanged in the post-mining period unless otherwise required through the PRCP process.



6.0 Quality Assurance / Quality Control

The QA/QC procedures that will be adopted for the Project are detailed in the following sections.

6.1 Field Procedures

Field procedures are detailed in **Sections 6.1.1 to 6.1.6** and have been developed to be meeting the requirements with the following guidelines:

- Groundwater Sampling and Analysis—A Field Guide (Geoscience Australia, 2025);
- DES (2018). Monitoring and Sampling Manual: Environmental Protection (Water) Policy. Brisbane: Department of Environment and Science Government.
- Australian and New Zealand Standard AS/NZS 5667.1:1998 (R2016) Water quality - Sampling - Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples (AS/NZS5667).

6.1.1 Qualified Personnel

Groundwater monitoring will be undertaken by appropriately qualified personnel with experience in conducting groundwater monitoring and sampling programs in accordance with the above-mentioned guidelines.

6.1.2 Equipment Calibration

All field equipment will be maintained according to the accordance with the manufacturer's recommendations.

The field water quality meter used during the program implementation will be calibrated to the relevant calibration standard solutions daily, and prior to each day's work. Daily calibration records will be noted in a dedicated register and provided with the monitoring event report (see **Section 6.1.6**) for record keeping purposes.

6.1.3 Equipment Decontamination

All field equipment used in the execution of the GMMP monitoring program will be thoroughly decontaminated before and after conducting any field measurements and sampling at each bore. This decontamination process includes the water level dip meter probe and tape, field water quality meter, and water quality sample pumps and tubing.

6.1.4 Groundwater Level Measurement Procedure

Manual groundwater level measurements will be collected by appropriately qualified personnel using an industry standard groundwater level e-tape prior to any disturbance for groundwater quality sample collection at any bore. The e-tape will be checked for operational readiness before each use, including a test of the probe function prior to use in the field. Measurements of the groundwater level will be taken from the top of the PVC casing at each bore.

6.1.5 Groundwater Quality Sampling Procedures

Groundwater quality sampling must be performed by suitably qualified personnel. Groundwater quality sampling procedures have been developed in accordance with the guidelines listed in **Section 6.1** and are detailed in the below sections.



6.1.5.1 Bore Purging Procedures

In accordance with the above listed guidelines, appropriate groundwater sampling procedures require that stagnant water that has been standing in the bore casing be purged prior to collection of a groundwater sample, so that sample is representative of the groundwater within the aquifer screened by the bore. The following purge methods will be adopted depending on which is more appropriate depending on the characteristics of each bore being sampled (e.g. bore depth, water column height, and rate of inflow to the bore):

- Three bore volumes/parameter stabilisation via a conventional submersible purge pump; or
- Low-flow sampling using specialised low-flow sampling equipment.

6.1.5.2 Field Water Quality Readings

Recording of field water quality parameters will be undertaken using appropriate field water quality equipment, after bore purging is confirmed to be satisfactorily complete with parameter stabilisation confirmed. The equipment will be calibrated prior to use as outlined in **Section 6.1.2**.

6.1.5.3 General Sample Collection Procedures

Following confirmation of field parameter stabilisation identifying representative aquifer water is being produced from the bore, groundwater samples will be collected from each bore in the monitoring program. Groundwater samples will be collected as follows.

- Only collected once parameter stabilisation has been confirmed.
- Collected in accordance with the relevant guidelines.
- Placed into the appropriate laboratory supplied bottles containing any appropriate preservative solutions for the analyte suite to be tested.
- Clearly labelled with the Bore identification (ID), sampling date/time and field personnel initials.
- Field filtered to 0.45 µm where relevant for particular bottles/analytes (e.g. dissolved metals).
- Placed onto ice in a cooler box with ice immediately after sampling for transfer to the analytical laboratory.
- Following sampling, all equipment will be cleaned and decontaminated in preparation for moving to the next bore.

Sample transfer will occur under industry standard Chain of Custody (CoC) protocols/documentation and within the relevant holding times for each parameter. Copies of each CoC form will be taken in the field prior to shipping the samples and the CoC forms will be included with the monitoring data (see **Section 6.1.6**) for record keeping purposes.

6.1.5.4 Quality Control Samples

The DES Monitoring and Sampling Manual (DES, 2018) provides guidance on the types of quality control measures and the frequency of collection of quality control samples. The types and quantities of quality control samples that will be taken are explained in the below text.



Sample Duplicates

Duplicate samples are used to check and provide consistency in laboratory analytical processes. Duplicate samples involve the collection of a second set of samples from a bore in an identical manner to the primary samples. The duplicate samples will be tested for the same analytical suite as the primary samples. Additionally, duplicate samples will be collected as “blind duplicates”, where an alternate naming convention is adopted for the duplicates so that the analytical laboratory cannot match a duplicate sample to its relevant primary sample. The blind duplicate sample will be clearly matched to its relevant primary sample in the field documentation (see **Section 6.1.6**).

One duplicate sample will be collected for every 10 primary samples per monitoring event (or one per program when there are less than 20 samples).

Sample Blanks

Blank samples are used to identify if any possible sample contamination has occurred during the sample collection and storage/shipping process. Blank samples will be tested for the same analytical suite as the primary samples. Two types of sample blanks will be adopted in the program:

- Field blank.
 - Deionised water is placed into sample containers whilst in the field and stored/transported to the analytical laboratory in the same manner as the primary samples. The container blank testing is used to identify if any contamination of samples may have occurred as a result of the sample collection process or use of non-sterile sample containers.

One field blank will be collected per monitoring event.

- Rinsate / Equipment Blank
 - Following field equipment cleaning/decontamination in the field, deionised water is poured over and through the field equipment and then placed into sample containers and stored/transported to the analytical laboratory in the same manner as the primary samples. The equipment blank testing is used to identify if any contamination of samples may have occurred because of insufficient equipment cleaning/decontamination processes.

One Rinsate / Equipment blank will be collected per monitoring event.

6.1.5.5 Field Sheet Documentation

Project personnel will compile all field documentation at the conclusion of each monitoring event in conjunction with the monitoring data (see **Section 6.1.6**). A Field Sheet (field documentation) will be developed by the field team for use during the monitoring program at each bore being monitored.

The Field Sheet will be used to record the following information:

- The date, time and the monitoring point on which the sample was taken and the results of all monitoring (noting that the resting standing water level measurement will be recorded pre purging/sampling).
- Date and time when purging commenced.
- Details of the purging method including pump/intake depth.
- Records of field water quality parameters during purging at routine time intervals.
- Colour and odour of purged water during purging at routine time intervals.



- Purge time, volume and standing water level during purging at routine time intervals.
- Observations of any degassing of water during purging.
- Sample collection date, time and ID, including the ID of any QA/QC (e.g. duplicate) samples taken.
- A daily calibration record for the field water quality meter.
- Any notes relating to condition of the bore e.g. headworks and general surrounding area.

A daily report will be emailed to the Project's environment team manager containing:

- The field sheet information as above;
- A completed CoC record for samples;
- A digital photographic record for each bore, clearly labelled with the bore ID, showing condition of the headworks and the general area.

6.1.6 Factual Field Work Reporting

Following each monitoring event, all factual data will be prepared for record keeping purposes.

This will contain the following information:

- Summary details regarding the dates of the field program covered by the report.
- Identification of staff who undertook the program and their relevant qualifications.
- Details of any monitoring restrictions encountered during the program.
- A summary table of measured standing water levels.
- A summary table of final field groundwater quality measurements.
- A summary of the water quality sampling.
- Appendices containing:
 - Laboratory Certificate of Analysis (COA)
 - The daily Calibration Record for the field water quality meter;
 - Copies of the CoC form(s); and

Additionally, electronic appendices will be attached containing:

- The site water quality and level database (excel format); and
- Laboratory water quality analysis data (excel format).

6.1.7 Sample Analysis Quality Assurance and Laboratory Procedures

Groundwater sample analysis will be undertaken by a laboratory accredited by the National Association of Testing Authorities (NATA).

The sample analysis will include duplicates and blanks collected in the field consistent with industry standard QA/QC procedures compliant with the relevant guidelines, as described in **Section 6.1.5.4**.

Additionally, the NATA accredited laboratories will employ as standard practice an internal QA/QC program (intra-lab QC) that will include laboratory control samples, method blanks, matrix spikes, laboratory duplicates and surrogates, at frequencies at or above those recommended in the NEPM (2013) guidelines.



6.1.8 Data Storage, Management and Processing

6.1.8.1 General

As part of the baseline groundwater monitoring program for the Project, the Project will implement data management and reporting practices consistent with anticipated regulatory requirements. The data gathered from the GMMP groundwater monitoring program will be collated into a dedicated electronic database managed by the Project's Environment team. Data will be entered into the database after it is received by the Project's Environment team. The database will be routinely backed up in accordance with electronic information backup procedures.

Subject to approval of the Project's EA and PRCP schedule, the Project will:

- submit groundwater monitoring data required under the approved EA and PRCP schedule, or collected as part of environmental management activities, to the administering authority via WaTERS, in accordance with the relevant approval conditions

Data will be managed and processed in the following steps:

1. Within the dedicated electronic database managed by the Environment team, flags will be implemented to automatically identify data that breaches any of the Groundwater Quality Limits or Groundwater Level Trigger Thresholds established and thus automatically notify the Environment Team personnel to enact the Groundwater Impact Investigation Procedure (see **Section 7.0**), the first step of which is to confirm the data validity.
2. The GMMP Annual Groundwater Monitoring Report (AGMR) (see **Section 8.1**) will include a thorough review of the groundwater monitoring database that will allow identification of any spurious data e.g. through comparison with baseline data and outlier analysis in accordance with the procedures identified in DES (2021).
3. Any formal investigation into the potential for environmental harm enacted as a result of a limit or trigger breach followed by implementation of the Groundwater Impact Investigation Procedure (see **Section 7.0**), will include identification of any spurious data through comparison with baseline data and statistical trend and outlier analysis in accordance with the procedures identified in DES (2021).

Should any of the above result in identification of spurious data, the Environment team will implement an investigation into the source of the data error, including review of the data collection procedures (**Section 6.1**), and where relevant the sample analysis quality assurance and laboratory procedures (**Section 6.1.7**), to identify the source of the error, where possible. Where the error source is conclusively identified, the procedures identified in this GMMP will be updated, if necessary, to mitigate the error reoccurring.



6.1.8.2 Post-Mining

Post-mining groundwater monitoring and record-keeping will be undertaken in a manner consistent with the anticipated requirements of the PRCP schedule.

Following approvals, the Project proponent will retain records relating to rehabilitation and closure activities for a minimum period of five years, or as otherwise required under the approved PRCP schedule, and make such records available to the administering authority upon request. These records are expected to include, but not be limited to:

- rehabilitation activities and outcomes;
- maintenance activities and outcomes;
- monitoring activities and monitoring results;
- designs, drawings, specifications, or similar documentation required under the PRCP schedule; and
- certifications, assessments, investigations, inspections, audits, or similar processes undertaken to demonstrate achievement of rehabilitation milestones and completion criteria.



7.0 Groundwater Impact Criteria, Triggers and Investigation Procedures

7.1.1 Groundwater Level Triggers

The development of Groundwater Level Triggers involves two key components, the calculation of Reference Level values based on statistical analysis of the available groundwater level monitoring dataset (**Appendix A**) and the derivation of Groundwater Level Trigger Thresholds informed by numerical groundwater modelling (SLR, 2026b). These two components are subsequently integrated to determine an effective compliance trigger value, referred to as the Level Trigger Elevation. This value is then assessed against historical groundwater level trends, as outlined in **Appendix B**

- Reference Level
The bore specific groundwater level that all future groundwater level measurements will be compared to for the purpose of calculating actual groundwater drawdown. The Reference Level is derived on the basis of historic groundwater level monitoring data (i.e. 'baseline' data) as outlined in **Section 7.1.1.1 and Appendix A**.
- Level Trigger Threshold
The bore specific maximum groundwater level drawdown in the future that will be allowed under the EA. The Level Trigger Threshold is derived on the basis of predictive groundwater modelling (SLR, 2025b) such that an exceedance of the Level Trigger Threshold represents greater groundwater level impact than predicted by modelling. The proposed Level Trigger Thresholds are derived in **Section 7.1.1.2**.
- Trigger Level Elevation
The proposed Reference Levels and Level Trigger Thresholds presented above have been tested against the historical dataset using the proposed compliance approach and are presented in the time series plots provided in **Appendix B**. For the testing, the effective compliance trigger value is termed the Level Trigger Elevation and is calculated as:

$$\text{Level Trigger Elevation} = \text{Groundwater Reference Level} - \text{Level Trigger Threshold}$$

7.1.1.1 Groundwater Level Reference Values

The time series plots and analysis reveals that groundwater levels are highly variable, primarily driven by natural causes (i.e. climate variability, response to rainfall, etc.). Furthermore, the relatively large range between the maximum and minimum groundwater levels highlights that groundwater level change compliance criteria need to appropriately recognise the significant variability in groundwater levels.

It is therefore proposed to adopt the 20th percentile of the baseline dataset summary statistics as the Reference Level values, similar to the approach proposed within DES (2021) for establishing statistically appropriate groundwater quality triggers. Adoption of the 20th percentile allows consideration of the historic variability in groundwater levels when proposing a bore specific groundwater level that will be compared to model predictions for compliance purposes. Groundwater Level summary statistics including the 20th percentile for each GMMMP monitoring bore are provided in **Appendix A**. The proposed groundwater Reference Level values for the compliance bores are presented in **Table 7-1**



Table 7-1 Groundwater Level Reference Values

Proposed Compliance Bore	Formation monitored	Designation	Reference level (mAHD)
MBID23	Alluvium	Compliance	186.03
MBID28	Alluvium	Compliance	187.27
MBIS04	Alluvium	Compliance	184.89
MBIS07	Alluvium	Compliance	na
MBIS20	Regolith	Compliance	186.56
RN182851	Regolith	Compliance	194.77
MBIS10	Regolith	Compliance	170.44
MBIS02	Leichhardt coal seam	Compliance	186.67
MBIS05	Leichhardt coal seam	Compliance	184.74
MBIS08	Leichhardt coal seam	Compliance	190.35
MBIS11	Leichhardt coal seam	Compliance	185.54
MBIS13	Leichhardt coal seam	Compliance	182.93
MBIS15	Leichhardt coal seam	Compliance	183.02
MBIS03	Vermont coal seam	Compliance	187.18
MBIS09	Vermont coal seam	Compliance	188.73

*MBIS07 has not been given a water level trigger as the water level trigger elevation falls below the screen of the bore. MBIS07 is used for groundwater quality compliance only



7.1.1.2 Groundwater Level Drawdown Triggers (Level Trigger Thresholds)

The predictive results of the Project's numerical groundwater model (SLR, 2026b) have been utilised to develop bore specific groundwater Level Trigger Thresholds for the compliance bores listed in **Table 5-1** Project GMMP Monitoring Network . Level Trigger Thresholds have been based on the following criteria:

- Level Trigger Thresholds are based on the maximum predicted cumulative drawdown for each bore. Drawdown is extracted from the best calibrated model realisation at the bore location within the relevant model layer.
- The trigger level elevation is derived by subtracting the predicted maximum drawdown from the reference level value for the bore.
- Where the proposed Groundwater Level Trigger Threshold would result in a level trigger elevation below the base of the model layer, then the Groundwater Level Trigger Threshold has been limited to drawdown to the base of the model layer.

It should be noted that bore MBIS07 has not been given a water level trigger as the water level trigger elevation falls below the screen of the bore and therefore cannot be measured for the purpose of compliance. MBIS07 is used for groundwater quality compliance only.

The groundwater Level Trigger Thresholds derived using the methodology as above are presented in **Table 7-2**. Note that no Level Trigger Thresholds are provided for GMMP interpretation bores (refer **Table 5-1**), or for dry bores.

The results of the testing in **Appendix B** indicate that the proposed Groundwater Reference Levels and Level Trigger Thresholds are appropriate and represent groundwater levels that if reached in the future, may indicate a greater level of groundwater impact from mining than predicted.

Table 7-2 Groundwater Level Trigger Thresholds

Proposed Compliance Bore	Formation monitored	Designation	Level Trigger Threshold (m)	Level Trigger Threshold Elevation (mAHD)
MBID23	Alluvium	Compliance	1.50 ¹	184.5
MBID28	Alluvium	Compliance	3.47 ¹	183.8
MBIS04	Alluvium	Compliance	4.28 ¹	180.6
MBIS07	Alluvium	Compliance	na	
MBIS20	Regolith	Compliance	7.60 ¹	179.0
RN182851	Regolith	Compliance	13.38	181.4
MBIS10	Regolith	Compliance	9.64	160.8
MBIS02	Leichhardt coal seam	Compliance	25.86	160.8
MBIS05	Leichhardt coal seam	Compliance	15.50	169.2
MBIS08	Leichhardt coal seam	Compliance	10.31	180.0
MBIS11	Leichhardt coal seam	Compliance	13.08	172.5
MBIS13	Leichhardt coal seam	Compliance	12.82	170.1
MBIS15	Leichhardt coal seam	Compliance	3.05	180.0



Proposed Compliance Bore	Formation monitored	Designation	Level Trigger Threshold (m)	Level Trigger Threshold Elevation (mAHD)
MBIS03	Vermont coal seam	Compliance	28.03	159.2
MBIS09	Vermont coal seam	Compliance	13.74	175.0

1. Maximum drawdown limited to base of model layer.

Note: MBIS07 has not been given a water level trigger as the water level trigger elevation falls below the screen of the bore. MBIS07 is used for groundwater quality compliance only

7.1.2 Groundwater Quality Limit Derivation

Groundwater Quality Limits for compliance bores have been established in accordance with the DES (2021) guideline *“Using monitoring data to assess groundwater quality and potential environmental impacts”*.

7.1.2.1 Methodology Overview

The general approach detailed in DES (2021), to use or derive site appropriate groundwater quality limits, is as follows:

- Determine summary statistics (i.e. 20th, 50th, 80th and 95th percentiles) for each bore and each indicator using all available validated data (**Appendix C**).
- Identify relevant default toxicant guidelines and relevant WQOs.
- Determine whether the site-specific groundwater guidelines are more appropriate than existing default guidelines and WQOs through the following:
 - Compare the 20th (for pH lower guideline) and 80th percentile of the dataset to the relevant guidelines. DES (2021) states that where multiple EVs (with associated water quality guidelines) have been identified for an area of interest, groundwater quality should be managed to comply with the most conservative water quality guideline so that the most sensitive EV is protected.
 - Where insufficient data were available to derive a trigger value (e.g. fewer than eight samples or where more than 15% of results were reported at the limit of reporting), the relevant ANZG (2018) guideline value has been adopted as an interim limit.
 - Determine appropriate site-specific limits. The limits are appropriate if they are sufficiently conservative to measure whether an environmental impact could occur, but do not result in false non-compliances.
 - If the 80th percentile aligns closely with the default guideline or WQO, the default guideline or WQO value should be adopted.
 - If the 80th percentile is substantially lower than the default guideline or WQO, a site-specific value may be adopted; however, for toxicants, the default guideline may still apply where it is more conservative.
 - If no default guideline or WQO exists, the 80th percentile may be used as a site-specific guideline, subject to regulatory acceptance.
 - If the 80th percentile exceeds the default guideline, a site-specific value may be adopted where it better reflects local hydrochemical conditions.

Groundwater monitoring for the Project have included all sampling events to the end of 2025, noting that some bores have less than 8 samples. Interim trigger values have



therefore been developed based on consideration of the available data and default guidelines values. Additionally, some bores with fewer than eight data points show two or more exceedances of the ANZG (2018) guideline values, which have been adopted as interim trigger criteria. In these cases, “TBA” has been placed in **Table 7-4** as it is proposed that these trigger values be reassessed once additional data become available to ensure they are representative of meaningful hydrochemical conditions.

The monitoring bore network will continue to be monitored and final ‘limits’/triggers will be developed when a sufficient number of representative samples have been obtained from each site.



7.1.2.2 Proposed Groundwater Analytical Suite

The analytes for which groundwater quality limits have been developed were selected based on the following considerations:

1. Potential impact from the activity: Natural groundwater conditions could potentially be impacted by the alteration of physiochemical parameters or the increase in/introduction of elements as a result of the activity, although this is highly unlikely, and;
2. Their relevance to protect identified Environmental Values (EV): The analyte has been identified as necessary to protect an EV relevant to the Project based on relevant guidelines DEHP (2011) and Water Quality Objectives (WQO) (e.g. ANZECC, 2018).

The proposed quality parameters selected for the IDE groundwater monitoring suite are presented in **Table 7-3** which also indicates which parameters require quality limits to be defined and which are included for Reference only.

7.1.2.3 Proposed Groundwater Quality Limits

Initial proposed parameters for Groundwater Quality Limits are presented in **Table 7-4**. Based on the methodology for developing Groundwater Quality Limits and the statistical data analysis, site specific values have been proposed for some parameters for two bores, MBID23 and MBID28.

This proposed groundwater quality limit is then assessed against historical groundwater quality trends, as shown in **Appendix D**.



Table 7-3 Proposed Parameters for Groundwater Quality Limits

Parameter to be monitored	Limit required	Justification
Physiochemical parameters		
pH	Yes	Standard parameter, identified in DEHP (2011) and ANZG (2018) for the relevant EV's
EC	Yes	Standard parameter, identified in DEHP (2011)
TDS	No	Standard parameter, identified in ANZG (2018) for the stock watering (cattle) EV.
Metal and metalloids (Dissolved)		
Aluminium	Yes	Identified in ANZG (2018) for the relevant EV's
Arsenic	Yes	Identified in ANZG (2018) for the relevant EV's
Boron	Yes	Identified in ANZG (2018) for the irrigation EV
Cadmium	Yes	Identified in ANZG (2018) for the relevant EV's
Chromium	Yes	Identified in ANZG (2018) for the relevant EV's
Cobalt	Yes	Identified in ANZG (2018) for the irrigation EV
Copper	Yes	Identified in DEHP (2011) and in ANZG (2018) for the relevant EV's
Iron	Yes	Identified in DEHP (2011)
Lead	Yes	Identified in ANZG (2018) for the relevant EV's
Manganese	Yes	Identified in DEHP (2011) and in ANZG (2018) for the relevant EV's
Mercury	Yes	Identified in ANZG (2018) for the relevant EV's
Molybdenum	Yes	Identified in ANZG (2018) for irrigation EV
Nickel	Yes	Identified in ANZG (2018) for the relevant EV's
Uranium	Yes	Identified in ANZG (2018) for the relevant EV's
Silver	Yes	Identified in ANZG (2018) for the relevant EV's
Zinc	Yes	Identified in DEHP (2011) and in ANZG (2018) for the relevant EV's
Major Ions		
Sulphate	Yes	Identified in DEHP (2011) and in ANZG (2018) for stock watering (cattle) EV
Calcium	No	Identified in DEHP (2011) and in ANZG (2018) for stock watering (cattle) EV
Magnesium	No	Identified in DEHP (2011) and in ANZG (2018) for stock watering (cattle) EV
Potassium	No	To be monitored for interpretative purposes only, not identified in any relevant guideline for the relevant EV's
Carbonate	No	To be monitored for interpretative purposes only, not identified in any relevant guideline for the relevant EV's
Bicarbonate	No	To be monitored for interpretative purposes only, not identified in any relevant guideline for the relevant EV's
Sodium	No	Identified in DEHP (2011) and in ANZG (2018) for stock watering (cattle) EV
Chloride	No	Identified in DEHP (2011) and in ANZG (2018) for stock watering (cattle) EV
Non-Metallic Elements		
Nitrate	Yes	Identified in DEHP (2011)



Table 7-4 Interim Groundwater Quality Limits for Compliance Bores

Analyte	pH (Field)	EC (Lab)	SO4	NO3	Ag	Al	As	B	Cd	Co	Cu	Cr	Fe	Hg	Mo	Mn	Ni	Pb	U	Zn
Unit	-	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MBID23	6.5 to 8.5 ^a	8910 ^d	318 ^d	3.26 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	0.784 ^e	0.0006 ^a	0.1 ^b	1.788 ^e	0.014 ^a	0.0034 ^a	0.0158 ^e	0.06 ^d
MBID28	6.38 to 6.85 ^e	8910 ^d	318 ^d	3.26 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0062 ^a	0.001 ^a	0.784 ^e	0.0006 ^a	0.1 ^b	1.83 ^e	0.011 ^a	0.0034 ^a	0.004 ^b	0.3214 ^e
MBIS04	6.5 to 8.5 ^a	8910 ^d	318 ^d	3.26 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	TBA	0.0006 ^a	0.1 ^b	TBA	0.011 ^a	0.0034 ^a	0.002 ^b	TBA
MBIS07	6.5 to 8.5 ^a	8910 ^d	318 ^d	3.26 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	0.14 ^d	0.0006 ^a	0.1 ^b	TBA	0.011 ^a	0.0034 ^a	0.002 ^b	0.008 ^c
MBIS20	6.5 to 8.5 ^a	8910 ^d	TBA	3.26 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	TBA	TBA	TBA	TBA	0.14 ^d	0.0006 ^a	0.1 ^b	TBA	0.011 ^a	0.0034 ^a	0.002 ^b	TBA
RN182851	6.5 to 8.5 ^a	16000 ^d	TBA	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	TBA	0.0006 ^a	0.1 ^b	TBA	0.011 ^a	0.0034 ^a	0.002 ^b	TBA
MBIS10	6.5 to 8.5 ^a	16000 ^d	398 ^d	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	0.246 ^d	0.0006 ^a	0.1 ^b	0.291 ^d	0.011 ^a	0.0034 ^a	0.002 ^b	TBA
MBIS02	6.5 to 8.5 ^a	16000 ^d	398 ^d	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	0.246 ^d	0.0006 ^a	0.1 ^b	TBA	0.011 ^a	0.0034 ^a	0.002 ^b	TBA
MBIS05	6.5 to 8.5 ^a	16000 ^d	398 ^d	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	0.246 ^d	0.0006 ^a	0.1 ^b	0.291 ^d	0.011 ^a	0.0034 ^a	TBA	TBA
MBIS08	6.5 to 8.5 ^a	16000 ^d	398 ^d	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	TBA	0.0006 ^a	0.1 ^b	0.291 ^d	0.011 ^a	0.0034 ^a	0.002 ^b	0.008 ^c
MBIS11	6.5 to 8.5 ^a	16000 ^d	398 ^d	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	0.246 ^d	0.0006 ^a	0.1 ^b	0.291 ^d	TBA	0.0034 ^a	0.002 ^b	TBA
MBIS13	6.5 to 8.5 ^a	16000 ^d	398 ^d	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	0.246 ^d	0.0006 ^a	0.1 ^b	0.291 ^d	0.011 ^a	0.0034 ^a	0.002 ^b	TBA
MBIS15	6.5 to 8.5 ^a	TBA	TBA	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	TBA	0.0002 ^a	0.1 ^b	TBA	TBA	TBA	0.0006 ^a	0.1 ^b	0.291 ^d	0.011 ^a	0.0034 ^a	TBA	TBA
MBIS03	6.5 to 8.5 ^a	16000 ^d	398 ^d	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	0.246 ^d	0.0006 ^a	0.1 ^b	0.291 ^d	0.011 ^a	0.0034 ^a	0.002 ^b	0.008 ^c
MBIS09	6.5 to 8.5 ^a	16000 ^d	398 ^d	1.12 ^d	0.05 ^a	0.055 ^a	0.024 ^a	0.5 ^b	0.0002 ^a	0.1 ^b	0.0014 ^a	0.001 ^a	TBA	0.0006 ^a	0.1 ^b	0.291 ^d	0.011 ^a	0.0034 ^a	0.002 ^b	TBA

Note: Dissolved metals

- a. Aquatic Ecosystem (95% Protection) (ANZG, 2018)
- b. Irrigation (Fitzroy Basin WQO)
- c. Stock (Fitzroy basin WQO)
- d. Lower Isaac River (zone 34) (DEHP, 2011)
- e. Site specific 80th percentile values.



7.1.3 Groundwater Exceedance Criteria and Investigation Procedure

Groundwater monitoring results are assessed against Project-specific groundwater quality limits and groundwater level trigger thresholds established for the monitoring network. These criteria have been developed to support interpretation of monitoring data and to identify results that may warrant further review or investigation. These criteria are expected to inform the Project-specific EA and PRCP schedule conditions.

A groundwater quality trigger exceedance is identified where a bore-specific groundwater quality limit is exceeded on three consecutive sampling occasions. A groundwater level trigger exceedance is identified where measured groundwater levels indicate drawdown greater than the established trigger threshold when compared to the reference level for a bore.

Where a trigger exceedance is identified, results will be reviewed to confirm validity, which may include data checks and/or resampling. Confirmed exceedances will be investigated to determine whether they are attributable to site activities, natural variation, or external influences such as neighbouring land use. Investigations will consider relevant monitoring data, groundwater flow conditions, baseline information, site activities, natural conditions, and bore integrity, and will be informed by recognised guidance, including ANZG (2018) and ARMCANZ (2000). Findings will be documented and used to inform ongoing groundwater management where required.

Further discussion on impact mitigation is provided in **Section 7.2**.

7.2 Mitigation

7.2.1 General

Where it is identified that there is potential for environmental harm in any investigation undertaken following a breach of the Groundwater Quality Limits or Level Trigger Thresholds as outlined in **Section 7.1.3** above, an action plan to mitigate potential environmental harm will be developed by a suitably qualified person.

The selection of the most effective mitigation measures will be based on providing the best outcome for protection of the affected groundwater resource and/or user as determined by the investigation into the potential for environmental harm. The selection of the most effective mitigation measures therefore will only be possible following the completion of the investigation into the potential for environmental harm. The GDEMMP (Watermark Eco 2026b) will guide any assessments, investigations or corrective actions for potential impacts to TGDEs.



7.2.2 Impacts to Third Party Groundwater Users

In the event that a formal groundwater investigation conclusively identifies that Project operations have adversely impacted a neighbouring groundwater bore user (affected groundwater user), the Project will attempt in 'good faith' to negotiate suitable mitigation measures in a timely manner to rectify the identified groundwater impact in accordance with the proponent's obligations under the *Water Act 2000*. The Project will involve an appropriately qualified environmental specialist to assist with development of the mitigation measures. The development of suitable mitigation measures will be based on the outcomes of an appropriate scientific investigation.

Possible third party bore impact mitigation measures that may be applied by the Project include:

- The refurbishment of an existing groundwater bore;
- The installation of a new groundwater bore;
- The establishment of an alternative water supply arrangement; and/or
- The use of another mutually agreed form of mitigation.

The Project will ensure as a minimum that the proposed mitigation measures are acceptable to the affected groundwater user, and if acceptable, will enter into a legal agreement for the installation of the proposed mitigation measures. The Project will also ensure the proposed mitigation measures are commensurate with the identified groundwater loss. The Project may be required to install interim mitigation measures until the permanent mitigation measures have been developed and installed. As required, the Project will seek agreement with the affected groundwater user for the use of any interim mitigation measures. If agreement cannot be reached with the affected groundwater user in relation to the proposed mitigation measures, the Project will facilitate some form of legal disputes resolution for the matter.



8.0 Reporting, Review and Improvement Process

During the life of Project operations, data collected through the GMMP will be used to assess the Project's actual impact on groundwater resources, and if deemed necessary update and refine the numerical groundwater model and its predictions of future impacts. These outcomes will in turn be used to review and improve this GMMP through a continual Reporting, Review and Improvement process as described herein.

8.1 Annual Groundwater Monitoring Reports

The Project proponent will undertake an annual review of groundwater monitoring data collected under the groundwater monitoring program to assess background groundwater conditions and support ongoing refinement of the conceptual groundwater model. The findings of each annual review will be documented in an AGMR prepared for the baseline phase of the Project.

The AGMR will include, but not be limited to, the following:

- a review of updated groundwater level and groundwater quality data, including identification of any anomalous values through comparison with baseline conditions and outlier assessment consistent with DES (2021) procedures;
- standing water levels measured in all groundwater monitoring bores listed in **Table 5-3**;
- groundwater quality results for all groundwater monitoring bores listed in **Table 5-3**;
- an assessment of temporal groundwater quality and groundwater level trends across the monitoring network;
- a comparison of groundwater quality results against the baseline trigger levels presented in **Table 7-2**;
- a review of the conceptual groundwater model, including documentation of any updates informed by baseline monitoring data; and
- provision of raw groundwater monitoring data in an appropriate digital format to support regulatory review, modelling updates, and future reporting requirements.

AGMR's will be prepared annually during the pre-mining phase to document groundwater conditions prior to disturbance. Following approval of the Project's EA and PRCP schedule, the scope, timing, and reporting requirements for AGMR's will be updated as necessary to ensure compliance with the conditions of those approvals, including any requirements relating to water year reporting, impact assessment, and public data availability.



8.2 Groundwater Monitoring and Management Program Review

This GMMP has been developed to include a structured review and improvement process consistent with anticipated regulatory requirements. The review process is intended to ensure that the GMMP remains fit for purpose throughout the Project lifecycle, from baseline monitoring through to operations and closure.

The GMMP will be reviewed periodically, with formal reviews undertaken as part of the preparation of AGMR's. Reviews will be informed by updates to the conceptual and numerical groundwater models, analysis of monitoring data, and any changes to the Project design, mine sequencing, or hydrogeological understanding.

As required, the GMMP may be modified to reflect updated conditions or improved knowledge. Potential outcomes of the review process may include, but are not limited to:

- revision of assessment conclusions where updated numerical groundwater modelling is available;
- amendment of monitoring parameters, monitoring locations, or monitoring frequency; and
- expansion or refinement of the groundwater monitoring network to support ongoing assessment of potential groundwater impacts.

Where a review identifies the need for amendments to the GMMP, the review will be undertaken by an appropriately qualified person and documented accordingly. Any revised versions of the GMMP will be prepared to support future regulatory approvals and to align with conditions imposed under the approved EA and PRCP schedule once granted.

A GMMP review may include:

- an assessment of program performance against the objectives of the GMMP and the baseline groundwater monitoring objectives;
- an evaluation of the adequacy of monitoring locations, monitoring frequency, and groundwater quality trigger levels in the context of updated groundwater impact predictions; and
- a review of the suitability of the groundwater monitoring program to support impact assessment during operations and the post-closure period.

Where significant changes to the GMMP are proposed, consultation with the relevant administering authorities will be undertaken at the appropriate stage of the approvals process. Updated versions of the GMMP will be issued as required to reflect agreed changes and to ensure alignment with the EA and PRCP schedule.

This GMMP is also intended to support approvals required under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in relation to potential groundwater-related impacts associated with the Project.



8.3 Monitoring Network Maintenance

Over the life of the Project, including any post-closure monitoring period, it is anticipated that some groundwater monitoring bores may become unserviceable and require maintenance, replacement, or decommissioning. The Project will proactively manage and maintain the groundwater monitoring network to ensure its ongoing suitability and effectiveness. This will include replacing monitoring bores where required and using the periodic review of monitoring data to inform the need for, and placement of, additional monitoring bores if data gaps or new monitoring requirements are identified.

The construction, maintenance and management of groundwater monitoring bores have been designed to align with anticipated regulatory requirements and recognised best practice. All bore-related activities will be undertaken in a manner that avoids or minimises potential impacts to the environment and maintains the integrity of groundwater monitoring infrastructure to ensure the collection of reliable and representative data.

Where replacement of existing monitoring bores or installation of additional monitoring bores is required to supplement the monitoring network, the proponent will implement appropriate environmental management measures to avoid or minimise impacts to environmental values. Bore construction and installation activities will be undertaken in accordance with the following principles:

- bore installation and associated works will be undertaken under the supervision of a suitably qualified and experienced person with expertise in hydrogeology and groundwater monitoring program design, capable of providing appropriate technical oversight and recommendations; and
- groundwater monitoring bores will be constructed in accordance with the methods and standards prescribed in the latest edition of the *Minimum Construction Requirements for Water Bores in Australia* and undertaken by appropriately qualified and licensed water bore drillers.

Following approval of the Project's EA and PRCP schedule, and any associated groundwater approvals, monitoring network maintenance requirements and environmental management controls will be updated as necessary to ensure ongoing compliance with applicable approval conditions.



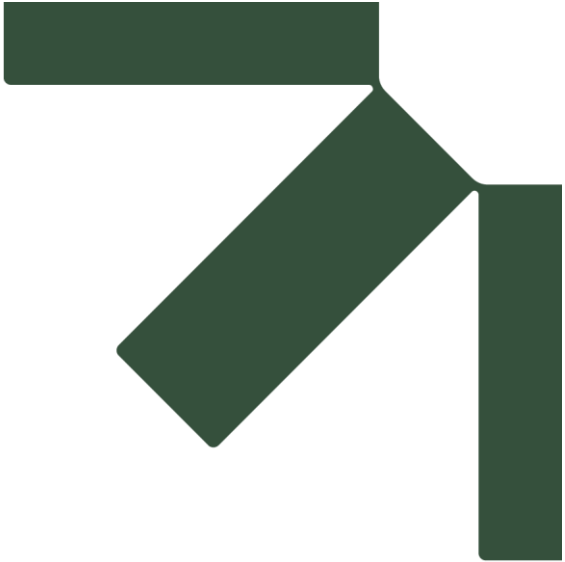
9.0 References

- 3D Environmental, 2020. Isaac Downs Project Groundwater Dependent Ecosystem Assessment. Report prepared for Stanmore IP South Pty Ltd
- 3D Environmental, 2024. Poitrel Mine Groundwater Dependent Ecosystem Risk Assessment for the High Wall Mining Project. Report prepared for Poitrel / Stanmore Limited
- Australian and New Zealand Environment and Conservation Council (ANZECC) & Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ). 2000a. Australian Guidelines for Water Quality Monitoring and Reporting. Volume 1. The guidelines. Canberra, Australia.
- Australian and New Zealand Environment and Conservation Council (ANZECC) & Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ). 2000b. Australian Guidelines for Water Quality Monitoring and Reporting. Volume 3. Primary Industries. Canberra, Australia.
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG), 2018. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines
- Barnett, B., Townley, L.R., Post, V., Evans, R.E., Hunt, R.J., Peters, L., Richardson, S., Werner, A.D., Knapton, A. and Boronkay, A. (2012). Australian Groundwater Modelling Guidelines. Waterlines Report Series No. 82, June 2012.
- Bureau of Meteorology (BoM), 2017. Groundwater Dependent Ecosystems Atlas. Available at: <http://www.bom.gov.au/water/groundwater/gde/map.shtml>
- Bureau of Meteorology (BoM), 2019. National Groundwater Information System. Available at: <http://www.bom.gov.au/water/groundwater/ngis/>
- Bureau of Meteorology (BoM). 2023. Climate Data Online. Available at: <http://www.bom.gov.au/climate/data/index.shtml>
- Department of Environment and Heritage Protection (DEHP), 2011. Environmental Protection (Water) Policy 2009 Isaac River Sub-basin Environmental Values and Water Quality Objectives Basin No. 130 (part), including all waters of the Isaac River Sub-basin (including Connors River) September 2011
- Department of Environment and Science (DES). 2021. Using Monitoring Data to Assess Groundwater Quality and Potential Environmental Impacts. Version 2. Department of Environment and Science (DES), Queensland Government, Brisbane.
- Department of Environment, Tourism, Science and Innovation (DETSI). 2025. Terms of Reference for an Environmental Impact Statement under the Environmental Protection Act 1994: Isaac Downs Extension Project, prepared for Stanmore ID Extension Pty Ltd, Queensland Government, December 2025.
- Hydrobalance (2026). Surface Water Impact Assessment. Prepared for Stanmore Resources Limited by Hydrobalance.
- MES, 2025. Isaac Downs Extension Electrical Resistivity Survey. Prepared for Stanmore Resources Limited by Marine & Earth Sciences Pty Ltd.



- McDonald, M. G., & Harbaugh, A. W. (1988). A modular three-dimensional finite-difference ground-water flow model. U.S. Geological Survey. Techniques of Water-Resources Investigations, Book 6, Chapter A1. <https://doi.org/10.3133/ofr83875>
- MDBC (Middlemis, H., Merrick, N., and Ross, J.) (2001). Murray-Darling Basin Commission – Groundwater Flow Modelling Guideline. Report for MDBC. January 2001.
- MES, 2025. Isaac Downs Extension Electrical Resistivity Survey. Prepared for Stanmore Resources Limited by Marine & Earth Sciences Pty Ltd.
- Peeters, L. J. M., & Middlemis, H. (2023). Information guidelines explanatory note: Uncertainty analysis for groundwater modelling. Independent Expert Scientific Committee, Commonwealth of Australia. <https://www.iesc.gov.au/sites/default/files/2022-07/information-guidelines-explanatory-note-uncertainty-analysis.pdf>
- SLR, 2024a, Poitrel Mine Progressive Rehabilitation and Closure Plan Groundwater Assessment. Report prepared for Stanmore Resources. Ref: 620.31445.00000-R01
- SLR, 2024b. Bore Census Factual Field Report and Recommendations. Prepared for Stanmore Resources Limited by SLR Consulting Australia Pty Ltd.
- SLR, 2024c. Groundwater Gap Analysis & Field Program Recommendations Prepared for Stanmore Resources Limited by SLR Consulting Australia Pty Ltd.
- SLR, 2026a. Groundwater Impact Assessment. Prepared for Stanmore Resources Limited by SLR Consulting Australia Pty Ltd.
- SLR, 2026b. Groundwater Modelling Calibration and Prediction Report. Prepared for Stanmore Resources Limited by SLR Consulting Australia Pty Ltd.
- SLR, 2026c. Central Bowen Basin Regional Groundwater Model Version 6.0. Groundwater Model Update Technical Report. Report prepared for Stanmore ID Extension Pty Ltd, Ref 620.041537.00006.
- SLR, 2026d. Factual Field Investigation Report. Prepared for Stanmore Resources Limited by SLR Consulting Australia Pty Ltd.
- RGS (2026). Pit Lake Hydrogeochemical Modelling. Prepared for Stanmore Resources Limited by RGS Environmental Consultants Pty Ltd.
- Watermark Eco, 2026a. Groundwater Dependent Ecosystem Assessment – Isaac Downs Extension. Prepared for Stanmore Resources Limited by Watermark Eco Pty Ltd.
- Watermark Eco, 2026b. Groundwater Dependent Ecosystem Monitoring and Management Plan – Isaac Downs Extension. Prepared for Stanmore Resources Limited by Watermark Eco Pty Ltd.
- Wilkins, A., Crosbie, R., Louth-Robins, T., Davies, P., Raiber, M., Dawes, W. and Gao, L., Year. Australian gridded chloride deposition-rate dataset. Data in Brief, 42(June 2022). <https://doi.org/10.1016/j.dib.2022.108189>





Appendix A Groundwater Level Summary Statistics

Isaac Downs Extension

Groundwater Monitoring and Management Plan

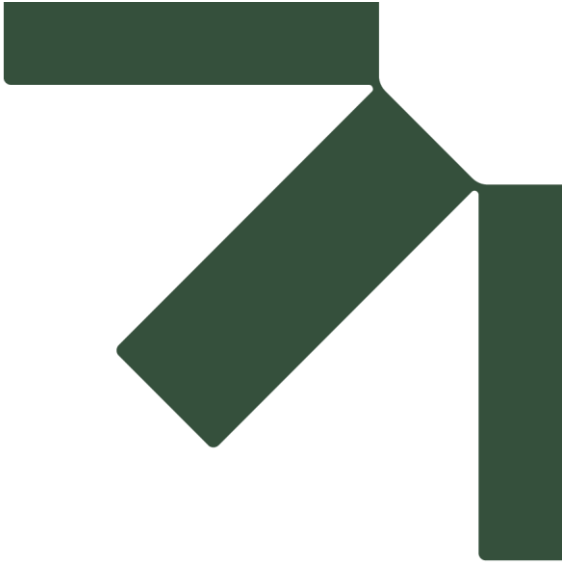
Stanmore ID Extension Pty Ltd

SLR Project No.: 620.041537.00001

28 May 2026

Bores	Monitoring Unit	Proposed GMMP Bore	Total Number	from	to	Min	5th %ile	20th %ile	Median	80th %ile	95th %ile	Max	Tau	2-sided-p	Trend
MBID23	Alluvium	Compliance	26	01-05-21	31-10-25	185.67	185.95	186.03	187.27	188.67	189.58	189.74	0.53	0.0001	Yes-Upward
MBID28	Alluvium	Compliance	28	01-05-21	31-10-25	186.74	187.07	187.27	187.51	188.16	188.68	189.15	0.23	0.09	No
MBIS04	Alluvium	Compliance	5	24-05-25	30-10-25	184.75	184.78	184.89	184.96	184.99	185.05	185.07	-0.20	0.81	No
MBIS07	Alluvium	Compliance	5	15-06-25	30-10-25	188.97	189.12	189.55	189.90	190.13	190.48	190.59	-1.00	0.03	Yes-Downward
MBIS20	Regolith	Compliance	2	07-08-25	31-08-25	186.55	186.55	186.56	186.58	186.60	186.61	186.61	na	na	na
RN182851	Regolith	Compliance	7	27-11-24	30-10-25	194.31	194.44	194.77	194.94	195.16	195.25	195.27	-0.14	0.76	No
MBIS10	Regolith	Compliance	8	11-12-24	30-10-25	170.02	170.15	170.44	170.80	170.97	170.98	170.98	0.07	0.90	No
MBIS02	Leichhardt coal seam	Compliance	4	03-07-25	01-11-25	186.65	186.66	186.67	186.72	186.75	186.76	186.76	-1.00	0.09	No
MBIS05	Leichhardt coal seam	Compliance	5	24-05-25	01-11-25	184.73	184.73	184.74	184.75	184.92	185.37	185.52	0.40	0.46	No
MBIS08	Leichhardt coal seam	Compliance	9	27-11-24	30-10-25	189.68	189.88	190.35	190.75	190.94	191.40	191.68	-0.20	0.53	No
MBIS11	Leichhardt coal seam	Compliance	3	30-07-25	03-11-25	185.42	185.45	185.54	185.71	185.87	185.94	185.97	na	na	na
MBIS13	Leichhardt coal seam	Compliance	3	24-05-25	01-11-25	182.41	182.54	182.93	183.72	184.16	184.37	184.45	na	na	na
MBIS15	Leichhardt coal seam	Compliance	3	31-07-25	30-10-25	182.99	183.00	183.02	183.07	183.09	183.10	183.11	na	na	na
MBIS03	Vermont coal seam	Compliance	9	24-05-25	01-11-25	187.14	187.15	187.18	187.23	187.34	187.46	187.46	-0.94	0.001	Yes-Downward
MBIS09	Vermont coal seam	Compliance	9	27-11-24	30-10-25	188.72	188.72	188.73	188.75	188.76	188.97	189.11	0.39	0.20	No
MBIS12	Alluvium	Interpretation	5	24-05-25	30-10-25	184.12	184.19	184.41	184.76	185.11	185.15	185.17	-1.00	0.03	Yes-Downward
MBIS01	Alluvium	Interpretation	Dry Bore												
MBIS14	Alluvium	Interpretation	Dry Bore												
MBID05	Alluvium	Interpretation	21	01-05-21	01-07-25	184.02	184.09	184.16	184.47	184.63	184.72	184.83	0.46	0.004	Yes-Upward
MBID08	Alluvium	Interpretation	22	01-05-21	01-07-25	183.43	183.482	183.564	183.84	183.93	184.038	184.04	-0.70	<0.001	Yes-Downward
MB06	Regolith	Interpretation	6	29-11-24	03-11-25	195.72	195.86	196.29	196.67	196.82	196.86	196.87	0.20	0.71	No
MBID22	Regolith	Interpretation	13	01-01-23	23-06-25	179.36	180.78	183.40	186.25	187.18	187.63	187.94	-0.28	0.20	No
MBIS17	Regolith	Interpretation	Dry Bore												
MBIS06	Regolith	Interpretation	Dry Bore												
MB09C	Regolith	Interpretation	Dry Bore												
MBIS18	Leichhardt coal seam	Interpretation	9	26-11-24	02-11-25	180.71	180.71	181.02	181.34	181.52	181.75	181.76	-0.61	0.03	Yes-Downward
MBIS16	Vermont coal seam	Interpretation	8	27-11-24	02-11-25	181.49	182.28	183.81	184.19	190.20	195.50	196.27	0.29	0.39	No
MBIS19	Isaac Thrust Fault core (RCM)	Interpretation	3	07-08-25	02-11-25	180.31	180.32	180.33	180.35	184.55	186.65	187.35	na	na	na
MB08b	Fort Cooper Coal Measures	Interpretation	5	28-11-24	03-11-25	206.92	206.96	207.06	207.22	207.27	207.31	207.32	-0.60	0.22	No
MB09B	Fort Cooper Coal Measures	Interpretation	8	25-11-24	31-10-25	194.22	194.23	194.24	194.26	194.27	194.28	194.28	-0.15	0.71	No

Note: “na” indicates insufficient data to determine a trend.



Appendix B Testing of Groundwater Level Triggers

Isaac Downs Extension

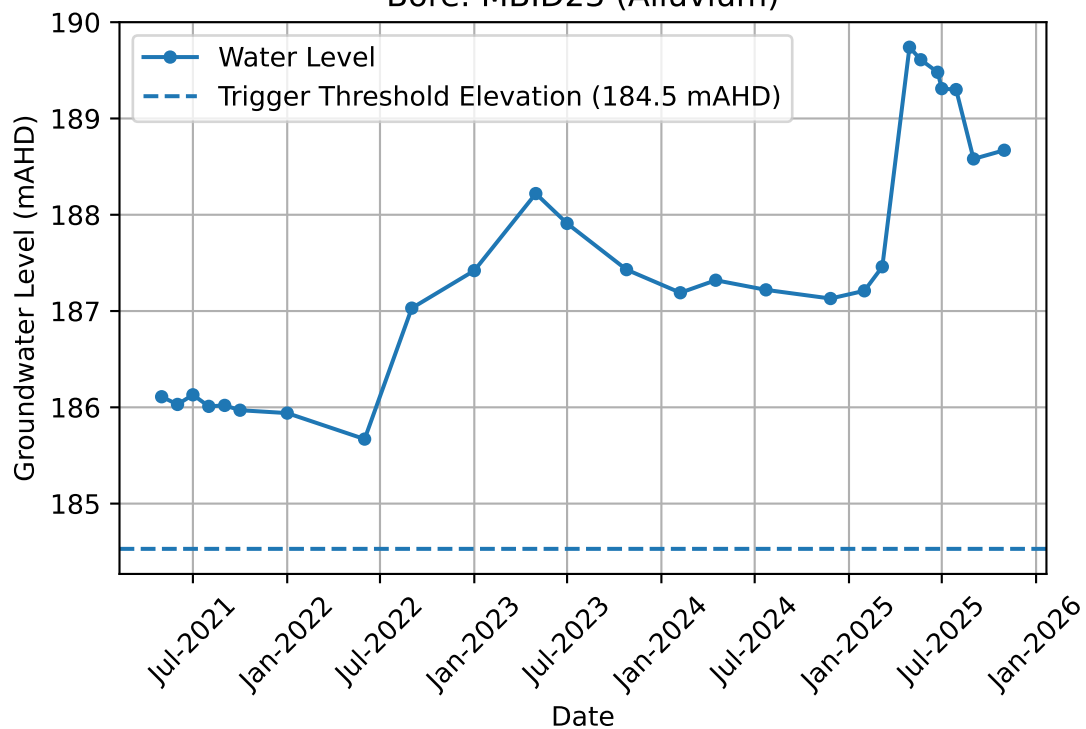
Groundwater Monitoring and Management Plan

Stanmore ID Extension Pty Ltd

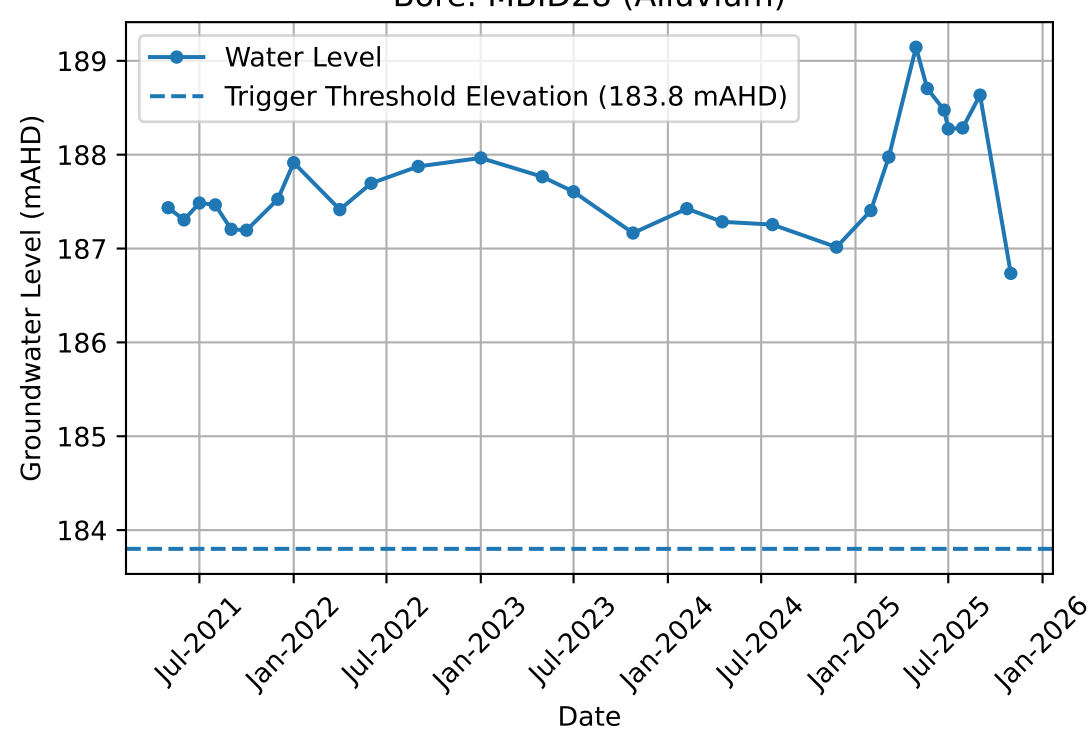
SLR Project No.: 620.041537.00001

28 May 2026

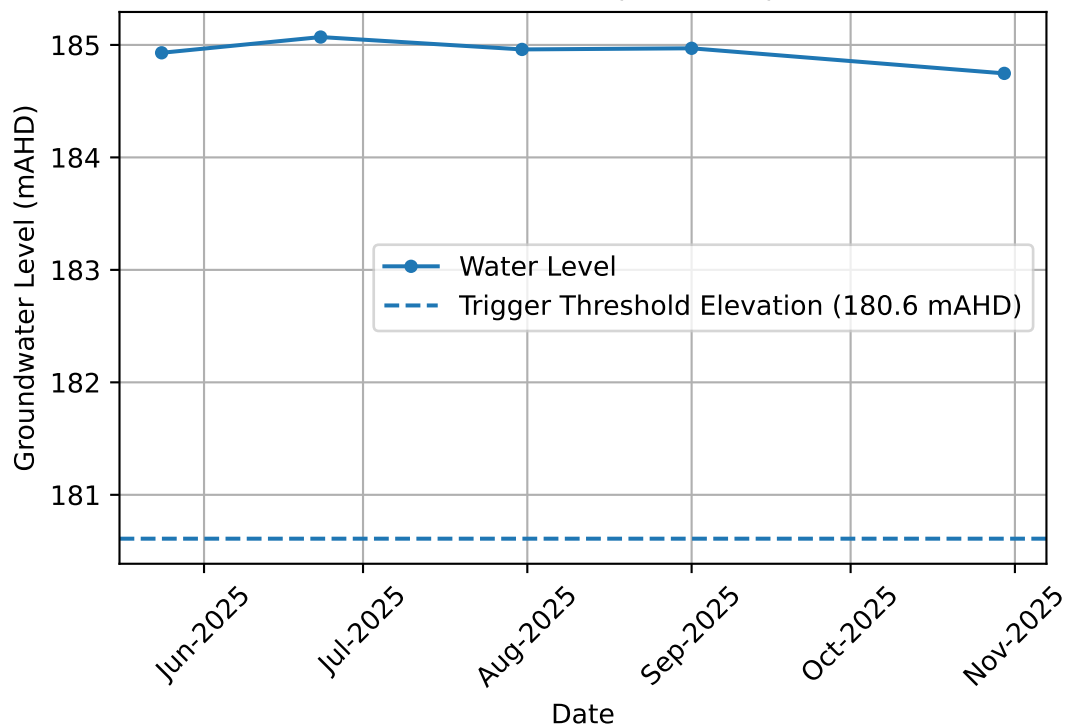
Bore: MBID23 (Alluvium)



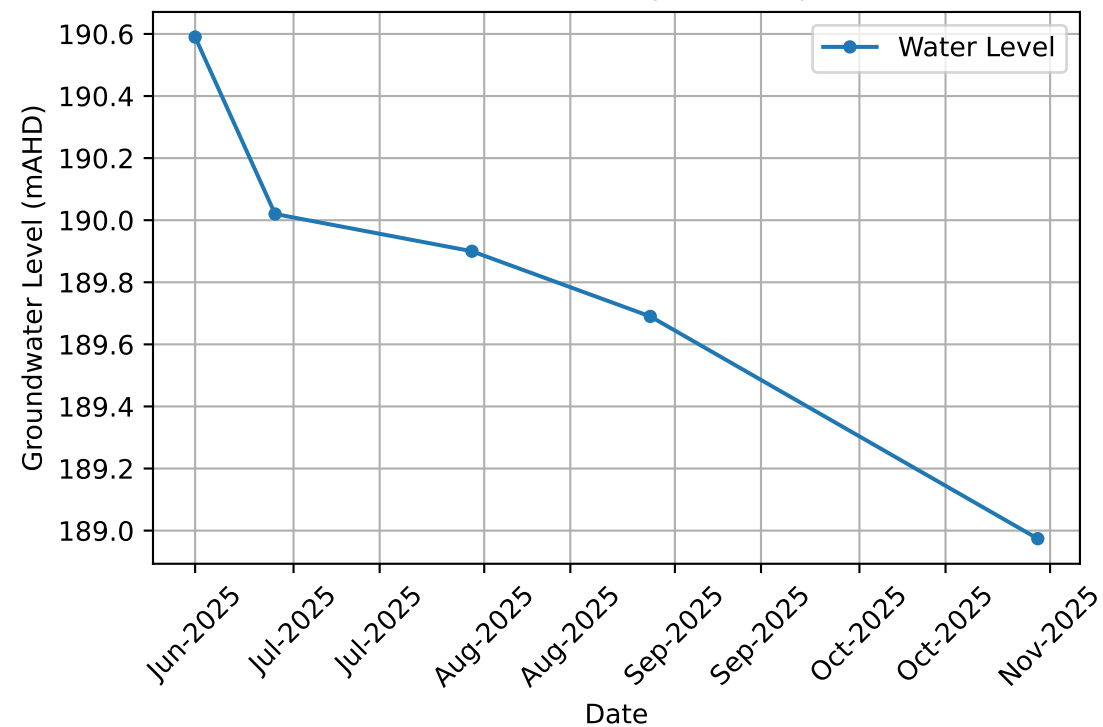
Bore: MBID28 (Alluvium)



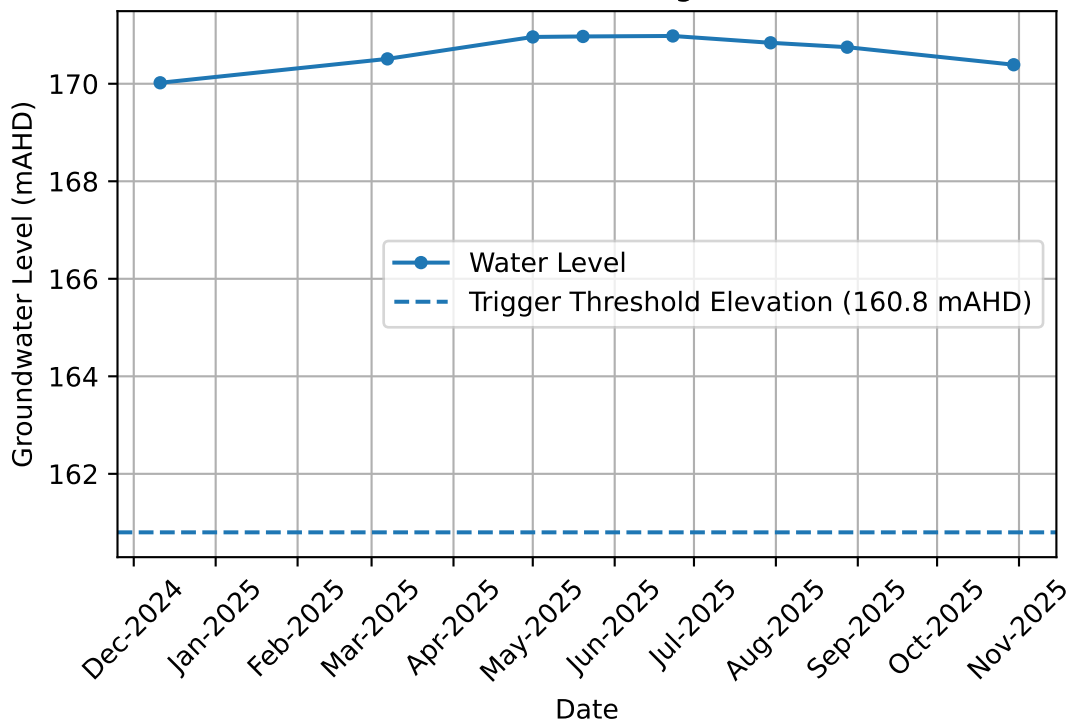
Bore: MBIS04 (Alluvium)



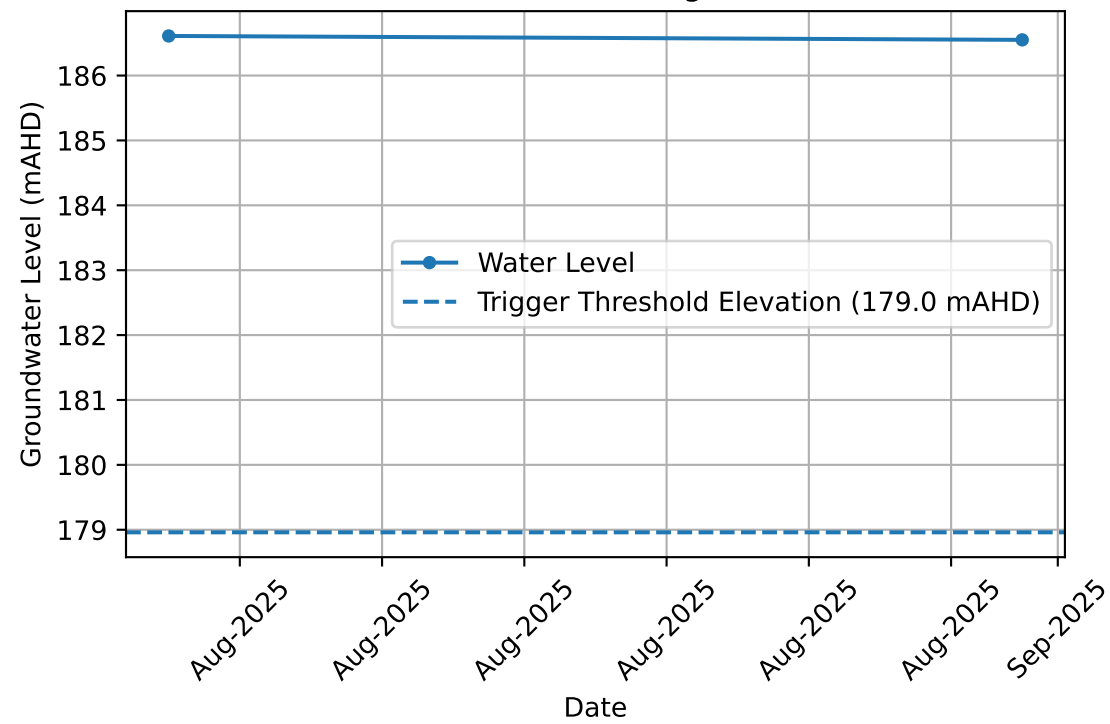
Bore: MBIS07 (Alluvium)



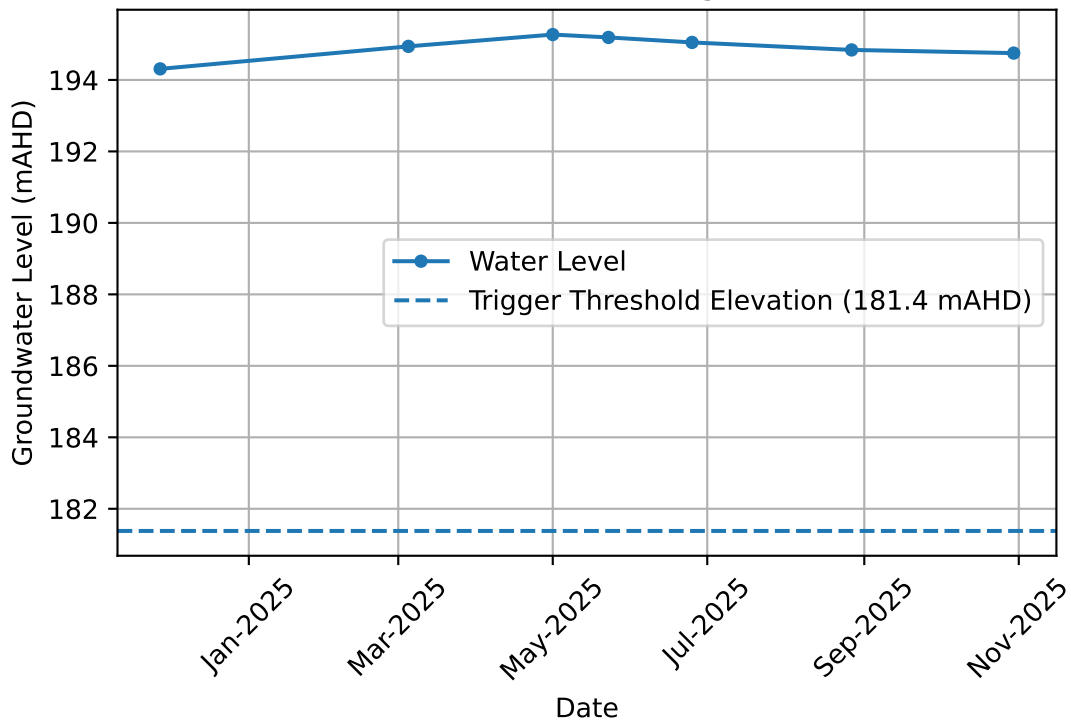
Bore: MBIS10 (Regolith)



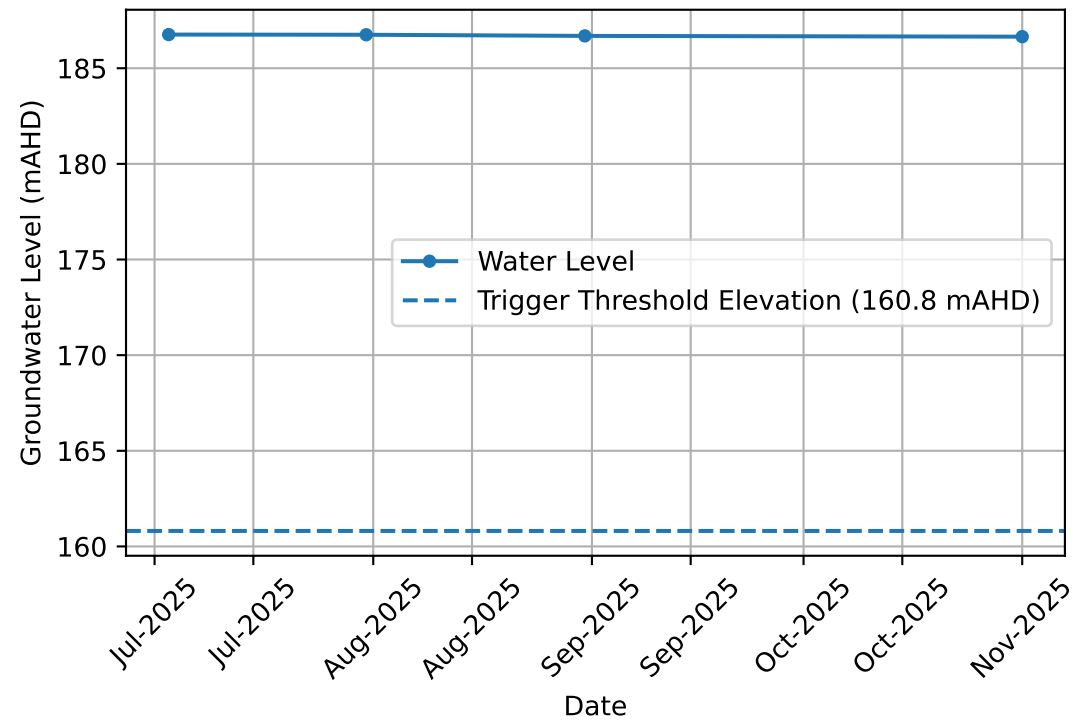
Bore: MBIS20 (Regolith)



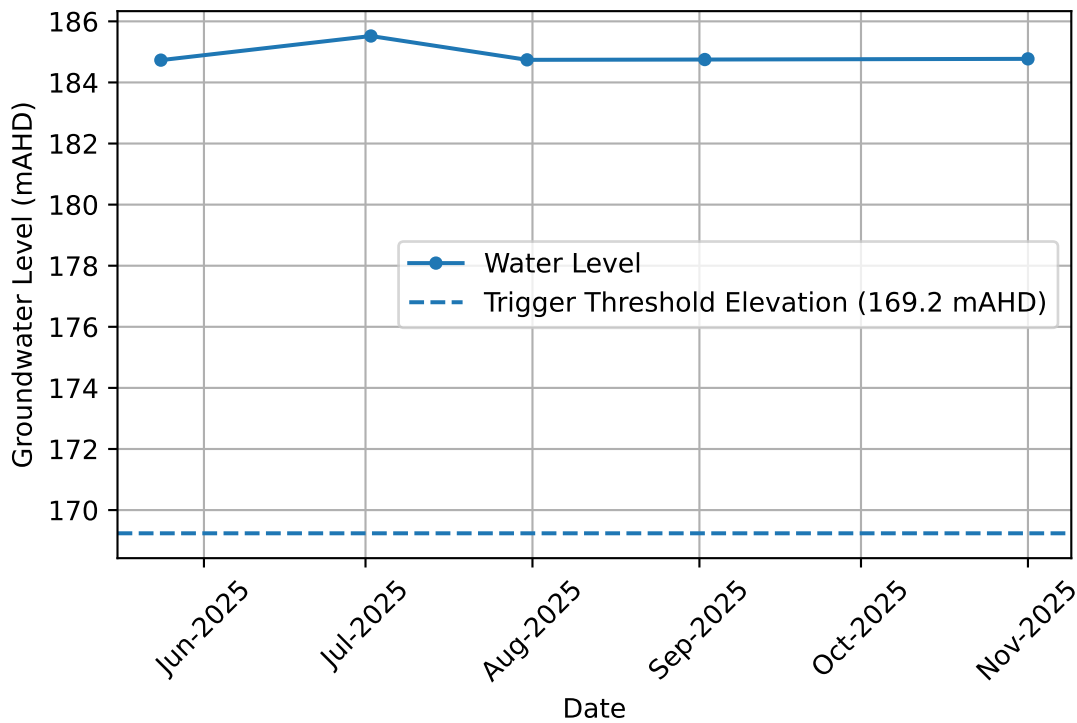
Bore: RN182851 (Regolith)



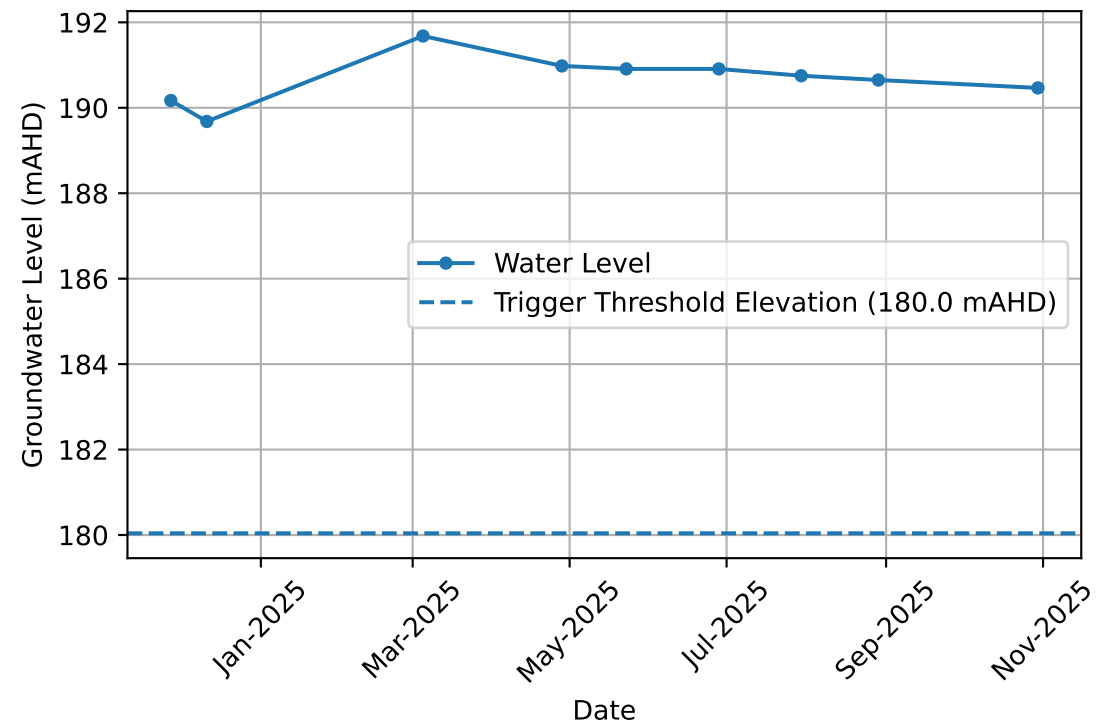
Bore: MBIS02 (Leichhardt coal seam)



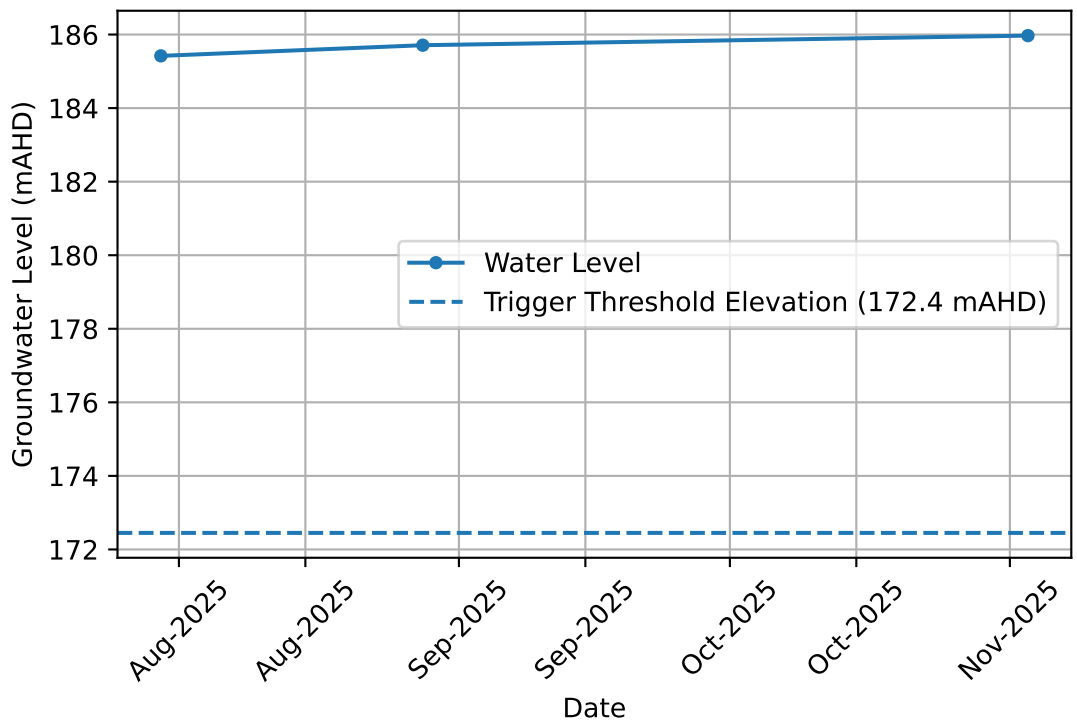
Bore: MBIS05 (Leichhardt coal seam)



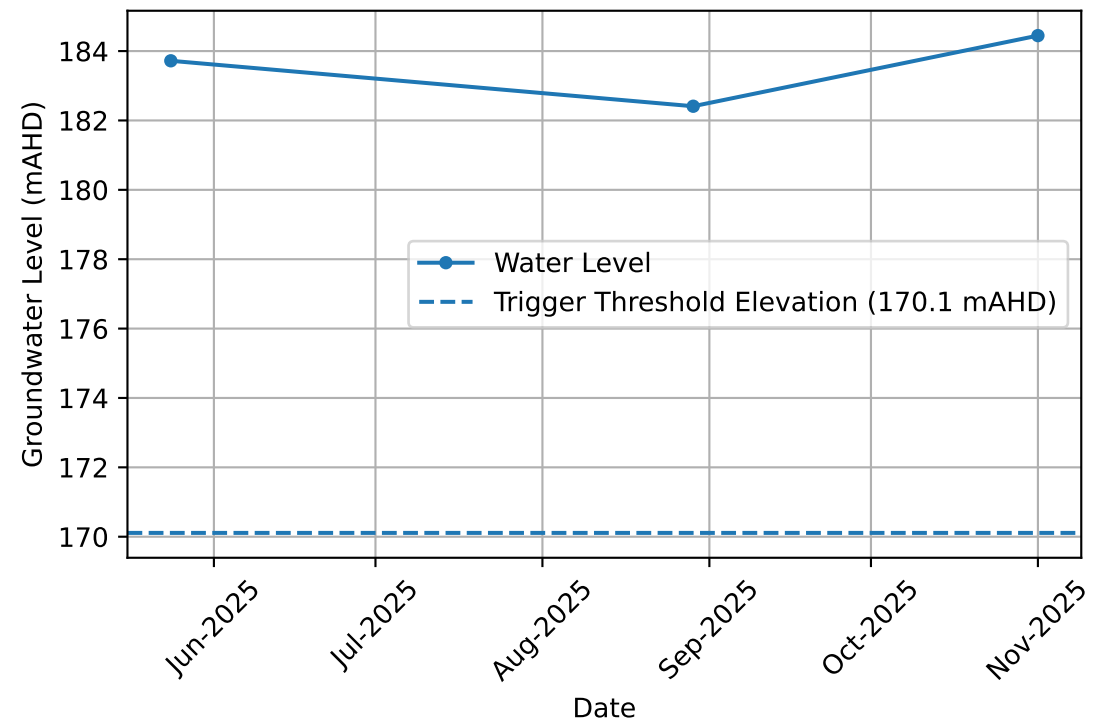
Bore: MBIS08 (Leichhardt coal seam)



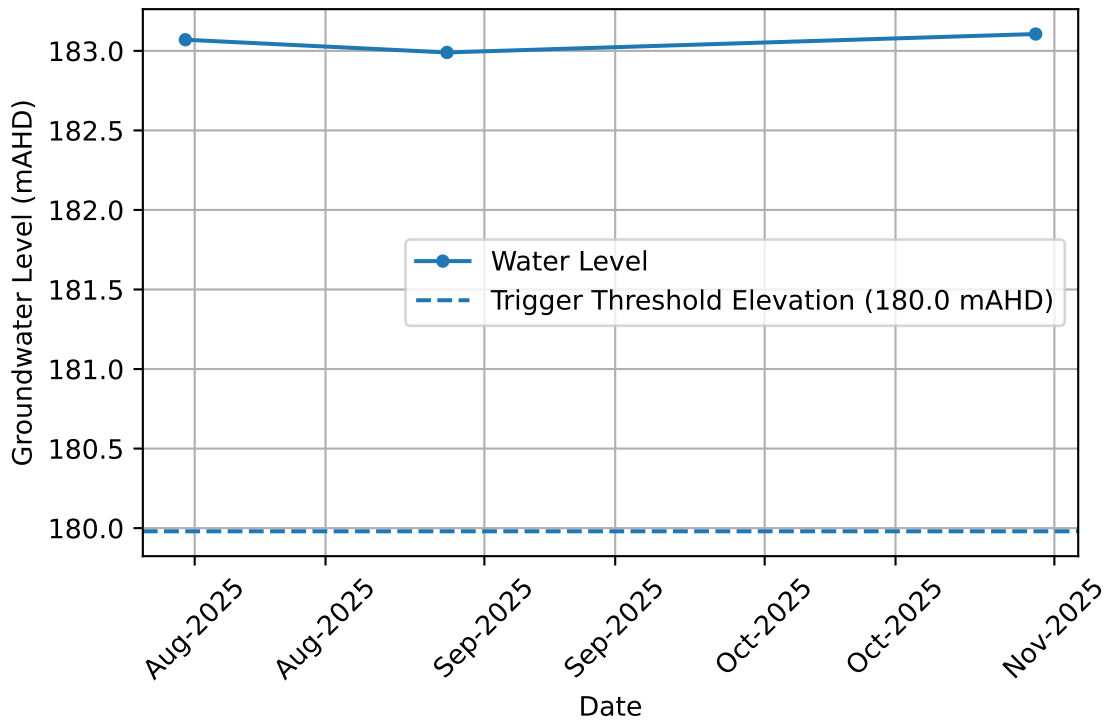
Bore: MBIS11 (Leichhardt coal seam)



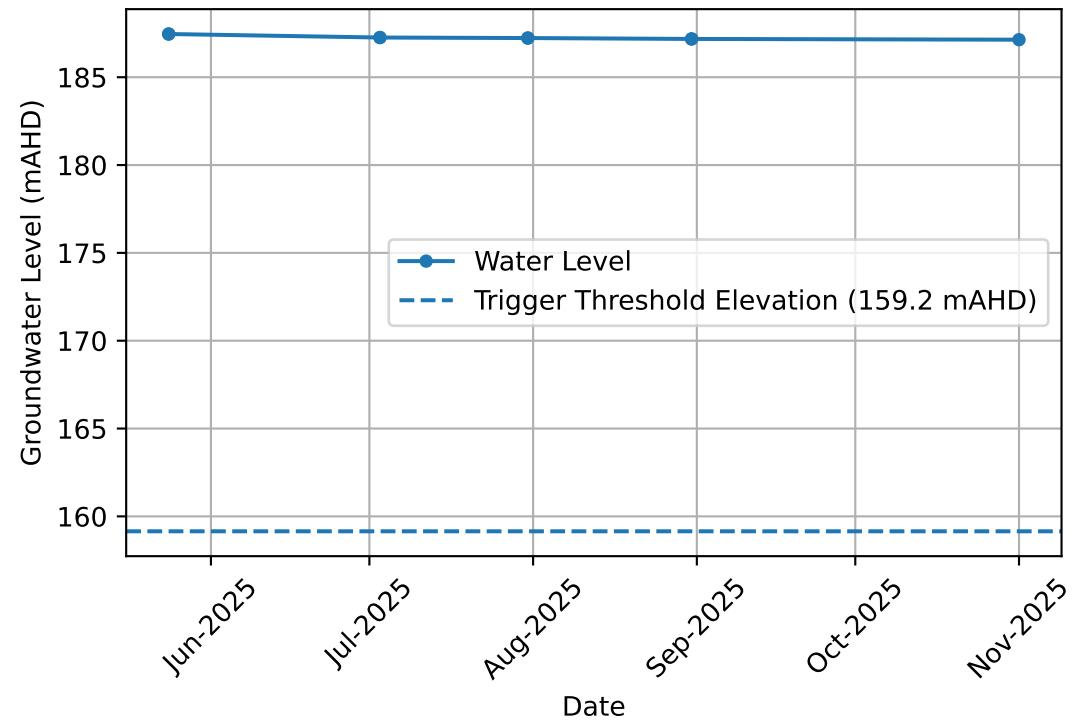
Bore: MBIS13 (Leichhardt coal seam)



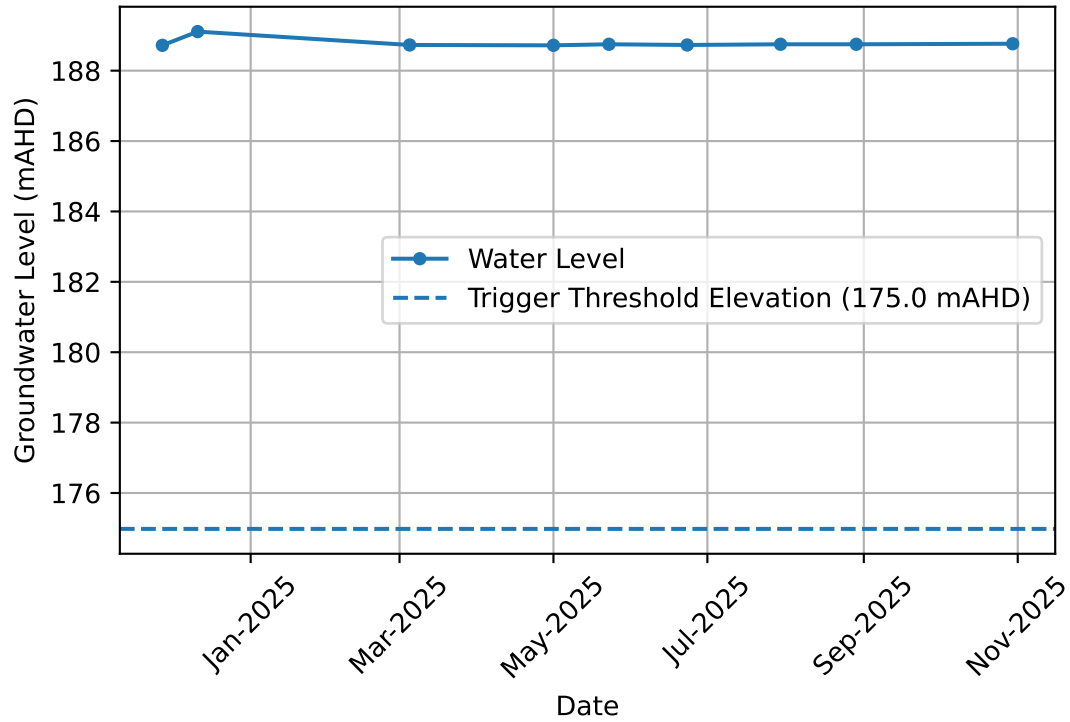
Bore: MBIS15 (Leichhardt coal seam)

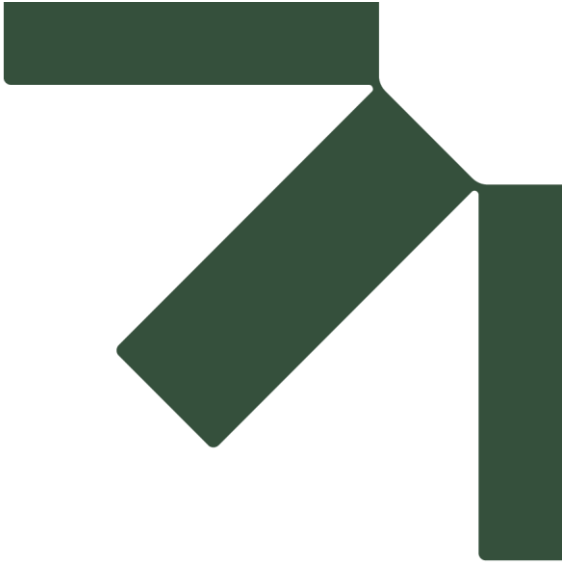


Bore: MBIS03 (Vermont coal seam)



Bore: MBIS09 (Vermont coal seam)





Appendix C Groundwater Quality Statistics

Isaac Downs Extension

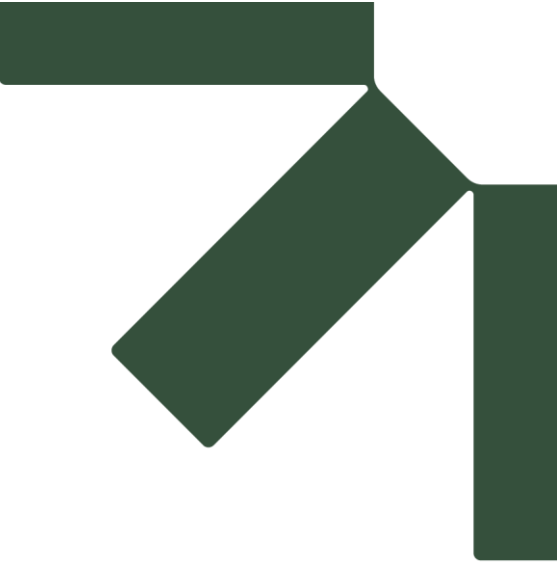
Groundwater Monitoring and Management Plan

