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NEWMONT BODDINGTON GOLD BASELINE HYDROLOGICAL ASSESSMENT FOR RDA2

Report Status

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EXECUTIVE SUMMARY

Newmont Boddington Gold Pty Ltd (Newmont Boddington) operates the Boddington Mine, located 17 km northwest of the town of Boddington, and around 100 km to the southeast of Perth in WA. The modern mining and processing operation was commissioned in 2009, with tailings currently being stored in the F1/F3 RDA. The modern operations are authorised by Prescribed Premises Licence L8306.

Newmont Boddington are currently designing and permitting a second facility for the storage of tailings, located to the northeast of the F1/F3 RDA and referred to as RDA2. Newmont Boddington are also progressing investigations into the potential to discharge excess water from the site wide water management system into Gringer Creek near the location of RDA2, if the combined operation of the F1/F3 RDA and RDA2 should cause the operations to have a net positive water balance. Hydrological investigations completed in support of the RDA2 design studies include the gauging of surface water flows, sampling of surface water hydrochemistry, and the installation and monitoring of groundwater monitoring bores.

All available surface water flow rate data, surface water hydrochemical data, groundwater depth data and groundwater hydrochemical data for the Gringer Creek catchment have been reviewed, and updated hydrological models have been developed for the location of RDA2.

In general, the conceptual models developed for the Boddington Mine in the catchments of 34 Mile Brook, Boggy Brook and House Brook and valid to apply to the Gringer Creek catchment. The groundwater units are identified to be consistent; with the SSGS, the oxide and the WFBGS all being recognised as present in the Gringer Creek catchment. Refinement of the conceptual models in the Gringer Creek catchment identifies that the oxide is thinner on average and is absent in some locations, and that groundwater discharge is a significant control on the hydrochemistry of Gringer Creek.

Based on the updated conceptual model, potential influences of the operation of RDA2 on the receiving environment which will require monitoring are:

1. The potential for the combination of seepage from RDA2 and from the F1/F3 RDA to drive or increase cross catchment groundwater flow to the northwest.
2. On most of the western margin of RDA2 groundwater is relatively deep and vegetation is unlikely to be adapted to inundation. If groundwater mounding occurred in the west there would be potential for impacts to vegetation health. To the east of RDA2 groundwater is naturally close to surface and this risk to vegetation is much lower.
3. To the east of RDA2 groundwater is naturally close to surface and is potentially contributing to surface water. If seepage should reach these locations and discharge, there would be potential for impacts to the surface water aquatic ecosystem.
4. If seepage or spills should enter the diversion drain around the northwest margin of RDA2 there would be potential for impacts to Gringer Creek.

A monitoring regime has been developed which addresses the potential risks to the receiving environment as a result of the operation of RDA2 and comprises:

1. Daily flow monitoring at station Gringer Creek.
2. Hydrochemical sampling of surface water monthly at six locations on Gringer Creek upstream and downstream of RDA2.
3. Groundwater depth and groundwater hydrochemistry monitoring every three months at 21 existing bores and at 12 proposed new bores.
4. Permanent decommissioning of any bores within facility footprints by grouting to surface.

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1. Introduction

1.1 Background

Newmont Boddington Gold Pty Ltd (Newmont Boddington) operates the Boddington Mine, located 17 km northwest of the town of Boddington, and around 100 km to the southeast of Perth in WA. Open pit mining of an oxide gold resource was undertaken from 1987 to 2001, with stockpiled ore being processed until 2002 when the operation was placed in care and maintenance. Following definition of a gold resource within the deeper bedrock, construction of a large scale open pit mining operation was commenced by Newmont in 2006. The modern mining and processing operation was commissioned in 2009, with tailings currently being stored in the F1/F3 RDA located as indicated in Figure 1. The modern operations are authorised by Prescribed Premises Licence L8306.

Newmont Boddington are currently designing and permitting a second facility for the storage of tailings, located to the northeast of the F1/F3 RDA and referred to as RDA2 (Figure 1). Hydrological investigations completed in support of the RDA2 design studies include the gauging of surface water flows, sampling of surface water hydrochemistry, and the installation and monitoring of groundwater monitoring bores.

Big Dog Hydrogeology Pty Ltd (BDH) were commissioned by Newmont Boddington to summarise the results of the investigations into a comprehensive, stand alone, baseline hydrological assessment and to provide specific recommendations for monitoring to be undertaken during construction and operation of RDA2. The resulting monitoring recommendations are described in this report and have been based on a site specific assessment of the influences of the operation of the existing F1/F3 RDA to date on the receiving environment.

1.2 Objectives

In consultation with Newmont, the objectives for the baseline hydrological assessment were defined to be:

- To describe the groundwater and surface water systems present at RDA2 in the absence of mining influences and to characterise the interactions between these systems.
- To identify potential mechanisms for environmental harm associated with the operation of RDA2.
- To provide recommendations for groundwater and surface water monitoring during construction and operation of RDA2 which will 1) meet the likely requirements of L8306; and 2) provide early warning of the potential for environmental harm and any requirement for mitigation.

1.3 Relevant studies

Other studies which have contributed to the assessment of hydrological conditions presented in this report comprise:

1. Review of groundwater conditions at the RDAs (BDH 2023). This report summarised groundwater elevations, groundwater chemistry and RDA hydrochemistry in the areas of the F1/F3 RDA and the R4 RDA using data collected to early 2023. The extent and fate of seepage influences in groundwater were discussed.

2. RDA Groundwater Management Plan (RDA GMP, BDH 2024a). This report provided a detailed investigation into groundwater mounding occurring around the F1/F3 and R4 RDAs, identified the mounding mechanisms, and investigated the influence of shallow groundwater mounding on vegetation health. A plan for the management of seepage influences at both the existing RDAs and any future RDAs (including RDA2) was developed incorporating triggered actions based on both groundwater and vegetation monitoring.
3. Site wide assessment of mining influences on groundwater (BDH 2025a). The influences of the Boddington Mine facilities on groundwater conditions were assessed and described including drawdown due to open pit dewatering, drawdown due to production bore operation, and groundwater mounding and changes in groundwater chemistry due to RDA seepage. Recommendations were made for managing the potential influences of RDA2 which are addressed in the current report.

2. Hydrological setting and RDA2 designs

2.1 Facilities, topography and surface drainage

The layout of the Boddington Mine is illustrated in Figure 1. The F1/F3 RDA, R4 RDA, North Pit, South Pit and the Waste Rock Storage Facilities have all been constructed within the surface water catchments of 34 Mile Brook, Boggy Brook and House Brook, all of which eventually report to the Hotham River. RDA2 will be constructed in the catchment of Gringer Creek, which flows into the Bannister River and then the Hotham River as illustrated in Figure 1. Natural topography slopes from around 340 m above Australian Height Datum (mAHD) to the north of the F1/F3 RDA down to 200 mAHD at the Hotham River in the south and is dominated by a prominent ridge to the west of the F1/F3 RDA which reaches 540 mAHD.

All of the surface water systems in the mine area, including Gringer Creek, 34 Mile Brook and the Hotham River, flow only during the winter period. The Hotham River retains pools during the summer period, and the regional groundwater investigations indicate these pools are supported by local groundwater discharge.

2.2 Sources of data

The description of hydrogeological conditions in the following sections has been compiled from extensive investigations which have resulted in the construction of the multiple groundwater monitoring points described in Figure 2. These regional investigations have included

1. Standpipe monitoring bores investigating groundwater conditions near the existing F1/F3 RDAs.
2. Standpipe monitoring bores and VWP installations measuring drawdown due to open pit dewatering.
3. Standpipe monitoring bores and VWP installations monitoring drawdown influences associated with the operation of the production bores marked in Figure 2.
4. Standpipe monitoring bores and VWP installations investigating regional conditions including groundwater interactions with the Hotham River.

More detail on groundwater and surface water monitoring points at the location of RDA2 is provided in Figure 3. Construction details for the monitoring bores are provided in Appendix A where available. The Gringer Creek catchment locations comprise:

1. Monitoring bores SBBR01 to SBBR09 constructed near the footprint of RDA2 under the supervision of Golder in 2021.
2. Monitoring bores SBB10 to SBBR15 constructed near the footprint of RDA2 under the supervision of KCB in 2023.
3. Monitoring bores constructed under the supervision of CDM Smith for South32 in 2024 (MBH series bores in Figures 2 and 3). These bores provide regional groundwater information within and surrounding the Gringer Creek catchment for input to bauxite mining operations. Monitoring data are not available, however the borelogs and initial groundwater elevations reproduced in Appendix A provide very useful control on the regional interpretation of groundwater conditions and groundwater elevations.
4. Two stream gauging sites on Gringer Creek near RDA2 operated by Newmont Boddington. Streamflow records are available for various periods between 2012 and 2025 including continuous data from 2020 to 2025.
5. Nine surface water hydrochemistry monitoring locations on Gringer Creek both upgradient and downgradient of RDA2. Hydrochemical data are available from 2012.

2.3 Climate

The Boddington Mine experiences strong seasonal patterns in precipitation and evaporation. January and February are typically the warmest months, and evaporation in this period reaches 250 mm/month to 300 mm/month, while the cooler month of July experiences evaporation at around 50 mm/month to 60 mm/month. Annual total evaporation is typically 1,600 mm to 1,800 mm. Long term average annual precipitation for the Boddington mine has been reported to be 653 mm. However various studies have identified that a long term shift in precipitation patterns has occurred, with annual average precipitation prior to 1968 being 711 mm, and average annual precipitation after 1968 being 589 mm. On an annual basis, potential evaporation significantly exceeds annual precipitation. However, on a monthly basis precipitation typically exceeds evaporation in the winter months.

2.4 Surface water hydrology

34 Mile Brook, Boggy Brook, House Brook which drain to the Hotham River are routinely inspected and sampled as required by L8306. These streams and their tributaries typically only flow for a few months in winter and are dry for the remainder of the year. The Hotham River typically flows for six to nine months driven by winter precipitation and reduces to baseflow conditions or isolated pools which are supported by groundwater discharge in summer.

The current topography and surface water drainage directions at RDA2 are illustrated in Figure 4. Surface water flows to the east across the RDA2 footprint in tributaries of Gringer Creek, then continues to the southeast in Gringer Creek.

2.5 Conceptual hydrogeological model

2.5.1 Background

The existing conceptual hydrogeological model summarised in the following sections utilises the terminology adopted by Newmont Boddington and employed in a number of hydrogeological investigations undertaken at the Boddington Mine. The units adopted for the conceptual model are summarised in Figure 5.

The properties of each unit in the conceptual hydrogeological model have been derived from observations of responses to large scale influences on the system, including natural seasonal recharge, mining related drawdown and mining related groundwater mounding.

2.5.2 Seasonal shallow groundwater system (SSGS)

The SSGS occurs at surface and comprises a mix of clays with some laterite gravel, laterite gravels, cemented laterite hardcap, cemented hardcap containing solution cavities, or in low elevation locations near 34 Mile Brook and the Hotham River alluvial gravels and sands. Typically, the SSGS is 3 m to 5 m thick, on average extending to 5.5 m Below Ground Level (mBGL). The SSGS occurs as discrete, isolated lenses and is not regionally continuous or consistently saturated.

In upper elevation areas the SSGS is periodically dry in most locations, and it appears that infiltration from significant precipitation events potentially saturates this zone in some locations and becomes perched above the underlying oxide clays. Perched groundwater moving through the lateritic gravel material potentially discharges downslope, is removed via evapotranspiration, or infiltrates the underlying oxide. Many of the monitoring bores screened in this formation are dry in summer and contain water for some portions of the winter months. In nearly all monitoring locations in the higher elevation areas near the pits, the groundwater elevation in the laterite gravels is higher than in the underlying weathered and fractured bedrock. In lower elevation areas, near 34 Mile Brook and the Hotham River, the SSGS is permanently saturated and has similar groundwater elevations to the underlying bedrock.

2.5.3 Oxide

The oxide unit comprises highly weathered bedrock material (saprolite) which occurs in the zone beneath the SSGS and above the interface with the weathered and fractured bedrock groundwater system (WFBGS). Although the oxide is not interpreted to act as a regional groundwater transmitting unit, it is interpreted to store groundwater and has been thought to act as a control on the vertical movement of recharge and groundwater within the regional system. The oxide has a massive clay nature, with variable amounts of relict structural features or chips of less weathered material, and has an average thickness of 29 m.

2.5.4 Weathered and fractured bedrock system (WFBGS)

The WFBGS has been identified as the major regional groundwater system at Boddington (due to it being regionally extensive), and it occurs at the interface at the base of the oxide material as schematically illustrated in Figure 5, where the weathered bedrock retains sufficient structure to allow some groundwater transmission along with fracture zones at the surface of the unweathered bedrock. The average thickness of the WFBGS across all of the drilling locations was 6.4 m and on average unweathered bedrock was encountered at 40.6 mBGL.

The WFBGS is the groundwater unit which has the greatest extent across the Boddington site. Although on a regional basis it has been observed to act and respond as a relatively continuous and connected hydraulic system, on a localised basis the groundwater transmitting properties are highly variable. The primary storage and transmission of groundwater has been inferred to occur in the saprock zone at the interface with the upper bedrock surface. Monitoring data identify that the WFBGS receives and acts to transmit both natural recharge and seepage from the mine facilities.

2.5.5 Deep fractured bedrock groundwater system (DFBGS)

The DFBGS comprises zones of open fracturing occurring at depths of 100 mBGL to 200 mBGL in the bedrock. Locally, groundwater transmission and storage in the DFBGS is controlled by the intensity and openness of the fracture zones present in the unweathered bedrock. Regionally, groundwater transmission is controlled more by the degree of regional connection of these fracture zones, and the presence of any compartmentalising structures. On a regional basis, the DFBGS acts as a continuous unit.

Responses to seasonal recharge occur in the DFBGS, in some cases with very rapid responses to daily precipitation events, the sources of which have not been defined but may be related to drillholes and sumps in the mine area.

Distant from the open pits, on a regional basis, vertical hydraulic gradients in the DFBGS are indicated to be small, and groundwater elevations in the DFBGS are interpreted to be similar to the WFBGS. However, in the zone within 2 km to 3 km of the open pits, spot measurements of groundwater elevations measured in the DFBGS identify significantly lower values than in the overlying WFBGS. Similarly, near the Westwood Borefield, operation of the production bores has a much larger influence on the DFBGS than on the overlying WFBGS.

2.5.6 Hotham River

Mapping and drilling investigations have identified that the oxide is present in some locations below the Hotham River, while in other locations it is absent and there is direct contact between the river and the WFBGS. Pathways are therefore present for the exchange of surface water in the river and groundwater in the underlying systems. Monitoring of groundwater elevations and river elevations confirm that groundwater discharge from SSGS and the WFBGS occurs to the Hotham River.

2.6 Current mine influences on receiving groundwater conditions

Observations of the influences of the existing mine facilities have been used to guide the site specific assessment of the potential influences of RDA2. A detailed review of all available groundwater monitoring data (BDH 2025a) concluded the influences of the mine facilities to be as follows:

- Open pit dewatering and production bore operation have caused local drawdown in the WFBGS. In some locations (such as Pillow, Round and Boomerang Swamps) this has had no effect on the SSGS, while in other locations (near the Westwood Borefield) drawdown in the SSGS has been observed. There is potential for mining related drawdown to cause harm to phreatophytic vegetation, and the Groundwater and Groundwater Dependent Vegetation Monitoring and Management Plan (GGDVMMP, Umwelt 2021) has been implemented to manage and mitigate this risk.
- Seepage occurring during operation of the F1/F3 and R4 RDAs has caused groundwater mounding and small changes in groundwater hydrochemistry in the WFBGS, which have subsequently been transmitted into the SSGS. There is potential for groundwater mounding to cause harm to vegetation due to saturation of the root zone, and there is potential for mounding to drive cross catchment groundwater flow. These risks are managed and mitigated by the RDA Groundwater Management Plan (RDA GMP, BDH 2024a).

2.7 RDA2 design

RDA2 will be formed by constructing the Main Embankment between two natural abutments across a tributary of Gringer Creek at the eastern margin of the facility and by constructing the Northern Embankment at the northwest margin. In the remainder of the facility tailings will be constrained by the natural topography. Management of seepage and runoff will include:

- Lining the entire facility with a compacted in situ clay liner overlain by an HDPE membrane.
- Installing an underdrainage system comprising slotted pipes in filter material on top of the HDPE liner to minimise the head acting on the liner.
- Installing a liner depressurisation system comprising slotted pipes in filter material below the liner in low points to reduce upward groundwater pressures.
- Excavating a cutoff trench to 3 mBGL to remove the SSGS at the base of RDA2 upgradient of the embankments.
- A perimeter diversion channel system along the western flank to minimise upgradient inflows to RDA2, with the diverted flows being released to a tributary of Gringer Creek as marked in Figure 4.

2.8 Potential influences of RDA2

RDA2 is distant from the open pit and from groundwater production bores and this location will not be subject to mining related groundwater drawdown over the mine life (BDH 2025a). The western margin of RDA2 lies within the zone of existing groundwater mounding due to F1/F3 RDA operation (BDH 2025a). The seepage mitigation measures described for RDA2 in Section 2.7 are expected to result in a reduced rate of seepage from RDA2 compared to the F1/F3 RDA. If seepage should occur at sufficient rates to enter the underling formations, then based on the observed performance of the F1/F3 RDA it is expected that:

- There would be little off-site seepage migration in the SSGS due to the cutoff trench.
- Once the oxide unit was saturated downward leakage into the WFBGS would occur, causing shallowing groundwater levels, and changes in groundwater chemistry.
- Rising groundwater elevations would have potential to affect vegetation in sensitive locations (such as the western extent of RDA2 which is bordered by jarrah forest) due to the permanent saturation of the root zone.

- Rising groundwater elevations, including any potential interaction with existing mounding from the F1/F3 RDA could potentially reverse the current hydraulic gradients and cause cross catchment groundwater flow.
- Changes in groundwater chemistry would have potential to affect the receiving surface water environment in locations where groundwater discharge to surface occurs.

3. Updated hydrological models for RDA2

3.1 Background

The understanding of surface water hydrology described in Section 2.4 and the conceptual hydrogeological model described in Section 2.5 were developed from investigations and monitoring undertaken primarily within the catchment of 34 Mile Brook. Baseline data collected from the Gringer Creek catchment are reviewed in the following sections to investigate whether the existing models can be applied to RDA2 or require refinement.

3.2 Groundwater units

Geology encountered and hydrogeological observations during drilling for all available bores in the Gringer Creek catchment are described in the bore completion diagrams in Appendix A. Interpretation of these data identifies that the groundwater units intersected in the bores can be characterised as the SSGS, oxide and the WFBGS, and that the properties of these units are comparable to the interpretation in Section 2. However some differences are noted in that:

- The SSGS appears to be thinner (4.1 m thick on average compared to 5.5 m in the 34Mile Brook catchment), hardcap and lateritic gravels were less common, and clayey horizons were more common.
- On average the oxide unit is thinner, having an average thickness of 15.7 m compared to 29 m in the 34 Mile Brook catchment, and in particular being thin to the east of RDA2.
- Unweathered bedrock is encountered at more shallow depths (23.3 mBGL on average compared to 40.6 m in the 34 Mile Brook catchment). In particular it is noted that
  - MB H01D located to the north of RDA2 encountered unweathered granite at surface,
  - SBBR14D at the southeast corner of RDA2 encountered unweathered granite at 9 mBGL and had little oxide, with most of the interval from 2 mBGL to 9 mBGL being recognisable weathered granite,
  - SBBR10D located to the east of RDA2 encountered less than 10 m of oxide.
  - SBBR08 located to the east of RDA2 encountered around 2 m of oxide.
  - Granite outcrop has also been mapped to the northeast of RDA2.

3.3 Groundwater elevations, depths and flow directions

Figures 6 to 11 present plots of groundwater depth and groundwater elevation for grouped bores. Bores are grouped to allow common regional trends to be correlated between the bores. The grouped regional bores comprise bores located between the F1/F3RDA and RDA2 for which long term records are available, and which are mostly far enough away from the F1/F3 RDA to reflect regional conditions rather than seepage influences (see Figures 2 and 3 for locations). The Gringer Creek plots include all the monitoring bores constructed within and surrounding RDA2. Data are presented as elevations, to allow vertical and horizontal hydraulic gradients to be identified, and as depth below ground, to identify locations where shallow groundwater depths may result in interactions with the surface water systems. Monthly precipitation totals are included to investigate seasonal trends in groundwater levels. Significant mining changes such as commencing mine dewatering or commencing tailings deposition in the F1/F3 RDA are marked in the long term plots for reference where relevant. The elevation of the pond in the F1/F3 RDA is included in the regional plots to identify the potential changes in seepage influences.

Observations from Figures 6 to 11 are:

- There is a long term regional trend of declining groundwater elevations as defined by BUBR7, BUBR10, F1BR43D and F1BR45D, which is attributed to long term reductions in annual precipitation.
- BUBR7 and BUBR6 display a delayed responses to the commencement of tailings deposition in the F1/F3 RDA and the raising of the pond. These bores are located within the groundwater mound caused by seepage from the F1/F3 RDA.
- Seasonal changes in groundwater elevation of 2 m to 3 m occur in most regional and Gringer Creek bores, driven by winter recharge, consistent with monitoring in all other catchments at the Boddington Mine.
- There are no trends in bores within the Gringer Creek catchment which can be attributed to groundwater mounding from the existing F1/F3 RDA. While BH01 demonstrates a rising trend, this bore is distant from the existing RDAs, and there are other standpipe bores between the RDAs and BH01 which show no groundwater mounding.
- Groundwater depths are predominantly less than 20 mBGL in the Gringer Creek catchment and are less than 5 mBGL in the lower elevation locations near Gringer Creek.
- Paired monitoring bores screened in the SSGS and in the WFBGS were installed at sites SBBR10 to SBBR15. SBBR06 and SBBR07 also appear to be intended to act as paired bores. These identify that:
    - At SBBR11 and SBBR12 the SSGS is unsaturated, and the shallow bores have been dry since drilling.
    - At SBBR10, groundwater elevations are very similar and no hydraulic gradient acting between the WFBGS and the SSGS is present. The shallow and deep bore have similar TDS concentrations, and no density correction has been applied.
    - At SBBR13 and SBBR14 a small upward hydraulic gradient is present which is consistent with the occurrence of groundwater discharge. In each case the shallow and deep bore have similar TDS concentrations, and no density correction is applied.
    - At SBBR15 a downward hydraulic gradient is indicated by the raw groundwater elevations. SBBR15S has a low TDS concentration at 580 mg/L. Correcting the groundwater depth at SBBR15D to match the groundwater density at SBBR15S still results in a downward gradient, indicating recharge is occurring in this location.
    - At SBB06 and SBBR07 a significant upward hydraulic gradient is indicated by the raw groundwater elevations. The shallow bore SBBR06 has a lower TDS concentration (1,700 mg/L) compared to the deeper SBBR07 (4,600 mg/L). Correcting the groundwater depth at SBBR07 to match the groundwater density at SBBR06 still results in a significant upward gradient, indicating discharge is occurring in this location adjacent to Gringer Creek.

Groundwater elevations measured in the WFBGS in the summer of 2025 are contoured in Figure 12, using all bores for which a groundwater depth and a groundwater elevation are available. In some locations, the elevations of ponds, or the elevations of creek beds have been used as an additional control on the surface where necessary. Groundwater flow directions have been automatically calculated from the contours and are indicated in Figure 12. Groundwater mounding associated with seepage is evident at the F1/F3 RDA causing concentric contours and groundwater flow being radially away from the facility. Undisturbed groundwater flow at RDA2 is from west to east, and groundwater flow directions parallel the surface water drainage system. Groundwater at RDA2 flows towards and then along Gringer Creek to the southeast.

Depth to groundwater has been interpolated by subtracting the groundwater surface in Figure 12 from the ground surface as defined by regional topographic data and are contoured in Figure 13. These topographic data have variable accuracy within the study area and the interpolated depths may not exactly match the measured groundwater depths at the locations of some bores. Due to seepage driven mounding groundwater is at surface along the northern embankment of the F1/F3 RDA where sumps are being employed to control and remove discharging groundwater. At RDA2 baseline groundwater depths are inferred to be up to 50 mBGL in the west and to be near or at surface within Gringer Creek and within its tributaries where groundwater discharge is inferred to occur.

Further evidence of groundwater discharge to Gringer Creek and its tributaries is provided by:

- A groundwater spring is known to be present in a tributary of Gringer Creek to the south of RDA2 as marked in Figure 3 and has been developed into a water supply pond.
- Heritage surveys undertaken in 2025 identified two natural springs flowing into Gringer Creek located around 100 m upgradient and 200 m downgradient of GRCK09 as marked in Figure 3. Inspection of these springs by BDH in March 2025 identified that they reflect discharge of true groundwater where granite outcrops close to surface at the base of catchment slopes.
- Heritage surveys undertaken in in 2025 identified a natural spring located around 1,000 m upgradient of GRCK04 as marked in Figure 3.
- Figure 13 confirms that all of the springs are in locations where groundwater elevations in the WFBGS are inferred to be close to or above surface.

These combined observations support the interpretation that groundwater from the SSGS and likely from the WFBGS discharges seasonally to Gringer Creek under baseline conditions.

3.4 Surface water flow conditions

Continuous monitoring of flow rates in Gringer Creek is undertaken at sites Gringer Creek and Gringer Creek DS located as marked in Figure 3. Data have been collected intermittently from 2012. The most recent continuous data were collected from 2020 to 2025, and monthly flow totals in that period are plotted in Figure 14 compared against monthly precipitation totals. The gauging data were reviewed in detail during construction of a calibrated rainfall runoff model for Gringer Creek (GRM 2021). Observations from Figure 14 and conclusions from the runoff model are:

- Flow volumes correlate with precipitation conditions, although there is a significant wetting up period which results in flows being delayed following the onset of winter precipitation.
- Flows in Gringer Creek mainly occur from July to October and there is almost no flow in the summer months.
- The total flow volumes at Gringer Creek DS are comparable to those at Gringer Creek despite the catchment area being 40% larger. As the catchment characteristics appear similar between these locations, this has been interpreted to potentially reflect the Gringer Creek DS data being less reliable than Gringer Creek (GRM 2021).
- The calibrated runoff model indicated average runoff coefficients range from 3% to 12% of precipitation and vary in response to the amount of precipitation in a year.
- The streamflow data indicate a significant baseflow component which occurs from July to October and has been attributed to groundwater discharge into Gringer Creek.

- Routine monthly inspection of all surface water monitoring locations on Gringer Creek has noted that although flow does not continue through summer months, disconnected pools remain present in some locations, which supports the interpretation that groundwater discharge supports the creek in summer.

3.5 Groundwater and surface water hydrochemistry

3.5.1 Statistical assessment

The occurrence of hydrochemical analytes in surface water and in groundwater has been broadly categorised in Appendix B by constructing box plots. The plots group surface water hydrochemistry in Gringer Creek, groundwater hydrochemistry for bores in the Gringer Creek catchment, and groundwater chemistry for regional bores upgradient of the Gringer Creek catchment and near the F1/F3 RDA. Examples of the analysis for pH (a primary control on metals concentrations) and sulphate concentrations (which have been demonstrated to be the most reliable indicator of seepage or background mineralisation influences in groundwater) are presented in Figures 15 and 16. Each plot presents a shaded box reflecting the interquartile range (the range which includes 50% of results from that site), a horizontal line for the median result, an x symbol for the average result, open dots for results inside the interquartile range, and closed dots for results outside the interquartile range. Values below detection were supplied by Newmont Boddington as the detection limit. The analytes included in Appendix B were all of those included in Tables 14 and Table 15 of L8306. Exceptions to this list of analytes were:

- Turbidity is not included in L8306 but is relevant to surface water conditions and both field and laboratory measured data have been investigated.
- Hardness is not included in L8306 but is relevant to the potential toxicity of metals in surface water. Laboratory calculated hardness is available from 2024, therefore hardness was calculated for all samples by BDH and included in the analyses.
- Acidity which is included in L8306 has not been measured in Gringer Creek surface water and was not included in the analyses.
- Ti (titanium) is included in L8306, however Newmont Boddington have concluded this is a typographic error and is intended to be Tl (thallium). Neither of these analytes have been measured in Gringer Creek surface water and neither were included.
- L8306 requires metals analyses for surface water to be measured as total concentrations, whereas Gringer Creek surface water has been analyses for filterable concentrations, and so filterable concentrations are used for the analyses.

For some of the plots in Appendix B, the analyte is not present at detectable concentrations and the box plots simply reflect variations in the detection limit applied to individual samples. The occurrence of hydrochemical analytes in surface water and groundwater is assessed as follows:

- Field and laboratory pH for Gringer Creek surface water is typically 6.5 to 7.5 but GRCK04 is consistently lower, typically in the range 5.8 to 6.8 (Figure 15). pH for Gringer Creek groundwater is mostly 5.5 to 7.5 but is as low as 3.5 at SBBR03 and SBBR14S. A similar distribution is measured in regional groundwater. The low pH values in groundwater are a natural feature and result from ferrolysis reactions.
- TDS and EC exhibit a very wide range at each surface water site with EC potentially ranging from 2,000 uS/cm to 20,000 uS/cm, although values at GRCK04 are consistently lower (Figures B2 and B5). At individual groundwater bores the range is much lower, but across all bores a similar range is present. Exceptions are noted for regional bores BUBR6, BUBR7 and BUBR10 which are interpreted to be screened in both the SSGS and the WFBGS resulting in highly variable values in each bore.

- Major ions (HCO_3, Ca, Cl, Mg, K, Na, F in Appendix B and sulphate illustrated in Figure 16) follow similar trends to TDS and EC, other than fluoride which is absent from surface water and most groundwater other than bores SBBR14D and SBBR14S.
- Total hardness is a function of the Ca and Mg concentrations and therefore follows similar trends. Surface water in Gringer Creek typically has very high hardness in the range 500 mg/L as $CaCO_3$ to 1,500 mg/L as $CaCO_3$ (Figure B4) but occasionally reduces to around 200 mg/L as $CaCO_3$.
- All forms of cyanide (WAD, free and total have been below detection in Gringer Creek surface water (Figure B30).
- Filterable concentrations of Hg, Se and W are below detection in Gringer Creek surface water, Gringer Creek groundwater and in regional groundwater.
- Filterable concentrations of Al, As, Cd, Cr and Pb are predominantly below detection in surface water and groundwater but are occasionally present in low pH samples. The sites with reduced pH where these analytes are occasionally present are GRCK04, SBBR03, SBBR04, SBBR14S and BUBR6.
- Filterable concentrations of Cu and Mo are detectable in some groundwater bores but are typically below detection in Gringer Creek surface water.
- Filterable metals which occur above the detection limit in surface water and groundwater and warrant further investigation are Co, Fe, Mn, Ni, and Zn. In each case the statistical comparisons in Appendix B identify that the concentrations in surface water lie within the range of concentrations in groundwater, and groundwater discharge is therefore a potential source of the metals.

3.5.2 Time series trends

For the analytes which have been identified to be consistently above the detection limit in surface water and groundwater, Appendix C provides time series plots compared against monthly precipitation data and major changes in the mine facilities. The plots are grouped into Gringer Creek surface water, Gringer Creek groundwater and regional groundwater in order to investigate common short term (seasonal) and long term (mine facility influences) trends. Where relevant concentrations are plotted at log scale to illustrate the trends at low concentrations. Figures 17 to 22 reproduce the graphs for pH and sulphate for reference. Trends identified in the data plotted in Appendix C are:

- Some bores located close to the F1/F3 RDA exhibit changes in groundwater hydrochemistry driven by seepage influences. Most of the regional bores selected for presentation in Appendix C do not exhibit significant long term trends associated with seepage from the F1/F3 RDA and therefore reflect baseline conditions near RDA2. An exception is noted for BUBR6 where groundwater depths are strongly influenced by mounding, and pH and TDS concentrations have risen since deposition commenced in the F1/F3 RDA.
- Other than the regional bores screened in both the SSGS and the WFBGS (BUBR6, BUBR7, BUBR10) pH, EC and concentrations of TDS and major ions are reasonably uniform in groundwater. Figures 21 and 22 illustrates that sulphate concentrations vary during the year, but do not consistently correlate with precipitation patterns. In contrast surface water in Gringer Creek illustrates very strong seasonal variation in these parameters as illustrated for sulphate in Figure 20. Total hardness of surface water in Gringer Creek follows similar seasonal trends. In Gringer Creek TDS, EC, hardness and major ions are typically highest in GRCK08 and GRCK01.
- Filterable concentrations of Co, Fe, Mn, Ni and Zn are relatively constant in groundwater, other than associated with short term changes in pH, or associated with the bores screened in both the SSGS and the WFBGS. Filterable Zn is the most variable metal in Gringer Creek and regional groundwater. Concentrations of all metals in surface water demonstrate strong seasonal trends, changing by one to two orders of magnitude between summer and winter conditions. GRCK04 typically exhibits the highest concentrations of Co, Fe and Ni in surface water.

- TSS and turbidity in Gringer Creek are highly variable, with localised peak values occurring in peak events and with these peaks being observed both in summer and winter.

3.5.3 Analyte correlations in surface water

Composite plots of surface water hydrochemistry at each site in Gringer Creek are presented in Figures 23 to 31, compared against monthly flow volumes measured at the Gringer Creek station in each case. Trends in turbidity, TDS, pH, EC, sulphate and filterable concentrations of Fe, Co, Mn Ni and Zn are overlain and compared. Trends and potential sources are discussed as follows:

- TDS, EC and sulphate are strongly correlated in surface water. At all surface water sites these parameters peak in low flow conditions and reduce in high flow conditions which could be explained by a larger contribution of groundwater discharge in low flow conditions, and a larger contribution of lower TDS runoff in high flow conditions. Evapoconcentration would also contribute to higher concentrations in the samples collected in low flow conditions (i.e. immediately before flow stops or immediately after flow recommences).
- Surface water pH is consistently highest in peak flows at each site, being around 2 pH units higher than in low flow conditions. This may imply runoff contributes more alkalinity than groundwater discharge.
- At GRCK01, GRCK02, GRCK03, GRCK05 and GRCK09 filterable concentrations of Fe, Mn and Co tend to peak during high flows, suggesting a runoff source is dominant over groundwater discharge as a source of these metals in these locations. At GRCK04 these metals are higher in low flow conditions suggesting a groundwater source. At GRCK06, GRCK07 and GRCK08 there are seasonal trends, but the peaks do not consistently occur in the same flow conditions.

3.5.4 Hydrochemical snapshots of surface water hydrochemistry

Figures 32 to 35 provide longitudinal plots of hydrochemical variation along the course of Gringer Creek during individual flow events sampled on the same day. Flow events selected for presentation were those with data for all sites, and include peak flow events (13 August 2020, 6 July 2022, 3 July 2022) and late season baseflow events (5 November 2020, 3 November 2022 and 9 October 2023). GRCK04 is located on a tributary and is not on the main branch of Gringer Creek sampled by the other sites. However GRCK04 is included in the plots (plotted at the confluence) as it is a significant control on downgradient hydrochemistry. Observations from the longitudinal trends are:

- GRCK04 contributes lower sulphate surface water under both swfitflow and baseflow conditions and causes a significant reduction in concentrations between GRCK03 and GRCK09. However the relatively lower pH and higher filterable Fe surface water contributed from GRCK04 does not have significant influence on the downgradient pH values and Fe concentrations.
- Turbidity values are highly variable and there is no evidence of one particular location consistently contributing sediment to the flows.
- On average filterable metals concentrations decrease with flow downstream, peaking between stations GRCK01 and GRCK02 to the north of RDA2. Filterable Fe is an exception, being always highest at GRCK04 regardless of flow conditions, although the influence is short-lived in the downgradient environment.

3.6 Updated conceptual hydrological models

Hydrological data collected from the Gringer Creek catchment since 2012 have been assessed in detail in the preceding sections to update the conceptual hydrologic models for groundwater and surface water flow. In general, the conceptual models developed for the Boddington Mine in the catchments of 34 Mile Brook, Boggy Brook and House Brook and described in Sections 2.4 and 2.5 are valid. Surface water flow occurs only in the winter months. Low pH conditions are present in both groundwater and surface water and reflect a natural baseline condition caused by ferrolysis. TDS, sulphate, and filterable concentrations of Co, Mn, Fe, Ni and Zn may be moderately elevated in surface water and groundwater which is attributed to baseline influences from mineralised bedrock. The groundwater units are identified to be consistent; with the SSGS, the oxide and the WFBGS all being recognised as present in the Gringer Creek catchment. Refinement of the conceptual models in the Gringer Creek catchment is illustrated by a hydrogeological cross section constructed around the perimeter of RDA2 in Figure 36 and is summarised as follows:

1. The SSGS may potentially be thinner and contain less permeable lateritic gravels and hardcap in the Gringer Creek catchment.
2. The oxide thickness is variable in the Gringer Creek catchment but on average is thinner than at the other facilities in the Boddington Mine. Figure 36 illustrates that in particular the oxide is relatively thin (10 m or less) on the eastern side of RDA2. This potentially provides a greater hydraulic connection between the WFBGS and Gringer Creek.
3. Figure 36 illustrates that similar to the remainder of the Boddington Mine, the oxide is fully saturated in some locations, fully unsaturated in some locations, and partially saturated in other locations.
4. Groundwater discharge is a more significant control on the hydrochemistry of Gringer Creek than it is at 34 Mile Brook. The exact mechanisms are not clear, but could include:
    a. Direct discharge of groundwater from the SSGS and the WFBGS into the base of Gringer Creek.
    b. Groundwater discharge to tributaries of Gringer Creek (including the tributary monitored by GRCK04) followed by surface water contribution to Gringer Creek.
    c. Diffuse groundwater discharge to surface in summer, resulting in evaporated solutes being present in the catchments, which contribute to runoff chemistry in winter.

4. Monitoring recommendations

4.1 Objectives

Recommendations for ongoing monitoring of the Gringer Creek catchment during the design and construction of RDA2 are provided in this section. Objectives defined by Newmont Boddington for the monitoring were:

1. To ensure sufficient monitoring is undertaken to be compliant with any potential future changes to L8306 to permit the operation of RDA2.
2. To provide early warning of any potential influences of the operation of RDA2 on the receiving environment which will allow mitigation measures to be implemented if necessary.

Based on the updated conceptual model described in Section 3.6, potential influences of the operation of RDA2 on the receiving environment which will require monitoring are:

1. The potential for the combination of seepage from RDA2 and from the F1/F3 RDA to drive or increase cross catchment groundwater flow to the northwest.
2. On most of the western margin of RDA2 groundwater is relatively deep and vegetation is unlikely to be adapted to inundation (see the location of SBBR02 in Figure 36 for example). If groundwater mounding occurred in the west where RDA2 is bordered by jarrah forest there would be potential for impacts to vegetation health. To the east of RDA2 groundwater is naturally close to surface and this risk to vegetation is much lower.
3. To the east of RDA2 groundwater is naturally close to surface and is potentially contributing to surface water (see the locations of SBBR04 and SBBR13 in Figure 36 for example). If seepage should reach these locations and discharge, there would be potential for impacts to the surface water aquatic ecosystem.
4. If seepage or spills should enter the diversion drain around the northwest margin of RDA2 there would be potential for impacts to Gringer Creek.

Monitoring designed to address these risks is discussed in the following sections.

4.2 Surface water flow rate monitoring

For the purposes of monitoring the influences of RDA2, indicative flow rates in Gringer Creek are useful to aid the interpretation changes in surface water hydrochemistry. For this purpose, it is recommended that operation of the Gringer Creek station be continued, and that operation of the Gringer Creek DS station be discontinued as the reliability of gauging data from this site have been questioned. Daily flow volumes are recommended to be measured at the Gringer Creek station.

4.3 Surface water hydrochemical monitoring

The selection of surface water monitoring stations is based on the following considerations:

- Based on the expected discharge route for the upgradient diversions and discharge to Gringer Creek GRCK01, GRCK02 and GRCK03 are all on the main branch of Gringer Creek and upgradient of all RDA2 influences. Figures 23 and 24 identify that surface water hydrochemistry follows similar trends at GRCK01 and GRCK02, and Figures 32 to 35 identify that there are not typically major changes in surface water between GRCK01 and GRCK02. It is therefore recommended that upgradient monitoring is undertaken at GRCK01 and GRCK03.
- GRCK04 is potentially downgradient of releases from upgradient diversions from RDA2, and this tributary contributes low pH, high Fe water to Gringer Creek and monitoring should be continued.

- All of GRCK09, GRCK05, GRCK06, GRCK07 and GRCK08 are downgradient of the potential influences of RDA2. Figures 28 and 29 identify that surface water hydrochemistry follows similar trends at GRCK06 and GRCK07, and Figures 32 to 35 identify that there are not typically major changes in surface water between GRCK06 and GRCK07. Monitoring at GRCK07 is not required and monitoring downgradient of RDA2 is recommended to be undertaken at GRCK09, GRCK05, GRCK06 and GRCK08.
- Resulting surface water monitoring sites are summarised in Table 1 and are located as marked in Figure 37.

For the purposes of identifying any influences from RDA2 and meeting the requirements of L8306 monthly hydrochemical monitoring in flowing conditions is recommended, i.e. each site is visited once during the month, if flowing it is sampled, if not flowing note is made and it is not sampled. The analytes applied for hydrochemical analyses are recommended to be those defined in L8306, with the following notes:

- L8306 requires total metals to be monitored in surface water, whereas current Gringer Creek monitoring is for filterable metals and so the new suite should be instituted in time to collect baseline data prior to operating RDA2.
- L8306 requires analysis for titanium but Newmont Boddington interpret this is intended to be thallium, so thallium should be included, and titanium should not be monitored.
- Note that for the last several years the Annual Hydrological Review completed for L8306 has concluded that Hg, Se, Pb and Tl are not typically present in surface water or groundwater and that measuring total acidity has little application to hydrological analyses (e.g. BDH 2025b). If an application is made to have these analytes removed from the licence, they should also be removed from the Gringer Creek monitoring program.
- L8306 only requires WAD CN to be measured in surface water, it is recommended that Total CN also be monitored to provide the earliest possible warning of any influences from RDA2 in surface water.

The analytes described above (total metals concentrations as required by L8306) will be sufficient to identify any changes in surface water hydrochemistry and to identify whether RDA2 is the source of the changes. If it is proposed to go a further step and assess the potential for harm to occur to aquatic ecosystems associated with any future changes in surface water hydrochemistry then the monthly monitoring in all conditions is recommended, i.e. each site is visited once during the month, and sampled if water is present regardless of flow. In this case the analytes applied for hydrochemical analyses should be expanded to include:

- All the analytes prescribed by L8306.
- L8306 requires total metals to be monitored in surface water, however filterable metals concentrations are more relevant to the protection of aquatic ecosystems and therefore both filterable and total concentrations should be determined.
- Total hardness as $CaCO_3$ should be calculated for all samples, either by the laboratory or by Newmont Boddington as hardness is relevant to the toxicity of metals.
- Dissolved organic carbon should be determined in the laboratory as it is relevant to the toxicity of metals.
- Turbidity, Dissolved Oxygen and temperature should be measured in the field as they are relevant to the protection of aquatic ecosystems.
- Forms of nitrogen and phosphorous which are relevant to the protection of aquatic ecosystems should be determined in the laboratory.
- L8306 requires WAD CN to be measured, this should be expanded to include total CN and free CN with an appropriate detection limit.

4.4 Groundwater depth monitoring

Monitoring of groundwater depths is critical for the early identification of seepage influences, including groundwater mounding, changes in cross catchment groundwater flow conditions, changes in vertical hydraulic gradients, and changes in groundwater discharge locations. It is recommended that groundwater depth monitoring be undertaken every three months at all of the existing monitoring bores identified in Figure 37. Specifically bores relevant to the management of RDA2 are summarised in Table 1 and discussed as follows:

- Existing bores F1BR40D, BUBR6 and BUBR7 in Figure 37 are suitably located to monitor the combined influences of mounding associated with the F1/F3 RDA and RDA2.
- Figure 36 illustrates that the existing bores around the RDA2 perimeter provide monitoring in locations where groundwater is deep (and mounding may therefore impact vegetation) and locations where groundwater is shallow (discharge may be occurring and changes in groundwater quality may influence the surface water environment). However as discussed below replacement of SBBR02 and SBBR05 is recommended.
- Existing bore BUBR11 is dry, and there is lack of monitoring of potential cross catchment groundwater flow to the west of RDA2. Two new monitoring sites are recommended as discussed below.
- SBBR06, SBBR07 and SBBR08 provide monitoring of groundwater immediately downgradient of RDA2, but there is a lack of monitoring in the more distant receiving groundwater environment. Two new monitoring locations are recommended as discussed below.

Locations recommended for additional groundwater monitoring are illustrated in Figure 37. In each location a shallow bore screened in the SSGS, and a deep bore screened in the WFBGS are recommended. The actual locations for the bores would require adjustment to meet tenure and access requirements and to avoid any proposed infrastructure. Details of each bore are summarised in Table 1 and are discussed as follows:

- Figure 37 identifies that existing bore BUBR11 is suitably located to investigate mounding associated with both the F1/F3 RDA and RDA2, and to define groundwater flow directions near the catchment boundary. However there are no records of the construction details for BUBR11, and monitoring indicates the bore has been dry since 2011. Replacement of BUBR11 by a shallow (SBBRAS) and a deep bore (SBBRAD) is recommended.
- SBBRBD and SBBRBS are proposed to be constructed to the northwest of RDA2 to measure baseline groundwater flow directions (expected to be to the southeast) and to provide warning if mounding at RDA2 should cause groundwater flow directions to reverse. There may be granite outcrop in this area and the locations of the bores may need to be adjusted accordingly.
- SBBRCD/SBBRCS and SBBRDD/SBBRDD are proposed to be constructed on the southwest side of Gringer Creek in the receiving environment downgradient of RDA2. They will be used to define local vertical hydraulic gradients and to provide calibration data for modelling downgradient influences of RDA2. They will also provide early warning of any changes in groundwater elevations or groundwater chemistry in the receiving environment.
- Figure 36 illustrates that SBBR05 was screened in oxide, not in the WFBGS, and the bore has been dry since it was drilled. Replacement of this bore with SBBRED/SBBRES is recommended with the bores designed to provide monitoring data for the SSGS and for the WFBGS.
- Figure 36 identifies that SBBR02 does have a groundwater level, but the bore was screened in oxide and the WFBGS which is expected to be the primary zone for seepage migration was not intersected. Replacement of this bore with SBBRFD/SBBRFS is recommended with the bores designed to provide monitoring data for the SSGS and for the WFBGS.

- If any of the other bores in Table 1 should be decommissioned due to changes in RDA2 footprint or to allow for construction of ancillary infrastructure, replacement of those bores is also recommended.

It is unclear whether the elevations recorded for Gringer Creek catchment monitoring bores SBBR01 to SBBR09 reflect the ground level of the top of casing for the bore. It is recommended that either the original survey data be located and clarified, or the bores be resurveyed to ensure that groundwater elevations can be accurately calculated from the measured groundwater depths.

SBBR15D and SBBR15S are located within the footprint of RDA2. It is recommended that these bores (along with any other monitoring bores required to be decommissioned and any exploration holes identified in the footprint) be decommissioned by grouting from the base of casing back to surface.

The recommended frequency for groundwater depth monitoring is every three months. This will provide definition of seasonal trends and identify any longer term trends associated with RDA2 operation.

4.5 Groundwater hydrochemistry monitoring

It is recommended that groundwater hydrochemistry monitoring be undertaken every three months at the bores listed in Table 1. However samples should only be collected if there is sufficient water in the bore to collect a purged sample following the Newmont Boddington standard protocols.

Analytes determined in each groundwater sample should match those defined for groundwater in L8306, with the following notes:

- L8306 requires filterable metals to be monitored in groundwater, which matches the current sampling protocols for the Gringer Creek bores and should be continued.
- L8306 requires analysis for titanium but Newmont Boddington interpret this is intended to be thallium, so thallium should be included, and titanium should not be monitored.
- Note that for the last several years the Annual Hydrological Review completed for L8306 has concluded that Hg, Se, Pb and Tl are not typically present in surface water or groundwater and that measuring total acidity has little application to hydrological analyses (e.g. BDH 2025b). If an application is made to have these analytes removed from the licence, they should also be removed from the Gringer Creek monitoring program.

4.6 Potential limits

The current version of L8306 does not set any limits for surface water or groundwater but includes targets for pH and WAD CN concentrations in some surface water monitoring locations. It is recommended that this approach be continued when incorporating RDA2 into the licence taking account that:

- There is no WAD CN present in baseline surface water or groundwater, and the presence of WAD CN in operational conditions can be definitively ascribed to RDA2.
- For other hydrochemical parameters, there is a relatively small contrast between the expected hydrochemistry of the decant pond in RDA2 and the baseline hydrochemical range in groundwater and surface water chemistry. Setting hydrochemical limits would potentially be prone to false triggering, including at locations such as surface water site GRCK04 where some metals which are expected to be present at RDA2 are naturally elevated which is attributed to background mineralisation. Similarly monitoring bores such as SBBR02, SBBR03, SBBR14S and SBBR14D demonstrate naturally elevated metals concentrations in groundwater.

Potential influences of RDA2 on surface water hydrochemistry may be most reliably identified by comparing surface water hydrochemistry upgradient and downgradient of the facility, using the surface water monitoring locations described in Section 4.3. This comparison will allow background long term and seasonal trends to be discerned from the influence of RDA2. Potential influences of RDA2 on groundwater hydrochemistry may most reliably be identified by collecting a sufficient duration of baseline data to identify statistically significant departures in hydrochemistry occurring during operations.

Any groundwater mounding driven by potential seepage from RDA2 will occur well in advance of any changes in groundwater chemistry and will provide advance warning of changes in the receiving environment. Changes in groundwater depth near RDA2 will be assessed and will be compared against vegetation monitoring data as described in the RDA GMP which will be updated to include RDA2. If required, triggers could be set for shallowing of groundwater depths at individual bores and included in the RDA GMP, however these would be best defined after collecting a longer period of data to define the natural background changes across a large range of seasonal conditions.

Table 1: Recommended monitoring locations

Site	Easting GDA94	Northing GDA94	Collar Elevation (mAHD)	Top Screen (mBGL)	Base Screen (mBGL)	Purpose
Surface water						
GRCK01	444,735	6,392,961	NA	NA	NA	Gringer Creek upstream of all influences
GRCK03	445,586	6,391,018	NA	NA	NA	Gringer Creek upstream of all influences
GRCK04	445,040	6,390,732	NA	NA	NA	Tributary of Gringer Creek contributing metals and receiving upgradient diversions
GRCK05	445,588	6,387,588	NA	NA	NA	Gringer Creek downgradient of main embankment
GRCK06	446,250	6,386,340	NA	NA	NA	Gringer Creek downgradient of main embankment
GRCK08	447,982	6,384,738	NA	NA	NA	Gringer Creek receiving environment
GRCK09	446,338	6,388,632	NA	NA	NA	Gringer Creek downgradient of upgradient diversion discharge
Groundwater						
F1BR40D	443,578	6,383,268	338.45	27	30	Cumulative mounding from F1/F3 RDA and RDA2
F1BR40S	443,574	6,383,270	338.32	3	6	Cumulative mounding from F1/F3 RDA and RDA2
BUBR6	441,954	6,384,454	326.89	10	40	Cumulative mounding from F1/F3 RDA and RDA2
BUBR7	441,152	6,385,447	333.13	10	42	Cumulative mounding from F1/F3 RDA and RDA2
SBBR01	442,499	6,388,844	341.10	24.2	30.2	Monitor groundwater near surface at embankment
SBBR03	444,298	6,384,668	334.49	17	23	Upgradient of RDA2
SBBR04	445,352	6,386,666	255.42	16	22	Monitor groundwater near surface at embankment
SBBR06	445,785	6,387,107	250.58	0.2	6	Downgradient of RDA2
SBBR07	445,775	6,387,119	250.62	15.5	21.5	Downgradient of RDA2
SBBR08	445,720	6,386,107	264.32	18	24	Downgradient of RDA2
SBBR09	445,571	6,388,087	258.31	10.3	16.3	Upgradient of RDA2
SBBR10D	445,326	6,387,451	252.98	16	22	Monitor groundwater near surface at embankment
SBBR10S	445,328	6,387,450	252.99	3	6	Monitor groundwater near surface at embankment
SBBR11D	443,903	6,389,368	331.70	28	34	Upgradient of RDA2
SBBR11S	443,901	6,389,369	331.70	5	9	Upgradient of RDA2
SBBR12D	442,460	6,387,652	323.23	47	53	Monitor deep upgradient groundwater
SBBR12S	442,458	6,387,652	323.36	7	10	Monitor deep upgradient groundwater
SBBR13D	443,509	6,383,992	323.85	12.5	18.5	Monitor shallow upgradient groundwater
SBBR13S	443,511	6,383,991	323.85	6	9	Monitor shallow upgradient groundwater
SBBR14D	445,568	6,385,408	271.98	6	12	Downgradient of RDA2
SBBR14S	445,568	6,385,409	271.98	1	4	Downgradient of RDA2
SBBRAD/S	440,700	6,386,050	TBD	TBD	TBD	Monitor cross catchment groundwater flow
SBBRBD/S	442,470	6,389,840	TBD	TBD	TBD	Monitor cross catchment groundwater flow
SBBRCD/S	447,121	6,385,570	TBD	TBD	TBD	Downgradient of RDA2
SBBRDD/S	449,080	6,383,530	TBD	TBD	TBD	Downgradient of RDA2
SBBRED/S	445,107	6,384,969	TBD	TBD	TBD	Monitor deep upgradient groundwater
SBBRFD/S	441,446	6,386,199	TBD	TBD	TBD	Monitor deep upgradient groundwater

5. Conclusions and recommendations

5.1 Conclusions

All available surface water flow rate data, surface water hydrochemical data, groundwater depth data and groundwater hydrochemical data for the Gringer Creek catchment have been reviewed, and updated hydrological models have been developed for the location of RDA2.

In general, the conceptual models developed for the Boddington Mine in the catchments of 34 Mile Brook, Boggy Brook and House Brook and valid to apply to the Gringer Creek catchment. Surface water flow occurs only in the winter months. Low pH conditions are present in both groundwater and surface water and reflect a natural baseline condition caused by ferrolysis. TDS, sulphate, and filterable concentrations of Co, Mn, Fe, Ni and Zn may be moderately elevated in surface water and groundwater which is attributed to baseline influences from mineralised bedrock. The groundwater units are identified to be consistent; with the SSGS, the oxide and the WFBGS all being recognised as present in the Gringer Creek catchment. Refinement of the conceptual models in the Gringer Creek catchment is illustrated by a hydrogeological cross section constructed around the perimeter of RDA2 in Figure 36 and is summarised as follows:

1. The SSGS may potentially be thinner and contain less permeable lateritic gravels and hardcap in the Gringer Creek catchment.
2. The oxide thickness is variable in the Gringer Creek catchment but on average is thinner than at the other facilities in the Boddington Mine. Figure 36 illustrates that in particular the oxide is relatively thin (10 m or less) on the eastern side of RDA2. This potentially provides a greater hydraulic connection between the WFBGS and Gringer Creek.
3. Figure 36 illustrates that similar to the remainder of the Boddington Mine, the oxide is fully saturated in some locations, fully unsaturated in some locations, and partially saturated in other locations.
4. Groundwater discharge is a more significant control on the hydrochemistry of Gringer Creek than it is at 34 Mile Brook. The exact mechanisms are not clear, but could include:
    a. Direct discharge of groundwater from the SSGS and the WFBGS into the base of Gringer Creek.
    b. Groundwater discharge to tributaries of Gringer Creek (including the tributary monitored by GRCK04) followed by surface water contribution to Gringer Creek.
    c. Diffuse groundwater discharge to surface in summer, resulting in evaporated solutes being present in the catchments, which contribute to runoff chemistry in winter.

Based on the updated conceptual model, potential influences of the operation of RDA2 on the receiving environment which will require monitoring are:

1. The potential for the combination of seepage from RDA2 and from the F1/F3 RDA to drive or increase cross catchment groundwater flow to the northwest.
2. On most of the western margin of RDA2 groundwater is relatively deep and vegetation is unlikely to be adapted to inundation. If groundwater mounding occurred in the west there would be potential for impacts to vegetation health. To the east of RDA2 groundwater is naturally close to surface and this risk to vegetation is much lower.
3. To the east of RDA2 groundwater is naturally close to surface and is potentially contributing to surface water. If seepage should reach these locations and discharge, there would be potential for impacts to the surface water aquatic ecosystem.
4. If seepage or spills should enter the diversion drain around the northwest margin of RDA2 there would be potential for impacts to Gringer Creek.

5.2 Recommendations

A monitoring regime has been developed which addresses the potential risks to the receiving environment as a result of the operation of RDA2 and comprises:

1. Daily flow monitoring at station Gringer Creek.
2. Hydrochemical sampling of surface water monthly at six locations on Gringer Creek upstream and downstream of RDA2.
3. Groundwater depth and groundwater hydrochemistry monitoring every three months at 21 existing bores and at 12 proposed new bores.
4. Permanent decommissioning of any bores within facility footprints by grouting to surface.

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List of Figures

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6390000 6385000 6380000 6375000 6370000 6365000

Legend

- Surface water catchment boundaries
- Proposed RDA2
- Granite/greenstone boundary
- Drainage

0 1.25 2.5 Km

N

Map projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia, Zone 50

South Dandalup River
F1/F3 RDA
Wattle Pit
R4 RDA
Pillow Swamp
Thirty Four Mile Brook
Boomerang Swamp
Round Swamp
WD9
North Pit
South Pit
WD8
WD7
Ginger Creek
Boggy Brook
Bannister River
Boggy Brook
House Brook
Hotham River
Long Gully

435000 440000 445000 450000

G:\Projects\BDH Projects\Boddington - Newmont\GIS\Figures\NBG Baseline Hydrological Assessment for RDA2

BIG DOG HYDROGEOLOGY

RDA2 hydrological setting

Figure 1

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2

435000 437500 440000 442500 445000 447500 450000 452500 455000

6392500 6390000 6387500 6385000 6382500 6380000 6377500 6375000 6372500 6370000 6367500

MB_H11 MB_H01 MB_H10 MB_H02 MB_H03 MB_H09 MB_H04 MB_H07 MB_H08 MB_H13 MB_H14

SBBR11S SBBR11D SBBR01 SBBR09 SBBR12S SBBR12D SBBR10S SBBR10D BH03 SBBR07 SBBR06 SBBR04 BH02 SBBR15S SBBR15D SBBR08 BH01 SBBR14S SBBR14D SBBR05 SBBR03 SBBR13D SBBR13S

BUBR11 SBBR02 BUBR10 BUBR7 BUBR6 BUBR5 BUBR16 BUBR13 BUBR2 BUBR15 BUBR12

F1BR45S F1BR45D F1BR44D F1BR44S F1BR43S F1BR43D F1BR34S F1BR34D F1BR33S F3BR19 F1BR33D F1BR35S F1BR35D F1BR31S F1BR31D F1BR32S-2 F1BR32D F1BR30S-2 F1BR30D F1BR36S F1BR36D F1BR37D F1BR37S F1BR28S-2 F1BR28D F1BR29D F1BR29S F1BR27D F1BR27S-2 F1BR26S-2 F1BR26D F1BR25S F1BR25D-2 F1BR25D F1BR24D-2 F1BR24S F1BR24D F1BR38S-2 F1BR38D F1BR40S F1BR40D F1BR39S F1BR39D-2 F1BR39D F1BR41S F1BR41D F3BR23 F1BR42S F1BR42D F1BR23D F1BR23S F1BR22D F1BR22S-2 F1BR20D F1BR20S F1BR18S F1BR18D F1BR46 O234BR3 F1BR16S-2 F1BR16D F1BR15D F1BR15S-2 F1BR21S-2 F1BR21D F1BR19D F1BR19S F1BR48 F1BR17S-2 F1BR17D F1BR47 F1BR8

MUBR1 MUBR2 MUBR3 MUBR4

F1/F3 RDA

R4 RDA

R4BR97 R4BR99 R4BR98 R4BR95 R4BR94 R4BR92 R4BR89 R4BR88 R4BR86 R4BR81 R4BR75 R4BR72 R4BR13 R4BR11 R4BR8 R4BR109 R4BR85 R4BR84 R4BR102S R4BR102D R4BR108S R4BR108D R4BR106S R4BR106D R4BR103S R4BR103D R4BR104S R4BR104D R4BR107S R4BR107D R4BR105S R4BR105D

Deewon 2 Coleman 2 Coleman 3 Coleman 1 Roberts 1 Westwood 8 Westwood 4 Westwood 5 Westwood 1 Westwood 3 Heharo 1

WTBR1 WTBR2 WTBR3 DeepVWP02

WD9BR3 WD9BR4 WD9BR2 WD9BR5 WD9BR1 NPBR2 NPBR1

PISWPZ1 PISWPZ2 PISWPZ3A PISWPZ3B Pillow Swamp

BMSWPZ3 BMSWPZ2 BMSWPZ1A BMSWPZ1B Boomerang Swamp

Q2PZ1A Q2PZ1B 34BR8

Round Swamp

MPBR1 RNSWPZ1 RNSWPZ3A RNSWPZ3B RNSWPZ2 ESBR1

HGPZ31A HGPZ31B HGPZ32 HGPZ33 HGPZ30A HGPZ30B

N4921-1A N4922-2A

K3PZ1B K3PZ1A P2PZ1B P2PZ1A

LPBR1-A LPBR1

SPBR1

WD8BR7 WD8BR6 WD8BR5 WD8BR4 WD8BR2 WD8BR3 WD8BR1

N5005-1A IWS07

WHVWP01 WHBR2 WHBR1 WHBR5S WHBR5D

WD7BR1D WD7BR1S WD7BR13 WD7BR2D WD7BR3D WD7BR5D WD7BR7 WD7BR5S WD7BR9 WD7BR10 WD7BR6 WD7BR4 WD7BR12

DeepVWP01

HBBR1 HBBR2 GMRBR1 GMRBR2 HRBR8

HFBR3 HFBR2 HFBR1 HFBR9 HFBR7 HFBR5 HFBR4 HFBR13 HFBR10 HFBR6 HFBR15 HFBR12 HFBR11 HFBR8 HFBR14

HFVWP01 HFVWP02

HRVWP01 HRVWP02 HRBR2 HRBR1S HRBR1D

HDBR01

South Dandalup River Ginger Creek Boggy Brook House Brook Bannister River Hotham River

0 1 2 Km

N

Map projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia, Zone 50

Legend

- Regional standpipe bore
- Decommissioned monitoring bore
- Completed deep VWP
- Completed shallow VWP
- Operational water supply bore
- South32 monitoring bore
- Proposed RDA2
- Granite/greenstone boundary
- Drainage

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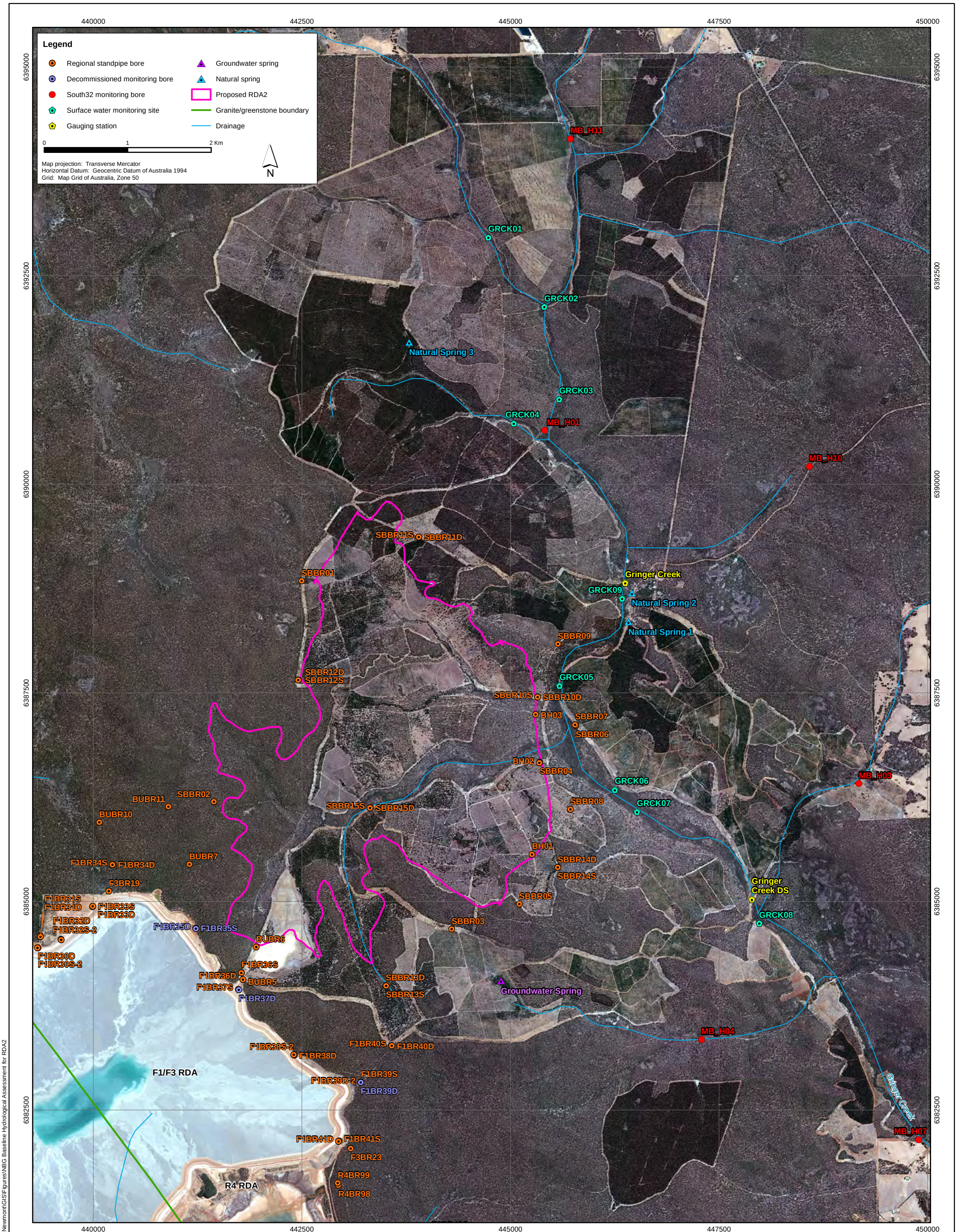
BIG DOG HYDROGEOLOGY

Regional groundwater monitoring locations

Figure 2

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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BIG DOG HYDROGEOLOGY

RDA2 groundwater and surface water monitoring locations

Figure 3

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2

440000 442500 445000 447500 450000

6395000 6392500 6390000 6387500 6385000 6382500

Legend

- Regional standpipe bore
- Decommissioned monitoring bore
- South32 monitoring bore
- Surface water monitoring site
- Gauging station
- Groundwater spring
- Natural spring
- RDA2 upgradient diversions
- Discharge to Gringer Creek
- Surface water flow direction
- Proposed RDA2
- Granite/greenstone boundary
- Drainage

Topography (m AHD)

486

0

0 1 2 Km

N

Map projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia, Zone 50

MB_H11
GRCK01
GRCK02
Natural Spring 3
GRCK03
GRCK04
MB_H01
MB_H10
SBBR11S
SBBR11D
SBBR01
Gringer Creek
GRCK09
Natural Spring 2
Natural Spring 1
SBBR09
SBBR12D
SBBR12S
GRCK05
SBBR10S
SBBR10D
BH03
SBBR07
SBBR06
BH02
SBBR04
GRCK06
MB_H03
BUBR11
SBBR02
BUBR10
SBBR15S
SBBR15D
SBBR08
GRCK07
BH01
F1BR34S
F1BR34D
BUBR7
SBBR14D
SBBR14S
F3BR19
Gringer Creek DS
F1BR31S
F1BR31D
F1BR33S
F1BR33D
SBBR05
GRCK08
F1BR32D
F1BR32S-2
F1BR35D
F1BR35S
SBBR03
BUBR6
F1BR30D
F1BR30S-2
F1BR36S
F1BR36D
BUBR5
F1BR37S
F1BR37D
SBBR13D
SBBR13S
Groundwater Spring
MB_H04
F1BR38S-2
F1BR38D
F1BR40S
F1BR40D
F1/F3 RDA
F1BR39S
F1BR39D-2
F1BR39D
Gringer Creek
MB_H07
F1BR41D
F1BR41S
F3BR23
R4BR99
R4BR98
R4 RDA

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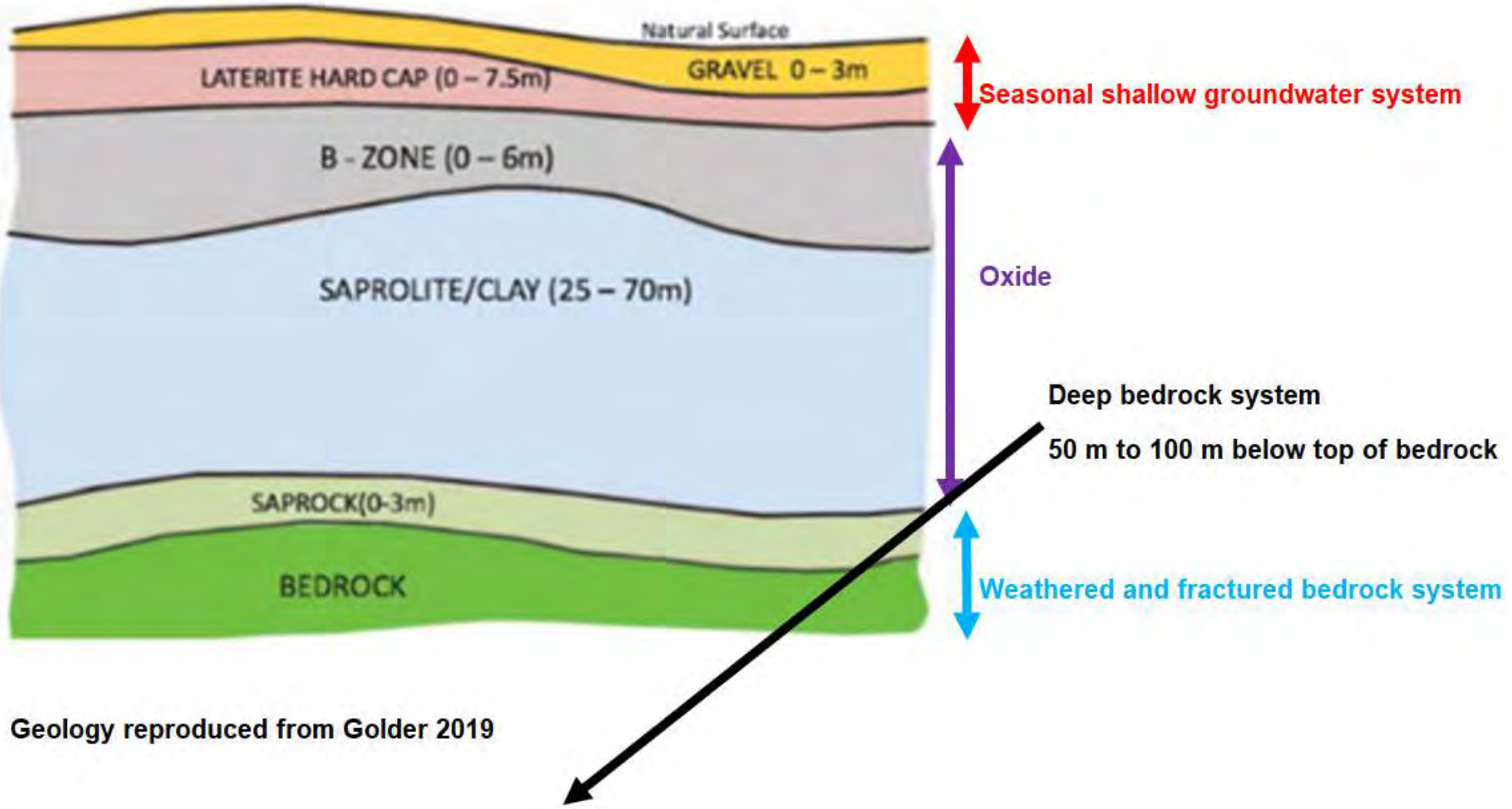
BIG DOG HYDROGEOLOGY

