Lamberts North Ash Placement Project – Water Management and Monitoring 2023 - 2024

Environmental Monitoring Report

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Lamberts North Ash Placement Project – Water Management and Monitoring 2023 - 2024

0743908

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CONTENTS

LIST OF TABLES

LIST OF FIGURES – APPENDIX A

ACRONYMS AND ABBREVIATIONS

Acronyms	Description
AHD	Australian Height Datum
ANZECC	Australia and New Zealand Environment Conservation Council
ANZG	Australian and New Zealand Guidelines
ARI	Average Recurrence Interval
BCA	Brine Conditioned Ash
C	Degrees Celsius
CEMP	Construction Environmental Management Plan
CSP	Coal Settling Pond
DO	Dissolved Oxygen
DPE	NSW Department of Planning and Environment
EC	Electrical Conductivity
EMR	Environmental Monitoring Report
EPA	Environmental Protection Authority
EPL	Environmental Protection Licence
ERM	Environmental Resources Management
FHP	Final Holding Pond
GCB	Groundwater Collection Basin
GMMP	Groundwater Management and Monitoring Plan
ha	hectare
HDPE	High Density-Polyethylene
km	kilometres
LCC	Lithgow City Council
LDP	Licenced Discharge Point
LGA	Local Government Area
LMP	Licenced Monitoring Point
LNAR	Lamberts North Ash Repository
LOR	Limit of Reporting
LSAR	Lamberts South Ash Repository
m	metre
mg/L	milligrams per litre
mm	millimetre
ML	megalitre
MPAR	Mt Piper Ash Repository

Acronyms	Description
MPPS	Mt Piper Power Station
MW	Megawatt
Nalco	Nalco Water – Ecolab
NGM	Numerical Groundwater Model
NHMRC	National Health and Medical Research Council
NSW	New South Wales
OEMP	Operation Environmental Management Plan
QAQC	Quality Assurance Quality Control
RL	Relative Level
SSD	State Significant Development
SWTP	Springvale Water Treatment Project
TDS	Total Dissolved Solids
WAL	Water Access Licence
WCA	Water Conditioned Ash
µg/L	micrograms per litre
µS/cm	microSiemens per centimetre

1. INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) was engaged by EnergyAustralia NSW Pty Ltd (EnergyAustralia) to prepare an Environmental Monitoring Report (EMR) for the Lamberts North Ash Repository (LNAR) at the Mt Piper Power Station located at 350 Boulder Road, Portland, New South Wales (MPPS, or the site). Refer to **Figure 1** for the location and setting of the site in a regional context.

This EMR presents the results of water quality monitoring conducted in accordance with the Lamberts North Ash Placement Project Operational Environmental Management Plan (the OEMP; EnergyAustralia, 2022) over the period of 1 September 2023 to 31 August 2024 (i.e. the reporting period). The OEMP includes a surface water management plan, a groundwater management plan, and a leachate management plan that stipulate monitoring and reporting requirements for each, the outcomes of which are presented in this report.

Results from the monitoring program are reported to key regulatory stakeholders including WaterNSW, NSW Environment Protection Authority (EPA), Lithgow City Council (LCC) and NSW Department of Planning, Housing and Infrastructure (DPHI).

This EMR has been prepared in accordance with Conditions E15 and E16 of Project Approval 09_0186 for the "Mt Piper Ash Placement Project" (the Project) which was originally granted under the Environmental Planning and Assessment Act 1979 (NSW) on 16 February 2012 (the Project Approval). In September 2021, PA 09_0186 was modified to authorise amendments to the design and operations of the LNAR (LNAR MOD 1). Principally, the LNAR MOD 1 allows for the installation of a leachate barrier and leachate management system within the LNAR below relative level (RL) 946 m Australia Height Datum (AHD) to capture and subsequently treat leachate moving through the ash placed above the liner. Details regarding the installation of the leachate barrier system are discussed in the Lamberts North Ash Repository Modification Report (the Modification Report; ERM, 2021a). An application has been submitted in 2024 for extension of LNAR hours of operation (LNAR MOD 2).

This EMR should be read in conjunction with the Statement of Limitations presented **Section 11**. Figures are provided in **Appendix A** of this report, tabulated surface water analytical results are provided in **Table 1** and **Table 2** of **Appendix B**, and tabulated groundwater analytical results are presented in **Appendix C**.

1.1 PROJECT BACKGROUND

EnergyAustralia owns and operates the MPPS. The MPPS was built between 1984 and 1993 and comprises two coal-fired steam turbine generators, with a generating capacity of 700 MW and 730 MW. The MPPS is located within the Lithgow Local Government Area (LGA), approximately 110 kilometres (km) west of Sydney, 18 km north-west of Lithgow, and 5 km east of Portland.

The MPPS is fuelled using black coal sourced from the local area. Ash is produced as a result of coal combustion by the transformation of the non-combustible matter present in the coal. The ash constituents comprise bottom furnace ash and fly ash.

Bottom furnace ash, which makes up approximately 10% of the total ash product, is typically coarse and wet. Fly ash typically makes up 90% of the total ash product and is finer with a moisture content of 0%.

Together, bottom furnace ash and fly ash is referred to as 'ash.' Ash produced by MPPS can either be reused (sold on the open market) or placed in purpose-built ash placement repositories.

EnergyAustralia has two approved and operating ash placement repositories as described below:

- The Mt Piper Ash Repository (MPAR), approved under the MPPS development consent (80-10060), as modified (the Mt Piper Consent). The majority of the ash produced at MPPS to date has been placed within the MPAR in accordance with the conditions of the Mt Piper Consent. Ash produced at the MPPS is now placed within the LNAR.
- The Mt Piper Ash Placement Project consists of two ash placement repository areas, the LNAR and the Lamberts South Ash Repository (LSAR). The LSAR is currently not available as the LSAR approval area is being used by Springvale Coal Pty Ltd (Centennial) for approved coal mining and processing activities. Since commissioning of the LNAR, ash placement had occurred within the northern (i.e. Stage 1a/1b) and southern (i.e. Stage 2a/2b) portions of the LNAR.

Together the LNAR and the MPAR are referred to as the Ash Repositories. This report is limited to the LNAR, as required by the Project Approval. The annual environmental monitoring conducted in relation to the MPAR is reported separately, in line with the separate development consents that apply to the MPAR. Refer to **Figure 2** for a plan showing relevant site features of LNAR and surrounds.

The wet bottom furnace ash is placed directly into the Ash Repositories, either temporarily (i.e., recovered and reused) or permanently. Prior to the placement of fly ash within the Ash Repositories, it is conditioned to increase its moisture content. This is undertaken to achieve required compaction rates and to maintain geotechnical stability of the Ash Repositories; it also assists in dust suppression.

Fly ash is conditioned by the addition of either:

- Water, sourced in accordance with MPPS existing water licences and allocations including recycled process water and fresh (non-potable) water. Fly ash treated with water is referred to as Water Conditioned Ash (WCA); or
- Brine, a by-product from:
  - Treatment of evaporative cooling water from the cooling towers of MPPS to remove salts and impurities. Treatment occurs at the MPPS Brine Concentrators under the Mt Piper Consent; and
  - The desalination process of the nearby Springvale Water Treatment Project (SWTP), Significant Development (SSD) 7592.
- Fly ash treated with brine is referred to as Brine Conditioned Ash (BCA).

The conditioning of fly ash as WCA or BCA occurs within the power block of the MPPS, away from the Ash Repositories. The BCA or the WCA is then transported separately (via conveyor) to the repository silos located at the MPAR. From the silos, the conditioned ash is loaded into trucks and transported to approved placement areas.

The relevant conditions of the Project Approval to operate the LNAR require:

- Implementation of the OEMP (Conditions D2, D3 and D3A) which contains a detailed environmental management framework, and practices and procedures to be adopted as part of operations at the LNAR. The OEMP includes:
  - A Groundwater Management Plan (**Section 5.5** of the OEMP, to address Conditions D3 (b), B2, B3, E15 and E17 of the Project Approval),
  - A Soil and Surface Water Management Plan (**Section 5.6** of the OEMP, to address Conditions D3 (c) and E16 of the Project Approval), and
  - A Leachate Management Plan (**Section 5.11** of the OEMP, to address Condition D5);
- The carrying out of groundwater and surface water monitoring programs required by Conditions E15 and E16 respectively and as specified in the OEMP.

The OEMP (EnergyAustralia, 2022) is applicable to the 2023/24 reporting period. BCA placement in the LNAR lined placement areas commenced in accordance with LNAR MOD 1 from 13 May 2022.

A separate and broader investigation of surface and groundwater conditions (the independent investigation) in the vicinity of the Ash Repositories, including the LNAR area, has recently been completed in line with the contingency measures identified in the OEMP.

1.2 OBJECTIVES

The objectives of this report are to meet the reporting requirements of the Groundwater Management and Monitoring Plan, Soil and Surface Water Management Plan and Leachate Management Plan presented in the OEMP.

1.3 CONTACTS

The key contact for compliance associated with the LNAR is Mr Ben Eastwood, NSW Environment Leader, EnergyAustralia, (02) 6354 8111.

1.4 SCOPE OF WORKS

In order to meet the objectives of this report, the following scope of works has been implemented:

- Import of environmental monitoring data provided by EnergyAustralia to the existing environmental database for the site;
- Export of summary tables for available water quality collected by EnergyAustralia from the monitoring conducted in accordance with the OEMP;
- Export of graphs of selected data collected by EnergyAustralia from the monitoring conducted in accordance with the OEMP;
- Review of monitoring data at the six existing surface water quality monitoring sites in Wangcol Creek at LMP01, NC01, WX22, SW_C, SW_E, and SW_G (**Appendix B**), with comparison to the Environmental Goals;
- Review of groundwater quality and depth to the water table at groundwater monitoring wells outlined in the OEMP (**Appendix C** and **Appendix D**, respectively), with comparison to the Environmental Goals;

- Comparison of surface water and groundwater data with the modelled groundwater elevation predictions in the OEMP;
- Assessment of trends in surface water and groundwater quality (comparison between reporting years) presented in **Appendix E** and **Appendix F** respectively;
- Assessment of climate observations during the reporting period, obtained from the MPPS Weather Station (**Appendix G**);
- Review of the Ash Repositories elevation survey (**Appendix H**);
- Review of leachate monitoring data in accordance with the leachate monitoring plan set out in the OEMP;
- An update on contingency and mitigation measures currently being implemented in accordance with the OEMP;
- Presenting figures of key findings of the assessment (**Appendix A**); and
- Preparation of this report to present the results of the surface water and groundwater quality monitoring, and leachate management. This includes the interpretation and discussion of results, as required under the Project Approval and the OEMP for the reporting period.

1.5 DOCUMENTATION REVIEWED

The reports listed below have been reviewed as part of this report, and information within them has been relied upon:

- Sinclair Knight Merz, September 2009. Mt Piper Power Station Ash Placement Project, Project Description and Preliminary Environmental Assessment;
- Sinclair Knight Merz, August 2010, Mt Piper Power Station Ash Placement Project Environmental Assessment;
- Sinclair Knight Merz, March 2011, Mt Piper Power Station Ash Placement Project Submissions Report;
- CDM Smith, December 2012 (2012a), Delta Electricity, Lamberts North Ash Placement Project Construction Environmental Management Plan (CEMP);
- ERM, March 2019. Lamberts North Ash Placement Water Quality Monitoring, Annual Water Quality Monitoring Report 2018/2019. Final Version 02, 15 March 2019;
- ERM, November 2020. Lamberts North Ash Placement Project, Annual Water Quality Monitoring Report 2019/2020. Final Version, 09 November 2020;
- ERM, November 2021. Lamberts North Ash Placement Water Quality Monitoring, Annual Water Quality Monitoring Report 2020/2021. Final Version, 22 November 2021;
- ERM, 2021a. Mt Piper Ash Placement Project – Lamberts North Ash Repository Modification Report – Modification 1, dated May 2021;
- ERM, 2022b. Lamberts North Ash Placement Water Quality Monitoring, Annual Water Quality Monitoring Report 2021/2022. Final Version 25 November 2022;
- ERM, 2023. Lamberts North Ash Placement Project, Annual Water Quality Monitoring Report 2022 – 2023. Final Version 24 November 2023;
- ERM, 2024. Mt Piper Power Station: Coal Ash Repository Water Characterisation Report, EPL 13007, Pollution Reduction Study. Final 003, 01 August 2024;

- EnergyAustralia NSW Pty Ltd (EnergyAustralia) (2022), Lamberts North Ash Placement Project – Operational Environmental Management Plan (the OEMP), Revision 6, May 2022; and
- The LNAR MOD 1 Conditions of Approval (relevant consent requirements included in **Appendix I**).

In addition to the above, the information presented in this report was prepared using data and information provided by EnergyAustralia, including:

- Water quality data (**Appendix B** and **Appendix C**);
- Gauging data, presented as hydrographs, for groundwater wells as supplied by EnergyAustralia for the reporting period (**Appendix D**);
- Local climate data from MPPS Weather Station (**Appendix G**); and
- LNAR operations summary (**Section 2** and **Appendix H**).

2. OPERATIONS SUMMARY

Ash placement operations for MPPS, including within the LNAR, are undertaken by a specialist ash placement contractor. Service Stream is the current service provider for EnergyAustralia in relation to aspects of ash placement and dust management at the MPPS.

During the 2023/2024 reporting period, 383,895 tonnes of ash were placed at the LNAR. A summary of operations at the LNAR area for the current reporting period and for the previous reporting period is presented in **Table 2-1**.

Figure 2 and Figure 3 provide the layout of site features and the current ash placement plan, respectively.

TABLE 2-1 LAMBERTS NORTH ASH REPOSITORY – OPERATIONS SUMMARY

Activity	Previous Reporting Period (2022/23)	This Reporting Period (2023/24)
Ash delivered to the LNAR (t)[2]	421,768[1]	383,895 (BCA)[2] 142,214 (WCA)[2]
Water co-placed (ML)[2]	0	40
Brine co-placed (ML)[2]	12.8	94
Total LNAR ash footprint (ha)[2]	16.7	16.7
Area of LNAR capped (ha)[2]	1.3	1.3

[1] = *Refers to MPAR and LNAR combined*
[2] = *Refers to LNAR only*
t = tonnes, ha = hectares

2.1 LEACHATE BARRIER SYSTEM INSTALLATION

During the 2021/22 reporting period, a leachate barrier system was installed in the LNAR Stage 1a and Stage 1b. During the current reporting period a leachate barrier system was installed and ash placement commenced in LNAR Stage 2a, and the installation of a leachate barrier system has commenced in LNAR Stage 2b (see Figures 2 and 3). LNAR Stages 1a, 1b and 2a are currently in use, and EnergyAustralia expect to commence use of LNAR Stage 2b in 2025.

The leachate barrier system is supported by a leachate management system to capture, store and transfer leachate generated from the lined areas to ponds LNAR 2 – LNAR 5 as required based on operations at the Ash Repositories. The leachate management system is operated in accordance with standards presented by NSW Environment Protection Authority (NSW EPA) (2016), as described in **Section 8**.

2.2 ASH PLACEMENT AND GEOMETRY

This subsection presents a summary of the intended ash placement procedure and geometry, as summarised from the OEMP, with a discussion of the ash placement activities that occurred over the reporting period.

Ash placement at the LNAR includes the handling of WCA, BCA and furnace bottom ash. Ash placement occurs within the perimeter embankment along the northern and eastern boundary of the LNAR, as prepared during the construction phase. Ash placement has occurred in the most northerly and eastern parts of the LNAR, continuing towards the southern parts of the active LNAR ash placement area.

BCA and Solid Mixed Salts are co-placed above the installed leachate barrier system, with only WCA placed below the liner. WCA may also be placed above the liner as and when required. Ash is placed in layers to the desired height (0.5 – 1 m lifts, or less) and in pads. The ash is treated to an average compaction of 95%, relative to its maximum standard compaction, through a controlled combination of moisture addition and machine compacting with the use of rollers, compactors and rubber-tyred vehicles. Moisture, referred to above, is generally water. However, within lined areas, collected leachate from the leachate management system may also be used to increase moisture content as required.

As each part of the LNAR meets its proposed RL for ash placement, the placed ash is capped with a welded low permeability liner and suitable soil cover layer, including revegetation media. Ash can then continue to be placed beside the capped area. The process is repeated until the LNAR reaches its maximum permissible height and extent.

The base elevation of ash placement in the LNAR is as follows:

- LNAR Stage 1 is 917 m AHD;
- Stage 2a
  - WCA placed below the liner - 930.48 m AHD,
  - ash placed above the liner - 931.28 m AHD (lowest point excluding sump); and
- Stage 2b
  - WCA placed below the liner - 927.01 m AHD,
  - ash placed above the liner - 927.81 m AHD (lowest point excluding sump).

Figure 3 (as supported by **Appendix H**) indicates that the elevation achieved by ash placement operations in the LNAR Stage 1 up to 23 July 2024 was approximately 965 m AHD at the highest point. The height of ash placement in the LNAR at that time remained below the maximum approved final landform height for the LNAR of 966-980 m AHD, depending on location.

3. ENVIRONMENTAL SETTING

The environmental setting for the LNAR and the site is described in the following sections to provide context to the surface water and groundwater assessments (**Sections 5** and **6** respectively). The surface water and groundwater monitoring locations are presented in **Figure 4**.

3.1 CLIMATE

The climate data presented in **Table 3-1** was provided by EnergyAustralia and is sourced from the MPPS weather station. A copy of the data is provided in **Appendix G**.

TABLE 3-1 LOCAL CLIMATE DATA FOR 2023/24

Month	Rainfall Total(mm)	Minimum Temperature (°C)	Maximum Temperature (°C)
September 2023	22.4	-4.1	26.2
October 2023	36.8	-0.5	27.4
November 2023	108.2	3.8	29.4
December 2023	72.9	6.5	34.4
January 2024	135.6	8.0	32.3
February 2024	86.6	9.8	33.9
March 2024	39.8	4.7	30.2
April 2024	98.4	0.6	26.0
May 2024	49.6	-2.5	17.5
June 2024	53.6	-4.7	14.0
July 2024	44.0	-4.0	14.6
August 2024	60.2	-4.6	20.1
TOTAL/MIN/MAX	**808.1**	**-4.7**	**34.4**

Data from MPPS Weather Station

The total rainfall for the reporting period was 808.1 mm, which is within range for recent reporting periods, including 2022/23 (808.4 mm), 2021/22 (1,127.1 mm), and 2020/21 (732.0 mm). Total rainfall in2019/20 was lower (500.1 mm). The higher than average rainfall observed between December 2020 and March 2021 broke the period of relative drought previously experienced at the site, and more broadly in NSW, between 2017 and 2020.

The highest monthly rainfall in the reporting period was January 2024 (135.6 mm), and the lowest monthly rainfall was September 2023 (22.4 mm). Overall, the highest rainfall occurred between November 2023 and April 2024.

3.2 GEOLOGY

The LNAR is located on an outcrop of the Illawarra Coal Measures. The Illawarra Coal Measures overlie the Shoalhaven Group and host the coal seams that were previously mined out in and around the LNAR. The Narrabeen Group, comprised of sandstones, overlies the Illawarra Coal Measures and forms the surrounding hillsides (NSW Government, 1992). Characteristics of the local geologic units are listed in Table 3-2.

TABLE 3-2 LOCAL GEOLOGICAL UNITS

Narrabeen Group	Illawarra Coal Measures	Shoalhaven Group
• Sandstones, shale and claystone. • Up to approximately 800 m thick in parts, although generally absent in the immediate vicinity of the Ash Repositories. • Deposition in estuarine/alluvial, fluvial, and fluvial-deltaic environments. • Unconformably overlies Illawarra Coal Measures (Danis et al., 2011).	• Interbedded shale, sandstone, conglomerate, and coal. • Dips 1 - 2 degrees to the east. • Outcrops extensively just east of Portland, exposing the Lidsdale and Lithgow coal seams close to the surface with approximately 15-25 m of sandstone overburden (CDM Smith, 2012b). • Mined coal seams at and in the vicinity of the Ash Repositories (underground and open cut mining). • Upper portions extensively weathered.	• Siltstones, lithic sandstones and conglomerate. • Marine sediments. • Berry Sandstone/ Formation (earlier) & Snapper Point Formation (later). • Contains sulfide-bearing material and is acid- generating in places where exposed via rock cuttings (SKM, 2010).

Whilst the majority of the area beneath and around the LNAR has been mined using open cut methods, there are small areas near the western boundary of the LNAR with remnant underground bord and pillar remains.

3.3 HYDROGEOLOGY

Groundwater beneath the LNAR is present within the Illawarra Coal Measures. The natural stratigraphy of the Illawarra Coal Measures in the vicinity of the LNAR is generally as follows:

- Bunnyong Sandstone (Long Swamp Formation) – massive sandstone;
- Lidsdale Coal Seam – interbedded high ash coal and shale;
- Blackmans Flat Conglomerate – coarse sandstone and conglomerate;
- Lithgow Coal Seam; and
- Marrangaroo Conglomerate – massive sandstone and conglomerate.

Considering the former mining in the area, and the current ash placement activities, anthropogenic lithologies in the vicinity of the LNAR include ash, fill and placed overburden, and mined out workings which may be voids, or may contain fill or collapsed overlying lithologies.

Prior to 2012, a former mined out void located to the east of the MPAR and beneath the footprint of the northern part of LNAR was used to extract groundwater (SKM, 2010). The void was referred to as the Groundwater Collection Basin (GCB) and, in 2012, it was filled in as part of the construction of the LNAR. Aurecon (2017) noted that, prior to the placement of ash on the footprint of the former GCB, the former void (Huons Void) was filled and compacted to a maximum level of 917 m AHD, with ash placed above that elevation. Historically, groundwater seepage from beneath the MPAR would have been collected in the former GCB (SKM, 2010).

Groundwater elevations, contours, and inferred flow directions for the reporting period are presented in **Figure 5a and 5b**. During the reporting period, the water table elevation range was approximately 903 m AHD to 919 m AHD in the vicinity of the LNAR. This, and other groundwater monitoring results indicate that, near the Ash Repositories, the water table occurs variably in the former below ground mined out areas and open cuts (ERM, 2021a). Away from the Ash Repositories the water table occurs predominantly in the overlying Bunnyong Sandstone. The maximum water table elevation during the reporting period (919.1 m AHD) exceeded the maximum groundwater level in the southern end of the LNAR of 912.5 m AHD as modelled by CDM Smith (2012b).

Groundwater elevation contours indicate primary groundwater flow directions beneath the LNAR are to the east and south-east. Groundwater elevations and groundwater flow directions were relatively consistent throughout the reporting period based on groundwater contour plans prepared across seasons (**Figure 5a** and **5b)**.

3.4 HYDROLOGY

The LNAR is located within the former Huons Gully catchment. The former Huons Gully is a part of the Wangcol Creek catchment, which is part of the upper Coxs River Catchment. Wangcol Creek is located to the north of the LNAR and flows from the north-west towards the south-east. The creek joins the Coxs River approximately 3.2 km east of the LNAR. At its closest point, Wangcol Creek is approximately 150 m north-east of the LNAR.

The following surface water management measures are implemented at the LNAR:

- Clean water is diverted from external areas (i.e. areas not exposed to ash placement activities) around the LNAR to avoid interaction with ash materials, as shown on **Figure 2**;
- Stormwater runoff from the west and south-west of the LNAR is captured by the existing clean water drain and is diverted into the clean water system;
- Stormwater from the south of the LNAR falls onto the existing mining operations of Centennial and is managed by Centennial through a series of ponds and drains in the vicinity of the Lamberts Gully Creek; and
- Stormwater falling on areas to the east and north of the LNAR largely drains naturally to the east into Wangcol Creek following the general lay of the land away from the LNAR.

The LNAR has been designed to contain and detain water by diverting water into the centre of the LNAR to internal retention and sediment basins. This allows for:

- Re-use and recycling of runoff from within the LNAR (i.e. for dust suppression);
- Cover and revegetation of completed external batters, diverting clean water to drainage systems; and
- Separation of clean and dirty water systems as described in the OEMP.

4. ENVIRONMENTAL GOALS

The Environmental Goals for groundwater and surface water monitoring associated with LNAR for the reporting period are consistent with both the OEMP and those applied to monitoring of the MPAR, as approved in the Water Management and Monitoring Plan[1]. The Environmental Goals were developed by Aurecon (2009) to account for hardness corrected guideline values, as presented by CDM Smith (2013).

The Environmental Goals utilise the 95% ecosystem protection values, stock watering, irrigation water or drinking water values based on the Australian and New Zealand Guidelines (ANZG, 2018) water quality guidelines (formerly Australia and New Zealand Environment Conservation Council, ANZECC, 2000), in combination with the 90th percentile pre-BCA placement local environmental (groundwater/surface water) data, whichever is greater. The local guideline values incorporated into the Environmental Goals are based upon the 90th percentile pre-ash placement water quality results, as measured at surface water quality point WX22 (for surface water) or the former GCB (for groundwater).

Aurecon (2017) presented additional baseline values for copper and nickel which were developed to capture potential changes that occurred since the operation of the MPAR, but prior to the commencement of operation of the LNAR. Guideline values presented in ANZG (2018) have been applied where available for other analytes that were added as part of OEMP Revision 6 completed as part of the LNAR MOD 1.

It is noted that, where the Environmental Goals for groundwater are based on the ANZG (2018) water quality guidelines, these guidelines are applicable to receiving waters and not to groundwater. However, these form an appropriate basis for undertaking a conservative screening assessment.

The Environmental Goals adopted for this assessment are presented with the surface water and groundwater data in **Appendix B** and **Appendix C** respectively.

4.1 GROUNDWATER MODEL PREDICTIONS

Groundwater modelling prepared by CDM Smith (2012b) presented the following conclusions:

- Ash placement was considered highly unlikely to adversely affect the two aquifers underlying the LNAR. The project design was modified to reduce the likelihood of groundwater contamination resulting from the LNAR, including provision of a sufficient separation distance between maximum groundwater level and the base of ash placement (CDM Smith, 2013);
- Groundwater modelling demonstrated that the water present in the former GCB and Huon Gully is largely groundwater from the intersection of Huon Void with the water table (CDM Smith, 2013);
- The maximum modelled groundwater level in the southern end of the LNAR was identified as 912.5 m AHD, 2.5 m above RL 910 m AHD (CDM Smith, 2012b);
- The model results indicated that groundwater levels across the LNAR were at maximum levels during wet weather patterns. Accordingly, the model (CDM Smith, 2012) results indicated that groundwater levels would remain at least 4 m below the base of the LNAR

[1] Approved for the Mt Piper Brine Conditioned Fly Ash Co-Placement Project in accordance with development consent DA80/10060 (as modified) and dated 28 February 2020.

under a 1:100 year Average Recurrence Interval (ARI) event and steady state normal conditions (CDM Smith, 2012b);

- The model indicated that LNAR operations were not expected to impact on background groundwater and surface water quality parameters (CDM Smith, 2012b); and
- Preliminary predictions based on sulfate and total dissolved solids (TDS) concentrations indicated that impacts from the LNAR associated with compounds such as boron, manganese, nickel, zinc, molybdenum, copper, arsenic and barium on the surrounding environment were unlikely (CDM Smith, 2012b).

5. SURFACE WATER ASSESSMENT

5.1 OBJECTIVE

The objective of the surface water monitoring program is to identify changes in the water quality of Wangcol Creek at an early stage so that potential causes can be investigated and, if necessary, effects mitigated. The surface water data is compared between locations and to the established Environmental Goals to assess changes in water quality, the extent to which changes may be related to activities associated with the LNAR, and to assess whether contingency measures should be considered and/or implemented.

5.2 SURFACE WATER MONITORING LOCATIONS

In order to assess for potential effects on surface water quality in Wangcol Creek, the receiving environment adjacent to the LNAR, Environmental Goals for surface water are set out in the OEMP. The Environmental Goals have been applied to the following surface water monitoring sites (green triangles in **Figure 4**):

- Licenced Monitoring Point (LMP01[2]) is located in Wangcol Creek, downstream of the Final Holding Pond (FHP). The FHP holds storm water from the clean water diversions from around the MPPS and can be closed in the event of an environmental incident to limit the likelihood of adverse impacts to the downstream surface water environment. The FHP was approved by the EPA and constructed within Wangcol Creek; it operates as the final pollution control structure for surface water associated with the MPPS. Surface water monitoring location LMP01 is representative of instream conditions downstream of the FHP and upstream of the Ash Repositories;
- Surface water monitoring locations NC01 and SW_C are located within the midstream of the monitored area of Wangcol Creek, upstream of the LNAR; and
- Surface water monitoring locations SW_E, WX22 and SW_G are located in Wangcol Creek to the east/downstream of the Ash Repositories. WX22 is also WaterNSW stream gauge and monitoring point 212055.

Licenced Discharge Point (LDP12) under Environment Protection Licence (EPL) 13007, is used to monitor discharge from the Coal Settling Pond (CSP). While this is a surface water monitoring location set out in the OEMP, the data from LDP12 is not representative of in-stream surface water conditions. Discharge from LDP12 enters the Western Drain, which is part of the upstream Wangcol Creek catchment, before flowing into the FHP. Data from LDP12 is not regulated by the Environmental Goals and is provided in this report for comparison only. **Figure 4**, **Appendix A** presents the location of LDP12.

5.3 SURFACE WATER MONITORING FREQUENCY

The surface water monitoring locations allow comparison of the surface water quality in Wangcol Creek downstream of the LNAR with upstream surface water quality, to assess for potential changes in surface water quality. With reference to **Figure 4**, **Appendix A**, a summary of the surface water monitoring site locations is presented in **Table 5-1.**

[2] Historically, LMP01 was referred to as LDP01 within prior versions of the OEMP (CDM Smith [2013], and EnergyAustralia [2019]).

TABLE 5-1 SURFACE WATER MONITORING SITE NETWORK AND FREQUENCY

Site ID	Location Description	Required Monitoring Frequency	No. of Samples in 2023/24
LDP12	Monitors the discharge from the CSP.	As required by EPL 13007 during discharge.	12
LMP01	Located north-west of the MPAR in an upstream position relative to the Ash Repositories and is the location where flow from the headwaters of Wangcol Creek leaves the MPPS operational area, downstream of the FHP.	Monthly	12
NC01	Located midstream in the monitored area of Wangcol Creek, upstream of the Ash Repositories.	Quarterly	12
SW_C	Located in Wangcol Creek, north-east of MPAR and adjacent to groundwater well D107.	Quarterly	12
SW_E	Located in Wangcol Creek, north-east of LNAR. Downstream of former open cut areas.	Quarterly	12
WX22	Located in Wangcol Creek at a stream gauge to the east and down-stream of the Ash Repositories. Also serves as WaterNSW stream gauge monitoring station 212055.	Monthly	12
SW_G	Located in Wangcol Creek, downstream of LNAR and of WX22. Located within former open cut mine footprint.	Quarterly	12

The number of samples in **Table 5-1** indicates the number of occasions where a complete, or near complete suite of analysis was conducted. LMP01 was monitored 12 times for a full suite of analytes, with one (1) additional monitoring event consisting of a limited analytical suite which has not been included within this assessment.

5.4 SURFACE WATER MONITORING METHODOLOGY

Surface water quality monitoring was undertaken by Nalco Water – Ecolab (Nalco) on behalf of EnergyAustralia. Details regarding the Nalco sampling method and quality assurance and quality control (QA/QC) program are presented in **Appendix J**, and these are understood to be in accordance with the sampling methodology outlined in the OEMP.

5.5 SURFACE WATER QUALITY DATASET

Samples were obtained by Nalco for either field or laboratory analysis in accordance with the analytes listed in the OEMP, and additional analytes, as follows:

- Physical and other parameters:
  - pH, total alkalinity, phenolphthalein alkalinity, bicarbonate alkalinity, Total Kjeldahl Nitrogen (TKN);
  - TDS, turbidity;
  - Electrical conductivity (EC), dissolved oxygen (DO); and
  - Nitrogen, Total phosphorus, filterable reactive phosphorus;
- Major and minor ions:
  - Chloride, sulfate as SO_4, fluoride, nitrite, nitrate, potassium, sodium; and
- Metals:
  - Al, As (III, V, III+V), Ba, Be, B, Cd, Cr (III, VI, III+VI), Cu, Co, Fe, Pb, Mg, Mn, Hg, Mo, Ni, Sb, Se, Sr, Ag, and Zn.

It is noted that Ba, Be, Co, Cd, Cr, Pb, Mg, Hg, Mo, Sb, Se, Sr and Ag were only analysed for total (unfiltered) concentrations during the current reporting period, although the OEMP specifies analysis of both total and dissolved (filtered) metals for surface water.

It is also noted that, on some occasions, filtered metals were reported at concentrations that were higher than the non-filtered concentrations from the same monitoring round. The differences between total and filtered concentrations are considered to be within the laboratory's acceptance criteria for experimental variation.

Evidence of the collection of field QC samples (i.e. rinsate, trip blanks or trip spikes) during the field-based programs was not provided. Results of laboratory QC measures including laboratory duplicate, triplicate, method blanks or spike data were not presented for review and are not considered in this report.

5.6 SURFACE WATER RESULTS

A summary of the surface water analytical results obtained for the 2023/24 reporting period against the Environmental Goals and comparison of LDP12 to the EPL discharge requirements for surface water is presented in **Table 5-2** along with the data ranges presented for each analyte.

The complete set of tabulated results for each monitoring point is presented in **Appendix B**. **Figure 6** presents a selection of results for the current monitoring period, including EC, TDS, chloride, sulfate, and other analytes for which concentrations at one or more locations were reported above the Environmental Goals.

TABLE 5-2 SURFACE WATER MONITORING RESULTS – 2023/24

Analyte /Location	Surface Water Concentration Ranges							Surface Water Environmental Goal
	LDP12	LMP01	NC01	SW_C	SW_E	WX22	SW_G	
pH (field)	6.94 – 7.72	7.53 – **8.21**	7.08 – **8.22**	7.09 – **8.4**	**6.31** – 7.94	7.29 – **8.18**	7.36 – **8.21**	6.5 – 8.0[a]
EC (µS/cm)	233 – 367	202 – 760	312 – 453	302 – 448	820 – **7,450**	458 – **2,310**	458 – **2,300**	2,200[b]
TDS, Major and Minor Ions (mg/L)								
TDS (mg/L)	110 – 530	144 - 480	176 – 306	174 – 306	500 – **5,980**	304 – **1760**	328 – **1,730**	1,500[c]
Sulfate (as SO_4) (mg/L)	30.9 – 127	40.8 – 214	51.9 – 97	47.1 – 98.1	223 – **3,760**	104 – 858	107 – 854	1,000[d]
Chloride (mg/L)	6 – 28.7	3.92 – 23.2	8.1 – 19.1	8.27 – 20.7	45.8 - **735**	22.9 – 187	24.3 – 185	350[e]
Fluoride (mg/L)	0.042 – 0.158	0.108 – 0.266	0.099 – 0.259	0.099 – 0.193	0.062 - <0.5	0.082 - <0.2	<0.1 - **<2***	1.5[f]
Trace Metals (µg/L)								
Arsenic (total) (µg/L)	<1	<1 – 2	<1 – 4	<1 – 1	<1	<1	<1	24[g]
Arsenic (µg/L)	<1	<1	<1	<1	<1	<1	<1	24[g]
Arsenic (III) (total) (µg/L)	<1 – 1.4	<1	<1	<1	<1	<1	<1	24
Arsenic (V) (total) (µg/L)	<1	<1	<1	<1	<1	<1	<1	13
Barium (µg/L)	4 – 14	17 – 39	17 – 27	20 – 31	22 – 63	8 – 28	7 – 28	700[f]
Beryllium (µg/L)	<1	<1 – 1	<1	<1	<1	<1	<1	100[i]
Boron (total) (µg/L)	<50	<50 – 90	<50 – 110	<50 – 110	80 – **1,600**	110 – **390**	<50 – **390**	370[g]

Analyte /Location	Surface Water Concentration Ranges							Surface Water Environmental Goal
	LDP12	LMP01	NC01	SW_C	SW_E	WX22	SW_G	
Boron (μg/L)	<50 – 100	<50 – 150	<50 – 190	<50 – 110	110 – **1,460**	<50 – **410**	<50 – **450**	370[g]
Cadmium (μg/L)	<0.1 – 0.7	<0.1 – 0.4	<0.1	<0.1	<0.1	<0.1	<0.1	0.85[h]
Chromium (μg/L)	<1	<1 – **2**	<1	<1 – **6**	<1	<1	<1	2[h]
Chromium (III) (total) (μg/L)	<1 - <10	<0.01 – **<10***	<0.001 – **<10***	<0.001 – **<10***	<0.001 – **<10***	<0.001 – **<10***	<0.001 – **<10***	3.3
Chromium (VI) (total) (μg/L)	<1 - <10	<1 - **<10***	<1 – **<10***	<1 – **<10***	<1 – **<10***	<1 – **<10***	<1 – **<10***	1
Copper (total) (μg/L)	<1 – 3	<1 – **8**	<1 – **8**	<1 – **12**	<1 – **7**	<1 – **29**	<1 – 1	3.5[h] / 5[j]
Copper (μg/L)	<1	<1 – 4	<1 – 3	<1 – 1	<1 – **4**	<1 – 2	<1	3.5[h] / 5[j]
Iron (total) (μg/L)	<50 – 70	130 – **1,510**	**380 – 1,430**	**380 – 860**	**1,320 – 12,200**	160 – **600**	140 – **540**	300[e]
Iron (μg/L)	<50	<50 – 110	<50 – 220	60 – 130	**650 – 8,700**	<50 – 140	<50 – 150	300[e]
Lead (μg/L)	<1 – 2	<1 – 3	<1 – 1	<1	<1	<1	<1	5[g]
Manganese (total) (μg/L)	18 – 339	40 – 312	169 – 623	99 – 560	935 – **13,800**	121 – 1,490	94 – 1,470	1,900[g]
Manganese (μg/L)	17 – 362	<1 – 45	104 – 574	91 – 440	813 – **13,300**	92 – 1,360	82 – 1,230	1,900[g]
Mercury (μg/L)	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04 – **0.08**	<0.04	0.06
Molybdenum (μg/L)	1 – 5	5 – **104**	4 – **28**	3 – **21**	<1 – 2	<1 – **13**	<1 – 2	10[i]

Analyte /Location	Surface Water Concentration Ranges							Surface Water Environmental Goal
	LDP12	LMP01	NC01	SW_C	SW_E	WX22	SW_G	
Nickel (total) (µg/L)	2 – 35	4 – 10	3 – 5	2 – 5	**56 – 1,080**	20 – **175**	20 – **177**	17[g] / 15[j]
Nickel (µg/L)	1 – 32	2 – 5	2 – 4	1 – 4	**54 – 1,040**	**18 – 181**	**18 – 182**	17[g] / 15[j]
Selenium (µg/L)	1.6 – <10	0.3 – 1.2	0.2 – 0.9	<0.2 – 0.8	<0.2 – 0.2	<0.2 – 0.5	<0.2 – 0.4	5[g]
Silver (µg/L)	<0.1 – <1	**<0.1 – <1***	**<0.1 – <1***	**<0.1 - <1***	**<0.1 - <1***	**<0.1 - <1***	**<0.1 - <1***	0.05[g]
Zinc (total) (µg/L)	<5 – 124	9 – 56	<5 – 31	<5 – 55	7 – 46	<5 – 20	<5 – 9	116[k]
Zinc (µg/L)	<5 – 104	<5 – 16	<5 – 7	<5 – 8	<5 – 37	<5 – 18	<5 – 9	116

Notes:
NA: Not Available
Both unfiltered (total) and filtered (dissolved) metal concentrations shown where available.
Bold indicates value is equal to or above the Environmental Goal
** Laboratory limit of reporting exceeds the Environmental Goal*
a. ANZECC (2000) pH values presented are for groundwater systems and based on aesthetic considerations such as corrosion and fouling of pumping, irrigation and stock watering systems) for primary industries
b. ANZECC 2000 – EC range for lowland rivers in slightly disturbed ecosystems in south-east Australia is 125-2200 µS/cm
c. 1,500 mg/L based on a conversion factor of 0.68 and an EC of 2200 µS/cm lowland river conductivity for slightly disturbed ecosystems
d. ANZECC (2000) Livestock
e. ANZECC (2000) Irrigation for moderately tolerant crops
f. ANZECC (2000) Drinking water guidelines
g. ANZECC 2000 for Freshwater Slightly-Moderately disturbed aquatic ecosystems (B 90th, Pb 90th, Ni 80th, Se 90th, Ag 90th)
h. Concentrations of cadmium, chromium and copper modified due to consideration of water hardness. Cd from 0.001 mg/L to 0.00085 mg/L; Cr from 0.001 mg/L to 0.002 mg/L and Cu from 0.0025 mg/L to 0.0035 mg/L
i. ANZECC (2000) Irrigation LTV
j. Lamberts North pre-placement 90th percentile baseline data from October 2012 to August 2013 and Wangcol Creek at WX22 as presented in Aurecon (2017)
k. Local guideline based on 90th percentile pre-brine placement.

5.6.1 UPSTREAM MONITORING RESULTS

As described in **Section 5.2**, LDP12 is a licenced discharge point for the MPPS under EPL 13007. LDP12 is located at the CSP, which is a sediment basin for the coal stockpile area. Samples from LDP12 are collected in relation to planned discharge events and the analytical results from these representative discharge samples are presented in this report (in accordance with the OEMP).

LDP12 and LMP01 are located upstream of the MPAR and water quality at these locations is not considered to be influenced by activities at the Ash Repositories. However, other aspects of the Project (e.g., brine transfer pipelines and brine waste holding ponds) are located within the catchment upstream of these sampling locations.

Data for LDP12 (discharging) is presented in the following written sections of this report, and in **Table 2**; however, assessment of trends, statistical assessment, and comparison with Environmental Goals has not been conducted for LDP12 as this location is not representative of in-stream conditions and has separate water quality requirements as part of EPL 13007. Assessment of trends at LMP01, which receives flow from LDP12 and other upstream portions of the Wangcol Creek catchment, has been conducted as it is considered most appropriate for assessment of potential impacts from the Project on the upstream section of Wangcol Creek. Analytical data for LMP01 is presented in **Table 1, Appendix B** and graphs showing the concentrations of key analytes over time are presented in **Appendix E.**

A discussion of upstream monitoring results is presented in the following subsections.

5.6.1.1 FIELD PARAMETERS

Field parameters monitored at upstream surface water locations for the reporting period are summarised as follows:

- pH values (field measured) of surface water samples from LMP01 ranged from 7.53 to 8.21. The pH at LMP01 was marginally outside of the range (more alkaline) of the Environmental Goal (6.5 to 8.0) on one occasion during the reporting period (October 2023). pH values at LDP12 ranged from 6.94 to 7.72, which was within the EPL discharge limits; and
- Field EC values obtained from LMP01 ranged from 202 µS/cm to 760 µS/cm, which is consistent with the concentrations recorded during 2022/23 reporting period. TDS values at LMP01 were generally similar, ranging between 144 mg/L to 480 mg/L. Field EC measured at LDP12 ranged from 233 µS/cm to 367 µS/cm and TDS concentrations were generally similar, ranging between 110 mg/L to 530 mg/L.

EC and TDS values throughout the reporting period were below the Environmental Goals (2,200 µS/cm for EC and 1,500 mg/L for TDS) for surface water at LMP01. Graphs of concentrations over the last 10 years show EC and TDS concentrations at LMP01 have consistently remained below the Environmental Goal. Concentrations of EC and TDS demonstrated a mostly stable trend during the current reporting period, remaining below the Environmental Goal and generally within historical ranges. A spike in TDS concentration in LMP01 was reported during October 2023 sampling event (480 mg/L).

This is the highest concentration recorded since July 2019 (430 mg/L) but remains well below the Environmental Goal of 1,500 mg/L and is of the same order of magnitude as previous monitoring rounds.

5.6.1.2 MAJOR AND MINOR IONS

Throughout the reporting period, concentrations of major and minor ions for which there are Environmental Goals (chloride, sulfate and fluoride) at LMP01 were below the relevant Environmental Goals for surface water by one to two orders of magnitude.

Graphs of concentrations over the last 10 years for LMP01 (**Appendix E**) demonstrate fluctuations of sulfate and chloride over time, however, these concentrations have consistently remained below the respective Environmental Goals. Concentrations of these analytes were generally steady over the reporting period, with a spike in concentrations noted in October 2023 for sulfate (214 mg/L), followed by a decline in concentrations to those similar to previous monitoring rounds. Concentrations of major and minor ions remained within the historical range and below the Environmental Goals for surface water at LMP01. Previously, high sulfate and chloride results relative to the historical dataset were reported intermittently from July 2019 to January 2020. These concentrations were attributed to a previous brine leak event that occurred in 2019 (ERM, 2020a); these were notified to the EPA, and the liner was repaired in 2019.

5.6.1.3 METALS

Throughout the reporting period concentrations of chromium, copper, iron, and molybdenum were reported on one or more occasions at, or above, the relevant Environmental Goals for surface water at LMP01, as presented in **Appendix B** and summarised in **Figure 6**.

Speciated chromium (hexavalent and trivalent) and silver had LORs above the Environmental Goals on one or more occasions for samples from LMP01.

ERM understands that a laboratory LOR that is lower than the Environmental Goal for silver (0.05 µg/L) is unachievable by the laboratory. Based on the results from previous monitoring, including concentrations of silver in brine (<1 µg/L for most samples during 2022/23 and below the LOR for all samples during the current reporting period), and <1 µg/L in groundwater, silver is not considered to represent a primary constituent of concern for monitoring in accordance with the OEMP (EnergyAustralia, 2022).

Concentrations of metals in surface water were above the relevant Environmental Goals during the reporting period as follows:

- Chromium (total) concentrations in surface water from LMP01 on two occasions during the June and December 2023 monitoring events;
- Copper (total) concentrations at LMP01 on nine occasions, reporting a maximum concentration of 8 µg/L on three occasions;
- Copper (filtered) concentrations during the October 2023 sampling event at LMP01;
- Iron (total) at LMP01 during eight sampling events; and
- Molybdenum (total) on seven occasions at LMP01.

Graphs of concentrations over the last 10 years for LMP01 (**Appendix E**) show fluctuations of boron (total and filtered), iron (total and filtered), lead (total), manganese (total and filtered), molybdenum (total), and nickel (total and filtered) over time. The largest molybdenum (total) concentration since February 2023 was observed during the September 2023 monitoring round at LMP01, however concentrations subsequently declined to be consistent with results from previous monitoring rounds. Similarly, the highest lead (total) concentrations observed at LMP01 since July 2022 were during the November 2023, December 2023, May 2024, and July 2024 monitoring events at LMP01, however these concentrations remained within the historical range and below the Environmental Goal.

Concentrations of all other metals at LMP01 remained within historical ranges during the current reporting period with the exception of boron (filtered) for which the highest concentration was recorded during the January 2024 monitoring event. This filtered concentration is greater than the non-filtered concentration from the same monitoring round. Discussion of inconsistencies compared to filtered and non-filtered analyses is provided in **Section 5.5**. Similar to the trends identified for the major and minor ions, concentrations of iron (total and filtered) increased during the summer months, but subsequently declined.

5.6.2 MIDSTREAM MONITORING RESULTS

Locations NC01, SW_C and SW_E are considered to represent midstream conditions relative to the LNAR in the monitored area of Wangcol Creek.

Locations NC01 and SW_C are located north of the LNAR along an area of Wangcol Creek that is not known to have been subject to open cut mining operations. SW_E is located further downstream of NC01 and SW_C, to the north-east of the LNAR and immediately downstream from an area of Wangcol Creek that was historically subject to open cut mining activities. At and in the vicinity of SW_E, a deep water (up to ~3 m deep) pool that has resulted from the open cut mining activities is present in the channel of Wangcol Creek.

The surface water field and analytical results obtained from sample points NC01, SW_C and SW_E for the reporting period are presented in **Table 1**, and summarised in **Figure 6**. Graphs showing the concentrations of key analytes over time are presented in **Appendix E**.

Based on a review of the results, results from sampling at NC01 and SW_C were generally similar to each other; however, results from sampling at SW_E indicated higher concentrations of some key analytes over the monitoring period. Although these sample locations are all in the midstream area, and as such are presented together below, these results represent different inputs to, and mixing within, Wangcol Creek.

5.6.2.1 FIELD PARAMETERS

Field parameters monitored at NC01, SW_C, and SW_E for the reporting period are summarised as follows:

- pH (field) values ranged from 6.31 to 8.4, with results from the midstream surface water sample locations indicating pH values above (more basic) than the Environmental Goal (6.5 to 8.0). The pH of one sample at SW_E (SW_E, March 2024) was more acidic than the Environmental Goal; and
- Field EC values reported at NC01, SW_C and SW_E ranged from 302 µS/cm to 7,450 µS/cm. Field EC values were generally consistent with laboratory TDS values. Results from NC01 and SW_C were below the Environmental Goals for both EC and TDS (2,200 µS/cm for EC and 1,500 mg/L for TDS). At SW_E, concentrations from four sampling events (four months) were above the Environmental Goals for both EC and TDS,

with concentrations across the monitoring period ranging from 820 to 7,450 µS/cm for EC and 500 to 5,980 mg/L for TDS.

Graphs of concentrations over the last 10 years show EC and TDS concentrations at NC01 and SW_C have remained low and stable, below the Environmental Goals for surface water. EC and TDS concentrations at SW_E steadily increased from late 2022 and fluctuated above the Environmental Goal between October to December 2023 and again in March 2024 but have not exceeded the highest reported concentrations, which were reported in January 2020. A spike in TDS concentrations was observed during the March 2024 monitoring event, however this remained within historical ranges. TDS concentrations from SW_E increased above the Environmental Goal from the period between October and December 2023; they then spiked again in March 2024. From April 2024 onwards TDS concentrations returned to below the Environmental Goal at SW_E. Throughout the reporting period, EC and TDS values at SW_E were higher than those further upstream at NC01 and SW_C.

5.6.2.2 MAJOR AND MINOR IONS

Throughout the reporting period, major and minor ions including chloride, sulfate, and fluoride were reported at NC01 and SW_C at concentrations below the respective Environmental Goals for surface water. Fluoride concentrations remained below the Environmental Goal for all midstream surface water monitoring locations.

Graphs of concentrations over the last 10 years for chloride and sulfate are consistent with the trends identified for TDS concentrations and demonstrate that chloride and sulfate concentrations at NC01 and SW_C have remained low and stable. Consistent with increased TDS and EC values at SW_E, concentrations of chloride and sulfate at SW_E increased from October 2023, with the highest concentration reported during the March 2024 sampling round. Chloride and sulfate concentrations subsequently returned to concentrations below the Environmental Goals from the April 2024 sampling event to the end of the reporting period. The chloride and sulfate concentrations observed during the current reporting period remained within historical ranges for all midstream surface water monitoring locations. SW_E concentrations were consistently higher than those at NC01 and SW_C during the reporting period.

5.6.2.3 METALS

Throughout the reporting period boron (total and filtered) (SW_E), chromium (total) (SW_C), copper (total and filtered), iron (total and filtered), manganese (SW_E), molybdenum (SW_C and NC01), and nickel (total and filtered) (SW_E) concentrations were reported at or above the relevant Environmental Goals for surface water at NC01, SW_C and/or SW_E on one or more occasion. These results are presented in **Table 1, Appendix B** and summarised in **Figure 6**.

LORs for speciated chromium (hexavalent and trivalent) and silver were above the Environmental Goals for one or more sample events. No concentrations above the LORs were reported for these analytes during the reporting period. Refer to **Section 5.6.1.3** for commentary relating to the laboratory LORs versus the Environmental Goals for silver and speciated chromium in surface water.

Concentrations of metals in surface water were above the relevant Environmental Goals during the reporting period as follows:

- Boron (total and filtered) concentrations in surface water from SW_E on four occasions;
- Chromium (total) concentrations during the June 2024 sampling event from SW_C. Total chromium was below the LOR during all other sampling events;
- Copper (total) concentrations in surface water on two occasions at all midstream monitoring locations;
- Copper (filtered) concentrations during the March 2024 sampling event at SW_E;
- Iron (total) at all midstream locations during every sampling event;
- Iron (filtered) and Nickel (total and filtered) during every sampling event at SW_E;
- Manganese (total) on eight occasions and manganese (filtered) on six occasions at SW_E; and
- Molybdenum (total) on three occasions at SW_C and NC01.

Graphs of concentrations over the last 10 years for boron, iron, lead, manganese, and nickel (**Appendix E**) are generally consistent with TDS; specifically, concentrations of these selected metals in surface water samples from NC01 and SW_C have remained low and stable. Boron, iron, manganese, and nickel concentrations at SW_E increased from October 2023, reaching the highest concentrations measured during the monitoring period in March 2024. These concentrations subsequently decreased; however, concentrations of nickel and iron at SW_E remained above the Environmental Goal throughout the reporting period. Concentrations of these metals at SW_E remained within historical ranges throughout the reporting period, except for boron and iron for which the highest concentrations over the 10 year period were reported during the March 2024 sampling round. Concentrations of boron, lead, manganese, and nickel remained below the Environmental Goals at NC01 and SW_C throughout the reporting period.

5.6.3 DOWNSTREAM MONITORING RESULTS

Locations WX22 (SW_F) and SW_G are considered to represent downstream conditions relative to the LNAR in the monitored area of Wangcol Creek.

Both WX22 and SW_G are located east of the LNAR along an area of Wangcol Creek that is downstream of and, in the case of SW_G, has been subject to open cut mining operations.

The surface water field and analytical results obtained from sample points WX22 (SW_F) and SW_G for the reporting period are presented in **Table 1, Appendix B**, and summarised in **Figure 6**. Graphs showing the concentrations of key analytes over time are presented in **Appendix E**.

A discussion of downstream monitoring results is presented in the following subsections.

5.6.3.1 FIELD PARAMETERS

Field parameters monitored at WX_22 and SW_G for the reporting period are summarised as follows:

- Field pH values ranged from 7.29 to 8.21 and were generally within the Environmental Goal range (6.5 to 8.0) for pH in surface water, except for two events from WX22 and SW_G for which pH values were above (more basic than) the Environmental Goal; and
- Field measured EC values ranged from 458 µS/cm to 2,310 µS/cm and were generally consistent with the laboratory determined TDS values. EC and TDS were generally reported below the respective Environmental Goals for surface water (2,200 µS/cm for EC and 1,500 mg/L for TDS) at both locations during the reporting period, except for one sampling event in November 2023 during which values above the Environmental Goals for EC and TDS were reported for both WX22 and SW_G.

Graphs of concentrations over the last 10 years (**Appendix E**) for WX22 and SW_G show EC and TDS at these locations have fluctuated over time and have typically increased during summer months, specifically November 2023. EC and TDS concentrations previously exceeded the Environmental Goal at SW_G in July and August 2018, in November 2019, and again in November 2023, during this reporting period. Similar results were seen for EC and TDS concentrations at WX22, with values above the Environmental Goals reported in February 2018, November 2019, and November 2023. Previously (in 2018 and 2020) TDS values at WX22 declined after a summer peak however, during this reporting period, TDS concentrations remained above typical historical values during the winter months but remained below the Environmental Goal. Similar trends were identified at SW_G. Although the EC and TDS concentrations at both downstream locations were above the Environmental Goal in November 2023, they remained within historical ranges. During this reporting period the typical summer peak occurred earlier than previously observed at SW_G and WX22, and subsequent concentrations, although below the Environmental Goal, were, since the summer of 2023, higher than observed since the summer of 2020.

5.6.3.2 MAJOR AND MINOR IONS

Throughout the reporting period, concentrations of major and minor ions including chloride, sulfate and fluoride were reported below the relevant Environmental Goals at WX22 and SW_G, with the exception of the December 2023 sampling round at SW_G. Although the fluoride concentration in this sample remained below the laboratory LOR, the laboratory LOR for fluoride was raised (<2 mg/L) to a value above the Environmental Goal (1.5 mg/L). The raised laboratory LOR above the Environmental Goal was related to sample matrix interference, as confirmed by EnergyAustralia.

Graphs of concentrations over the last 10 years for WX22 and SW_G (**Appendix E**) show chloride and sulfate concentrations have fluctuated over time and are generally consistent with TDS trends (i.e., typically increase during and following summer months). Similar to historic TDS concentrations, chloride and sulfate concentrations were highest during February 2014, February 2018 and January 2020.

For the current reporting period, the highest concentrations of sulfate and chloride were recorded during the November 2023 sampling event, however, concentrations remained below the respective Environmental Goals.

5.6.3.3 METALS

Throughout the reporting period, boron (total and filtered), copper (total) (WX22), iron (total), mercury (WX22), molybdenum (WX22) and nickel (total and filtered) were identified on one or more occasion at concentrations above the relevant Environmental Goal for surface water at WX22 and/or SW_G, as presented in **Table 1, Appendix B**, and summarised in **Figure 6**.

LORs for speciated chromium (hexavalent and trivalent) and silver were above the relevant Environmental Goals for one or more sample events. Refer to **Section 5.6.1.3** for commentary relating to the laboratory LORs versus the Environmental Goals for silver and speciated chromium in surface water.

Graphs of concentrations over the last 10 years for WX22 and SW_G (**Appendix E**) present boron, iron, manganese, molybdenum, and nickel concentrations over time.

Boron concentrations were generally reported below the Environmental Goal for surface water during this reporting period, although, similar to TDS and EC concentrations, boron concentrations at both WX22 and SW_G were above the Environmental Goal, but within historic values, during the November 2023 sampling event.

Concentrations of iron (total) were reported above the Environmental Goal on five occasions at SW_G and on six occasions at WX22. These elevated iron concentrations generally followed similar trends to TDS and EC, peaking in the summer months between November 2023 to March 2024, and again during the May 2024 monitoring event before returning to concentrations below the respective Environmental Goal. These concentrations, although above the Environmental Goal, were lower than those observed historically during the summer months. Concentrations of manganese followed a similar pattern but did not exceed the Environmental Goal.

Concentrations of nickel fluctuated and were above the Environmental Goal for all sampling events throughout the reporting period. Similar to TDS, EC and boron, the nickel concentrations were highest in the November 2023 sample.

For this reporting period, copper (total), mercury, and molybdenum concentrations at WX22 were above the corresponding Environmental Goals in one of the 12 sampling events only. It is noted that the molybdenum concentration was above the Environmental Goal and also fell outside of historical ranges for the 10 year period.

Copper, mercury, and molybdenum concentrations at SW_G remained below the corresponding Environmental Goals throughout the reporting period.

5.7 SURFACE WATER FLOW VS CONCENTRATION DATA

To assess the relationship between the concentrations of key analytes measured from the surface water monitoring locations and the surface water flow volume of Wangcol Creek, **Plate** 1 and **Plate 2** show TDS and chloride concentrations, respectively, plotted against the daily average surface water flow rate of Wangcol Creek (in megalitres per day) over the six year period July 2018 to August 2024.

Flow volume data was sourced from WaterNSW via Real-time water data (waternsw.com.au), using NSW site 212055 which correlates with the downstream monitoring point WX22.

Over the past two years of monitoring, both TDS and chloride concentrations are noted to have progressively increased (December 2022 to March 2024) relative to previous concentrations. This period correlates to an extended period of low surface water flow, noting that the highest mean surface water discharge event in this six-year period was recorded on 15 November 2022. This pattern is consistent with that seen previously, including during the 2018-2019 period as presented on **Plate 1** and **Plate 2**.

Plate 3 demonstrates the generally direct relationship between stream flow and rainfall; however, the highest rainfall events in 2023-2024 did not correlate directly with high stream flow.

In the current reporting period, the highest TDS, sulfate and chloride concentrations were reported at SW_E in March 2024. This directly corresponds with the low stream flow rates between January 2024 and April 2024 and with a period of high rainfall in April 2024. For downstream monitoring locations, SW_G and WX22, TDS and chloride concentrations peaked in November 2023 with concentrations decreasing towards the end of the reporting period. These decreasing TDS and chloride concentrations at WX22 and SW_G generally corresponded with the higher surface water flow volumes (and rainfall) observed during December 2023.

As outlined in **Section 5.6**, concentrations of select metals in surface water from midstream and downstream locations (particularly SW_E) have also displayed similar patterns to TDS, sulfate and chloride. The 10 year trend graphs, presented in **Appendix E**, indicate that metals such as boron, iron, manganese, and nickel have steadily increased over the period between December 2022 and March 2024, when the mean volume of surface water discharge and rainfall were lower. This pattern was also observed in key heavy metal analytes during the 2018 – 2019 period, further suggesting that there is a relationship between low stream flow and more concentrated levels of target analytes.

The stream flow rate vs surface water analytical data highlights that the concentrations of key analytes in surface water are influenced by both surface water flow conditions in Wangcol Creek and also by local rainfall, which alter the ratio of surface water flow within vs groundwater seepage into Wangcol Creek. This relationship is most apparent at SW_E and downstream surface water monitoring locations WX22 and SW_G, which are in the portions of Wangcol Creek that are more connected to groundwater as a result of historical open cut mining voids within the Wangcol Creek stream channel.

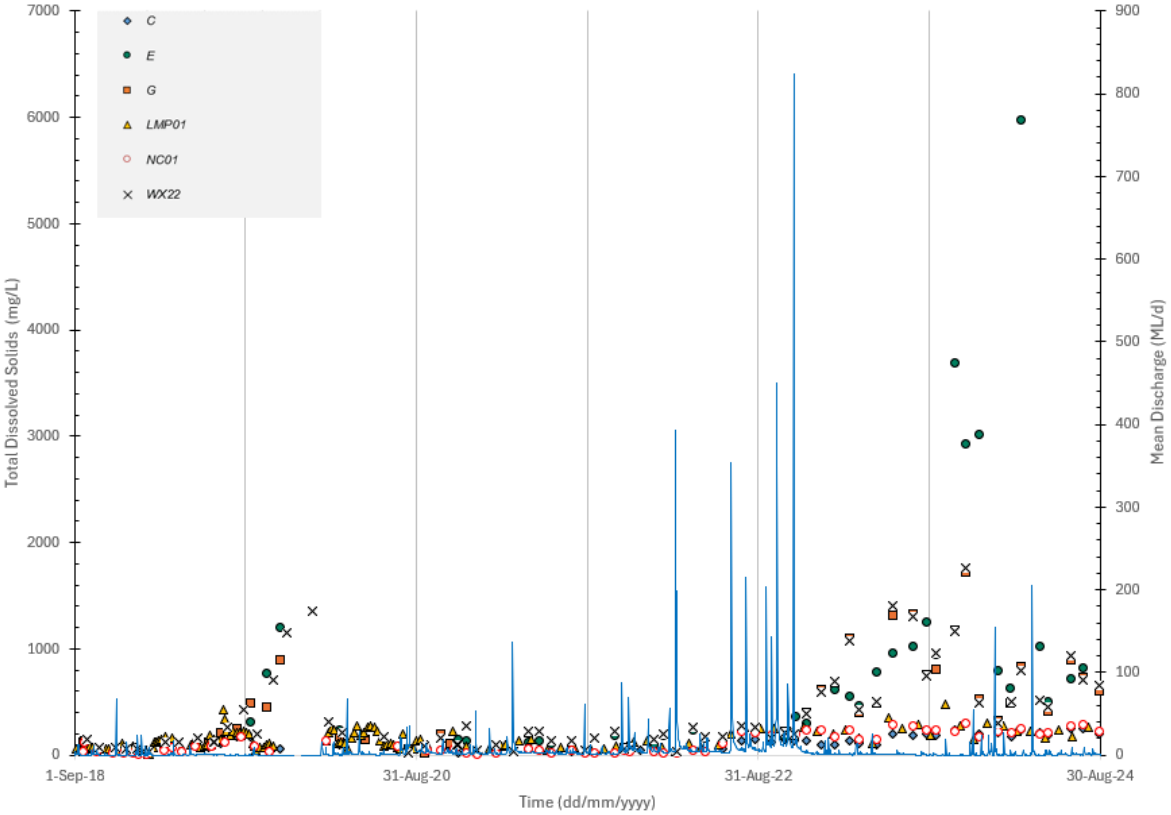


PLATE 1 TOTAL DISSOLVED SOLIDS VS SURFACE WATER DISCHARGE

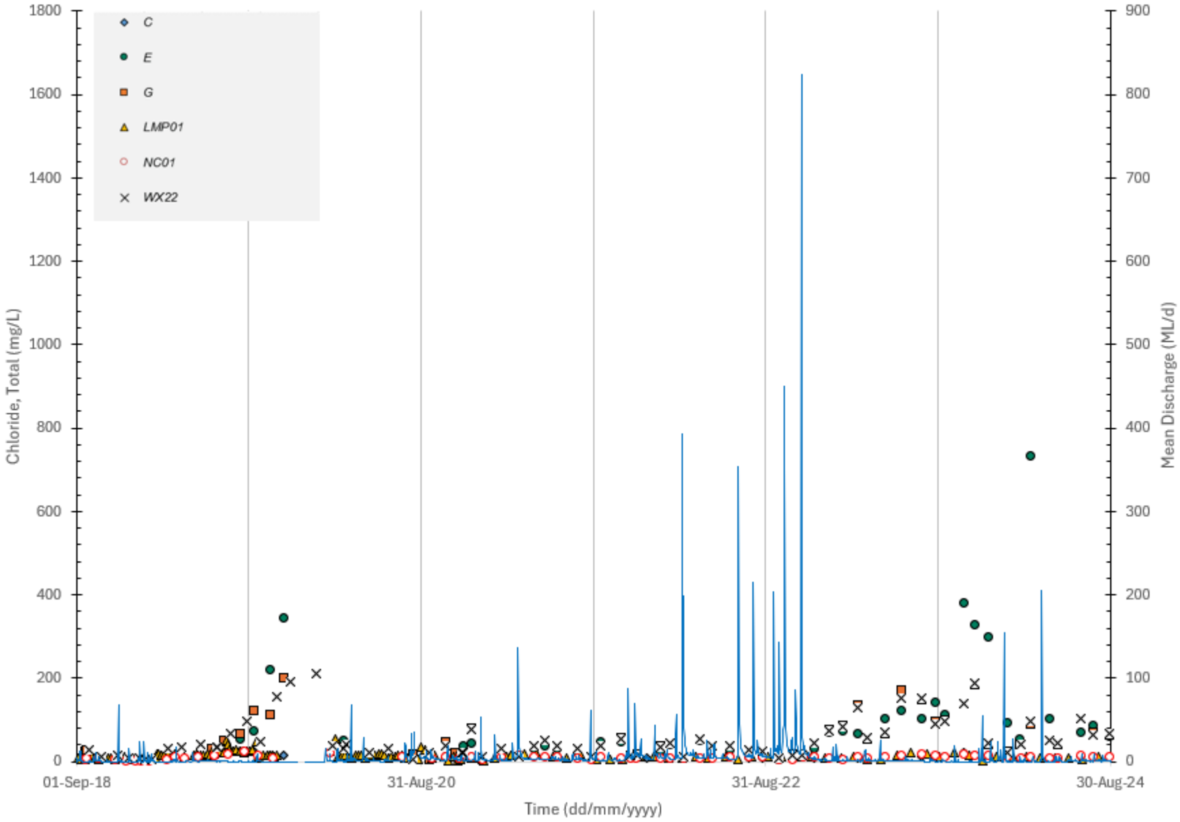


PLATE 2 CHLORIDE CONCENTRATIONS VS SURFACE WATER DISCHARGE

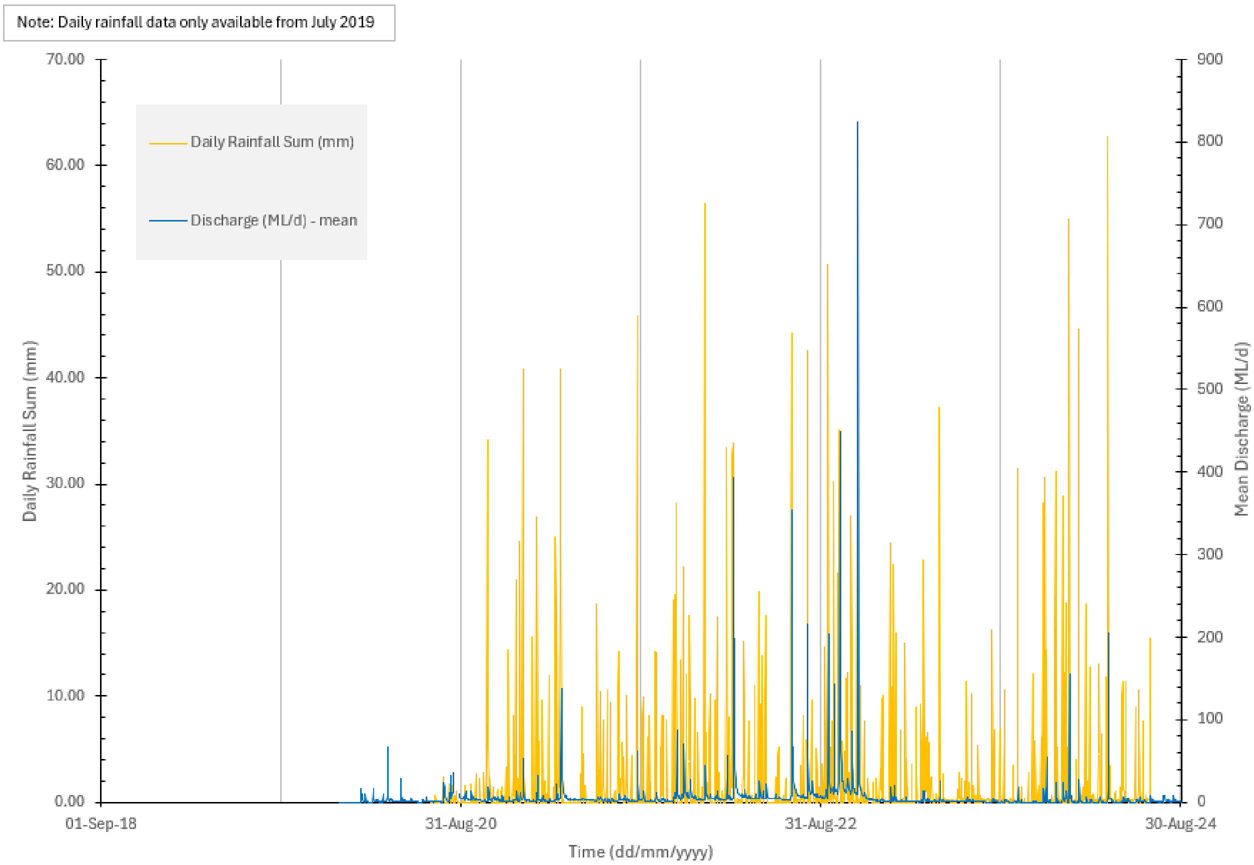


PLATE 3 DAILY RAINFALL DATA VS SURFACE WATER DISCHARGE

5.8 DISCUSSION OF RESULTS

The surface water data from the reporting period is presented in **Appendix B**, where the surface water results are compared to the Environmental Goals. **Figure 6** summarises the surface water data collected during the reporting period.

During the reporting period, concentrations of pH, chromium, copper, iron, and molybdenum at upstream location LMP01 were above the Environmental Goals on one or more occasions.

pH, EC, TDS, boron, chromium, copper, iron, manganese, molybdenum and nickel were reported above the Environmental Goals on one or more occasions from at least one of the midstream monitoring locations NC01, SW_C and SW_E. Iron concentrations were consistently above the Environment Goal throughout the reporting period at all midstream locations. SW_E accounted for majority of the concentrations reported above the Environmental Goals throughout the reporting period.

Surface water quality at the midstream locations showed a summer peak in concentrations. This was generally similar to behaviour during the last reporting period (2022/23) although 10 year graphs of key analytes (**Appendix E**) demonstrated that concentrations of most key analytes were higher during 2023/24 summer peak than in the previous reporting period. Additionally, concentrations of key analytes also increased around March 2024. This is considered to be related to the drier conditions followed by rainfall that was experienced during March 2024 compared to last reporting period.

At the downstream monitoring locations (WX22 and SW_G), concentrations of nickel in surface water were above the relevant Environmental Goal for all monitoring events during the reporting period. The concentrations of nickel were similar at the midstream monitoring location SW_E and downstream locations WX22 and SW_G. TDS, EC, and boron concentrations were reported above the Environmental Goals for surface water for both downstream monitoring locations during the November 2023 sampling event. Copper, mercury, and molybdenum concentrations were reported above the Environmental Goals for surface water during one event at WX22. Iron concentrations were reported above the Environmental Goals at WX22 and SW_G over the summer months (November to March) and again in the May 2024 sampling event.

The surface water quality at downstream locations WX22 and SW_ G generally showed an overall decreasing trend in concentrations towards the end of the reporting period, after the March 2024 peak. During the March 2024 sampling event, nickel concentrations remained below the historic maximum concentrations (2018 for SW_G, 2020 for WX22) but were above the Environmental Goal for nickel during all sampling events at both downstream locations. The higher concentrations observed in March 2024 were consistent with the observations for midstream surface water locations and are likely related to the drier conditions experienced during the summer months of this reporting period.

Nickel concentrations were consistently above the Environmental Goal at midstream and downstream monitoring locations. Iron concentrations were consistently above the Environmental Goal at midstream locations and were above the Environmental Goal at downstream monitoring locations during periods of low rainfall between September and November 2023 and March 2024.

Iron concentrations are related to background conditions in the local environment as a result of the mining history and disturbed geology. Nickel concentrations in surface water are considered to be influenced by interaction between groundwater and the surface water of Wangcol Creek. Concentrations of key analytes in surface water were, for SW_E, SW_C, WX22 and SW_G, higher during the current reporting period compared to previous monitoring periods, including the higher concentrations observed between October 2023 to March 2024, which likely resulted from the drier conditions in the summer months leading up to March 2024. Due to the drier conditions, water within the Creek is influenced more by the discharge of groundwater to the creek during previously wetter periods, particularly through former mined out areas, than by surface flow in Wangcol Creek. This has resulted in higher concentrations of key analytes in these parts of the creek over the summer months.

6. GROUNDWATER ASSESSMENT

6.1 OBJECTIVES

The objective of the groundwater monitoring program is to identify groundwater quality changes at an early stage so that potential causes can be investigated and, if necessary, effects mitigated. The groundwater data is compared between locations to historical data, and to the established Environmental Goals, to assess changes in water quality, the extent to which changes may be related to activities associated with the LNAR, and to assess whether contingency measures should be considered and/or implemented.

6.2 GROUNDWATER MONITORING LOCATIONS

To summarise the groundwater data, the groundwater wells have been categorised into five groups based on their hydraulic location in relation to the LNAR as described in **Table 6-1**. The groundwater monitoring zones are summarised as follows:

- Upgradient / background: D4 and D5;
- Upgradient / adjacent MPAR: D3, D106, D107, D119;
- Within / immediately adjacent LNAR North: D10, D11, D20, D110, D117;
- Within / immediately adjacent LNAR South: D15, D16A, D17, D18; and
- Cross- and downgradient of LNAR / adjacent Wangcol Creek: D1, D2, D8, D9, D19, D102, D103, D104, D105, D113.

6.3 GROUNDWATER MONITORING FREQUENCY

A summary of the groundwater monitoring locations is presented in **Table 6-1** and **Figure 4**, **Appendix A**.

TABLE 6-1 GROUNDWATER MONITORING NETWORK AND FREQUENCY

Well ID	Monitoring Zone	Screened Lithology	Frequency[1]	No. of Samples
MPGM4/D1	Cross- and downgradient of LNAR / adjacent Wangcol Creek)	Mudstone, sandstone and coal	Quarterly	4
MPGM4/D3	Upgradient / adjacent MPAR	Bedrock (sedimentary)	Quarterly	4
MPGM4/D4	Upgradient / background	Bedrock (sedimentary)	Quarterly	4
MPGM4/D5	Upgradient / background	Bedrock (sedimentary)	Quarterly	4
MPGM4/D8	Cross- and downgradient of LNAR / adjacent Wangcol Creek	Alluvial deposits	Quarterly	4
MPGM4/D9	Cross- and downgradient of LNAR / adjacent Wangcol Creek)	Alluvial deposits	Quarterly	4
MPGM4/D10	Within / immediately adjacent LNAR North)	Fill beneath the ash	Quarterly	4
MPGM4/D15	Within / immediately adjacent LNAR South	Sandstone and/or shale	Quarterly	4

Well ID	Monitoring Zone	Screened Lithology	Frequency[1]	No. of Samples
MPGM4/D17	Within / immediately adjacent LNAR South	Sandstone and/or shale	Quarterly	4
MPGM4/D18	Within / immediately adjacent LNAR South	Sandstone and/or shale	Quarterly	4
MPGM4/D19	Cross- and downgradient of LNAR / adjacent Wangcol Creek	Fill (mine spoil)	Quarterly	4
D20	Within / immediately adjacent LNAR North	Fill (mine spoil)	Quarterly	4
D102	Cross- and downgradient of LNAR / adjacent Wangcol Creek	Bedrock (sedimentary)	Quarterly	4
D103	Cross- and downgradient of LNAR / adjacent Wangcol Creek	Bedrock (sedimentary)	Quarterly	4
D104	Cross- and downgradient of LNAR / adjacent Wangcol Creek	Bedrock (sedimentary)	Quarterly	4
D105	Cross- and downgradient of LNAR / adjacent Wangcol Creek	Bedrock (sedimentary)	Quarterly	4
D106	Upgradient / adjacent MPAR	Bedrock (sedimentary)	Quarterly	4
D107	Upgradient / adjacent MPAR	Bedrock (sedimentary)	Quarterly	4
D110	Within / immediately adjacent LNAR North	Bedrock (sedimentary)	Quarterly	4
D113	Cross- and downgradient of LNAR / adjacent Wangcol Creek	Bedrock (sedimentary)	Quarterly	4
D117	Within / immediately adjacent LNAR North	Fill (mine spoil)	Quarterly	5
D119	Upgradient / adjacent MPAR	Bedrock (sedimentary)	Quarterly	4
D16A	Within / immediately adjacent LNAR South	Bedrock (sedimentary)	Quarterly	4

[1]Monitoring frequency as specified in the OEMP

Well D16 was decommissioned and replaced by D16A in April 2022. Additionally, well D11 was decommissioned in February 2023 as part of the installation of the LNAR Stage 1B leachate barrier system and has therefore been removed from the groundwater monitoring network. As outlined in Section 5.5.3 of the OEMP, the existing groundwater monitoring network accounts for the decommissioned monitoring infrastructure and the planned stages of LNAR operations (EnergyAustralia, 2022).

6.4 GROUNDWATER MONITORING METHODOLOGY

Groundwater quality monitoring was undertaken by Nalco on behalf of EnergyAustralia. Details regarding the Nalco sampling method and QAQC program are presented in **Appendix J**, and these are understood to be in accordance with the sampling methodology outlined in the OEMP.

6.5 GROUNDWATER QUALITY DATASET

Groundwater samples were obtained for analysis in accordance with the following:

- Physical and other parameters
  - pH, total alkalinity, phenolphthalein alkalinity, bicarbonate alkalinity, TKN;
  - TDS, turbidity; and
  - EC, DO;
- Major and minor anions
  - Chloride, sulfate as SO4, fluoride, potassium and sodium; and
- Metals (dissolved)
  - As, Ba, Be, B, Cd, Ca, Cr, Cu, Co, Fe, Pb, Mg, Mn, Hg, Mo, Ni, Sb, Se, Sr, Ag, and Zn.

It is noted that, for Ba, Be, Co, Cd, Cr, Pb, Hg, Mo, Sb, Se, Sr and Ag, only total (unfiltered) metal concentrations were analysed; however, the OEMP specifies that metal concentrations for groundwater be analysed as dissolved (filtered) instead of total.

It is also noted that, on some occasions, filtered metals were reported at concentrations that were higher than the corresponding non-filtered concentrations from the same monitoring round. The difference between total and filtered concentrations are considered to be within the laboratory's acceptance criteria for experimental variation.

Evidence of the collection of field QC samples (i.e., rinsate, trip blanks or trip spikes) during the field-based programs was not provided. Results of laboratory QC measures including laboratory duplicate, triplicate, internal duplicates, method blanks or spike data were not presented for review and are not considered within the scope of this report.

6.6 GROUNDWATER RESULTS

6.6.1 GROUNDWATER LEVELS AND INFERRED FLOW DIRECTION

Water levels measured during the reporting period generally remained stable, within a 1 m range, with the lowest levels generally observed at start of the reporting period (October – November 2023). For select wells, specifically D5, D18, and D105, the discrepancies between quarterly gauging were larger. The overall trends in groundwater elevations are considered to be related to the low rainfall that occurred during the beginning of the reporting period and in March 2024. Hydrographs showing the rainfall data overlaid by groundwater level as measured at each of the groundwater wells are presented in **Appendix C**.

Groundwater levels in the monitored wells adjacent to and within LNAR North (i.e. D10, D20, D110 and D117) and LNAR South (i.e. D15, D16A, D17 and D18) remained below the base of ash placement in the LNAR Stage 1 (917 m AHD), with the highest groundwater level in these wells being measured in D15, at 915.61 m AHD. D15 is located adjacent to the western boundary of the LNAR and the existing approved double lined water storage LNAR 5, in the LNAR Stage 2 ash placement area.

Groundwater levels were used to infer local groundwater flow directions in October to November 2023 and June to July 2024, as shown in **Figures 5a and 5b**. The water levels recorded from well D11 were not included in the calculation as this well was decommissioned and capped in February 2023.

Throughout the reporting period, groundwater was generally inferred to flow to the east / south-east. Groundwater in the northern half of the LNAR appears to flow more towards the south-east and in the southern half of the LNAR slightly more towards the east. The groundwater flow direction remained relatively consistent throughout the seasons and with previous reporting periods.

6.6.2 GROUNDWATER ANALYTICAL RESULTS SUMMARY

A summary of groundwater analytical results for the 2023/24 reporting period against the Environmental Goals is presented in **Table 6-2** along with the data ranges presented for each analyte. The complete set of tabulated results for each groundwater monitoring well are presented in **Appendix C**.

TABLE 6-2 SUMMARY OF GROUNDWATER CONCENTRATIONS - 2023/24 REPORTING PERIOD

Analyte / Location	Groundwater Concentration Range (2023/24)					Screening Criteria	
	Upgradient / background	Upgradient / adjacent MPAR	Within / immediately adjacent LNAR North	Within / immediately adjacent LNAR South	Cross- and down gradient of LNAR / adjacent Wangcol Creek	Groundwater Collection Basin Pre-Ash Placement 90th Percentile [a]	Groundwater Environmental Goal[a b,c,e]
pH (field)	**3.42 – 5.95**	**5.95 - 6.96**	**5.78 – 6.28**	**5.43** – 7.07	**5.29** – **6.26**	NA	6.5 – 8.0[a]
EC (µS/cm)	640 – 1,344	461 – **13,630**	**3,590 – 11,330**	660 – 2,200	313 – **10,530**	1,576	2,600[a]
TDS, Major and Minor Ions (mg/L)							
TDS (mg/L)	495 – 1,060	265 – **12,000**	**3,340 – 10,400**	352 – 1,760	189 – **9,840**	1,306	1,500[a]
Sulfate (as SO_4) (mg/L)	235 – 478	110 – **7,140**	**2,050 – 5,910**	9.42 – **1,030**	111 – **5,330**	824	1,000[a]
Chloride (mg/L)	16.1 – 23.9	37.2 – **1,300**	114 – **1,090**	7.52 – 116	14 – **1,180**	31.5	350[a]
Fluoride (mg/L)	< 0.1 – < 0.2	0.055 – < 2 (LOR < 0.1, < 0.5, < 1, < 2)	0.23 – **3.2** (LOR < 0.5, < 1)	0.045 – 0.54 (LOR < 0.2)	< 0.01 – < 1 (LOR < 0.01, < 0.05, < 0.1, < 0.2, 0.5, < 1)	0.435	1.5[d]
Trace Metals (µg/L)							
Arsenic (total) (µg/L)	< 1 – **31**	< 1 – **28**	<1 – 8	< 1 – 25	<1 – **55**	1	24[b]
Arsenic (filtered) (µg/L)	< 1 - **28**	< 1 - 14	<1 – 4	< 1 – 9	< 1 – 5	1	24[b]
Barium (total) (µg/L)	14 – 20	14 – 81	11 – 46	12 – **703**	11 – 122	37	700[f]
Boron (total) (µg/L)	< 50 – 80	< 50 – **5,390**	**1,900- 13,000**	< 50 – **410**	< 50 – **3,490**	244	370[b]

Analyte / Location	Groundwater Concentration Range (2023/24)					Screening Criteria	
	Upgradient / background	Upgradient / adjacent MPAR	Within / immediately adjacent LNAR North	Within / immediately adjacent LNAR South	Cross- and down gradient of LNAR / adjacent Wangcol Creek	Groundwater Collection Basin Pre-Ash Placement 90th Percentile [a]	Groundwater Environmental Goal[a b,c,e]
Boron (filtered) (µg/L)	< 50 – 80	< 50 – **6,120**	**1,590 – 13,600**	< 50 - 220	< 50 – **2,960**	244	370[b]
Cadmium (µg/L)	< 0.1 – 0.2	< 0.1 – 1.4	< 0.1 –**35.4**	< 0.1 – 1.1	< 0.1 – 0.3	2	2[d,e]
Chromium (total) (µg/L)	< 1 – 1	< 1 – **8**	< 1 – **28**	< 1 – **61**	< 1 – **41**	1	5[d]
Copper (total) (µg/L)	< 1 – **5**	< 1 – **13**	< 1 – **12**	< 1 – **33**	< 1 – **17**	1	5[a]
Copper (filtered) (µg/L)	< 1 – 4	< 1 – 2	< 1 – 4	< 1 – 2	< 1 – **9**	1	5[a]
Iron (total) (µg/L)	**26,600** – **66,700**	**1,290** – **31,200**	350 – **61,600**	**780** – **20,100**	110 – **56,200**	664	664[e]
Iron (filtered) (µg/L)	**16,500** – **58,600**	530 – **23,000**	< 50 – **46,000**	< 50 – **14,400**	< 50 – **41,900**	664	664[e]
Lead (µg/L)	< 1 - **18**	< 1 - **20**	< 1 – **16**	< 1 – **19**	< 1 – **134**	1	5[f]
Manganese (total) (µg/L)	621 - **7,960**	107 - **18,200**	**6,480** - **31,700**	91 – 1,700	103 – **20,700**	5,704	5,704[e]
Manganese (filtered) (µg/L)	566 – **7,750**	91 – **17,400**	5,360 – **28,800**	86 – 1,610	50 – **18,000**	5,704	5,704[e]
Mercury (total) (µg/L)	<0.04	< 0.04 – **0.1**	<0.04	< 0.04 – **0.1**	< 0.04	<0.1	0.06[c]
Molybdenum (total) (µg/L)	<1	< 1 – **14**	< 1 – **961**	< 1 – **40**	< 1 – 2	1	10[a]

Analyte / Location	Groundwater Concentration Range (2023/24)					Screening Criteria	
	Upgradient / background	Upgradient / adjacent MPAR	Within / immediately adjacent LNAR North	Within / immediately adjacent LNAR South	Cross- and down gradient of LNAR / adjacent Wangcol Creek	Groundwater Collection Basin Pre-Ash Placement 90th Percentile [a]	Groundwater Environmental Goal[a b,c,e]
Nickel (total) (µg/L)	12 – 59	3 – **2,210**	312 – **1,790**	5 – 333	43 – **2,100**	550.9	550.9[e]
Nickel (filtered) (µg/L)	10 – 57	2 – **2,080**	284 – **1,720**	3 – 292	36 – **1,940**	550.9	550.9[e]
Selenium (µg/L)	< 0.2 – < 1	< 0.2 – 0.8	< 0.2 – **235**	< 0.2 – **< 10 *** (LOR < 0.2, < 10)	< 0.2 – 0.6	2	5[c]
Silver (µg/L)	**< 0.1 – <1 *** (LOR < 0.1)	**< 0.1 – < 1 *** (LOR < 0.1, < 1)	**< 0.1 – < 1 *** (LOR < 0.1, < 1)	**< 1 ***	**< 0.1 – < 1 *** (LOR < 0.1, < 1)	**< 1**	0.05[b]
Zinc (total) (µg/L)	18 – 124	< 5 – **366**	244 – **1,240**	42 – 526	45 – 528	908	908[e]
Zinc (filtered) (µg/L)	8 – 110	< 5 – 346	180 – **1,170**	28 – 450	30 – 246	908	908[e]

Notes:
Both unfiltered (total) and filtered (dissolved) metal concentrations shown where available.
Bold indicates value is equal to or above the Environmental Goal
Dissolved metals presented above as per the OEMP, unless otherwise specified
** Laboratory limit of reporting exceeds the Environmental Goal*
[a] Criteria from OEMP.
[b] OEMP Criteria - ANZECC (2000) 95% Level of species protection for freshwater aquatic ecosystems.
[c] OEMP Criteria - ANZECC (2000) 99% Level of species protection for freshwater aquatic ecosystems.
[d] OEMP Criteria - NHMRC (2011) Australian Drinking Water Guidelines.
[e] OEMP Criteria - adopted from Groundwater Collection Basin Pre-Ash Placement 90th Percentile
[f] OEMP Criteria - NHMRC (2008) Guidelines for Managing Risks in Recreational Waters.
[g] Lamberts North pre-placement 90th Percentile baseline data from October 2012 to August 2013 and Neubecks Creek (now referred to as Wangcol Creek) at WX22 (Aurecon, 2017).

6.7 DISCUSSION OF RESULTS

The following subsections provide a discussion of groundwater results in each of the monitoring zones. The groundwater data from the reporting period is presented in **Appendix C**, where the results are compared to the groundwater Environmental Goals. **Figure 6a** to **Figure 6e** present a selection of groundwater results (per monitoring zone) for the current monitoring period, including EC, TDS, chloride, sulfate, and others for which reported measurements at one or more locations were above the Environmental Goals.

6.7.1 UPGRADIENT / BACKGROUND WELLS

Data obtained from wells MPGM4/D4 and MPGM4/D5 located to the north-west and up hydraulic gradient (background) of the LNAR, is outlined below and compared to the Environmental Goals for groundwater. Wells MPGM4/D4 and MPGM4/D5 are considered to represent background groundwater conditions in the area and, based on their location up hydraulic gradient of MPAR, are not considered to have been affected by activities at LNAR. Groundwater monitoring data for the current reporting period is presented in **Appendix C** and summarised in **Figure 7a**. Graphs of concentrations over the last 10 years are provided in **Appendix F.**

6.7.1.1 FIELD PARAMETERS

The field parameters monitored at MPGM4/D4 and MPGM4/D5 for the reporting period are summarised as follows:

- pH values in groundwater from upgradient wells, MPGM4/D4 and MPGM4/D5 were consistently below the Environmental Goal range (6-8.5). Groundwater conditions at MPGM4/D4 were acidic and consistently reported at or below pH 3.49. Groundwater from MPGM4/D5 was less acidic and ranged from pH 5.88 to 5.95; and
- EC values obtained from field measurements ranged from 640 µS/cm to 1,344 µS/cm and, although indicating an increasing trend during the reporting period, remained within historical ranges. TDS values were generally consistent with EC measurements. EC and TDS values did not exceed the Environmental Goals for groundwater (2,600 µS/cm for EC and 1,500 mg/L for TDS) during the reporting period.

Graphs of concentrations over the last 10 years for up gradient (background) wells MPGM4/D4 and MPGM4/D5 show concentrations of TDS in groundwater have been generally stable and below the Environmental Goal for groundwater throughout the historical dataset.

6.7.1.2 MAJOR AND MINOR IONS

Throughout the reporting period, concentrations of major and minor ions, including chloride, sulfate, and fluoride were reported below the relevant Environmental Goals for wells MPGM4/D4 and MPGM4/D5.

Graphs of concentrations over the last 10 years for up gradient (background) wells MPGM4/D4 and MPGM4/D5 show concentrations of chloride and sulfate follow trends consistent with TDS and have been stable and below the Environmental Goals for groundwater throughout the historical dataset.

6.7.1.3 METALS

Throughout the reporting period, arsenic (total and filtered) (MPGM4/D4), copper (total) (MPGM4/D4), iron (total and filtered) (MPGM4/D4 and MPGM4/D5), lead (total) (MPGM4/D4), and manganese (total and filtered) (MPGM4/D5) were identified on several or more occasions at concentrations above the Environmental Goal for groundwater, as presented in **Appendix F** and summarised in **Figure 7a**.

LORs for speciated chromium (hexavalent and trivalent), and silver (total) were above the Environmental Goals for one or more sample events.

The raised laboratory LOR above the Environmental Goal for speciated chromium was due to previous laboratory methods being unable to detect concentrations as low as the Environmental Goal, as confirmed by EnergyAustralia. The raised laboratory LOR above the Environmental Goal for silver was related to sample matrix interference, as confirmed by EnergyAustralia.

Total chromium concentrations were below the Environmental Goal for MPGM4/D4 and MPGM4/D5 during the reporting period.

ERM understands that a laboratory LOR lower than the Environmental Goal for silver (total) (0.05 µg/L) is unachievable by the laboratory. Based on the results of previous monitoring, including concentrations of silver (total) in brine (<10 µg/L for most samples during 2022/23 and below the LOR for most samples for the current reporting period) silver (total) is not considered to represent a primary constituent of concern for groundwater monitoring in accordance with the OEMP (EnergyAustralia, 2022).

Concentrations of arsenic (total and filtered), iron (total and filtered) and lead (total) were higher in groundwater from well MPGM4/D4 when compared to groundwater from well MPGM4/D5, noting the lower pH recorded from MPGM4/D4. However, manganese concentrations were an order of magnitude higher at MPGM4/D5 than MPGM4/D4.

Graphs of concentrations over the last 10 years (**Appendix F**) for up gradient (background) wells MPGM4/D4 and MPGM4/D5 show that concentrations of boron (total and filtered), and nickel (total and filtered) have remained stable and below the Environmental Goal for groundwater throughout the historical dataset. Lead (total) and iron (total and filtered) concentrations in groundwater from MPGM4/D4 have remained stable but above the Environmental Goal historically and during this reporting period. Manganese (total and filtered) concentrations in groundwater from MPGM4/D5 have remained above the Environmental Goal historically and during this reporting period, with relatively stable concentrations within the historical range during this reporting period.

Given the hydraulic gradient observed, with an inferred local groundwater flow direction towards the east, concentrations recorded at D4 and D5 are not considered to be associated with the activities at the LNAR and are taken to be background concentrations that may also be influenced by historical mining and other activities within the upgradient surrounding area.

6.7.2 WELLS UPGRADIENT / ADJACENT MPAR

Data obtained for groundwater from wells D106, D107, MPDM4/D3 (north of MPAR), and D119 (south of MPAR), situated up hydraulic gradient of the LNAR and adjacent to the MPAR is outlined below and compared to the Environmental Goals for groundwater.

Wells D106, D107, MPDM4/D3, and D119 are situated up hydraulic gradient of the LNAR and adjacent to the MPAR and are therefore not considered to have been affected by activities at LNAR. Groundwater monitoring data for the current reporting period is presented in **Appendix C** and summarised in **Figure 7b**. Graphs of concentrations over the last 10 years are provided in **Appendix F.**

6.7.2.1 FIELD PARAMETERS

Field parameters monitored from wells within LNAR or in the mine disturbance area immediately to the east for the reporting period are summarised as follows:

- pH values of groundwater in this area were slightly acidic, ranging from 5.95 to 6.96 throughout the reporting period. pH values measured during the reporting period remained generally stable and similar to those reported in 2022/23. pH values were consistently more acidic than the Environmental Goal range (6.5 to 8.0); and
- EC values obtained from field measurements ranged from 461 µS/cm (MPGM4/D3) to 13,630 µS/cm (D107), with values remaining generally consistent with the previous reporting period. TDS concentrations ranged from 265 mg/L (MPGM4/D3) to 12,000 mg/L (D107). Both EC and TDS values in groundwater from wells D106 and D107 were consistently above the Environmental Goals for groundwater (2,600 µS/cm for EC and 1,500 mg/L for TDS).

Graphs of concentrations over the last 10 years for data from wells D106 and D107 show concentrations of EC and TDS in groundwater have fluctuated over time but remained within the historical range during this reporting period. The trend graphs indicate that concentrations of EC and TDS in D106 and D107 have generally been declining since 2023. TDS concentrations in groundwater from these wells have generally remained above the Environmental Goal since they were installed in 2018. EC and TDS concentrations from well D119 have generally remained stable since 2020, primarily remaining below the Environmental Goal since 2022. Concentrations of EC and TDS in groundwater from MPGM4/D3 have consistently remained below the respective Environmental Goals across the 10 year period.

6.7.2.2 MAJOR AND MINOR IONS

Throughout the reporting period, major and minor ions including chloride, sulfate and fluoride were analysed in groundwater from wells D106, D107, MPDM4/D3, and D119. During the reporting period, sulfate concentrations were above the Environmental Goal for groundwater during two or more sampling events from wells D106, D107, and D119. Chloride concentrations in groundwater from wells D106 and D107 were reported above the Environmental Goal for all four sampling events, while chloride concentrations in groundwater from D119 and D113 remained consistently below the Environmental Goal.

During the reporting period, fluoride concentrations were consistently below the Environmental Goal, with fluoride concentrations being reported below the LOR in groundwater for the majority of sampling events from these four wells. It is noted that the LOR for fluoride was raised to <2 mg/L on one occasion at D106 and D107 which is higher than the Environmental Goal of 1.5 mg/L. The raised laboratory LOR above the Environmental Goal was related to sample matrix interference, as confirmed by EnergyAustralia.

Graphs of concentrations for bores D106 and D107 since their installation in 2018 show that chloride and sulfate concentrations have fluctuated over time, but appear to be, in general, declining since 2022. Chloride and sulfate concentrations in D119 have remained generally stable since 2020, following a similar trend to EC and TDS, but have been steadily increasing since November 2023 to above the Environmental Goal in August 2024 (still within historical range). Concentrations of chloride and sulfate in MPGM4/D3 have remained consistently below the respective Environmental Goals across the 10 year period.

6.7.2.3 METALS

Throughout the reporting period arsenic (total) (D119), boron (total and filtered) (D106, D107, and D119), chromium (total) (D107), copper (total) (D106 and D119), iron (total and filtered), lead (total) (D106, D107, and D119), manganese (total and filtered) (D107 and D107), mercury (total) (D107 and D119), molybdenum (total) (D119), and nickel (total and filtered) (D106 and D107) were measured on one or more occasions at concentrations above the Environmental Goals for groundwater from bores D106, D107, D119 and/or MPGM4/D3. These results are presented in **Appendix F** and summarised in **Figure 8b**.

LORs for speciated chromium (hexavalent and trivalent) and silver (total) were above the relevant Environmental Goals for one or more sampling events. Commentary about the raised LORs is provided in **Section 6.7.1.3.**

Concentrations of metals in groundwater were above the relevant Environmental Goals during the reporting period as follows:

- Arsenic (total) concentrations in groundwater from D119 on two occasions with a maximum concentration of 28 µg/L;
- Boron (total) concentrations in groundwater from D106, D107, and D119 on all occasions, and boron (filtered) concentrations in groundwater on one occasion at D119 and on all occasions at D106 and D107;
- Chromium (total) concentrations during the October 2023 sampling event in groundwater from D107;
- Copper (total) concentrations in on one occasion for D106 and on two occasions for D119;
- Iron (total and filtered) concentrations during all sampling events for all bores within this area, except for dissolved iron during the June 2024 sampling event at MPGM4/D3;
- Lead (total) concentrations for all sampling events for D107, during two sampling events for D119, and during one sampling event for D106;
- Manganese (total and filtered) and nickel (total and filtered) concentrations during all sampling events at D106 and D107;
- Mercury (total) concentrations in groundwater on one occasion at D107 and D119, with a maximum concentration of 0.1 µg/L at D119; and
- Molybdenum (total) concentrations during the November 2023 monitoring round at D119.

Graphs indicate that concentrations over the last 10 years for bores D106 and D107 have fluctuated and remained above the Environmental Goals but have displayed generally decreasing trends in manganese (total and filtered) and nickel (total and filtered) since 2018 (**Appendix F**). Boron (total and filtered) concentrations at D106 and D107 have fluctuated but remained above the Environmental Goal consistently since monitoring of these wells began. Boron concentrations within these wells indicate a slight increasing trend.

Concentrations of nickel (total and filtered), manganese (total and filtered), and boron (total and filtered) in groundwater from wells MPGM4/D3 and D119 have generally remained stable and below the respective Environmental Goals, except for boron (total and filtered) at D119 on some occasions since 2020. Concentrations of iron (total and filtered) have fluctuated significantly for all wells within this area and have generally remained above the Environmental Goal. Lead concentrations in groundwater from these wells have fluctuated above the Environmental Goal but remained within historical ranges at D107 and D119 since 2020, whereas lead concentrations at D106 and MPGM4/D3 have remained stable and generally below the Environmental Goal.

Considering the hydraulic gradient, the concentrations recorded above the Environmental Goals in groundwater from these wells, which are upgradient of the LNAR / adjacent to the MPAR, are not associated with activities at the LNAR.

6.7.3 WELLS WITHIN / IMMEDIATELY ADJACENT LNAR NORTH

Data obtained from wells D10, D110, D117, and D20 located within or immediately adjacent to LNAR north is outlined below and compared to the Environmental Goals for groundwater. Wells D10, D110, D117, and D20 represent groundwater conditions within the northern portion of the LNAR and, based on their location down hydraulic gradient of MPAR and within the historical Lidsdale Mining Seam, are considered to have been affected by operations at both the MPAR and LNAR as well as by historical mining activities. It is noted that D11 was previously part of this monitoring zone but was decommissioned in February 2023 as part of the LNAR 1B Liner Installation works. Groundwater monitoring data for the current reporting period is presented in **Appendix C** and summarised in **Figure 7c**. Graphs of concentrations over the last 10 years are provided in **Appendix F.**

6.7.3.1 FIELD PARAMETERS

Field parameters monitored at these wells, which are situated within or immediately adjacent to the LNAR north, are summarised as follows for the reporting period:

- pH values were consistently more acidic than the Environmental Goal range in groundwater from all wells within this area although values were generally stable ranging between 5.78 and 6.28. pH within these areas was consistently below the Environmental Goal range (6.5 to 8.0); and
- EC values obtained from field measurements ranged between 3,590 µS/cm to 11,330 µS/cm, and generally consistent with laboratory TDS concentrations of 3,340 mg/L to 10,400 mg/L. EC and TDS were above the Environmental Goals for groundwater (2,600 µS/cm for EC and 1,500 mg/L for TDS) during all sampling events for the wells within / immediately adjacent LNAR North. Concentrations of TDS and EC in groundwater from D10 in November 2023, and from D110 in May 2024 exceeded the historical maximum values, with concentrations in these wells declining in subsequent monitoring rounds to within previous historical ranges.

Graphs of concentrations over the last 10 years for wells within this area show fluctuating EC and TDS concentrations, particularly in D10, but generally indicate stable trends with concentrations that remain within historical ranges. Concentrations of EC and TDS have consistently remained above the Environmental Goals despite fluctuating over time.

6.7.3.2 MAJOR AND MINOR IONS

Throughout the reporting period, concentrations of major and minor ions including chloride, sulfate and fluoride were reported for groundwater from wells D10, D110, D117, and D20. Sulfate concentrations were reported above the Environmental Goal during all sampling events for wells within this monitoring zone. Chloride concentrations in groundwater from D10 and D110 were reported above the Environmental Goal on all occasions during the reporting period, with one occasion at D110 reporting concentrations an order of magnitude higher than the Environmental Goal (the concentrations subsequently declined back to within the same order of magnitude). Concentrations of fluoride were reported above the Environmental Goal during all monitoring events in groundwater from D117. Reported fluoride concentrations in groundwater from the other wells in this location were below the LOR or Environmental Goal during the reporting period.

Graphs of concentrations over the last 10 years for wells within this area show concentrations of sulfate have fluctuated, particularly in D10 and D110, but generally indicate stable trends. Concentrations of sulfate have remained consistently above the Environmental Goal in groundwater from all wells in this monitoring zone. Concentrations of chloride have shown some variability over time but have followed a similar trend to sulfate; however chloride concentrations in D20 and D117 have generally remained below the Environmental Goal. Despite some variability, concentrations of sulfate and chloride from this reporting period have remained within historical ranges.

6.7.3.3 METALS

Throughout the reporting period boron (total and filtered), cadmium (total) (D117 and D20), chromium (total) (D110 and D20), copper (total) (D10 and D20), iron (total and filtered), lead (total) (D110 and D20), manganese (total and filtered), molybdenum (total) (D10 and D117), nickel (total and filtered) (D10, D20, and D110), selenium (total) (D117), and zinc (total and filtered) (D117) were measured on one or more occasions at concentrations above the Environmental Goals for groundwater from wells D10, D110, D117, and/or D20. These results are presented in **Appendix F** and summarised in **Figure 8c**.

LORs for speciated chromium (hexavalent and trivalent) and silver (total) were above the relevant Environmental Goals for one or more sampling events. Commentary about the raised LORs is provided in **Section 6.7.1.3.**

Concentrations of metals in groundwater were above the relevant Environmental Goals during the reporting period as follows:

- Boron (total and filtered) concentrations in groundwater from all wells within this monitoring zone during all sampling events;
- Cadmium (total) concentrations in groundwater on all occasions at D117 and on three occasions at D20, with a maximum concentration of 35.4 µg/L reported in D117;
- Chromium (total) concentrations on one occasion from D110 and on three occasions from D20;
- Copper (total) concentrations in on one occasion for D10 and on three occasions for D20;
- Iron (total and filtered) concentrations during all sampling events for D10, D20, and D110, and Iron (total) concentrations on four occasions in D117;

- Lead (total) concentrations for all sampling events for D10 and during two sampling events for D20;
- Manganese (total and filtered) concentrations during all sampling events for all wells within this area, except for concentrations of dissolved manganese on one occasion at D10;
- Molybdenum (total) concentrations on all occasions for D117 and on two occasions at D10;
- Nickel (total) concentrations on one occasion at D20, and nickel (total and filtered) concentrations on all occasions at D10 and D110;
- Selenium (total) concentrations on all occasions at D117; and
- Zinc (total) concentrations on three occasions and zinc (filtered) concentrations on two occasions at D117.

Graphs of concentrations over the last 10 years for all wells within this monitoring zone have fluctuated but have generally remained above the Environmental Goals for boron (total and filtered), iron (total and filtered), and manganese (total and filtered) (**Appendix F**). Concentrations of nickel (total and filtered) have followed a similar pattern, except in groundwater from D117 and D20 for which nickel concentrations have remained at or below the Environmental Goal since around June 2023. Concentrations of total and dissolved nickel in groundwater from D10 had remained below the Environmental Goal since 2020, but increased above the Environmental Goal in and following March 2023. Concentrations of dissolved nickel at D117 were outside of the historical range during the current reporting period. Lead (total) concentrations in groundwater have fluctuated over the 10 year period, but have generally remained below the Environmental Goal, with the exception of D10 and D20. Despite these fluctuations, concentrations of lead at D10 and D20 have remained within the historical range during the current reporting period.

Considering the relative chloride concentrations and the reported chloride to sulfate ratios at D117, the concentrations of fluoride, selenium, molybdenum, zinc, cadmium and boron reported in groundwater from D117 are unlikely to be related to the LNAR, but also may not be related to BCA in MPAR. The elevated concentrations of these analytes in groundwater from D117 may be related to localised fill compacted in place to fill the GCB.

When groundwater quality in the remaining wells in this area is compared to the groundwater quality up hydraulic gradient, the concentrations recorded above the Environmental Goals are not considered to be related to activities at the LNAR.

6.7.4 WELLS WITHIN / IMMEDIATELY ADJACENT LNAR SOUTH

Data obtained from wells D15, D16A, D17, and D18 located within or immediately adjacent LNAR south (i.e. south of LNAR 2 and bore D10) is outlined below and compared to the Environmental Goals for groundwater. It is noted that D16A was commissioned in October 2022 to replace D16. Groundwater monitoring data for the current reporting period is presented in **Appendix C** and summarised in **Figure 7d**. Graphs of concentrations over the last 10 years are provided in **Appendix F.**

6.7.4.1 FIELD PARAMETERS

Field parameters monitored at these wells, which are situated within or immediately adjacent to the LNAR south, are summarised as follows for the reporting period:

- pH values remained within the Environmental Goal range in groundwater from wells D16A and D18. pH values of groundwater were more acidic than the Environmental Goal at D15 on all occasions and D17 on three occasions. Values were generally stable for wells within this area, ranging between 5.43 and 7.07; and
- EC values obtained from field measurements ranged from 660 µS/cm to 2,200 µS/cm, and generally consistent with laboratory TDS concentrations of 352 mg/L to 1,760 mg/L. EC and TDS were below the Environmental Goals for groundwater (2,600 µS/cm for EC and 1,500 mg/L for TDS) during all sampling events for the wells within / immediately adjacent LNAR North.

Graphs of concentrations over the last 10 years for wells within this area indicate that concentrations of EC and TDS have generally remained stable (D16a and D18) or have declined (D15 and D17). Furthermore, concentrations of EC and TDS in D15 and D17 were below the historical ranges during the current reporting period. Concentrations of EC and TDS in all wells within this area have remained below the Environmental Goals since March 2023.

6.7.4.2 MAJOR AND MINOR IONS

Throughout the reporting period, major and minor ions including chloride, sulfate and fluoride were analysed in groundwater from wells D15, D16A, D17, and D18. During the reporting period, chloride and fluoride concentrations remained below the Environmental Goals for all wells within this monitoring zone. Concentrations of sulfate in groundwater were reported below the Environmental Goal (1,000 mg/L) in groundwater from the four wells, except for one occasion at D17 (concentration of 1,030 mg/L).

Graphs of concentrations over the last 10 years for wells D15 and D17 show concentrations of sulfate and chloride follow a similar pattern, and demonstrate a declining trend. Chloride and sulfate concentrations in groundwater from D16A and D18 indicate stable trends, with concentrations below the Environmental Goals.

6.7.4.3 METALS

Throughout the reporting period arsenic (total) (D15), barium (total) (D18), boron (total) (D15), chromium (total) (D15 and D17), copper (total), iron (total and filtered), lead (total) (D15, D16a, and D17), mercury (D17), molybdenum (D15, D16a, and D17), and selenium (D15) were measured on one or more occasions at concentrations above the Environmental Goals for groundwater from wells D15, D16a, D17, and/or D18. These results are presented in **Appendix F** and summarised in **Figure 8c**.

LORs for speciated chromium (hexavalent and trivalent), silver (total), and selenium (total) (D16a) were above the relevant Environmental Goals for one or more sampling events. Commentary about the raised LORs is provided in **Section 6.7.1.3.**

Concentrations of metals in groundwater were above the relevant Environmental Goals during the reporting period as follows:

- Arsenic (total) and boron (total) concentrations in groundwater from D15 on one occasion;
- Barium (total) concentrations in groundwater on one occasion at D18;

- Chromium (total) concentrations on one occasion at D17 and on three occasions at D15, with the maximum concentration (61 µg/L) at D15 being almost 12 times the Environmental Goal;
- Copper (total) concentrations on one occasion at all wells within this monitoring zone;
- Iron (total and filtered) concentrations during all sampling events for D15, D16a, and D17, and Iron (total) concentrations on four occasions in D17;
- Lead (total) concentrations on one occasion at D15, D16a, and D17;
- Mercury (total) concentrations on one occasion at D17, with a maximum concentration of 0.1 µg/L. All other monitoring rounds reported concentrations of mercury below the LOR;
- Molybdenum (total) concentrations on three occasions at D16a and D17, and on one occasion at D15; and
- Selenium (total) concentrations on one occasion at D17.

Graphs of concentrations over the last 10 years for D16A (monitored since December 2022 only) and D18 have remained stable and generally below the Environmental Goals for boron (total and filtered), iron (total and filtered), manganese (total and filtered), nickel (total and filtered), and lead (total) (**Appendix F**). Concentrations of these same analytes in groundwater from D15 and D17 have varied over the 10 year period. Manganese (total and filtered) concentrations in groundwater from D15 and D17 have consistently remained below the Environmental Goal and indicate a decreasing trend. Similarly, concentrations of nickel (total and filtered) in groundwater from D15 dropped below the Environmental Goal in 2021 with a consistent decreasing trend. Concentrations of nickel at D17 have also decreased over the last 10 years and have remained below the Environmental Goal. Iron (total and filtered) concentrations in groundwater have been highly variable over the 10 year period, remaining above the Environmental Goal but have generally decreased since June 2020. One sample from D15 in the current monitoring period was reported above the Environmental Goal for lead (June 2024) and boron (total) (November 2023), but generally concentrations of lead and boron in groundwater from D15 and D17 have remained relatively stable and generally below the Environmental Goals over the 10 year period.

6.7.5 WELLS CROSS AND DOWNGRADIENT OF LNAR / ADJACENT WANGCOL CREEK

Data obtained from wells D1, D2, D8, D9, D19, D102, D103, D104, D105, and D113 located cross and down hydraulic gradient of LNAR and adjacent Wangcol Creek is outlined below and compared to the Environmental Goals for groundwater. Groundwater monitoring data for the current reporting period is presented in **Appendix C** and summarised in **Figure 7e**. Graphs of concentrations over the last 10 years are provided in **Appendix F.**

6.7.5.1 FIELD PARAMETERS

Field parameters monitored at these wells, which are situated cross and downgradient of LNAR and adjacent Wangcol Creek, are summarised as follows for the reporting period:

- pH values were consistently more acidic than the Environmental Goal range (6.5 to 8.0) in groundwater from all wells within this area although values were generally stable ranging between 5.29 and 6.26; and
- EC values obtained from field measurements ranged between 313 µS/cm to 10,530 µS/cm, and generally consistent with laboratory TDS concentrations of 189 mg/L to 9,840 mg/L.

EC and TDS were below the Environmental Goals for groundwater (2,600 µS/cm for EC and 1,500 mg/L for TDS) on one occasion at D1 and on all occasions at D2, D8, and D104, with concentrations above the Environmental Goal in groundwater from the other wells throughout the monitoring period.

Graphs of concentrations over the last 10 years for wells within this area show concentrations of EC and TDS have generally remained stable and below the Environmental Goals (D2, D9, and D104) or have fluctuated but consistently remained above the Environmental Goals (all other wells). Concentrations of EC and TDS remained within historical ranges in all wells, except for the November 2023 monitoring event at D1 in which was anomalously low in the November 2023 monitoring event.

6.7.5.2 MAJOR AND MINOR IONS

Throughout the reporting period, major and minor ions including chloride, sulfate and fluoride were analysed in groundwater from wells D1, D2, D8, D9, D19, D102, D103, D104, D105, and D113. During the reporting period, fluoride concentrations remained below the Environmental Goals for all wells within this monitoring zone. Concentrations of chloride were reported above the Environmental Goal in groundwater from D9 and D102 on all occasions, and from D1 on three occasions. Concentrations of sulfate in groundwater were reported above the Environmental Goal in D9, D19, D102, D103, D105, and D113 during all monitoring events, and in D1 during three monitoring events.

Graphs of sulfate concentrations over the last 10 years demonstrate similar trends to EC and TDS, as they have generally remained stable and below the Environmental Goal (D2, D9, and D104) or have fluctuated but consistently remained above the Environmental Goal (all other wells). Similarly, chloride concentrations in groundwater have remained stable and generally below the Environmental Goal for all wells except for D1, D9, and D102, which have fluctuated but generally remained above the Environmental Goal. Concentrations of sulfate and chloride remained within historical ranges in all wells, except for the November 2023 monitoring event at D1, which was anomalously low in the November 2023 monitoring event.

6.7.5.3 METALS

Throughout the reporting period arsenic (total) (D19), boron (total and filtered) (D1, D2, D9, D19, D102, D103, D105, and D113), chromium (total) (D19, D105, and D113), copper (total and filtered) (D1, D2, D8, D19, D102, D104, D105, and D113), iron (total and filtered) (D1, D2, D9, D19, D102, D103, D104, D105, and D113), lead (total) (D2, D19, and D113), manganese (total and filtered) (D1, D9, D19, D102, D103, D105, and D113), and nickel (total and filtered) (D1, D9, D19, D102, D103, D105, and D113) were measured on one or more occasions at concentrations above the Environmental Goals for groundwater. These results are presented in **Appendix F** and summarised in **Figure 8e**.

LORs for speciated chromium (hexavalent and trivalent), and silver (total) were above the relevant Environmental Goals for one or more sampling events. Commentary about the raised LORs is provided in **Section 6.7.1.3.**

Concentrations of metals in groundwater were above the relevant Environmental Goals during the reporting period as follows:

- Arsenic (total) concentrations in groundwater from D19 on one occasion;
- Boron (total) concentrations in groundwater on all occasions at D1, D9, D19, D102, D103, D105, and D113, and on two occasions at D2;
- Boron (filtered) concentrations in groundwater on all occasions at D1, D9, D19, D102, D103, and D113, on three occasions at D105, and on two occasions at D2;
- Chromium (total) concentrations on all occasions at D19, and on one occasion at D105 and D113;
- Copper (total) concentrations on all occasions at D2, on three occasions at D19, and on one occasion at D8, D102, D104, and D113;
- Copper (filtered) concentrations on one occasion at D1 and D2;
- Iron (total and filtered) concentrations during all sampling events for D1, D2, D9, D19, D102, D103, D104, D105, and D113, except for D104 in which dissolved iron concentrations were below the Environmental Goal in October 2023;
- Lead (total) concentrations on all occasions at D19, and on one occasion at D2 and D113;
- Manganese (total and filtered) concentrations in groundwater on all occasions at D9, D102, D103, and D105, and on three occasions at D1 and D19. Total concentrations of manganese were reported above the Environmental Goal on three occasions at D113, but dissolved concentrations of manganese were reported above the Environmental Goal on two occasions;
- Nickel (total) concentrations on all occasions at D9, D102, and D103, on three occasions at D1 and D19, on two occasions at D113, and on one occasion at D105; and
- Nickel (filtered) concentrations on all occasions at D9, D102, and D103, on three occasions at D1, and on one occasion at D19 and D105.

Graphs of concentrations over the last 10 years (or since well installation) for iron (total and filtered) have fluctuated but consistently remained above the Environmental Goals for all wells except for D8 and D104 (**Appendix F**). Concentrations of nickel (total and filtered), manganese (total and filtered), and boron (total and filtered) have displayed similar trends to those outlined previously, in which concentrations of these analytes have generally remained stable and below the Environmental Goal (D2, D9, and D104) or have fluctuated but consistently remained above the Environmental Goal (all other wells). Concentrations of metals remained within historical ranges in all wells during this reporting period, with the exception of concentrations of all analytes in groundwater from D1 which were anomalously low in the November 2023 monitoring event. Over the 10 year period, concentrations of lead in groundwater from all wells have remained generally stable and below the Environmental Goal, with the exception of D19 which has periodically fluctuated to two order of magnitude above the Environmental Goal (as in June 2024 in the current monitoring period). Concentrations of lead at D19 have remained within historical ranges during the current reporting period.

7. EARLY WARNING ASSESSMENT

In addition to comparing results with the Environmental Goals for surface water and groundwater, an early warning assessment of the groundwater and surface water monitoring data is required as part of the OEMP. This assessment includes assessment of concentration plots through time, including statistical analysis where appropriate.

7.1 TREND ASSESSMENT APPROACH

Trends in target analyte concentrations in groundwater and surface water were assessed through a combination of graphical and statistical tools.

Firstly, graphs of concentrations over the last 10 years (depending on available data) were created for target analyte concentrations for individual monitoring locations to evaluate temporal trends of solute concentrations. Descriptions of historical concentrations over the last ten years (since 2014) and Environmental Goals are provided in **Section 5** (for surface water) and **Section 6** (for groundwater). The graphs of concentrations over the last 10 years also include adopted Environmental Goals and are presented for surface water and groundwater in **Appendix E** and **Appendix F** respectively.

7.2 STATISTICAL ASSESSMENT OF TRENDS

For both groundwater and surface water, data covering the last two reporting periods was adopted for the statistical assessment to indicate recent conditions. Statistical tools were applied and included the use of linear regression (for surface water) and the Mann-Kendall method (for groundwater) to evaluate trends in target analyte concentrations in groundwater and surface water from each individual monitoring location. Statistical trend plots from the statistical assessment for surface water and groundwater are presented in **Appendix K** and **Appendix L** respectively. Further details of the Mann-Kendall and data assessment methodology are provided in **Appendix M**.

7.2.1 SURFACE WATER

Surface water statistical trend plots (linear regression graphs) comparing concentrations in surface water vs time for the last two years were generated for each individual monitoring location for selected analytes. Where surface water concentrations were reported below the laboratory LOR, half the laboratory LOR concentration was used for the statistical trend assessment.

Due to the variability within the data set for surface water, linear regression graphs were identified to be the most appropriate statistical assessment tool for the two-year dataset. The outputs in **Appendix K** include data from the beginning of the 2022/23 reporting period and the linear regression trend assessment.

For the purpose of this assessment, identified trends were considered positive (increasing trend) when the R was reported between 0.5 and 1, and negative (decreasing trend) when the R was reported between -0.5 and -1. For identified surface water trends, the R^2 value presented in the surface water statistical trend plots evaluates the scatter of the data points around a fitted regression line (presented as a solid blue line on the trend graphs). The R^2 value is reported between 0 and 1, where the R^2 value closer to 1, indicates a stronger trend, with more of the variability explained by the model.

Linear regression graphs are included in **Appendix K** for analytes where statically significant trends were identified; however, a summary of all R and R^2 values is included as a summary table in **Appendix K**.

Table 7-1 presents a summary from the statistical assessment of trends assessed for LMP01, NC01, WX22, SW_C, SW_E and SW_G for analytes with concentrations above the relevant Environmental Goal during the reporting period. For consistency, only total (unfiltered) metal concentrations have been used for the surface water trend analysis. Linear regressions performed for the remaining analytes and locations did not indicate significant trends.

TABLE 7-1 STATISTICAL SUMMARY OF TARGET ANALYTES IN SURFACE WATER

Monitoring Location	EC	Fluoride	Sulfate	TDS	Boron	Molybdenum
LMP01	- 0.04	0.29	- 0.10	- 0.02	0.13	0.15
NC01	0.48	0.54	0.32	0.33	0.58	0.33
SW_C	0.81	0.82	0.70	0.72	0.44	0.46
SW_E	0.37	0.44	0.33	0.33	0.35	0.52
WX22	0.29	0.31	0.22	0.23	0.45	0.25
SW_G	0.27	0.15	0.19	0.23	0.38	0.44

Unshaded cells indicate no identified increasing or decreasing trend.
Cells highlighted orange indicate a statistically significant increasing trend.

7.2.2 GROUNDWATER

Groundwater statistical trend plots (analyte concentrations in groundwater vs time) were generated for each individual monitoring location for selected analytes by the ERM Mann-Kendall application which was developed by the Data Science and Visualisation Group to facilitate Mann-Kendall trend analysis and reporting.

As with surface water, data from the last two years is assessed, including data from the beginning of the 2022/23 reporting period, to support the statistical trend assessment. For the groundwater trends, the p-value presented in the trend plots indicates the level of statistical significance that can be attributed to the trend. A p-value of less than 0.05 relates to a statistical significance of 95%, i.e. if a trend has a p-value of less than 0.05 there is a 95% level of confidence that the data presents a statistically significant trend and not a more random distribution of data. The 95% confidence level has been adopted by ERM as an indicator of statistical significance in trends, and trends with these characteristics are shown in a solid black line, those that are not statistically significant do not include a solid black line.

For consistency, only total (unfiltered) metal concentrations have been used for the Mann-Kendall trend analysis.

Where no p-value is provided on the graphical outputs, a sufficient number of data points were not available to identify a statistically significant trend through the Mann-Kendall test. Concentrations both above and below the LOR and with respect to the relevant adopted background concentration (where available) are shown.

Further details on the Mann-Kendall procedure are presented in the Western Australia Department of Environment's guidance document entitled *Use of Monitored Natural Attenuation for Groundwater Remediation* (2004).

Table 7-2 presents a summary from the statistical trend assessment of the concentrations of key analytes for groundwater monitoring locations.

TABLE 7-2 SUMMARY OF MANN-KENDALL ASSESSMENT OF GROUNDWATER FOR KEY ANALYTES

Monitoring Location	Boron (total)	Chloride	EC	Iron (total)	Manganese (total)	Nickel (total)	Sulfate	Lead (total)	TDS
Upgradient / background									
D4	ID	NT	NT	NT	NT	Decreasing	Decreasing	ID	NT
D5	NT	Decreasing	NT	NT	NT	NT	Decreasing	ID	NT
Upgradient / adjacent MPAR									
D106	NT	NT	**Decreasing**	NT	**Decreasing**	NT	NT	NT	**Decreasing**
D107	NT	NT	NT	NT	**Decreasing**	NT	NT	NT	**Decreasing**
D119	NT	Increasing	NT	NT	Increasing	NT	**Increasing**	NT	NT
D3	NT	NT	NT	NT	NT	Decreasing	NT	ID	NT
Within / immediately adjacent LNAR North									
D10	**Increasing**	**Increasing**	**Increasing**	NT	NT	**Increasing**	**Increasing**	**Increasing**	**Increasing**
D110	NT	NT	NT	NT	NT	NT	NT	ID	NT
D117	NT	Increasing	NT	NT	NT	NT	NT	ID	NT
D20	NT	NT	NT	NT	NT	**Decreasing**	NT	NT	NT
Within / immediately adjacent LNAR South									
D15	NT	NT	NT	NT	NT	Decreasing	NT	NT	NT
D16A	ID	NT	NT	NT	Increasing	Increasing	NT	ID	NT
D17	NT	Decreasing	Decreasing	NT	Decreasing	NT	**Decreasing**	NT	Decreasing
D18	ID	ID	NT	NT	Increasing	Increasing	NT	ID	NT
Cross- and downgradient of Ash Repositories / adjacent Wangcol Creek									
D1	NT	NT	NT	NT	NT	NT	NT	ID	NT
D102	NT	NT	NT	NT	NT	NT	NT	ID	NT
D103	NT	Increasing	NT	NT	NT	**Increasing**	**Increasing**	ID	**Increasing**
D104	NT	Increasing	NT	NT	Decreasing	Decreasing	NT	ID	NT

Monitoring Location	Boron (total)	Chloride	EC	Iron (total)	Manganese (total)	Nickel (total)	Sulfate	Lead (total)	TDS
D105	NT	NT	NT	NT	NT	NT	NT	ID	NT
D113	**Increasing**	NT	**Increasing**	NT	NT	NT	NT	NT	NT
D19	NT	Increasing	**Increasing**	NT	NT	NT	**Increasing**	NT	NT
D2	NT	NT	NT	NT	NT	NT	NT	NT	NT
D8	ID	Increasing	Increasing	ID	NT	NT	NT	ID	NT
D9	**Increasing**	NT	NT	NT	NT	**Increasing**	NT	ID	NT

Notes:
ID: Insufficient data
NT: No significant trend
***Bold:** concentration during reporting period at / or above Environmental Goal*
Metal concentrations presented are total (unfiltered) concentrations.

7.3 TREND ASSESSMENT SUMMARY

7.3.1 SURFACE WATER

Concentration data presented for the previous reporting period (2022/23) indicated increasing trends for boron (NC01), chloride (NC01, SW_E, WX22, SW_C, and SW_G), EC (NC01, SW_E, WX22, and SW_G), iron (SW_E), manganese (SW_E), molybdenum (WX22), nickel (NC01, SW_E, and SW_G), and sulphate (NC01, SW_E, WX22, and SW_G). The increasing trends identified during that reporting period were not related to the LNAR and were attributed to the lower rainfall experienced during the 2022/23 reporting period when compared to the previous 2021/22 reporting period.

Similar to the last reporting period, several increasing trends were identified for the key analytes in surface water at midstream monitoring locations during the 2023/24 reporting period. At midstream location NC01, increasing trends were identified for fluoride and boron. At midstream location SW_C, increasing trends were identified for EC, fluoride, sulfate, and TDS. At SW_E, an increasing trend was identified for molybdenum.

Above average rainfall conditions were experienced in 2021/22 (1,191.4 mm); since then, rainfall has decreased, continuing into the current reporting period. The decrease in rainfall over this reporting period, particularly between September and October 2023, is considered to have contributed to the increasing trends identified by the linear regression trend assessment. Where concentrations of surface water parameters are reported to be elevated compared to historical data used in the early warning assessment (i.e. over a two year period), this is considered to have resulted from changes in the amount of surface water flow relative to groundwater inflows to Wangcol Creek as rainfall has varied, rather than increasing concentrations of surface water flow from upstream catchment areas (e.g. LMP01).

7.3.2 GROUNDWATER

For wells upgradient / background to LNAR, no increasing trends were identified from the groundwater data collected over the two years (i.e. 2022/23 and 2023/24). Statistically significant decreasing trends were identified for chloride (D5), nickel (D4), and sulfate (D4 and D5). During the previous reporting period (2022/23), increasing trends had been identified for nickel at D5. These wells are hydraulically upgradient of LNAR and concentrations are considered to represent background conditions, unrelated to LNAR activities.

All wells located upgradient / adjacent to the MPAR reported statistically significant decreasing trends, except for D119 which reported increasing trends for chloride, manganese, and sulfate. Decreasing trends were identified for EC (D106), manganese (D106 and D107), nickel (D3), and TDS (D106 and D107). During the previous reporting period (2022/23), decreasing trends were identified at D119 for chloride, EC, nickel, and TDS, and increasing trends were identified for chloride and iron at D3.

For the wells located within / immediately adjacent the LNAR north, increasing trends were identified for boron (D10), chloride (D10 and D117), EC (D10), nickel (D10), sulfate (D10), lead (D10), and TDS (D10). While increasing trends were reported for concentrations of these analytes in groundwater from D10, the concentrations indicate a return towards the previous concentrations that were reported for key analytes between 2016 and 2018. Decreasing trends were reported for nickel (D20).

Decreasing trends had been identified for nickel at D117 and TDS at D110 during the previous reporting period (2022/23), however these stabilised during the current reporting period (2023/24).

The wells located within / immediately adjacent to the LNAR south reported a number of decreasing trends, specifically within D17. Decreasing trends were identified for chloride (D17), EC (D17), manganese (D17), nickel (D15), sulfate (D17), and TDS (D17). Increasing trends within this monitoring zone during the current reporting period (2023/24) were limited to manganese (D16A and D18) and nickel (D16A and D18). Despite these increasing trends, it is noted that concentrations of these analytes were not reported above the Environmental Goals during the current reporting period (2023/24). During the previous reporting period (2022/23) a greater number of decreasing trends were identified within this monitoring zone, noting that this is the first time a statistical assessment could be performed for D16A.

A number of increasing trends were reported within wells located cross- and downgradient of the Ash Repositories / adjacent Wangcol Creek, specifically for boron (D113 and D9), chloride (D103, D104, D19, and D8), EC (D113, D19, and D8), nickel (D103 and D9), sulfate (D103 and D19), and TDS (D103). Decreasing trends were also identified within this area, specifically for manganese (D104) and nickel (D104). During the previous reporting period (2022/23), less statistically significant increasing trends were identified, and concentrations of chloride, EC, sulfate, and TDS were generally decreasing. These trends were attributed to the higher than average rainfall experienced during the period between 2021 and 2023 which reduced concentrations of key analytes during the 2022/23 period.

Elevated concentrations of the monitored analytes in groundwater from wells upgradient / adjacent to the MPAR, within and immediately adjacent LNAR north, and cross- and downgradient of the Ash Repositories / adjacent Wangcol Creek are considered to be unrelated to operations at the LNAR. As outlined in a separate investigation, these increased concentrations are considered to be from the leaching of the BCA placed in the MPAR, and subsequent transport of solutes within the regional groundwater (ERM, 2024b). These increasing trends are considered to be related to the return to drier conditions following the period of above average rainfall between 2021 and 2023, causing the concentrations to be less diluted and to return to historical concentration ranges.

7.4 STATISTICAL ASSESSMENT SUMMARY

From the identified statistically significant trends, the majority of the target analytes were found to be slightly increasing or remaining stable for groundwater however for surface water the trends of target analytes were increasing. The increasing trends are likely due to the lower rainfall experienced during the current reporting period when compared to the previous 2022/23 reporting period.

7.5 IMPLEMENTATION OF CONTINGENCY AND MITIGATION MEASURES

The OEMP outlines that changes in water quality will be reviewed by comparing results with the Environmental Goals for surface water and groundwater. Furthermore, early warning monitoring will be conducted by assessment of concentration trends through time at each location, including statistical analysis where appropriate, and assessment of observed groundwater conditions with comparison to the Numerical Groundwater Model (NGM).

Those wells with increasing target analyte concentrations were not in consistent locations and were typically observed at wells located within LNAR north or cross – and down gradient from LNAR, which is hydraulically downgradient of the MPAR. The elevated concentrations of target analytes identified during this report are considered to be related to the leaching of the BCA placed in the MPAR, and subsequent transport of solutes within the regional groundwater (ERM, 2024b).

While the concentrations reported above the Environmental Goals noted in this report are considered to be unrelated to the LNAR, in accordance with the contingency planning measures outlined in the OEMP, a separate and broader independent investigation into surface and groundwater impacts in the vicinity of the Ash Repositories has been recently completed.

Planning for implementation of additional controls at the adjacent MPAR is currently underway. The additional controls include installation of a low-permeability cap on MPAR and installation of a leachate barrier management system in the MPAR Zone 2, and an application to modify the Mt Piper Consent (Modification 9) has been prepared. The additional controls will be implemented following consultation with key regulatory stakeholders and relevant planning approval.

In response to the legacy groundwater impacts related to the leaching of the BCA placed in the MPAR, and subsequent transport of solutes in groundwater, following the approval of LNAR MOD 1, EnergyAustralia has installed a leachate barrier management system in areas of the LNAR prior to placement of BCA above the liner and leachate collection system. The installation of the leachate barrier management system is a significant part of an adaptive and phased management approach for the long-term management of the Ash Repositories.

8. LEACHATE MANAGEMENT

8.1 OBJECTIVES

The objective of the leachate monitoring program is to assess the management of generated stormwater run-off from active ash placement areas and leachate at the LNAR and to minimise the potential for adverse impacts to the environment.

8.2 LEACHATE MANAGEMENT SYSTEM

To manage the risk of vertical and lateral movement of BCA leachate, a leachate barrier system was included as an integral component of the LNAR MOD 1. As described in the OEMP, the leachate barrier system comprises three primary components as summarised below:

- A liner comprising a geotechnical base layer and sidewall liner. The liner includes a leachate collection system through drainage aggregate, leachate sumps and connecting pipework;
- A capping liner welded to the sidewall liner overlain with fill material, growth medium and erosion protection measures as necessary; and
- Leachate storage ponds and ancillary multipurpose high-density polyethylene (HDPE) double lined storage ponds to manage BCA leachate and water intercepted from other areas of the LNAR
    - Leachate storage ponds: LNAR 3, LNAR 4, LNAR 5[3], and
    - Multipurpose storage ponds: Settling Pond D, and LNAR2 (referred to as LN Pond 2 in the OEMP).

The leachate management system includes internal drains that follow the general subgrade gradient to direct leachate to collection sumps. Leachate is then pumped out from the risers and transferred to leachate storage ponds.

The volume of stored leachate is managed via reuse for dust suppression within the lined BCA placement areas of the LNAR.

[3] Referred to as Pond BWA, BWB, and BWC respectively in the OEMP.

8.3 LEACHATE MONITORING PLAN

A summary of the leachate monitoring plan, as outlined in the OEMP (EnergyAustralia, 2022), is presented in **Table 8-1**.

TABLE 8-1 LEACHATE MONITORING PLAN

Location Description	Monitoring Parameters	Frequency	Target
Leachate storage	Storage volume / capacity. Available freeboard. Leachate quality as measured from leachate storage	Monthly for leachate quality monitoring for the first 24 months, then quarterly.	Suitable freeboard / pumping capacity available with account for seasonal weather and forecasting. To be defined by contractor.
Leachate storage	Monitoring for leachate within the space between storage liners and within underlying sump.	Monthly as part of routine inspections.	No leaks.
Lined ash placement areas	Leachate level monitoring as measured from leachate collection sumps and leak detection system.	Monthly as part of routine inspections.	Level to be maintained no more than 300 mm above the upper surface of the base liner. No leaks.
Leachate transfer pipelines	Monitoring volume and operational integrity.	Weekly as part of routine inspections.	Visual inspection and documentation to assess the integrity of the transfer system. Record of volumes via flow totaliser meter.

8.4 LEACHATE MONITORING OUTCOMES

Evidence of leachate monitoring conducted in accordance with the OEMP's leachate monitoring plan is presented in **Appendix N** and includes the following.

- Daily LNAR leachate system inspection and leachate collection sump pump out records (blank example);
- LNAR lined pond storage summary examples for January and July 2024, as extracted from the Service Stream Monthly Client Report – Mt Piper (Contract CW2228375). These storage records are presented in each monthly client report from Service Stream to EnergyAustralia;
- LNAR lined pond storage and transfer tracking spreadsheet, presenting January 2023 to September 2024 data, as provided by Service Stream via an email to EnergyAustralia NSW Pty Ltd (Service Stream, 2024);
- LNAR lined pond storage, leachate collection pipeline and leachate collection sump annual monitoring summary spreadsheet, as provided by Service Stream via email (Service Stream, 2024); and
- LNAR lined pond storage analytical data summary, with Surface Water Environmental Goals provided alongside for comparison purposes only as these Environmental Goals do not apply to leachate or water collected from this system.

In summary, based on the evidence of monitoring presented in **Appendix N**, leachate monitoring has been conducted in general accordance with the requirements of the OEMP. Operational management and monitoring of the leachate management system has been reported to be consistent with the design intent, and implementation of contingency or mitigation measures has not been required.

9. CONCLUSIONS

Based on the review of the surface water and groundwater quality data at the LNAR obtained in accordance with the OEMP for the 2023/24 reporting period, it is considered that the objectives of this EMR have been met. The LNAR operations were generally compliant with the relevant conditions of the Project Approval (PA 09_0186). The following conclusions are drawn.

- Over this reporting period, concentrations of target analytes in surface water have been reported above the Environmental Goal at monitoring locations midstream (particularly SW_E) and downstream of the LNAR. Elevated levels of key analytes including EC, TDS, chloride, sulfate, boron, manganese, and nickel are not considered to be related to operations at the LNAR. They have been assessed as part of an independent investigation and are also reported in the EMR for MPAR (ERM, 2024). During the reporting period, concentrations in surface water were reported to have generally increased since the previous reporting period (2022/23), with concentrations of several analytes (TDS, sulfate, iron, boron, copper, molybdenum, and nickel) reported above the historical range during periods of lower than average rainfall that occurred in September to November 2023 and March 2024. Concentrations of these COPCs subsequently declined to within historical ranges, as discussed in **Section 5.6**.
- For this reporting period, increasing trends of EC, fluoride, sulfate, TDS, molybdenum, and boron were reported for midstream surface water monitoring locations, particularly at SW_C. The increasing trends identified are considered to reflect the drier conditions experienced during the reporting period where surface water flows were lower. These are not considered to be related to operations at the LNAR.
- Concentrations of several target analytes in groundwater were reported above the relevant Environmental Goals at monitoring locations within the LNAR and cross – and downgradient of the LNAR. Elevated concentrations of key analytes including EC, TDS, chloride, sulfate, boron, manganese, and nickel are not considered to be related to operations at the LNAR and have been assessed as part of an independent investigation and are also reported in the EMR for MPAR (ERM, 2024). During the current reporting period concentrations of key analytes in groundwater from several wells increased, however they remained within historical ranges.
- A review of groundwater concentrations and trends indicate that activities at the LNAR are not significantly impacting the groundwater as elevated concentrations are comparable to concentrations and trends identified at well locations upgradient of the LNAR. The elevated concentrations of key analytes are unlikely to be related to the LNAR based on reported groundwater conditions across the monitoring network, particularly up hydraulic gradient of LNAR.
- For this reporting period, increasing trends for target analytes in groundwater were reported for a higher number of wells within / immediately adjacent LNAR north and south, and wells located cross- and downgradient of the LNAR than in 2022/23; however decreasing trends of some analytes have also been identified in several wells in these areas. These changes in trends are considered to be related to the return of drier conditions after the above average rainfall experienced in 2021/22, causing the concentrations to return to historical ranges.

- The reported groundwater levels at certain wells in the southern portion of the LNAR exceeded the maximum predicted groundwater level (912.5 m AHD) from CDM Smith (2012b). Groundwater levels remained below the base of LNAR Stage 1 ash placement (917 m AHD) at all wells within the LNAR.
- Leachate monitoring has been conducted in general accordance with the requirements of the OEMP. Operational management and monitoring of the leachate management system has been reported to be consistent with the design intent, and implementation of contingency or mitigation measures has not been required in relation to leachate management for LNAR MOD 1.

While the concentrations above the Environmental Goals noted in this report are not considered to be related to the LNAR, in accordance with the contingency planning measures outlined in the OEMP, a separate and broader independent investigation into surface and groundwater impacts in the vicinity of the Ash Repositories has been completed.

Planning for implementation of additional controls at the adjacent MPAR is currently underway. The additional controls include installation of a low-permeability cap on MPAR and installation of a leachate barrier management system in the MPAR Zone 2, and an application to modify the Mt Piper Consent (Modification 9) has been prepared. The additional controls will be implemented following consultation with key regulatory stakeholders and relevant planning approval.

In response to the legacy groundwater impacts related to the leaching of the BCA placed in the MPAR, and subsequent transport of solutes in groundwater, following the approval of LNAR MOD 1, EnergyAustralia has installed a leachate barrier management system in areas of the LNAR prior to placement of BCA above the liner and leachate collection system. The installation of the leachate barrier management system is a significant part of an adaptive and phased management approach for the long-term management of the Ash Repositories.

Where required in relation to the LNAR, the OEMP and the associated monitoring and reporting requirements may be revised following implementation of mitigation measures.

A summary of the Project Approval and OEMP requirements pertaining to water quality monitoring and reporting, and how each item is addressed is provided in **Appendix I**.

10. REFERENCES

Australian and New Zealand Guidelines (ANZG, 2018), Australian and New Zealand guidelines for fresh and marine water quality. Fresh and marine water (Australia and New Zealand) (waterquality.gov.au)

Australian and New Zealand Environment and Conservation Council (ANZECC) (2000) National Water Quality Management Strategy. Paper No. 4. Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 1: The Guidelines (Chapter 1-7).

Aurecon, 2009. Mt Piper Power Station Brine Conditioned Fly Ash Co-Placement Water Management Plan – Water Quality Monitoring Update Report 2008 to January 2009, revision 2, Final, 10 July 2009.

Aurecon, 2017. Lamberts North Water Conditioned Fly Ash Placement Water Quality Monitoring, Annual Update Report 2016/17, Revision 3, 21 November 2017.

CDM Smith (2012a), Delta Electricity, Lamberts North Ash Placement Project Plan, Construction Environmental Management Plan (CEMP), 10 December 2012.

CDM Smith (2012b) Lamberts North Ash Placement Project. Groundwater Modelling Report, November 2012

CDM Smith (2013) Lamberts North Ash Placement Project - Operational Environmental Management Plan, for Delta Electricity Western, Revision 3, May 2013

Danis, A., Danis, C., Lackie, M., O'Neil, C., & Twigg, L. (2011) Deep 3D structure of the Sydney Basin using gravity modelling, Australian Journal of Earth Sciences, 58:5, 517-542, DOI: 10.1080/08120099.2011.565802.

EnergyAustralia NSW Pty Ltd (EnergyAustralia) (2022), Lamberts North Ash Placement Project – Operational Environmental Management Plan (the LNAR OEMP), Revision 6, May 2022.

ERM, 2019. Lamberts North Ash Placement Water Quality Monitoring, Annual Water Quality Monitoring Report 2018/2019. Final Version 01 November 2019.

ERM, 2020. Lamberts North Ash Placement Water Quality Monitoring, Annual Water Quality Monitoring Report 2019/2020. Final Version 09 November 2020.

ERM, 2021a. Mt Piper Ash Placement Project – Lamberts North Ash Repository Modification Report – Modification 1, dated May 2021

ERM, 2021b. Lamberts North Ash Placement Water Quality Monitoring, Annual Water Quality Monitoring Report 2010/2021. Final Version 22 November 2021.

ERM, 2021c. Mt Piper Brine Conditioned Fly Ash Co-placement Project, Annual Environmental Monitoring Report 2020/21 (the AEMR), EnergyAustralia NSW Pty Ltd, Final September 2021.

ERM, 2022a. Mt Piper Brine Conditioned Fly Ash Co-placement Project, Annual Environmental Monitoring Report 2021/22 (the AEMR), EnergyAustralia NSW Pty Ltd, Final September 2022.

ERM, 2022b. Lamberts North Ash Placement Water Quality Monitoring, Annual Water Quality Monitoring Report 2021/2022. Final Version 25 November 2022.

ERM, 2023. Lamberts North Ash Placement Project, Annual Water Quality Monitoring Report 2022 – 2023. Final Version 24 November 2023.

ERM, 2024a. Mt Piper Power Station: Coal Ash Repository Water Characterisation Report, EPL 13007, Pollution Reduction Study. Final Version 19th June 2024.

ERM, 2024b. Mt Piper Brine Conditioned Fly Ash Co-placement Project, Environmental Monitoring Report – Water Management and Monitoring 2023/24 (the EMR), EnergyAustralia NSW Pty Ltd, Final, 24 September 2024.

NSW Environmental Protection Authority, 2016, Environmental Guidelines Solid Waste Landfills, Environment Protection Authority, Second edition 2016.

NSW Government (1992) Western Coalfield Regional Geology (Southern Part), 1:100 000 scale, Geological Series Sheet 8931 and part of 8830, 8831,8832, 8930 and 8932 (1st Edition), Geological Survey of New South Wales, Sydney

National Health and Medical Research Council (NHMRC) (2011). Australian Drinking Water Guidelines 6 (ADWG), revised August 2018.

National Health and Medical Research Council (NHMRC) (2008). Guidelines for Managing Risks in Recreational Waters (ADWG).

ServiceStream (2024) Personal Communications, via email subject *LNAR - EMR - Water Management and Monitoring RFI 2023/,* dated 10/09/24 to 14/10/2024.

SKM, 2009. Mt Piper Power Station Ash Placement Project, Project Application and Preliminary Environmental Assessment, September 2009.

SKM, 2010, Mt Piper Power Station Ash Placement Project Environmental Assessment, August 2010.

SKM, 2011, Mt Piper Power Station Ash Placement Project Submissions Report, March 2011.

SKM, 2010. Mt Piper Power Station, Ash Placement Project, Appendix D, Hydrology and Water Quality. August 2010.

WaterNSW, 2024. Real Time Data, https://realtimedata.waternsw.com.au/water.stm. Accessed last 9 October 2024.

Western Australia Department of Environment, 2004: Use of Monitored Natural Attenuation for Groundwater Remediation.