Stanmore ID Extension Pty Ltd

SLR Project No.: 620.041537.00001

28 May 2026

Bore	Statistic	pH field	EC (Lab)	Sulfate as SO ₄	Nitrate as N	Diss Al	Diss As	Diss B	Diss Cd	Diss Cr	Diss Co	Diss Cu	Diss Fe	Diss Pb	Diss Mn	Diss Hg	Diss Mo	Diss Ni	Diss Ag	Diss U	Diss Zn
MBID23	Total Number	20.00	35	35	1	33	35	18	18	17	18	18	34	18	19	19	35	18	18	8	19
MBID23	Number of outliers	3.00	7	7	0	2	3	4	0	2	0	4	5	1	0	0	2	1	0	0	2
MBID23	from	44070.00	27-08-20	27-08-20	31-10-25	27-08-20	27-08-20	27-08-20	27-08-20	27-08-20	27-08-20	27-08-20	27-08-20	27-08-20	27-08-20	27-08-20	27-08-20	27-08-20	27-08-20	28-11-24	27-08-20
MBID23	to	45961.00	31-10-25	31-10-25	31-10-25	31-10-25	31-10-25	01-09-25	01-09-25	31-10-25	31-10-25	31-10-25	31-10-25	31-10-25	31-10-25	31-10-25	31-10-25	31-10-25	01-09-25	31-10-25	31-10-25
MBID23	Min	6.37	1080	24	0.11	0.005	5.00E-04	0.12	5.00E-05	5.00E-04	5.00E-04	5.00E-04	0.025	5.00E-04	0.001	5.00E-05	5.00E-04	0.001	5.00E-04	0.003	0.0025
MBID23	5th %ile	6.49	1361	27.1	0.11	0.005	5.00E-04	0.188	5.00E-05	5.00E-04	5.00E-04	5.00E-04	0.025	5.00E-04	0.0055	5.00E-05	5.00E-04	0.00185	5.00E-04	0.003	0.0025
MBID23	20th %ile	6.75	1976	33.6	0.11	0.005	5.00E-04	0.21	5.00E-05	5.00E-04	0.001	5.00E-04	0.025	5.00E-04	0.057	5.00E-05	5.00E-04	0.0034	5.00E-04	0.0034	0.004
MBID23	Median	6.91	4060	40	0.11	0.005	0.002	0.26	5.00E-05	5.00E-04	0.002	5.00E-04	0.11	5.00E-04	0.29	5.00E-05	5.00E-04	0.0055	5.00E-04	0.005	0.006
MBID23	80th %ile	7.04	6704	59.2	0.11	0.005	0.0042	0.446	5.00E-05	5.00E-04	0.016	0.0016	0.634	5.00E-04	1.788	5.00E-05	0.003	0.0124	5.00E-04	0.0158	0.0326
MBID23	95th %ile	7.80	15740	224.1	0.11	0.015	0.011	0.6745	5.00E-05	0.001	0.0239	0.003025	2.523	0.000575	2.689	5.00E-05	0.0063	0.0169	5.00E-04	0.01765	0.0608
MBID23	Max	7.85	18500	260	0.11	0.08	0.018	0.7	5.00E-05	0.001	0.029	0.006	4.45	0.001	2.86	5.00E-05	0.009	0.022	5.00E-04	0.018	0.068
MBID23	Tau	0.01	-0.384874	-0.339043	na	-0.0932098	-0.59389	0.0265817	1	-0.0626224	-0.536796	0.131533	-0.0963914	0.254902	-0.590643	1	-0.424572	-0.0401448	1	-0.2965	0.396972
MBID23	2-sided-p	1.00	0.00120402	0.00483883	na	0.546399	2.70723E-06	0.90916	1	0.823063	0.00303211	0.523824	0.449726	0.247482	0.000467783	1	0.00112122	0.848965	1	0.37908	0.0248142
MBID23	Trend	No	Yes-Downward	Yes-Downward	na	No	Yes-Downward	No	No	No	Yes-Downward	No	No	No	Yes-Downward	No	Yes-Downward	No	No	No	Yes-Upward
MBID28	Total Number	23.00	38	38	1	38	38	18	19	19	19	19	38	19	19	19	38	19	17	6	19
MBID28	Number of outliers	3.00	2	3	0	4	7	2	3	2	0	2	3	0	0	0	7	1	1	0	0
MBID28	from	44041.00	29-07-20	29-07-20	31-10-25	29-07-20	29-07-20	29-07-20	29-07-20	29-07-20	29-07-20	29-07-20	29-07-20	29-07-20	29-07-20	29-07-20	29-07-20	29-07-20	29-07-20	31-01-25	29-07-20
MBID28	to	45961.00	31-10-25	31-10-25	31-10-25	31-10-25	31-10-25	01-09-25	31-10-25	31-10-25	31-10-25	31-10-25	31-10-25	31-10-25	31-10-25	31-10-25	31-10-25	31-10-25	01-09-25	31-10-25	31-10-25
MBID28	Min	6.30	913	15	0.005	0.005	5.00E-04	0.1	5.00E-05	5.00E-04	5.00E-04	5.00E-04	0.025	5.00E-04	0.108	5.00E-05	5.00E-04	0.002	5.00E-04	5.00E-04	0.011
MBID28	5th %ile	6.35	1220	16.85	0.005	0.005	5.00E-04	0.1	5.00E-05	5.00E-04	0.00095	5.00E-04	0.025	5.00E-04	0.1791	5.00E-05	5.00E-04	0.002	5.00E-04	0.000625	0.0137
MBID28	20th %ile	6.38	1554	22.4	0.005	0.005	5.00E-04	0.11	5.00E-05	5.00E-04	0.0032	5.00E-04	0.025	5.00E-04	0.2352	5.00E-05	5.00E-04	0.003	5.00E-04	0.001	0.0172
MBID28	Median	6.57	1860	27	0.005	0.005	5.00E-04	0.125	5.00E-05	5.00E-04	0.006	0.002	0.025	5.00E-04	1.06	5.00E-05	5.00E-04	0.004	5.00E-04	0.001	0.153
MBID28	80th %ile	6.85	3164	56	0.005	0.005	5.00E-04	0.156	1.00E-04	5.00E-04	0.011	0.0062	0.126	5.00E-04	1.83	5.00E-05	0.001	0.006	5.00E-04	0.004	0.3214
MBID28	95th %ile	7.77	4810.5	88.2	0.005	0.01	0.00215	0.3015	2.00E-04	0.0024	0.0132	0.0123	0.459	5.00E-04	2.556	5.00E-05	0.002	0.0093	6.00E-04	0.004	0.4488
MBID28	Max	7.86	5680	100	0.005	0.48	0.003	0.31	2.00E-04	0.006	0.015	0.015	0.6	5.00E-04	2.7	5.00E-05	0.004	0.012	0.001	0.004	0.456
MBID28	Tau	0.02	-0.155493	-0.365117	na	-0.00319901	-0.570764	0.240002	-0.0175439	0.323153	-0.552754	0.109482	-0.408511	1	-0.614035	1	-0.0381407	0.0447643	-0.0428746	0.0778499	-0.426901
MBID28	2-sided-p	0.94	0.174402	0.00149757	na	1	1.70024E-05	0.191087	0.963544	0.111699	0.00135526	0.558973	0.00111271	1	0.000274231	1	0.781806	0.828189	0.918707	1	0.0117702
MBID28	Trend	No	No	Yes-Downward	na	No	Yes-Downward	No	No	No	Yes-Downward	No	Yes-Downward	No	Yes-Downward	No	No	No	No	No	Yes-Downward
MBIS08	Total Number	6.00	7	7	1	7	7	6	7	7	7	7	7	7	7	7	7	7	6	7	7
MBIS08	Number of outliers	0.00	0	0	0	1	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0
MBIS08	from	45640.00	14-12-24	14-12-24	30-10-25	14-12-24	14-12-24	14-12-24	14-12-24	14-12-24	14-12-24	14-12-24	14-12-24	14-12-24	14-12-24	14-12-24	14-12-24	14-12-24	14-12-24	14-12-24	14-12-24
MBIS08	to	45960.00	30-10-25	30-10-25	30-10-25	30-10-25	30-10-25	29-08-25	30-10-25	30-10-25	30-10-25	30-10-25	30-10-25	30-10-25	30-10-25	30-10-25	30-10-25	30-10-25	29-08-25	30-10-25	30-10-25
MBIS08	Min	7.05	9930	0.5	0.005	0.005	5.00E-04	0.26	5.00E-05	5.00E-04	5.00E-04	5.00E-04	0.025	5.00E-04	0.006	5.00E-05	0.001	5.00E-04	5.00E-04	5.00E-04	0.006
MBIS08	5th %ile	7.13	9933	0.95	0.005	0.005	5.00E-04	0.27	5.00E-05	5.00E-04	5.00E-04	5.00E-04	0.0475	5.00E-04	0.0123	5.00E-05	0.0025	0.00065	5.00E-04	5.00E-04	0.006
MBIS08	20th %ile	7.37	9992	3.4	0.005	0.005	5.00E-04	0.3	5.00E-05	5.00E-04	5.00E-04	5.00E-04	0.104	5.00E-04	0.0306	5.00E-05	0.0068	0.0014	5.00E-04	5.00E-04	0.006
MBIS08	Median	7.87	10800	10	0.005	0.005	0.003	0.3	5.00E-05	5.00E-04	5.00E-04	5.00E-04	1.29	5.00E-04	0.053	5.00E-05	0.024	0.003	5.00E-04	5.00E-04	0.008
MBIS08	80th %ile	7.98	11400	13.4	0.005	0.005	0.0092	0.3	5.00E-05	5.00E-04	5.00E-04	0.0018	1.964	5.00E-04	0.0678	5.00E-05	0.0362	0.0068	5.00E-04	9.00E-04	0.0124
MBIS08	95th %ile	8.05	11400	16.1	0.005	0.0155	0.0114	0.5025	5.00E-05	0.00085	5.00E-04	0.002	2.19	5.00E-04	0.0764	5.00E-05	0.0391	0.0077	5.00E-04	0.001	0.0172
MBIS08	Max	8.07	11400	17	0.005	0.02	0.012	0.57	5.00E-05	0.001	5.00E-04	0.002	2.25	5.00E-04	0.08	5.00E-05	0.04	0.008	5.00E-04	0.001	0.019
MBIS08	Tau	-0.60	0.308607	0.428571	na	0.356348	0.411476	-0.258199	1	0	1	-0.233285	0.333333	1	0.619048	1	0.142857	0.19518	1	-0.414039	0
MBIS08	2-sided-p	0.13	0.433003	0.229556	na	0.453255	0.272341	0.651998	1	1	1	0.610385	0.367521	1	0.0715054	1	0.763891	0.648582	1	0.332922	1
MBIS08	Trend	No	No	No	na	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No



Appendix D Testing of Groundwater Quality Triggers

Isaac Downs Extension

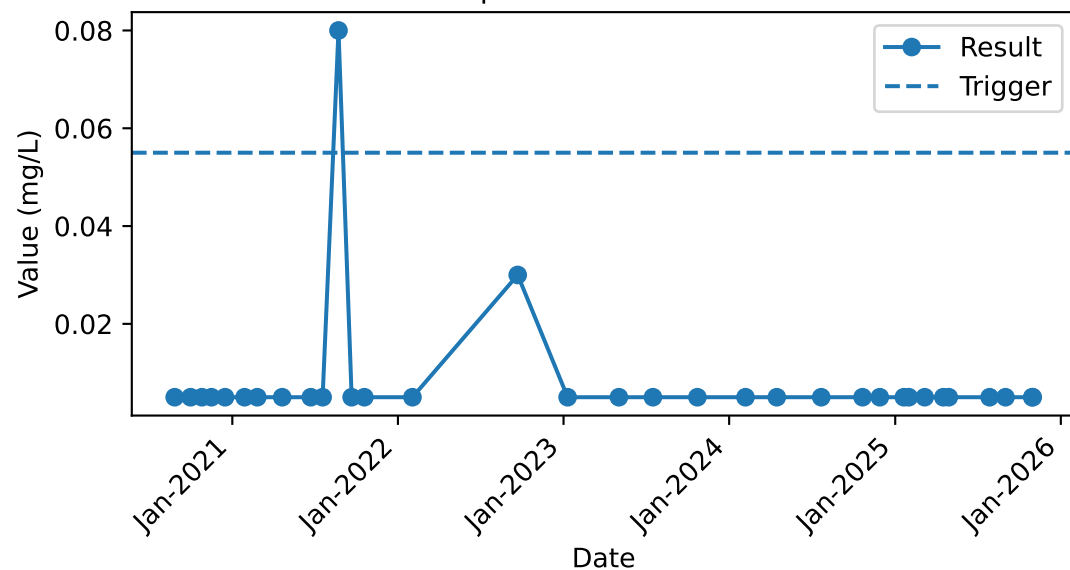
Groundwater Monitoring and Management Plan

Stanmore ID Extension Pty Ltd

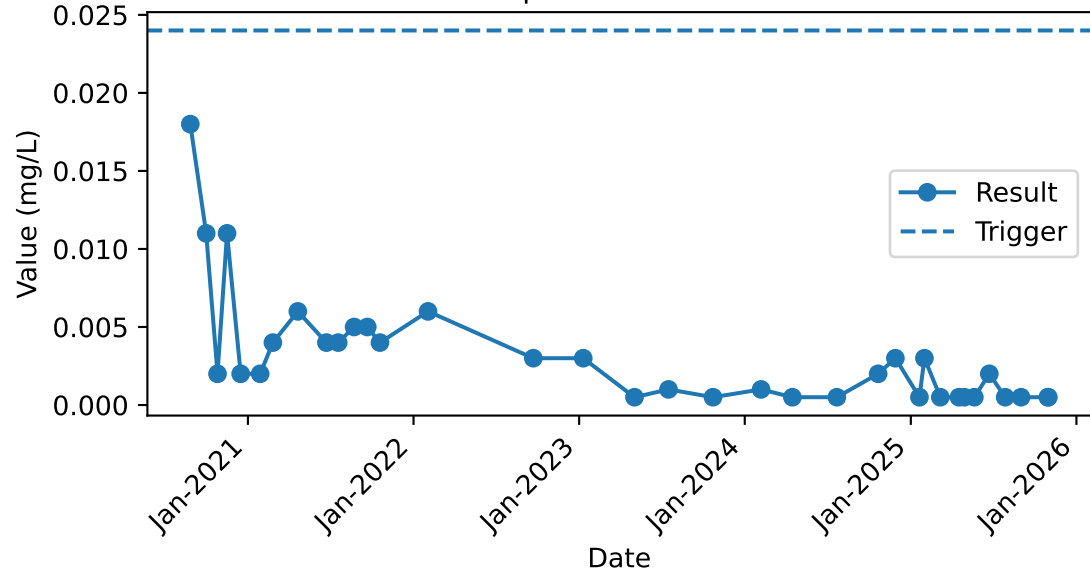
SLR Project No.: 620.041537.00001

28 May 2026

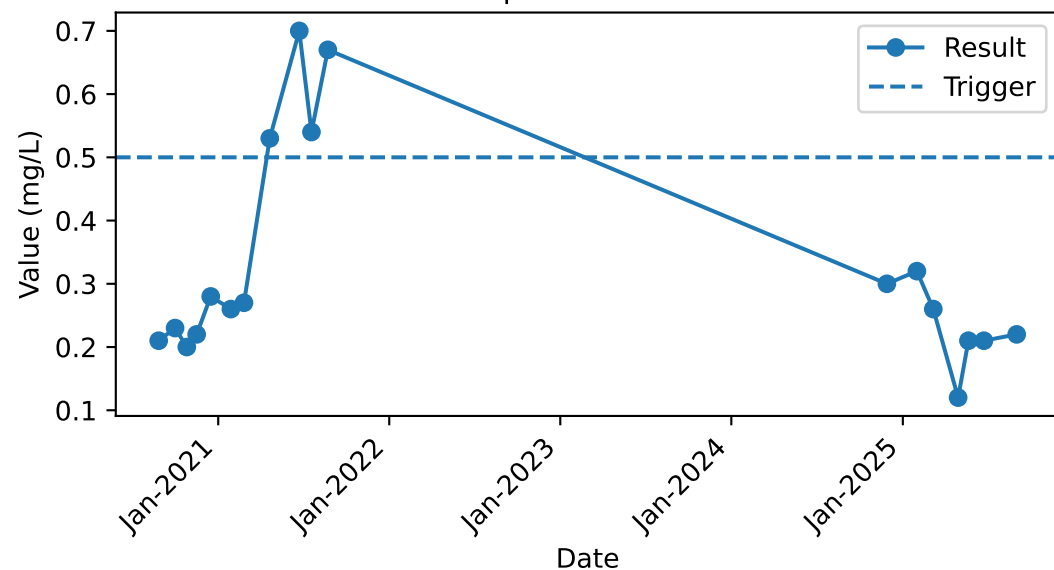
Bore: MBID23 | Param: Dissolved Aluminium



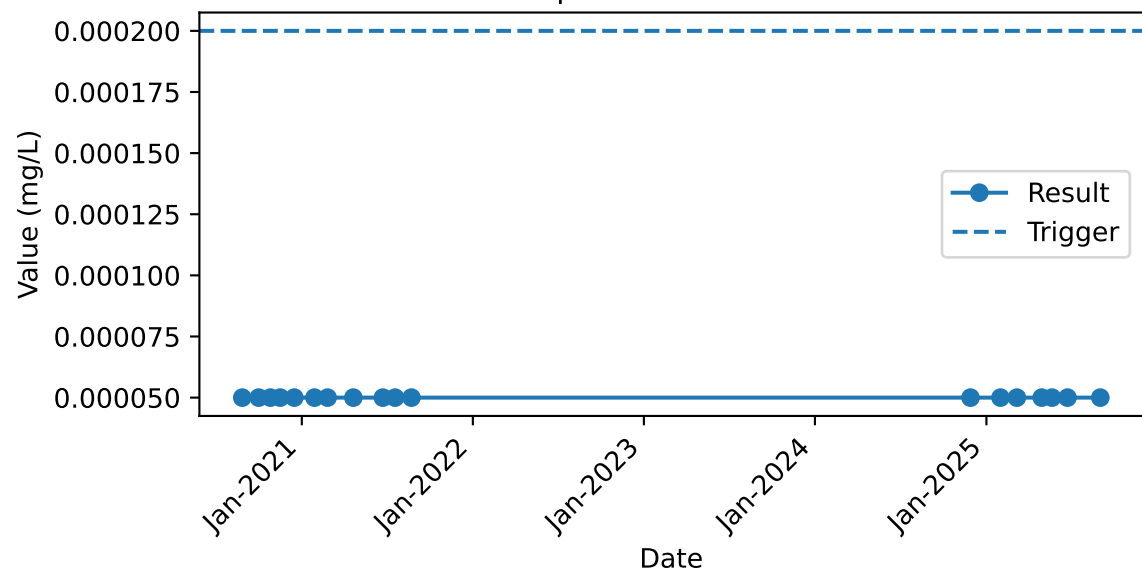
Bore: MBID23 | Param: Dissolved Arsenic



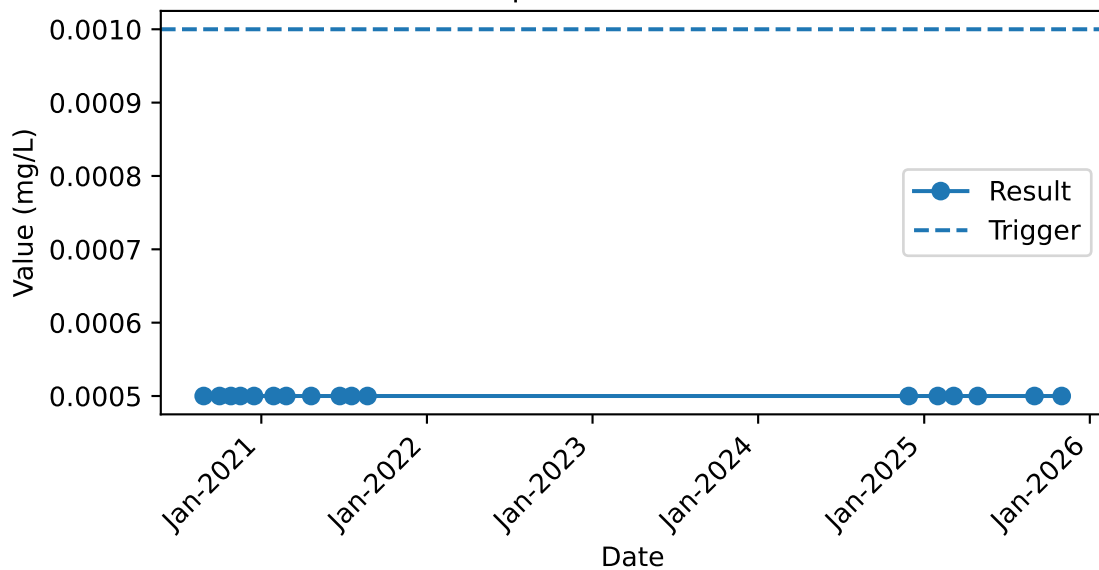
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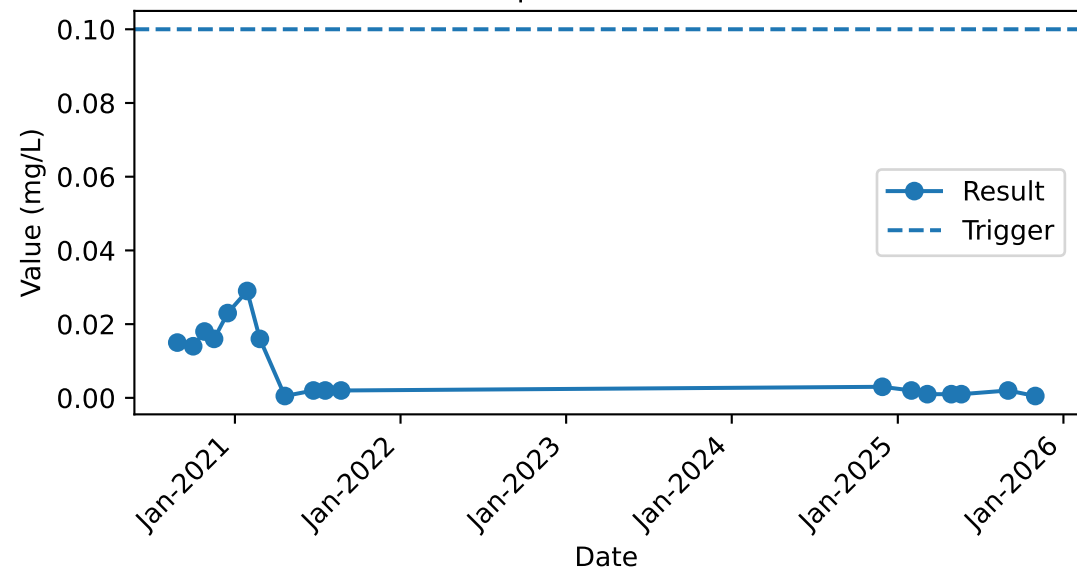
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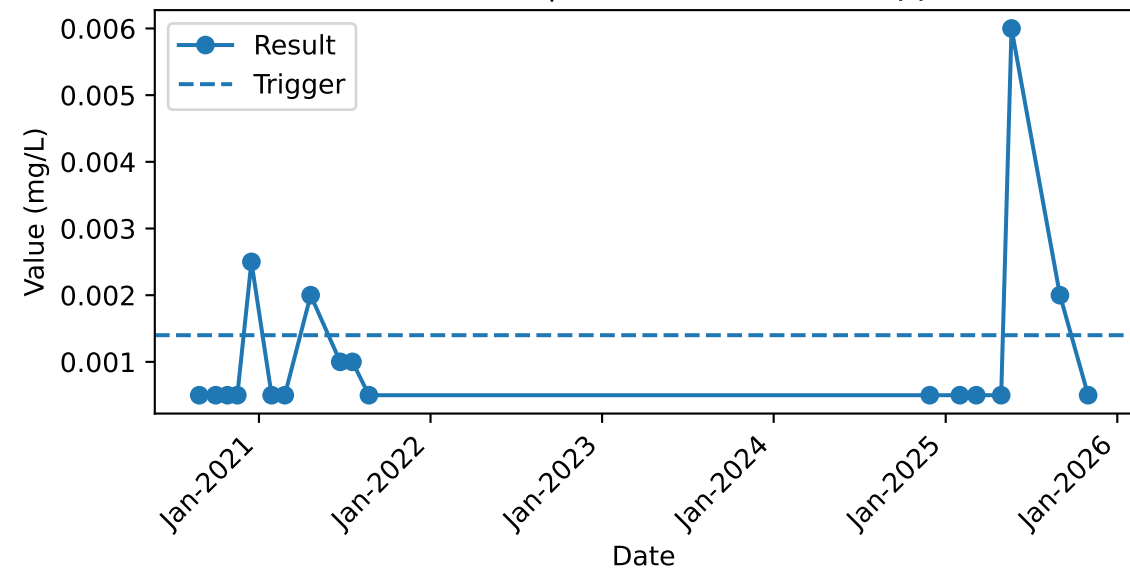
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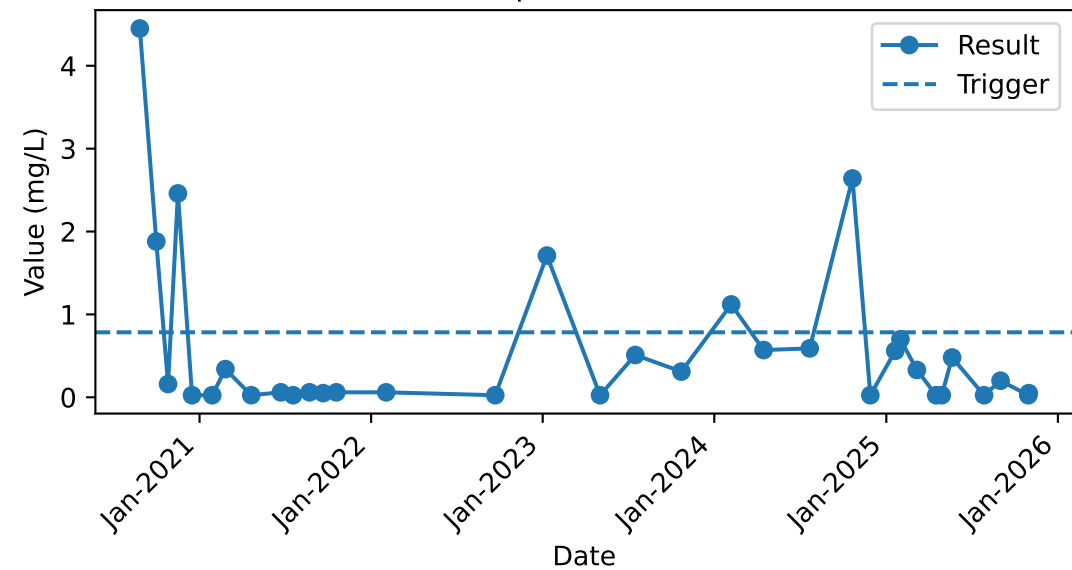
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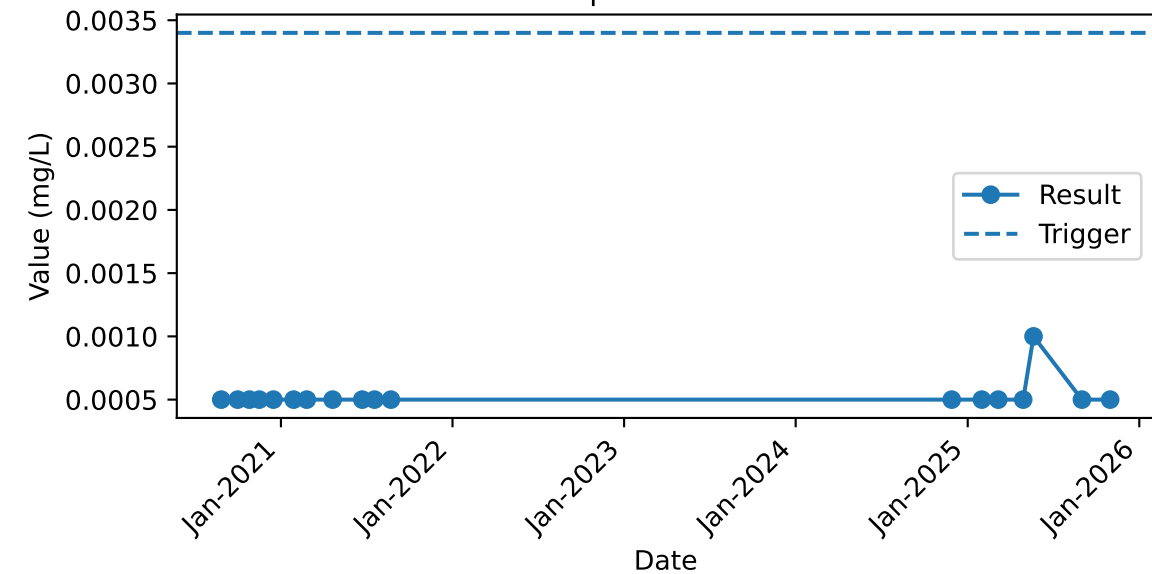
Bore: MBID23 | Param: Dissolved Copper



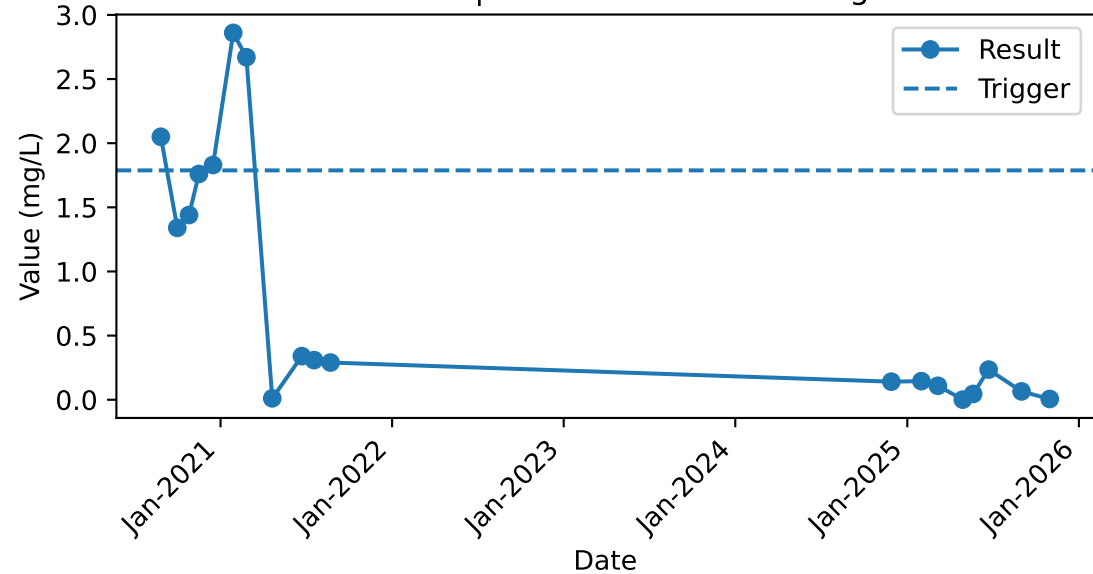
Bore: MBID23 | Param: Dissolved Iron



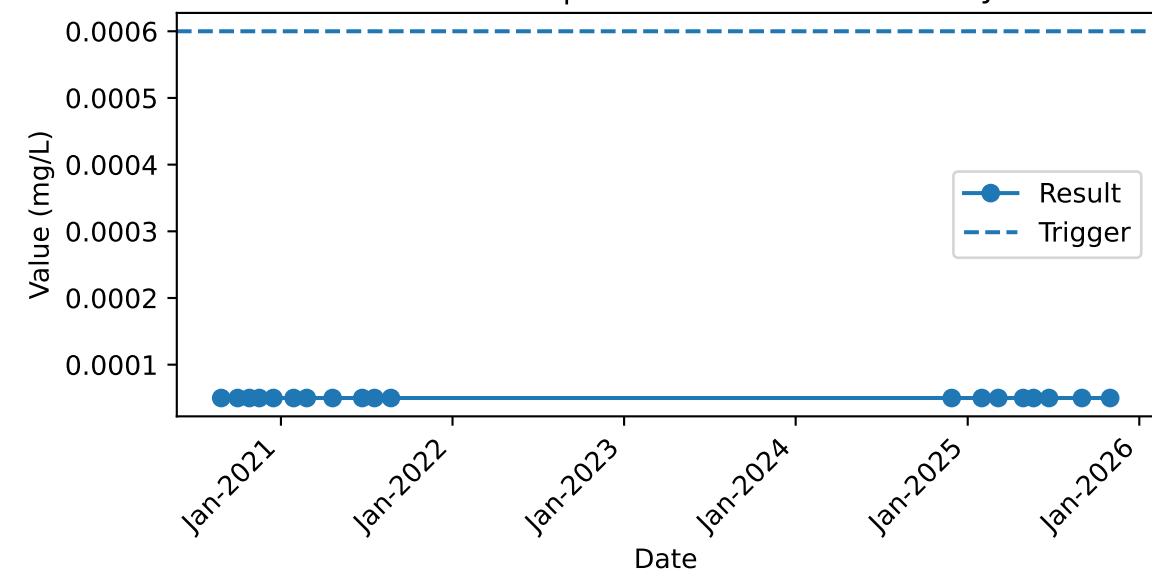
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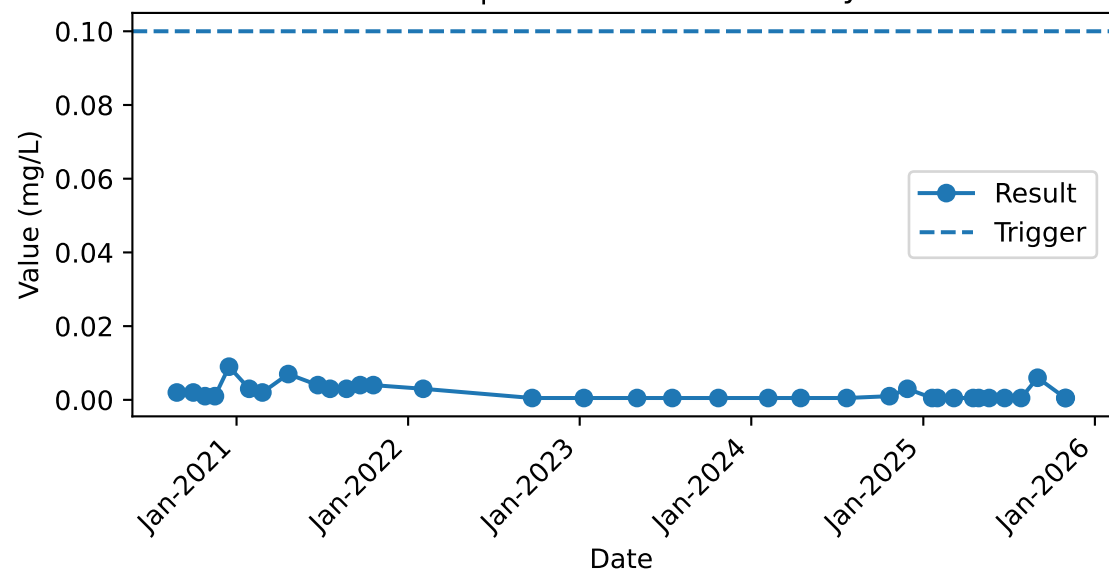
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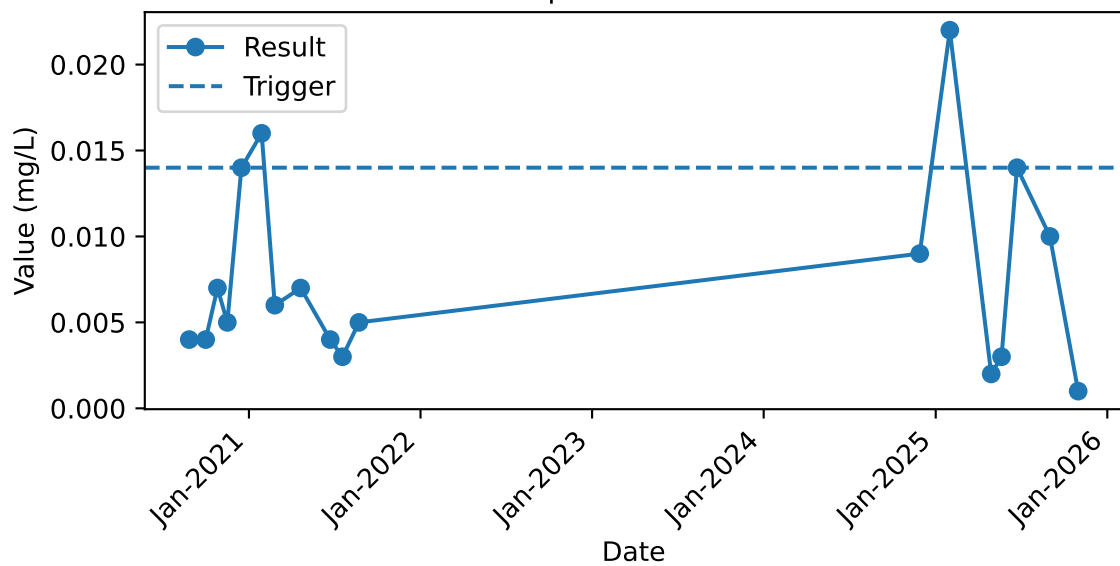
Bore: MBID23 | Param: Dissolved Mercury



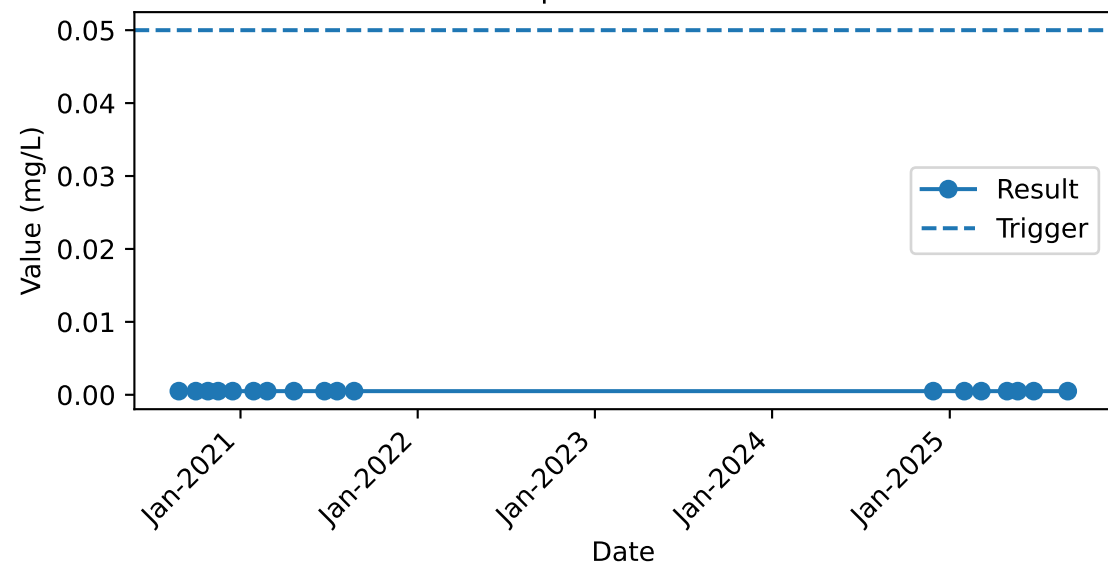
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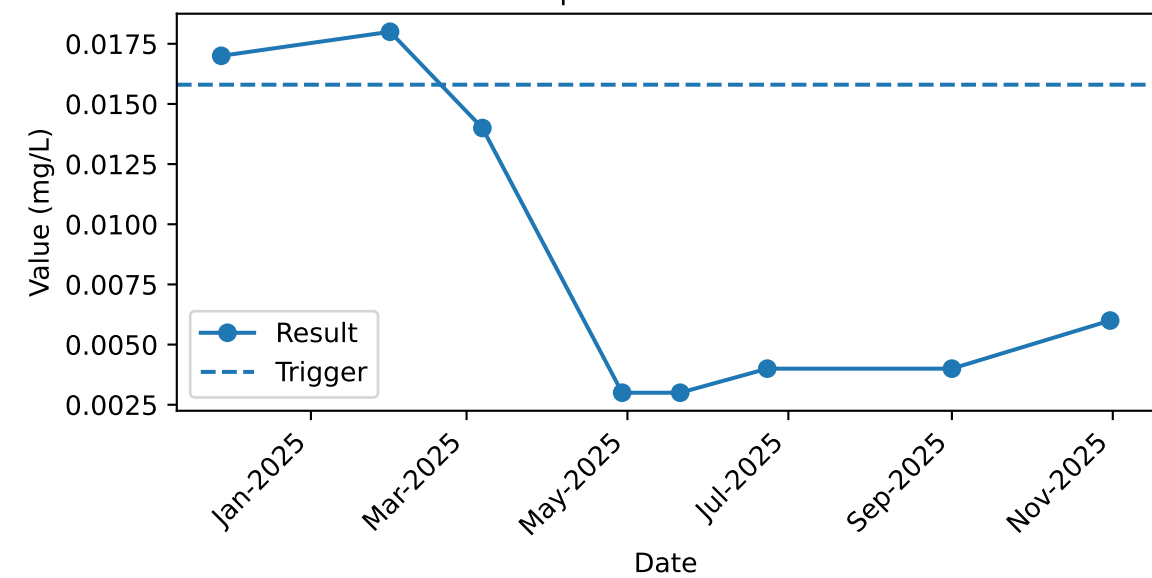
Bore: MBID23 | Param: Dissolved Nickel



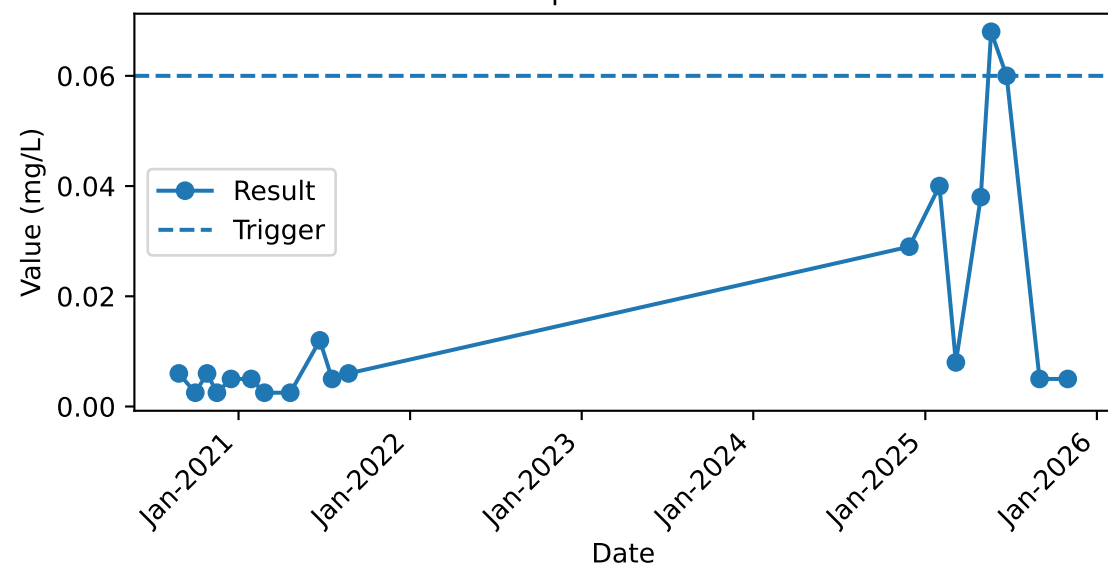
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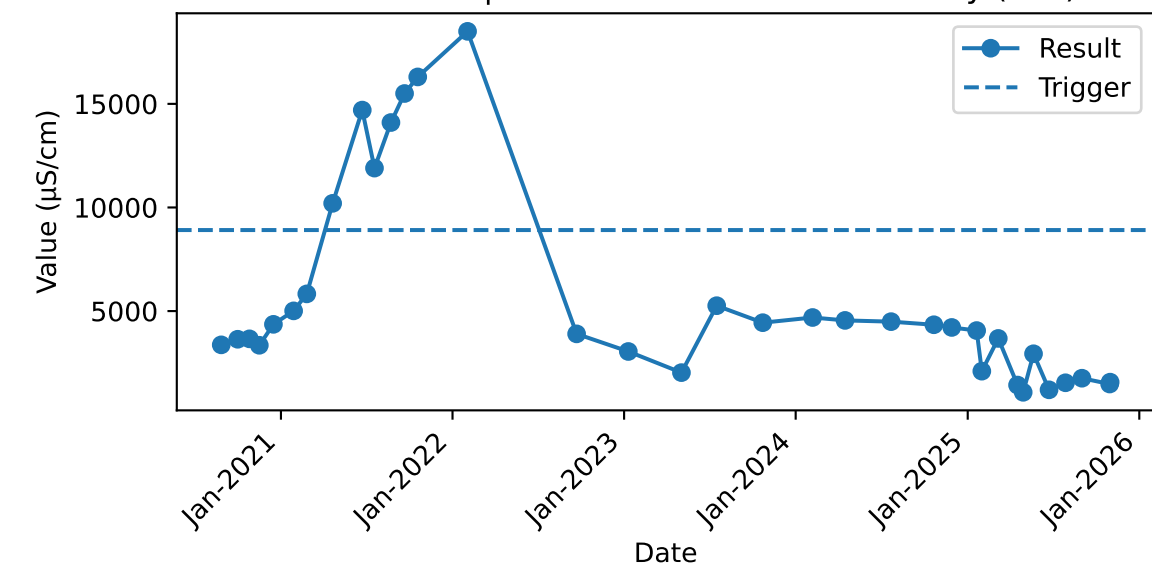
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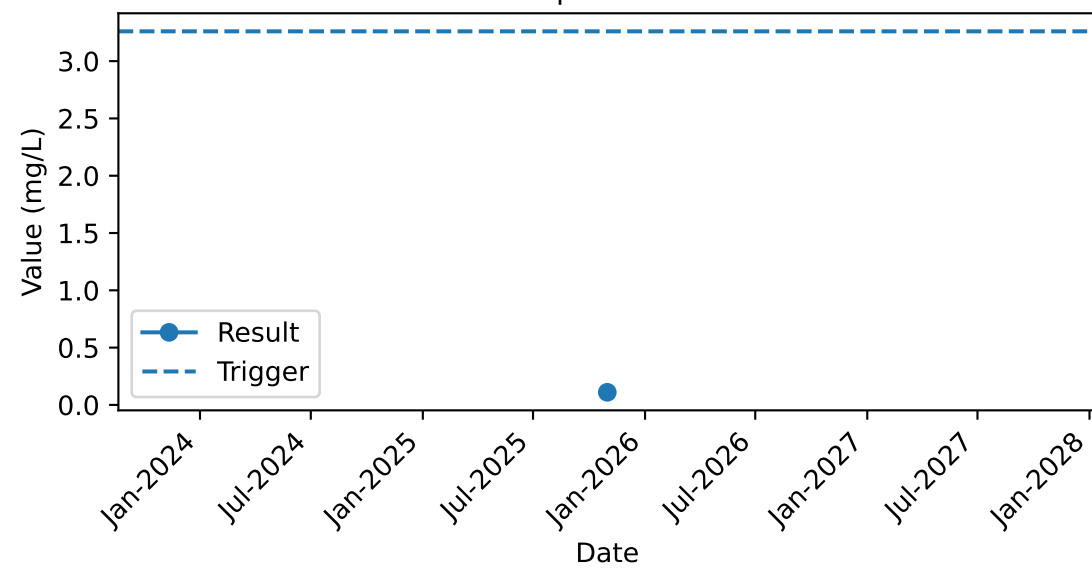
Bore: MBID23 | Param: Dissolved Zinc



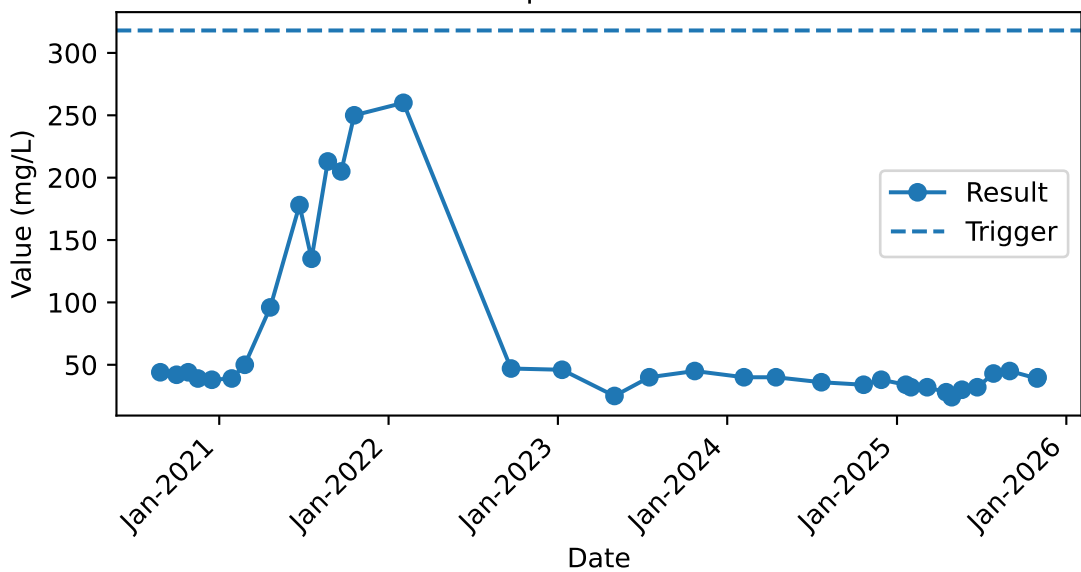
Bore: MBID23 | Param: Electrical Conductivity (Lab)



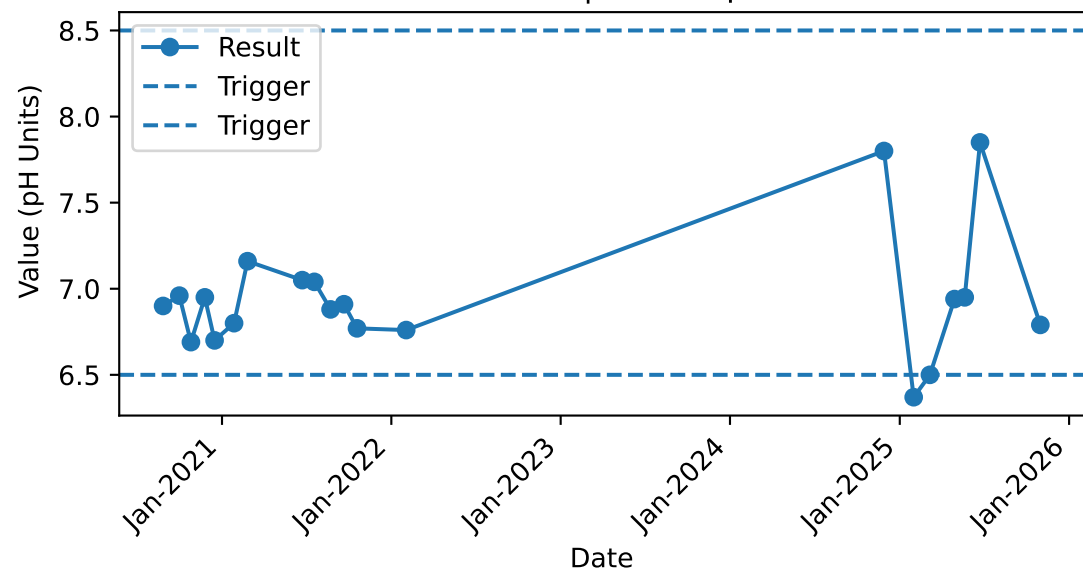
Bore: MBID23 | Param: Nitrate as N



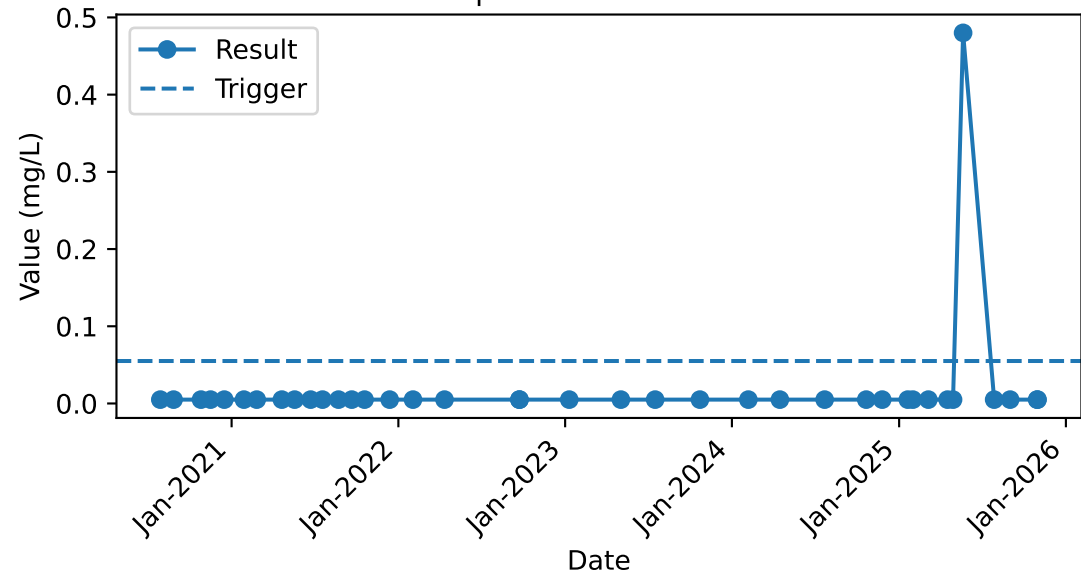
Bore: MBID23 | Param: Sulfate as SO4



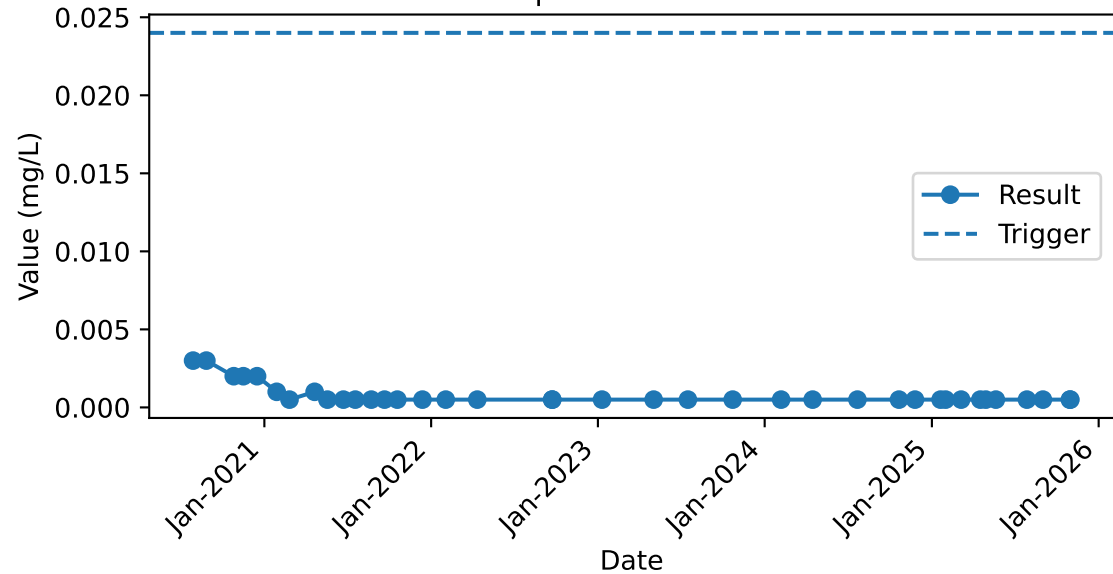
Bore: MBID23 | Param: pH field



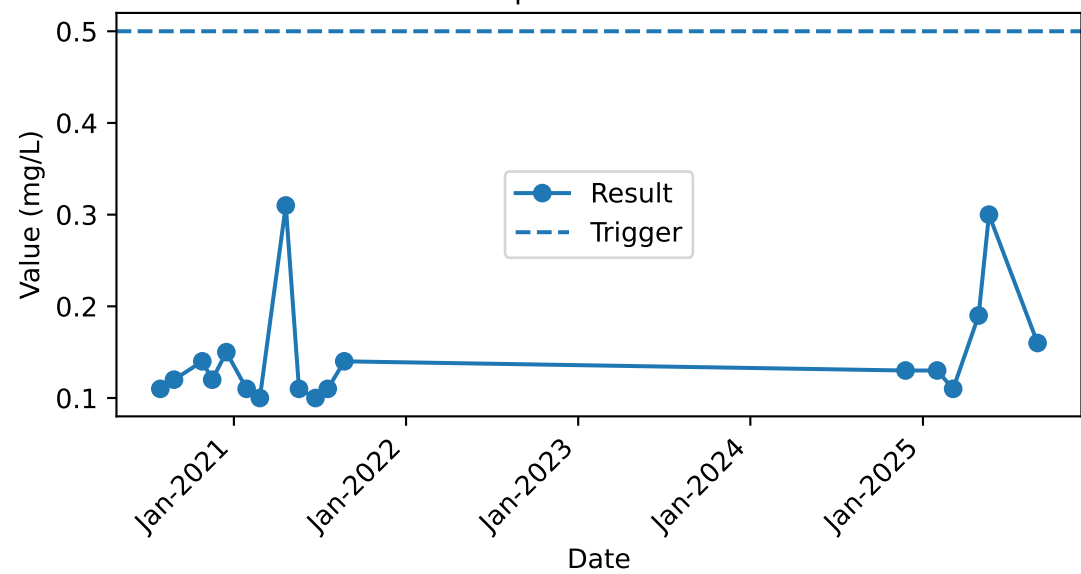
Bore: MBID28 | Param: Dissolved Aluminium



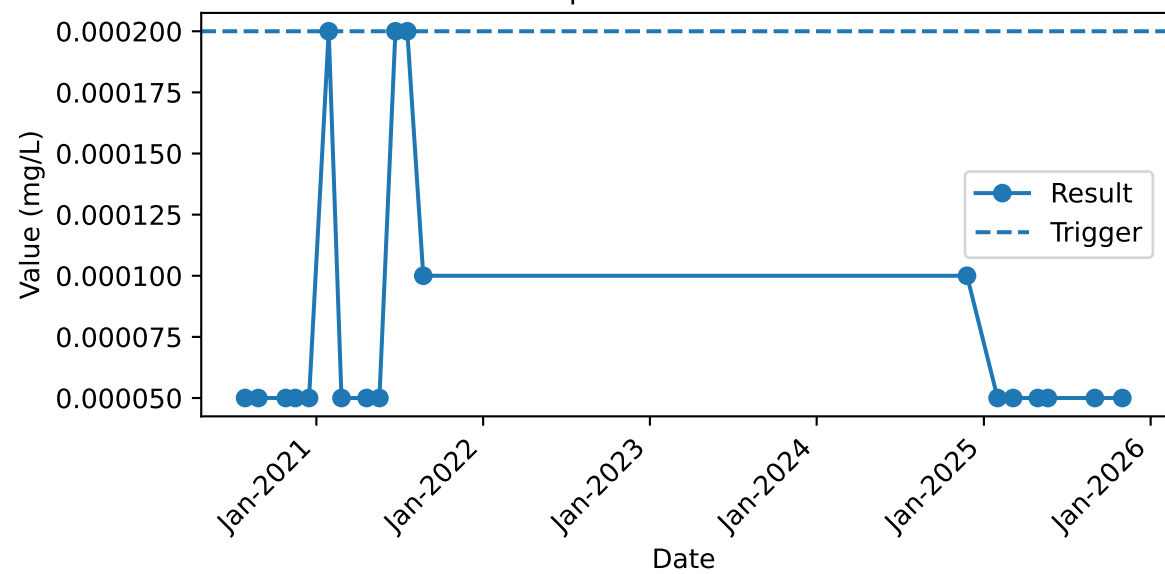
Bore: MBID28 | Param: Dissolved Arsenic



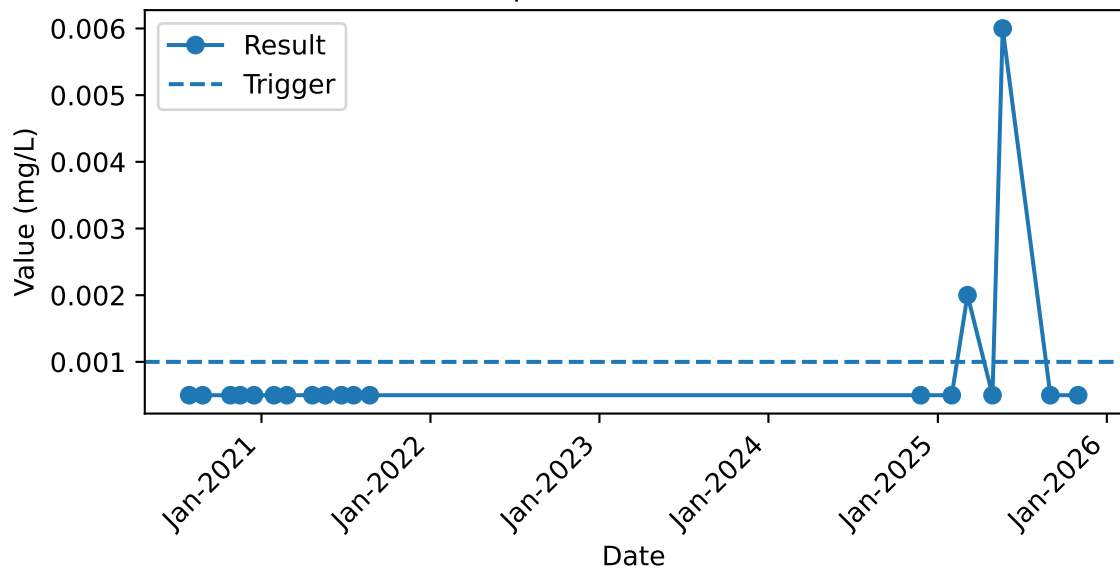
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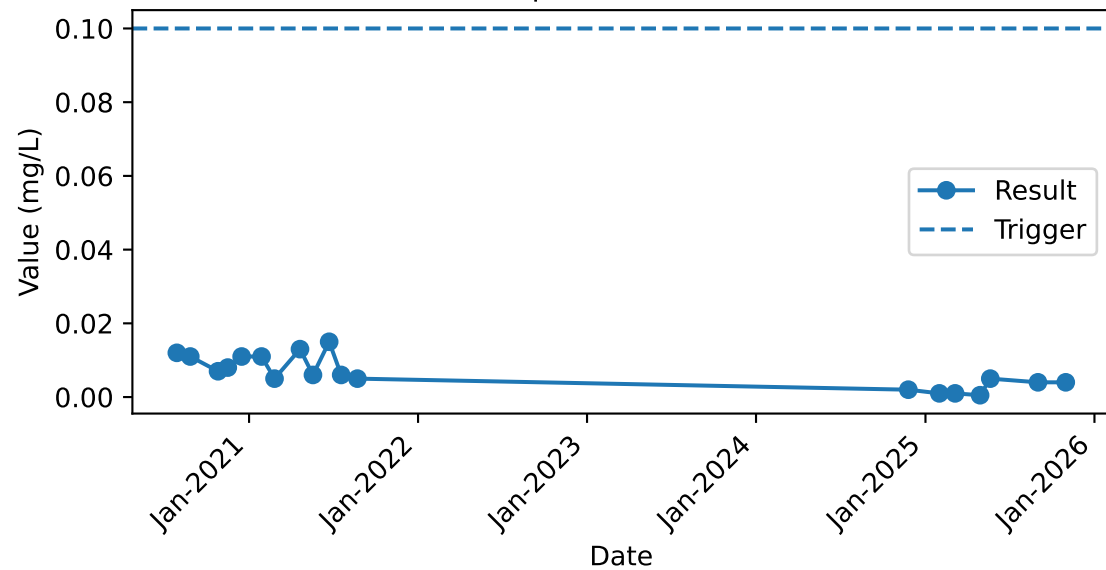
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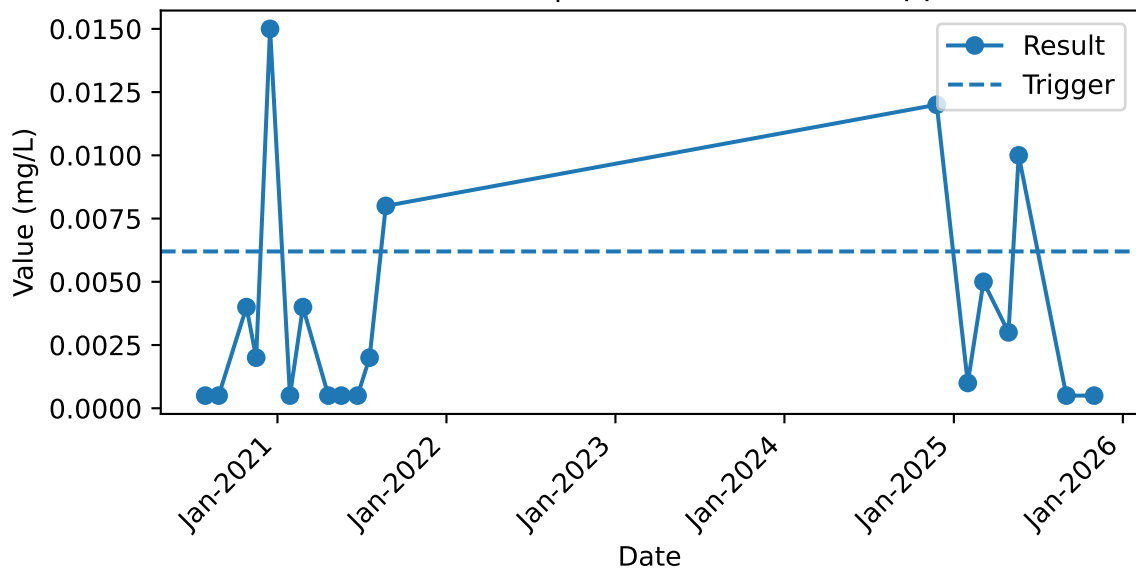
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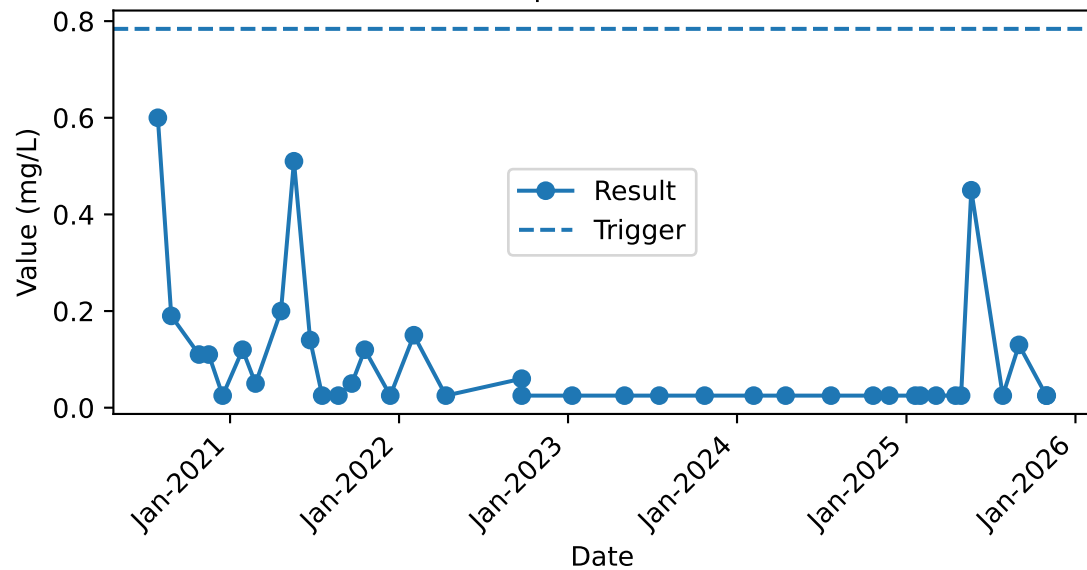
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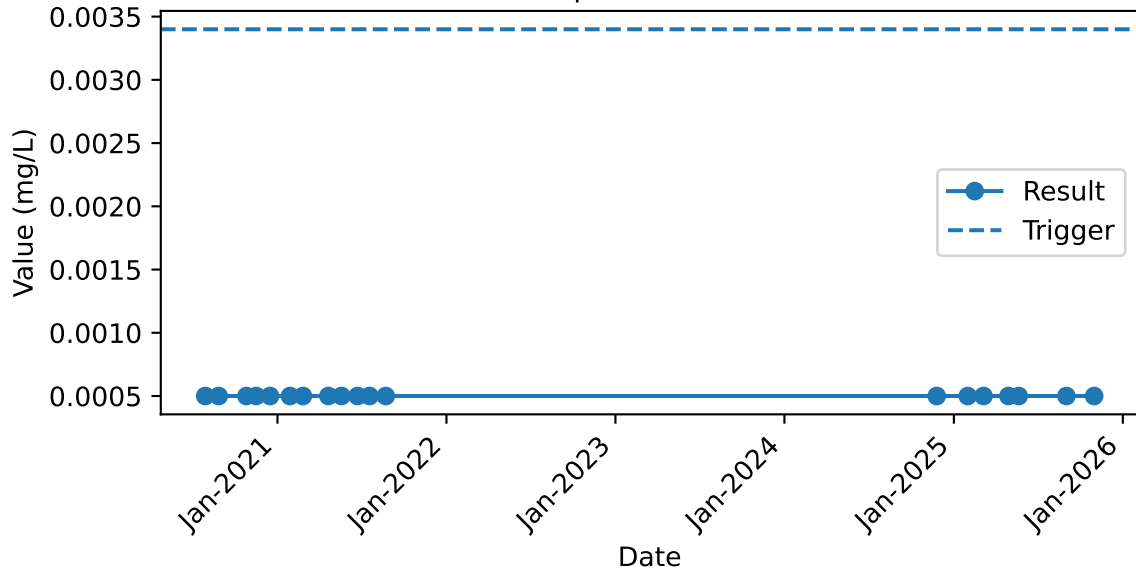
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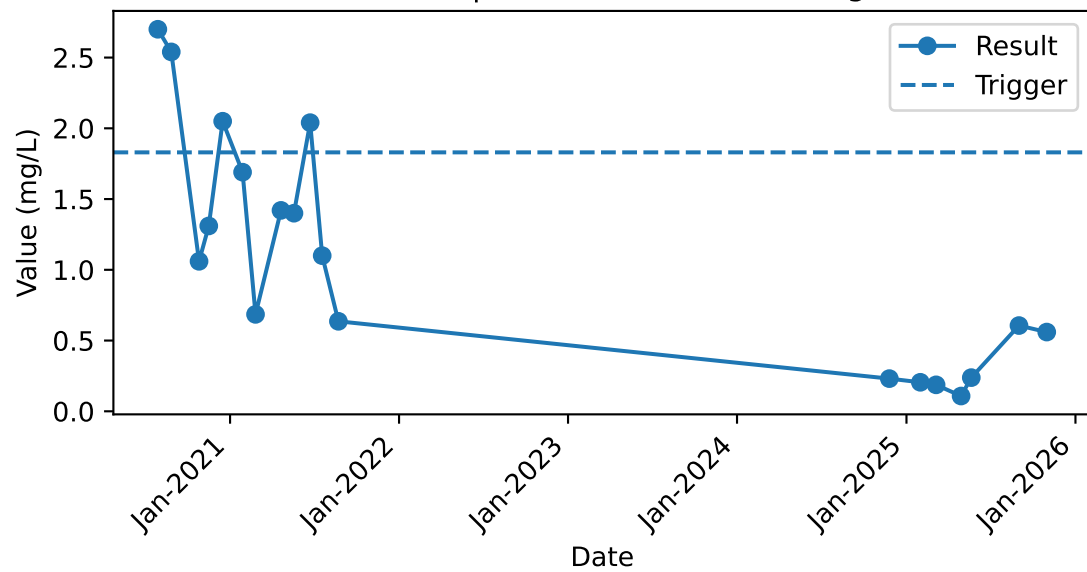
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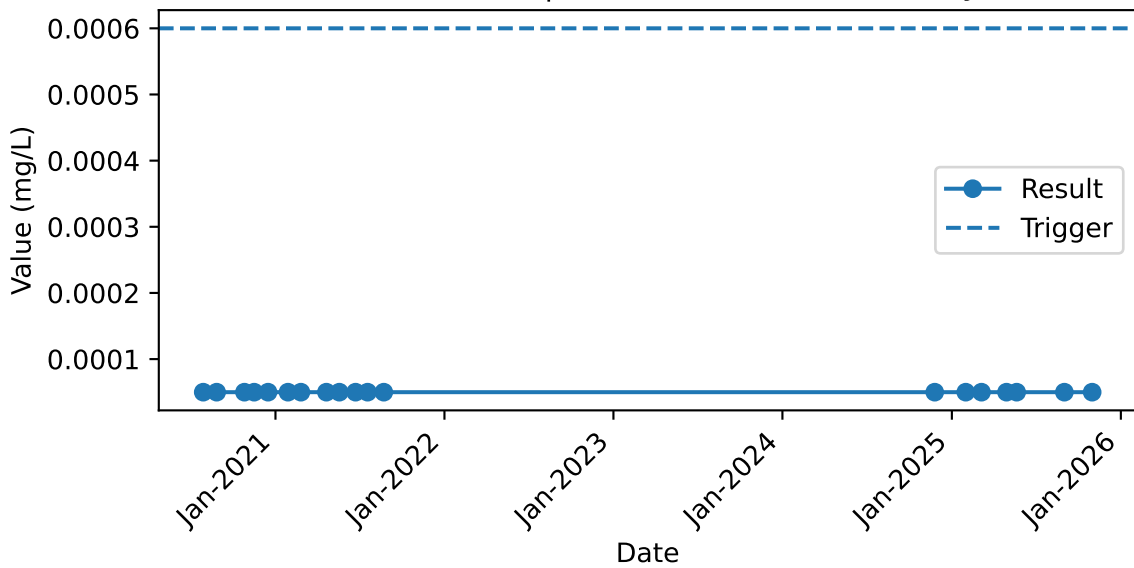
Bore: MBID28 | Param: Dissolved Lead



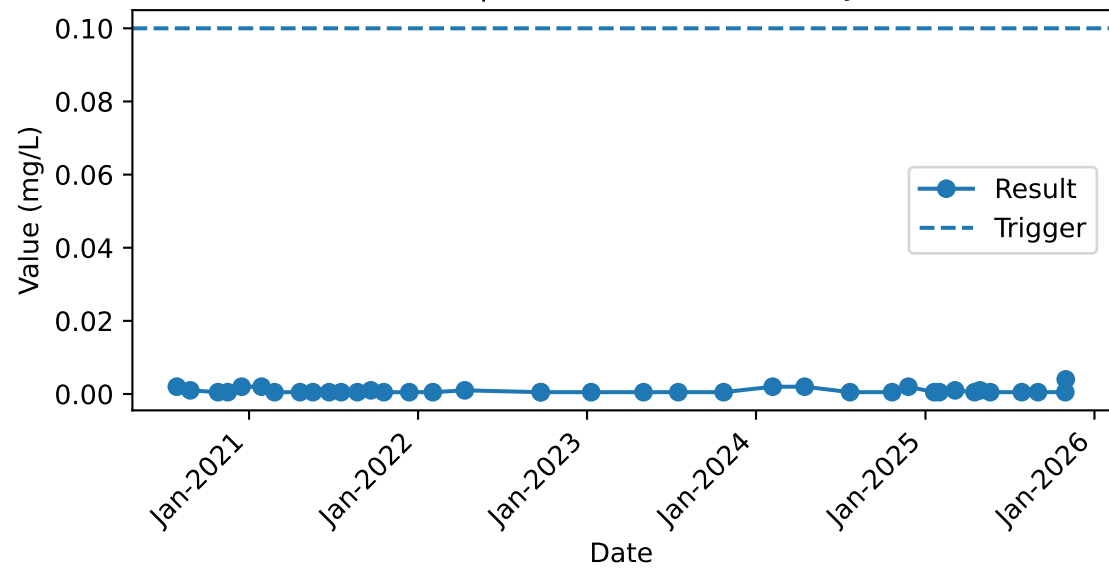
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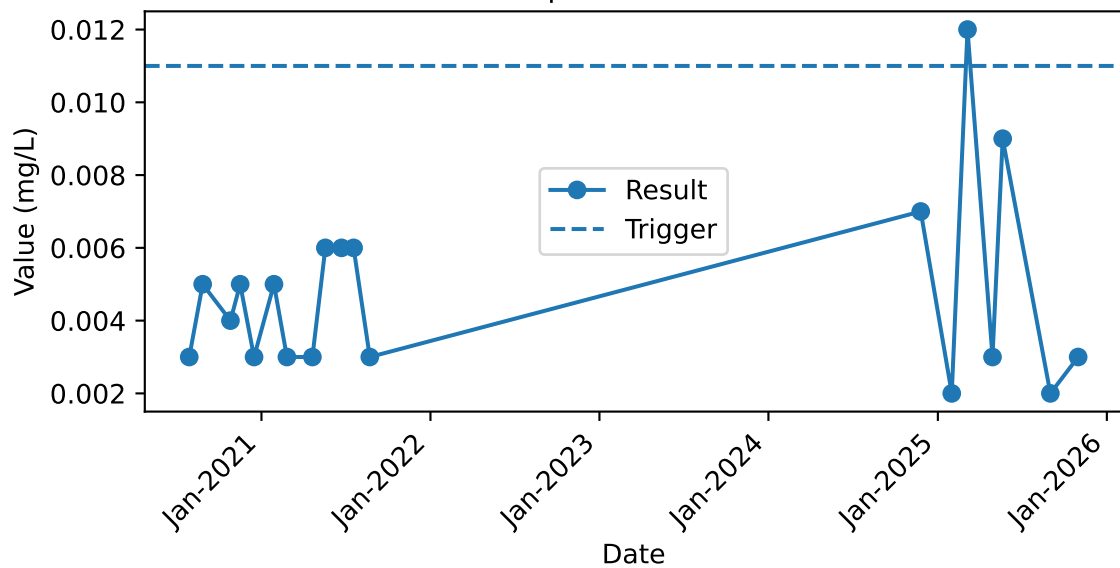
Bore: MBID28 | Param: Dissolved Mercury



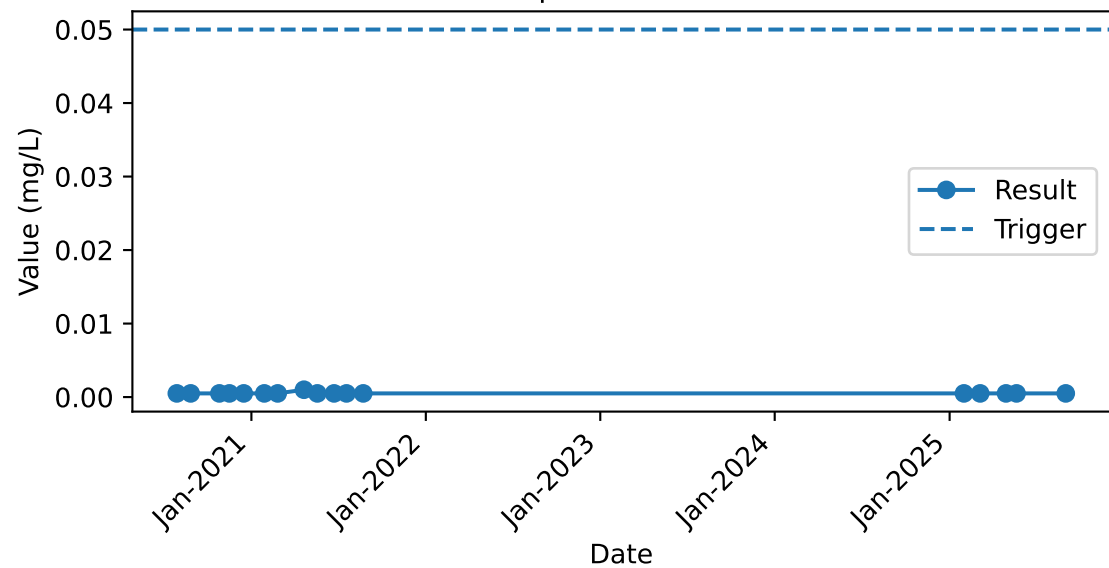
Bore: MBID28 | Param: Dissolved Molybdenum



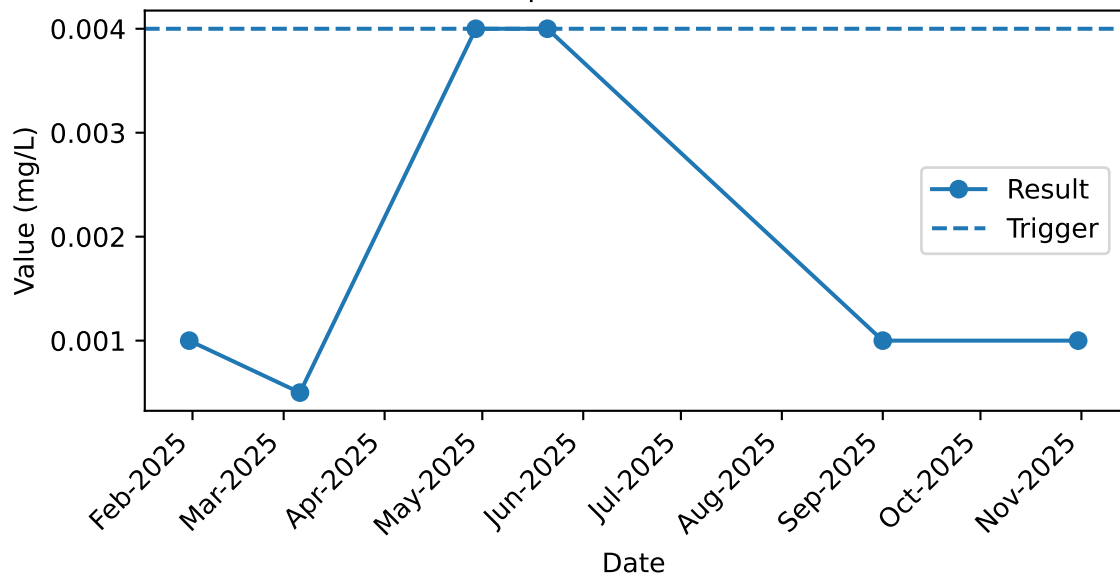
Bore: MBID28 | Param: Dissolved Nickel



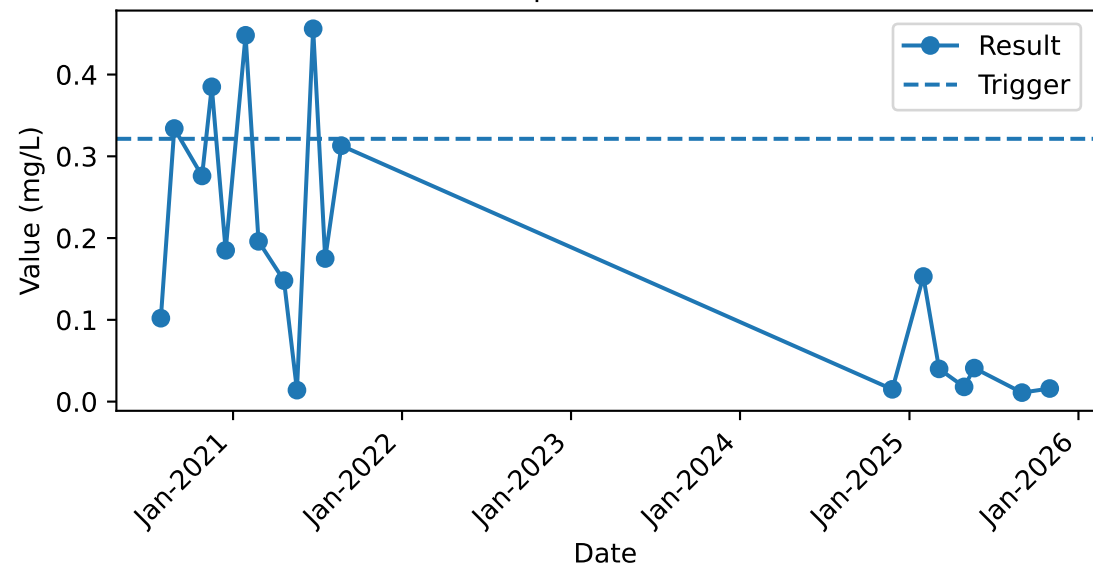
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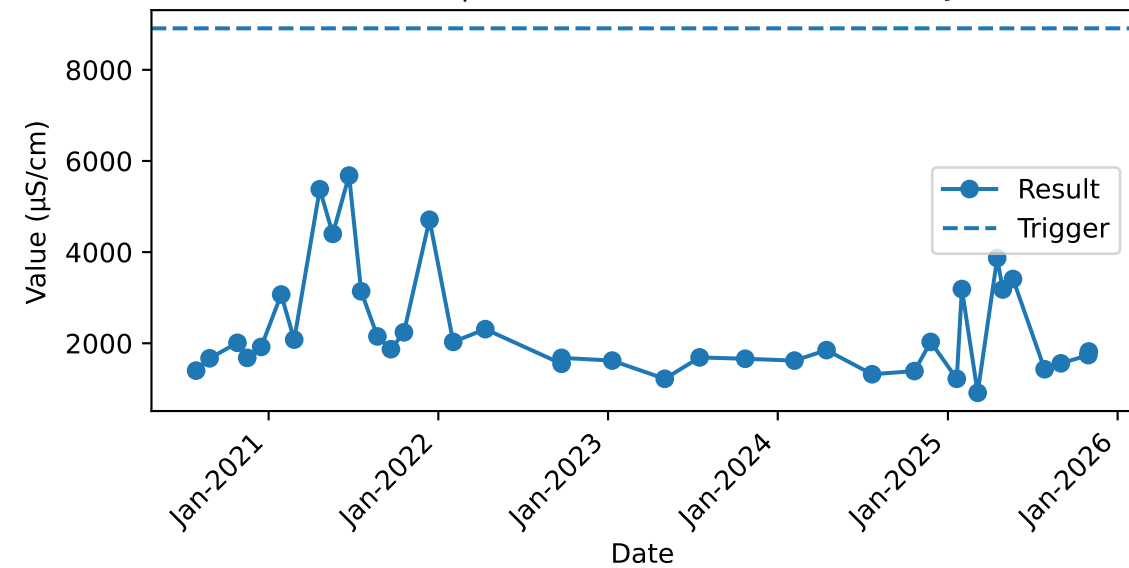
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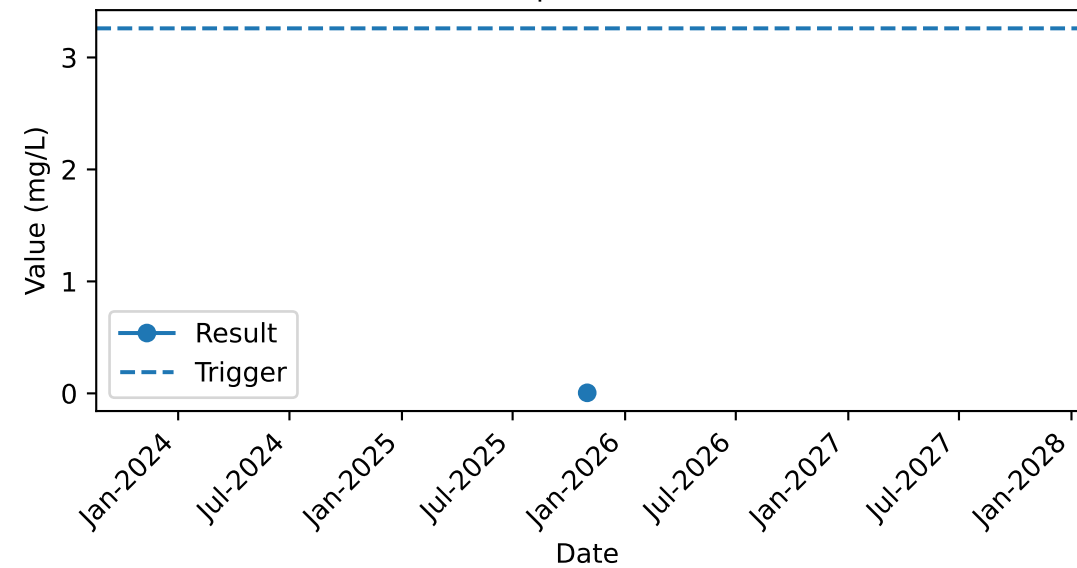
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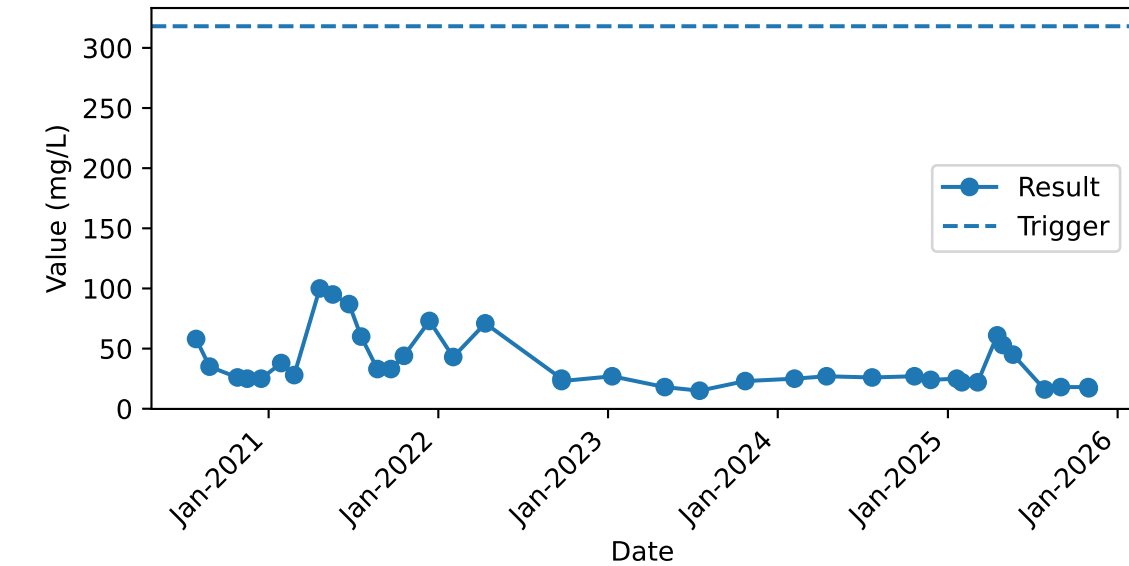
Bore: MBID28 | Param: Electrical Conductivity (Lab)