Current topography and surface water flow directions at RDA2

Figure 4

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

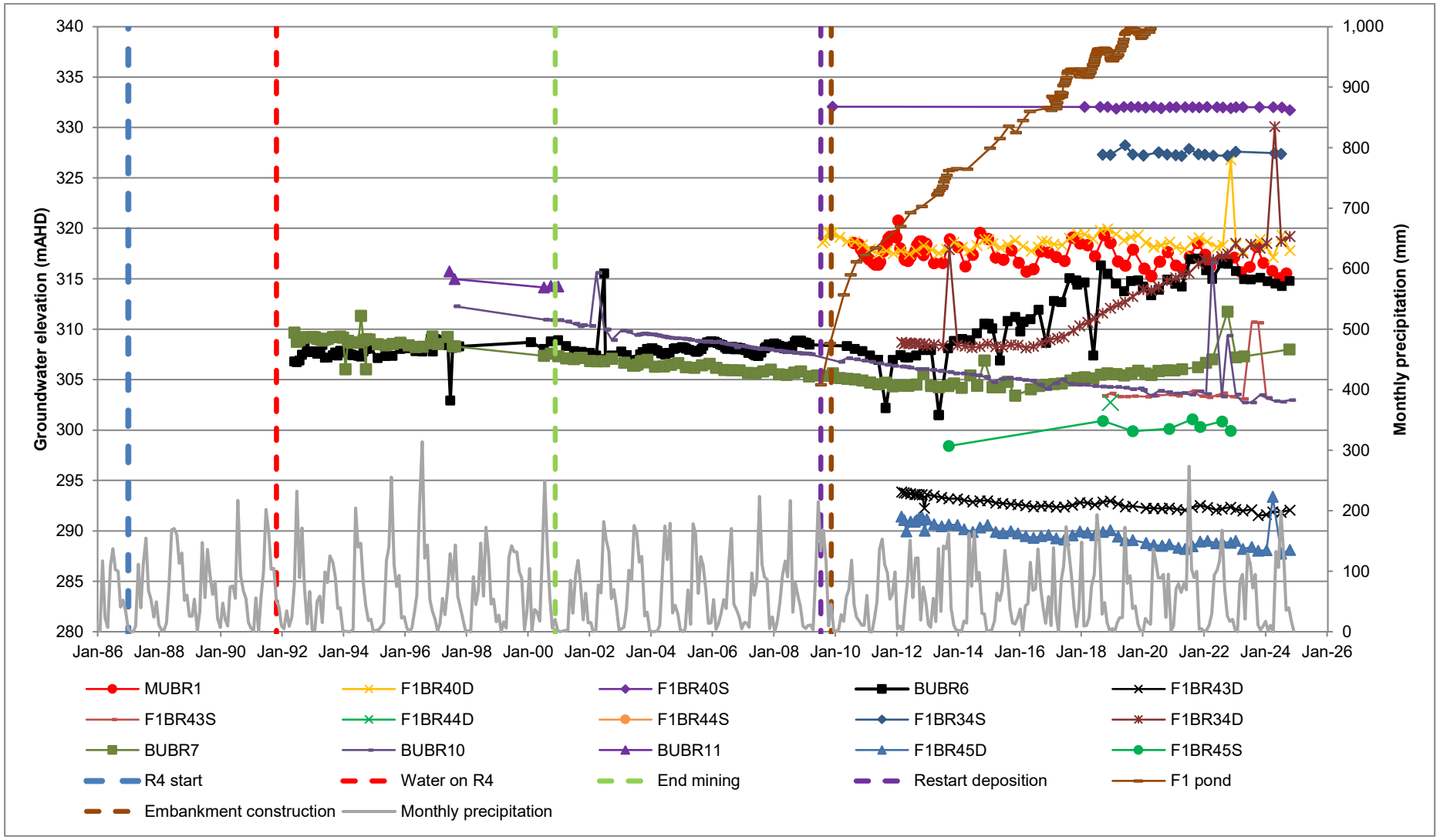
BIG DOG HYDROGEOLOGY

Schematic geological and hydrogeological section

Figure 5

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

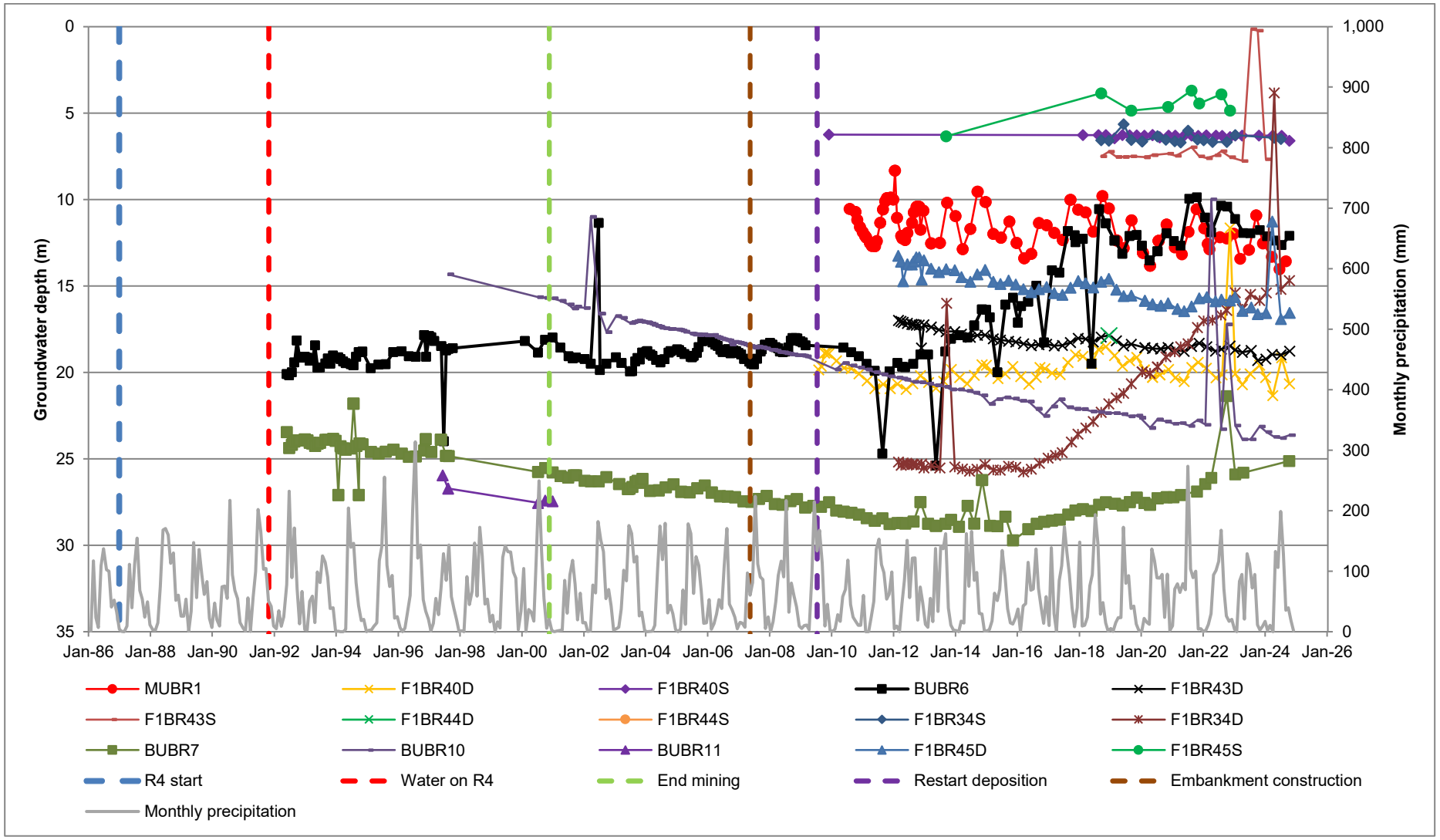
BIG DOG HYDROGEOLOGY

Groundwater elevations - regional

Figure 6

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

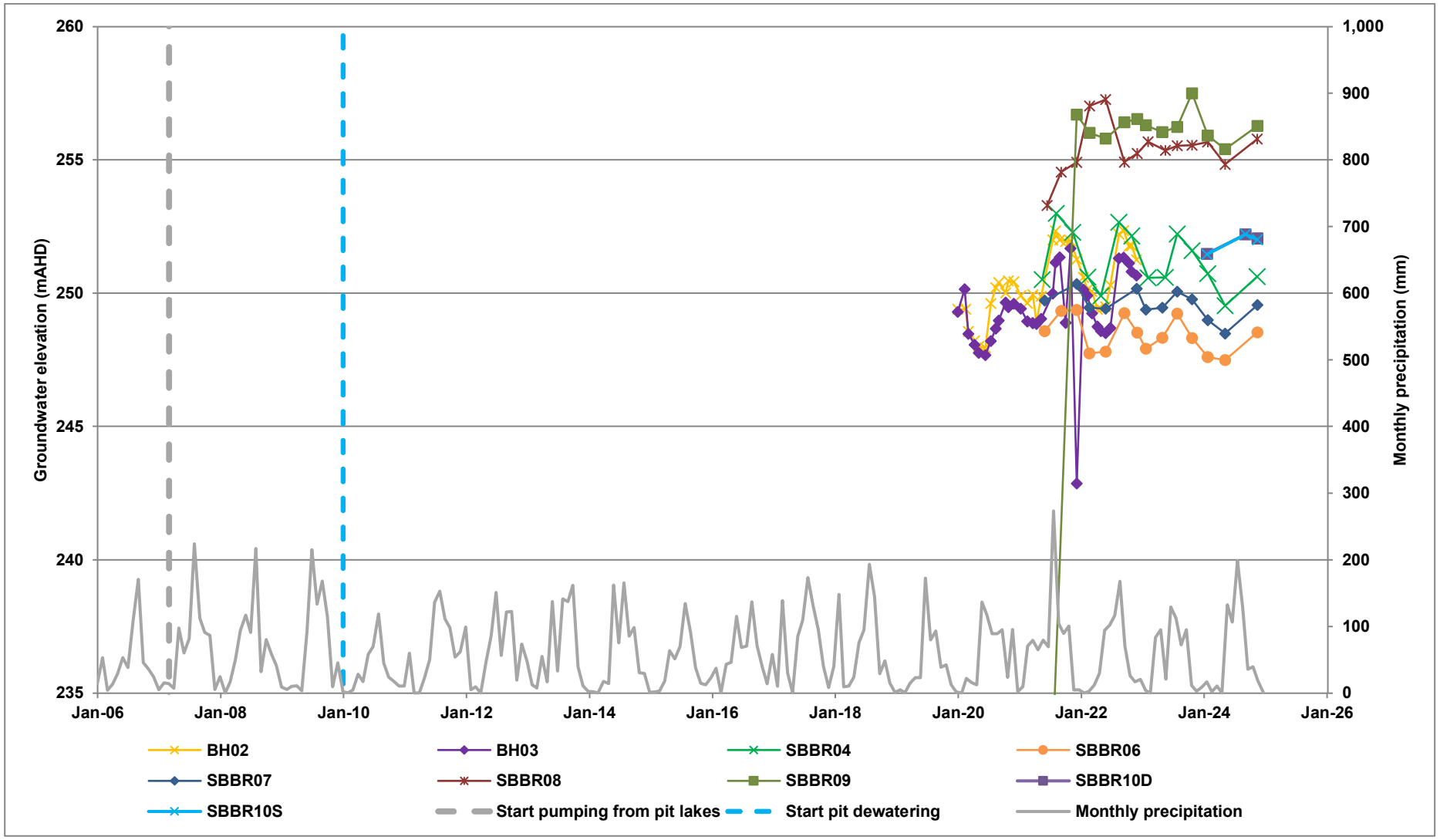
BIG DOG HYDROGEOLOGY

Groundwater depths - regional

Figure 7

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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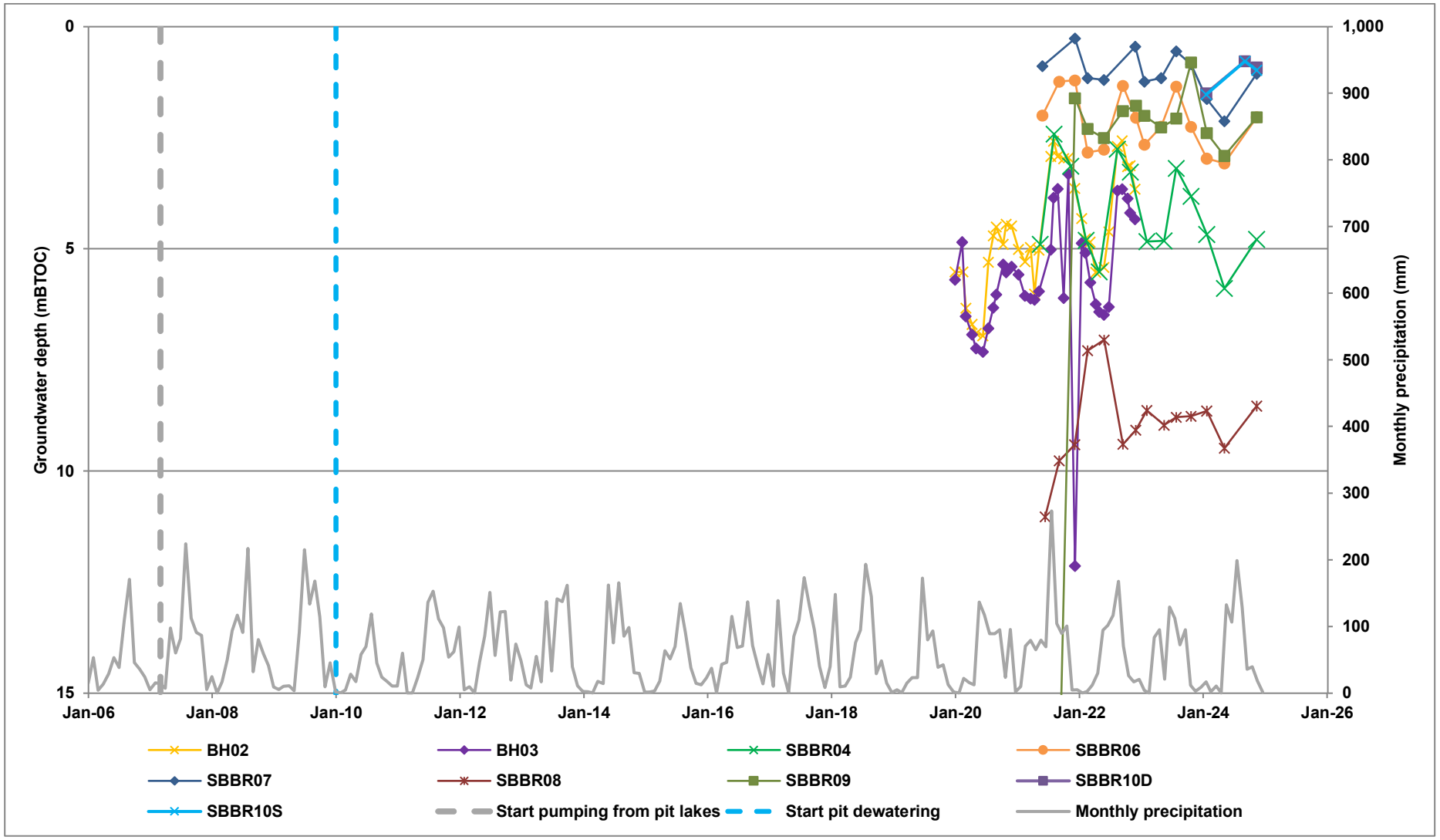
BIG DOG HYDROGEOLOGY Pty Ltd

Groundwater elevations - Gringer Creek part 1

Figure 8

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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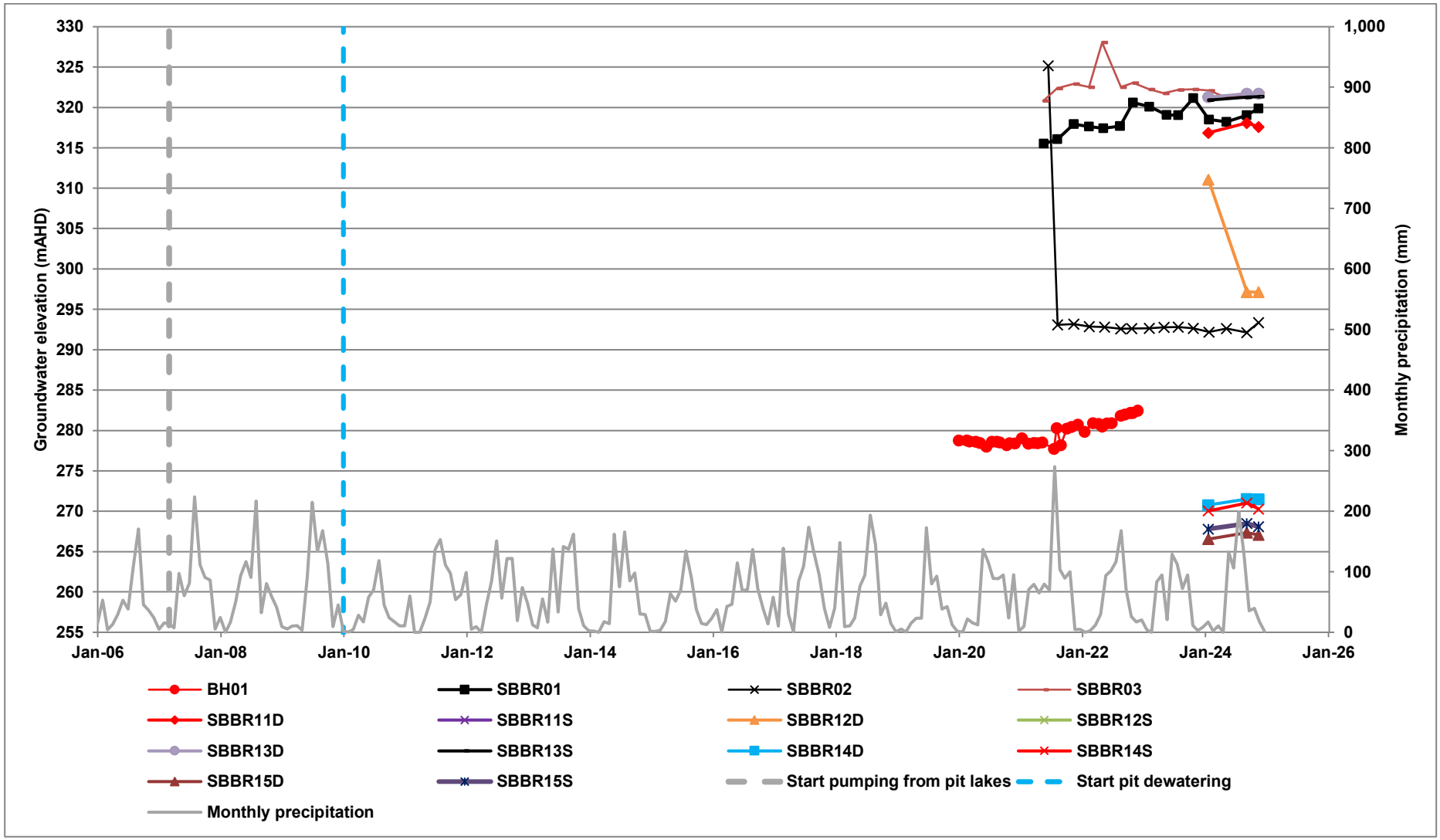
BIG DOG HYDROGEOLOGY Pty Ltd

Groundwater depths - Gringer Creek part 1

Figure 9

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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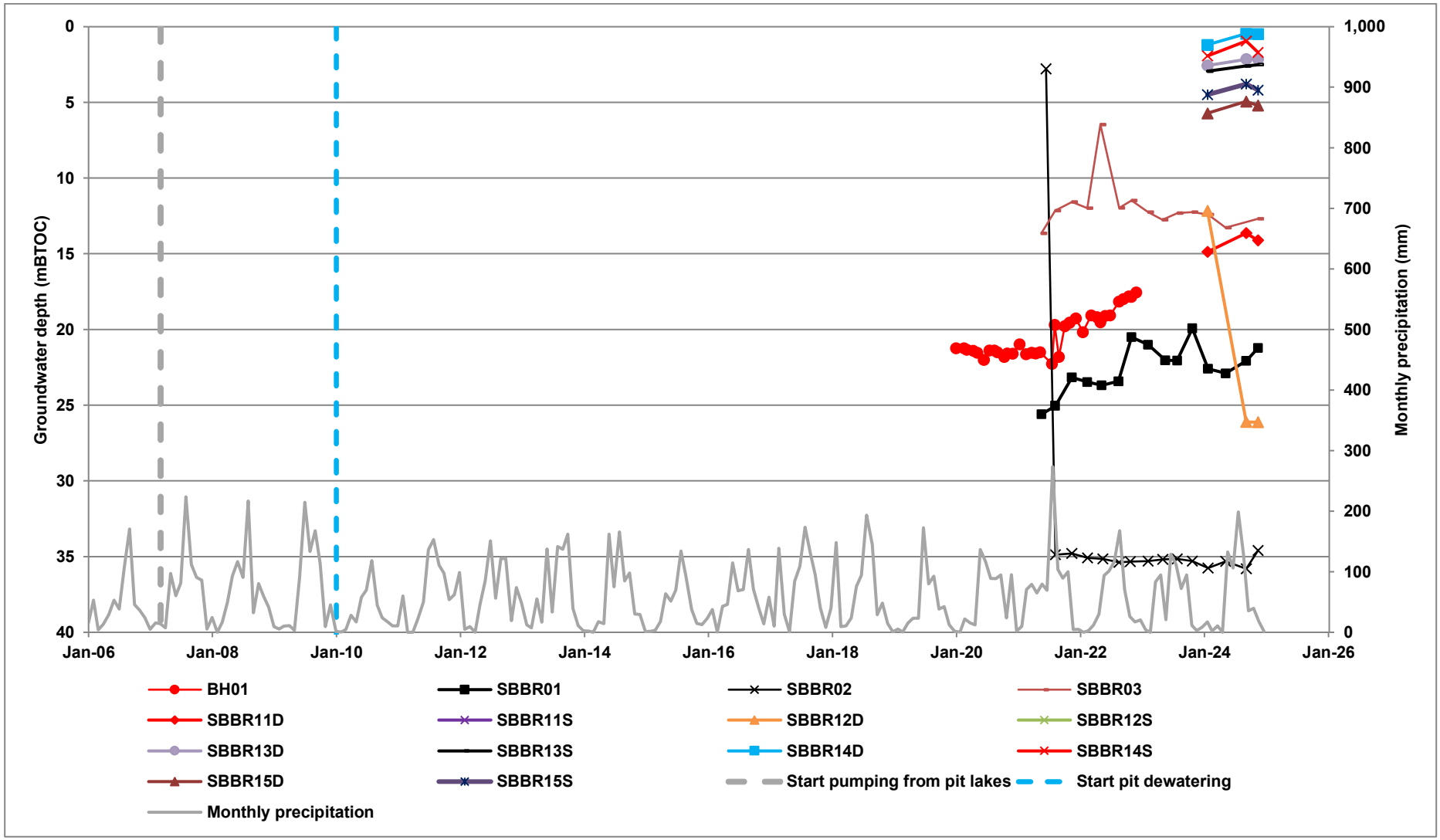
BIG DOG HYDROGEOLOGY

Groundwater elevations - Gringer Creek part 2

Figure 10

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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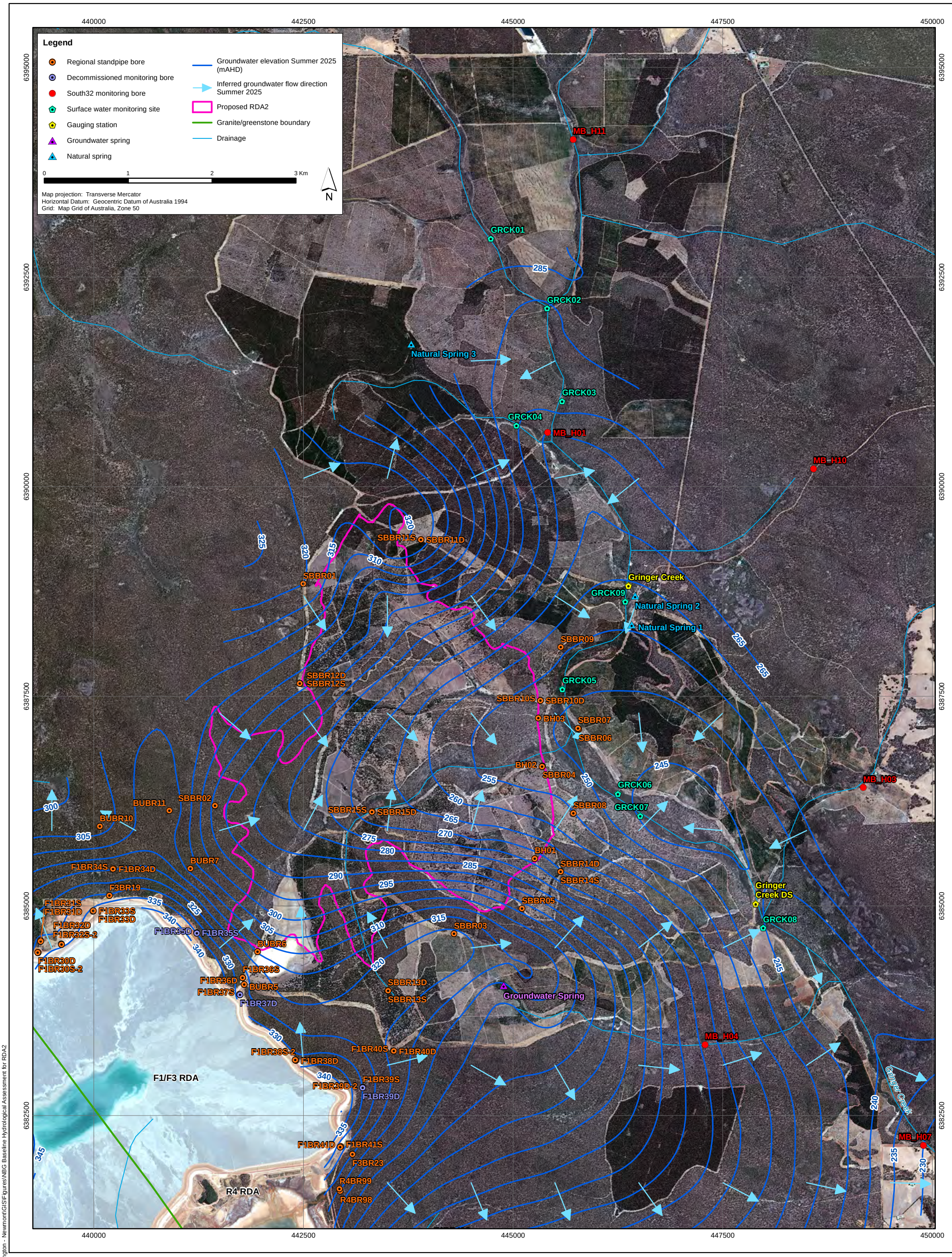
BIG DOG HYDROGEOLOGY Pty Ltd

Groundwater elevations - Gringer Creek part 2

Figure 11

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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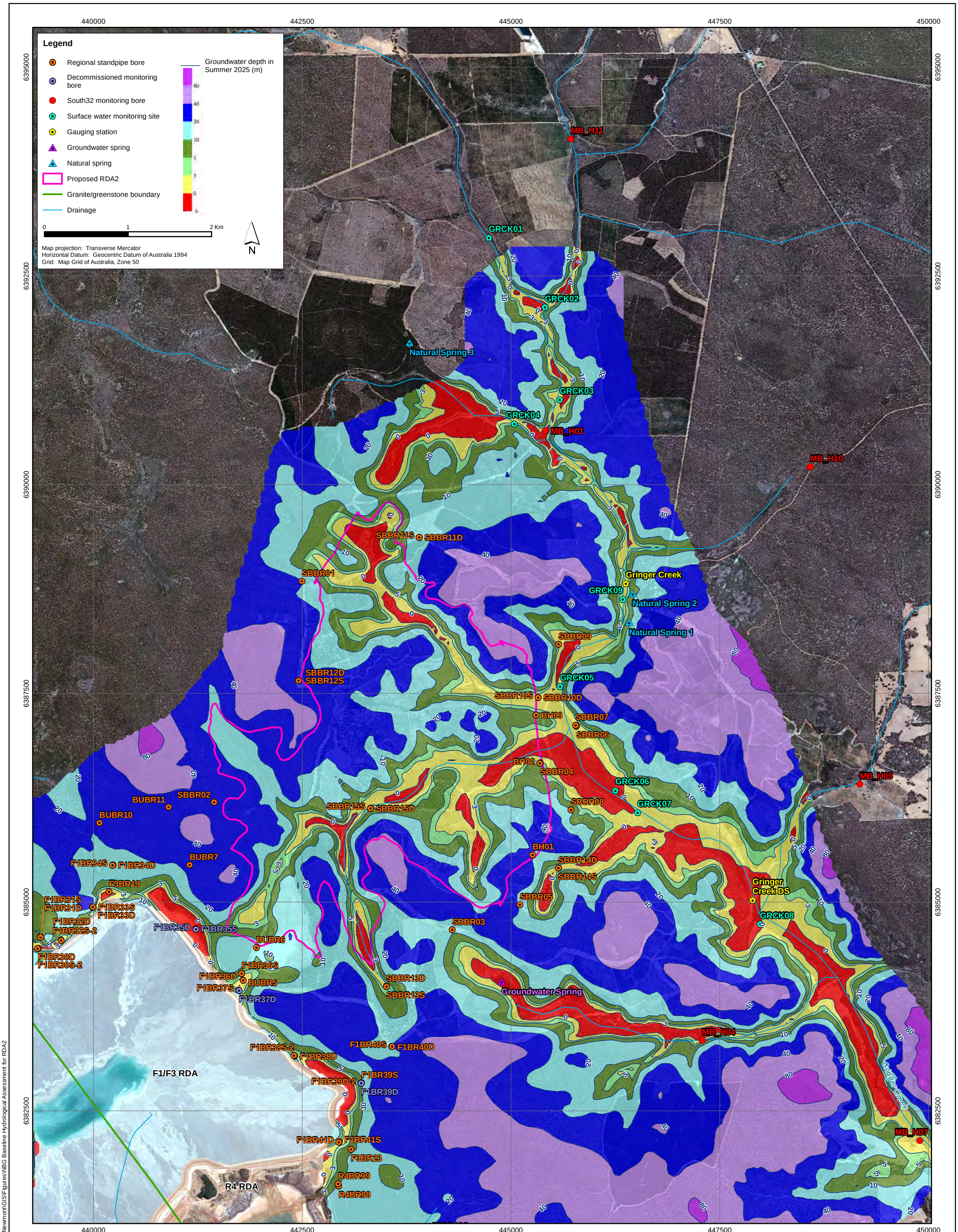
BIG DOG HYDROGEOLOGY

Groundwater elevations and flow directions in summer 2025

Figure 12

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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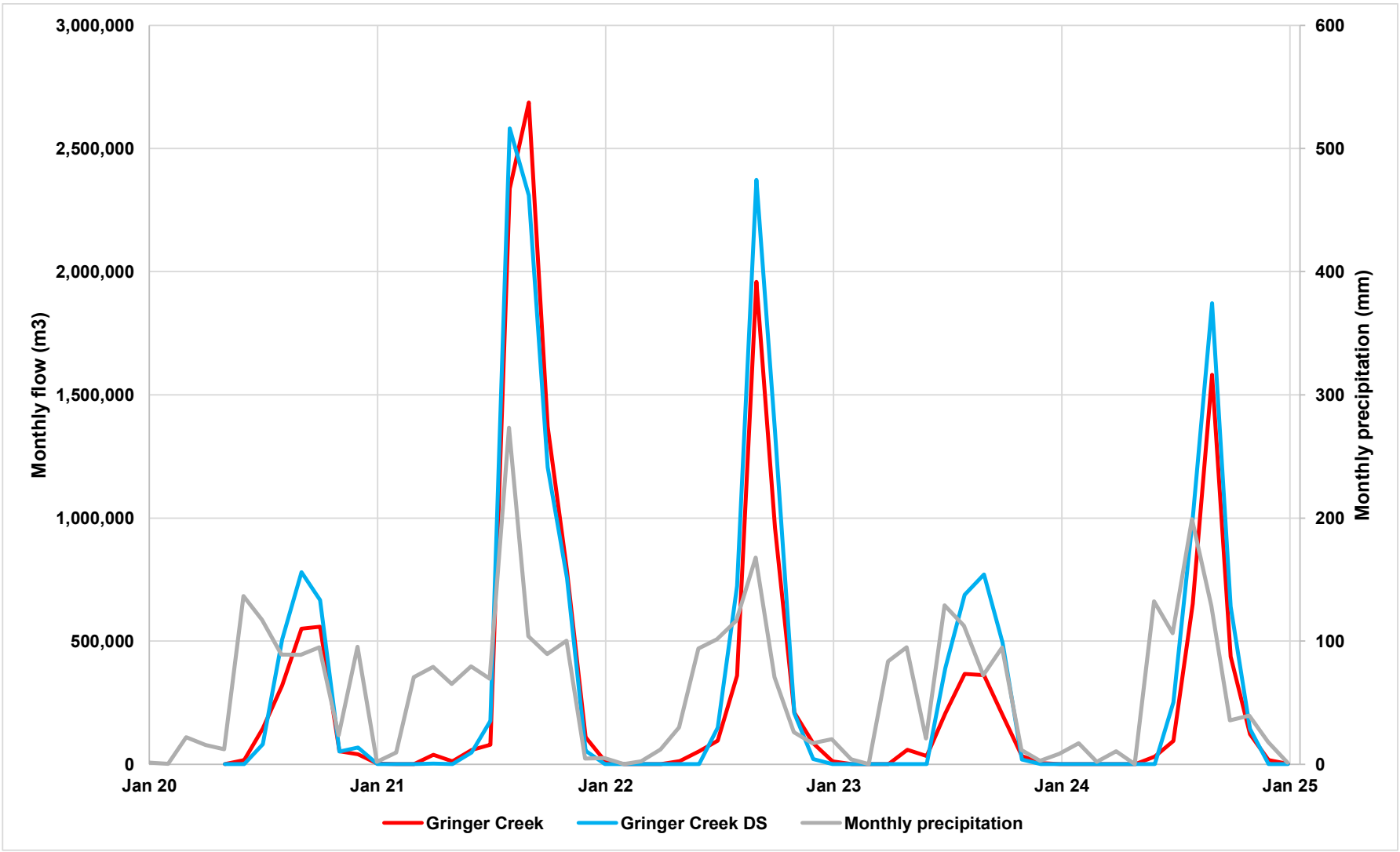
BIG DOG HYDROGEOLOGY

Groundwater depths in summer 2025

Figure 13

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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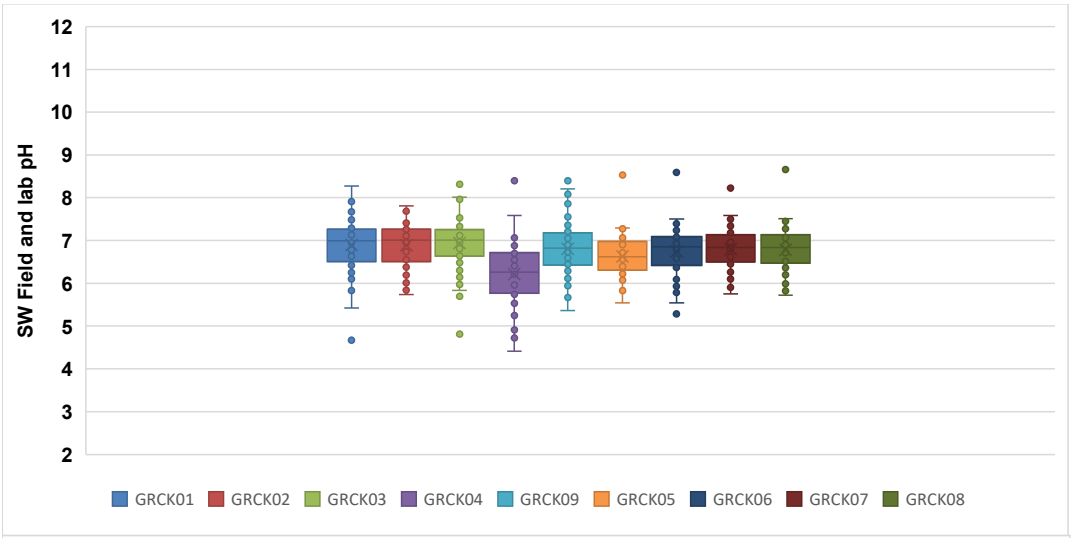
BIG DOG HYDROGEOLOGY

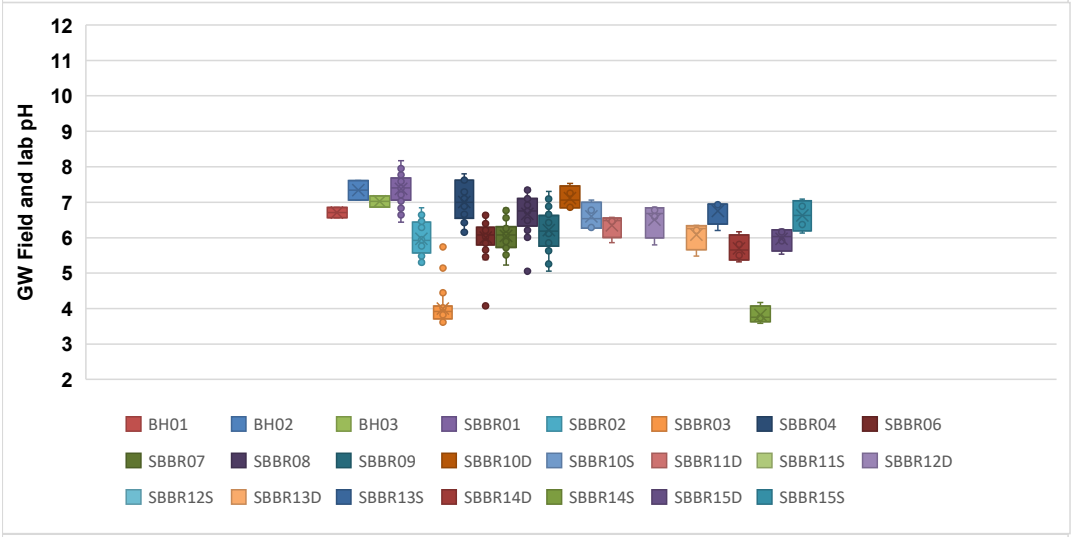
Monthly surface water flow volumes

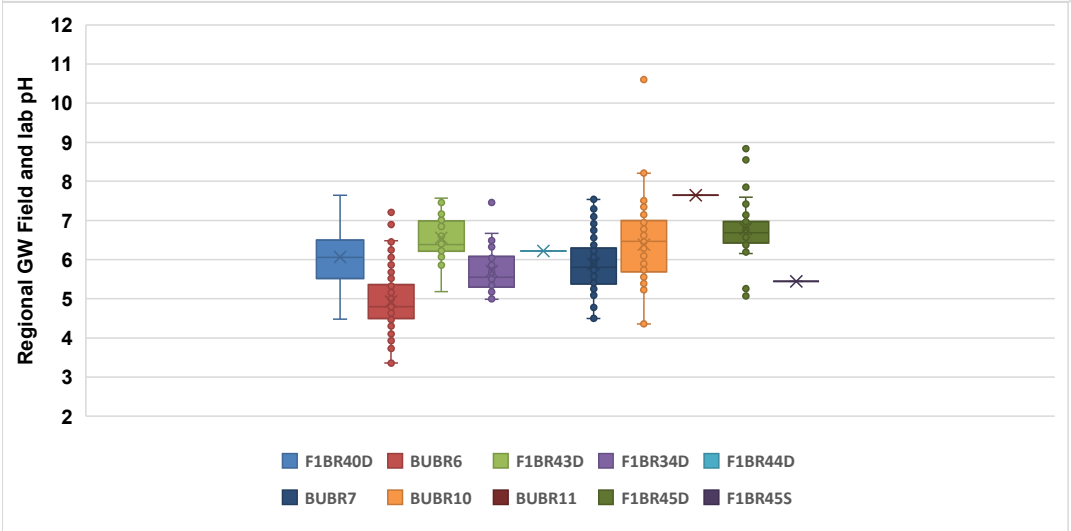
Figure 14

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







pH in surface water and groundwater

Figure 15

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2

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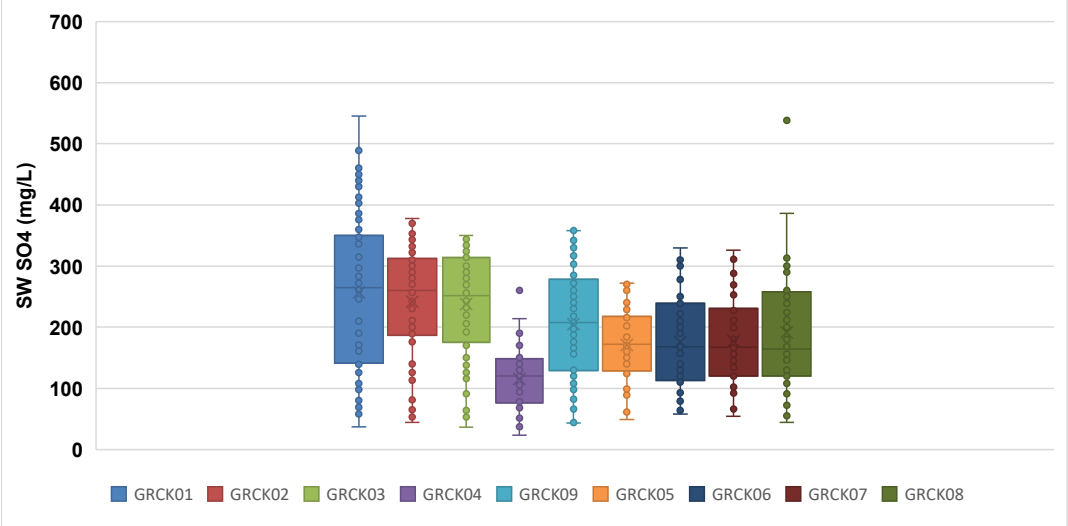

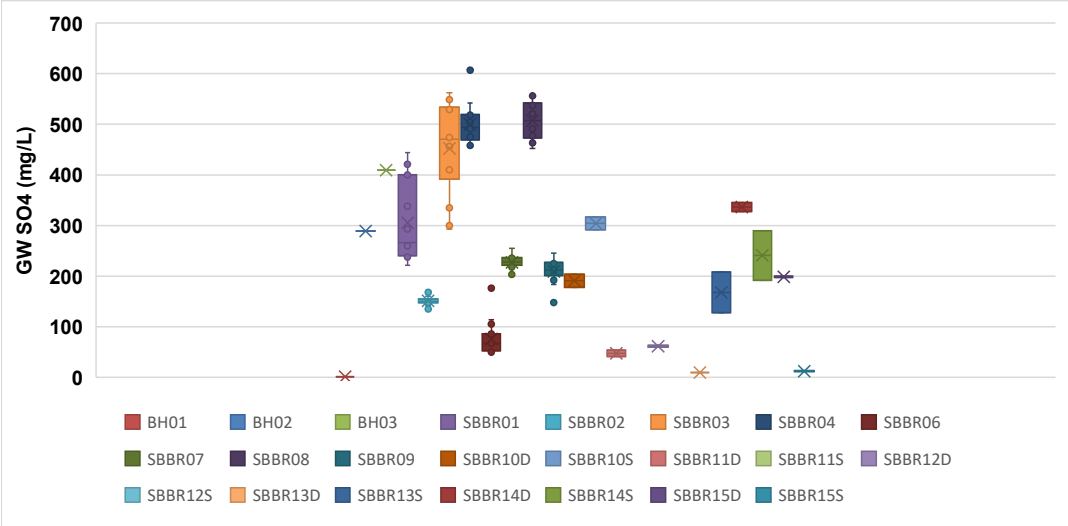

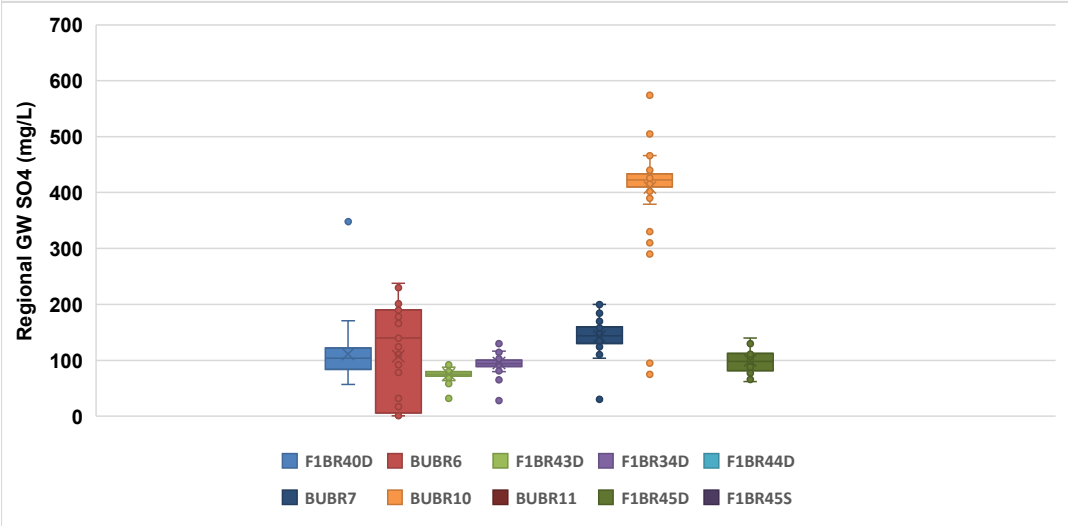

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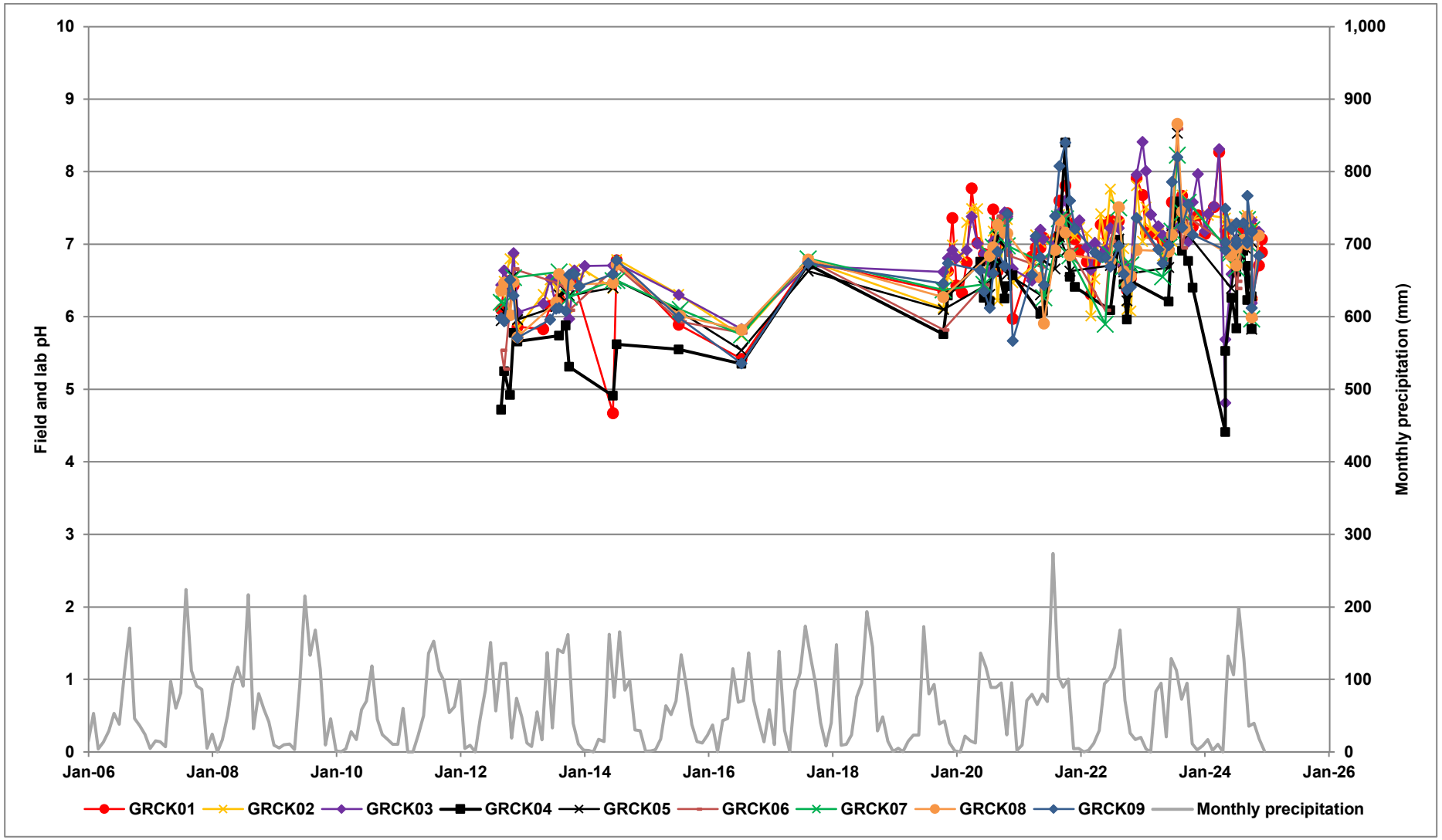
BIG DOG HYDROGEOLOGY

Sulphate in surface water and groundwater

Figure 16

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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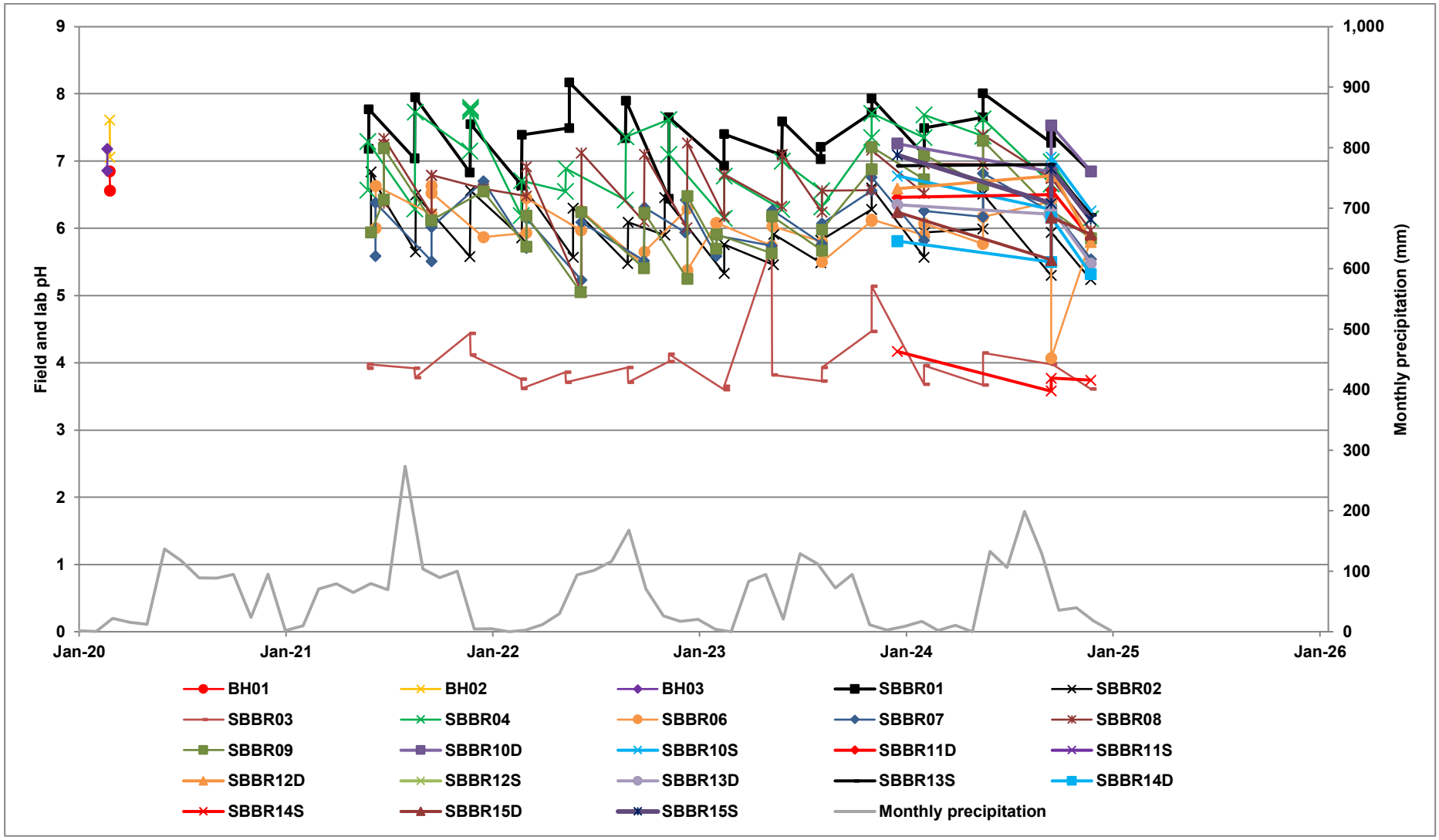
BIG DOG HYDROGEOLOGY

pH trends in Gringer Creek surface water

Figure 17

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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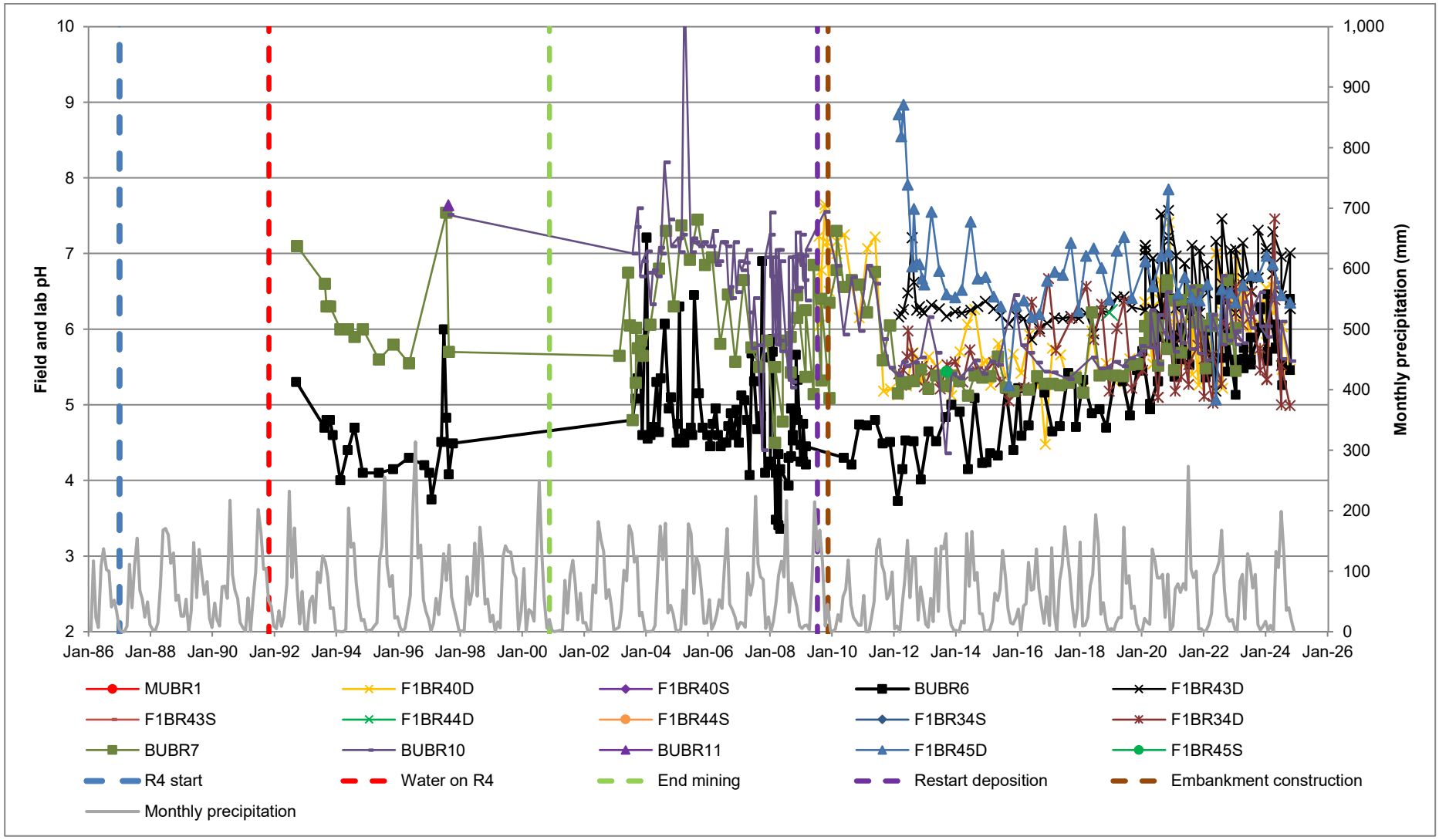
BIG DOG HYDROGEOLOGY Pty Ltd

pH trends in Gringer Creek groundwater

Figure 18

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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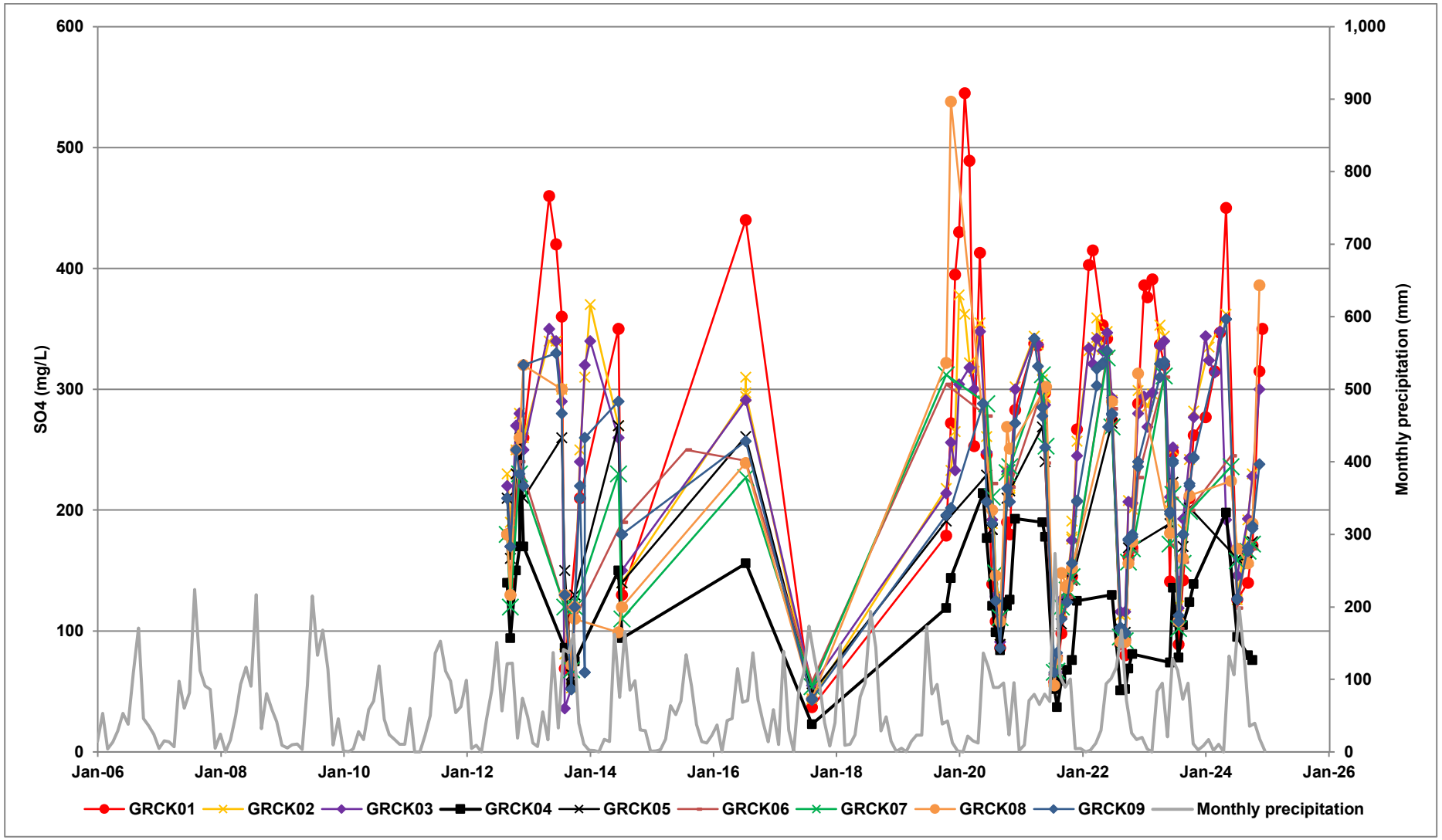
BIG DOG HYDROGEOLOGY

pH trends in regional groundwater

Figure 19

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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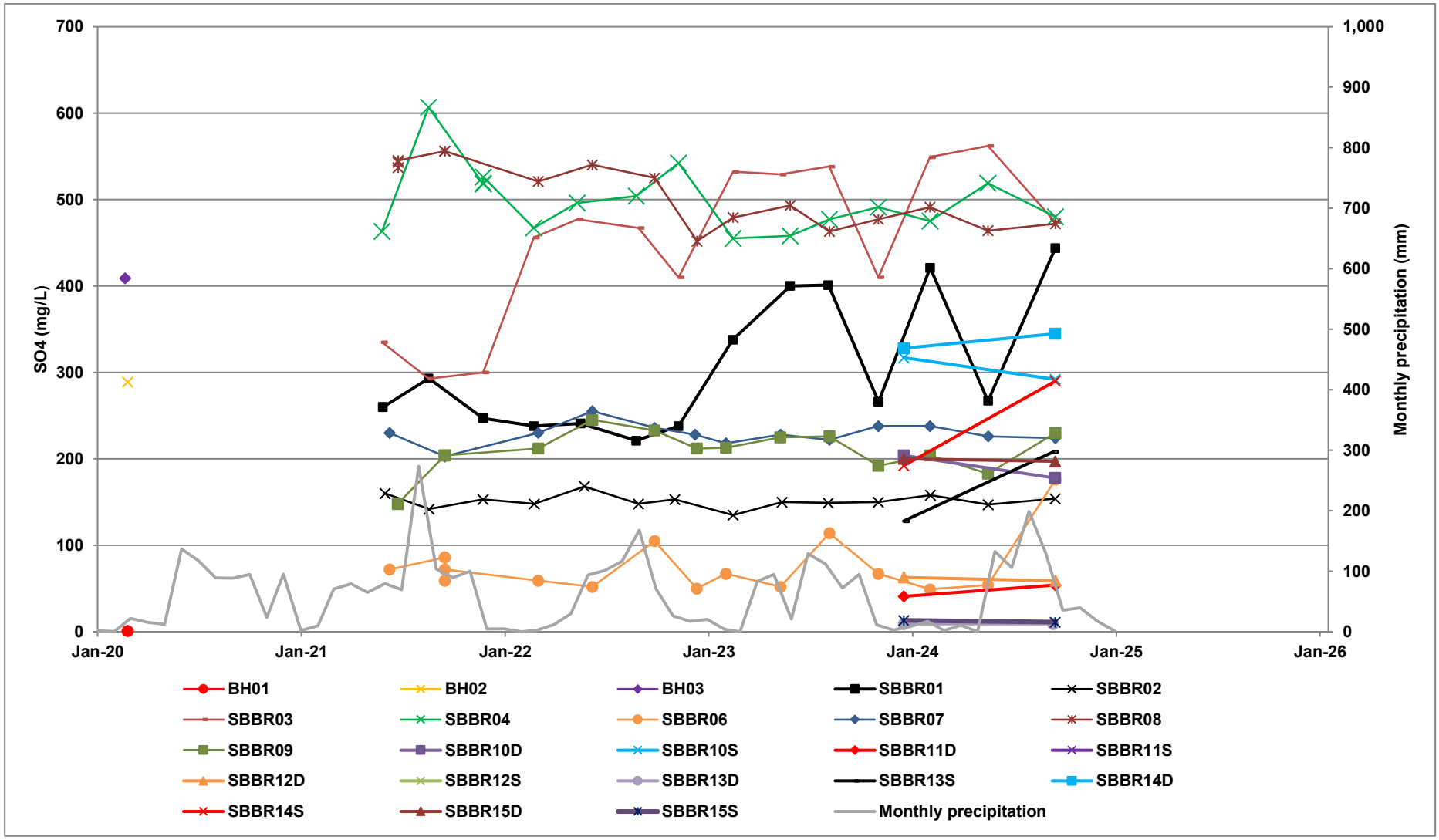
BIG DOG HYDROGEOLOGY Pty Ltd

Sulphate trends in Gringer Creek surface water

Figure 20

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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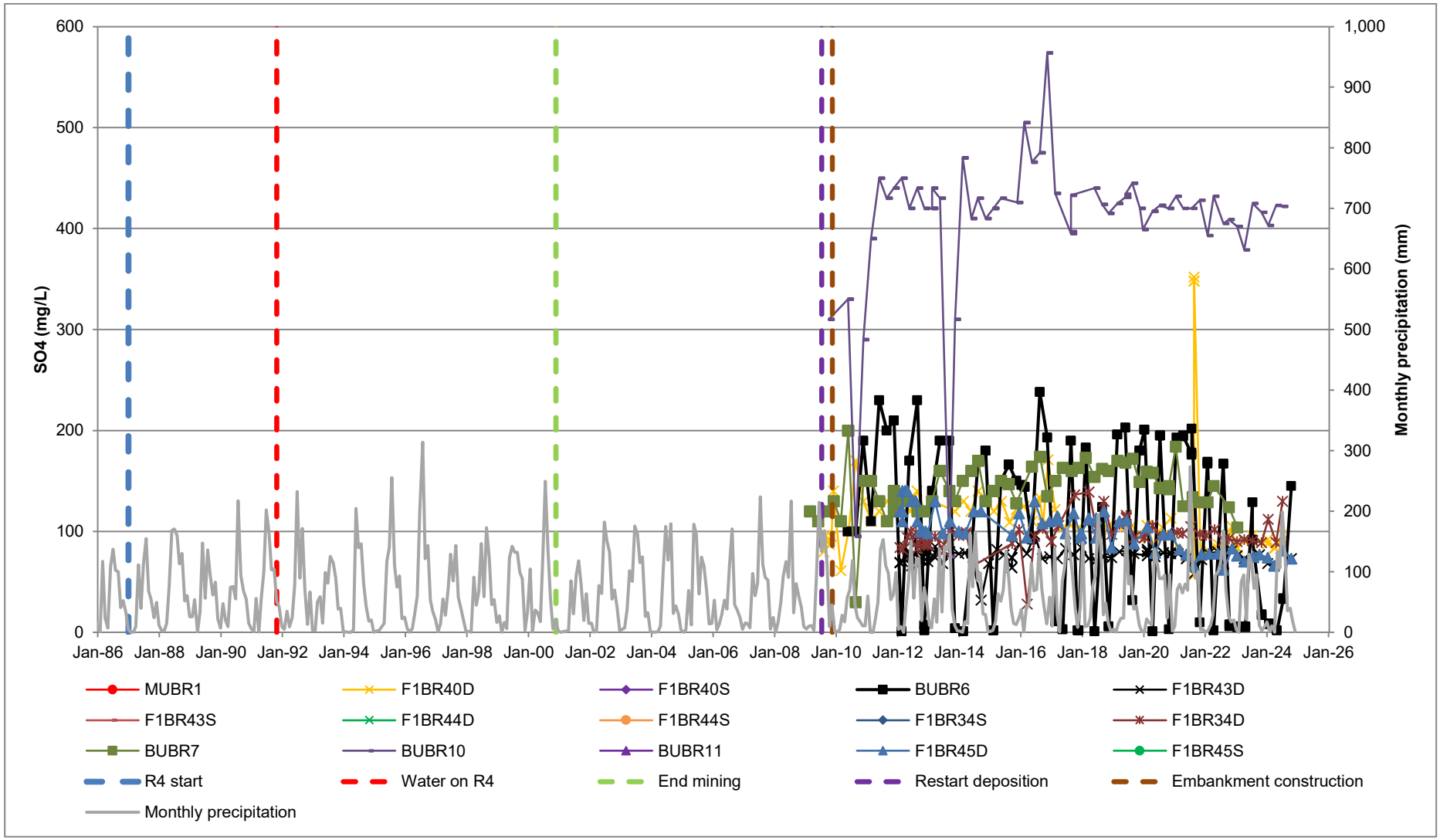
BIG DOG HYDROGEOLOGY Pty Ltd