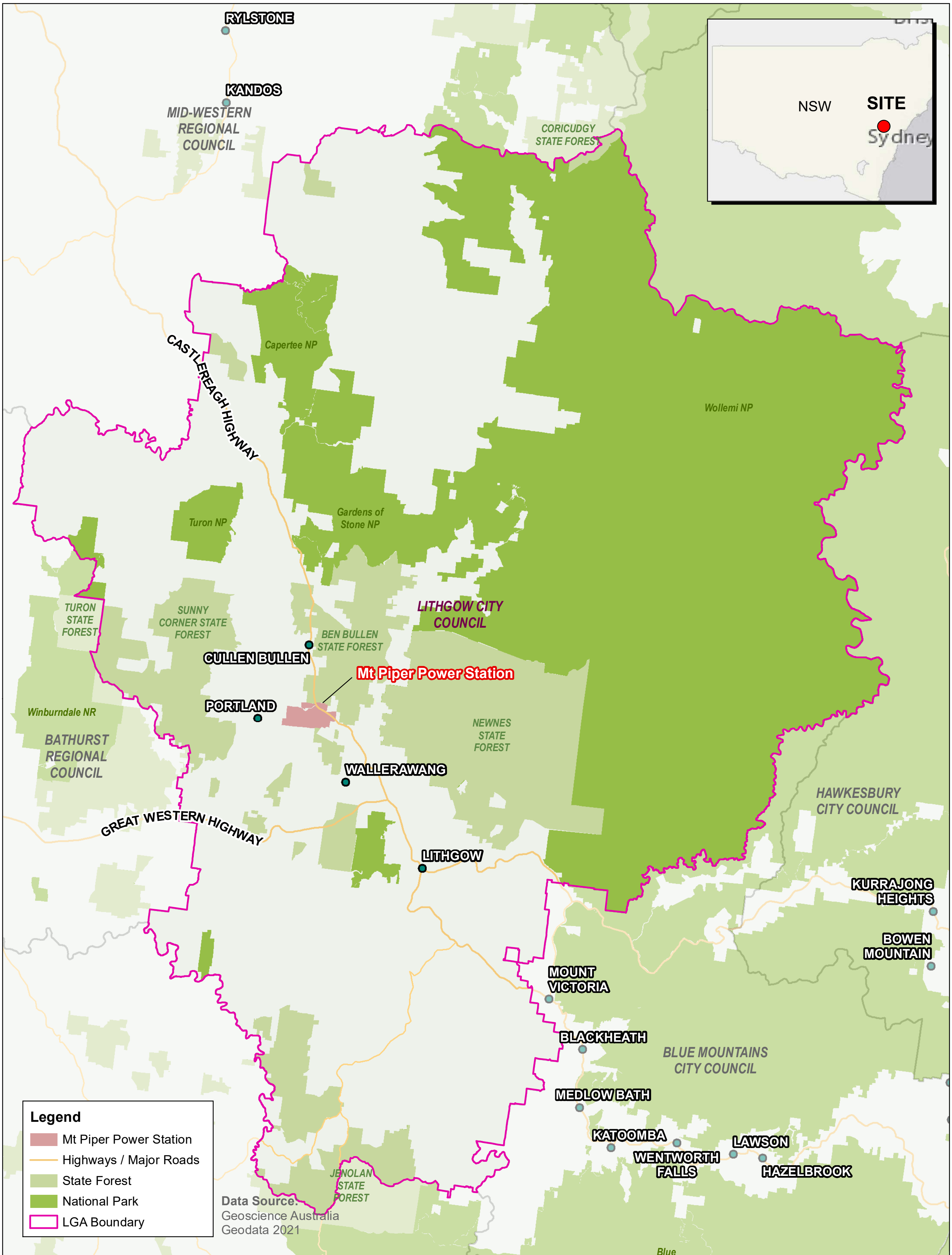
11. STATEMENT OF LIMITATIONS

1. This report is based solely on the scope of work described in our proposal P0659049 dated 25/6/24, confirmed via email on 5/7/24 (Scope of Work) and performed by Environmental Resources Management Australia Pty Ltd (ERM) for EnergyAustralia NSW Pty Ltd (the Client). The Scope of Work was governed by a contract between ERM and the Client (Contract).
2. No limitation, qualification or caveat set out below is intended to derogate from the rights and obligations of ERM and the Client under the Contract.
3. The findings of this report are solely based on, and the information provided in this report is strictly limited to that required by, the Scope of Work. Except to the extent stated otherwise, in preparing this report ERM has not considered any question, nor provides any information, beyond that required by the Scope of Work.
4. This report was prepared between 1 September 2024 and 21 November 2024 is based on conditions encountered and information reviewed at the time of preparation. The report does not, and cannot, take into account changes in law, factual circumstances, applicable regulatory instruments or any other future matter. ERM does not, and will not, provide any on-going advice on the impact of any future matters unless it has agreed with the Client to amend the Scope of Work or has entered into a new engagement to provide a further report.
5. Unless this report expressly states to the contrary, ERM's Scope of Work was limited strictly to identifying typical environmental conditions associated with the subject site(s) and does not evaluate the condition of any structure on the subject site nor any other issues. Although normal standards of professional practice have been applied, the absence of any identified hazardous or toxic materials or any identified impacted soil or groundwater on the site(s) should not be interpreted as a guarantee that such materials or impacts do not exist.
6. This report is based on one or more site inspections conducted by ERM personnel, the sampling and analyses described in the report, and information provided by the Client or third parties (including regulatory agencies). All conclusions and recommendations made in the report are the professional opinions of the ERM personnel involved. Whilst normal checking of data accuracy was undertaken, except to the extent expressly set out in this report ERM:
    a. did not, nor was able to, make further enquiries to assess the reliability of the information or independently verify information provided by;
    b. assumes no responsibility or liability for errors in data obtained from,
    c. the Client, any third parties or external sources (including regulatory agencies).
7. Although the data that has been used in compiling this report is generally based on actual circumstances, if the report refers to hypothetical examples those examples may, or may not, represent actual existing circumstances.
8. Only the environmental conditions and or potential contaminants specifically referred to in this report have been considered. To the extent permitted by law and except as is specifically stated in this report, ERM makes no warranty or representation about:

   a. the suitability of the site(s) for any purpose or the permissibility of any use;
   b. the presence, absence or otherwise of any environmental conditions or contaminants at the site(s) or elsewhere; or
   c. the presence, absence or otherwise of asbestos, asbestos containing materials or any hazardous materials on the site(s).

9. Use of the site for any purpose may require planning and other approvals and, in some cases, environmental regulator and accredited site auditor approvals. ERM offers no opinion as to the likelihood of obtaining any such approvals, or the conditions and obligations which such approvals may impose, which may include the requirement for additional environment works.
10. The ongoing use of the site or use of the site for a different purpose may require the management of or remediation of site conditions, such as contamination and other conditions, including but not limited to conditions referred to in this report.
11. This report should be read in full and no excerpts are to be taken as representative of the whole report. To ensure its contextual integrity, the report is not to be copied, distributed or referred to in part only. No responsibility or liability is accepted by ERM for use of any part of this report in any other context.
12. Except to the extent that ERM has agreed otherwise with the Client in the Scope of Work or the Contract, this report:
    a. has been prepared and is intended only for the exclusive use of the Client;
    b. must not to be relied upon or used by any other party;
    c. has not been prepared nor is intended for the purpose of advertising, sales, promoting or endorsing any Client interests including raising investment capital, recommending investment decisions, or other publicity purposes;
    d. does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in or in relation to the site(s); and
    e. does not purport to provide, nor should be construed as, legal advice.

APPENDIX A FIGURES



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Date: 30/10/2024
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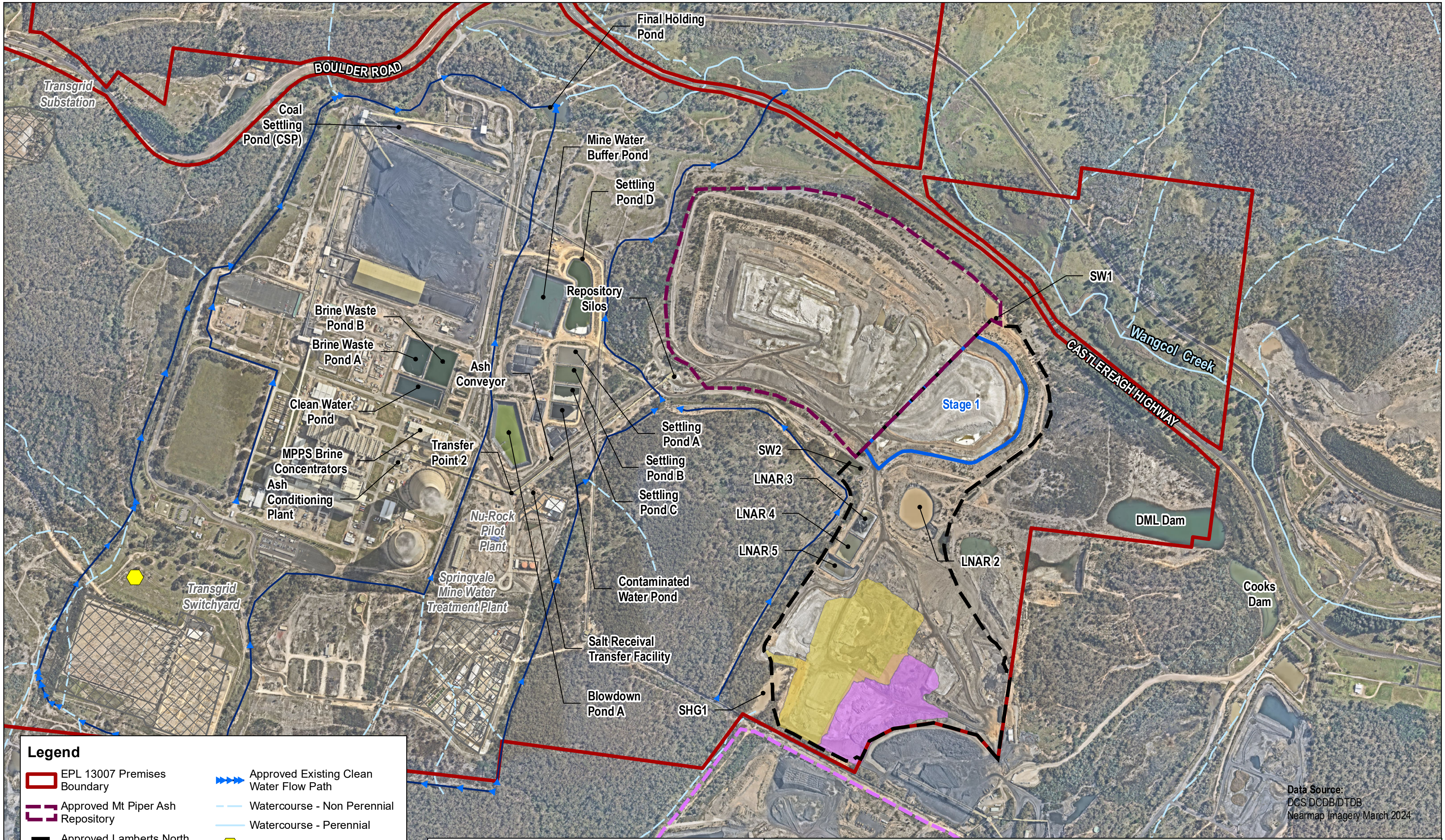
Figure 1 - Regional Context

Lamberts North Annual Report 2023/24
350 Boulder Road, Portland, New South Wales

EnergyAustralia NSW Pty Ltd

ERM

0743908_LNAR24_G001_R1.mxd



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Date: 08/11/2024
Created By: GC
Drawing Size: A4

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1:13,800

Figure 2 - Lamberts North Ash Repository and Surrounds

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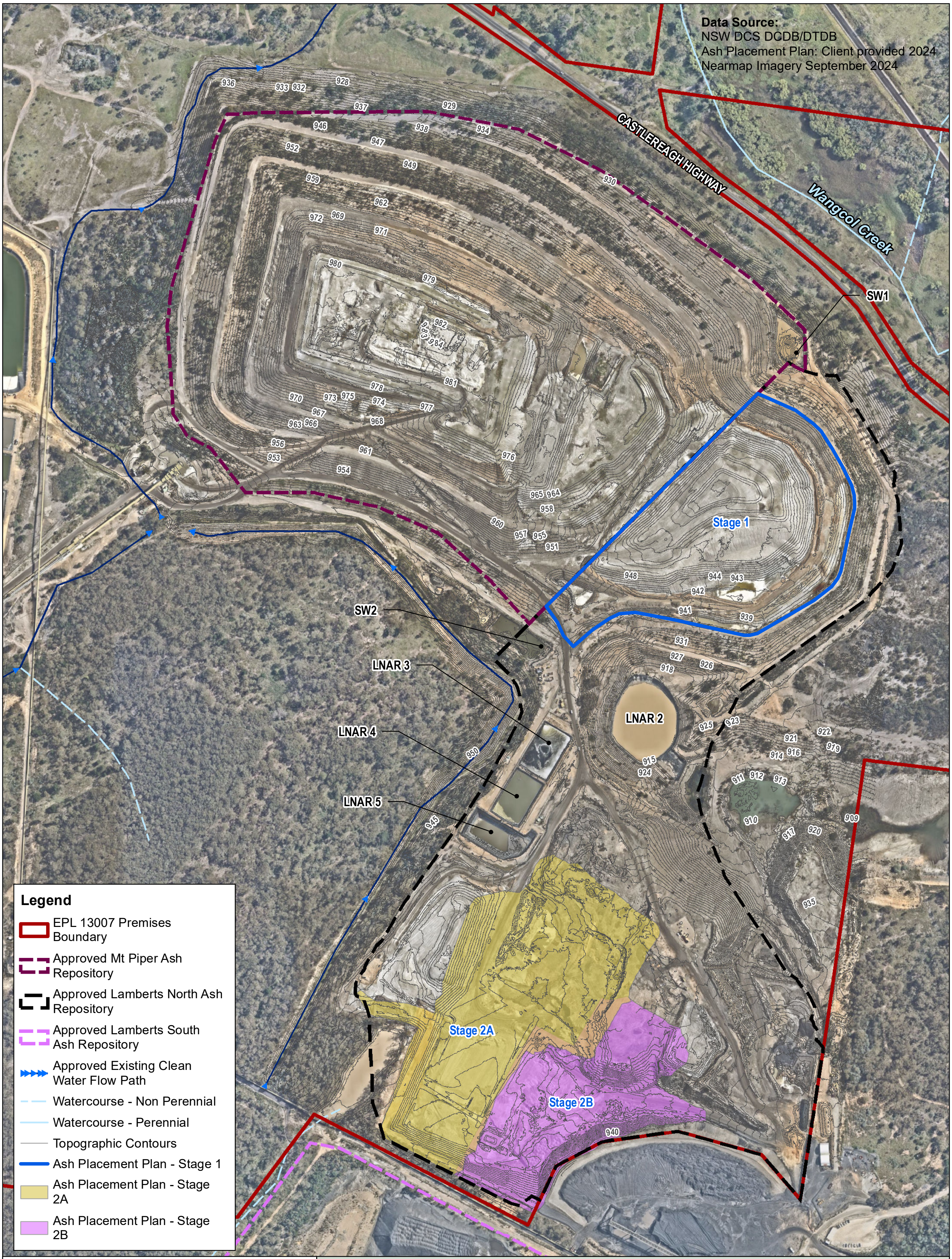
EnergyAustralia NSW Pty Ltd

ERM

0743908_LNAR24_G014_R0.mxd



Coordinate System:
GDA 1994 MGA Zone 56

Date: 08/11/2024
Created By: GC
Drawing Size: A4

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Figure 3 - Ash Placement Plan

Lamberts North Annual Report 2023/24
350 Boulder Road, Portland, New South Wales

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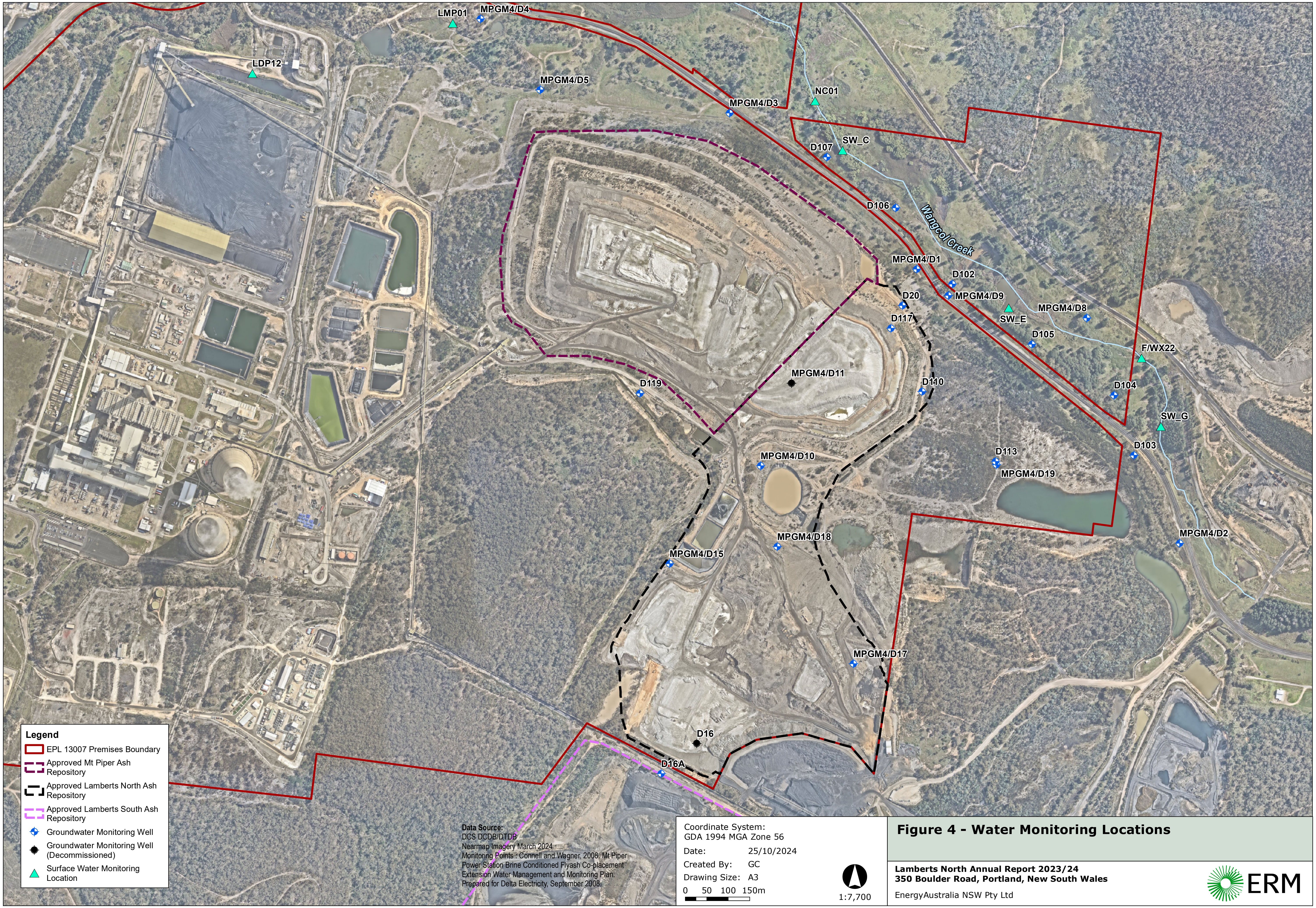

Figure 4 - Water Monitoring Locations

Lamberts North Annual Report 2023/24
350 Boulder Road, Portland, New South Wales
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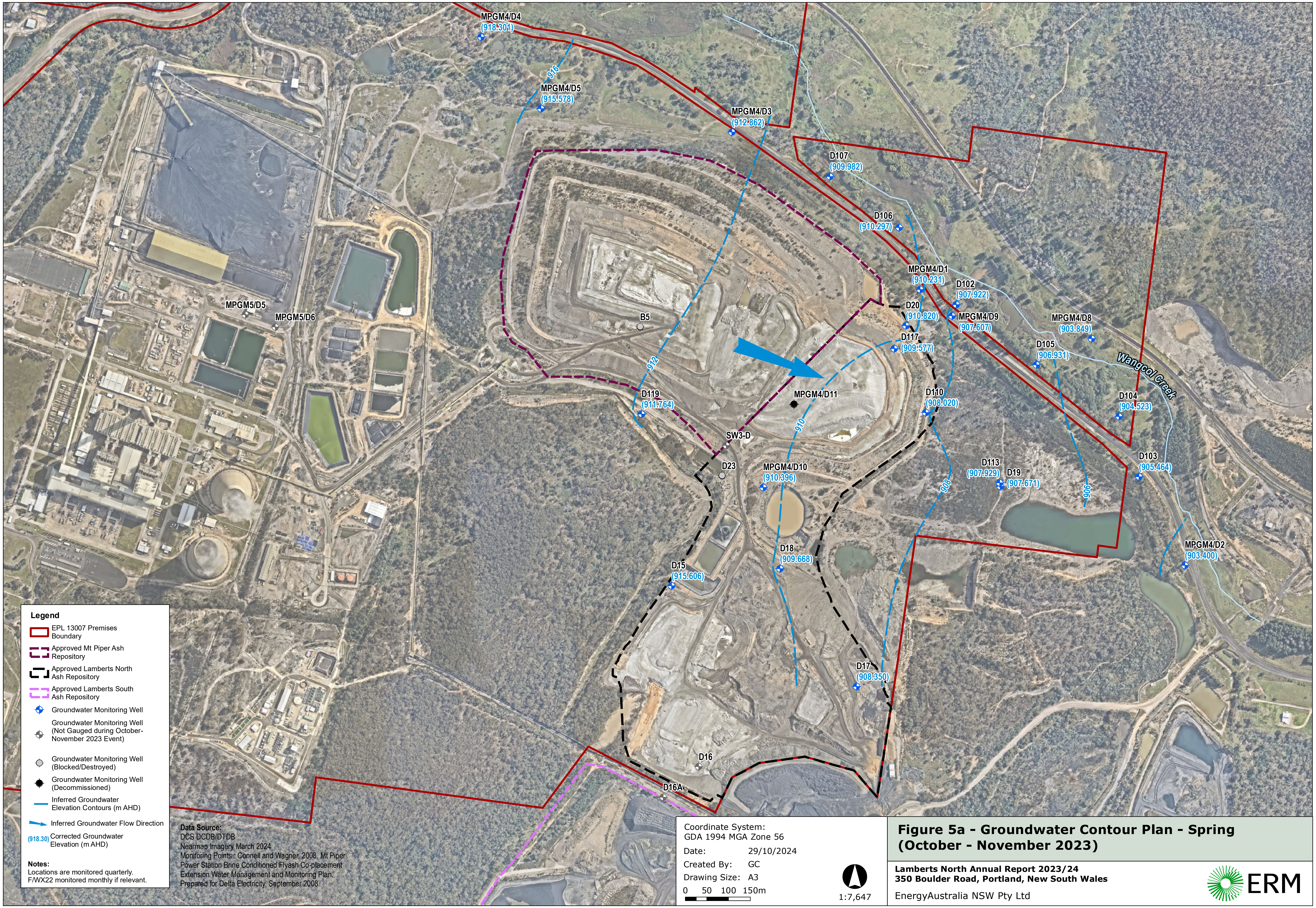

Coordinate System:
GDA 1994 MGA Zone 56

Date: 29/10/2024

Created By: GC

Drawing Size: A3

Figure 5a - Groundwater Contour Plan - Spring (October - November 2023)

Lamberts North Annual Report 2023/24
350 Boulder Road, Portland, New South Wales

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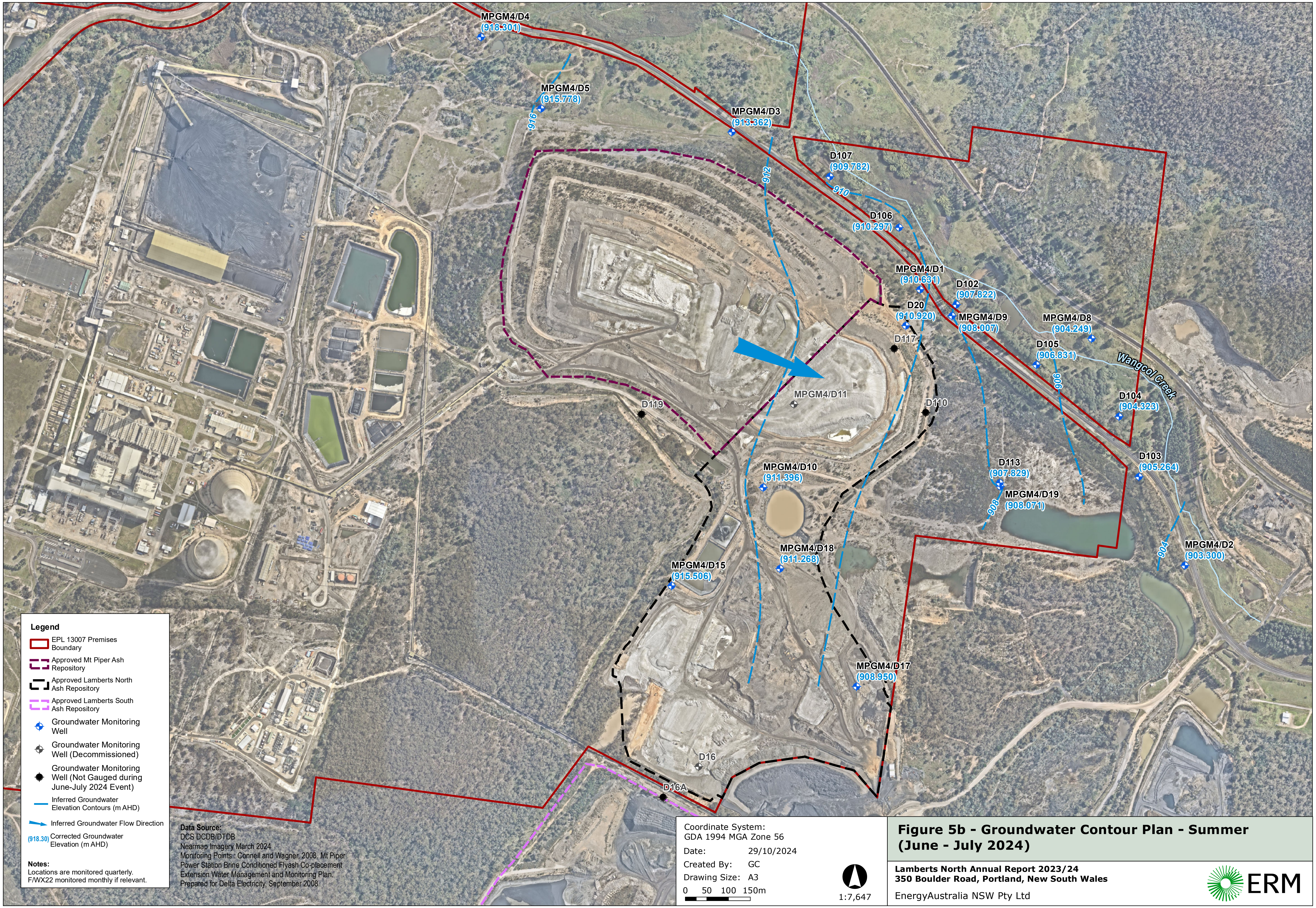

Coordinate System:
GDA 1994 MGA Zone 56

Date: 29/10/2024

Created By: GC

Drawing Size: A3

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Figure 5b - Groundwater Contour Plan - Summer (June - July 2024)

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350 Boulder Road, Portland, New South Wales

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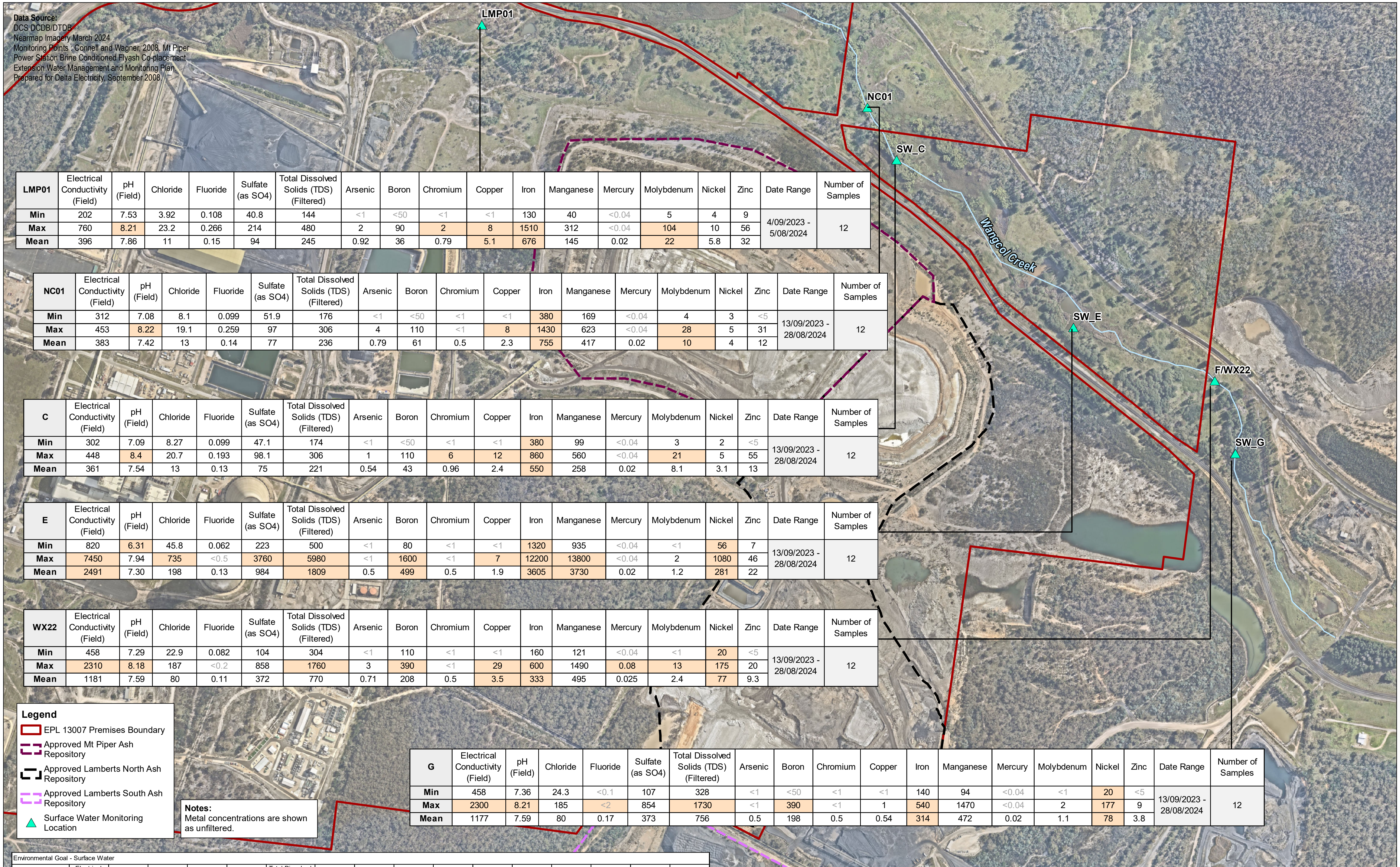
0743908_LNAR24_G006_R0.mxd



LMP01	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic	Boron	Chromium	Copper	Iron	Manganese	Mercury	Molybdenum	Nickel	Zinc	Date Range	Number of Samples
Min	202	7.53	3.92	0.108	40.8	144	<1	<50	<1	<1	130	40	<0.04	5	4	9	4/09/2023 - 5/08/2024	12
Max	760	8.21	23.2	0.266	214	480	2	90	2	8	1510	312	<0.04	104	10	56		
Mean	396	7.86	11	0.15	94	245	0.92	36	0.79	5.1	676	145	0.02	22	5.8	32		

NC01	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic	Boron	Chromium	Copper	Iron	Manganese	Mercury	Molybdenum	Nickel	Zinc	Date Range	Number of Samples
Min	312	7.08	8.1	0.099	51.9	176	<1	<50	<1	<1	380	169	<0.04	4	3	<5	13/09/2023 - 28/08/2024	12
Max	453	8.22	19.1	0.259	97	306	4	110	<1	8	1430	623	<0.04	28	5	31		
Mean	383	7.42	13	0.14	77	236	0.79	61	0.5	2.3	755	417	0.02	10	4	12		

C	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic	Boron	Chromium	Copper	Iron	Manganese	Mercury	Molybdenum	Nickel	Zinc	Date Range	Number of Samples
Min	302	7.09	8.27	0.099	47.1	174	<1	<50	<1	<1	380	99	<0.04	3	2	<5	13/09/2023 - 28/08/2024	12
Max	448	8.4	20.7	0.193	98.1	306	1	110	6	12	860	560	<0.04	21	5	55		
Mean	361	7.54	13	0.13	75	221	0.54	43	0.96	2.4	550	258	0.02	8.1	3.1	13		

E	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic	Boron	Chromium	Copper	Iron	Manganese	Mercury	Molybdenum	Nickel	Zinc	Date Range	Number of Samples
Min	820	6.31	45.8	0.062	223	500	<1	80	<1	<1	1320	935	<0.04	<1	56	7	13/09/2023 - 28/08/2024	12
Max	7450	7.94	735	<0.5	3760	5980	<1	1600	<1	7	12200	13800	<0.04	2	1080	46		
Mean	2491	7.30	198	0.13	984	1809	0.5	499	0.5	1.9	3605	3730	0.02	1.2	281	22		

WX22	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic	Boron	Chromium	Copper	Iron	Manganese	Mercury	Molybdenum	Nickel	Zinc	Date Range	Number of Samples
Min	458	7.29	22.9	0.082	104	304	<1	110	<1	<1	160	121	<0.04	<1	20	<5	13/09/2023 - 28/08/2024	12
Max	2310	8.18	187	<0.2	858	1760	3	390	<1	29	600	1490	0.08	13	175	20		
Mean	1181	7.59	80	0.11	372	770	0.71	208	0.5	3.5	333	495	0.025	2.4	77	9.3		

G	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic	Boron	Chromium	Copper	Iron	Manganese	Mercury	Molybdenum	Nickel	Zinc	Date Range	Number of Samples
Min	458	7.36	24.3	<0.1	107	328	<1	<50	<1	<1	140	94	<0.04	<1	20	<5	13/09/2023 - 28/08/2024	12
Max	2300	8.21	185	<2	854	1730	<1	390	<1	1	540	1470	<0.04	2	177	9		
Mean	1177	7.59	80	0.17	373	756	0.5	198	0.5	0.54	314	472	0.02	1.1	78	3.8		

Legend

- EPL 13007 Premises Boundary
- Approved Mt Piper Ash Repository
- Approved Lamberts North Ash Repository
- Approved Lamberts South Ash Repository
- Surface Water Monitoring Location

Notes:
Metal concentrations are shown as unfiltered.

Environmental Goal - Surface Water

	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic	Boron	Chromium	Copper	Iron	Manganese	Mercury	Molybdenum	Nickel	Zinc
Units	uS/cm	pH units	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
ANZECC (2000) or Local Guidelines - Surface Water	2200	6.5-8	350	1.5	1000	1500	24	370	2	3.5	300	1900	0.06	10	17	116

350 Highlighted cells indicate an exceedance of the Surface Water Environmental Goal.

Coordinate System:
GDA 1994 MGA Zone 56
Date: 25/10/2024
Created By: GC
Drawing Size: A3
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1:7,700

Figure 6 - Surface Water Summary of Results

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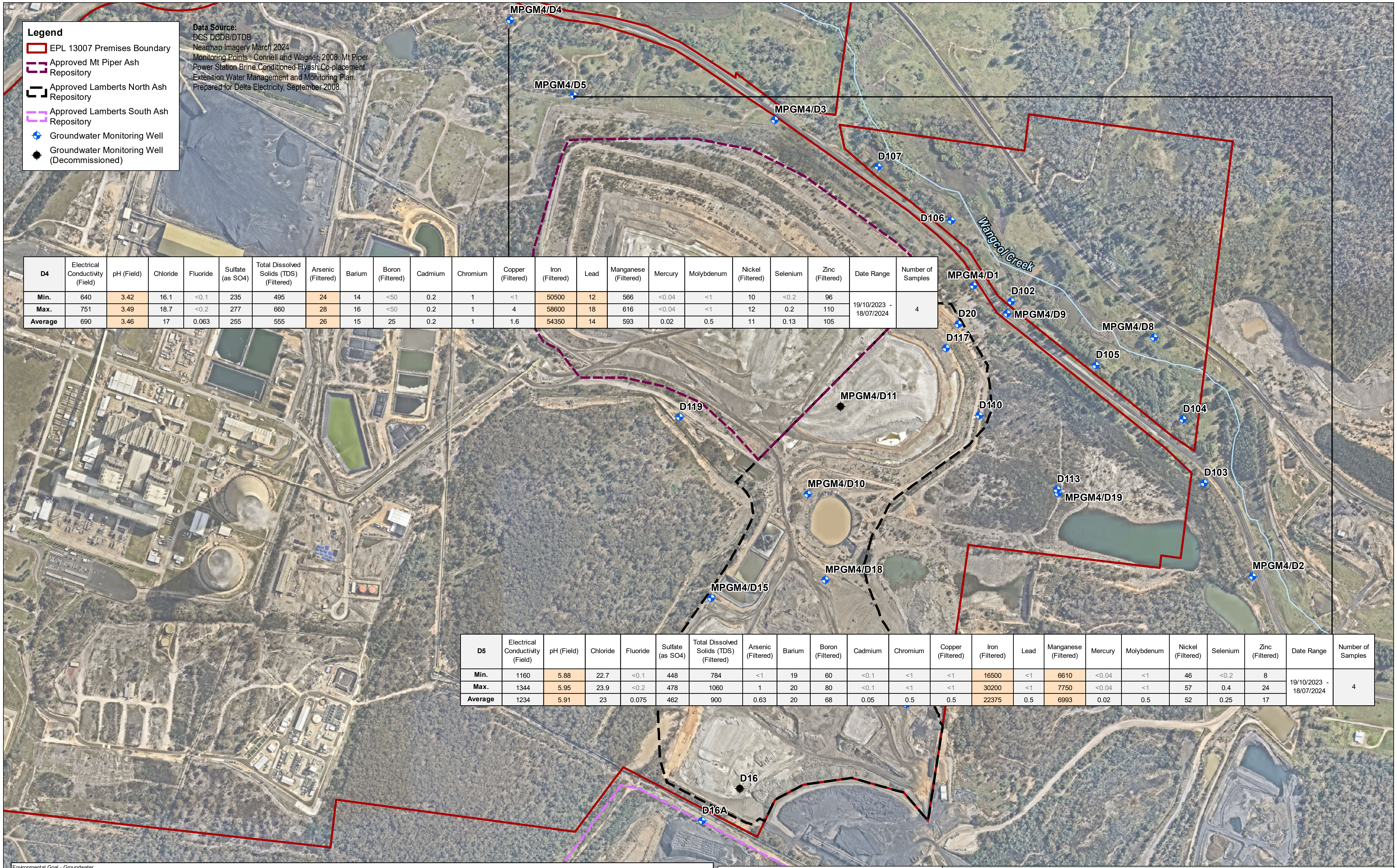
0743908_LNAR24_G007_R0.mxd



D4	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	640	3.42	16.1	<0.1	235	495	24	14	<50	0.2	1	<1	50500	12	566	<0.04	<1	10	<0.2	96	19/10/2023 - 18/07/2024	4
Max.	751	3.49	18.7	<0.2	277	660	28	16	<50	0.2	1	4	58600	18	616	<0.04	<1	12	0.2	110		
Average	690	3.46	17	0.063	255	555	26	15	25	0.2	1	1.6	54350	14	593	0.02	0.5	11	0.13	105		

D5	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	1160	5.88	22.7	<0.1	448	784	<1	19	60	<0.1	<1	<1	16500	<1	6610	<0.04	<1	46	<0.2	8	19/10/2023 - 18/07/2024	4
Max.	1344	5.95	23.9	<0.2	478	1060	1	20	80	<0.1	<1	<1	30200	<1	7750	<0.04	<1	57	0.4	24		
Average	1234	5.91	23	0.075	462	900	0.63	20	68	0.05	0.5	0.5	22375	0.5	6993	0.02	0.5	52	0.25	17		

Environmental Goal - Groundwater

	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)
Units	uS/cm	pH units	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
ANZECC (2000) or Local Guidelines - Groundwater	2600	6.5-8	350	1.5	1000	2000	24	700	370	2	5	5	664	5	5704	0.06	10	550.9	5	908

350 Highlighted cells indicate an exceedance of the Groundwater Environmental Goal

Coordinate System:
GDA 1994 MGA Zone 56

Date: 29/10/2024

Created By: GC

Drawing Size: A3

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Figure 7a - Groundwater Summary of Results Upgradient / Background

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350 Boulder Road, Portland, New South Wales

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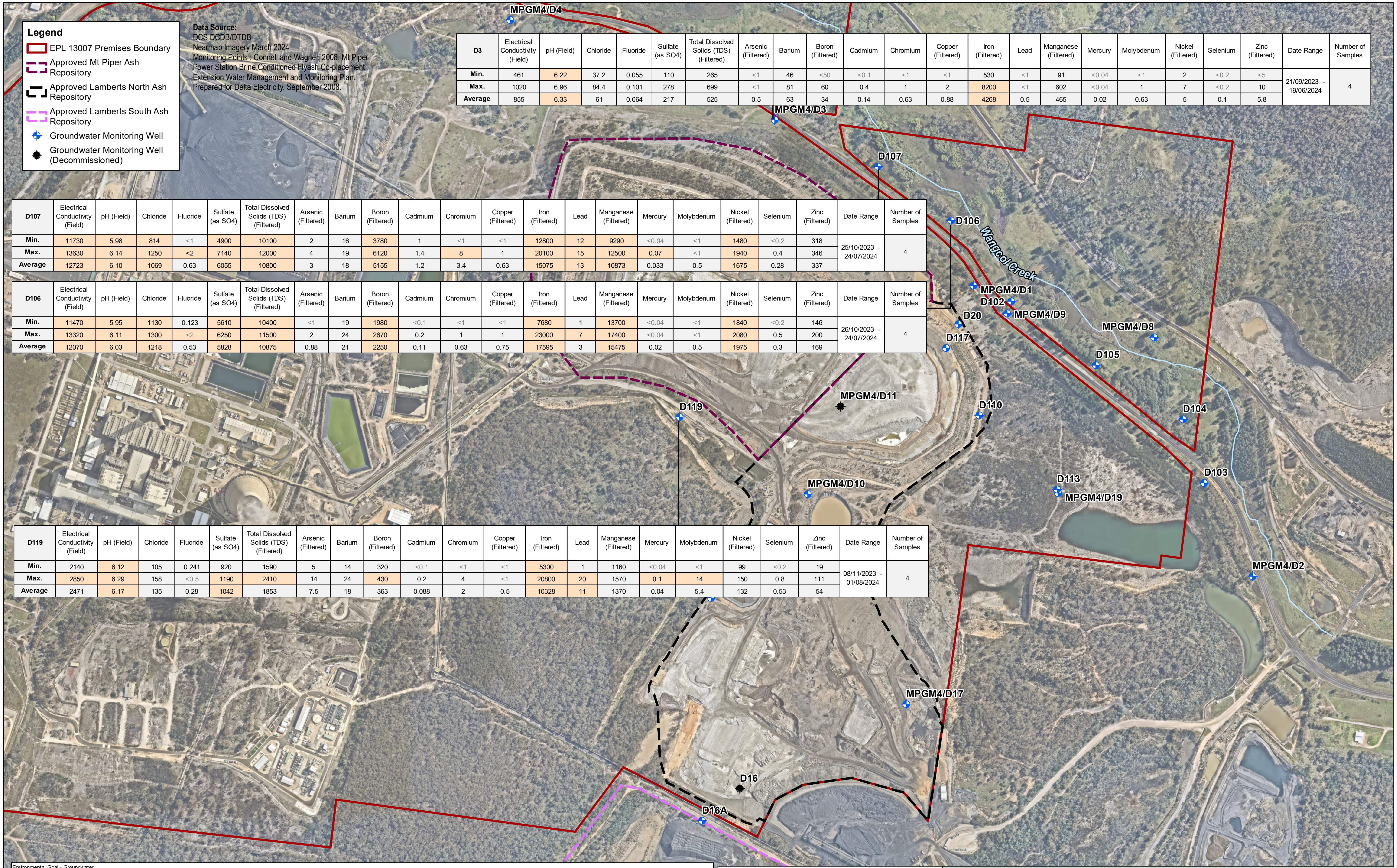
Figure 7b - Groundwater Summary of Results Upgradient / Adjacent MPAR



D3	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	461	6.22	37.2	0.055	110	265	<1	46	<50	<0.1	<1	<1	530	<1	91	<0.04	<1	2	<0.2	<5	21/09/2023 - 19/06/2024	4
Max.	1020	6.96	84.4	0.101	278	699	<1	81	60	0.4	1	2	8200	<1	602	<0.04	1	7	<0.2	10		
Average	855	6.33	61	0.064	217	525	0.5	63	34	0.14	0.63	0.88	4268	0.5	465	0.02	0.63	5	0.1	5.8		

D107	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	11730	5.98	814	<1	4900	10100	2	16	3780	1	<1	<1	12800	12	9290	<0.04	<1	1480	<0.2	318	25/10/2023 - 24/07/2024	4
Max.	13630	6.14	1250	<2	7140	12000	4	19	6120	1.4	8	1	20100	15	12500	0.07	<1	1940	0.4	346		
Average	12723	6.10	1069	0.63	6055	10800	3	18	5155	1.2	3.4	0.63	15075	13	10873	0.033	0.5	1675	0.28	337		

D106	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	11470	5.95	1130	0.123	5610	10400	<1	19	1980	<0.1	<1	<1	7680	1	13700	<0.04	<1	1840	<0.2	146	26/10/2023 - 24/07/2024	4
Max.	13320	6.11	1300	<2	6250	11500	2	24	2670	0.2	1	1	23000	7	17400	<0.04	<1	2080	0.5	200		
Average	12070	6.03	1218	0.53	5828	10875	0.88	21	2250	0.11	0.63	0.75	17595	3	15475	0.02	0.5	1975	0.3	169		

D119	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	2140	6.12	105	0.241	920	1590	5	14	320	<0.1	<1	<1	5300	1	1160	<0.04	<1	99	<0.2	19	08/11/2023 - 01/08/2024	4
Max.	2850	6.29	158	<0.5	1190	2410	14	24	430	0.2	4	<1	20800	20	1570	0.1	14	150	0.8	111		
Average	2471	6.17	135	0.28	1042	1853	7.5	18	363	0.088	2	0.5	10328	11	1370	0.04	5.4	132	0.53	54		

Environmental Goal - Groundwater

	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)
Units	uS/cm	pH units	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
ANZECC (2000) or Local Guidelines - Groundwater	2600	6.5-8	350	1.5	1000	2000	24	700	370	2	5	5	664	5	5704	0.06	10	550.9	5	908

350 Highlighted cells indicate an exceedance of the Groundwater Environmental Goal

Coordinate System:
GDA 1994 MGA Zone 56
Date: 29/10/2024
Created By: GC
Drawing Size: A3
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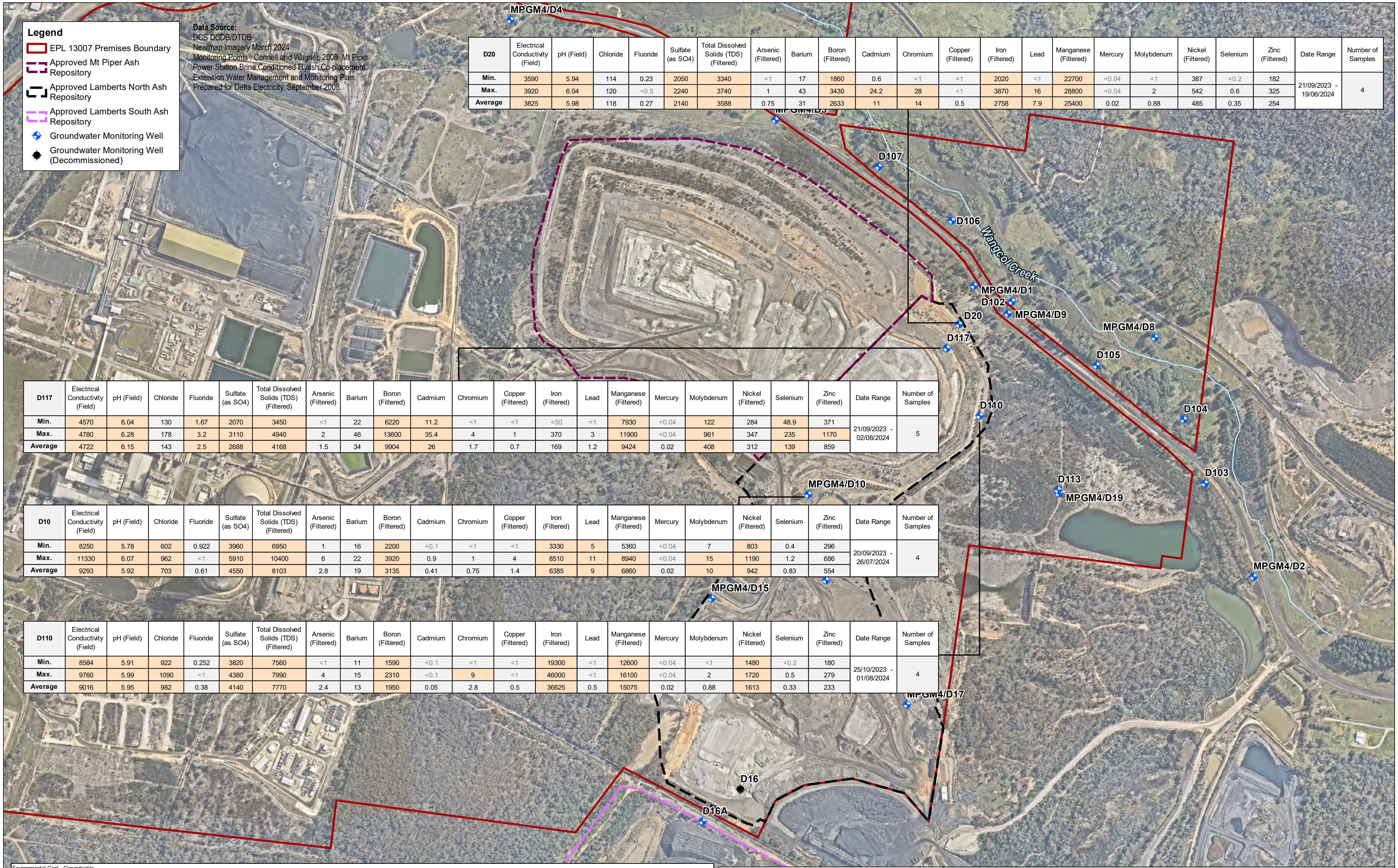

D20	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	3590	5.94	114	0.23	2050	3340	<1	17	1860	0.6	<1	<1	2020	<1	22700	<0.04	<1	387	<0.2	182	21/09/2023 - 19/06/2024	4
Max.	3920	6.04	120	<0.5	2240	3740	1	43	3430	24.2	28	<1	3870	16	28800	<0.04	2	542	0.6	325		
Average	3825	5.98	118	0.27	2140	3588	0.75	31	2633	11	14	0.5	2758	7.9	25400	0.02	0.88	485	0.35	254		

D117	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	4570	6.04	130	1.67	2070	3450	<1	22	6220	11.2	<1	<1	<50	<1	7930	<0.04	122	284	48.9	371	21/09/2023 - 02/08/2024	5
Max.	4780	6.28	178	3.2	3110	4940	2	46	13600	35.4	4	1	370	3	11900	<0.04	961	347	235	1170		
Average	4722	6.15	143	2.5	2688	4168	1.5	34	9904	26	1.7	0.7	169	1.2	9424	0.02	408	312	139	859		

D10	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	8250	5.78	602	0.922	3960	6950	1	16	2200	<0.1	<1	<1	3330	5	5360	<0.04	7	803	0.4	296	20/09/2023 - 26/07/2024	4
Max.	11330	6.07	962	<1	5910	10400	6	22	3920	0.9	1	4	8510	11	8940	<0.04	15	1190	1.2	686		
Average	9293	5.92	703	0.61	4550	8103	2.8	19	3135	0.41	0.75	1.4	6385	9	6860	0.02	10	942	0.83	554		

D110	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	8584	5.91	922	0.252	3820	7560	<1	11	1590	<0.1	<1	<1	19300	<1	12600	<0.04	<1	1480	<0.2	180	25/10/2023 - 01/08/2024	4
Max.	9760	5.99	1090	<1	4380	7990	4	15	2310	<0.1	9	<1	46000	<1	16100	<0.04	2	1720	0.5	279		
Average	9016	5.95	982	0.38	4140	7770	2.4	13	1950	0.05	2.8	0.5	36625	0.5	15075	0.02	0.88	1613	0.33	233		

Environmental Goal - Groundwater

	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)
Units	uS/cm	pH units	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
ANZECC (2000) or Local Guidelines - Groundwater	2600	6.5-8	350	1.5	1000	2000	24	700	370	2	5	5	664	5	5704	0.06	10	550.9	5	908

350 Highlighted cells indicate an exceedance of the Groundwater Environmental Goal

Coordinate System:
GDA 1994 MGA Zone 56
Date: 29/10/2024
Created By: GC
Drawing Size: A3
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1:7,700

Figure 7c - Groundwater Summary of Results Within / Immediatley Adjacent LNAR North

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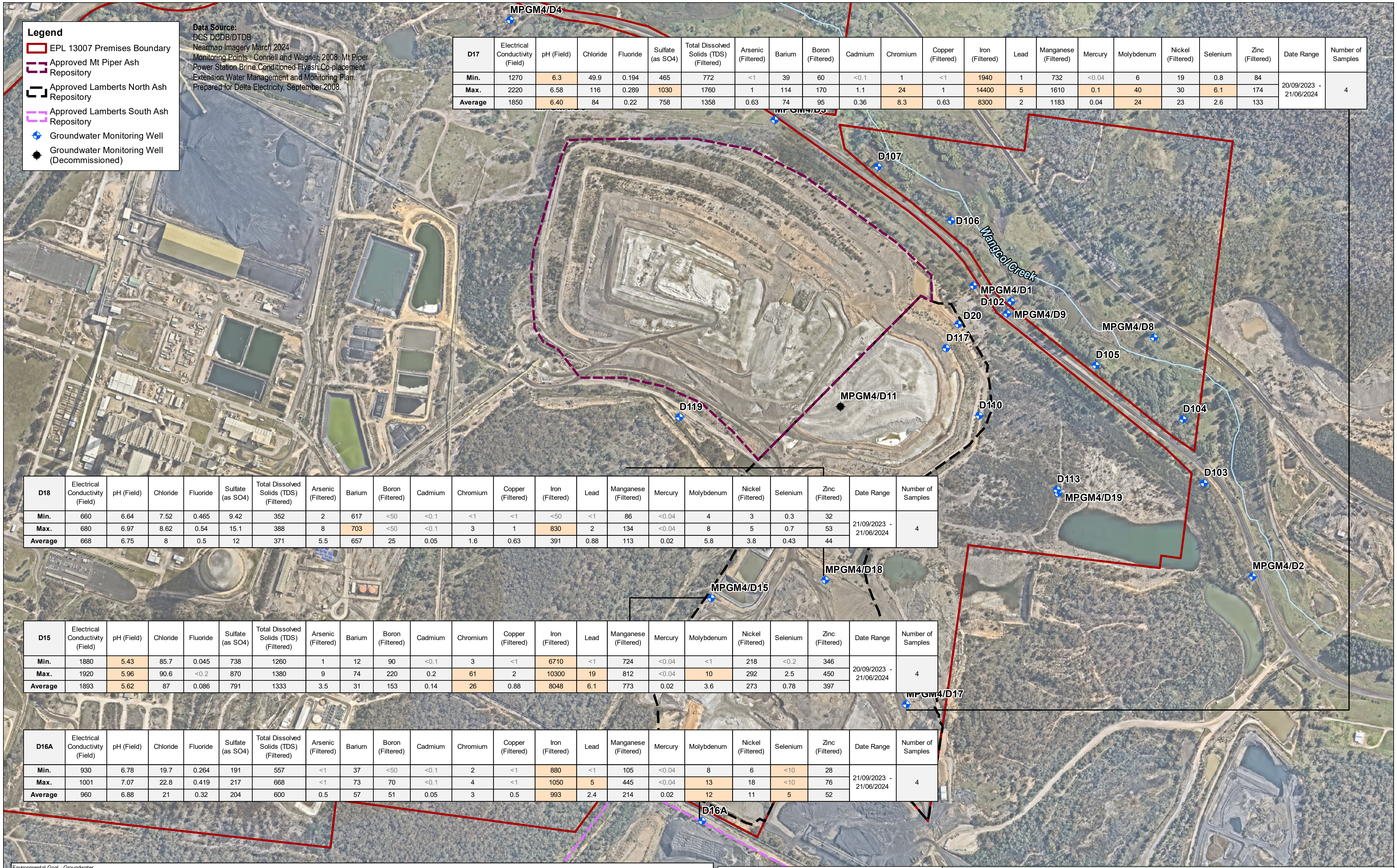
Figure 7d - Groundwater Summary of Results Within / Immediatley Adjacent LNAR South



D17	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	1270	6.3	49.9	0.194	465	772	<1	39	60	<0.1	1	<1	1940	1	732	<0.04	6	19	0.8	84	20/09/2023 - 21/06/2024	4
Max.	2220	6.58	116	0.289	1030	1760	1	114	170	1.1	24	1	14400	5	1610	0.1	40	30	6.1	174		
Average	1850	6.40	84	0.22	758	1358	0.63	74	95	0.36	8.3	0.63	8300	2	1183	0.04	24	23	2.6	133		

D18	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	660	6.64	7.52	0.465	9.42	352	2	617	<50	<0.1	<1	<1	<50	<1	86	<0.04	4	3	0.3	32	21/09/2023 - 21/06/2024	4
Max.	680	6.97	8.62	0.54	15.1	388	8	703	<50	<0.1	3	1	830	2	134	<0.04	8	5	0.7	53		
Average	668	6.75	8	0.5	12	371	5.5	657	25	0.05	1.6	0.63	391	0.88	113	0.02	5.8	3.8	0.43	44		

D15	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	1880	5.43	85.7	0.045	738	1260	1	12	90	<0.1	3	<1	6710	<1	724	<0.04	<1	218	<0.2	346	20/09/2023 - 21/06/2024	4
Max.	1920	5.96	90.6	<0.2	870	1380	9	74	220	0.2	61	2	10300	19	812	<0.04	10	292	2.5	450		
Average	1893	5.62	87	0.086	791	1333	3.5	31	153	0.14	26	0.88	8048	6.1	773	0.02	3.6	273	0.78	397		

D16A	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	930	6.78	19.7	0.264	191	557	<1	37	<50	<0.1	2	<1	880	<1	105	<0.04	8	6	<10	28	21/09/2023 - 21/06/2024	4
Max.	1001	7.07	22.8	0.419	217	668	<1	73	70	<0.1	4	<1	1050	5	445	<0.04	13	18	<10	76		
Average	960	6.88	21	0.32	204	600	0.5	57	51	0.05	3	0.5	993	2.4	214	0.02	12	11	5	52		

Environmental Goal - Groundwater

	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)
Units	uS/cm	pH units	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
ANZECC (2000) or Local Guidelines - Groundwater	2600	6.5-8	350	1.5	1000	2000	24	700	370	2	5	5	664	5	5704	0.06	10	550.9	5	908

350 Highlighted cells indicate an exceedance of the Groundwater Environmental Goal

Coordinate System:
GDA 1994 MGA Zone 56

Date: 29/10/2024

Created By: GC

Drawing Size: A3

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Lamberts North Annual Report 2023/24
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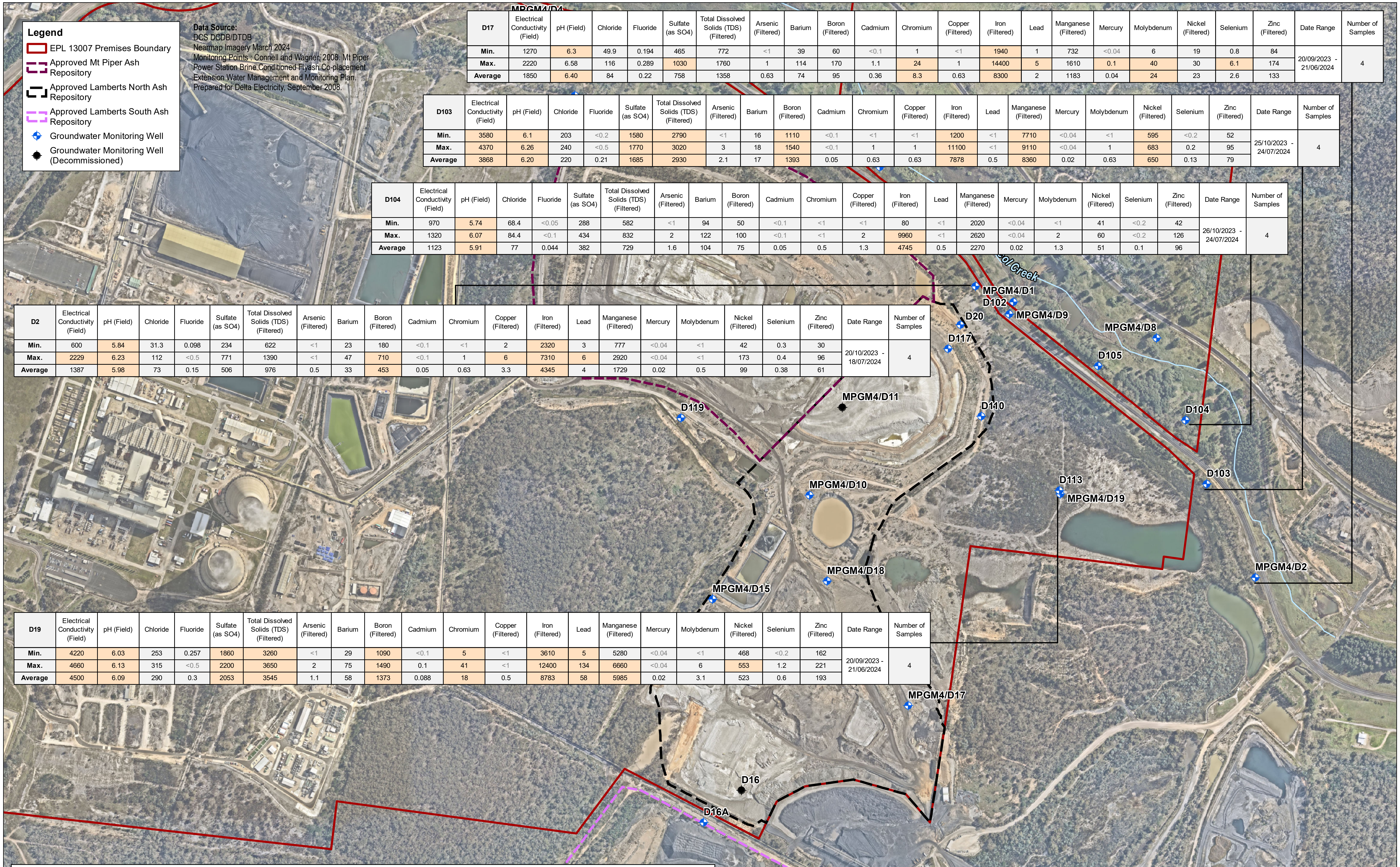

D17	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	1270	6.3	49.9	0.194	465	772	<1	39	60	<0.1	1	<1	1940	1	732	<0.04	6	19	0.8	84	20/09/2023 - 21/06/2024	4
Max.	2220	6.58	116	0.289	1030	1760	1	114	170	1.1	24	1	14400	5	1610	0.1	40	30	6.1	174		
Average	1850	6.40	84	0.22	758	1358	0.63	74	95	0.36	8.3	0.63	8300	2	1183	0.04	24	23	2.6	133		

D103	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	3580	6.1	203	<0.2	1580	2790	<1	16	1110	<0.1	<1	<1	1200	<1	7710	<0.04	<1	595	<0.2	52	25/10/2023 - 24/07/2024	4
Max.	4370	6.26	240	<0.5	1770	3020	3	18	1540	<0.1	1	1	11100	<1	9110	<0.04	1	683	0.2	95		
Average	3868	6.20	220	0.21	1685	2930	2.1	17	1393	0.05	0.63	0.63	7878	0.5	8360	0.02	0.63	650	0.13	79		

D104	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	970	5.74	68.4	<0.05	288	582	<1	94	50	<0.1	<1	<1	80	<1	2020	<0.04	<1	41	<0.2	42	26/10/2023 - 24/07/2024	4
Max.	1320	6.07	84.4	<0.1	434	832	2	122	100	<0.1	<1	2	9960	<1	2620	<0.04	2	60	<0.2	126		
Average	1123	5.91	77	0.044	382	729	1.6	104	75	0.05	0.5	1.3	4745	0.5	2270	0.02	1.3	51	0.1	96		

D2	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	600	5.84	31.3	0.098	234	622	<1	23	180	<0.1	<1	2	2320	3	777	<0.04	<1	42	0.3	30	20/10/2023 - 18/07/2024	4
Max.	2229	6.23	112	<0.5	771	1390	<1	47	710	<0.1	1	6	7310	6	2920	<0.04	<1	173	0.4	96		
Average	1387	5.98	73	0.15	506	976	0.5	33	453	0.05	0.63	3.3	4345	4	1729	0.02	0.5	99	0.38	61		

D19	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	4220	6.03	253	0.257	1860	3260	<1	29	1090	<0.1	5	<1	3610	5	5280	<0.04	<1	468	<0.2	162	20/09/2023 - 21/06/2024	4
Max.	4660	6.13	315	<0.5	2200	3650	2	75	1490	0.1	41	<1	12400	134	6660	<0.04	6	553	1.2	221		
Average	4500	6.09	290	0.3	2053	3545	1.1	58	1373	0.088	18	0.5	8783	58	5985	0.02	3.1	523	0.6	193		

Environmental Goal - Groundwater

	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)
Units	uS/cm	pH units	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
ANZECC (2000) or Local Guidelines - Groundwater	2600	6.5-8	350	1.5	1000	2000	24	700	370	2	5	5	664	5	5704	0.06	10	550.9	5	908

350 Highlighted cells indicate an exceedance of the Groundwater Environmental Goal

Coordinate System:
GDA 1994 MGA Zone 56
Date: 29/10/2024
Created By: GC
Drawing Size: A3
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Figure 7e - Groundwater Summary of Results Cross and Downgradient of LNAR / Adjacent Wangcol Creek

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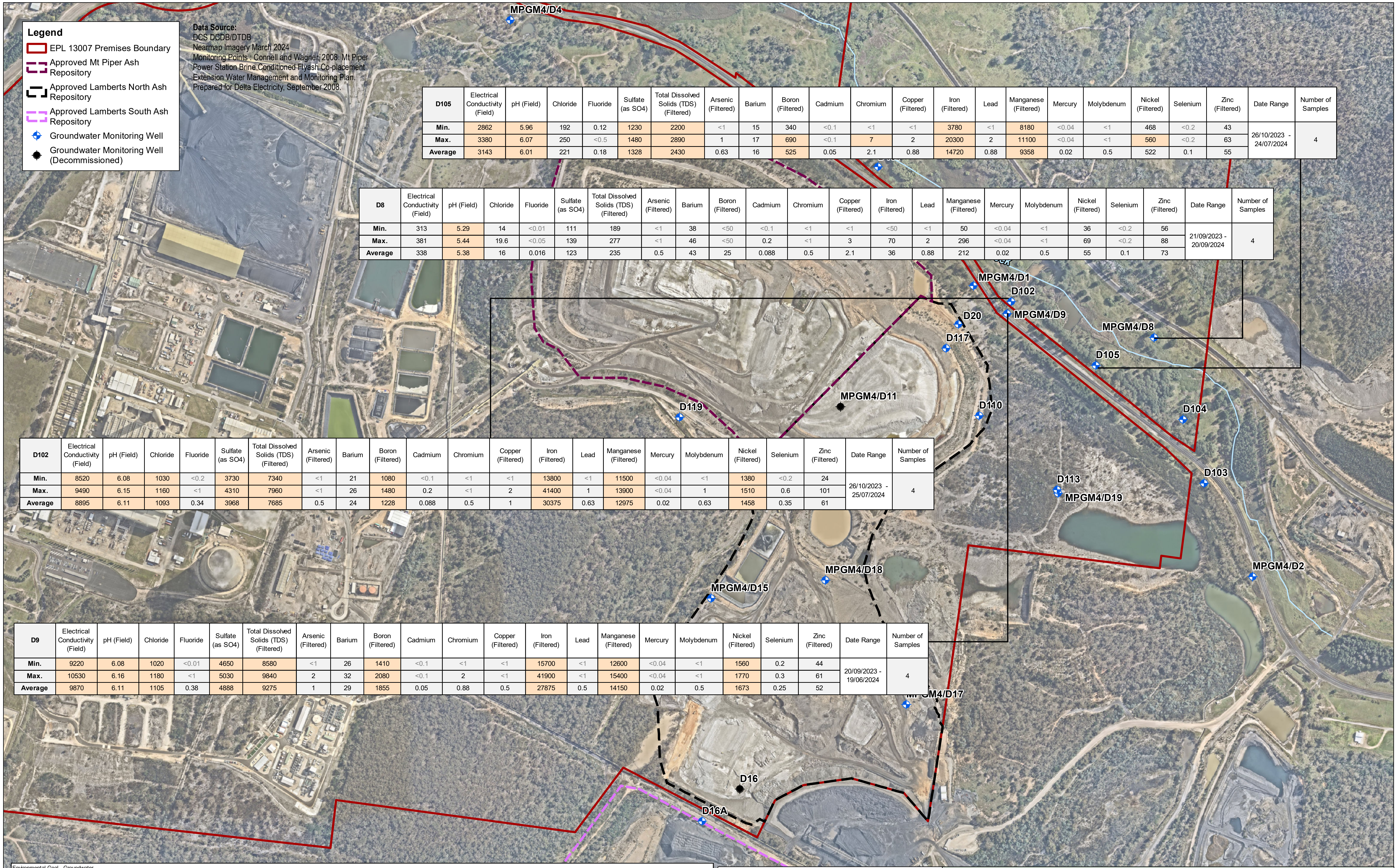

D105	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	2862	5.96	192	0.12	1230	2200	<1	15	340	<0.1	<1	<1	3780	<1	8180	<0.04	<1	468	<0.2	43	26/10/2023 - 24/07/2024	4
Max.	3380	6.07	250	<0.5	1480	2890	1	17	690	<0.1	7	2	20300	2	11100	<0.04	<1	560	<0.2	63		
Average	3143	6.01	221	0.18	1328	2430	0.63	16	525	0.05	2.1	0.88	14720	0.88	9358	0.02	0.5	522	0.1	55		

D8	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	313	5.29	14	<0.01	111	189	<1	38	<50	<0.1	<1	<1	<50	<1	50	<0.04	<1	36	<0.2	56	21/09/2023 - 20/09/2024	4
Max.	381	5.44	19.6	<0.05	139	277	<1	46	<50	0.2	<1	3	70	2	296	<0.04	<1	69	<0.2	88		
Average	338	5.38	16	0.016	123	235	0.5	43	25	0.088	0.5	2.1	36	0.88	212	0.02	0.5	55	0.1	73		

D102	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	8520	6.08	1030	<0.2	3730	7340	<1	21	1080	<0.1	<1	<1	13800	<1	11500	<0.04	<1	1380	<0.2	24	26/10/2023 - 25/07/2024	4
Max.	9490	6.15	1160	<1	4310	7960	<1	26	1480	0.2	<1	2	41400	1	13900	<0.04	1	1510	0.6	101		
Average	8895	6.11	1093	0.34	3968	7685	0.5	24	1228	0.088	0.5	1	30375	0.63	12975	0.02	0.63	1458	0.35	61		

D9	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)	Date Range	Number of Samples
Min.	9220	6.08	1020	<0.01	4650	8580	<1	26	1410	<0.1	<1	<1	15700	<1	12600	<0.04	<1	1560	0.2	44	20/09/2023 - 19/06/2024	4
Max.	10530	6.16	1180	<1	5030	9840	2	32	2080	<0.1	2	<1	41900	<1	15400	<0.04	<1	1770	0.3	61		
Average	9870	6.11	1105	0.38	4888	9275	1	29	1855	0.05	0.88	0.5	27875	0.5	14150	0.02	0.5	1673	0.25	52		

Environmental Goal - Groundwater

	Electrical Conductivity (Field)	pH (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS) (Filtered)	Arsenic (Filtered)	Barium	Boron (Filtered)	Cadmium	Chromium	Copper (Filtered)	Iron (Filtered)	Lead	Manganese (Filtered)	Mercury	Molybdenum	Nickel (Filtered)	Selenium	Zinc (Filtered)
Units	uS/cm	pH units	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
ANZECC (2000) or Local Guidelines - Groundwater	2600	6.5-8	350	1.5	1000	2000	24	700	370	2	5	5	664	5	5704	0.06	10	550.9	5	908

350 — Highlighted cells indicate an exceedance of the Groundwater Environmental Goal

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Figure 7f - Groundwater Summary of Results Cross and Downgradient of LNAR / Adjacent Wangcol Creek

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350 Boulder Road, Portland, New South Wales
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APPENDIX B TABULATED SURFACE WATER DATA

ERM

				Field Parameters				Major Anions and Cations											Nutrients								Physical Parameters										
				Dissolved Oxygen (Field) (Filtered)	Electrical Conductivity (Field)	pH (Field)	Redox (Field)	Carbonate (as CaCO3)	Bicarbonate Alkalinity (as CaCO3)	Calcium	Carbonate Alkalinity (as CaCO3)	Chloride	Fluoride	Magnesium	Phenolphthalein Alkalinity	Potassium	Sodium	Sulfate (as SO4)	Ammonia	Sulfur	Nitrate	Nitrite (as NO2-)	Nitrite + Nitrate (as N)	Nitrogen (N) - Kjeldahl	Nitrogen (N)	Phosphorus	Total Dissolved Solids (TDS) (Filtered)	Total Suspended Solids (TSS)	Turbidity	Aluminium	Aluminium (Filtered)	Antimony	Arsenic	Arsenic (Filtered)	Arsenic III	Arsenic V	Barium
				mg/L	uS/cm	pH units	mV	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
ANZECC (2000) or Local Guidelines - Surface Water					2200	6.5-8						350	1.5					1000									1500						24	24	24	13	700
Purpose	**Field_ID**	**LocCode**	**Sampled_Date-Time**																																		
Upstream	Wangcol Creek Weir	LMP01	4/09/2023	6.5	368	7.75	109.9	<1	69	24.6	69	11.5	0.135	14.1	<1	5.44	23.5	92.5	20	29	60	<10	0.06	0.3	0.4	0.04	192	9	22.7	340	10	<1	1	<1	<1	<1	39
Upstream	Wangcol Creek Weir	LMP01	3/10/2023	7.4	760	8.21	100.2	<1	117	32	117	23.2	0.266	18.4	<1	10.8	85.9	214	20	66	50	<10	0.05	0.6	0.6	0.04	480	24	22.6	540	<10	<1	<1	<1	<1	<1	30
Upstream	Wangcol Creek Weir	LMP01	6/11/2023	8.7	463	7.98	106.8	<1	100	27.1	100	16.2	0.184	13	<1	7.75	52.1	108	20	33	140	<10	0.14	0.5	0.6	0.02	274	29	43.5	1090	10	<1	2	<1	<1	<1	26
Upstream	Wangcol Creek Weir	LMP01	4/12/2023	6.6	202	7.53	125.8	<1	48	14.2	48	3.92	0.144	5.56	<1	4.88	20.5	40.8	30	13	130	10	0.14	0.6	0.7	0.06	144	44	108	1390	60	<1	2	<1	<1	<1	22
Upstream	Wangcol Creek Weir	LMP01	2/01/2024	7.5	465	7.83	135.5	<1	87	20.2	87	10.8	0.18	11.3	<1	6.06	55.8	112	10	36	40	<10	0.04	0.3	0.3	0.01	298	6	4.8	110	<10	<1	<1	<1	<1	<1	19
Upstream	Wangcol Creek Weir	LMP01	5/02/2024	6.7	459	7.92	132.6	<1	112	28	112	12.4	0.158	16.9	<1	6.69	38	100	<10	32	40	<10	0.04	0.4	0.4	0.03	275	<5	4.9	100	30	<1	<1	<1	<1	<1	24
Upstream	Wangcol Creek Weir	LMP01	4/03/2024	8.1	371	7.71	139	<1	63	20.5	63	12.6	0.115	10.9	<1	5.82	34.8	86.7	20	29	180	<10	0.18	0.2	0.4	<0.01	220	<5	3.6	80	<10	2	<1	<1	<1	<1	18
Upstream	Wangcol Creek Weir	LMP01	2/04/2024	8.2	354	7.88	125.8	<1	96	23.6	96	10.5	0.146	13.8	<1	5.2	27.9	72.2	<10	21	40	<10	0.04	0.2	0.2	<0.01	230	6	7.6	70	<10	<1	<1	<1	<1	<1	20
Upstream	Wangcol Creek Weir	LMP01	6/05/2024	6.1	270	7.87	126.7	<1	67	18.6	67	7.46	0.131	10.9	<1	5.27	18.8	57.3	20	18	90	<10	0.09	0.4	0.5	0.06	164	44	56.4	990	10	<1	2	<1	<1	<1	26
Upstream	Wangcol Creek Weir	LMP01	3/06/2024	7.8	354	7.92	122.6	<1	84	23.8	84	9.97	0.144	14.2	<1	5.47	32	74.6	20	26	150	<10	0.15	0.3	0.4	0.02	232	18	45.4	520	10	<1	<1	<1	<1	<1	22
Upstream	Wangcol Creek Weir	LMP01	1/07/2024	9.8	265	7.81	184.5	<1	60	19.5	60	7.19	0.108	10.5	<1	4.85	23.4	61.7	20	21	100	<10	0.1	0.4	0.5	0.08	176	32	81.8	946	10	<1	<1	<1	<1	<1	21
Upstream	Wangcol Creek Weir	LMP01	5/08/2024	10.1	392	7.86	184.3	<1	74	20.6	74	12	0.123	12.5	<1	5.35	37.8	110	60	33	140	<10	0.14	0.3	0.4	<0.01	258	<5	14	488	10	<1	<1	<1	<1	<1	17
			Min.	6.1	202	7.53	100.2	<1	48	14.2	48	3.92	0.108	5.56	<1	4.85	18.8	40.8	<10	13	40	<10	0.04	0.2	0.2	<0.01	144	<5	3.6	70	<10	<1	<1	<1	<1	<1	17
			Max.	10.1	760	8.21	184.5	<1	117	32	117	23.2	0.266	18.4	<1	10.8	85.9	214	60	66	180	10	0.18	0.6	0.7	0.08	480	44	108	1390	60	2	2	<1	<1	<1	30
			Average	7.8	394	7.82	133	0.5	81	23	81	11	0.15	13	0.5	6.1	38	94	21	30	97	5.4	0.098	0.38	0.45	0.031	245	18	35	555	14	0.63	0.92	0.5	0.5	0.5	24
Mid-stream	Wangcol Ck Surface Water_C	C	13/09/2023	11.1	348	8.04	58	<1	66	20.1	66	13.8	0.141	11.6	<1	5.18	27	87.5	<10	25	20	<10	0.02	0.5	0.5	0.02	188	<5	9.7	210	20	<1	<1	<1	<1	<1	24
Mid-stream	Wangcol Ck Surface Water_C	C	25/10/2023	7.9	409	7.29	92.5	<1	85	21.8	85	20.7	0.139	12.1	<1	7.66	49.2	87.7	40	29	20	<10	0.02	1.3	1.3	0.01	236	17	4.2	320	20	<1	<1	<1	<1	<1	25
Mid-stream	Wangcol Ck Surface Water_C	C	16/11/2023	5.1	448	7.31	123.2	<1	107	25.7	107	15.7	0.142	13.9	<1	7.31	48.4	95.7	30	31	<10	<10	<0.01	1	1	0.08	306	10	8	320	<10	<1	<1	<1	<1	<1	31
Mid-stream	Wangcol Ck Surface Water_C	C	14/12/2023	3.2	326	7.41	82.5	<1	86	15.7	86	14.5	0.151	7.85	<1	4.68	37.4	47.1	30	19	<10	20	0.02	0.6	0.6	0.02	203	19	12.8	490	20	<1	1	<1	<1	<1	27
Mid-stream	Wangcol Ck Surface Water_C	C	24/01/2024	5.2	318	7.46	101.2	<1	80	16.8	80	12.4	0.133	8.96	<1	3.92	35.1	60.6	20	19	30	<10	0.03	0.2	0.2	<0.01	218	<5	9.3	200	10	<1	<1	<1	<1	<1	20
Mid-stream	Wangcol Ck Surface Water_C	C	21/02/2024	6.2	302	7.66	75.1	<1	90	21.4	90	8.27	0.128	11.5	<1	5.18	25.5	53.1	10	16	<10	<10	<0.01	0.3	0.3	0.03	174	11	17.6	620	20	<1	<1	<1	<1	<1	23
Mid-stream	Wangcol Ck Surface Water_C	C	13/03/2024	3.7	363	7.09	158.6	<1	109	23.6	109	11.7	0.129	12.8	<1	6.13	21.9	66.6	10	32	60	<10	0.06	0.2	0.3	<0.01	234	<5	3.2	280	10	<1	<1	<1	<1	<1	27
Mid-stream	Wangcol Ck Surface Water_C	C	24/04/2024	7.8	389	8.07	80.5	<1	83	20.5	83	8.62	0.111	12.5	<1	4.76	29.3	88	10	26	10	<10	0.01	0.1	0.1	<0.01	208	<5	3.2	50	<10	<1	<1	<1	<1	<1	23
Mid-stream	Wangcol Ck Surface Water_C	C	9/05/2024	8.1	320	7.65	66.7	<1	85	21.9	85	9.94	0.099	12.7	<1	5.43	25.2	58.5	20	21	10	<10	0.01	0.3	0.3	0.04	185	<5	7.3	170	20	<1	<1	<1	<1	<1	24
Mid-stream	Wangcol Ck Surface Water_C	C	27/06/2024	13.3	386	7.75	98	<1	87	22.4	87	11.4	0.125	14.1	<1	4.53	33.6	84.3	<10	29	20	<10	0.02	0.2	0.2	0.05	253	<5	7.3	179	<10	<1	<1	<1	<1	<1	24
Mid-stream	Wangcol Ck Surface Water_C	C	24/07/2024	12.1	394	7.14	83.1	<1	82	22.4	82	13.2	0.117	13.8	<1	5.72	38	98.1	<10	36	160	<10	0.16	0.2	0.4	<0.01	246	<5	4	134	20	<1	<1	<1	<1	<1	26
Mid-stream	Wangcol Ck Surface Water_C	C	28/08/2024	9.7	328	8.4	65.7	<1	65	18	65	11.8	0.193	10.8	<1	4.96	28.6	68	20	23	<10	10	0.01	0.4	0.4	0.02	201	<5	8.4	296	60	<1	<1	<1	<1	<1	25
			Min.	3.2	302	7.09	58	<1	65	15.7	65	8.27	0.099	7.85	<1	3.92	21.9	47.1	<10	16	<10	<10	<0.01	0.1	0.1	<0.01	174	<5	3.2	50	<10	<1	<1	<1	<1	<1	20
			Max.	13.3	448	8.4	158.6	<1	109	25.7	109	20.7	0.193	14.1	<1	7.66	49.2	98.1	40	36	160	20	0.16	1.3	1.3	0.08	306	19	17.6	620	60	<1	1	<1	<1	<1	31
			Average	7.8	361	7.47	90	0.5	85	21	85	13	0.13	12	0.5	5.5	33	75	17	26	29	6.7	0.031	0.44	0.47	0.024	221	6.4	7.9	272	18	0.5	0.54	0.5	0.5	0.5	25
Mid-stream	Wangcol Ck Surface Water_E	E	13/09/2023	12	1530	7.65	-87.9	<1	64	50	64	113	<0.1	49.6	<1	13.9	158	537	30	163	<10	<10	<0.01	0.4	0.4	0.02	953	<5	19	10	10	<1	<1	<1	<1	<1	35
Mid-stream	Wangcol Ck Surface Water_E	E	25/10/2023	5.7	4850	6.54	81.1	<1	119	176	119	382	<0.5	201	<1	61.5	725	1820	90	743	20	<10	0.02	0.9	0.9	<0.01	3690	20	44.2	20	<10	<1	<1	<1	<1	<1	47
Mid-stream	Wangcol Ck Surface Water_E	E	16/11/2023	7.3	3650	6.78	154.2	<1	94	131	94	330	0.062	143	<1	44.2	513	1650	60	500	<10	<10	<0.01	0.6	0.6	0.03	2930	5	8.8	20	<10	<1	<1	<1	<1	<1	52
Mid-stream	Wangcol Ck Surface Water_E	E	14/12/2023	4	4270	6.72	28.5	<1	141	132	141	300	0.115	152	<1	43.6	540	1460	60	535	<10	<10	<0.01	1	1	0.01	3020	11	25.5	50	<10	<1	<1	<1	<1	<1	46
Mid-stream	Wangcol Ck Surface Water_E	E	24/01/2024	7.3	1150	7.26	37.1	<1	114	40.3	114	94.6	0.172	37.5	<1	12.2	131	442	20	111	<10	<10	<0.01	0.3	0.3	<0.01	797	<5	6.9	40	<10	<1	<1	<1	<1	<1	26
Mid-stream	Wangcol Ck Surface Water_E	E	21/02/2024	8	870	7.49	77.6	<1	127	36.6	127	53.7	0.147	30.3	<1	9.84	99	247	20	77	<10	<10	<0.01	0.3	0.3	0.01	630	5	7.5	40	<10	<1	<1	<1	<1	<1	28
Mid-stream	Wangcol Ck Surface Water_E	E	13/03/2024	3.6	7450	6.31	144.3	<1	183	302	183	735	<0.5	336	<1	98.5	1070	3760	50	1270	<10	<10	<0.01	0.8	0.8	<0.01	5980	20	96.6	<10	10	<1	<1	<1	<1	<1	63
Mid-stream	Wangcol Ck Surface Water_E	E	24/04/2024	9.99	1780	7.15	-29.8	<1	105	50	105	105	0.104	51.4	<1	15.5	175	523	30	178	<10	<10	<0.01	0.2	0.2	<0.01	1020	<5	16.6	<10	<10	<1	<1	<1	<1	<1	34
Mid-stream	Wangcol Ck Surface Water_E	E	9/05/2024	9.6	820	7.4	110.7	<1	98	34.8	98	45.8	<0.1	29.3	<1	9.74	85.7	223	30	81	<10	<10	<0.01	0.4	0.4	0.03	500	<5	5.5	20	<10	<1	<1	<1	<1	<1	30
Mid-stream	Wangcol Ck Surface Water_E	E	27/06/2024	14.8	1133	7.6	117	<1	74	39.2	74	72.5	0.103	37.6	<1	10.4	116	366	20	112	<10	10	<0.01	0.7	0.7	0.02	720	<5	11.8	30	<10	<1	<1	<1	<1	-	23
Mid-stream	Wangcol Ck Surface Water_E	E	24/07/2024	13.5	1303	6.91	33.8	<1	78	44.7	78	86	<0.2	42.8	<1	12.8	139	461	30	139	60	<10	0.06	0.4	0.5	<0.01	819	<5	16.1	19	<10	<1	<1	<1	<1	<1	24
Mid-stream	Wangcol Ck Surface Water_E	E	28/08/2024	11	1082	7.94	-113.1	<1	77	36.5	77	60.9	0.121	33.7	<1	11.1	111	323	150	112	10	<10	0.01	0.4	0.4	0.02	654	<5	7.7	18	<10	<1	<1	<1	<1	<1	22
			Min.	3.6	820	6.31	-113.1	<1	64	34.8	64	45.8	0.062	29.3	<1	9.74	85.7	223	20	77	<10	<10	<0.01	0.2	0.2	<0.01	500	<5	5.5	<10	<10	<1	<1	<1	<1	<1	22
			Max.	14.8	7450	7.94	154.2	<1	183	302	183	735	<0.5	336	<1	98.5	1070	3760	150	1270	60	10	0.06	1	1	0.03	5980	20	96.6	50	10	<1	<1	<1	<1	<1	63
			Average	8.9	2491	6.90	46	0.5	106	89	106	198	0.13	95	0.5	29	322	984	49	335	11	5.4	0.011	0.53	0.54	0.014	1809	6.5	22	23	5.8	0.5	0.5	0.5	0.5	0.5	36
Mid-stream	Wangcol Creek NC01	NC01	13/09/2023	9.2	399	8.22	61	<1	80	24	80	13.6	0.159	13.3	<1	5.89	30.3	96.1	10	29	20	<10	0.02	0.8	0.8	0.04	240	26	26.1	460	<10	<1	<1	<1	<1	<1	26
Mid-stream	Wangcol Creek NC01	NC01	25/10/2023	6.8	419	7.25	86.9	<1	81	22.1	81	19.1	0.145	12.3	<1	7.11	48.9	87.4	40	29	<10	<10	<0.01	0.8	0.8	0.02	229	18	8.5	70	<10	<1	<1	<1	<1	<1	20
Mid-stream	Wangcol Creek NC01	NC01	16/11/2023	5.1	451	7.28	136.2	<1	100	25.7	100	15.8	0.099	13.6	<1	6.86	47	97	10	35	<10	<10	<0.01	0.4	0.4	<0.01	306	<5	4.9	80	10	<1	<1	<1	<1	<1	26
Mid-stream	Wangcol Creek NC01	NC01	14/12/2023	3.7	329	7.48	88.6	<1	82	15.5	82	15.5	0.15	7.5	<1	4.34	37.9	51.9	20	16	<10	<10	<0.01	0.8	0.8	0.03	176	27	19.7	220	10	<1	<1	<1	<1	<1	21
Mid-stream	Wangcol Creek NC01	NC01	24/01/2024	4.6	322	7.47	109.9	<1	79	16.6	79	12.2	0.114	8.85	<1	4.05	36.4	61.5	20	20	<10	<10	<0.01	0.4	0.4	0.01	224	6	7.5	200	<10	<1	<1	<1	<1	<1	18
Mid-stream	Wangcol Creek NC01	NC01	21/02/2024	7.5	312	7.73	89.7	<1	91	22.8	91	8.1	0.135	12.1	<1	5.34	26	56.5	<10	18	<10	<10	<0.01	0.4	0.4	0.06	207	13	18.5	480	10	<1	<1	<1	<1	<1	19
Mid-stream	Wangcol Creek NC01	NC01	13/03/2024	3.5	365	7.08	158	<1	106	24.6	106	12.1	0.14	13.5	<1	6.51	24.2	72.8	10	24	<10	<10	<0.01	0.3	0.3	<0.01	251	<5	5.2	60	<10	<1	4	<1	<1	<1	25
Mid-stream	Wangcol Creek NC01	NC01	24/04/2024	8.13	394	7.59	79.7	<1	84	21.5	84	8.21	0.113	13	<1	4.96	30.6	84.8	<10	32	10	<10	0.01	0.1	0.1	<0.01	202	7	3.8	60	<10	<1	<1	<1	<1	<1	20
Mid-stream	Wangcol Creek NC01	NC01	9/05/2024	6.6	346	7.86	75.3	<1	98	23.8	98	9.68	0.103	14	<1	6.09	26.6	57.6	20	21	<10	<10	<0.01	0.3	0.3	0.03	213	7	8.2	170	<10	<1	<1	<1	<1	<1	22
Mid-stream	Wangcol Creek NC01	NC01	27/06/2024	9.3	420	7.42	127	<1	103	25.6	103	15	0.191	15.9	<1	5.69	39.3	96	30	29	10	<10	0.01	0.7	0.7	0.04	270	16	15.5	423	<10	<1	<1	<1	<1	<1	27
Mid-stream	Wangcol Creek NC01	NC01	24/07/2024	8.7	453	7.09	115.5	<1	105	27.8	105	11	0.108	16.7	<1	6.54	43	87.8	20	36	70	<10	0.07	0.4	0.5	<0.01	288	8	6.8	109	<10	<1	<1	<1	<1	<1	22
Mid-stream	Wangcol Creek NC01	NC01	28/08/2024	6.8	384	7.75	76	<1	95	22.6	95	11.4	0.259	13.5	<1	5.61	34.3	74.6	20	26	<10	<10	<0.01	0.4	0.4	0.03	220	<5	12	132	<10	<1	<1	<1	<1	<1	17
Mid-stream	Wangcol Creek NC01	NC01	**Min.**	3.5	312	7.08	61	<1	79	15.5	79	8.1	0.099	7.5	<1	4.05	24.2	51.9	<10	16	<10	<10	<0.01	0.1	0.1	<0.01	176	<5	3.8	60	<10	<1	<1	<1	<1	<1	17
Mid-stream	Wangcol Creek NC01	NC01	**Max.**	9.3	453	8.22	158	<1	106	27.8	106	19.1	0.259	16.7	<1	7.11	48.9	97	40	36	70	<10	0.07	0.8	0.8	0.06	306	27	26.1	480	10	<1	4	<1	<1	<1	27
Mid-stream	Wangcol Creek NC01	NC01	**Average**	6.7	383	7.42	100	0.5	92	23	92	13	0.14	13	0.5	5.7	35	77	18	26	13	5	0.013	0.48	0.49	0.023	236	11	11	205	6.3	0.5	0.79	0.5	0.5	0.5	22

				Field Parameters				Major Anions and Cations											Nutrients								Physical Parameters										
				Dissolved Oxygen (Field) (Filtered)	Electrical Conductivity (Field)	pH (Field)	Redox (Field)	Carbonate (as CaCO3)	Bicarbonate Alkalinity (as CaCO3)	Calcium	Carbonate Alkalinity (as CaCO3)	Chloride	Fluoride	Magnesium	Phenolphthalein Alkalinity	Potassium	Sodium	Sulfate (as SO4)	Ammonia	Sulfur	Nitrate	Nitrite (as NO2-)	Nitrite + Nitrate (as N)	Nitrogen (N) - Kjeldahl	Nitrogen (N)	Phosphorus	Total Dissolved Solids (TDS) (Filtered)	Total Suspended Solids (TSS)	Turbidity	Aluminium	Aluminium (Filtered)	Antimony	Arsenic	Arsenic (Filtered)	Arsenic III	Arsenic V	Barium
				mg/L	uS/cm	pH units	mV	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
ANZECC (2000) or Local Guidelines - Surface Water					2200	6.5-8						350	1.5					1000									1500						24	24	24	13	700
Purpose	**Field_ID**	**LocCode**	**Sampled_Date-Time**																																		
Downstream	Wangcol Ck Surface Water_G	G	13/09/2023	10.4	1290	8.14	4.3	<1	53	45.7	53	99.2	<0.1	42.4	<1	12.2	128	465	<10	133	<10	<10	<0.01	0.2	0.2	0.02	808	<5	1	20	<10	<1	<1	<1	<1	<1	15
Downstream	Wangcol Ck Surface Water_G	G	25/10/2023	8.2	1910	7.5	105.8	<1	84	78.6	84	138	<0.2	72.1	<1	19.9	223	622	<10	240	<10	<10	<0.01	0.4	0.4	<0.01	1180	<5	1.8	20	<10	<1	<1	<1	<1	<1	23
Downstream	Wangcol Ck Surface Water_G	G	15/11/2023	7.4	2300	7.53	101.5	<1	94	94	94	185	<0.2	85.9	<1	22.9	281	854	40	279	<10	<10	<0.01	0.4	0.4	0.03	1730	<5	1.3	20	<10	<1	<1	<1	<1	<1	28
Downstream	Wangcol Ck Surface Water_G	G	14/12/2023	6.6	850	7.93	44.6	<1	108	35	108	42.3	<2	29.7	<1	9.84	96.9	209	<10	76	<10	<10	<0.01	0.5	0.5	0.02	526	<5	2.3	50	<10	<1	<1	<1	<1	<1	10
Downstream	Wangcol Ck Surface Water_G	G	24/01/2024	7.9	458	7.62	73.8	<1	84	20	84	24.3	0.135	14.6	<1	5.85	48.6	107	<10	34	<10	<10	<0.01	0.3	0.3	<0.01	328	<5	4.5	130	10	<1	<1	<1	<1	<1	7
Downstream	Wangcol Ck Surface Water_G	G	21/02/2024	7.6	700	8.21	42.3	<1	109	30.6	109	41.6	0.138	23.6	<1	8.89	77.4	184	<10	56	<10	<10	<0.01	0.3	0.3	<0.01	492	<5	2.5	70	<10	<1	<1	<1	<1	<1	12
Downstream	Wangcol Ck Surface Water_G	G	13/03/2024	7.3	1290	7.52	71.5	<1	149	54.5	149	91.7	0.116	48.5	<1	15.3	123	396	20	138	<10	<10	<0.01	0.3	0.3	<0.01	839	<5	2.6	40	<10	<1	<1	<1	<1	<1	21
Downstream	Wangcol Ck Surface Water_G	G	24/04/2024	8.9	930	7.78	60.1	<1	83	31.2	83	51.8	0.101	27.8	<1	8.75	86.1	252	<10	84	<10	<10	<0.01	0.1	0.1	<0.01	520	<5	1.3	10	<10	<1	<1	<1	<1	<1	16
Downstream	Wangcol Ck Surface Water_G	G	9/05/2024	9.9	760	7.71	135.9	<1	94	33	94	41.8	<0.1	27	<1	9.78	76.9	199	<10	72	<10	<10	<0.01	0.2	0.2	0.01	416	<5	3.1	40	<10	<1	<1	<1	<1	<1	15
Downstream	Wangcol Ck Surface Water_G	G	27/06/2024	13.3	1434	7.76	136.5	<1	79	50.8	79	105	0.107	50.4	<1	12.8	150	507	<10	151	<10	<10	<0.01	0.3	0.3	<0.01	900	<5	1.8	9	<10	<1	<1	<1	<1	<1	24
Downstream	Wangcol Ck Surface Water_G	G	24/07/2024	12.4	1179	7.36	84.5	<1	74	45.9	74	71	<0.1	42.9	<1	12.6	132	344	<10	128	40	<10	0.04	0.2	0.2	<0.01	730	<5	1.7	8	<10	<1	<1	<1	<1	<1	22
Downstream	Wangcol Ck Surface Water_G	G	28/08/2024	10.7	1020	7.64	68.8	<1	74	37.6	74	65.7	0.123	33.4	<1	11	107	334	20	116	<10	<10	<0.01	0.4	0.2	0.03	607	<5	1.8	13	<10	<1	<1	<1	<1	<1	14
Downstream	Wangcol Ck Surface Water_G	G	**Min.**	6.6	458	7.36	4.3	<1	53	20	53	24.3	<0.1	14.6	<1	5.85	48.6	107	<10	34	<10	<10	<0.01	0.1	0.1	<0.01	328	<5	1	8	<10	<1	<1	<1	<1	<1	7
Downstream	Wangcol Ck Surface Water_G	G	**Max.**	13.3	2300	8.21	136.5	<1	149	94	149	185	<2	85.9	<1	22.9	281	854	40	279	40	<10	0.04	0.5	0.5	0.03	1730	<5	4.5	130	10	<1	<1	<1	<1	<1	28
Downstream	Wangcol Ck Surface Water_G	G	**Average**	9.2	1177	7.66	77	0.5	90	46	90	80	0.17	42	0.5	12	127	373	10	126	7.9	5	0.0079	0.3	0.28	0.012	756	2.5	2.1	36	5.4	0.5	0.5	0.5	0.5	0.5	17
Downstream	Wangcol Ck_F/Stream Gauge	WX22	13/09/2023	9.9	1300	7.61	10.9	<1	57	47.8	57	95.8	<0.1	44.1	<1	12.9	134	423	20	140	<10	<10	<0.01	0.6	0.6	0.02	956	<5	1.2	10	<10	<1	<1	<1	<1	<1	15
Downstream	Wangcol Ck_F/Stream Gauge	WX22	25/10/2023	8.9	1910	7.44	100.9	<1	78	79	78	139	<0.2	72.4	<1	20.2	225	630	40	250	<10	<10	<0.01	1.5	1.5	<0.01	1160	<5	1.7	10	<10	<1	<1	<1	<1	<1	25
Downstream	Wangcol Ck_F/Stream Gauge	WX22	15/11/2023	7	2310	7.56	93.4	<1	92	93.8	92	187	0.082	85.2	<1	22.9	280	858	50	274	<10	<10	<0.01	1	1	<0.01	1760	<5	1.5	20	<10	<1	<1	<1	<1	<1	28
Downstream	Wangcol Ck_F/Stream Gauge	WX22	14/12/2023	6.7	840	7.52	62	<1	107	31.7	107	44.6	0.134	26.8	<1	8.95	89.7	214	150	69	<10	<10	<0.01	0.9	0.9	0.02	489	<5	1.6	50	<10	<1	<1	<1	<1	<1	10
Downstream	Wangcol Ck_F/Stream Gauge	WX22	24/01/2024	7.2	458	7.69	63.2	<1	87	19.9	87	22.9	0.121	14.3	<1	5.66	48.2	104	20	33	<10	<10	<0.01	0.3	0.3	0.01	304	<5	6.6	180	<10	<1	<1	<1	<1	<1	8
Downstream	Wangcol Ck_F/Stream Gauge	WX22	21/02/2024	8.6	700	7.87	62.3	<1	108	31.3	108	41	0.138	23.9	<1	8.79	77.8	182	<10	56	<10	<10	<0.01	0.3	0.3	0.01	501	<5	3.3	90	20	<1	<1	<1	<1	<1	11
Downstream	Wangcol Ck_F/Stream Gauge	WX22	13/03/2024	7.3	1300	7.39	99.4	<1	149	57	149	95.5	0.129	49.6	<1	15.3	126	417	20	143	<10	<10	<0.01	0.3	0.3	<0.01	803	<5	1.8	20	<10	<1	3	<1	<1	<1	21
Downstream	Wangcol Ck_F/Stream Gauge	WX22	24/04/2024	12.46	940	8.18	41.1	<1	82	31.8	82	51.3	0.1	28.4	<1	9.04	88.3	251	<10	82	<10	<10	<0.01	0.2	0.2	<0.01	516	<5	1.5	<10	<10	<1	<1	<1	<1	<1	15
Downstream	Wangcol Ck_F/Stream Gauge	WX22	9/05/2024	9.4	770	7.57	151.3	<1	92	32.8	92	45.3	<0.1	26.8	<1	10	76.7	207	10	73	<10	<10	<0.01	0.4	0.4	0.03	450	<5	3	40	<10	<1	<1	<1	<1	<1	15
Downstream	Wangcol Ck_F/Stream Gauge	WX22	27/06/2024	13.2	1428	7.76	134.8	<1	65	51	65	103	0.138	50.7	<1	13.6	153	510	<10	151	<10	<10	<0.01	0.4	0.4	<0.01	932	<5	1.8	14	<10	<1	<1	<1	<1	<1	25
Downstream	Wangcol Ck_F/Stream Gauge	WX22	24/07/2024	11.4	1177	7.29	79.8	<1	74	46.2	74	65.6	<0.2	43.1	<1	12.7	133	327	<10	127	20	<10	0.02	0.2	0.2	<0.01	704	<5	1.5	8	<10	<1	<1	<1	<1	<1	20
Downstream	Wangcol Ck_F/Stream Gauge	WX22	28/08/2024	11.3	1043	8.16	51	<1	74	37.5	74	68.3	0.129	33.3	<1	11.4	110	337	10	110	<10	<10	<0.01	0.4	0.4	0.03	662	<5	2.1	22	<10	<1	<1	<1	<1	<1	15
Downstream	Wangcol Ck_F/Stream Gauge	WX22	**Min.**	6.7	458	7.29	10.9	<1	57	19.9	57	22.9	0.082	14.3	<1	5.66	48.2	104	<10	33	<10	<10	<0.01	0.2	0.2	<0.01	304	<5	1.2	8	<10	<1	<1	<1	<1	<1	8
Downstream	Wangcol Ck_F/Stream Gauge	WX22	**Max.**	13.2	2310	8.18	151.3	<1	149	93.8	149	187	<0.2	85.2	<1	22.9	280	858	150	274	20	<10	0.02	1.5	1.5	0.03	1760	<5	6.6	180	20	<1	3	<1	<1	<1	28
Downstream	Wangcol Ck_F/Stream Gauge	WX22	**Average**	9.4	1181	7.60	79	0.5	89	47	89	80	0.11	42	0.5	13	128	372	28	126	6.3	5	0.0063	0.54	0.54	0.013	770	2.5	2.3	39	6.3	0.5	0.71	0.5	0.5	0.5	17

				Metals																									
				Beryllium	Boron	Boron (Filtered)	Cadmium	Chromium	Chromium (Hexavalent)	Chromium (Trivalent)	Cobalt	Copper	Copper (Filtered)	Iron	Iron (Filtered)	Lead	Manganese	Manganese (Filtered)	Mercury	Molybdenum	Nickel	Nickel (Filtered)	Selenium	Silver	Strontium	Vanadium	Vanadium (Filtered)	Zinc	Zinc (Filtered)
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
ANZECC (2000) or Local Guidelines - Surface Water				100	370	370	0.85	2	1	3.3		3.5	3.5	300	300	5	1900	1900	0.06	10	17	17	5	0.05				116	116
Purpose	Field_ID	LocCode	Sampled_Date-Time																										
Upstream	Wangcol Creek Weir	LMP01	4/09/2023	<1	<50	<50	<0.1	<1	<10	<10	<1	4	3	440	<50	<1	101	<1	<0.04	104	4	4	0.3	<1	0.008	<10	<10	21	11
Upstream	Wangcol Creek Weir	LMP01	3/10/2023	<1	90	150	<0.1	<1	<10	<10	1	8	4	850	110	<1	312	8	<0.04	57	8	5	0.4	<1	0.105	<10	<10	33	9
Upstream	Wangcol Creek Weir	LMP01	6/11/2023	<1	<50	<50	0.1	1	<10	<10	1	8	3	1270	<50	2	186	18	<0.04	19	7	3	0.8	<1	0.08	<10	<10	49	9
Upstream	Wangcol Creek Weir	LMP01	4/12/2023	<1	<50	<50	<0.1	2	<10	<10	1	7	2	1510	110	3	117	24	<0.04	5	7	4	0.4	<1	0.038	<10	<10	39	7
Upstream	Wangcol Creek Weir	LMP01	2/01/2024	<1	60	<50	<0.1	<1	<10	<10	<1	3	1	130	<50	<1	69	7	<0.04	12	5	4	1	<1	0.062	<10	<10	23	5
Upstream	Wangcol Creek Weir	LMP01	5/02/2024	<1	<50	<50	<0.1	<1	<10	<10	<1	<1	<1	140	<50	<1	96	16	<0.04	11	5	4	0.8	<1	0.088	<10	<10	10	<5
Upstream	Wangcol Creek Weir	LMP01	4/03/2024	<1	60	<50	<0.1	<1	<10	<10	<1	4	<1	140	<50	<1	40	2	<0.04	6	4	4	1.2	<1	0.057	<10	<10	10	<5
Upstream	Wangcol Creek Weir	LMP01	2/04/2024	<1	<50	<50	<0.1	<1	<10	<10	<1	2	<1	190	<50	<1	274	<1	<0.04	7	4	2	0.6	<1	0.067	<10	<10	9	5
Upstream	Wangcol Creek Weir	LMP01	6/05/2024	1	<50	<50	0.4	2	<10	<10	3	8	<1	1200	<50	2	294	23	<0.04	6	10	3	0.3	<1	0.058	<10	<10	56	7
Upstream	Wangcol Creek Weir	LMP01	3/06/2024	<1	<50	<50	0.1	<1	<10	<0.01	<1	7	3	720	<50	<1	84	18	<0.04	9	6	3	0.5	<1	0.062	<10	<10	52	16
Upstream	Wangcol Creek Weir	LMP01	1/07/2024	<1	<50	<50	<0.1	<1	<1	<1	<1	6	<1	1190	<50	1	110	28	<0.04	11	5	3	0.4	<0.1	0.053	1.8	<10	48	13
Upstream	Wangcol Creek Weir	LMP01	5/08/2024	<1	<50	<50	<0.1	<1	<1	<1	<1	4	3	330	<50	<1	58	45	<0.04	17	5	3	0.5	<0.1	0.055	0.6	<10	22	8
			Min.	<1	<50	<50	<0.1	<1	<1	<0.01	<1	<1	<1	130	<50	<1	40	<1	<0.04	5	4	2	0.3	<0.1	0.038	0.6	<10	9	<5
			Max.	1	90	150	0.4	2	<10	<10	3	8	4	1510	110	3	312	45	<0.04	57	10	5	1.2	<1	0.105	<10	<10	56	16
			Average	0.54	36	35	0.088	0.79	4.3	3.8	0.83	5.1	1.8	676	39	1	145	16	0.02	22	5.8	3.5	0.6	0.43	0.061	4.4	5	31	7.9
Mid-stream	Wangcol Ck Surface Water_C	C	13/09/2023	<1	<50	60	<0.1	<1	<10	<10	<1	2	1	460	110	<1	160	132	<0.04	21	2	2	0.2	<1	0.061	<10	<10	12	5
Mid-stream	Wangcol Ck Surface Water_C	C	25/10/2023	<1	<50	<50	<0.1	<1	<10	<10	<1	5	1	590	70	<1	272	304	<0.04	9	3	2	0.3	<1	0.066	<10	<10	55	<5
Mid-stream	Wangcol Ck Surface Water_C	C	16/11/2023	<1	50	60	<0.1	<1	<10	<10	<1	12	<1	580	60	<1	480	440	<0.04	9	5	4	0.2	<1	0.083	<10	<10	17	8
Mid-stream	Wangcol Ck Surface Water_C	C	14/12/2023	<1	90	60	<0.1	<1	<10	<10	<1	<1	<1	700	130	<1	353	296	<0.04	11	4	3	0.5	<1	0.054	<10	<10	10	<5
Mid-stream	Wangcol Ck Surface Water_C	C	24/01/2024	<1	<50	<50	<0.1	<1	<10	<10	<1	2	<1	620	80	<1	246	210	<0.04	5	3	2	0.8	<1	0.052	<10	<10	<5	<5
Mid-stream	Wangcol Ck Surface Water_C	C	21/02/2024	<1	<50	<50	<0.1	<1	<10	<10	<1	2	<1	860	70	<1	206	136	<0.04	4	5	2	0.3	<1	0.063	<10	<10	11	<5
Mid-stream	Wangcol Ck Surface Water_C	C	13/03/2024	<1	<50	<50	<0.1	<1	<10	<10	<1	<1	<1	570	100	<1	560	322	<0.04	6	2	3	0.3	<1	0.07	<10	<10	6	<5
Mid-stream	Wangcol Ck Surface Water_C	C	24/04/2024	<1	<50	<50	<0.1	<1	<10	<10	<1	<1	<1	380	60	<1	168	142	<0.04	3	3	2	0.4	<1	0.07	<10	<10	9	<5
Mid-stream	Wangcol Ck Surface Water_C	C	9/05/2024	<1	<50	<50	<0.1	<1	<10	<10	<1	<1	<1	440	90	<1	187	139	<0.04	3	2	2	<0.2	<1	0.064	<10	<10	8	<5
Mid-stream	Wangcol Ck Surface Water_C	C	27/06/2024	<1	60	<50	<0.1	6	<1	<0.001	<1	1	<1	580	70	<1	222	172	<0.04	10	3	3	<0.2	<0.1	0.07	0.3	<10	8	6
Mid-stream	Wangcol Ck Surface Water_C	C	24/07/2024	<1	<50	<50	<0.1	<1	<1	<1	<1	1	<1	420	110	<1	138	111	<0.04	9	3	2	0.2	<0.1	0.067	0.2	<10	10	6
Mid-stream	Wangcol Ck Surface Water_C	C	28/08/2024	<1	110	110	<0.1	<1	<1	<1	<1	2	<1	400	90	<1	99	91	<0.04	7	2	1	0.3	<0.1	0.06	0.4	<10	9	<5
			Min.	<1	<50	<50	<0.1	<1	<1	<0.001	<1	<1	<1	380	60	<1	99	91	<0.04	3	2	1	<0.2	<0.1	0.052	0.2	<10	<5	<5
			Max.	<1	110	110	<0.1	6	<10	<10	<1	12	1	860	130	<1	560	440	<0.04	21	5	4	0.8	<1	0.083	<10	<10	55	8
			Average	0.5	43	41	0.05	0.96	3.9	3.8	0.5	2.4	0.58	550	87	0.5	258	208	0.02	8.1	3.1	2.3	0.31	0.39	0.065	3.8	5	13	3.8
Mid-stream	Wangcol Ck Surface Water_E	E	13/09/2023	<1	230	270	<0.1	<1	<10	<10	14	1	<1	3130	830	<1	2210	2210	<0.04	<1	128	128	<0.2	<1	0.292	<10	<10	16	7
Mid-stream	Wangcol Ck Surface Water_E	E	25/10/2023	<1	1160	1010	<0.1	<1	<10	<10	65	2	<1	7380	4450	<1	6900	5860	<0.04	<1	609	550	<0.2	<1	1.18	<10	<10	44	22
Mid-stream	Wangcol Ck Surface Water_E	E	16/11/2023	<1	760	850	<0.1	<1	<10	<10	39	4	<1	3950	650	<1	4920	4740	<0.04	<1	432	439	<0.2	<1	0.896	<10	<10	46	16
Mid-stream	Wangcol Ck Surface Water_E	E	14/12/2023	<1	980	800	<0.1	<1	<10	<10	40	3	<1	3330	1580	<1	5660	5510	<0.04	2	451	428	<0.2	<1	0.933	<10	<10	29	16
Mid-stream	Wangcol Ck Surface Water_E	E	24/01/2024	<1	180	160	<0.1	<1	<10	<10	10	1	<1	2170	1020	<1	1950	1880	<0.04	2	91	85	0.2	<1	0.219	<10	<10	10	<5
Mid-stream	Wangcol Ck Surface Water_E	E	21/02/2024	<1	80	110	<0.1	<1	<10	<10	7	<1	<1	1860	680	<1	1930	1850	<0.04	2	67	59	0.2	<1	0.176	<10	<10	13	5
Mid-stream	Wangcol Ck Surface Water_E	E	13/03/2024	<1	1600	1460	<0.1	<1	<10	<10	116	<1	4	12,200	8700	<1	13,800	13,300	<0.04	<1	1080	1040	<0.2	<1	2.09	<10	<10	37	37
Mid-stream	Wangcol Ck Surface Water_E	E	24/04/2024	<1	280	260	<0.1	<1	<10	<10	19	<1	1	3060	1130	<1	2640	2370	<0.04	1	170	137	<0.2	<1	0.356	<10	<10	10	8
Mid-stream	Wangcol Ck Surface Water_E	E	9/05/2024	<1	110	120	<0.1	<1	<10	<10	6	<1	<1	1360	900	<1	1340	1350	<0.04	<1	56	54	<0.2	<1	0.167	<10	<10	7	<5
Mid-stream	Wangcol Ck Surface Water_E	E	27/06/2024	<1	190	170	<0.1	<1	<1	<0.001	9	7	<1	1680	740	<1	1160	1030	<0.04	2	98	80	<0.2	<0.1	0.215	<0.2	<10	21	7
Mid-stream	Wangcol Ck Surface Water_E	E	24/07/2024	<1	220	120	<0.1	<1	<1	<1	12	2	<1	1820	1300	<1	1320	1200	<0.04	<1	109	100	<0.2	<0.1	0.23	<0.2	<10	19	11
Mid-stream	Wangcol Ck Surface Water_E	E	28/08/2024	<1	200	200	<0.1	<1	<1	<1	8	<1	<1	1320	800	<1	935	813	<0.04	2	76	67	<0.2	<0.1	0.196	<0.2	<10	7	<5
			Min.	<1	80	110	<0.1	<1	<1	<0.001	6	<1	<1	1320	650	<1	935	813	<0.04	<1	56	54	<0.2	<0.1	0.167	<0.2	<10	7	<5
			Max.	<1	1600	1460	<0.1	<1	<10	<10	116	7	4	12200	8700	<1	13800	13300	<0.04	2	1080	1040	0.2	<1	2.09	<10	<10	46	37
			Average	0.5	499	461	0.05	0.5	3.9	3.8	29	1.9	0.83	3605	1898	0.5	3730	3509	0.02	1.2	281	264	0.12	0.39	0.58	3.8	5	22	11
Mid-stream	Wangcol Creek NC01	NC01	13/09/2023	<1	60	100	<0.1	<1	<10	<10	<1	5	2	1080	100	1	458	122	<0.04	28	4	2	0.3	<1	0.071	<10	<10	31	5
Mid-stream	Wangcol Creek NC01	NC01	25/10/2023	<1	<50	<50	<0.1	<1	<10	<10	<1	2	<1	410	80	<1	436	401	<0.04	7	4	3	0.3	<1	0.065	<10	<10	17	<5
Mid-stream	Wangcol Creek NC01	NC01	16/11/2023	<1	<50	<50	<0.1	<1	<10	<10	<1	8	<1	520	70	<1	552	476	<0.04	9	5	3	0.2	<1	0.084	<10	<10	10	<5
Mid-stream	Wangcol Creek NC01	NC01	14/12/2023	<1	100	80	<0.1	<1	<10	<10	<1	<1	<1	830	180	<1	623	574	<0.04	11	4	3	0.5	<1	0.052	<10	<10	8	<5
Mid-stream	Wangcol Creek NC01	NC01	24/01/2024	<1	80	<50	<0.1	<1	<10	<10	<1	2	<1	650	60	<1	323	244	<0.04	8	3	2	0.9	<1	0.052	<10	<10	8	<5
Mid-stream	Wangcol Creek NC01	NC01	21/02/2024	<1	50	<50	<0.1	<1	<10	<10	<1	1	<1	720	<50	<1	169	104	<0.04	6	5	2	0.4	<1	0.064	<10	<10	10	<5
Mid-stream	Wangcol Creek NC01	NC01	13/03/2024	<1	110	<50	<0.1	<1	<10	<10	<1	2	3	550	120	<1	383	330	<0.04	22	5	4	0.3	<1	0.069	<10	<10	<5	6
Mid-stream	Wangcol Creek NC01	NC01	24/04/2024	<1	<50	<50	<0.1	<1	<10	<10	<1	<1	1	380	<50	<1	319	113	<0.04	5	3	3	0.4	<1	0.065	<10	<10	9	6
Mid-stream	Wangcol Creek NC01	NC01	9/05/2024	<1	<50	<50	<0.1	<1	<10	<10	<1	<1	<1	570	90	<1	454	238	<0.04	4	3	2	0.2	<1	0.069	<10	<10	7	<5
Mid-stream	Wangcol Creek NC01	NC01	27/06/2024	<1	<50	50	<0.1	<1	<1	<0.001	<1	3	<1	1430	180	<1	599	474	<0.04	8	4	3	0.2	<0.1	0.076	0.8	<10	17	7
Mid-stream	Wangcol Creek NC01	NC01	24/07/2024	<1	110	<50	<0.1	<1	<1	<1	<1	1	<1	860	220	<1	406	375	<0.04	8	4	3	0.2	<0.1	0.079	0.2	<10	17	6
Mid-stream	Wangcol Creek NC01	NC01	28/08/2024	<1	100	190	<0.1	<1	<1	<1	<1	2	<1	1060	200	<1	283	236	<0.04	5	4	2	0.2	<0.1	0.073	0.3	<10	11	7
Mid-stream	Wangcol Creek NC01	NC01	**Min.**	<1	<50	<50	<0.1	<1	<1	<0.001	<1	<1	<1	380	<50	<1	169	104	<0.04	4	3	2	0.2	<0.1	0.052	0.2	<10	<5	<5
Mid-stream	Wangcol Creek NC01	NC01	**Max.**	<1	110	190	<0.1	<1	<10	<10	<1	8	3	1430	220	1	623	574	<0.04	28	5	4	0.9	<1	0.084	<10	<10	31	7
Mid-stream	Wangcol Creek NC01	NC01	**Average**	0.5	61	52	0.05	0.5	3.9	3.8	0.5	2.3	0.88	755	113	0.54	417	307	0.02	10	4	2.7	0.34	0.39	0.068	3.9	5	12	4.3

				Metals																									
				Beryllium	Boron	Boron (Filtered)	Cadmium	Chromium	Chromium (Hexavalent)	Chromium (Trivalent)	Cobalt	Copper	Copper (Filtered)	Iron	Iron (Filtered)	Lead	Manganese	Manganese (Filtered)	Mercury	Molybdenum	Nickel	Nickel (Filtered)	Selenium	Silver	Strontium	Vanadium	Vanadium (Filtered)	Zinc	Zinc (Filtered)
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
ANZECC (2000) or Local Guidelines - Surface Water				100	370	370	0.85	2	1	3.3		3.5	3.5	300	300	5	1900	1900	0.06	10	17	17	5	0.05				116	116
Purpose	Field_ID	LocCode	Sampled_Date-Time																										
Downstream	Wangcol Ck Surface Water_G	G	13/09/2023	<1	180	220	<0.1	<1	<10	<10	1	<1	<1	170	50	<1	159	131	<0.04	<1	73	72	<0.2	<1	0.234	<10	<10	<5	<5
Downstream	Wangcol Ck Surface Water_G	G	25/10/2023	<1	360	320	<0.1	<1	<10	<10	1	1	<1	220	<50	<1	260	265	<0.04	<1	133	130	<0.2	<1	0.422	<10	<10	6	<5
Downstream	Wangcol Ck Surface Water_G	G	15/11/2023	<1	390	450	<0.1	<1	<10	<10	2	<1	<1	230	<50	<1	275	310	<0.04	<1	177	182	<0.2	<1	0.534	<10	<10	5	<5
Downstream	Wangcol Ck Surface Water_G	G	14/12/2023	<1	260	190	<0.1	<1	<10	<10	1	<1	<1	410	150	<1	278	263	<0.04	2	47	46	<0.2	<1	0.173	<10	<10	<5	<5
Downstream	Wangcol Ck Surface Water_G	G	24/01/2024	<1	70	<50	<0.1	<1	<10	<10	<1	<1	<1	540	90	<1	426	402	<0.04	2	20	18	0.4	<1	0.088	<10	<10	<5	<5
Downstream	Wangcol Ck Surface Water_G	G	21/02/2024	<1	<50	80	<0.1	<1	<10	<10	1	<1	<1	480	100	<1	813	726	<0.04	2	43	36	0.3	<1	0.146	<10	<10	<5	<5
Downstream	Wangcol Ck Surface Water_G	G	13/03/2024	<1	220	200	<0.1	<1	<10	<10	3	<1	<1	500	70	<1	1470	1230	<0.04	2	99	91	<0.2	<1	0.276	<10	<10	<5	6
Downstream	Wangcol Ck Surface Water_G	G	24/04/2024	<1	140	130	<0.1	<1	<10	<10	1	<1	<1	210	60	<1	716	638	<0.04	1	60	47	0.3	<1	0.185	<10	<10	<5	<5
Downstream	Wangcol Ck Surface Water_G	G	9/05/2024	<1	100	100	<0.1	<1	<10	<10	<1	<1	<1	370	100	<1	417	411	<0.04	<1	39	37	<0.2	<1	0.15	<10	<10	<5	9
Downstream	Wangcol Ck Surface Water_G	G	27/06/2024	<1	240	220	<0.1	<1	<1	<0.001	2	<1	<1	140	<50	<1	449	395	<0.04	1	104	92	<0.2	<0.1	0.287	<0.2	<10	9	<5
Downstream	Wangcol Ck Surface Water_G	G	24/07/2024	<1	200	210	<0.1	<1	<1	<1	1	<1	<1	260	<50	<1	301	279	<0.04	<1	79	73	<0.2	<0.1	0.217	<0.2	<10	6	<5
Downstream	Wangcol Ck Surface Water_G	G	28/08/2024	<1	190	180	<0.1	<1	<1	<1	<1	<1	<1	240	<50	<1	94	82	<0.04	1	58	50	<0.2	<0.1	0.199	<0.2	<10	<5	<5
Downstream	Wangcol Ck Surface Water_G	G	**Min.**	<1	<50	<50	<0.1	<1	<1	<0.001	<1	<1	<1	140	<50	<1	94	82	<0.04	<1	20	18	<0.2	<0.1	0.088	<0.2	<10	<5	<5
Downstream	Wangcol Ck Surface Water_G	G	**Max.**	<1	390	450	<0.1	<1	<10	<10	3	1	<1	540	150	<1	1470	1230	<0.04	2	177	182	0.4	<1	0.534	<10	<10	9	9
Downstream	Wangcol Ck Surface Water_G	G	**Average**	0.5	198	194	0.05	0.5	3.9	3.8	1.2	0.54	0.5	314	62	0.5	472	428	0.02	1.1	78	73	0.16	0.39	0.24	3.8	5	3.8	3.3
Downstream	Wangcol Ck_F/Stream Gauge	WX22	13/09/2023	<1	190	250	<0.1	<1	<10	<10	1	3	2	160	80	<1	157	143	<0.04	<1	74	77	<0.2	<1	0.237	<10	<10	18	11
Downstream	Wangcol Ck_F/Stream Gauge	WX22	25/10/2023	<1	320	340	<0.1	<1	<10	<10	<1	2	1	240	90	<1	287	342	<0.04	<1	133	130	<0.2	<1	0.421	<10	<10	13	18
Downstream	Wangcol Ck_F/Stream Gauge	WX22	15/11/2023	<1	390	410	<0.1	<1	<10	<10	2	2	<1	320	50	<1	351	320	<0.04	<1	175	181	<0.2	<1	0.534	<10	<10	20	<5
Downstream	Wangcol Ck_F/Stream Gauge	WX22	14/12/2023	<1	230	170	<0.1	<1	<10	<10	1	<1	2	360	140	<1	298	276	<0.04	3	47	46	<0.2	<1	0.17	<10	<10	9	10
Downstream	Wangcol Ck_F/Stream Gauge	WX22	24/01/2024	<1	110	<50	<0.1	<1	<10	<10	1	<1	<1	600	80	<1	467	446	<0.04	4	20	18	0.5	<1	0.092	<10	<10	<5	<5
Downstream	Wangcol Ck_F/Stream Gauge	WX22	21/02/2024	<1	110	90	<0.1	<1	<10	<10	1	<1	<1	500	90	<1	874	799	<0.04	3	43	36	0.2	<1	0.142	<10	<10	<5	6
Downstream	Wangcol Ck_F/Stream Gauge	WX22	13/03/2024	<1	240	170	<0.1	<1	<10	<10	3	<1	2	520	70	<1	1490	1360	<0.04	13	98	100	<0.2	<1	0.267	<10	<10	13	15
Downstream	Wangcol Ck_F/Stream Gauge	WX22	24/04/2024	<1	130	170	<0.1	<1	<10	<10	1	<1	<1	190	50	<1	694	729	<0.04	2	55	54	0.2	<1	0.172	<10	<10	<5	6
Downstream	Wangcol Ck_F/Stream Gauge	WX22	9/05/2024	<1	110	100	<0.1	<1	<10	<10	1	<1	<1	380	90	<1	426	421	0.08	1	40	38	<0.2	<1	0.15	<10	<10	8	5
Downstream	Wangcol Ck_F/Stream Gauge	WX22	27/06/2024	<1	270	210	<0.1	<1	<1	<0.001	2	29	<1	170	<50	<1	465	421	<0.04	<1	101	94	<0.2	<0.1	0.287	<0.2	<10	10	<5
Downstream	Wangcol Ck_F/Stream Gauge	WX22	24/07/2024	<1	220	210	<0.1	<1	<1	<1	1	<1	<1	260	<50	<1	313	272	<0.04	<1	80	73	<0.2	<0.1	0.223	<0.2	<10	<5	<5
Downstream	Wangcol Ck_F/Stream Gauge	WX22	28/08/2024	<1	180	230	<0.1	<1	<1	<1	<1	2	<1	290	<50	<1	121	92	<0.04	<1	59	52	<0.2	0.3	0.2	<0.2	<10	10	<5
Downstream	Wangcol Ck_F/Stream Gauge	WX22	**Min.**	<1	110	<50	<0.1	<1	<1	<0.001	<1	<1	<1	160	<50	<1	121	92	<0.04	<1	20	18	<0.2	<0.1	0.092	<0.2	<10	<5	<5
Downstream	Wangcol Ck_F/Stream Gauge	WX22	**Max.**	<1	390	410	<0.1	<1	<10	<10	3	29	2	600	140	<1	1490	1360	0.08	13	175	181	0.5	<1	0.534	<10	<10	20	18
Downstream	Wangcol Ck_F/Stream Gauge	WX22	**Average**	0.5	208	198	0.05	0.5	3.9	3.8	1.3	3.5	0.92	333	68	0.5	495	468	0.025	2.4	77	75	0.15	0.41	0.24	3.8	5	9.3	7

			Field Parameters				Major Anions and Cations											NA	Nutrients										
			Dissolved Oxygen (Field) (Filtered)	Electrical Conductivity (Field)	pH (Field)	Redox (Field)	Carbonate (as CaCO3)	Bicarbonate Alkalinity (as CaCO3)	Calcium	Carbonate Alkalinity (as CaCO3)	Chloride	Fluoride	Magnesium	Phenolphthalein Alkalinity	Potassium	Sodium	Sulfate (as SO4)	Oil & Grease	Ammonia	Sulfur	Nitrate	Nitrite (as NO2-)	Nitrite + Nitrate (as N)	Nitrogen (N) - Kjeldahl	Nitrogen (N)	Total Phosphate (PO4)	Total Phosphate (PO4) (Filtered)	Phosphorus	Phosphorus (Filtered)
			mg/L	uS/cm	pH units	mV	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EPL 13007 - Discharge Limits (LDP12)				500	6.5-8.5																								
Monitoring_Zone	**LocCode**	**Sampled_Date-Time**																											
Coal Settling Pond Discharge	LDP12	10/10/2023	5	254	7.46	122.5	-	35.78	2.58	35.78	28.7	0.069	1.06	0	3.67	44.1	30.9	<5	70	11	430	<10	0.43	0.4	0.8	<0.1	<0.1	<0.01	<0.01
Coal Settling Pond Discharge	LDP12	5/12/2023	5	236	7.04	133.8	-	25.73	3.91	25.73	27.2	<0.05	1.47	0	3.73	37.4	38.6	<5	90	14	310	<10	0.31	0.5	0.8	<0.1	<0.1	0.02	<0.01
Coal Settling Pond Discharge	LDP12	22/12/2023	7.6	233	7.6	144	<1	<1	5.08	<1	16.2	0.072	2.08	<1	3.73	37.4	50	<5	90	18	370	<10	0.37	0.2	0.6	<0.1	<0.1	<0.01	<0.01
Coal Settling Pond Discharge	LDP12	8/01/2024	6.9	267	7.65	111.2	<1	19	30	19	22.2	0.069	16	<1	6.15	21.4	66	<5	90	2	390	<10	0.39	0.3	0.7	<0.1	<0.1	<0.01	<0.01
Coal Settling Pond Discharge	LDP12	24/01/2024	5.5	351	7.21	74.6	<1	12	9.61	12	27.2	<0.05	4.78	<1	5.17	44.8	103	<5	50	31	290	<10	0.29	0.3	0.6	<0.1	<0.1	<0.01	<0.01
Coal Settling Pond Discharge	LDP12	7/02/2024	5.2	281	7.27	129.6	<1	18	8.42	18	15.8	0.077	3.81	<1	4.11	34.8	87.2	<5	60	26	300	<10	0.3	0.2	0.5	<0.1	<0.1	0.02	<0.01
Coal Settling Pond Discharge	LDP12	1/03/2024	5.9	367	7.59	169.7	<1	26	14.1	26	18	0.042	6.3	<1	5.35	44.1	106	<5	60	35	380	<10	0.38	0.1	0.5	<0.1	<0.1	<0.01	<0.01
Coal Settling Pond Discharge	LDP12	19/03/2024	6.1	353	7.07	121.5	<1	27	12.8	27	14.4	0.111	6.15	<1	4.36	40.8	114	<5	50	33	240	<10	0.24	0.2	0.4	<0.1	<0.1	<0.01	<0.01
Coal Settling Pond Discharge	LDP12	11/04/2024	6.4	253	7.04	140.2	<1	9	8.91	9	6	0.097	4.63	<1	3.88	34.8	88	<5	70	32	190	<10	0.19	0.2	0.4	<0.1	<0.1	<0.01	<0.01
Coal Settling Pond Discharge	LDP12	14/05/2024	9.3	335	6.94	169.6	<1	8	13.8	8	6.48	0.158	7.35	<1	4.02	39	127	<5	100	43	210	10	0.22	0.3	0.5	<0.1	<0.1	0.03	0.01
Coal Settling Pond Discharge	LDP12	2/07/2024	8.8	367	7.72	253.2	<1	42	13	42	13.2	0.097	5.99	<1	4.64	44.4	118	<5	470	32	280	10	0.29	0.6	0.9	<0.1	<0.1	0.02	<0.01
Coal Settling Pond Discharge	LDP12	2/08/2024	10.2	358	7.63	145.8	<1	52	14.2	52	17.5	0.075	5.61	<1	5.36	50.6	102	<5	300	36	260	<10	0.26	0.5	0.8	<0.1	<0.1	0.02	0.02
		Min.	5	233	6.94	74.6	<1	<1	2.58	<1	6	0.042	1.06	0	3.67	21.4	30.9	<5	50	2	190	<10	0.19	0.1	0.4	<0.1	<0.1	<0.01	<0.01
		Max.	10.2	367	7.72	253.2	<1	52	30	52	28.7	0.158	16	<1	6.15	50.6	127	<5	470	43	430	10	0.43	0.6	0.9	<0.1	<0.1	0.03	0.02
		Average	6.8	305	7.27	143	0.5	23	11	23	18	0.076	5.4	0.42	4.5	39	86	2.5	125	26	304	5.8	0.31	0.32	0.63	0.05	0.05	0.012	0.0067

			Physical Parameters			Metals																																	
			Total Dissolved Solids (TDS) (Filtered)	Total Suspended Solids (TSS)	Turbidity	Aluminium	Aluminium (Filtered)	Antimony	Arsenic	Arsenic (Filtered)	Arsenic III	Arsenic V	Barium	Beryllium	Boron	Boron (Filtered)	Cadmium	Chromium	Chromium (Hexavalent)	Chromium (Trivalent)	Cobalt	Copper	Copper (Filtered)	Iron	Iron (Filtered)	Lead	Manganese	Manganese (Filtered)	Mercury	Molybdenum	Nickel	Nickel (Filtered)	Selenium	Silver	Strontium	Vanadium	Vanadium (Filtered)	Zinc	Zinc (Filtered)
			mg/L	mg/L	NTU	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
EPL 13007 - Discharge Limits (LDP12)				50	25																																		
Monitoring_Zone	**LocCode**	**Sampled_Date-Time**																																					
Coal Settling Pond Discharge	LDP12	10/10/2023	530	14.33	3.66	3730	150	<1	<1	<1	<1	<1	4	<1	<50	100	<0.1	<1	<10	<10	<1	<1	<1	<50	<50	<1	18	17	<0.04	4	2	1	<10	<1	0.006	<10	<10	<5	<5
Coal Settling Pond Discharge	LDP12	5/12/2023	110	8.333	8.69	12,500	140	<1	<1	<1	<1	<1	7	<1	<50	<50	<0.1	<1	<10	<10	1	<1	<1	<50	<50	<1	29	24	<0.04	5	3	2	2.7	<1	0.012	<10	<10	<5	9
Coal Settling Pond Discharge	LDP12	22/12/2023	135	0.8	3.73	240	<10	<1	<1	<1	<1	<1	5	<1	<50	<50	<0.1	<1	<10	<10	2	<1	<1	<50	<50	<1	65	62	<0.04	4	5	5	3.6	<1	0.011	<10	<10	<5	<5
Coal Settling Pond Discharge	LDP12	8/01/2024	136	3.333	2.07	180	30	<1	<1	<1	<1	<1	7	<1	<50	<50	<0.1	<1	<10	<10	2	<1	<1	<50	<50	<1	79	75	<0.04	3	6	6	4	<1	0.014	<10	<10	34	5
Coal Settling Pond Discharge	LDP12	24/01/2024	228	6.4	8.76	450	30	<1	<1	<1	<1	<1	13	<1	<50	<50	0.1	<1	<10	<10	7	<1	<1	70	<50	<1	199	193	<0.04	2	9	8	3.4	<1	0.021	<10	<10	<5	<5
Coal Settling Pond Discharge	LDP12	7/02/2024	188	2	3.54	470	<10	<1	<1	<1	<1	<1	10	<1	<50	<50	0.2	<1	<10	<10	9	<1	<1	<50	<50	<1	157	17	<0.04	2	14	4	2.6	<1	0.02	<10	<10	26	<5
Coal Settling Pond Discharge	LDP12	1/03/2024	224	2	4.57	310	30	<1	<1	<1	<1	<1	12	<1	<50	<50	0.1	<1	<10	<10	6	<1	<1	<50	<50	2	218	203	<0.04	2	10	10	2.4	<1	0.034	<10	<10	6	<5
Coal Settling Pond Discharge	LDP12	19/03/2024	208	7.333	10.6	690	30	<1	<1	<1	<1	<1	12	<1	<50	<50	0.5	<1	<10	<10	18	3	<1	<50	<50	<1	260	254	<0.04	3	27	25	2.8	<1	0.032	<10	<10	106	82
Coal Settling Pond Discharge	LDP12	11/04/2024	167	11.67	16.5	260	<10	<1	<1	<1	1.4	<1	8	<1	<50	<50	0.7	<1	<10	<10	22	<1	<1	<50	<50	<1	182	164	<0.04	1	35	32	2.9	<1	0.017	<10	<10	124	104
Coal Settling Pond Discharge	LDP12	14/05/2024	241	3.333	5.97	100	10	<1	<1	<1	<1	<1	14	<1	<50	<50	0.7	<1	<10	<10	15	<1	<1	<50	<50	<1	339	362	<0.04	1	25	26	2.4	<1	0.033	<10	<10	86	88
Coal Settling Pond Discharge	LDP12	2/07/2024	234	9.333	9.34	1400	<10	<1	<1	<1	<1	<1	11	<1	<50	<50	<0.1	<1	<1	<1	2	<1	<1	<50	<50	<1	305	286	<0.04	4	5	4	1.6	<0.1	0.032	0.4	<10	<5	<5
Coal Settling Pond Discharge	LDP12	2/08/2024	236	1.667	6.1	1480	50	<1	<1	<1	<1	<1	10	<1	<50	<50	<0.1	<1	<1	<1	2	<1	<1	<50	<50	<1	320	226	<0.04	3	5	4	1.8	<0.1	0.031	0.3	<10	8	<5
		Min.	110	0.8	2.07	100	<10	<1	<1	<1	<1	<1	4	<1	<50	<50	<0.1	<1	<1	<1	<1	<1	<1	<50	<50	<1	18	17	<0.04	1	2	1	1.6	<0.1	0.006	0.3	<10	<5	<5
		Max.	530	14.33	16.5	12500	150	<1	<1	<1	1.4	<1	14	<1	<50	100	0.7	<1	<10	<10	22	3	<1	70	<50	2	339	362	<0.04	5	35	32	<10	<1	0.034	<10	<10	124	104
		Average	220	5.9	7	1818	41	0.5	0.5	0.5	0.58	0.5	9.4	0.5	25	31	0.22	0.5	4.3	4.3	7.2	0.71	0.5	29	25	0.63	181	157	0.02	2.8	12	11	2.9	0.43	0.022	4.2	5	34	25