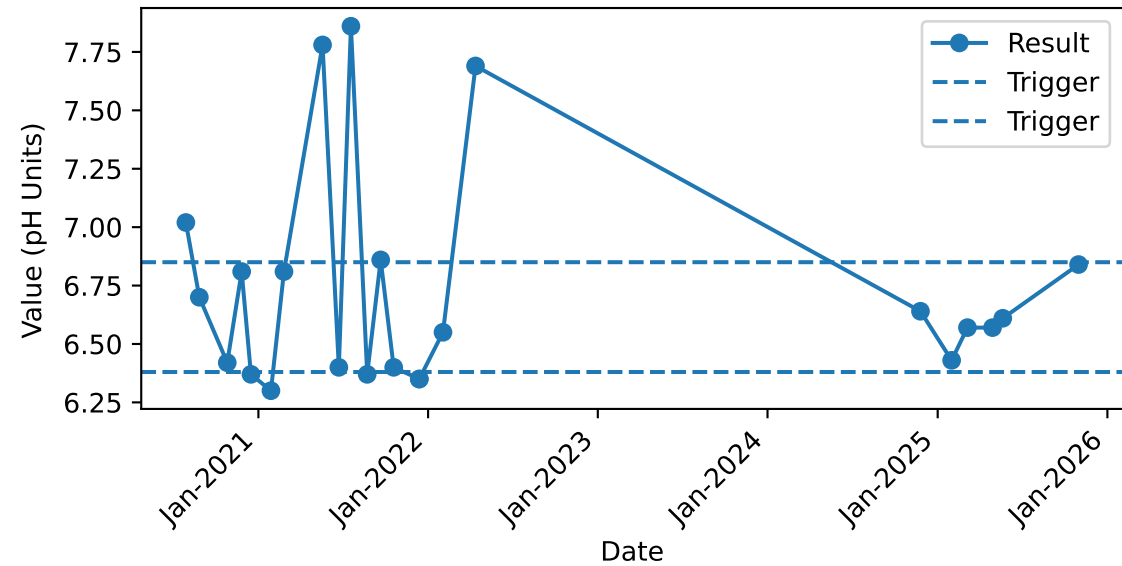
Bore: MBID28 | Param: Nitrate as N



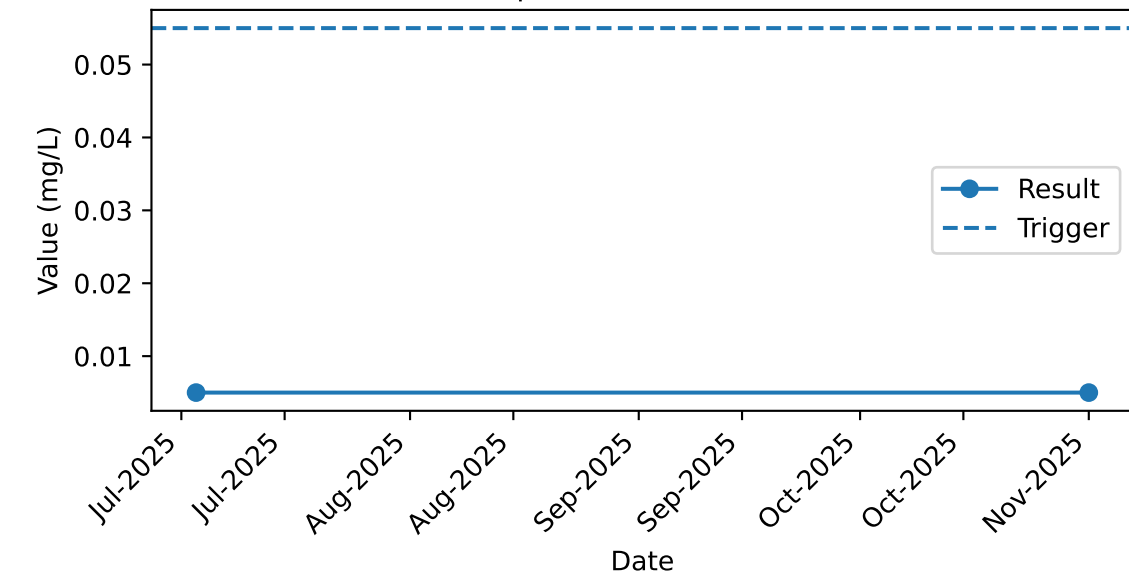
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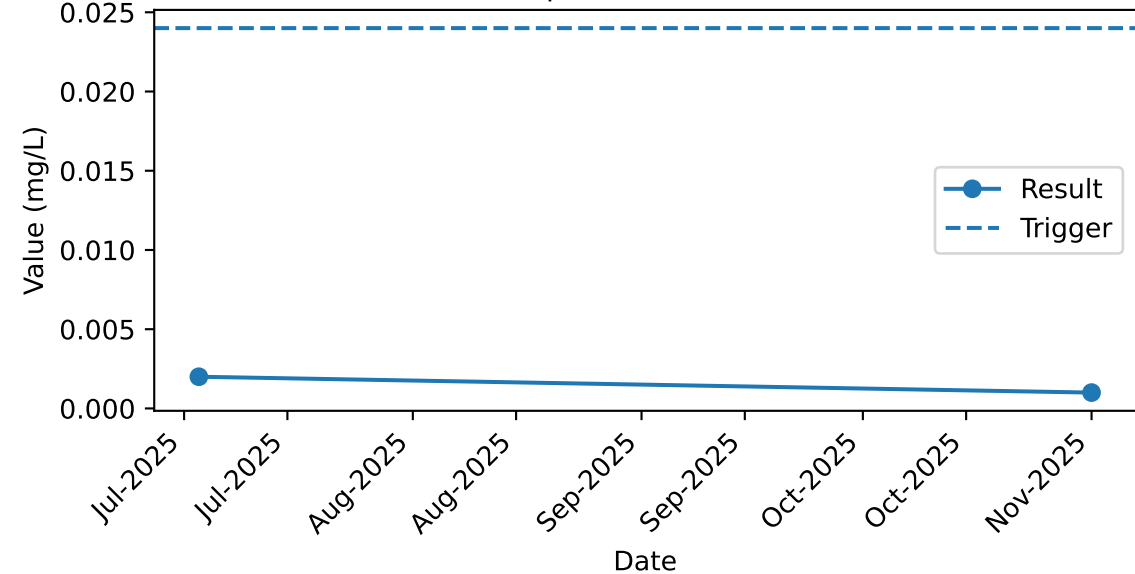
Bore: MBID28 | Param: pH field



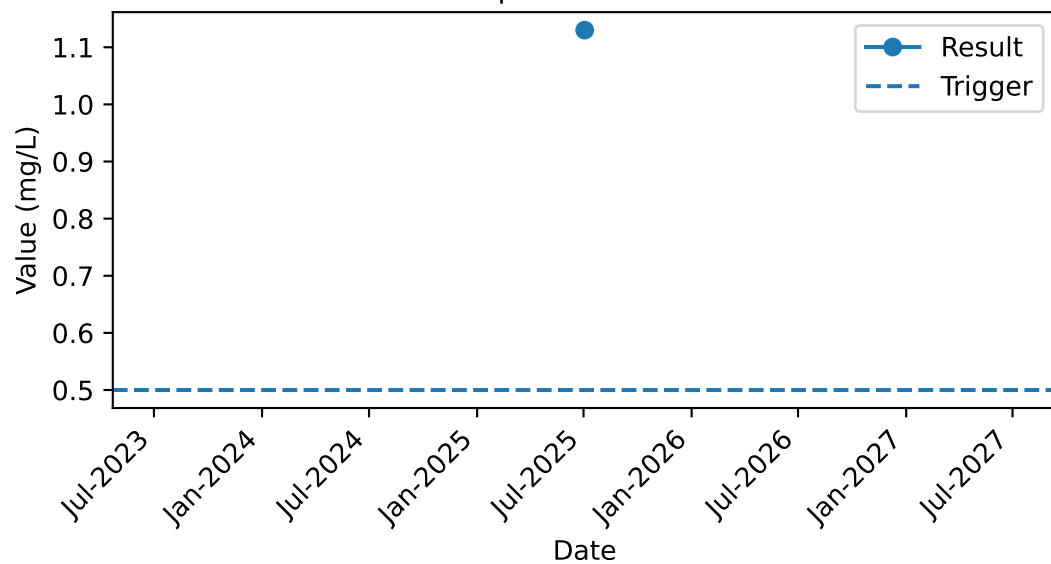
Bore: MBIS02 | Param: Dissolved Aluminium



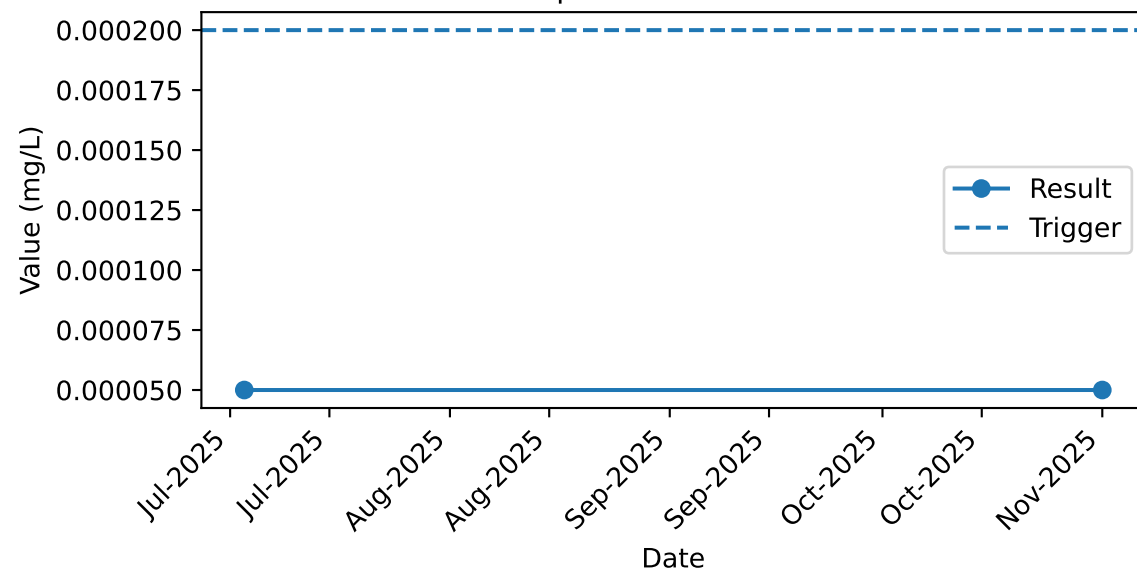
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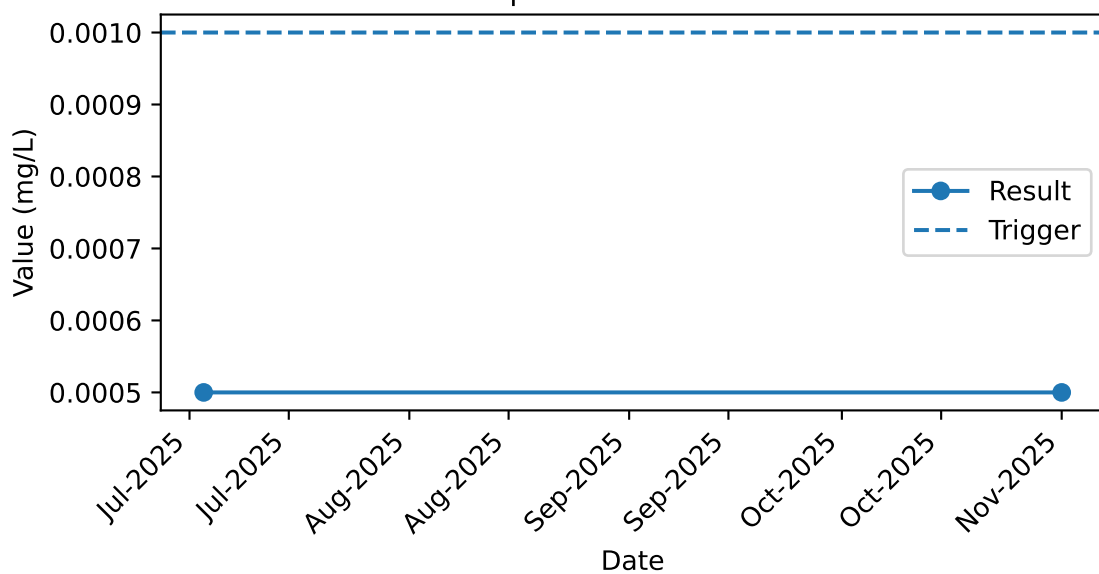
Bore: MBIS02 | Param: Dissolved Boron



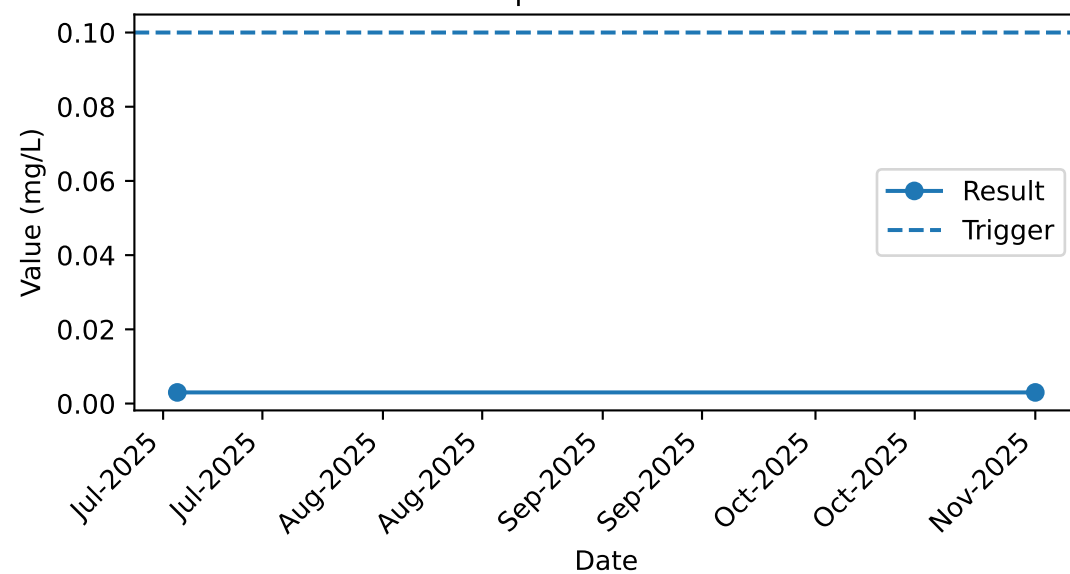
Bore: MBIS02 | Param: Dissolved Cadmium



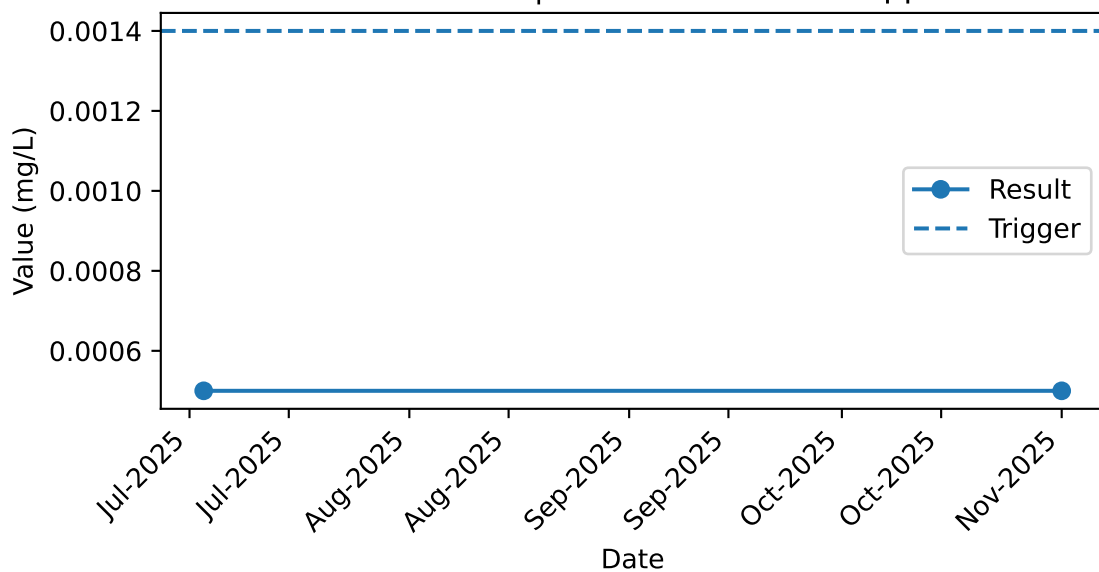
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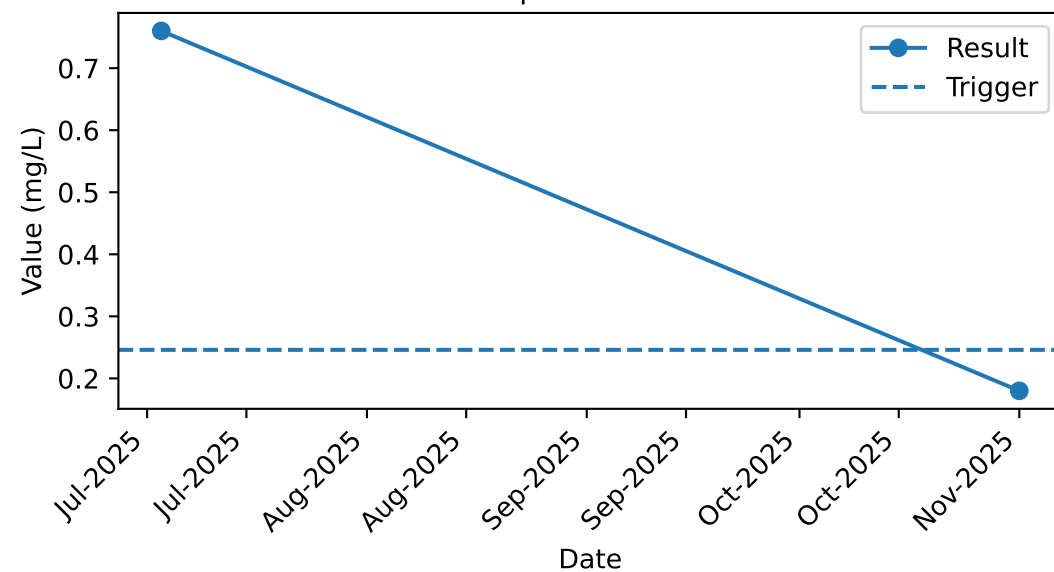
Bore: MBIS02 | Param: Dissolved Cobalt



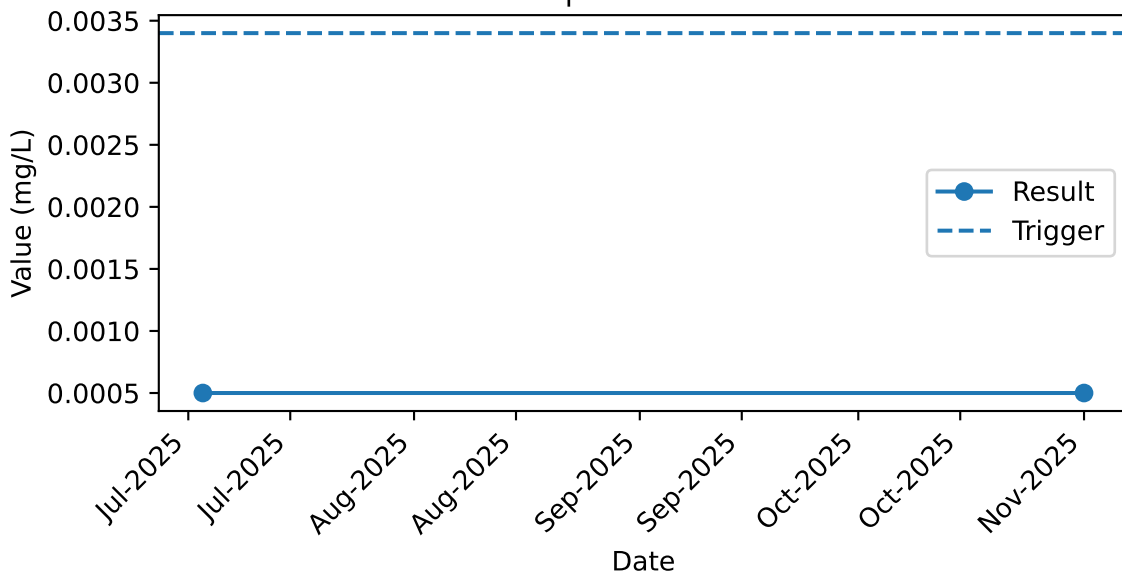
Bore: MBIS02 | Param: Dissolved Copper



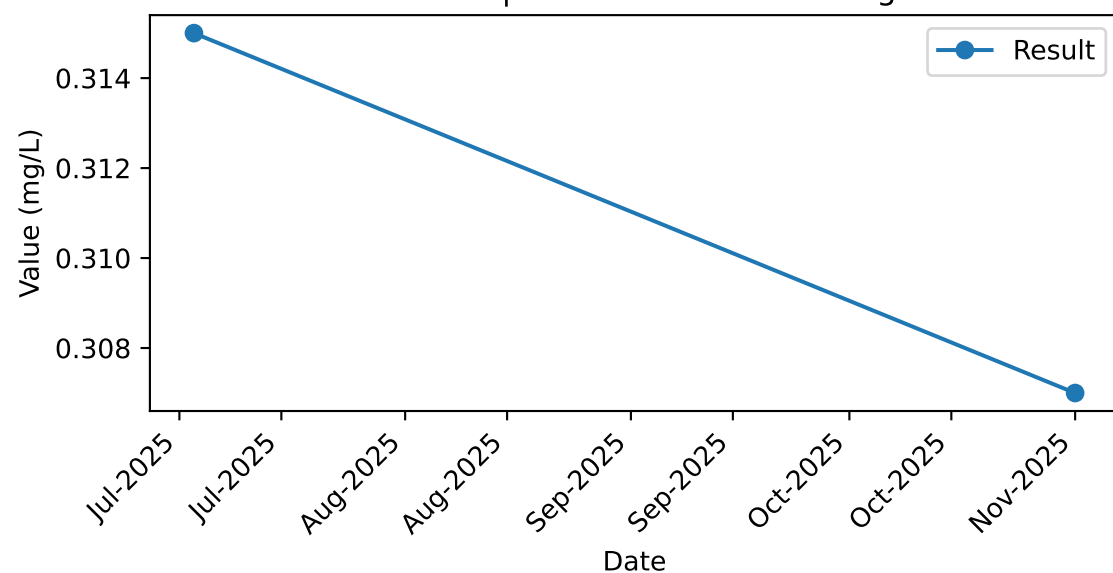
Bore: MBIS02 | Param: Dissolved Iron



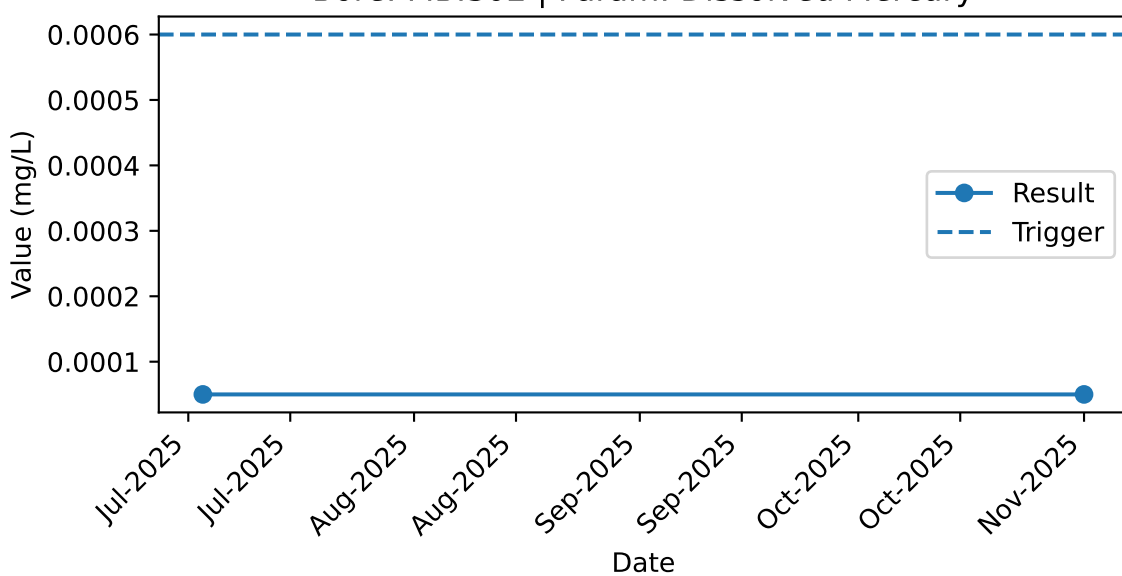
Bore: MBIS02 | Param: Dissolved Lead



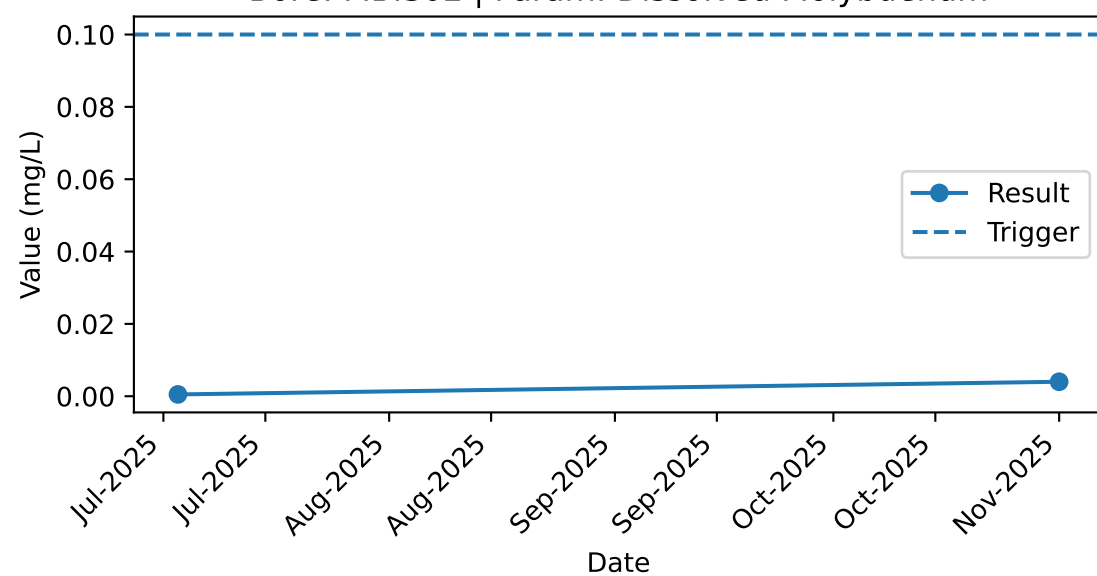
Bore: MBIS02 | Param: Dissolved Manganese



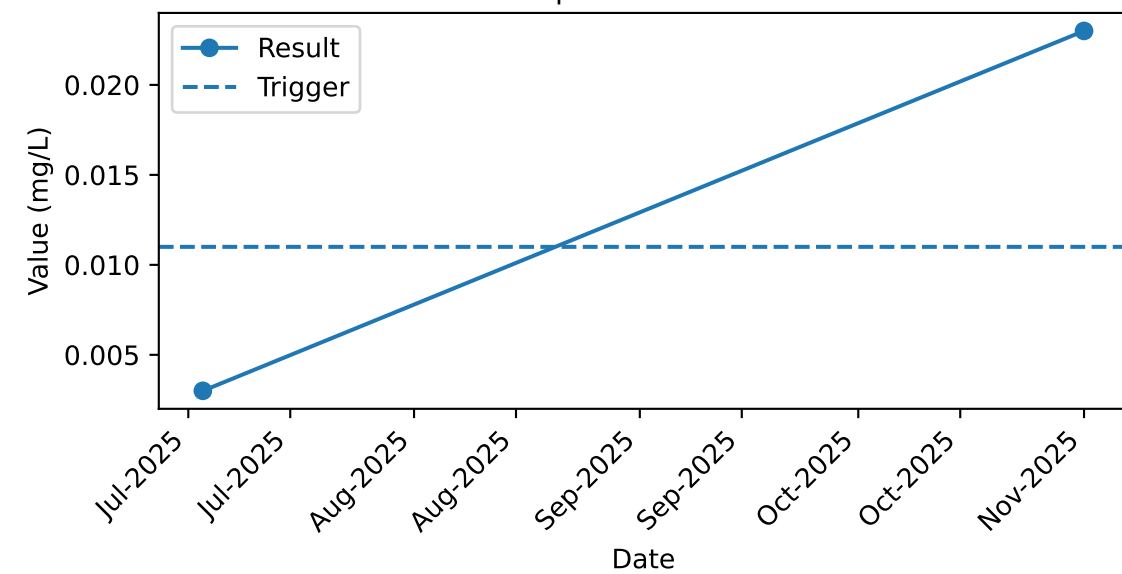
Bore: MBIS02 | Param: Dissolved Mercury



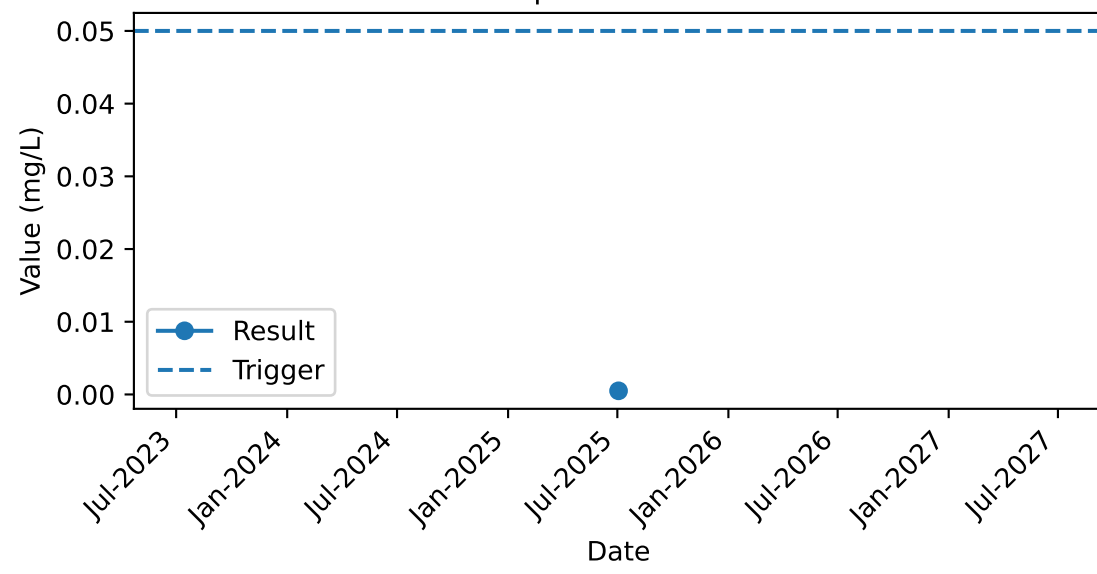
Bore: MBIS02 | Param: Dissolved Molybdenum



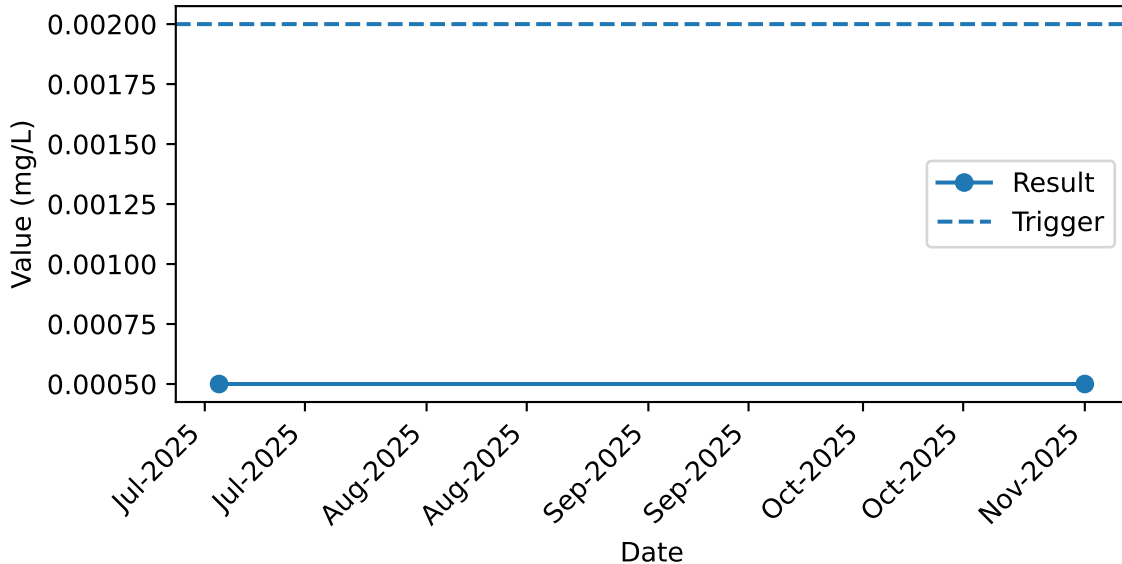
Bore: MBIS02 | Param: Dissolved Nickel



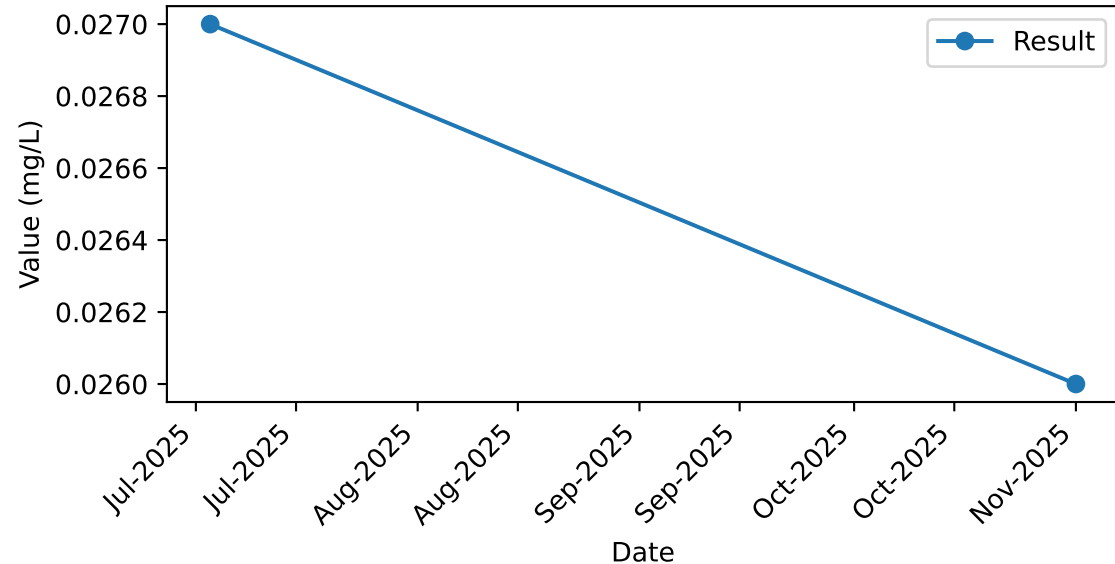
Bore: MBIS02 | Param: Dissolved Silver



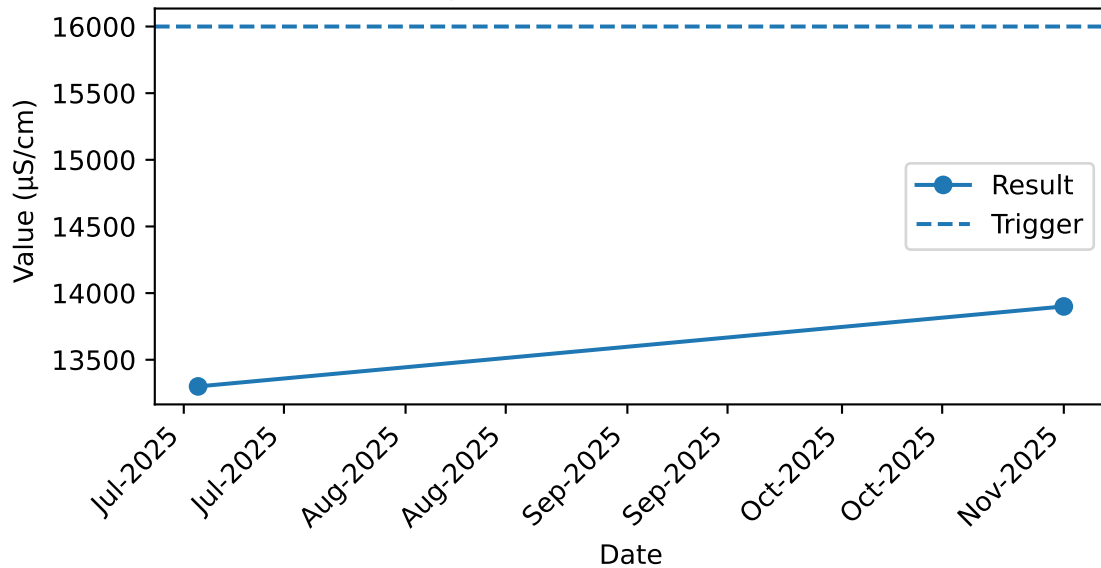
Bore: MBIS02 | Param: Dissolved Uranium



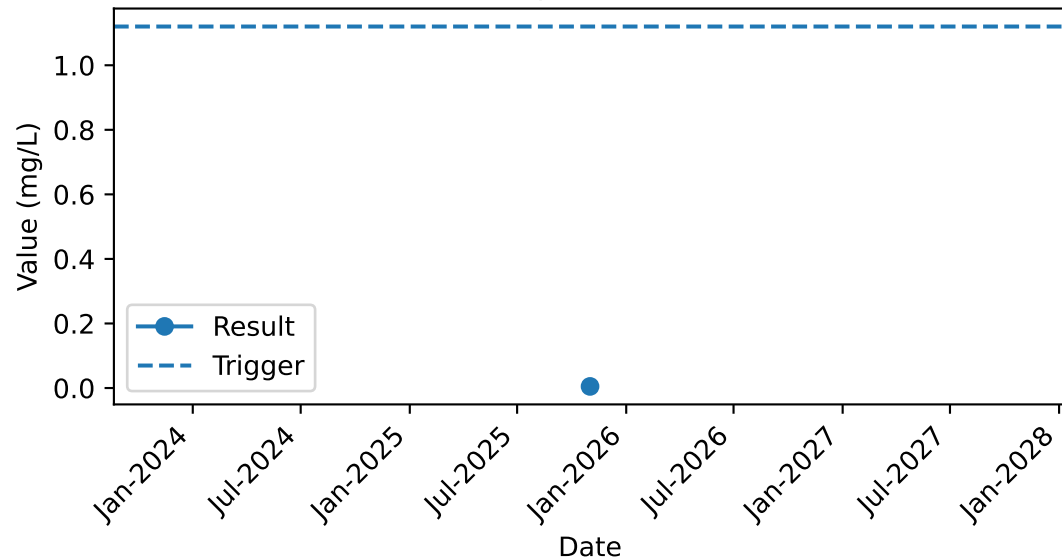
Bore: MBIS02 | Param: Dissolved Zinc



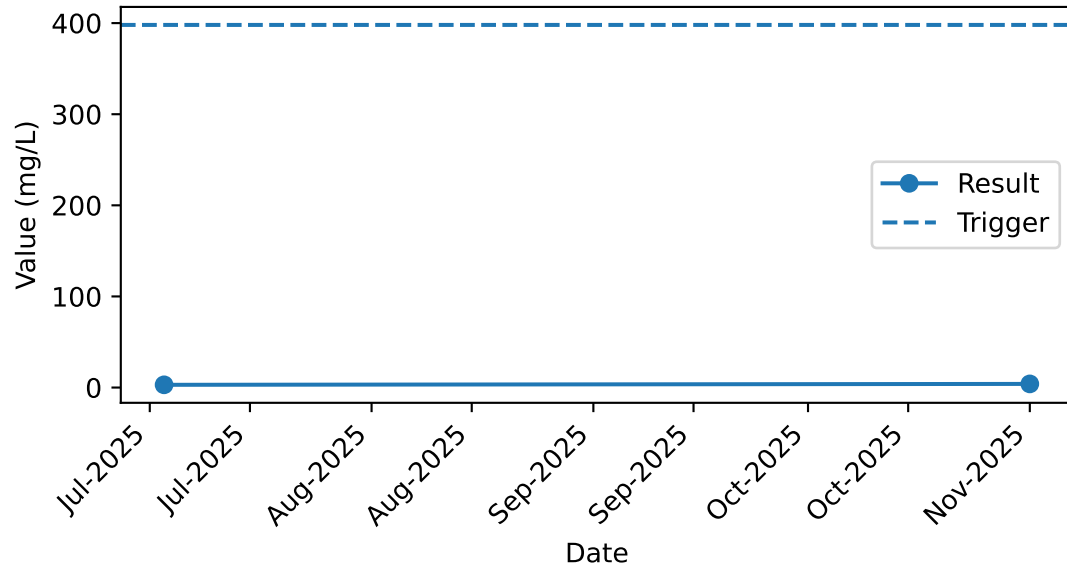
Bore: MBIS02 | Param: Electrical Conductivity (Lab)



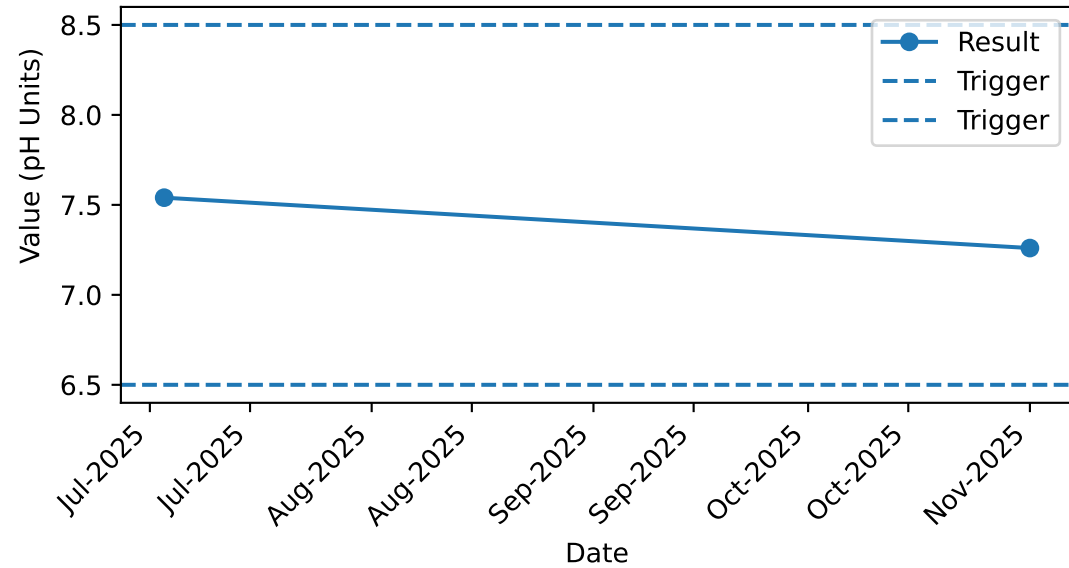
Bore: MBIS02 | Param: Nitrate as N



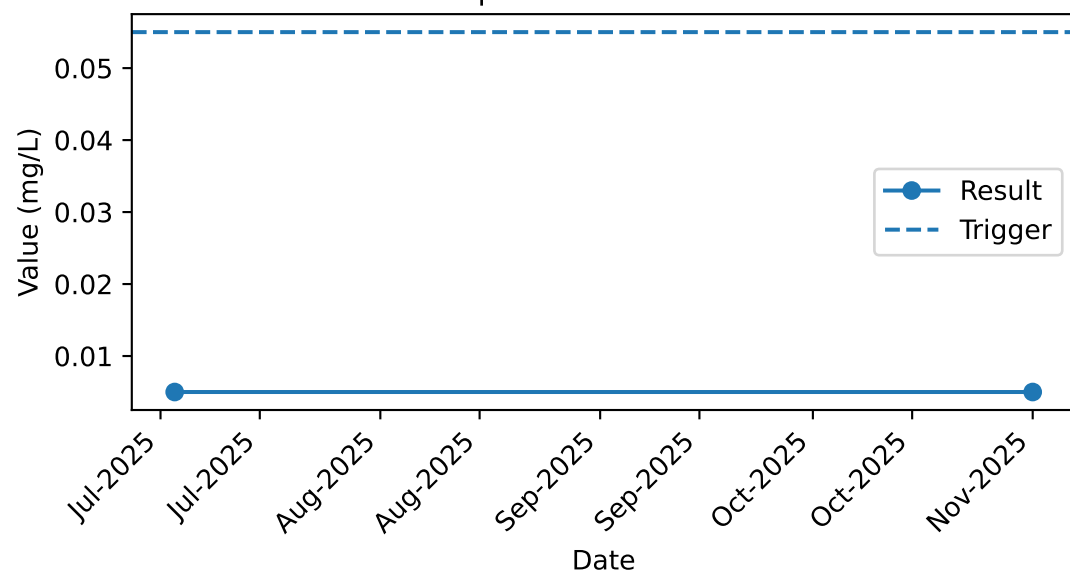
Bore: MBIS02 | Param: Sulfate as SO4



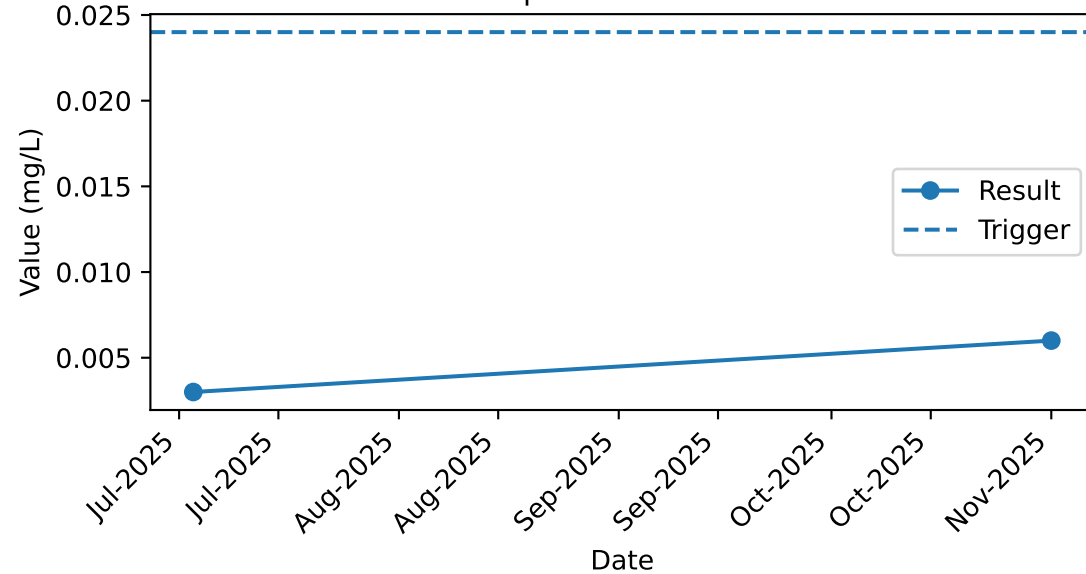
Bore: MBIS02 | Param: pH field



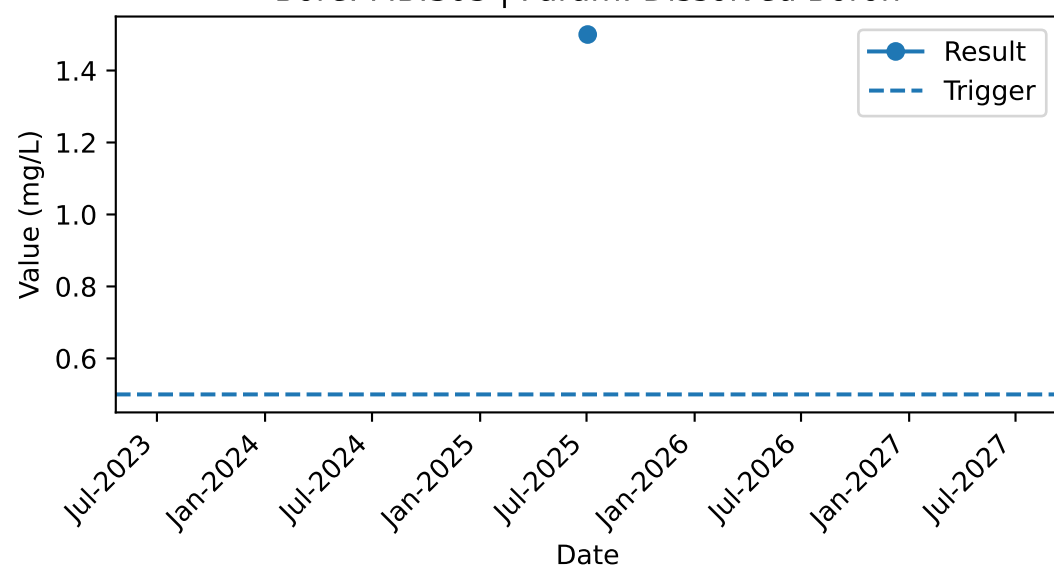
Bore: MBIS03 | Param: Dissolved Aluminium



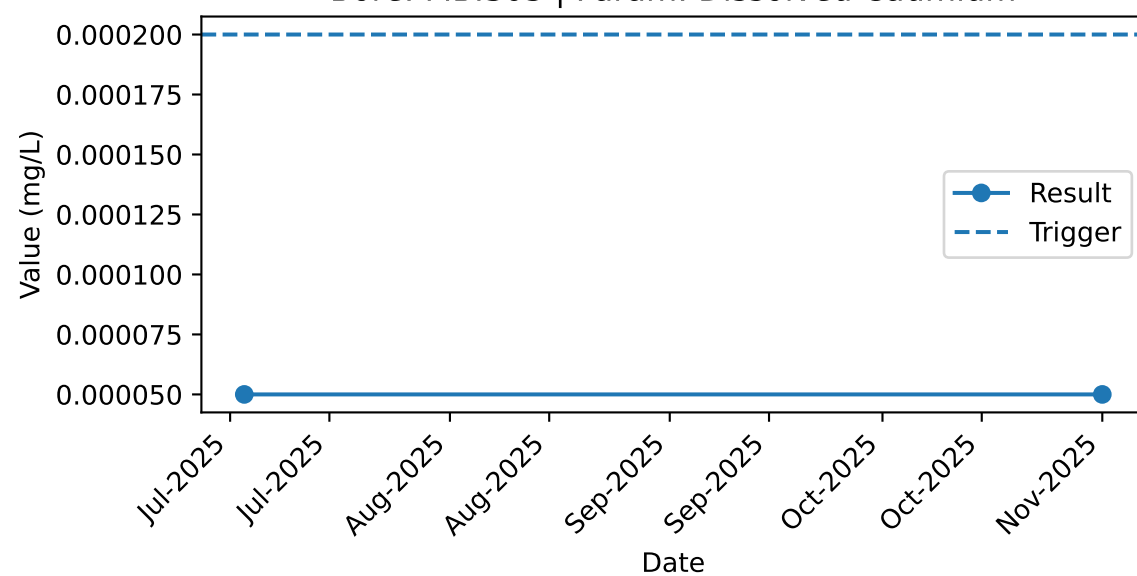
Bore: MBIS03 | Param: Dissolved Arsenic



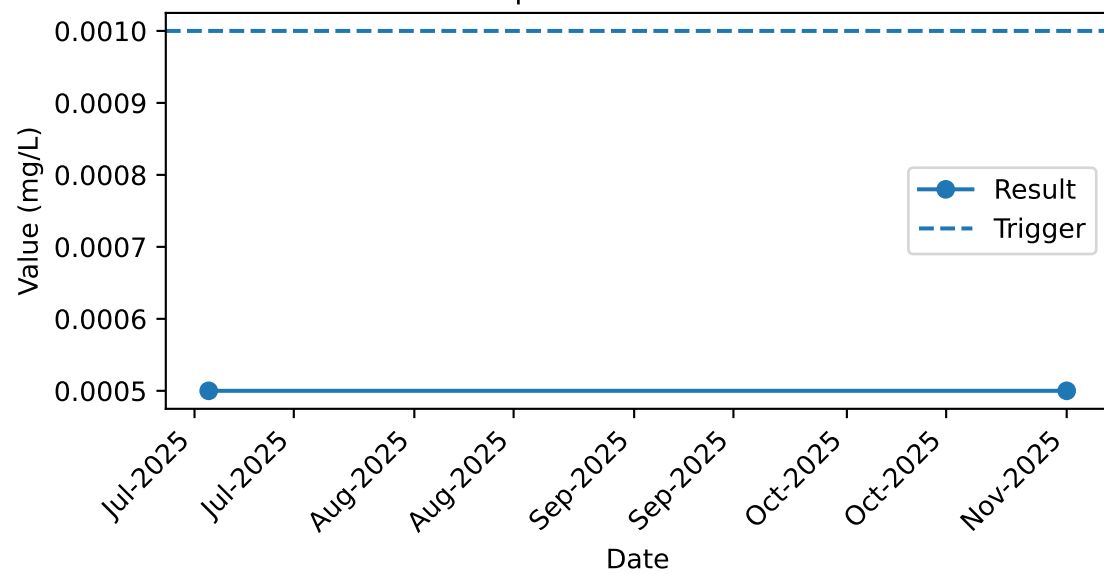
Bore: MBIS03 | Param: Dissolved Boron



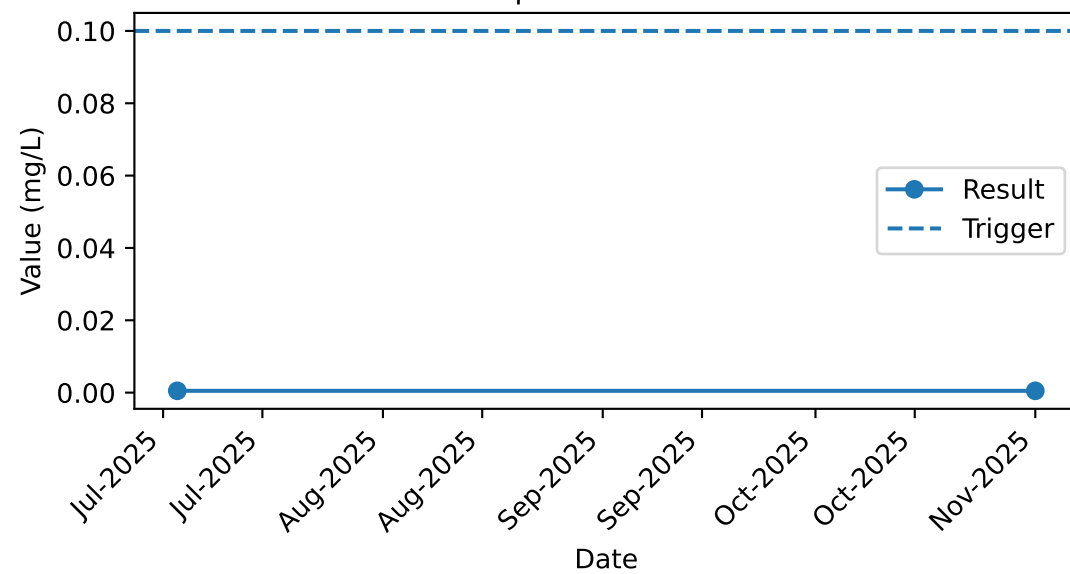
Bore: MBIS03 | Param: Dissolved Cadmium



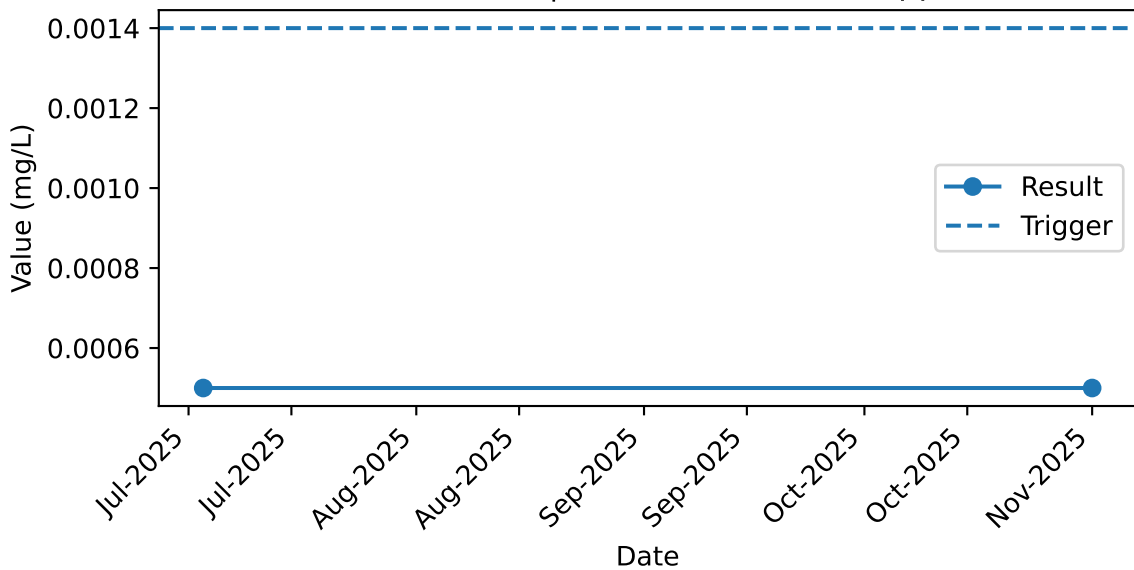
Bore: MBIS03 | Param: Dissolved Chromium



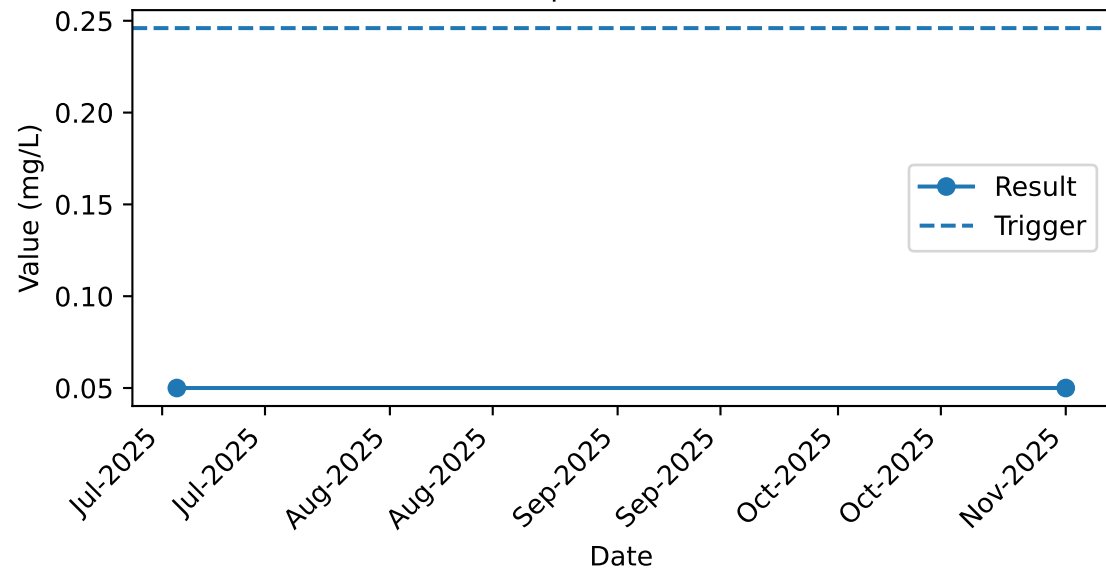
Bore: MBIS03 | Param: Dissolved Cobalt



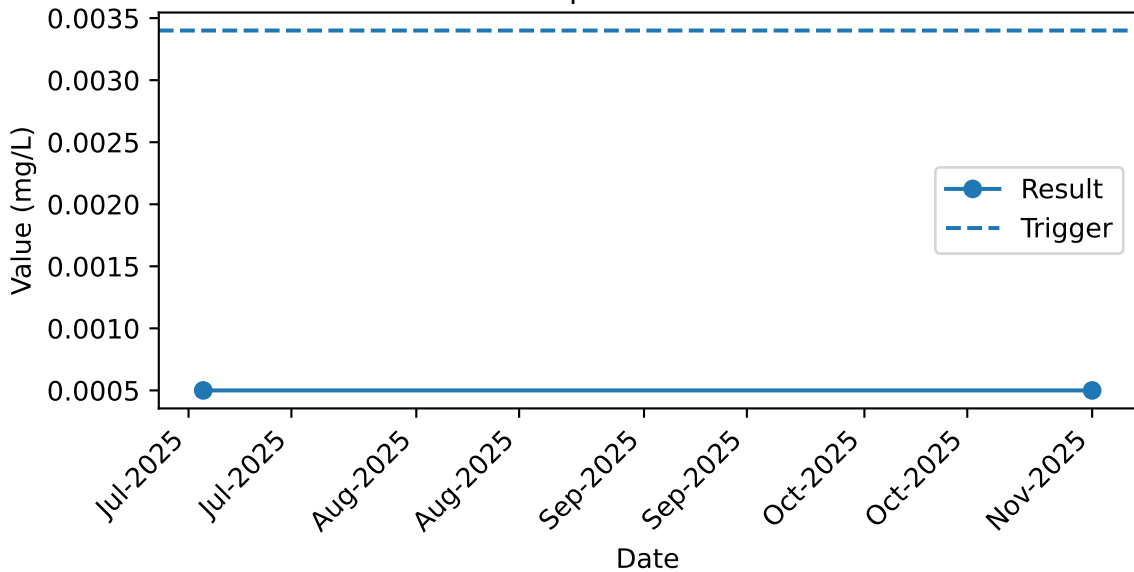
Bore: MBIS03 | Param: Dissolved Copper



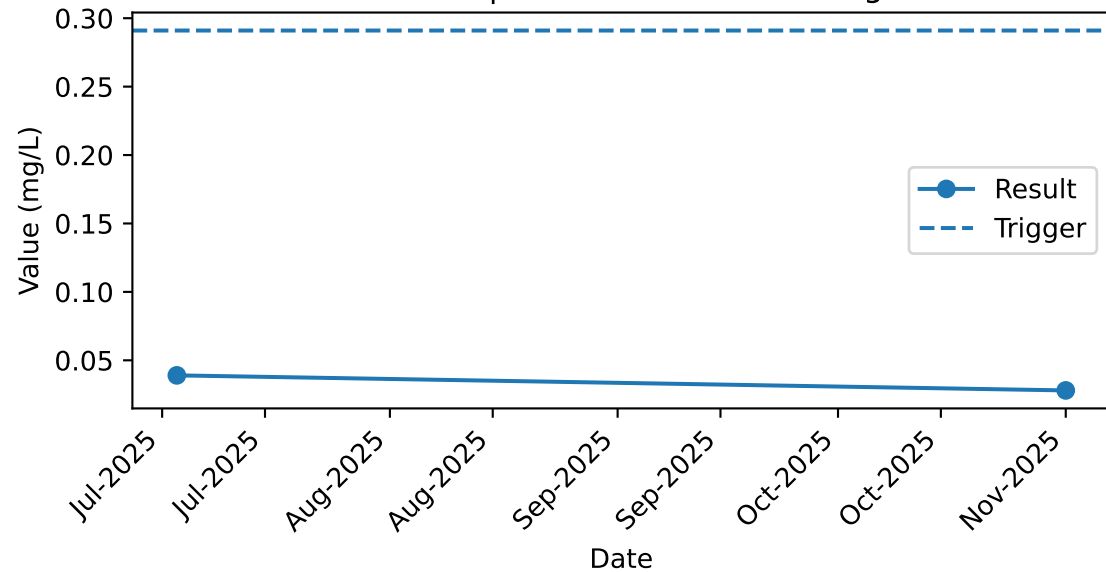
Bore: MBIS03 | Param: Dissolved Iron



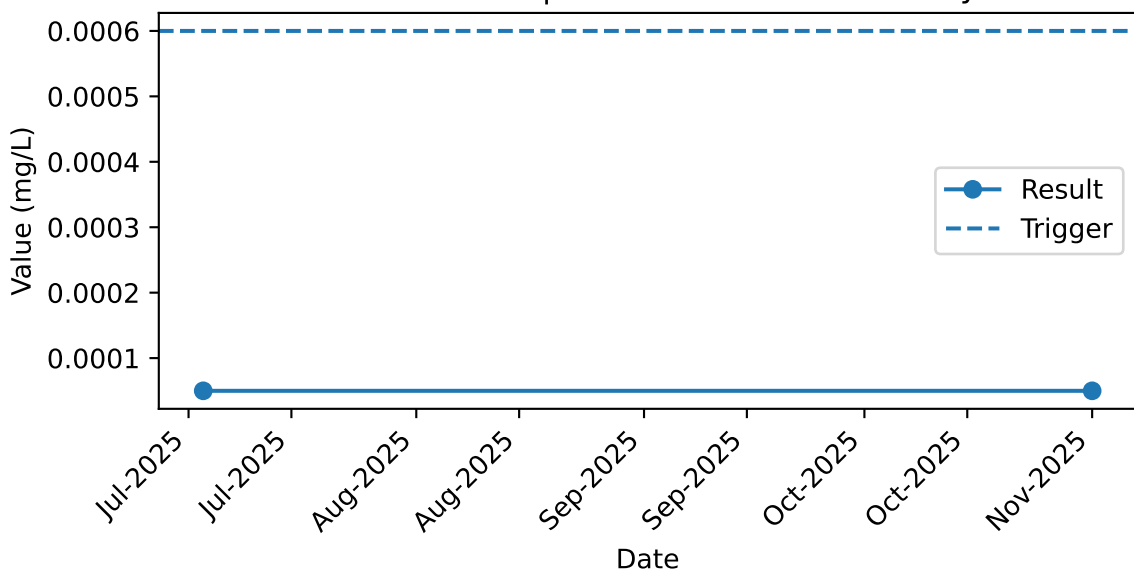
Bore: MBIS03 | Param: Dissolved Lead



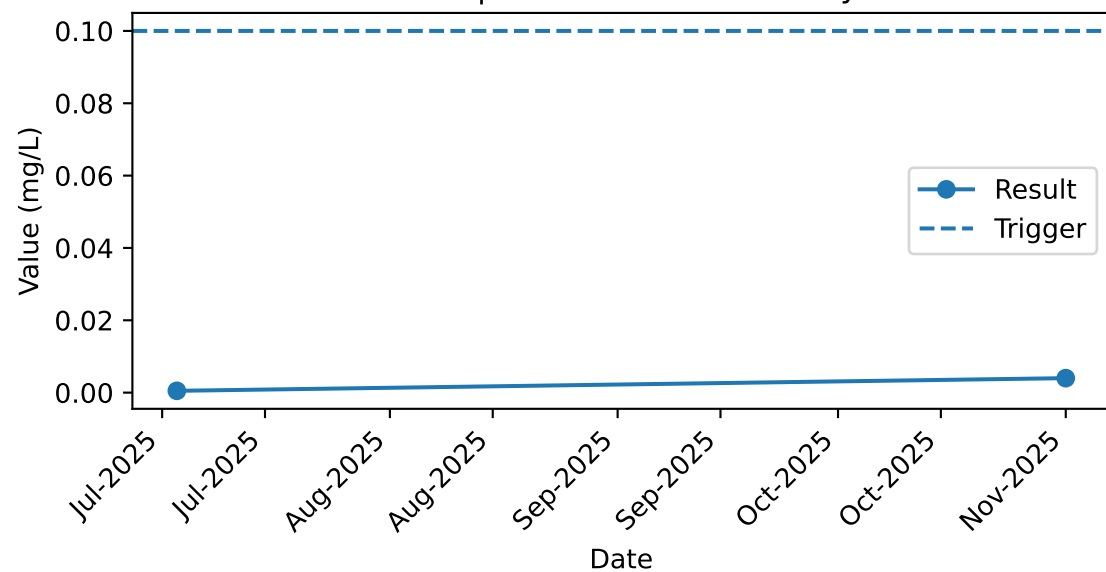
Bore: MBIS03 | Param: Dissolved Manganese



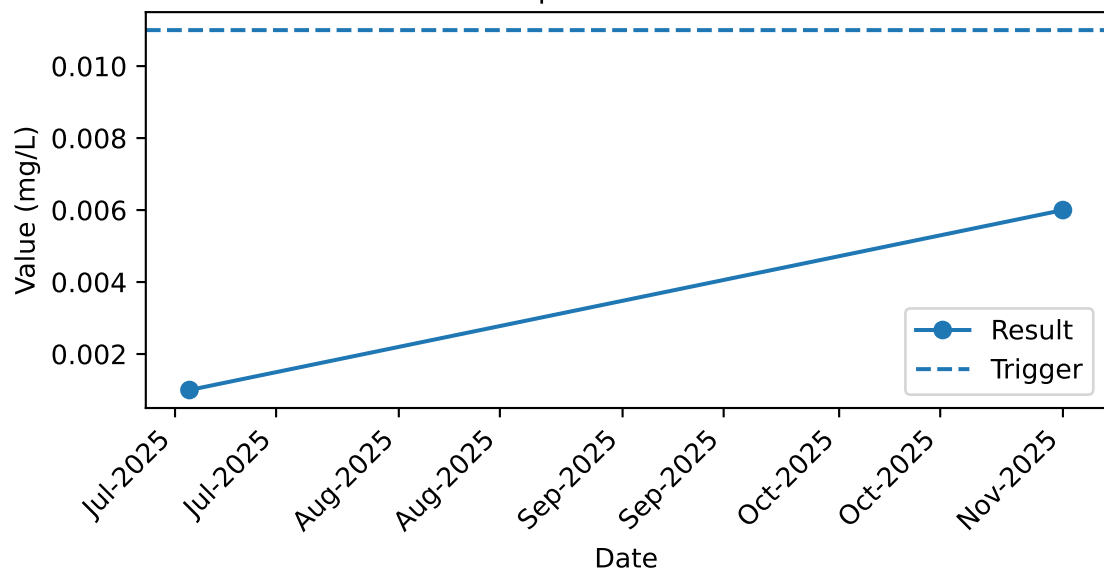
Bore: MBIS03 | Param: Dissolved Mercury



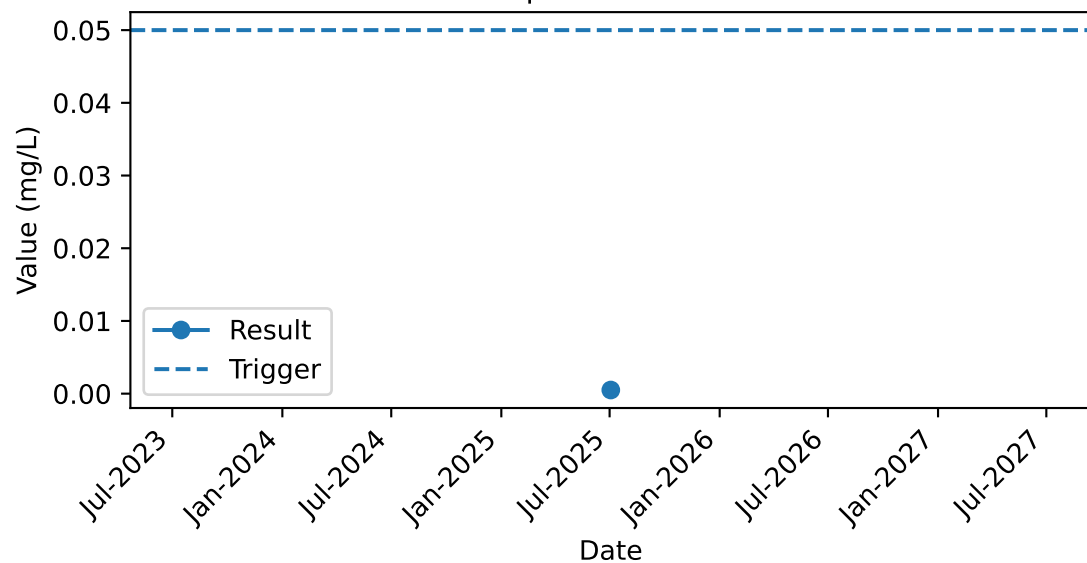
Bore: MBIS03 | Param: Dissolved Molybdenum



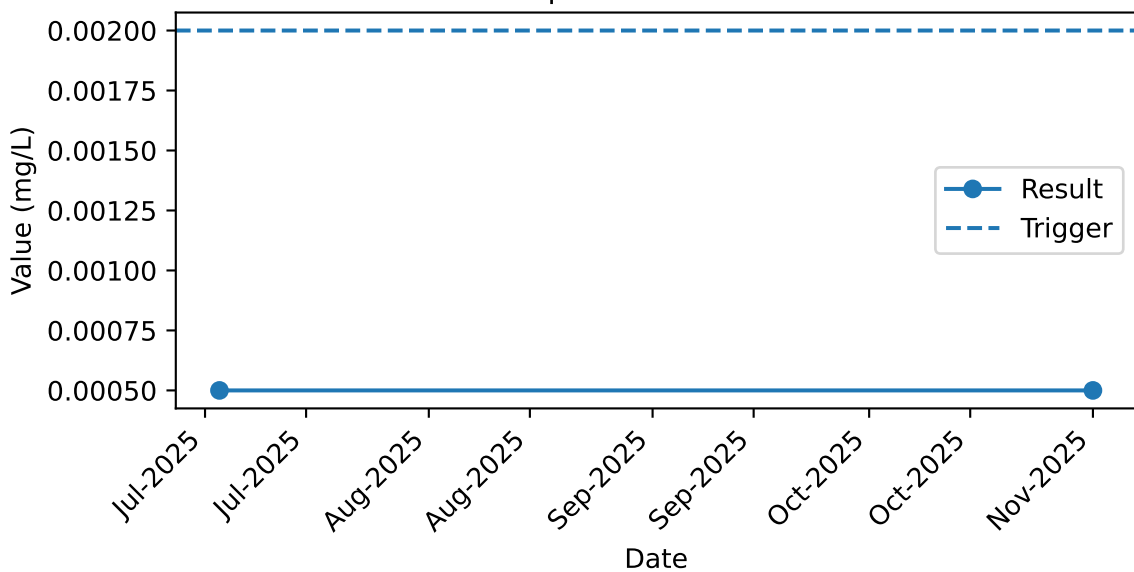
Bore: MBIS03 | Param: Dissolved Nickel



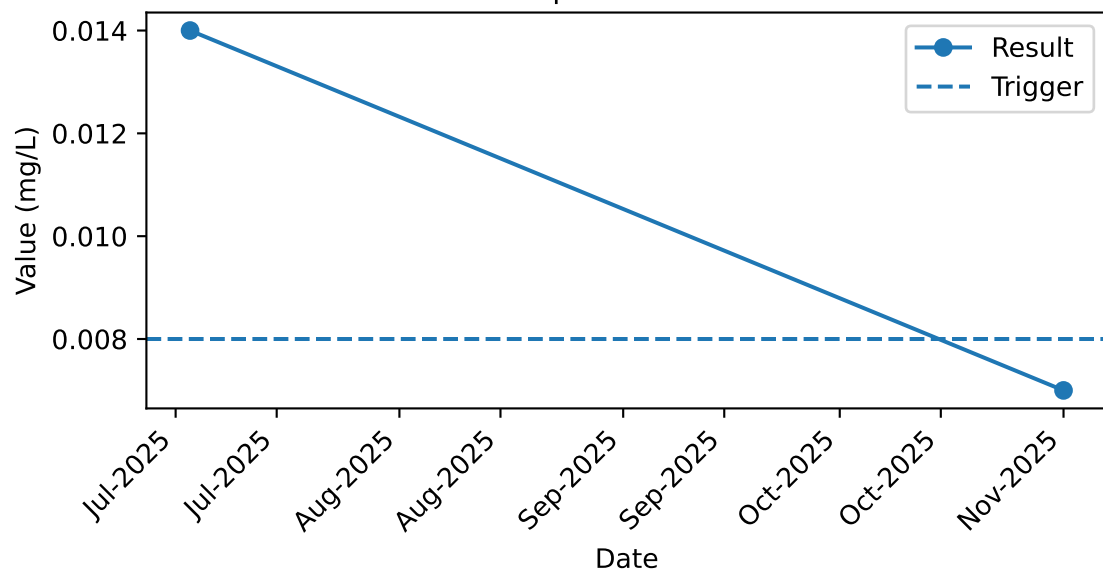
Bore: MBIS03 | Param: Dissolved Silver



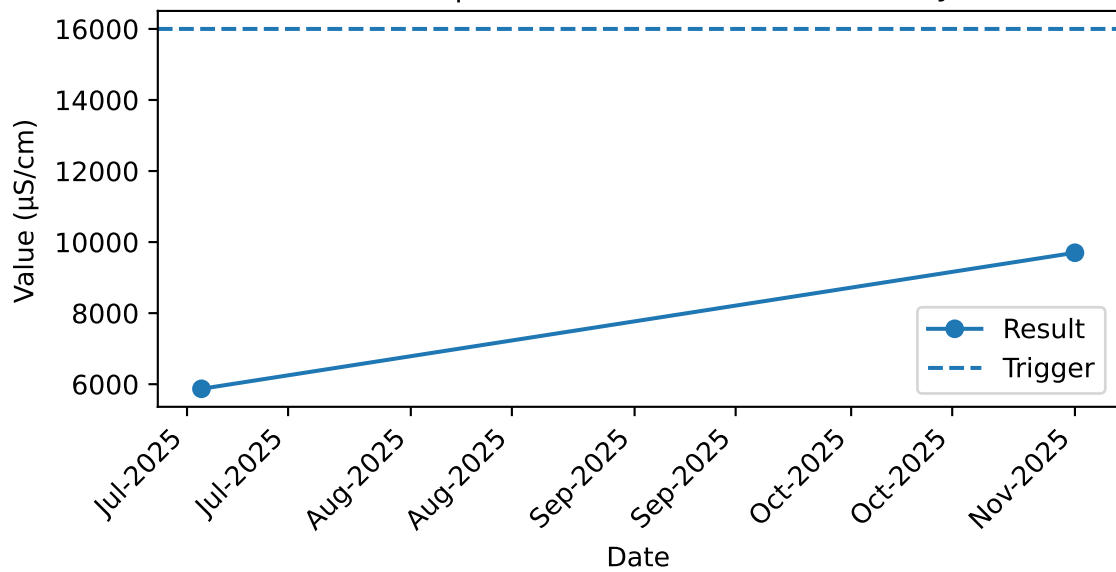
Bore: MBIS03 | Param: Dissolved Uranium



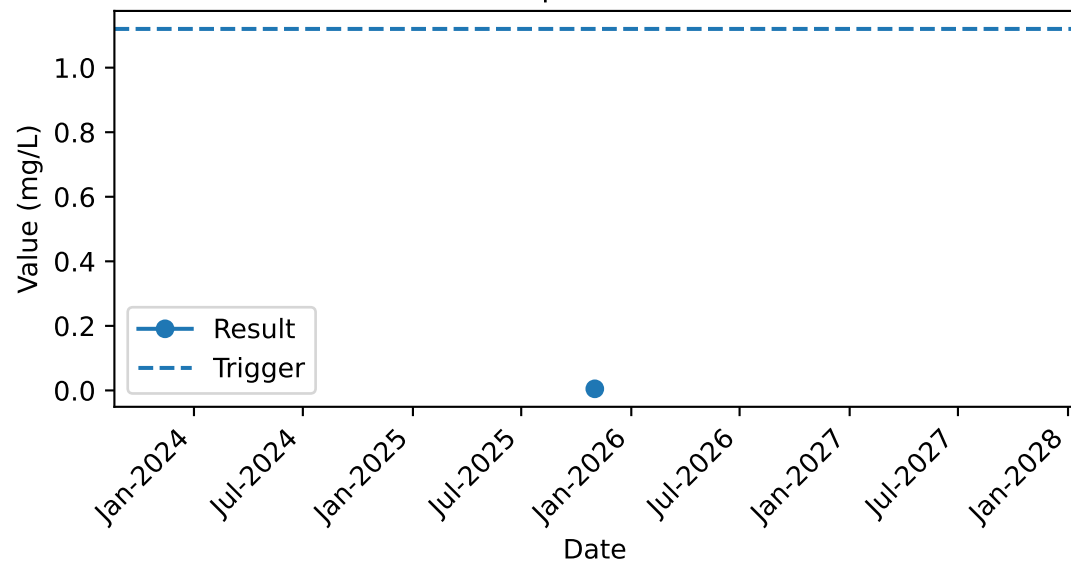
Bore: MBIS03 | Param: Dissolved Zinc



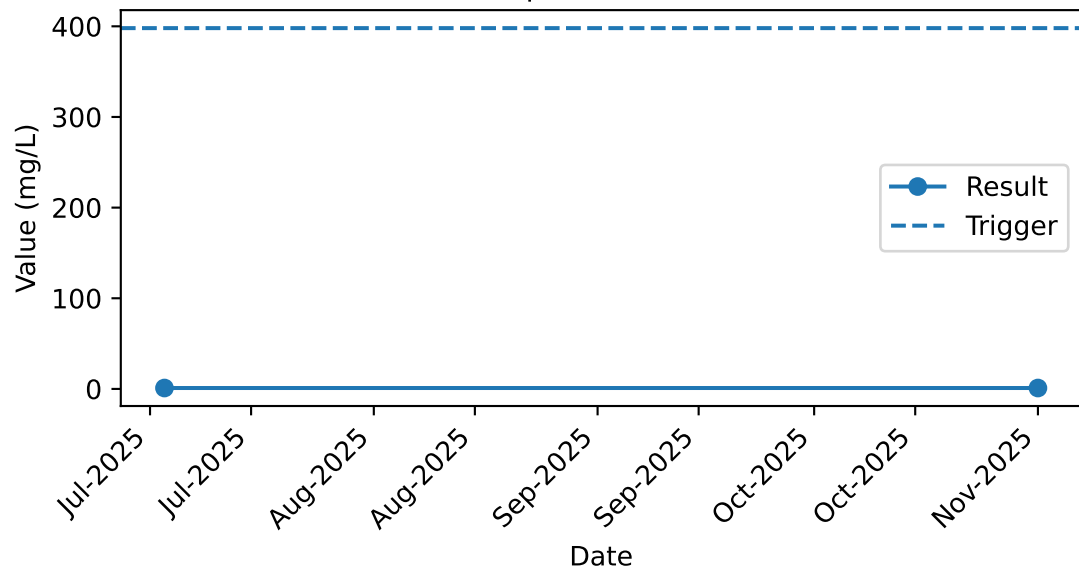
Bore: MBIS03 | Param: Electrical Conductivity (Lab)



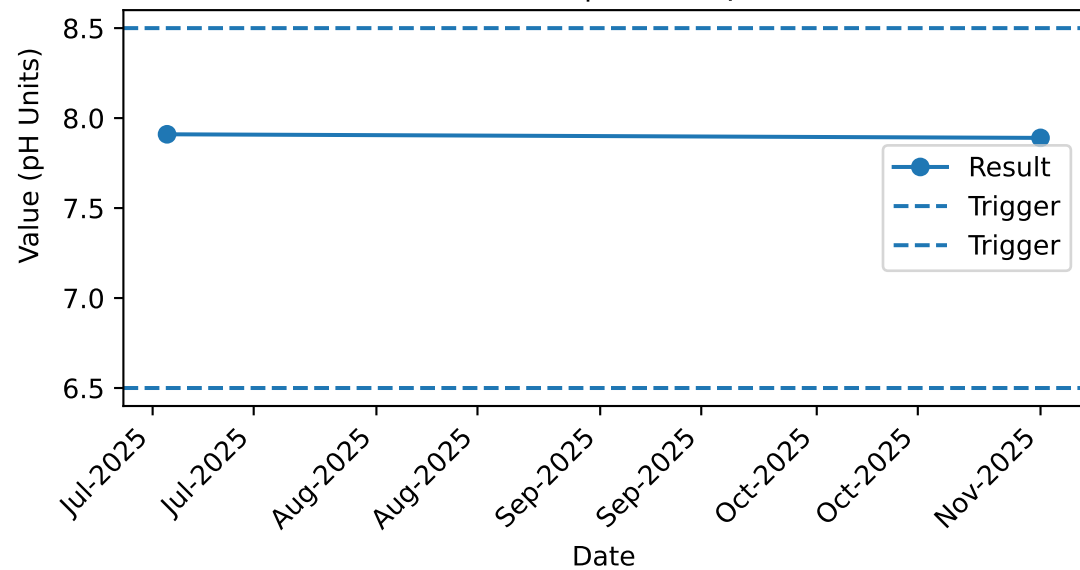
Bore: MBIS03 | Param: Nitrate as N



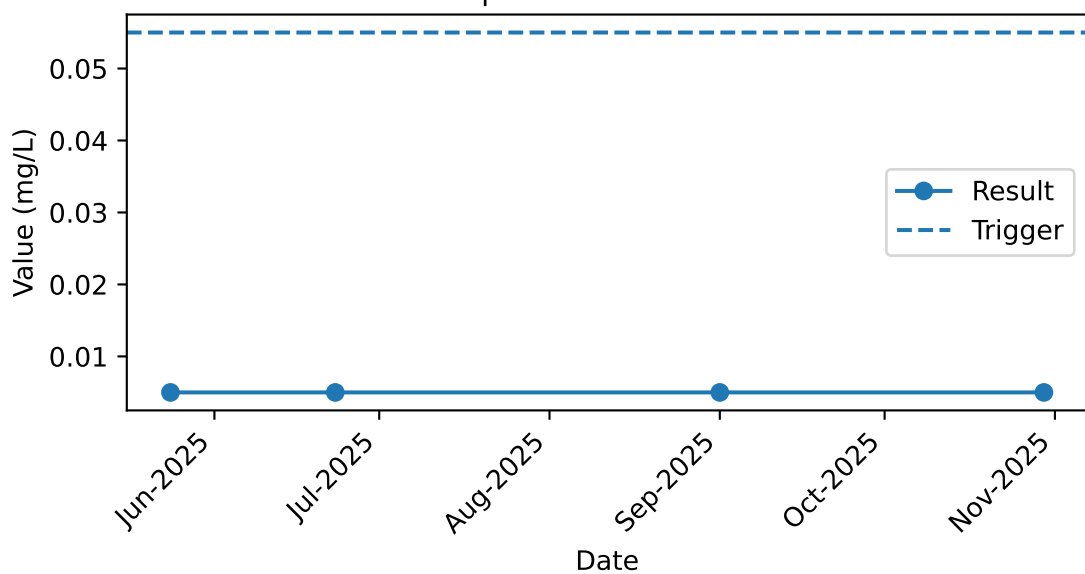
Bore: MBIS03 | Param: Sulfate as SO4



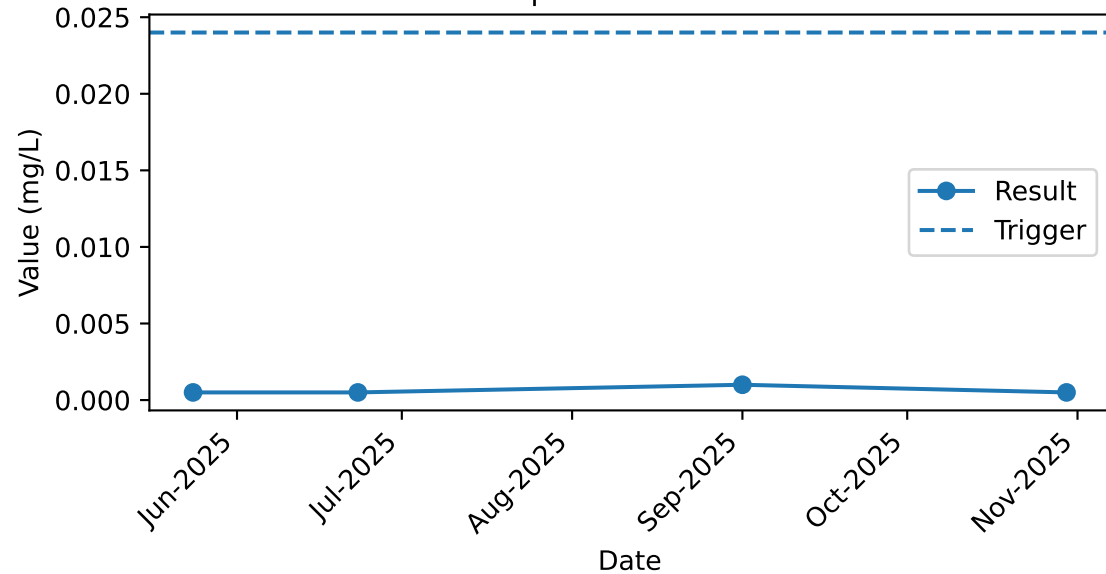
Bore: MBIS03 | Param: pH field



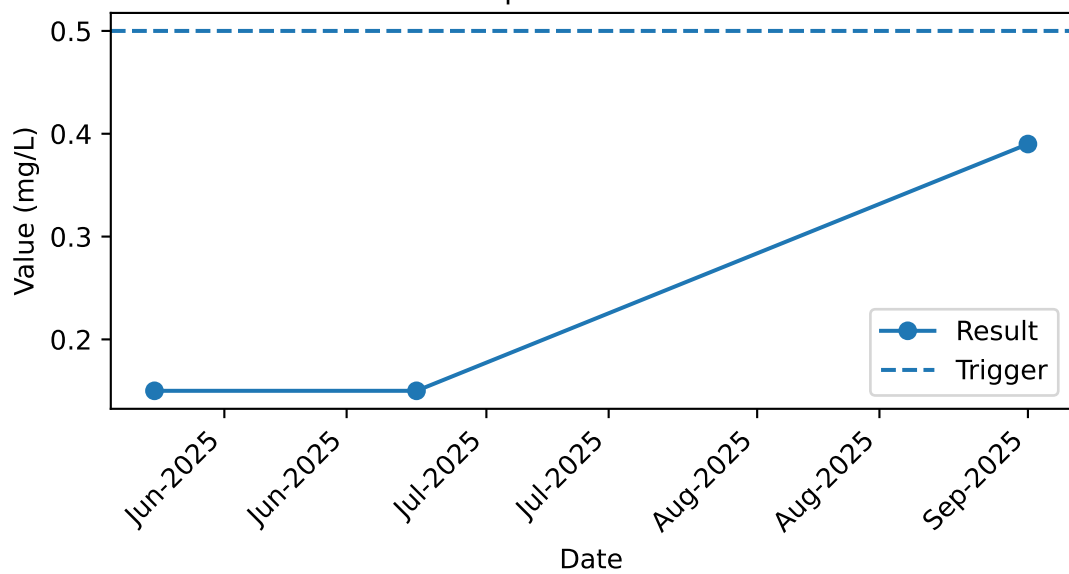
Bore: MBIS04 | Param: Dissolved Aluminium