Sulphate trends in Gringer Creek groundwater

Figure 21

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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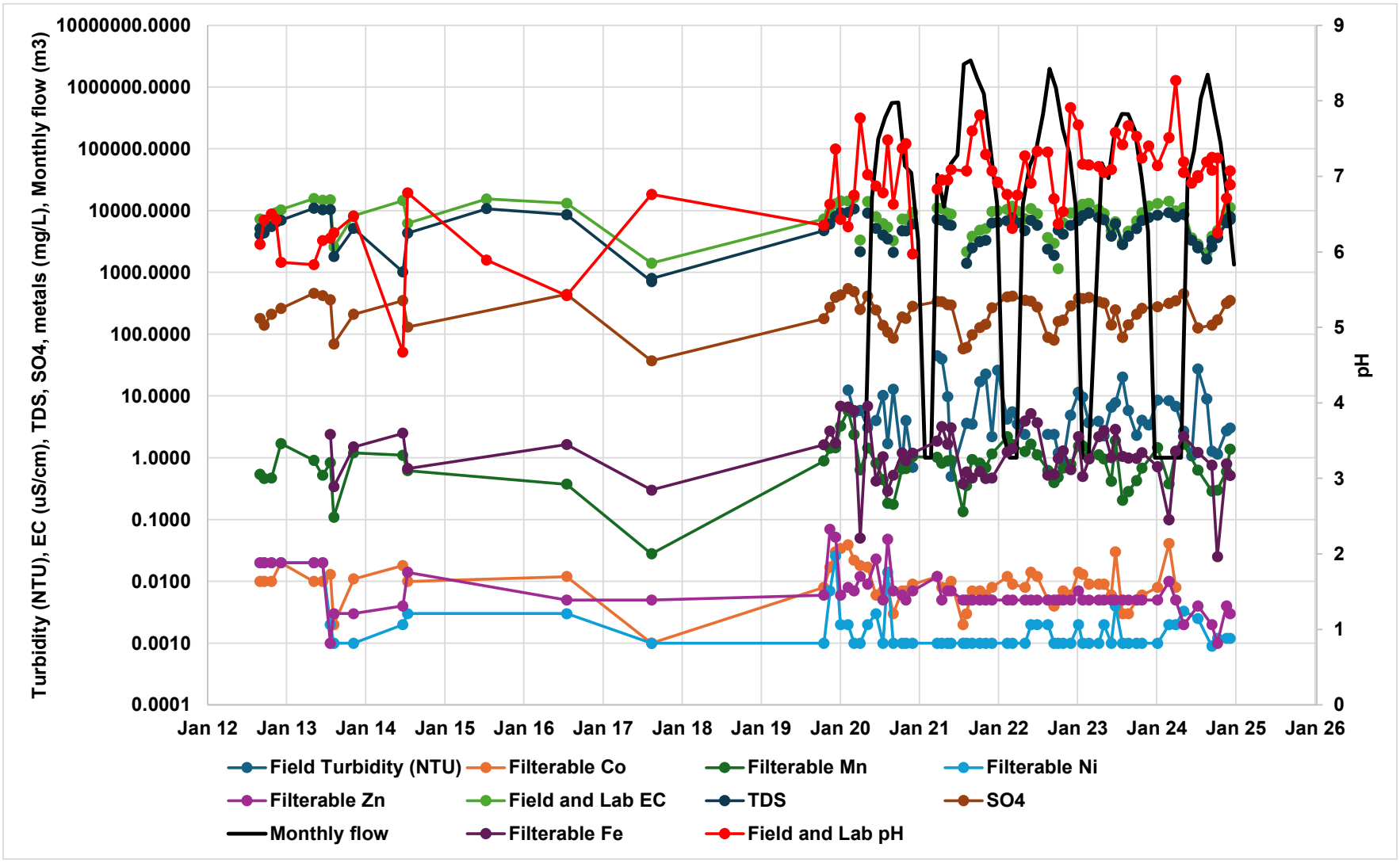
BIG DOG HYDROGEOLOGY

Sulphate trends in regional groundwater

Figure 22

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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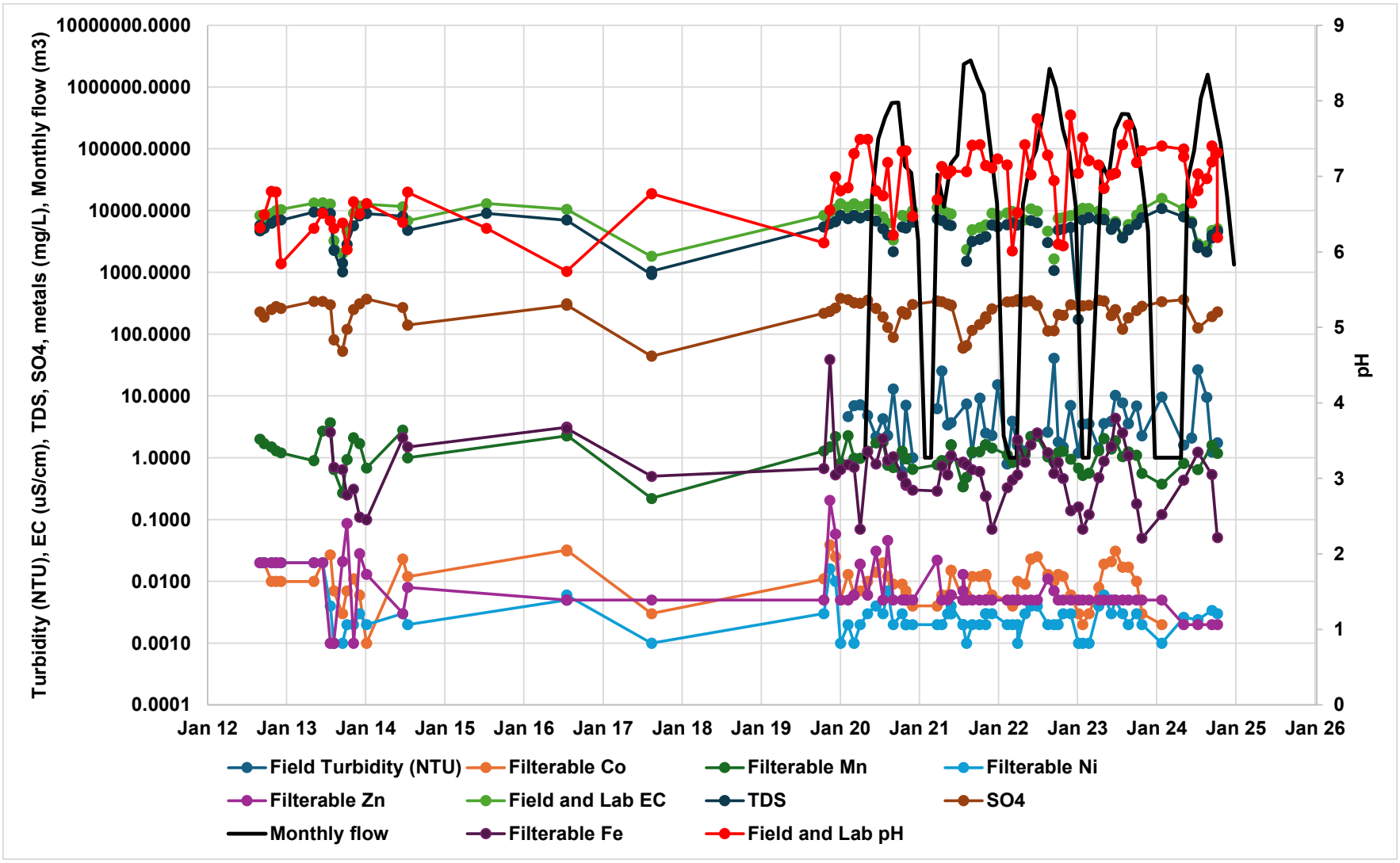
BIG DOG HYDROGEOLOGY

Composite hydrochemistry at GRCK01

Figure 23

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

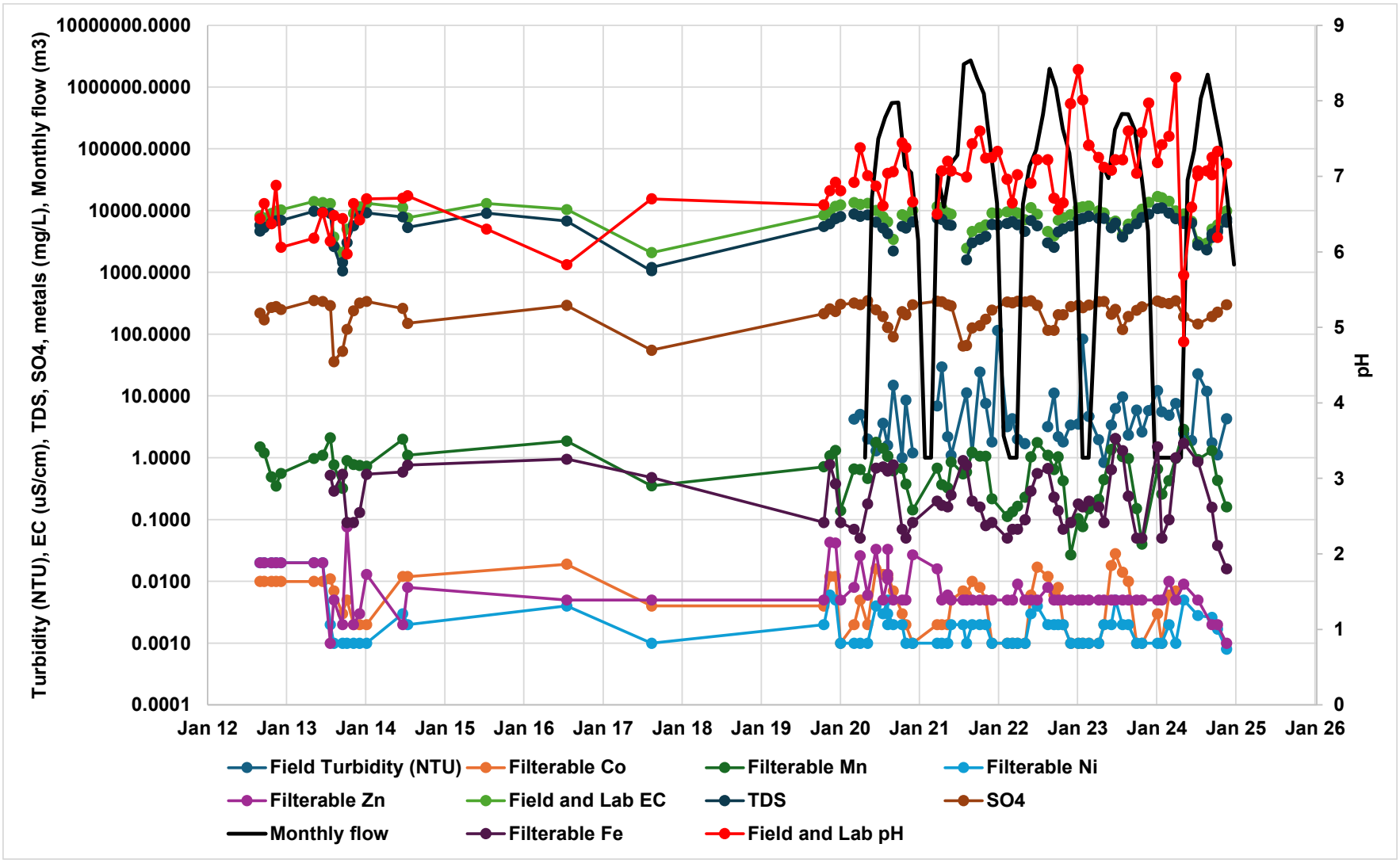
BIG DOG HYDROGEOLOGY

Composite hydrochemistry at GRCK02

Figure 24

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

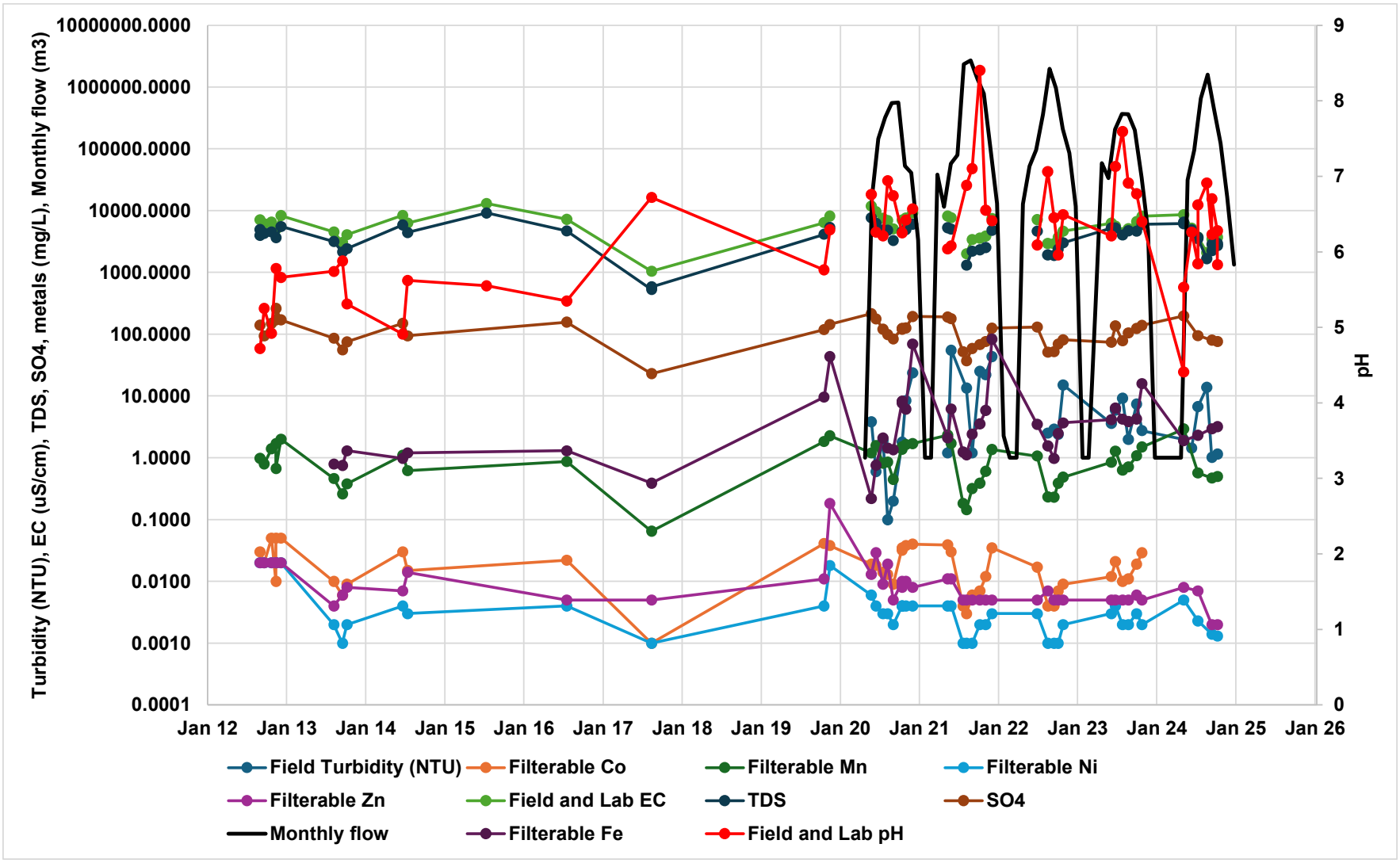
BIG DOG HYDROGEOLOGY

Composite hydrochemistry at GRCK03

Figure 25

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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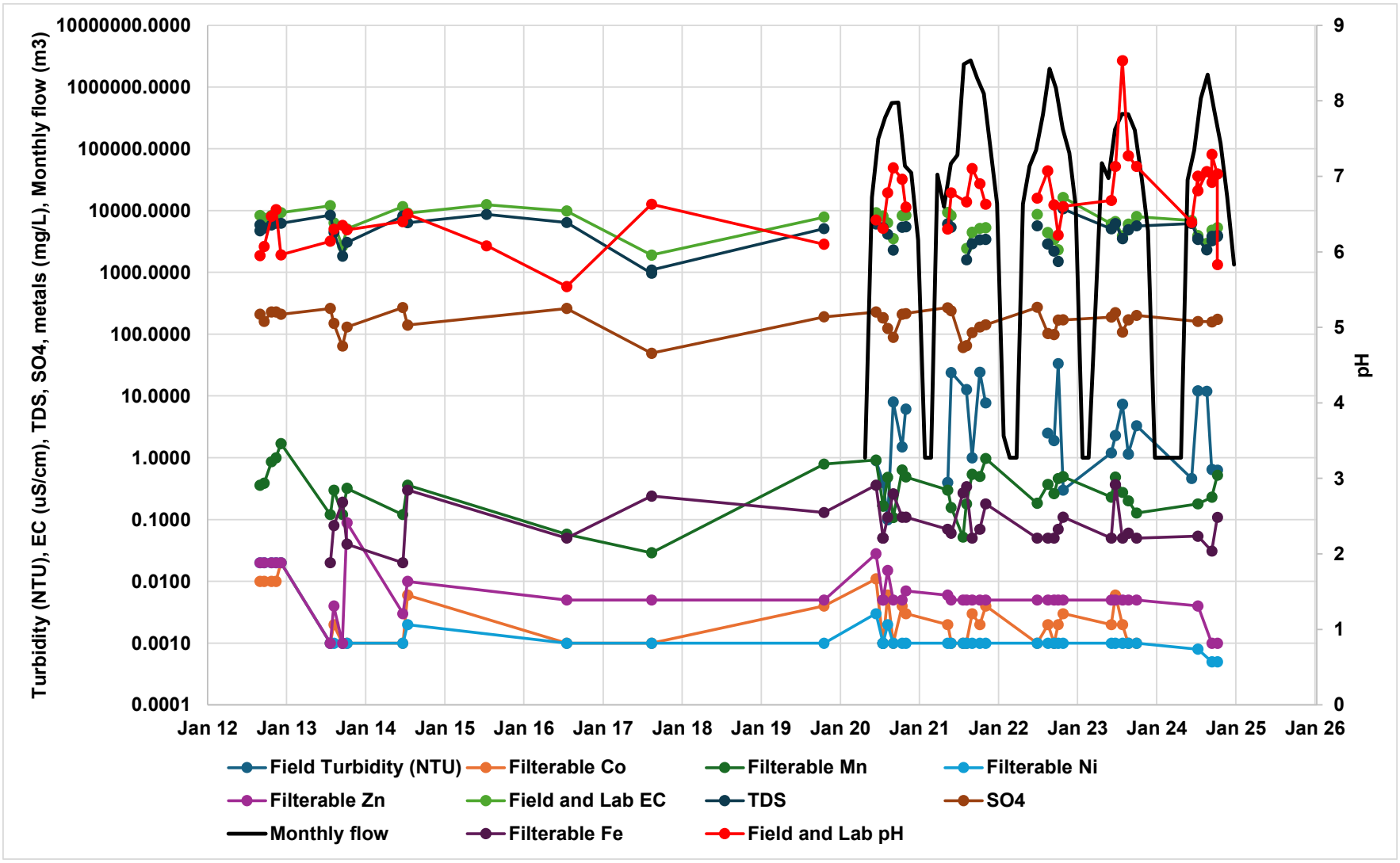
BIG DOG HYDROGEOLOGY

Composite hydrochemistry at GRCK04

Figure 26

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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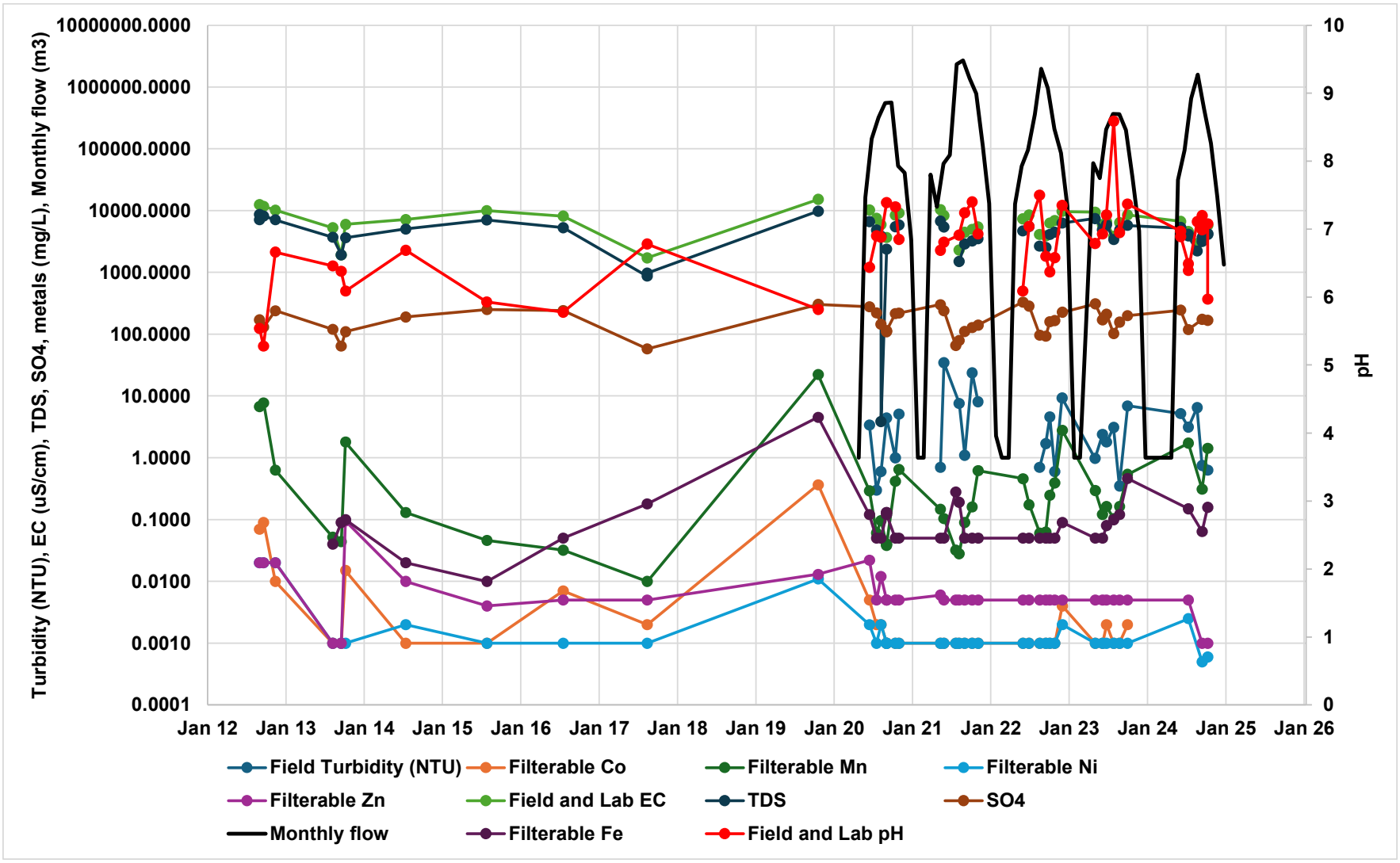
BIG DOG HYDROGEOLOGY

Composite hydrochemistry at GRCK05

Figure 27

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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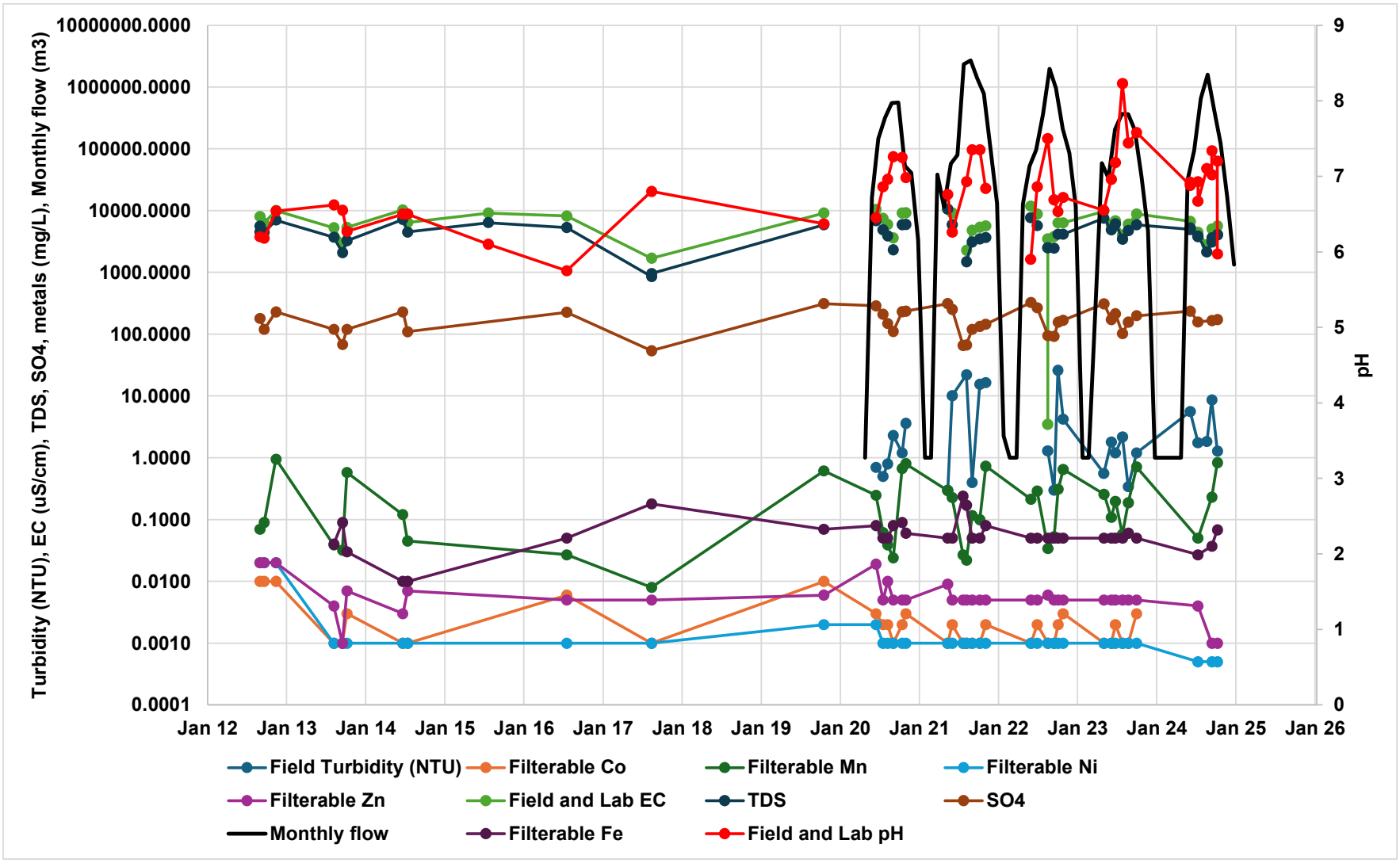
BIG DOG HYDROGEOLOGY

Composite hydrochemistry at GRCK06

Figure 28

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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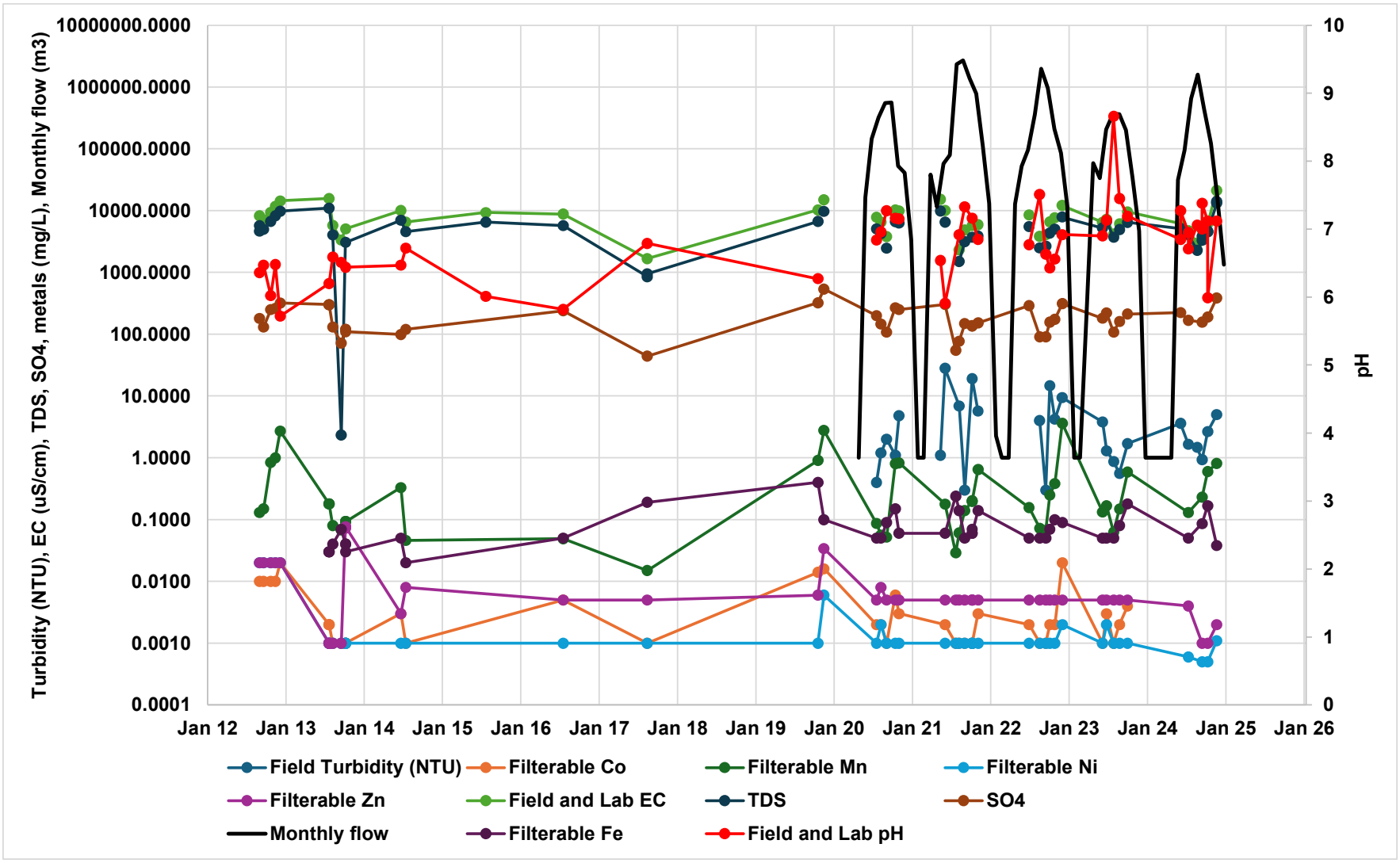
BIG DOG HYDROGEOLOGY

Composite hydrochemistry at GRCK07

Figure 29

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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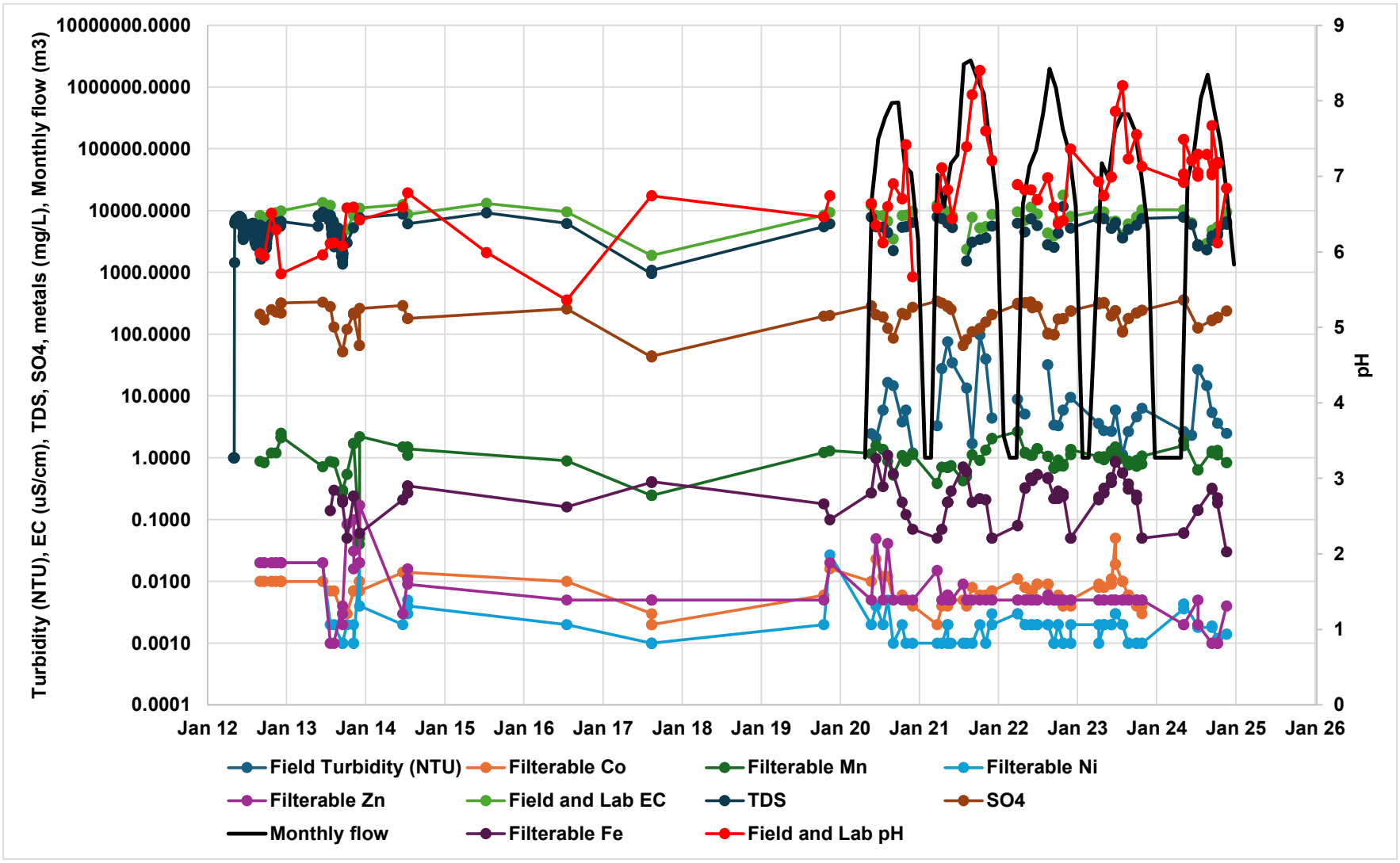
BIG DOG HYDROGEOLOGY

Composite hydrochemistry at GRCK08

Figure 30

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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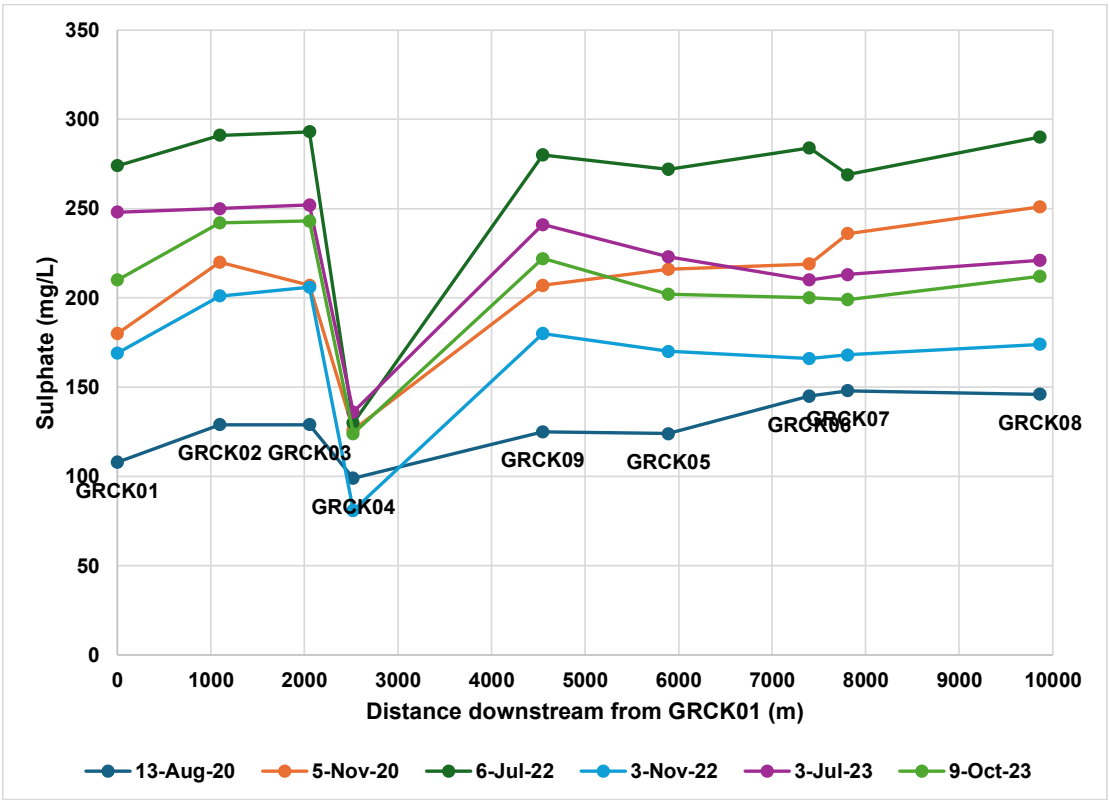
BIG DOG HYDROGEOLOGY

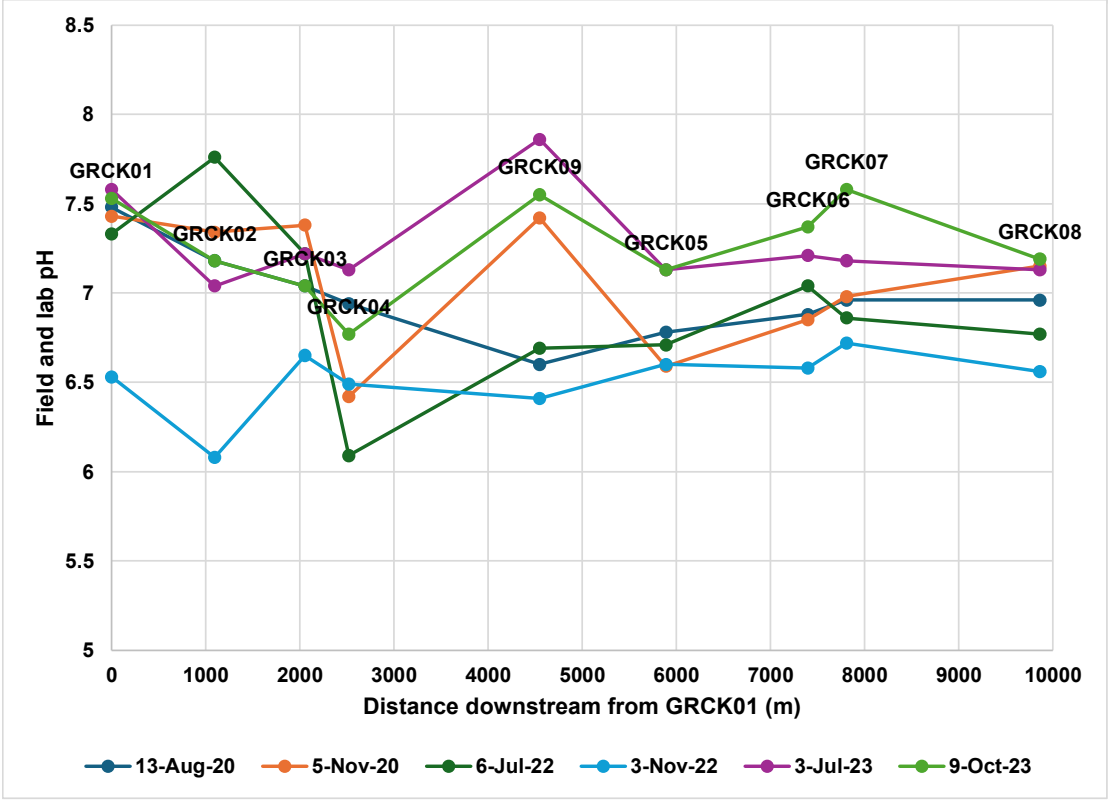
Composite hydrochemistry at GRCK09

Figure 31

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2





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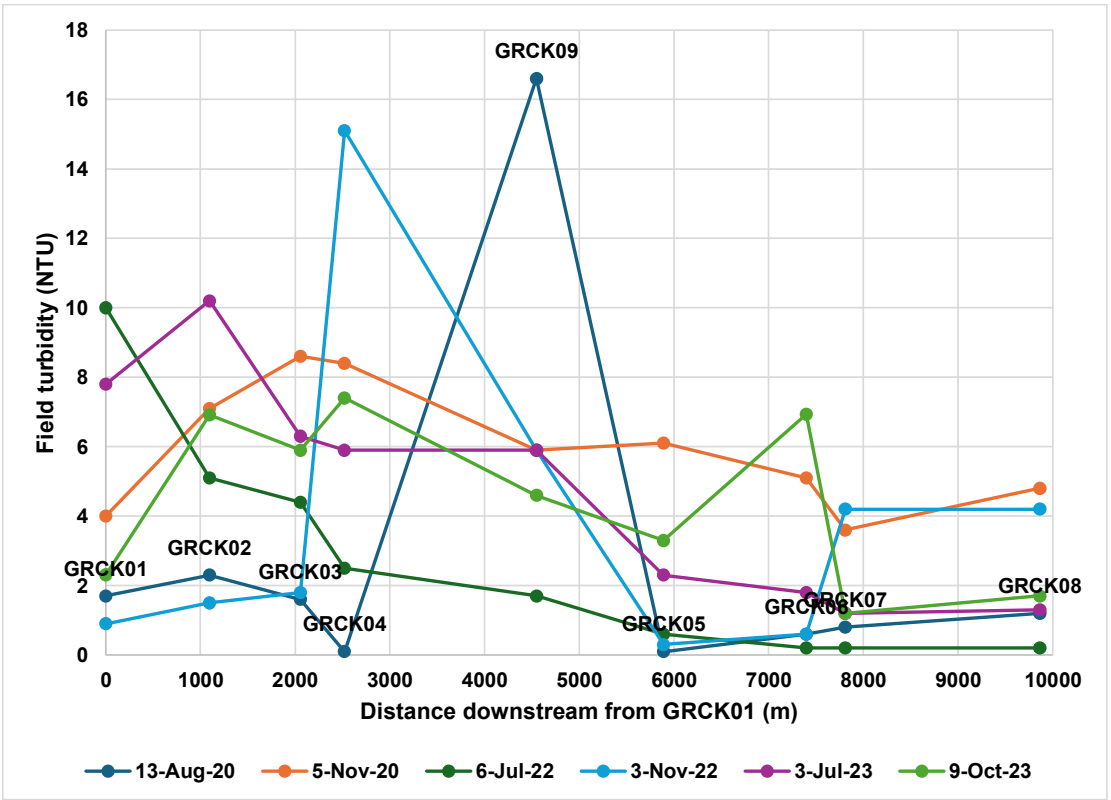
BIG DOG HYDROGEOLOGY

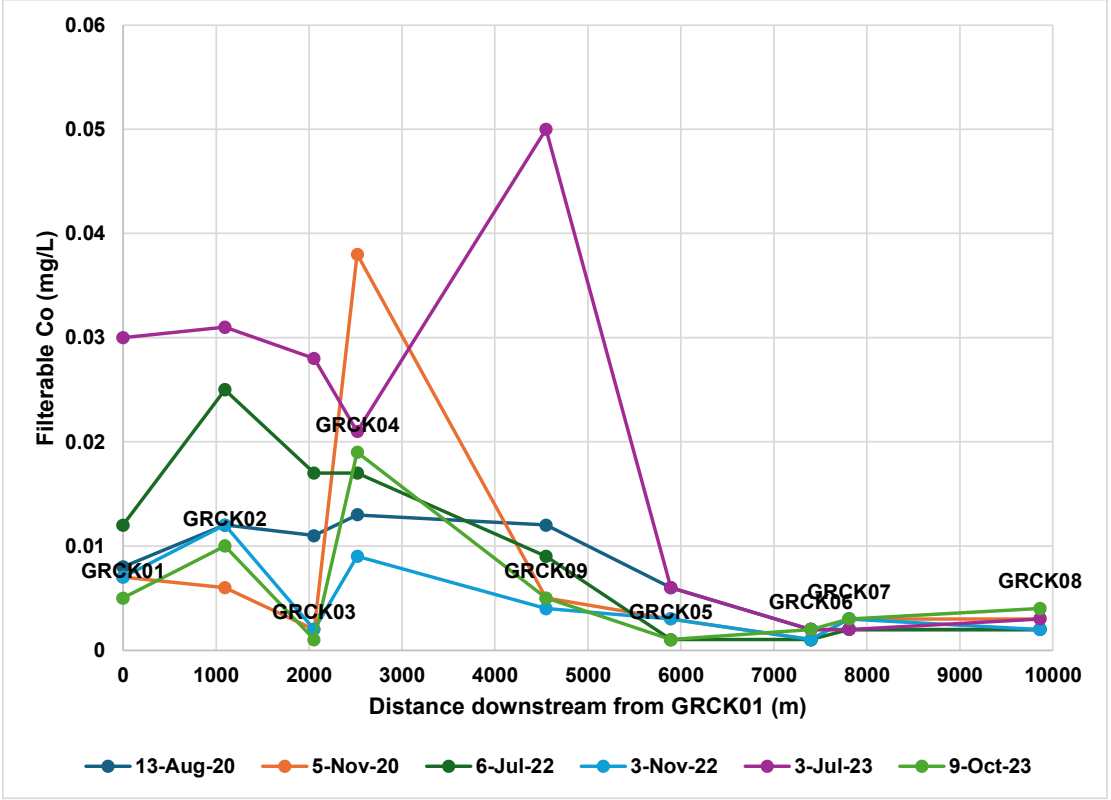
Longitudinal surface water chemistry part 1

Figure 32

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2





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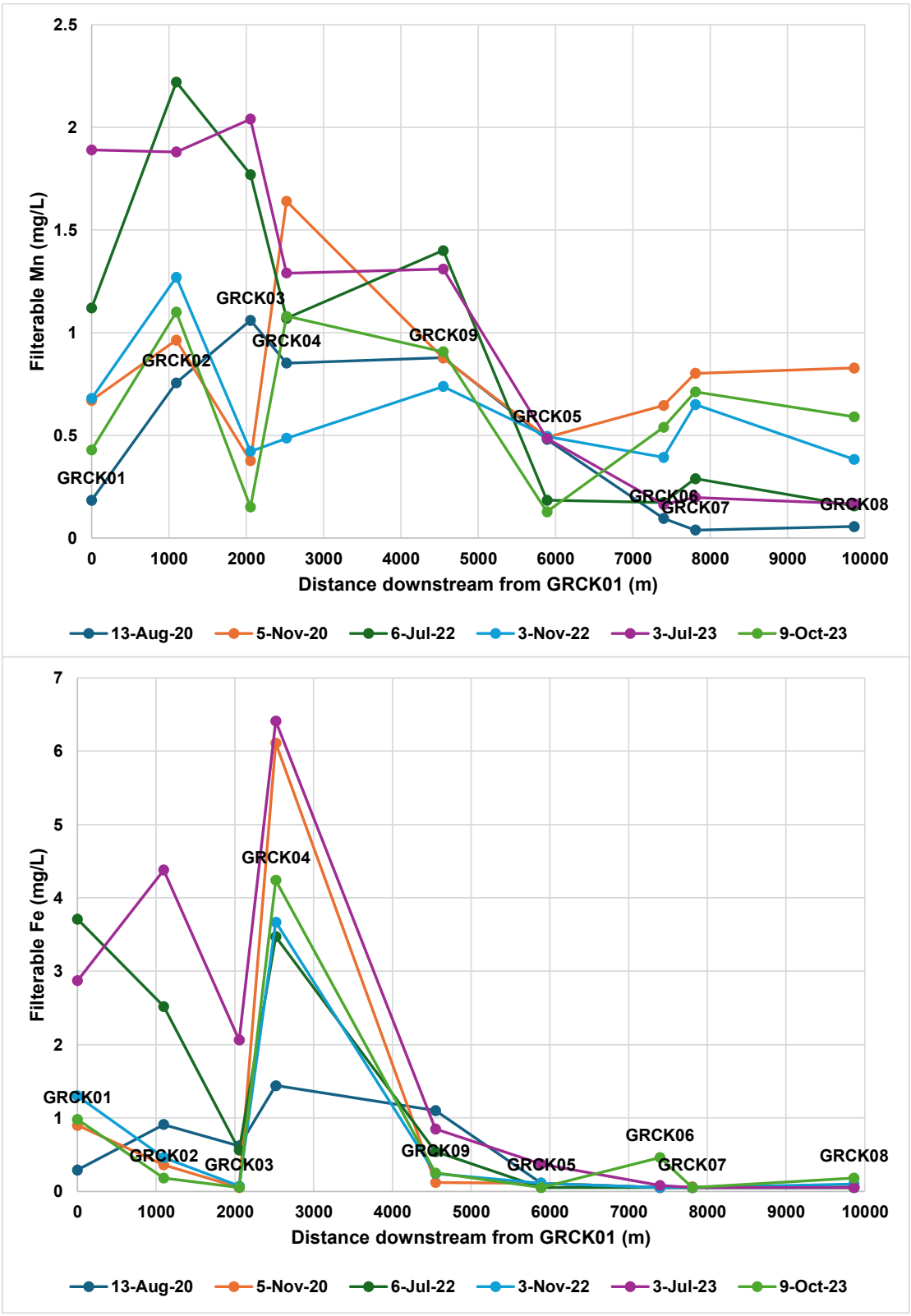
BIG DOG HYDROGEOLOGY

Longitudinal surface water chemistry part 2

Figure 33

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

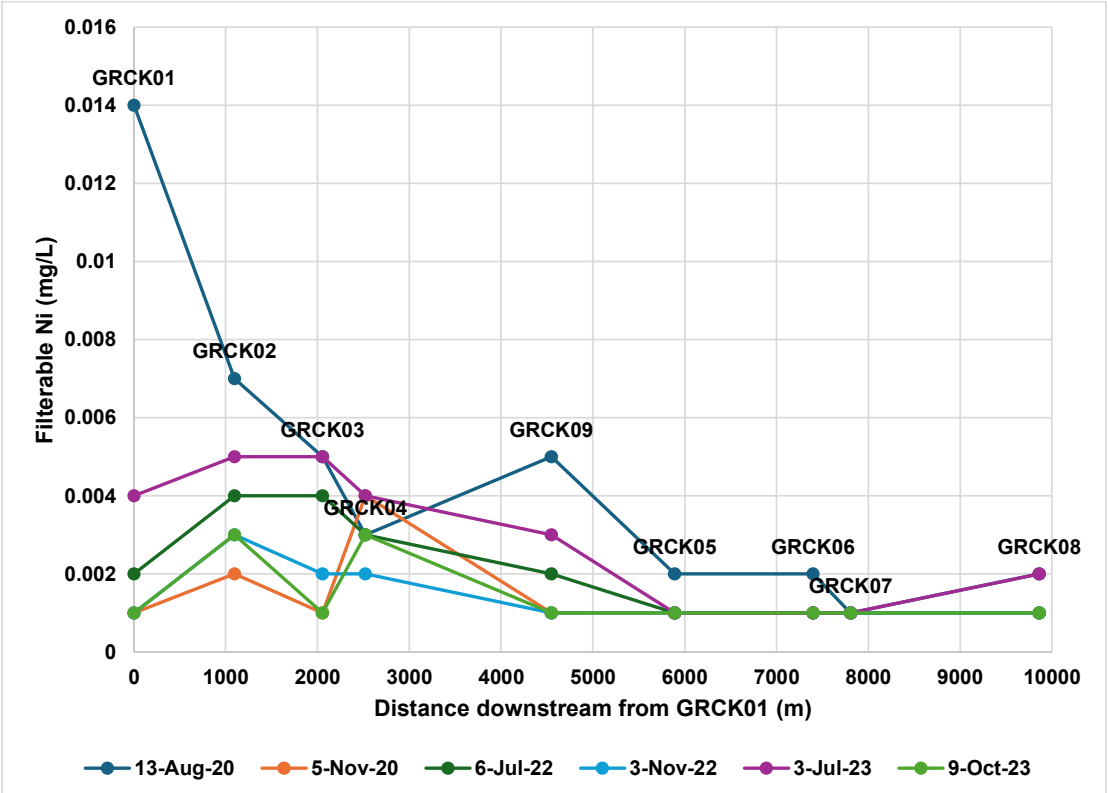
BIG DOG HYDROGEOLOGY

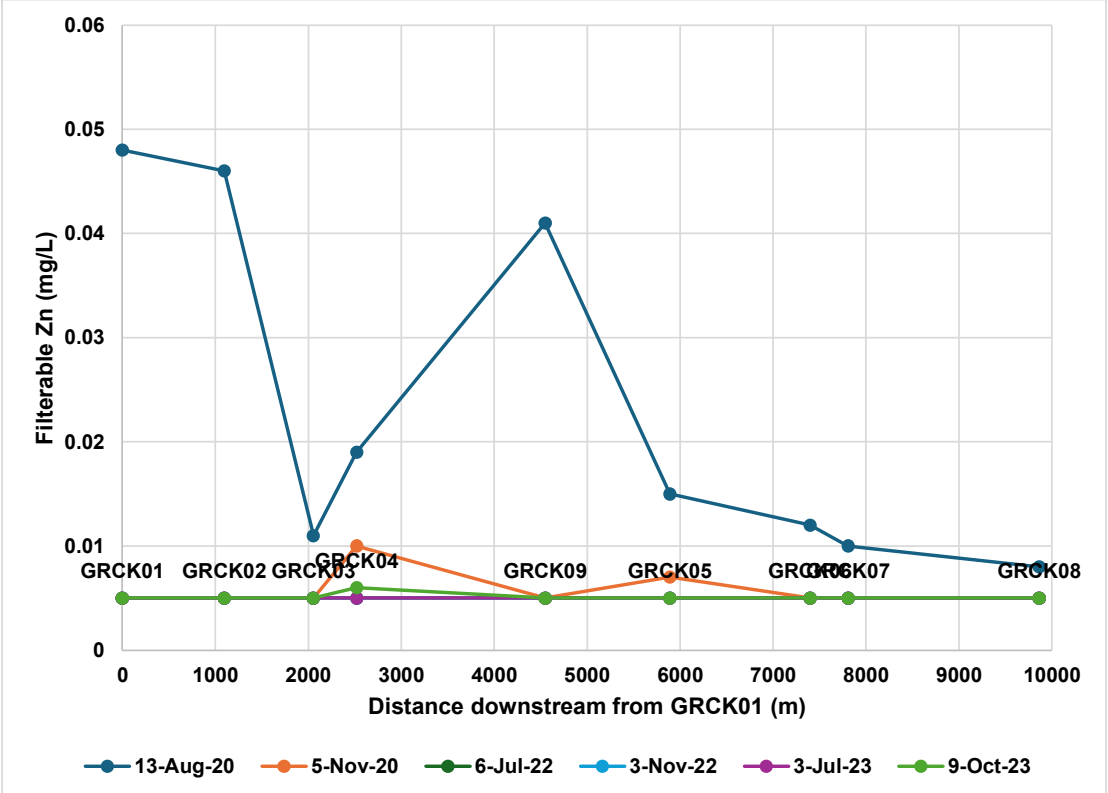
Longitudinal surface water chemistry part 3

Figure 34

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2





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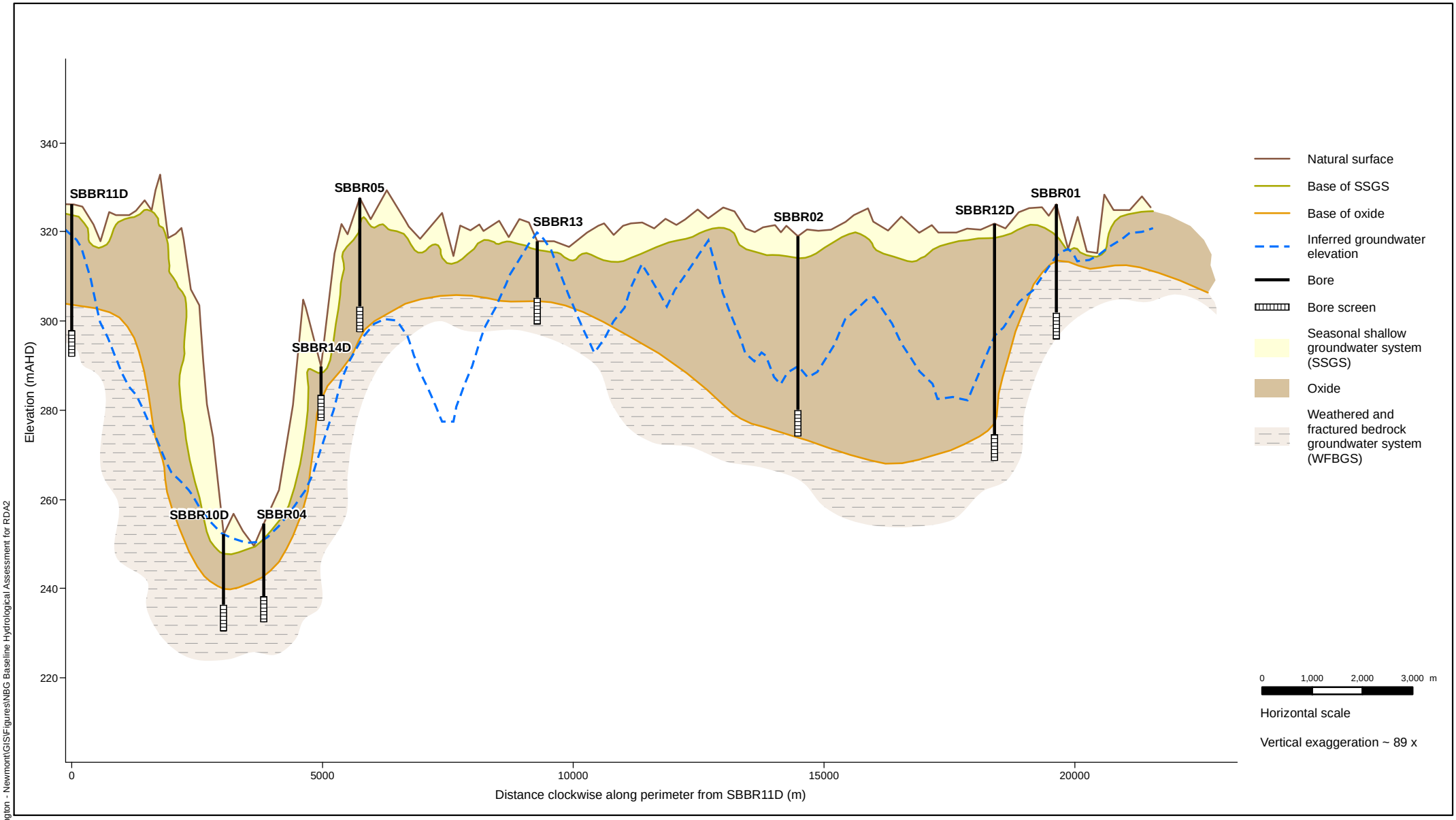
BIG DOG HYDROGEOLOGY

Longitudinal surface water chemistry part 4

Figure 35

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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BIG DOG HYDROGEOLOGY

Perimeter hydrogeological section for RDA2

Figure 36

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2

440000 442500 445000 447500 450000

6395000 6392500 6390000 6387500 6385000 6382500

Legend

- Recommended groundwater monitoring location
- Regional standpipe bore
- Decommissioned monitoring bore
- South32 monitoring bore
- Surface water monitoring site
- Gauging station
- Groundwater spring
- Natural spring
- RDA2 upgradient diversions
- Discharge to Gringer Creek
- Proposed RDA2
- Granite/greenstone boundary
- Drainage

0 1 2 Km

N

Map projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia, Zone 50

MB_H11
GRCK01
Natural Spring 3
GRCK03
GRCK04
MB_H01
MB_H10
SBBRBD/S
SBBR11S
SBBR11D
SBBR01
Gringer Creek
GRCK09
Natural Spring 2
Natural Spring 1
SBBR09
SBBR12D
SBBR12S
GRCK05
SBBR10S
SBBR10D
BH03
SBBR07
SBBR06
BH02
SBBR04
GRCK06
MB_H03
BUBR11
SBBR02
SBBRFD/S
SBBR15S
SBBR15D
SBBR08
BUBR10
SBBRAD/S
BH01
SBBRCD/S
BUBR7
F1BR34S
F1BR34D
SBBR14D
SBBR14S
F3BR19
Gringer Creek DS
F1BR31S
F1BR31D
F1BR33S
F1BR33D
SBBRED/S
SBBR05
GRCK08
F1BR32D
F1BR32S-2
F1BR35D
F1BR35S
SBBR03
BUBR6
F1BR30D
F1BR30S-2
F1BR36S
F1BR36D
BUBR5
SBBR13D
SBBR13S
F1BR37S
F1BR37D
Groundwater Spring
SBBRDD/S
MB_H04
F1BR38S-2
F1BR38D
F1BR40S
F1BR40D
F1/F3 RDA
F1BR39S
F1BR39D-2
F1BR39D
Gringer Creek
MB_H07
F1BR41D
F1BR41S
F3BR23
R4BR99
R4 RDA
R4BR98

440000 442500 445000 447500 450000

G:\Projects\BDH Projects\Boddington - Newmont\GIS\Figures\NBG Baseline Hydrological Assessment for RDA2

BIG DOG HYDROGEOLOGY

Monitoring recommendations

Figure 37

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2

Appendix A
Monitoring Bore Construction Details

REPORT OF BOREHOLE: BHH-01

SBBR01

SHEET: 1 OF 1

CLIENT:	Newmont Boddington Gold	COORDS: 442498.6 m 6388844.0 m	DRILL RIG: DR007 Tracked Rig
PROJECT:	RDA FS Site Investigation	SURFACE RL: 340.60 m DATUM: AHD	CONTRACTOR: Hagstrom Drilling
LOCATION:	Boddington Saddleback Treefarm	INCLINATION: -90°	LOGGED: MTK DATE: 13/1/21
JOB NO:	20142426	HOLE DEPTH: 30.20 m	CHECKED: AP DATE: 15/3/21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RC	13/01/21	0	340.60				Gravelly SAND/Sandy GRAVEL fine to coarse grained, sub-rounded to sub-angular, brown to red-brown, trace fines, gravels up to 10 mm, dry		Cement grout (0-19.6m), PVC inner diameter = 60mm
			1.00 339.60				Silty SAND fine to coarse grained, sub-rounded to sub-angular, non to low plastic, pale brown, trace gravel, dry		
			2.00 338.60				Becoming fine grained sand, trace gravels, pale yellow brown, medium plastic, less sand content, dry		
			3.00 337.60				Slight increase in gravels		
			4.00 336.60				Increase in gravel content		
		5							
			8.00 332.60				Sandy SILT/Clayey SILT low to medium plasticity, yellow brown, trace gravel, dry		
		10							
			12.00 328.60				GRANITE fine to coarse grained, dry, highly weathered, dry to moist		
		15							
		20							Bentonite pallets (19.6-21.6m) Gravel (21.6-30.1) Screened section (24.1-30.1m)
		25							
			28.50 312.10				becoming damp, moist		
		30	30.20 310.40				END OF BOREHOLE @ 30.20 m STANDPIPE INSTALLED GROUDNWATER ENCOUNTERED AT 25.7m FROM GL		

REPORT OF BOREHOLE: BHH-02

SBBR02

SHEET: 1 OF 1

CLIENT:	Newmont Boddington Gold	COORDS: 441446.0 m 6386199.0 m	DRILL RIG: DR007 Tracked Rig
PROJECT:	RDA FS Site Investigation	SURFACE RL: 327.44 m DATUM: AHD	CONTRACTOR: Hagstrom Drilling
LOCATION:	Boddington Saddleback Treefarm	INCLINATION: -90°	LOGGED: MTK DATE: 27/1/21
JOB NO:	20142426	HOLE DEPTH: 45.00 m	CHECKED: AP DATE: 15/3/21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RC	29/01/21	0	327.44				Sandy GRAVEL fine to medium grained, sub-rounded to sub-angular, yellow brown, damp, dry to moist		Cement grout (0-27.0m), PVC inner diameter = 60mm
			1.00						
			326.44				Sandy SILT fine to medium, sub-rounded to sub-angular, non plastic, brown, trace gravel, damp, dry to moist		
			2.00						
			325.44				with low to medium plastic fines, dry to moist		
			4.00						
			323.44				Sandy GRAVEL fine to coarse grained, sub-rounded to sub-angular, red brown, trace fines, dry to moist		
		5	5.00						
			322.44				Sandy CLAY fine to medium, sub-rounded to sub-angular, medium to high plasticity, red, trace gravel, dry to moist		
			9.00				becoming white, dry to moist		
		10	318.44						
			13.00				non to low plastic, becoming pink, dry to moist		
			314.44						
		15	17.00				becoming white, dry to moist		
			310.44						
			18.00				Sandy fine to medium grained, sub-rounded to sub-angular, non to low plastic, pale brown-white, becoming brown, dry to moist		
			309.44						
		20	21.00				becoming yellow brown, increase in low plasticity fines content, becoming moist		
			306.44				becoming yellow brown, increase in low plastic fines content, becoming moist, dry to moist		Bentonite pallets (27.5-33.5m), possible bridging
		25							
		30							Gravel (33.5-45.0m), possible bridging
		35							
			38.00				becoming dark yellow brown, with ~20% low plastic fines		Screened section (39.0-45.0m)
			289.44						
		40	40.00				becoming brown, less low plasticity fines content		
			287.44						
			45.00				END OF BOREHOLE @ 45.00 m STANDPIPE INSTALLED GROUNDWATER ENCOUNTERED AT 34.05m FROM GL		
		45	282.44						

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for hydrogeological purposes only, without attempt to assess geotechnical properties or possible contamination. Any reference to geotechnical properties or potential contamination are for information only and do not necessarily indicate the presence or absence of the properties stated.

REPORT OF BOREHOLE: BHH-03

SBBR03

SHEET: 1 OF 1

CLIENT: Newmont Boddington Gold
PROJECT: RDA FS Site Investigation
LOCATION: Boddington Saddleback Treefarm
JOB NO: 20142426

COORDS: 444298.0 m 6384668.0 m
SURFACE RL: 333.99 m DATUM: AHD
INCLINATION: -90°
HOLE DEPTH: 23.00 m

DRILL RIG: DR007 Tracked Rig
CONTRACTOR: Hagstrom Drilling
LOGGED: JR DATE: 20/1/21
CHECKED: AP DATE: 15/3/21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RC	29/01/21	0	333.99				Sandy GRAVEL rounded to sub-angular, brown, dry		Cement grout (0-11.0m), PVC inner diameter = 60mm
			1.00						
			332.99				Silty SAND white, dry		
			4.00						
			329.99				Sandy SILT low plasticity, white, slightly moist		
		5							
		10							Bentonite pallets (11.0-14.2m), possible bridging
			13.00						
			320.99				SILT low plasticity, grey/white, slightly moist		Gravel (14.2-23.0m), possible bridging
		15							
			17.00						Screened section (17.0-23.0m)
			316.99				CLAY medium plasticity, red, trace sand, moist to wet		
		20							
			23.00						
			310.99				END OF BOREHOLE @ 23.00 m STANDPIPE INSTALLED GROUDNWATER ENCOUNTERED AT 19.05m FROM GL		
		25							

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GAP gINT FN. F05 RL3

REPORT OF BOREHOLE: BHH-04

SBBR04

SHEET: 1 OF 1

CLIENT: Newmont Boddington Gold
PROJECT: RDA FS Site Investigation
LOCATION: Boddington Saddleback Treefarm
JOB NO: 20142426

COORDS: 445352.3 m 6386666.0 m
SURFACE RL: 254.92 m DATUM: AHD
INCLINATION: -90°
HOLE DEPTH: 22.00 m

DRILL RIG: DR007 Tracked Rig
CONTRACTOR: Hagstrom Drilling
LOGGED: MTK DATE: 14/1/21
CHECKED: AP DATE: 15/3/21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RC	29/01/21	0	254.92				Gravelly SAND fine to coarse grained, sub-rounded to sub-angular, pale brown, with non plastic fines, slightly moist		Cement grout (0-12.0m), PVC inner diameter = 60mm
			1.00 253.92				fine to medium grain, red brown, with low to medium plasticity fines, slightly moist		
			3.00 251.92				CLAY low to medium plasticity, pale grey red brown, trace gravel, trace sand, trace non plastic fines, moist		
		5	5.00 249.92				White grey, mottled purple brown, slightly moist		
			7.00 247.92				red brown mottled white		
			8.00 246.92				red brown		
		10							
			11.00 243.92				wet		
			12.00 242.92				DOLERITE fine grained, grey, extremely weathered		Bentonite pallets (12.0-14.0m)
			13.00 241.92				becoming highly weathered		Gravel (14.0-22.0m)
		15							Screened section (16.0-22.0m)
		20							
			22.00 232.92				END OF BOREHOLE @ 22.00 m STANDPIPE INSTALLED GROUDNWATER ENCOUNTERED AT 4.8m FROM GL		

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for hydrogeological purposes only, without attempt to assess geotechnical properties or possible contamination. Any reference to geotechnical properties or potential contamination are for information only and do not necessarily indicate the presence or absence of the properties stated.

GAP gINT FN. F05 RL3

REPORT OF BOREHOLE: BHH-05

SBBR05

SHEET: 1 OF 1

CLIENT: Newmont Boddington Gold
PROJECT: RDA FS Site Investigation
LOCATION: Boddington Saddleback Treefarm
JOB NO: 20142426

COORDS: 445106.9 m 6384969.0 m
SURFACE RL: 315.19 m DATUM: AHD
INCLINATION: -90°
HOLE DEPTH: 30.00 m

DRILL RIG: DR007 Tracked Rig
CONTRACTOR: Hagstrom Drilling
LOGGED: JR DATE: 19/1/21
CHECKED: AP DATE: 15/3/21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
		0	315.19				Sandy GRAVEL sub-rounded to sub-angular, trace organics, dry		Cement grout (0-19.7m), PVC inner diameter = 60mm
			2.00						
			313.19				Clayey GRAVEL sub-rounded to sub-angular, dry		
			3.00						
			312.19				Silty CLAY medium plasticity, slightly moist		
			4.00						
			311.19				silt% increasing, clay% decreasing		
		5							
			9.00						
			306.19				SILT low plasticity, white, moist		
		10							
			13.00						
			302.19				Silty CLAY medium plasticity, red, moist, moisture % increasing with depth		
RC		15							
			16.00						
			299.19				Clayey SILT low plasticity, white		Bentonite pallets (19.7-21.6m) Gravel (21.6-30,0m) Screened section (24.0-30.0m)
		20							
		25	25.00						
			290.19				Clayey SILT trace sand, moist		
		30	30.00						
			285.19				END OF BOREHOLE @ 30.00 m STANDPIPE INSTALLED		

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for hydrogeological purposes only, without attempt to assess geotechnical properties or possible contamination. Any reference to geotechnical properties or potential contamination are for information only and do not necessarily indicate the presence or absence of the properties stated.