APPENDIX C TABULATED GROUNDWATER DATA

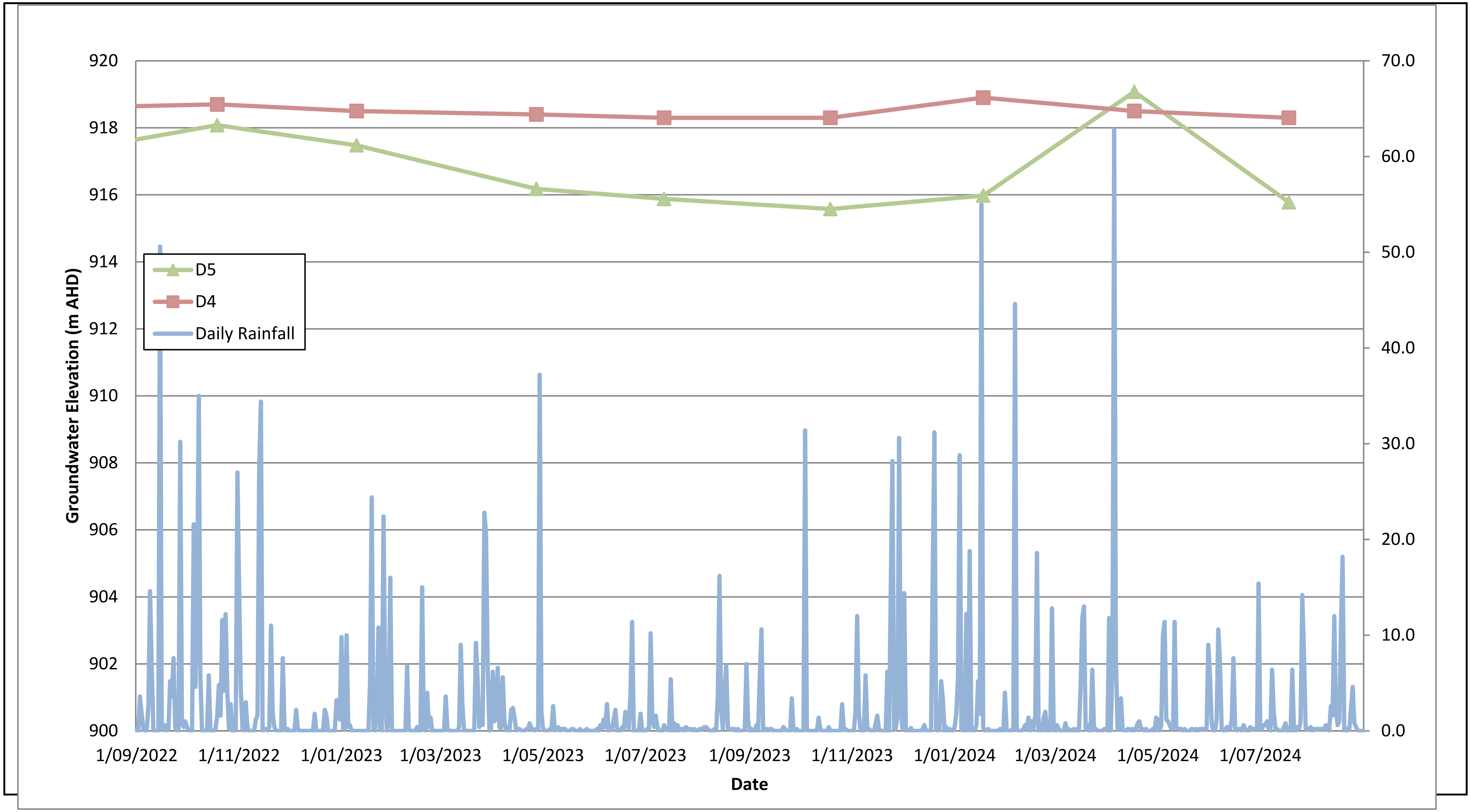
Purpose	LocCode	Sample Date	Standing Water Level	Dissolved Oxygen (Field) (Filtered)	Electrical Conductivity (Field)	pH (Field)	Purge Volume	Redox (Field)	Carbonate (as CaCO3)	Bicarbonate Alkalinity (as CaCO3)	Calcium	Carbonate Alkalinity (as CaCO3)	Chloride	Fluoride	Magnesium	Phenolphthalein Alkalinity	Potassium	Sodium	Sulfate (as SO4)	Ammonia	Sulfur	Nitrate	Nitrite (as NO2-)	Nitrite + Nitrate (as N)
			Field Parameters						Major Anions and Cations											Nutrients				
			m AHD	mg/L	uS/cm	pH units	L	mV	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	µg/L	µg/L	mg/L
ANZECC (2000) or Local Guidelines - Groundwater					2600	6.5-8							350	1.5					1000					
Upgradient / background	D4	19/10/2023	918.301	0.8	650	3.48	81	239.1	<1	<1	13.8	<1	16.8	<0.2	7.84	<1	8.73	19.8	235	180	82	20	<10	0.02
Upgradient / background	D4	18/01/2024	918.901	0.8	640	3.45	90	285.8	<1	<1	13.8	<1	18.7	<0.1	7.82	<1	8.59	19.6	277	200	84	<10	<10	<0.01
Upgradient / background	D4	17/04/2024	918.501	1.4	720	3.42	84	247.4	<1	<1	12.5	<1	17	<0.1	7.58	<1	8.15	19.8	261	200	80	<10	<10	<0.01
Upgradient / background	D4	18/07/2024	918.301	1.5	751	3.49	126	353.2	<1	<1	13	<1	16.1	<0.1	7.74	<1	8.43	20	245	350	89	<10	<10	<0.01
		Min.	918.301	0.8	640	3.42	81	239.1	<1	<1	12.5	<1	16.1	<0.1	7.58	<1	8.15	19.6	235	180	80	<10	<10	<0.01
		Max.	918.901	1.5	751	3.49	126	353.2	<1	<1	13.8	<1	18.7	<0.2	7.84	<1	8.73	20	277	350	89	20	<10	0.02
		Average	919.000	1.1	690	3.46	95	281	0.5	0.5	13	0.5	17	0.063	7.7	0.5	8.5	20	255	233	84	8.8	5	0.0088
Upgradient / background	D5	19/10/2023	915.578	0.9	1160	5.9	266	7.8	<1	65	101	65	22.7	<0.2	66.8	<1	11	34.5	448	100	174	40	<10	0.04
Upgradient / background	D5	18/01/2024	915.978	1	1170	5.88	177	41.6	<1	73	102	73	23.9	<0.2	67.1	<1	10.5	33.2	478	390	168	<10	<10	<0.01
Upgradient / background	D5	17/04/2024	919.078	0.9	1260	5.9	224	44.5	<1	58	94.4	58	23.5	<0.1	64.8	<1	9.84	33.3	450	120	166	<10	<10	<0.01
Upgradient / background	D5	18/07/2024	915.778	1.3	1344	5.95	271	14.9	<1	74	98.4	74	23.1	<0.1	67	<1	10.1	34.5	473	200	155	<10	<10	<0.01
		Min.	915.578	0.9	1160	5.88	177	7.8	<1	58	94.4	58	22.7	<0.1	64.8	<1	9.84	33.2	448	100	155	<10	<10	<0.01
		Max.	919.078	1.3	1344	5.95	271	44.5	<1	74	102	74	23.9	<0.2	67.1	<1	11	34.5	478	390	174	40	<10	0.04
		Average	917.000	1	1234	5.91	235	27	0.5	68	99	68	23	0.075	66	0.5	10	34	462	203	166	14	5	0.014
Upgradient / Adjacent MPAR	D119	8/11/2023	911.764	2.2	2140	6.29	29	-5.7	<1	171	85	171	105	0.333	56.1	<1	45.8	309	920	400	264	40	20	0.06
Upgradient / Adjacent MPAR	D119	21/02/2024	912.364	1.2	2560	6.17	33	71.6	<1	150	101	150	144	<0.5	71.9	<1	53.2	366	1070	390	345	30	<10	0.03
Upgradient / Adjacent MPAR	D119	23/05/2024	912.264	1.9	2850	6.13	32	141.2	<1	134	97.7	134	134	0.241	69.3	<1	47	344	987	340	365	<10	<10	<0.01
Upgradient / Adjacent MPAR	D119	1/08/2024	912.064	1.5	2332	6.12	31	8.4	<1	146	90.7	146	158	0.314	60.1	<1	38.8	300	1190	360	354	40	<10	0.04
		Min.	911.764	1.2	2140	6.12	29	-5.7	<1	134	85	134	105	0.241	56.1	<1	38.8	300	920	340	264	<10	<10	<0.01
		Max.	912.364	2.2	2850	6.29	33	141.2	<1	171	101	171	158	<0.5	71.9	<1	53.2	366	1190	400	365	40	20	0.06
		Average	912.000	1.7	2471	6.17	31	54	0.5	150	94	150	135	0.28	64	0.5	46	330	1042	373	332	29	8.8	0.034
Upgradient / Adjacent MPAR	D106	26/10/2023	910.297	1.2	11,850	6.11	22	126.7	<1	196	492	196	1290	<1	612	<1	112	2070	5810	310	2120	<10	<10	<0.01
Upgradient / Adjacent MPAR	D106	31/01/2024	910.797	1.5	11,640	6.03	25	133.6	<1	180	481	180	1300	0.123	588	<1	118	2030	6250	370	2000	10	<10	0.01
Upgradient / Adjacent MPAR	D106	22/05/2024	910.197	2.3	13,320	6.05	21	216.2	<1	175	478	175	1150	<1	567	<1	131	2050	5640	410	2160	<10	<10	<0.01
Upgradient / Adjacent MPAR	D106	24/07/2024	910.297	1.7	11,470	5.95	22	73.7	<1	176	464	176	1130	<2	542	<1	119	1990	5610	410	1800	20	<10	0.02
		Min.	910.197	1.2	11470	5.95	21	73.7	<1	175	464	175	1130	0.123	542	<1	112	1990	5610	310	1800	<10	<10	<0.01
		Max.	910.797	2.3	13320	6.11	25	216.2	<1	196	492	196	1300	<2	612	<1	131	2070	6250	410	2160	20	<10	0.02
		Average	910.000	1.7	12070	6.03	23	138	0.5	182	479	182	1218	0.53	577	0.5	120	2035	5828	375	2020	10	5	0.01
Upgradient / Adjacent MPAR	D107	25/10/2023	909.982	1.3	12,240	6.14	42	61.6	<1	252	390	252	1120	<1	510	<1	294	2260	6080	350	2190	<10	<10	<0.01
Upgradient / Adjacent MPAR	D107	31/01/2024	910.582	1.1	13,290	6.09	46	59	<1	233	403	233	1250	<1	528	<1	302	2350	7140	380	2190	20	<10	0.02
Upgradient / Adjacent MPAR	D107	24/05/2024	909.982	2	13,630	6.12	43	212	<1	238	381	238	1090	<1	472	<1	287	2210	6100	460	2180	<10	<10	<0.01
Upgradient / Adjacent MPAR	D107	24/07/2024	909.782	1.4	11,730	5.98	41	48.7	<1	248	372	248	814	<2	455	<1	278	2150	4900	410	1890	10	<10	0.01
		Min.	909.782	1.1	11730	5.98	41	48.7	<1	233	372	233	814	<1	455	<1	278	2150	4900	350	1890	<10	<10	<0.01
		Max.	910.582	2	13630	6.14	46	212	<1	252	403	252	1250	<2	528	<1	302	2350	7140	460	2190	20	<10	0.02
		Average	910.000	1.5	12723	6.1	43	95	0.5	243	387	243	1069	0.63	491	0.5	290	2243	6055	400	2113	10	5	0.01
Upgradient / Adjacent MPAR	D3	21/09/2023	913.062	1.7	1020	6.25	218	5.9	<1	178	85.1	178	68.7	0.101	52.1	<1	10.1	59	242	90	85	20	20	0.04
Upgradient / Adjacent MPAR	D3	22/11/2023	912.862	1.2	930	6.22	213	45.5	<1	159	79.2	159	52.5	<0.1	45.8	<1	9.8	45.9	238	70	76	10	<10	0.01
Upgradient / Adjacent MPAR	D3	13/03/2024	913.362	1.7	1010	6.22	225	44.9	<1	179	79.8	179	84.4	<0.1	50.4	<1	11.1	42.3	278	70	84	20	<10	0.02
Upgradient / Adjacent MPAR	D3	19/06/2024	913.362	3.2	461	6.96	225	140.6	<1	58	28.6	58	37.2	0.055	20	<1	4.68	31.9	110	30	38	30	<10	0.03
		Min.	912.862	1.2	461	6.22	213	5.9	<1	58	28.6	58	37.2	0.055	20	<1	4.68	31.9	110	30	38	10	<10	0.01
		Max.	913.362	3.2	1020	6.96	225	140.6	<1	179	85.1	179	84.4	0.101	52.1	<1	11.1	59	278	90	85	30	20	0.04
		Average	913.000	2	855	6.33	220	59	0.5	144	68	144	61	0.064	42	0.5	8.9	45	217	65	71	20	8.8	0.025
Within / Immediately Adjacent LNAR North	D110	25/10/2023	908.020	1.1	8960	5.99	49	40.4	<1	107	584	107	1090	<1	462	<1	113	1210	4380	230	1550	<10	<10	<0.01
Within / Immediately Adjacent LNAR North	D110	1/02/2024	908.720	1.7	8760	5.97	53	51.2	<1	94	554	94	970	0.252	447	<1	108	1200	3990	300	1410	30	<10	0.03
Within / Immediately Adjacent LNAR North	D110	23/05/2024	908.320	1.4	9760	5.94	50	93.2	<1	103	506	103	922	<0.5	413	<1	90.9	1120	3820	380	1490	<10	<10	<0.01
Within / Immediately Adjacent LNAR North	D110	1/08/2024	908.020	9.1	8584	5.91	49	38.1	<1	157	518	157	944	<1	415	<1	85.9	1120	4370	480	1460	140	<100	0.14
		Min.	908.020	1.1	8584	5.91	49	38.1	<1	94	506	94	922	0.252	413	<1	85.9	1120	3820	230	1410	<10	<10	<0.01
		Max.	908.720	9.1	9760	5.99	53	93.2	<1	157	584	157	1090	<1	462	<1	113	1210	4380	480	1550	140	<100	0.14
		Average	908.000	3.3	9016	5.95	50	56	0.5	115	541	115	982	0.38	434	0.5	99	1163	4140	348	1478	45	16	0.045
Within / Immediately Adjacent LNAR North	D117	21/09/2023	908.077	4.2	4760	6.04	199	188.5	<1	81	382	81	130	3.2	123	<1	158	555	2670	990	888	1610	20	1.63
Within / Immediately Adjacent LNAR North	D117	7/11/2023	909.577	3.8	4780	6.15	234	171.9	<1	79	403	79	140	2.75	124	<1	171	583	2910	840	919	1760	<10	1.76
Within / Immediately Adjacent LNAR North	D117	22/02/2024	909.577	3.7	4780	6.28	3	103.7	<1	100	383	100	132	2.47	127	<1	160	580	2680	730	903	1880	<10	1.88
Within / Immediately Adjacent LNAR North	D117	22/05/2024	907.877	4.2	4720	6.25	194	220.8	<1	198	303	198	134	1.67	160	<1	102	447	2070	310	789	620	<10	0.62
Within / Immediately Adjacent LNAR North	D117	2/08/2024	908.377	3.6	4570	6.10	206	137.1	<1	132	348	132	178	2.22	138	<1	128	484	3110	580	948	1650	<10	1.65
		Min.	907.877	3.6	4570	6.04	3	103.7	<1	79	303	79	130	1.67	123	<1	102	447	2070	310	789	620	<10	0.62
		Max.	909.577	4.2	4780	6.28	234	220.8	<1	198	403	198	178	3.2	160	<1	171	583	3110	990	948	1880	20	1.88
		Average	909.000	3.9	4722	6.15	167	164	0.5	118	364	118	143	2.5	134	0.5	144	530	2688	690	889	1504	8	1.5
Within / Immediately Adjacent LNAR North	D20	21/09/2023	910.820	0.8	3920	5.94	14	139.5	<1	289	295	289	120	0.23	325	<1	38.1	278	2150	380	740	<10	<10	<0.01
Within / Immediately Adjacent LNAR North	D20	22/11/2023	910.820	1	3890	5.98	14	144.1	<1	287	295	287	114	<0.5	308	<1	46.2	280	2050	400	721	<10	<10	<0.01
Within / Immediately Adjacent LNAR North	D20	14/03/2024	911.020	1.8	3900	6.04	16	118.3	<1	298	319	298	119	<0.5	340	<1	34	221	2240	360	808	<10	<10	<0.01
Within / Immediately Adjacent LNAR North	D20	19/06/2024	910.920	2.7	3590	5.95	15	207.5	<1	303	258	303	119	0.344	307	<1	32.3	242	2120	390	736	<10	<10	<0.01
		Min.	910.820	0.8	3590	5.94	14	118.3	<1	287	258	287	114	0.23	307	<1	32.3	221	2050	360	721	<10	<10	<0.01
		Max.	911.020	2.7	3920	6.04	16	207.5	<1	303	319	303	120	<0.5	340	<1	46.2	280	2240	400	808	<10	<10	<0.01
		Average	911.000	1.6	3825	5.98	15	152	0.5	294	292	294	118	0.27	320	0.5	38	255	2140	383	751	5	5	0.005
Within / Immediately Adjacent LNAR North	D10	20/09/2023	911.296	0.7	8250	6.07	156	43.3	<1	205	261	205	614	0.922	279	<1	155	1480	3960	410	1310	<10	<10	<0.01
Within / Immediately Adjacent LNAR North	D10	22/11/2023	910.396	0.8	11,330	5.95	57	121	<1	163	346	163	962	<1	395	<1	235	2080	5910	430	1940	<10	<10	<0.01
Within / Immediately Adjacent LNAR North	D10	14/03/2024	911.996	1.4	8260	5.91	167	88.2	<1	131	264	131	602	<1	288	<1	179	1380	4080	420	1540	<10	<10	<0.01
Within / Immediately Adjacent LNAR North	D10	26/07/2024	911.396	1	9333	5.78	158	114.1	<1	144	291	144	635	<1	314	<1	185	1720	4250	420	1450	<10	<10	<0.01
		Min.	910.396	0.7	8250	5.78	57	43.3	<1	131	261	131	602	0.922	279	<1	155	1380	3960	410	1310	<10	<10	<0.01
		Max.	911.996	1.4	11330	6.07	167	121	<1	205	346	205	962	<1	395	<1	235	2080	5910	430	1940	<10	<10	<0.01
		Average	911.000	0.98	9293	5.92	135	92	0.5	161	291	161	703	0.61	319	0.5	189	1665	4550	420	1560	5	5	0.005
Within / Immediatley Adjacent LNAR South	D16A	21/09/2023	913.062	2.3	970	6.78	131	64.7	<1	315	123	315	19.7	0.326	41.9	<1	21.8	34.1	191	220	66	40	50	0.09
Within / Immediatley Adjacent LNAR South	D16A	23/11/2023	913.862	1.7	940	6.87	133	129.6	<1	276	113	276	20.3	0.28	39.4	<1	20.6	33.7	202	230	66	50	30	0.08
Within / Immediatley Adjacent LNAR South	D16A	15/03/2024	913.362	2.7	930	7.07	140	-4.5	<1	290	110	290	21.7	0.264	40.8	<1	22.8	24.5	204	200	69	120	<10	0.12
Within / Immediatley Adjacent LNAR South	D16A	21/06/2024	913.362	3.2	1001	6.85	131	153.4	<1	313	110	313	22.8	0.419	43.5	<1	20.6	38	217	240	71	120	<10	0.12
		Min.	913.062	1.7	930	6.78	131	-4.5	<1	276	110	276	19.7	0.264	39.4	<1	20.6	24.5	191	200	66	40	<10	0.08
		Max.	913.862	3.2	1001	7.07	140	153.4	<1	315	123	315	22.8	0.419	43.5	<1	22.8	38	217	240	71	120	50	0.12
		Average	913.000	2.5	960	6.88	134	86	0.5	299	114	299	21	0.32	41	0.5	21	33	204	223	68	83	23	0.1
Within / Immediatley Adjacent LNAR South	D15	20/09/2023	914.706	0.9	1880	5.43	26	126.4	<1	47	87.7	47	85.7	0.045	38.4	<1	25.8	247	772	400	258	<10	<10	<0.01
Within / Immediatley Adjacent LNAR South	D15	23/11/2023	915.606	1.2	1880	5.55	31	183.4	<1	52	91.2	52	86	<0.2	39.6	<1	26.7	249	785	400	266	<10	<10	<0.01
Within / Immediatley Adjacent LNAR South	D15	14/03/2024	914.506	1.4	1920	5.71	25	78.4	<1	68	92.4	68	90.6	<0.2	41.3	<1	29.8	225	870	360	289	<10	<10	<0.01
Within / Immediatley Adjacent LNAR South	D15	21/06/2024	915.506	3.2	1890	5.96	31	236.7	<1	136	75.9	136	86.4	<0.2	37.5	<1	24.2	258	738	390	244	20	<10	0.02
		Min.	914.506	0.9	1880	5.43	25	78.4	<1	47	75.9	47	85.7	0.045	37.5	<1	24.2	225	738	360	244	<10	<10	<0.01
		Max.	915.606	3.2	1920	5.96	31	236.7	<1	136	92.4	136	90.6	<0.2	41.3	<1	29.8	258	870	400	289	20	<10	0.02
		Average	915.000	1.7	1893	5.62	28	156	0.5	76	87	76	87	0.086	39	0.5	27	245	791	388	264	8.8	5	0.0088
Within / Immediatley Adjacent LNAR South	D17	20/09/2023	908.950	2.3	2220	6.30	35	85.1	<1	168	184	168	116	0.283	97.9	<1	22.3	188	1030	370	314	100	20	0.12
Within / Immediatley Adjacent LNAR South	D17	23/11/2023	908.350	1.5	2070	6.39	32	167.5	<1	212	178	212	87.8	<0.2	94.7	<1	20.2	161	790	250	275	60	20	0.08
Within / Immediatley Adjacent LNAR South	D17	14/03/2024	909.250	2.6	1270	6.58	37	-3.8	<1	168	110	168	49.9	0.194	51.6	<1	15.2	76.6	465	500	159	1140	<10	1.14
Within / Immediatley Adjacent LNAR South	D17	21/06/2024	908.950	2.7	1840	6.39	35	203.1	<1	227	147	227	80.6	0.289	84.4	<1	16.8	133	748	290	245	100	<10	0.1
		Min.	908.350	1.5	1270	6.30	32	-3.8	<1	168	110	168	49.9	0.194	51.6	<1	15.2	76.6	465	250	159	60	<10	0.08
		Max.	909.250	2.7	2220	6.58	37	203.1	<1	227	184	227	116	0.289	97.9	<1	22.3	188	1030	500	314	1140	20	1.14
		Average	909.000	2.3	1850	6.40	35	113	0.5	194	155	194	84	0.22	82	0.5	19	140	758	353	248	350	13	0.36
Within / Immediatley Adjacent LNAR South	D18	21/09/2023	910.268	1.6	660	6.71	18	74.7	<1	353	84.5	353	7.52	0.518	30.4	<1	19.2	17.5	9.42	200	4	<10	40	0.04
Within / Immediatley Adjacent LNAR South	D18	23/11/2023	909.668	1.6	660	6.74	7	171.3	<1	350	81.6	350	7.64	0.465	29.8	<1	18.3	17.2	10.6	190	4	30	<10	0.03
Within / Immediatley Adjacent LNAR South	D18	14/03/2024	903.568	2	670	6.97	6	134.6	<1	354	81.4	354	8.62	0.489	29.8	<1	20.5	10.9	13.1	180	5	70	<10	0.07
Within / Immediatley Adjacent LNAR South	D18	21/06/2024	911.268	2.9	680	6.64	8	137.7	<1	328	73.6	328	8.31	0.54	30.4	<1	17.2	18	15.1	240	5	30	<10	0.03
		Min.	903.568	1.6	660	6.64	6	74.7	<1	328	73.6	328	7.52	0.465	29.8	<1	17.2	10.9	9.42	180	4	<10	<10	0.03
		Max.	911.268	2.9	680	6.97	18	171.3	<1	354	84.5	354	8.62	0.54	30.4	<1	20.5	18	15.1	240	5	70	40	0.07
		Average	909.000	2	668	6.75	9.8	130	0.5	346	80	346	8	0.5	30	0.5	19	16	12	203	4.5	34	14	0.043
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D1	20/09/2023	910.631	0.7	9510	5.92	131	35.6	<1	179	438	179	876	<1	468	<1	115	1590	4390	380	1550	<10	<10	<0.01
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D1	22/11/2023	910.231	1.5	2020	5.94	50	130.9	<1	26	96.1	26	121	<0.2	78	<1	17.9	226	823	70	283	<10	<10	<0.01
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D1	13/03/2024	910.731	1.1	10,330	5.98	132	42.4	<1	142	511	142	959	<1	512	<1	135	1560	5330	340	2010	<10	<10	<0.01
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D1	19/06/2024	910.631	3.3	9370	5.99	131	201.2	<1	170	427	170	954	<1	432	<1	121	1590	5170	370	1830	<200	<200	<0.2
		Min.	910.231	0.7	2020	5.92	50	35.6	<1	26	96.1	26	121	<0.2	78	<1	17.9	226	823	70	283	<10	<10	<0.01
		Max.	910.731	3.3	10330	5.99	132	201.2	<1	179	511	179	959	<1	512	<1	135	1590	5330	380	2010	<200	<200	<0.2
		Average	911.000	1.7	7808	5.96	111	103	0.5	129	368	129	728	0.4	373	0.5	97	1242	3928	290	1418	29	29	0.029

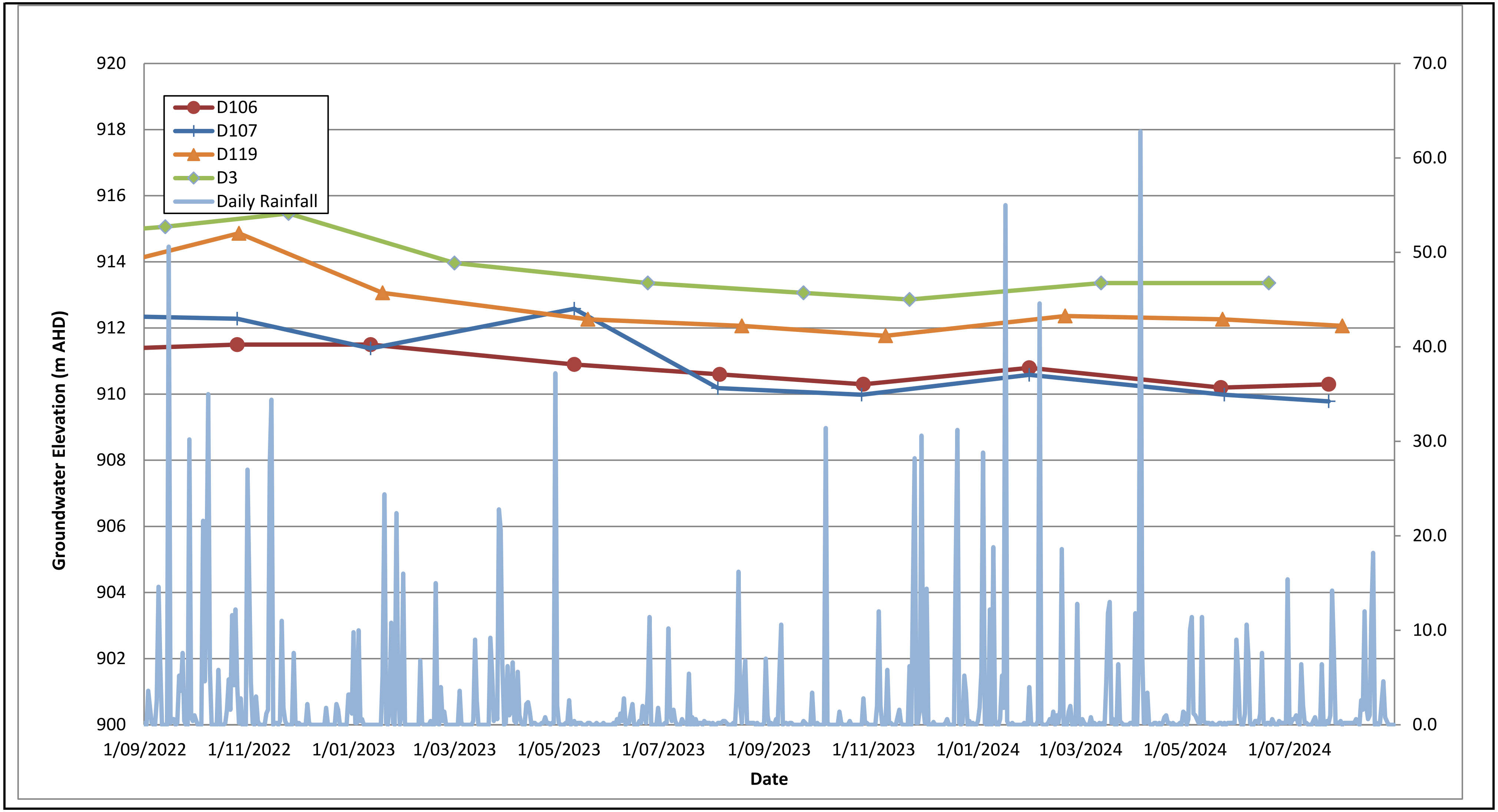
LocCode	Sample Date	Total Dissolved Solids (TDS) (Filtered)	Aluminium	Aluminium (Filtered)	Antimony	Arsenic	Arsenic (Filtered)	Barium	Beryllium	Boron	Boron (Filtered)	Cadmium	Chromium	Chromium (Hexavalent)	Chromium (Trivalent)	Cobalt	Copper	Copper (Filtered)	Iron	Iron (Filtered)	Lead	Manganese	Manganese (Filtered)	Mercury	Molybdenum	Nickel	Nickel (Filtered)	Selenium	Silver	Strontium	Vanadium	Vanadium (Filtered)	Zinc	Zinc (Filtered)
		cal Param	Metals																															
		mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
ANZECC (2000) or Local Guidelines - Groundwater		2000				24	24	700	100	370	370	2	5	1	3.3		5	5	664	664	5	5704	5704	0.06	10	550.9	550.9	5	0.05				908	908
D4	19/10/2023	540	7540	7070	<1	26	25	14	2	50	<50	0.2	1	<10	<10	4	<1	1	63,000	50,500	13	621	566	<0.04	<1	12	10	<0.2	<1	0.069	<10	<10	116	105
D4	18/01/2024	660	7650	7640	<1	25	24	16	2	<50	<50	0.2	1	<10	<10	3	2	<1	62,800	58,600	12	631	616	<0.04	<1	12	12	<0.2	<1	0.07	<10	<10	124	108
D4	17/04/2024	495	8080	7360	<1	31	28	14	2	<50	<50	0.2	1	<10	<10	3	4	1	63,600	56,500	14	632	611	<0.04	<1	12	10	0.2	<1	0.07	<10	<10	115	110
D4	18/07/2024	524	7560	6640	<1	26	26	16	2	<50	<50	0.2	1	<1	1	4	5	4	66,700	51,800	18	682	580	<0.04	<1	12	11	<0.2	<0.1	0.075	4.4	<10	116	96
	Min.	495	7540	6640	<1	25	24	14	2	<50	<50	0.2	1	<1	1	3	<1	<1	62800	50500	12	621	566	<0.04	<1	12	10	<0.2	<0.1	0.069	4.4	<10	115	96
	Max.	660	8080	7640	<1	31	28	16	2	50	<50	0.2	1	<10	<10	4	5	4	66700	58600	18	682	616	<0.04	<1	12	12	0.2	<1	0.075	<10	<10	124	110
	Average	555	7708	7178	0.5	27	26	15	2	31	25	0.2	1	3.9	4	3.5	2.9	1.6	64025	54350	14	642	593	0.02	0.5	12	11	0.13	0.39	0.071	4.9	5	118	105
D5	19/10/2023	784	70	10	<1	1	<1	19	2	70	80	<0.1	<1	<10	<10	26	<1	<1	30,400	18,100	<1	7220	6610	<0.04	<1	59	54	0.2	<1	0.395	<10	<10	28	24
D5	18/01/2024	1060	60	40	<1	<1	<1	19	1	70	60	<0.1	<1	<10	<10	24	<1	<1	26,600	16,500	<1	7860	7750	<0.04	<1	54	57	<0.2	<1	0.396	<10	<10	21	15
D5	17/04/2024	910	60	60	<1	<1	<1	20	2	80	60	<0.1	<1	<10	<10	24	<1	<1	29,500	24,700	<1	7960	6790	<0.04	<1	54	46	0.3	<1	0.419	<10	<10	21	19
D5	18/07/2024	846	68	20	<1	2	1	20	3	60	70	<0.1	<1	<1	<1	25	2	<1	40,700	30,200	<1	7700	6820	<0.04	<1	54	51	0.4	<0.1	0.419	<0.2	<10	18	8
	Min.	784	60	10	<1	<1	<1	19	1	60	60	<0.1	<1	<1	<1	24	<1	<1	26600	16500	<1	7220	6610	<0.04	<1	54	46	<0.2	<0.1	0.395	<0.2	<10	18	8
	Max.	1060	70	60	<1	2	1	20	3	80	80	<0.1	<1	<10	<10	26	2	<1	40700	30200	<1	7960	7750	<0.04	<1	59	57	0.4	<1	0.419	<10	<10	28	24
	Average	900	65	33	0.5	1	0.63	20	2	70	68	0.05	0.5	3.9	3.9	25	0.88	0.5	31800	22375	0.5	7685	6993	0.02	0.5	55	52	0.25	0.39	0.41	3.8	5	22	17
D119	8/11/2023	1590	340	<10	<1	14	6	20	<1	620	320	<0.1	3	<10	<10	46	13	<1	17,400	7490	1	1390	1160	<0.04	14	119	99	0.6	<1	0.442	<10	<10	167	111
D119	21/02/2024	2410	690	10	<1	28	5	15	<1	490	350	<0.1	<1	<10	<10	56	2	<1	28,600	5300	4	1530	1440	0.1	2	156	138	<0.2	<1	0.588	<10	<10	75	19
D119	23/05/2024	1750	3120	<10	<1	27	5	24	1	590	350	0.2	4	<10	<10	54	5	<1	31,200	7720	19	1720	1310	<0.04	5	147	139	0.6	<1	0.514	<10	<10	211	33
D119	1/08/2024	1660	3950	10	<1	15	14	14	1	370	430	<0.1	<1	<1	<1	64	<1	<1	24,600	20,800	20	1680	1570	<0.04	<1	162	150	0.8	<0.1	0.533	3.8	<10	289	52
	Min.	1590	340	<10	<1	14	5	14	<1	370	320	<0.1	<1	<1	<1	46	<1	<1	17400	5300	1	1390	1160	<0.04	<1	119	99	<0.2	<0.1	0.442	3.8	<10	75	19
	Max.	2410	3950	10	<1	28	14	24	1	620	430	0.2	4	<10	<10	64	13	<1	31200	20800	20	1720	1570	0.1	14	162	150	0.8	<1	0.588	<10	<10	289	111
	Average	1853	2025	7.5	0.5	21	7.5	18	0.75	518	363	0.088	2	3.9	3.9	55	5.1	0.5	25450	10328	11	1580	1370	0.04	5.4	146	132	0.53	0.39	0.52	4.7	5	186	54
D106	26/10/2023	10,900	650	<10	<1	2	<1	20	<1	1900	1980	0.1	1	<10	<10	312	3	<1	28,100	23,000	2	17,600	16,000	<0.04	<1	2040	1940	0.2	<1	3.16	<10	<10	193	173
D106	31/01/2024	11,500	70	<10	<1	2	<1	19	<1	2300	2230	0.1	<1	<10	<10	346	<1	<1	24,600	7680	1	18,200	17,400	<0.04	<1	2210	2080	<0.2	<1	3.42	<10	<10	179	146
D106	22/05/2024	10,700	420	<10	<1	5	2	24	<1	2960	2120	0.2	<1	<10	<10	294	5	1	31,200	20,800	7	17,800	13,700	<0.04	<1	1990	2040	0.5	<1	3.53	<10	<10	237	200
D106	24/07/2024	10,400	581	<10	<1	2	<1	19	<1	2400	2670	<0.1	<1	<1	<1	302	3	1	21,900	18,900	2	15,900	14,800	<0.04	<1	2040	1840	0.4	<0.1	2.85	1.5	<10	183	155
	Min.	10400	70	<10	<1	2	<1	19	<1	1900	1980	<0.1	<1	<1	<1	294	<1	<1	21900	7680	1	15900	13700	<0.04	<1	1990	1840	<0.2	<0.1	2.85	1.5	<10	179	146
	Max.	11500	650	<10	<1	5	2	24	<1	2960	2670	0.2	1	<10	<10	346	5	1	31200	23000	7	18200	17400	<0.04	<1	2210	2080	0.5	<1	3.53	<10	<10	237	200
	Average	10875	430	5	0.5	2.8	0.88	21	0.5	2390	2250	0.11	0.63	3.9	3.9	314	2.9	0.75	26450	17595	3	17375	15475	0.02	0.5	2070	1975	0.3	0.39	3.2	4.1	5	198	169
D107	25/10/2023	10,800	40	<10	<1	4	4	17	<1	5020	5780	1	8	<10	<10	288	1	<1	21,400	20,100	12	11,800	11,600	<0.04	<1	1690	1700	0.3	<1	3.6	<10	<10	350	343
D107	31/01/2024	12,000	20	<10	<1	3	2	19	<1	5050	4940	1.4	3	<10	<10	353	1	<1	21,900	12,800	15	13,300	12,500	0.07	<1	2030	1940	<0.2	<1	4.3	<10	<10	366	346
D107	24/05/2024	10,300	30	<10	<1	5	3	16	<1	5050	3780	1.2	2	<10	<10	226	<1	<1	21,700	14,100	12	11,300	9290	<0.04	<1	1370	1580	0.3	<1	3.43	<10	<10	329	340
D107	24/07/2024	10,100	21	<10	<1	6	3	18	<1	5390	6120	1.2	<1	<1	<1	268	2	1	17,500	13,300	13	10,500	10,100	<0.04	<1	1630	1480	0.4	<0.1	3.21	1.2	<10	356	318
	Min.	10100	20	<10	<1	3	2	16	<1	5020	3780	1	<1	<1	<1	226	<1	<1	17500	12800	12	10500	9290	<0.04	<1	1370	1480	<0.2	<0.1	3.21	1.2	<10	329	318
	Max.	12000	40	<10	<1	6	4	19	<1	5390	6120	1.4	8	<10	<10	353	2	1	21900	20100	15	13300	12500	0.07	<1	2030	1940	0.4	<1	4.3	<10	<10	366	346
	Average	10800	28	5	0.5	4.5	3	18	0.5	5128	5155	1.2	3.4	3.9	3.9	284	1.1	0.63	20625	15075	13	11725	10873	0.033	0.5	1680	1675	0.28	0.39	3.6	4.1	5	350	337
D3	21/09/2023	699	20	<10	3	1	<1	68	1	<50	<50	0.4	1	<10	<10	2	2	2	10,400	8200	<1	581	600	<0.04	1	8	6	<0.2	<1	0.388	<10	<10	13	10
D3	22/11/2023	583	20	<10	<1	<1	<1	46	<1	<50	<50	<0.1	<1	<10	<10	<1	<1	<1	8800	2290	<1	686	567	<0.04	<1	6	5	<0.2	<1	0.356	<10	<10	6	<5
D3	13/03/2024	553	10	<10	<1	<1	<1	81	<1	80	60	<0.1	<1	<10	<10	1	2	<1	10,400	6050	<1	678	602	<0.04	<1	11	7	<0.2	<1	0.401	<10	<10	11	8
D3	19/06/2024	265	<10	<10	<1	<1	<1	56	<1	<50	<50	<0.1	<1	<1	<0.001	<1	<1	<1	1290	530	<1	107	91	<0.04	<1	3	2	<0.2	<1	0.166	<10	<10	<5	<5
	Min.	265	<10	<10	<1	<1	<1	46	<1	<50	<50	<0.1	<1	<1	<0.001	<1	<1	<1	1290	530	<1	107	91	<0.04	<1	3	2	<0.2	<1	0.166	<10	<10	<5	<5
	Max.	699	20	<10	3	1	<1	81	1	80	60	0.4	1	<10	<10	2	2	2	10400	8200	<1	686	602	<0.04	1	11	7	<0.2	<1	0.401	<10	<10	13	10
	Average	525	14	5	1.1	0.63	0.5	63	0.63	39	34	0.14	0.63	3.9	3.8	1	1.3	0.88	7723	4268	0.5	513	465	0.02	0.63	7	5	0.1	0.5	0.33	5	5	8.1	5.8
D110	25/10/2023	7940	160	<10	<1	8	4	15	<1	1930	2070	<0.1	9	<10	<10	329	2	<1	54,600	46,000	<1	16,800	16,100	<0.04	2	1760	1720	0.3	<1	3.79	<10	<10	308	279
D110	1/02/2024	7990	80	<10	<1	7	<1	15	<1	1900	1830	<0.1	1	<10	<10	323	3	<1	48,000	19,300	<1	17,000	16,000	<0.04	<1	1790	1650	<0.2	<1	3.72	<10	<10	244	180
D110	23/05/2024	7560	40	<10	<1	8	2	12	<1	1960	1590	<0.1	<1	<10	<10	250	<1	<1	58,300	35,600	<1	16,700	12,600	<0.04	<1	1420	1480	0.4	<1	3.44	<10	<10	250	225
D110	1/08/2024	7590	75	10	<1	8	3	11	<1	2350	2310	<0.1	<1	<1	<1	287	<1	<1	61,600	45,600	<1	18,400	15,600	<0.04	<1	1650	1600	0.5	<0.1	3.84	1.3	<10	280	249
	Min.	7560	40	<10	<1	7	<1	11	<1	1900	1590	<0.1	<1	<1	<1	250	<1	<1	48000	19300	<1	16700	12600	<0.04	<1	1420	1480	<0.2	<0.1	3.44	1.3	<10	244	180
	Max.	7990	160	10	<1	8	4	15	<1	2350	2310	<0.1	9	<10	<10	329	3	<1	61600	46000	<1	18400	16100	<0.04	2	1790	1720	0.5	<1	3.84	<10	<10	308	279
	Average	7770	89	6.3	0.5	7.8	2.4	13	0.5	2035	1950	0.05	2.8	3.9	3.9	297	1.5	0.5	55625	36625	0.5	17225	15075	0.02	0.88	1655	1613	0.33	0.39	3.7	4.1	5	271	233
D117	21/09/2023	4300	10,800	1210	4	6	2	29	5	11,000	10,900	35.4	3	<10	<10	125	2	<1	2420	<50	1	8300	8140	<0.04	382	362	347	123	<1	8.93	<10	<10	1200	1170
D117	7/11/2023	4300	15,200	1910	9	7	2	46	6	11,700	8800	34.5	4	<10	<10	124	4	1	7720	100	3	8390	8350	<0.04	961	361	307	235	<1	8.56	40	<10	1240	1170
D117	22/02/2024	4940	2400	1460	2	3	1	41	3	12,200	10,000	27.6	<1	<10	<10	115	2	<1	350	290	1	8740	7930	<0.04	254	324	284	161	<1	8.62	<10	<10	960	891
D117	22/05/2024	3450	1430	440	<1	<1	<1	22	2	10,500	6220	11.2	<1	<10	<10	110	3	1	710	370	<1	16,000	11,900	<0.04	122	312	304	48.9	<1	5.05	<10	<10	401	371
D117	2/08/2024	3850	2380	940	2	2	2	31	3	13,000	13,600	20	<1	<1	<1	118	<1	<1	1140	60	<1	12,700	10,800	<0.04	322	337	318	125	<0.1	7.93	2.9	<10	735	692
	Min.	3450	1430	440	<1	<1	<1	22	2	10500	6220	11.2	<1	<1	<1	110	<1	<1	350	<50	<1	8300	7930	<0.04	122	312	284	48.9	<0.1	5.05	2.9	<10	401	371
	Max.	4940	15200	1910	9	7	2	46	6	13000	13600	35.4	4	<10	<10	125	4	1	7720	370	3	16000	11900	<0.04	961	362	347	235	<1	8.93	40	<10	1240	1170
	Average	4168	6442	1192	3.5	3.7	1.5	34	3.8	11680	9904	26	1.7	4.1	4.1	118	2.3	0.7	2468	169	1.2	10826	9424	0.02	408	339	312	139	0.41	7.8	12	5	907	859
D20	21/09/2023	3740	1750	30	<1	3	<1	43	<1	2860	2960	24.2	28	<10	<10	267	8	<1	5360	3020	16	29,500	28,800	<0.04	2	608	542	0.4	<1	1.49	<10	<10	307	242
D20	22/11/2023	3550	560	100	<1	1	1	27	<1	4400	3430	3.4	11	<10	<10	245	12	<1	5140	3870	3	31,700	27,100	<0.04	<1	538	511	<0.2	<1	1.74	<10	<10	284	265
D20	14/03/2024	3720	<10	<10	1	1	1	17	<1	2590	1860	0.6	<1	<10	<10	274	<1	<1	2760	2020	<1	28,900	23,000	<0.04	<1	528	499	0.6	<1	1.19	<10	<10	333	325
D20	19/06/2024	3340	1460	20	<1	2	<1	37	<1	2580	2280	15.5	17	<1	<0.001	217	9	<1	4260	2120	12	28,200	22,700	<0.04	<1	498	387	0.3	<1	1.25	<10	<10	281	182
	Min.	3340	<10	<10	<1	1	<1	17	<1	2580	1860	0.6	<1	<1	<0.001	217	<1	<1	2760	2020	<1	28200	22700	<0.04	<1	498	387	<0.2	<1	1.19	<10	<10	281	182
	Max.	3740	1750	100	1	3	1	43	<1	4400	3430	24.2	28	<10	<10	274	12	<1	5360	3870	16	31700	28800	<0.04	2	608	542	0.6	<1	1.74	<10	<10	333	325
	Average	3588	944	39	0.63	1.8	0.75	31	0.5	3108	2633	11	14	3.9	3.8	251	7.4	0.5	4380	2758	7.9	29575	25400	0.02	0.88	543	485	0.35	0.5	1.4	5	5	301	254
D10	20/09/2023	6950	60	60	<1	7	6	22	<1	3050	2870	<0.1	<1	<10	<10	212	11	<1	9600	8510	5	6480	6420	<0.04	15	845	803	0.4	<1	3.44	<10	<10	309	296
D10	22/11/2023	10,400	120	70	<1	2	1	19	<1	5440	3920	0.3	1	<10	<10	274	<1	<1	5830	3330	11	10,400	8940	<0.04	11	1210	1190	1.2	<1	4.94	<10	<10	676	686
D10	14/03/2024	7050	110	60	<1	3	2	17	<1	3120	2200	0.4	1	<10	<10	231	<1	4	9140	5830	9	6660	5360	<0.04	7	895	852	0.6	<1	3.39	<10	<10	589	617
D10	26/07/2024	8010	79	70	<1	3	2	16	<1	3630	3550	0.9	<1	<1	<1	250	1	<1	6990	7870	11	6960	6720	<0.04	8	1020	921	1.1	<0.1	3.56	0.4	<10	690	616
	Min.	6950	60	60	<1	2	1	16	<1	3050	2200	<0.1	<1	<1	<1	212	<1	<1	5830	3330	5	6480	5360	<0.04	7	845	803	0.4	<0.1	3.39	0.4	<10	309	296
	Max.	10400	120	70	<1	7	6	22	<1	5440	3920	0.9	1	<10	<10	274	11	4	9600	8510	11	10400	8940	<0.04	15	1210	1190	1.2	<1	4.94	<10	<10	690	686
	Average	8103	92	65	0.5	3.8	2.8	19	0.5	3810	3135	0.41	0.75	3.9	3.9	242	3.3	1.4	7890	6385	9	7625	6860	0.02	10	993	942	0.83	0.39	3.8	3.9	5	566	554
D16A	21/09/2023	608	200	<10	2	1	<1	70	<1	<50	<50	<0.1	4	<10	<10	1	3	<1	3300	880	2	115	105	<0.04	8	8	6	<10	<1	0.538	<10	<10	121	76
D16A	23/11/2023	557	180	<10	<1	<1	<1	49	<1	90	60	<0.1	2	<10	<10	3	2	<1	2720	1030	2	154	135	<0.04	13	12	9	<10	<1	0.508	<10	<10	116	57
D16A	15/03/2024	565	100	<10	<1	<1	<1	37	<1	60	70	<0.1	2	<10	<10	5	2	<1	1650	1050	<1	472	445	<0.04	13	19	18	<10	<1	0.465	<10	<10	56	28
D16A	21/06/2024	668	820	<10	<1	1	<1	73	<1	<50	50	<0.1	4	<1	<0.001	3	6	<1	3000	1010	5	246	169	<0.04	12	14	9	<10	<1	0.552	<10	<10	134	46
	Min.	557	100	<10	<1	<1	<1	37	<1	<50	<50	<0.1	2	<1	<0.001	1	2	<1	1650	880	<1	115	105	<0.04	8	8	6	<10	<1	0.465	<10	<10	56	28
	Max.	668	820	<10	2	1	<1	73	<1	90	70	<0.1	4	<10	<10	5	6	<1	3300	1050	5	472	445	<0.04	13	19	18	<10	<1	0.552	<10	<10	134	76
	Average	600	325	5	0.88	0.75	0.5	57	0.5	50	51	0.05	3	3.9	3.8	3	3.3	0.5	2668	993	2.4	247	214	0.02	12	13	11	5	0.5	0.52	5	5	107	52
D15	20/09/2023	1320	570	20	<1	6	2	16	<1	130	120	0.1	61	<10	<10	212	4	<1	12,700	10,300	3	781	792	<0.04	3	328	290	0.2	<1	0.348	<10	<10	431	418
D15	23/11/2023	1380	150	<10	<1	3	1	20	<1	410	220	0.2	3	<10	<10	222	1	<1	10,800	7780	2	906	765	<0.04	<1	319	290	0.3	<1	0.379	<10	<10	482	450
D15	14/03/2024	1370	70	<10	<1	3	2	12	<1	200	180	<0.1	23	<10	<10	220	<1	<1	11,500	7400	<1	876	812	<0.04	1	333	292	<0.2	<1	0.382	<10	<10	397	374
D15	21/06/2024	1260	4910	<10	<1	25	9	74	<1	120	90	0.2	15	<1	<0.001	191	33	2	14,900	6710	19	946	724	<0.04	10	282	218	2.5	<1	0.368	10	<10	526	346
	Min.	1260	70	<10	<1	3	1	12	<1	120	90	<0.1	3	<1	<0.001	191	<1	<1	10800	6710	<1	781	724	<0.04	<1	282	218	<0.2	<1	0.348	<10	<10	397	346
	Max.	1380	4910	20	<1	25	9	74	<1	410	220	0.2	61	<10	<10	222	33	2	14900	10300	19	946	812	<0.04	10	333	292	2.5	<1	0.382	10	<10	526	450
	Average	1333	1425	8.8	0.5	9.3	3.5	31	0.5	215	153	0.14	26	3.9	3.8	211	9.6	0.88	12475	8048	6.1	877	773	0.02	3.6	316	273	0.78	0.5	0.37	6.3	5	459	397
D17	20/09/2023	1760	1030	<10	4	5	<1	60	<1	160	170	1.1	24	<10	<10	9	9	1	20,100	9630	5	1700	1610	<0.04	38	46	30	6.1	<1	0.779	<10	<10	291	174
D17	23/11/2023	1530	240	<10	<1	<1	<1	84	<1	80	70	0.2	4	<10	<10	4	2	<1	10,100	1940	1	1490	1330	<0.04	13	24	20	2	<1	0.698	<10	<10	135	84
D17	14/03/2024	772	190	<10	1	<1	<1	114	<1	80	80	0.1	4	<10	<10	4	4	<1	6450	7230	1	801	732	0.1	40	22	19	1.4	<1	0.386	<10	<10	249	169
D17	21/06/2024	1370	210	<10	<1	2	1	39	<1	<50	60	<0.1	1	<1	<0.001	6	3	<1	16,500	14,400	1	1300	1060	<0.04	6	25	21	0.8	<1	0.678	<10	<10	144	105
	Min.	772	190	<10	<1	<1	<1	39	<1	<50	60	<0.1	1	<1	<0.001	4	2	<1	6450	1940	1	801	732	<0.04	6	22	19	0.8	<1	0.386	<10	<10	135	84
	Max.	1760	1030	<10	4	5	1	114	<1	160	170	1.1	24	<10	<10	9	9	1	20100	14400	5	1700	1610	0.1	40	46	30	6.1	<1	0.779	<10	<10	291	174
	Average	1358	418	5	1.5	2	0.63	74	0.5	86	95	0.36	8.3	3.9	3.8	5.8	4.5	0.63	13288	8300	2	1323	1183	0.04	24	29	23	2.6	0.5	0.64	5	5	205	133
D18	21/09/2023	370	250	<10	<1	13	6	662	<1	<50	<50	<0.1	3	<10	<10	<1	3	<1	1580	220	<1	91	86	<0.04	4	5	3	0.3	<1	0.391	<10	<10	51	38
D18	23/11/2023	372	50	<10	<1	8	2	703	<1	<50	<50	<0.1	<1	<10	<10	1	2	<1	780	<50	<1	138	113	<0.04	4	6	3	0.3	<1	0.413	<10	<10	42	32
D18	14/03/2024	352	110	<10	<1	16	8	617	<1	100	<50	<0.1	2	<10	<10	2	4	1	1600	490	<1	185	119	<0.04	7	5	4	0.7	<1	0.39	<10	<10	68	51
D18	21/06/2024	388	290	<10	<1	22	6	646	<1	<50	<50	<0.1	1	<1	<0.001	2	5	<1	2730	830	2	184	134	<0.04	8	8	5	0.4	<1	0.418	<10	<10	86	53
	Min.	352	50	<10	<1	8	2	617	<1	<50	<50	<0.1	<1	<1	<0.001	<1	2	<1	780	<50	<1	91	86	<0.04	4	5	3	0.3	<1	0.39	<10	<10	42	32
	Max.	388	290	<10	<1	22	8	703	<1	100	<50	<0.1	3	<10	<10	2	5	1	2730	830	2	185	134	<0.04	8	8	5	0.7	<1	0.418	<10	<10	86	53
	Average	371	175	5	0.5	15	5.5	657	0.5	44	25	0.05	1.6	3.9	3.8	1.4	3.5	0.63	1673	391	0.88	150	113	0.02	5.8	6	3.8	0.43	0.5	0.4	5	5	62	44
D1	20/09/2023	8510	20	<10	<1	8	5	24	<1	2970	2790	<0.1	<1	<10	<10	344	<1	9	43,500	37,300	<1	18,100	18,000	<0.04	<1	1940	1690	<0.2	<1	2.85	<10	<10	167	146
D1	22/11/2023	1450	770	440	<1	1	<1	50	<1	560	490	<0.1	2	<10	<10	92	4	2	17,300	12,400	3	3390	2940	<0.04	<1	178	162	0.3	<1	0.428	<10	<10	158	134
D1	13/03/2024	9420	20	<10	<1	8	2	24	<1	3240	2180	<0.1	<1	<10	<10	348	<1	<1	50,600	14,200	<1	20,700	16,100	<0.04	<1	2100	1940	0.3	<1	3.31	<10	<10	182	130
D1	19/06/2024	8750	20	<10	<1	9	4	23	<1	3490	2960	<0.1	<1	<1	<0.001	349	1	<1	46,500	32,700	<1	19,500	15,800	<0.04	<1	2010	1640	0.2	<1	2.94	<10	<10	182	136
	Min.	1450	20	<10	<1	1	<1	23	<1	560	490	<0.1	<1	<1	<0.001	92	<1	<1	17300	12400	<1	3390	2940	<0.04	<1	178	162	<0.2	<1	0.428	<10	<10	158	130
	Max.	9420	770	440	<1	9	5	50	<1	3490	2960	<0.1	2	<10	<10	349	4	9	50600	37300	3	20700	18000	<0.04	<1	2100	1940	0.3	<1	3.31	<10	<10	182	146
	Average	7033	208	114	0.5	6.5	2.9	30	0.5	2565	2105	0.05	0.88	3.9	3.8	283	1.5	3	39475	24150	1.1	15423	13210	0.02	0.5	1557	1358	0.23	0.5	2.4	5	5	172	137

Purpose	LocCode	Sample Date	Standing Water Level	Dissolved Oxygen (Field) (Filtered)	Electrical Conductivity (Field)	pH (Field)	Purge Volume	Redox (Field)	Carbonate (as CaCO3)	Bicarbonate Alkalinity (as CaCO3)	Calcium	Carbonate Alkalinity (as CaCO3)	Chloride	Fluoride	Magnesium	Phenolphthalein Alkalinity	Potassium	Sodium	Sulfate (as SO4)	Ammonia	Sulfur	Nitrate	Nitrite (as NO2-)	Nitrite + Nitrate (as N)	Total Dissolved Solids (TDS) (Filtered)
			Field Parameters						Major Anions and Cations											Nutrients					cal Param
			m AHD	mg/L	uS/cm	pH units	L	mV	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	µg/L	µg/L	mg/L	mg/L
ANZECC (2000) or Local Guidelines - Groundwater					2600	6.5-8							350	1.5					1000						2000
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D102	26/10/2023	907.922	1.7	8520	6.15	15	85.9	<1	98	522	98	1040	<1	480	<1	77.8	1110	3730	230	1390	<10	<10	<0.01	7550
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D102	1/02/2024	908.422	2.5	8550	6.12	19	113.3	<1	63	523	63	1160	<0.5	474	<1	77.8	1140	4310	260	1340	<10	<10	<0.01	7890
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D102	23/05/2024	908.222	4.5	9490	6.08	12	175.3	<1	58	488	58	1140	<0.2	452	<1	66.3	1050	3900	560	1400	<10	<10	<0.01	7340
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D102	25/07/2024	907.822	2.9	9018	6.11	16	26.1	<1	79	561	79	1030	<1	483	<1	71.3	1200	3930	270	1350	<10	<10	<0.01	7960
		Min.	907.822	1.7	8520	6.08	12	26.1	<1	58	488	58	1030	<0.2	452	<1	66.3	1050	3730	230	1340	<10	<10	<0.01	7340
		Max.	908.422	4.5	9490	6.15	19	175.3	<1	98	561	98	1160	<1	483	<1	77.8	1200	4310	560	1400	<10	<10	<0.01	7960
		Average	908.000	2.9	8895	6.11	16	100	0.5	75	524	75	1093	0.34	472	0.5	73	1125	3968	330	1370	5	5	0.005	7685
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D103	25/10/2023	905.464	1.5	3580	6.26	37	86.1	<1	228	168	228	203	<0.5	162	<1	33.1	460	1580	270	552	<10	<10	<0.01	2790
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D103	31/01/2024	905.764	1.1	3660	6.2	38	79.3	<1	215	175	215	219	<0.5	171	<1	34.2	483	1730	160	555	<10	<10	<0.01	2950
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D103	22/05/2024	905.464	1.7	4370	6.19	37	191.6	<1	205	181	205	240	<0.2	176	<1	31.7	492	1770	190	635	<10	<10	<0.01	2960
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D103	24/07/2024	905.264	1.4	3860	6.1	35	35.9	<1	214	175	214	216	<0.5	176	<1	33.5	488	1660	170	555	<10	<10	<0.01	3020
		Min.	905.264	1.1	3580	6.1	35	35.9	<1	205	168	205	203	<0.2	162	<1	31.7	460	1580	160	552	<10	<10	<0.01	2790
		Max.	905.764	1.7	4370	6.26	38	191.6	<1	228	181	228	240	<0.5	176	<1	34.2	492	1770	270	635	<10	<10	<0.01	3020
		Average	905.000	1.4	3868	6.2	37	98	0.5	216	175	216	220	0.21	171	0.5	33	481	1685	198	574	5	5	0.005	2930
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D104	26/10/2023	904.523	1.7	970	6.07	6	55.6	<1	85	65.2	85	68.4	<0.1	40	<1	8.67	82.2	288	40	99	20	<10	0.02	582
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D104	1/02/2024	904.723	1.3	1210	5.99	8	67	<1	74	82.7	74	75.5	<0.1	54.5	<1	10.6	90.3	429	110	141	40	30	0.07	832
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D104	23/05/2024	904.623	1.3	1320	5.74	12	226.7	<1	47	84.8	47	81.2	<0.05	57.8	<1	9.01	70.7	434	100	158	20	<10	0.02	818
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D104	24/07/2024	904.323	2.4	992	5.91	8	98.5	<1	71	65.4	71	84.4	<0.1	45.7	<1	8.29	72.4	377	90	113	40	<10	0.04	684
		Min.	904.323	1.3	970	5.74	6	55.6	<1	47	65.2	47	68.4	<0.05	40	<1	8.29	70.7	288	40	99	20	<10	0.02	582
		Max.	904.723	2.4	1320	6.07	12	226.7	<1	85	84.8	85	84.4	<0.1	57.8	<1	10.6	90.3	434	110	158	40	30	0.07	832
		Average	905.000	1.7	1123	5.91	8.5	112	0.5	69	75	69	77	0.044	50	0.5	9.1	79	382	85	128	30	11	0.038	729
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D105	26/10/2023	906.931	1	3120	6.07	29	57.2	<1	151	175	151	220	<0.5	165	<1	24.4	312	1300	170	462	<10	<10	<0.01	2330
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D105	31/01/2024	904.431	1.3	3210	5.96	14	106.2	<1	122	181	122	250	0.12	168	<1	26.5	337	1480	120	461	<10	<10	<0.01	2890
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D105	24/05/2024	907.131	2.2	3380	6.07	31	234.2	<1	146	163	146	221	<0.2	157	<1	22.1	305	1300	130	470	<10	<10	<0.01	2300
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D105	24/07/2024	906.831	1.3	2862	5.96	29	51.3	<1	135	150	135	192	<0.5	152	<1	20.6	283	1230	100	386	20	<10	0.02	2200
		Min.	904.431	1	2862	5.96	14	51.3	<1	122	150	122	192	0.12	152	<1	20.6	283	1230	100	386	<10	<10	<0.01	2200
		Max.	907.131	2.2	3380	6.07	31	234.2	<1	151	181	151	250	<0.5	168	<1	26.5	337	1480	170	470	20	<10	0.02	2890
		Average	906.000	1.5	3143	6.01	26	112	0.5	139	167	139	221	0.18	161	0.5	23	309	1328	130	445	8.8	5	0.0088	2430
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D2	20/10/2023	903.400	26.6	1780	5.99	60	64.2	<1	34	83.3	34	112	<0.5	67.5	<1	17.2	206	726	40	258	60	<10	0.06	1260
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D2	19/01/2024	904.600	1.3	600	5.84	80	200.5	<1	17	26.4	17	31.3	0.132	20.4	<1	8.76	60	234	40	70	<10	<10	<0.01	632
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D2	18/04/2024	903.600	1.8	940	5.94	63	132	<1	28	33.9	28	41.9	0.098	27.8	<1	10.6	91.6	293	50	103	<10	<10	<0.01	622
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D2	18/07/2024	904.300	3.3	2229	6.23	42	82.7	<1	40	90.2	40	107	0.136	74.8	<1	19.1	226	771	110	260	<10	<10	<0.01	1390
		Min.	903.400	1.3	600	5.84	42	64.2	<1	17	26.4	17	31.3	0.098	20.4	<1	8.76	60	234	40	70	<10	<10	<0.01	622
		Max.	904.600	26.6	2229	6.23	80	200.5	<1	40	90.2	40	112	<0.5	74.8	<1	19.1	226	771	110	260	60	<10	0.06	1390
		Average	904.000	8.3	1387	5.98	61	120	0.5	30	58	30	73	0.15	48	0.5	14	146	506	60	173	19	5	0.019	976
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D8	21/09/2023	904.149	7.1	381	5.38	42	120.8	<1	10	25.8	10	19.6	<0.01	19.2	<1	2.64	18.8	139	<10	44	40	10	0.05	277
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D8	23/11/2023	903.849	6	313	5.29	42	184.4	<1	11	21.9	11	14	<0.05	16.8	<1	2.27	10.9	112	<10	35	20	<10	0.02	236
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D8	14/03/2024	904.049	3.9	313	5.44	43	98.7	<1	10	21.5	10	14.4	<0.05	16.8	<1	3.16	7.04	111	10	37	10	<10	0.01	189
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D8	20/06/2024	904.249	5.6	343	5.44	45	231.3	<1	11	22.8	11	15.4	<0.02	19.1	<1	2.52	12.9	131	20	44	40	<10	0.04	238
		Min.	903.849	3.9	313	5.29	42	98.7	<1	10	21.5	10	14	<0.01	16.8	<1	2.27	7.04	111	<10	35	10	<10	0.01	189
		Max.	904.249	7.1	381	5.44	45	231.3	<1	11	25.8	11	19.6	<0.05	19.2	<1	3.16	18.8	139	20	44	40	10	0.05	277
		Average	904.000	5.7	338	5.38	43	159	0.5	11	23	11	16	0.016	18	0.5	2.6	12	123	10	40	28	6.3	0.03	235
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D9	20/09/2023	908.007	1	10,530	6.08	17	59.9	<1	136	579	136	1140	<0.01	530	<1	106	1580	4880	300	1670	<10	<10	<0.01	9840
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D9	22/11/2023	907.607	1.9	10,250	6.16	14	121.4	<1	130	570	130	1180	<1	506	<1	112	1550	5030	350	1730	<10	<10	<0.01	9760
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D9	13/03/2024	907.907	1.3	9220	6.11	16	102.2	<1	119	560	119	1020	<1	482	<1	99.8	1270	4650	320	1720	<10	<10	<0.01	8580
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D9	19/06/2024	908.007	3	9480	6.1	17	209.8	<1	132	535	132	1080	<1	463	<1	97.9	1520	4990	300	1800	<200	<200	<0.2	8920
		Min.	907.607	1	9220	6.08	14	59.9	<1	119	535	119	1020	<0.01	463	<1	97.9	1270	4650	300	1670	<10	<10	<0.01	8580
		Max.	908.007	3	10530	6.16	17	209.8	<1	136	579	136	1180	<1	530	<1	112	1580	5030	350	1800	<200	<200	<0.2	9840
		Average	908.000	1.8	9870	6.11	16	123	0.5	129	561	129	1105	0.38	495	0.5	104	1480	4888	318	1730	29	29	0.029	9275
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D113	25/10/2023	907.929	0.6	4830	6.07	51	51.4	<1	180	201	180	313	<0.5	168	<1	87.7	713	2150	240	773	<10	<10	<0.01	3850
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D113	31/01/2024	908.529	1.2	4320	6.05	55	132.3	<1	169	159	169	254	<0.5	138	<1	81	683	1860	210	635	<10	<10	<0.01	3400
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D113	23/05/2024	908.229	1.3	5360	6.01	53	100.4	<1	167	179	167	307	0.282	156	<1	81.3	708	2100	190	786	<10	<10	<0.01	3700
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D113	25/07/2024	907.829	3.8	4940	6.12	50	50.1	<1	171	198	171	289	<0.5	174	<1	83.8	754	2060	240	733	60	<10	0.06	3950
		Min.	907.829	0.6	4320	6.01	50	50.1	<1	167	159	167	254	0.282	138	<1	81	683	1860	190	635	<10	<10	<0.01	3400
		Max.	908.529	3.8	5360	6.12	55	132.3	<1	180	201	180	313	<0.5	174	<1	87.7	754	2150	240	786	60	<10	0.06	3950
		Average	908.000	1.7	4863	6.06	52	84	0.5	172	184	172	291	0.26	159	0.5	83	715	2043	220	732	19	5	0.019	3725
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D19	20/09/2023	912.064	1.1	4520	6.03	16	72.8	<1	168	192	168	288	0.257	164	<1	78.4	678	2000	490	682	<10	<10	<0.01	3650
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D19	22/11/2023	911.764	16	4600	6.13	13	115.8	<1	166	196	166	315	<0.5	167	<1	82.4	686	2150	290	716	<10	<10	<0.01	3620
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D19	13/03/2024	912.364	7.3	4220	6.11	17	128.3	<1	179	158	179	253	<0.5	140	<1	79.6	590	1860	220	689	<10	<10	<0.01	3260
Cross- and downgradient of LNAR / adjacent Wangcol Creek	D19	21/06/2024	912.264	2.7	4660	6.08	16	171.1	<1	155	162	155	303	0.433	156	<1	75.7	696	2200	410	797	<10	<10	<0.01	3650
		Min.	911.764	1.1	4220	6.03	13	72.8	<1	155	158	155	253	0.257	140	<1	75.7	590	1860	220	682	<10	<10	<0.01	3260
		Max.	912.364	16	4660	6.13	17	171.1	<1	179	196	179	315	<0.5	167	<1	82.4	696	2200	490	797	<10	<10	<0.01	3650
		Average	912.000	6.8	4500	6.09	16	122	0.5	167	177	167	290	0.3	157	0.5	79	663	2053	353	721	5	5	0.005	3545

LocCode	Sample Date	Aluminium	Aluminium (Filtered)	Antimony	Arsenic	Arsenic (Filtered)	Barium	Beryllium	Boron	Boron (Filtered)	Cadmium	Chromium	Chromium (Hexavalent)	Chromium (Trivalent)	Cobalt	Copper	Copper (Filtered)	Iron	Iron (Filtered)	Lead	Manganese	Manganese (Filtered)	Mercury	Molybdenum	Nickel	Nickel (Filtered)	Selenium	Silver	Strontium	Vanadium	Vanadium (Filtered)	Zinc	Zinc (Filtered)
		Metals																															
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
					24	24	700	100	370	370	2	5	1	3.3		5	5	664	664	5	5704	5704	0.06	10	550.9	550.9	5	0.05				908	908
D102	26/10/2023	40	<10	<1	<1	<1	21	<1	1220	1210	<0.1	<1	<10	<10	199	2	<1	49,600	41,400	<1	13,600	13,600	<0.04	<1	1430	1510	0.2	<1	3.12	<10	<10	66	57
D102	1/02/2024	10	<10	<1	1	<1	24	<1	1140	1140	<0.1	<1	<10	<10	212	<1	<1	50,000	13,800	<1	14,700	13,900	<0.04	<1	1600	1490	<0.2	<1	3.37	<10	<10	45	24
D102	23/05/2024	60	<10	<1	<1	<1	26	<1	1290	1080	0.2	<1	<10	<10	178	4	2	38,900	27,900	<1	15,200	11,500	<0.04	1	1360	1380	0.6	<1	3.54	<10	<10	119	101
D102	25/07/2024	114	<10	<1	1	<1	26	<1	1250	1480	<0.1	<1	<1	<1	208	6	1	53,800	38,400	1	13,700	12,900	<0.04	<1	1620	1450	0.5	<0.1	3.14	1.4	<10	90	60
	Min.	10	<10	<1	<1	<1	21	<1	1140	1080	<0.1	<1	<1	<1	178	<1	<1	38900	13800	<1	13600	11500	<0.04	<1	1360	1380	<0.2	<0.1	3.12	1.4	<10	45	24
	Max.	114	<10	<1	1	<1	26	<1	1290	1480	0.2	<1	<10	<10	212	6	2	53800	41400	1	15200	13900	<0.04	1	1620	1510	0.6	<1	3.54	<10	<10	119	101
	Average	56	5	0.5	0.75	0.5	24	0.5	1225	1228	0.088	0.5	3.9	3.9	199	3.1	1	48075	30375	0.63	14300	12975	0.02	0.63	1503	1458	0.35	0.39	3.3	4.1	5	80	61
D103	25/10/2023	130	<10	<1	4	3	16	<1	1620	1490	<0.1	<1	<10	<10	169	<1	<1	14,500	11,100	<1	8830	7710	<0.04	<1	648	595	<0.2	<1	0.776	<10	<10	96	81
D103	31/01/2024	50	<10	<1	3	<1	16	<1	1540	1540	<0.1	<1	<10	<10	183	<1	<1	9830	1200	<1	9810	9110	<0.04	<1	704	641	<0.2	<1	0.884	<10	<10	74	52
D103	22/05/2024	120	<10	<1	7	3	18	<1	1800	1430	<0.1	1	<10	<10	178	1	<1	20,100	10,800	<1	10,500	7770	<0.04	1	695	680	0.2	<1	0.92	<10	<10	121	95
D103	24/07/2024	49	<10	<1	5	2	17	<1	1660	1110	<0.1	<1	<1	<1	192	3	1	14,700	8410	<1	9440	8850	<0.04	<1	762	683	<0.2	<0.1	0.866	<0.2	<10	112	87
	Min.	49	<10	<1	3	<1	16	<1	1540	1110	<0.1	<1	<1	<1	169	<1	<1	9830	1200	<1	8830	7710	<0.04	<1	648	595	<0.2	<0.1	0.776	<0.2	<10	74	52
	Max.	130	<10	<1	7	3	18	<1	1800	1540	<0.1	1	<10	<10	192	3	1	20100	11100	<1	10500	9110	<0.04	1	762	683	0.2	<1	0.92	<10	<10	121	95
	Average	87	5	0.5	4.8	2.1	17	0.5	1655	1393	0.05	0.63	3.9	3.9	181	1.3	0.63	14783	7878	0.5	9645	8360	0.02	0.63	702	650	0.13	0.39	0.86	3.8	5	101	79
D104	26/10/2023	20	<10	<1	4	<1	122	<1	<50	60	<0.1	<1	<10	<10	27	4	2	2420	80	<1	2430	2320	<0.04	2	60	60	<0.2	<1	0.265	<10	<10	106	97
D104	1/02/2024	150	<10	<1	8	2	99	<1	60	90	<0.1	<1	<10	<10	16	2	<1	13,300	9960	<1	2640	2620	<0.04	2	55	54	<0.2	<1	0.336	<10	<10	118	126
D104	23/05/2024	130	<10	<1	4	2	99	<1	70	100	<0.1	<1	<10	<10	11	2	<1	10,000	5760	<1	2820	2020	<0.04	<1	43	41	<0.2	<1	0.391	<10	<10	146	119
D104	24/07/2024	197	<10	<1	5	2	94	<1	120	50	<0.1	<1	<1	<1	16	7	2	4590	3180	<1	2300	2120	<0.04	<1	55	48	<0.2	<0.1	0.279	0.5	<10	56	42
	Min.	20	<10	<1	4	<1	94	<1	<50	50	<0.1	<1	<1	<1	11	2	<1	2420	80	<1	2300	2020	<0.04	<1	43	41	<0.2	<0.1	0.265	0.5	<10	56	42
	Max.	197	<10	<1	8	2	122	<1	120	100	<0.1	<1	<10	<10	27	7	2	13300	9960	<1	2820	2620	<0.04	2	60	60	<0.2	<1	0.391	<10	<10	146	126
	Average	124	5	0.5	5.3	1.6	104	0.5	69	75	0.05	0.5	3.9	3.9	18	3.8	1.3	7578	4745	0.5	2548	2270	0.02	1.3	53	51	0.1	0.39	0.32	3.9	5	107	96
D105	26/10/2023	20	<10	<1	<1	<1	15	<1	510	560	<0.1	<1	<10	<10	144	<1	<1	21,500	20,300	<1	10,100	9960	<0.04	<1	542	560	<0.2	<1	0.661	<10	<10	64	63
D105	31/01/2024	40	<10	<1	3	<1	17	<1	710	690	<0.1	<1	<10	<10	167	<1	<1	21,000	3780	2	12,000	11,100	<0.04	<1	607	553	<0.2	<1	0.855	<10	<10	80	50
D105	24/05/2024	30	<10	<1	2	1	15	<1	550	510	<0.1	7	<10	<10	119	<1	<1	23,800	18,000	<1	10,000	8190	<0.04	<1	452	506	<0.2	<1	0.624	<10	<10	62	63
D105	24/07/2024	24	<10	<1	1	<1	16	<1	490	340	<0.1	<1	<1	<1	130	1	2	18,400	16,800	<1	8950	8180	<0.04	<1	529	468	<0.2	<0.1	0.553	<0.2	<10	51	43
	Min.	20	<10	<1	<1	<1	15	<1	490	340	<0.1	<1	<1	<1	119	<1	<1	18400	3780	<1	8950	8180	<0.04	<1	452	468	<0.2	<0.1	0.553	<0.2	<10	51	43
	Max.	40	<10	<1	3	1	17	<1	710	690	<0.1	7	<10	<10	167	1	2	23800	20300	2	12000	11100	<0.04	<1	607	560	<0.2	<1	0.855	<10	<10	80	63
	Average	29	5	0.5	1.6	0.63	16	0.5	565	525	0.05	2.1	3.9	3.9	140	0.63	0.88	21175	14720	0.88	10263	9358	0.02	0.5	533	522	0.1	0.39	0.67	3.8	5	64	55
D2	20/10/2023	920	590	<1	2	<1	37	<1	550	610	<0.1	<1	<10	<10	58	10	2	12,700	7310	6	2260	2150	<0.04	<1	130	124	0.3	<1	0.361	<10	<10	95	87
D2	19/01/2024	1250	610	<1	<1	<1	23	<1	220	180	<0.1	1	<10	<10	23	5	2	3990	3150	3	789	777	<0.04	<1	43	42	0.4	<1	0.115	<10	<10	51	32
D2	18/04/2024	910	540	<1	2	<1	23	<1	320	310	<0.1	<1	<10	<10	25	7	3	4260	2320	3	1170	1070	<0.04	<1	67	57	0.4	<1	0.167	<10	<10	49	30
D2	18/07/2024	691	380	<1	<1	<1	47	<1	800	710	<0.1	<1	<10	<10	56	8	6	6990	4600	4	3150	2920	<0.04	<1	178	173	0.4	<0.1	0.435	2.4	<10	113	96
	Min.	691	380	<1	<1	<1	23	<1	220	180	<0.1	<1	<10	<10	23	5	2	3990	2320	3	789	777	<0.04	<1	43	42	0.3	<0.1	0.115	2.4	<10	49	30
	Max.	1250	610	<1	2	<1	47	<1	800	710	<0.1	1	<10	<10	58	10	6	12700	7310	6	3150	2920	<0.04	<1	178	173	0.4	<1	0.435	<10	<10	113	96
	Average	943	530	0.5	1.3	0.5	33	0.5	473	453	0.05	0.63	5	5	41	7.5	3.3	6985	4345	4	1842	1729	0.02	0.5	105	99	0.38	0.39	0.27	4.4	5	77	61
D8	21/09/2023	190	20	<1	<1	<1	44	<1	<50	<50	<0.1	<1	<10	<10	2	3	3	290	70	<1	254	256	<0.04	<1	56	56	<0.2	<1	0.129	<10	<10	84	77
D8	23/11/2023	320	10	<1	<1	<1	46	<1	<50	<50	<0.1	<1	<10	<10	2	2	<1	570	<50	2	290	244	<0.04	<1	68	57	<0.2	<1	0.117	<10	<10	108	88
D8	14/03/2024	40	20	<1	<1	<1	42	<1	<50	<50	0.2	<1	<10	<10	2	3	2	110	<50	<1	317	296	<0.04	<1	72	69	<0.2	<1	0.115	<10	<10	79	71
D8	20/06/2024	250	70	<1	<1	<1	38	<1	<50	<50	<0.1	<1	<1	<0.001	<1	5	3	310	<50	<1	103	50	<0.04	<1	44	36	<0.2	<1	0.135	<10	<10	71	56
	Min.	40	10	<1	<1	<1	38	<1	<50	<50	<0.1	<1	<1	<0.001	<1	2	<1	110	<50	<1	103	50	<0.04	<1	44	36	<0.2	<1	0.115	<10	<10	71	56
	Max.	320	70	<1	<1	<1	46	<1	<50	<50	0.2	<1	<10	<10	2	5	3	570	70	2	317	296	<0.04	<1	72	69	<0.2	<1	0.135	<10	<10	108	88
	Average	200	30	0.5	0.5	0.5	43	0.5	25	25	0.088	0.5	3.9	3.8	1.6	3.3	2.1	320	36	0.88	241	212	0.02	0.5	60	55	0.1	0.5	0.12	5	5	86	73
D9	20/09/2023	190	<10	<1	4	1	28	<1	2000	1930	<0.1	<1	<10	<10	249	2	<1	56,200	36,700	<1	14,800	15,400	<0.04	<1	1790	1740	0.2	<1	3.38	<10	<10	96	57
D9	22/11/2023	90	<10	<1	3	<1	30	<1	2640	2080	<0.1	2	<10	<10	254	<1	<1	50,200	15,700	<1	17,400	14,700	<0.04	<1	1820	1770	0.3	<1	3.34	<10	<10	102	44
D9	13/03/2024	80	<10	<1	3	<1	26	<1	2080	1410	<0.1	<1	<10	<10	224	<1	<1	53,600	17,200	<1	15,800	12,600	<0.04	<1	1660	1560	0.2	<1	3.29	<10	<10	76	45
D9	19/06/2024	310	<10	<1	4	2	32	<1	2260	2000	<0.1	<1	<1	<0.001	255	2	<1	56,200	41,900	<1	15,500	13,900	<0.04	<1	1820	1620	0.3	<1	3.19	<10	<10	118	61
	Min.	80	<10	<1	3	<1	26	<1	2000	1410	<0.1	<1	<1	<0.001	224	<1	<1	50200	15700	<1	14800	12600	<0.04	<1	1660	1560	0.2	<1	3.19	<10	<10	76	44
	Max.	310	<10	<1	4	2	32	<1	2640	2080	<0.1	2	<10	<10	255	2	<1	56200	41900	<1	17400	15400	<0.04	<1	1820	1770	0.3	<1	3.38	<10	<10	118	61
	Average	168	5	0.5	3.5	1	29	0.5	2245	1855	0.05	0.88	3.9	3.8	246	1.3	0.5	54050	27875	0.5	15875	14150	0.02	0.5	1773	1673	0.25	0.5	3.3	5	5	98	52
D113	25/10/2023	80	<10	<1	1	<1	13	<1	1860	1870	0.1	11	<10	<10	167	1	<1	12,100	11,100	3	6530	5890	<0.04	<1	601	538	<0.2	<1	1.7	<10	<10	256	228
D113	31/01/2024	50	<10	<1	<1	<1	11	<1	1480	1490	0.1	2	<10	<10	128	<1	<1	8380	5370	3	5180	5040	<0.04	<1	485	463	<0.2	<1	1.47	<10	<10	176	180
D113	23/05/2024	60	<10	<1	1	<1	12	<1	2080	1560	0.2	3	<10	<10	134	<1	<1	13,100	7720	3	6630	4900	<0.04	<1	507	507	<0.2	<1	1.6	<10	<10	235	214
D113	25/07/2024	1100	<10	<1	2	<1	19	<1	1990	1820	0.3	3	<1	<1	161	11	1	11,300	8100	6	6330	5780	<0.04	<1	621	546	0.4	<0.1	1.7	2.9	<10	316	246
	Min.	50	<10	<1	<1	<1	11	<1	1480	1490	0.1	2	<1	<1	128	<1	<1	8380	5370	3	5180	4900	<0.04	<1	485	463	<0.2	<0.1	1.47	2.9	<10	176	180
	Max.	1100	<10	<1	2	<1	19	<1	2080	1870	0.3	11	<10	<10	167	11	1	13100	11100	6	6630	5890	<0.04	<1	621	546	0.4	<1	1.7	<10	<10	316	246
	Average	323	5	0.5	1.1	0.5	14	0.5	1853	1685	0.18	4.8	3.9	3.9	148	3.3	0.63	11220	8073	3.8	6168	5403	0.02	0.5	554	514	0.18	0.39	1.6	4.5	5	246	217
D19	20/09/2023	1700	<10	<1	36	1	56	2	1360	1490	0.1	18	<10	<10	173	13	<1	45,200	12,300	73	6850	6660	<0.04	4	618	548	0.7	<1	1.56	<10	<10	418	212
D19	22/11/2023	2010	30	<1	12	<1	70	<1	1570	1460	0.1	41	<10	<10	168	6	<1	26,300	3610	21	7590	6260	<0.04	2	619	553	0.4	<1	1.56	<10	<10	286	176
D19	13/03/2024	260	<10	2	3	1	29	<1	1580	1090	<0.1	5	<10	<10	130	<1	<1	15,200	6820	5	5580	5280	<0.04	<1	512	468	<0.2	<1	1.3	<10	<10	196	162
D19	21/06/2024	3730	<10	2	55	2	75	3	1580	1450	0.1	9	<1	<0.001	167	17	<1	55,800	12,400	134	6600	5740	<0.04	6	629	521	1.2	<1	1.53	10	<10	528	221
	Min.	260	<10	<1	3	<1	29	<1	1360	1090	<0.1	5	<1	<0.001	130	<1	<1	15200	3610	5	5580	5280	<0.04	<1	512	468	<0.2	<1	1.3	<10	<10	196	162
	Max.	3730	30	2	55	2	75	3	1580	1490	0.1	41	<10	<10	173	17	<1	55800	12400	134	7590	6660	<0.04	6	629	553	1.2	<1	1.56	10	<10	528	221
	Average	1925	11	1.3	27	1.1	58	1.5	1523	1373	0.088	18	3.9	3.8	160	9.1	0.5	35625	8783	58	6655	5985	0.02	3.1	595	523	0.6	0.5	1.5	6.3	5	357	193

APPENDIX D HYDROGRAPHS


920
918
916
914
912
910
908
906
904
902
900
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Groundwater Elevation (m AHD)
D5
D4
Daily Rainfall
1/09/2022
1/11/2022
1/01/2023
1/03/2023
1/05/2023
1/07/2023
1/09/2023
1/11/2023
1/01/2024
1/03/2024
1/05/2024
1/07/2024
Date


D106
D107
D119
D3
Daily Rainfall
Groundwater Elevation (m AHD)
920
918
916
914
912
910
908
906
904
902
900
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
1/09/2022
1/11/2022
1/01/2023
1/03/2023
1/05/2023
1/07/2023
1/09/2023
1/11/2023
1/01/2024
1/03/2024
1/05/2024
1/07/2024
Date

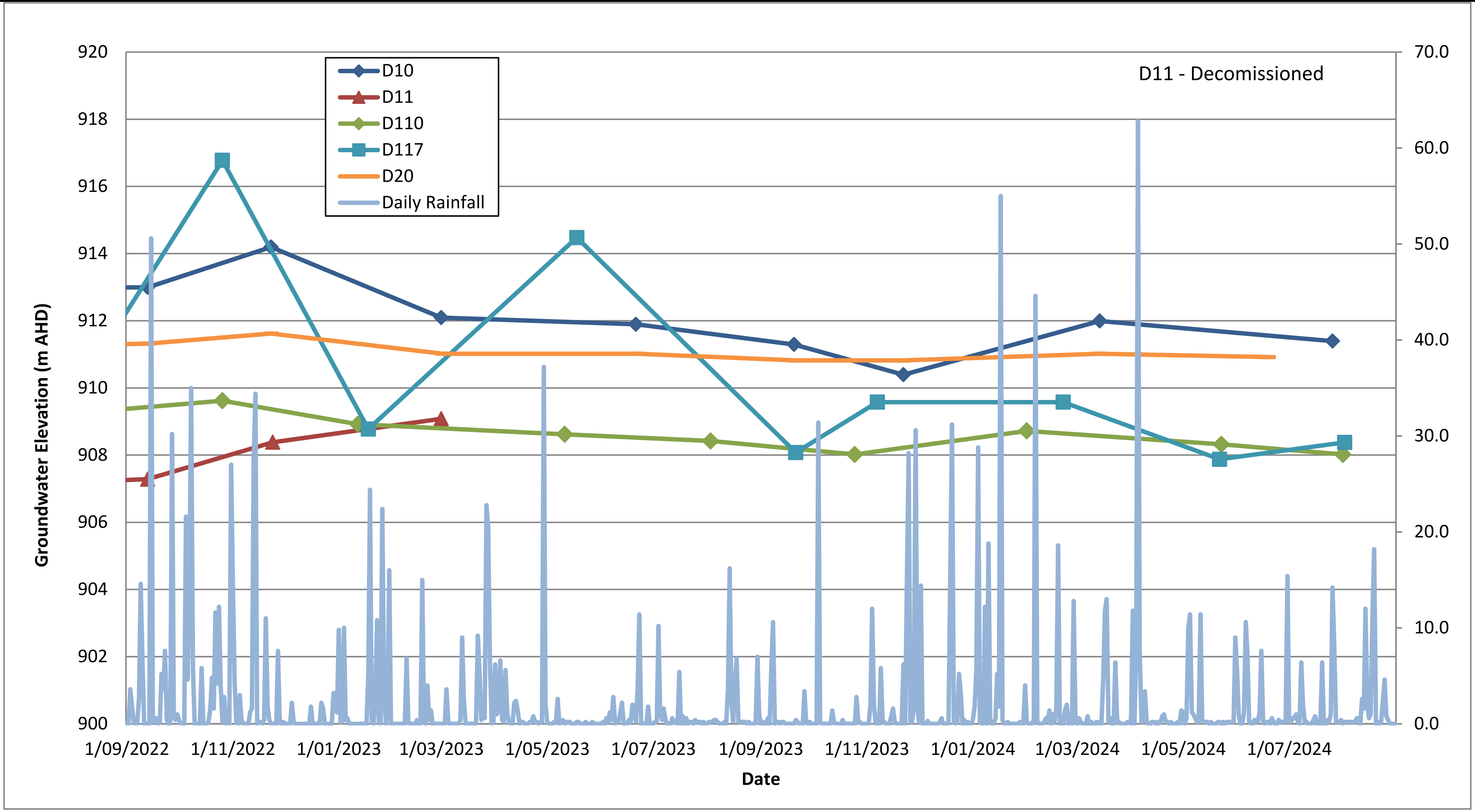
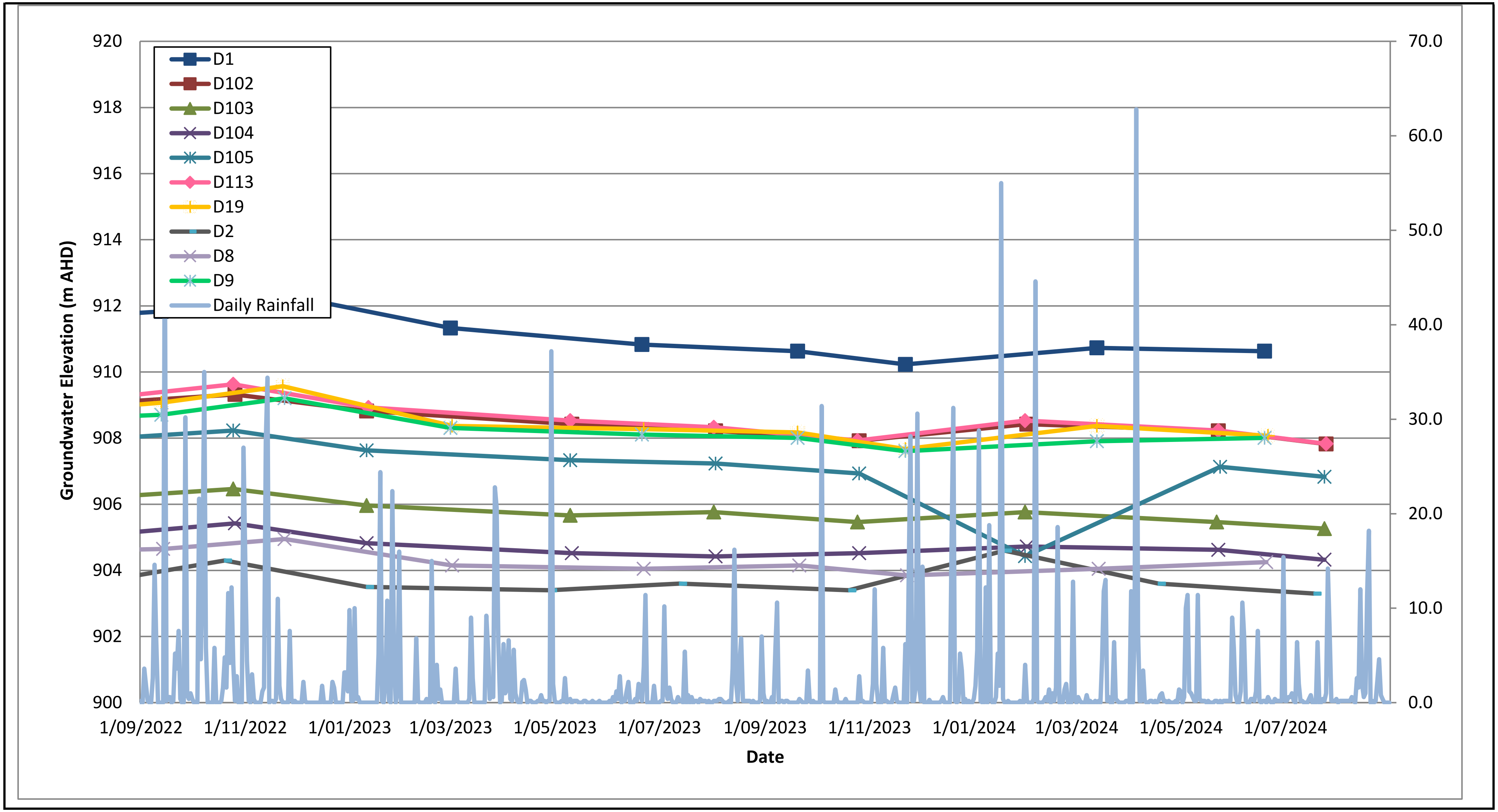
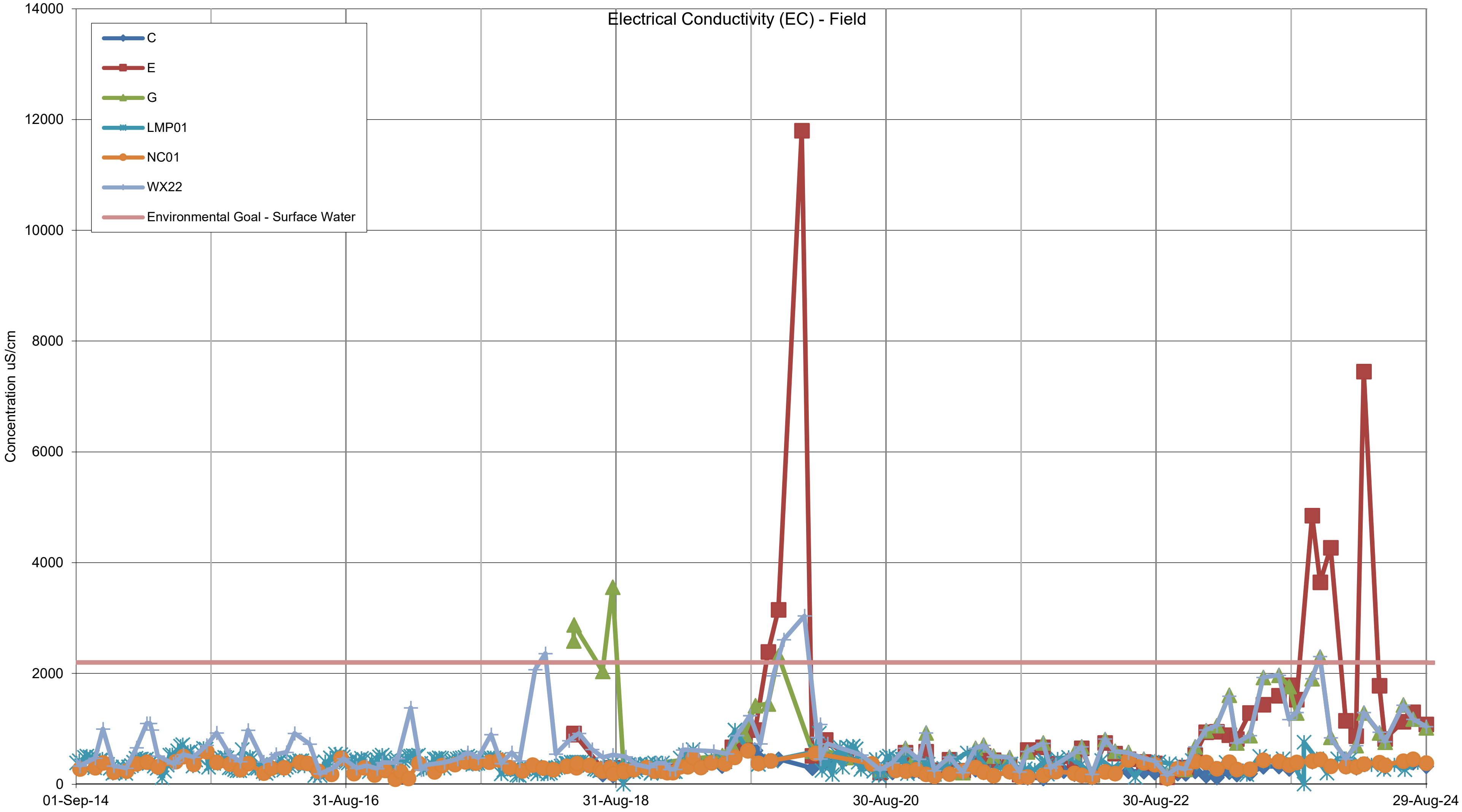
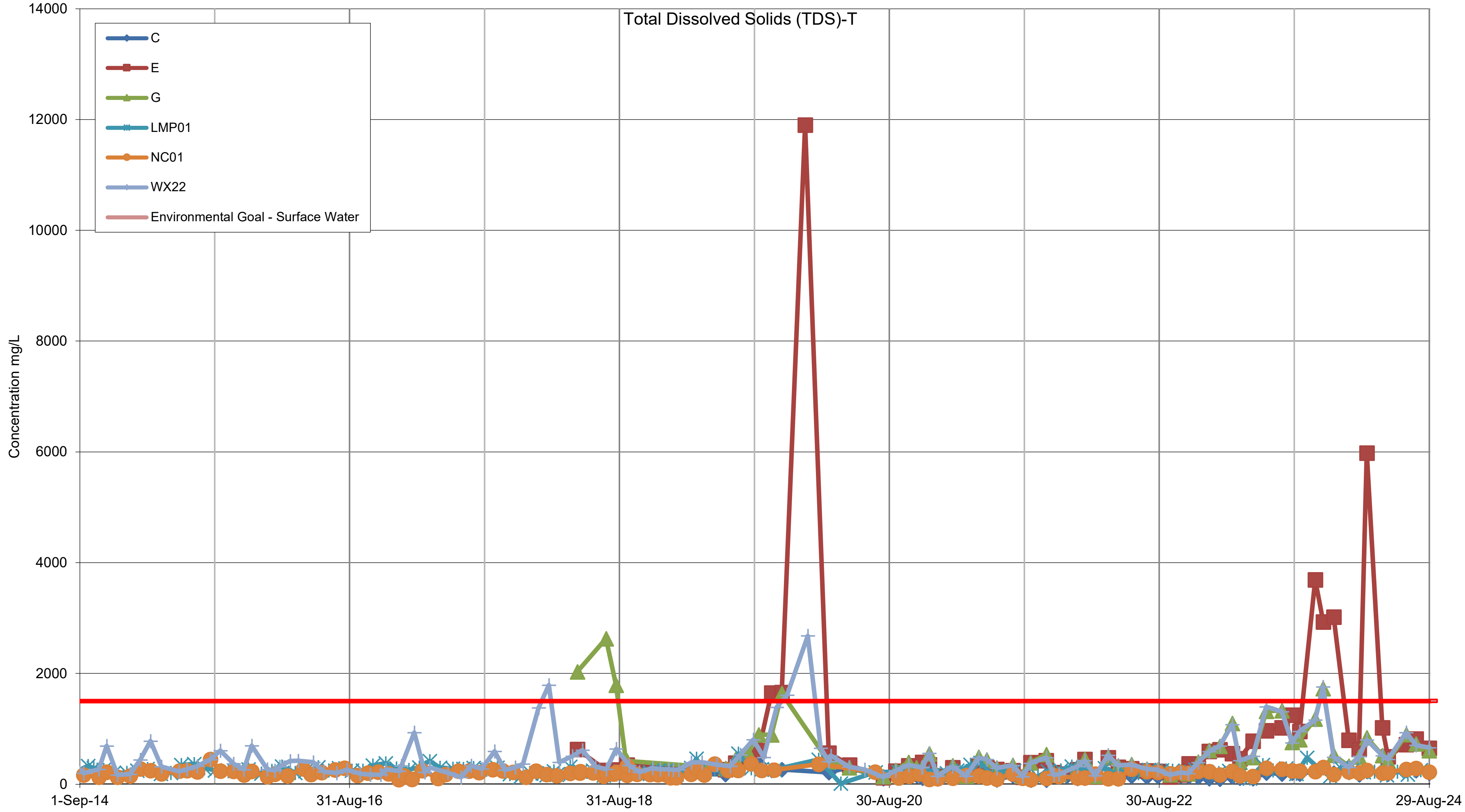

D10
D11
D110
D117
D20
Daily Rainfall
D11 - Decomissioned
Groundwater Elevation (m AHD)
920
918
916
914
912
910
908
906
904
902
900
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
1/09/2022
1/11/2022
1/01/2023
1/03/2023
1/05/2023
1/07/2023
1/09/2023
1/11/2023
1/01/2024
1/03/2024
1/05/2024
1/07/2024
Date

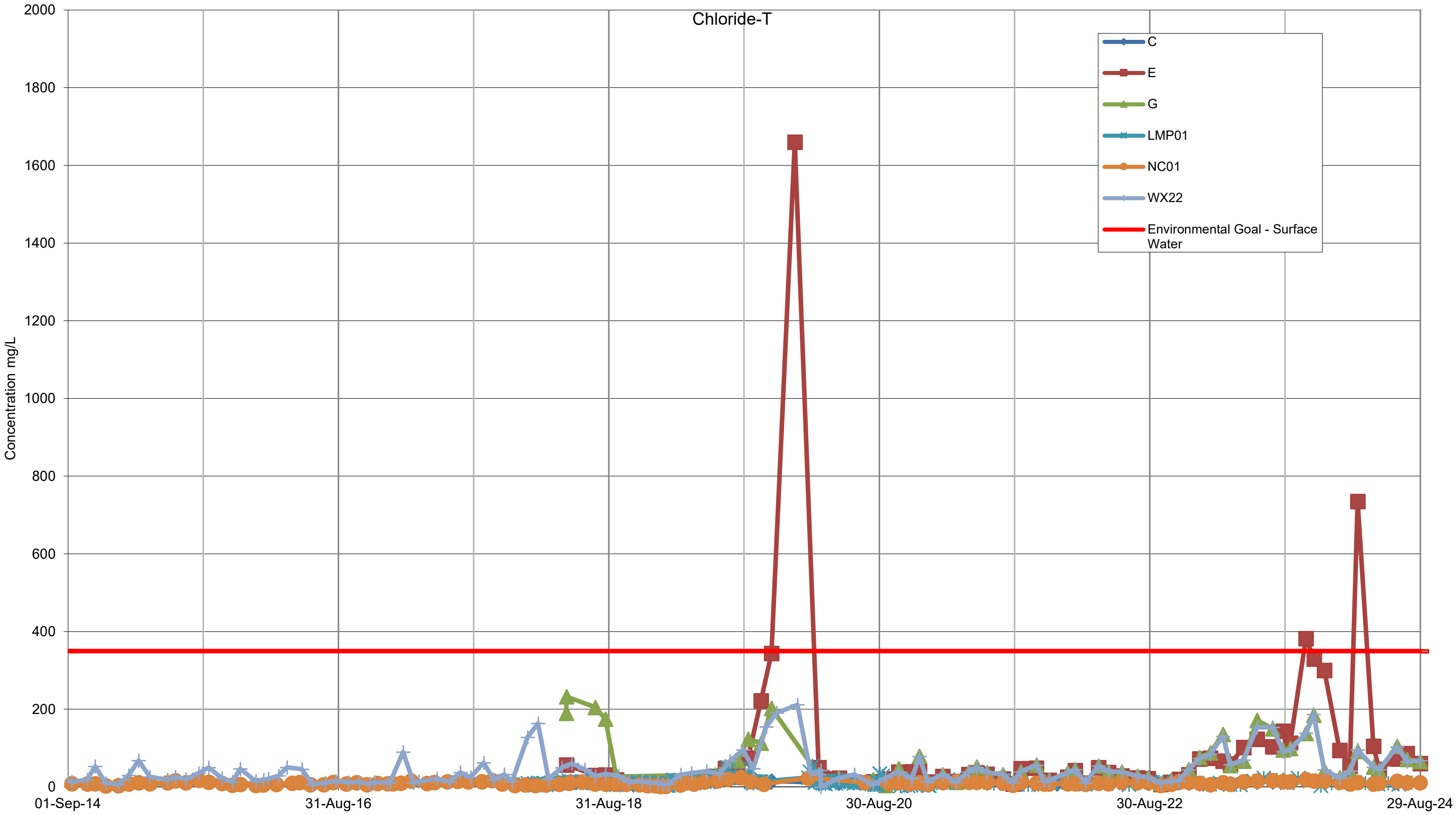
Figure C-4. Water Levels Over Time - Within / Immediately Adjacent LNAR South
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/24
0743908

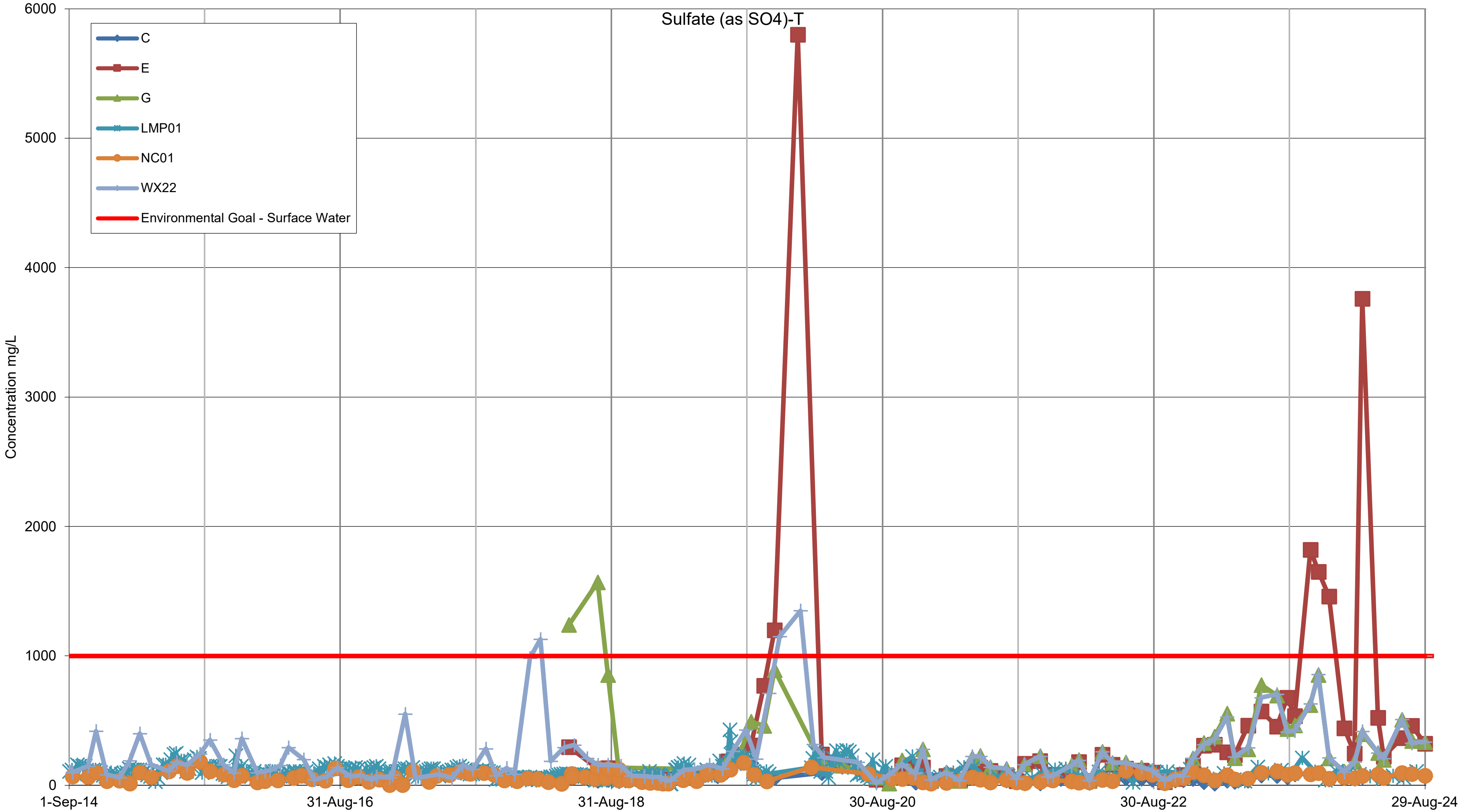

D1
D102
D103
D104
D105
D113
D19
D2
D8
D9
Daily Rainfall
Groundwater Elevation (m AHD)
920
918
916
914
912
910
908
906
904
902
900
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
1/09/2022
1/11/2022
1/01/2023
1/03/2023
1/05/2023
1/07/2023
1/09/2023
1/11/2023
1/01/2024
1/03/2024
1/05/2024
1/07/2024
Date

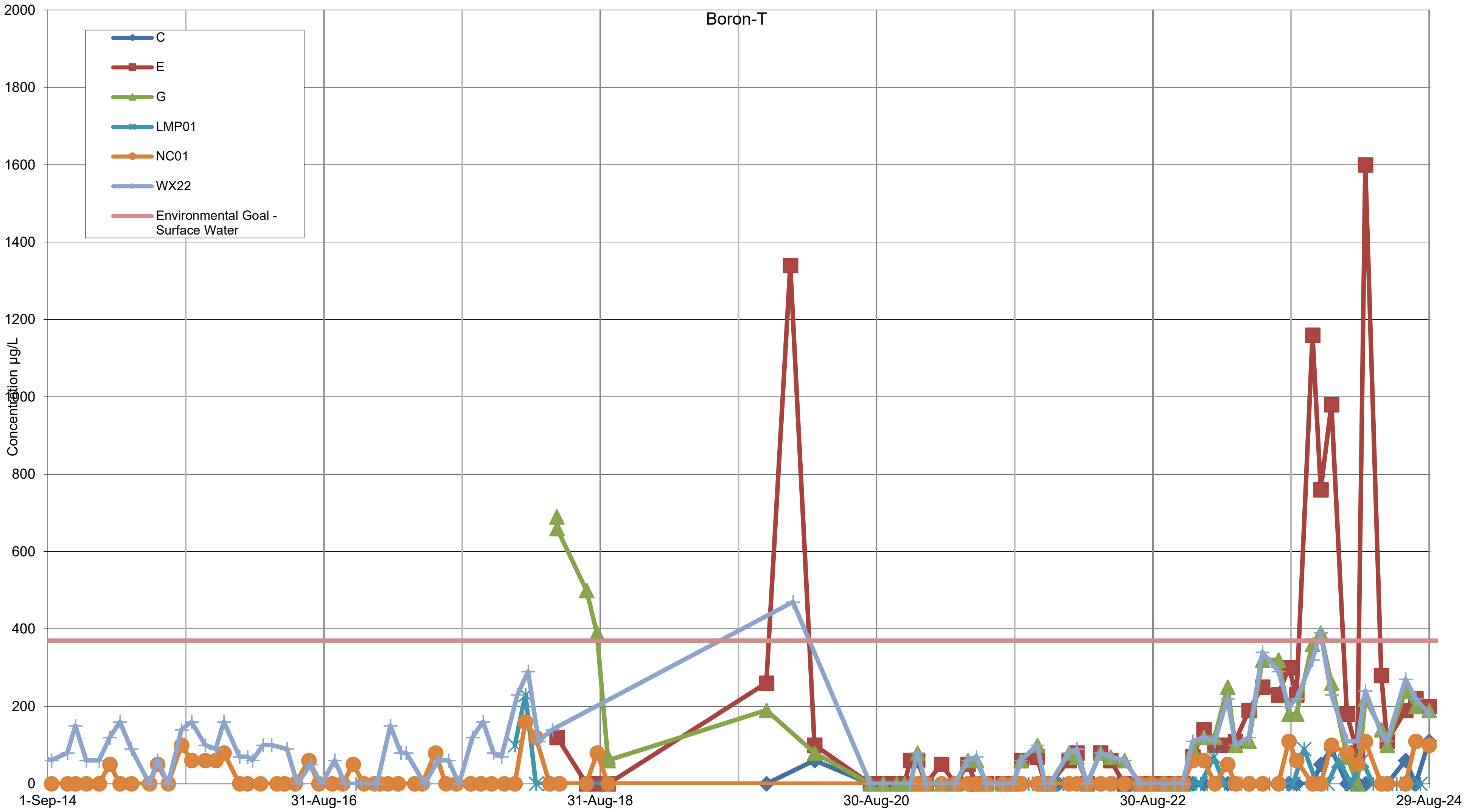
APPENDIX E TREND GRAPHS – SURFACE WATER

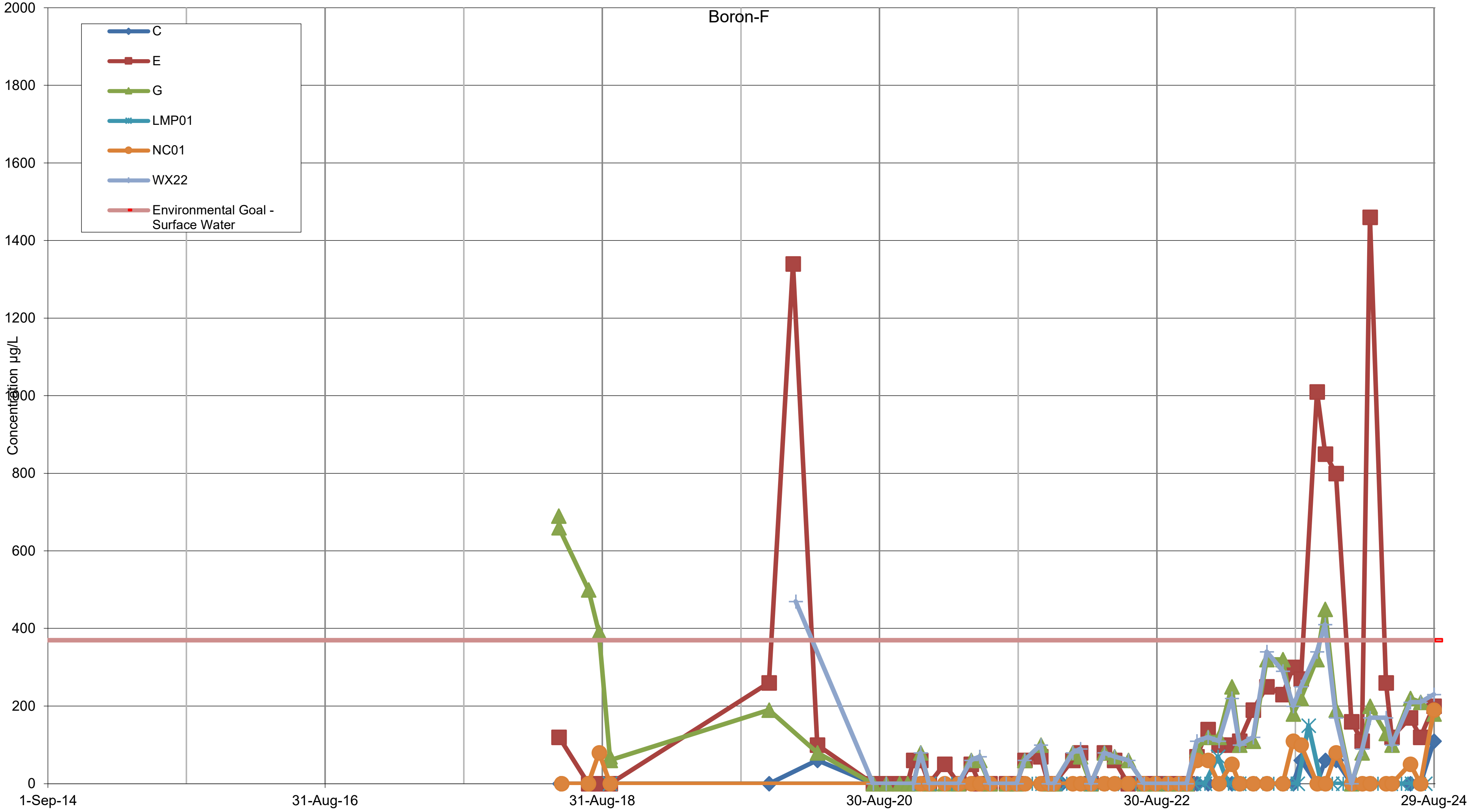

Electrical Conductivity (EC) - Field
Concentration uS/cm
14000
12000
10000
8000
6000
4000
2000
0
01-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
C
E
G
LMP01
NC01
WX22
Environmental Goal - Surface Water

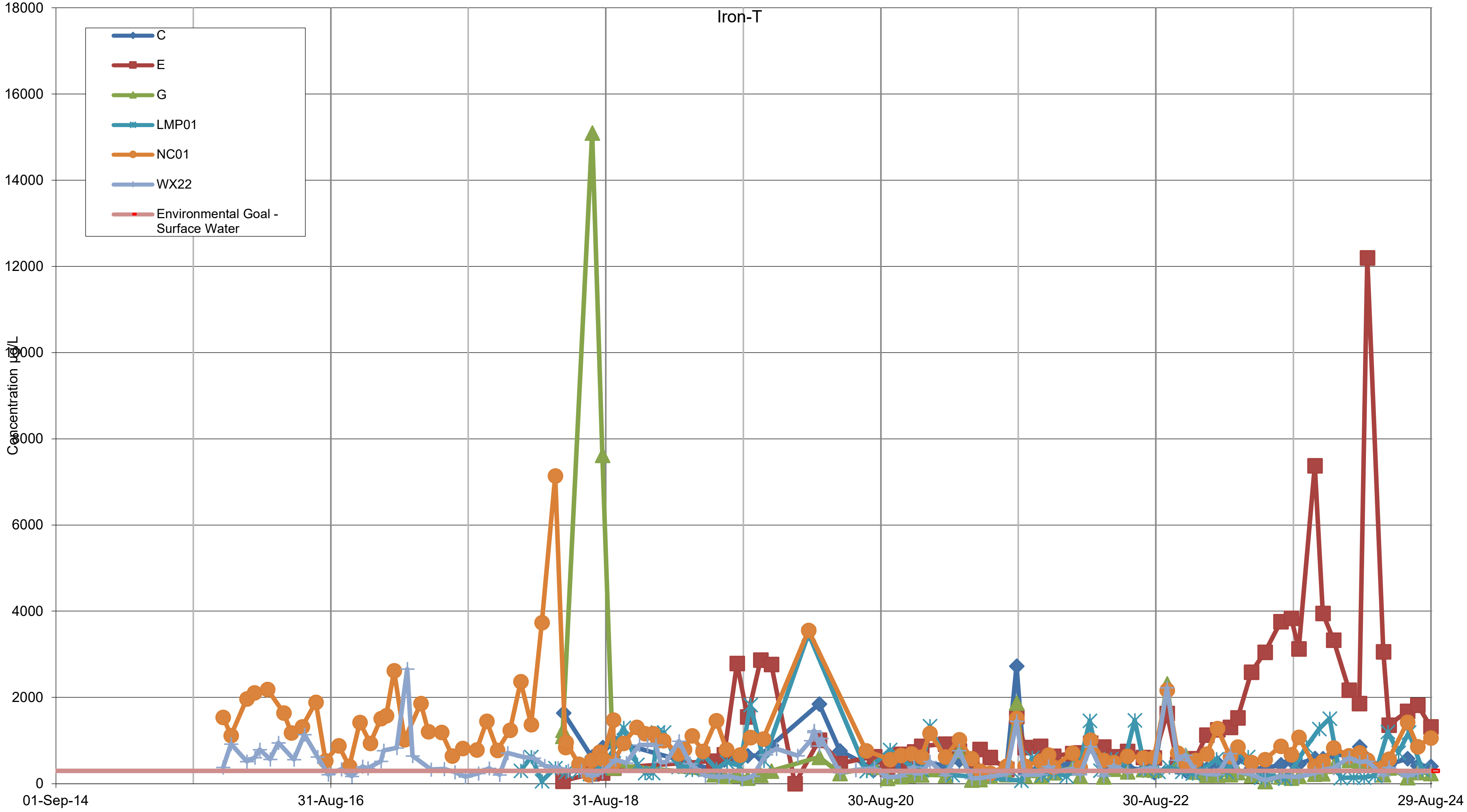

Total Dissolved Solids (TDS)-T
C
E
G
LMP01
NC01
WX22
Environmental Goal - Surface Water
Concentration mg/L
14000
12000
10000
8000
6000
4000
2000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24


Chloride-T
Concentration mg/L
2000
1800
1600
1400
1200
1000
800
600
400
200
0
01-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
C
E
G
LMP01
NC01
WX22
Environmental Goal - Surface Water

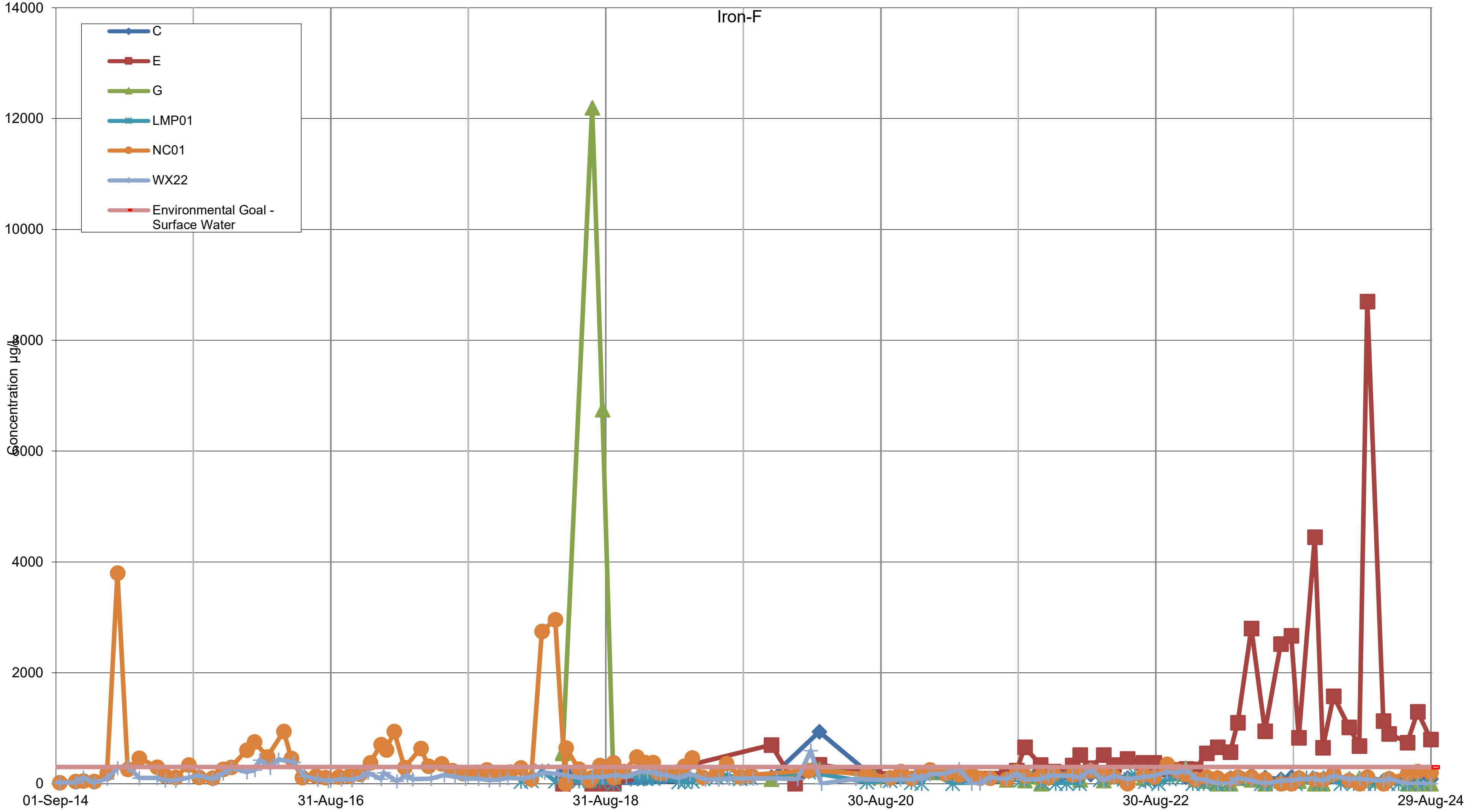

Sulfate (as SO4)-T
Concentration mg/L
6000
5000
4000
3000
2000
1000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
C
E
G
LMP01
NC01
WX22
Environmental Goal - Surface Water

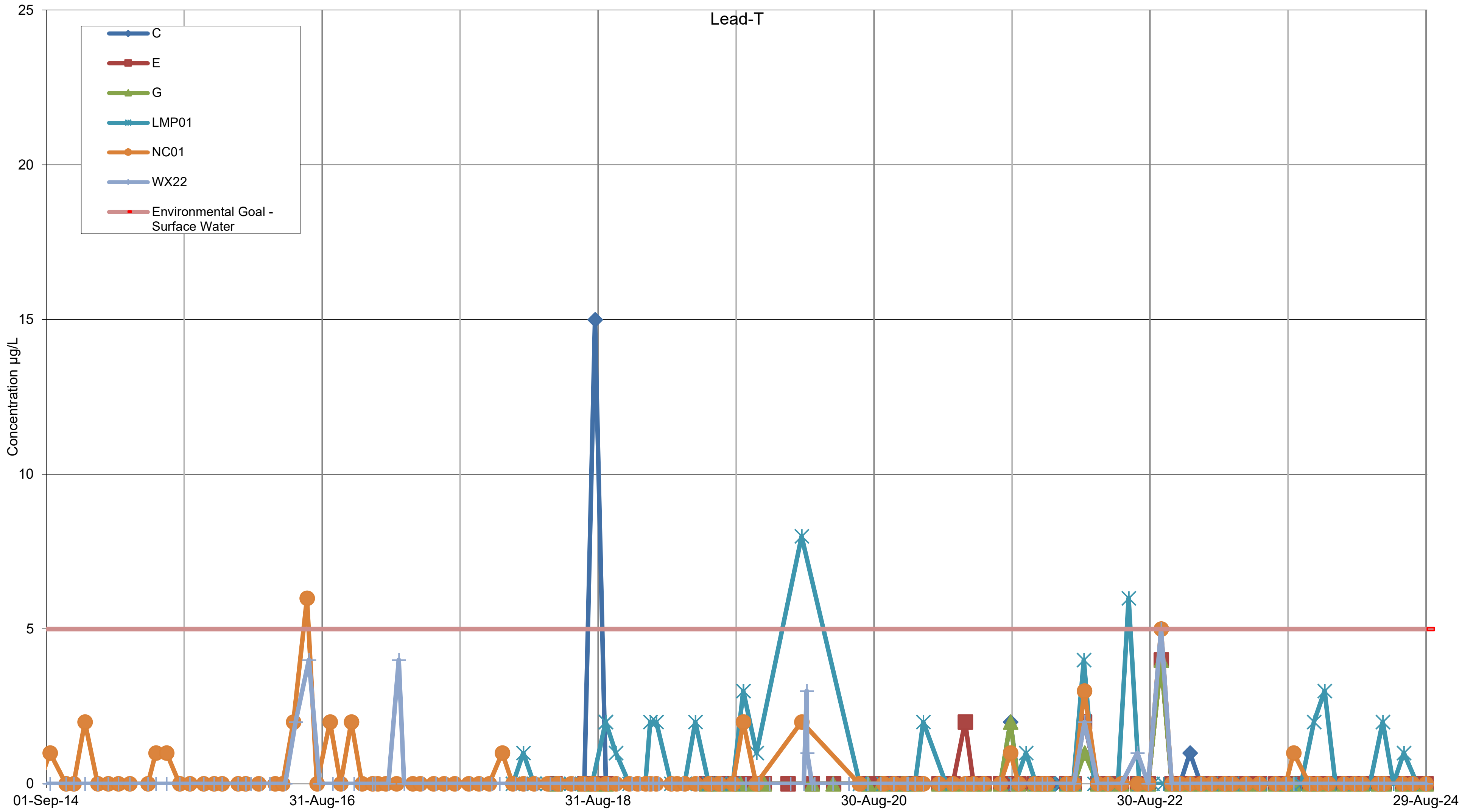

Boron-T
C
E
G
LMP01
NC01
WX22
Environmental Goal - Surface Water
Concentration µg/L
2000
1800
1600
1400
1200
1000
800
600
400
200
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24


Boron-F
C
E
G
LMP01
NC01
WX22
Environmental Goal - Surface Water
Concentration µg/L
2000
1800
1600
1400
1200
1000
800
600
400
200
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

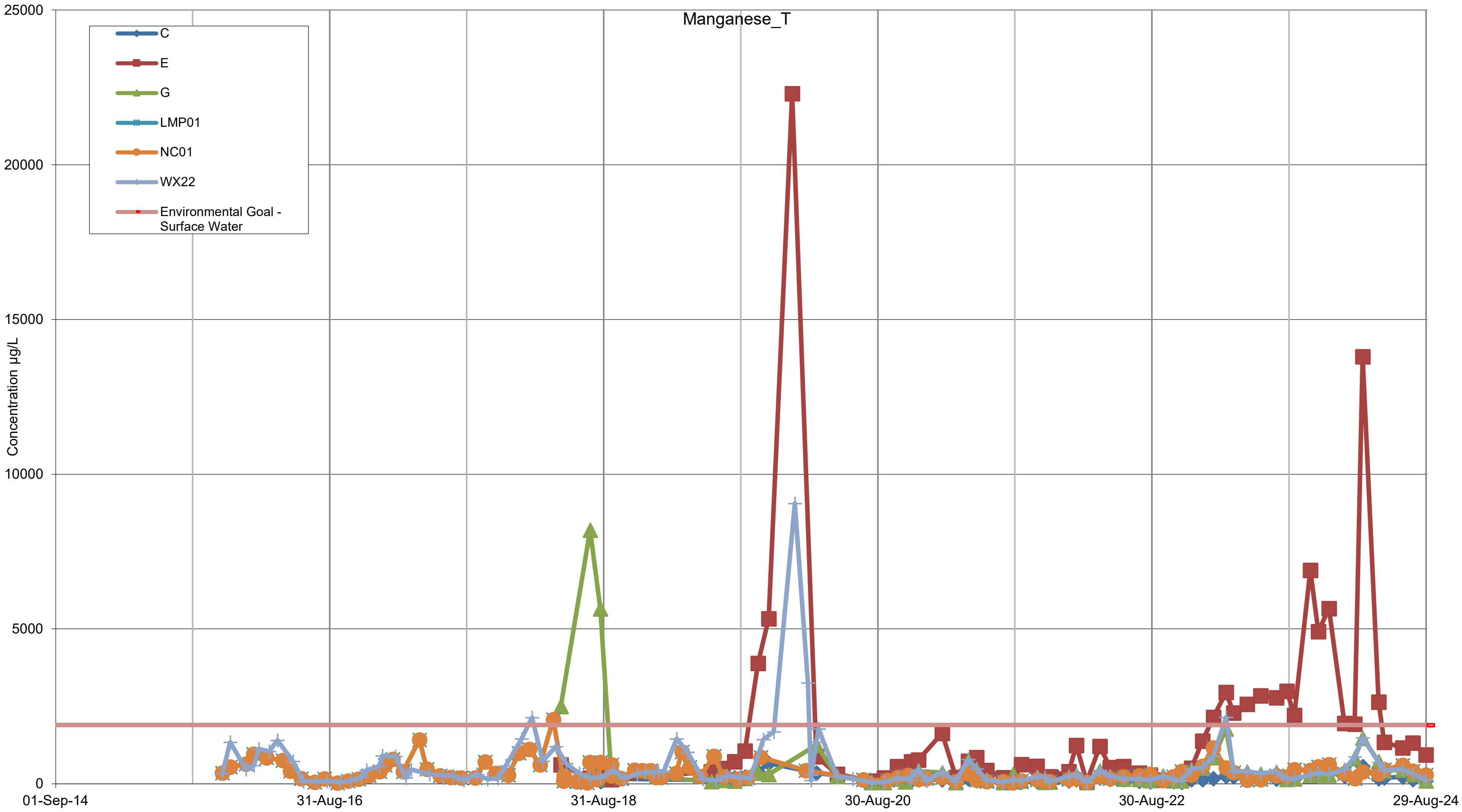

Iron-T
C
E
G
LMP01
NC01
WX22
Environmental Goal - Surface Water
Concentration µg/L
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
01-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

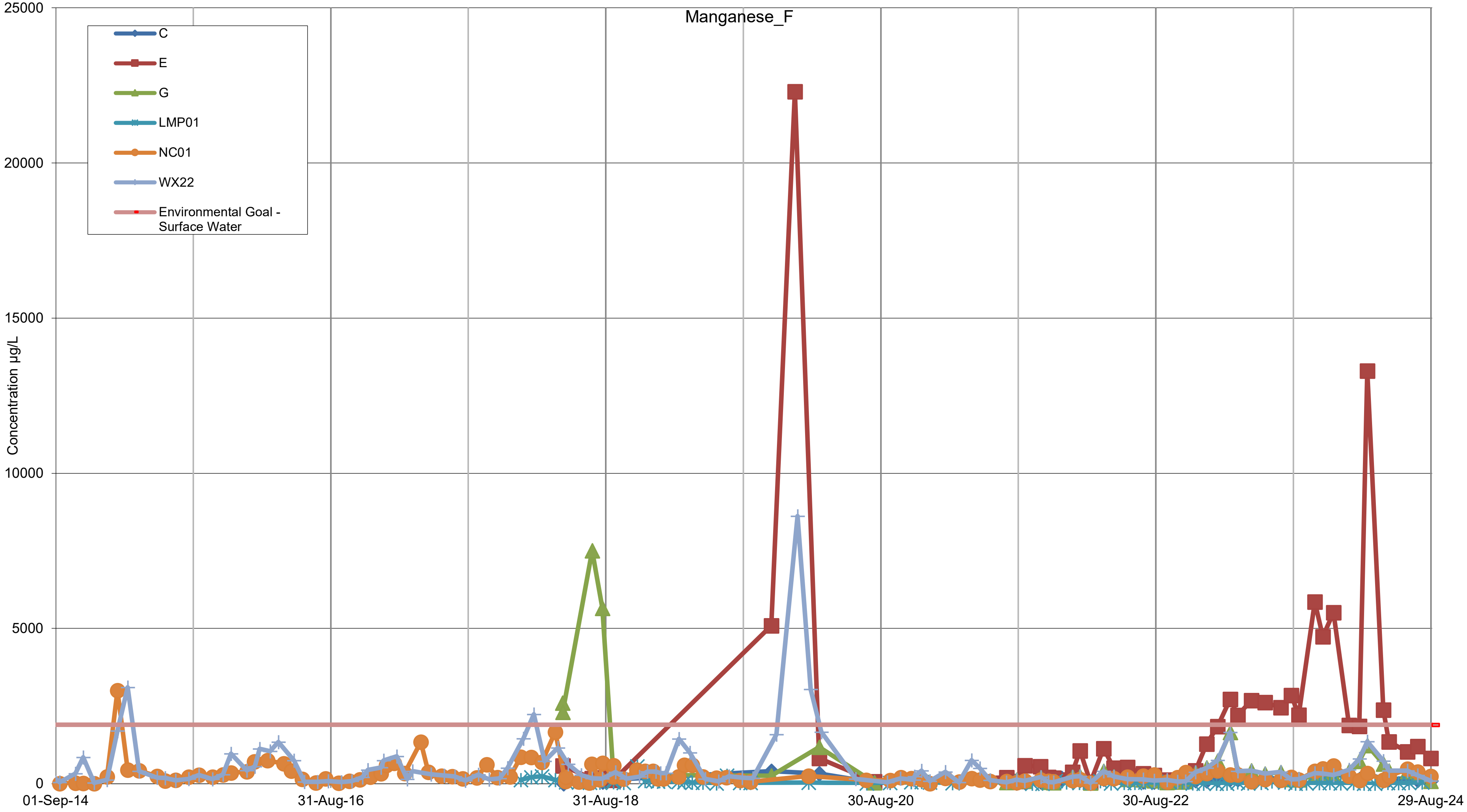
Appendix E. Iron (Filtered) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024

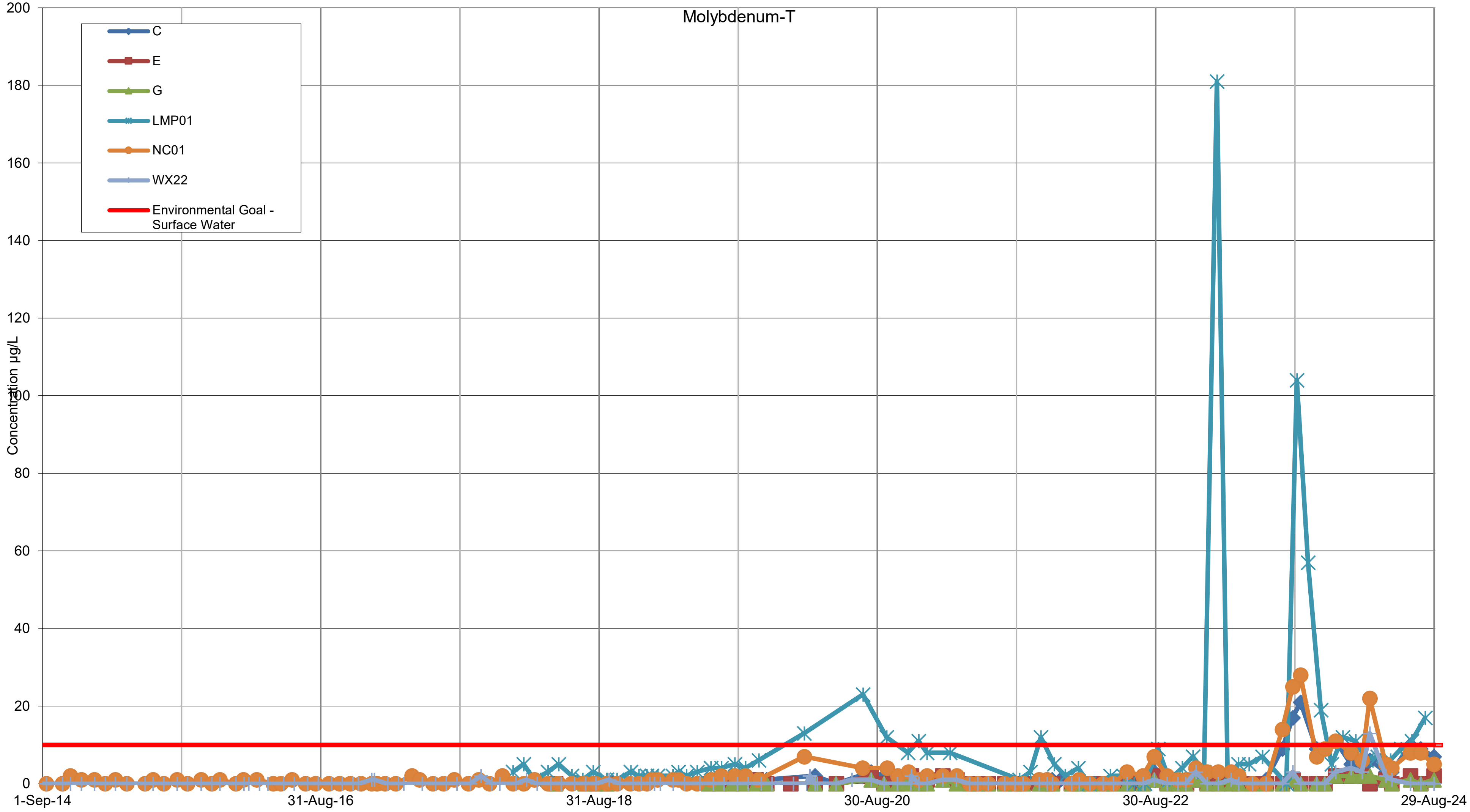


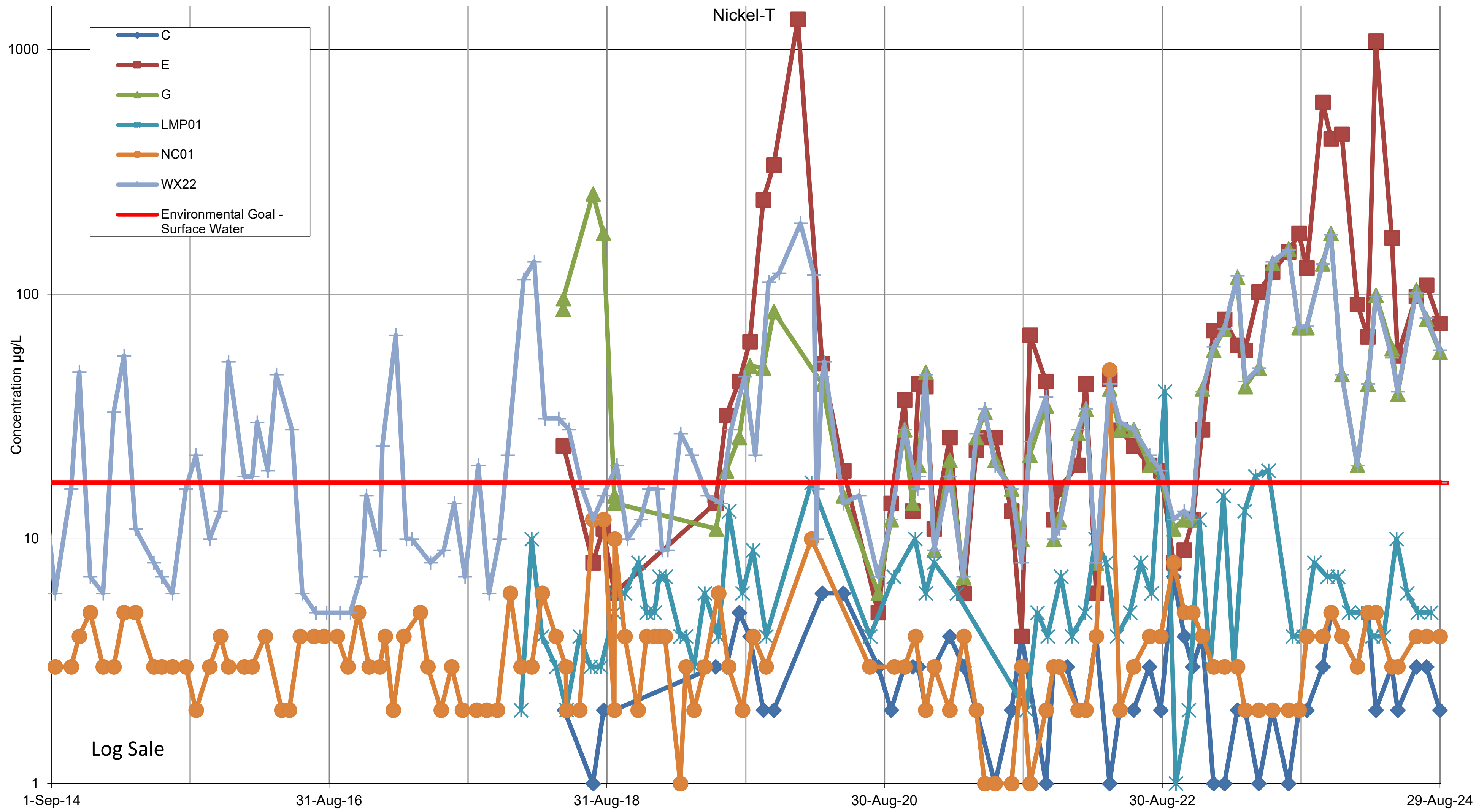

Lead-T
C
E
G
LMP01
NC01
WX22
Environmental Goal - Surface Water
Concentration µg/L
25
20
15
10
5
0
01-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

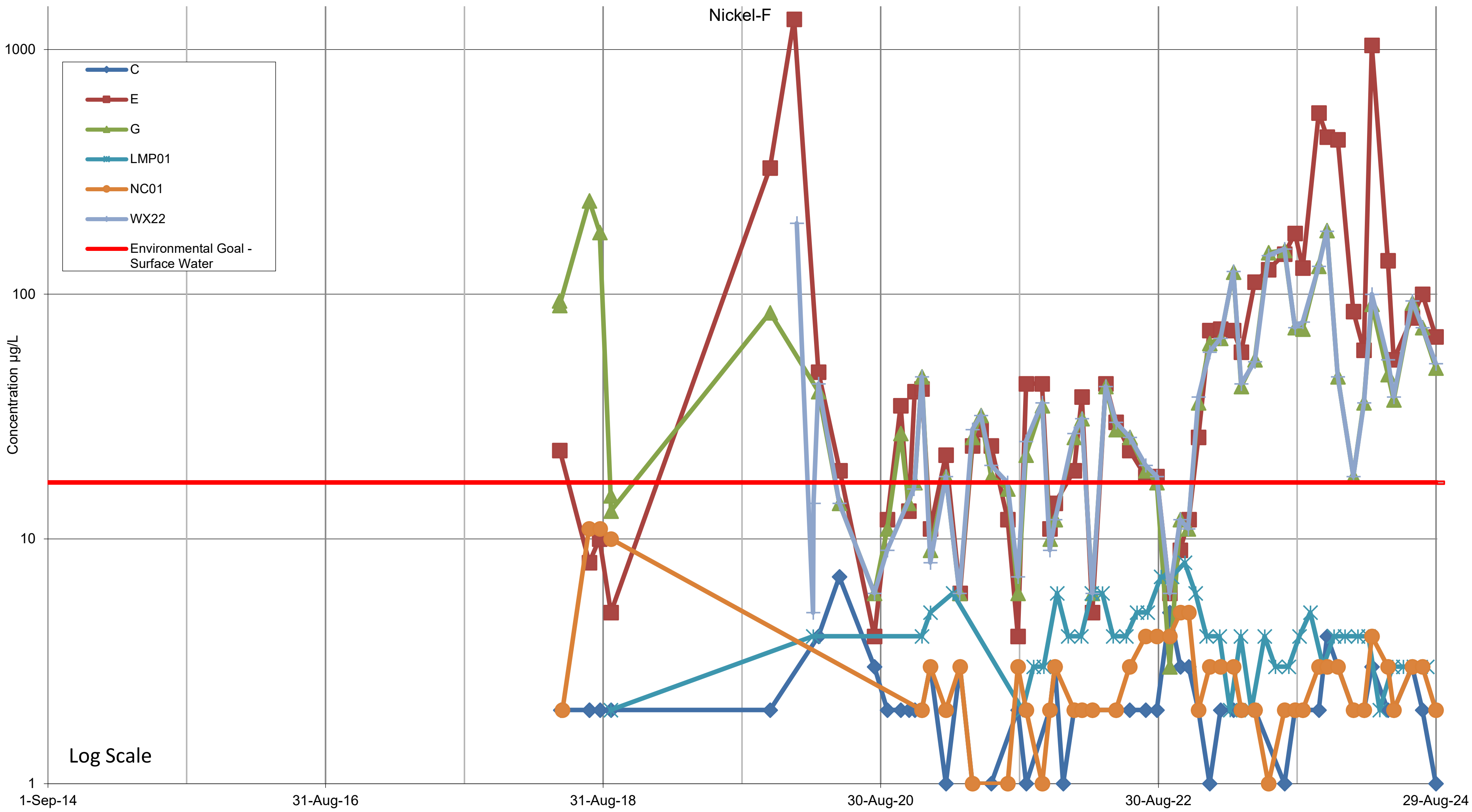
Appendix E. Manganese (Total) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024



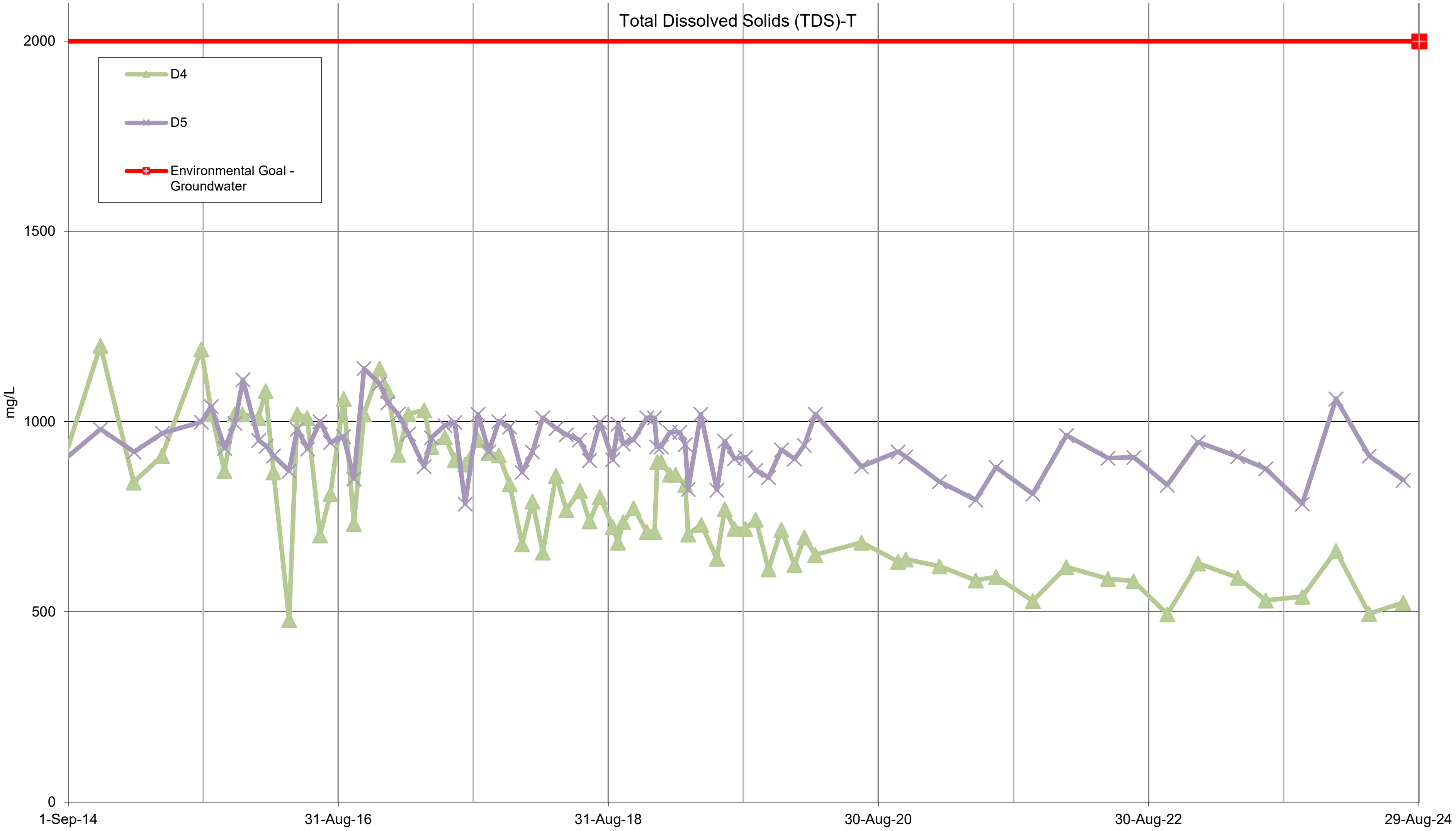

Manganese_F
Concentration µg/L
25000
20000
15000
10000
5000
0
01-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
C
E
G
LMP01
NC01
WX22
Environmental Goal - Surface Water


Molybdenum-T
Concentration µg/L
C
E
G
LMP01
NC01
WX22
Environmental Goal - Surface Water
200
180
160
140
120
100
80
60
40
20
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

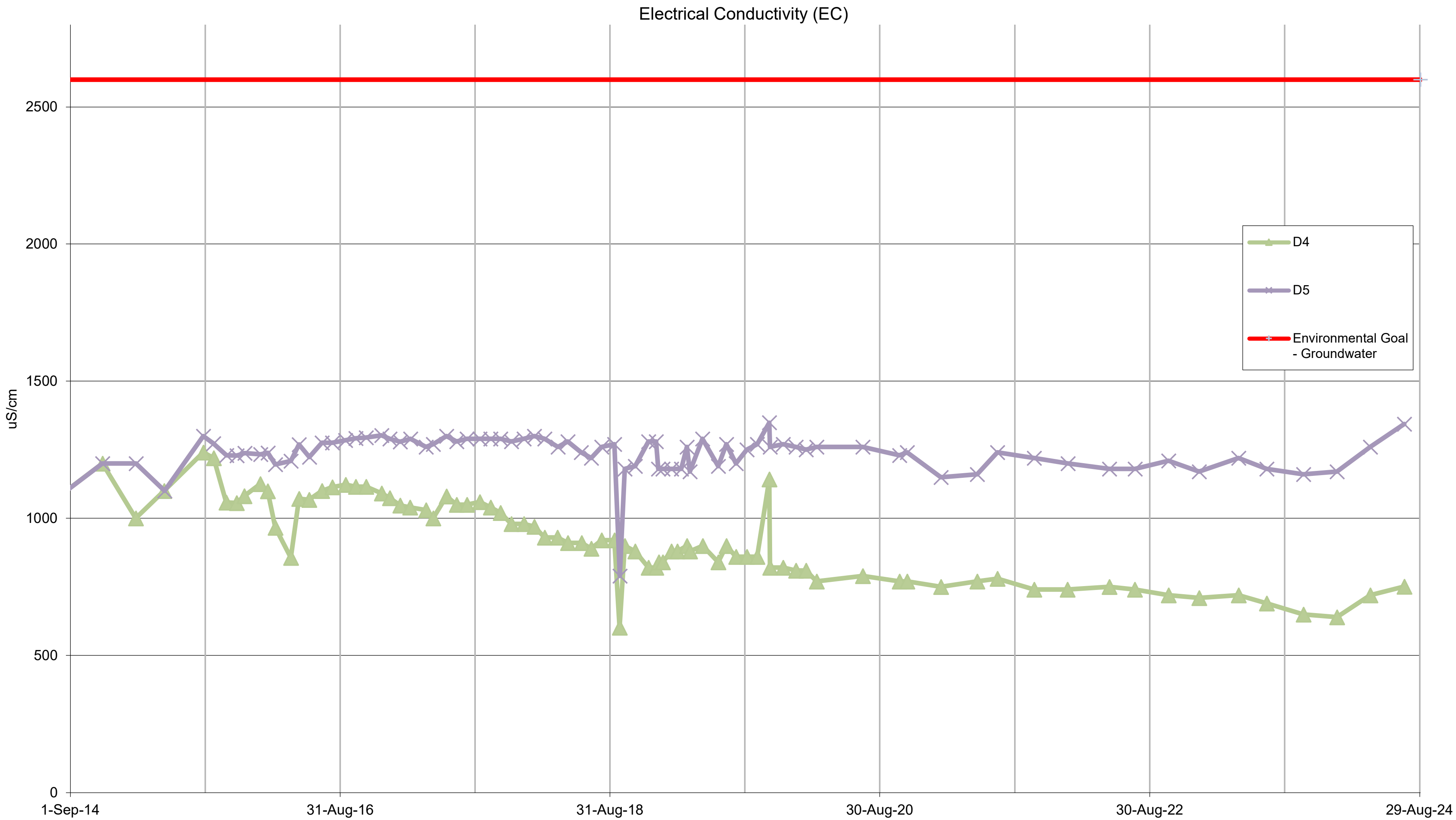

Nickel-T
C
E
G
LMP01
NC01
WX22
Environmental Goal - Surface Water
Concentration µg/L
1000
100
10
1
Log Sale
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

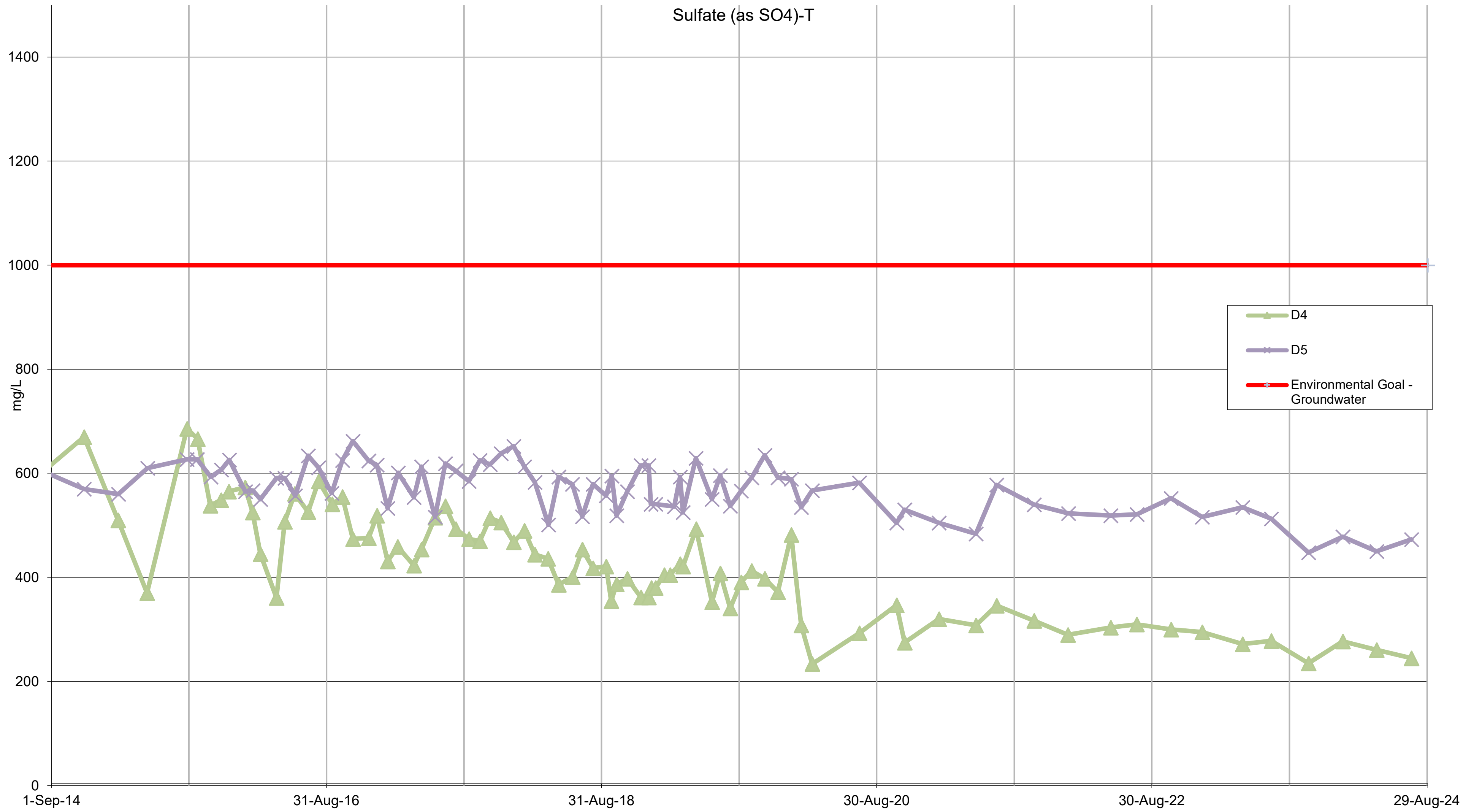

Nickel-F
1000
100
10
1
Concentration µg/L
C
E
G
LMP01
NC01
WX22
Environmental Goal - Surface Water
Log Scale
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