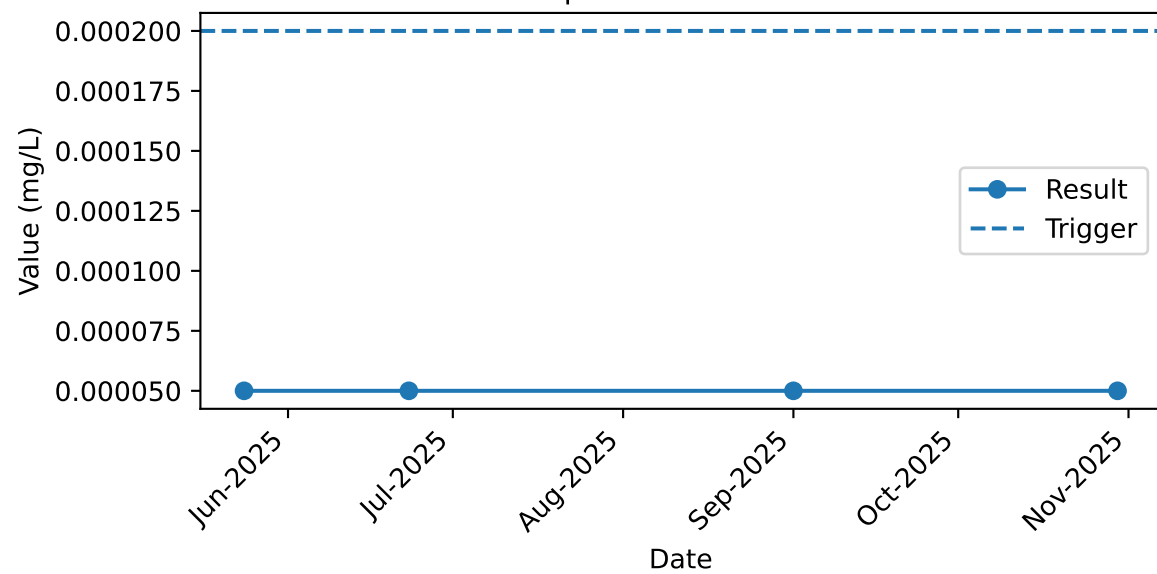
Bore: MBIS04 | Param: Dissolved Arsenic



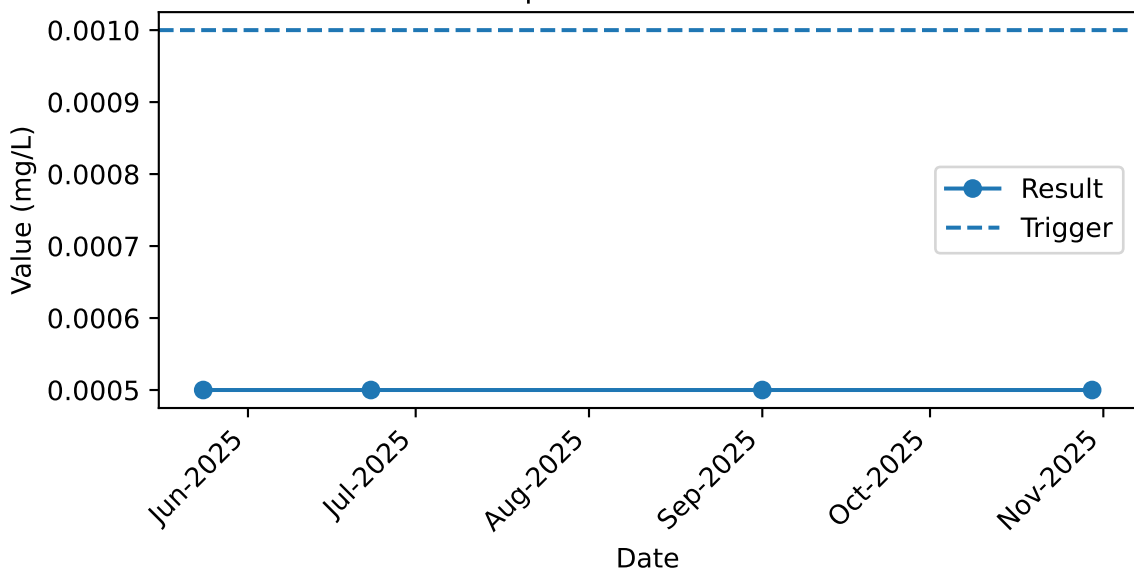
Bore: MBIS04 | Param: Dissolved Boron



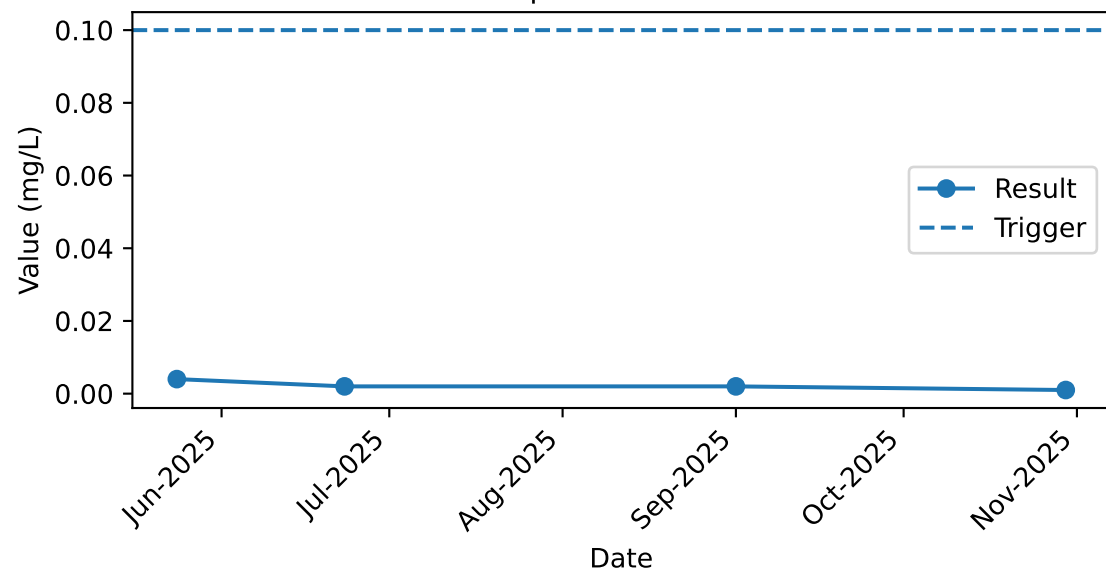
Bore: MBIS04 | Param: Dissolved Cadmium



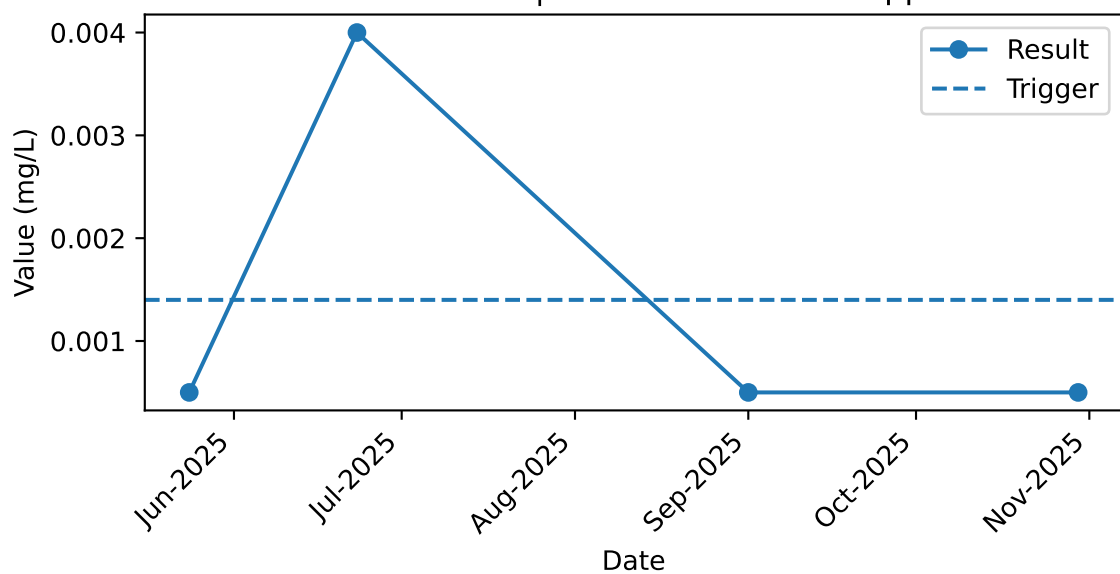
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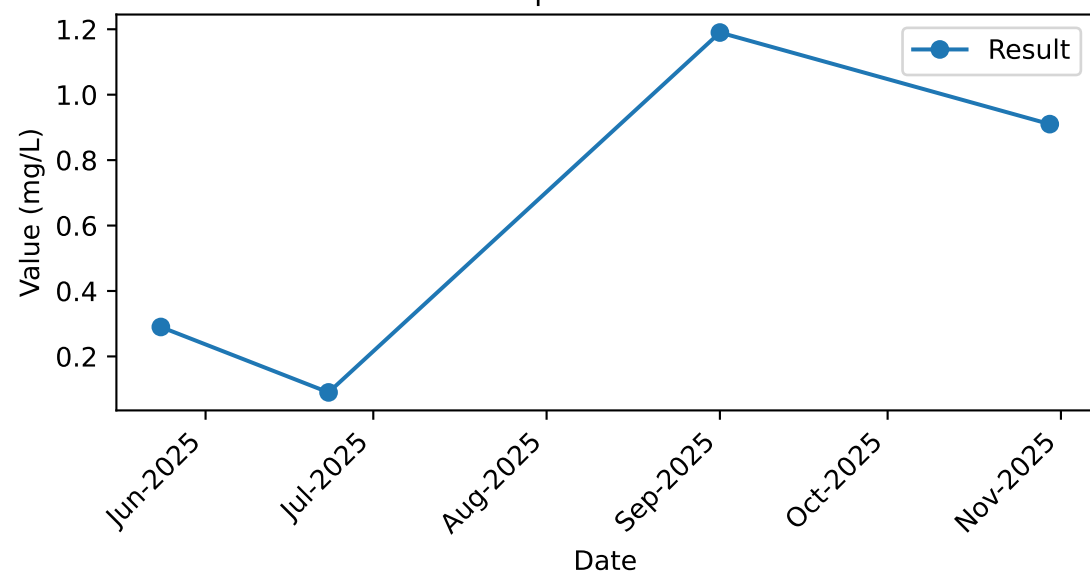
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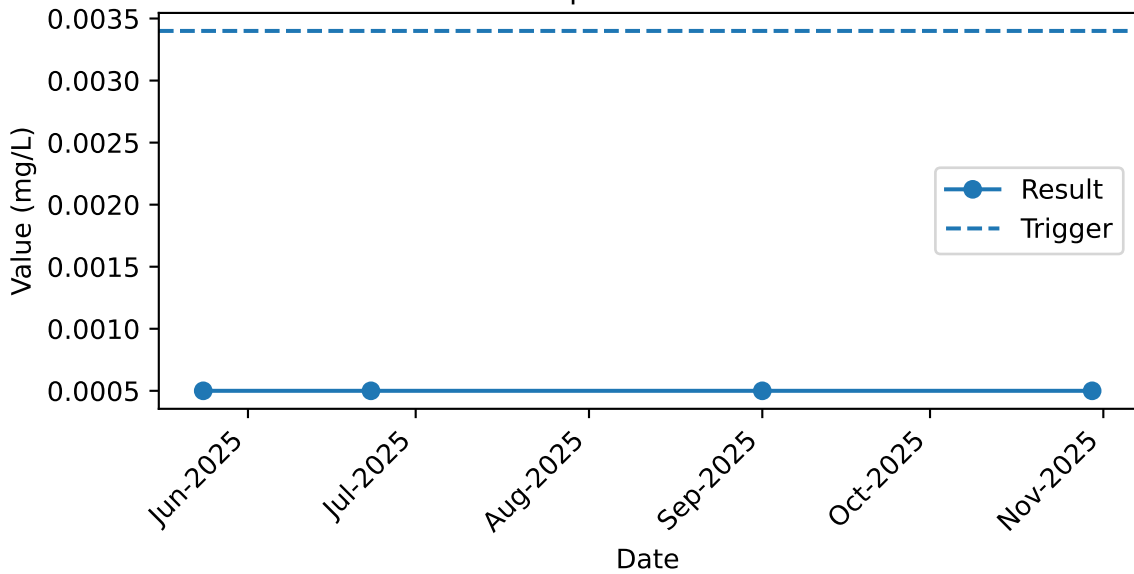
Bore: MBIS04 | Param: Dissolved Copper



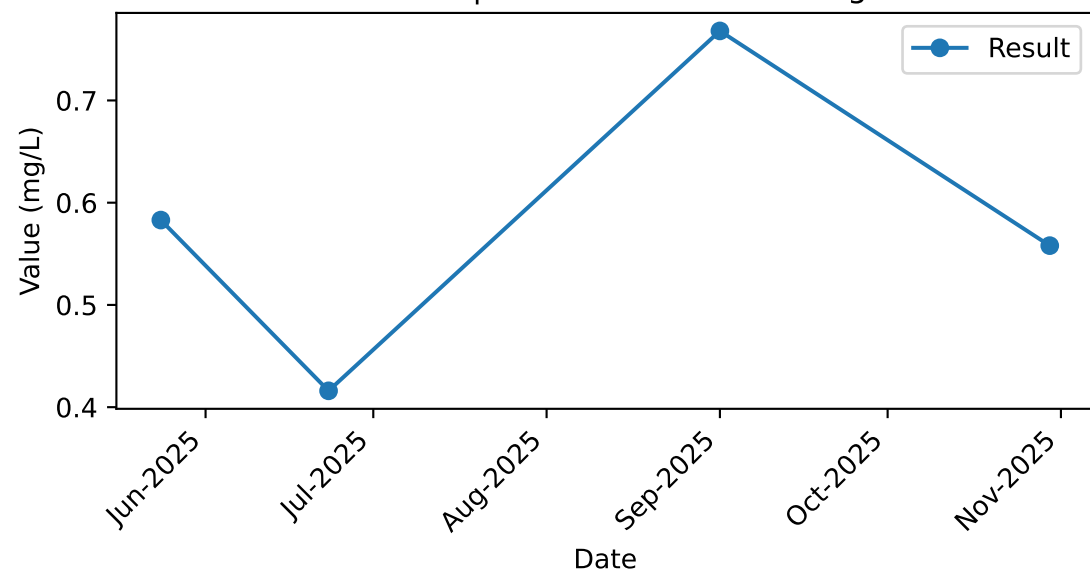
Bore: MBIS04 | Param: Dissolved Iron



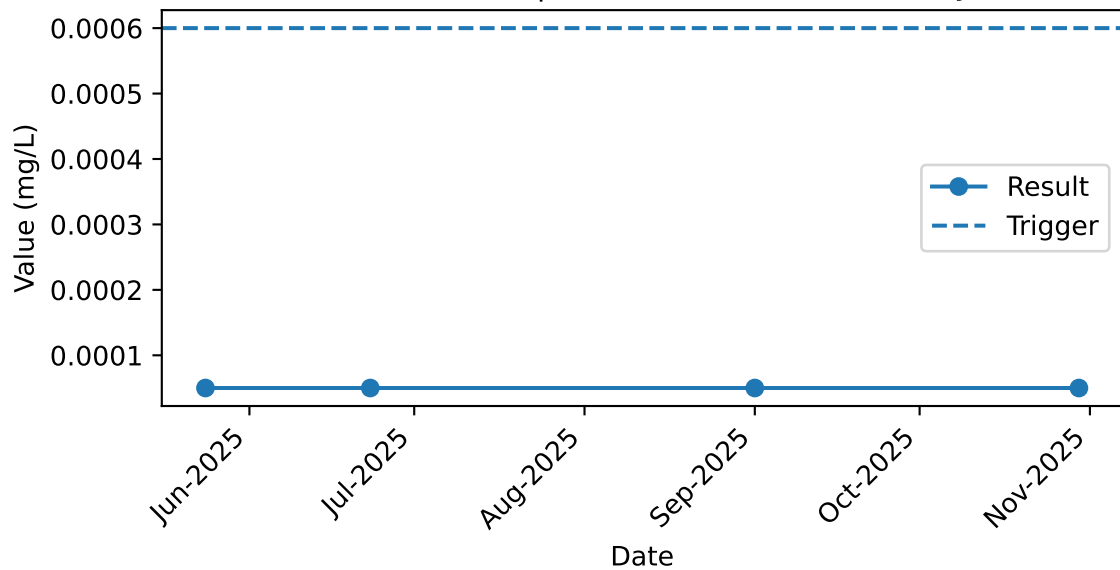
Bore: MBIS04 | Param: Dissolved Lead



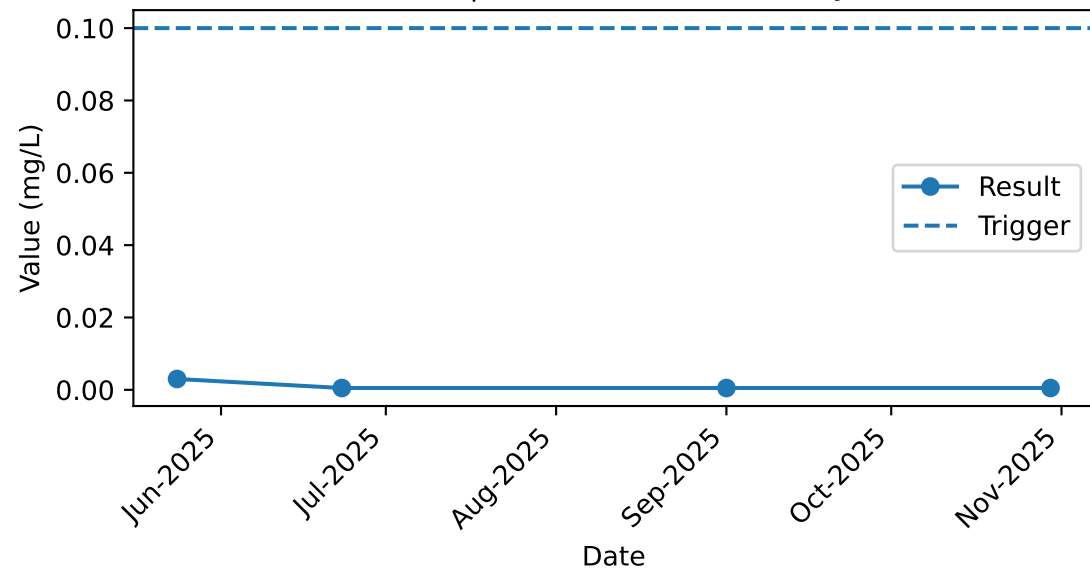
Bore: MBIS04 | Param: Dissolved Manganese



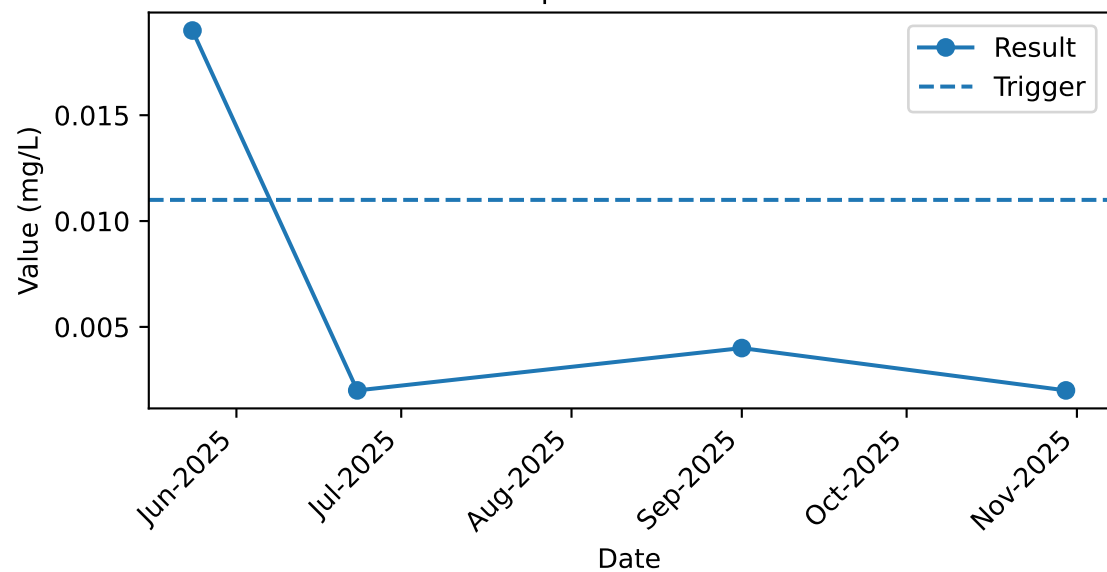
Bore: MBIS04 | Param: Dissolved Mercury



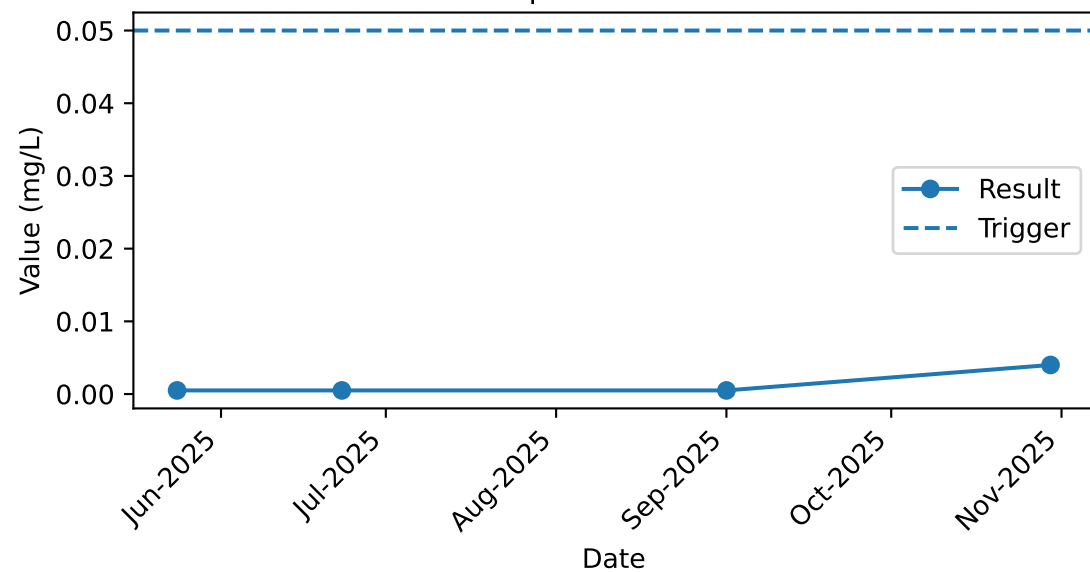
Bore: MBIS04 | Param: Dissolved Molybdenum



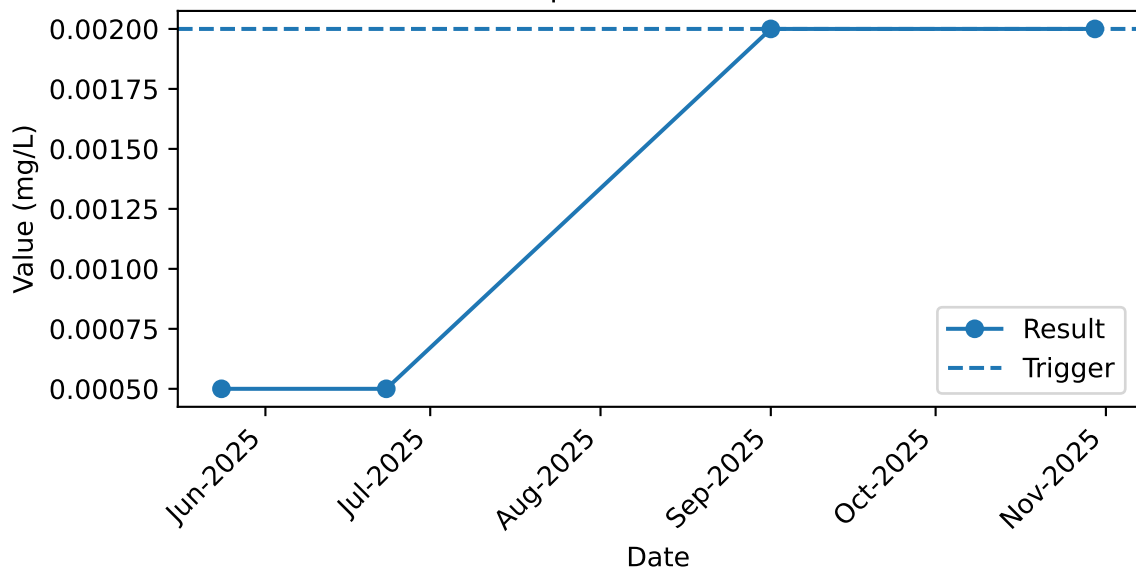
Bore: MBIS04 | Param: Dissolved Nickel



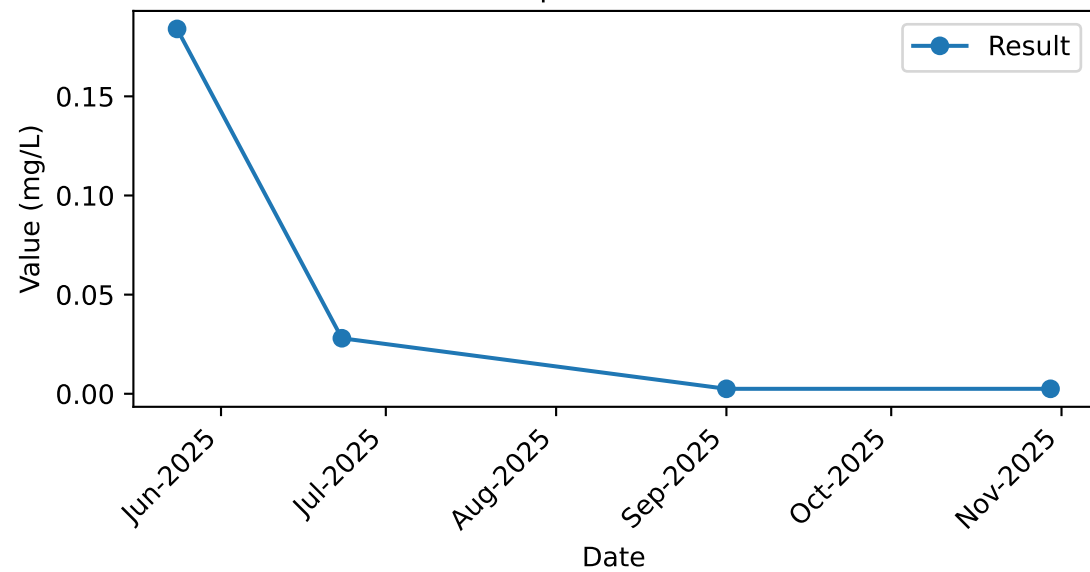
Bore: MBIS04 | Param: Dissolved Silver



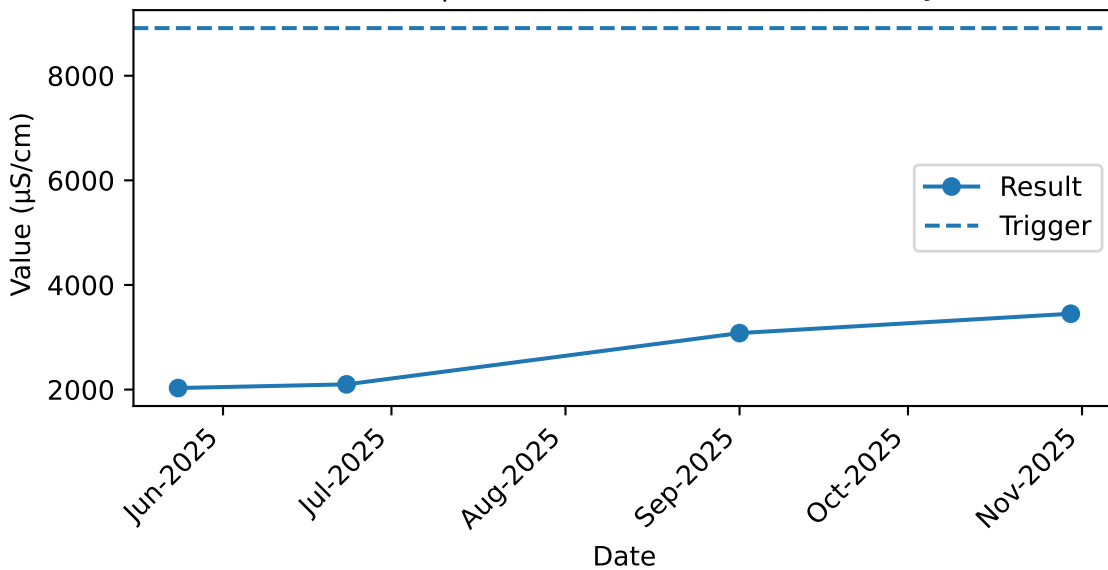
Bore: MBIS04 | Param: Dissolved Uranium



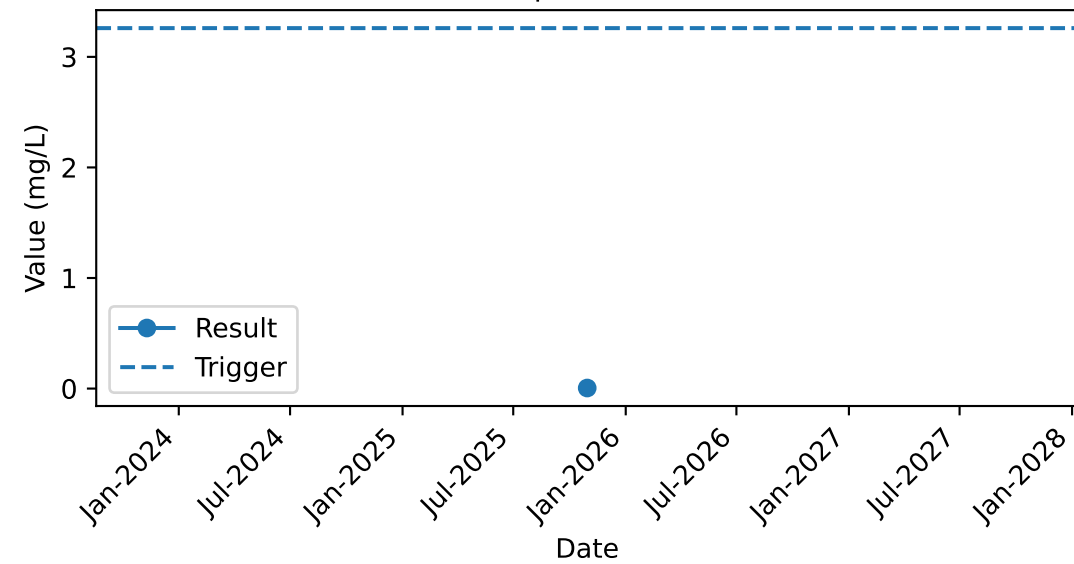
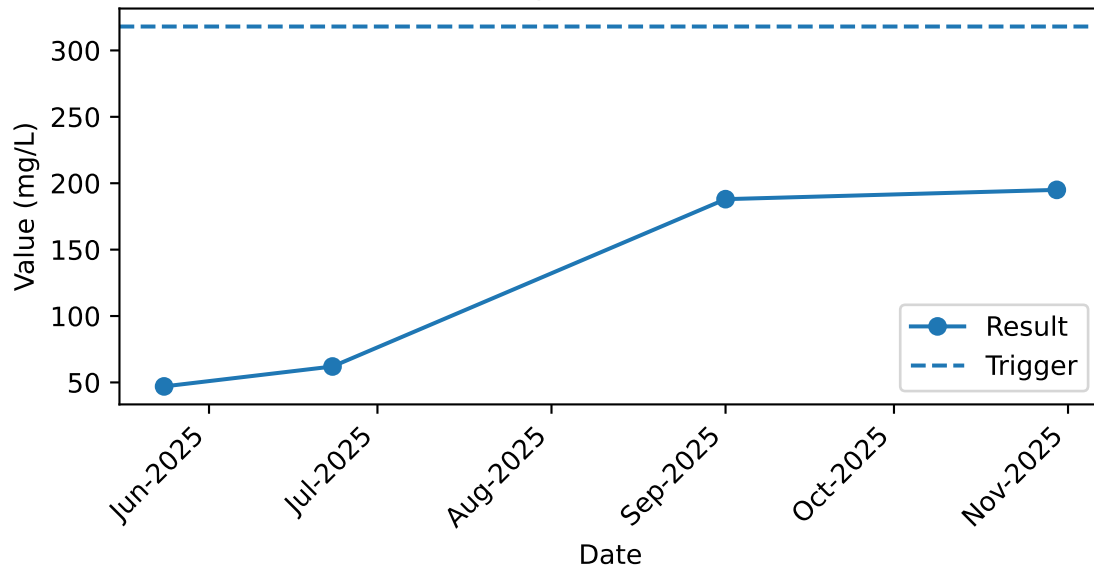
Bore: MBIS04 | Param: Dissolved Zinc



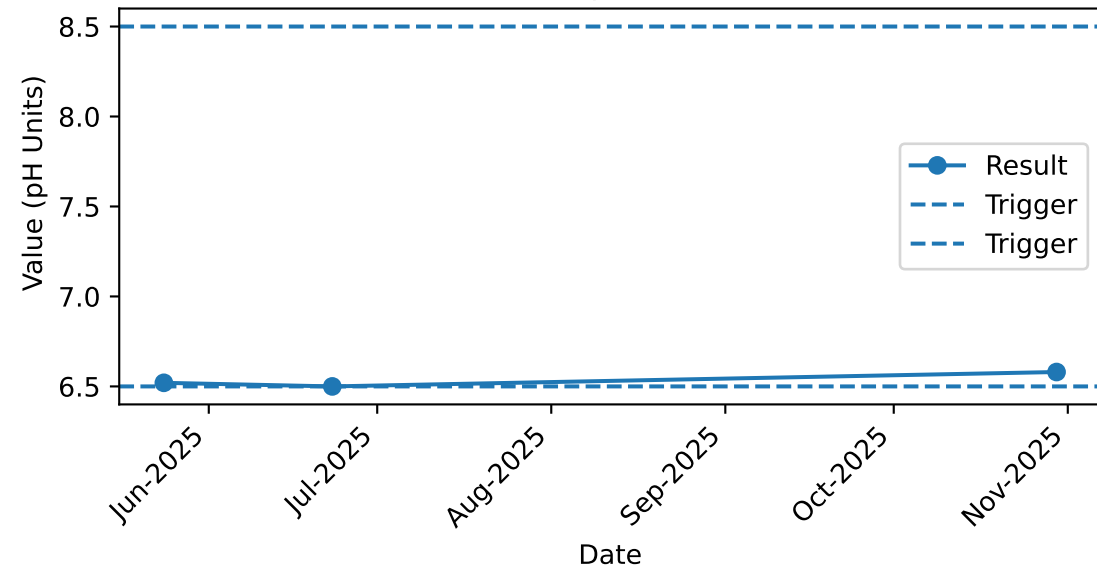
Bore: MBIS04 | Param: Electrical Conductivity (Lab)



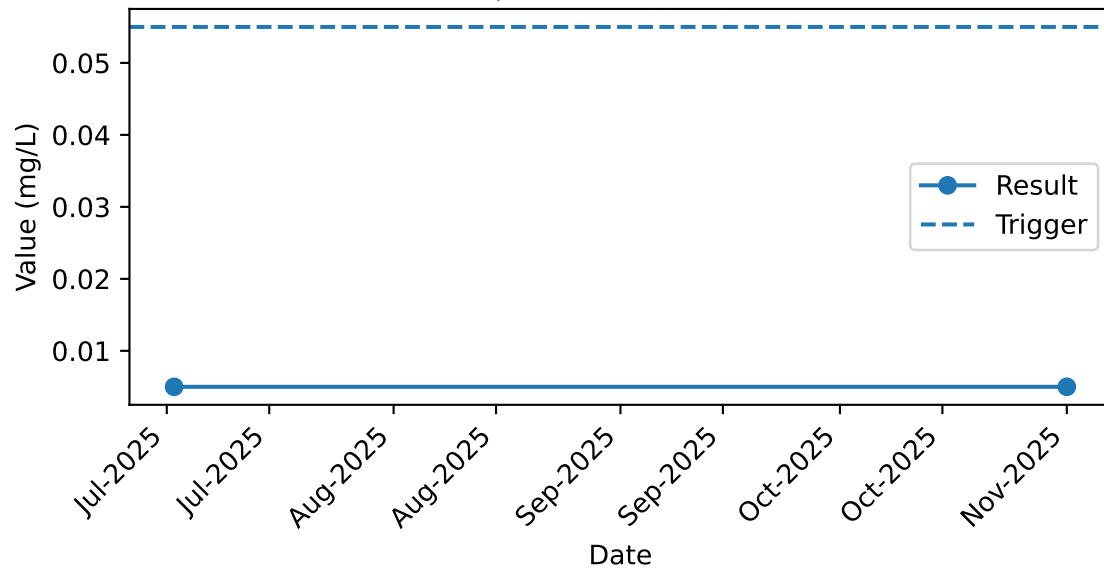
Bore: MBIS04 | Param: Nitrate as N

Bore: MBIS04 | Param: Sulfate as SO_4 

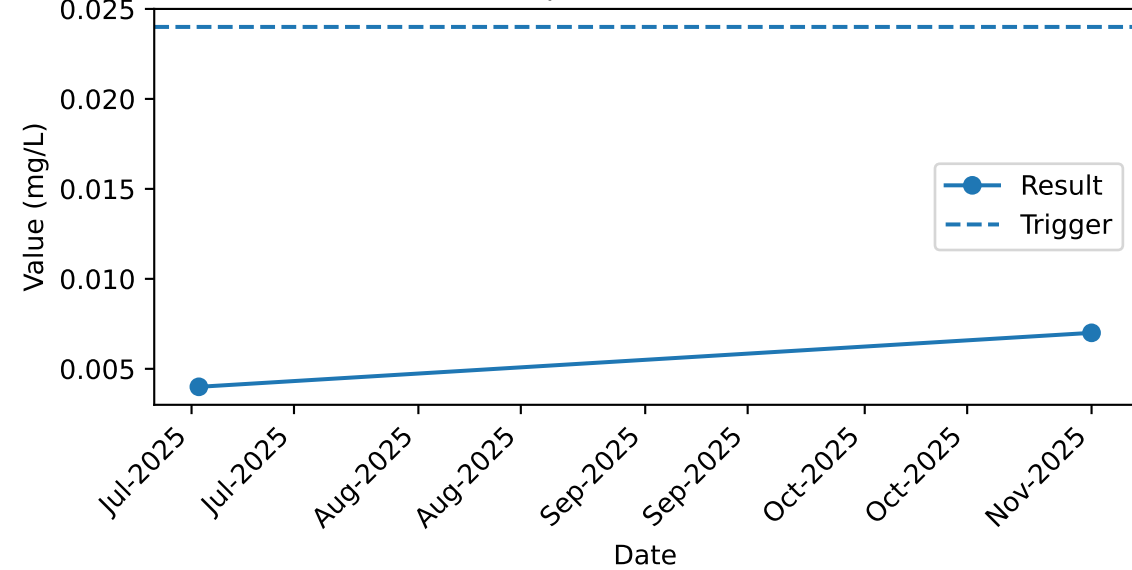
Bore: MBIS04 | Param: pH field



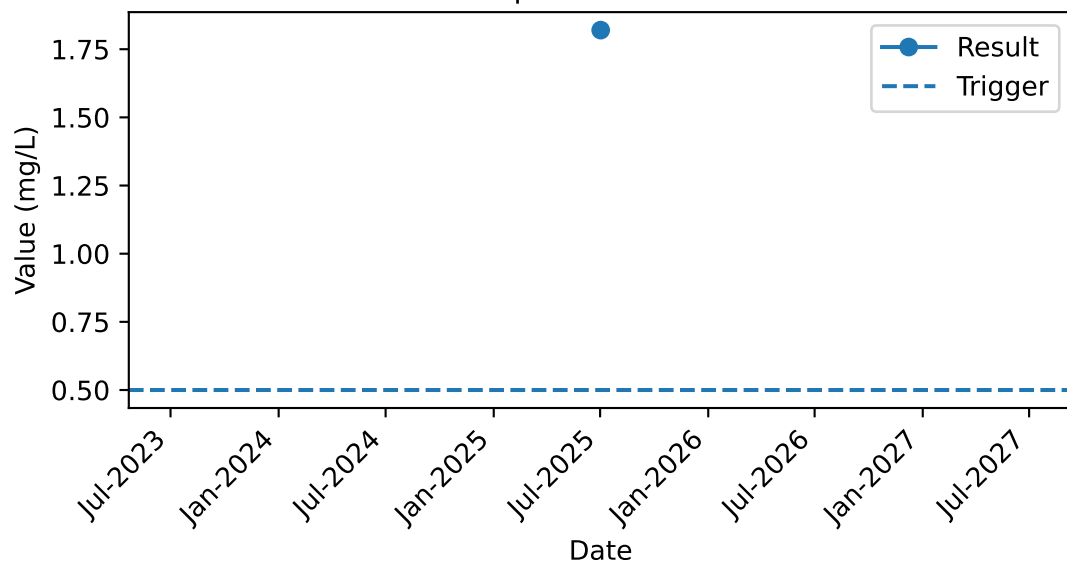
Bore: MBIS05 | Param: Dissolved Aluminium



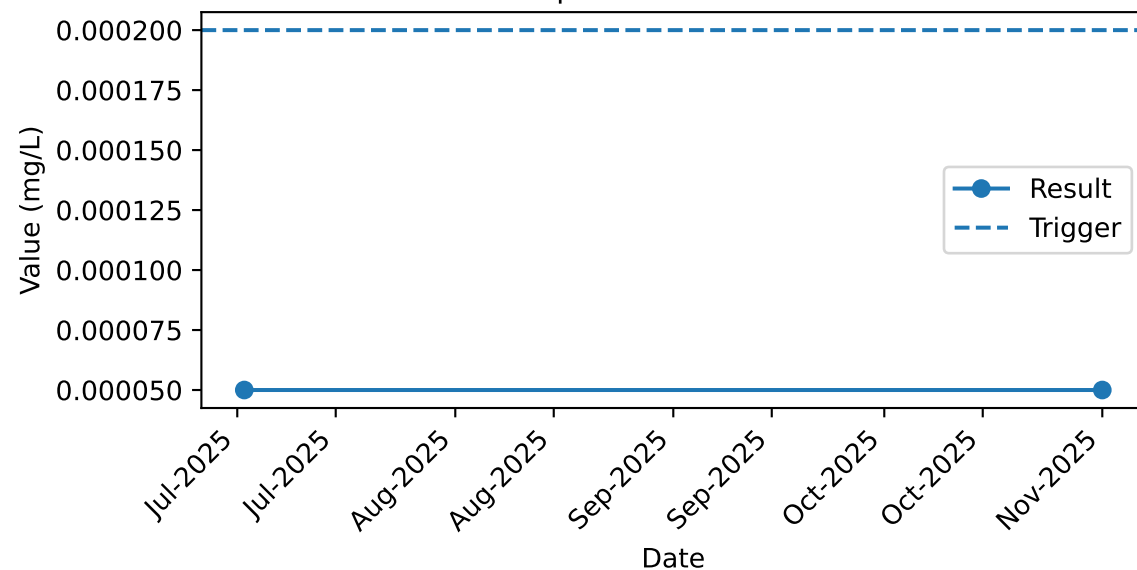
Bore: MBIS05 | Param: Dissolved Arsenic



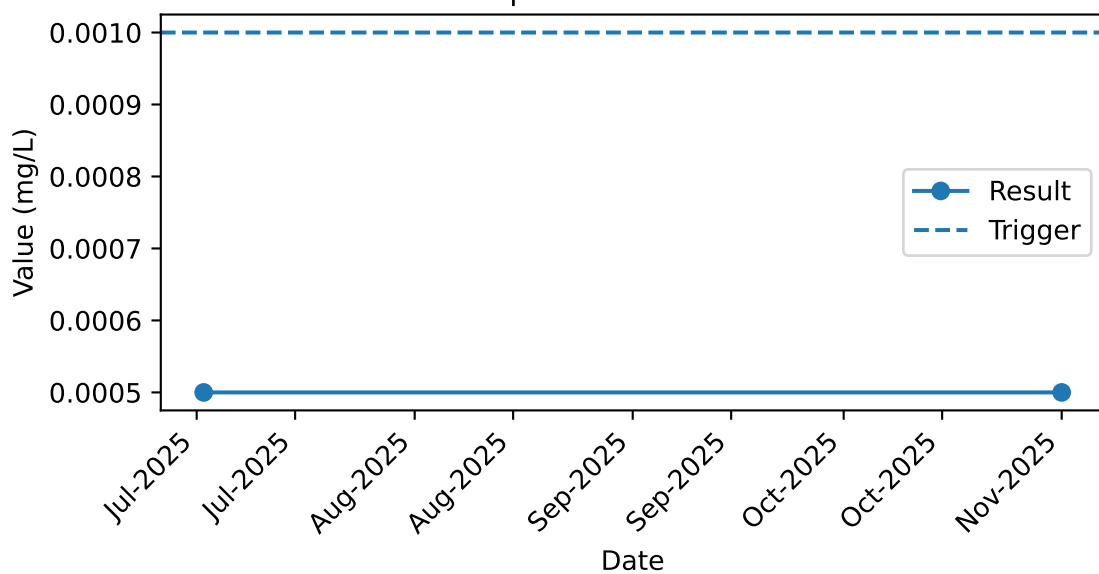
Bore: MBIS05 | Param: Dissolved Boron



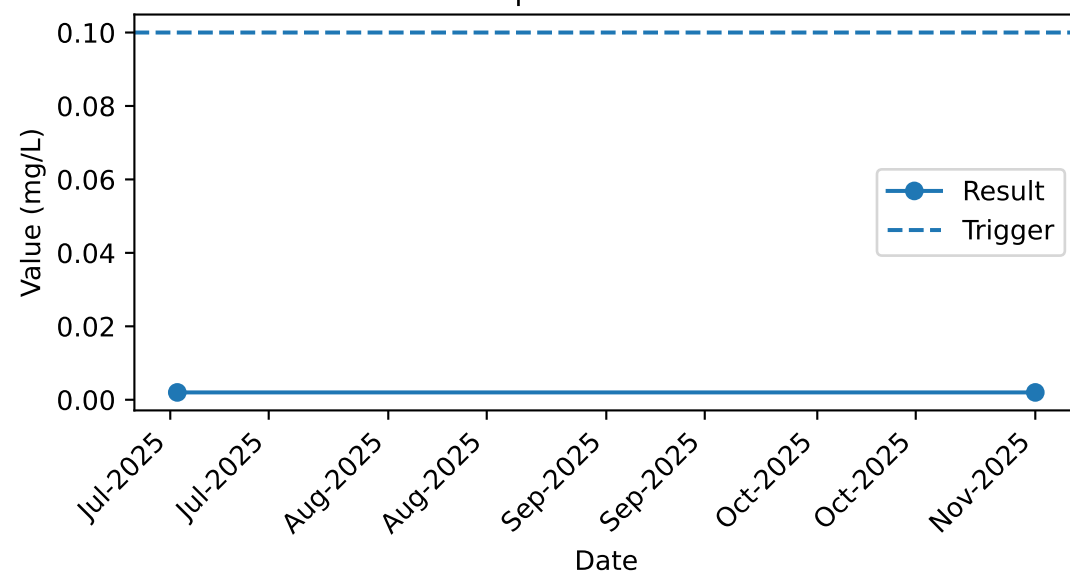
Bore: MBIS05 | Param: Dissolved Cadmium



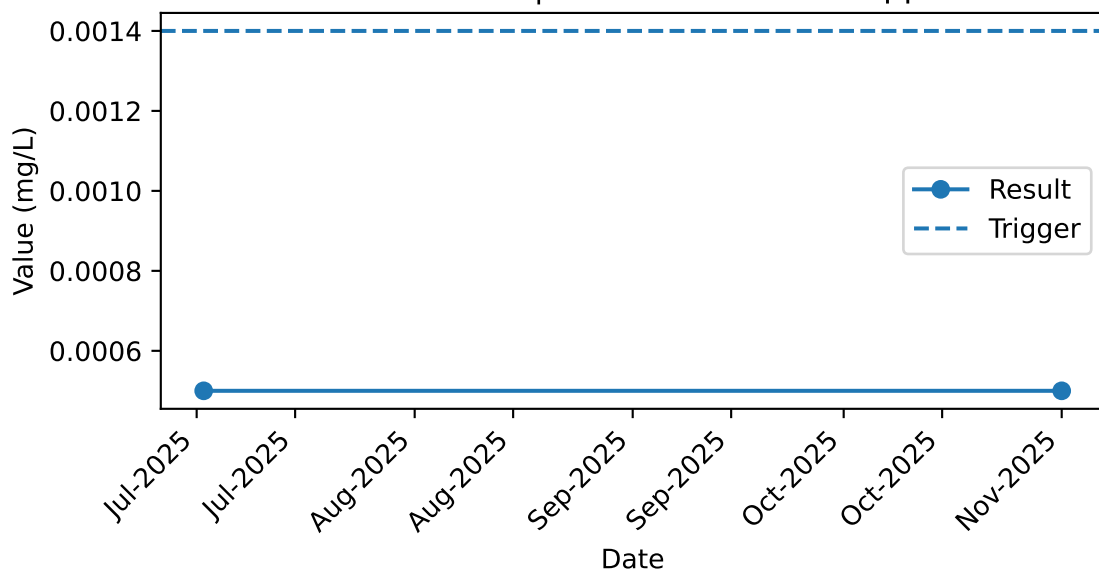
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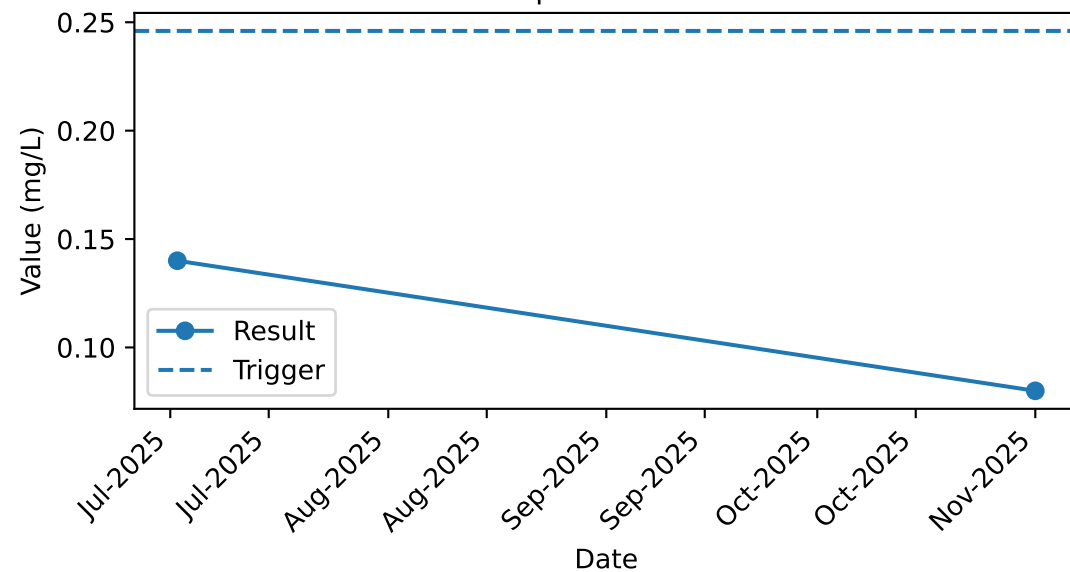
Bore: MBIS05 | Param: Dissolved Cobalt



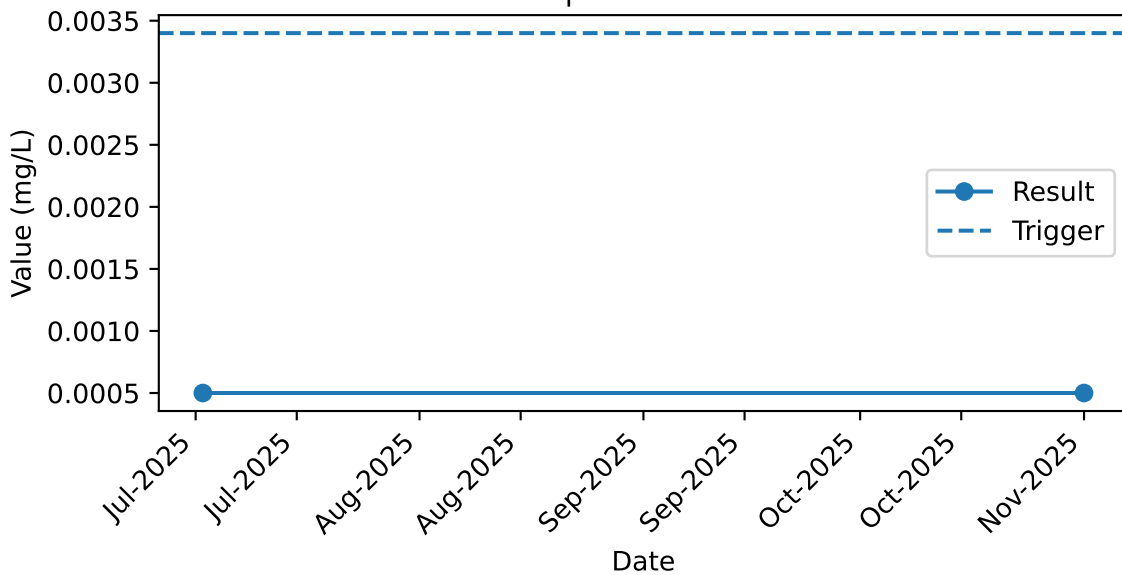
Bore: MBIS05 | Param: Dissolved Copper



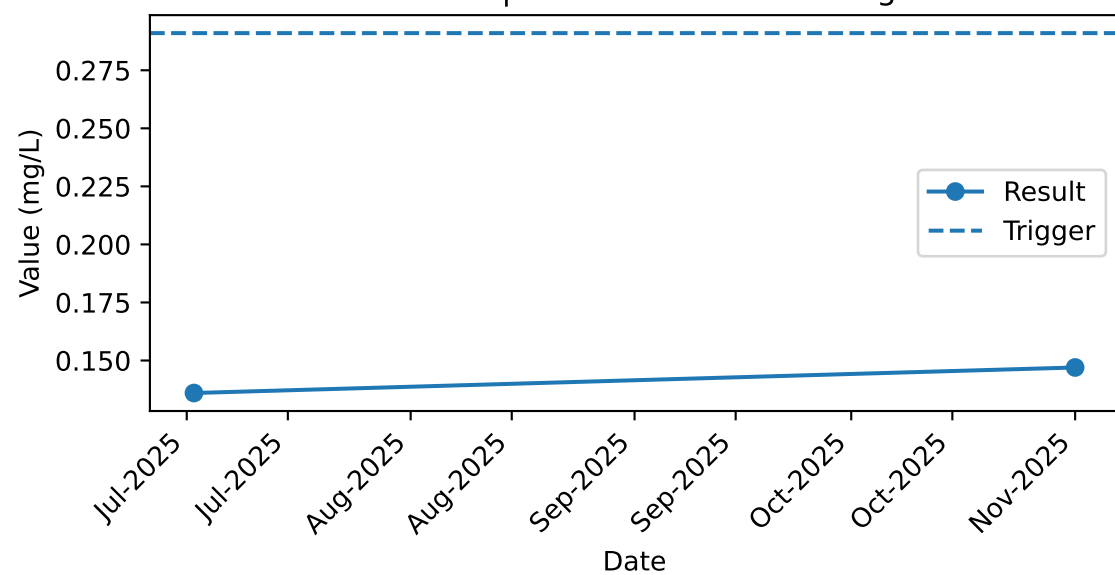
Bore: MBIS05 | Param: Dissolved Iron



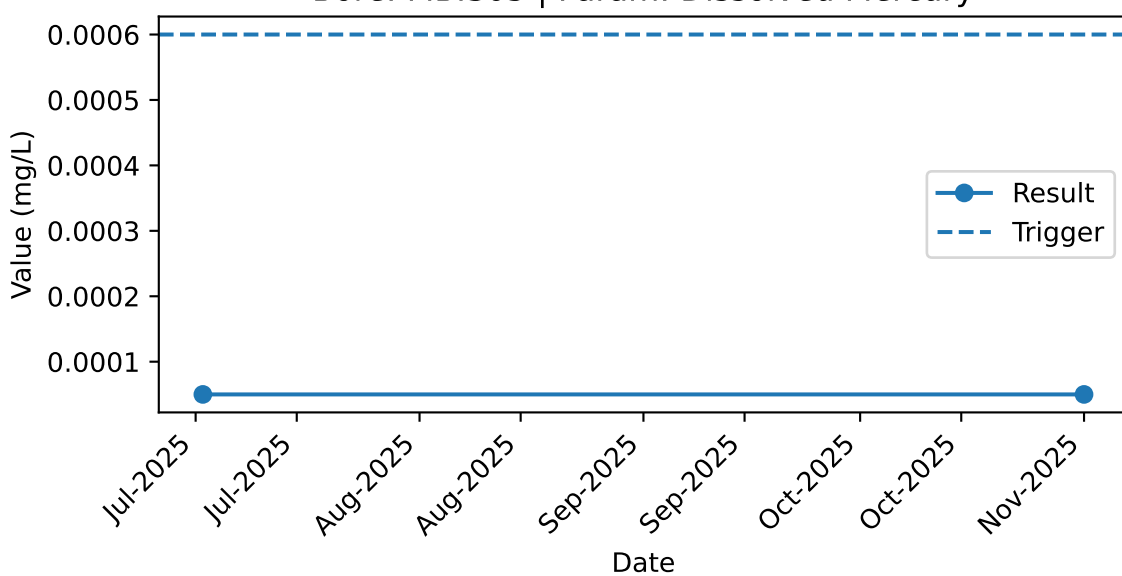
Bore: MBIS05 | Param: Dissolved Lead



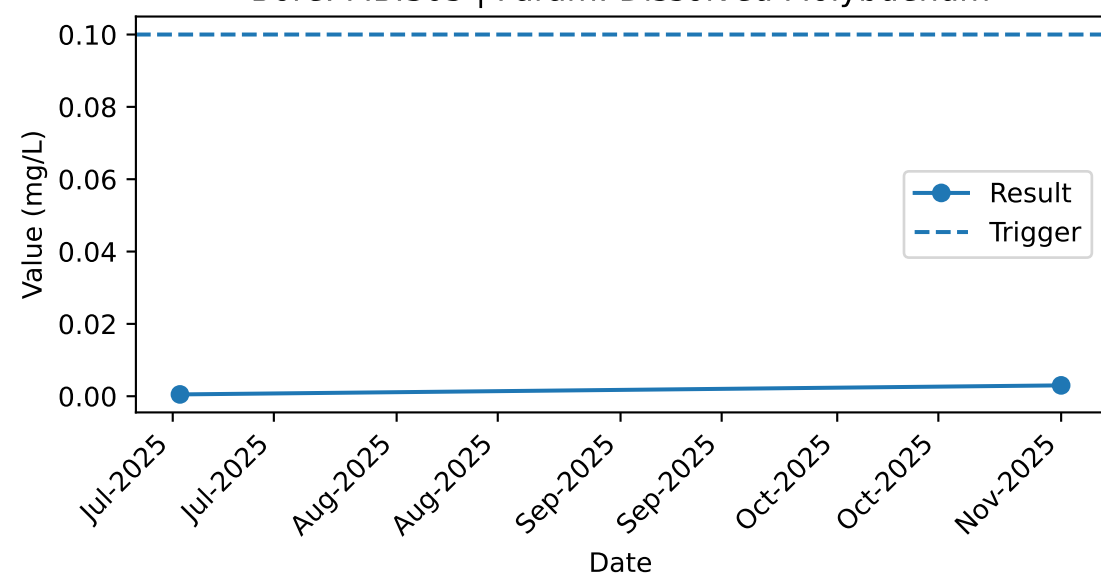
Bore: MBIS05 | Param: Dissolved Manganese



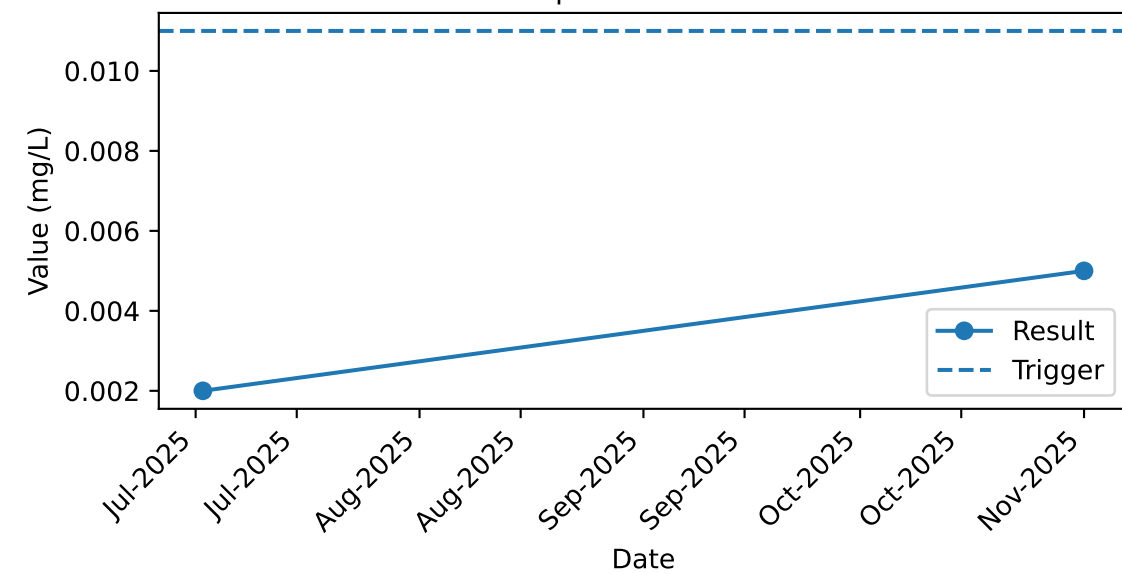
Bore: MBIS05 | Param: Dissolved Mercury



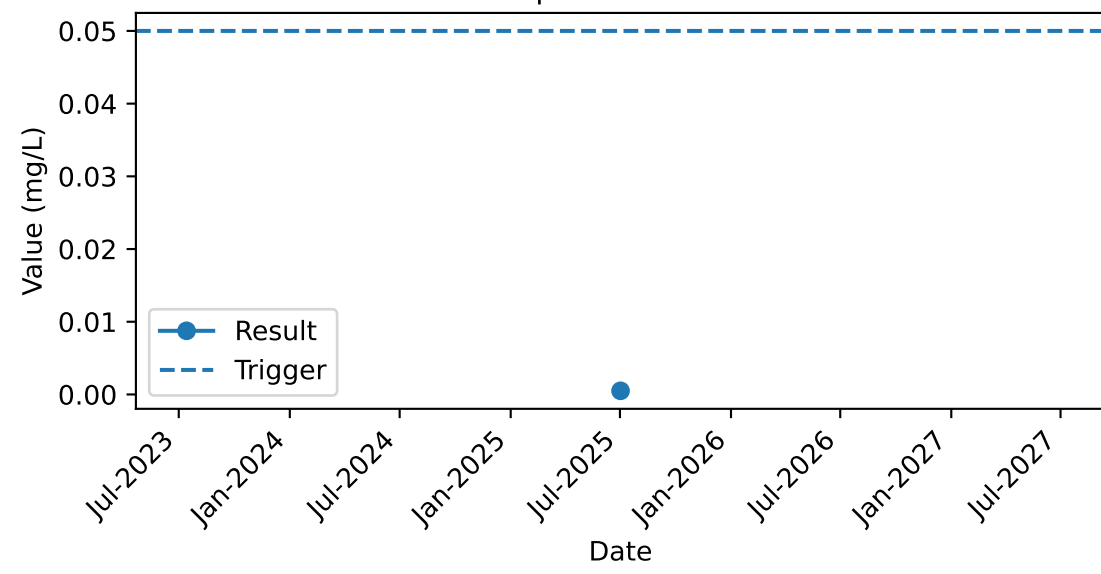
Bore: MBIS05 | Param: Dissolved Molybdenum



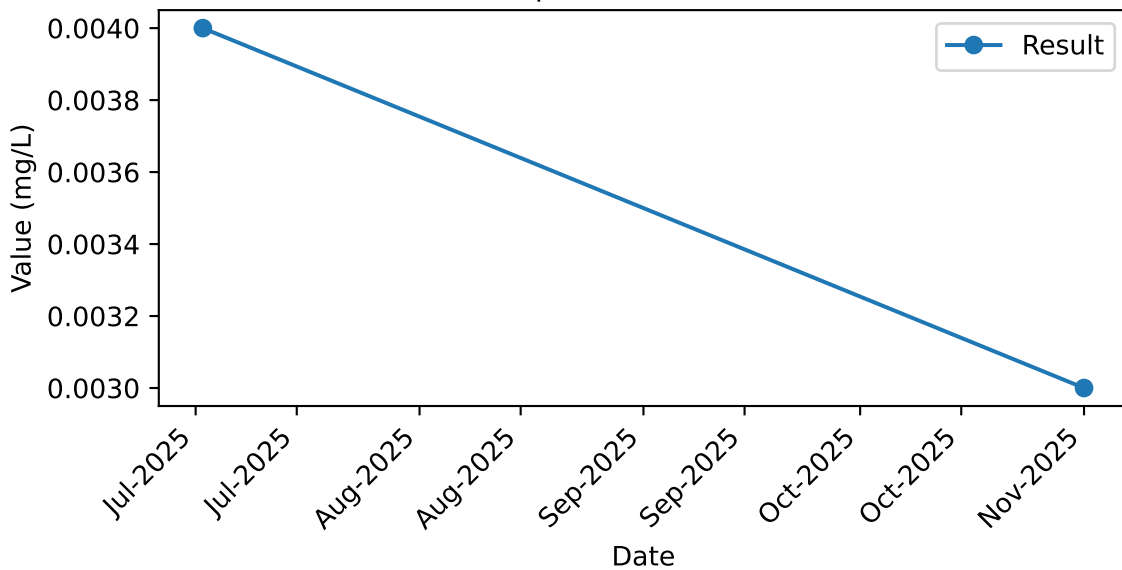
Bore: MBIS05 | Param: Dissolved Nickel



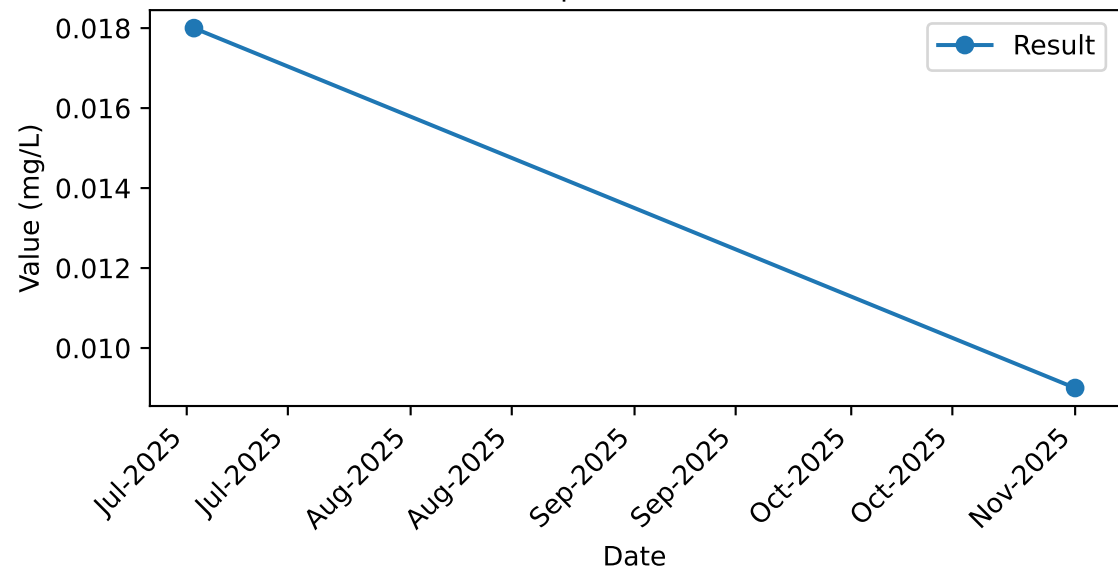
Bore: MBIS05 | Param: Dissolved Silver



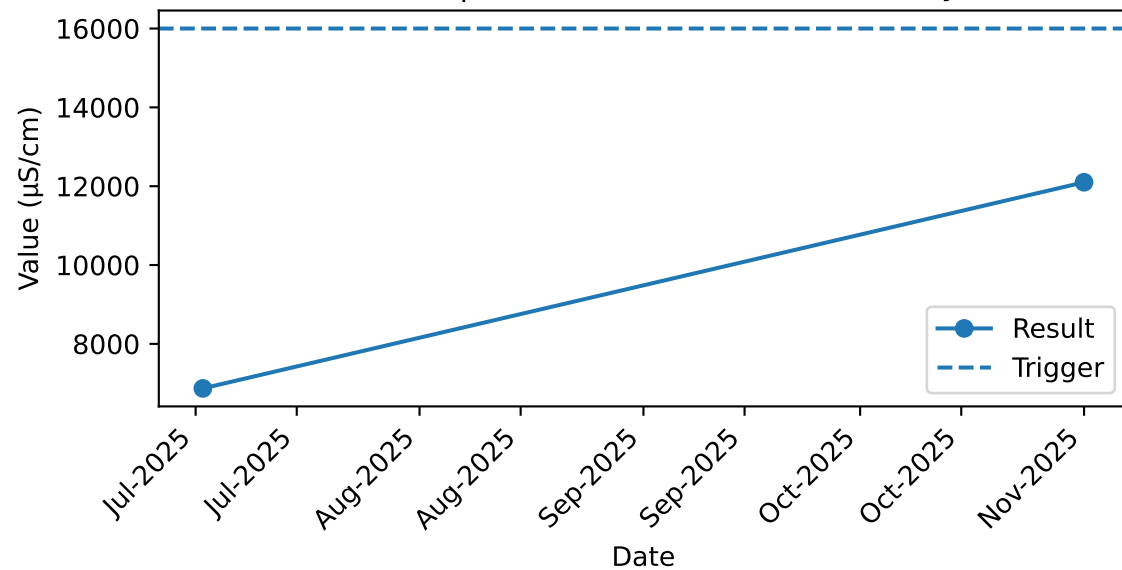
Bore: MBIS05 | Param: Dissolved Uranium



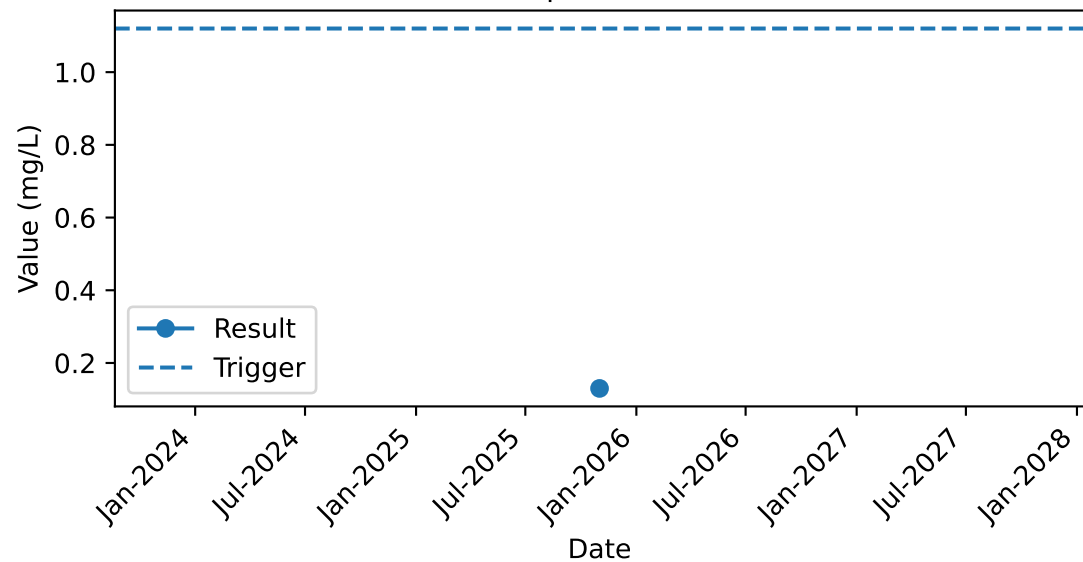
Bore: MBIS05 | Param: Dissolved Zinc



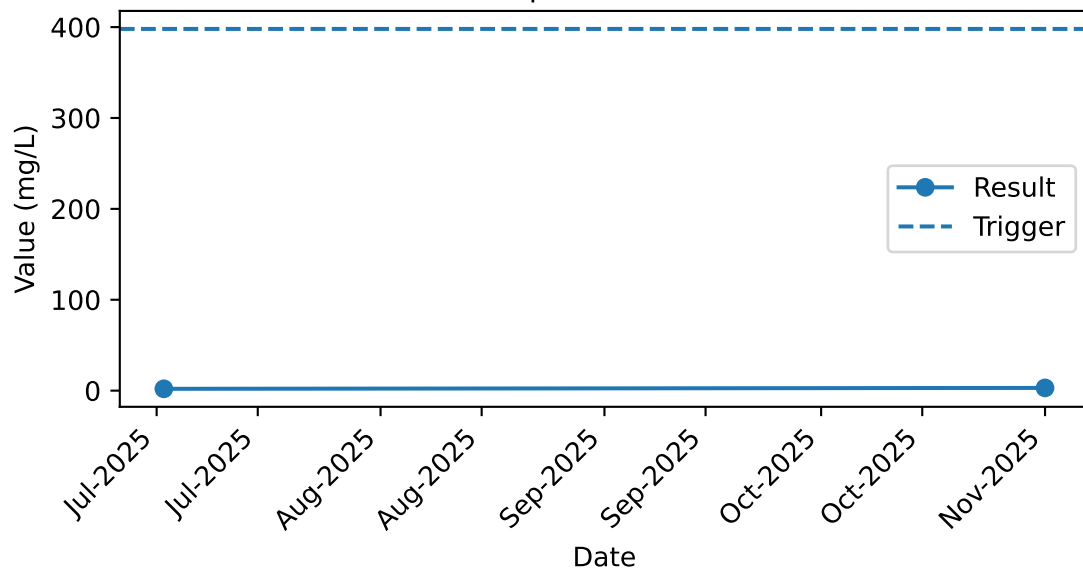
Bore: MBIS05 | Param: Electrical Conductivity (Lab)



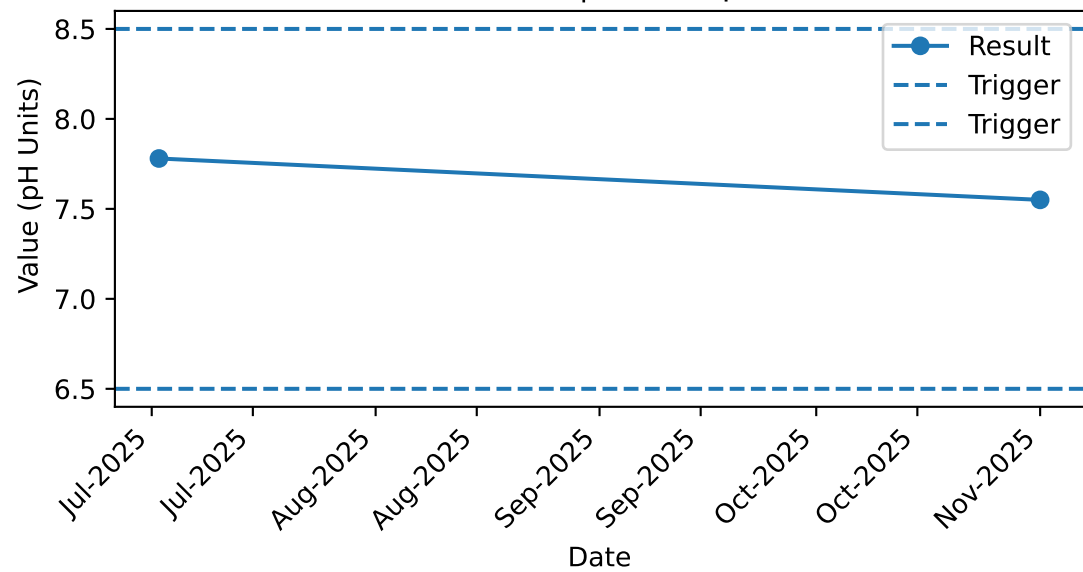
Bore: MBIS05 | Param: Nitrate as N



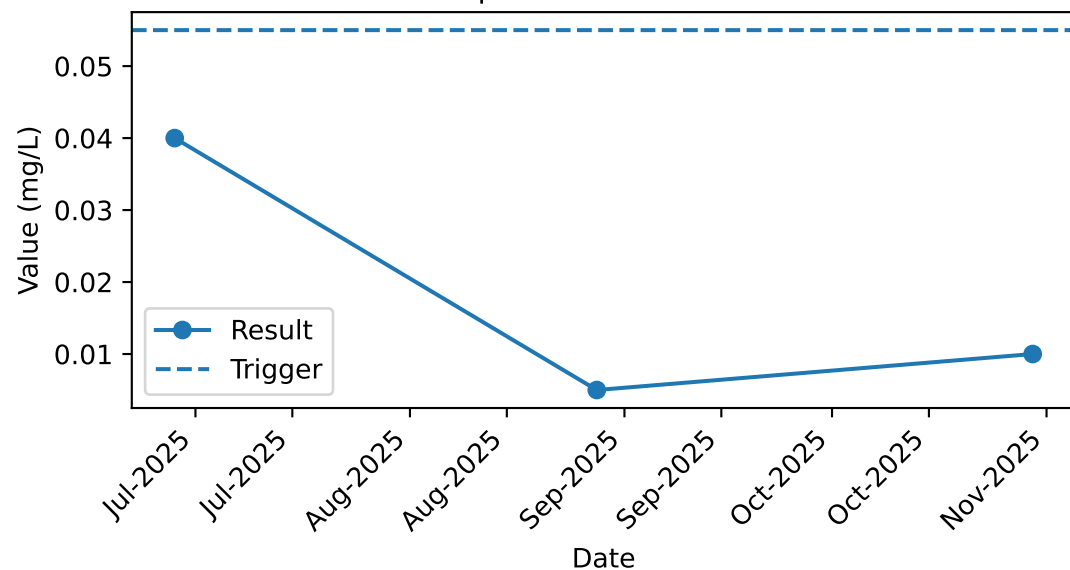
Bore: MBIS05 | Param: Sulfate as SO4



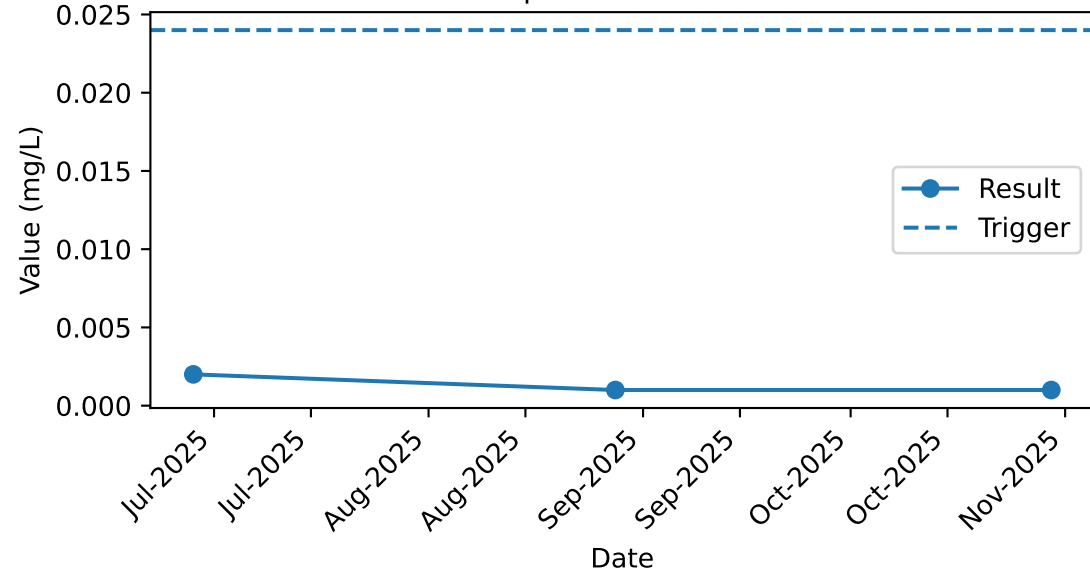
Bore: MBIS05 | Param: pH field



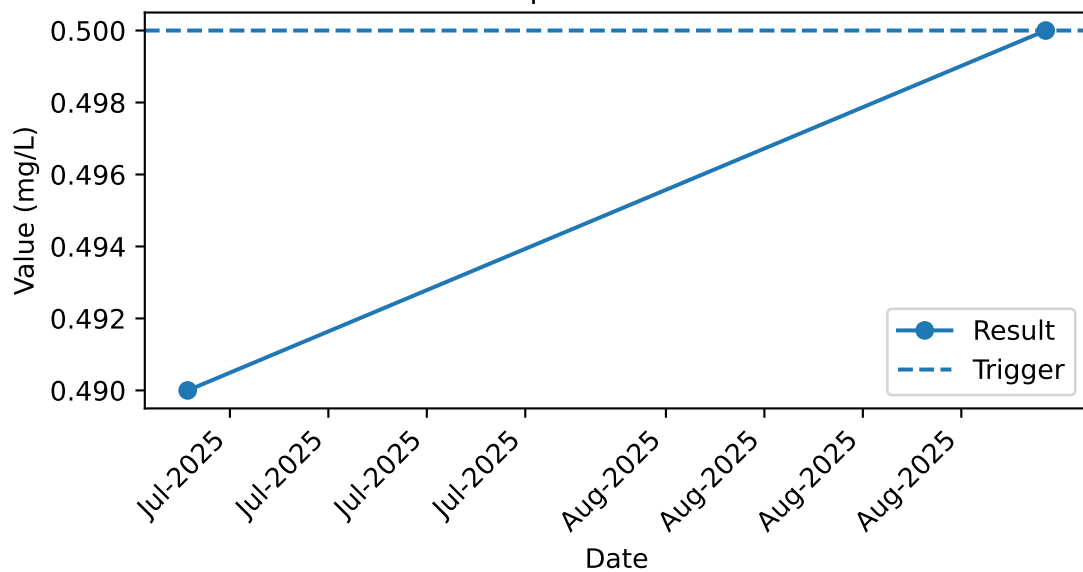
Bore: MBIS07 | Param: Dissolved Aluminium



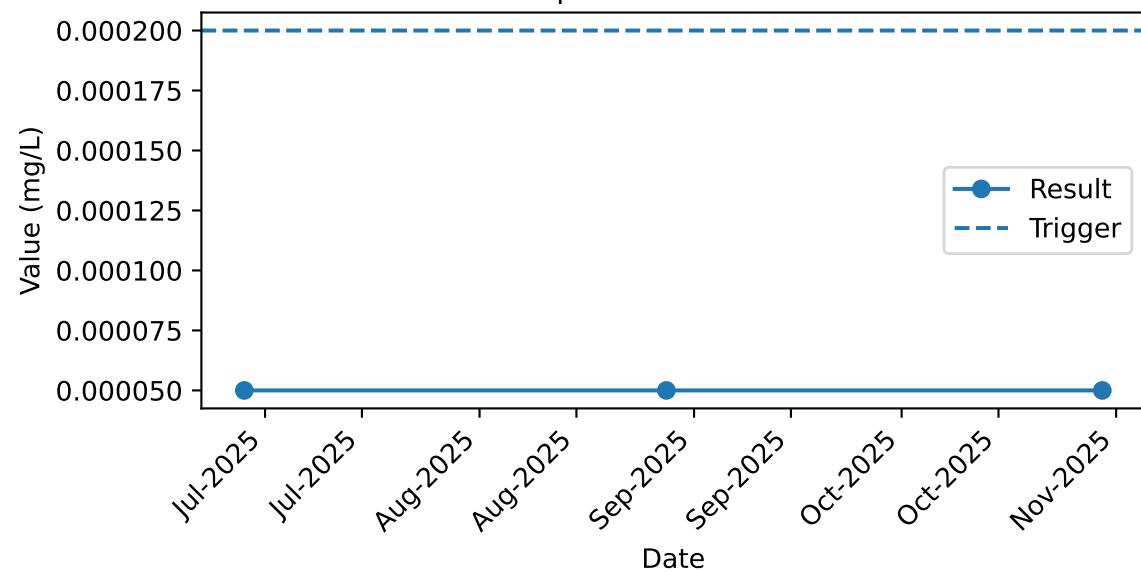
Bore: MBIS07 | Param: Dissolved Arsenic



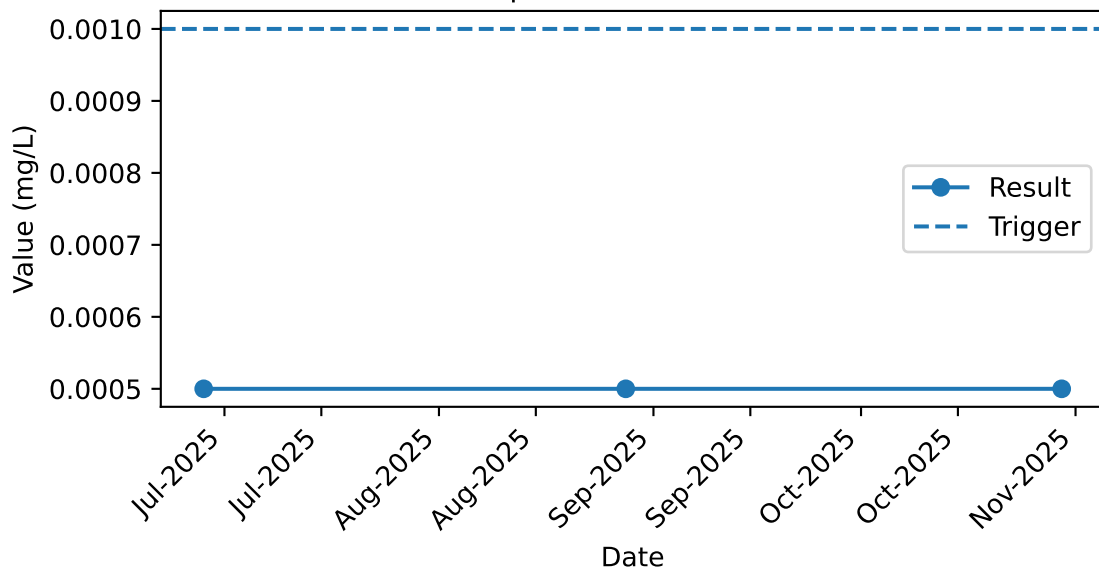
Bore: MBIS07 | Param: Dissolved Boron



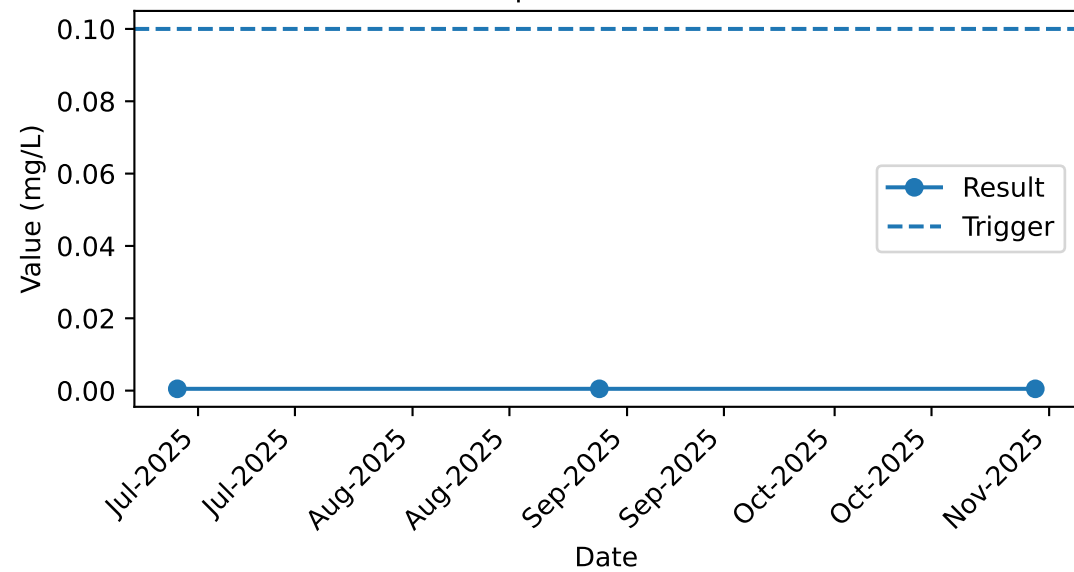
Bore: MBIS07 | Param: Dissolved Cadmium



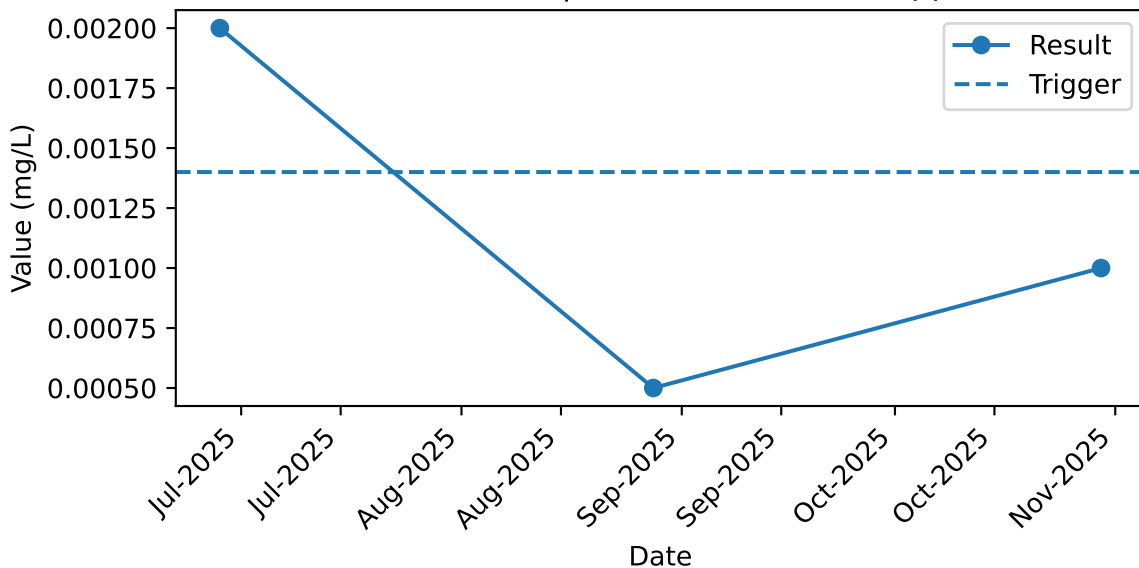
Bore: MBIS07 | Param: Dissolved Chromium