GAP gINT FN. F05 RL3

REPORT OF BOREHOLE: BHH-06

SBBR06

SHEET: 1 OF 1

CLIENT:	Newmont Boddington Gold	COORDS:	445784.7 m 6387107.0 m	DRILL RIG:	DR007 Tracked Rig
PROJECT:	RDA FS Site Investigation	SURFACE RL:	250.08 m DATUM: AHD	CONTRACTOR:	Hagstrom Drilling
LOCATION:	Boddington Saddleback Treefarm	INCLINATION:	-90°	LOGGED: MTK	DATE: 25/1/21
JOB NO:	20142426	HOLE DEPTH:	6.00 m	CHECKED: AP	DATE: 15/3/21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
PQ3	29/01/21	0	250.08				Clayey SAND fine to medium grained, sub-rounded to sub-angular, brown, low plasticity clay, trace gravel, slightly moist		Bentonite pallets (0-0.2m), PVC inner diameter = 60mm Screened section (0-6.0m) Gravel (0.2-6.0m)
		1	1.00 249.08				Sandy CLAY medium plasticity, brown, fine to medium, sub-rounded to sub-angular sand, 30-40% sand, slightly moist		
		2	2.00 248.08				dark grey/brown, increase in moisture		
		3	3.00 247.08				light brown, can mould with hand with no water added		
		4							
		5	5.00 245.08				wet		
		6	6.00 244.08				END OF BOREHOLE @ 6.00 m STANDPIPE INSTALLED GROUNDWATER ENCOUNTERED AT 1.6m FROM GL		
		7							
		8							

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GAP gINT FN. F05 RL3

REPORT OF BOREHOLE: BHH-07

SBBR07

SHEET: 1 OF 1

CLIENT:	Newmont Boddington Gold	COORDS: 445775.0 m 6387119.0 m	DRILL RIG: DR007 Tracked Rig
PROJECT:	RDA FS Site Investigation	SURFACE RL: 250.12 m DATUM: AHD	CONTRACTOR: Hagstrom Drilling
LOCATION:	Boddington Saddleback Treefarm	INCLINATION: -90°	LOGGED: MTK DATE: 25/1/21
JOB NO:	20142426	HOLE DEPTH: 21.50 m	CHECKED: AP DATE: 15/3/21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
PQ3	29/01/21	0	250.12				Clayey SAND fine to medium grained, sub-rounded to sub-angular, brown, low plasticity clay, trace gravel, slightly moist		Cement grout (0-11.6m), PVC inner diameter = 60mm
			1.00						
			249.12				Sandy CLAY medium plasticity, brown, fine to medium, sub-rounded to sub-angular sand, 30-40% sand, slightly moist		
			2.00						
			248.12				dark grey/brown, increase in moisture		
			3.00						
			247.12				light brown, can mould with hand with no water added		
		5	5.00						
			245.12				wet		
			6.00						
			244.12				becoming red mottled white grey		
			7.50						
			242.62				Silty SAND fine to medium grained, sub-rounded to sub-angular, white grey, non-low plasticity silt, ~20-25% fines, wet		Bentonite pallets (11.6-13.2m)
		10	10.00						
			240.12				becoming yellow brown mottled white		Gravel (13.2-21.5m)
		15							Screened section (15.5-21.5m)
		20	21.50						
			228.62				END OF BOREHOLE @ 21.50 m STANDPIPE INSTALLED GROUNDWATER ENCOUNTERED AT 1.0m FROM GL		

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REPORT OF BOREHOLE: BHH-08

SBBR08

SHEET: 1 OF 1

CLIENT: Newmont Boddington Gold
PROJECT: RDA FS Site Investigation
LOCATION: Boddington Saddleback Treefarm
JOB NO: 20142426

COORDS: 445720.2 m 6386107.0 m
SURFACE RL: 263.82 m DATUM: AHD
INCLINATION: -90°
HOLE DEPTH: 24.00 m

DRILL RIG: DR007 Tracked Rig
CONTRACTOR: Hagstrom Drilling
LOGGED: MTK DATE: 15/1/21
CHECKED: AP DATE: 15/3/21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RC	15/01/21	0	263.82				Silty SAND fine to medium grained, sub-rounded to sub-angular, non plastic, pale brown, trace low plastic fines, slightly moist		Cement grout (0-14.0m), PVC inner diameter = 60mm
			1.00 262.82				becoming pale red brown		
			2.00 261.82				becoming pale yellow brown		
			4.00 259.82				SAND fine to coarse grained, sub-rounded to sub-angular, pale yellow brown, trace gravel, dry to slightly-moist		
		5							
			8.00 255.82				with low plastic clay		
		10							
			12.00 251.82				Sandy CLAY low plasticity, yellow brown, trace gravel, moist		
			14.00 249.82				less clay content, transitioning towards clayey sand		Bentonite pallets (14.0-15.9m)
		15	15.00 248.82				SAND fine to coarse grained, non plastic, yellow brown, moist to wet		Gravel (15.9-24.0m)
			17.00 246.82				increase in clay content		Screened section (18.0-24.0m)
		20							
			21.50 242.32				GRANITE fine to coarse grained, grey, extremely weathered, mixed with clay, wet		
			24.00 239.82				END OF BOREHOLE @ 24.00 m STANDPIPE INSTALLED GROUDNWATER ENCOUNTERED AT 16.0m FROM GL		
		25							

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for hydrogeological purposes only, without attempt to assess geotechnical properties or possible contamination. Any reference to geotechnical properties or potential contamination are for information only and do not necessarily indicate the presence or absence of the properties stated.

REPORT OF BOREHOLE: BHH-09

SBBR09

SHEET: 1 OF 1

CLIENT:	Newmont Boddington Gold	COORDS:	445570.5 m 6388087.0 m	DRILL RIG:	DR007 Tracked Rig
PROJECT:	RDA FS Site Investigation	SURFACE RL:	257.81 m DATUM: AHD	CONTRACTOR:	Hagstrom Drilling
LOCATION:	Boddington Saddleback Treefarm	INCLINATION:	-90°	LOGGED: MTK	DATE: 28/1/21
JOB NO:	20142426	HOLE DEPTH:	17.00 m	CHECKED: AP	DATE: 15/3/21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RC	29/01/21	0	257.81				Gravelly SAND fine to coarse grained, sub-rounded to sub-angular, low plasticity, yellow/brown, damp		Cement grout (0-6.0m), PVC inner diameter = 60mm
		2	2.00 255.81				Sandy CLAY fine to coarse, sub-rounded to sub-angular, low to medium plasticity, red mottled white		
		4							
			5.00 252.81				becoming moist		
		6	6.00 251.81				becoming clayey SAND, yellow brown, moist near plastic limit		Bentonite pallets (6.0-7.8m)
		8	8.00 249.81				becoming wet		Gravel (7.8-16.3m)
		10	10.00 247.81				very wet		Screened section (10.3-16.3m)
		12							
		14							
		16							
			17.00 240.81				END OF BOREHOLE @ 17.00 m STANDPIPE INSTALLED GROUDNWATER ENCOUNTERED AT 2.05m FROM GL		
		18							

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for hydrogeological purposes only, without attempt to assess geotechnical properties or possible contamination. Any reference to geotechnical properties or potential contamination are for information only and do not necessarily indicate the presence or absence of the properties stated.

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB01D**
Page	**1 of 3**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**11/11/23**				
Date Completed:	**26/11/23**				
Logged by:	**A. Dlamini**				
Checked by:	**D. Lee**				
Contractor:	**Hagstrom Drilling**	Northing:	**6387451N**	Hole Depth (mbgl):	**23.0**
Hole Location:	**Saddleback Treefarm**	Easting:	**445326E**	Stick Up (m):	**0.54**
Hole Diameter (mm):	**126**	Elevation (m):	**252.44 m**	Static Water Level (mbgl):	**0.07**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
252	1	Silty SAND (SW-SC), loose, medium to coarse-grained, yellowish-brown, subrounded to subangular, non-plastic. (Inferred from 0 - 1m) [SURFICIAL SOIL]				Lockable monument installed; uPVC blank casing 50mm diameter; Grout (2% bentonite - cement mixture) to surface
	1.32 m					
251	2	Sandy CLAY (CL-CI), low to medium plasticity, greenish grey mottled orange-brown, subrounded to subangular medium to coarse-grained sand, with gravel [SURFICIAL SOIL]				
250	3					
	3.00 m					
249	4	FERRICRETE, pisolitic, very low strength, red-brown mottled yellow-brown, slightly moist, subrounded to subangular fine to coarse-grained sand, fine gravel, with trace of clay, strong cementation [FERRICRETE/LATERITE]				
248	5					
	5.00 m					
247	6	Clayey SAND (SC), loose, medium to coarse-grained, greyish white, well graded, subrounded to subangular, with quartz gravel, slightly moist, strong cementation [EXTREMELY WEATHERED/RESIDUAL SOIL]				
	6.00 m					
246	7	Sandy SILT (ML), low to medium plasticity, soft, greyish white, subrounded to subangular fine to coarse-grained sand, moderate cementation, moist. Less coarse-grained (8.5 - 9m) [EXTREMELY WEATHERED/RESIDUAL SOIL]				
245	8					Graded filter pack
244	9					
	9.00 m					
243	10	GRANITE, recovered as light orange-brown silty sand (SM), fine to coarse-grained, subrounded to subangular sand, low plasticity silt [EXTREMELY WEATHERED TO HIGHLY WEATHERED]				
242						

Notes

Paired monitoring bore (lower screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB01D**
Page	**2 of 3**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**11/11/23**
Date Completed:	**26/11/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6387451N**	Hole Depth (mbgl):	**23.0**
Hole Location:	**Saddleback Treefarm**	Easting:	**445326E**	Stick Up (m):	**0.54**
Hole Diameter (mm):	**126**	Elevation (m):	**252.44 m**	Static Water Level (mbgl):	**0.07**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
241	11	GRANITE, recovered as light orange-brown silty sand (SM), fine to coarse-grained, subrounded to subangular sand, low plasticity silt [EXTREMELY WEATHERED TO HIGHLY WEATHERED]				
240	12					
239	13	13.50 m				
		GRANITE, medium strength, medium to coarse-grained, recovered as greyish-white, distinctly altered [HIGHLY WEATHERED TO MODERATELY WEATHERED]				
238	14					
237	15					Bentonite seal (pellets, hydrated)
236	16	16.00 m				
		GRANITE, high strength, medium to coarse-grained, grey mottled brown, orange-brown staining on joints/fractures [MODERATELY WEATHERED TO SLIGHTLY WEATHERED/FRESH]				
235	17					
234	18					
233	19	19.00 m				
		GRANITE, very high strength, fine to coarse-grained, whitish grey, massive, orange-brown staining on joints/fractures, dissolution voids at 20 - 21.3m [SLIGHTLY WEATHERED TO FRESH]				Graded filter pack
232	20					
231	21					

Notes

Paired monitoring bore (lower screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB01D**
Page	**3 of 3**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**11/11/23**
Date Completed:	**26/11/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6387451N**	Hole Depth (mbgl):	**23.0**
Hole Location:	**Saddleback Treefarm**	Easting:	**445326E**	Stick Up (m):	**0.54**
Hole Diameter (mm):	**126**	Elevation (m):	**252.44 m**	Static Water Level (mbgl):	**0.07**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Graphic Log	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
230	22		GRANITE, very high strength, fine to coarse-grained, whitish grey, massive, orange-brown staining on joints/fractures, dissolution voids at 20 - 21.3 m [SLIGHTLY WEATHERED TO FRESH]				
	23		23.00 m				
229			KCB23-SB-MB01D terminated at 23.00 m.				
	24						
228							
	25						
227							
	26						
226							
	27						
225							
	28						
224							
	29						
223							
	30						
222							
	31						
221							
	32						

Notes

Paired monitoring bore (lower screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB01S**
Page	**1 of 1**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**26/11/23**
Date Completed:	**26/11/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6387450N**	Hole Depth (mbgl):	**6.0**
Hole Location:	**Saddleback Treefarm**	Easting:	**445328E**	Stick Up (m):	**0.55**
Hole Diameter (mm):	**126**	Elevation (m):	**252.44 m**	Static Water Level (mbgl):	**0.52**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Graphic Log	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
252	1		See KCB23-SB-MB01D for geological log		▼		Lockable monument installed; uPVC blank casing 50mm diameter; Grout (2% bentonite - cement mixture) to surface
251							Graded filter pack
250	2						Bentonite seal (pellets, hydrated)
249	3						
248	4						Graded filter pack
247	5						
246	6		KCB23-SB-MB01S terminated at 6.00 m.				
245	7						
244	8						
243	9						
242	10						

Notes

Paired monitoring bore (upper screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB02D**
Page	**1 of 4**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**26/11/23**
Date Completed:	**29/11/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6389369N**	Hole Depth (mbgl):	**35.2**
Hole Location:	**Saddleback Treefarm**	Easting:	**443901E**	Stick Up (m):	**0.54**
Hole Diameter (mm):	**96**	Elevation (m):	**331.17 m**	Static Water Level (mbgl):	**13.26**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Graphic Log	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
331	0		Sandy GRAVEL (GW-GC), loose, fine to coarse-grained with traces of fines, light red-brown, well graded, subrounded to subangular, slightly moist [SURFICIAL SOIL]				Lockable monument installed; uPVC blank casing 50mm diameter; Grout (2% bentonite - cement mixture) to surface
			0.60 m				
			Sandy SILT (ML), stiff, low plasticity, pale orange-brown, subrounded to subangular fine to coarse-grained sand [SURFICIAL SOIL]				
	1		1.00 m				
330			Sandy CLAY (CL), firm to stiff, low plasticity, yellowish brown with reddish brown lenses, subrounded to subangular fine to medium-grained sand with occasional gravel nodules, slightly moist [SURFICIAL SOIL/ FERRICRETE AND LATERITE]				
	2						
329			2.60 m				
			Sandy CLAY (CL-CI), firm, low to medium plasticity, banded reddish-brown and pale orange-brown, subrounded to subangular medium to fine-grained sand, slightly moist. Less coarse-grained (6 - 7 m) and from 7.7m [EXTREMELY WEATHERED/RESIDUAL SOIL]				
328	3						
	4						
327							
	5						
326							
	6						
325							
	7						
324							
	8						
323							
	9						
322							
	10						
321							

Notes

Paired monitoring bore (lower screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB02D**
Page	**2 of 4**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**26/11/23**
Date Completed:	**29/11/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6389369N**	Hole Depth (mbgl):	**35.2**
Hole Location:	**Saddleback Treefarm**	Easting:	**443901E**	Stick Up (m):	**0.54**
Hole Diameter (mm):	**96**	Elevation (m):	**331.17 m**	Static Water Level (mbgl):	**13.26**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
320	11	Sandy CLAY (CL-CI), firm, low to medium plasticity, banded reddish-brown and pale orange-brown, subrounded to subangular medium to fine-grained sand, slightly moist. Less coarse-grained (6 to 7 m) and from 7.7m [EXTREMELY WEATHERED/RESIDUAL SOIL]				
	12	12.00 m				
319		CLAY (CI-CH), soft, medium to high plasticity, reddish brown with orange-brown layers, moist [EXTREMELY WEATHERED/RESIDUAL SOIL]				
	13	13.00 m				
318		CLAY (CI-CH), firm, medium to high plasticity, greyish white, with occasional iron indurated layers [EXTREMELY WEATHERED/ RESIDUAL SOIL]		▼		
	14	14.00 m				Graded filter pack
317		CLAY (CI-CH), soft, medium to high plasticity, reddish brown with orange-brown layers, moist [EXTREMELY WEATHERED/RESIDUAL SOIL]				
	15	15.00 m				
316		CLAY (CI-CH), soft, medium to high plasticity, orange-brown [EXTREMELY WEATHERED/RESIDUAL SOIL]				
	16	16.60 m				
315		Sandy CLAY (CI-CH), soft, medium to high plasticity, orange-brown, subrounded to subangular fine to medium-grained sand, moist [EXTREMELY WEATHERED/RESIDUAL SOIL]				
314	17					
	18	18.00 m				
313		CLAY (CI-CH), soft, medium to high plasticity, orange-brown, with gravel, moist [EXTREMELY WEATHERED/RESIDUAL SOIL]				
	19	19.00 m				
312		CLAY (CI-CH), soft, medium to high plasticity, reddish to orange-brown, moist [EXTREMELY WEATHERED/RESIDUAL SOIL]				
	20					
311						
	21	21.00 m				
310		CLAY (CI-CH), soft, medium to high plasticity, orange-brown, moist [EXTREMELY WEATHERED TO HIGHLY WEATHERED]				

Notes

Paired monitoring bore (lower screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB02D**
Page	**3 of 4**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**26/11/23**
Date Completed:	**29/11/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6389369N**	Hole Depth (mbgl):	**35.2**
Hole Location:	**Saddleback Treefarm**	Easting:	**443901E**	Stick Up (m):	**0.54**
Hole Diameter (mm):	**96**	Elevation (m):	**331.17 m**	Static Water Level (mbgl):	**13.26**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Graphic Log	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
309	22		CLAY (CI-CH), soft, medium to high plasticity, orange-brown, moist [EXTREMELY WEATHERED TO HIGHLY WEATHERED]				
	23		23.00 m DIORITE, very low strength, greyish green, recovered as silty sand, medium to coarse-grained sand, low plasticity silt [HIGHLY WEATHERED]				
308							
	24		24.00 m DIORITE, low to medium strength, greyish green, highly altered rock [MODERATELY WEATHERED]				
307							
	25						
306			25.50 m DIORITE, very high strength, medium to coarse-grained, dark grey, slightly altered rock [SLIGHTLY WEATHERED TO FRESH]				
	26						
305							Bentonite seal (pellets, hydrated)
	27						
304							
	28						
303							
	29						
302							
	30						
301							
	31						Graded filter pack
300							
	32						
299							

Notes

Paired monitoring bore (lower screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB02D**
Page	**4 of 4**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**26/11/23**
Date Completed:	**29/11/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6389369N**	Hole Depth (mbgl):	**35.2**
Hole Location:	**Saddleback Treefarm**	Easting:	**443901E**	Stick Up (m):	**0.54**
Hole Diameter (mm):	**96**	Elevation (m):	**331.17 m**	Static Water Level (mbgl):	**13.26**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Graphic Log	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
298	33		DIORITE, very high strength, medium to coarse-grained, dark grey, slightly altered rock [SLIGHTLY WEATHERED TO FRESH]				
297	34						
296	35		35.20 m				
295	36		KCB23-SB-MB02D terminated at 35.20 m.				
294	37						
293	38						
292	39						
291	40						
290	41						
289	42						
	43						

Notes

Paired monitoring bore (lower screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB02S**
Page	**1 of 1**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**29/11/23**
Date Completed:	**29/11/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6389369N**	Hole Depth (mbgl):	**9.0**
Hole Location:	**Saddleback Treefarm**	Easting:	**443901E**	Stick Up (m):	**0.54**
Hole Diameter (mm):	**126**	Elevation (m):	**331.17 m**	Static Water Level (mbgl):	**6.90**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Graphic Log	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
331	0		See KCB23-SB-MB02D for geological log				Lockable monument installed; uPVC blank casing 50mm diameter; Grout (2% bentonite - cement mixture) to surface
330	1						
329	2						Graded filter pack
328	3						
327	4						Bentonite seal (pellets, hydrated)
326	5						
325	6						
324	7				▼		Graded filter pack
323	8						
322	9		KCB23-SB-MB02S terminated at 9.00 m.				
321	10						

Notes

Paired monitoring bore (upper screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB03D**
Page	**1 of 5**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**30/11/23**
Date Completed:	**07/12/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6387652N**	Hole Depth (mbgl):	**53.0**
Hole Location:	**Saddleback Treefarm**	Easting:	**442460E**	Stick Up (m):	**0.71**
Hole Diameter (mm):	**96**	Elevation (m):	**322.52 m**	Static Water Level (mbgl):	**24.91**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Graphic Log	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
322	1		SAND (SW), loose, fine to coarse-grained, orange-brown, subrounded to subangular, well-graded, dry [SURFICIAL SOIL]				
			1.50 m				
321	2		FERRICRETE, red-brown (1.5 - 2 m), light grey (2 - 2.5 m), strong cementation [FERRICRETE/LATERITE]				
			2.50 m				
320	3		Silty SAND (SM), loose, medium to fine-grained, light grey, subrounded to subangular, low plasticity silt, trace of gravel, slightly moist, weak cementation [EXTREMELY WEATHERED/RESIDUAL SOIL]				
			3.00 m				
319	4		Sandy CLAY (CL-CI), soft, low to medium plasticity, white-grey, subrounded to subangular fine to coarse-grained sand, with quartz gravel, wet [EXTREMELY WEATHERED/RESIDUAL SOIL]				
318	5		- Moist				
317	6						
316	7		- Wet, flaky (visible mica)				
315	8						
314	9		- Moist, firm				
313	10						
312							

Notes

Paired monitoring bore (lower screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB03D**
Page	**2 of 5**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**30/11/23**
Date Completed:	**07/12/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6387652N**	Hole Depth (mbgl):	**53.0**
Hole Location:	**Saddleback Treefarm**	Easting:	**442460E**	Stick Up (m):	**0.71**
Hole Diameter (mm):	**96**	Elevation (m):	**322.52 m**	Static Water Level (mbgl):	**24.91**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Graphic Log	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
311	11		Sandy CLAY (CL-CI), soft, low to medium plasticity, white-grey, subrounded to subangular fine to coarse-grained sand, with quartz gravel, wet [EXTREMELY WEATHERED/RESIDUAL SOIL] - Lensed/laminated, dusky red, red-brown mottled orange-brown				
310	12						
309	13						
308	14						
307	15						
306	16		- Moist, firm, light grey, mottled white grey - Firm, white grey				
305	17		- Orange-brown (16.5 - 17m), red-brown (17 - 18m)				
304	18		- Stratified white-grey, red-brown, orange-brown				
303	19						
302	20						
301	21						

Notes

Paired monitoring bore (lower screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB03D**
Page	**3 of 5**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**30/11/23**
Date Completed:	**07/12/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6387652N**	Hole Depth (mbgl):	**53.0**
Hole Location:	**Saddleback Treefarm**	Easting:	**442460E**	Stick Up (m):	**0.71**
Hole Diameter (mm):	**96**	Elevation (m):	**322.52 m**	Static Water Level (mbgl):	**24.91**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Graphic Log	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
300	22		Sandy CLAY (CL-CI), soft, low to medium plasticity, white-grey, subrounded to subangular fine to coarse-grained sand, with quartz gravel, wet [EXTREMELY WEATHERED/RESIDUAL SOIL]		▼		Lockable monument installed; uPVC blank casing 50mm diameter; Grout (2% bentonite - cement mixture) to surface
299	23						
298	24						
297	25						
296	26						
295	27		- Wet, soft, white grey				
294	28						
293	29						
292	30						
291	31		- Moist, soft, orange-brown with minor gravel.				
	32		Moist, firm, white grey [HIGHLY WEATHERED]				

Notes

Paired monitoring bore (lower screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB03D**
Page	**4 of 5**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**30/11/23**
Date Completed:	**07/12/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6387652N**	Hole Depth (mbgl):	**53.0**
Hole Location:	**Saddleback Treefarm**	Easting:	**442460E**	Stick Up (m):	**0.71**
Hole Diameter (mm):	**96**	Elevation (m):	**322.52 m**	Static Water Level (mbgl):	**24.91**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Graphic Log	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
290			Sandy CLAY (CL-CI), soft, low to medium plasticity, white-grey, subrounded to subangular fine to coarse-grained sand, with quartz gravel, wet [EXTREMELY WEATHERED/RESIDUAL SOIL]				
	33		Moist, firm, white-grey [HIGHLY WEATHERED]				
289							
	34						
288							
	35		35.00 m Moist, firm to soft, orange-brown [HIGHLY WEATHERED]				
287							
	36						
286							
	37						
285							
	38						
284							
	39						
283							
	40						
282							
	41						
281							
	42						
280							
	43						

Notes

Paired monitoring bore (lower screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB03D**
Page	**5 of 5**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**30/11/23**
Date Completed:	**07/12/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6387652N**	Hole Depth (mbgl):	**53.0**
Hole Location:	**Saddleback Treefarm**	Easting:	**442460E**	Stick Up (m):	**0.71**
Hole Diameter (mm):	**96**	Elevation (m):	**322.52 m**	Static Water Level (mbgl):	**24.91**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
279	44	Moist, firm to soft, orange-brown [HIGHLY WEATHERED]				
278	45					Bentonite seal (pellets, hydrated)
277	46	46.00 m GRANITE, recovered as sandy gravel, loose, fine to coarse-grained, orange-brown, subrounded to subangular sand, moist [HIGHLY WEATHERED]				
276	47					
275	48					
274	49					
273		49.40 m METAGRANITE, medium to high strength rock, orange-brown, highly altered [MODERATELY WEATHERED]				Graded filter pack
	50	50.20 m				
272		GRANODIORITE, very high strength, coarse-grained, light grey, with staining on joints/fractures [SLIGHTLY WEATHERED TO FRESH]				
	51					
271						
	52					
270						
	53	53.00 m				
269		KCB23-SB-MB03D terminated at 53.00 m.				

Notes

Paired monitoring bore (lower screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB03S**
Page	**1 of 1**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**07/12/23**
Date Completed:	**07/12/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6387652N**	Hole Depth (mbgl):	**10.0**
Hole Location:	**Saddleback Treefarm**	Easting:	**442458E**	Stick Up (m):	**0.83**
Hole Diameter (mm):	**126**	Elevation (m):	**322.52 m**	Static Water Level (mbgl):	**9.56**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Graphic Log	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
322	1		See KCB23-SB-MB03D for geological log				Lockable monument installed; uPVC blank casing 50mm diameter; Grout (2% bentonite - cement mixture) to surface
321	2						
320	3						Graded filter pack
319	4						
318	5						
317	6						Bentonite seal (pellets, hydrated)
316	7						
315	8						Graded filter pack
314	9						
313	10		KCB23-SB-MB03S terminated at 10.00 m.		▼		
312							

Notes

Paired monitoring bore (upper screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB04D**
Page	**1 of 2**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**11/12/23**
Date Completed:	**14/12/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6383992N**	Hole Depth (mbgl):	**18.5**
Hole Location:	**Saddleback Treefarm**	Easting:	**443509E**	Stick Up (m):	**0.68**
Hole Diameter (mm):	**126**	Elevation (m):	**323.16 m**	Static Water Level (mbgl):	**1.3**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
323	0	0.20 m: Silty SAND (SM), loose to medium dense, medium to coarse-grained, light grey, subrounded to subangular, very soft, low plasticity silt, slightly moist, with minor gravel and rootlets [SURFICIAL SOIL/TOP SOIL]				
		FERRICRETE, weakly cemented bands of gravel, sand and clay, light grey, reddish brown, black stained [FERRICRETE/LATERITE]				
322	1	1.00 m: Sandy SILT (ML), very stiff, low plasticity, light grey, fine to medium-grained subrounded to subangular sand, slightly moist [SURFICIAL SOIL]		▼		
		1.60 m: Sandy CLAY (CH), very stiff, high plasticity, orange-brown blotched light grey, subrounded to subangular fine to coarse-grained sand, with gravel, slightly moist [SURFICIAL SOIL]				
321	2	2.00 m: Sandy CLAY (CI), stiff, medium plasticity, greyish white, subrounded to subangular fine to medium-grained sand, with kaolinite, moist [EXTREMELY WEATHERED/RESIDUAL SOIL]				
320	3					
319	4					
318	5					Lockable monument installed; uPVC blank casing 50mm diameter; Grout (2% bentonite - cement mixture) to surface
317	6					
316	7	7.00 m: Wet, very soft.				
315	8	8.00 m: Soft.				
314	9					
313	10					Bentonite seal (pellets, hydrated)

Notes

Paired monitoring bore (lower screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB04D**
Page	**2 of 2**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**11/12/23**
Date Completed:	**14/12/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6383992N**	Hole Depth (mbgl):	**18.5**
Hole Location:	**Saddleback Treefarm**	Easting:	**443509E**	Stick Up (m):	**0.68**
Hole Diameter (mm):	**126**	Elevation (m):	**323.16 m**	Static Water Level (mbgl):	**1.3**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Graphic Log	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
312	11		Soft.				
	12		12.00 m				
311			GRANITE, recovered as silty sand, light orange-brown, subrounded to subangular sand, non-plastic silt [HIGHLY WEATHERED]				
	13		13.00 m				
310			GRANITE, high strength, medium to coarse-grained, pale orange-brown mottled white-grey, orange-brown staining on joints/fractures [MODERATELY WEATHERED]				
309	14						
	15						Graded filter pack
308							
307	16						
	17		17.00 m				
306			GRANITE, very high strength, fine to coarse-grained, pale whitish grey, massive, orange-brown staining on joints/fractures [SLIGHTLY WEATHERED/FRESH (SW/F)]				
305	18		18.50 m				
			KCB23-SB-MB04D terminated at 18.50 m.				
304	19						
303	20						
302	21						

Notes

Paired monitoring bore (lower screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB04S**
Page	**1 of 1**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**14/12/23**
Date Completed:	**14/12/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6383991N**	Hole Depth (mbgl):	**9.0**
Hole Location:	**Saddleback Treefarm**	Easting:	**443511E**	Stick Up (m):	**0.69**
Hole Diameter (mm):	**126**	Elevation (m):	**323.16 m**	Static Water Level (mbgl):	**1.56**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Graphic Log	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
323	0		See KCB23-SB-MB04D for geological log		▼		Lockable monument installed; uPVC blank casing 50mm diameter; Grout (2% bentonite - cement mixture) to surface
322	1						
321	2						
320	3						Bentonite seal (pellets, hydrated)
319	4						
318	5						
317	6						Graded filter pack
316	7						
315	8						
314	9		KCB23-SB-MB04S terminated at 9.00 m.				
313	10						

Notes

Paired monitoring bore (upper screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB05D**
Page	**1 of 2**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**14/12/23**
Date Completed:	**16/12/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6385408N**	Hole Depth (mbgl):	**12.0**
Hole Location:	**Saddleback Treefarm**	Easting:	**445568E**	Stick Up (m):	**0.64**
Hole Diameter (mm):	**126**	Elevation (m):	**271.34 m**	Static Water Level (mbgl):	**0.24**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
271	0	SAND (SW), loose, fine to medium -grained, dark grey, well graded, subrounded, with rootlets, dry [SURFICIAL SOIL/TOP SOIL]		▼		
	0.70 m					
	1	Sandy CLAY (CL), soft, low plasticity, dark yellowish brown mottled reddish-brown, weakly cemented subrounded to subangular fine to medium-grained sand, moist [FERRICRETE/LATERITE]				
270	1.50 m					Lockable monument installed; uPVC blank casing 50mm diameter; Grout (2% bentonite - cement mixture) to surface
	2	GRANITE, recovered as clayey sand, medium dense, fine to coarse-grained, light grey, subrounded to subangular, wet [EXTREMELY WEATHERED/RESIDUAL SOIL]				
269						
	3					
268						
	4					Bentonite seal (pellets, hydrated)
267						
	5					
	5.00 m					
266		GRANITE, recovered as sand, medium dense, fine to coarse-grained, light grey mottled orange-brown, slightly moist; becoming loose (5 - 6m) and (7.5 - 8.5m); blotched orange-brown (6 -7m) [HIGHLY WEATHERED TO MODERATELY WEATHERED]				
	6					
265						
	7					
264						
	8					
263	8.50 m					Graded filter pack
		GRANITE, high to very high strength rock, coarse-grained crystalline, pale white-red mottled grey and black, weak staining on joints [SLIGHTLY WEATHERED TO FRESH]				
	9					
262						
	10					
261						

Notes

Paired monitoring bore (lower screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB05D**
Page	**2 of 2**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**14/12/23**
Date Completed:	**16/12/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6385408N**	Hole Depth (mbgl):	**12.0**
Hole Location:	**Saddleback Treefarm**	Easting:	**445568E**	Stick Up (m):	**0.64**
Hole Diameter (mm):	**126**	Elevation (m):	**271.34 m**	Static Water Level (mbgl):	**0.24**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Graphic Log	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
260	11		GRANITE, high to very high strength rock, coarse-grained crystalline, pale white-red mottled grey and black, weak staining on joints [SLIGHTLY WEATHERED TO FRESH]				
	12		12.00 m				
259			KCB23-SB-MB05D terminated at 12.00 m.				
258	13						
257	14						
256	15						
255	16						
254	17						
253	18						
252	19						
251	20						
250	21						

Notes

Paired monitoring bore (lower screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB05S**
Page	**1 of 1**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**16/12/23**
Date Completed:	**16/12/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6385409N**	Hole Depth (mbgl):	**4.0**
Hole Location:	**Saddleback Treefarm**	Easting:	**445568E**	Stick Up (m):	**0.64**
Hole Diameter (mm):	**126**	Elevation (m):	**271.34 m**	Static Water Level (mbgl):	**0.99**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Graphic Log	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
271	0		See KCB23-SB-MB05D for geological log		▼		Lockable monument installed; uPVC blank casing 50mm diameter; Grout (2% bentonite - cement mixture) to surface
270	1						
269	2						Graded filter pack
268	3						
267	4		KCB23-SB-MB05S terminated at 4.00 m.				
266	5						
265	6						
264	7						
263	8						
262	9						
261	10						

Notes

Paired monitoring bore (upper screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB06D**
Page	**1 of 3**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**08/12/23**
Date Completed:	**12/12/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6386125N**	Hole Depth (mbgl):	**29.0**
Hole Location:	**Saddleback Treefarm**	Easting:	**443322E**	Stick Up (m):	**0.67**
Hole Diameter (mm):	**96**	Elevation (m):	**271.61 m**	Static Water Level (mbgl):	**4.6**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
271	1	Sandy CLAY (CL), soft, low plasticity, red-brown, weak cementation, dry. Becoming moist with depth (1 - 2m) [SURFICIAL SOIL / LATERITE]			Lockable monument installed; uPVC blank casing 50mm diameter; Grout (2% bentonite - cement mixture) to surface	
270	2	2.00 m				
		CLAY (Cl - CH), firm to stiff, medium to high plasticity, orange-brown, with black gravel nodules, moist [FERRICRETE AND LATERITE]				
269	3					
268	4	4.50 m				
267	5	CLAY (CL - CH), firm to stiff, medium plasticity, orange-brown, with gravel, slightly moist [EXTREMELY WEATHERED/RESIDUAL SOIL]		▼		
266	6					
265	7	7.50 m				
264	8	Sandy CLAY (CL - Cl), firm, low to medium plasticity, light grey, subrounded to subangular fine to medium-grained sand, moist; becoming hard (7 - 9m), becoming stiff (9 - 12m), becoming soft to firm (12 - 14.5m) [EXTREMELY WEATHERED]				
263	9					
262	10					
261						

Notes

Paired monitoring bore (lower screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB06D**
Page	**2 of 3**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**08/12/23**
Date Completed:	**12/12/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6386125N**
Hole Location:	**Saddleback Treefarm**	Easting:	**443322E**
Hole Diameter (mm):	**96**	Elevation (m):	**271.61 m**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**
Drilling Method:	**SNC**	Datum:	**AHD**

Hole Depth (mbgl):	**29.0**
Stick Up (m):	**0.67**
Static Water Level (mbgl):	**4.6**
Sampling Method:	**Core**

Elevation (m)	Depth (m)	Graphic Log	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
260	11		Sandy CLAY (CL - CI), firm, low to medium plasticity, light grey, subrounded to subangular fine to medium-grained sand, moist; becoming hard (7 - 9m), becoming stiff (9 - 12m), becoming soft to firm (12 - 14.5m) [EXTREMELY WEATHERED]				
259	12						
258	13						
257	14						
	14.50 m		Orange brown, soft, firm.				
256	15						
255	16						
254	17						
253	18						
	18.50 m		Light grey, stiff.				
252	19						
251	20						
	20.00 m		GRANITE, recovered as clayey sand, medium dense, fine to coarse-grained, light orange-brown and grey, subrounded to subangular, with gravel, moist to wet [HIGHLY WEATHERED TO MODERATELY WEATHERED]				Bentonite seal (pellets, hydrated)
	21						

Notes

Paired monitoring bore (lower screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB06D**
Page	**3 of 3**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**08/12/23**
Date Completed:	**12/12/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

Contractor:	**Hagstrom Drilling**	Northing:	**6386125N**	Hole Depth (mbgl):	**29.0**
Hole Location:	**Saddleback Treefarm**	Easting:	**443322E**	Stick Up (m):	**0.67**
Hole Diameter (mm):	**96**	Elevation (m):	**271.61 m**	Static Water Level (mbgl):	**4.6**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

Elevation (m)	Depth (m)	Graphic Log	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
249	22		GRANITE, recovered as clayey sand, medium dense, fine to coarse-grained, light orange-brown and grey, subrounded to subangular, with gravel, moist to wet [HIGHLY WEATHERED TO MODERATELY WEATHERED]				
248	23						
247	24						
246	25						Graded filter pack
245	26		26.50 m				
244	27		GRANITE, high to very high strength, coarse-grained crystalline, pale white-red and grey mottled black, weak staining on joints [SLIGHTLY WEATHERED TO FRESH]				
243	28						
242	29		29.00 m KCB23-SB-MB06D terminated at 29.00 m.				
241	30						
240	31						
	32						

Notes

Paired monitoring bore (lower screen)

Klohn Crippen Berger

Borehole No.	**KCB23-SB-MB06S**
Page	**1 of 1**
Project No.	**DX70046A04**

Client: **Newmont**

Status: DRAFT

Project: **Boddington Saddleback RDA2 Site Investigation**

Date Started:	**12/12/23**
Date Completed:	**12/12/23**
Logged by:	**A. Dlamini**
Checked by:	**D. Lee**

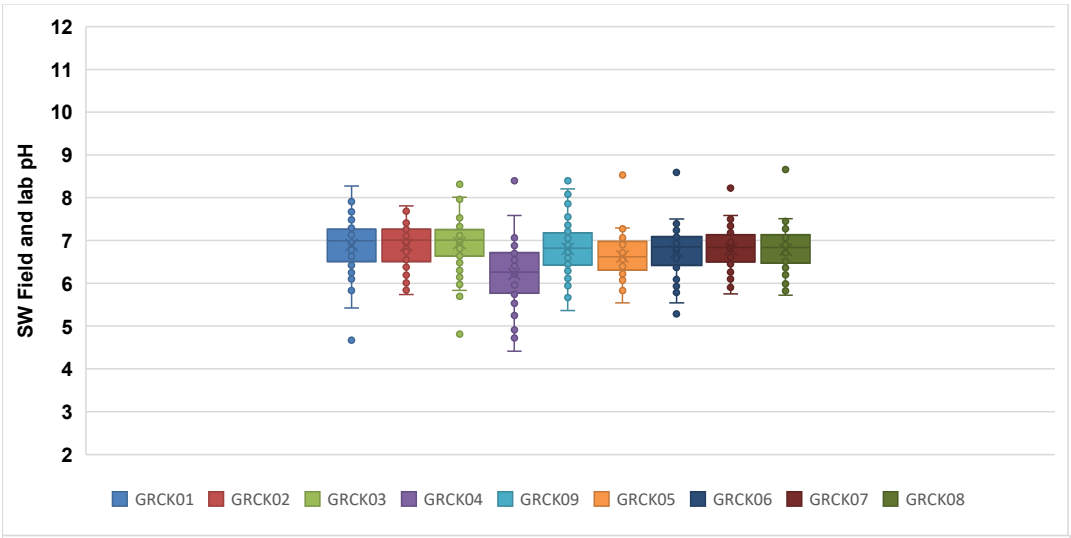
Contractor:	**Hagstrom Drilling**	Northing:	**6386124N**	Hole Depth (mbgl):	**6.0**
Hole Location:	**Saddleback Treefarm**	Easting:	**443318E**	Stick Up (m):	**0.65**
Hole Diameter (mm):	**126**	Elevation (m):	**271.61 m**	Static Water Level (mbgl):	**3.28**
Rig Details:	**LS 250 Mini Sonic**	Grid:	**GDA94 / MGA zone 50**	Sampling Method:	**Core**
Drilling Method:	**SNC**	Datum:	**AHD**		

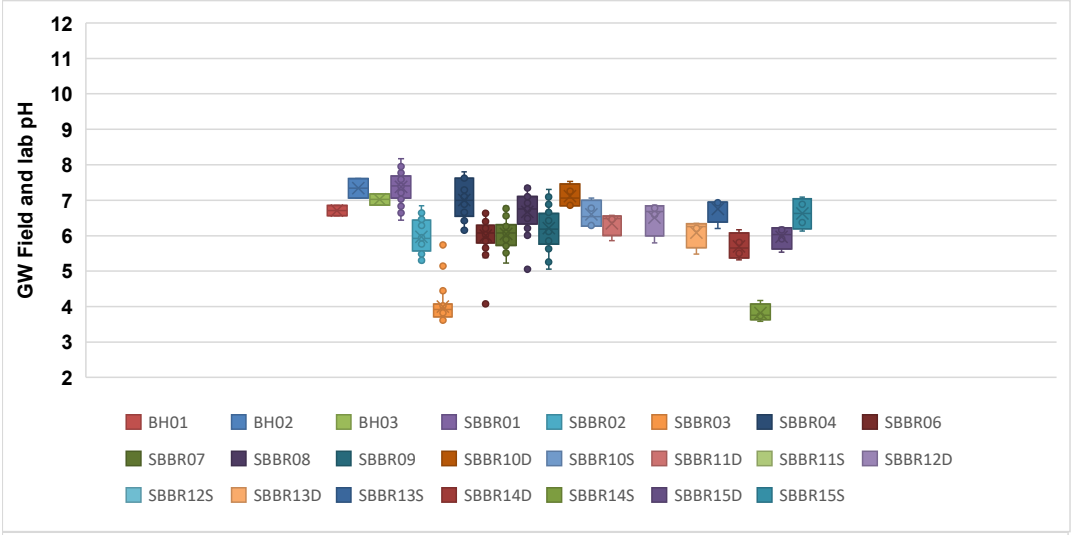
Elevation (m)	Depth (m)	Graphic Log	Material Description	Water Strike	Static Water Level (mbgl)	Installation Diagram	Installation Details
271	1		See KCB23-SB-MB06D for geological log		▼		Lockable monument installed; uPVC blank casing 50mm diameter; Grout (2% bentonite - cement mixture) to surface Bentonite seal (pellets, hydrated)
270	2						
269	3						
268	4						Graded filter pack
267	5						
266	6		KCB23-SB-MB06S terminated at 6.00 m.				
265	7						
264	8						
263	9						
262	10						
261							

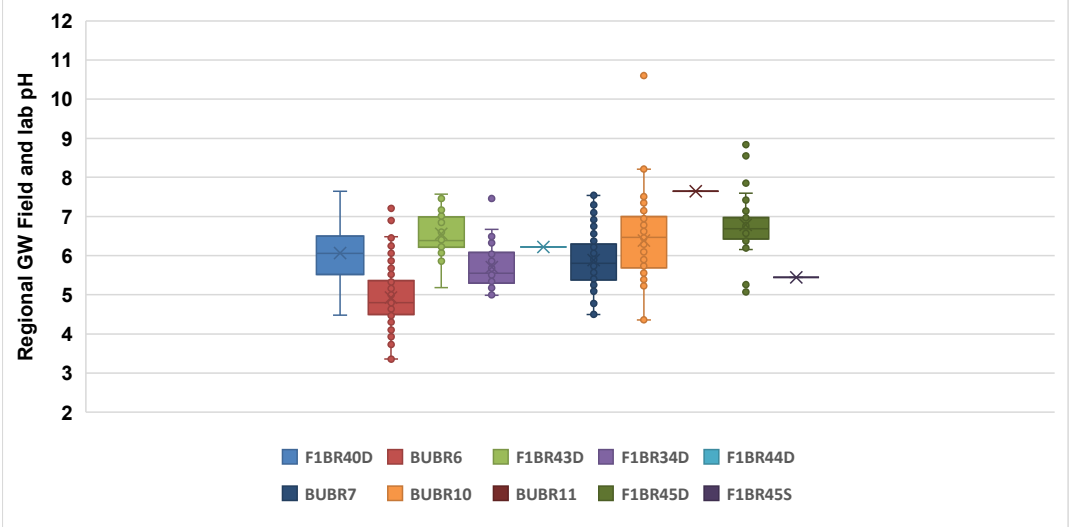
Notes

Paired monitoring bore (upper screen)

Appendix B
Statistical assessment of surface water and groundwater hydrochemistry







D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

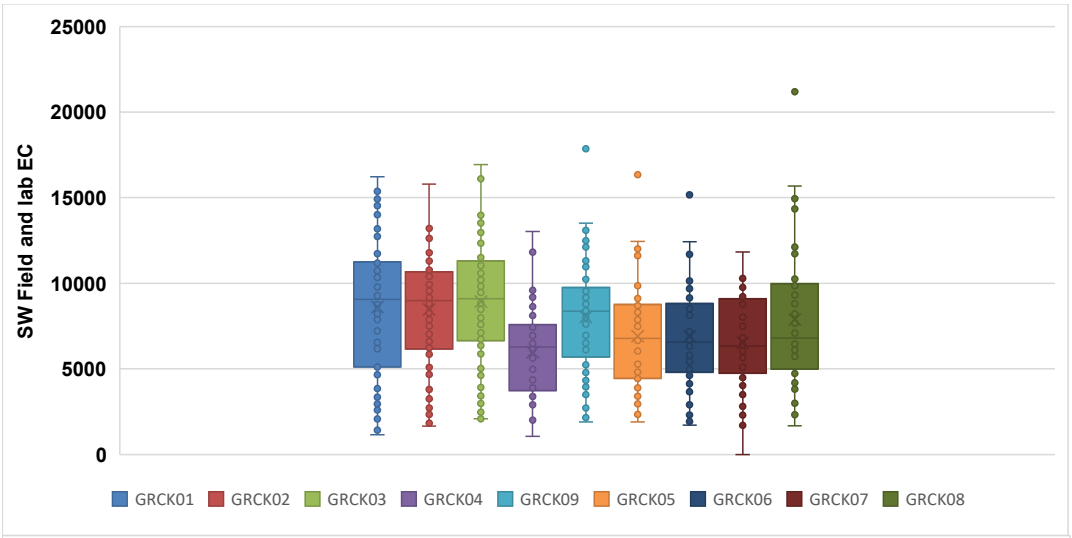
BIG DOG HYDROGEOLOGY

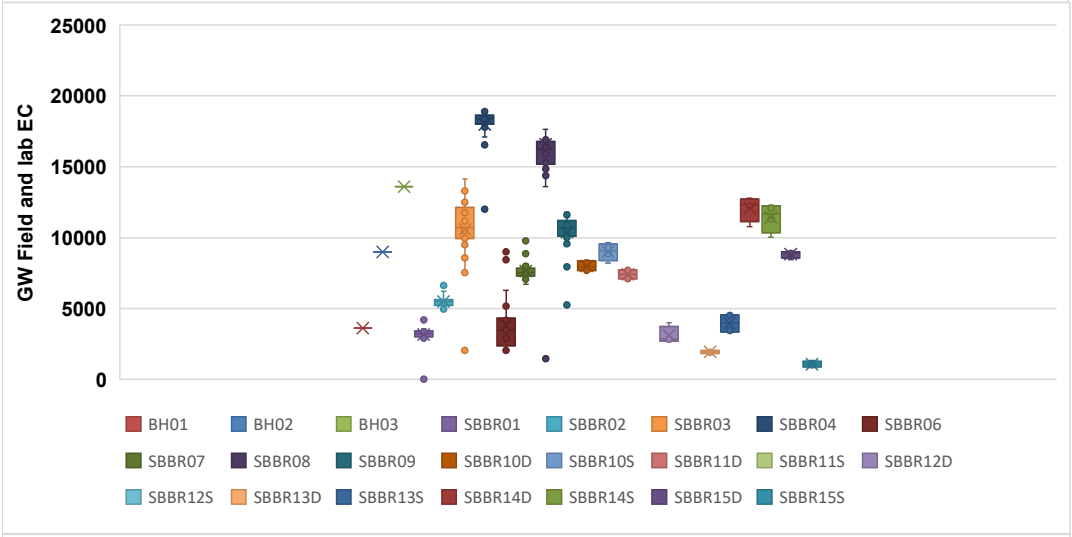
pH in surface water and groundwater

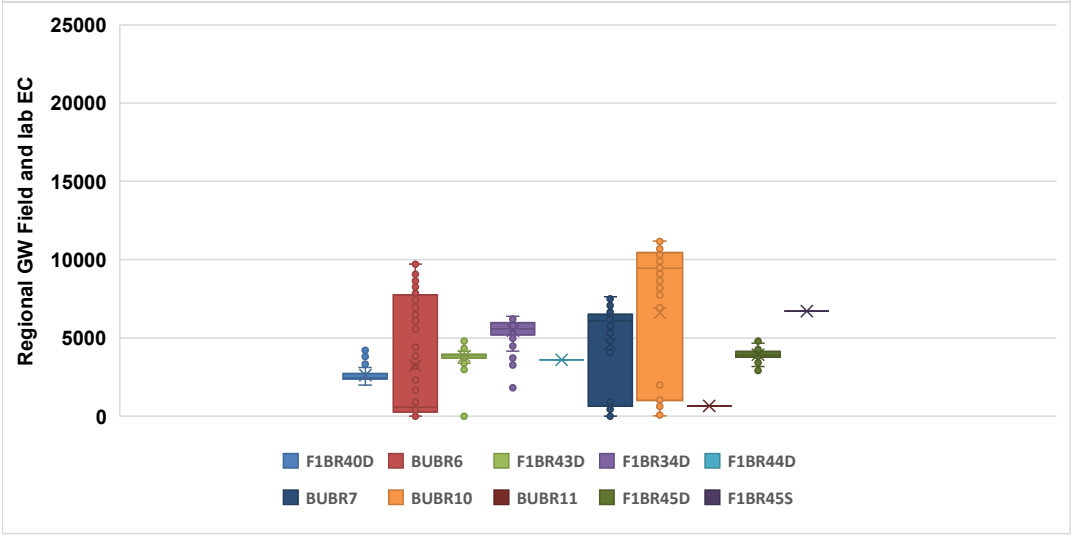
Figure B1

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







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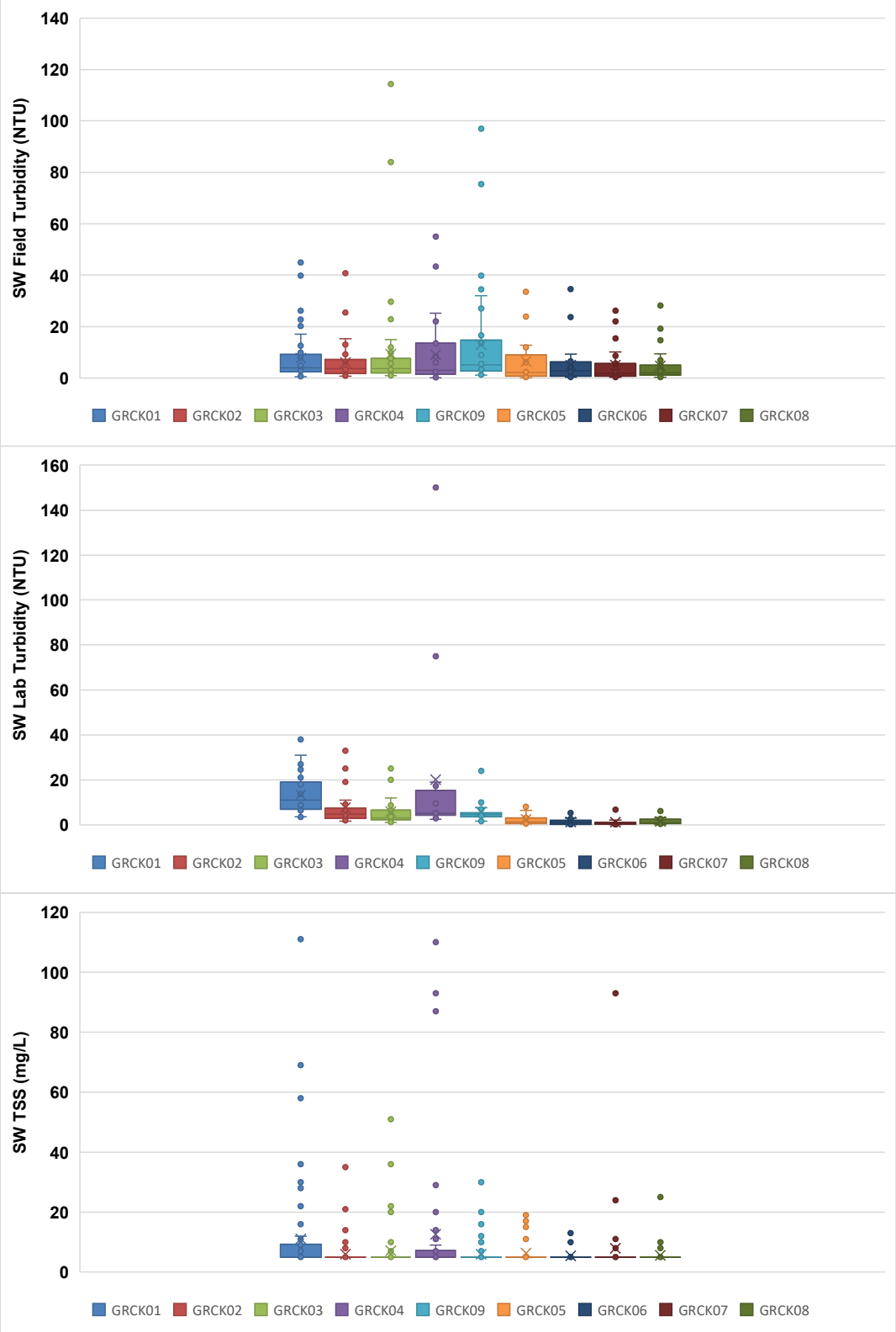
BIG DOG HYDROGEOLOGY

EC in surface water and groundwater

Figure B2

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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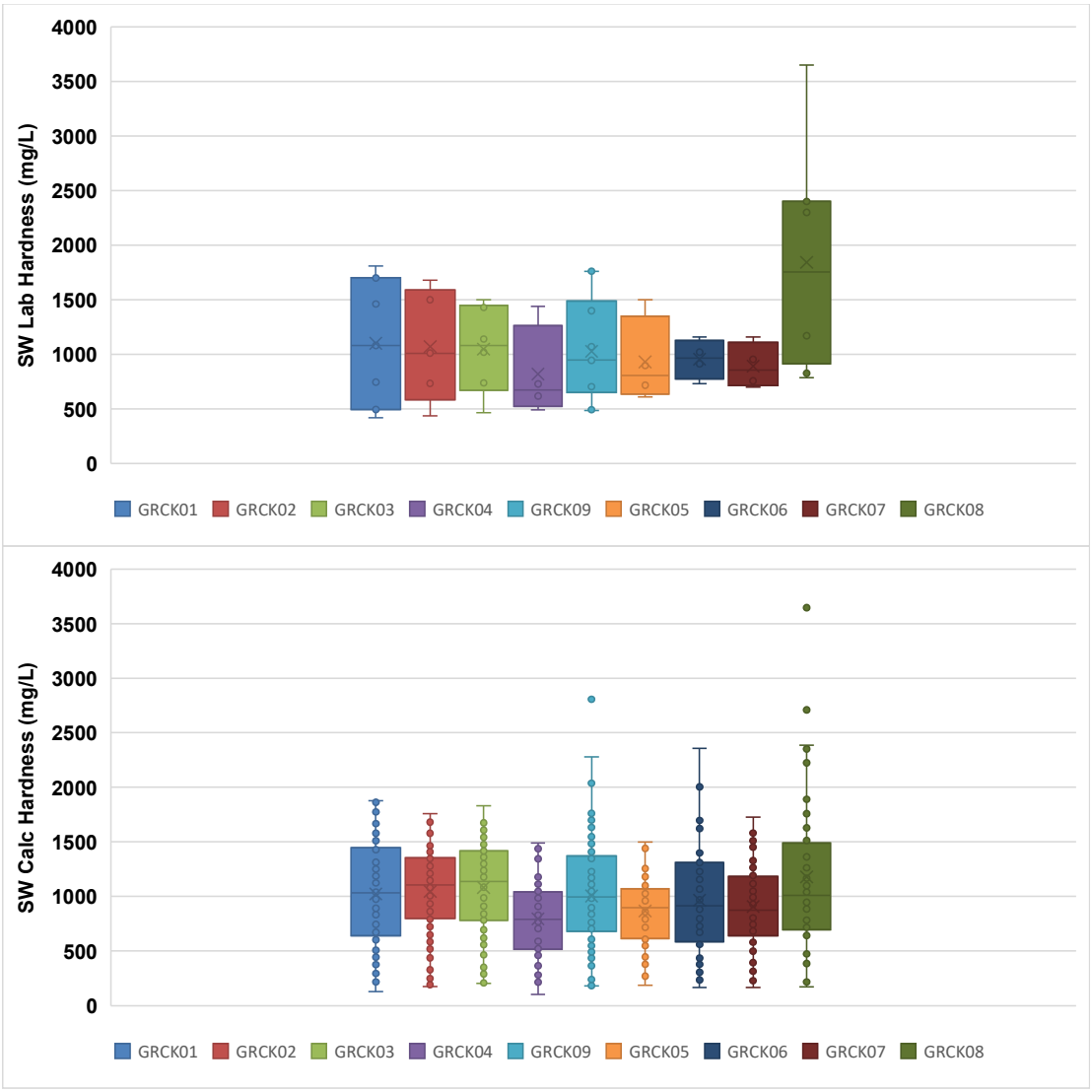
BIG DOG HYDROGEOLOGY

Turbidity and TSS in surface water

Figure B3

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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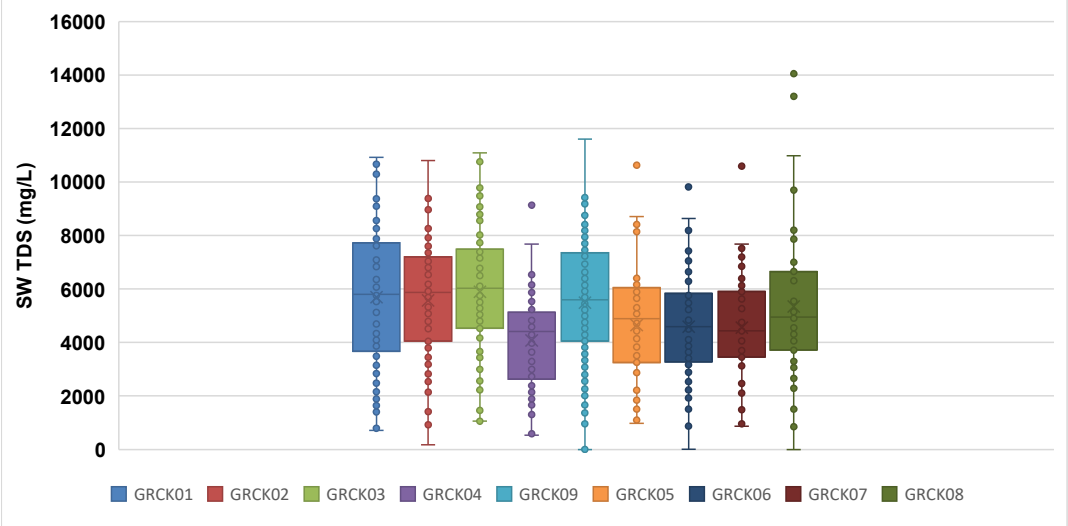
BIG DOG HYDROGEOLOGY

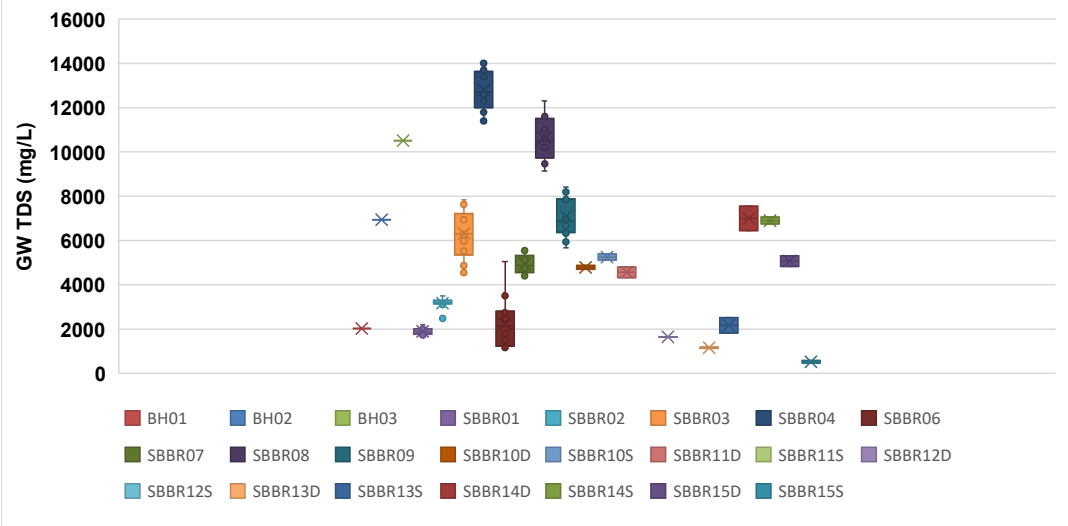
Hardness in surface water

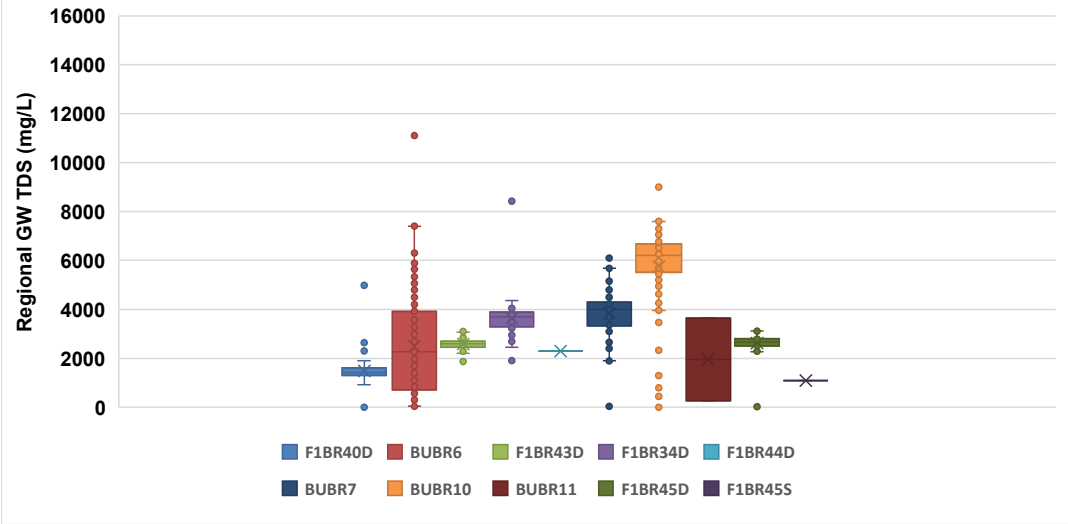
Figure B4

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







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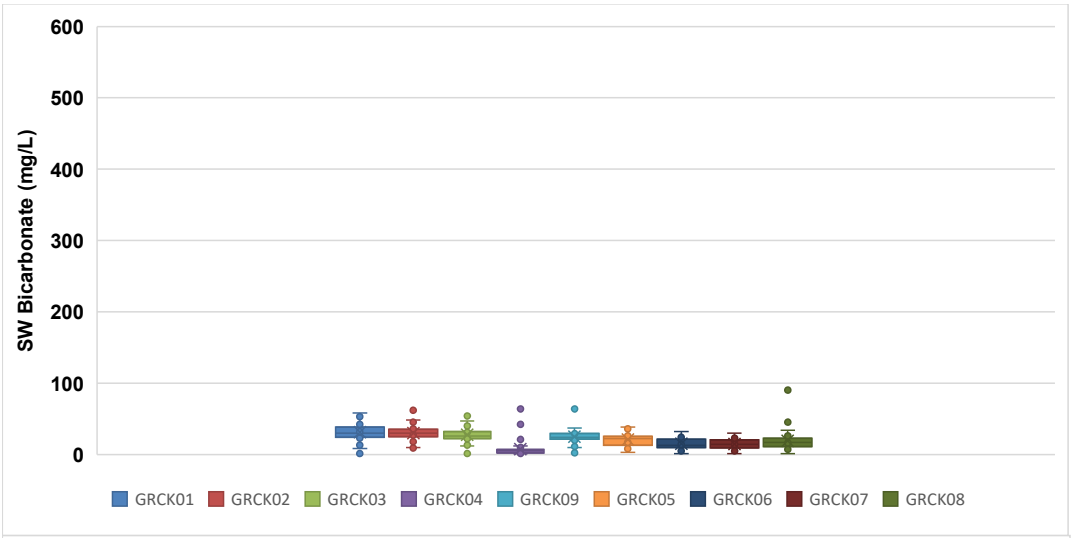
BIG DOG HYDROGEOLOGY

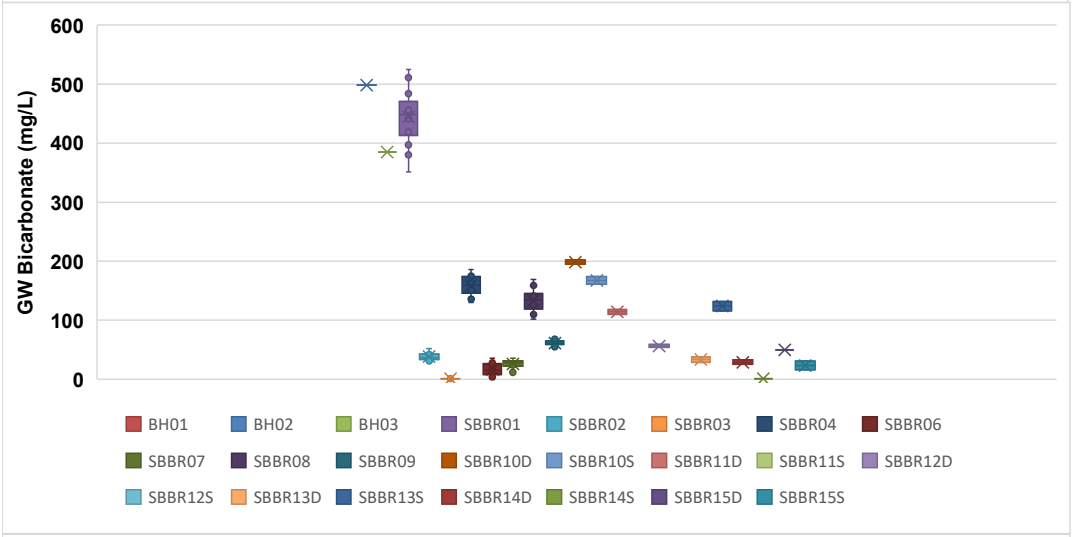
TDS in surface water and groundwater

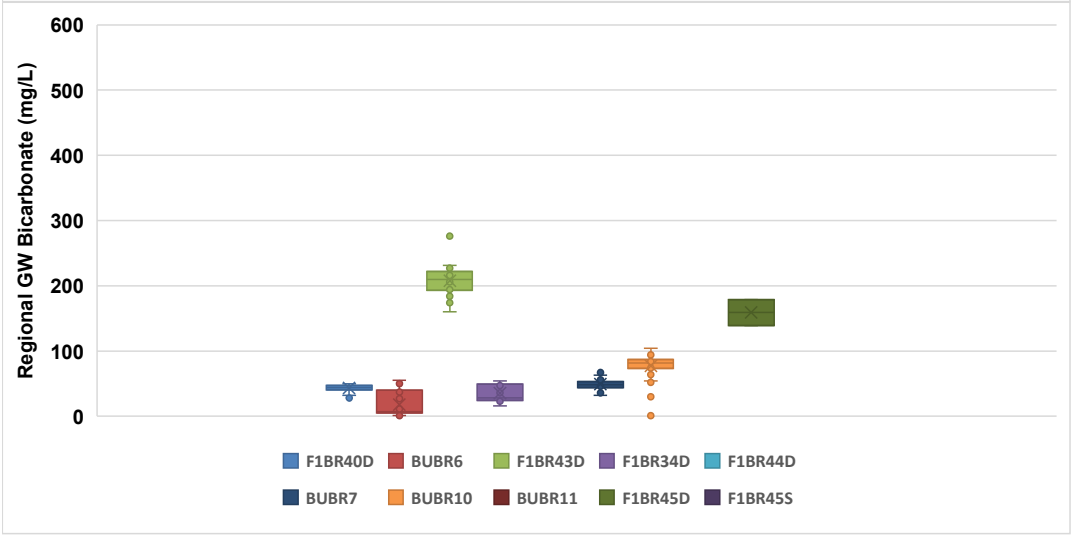
Figure B5

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







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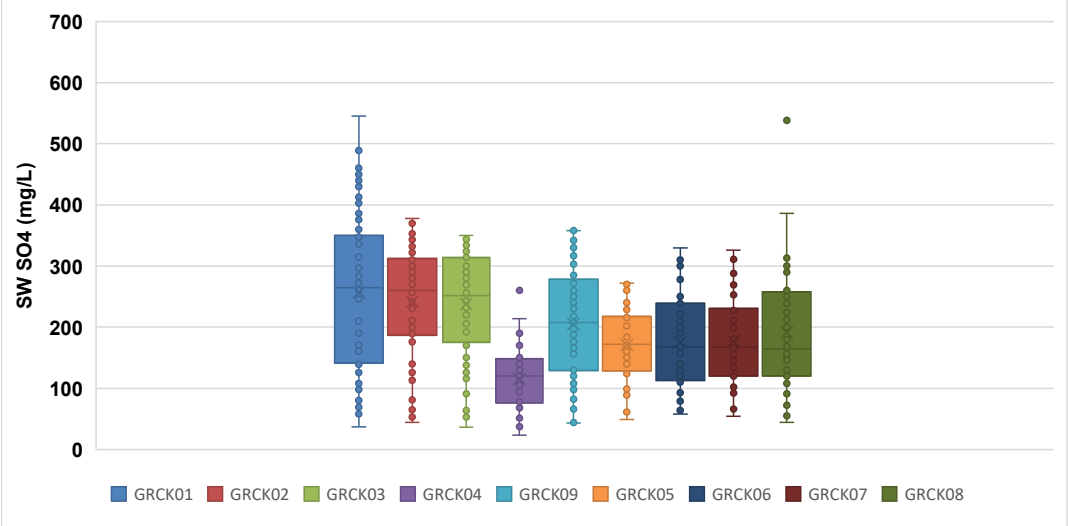
BIG DOG HYDROGEOLOGY

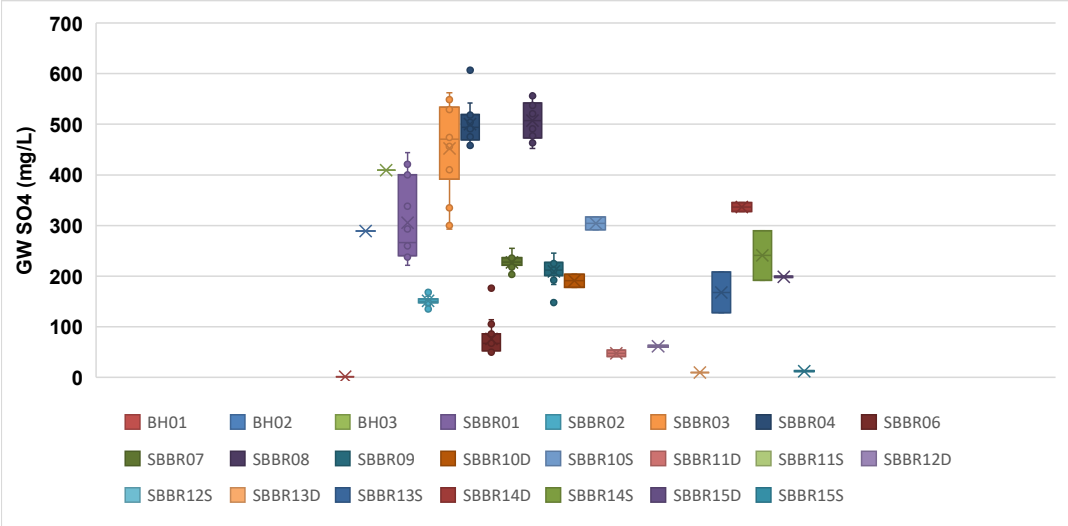
Bicarbonate in surface water and groundwater