APPENDIX F TREND GRAPHS – GROUNDWATER

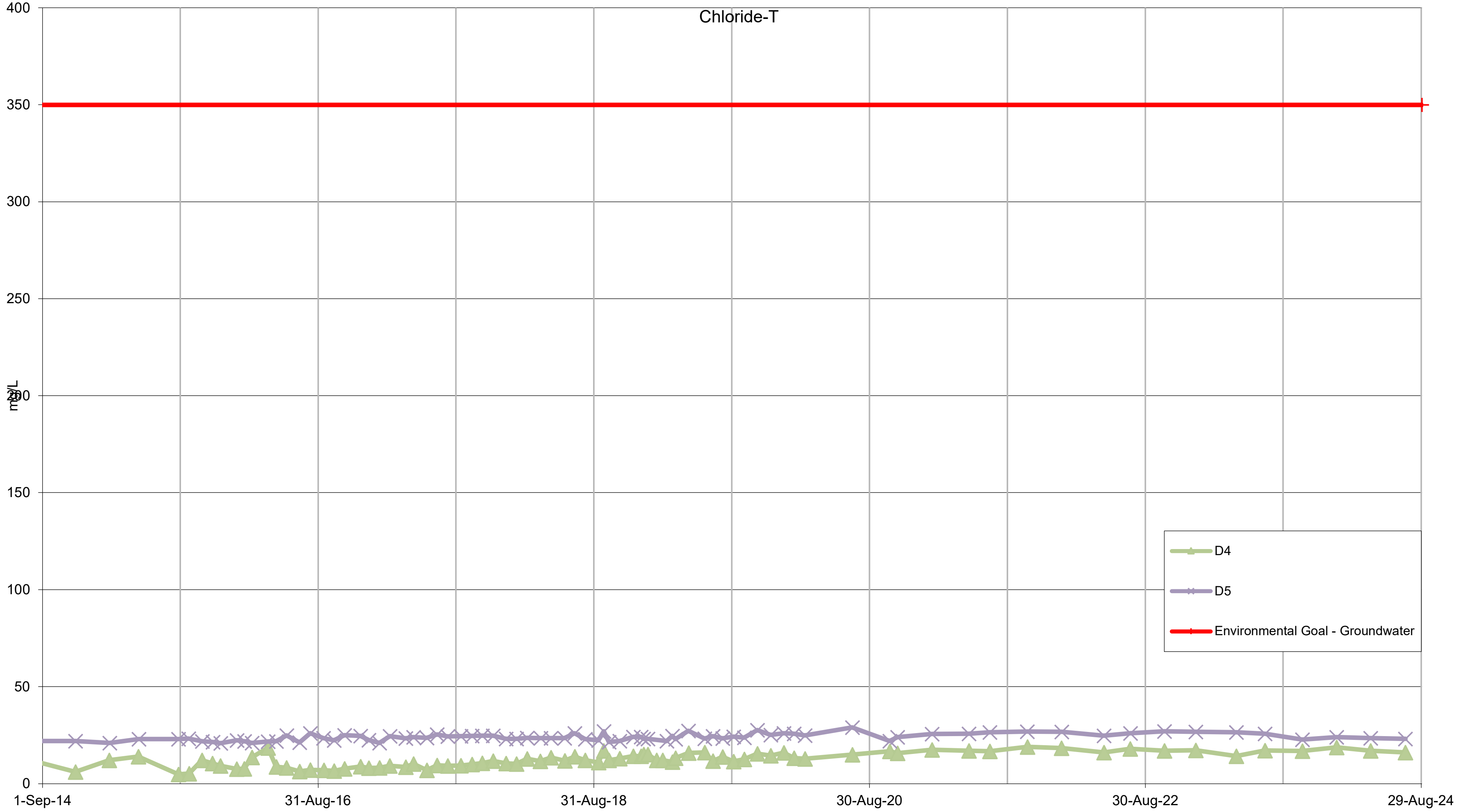

Total Dissolved Solids (TDS)-T
mg/L
2000
1500
1000
500
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D4
D5
Environmental Goal - Groundwater

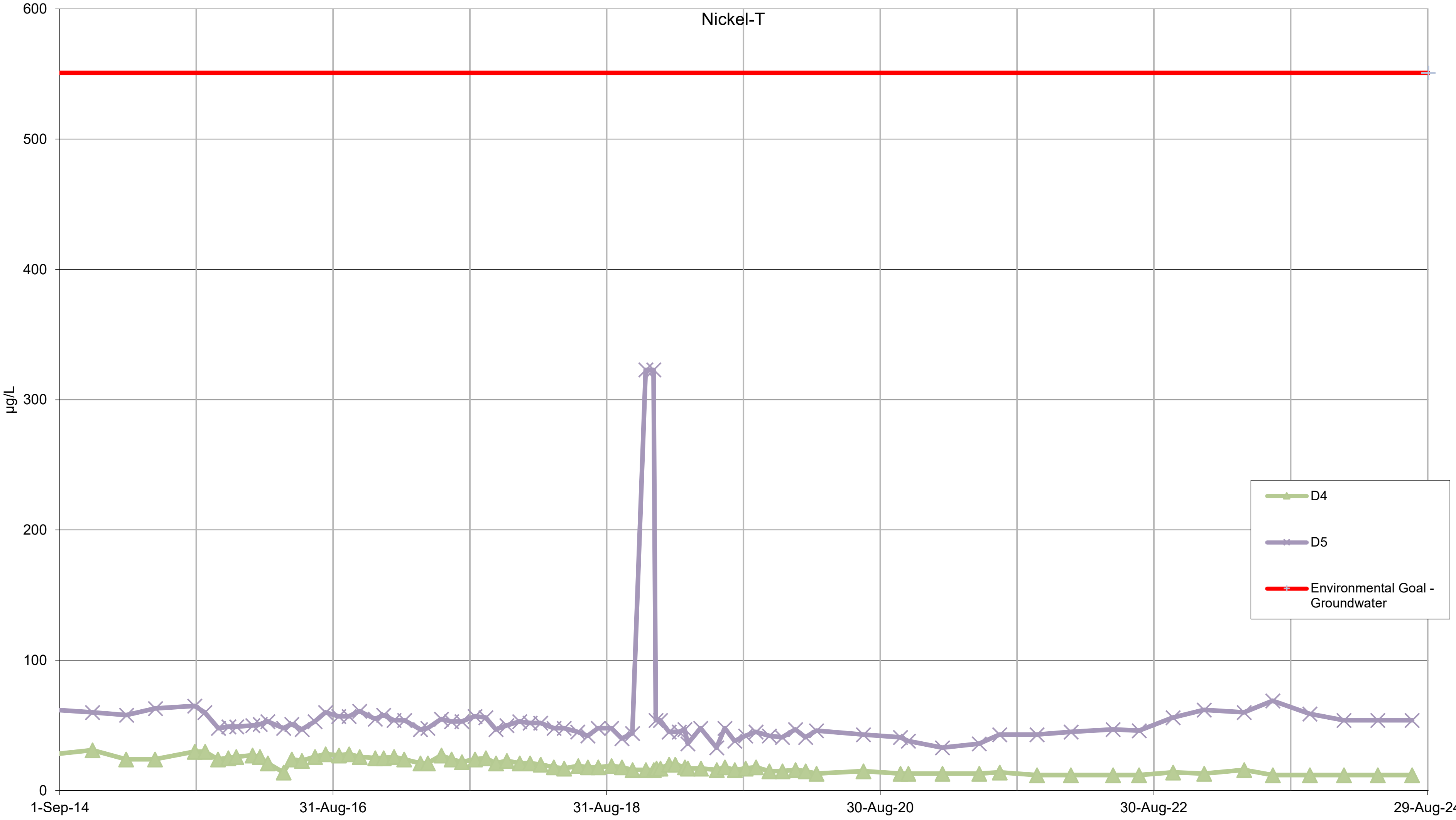
Appendix F. Upgradient / Background Wells - EC Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908

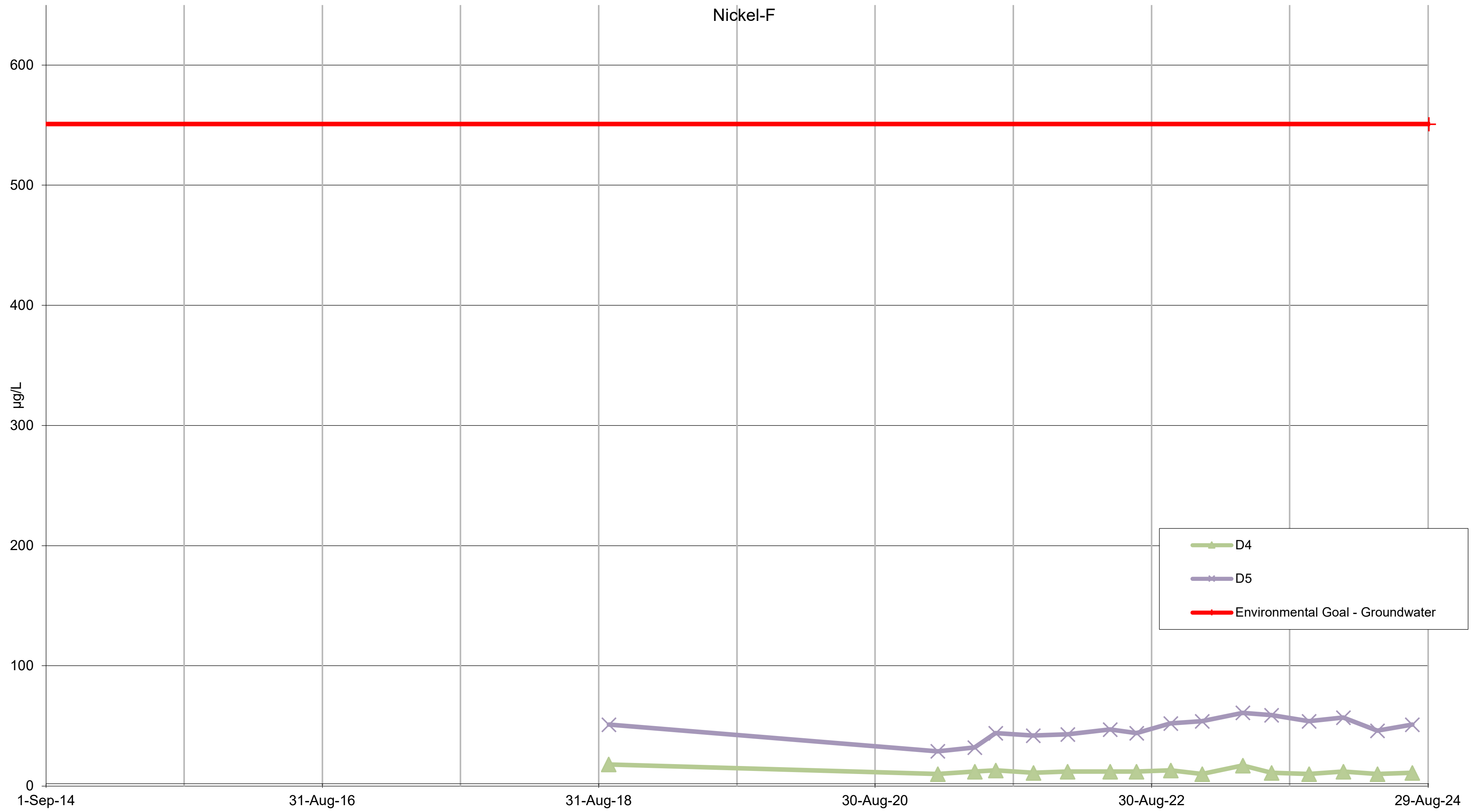



Sulfate (as SO4)-T
mg/L
0
200
400
600
800
1000
1200
1400
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D4
D5
Environmental Goal - Groundwater

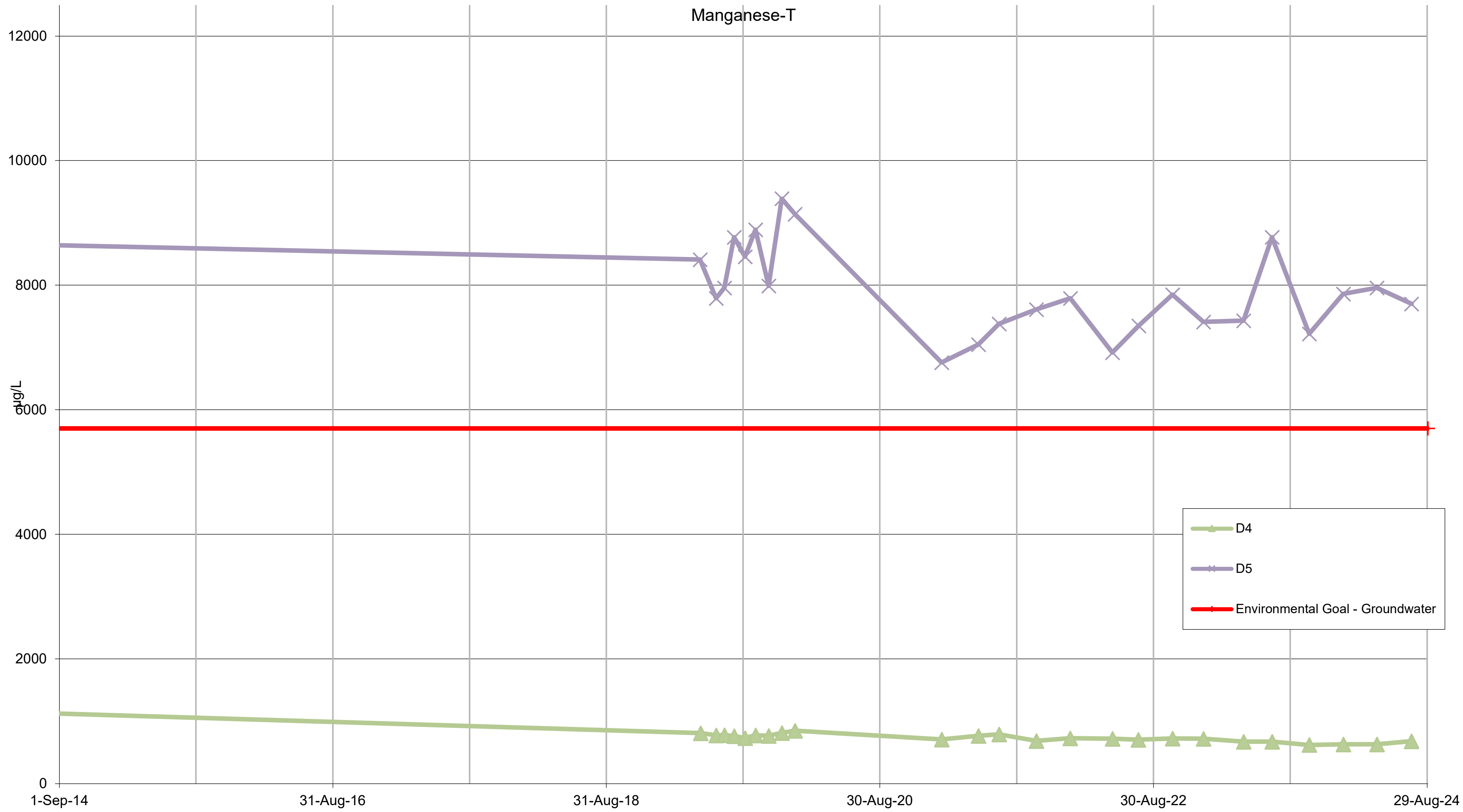
Appendix F. Upgradient / Background Wells - Chloride (Total) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908



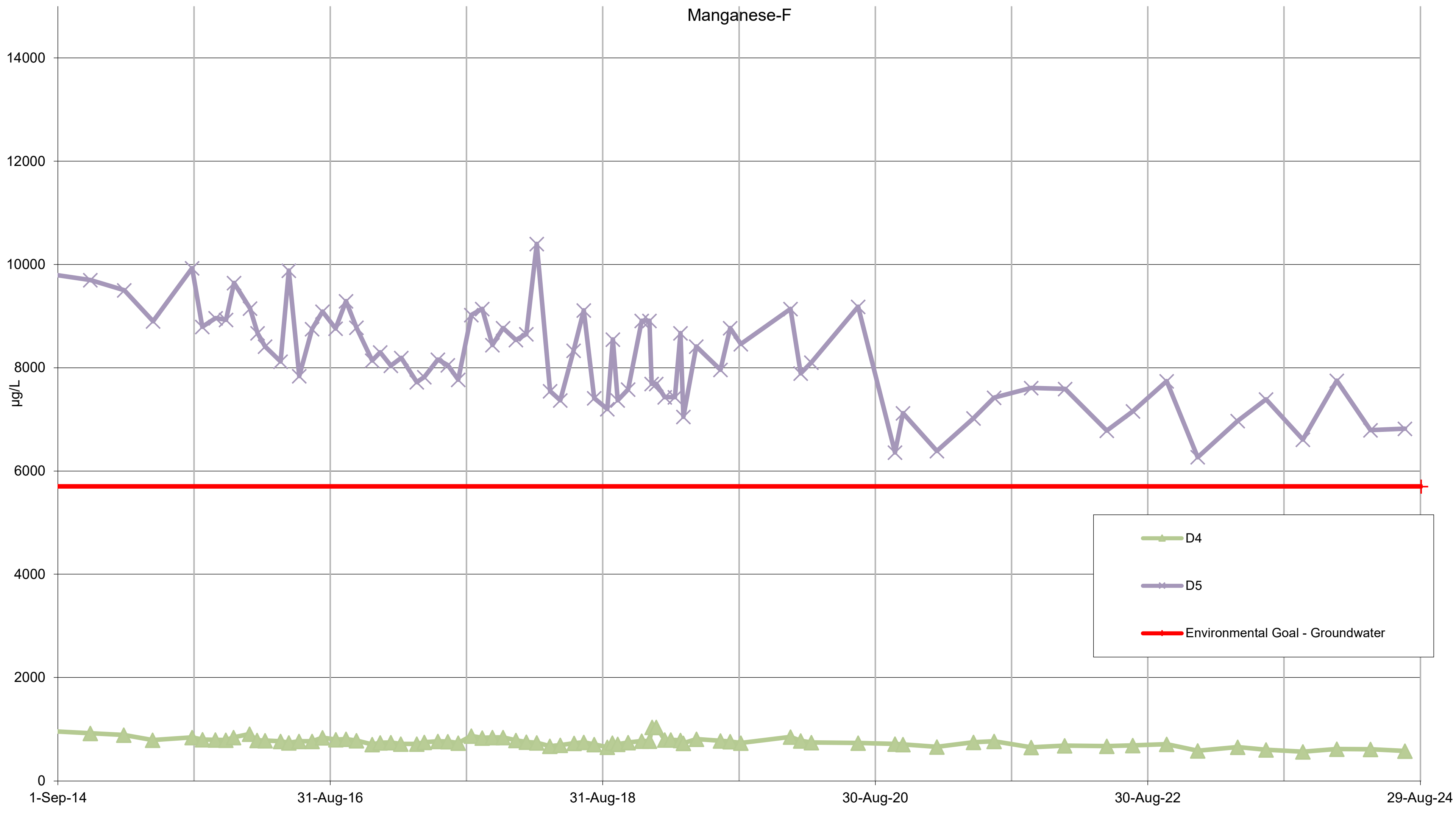

Nickel-T
µg/L
600
500
400
300
200
100
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D4
D5
Environmental Goal - Groundwater

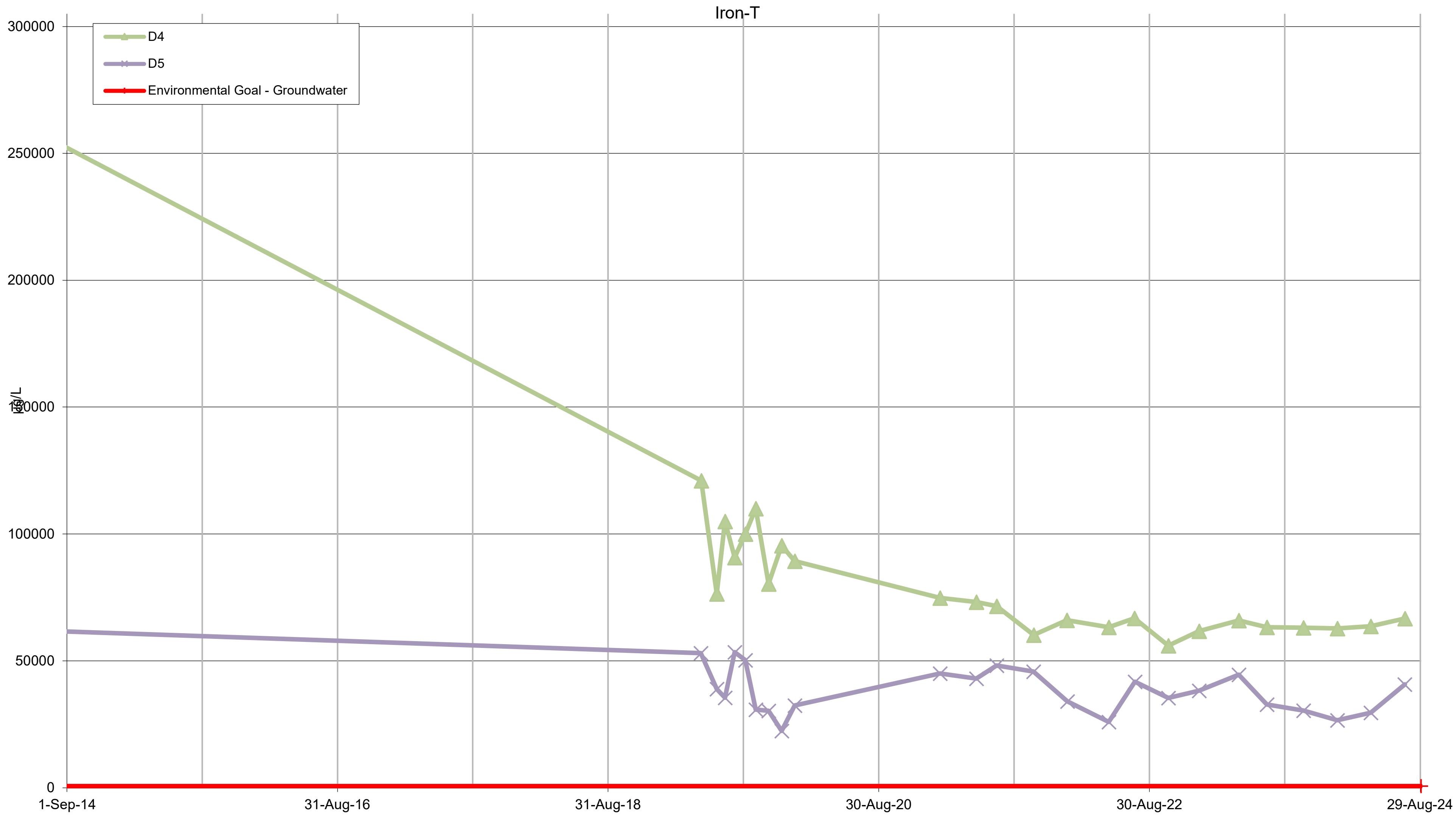

Nickel-F
µg/L
600
500
400
300
200
100
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D4
D5
Environmental Goal - Groundwater

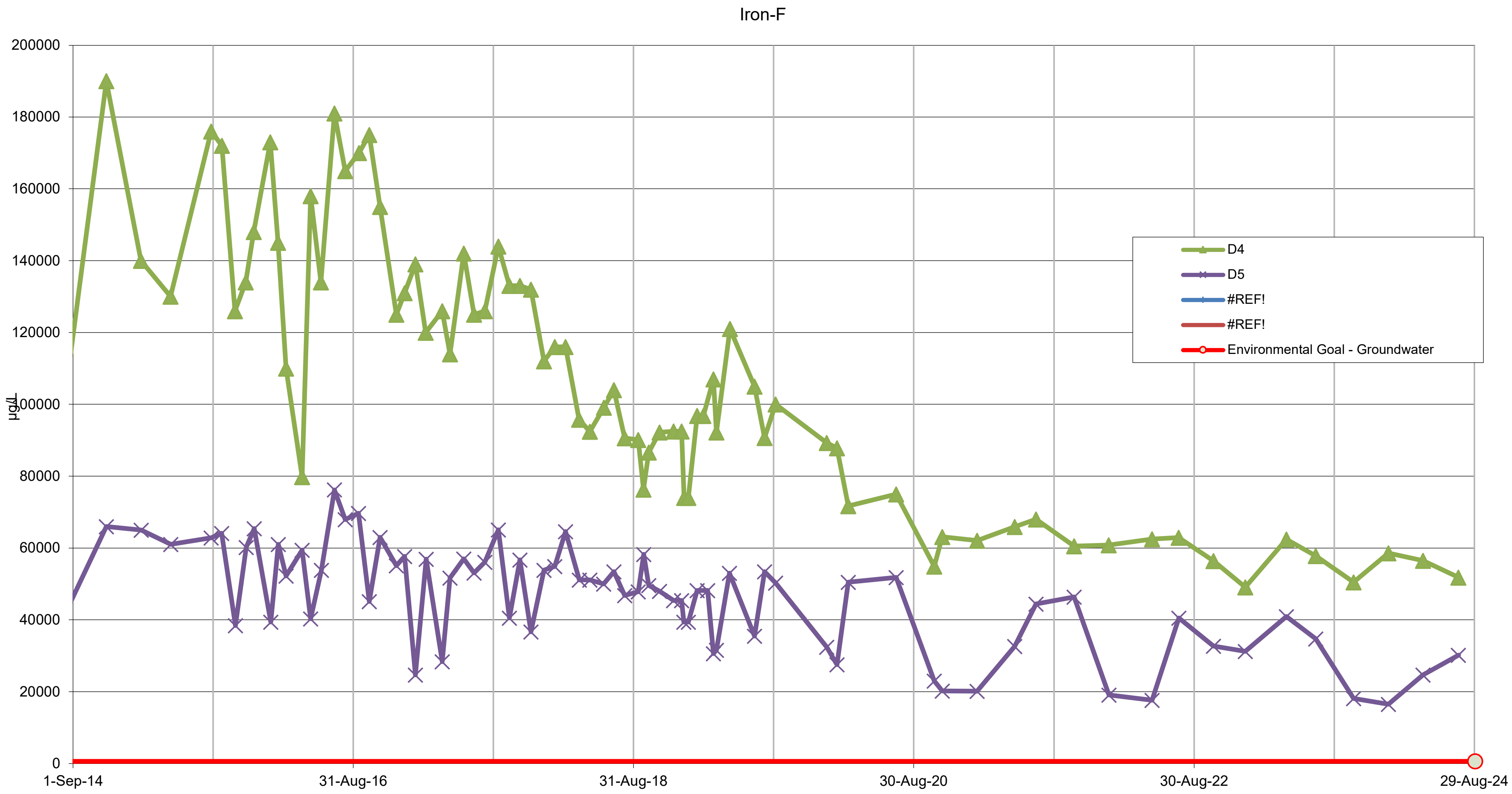
Appendix F. Upgradient / Background Wells - Manganese (Total) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908



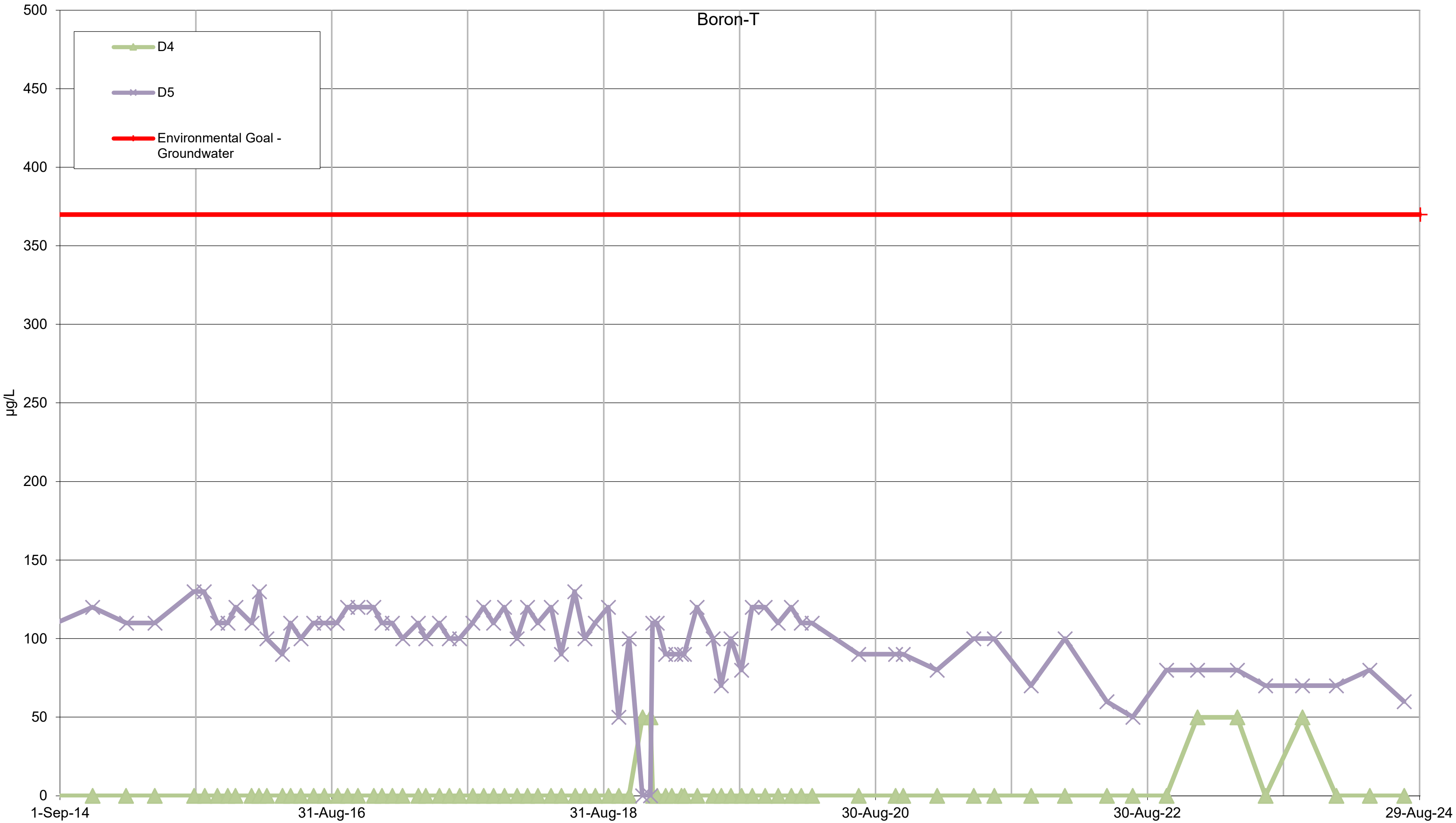
Appendix F. Upgradient / Background Wells - Manganese (Filtered) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908



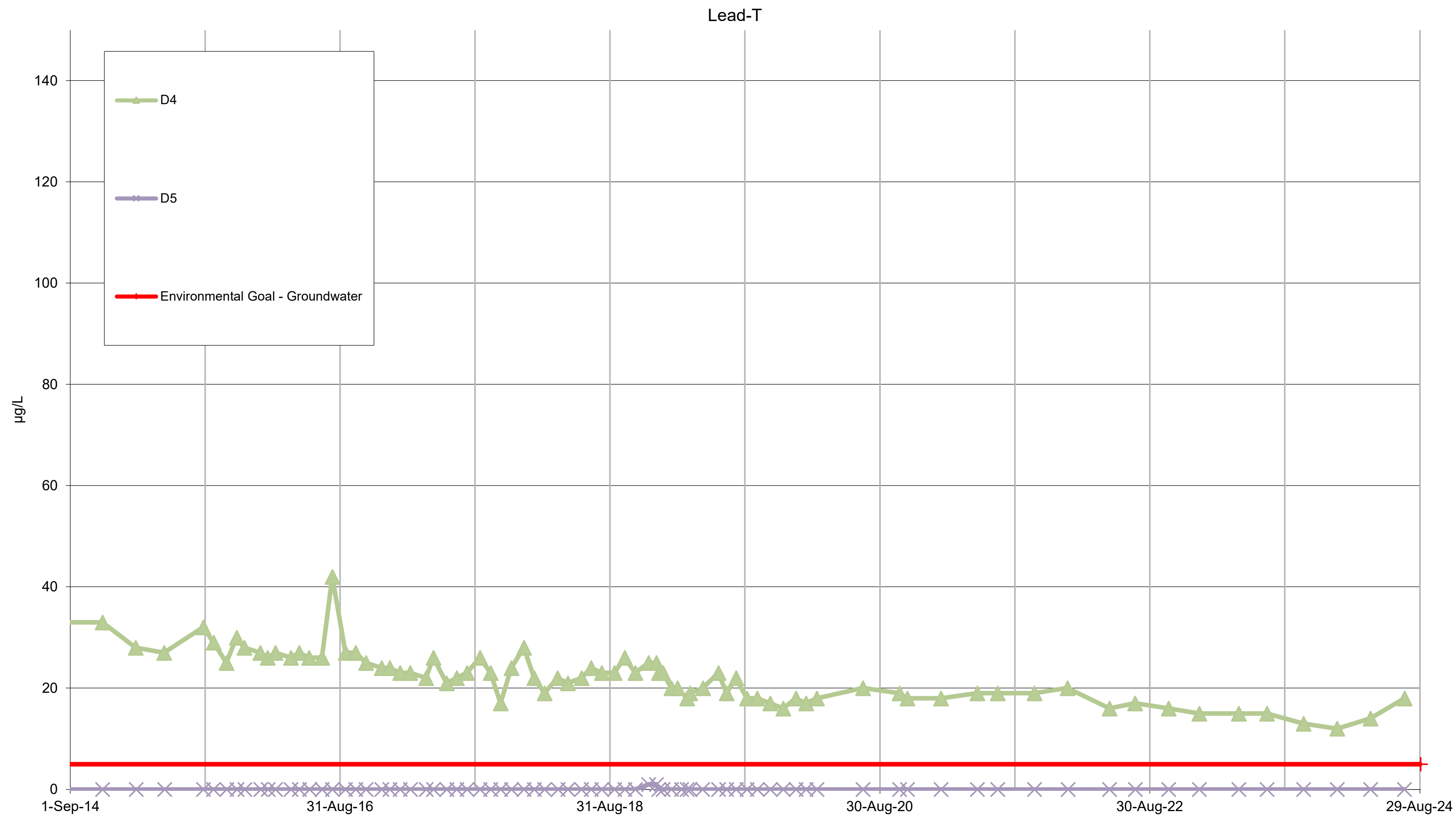

Iron-T
D4
D5
Environmental Goal - Groundwater
ug/L
300000
250000
200000
150000
100000
50000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

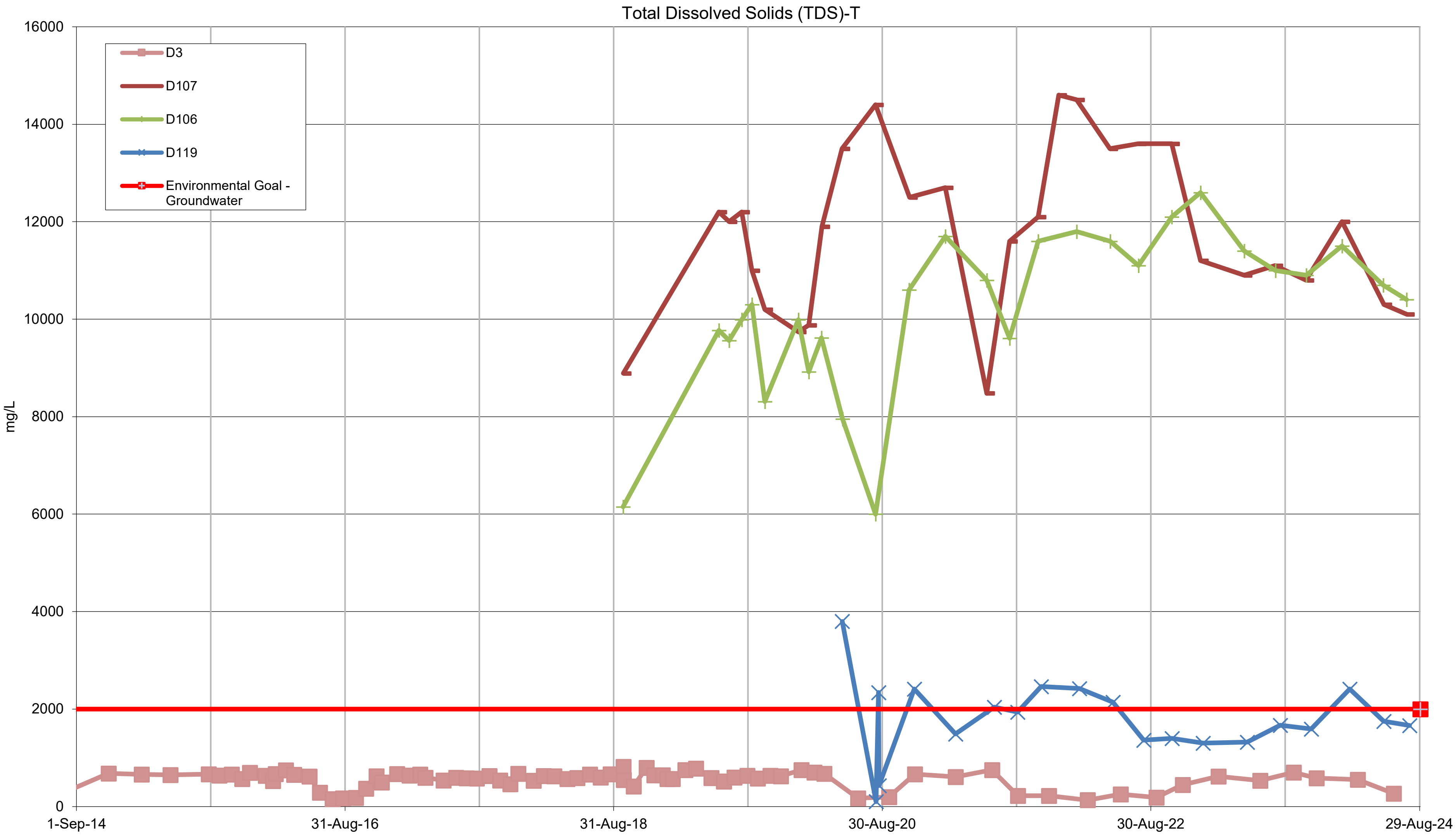

Iron-F
µg/L
200000
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D4
D5
#REF!
#REF!
Environmental Goal - Groundwater

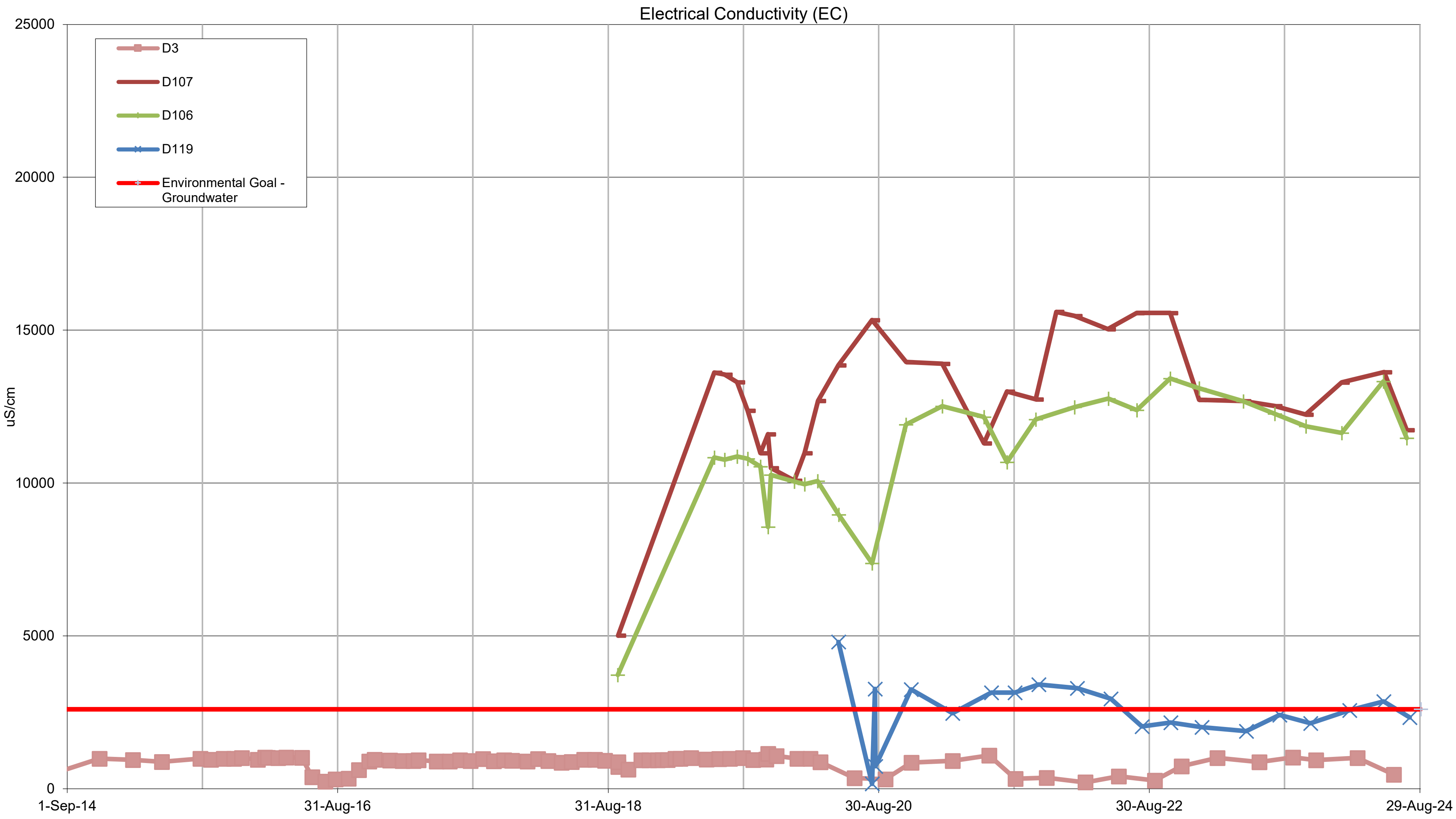
Appendix F. Upgradient / Background Wells - Boron (Total) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908

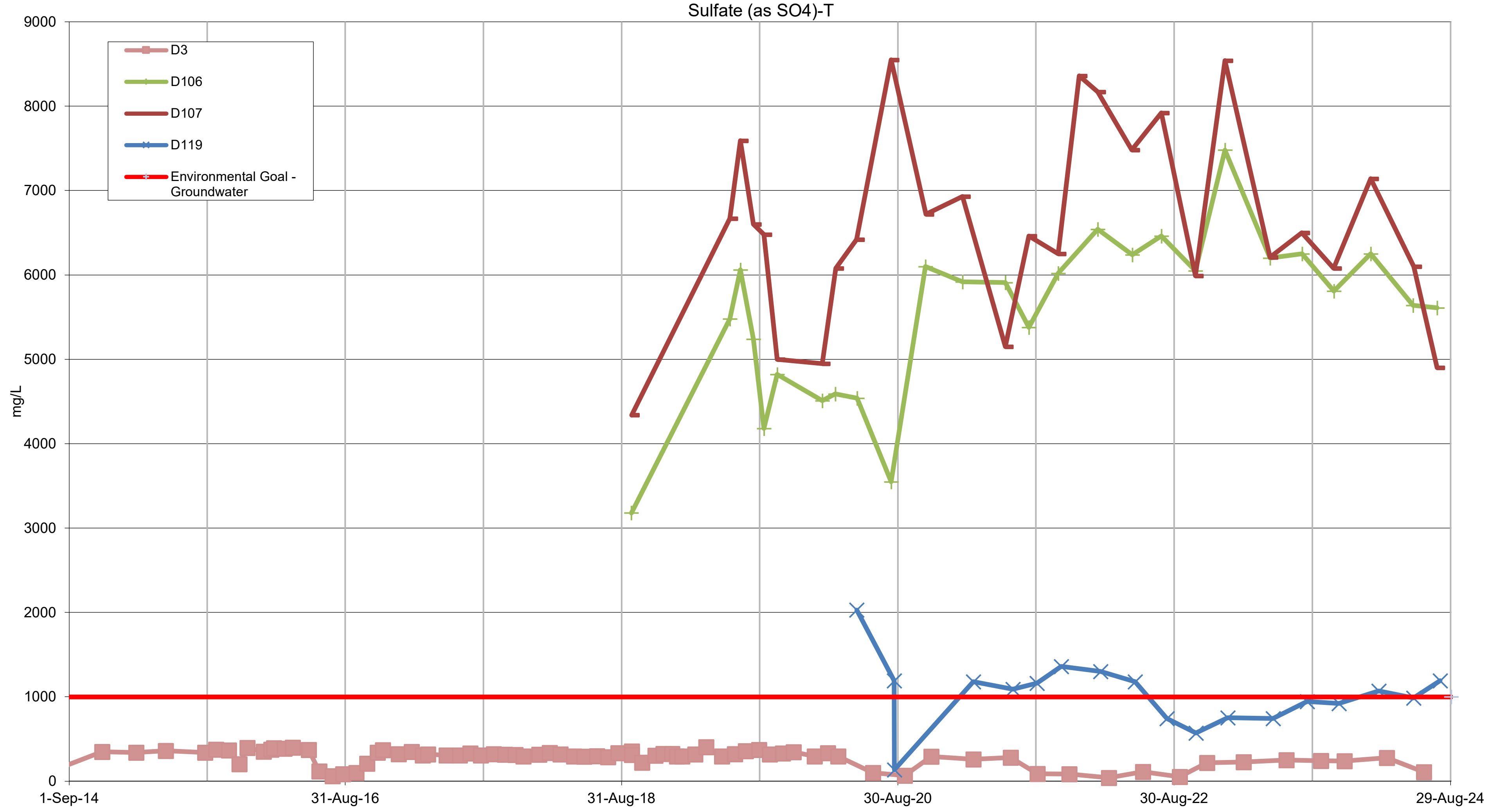


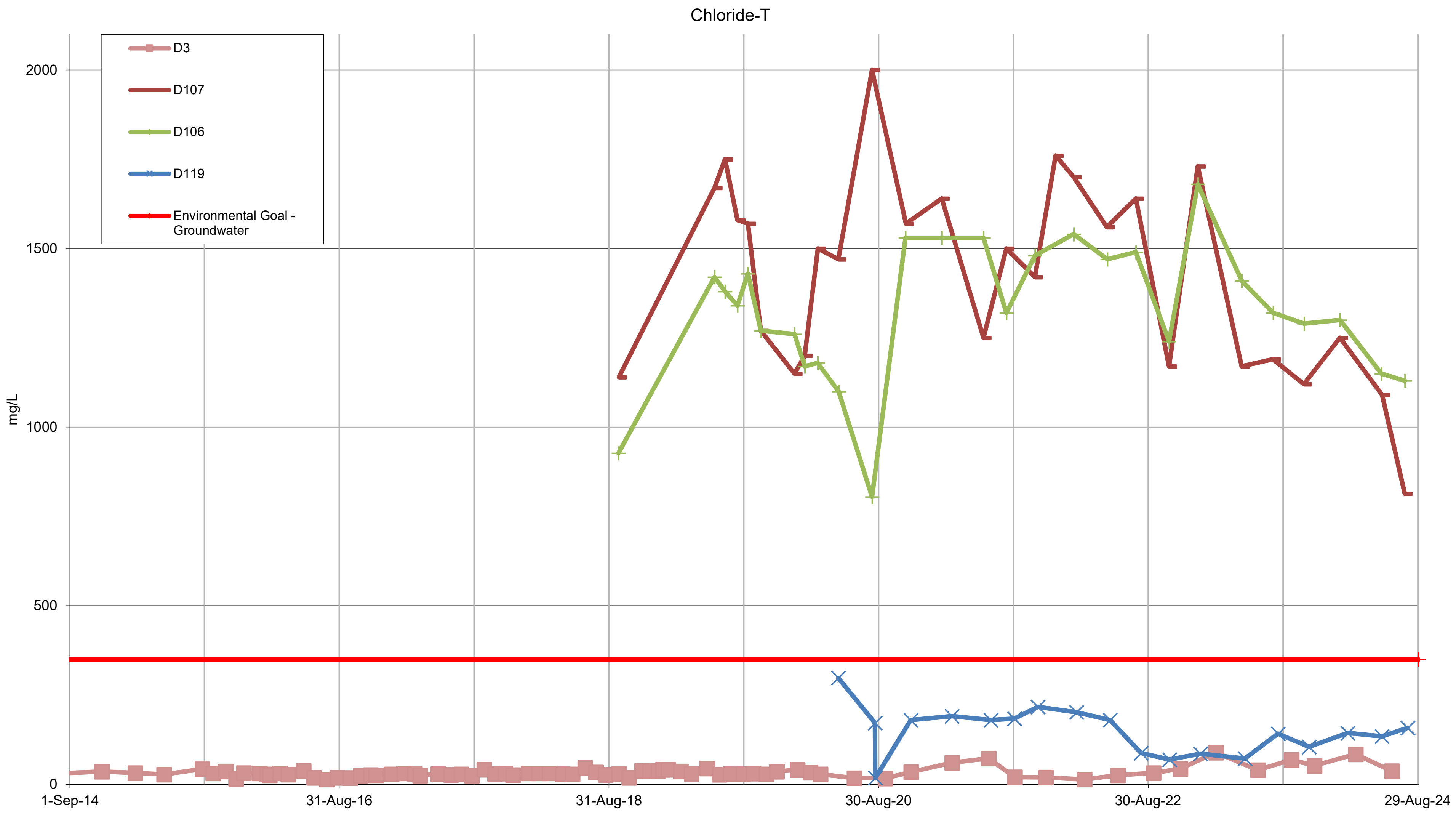
Appendix F. Upgradient / Background Wells - Boron (Filtered) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908


Lead-T
D4
D5
Environmental Goal - Groundwater
µg/L
0
20
40
60
80
100
120
140
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

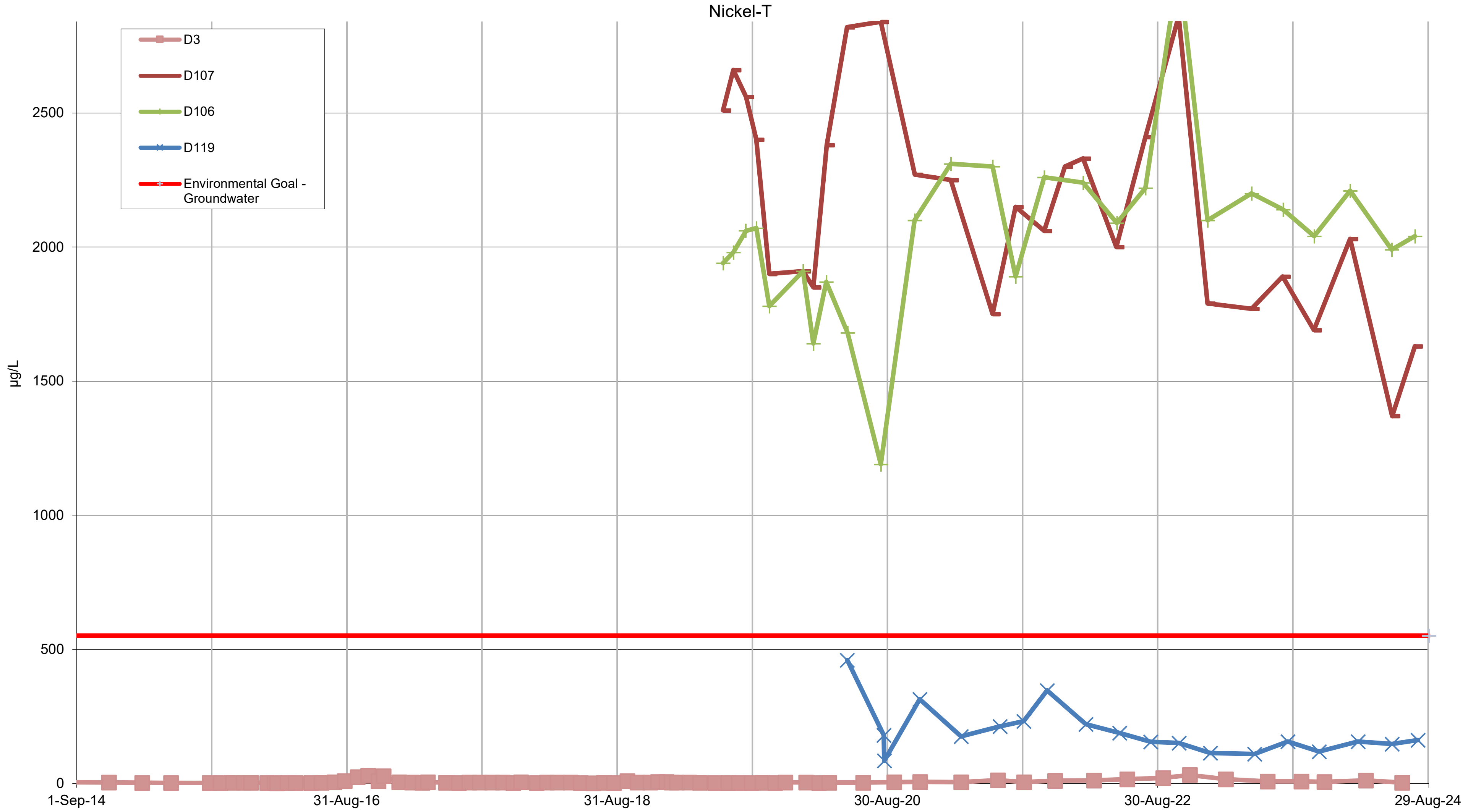

Total Dissolved Solids (TDS)-T
D3
D107
D106
D119
Environmental Goal - Groundwater
mg/L
16000
14000
12000
10000
8000
6000
4000
2000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

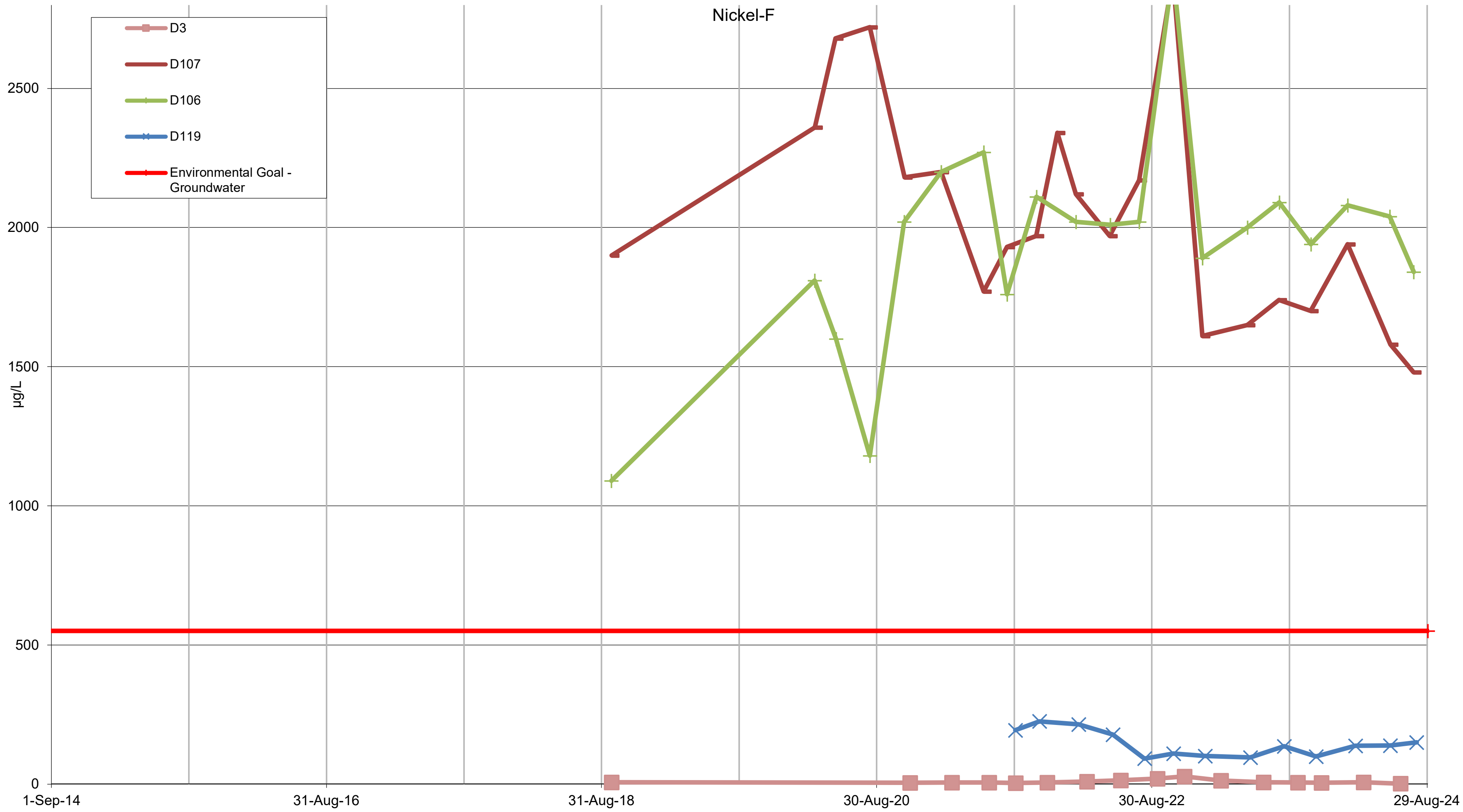

Electrical Conductivity (EC)
D3
D107
D106
D119
Environmental Goal - Groundwater
uS/cm
25000
20000
15000
10000
5000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24


Sulfate (as SO4)-T
D3
D106
D107
D119
Environmental Goal - Groundwater
mg/L
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

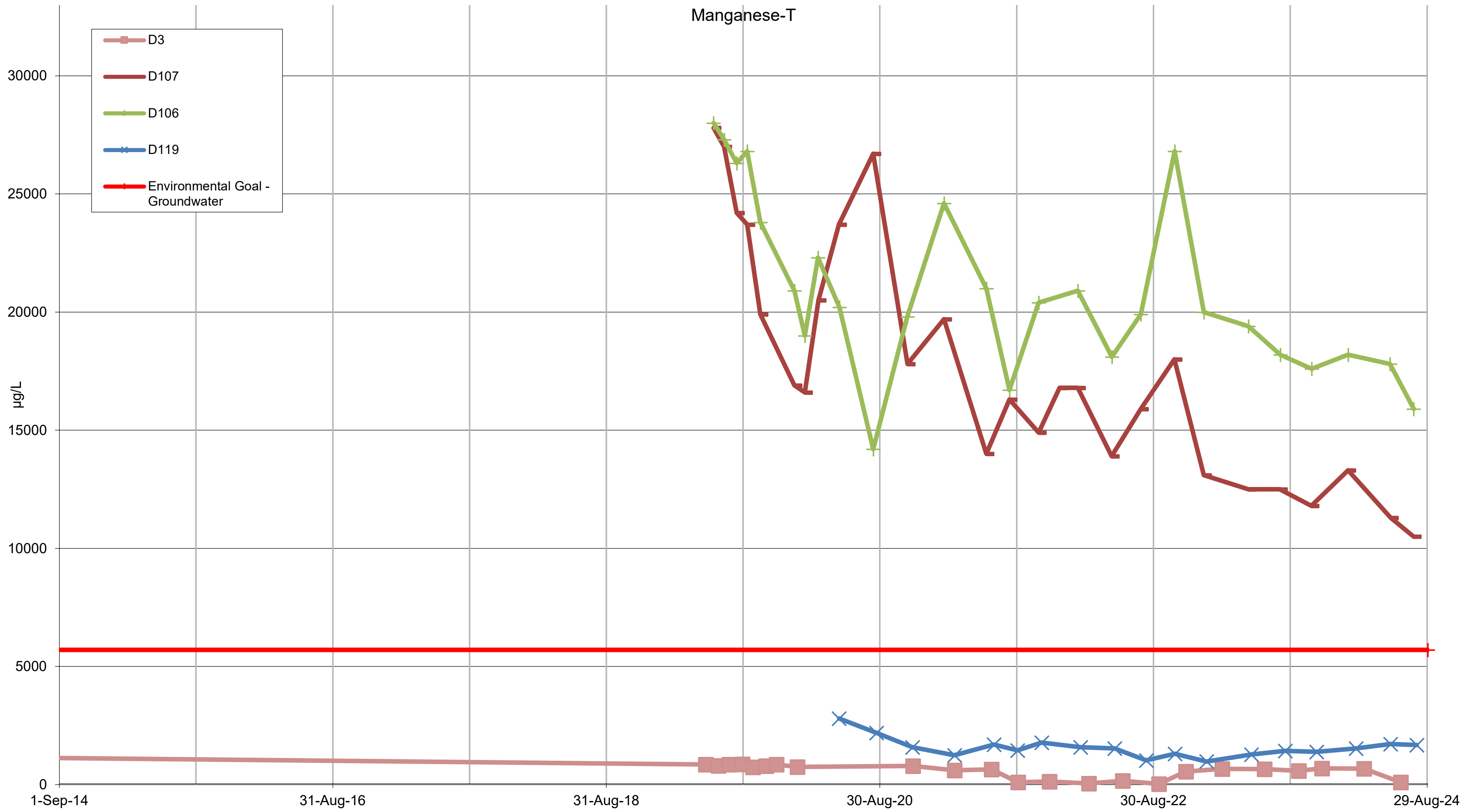

Chloride-T
D3
D107
D106
D119
Environmental Goal - Groundwater
2000
1500
1000
500
0
mg/L
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

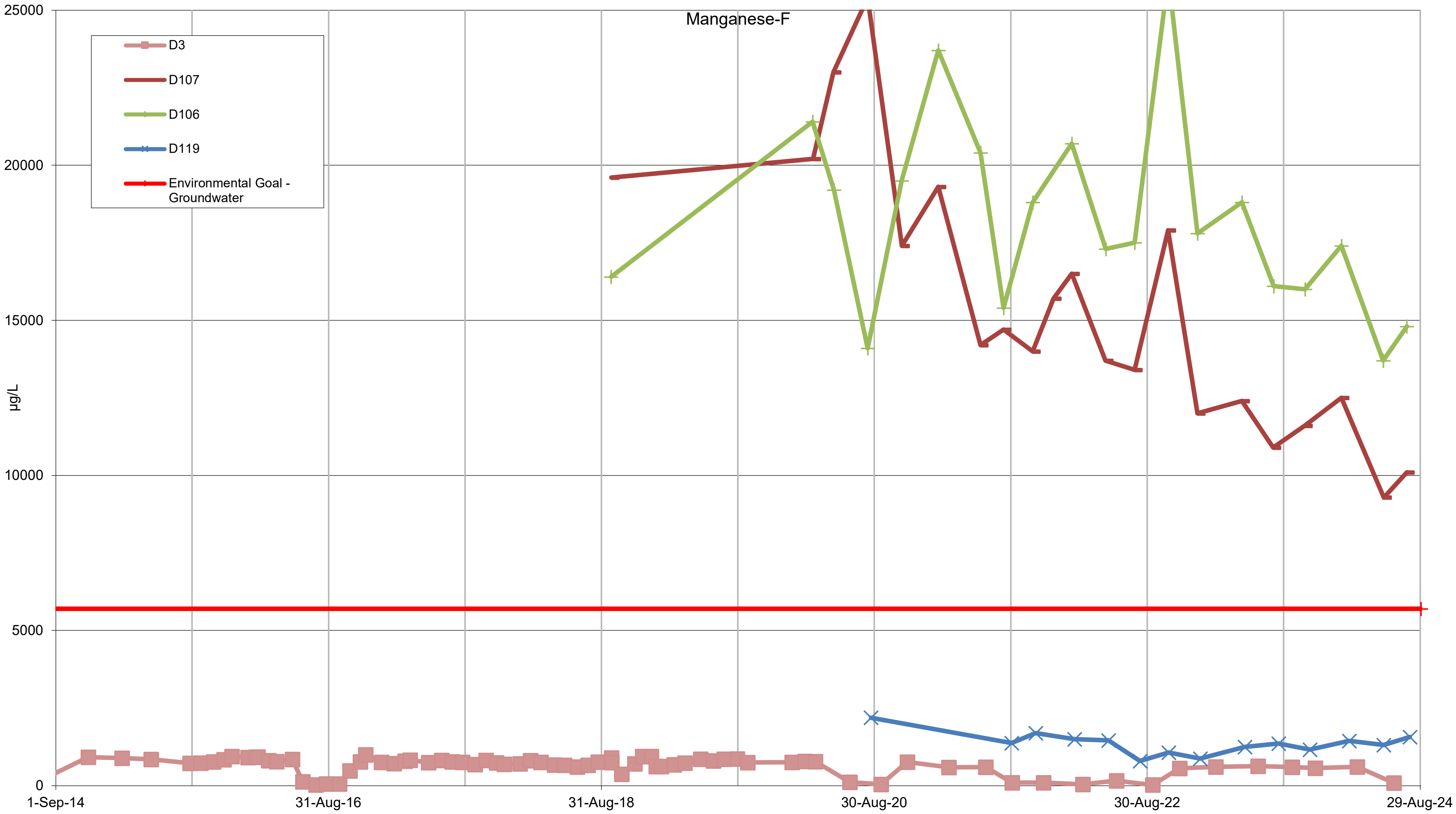
Appendix F. Upgradient / Adjacent the MPAR - Nickel (Total) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908

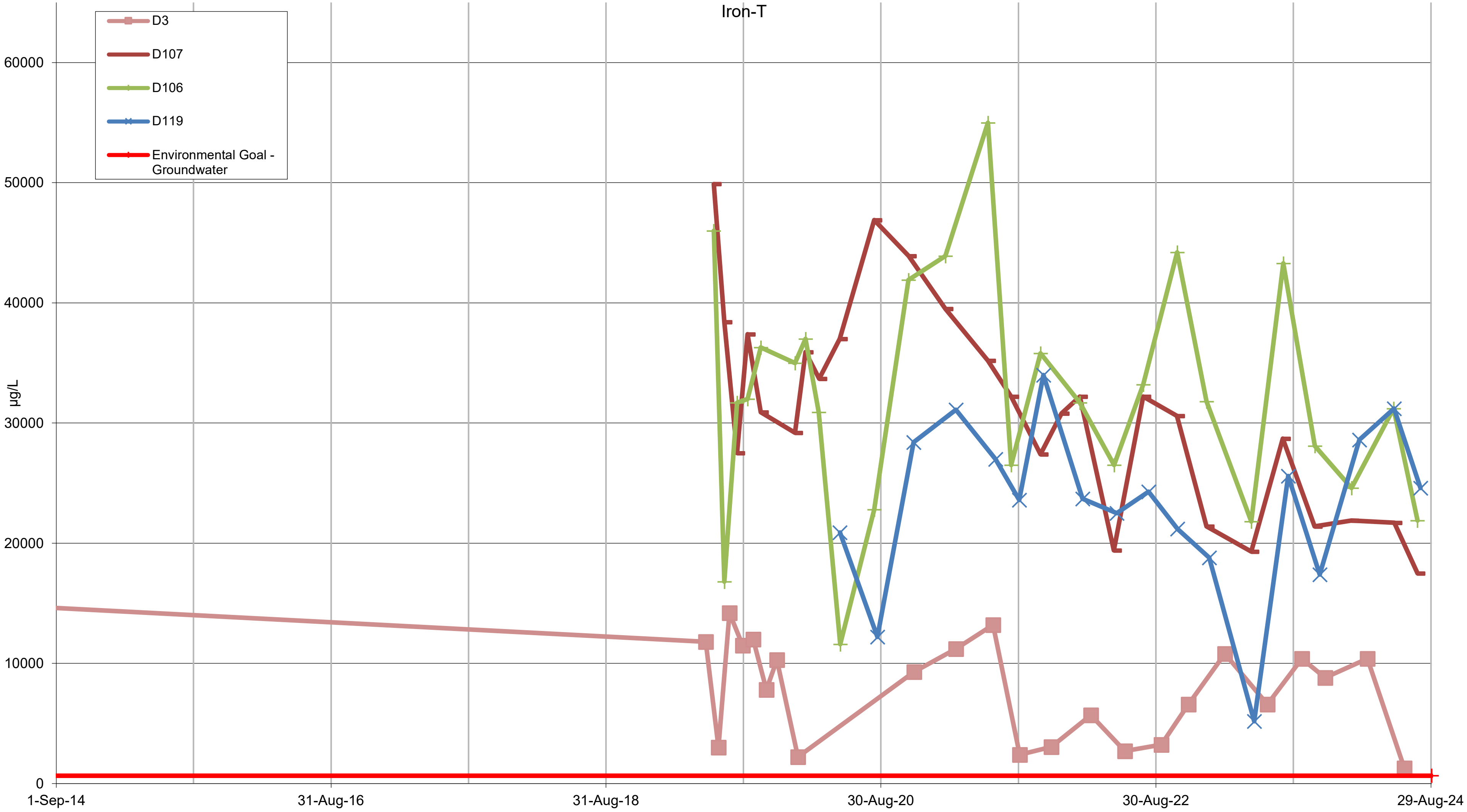


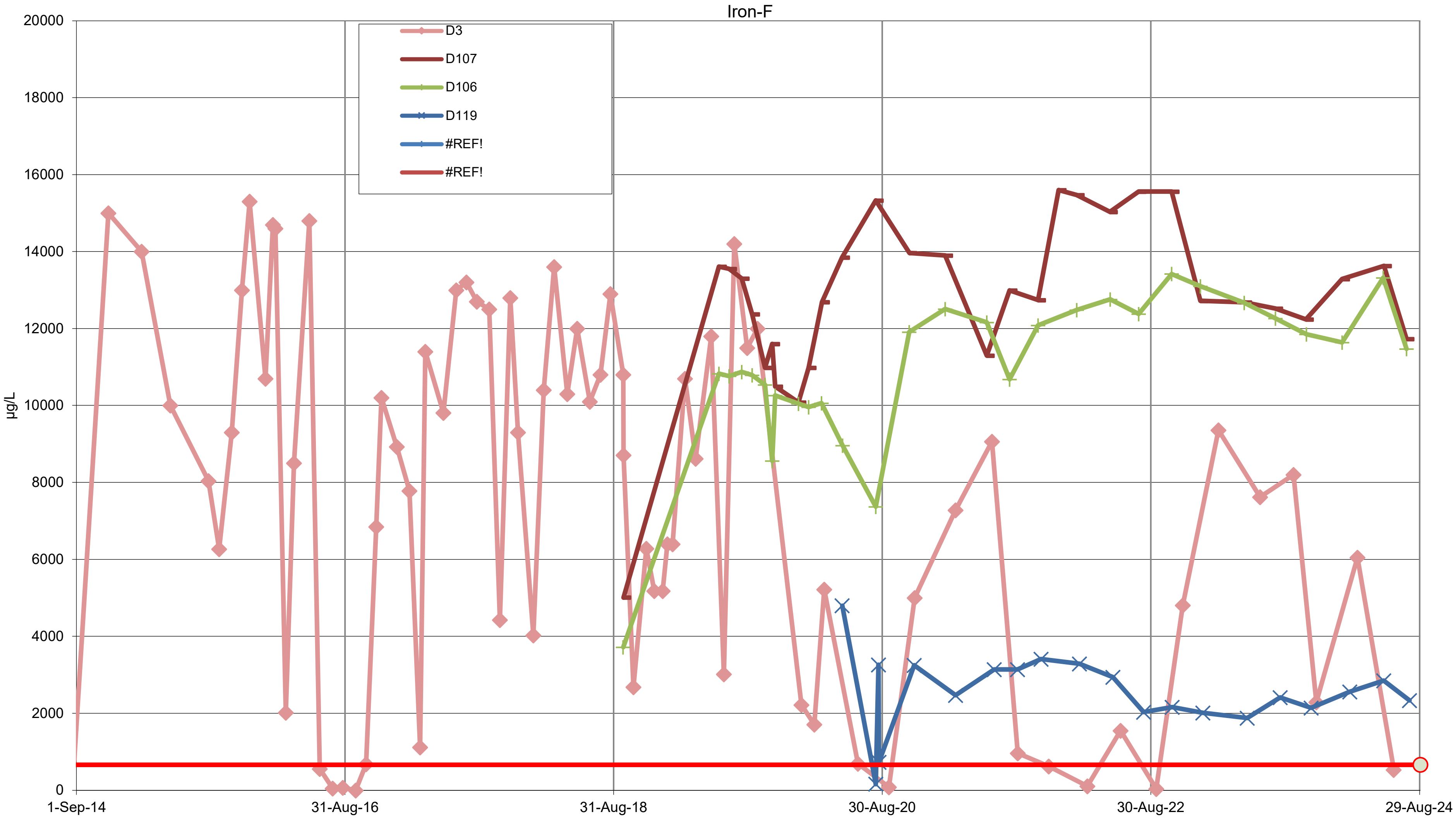

Nickel-F
D3
D107
D106
D119
Environmental Goal - Groundwater
µg/L
2500
2000
1500
1000
500
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

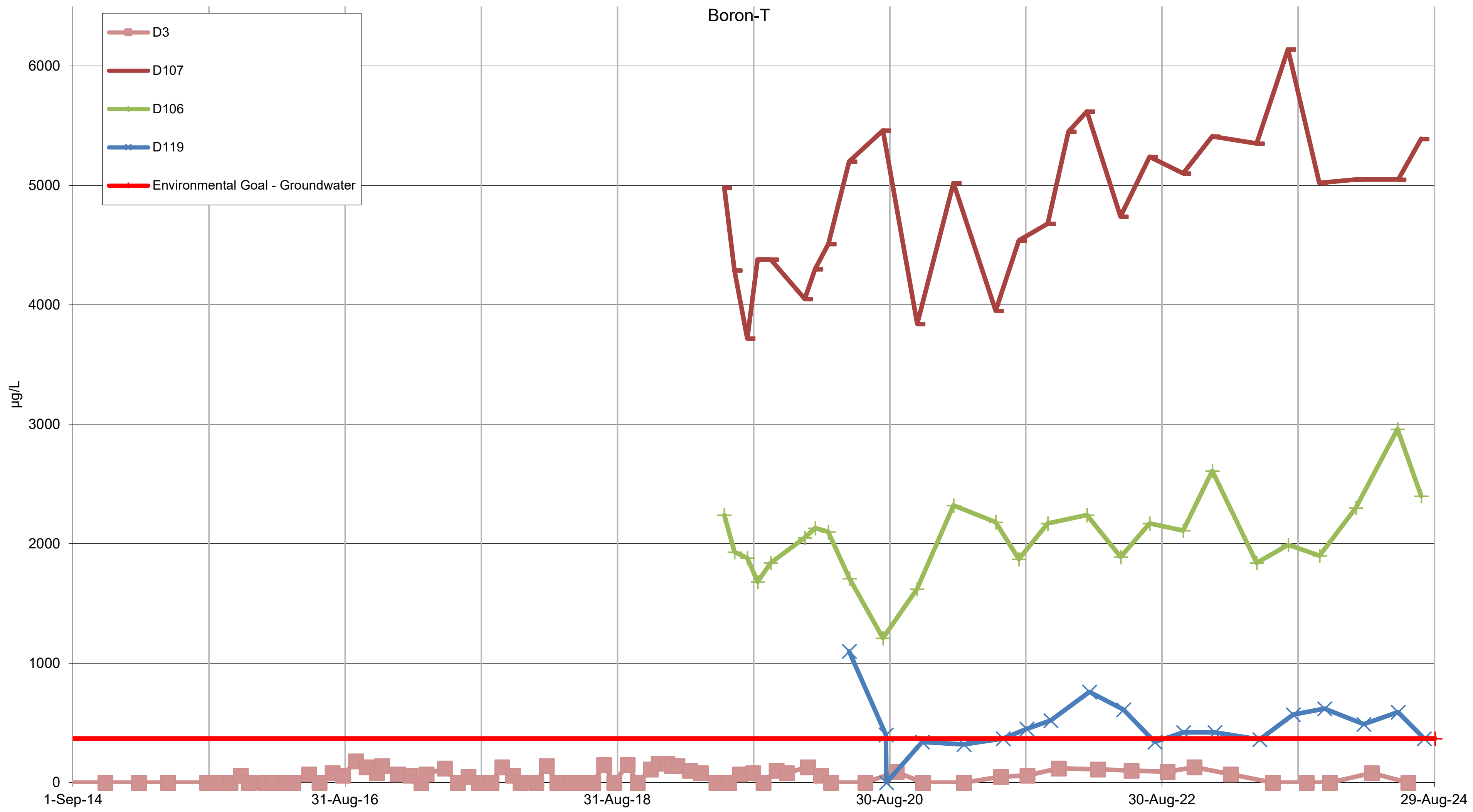
Appendix F. Upgradient / Adjacent the MPAR - Manganese (Total) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908

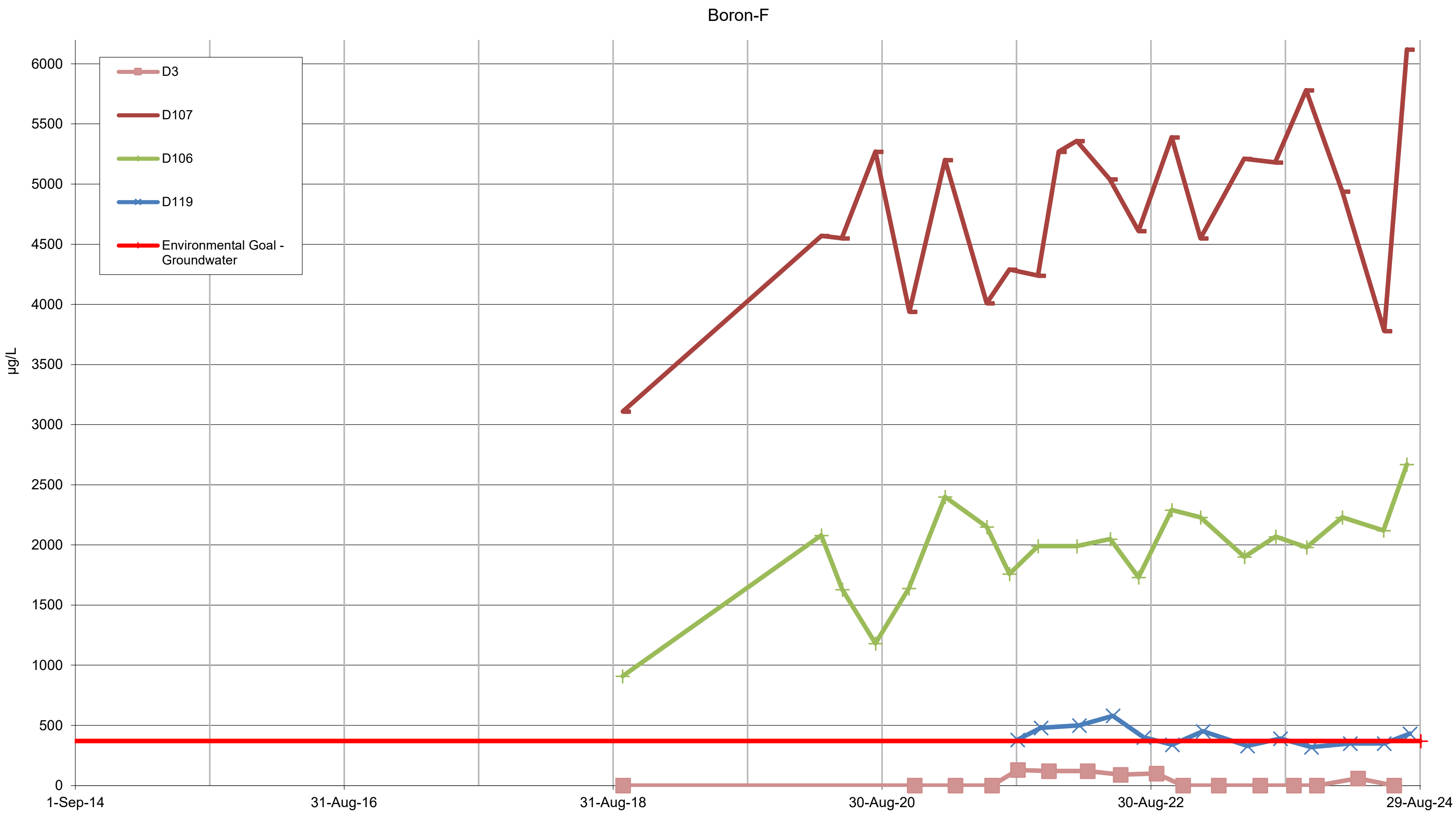


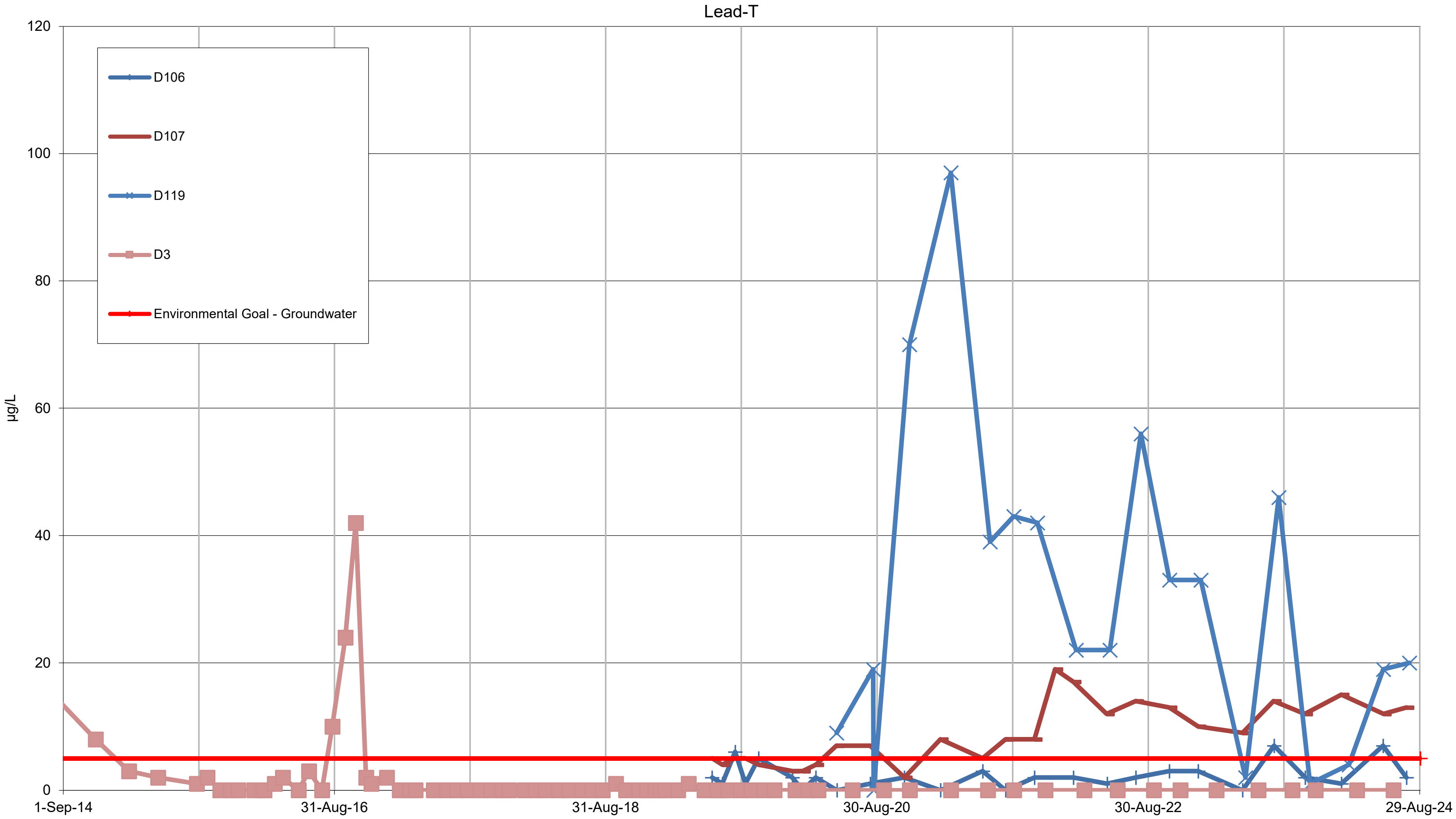

Manganese-F
D3
D107
D106
D119
Environmental Goal - Groundwater
µg/L
25000
20000
15000
10000
5000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

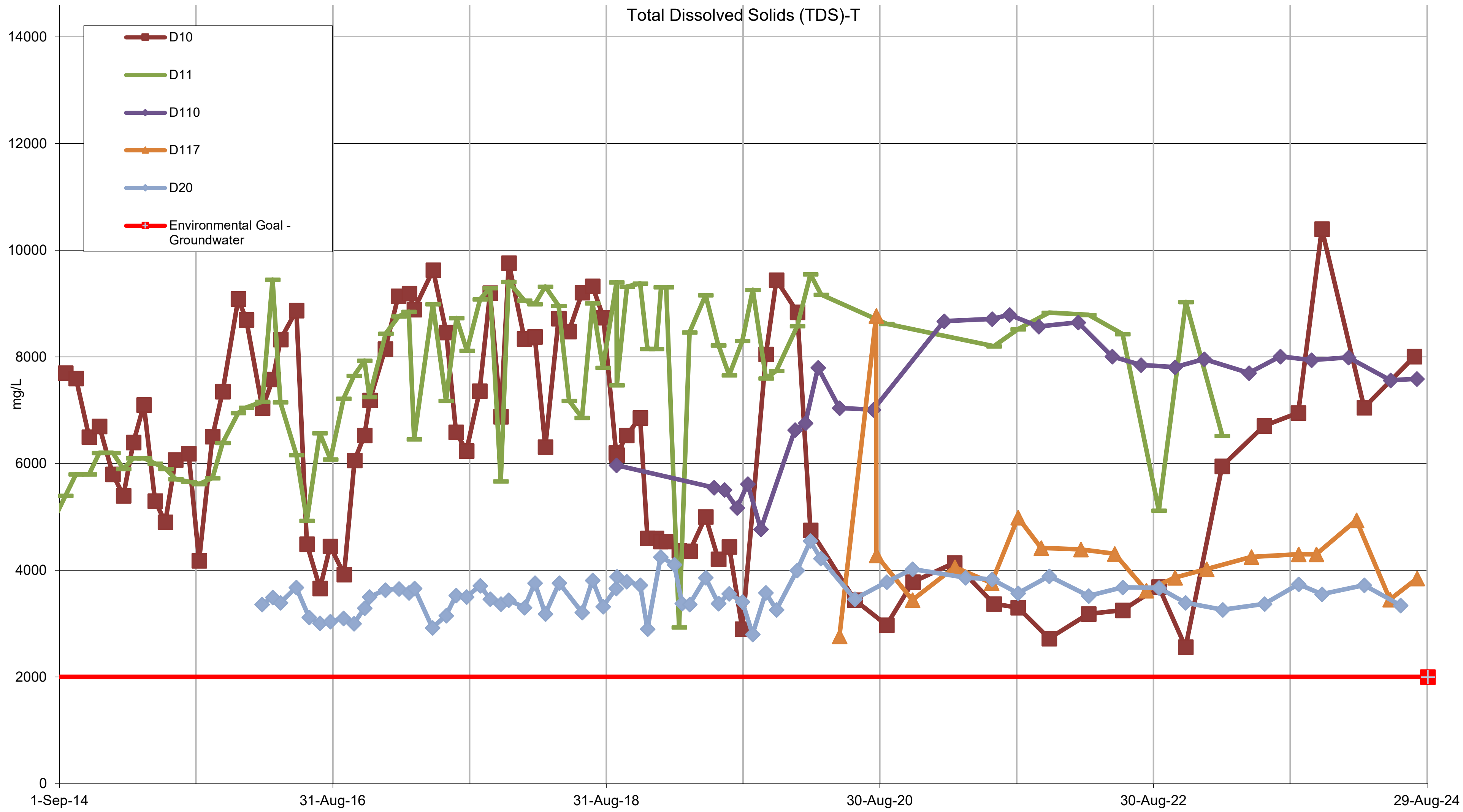

Iron-T
D3
D107
D106
D119
Environmental Goal - Groundwater
µg/L
60000
50000
40000
30000
20000
10000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24


Iron-F
D3
D107
D106
D119
#REF!
#REF!
µg/L
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

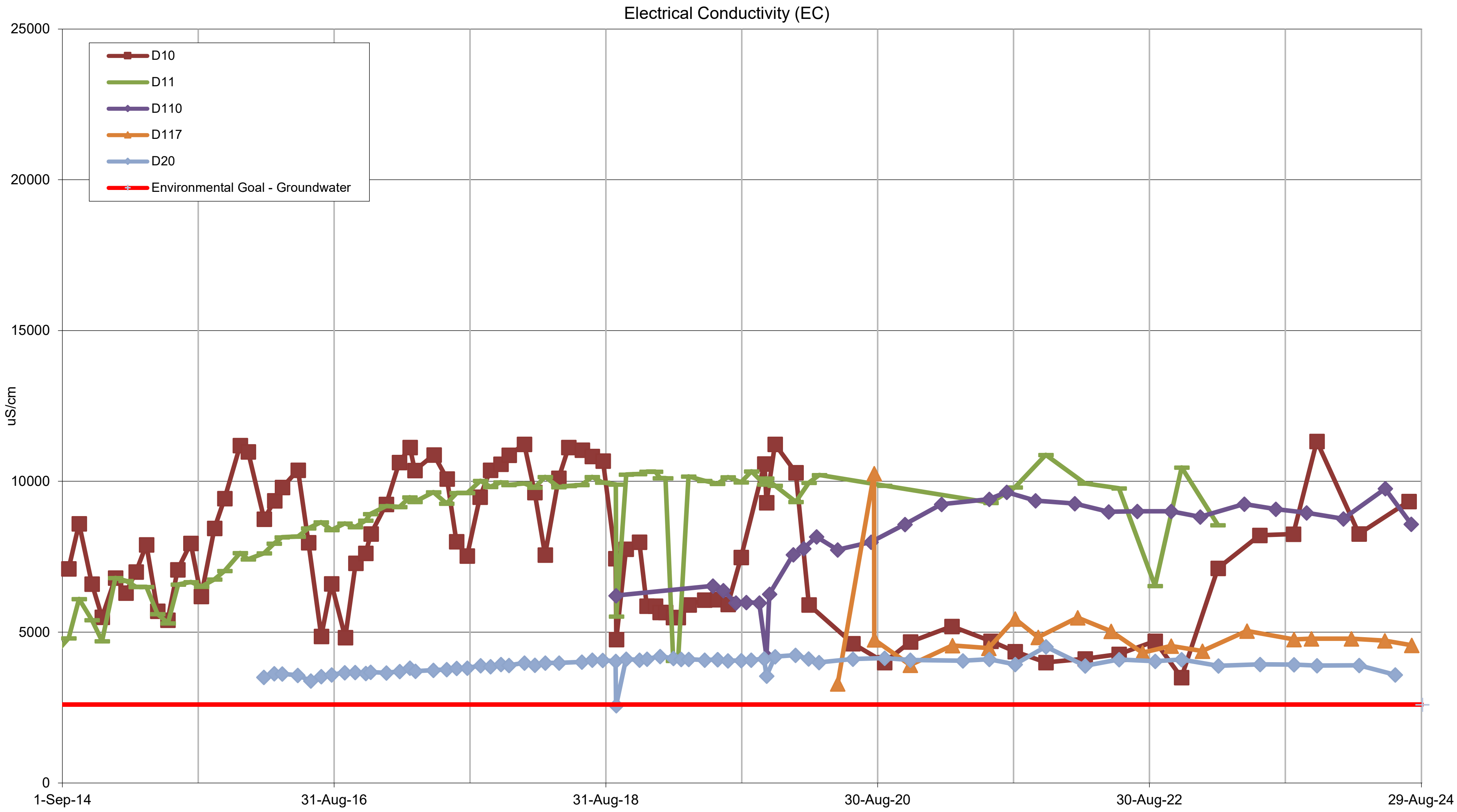

Boron-T
D3
D107
D106
D119
Environmental Goal - Groundwater
µg/L
6000
5000
4000
3000
2000
1000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

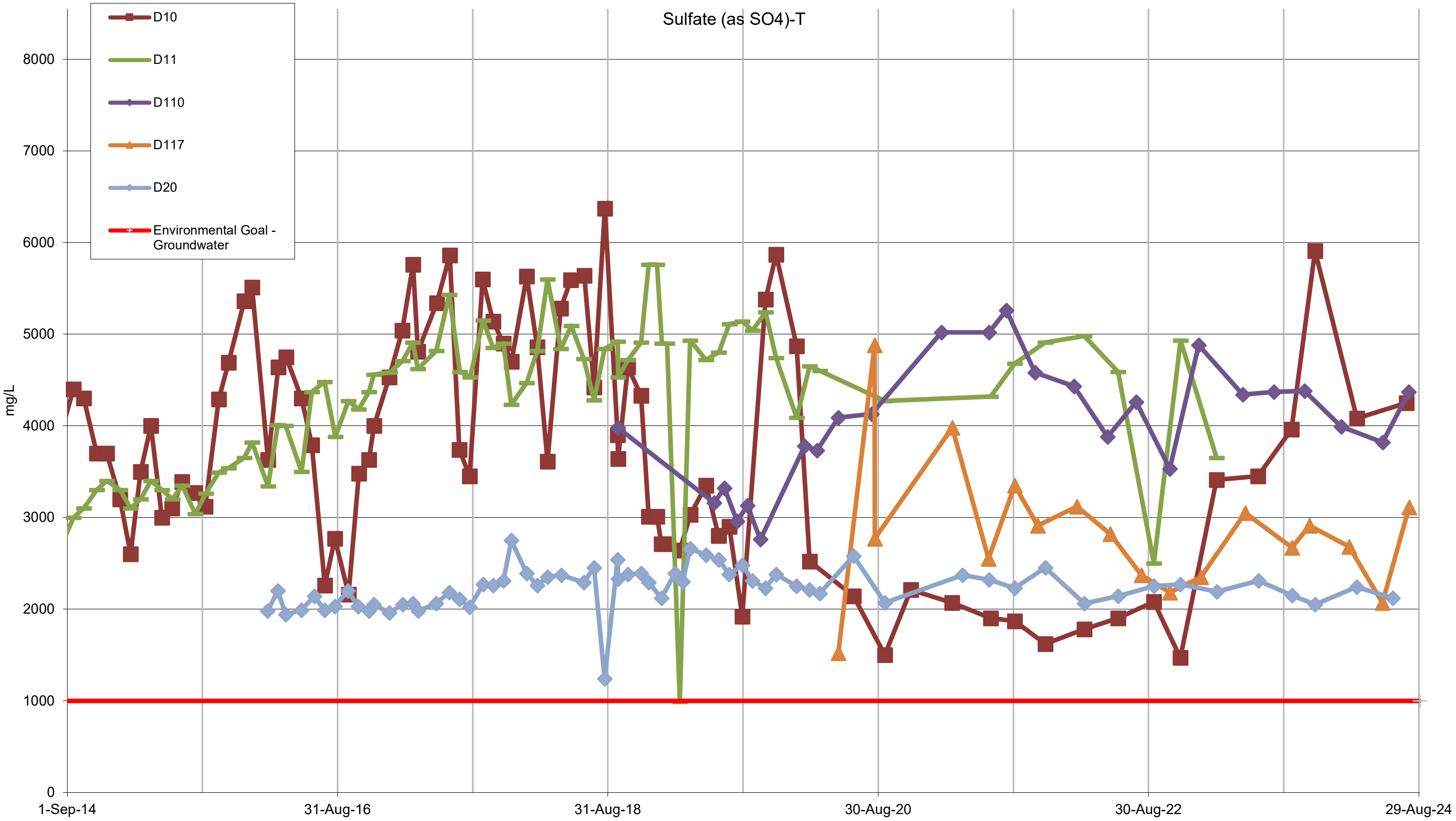

Boron-F
D3
D107
D106
D119
Environmental Goal - Groundwater
µg/L
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

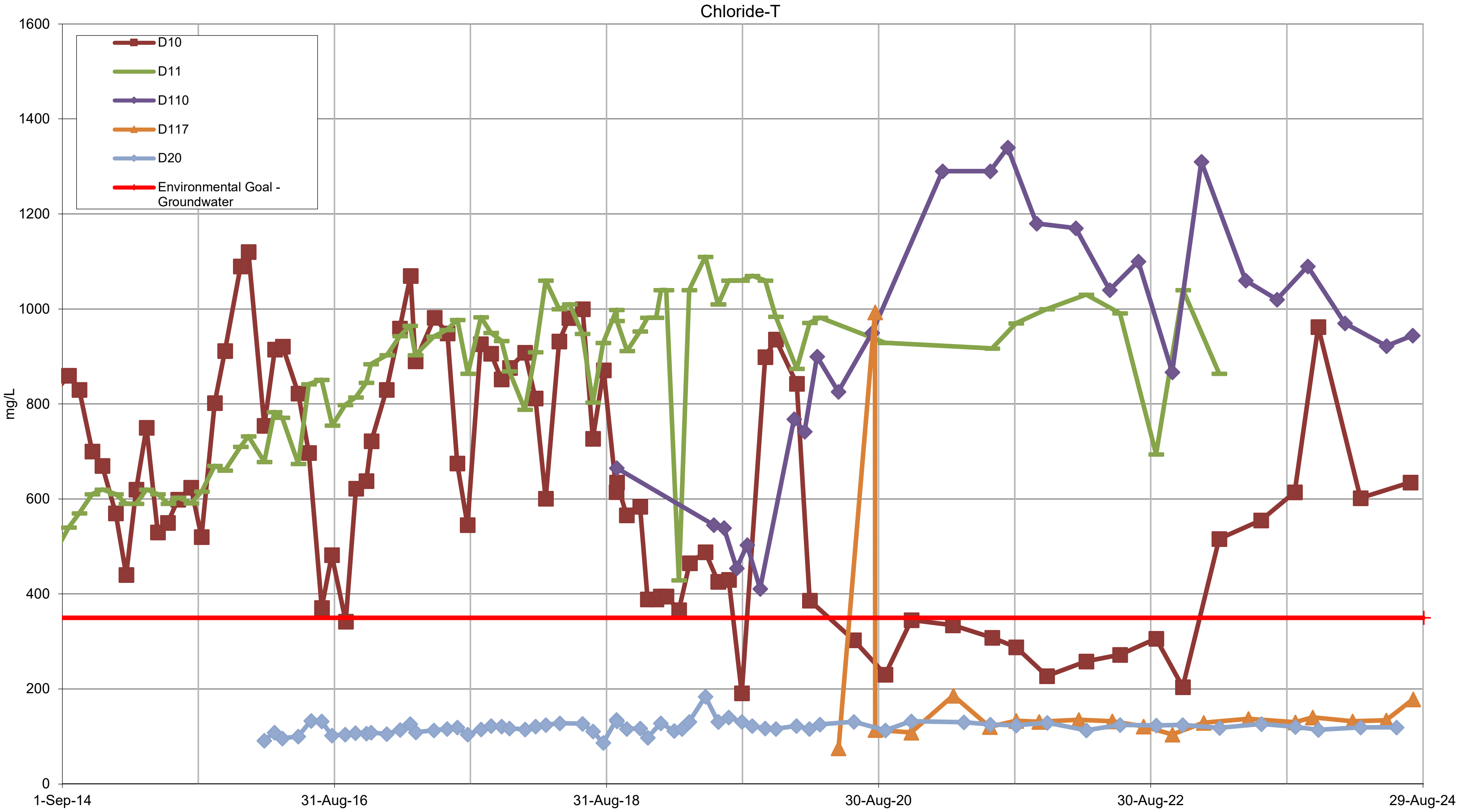

Lead-T
µg/L
120
100
80
60
40
20
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D106
D107
D119
D3
Environmental Goal - Groundwater


Total Dissolved Solids (TDS)-T
D10
D11
D110
D117
D20
Environmental Goal - Groundwater
mg/L
14000
12000
10000
8000
6000
4000
2000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

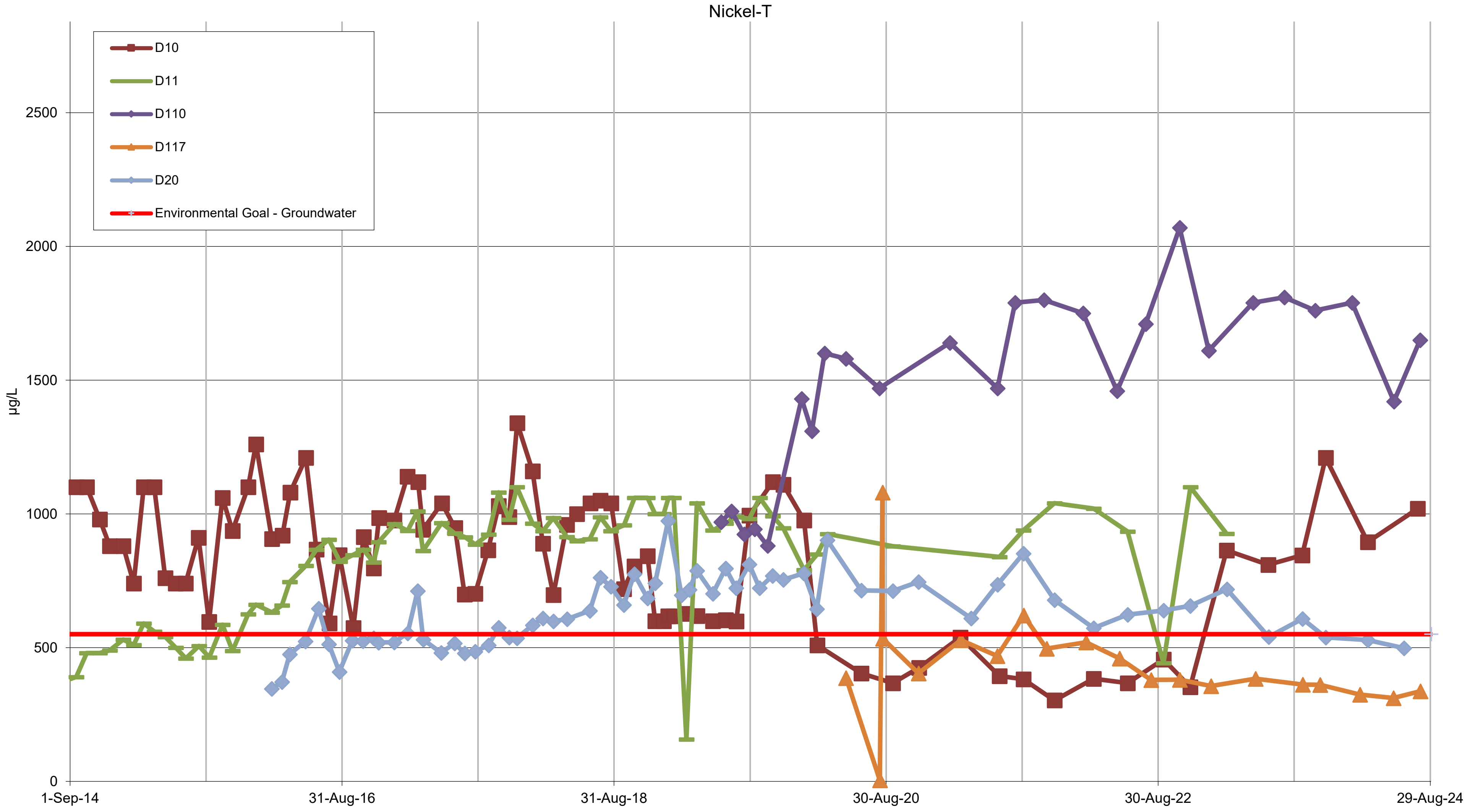
Appendix F. Within / Immediately Adjacent LNAR North - EC Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908

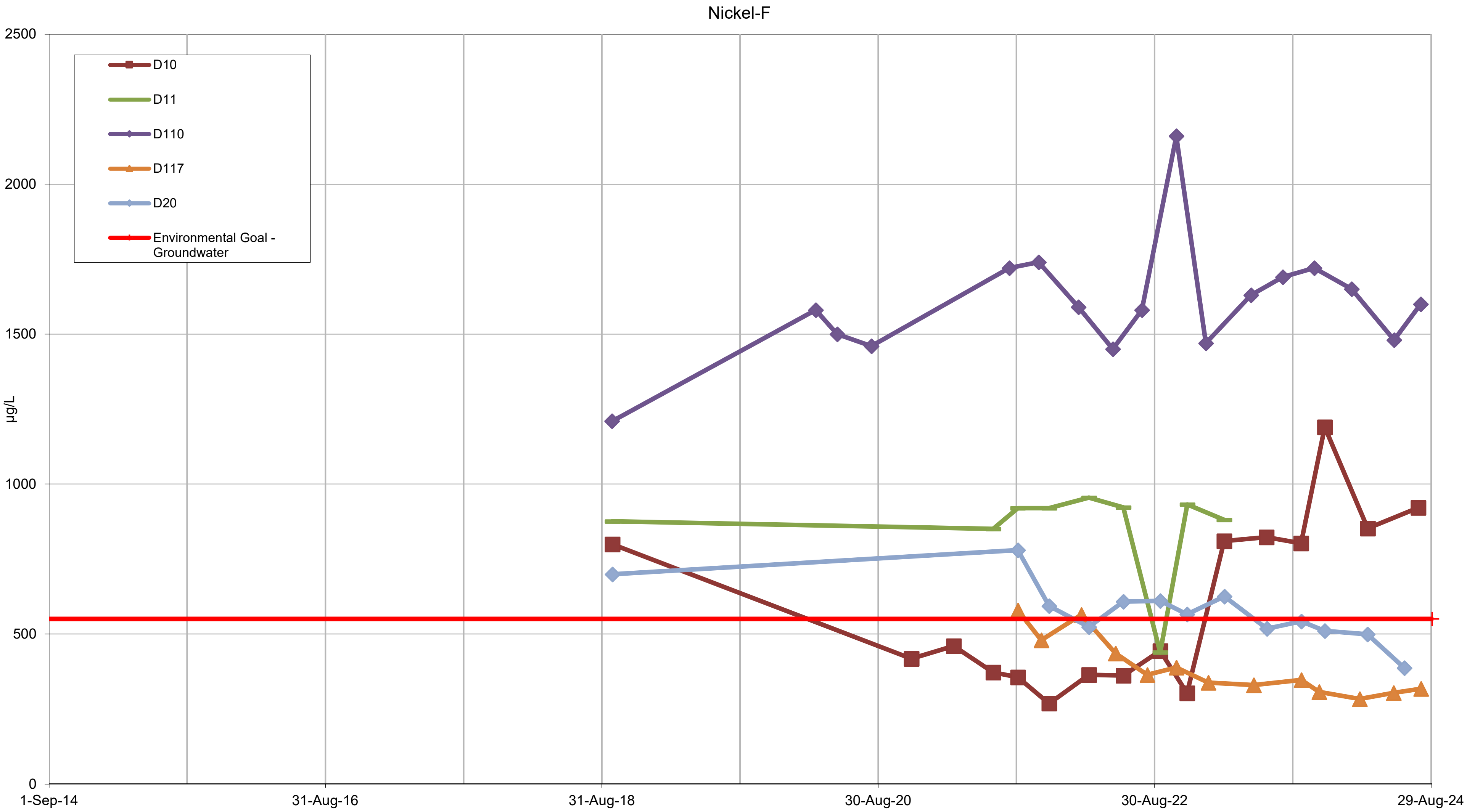



Sulfate (as SO4)-T
D10
D11
D110
D117
D20
Environmental Goal - Groundwater
mg/L
8000
7000
6000
5000
4000
3000
2000
1000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

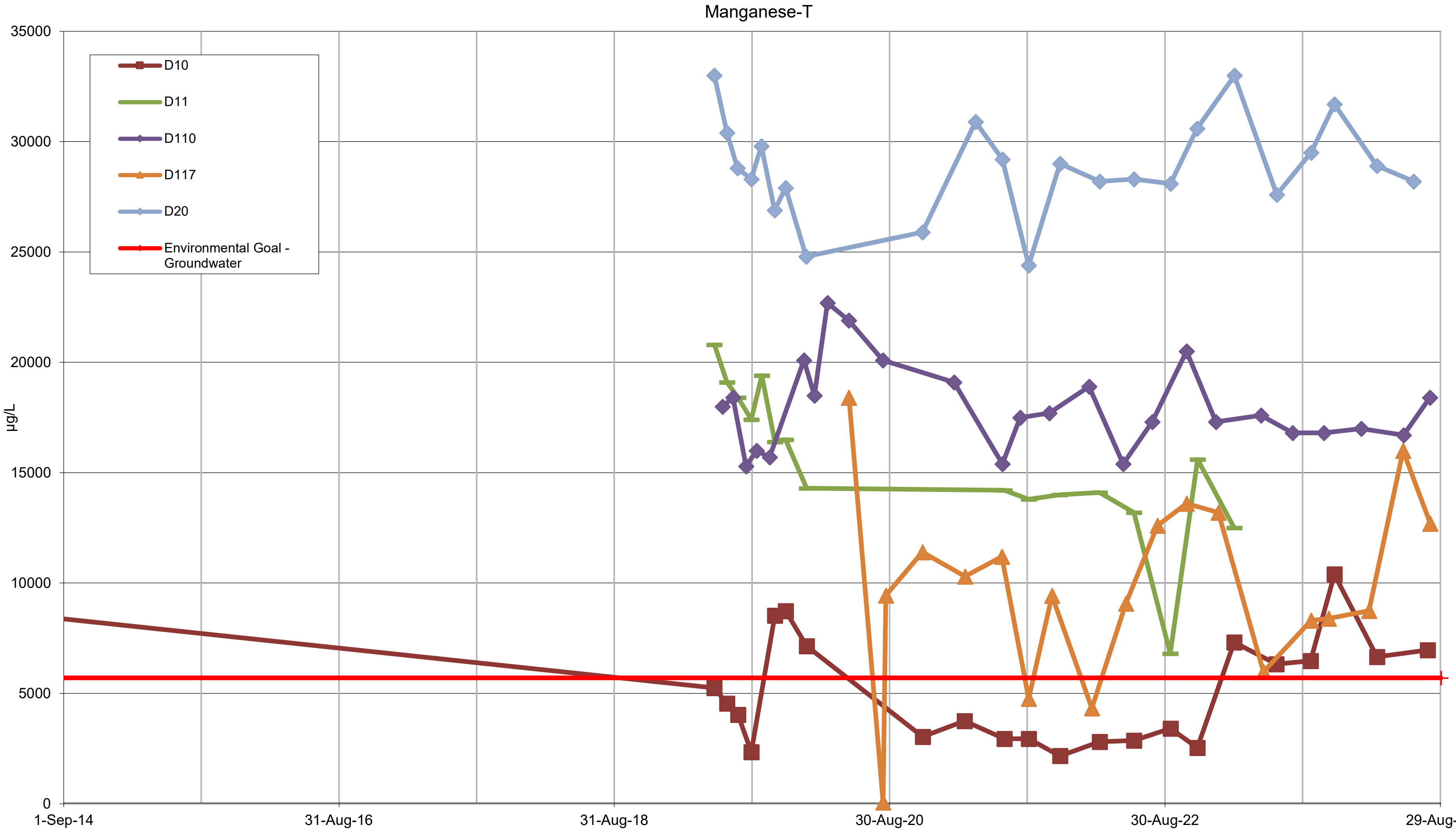

Chloride-T
mg/L
1600
1400
1200
1000
800
600
400
200
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D10
D11
D110
D117
D20
Environmental Goal - Groundwater

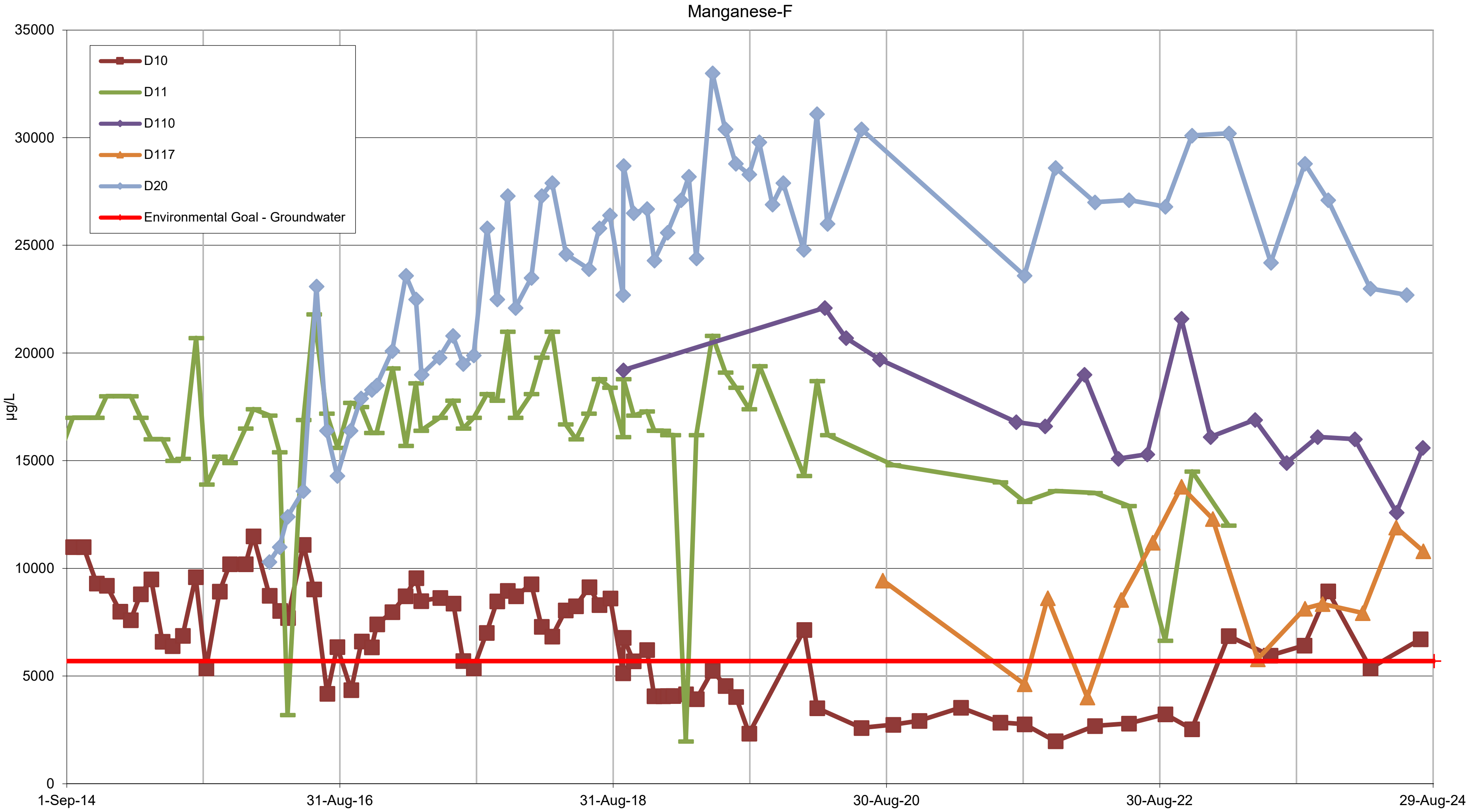
Appendix F. Within / Immediately Adjacent LNAR North - Nickel (Total) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908

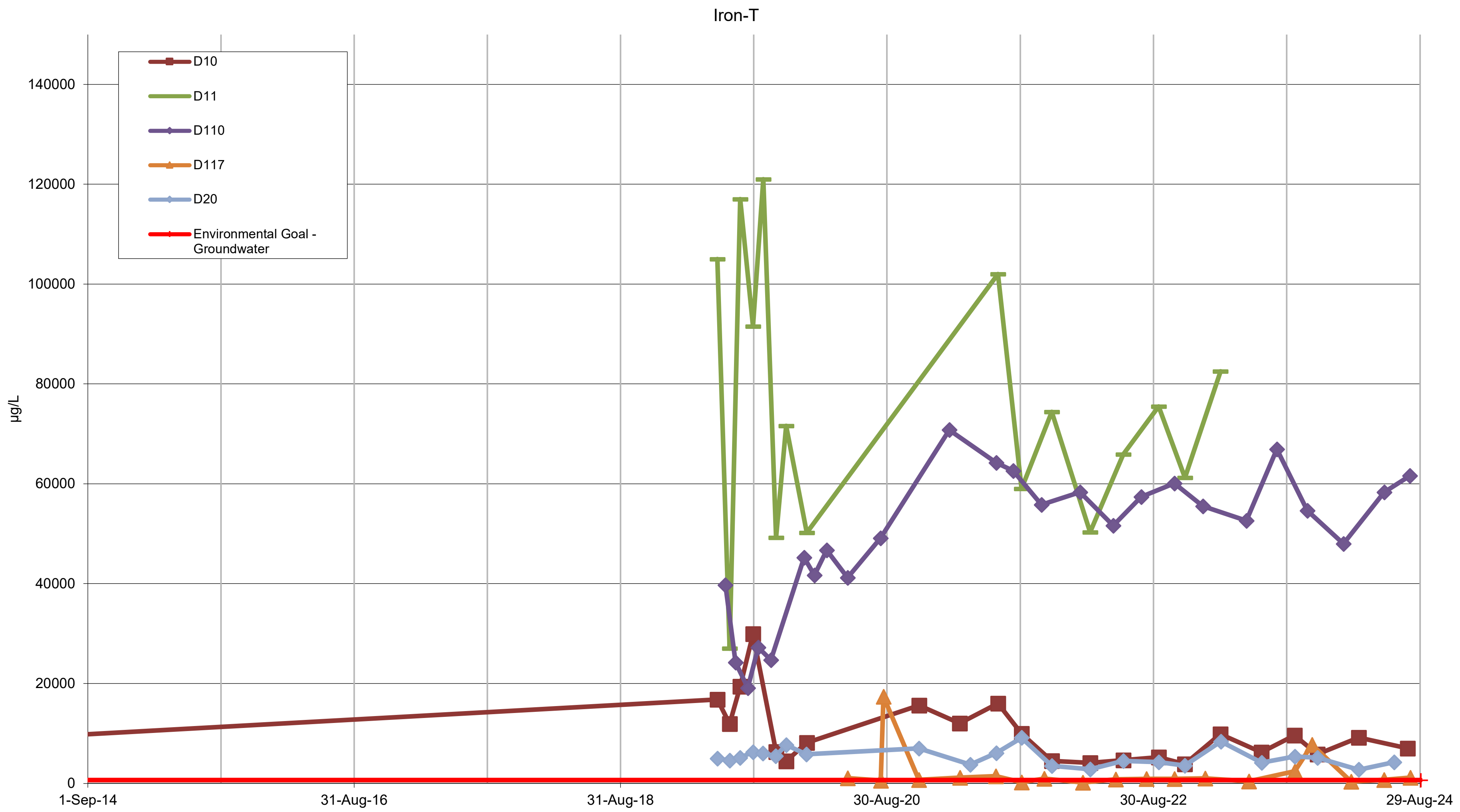



Nickel-F
µg/L
2500
2000
1500
1000
500
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D10
D11
D110
D117
D20
Environmental Goal - Groundwater

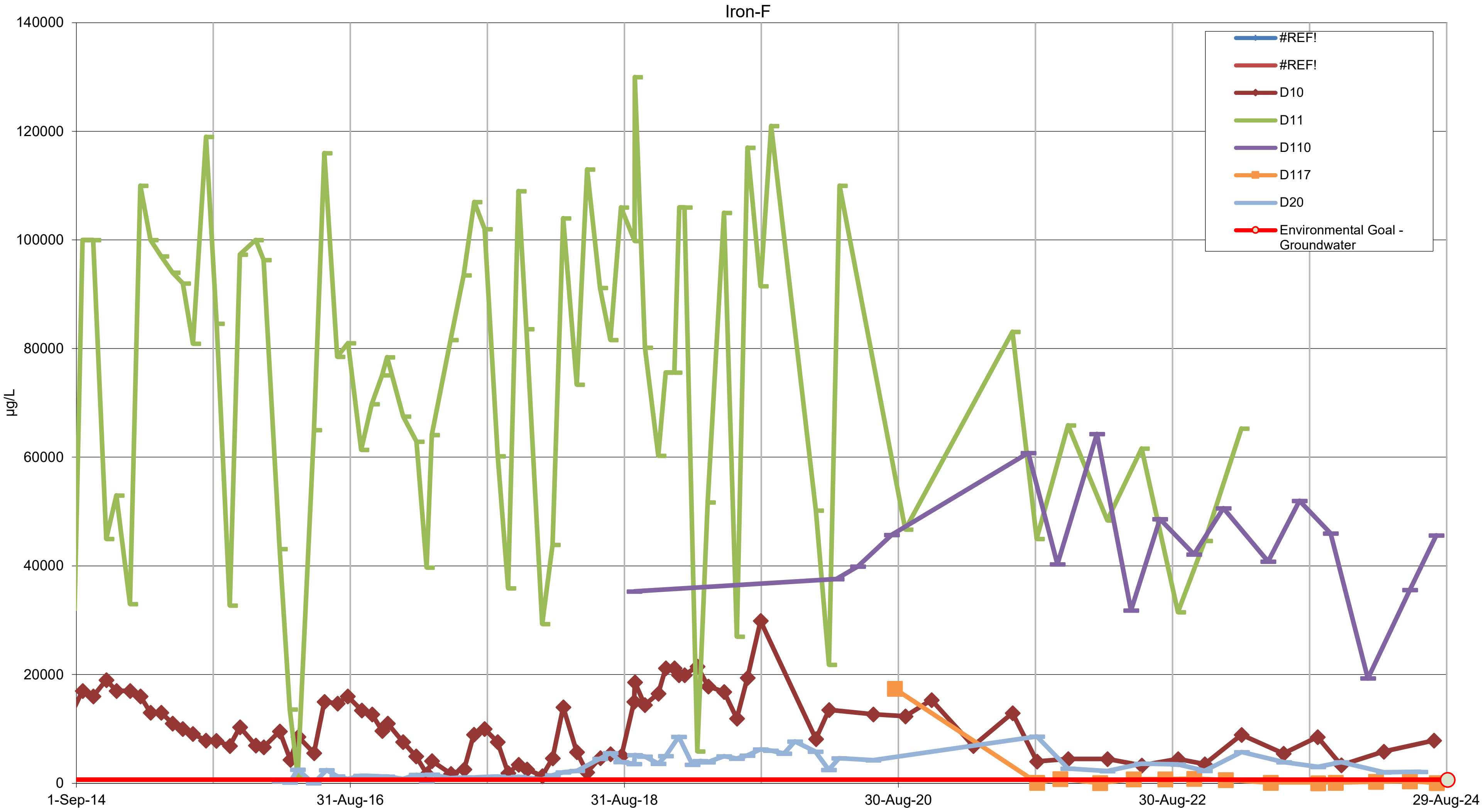
Appendix F. Within / Immediately Adjacent LNAR North - Manganese (Total) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908

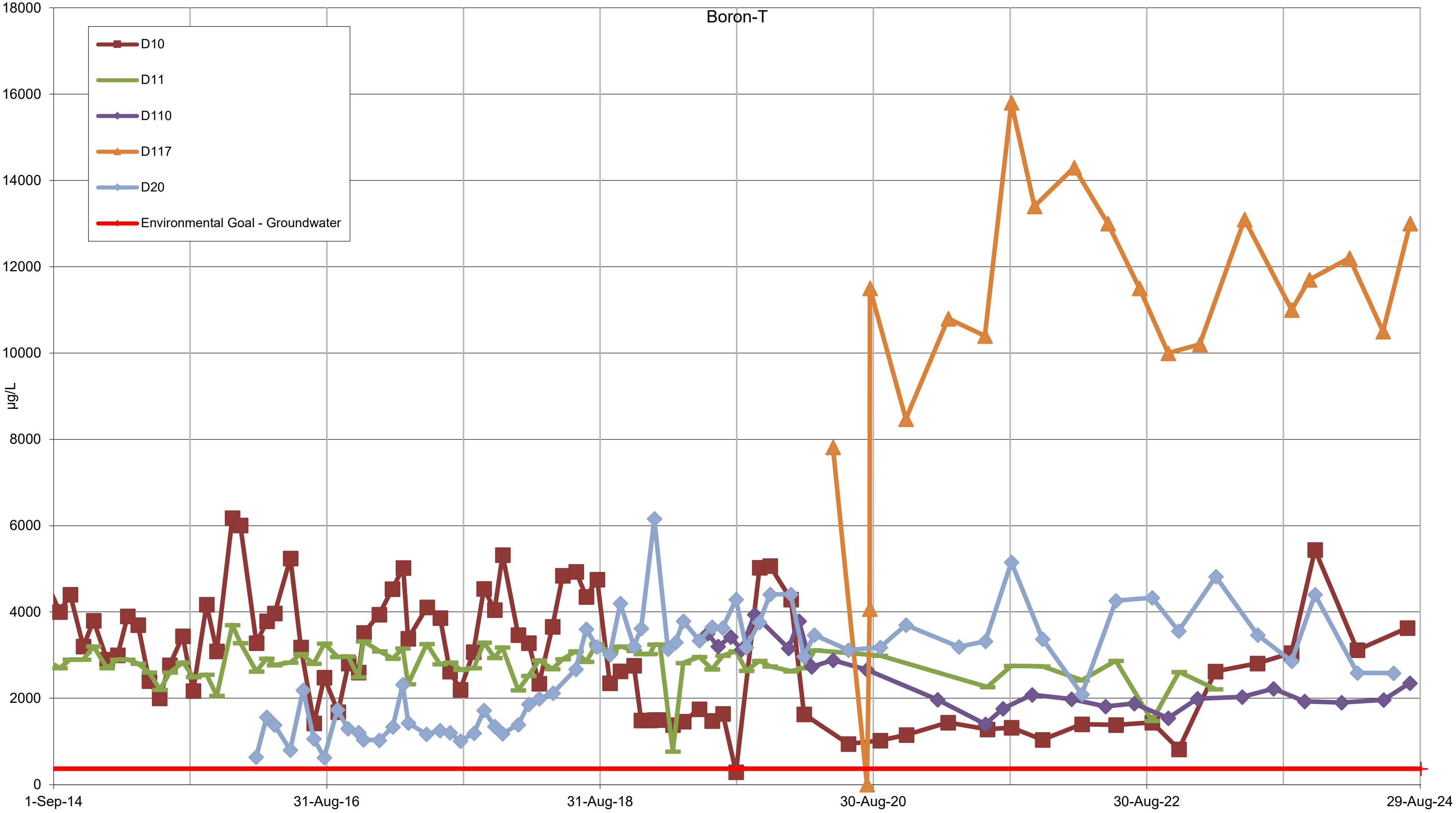


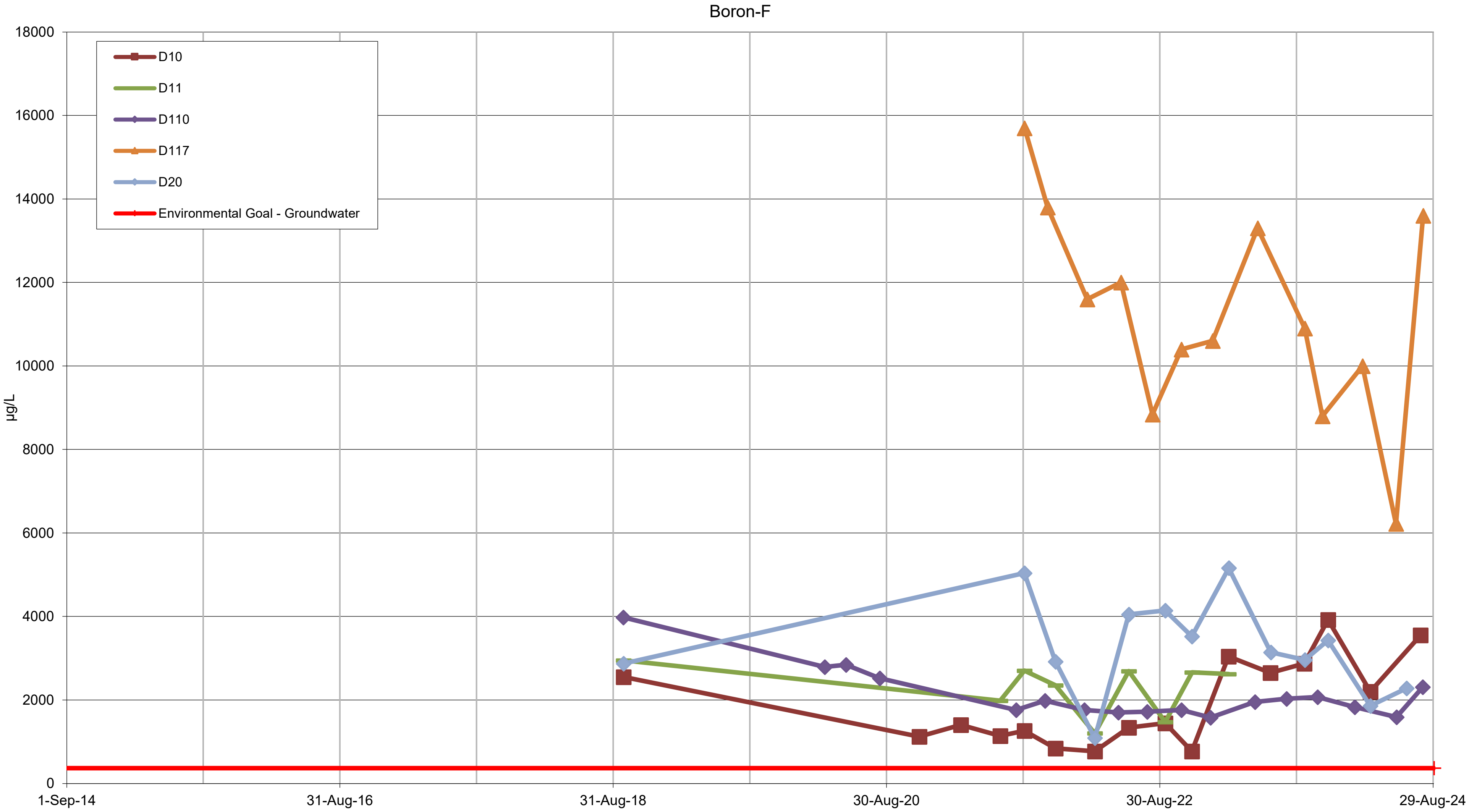

Manganese-F
µg/L
35000
30000
25000
20000
15000
10000
5000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D10
D11
D110
D117
D20
Environmental Goal - Groundwater

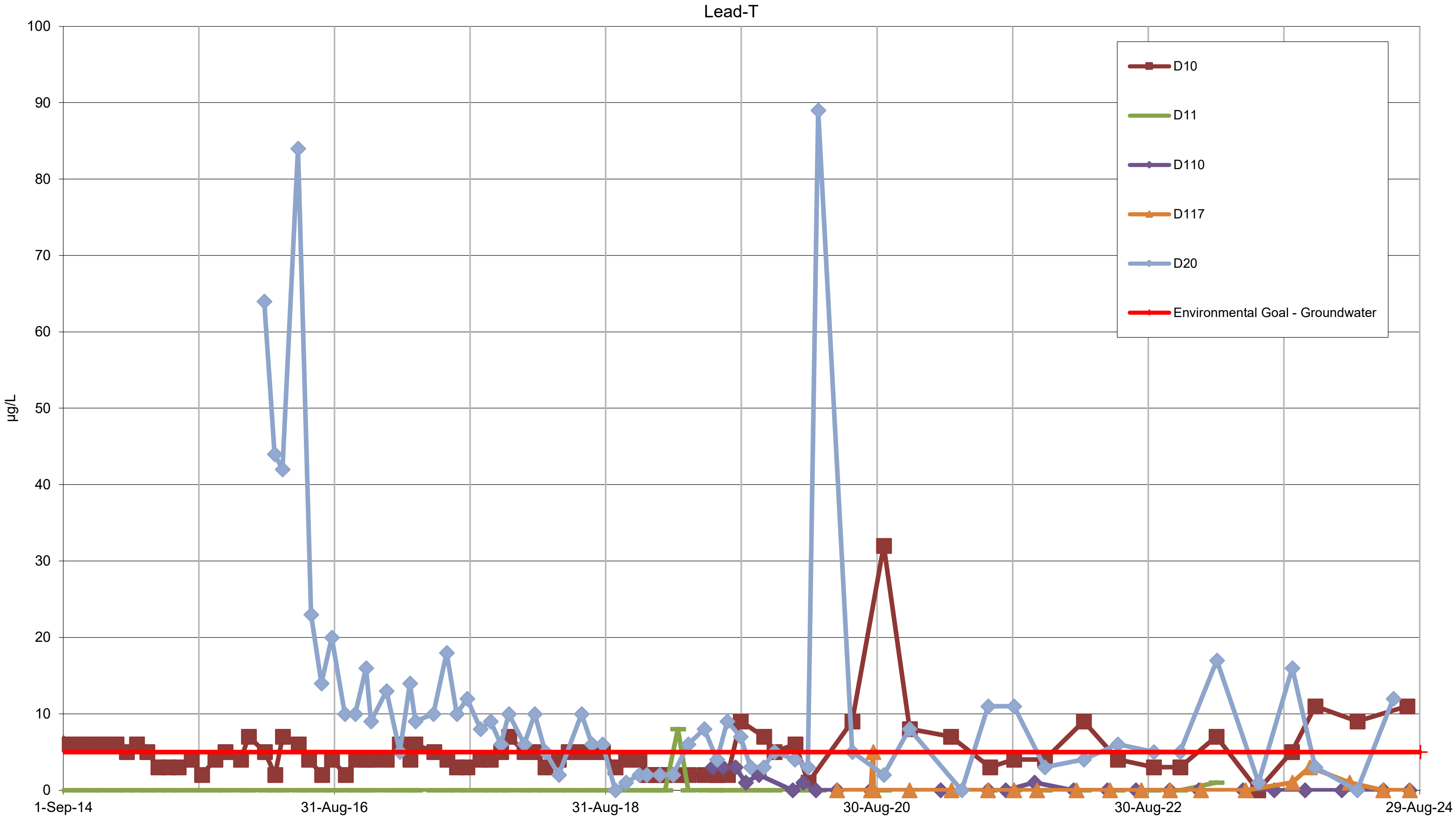

Iron-T
D10
D11
D110
D117
D20
Environmental Goal - Groundwater
µg/L
140000
120000
100000
80000
60000
40000
20000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

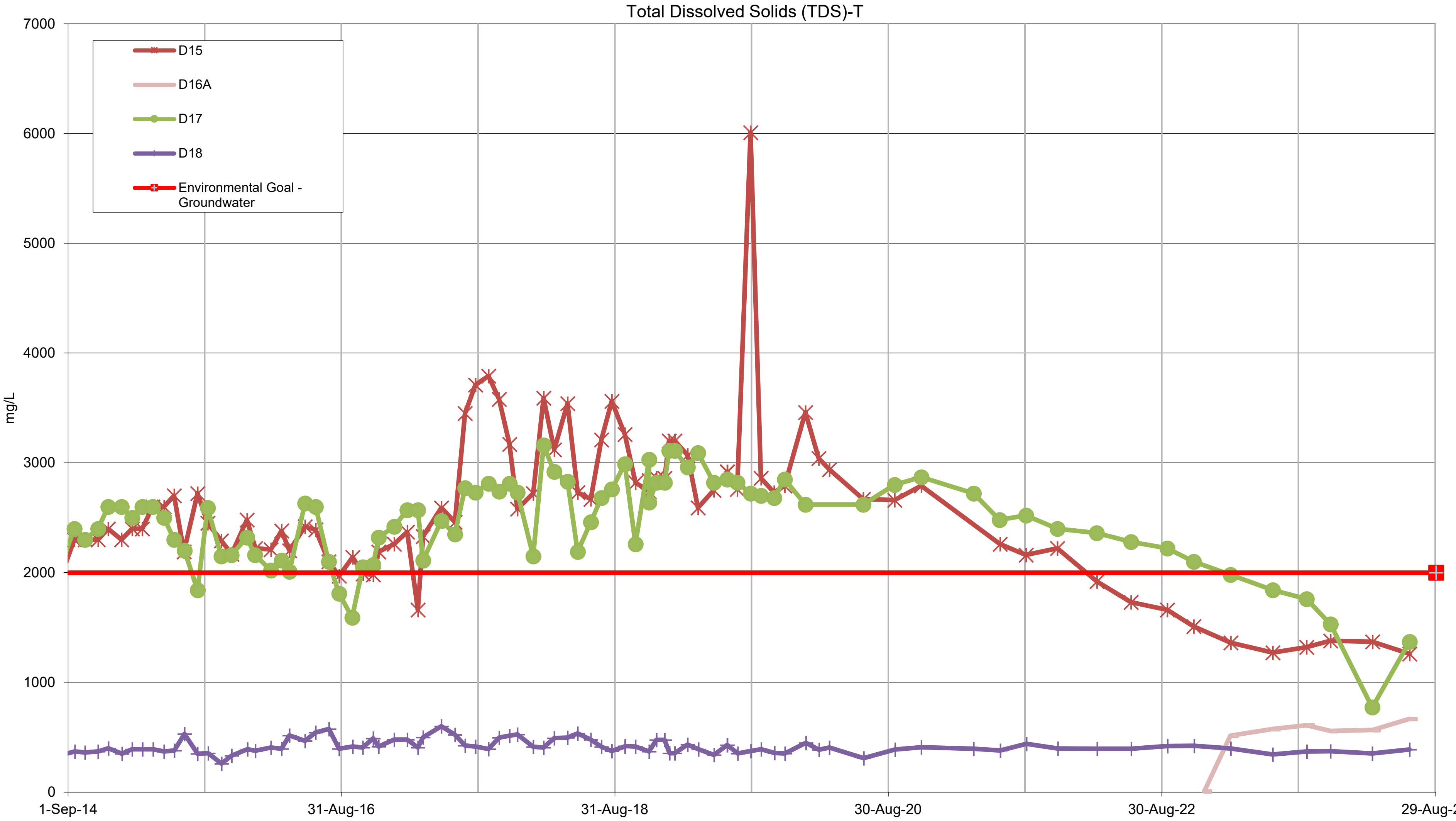
Appendix F. Within / Immediately Adjacent LNAR North - Iron (Filtered) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908

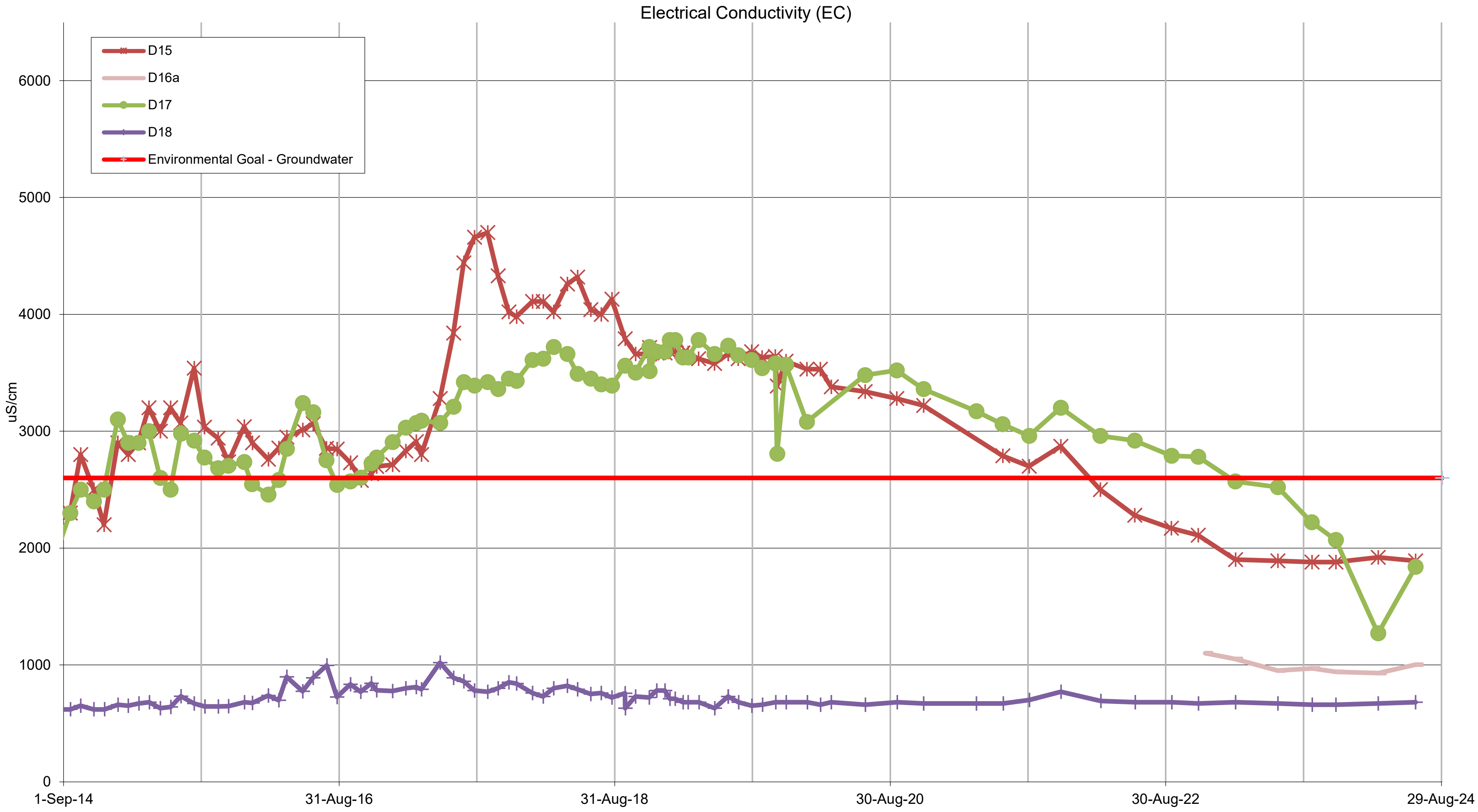



Boron-T
µg/L
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D10
D11
D110
D117
D20
Environmental Goal - Groundwater

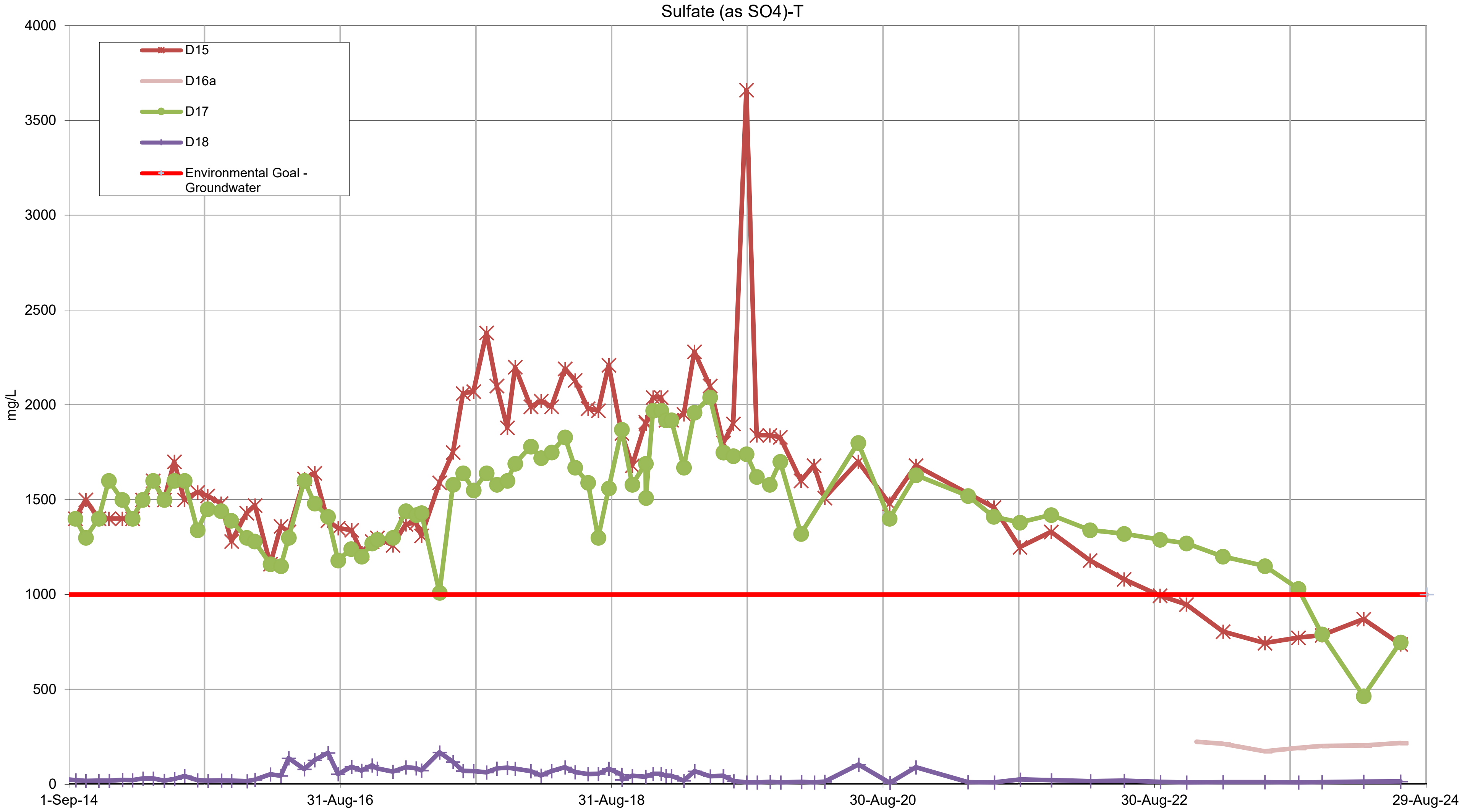

Boron-F
D10
D11
D110
D117
D20
Environmental Goal - Groundwater
µg/L
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24


Lead-T
µg/L
100
90
80
70
60
50
40
30
20
10
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D10
D11
D110
D117
D20
Environmental Goal - Groundwater