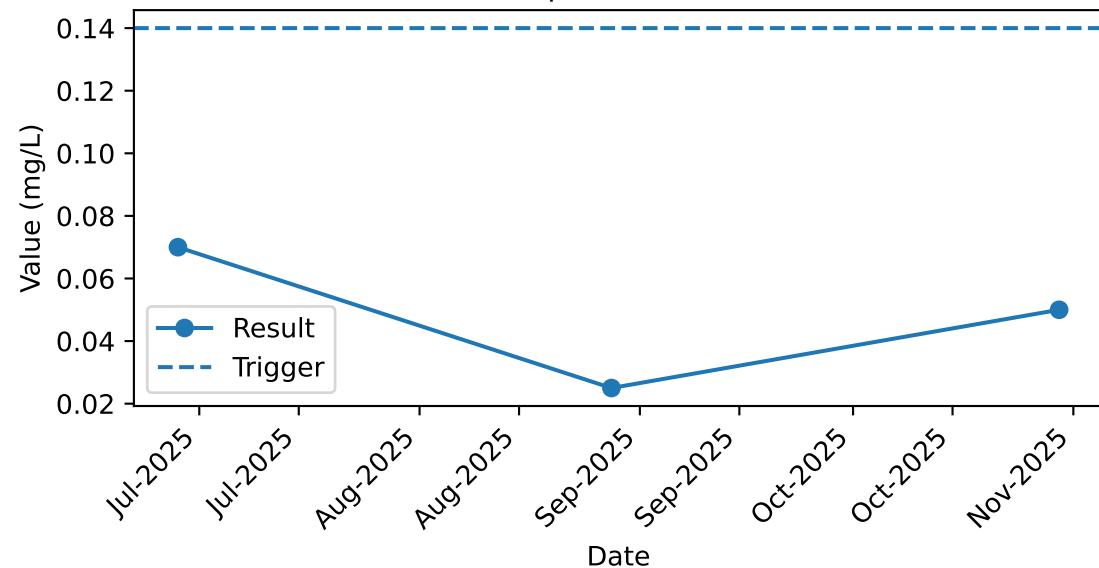
Bore: MBIS07 | Param: Dissolved Cobalt



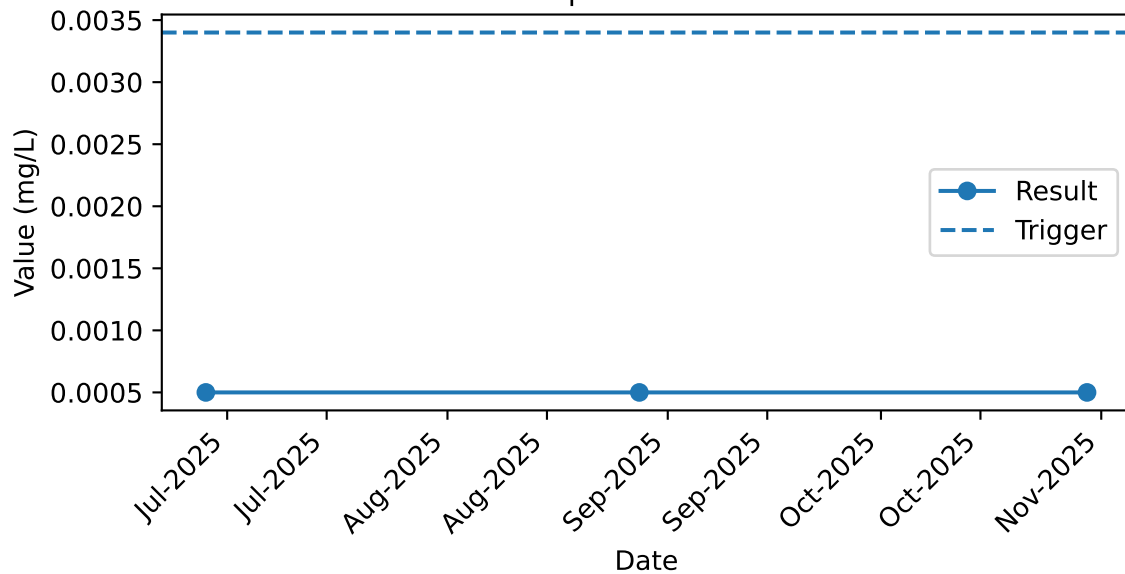
Bore: MBIS07 | Param: Dissolved Copper



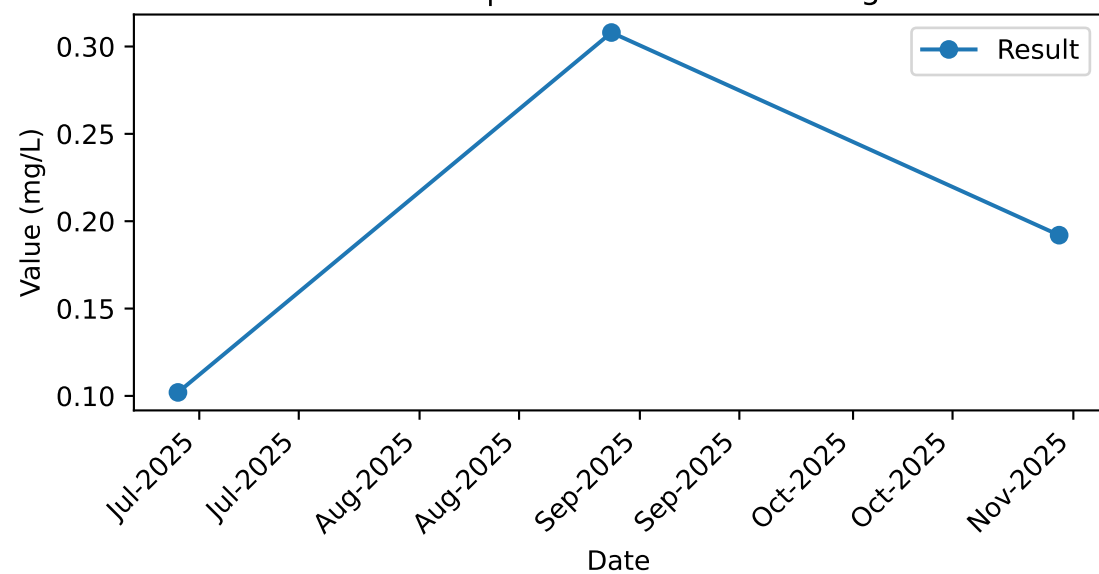
Bore: MBIS07 | Param: Dissolved Iron



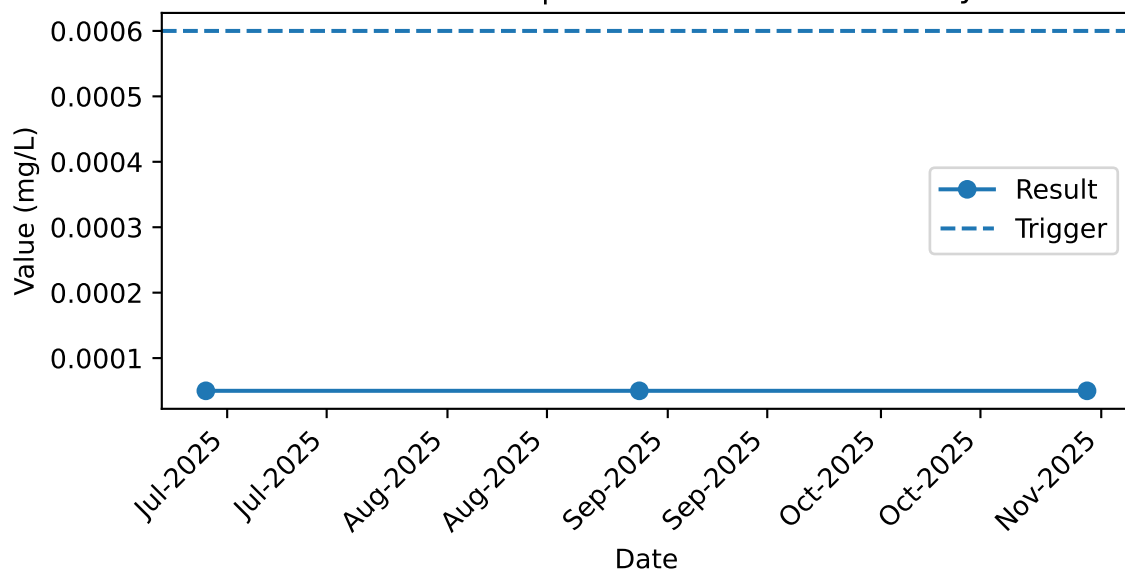
Bore: MBIS07 | Param: Dissolved Lead



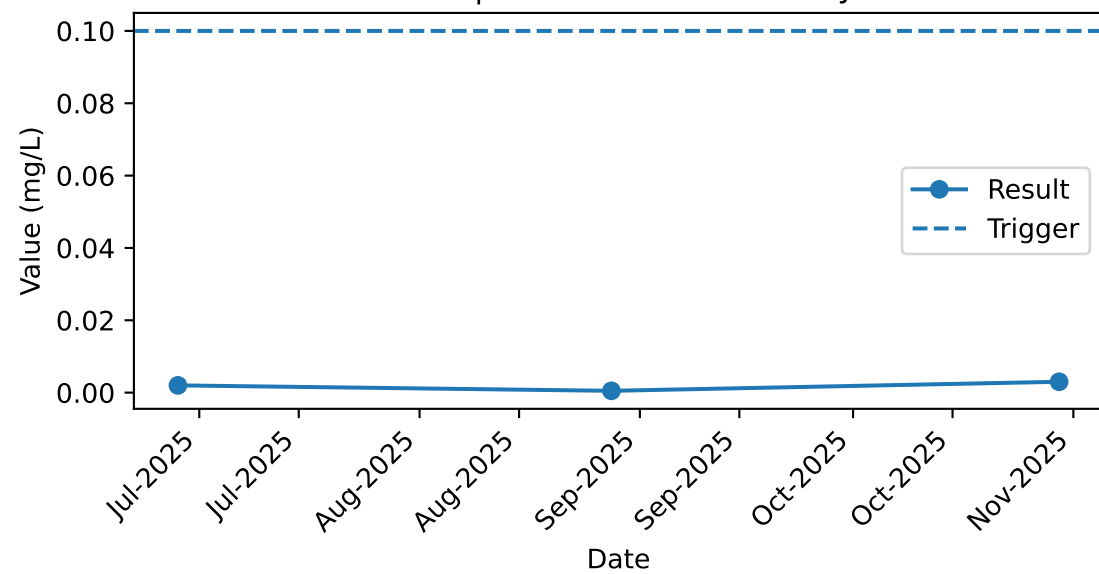
Bore: MBIS07 | Param: Dissolved Manganese



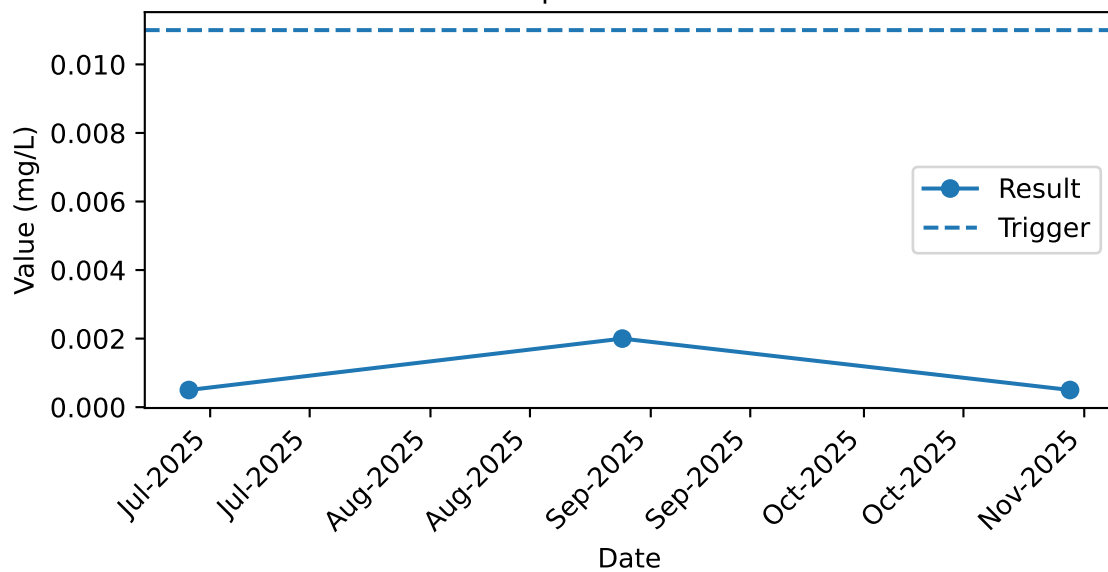
Bore: MBIS07 | Param: Dissolved Mercury



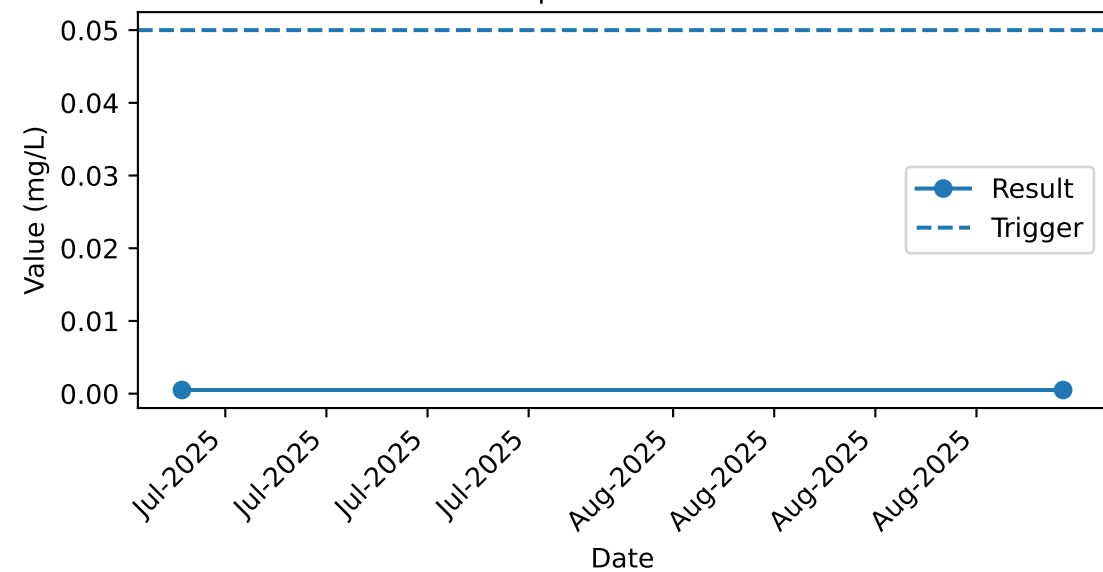
Bore: MBIS07 | Param: Dissolved Molybdenum



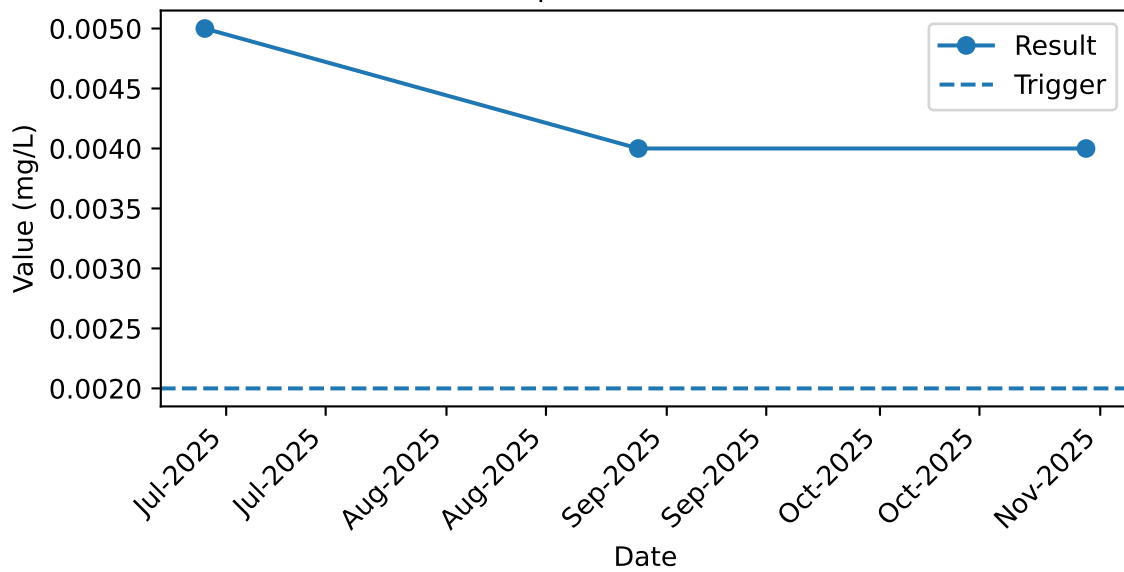
Bore: MBIS07 | Param: Dissolved Nickel



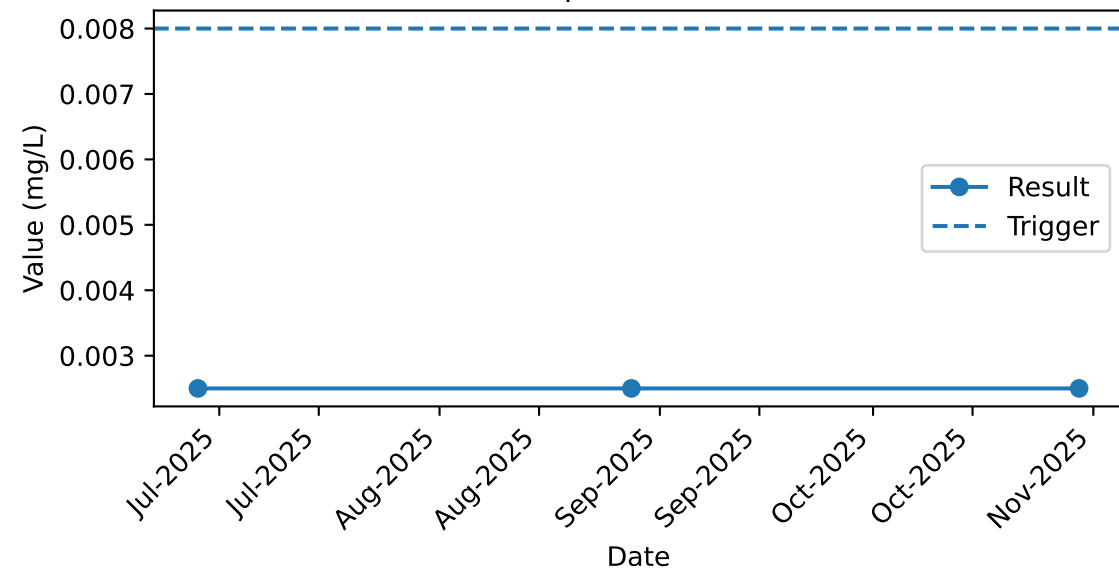
Bore: MBIS07 | Param: Dissolved Silver



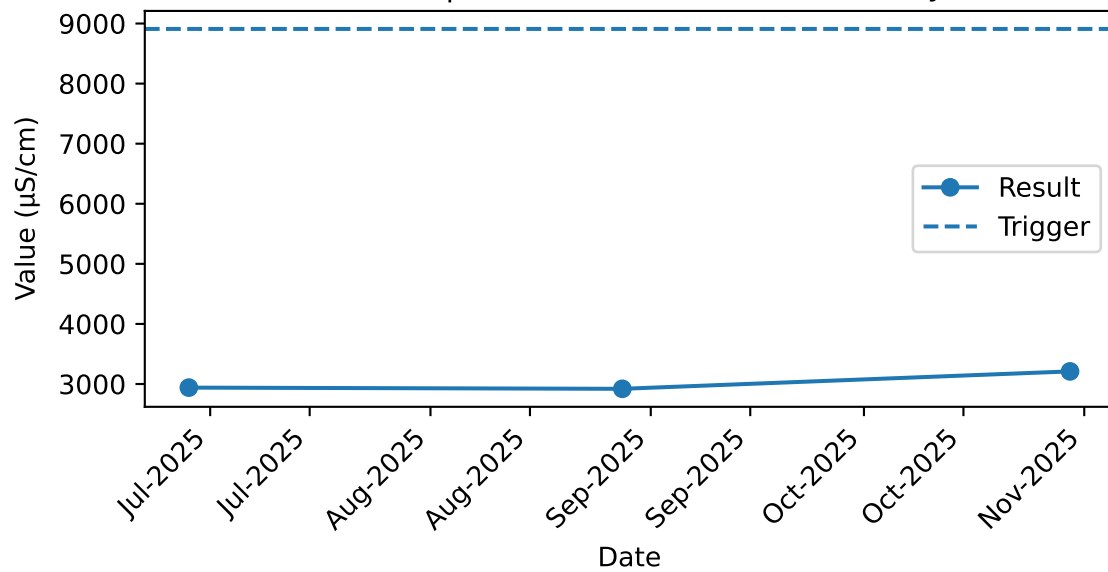
Bore: MBIS07 | Param: Dissolved Uranium



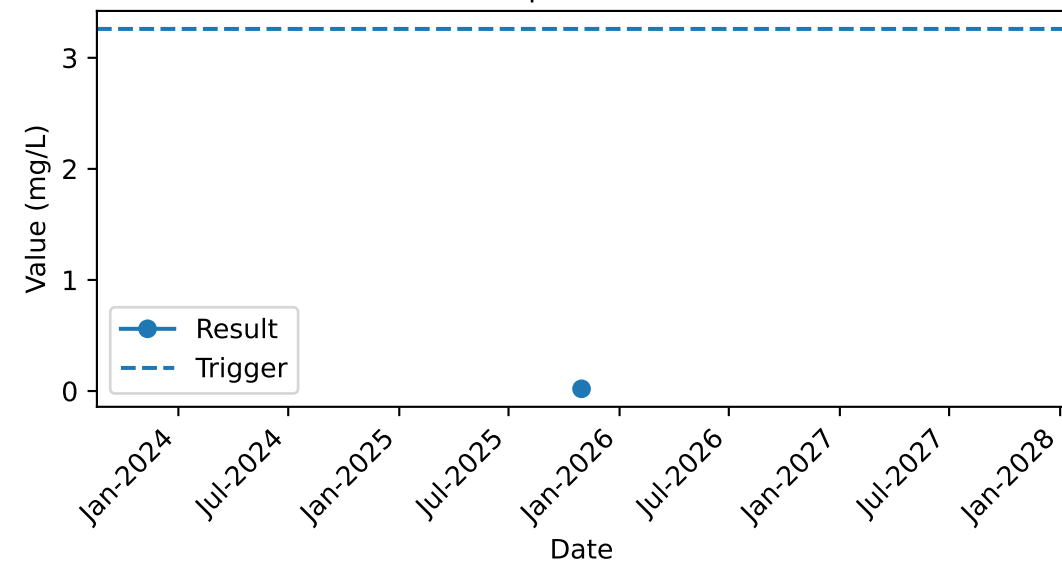
Bore: MBIS07 | Param: Dissolved Zinc



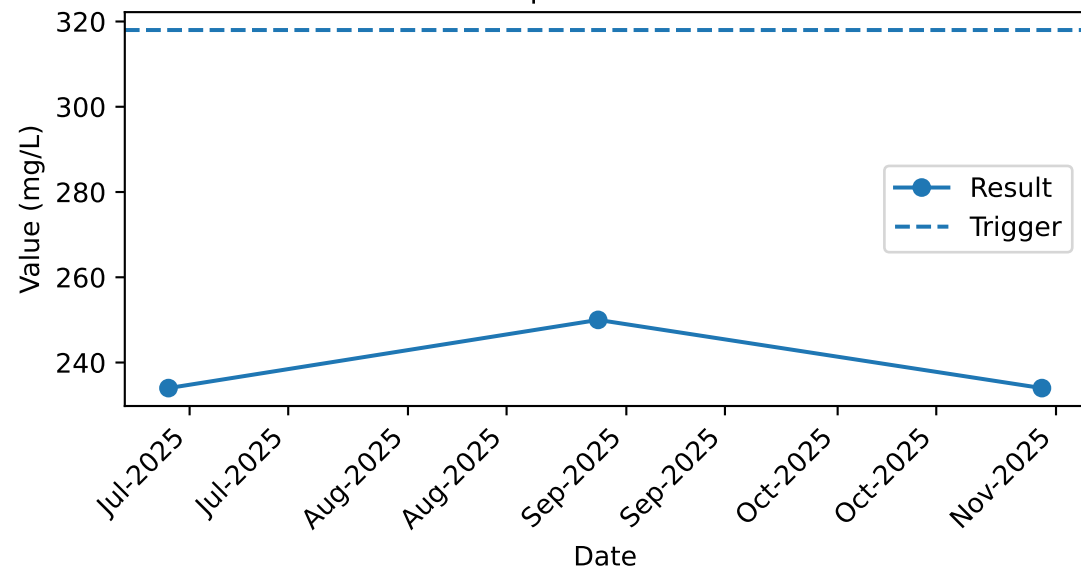
Bore: MBIS07 | Param: Electrical Conductivity (Lab)



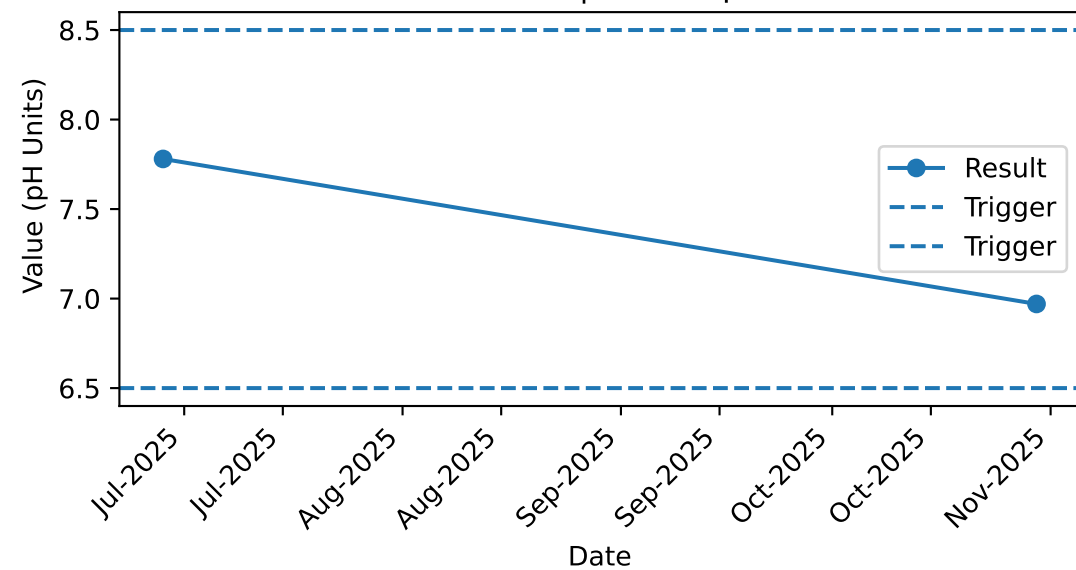
Bore: MBIS07 | Param: Nitrate as N



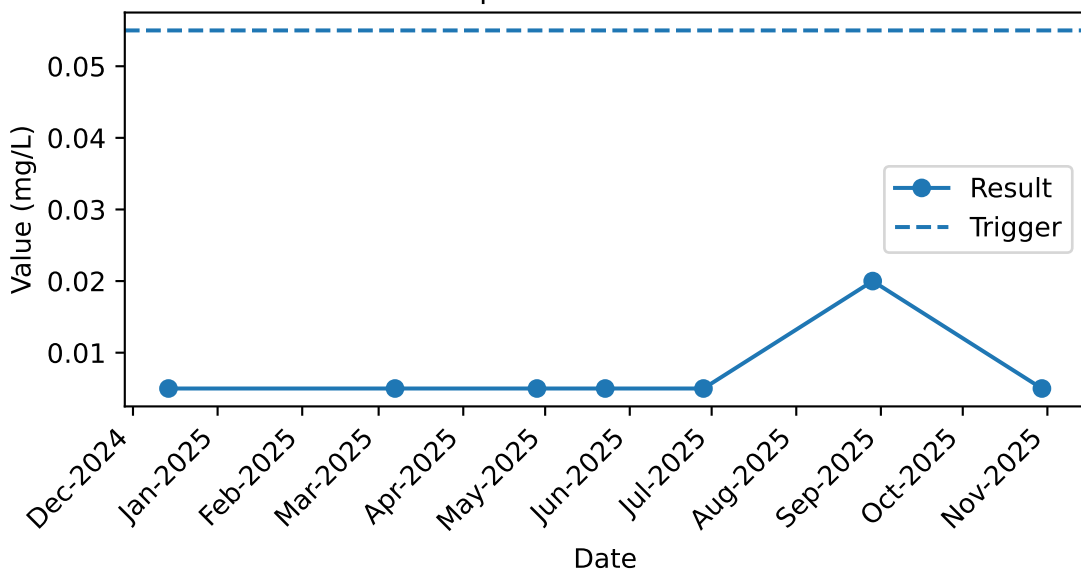
Bore: MBIS07 | Param: Sulfate as SO4



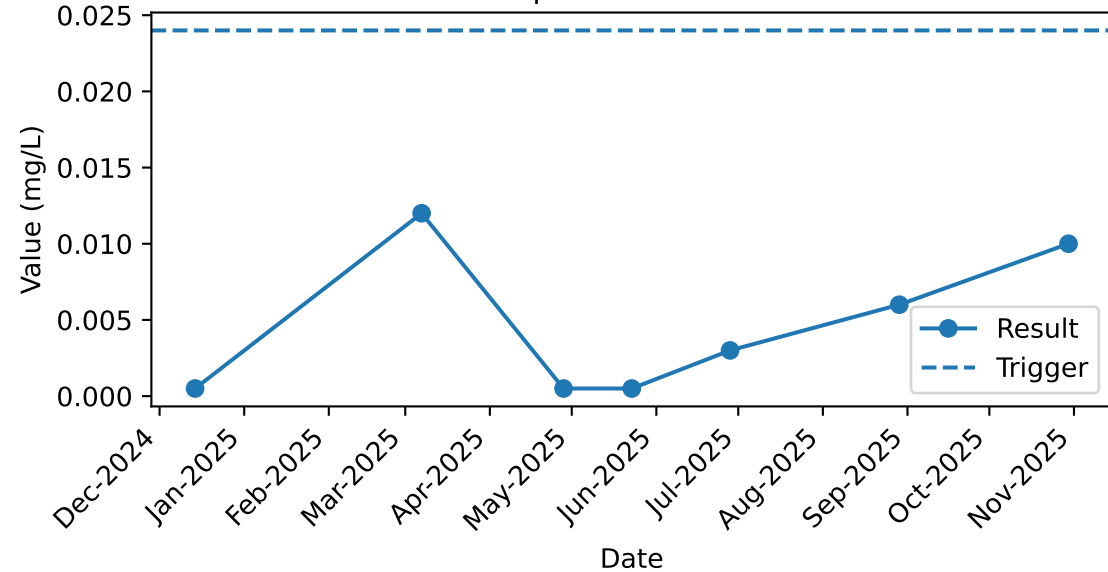
Bore: MBIS07 | Param: pH field



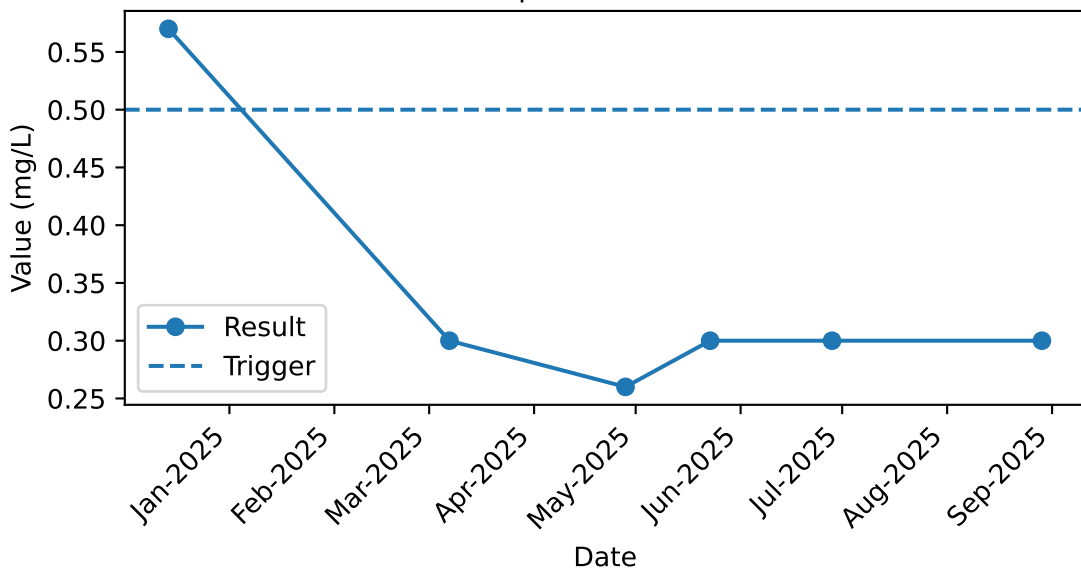
Bore: MBIS08 | Param: Dissolved Aluminium



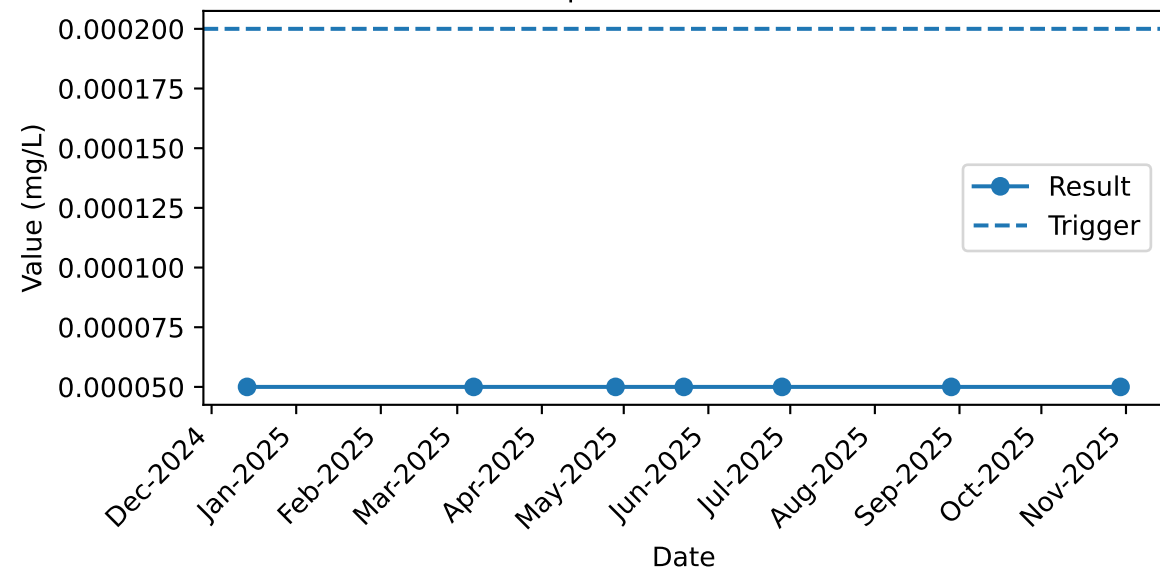
Bore: MBIS08 | Param: Dissolved Arsenic



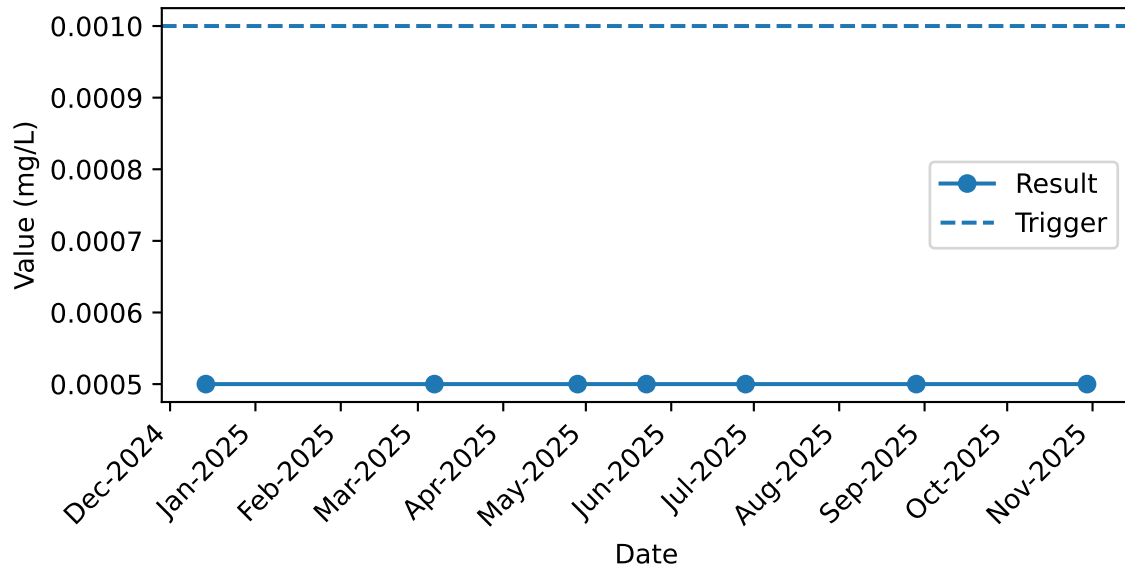
Bore: MBIS08 | Param: Dissolved Boron



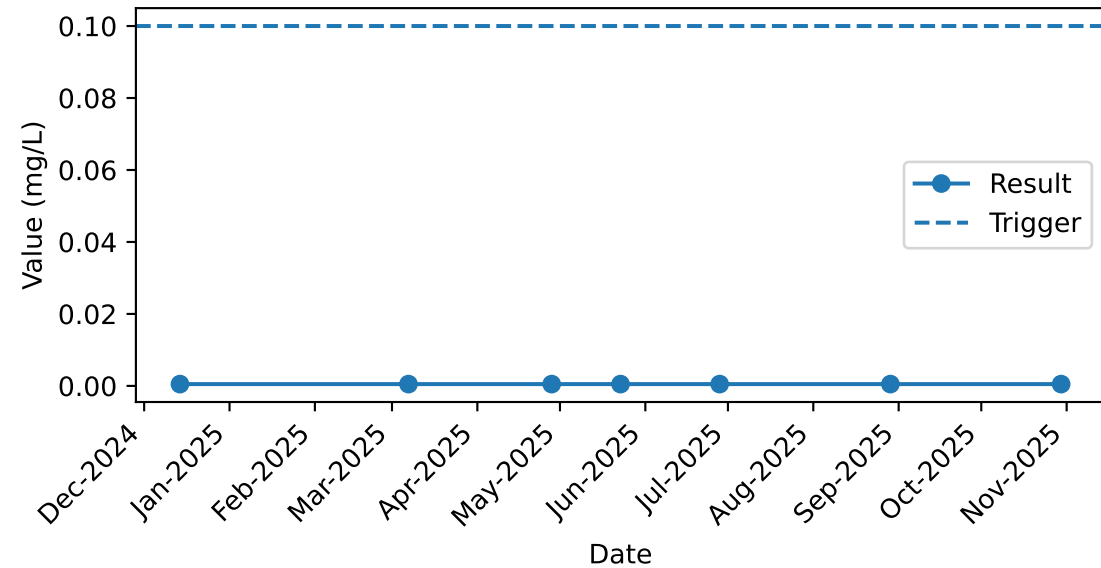
Bore: MBIS08 | Param: Dissolved Cadmium



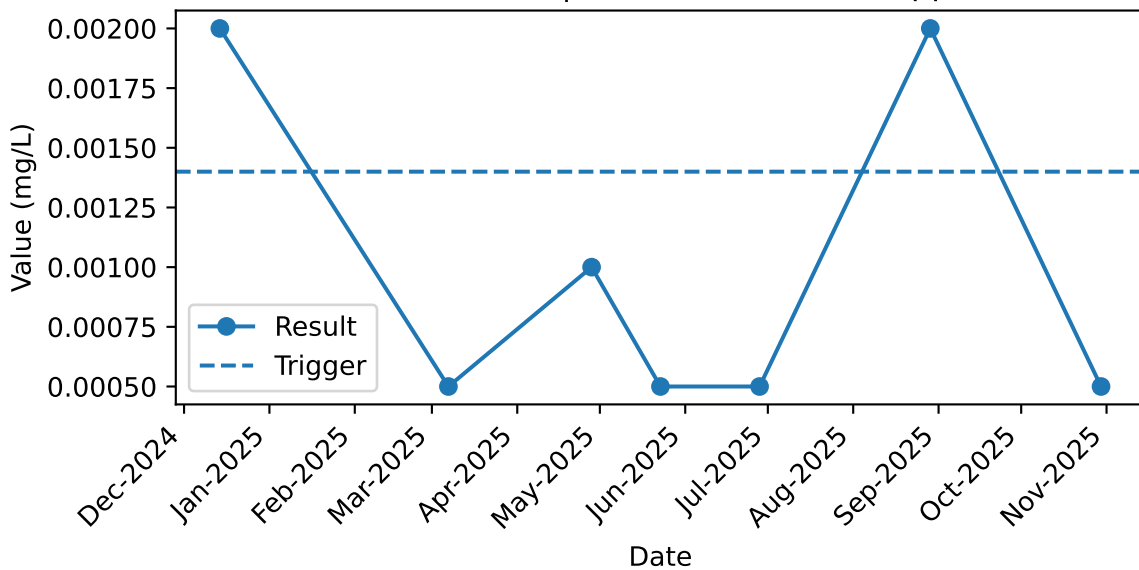
Bore: MBIS08 | Param: Dissolved Chromium



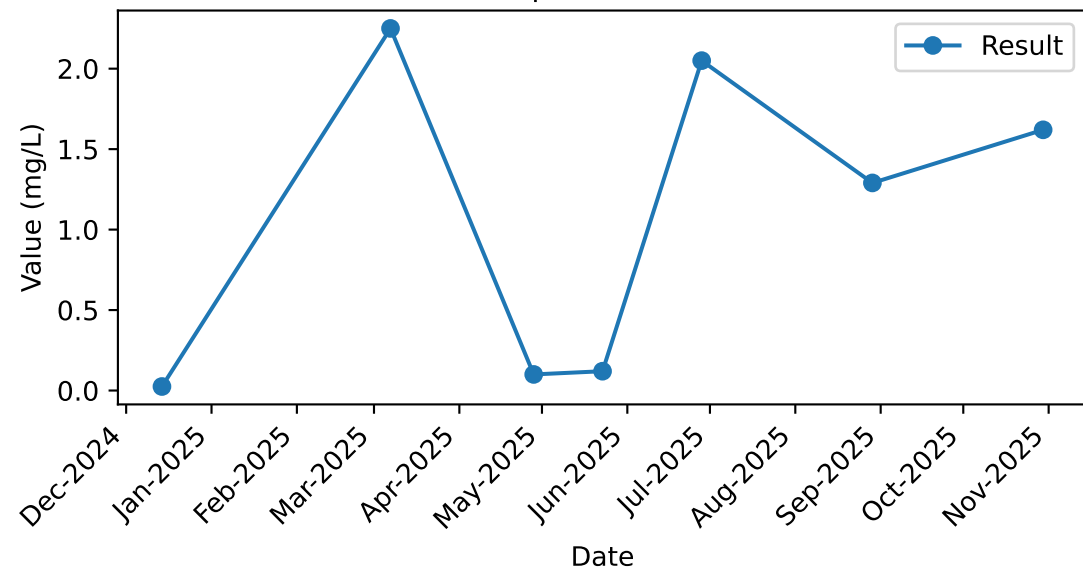
Bore: MBIS08 | Param: Dissolved Cobalt



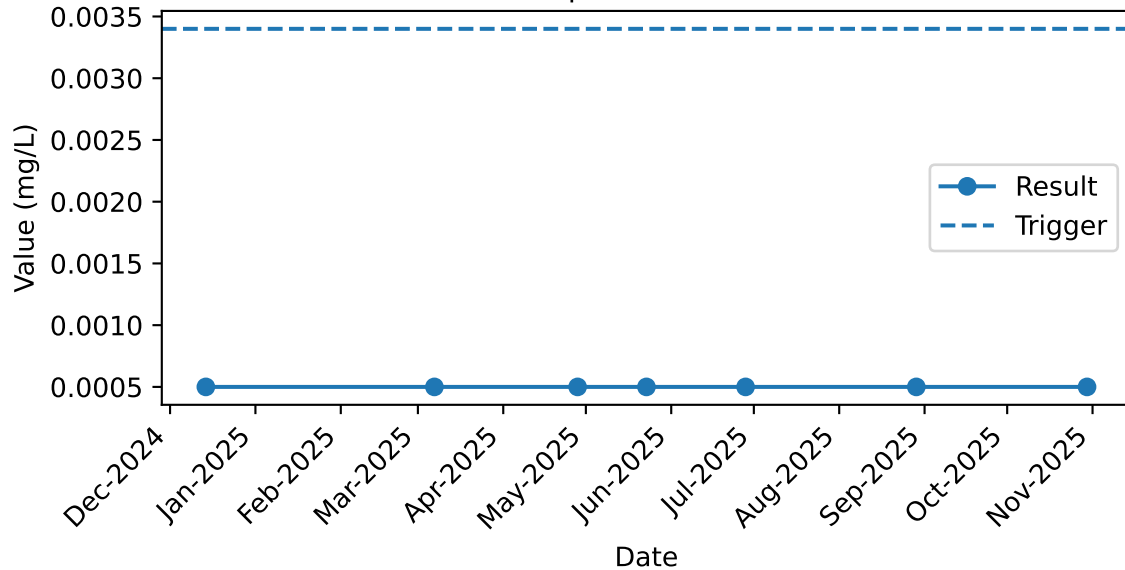
Bore: MBIS08 | Param: Dissolved Copper



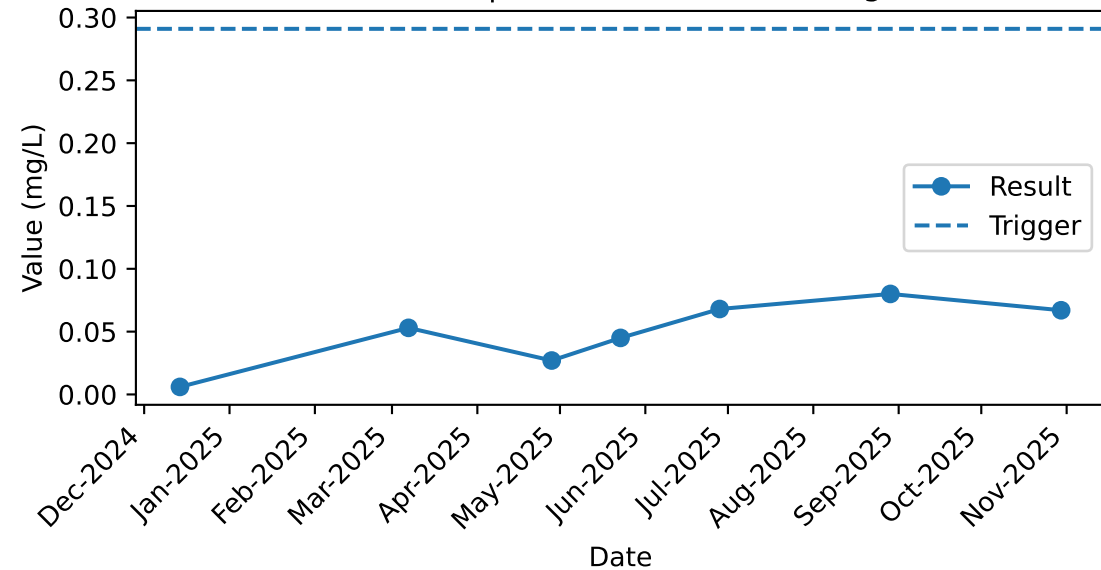
Bore: MBIS08 | Param: Dissolved Iron



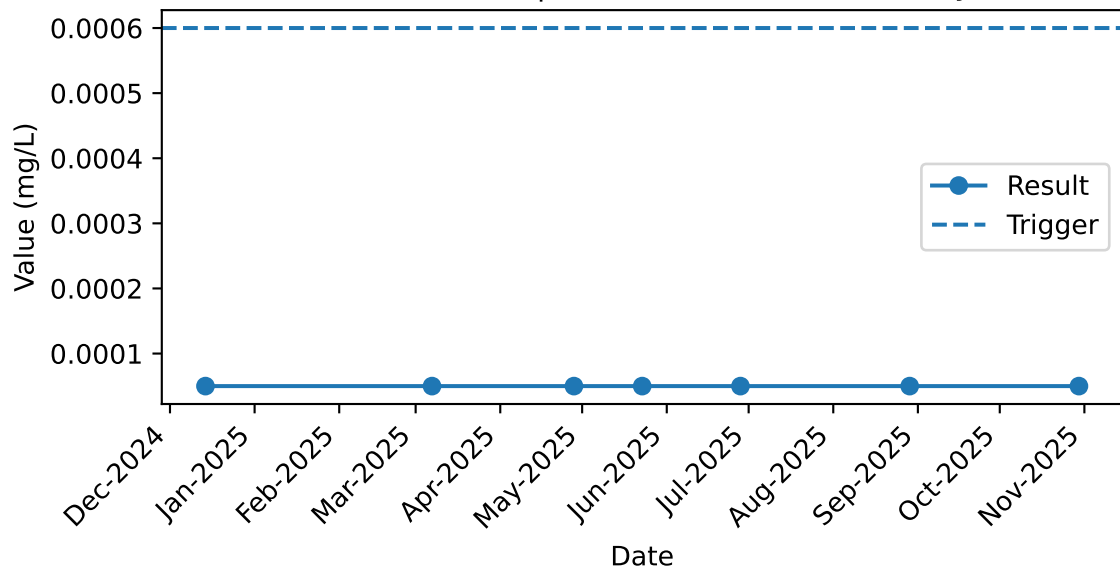
Bore: MBIS08 | Param: Dissolved Lead



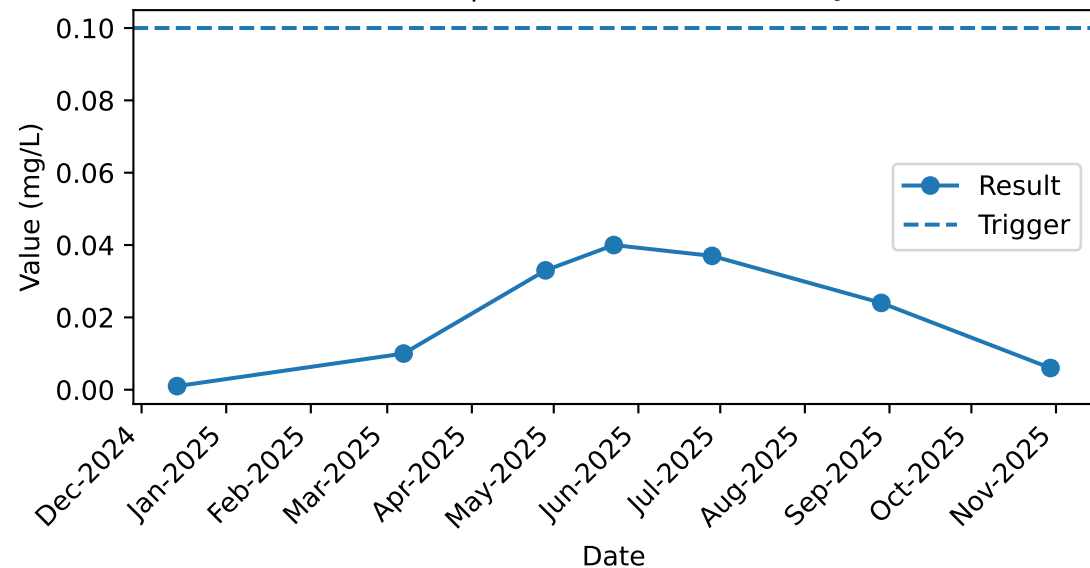
Bore: MBIS08 | Param: Dissolved Manganese



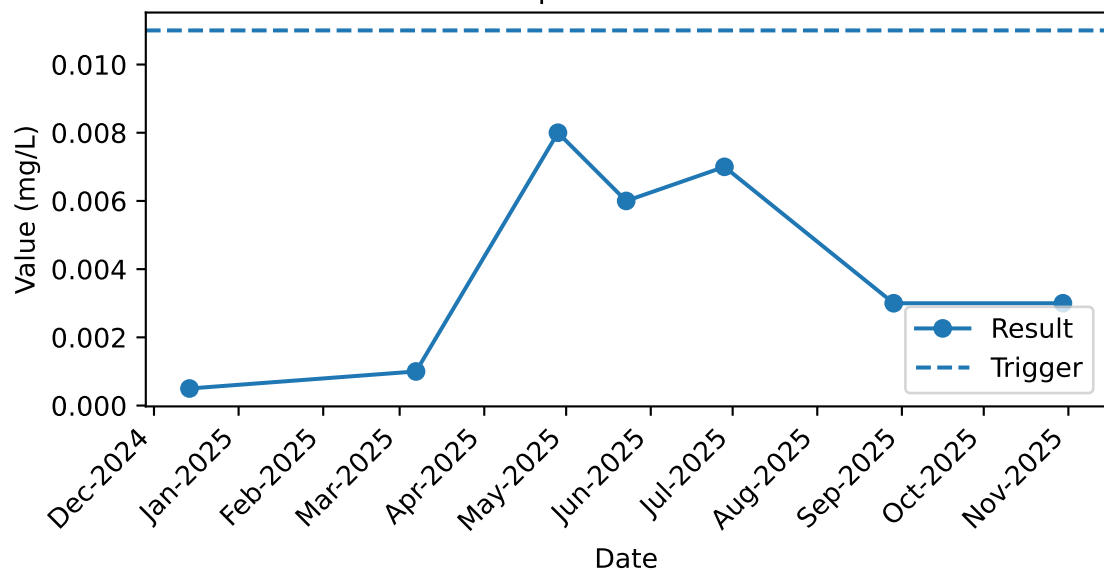
Bore: MBIS08 | Param: Dissolved Mercury



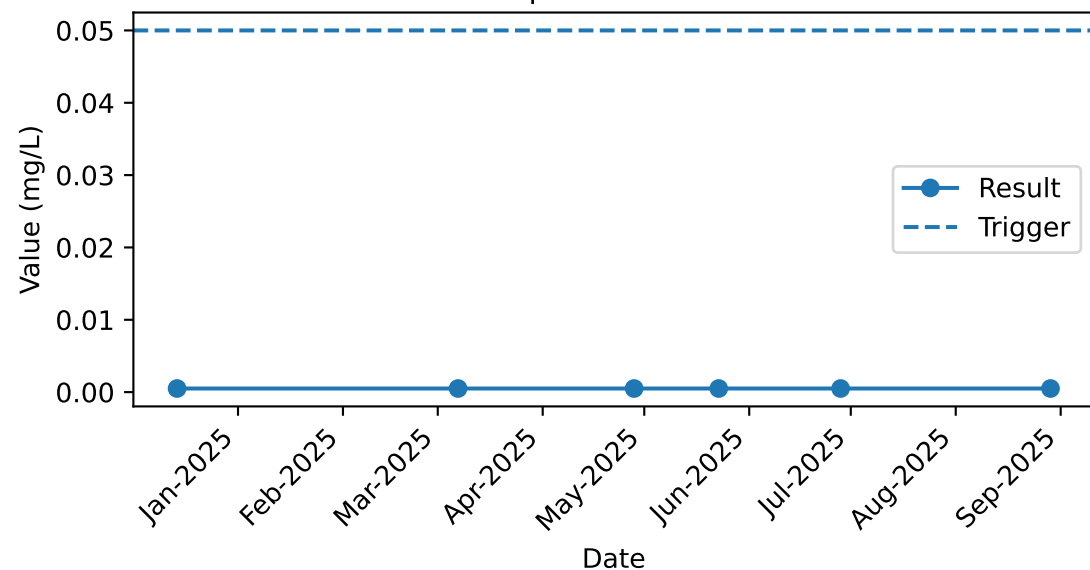
Bore: MBIS08 | Param: Dissolved Molybdenum



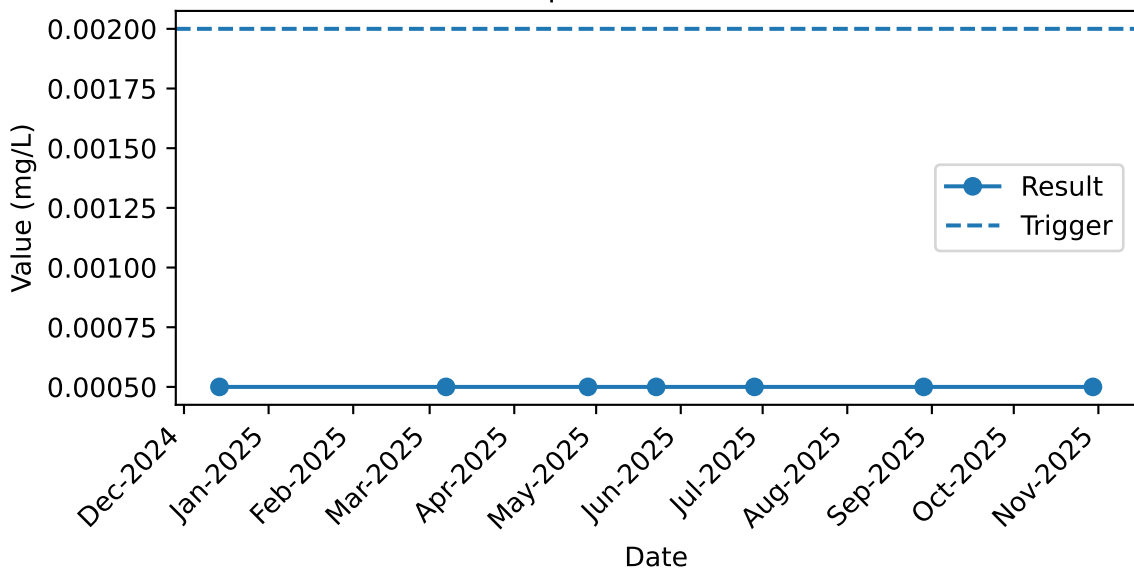
Bore: MBIS08 | Param: Dissolved Nickel



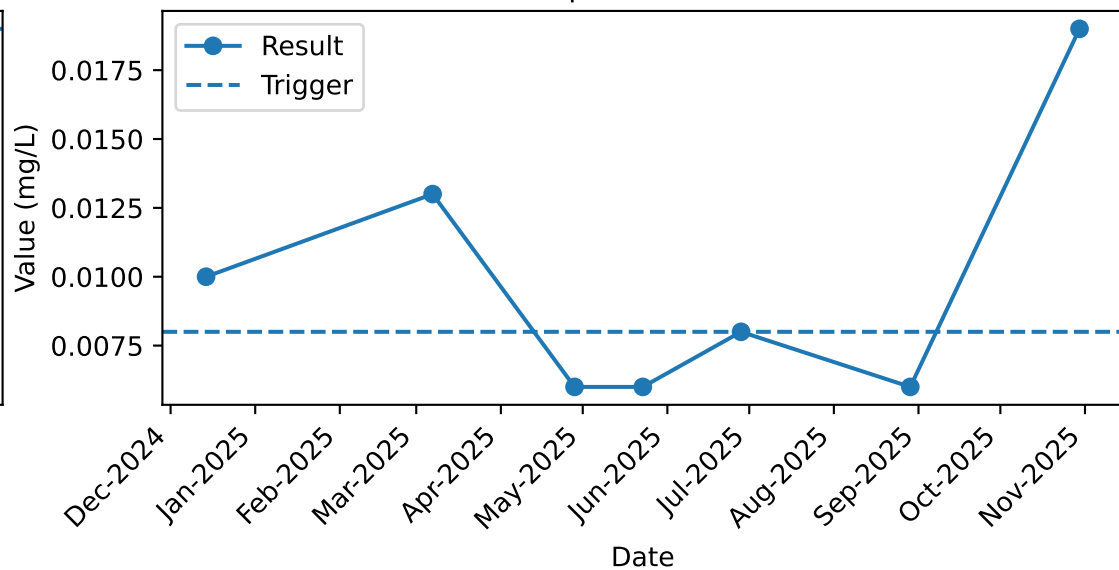
Bore: MBIS08 | Param: Dissolved Silver



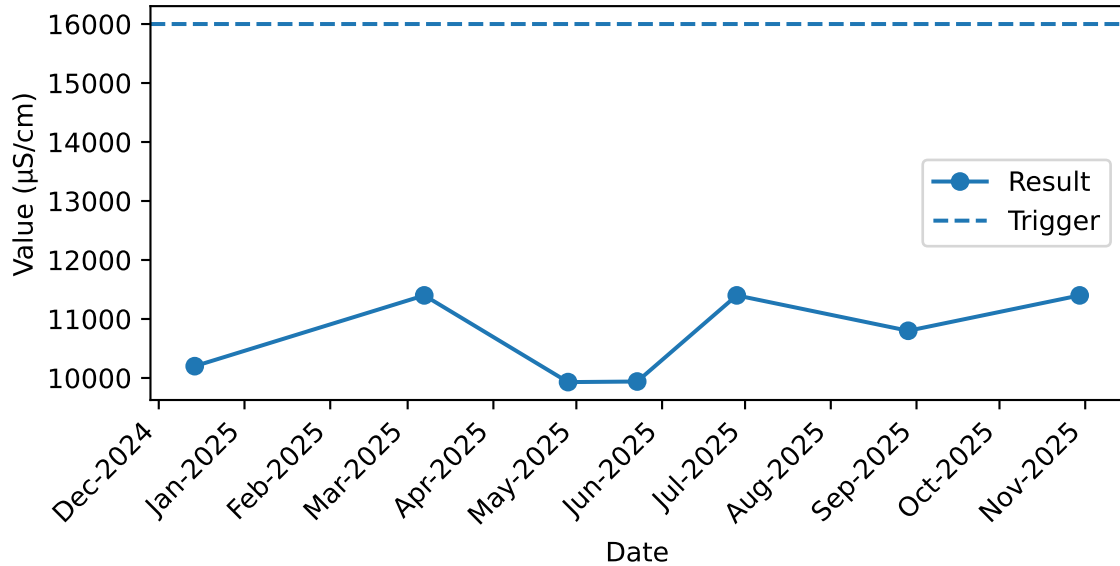
Bore: MBIS08 | Param: Dissolved Uranium



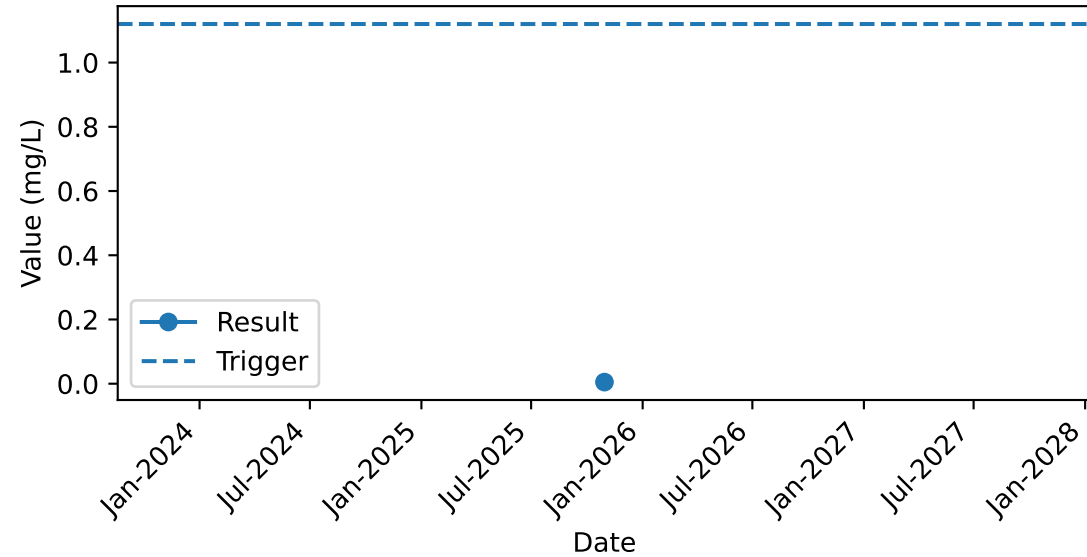
Bore: MBIS08 | Param: Dissolved Zinc



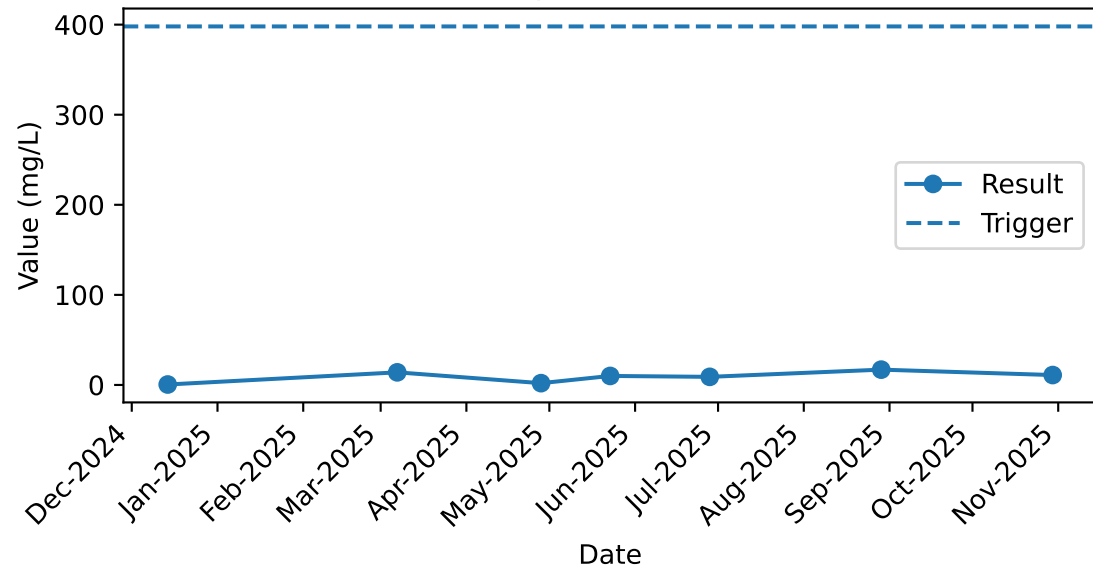
Bore: MBIS08 | Param: Electrical Conductivity (Lab)



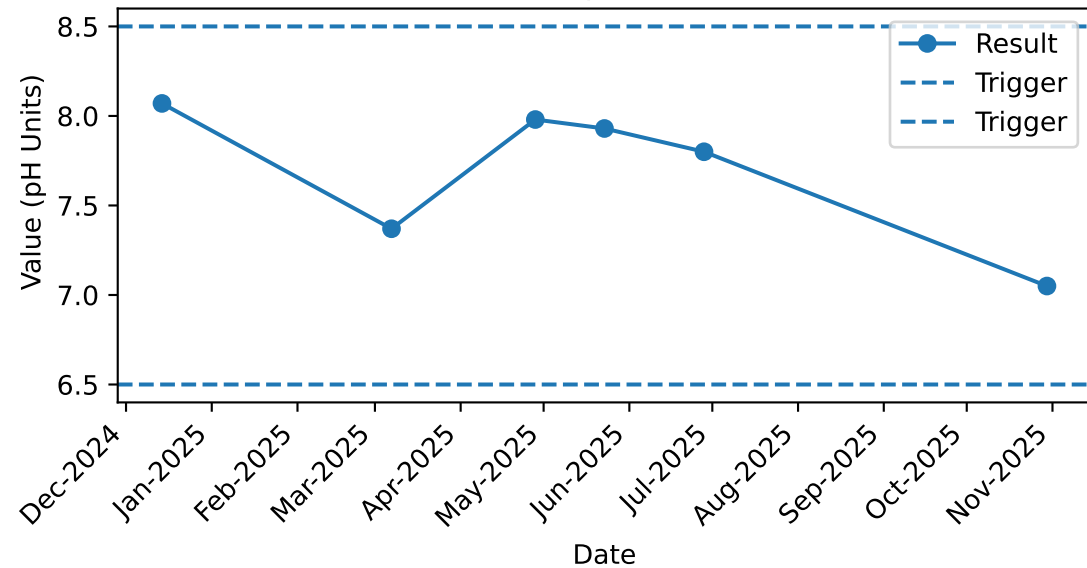
Bore: MBIS08 | Param: Nitrate as N



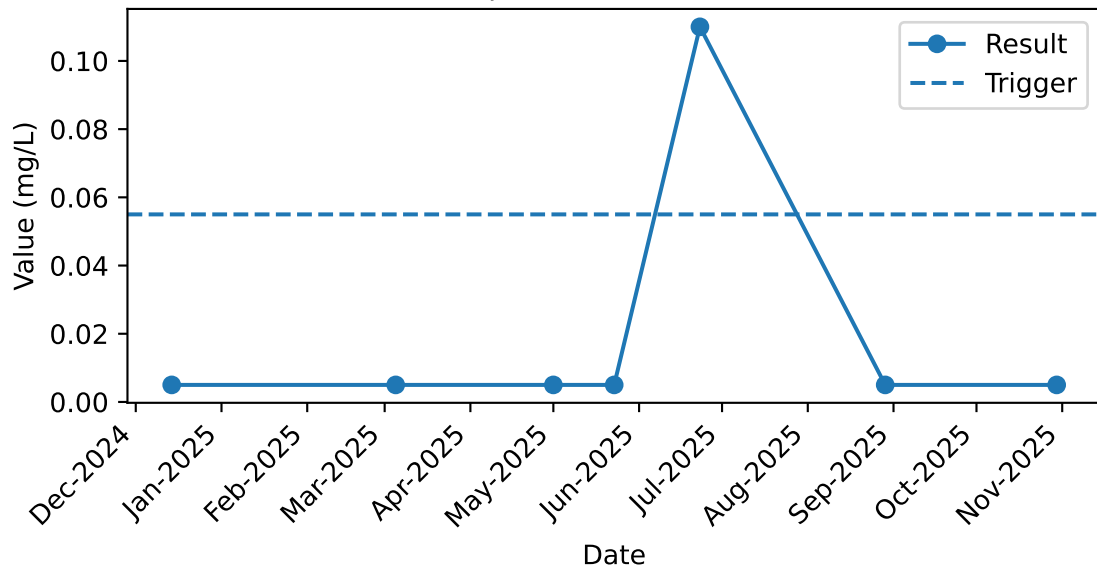
Bore: MBIS08 | Param: Sulfate as SO4



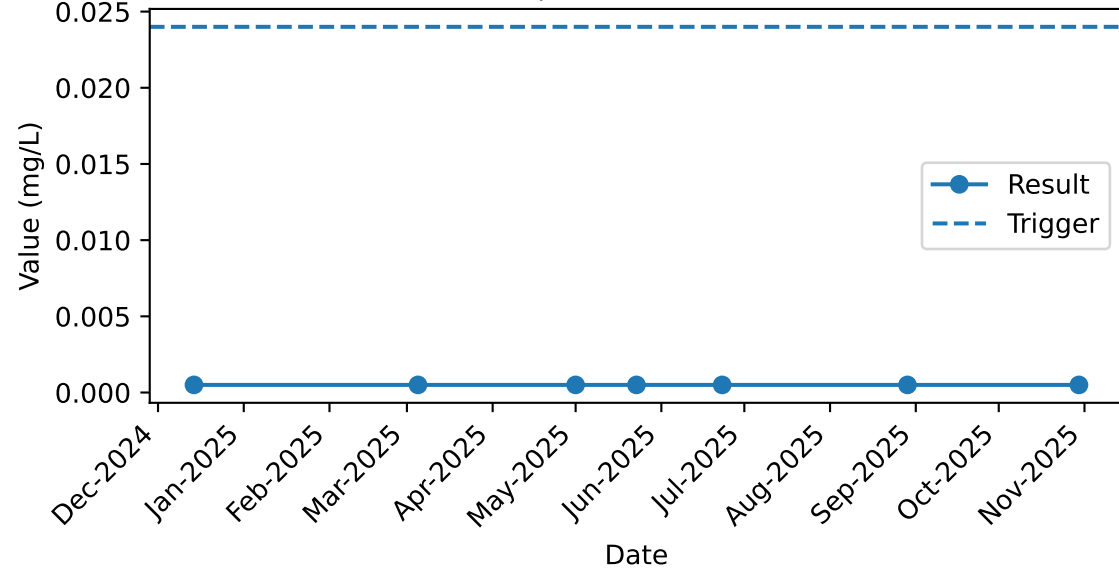
Bore: MBIS08 | Param: pH field



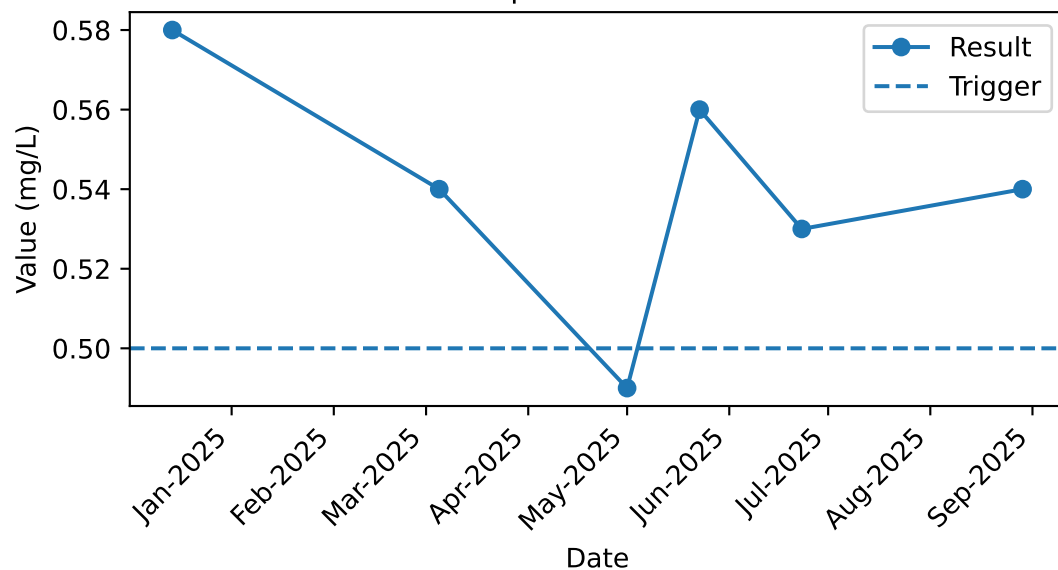
Bore: MBIS09 | Param: Dissolved Aluminium



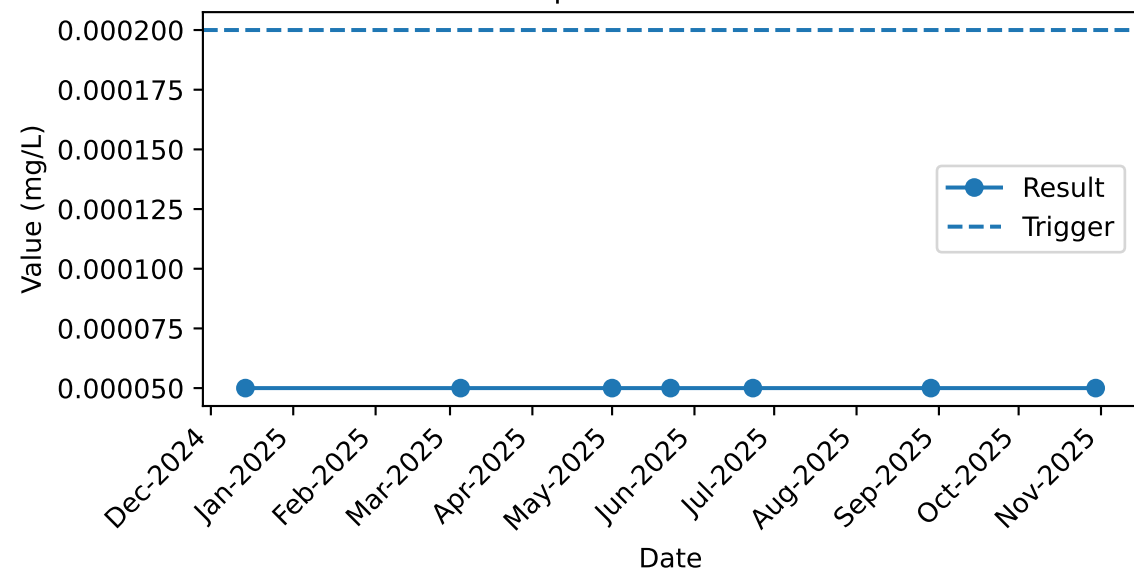
Bore: MBIS09 | Param: Dissolved Arsenic



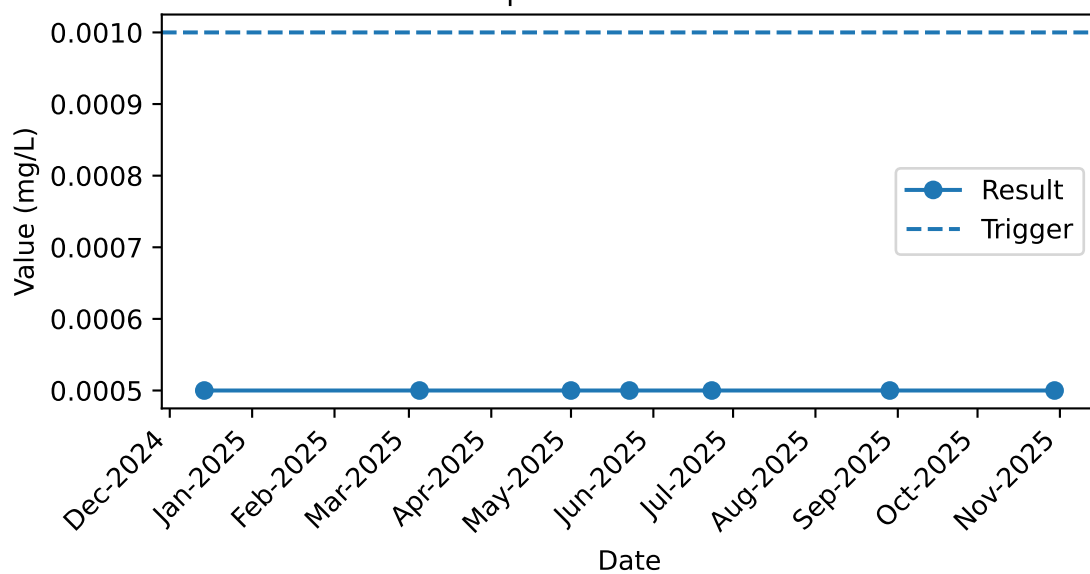
Bore: MBIS09 | Param: Dissolved Boron



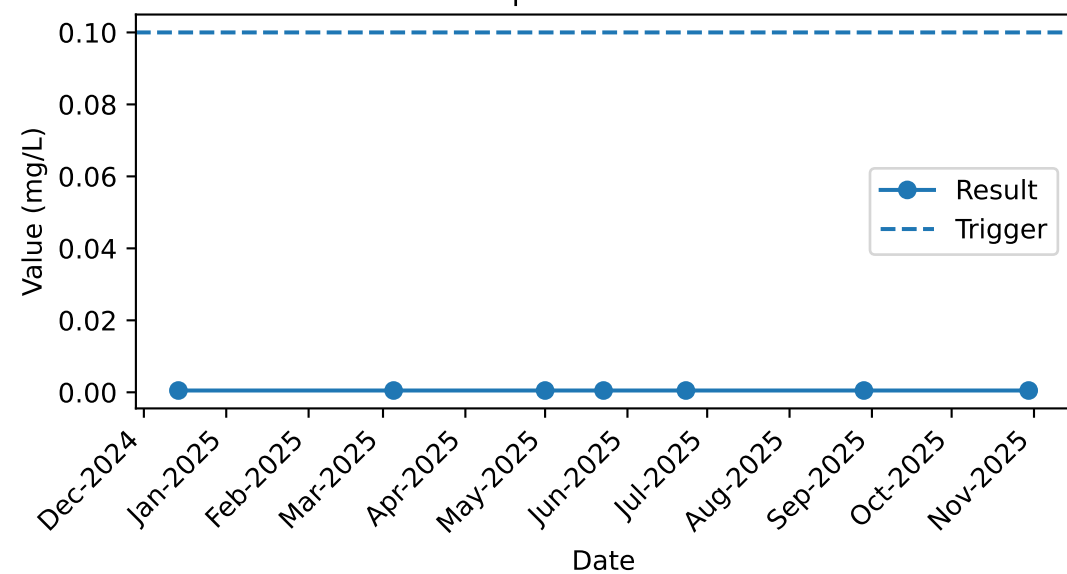
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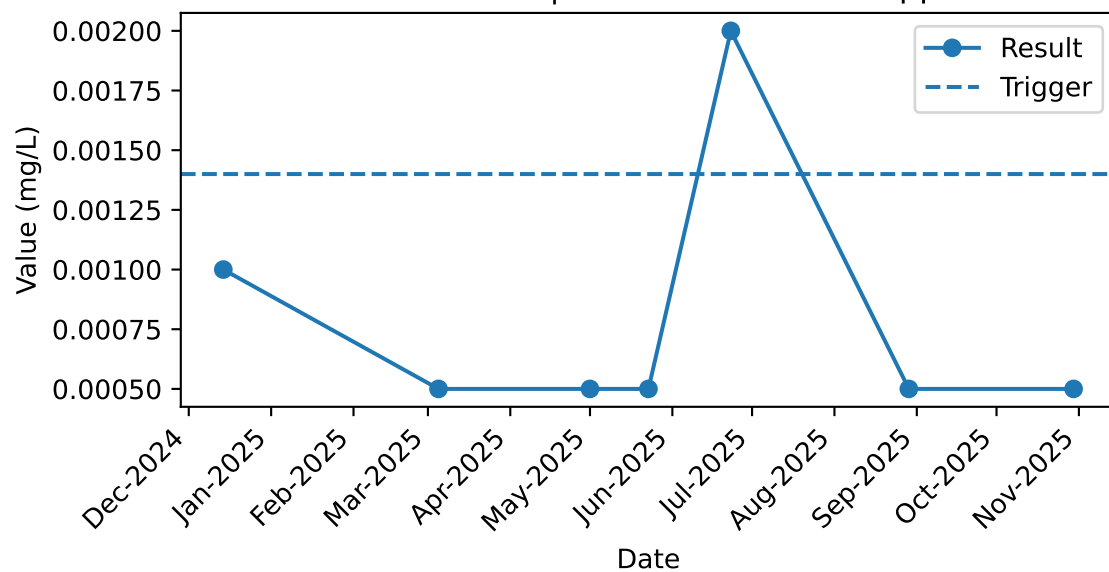
Bore: MBIS09 | Param: Dissolved Chromium



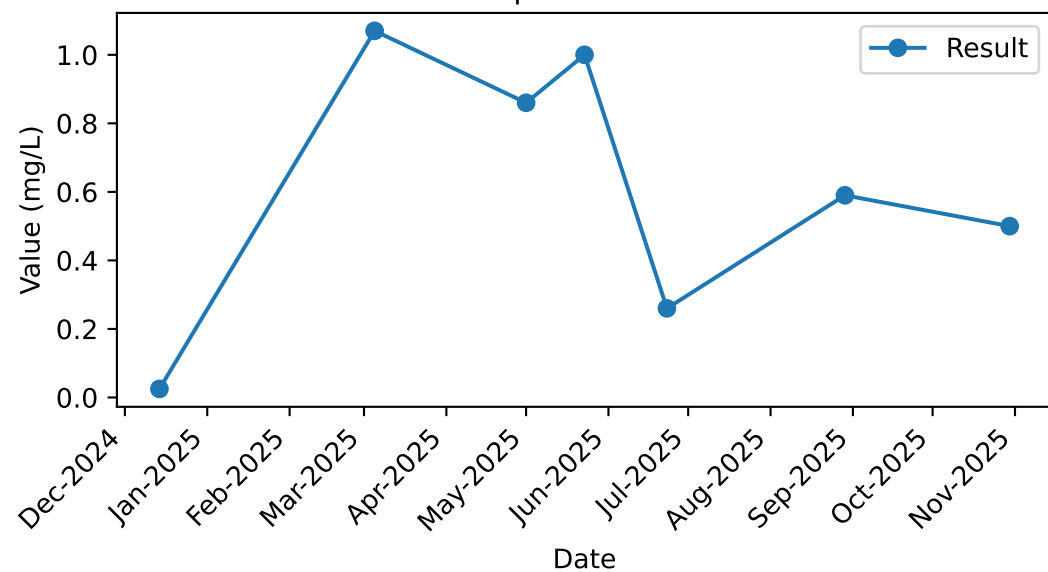
Bore: MBIS09 | Param: Dissolved Cobalt



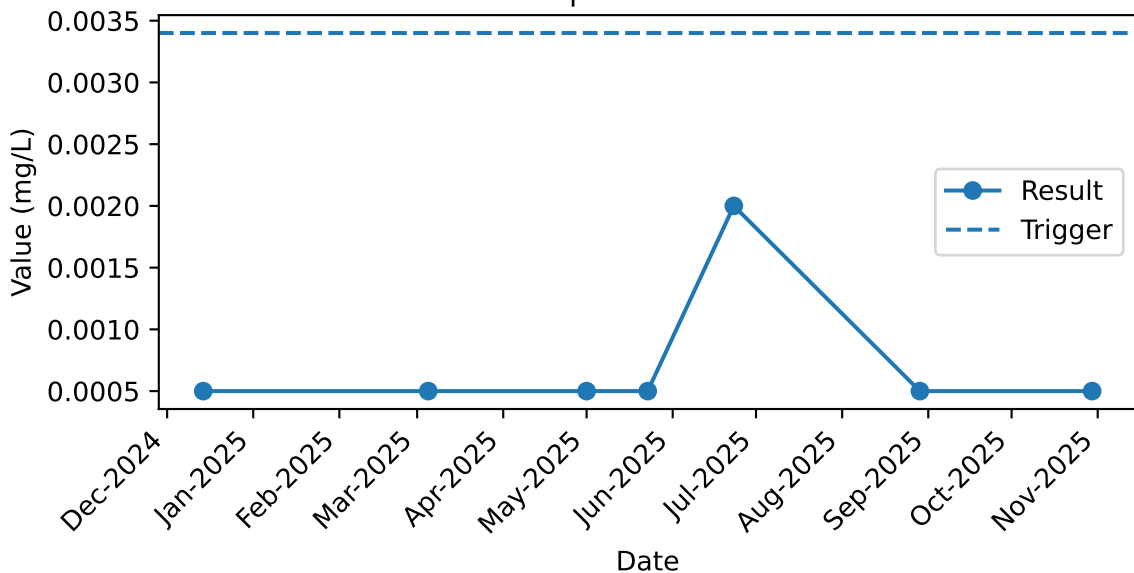
Bore: MBIS09 | Param: Dissolved Copper



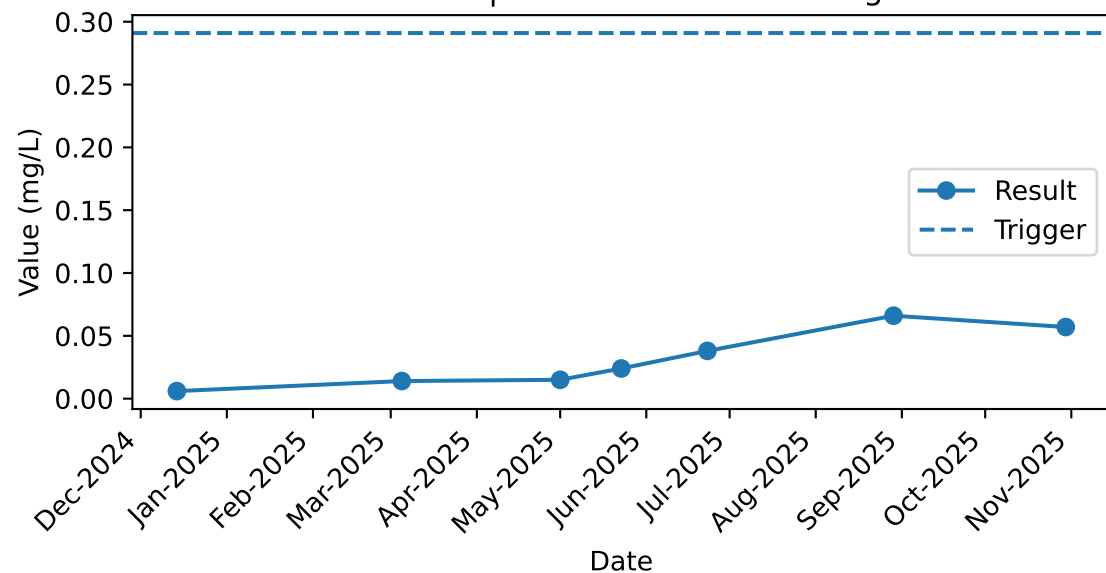
Bore: MBIS09 | Param: Dissolved Iron



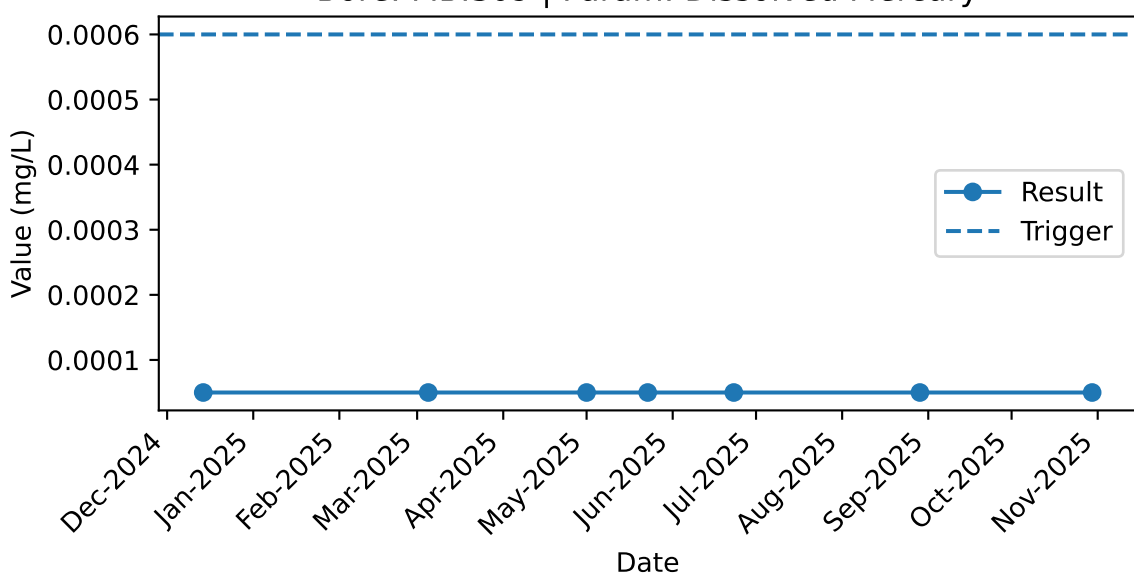
Bore: MBIS09 | Param: Dissolved Lead



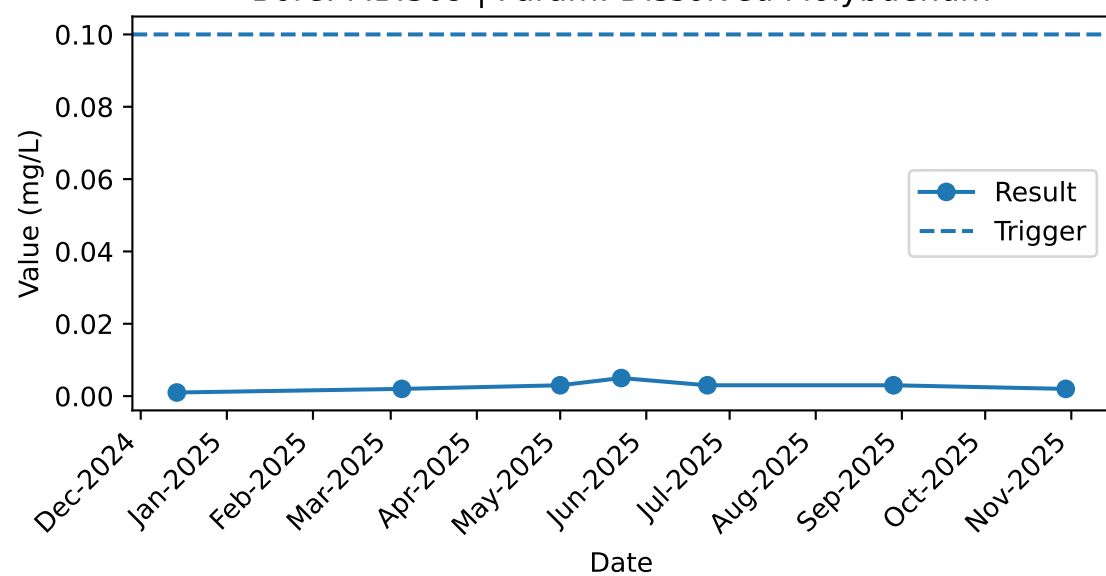
Bore: MBIS09 | Param: Dissolved Manganese