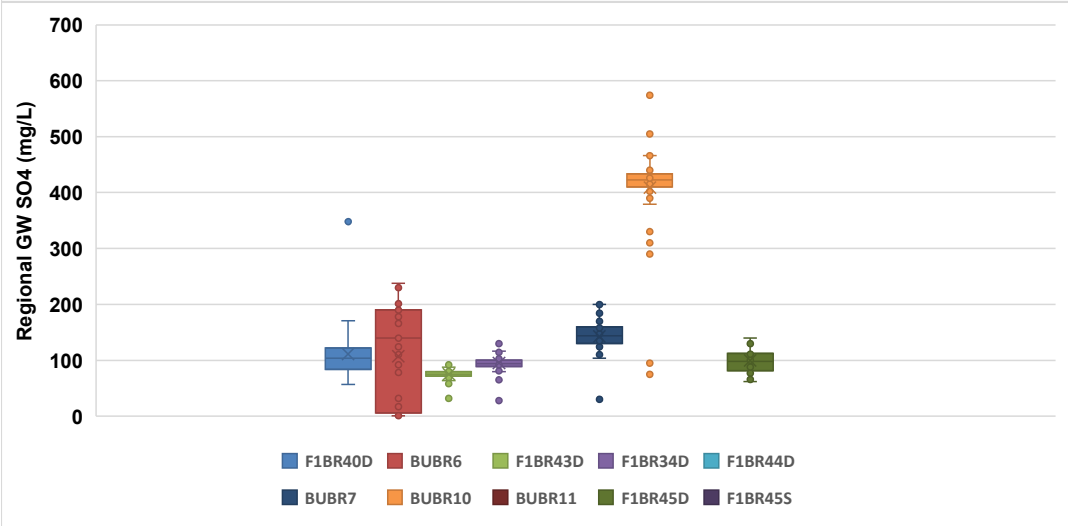
Figure B6

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







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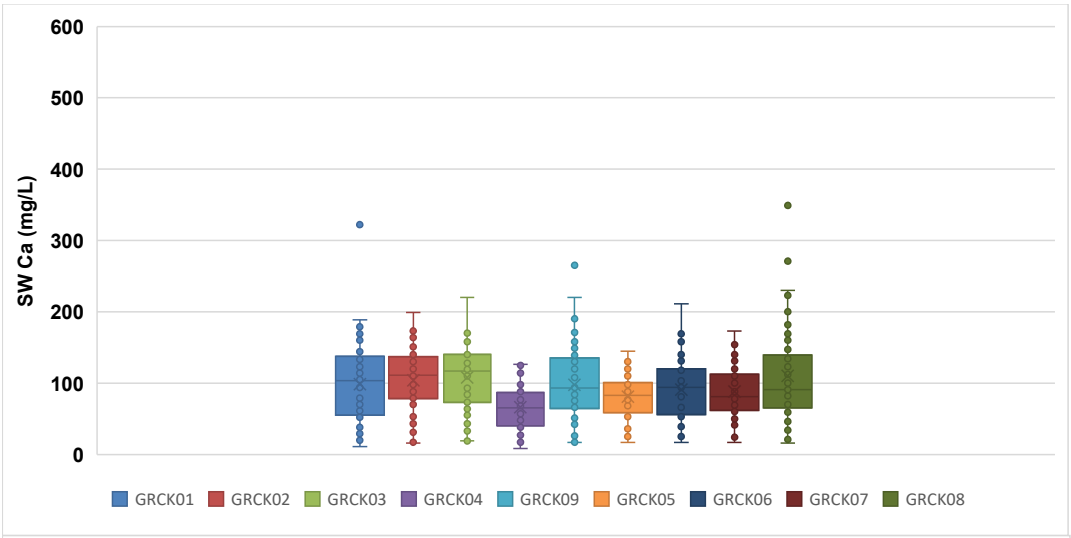
BIG DOG HYDROGEOLOGY

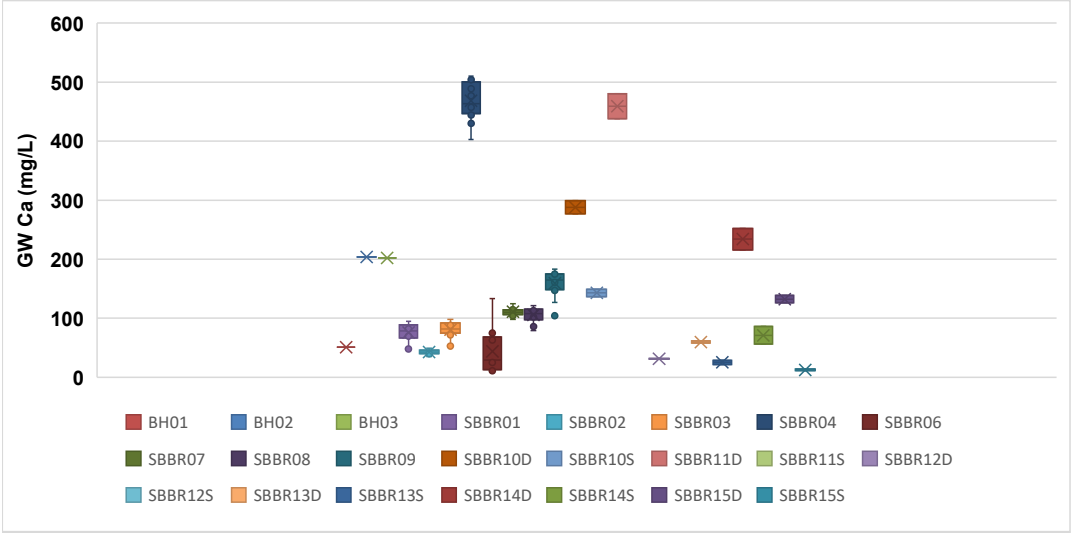
Sulphate in surface water and groundwater

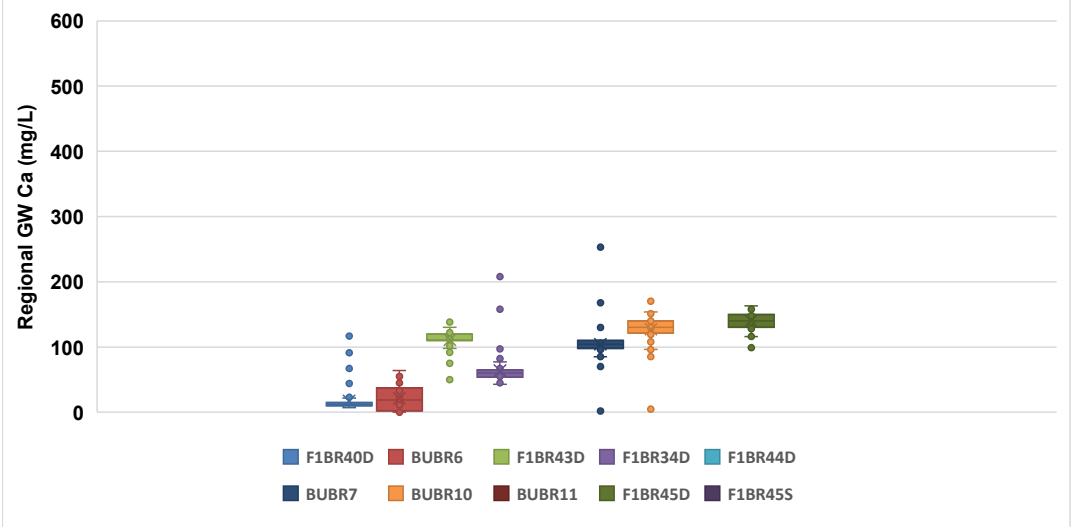
Figure B7

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







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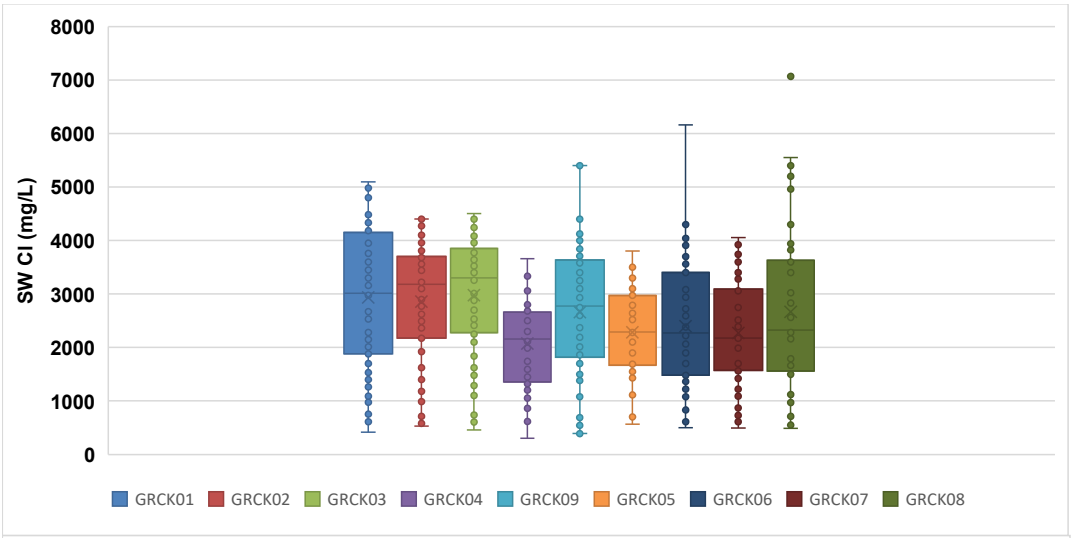
BIG DOG HYDROGEOLOGY

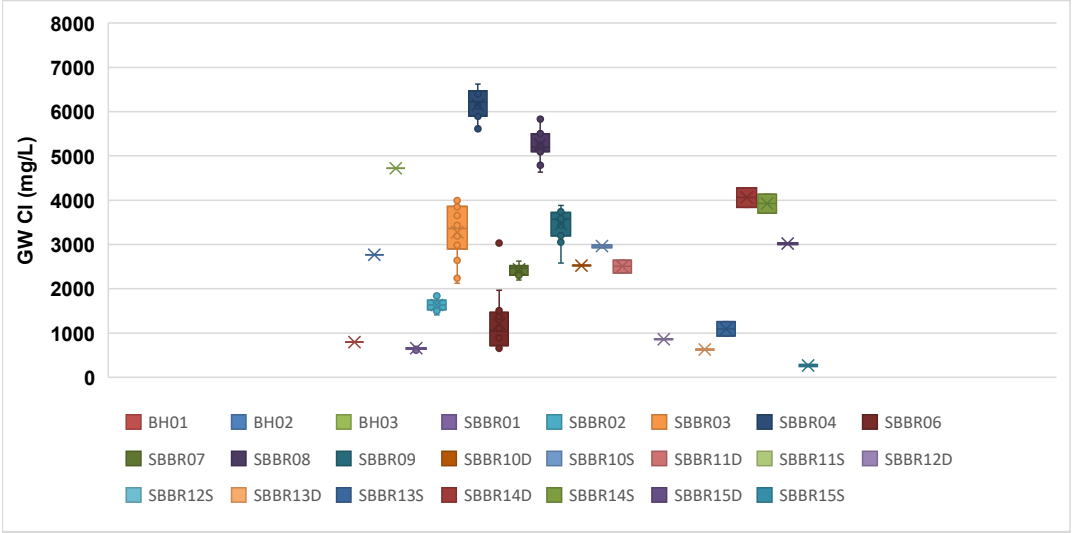
Ca in surface water and groundwater

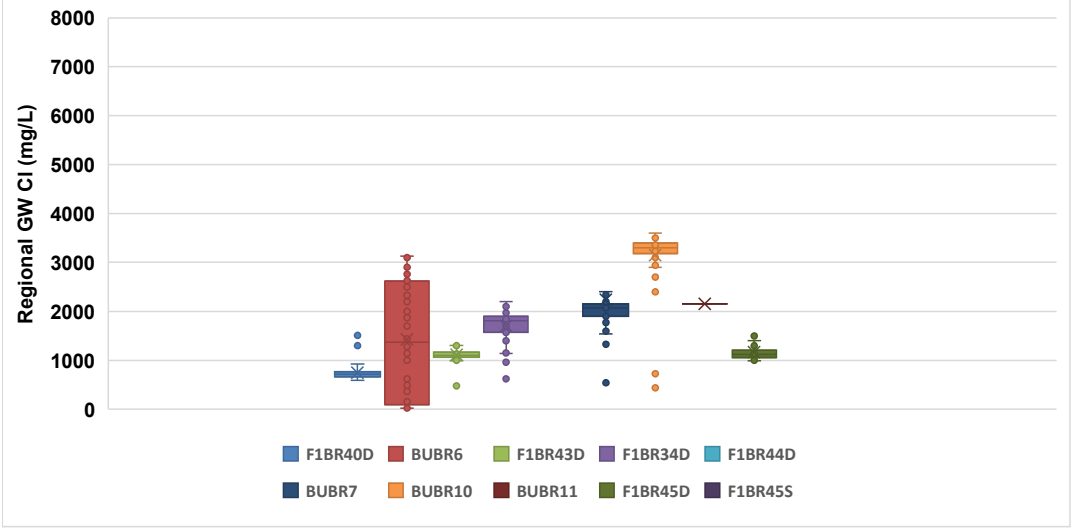
Figure B8

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







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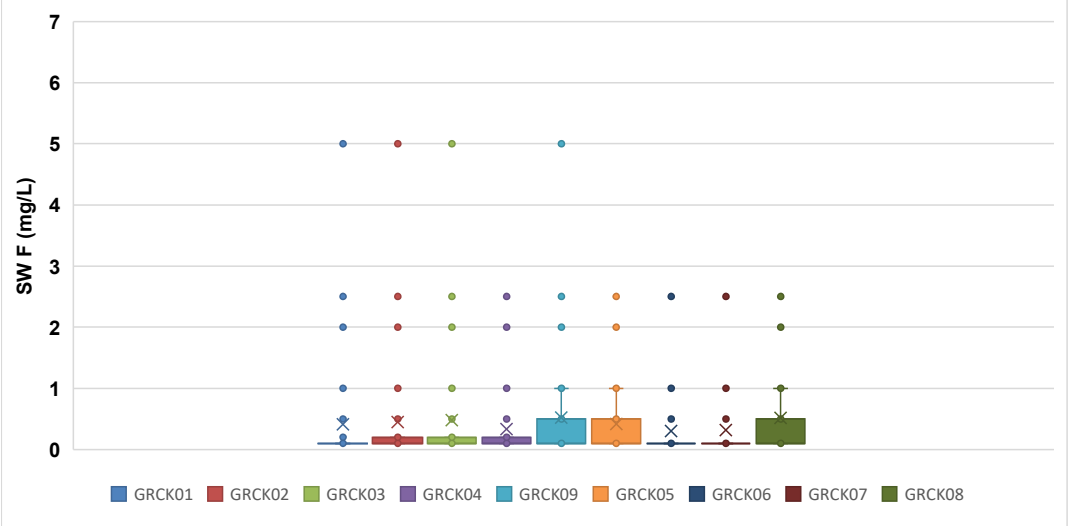
BIG DOG HYDROGEOLOGY

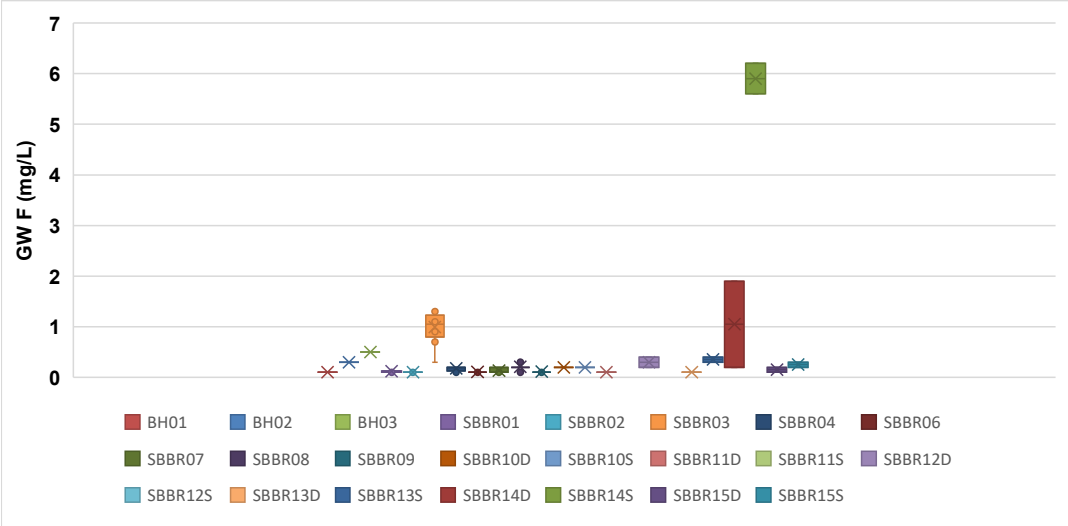
Cl in surface water and groundwater

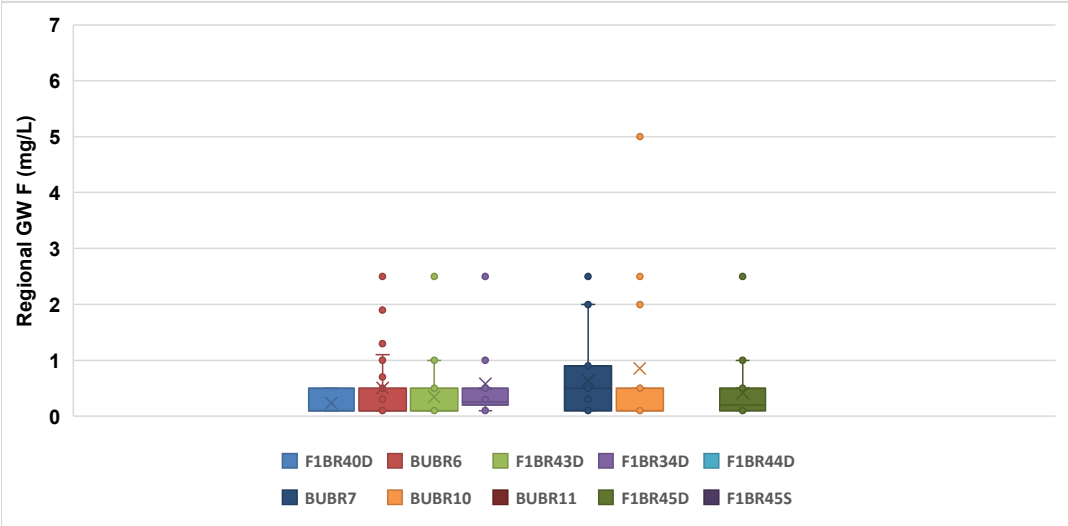
Figure B9

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







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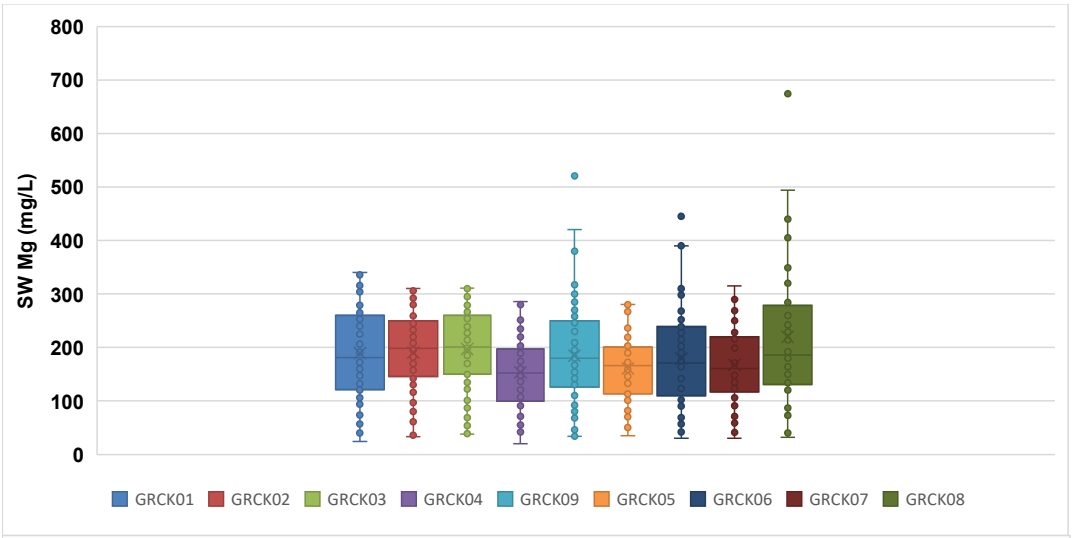
BIG DOG HYDROGEOLOGY

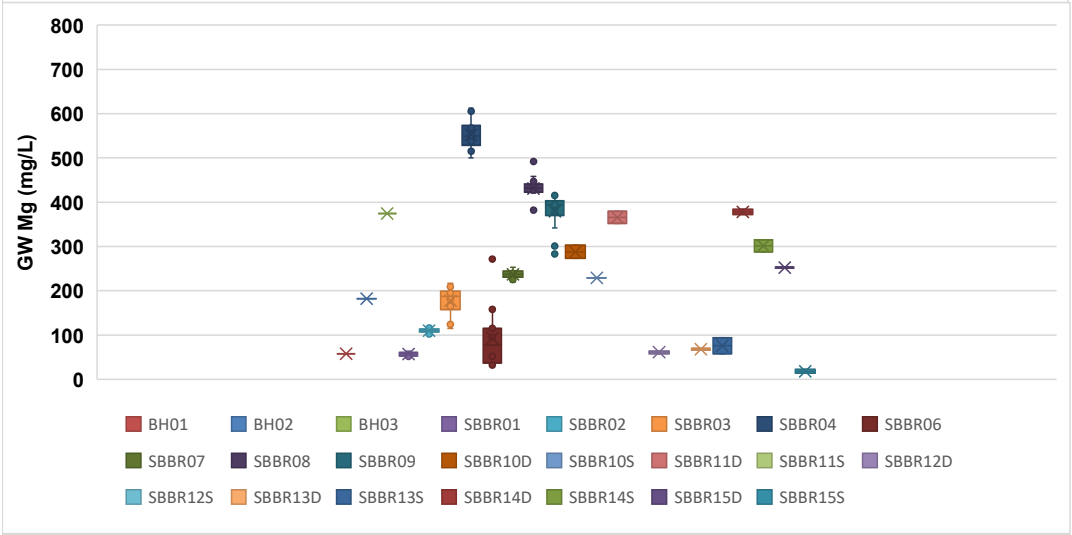
F in surface water and groundwater

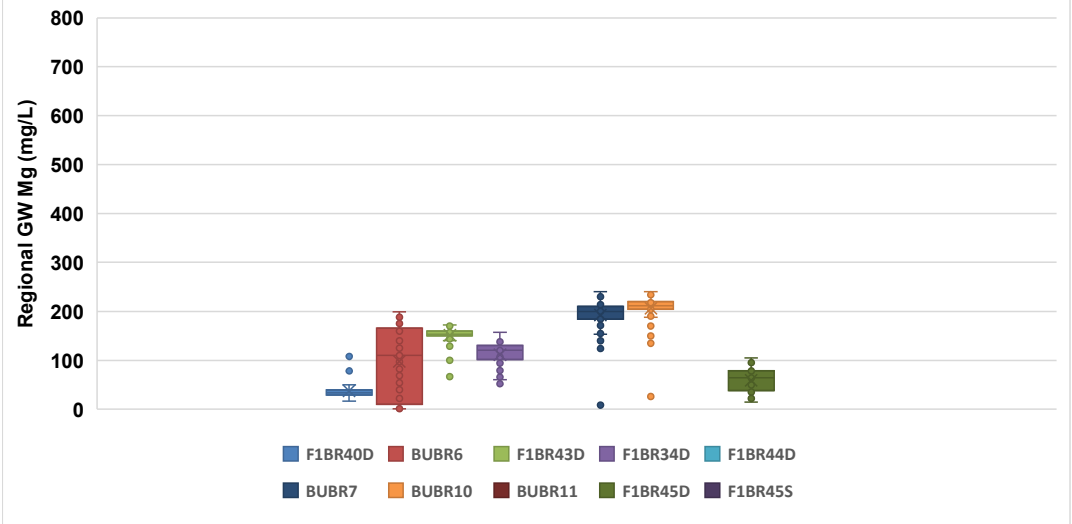
Figure B10

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







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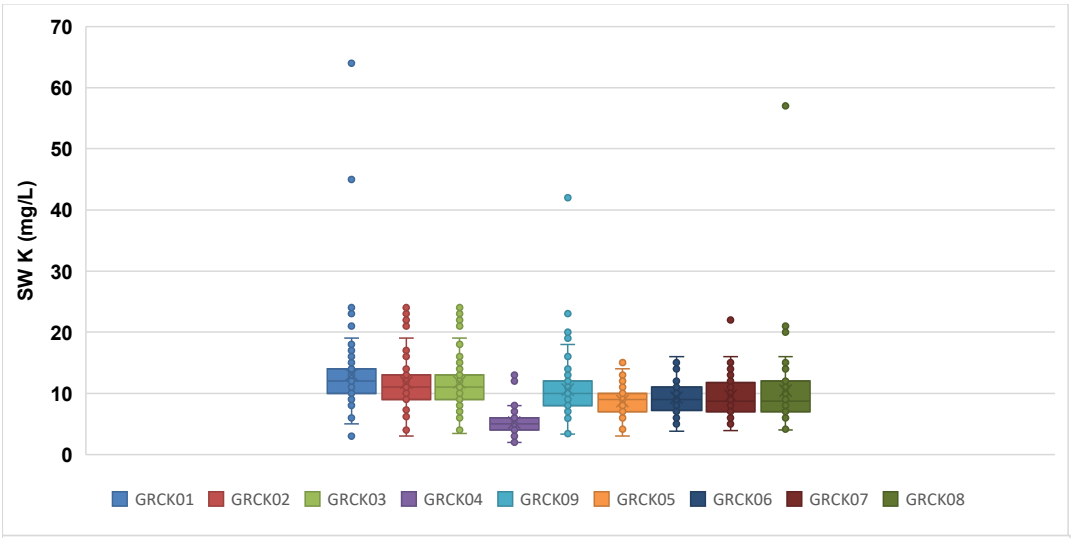
BIG DOG HYDROGEOLOGY

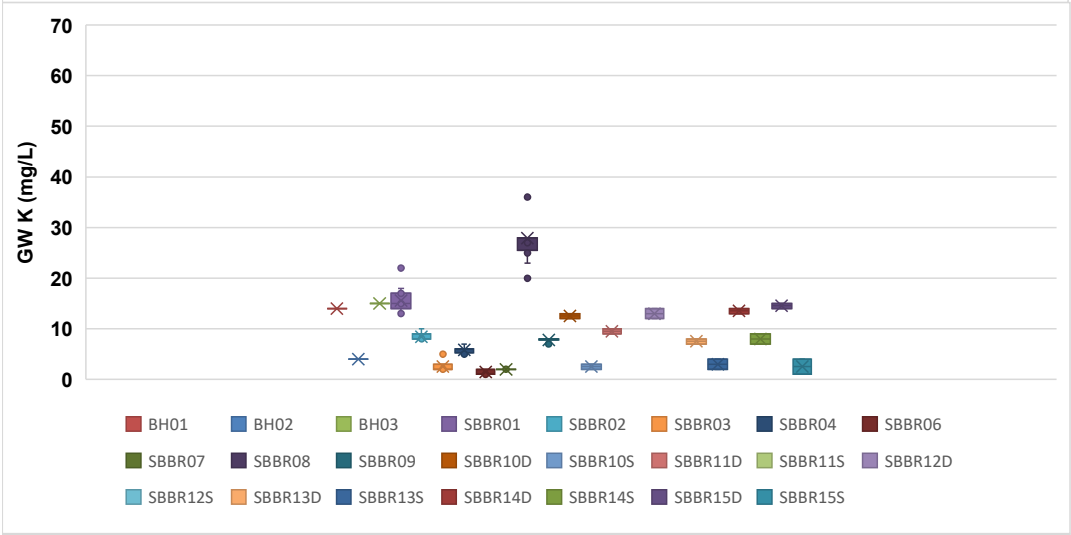
Mg in surface water and groundwater

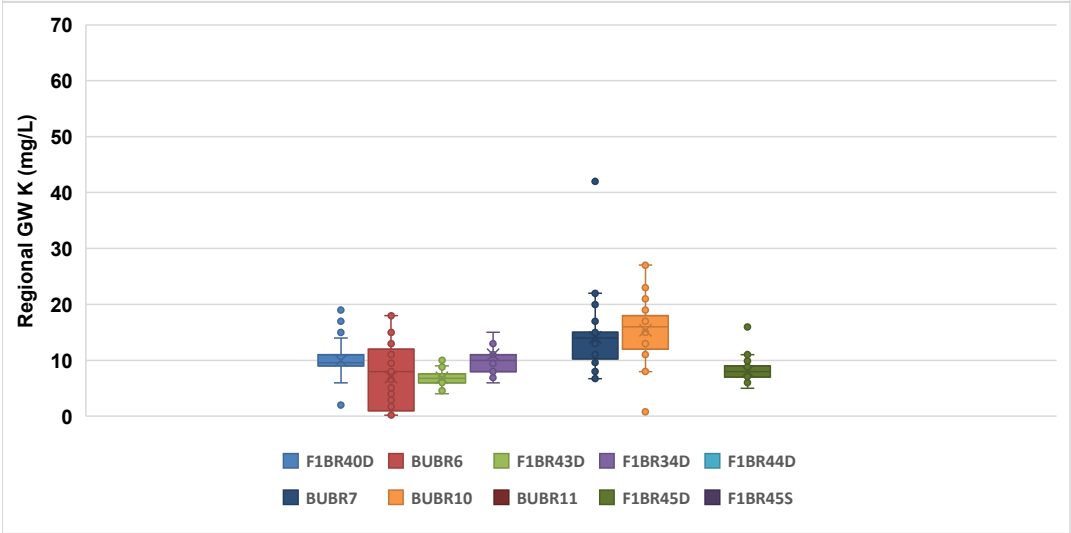
Figure B11

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







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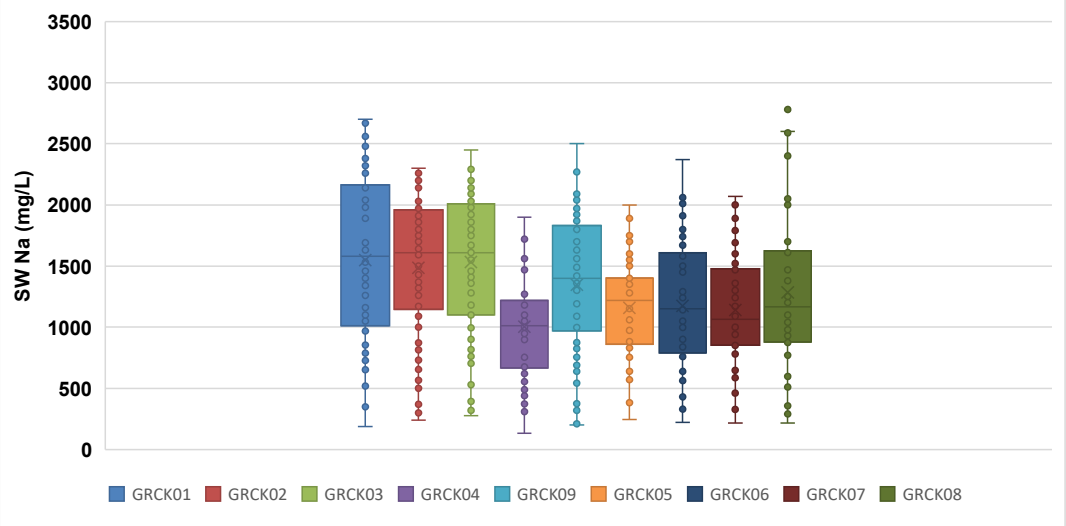
BIG DOG HYDROGEOLOGY

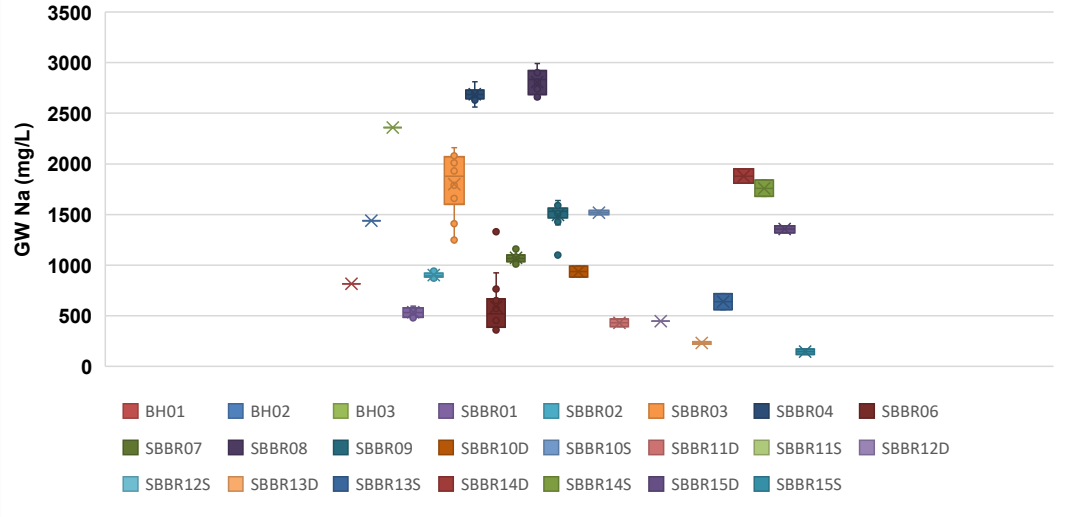
K in surface water and groundwater

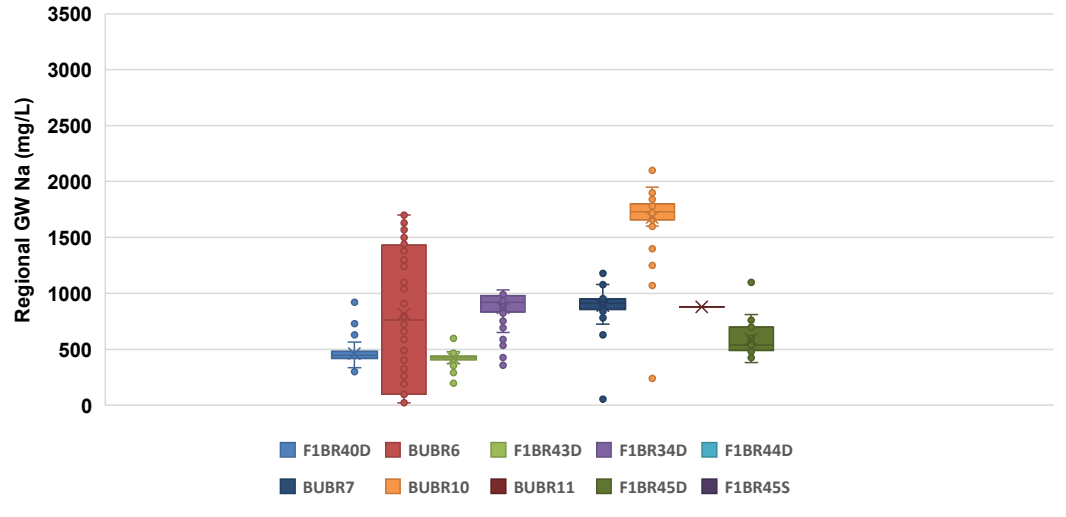
Figure B12

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







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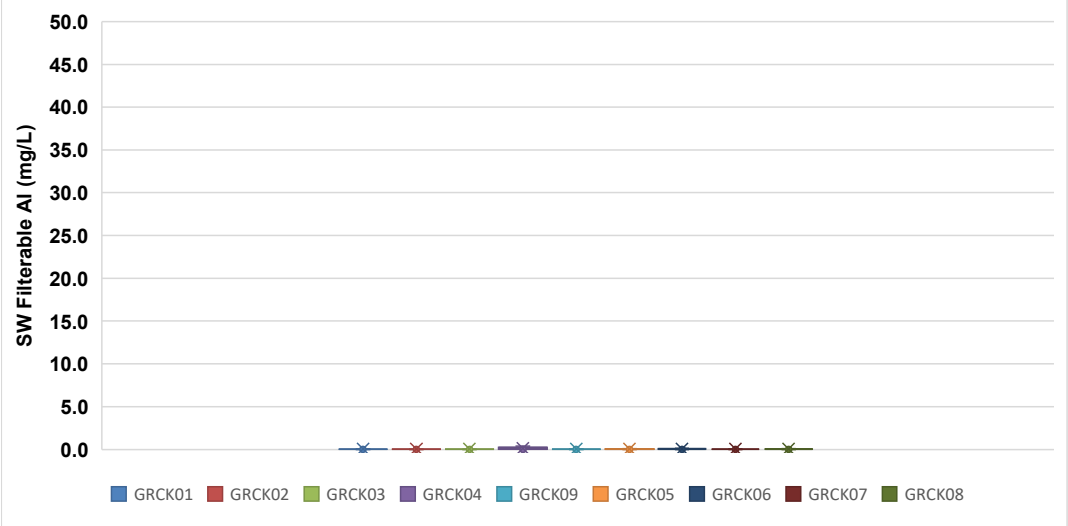
BIG DOG HYDROGEOLOGY

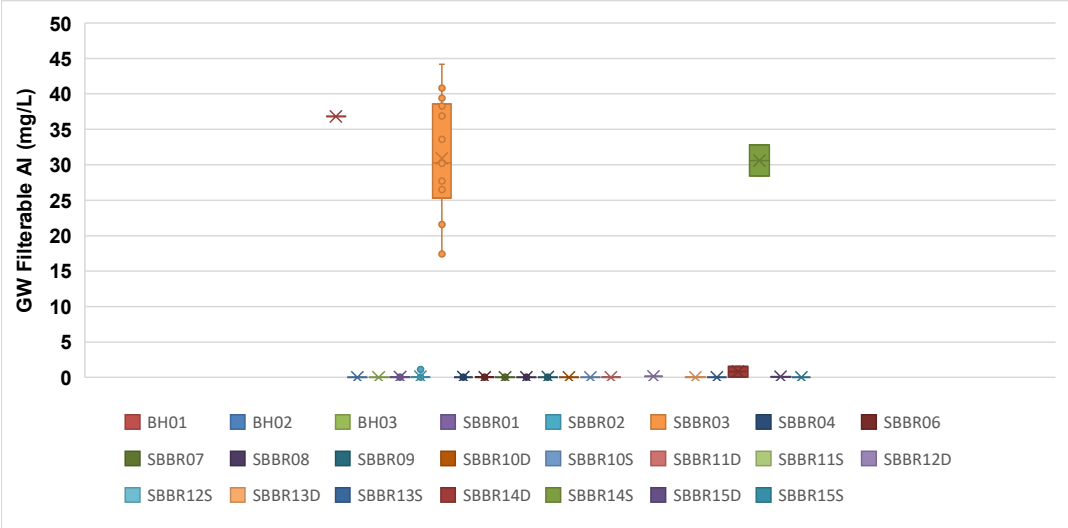
Na in surface water and groundwater

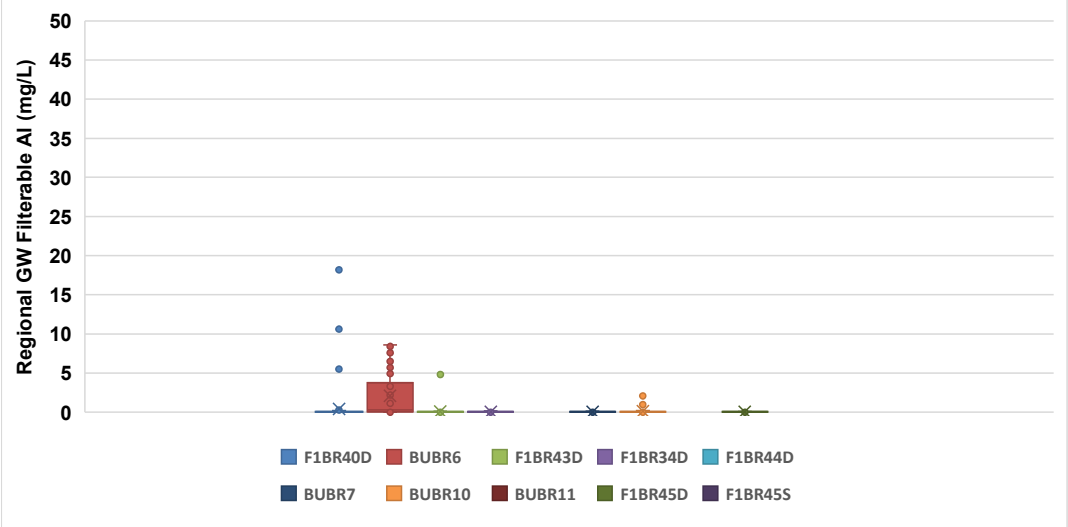
Figure B13

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







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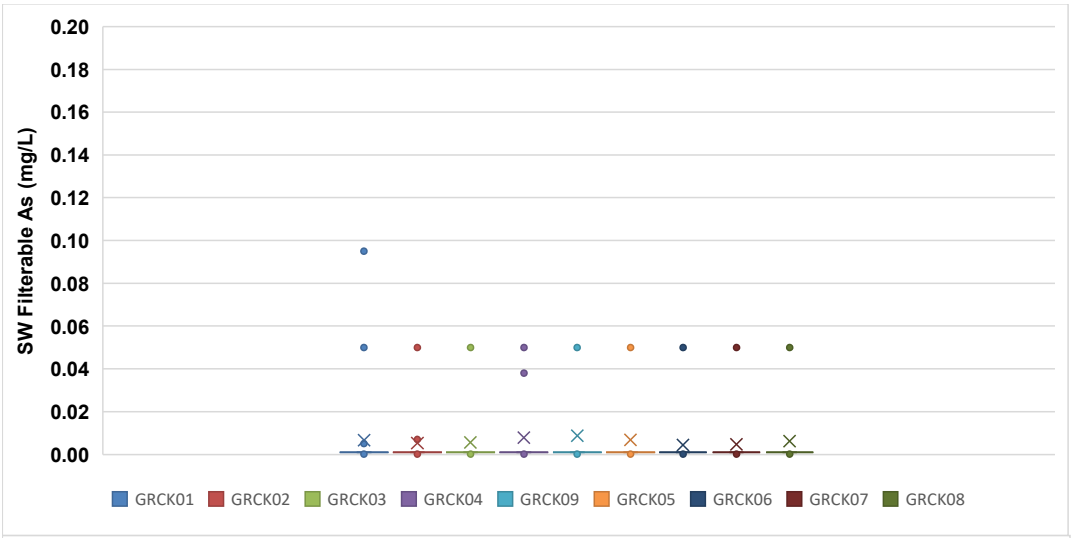
BIG DOG HYDROGEOLOGY

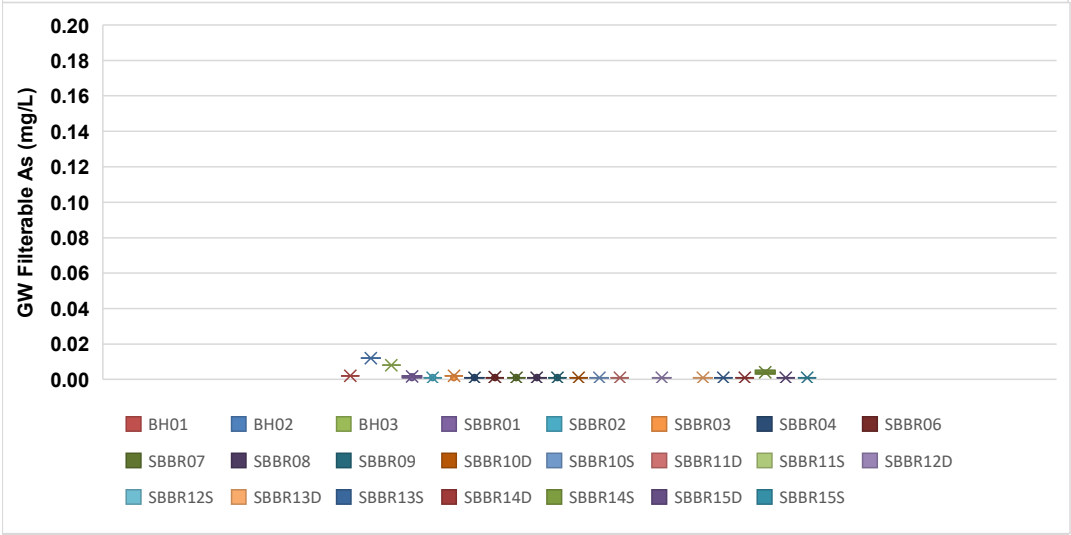
Filterable Al in surface water and groundwater

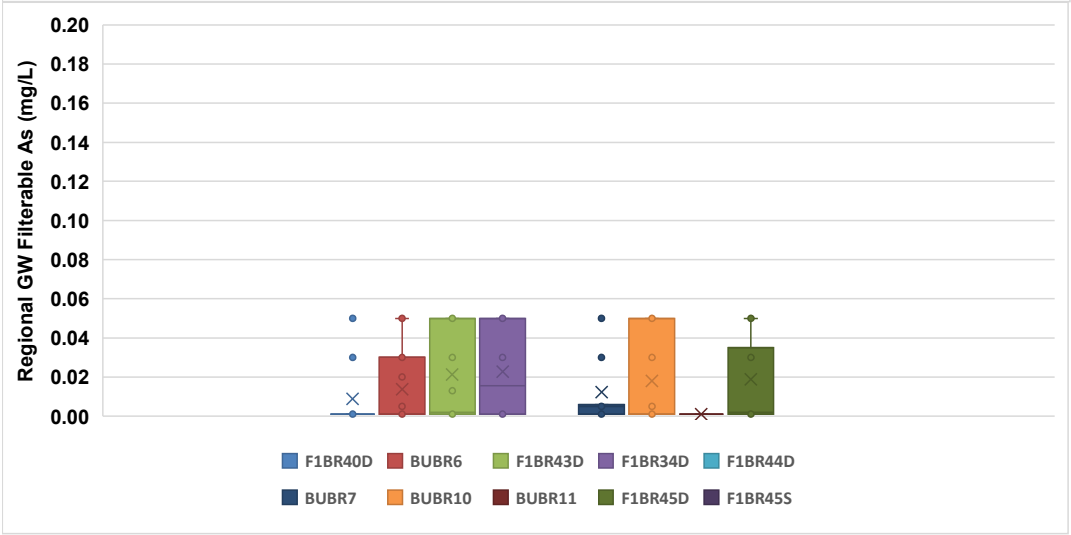
Figure B14

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







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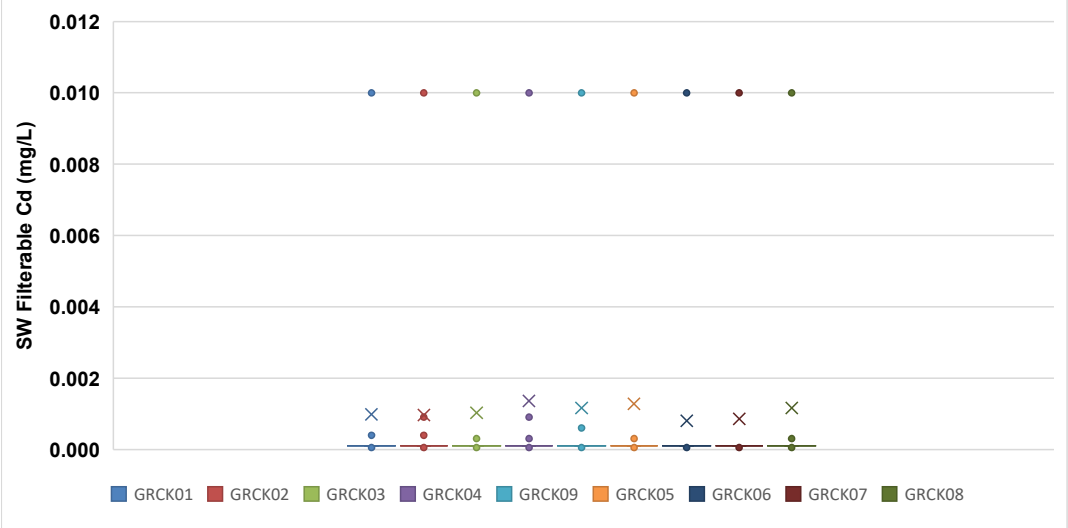
BIG DOG HYDROGEOLOGY

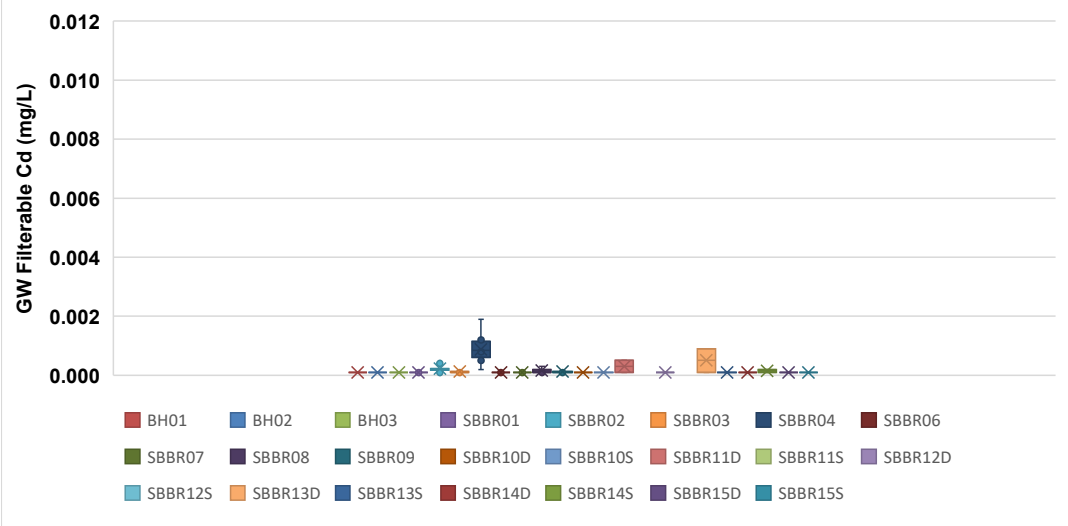
Filterable As in surface water and groundwater

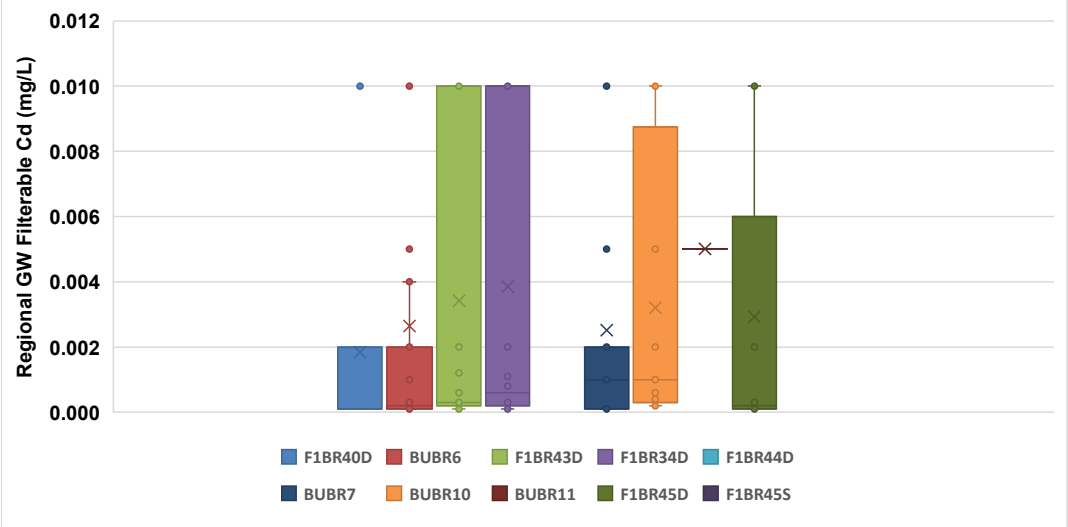
Figure B15

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

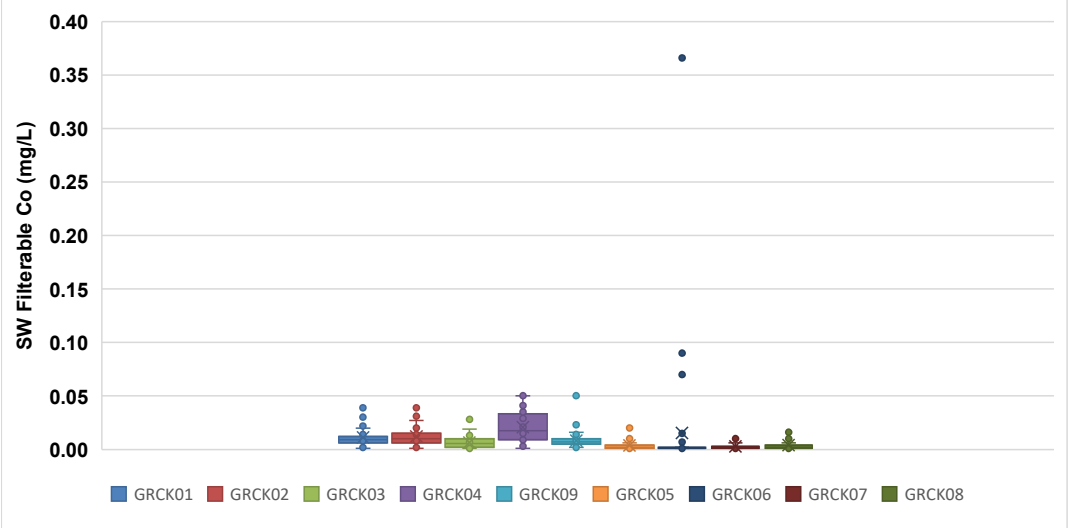
BIG DOG HYDROGEOLOGY

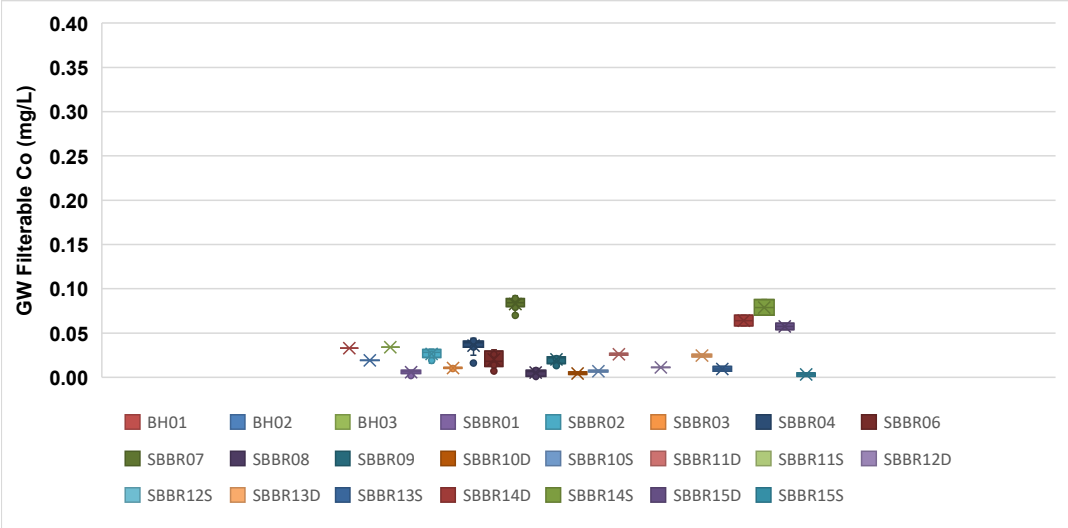
Filterable Cd in surface water and groundwater

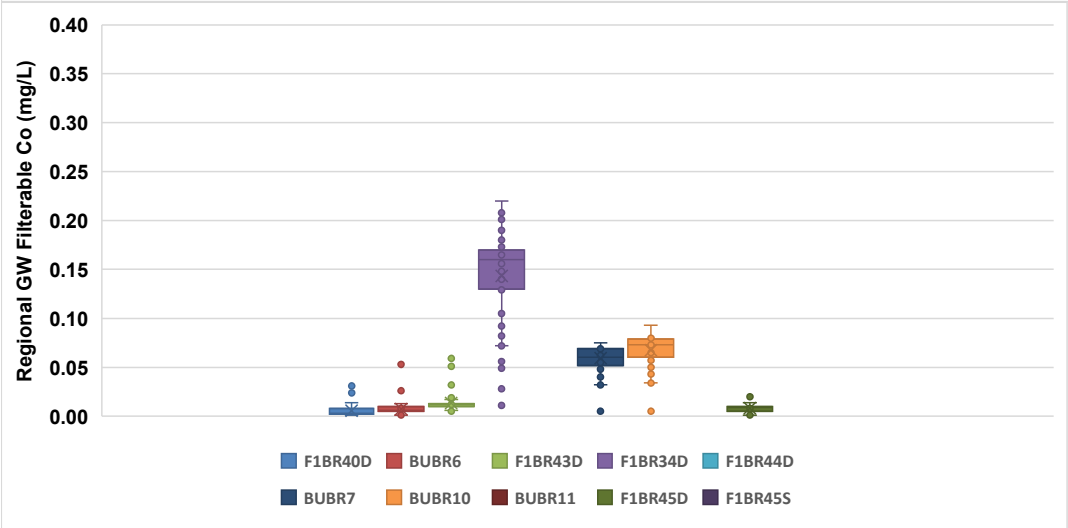
Figure B16

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







BIG DOG HYDROGEOLOGY

Filterable Co in surface water and groundwater

Figure B17

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2

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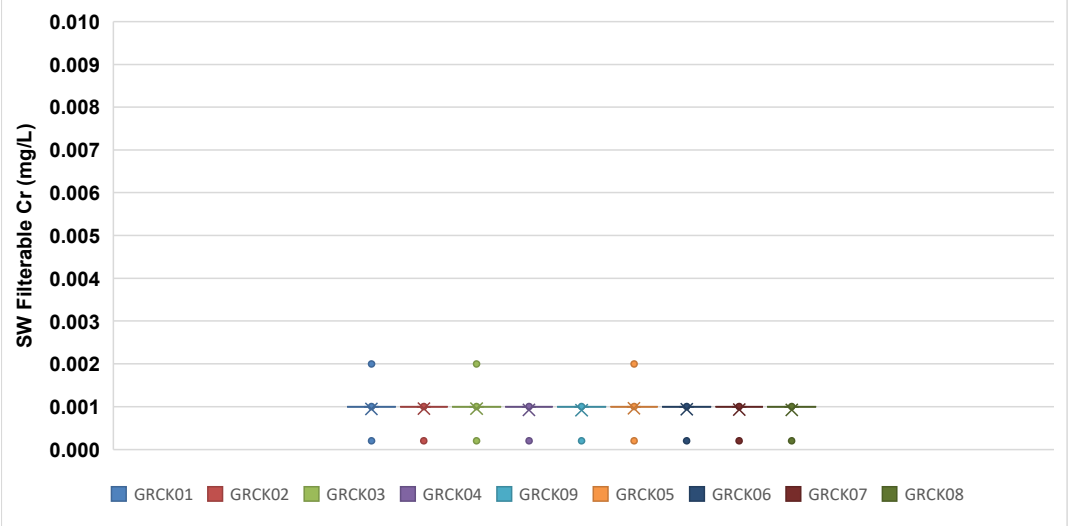
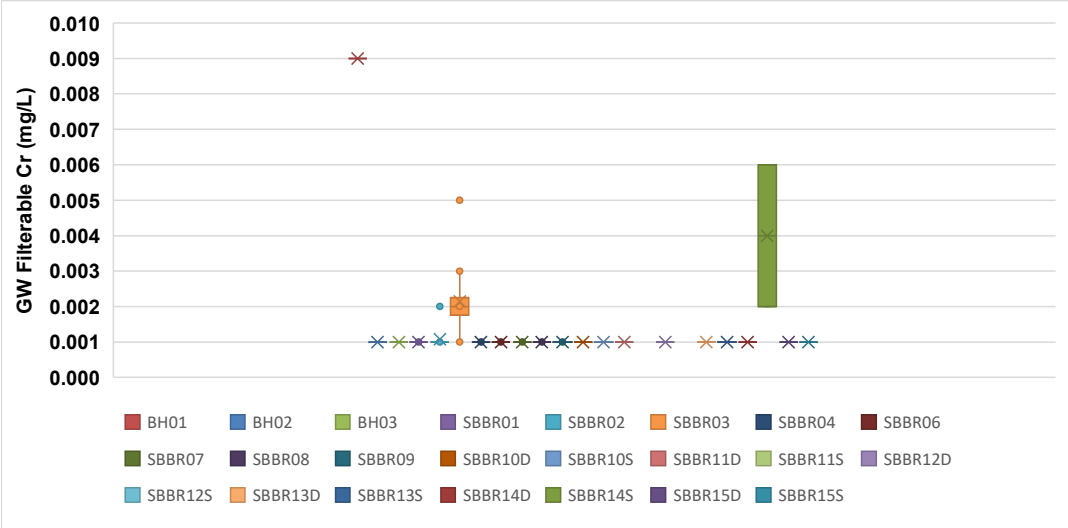
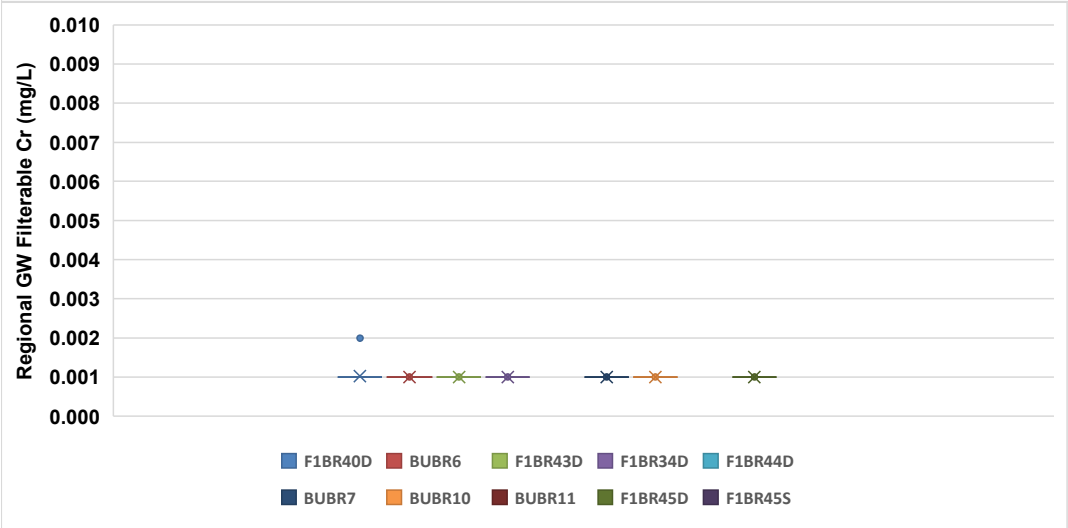






D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

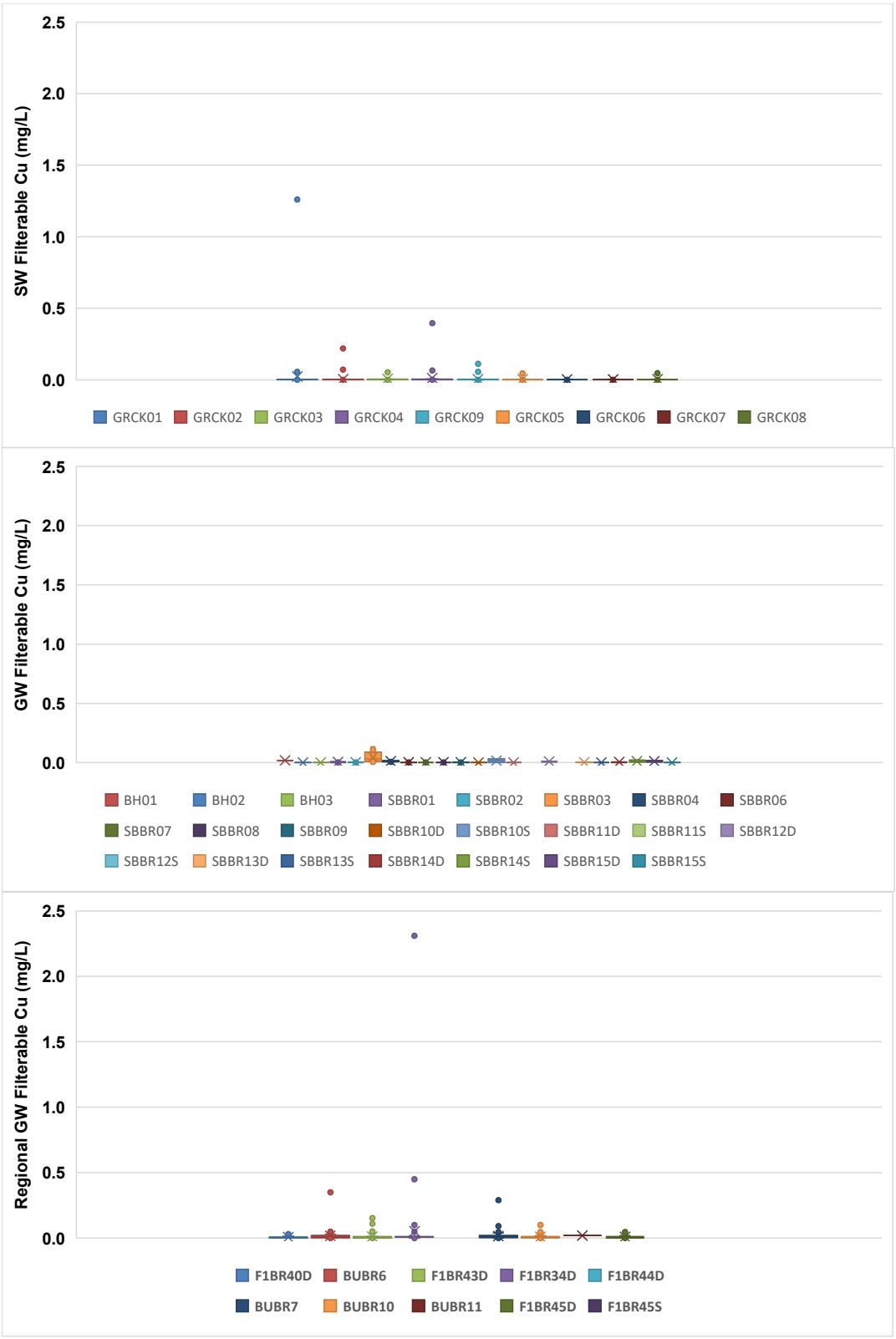
BIG DOG HYDROGEOLOGY

Filterable Cr in surface water and groundwater

Figure B18

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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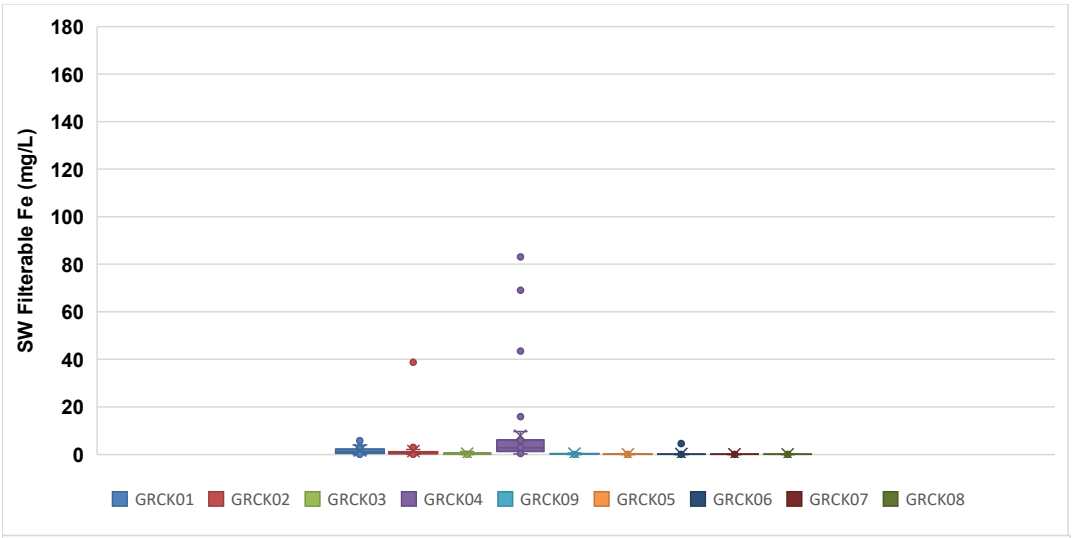
BIG DOG HYDROGEOLOGY

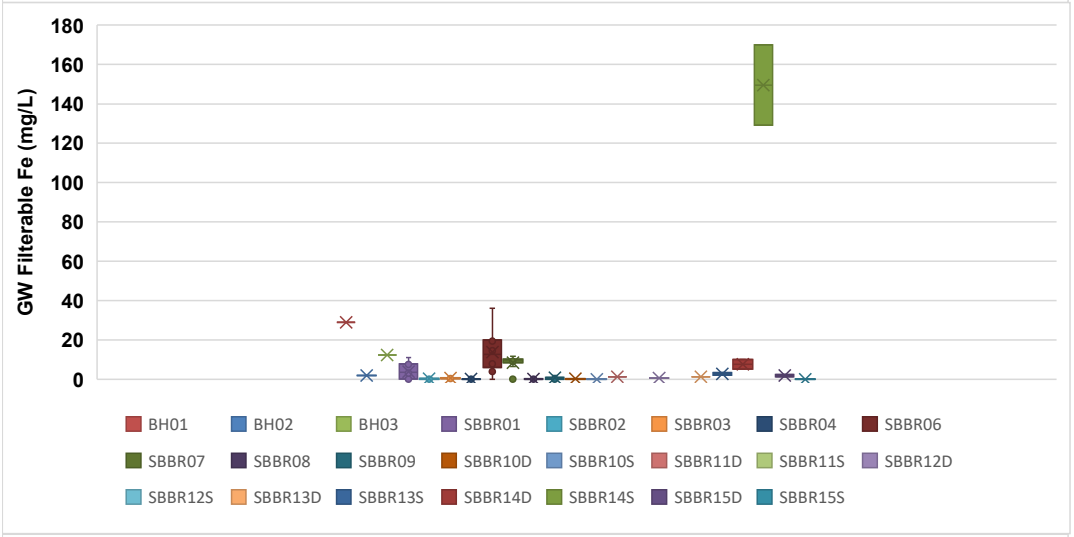
Filterable Cu in surface water and groundwater