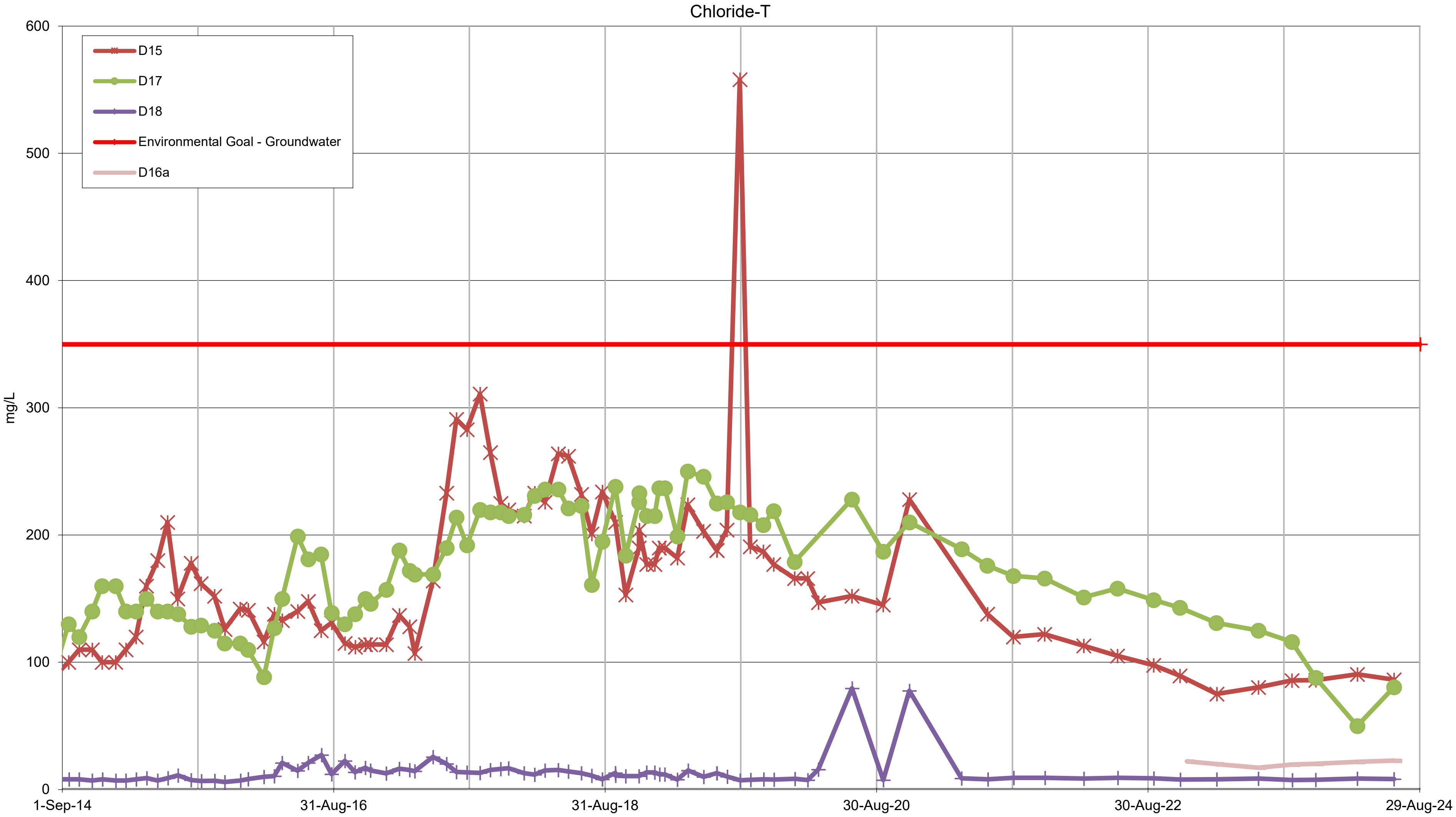

Total Dissolved Solids (TDS)-T
mg/L
7000
6000
5000
4000
3000
2000
1000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D15
D16A
D17
D18
Environmental Goal - Groundwater


Electrical Conductivity (EC)
D15
D16a
D17
D18
Environmental Goal - Groundwater
uS/cm
6000
5000
4000
3000
2000
1000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

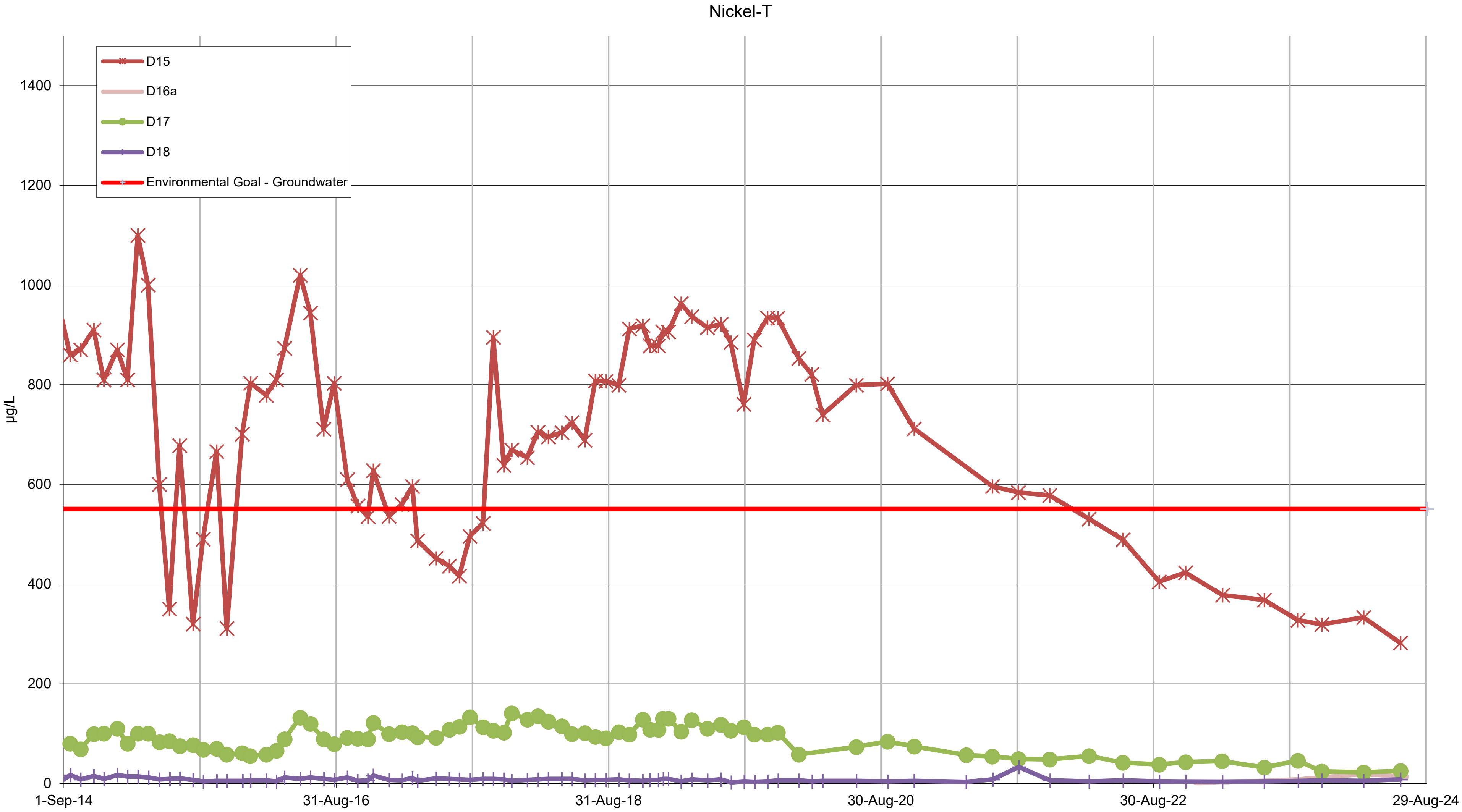
Appendix F. Within / Immediately Adjacent LNAR South - Sulfate (as SO4) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908

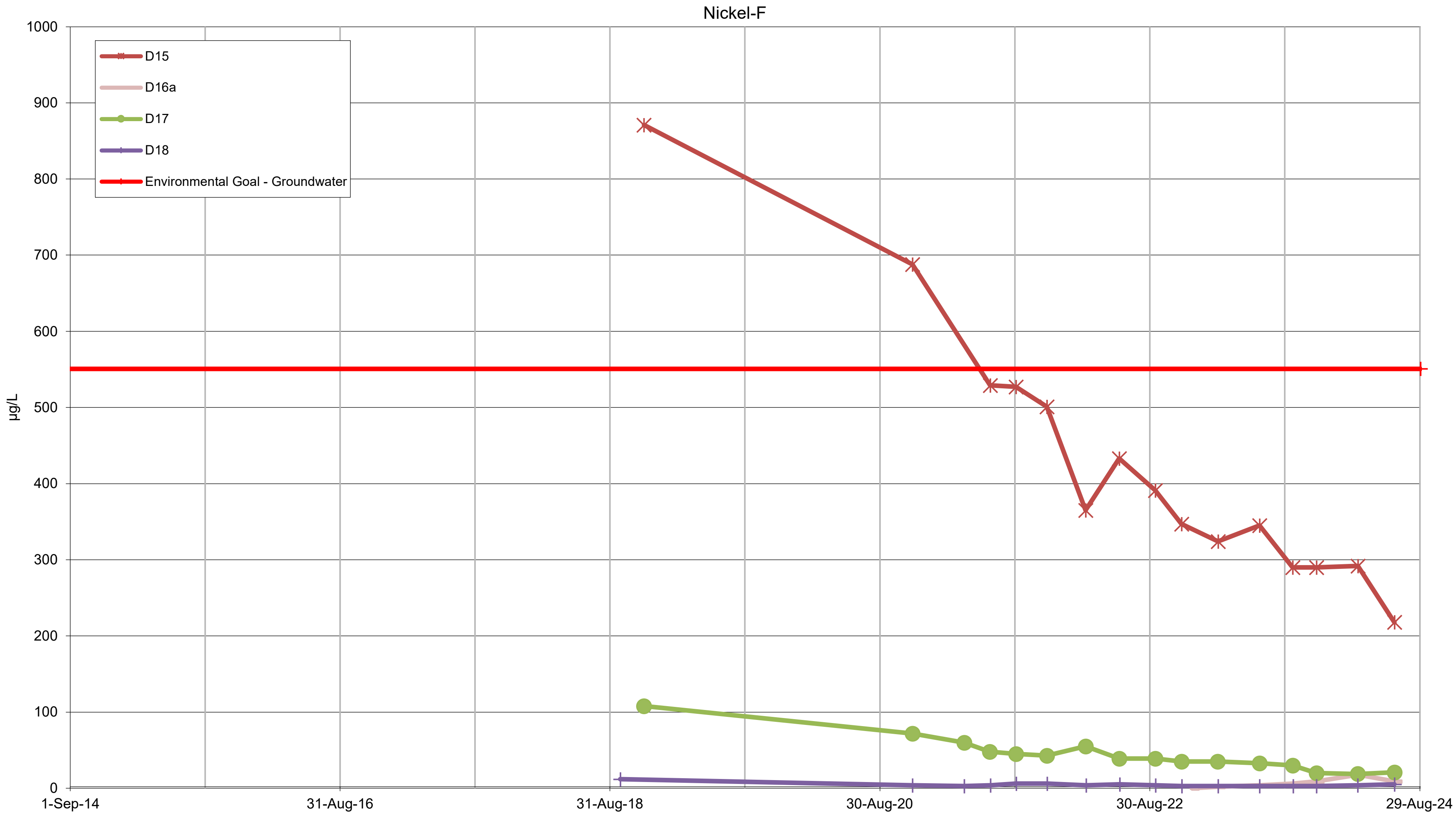


Appendix F. Within / Immediately Adjacent LNAR South - Chloride (Total) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908

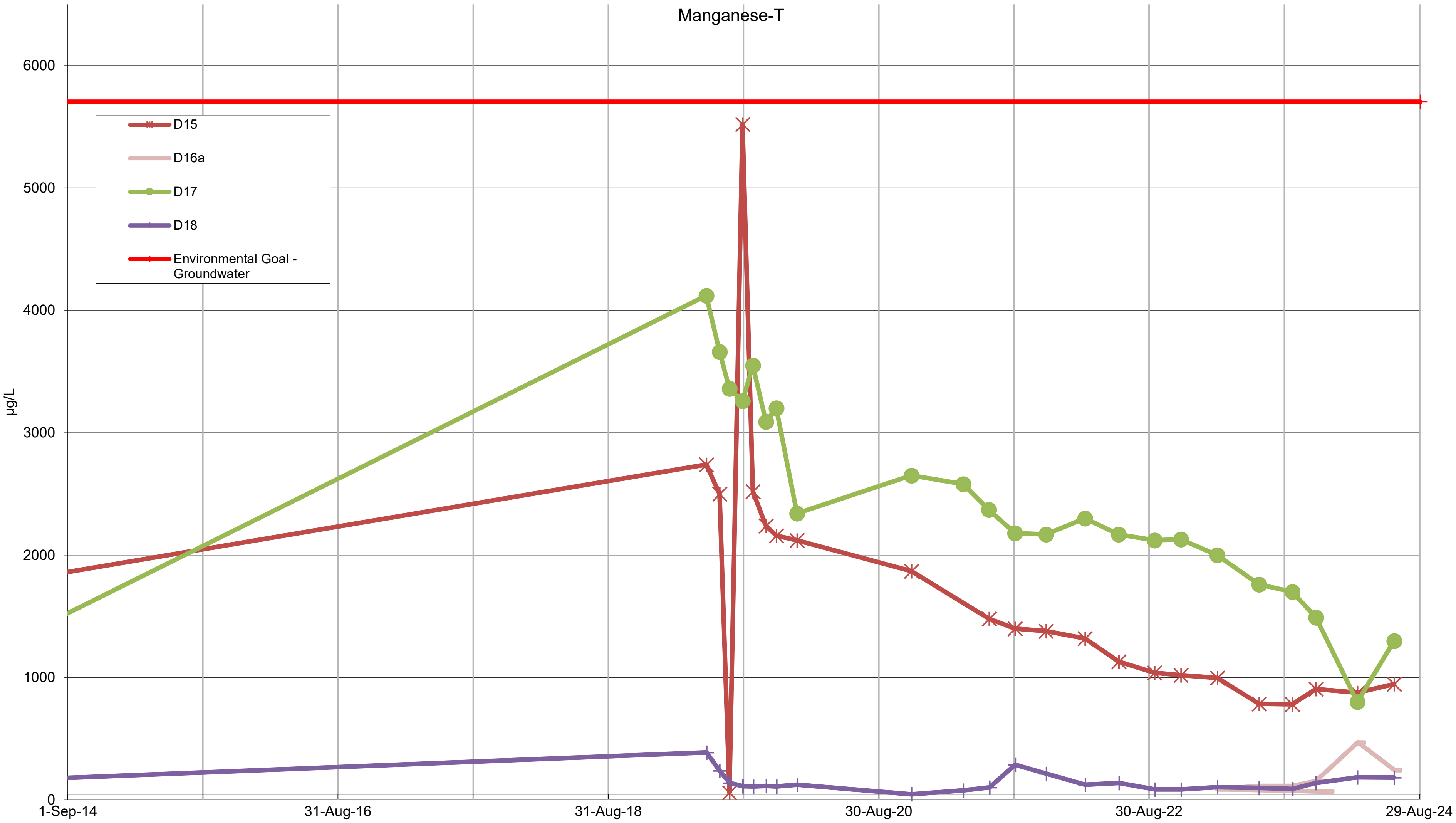


Appendix F. Within / Immediately Adjacent LNAR South - Nickel (Total) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908

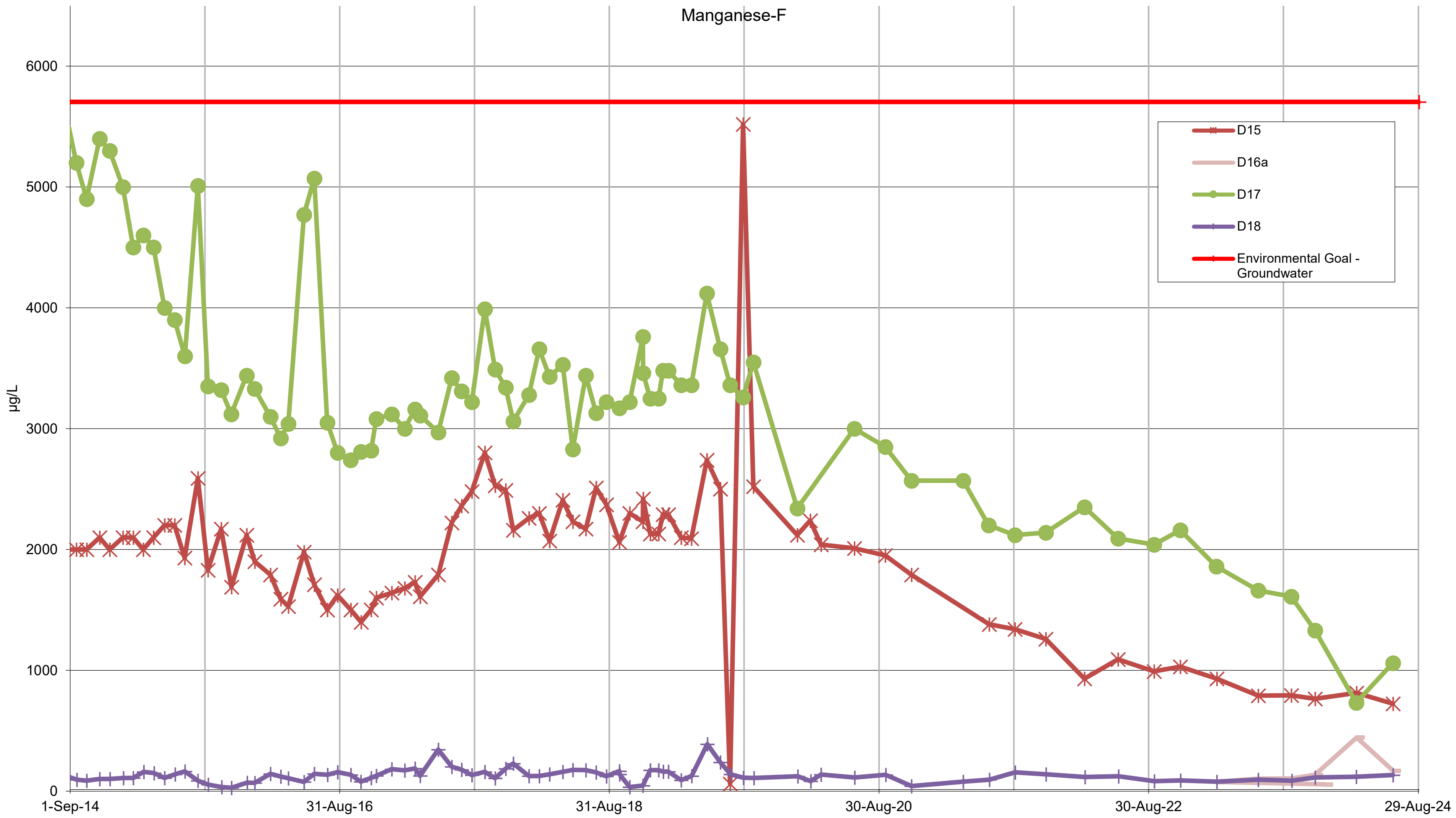


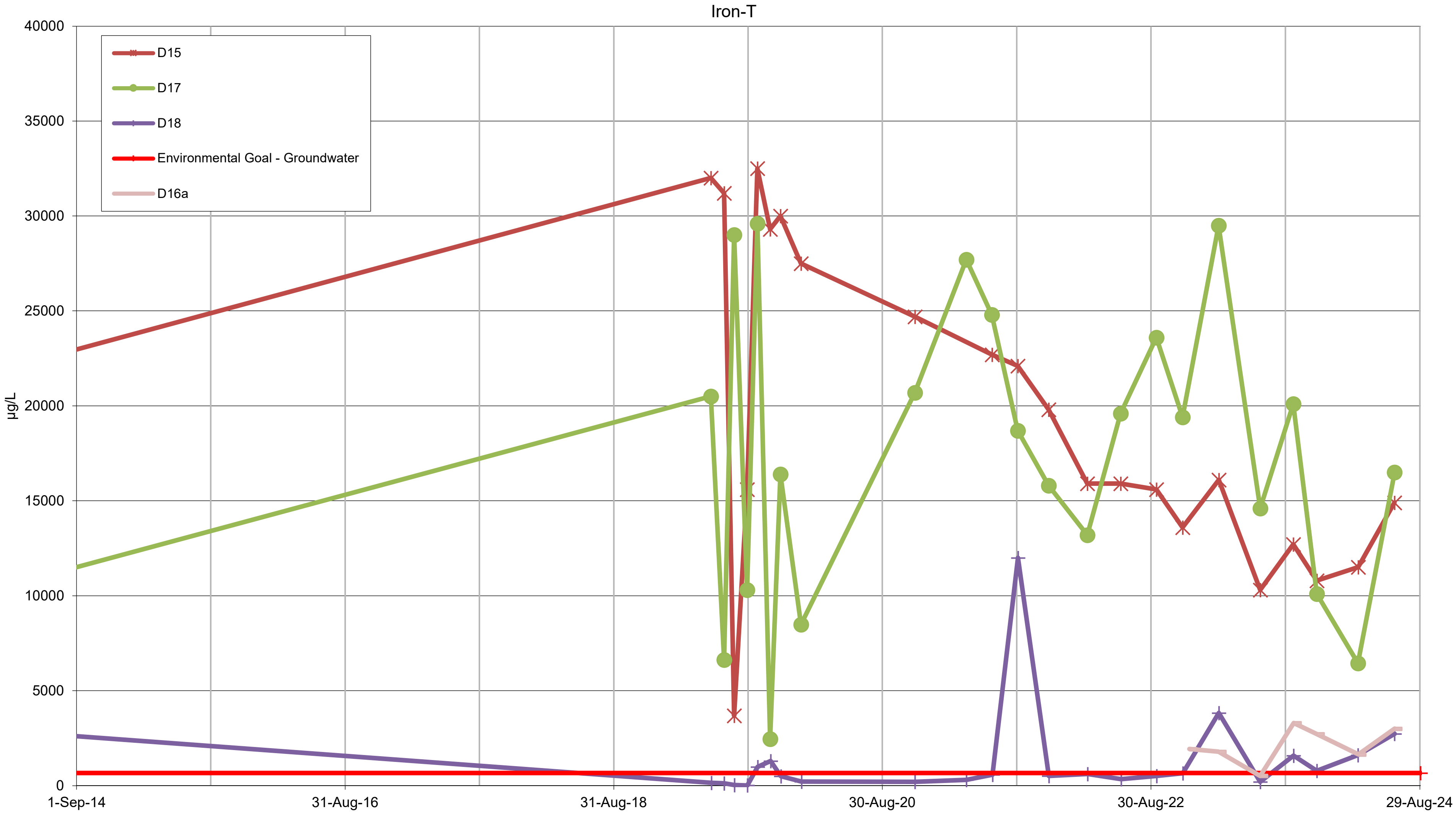

Nickel-F
µg/L
1000
900
800
700
600
500
400
300
200
100
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D15
D16a
D17
D18
Environmental Goal - Groundwater

Appendix F. Within / Immediately Adjacent LNAR South - Manganese (Total) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908

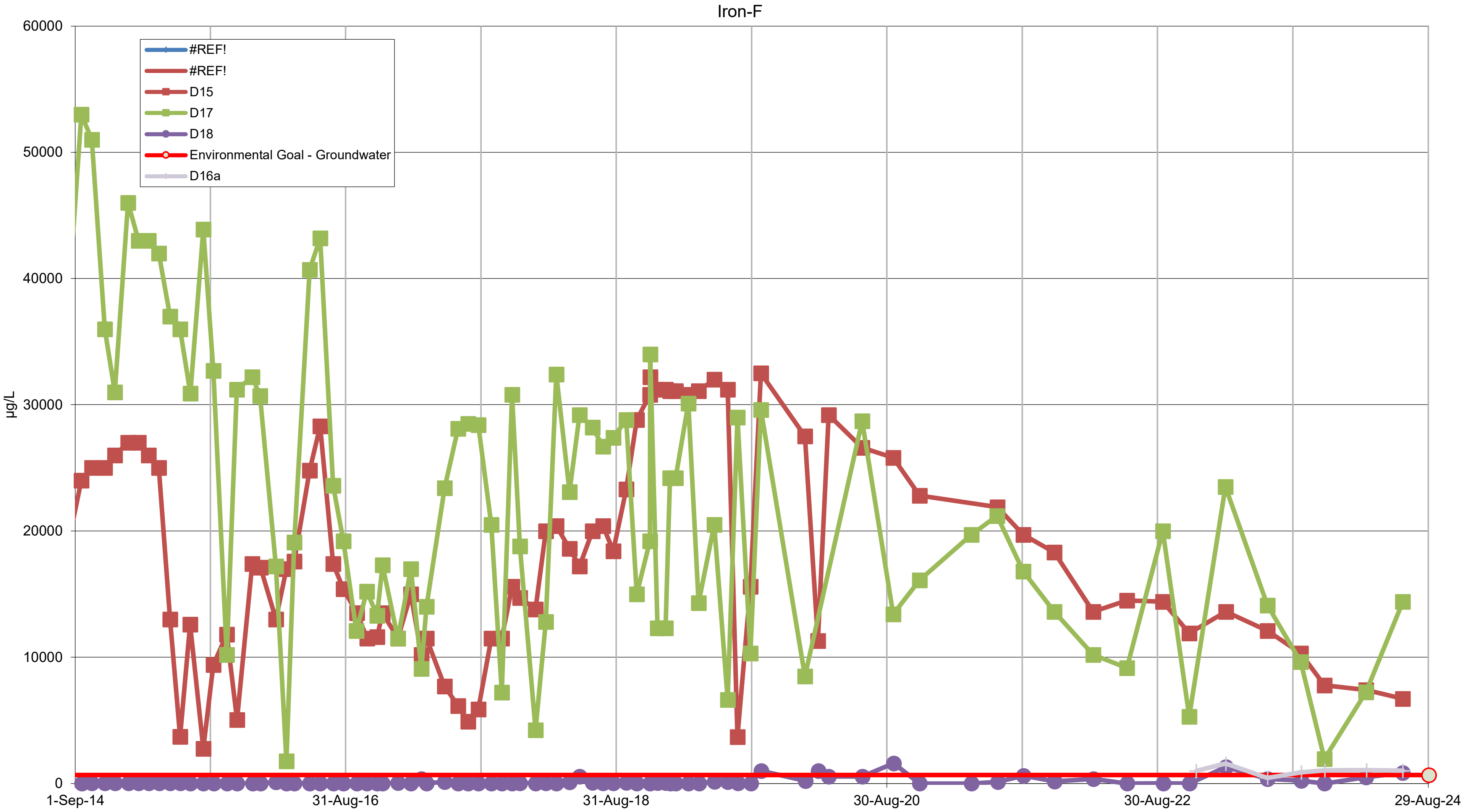


Appendix F. Within / Immediately Adjacent LNAR South - Manganese (Filtered) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908



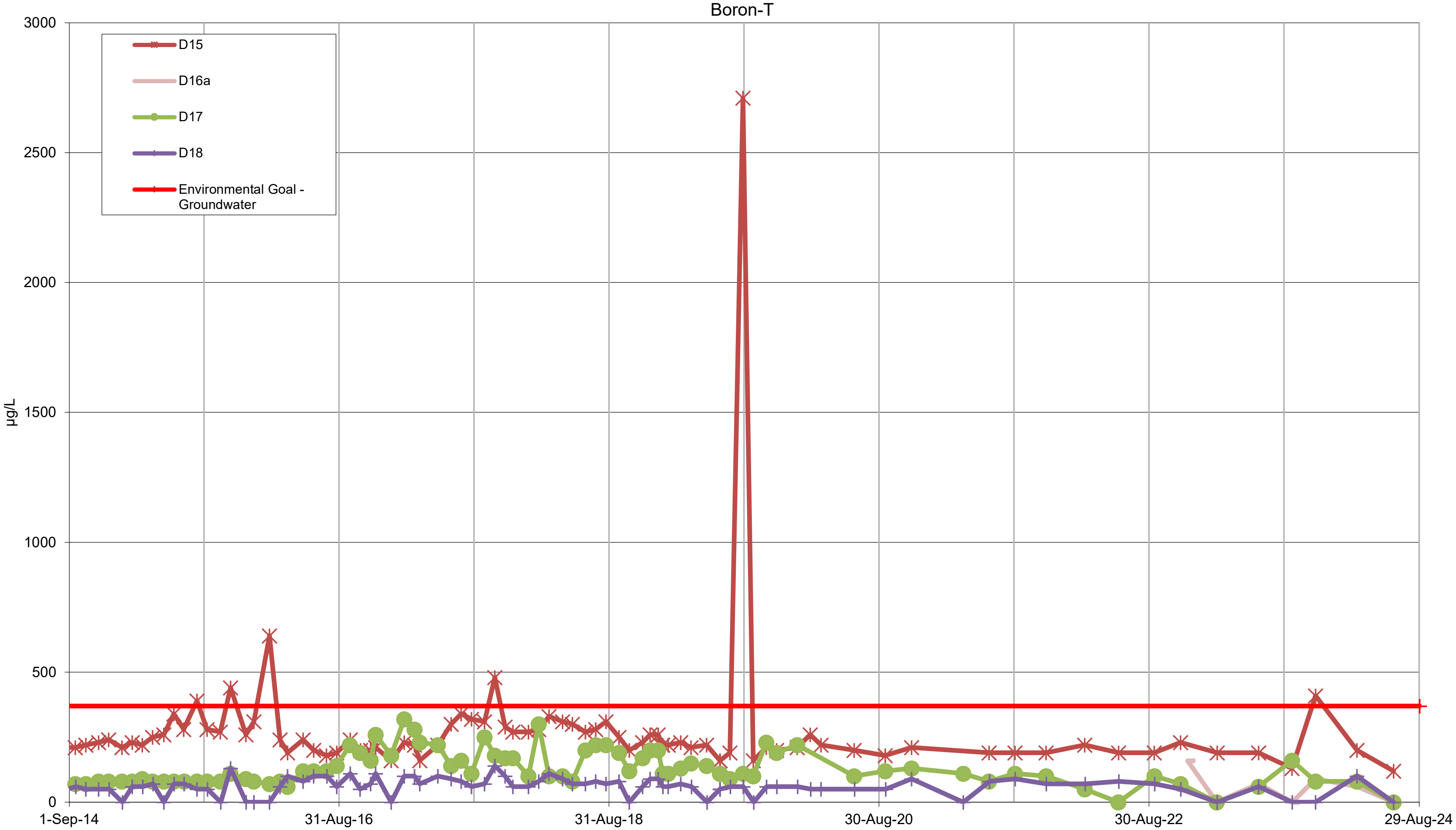

Iron-T
D15
D17
D18
Environmental Goal - Groundwater
D16a
µg/L
40000
35000
30000
25000
20000
15000
10000
5000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

Appendix F. Within / Immediately Adjacent LNAR South - Iron (Filtered) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908

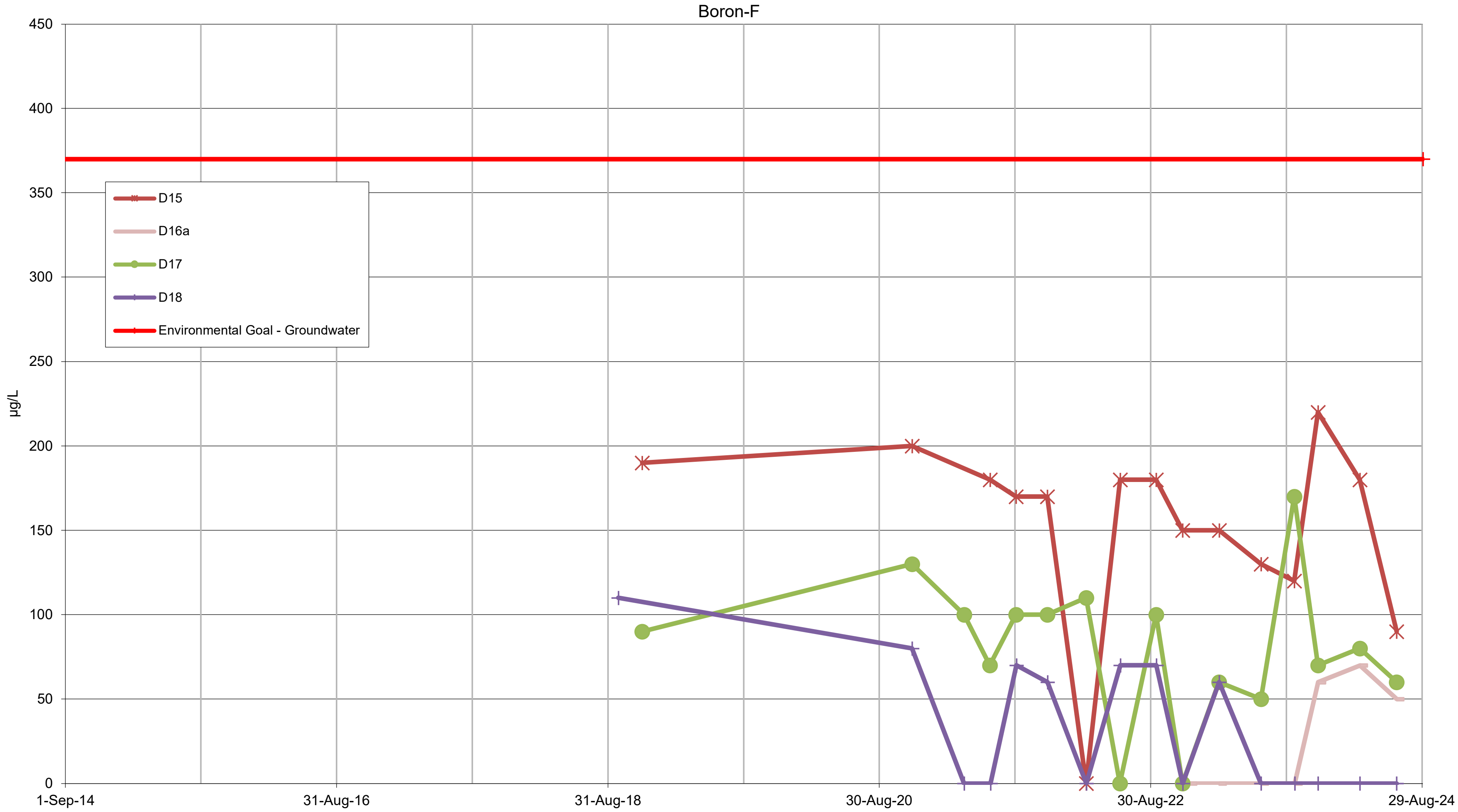


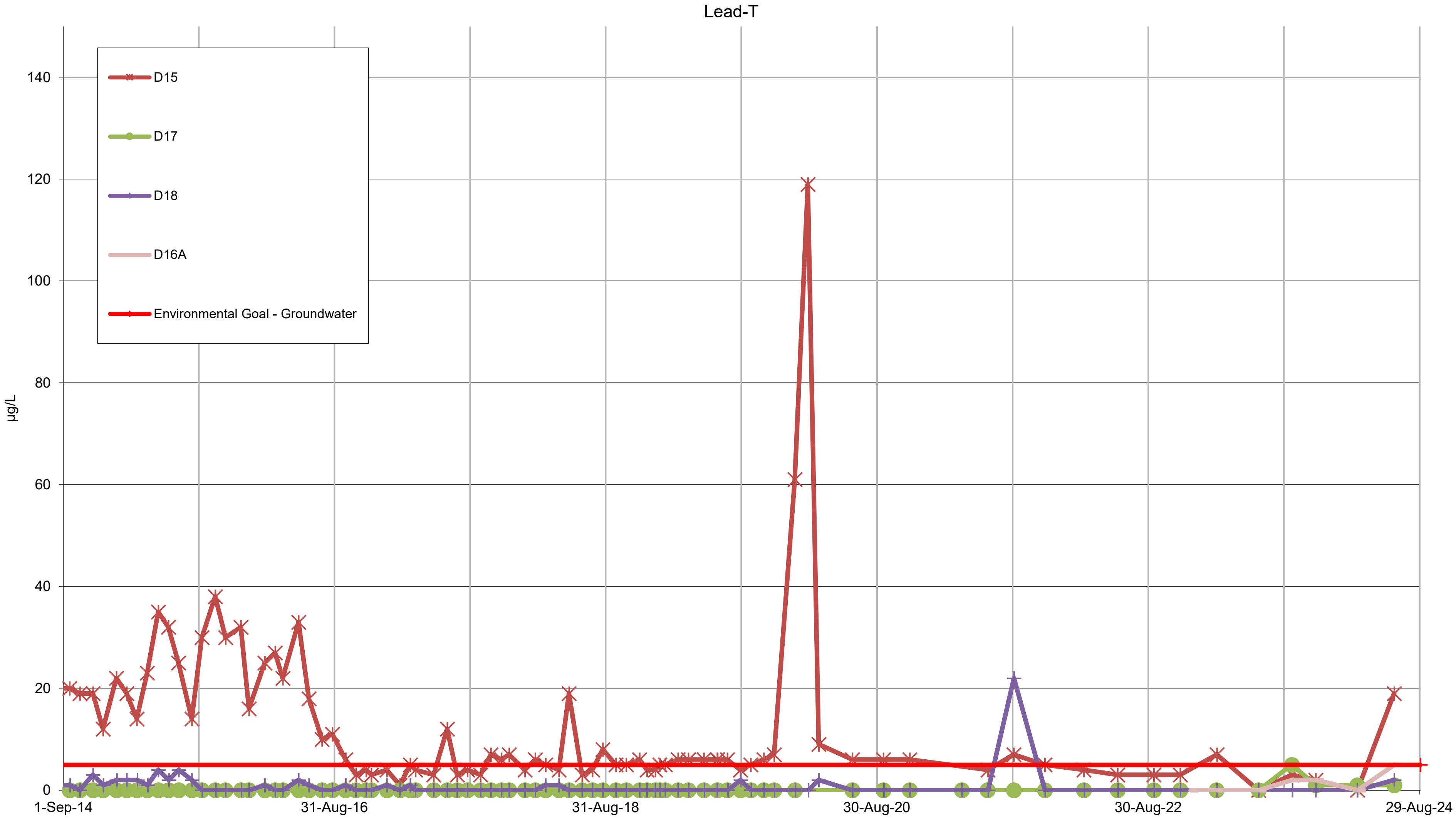
ERM

Appendix F. Within / Immediately Adjacent LNAR South - Boron (Total) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908

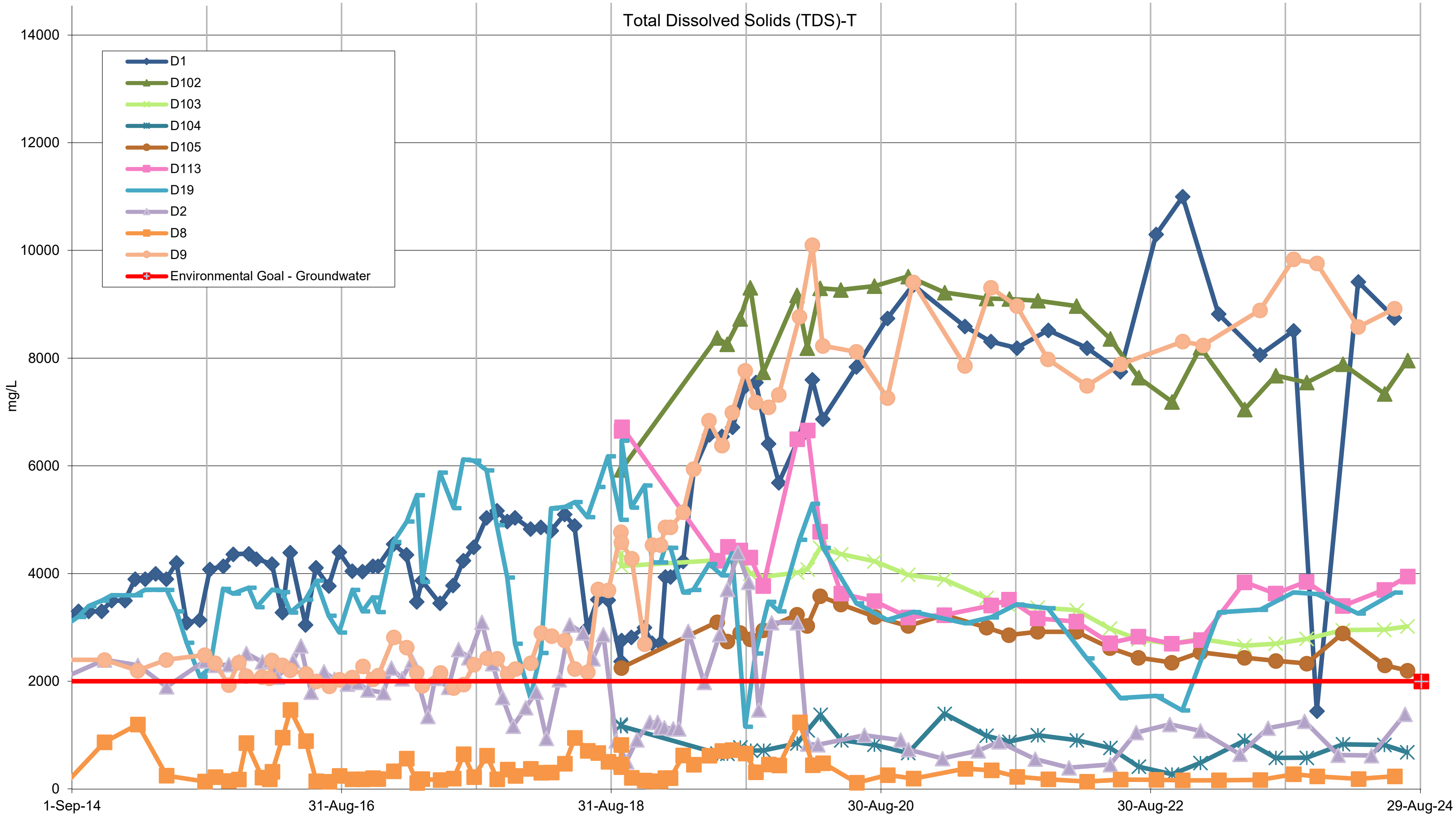


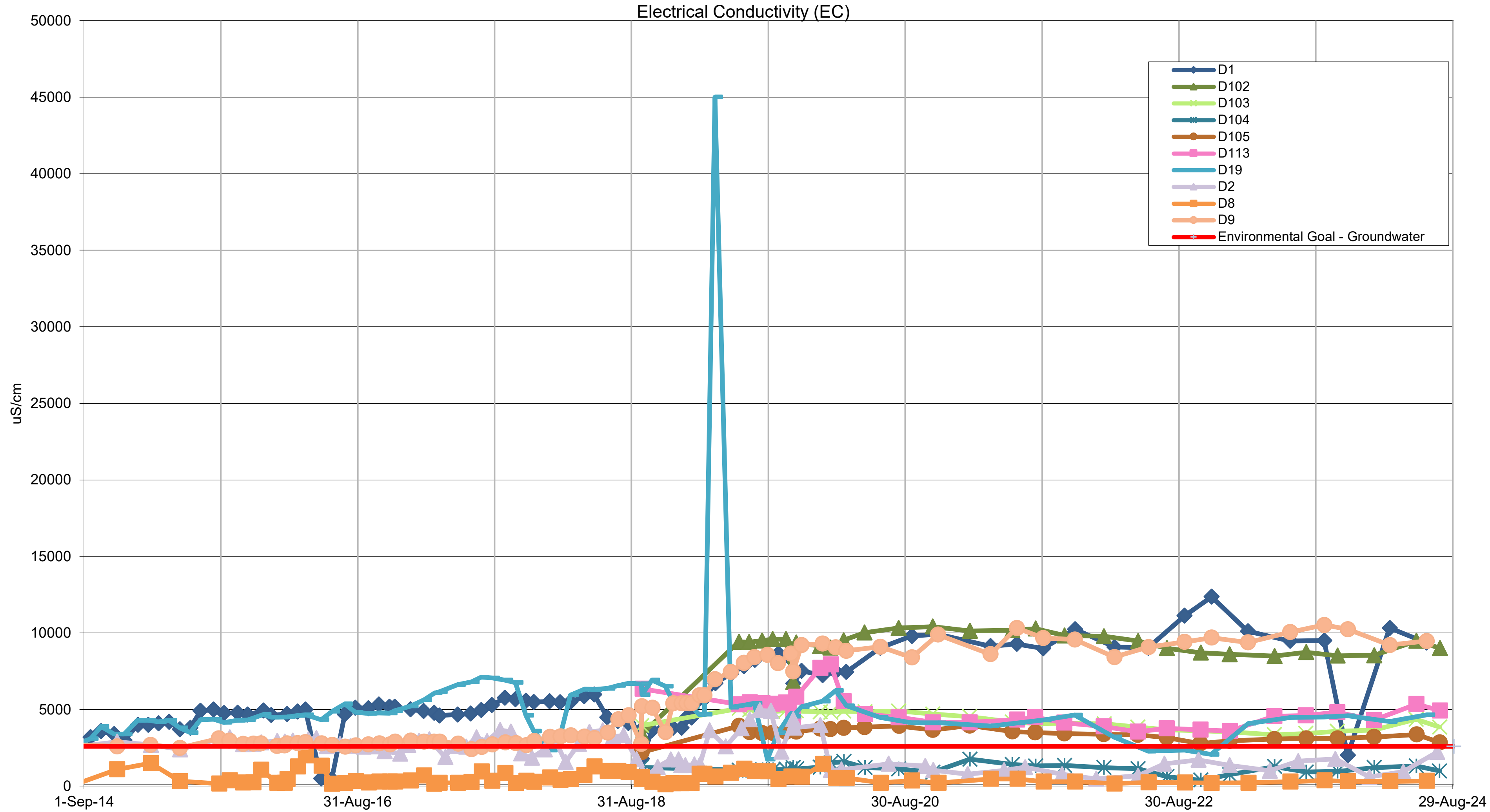
Appendix F. Within / Immediately Adjacent LNAR South - Boron (Filtered) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908

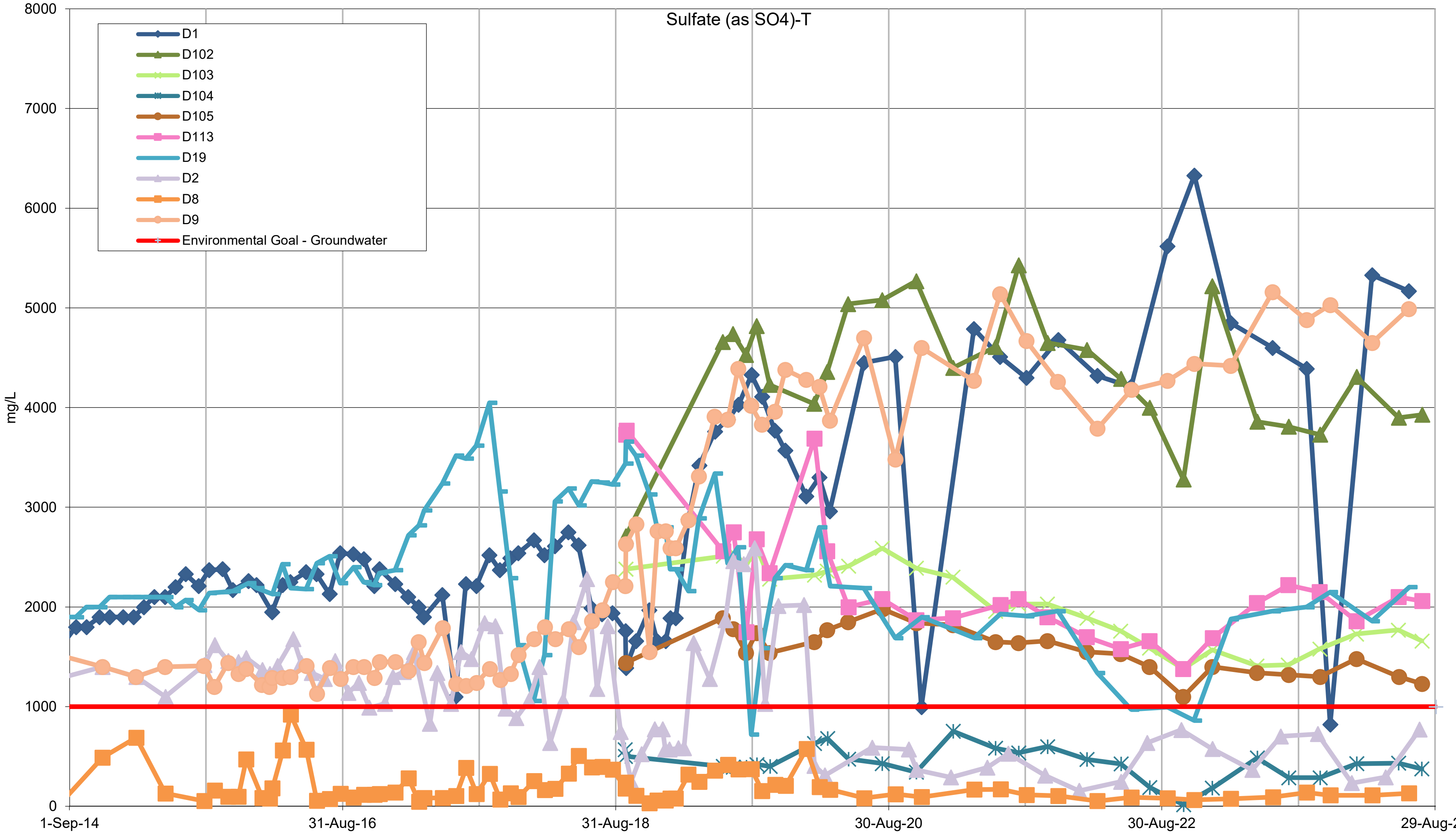



Lead-T
140
120
100
80
60
40
20
0
µg/L
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D15
D17
D18
D16A
Environmental Goal - Groundwater

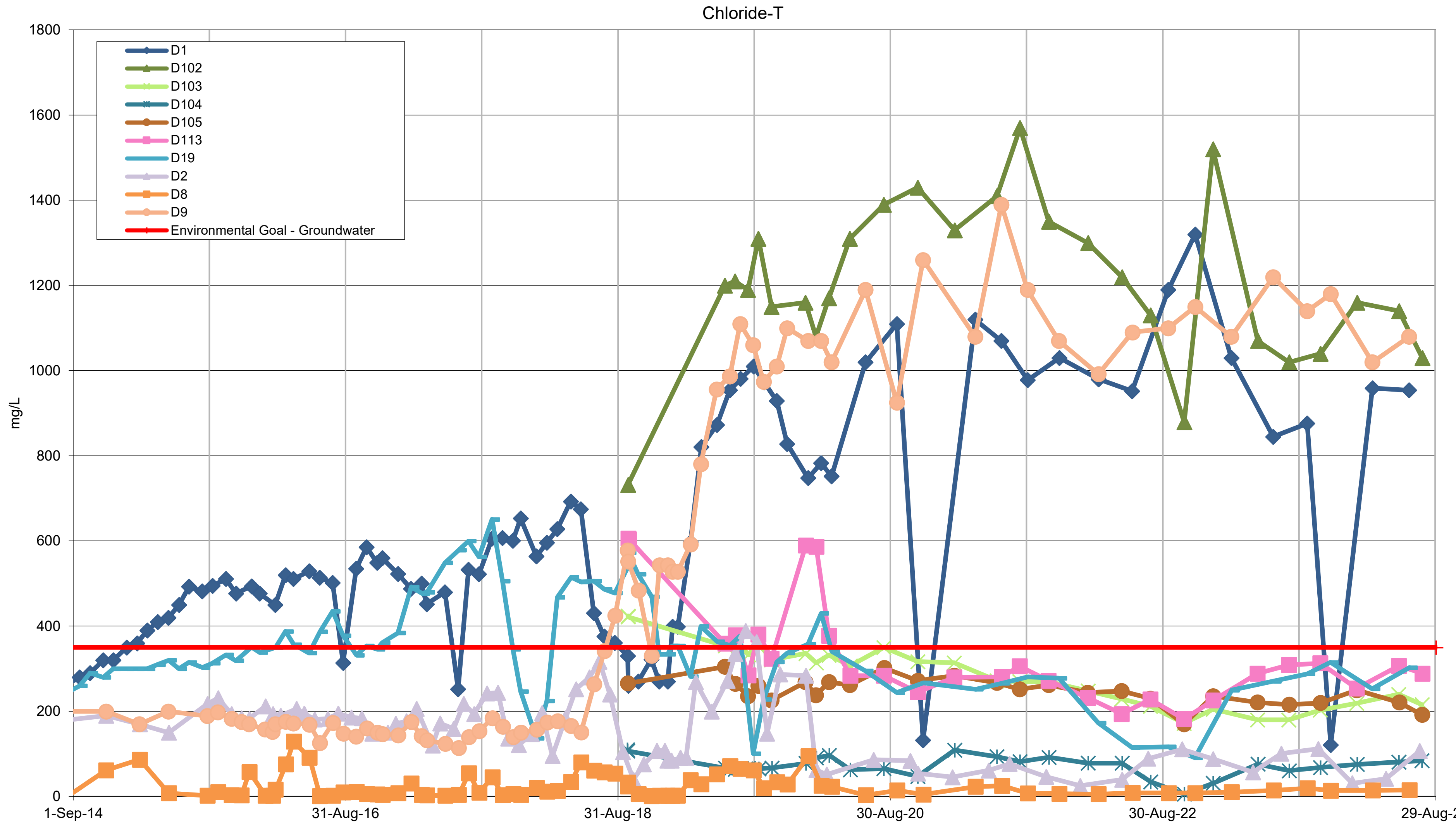
Appendix F. Cross- and downgradient of LNAR / Adjacent Wangcol Creek - TDS Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908



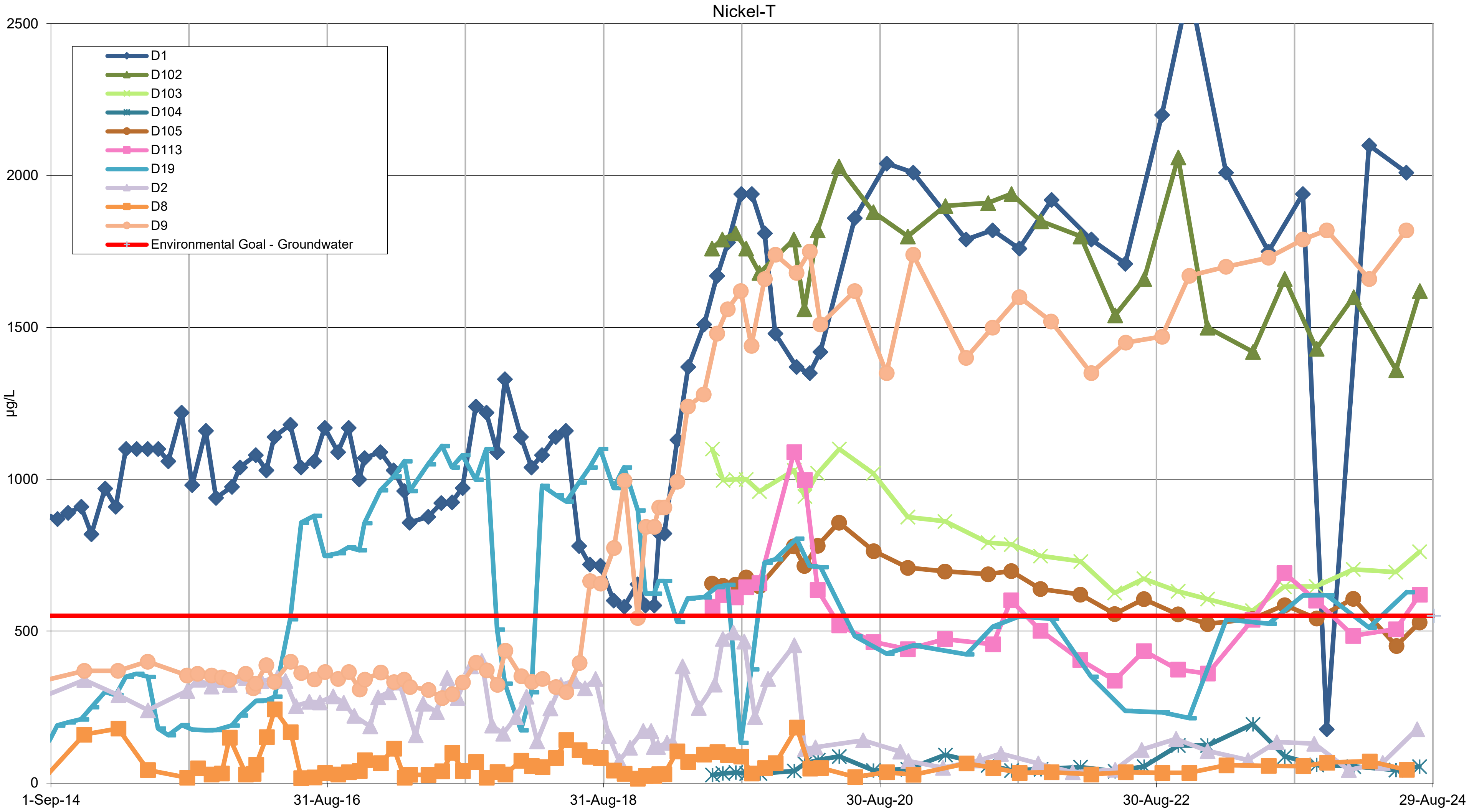

Electrical Conductivity (EC)
uS/cm
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D1
D102
D103
D104
D105
D113
D19
D2
D8
D9
Environmental Goal - Groundwater



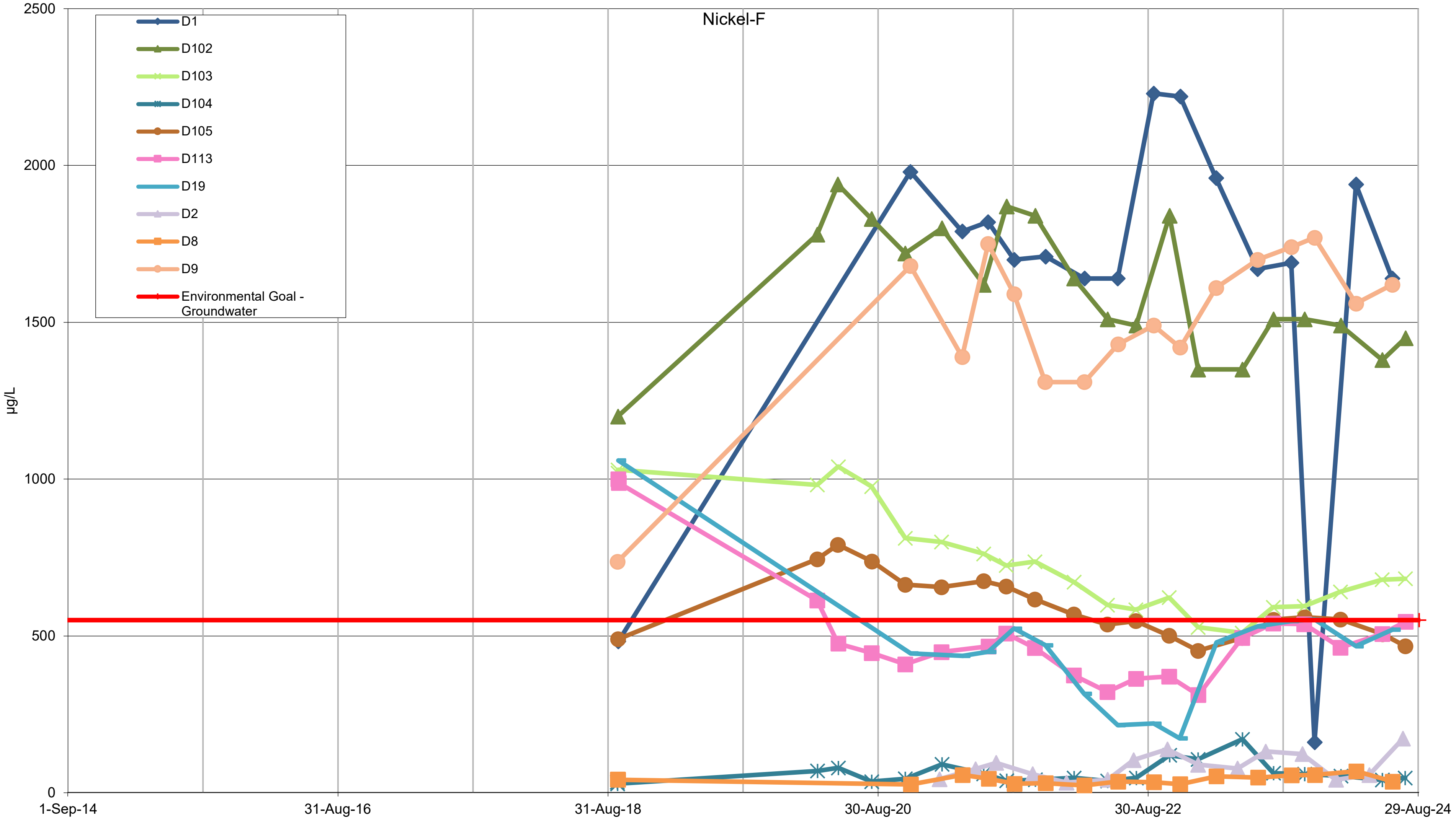
Sulfate (as SO4)-T
mg/L
D1
D102
D103
D104
D105
D113
D19
D2
D8
D9
Environmental Goal - Groundwater
8000
7000
6000
5000
4000
3000
2000
1000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24

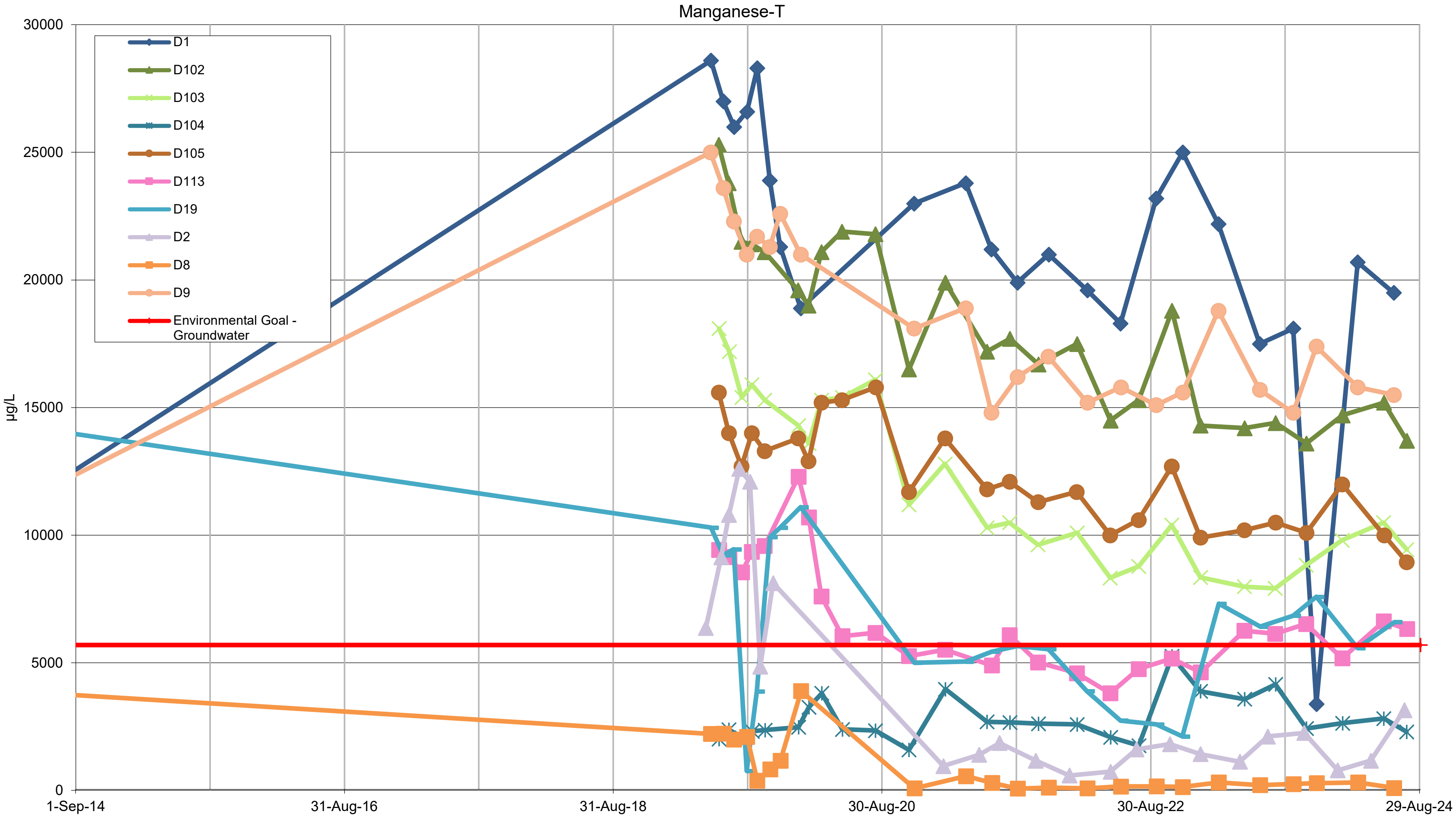

Chloride-T
mg/L
1800
1600
1400
1200
1000
800
600
400
200
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D1
D102
D103
D104
D105
D113
D19
D2
D8
D9
Environmental Goal - Groundwater

Appendix F. Cross- and downgradient of LNAR / Adjacent Wangcol Creek - Nickel (Total) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908



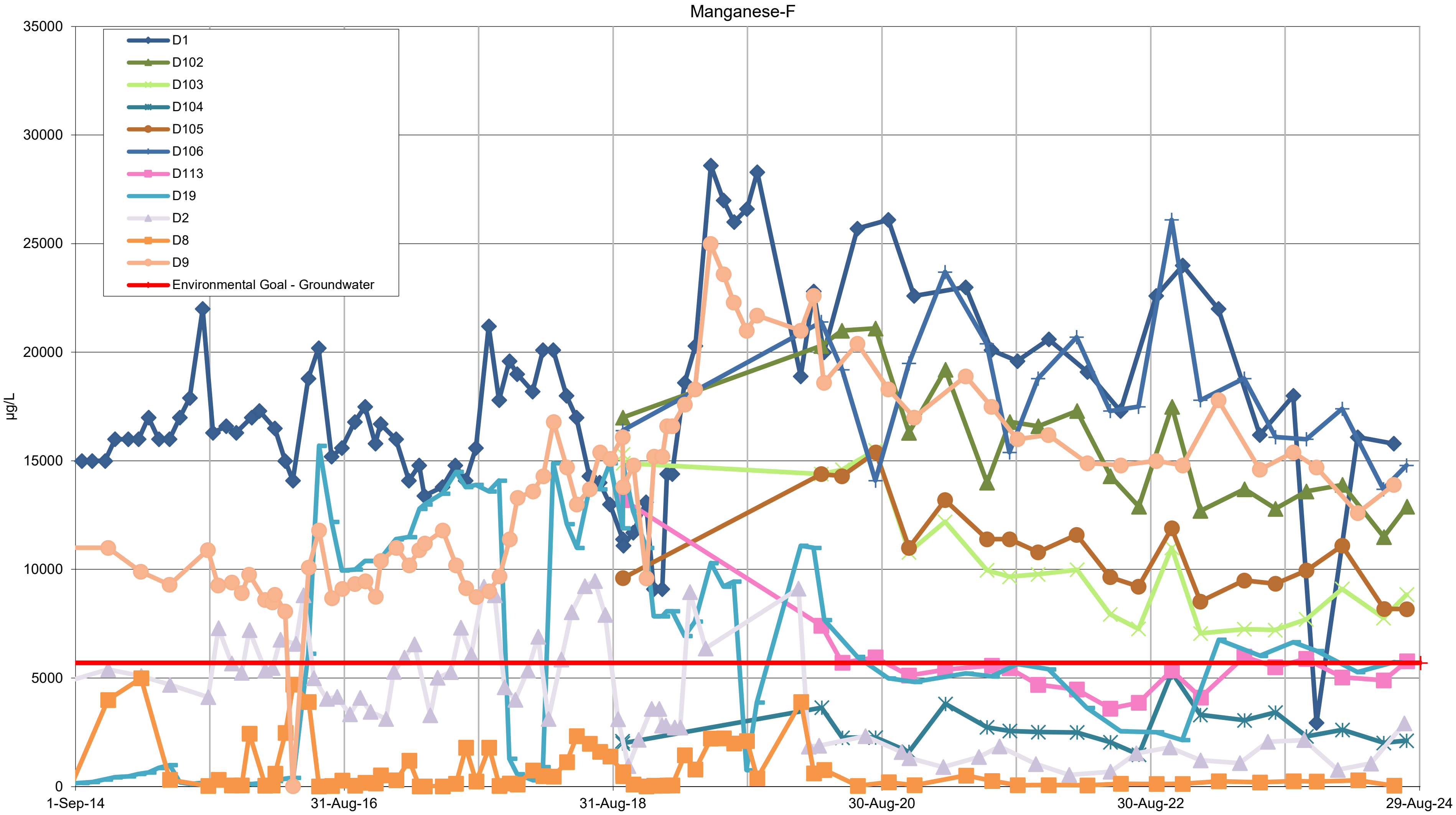
Appendix F. Cross- and downgradient of LNAR / Adjacent Wangcol Creek - Nickel (Filtered) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908

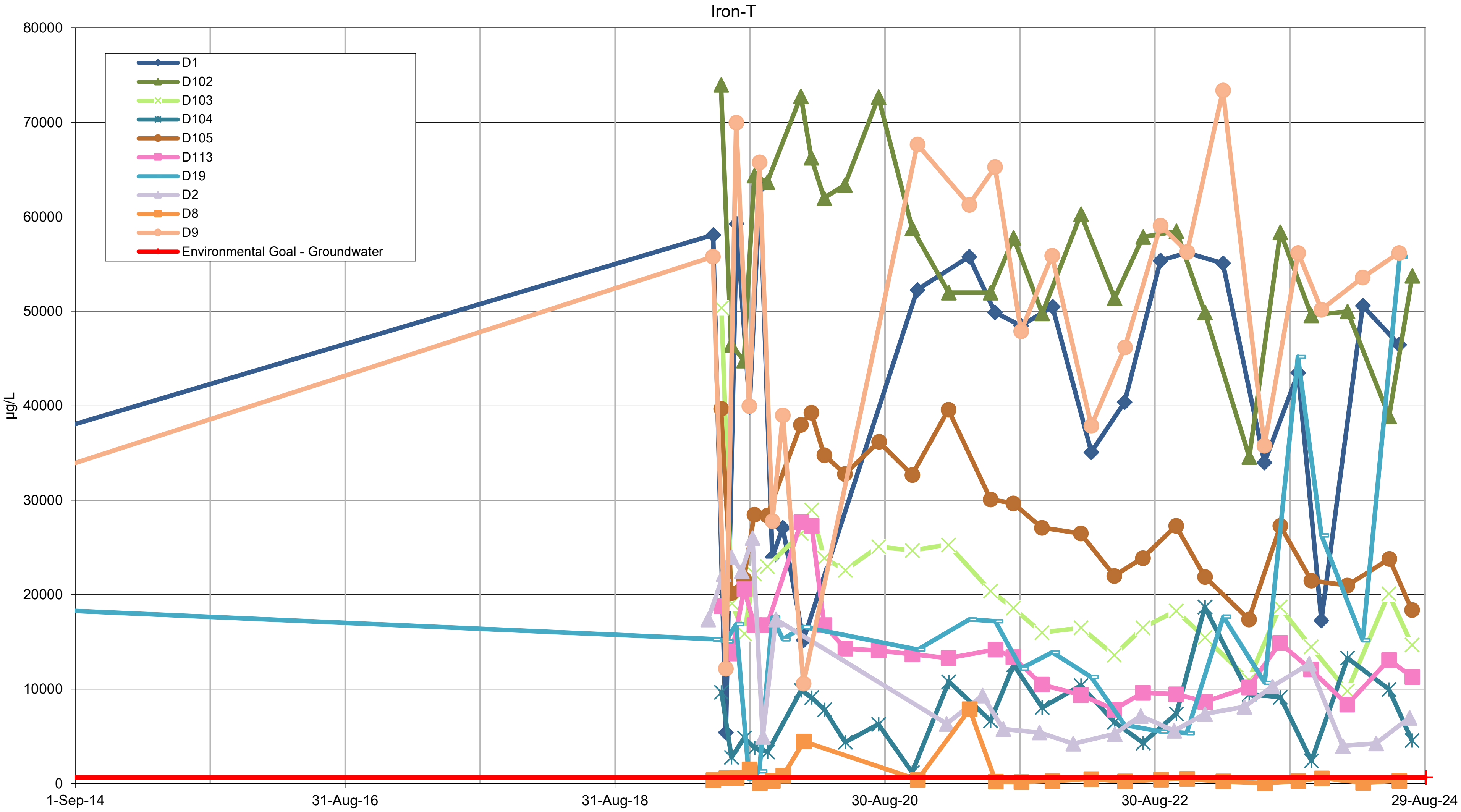


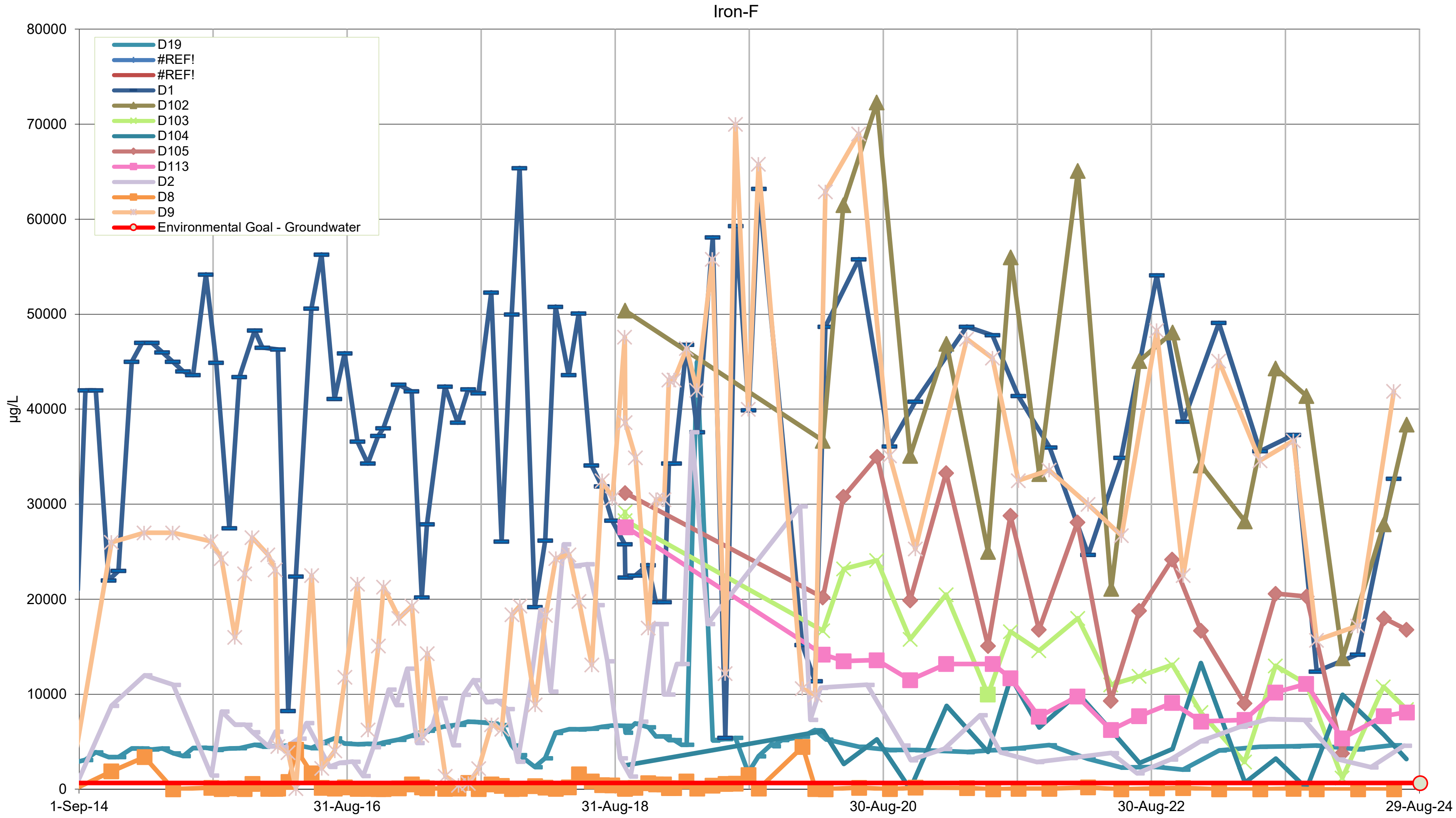

Manganese-T
µg/L
30000
25000
20000
15000
10000
5000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D1
D102
D103
D104
D105
D113
D19
D2
D8
D9
Environmental Goal - Groundwater

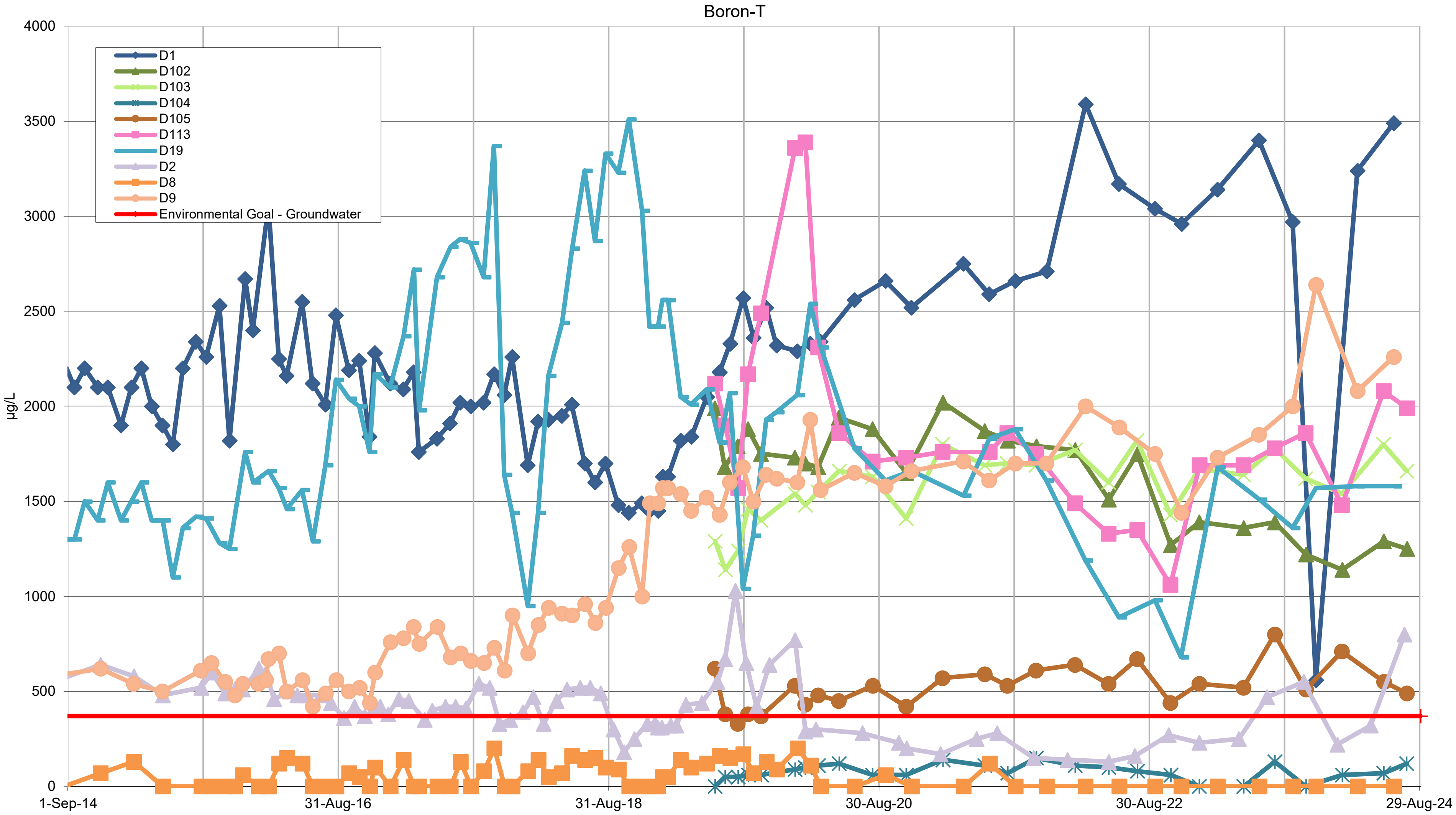
ERM

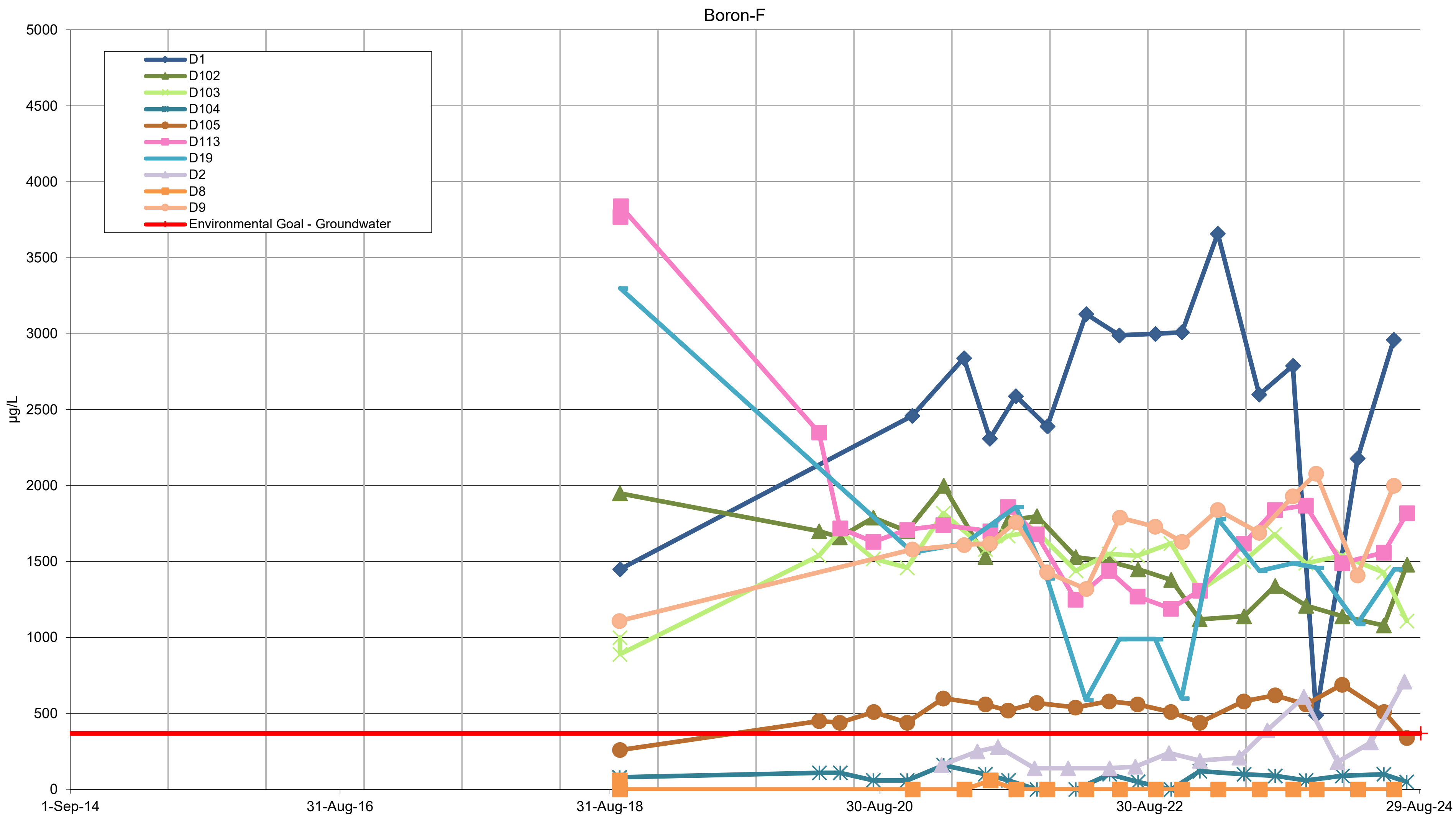
Appendix F. Cross- and downgradient of LNAR / Adjacent Wangcol Creek - Manganese (Filtered) Concentrations Over Time
Lamberts North Ash Placement Water Quality Monitoring
Environmental Monitoring Report 2023/2024
0743908

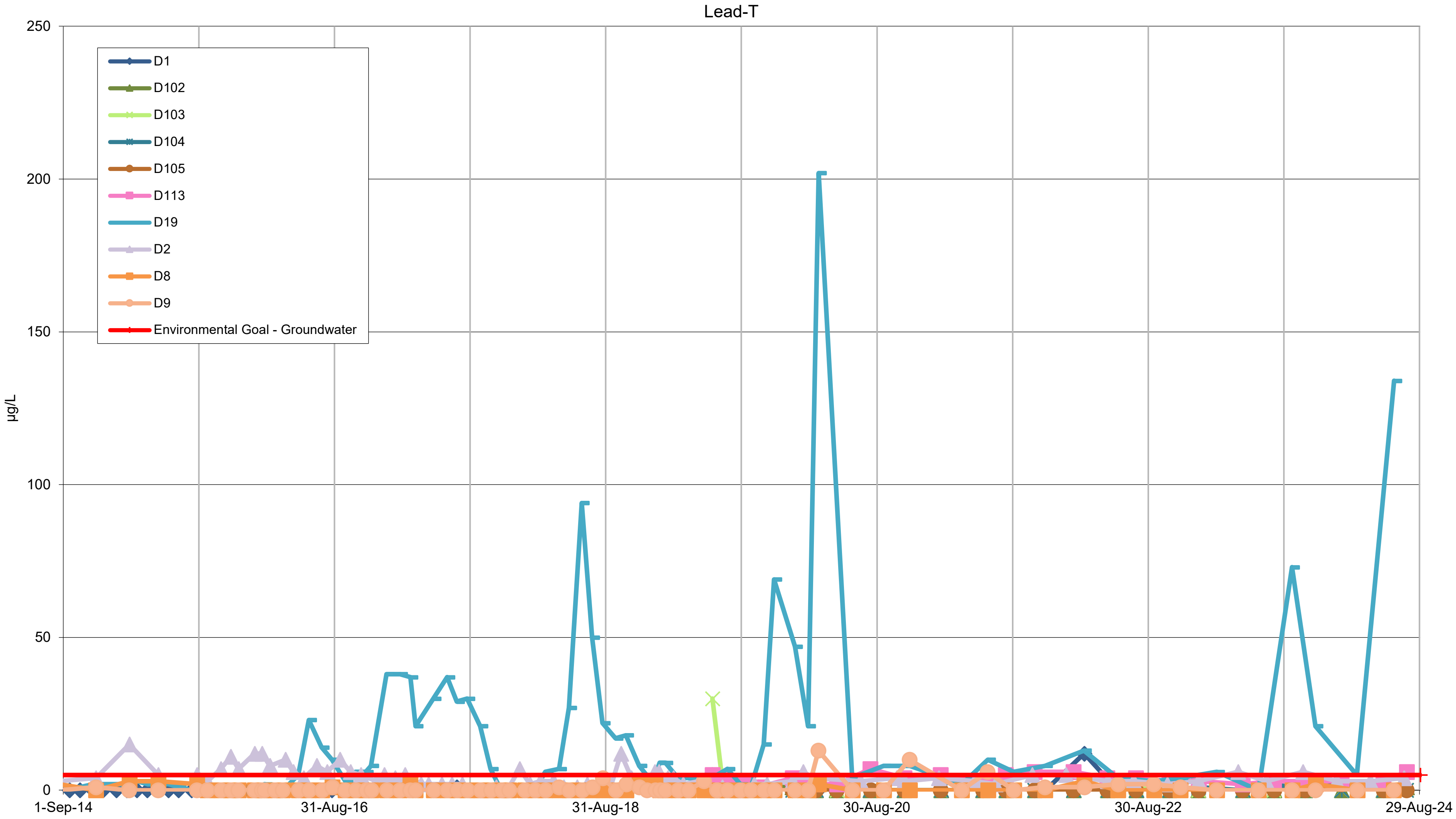



Iron-T
80000
70000
60000
50000
40000
30000
20000
10000
0
µg/L
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D1
D102
D103
D104
D105
D113
D19
D2
D8
D9
Environmental Goal - Groundwater


Iron-F
µg/L
80000
70000
60000
50000
40000
30000
20000
10000
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D19
#REF!
#REF!
D1
D102
D103
D104
D105
D113
D2
D8
D9
Environmental Goal - Groundwater


Boron-T
µg/L
4000
3500
3000
2500
2000
1500
1000
500
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D1
D102
D103
D104
D105
D113
D19
D2
D8
D9
Environmental Goal - Groundwater


Boron-F
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
µg/L
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D1
D102
D103
D104
D105
D113
D19
D2
D8
D9
Environmental Goal - Groundwater


Lead-T
µg/L
250
200
150
100
50
0
1-Sep-14
31-Aug-16
31-Aug-18
30-Aug-20
30-Aug-22
29-Aug-24
D1
D102
D103
D104
D105
D113
D19
D2
D8
D9
Environmental Goal - Groundwater

ERM

APPENDIX G CLIMATE DATA

Weather Observations from Mt Piper Weather Station

Month	Sep-23			Oct-23			Nov-23			Dec-23		
Measurement	AT 2M 1Hr Min	AT 2M 1Hr Max	Rainfall	AT 2M 1Hr Min	AT 2M 1Hr Max	Rainfall	AT 2M 1Hr Min	AT 2M 1Hr Max	Rainfall	AT 2M 1Hr Min	AT 2M 1Hr Max	Rainfall
Date	°C	°C	mm	°C	°C	mm	°C	°C	mm	°C	°C	mm
1	1.1	14.0	0	7.1	27.2	0	4.5	20.9	0	10.4	23.2	0.2
2	-1.8	15.4	0.2	9.5	26.7	0	9.5	21.3	0	9.9	22.7	14.4
3	-0.1	16.6	0	12.0	27.2	0	9.6	21.0	2	6.5	23.7	0
4	1.9	19.6	0	6.2	19.1	31.4	9.8	18.0	12	12.0	25.0	0
5	6.4	13.7	0.6	5.0	10.7	0.2	9.1	13.6	2	9.3	30.5	0
6	-1.1	18.1	0	4.6	16.2	0	9.0	18.3	0	14.9	32.8	0.3
7	-1.5	21.7	5.8	5.6	14.7	0	3.8	22.3	0	12.3	30.9	0
8	2.3	12.8	10.6	4.4	17.8	0	6.1	21.1	0	17.5	32.4	0
9	-0.3	8.9	0	1.1	19.4	0	8.3	22.9	5.8	17.0	34.4	0
10	-4.1	12.0	0.2	1.8	19.5	0	6.9	24.2	0.2	15.7	29.9	0
11	-3.4	15.4	0.2	5.1	21.6	0	8.8	29.3	0.2	13.7	31.1	0
12	-1.4	15.9	0	3.2	24.9	1.4	10.7	29.4	0	16.4	28.5	0
13	-0.4	18.8	0.2	5.3	14.5	0.2	4.9	26.6	0	12.4	31.2	0.2
14	0.6	22.0	0.2	7.2	18.0	0	10.1	27.0	0	14.5	29.7	0.6
15	2.1	22.7	0	6.9	20.5	0	11.0	24.8	0.8	11.2	29.5	0
16	4.2	23.9	0	3.9	15.1	0	7.5	24.8	1.6	10.9	26.5	0
17	5.2	23.7	0	-0.5	12.5	0	6.9	20.2	0.2	10.1	28.5	0
18	3.3	26.2	0	7.1	16.3	0.4	9.6	24.8	0	16.4	31.4	0
19	6.2	24.6	0	5.7	22.2	0	6.5	27.6	0	16.1	28.5	16.4
20	9.0	25.3	0	3.1	24.5	0	9.2	19.6	0	11.6	16.7	31.2
21	6.9	15.9	0.4	6.1	27.4	0	7.2	25.3	0	11.7	16.1	0.2
22	4.8	13.0	0.2	7.8	20.2	0	9.3	22.2	6.2	11.2	22.2	0
23	-1.3	15.9	0	4.3	20.3	0	13.1	19.5	0	8.5	23.4	0.2
24	2.8	18.7	0	0.5	26.9	0	14.0	18.4	14.4	13.0	20.1	5.2
25	0.3	20.0	0	6.5	20.6	0	14.6	20.0	28.2	12.7	23.3	3.4
26	3.2	20.1	3.4	5.2	11.1	2.8	9.9	22.0	0.2	11.7	26.4	0
27	4.8	20.1	0.2	5.3	13.3	0.2	7.7	25.9	0.2	9.0	20.6	0.4
28	6.1	20.4	0	4.9	17.8	0.2	13.7	19.6	1.8	9.1	25.8	0
29	2.8	22.4	0.2	1.1	21.6	0	12.5	20.7	30.6	12.4	23.0	0.2
30	1.0	24.8	0	4.0	25.9	0	12.9	18.5	1.8	10.0	23.8	0
31	-	-	-	5.5	19.8	0	-	-	-	12.9	16.2	0
Min	-4.1	8.9	0.0	-0.5	10.7	0.0	3.8	13.6	0.0	6.5	16.1	0.0
Max	9.0	26.2	10.6	12.0	27.4	31.4	14.6	29.4	30.6	17.5	34.4	31.2
Average	2.0	18.8		5.0	19.8		9.2	22.3		12.3	26.1	
Total			22.4			36.8			108.2			72.9

Note:
- signifies data not provided

Weather Observations

Month	Jan-24			Feb-24			Mar-24			Apr-24		
Measurement	AT 2M 1Hr Min	AT 2M 1Hr Max	Rain	AT 2M 1Hr Min	AT 2M 1Hr Max	Rainfall	AT 2M 1Hr Min	AT 2M 1Hr Max	Rainfall	AT 2M 1Hr Min	AT 2M 1Hr Max	Rainfall
Date	°C	°C	mm	°C	°C	mm	°C	°C	mm	°C	°C	mm
1	13.4	21.7	0.4	15.9	29.8	0.2	18.1	30.2	0	7.7	26.0	0.0
2	16.9	25.4	1.8	11.7	31.7	0	15.5	23.5	0.6	9.5	19.9	11.8
3	14.7	25.8	5.6	16.2	29.9	0	7.0	25.1	0.2	5.8	20.1	0.0
4	13.8	26.4	28.8	13.6	33.9	0	6.5	20.1	0	12.4	13.8	7.4
5	13.0	18.6	0.2	20.3	27.0	0.4	9.6	24.6	0	12.5	14.1	62.8
6	10.6	19.7	0	13.2	20.5	44.6	9.3	27.3	0	10.5	19.4	7.6
7	13.5	23.6	0	11.3	19.4	0.2	15.1	26.5	0.8	9.8	18.7	0.2
8	16.0	18.6	12.2	12.7	16.6	0	15.1	25.3	0	8.0	19.0	0.2
9	16.2	26.2	0	9.8	26.6	0	11.7	23.8	0.2	6.3	14.2	3.4
10	16.7	27.6	18.8	14.1	19.2	0	10.1	24.9	0	3.2	15.8	0.2
11	16.6	26.4	0.4	13.2	21.2	0.2	10.7	25.5	0	2.6	18.0	-
12	17.2	25.7	0	13.7	25.0	0.6	8.2	29.9	0.2	6.1	19.0	0.0
13	12.6	29.3	0	12.7	27.0	0.2	9.0	28.0	0	3.7	21.0	0.2
14	16.4	23.3	0.6	15.2	26.4	1.4	10.9	28.6	0.2	5.4	20.5	0.2
15	13.7	16.6	5.2	15.1	18.9	0	11.2	18.1	0	2.4	20.3	0.0
16	13.6	20.2	1.8	15.8	24.7	1	10.8	17.2	4.6	3.0	20.4	0.2
17	16.2	23.1	55	14.7	27.5	0.2	12.1	19.4	11.8	9.3	20.2	0.0
18	10.1	22.7	0.4	12.0	26.9	1.6	13.8	19.9	13	5.6	17.5	0.2
19	8.0	27.1	0	11.3	23.2	18.6	12.6	25.2	0.2	1.9	14.0	0.8
20	14.9	26.5	0	11.5	20.4	0	12.2	19.3	0.6	8.9	11.2	1.0
21	11.8	31.7	0.2	14.9	23.3	0.6	8.1	15.0	0	5.7	17.6	0.2
22	10.0	23.8	0	13.6	29.1	0	8.9	20.9	0	3.2	17.6	0.2
23	13.7	22.9	0	13.2	30.0	1.4	8.0	20.6	6.4	6.6	19.8	0.0
24	10.5	29.1	0	13.6	18.4	2	8.3	21.8	0.4	4.3	18.1	0.2
25	18.9	30.8	0	12.7	27.3	0	5.2	23.8	0.2	3.0	15.6	0.0
26	18.2	30.9	0	10.3	28.1	0.2	4.7	22.1	-	0.6	16.8	0.0
27	12.8	25.1	0	14.3	20.5	0	8.5	22.2	0	2.6	17.1	0.0
28	8.3	25.2	0.2	16.6	30.6	12.8	8.0	21.9	0	4.3	18.6	0.2
29	14.3	32.3	0	18.6	31.8	0.4	10.2	23.4	0	3.6	19.2	0.0
30	19.5	26.5	0	-	-	-	7.8	25.7	0.2	8.6	12.8	1.4
31	17.1	26.3	4	-	-	-	7.0	24.2	0.2	-	-	-
Min	8.0	16.6	0.0	9.8	16.6	0.0	4.7	15.0	0.0	0.6	11.2	0.0
Max	19.5	32.3	55.0	20.3	33.9	44.6	18.1	30.2	13.0	12.5	26.0	62.8
Average	14.2	25.1		13.9	25.3		10.1	23.4		5.9	17.9	
Total			135.6			86.6			39.8			98.4

Note:
- signifies data not prov

Weather Observations

Month	May-24			Jun-24			Jul-24			Aug-24		
Measurement	AT 2M 1Hr Min	AT 2M 1Hr Max	Rainfall	AT 2M 1Hr Min	AT 2M 1Hr Max	Rainfall	AT 2M 1Hr Min	AT 2M 1Hr Max	Rainfall	AT 2M 1Hr Min	AT 2M 1Hr Max	Rainfall
Date	°C	°C	mm	°C	°C	mm	°C	°C	mm	°C	°C	mm
1	7.5	11.5	1.2	6.7	9.9	5.8	-0.9	8.5	0.2	-1.8	9.3	0.0
2	8.0	12.3	0	3.1	7.7	0.8	4.4	8.2	0.2	3.0	10.7	0.2
3	6.8	12.9	0.6	-0.4	8.3	0	4.5	8.5	0.6	3.0	-	0.2
4	9.3	13.0	10	1.3	10.4	0	5.7	10.0	0.6	-4.6	11.5	0.2
5	8.9	11.6	11.4	2.8	12.2	1.2	5.0	9.6	1.0	0.0	10.8	0.2
6	8.7	12.5	1.2	6.5	10.8	10.6	4.2	9.2	0.2	-1.5	9.9	0.2
7	8.8	13.7	1	6.5	9.7	7.2	1.4	11.0	0.0	-4.6	14.7	0.2
8	9.1	13.9	0.6	1.0	11.6	0.2	7.0	11.4	6.4	-3.3	14.2	0.2
9	9.6	14.4	0.2	4.7	10.7	0	3.8	11.7	2.0	1.1	13.0	0.6
10	10.2	13.6	0.2	-1.9	10.2	0	5.7	9.9	0.2	-1.2	14.2	0.2
11	10.0	11.6	11.4	-2.0	11.7	0.4	-0.8	11.9	0.2	4.9	13.8	0.0
12	7.5	15.1	0.4	0.8	8.8	0.4	-0.2	11.1	0.0	8.0	10.9	2.6
13	6.5	16.0	0.2	-4.5	9.5	0.2	4.0	9.1	0.0	8.8	15.4	1.6
14	3.2	16.5	0.2	1.9	9.7	1.2	2.8	5.6	0.0	9.5	13.2	12.0
15	4.2	14.2	0.2	4.1	8.3	7.6	1.3	4.1	0.4	8.8	14.1	2.0
16	3.7	15.9	0	-0.8	8.5	0.2	1.9	4.4	0.8	7.3	14.7	0.6
17	5.6	16.4	0.2	1.6	9.9	0	4.3	8.4	0.0	5.6	10.5	1.0
18	2.7	9.4	0	-2.1	9.9	0.2	2.7	8.1	0.0	5.6	11.8	11.4
19	-2.5	11.1	0	-3.2	10.1	0.2	0.7	7.0	0.0	6.1	11.7	18.2
20	2.0	12.5	-	-2.8	10.5	0	3.3	7.1	6.4	4.6	16.0	0.0
21	0.5	13.8	0.2	-0.4	9.0	0.6	2.1	7.4	0.0	7.4	16.7	0.2
22	-0.5	12.8	0.2	-0.7	9.8	0.2	-0.8	10.0	0.0	2.6	14.2	0.0
23	-2.5	14.6	0	-0.7	8.8	0	-4.0	11.4	0.4	-0.6	15.6	0.2
24	-1.4	15.8	0.2	-2.5	11.4	0	-3.2	14.0	0.2	6.8	19.1	2.4
25	4.0	13.8	0	-3.6	11.8	0.4	4.6	14.6	1.0	10.7	15.5	4.6
26	1.5	15.0	0.2	-0.2	14.0	0.2	-7.0	13.3	14.2	4.2	15.4	0.8
27	-1.3	14.9	0.2	-3.7	10.8	0.2	-1.0	11.5	8.0	-0.4	18.0	0.4
28	-1.0	17.5	0.2	-4.7	12.4	0.2	1.3	5.4	0.2	8.7	18.7	0.0
29	-1.2	16.6	0.2	-3.3	13.9	0.2	-1.5	7.6	0.2	5.7	15.2	0.0
30	0.4	16.2	0.2	4.0	12.3	15.4	-3.7	9.4	0.2	3.9	20.1	0.0
31	10.2	13.4	9	-	-	-	4.0	8.8	0.4	7.7	15.6	0.0
Min	-2.5	9.4	0.0	-4.7	7.7	0.0	-22.0	4.1	0.0	-25.0	9.3	0.0
Max	10.2	17.5	11.4	6.7	14.0	15.4	7.0	14.6	14.2	33.0	121.0	18.2
Average	4.5	14.0		0.3	10.4		1.1	9.3		4.1	17.6	
Total			49.6			53.6			44.0			60.2

Note:
- signifies data not prov

APPENDIX H CEH REPOSITORY DATA

NOTES:
1) COPYRIGHT OF THIS PLAN & ASSOCIATED ELECTRONIC FILES VESTS WITH CEH SURVEY.
2) THE PLAN & ASSOCIATED ELECTRONIC FILES SHALL ONLY BE USED BY THE ADDRESSED CLIENT FOR THE PURPOSE OF THE SURVEY.
3) THIS SURVEY AND PLAN IS FOR CONTOUR & DETAIL / PLANNING PURPOSES ONLY.
4) THE BOUNDARIES, AREAS & DIMENSIONS OF THE LAND, AS SHOWN, ARE BASED ON ORIGINAL DATA AND HAVE NOT BEEN RE-SURVEYED, OR ARE SUBJECT TO FINAL SURVEY.
5) CONTOURS SHOW THE GENERAL SURFACE TOPOGRAPHY AS SURVEYED AT 1.0m INTERVAL, AS DERIVED FROM DRONE SURVEY DATED 23/07/2024.
6) NO SERVICES HAVE BEEN LOCATED OR SHOWN. SURFACE AND/OR UNDERGROUND SERVICES MAY EXIST. CEH SURVEY ACCEPTS NO RESPONSIBILITY FOR SERVICES NOT SHOWN.
7) BACKGROUND IMAGERY FROM DRONE FLIGHTS UNDERTAKEN BY CEH SURVEY DATED 23/07/2024.
8) CALCULATION BOUNDARIES AS SHOWN ARE BASED ON LIMITS OF ASH PLACEMENT AND WORKING AREAS AS AT THE DATE OF SURVEY INTERPRETED FROM THE AERIAL IMAGERY.
9) VOLUMES AS SHOWN FOR ZONES 1, 2 & 3 ARE VOLUMES IN EXCESS/REMAINING CALCULATED BETWEEN THE SURVEYED SURFACE AND FINAL DESIGN ASH SURFACES HELD ON FILE AT CEH SURVEY, ALLOWANCES FOR A CAPPING LAYER 1 METRE THICK ACROSS THE FINAL DESIGN SURFACE AREA, HAVE BEEN APPLIED IN CALCULATING VOLUMES.
10) VOLUMES FOR LNAR STAGE 2A & WCA1 AREAS ARE CALCULATED BETWEEN SURVEYED SURFACE AND SURFACE AS SUPPLIED BY GHD/SERVICE STREAM DATED 13/12/2023, CALCULATION BOUNDARIES FOR LNAR STAGE 2A & WCA1 ADOPTED FROM GHD PLAN#12610307-C005, REV.0.

SERVICESTREAM

MOUNT PIPER - ASH PLACEMENT
SURVEY : 23rd JULY 2024

SCALE - 1:5000 (A3 SHEET) DATUM: MGA (ZONE56)

GRID NORTH

CEH SURVEY
CONSULTING LAND, ENGINEERING AND MINING SURVEYORS
"Astrolabe" 1 Rutherford Lane,
LITHGOW 2790
ABN: 88 056 544 551 Office: (02) 6351 2281
Email: survey@ceh.com.au Website: www.ceh.com.au

DATE	23-07-2024
AMENDED	
SURVEYOR	TH/BN
DRAWN	TH/GM
CHECKED	

DRAWING No:
MPA0724
(as surveyed)

CCAD6 JOB & DWG:
MPA0724_gm - MPA0724 as survey

APPENDIX I PROJECT APPROVAL REQUIREMENTS

APPENDIX I PROJECT APPROVAL REQUIREMENTS

The relevant consent requirements required under the project approval and the corresponding actions and compliance status are summarised in Table I-1Table I-1.

TABLE I-1 PROJECT APPROVAL REQUIREMENTS

Project Approval Document	Condition Number and Phase	Consent requirements	How addressed by this report	Compliance status
Project Approval 09_0186	E15 (During Operations).	The Proponent shall prepare and implement a Groundwater Monitoring Program to monitor the impacts of ash placement activities on local groundwater quality and hydrology. The Program shall be developed in consultation with WaterNSW, and shall describe the location, frequency, rationale and procedures and protocols for collecting groundwater samples as well as the parameters analysed and methods of analysis. The monitoring program shall be ongoing for the operation of the project and for a minimum of 5 years following project completion and include, but not be limited to:	Refer to Section 5.5 of OEMP	Compliant
		a) monitoring at established bore sites (or replacement bore sites in the event that existing sites are damaged or lost) as described in the Groundwater Management Plan as per condition D3(b); and	Refer to Section 6 of this report	Compliant
		b) a schedule for periodic monitoring of groundwater quality, depth and flow at all monitoring sites, at an initial frequency of no less than once every month for the first 12 months of operation. The monitoring program shall form part of the Groundwater Management Plan referred to in condition D3(b) of this approval.	Refer to Section 6 of this report	Compliant
	E16 (During Operations).	The Proponent shall prepare and implement a surface water quality monitoring program to monitor the impacts of the ash placement activities on Wangcol Creek Lamberts Gully. The Program shall be developed in consultation with the WaterNSW, and shall describe the location, frequency, rationale and the procedures and protocols for collecting water samples as well as the parameters analysed and methods of analysis. The program shall include, but not necessarily be limited to:	Refer to Section 5.6 of OEMP	Compliant Observation of laboratory LORs were reported for chromium, silver, and selenium as described in Section 5 of this report. These laboratory LORs do not impact upon the conclusions of this

Project Approval Document	Condition Number and Phase	Consent requirements	How addressed by this report	Compliance status
				report, as these are not considered to represent primary constituents of concern for groundwater monitoring in accordance with the OEMP.
		a) monitoring at the existing water quality monitoring sites as described in the document referred to under condition A1c);	Refer to Section 5 of this report	Compliant
		b) monitoring at surface water discharge points from Lamberts Gully Creek;	Refer to Section 5 of this report	Compliant
		c) monitoring at surface water discharge points into Wangcol Creek;	Refer to Section 5 of this report	Compliant
		d) wet weather monitoring with a minimum of two events recorded within the first 12 months operation of the project; and	Refer to Section 3.1 of this report	Compliant
		e) a schedule for periodic monitoring of surface quality at all sites throughout the life of the project, at an initial frequency of no less than once every month for the first 12 months and must include, but not be limited to, monitoring of dissolved oxygen, turbidity, sulfate, salinity, boron, manganese, iron chloride, total phosphorus and total nitrogen.	Refer to Section 5 of this report	Compliant
Operational Environmental Management Plan	Not applicable	Section 5.5.3 Groundwater Monitoring Program - Guidelines	Refer to Section 6 of this report	Compliant
	Not applicable	Section 5.5.3.1 Groundwater Monitoring Program – Water Quality Criteria	Refer to Appendix C and Section 6 of this report	Compliant
	Not applicable	Section 5.5.4 Monitoring (Table 5-12 – Groundwater Monitoring Schedule)	Refer to Section 6.3 of this report	Compliant
	Not applicable	Section 5.5.4 Monitoring (Table 5-13 – Procedures and Protocols for Monitoring)	Refer to Appendix C and Sections 6.4 and 6.5 of this report	Compliant. Observation of laboratory LORs were reported for

Project Approval Document	Condition Number and Phase	Consent requirements	How addressed by this report	Compliance status
				chromium, silver, and selenium as described in Section 6 of this report. These laboratory LORs do not impact upon the conclusions of this report, as these are not considered to represent primary constituents of concern for groundwater monitoring in accordance with the OEMP.
	Not applicable	Section 5.5.4 Monitoring (Table 5-14 – Groundwater contamination contingency plan for Lamberts North)	Refer to Sections 6.7 and of this report	Compliant
	Not applicable	Section 5.5.4 Monitoring (Table 5-15 – Investigation protocol)	Refer to Sections 6.7, and 9 of this report	Compliant
	Not applicable	Section 5.5.4 Monitoring (Table 5-16 Reporting Requirements, Item 2)	This report	Compliant
	Not applicable	Section 5.6.5 (Table 5-20 Soil and Surface Water Monitoring Measures – Items 3 to 5)	Refer to Appendix B and Section 5 of this report	Compliant
	Not applicable	Section 5.6.5 (Table 5-21 Reporting, Item 5)	This report	Compliant

APPENDIX J NALCO QAQC PROGRAM

Unit 12, 2 Eden Park Drive
Macquarie Park 2113
Phone: +61 (0) 2 8870 8434

ABN: 41 000 424 788

Ecolab | Nalco Water - Global Analytical & Microbiology

Quality assurance/quality control program (2024)

The laboratory's Quality assurance/quality control program ensures that sampling activities and analytical data is accurate, reliable and acceptable.

The Quality assurance/quality control program consists of both internal and external measures.

Internal

- Laboratory instrumentation and field equipment are calibrated at the correct intervals, as prescribed in the relevant NATA 'General equipment table'.
- Regular preventative maintenance is carried out on all key laboratory instrumentation and field equipment.
- Trip blanks (where appropriate) are supplied to monitor contamination.
- Certified reference materials are analysed routinely.
- Duplicate analysis is conducted to check precision.
- Laboratory blanks are analysed to monitor contamination.
- Quality control checks on media are performed.
- All records and subsequent reports are systematically checked.
- Quality control charts are used to statistically monitor trends in data.
- The laboratory is regularly internally audited.

External

- Ecolab Global Analytical & Microbiology laboratory participates in regular chemical and microbiological external proficiency testing programs as well as NATA audits as per their surveillance program.

Sampling and Data Collection

- All sampling is performed by trained personnel in accordance with procedure A-2.18 and relevant parts of Australian Standard 5667, for which NATA accreditation is held.
- Site measurements (Dissolved Oxygen, pH, Turbidity, Temperature and Conductivity) and sampling observations (water depth) are recorded and reported in accordance with procedure CA12125.

Sample Bottles

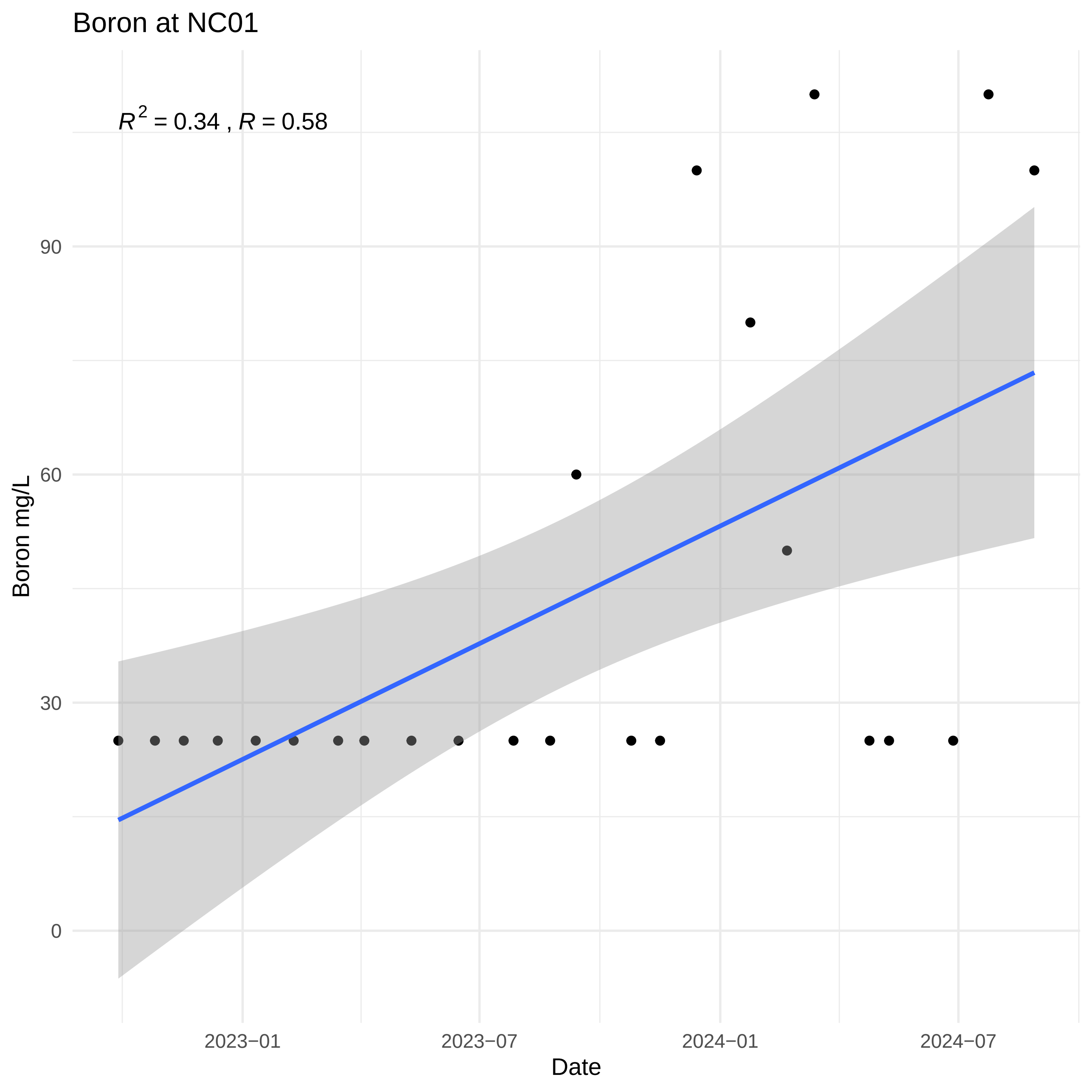
- Pre-labeled sample containers are used for routine sampling and testing.
- The sample bottles are prepared so that samples are preserved in accordance with Australian Standard 5667.1:1998 and Standard Methods for the Examination of Water and Wastewater, 22nd Edition (APHA).

Delivery of Samples

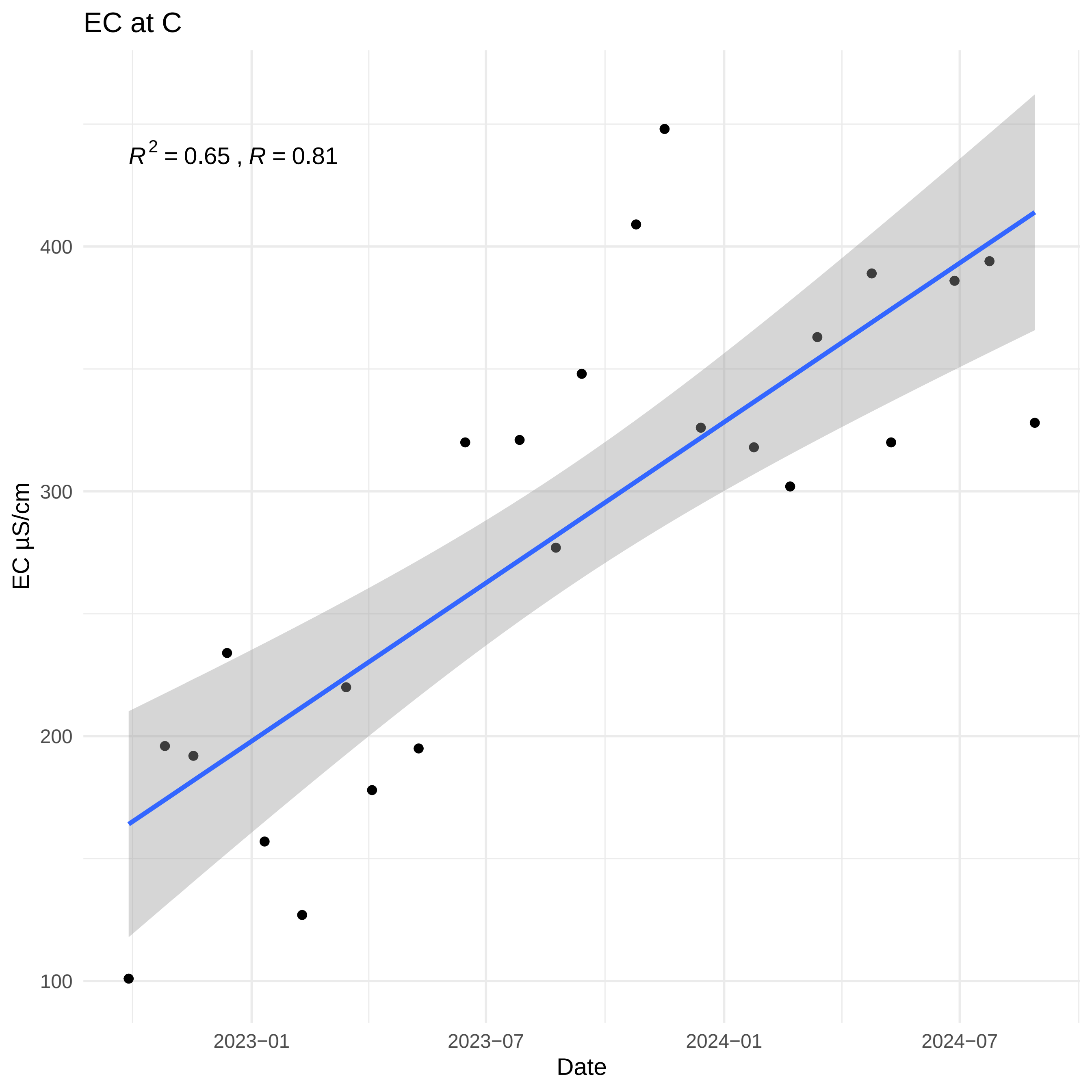
- Eskies and freezer packs are used to maintain the integrity of the samples during transport from the sampling sites to our Global Analytical & Microbiology laboratory (Sydney).

APPENDIX K SURFACE WATER LINEAR TREND GRAPHS

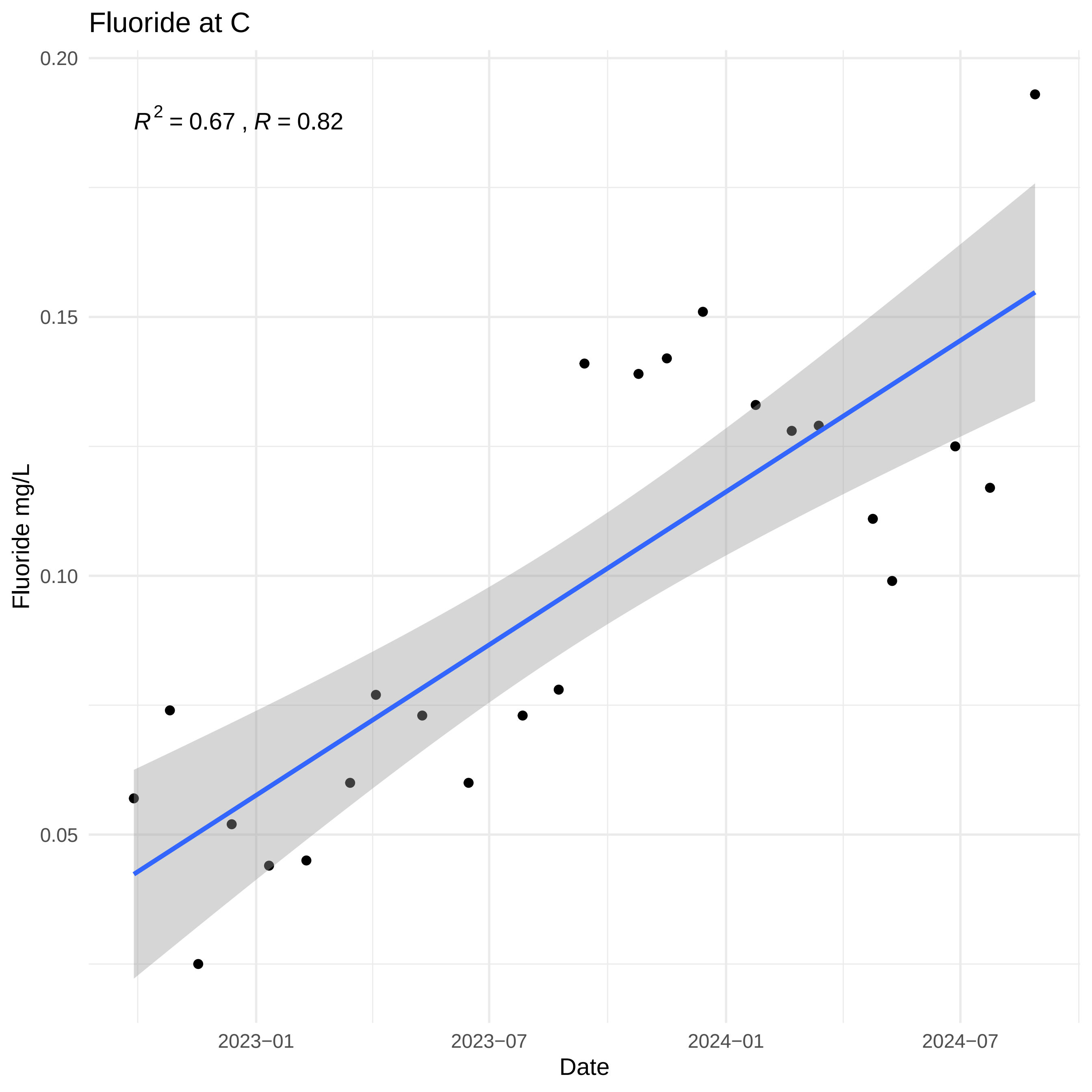
Purpose	Monitoring Location	Stats	Electrical Conductivity (Field)	Chloride	Fluoride	Sulfate (as SO4)	Total Dissolved Solids (TDS)	Arsenic	Boron	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Zinc
Upstream	LMP01	R	-0.04	-0.14	0.29	-0.10	-0.02	0.27	0.13	0.31	0.28	0.42	0.32	0.29	0.01	0.19	0.15	0.01	0.25	0.45
		R2	0.00	0.02	0.08	0.01	0.00	0.07	0.02	0.09	0.08	0.18	0.10	0.09	0.00	0.04	0.02	0.00	0.06	0.20
Midstream	NC01	R	0.48	0.25	0.54	0.32	0.33	-0.04	0.58	-0.33	-0.43	-0.19	-0.12	-0.33	0.03	-0.15	0.33	-0.11	-0.34	-0.09
		R2	0.23	0.06	0.29	0.10	0.11	0.00	0.34	0.11	0.19	0.04	0.02	0.11	0.00	0.02	0.11	0.01	0.12	0.01
	SW_C	R	0.81	0.33	0.82	0.70	0.72	-0.36	0.44	-0.33	0.20	-0.02	-0.17	-0.37	0.35	0.00	0.46	-0.08	-0.33	0.03
		R2	0.65	0.11	0.67	0.49	0.53	0.13	0.20	0.11	0.04	0.00	0.03	0.14	0.12	0.00	0.21	0.01	0.11	0.00
	SW_E	R	0.37	0.31	0.44	0.33	0.33	-0.33	0.35	0.00	-0.33	0.07	0.31	-0.33	0.28	-0.15	0.52	0.32	-0.38	0.27
		R2	0.13	0.10	0.19	0.11	0.11	0.11	0.12	0.00	0.11	0.01	0.10	0.11	0.08	0.02	0.27	0.10	0.14	0.07
Downstream	WX22	R	0.29	0.16	0.31	0.22	0.23	-0.01	0.45	0.00	-0.33	0.21	-0.36	-0.33	0.01	-0.01	0.25	0.23	-0.16	-0.14
		R2	0.08	0.03	0.09	0.05	0.05	0.00	0.20	0.00	0.11	0.05	0.13	0.11	0.00	0.00	0.06	0.06	0.03	0.02
	SW_G	R	0.27	0.14	0.15	0.19	0.23	-0.33	0.38	0.00	-0.33	-0.39	-0.33	-0.33	0.04	0.00	0.44	0.25	-0.12	-0.41
		R2	0.07	0.02	0.02	0.04	0.05	0.11	0.15	0.00	0.11	0.15	0.11	0.11	0.00	0.00	0.19	0.06	0.02	0.17



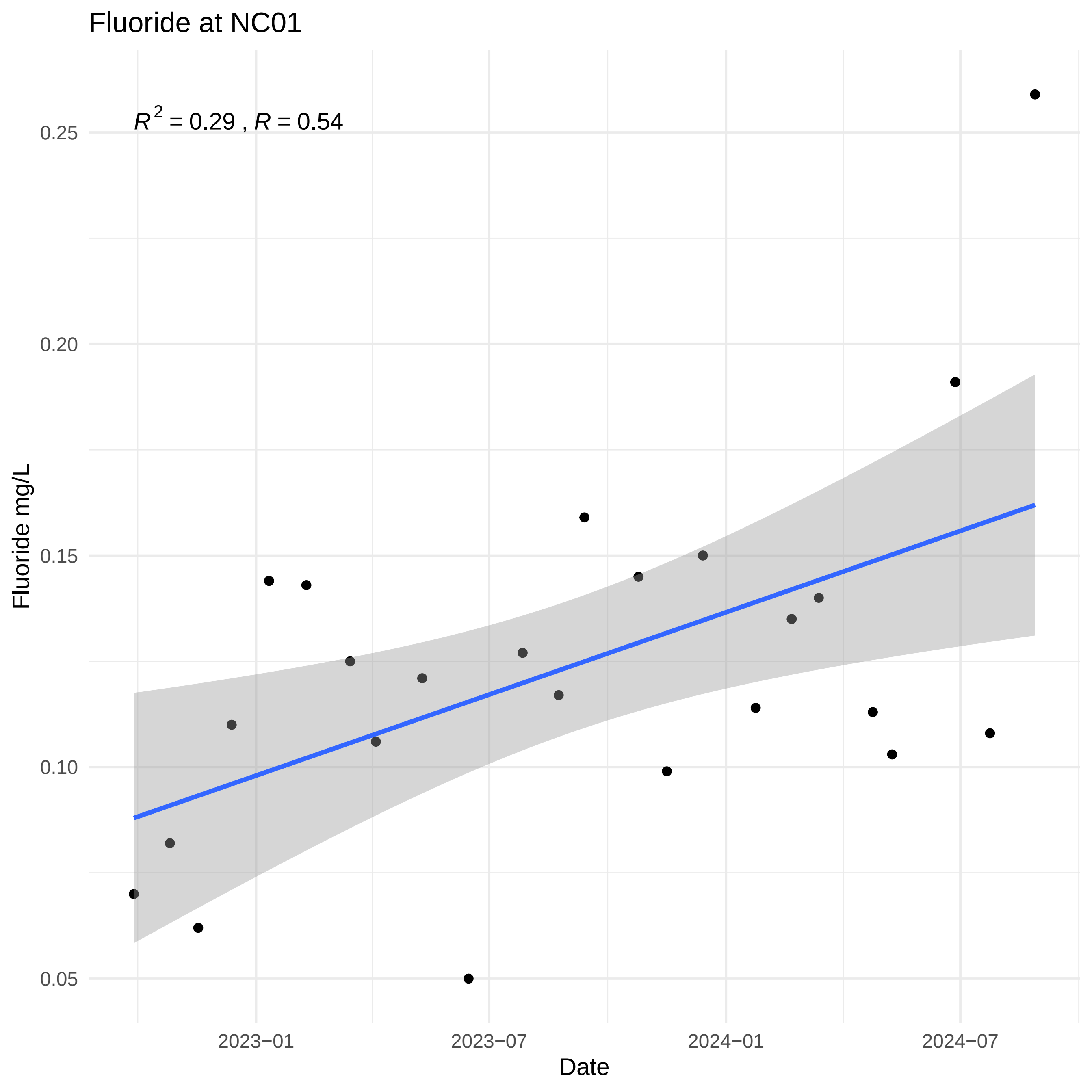
Boron at NC01
$R^2 = 0.34$, $R = 0.58$
90
60
30
0
Boron mg/L
2023−01
2023−07
2024−01
2024−07
Date

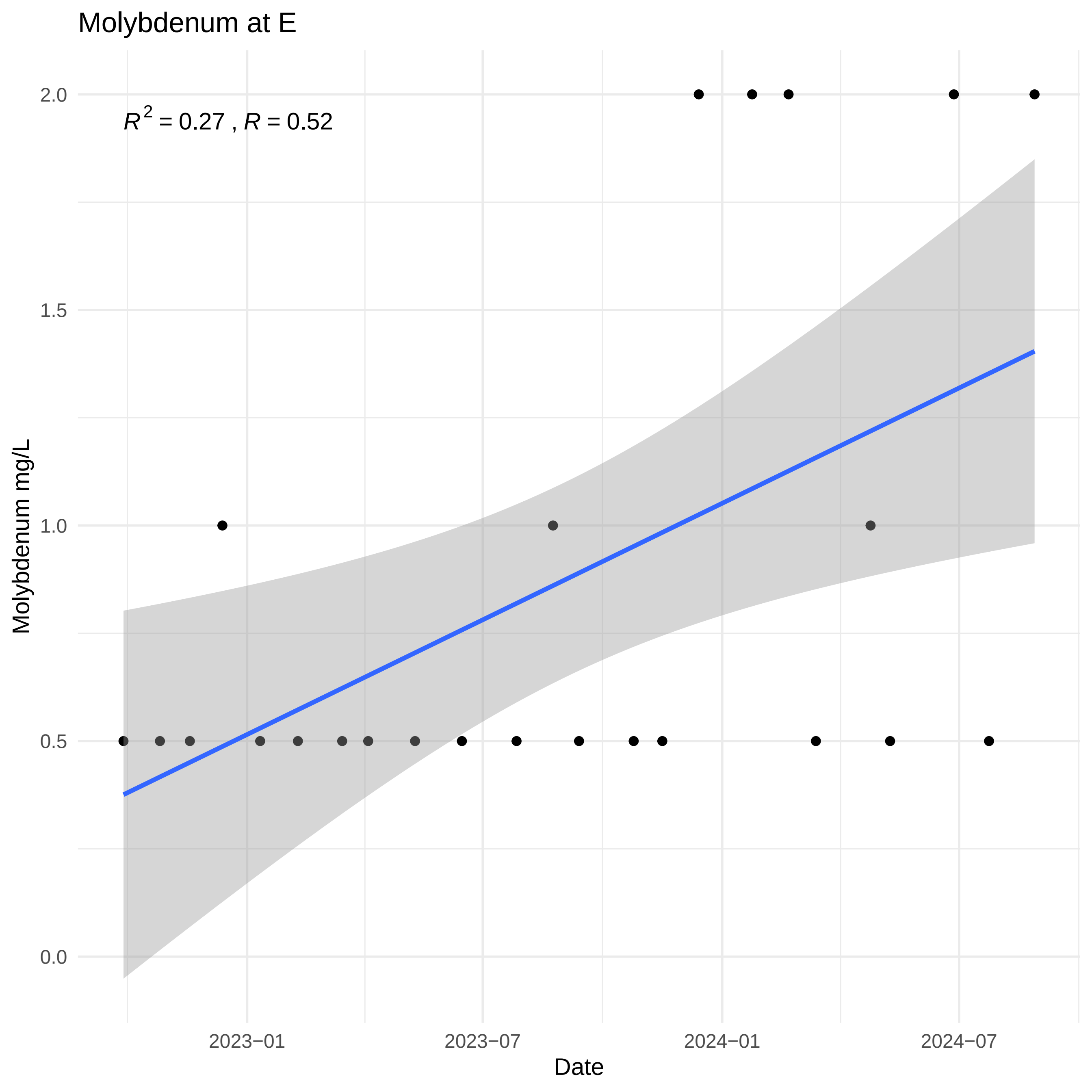


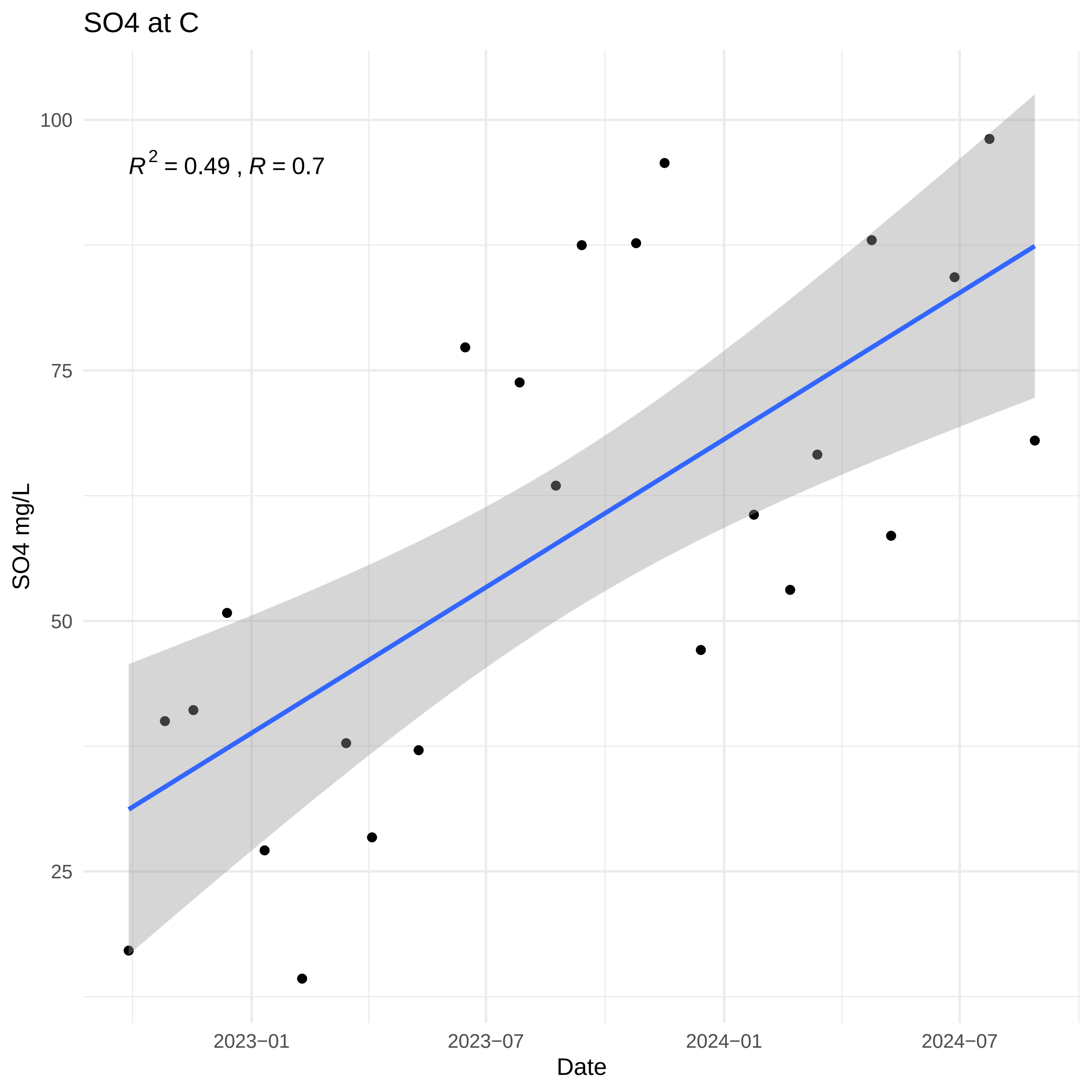
EC at C
$R^2 = 0.65$, $R = 0.81$
400
300
200
100
EC µS/cm
2023−01
2023−07
2024−01
2024−07
Date



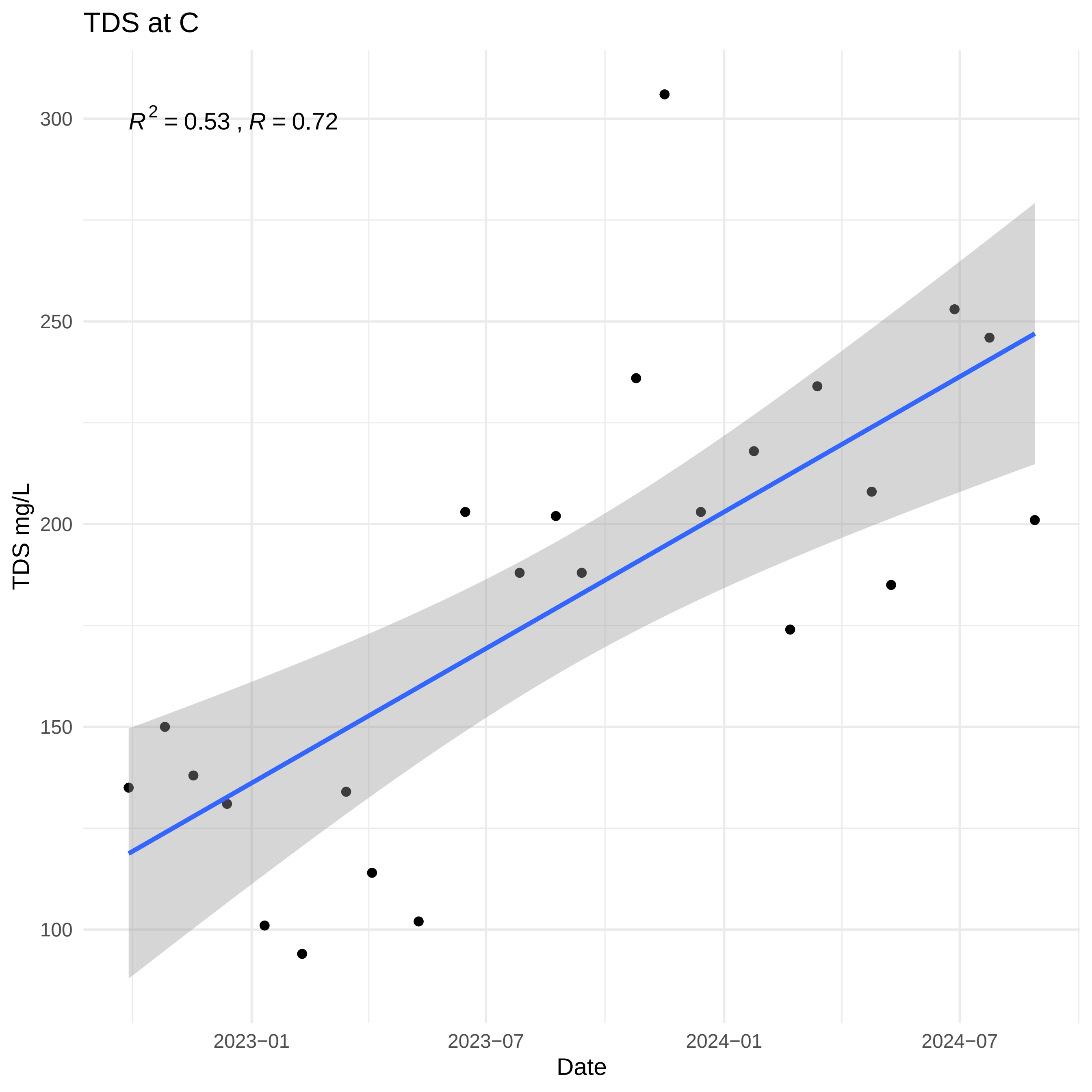
Fluoride at C
$R^2 = 0.67$, $R = 0.82$
0.20
0.15
0.10
0.05
Fluoride mg/L
2023−01
2023−07
2024−01
2024−07
Date


Fluoride at NC01
$R^2 = 0.29$, $R = 0.54$
0.25
0.20
0.15
0.10
0.05
Fluoride mg/L
2023−01
2023−07
2024−01
2024−07
Date


Molybdenum at E
$R^2 = 0.27$, $R = 0.52$
2.0
1.5
1.0
0.5
0.0
Molybdenum mg/L
2023−01
2023−07
2024−01
2024−07
Date



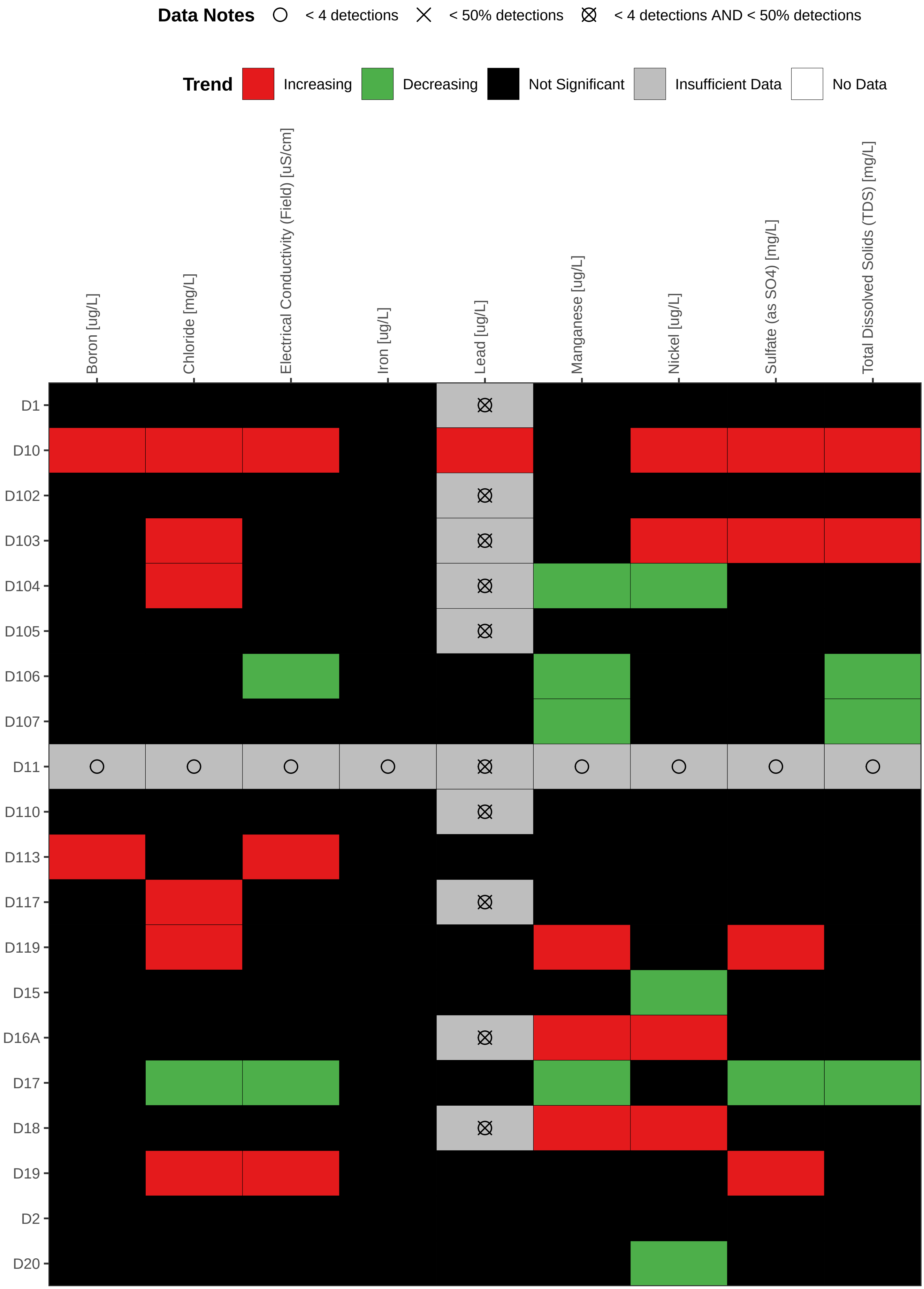
SO4 at C
$R^2 = 0.49$, $R = 0.7$
100
75
50
25
SO4 mg/L
2023−01
2023−07
2024−01
2024−07
Date

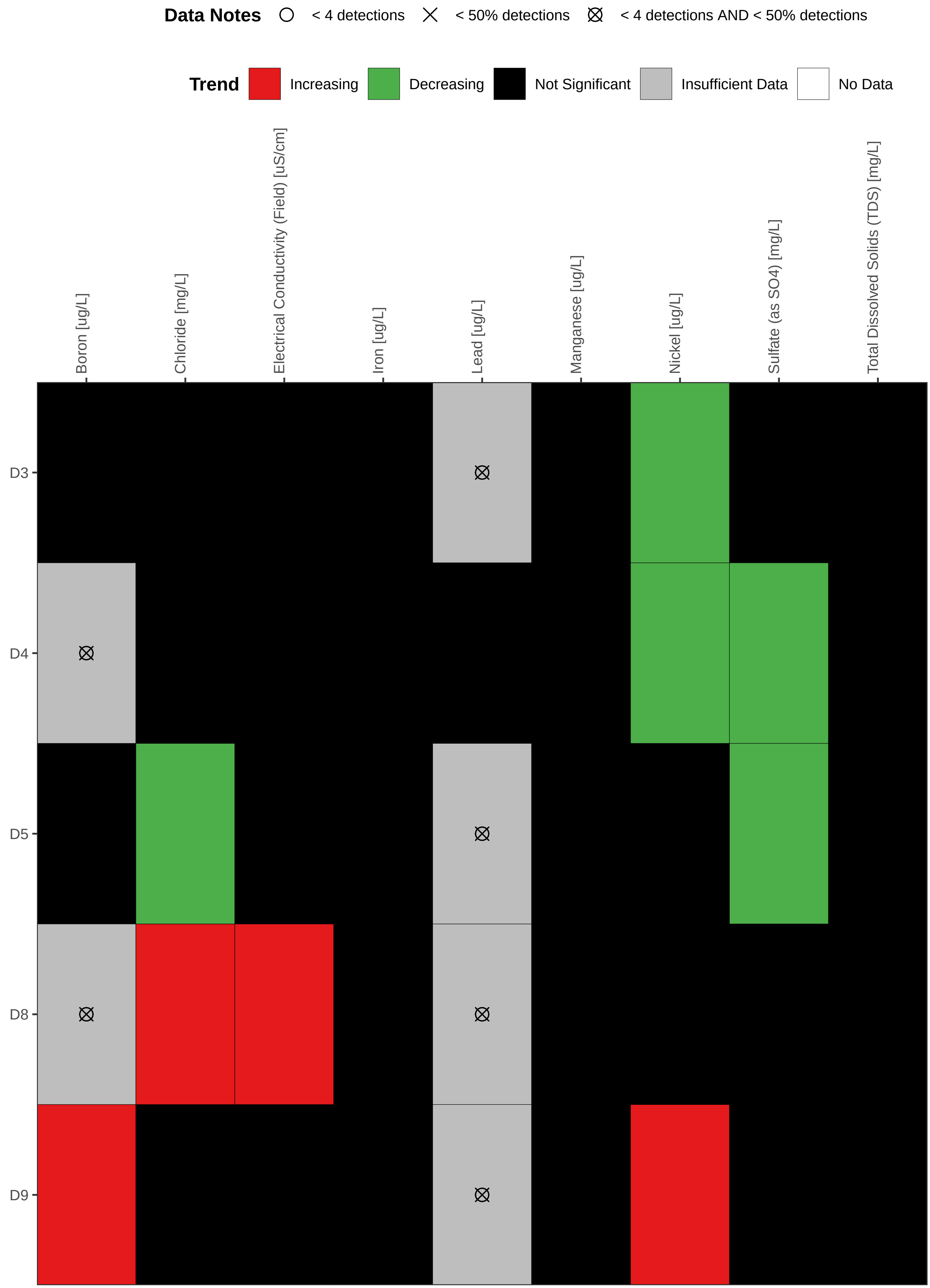

TDS at C
$R^2 = 0.53$, $R = 0.72$
300
250
200
150
100
TDS mg/L
2023−01
2023−07
2024−01
2024−07
Date