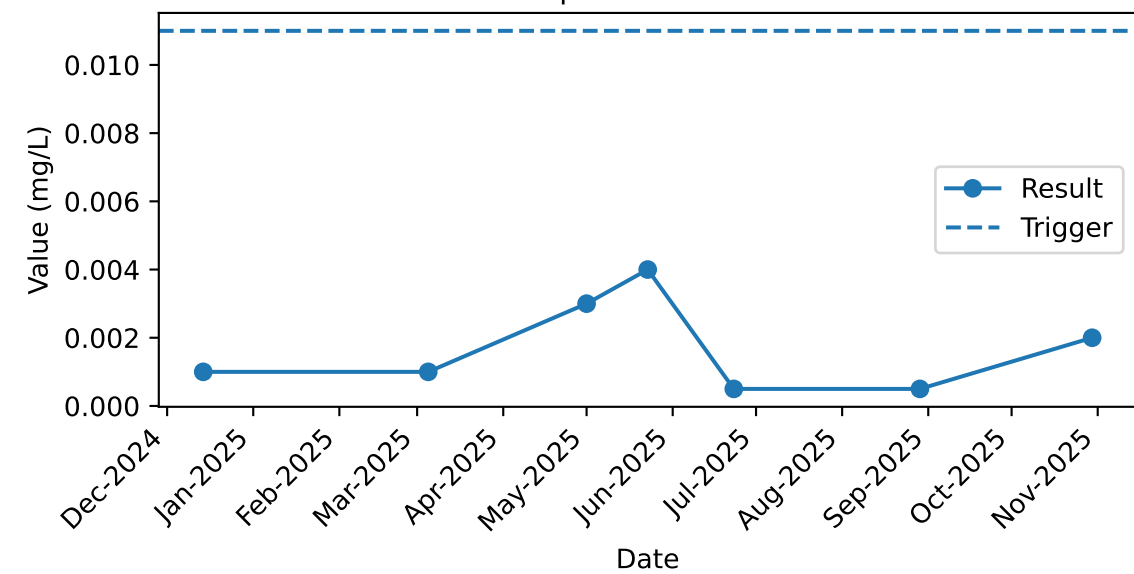
Bore: MBIS09 | Param: Dissolved Mercury



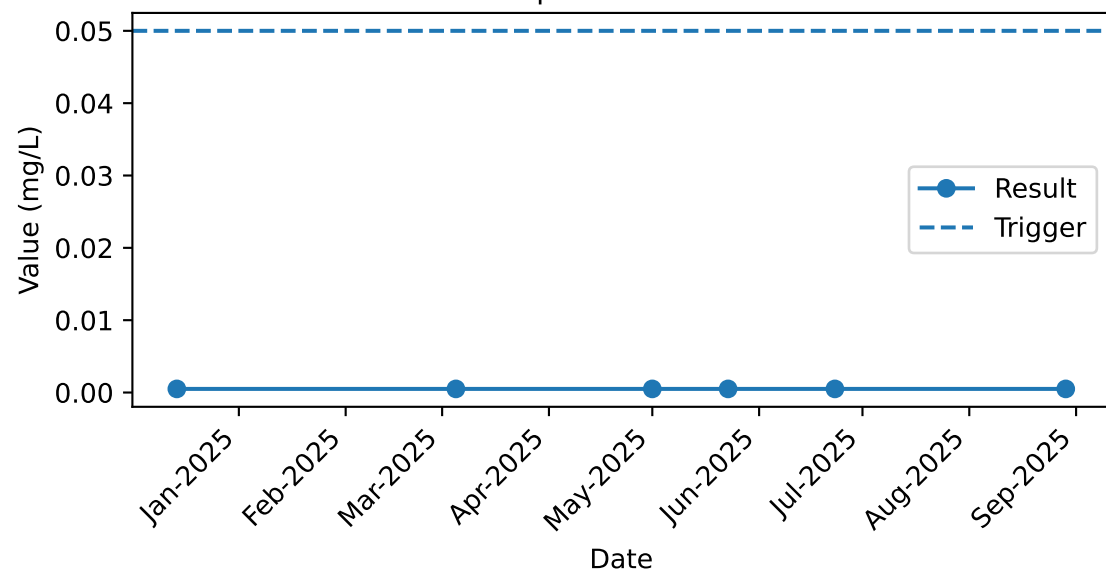
Bore: MBIS09 | Param: Dissolved Molybdenum



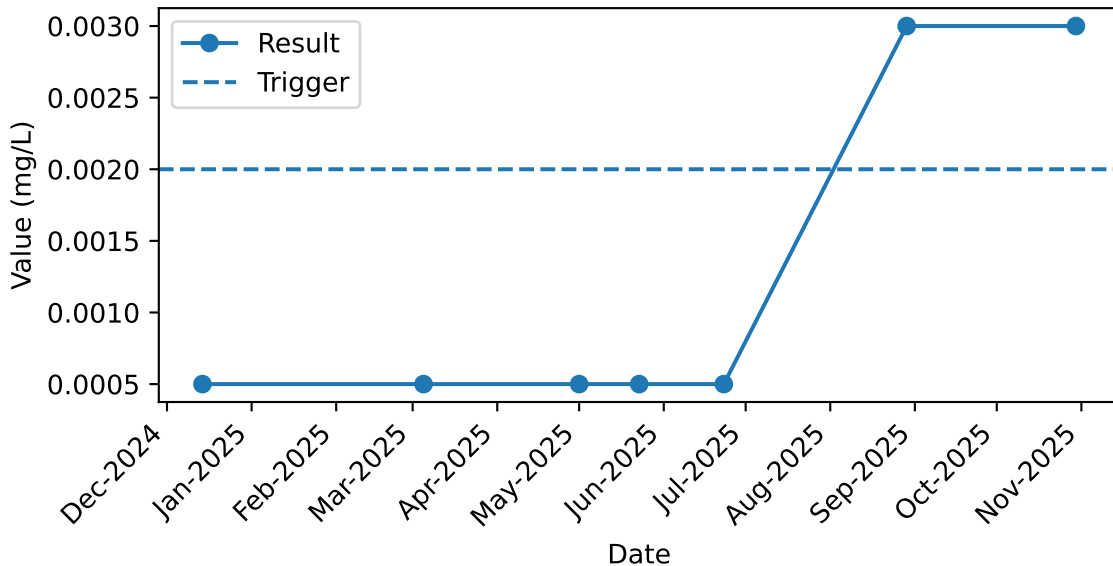
Bore: MBIS09 | Param: Dissolved Nickel



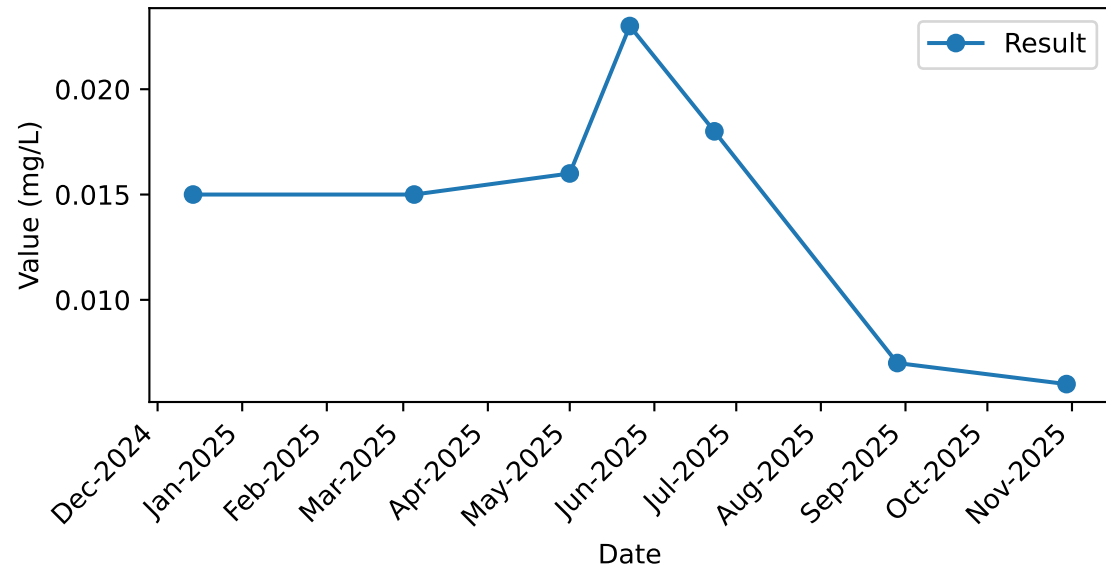
Bore: MBIS09 | Param: Dissolved Silver



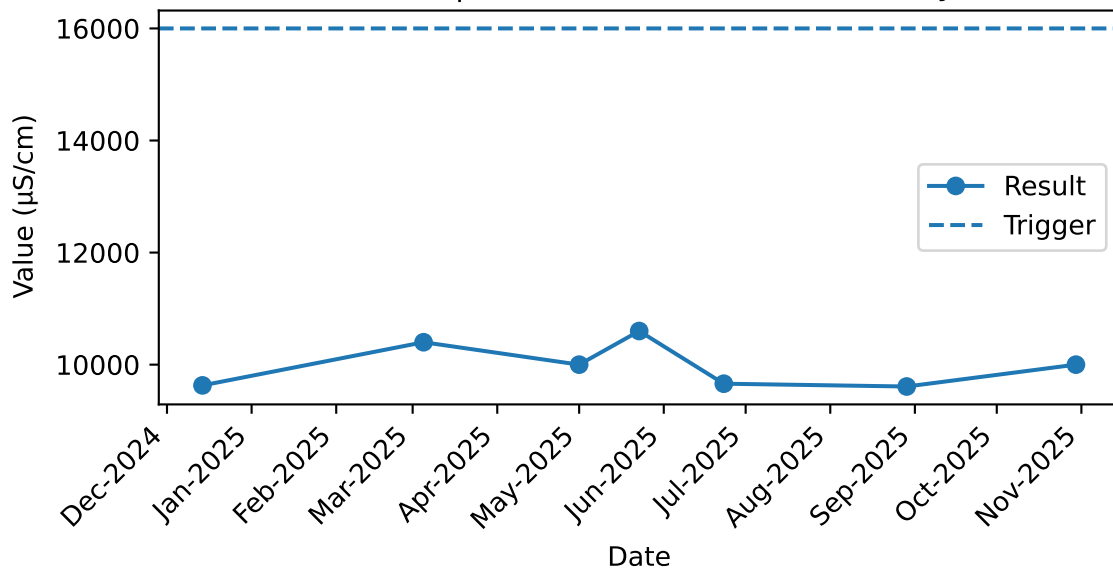
Bore: MBIS09 | Param: Dissolved Uranium



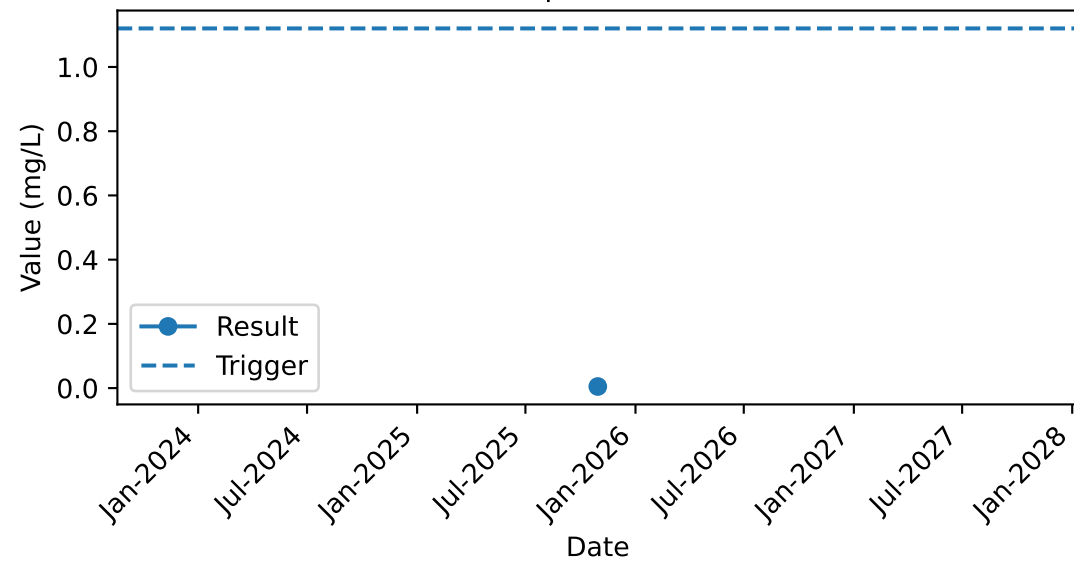
Bore: MBIS09 | Param: Dissolved Zinc



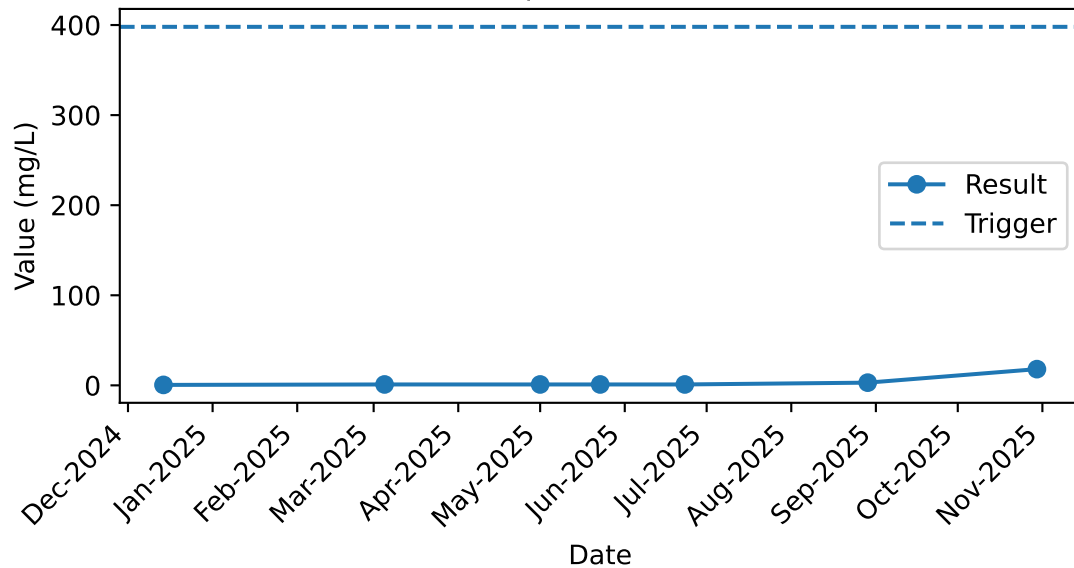
Bore: MBIS09 | Param: Electrical Conductivity (Lab)



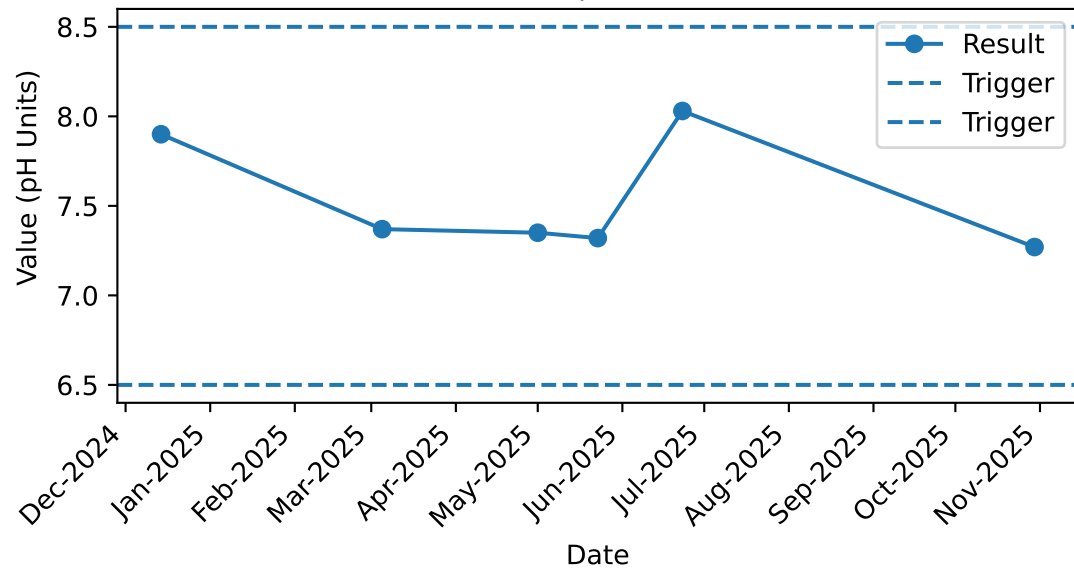
Bore: MBIS09 | Param: Nitrate as N



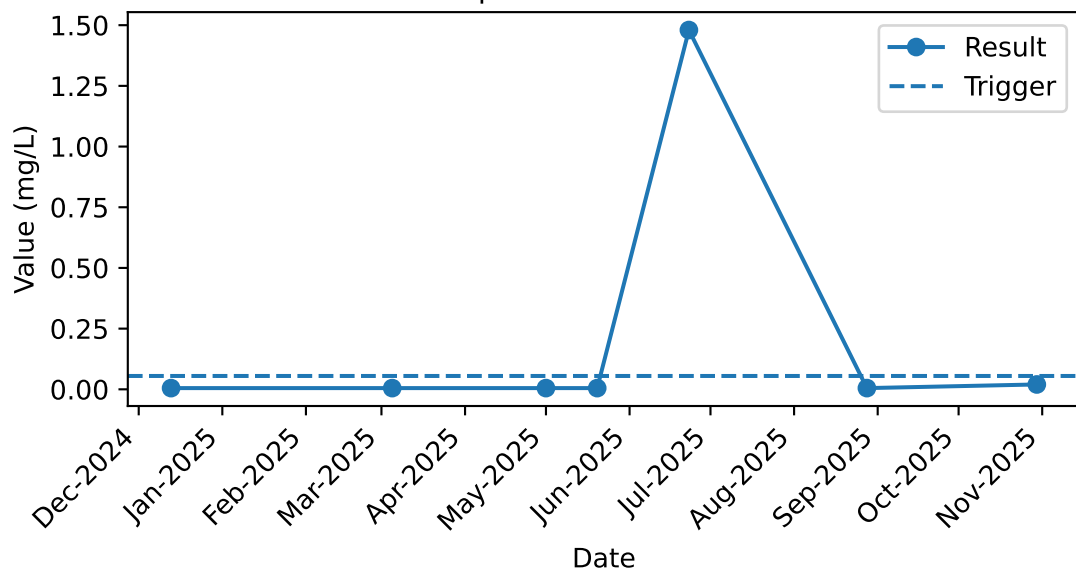
Bore: MBIS09 | Param: Sulfate as SO4



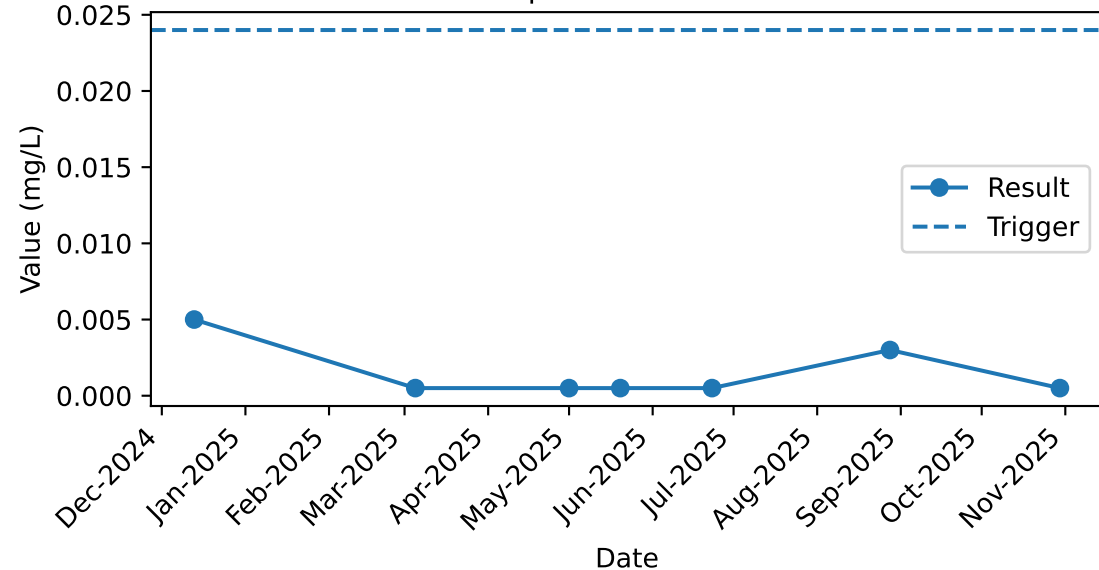
Bore: MBIS09 | Param: pH field



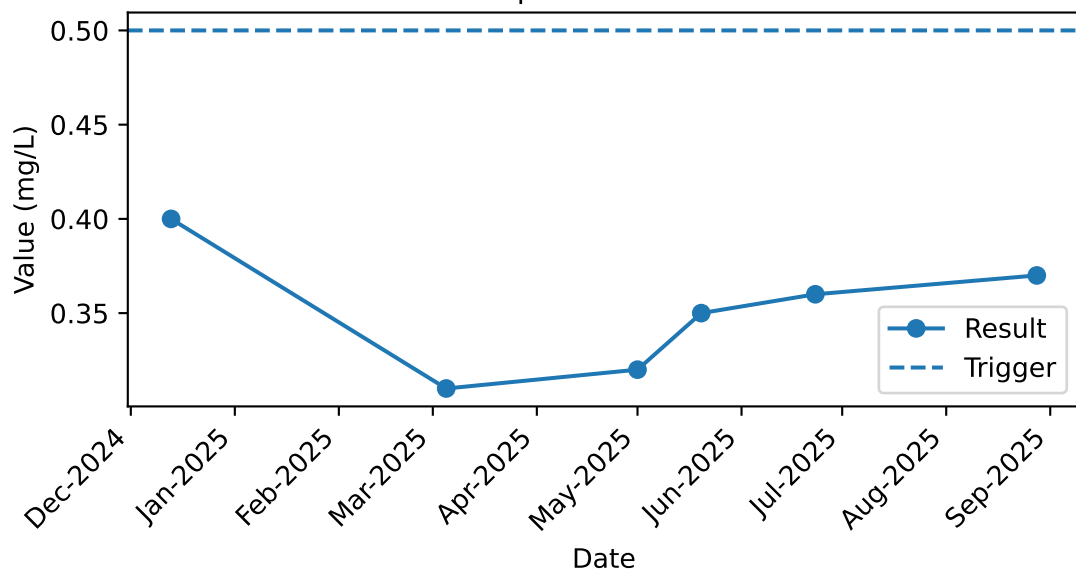
Bore: MBIS10 | Param: Dissolved Aluminium



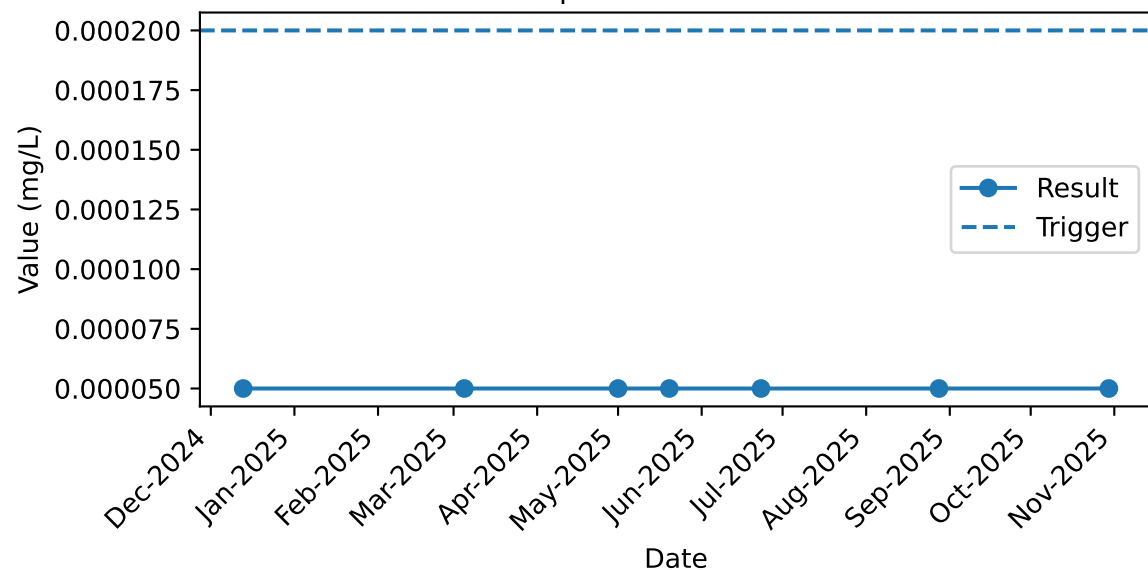
Bore: MBIS10 | Param: Dissolved Arsenic



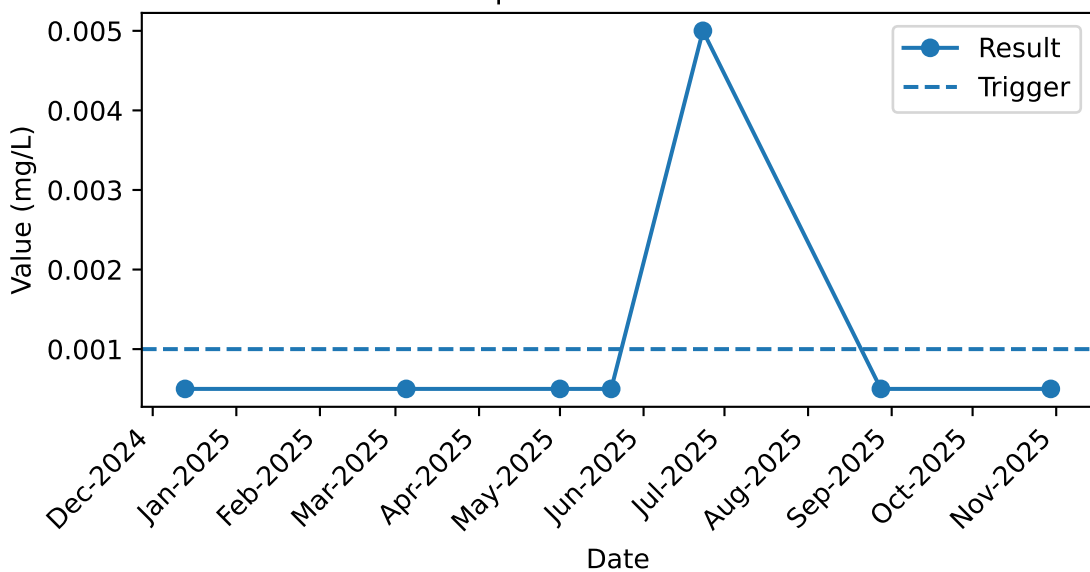
Bore: MBIS10 | Param: Dissolved Boron



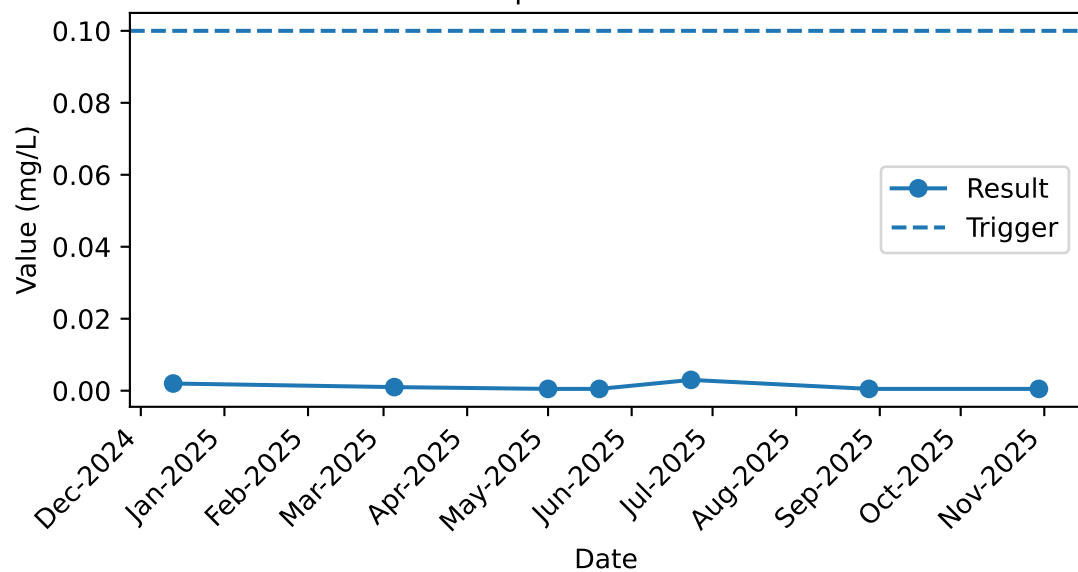
Bore: MBIS10 | Param: Dissolved Cadmium



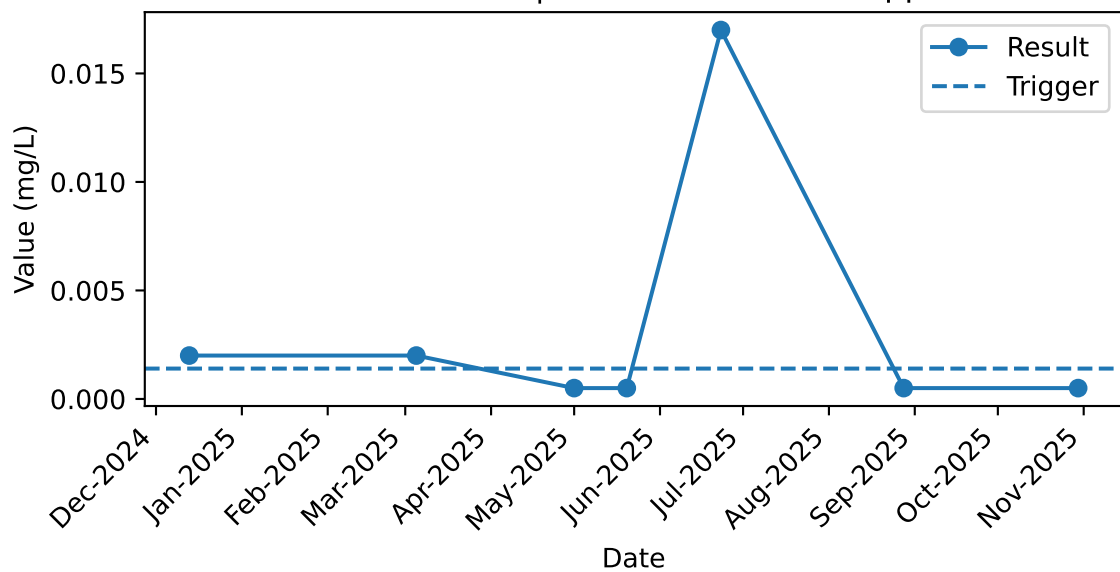
Bore: MBIS10 | Param: Dissolved Chromium



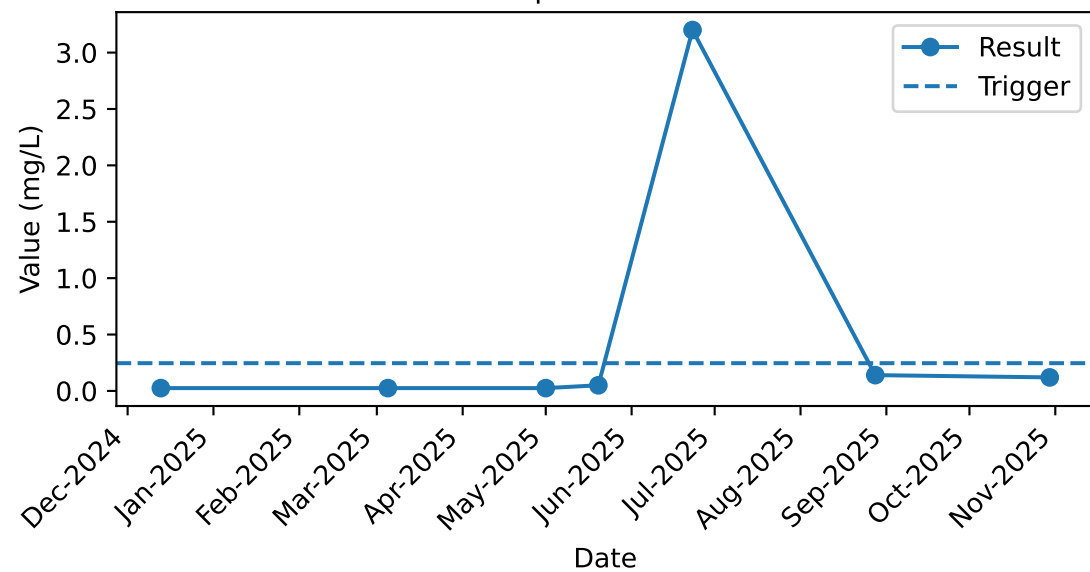
Bore: MBIS10 | Param: Dissolved Cobalt



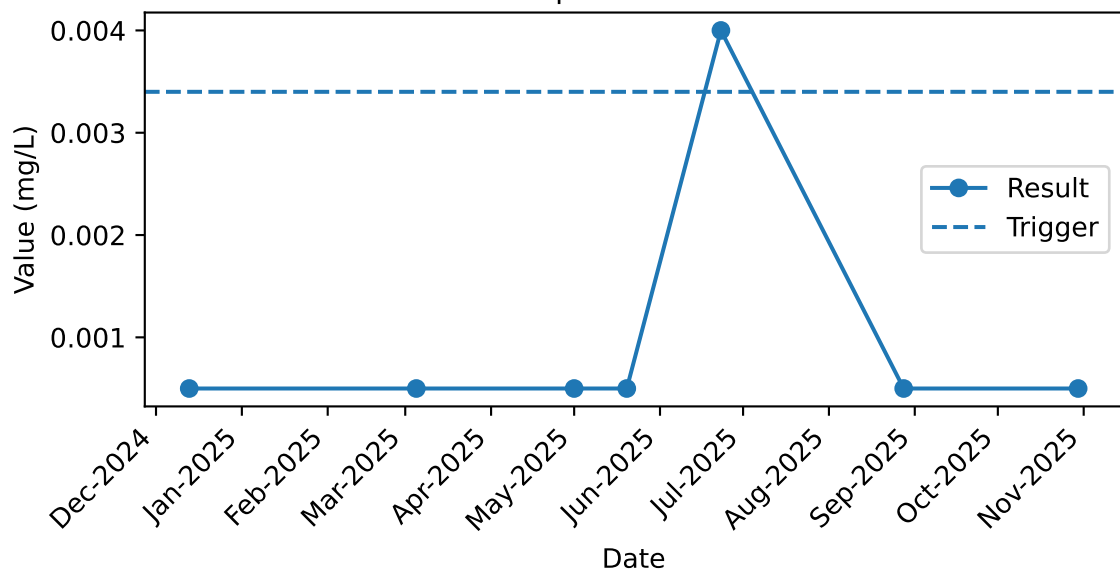
Bore: MBIS10 | Param: Dissolved Copper



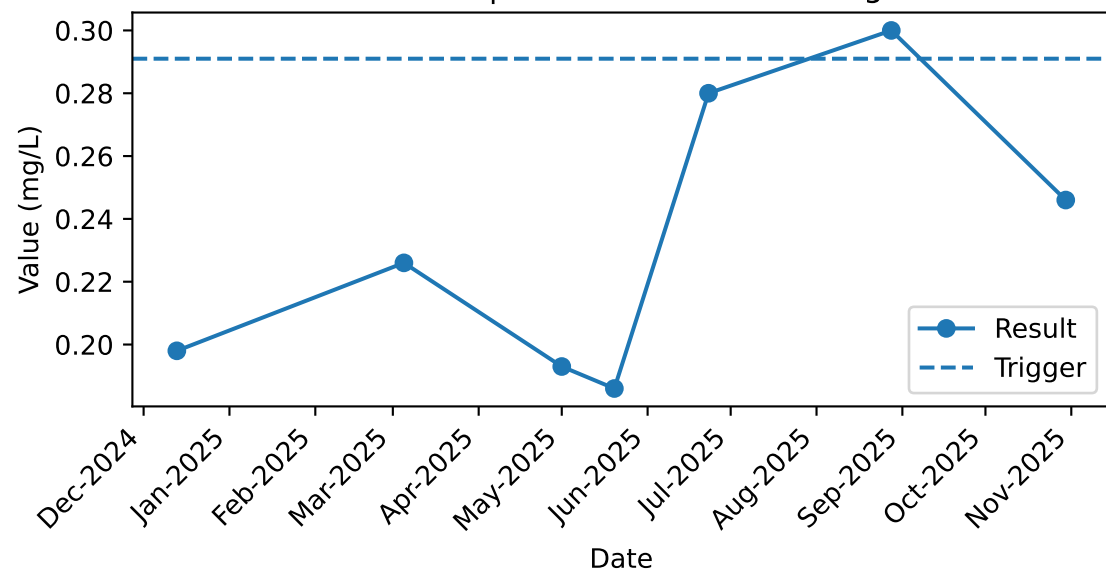
Bore: MBIS10 | Param: Dissolved Iron



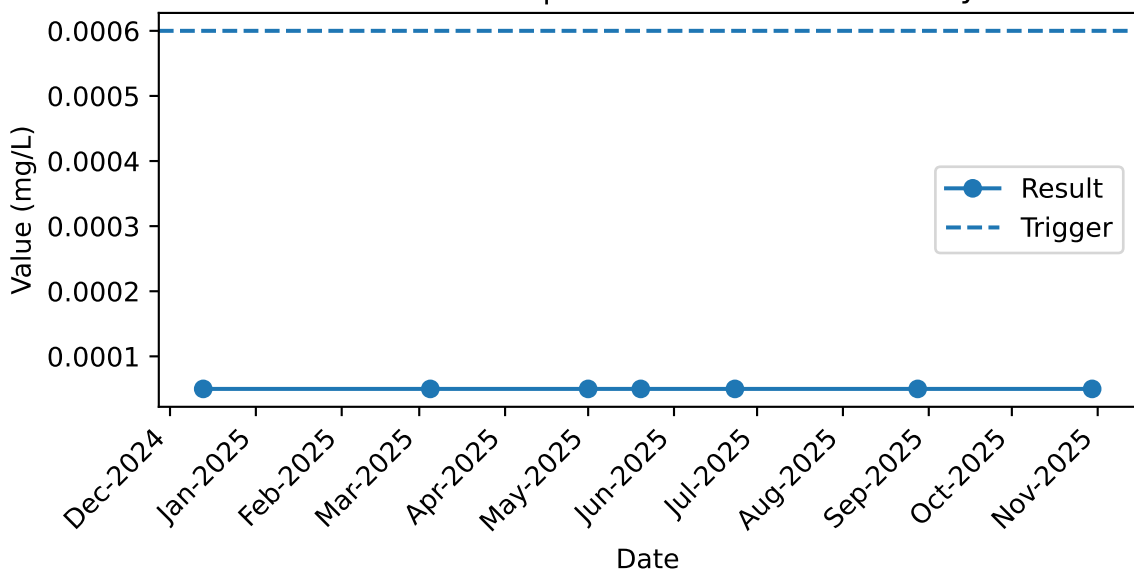
Bore: MBIS10 | Param: Dissolved Lead



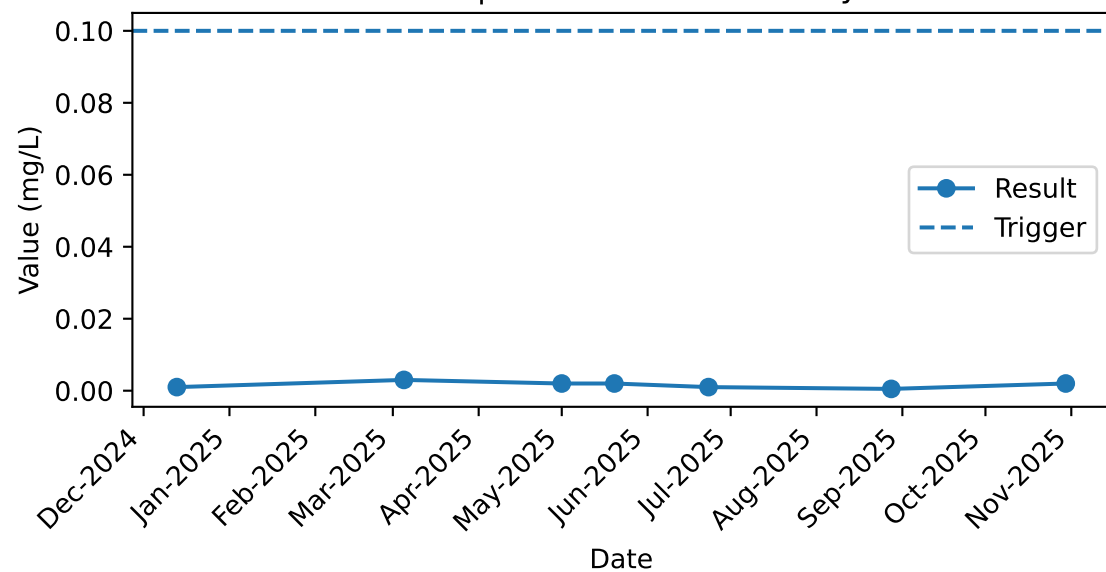
Bore: MBIS10 | Param: Dissolved Manganese



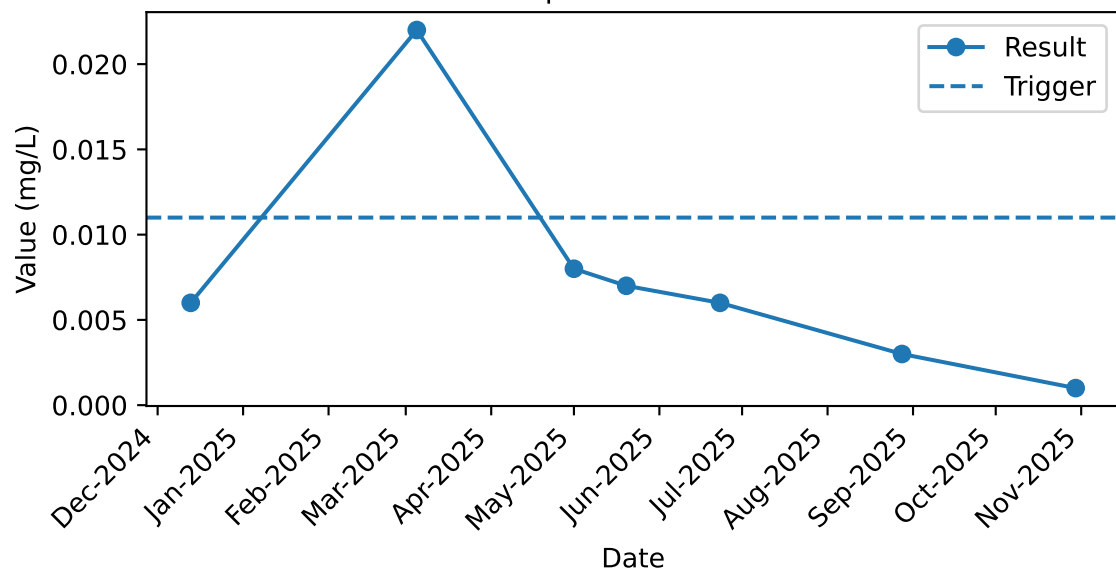
Bore: MBIS10 | Param: Dissolved Mercury



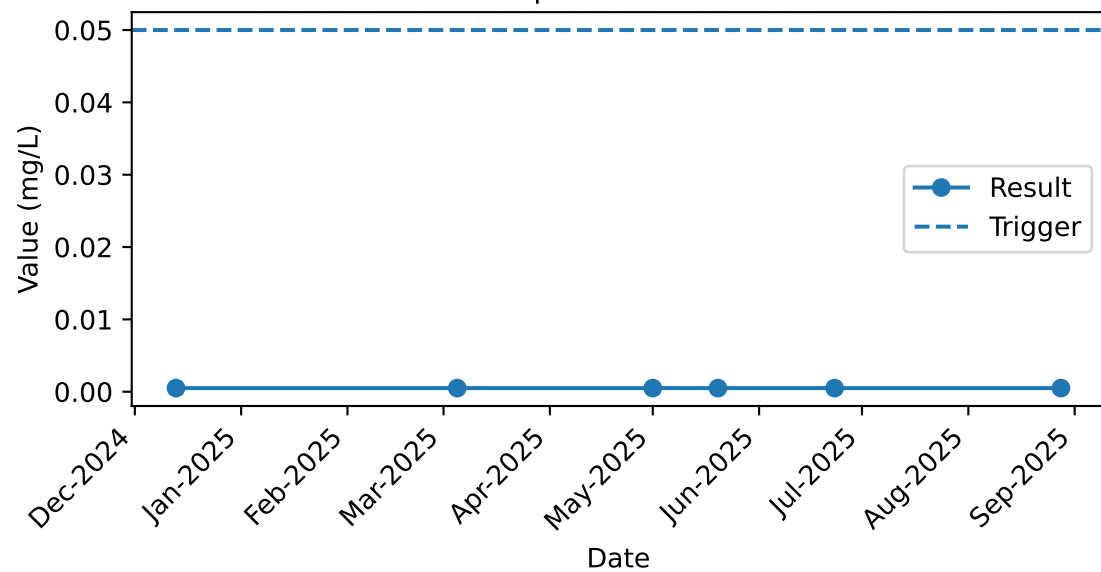
Bore: MBIS10 | Param: Dissolved Molybdenum



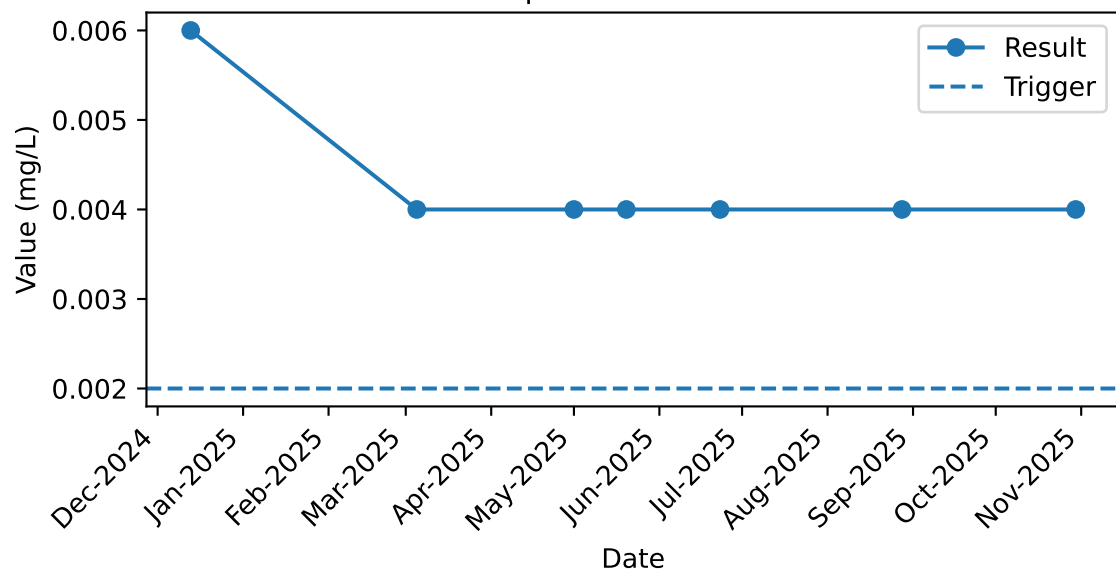
Bore: MBIS10 | Param: Dissolved Nickel



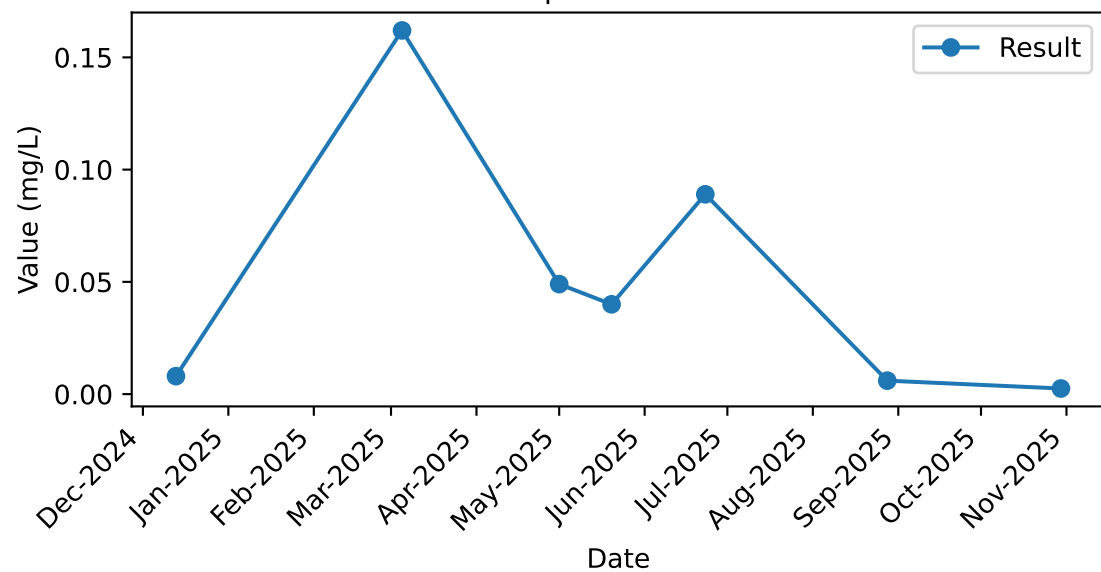
Bore: MBIS10 | Param: Dissolved Silver



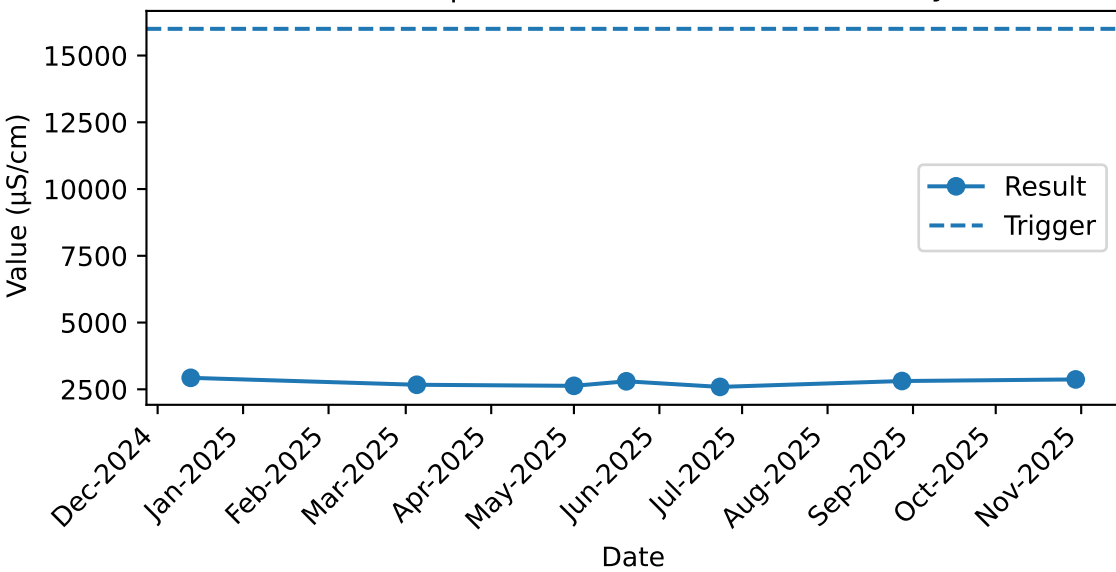
Bore: MBIS10 | Param: Dissolved Uranium



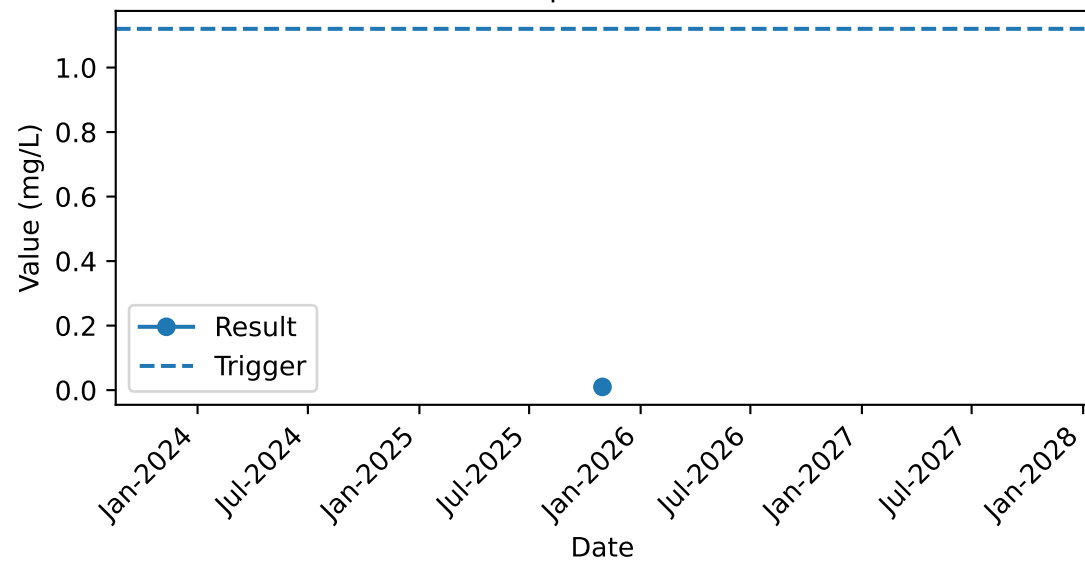
Bore: MBIS10 | Param: Dissolved Zinc



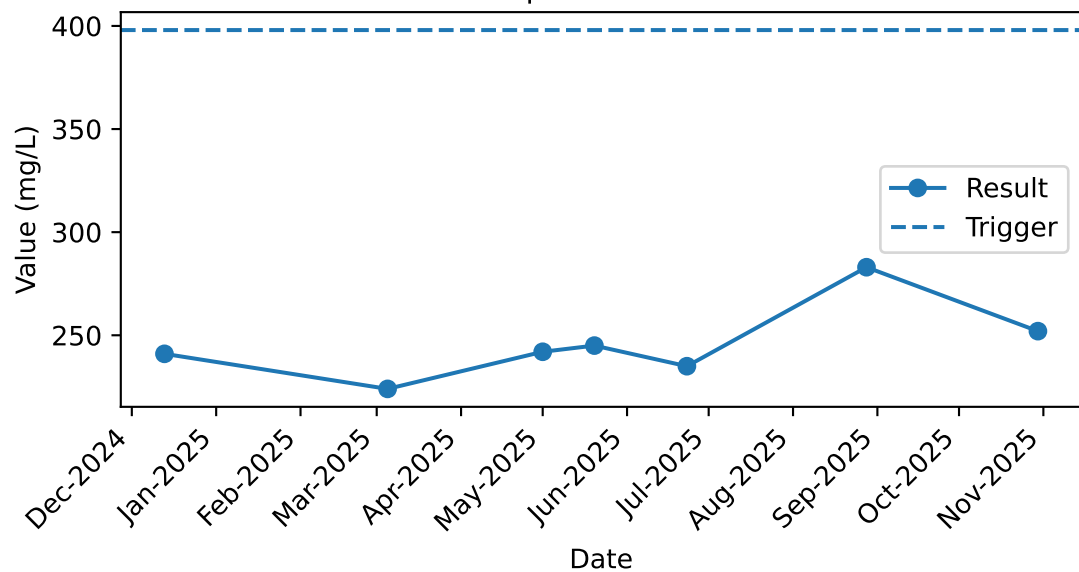
Bore: MBIS10 | Param: Electrical Conductivity (Lab)



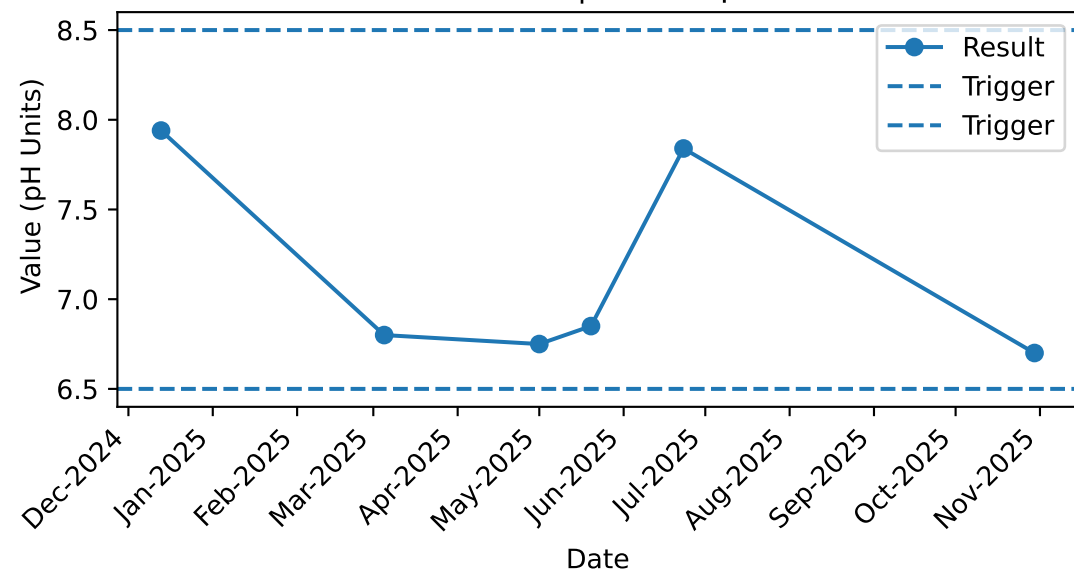
Bore: MBIS10 | Param: Nitrate as N



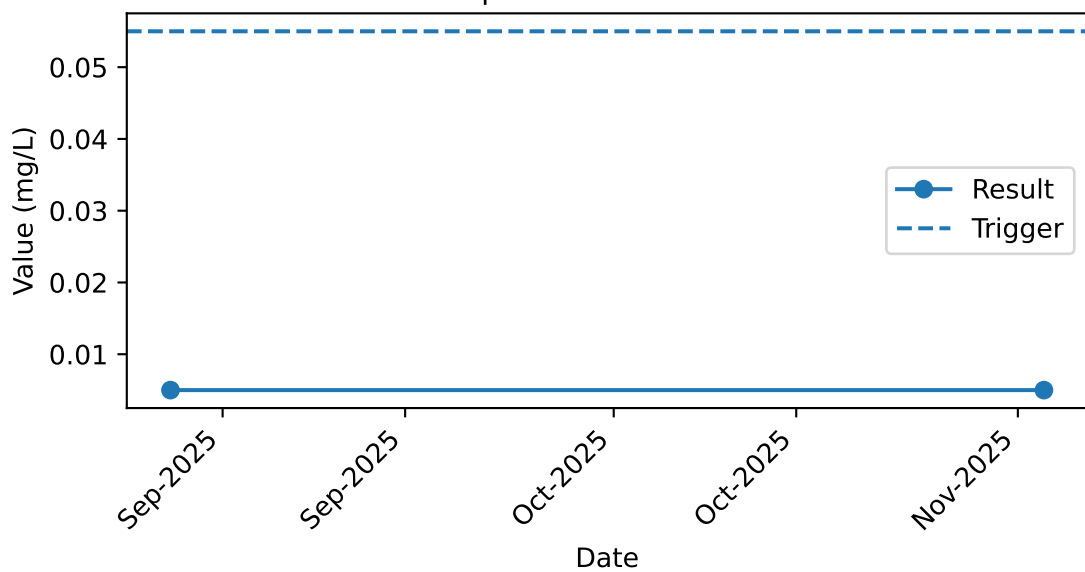
Bore: MBIS10 | Param: Sulfate as SO4



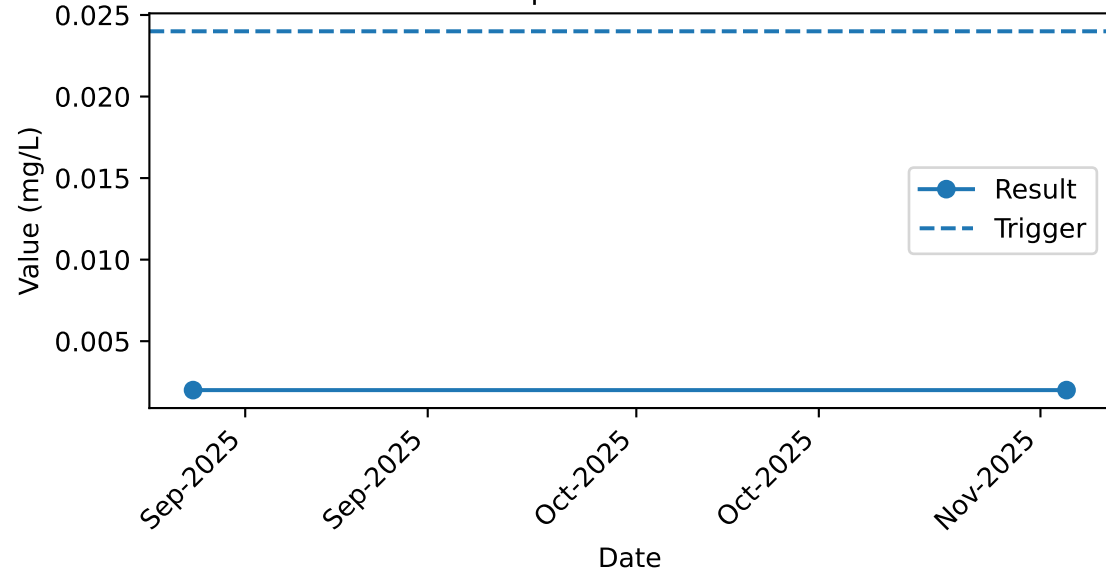
Bore: MBIS10 | Param: pH field



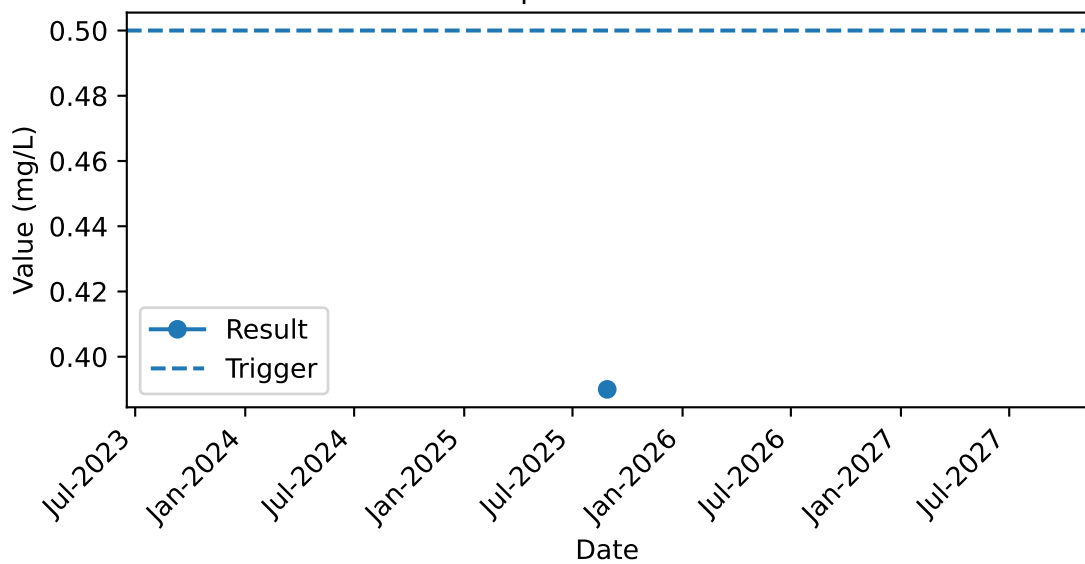
Bore: MBIS11 | Param: Dissolved Aluminium



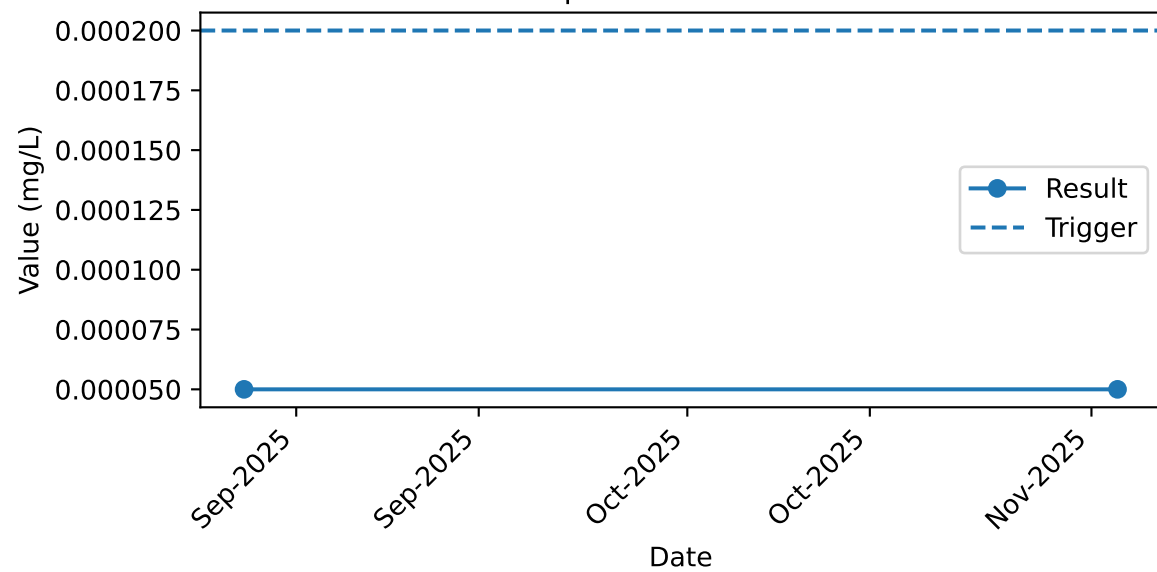
Bore: MBIS11 | Param: Dissolved Arsenic



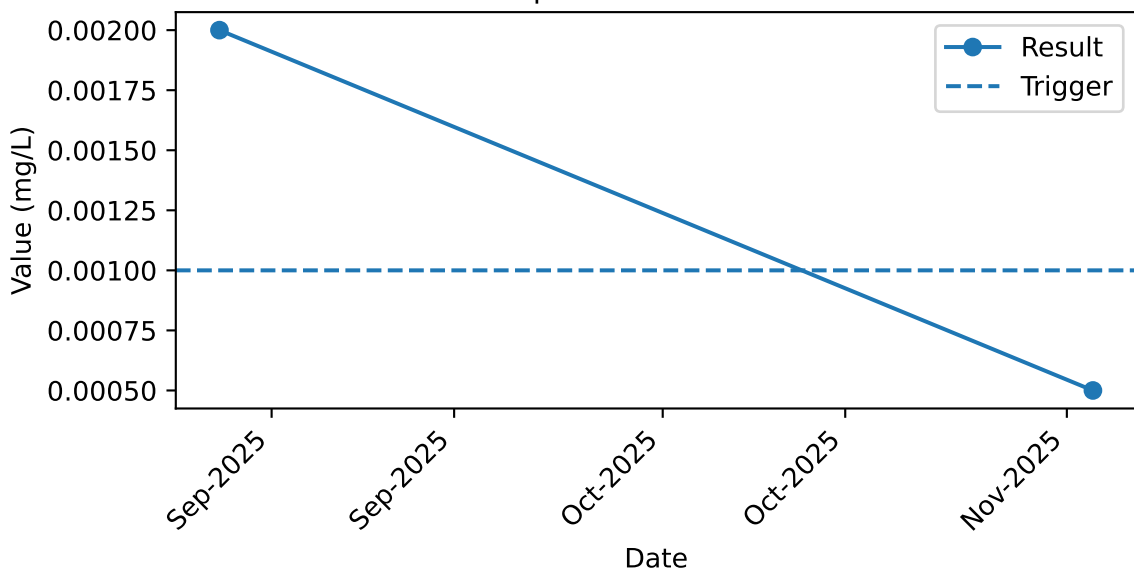
Bore: MBIS11 | Param: Dissolved Boron



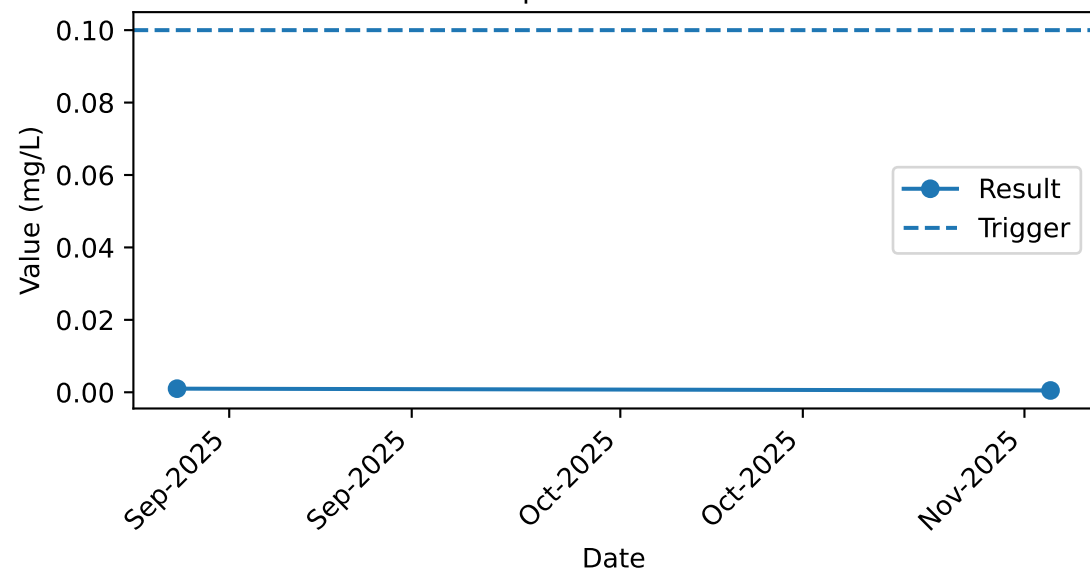
Bore: MBIS11 | Param: Dissolved Cadmium



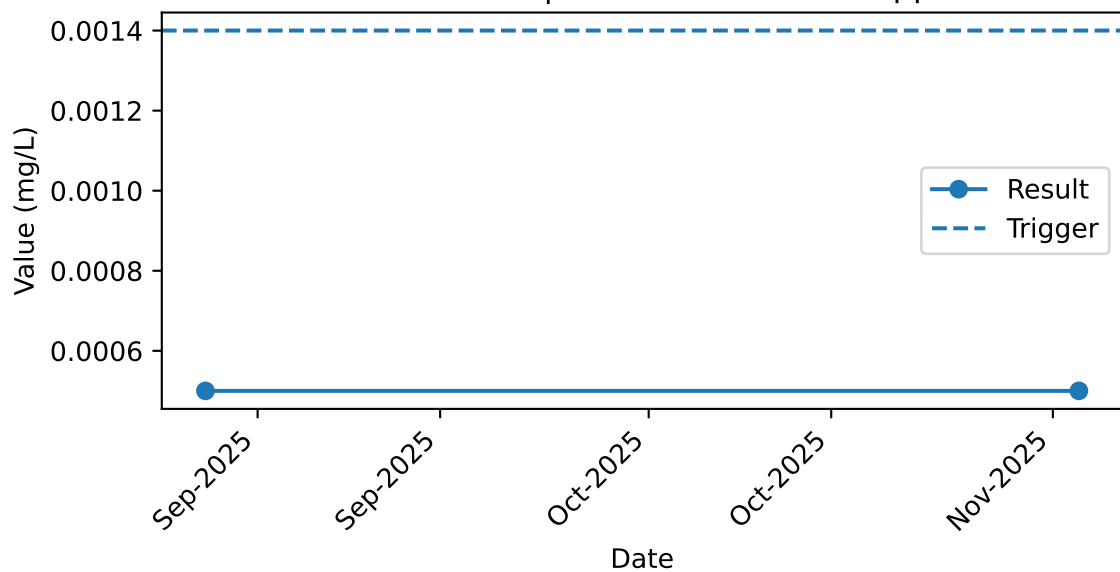
Bore: MBIS11 | Param: Dissolved Chromium



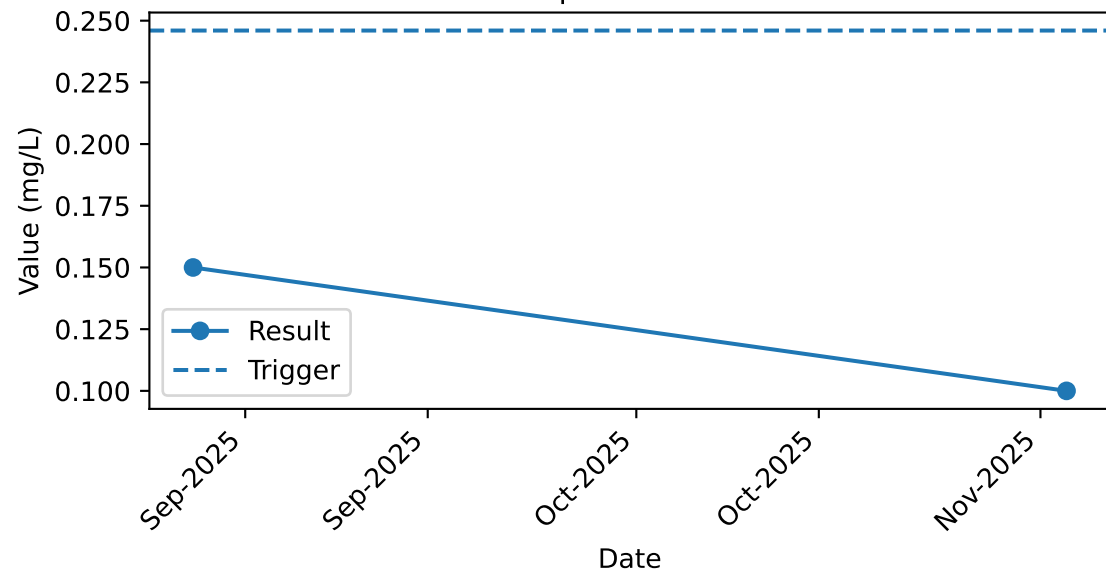
Bore: MBIS11 | Param: Dissolved Cobalt



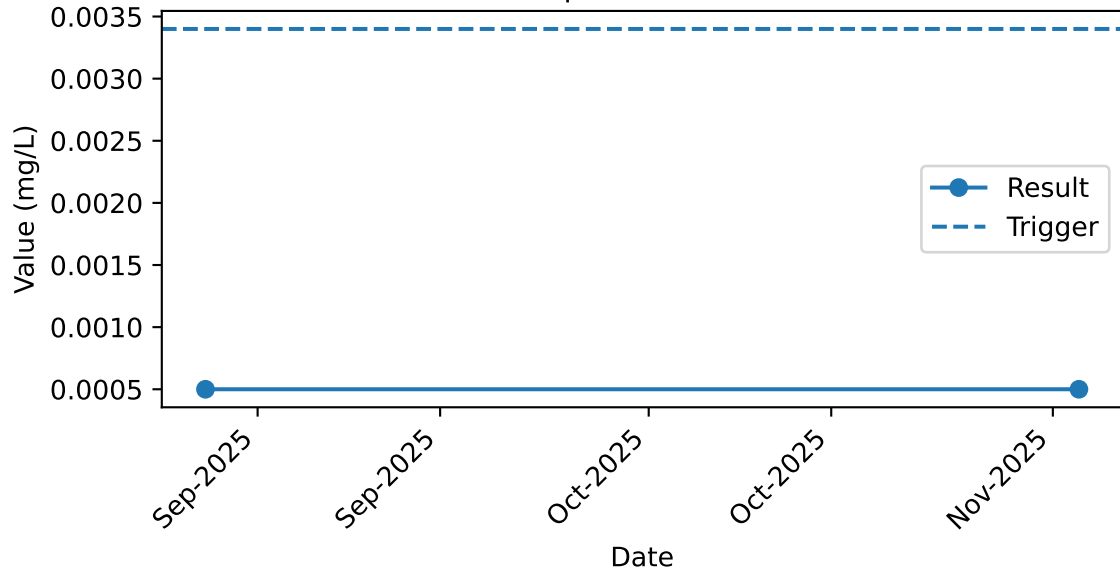
Bore: MBIS11 | Param: Dissolved Copper



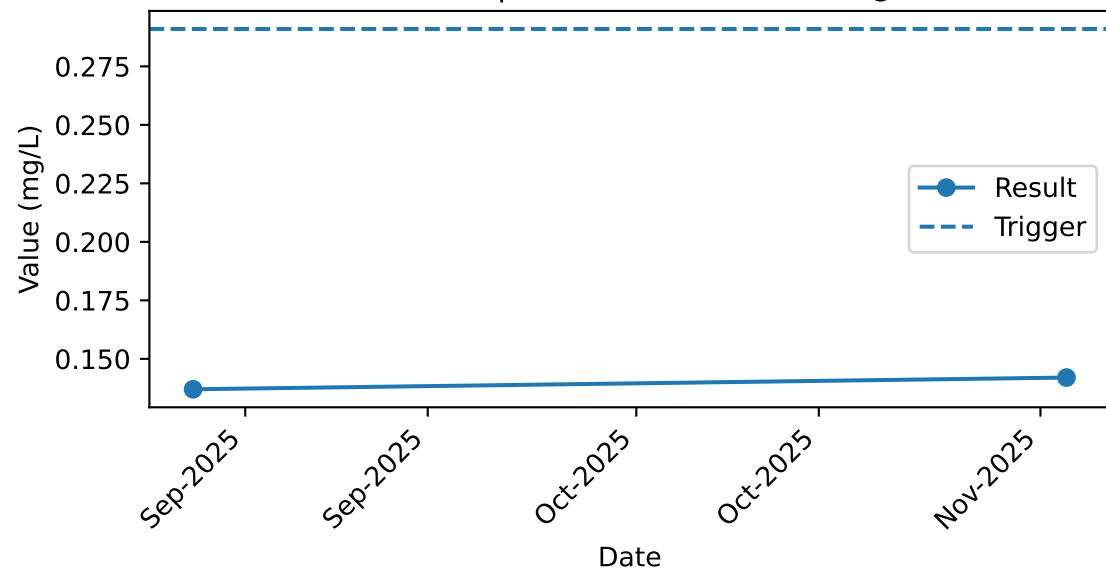
Bore: MBIS11 | Param: Dissolved Iron



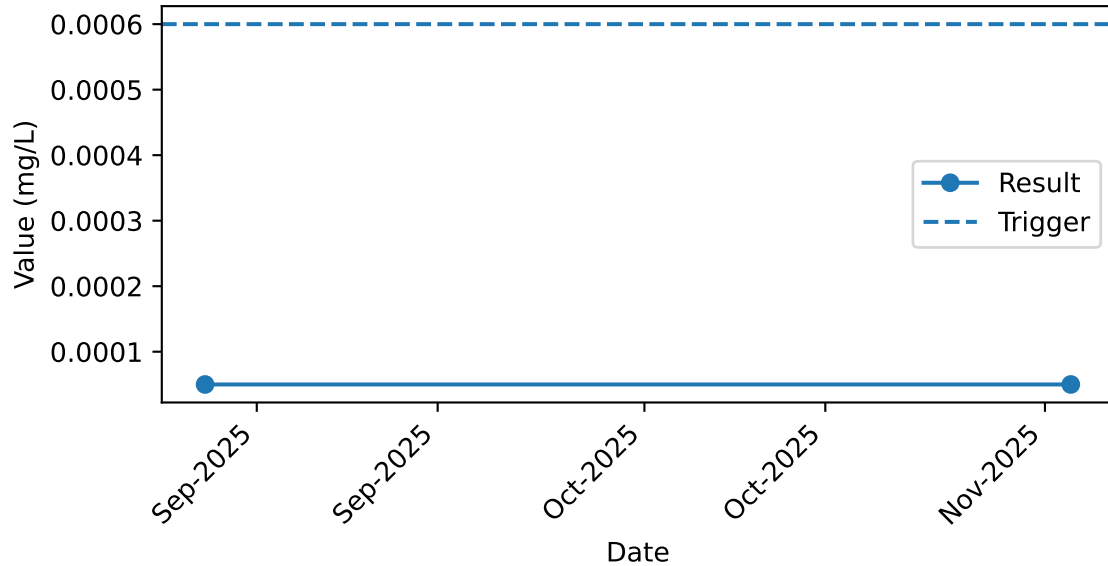
Bore: MBIS11 | Param: Dissolved Lead



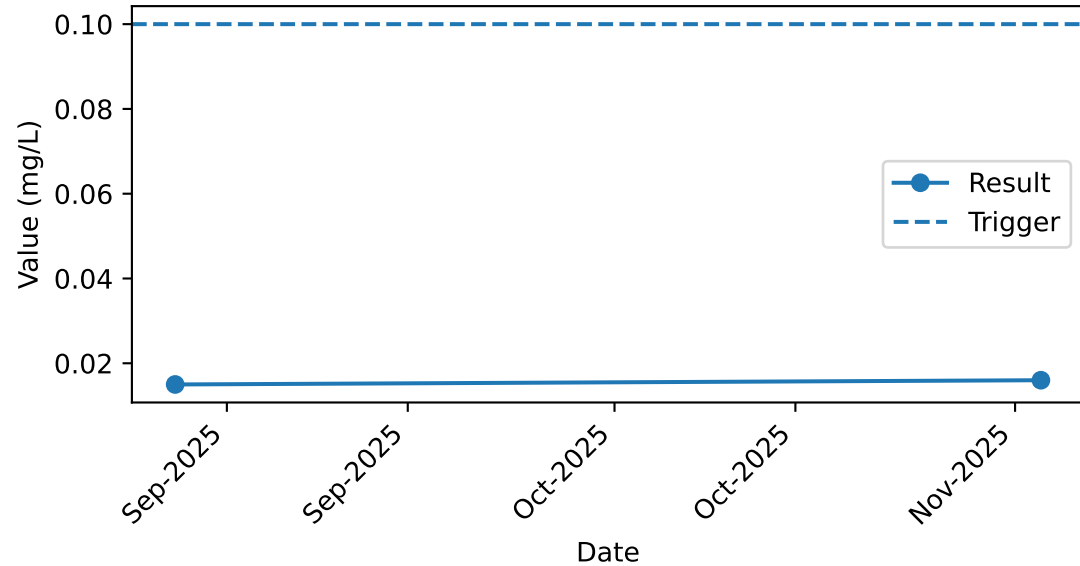
Bore: MBIS11 | Param: Dissolved Manganese



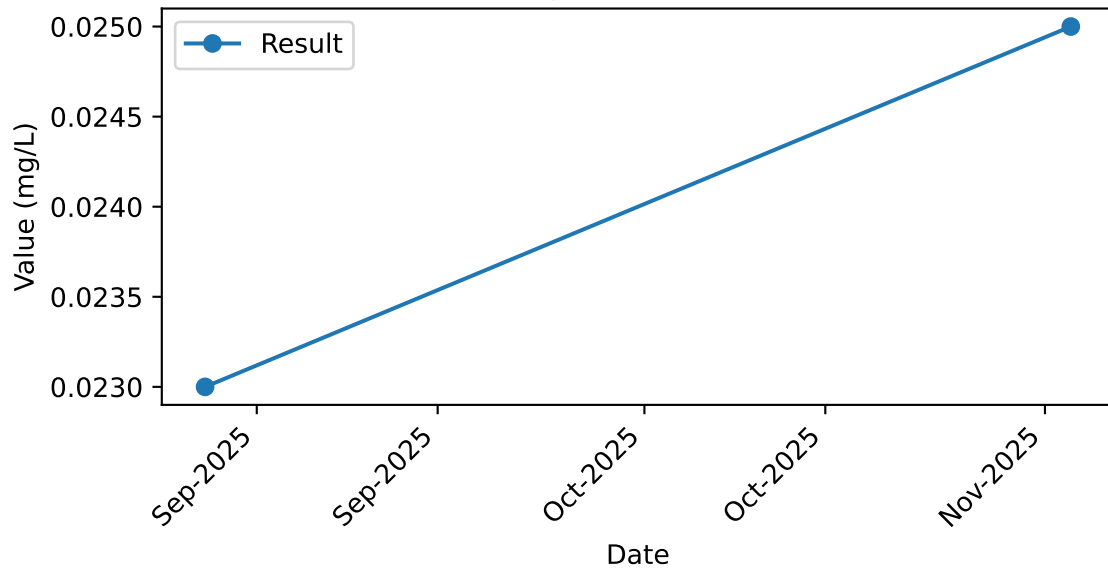
Bore: MBIS11 | Param: Dissolved Mercury



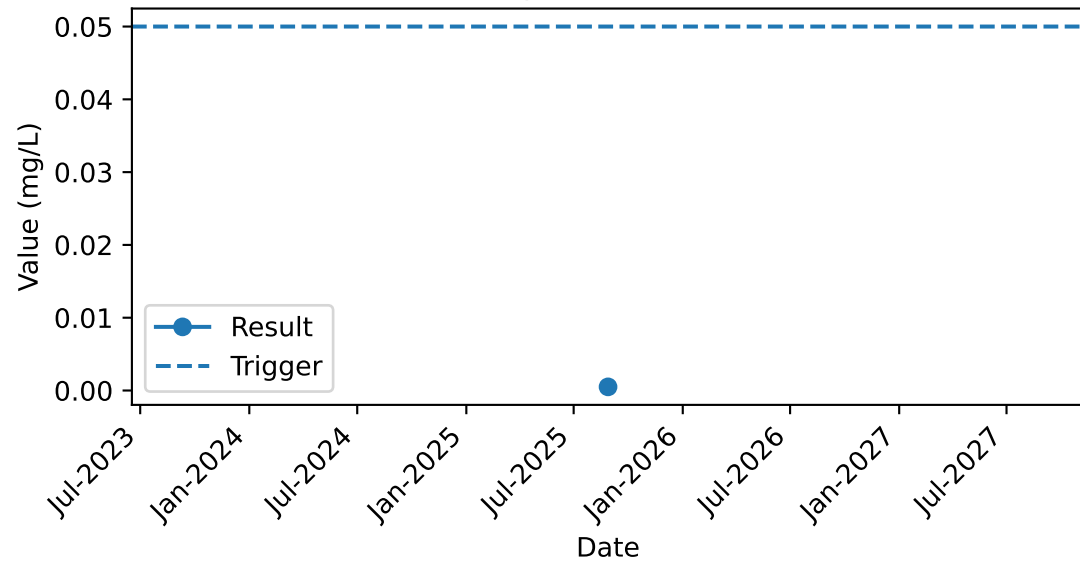
Bore: MBIS11 | Param: Dissolved Molybdenum