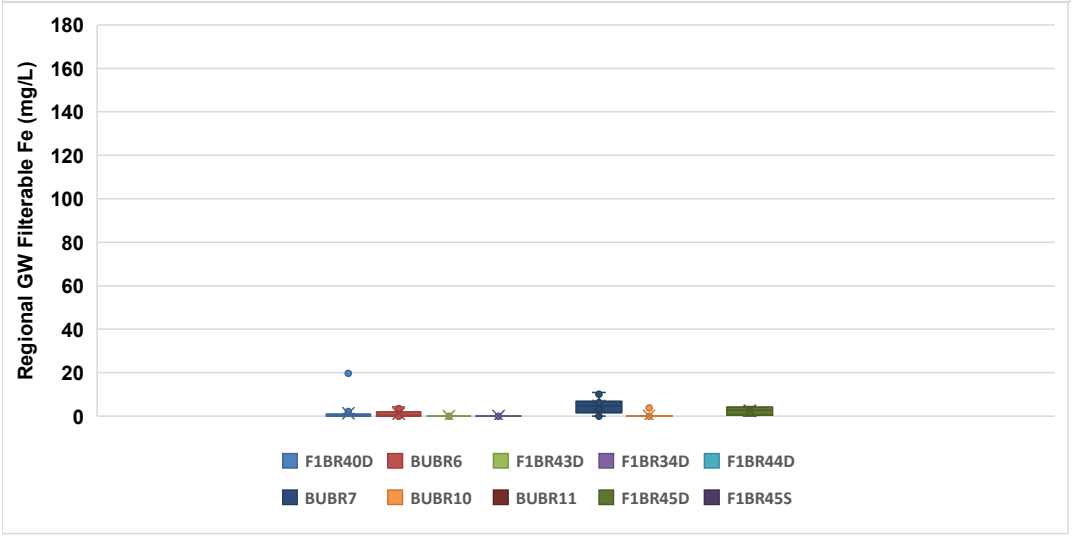
Figure B19

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

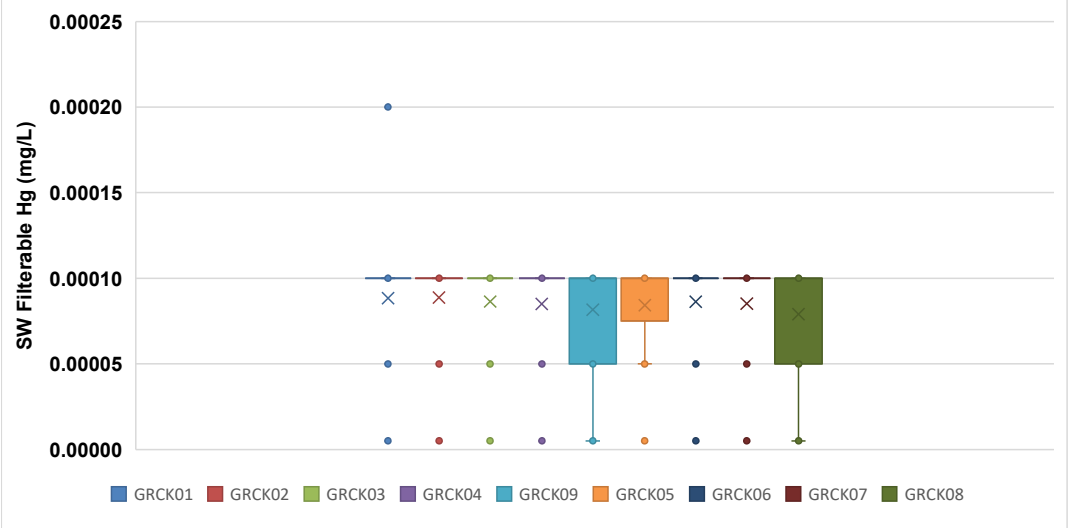
BIG DOG HYDROGEOLOGY

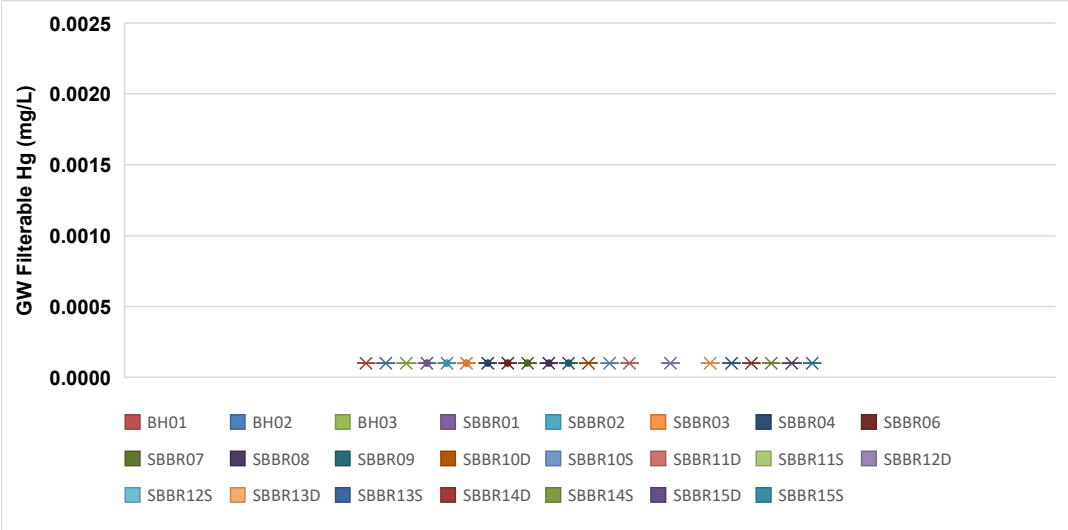
Filterable Fe in surface water and groundwater

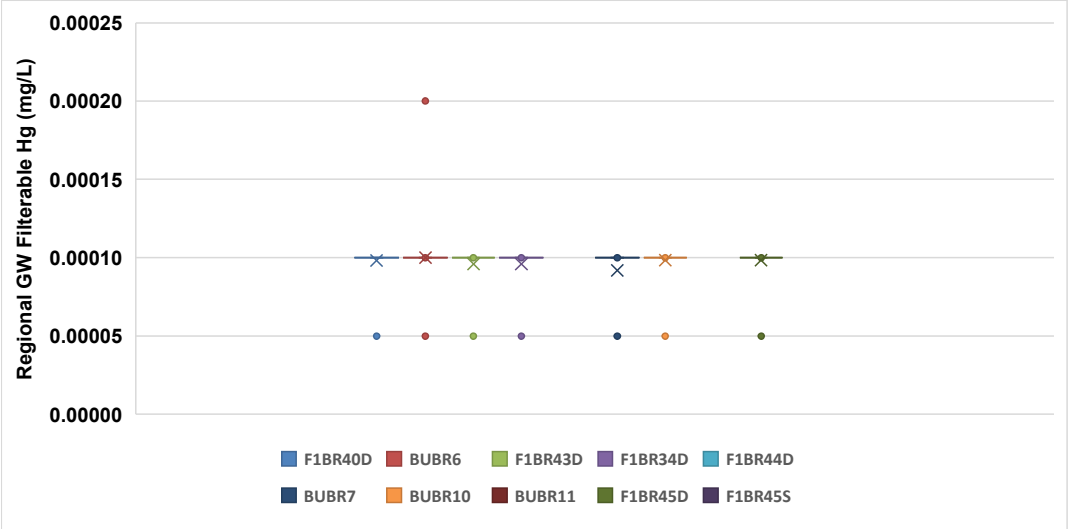
Figure B20

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

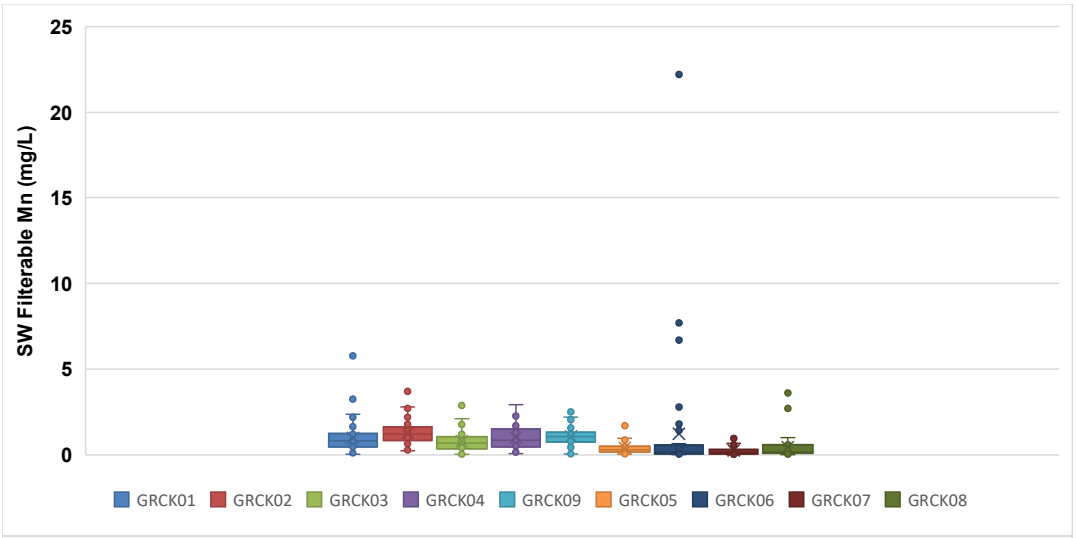
BIG DOG HYDROGEOLOGY

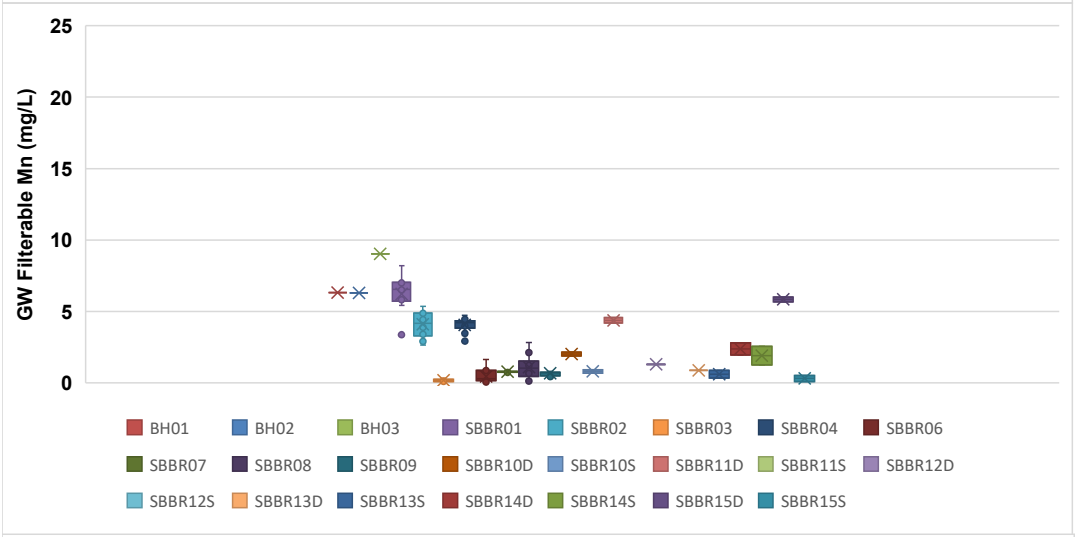
Filterable Hg in surface water and groundwater

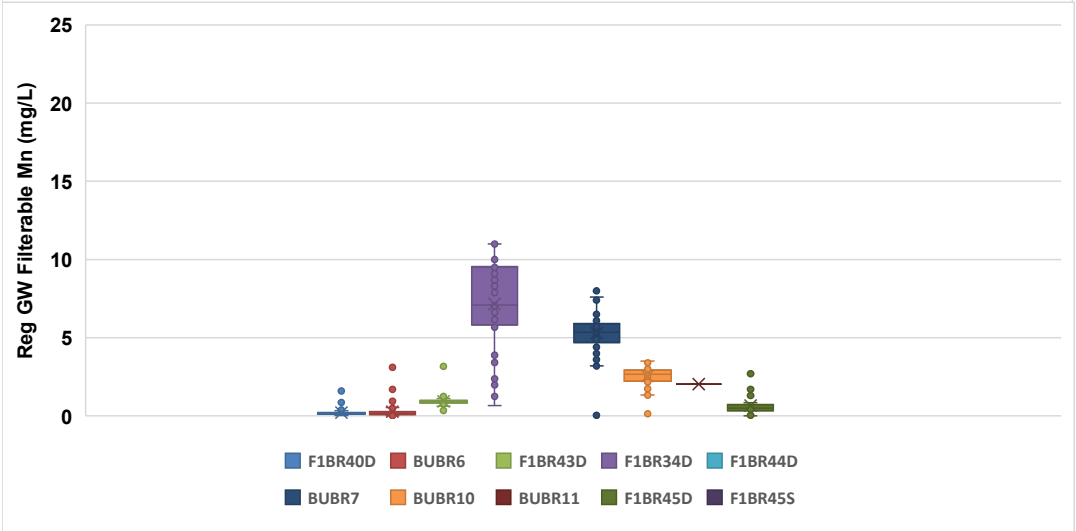
Figure B21

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

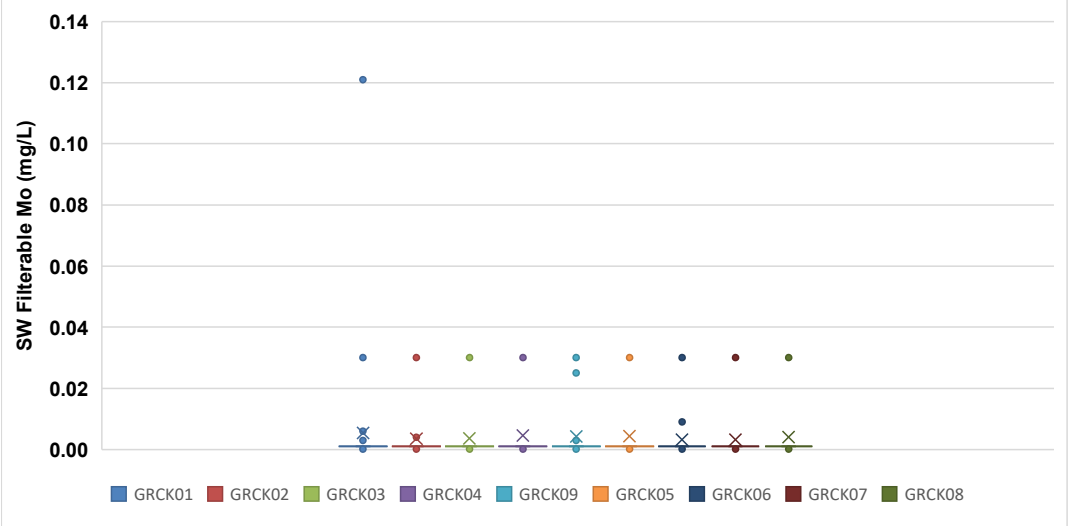
BIG DOG HYDROGEOLOGY

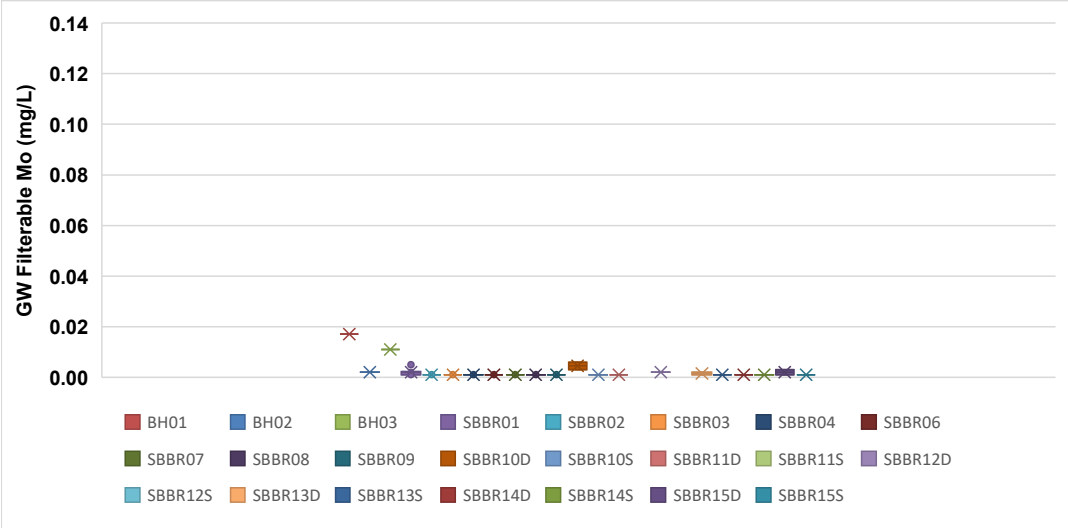
Filterable Mn in surface water and groundwater

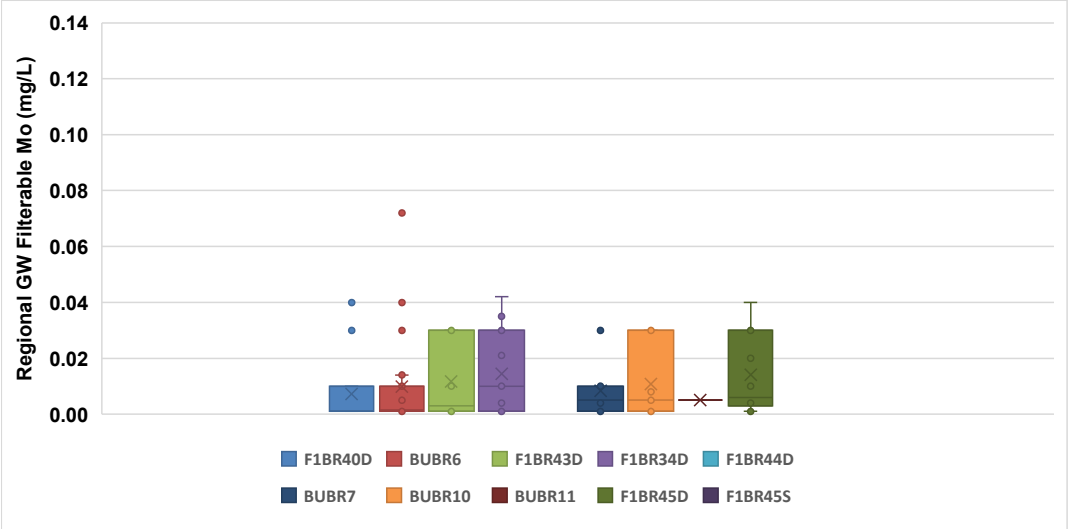
Figure B22

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

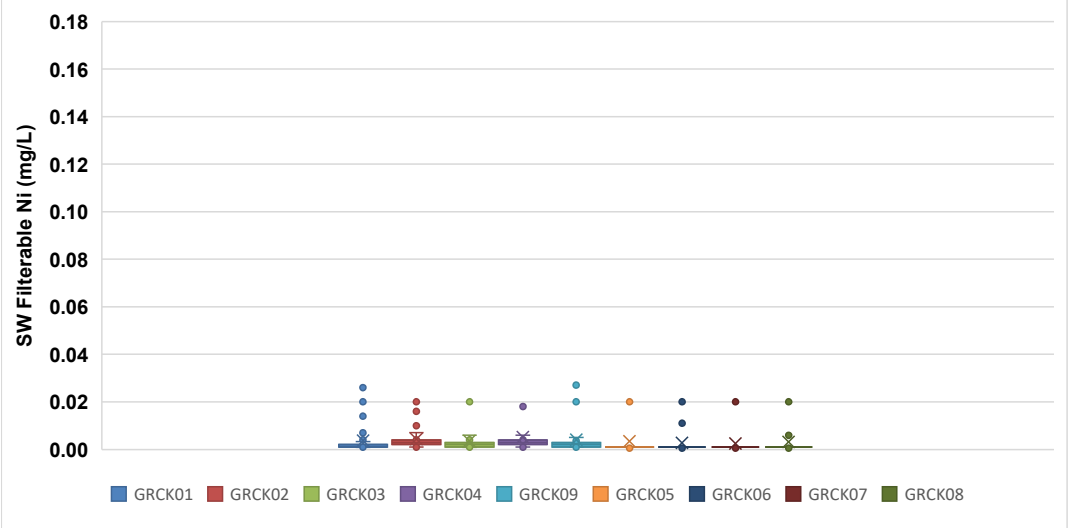
BIG DOG HYDROGEOLOGY

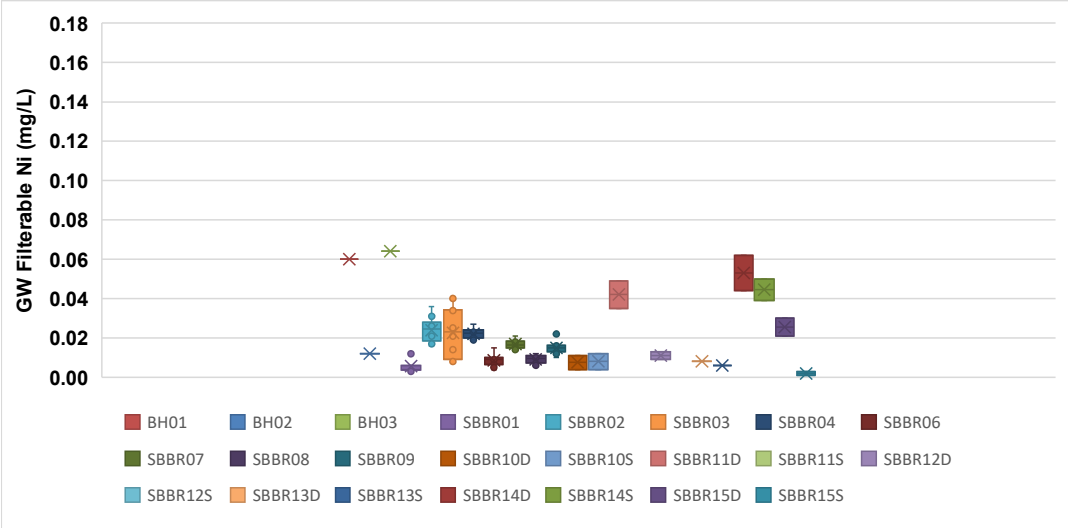
Filterable Mo in surface water and groundwater

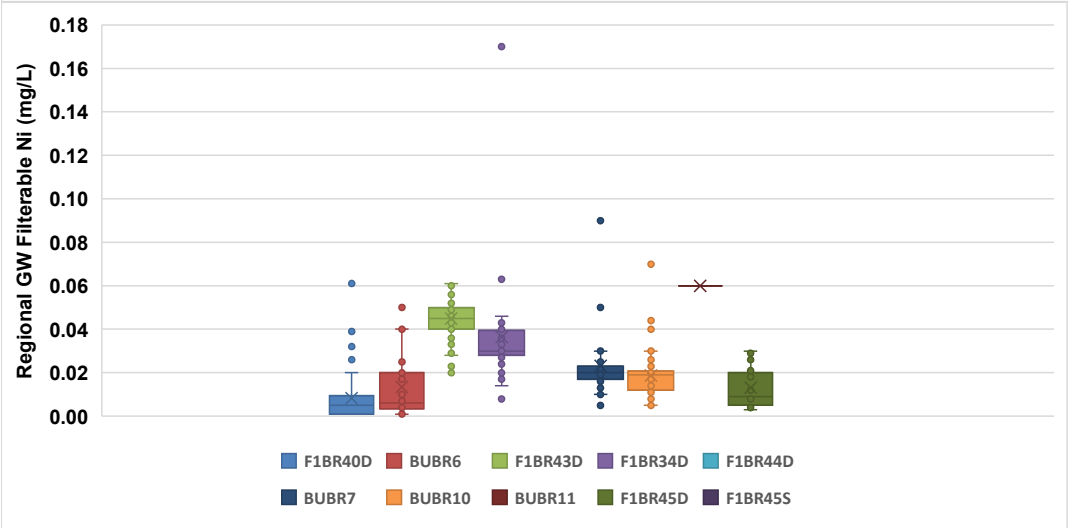
Figure B23

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

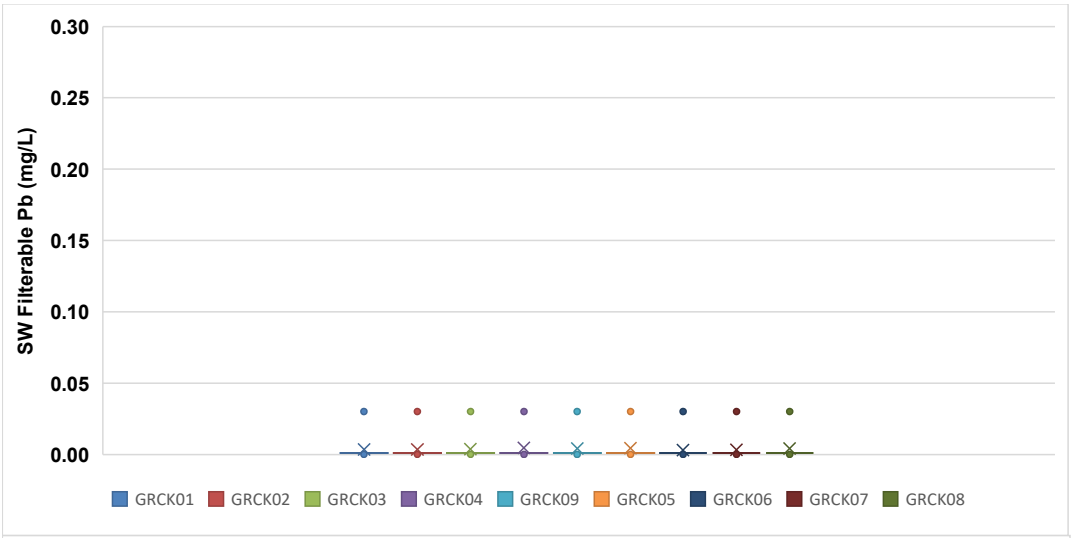
BIG DOG HYDROGEOLOGY

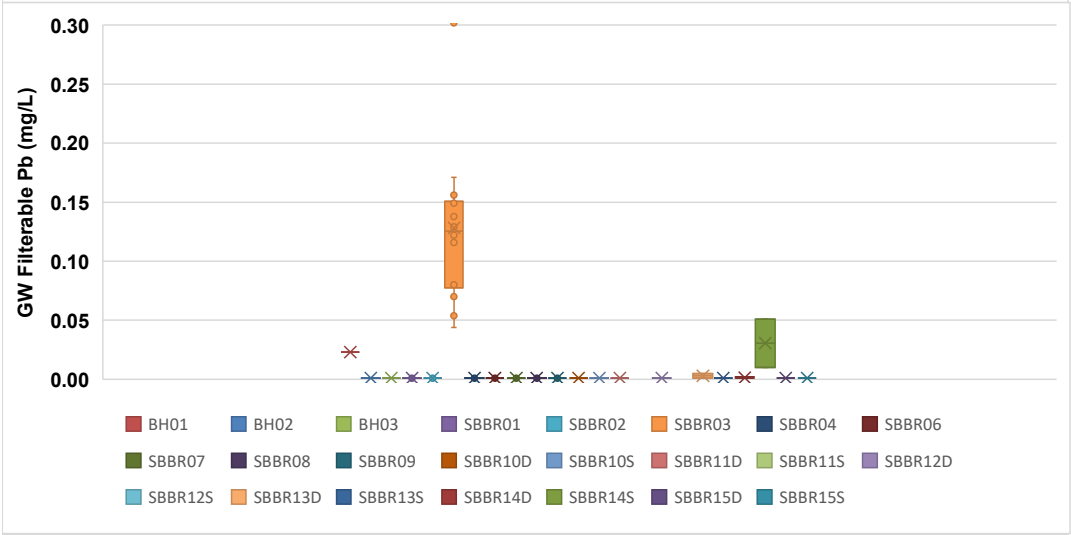
Filterable Ni in surface water and groundwater

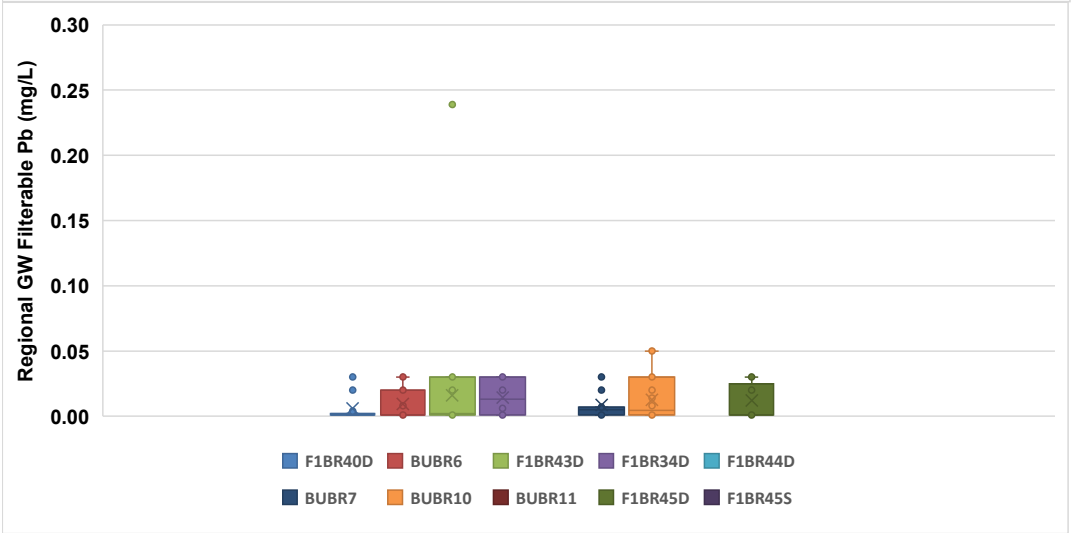
Figure B24

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







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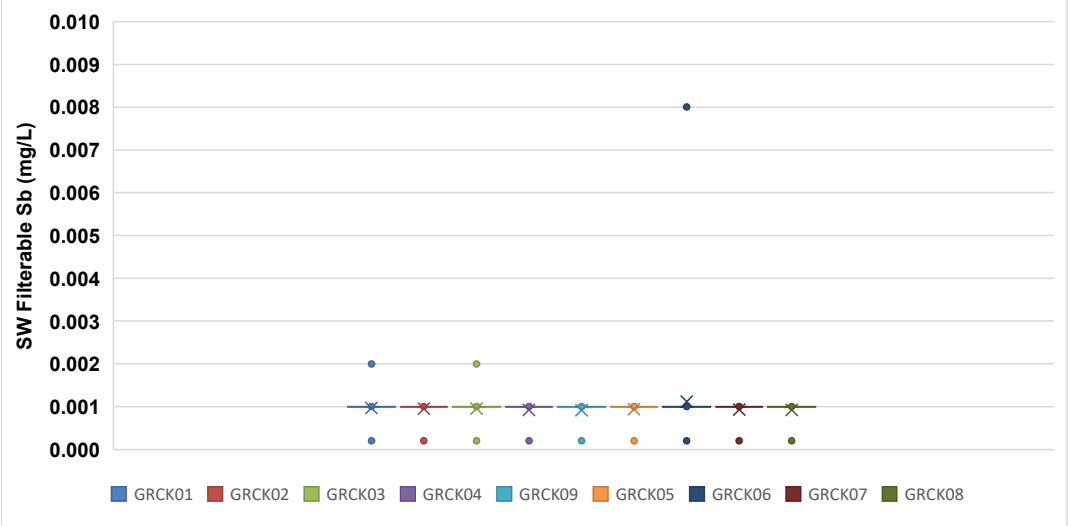
BIG DOG HYDROGEOLOGY

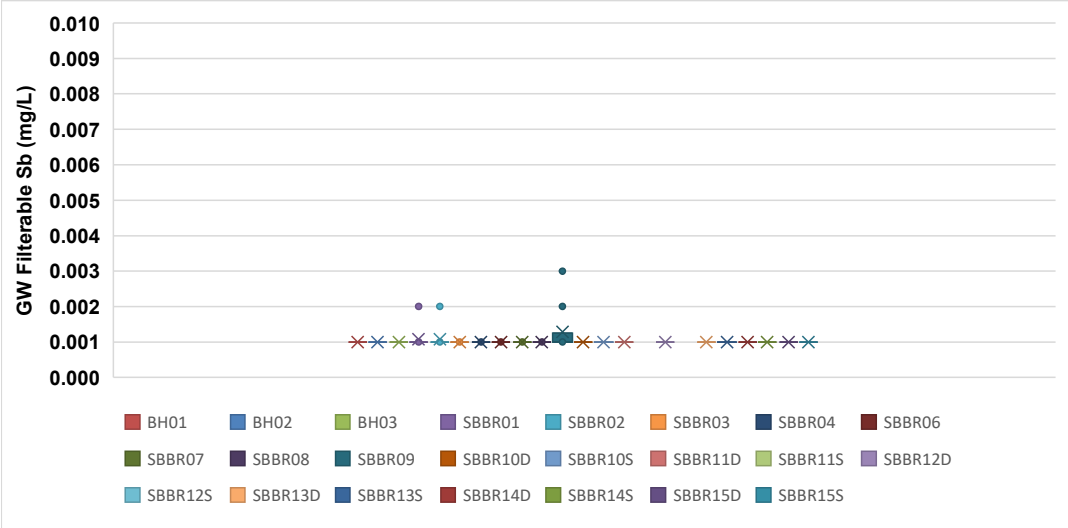
Filterable Pb in surface water and groundwater

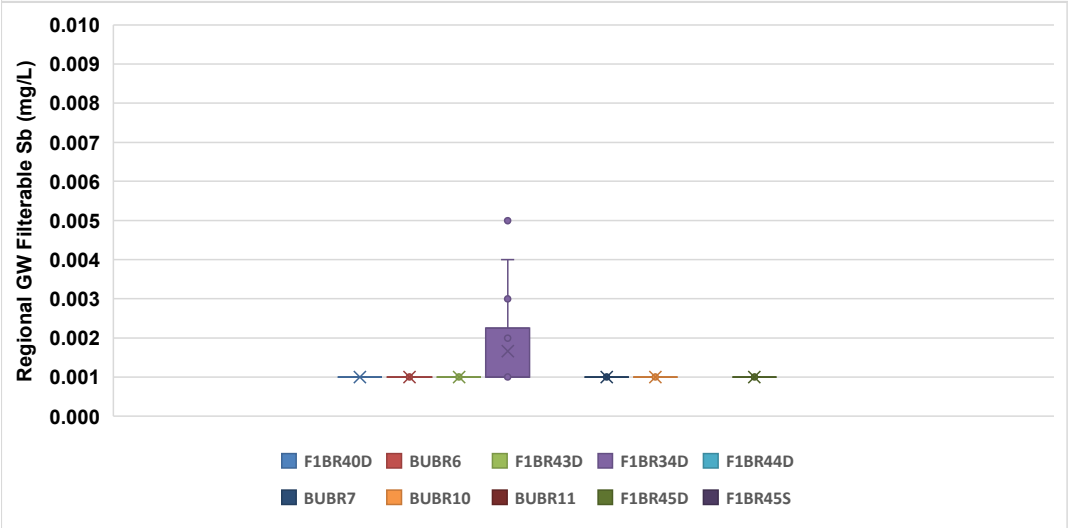
Figure B25

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







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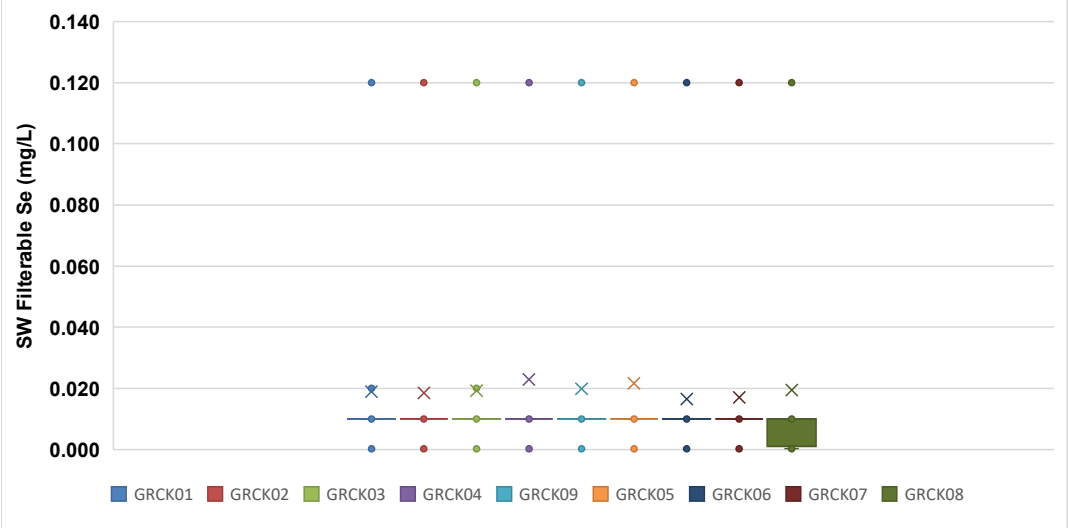
BIG DOG HYDROGEOLOGY

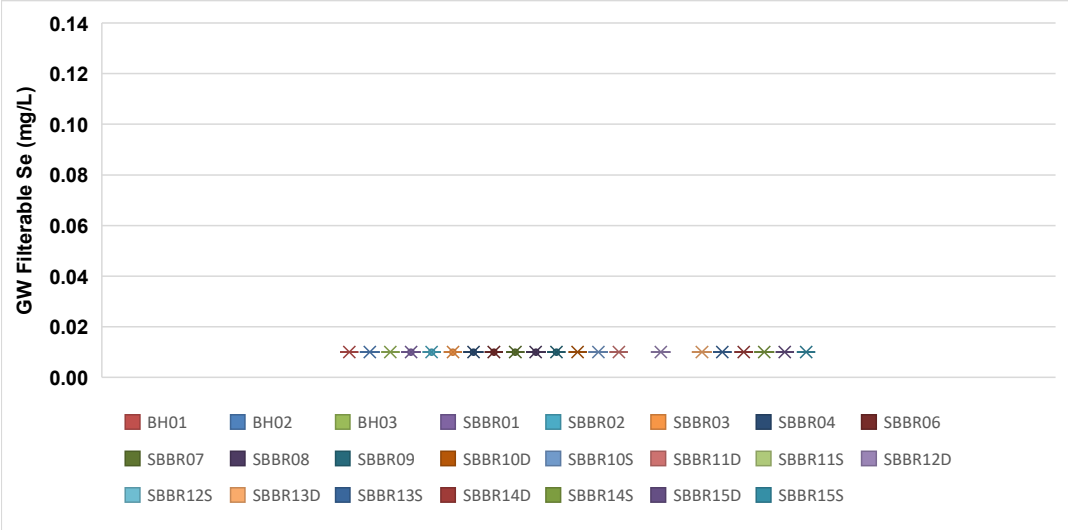
Filterable Sb in surface water and groundwater

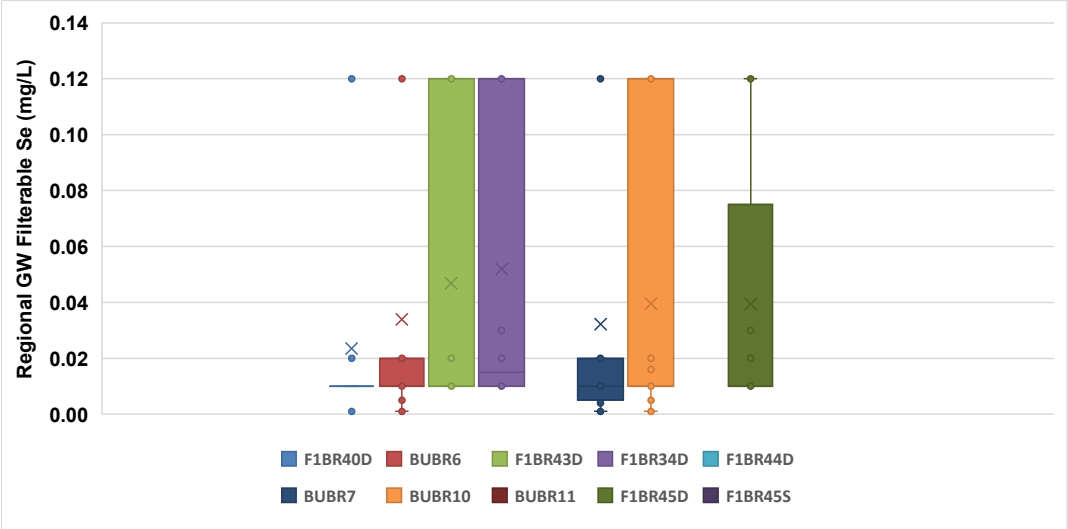
Figure B26

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







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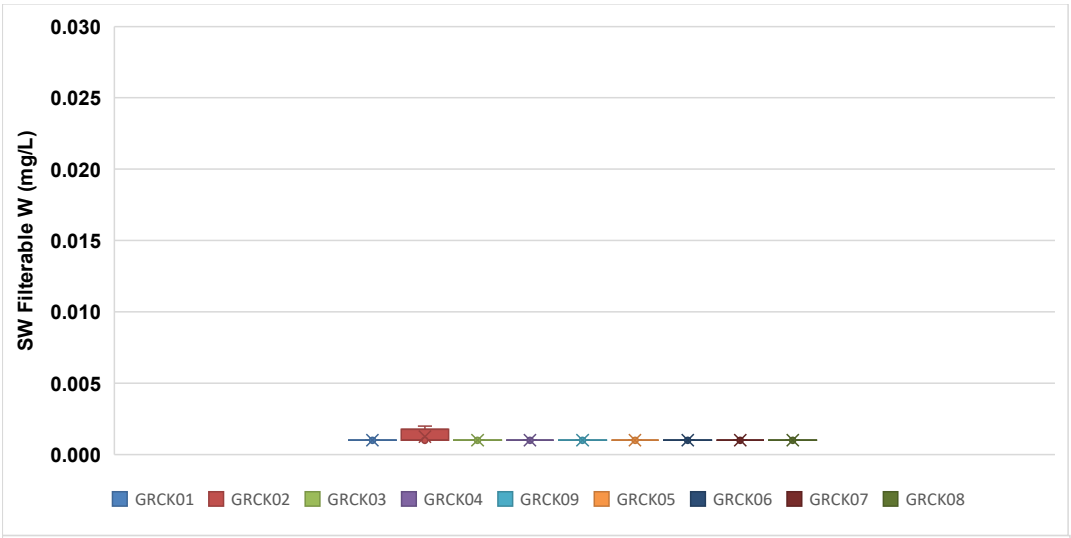
BIG DOG HYDROGEOLOGY

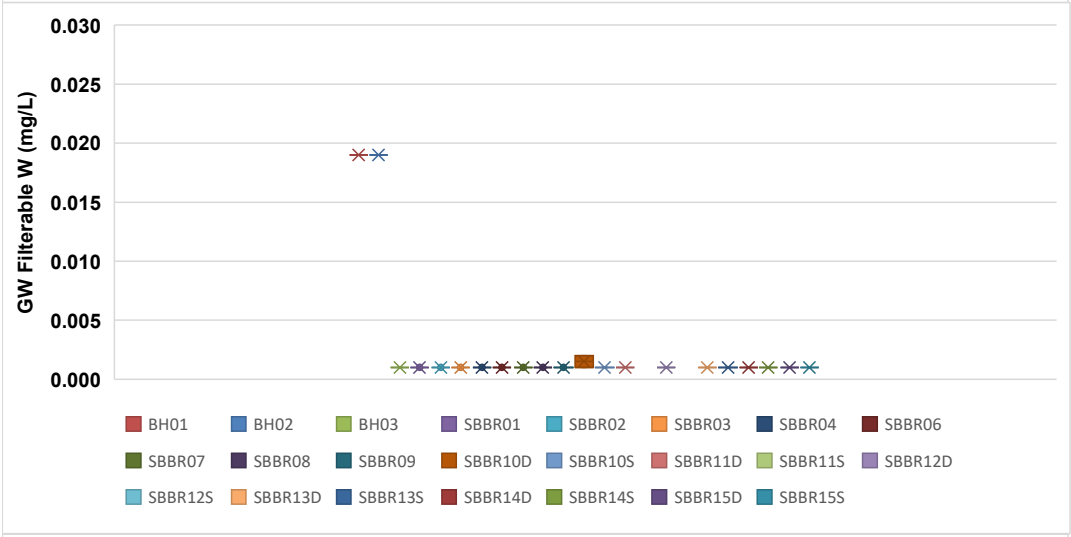
Filterable Se in surface water and groundwater

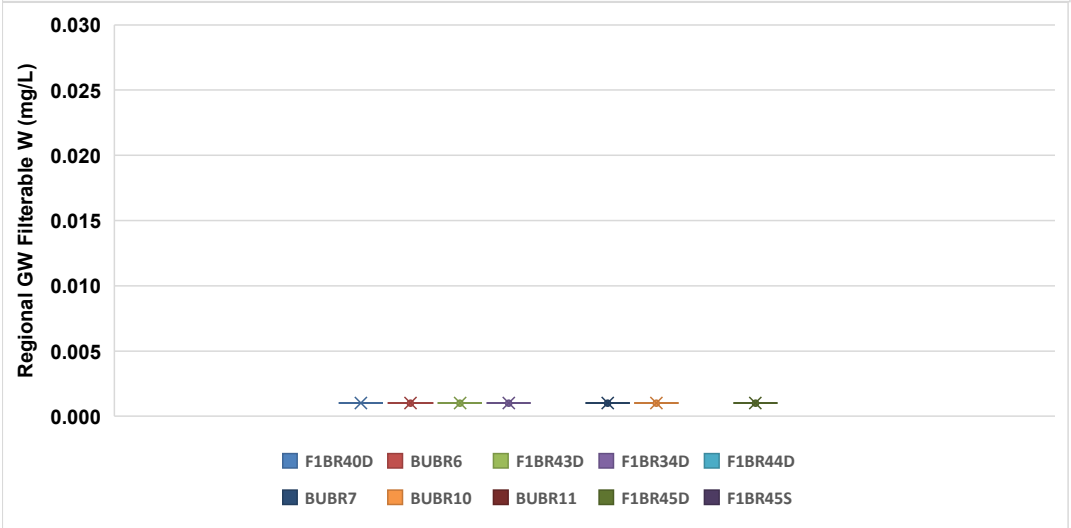
Figure B27

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







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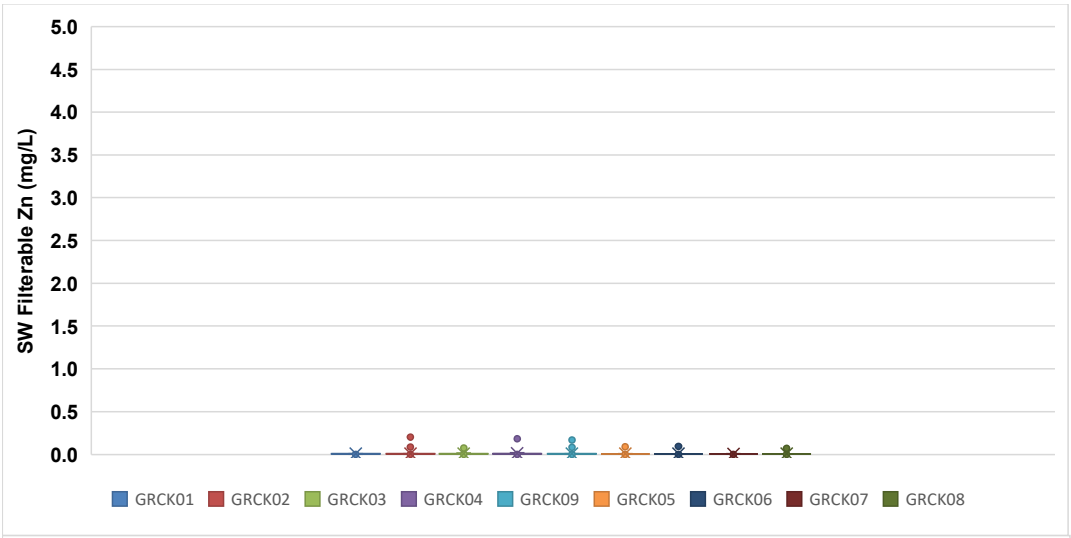
BIG DOG HYDROGEOLOGY

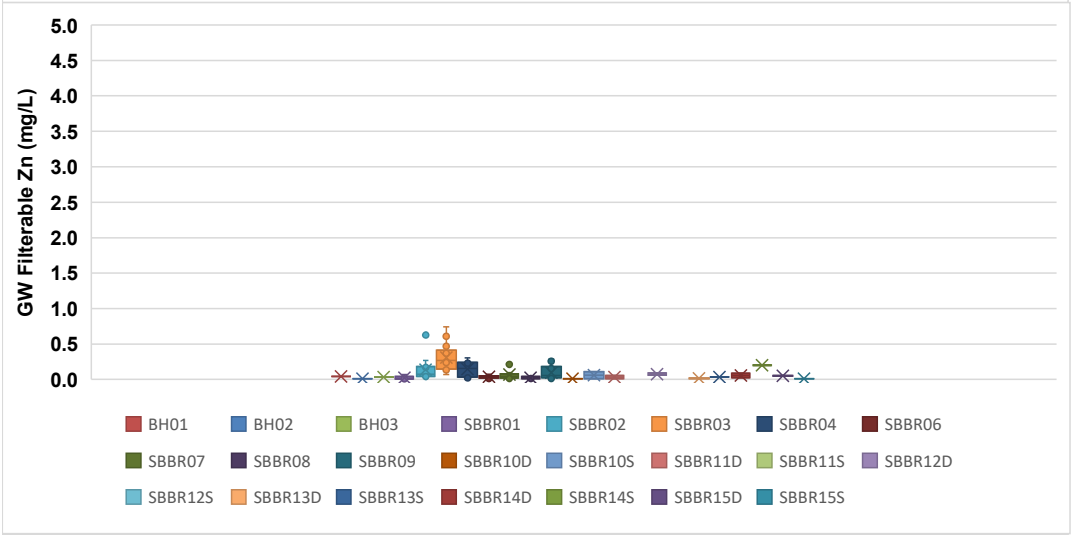
Filterable W in surface water and groundwater

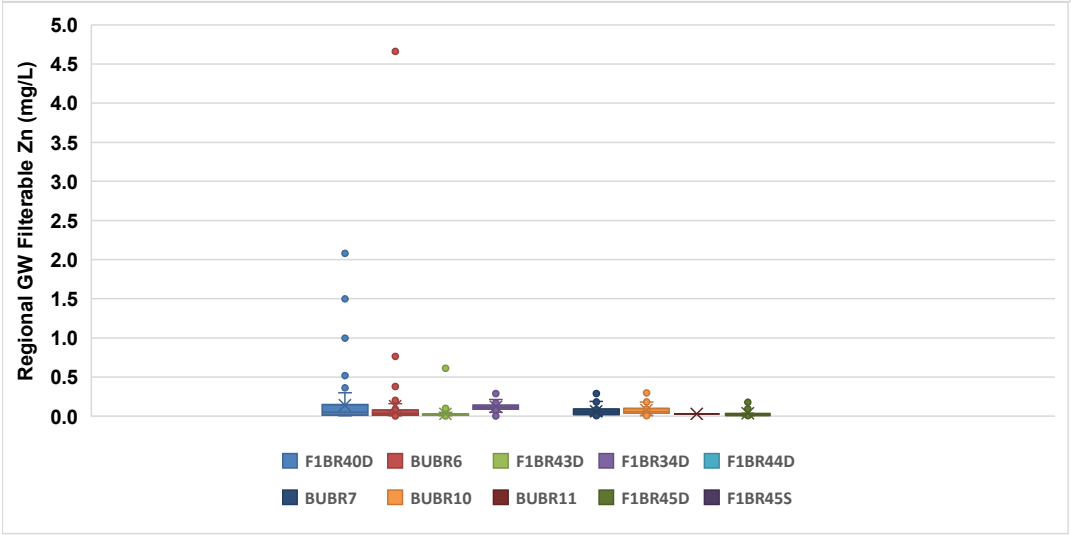
Figure B28

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







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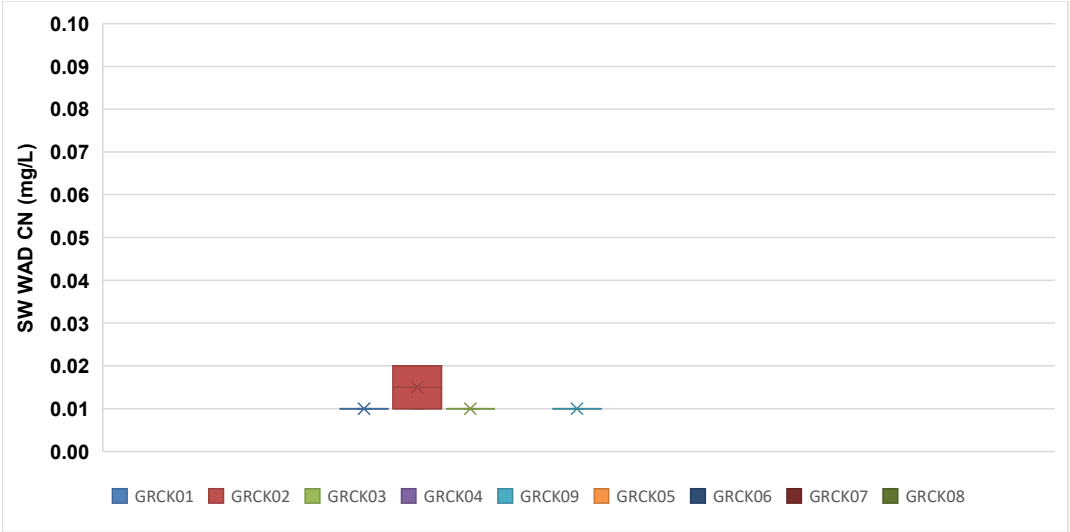
BIG DOG HYDROGEOLOGY

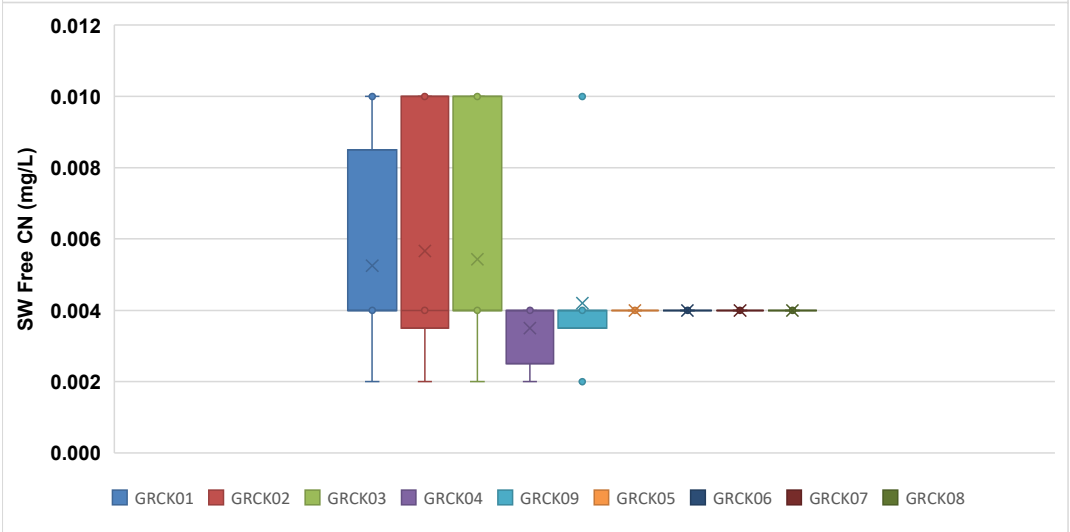
Filterable Zn in surface water and groundwater

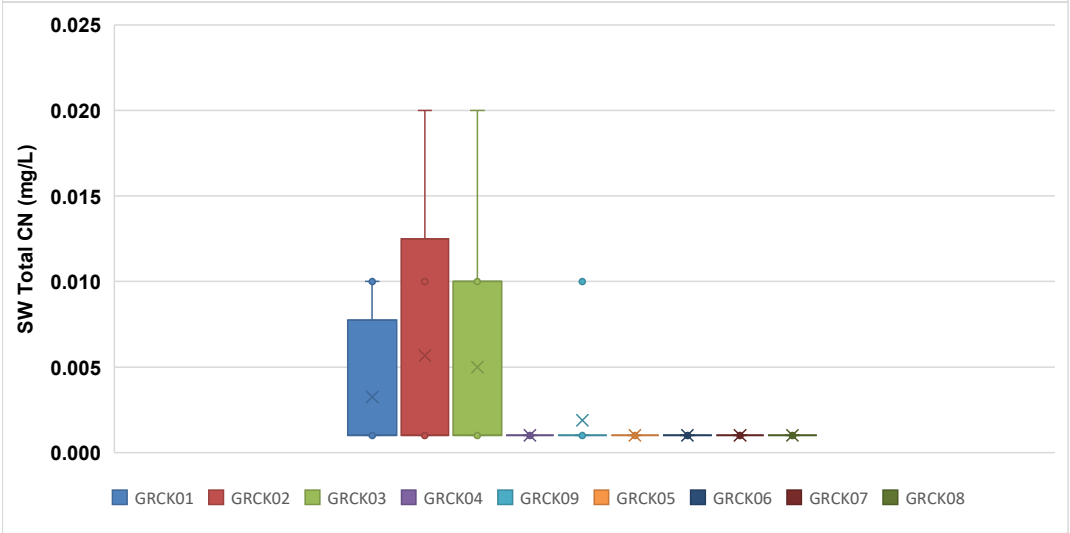
Figure B29

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2







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BIG DOG HYDROGEOLOGY

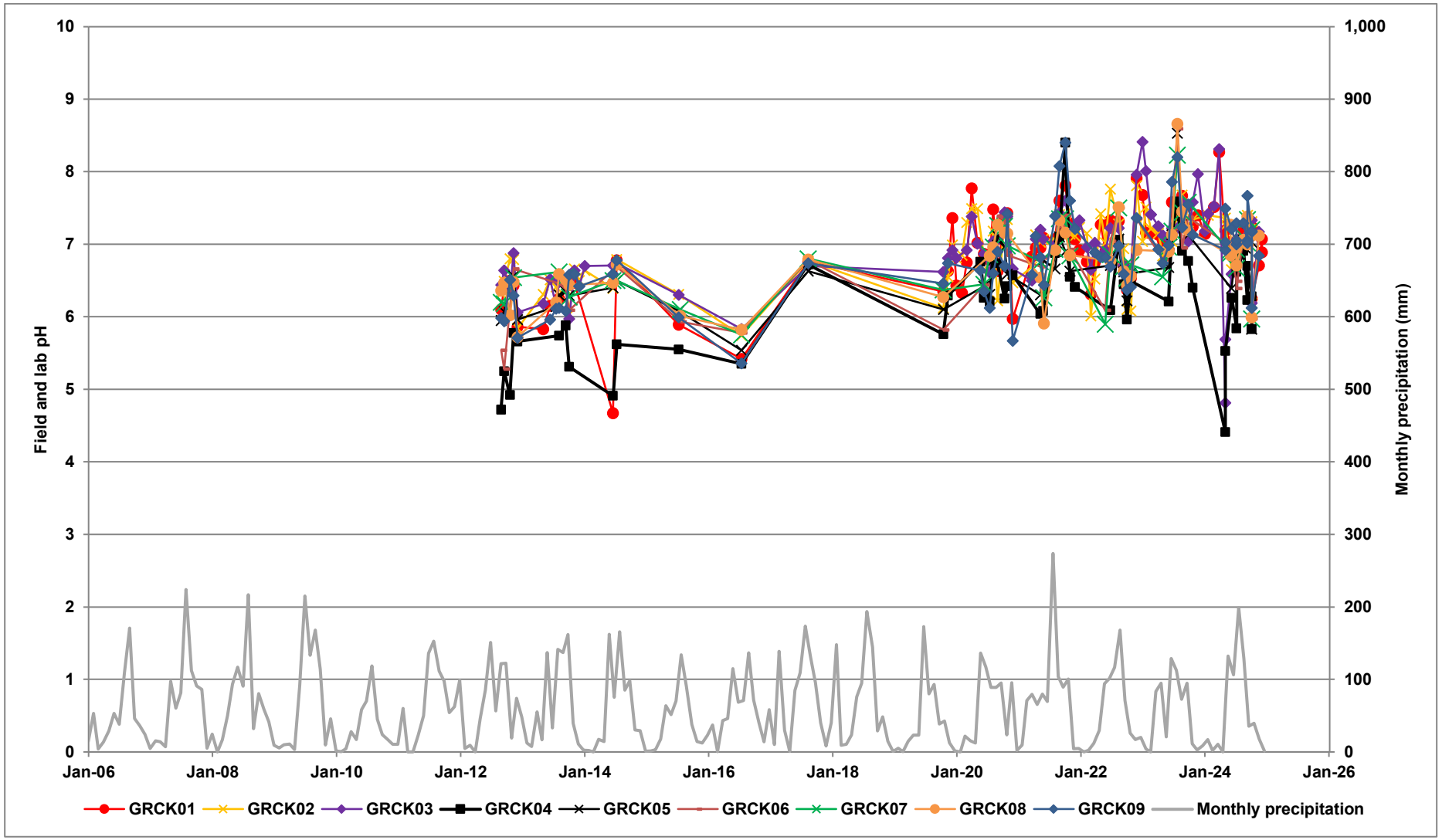
CN in surface water

Figure B30

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2

Appendix C
Time series hydrochemical plots



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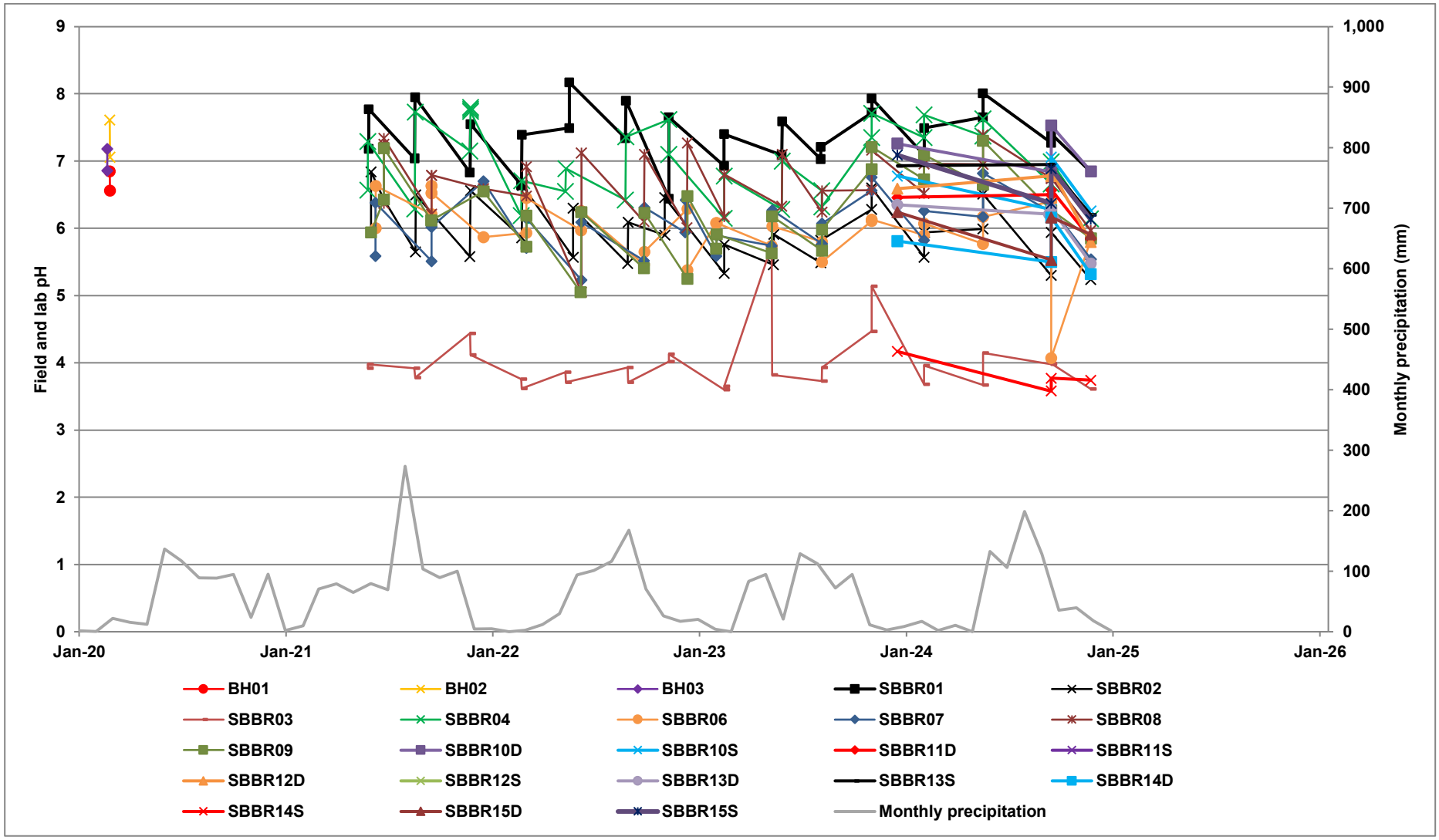
BIG DOG HYDROGEOLOGY

pH trends in Gringer Creek surface water

Figure C1

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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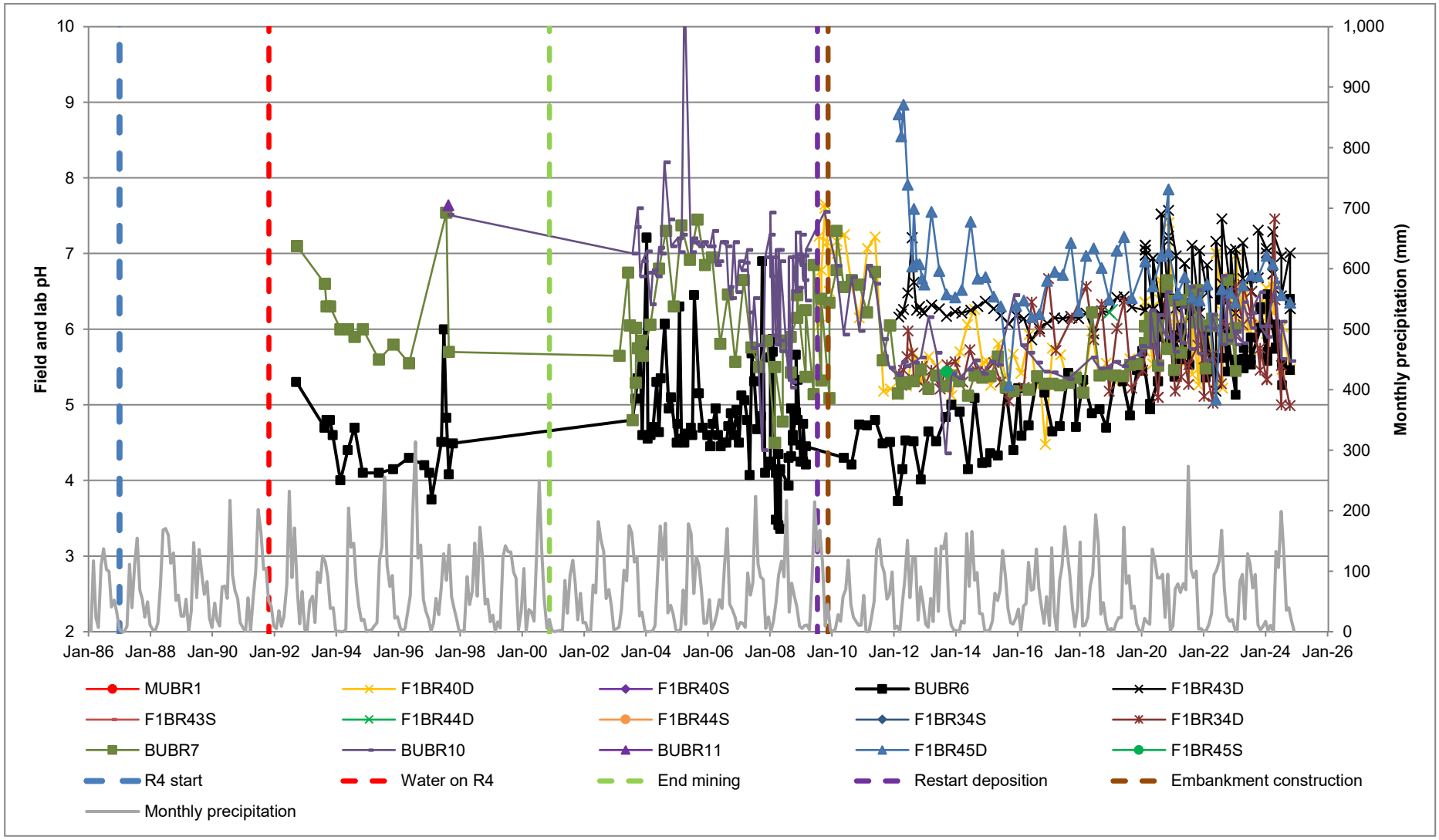
BIG DOG HYDROGEOLOGY Pty Ltd

pH trends in Gringer Creek groundwater

Figure C2

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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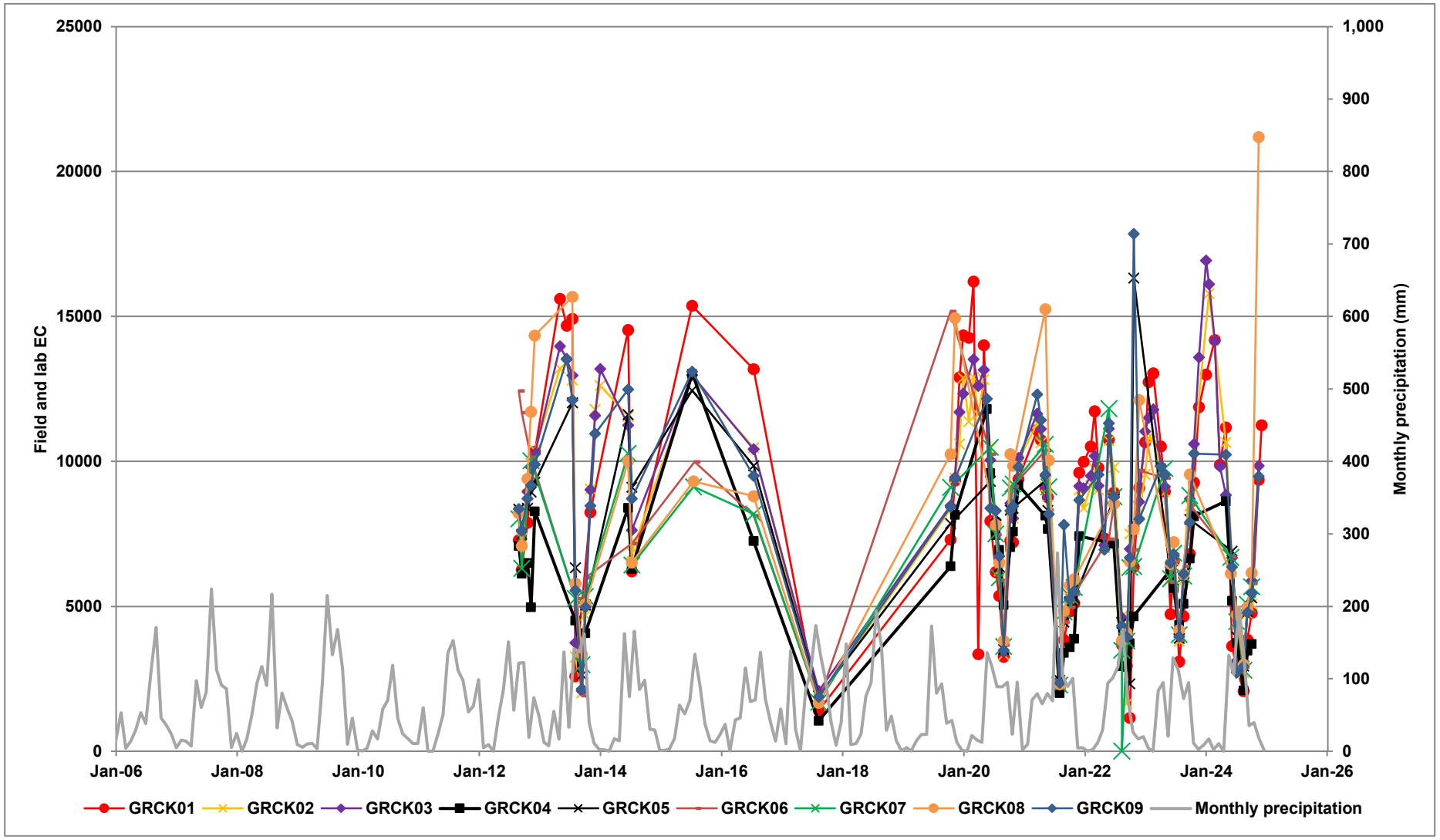
BIG DOG HYDROGEOLOGY

pH trends in regional groundwater

Figure C3

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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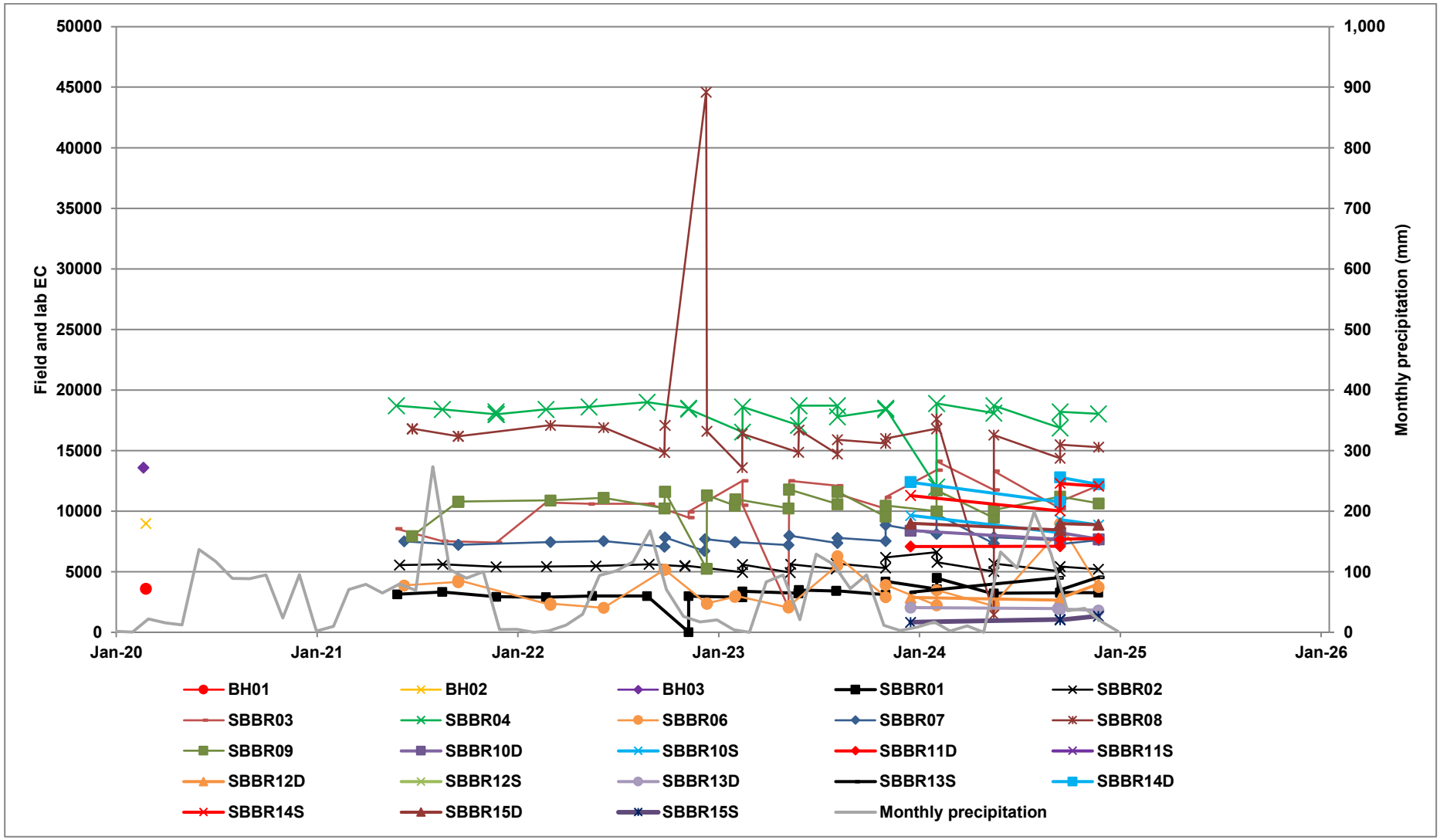
BIG DOG HYDROGEOLOGY