ERM

APPENDIX L GROUNDWATER MANN-KENDALL OUTPUTS

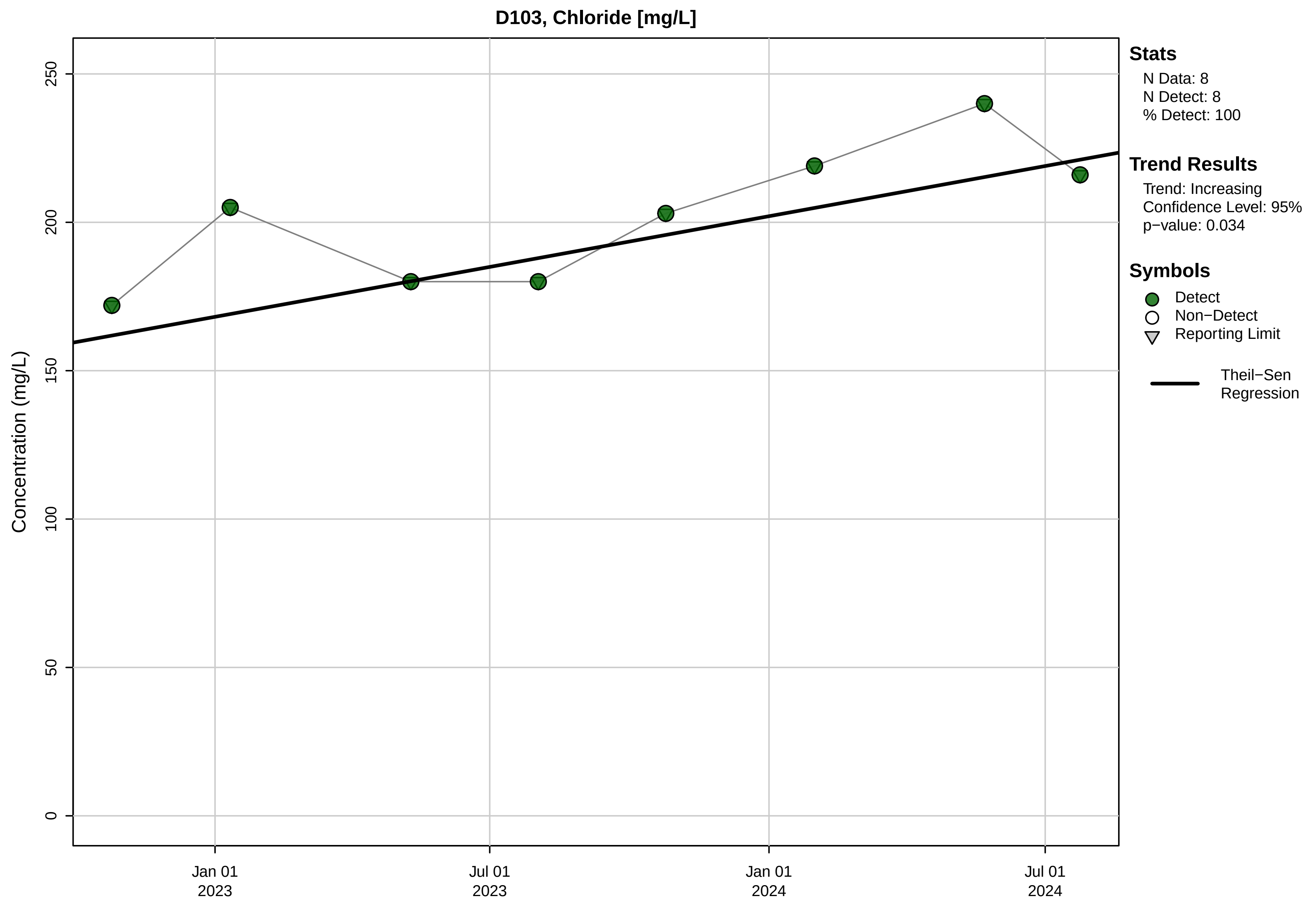
Trend Analysis Summary


Data Notes
< 4 detections
< 50% detections
< 4 detections AND < 50% detections
Trend
Increasing
Decreasing
Not Significant
Insufficient Data
No Data
Boron [ug/L]
Chloride [mg/L]
Electrical Conductivity (Field) [uS/cm]
Iron [ug/L]
Lead [ug/L]
Manganese [ug/L]
Nickel [ug/L]
Sulfate (as SO4) [mg/L]
Total Dissolved Solids (TDS) [mg/L]
D1
D10
D102
D103
D104
D105
D106
D107
D11
D110
D113
D117
D119
D15
D16A
D17
D18
D19
D2
D20

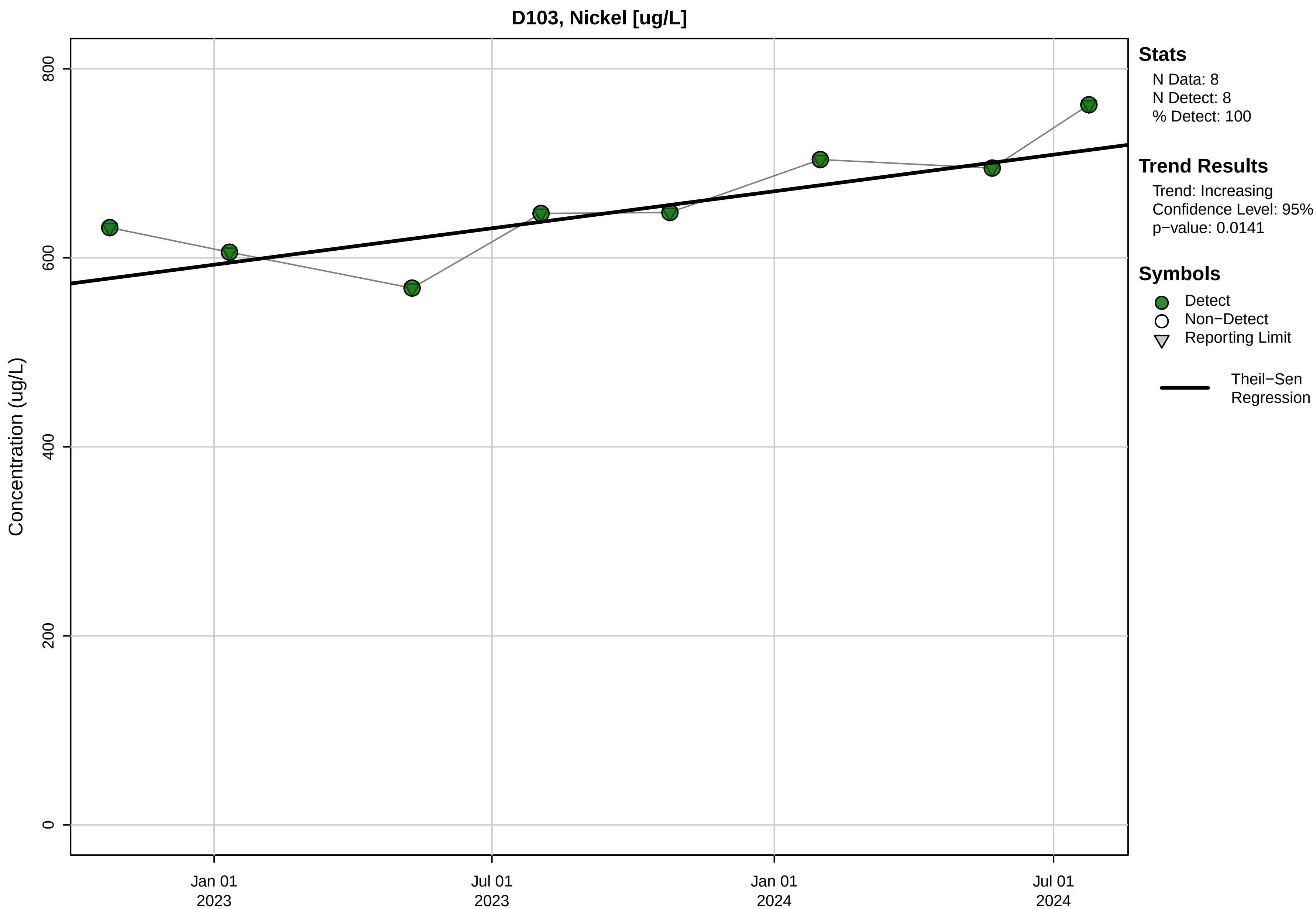


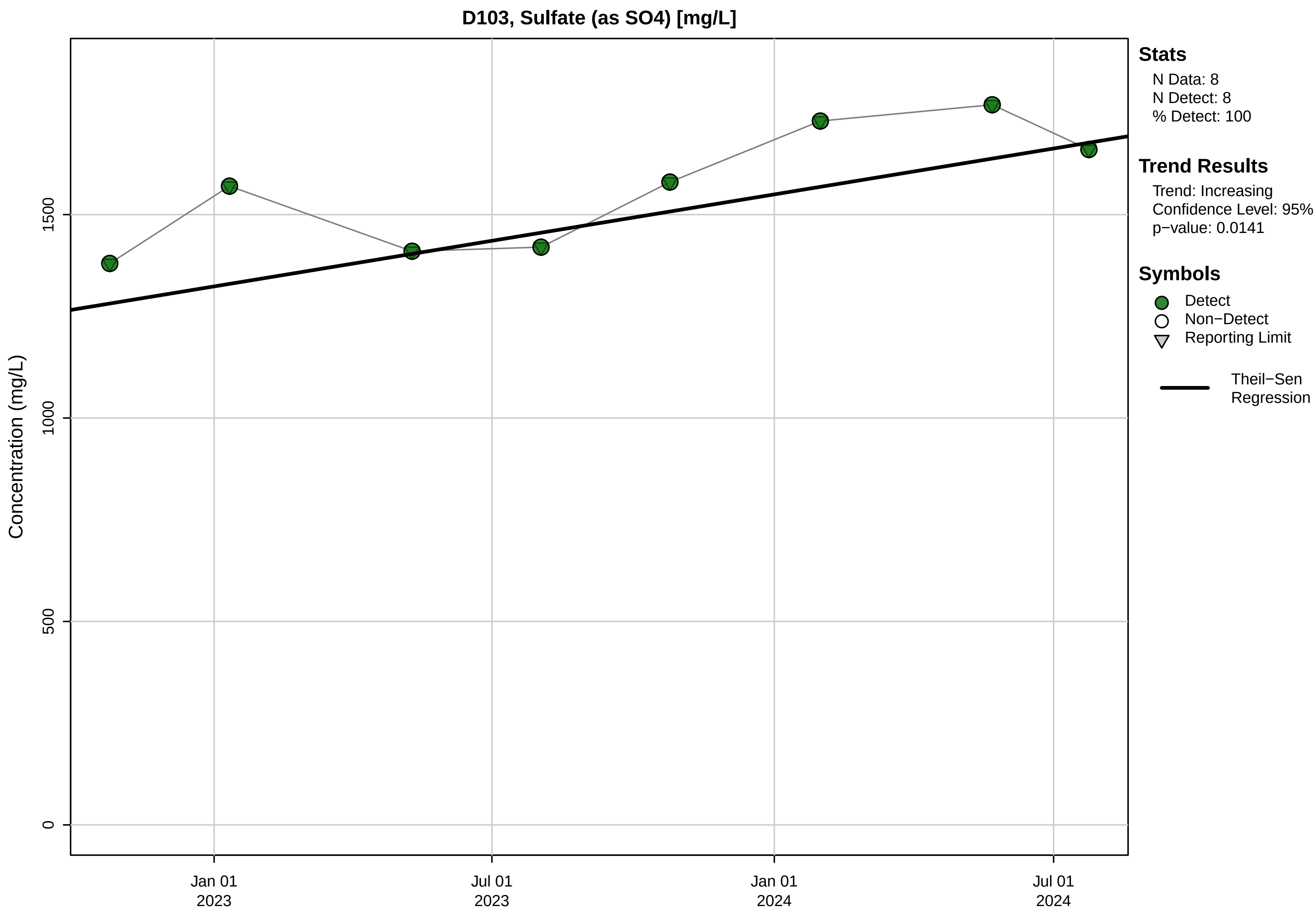
Data Notes
< 4 detections
< 50% detections
< 4 detections AND < 50% detections
Trend
Increasing
Decreasing
Not Significant
Insufficient Data
No Data
Boron [ug/L]
Chloride [mg/L]
Electrical Conductivity (Field) [uS/cm]
Iron [ug/L]
Lead [ug/L]
Manganese [ug/L]
Nickel [ug/L]
Sulfate (as SO4) [mg/L]
Total Dissolved Solids (TDS) [mg/L]
D3
D4
D5
D8
D9

Time Series Figures

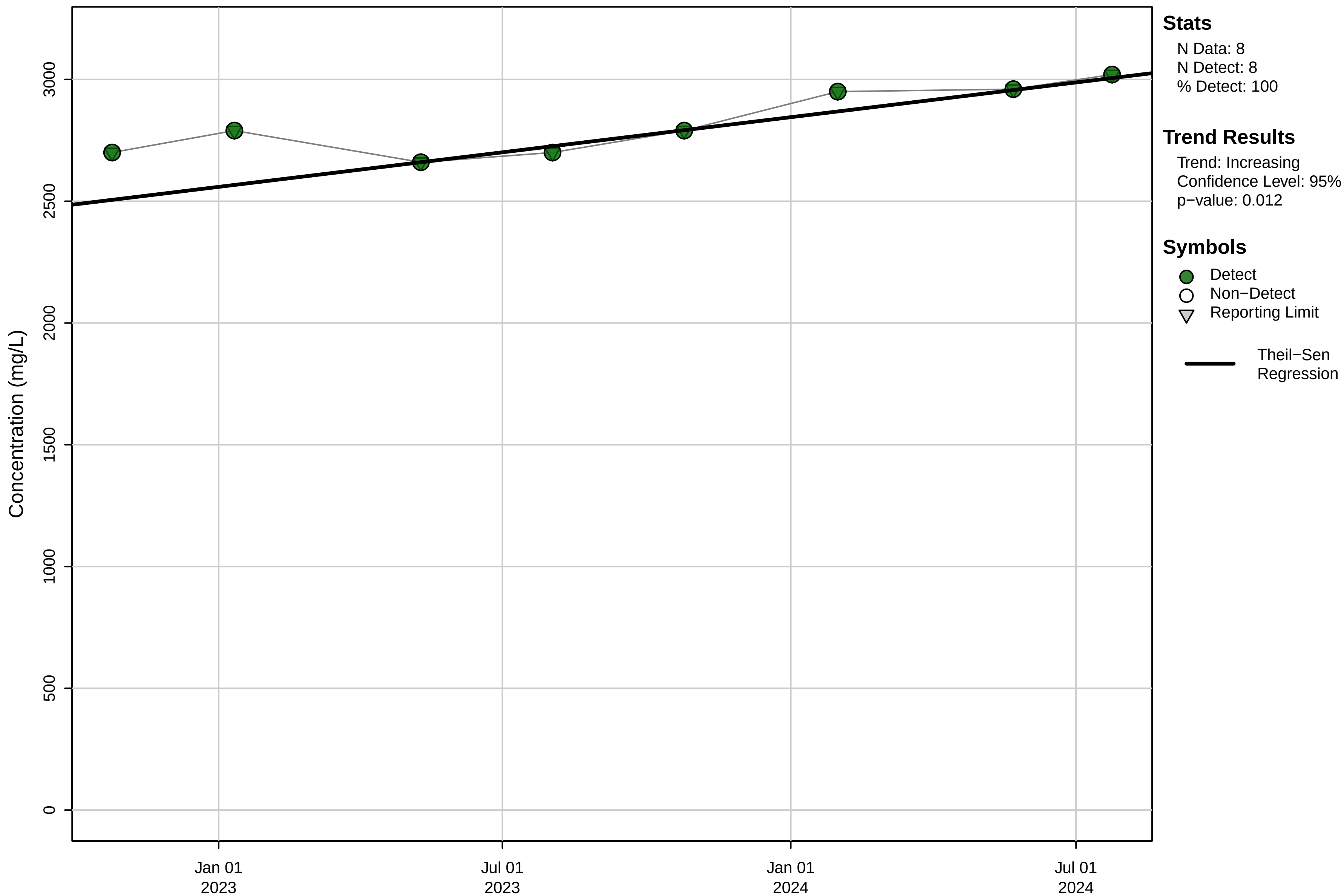


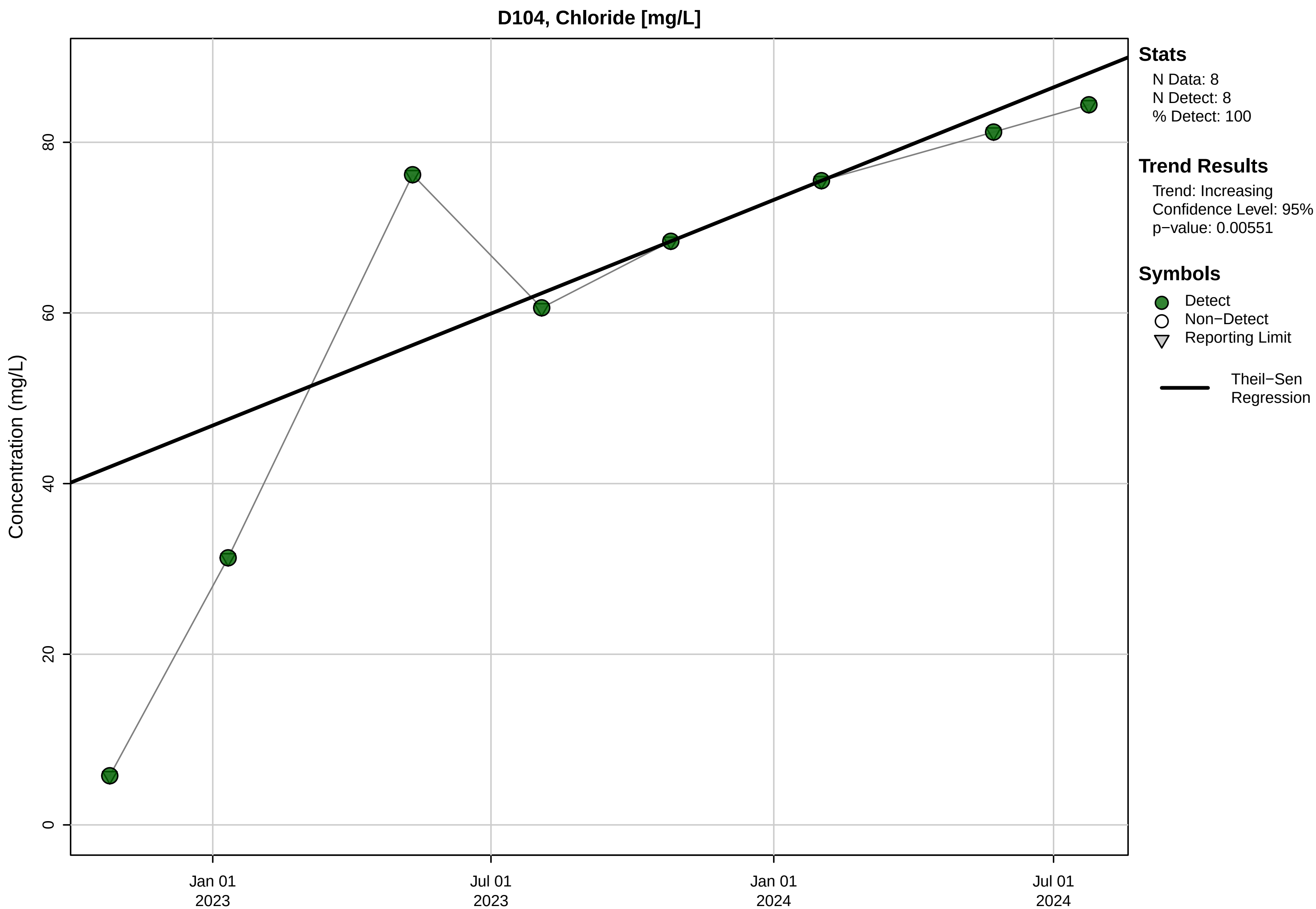
D103, Chloride [mg/L]
Concentration (mg/L)
0
50
100
150
200
250
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.034
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression


D103, Nickel [ug/L]
Concentration (ug/L)
0
200
400
600
800
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.0141
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

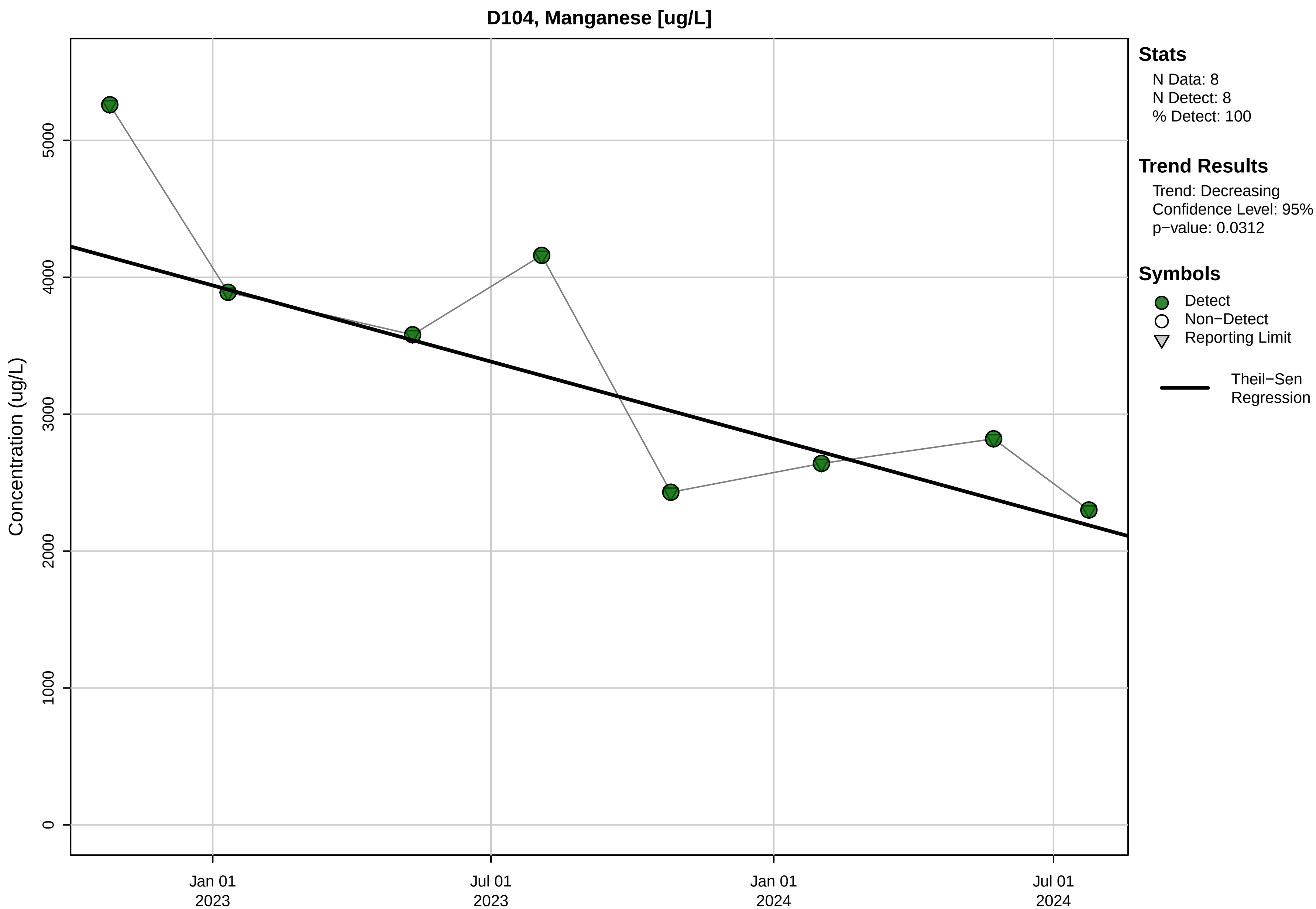

D103, Sulfate (as SO4) [mg/L]
Concentration (mg/L)
0
500
1000
1500
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.0141
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

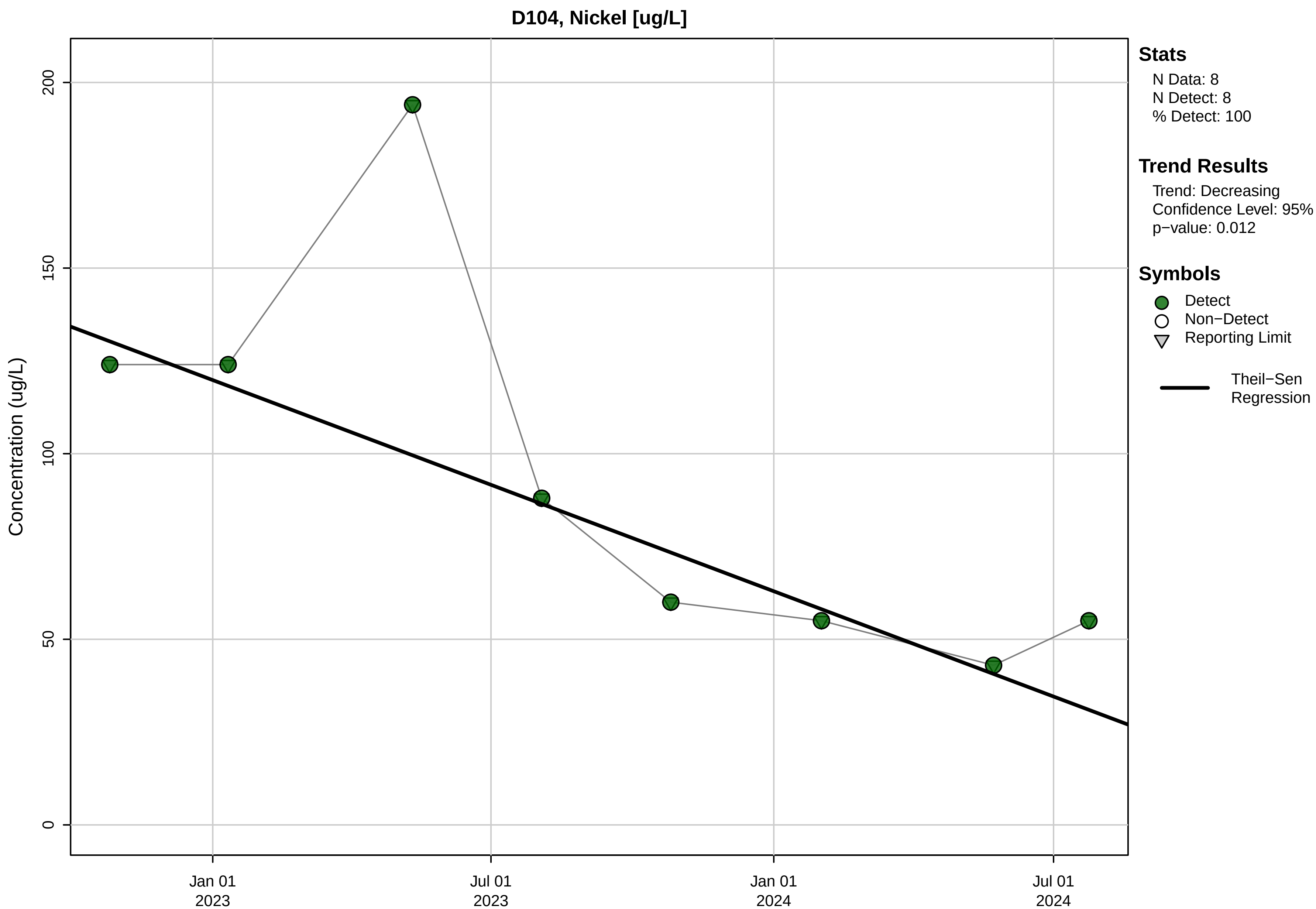
D103, Total Dissolved Solids (TDS) [mg/L]

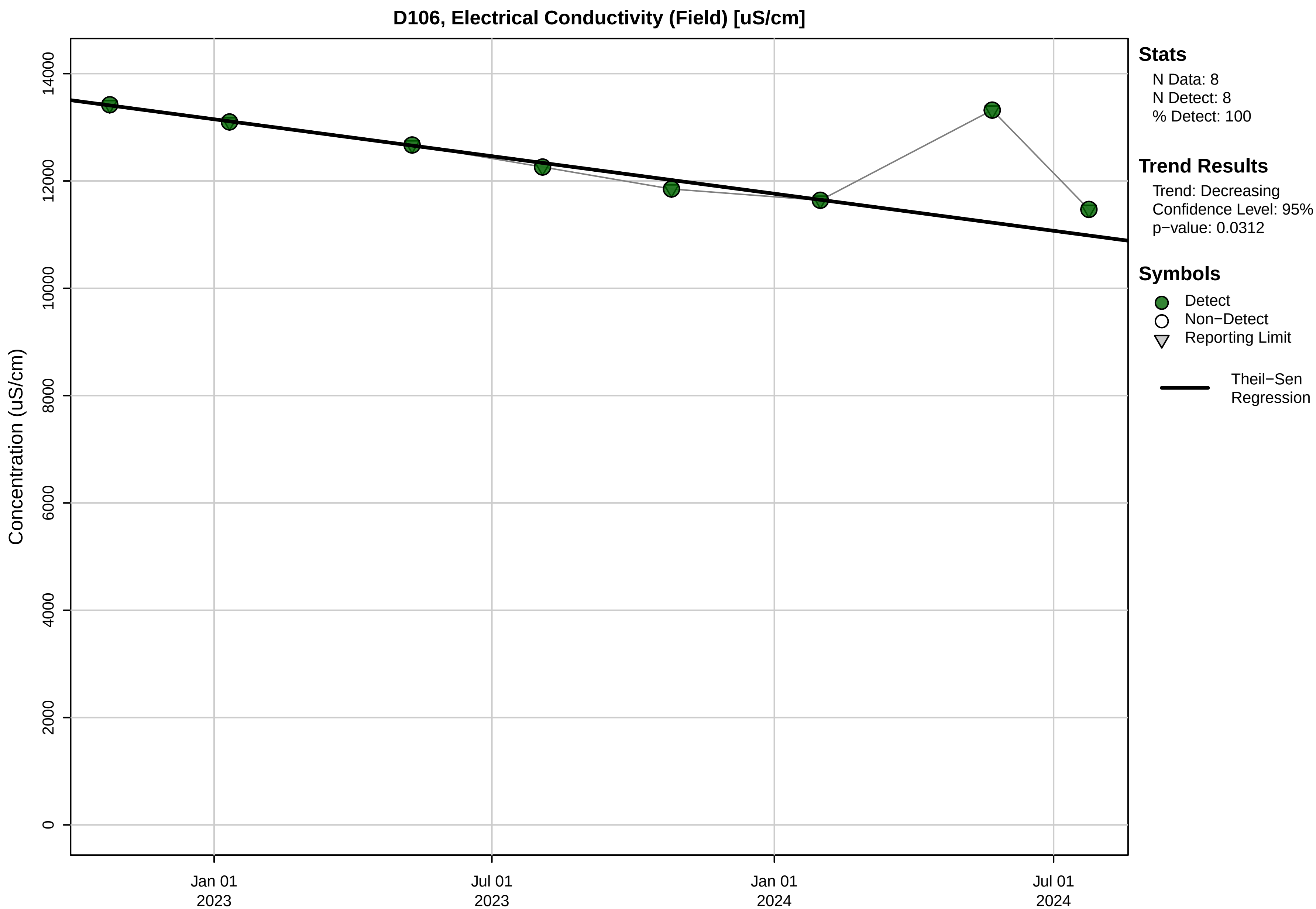




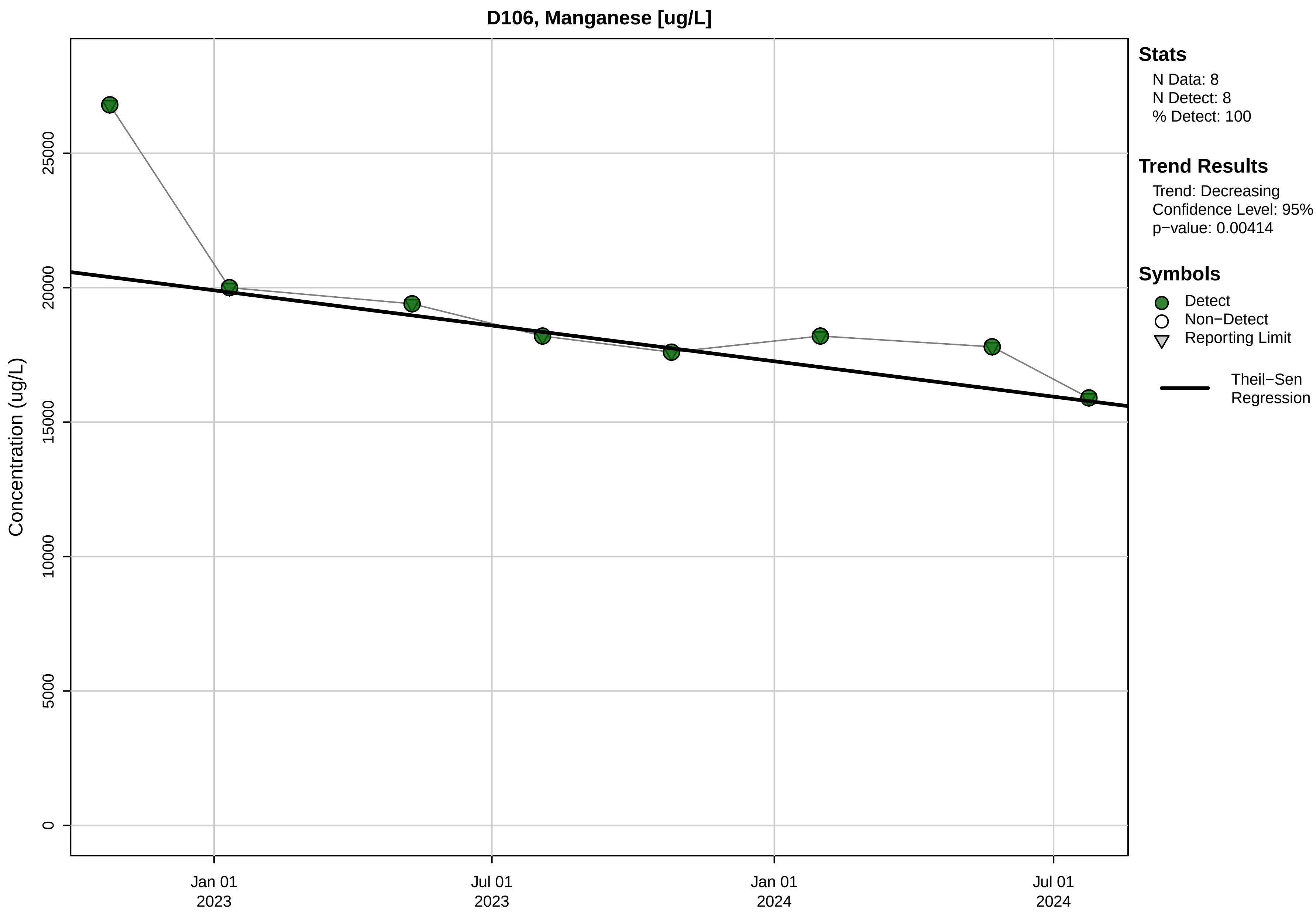
D104, Chloride [mg/L]
Concentration (mg/L)
0
20
40
60
80
Jan 01
2023
Jul 01
2023
Jan 01
2024
Jul 01
2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.00551
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen
Regression


D104, Manganese [ug/L]
Concentration (ug/L)
0
1000
2000
3000
4000
5000
Jan 01
2023
Jul 01
2023
Jan 01
2024
Jul 01
2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Decreasing
Confidence Level: 95%
p−value: 0.0312
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen
Regression

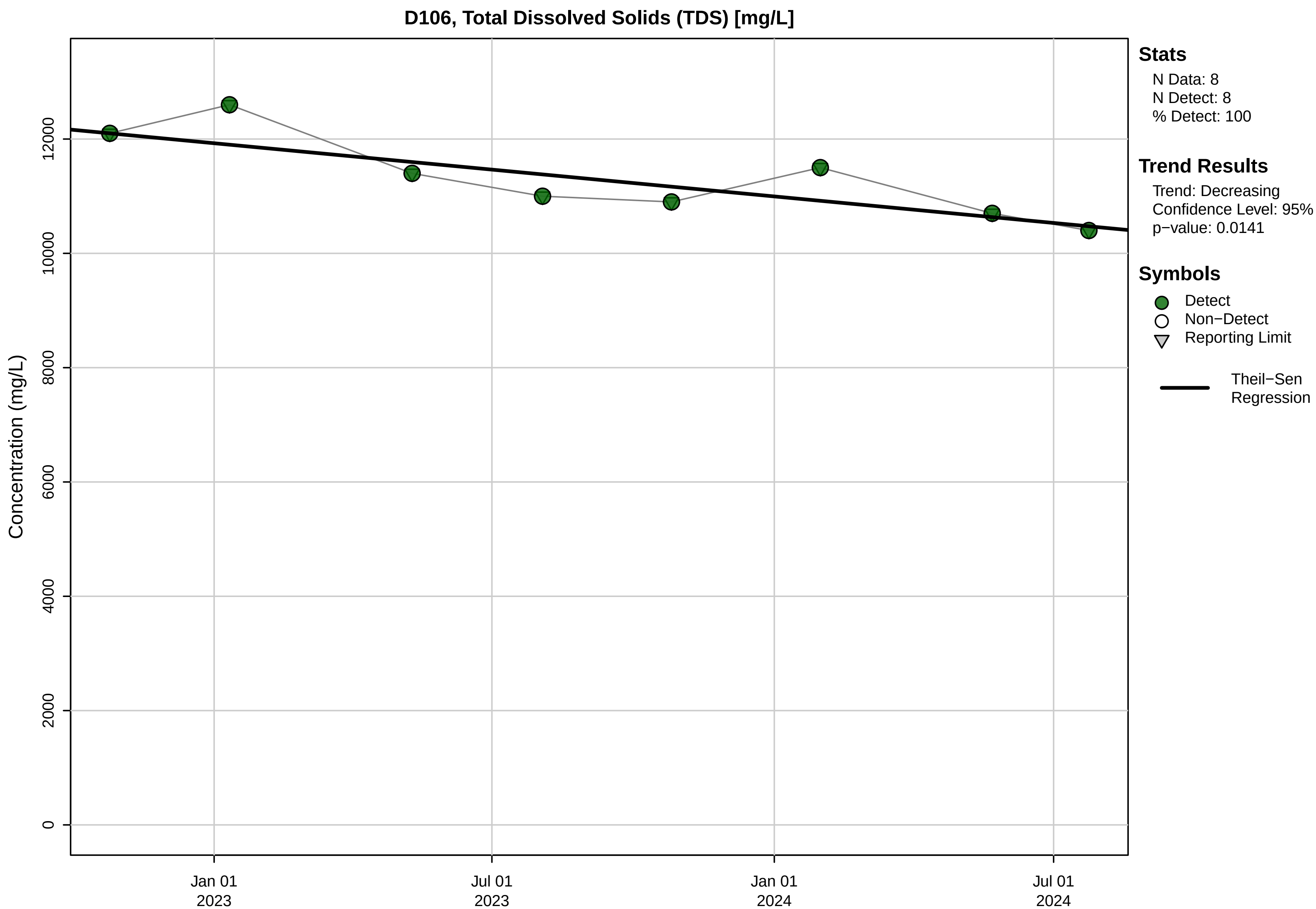

D104, Nickel [ug/L]
Concentration (ug/L)
0
50
100
150
200
Jan 01
2023
Jul 01
2023
Jan 01
2024
Jul 01
2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Decreasing
Confidence Level: 95%
p−value: 0.012
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen
Regression

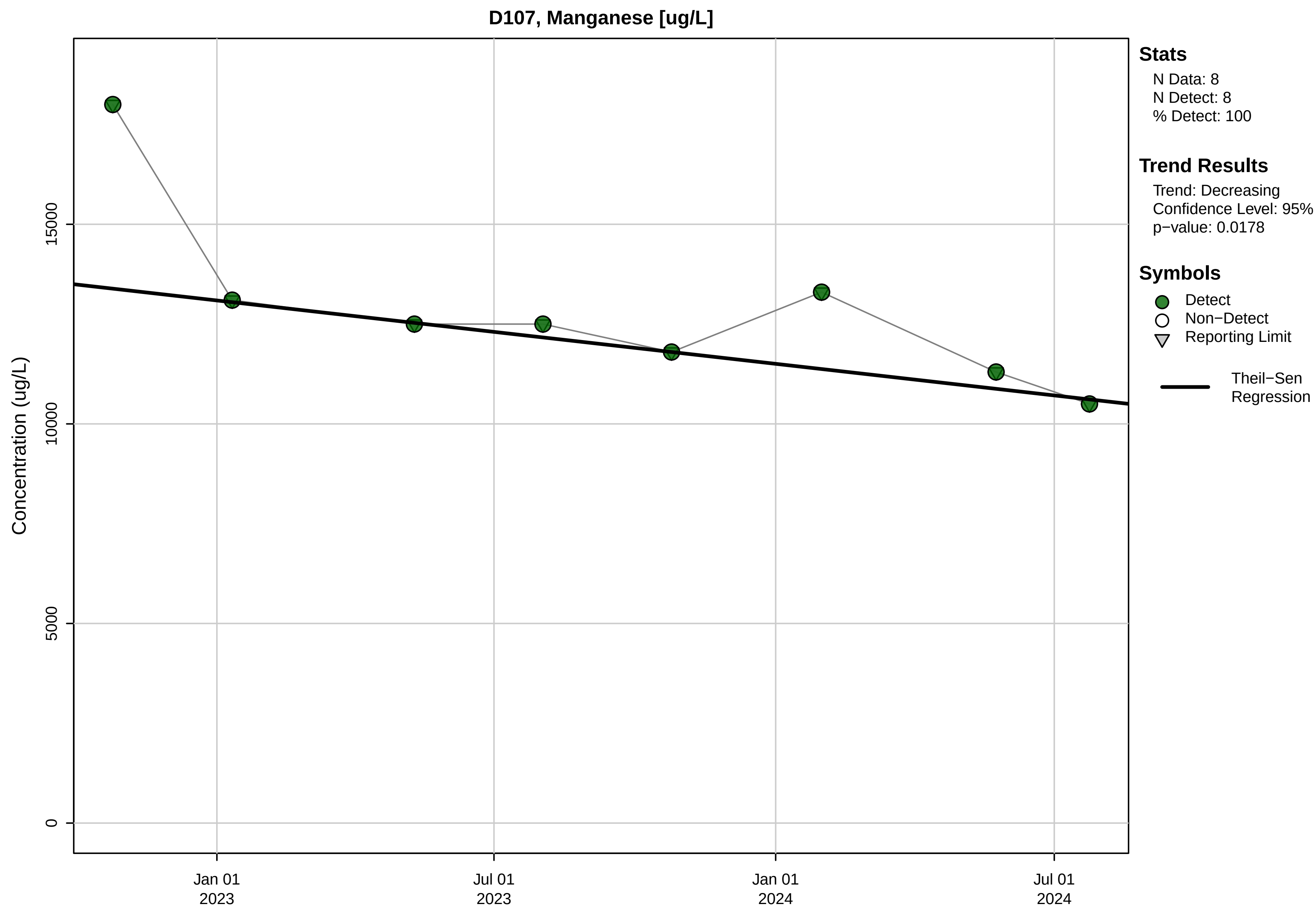


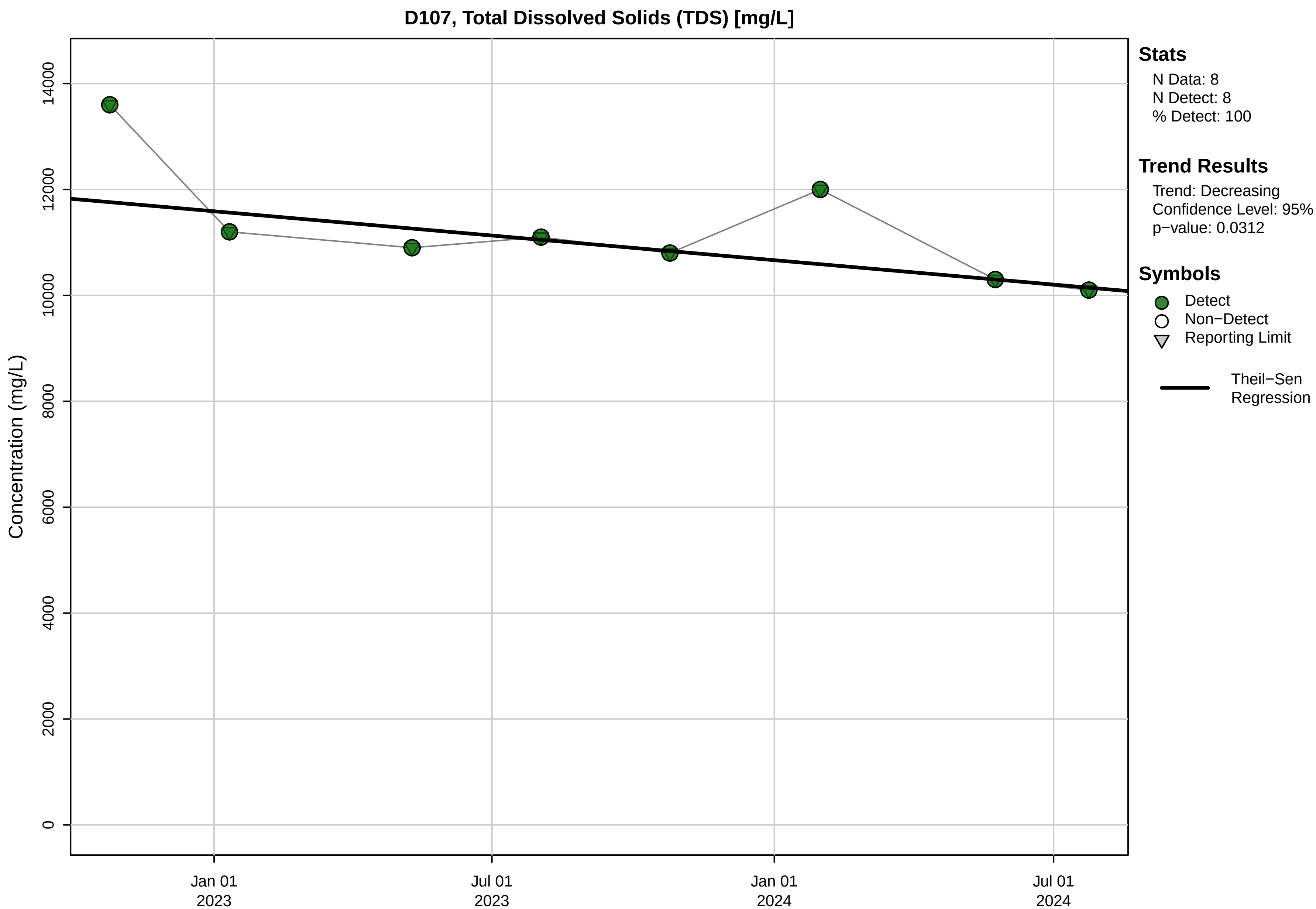
D106, Electrical Conductivity (Field) [uS/cm]
Concentration (uS/cm)
0
2000
4000
6000
8000
10000
12000
14000
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Decreasing
Confidence Level: 95%
p−value: 0.0312
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression



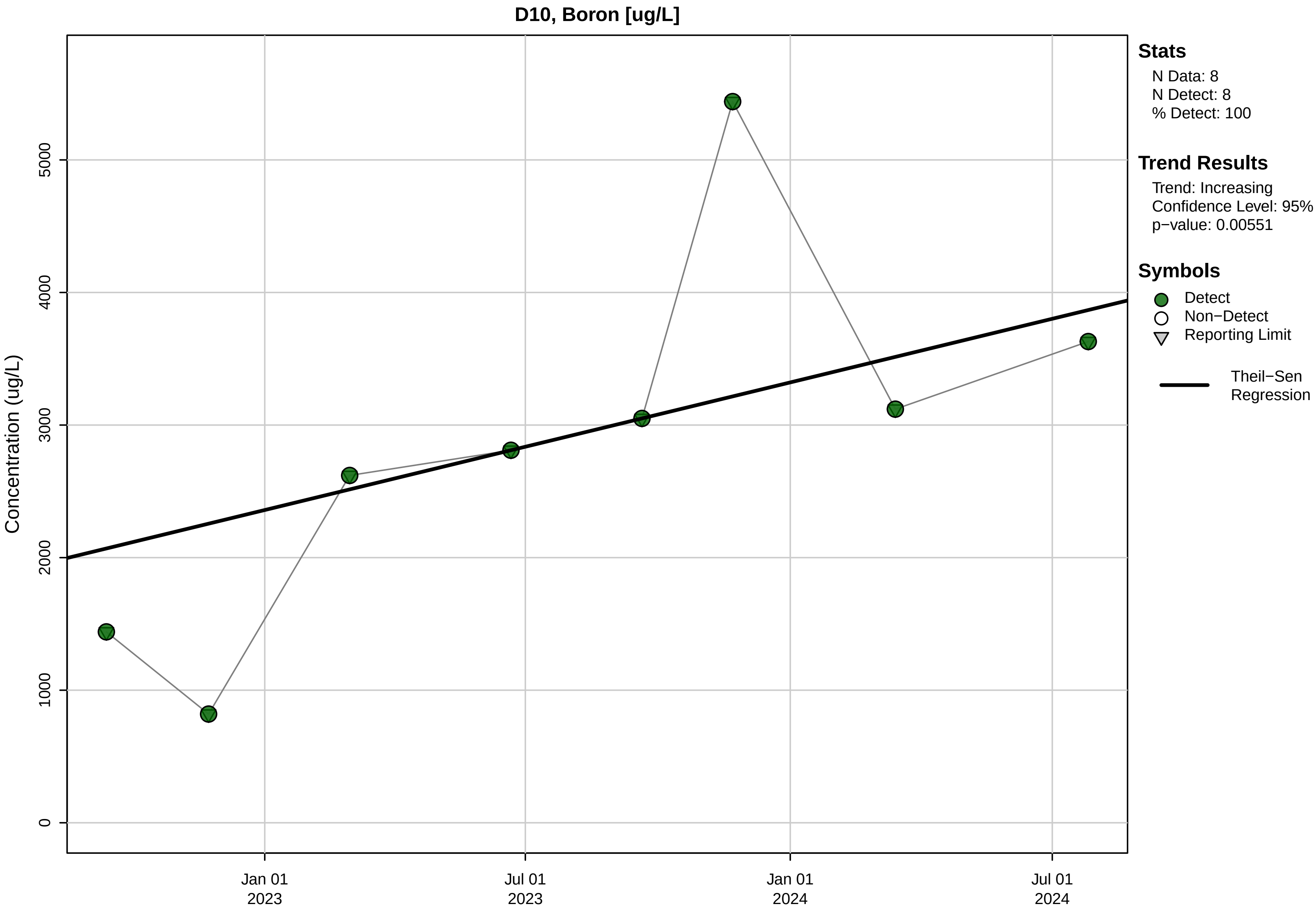
D106, Manganese [ug/L]
Concentration (ug/L)
0
5000
10000
15000
20000
25000
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Decreasing
Confidence Level: 95%
p−value: 0.00414
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

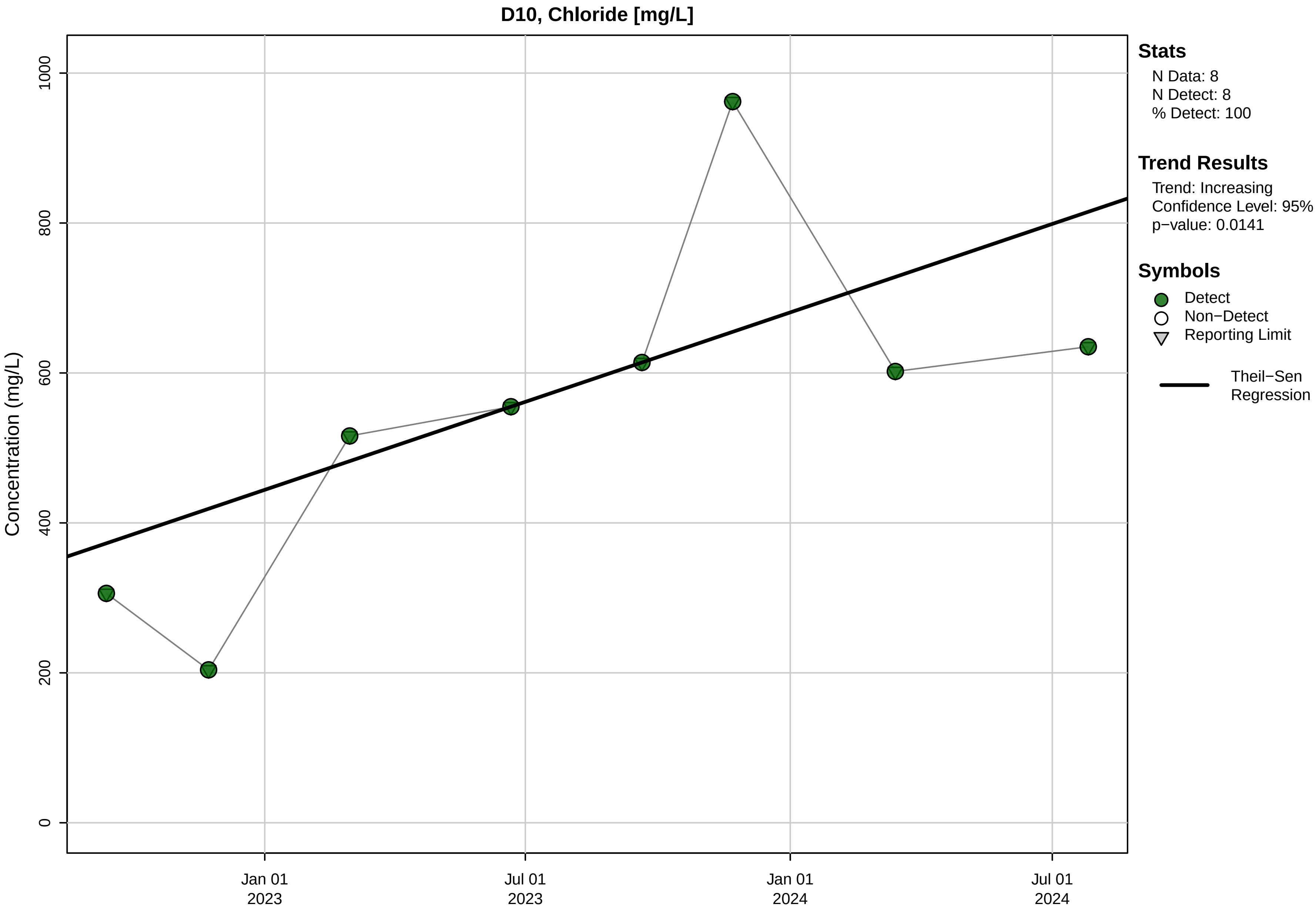

D106, Total Dissolved Solids (TDS) [mg/L]
Concentration (mg/L)
0
2000
4000
6000
8000
10000
12000
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Decreasing
Confidence Level: 95%
p−value: 0.0141
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

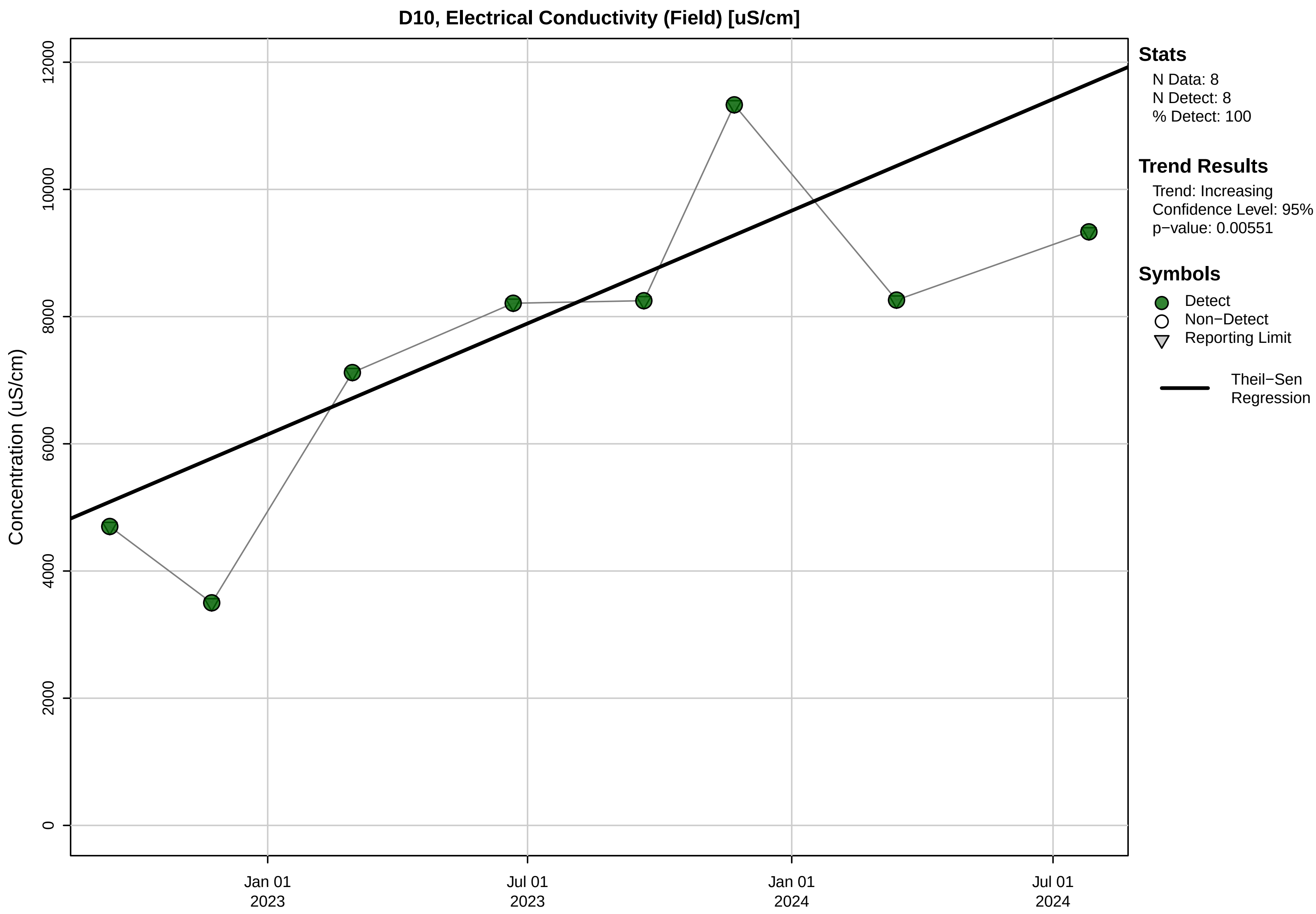

D107, Manganese [ug/L]
Concentration (ug/L)
0
5000
10000
15000
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Decreasing
Confidence Level: 95%
p−value: 0.0178
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression



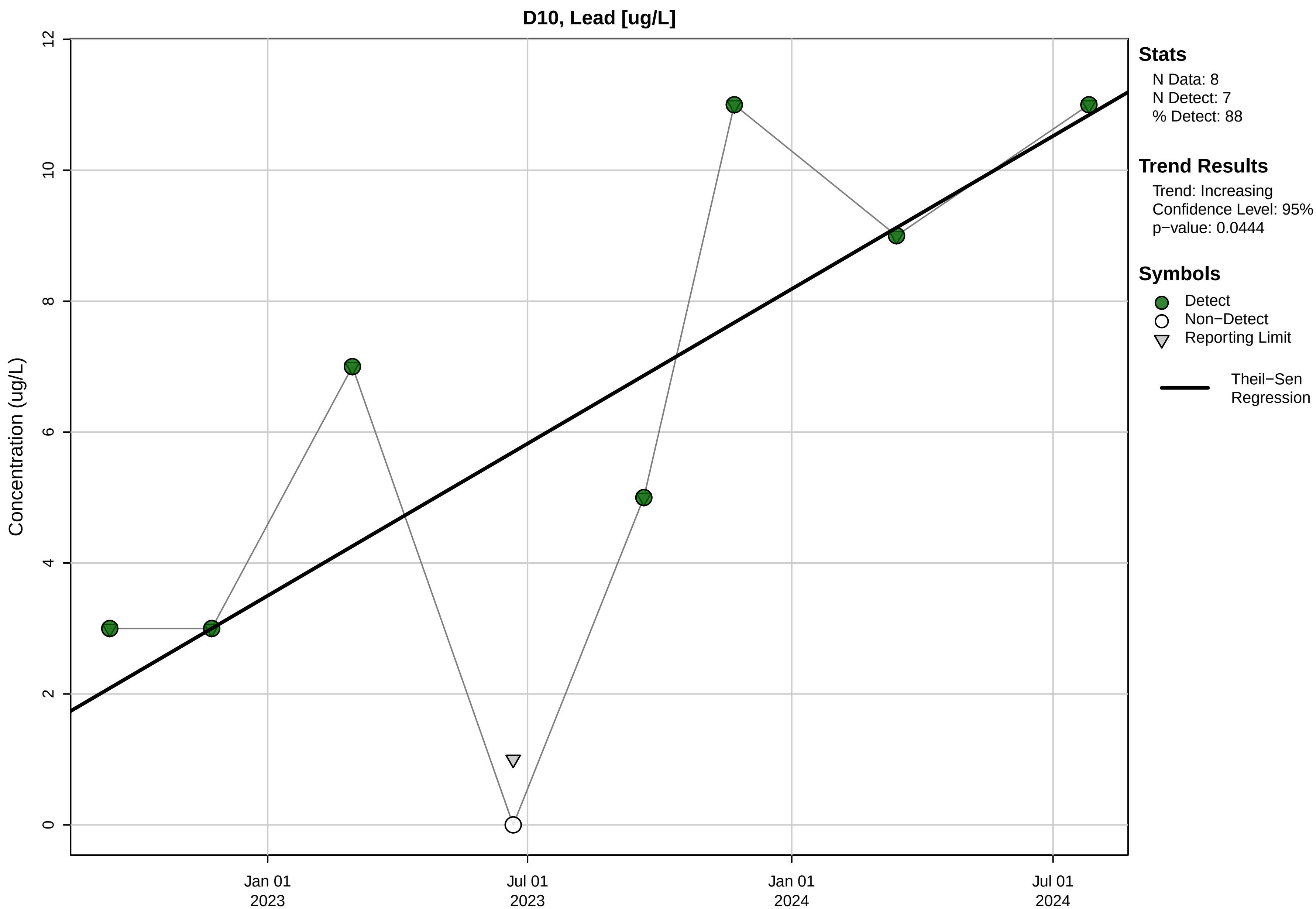
D107, Total Dissolved Solids (TDS) [mg/L]
Concentration (mg/L)
0
2000
4000
6000
8000
10000
12000
14000
Jan 01
2023
Jul 01
2023
Jan 01
2024
Jul 01
2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Decreasing
Confidence Level: 95%
p−value: 0.0312
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen
Regression


D10, Boron [ug/L]
Concentration (ug/L)
0
1000
2000
3000
4000
5000
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.00551
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

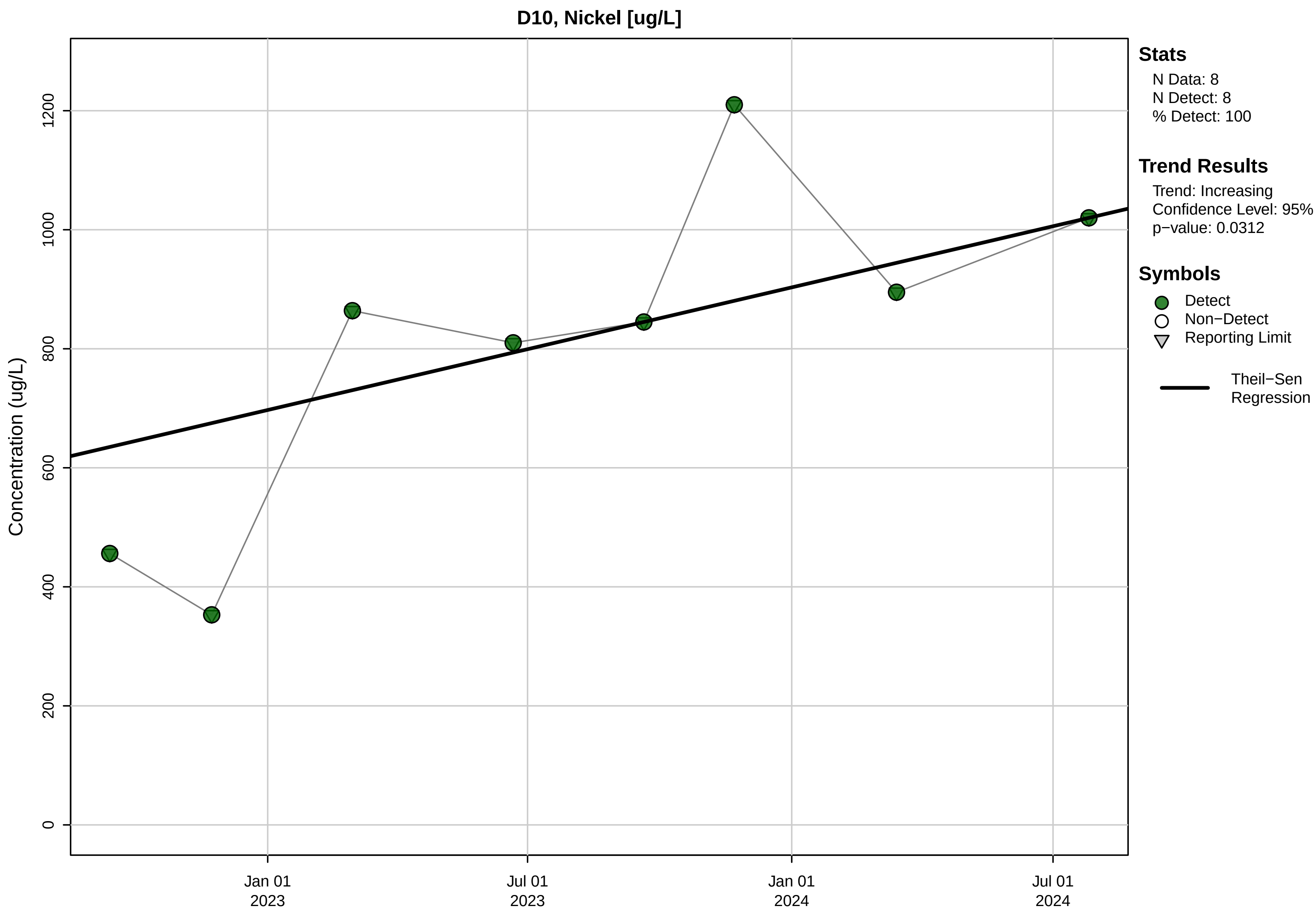

D10, Chloride [mg/L]
Concentration (mg/L)
0
200
400
600
800
1000
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.0141
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

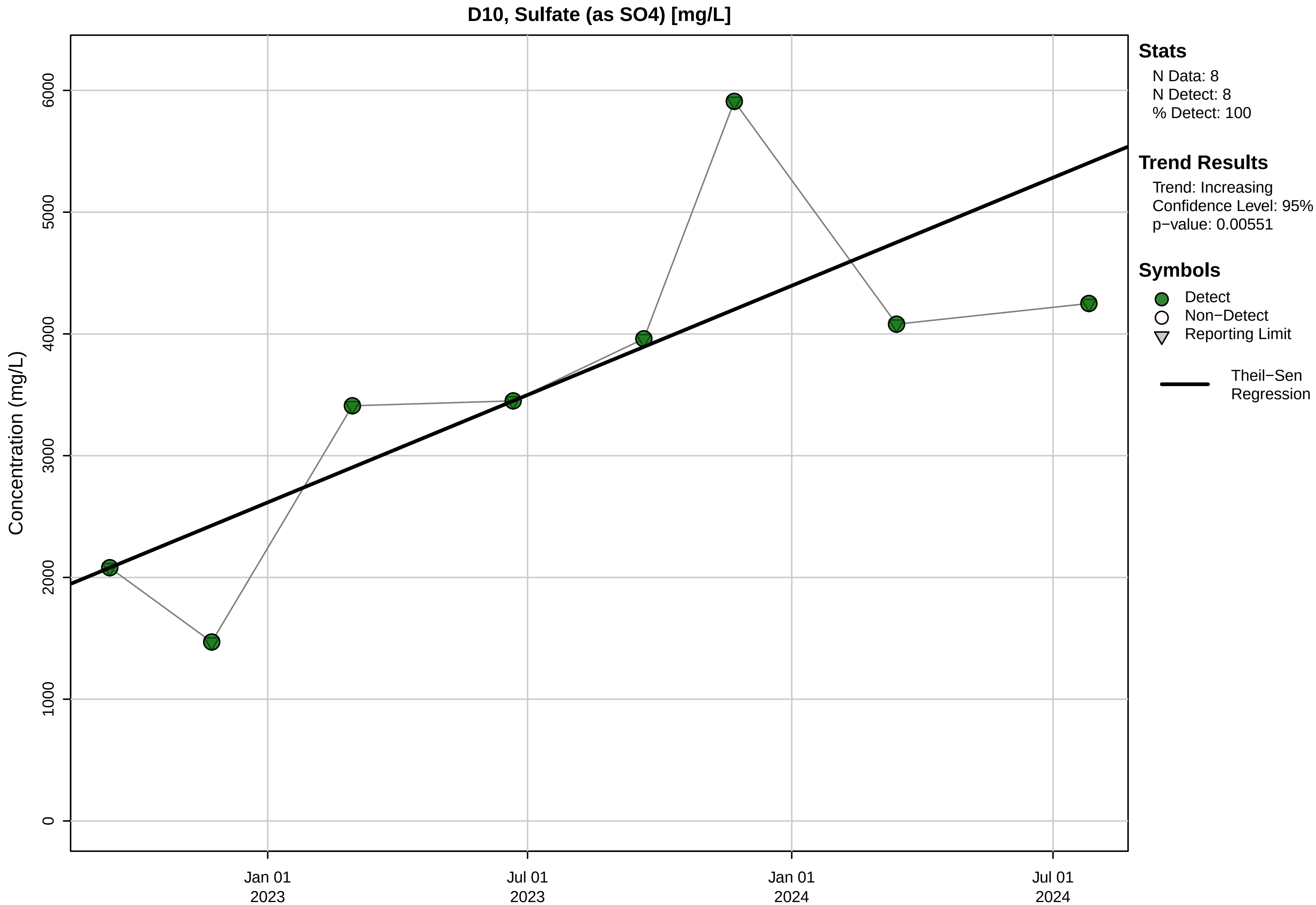


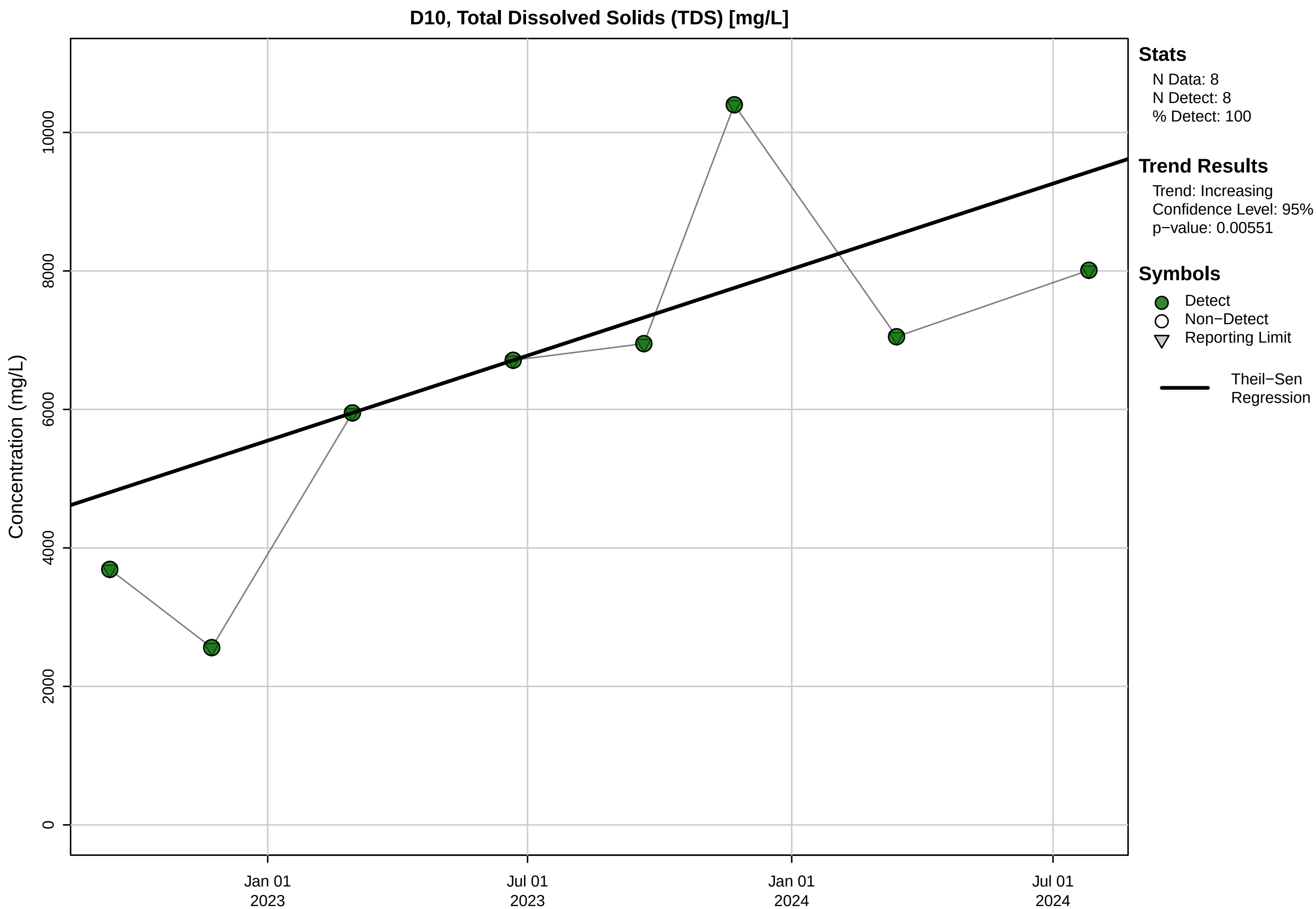
D10, Electrical Conductivity (Field) [uS/cm]
Concentration (uS/cm)
0
2000
4000
6000
8000
10000
12000
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.00551
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

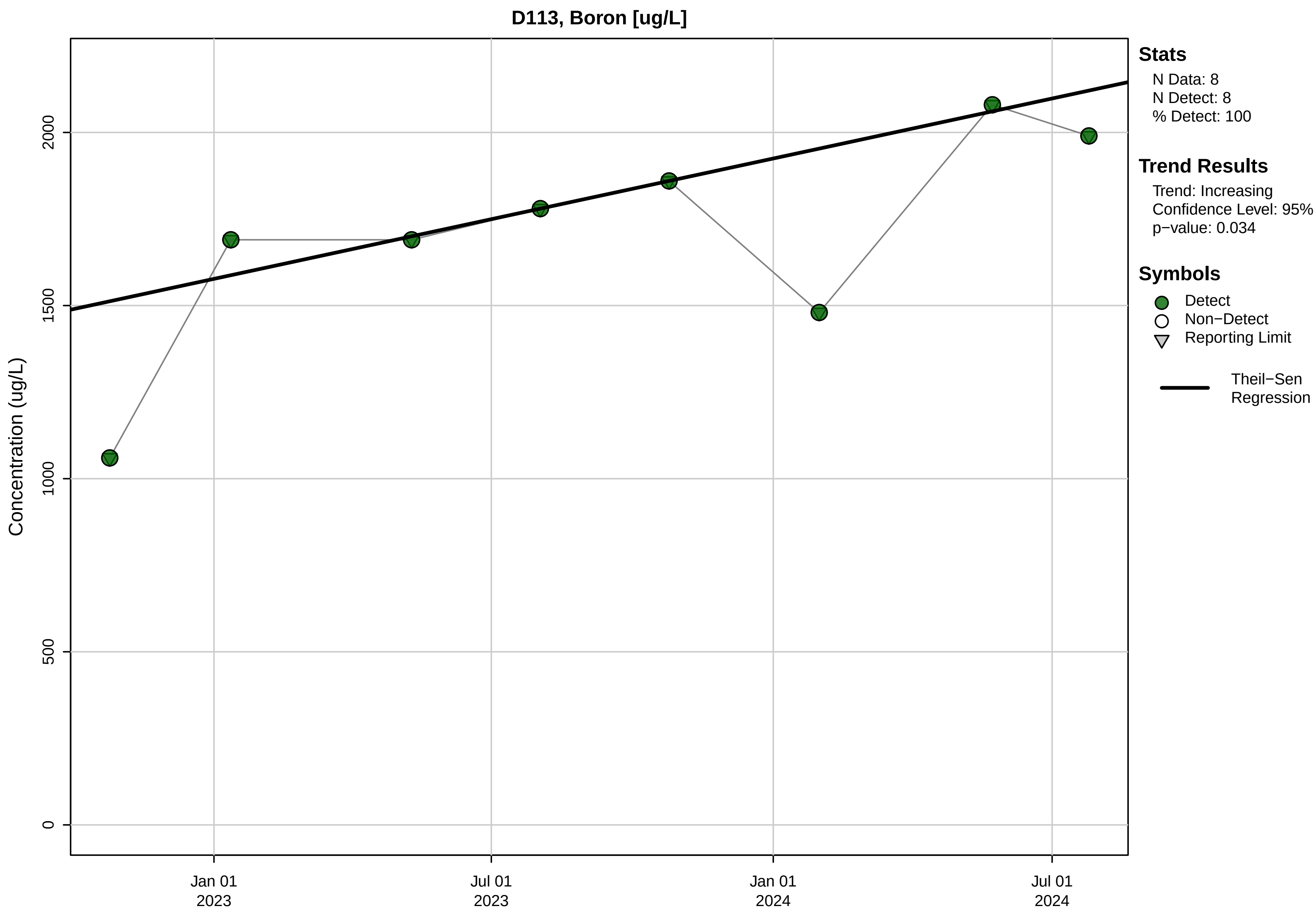


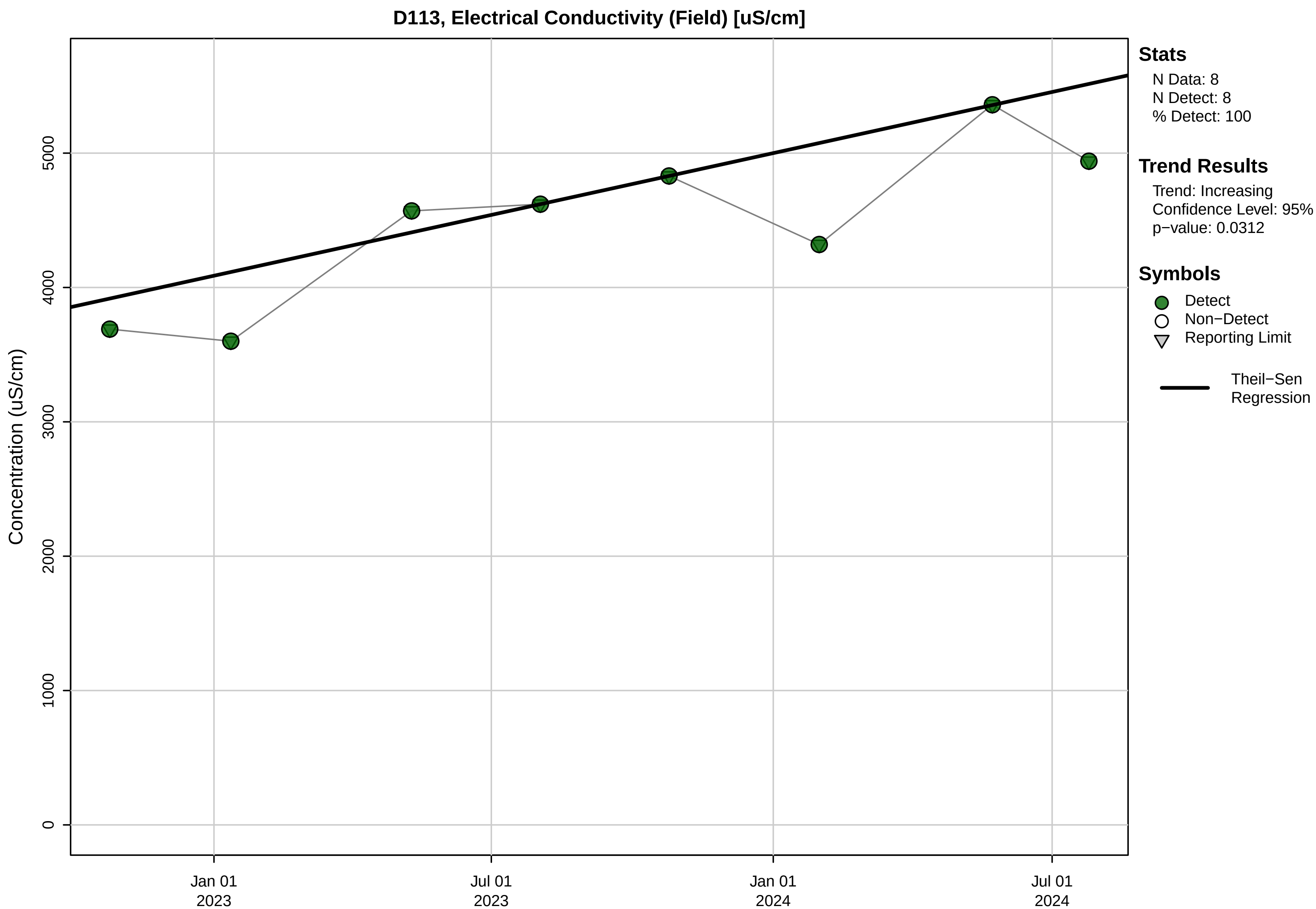
D10, Lead [ug/L]
Concentration (ug/L)
0
2
4
6
8
10
12
Jan 01
2023
Jul 01
2023
Jan 01
2024
Jul 01
2024
Stats
N Data: 8
N Detect: 7
% Detect: 88
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.0444
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen
Regression

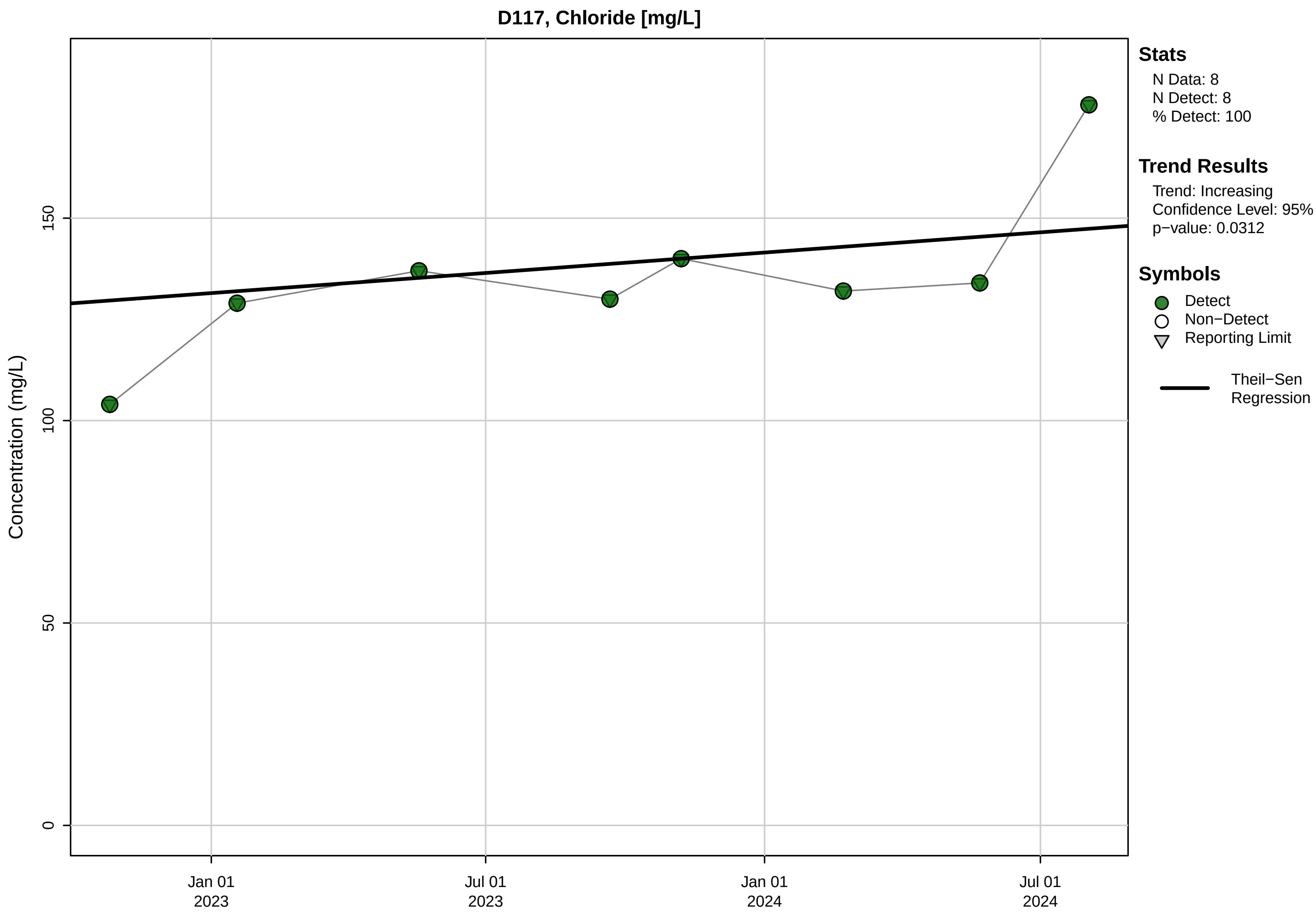

D10, Nickel [ug/L]
Concentration (ug/L)
0
200
400
600
800
1000
1200
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.0312
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression


D10, Sulfate (as SO4) [mg/L]
Concentration (mg/L)
0
1000
2000
3000
4000
5000
6000
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.00551
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

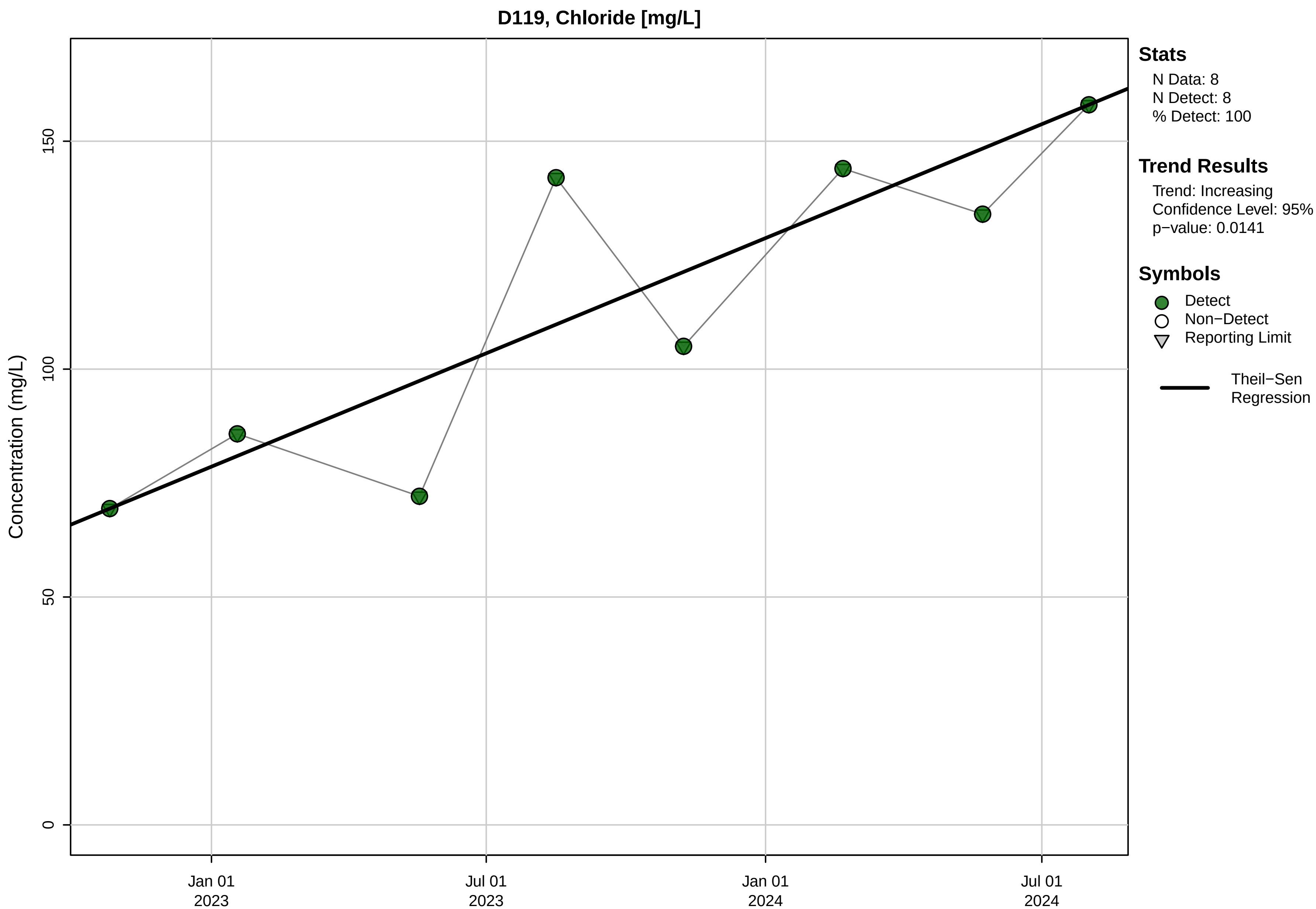

D10, Total Dissolved Solids (TDS) [mg/L]
Concentration (mg/L)
0
2000
4000
6000
8000
10000
Jan 01
2023
Jul 01
2023
Jan 01
2024
Jul 01
2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.00551
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen
Regression


D113, Boron [ug/L]
Concentration (ug/L)
0
500
1000
1500
2000
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.034
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

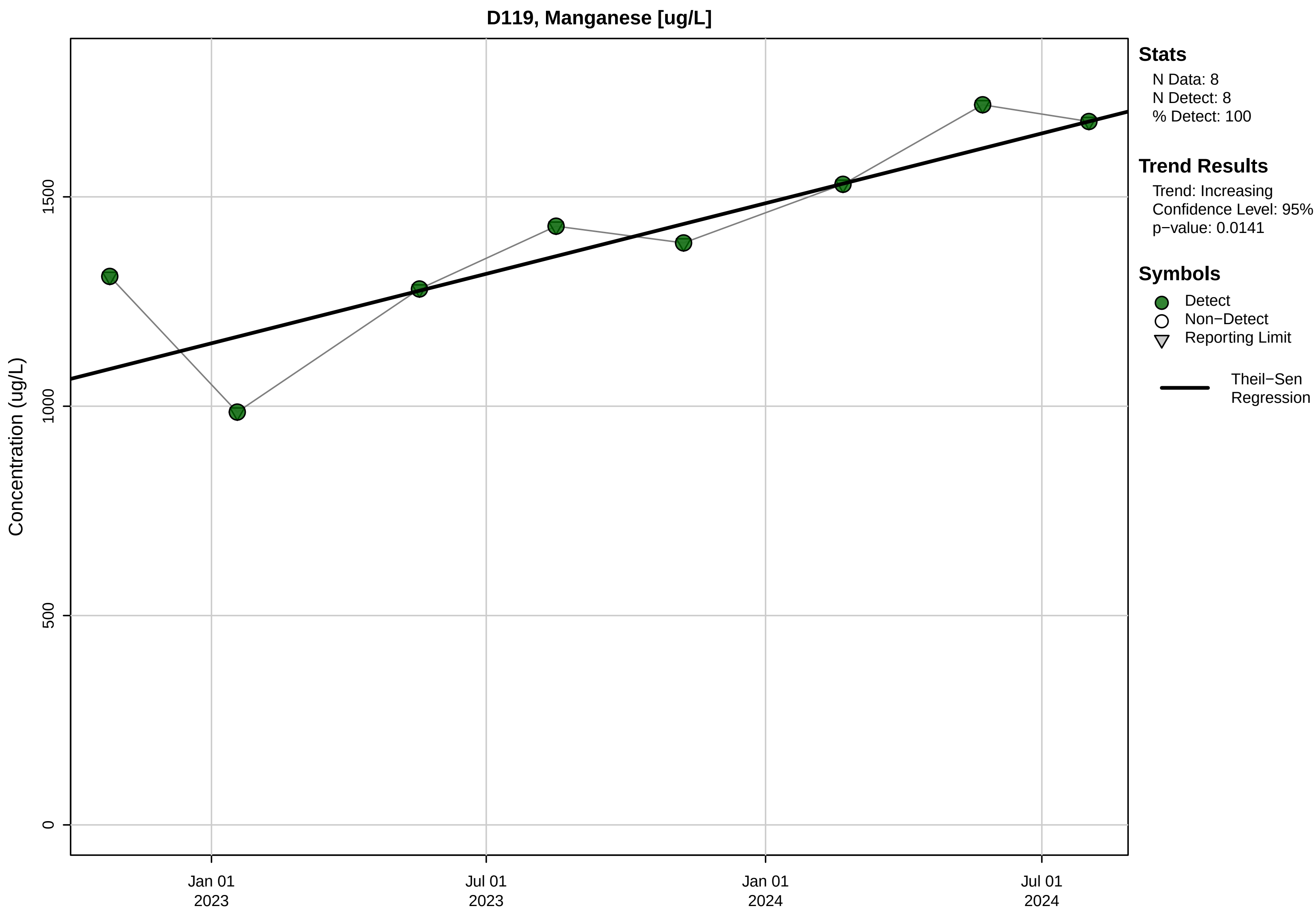

D113, Electrical Conductivity (Field) [uS/cm]
Concentration (uS/cm)
0
1000
2000
3000
4000
5000
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.0312
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

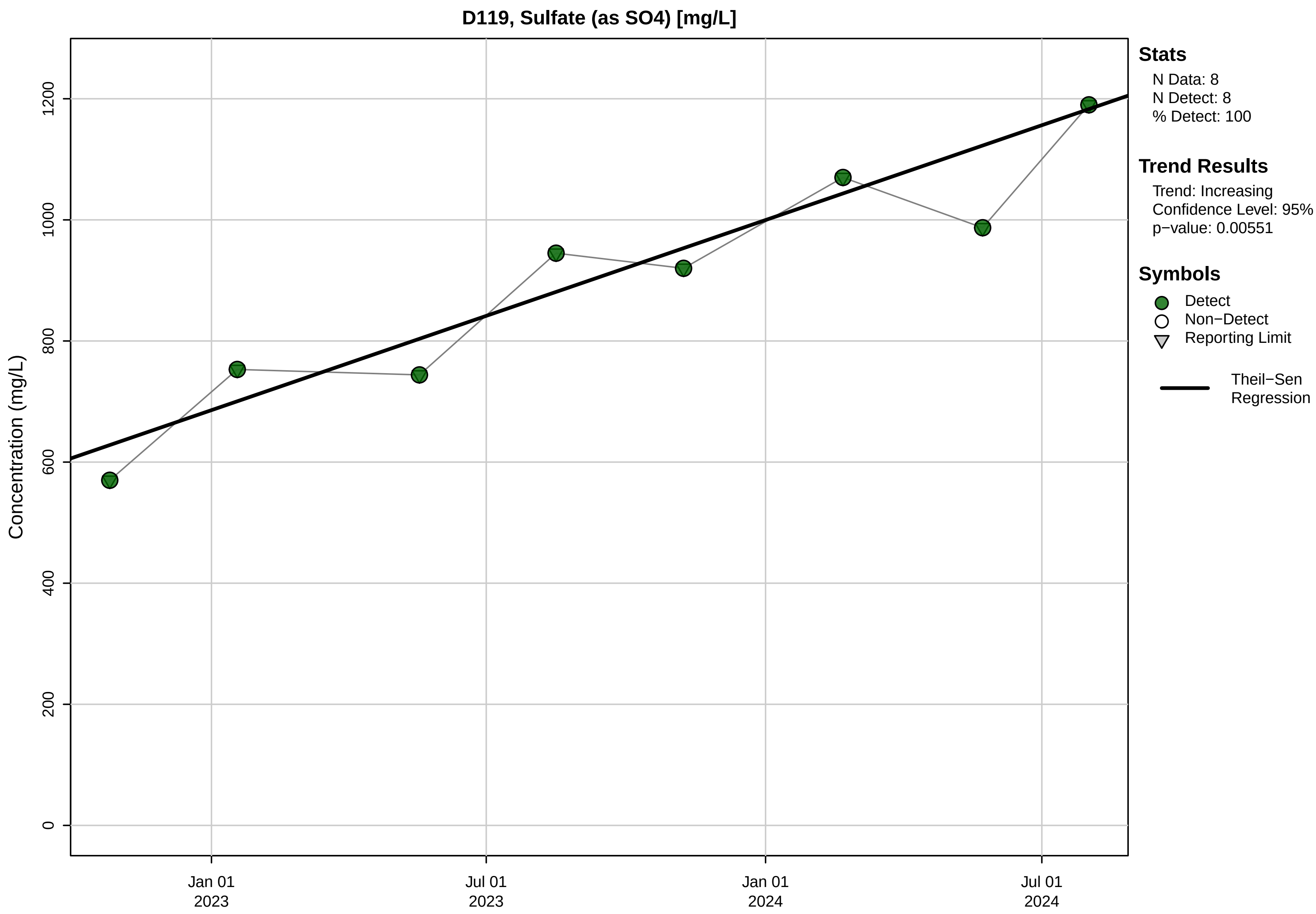


D117, Chloride [mg/L]
Concentration (mg/L)
0
50
100
150
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.0312
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

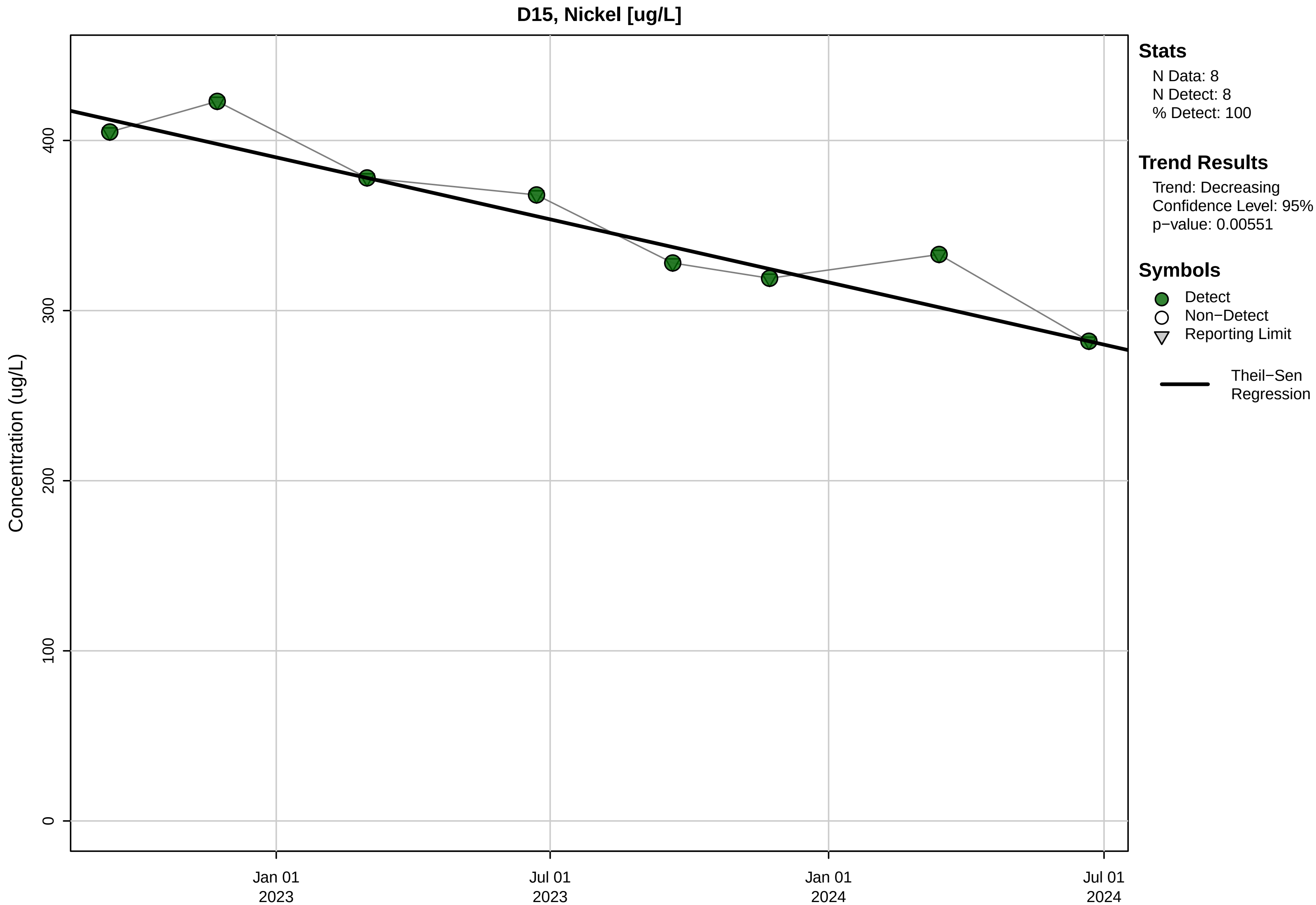


D119, Chloride [mg/L]
Concentration (mg/L)
0
50
100
150
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.0141
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

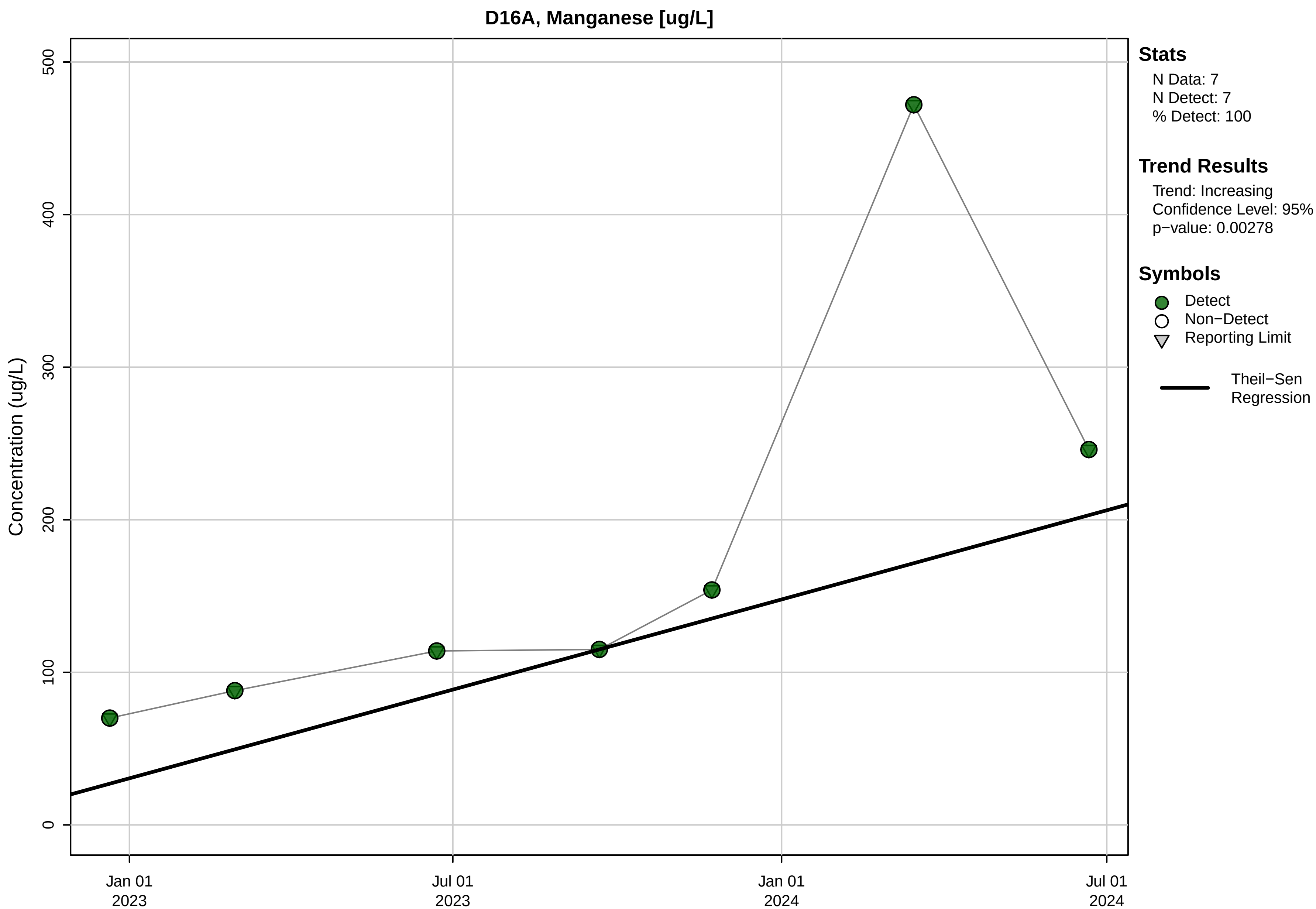

D119, Manganese [ug/L]
Concentration (ug/L)
0
500
1000
1500
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.0141
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression



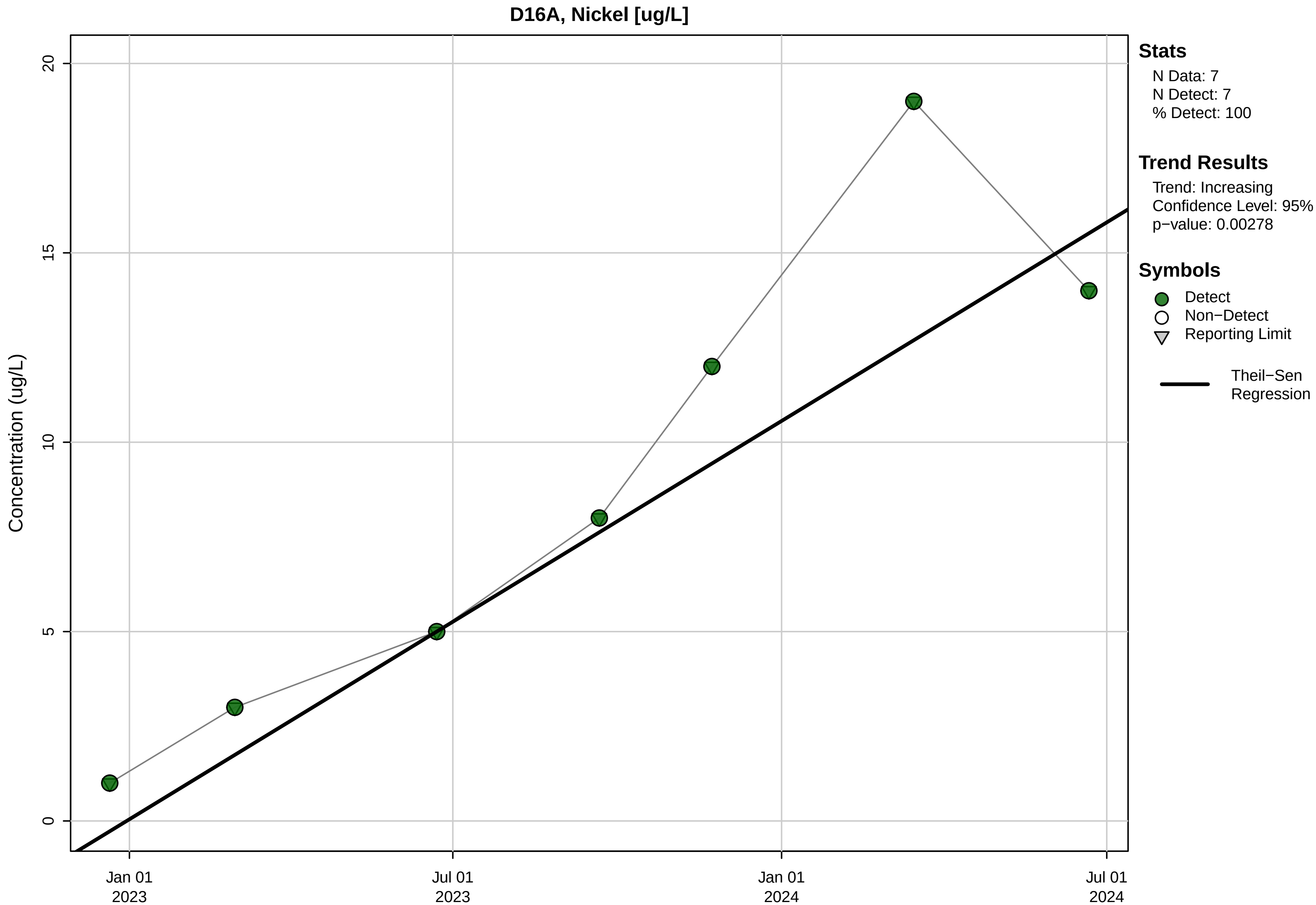
D119, Sulfate (as SO4) [mg/L]
Concentration (mg/L)
0
200
400
600
800
1000
1200
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.00551
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression



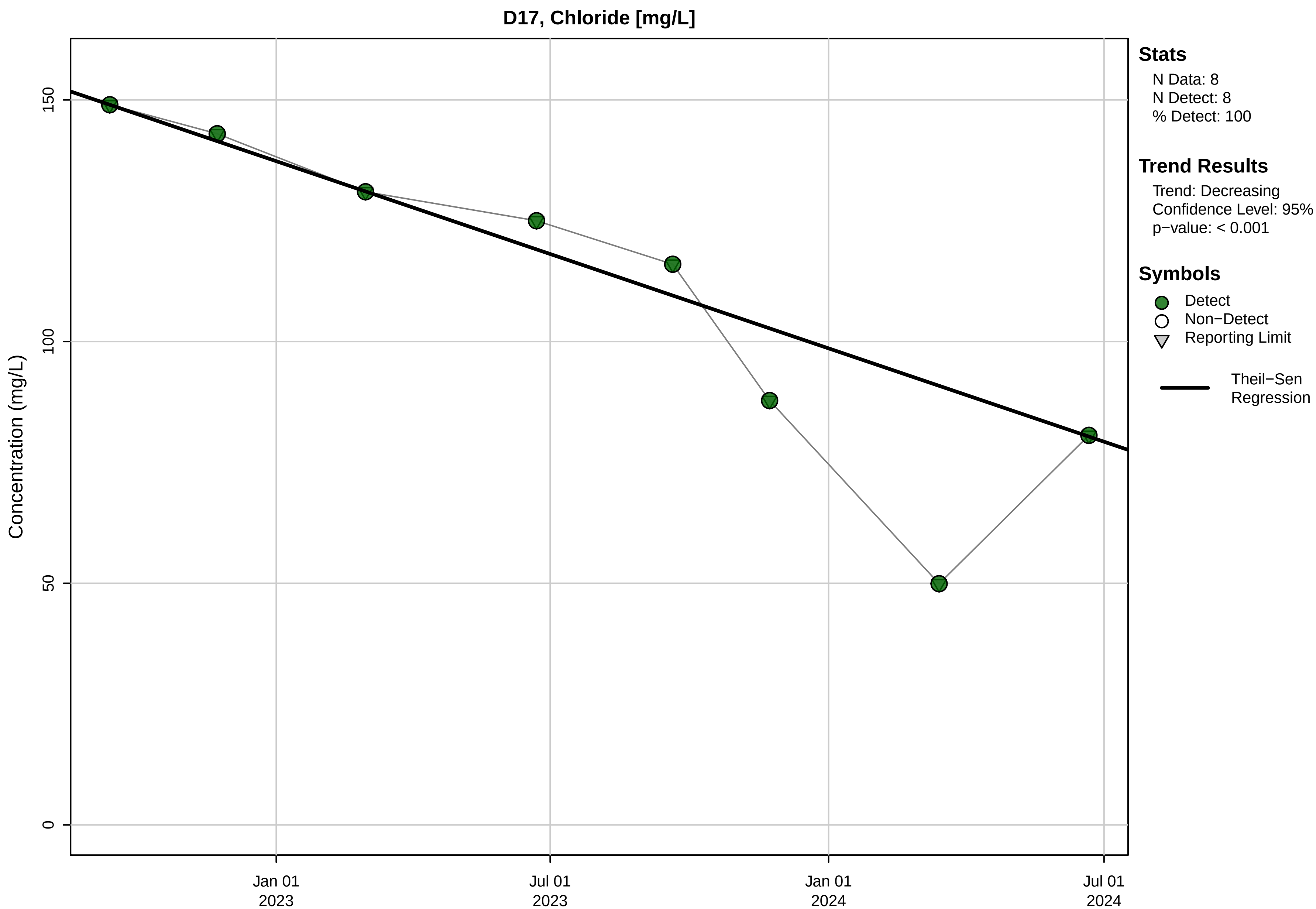
D15, Nickel [ug/L]
Concentration (ug/L)
0
100
200
300
400
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Decreasing
Confidence Level: 95%
p−value: 0.00551
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

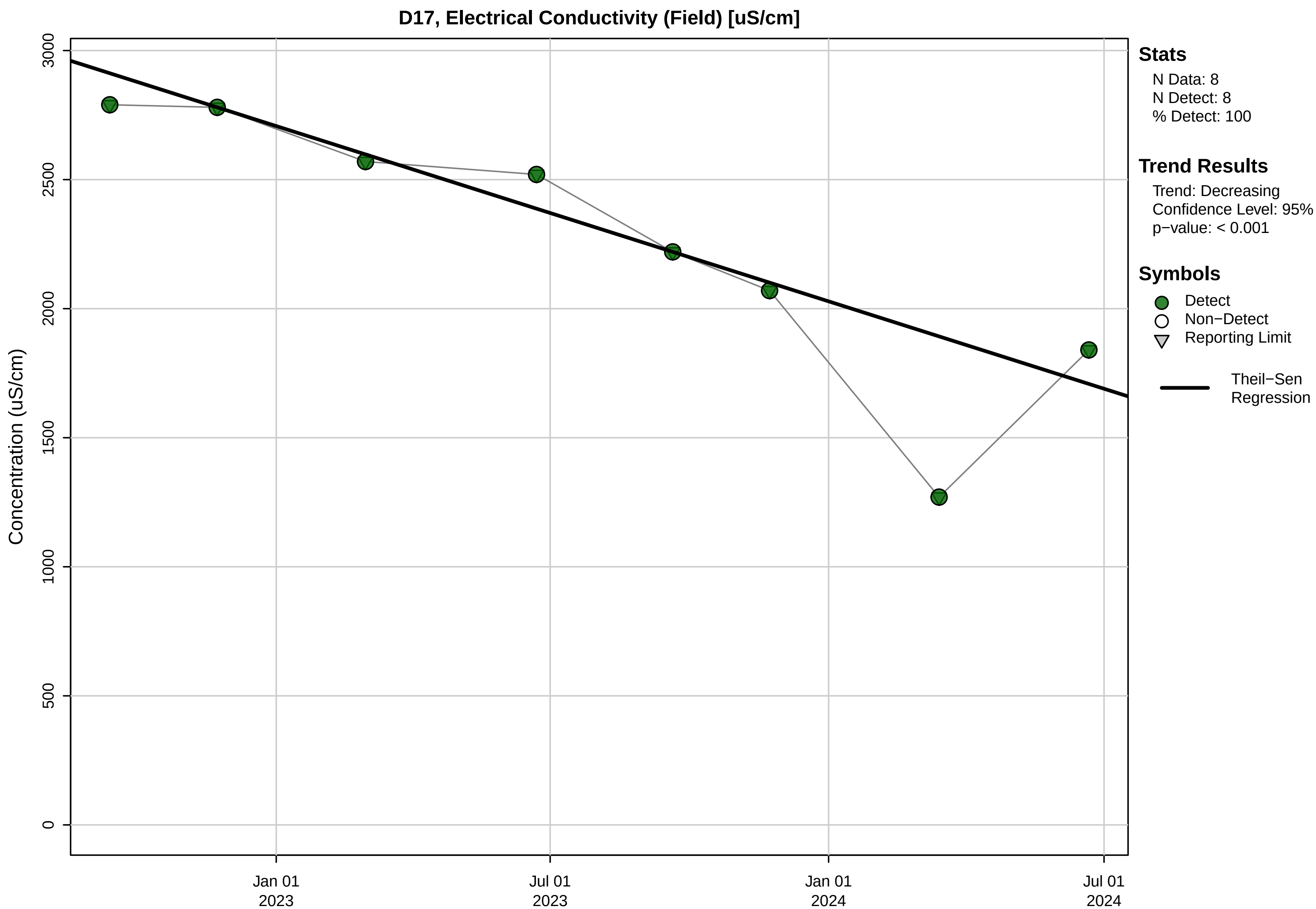


D16A, Manganese [ug/L]
Concentration (ug/L)
0
100
200
300
400
500
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 7
N Detect: 7
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.00278
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

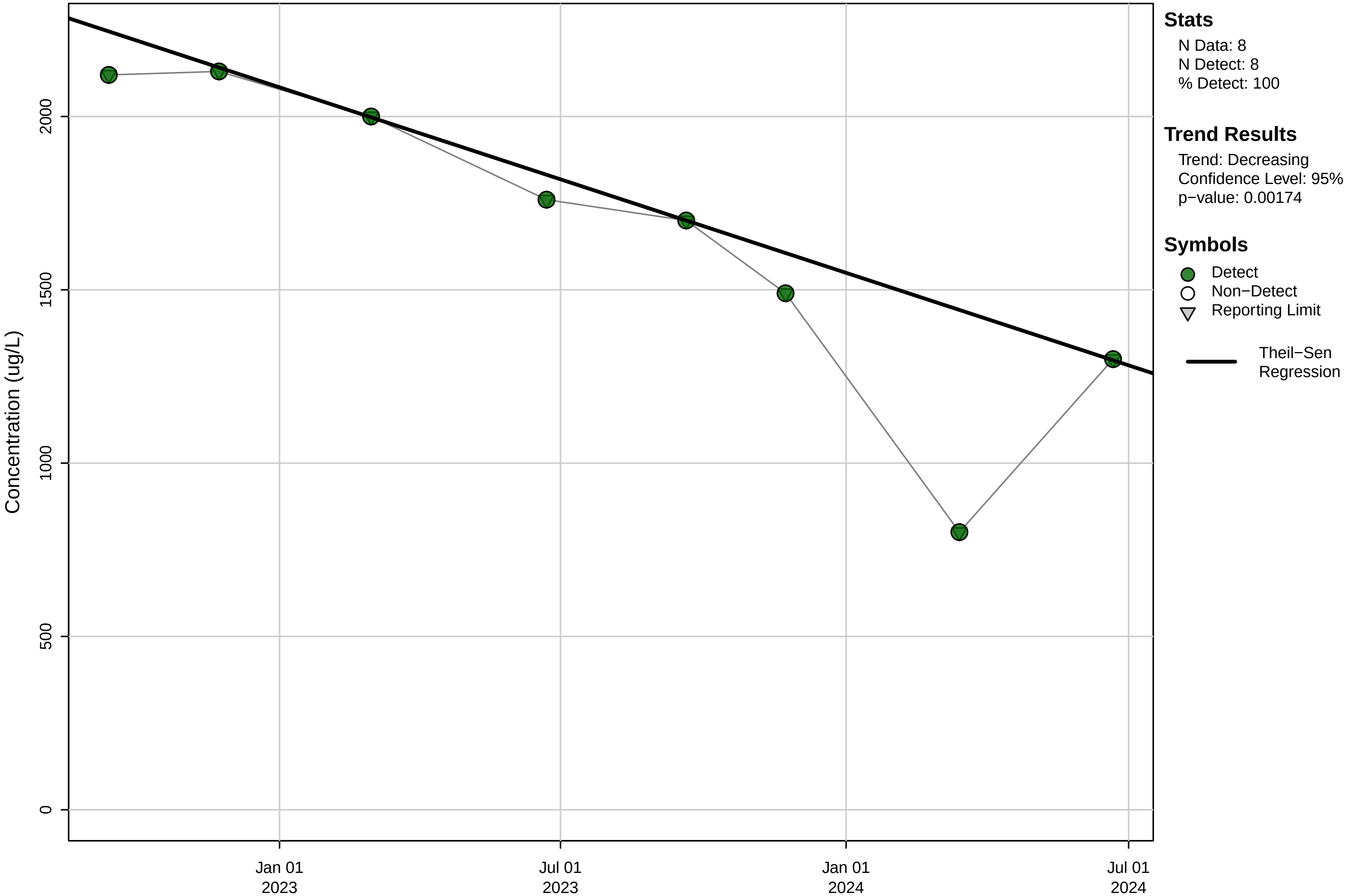


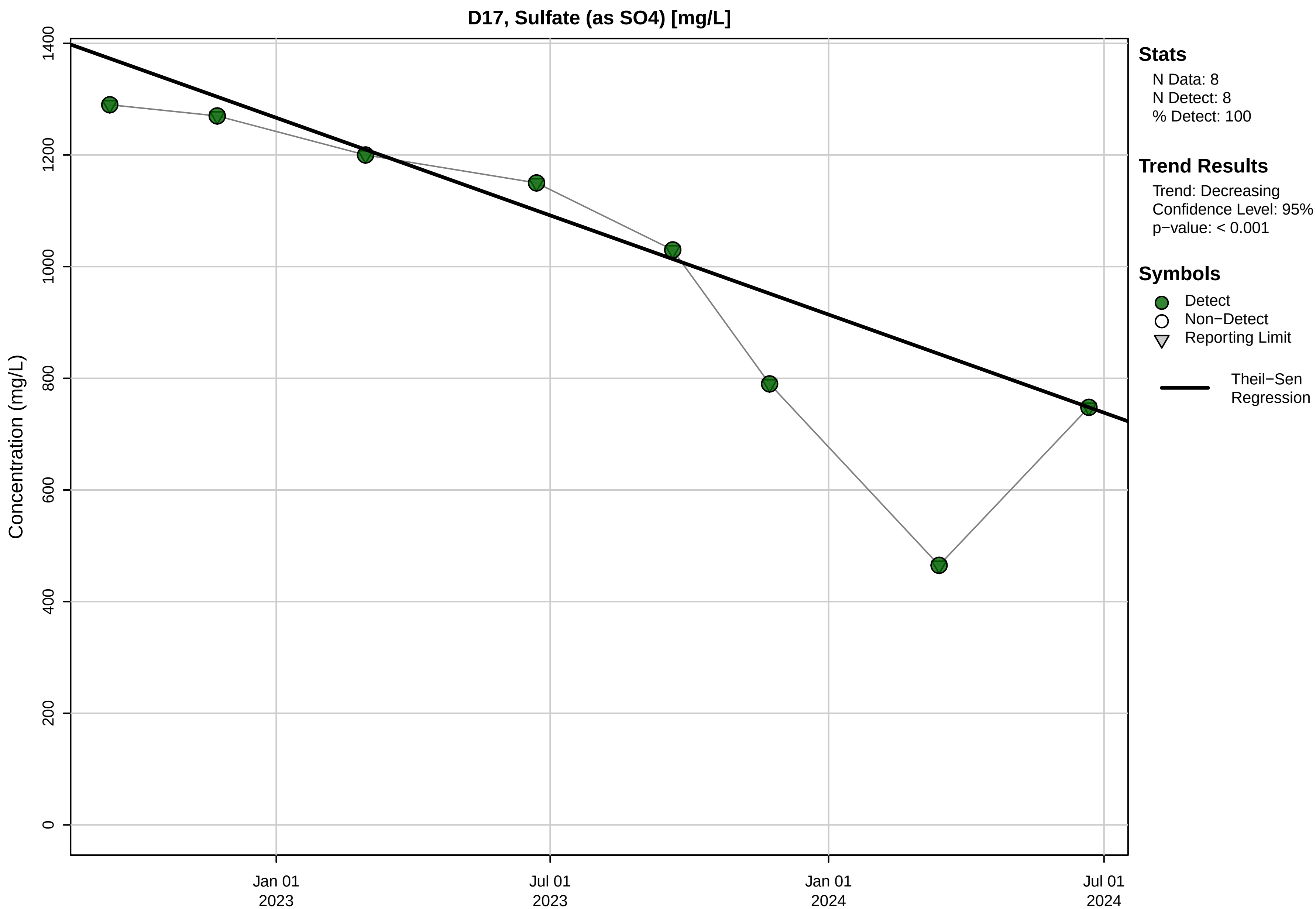
D16A, Nickel [ug/L]
Concentration (ug/L)
0
5
10
15
20
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 7
N Detect: 7
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.00278
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression


D17, Chloride [mg/L]
Concentration (mg/L)
0
50
100
150
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Decreasing
Confidence Level: 95%
p−value: < 0.001
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

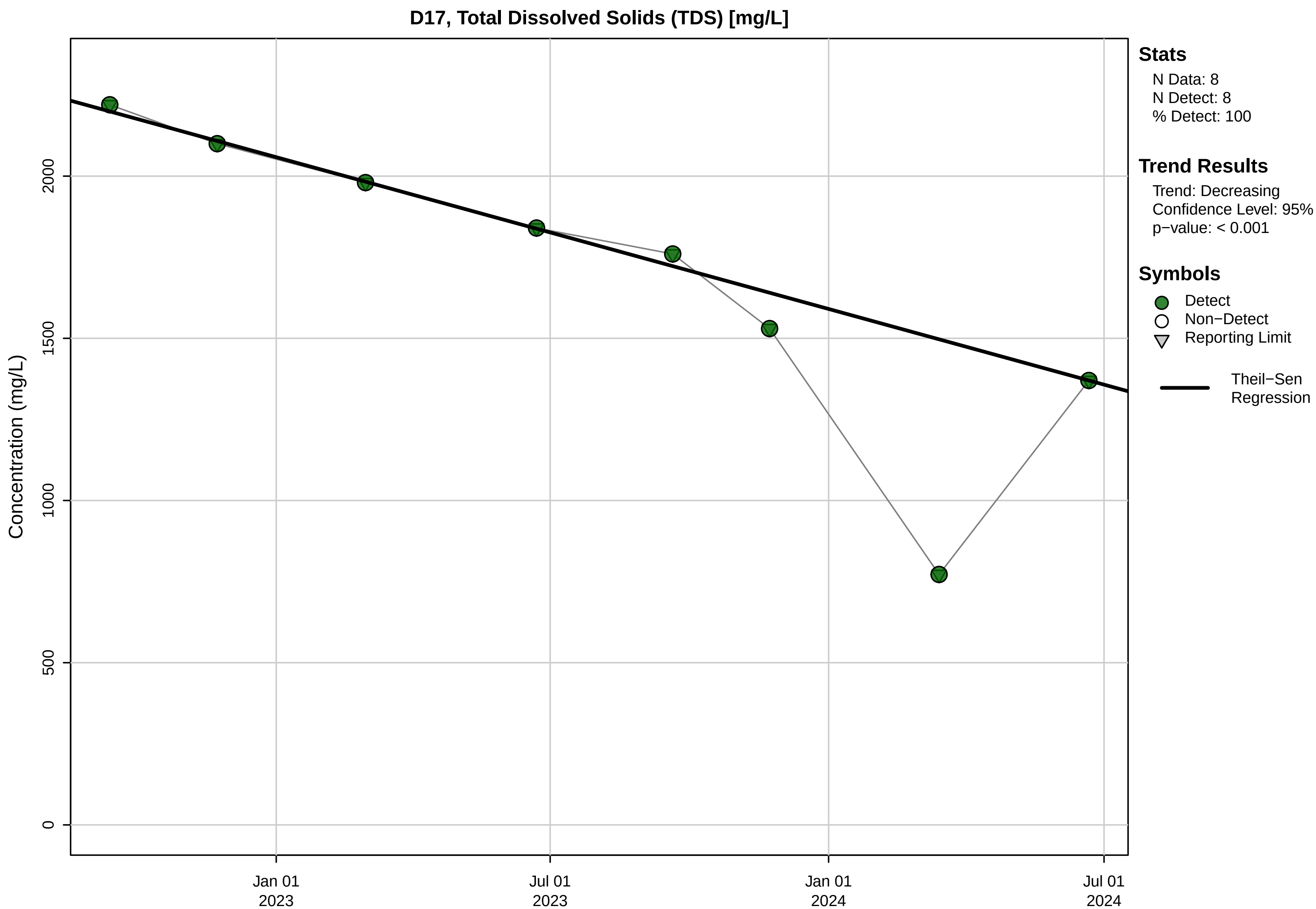

D17, Electrical Conductivity (Field) [uS/cm]
Concentration (uS/cm)
0
500
1000
1500
2000
2500
3000
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Decreasing
Confidence Level: 95%
p−value: < 0.001
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

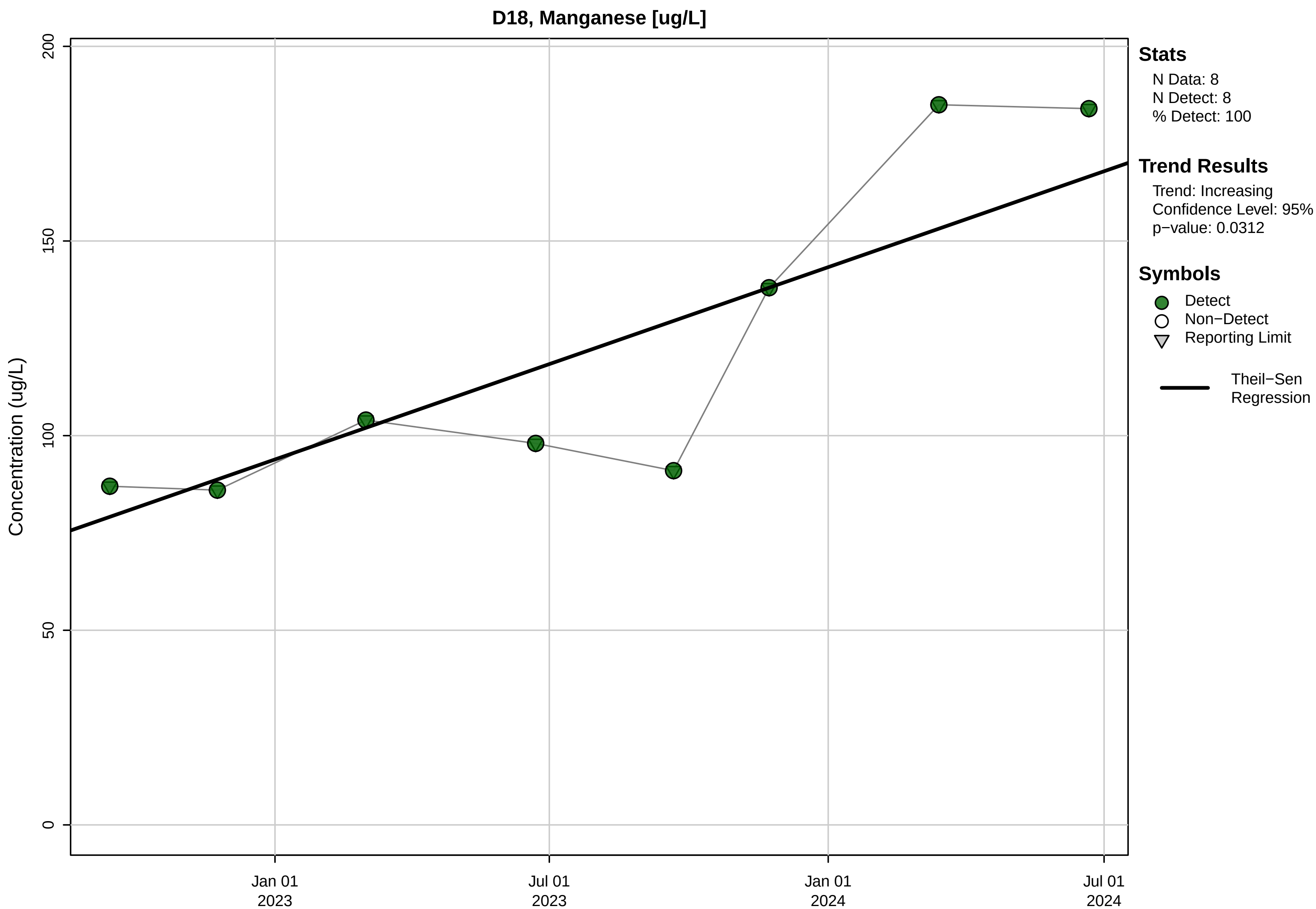
D17, Manganese [ug/L]



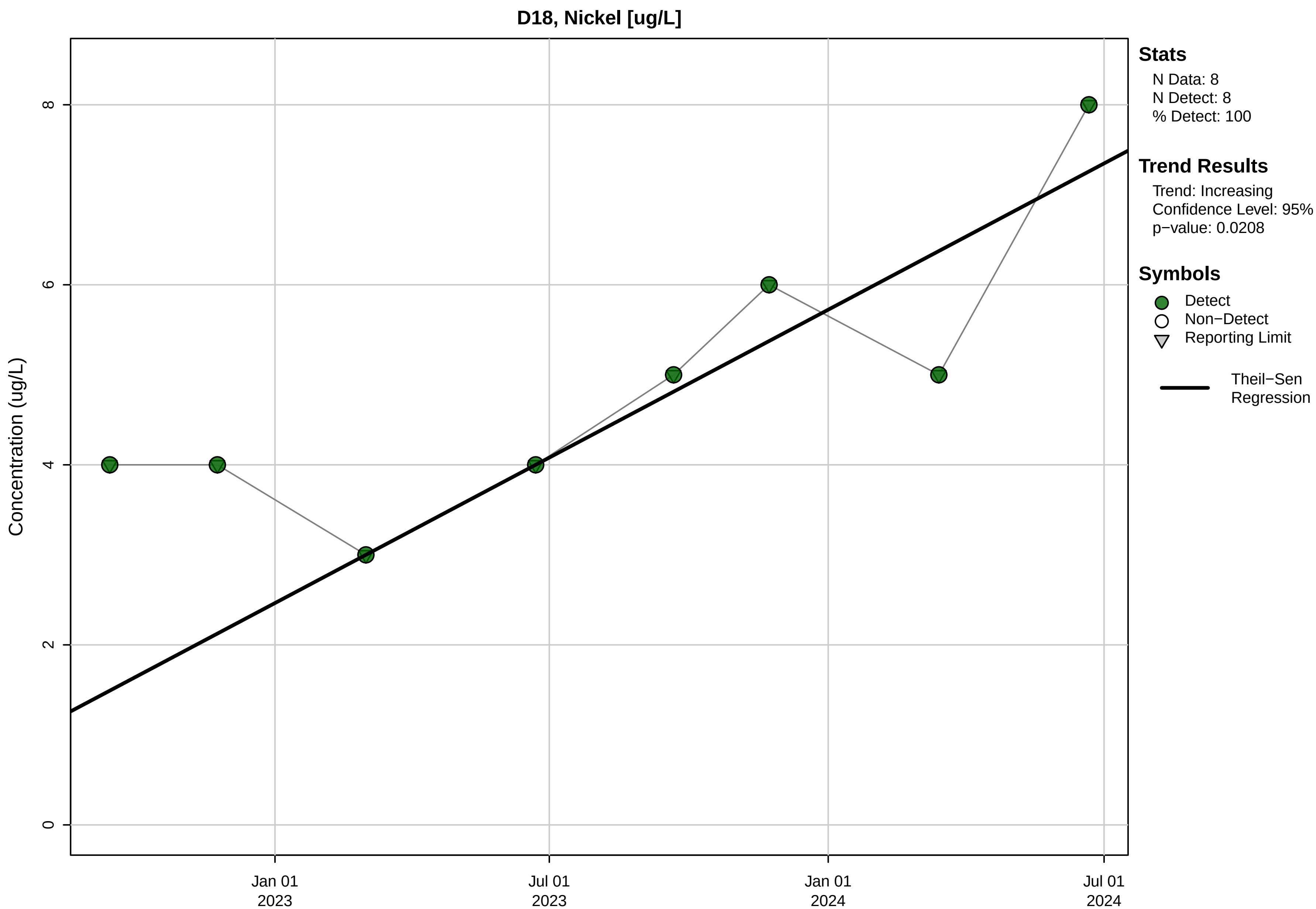


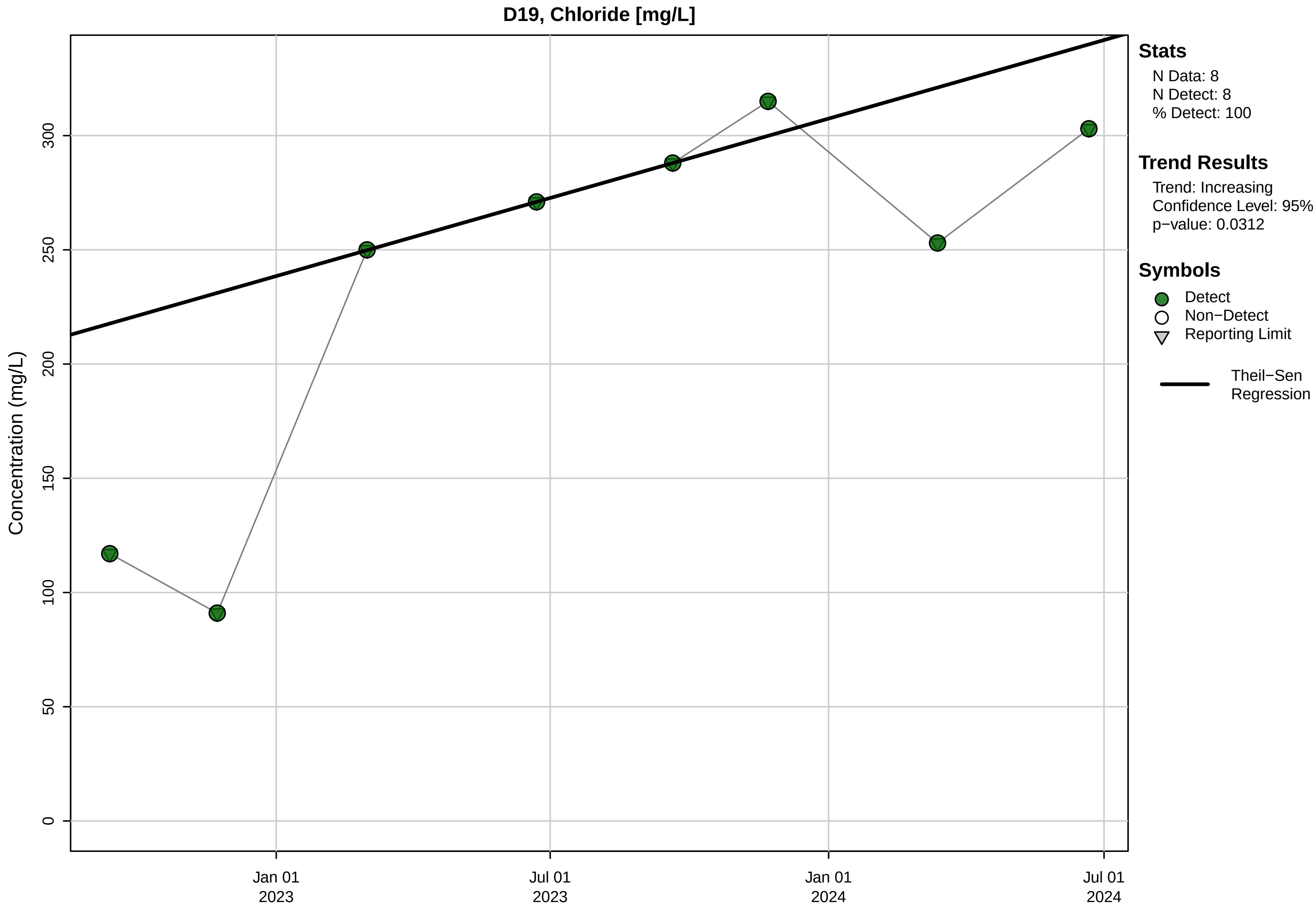
D17, Sulfate (as SO4) [mg/L]
Concentration (mg/L)
0
200
400
600
800
1000
1200
1400
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Decreasing
Confidence Level: 95%
p−value: < 0.001
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

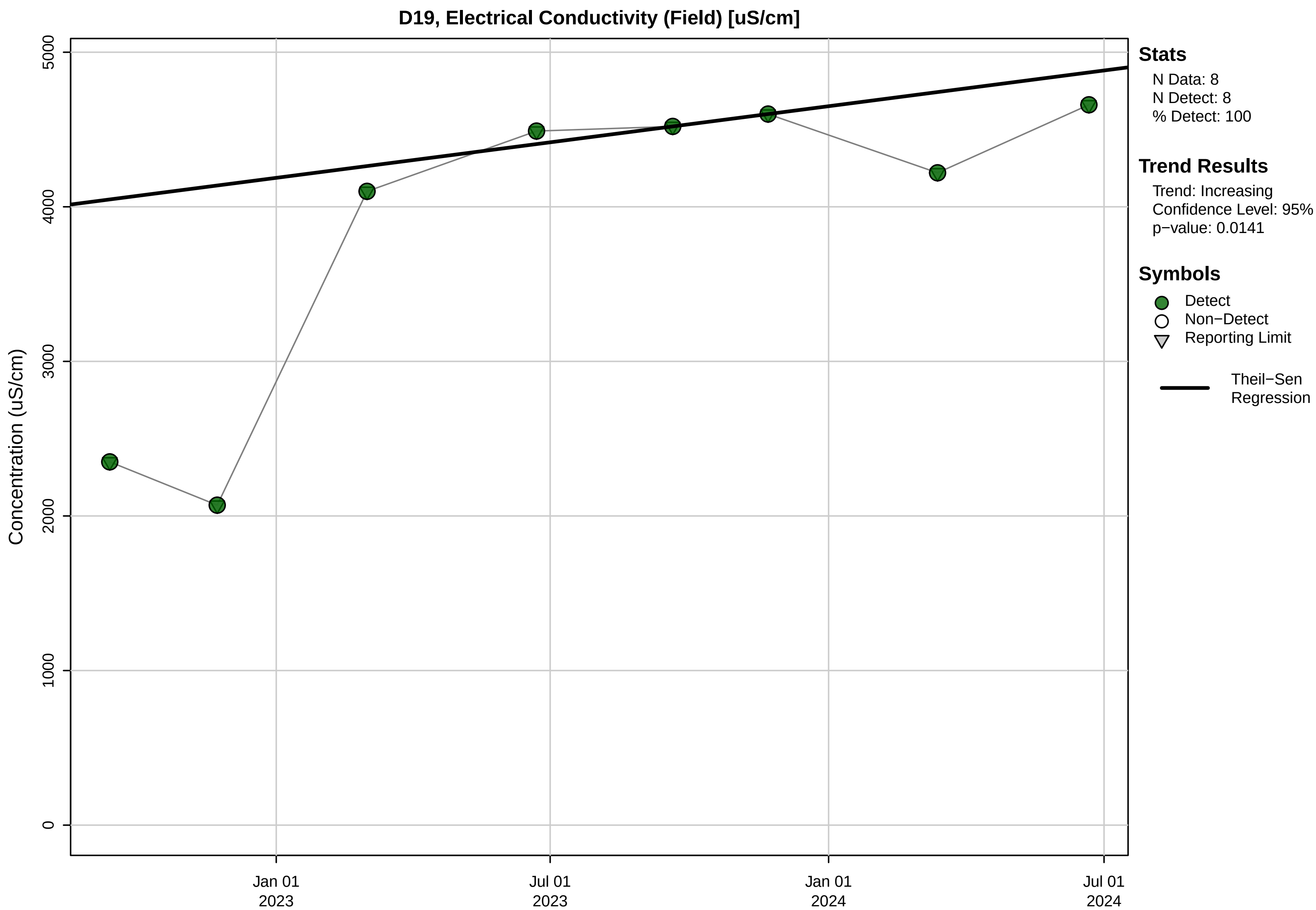

D17, Total Dissolved Solids (TDS) [mg/L]
Concentration (mg/L)
0
500
1000
1500
2000
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Decreasing
Confidence Level: 95%
p−value: < 0.001
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression



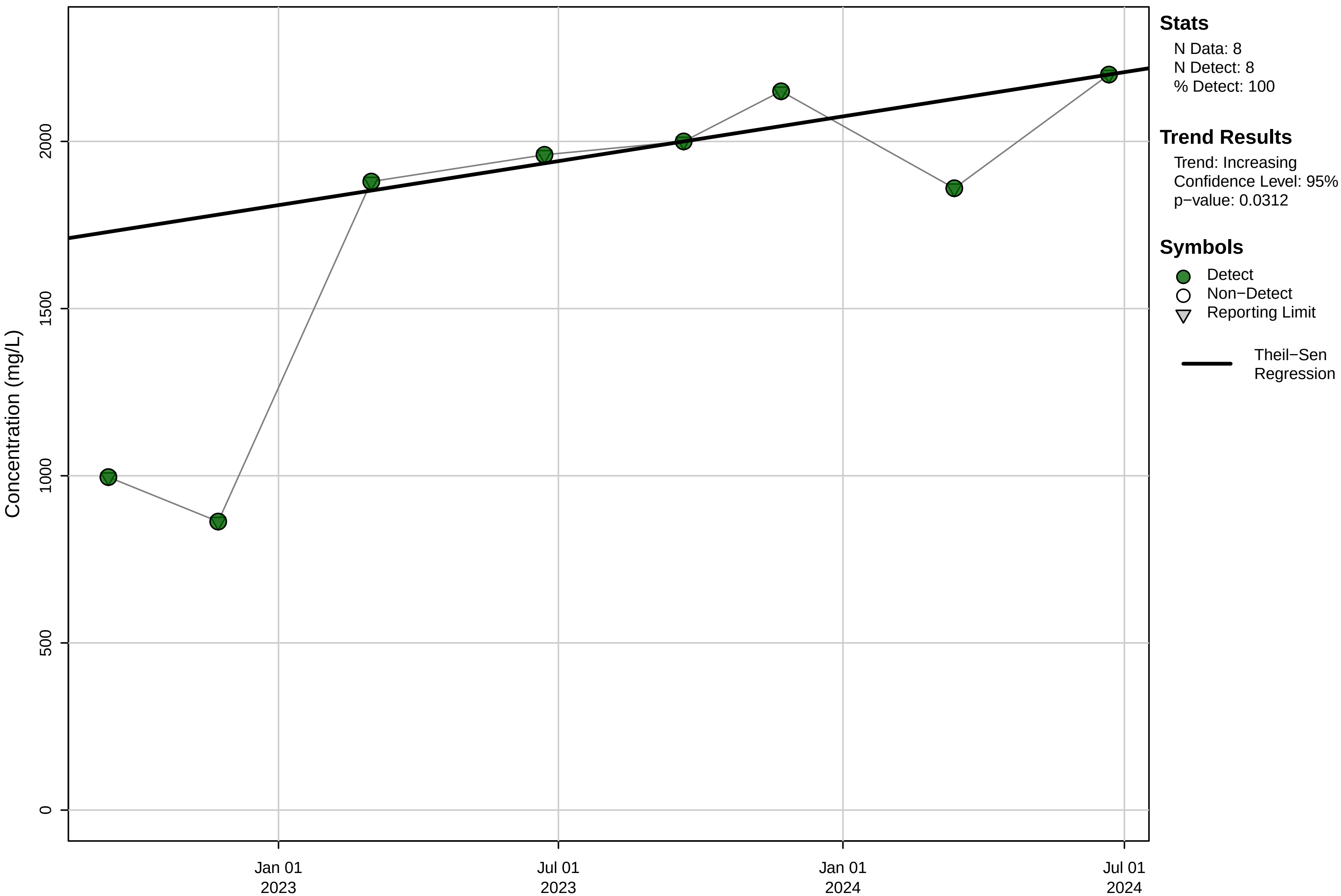
D18, Manganese [ug/L]
Concentration (ug/L)
0
50
100
150
200
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.0312
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