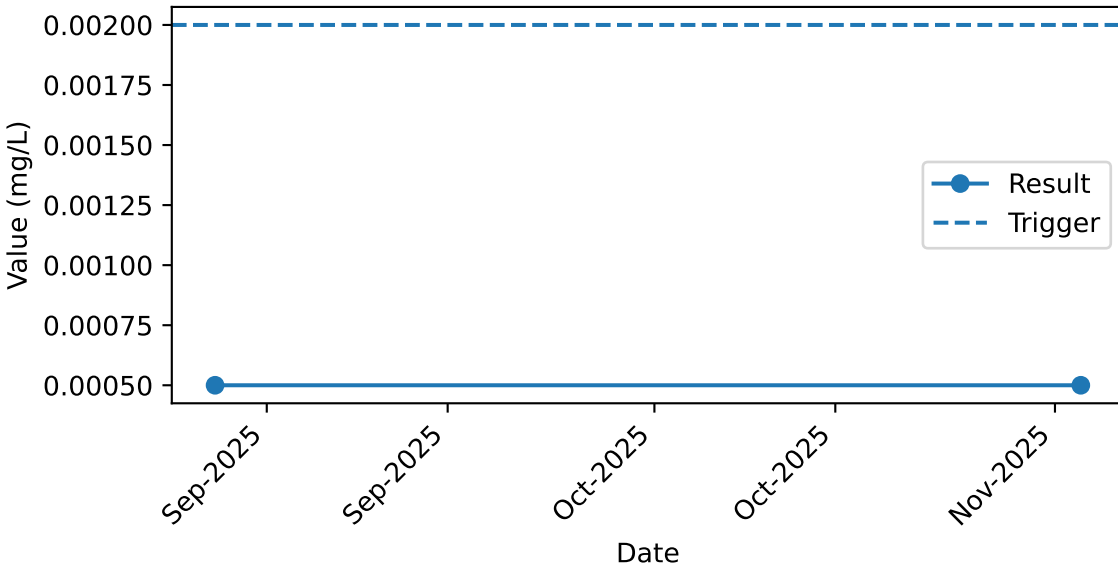
Bore: MBIS11 | Param: Dissolved Nickel



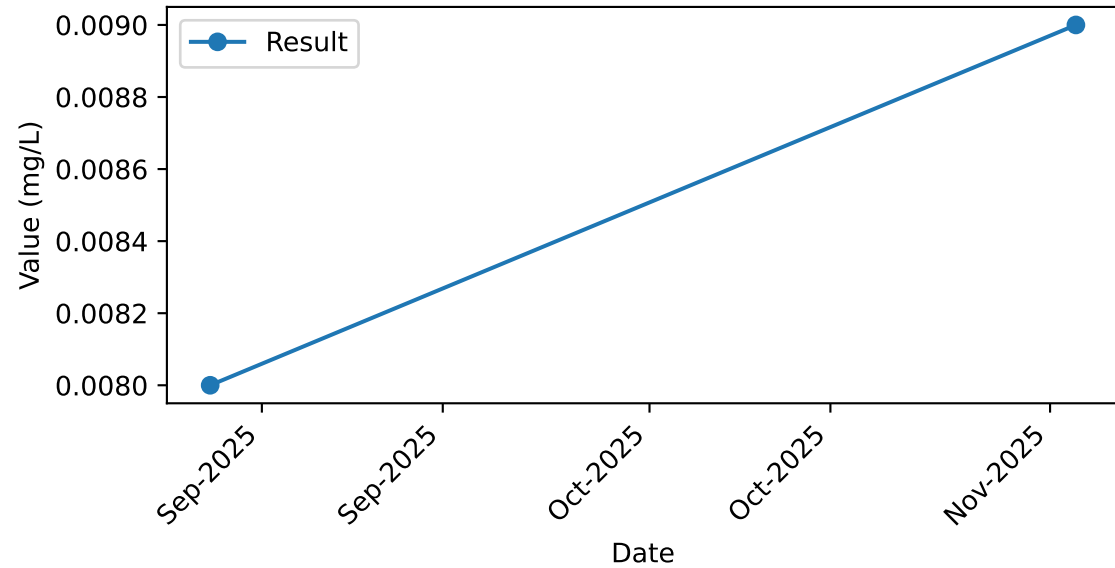
Bore: MBIS11 | Param: Dissolved Silver



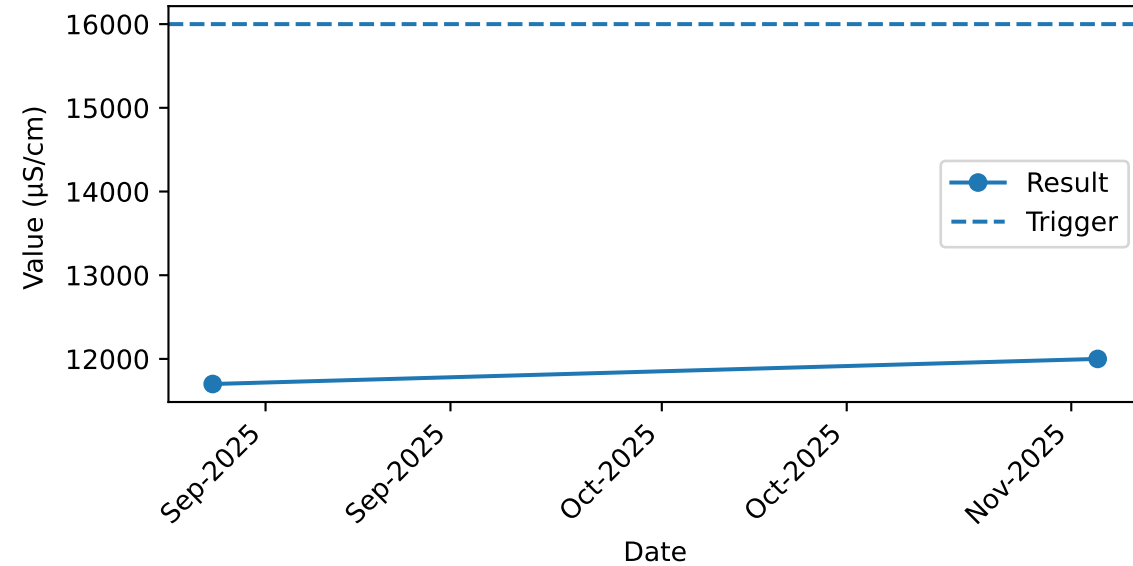
Bore: MBIS11 | Param: Dissolved Uranium



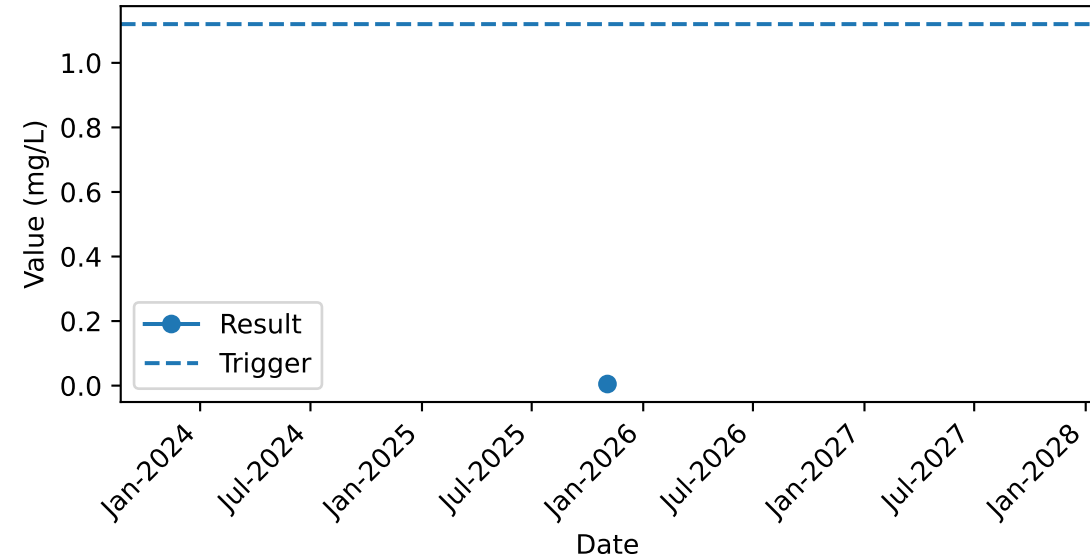
Bore: MBIS11 | Param: Dissolved Zinc



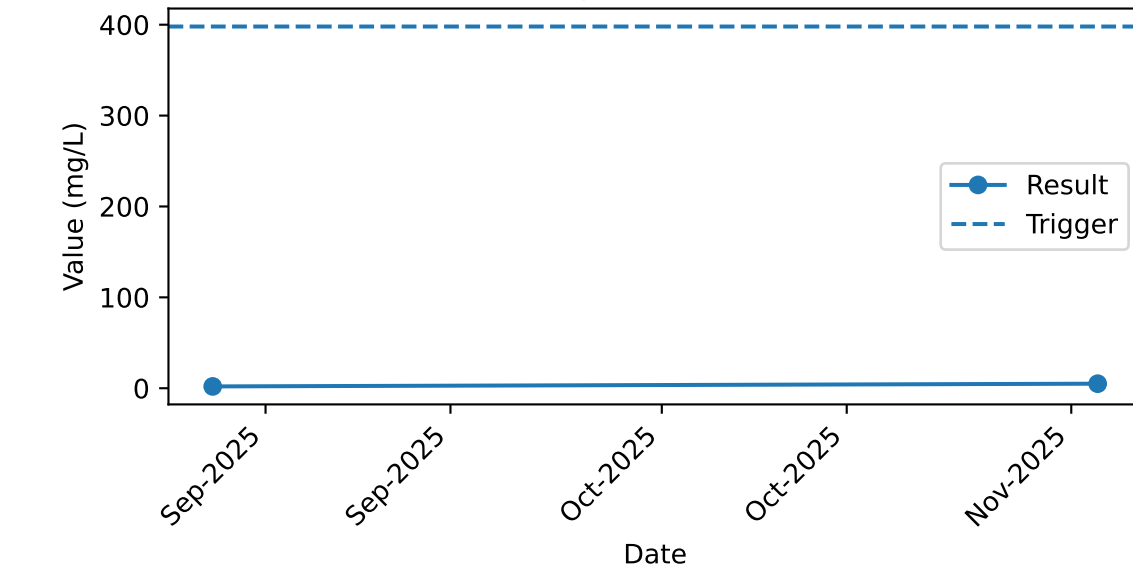
Bore: MBIS11 | Param: Electrical Conductivity (Lab)



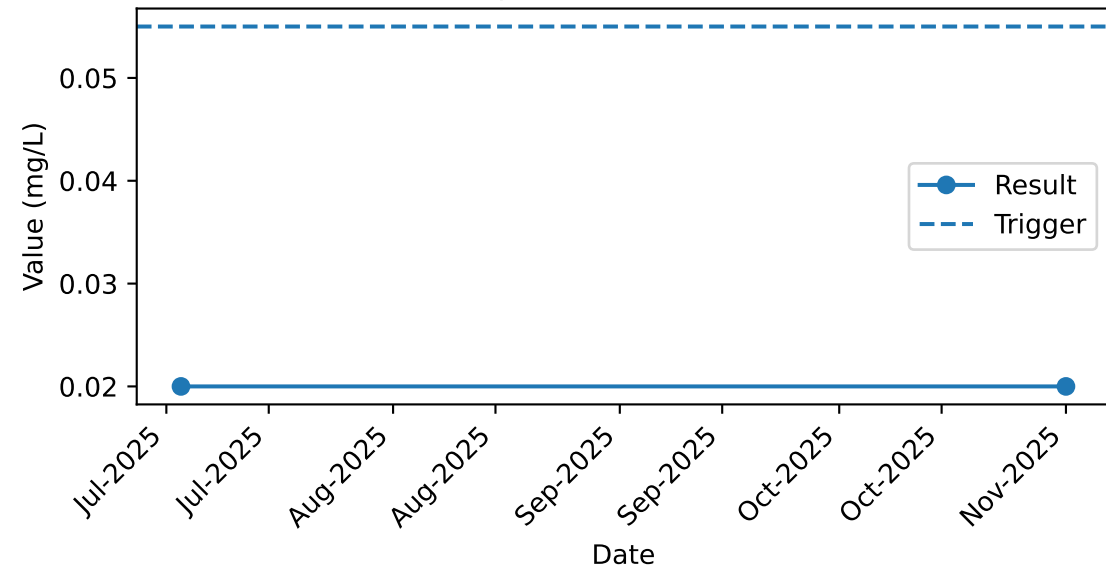
Bore: MBIS11 | Param: Nitrate as N



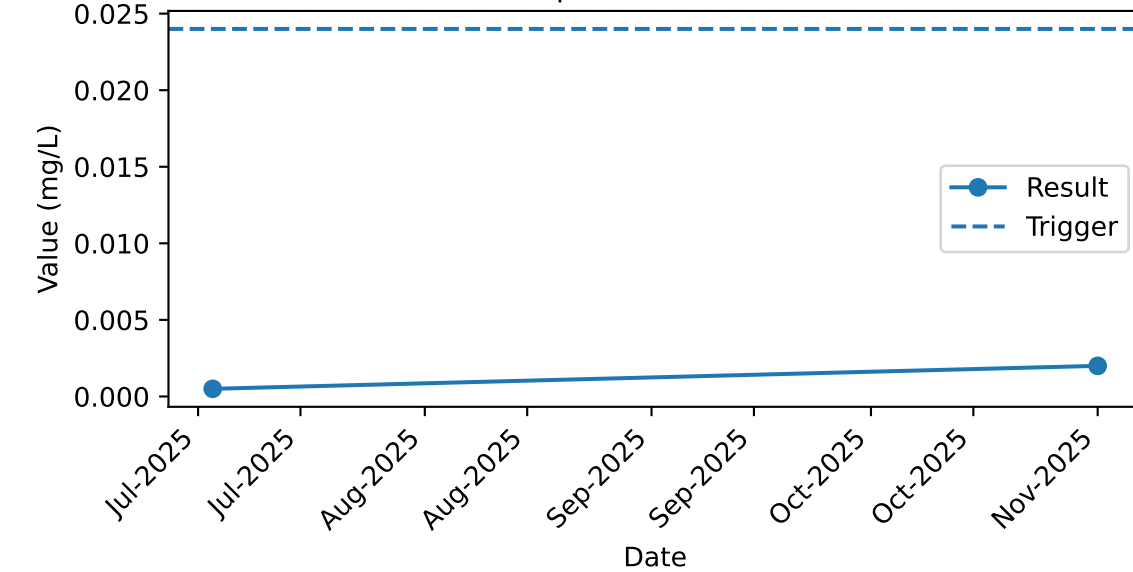
Bore: MBIS11 | Param: Sulfate as SO4



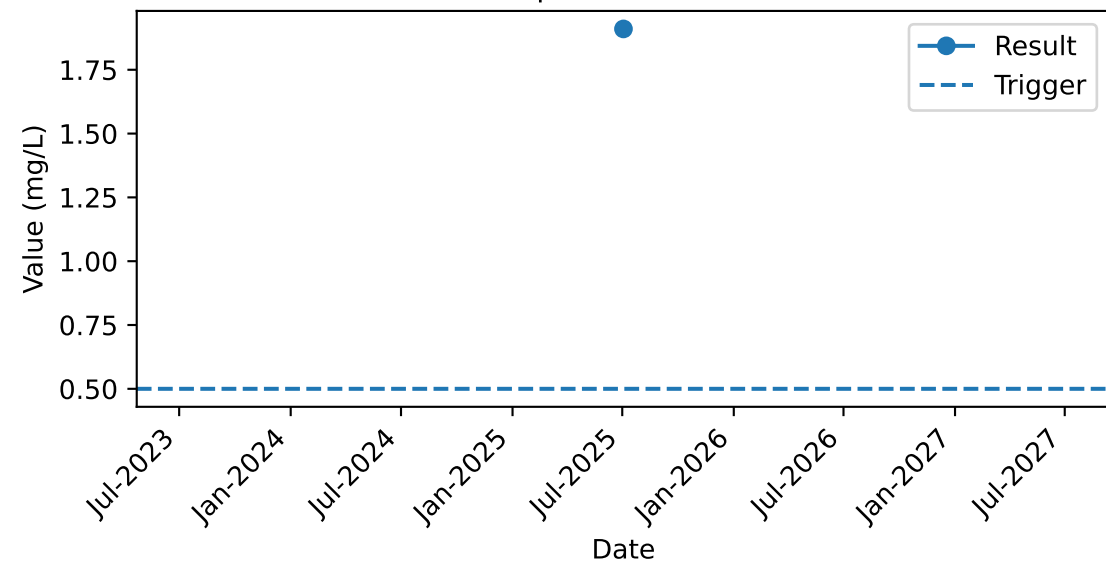
Bore: MBIS13 | Param: Dissolved Aluminium



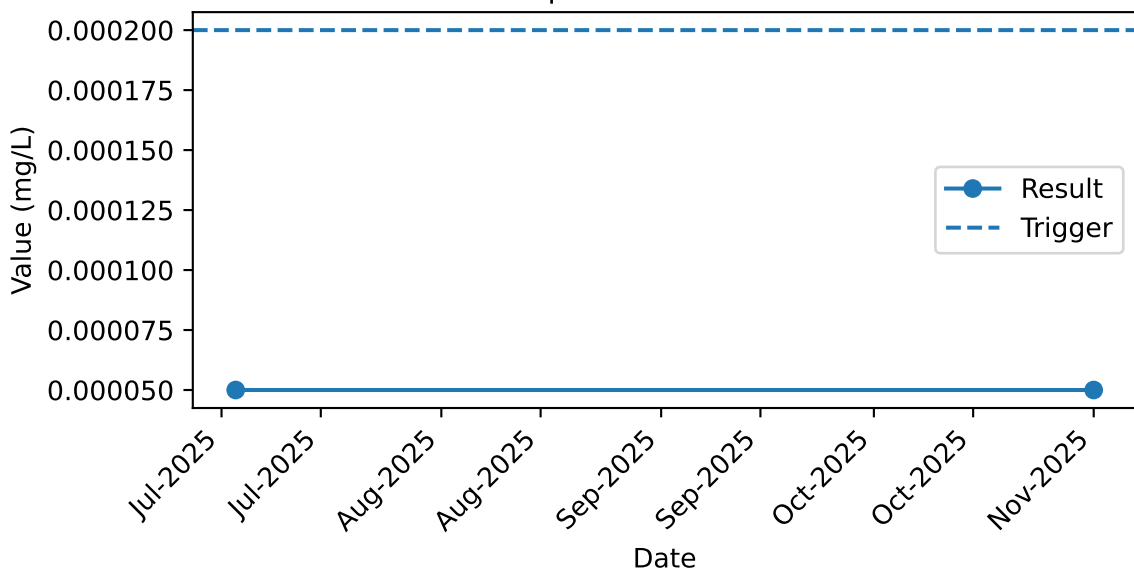
Bore: MBIS13 | Param: Dissolved Arsenic



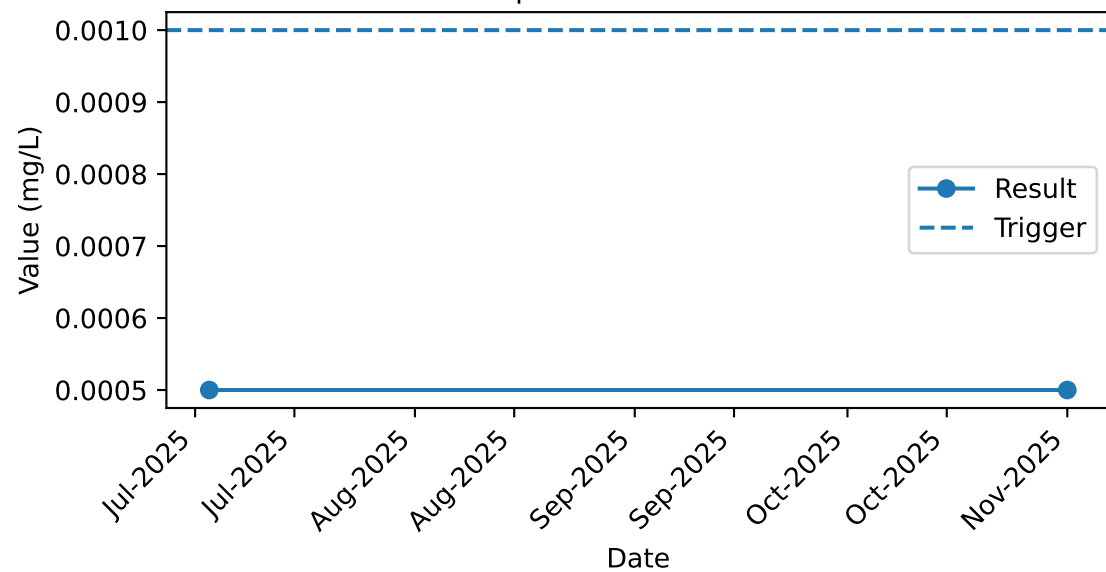
Bore: MBIS13 | Param: Dissolved Boron



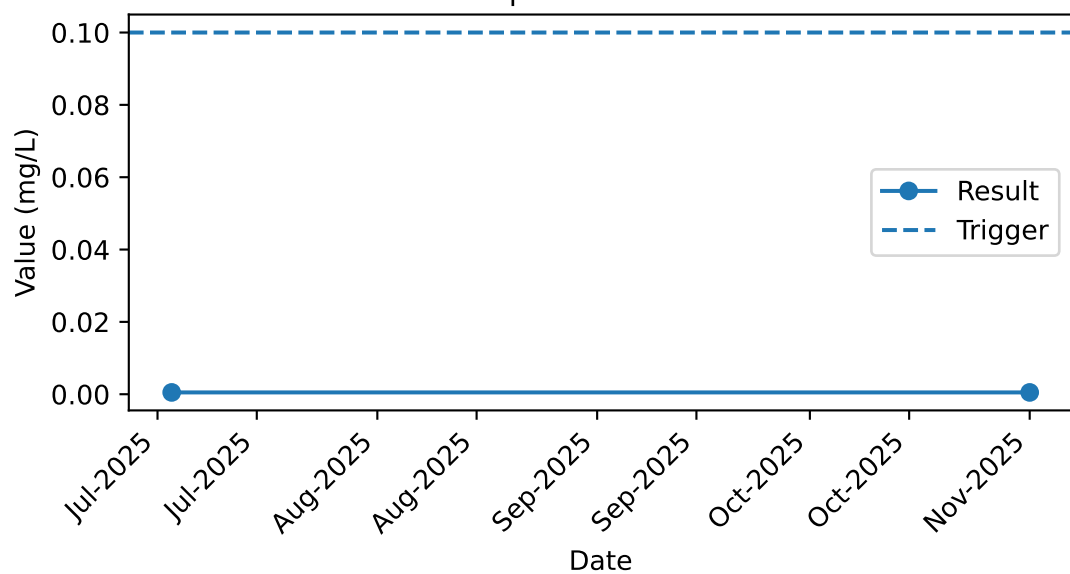
Bore: MBIS13 | Param: Dissolved Cadmium



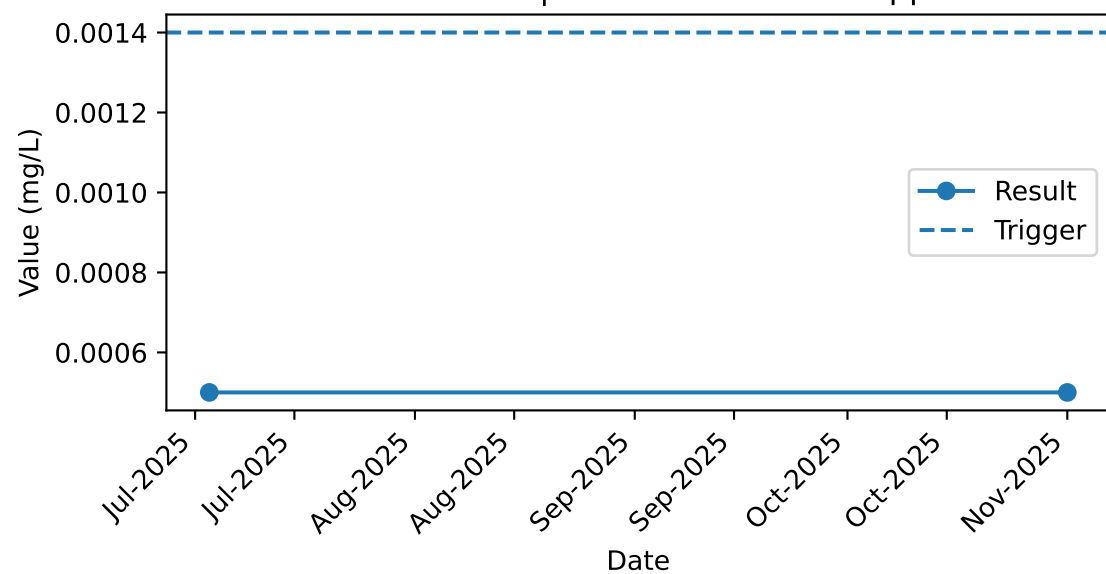
Bore: MBIS13 | Param: Dissolved Chromium



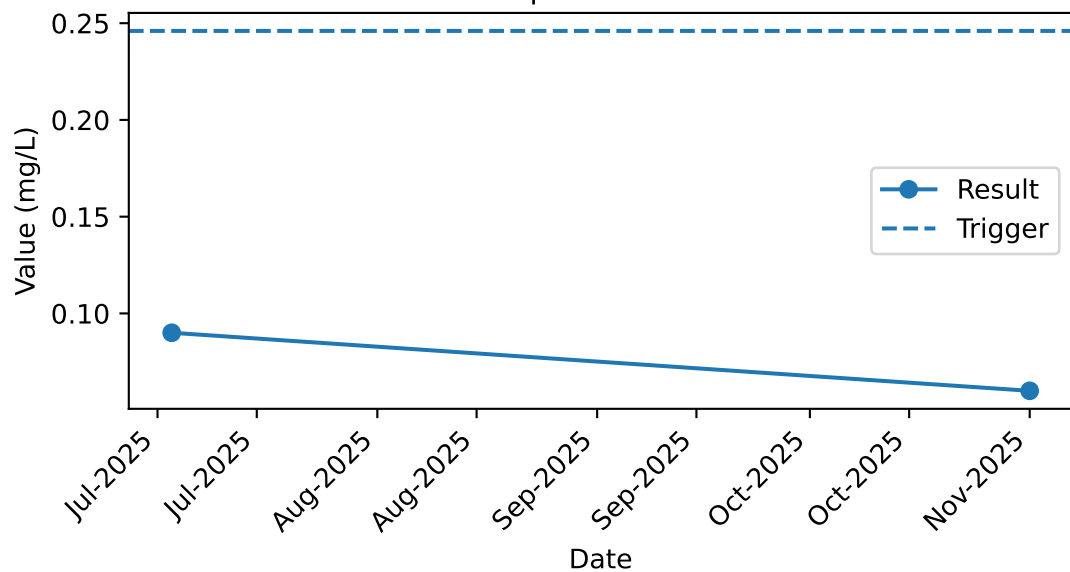
Bore: MBIS13 | Param: Dissolved Cobalt



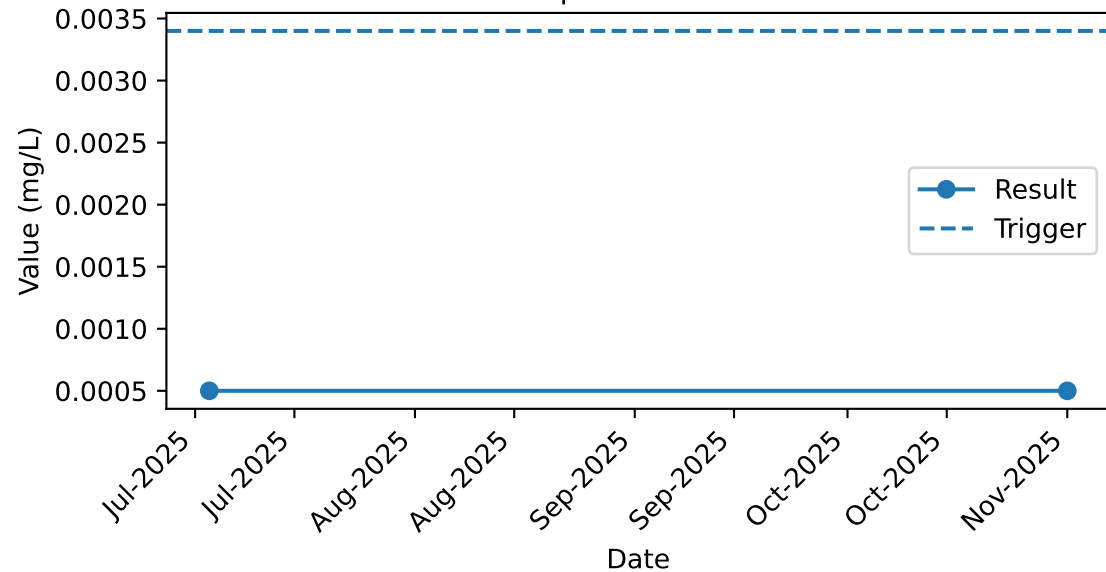
Bore: MBIS13 | Param: Dissolved Copper



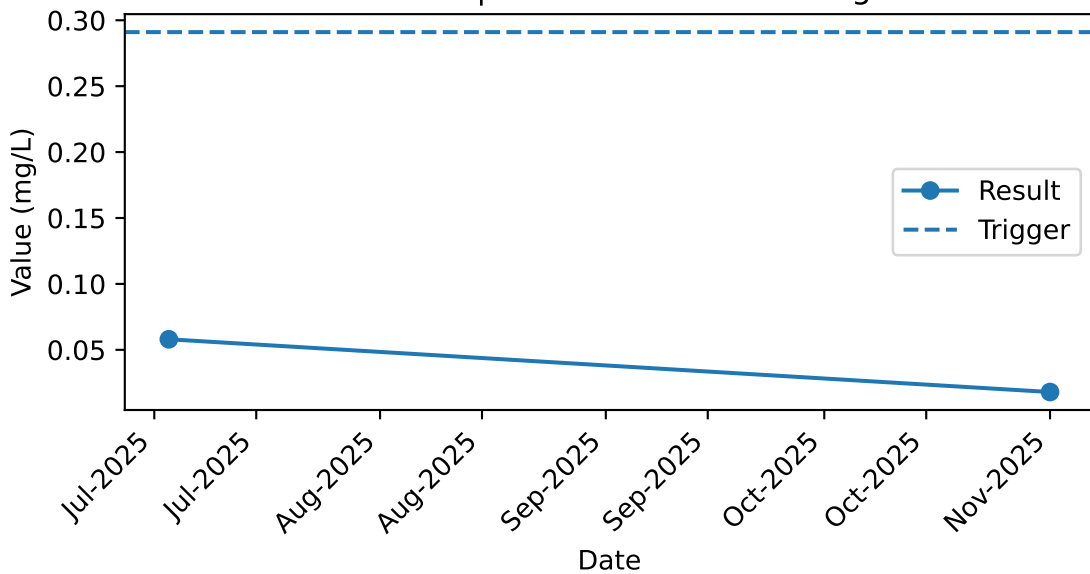
Bore: MBIS13 | Param: Dissolved Iron



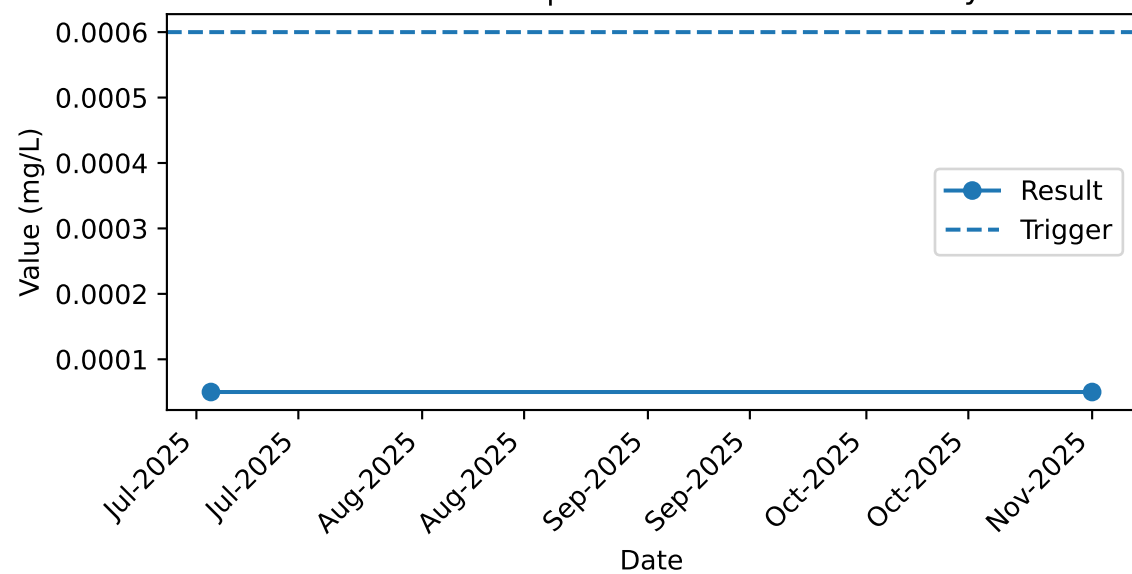
Bore: MBIS13 | Param: Dissolved Lead



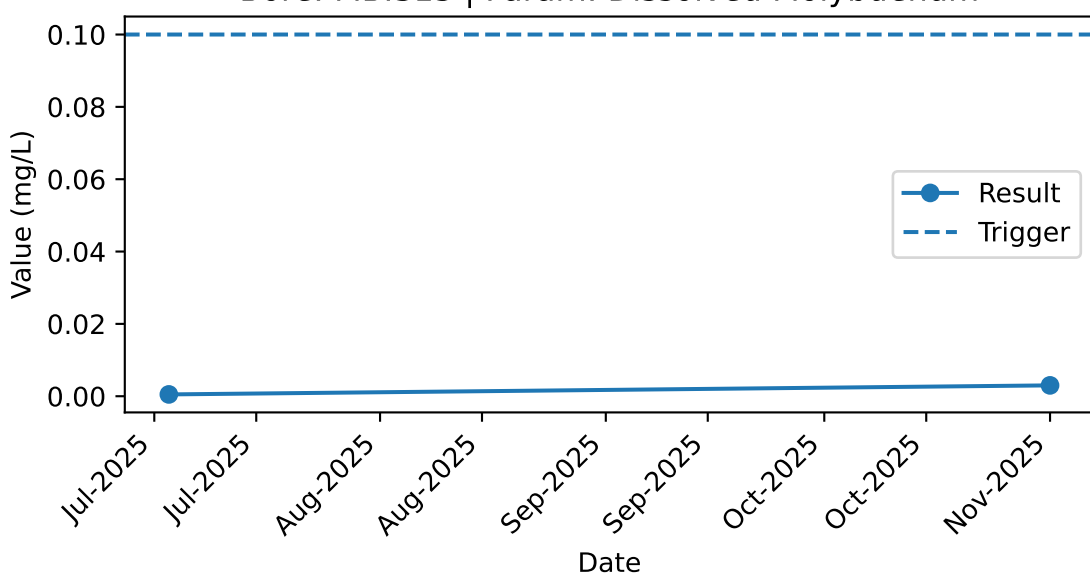
Bore: MBIS13 | Param: Dissolved Manganese



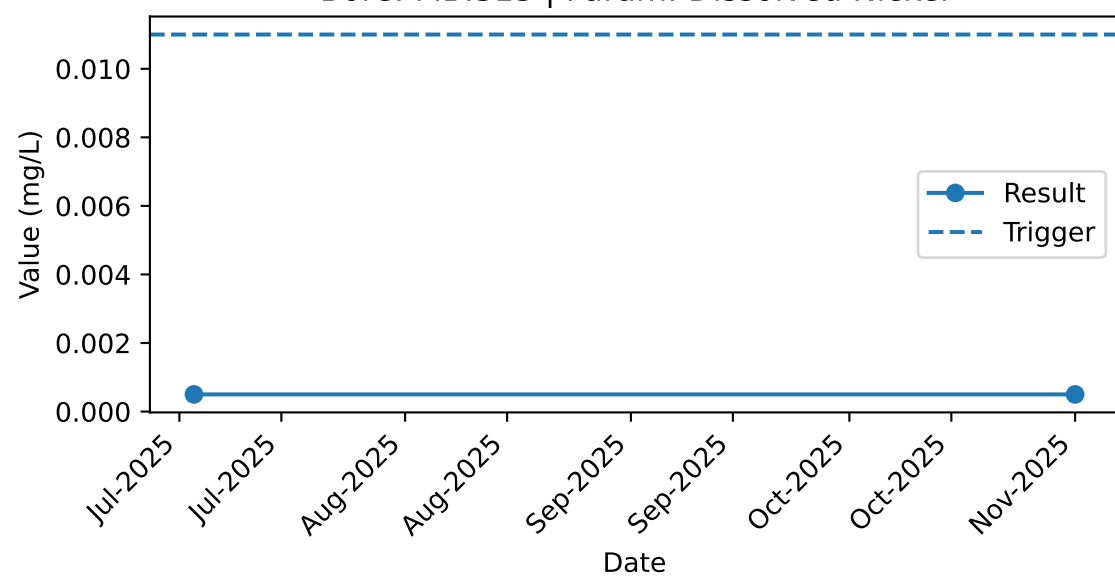
Bore: MBIS13 | Param: Dissolved Mercury



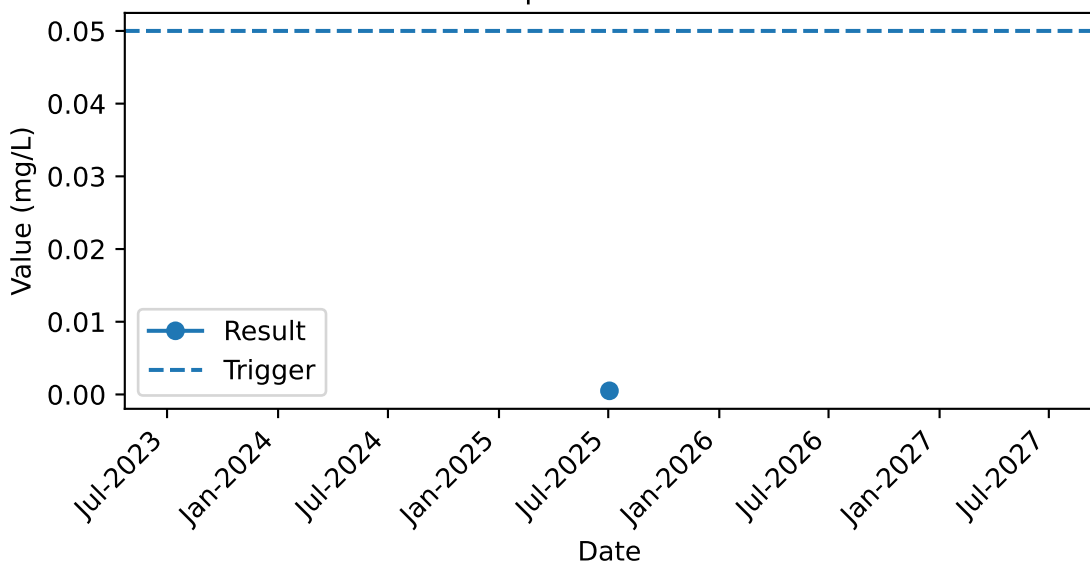
Bore: MBIS13 | Param: Dissolved Molybdenum



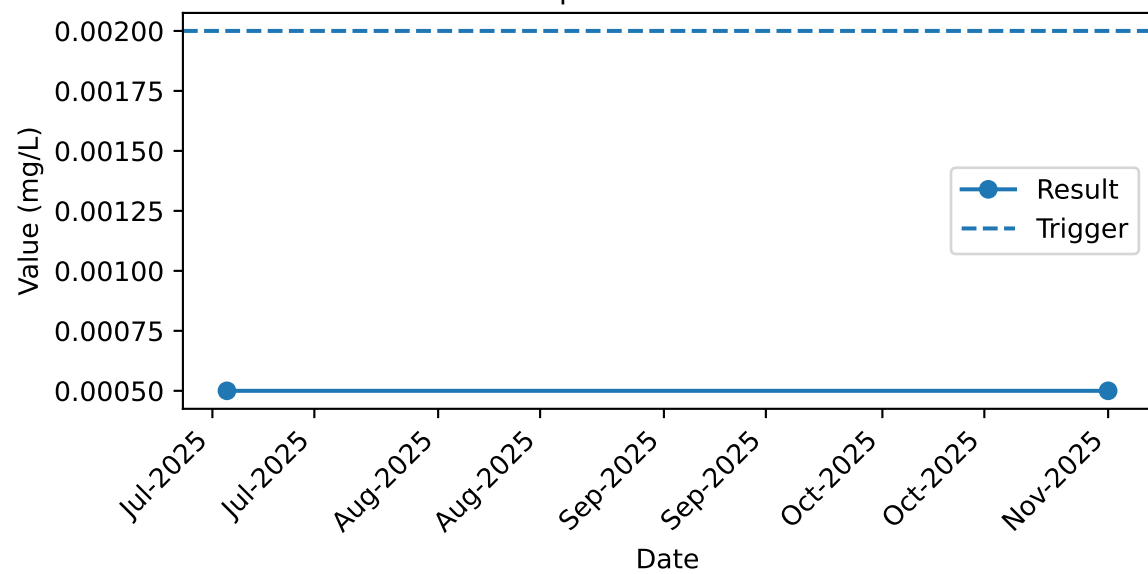
Bore: MBIS13 | Param: Dissolved Nickel



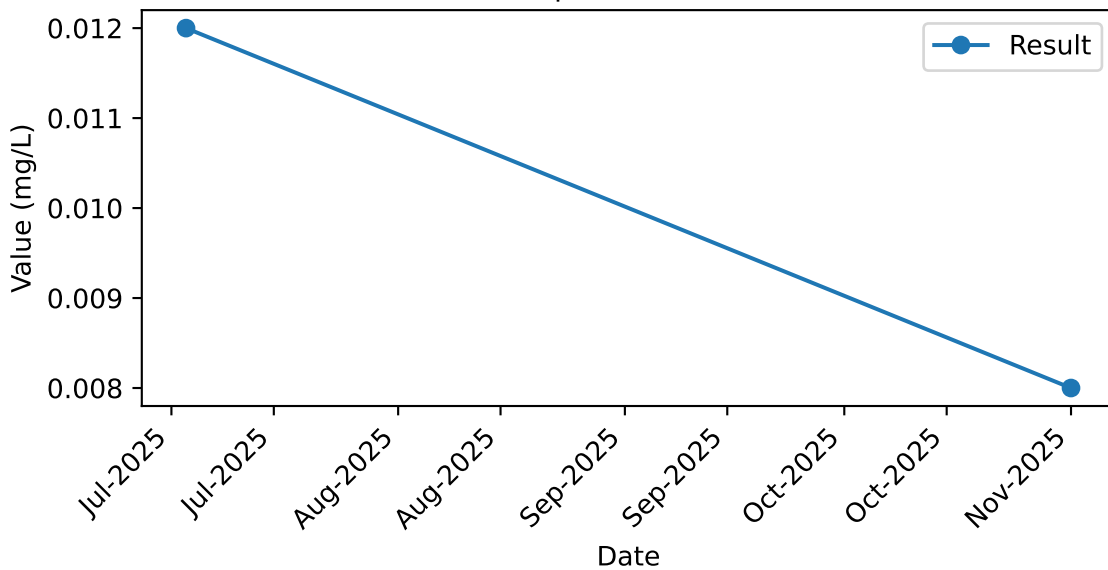
Bore: MBIS13 | Param: Dissolved Silver



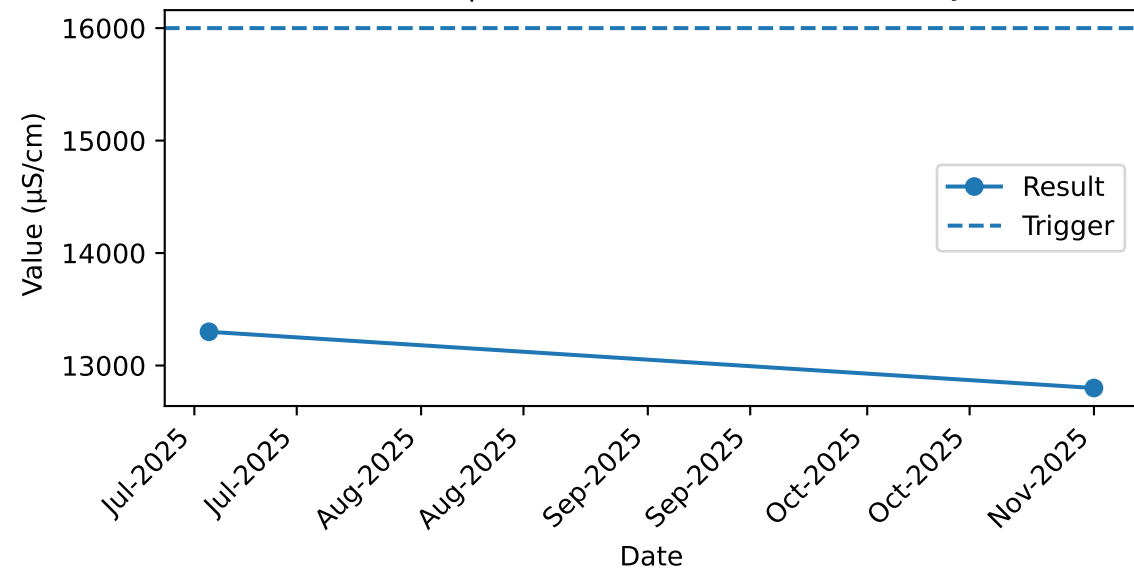
Bore: MBIS13 | Param: Dissolved Uranium



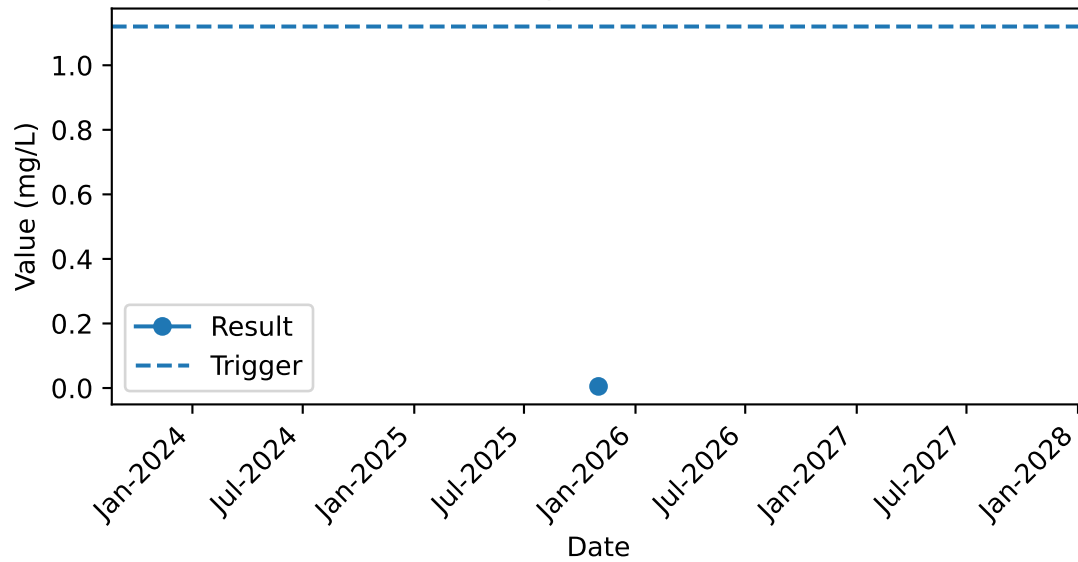
Bore: MBIS13 | Param: Dissolved Zinc



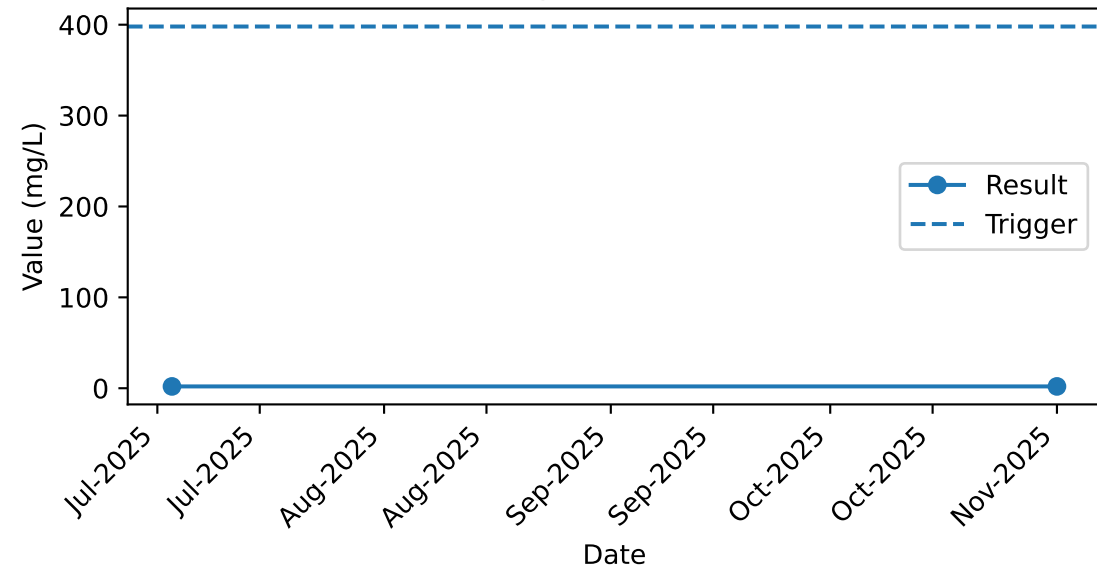
Bore: MBIS13 | Param: Electrical Conductivity (Lab)



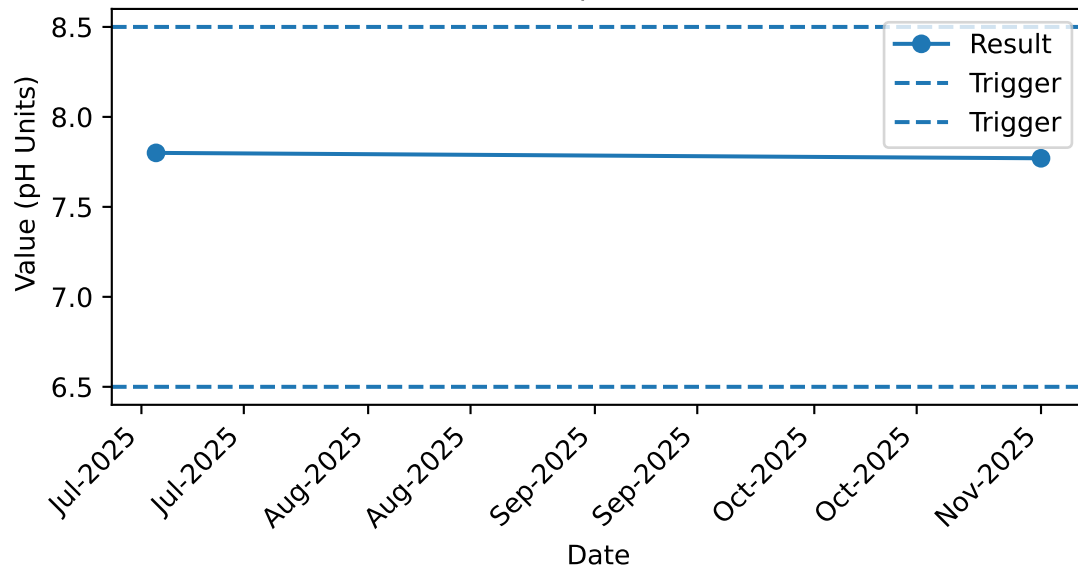
Bore: MBIS13 | Param: Nitrate as N



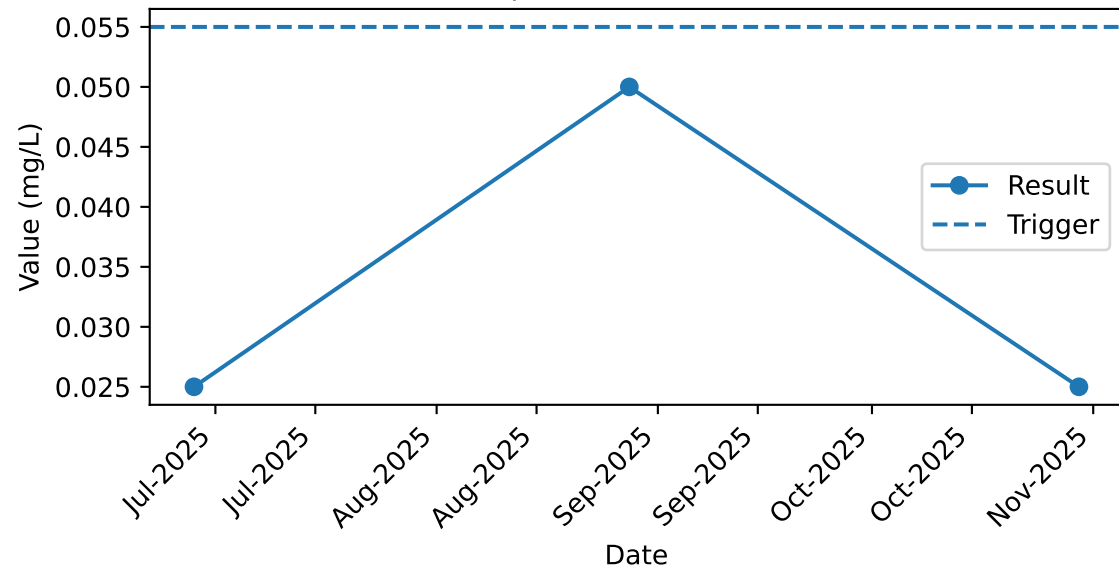
Bore: MBIS13 | Param: Sulfate as SO4



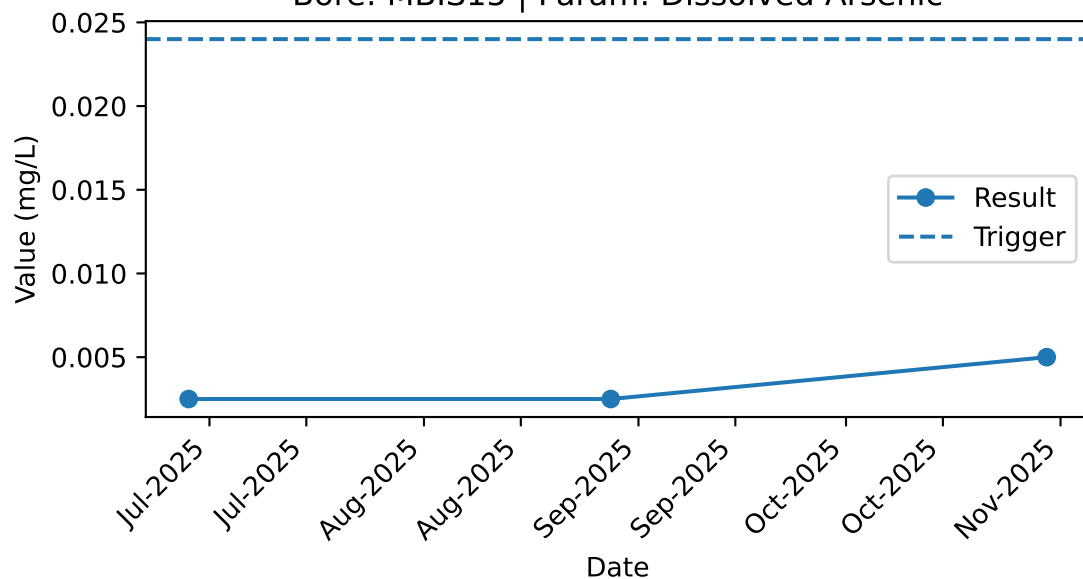
Bore: MBIS13 | Param: pH field



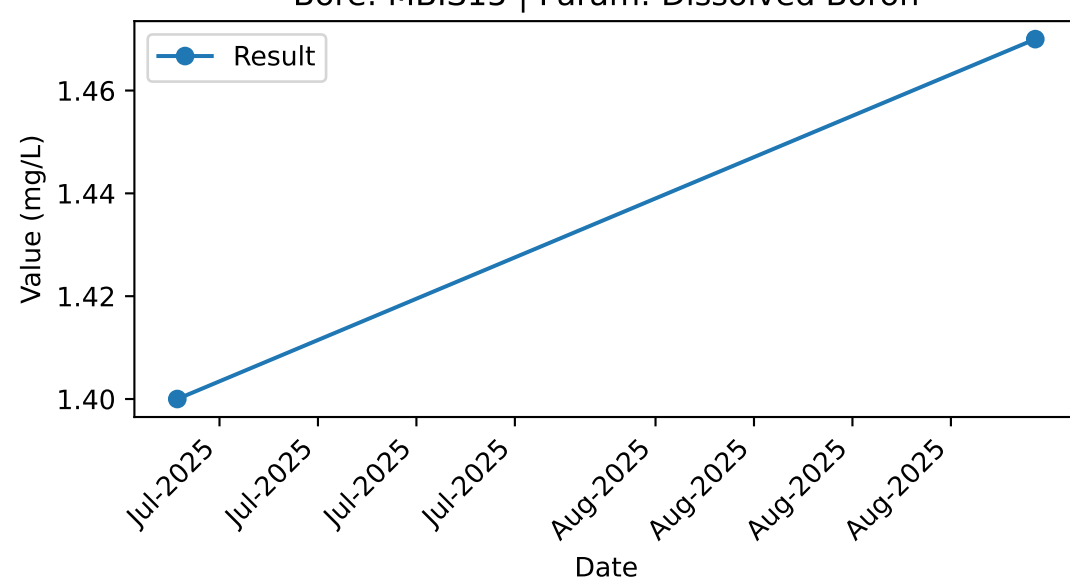
Bore: MBIS15 | Param: Dissolved Aluminium



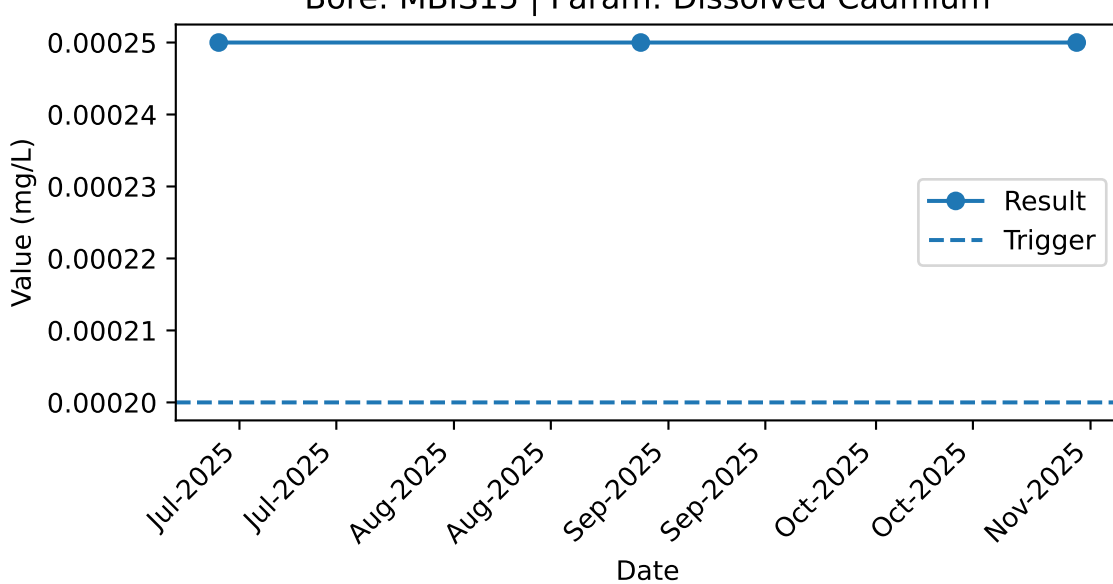
Bore: MBIS15 | Param: Dissolved Arsenic



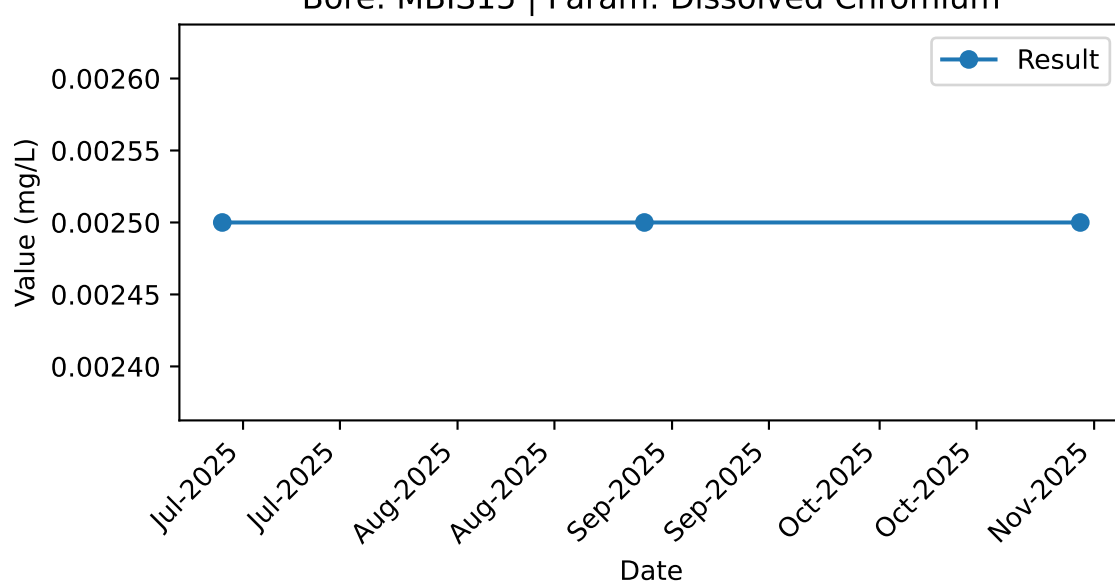
Bore: MBIS15 | Param: Dissolved Boron



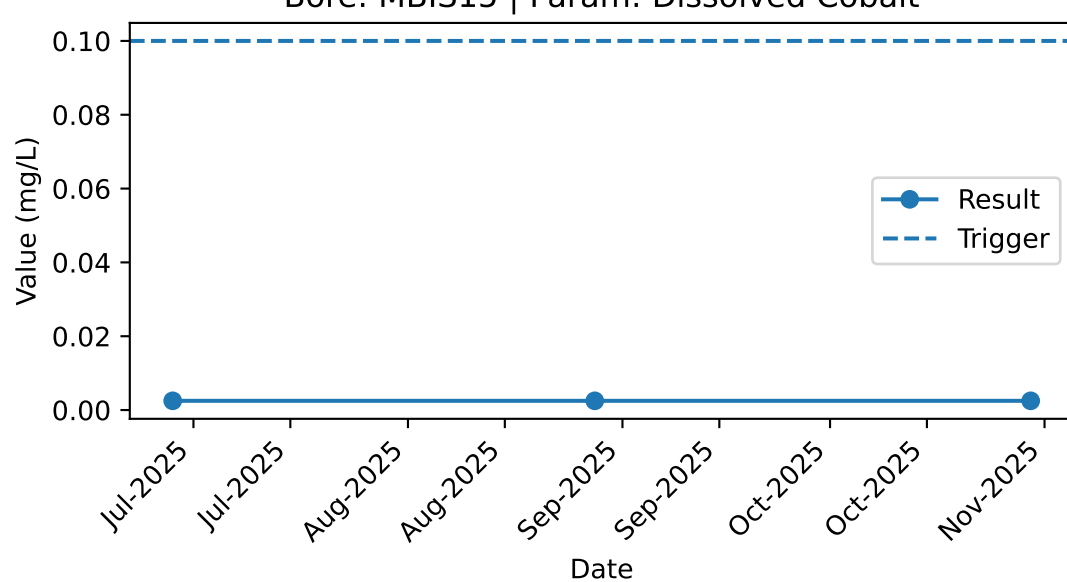
Bore: MBIS15 | Param: Dissolved Cadmium



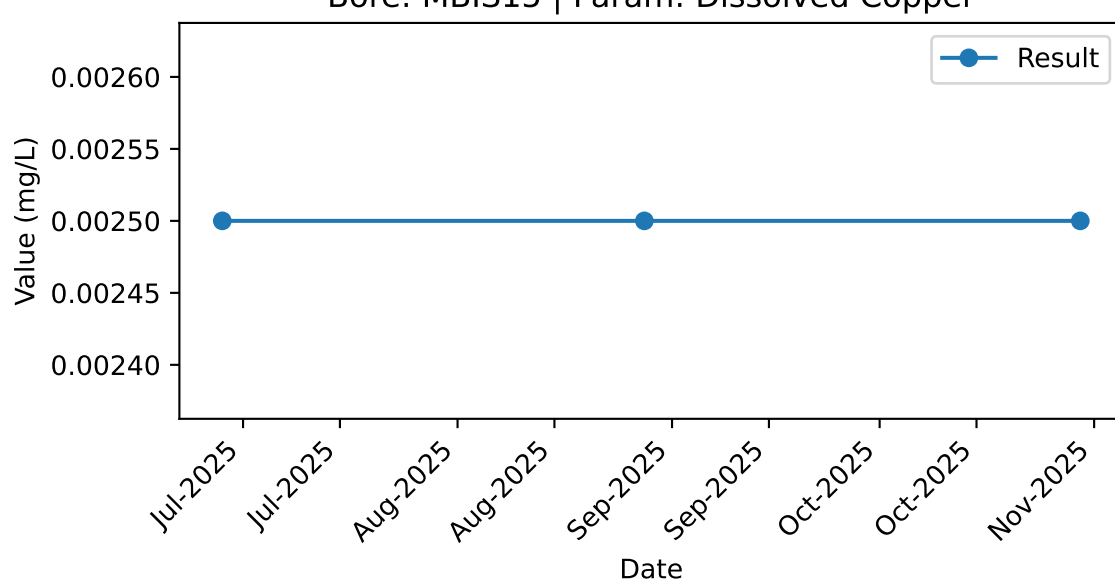
Bore: MBIS15 | Param: Dissolved Chromium



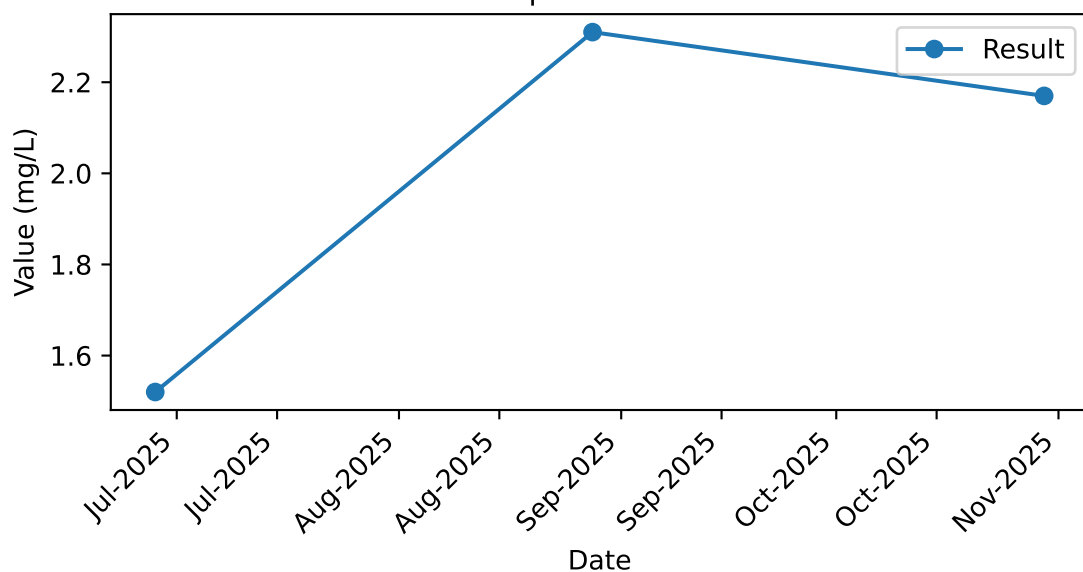
Bore: MBIS15 | Param: Dissolved Cobalt



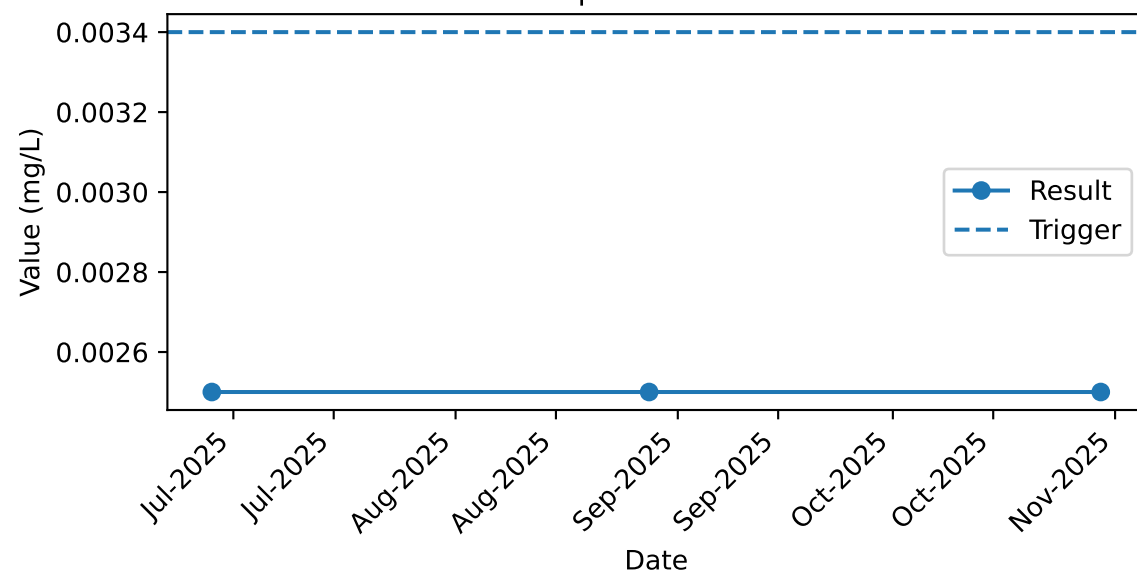
Bore: MBIS15 | Param: Dissolved Copper



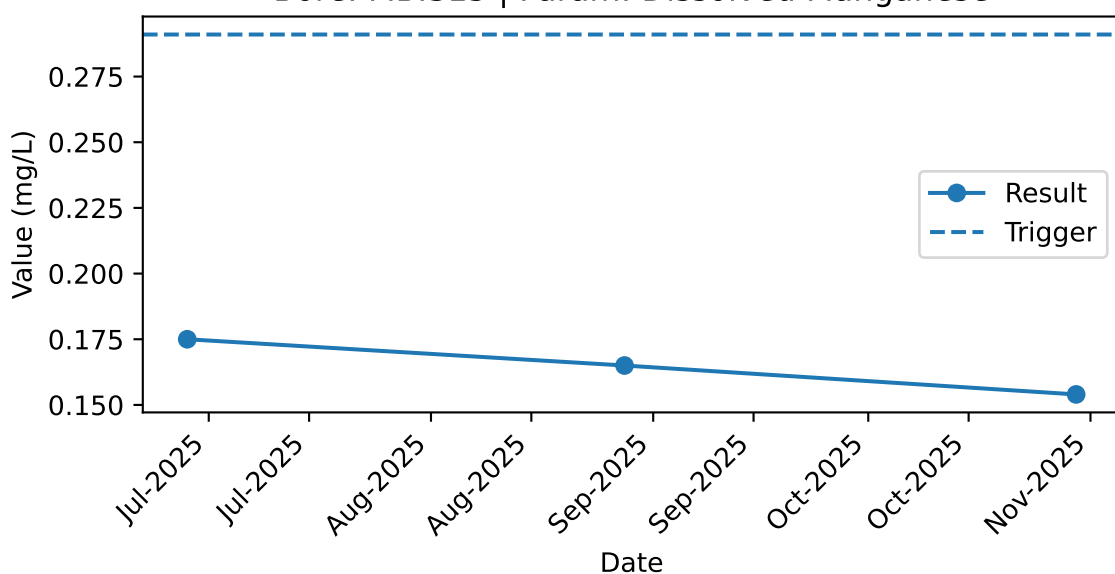
Bore: MBIS15 | Param: Dissolved Iron



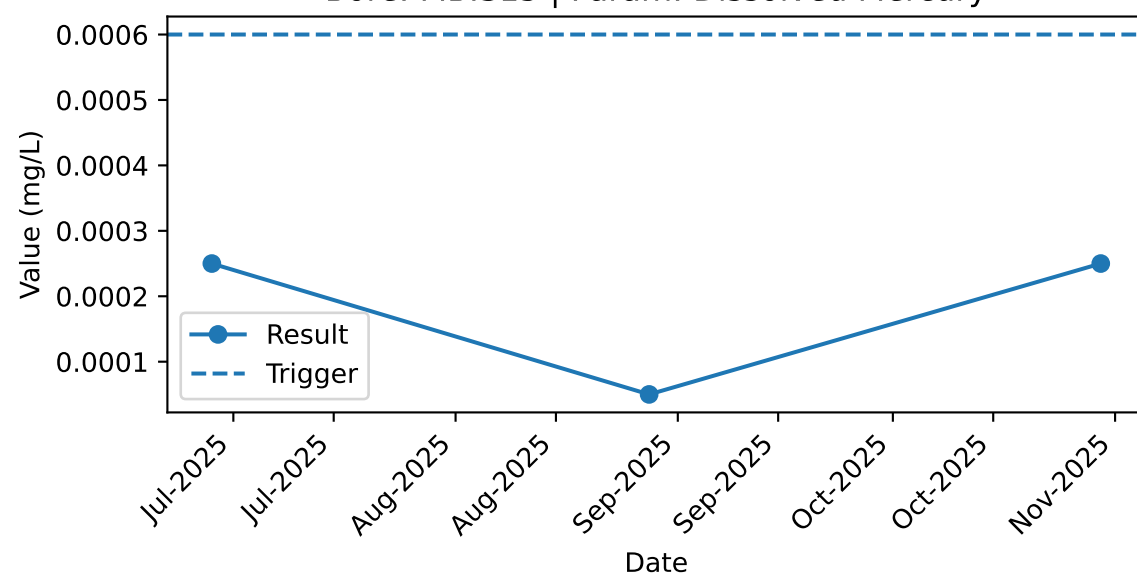
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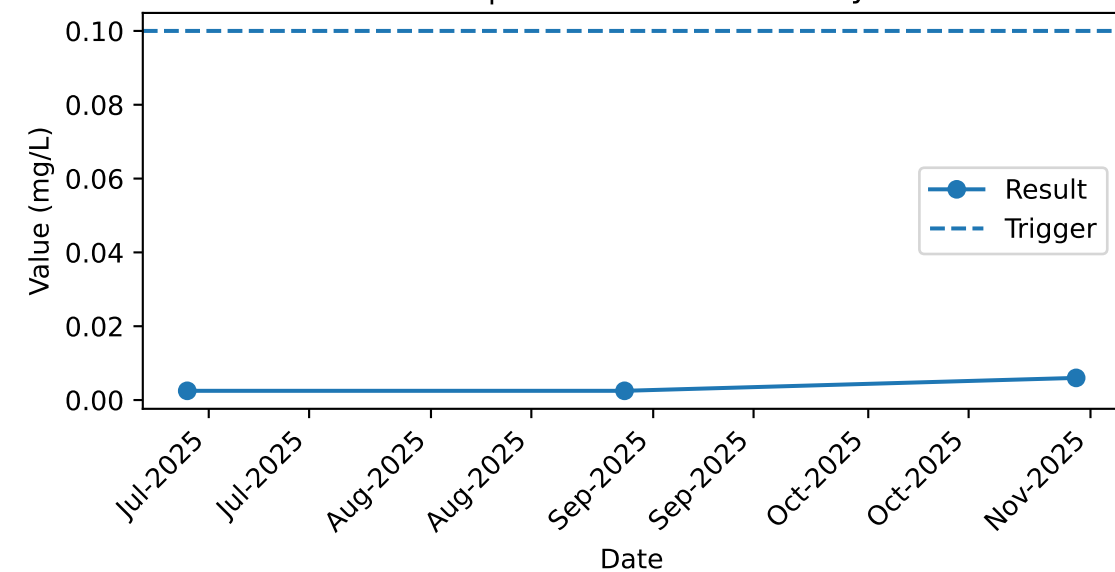
Bore: MBIS15 | Param: Dissolved Manganese



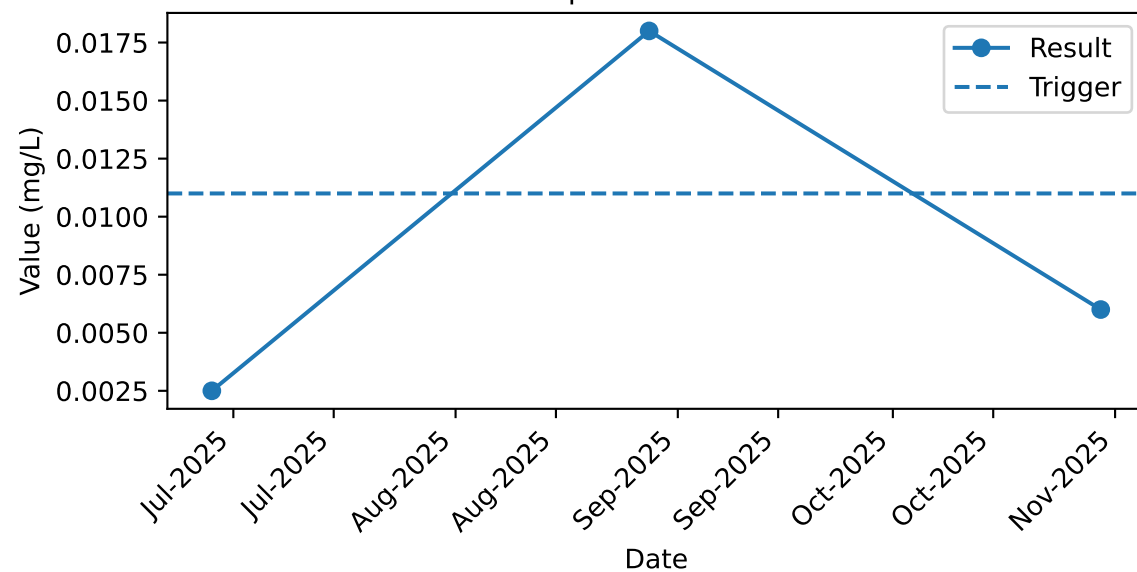
Bore: MBIS15 | Param: Dissolved Mercury



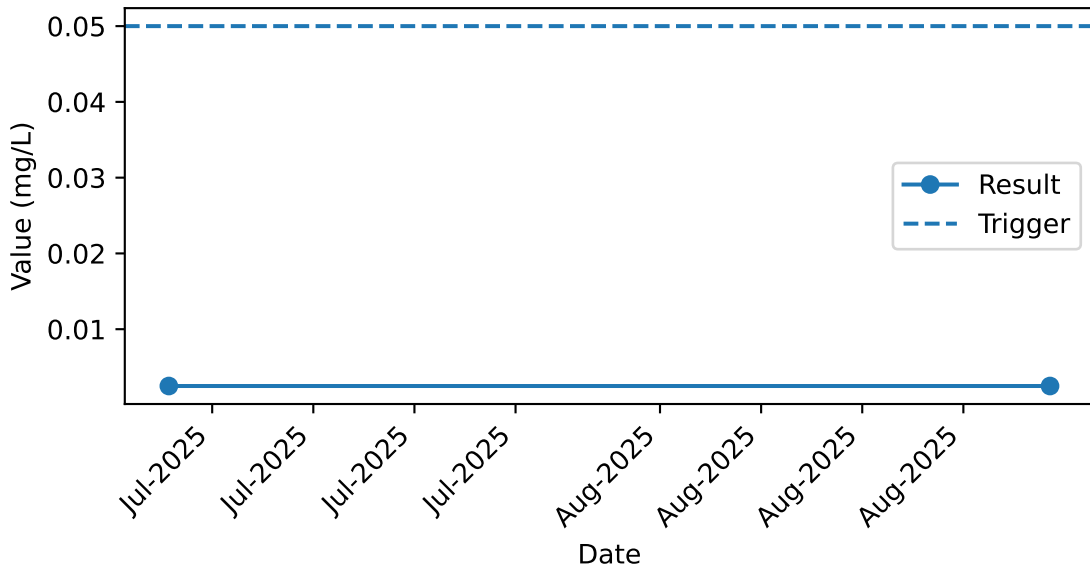
Bore: MBIS15 | Param: Dissolved Molybdenum



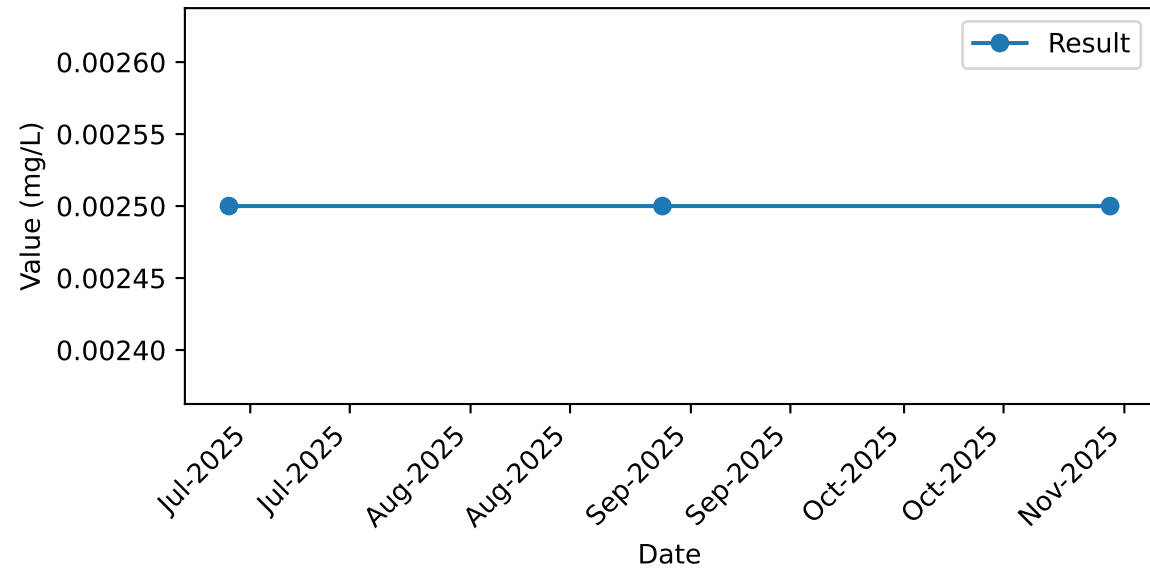
Bore: MBIS15 | Param: Dissolved Nickel



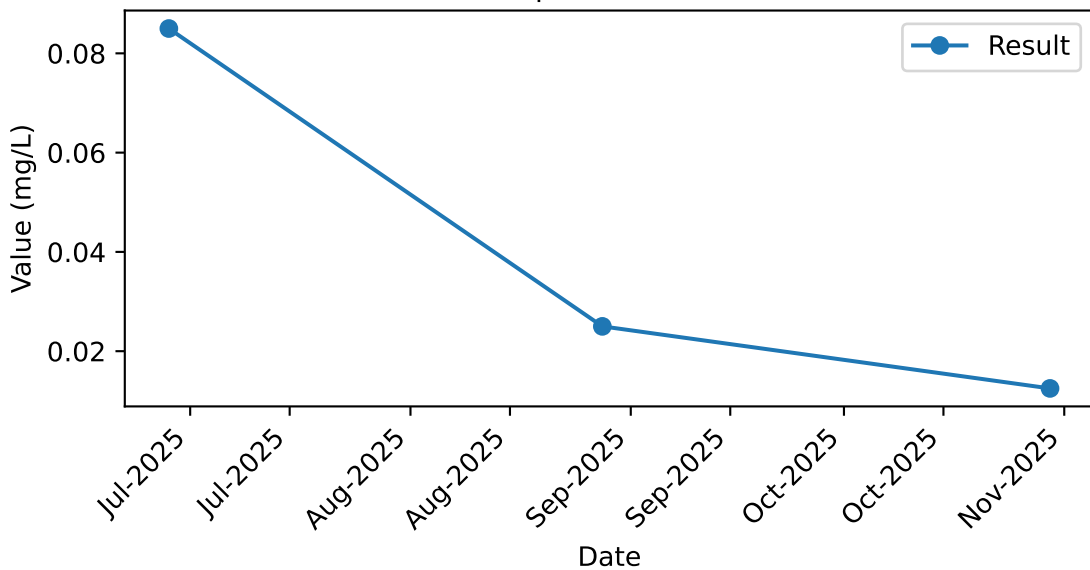
Bore: MBIS15 | Param: Dissolved Silver



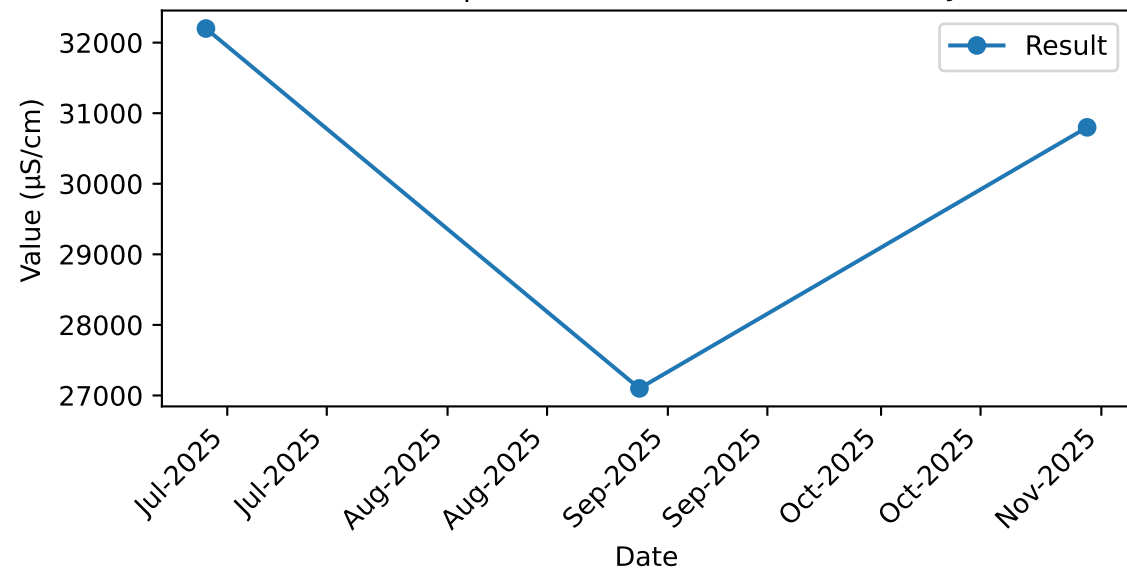
Bore: MBIS15 | Param: Dissolved Uranium



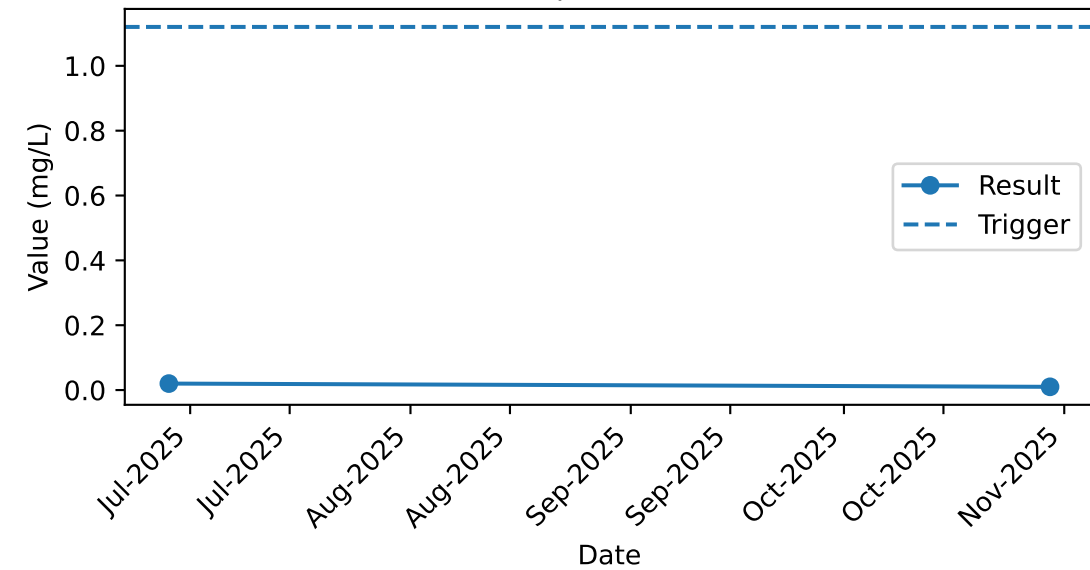
Bore: MBIS15 | Param: Dissolved Zinc



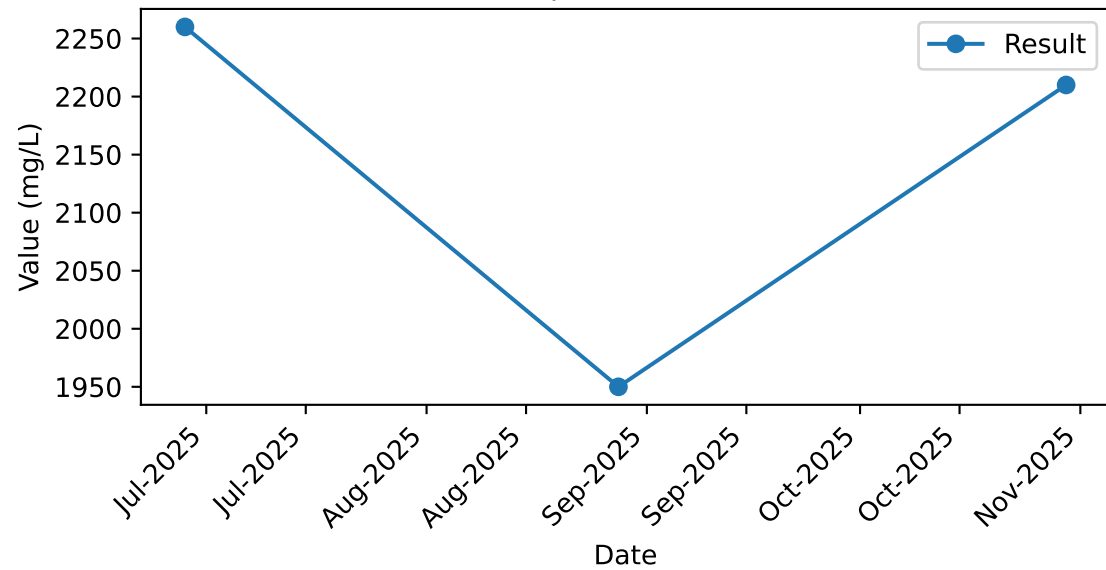
Bore: MBIS15 | Param: Electrical Conductivity (Lab)