EC trends in Gringer Creek surface water

Figure C4

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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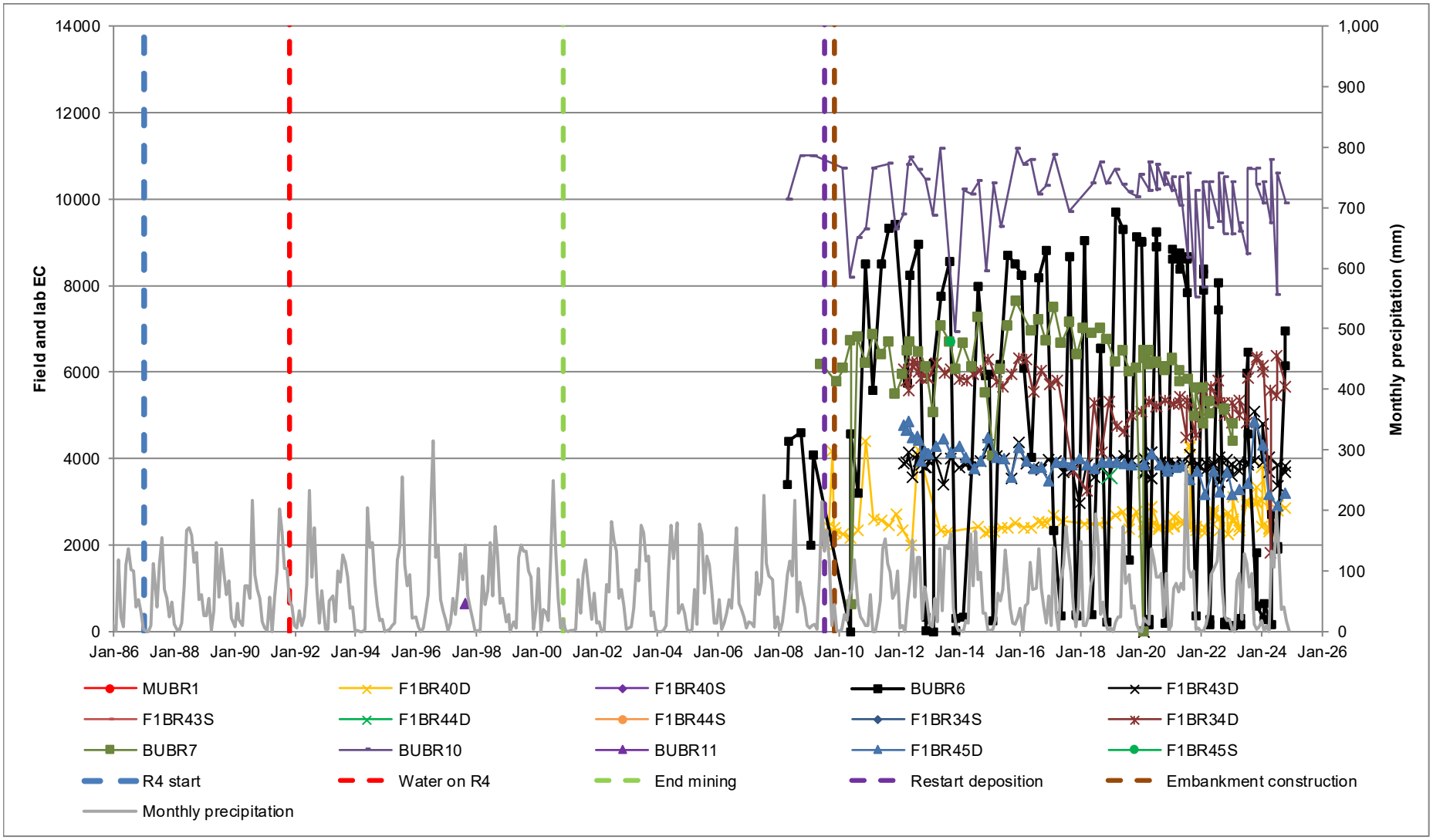
BIG DOG HYDROGEOLOGY Pty Ltd

EC trends in Gringer Creek groundwater

Figure C5

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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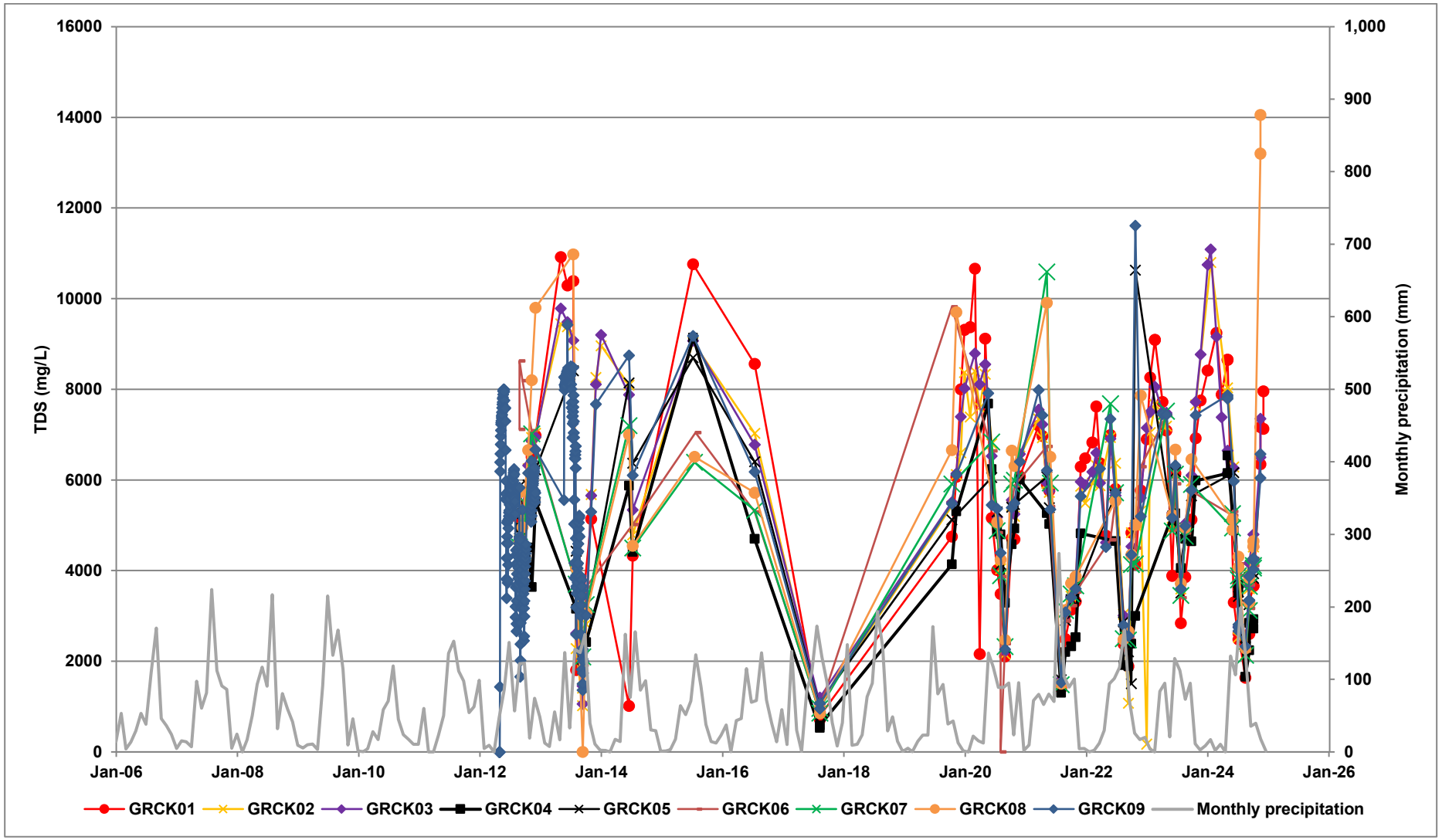
BIG DOG HYDROGEOLOGY

EC trends in regional groundwater

Figure C6

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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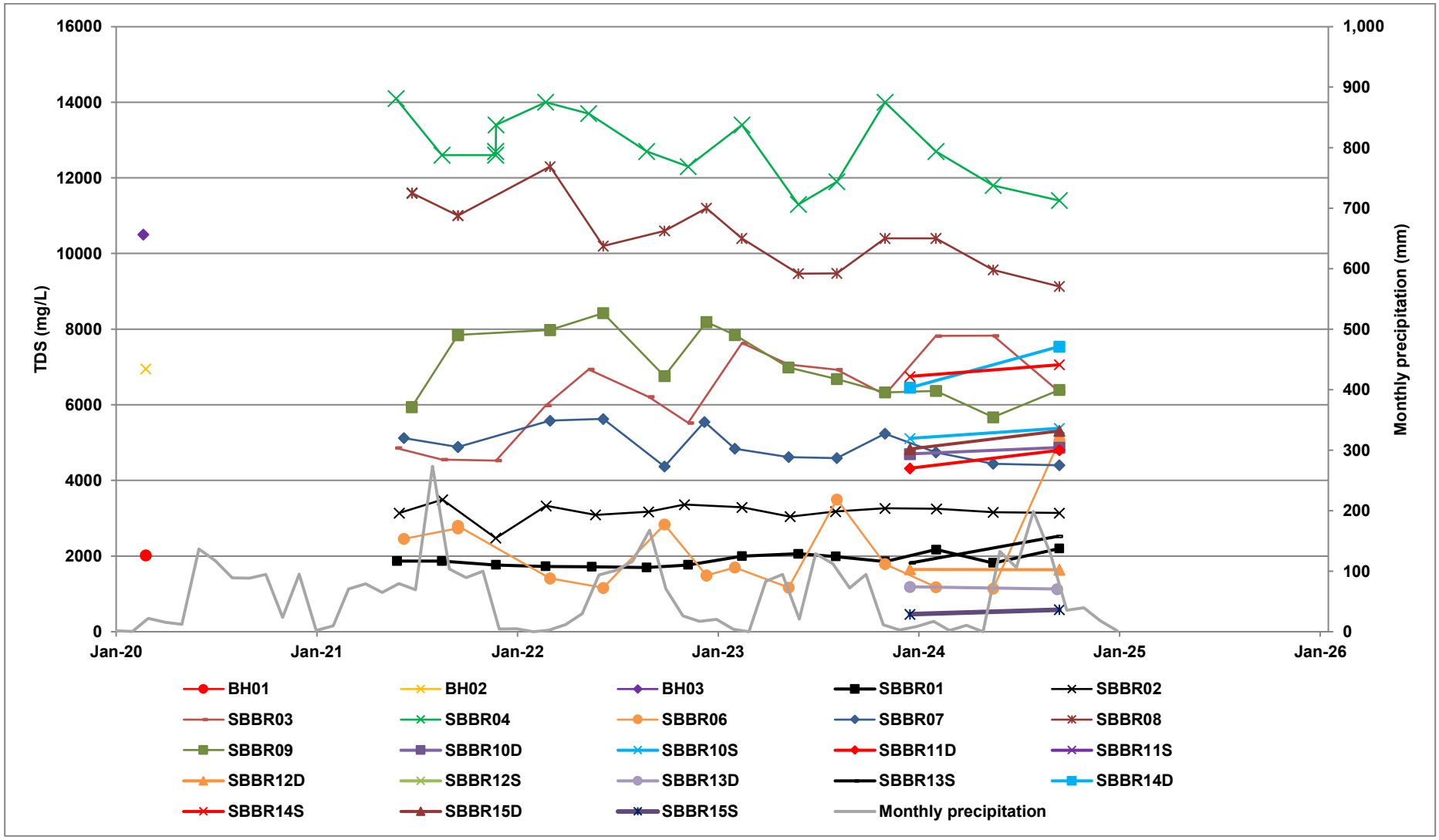
BIG DOG HYDROGEOLOGY

TDS trends in Gringer Creek surface water

Figure C7

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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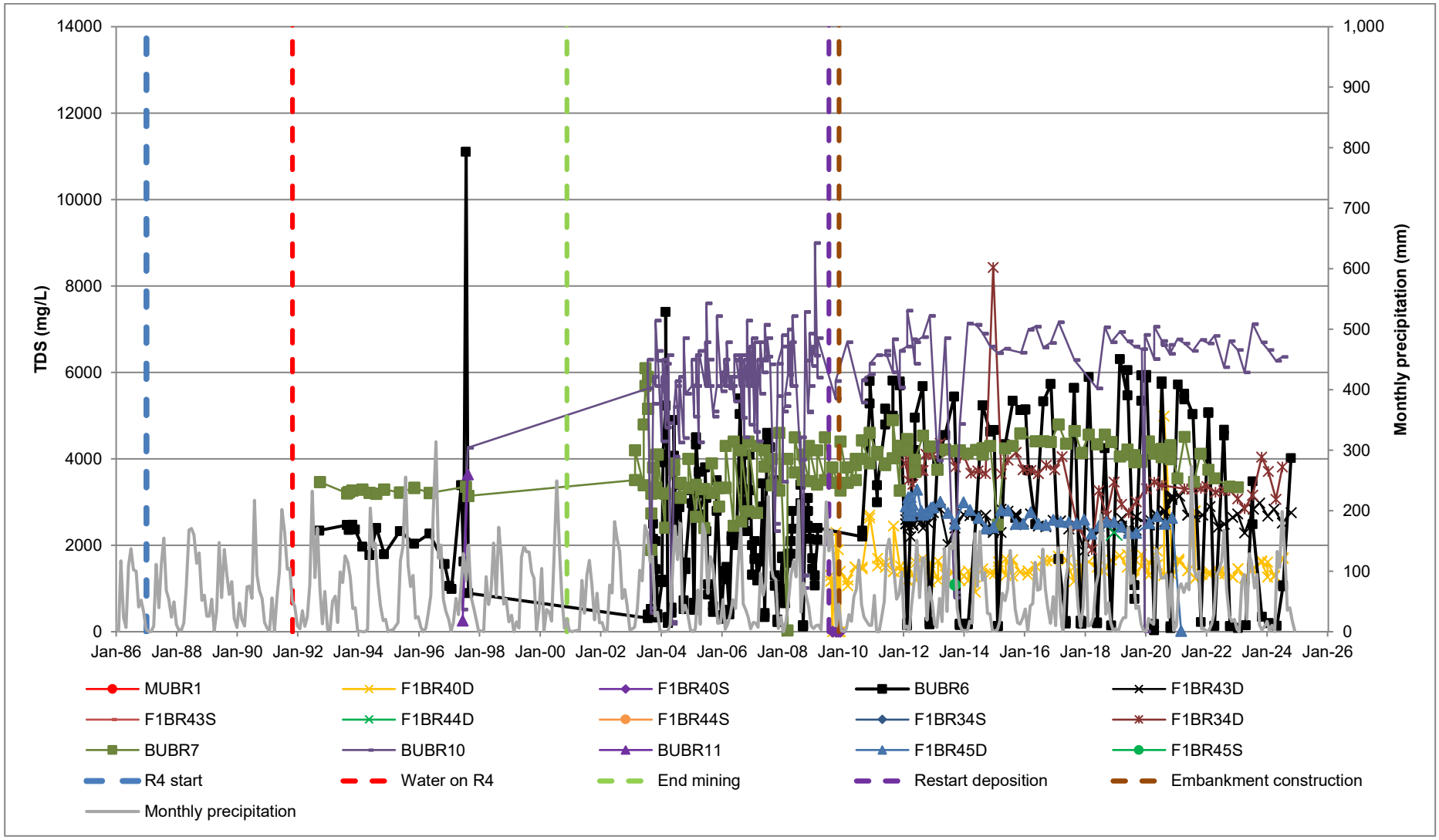
BIG DOG HYDROGEOLOGY Pty Ltd

TDS trends in Gringer Creek groundwater

Figure C8

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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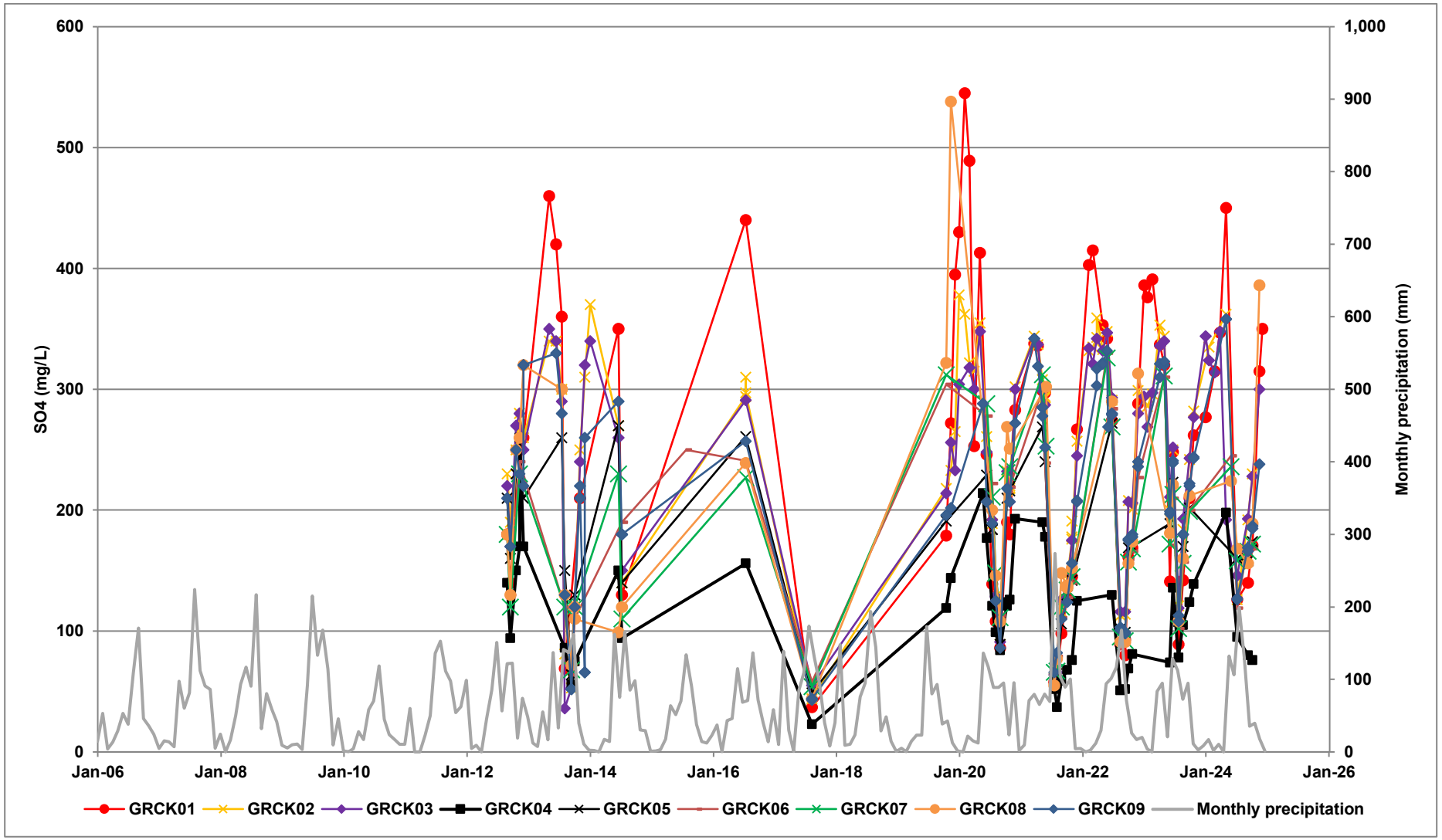
BIG DOG HYDROGEOLOGY

TDS trends in regional groundwater

Figure C9

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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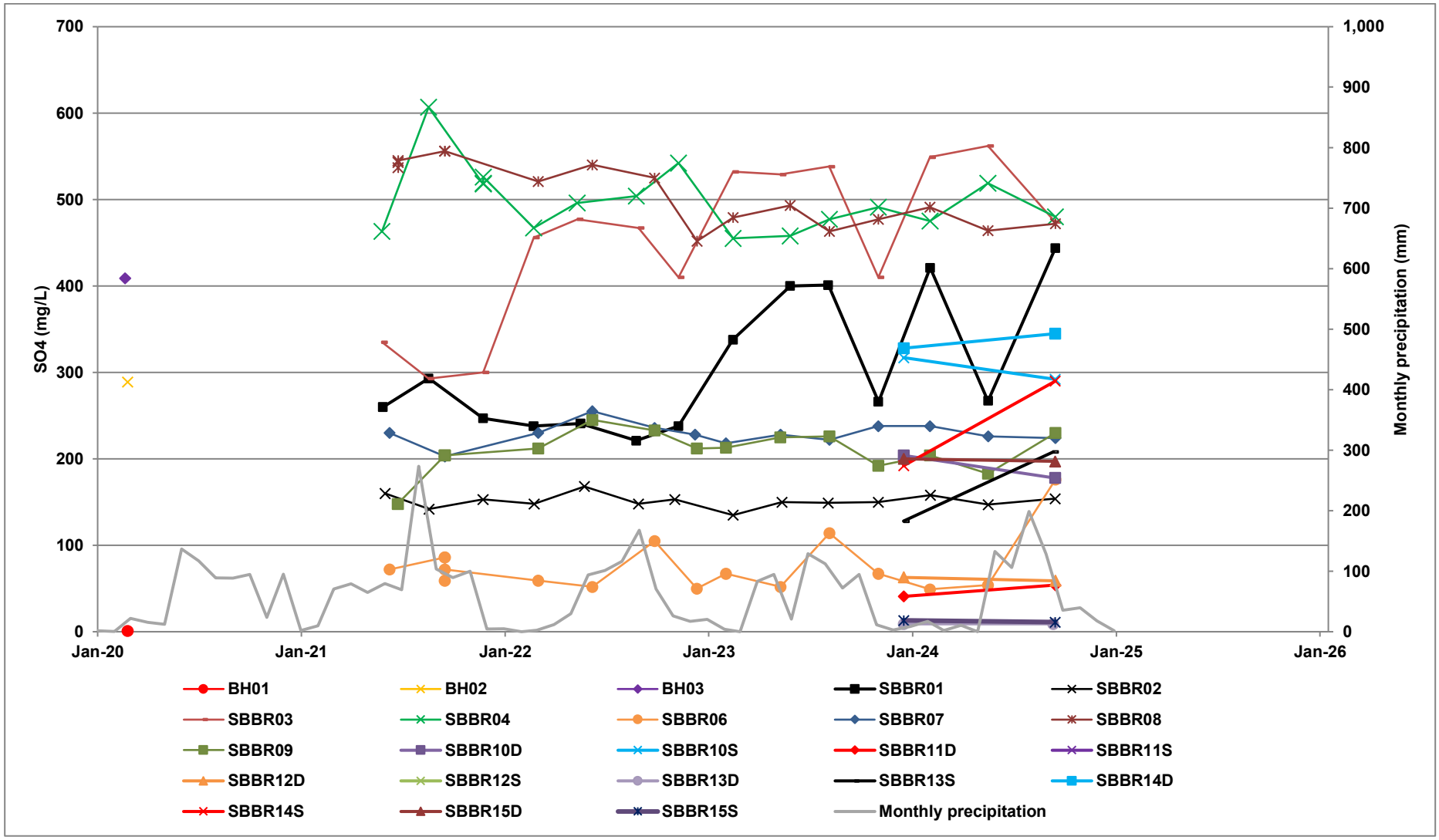
BIG DOG HYDROGEOLOGY Pty Ltd

Sulphate trends in Gringer Creek surface water

Figure C10

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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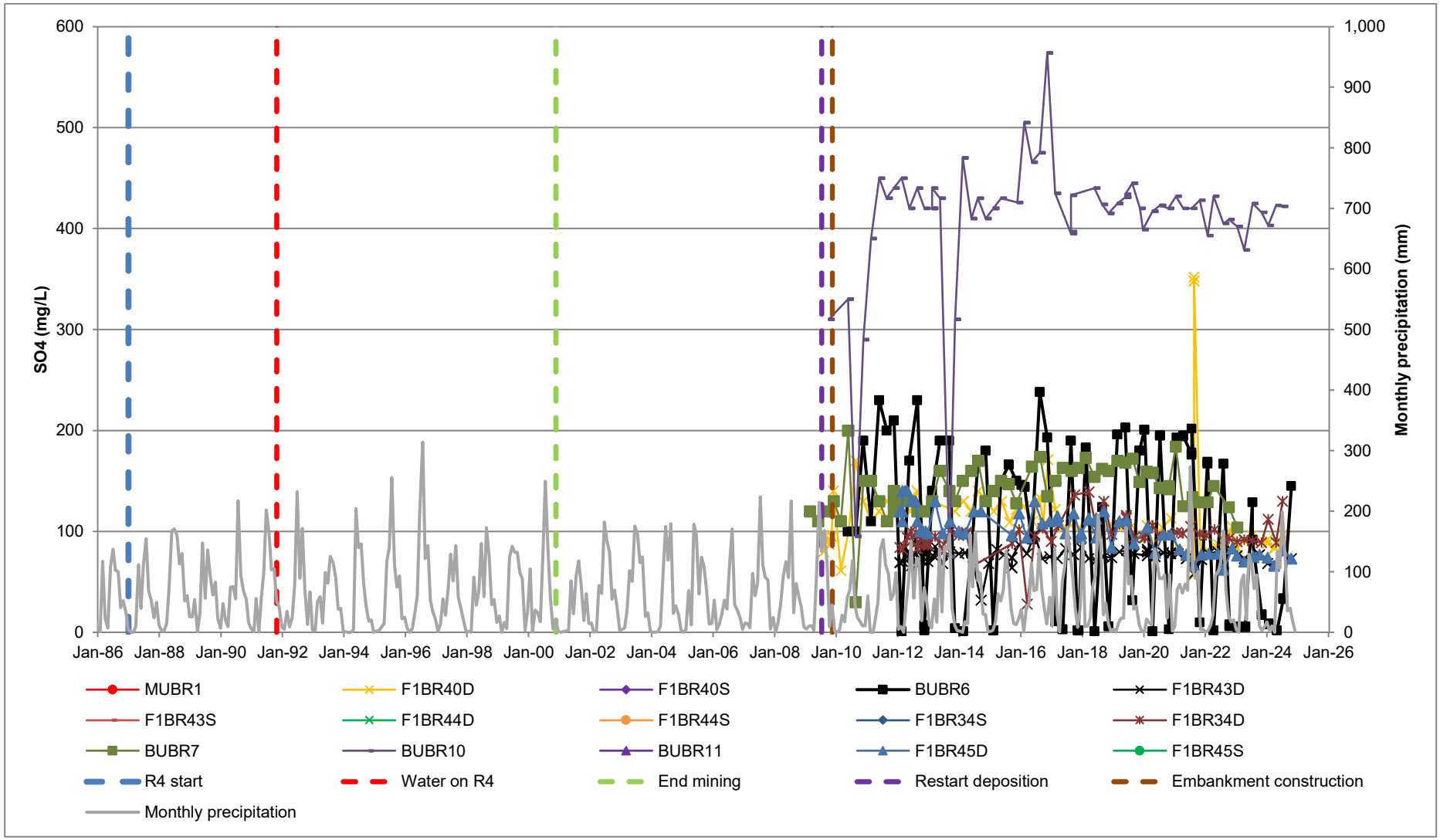
BIG DOG HYDROGEOLOGY Pty Ltd

Sulphate trends in Gringer Creek groundwater

Figure C11

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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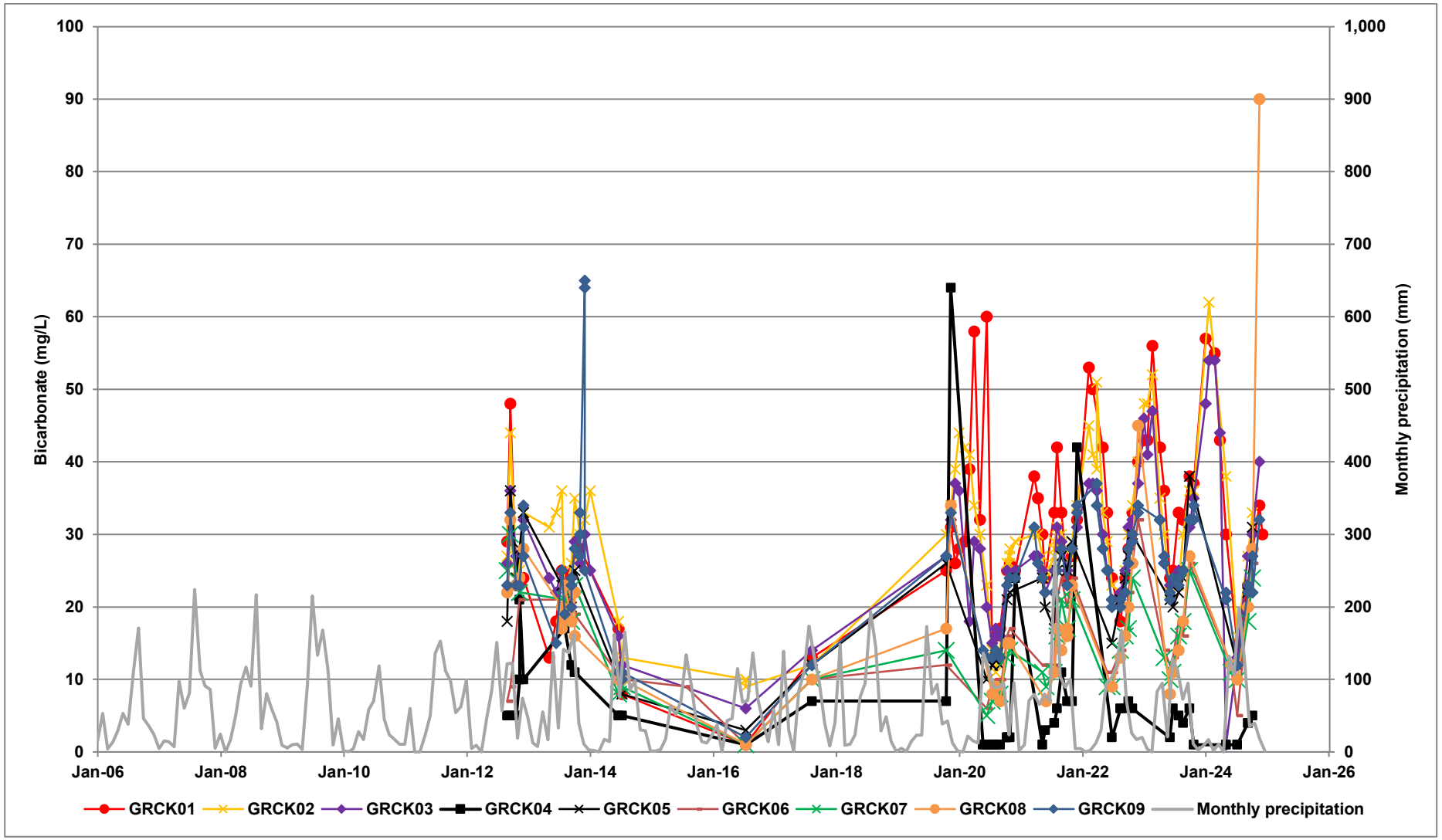
BIG DOG HYDROGEOLOGY

Sulphate trends in regional groundwater

Figure C12

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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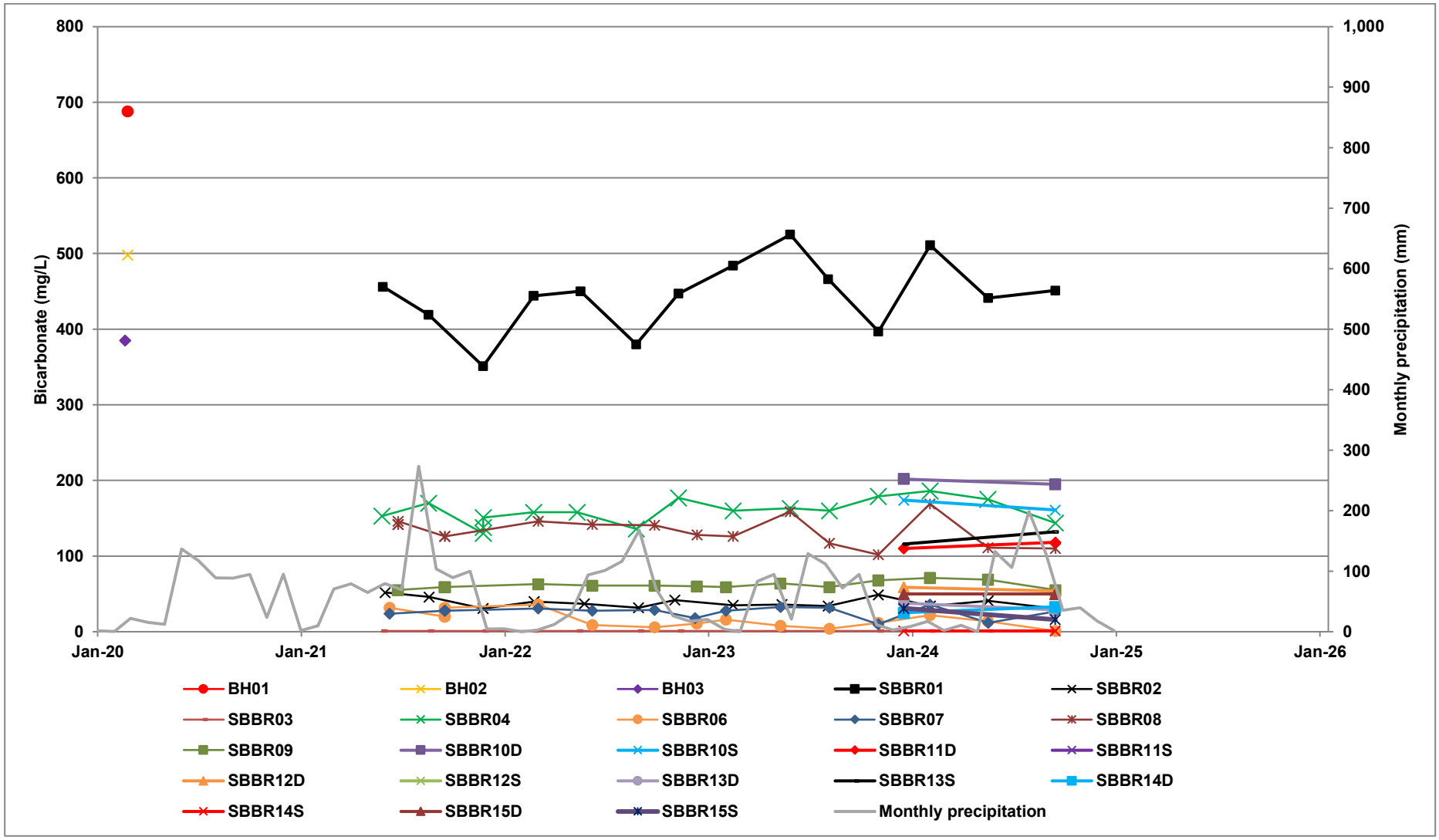
BIG DOG HYDROGEOLOGY Pty Ltd

Bicarbonate trends in Gringer Creek surface water

Figure C13

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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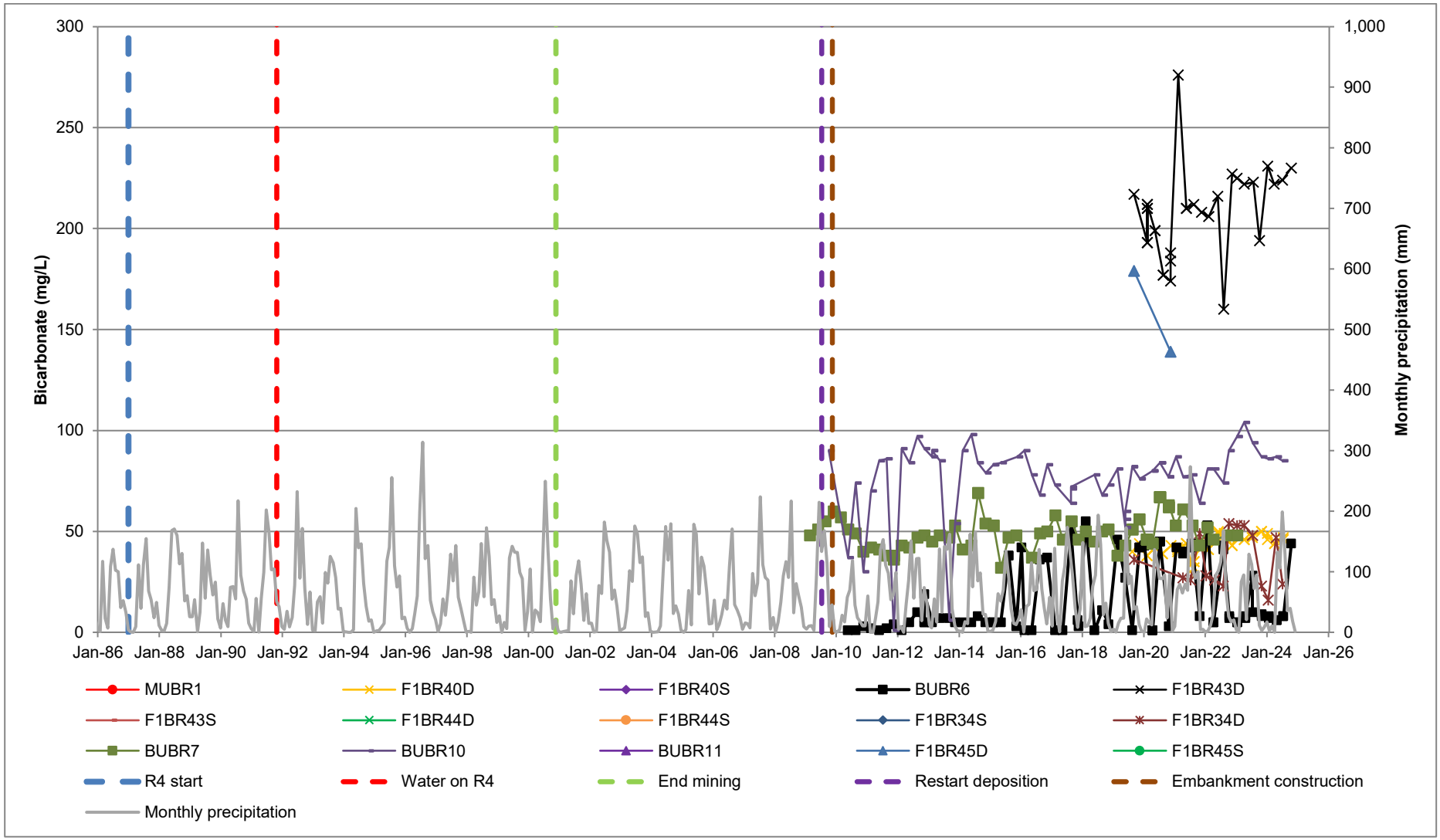
BIG DOG HYDROGEOLOGY Pty Ltd

Bicarbonate trends in Gringer Creek groundwater

Figure C14

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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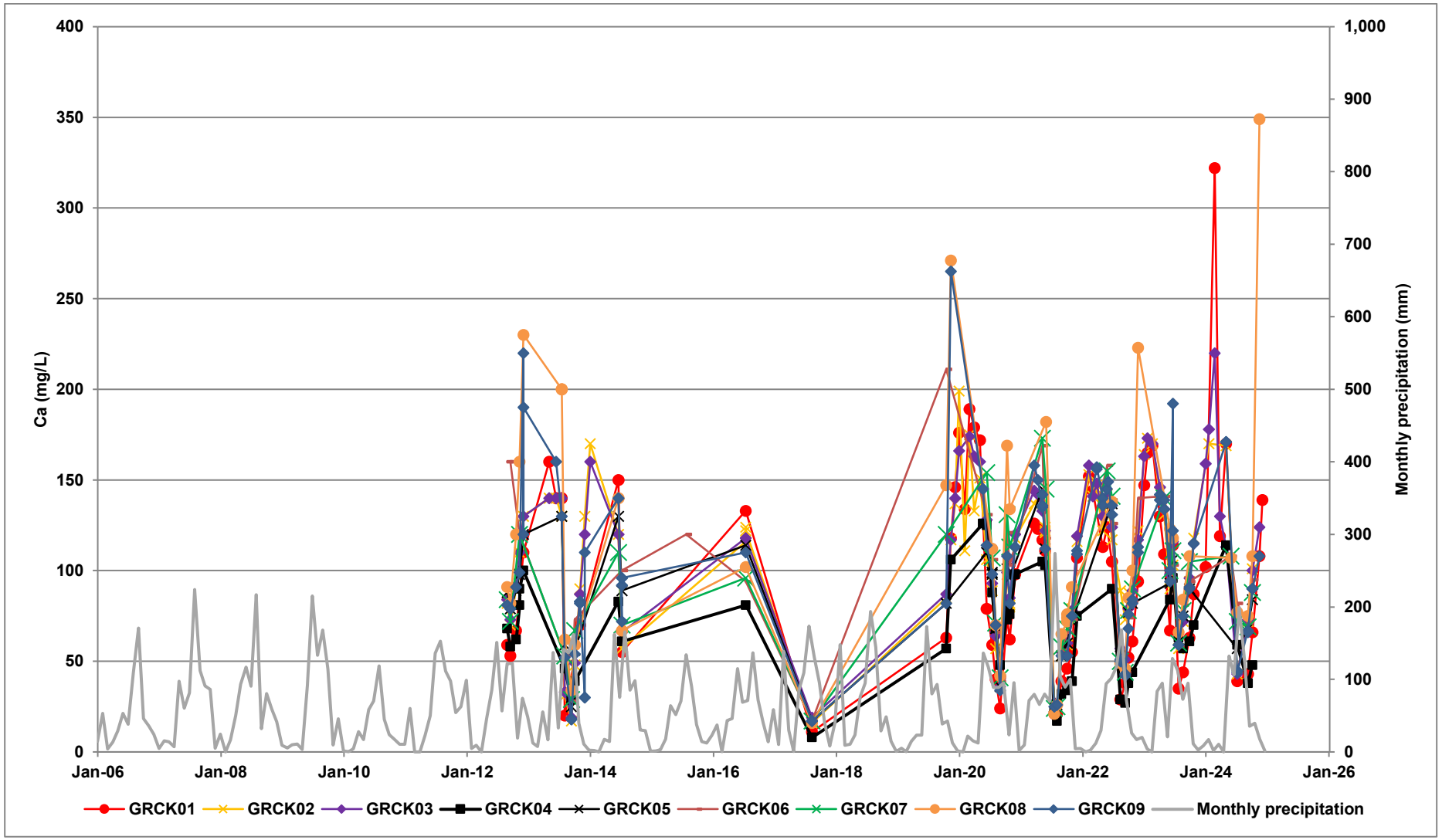
BIG DOG HYDROGEOLOGY