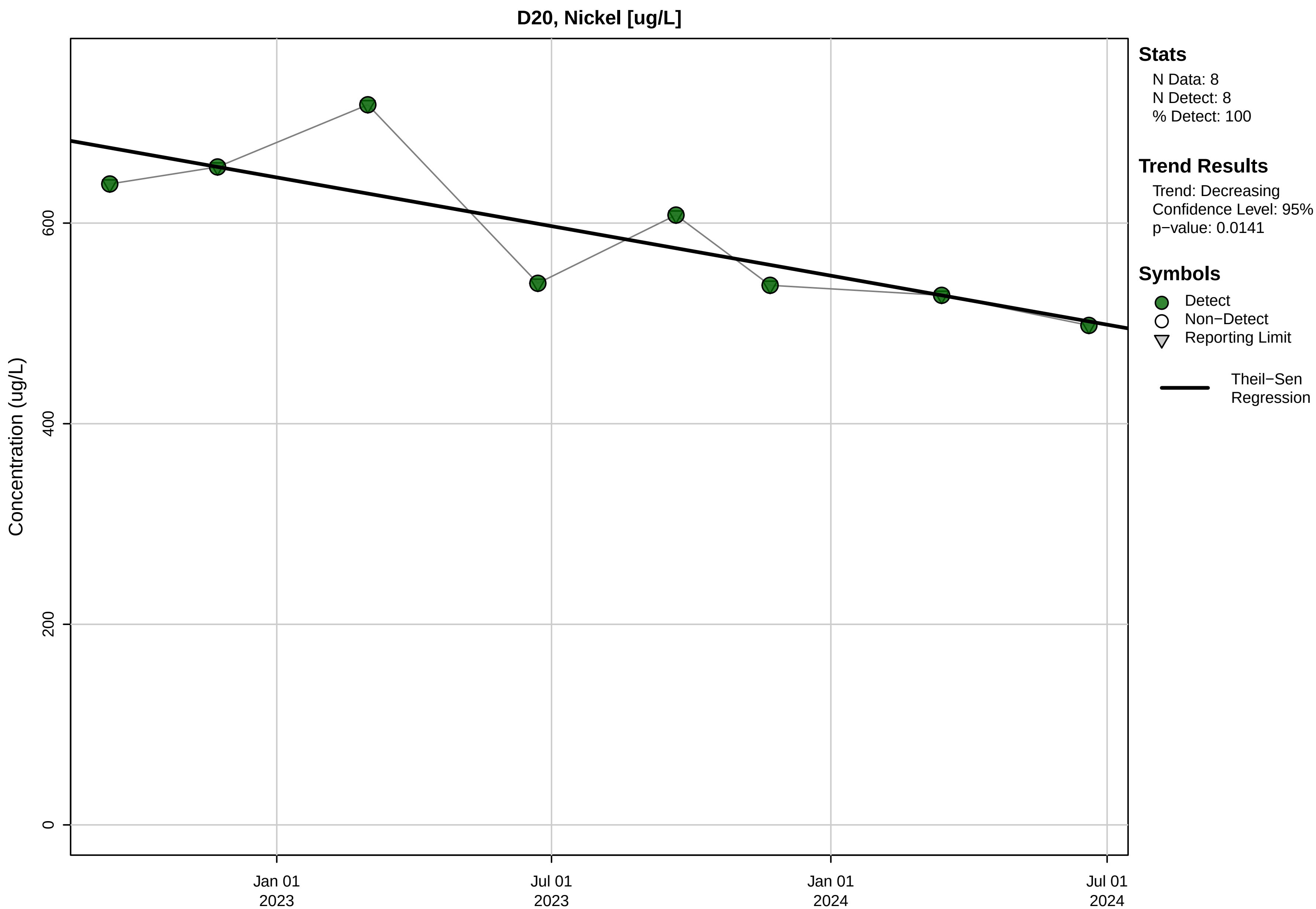

D18, Nickel [ug/L]
Concentration (ug/L)
0
2
4
6
8
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.0208
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

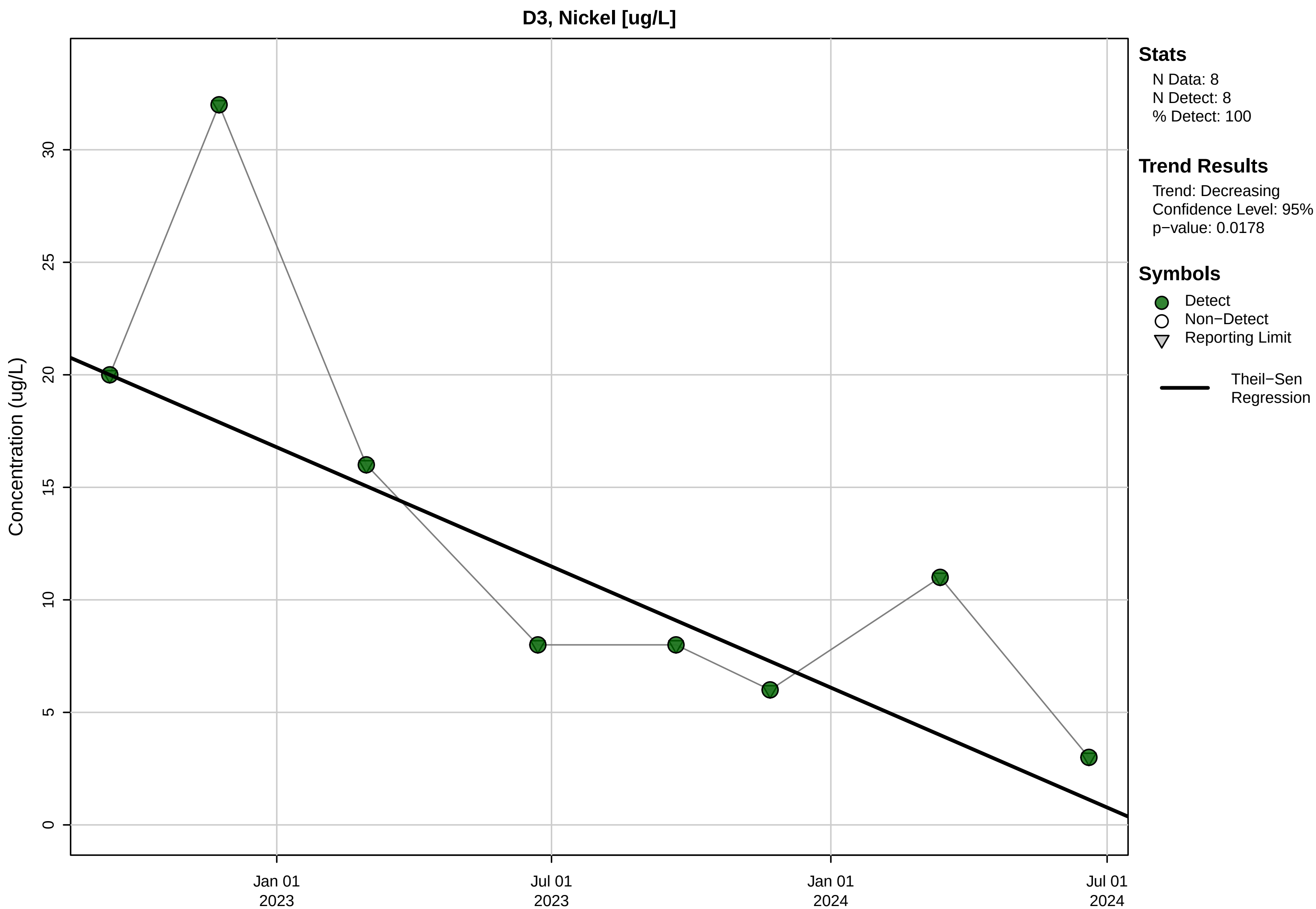

D19, Chloride [mg/L]
Concentration (mg/L)
0
50
100
150
200
250
300
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.0312
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression


D19, Electrical Conductivity (Field) [uS/cm]
Concentration (uS/cm)
0
1000
2000
3000
4000
5000
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.0141
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

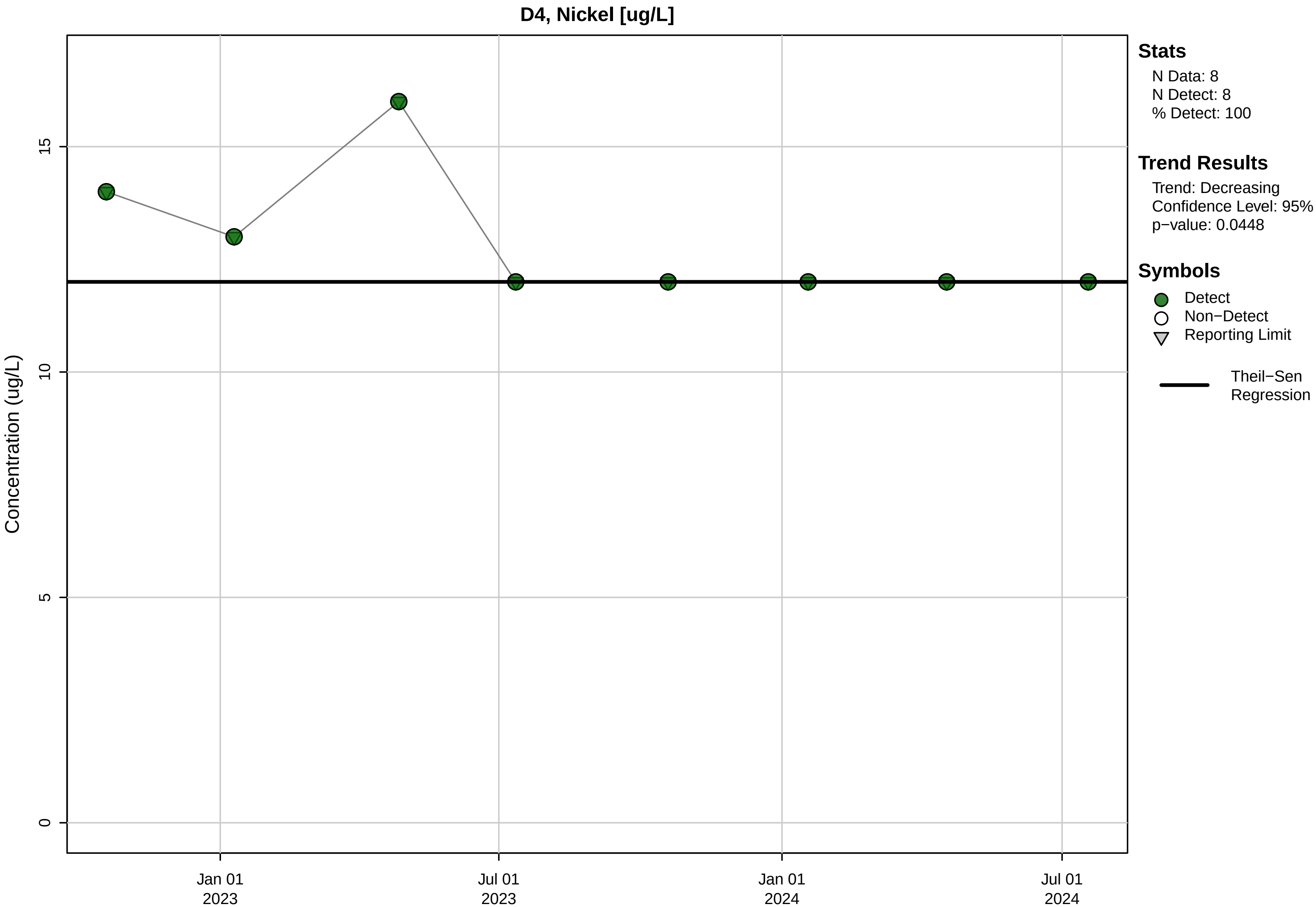
D19, Sulfate (as SO4) [mg/L]

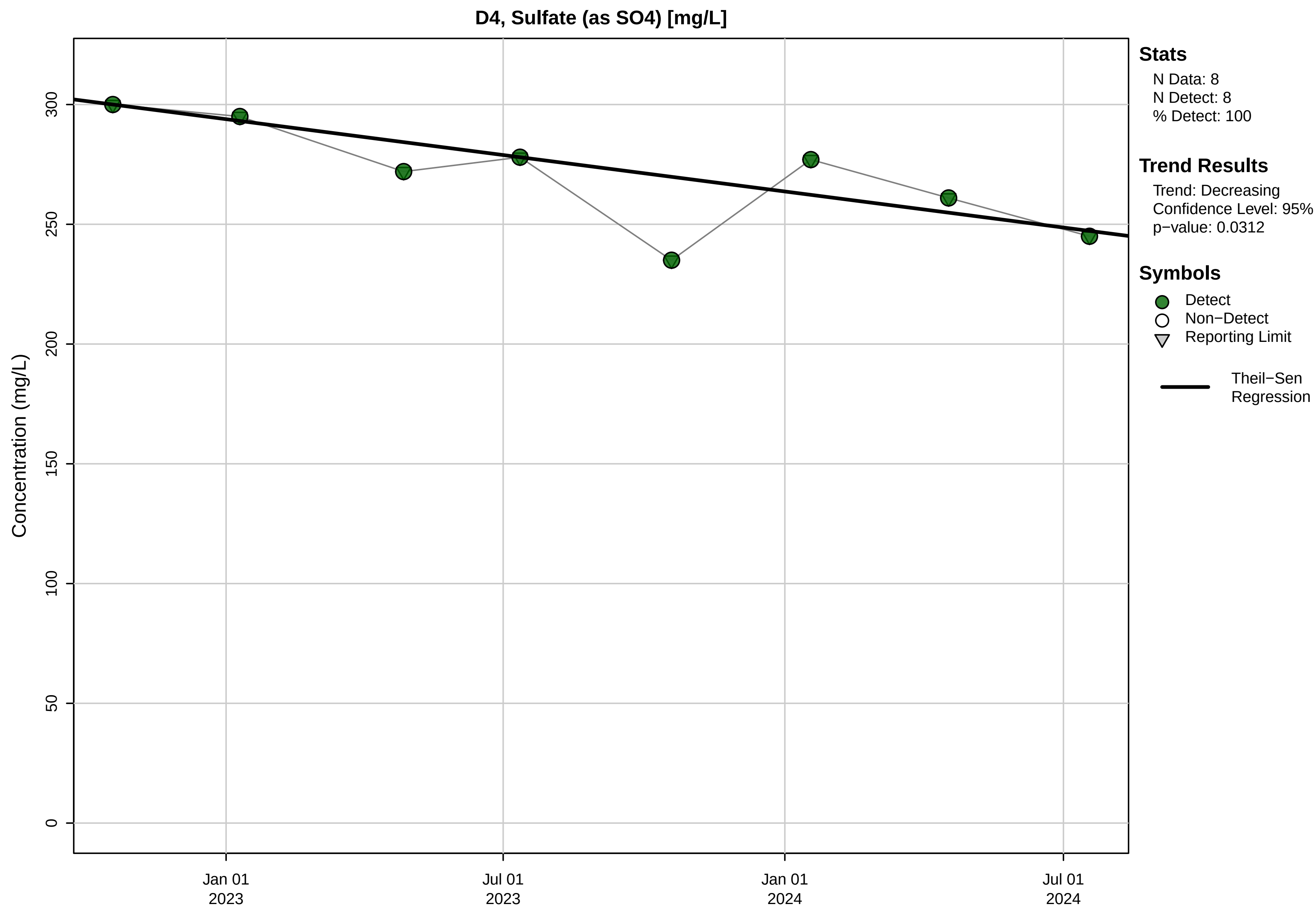



D20, Nickel [ug/L]
Concentration (ug/L)
0
200
400
600
Jan 01
2023
Jul 01
2023
Jan 01
2024
Jul 01
2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Decreasing
Confidence Level: 95%
p−value: 0.0141
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen
Regression

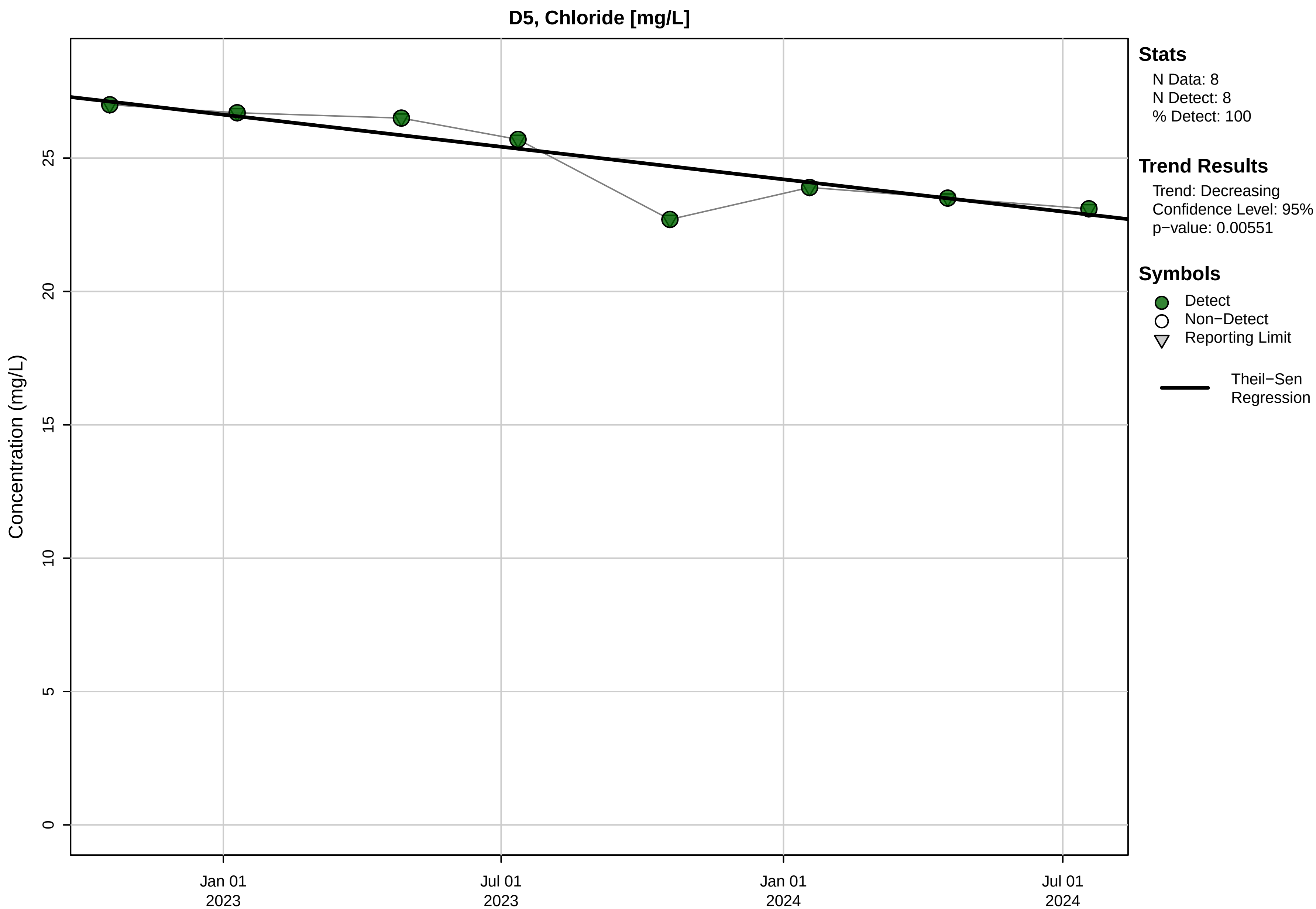


D3, Nickel [ug/L]
Concentration (ug/L)
0
5
10
15
20
25
30
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Decreasing
Confidence Level: 95%
p−value: 0.0178
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

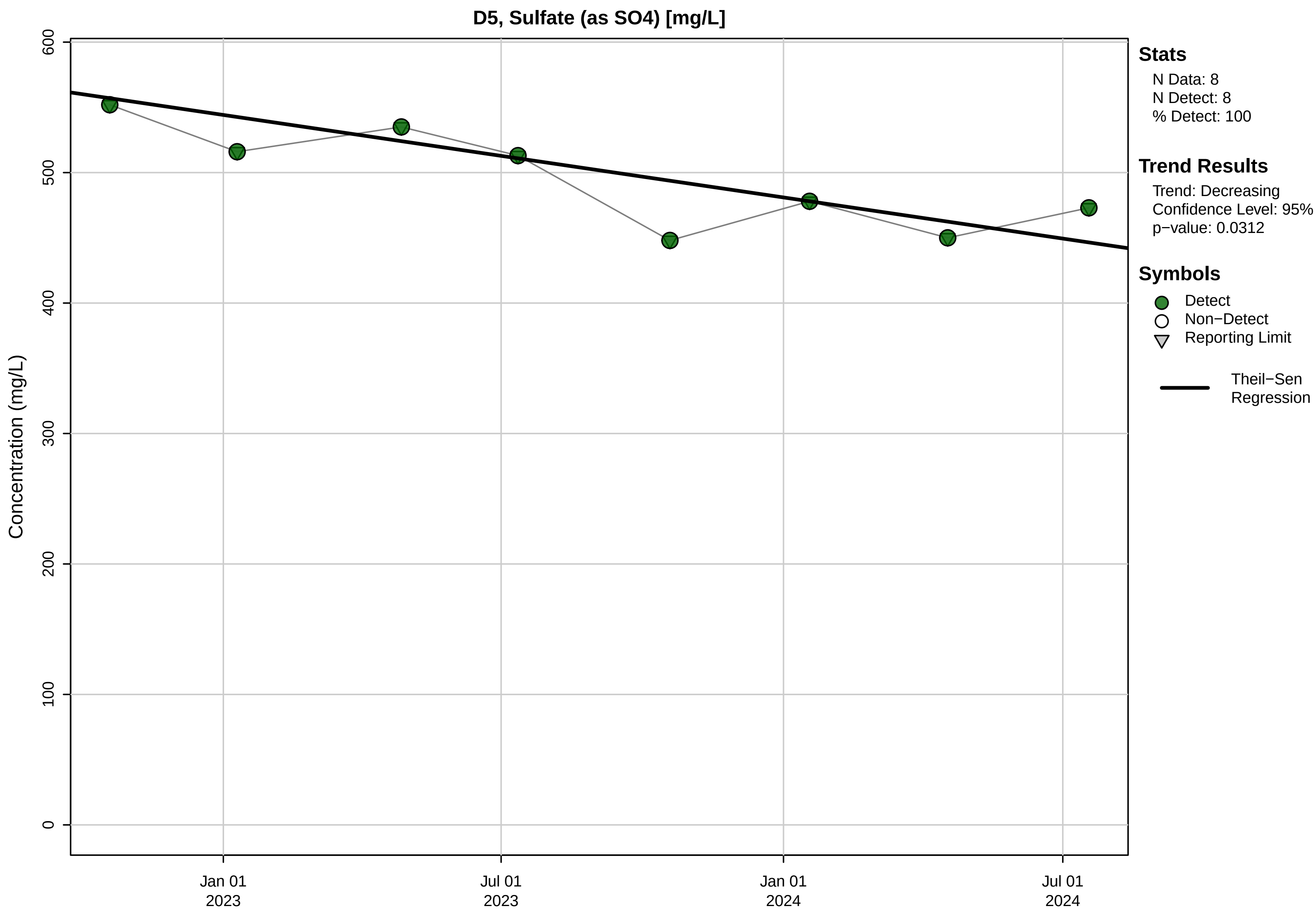

D4, Nickel [ug/L]
Concentration (ug/L)
0
5
10
15
Jan 01
2023
Jul 01
2023
Jan 01
2024
Jul 01
2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Decreasing
Confidence Level: 95%
p−value: 0.0448
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen
Regression

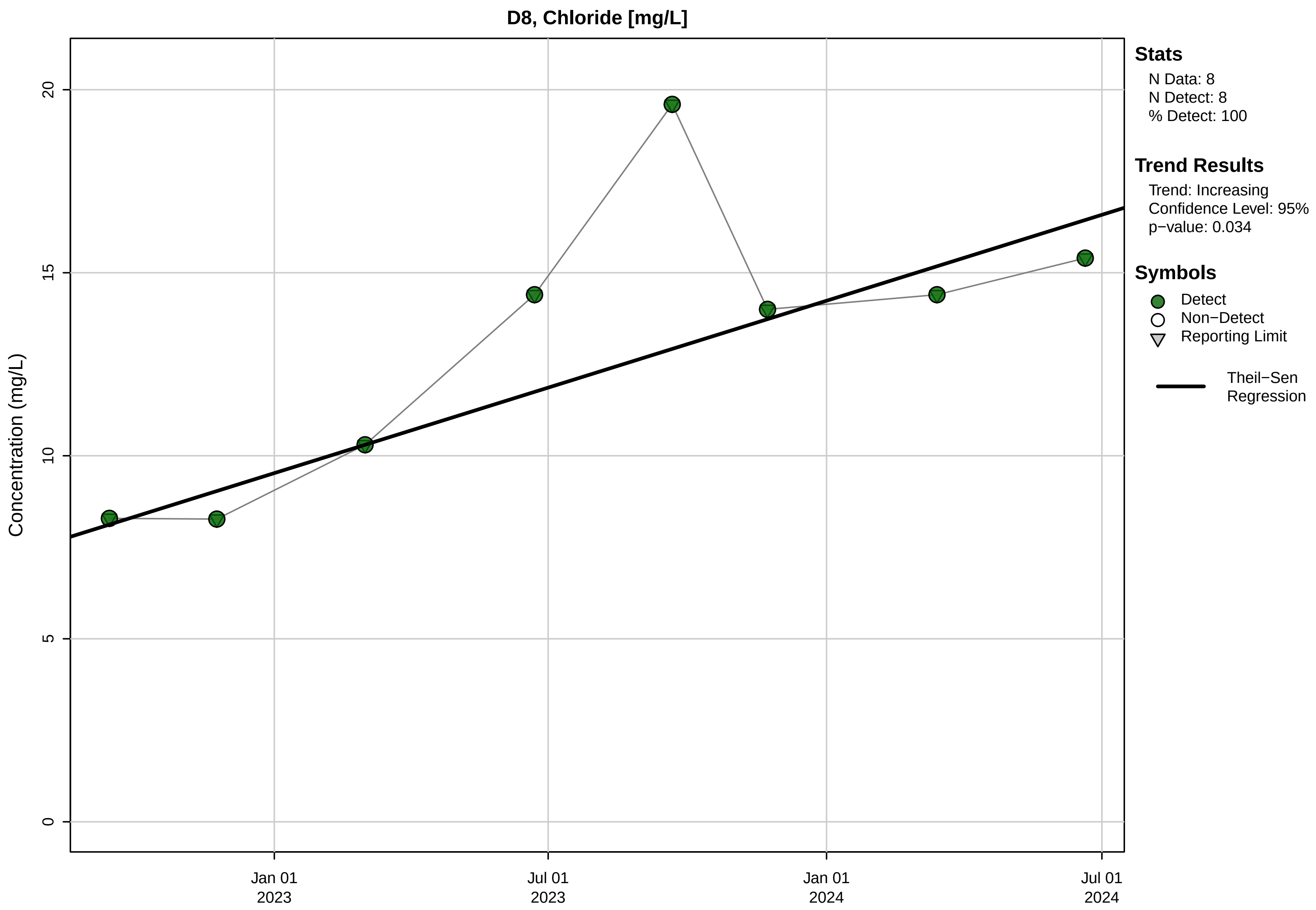


D4, Sulfate (as SO4) [mg/L]
Concentration (mg/L)
0
50
100
150
200
250
300
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Decreasing
Confidence Level: 95%
p−value: 0.0312
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

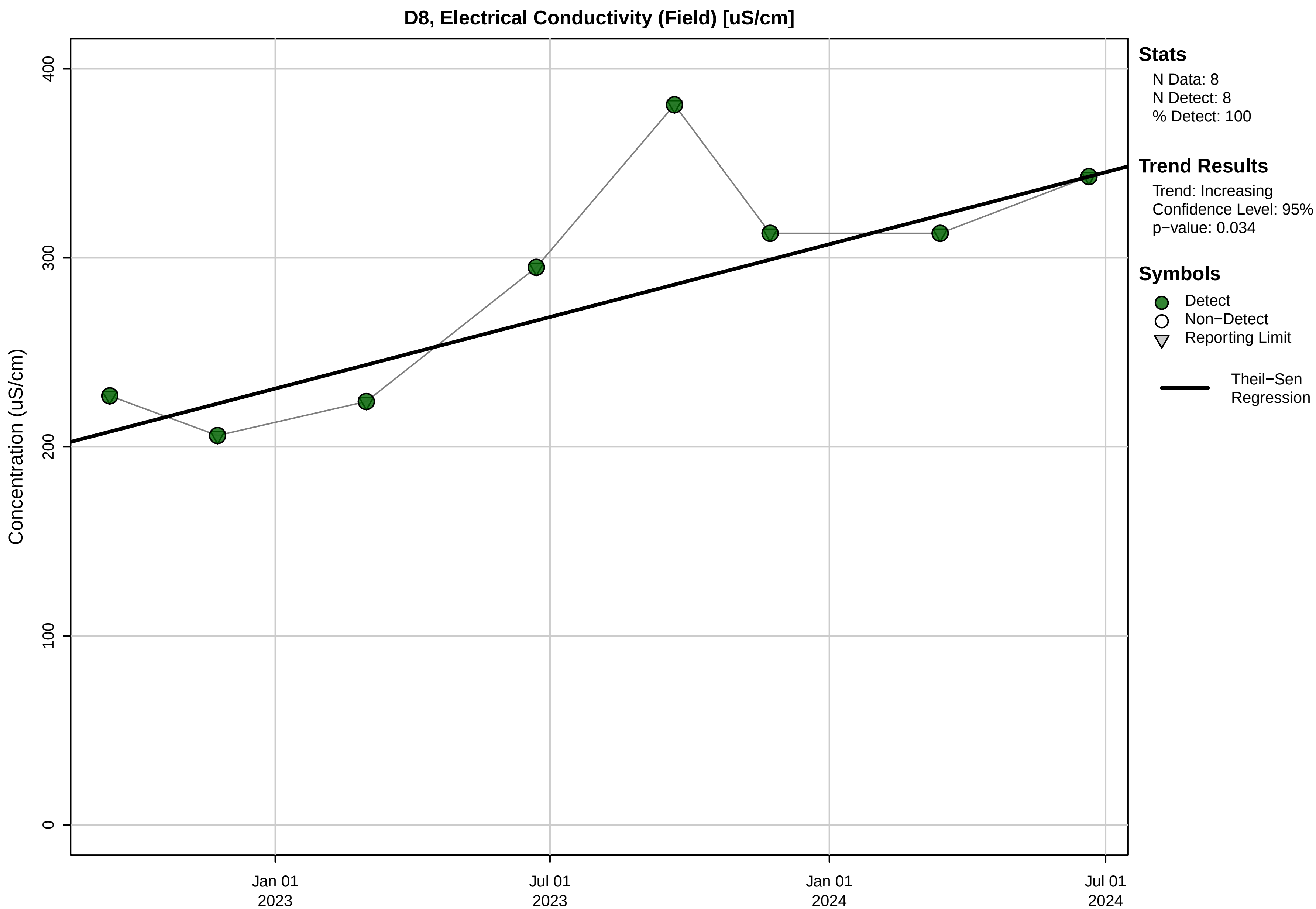


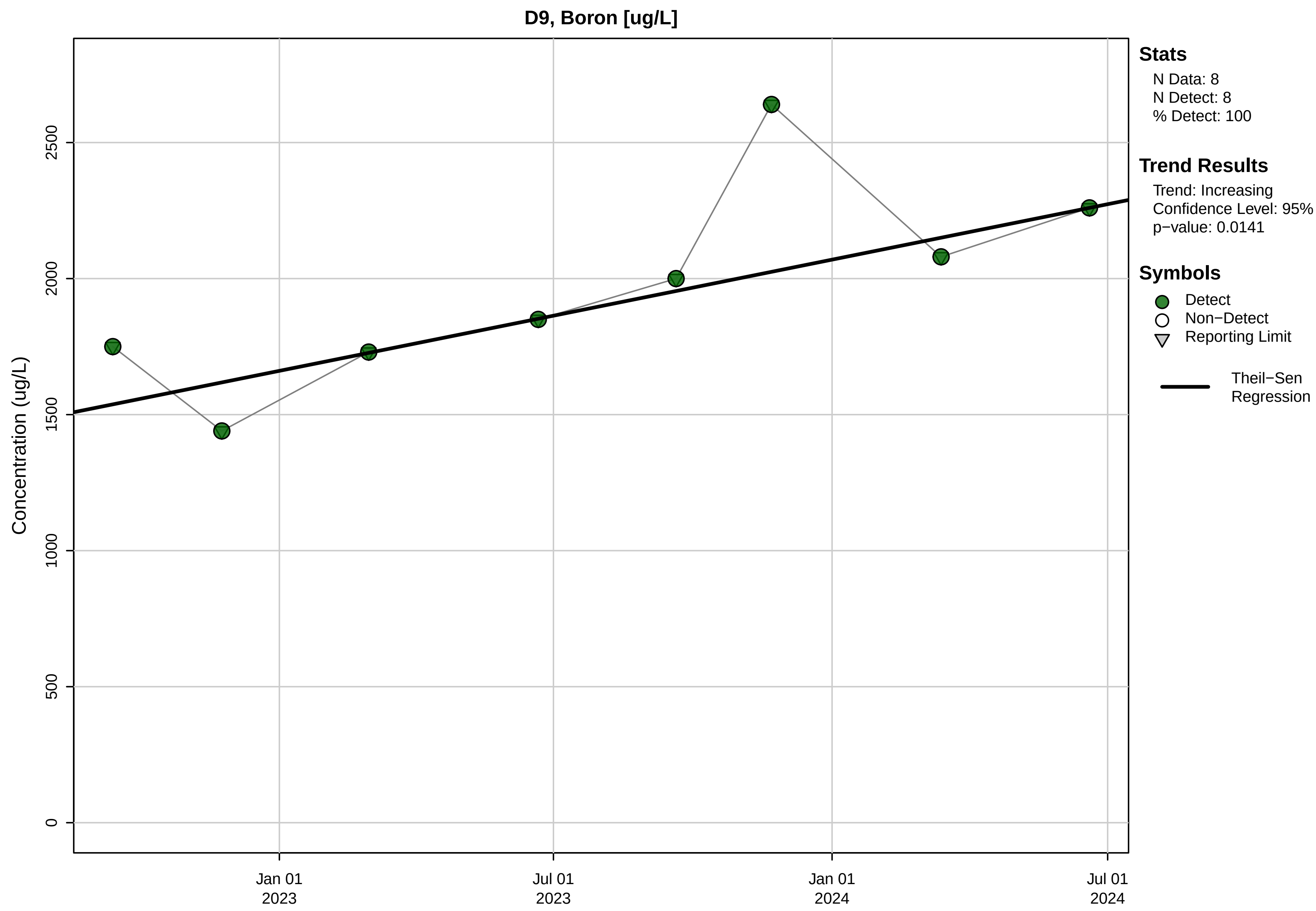
D5, Chloride [mg/L]
Concentration (mg/L)
0
5
10
15
20
25
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Decreasing
Confidence Level: 95%
p−value: 0.00551
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression


D5, Sulfate (as SO4) [mg/L]
Concentration (mg/L)
0
100
200
300
400
500
600
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Decreasing
Confidence Level: 95%
p−value: 0.0312
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

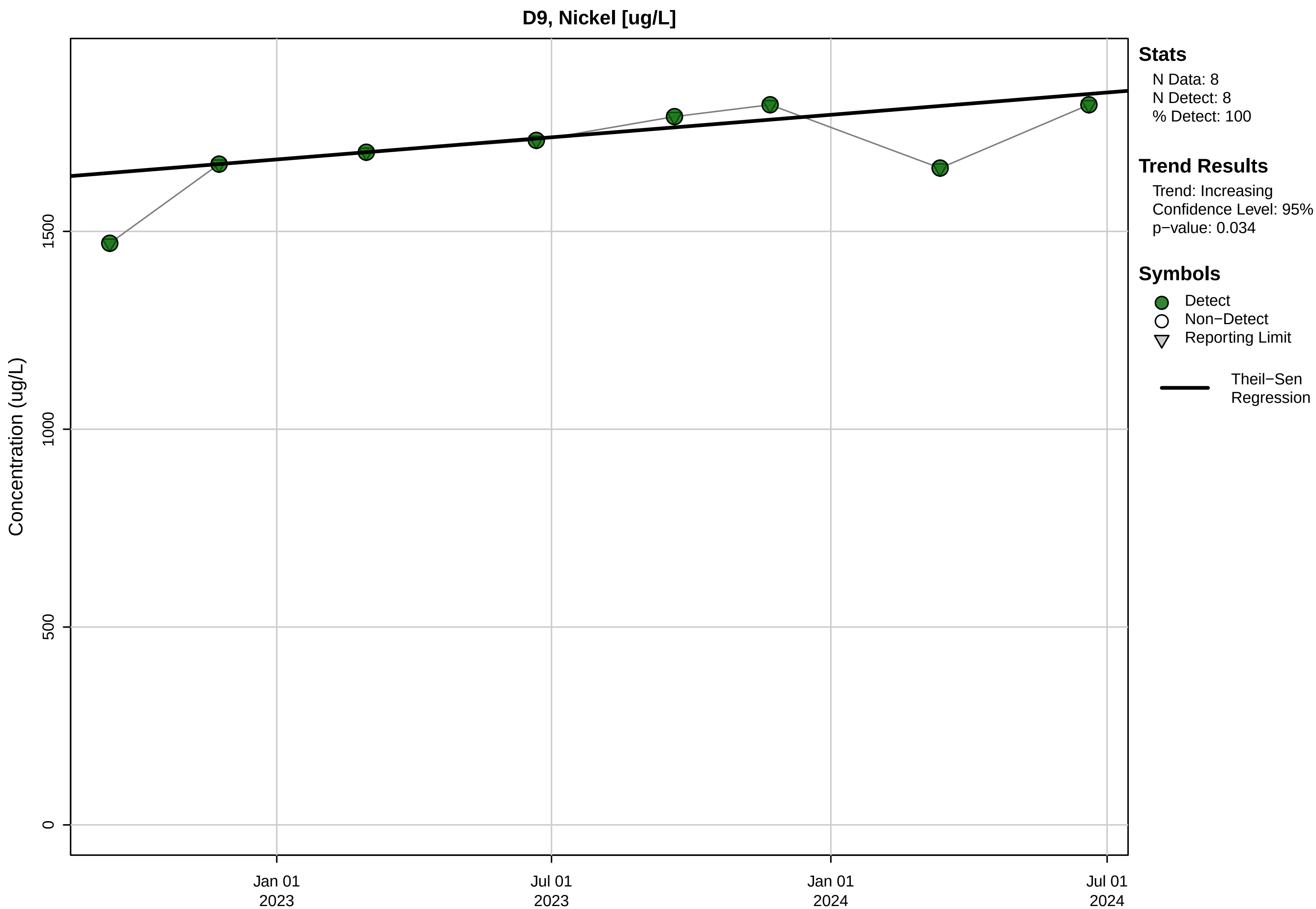


D8, Chloride [mg/L]
Concentration (mg/L)
0
5
10
15
20
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.034
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression


D8, Electrical Conductivity (Field) [uS/cm]
Concentration (uS/cm)
0
100
200
300
400
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.034
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression



D9, Boron [ug/L]
Concentration (ug/L)
0
500
1000
1500
2000
2500
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.0141
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression



D9, Nickel [ug/L]
Concentration (ug/L)
0
500
1000
1500
Jan 01 2023
Jul 01 2023
Jan 01 2024
Jul 01 2024
Stats
N Data: 8
N Detect: 8
% Detect: 100
Trend Results
Trend: Increasing
Confidence Level: 95%
p−value: 0.034
Symbols
Detect
Non−Detect
Reporting Limit
Theil−Sen Regression

Table 1
Descriptive Statistics
Mt Piper

sys_loc_code	chemical_name	Units	N	Num Detects	Num ND	Percent Detects	Min RL	Max RL	Min Detect	Median	Mean	Max Detect	SD	CV	Distribution
D1	Boron [ug/L]	ug/L	8	8	0	100.00%			560	3090	2850	3490	945.3	33.17%	NDD
D1	Chloride [mg/L]	mg/L	8	8	0	100.00%			121	956.5	911.9	1320	357.2	39.17%	Normal
D1	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			2020	9815	9292	12370	3107	33.44%	NDD
D1	Iron [ug/L]	ug/L	8	8	0	100.00%			17300	48550	44820	56200	13410	29.92%	Normal
D1	Lead [ug/L]	ug/L	8	1	7	12.50%	1	1	3	1	1.25	3	0.7071	56.57%	NDD
D1	Manganese [ug/L]	ug/L	8	8	0	100.00%			3390	20100	18700	25000	6687	35.76%	NDD
D1	Nickel [ug/L]	ug/L	8	8	0	100.00%			178	2010	1851	2620	721.4	38.97%	NDD
D1	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			823	5010	4639	6330	1658	35.75%	NDD
D1	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			1450	8785	8289	11000	2929	35.33%	NDD
D10	Boron [ug/L]	ug/L	8	8	0	100.00%			820	2930	2866	5440	1393	48.61%	Normal
D10	Chloride [mg/L]	mg/L	8	8	0	100.00%			204	578.5	549.2	962	228.1	41.53%	Normal
D10	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			3500	8230	7588	11330	2496	32.89%	Normal
D10	Iron [ug/L]	ug/L	8	8	0	100.00%			3860	6590	7084	9840	2217	31.30%	Normal
D10	Lead [ug/L]	ug/L	8	7	1	87.50%	1	1	3	6	6.25	11	3.845	61.52%	Normal
D10	Manganese [ug/L]	ug/L	8	8	0	100.00%			2540	6570	6261	10400	2417	38.61%	Normal
D10	Nickel [ug/L]	ug/L	8	8	0	100.00%			353	854.5	806.6	1210	280.2	34.74%	Normal
D10	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			1470	3705	3576	5910	1364	38.14%	Normal
D10	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			2560	6830	6415	10400	2441	38.05%	Normal
D102	Boron [ug/L]	ug/L	8	8	0	100.00%			1140	1280	1289	1390	88.06	6.83%	Normal
D102	Chloride [mg/L]	mg/L	8	8	0	100.00%			879	1055	1107	1520	187.4	16.92%	Normal
D102	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			8500	8665	8770	9490	336.4	3.84%	NDD
D102	Iron [ug/L]	ug/L	8	8	0	100.00%			34600	49950	49210	58500	8559	17.39%	Normal
D102	Lead [ug/L]	ug/L	8	1	7	12.50%	1	1	1	1	1	1	0	0.00%	NDD
D102	Manganese [ug/L]	ug/L	8	8	0	100.00%			13600	14350	14860	18800	1672	11.25%	NDD
D102	Nickel [ug/L]	ug/L	8	8	0	100.00%			1360	1550	1581	2060	220.9	13.97%	Normal
D102	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			3280	3880	4005	5220	566.5	14.14%	Normal
D102	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			7050	7615	7608	8200	400.1	5.26%	Normal
D103	Boron [ug/L]	ug/L	8	8	0	100.00%			1430	1650	1642	1800	120.1	7.31%	Normal
D103	Chloride [mg/L]	mg/L	8	8	0	100.00%			172	204	201.9	240	23.32	11.55%	Normal
D103	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			3360	3600	3681	4370	315.5	8.57%	Normal
D103	Iron [ug/L]	ug/L	8	8	0	100.00%			9830	15100	15330	20100	3646	23.78%	Normal
D103	Lead [ug/L]	ug/L	8	0	8	0.00%	1	1		1	1		0	0.00%	NDD
D103	Manganese [ug/L]	ug/L	8	8	0	100.00%			7920	9135	9155	10500	1035	11.31%	Normal
D103	Nickel [ug/L]	ug/L	8	8	0	100.00%			568	647.5	657.8	762	60.95	9.27%	Normal
D103	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			1380	1575	1565	1770	150.1	9.59%	Normal
D103	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			2660	2790	2821	3020	137.7	4.88%	Normal
D104	Boron [ug/L]	ug/L	8	5	3	62.50%	50	50	60	60	73.75	130	32.49	44.05%	NDD
D104	Chloride [mg/L]	mg/L	8	8	0	100.00%			5.76	71.95	60.42	84.4	27.73	45.90%	NDD
D104	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			393	981	980.6	1320	306.8	31.28%	Normal
D104	Iron [ug/L]	ug/L	8	8	0	100.00%			2420	9320	9381	18700	5042	53.75%	Normal
D104	Lead [ug/L]	ug/L	8	2	6	25.00%	1	1	1	1	1.125	2	0.3536	31.43%	NDD
D104	Manganese [ug/L]	ug/L	8	8	0	100.00%			2300	3200	3385	5260	1026	30.32%	Normal
D104	Nickel [ug/L]	ug/L	8	8	0	100.00%			43	74	92.88	194	51.58	55.54%	Normal
D104	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			16.9	332.5	312.9	486	154.8	49.47%	Normal
D104	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			274	633	644.8	903	208.5	32.33%	Normal
D105	Boron [ug/L]	ug/L	8	8	0	100.00%			440	530	570	800	121.4	21.30%	Normal
D105	Chloride [mg/L]	mg/L	8	8	0	100.00%			170	220.5	215.8	250	24.82	11.51%	Normal
D105	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			2790	3095	3064	3380	190.6	6.22%	Normal
D105	Iron [ug/L]	ug/L	8	8	0	100.00%			17400	21700	22320	27300	3664	16.41%	Normal
D105	Lead [ug/L]	ug/L	8	1	7	12.50%	1	1	2	1	1.125	2	0.3536	31.43%	NDD
D105	Manganese [ug/L]	ug/L	8	8	0	100.00%			8950	10150	10540	12700	1214	11.52%	Normal
D105	Nickel [ug/L]	ug/L	8	8	0	100.00%			452	541.5	542.1	607	46.22	8.52%	Normal
D105	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			1100	1310	1309	1480	112.6	8.60%	Normal
D105	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			2200	2365	2429	2890	211.3	8.70%	Normal
D106	Boron [ug/L]	ug/L	8	8	0	100.00%			1840	2205	2264	2960	384.5	16.99%	Normal
D106	Chloride [mg/L]	mg/L	8	8	0	100.00%			1130	1295	1315	1680	173.3	13.18%	Normal
D106	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			11470	12465	12470	13420	772.7	6.20%	Normal
D106	Iron [ug/L]	ug/L	8	8	0	100.00%			21800	29650	30860	44200	8806	28.53%	Normal
D106	Lead [ug/L]	ug/L	8	7	1	87.50%	1	1	1	2.5	3.25	7	2.435	74.92%	Lognormal
D106	Manganese [ug/L]	ug/L	8	8	0	100.00%			15900	18200	19240	26800	3292	17.11%	Lognormal
D106	Nickel [ug/L]	ug/L	8	8	0	100.00%			1990	2120	2221	3050	343.9	15.48%	NDD
D106	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			5610	6125	6161	7480	593.7	9.64%	Lognormal
D106	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			10400	11200	11320	12600	736.3	6.50%	Normal
D107	Boron [ug/L]	ug/L	8	8	0	100.00%			5020	5225	5314	6140	372.3	7.01%	NDD
D107	Chloride [mg/L]	mg/L	8	8	0	100.00%			814	1170	1192	1730	254.2	21.33%	Normal
D107	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			11730	12700	13050	15560	1172	8.99%	Normal
D107	Iron [ug/L]	ug/L	8	8	0	100.00%			17500	21550	22810	30600	4503	19.74%	Normal
D107	Lead [ug/L]	ug/L	8	8	0	100.00%			9	12.5	12.25	15	1.982	16.18%	Normal
D107	Manganese [ug/L]	ug/L	8	8	0	100.00%			10500	12500	12880	18000	2270	17.63%	Lognormal
D107	Nickel [ug/L]	ug/L	8	8	0	100.00%			1370	1780	1879	2860	441.1	23.48%	Normal
D107	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			4900	6155	6432	8540	1054	16.38%	Normal
D107	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			10100	11000	11250	13600	1112	9.89%	Normal
D11	Boron [ug/L]	ug/L	3	3	0	100.00%			1480	2210	2100	2610	573	27.28%	Normal
D11	Chloride [mg/L]	mg/L	3	3	0	100.00%			694	864	866	1040	173	19.98%	Normal
D11	cal Conductivity (Field) [uS/cm]	uS/cm	3	3	0	100.00%			6530	8550	8513	10460	1965	23.08%	Normal
D11	Iron [ug/L]	ug/L	3	3	0	100.00%			61200	75500	73070	82500	10860	14.86%	Normal
D11	Lead [ug/L]	ug/L	3	1	2	33.33%	1	1	1	1	1	1	0	0.00%	NDD
D11	Manganese [ug/L]	ug/L	3	3	0	100.00%			6810	12500	11640	15600	4458	38.31%	Normal
D11	Nickel [ug/L]	ug/L	3	3	0	100.00%			442	926	822.7	1100	341	41.44%	Normal
D11	Sulfate (as SO4) [mg/L]	mg/L	3	3	0	100.00%			2500	3650	3693	4930	1216	32.91%	Normal
D11	al Dissolved Solids (TDS) [mg/L]	mg/L	3	3	0	100.00%			5120	6520	6890	9030	1981	28.75%	Normal
D110	Boron [ug/L]	ug/L	8	8	0	100.00%			1540	1975	1990	2350	238.8	12.00%	Normal
D110	Chloride [mg/L]	mg/L	8	8	0	100.00%			867	995	1023	1310	137.2	13.42%	Normal
D110	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			8584	8985	9028	9760	359.6	3.98%	Normal
D110	Iron [ug/L]	ug/L	8	8	0	100.00%			48000	56900	57200	66900	5837	10.21%	Normal
D110	Lead [ug/L]	ug/L	8	0	8	0.00%	1	1		1	1		0	0.00%	NDD
D110	Manganese [ug/L]	ug/L	8	8	0	100.00%			16700	17150	17640	20500	1286	7.29%	NDD
D110	Nickel [ug/L]	ug/L	8	8	0	100.00%			1420	1775	1738	2070	187.7	10.80%	Normal
D110	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			3530	4355	4210	4880	415.6	9.87%	Normal
D110	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			7560	7875	7820	8010	182.8	2.34%	Normal
D113	Boron [ug/L]	ug/L	8	8	0	100.00%			1060	1735	1704	2080	320.4	18.81%	Normal
D113	Chloride [mg/L]	mg/L	8	8	0	100.00%			182	289	271.1	313	46.88	17.29%	Normal
D113	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			3600	4595	4491	5360	604.7	13.46%	Normal
D113	Iron [ug/L]	ug/L	8	8	0	100.00%			8380	10750	11020	14900	2271	20.62%	Normal
D113	Lead [ug/L]	ug/L	8	8	0	100.00%			2	3	3.25	6	1.165	35.85%	NDD
D113	Manganese [ug/L]	ug/L	8	8	0	100.00%			4630	6200	5859	6630	751.4	12.83%	Normal
D113	Nickel [ug/L]	ug/L	8	8	0	100.00%			361	522.5	522.4	692	116.3	22.26%	Normal
D113	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			1380	2050	1938	2220	281.6	14.53%	Normal
D113	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			2700	3665	3480	3950	489.5	14.07%	Normal
D117	Boron [ug/L]	ug/L	8	8	0	100.00%			10000	11350	11460	13100	1226	10.69%	Normal
D117	Chloride [mg/L]	mg/L	8	8	0	100.00%			104	133	135.5	178	20.38	15.04%	Normal
D117	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			4370	4740	4695	5040	201.3	4.29%	Normal
D117	Iron [ug/L]	ug/L	8	8	0	100.00%			350	950	1830	7720	2466	134.74%	Lognormal
D117	Lead [ug/L]	ug/L	8	3	5	37.50%	1	1	1	1	1.25	3	0.7071	56.57%	NDD
D117	Manganese [ug/L]	ug/L	8	8	0	100.00%			5980	10720	10860	16000	3459	31.84%	Normal
D117	Nickel [ug/L]	ug/L	8	8	0	100.00%			312	358.5	352	384	25.67	7.29%	Normal
D117	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			2070	2675	2628	3110	393.5	14.98%	Normal
D117	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			3450	4135	4121	4940	439.7	10.67%	Normal

Table 1
Descriptive Statistics
Mt Piper

sys_loc_code	chemical_name	Units	N	Num Detects	Num ND	Percent Detects	Min RL	Max RL	Min Detect	Median	Mean	Max Detect	SD	CV	Distribution
D1	Boron [ug/L]	ug/L	8	8	0	100.00%			560	3090	2850	3490	945.3	33.17%	NDD
D1	Chloride [mg/L]	mg/L	8	8	0	100.00%			121	956.5	911.9	1320	357.2	39.17%	Normal
D1	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			2020	9815	9292	12370	3107	33.44%	NDD
D1	Iron [ug/L]	ug/L	8	8	0	100.00%			17300	48550	44820	56200	13410	29.92%	Normal
D1	Lead [ug/L]	ug/L	8	1	7	12.50%	1	1	3	1	1.25	3	0.7071	56.57%	NDD
D1	Manganese [ug/L]	ug/L	8	8	0	100.00%			3390	20100	18700	25000	6687	35.76%	NDD
D1	Nickel [ug/L]	ug/L	8	8	0	100.00%			178	2010	1851	2620	721.4	38.97%	NDD
D1	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			823	5010	4639	6330	1658	35.75%	NDD
D1	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			1450	8785	8289	11000	2929	35.33%	NDD
D10	Boron [ug/L]	ug/L	8	8	0	100.00%			820	2930	2866	5440	1393	48.61%	Normal
D10	Chloride [mg/L]	mg/L	8	8	0	100.00%			204	578.5	549.2	962	228.1	41.53%	Normal
D119	Boron [ug/L]	ug/L	8	8	0	100.00%			360	455	480	620	102.5	21.36%	Normal
D119	Chloride [mg/L]	mg/L	8	8	0	100.00%			69.4	119.5	113.8	158	35.13	30.88%	Normal
D119	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			1880	2246	2293	2850	313.6	13.68%	Normal
D119	Iron [ug/L]	ug/L	8	8	0	100.00%			5190	22900	21570	31200	8116	37.62%	Normal
D119	Lead [ug/L]	ug/L	8	8	0	100.00%			1	19.5	19.75	46	16.71	84.63%	Normal
D119	Manganese [ug/L]	ug/L	8	8	0	100.00%			986	1410	1416	1720	236.2	16.69%	Normal
D119	Nickel [ug/L]	ug/L	8	8	0	100.00%			110	149	139.2	162	21.49	15.43%	Normal
D119	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			570	932.5	897.4	1190	199.2	22.20%	Normal
D119	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			1300	1625	1638	2410	355.4	21.71%	Normal
D15	Boron [ug/L]	ug/L	8	8	0	100.00%			120	190	207.5	410	89.56	43.16%	Lognormal
D15	Chloride [mg/L]	mg/L	8	8	0	100.00%			75.1	86.2	86.44	97.8	6.777	7.84%	Normal
D15	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			1880	1895	1955	2170	116	5.93%	NDD
D15	Iron [ug/L]	ug/L	8	8	0	100.00%			10300	13150	13190	16100	2221	16.84%	Normal
D15	Lead [ug/L]	ug/L	8	6	2	75.00%	1	1	2	3	4.875	19	6.01	123.29%	Lognormal
D15	Manganese [ug/L]	ug/L	8	8	0	100.00%			781	926	918.8	1040	100.4	10.92%	Normal
D15	Nickel [ug/L]	ug/L	8	8	0	100.00%			282	350.5	354.5	423	47.3	13.34%	Normal
D15	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			738	795	832	994	95.81	11.52%	Normal
D15	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			1260	1365	1391	1660	133.6	9.60%	Normal
D16A	Boron [ug/L]	ug/L	7	4	3	57.14%	50	50	60	60	75.71	160	39.94	52.75%	Lognormal
D16A	Chloride [mg/L]	mg/L	7	7	0	100.00%			17.3	20.3	20.56	22.8	1.846	8.98%	Normal
D16A	cal Conductivity (Field) [uS/cm]	uS/cm	7	7	0	100.00%			930	970	991.6	1100	63.12	6.37%	Normal
D16A	Iron [ug/L]	ug/L	7	7	0	100.00%			520	1930	2130	3300	953.2	44.75%	Normal
D16A	Lead [ug/L]	ug/L	7	3	4	42.86%	1	1	2	1	1.857	5	1.464	78.82%	NDD
D16A	Manganese [ug/L]	ug/L	7	7	0	100.00%			70	115	179.9	472	141.1	78.45%	Lognormal
D16A	Nickel [ug/L]	ug/L	7	7	0	100.00%			1	8	8.857	19	6.466	73.00%	Normal
D16A	Sulfate (as SO4) [mg/L]	mg/L	7	7	0	100.00%			174	204	203.6	224	16.94	8.32%	Normal
D16A	al Dissolved Solids (TDS) [mg/L]	mg/L	7	7	0	100.00%			514	574	606.9	762	83.42	13.75%	Normal
D17	Boron [ug/L]	ug/L	8	6	2	75.00%	50	50	60	75	81.25	160	36.03	44.35%	Lognormal
D17	Chloride [mg/L]	mg/L	8	8	0	100.00%			49.9	120.5	110.3	149	34.39	31.19%	Normal
D17	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			1270	2370	2258	2790	522.2	23.13%	Normal
D17	Iron [ug/L]	ug/L	8	8	0	100.00%			6450	17950	17530	29500	7347	41.91%	Normal
D17	Lead [ug/L]	ug/L	8	4	4	50.00%	1	1	1	1	1.5	5	1.414	94.28%	NDD
D17	Manganese [ug/L]	ug/L	8	8	0	100.00%			801	1730	1663	2130	456.1	27.43%	Normal
D17	Nickel [ug/L]	ug/L	8	8	0	100.00%			22	35	34.38	46	9.927	28.88%	Normal
D17	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			465	1090	992.9	1290	296.1	29.82%	Normal
D17	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			772	1800	1696	2220	467.7	27.57%	Normal
D18	Boron [ug/L]	ug/L	8	4	4	50.00%	50	50	50	50	60	100	17.73	29.55%	NDD
D18	Chloride [mg/L]	mg/L	8	8	0	100.00%			7.52	8.215	8.179	8.74	0.4778	5.84%	Normal
D18	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			660	670	671.2	680	8.345	1.24%	Normal
D18	Iron [ug/L]	ug/L	8	8	0	100.00%			200	1180	1485	3830	1246	83.89%	Normal
D18	Lead [ug/L]	ug/L	8	1	7	12.50%	1	1	2	1	1.125	2	0.3536	31.43%	NDD
D18	Manganese [ug/L]	ug/L	8	8	0	100.00%			86	101	121.6	185	42.17	34.67%	Lognormal
D18	Nickel [ug/L]	ug/L	8	8	0	100.00%			3	4.5	4.875	8	1.553	31.85%	Normal
D18	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			9.29	10.75	11.45	15.1	1.996	17.43%	Normal
D18	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			343	380	382.9	422	29.12	7.61%	Normal
D19	Boron [ug/L]	ug/L	8	8	0	100.00%			680	1540	1368	1680	353	25.81%	NDD
D19	Chloride [mg/L]	mg/L	8	8	0	100.00%			91	262	236	315	84.79	35.93%	NDD
D19	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			2070	4355	3876	4660	1048	27.04%	NDD
D19	Iron [ug/L]	ug/L	8	8	0	100.00%			5360	16450	22720	55800	18650	82.09%	Normal
D19	Lead [ug/L]	ug/L	8	7	1	87.50%	1	1	3	5.5	30.88	134	48.09	155.75%	Lognormal
D19	Manganese [ug/L]	ug/L	8	8	0	100.00%			2120	6510	5634	7590	2115	37.54%	NDD
D19	Nickel [ug/L]	ug/L	8	8	0	100.00%			214	532	486.1	629	168.4	34.65%	NDD
D19	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			863	1920	1739	2200	514.4	29.59%	NDD
D19	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			1460	3305	2998	3650	883.9	29.49%	NDD
D2	Boron [ug/L]	ug/L	8	8	0	100.00%			220	295	388.8	800	204.8	52.67%	Normal
D2	Chloride [mg/L]	mg/L	8	8	0	100.00%			31.3	94.6	81.21	112	32.84	40.44%	Normal
D2	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			600	1495	1409	2229	533.4	37.87%	Normal
D2	Iron [ug/L]	ug/L	8	8	0	100.00%			3990	7185	7421	12700	2974	40.07%	Normal
D2	Lead [ug/L]	ug/L	8	8	0	100.00%			2	3	3.75	6	1.488	39.68%	Lognormal
D2	Manganese [ug/L]	ug/L	8	8	0	100.00%			789	1625	1734	3150	765.9	44.18%	Normal
D2	Nickel [ug/L]	ug/L	8	8	0	100.00%			43	118	110.1	178	45.44	41.26%	Normal
D2	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			234	639.5	554.6	771	223.6	40.31%	Normal
D2	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			622	1105	995.1	1390	313	31.45%	Normal
D20	Boron [ug/L]	ug/L	8	8	0	100.00%			2580	3515	3576	4820	868.8	24.29%	Normal
D20	Chloride [mg/L]	mg/L	8	8	0	100.00%			114	119.5	120.4	126	3.815	3.17%	Normal
D20	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			3590	3910	3905	4090	148	3.79%	Normal
D20	Iron [ug/L]	ug/L	8	8	0	100.00%			2760	4245	4722	8360	1685	35.68%	Normal
D20	Lead [ug/L]	ug/L	8	7	1	87.50%	1	1	1	5	7.5	17	6.547	87.29%	Normal
D20	Manganese [ug/L]	ug/L	8	8	0	100.00%			27600	29200	29700	33000	1912	6.44%	Normal
D20	Nickel [ug/L]	ug/L	8	8	0	100.00%			498	574	590.6	718	76.51	12.95%	Normal
D20	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			2050	2215	2198	2310	86.64	3.94%	Normal
D20	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			3260	3470	3505	3740	188.8	5.39%	Normal
D3	Boron [ug/L]	ug/L	8	4	4	50.00%	50	50	70	60	71.25	130	28.5	40.01%	Lognormal
D3	Chloride [mg/L]	mg/L	8	8	0	100.00%			31.5	47.9	55.88	89.2	22.19	39.71%	Normal
D3	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			269	900	787.5	1020	282.6	35.88%	Normal
D3	Iron [ug/L]	ug/L	8	8	0	100.00%			1290	7700	7265	10800	3532	48.61%	Normal
D3	Lead [ug/L]	ug/L	8	0	8	0.00%	1	1		1	1		0	0.00%	NDD
D3	Manganese [ug/L]	ug/L	8	8	0	100.00%			34	618	495.5	686	267	53.88%	NDD
D3	Nickel [ug/L]	ug/L	8	8	0	100.00%			3	9.5	13	32	9.426	72.51%	Normal
D3	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			51.9	232.5	202	278	78.27	38.75%	NDD
D3	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			184	541.5	484.5	699	177.4	36.63%	Normal
D4	Boron [ug/L]	ug/L	8	3	5	37.50%	50	50	50	50	50	50	0	0.00%	NDD
D4	Chloride [mg/L]	mg/L	8	8	0	100.00%			14.2	16.95	16.75	18.7	1.262	7.53%	Normal
D4	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			640	715	700.1	751	37.99	5.43%	Normal
D4	Iron [ug/L]	ug/L	8	8	0	100.00%			56000	63100	62860	66700	3231	5.14%	Normal
D4	Lead [ug/L]	ug/L	8	8	0	100.00%			12	15	14.75	18	1.832	12.42%	Normal
D4	Manganese [ug/L]	ug/L	8	8	0	100.00%			621	673.5	669.4	723	39.17	5.85%	Normal
D4	Nickel [ug/L]	ug/L	8	8	0	100.00%			12	12	12.88	16	1.458	11.32%	NDD
D4	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			235	274.5	270.4	300	22.59	8.35%	Normal
D4	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			494	535	557.6	660	61.71	11.07%	Normal
D5	Boron [ug/L]	ug/L	8	8	0	100.00%			60	75	73.75	80	7.44	10.09%	NDD
D5	Chloride [mg/L]	mg/L	8	8	0	100.00%			22.7	24.8	24.89	27	1.768	7.11%	Normal
D5	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			1160	1195	1214	1344	62.12	5.12%	Normal
D5	Iron [ug/L]	ug/L	8	8	0	100.00%			26600	34100	34760	44500	6089	17.51%	Normal
D5	Lead [ug/L]	ug/L	8	0	8	0.00%	1	1		1	1		0	0.00%	NDD
D5	Manganese [ug/L]	ug/L	8	8	0	100.00%			7220	7775	7775	8770	478.5	6.15%	Normal
D5	Nickel [ug/L]	ug/L	8	8	0	100.00%			54	57.5	58.5	69	5.237	8.95%	Normal

Table 1
Descriptive Statistics
Mt Piper

sys_loc_code	chemical_name	Units	N	Num Detects	Num ND	Percent Detects	Min RL	Max RL	Min Detect	Median	Mean	Max Detect	SD	CV	Distribution
D1	Boron [ug/L]	ug/L	8	8	0	100.00%			560	3090	2850	3490	945.3	33.17%	NDD
D1	Chloride [mg/L]	mg/L	8	8	0	100.00%			121	956.5	911.9	1320	357.2	39.17%	Normal
D1	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			2020	9815	9292	12370	3107	33.44%	NDD
D1	Iron [ug/L]	ug/L	8	8	0	100.00%			17300	48550	44820	56200	13410	29.92%	Normal
D1	Lead [ug/L]	ug/L	8	1	7	12.50%	1	1	3	1	1.25	3	0.7071	56.57%	NDD
D1	Manganese [ug/L]	ug/L	8	8	0	100.00%			3390	20100	18700	25000	6687	35.76%	NDD
D1	Nickel [ug/L]	ug/L	8	8	0	100.00%			178	2010	1851	2620	721.4	38.97%	NDD
D1	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			823	5010	4639	6330	1658	35.75%	NDD
D1	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			1450	8785	8289	11000	2929	35.33%	NDD
D10	Boron [ug/L]	ug/L	8	8	0	100.00%			820	2930	2866	5440	1393	48.61%	Normal
D10	Chloride [mg/L]	mg/L	8	8	0	100.00%			204	578.5	549.2	962	228.1	41.53%	Normal
D5	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			448	495.5	495.6	552	38.95	7.86%	Normal
D5	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			784	892	895.4	1060	83.79	9.36%	Normal
D8	Boron [ug/L]	ug/L	8	0	8	0.00%	50	50		50	50		0	0.00%	NDD
D8	Chloride [mg/L]	mg/L	8	8	0	100.00%			8.27	14.2	13.08	19.6	3.892	29.75%	Normal
D8	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			206	304	287.8	381	62.69	21.79%	Normal
D8	Iron [ug/L]	ug/L	8	8	0	100.00%			60	300	317.6	570	181.6	57.17%	Normal
D8	Lead [ug/L]	ug/L	8	1	7	12.50%	1	1	2	1	1.125	2	0.3536	31.43%	NDD
D8	Manganese [ug/L]	ug/L	8	8	0	100.00%			103	232.5	225.2	319	82.65	36.69%	Normal
D8	Nickel [ug/L]	ug/L	8	8	0	100.00%			34	56.5	53	72	14.39	27.16%	Normal
D8	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			64.9	101.95	101.2	139	26.43	26.13%	Normal
D8	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			163	180.5	201.1	277	43.31	21.53%	Normal
D9	Boron [ug/L]	ug/L	8	8	0	100.00%			1440	1925	1969	2640	367.9	18.69%	Normal
D9	Chloride [mg/L]	mg/L	8	8	0	100.00%			1020	1120	1121	1220	63.79	5.69%	Normal
D9	cal Conductivity (Field) [uS/cm]	uS/cm	8	8	0	100.00%			9220	9590	9756	10530	470.4	4.82%	Normal
D9	Iron [ug/L]	ug/L	8	8	0	100.00%			35800	56200	55100	73400	10380	18.83%	Normal
D9	Lead [ug/L]	ug/L	8	2	6	25.00%	1	1	1	1	1.125	2	0.3536	31.43%	NDD
D9	Manganese [ug/L]	ug/L	8	8	0	100.00%			14800	15650	16090	18800	1338	8.32%	Lognormal
D9	Nickel [ug/L]	ug/L	8	8	0	100.00%			1470	1715	1708	1820	115.1	6.74%	Normal
D9	Sulfate (as SO4) [mg/L]	mg/L	8	8	0	100.00%			4270	4765	4730	5160	330.2	6.98%	Normal
D9	al Dissolved Solids (TDS) [mg/L]	mg/L	8	8	0	100.00%			8240	8735	8855	9840	638.5	7.21%	Normal

Notes
Data file input: MK_Input_20241011.xlsx
Data date range: 2022-09-13 to 2024-08-02
Non-detects were substituted with the reporting limit value for summary statistics
N: number of data points
Num ND: number of non-detected data points
Min RL: The minimum reporting limit value
Max RL: The maximum reporting limit value
SD: Standard Deviation
CV: Coefficient of Variation (standard deviation divided by the mean)
Normal: the data fit a normal distribution
Lognormal: the data fit a lognormal distribution
NDD: No discernible distribution
GammaHW or GammaWH: the data fit one of the particular gamma distributions (Hawkins–Wixley [HW] or Wilson–Hilferty [WH])

Table 2
Trend Test Results
Mt Piper

sys_loc_code	chemical_name	N	Num Detects	Percent Detects	Meet Data Reqs	p-value	MK tau^2	MK tau	MK S	MK Trend	Theil-Sen Slope	Theil-Sen Intercept
D102	Boron [ug/L]	8	8	100.00%	Yes	0.262	0.107	-0.327	-9	Not Significant	-0.2495	6222
D102	Chloride [mg/L]	8	8	100.00%	Yes	0.905	0.0051	0.0714	2	Not Significant	0.2116	-3089
D102	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.399	0.0816	0.286	8	Not Significant	0.188	4837
D102	Iron [ug/L]	8	8	100.00%	Yes	0.72	0.0204	-0.143	-4	Not Significant	-1.042	70080
D102	Lead [ug/L]	8	1	12.50%	No						0	0
D102	Manganese [ug/L]	8	8	100.00%	Yes	0.72	0.0204	-0.143	-4	Not Significant	-0.8333	30440
D102	Nickel [ug/L]	8	8	100.00%	Yes	0.548	0.0459	-0.214	-6	Not Significant	-0.2431	6208
D102	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.548	0.0459	0.214	6	Not Significant	0.3211	-2475
D102	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.548	0.0459	0.214	6	Not Significant	1.07	-13370
D103	Boron [ug/L]	8	8	100.00%	Yes	0.548	0.0459	0.214	6	Not Significant	0.04535	756.2
D103	Chloride [mg/L]	8	8	100.00%	Yes	0.034	0.382	0.618	17	Increasing	0.09289	-1630
D103	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.109	0.25	0.5	14	Not Significant	1.077	-17600
D103	Iron [ug/L]	8	8	100.00%	Yes	0.905	0.0051	-0.0714	-2	Not Significant	-2.456	63080
D103	Lead [ug/L]	8	0	0.00%	No						0	0
D103	Manganese [ug/L]	8	8	100.00%	Yes	0.548	0.0459	0.214	6	Not Significant	3.773	-65750
D103	Nickel [ug/L]	8	8	100.00%	Yes	0.0141	0.51	0.714	20	Increasing	0.2129	-3528
D103	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.0141	0.51	0.714	20	Increasing	0.6196	-10670
D103	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.012	0.549	0.741	20	Increasing	0.7837	-12610
D104	Boron [ug/L]	8	5	62.50%	Yes	0.199	0.149	0.386	10	Not Significant	0.1406	-2722
D104	Chloride [mg/L]	8	8	100.00%	Yes	0.00551	0.617	0.786	22	Increasing	0.07245	-1356
D104	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.061	0.327	0.571	16	Not Significant	1.013	-18880
D104	Iron [ug/L]	8	8	100.00%	Yes	0.72	0.0204	-0.143	-4	Not Significant	-3.571	79070
D104	Lead [ug/L]	8	2	25.00%	No						0	0
D104	Manganese [ug/L]	8	8	100.00%	Yes	0.0312	0.413	-0.643	-18	Decreasing	-3.074	63440
D104	Nickel [ug/L]	8	8	100.00%	Yes	0.012	0.549	-0.741	-20	Decreasing	-0.1558	3137
D104	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.105	0.224	0.473	13	Not Significant	0.4966	-9431
D104	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.179	0.184	0.429	12	Not Significant	0.5613	-10380
D105	Boron [ug/L]	8	8	100.00%	Yes	0.905	0.0051	0.0714	2	Not Significant	0.02004	151.9
D105	Chloride [mg/L]	8	8	100.00%	Yes	0.901	0.00132	0.0364	1	Not Significant	0.00237	173.9
D105	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.0615	0.298	0.546	15	Not Significant	0.6188	-9005
D105	Iron [ug/L]	8	8	100.00%	Yes	0.262	0.107	-0.327	-9	Not Significant	-5.155	122800
D105	Lead [ug/L]	8	1	12.50%	No						0	0
D105	Manganese [ug/L]	8	8	100.00%	Yes	0.275	0.128	-0.357	-10	Not Significant	-1.143	32700
D105	Nickel [ug/L]	8	8	100.00%	Yes	0.905	0.0051	-0.0714	-2	Not Significant	-0.01617	859.8
D105	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.533	0.0331	-0.182	-5	Not Significant	-0.2353	5925
D105	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.179	0.184	-0.429	-12	Not Significant	-0.4918	12000
D106	Boron [ug/L]	8	8	100.00%	Yes	0.399	0.0816	0.286	8	Not Significant	0.8616	-14770
D106	Chloride [mg/L]	8	8	100.00%	Yes	0.061	0.327	-0.571	-16	Not Significant	-0.5882	12850
D106	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.0312	0.413	-0.643	-18	Decreasing	-3.8	86700
D106	Iron [ug/L]	8	8	100.00%	Yes	0.179	0.184	-0.429	-12	Not Significant	-20.75	435100
D106	Lead [ug/L]	8	7	87.50%	Yes	0.899	0.00143	-0.0378	-1	Not Significant	-0.001567	33.24
D106	Manganese [ug/L]	8	8	100.00%	Yes	0.00414	0.7	-0.837	-23	Decreasing	-7.232	159900
D106	Nickel [ug/L]	8	8	100.00%	Yes	0.105	0.224	-0.473	-13	Not Significant	-0.3964	9899
D106	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.105	0.224	-0.473	-13	Not Significant	-1.338	32270
D106	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.0141	0.51	-0.714	-20	Decreasing	-2.55	61280
D107	Boron [ug/L]	8	8	100.00%	Yes	0.708	0.0119	-0.109	-3	Not Significant	-0.1636	8256
D107	Chloride [mg/L]	8	8	100.00%	Yes	0.105	0.224	-0.473	-13	Not Significant	-0.3177	7386
D107	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.275	0.128	-0.357	-10	Not Significant	-1.886	49380
D107	Iron [ug/L]	8	8	100.00%	Yes	0.262	0.107	-0.327	-9	Not Significant	-1.754	56550
D107	Lead [ug/L]	8	8	100.00%	Yes	0.451	0.0495	0.222	6	Not Significant	0.003663	-60
D107	Manganese [ug/L]	8	8	100.00%	Yes	0.0178	0.478	-0.691	-19	Decreasing	-4.348	97260
D107	Nickel [ug/L]	8	8	100.00%	Yes	0.109	0.25	-0.5	-14	Not Significant	-0.3968	9503
D107	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.548	0.0459	-0.214	-6	Not Significant	-1.063	27120
D107	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.0312	0.413	-0.643	-18	Decreasing	-2.531	60580
D10	Boron [ug/L]	8	8	100.00%	Yes	0.00551	0.617	0.786	22	Increasing	2.637	-48700
D10	Chloride [mg/L]	8	8	100.00%	Yes	0.0141	0.51	0.714	20	Increasing	0.6484	-12110
D10	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.00551	0.617	0.786	22	Increasing	9.638	-180400
D10	Iron [ug/L]	8	8	100.00%	Yes	0.548	0.0459	0.214	6	Not Significant	2.723	-47000
D10	Lead [ug/L]	8	7	87.50%	Yes	0.0444	0.352	0.593	16	Increasing	0.01284	-245
D10	Manganese [ug/L]	8	8	100.00%	Yes	0.109	0.25	0.5	14	Not Significant	1.648	-25860
D10	Nickel [ug/L]	8	8	100.00%	Yes	0.0312	0.413	0.643	18	Increasing	0.5645	-10230
D10	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.00551	0.617	0.786	22	Increasing	4.875	-91760
D10	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.00551	0.617	0.786	22	Increasing	6.786	-125800
D110	Boron [ug/L]	8	8	100.00%	Yes	0.399	0.0816	0.286	8	Not Significant	0.3361	-4521
D110	Chloride [mg/L]	8	8	100.00%	Yes	0.399	0.0816	-0.286	-8	Not Significant	-0.3383	7654
D110	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.548	0.0459	-0.214	-6	Not Significant	-1.153	31560
D110	Iron [ug/L]	8	8	100.00%	Yes	1	0	0	0	Not Significant	-3.147	116500
D110	Lead [ug/L]	8	0	0.00%	No						0	0
D110	Manganese [ug/L]	8	8	100.00%	Yes	0.262	0.107	-0.327	-9	Not Significant	-0.9932	36540
D110	Nickel [ug/L]	8	8	100.00%	Yes	0.17	0.16	-0.4	-11	Not Significant	-0.3915	9454
D110	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.901	0.00132	-0.0364	-1	Not Significant	-0.01779	4725
D110	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.548	0.0459	-0.214	-6	Not Significant	-0.08991	9738
D113	Boron [ug/L]	8	8	100.00%	Yes	0.034	0.382	0.618	17	Increasing	0.9524	-16860
D113	Chloride [mg/L]	8	8	100.00%	Yes	0.17	0.16	0.4	11	Not Significant	0.06027	-911.4
D113	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.0312	0.413	0.643	18	Increasing	2.5	-44310
D113	Iron [ug/L]	8	8	100.00%	Yes	0.548	0.0459	0.214	6	Not Significant	4.197	-71040
D113	Lead [ug/L]	8	8	100.00%	Yes	0.139	0.223	0.472	9	Not Significant	0	3
D113	Manganese [ug/L]	8	8	100.00%	Yes	0.109	0.25	0.5	14	Not Significant	1.634	-25710
D113	Nickel [ug/L]	8	8	100.00%	Yes	0.275	0.128	0.357	10	Not Significant	0.2848	-5065
D113	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.275	0.128	0.357	10	Not Significant	0.3005	-3965
D113	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.061	0.327	0.571	16	Not Significant	1.624	-28630
D117	Boron [ug/L]	8	8	100.00%	Yes	0.179	0.184	0.429	12	Not Significant	4.591	-78600
D117	Chloride [mg/L]	8	8	100.00%	Yes	0.0312	0.413	0.643	18	Increasing	0.02744	-399.7
D117	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.901	0.00132	0.0364	1	Not Significant	0	4780
D117	Iron [ug/L]	8	8	100.00%	Yes	0.905	0.0051	0.0714	2	Not Significant	0.387	-6576
D117	Lead [ug/L]	8	3	37.50%	No						0	0
D117	Manganese [ug/L]	8	8	100.00%	Yes	0.72	0.0204	0.143	4	Not Significant	3.271	-55940
D117	Nickel [ug/L]	8	8	100.00%	Yes	0.061	0.327	-0.571	-16	Not Significant	-0.08417	2015
D117	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.399	0.0816	0.286	8	Not Significant	1.022	-17280
D117	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.708	0.0119	0.109	3	Not Significant	0.3968	-3486
D119	Boron [ug/L]	8	8	100.00%	Yes	0.533	0.0331	0.182	5	Not Significant	0.2355	-4131
D119	Chloride [mg/L]	8	8	100.00%	Yes	0.0141	0.51	0.714	20	Increasing	0.1374	-2580
D119	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.179	0.184	0.429	12	Not Significant	0.7847	-13120
D119	Iron [ug/L]	8	8	100.00%	Yes	0.275	0.128	0.357	10	Not Significant	20.22	-371200
D119	Lead [ug/L]	8	8	100.00%	Yes	0.708	0.0119	-0.109	-3	Not Significant	0.0007107	-11.85

Table 2
Trend Test Results
Mt Piper

sys_loc_code	chemical_name	N	Num Detects	Percent Detects	Meet Data Reqs	p-value	MK tau^2	MK tau	MK S	MK Trend	Theil-Sen Slope	Theil-Sen Intercept
D102	Boron [ug/L]	8	8	100.00%	Yes	0.262	0.107	-0.327	-9	Not Significant	-0.2495	6222
D102	Chloride [mg/L]	8	8	100.00%	Yes	0.905	0.0051	0.0714	2	Not Significant	0.2116	-3089
D102	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.399	0.0816	0.286	8	Not Significant	0.188	4837
D102	Iron [ug/L]	8	8	100.00%	Yes	0.72	0.0204	-0.143	-4	Not Significant	-1.042	70080
D102	Lead [ug/L]	8	1	12.50%	No						0	0
D102	Manganese [ug/L]	8	8	100.00%	Yes	0.72	0.0204	-0.143	-4	Not Significant	-0.8333	30440
D102	Nickel [ug/L]	8	8	100.00%	Yes	0.548	0.0459	-0.214	-6	Not Significant	-0.2431	6208
D102	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.548	0.0459	0.214	6	Not Significant	0.3211	-2475
D119	Manganese [ug/L]	8	8	100.00%	Yes	0.0141	0.51	0.714	20	Increasing	0.9165	-16590
D119	Nickel [ug/L]	8	8	100.00%	Yes	0.17	0.16	0.4	11	Not Significant	0.06049	-1064
D119	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.00551	0.617	0.786	22	Increasing	0.8602	-15970
D119	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.109	0.25	0.5	14	Not Significant	0.8643	-15350
D11	Boron [ug/L]	3	3	100.00%	No						5.785	-109200
D11	Chloride [mg/L]	3	3	100.00%	No						1.496	-27850
D11	cal Conductivity (Field) [uS/cm]	3	3	100.00%	No						17.45	-326600
D11	Iron [ug/L]	3	3	100.00%	No						10.49	-141400
D11	Lead [ug/L]	3	1	33.33%	No						0.005155	-99.59
D11	Manganese [ug/L]	3	3	100.00%	No						45.06	-855000
D11	Nickel [ug/L]	3	3	100.00%	No						3.673	-69850
D11	Sulfate (as SO4) [mg/L]	3	3	100.00%	No						10.28	-193600
D11	al Dissolved Solids (TDS) [mg/L]	3	3	100.00%	No						14.21	-265600
D15	Boron [ug/L]	8	8	100.00%	Yes	0.524	0.0357	-0.189	-5	Not Significant	0	190
D15	Chloride [mg/L]	8	8	100.00%	Yes	0.905	0.0051	0.0714	2	Not Significant	0.004687	-6.269
D15	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.0785	0.269	-0.519	-14	Not Significant	-0.08929	3634
D15	Iron [ug/L]	8	8	100.00%	Yes	0.548	0.0459	-0.214	-6	Not Significant	-5.61	122600
D15	Lead [ug/L]	8	6	75.00%	Yes	0.797	0.00595	-0.0772	-2	Not Significant	0	3
D15	Manganese [ug/L]	8	8	100.00%	Yes	0.179	0.184	-0.429	-12	Not Significant	-0.2679	6178
D15	Nickel [ug/L]	8	8	100.00%	Yes	0.00551	0.617	-0.786	-22	Decreasing	-0.2013	4286
D15	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.109	0.25	-0.5	-14	Not Significant	-0.1435	3587
D15	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.109	0.25	-0.5	-14	Not Significant	-0.2038	5318
D16A	Boron [ug/L]	7	4	57.14%	Yes	0.347	0.0952	-0.309	-6	Not Significant	-0.1146	2308
D16A	Chloride [mg/L]	7	7	100.00%	Yes	0.381	0.111	0.333	7	Not Significant	0.01069	-190
D16A	cal Conductivity (Field) [uS/cm]	7	7	100.00%	Yes	0.136	0.274	-0.524	-11	Not Significant	-0.2502	5866
D16A	Iron [ug/L]	7	7	100.00%	Yes	0.773	0.0204	0.143	3	Not Significant	1.836	-33410
D16A	Lead [ug/L]	7	3	42.86%	No						0.006494	-126.8
D16A	Manganese [ug/L]	7	7	100.00%	Yes	0.00278	0.819	0.905	19	Increasing	0.3212	-6187
D16A	Nickel [ug/L]	7	7	100.00%	Yes	0.00278	0.819	0.905	19	Increasing	0.02881	-557.7
D16A	Sulfate (as SO4) [mg/L]	7	7	100.00%	Yes	1	0.00227	0.0476	1	Not Significant	0.04578	-702.3
D16A	al Dissolved Solids (TDS) [mg/L]	7	7	100.00%	Yes	1	0.00227	0.0476	1	Not Significant	0.01854	197.9
D17	Boron [ug/L]	8	6	75.00%	Yes	0.615	0.022	-0.148	-4	Not Significant	0	80
D17	Chloride [mg/L]	8	8	100.00%	Yes	0.000397	0.862	-0.929	-26	Decreasing	-0.1061	2191
D17	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.000397	0.862	-0.929	-26	Decreasing	-1.86	38720
D17	Iron [ug/L]	8	8	100.00%	Yes	0.109	0.25	-0.5	-14	Not Significant	-30.09	602400
D17	Lead [ug/L]	8	4	50.00%	Yes	0.0741	0.318	0.564	13	Not Significant	0.001958	-37.87
D17	Manganese [ug/L]	8	8	100.00%	Yes	0.00174	0.735	-0.857	-24	Decreasing	-1.466	30470
D17	Nickel [ug/L]	8	8	100.00%	Yes	0.275	0.128	-0.357	-10	Not Significant	-0.03442	706.5
D17	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.000397	0.862	-0.929	-26	Decreasing	-0.9659	19960
D17	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.000397	0.862	-0.929	-26	Decreasing	-1.282	26870
D18	Boron [ug/L]	8	4	50.00%	Yes	0.425	0.0584	-0.242	-6	Not Significant	-0.01779	377.5
D18	Chloride [mg/L]	8	8	100.00%	Yes	0.72	0.0204	-0.143	-4	Not Significant	0.00003902	7.645
D18	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.508	0.0425	-0.206	-5	Not Significant	-0.02696	1197
D18	Iron [ug/L]	8	8	100.00%	Yes	0.179	0.184	0.429	12	Not Significant	1.996	-37910
D18	Lead [ug/L]	8	1	12.50%	No						0	0
D18	Manganese [ug/L]	8	8	100.00%	Yes	0.0312	0.413	0.643	18	Increasing	0.1353	-2526
D18	Nickel [ug/L]	8	8	100.00%	Yes	0.0208	0.482	0.694	18	Increasing	0.008929	-170.4
D18	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.262	0.107	0.327	9	Not Significant	0.002015	-29.65
D18	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.275	0.128	-0.357	-10	Not Significant	-0.1096	2522
D19	Boron [ug/L]	8	8	100.00%	Yes	0.105	0.224	0.473	13	Not Significant	0.3282	-4899
D19	Chloride [mg/L]	8	8	100.00%	Yes	0.0312	0.413	0.643	18	Increasing	0.1889	-3418
D19	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.0141	0.51	0.714	20	Increasing	1.27	-20390
D19	Iron [ug/L]	8	8	100.00%	Yes	0.061	0.327	0.571	16	Not Significant	52.64	-1010000
D19	Lead [ug/L]	8	7	87.50%	Yes	0.109	0.25	0.5	14	Not Significant	0.0202	-386.3
D19	Manganese [ug/L]	8	8	100.00%	Yes	0.399	0.0816	0.286	8	Not Significant	4.778	-86890
D19	Nickel [ug/L]	8	8	100.00%	Yes	0.061	0.327	0.571	16	Not Significant	0.3465	-6189
D19	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.0312	0.413	0.643	18	Increasing	0.7273	-12270
D19	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.0615	0.298	0.546	15	Not Significant	1.557	-26960
D1	Boron [ug/L]	8	8	100.00%	Yes	0.399	0.0816	0.286	8	Not Significant	0.4776	-6174
D1	Chloride [mg/L]	8	8	100.00%	Yes	0.179	0.184	-0.429	-12	Not Significant	-0.8954	18420
D1	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.109	0.25	-0.5	-14	Not Significant	-4.99	107100
D1	Iron [ug/L]	8	8	100.00%	Yes	0.179	0.184	-0.429	-12	Not Significant	-17.5	394600
D1	Lead [ug/L]	8	1	12.50%	No						0	0
D1	Manganese [ug/L]	8	8	100.00%	Yes	0.179	0.184	-0.429	-12	Not Significant	-16.95	350400
D1	Nickel [ug/L]	8	8	100.00%	Yes	0.262	0.107	-0.327	-9	Not Significant	-0.9116	19750
D1	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.275	0.128	-0.357	-10	Not Significant	-2.308	49670
D1	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.275	0.128	-0.357	-10	Not Significant	-5.799	121700
D20	Boron [ug/L]	8	8	100.00%	Yes	0.061	0.327	-0.571	-16	Not Significant	-2.751	57190
D20	Chloride [mg/L]	8	8	100.00%	Yes	0.262	0.107	-0.327	-9	Not Significant	-0.007671	270.7
D20	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.061	0.327	-0.571	-16	Not Significant	-0.3333	10450
D20	Iron [ug/L]	8	8	100.00%	Yes	0.905	0.0051	-0.0714	-2	Not Significant	-1.751	39160
D20	Lead [ug/L]	8	7	87.50%	Yes	0.533	0.0331	-0.182	-5	Not Significant	-0.004343	92.78
D20	Manganese [ug/L]	8	8	100.00%	Yes	0.905	0.0051	-0.0714	-2	Not Significant	-3.496	98110
D20	Nickel [ug/L]	8	8	100.00%	Yes	0.0141	0.51	-0.714	-20	Decreasing	-0.2683	5840
D20	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.179	0.184	-0.429	-12	Not Significant	-0.2314	6724
D20	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	1	0	0	0	Not Significant	0.3136	-2522
D2	Boron [ug/L]	8	8	100.00%	Yes	0.275	0.128	0.357	10	Not Significant	0.1955	-3557
D2	Chloride [mg/L]	8	8	100.00%	Yes	0.72	0.0204	-0.143	-4	Not Significant	-0.07163	1462
D2	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	1	0	0	0	Not Significant	-0.5519	11880
D2	Iron [ug/L]	8	8	100.00%	Yes	1	0	0	0	Not Significant	7.103	-130200
D2	Lead [ug/L]	8	8	100.00%	Yes	0.348	0.0833	0.289	7	Not Significant	0	3
D2	Manganese [ug/L]	8	8	100.00%	Yes	0.72	0.0204	0.143	4	Not Significant	-0.2246	5624
D2	Nickel [ug/L]	8	8	100.00%	Yes	0.72	0.0204	-0.143	-4	Not Significant	-0.06403	1364
D2	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.905	0.0051	-0.0714	-2	Not Significant	-0.4106	8436
D2	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.905	0.0051	-0.0714	-2	Not Significant	-0.5228	10990
D3	Boron [ug/L]	8	4	50.00%	Yes	0.111	0.234	-0.483	-12	Not Significant	-0.06977	1388
D3	Chloride [mg/L]	8	8	100.00%	Yes	0.72	0.0204	0.143	4	Not Significant	0.05762	-1075

Table 2
Trend Test Results
Mt Piper

sys_loc_code	chemical_name	N	Num Detects	Percent Detects	Meet Data Reqs	p-value	MK tau^2	MK tau	MK S	MK Trend	Theil-Sen Slope	Theil-Sen Intercept
D102	Boron [ug/L]	8	8	100.00%	Yes	0.262	0.107	-0.327	-9	Not Significant	-0.2495	6222
D102	Chloride [mg/L]	8	8	100.00%	Yes	0.905	0.0051	0.0714	2	Not Significant	0.2116	-3089
D102	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.399	0.0816	0.286	8	Not Significant	0.188	4837
D102	Iron [ug/L]	8	8	100.00%	Yes	0.72	0.0204	-0.143	-4	Not Significant	-1.042	70080
D102	Lead [ug/L]	8	1	12.50%	No						0	0
D102	Manganese [ug/L]	8	8	100.00%	Yes	0.72	0.0204	-0.143	-4	Not Significant	-0.8333	30440
D102	Nickel [ug/L]	8	8	100.00%	Yes	0.548	0.0459	-0.214	-6	Not Significant	-0.2431	6208
D102	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.548	0.0459	0.214	6	Not Significant	0.3211	-2475
D3	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.383	0.0648	0.255	7	Not Significant	0.4602	-8118
D3	Iron [ug/L]	8	8	100.00%	Yes	0.901	0.00132	0.0364	1	Not Significant	7.03	-129200
D3	Lead [ug/L]	8	0	0.00%	No						0	0
D3	Manganese [ug/L]	8	8	100.00%	Yes	0.399	0.0816	0.286	8	Not Significant	0.08679	-1040
D3	Nickel [ug/L]	8	8	100.00%	Yes	0.0178	0.478	-0.691	-19	Decreasing	-0.02926	583.3
D3	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.275	0.128	0.357	10	Not Significant	0.08247	-1374
D3	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.72	0.0204	0.143	4	Not Significant	0.1074	-1531
D4	Boron [ug/L]	8	3	37.50%	No						0	0
D4	Chloride [mg/L]	8	8	100.00%	Yes	0.905	0.0051	-0.0714	-2	Not Significant	-0.0003156	23.13
D4	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.899	0.00143	-0.0378	-1	Not Significant	-0.111	2861
D4	Iron [ug/L]	8	8	100.00%	Yes	0.109	0.25	0.5	14	Not Significant	3.709	-9955
D4	Lead [ug/L]	8	8	100.00%	Yes	0.373	0.07	-0.265	-7	Not Significant	-0.00319	77.26
D4	Manganese [ug/L]	8	8	100.00%	Yes	0.275	0.128	-0.357	-10	Not Significant	-0.1711	4012
D4	Nickel [ug/L]	8	8	100.00%	Yes	0.0448	0.389	-0.624	-14	Decreasing	0	12
D4	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.0312	0.413	-0.643	-18	Decreasing	-0.08271	1895
D4	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.905	0.0051	-0.0714	-2	Not Significant	-0.05861	1692
D5	Boron [ug/L]	8	8	100.00%	Yes	0.0741	0.318	-0.564	-13	Not Significant	-0.02685	597.4
D5	Chloride [mg/L]	8	8	100.00%	Yes	0.00551	0.617	-0.786	-22	Decreasing	-0.006642	155.2
D5	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.383	0.0648	0.255	7	Not Significant	0.02632	682.5
D5	Iron [ug/L]	8	8	100.00%	Yes	0.399	0.0816	-0.286	-8	Not Significant	-21.52	454400
D5	Lead [ug/L]	8	0	0.00%	No						0	0
D5	Manganese [ug/L]	8	8	100.00%	Yes	0.72	0.0204	0.143	4	Not Significant	0.1437	4837
D5	Nickel [ug/L]	8	8	100.00%	Yes	0.0978	0.241	-0.491	-13	Not Significant	-0.01563	364.7
D5	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.0312	0.413	-0.643	-18	Decreasing	-0.1732	3898
D5	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	1	0	0	0	Not Significant	-0.1074	2937
D8	Boron [ug/L]	8	0	0.00%	No						0	0
D8	Chloride [mg/L]	8	8	100.00%	Yes	0.034	0.382	0.618	17	Increasing	0.0129	-240.2
D8	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.034	0.382	0.618	17	Increasing	0.2093	-3820
D8	Iron [ug/L]	8	8	100.00%	Yes	0.905	0.0051	-0.0714	-2	Not Significant	-0.1486	3147
D8	Lead [ug/L]	8	1	12.50%	No						0	0
D8	Manganese [ug/L]	8	8	100.00%	Yes	0.72	0.0204	0.143	4	Not Significant	0.2806	-5234
D8	Nickel [ug/L]	8	8	100.00%	Yes	0.17	0.16	0.4	11	Not Significant	0.05777	-1074
D8	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.061	0.327	0.571	16	Not Significant	0.1141	-2136
D8	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.179	0.184	0.429	12	Not Significant	0.07011	-1199
D9	Boron [ug/L]	8	8	100.00%	Yes	0.0141	0.51	0.714	20	Increasing	1.12	-20020
D9	Chloride [mg/L]	8	8	100.00%	Yes	0.533	0.0331	-0.182	-5	Not Significant	-0.03333	1794
D9	cal Conductivity (Field) [uS/cm]	8	8	100.00%	Yes	0.905	0.0051	0.0714	2	Not Significant	1.374	-16800
D9	Iron [ug/L]	8	8	100.00%	Yes	0.262	0.107	-0.327	-9	Not Significant	-6.74	187600
D9	Lead [ug/L]	8	2	25.00%	No						0	0
D9	Manganese [ug/L]	8	8	100.00%	Yes	0.905	0.0051	0.0714	2	Not Significant	0.3759	8358
D9	Nickel [ug/L]	8	8	100.00%	Yes	0.034	0.382	0.618	17	Increasing	0.3093	-4305
D9	Sulfate (as SO4) [mg/L]	8	8	100.00%	Yes	0.179	0.184	0.429	12	Not Significant	1.332	-21360
D9	al Dissolved Solids (TDS) [mg/L]	8	8	100.00%	Yes	0.179	0.184	0.429	12	Not Significant	1.247	-15880

Notes

Data file input: MK_Input_20241011.xlsx
Data date range: 2022-09-13 to 2024-08-02
Non-detects were substituted with a value of zero for trend analysis
N: number of data points
Meet Data Reqs: trend tests were performed only if the dataset had >=4 detected values and >=50 percent detects.
tau^22: Kendall's tau-b^2, measure of linear model fit
tau: Kendall's tau-b statistic
S: Kendall's S statistic
p-value: A two-sided p-value describing the probability of the null hypothesis (i.e., no monotonic trend) being true (α=0.05)

APPENDIX M MANN-KENDALL METHODOLOGY

1. USER WARNINGS

Trend analysis is a commonly used statistical tool for assessing changes in concentration over time. Like most statistical analyses, trend tests involve some assumptions about the data being analyzed. If these assumptions are not met, the results of the test may be wrong or misleading. The final section of this memo discusses scenarios that will likely require the input of a qualified statistician to ensure that the results of the trend test are appropriate for your data. A careful review of the results tables and figures can help identify any anomalies in the data that merit further assessment.

Selection of an appropriate significance level (ɑ): Statistical convention typically uses an ɑ equal to 0.05 which sets the probability of drawing a false positive conclusion (saying there is a trend when one does not exist) in the statistical analysis at 5 percent. The significance level can be adjusted up or down to meet specific programmatic needs or to meet data quality objectives, but changes in ɑ should be made a priori and should not be changed in an attempt to obtain a more 'favorable' result. Often decreasing ɑ will result in a reduction in the probability of finding a false negative result (saying there is no trend when one actually exists).

2. INTRODUCTION

This report addresses data quality, descriptive statistics, and trend analysis for the Mt Piper project.

- The data file used in this report (MK_Input_20241011.xlsx) consists of samples from September 2022 to August 2024.
- The analysis includes 25 unique wells and 9 analytes.
- Descriptive statistics and trend analysis are run for every unique combination of: sys_loc_code, chemical_name (referred to as Group from hereon). There are 225 unique Groups.
- Trend tests were conducted at 95% confidence with minimum data requirements of at least 4 detected values and 50% detection frequency for each Group.

3. DATA HANDLING

This section describes the data included in this evaluation, the handling of field duplicates, data qualifiers, censored values, and handling of anomalous data points.

3.1 FIELD DUPLICATES

Only one set of primary and field duplicate measurements are generally retained for statistical evaluation. While field duplicates can provide useful information on the sampling methodology, the duplicates are almost always statistically dependent on the parent sample (USEPA 2009, Page 6-27). Although complicated methods can be used to allow the inclusion of both values in statistical tests, simpler strategies involve keeping the maximum value between the two samples, randomly selecting one of the two samples, or removing the duplicates altogether (USEPA 2009, Page 6-28).

Field duplicates were omitted from this analysis. Only the parent samples were retained.

3.2 DATA QUALIFIERS

Data was qualified by a data validator to ensure the quality of the reported results. Consistent with lab conventions, J-flagged values were estimated quantities. Guidance allows for J-flagged values to be used with reported concentrations but cautions against making regulatory decision based on these values (USEPA 2014).

Measurements that have an R-flag had their concentration rejected; the result is rejected due to serious deficiencies in meeting quality control criteria and the analyte may or may not be present in the sample (USEPA 2014). The data quality review found the results to be valid, reliable and usable for decision making purposes with the listed qualifiers. Any records with validator_qualifiers containing "R" or reportable_result = "N" or "No" in the dataset were removed prior to analysis.

3.3 NON-DETECTS

Non-detects (NDs) commonly reported in water monitoring are statistically known as "left censored" measurements because the concentration of any ND can only be estimated. NDs are assumed to fall between zero and the reporting limit (USEPA 2009). USEPA (2015) offers a number of options for handling non-detected values, including Kaplan-Meier estimators, Regression on Order Statistics, and replacement with surrogate values. The appropriate handling of NDs depends on the statistical test being used and will be discussed in the following sections as appropriate.

Consistent with USEPA guidance, in cases where frequency of detection (FOD) was greater than 50 percent, NDs were substituted with a constant that is below the lowest detected value (Helsel and Hirsch 2002). This ensures that all NDs are "tied" in the analysis and that changing reporting limits have limited influence on whether trends are detected (USEPA 2009, Helsel and Hirsch 2002). NDs were substituted with a value of zero for the trend analysis.

4. DESCRIPTIVE STATISTICS

Descriptive statistics were calculated for all Groups and can be found in Table 1. Non-detects were substituted with a value of half the reporting limit for calculations. The descriptive statistics highlight a number of relevant characteristics about the datasets, including:

- There are a total of 225 Groups.
- 209 Groups have detection rates greater than or equal to 50 percent.
- 5 Groups have 100 percent non-detects.
- 198 Groups have 100 percent detects.
- 166 Groups follow a normal distribution (using Shapiro-Wilks Normality Test) and 15 Groups follow a log-normal distribution. 0 Groups follow a gamma distribution (using Anderson-Darling Normality Test). The remaining 44 Groups have no discernible distribution.

5. TESTING FOR TRENDS

Trend tests are a commonly used tool to assess the effectiveness of remediation efforts. By examining whether concentrations are increasing, decreasing, or not statistically significant, trend tests provide one line of evidence about the directional change in concentrations over time.

5.1 TREND TESTING APPROACH

A Mann-Kendall test was used to detect changes in concentrations over time. The Mann-Kendall test is a non-parametric method that tests the following null hypothesis (USEPA 2009):

- Null Hypothesis (Ho): No monotonic trend exists.
- Alternative Hypothesis (Ha): A monotonic trend exists.

A monotonic upward (downward) trend means that the variable consistently increases (decreases) through time, but the trend may or may not be linear. The Mann-Kendall test is based on the premise that the lack of monotonic trend should correspond to a time series plot fluctuating randomly about a constant median with no visually apparent upward or downward pattern (Helsel and Hirsch 2002). Significantly increasing or decreasing trends (τ) are identified at a significance level (ɑ) of less than or equal to 0.05. τ^2 can be used like an R^2 value to estimate how much variance in y is explained by x (i.e., what proportion of the variability in concentration is explained by time). USEPA 2009 guidance and/or Helsel and Hirsch (2002) may be consulted for further details about trend analysis. With the specified 95% confidence, significantly increasing or decreasing trends are identified with p-values as follows:

Tau	p-value	Conclusion	Trend
Positive	p <= 0.05	Ho Rejected	Increasing
Negative	p <= 0.05	Ho Rejected	Decreasing
Positive or Negative	p > 0.05	Ho Accepted	Not Significant

5.2 DATA CONSTRAINTS

Guidance recommends that trend tests be performed with at least eight detected data points to ensure a reasonable amount of confidence in results (USEPA 2009, p. 17-24). However, it is mathematically possible to carry out the test with five detected samples. The consequences of using the minimum sample size is that there is a greater chance of concluding that there is no trend when, in fact there is a trend (USEPA 2009). If a dataset is comprised of more than 50 percent ND values, the loss of information is considered too great to support a reliable analysis of trends, so no trend test was performed.

5.3 RESULTS

Trend tests were calculated with 95% confidence for all Groups that met the minimum data requirements of at least 4 detected values and 50% detection frequency. A full report of the trend test results and time series plots can be found in Table 2. The following summarize the results of the trend analysis:

- There are a total of 225 Groups in the dataset.
- 201 Groups meet the data requirements of the trend test. Of those:

- 29 Groups had a significant increasing trend,
- 19 Groups had a significant decreasing trend,
- 153 Groups had no significant trend.

Time series scatterplots are provided in Figure 1 for each Group. Detection limits for each sample are also plotted for an easy visual assessment of changing detection limits over time. A Theil-Sen regression line is shown on each figure to provide a visual guide for temporal trends.

6. SPECIAL CONSIDERATIONS

Like most statistical analyses, these trend tests involve some assumptions about the data being analyzed including:

- Observations or data obtained over time are independent.
- The observations obtained over time are representative of the true conditions at sampling times.
- The sample collection, handling, and measurement methods provide unbiased and representative observations of the underlying populations over time.
- There is no requirement that the measurements be normally distributed. The Mann-Kendall test can be computed if there are missing values and varying detection limits, but the performance of the test will be adversely affected by such events. The assumption of independence requires that the time between samples be sufficiently large so that there is no correlation between measurements collected at different times.

The Mann-Kendall test does not assume that the underlying relationship is linear. However, in cases where the data are clearly curvilinear, it may be more appropriate to consult with a statistician to employ different statistical techniques that more accurately characterize the changes in concentration over time.

Special consideration should be given to dataset with clear seasonality and/or NDs. These are considered in the following sections.

6.1 SEASONALITY

Seasonal changes in precipitation and temperature can cause cyclical fluctuations in groundwater concentrations. These seasonal fluctuations functionally add ‘noise’ to the data. This type of noise is called serial dependence and can make it difficult to determine trends in the data because of a long-term persistent pattern (like seasonality) or whether it represents a true, underlying change. USEPA Guidance (2009) strongly recommends accounting for seasonality when performing linear trends in hydrologic data. Seasonality has not been explicitly handled in the data described herein.

6.2 NON-DETECTS AND DETECTION LIMITS

Non-detects (NDs) commonly reported in water monitoring are statistically known as “left censored” measurements because the concentration of any non-detect either cannot be estimated or is not reported directly. Rather, it is known or assumed only to fall within a certain range of concentration values (USEPA 2009 p. 15-1). With higher detection limits, that uncertainty is greater because the true value lies somewhere in a larger range of possible values.

USEPA (2006) notes that no general procedures exist for the statistical analyses of censored datasets. If a dataset is comprised of more than 50 percent non-detected (ND) values, guidance cautions the user when interpreting the results of statistical tests, especially for relatively small datasets (USEPA 2009).

In the context of the trend tests described herein, there is general agreement that substituting a constant below the lowest detected value is the best solution for handling non-detected values.

When detection rates are below 85 percent, however, this simple substitution method may lead to bias in the trend tests. Visually reviewing the data is a key step in interpreting the appropriateness of the statistical results. The time series plots have been generated using the detection limit for non-detects so that detection rates and multiple detection limits can be visualized. Additional statistical testing may be needed to address datasets with low detection rates or elevated detection limits.

7. REFERENCES

Helsel and Hirsch. 2002. *Statistical Methods in Water Resources.* Chapter A3. U.S. Department of the Interior, U.S. Geological Survey.

USEPA. 2006. *Data Quality Assessment: Statistical Methods for Practitioners.* EPA QA/G-9S. Office of Environmental Information. Washington, DC.

USEPA. 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities.* Unified Guidance. EPA/530/R/09/007. Office of Resource Conservation and Recovery. Washington, D.C.

USEPA. 2014. *National Functional Guidelines for Superfund Organic Methods Data Review.* USEPA 540-R-014-002. OSWER 9355.0-132. August.

USEPA. 2015. *ProUCL Version 5.1.002 Technical Guide: Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations.* Publication EPA/600/R-07/041, October.

APPENDIX N LNAR LEACHATE MONITORING INFORMATION

Work Order

ServiceStream

Printed ☑

Work Order No
142398

Asset Information

Asset No: MPSLNDENV0 Environmental

Asset No	Asset Description
MP	CEM Mt Piper
MPSLND	Land Management Dump Site
MPSLNDENV0	Environmental

Comments:

Last Reading: **Date:**

Work Details

Job Description: LNAR 1A - Ash Repository Leachate System Daily Inspections
Instructions: Complete Inspection sheet attached
Safety Notes:
Priority: 2 Change Weekly Plan **Job Type:** PM07
Status: 1 - Scheduled
Account Code: 8R1323-B10011-L **Reference No:** **Frequency:** 7 Days
Duration: 1.00 h **Policy No:** 4714 **Department:** 85MP01 14

Raised: 29/09/2022 **Due Start:** 2/10/2022 **Start:** **Due Finish** 8/10/2022 **Finish:**

Contractor Information

Contractor:
Contact: **Ph No:**
Warranty Start: **Warranty Finish:**

Completion Details

Trades Name	Date Started	Date Finished	Hours Worked	Signature

Work History Comments

SERVICE STREAM

ServiceStream

LNAR 1A - Ash Repository Leachate System Daily Inspection - MP-SF-713H

Daily Inspection Monday						
Area	**Inspection Criteria**	**Inspection Criteria**			**Inspected By**	**Date**
Liner Perimeter	Inspect Liner Perimeter and Anchor Trench for Subsidence / Deformation	Free From Deformation	YES	NO		
Liner Separation Berm / Rainflap	Inspect FBA Batter for Weather Erosion Damage	Free From Damage	YES	NO		
	Inspect LLDPE Flap to Ensure Correct Placement Over FBA Batter	Correctly in Place	YES	NO		
	Inspect LLDPE Flap to Ensure Sandbagging is in Place	Correctly in Place	YES	NO		
Leachate Liner Sump 1	Inspect and Report on Free Water Above Liner / FBA Layer	Free Water Present	YES	NO		
Leachate Liner Sump 2	Inspect and Report on Free Water Above Liner / FBA Layer	Free Water Present	YES	NO		
Comment						

Daily Inspection Tuesday						
Area	**Inspection Criteria**	**Inspection Criteria**			**Inspected By**	**Date**
Liner Perimeter	Inspect Liner Perimeter and Anchor Trench for Subsidence / Deformation	Free From Deformation	YES	NO		
Liner Separation Berm / Rainflap	Inspect FBA Batter for Weather Erosion Damage	Free From Damage	YES	NO		
	Inspect LLDPE Flap to Ensure Correct Placement Over FBA Batter	Correctly in Place	YES	NO		
	Inspect LLDPE Flap to Ensure Sandbagging is in Place	Correctly in Place	YES	NO		
Leachate Liner Sump 1	Inspect and Report on Free Water Above Liner / FBA Layer	Free Water Present	YES	NO		
Leachate Liner Sump 2	Inspect and Report on Free Water Above Liner / FBA Layer	Free Water Present	YES	NO		
Comment						

Daily Inspection Wednesday						
Area	**Inspection Criteria**	**Inspection Criteria**			**Inspected By**	**Date**
Liner Perimeter	Inspect Liner Perimeter and Anchor Trench for Subsidence / Deformation	Free From Deformation	YES	NO		
Liner Separation Berm / Rainflap	Inspect FBA Batter for Weather Erosion Damage	Free From Damage	YES	NO		
	Inspect LLDPE Flap to Ensure Correct Placement Over FBA Batter	Correctly in Place	YES	NO		
	Inspect LLDPE Flap to Ensure Sandbagging is in Place	Correctly in Place	YES	NO		
Leachate Liner Sump 1	Inspect and Report on Free Water Above Liner / FBA Layer	Free Water Present	YES	NO		
Leachate Liner Sump 2	Inspect and Report on Free Water Above Liner / FBA Layer	Free Water Present	YES	NO		
Comment						

Daily Inspection Thursday						
Area	**Inspection Criteria**	**Inspection Criteria**			**Inspected By**	**Date**
Liner Perimeter	Inspect Liner Perimeter and Anchor Trench for Subsidence / Deformation	Free From Deformation	YES	NO		
Liner Separation Berm / Rainflap	Inspect FBA Batter for Weather Erosion Damage	Free From Damage	YES	NO		
	Inspect LLDPE Flap to Ensure Correct Placement Over FBA Batter	Correctly in Place	YES	NO		
	Inspect LLDPE Flap to Ensure Sandbagging is in Place	Correctly in Place	YES	NO		
Leachate Liner Sump 1	Inspect and Report on Free Water Above Liner / FBA Layer	Free Water Present	YES	NO		
Leachate Liner Sump 2	Inspect and Report on Free Water Above Liner / FBA Layer	Free Water Present	YES	NO		
Comment						

Daily Inspection Friday						
Area	**Inspection Criteria**	**Inspection Criteria**			**Inspected By**	**Date**
Liner Perimeter	Inspect Liner Perimeter and Anchor Trench for Subsidence / Deformation	Free From Deformation	YES	NO		
Liner Separation Berm / Rainflap	Inspect FBA Batter for Weather Erosion Damage	Free From Damage	YES	NO		
	Inspect LLDPE Flap to Ensure Correct Placement Over FBA Batter	Correctly in Place	YES	NO		
	Inspect LLDPE Flap to Ensure Sandbagging is in Place	Correctly in Place	YES	NO		
Leachate Liner Sump 1	Inspect and Report on Free Water Above Liner / FBA Layer	Free Water Present	YES	NO		
Leachate Liner Sump 2	Inspect and Report on Free Water Above Liner / FBA Layer	Free Water Present	YES	NO		
Comment						

Daily Inspection Saturday						
Area	**Inspection Criteria**	**Inspection Criteria**			**Inspected By**	**Date**
Liner Perimeter	Inspect Liner Perimeter and Anchor Trench for Subsidence / Deformation	Free From Deformation	YES	NO		
Liner Separation Berm / Rainflap	Inspect FBA Batter for Weather Erosion Damage	Free From Damage	YES	NO		
	Inspect LLDPE Flap to Ensure Correct Placement Over FBA Batter	Correctly in Place	YES	NO		
	Inspect LLDPE Flap to Ensure Sandbagging is in Place	Correctly in Place	YES	NO		
Leachate Liner Sump 1	Inspect and Report on Free Water Above Liner / FBA Layer	Free Water Present	YES	NO		
Leachate Liner Sump 2	Inspect and Report on Free Water Above Liner / FBA Layer	Free Water Present	YES	NO		
Comment						

Daily Inspection Sunday						
Area	**Inspection Criteria**	**Inspection Criteria**			**Inspected By**	**Date**
Liner Perimeter	Inspect Liner Perimeter and Anchor Trench for Subsidence / Deformation	Free From Deformation	YES	NO		
Liner Separation Berm / Rainflap	Inspect FBA Batter for Weather Erosion Damage	Free From Damage	YES	NO		
	Inspect LLDPE Flap to Ensure Correct Placement Over FBA Batter	Correctly in Place	YES	NO		
	Inspect LLDPE Flap to Ensure Sandbagging is in Place	Correctly in Place	YES	NO		
Leachate Liner Sump 1	Inspect and Report on Free Water Above Liner / FBA Layer	Free Water Present	YES	NO		
Leachate Liner Sump 2	Inspect and Report on Free Water Above Liner / FBA Layer	Free Water Present	YES	NO		
Comment						

SERVICE STREAM

LNAR 1A - Ash Repository Leachate Management Pumpout Record - MP-SF-713J

Underliner Leachate Collection Sump 1	Actions			Inspected By	Date
LNAR Stage 1A Underliner Leachate Pipeline Sump 1	Water Present in Sump	YES	NO		
LNAR Stage 1A Underliner Leachate Pipeline Sump 1	Sump Pumped Out	YES	NO		
Leachate Totaliser Detail	Pump Start Time			Pump Finish Time	
Leachate Totaliser Detail	Meter at Start (L)			Meter at Finish (L)	
Comment					

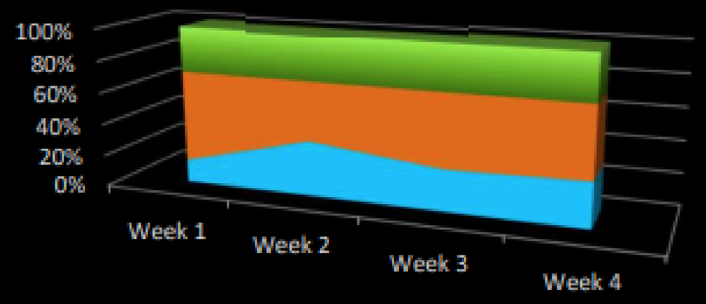
Leachate Collection Sump 1	Actions			Inspected By	Date
LNAR Stage 1A Liner Leachate Pipeline Sump 1	Water Present in Sump	YES	NO		
LNAR Stage 1A Liner Leachate Pipeline Sump 1	Sump Pumped Out	YES	NO		
Leachate Totaliser Detail	Pump Start Time			Pump Finish Time	
Leachate Totaliser Detail	Meter at Start (L)			Meter at Finish (L)	
Comment					

Underliner Leachate Collection Sump 2	Actions			Inspected By	Date
LNAR Stage 1A Underliner Leachate Pipeline Sump 2	Water Present in Sump	YES	NO		
LNAR Stage 1A Underliner Leachate Pipeline Sump 2	Sump Pumped Out	YES	NO		
Leachate Totaliser Detail	Pump Start Time			Pump Finish Time	
Leachate Totaliser Detail	Meter at Start (L)			Meter at Finish (L)	
Comment					

Leachate Collection Sump 2	Actions			Inspected By	Date
LNAR Stage 1A Liner Leachate Pipeline Sump 2	Water Present in Sump	YES	NO		
LNAR Stage 1A Liner Leachate Pipeline Sump 2	Sump Pumped Out	YES	NO		
Leachate Totaliser Detail	Pump Start Time			Pump Finish Time	
Leachate Totaliser Detail	Meter at Start (L)			Meter at Finish (L)	
Comment					

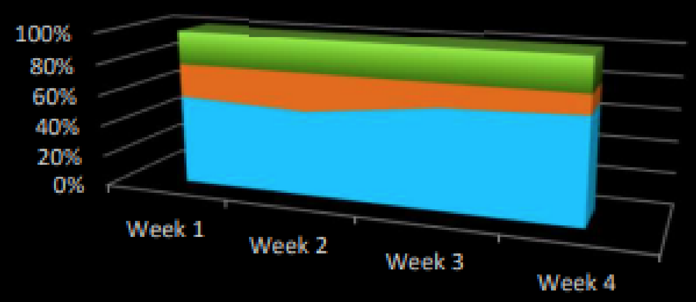
LNAR Lined Ponds – Storage Summary Example (January 2024)

LNAR 2



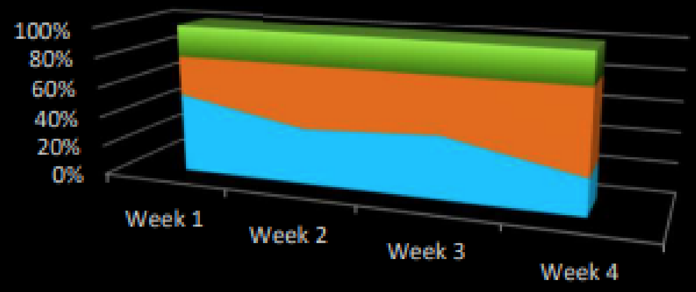
	Week 1	Week 2	Week 3	Week 4
Stormwater Buffer	5	5	5	5
Freeboard	10.14	6.55	8.09	7.71
Water Level	2.51	6.1	4.56	4.94

LNAR 3



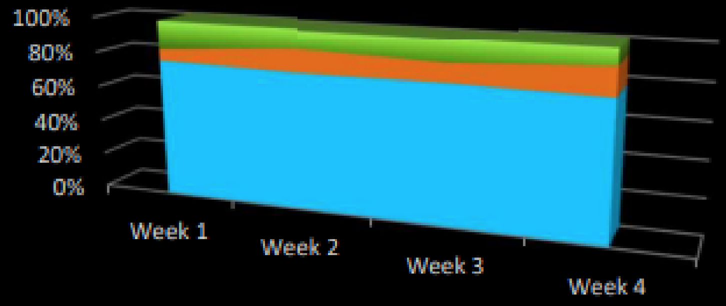
	Week 1	Week 2	Week 3	Week 4
Stormwater Buffer	5	5	5	5
Operating Freeboard	5.03	5.73	3.53	2.85
Water Level	13.47	12.77	14.97	15.65

LNAR 4



	Week 1	Week 2	Week 3	Week 4
Stormwater Buffer	5	5	5	5
Operating Freeboard	6.24	10.1	9.02	13.2
Water Level	12.76	8.9	9.98	5.8

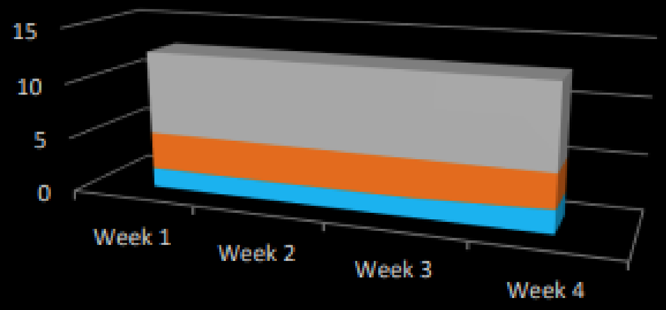
LNAR 5



	Week 1	Week 2	Week 3	Week 4
Stormwater Buffer	3.53	2.22	2.74	1.82
Operating Freeboard	1.47	2.78	2.26	3.18
Water Level	17.53	16.22	16.74	15.82

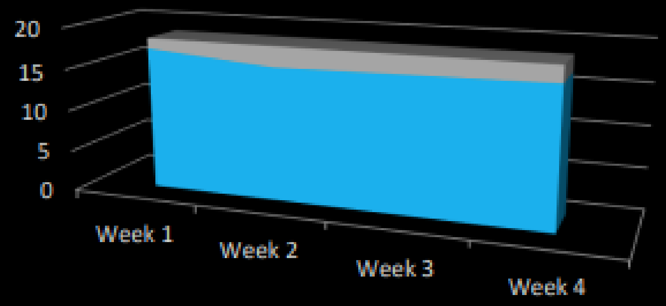
LNAR Lined Ponds – Storage Summary Example (July 2024)

LNAR 2



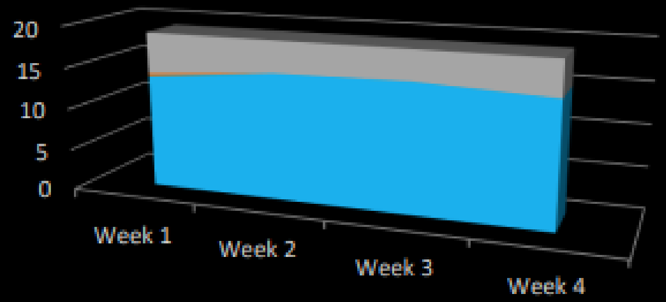
	Week 1	Week 2	Week 3	Week 4
Stormwater Buffer	7.5	7.5	7.5	7.5
Operating Freeboard	3.37	3.43	3.43	3.04
Pond Level	1.78	1.72	1.72	2.11

LNAR 3



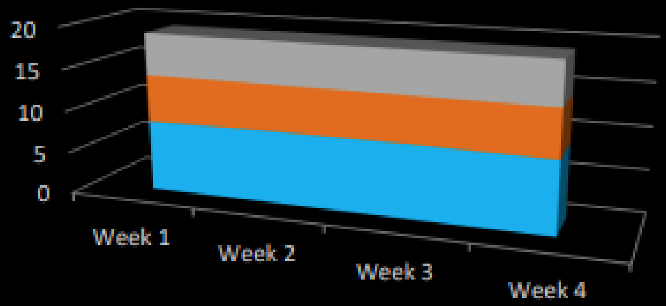
	Week 1	Week 2	Week 3	Week 4
Stormwater Buffer	1.25	2.5	2.22	1.97
Operating Freeboard	0	0	0	0
Pond Level	17.25	16	16.28	16.53

LNAR 4



	Week 1	Week 2	Week 3	Week 4
Stormwater Buffer	5	3.86	3.59	4.22
Operating Freeboard	0.35	0	0	0
Pond Level	13.65	15.14	15.41	14.78

LNAR 5



	Week 1	Week 2	Week 3	Week 4
Stormwater Buffer	5	5	5	5
Operating Freeboard	5.63	5.4	5.4	5.54
Pond Level	8.37	8.6	8.6	8.46

ERM

LNAR2 **Operating Level - 12.6 ML**

Purpose: catchment for runoff from unlined areas **Colour Legend Instructions** Copy Formula | Enter Data | Enter Data

Date	FREEBOARD	INFLOWS			OUTFLOWS					Comments
	Calculated (ML)	Transfers from SW1 (ML)	Other (ML)	Adjustment (MONTHLY)	Dust Suppression (ML)	Volume to Evaps / Atomisers (ML)	Transfers to LNAR5 (ML)	Transfers to LNAR4 (ML)	Other Transfers (e.g. to SW2)	
1/01/2023	6.93				0.330					
2/01/2023	7.10				0.170					
3/01/2023	7.65				0.550					
4/01/2023	7.09				0.560					
5/01/2023	7.09									
6/01/2023	7.19				0.100					
7/01/2023	7.29				0.100					
8/01/2023	7.70				0.410					
9/01/2023	8.31				0.610					
10/01/2023	8.84				0.530					
11/01/2023	9.29				0.450					
12/01/2023	6.13		3.64		0.480					Settling pond B
13/01/2023	6.67				0.540					
14/01/2023	7.51				0.840					
15/01/2023	9.19				0.580				1.1	1.1ML sent to SW2
16/01/2023	8.25		1.04		0.100					Transfer Settling Pond D
17/01/2023	8.25									
18/01/2023	8.25									
19/01/2023	6.82		1.43							Received 1.43ML Directly from D Settling Pond Overnight
20/01/2023	6.82									
21/01/2023	6.82									
22/01/2023	7.08								0.26	0.26ML Tranferred SW2?
23/01/2023	7.08									
24/01/2023	7.08									
25/01/2023	7.08									
26/01/2023	7.08									
27/01/2023	6.28	0.800								
28/01/2023	5.08	1.200								
29/01/2023	3.82	1.460			0.200					
30/01/2023	3.82									
31/01/2023	3.22	0.600								
1/02/2023	3.22									
2/02/2023	3.82				0.600					
3/02/2023	4.02				0.200					
4/02/2023	4.25				0.230					
5/02/2023	4.40				0.150					
6/02/2023	4.53				0.130					
7/02/2023	4.63				0.100					
8/02/2023	4.73				0.100					
9/02/2023	4.73									
10/02/2023	5.03				0.300					
11/02/2023	5.23				0.200					
12/02/2023	5.46				0.230					
13/02/2023	5.56				0.100					
14/02/2023	5.61				0.050					
15/02/2023	5.71				0.100					
16/02/2023	4.40	1.510			0.200					
17/02/2023	4.60				0.200					
18/02/2023	4.85				0.250					
19/02/2023	4.89				0.040					
20/02/2023	4.96				0.070					
21/02/2023	5.02				0.060					
22/02/2023	7.06						2.300			
23/02/2023	6.52	0.900			0.340		0.700			
24/02/2023	6.03				0.490					
25/02/2023	6.03									
26/02/2023	6.14				0.110					
27/02/2023	6.24				0.100					
28/02/2023	6.38				0.140					
1/03/2023	6.48				0.100					
2/03/2023	6.58				0.100					
3/03/2023	6.63				0.050					
4/03/2023	6.66				0.030					
5/03/2023	6.03	0.630								
6/03/2023	6.24				0.210					
7/03/2023	6.52				0.280					
8/03/2023	6.65				0.130					
9/03/2023	6.81				0.160					
10/03/2023	6.91				0.100					
11/03/2023	7.05				0.140					
12/03/2023	7.15				0.100					
13/03/2023	7.15									
14/03/2023	7.15									
15/03/2023	7.36				0.210					
16/03/2023	7.46				0.100					
17/03/2023	6.69	0.870			0.100					
18/03/2023	6.82				0.130					
19/03/2023	6.03	0.790								0.04 Dust Supression?
20/03/2023	6.03									0.02 Dust Supression?
21/03/2023	6.03									
22/03/2023	6.03									
23/03/2023	6.03									
24/03/2023	6.03									
25/03/2023	6.03									
26/03/2023	6.03									
27/03/2023	5.54	0.490								
28/03/2023	5.39	0.890					0.740			
29/03/2023	6.42	0.800					1.830			
30/03/2023	5.72	0.700								
31/03/2023	4.95	0.770								
1/04/2023	4.95									
2/04/2023	6.13						1.180			
3/04/2023	7.07						0.940			
4/04/2023	6.51	0.560								
5/04/2023	6.51									
6/04/2023	6.51									
7/04/2023	4.96	1.550								
8/04/2023	4.96									
9/04/2023	4.98				0.020					
10/04/2023	4.98									
11/04/2023	4.98									
12/04/2023	4.98									
13/04/2023	4.98									
14/04/2023	6.52						1.540			
15/04/2023	6.55				0.030					
16/04/2023	6.60				0.050					
17/04/2023	6.65				0.050					
18/04/2023	6.65									
19/04/2023	6.71				0.060					
20/04/2023	6.72				0.010					
21/04/2023	6.72									
22/04/2023	6.72									
23/04/2023	6.72									
24/04/2023	6.72									
25/04/2023	6.75				0.030					
26/04/2023	6.75									
27/04/2023	6.81				0.060					
28/04/2023	6.88				0.070					
29/04/2023	6.94				0.060					
30/04/2023	6.94									
1/05/2023	6.03	0.760	0.15							Significant rain event 40mm
2/05/2023	6.50	0.880					1.350			
3/05/2023	7.30						0.800			
4/05/2023	7.44				0.140					

LNAR2 **Operating Level - 12.6 ML**

Purpose: catchment for runoff from unlined areas **Colour Legend Instructions** Copy Formula | Enter Data | Enter Data

Date	FREEBOARD Calculated (ML)	INFLOWS Transfers from SW1 (ML)	INFLOWS Other (ML)	Adjustment (MONTHLY)	OUTFLOWS Dust Suppression (ML)	OUTFLOWS Volume to Evaps / Atomisers (ML)	OUTFLOWS Transfers to LNAR5 (ML)	OUTFLOWS Transfers to LNAR4 (ML)	OUTFLOWS Other Transfers (e.g. to SW2)	Comments
5/05/2023	7.47				0.030					
6/05/2023	7.50				0.030					
7/05/2023	7.50									
8/05/2023	7.07	0.430								
9/05/2023	7.07									
10/05/2023	7.07									
11/05/2023	7.07									
12/05/2023	7.07									
13/05/2023	7.10				0.030					
14/05/2023	7.10									
15/05/2023	7.11				0.010					
16/05/2023	7.13				0.020					
17/05/2023	7.16				0.030					
18/05/2023	7.21				0.050					
19/05/2023	7.21									
20/05/2023	7.26				0.050					
21/05/2023	7.26									
22/05/2023	7.32				0.060					
23/05/2023	7.40				0.080					
24/05/2023	7.47				0.070					
25/05/2023	7.50				0.030					
26/05/2023	7.60				0.100					
27/05/2023	7.60									
28/05/2023	7.60									
29/05/2023	7.60									
30/05/2023	7.64				0.040					
31/05/2023	7.64									
1/06/2023	7.66				0.020					
2/06/2023	7.66									
3/06/2023	7.68				0.020					
4/06/2023	7.68									
5/06/2023	7.68									
6/06/2023	7.68									
7/06/2023	7.68									
8/06/2023	7.68									
9/06/2023	7.68									
10/06/2023	7.68									
11/06/2023	7.69				0.010					
12/06/2023	7.69									
13/06/2023	7.69									
14/06/2023	7.69									
15/06/2023	7.68	0.052			0.040					
16/06/2023	7.68									
17/06/2023	7.70				0.020					
18/06/2023	7.70									
19/06/2023	7.76				0.060					
20/06/2023	7.77				0.010					
21/06/2023	7.77									
22/06/2023	7.77									
23/06/2023	7.77									
24/06/2023	7.77									
25/06/2023	7.77									
26/06/2023	7.77									
27/06/2023	7.77									
28/06/2023	7.77									
29/06/2023	7.79				0.020					
30/06/2023	7.80				0.010					
1/07/2023	7.82				0.020					
2/07/2023	7.82									
3/07/2023	7.82									
4/07/2023	7.82									
5/07/2023	7.82									
6/07/2023	7.46	0.360								
7/07/2023	7.46									
8/07/2023	7.46									
9/07/2023	7.46									
10/07/2023	7.46									
11/07/2023	7.46									
12/07/2023	7.46									
13/07/2023	7.46									
14/07/2023	7.46									
15/07/2023	7.46									
16/07/2023	7.46									
17/07/2023	6.96	0.500								
18/07/2023	6.96									
19/07/2023	7.56						0.600			
20/07/2023	7.56									
21/07/2023	7.56									
22/07/2023	7.56									
23/07/2023	7.56									
24/07/2023	7.56									
25/07/2023	7.56									
26/07/2023	7.56									
27/07/2023	7.57				0.010					
28/07/2023	7.87						0.300			
29/07/2023	7.87									
30/07/2023	7.87									
31/07/2023	8.85						0.980			
1/08/2023	8.85									
2/08/2023	8.85									
3/08/2023	8.85									
4/08/2023	8.85									
5/08/2023	9.08				0.230					
6/08/2023	9.39				0.310					
7/08/2023	9.56				0.170					
8/08/2023	9.58				0.020					
9/08/2023	9.58									
10/08/2023	9.58									
11/08/2023	9.84				0.260					
12/08/2023	10.14				0.300					
13/08/2023	10.35				0.210					
14/08/2023	10.35				0.000					Will Receive Inflow from SW1 Due to Rain Event
15/08/2023	10.35				0.000					
16/08/2023	10.35				0.000					
17/08/2023	9.65	0.693			0.000					
18/08/2023	9.65				0.000					
19/08/2023	8.86	0.790			0.000					
20/08/2023	8.86				0.000					
21/08/2023	8.86				0.000					
22/08/2023	8.86				0.000					
23/08/2023	8.87				0.001					
24/08/2023	8.87				0.000					
25/08/2023	8.87				0.000					
26/08/2023	8.87				0.000					
27/08/2023	8.92				0.050					
28/08/2023	8.95				0.030					
29/08/2023	8.95				0.000					
30/08/2023	9.05				0.100					
31/08/2023	9.15				0.100					
1/09/2023	9.15				0.000					
2/09/2023	9.15				0.000					
3/09/2023	9.15				0.000					
4/09/2023	9.15				0.000					
5/09/2023	9.17				0.020					

LNAR2 **Operating Level - 12.6 ML**

Purpose: catchment for runoff from unlined areas

Colour Legend Instructions	Copy Formula	Enter Data	Enter Data

Date	FREEBOARD Calculated (ML)	INFLOWS Transfers from SW1 (ML)	Other (ML)	Adjustment (MONTHLY)	OUTFLOWS Dust Suppression (ML)	Volume to Evaps / Atomisers (ML)	Transfers to LNAR5 (ML)	Transfers to LNAR4 (ML)	Other Transfers (e.g. to SW2)	Comments
6/09/2023	9.18				0.018					
7/09/2023	9.18				0.000					
8/09/2023	9.18				0.000					
9/09/2023	9.18				0.000					
10/09/2023	9.18				0.000					
11/09/2023	9.18				0.000					
12/09/2023	9.18				0.000					
13/09/2023	9.20				0.020					
14/09/2023	9.20				0.000					
15/09/2023	9.22				0.020					
16/09/2023	9.56				0.340					
17/09/2023	9.56				0.000					
18/09/2023	9.61				0.042					
19/09/2023	9.73				0.120					
20/09/2023	9.73				0.000					
21/09/2023	9.83				0.100					
22/09/2023	9.86				0.030					
23/09/2023	9.86				0.000					
24/09/2023	9.87				0.010					
25/09/2023	9.89				0.020					
26/09/2023	9.91				0.020					
27/09/2023	9.91				0.000					
28/09/2023	9.91				0.000					
29/09/2023	9.91				0.000					
30/09/2023	9.91				0.000					
1/10/2023	9.93				0.020					
2/10/2023	10.10				0.170					
3/10/2023	10.12				0.020					
4/10/2023	10.27				0.150					
5/10/2023	10.27				0.000					Inflows expected Post Rain Event
6/10/2023	10.27				0.000					
7/10/2023	10.27				0.000					
8/10/2023	10.27				0.000					
9/10/2023	10.27				0.000					
10/10/2023	10.30				0.030					
11/10/2023	10.30				0.000					
12/10/2023	10.32				0.020					
13/10/2023	10.71				0.390					
14/10/2023	10.73				0.020					
15/10/2023	10.26	0.500			0.030					
16/10/2023	9.50	0.760			0.000					
17/10/2023	9.87				0.370					
18/10/2023	9.87				0.000					
19/10/2023	9.89				0.020					
20/10/2023	9.91				0.020					
21/10/2023	9.96				0.050					
22/10/2023	10.01				0.050					
23/10/2023	10.12				0.110					
24/10/2023	10.18				0.060					
25/10/2023	9.67	0.600			0.090					
26/10/2023	9.67				0.000					
27/10/2023	9.67				0.000					
28/10/2023	9.70				0.030					
29/10/2023	9.73				0.030					
30/10/2023	9.76				0.030					
31/10/2023	9.76				0.000					
1/11/2023	9.82				0.060					
2/11/2023	9.82				0.000					
3/11/2023	9.85				0.030					
4/11/2023	9.86				0.010					
5/11/2023	9.86				0.000					
6/11/2023	9.86				0.000					
7/11/2023	9.86				0.000					
8/11/2023	9.86				0.000					
9/11/2023	9.86				0.000					
10/11/2023	9.73	0.153			0.030					
11/11/2023	9.73				0.000					
12/11/2023	9.73				0.000					
13/11/2023	9.73				0.000					
14/11/2023	9.76				0.030					
15/11/2023	9.82				0.060					
16/11/2023	9.86				0.040					
17/11/2023	9.90				0.040					
18/11/2023	9.90				0.000					
19/11/2023	9.97				0.070					
20/11/2023	10.12				0.150					
21/11/2023	10.15				0.030					
22/11/2023	10.53				0.380					
23/11/2023	10.53				0.000					
24/11/2023	10.53				0.000					
25/11/2023	10.53				0.000					
26/11/2023	10.09	0.442			0.000					
27/11/2023	8.53	0.356	1.20		0.000					Inflows /Other - Surface water from weekend rainfall.
28/11/2023	7.92	0.735			0.120					
29/11/2023	7.54	0.375			0.000					
30/11/2023	6.80	0.744			0.000					
1/12/2023	5.99	0.809			0.000					
2/12/2023	5.99				0.000					
3/12/2023	7.35	0.930			0.000		2.290			Rain Event
4/12/2023	7.09	0.627			0.000		0.370			
5/12/2023	6.71	0.580			0.000		0.200			
6/12/2023	6.75	0.411			0.040		0.411			
7/12/2023	6.52	0.620			0.060		0.330			
8/12/2023	6.55	0.432			0.030		0.432			
9/12/2023	6.58	0.371					0.400			
10/12/2023	6.58	0.540					0.540			
11/12/2023	6.61	0.570					0.600			
12/12/2023	6.62	0.260					0.264			
13/12/2023	6.67	0.140			0.040		0.150			
14/12/2023	6.72	0.238			0.050		0.240			
15/12/2023	7.01	0.000			0.290					
16/12/2023	7.22	0.370			0.280		0.300			
17/12/2023	7.40	0.000			0.180					
18/12/2023	7.28	0.210			0.090					
19/12/2023	7.31				0.030					
20/12/2023	7.31				0.000					
21/12/2023	7.10	0.960			0.000		0.750			
22/12/2023	9.29	0.770			0.000		2.960			
23/12/2023	8.66	0.630			0.000					
24/12/2023	8.02	0.641			0.000					
25/12/2023	7.42	0.598			0.000					
26/12/2023	6.95	0.467			0.000					
27/12/2023	7.06	0.380			0.000		0.490			
28/12/2023	7.26	0.200			0.000		0.400			
29/12/2023	7.64	0.000			0.120	0.26				
30/12/2023	7.64	0.000			0.000	0.00				
31/12/2023	8.16	0.000			0.120	0.40				
1/01/2024	8.16	0.000			0.000	0.00				
2/01/2024	8.16	0.000			0.000	0.00				
3/01/2024	8.16	0.000			0.000	0.00				
4/01/2024	8.16	0.000			0.000	0.00				
5/01/2024	8.16	0.000			0.000	0.00				
6/01/2024	10.14	0.670			0.000	0.00	2.650			Post Rain Event
7/01/2024	10.14	0.359			0.000	0.36				Evaps Run

LNAR2 **Operating Level - 12.6 ML**

Purpose: catchment for runoff from unlined areas **Colour Legend Instructions** Copy Formula | Enter Data | Enter Data

Date	FREEBOARD Calculated (ML)	INFLOWS Transfers from SW1 (ML)	INFLOWS Other (ML)	Adjustment (MONTHLY)	OUTFLOWS Dust Suppression (ML)	OUTFLOWS Volume to Evaps / Atomisers (ML)	OUTFLOWS Transfers to LNAR5 (ML)	OUTFLOWS Transfers to LNAR4 (ML)	OUTFLOWS Other Transfers (e.g. to SW2)	Comments
8/01/2024	9.78	0.620			0.000	0.26				Evaps Run
9/01/2024	9.02	0.757			0.000	0.00				
10/01/2024	8.82	0.592			0.000	0.39				Evaps Run
11/01/2024	7.70	1.530			0.000	0.41				Evaps Run/ Isolated Thunderstorms >10mm Received
12/01/2024	7.66	0.498			0.000	0.45				Evaps Run
13/01/2024	7.16	0.536			0.040	0.00				
14/01/2024	6.55	0.630			0.020	0.00				
15/01/2024	6.31	0.480			0.000	0.24				
16/01/2024	6.31	0.000			0.000	0.00				
17/01/2024	6.31	0.000			0.000	0.00				
18/01/2024	4.41	1.900			0.000	0.00				
19/01/2024	5.83	1.200			0.000	0.23	2.390			
20/01/2024	5.29	1.000			0.000	0.46				
21/01/2024	8.09	0.070			0.000	0.51	2.360			
22/01/2024	8.10	0.488			0.000	0.50				
23/01/2024	8.10	0.408			0.000	0.41				
24/01/2024	7.42	0.680			0.000	0.00				
25/01/2024	7.42	0.460			0.000	0.46				
26/01/2024	7.42	0.416			0.000	0.42				
27/01/2024	7.71	0.365			0.290	0.36				
28/01/2024	7.71	0.000			0.000	0.00				
29/01/2024	7.91	0.000			0.200	0.00				
30/01/2024	8.36	0.000			0.000	0.45				
31/01/2024	8.71	0.000			0.000	0.35				
1/02/2024	9.16	0.000			0.300	0.15				
2/02/2024	9.17	0.000			0.010	0.00				
3/02/2024	9.66	0.000			0.090	0.40				
4/02/2024	9.66	0.000			0.000	0.00				
5/02/2024	9.66	0.000			0.000	0.00				
6/02/2024	9.66	0.000			0.000	0.00				
7/02/2024	8.90	0.760			0.000	0.00				
8/02/2024	8.90	0.000			0.000	0.00				
9/02/2024	8.59	0.314			0.000	0.00				
10/02/2024	8.29	0.300			0.000	0.00				
11/02/2024	8.08	0.550			0.000	0.34				
12/02/2024	8.29	0.220			0.000	0.43				
13/02/2024	8.29	0.000			0.000	0.00				
14/02/2024	8.29	0.000			0.000	0.00				
15/02/2024	8.29	0.000			0.000	0.00				
16/02/2024	8.29	0.000			0.000	0.00				
17/02/2024	9.92	0.000			0.300	1.33				
18/02/2024	10.04	0.000			0.000	0.12				
19/02/2024	10.18	0.000			0.000	0.14				
20/02/2024	8.986	1.070		0.17	0.000	0.05				Transfers From SW1 Continuing
21/02/2024	8.78	0.201		0.00	0.000	0.00				
22/02/2024	8.78	0.370		0.00	0.000	0.37				
23/02/2024	8.94	0.000		0.00	0.000	0.16				
24/02/2024	8.95	0.110		0.00	0.000	0.12				
25/02/2024	8.95	0.000		0.00	0.000	0.00				
26/02/2024	9.27	0.000		0.00	0.000	0.32				
27/02/2024	9.63	0.000		0.00	0.006	0.35				
28/02/2024	9.89	0.000		0.00	0.000	0.26				
29/02/2024	10.05	0.000		0.00	0.000	0.16				
1/03/2024	10.26	0.000		0.00	0.000	0.21				
2/03/2024	10.71	0.000		0.00	0.000	0.45				
3/03/2024	11.24	0.000		0.00	0.000	0.53				
4/03/2024	11.54	0.000		0.00	0.000	0.30				
5/03/2024	11.69	0.360		0.00	0.150	0.36				
6/03/2024	11.69	0.000		0.00	0.000	0.00				
7/03/2024	12.06	0.000		0.00	0.003	0.37				
8/03/2024	12.06	0.000		0.00	0.000	0.00				
9/03/2024	12.06	0.000		0.00	0.000	0.00				
10/03/2024	12.06	0.336		0.00	0.000	0.34				
11/03/2024	12.06	0.000		0.00	0.000	0.00				
12/03/2024	12.28	0.000		0.00	0.000	0.22				
13/03/2024	10.95	0.000	1.33	0.00	0.000	0.00				Received 1.33ML from LNAR5
14/03/2024	10.95	0.000		0.00	0.000	0.00				
15/03/2024	10.95	0.000		0.00	0.000	0.00				
16/03/2024	10.95	0.000		0.00	0.000	0.00				
17/03/2024	10.73	0.000		0.23	0.000	0.00				Rain Event
18/03/2024	10.73	0.000		0.00	0.000	0.00				
19/03/2024	10.73	0.000		0.00	0.000	0.00				Raining
20/03/2024	10.61	0.170		0.10	0.000	0.15				
21/03/2024	10.61	0.000		0.00	0.000	0.00				
22/03/2024	10.61	0.000		0.00	0.000	0.00				
23/03/2024	10.61	0.000		0.00	0.000	0.00				
24/03/2024	10.61	0.000		0.00	0.000	0.00				
25/03/2024	10.61	0.000		0.00	0.000	0.00				
26/03/2024	10.62	0.200		0.00	0.000	0.21				
27/03/2024	10.73	0.000		0.00	0.110	0.00				
28/03/2024	10.86	0.000		0.00	0.130	0.00				
29/03/2024	10.86	0.000		0.00	0.000	0.00				
30/03/2024	10.86	0.000		0.00	0.000	0.00				
31/03/2024	10.88	0.280		0.00	0.000	0.30				
1/04/2024	10.88	0.000		0.00	0.000	0.00				
2/04/2024	10.88	0.000		0.00	0.000	0.00				
3/04/2024	10.78	0.000		0.10	0.000	0.00				Raining
4/04/2024	10.10	0.683		0.00	0.000	0.00				
5/04/2024	9.99	0.000		0.10	0.000	0.00				
6/04/2024	6.55	2.240	0.90	0.30	0.000	0.00				Rain Event
7/04/2024	6.55	0.000	0.00	0.00	0.000	0.00				
8/04/2024	7.80	1.300	0.00	0.00	0.000	0.00		2.550		
9/04/2024	6.93	0.870	0.00	0.00	0.000	0.00				
10/04/2024	5.18	1.120	0.63	0.00	0.000	0.00				
11/04/2024	4.58	0.601	0.00	0.00	0.000	0.00				Transfers to LNAR4 to commence 11/4
12/04/2024	6.25	0.656	0.00	0.00	0.000	0.00		2.320		2.32 transferred to LNAR4
13/04/2024	6.30	0.498	0.00	0.00	0.000	0.55				
14/04/2024	6.29	0.317	0.00	0.00	0.000	0.31				
15/04/2024	6.33	0.309	0.00	0.00	0.000	0.35				
16/04/2024	6.35	0.377	0.00	0.00	0.000	0.39				
17/04/2024	7.03	0.350	0.00	0.00	0.000	0.25		0.780		
18/04/2024	6.30	0.730	0.00	0.00	0.000	0.00				
19/04/2024	6.31	0.350	0.00	0.00	0.000	0.36				
20/04/2024	6.25	0.476	0.00	0.00	0.000	0.42				
21/04/2024	6.60	0.000	0.00	0.00	0.000	0.35				
22/04/2024	6.57	0.340	0.00	0.00	0.000	0.31				
23/04/2024	6.81	0.000	0.00	0.00	0.000	0.24				
24/04/2024	7.14	0.000	0.00	0.00	0.000	0.33				
25/04/2024	7.21	0.000	0.00	0.00	0.000	0.07				
26/04/2024	7.44	0.000	0.00	0.00	0.000	0.23				
27/04/2024	7.47	0.130	0.00	0.00	0.000	0.16				
28/04/2024	7.61	0.000	0.00	0.00	0.000	0.14				
29/04/2024	7.58	0.110	0.00	0.00	0.000	0.08				
30/04/2024	7.70	0.000	0.00	0.00	0.000	0.12				
1/05/2024	7.70	0.000	0.00	0.00	0.000	0.00				
2/05/2024	7.33	0.374	0.00	0.00	0.000	0.00				
3/05/2024	7.33	0.000	0.00	0.00	0.000	0.00				
4/05/2024	7.33	0.000	0.00	0.00	0.000	0.00				
5/05/2024	6.10	1.230	0.00	0.00	0.000	0.00				Receiving Inflows SW1
6/05/2024	5.90	0.200	0.00	0.00	0.000	0.00				Receiving Inflows SW1
7/05/2024	5.90	0.000	0.00	0.00	0.000	0.00				
8/05/2024	5.90	0.000	0.00	0.00	0.000	0.00				
9/05/2024	5.90	0.000	0.00	0.00	0.000	0.00				
10/05/2024	5.90	0.000	0.00	0.00	0.000	0.00				