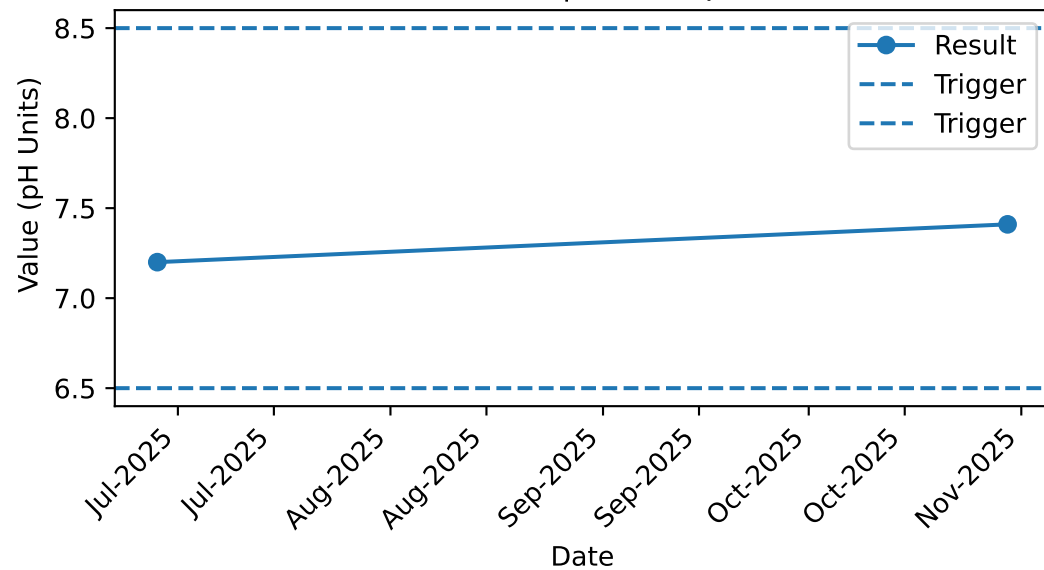
Bore: MBIS15 | Param: Nitrate as N



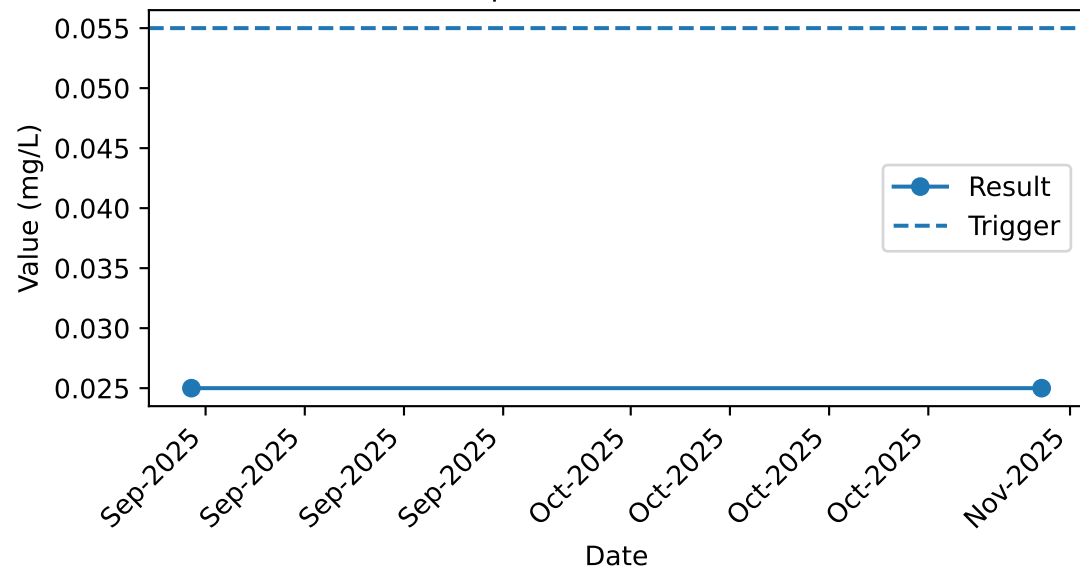
Bore: MBIS15 | Param: Sulfate as SO4



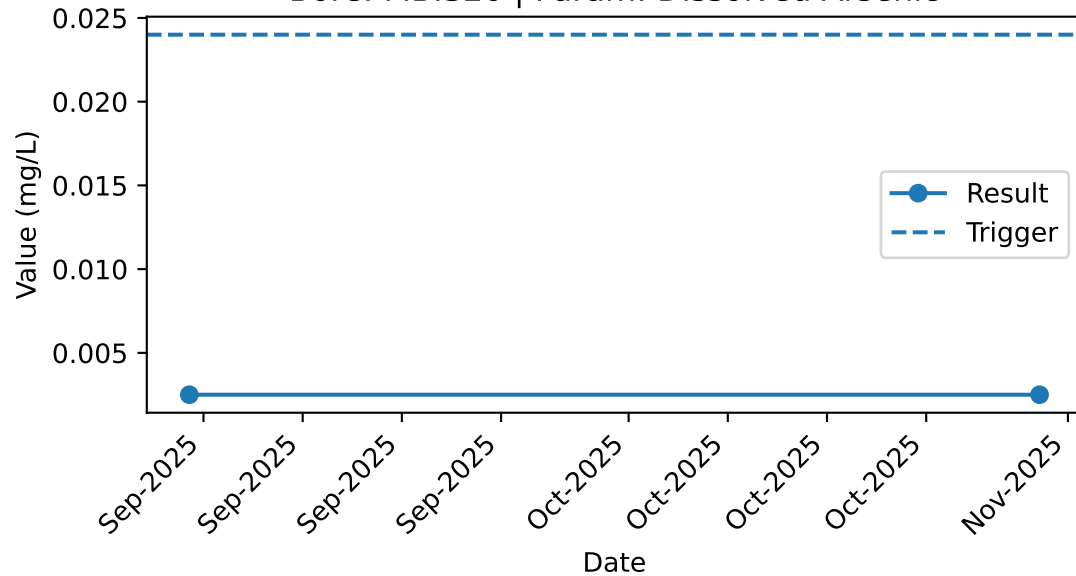
Bore: MBIS15 | Param: pH field



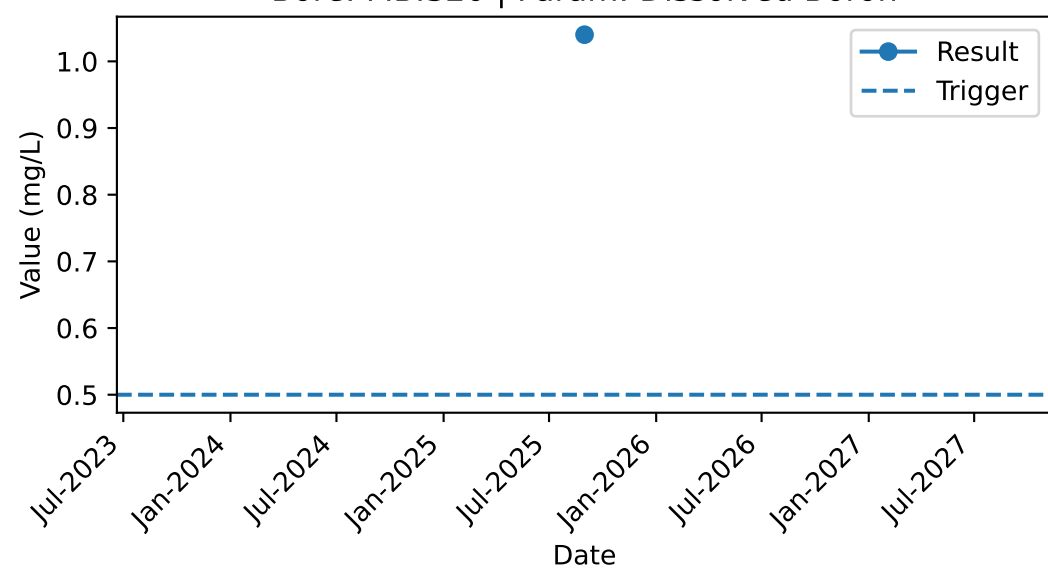
Bore: MBIS20 | Param: Dissolved Aluminium



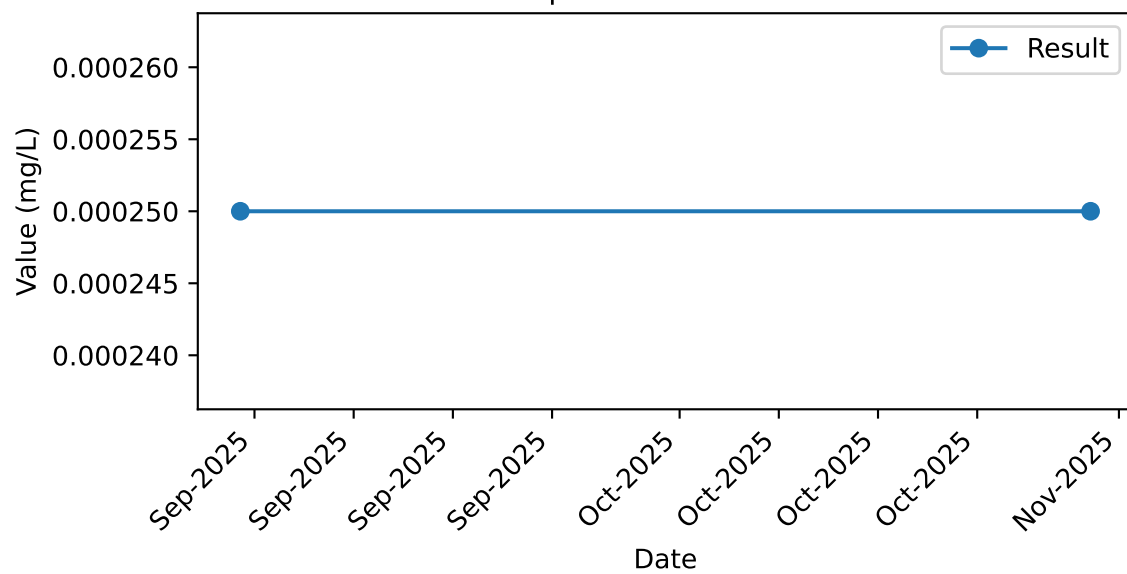
Bore: MBIS20 | Param: Dissolved Arsenic



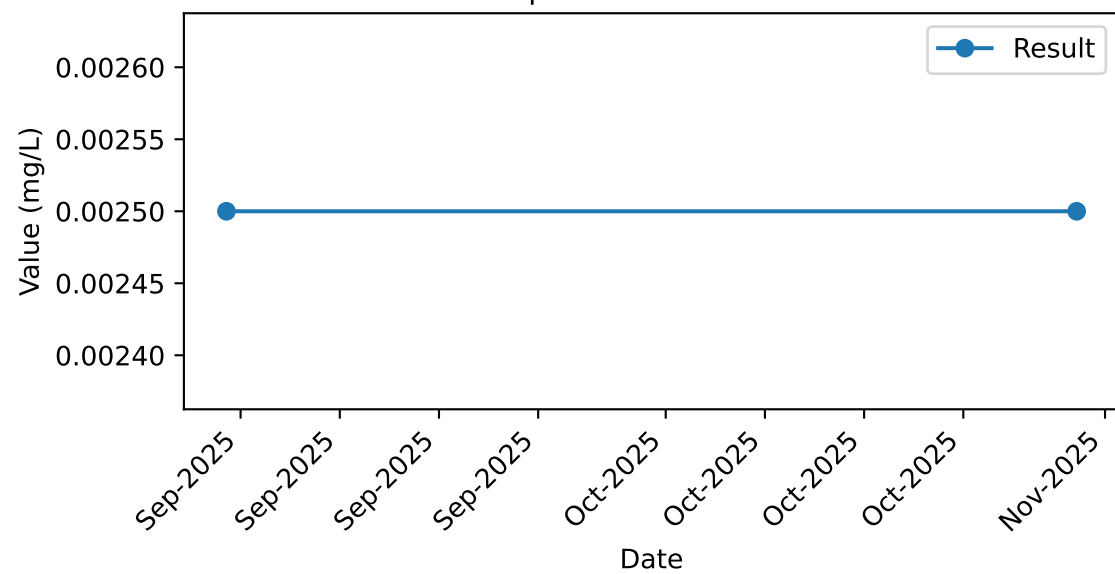
Bore: MBIS20 | Param: Dissolved Boron



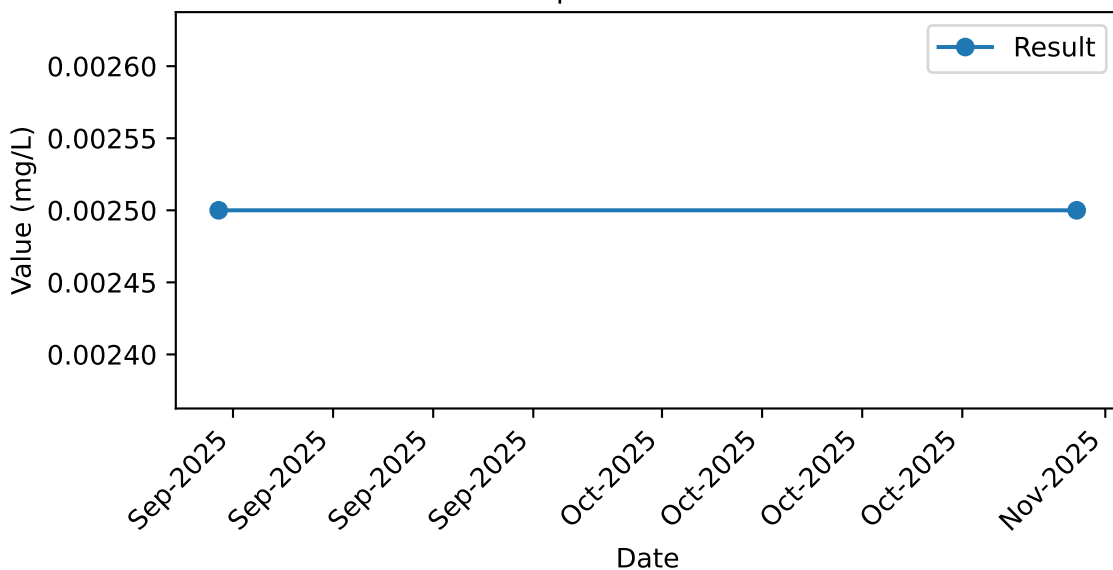
Bore: MBIS20 | Param: Dissolved Cadmium



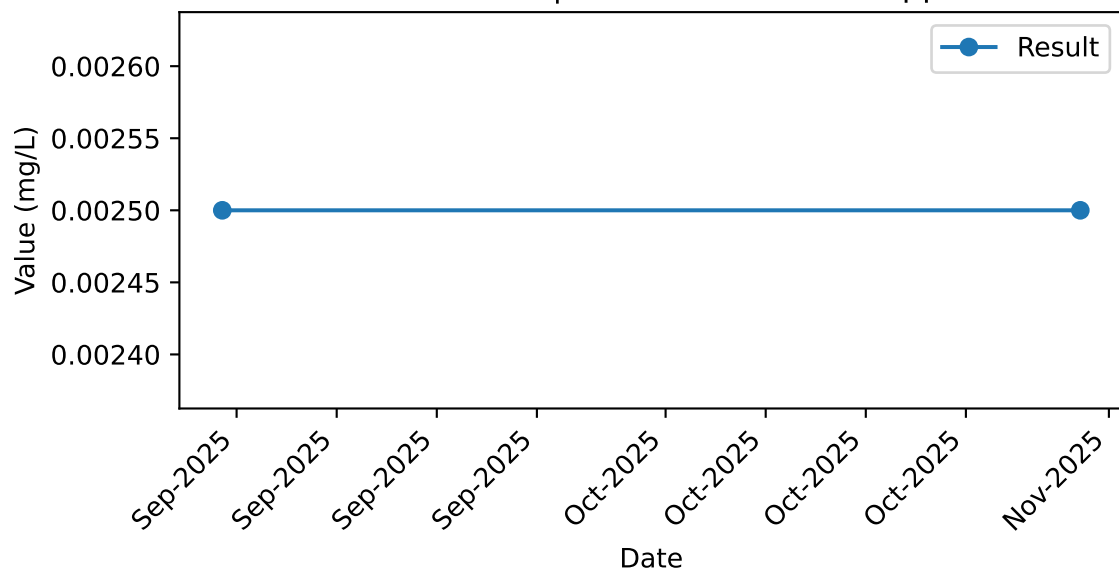
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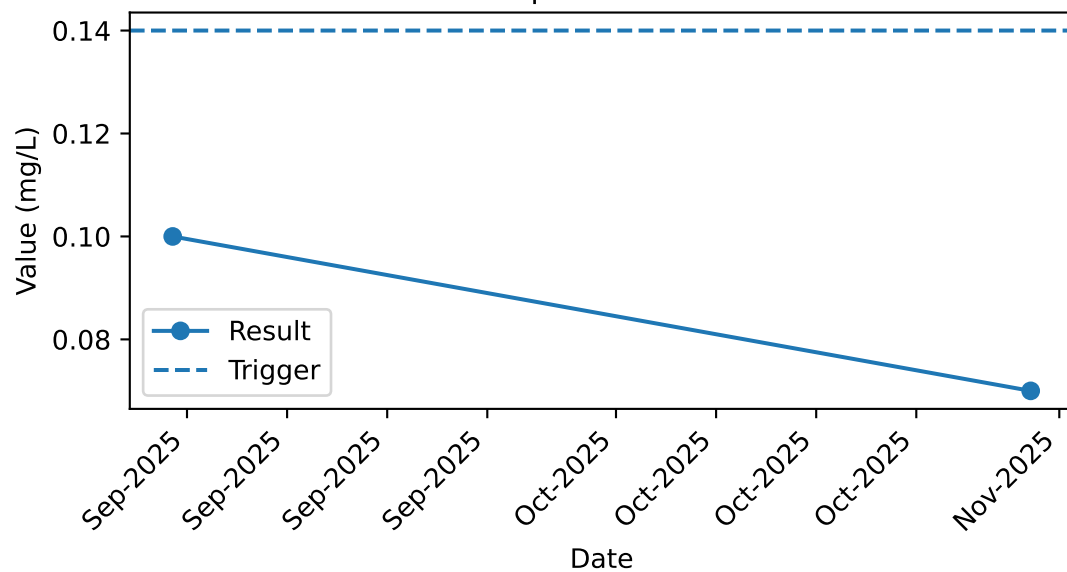
Bore: MBIS20 | Param: Dissolved Cobalt



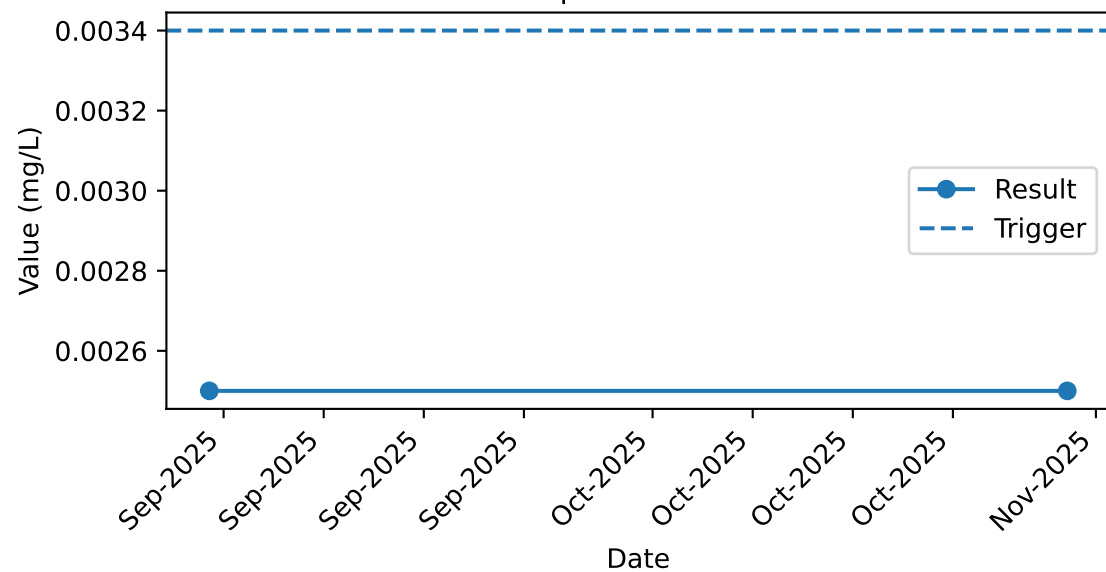
Bore: MBIS20 | Param: Dissolved Copper



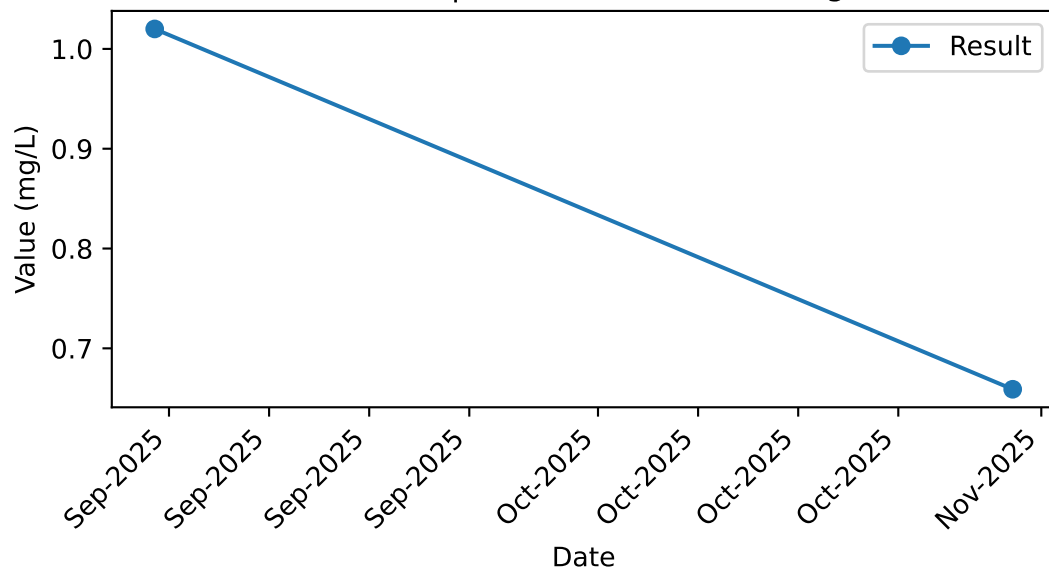
Bore: MBIS20 | Param: Dissolved Iron



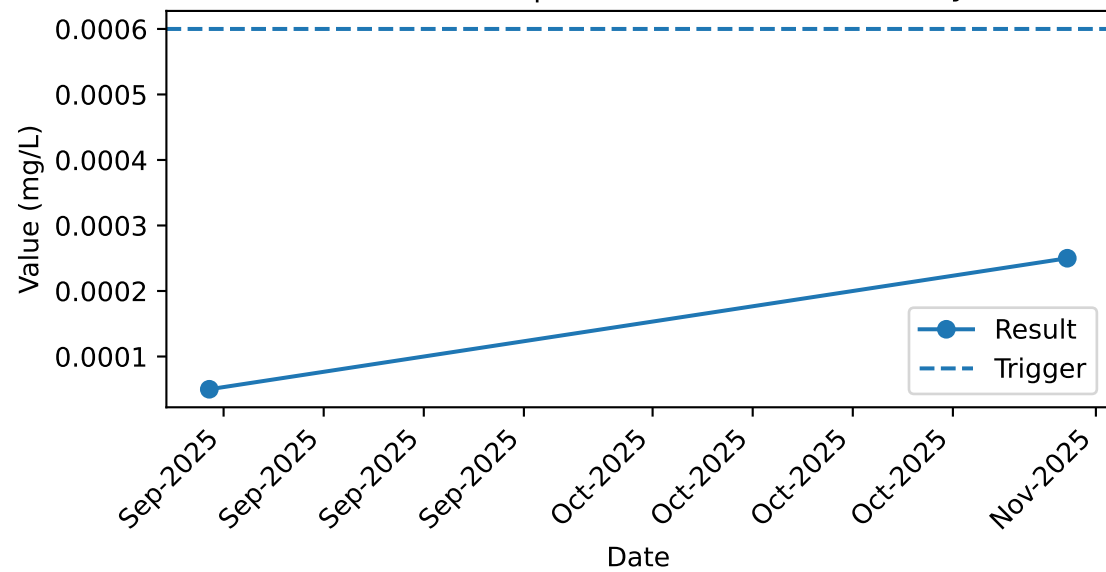
Bore: MBIS20 | Param: Dissolved Lead



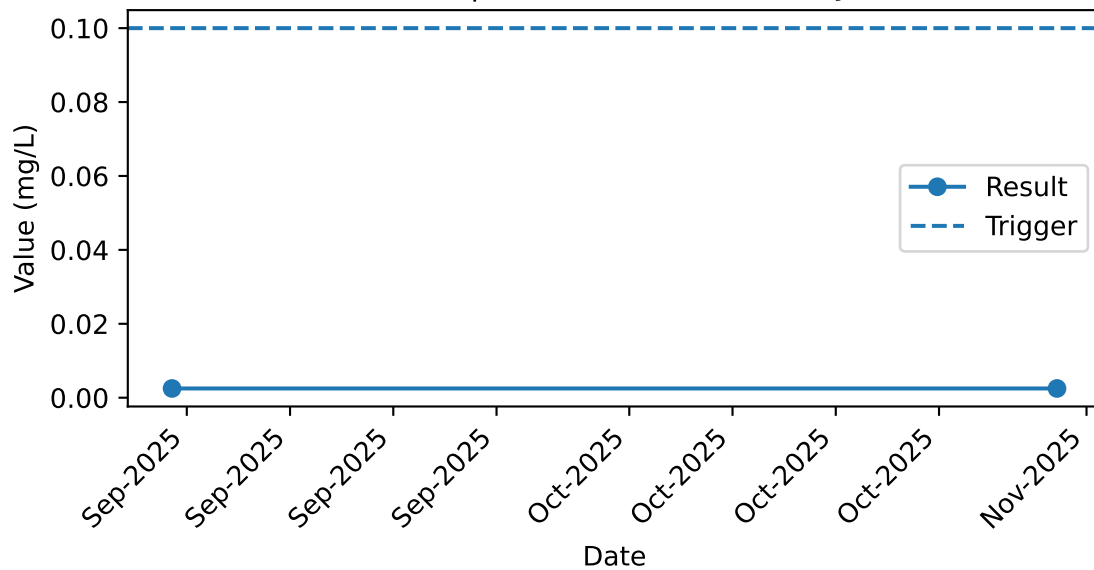
Bore: MBIS20 | Param: Dissolved Manganese



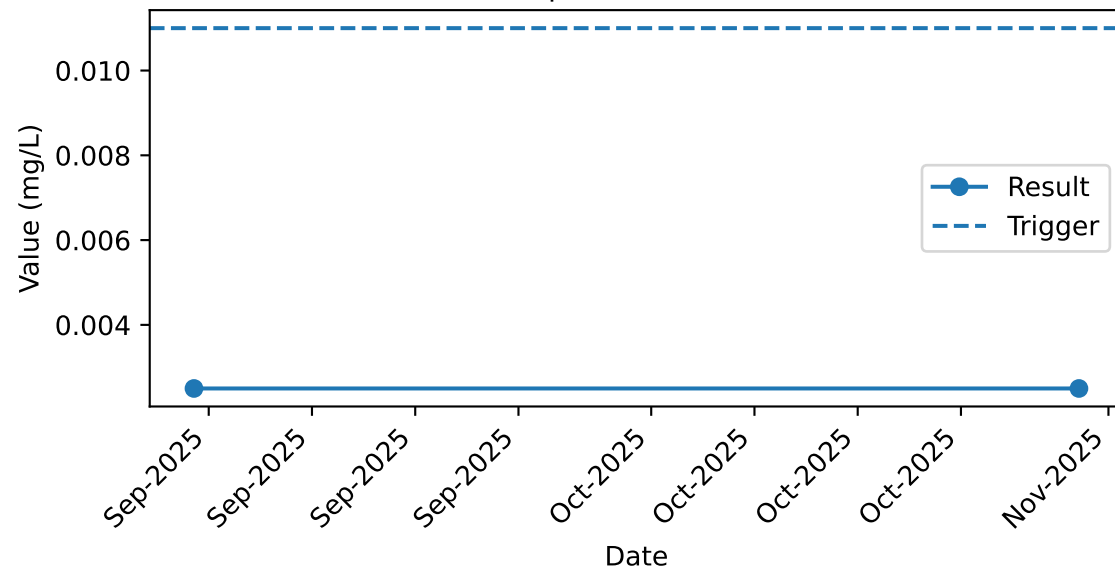
Bore: MBIS20 | Param: Dissolved Mercury



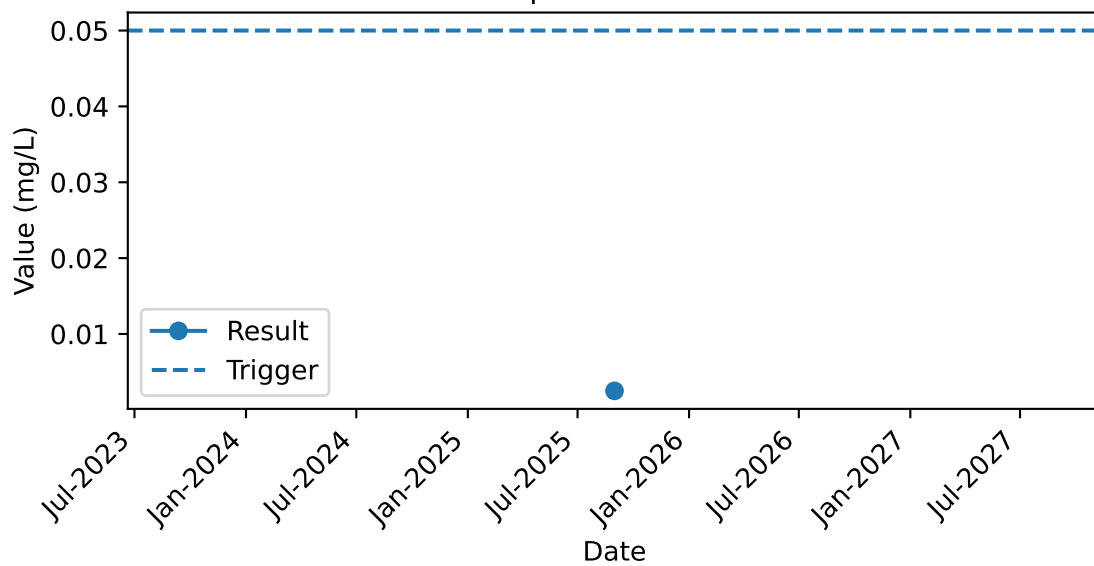
Bore: MBIS20 | Param: Dissolved Molybdenum



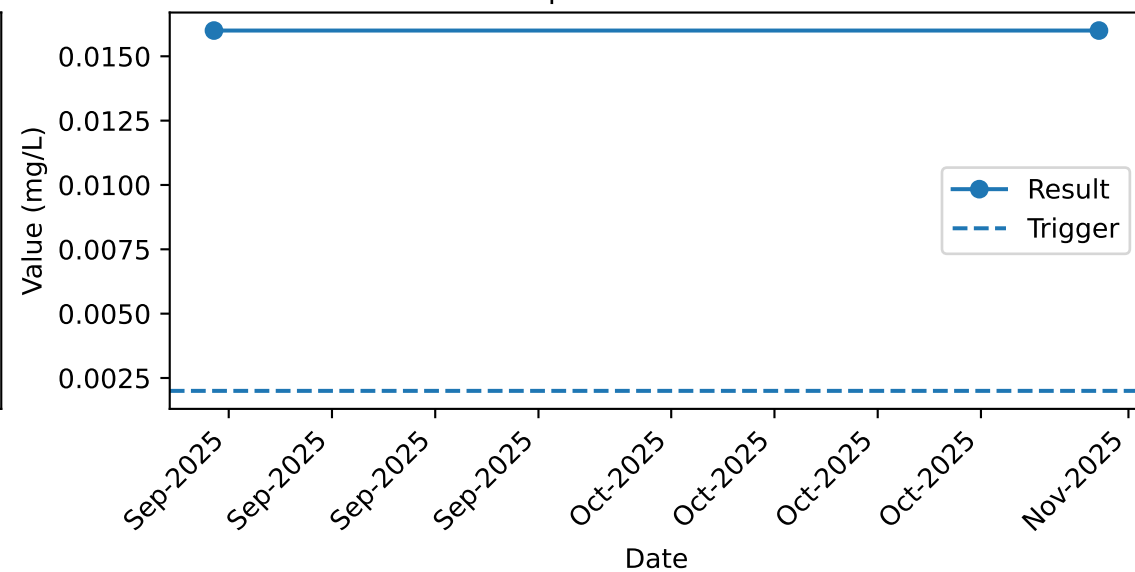
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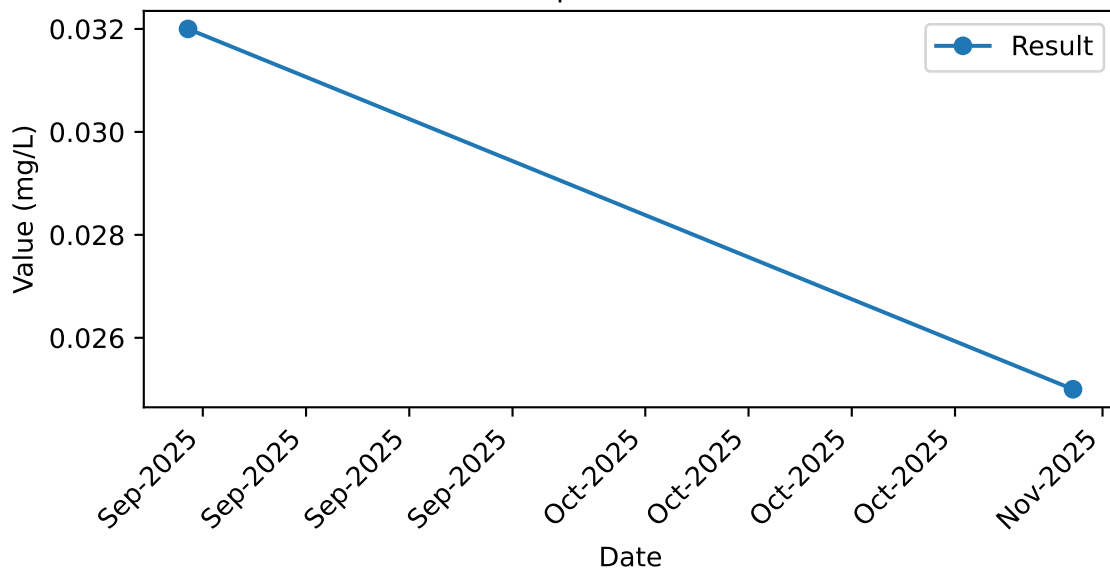
Bore: MBIS20 | Param: Dissolved Silver



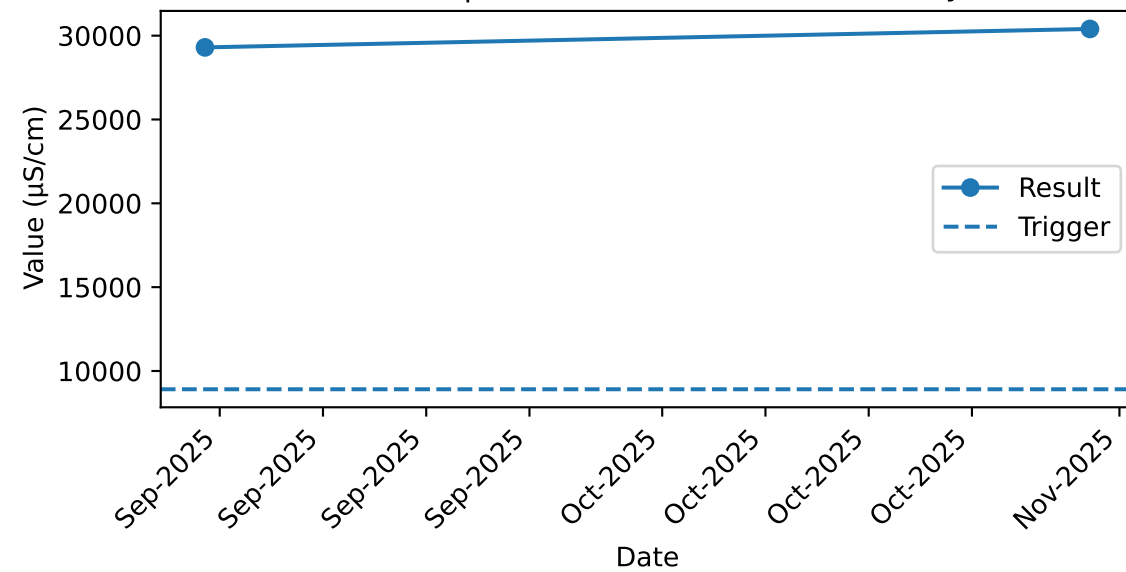
Bore: MBIS20 | Param: Dissolved Uranium



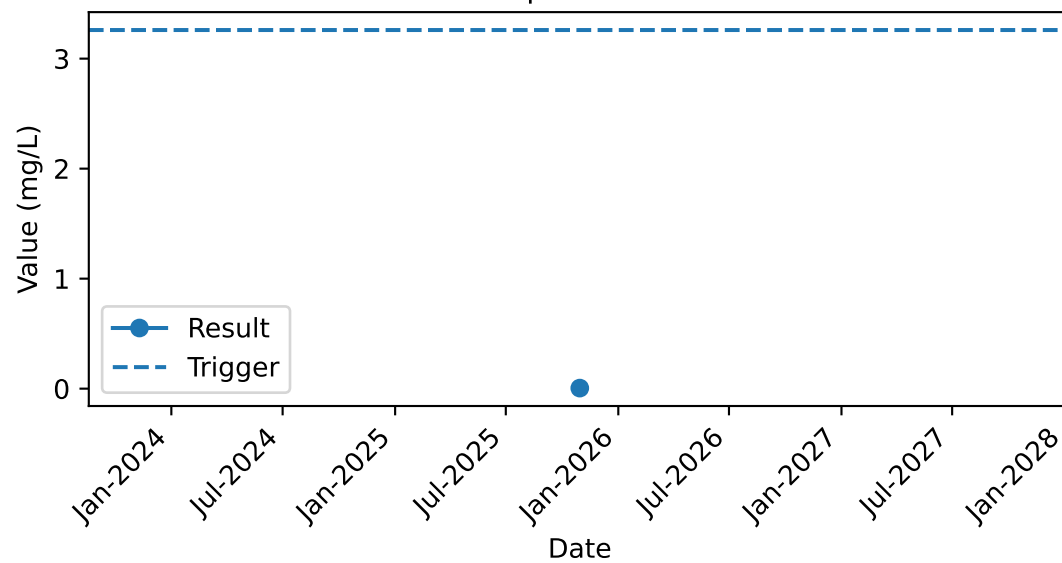
Bore: MBIS20 | Param: Dissolved Zinc



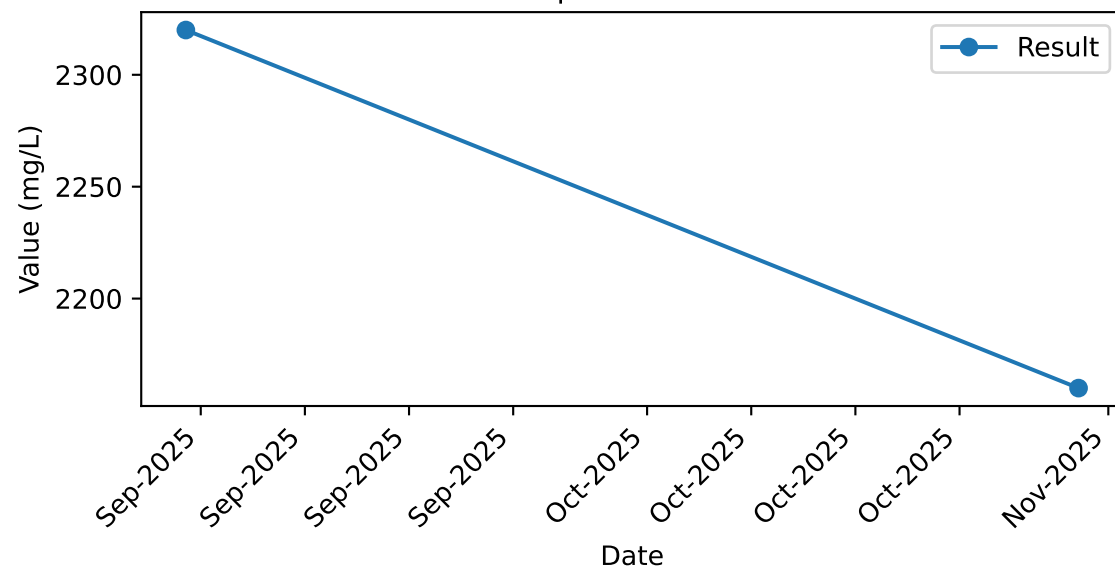
Bore: MBIS20 | Param: Electrical Conductivity (Lab)



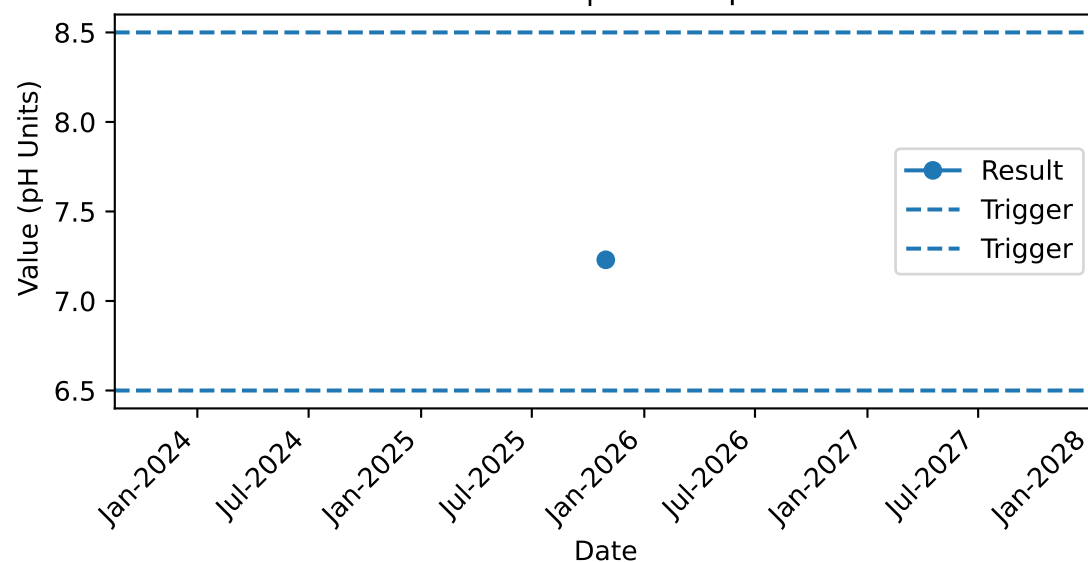
Bore: MBIS20 | Param: Nitrate as N



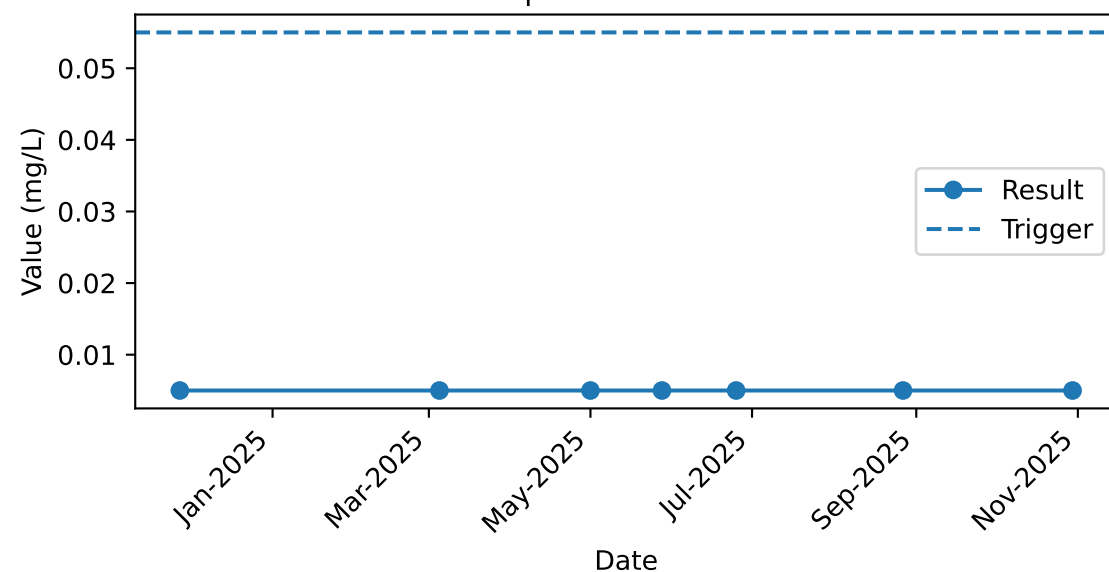
Bore: MBIS20 | Param: Sulfate as SO4



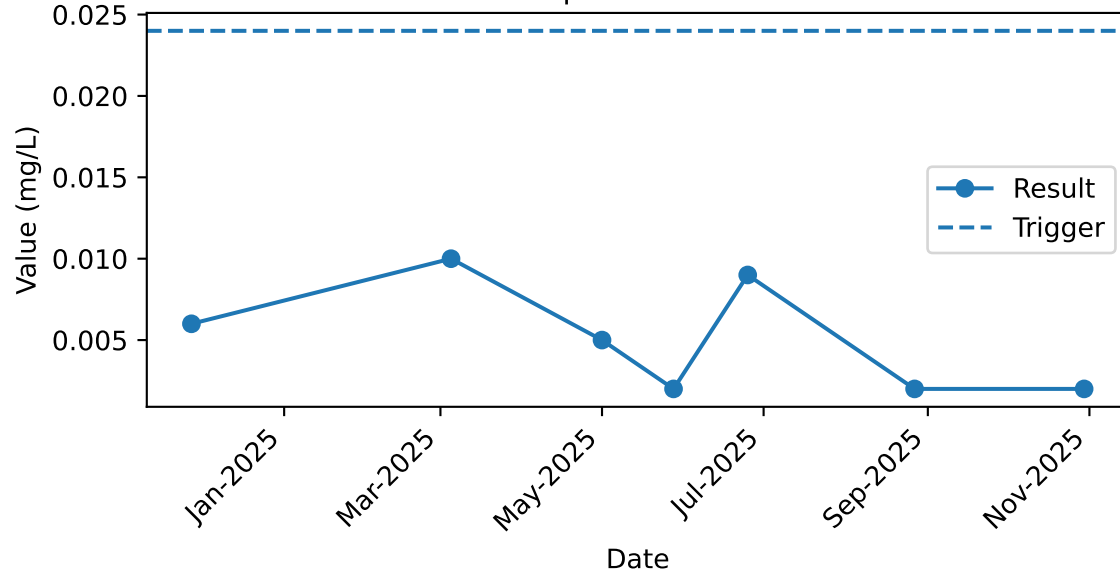
Bore: MBIS20 | Param: pH field



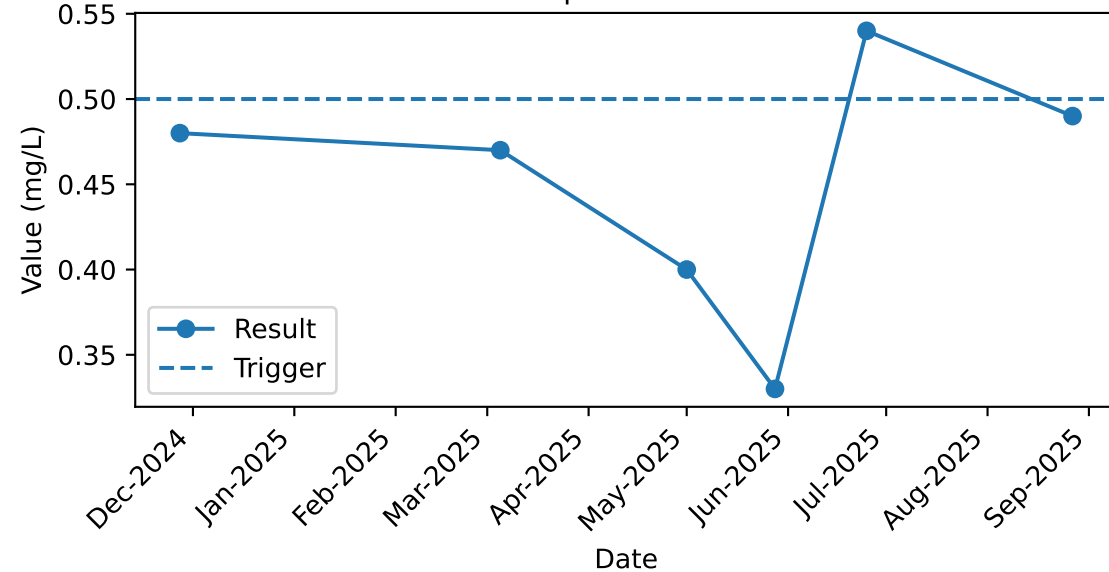
Bore: RN182851 | Param: Dissolved Aluminium



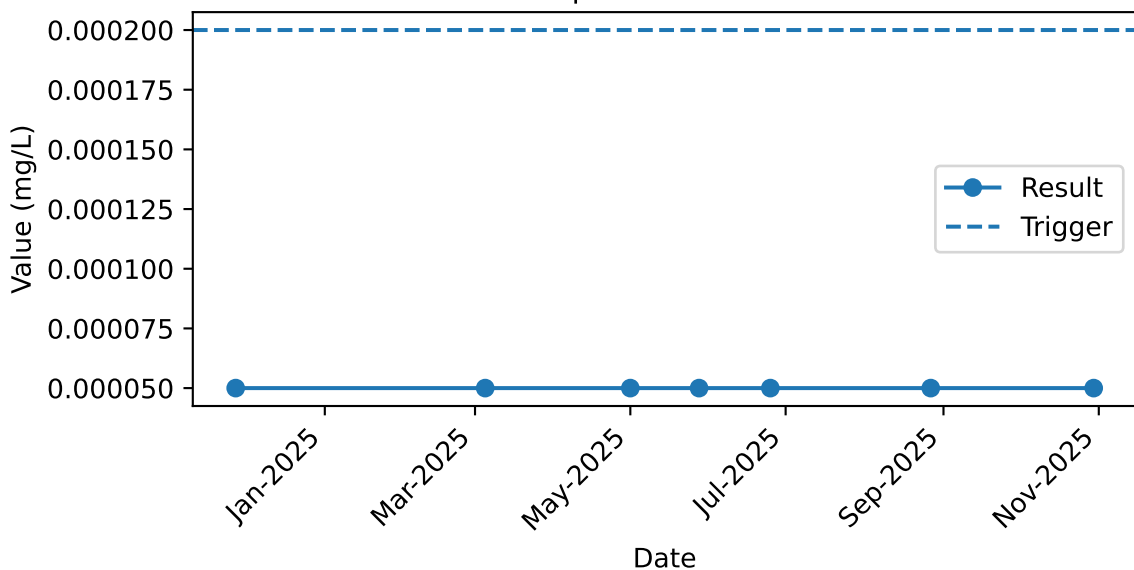
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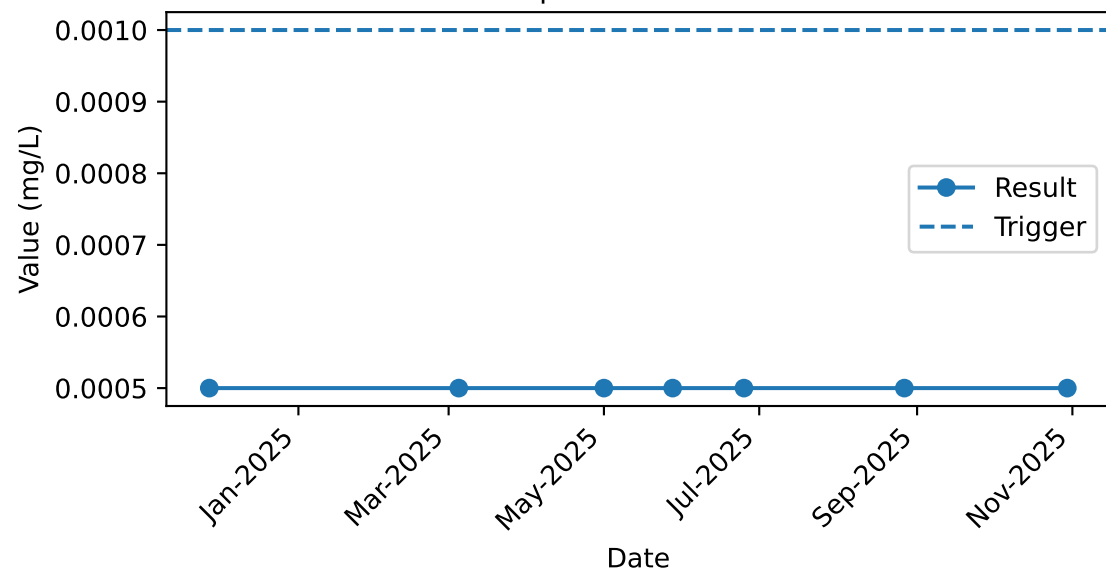
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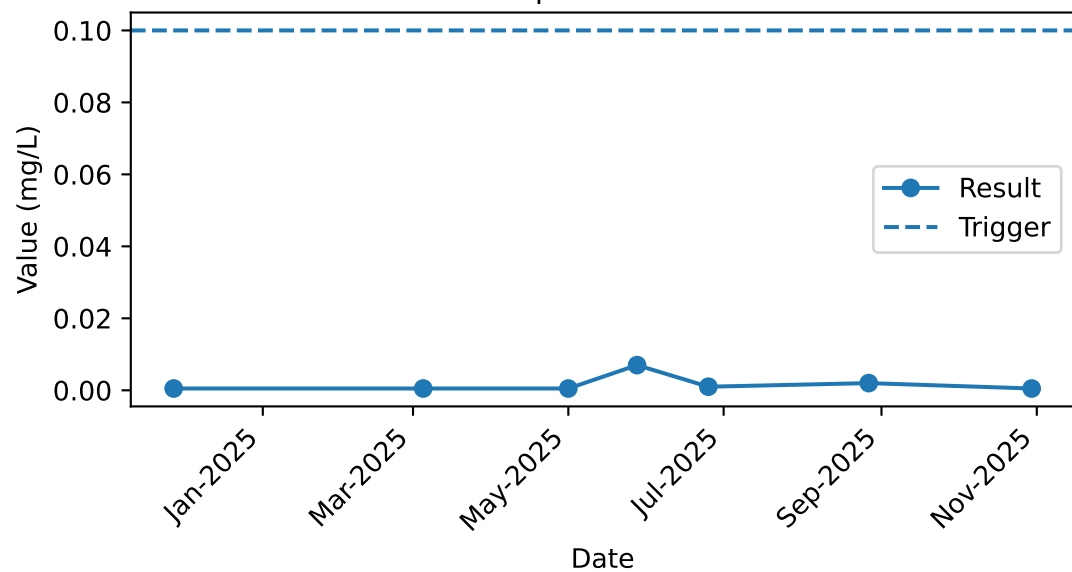
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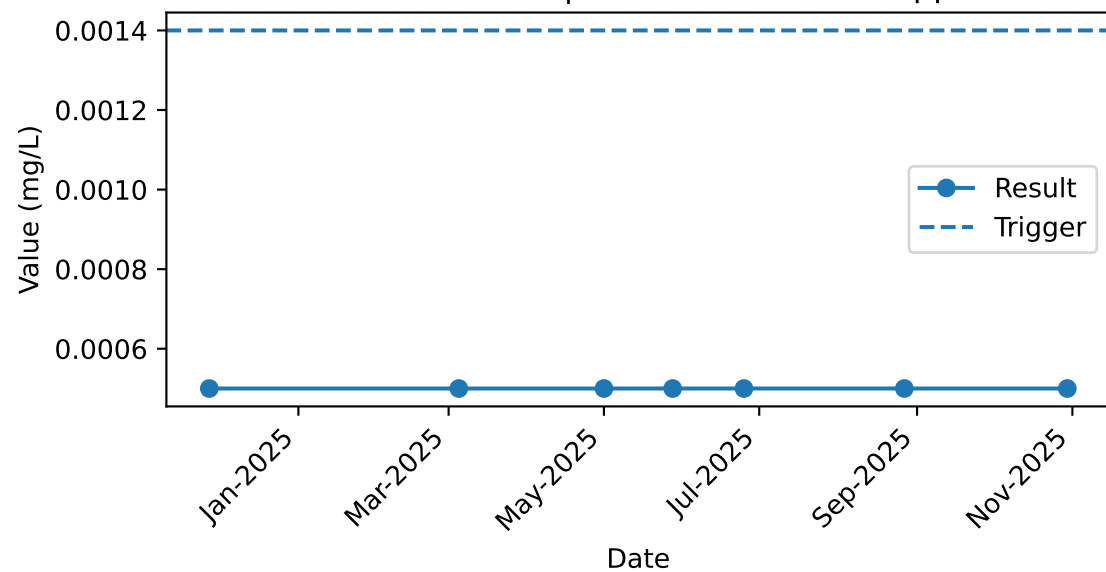
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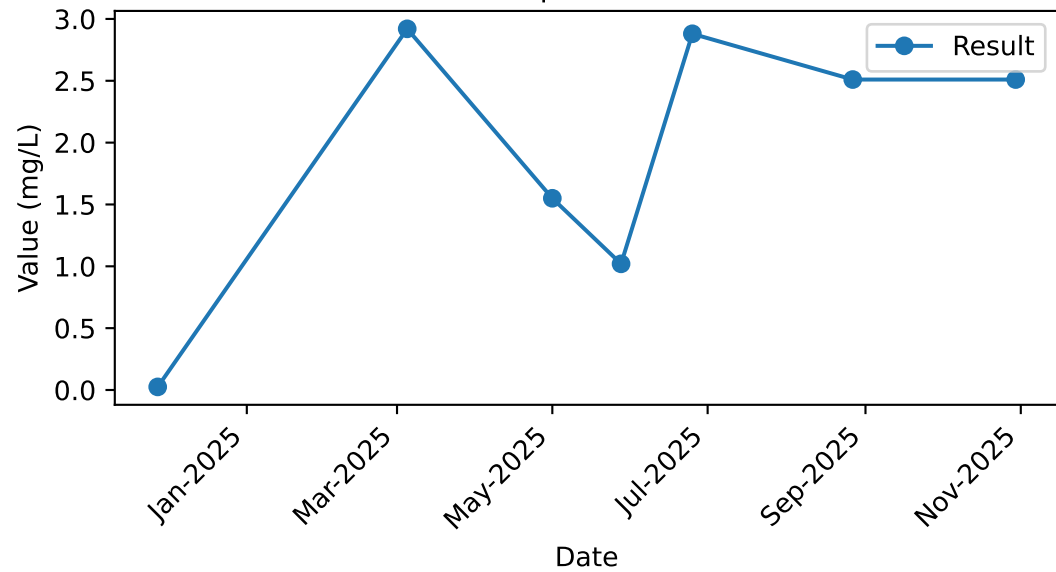
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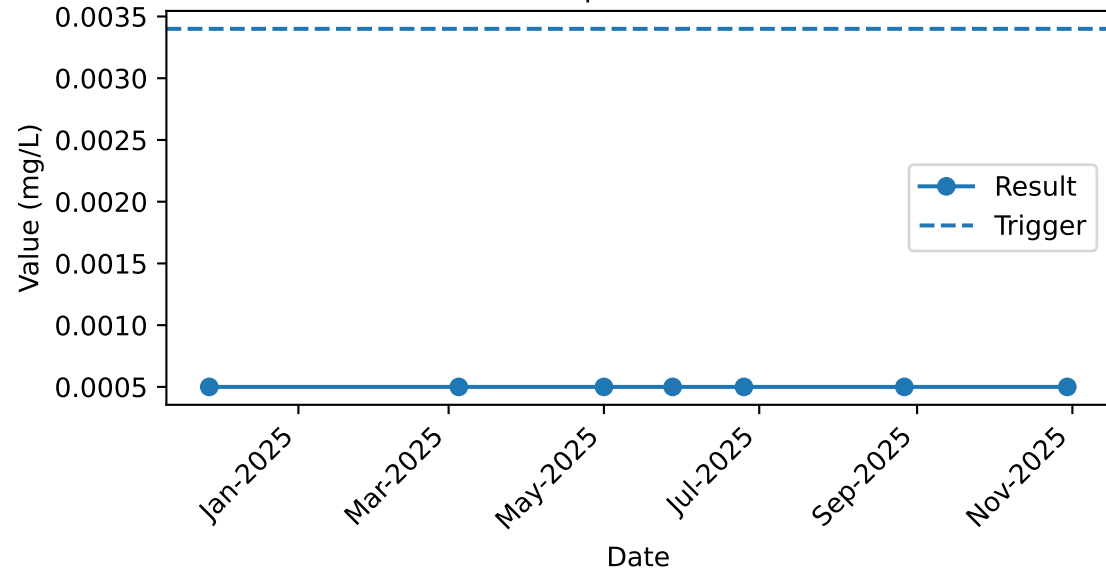
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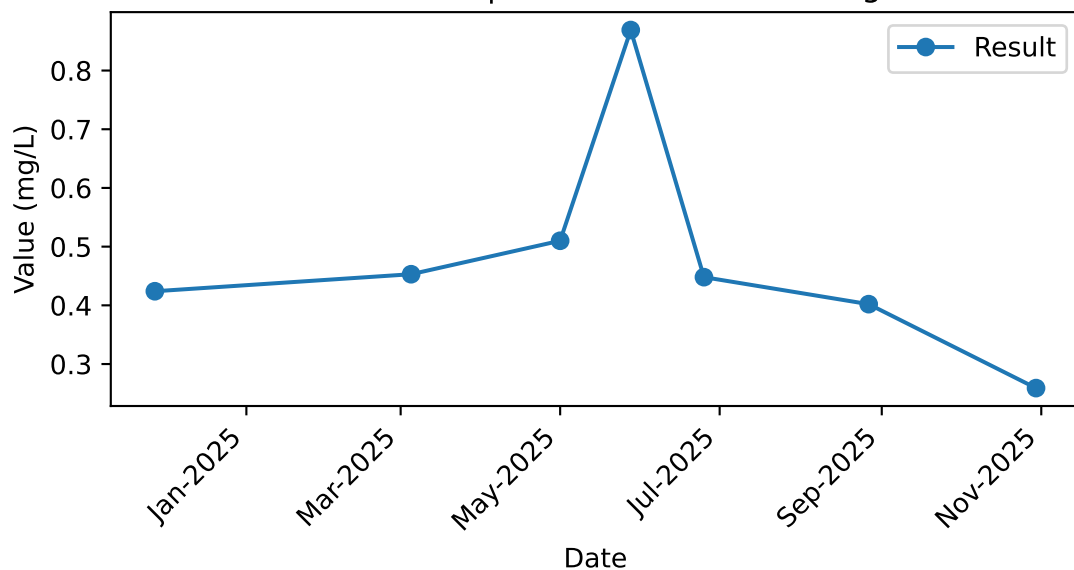
Bore: RN182851 | Param: Dissolved Iron



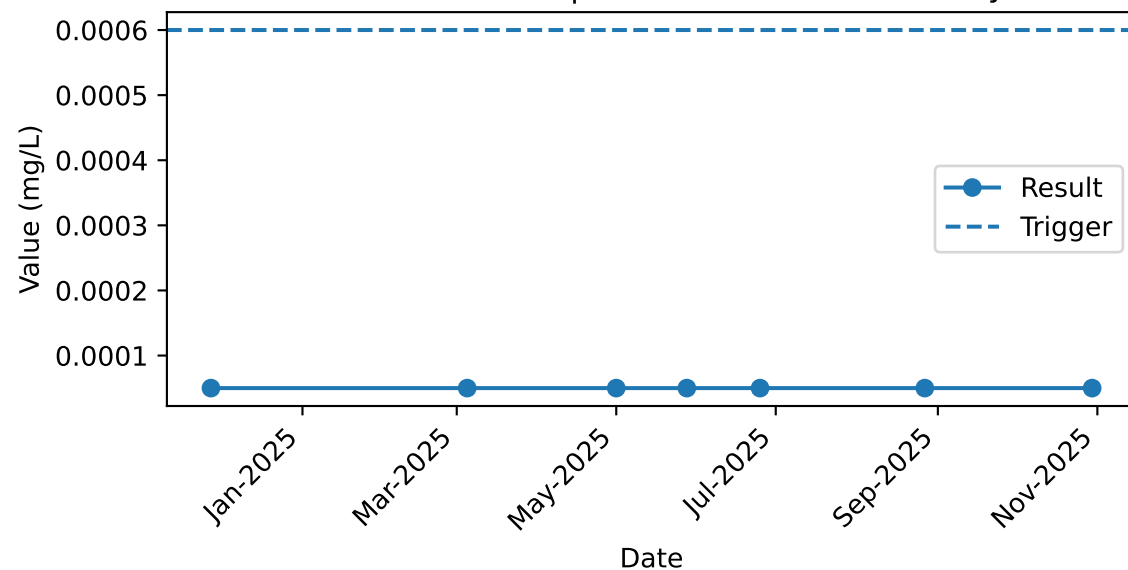
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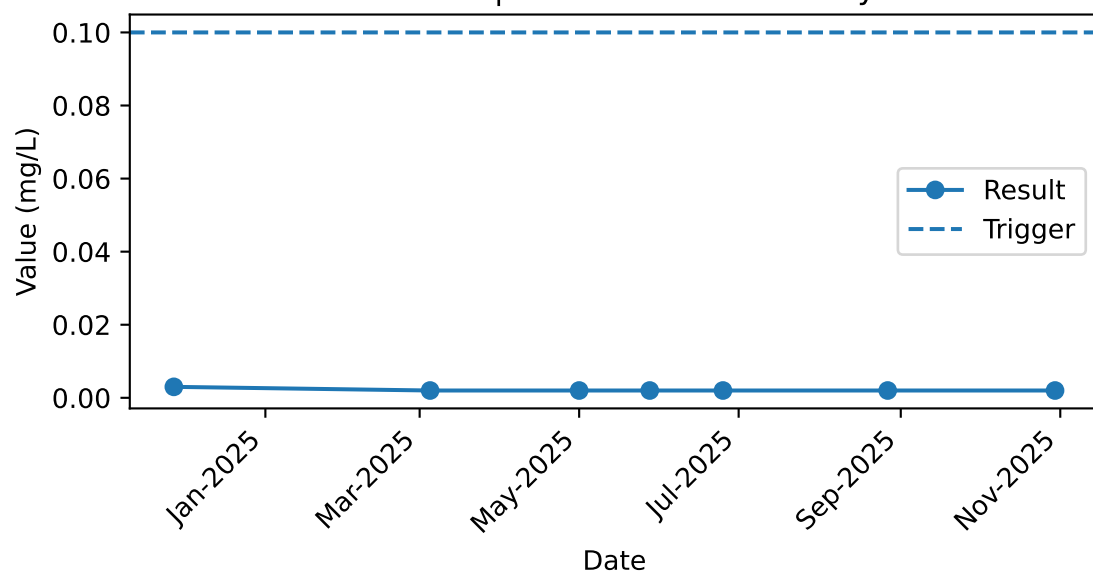
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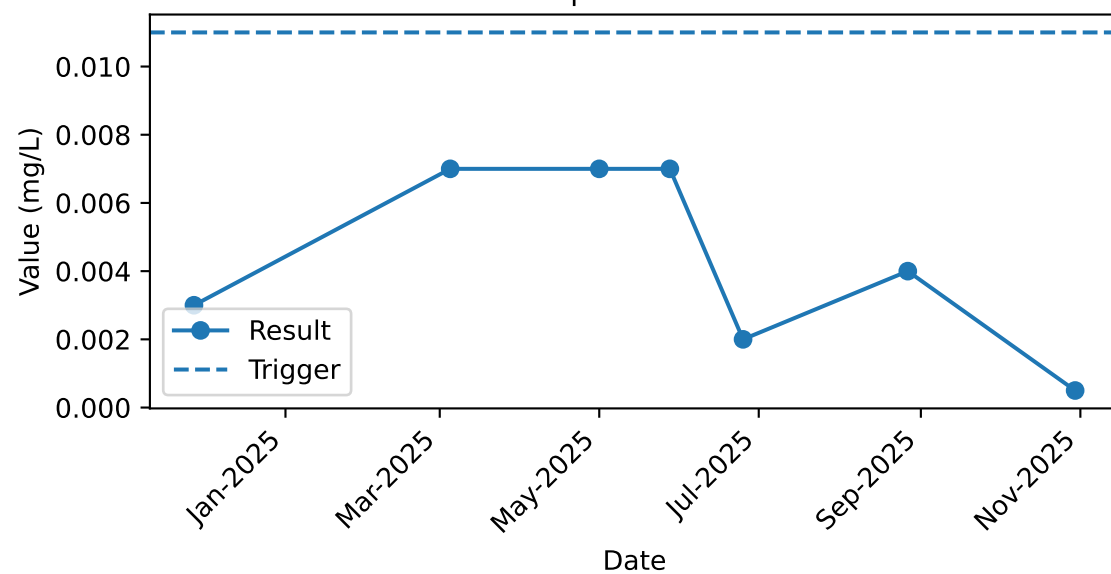
Bore: RN182851 | Param: Dissolved Mercury



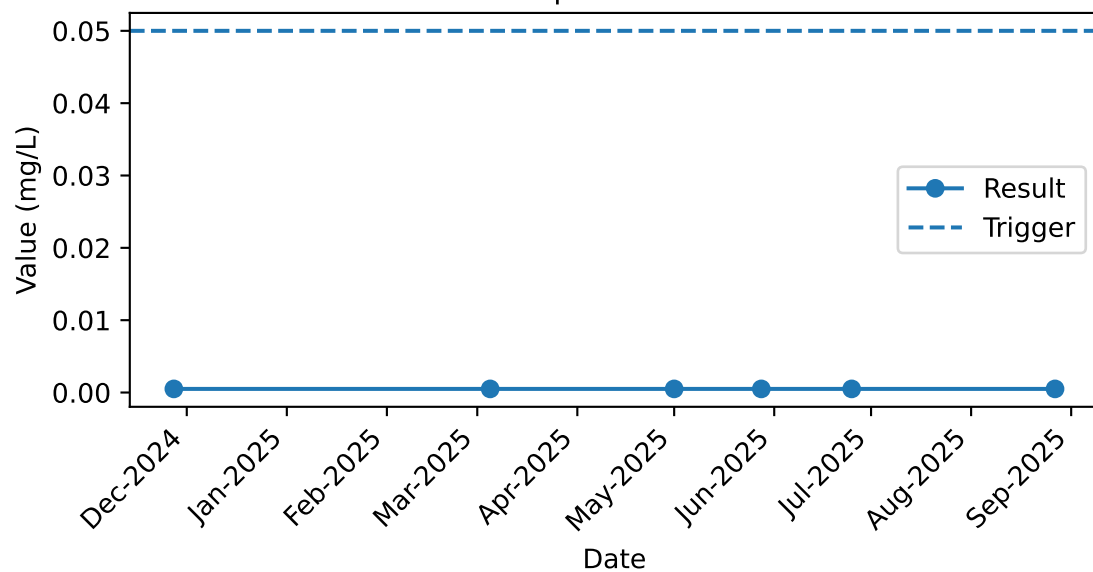
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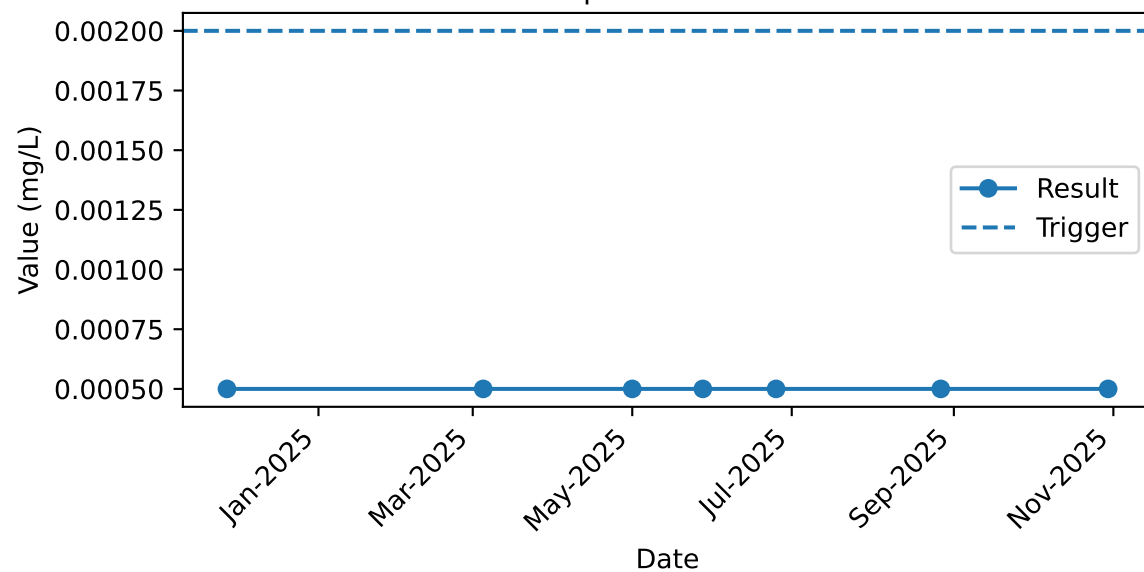
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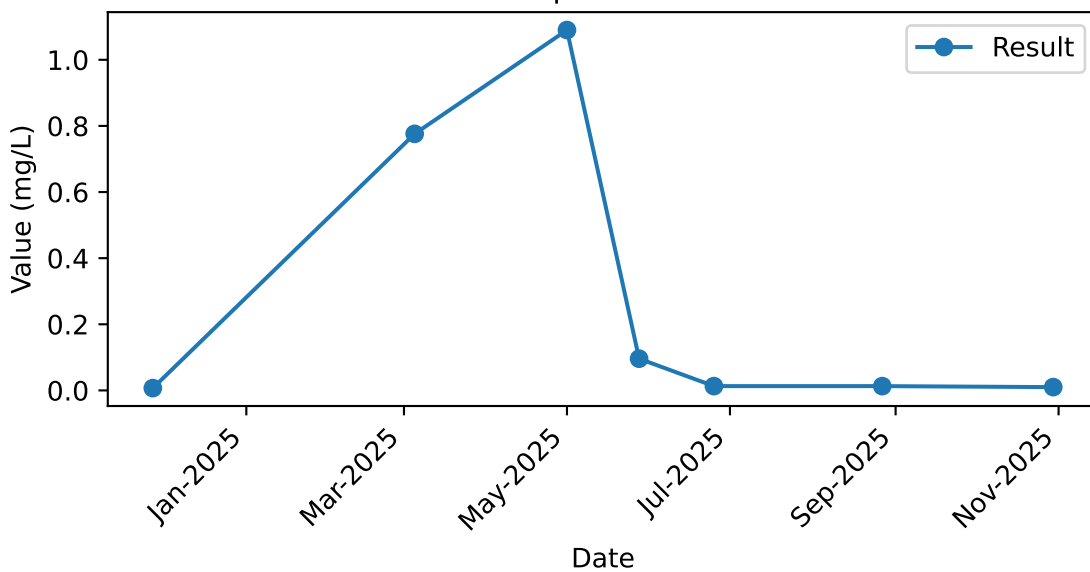
Bore: RN182851 | Param: Dissolved Silver



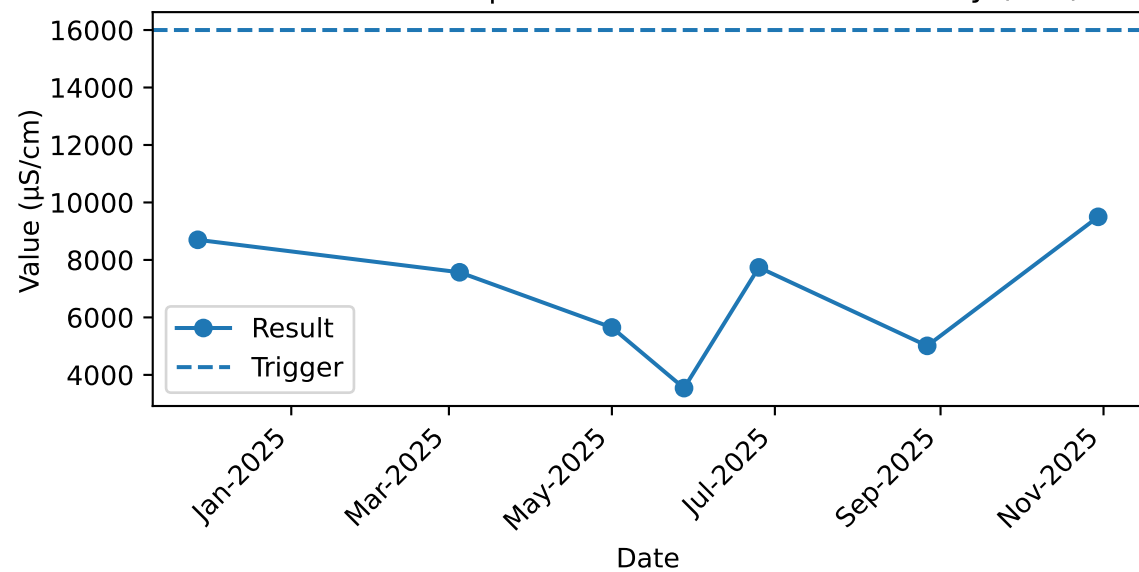
Bore: RN182851 | Param: Dissolved Uranium



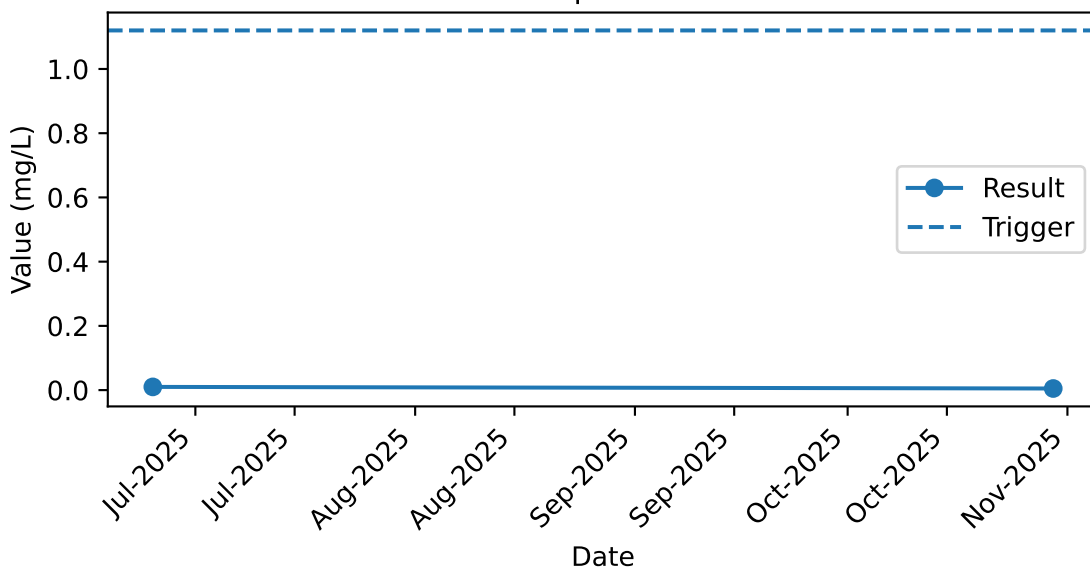
Bore: RN182851 | Param: Dissolved Zinc



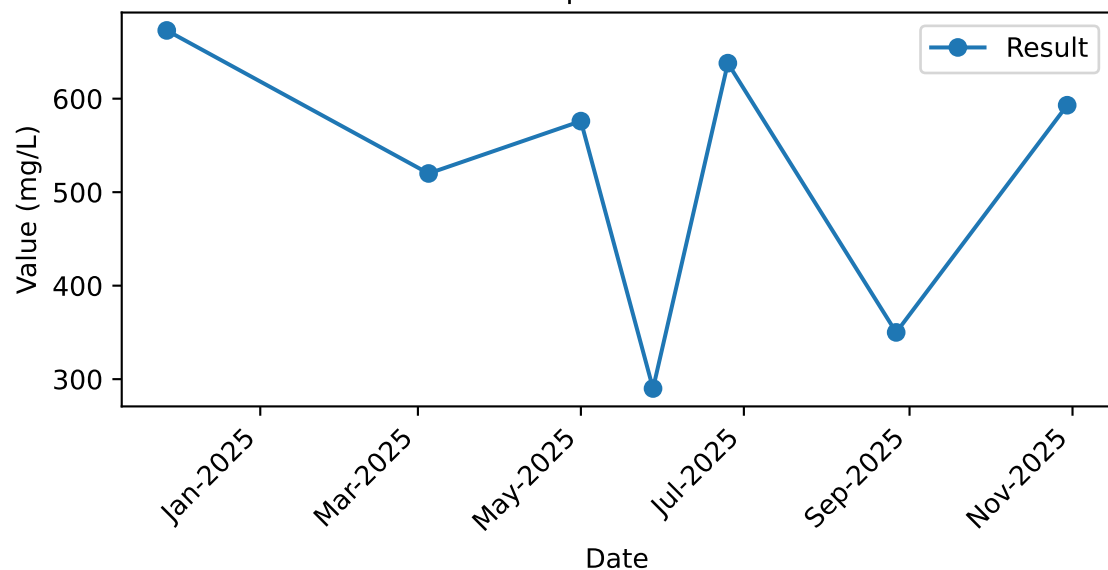
Bore: RN182851 | Param: Electrical Conductivity (Lab)



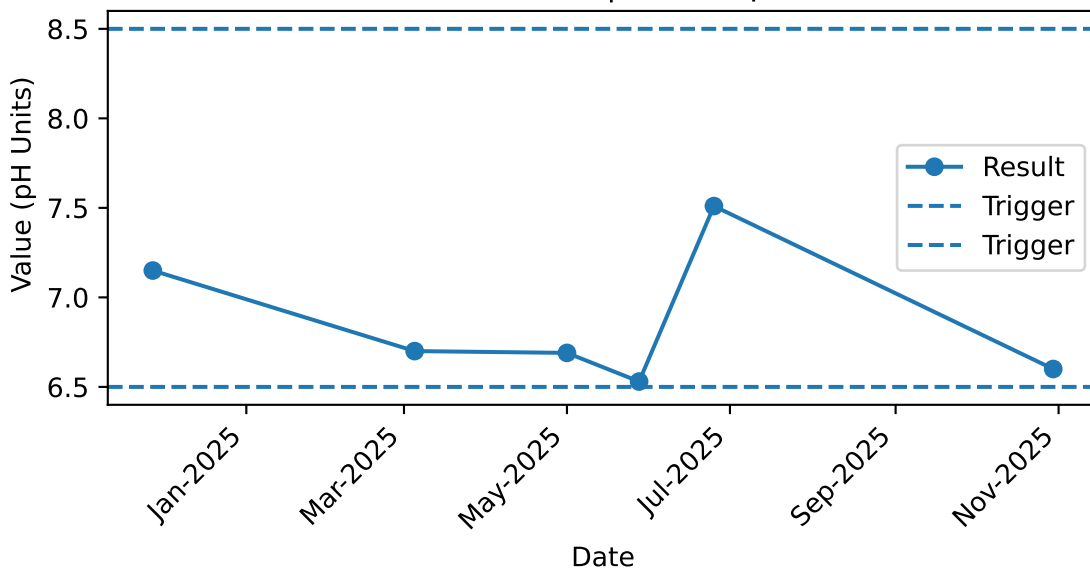
Bore: RN182851 | Param: Nitrate as N

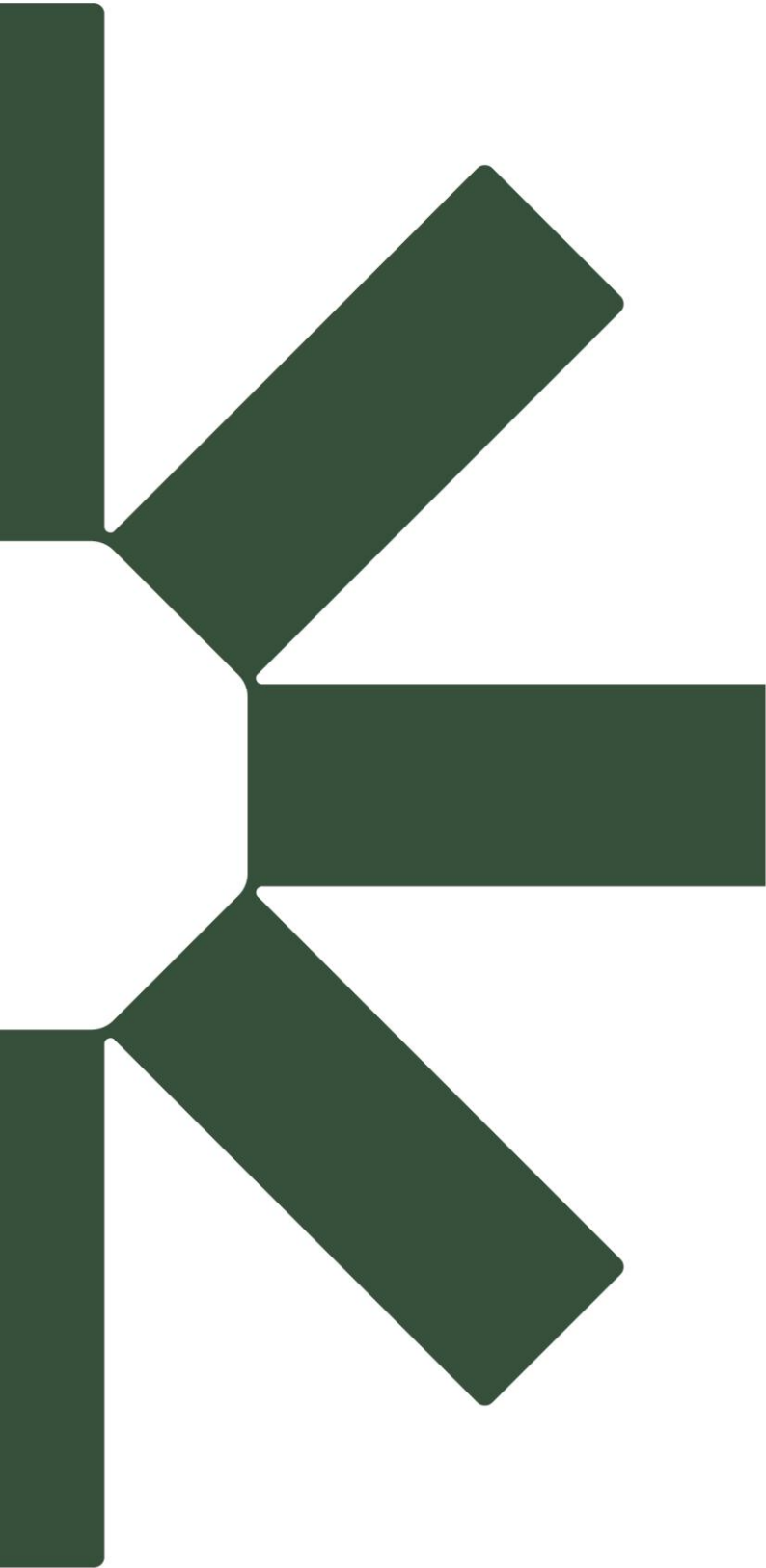


Bore: RN182851 | Param: Sulfate as SO4



Bore: RN182851 | Param: pH field





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