LNAR2 **Operating Level - 12.6 ML**

Purpose: catchment for runoff from unlined areas **Colour Legend Instructions** Copy Formula | Enter Data | Enter Data

Date	FREEBOARD Calculated (ML)	INFLOWS Transfers from SW1 (ML)	Other (ML)	Adjustment (MONTHLY)	OUTFLOWS Dust Suppression (ML)	Volume to Evaps / Atomisers (ML)	Transfers to LNAR5 (ML)	Transfers to LNAR4 (ML)	Other Transfers (e.g. to SW2)	Comments
11/05/2024	5.90	0.000	0.00	0.00	0.000	0.00				
12/05/2024	5.65	0.250	0.00	0.00	0.000	0.00				Received 0.25ML SW1
13/05/2024	5.65	0.000	0.00	0.00	0.000	0.00				
14/05/2024	5.18	0.470	0.00	0.00	0.000	0.00				Received 0.47 ML SW1
15/05/2024	5.17	0.218	0.00	0.00	0.000	0.21				Received 0.218 ML SW1 Used 0.21ML Evaps
16/05/2024	5.41	0.000	0.00	0.00	0.000	0.24				
17/05/2024	7.11	0.000	0.00	0.00	0.000	0.00	1.700			Sent 1.7ML LNAR5
18/05/2024	8.33	0.000	0.00	0.00	0.000	0.00	1.220			Sent 1.22ML LNAR5
19/05/2024	10.54	0.000	0.00	0.00	0.000	0.11	2.100			Sent 2.1ML LNAR5
20/05/2024	10.66	0.000	0.00	0.00	0.000	0.12				
21/05/2024	10.66	0.000	0.00	0.00	0.000	0.00				
22/05/2024	10.66	0.000	0.00	0.00	0.000	0.00				
23/05/2024	10.66	0.000	0.00	0.00	0.000	0.00				
24/05/2024	10.66	0.000	0.00	0.00	0.000	0.00				
25/05/2024	10.66	0.000	0.00	0.00	0.000	0.00				
26/05/2024	10.66	0.000	0.00	0.00	0.000	0.00				
27/05/2024	10.66	0.000	0.00	0.00	0.000	0.00				
28/05/2024	10.66	0.000	0.00	0.00	0.000	0.00				
29/05/2024	10.66	0.000	0.00	0.00	0.000	0.00				
30/05/2024	10.66	0.000	0.00	0.00	0.000	0.00				
31/05/2024	10.93	0.000	0.00	0.00	0.270	0.00				
1/06/2024	10.93	0.000	0.00	0.00	0.000	0.00				
2/06/2024	10.93	0.000	0.00	0.00	0.000	0.00				
3/06/2024	10.93	0.000	0.00	0.00	0.000	0.00				
4/06/2024	10.76	0.170	0.00	0.00	0.000	0.00				
5/06/2024	10.76									
6/06/2024	10.76									
7/06/2024	10.76									
8/06/2024	10.66	0.100								
9/06/2024	10.34	0.320								
10/06/2024	10.06	0.280								
11/06/2024	9.93	0.130								
12/06/2024	9.93									
13/06/2024	9.93									
14/06/2024	9.93									
15/06/2024	9.93									
16/06/2024	9.78	0.150								
17/06/2024	11.01	0.260					1.490			
18/06/2024	11.01									
19/06/2024	11.01									
20/06/2024	11.01									
21/06/2024	11.01									
22/06/2024	11.01									
23/06/2024	11.06	0.055				0.10				
24/06/2024	11.06									
25/06/2024	11.04	0.097				0.08				
26/06/2024	11.04									
27/06/2024	11.04									
28/06/2024	11.08				0.040					
29/06/2024	11.08									
30/06/2024	11.03			0.05						
1/07/2024	10.89	0.145								
2/07/2024	10.89									
3/07/2024	10.89									
4/07/2024	10.89									
5/07/2024	10.89									
6/07/2024	10.87	0.110				0.09				
7/07/2024	10.87									
8/07/2024	10.93					0.06				
9/07/2024	10.93									
10/07/2024	10.93									
11/07/2024	10.93									
12/07/2024	10.93									
13/07/2024	10.93									
14/07/2024	10.93									
15/07/2024	10.93									
16/07/2024	10.93									
17/07/2024	10.93									
18/07/2024	10.93									
19/07/2024	10.93									
20/07/2024	10.93									
21/07/2024	10.93									
22/07/2024	10.93									
23/07/2024	10.82	0.110								
24/07/2024	10.82									
25/07/2024	10.82									
26/07/2024	10.62			0.20						
27/07/2024	10.62									
28/07/2024	10.51			0.11						
29/07/2024	10.54	0.120				0.15				
30/07/2024	10.45	0.200				0.11				
31/07/2024	10.42	0.140				0.11				
1/08/2024	10.42									
2/08/2024	10.47	0.050				0.10				
3/08/2024	9.87	0.600								
4/08/2024	9.23	0.640								
5/08/2024	9.33					0.10				
6/08/2024	9.44					0.11				
7/08/2024	9.54					0.10				
8/08/2024	9.63					0.10				
9/08/2024	9.75					0.12				
10/08/2024	9.62	0.240				0.11				
11/08/2024	9.31	0.310								
12/08/2024	9.28	0.170				0.14				
13/08/2024	9.28									
14/08/2024	9.13			0.15						
15/08/2024	9.00	0.130								
16/08/2024	8.65	0.350								
17/08/2024	8.27	0.380								
18/08/2024	8.65					0.38				
19/08/2024	8.65									
20/08/2024	8.65									
21/08/2024	8.64	0.120				0.11				
22/08/2024	8.70					0.06				
23/08/2024	8.78					0.08				
24/08/2024	8.79					0.01				
25/08/2024	9.01				0.180	0.04				
26/08/2024	9.01									
27/08/2024	8.70	0.310								
28/08/2024	8.72					0.02				
29/08/2024	9.25				0.530					
30/08/2024	9.29				0.040					
31/08/2024	9.35	0.270			0.110	0.22				
1/09/2024	9.41	0.420			0.060	0.42				
2/09/2024	9.64	0.180			0.140	0.27				
3/09/2024	10.02				0.220	0.16				
4/09/2024	10.02									
5/09/2024	10.12				0.100					

ERM

LNAR3 Operating Level - 19 ML

Purpose: Staging pond for irrigation of lined repository areas and leachate collection

Colour Legend Instructions | Copy Formula | Enter Data | Enter Data

														revised	new	revised	
	FREEBOARD	INFLOWS									OUTFLOWS						
Date	Calculated (ML)	Surface Water Runoff (transferred via Sump) (ML)	LNAR Leachate (Total, ML)	Sump 1	Sump 2	Sump 3	Sump 4	Sump 5	Transfers from Waste Ponds (ML)	Adjustment (MONTHLY)	LNAR Irrigation (ML)	LNAR Tanker (ML)	Transfers to LNAR5 (ML)	Transfers to Pond D (ML)	Transfers to Waste Pond A (ML)	Comments
1/01/2024	5.65	0.000	0.137								0.190					
2/01/2024	5.58	0.000	0.130								0.060					
3/01/2024	5.51	0.000	0.160								0.090					
4/01/2024	5.36	0.000	0.149								0.000					
5/01/2024	5.30	0.000	0.087								0.027					
6/01/2024	5.16	0.000	0.139								0.000					
7/01/2024	5.03	0.000	0.194								0.060					
8/01/2024	5.07	0.000	0.144								0.190					
9/01/2024	4.93	0.000	0.147								0.000					
10/01/2024	4.86	0.000	0.136	0.020	0.024	0.038	0.021	0.033			0.070					
11/01/2024	4.78	0.000	0.135	0.016	0.025	0.039	0.022	0.033			0.050					
12/01/2024	5.77	0.000	0.113	0.017	0.020	0.035	0.021	0.020			0.040				1.07	1.07 transferred To BWPA
13/01/2024	5.76	0.000	0.094	0.014	0.015	0.023	0.013	0.029			0.080					
14/01/2024	5.73	0.000	0.147	0.020	0.026	0.037	0.023	0.041			0.120					
15/01/2024	5.67	0.000	0.141	0.019	0.025	0.036	0.022	0.039			0.080					
16/01/2024	5.53	0.000	0.140	0.018	0.026	0.039	0.022	0.035			0.000					
17/01/2024	5.40	0.000	0.136	0.020	0.024	0.036	0.021	0.035			0.000					
18/01/2024	3.94	0.000	0.224	0.036	0.049	0.054	0.038	0.047		1.23	0.000					SW Run Off Received after Major Rain Event
19/01/2024	3.81	0.000	0.134	0.022	0.028	0.036	0.022	0.026			0.000					
20/01/2024	3.68	0.000	0.129	0.019	0.025	0.028	0.025	0.032			0.000					
21/01/2024	3.53	0.000	0.147	0.018	0.024	0.036	0.030	0.039			0.000					
22/01/2024	3.44	0.000	0.089	0.013	0.017	0.018	0.014	0.027			0.000					
23/01/2024	3.31	0.000	0.128	0.021	0.023	0.025	0.026	0.033			0.000					
24/01/2024	3.18	0.000	0.139	0.009	0.026	0.039	0.034	0.031			0.000					
25/01/2024	3.10	0.000	0.155	0.017	0.033	0.044	0.025	0.036			0.079					
26/01/2024	3.05	0.000	0.134	0.000	0.032	0.041	0.028	0.033			0.083					
27/01/2024	2.97	0.000	0.138	0.000	0.036	0.044	0.027	0.031			0.055					Opus Irrigation Limited Due To High Winds
28/01/2024	2.88	0.000	0.146	0.000	0.038	0.043	0.025	0.040			0.062					
29/01/2024	2.87	0.000	0.131	0.000	0.028	0.043	0.026	0.034			0.120					
30/01/2024	2.89	0.000	0.074	0.000	0.017	0.022	0.019	0.016			0.090					
31/01/2024	2.85	0.000	0.112	0.000	0.029	0.040	0.025	0.018			0.080					
1/02/2024	2.80	0.000	0.121	0.000	0.031	0.041	0.027	0.022			0.070					
2/02/2024	4.27	0.000	0.134	0.000	0.033	0.046	0.032	0.023			0.100				1.5	1.5 ML Transferred to BWPA
3/02/2024	4.28	0.000	0.107	0.000	0.027	0.037	0.021	0.022			0.115					
4/02/2024	4.29	0.000	0.156	0.000	0.059	0.041	0.025	0.031			0.167					
5/02/2024	4.37	0.000	0.068	0.000	0.043	0.025	0.000	0.000			0.154					
6/02/2024	4.39	0.000	0.102	0.000	0.038	0.024	0.019	0.021			0.119					
7/02/2024	4.27	0.000	0.125	0.000	0.024	0.045	0.024	0.032			0.000					
8/02/2024	4.17	0.000	0.127	0.000	0.029	0.041	0.026	0.031			0.030					0.030 Run through Atomiser Ring Main (Evaporation Rate Low Due To Weather)
9/02/2024	4.14	0.000	0.134	0.000	0.030	0.042	0.029	0.033			0.109					
10/02/2024	4.10	0.000	0.131	0.000	0.030	0.042	0.026	0.033			0.083					
11/02/2024	4.06	0.000	0.127	0.000	0.029	0.041	0.026	0.031			0.095					
12/02/2024	4.08	0.000	0.092	0.000	0.036	0.008	0.011	0.037			0.110					
13/02/2024	4.14	0.000	0.078	0.000	0.018	0.027	0.013	0.020			0.140					
14/02/2024	4.22	0.000	0.080	0.000	0.036	0.004	0.003	0.037			0.160					
15/02/2024	4.28	0.000	0.119	0.000	0.041	0.021	0.017	0.040			0.171					
16/02/2024	4.33	0.000	0.110	0.000	0.000	0.044	0.026	0.040			0.160					
17/02/2024	4.42	0.000	0.106	0.000	0.000	0.046	0.027	0.033			0.195					
18/02/2024	4.47	0.000	0.109	0.000	0.000	0.047	0.028	0.034			0.161					
19/02/2024	4.51	0.000	0.117	0.000	0.000	0.051	0.030	0.036			0.155					
20/02/2024	4.41	0.000	0.122	0.000	0.000	0.053	0.026	0.043		0.06	0.084					Significant Rain Event
21/02/2024	4.40	0.000	0.105	0.000	0.000	0.047	0.025	0.033			0.093					
22/02/2024	4.37	0.000	0.093	0.000	0.000	0.036	0.019	0.038			0.067					
23/02/2024	4.41	0.000	0.108	0.000	0.000	0.049	0.028	0.031			0.152					
24/02/2024	4.45	0.000	0.098	0.000	0.000	0.035	0.029	0.034			0.135					
25/02/2024	4.41	0.000	0.136	0.000	0.000	0.039	0.047	0.050			0.100					
26/02/2024	4.43	0.000	0.134	0.000	0.000	0.043	0.052	0.039			0.147					
27/02/2024	4.36	0.000	0.211	0.000	0.000	0.052	0.087	0.072			0.140					
28/02/2024	4.23	0.000	0.230	0.000	0.000	0.093	0.064	0.073			0.108					
29/02/2024	4.21	0.000	0.128	0.000	0.000	0.051	0.031	0.046			0.101					
1/03/2024	4.21	0.000	0.108	0.000	0.000	0.046	0.028	0.034			0.110					
2/03/2024	4.18	0.000	0.112	0.000	0.000	0.045	0.027	0.040			0.078					
3/03/2024	4.11	0.000	0.188	0.000	0.000	0.074	0.047	0.067			0.121					
4/03/2024	4.11	0.000	0.105	0.000	0.000	0.045	0.028	0.032			0.107					
5/03/2024	4.08	0.000	0.130	0.000	0.000	0.046	0.047	0.037			0.097					
6/03/2024	3.99	0.000	0.206	0.000	0.000	0.073	0.065	0.068			0.117					
7/03/2024	3.97	0.000	0.114	0.000	0.000	0.042	0.039	0.033			0.097					
8/03/2024	3.93	0.000	0.116	0.000	0.000	0.045	0.036	0.035			0.071					
9/03/2024	3.87	0.000	0.124	0.000	0.000	0.048	0.034	0.042			0.072					
10/03/2024	3.84	0.000	0.127	0.000	0.000	0.046	0.034	0.047			0.089					
11/03/2024	3.82	0.000	0.111	0.000	0.000	0.042	0.029	0.040			0.091					
12/03/2024	3.81	0.000	0.118	0.000	0.000	0.043	0.031	0.044			0.112					
13/03/2024	3.85	0.000	0.105	0.000	0.000	0.039	0.026	0.040			0.141					
14/03/2024	3.87	0.000	0.104	0.000	0.000	0.037	0.028	0.039			0.127					

ERM

LNAR3 Operating Level - 19 ML

Purpose: Staging pond for irrigation of lined repository areas and leachate collection

Colour Legend Instructions | Copy Formula | Enter Data | Enter Data

													revised	new	revised	
	FREEBOARD	INFLOWS									OUTFLOWS					
Date	Calculated (ML)	Surface Water Runoff (transferred via Sump) (ML)	LNAR Leachate (Total, ML)	Sump 1	Sump 2	Sump 3	Sump 4	Sump 5	Transfers from Waste Ponds (ML)	Adjustment (MONTHLY)	LNAR Irrigation (ML)	LNAR Tanker (ML)	Transfers to LNAR5 (ML)	Transfers to Pond D (ML)	Transfers to Waste Pond A (ML)	Comments
15/03/2024	3.88	0.000	0.103	0.000	0.000	0.039	0.025	0.039			0.116					
16/03/2024	3.77	0.000	0.109	0.000	0.000	0.042	0.027	0.040			0.000					Rainy Conditions
17/03/2024	3.62	0.000	0.107	0.000	0.000	0.040	0.029	0.038		0.05	0.000					Rainy Conditions
18/03/2024	3.51	0.000	0.103	0.000	0.000	0.039	0.025	0.039			0.000					Rainy Conditions
19/03/2024	3.40	0.000	0.109	0.000	0.000	0.042	0.027	0.040			0.000					Rainy Conditions
20/03/2024	3.31	0.000	0.108	0.000	0.000	0.038	0.030	0.040		0.04	0.056					
21/03/2024	3.23	0.000	0.108	0.000	0.000	0.041	0.029	0.038			0.026					
22/03/2024	3.19	0.000	0.107	0.000	0.000	0.036	0.031	0.040			0.067					
23/03/2024	3.16	0.000	0.102	0.000	0.000	0.038	0.027	0.037			0.070					
24/03/2024	3.09	0.000	0.110	0.000	0.000	0.040	0.030	0.040			0.041					
25/03/2024	3.03	0.000	0.108	0.000	0.000	0.038	0.031	0.039			0.050					
26/03/2024	2.98	0.000	0.107	0.000	0.000	0.041	0.029	0.037			0.052					
27/03/2024	2.96	0.000	0.106	0.000	0.000	0.039	0.028	0.039			0.094					
28/03/2024	2.97	0.000	0.107	0.000	0.000	0.041	0.029	0.037			0.110					
29/03/2024	2.96	0.000	0.105	0.000	0.000	0.038	0.030	0.037			0.098					
30/03/2024	2.89	0.000	0.107	0.000	0.000	0.040	0.029	0.038			0.035					
31/03/2024	2.92	0.000	0.101	0.000	0.000	0.039	0.027	0.035			0.129					
1/04/2024	2.91	0.000	0.101	0.000	0.000	0.038	0.028	0.035			0.098					
2/04/2024	2.92	0.000	0.103	0.000	0.000	0.040	0.030	0.033			0.112					
3/04/2024	2.79	0.000	0.106	0.000	0.000	0.041	0.028	0.037		0.03	0.000					Rainy Conditions
4/04/2024	4.22	0.000	0.110	0.000	0.000	0.042	0.030	0.038			0.000				1.54	1.54ML Transferred to BWPA as Directed
5/04/2024	4.41	0.410	0.144	0.031	0.000	0.043	0.032	0.038		0.05	0.000				0.79	0.79ML Transferred to BWPA as Directed
6/04/2024	2.91	1.224	0.174	0.040	0.000	0.050	0.043	0.041		0.10	0.000				0	
7/04/2024	2.37	0.000	0.542	0.043	0.370	0.049	0.041	0.039			0.000				0	
8/04/2024	2.24	0.000	0.131	0.027	0.027	0.035	0.033	0.009			0.000				0	
9/04/2024	2.14	0.000	0.129	0.028	0.024	0.034	0.033	0.010			0.029				0	
10/04/2024	2.03	0.000	0.111	0.024	0.025	0.032	0.030	0.000			0.000				0	
11/04/2024	1.92	0.000	0.141	0.020	0.046	0.039	0.036	0.000			0.031				0	
12/04/2024	2.83	0.000	0.112	0.015	0.018	0.041	0.038	0.000			0.029				1	1 ML Transferred to BWPA as Directed
13/04/2024	3.07	0.000	0.116	0.021	0.019	0.038	0.038	0.000			0.350				0	
14/04/2024	2.99	0.000	0.108	0.011	0.018	0.043	0.036	0.000			0.030				0	
15/04/2024	2.93	0.000	0.091	0.005	0.009	0.042	0.035	0.000			0.034				0	
16/04/2024	2.87	0.000	0.091	0.003	0.004	0.046	0.038	0.000			0.029				0	
17/04/2024	2.80	0.000	0.101	0.009	0.007	0.047	0.038	0.000			0.035				0	
18/04/2024	2.74	0.000	0.094	0.010	0.008	0.045	0.031	0.000			0.028				0	
19/04/2024	2.59	0.000	0.163	0.010	0.009	0.037	0.107	0.000			0.014				0	
20/04/2024	2.85	0.000	0.117	0.011	0.010	0.032	0.064	0.000			0.010			0.37		0.37 Sent To D Pond As Directed
21/04/2024	2.74	0.000	0.120	0.013	0.009	0.033	0.065	0.000			0.010					
22/04/2024	3.00	0.000	0.096	0.011	0.011	0.031	0.043	0.000			0.010			0.34		0.34 Sent To D Pond As Directed
23/04/2024	2.92	0.000	0.091	0.011	0.006	0.000	0.074	0.000			0.015					
24/04/2024	2.83	0.000	0.111	0.023	0.006	0.000	0.082	0.000			0.017					
25/04/2024	2.78	0.000	0.063	0.014	0.010	0.000	0.039	0.000			0.020					
26/04/2024	2.73	0.000	0.069	0.021	0.005	0.000	0.043	0.000			0.016					
27/04/2024	2.67	0.000	0.073	0.020	0.006	0.000	0.047	0.000			0.013					
28/04/2024	2.59	0.000	0.078	0.023	0.008	0.000	0.047	0.000			0.000					
29/04/2024	2.55	0.000	0.062	0.018	0.006	0.000	0.038	0.000			0.025					
30/04/2024	2.57	0.000	0.011	0.000	0.000	0.000	0.011	0.000			0.022					
1/05/2024	2.53	0.000	0.033	0.010	0.008	0.000	0.015	0.000			0.000					
2/05/2024	2.50	0.000	0.029	0.009	0.006	0.000	0.014	0.000			0.000					
3/05/2024	2.45	0.000	0.050	0.009	0.008	0.000	0.033	0.000			0.000					
4/05/2024	2.40	0.000	0.056	0.011	0.008	0.000	0.037	0.000			0.000					
5/05/2024	2.34	0.000	0.057	0.009	0.007	0.000	0.041	0.000			0.000					
6/05/2024	2.28	0.000	0.057	0.006	0.008	0.000	0.043	0.000			0.000					
7/05/2024	2.23	0.000	0.057	0.007	0.000	0.000	0.050	0.000			0.000					
8/05/2024	2.18	0.000	0.047	0.005	0.000	0.000	0.042	0.000			0.000					
9/05/2024	2.12	0.000	0.058	0.010	0.009	0.000	0.039	0.000			0.000					
10/05/2024	2.07	0.000	0.048	0.006	0.010	0.000	0.032	0.000			0.000					
11/05/2024	2.01	0.000	0.067	0.011	0.010	0.000	0.046	0.000			0.000					
12/05/2024	1.94	0.000	0.066	0.007	0.010	0.000	0.049	0.000			0.000					
13/05/2024	1.88	0.000	0.061	0.007	0.010	0.000	0.044	0.000			0.000					
14/05/2024	1.84	0.000	0.043	0.000	0.008	0.000	0.035	0.000			0.000					
15/05/2024	1.81	0.000	0.059	0.000	0.010	0.000	0.049	0.000			0.031					
16/05/2024	1.78	0.000	0.051	0.000	0.009	0.000	0.042	0.000			0.026					
17/05/2024	2.29	0.000	0.051	0.000	0.009	0.000	0.042	0.000			0.026		0.53			0.53ML Transferred to LNAR5 As Directed
18/05/2024	2.26	0.000	0.052	0.000	0.009	0.000	0.043	0.000			0.019					
19/05/2024	2.21	0.000	0.059	0.009	0.008	0.000	0.042	0.000			0.015					
20/05/2024	2.18	0.000	0.048	0.000	0.010	0.000	0.038	0.000			0.017					
21/05/2024	2.12	0.000	0.058	0.007	0.009	0.000	0.042	0.000			0.000					
22/05/2024	2.07	0.000	0.067	0.010	0.009	0.000	0.048	0.000			0.011					
23/05/2024	2.01	0.000	0.060	0.000	0.007	0.000	0.053	0.000			0.000					
24/05/2024	1.95	0.000	0.069	0.006	0.008	0.000	0.055	0.000			0.014					
25/05/2024	2.42	0.000	0.050	0.000	0.008	0.000	0.042	0.000			0.000		0.52			0.52ML Transferred LNAR5 As Directed
26/05/2024	2.37	0.000	0.068	0.010	0.009	0.000	0.049	0.000			0.016					
27/05/2024	2.32	0.000	0.059	0.000	0.008	0.000	0.051	0.000			0.011					

ERM

LNAR3 **Operating Level - 19 ML**

Purpose: Staging pond for irrigation of lined repository areas and leachate collection

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													revised	new	revised	
	FREEBOARD	INFLOWS									OUTFLOWS					
Date	Calculated (ML)	Surface Water Runoff (transferred via Sump) (ML)	LNAR Leachate (Total, ML)	Sump 1	Sump 2	Sump 3	Sump 4	Sump 5	Transfers from Waste Ponds (ML)	Adjustment (MONTHLY)	LNAR Irrigation (ML)	LNAR Tanker (ML)	Transfers to LNAR5 (ML)	Transfers to Pond D (ML)	Transfers to Waste Pond A (ML)	Comments
28/05/2024	2.28	0.000	0.055	0.000	0.000	0.000	0.055	0.000			0.017					
29/05/2024	2.25	0.000	0.058	0.000	0.000	0.000	0.058	0.000			0.025					
30/05/2024	2.22	0.000	0.049	0.000	0.000	0.000	0.049	0.000			0.022					
31/05/2024	2.19	0.000	0.050	0.000	0.000	0.000	0.050	0.000			0.014					
1/06/2024	2.18	0.000	0.038	0.000	0.000	0.000	0.038	0.000			0.035					
2/06/2024	2.14	0.000	0.043	0.000	0.000	0.000	0.043	0.000			0.000					
3/06/2024	2.11	0.000	0.033	0.000	0.000	0.000	0.033	0.000			0.000					
4/06/2024	2.06	0.000	0.047	0.000	0.000	0.000	0.047	0.000			0.000					
5/06/2024	2.01	0.000	0.054				0.054									
6/06/2024	1.95	0.000	0.055				0.055									
7/06/2024	1.90	0.000	0.048				0.048									
8/06/2024	1.86	0.000	0.043				0.043									
9/06/2024	1.81	0.000	0.049				0.049									
10/06/2024	1.76	0.000	0.051				0.051									
11/06/2024	1.72	0.000	0.040				0.040									
12/06/2024	1.68	0.000	0.043				0.043									
13/06/2024	1.64	0.000	0.043				0.043									
14/06/2024	1.58	0.000	0.051				0.051									
15/06/2024	1.54	0.000	0.049				0.049									
16/06/2024	1.48	0.000	0.052				0.052									
17/06/2024	1.44	0.000	0.047				0.047									
18/06/2024	1.39	0.000	0.046				0.046									
19/06/2024	1.64	0.000	0.052				0.052						0.30			
20/06/2024	1.59	0.000	0.049				0.049									
21/06/2024	1.54	0.000	0.054				0.054									
22/06/2024	1.48	0.000	0.051				0.051									
23/06/2024	1.51	0.000	0.045				0.045				0.067					
24/06/2024	1.46	0.000	0.049				0.049									
25/06/2024	1.41	0.000	0.049				0.049									
26/06/2024	1.87	0.000	0.052				0.052						0.51			
27/06/2024	1.82	0.000	0.045				0.045									
28/06/2024	1.78	0.000	0.046				0.046									
29/06/2024	1.72	0.000	0.053				0.053									
30/06/2024	1.62	0.000	0.051				0.051			0.05						
1/07/2024	1.57	0.000	0.053				0.053									
2/07/2024	1.52	0.000	0.051				0.051									
3/07/2024	1.46	0.000	0.055				0.055									
4/07/2024	1.41	0.000	0.052				0.052									
5/07/2024	1.36	0.000	0.055				0.055									
6/07/2024	1.31	0.000	0.049				0.049									
7/07/2024	1.25	0.000	0.052				0.052									
8/07/2024	1.20	0.000	0.050				0.050									
9/07/2024	1.16	0.000	0.048				0.048									
10/07/2024	1.11	0.000	0.049				0.049									LNAR3 Transfer to BWPA 1.5ML scheduled- transfer on hold due to out of hours ashing
11/07/2024	2.58	0.000	0.049				0.049				0.031				1.49	
12/07/2024	2.56	0.000	0.047				0.047				0.029					
13/07/2024	2.52	0.000	0.045				0.045									
14/07/2024	2.50	0.000	0.050				0.050				0.030					
15/07/2024	2.45	0.000	0.049				0.049									
16/07/2024	2.41	0.000	0.041				0.041									
17/07/2024	2.37	0.000	0.035				0.035									
18/07/2024	2.33	0.000	0.040				0.040									
19/07/2024	2.30	0.000	0.035				0.035									
20/07/2024	2.26	0.000	0.039				0.039									
21/07/2024	2.22	0.000	0.035				0.035									
22/07/2024	2.18	0.000	0.040				0.040									
23/07/2024	2.14	0.000	0.041				0.041									
24/07/2024	2.11	0.000	0.035				0.035									
25/07/2024	2.07	0.000	0.035				0.035									
26/07/2024	2.03	0.000	0.041				0.041									
27/07/2024	2.00	0.000	0.041				0.041				0.015					
28/07/2024	1.97	0.000	0.039				0.039									
29/07/2024	1.95	0.000	0.041				0.041				0.027					
30/07/2024	1.94	0.000	0.036				0.036				0.022					
31/07/2024	1.92	0.000	0.036				0.036				0.019					
1/08/2024	1.90	0.000	0.035				0.035				0.017					
2/08/2024	1.89	0.000	0.037				0.037				0.025					
3/08/2024	1.87	0.000	0.037				0.037				0.018					
4/08/2024	1.86	0.000	0.040				0.040				0.025					
5/08/2024	1.84	0.000	0.038				0.038				0.024					
6/08/2024	1.82	0.000	0.040				0.040				0.019					
7/08/2024	1.79	0.000	0.041				0.041				0.014					
8/08/2024	1.77	0.000	0.038				0.038				0.011					
9/08/2024	1.74	0.000	0.038				0.038				0.012					

LNAR3 Operating Level - 19 ML

Purpose: Staging pond for irrigation of lined repository areas and leachate collection

Colour Legend Instructions | Copy Formula | Enter Data | Enter Data

													revised	new	revised	
	FREEBOARD	INFLOWS									OUTFLOWS					
Date	Calculated (ML)	Surface Water Runoff (transferred via Sump) (ML)	LNAR Leachate (Total, ML)	Sump 1	Sump 2	Sump 3	Sump 4	Sump 5	Transfers from Waste Ponds (ML)	Adjustment (MONTHLY)	LNAR Irrigation (ML)	LNAR Tanker (ML)	Transfers to LNAR5 (ML)	Transfers to Pond D (ML)	Transfers to Waste Pond A (ML)	Comments
10/08/2024	1.70	0.000	0.038				0.038									
11/08/2024	1.68	0.000	0.040				0.040				0.015					
12/08/2024	1.65	0.000	0.037				0.037				0.010					
13/08/2024	1.61	0.000	0.041				0.041									
14/08/2024	1.55	0.000	0.038				0.038			0.03						
15/08/2024	1.36	0.000	0.045				0.045			0.14						
16/08/2024	1.16	0.000	0.042				0.042			0.16						
17/08/2024	1.01	0.000	0.045				0.045			0.11						
18/08/2024	0.90	0.000	0.031				0.031			0.07						
19/08/2024	0.87	0.000	0.039				0.039									
20/08/2024	2.27	0.000	0.040				0.040								1.44	
21/08/2024	2.09	0.000	0.041				0.041			0.13						
22/08/2024	2.08	0.000	0.041				0.041				0.026					
23/08/2024	2.06	0.000	0.035				0.035				0.019					
24/08/2024	2.09	0.000	0.035				0.035				0.063					
25/08/2024	2.08	0.000	0.039				0.039				0.031					Opus Irrigation suspended due to wind drift
26/08/2024	2.05	0.000	0.035				0.035									
27/08/2024	1.56	0.000	0.042				0.042			0.46	0.014					
28/08/2024	1.54	0.000	0.038				0.038				0.021					
29/08/2024	1.52	0.000	0.035				0.035				0.011					Opus Irrigation suspended due to wind drift
30/08/2024	1.51	0.000	0.038				0.038				0.028					
31/08/2024	1.51	0.000	0.026				0.026				0.023					Opus Irrigation Suspended due to wind drift
1/09/2024	1.50	0.000	0.038				0.038				0.031					Opus Irrigation Suspended due to wind drift
2/09/2024	1.46	0.000	0.042				0.042				0.005					Opus Irrigation Suspended due to wind drift
3/09/2024	1.41	0.000	0.050				0.050									Opus Irrigation Suspended due to wind drift
4/09/2024	1.43	0.000	0.019				0.019				0.034					
5/09/2024	2.88	0.000	0.035				0.035				0.060				1.43	

ERM

LNAR4 **Operating Level - 18.5 ML**

Purpose: Staging pond for WCA, irrigation and storage for runoff from unlined areas

Colour Legend Instructions: Copy Formula | Enter Data | Enter Data

Date	FREEBOARD Calculated (ML)	INFLOWS Transfers from LNAR5 (ML)	Transfers from LNAR2 (ML)	Transfers from Settling Ponds (ML) (Revised)	Transfers from SW2 (ML) (Added)	Transfers from SHG1 (ML) (Added)	Adjustment (MONTHLY)	OUTFLOWS Volume to Evaps / Atomisers (ML)	Volume for Dust Suppression (incl Tanker) (ML)	Volume for WCA Ash Conditioning (ML)	Daily Total Volume Used at the Repository (ML)	Transfers to LNAR5 (ML)	Transfers to SW2 (ML)	Comments
1/01/2024	11.86						-1.10				0.00		0.00	
2/01/2024	11.86										0.00		0.00	
3/01/2024	11.86										0.00		0.00	
4/01/2024	11.86										0.00		0.00	
5/01/2024	10.07			1.79							0.00		0.00	
6/01/2024	10.07										0.00		0.00	
7/01/2024	8.17			1.90							0.00		0.00	
8/01/2024	8.17										0.00		0.00	
9/01/2024	8.17										0.00		0.00	
10/01/2024	8.17										0.00		0.00	
11/01/2024	8.17										0.00		0.00	
12/01/2024	9.74										0.00	1.57	0.00	
13/01/2024	11.36							0.61			0.61	0.44	0.57	
14/01/2024	12.00							0.64			0.64		0.00	
15/01/2024	12.23								0.23		0.23		0.00	
16/01/2024	12.23										0.00		0.00	
17/01/2024	12.23										0.00		0.00	
18/01/2024	10.92				1.31						0.00		0.00	Received SW SW2
19/01/2024	10.92										0.00		0.00	
20/01/2024	10.92										0.00		0.00	
21/01/2024	10.92										0.00		0.00	
22/01/2024	10.92										0.00		0.00	
23/01/2024	10.92										0.00		0.00	
24/01/2024	10.92										0.00		0.00	
25/01/2024	12.00							0.15	0.45		0.60		0.48	
26/01/2024	12.76							0.13	0.63		0.76		0.00	
27/01/2024	13.24							0.15	0.33		0.48		0.00	
28/01/2024	15.04							0.58	1.22		1.80		0.00	
29/01/2024	16.07							0.61	0.42		1.03		0.00	
30/01/2024	16.07										0.00		0.00	
31/01/2024	16.07										0.00		0.00	
1/02/2024	16.07										0.00		0.00	
2/02/2024	16.07										0.00		0.00	
3/02/2024	16.07										0.00		0.00	
4/02/2024	16.07										0.00		0.00	
5/02/2024	16.07										0.00		0.00	
6/02/2024	16.07										0.00		0.00	
7/02/2024	13.25	2.82									0.00		0.00	Transferring LNAR5 to LNAR4
8/02/2024	11.27	1.98									0.00		0.00	Transferring LNAR5 to LNAR4
9/02/2024	9.26			2.01							0.00		0.00	Transfer Received From Sett Pond B
10/02/2024	6.38	2.88									0.00		0.00	Transferring LNAR5 to LNAR4
11/02/2024	4.74			1.64							0.00		0.00	
12/02/2024	4.74										0.00		0.00	
13/02/2024	3.48	1.26									0.00		0.00	Transferring LNAR5 to LNAR4
14/02/2024	3.48										0.00		0.00	
15/02/2024	3.48										0.00		0.00	
16/02/2024	3.48										0.00		0.00	
17/02/2024	3.70			0.56					0.78		0.78		0.00	
18/02/2024	4.07								0.37		0.37		0.00	
19/02/2024	4.74								0.67		0.67		0.00	
20/02/2024	4.83			0.30			0.06		0.45		0.45		0.00	
21/02/2024	4.83			0.24					0.24		0.24		0.00	
22/02/2024	4.83			0.11					0.11		0.11		0.00	
23/02/2024	5.12								0.29		0.29		0.00	
24/02/2024	5.44								0.32		0.32		0.00	
25/02/2024	6.08							0.24	0.40		0.64		0.00	
26/02/2024	5.33			0.75	0.51				0.51		0.51		0.00	Received 0.75ML SPB & Inflows From SW2
27/02/2024	5.90			0.26					0.83		0.83		0.00	
28/02/2024	4.44			1.67	0.27				0.48		0.48		0.00	Received 0.27 SW2 Received 1.67 Sett Pond C
29/02/2024	2.94						2.04		0.54		0.54		0.00	
1/03/2024	1.49			1.80	0.27				0.62		0.62		0.00	0.27 In From SW2 1.8ML In from SPC
2/03/2024	2.30			0.39					1.20		1.20		0.00	
3/03/2024	3.06			0.11					0.87		0.87		0.00	
4/03/2024	2.88			0.97					0.79		0.79		0.00	0.97 Received SPC
5/03/2024	3.65							0.26	0.51		0.77		0.00	
6/03/2024	3.66			1.02				0.39	0.64		1.03		0.00	1.02 Received SPC
7/03/2024	3.97				0.39				0.70		0.70		0.00	0.39 Received SW2
8/03/2024	2.26			2.01	0.10				0.40		0.40		0.00	0.1 Received SW2 2.01ML Received SPC
9/03/2024	3.10				0.20			0.44	0.60		1.04		0.00	0.2 Received SW2
10/03/2024	1.63			1.92	0.42				0.87		0.87		0.00	1.92 SPC 0.42 SW2
11/03/2024	2.91								0.71		0.71		0.57	0.57 Sent to SW2

LNAR4 **Operating Level - 18.5 ML**

Purpose: Staging pond for WCA, irrigation and storage for runoff from unlined areas

Colour Legend Instructions	Copy Formula	Enter Data	Enter Data

				Revised	Added	Added								
	FREEBOARD	INFLOWS						OUTFLOWS						
Date	Calculated (ML)	Transfers from LNAR5 (ML)	Transfers from LNAR2 (ML)	Transfers from Settling Ponds (ML)	Transfers from SW2 (ML)	Transfers from SHG1 (ML)	Adjustment (MONTHLY)	Volume to Evaps / Atomisers (ML)	Volume for Dust Suppression (incl Tanker) (ML)	Volume for WCA Ash Conditioning (ML)	Daily Total Volume Used at the Repository (ML)	Transfers to LNAR5 (ML)	Transfers to SW2 (ML)	Comments
12/03/2024	3.64								0.73		0.73		0.00	
13/03/2024	2.94			2.34	1.10			0.35	0.75	0.39	1.49		1.25	1.1 ML in from SW2 2.34ML in from SPC 1.25ML Received SPC
14/03/2024	4.29			0.79				0.54	0.81		1.35		0.79	0.79 in SPC 0.79 Transferred to SW2
15/03/2024	2.27			2.32	1.37			0.48	0.89		1.37		0.30	2.32ML Received SPC 1.37ML Received SW2 0.3ML Sent SW2
16/03/2024	2.27										0.00		0.00	
17/03/2024	2.22						0.05				0.00		0.00	
18/03/2024	2.22										0.00		0.00	
19/03/2024	2.22			0.27					0.27		0.27		0.00	
20/03/2024	2.47						0.04		0.29		0.29		0.00	
21/03/2024	2.47			0.18					0.18		0.18		0.00	
22/03/2024	2.44			1.10	0.47				0.47		0.47		1.07	1.1 in SPC 1.07 to SW2 Overnight 0.47 in SW2 0.47 Used D/S
23/03/2024	2.44			0.54					0.54		0.54		0.00	
24/03/2024	2.47			0.37					0.40		0.40		0.00	
25/03/2024	2.50			0.23					0.26		0.26		0.00	
26/03/2024	2.48			1.14					0.31		0.31		0.81	Received 0.83 SPC
27/03/2024	2.51			1.34					0.47		0.47		0.90	Received 0.47 SW2 Sent 0.90 to SW2 overnight
28/03/2024	2.56			0.62	0.70			0.13	0.57		0.70		0.67	Received 0.62 SPC Received 0.7 SW2 0.67 sent to SW2
29/03/2024	2.52			0.75	0.97			0.41	0.53		0.94		0.74	Received 0.97 SW2 Received 0.75 SPC SW2 Sent 0.74 SW2 Overnight
30/03/2024	2.65				0.21				0.34		0.34		0.00	Received 0.21 SW2
31/03/2024	2.69			0.43					0.47		0.47		0.00	
1/04/2024	5.45							0.39	0.87		1.26		1.50	Transferred 1.5 to SW2
2/04/2024	4.04			1.99					0.58		0.58		0.00	1.99 ML Received SPC
3/04/2024	4.04										0.00		0.00	Rainy Conditions
4/04/2024	4.04										0.00		0.00	
5/04/2024	3.99						0.05				0.00		0.00	
6/04/2024	4.75						0.10		0.86		0.86		0.00	0.86ML Transferred to Settling Pond D
7/04/2024	7.83								3.08		3.08		0.00	3.08ML Transferred to Settling Pond D
8/04/2024	5.01		2.55		0.27						0.00		0.00	2.55 in from LNAR2 0.27 In SW2
9/04/2024	5.01										0.00		0.00	
10/04/2024	5.01										0.00		0.00	
11/04/2024	5.01										0.00		0.00	
12/04/2024	2.69		2.32								0.00		0.00	2.32ML Received LNAR2
13/04/2024	3.37								0.68		0.68		0.00	
14/04/2024	3.87				0.21				0.71		0.71		0.00	0.21 in SW2
15/04/2024	3.86				0.42				0.41		0.41		0.00	0.42 in SW2
16/04/2024	4.51								0.65		0.65		0.00	
17/04/2024	4.19		0.78						0.46		0.46		0.00	
18/04/2024	4.51								0.32		0.32		0.00	
19/04/2024	5.19								0.68		0.68		0.00	
20/04/2024	3.51				0.40	1.68			0.40		0.40		0.00	Received 0.4 SW2 Received 1.68 SHG1
21/04/2024	3.79					1.54			0.00		0.00		1.82	Received 1.54ML SHG1 Transerred 1.82 SW2
22/04/2024	4.18					1.75			0.35		0.35		1.79	Received 1.75ML SHG1 Transerred 1.79 SW2
23/04/2024	4.16				0.64	0.58			0.64		0.64		0.56	Received 0.58ML SHG1 Reveived 0.64 SW2 Transerred 0.56 SW2
24/04/2024	3.46				0.50	0.71			0.51		0.51		0.00	Received 0.71 Ml SHG1 Received 0.5ML SW2
25/04/2024	2.40				0.24	1.26			0.44		0.44		0.00	Received 1.26 Ml SHG1 Received 0.24ML SW2
26/04/2024	2.40				0.23				0.23		0.23		0.00	Received 0.23ML SW2
27/04/2024	2.25				0.56				0.41		0.41		0.00	Received 0.56ML SW2
28/04/2024	2.74								0.49		0.49		0.00	
29/04/2024	3.11								0.37		0.37		0.00	
30/04/2024	3.45								0.34		0.34		0.00	
1/05/2024	3.03			0.42							0.00		0.00	
2/05/2024	3.03										0.00		0.00	
3/05/2024	3.24								0.21		0.21		0.00	
4/05/2024	3.24										0.00		0.00	
5/05/2024	2.97					0.27					0.00		0.00	Received 0.27 SHG1
6/05/2024	2.38					0.59					0.00		0.00	Received 0.59 SHG1
7/05/2024	2.38										0.00		0.00	
8/05/2024	2.38										0.00		0.00	
9/05/2024	2.38										0.00		0.00	
10/05/2024	2.38										0.00		0.00	
11/05/2024	2.38										0.00		0.00	
12/05/2024	2.36					0.88					0.00		0.86	0.88 Received SHG1 Transferred 0.86 SW2
13/05/2024	2.67					0.63					0.00		0.94	0.63 Received SHG1 Transferred 0.94 SW2
14/05/2024	1.99					0.68					0.00		0.00	0.68 Received SHG1
15/05/2024	1.99										0.00		0.00	
16/05/2024	1.99										0.00		0.00	
17/05/2024	1.99										0.00		0.00	
18/05/2024	1.99										0.00		0.00	
19/05/2024	2.10								0.11		0.11		0.00	
20/05/2024	2.37								0.27		0.27		0.00	
21/05/2024	2.37										0.00		0.00	

ERM

LNAR4 **Operating Level - 18.5 ML**

Purpose: Staging pond for WCA, irrigation and storage for runoff from unlined areas

Colour Legend Instructions: Copy Formula | Enter Data | Enter Data

	FREEBOARD	INFLOWS						OUTFLOWS						
				Revised	Added	Added								
Date	Calculated (ML)	Transfers from LNAR5 (ML)	Transfers from LNAR2 (ML)	Transfers from Settling Ponds (ML)	Transfers from SW2 (ML)	Transfers from SHG1 (ML)	Adjustment (MONTHLY)	Volume to Evaps / Atomisers (ML)	Volume for Dust Suppression (incl Tanker) (ML)	Volume for WCA Ash Conditioning (ML)	Daily Total Volume Used at the Repository (ML)	Transfers to LNAR5 (ML)	Transfers to SW2 (ML)	Comments
22/05/2024	2.55			0.13					0.31		0.31		0.00	
23/05/2024	2.73			0.16					0.34		0.34		0.00	
24/05/2024	2.81			0.20					0.28		0.28		0.00	
25/05/2024	2.84			0.18					0.21		0.21		0.00	
26/05/2024	2.84										0.00		0.00	
27/05/2024	2.84			0.28					0.28		0.28		0.00	
28/05/2024	2.91			0.25					0.32		0.32		0.00	
29/05/2024	2.90			0.31					0.30		0.30		0.00	
30/05/2024	2.99			0.22					0.31		0.31		0.00	
31/05/2024	3.28								0.29		0.29		0.00	
1/06/2024	3.44								0.16		0.16		0.00	
2/06/2024	3.44										0.00		0.00	
3/06/2024	3.44										0.00		0.00	
4/06/2024	3.55								0.11		0.11		0.00	
5/06/2024	3.57				0.12				0.14		0.14			
6/06/2024	3.57										0.00			
7/06/2024	3.57										0.00			
8/06/2024	3.57										0.00			
9/06/2024	3.41				0.16						0.00			
10/06/2024	3.21					0.20					0.00			
11/06/2024	3.21										0.00			
12/06/2024	3.21										0.00			
13/06/2024	3.63				0.11				0.53		0.53			
14/06/2024	3.65				0.10				0.12		0.12			
15/06/2024	3.58				0.11				0.04		0.04			
16/06/2024	3.58										0.00			
17/06/2024	3.53				0.22				0.17		0.17			
18/06/2024	3.51				0.13				0.11		0.11			
19/06/2024	3.51										0.00			
20/06/2024	3.52				0.26				0.27		0.27			
21/06/2024	3.50				0.10				0.08		0.08			
22/06/2024	3.40				0.20				0.10		0.10			
23/06/2024	3.35				0.23				0.18		0.18			
24/06/2024	3.37				0.13				0.15		0.15			
25/06/2024	3.38				0.10				0.11		0.11			
26/06/2024	3.38				0.13				0.13		0.13			
27/06/2024	4.25								0.26		0.26		0.61	
28/06/2024	4.43								0.18		0.18			
29/06/2024	4.61								0.18		0.18			
30/06/2024	4.85								0.24		0.24			
1/07/2024	4.85										0.00			
2/07/2024	4.85										0.00			
3/07/2024	4.85										0.00			
4/07/2024	5.01									0.16	0.16			
5/07/2024	5.36									0.35	0.35			
6/07/2024	5.71									0.35	0.35			
7/07/2024	5.35			0.79						0.43	0.43			
8/07/2024	5.33			0.20		0.23				0.40	0.40			
9/07/2024	4.90			0.89						0.46	0.46			
10/07/2024	4.56			0.75						0.41	0.41			
11/07/2024	4.61			0.43						0.48	0.48			
12/07/2024	4.25			0.78						0.42	0.42			
13/07/2024	3.76			0.79	0.20				0.17	0.33	0.50			
14/07/2024	3.86			0.65						0.75	0.75			
15/07/2024	3.63			0.58	0.11				0.13	0.33	0.46			
16/07/2024	4.06									0.43	0.43			
17/07/2024	4.25			0.25						0.44	0.44			
18/07/2024	4.25										0.00			
19/07/2024	3.58			0.64	0.24				0.21		0.21			
20/07/2024	3.59			0.69							0.00		0.70	
21/07/2024	3.59										0.00			
22/07/2024	3.56				0.18				0.15		0.15			
23/07/2024	3.69								0.13		0.13			
24/07/2024	3.67				0.12				0.10		0.10			
25/07/2024	3.65				0.19				0.17		0.17			
26/07/2024	4.59								0.21		0.21		0.73	
27/07/2024	4.59										0.00			
28/07/2024	4.22				0.37						0.00			
29/07/2024	4.47								0.25		0.25			
30/07/2024	4.51				0.17				0.21		0.21			
31/07/2024	4.58				0.11				0.18		0.18			

LNAR4 **Operating Level - 18.5 ML**

Purpose: Staging pond for WCA, irrigation and storage for runoff from unlined areas

Colour Legend Instructions	Copy Formula	Enter Data	Enter Data

Date	FREEBOARD	INFLOWS						OUTFLOWS						Comments
				Revised	Added	Added								
	Calculated (ML)	Transfers from LNAR5 (ML)	Transfers from LNAR2 (ML)	Transfers from Settling Ponds (ML)	Transfers from SW2 (ML)	Transfers from SHG1 (ML)	Adjustment (MONTHLY)	Volume to Evaps / Atomisers (ML)	Volume for Dust Suppression (incl Tanker) (ML)	Volume for WCA Ash Conditioning (ML)	Daily Total Volume Used at the Repository (ML)	Transfers to LNAR5 (ML)	Transfers to SW2 (ML)	
1/08/2024	4.62				0.10				0.14		0.14			
2/08/2024	4.65				0.12				0.15		0.15			
3/08/2024	4.88								0.23		0.23			
4/08/2024	5.49								0.18		0.18		0.43	
5/08/2024	5.99								0.29		0.29		0.21	
6/08/2024	6.06				0.12				0.19		0.19			
7/08/2024	6.21								0.15		0.15			
8/08/2024	6.41								0.20		0.20			
9/08/2024	6.44				0.18				0.21		0.21			
10/08/2024	6.59								0.15		0.15			
11/08/2024	6.90								0.31		0.31			
12/08/2024	7.28								0.38		0.38			
13/08/2024	7.28										0.00			
14/08/2024	7.25						0.03				0.00			
15/08/2024	7.25										0.00			
16/08/2024	6.76			0.82						0.33	0.33			
17/08/2024	6.88									0.12	0.12			
18/08/2024	5.53			1.53					0.18		0.18			
19/08/2024	5.53										0.00			
20/08/2024	5.49				0.20				0.16		0.16			
21/08/2024	5.96								0.27		0.27		0.20	
22/08/2024	6.34								0.38		0.38			
23/08/2024	4.65			1.95					0.26		0.26			
24/08/2024	4.99								0.34		0.34			
25/08/2024	6.84								0.53		0.53		1.32	
26/08/2024	5.17			1.67							0.00			
27/08/2024	4.40			0.53	0.42				0.18		0.18			
28/08/2024	3.58			1.16					0.34		0.34			
29/08/2024	2.85			1.67					0.94		0.94			
30/08/2024	3.61								0.76		0.76			
31/08/2024	4.25			1.60					1.24		1.24		1.00	
1/09/2024	4.93								0.68		0.68			
2/09/2024	5.53			1.40					1.10		1.10		0.90	
3/09/2024	5.18			2.40	1.23				1.88		1.88		1.40	
4/09/2024	3.61			1.92					0.35		0.35			
5/09/2024	4.59								0.98		0.98			

ERM

LNAR5 Operating Level - 19ML

Purpose: Holds runoff from lined LNAR areas (salty runoff)

Colour Legend Instructions: Copy Formula | Enter Data | Enter Data

Added

	FREEBOARD	INFLOWS								OUTFLOWS							
Date	Calculated (ML)	Transfers from LNAR2 (ML)	Transfers from LNAR3 (ML)	Transfers from LNAR4 (ML)	Transfers from SW2 (ML)	Transfers from CT Basin (ML)	Transfers from Settling Ponds (ML)	Runoff/RSW from LNAR Lined Repository Areas	Adjustment (MONTHLY)	Volume to Evaps / Atomisers (ML)	Volume for Dust Suppression (incl Tanker) (ML)	LNAR Irrigation (ML)	Daily Total Volume Used at the Repository (ML)	Transfers to LNAR4 (ML)	Transfers to SW2 (ML)	Transfers to Settling Ponds (ML)	Comments
1/01/2024	3.30						2.08				0.79		1.01				
2/01/2024	4.30				0.14						0.93		1.14				
3/01/2024	5.07				0.18						0.71		0.95				
4/01/2024	3.45				0.05		1.62				0.05		0.05				
5/01/2024	3.58										0.13		0.13				
6/01/2024	0.93	2.65											0.00				
7/01/2024	1.61										0.68		0.68				
8/01/2024	1.29				0.89						0.57		0.57				
9/01/2024	1.29												0.00				
10/01/2024	1.82										0.53		0.53				
11/01/2024	2.31										0.49		0.49				
12/01/2024	2.88										0.57		0.57				
13/01/2024	1.77			1.57							0.46		0.46				
14/01/2024	1.90			0.44							0.57		0.57				
15/01/2024	0.68				1.39						0.17		0.17				
16/01/2024	0.68												0.00				
17/01/2024	0.68												0.00				
18/01/2024	1.28									0.28	0.32		0.60				
19/01/2024	-2.50	2.39			0.76		2.39			0.34	0.25		0.59			1.17	
20/01/2024	0.79				0.61					0.27	1.04		1.78		2.13		Internal Transfer to SW2
21/01/2024	-0.91	2.36			1.87					0.56	1.60		2.53				
22/01/2024	0.43				0.50					0.49	0.98		1.84				
23/01/2024	1.32				0.52					0.15	0.85		1.41				
24/01/2024	1.54				0.35						0.57		0.57				
25/01/2024	1.79				0.29						0.54		0.54				
26/01/2024	0.58				0.33		1.44				0.56		0.56				Transfer Received From Sett Pond B
27/01/2024	1.17										0.59		0.59				
28/01/2024	0.38						1.08				0.29		0.29				Transfer Received From Sett Pond B
29/01/2024	0.75										0.37		0.37				
30/01/2024	3.42									0.14	0.95		1.09		1.58		
31/01/2024	1.47						1.95						0.00				Transfer Received From Sett Pond B
1/02/2024	1.80				0.37					0.10	0.60		0.70				
2/02/2024	2.25				0.18					0.14	0.49		0.63				
3/02/2024	-0.32				0.31		3.39			0.20	0.93		1.13				Transfer Received From Sett Pond B
4/02/2024	1.14				0.38					0.61	1.23		1.84				
5/02/2024	0.40				0.38		3.30			0.74	1.38		2.12		0.82		
6/02/2024	0.77				0.41					0.35	0.43		0.78				
7/02/2024	3.59												0.00	2.82			2.82ML Sent To LNAR4
8/02/2024	5.75										0.18		0.18	1.98			1.98ML Sent To LNAR4
9/02/2024	5.88				0.26					0.13	0.26		0.39				
10/02/2024	9.06				0.33					0.11	0.52		0.63	2.88			2.88ML Sent To LNAR4
11/02/2024	9.26				0.38					0.12	0.46		0.58				
12/02/2024	9.55				0.22					0.15	0.36		0.51				
13/02/2024	12.22						1.07			0.41	0.47		0.88	1.26	1.60		1.26 Sent To LNAR4 1.07 Received from SPB - 1.6 Sent to SW2
14/02/2024	14.32				1.20					1.00	1.20		2.20		1.10		1.10 sent to SW2
15/02/2024	14.85				0.73					0.53	0.73		1.26				
16/02/2024	15.94									0.50	0.37		0.87		0.22		
17/02/2024	15.94												0.00				
18/02/2024	15.94												0.00				
19/02/2024	15.94												0.00				
20/02/2024	15.88								0.06				0.00				Significant Rain event
21/02/2024	15.88												0.00				
22/02/2024	15.88												0.00				
23/02/2024	16.03									0.15			0.15				
24/02/2024	17.13												0.00		1.10		
25/02/2024	17.45												0.00		0.32		
26/02/2024	16.85						0.77				0.17		0.17				
27/02/2024	17.48												0.00			0.63	0.63 Transferred to LNAR4
28/02/2024	17.48												0.00				
29/02/2024	17.48												0.00				
1/03/2024	17.48												0.00				
2/03/2024	17.48												0.00				
3/03/2024	17.48												0.00				
4/03/2024	17.48												0.00				
5/03/2024	17.48												0.00				
6/03/2024	17.48												0.00				
7/03/2024	17.48												0.00				
8/03/2024	17.48												0.00				
9/03/2024	17.48												0.00				
10/03/2024	17.48												0.00				
11/03/2024	17.48												0.00				
12/03/2024	17.48												0.00				
13/03/2024	18.81												0.00			1.33	1.33ML Internal Transfer to LNAR2
14/03/2024	18.81												0.00				
15/03/2024	18.81												0.00				
16/03/2024	18.81												0.00				
17/03/2024	18.76								0.05				0.00				
18/03/2024	18.76												0.00				
19/03/2024	18.76												0.00				
20/03/2024	18.72								0.04				0.00				
21/03/2024	18.72												0.00				
22/03/2024	18.72												0.00				
23/03/2024	18.72												0.00				
24/03/2024	18.72												0.00				
25/03/2024	18.72												0.00				
26/03/2024	18.72												0.00				
27/03/2024	18.72												0.00				
28/03/2024	18.72												0.00				
29/03/2024	18.72												0.00				
30/03/2024	18.72												0.00				
31/03/2024	18.72												0.00				
1/04/2024	18.72												0.00				
2/04/2024	18.72												0.00				
3/04/2024	18.72												0.00				

LNAR5 **Operating Level - 19ML**

Purpose: Holds runoff from lined LNAR areas (salty runoff)

Colour Legend Instructions: Copy Formula | Enter Data | Enter Data

	FREEBOARD	INFLOWS	Added							OUTFLOWS							
Date	Calculated (ML)	Transfers from LNAR2 (ML)	Transfers from LNAR3 (ML)	Transfers from LNAR4 (ML)	Transfers from SW2 (ML)	Transfers from CT Basin (ML)	Transfers from Settling Ponds (ML)	Runoff/RSW from LNAR Lined Repository Areas	Adjustment (MONTHLY)	Volume to Evaps / Atomisers (ML)	Volume for Dust Suppression (incl Tanker) (ML)	LNAR Irrigation (ML)	Daily Total Volume Used at the Repository (ML)	Transfers to LNAR4 (ML)	Transfers to SW2 (ML)	Transfers to Settling Ponds (ML)	Comments
4/04/2024	18.72												0.00				
5/04/2024	18.67								0.05				0.00				
6/04/2024	18.57								0.10				0.00				
7/04/2024	18.57												0.00				
8/04/2024	18.57												0.00				
9/04/2024	18.57												0.00				
10/04/2024	18.57												0.00				
11/04/2024	18.57												0.00				
12/04/2024	18.57												0.00				
13/04/2024	17.70							0.87					0.00				
14/04/2024	17.31							0.39					0.00				
15/04/2024	17.17							0.14					0.00				
16/04/2024	17.14							0.03					0.00				
17/04/2024	17.08							0.07					0.00				LNAR5 Continuous Circulation as Directed
18/04/2024	16.95							0.13					0.00				
19/04/2024	16.58							0.37					0.00				
20/04/2024	16.58												0.00				
21/04/2024	16.58												0.00				
22/04/2024	16.58												0.00				
23/04/2024	16.58												0.00				
24/04/2024	16.58												0.00				
25/04/2024	16.58												0.00				
26/04/2024	16.58												0.00				
27/04/2024	16.58												0.00				
28/04/2024	16.58												0.00				
29/04/2024	16.58												0.00				
30/04/2024	16.58												0.00				Pond Recirculating for Floccing As Directed
1/05/2024	17.12												0.00			0.54	0.54 Transferred Sett Pond D Overnight As Directed
2/05/2024	17.63												0.00			0.51	0.51 Transferred Sett Pond D Overnight As Directed
3/05/2024	17.92												0.00			0.29	0.29 Transferred Sett Pond D Overnight As Directed
4/05/2024	17.92												0.00				
5/05/2024	17.92												0.00				
6/05/2024	17.31							0.61					0.00				Received 0.61 RSW
7/05/2024	16.97							0.34					0.00				
8/05/2024	16.97												0.00				
9/05/2024	16.97												0.00				
10/05/2024	16.93							0.04					0.00				0.035 Transferred in RSW
11/05/2024	16.93												0.00				
12/05/2024	16.77							0.16					0.00				0.16 Transferred RSW
13/05/2024	16.77												0.00				
14/05/2024	16.68							0.10					0.00				0.098 Received RSW
15/05/2024	16.68												0.00				
16/05/2024	16.68												0.00				
17/05/2024	14.45	1.70	0.53										0.00				1.7ML Transferred LNAR2 to 5
18/05/2024	13.23	1.22											0.00				1.22ML Transferred LNAR2 to 5
19/05/2024	11.13	2.10											0.00				2.1ML Transferred LNAR2 to 5
20/05/2024	11.13												0.00				
21/05/2024	12.87												0.00			1.74	1.74ML Transferred to SPD as Directed
22/05/2024	14.89												0.00			2.02	2.02ML Transferred to SPD as Directed
23/05/2024	16.99												0.00			2.1	2.1ML Transferred to SPD as Directed
24/05/2024	16.99												0.00				0.52ML Received LNAR3
25/05/2024	14.73		0.52				1.74						0.00				1.74ML Received SPA
26/05/2024	13.57						1.16						0.00				1.16ML Received SPA
27/05/2024	11.44						2.13						0.00				2.13ML Received SPA
28/05/2024	11.44												0.00				Pond Circulating
29/05/2024	13.31												0.00			1.87	1.87ML Transferred to SPD
30/05/2024	15.25												0.00			1.94	1.94ML Transferred to SPD
31/05/2024	16.46							0.51					0.00			1.72	1.72ML Transferred to SPD Received 0.51ML from RSW
1/06/2024	16.46												0.00				
2/06/2024	16.34							0.12					0.00				
3/06/2024	16.23							0.11					0.00				
4/06/2024	16.23												0.00				
5/06/2024	16.23												0.00				
6/06/2024	13.54						2.54	0.15					0.00				
7/06/2024	12.12						1.22	0.20					0.00				
8/06/2024	11.17						0.95						0.00				
9/06/2024	10.84						0.33						0.00				
10/06/2024	10.84												0.00				
11/06/2024	10.84												0.00				
12/06/2024	10.84												0.00				
13/06/2024	13.06												0.00			2.22	
14/06/2024	13.28												0.00			0.22	Issue with LNAR5 pumpset
15/06/2024	14.43												0.00			1.15	
16/06/2024	16.39												0.00			1.96	
17/06/2024	14.41	1.49					0.49						0.00				
18/06/2024	10.99						3.42						0.00				
19/06/2024	10.69		0.30										0.00				Pond Circulated Post Transfer
20/06/2024	13.96												0.00			3.27	LNAR5 to D Transfer Continuing
21/06/2024	16.39												0.00			2.43	LNAR5 to D Transfer Complete
22/06/2024	14.64						1.75						0.00				
23/06/2024	11.87						2.77						0.00				
24/06/2024	11.25						0.62						0.00				
25/06/2024	11.25												0.00				Pond Circulated and Tested
26/06/2024	10.74		0.51										0.00				Pond Circulated Post Transfer
27/06/2024	10.74												0.00				
28/06/2024	10.92												0.00			0.185	Transfer Stopped
29/06/2024	10.92												0.00				
30/06/2024	10.87								0.05				0.00				
1/07/2024	10.74							0.13					0.00				
2/07/2024	10.74												0.00				
3/07/2024	10.74												0.00				
4/07/2024	10.74												0.00				
5/07/2024	10.74												0.00				
6/07/2024	10.63							0.11					0.00				

ERM

LNAR5 Operating Level - 19ML

Purpose: Holds runoff from lined LNAR areas (salty runoff)

Colour Legend Instructions | Copy Formula | Enter Data | Enter Data

Added

	FREEBOARD	INFLOWS								OUTFLOWS							
Date	Calculated (ML)	Transfers from LNAR2 (ML)	Transfers from LNAR3 (ML)	Transfers from LNAR4 (ML)	Transfers from SW2 (ML)	Transfers from CT Basin (ML)	Transfers from Settling Ponds (ML)	Runoff/RSW from LNAR Lined Repository Areas	Adjustment (MONTHLY)	Volume to Evaps / Atomisers (ML)	Volume for Dust Suppression (incl Tanker) (ML)	LNAR Irrigation (ML)	Daily Total Volume Used at the Repository (ML)	Transfers to LNAR4 (ML)	Transfers to SW2 (ML)	Transfers to Settling Ponds (ML)	Comments
7/07/2024	10.63												0.00				
8/07/2024	10.63												0.00				
9/07/2024	10.40							0.23					0.00				
10/07/2024	10.40												0.00				
11/07/2024	10.40												0.00				
12/07/2024	10.40												0.00				
13/07/2024	10.40												0.00				
14/07/2024	10.40												0.00				
15/07/2024	10.40												0.00				
16/07/2024	10.40												0.00				
17/07/2024	10.40																
18/07/2024	10.40																
19/07/2024	10.40																
20/07/2024	10.40																
21/07/2024	10.40																
22/07/2024	10.40																
23/07/2024	10.40																
24/07/2024	10.40																Pond Circulated
25/07/2024	10.40																
26/07/2024	10.26							0.22	0.10							0.18	1 Hr Transfer to SPD as Directed
27/07/2024	10.62															0.36	2 X 1Hr Transfer SPD
28/07/2024	10.54							0.19	0.24							0.35	2 X 1Hr Transfer SPD
29/07/2024	10.90															0.36	2X 1Hr Transfer SPD
30/07/2024	11.24															0.34	2X 1Hr Transfer SPD
31/07/2024	11.60															0.36	2X 1Hr Transfer SPD
1/08/2024	11.96															0.36	2X 1Hr Transfer SPD
2/08/2024	12.32															0.36	2X 1Hr Transfer SPD
3/08/2024	12.68															0.36	2X 1Hr Transfer SPD
4/08/2024	12.68																Transfers stopped as directed
5/08/2024	12.68																Transfers stopped as directed
6/08/2024	12.68																
7/08/2024	12.68																
8/08/2024	12.68																
9/08/2024	12.68																
10/08/2024	12.68																
11/08/2024	12.68																
12/08/2024	12.68																
13/08/2024	12.84															0.16	
14/08/2024	13.00								0.03							0.18	
15/08/2024	12.94								0.24							0.18	
16/08/2024	13.00								0.28							0.34	
17/08/2024	12.93								0.25							0.18	
18/08/2024	12.73								0.20								
19/08/2024	12.73																
20/08/2024	11.66								1.43							0.36	
21/08/2024	11.84															0.18	1 Hr Transfer Complete
22/08/2024	12.02															0.18	1 Hr Transfer Complete
23/08/2024	12.02																
24/08/2024	12.20															0.18	1 HR Transfer Complete
25/08/2024	12.20																
26/08/2024	12.20																
27/08/2024	12.16								0.22							0.18	1 Hr Transfer Complete
28/08/2024	12.24								0.10							0.18	1 Hr Transfer Complete
29/08/2024	12.37								0.14							0.27	1.5Hr Transfer Complete
30/08/2024	12.62															0.25	1.5Hr Transfer Complete
31/08/2024	12.89															0.27	1.5Hr Transfer Complete
1/09/2024	12.89																
2/09/2024	12.89																
3/09/2024	12.89																
4/09/2024	12.89																
5/09/2024	12.89																

ASH CONDITIONING SUMMARY

Colour Legend Instructions	Copy Formula	Enter Data	Enter Data

Date	WCA				BCA			
	From LNAR5 (ML)	From Settling Ponds (ML)	CT Basin (ML)	Total (kL)	From LNAR3 (ML)	From Waste Pond A (ML)	From Waste Pond B (ML)	TOTAL (kL)
1/09/2023				0		0.420		420
2/09/2023				0		0.372		372
3/09/2023				0		0.469		469
4/09/2023				0		0.508		508
5/09/2023				0		0.467		467
6/09/2023				0		0.559		559
7/09/2023				0		0.389		389
8/09/2023				0		0.397		397
9/09/2023				0		0.260		260
10/09/2023				0		0.429		429
11/09/2023				0		0.483		483
12/09/2023				0		0.468		468
13/09/2023				0		0.438		438
14/09/2023				0		0.417		417
15/09/2023				0		0.351		351
16/09/2023				0		0.380		380
17/09/2023				0		0.268		268
18/09/2023				0		0.306		306
19/09/2023				0		0.360		360
20/09/2023				0		0.278		278
21/09/2023				0		0.227		227
22/09/2023				0		0.324		324
23/09/2023				0		0.224		224
24/09/2023				0		0.459		459
25/09/2023				0		0.400		400
26/09/2023				0		0.000	0.360	360
27/09/2023				0		0.000	0.289	289
28/09/2023				0		0.000	0.240	240
29/09/2023				0		0.000	0.216	216
30/09/2023			0.226	226		0.000		0
1/10/2023			0.225	225		0.000		0
2/10/2023			0.362	362		0.000		0
3/10/2023			0.368	368		0.000		0
4/10/2023			0.158	158		0.000		0
5/10/2023			0.328	328		0.000		0
6/10/2023			0.426	426		0.000		0
7/10/2023			0.331	331		0.000		0
8/10/2023			0.359	359		0.000		0
9/10/2023			0.338	338		0.000		0
10/10/2023			0.301	301		0.000		0
11/10/2023			0.190	190		0.000		0
12/10/2023			0.179	179		0.000		0
13/10/2023			0.135	135		0.000		0
14/10/2023				0		0.087		87
15/10/2023				0		0.138		138
16/10/2023				0		0.271		271
17/10/2023				0		0.284		284
18/10/2023			0.125	125				0
19/10/2023			0.000	0				0
20/10/2023			0.163	163				0
21/10/2023			0.215	215				0
22/10/2023			0.328	328				0
23/10/2023			0.200	200				0
24/10/2023			0.219	219				0
25/10/2023			0.261	261				0
26/10/2023			0.217	217				0
27/10/2023			0.218	218				0
28/10/2023			0.222	222				0
29/10/2023			0.315	315				0
30/10/2023			0.388	388				0
31/10/2023			0.188	188				0
1/11/2023			0.267	267				0
2/11/2023			0.301	301				0
3/11/2023			0.236	236				0
4/11/2023			0.269	269				0
5/11/2023			0.356	356				0
6/11/2023			0.245	245				0
7/11/2023			0.263	263				0
8/11/2023			0.000	0		0.137		137
9/11/2023			0.000	0		0.251		251
10/11/2023			0.366	366		0.000		0
11/11/2023			0.285	285		0.000		0

ASH CONDITIONING SUMMARY

Colour Legend Instructions	Copy Formula	Enter Data	Enter Data

Date	WCA				BCA			
	From LNAR5 (ML)	From Settling Ponds (ML)	CT Basin (ML)	Total (kL)	From LNAR3 (ML)	From Waste Pond A (ML)	From Waste Pond B (ML)	TOTAL (kL)
12/11/2023			0.434	434		0.000		0
13/11/2023			0.472	472		0.000		0
14/11/2023			0.373	373		0.000		0
15/11/2023			0.198	198		0.000		0
16/11/2023			0.158	158		0.000		0
17/11/2023			0.000	0		0.121		121
18/11/2023			0.000	0		0.167		167
19/11/2023			0.000	0		0.313		313
20/11/2023			0.000	0		0.156		156
21/11/2023			0.000	0		0.254		254
22/11/2023			0.000	0		0.247		247
23/11/2023			0.000	0		0.258		258
24/11/2023			0.000	0		0.157		157
25/11/2023			0.000	0		0.163		163
26/11/2023			0.000	0		0.179		179
27/11/2023			0.000	0		0.319		319
28/11/2023			0.000	0		0.112		112
29/11/2023			0.000	0		0.456		456
30/11/2023			0.000	0		0.381		381
1/12/2023			0.000	0		0.459		459
2/12/2023			0.000	0		0.480		480
3/12/2023			0.000	0		0.412		412
4/12/2023			0.000	0		0.452		452
5/12/2023			0.000	0		0.319		319
6/12/2023			0.000	0		0.352		352
7/12/2023			0.000	0		0.401		401
8/12/2023		0.299	0.000	299				0
9/12/2023			0.000	0		0.415		415
10/12/2023			0.000	0		0.496		496
11/12/2023			0.000	0		0.523		523
12/12/2023			0.000	0		0.423		423
13/12/2023			0.000	0				0
14/12/2023			0.000	0		0.274		274
15/12/2023			0.000	0		0.000		0
16/12/2023			0.000	0		0.271		271
17/12/2023			0.000	0		0.190		190
18/12/2023			0.000	0		0.357		357
19/12/2023			0.000	0		0.297		297
20/12/2023	0.15		0.000	150				0
21/12/2023	0.10		0.000	97				0
22/12/2023	0.00		0.000	0		0.108		108
23/12/2023	0.16		0.000	160				0
24/12/2023	0.25		0.000	250				0
25/12/2023	0.33		0.000	330				0
26/12/2023	0.18		0.000	183				0
27/12/2023	0.15		0.000	151				0
28/12/2023	0.36		0.000	356				0
29/12/2023	0.24		0.000	243				0
30/12/2023	0.21		0.000	213				0
31/12/2023	0.22		0.000	220				0
1/01/2024	0.21		0.000	210				0
2/01/2024	0.24		0.000	237				0
3/01/2024			0.000	0		0.263		263
4/01/2024			0.000	0		0.311		311
5/01/2024			0.000	0		0.380		380
6/01/2024			0.000	0		0.421		421
7/01/2024			0.000	0		0.306		306
8/01/2024			0.000	0		0.389		389
9/01/2024			0.000	0		0.336		336
10/01/2024			0.341	341		0.000		0
11/01/2024			0.329	329		0.000		0
12/01/2024			0.348	348		0.000		0
13/01/2024			0.000	0		0.371		371
14/01/2024			0.000	0		0.387		387
15/01/2024			0.000	0		0.502		502
16/01/2024			0.000	0		0.317		317
17/01/2024			0.000	0		0.386		386
18/01/2024			0.000	0		0.070		70
19/01/2024	0.47		0.000	467		0.000		0
20/01/2024	0.37		0.000	370		0.000		0
21/01/2024	0.37		0.000	368		0.000		0
22/01/2024	0.41		0.000	408		0.000		0

ERM

ASH CONDITIONING SUMMARY

Colour Legend Instructions	Copy Formula	Enter Data	Enter Data

Date	WCA				BCA			
	From LNAR5 (ML)	From Settling Ponds (ML)	CT Basin (ML)	Total (kL)	From LNAR3 (ML)	From Waste Pond A (ML)	From Waste Pond B (ML)	TOTAL (kL)
23/01/2024	0.00		0.000	0		0.337		337
24/01/2024	0.00		0.000	0		0.224		224
25/01/2024	0.00		0.000	0		0.123		123
26/01/2024	0.00		0.000	0		0.500		500
27/01/2024	0.00		0.000	0		0.447		447
28/01/2024	0.00		0.000	0		0.408		408
29/01/2024	0.00		0.000	0		0.462		462
30/01/2024	0.00		0.000	0		0.363		363
31/01/2024	0.00		0.000	0		0.348		348
1/02/2024	0.00		0.000	0		0.330		330
2/02/2024	0.00		0.000	0		0.353		353
3/02/2024	0.00		0.000	0		0.376		376
4/02/2024	0.00		0.000	0		0.361		361
5/02/2024	0.00		0.000	0		0.404		404
6/02/2024	0.00		0.000	0		0.341		341
7/02/2024	0.00		0.000	0		0.360		360
8/02/2024	0.00		0.000	0		0.304		304
9/02/2024	0.00		0.000	0		0.233		233
10/02/2024	0.00		0.000	0		0.263		263
11/02/2024	0.00		0.000	0		0.313		313
12/02/2024	0.00		0.000	0		0.372		372
13/02/2024	0.00		0.000	0		0.397		397
14/02/2024	0.00		0.000	0		0.378		378
15/02/2024	0.00	0.370	0.000	370		0.000		0
16/02/2024	0.00	0.482	0.000	482		0.000		0
17/02/2024	0.00	0.416	0.000	416		0.000		0
18/02/2024	0.00	0.547	0.000	547		0.000		0
19/02/2024	0.00	0.541	0.000	541		0.000		0
20/02/2024	0.00	0.168	0.000	168		0.448		448
21/02/2024	0.00		0.000	0		0.446		446
22/02/2024	0.00		0.000	0		0.456		456
23/02/2024	0.00		0.000	0		0.403		403
24/02/2024	0.00		0.000	0		0.373		373
25/02/2024	0.00		0.000	0		0.623		623
26/02/2024	0.00		0.000	0		0.438		438
27/02/2024	0.00		0.000	0		0.470		470
28/02/2024	0.00	0.353	0.000	353		0.000		0
29/02/2024	0.00	0.415	0.000	415		0.000		0
1/03/2024	0.00	0.316	0.000	316		0.000		0
2/03/2024	0.00	0.000	0.000	0		0.000		0
3/03/2024	0.00	0.346	0.000	346		0.000		0
4/03/2024	0.00	0.518	0.000	518		0.000		0
5/03/2024	0.00	0.509	0.000	509		0.000		0
6/03/2024	0.00	0.506	0.000	506		0.000		0
7/03/2024	0.00	0.452	0.000	452		0.000		0
8/03/2024	0.00	0.000	0.000	0		0.436		436
9/03/2024	0.00	0.000	0.000	0		0.362		362
10/03/2024	0.00	0.000	0.000	0		0.556		556
11/03/2024	0.00	0.000	0.000	0		0.459		459
12/03/2024	0.00	0.000	0.000	0		0.510		510
13/03/2024	0.39	0.000	0.000	387		0.000		0
14/03/2024	0.00	0.338	0.000	338		0.000		0
15/03/2024	0.00	0.386	0.000	386		0.000		0
16/03/2024	0.00	0.000	0.000	0		0.353		353
17/03/2024	0.00	0.000	0.000	0		0.391		391
18/03/2024	0.00	0.000	0.000	0		0.471		471
19/03/2024	0.00	0.000	0.000	0		0.329		329
20/03/2024	0.00	0.000	0.000	0		0.330		330
21/03/2024	0.00	0.000	0.000	0		0.352		352
22/03/2024	0.00	0.000	0.000	0		0.412		412
23/03/2024	0.00	0.000	0.000	0		0.284		284
24/03/2024	0.00	0.000	0.000	0		0.393		393
25/03/2024	0.00	0.000	0.000	0		0.477		477
26/03/2024	0.00	0.188	0.000	188		0.000		0
27/03/2024	0.00	0.084	0.000	84		0.000		0
28/03/2024	0.00	0.000	0.000	0		0.378		378
29/03/2024	0.00	0.000	0.000	0		0.294		294
30/03/2024	0.00	0.000	0.000	0		0.387		387
31/03/2024	0.00	0.000	0.000	0		0.514		514
1/04/2024	0.00	0.000	0.000	0		0.443		443
2/04/2024	0.00	0.000	0.000	0		0.565		565
3/04/2024	0.00	0.000	0.000	0		0.299		299

ASH CONDITIONING SUMMARY

Colour Legend Instructions	Copy Formula	Enter Data	Enter Data

Date	WCA				BCA			
	From LNAR5 (ML)	From Settling Ponds (ML)	CT Basin (ML)	Total (kL)	From LNAR3 (ML)	From Waste Pond A (ML)	From Waste Pond B (ML)	TOTAL (kL)
4/04/2024	0.00	0.000	0.000	0		0.283		283
5/04/2024	0.00	0.000	0.000	0		0.367		367
6/04/2024	0.00	0.000	0.000	0		0.358		358
7/04/2024	0.00	0.000	0.000	0		0.357		357
8/04/2024	0.00	0.000	0.000	0		0.561		561
9/04/2024	0.00	0.000	0.000	0		0.456		456
10/04/2024	0.00	0.000	0.000	0		0.414		414
11/04/2024	0.00	0.000	0.000	0		0.344		344
12/04/2024	0.00	0.000	0.000	0		0.447		447
13/04/2024	0.00	0.000	0.000	0		0.349		349
14/04/2024	0.00	0.000	0.000	0		0.502		502
15/04/2024	0.00	0.000	0.000	0		0.537		537
16/04/2024	0.00	0.000	0.000	0		0.531		531
17/04/2024	0.00	0.000	0.000	0		0.351		351
18/04/2024	0.00	0.000	0.000	0		0.278		278
19/04/2024	0.00	0.000	0.000	0		0.350		350
20/04/2024	0.00	0.000	0.000	0		0.486		486
21/04/2024	0.00	0.000	0.000	0		0.339		339
22/04/2024	0.00	0.186	0.000	186		0.552		552
23/04/2024	0.00	0.306	0.000	306		0.000		0
24/04/2024	0.00	0.326	0.000	326		0.000		0
25/04/2024	0.00	0.239	0.000	0		0.000		0
26/04/2024	0.00	0.385	0.000	385		0.000		0
27/04/2024	0.00	0.386	0.000	386		0.000		0
28/04/2024	0.00	0.423	0.000	423		0.000		0
29/04/2024	0.00	0.450	0.000	450		0.000		0
30/04/2024	0.00	0.365	0.000	365		0.000		0
1/05/2024	0.00	0.420	0.000	420		0.000		0
2/05/2024	0.00	0.405	0.000	405		0.000		0
3/05/2024	0.00	0.430	0.000	430		0.000		0
4/05/2024	0.00	0.416	0.000	416		0.000		0
5/05/2024	0.00		0.000	0		0.511		511
6/05/2024	0.00		0.000	0		0.494		494
7/05/2024	0.00		0.000	0		0.503		503
8/05/2024	0.00		0.000	0		0.522		522
9/05/2024	0.00		0.000	0		0.439		439
10/05/2024	0.00		0.000	0		0.450		450
11/05/2024	0.00	0.116	0.000	116		0.432		432
12/05/2024	0.00		0.000	0		0.450		450
13/05/2024	0.00		0.000	0		0.476		476
14/05/2024	0.00		0.000	0		0.376		376
15/05/2024	0.00		0.000	0		0.384		384
16/05/2024	0.00		0.000	0		0.393		393
17/05/2024	0.00		0.000	0		0.384		384
18/05/2024	0.00		0.000	0		0.359		359
19/05/2024	0.00		0.000	0		0.384		384
20/05/2024	0.00		0.000	0		0.429		429
21/05/2024	0.00		0.000	0		0.381		381
22/05/2024	0.00		0.000	0		0.371		371
23/05/2024	0.00		0.000	0		0.341		341
24/05/2024	0.00		0.000	0		0.348		348
25/05/2024	0.00		0.000	0		0.468		468
26/05/2024	0.00		0.000	0		0.445		445
27/05/2024	0.00		0.000	0		0.466		466
28/05/2024	0.00		0.000	0		0.399		399
29/05/2024	0.00	0.374	0.000	374		0.000		0
30/05/2024	0.00	0.362	0.000	362		0.000		0
31/05/2024	0.00	0.148	0.000	148		0.000		0
1/06/2024	0.00	0.000	0.000	0		0.142		142
2/06/2024	0.00	0.000	0.000	0		0.459		459
3/06/2024	0.00	0.000	0.000	0		0.395		395
4/06/2024	0.00	0.000	0.000	0		0.360		360
5/06/2024				0		0.313		313
6/06/2024				0		0.242		242
7/06/2024				0		0.308		308
8/06/2024				0		0.308		308
9/06/2024		0.220		220		0.402		402
10/06/2024				0		0.448		448
11/06/2024				0		0.500		500
12/06/2024				0		0.504		504
13/06/2024				0		0.261		261
14/06/2024				0		0.309		309

ASH CONDITIONING SUMMARY

Colour Legend Instructions	Copy Formula	Enter Data	Enter Data

Date	WCA				BCA			
	From LNAR5 (ML)	From Settling Ponds (ML)	CT Basin (ML)	Total (kL)	From LNAR3 (ML)	From Waste Pond A (ML)	From Waste Pond B (ML)	TOTAL (kL)
15/06/2024				0		0.451		451
16/06/2024		0.351		351		0.413		413
17/06/2024				0		0.465		465
18/06/2024				0		0.421		421
19/06/2024				0		0.281		281
20/06/2024				0		0.217		217
21/06/2024				0		0.180		180
22/06/2024				0		0.258		258
23/06/2024				0		0.374		374
24/06/2024				0		0.305		305
25/06/2024				0		0.324		324
26/06/2024				0		0.652		652
27/06/2024				0		0.410		410
28/06/2024				0		0.433		433
29/06/2024				0		0.344		344
30/06/2024				0		0.471		471
1/07/2024				0		0.463		463
2/07/2024				0		0.470		470
3/07/2024				0		0.423		423
4/07/2024		0.163		163		0.338		338
5/07/2024		0.351		351				0
6/07/2024		0.350		350				0
7/07/2024		0.434		434				0
8/07/2024		0.404		404				0
9/07/2024		0.460		460		0.127		127
10/07/2024		0.416		416				0
11/07/2024		0.484		484				0
12/07/2024		0.420		420				0
13/07/2024		0.326		326		0.175		175
14/07/2024		0.749		749				0
15/07/2024		0.332		332		0.384		384
16/07/2024		0.427		427				0
17/07/2024		0.439		439				0
18/07/2024				0		0.424		424
19/07/2024				0		0.210		210
20/07/2024				0		0.222		222
21/07/2024				0		0.269		269
22/07/2024				0		0.119		119
23/07/2024				0		0.255		255
24/07/2024				0		0.193		193
25/07/2024				0		0.123		123
26/07/2024				0		0.063		63
27/07/2024				0		0.241		241
28/07/2024				0		0.277		277
29/07/2024				0		0.472		472
30/07/2024				0		0.587		587
31/07/2024				0		0.387		387
1/08/2024				0		0.446		446
2/08/2024				0		0.454		454
3/08/2024				0		0.576		576
4/08/2024				0		0.436		436
5/08/2024				0		0.467		467
6/08/2024				0		0.864		864
7/08/2024				0		0.572		572
8/08/2024				0		0.426		426
9/08/2024				0		0.460		460
10/08/2024				0		0.452		452
11/08/2024				0		0.537		537
12/08/2024				0		0.444		444
13/08/2024				0		0.774		774
14/08/2024				0		0.375		375
15/08/2024				0		0.757		757
16/08/2024	0.33			328		0.757		757
17/08/2024	0.12			120		0.614		614
18/08/2024				0		0.721		721
19/08/2024				0		0.292		292
20/08/2024				0		0.434		434
21/08/2024				0		0.528		528
22/08/2024				0		0.330		330
23/08/2024				0		0.402		402
24/08/2024				0		0.338		338
25/08/2024				0		0.341		341

ERM

ASH CONDITIONING SUMMARY

Colour Legend Instructions	Copy Formula	Enter Data	Enter Data

Date	WCA				BCA			
	From LNAR5 (ML)	From Settling Ponds (ML)	CT Basin (ML)	Total (kL)	From LNAR3 (ML)	From Waste Pond A (ML)	From Waste Pond B (ML)	TOTAL (kL)
26/08/2024				0		0.323		323
27/08/2024				0		0.360		360
28/08/2024				0		0.310		310
29/08/2024				0		0.296		296
30/08/2024				0		0.363		363
31/08/2024				0		0.325		325
1/09/2024				0		0.298		298
2/09/2024				0		0.271		271
3/09/2024				0		0.318		318
4/09/2024				0		0.341		341
5/09/2024				0		0.350		350

Rainfall

Date	Daily Rainfall (MM)
1/01/2024	
2/01/2024	
3/01/2024	
4/01/2024	
5/01/2024	
6/01/2024	
7/01/2024	
8/01/2024	
9/01/2024	
10/01/2024	
11/01/2024	16.5
12/01/2024	0.0
13/01/2024	0.0
14/01/2024	0.0
15/01/2024	4.0
16/01/2024	2.0
17/01/2024	2.0
18/01/2024	62.0
19/01/2024	0.0
20/01/2024	0.0
21/01/2024	0.0
22/01/2024	0.0
23/01/2024	0.0
24/01/2024	0.0
25/01/2024	0.0
26/01/2024	0.0
27/01/2024	0.0
28/01/2024	0.0
29/01/2024	0.0
30/01/2024	0.0
31/01/2024	0.0
1/02/2024	4.0
2/02/2024	0.0
3/02/2024	0.0
4/02/2024	0.0
5/02/2024	0.0
6/02/2024	33.4
7/02/2024	4.5
8/02/2024	0.5
9/02/2024	0.0
10/02/2024	0.0
11/02/2024	0.0
12/02/2024	0.0
13/02/2024	1.0
14/02/2024	3.0
15/02/2024	5.0
16/02/2024	0.0
17/02/2024	1.8
18/02/2024	0.0
19/02/2024	1.6
20/02/2024	19.0
21/02/2024	2.0
22/02/2024	0.0
23/02/2024	0.0
24/02/2024	0.0
25/02/2024	0.0
26/02/2024	0.0
27/02/2024	0.0
28/02/2024	0.0
29/02/2024	8.4
1/03/2024	0.1
2/03/2024	0.0
3/03/2024	1.0
4/03/2024	0.0
5/03/2024	0.0
6/03/2024	0.0
7/03/2024	0.0
8/03/2024	1.0

ERM

Rainfall

Date	Daily Rainfall (MM)
9/03/2024	0.0
10/03/2024	0.0
11/03/2024	0.0
12/03/2024	0.0
13/03/2024	0.0
14/03/2024	0.0
15/03/2024	1.0
16/03/2024	1.0
17/03/2024	15.0
18/03/2024	1.0
19/03/2024	13.5
20/03/2024	0.0
21/03/2024	1.5
22/03/2024	0.0
23/03/2024	0.0
24/03/2024	3.5
25/03/2024	0.0
26/03/2024	0.0
27/03/2024	0.0
28/03/2024	0.0
29/03/2024	0.0
30/03/2024	0.0
31/03/2024	0.0
1/04/2024	0.0
2/04/2024	0.0
3/04/2024	12.5
4/04/2024	0.0
5/04/2024	20.0
6/04/2024	76.0
7/04/2024	0.0
8/04/2024	0.0
9/04/2024	0.0
10/04/2024	4.6
11/04/2024	0.0
12/04/2024	0.0
13/04/2024	0.0
14/04/2024	0.0
15/04/2024	0.0
16/04/2024	0.0
17/04/2024	0.0
18/04/2024	0.0
19/04/2024	0.0
20/04/2024	1.0
21/04/2024	2.0
22/04/2024	0.0
23/04/2024	0.0
24/04/2024	0.0
25/04/2024	0.0
26/04/2024	0.0
27/04/2024	0.0
28/04/2024	0.0
29/04/2024	0.0
30/04/2024	0.0
1/05/2024	4.0
2/05/2024	0.5
3/05/2024	0.4
4/05/2024	2.0
5/05/2024	12.0
6/05/2024	11.0
7/05/2024	3.4
8/05/2024	0.6
9/05/2024	0.5
10/05/2024	0.2
11/05/2024	3.5
12/05/2024	11.2
13/05/2024	0.5
14/05/2024	0.0
15/05/2024	0.0

ERM

Rainfall

Date	Daily Rainfall (MM)
16/05/2024	0.0
17/05/2024	0.0
18/05/2024	0.0
19/05/2024	0.0
20/05/2024	0.0
21/05/2024	0.0
22/05/2024	0.0
23/05/2024	0.0
24/05/2024	0.0
25/05/2024	0.0
26/05/2024	0.0
27/05/2024	0.0
28/05/2024	0.0
29/05/2024	0.0
30/05/2024	0.0
31/05/2024	0.0
1/06/2024	9.6
2/06/2024	7.4
3/06/2024	1.2
4/06/2024	0.0
5/06/2024	0.0
6/06/2024	5.4
7/06/2024	16.4
8/06/2024	4.0
9/06/2024	
10/06/2024	
11/06/2024	
12/06/2024	
13/06/2024	7.0
14/06/2024	1.7
15/06/2024	
16/06/2024	
17/06/2024	
18/06/2024	
19/06/2024	
20/06/2024	
21/06/2024	
22/06/2024	
23/06/2024	
24/06/2024	0.8
25/06/2024	
26/06/2024	
27/06/2024	
28/06/2024	
29/06/2024	
30/06/2024	16.6
1/07/2024	
2/07/2024	1.2
3/07/2024	1.5
4/07/2024	3.0
5/07/2024	0.8
6/07/2024	1.8
7/07/2024	
8/07/2024	
9/07/2024	6.2
10/07/2024	0.2
11/07/2024	0.4
12/07/2024	
13/07/2024	
14/07/2024	
15/07/2024	
16/07/2024	1.0
17/07/2024	0.6
18/07/2024	
19/07/2024	
20/07/2024	3.6
21/07/2024	
22/07/2024	

ERM

Rainfall

Date	Daily Rainfall (MM)
23/07/2024	
24/07/2024	
25/07/2024	
26/07/2024	15.8
27/07/2024	
28/07/2024	10.6
29/07/2024	
30/07/2024	
31/07/2024	
1/08/2024	
2/08/2024	
3/08/2024	
4/08/2024	
5/08/2024	
6/08/2024	
7/08/2024	
8/08/2024	
9/08/2024	
10/08/2024	1.0
11/08/2024	
12/08/2024	
13/08/2024	3.2
14/08/2024	7.6
15/08/2024	1.6
16/08/2024	0.2
17/08/2024	4.3
18/08/2024	
19/08/2024	
20/08/2024	
21/08/2024	
22/08/2024	
23/08/2024	
24/08/2024	
25/08/2024	2.0
26/08/2024	9.0
27/08/2024	
28/08/2024	
29/08/2024	
30/08/2024	
31/08/2024	
1/09/2024	
2/09/2024	
3/09/2024	
4/09/2024	
5/09/2024	

ERM

APA Receival Bin Sump

Date	Flow to SPB/SPC (ML)	Flowing into SPB/SPC
28/05/2023		
29/05/2023		
30/05/2023		
31/05/2023		
1/06/2023		
2/06/2023		
3/06/2023		
4/06/2023		
5/06/2023		
6/06/2023		
7/06/2023		
8/06/2023		
9/06/2023		
10/06/2023		
11/06/2023		
12/06/2023	0.04	
13/06/2023	0.01	
14/06/2023		
15/06/2023		
16/06/2023		
17/06/2023		
18/06/2023	0.06	
19/06/2023		
20/06/2023		
21/06/2023		
22/06/2023		
23/06/2023	0.20	
24/06/2023		
25/06/2023		
26/06/2023		
27/06/2023		
28/06/2023		
29/06/2023	0.02	
30/06/2023		
1/07/2023		
2/07/2023		
3/07/2023		
4/07/2023		
5/07/2023		
6/07/2023		
7/07/2023	0.08	
8/07/2023		
9/07/2023		
10/07/2023		
11/07/2023		
12/07/2023		
13/07/2023		
14/07/2023		
15/07/2023		
16/07/2023		
17/07/2023		
18/07/2023		
19/07/2023		
20/07/2023		
21/07/2023		
22/07/2023		
23/07/2023		
24/07/2023		
25/07/2023		
26/07/2023		
27/07/2023		
28/07/2023		
29/07/2023		
30/07/2023		
31/07/2023		
1/08/2023		
2/08/2023		
3/08/2023		

ERM

APA Receival Bin Sump

Date	Flow to SPB/SPC (ML)	Flowing into SPB/SPC
4/08/2023		
5/08/2023	0.03	
6/08/2023		
7/08/2023		
8/08/2023		
9/08/2023		
10/08/2023	0.03	
11/08/2023		
12/08/2023		
13/08/2023		
14/08/2023		
15/08/2023	0.10	
16/08/2023	0.04	
17/08/2023		
18/08/2023		
19/08/2023	0.79	
20/08/2023		
21/08/2023		
22/08/2023		
23/08/2023		
24/08/2023		
25/08/2023		
26/08/2023		
27/08/2023		
28/08/2023		
29/08/2023		
30/08/2023		
31/08/2023		
1/09/2023	0.07	
2/09/2023		
3/09/2023		
4/09/2023		
5/09/2023		
6/09/2023		
7/09/2023		
8/09/2023		
9/09/2023	0.13	
10/09/2023		
11/09/2023		
12/09/2023		
13/09/2023		
14/09/2023		
15/09/2023		
16/09/2023		
17/09/2023		
18/09/2023		
19/09/2023		
20/09/2023		
21/09/2023		
22/09/2023		
23/09/2023	0.01	
24/09/2023		
25/09/2023		
26/09/2023	0.01	
27/09/2023		
28/09/2023		
29/09/2023		
30/09/2023		
1/10/2023		
2/10/2023		
3/10/2023		
4/10/2023	0.02	
5/10/2023	0.00	
6/10/2023	0.03	
7/10/2023	0.00	
8/10/2023	0.03	
9/10/2023	0.00	
10/10/2023	0.00	

ERM

APA Receival Bin Sump

Date	Flow to SPB/SPC (ML)	Flowing into SPB/SPC
11/10/2023	0.00	
12/10/2023	0.00	
13/10/2023	0.00	
14/10/2023	0.00	
15/10/2023	0.00	
16/10/2023	0.00	
17/10/2023	0.00	
18/10/2023	0.00	
19/10/2023	0.01	
20/10/2023	0.00	
21/10/2023	0.00	
22/10/2023	0.00	
23/10/2023	0.00	
24/10/2023	0.00	
25/10/2023	0.00	
26/10/2023	0.00	
27/10/2023	0.00	
28/10/2023	0.00	
29/10/2023	0.00	
30/10/2023	0.00	
31/10/2023	0.00	
1/11/2023	0.00	
2/11/2023	0.00	
3/11/2023	0.00	
4/11/2023	0.00	
5/11/2023	0.047	SPB
6/11/2023	0.000	
7/11/2023	0.000	
8/11/2023	0.000	
9/11/2023	0.000	
10/11/2023	0.029	SPB
11/11/2023	0.000	
12/11/2023	0.000	
13/11/2023	0.000	
14/11/2023	0.000	
15/11/2023	0.000	
16/11/2023	0.000	
17/11/2023	0.000	
18/11/2023	0.000	
19/11/2023	0.000	
20/11/2023	0.000	
21/11/2023	0.000	
22/11/2023	0.000	
23/11/2023	0.000	
24/11/2023	0.000	
25/11/2023	0.000	
26/11/2023	0.410	SPB
27/11/2023	0.000	
28/11/2023	0.022	SPB
29/11/2023	0.000	
30/11/2023	0.192	SPB
1/12/2023	0.000	
2/12/2023	0.000	
3/12/2023	0.250	SPB
4/12/2023	0.180	SPB
5/12/2023	0.120	SPB
6/12/2023		
7/12/2023		
8/12/2023		
9/12/2023		
10/12/2023		
11/12/2023		
12/12/2023		
13/12/2023		
14/12/2023		
15/12/2023		
16/12/2023		
17/12/2023		

ERM

APA Receival Bin Sump

Date	Flow to SPB/SPC (ML)	Flowing into SPB/SPC
18/12/2023		
19/12/2023		
20/12/2023		
21/12/2023	0.137	SPB
22/12/2023	0.100	SPB
23/12/2023		
24/12/2023		
25/12/2023		
26/12/2023		
27/12/2023	0.059	SPB
28/12/2023	0.059	SPB
29/12/2023		
30/12/2023		
31/12/2023		
1/01/2024		
2/01/2024		
3/01/2024		
4/01/2024		
5/01/2024	0.162	SPB
6/01/2024		
7/01/2024		
8/01/2024		
9/01/2024	0.149	SPB
10/01/2024	0.018	SPB
11/01/2024		
12/01/2024	0.133	SPB
13/01/2024		
14/01/2024		
15/01/2024		
16/01/2024	0.004	SPB
17/01/2024		
18/01/2024	0.183	SPB
19/01/2024	0.183	SPB
20/01/2024		
21/01/2024		
22/01/2024		
23/01/2024		
24/01/2024		
25/01/2024		
26/01/2024		
27/01/2024		
28/01/2024		
29/01/2024		
30/01/2024		
31/01/2024		
1/02/2024		
2/02/2024		
3/02/2024		
4/02/2024		
5/02/2024		
6/02/2024		
7/02/2024	0.240	SPC
8/02/2024	0.240	SPC
9/02/2024	0.000	
10/02/2024	0.000	
11/02/2024	0.000	
12/02/2024	0.000	
13/02/2024	0.000	
14/02/2024	0.000	
15/02/2024	0.000	
16/02/2024	0.007	SPC
17/02/2024	0.000	
18/02/2024	0.000	
19/02/2024	0.000	
20/02/2024	0.100	SPC
21/02/2024	0.073	SPC
22/02/2024	0.000	
23/02/2024	0.000	

ERM

APA Receival Bin Sump

Date	Flow to SPB/SPC (ML)	Flowing into SPB/SPC
24/02/2024	0.000	
25/02/2024	0.000	
26/02/2024	0.000	
27/02/2024	0.000	
28/02/2024	0.000	
29/02/2024	0.000	
1/03/2024	0.000	
2/03/2024	0.000	
3/03/2024	0.000	
4/03/2024	0.000	
5/03/2024	0.000	
6/03/2024	0.000	
7/03/2024	0.000	
8/03/2024	0.000	
9/03/2024	0.000	
10/03/2024	0.000	
11/03/2024	0.000	
12/03/2024	0.000	
13/03/2024	0.000	
14/03/2024	0.000	
15/03/2024	0.330	SPC
16/03/2024	0.000	
17/03/2024	0.000	
18/03/2024	0.000	
19/03/2024	0.410	SPC
20/03/2024	0.300	SPC
21/03/2024	0.000	
22/03/2024	0.000	
23/03/2024	0.000	
24/03/2024	0.000	
25/03/2024	0.000	
26/03/2024	0.270	SPC
27/03/2024	0.000	
28/03/2024	0.000	
29/03/2024	0.230	SPC
30/03/2024	0.170	SPC
31/03/2024	0.000	SPC
1/04/2024	0.000	SPC
2/04/2024	0.000	
3/04/2024	0.000	
4/04/2024	0.000	
5/04/2024	0.000	
6/04/2024	0.630	SPC
7/04/2024	0.570	SPC
8/04/2024	0.261	SPC
9/04/2024	0.000	SPC
10/04/2024	0.000	SPC
11/04/2024	0.120	SPC
12/04/2024	0.000	SPC
13/04/2024	0.000	SPC
14/04/2024	0.000	SPC
15/04/2024	0.000	SPC
16/04/2024	0.000	SPC
17/04/2024	0.000	SPC
18/04/2024	0.000	SPC
19/04/2024	0.000	SPC
20/04/2024	0.000	SPC
21/04/2024	0.000	SPC
22/04/2024	0.000	SPC
23/04/2024	0.000	SPC
24/04/2024	0.000	SPC
25/04/2024	0.000	SPC
26/04/2024	0.000	SPC
27/04/2024	0.000	SPC
28/04/2024	0.000	SPC
29/04/2024	0.000	SPC
30/04/2024	0.000	SPC
1/05/2024	0.000	SPC

ERM

APA Receival Bin Sump

Date	Flow to SPB/SPC (ML)	Flowing into SPB/SPC
2/05/2024	0.000	SPC
3/05/2024	0.000	SPC
4/05/2024	0.000	SPC
5/05/2024	0.240	SPC
6/05/2024	0.170	SPC
7/05/2024	0.260	SPC
8/05/2024	0.180	SPC
9/05/2024	0.100	SPC
10/05/2024	0.000	SPC
11/05/2024	0.000	SPC
12/05/2024	0.120	SPC
13/05/2024	0.110	SPC
14/05/2024		
15/05/2024		
16/05/2024		
17/05/2024		
18/05/2024		
19/05/2024		
20/05/2024		
21/05/2024		
22/05/2024		
23/05/2024		
24/05/2024		
25/05/2024		
26/05/2024		
27/05/2024		
28/05/2024		
29/05/2024		
30/05/2024		
31/05/2024		
1/06/2024		
2/06/2024	0.120	SPC
3/06/2024		
4/06/2024		
5/06/2024		
6/06/2024		
7/06/2024	0.076	SPC
8/06/2024		
9/06/2024	0.156	SPC
10/06/2024		
11/06/2024		
12/06/2024		
13/06/2024		
14/06/2024		
15/06/2024	0.123	SPC
16/06/2024		
17/06/2024		
18/06/2024	0.120	SPC
19/06/2024		
20/06/2024		
21/06/2024		
22/06/2024		
23/06/2024		
24/06/2024		
25/06/2024		
26/06/2024		
27/06/2024		
28/06/2024		
29/06/2024		
30/06/2024	0.110	SPC
1/07/2024		
2/07/2024		
3/07/2024	0.100	SPC
4/07/2024		
5/07/2024		
6/07/2024		
7/07/2024		
8/07/2024		

ERM

APA Receival Bin Sump

Date	Flow to SPB/SPC (ML)	Flowing into SPB/SPC
9/07/2024	0.120	SPC
10/07/2024		
11/07/2024		
12/07/2024		
13/07/2024		
14/07/2024	0.090	SPC
15/07/2024		
16/07/2024		
17/07/2024		
18/07/2024		
19/07/2024		
20/07/2024		
21/07/2024		
22/07/2024		
23/07/2024		
24/07/2024		
25/07/2024		
26/07/2024		
27/07/2024	0.096	SPC
28/07/2024		
29/07/2024		
30/07/2024		
31/07/2024		
1/08/2024		
2/08/2024		
3/08/2024		
4/08/2024		
5/08/2024		
6/08/2024		
7/08/2024		
8/08/2024		
9/08/2024		
10/08/2024		
11/08/2024		
12/08/2024		
13/08/2024		
14/08/2024		
15/08/2024		
16/08/2024	0.100	SPC
17/08/2024		
18/08/2024		
19/08/2024		
20/08/2024		
21/08/2024		
22/08/2024		
23/08/2024		
24/08/2024		
25/08/2024		
26/08/2024		
27/08/2024		
28/08/2024		
29/08/2024		
30/08/2024		
31/08/2024		
1/09/2024		
2/09/2024		
3/09/2024		
4/09/2024		
5/09/2024		

ERM

Annual Summary - 2023-2024

LNAR Lined Storage Ponds	Inter Liner Leak Detection Sump											
	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24
LNAR 3 (Formerly BWA)	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	
LNAR 4 (Formerly BWB)	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	
LNAR 5 (Formerly BWC)	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	

12 Monthly Summary - 2023 / 2024

LinerLeachate Collection Sumps 1 - 5	Leachate Volume (L)												
	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Totals
LNAR Stage 1 Liner Leachate Pipeline Sump 1	127,000	353,000	281,000	359,000	395,000	383,000	-	462,000	149,000				2,509,000
LNAR Stage 1 Liner Leachate Pipeline Sump 2	334,000	908,000	830,000	717,000	801,000	756,000	-	328,000	215,000				4,889,000
LNAR Stage 1 Liner Leachate Pipeline Sump 3	973,000	225,000	330,000	965,000	1,196,000	1,120,000	1,225,000	878,000	-				6,912,000
LNAR Stage 1 Liner Leachate Pipeline Sump 4	698,000	132,000	357,000	576,000	759,000	714,000	910,000	1,278,000	1,328,000	1,428,000	1,364,000	1,185,000	10,729,000
LNAR Stage 1 Liner Leachate Pipeline Sump 5	30,000	-	-	223,000	1,173,000	1,117,000	1,141,000	280,000	-				3,964,000

			Field Parameters					Ionic Balance	Major Anions and Cations															hor Anions and Cati		NA			Nutrients											Physical Parameters		
			Dissolved Oxygen (Field) (Filtered)	Electrical Conductivity (Field)	pH (Field)	Redox (Field)	Temperature (Field)	Hardness as CaCO3 (Filtered)	Carbonate (as CaCO3)	Bicarbonate Alkalinity (as CaCO3)	Calcium	Calcium (Filtered)	Carbonate Alkalinity (as CaCO3)	Chloride	Fluoride	Magnesium	Magnesium (Filtered)	Phenolphthalein Alkalinity	Potassium	Potassium (Filtered)	Sodium	Sodium (Filtered)	Sulfate (as SO4)	Silica (Total)	Silica, Molybdate Reactive (Dissolved)	Calcium Hardness (as CaCO3) (mg/L) (Filtered)	Oil & Grease	Ortho Phosphorus (as P) (Filtered)	Ammonia	Sulfur	Nitrate	Nitrite (as NO2-)	Nitrite + Nitrate (as N)	Nitrogen (N) - Kjeldahl	Nitrogen (N)	Total Phosphate (PO4)	Total Phosphate (PO4) (Filtered)	Phosphorus	Phosphorus (Filtered)	Total Dissolved Solids (TDS) (Filtered)	Total Suspended Solids (TSS)	Turbidity
			mg/L	uS/cm	pH units	mV	oC	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	µg/L	µg/L	mg/L	mg/L	mg/L	µg/L	mg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	NTU
ANZECC (2000) or Local Guidelines - Surface Water				2200	6.5-8									350	1.5								1000																	1500		
LocCode	Field_ID	Sampled_Date-Time																																								
LN Pond 2	Lamberts North Pond 2	13/09/2023	8.4	820	8.33	32	-	-	-	76.25	28.9	29.3	76.25	27.8	0.618	15.9	17.8	0	12.8	14.3	97.2	105	304	-	-	-	<5	-	20	85	560	<10	0.56	0.3	0.9	<0.1	0.1	0.03	0.03	5800	5	35.2
LN Pond 2	Lamberts North Pond 2	18/10/2023	8.1	770	8.12	154.1	-	-	-	82.46	29.7	30.6	82.46	23.9	0.516	16.6	17.1	0	14.4	15.4	104	102	268	-	-	-	<5	-	40	79	250	20	0.27	0.5	0.8	0.23	<0.1	0.07	<0.01	412	26	99.1
LN Pond 2	Lamberts North Pond 2	7/11/2023	8.2	800	8.44	71.2	-	-	-	77.28	34.8	33	77.28	27.8	0.587	18.6	18.1	0	16.2	15.5	111	113	303	-	-	-	<5	-	30	84	320	20	0.34	0.8	1.1	0.29	<0.1	0.09	<0.01	1450	366.7	325
LN Pond 2	Lamberts North Pond 2	14/12/2023	5.9	503	8.56	81.2	-	-	-	73.49	17.2	17.9	73.49	13.2	0.354	11.1	12.5	0	9.61	9.63	55.6	58.5	139	-	-	-	<5	-	20	46	520	30	0.55	2.8	3.4	<0.1	<0.1	<0.1	<0.1	362	22.5	310
LN Pond 2	Lamberts North Pond 2	24/01/2024	6.9	230	8.24	83.3	-	-	-	25.43	8.25	6.73	25.43	7.1	0.298	6.58	5.67	0	7.8	5.55	28.8	30.2	63.1	-	-	-	<5	-	40	20	650	<10	0.65	1.2	1.8	0.59	0.2	0.19	0.06	336	92	1367
LN Pond 2	Lamberts North Pond 2	21/02/2024	7.1	340	7.6	117.4	-	-	-	35.69	11.1	9.46	35.69	13.2	0.312	8.31	7.28	0	8.71	6.67	46.8	44.1	97.2	-	-	-	<5	-	10	31	1010	<10	1.01	1.1	2.1	0.66	<0.1	0.22	<0.01	368	66	762
LN Pond 2	Lamberts North Pond 2	13/03/2024	5.7	1040	9.37	59.9	-	-	48.48	83.16	15.6	13.6	131.6	48.3	0.595	9.57	8.28	24.24	17.9	15.9	156	175	279	-	-	-	<5	-	320	99	1600	360	1.96	2.1	4.1	0.53	0.17	0.17	0.06	770	11.33	325
LN Pond 2	Lamberts North Pond 2	24/04/2024	8.33	614	8.44	42.4	-	-	-	66.32	10.8	10.2	66.32	23.8	0.376	7.62	7.31	0	8.79	8.42	82.9	84.3	153	-	-	-	<5	-	40	49	600	680	1.28	<2	<2	<0.2	0.12	<0.2	0.04	480	142.7	525
LN Pond 2	Lamberts North Pond 2	9/05/2024	9.5	549	8.16	112.9	-	-	-	62.42	12.4	10.7	62.42	21.7	0.323	8.61	8.1	0	10.4	9.64	89	89.9	142	-	-	-	<5	-	20	54	1110	<10	1.11	0.8	1.9	0.59	0.52	0.19	0.17	478	22	426
LN Pond 2	Lamberts North Pond 2	27/06/2024	10.1	510	8.08	193	-	-	-	56.84	13.2	12.1	56.84	21.4	0.393	9.63	9.18	0	8.16	7.72	76.5	73.5	150	-	-	-	<5	-	<10	48	980	10	0.99	0.7	1.7	0.69	0.11	0.22	0.04	308	75	356
LN Pond 2	Lamberts North Pond 2	17/07/2024	7.6	576	8.36	53.7	-	-	-	909.4	14.6	13.6	909.4	19	0.347	10.2	9.75	0	8.72	9.56	75.8	89	29.1	-	-	-	<5	-	10	47	930	<10	0.93	8.6	9.5	<0.4	<0.1	<0.4	0.02	410	18	306
LN Pond 2	Lamberts North Pond 2	28/08/2024	10.5	463	7.84	155.9	11.1	64	-	63.44	11.7	11.5	63.44	16	0.31	8.2	8.56	0	7.31	7.14	67	64.5	122	6700	4890	28.7	<5	<0.01	40	45	820	10	0.83	1.4	2.2	<0.1	<0.1	<0.1	<0.01	510	11	182
LNAR 3	LNAR 3	13/09/2023	15.4	60,060	10.14	75.2	-	-	1068	134.6	30.1	18.6	1203	5290	25.4	72.3	73.6	534.1	1490	1520	18,600	19,200	10,800	-	-	-	<5	-	<10	6230	30,300	610	30.9	16.4	47.3	21.3	13.3	6.95	4.35	55,580	99	40.8
LNAR 3	LNAR 3	18/10/2023	17.7	64,300	10.1	123.6	-	-	23,180	2588	22.2	21.7	25,770	11,400	56.3	72.7	51.9	11,590	1660	1560	19,800	22,000	24,400	-	-	-	<5	-	280	7270	29,500	990	30.5	7.5	38	23.7	20.1	7.74	6.56	61,160	32	21.8
LNAR 3	LNAR 3	7/11/2023	29.3	66,400	10.27	59.4	-	-	17,180	3312	32.2	30.2	20,490	10,300	62.9	70.8	60.3	8591	1880	1920	24,900	23,600	22,700	-	-	-	<5	-	2700	7900	15,700	540	16.2	41.3	57.5	41.8	26.2	13.6	8.55	69,450	168	92.5
LNAR 3	LNAR 3	14/12/2023	5.4	44,120	10.17	38.1	-	-	8528	1408	37.1	20.7	9936	6430	50	42.1	26.7	4264	1250	1060	16,700	13,700	14,500	-	-	-	<5	-	4560	5330	4420	2460	6.88	23.6	30.5	32.6	31.4	10.6	10.2	38,960	106	73.4
LNAR 3	LNAR 3	24/01/2024	16.5	53,290	10.02	76.7	-	-	17,800	8177	41.1	35.5	25,980	8370	98.9	30.1	26.9	8901	1340	1320	17,500	17,000	21,100	-	-	-	10	-	7660	6330	<100	3660	0.02	31.4	31.4	67.9	65.4	22.2	21.3	49,070	50	75.8
LNAR 3	LNAR 3	21/02/2024	3.6	67,700	10.06	54.1	-	-	21,450	1656	22.3	17.7	23,110	8420	83.7	30.4	23.4	10,730	1750	2030	23,800	23,000	20,300	-	-	-	<5	-	1910	6830	16,800	140	16.9	14	30.9	48	45.3	15.6	14.8	67,760	115.5	15.6
LNAR 3	LNAR 3	13/03/2024	4.1	69,600	9.98	42	-	-	27,880	2222	21.1	17.4	30,100	9530	85.5	30.9	23.1	13,940	1830	1770	25,500	24,600	22,200	-	-	-	<5	-	1410	7270	16,200	100	16.3	16.7	33	66.6	46.8	21.7	15.3	108,300	8.5	5.88
LNAR 3	LNAR 3	24/04/2024	5.31	58,720	10.17	85.9	-	-	14,340	1515	26.4	26.8	15,860	9530	104	18.5	14.6	7878	1180	1120	19,000	17,000	23,400	-	-	-	<5	-	510	5860	11,100	8600	19.7	11.6	31.3	62.1	61.6	20.2	20.1	56,100	33	6.86
LNAR 3	LNAR 3	9/05/2024	5.1	61,670	9.98	79.5	-	-	19,590	-	27.4	21.6	20,200	7570	73.1	18.2	13.1	10,400	1350	1410	20,500	21,300	19,300	-	-	-	<5	-	540	6720	7800	11,700	19.5	13.5	33	70	66.7	22.8	21.8	72,940	5.667	4.11
LNAR 3	LNAR 3	27/06/2024	5.8	71,250	10.19	126.2	-	-	20,750	2436	25.8	27.4	23,180	11,800	139	25.4	22.1	10,370	1620	1570	24,900	23,100	28,500	-	-	-	<5	-	1680	7060	16,800	220	17	18	35	75.7	75	24.7	24.5	67,300	25.33	15
LNAR 3	LNAR 3	17/07/2024	3.4	80,560	10.17	69.1	-	-	23,950	1675	25.9	19.3	25,630	8760	96.1	25.5	15.2	11,980	1770	1600	27,000	24,600	20,500	-	-	-	<5	-	1450	7940	18,400	310	18.7	16.4	35.1	78.5	83.3	25.6	27.2	70,620	13.6	7.56
LNAR 3	LNAR 3	28/08/2024	7.6	67,920	10	129.4	12.4	97.8	16,520	2842	26	18.7	19,370	8810	89.7	17.7	12.4	8262	1570	1560	22,800	22,200	22,500	106,000	105,000	46.7	<5	23.1	2290	6800	20,600	260	20.9	16.5	37.4	83.2	79.6	27.1	26	66,560	19.2	6.53
LNAR 4	LNAR 4	13/09/2023	12.9	3520	9.72	46.8	-	-	66.93	67.62	29.7	29.3	134.6	420	1.71	7.72	8.4	33.47	57.9	64.2	645	688	996	-	-	-	<5	-	10	314	1220	120	1.34	1.3	2.6	0.24	0.18	0.08	0.06	2156	15.67	5.99
LNAR 4	LNAR 4	18/10/2023	8.1	3690	10.09	109.6	-	-	124.9	32.09	32.3	33.4	157	422	1.53	8.26	8.48	62.45	70.8	77.3	722	744	992	-	-	-	<5	-	20	351	<10	<10	<0.01	0.8	0.8	0.24	<0.1	0.08	0.01	2294	7	6.88
LNAR 4	LNAR 4	7/11/2023	11.2	4020	9.75	60.6	-	-	81.42	71.07	37.1	36.3	152.5	548	1.92	9.37	9.21	40.71	84	83.7	939	857	1270	-	-	-	<5	-	30	406	<10	20	0.02	1.6	1.6	0.26	0.14	0.09	0.05	2698	18.5	5.75
LNAR 4	LNAR 4	14/12/2023	12.3	2900	10.04	27.1	-	-	113.9	24.84	28.6	28.7	138.7	237	1.3	10.3	10.9	56.93	47.2	47.4	542	578	757	-	-	-	<5	-	40	278	5790	860	6.65	3	9.6	0.51	0.26	0.16	0.08	2018	30.8	24.3
LNAR 4	LNAR 4	24/01/2024	11.3	3470	9.61	73.7	-	-	106.3	140.8	22.5	22.7	247	354	2.21	7.42	7.42	53.13	57.8	59.4	695	712	978	-	-	-	<5	-	30	320	2960	1820	4.78	1.3	6.1	0.76	0.38	0.25	0.12	2280	18	53.2
LNAR 4	LNAR 4	21/02/2024	2.7	2310	8.72	68.4	-	-	8.753	126.6	22	22.3	135.3	147	1.33	7.95	7.88	4.377	34.8	33	445	431	720	-	-	-	<5	-	80	242	10,300	110	10.4	1.5	11.9	0.48	0.21	0.16	0.07	1552	22.5	50.4
LNAR 4	LNAR 4	13/03/2024	7.9	2450	8.63	48.1	-	-	-	108.4	37.1	37.4	108.4	111	1.04	9.59	9.69	0	32.4	32.4	399	456	968	-	-	-	<5	-	9180	322	4620	4560	9.18	11.7	20.9	0.71	0.23	0.23	0.08	1650	17.33	25.6
LNAR 4	LNAR 4	24/04/2024	6.3	1420	9.04	52.7	-	-	11.45	121.5	14.8	13.1	133	69.1	0.604	6.19	5.51	5.723	17.4	16	222	198	350	-	-	-	<5	-	50	116	2030	490	2.52	<2	2.5	0.92	0.29	0.3	0.1	950	33.33	293
LNAR 4	LNAR 4	9/05/2024	7.9	1540	9.08	52.3	-	-	23.57	116.5	17.2	13.3	140.1	88.4	0.649	7.05	5.87	11.78	24.3	19.8	285	246	389	-	-	-	<5	-	40	155	2300	230	2.53	1.4	3.9	0.79	0.45	0.26	0.15	1092	14.67	270
LNAR 4	LNAR 4	27/06/2024	10.1	1496	8.88	137.2	-	-	4.06	130.9	16.8	13.4	135	102	0.804	7.47	6.1	2.03	19.5	18.2	250	234	432	-	-	-	<5	-	150	123	2120	20	2.14	1.2	3.3	0.87	0.38	0.28	0.12	946	19	205
LNAR 4	LNAR 4	17/07/2024	11.4	2121	8.46	119.8	-	-	-	130.9	18.7	18.5	130.9	93.4	0.678	5.31	5.49	0	20.2	19.6	308	313	540	-	-	-	6	-	23,500	197	<10	6400	1.98	25.3	27.3	2.38	0.36	0.78	0.12	1156	51	109
LNAR 4	LNAR 4	28/08/2024	6.6	3244	9.42	84.4	13.5	36.5	-	162.7	14.2	10.7	162.7	89.2	1.01	2.88	2.38	0	19.9	14.6	348	262	667	6900	5480	26.7	<5	0.14	28,700	226	430	3990	4.42	29.2	33.6	0.74	0.4	0.24	0.13	1460	16.4	34.6
LNAR 5	LNAR 5	13/09/2023	2.2	1320	6.68	122.5	-	-	-	23.66	12.7	11.8	23.66	30.9	0.902	3.08	3.13	0	11.6	11.9	215	228	478	-	-	-	<5	-	3570	139	<10	21,800	20.1	7.1	27.2	1.49	0.2	0.49	0.07	4760	92	299
LNAR 5	LNAR 5	18/10/2023	4.3	1720	8.04	138.2	-	-	-	102.1	25.9	27	102.1	53.3	1	10.2	10.6	0	22.2	24	279	290	620	-	-	-	<5	-	8480	194	900	10,100	11	9.8	20.8	0.95	0.64	0.31	0.21	930	88.67	123
LNAR 5	LNAR 5	7/11/2023	1.8	2200	8.66	72.2	-	-	-	100.7	40.4	38.1	100.7	68.8	1.24	18.1	17.3	0	31.8	30.6	388	250	934	-	-	-	<5	-	10,100	257	8870	310	9.18	9.9	19.1	1.81	1.47	0.59	0.48	1270	171	259
LNAR 5	LNAR 5	14/12/2023	4.9	1940	9.5	40.8	-	-	82.8	107.3	20.4	21.3	190.1	54.5	1.11	8.99	9.97	41.4	23.3	24	326	367	598	-	-	-	5	-	8030	193	4350	4890	9.24	8.6	17.8	0.63	0.56	0.2	0.18	1208	43.33	41.4
LNAR 5	LNAR 5	24/01/2024	4.4	1780	9.35	68.8	-	-	38.64	133.9	16.3	15.9	172.5	106	1.08	7.49	7.21	19.32	26.2	26.4	312	323	479	-	-	-	<5	-	20	155	7150	<10	7.15	1.4	8.6	0.74	0.52	0.24	0.17	1202	55	463
LNAR 5	LNAR 5	21/02/2024	5.3	2290	9.68	49.8	-	-	90.23	108.1	22.8	21.1	198.3	132	1.51	8.33	7.24	45.11	33.1	30.9	427	410	716	-	-	-	<5	-	440	216	7810	1550	9.36	4.7	14.1	1.89	0.61	0.62	0.2	1440	774	771
LNAR 5	LNAR 5	24/04/2024	9.46	6110	10.05	71.7	-	-	513.8	272	17.7	18.4	785.8	451	5.51	7.26	7.13	256.9	80.3	85.1	1210	1190	1520	-	-	-	<5	-	280	488	4920	340	5.26	<2	5.3	4.9	4.38	1.6	1.43	3844	19	304
LNAR 5	LNAR 5	9/05/2024	9	12,260	10.03	83.4	-	-	13,570	1566	15.1	14	15,140	973	14.4	6.2	6.1	6787	183	185	2970	2930	2880	-	-	-	<5	-	290	1230	3620	1700	5.32	3.3	8.6	12.4	13.2	4.04	4.32	8724	7	94.1
LNAR 5	LNAR 5	27/06/2024	10	10,400	10.25	118	-	-	1299	351.2	11.7	10.5	1650	964	13.5	4.32	3.74	649.6	132	136	2210	2220	2960	-	-	-	<5	-	18,900	795	1440	1250	2.69	20.7	23.4	8.44	8.23	2.75	2.68	5886	3038	964
LNAR 5	LNAR 5	17/07/2024	9.9	24,000	10.14	64.1	-	-	5055	-	16.2	12.2	18,960	2310	33.9	7.01	4.86	16,430	453	403	5940	5480	6380	-	-	-	20	-	11,500	2040	4010	3460	7.47	18.2	25.7	24.6	22.4	8.04	7.32	15,900	3152	2584
LNAR 5	LNAR 5	28/08/2024	7.7	31,650	10.04	112.8	11	55.7	-	327.8	18.3	14	327.8	3490	43.1	6.68	5.04	0	671	645	9060	8610	9950	47,000	43,500	35	<5	12.2	8150	3030	6940	5860	12.8	13.1	25.9	38.2	38.7	12.5	12.6	24,040	13.6	8.16

LocCode	Field_ID	Sampled_Date-Time	TRH					Metals																			
			TRH >C10-C14 Fraction	TRH >C10-C36 Fraction	TRH >C15-C28 Fraction	TRH >C29-C36 Fraction	TRH >C6-C9 Fraction	Aluminium	Aluminium (Filtered)	Antimony	Antimony (Filtered)	Arsenic	Arsenic (Filtered)	Arsenic III	Arsenic V	Barium	Barium (Filtered)	Beryllium	Beryllium (Filtered)	Boron	Boron (Filtered)	Cadmium	Cadmium (Filtered)	Chromium	Chromium (Filtered)	Chromium (Hexavalent)	Chromium (Trivalent)
			μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L
ANZECC (2000) or Local Guidelines - Surface Water												24	24	24	13	700	700	100	100	370	370	0.85	0.85	2	2	1	3.3
LN Pond 2	Lamberts North Pond 2	13/09/2023	-	-	-	-	-	720	10	<1	<1	<1	1	<1	<1	40	37	<1	-	550	650	<0.1	<0.1	<1	<1	<10	<10
LN Pond 2	Lamberts North Pond 2	18/10/2023	-	-	-	-	-	1540	10	<1	<1	2	<1	<1	<1	52	41	<1	-	750	580	<0.1	<0.1	2	<1	<10	<10
LN Pond 2	Lamberts North Pond 2	7/11/2023	-	-	-	-	-	3240	10	<1	<1	4	<1	<1	<1	65	45	<1	-	530	520	<0.1	<0.1	4	<1	<10	<10
LN Pond 2	Lamberts North Pond 2	14/12/2023	-	-	-	-	-	2440	10	<1	<1	4	<1	<1	<1	53	39	<1	-	420	350	<0.1	<0.1	4	<1	<10	<10
LN Pond 2	Lamberts North Pond 2	24/01/2024	-	-	-	-	-	9800	30	<1	<1	8	<1	<1	<1	76	17	<1	-	180	150	<0.1	<0.1	10	<1	<10	<10
LN Pond 2	Lamberts North Pond 2	21/02/2024	-	-	-	-	-	9520	40	<1	<1	8	<1	<1	<1	72	26	<1	-	240	240	0.1	0.2	9	<1	<10	<10
LN Pond 2	Lamberts North Pond 2	13/03/2024	-	-	-	-	-	4400	30	5	2	12	7	<1	7.6	55	46	<1	-	280	300	0.2	0.2	5	<1	<10	<10
LN Pond 2	Lamberts North Pond 2	24/04/2024	-	-	-	-	-	1100	40	<1	1	3	3	<1	3.1	41	46	<1	-	180	210	<0.1	0.1	1	<1	<10	<10
LN Pond 2	Lamberts North Pond 2	9/05/2024	-	-	-	-	-	8860	620	<1	1	10	4	<1	1.9	49	53	<1	-	130	160	0.1	0.1	5	<1	<10	<10
LN Pond 2	Lamberts North Pond 2	27/06/2024	-	-	-	-	-	2050	20	<1	<1	4	<1	<1	1.3	47	25	<1	-	160	240	<0.1	<0.1	2	<1	<1	<0.001
LN Pond 2	Lamberts North Pond 2	17/07/2024	-	-	-	-	-	8450	40	<1	2	8	7	<1	<1	56	39	<1	-	200	330	<0.1	<0.1	8	<1	<1	<1
LN Pond 2	Lamberts North Pond 2	28/08/2024	<50	<50	<100	<50	<20	990	<10	<1	<1	3	2	<1	2.4	34	23	<1	<1	150	340	<0.1	<0.1	1	3	<1	3
LNAR 3	LNAR 3	13/09/2023	-	-	-	-	-	610	<100	370	397	1910	2000	<40	2490	84	29	<10	-	17,500	18,000	23.2	25.9	126	134	<10	130
LNAR 3	LNAR 3	18/10/2023	-	-	-	-	-	<100	<100	404	414	3440	3350	<40	2730	44	42	<10	-	26,100	25,700	29.6	30.3	123	120	90	30
LNAR 3	LNAR 3	7/11/2023	-	-	-	-	-	<100	<100	463	202	3120	1440	13.3	3140	39	18	<10	-	18,200	730	28.5	13.6	83	39	<100	<100
LNAR 3	LNAR 3	14/12/2023	-	-	-	-	-	740	<100	286	303	3110	3320	<100	3430	48	43	<10	-	11,800	10,900	20.6	21.1	101	104	30	70
LNAR 3	LNAR 3	24/01/2024	-	-	-	-	-	430	<100	1010	915	6870	6400	<40	6730	98	85	<10	-	24,800	22,300	36	34.2	250	221	200	<100
LNAR 3	LNAR 3	21/02/2024	-	-	-	-	-	<100	<100	995	849	5380	5760	<40	5200	66	71	<10	-	17,400	17,200	28.3	32	170	170	<10	170
LNAR 3	LNAR 3	13/03/2024	-	-	-	-	-	150	<100	691	743	5090	5460	<40	5030	64	72	<10	-	15,600	16,700	27.2	28.2	154	160	<10	160
LNAR 3	LNAR 3	24/04/2024	-	-	-	-	-	110	<100	738	715	6890	6560	<40	6530	74	67	<10	-	21,400	19,400	39.4	37.7	200	178	80	100
LNAR 3	LNAR 3	9/05/2024	-	-	-	-	-	<100	<100	700	674	7330	7280	<200	8050	79	72	<10	-	17,500	16,800	38.6	36.1	211	201	50	150
LNAR 3	LNAR 3	27/06/2024	-	-	-	-	-	180	<100	635	639	6200	5910	<20	6060	68	59	<10	-	20,400	19,800	29.3	30.3	157	146	144	<0.01
LNAR 3	LNAR 3	17/07/2024	-	-	-	-	-	<100	<100	636	581	7390	5850	<100	7530	76	59	<10	-	21,500	17,600	37.1	29.2	195	146	190	<10
LNAR 3	LNAR 3	28/08/2024	<50	<50	<100	<50	<20	100	<100	649	580	7510	6850	<400	15,100	73	64	<10	<10	18,600	16,600	32.9	30.2	202	180	230	<10
LNAR 4	LNAR 4	13/09/2023	-	-	-	-	-	140	80	11	11	17	16	2.5	11.4	40	41	<1	-	780	800	0.2	0.3	<1	<1	<10	<10
LNAR 4	LNAR 4	18/10/2023	-	-	-	-	-	150	40	12	9	22	20	3	11.2	49	45	<1	-	1410	1080	0.4	0.2	<1	<1	<10	<10
LNAR 4	LNAR 4	7/11/2023	-	-	-	-	-	150	60	10	9	22	19	<1	10.3	52	48	<1	-	880	920	0.3	0.2	<1	<1	<10	<10
LNAR 4	LNAR 4	14/12/2023	-	-	-	-	-	320	30	13	12	20	18	1.9	12	79	65	<1	-	620	490	0.8	0.5	<1	<1	<10	<10
LNAR 4	LNAR 4	24/01/2024	-	-	-	-	-	1180	170	18	21	76	71	1	73	56	51	<1	-	910	1000	0.7	0.6	4	3	<10	<10
LNAR 4	LNAR 4	21/02/2024	-	-	-	-	-	480	40	14	16	33	32	<1	25.9	52	49	<1	-	660	480	0.5	0.4	1	<1	<10	<10
LNAR 4	LNAR 4	13/03/2024	-	-	-	-	-	410	80	17	16	20	18	<1	22.7	73	67	<1	-	520	480	0.3	0.2	2	<1	<10	<10
LNAR 4	LNAR 4	24/04/2024	-	-	-	-	-	940	60	3	5	35	36	8.7	22	53	51	<1	-	280	280	0.2	0.5	1	1	<10	<10
LNAR 4	LNAR 4	9/05/2024	-	-	-	-	-	2120	660	5	5	35	32	<1	39.9	67	60	<1	-	300	280	0.7	0.7	2	1	<10	<10
LNAR 4	LNAR 4	27/06/2024	-	-	-	-	-	3100	20	3	4	254	27	<1	22.9	39	22	<1	-	260	290	1.4	0.1	8	<1	<1	<0.001
LNAR 4	LNAR 4	17/07/2024	-	-	-	-	-	2900	<10	4	6	31	24	<1	27.7	30	20	<1	-	290	300	0.2	0.2	3	<1	4	<1
LNAR 4	LNAR 4	28/08/2024	<50	<50	<100	<50	<20	450	10	10	12	60	57	4.6	62.5	23	20	<1	<1	410	610	1.6	1.7	2	2	6	<1
LNAR 5	LNAR 5	13/09/2023	-	-	-	-	-	2610	40	6	9	8	7	<1	6.9	35	22	<1	-	240	320	<0.1	<0.1	2	<1	40	<10
LNAR 5	LNAR 5	18/10/2023	-	-	-	-	-	760	40	19	17	15	12	<1	10.2	80	60	<1	-	510	380	0.1	<0.1	2	<1	<100	<100
LNAR 5	LNAR 5	7/11/2023	-	-	-	-	-	2150	50	18	21	27	20	<1	19.7	161	110	1	-	340	310	0.1	<0.1	4	<1	<10	<10
LNAR 5	LNAR 5	14/12/2023	-	-	-	-	-	470	90	15	15	19	19	<1	20	75	71	<1	-	430	350	1.4	1.2	<1	<1	<10	<10
LNAR 5	LNAR 5	24/01/2024	-	-	-	-	-	5660	50	8	11	44	34	<1	31.4	67	36	<1	-	460	460	0.6	0.5	6	1	<10	<10
LNAR 5	LNAR 5	21/02/2024	-	-	-	-	-	7900	40	10	15	50	39	<1	33.8	97	108	1	-	570	530	0.8	0.5	8	2	<10	<10
LNAR 5	LNAR 5	24/04/2024	-	-	-	-	-	3670	40	43	51	445	420	<4	442	95	88	<1	-	1710	1560	2	2.4	15	13	10	<10
LNAR 5	LNAR 5	9/05/2024	-	-	-	-	-	2600	1710	141	167	1240	1220	<40	1520	60	62	<1	-	3370	3050	6	5.9	52	50	50	<10
LNAR 5	LNAR 5	27/06/2024	-	-	-	-	-	46,600	190	72	76	795	751	<2	702	159	29	8	-	2570	2260	5.1	4.3	39	24	26	<0.001
LNAR 5	LNAR 5	17/07/2024	-	-	-	-	-	161,000	90	197	221	2370	2370	<20	2350	460	68	22	-	6240	5980	11.5	11.4	117	75	72	3
LNAR 5	LNAR 5	28/08/2024	<50	<50	<100	<50	<20	1070	<100	353	337	3870	3700	<10	3780	53	50	<10	<10	10,100	9000	17.1	17.3	125	119	128	<10

LocCode	Field_ID	Sampled_Date-Time	Metals																								
			Cobalt	Cobalt (Filtered)	Copper	Copper (Filtered)	Iron	Iron (Filtered)	Lead	Lead (Filtered)	Manganese	Manganese (Filtered)	Mercury	Molybdenum	Molybdenum (Filtered)	Nickel	Nickel (Filtered)	Selenium	Selenium (Filtered)	Silver	Silver (Filtered)	Strontium	Strontium (Filtered)	Vanadium	Vanadium (Filtered)	Zinc	Zinc (Filtered)
			μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	mg/L	mg/L	μg/L	μg/L	μg/L	μg/L
ANZECC (2000) or Local Guidelines - Surface Water					3.5	3.5	300	300	5	5	1900	1900	0.06	10	10	17	17	5	5	0.05	0.05					116	116
LN Pond 2	Lamberts North Pond 2	13/09/2023	<1	<1	3	2	550	<50	<1	<1	17	5	<0.04	10	-	6	5	<10	<10	<1	-	0.318	-	<10	<10	10	<5
LN Pond 2	Lamberts North Pond 2	18/10/2023	1	<1	4	2	1500	<50	2	<1	35	4	<0.04	16	-	9	4	<10	<10	<1	-	0.353	-	<10	<10	12	<5
LN Pond 2	Lamberts North Pond 2	7/11/2023	3	<1	14	1	3880	<50	8	<1	111	18	<0.04	10	-	16	4	<10	<10	<1	-	0.353	-	<10	<10	40	<5
LN Pond 2	Lamberts North Pond 2	14/12/2023	2	<1	1	<1	2800	<50	5	<1	57	4	<0.04	6	-	12	3	<10	<10	<1	-	0.173	-	<10	<10	18	<5
LN Pond 2	Lamberts North Pond 2	24/01/2024	7	<1	15	<1	9910	60	17	<1	214	7	<0.04	8	-	25	2	<10	<10	<1	-	0.077	-	20	<10	46	<5
LN Pond 2	Lamberts North Pond 2	21/02/2024	5	<1	12	2	7990	<50	12	<1	140	15	<0.04	8	-	25	3	<10	<10	<1	-	0.097	-	20	<10	48	6
LN Pond 2	Lamberts North Pond 2	13/03/2024	4	2	14	5	4100	<50	7	<1	65	<1	<0.04	51	-	18	7	<10	<10	<1	-	0.127	-	20	<10	52	17
LN Pond 2	Lamberts North Pond 2	24/04/2024	3	2	6	3	670	60	5	<1	70	6	<0.04	26	-	10	6	<10	<10	<1	-	0.091	-	<10	<10	25	14
LN Pond 2	Lamberts North Pond 2	9/05/2024	5	2	11	4	4770	280	8	2	90	29	<0.04	20	-	18	7	<10	<10	<1	-	0.099	-	10	<10	41	30
LN Pond 2	Lamberts North Pond 2	27/06/2024	3	<1	18	3	1900	<50	5	<1	83	4	<0.04	20	-	13	5	<10	<10	<1	-	0.119	-	<10	<10	25	<5
LN Pond 2	Lamberts North Pond 2	17/07/2024	4	<1	12	3	5960	<50	9	<1	81	7	<0.04	14	-	19	5	<10	<10	<1	-	0.128	-	10	<10	47	<5
LN Pond 2	Lamberts North Pond 2	28/08/2024	2	<1	5	<1	770	<50	3	<1	33	2	<0.04	8	9	8	4	<10	<10	<1	<1	0.11	0.098	<10	<10	20	<5
LNAR 3	LNAR 3	13/09/2023	23	24	491	509	<100	<100	10	<10	389	387	<0.04	7360	-	380	399	2600	2750	<10	-	2.91	-	1940	1940	603	614
LNAR 3	LNAR 3	18/10/2023	28	28	745	718	<100	<100	20	12	484	466	<0.04	13,700	-	525	517	4180	4090	<10	-	3.83	-	3460	3410	812	823
LNAR 3	LNAR 3	7/11/2023	35	13	520	282	<100	<100	16	<10	417	163	<0.04	13,000	-	485	236	3450	1640	<10	-	3.02	-	3310	1490	682	255
LNAR 3	LNAR 3	14/12/2023	22	23	690	696	400	<100	25	24	161	142	<0.04	8450	-	345	395	3220	3270	<10	-	2.06	-	3270	3650	543	548
LNAR 3	LNAR 3	24/01/2024	33	30	1440	1330	140	<100	50	48	382	321	<0.04	13,800	-	561	533	6900	6550	<10	-	3.4	-	6550	6020	1070	982
LNAR 3	LNAR 3	21/02/2024	44	49	1030	1070	<100	110	35	42	321	325	<0.04	13,700	-	578	648	5120	5790	<10	-	2.3	-	4810	4980	861	892
LNAR 3	LNAR 3	13/03/2024	49	53	932	997	230	140	36	37	325	341	<0.04	13,800	-	601	658	4960	5330	<10	-	2.22	-	4530	4840	777	832
LNAR 3	LNAR 3	24/04/2024	46	44	1510	1430	<100	<100	53	49	248	164	<0.04	13,200	-	714	672	6710	6450	<10	-	2.56	-	6280	6010	1010	948
LNAR 3	LNAR 3	9/05/2024	49	48	1580	1520	<100	<100	61	60	288	268	<0.04	14,500	-	761	750	7330	7670	<10	-	2.64	-	6480	6300	1040	992
LNAR 3	LNAR 3	27/06/2024	52	51	1150	1070	120	170	49	45	413	354	<0.04	14,400	-	710	687	5820	5920	<10	-	2.28	-	5530	5000	898	864
LNAR 3	LNAR 3	17/07/2024	66	45	1350	1090	110	<100	59	44	626	388	<0.04	17,700	-	838	678	6880	5750	<10	-	2.85	-	6410	5300	1010	862
LNAR 3	LNAR 3	28/08/2024	55	49	1390	1260	120	<100	58	51	400	353	<0.04	15,800	14,300	766	675	7130	6600	<10	<10	2.25	2.02	6220	5500	904	827
LNAR 4	LNAR 4	13/09/2023	<1	<1	12	10	<50	<50	<1	<1	5	1	<0.04	461	-	14	14	40	60	<1	-	0.355	-	10	10	40	35
LNAR 4	LNAR 4	18/10/2023	<1	<1	10	6	50	<50	<1	<1	9	3	<0.04	660	-	17	16	50	50	<1	-	0.433	-	10	10	17	10
LNAR 4	LNAR 4	7/11/2023	<1	<1	6	4	70	<50	<1	<1	17	1	<0.04	573	-	17	14	40	40	<1	-	0.472	-	20	10	14	9
LNAR 4	LNAR 4	14/12/2023	<1	<1	13	8	320	<50	<1	<1	5	<1	<0.04	339	-	12	11	30	20	<1	-	0.347	-	20	20	30	8
LNAR 4	LNAR 4	24/01/2024	2	2	12	8	680	<50	<1	<1	30	<1	<0.04	418	-	18	16	90	90	<1	-	0.326	-	70	70	21	10
LNAR 4	LNAR 4	21/02/2024	2	2	27	24	240	<50	1	1	12	<1	<0.04	198	-	17	14	40	30	<1	-	0.169	-	30	30	180	173
LNAR 4	LNAR 4	13/03/2024	2	2	85	77	250	60	2	1	59	6	<0.04	217	-	18	15	20	10	<1	-	0.175	-	30	20	528	553
LNAR 4	LNAR 4	24/04/2024	2	1	14	10	1190	130	5	<1	238	44	<0.04	96	-	12	10	20	40	<1	-	0.093	-	20	20	97	62
LNAR 4	LNAR 4	9/05/2024	1	1	9	10	1940	580	3	2	58	52	<0.04	108	-	12	11	30	30	<1	-	0.105	-	30	30	94	84
LNAR 4	LNAR 4	27/06/2024	4	1	55	6	2120	<50	6	<1	171	10	<0.04	82	-	42	10	240	30	<1	-	0.187	-	220	20	107	21
LNAR 4	LNAR 4	17/07/2024	2	<1	33	23	1980	<50	4	<1	85	20	<0.04	118	-	12	8	30	30	<1	-	0.097	-	30	20	73	57
LNAR 4	LNAR 4	28/08/2024	2	2	66	61	300	<50	4	2	69	48	<0.04	166	186	12	11	60	60	<1	<1	0.09	0.089	60	50	128	120
LNAR 5	LNAR 5	13/09/2023	2	<1	20	12	1320	<50	7	<1	37	24	<0.04	64	-	7	4	<10	<10	<1	-	0.119	-	20	20	53	30
LNAR 5	LNAR 5	18/10/2023	2	<1	86	57	1230	350	2	<1	97	54	<0.04	136	-	18	13	<10	<10	<1	-	0.174	-	30	20	382	269
LNAR 5	LNAR 5	7/11/2023	3	<1	124	50	2450	400	6	<1	175	81	<0.04	138	-	30	15	<10	<10	<1	-	0.254	-	40	20	604	228
LNAR 5	LNAR 5	14/12/2023	<1	<1	11	8	450	<50	1	<1	19	6	<0.04	112	-	8	6	<10	<10	<1	-	0.167	-	20	20	46	20
LNAR 5	LNAR 5	24/01/2024	4	1	16	5	4680	<50	8	<1	91	<1	<0.04	171	-	19	7	40	40	<1	-	0.153	-	50	30	36	<5
LNAR 5	LNAR 5	21/02/2024	7	3	77	12	6550	<50	16	<1	174	3	0.04	199	-	37	14	40	40	<1	-	0.182	-	60	40	249	56
LNAR 5	LNAR 5	24/04/2024	8	5	108	88	2070	<50	9	2	114	6	<0.04	871	-	61	52	390	400	<1	-	0.243	-	380	380	246	167
LNAR 5	LNAR 5	9/05/2024	12	12	303	306	830	230	11	8	94	51	<0.04	2350	-	138	137	1300	1200	<1	-	0.364	-	1210	1160	268	268
LNAR 5	LNAR 5	27/06/2024	11	6	243	190	3940	<50	38	6	169	63	<0.04	1420	-	108	80	780	750	<1	-	0.426	-	740	640	246	140
LNAR 5	LNAR 5	17/07/2024	30	15	587	506	11,700	<50	103	16	358	124	<0.04	4360	-	278	223	2330	2490	<1	-	1.19	-	2160	1770	513	357
LNAR 5	LNAR 5	28/08/2024	26	24	844	810	230	<100	29	28	181	164	<0.04	7040	6730	372	354	3780	3620	<10	<10	0.961	0.919	3210	3060	787	493

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