Bicarbonate trends in regional groundwater

Figure C15

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

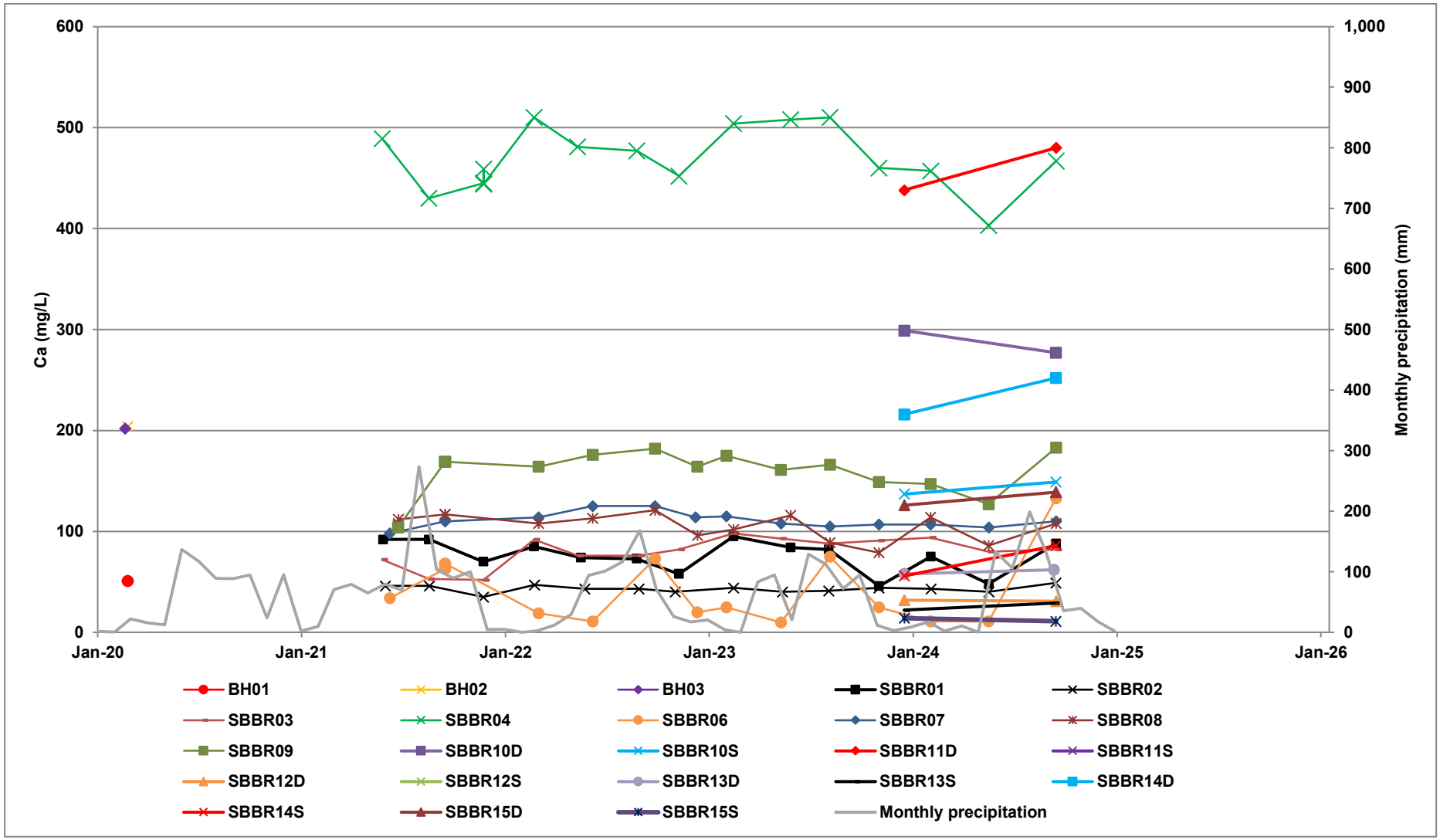
BIG DOG HYDROGEOLOGY Pty Ltd

Ca trends in Gringer Creek surface water

Figure C16

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

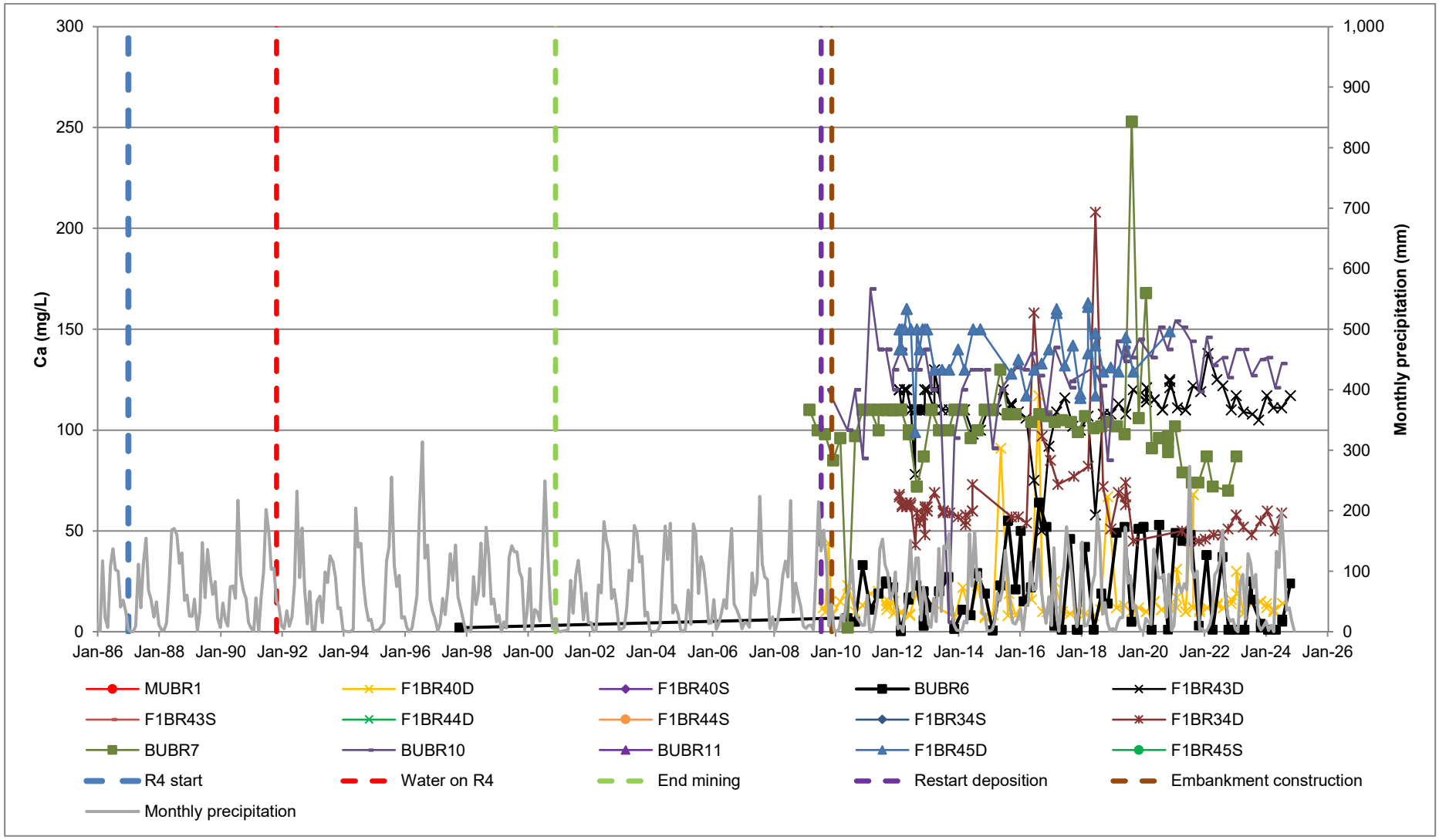
BIG DOG HYDROGEOLOGY Pty Ltd

Ca trends in Gringer Creek groundwater

Figure C17

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

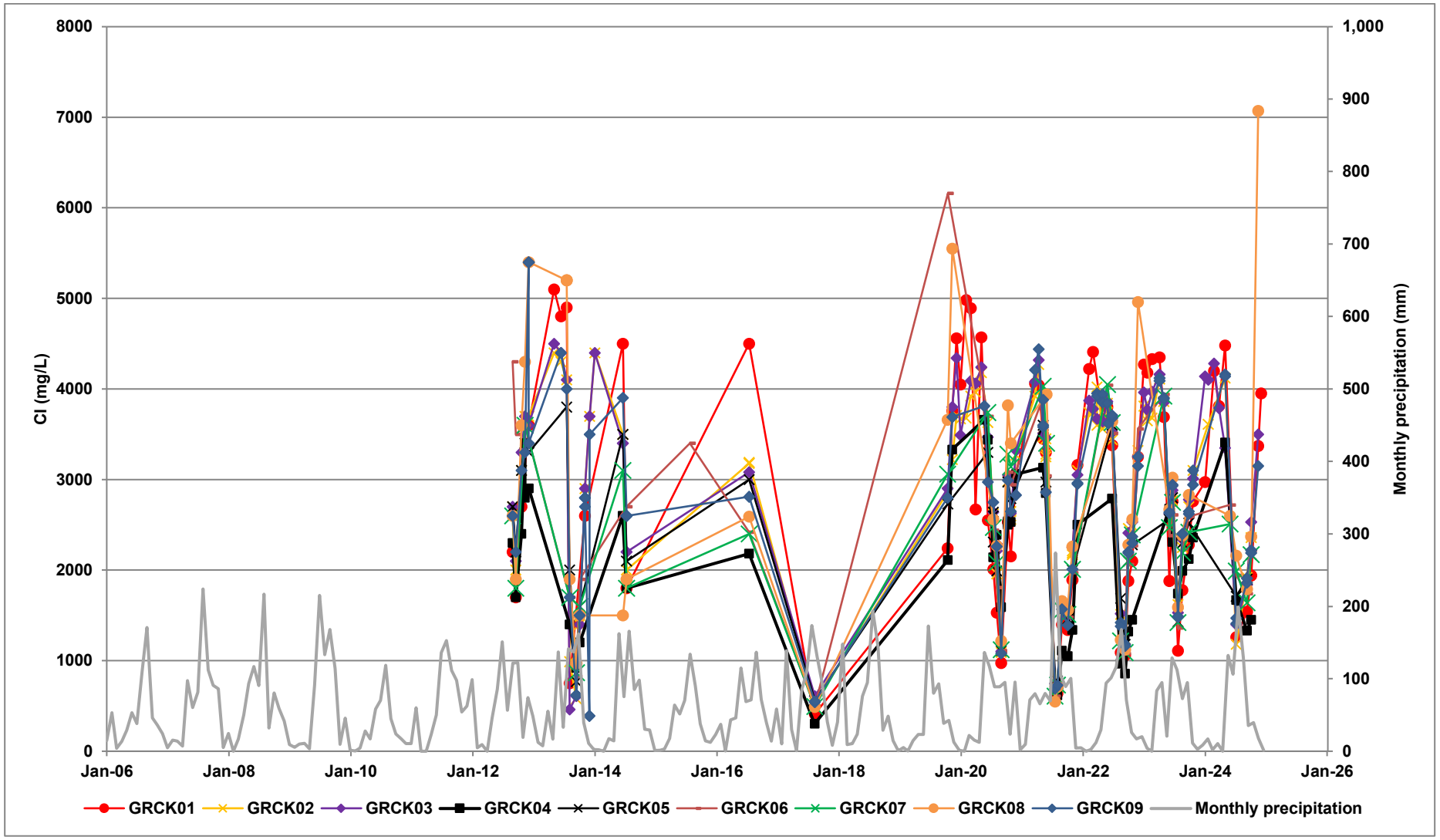
BIG DOG HYDROGEOLOGY

Ca trends in regional groundwater

Figure C18

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

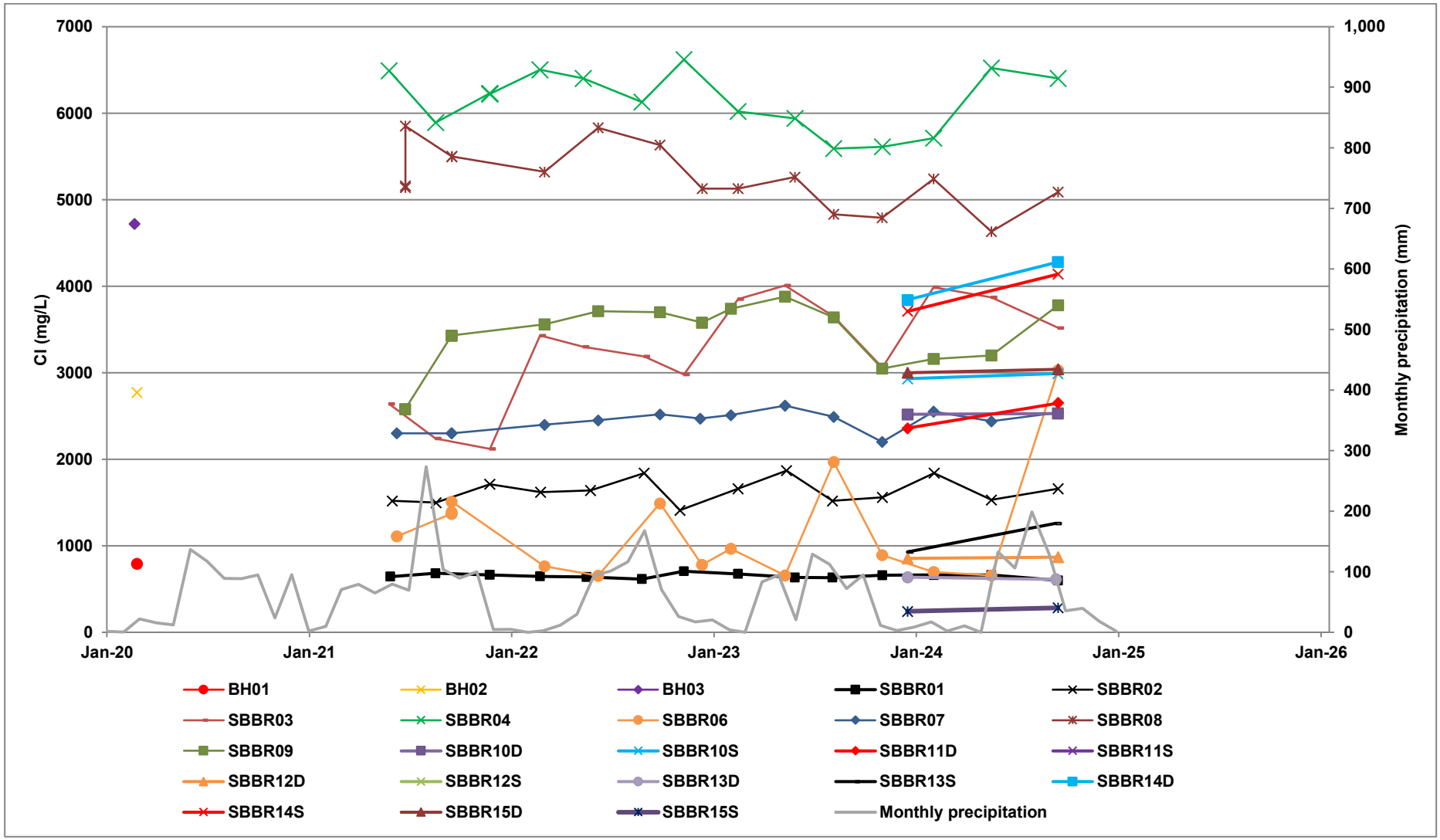
BIG DOG HYDROGEOLOGY Ltd

Cl trends in Gringer Creek surface water

Figure C19

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

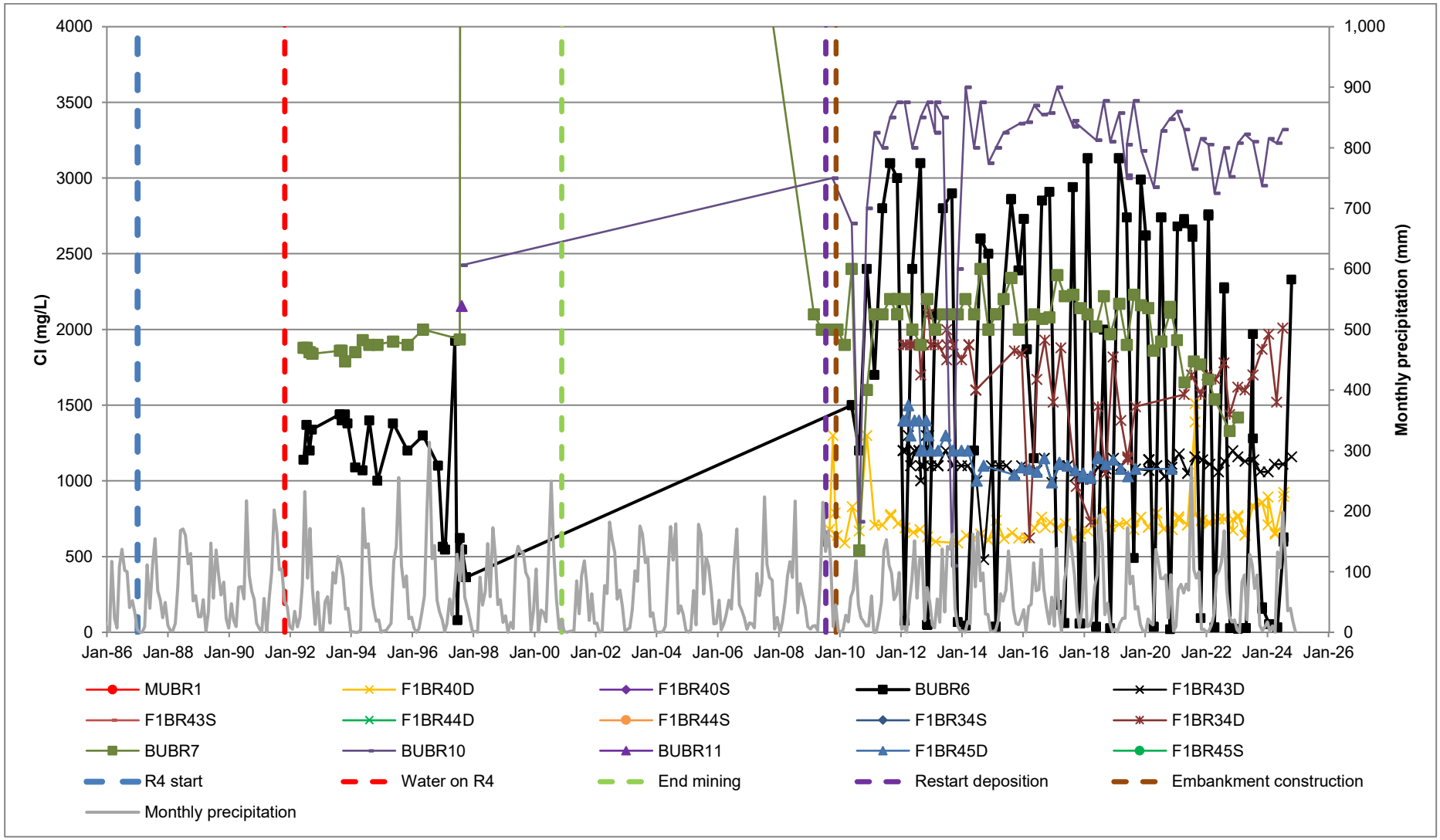
BIG DOG HYDROGEOLOGY Pty Ltd

Cl trends in Gringer Creek groundwater

Figure C20

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

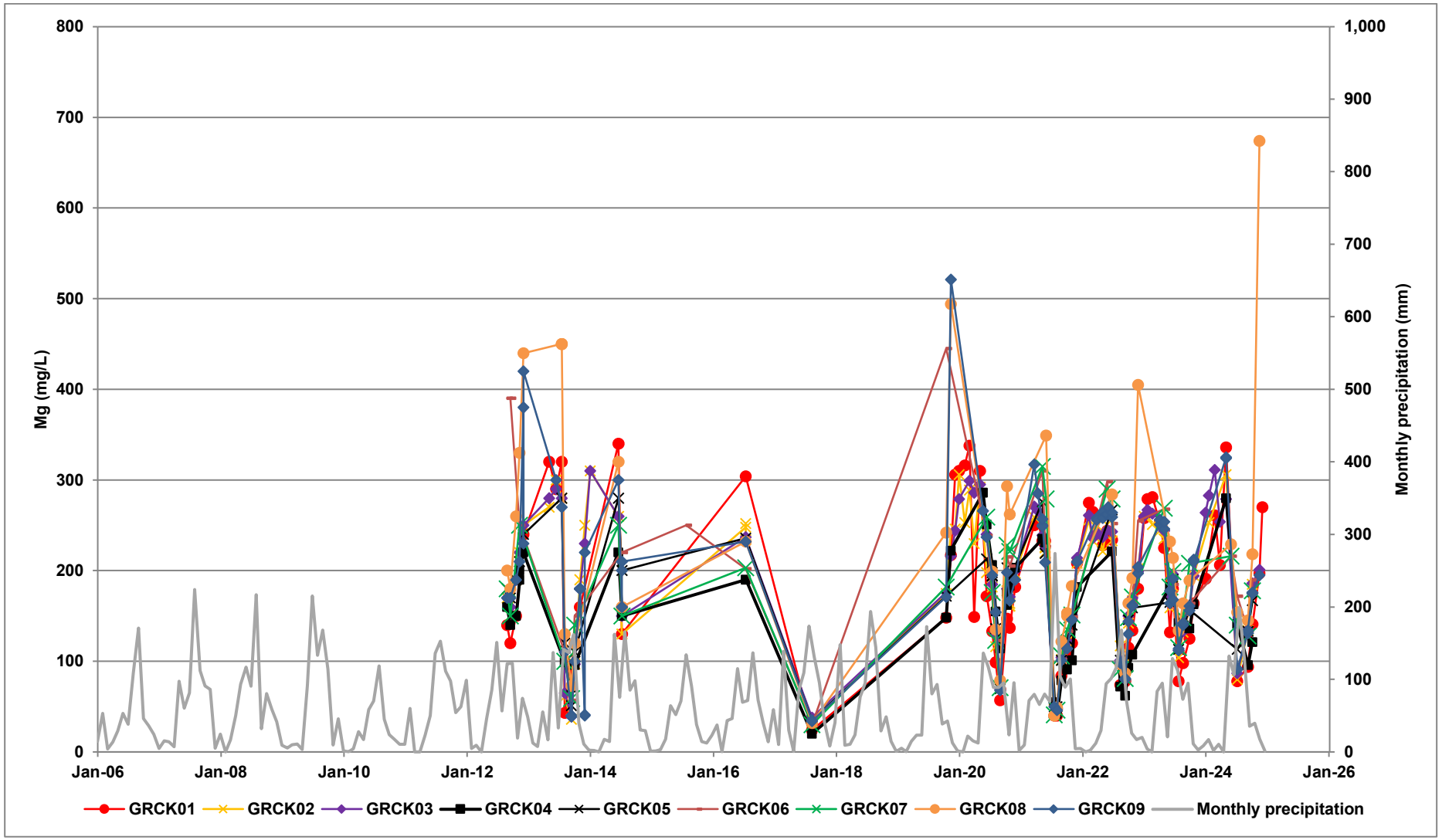
BIG DOG HYDROGEOLOGY

Cl trends in regional groundwater

Figure C21

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

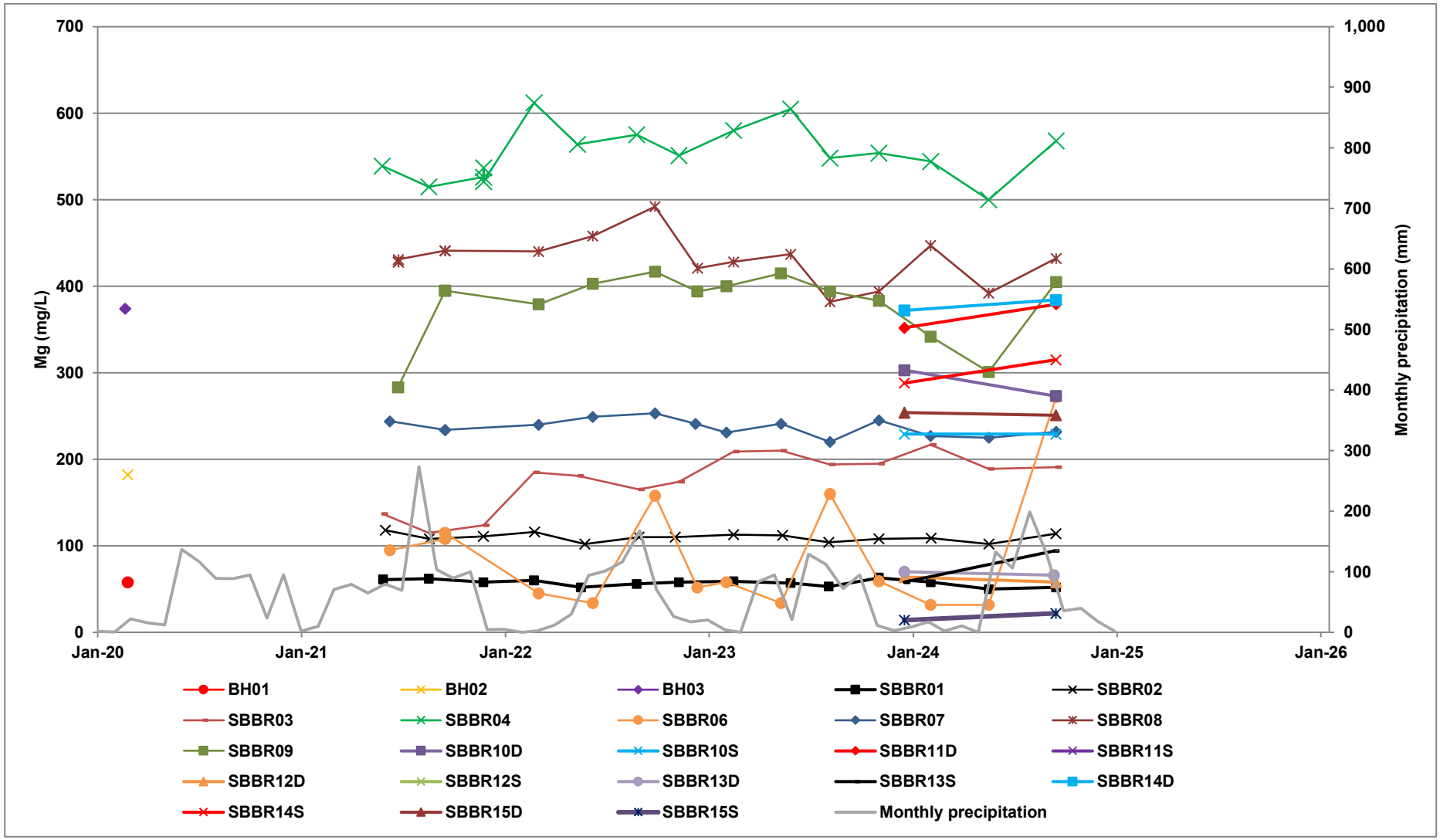
BIG DOG HYDROGEOLOGY

Mg trends in Gringer Creek surface water

Figure C22

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

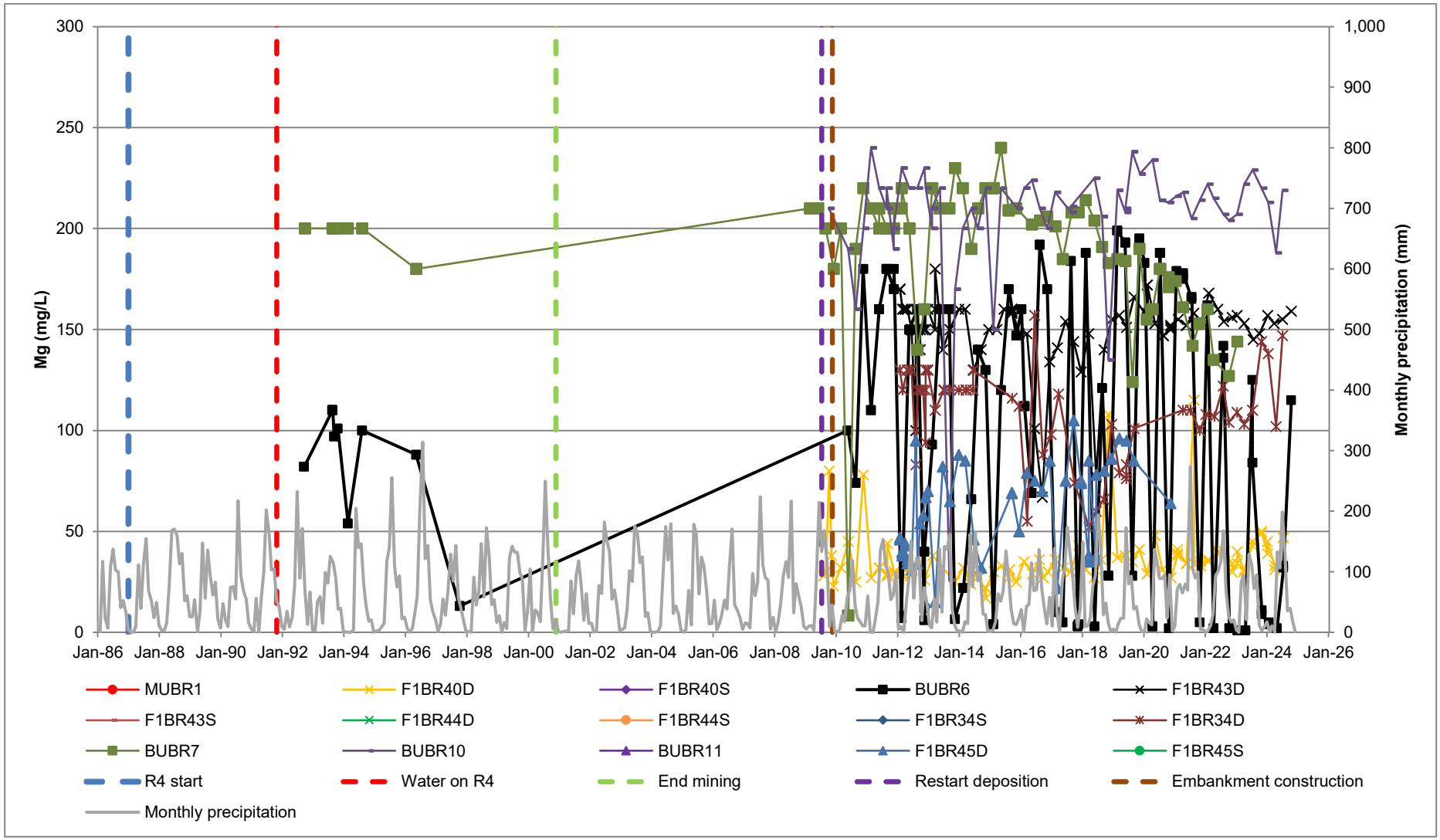
BIG DOG HYDROGEOLOGY Pty Ltd

Mg trends in Gringer Creek groundwater

Figure C23

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

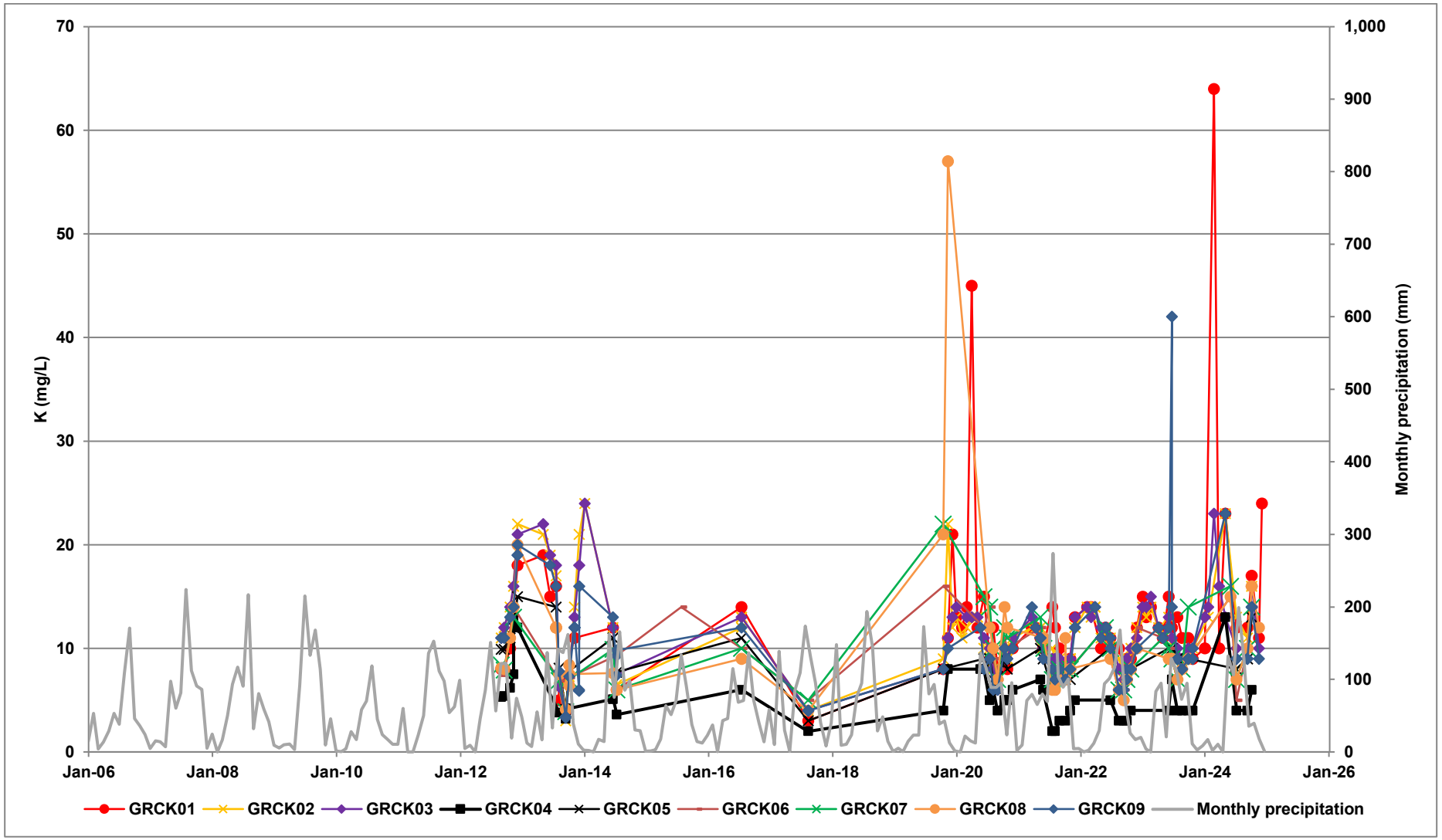
BIG DOG HYDROGEOLOGY

Mg trends in regional groundwater

Figure C24

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

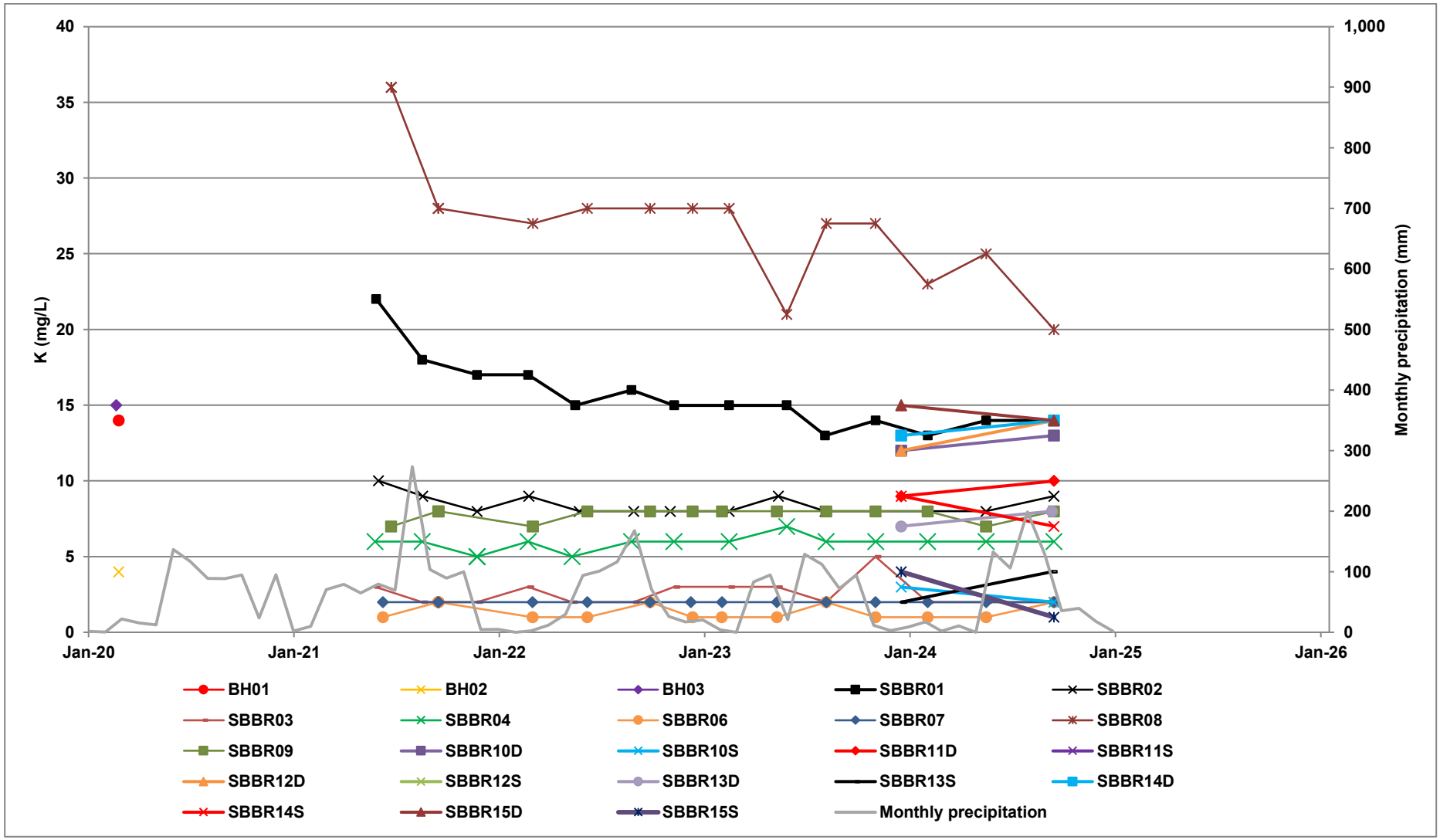
BIG DOG HYDROGEOLOGY Pty Ltd

K trends in Gringer Creek surface water

Figure C25

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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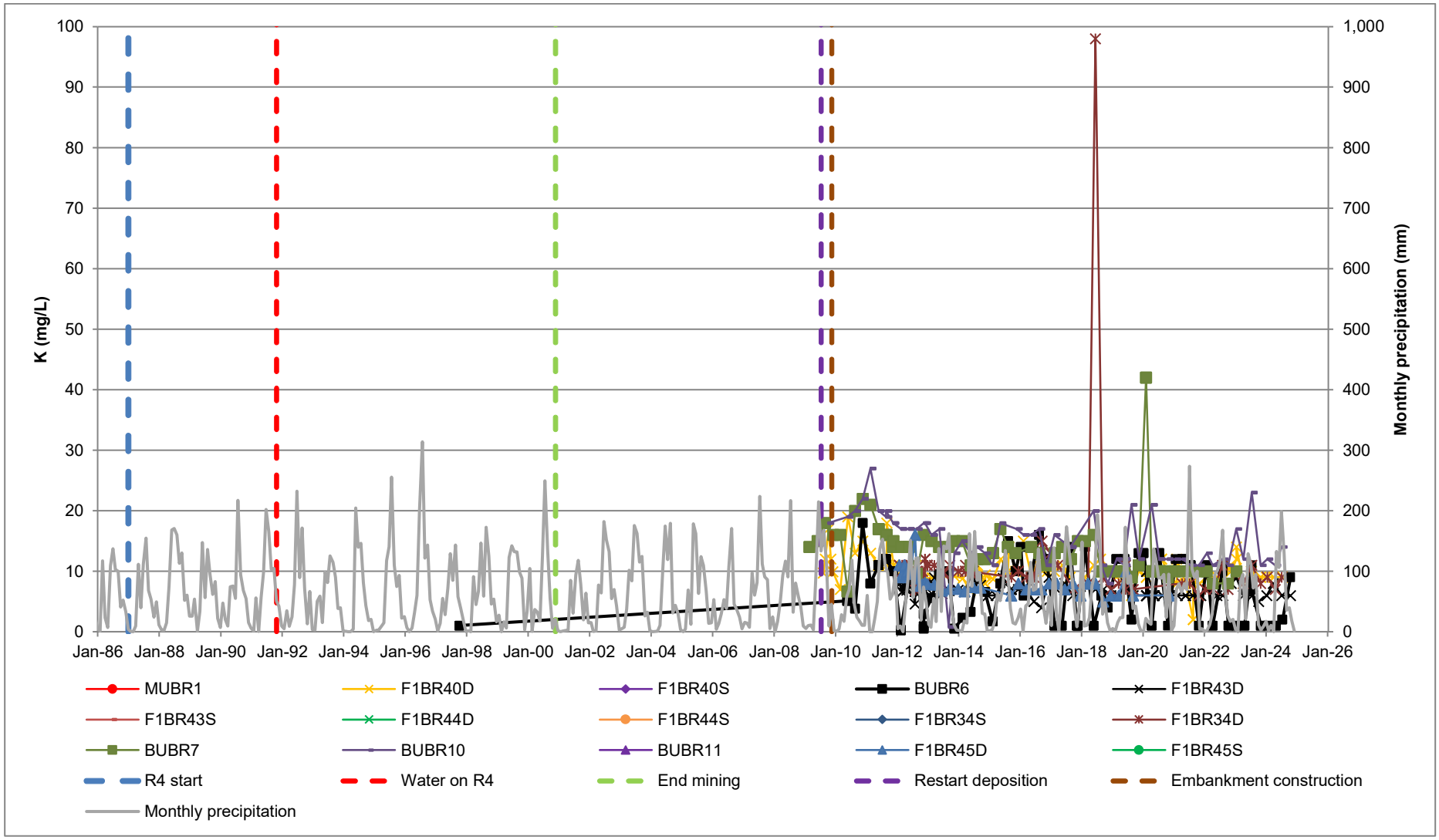
BIG DOG HYDROGEOLOGY Pty Ltd

K trends in Gringer Creek groundwater

Figure C26

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



K trends in regional groundwater

Figure C27

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2

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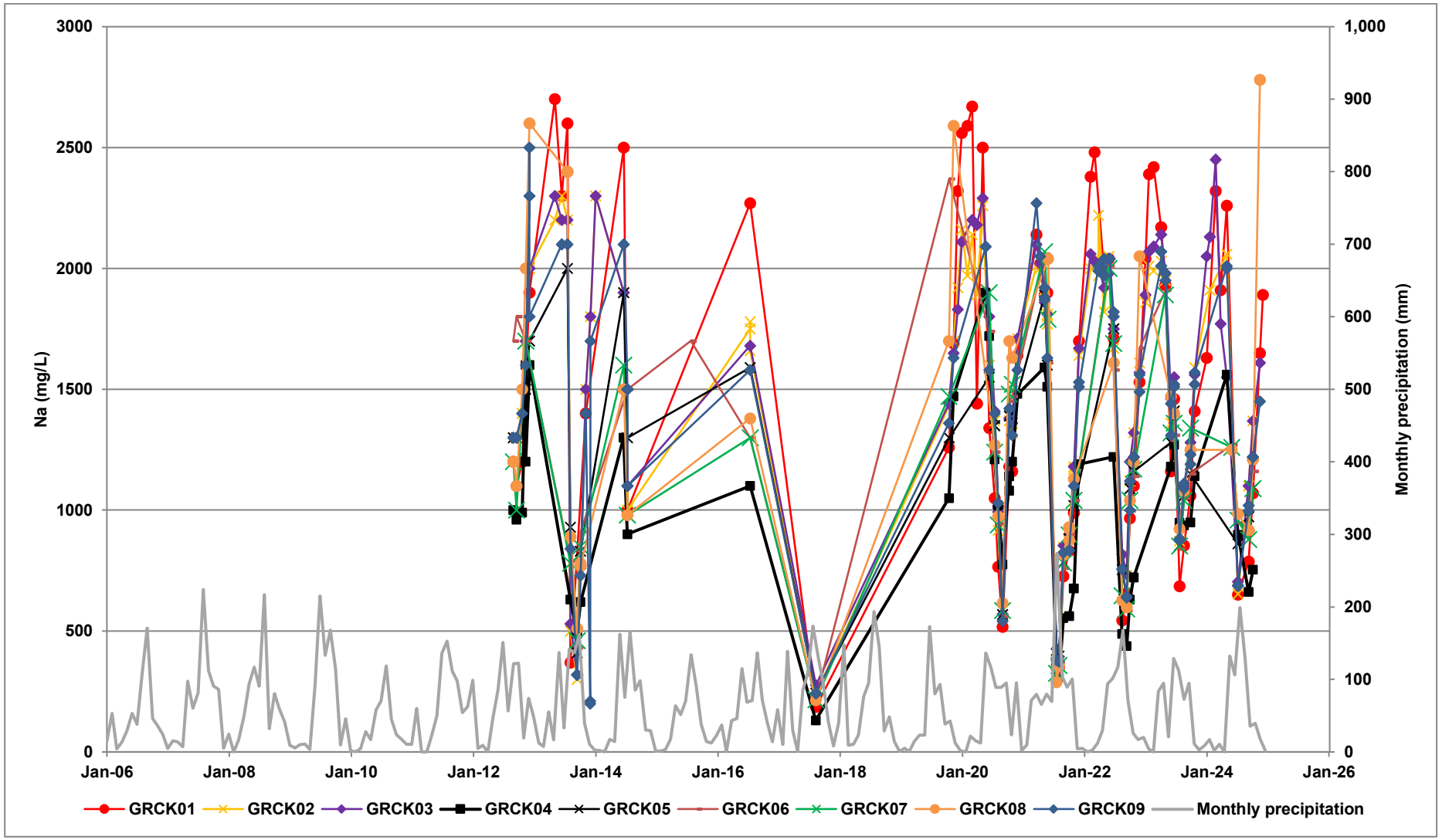


D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

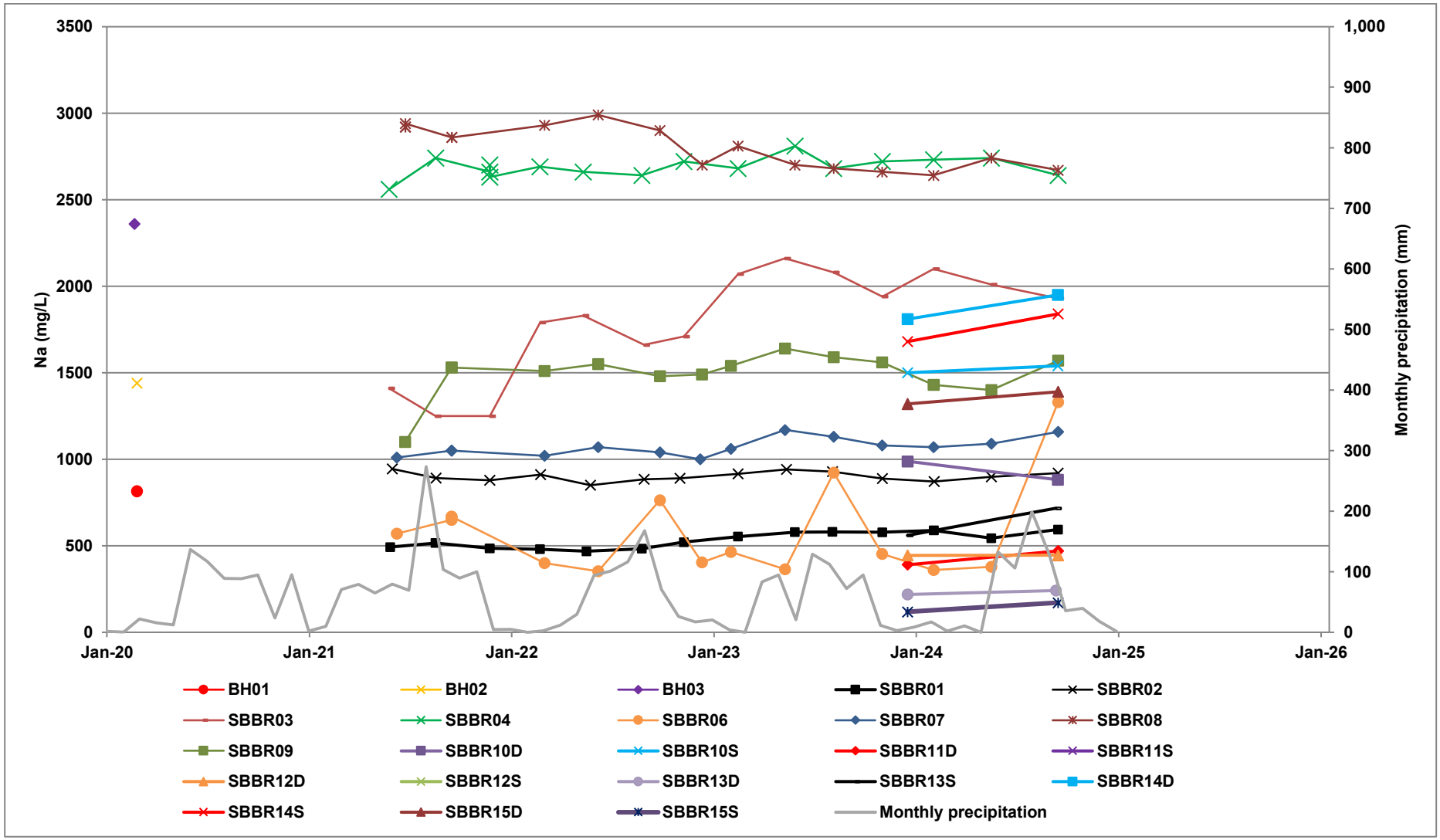
BIG DOG HYDROGEOLOGY Pty Ltd

Na trends in Gringer Creek surface water

Figure C28

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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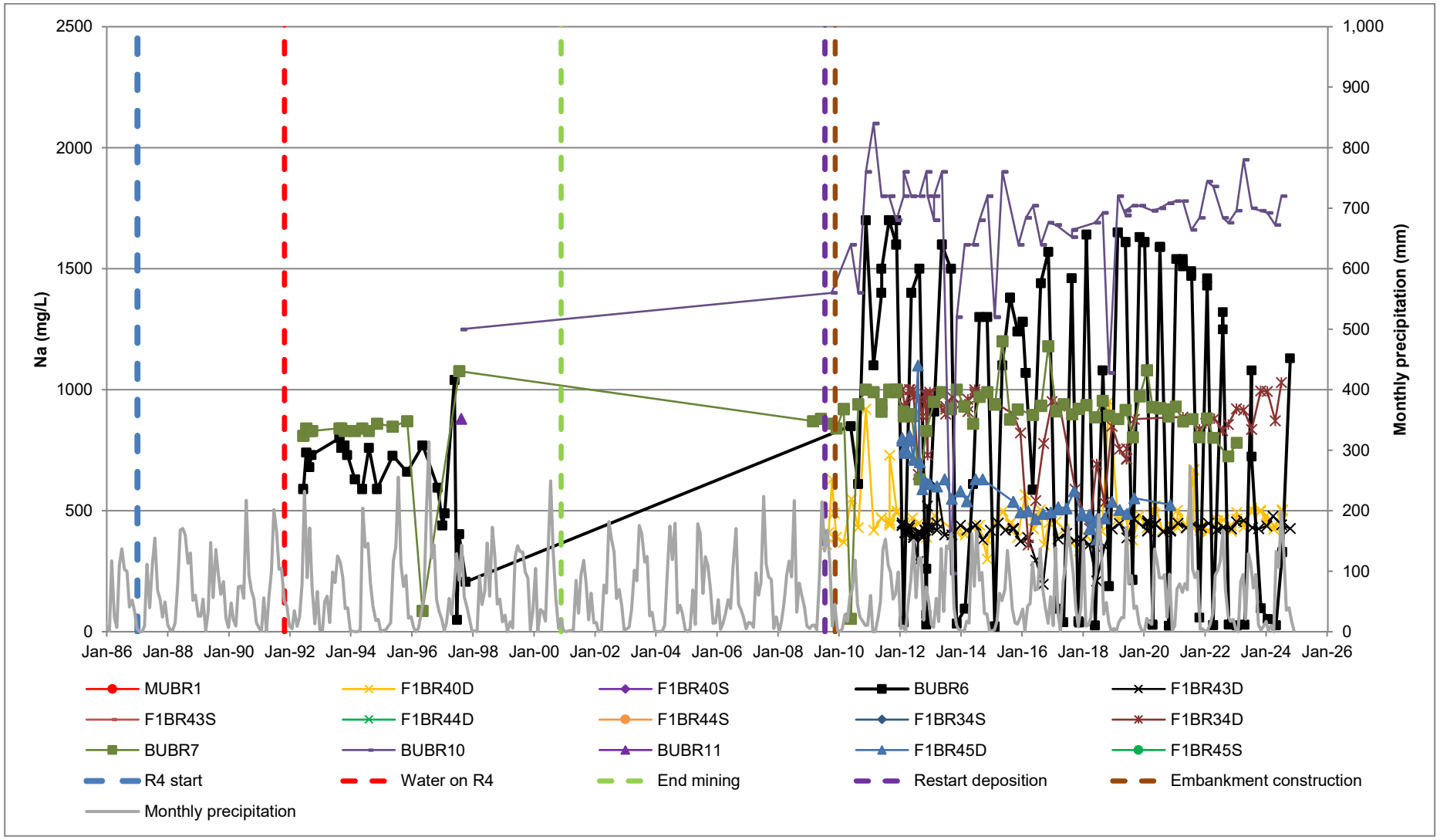
BIG DOG HYDROGEOLOGY Pty Ltd

Na trends in Gringer Creek groundwater

Figure C29

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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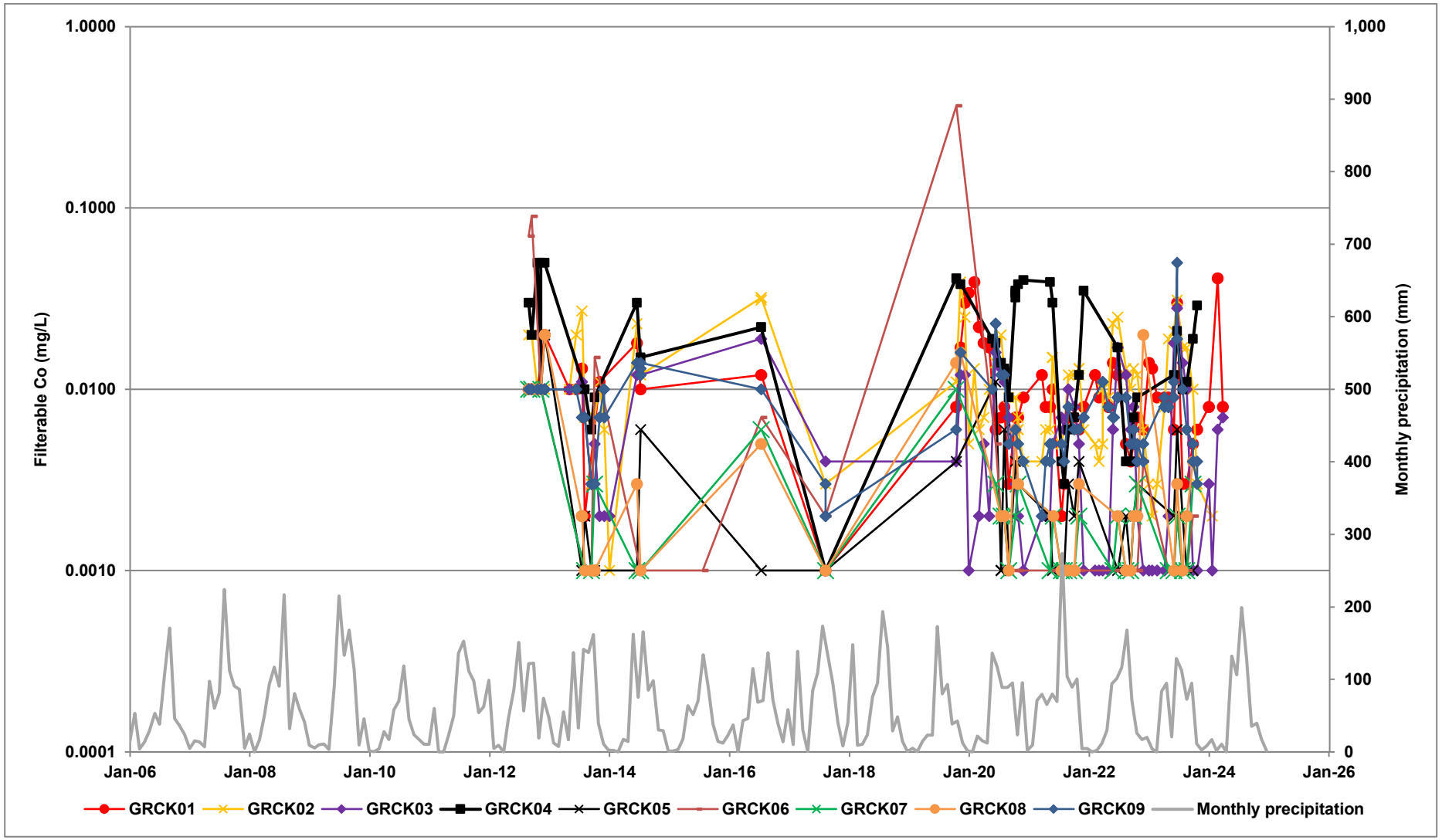
BIG DOG HYDROGEOLOGY

Na trends in regional groundwater

Figure C30

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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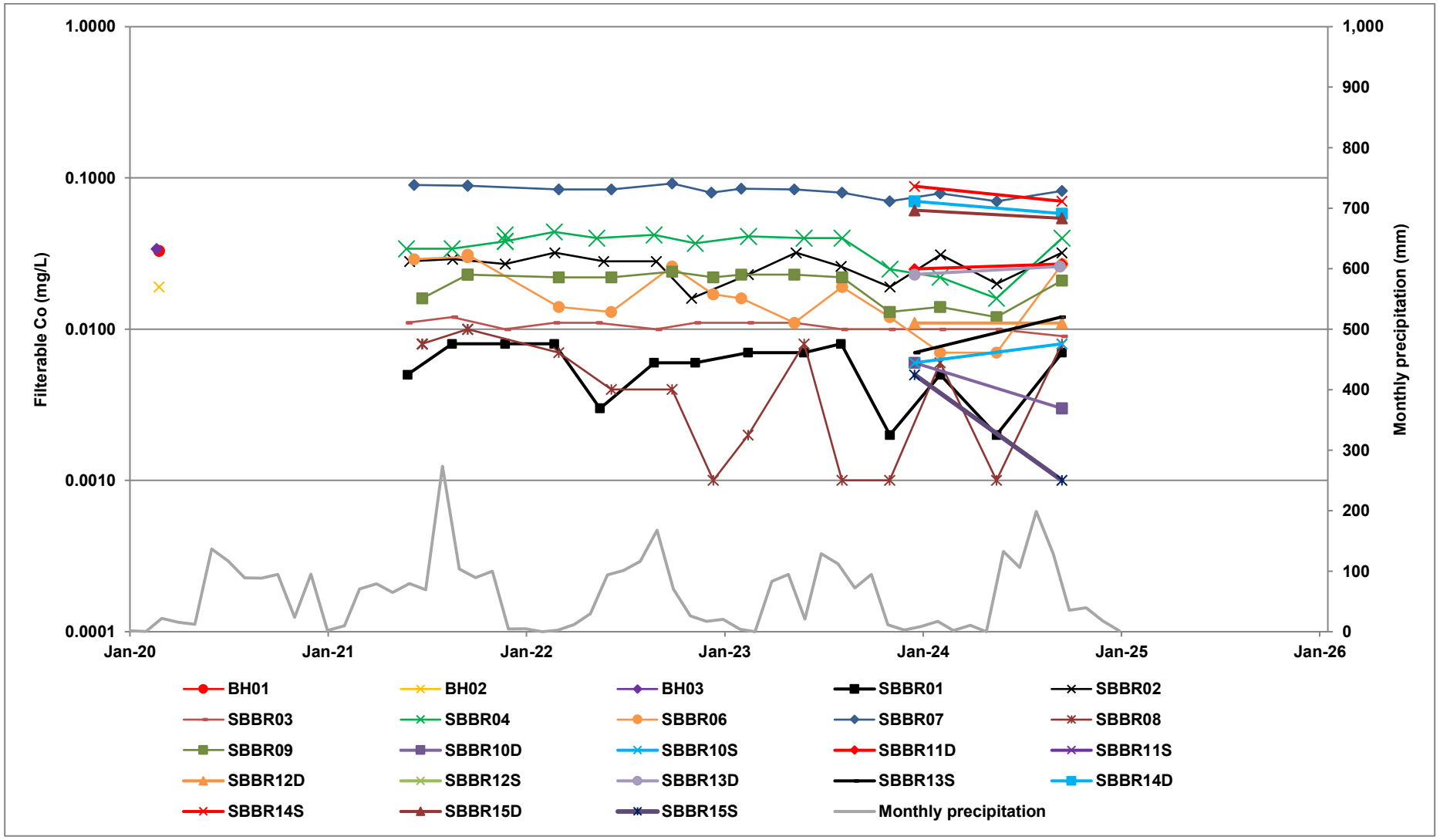
BIG DOG HYDROGEOLOGY

Filterable Co trends in Gringer Creek surface water

Figure C31

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

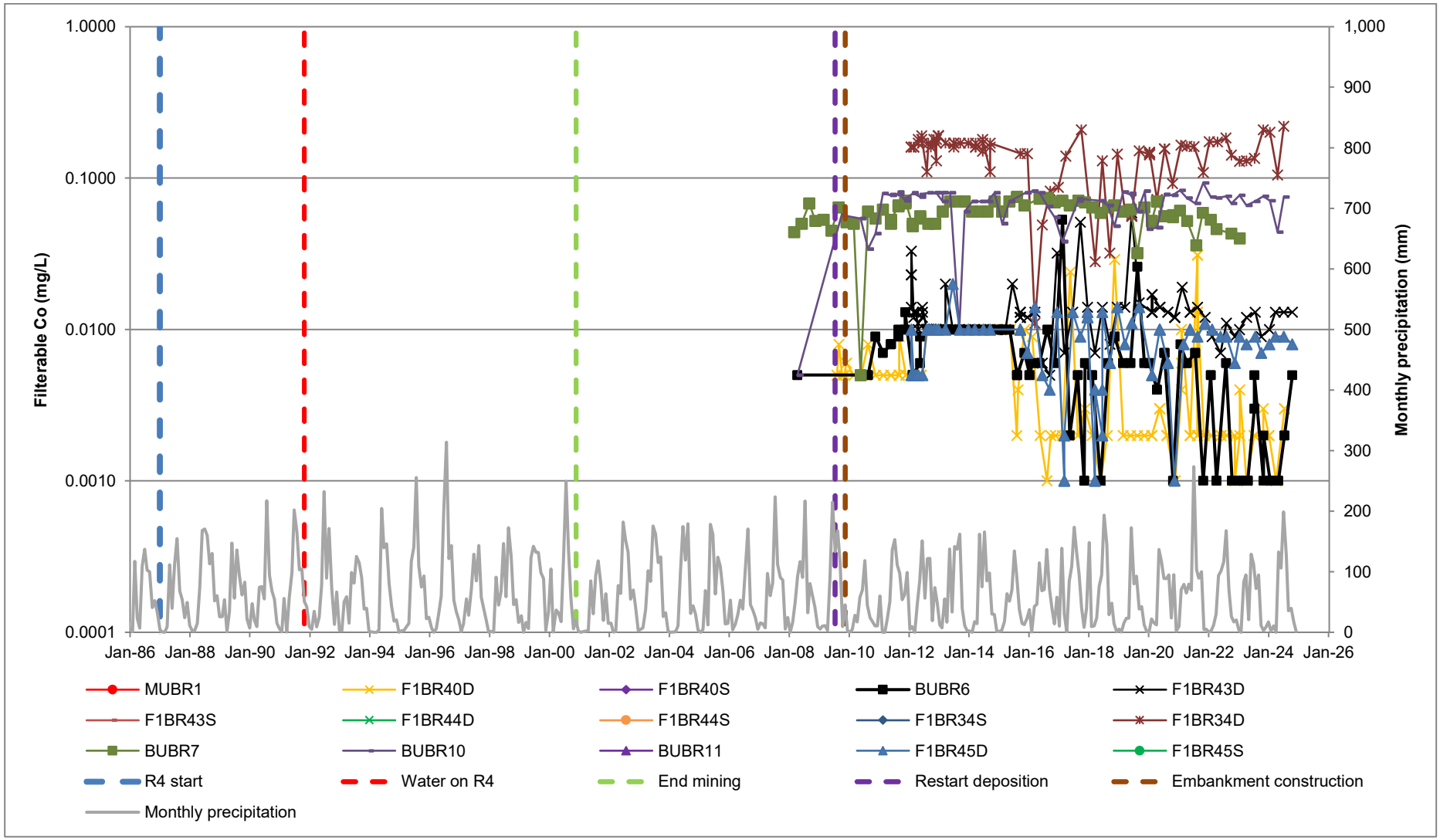
BIG DOG HYDROGEOLOGY Pty Ltd

Filterable Co trends in Gringer Creek groundwater

Figure C32

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

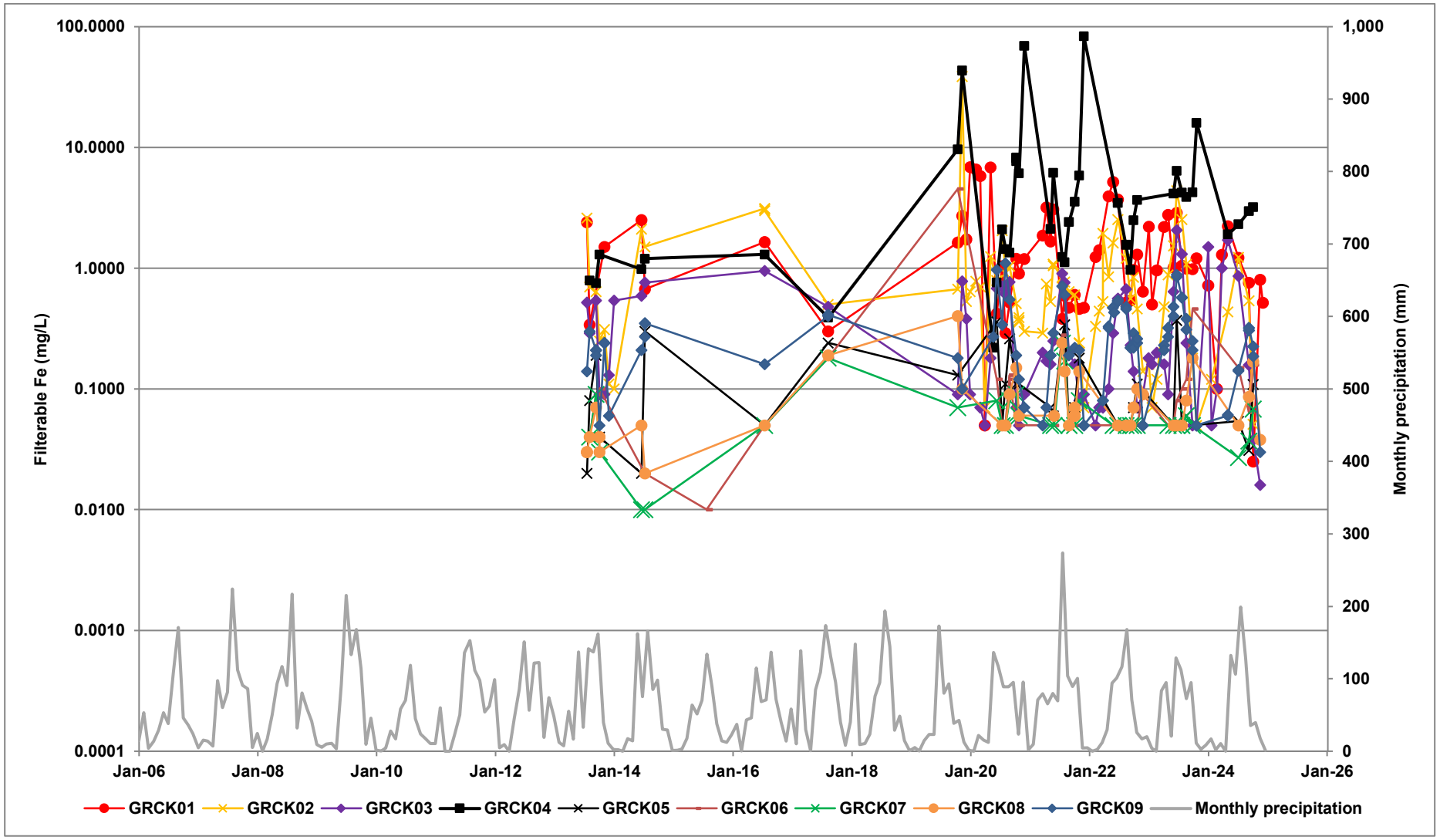
BIG DOG HYDROGEOLOGY Pty Ltd

Filterable Co trends in regional groundwater

Figure C33

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

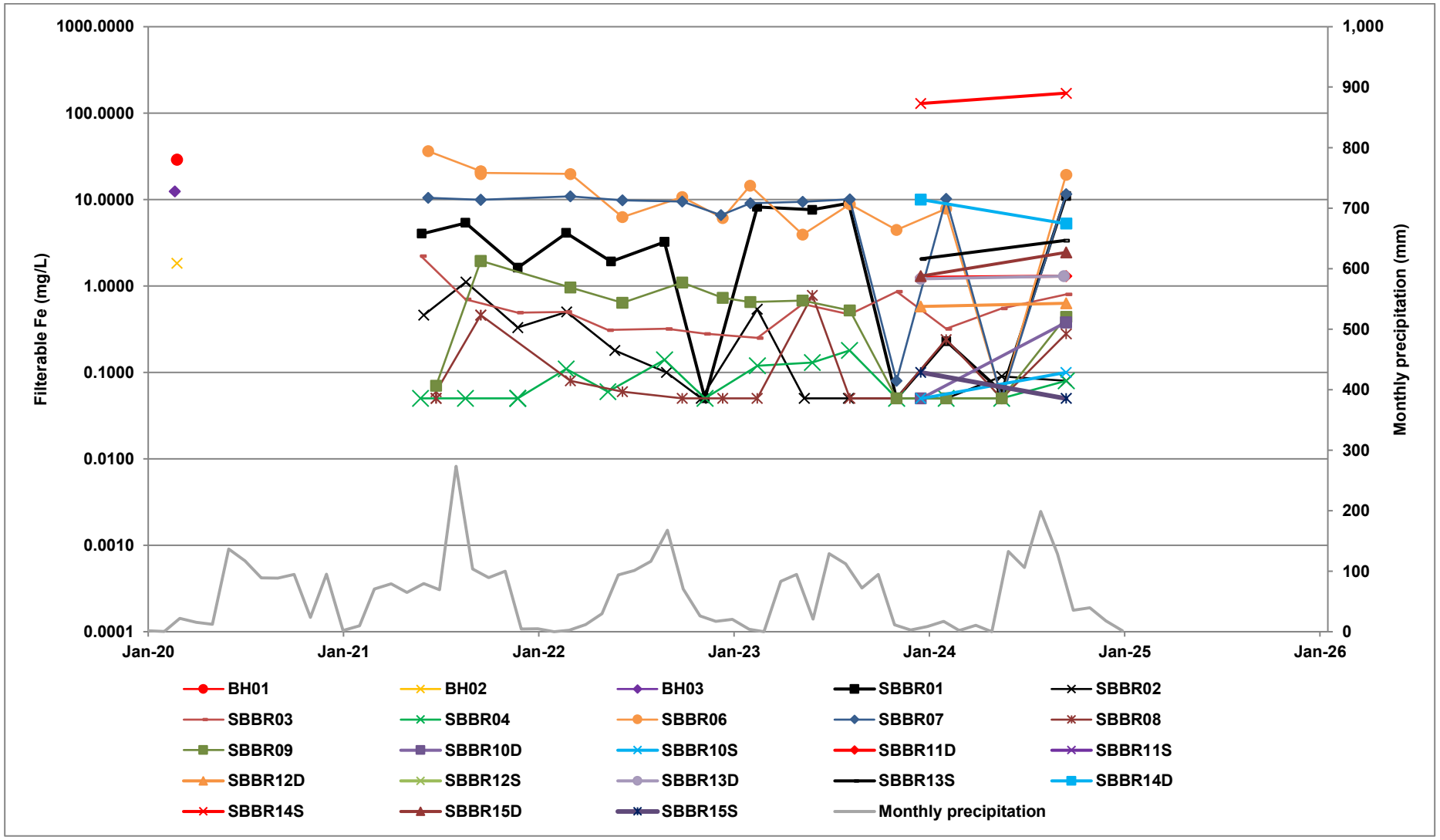
BIG DOG HYDROGEOLOGY

Filterable Fe trends in Gringer Creek surface water

Figure C34

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

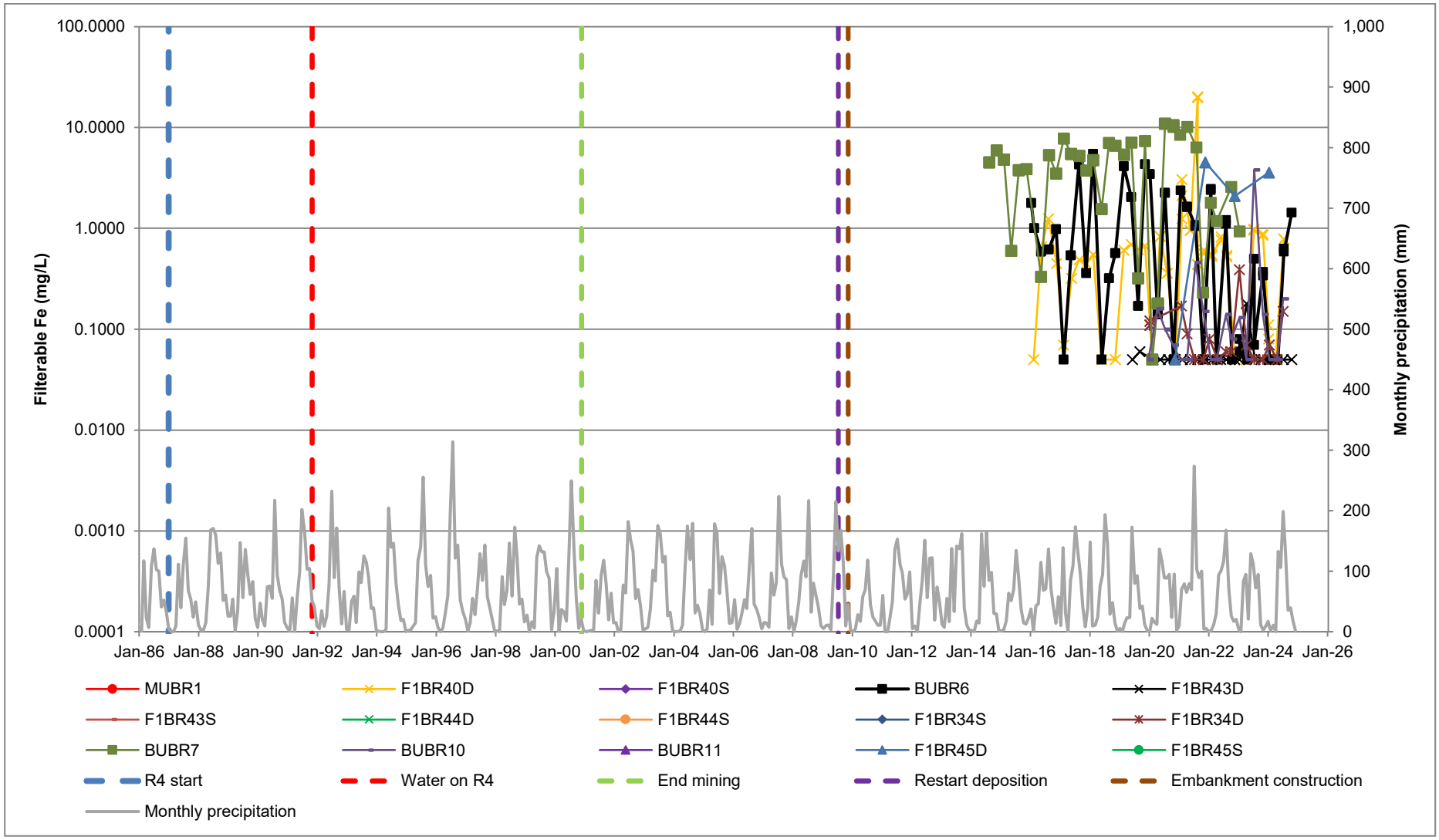
BIG DOG HYDROGEOLOGY Pty Ltd

Filterable Fe trends in Gringer Creek groundwater

Figure C35

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

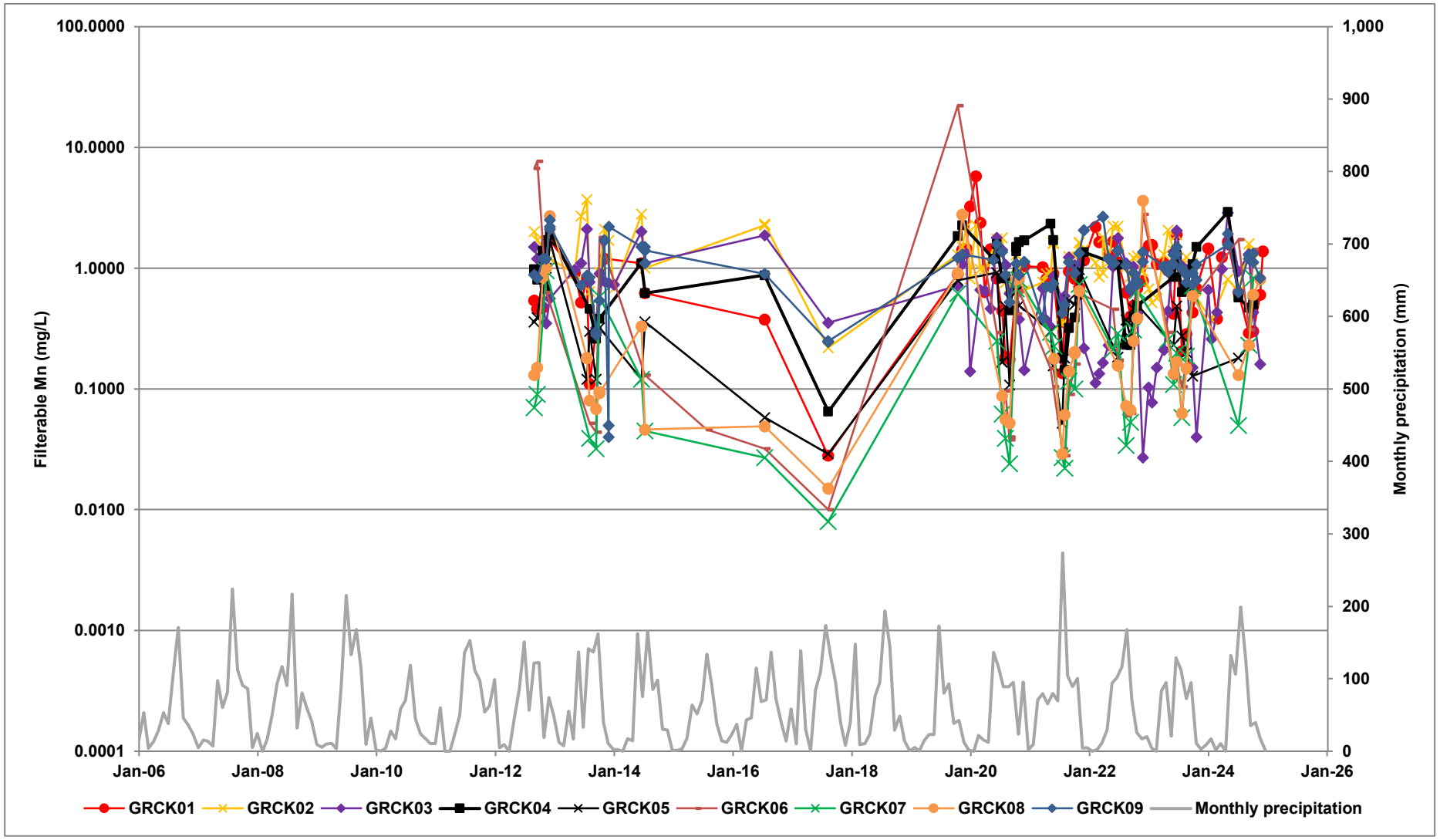
BIG DOG HYDROGEOLOGY Pty Ltd

Filterable Fe trends in regional groundwater

Figure C35

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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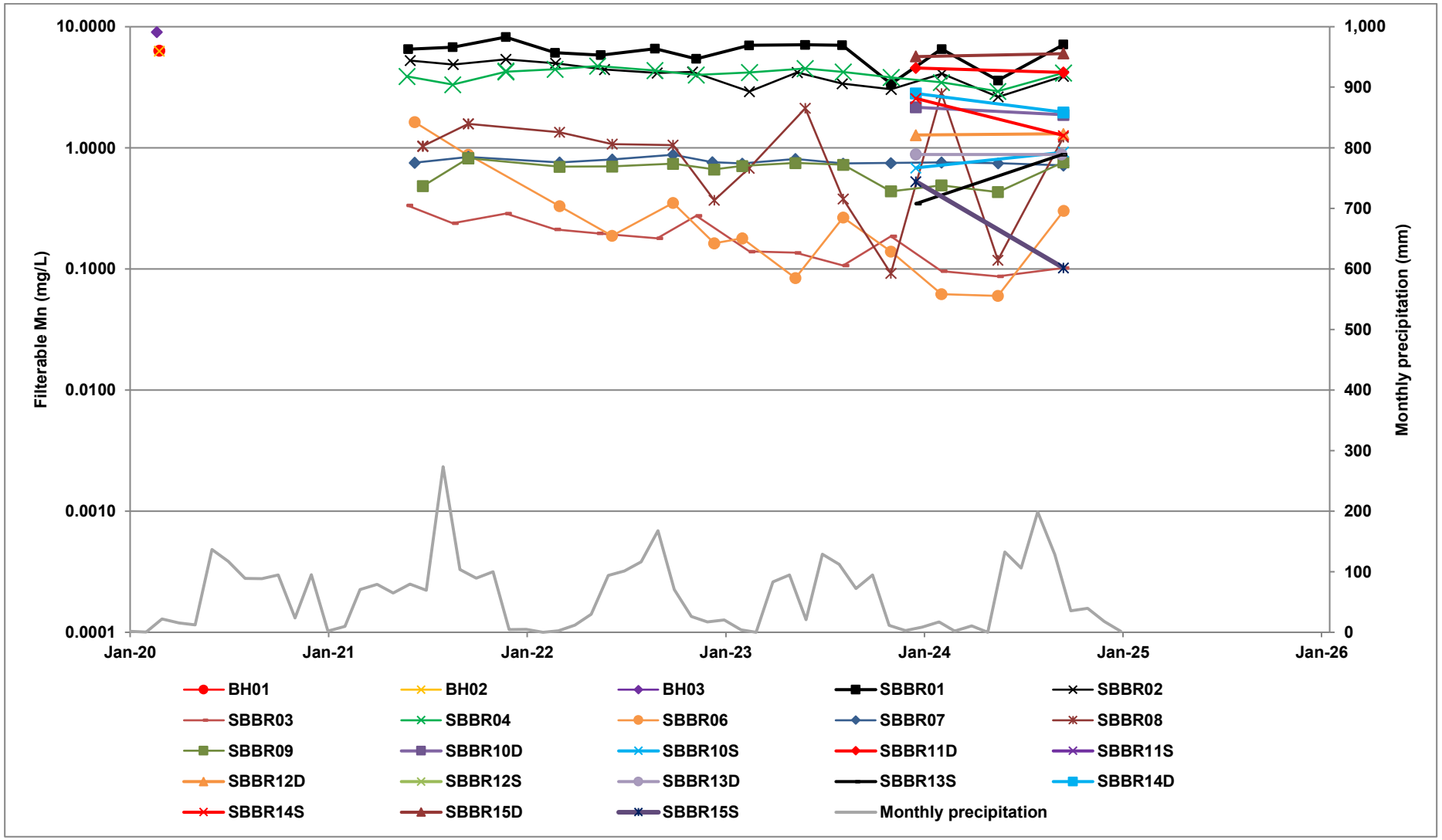
BIG DOG HYDROGEOLOGY Pty Ltd

Filterable Mn trends in Gringer Creek surface water

Figure C37

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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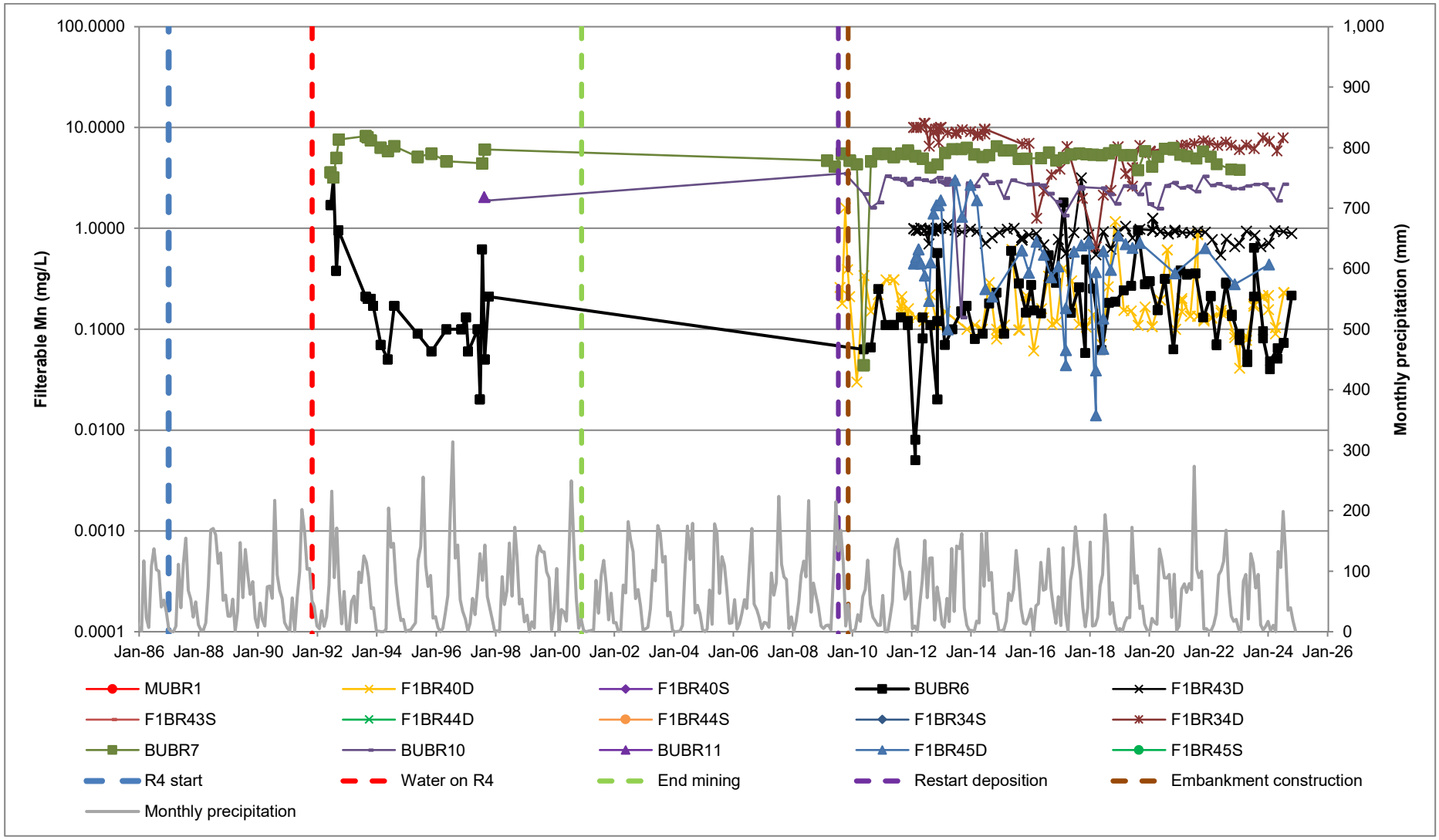
BIG DOG HYDROGEOLOGY Pty Ltd

Filterable Mn trends in Gringer Creek groundwater

Figure C38

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



D:\Documents\BDH Projects\Boddington\Boddington RDA2 baseline

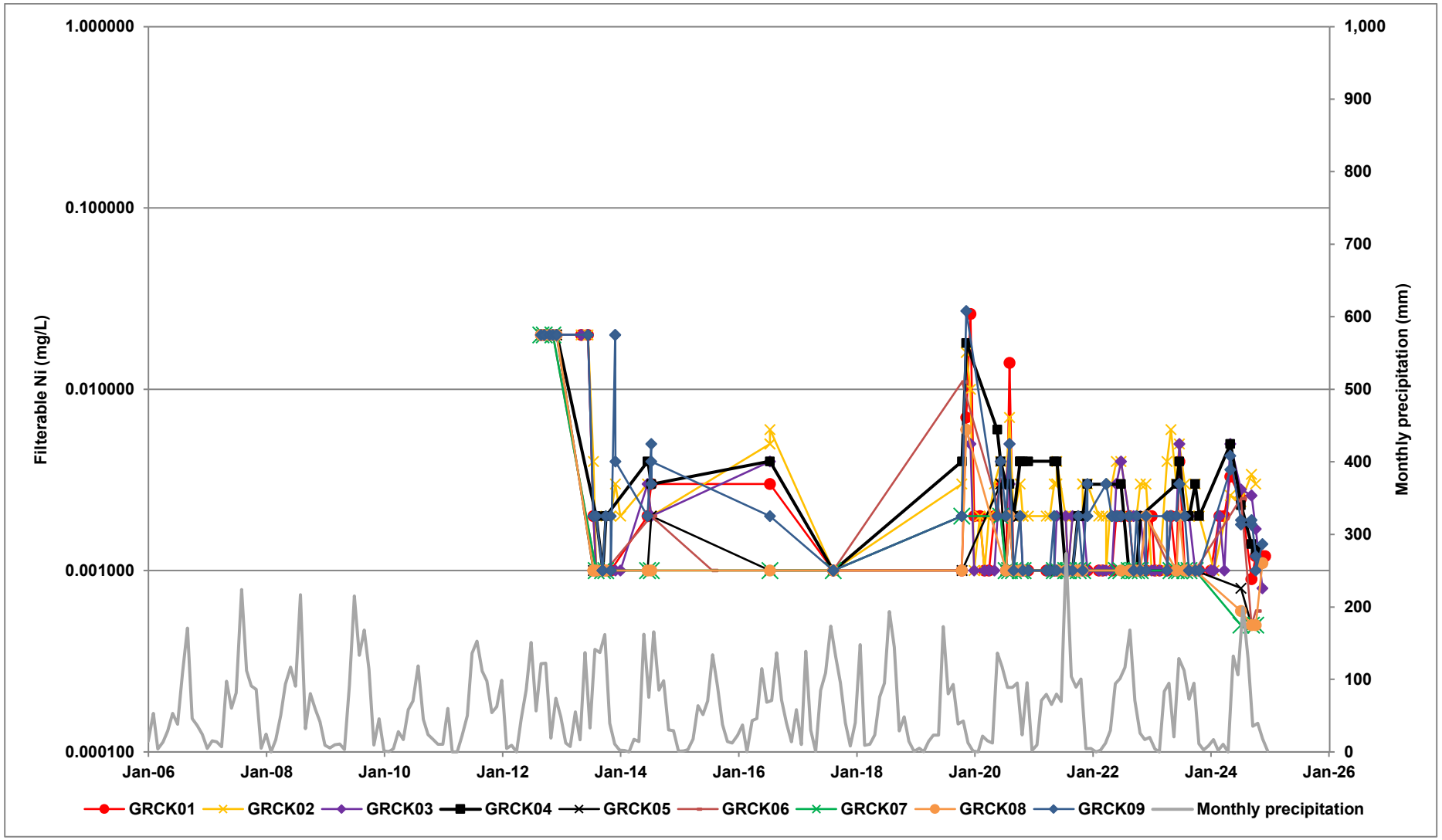
BIG DOG HYDROGEOLOGY

Filterable Mn trends in regional groundwater

Figure C39

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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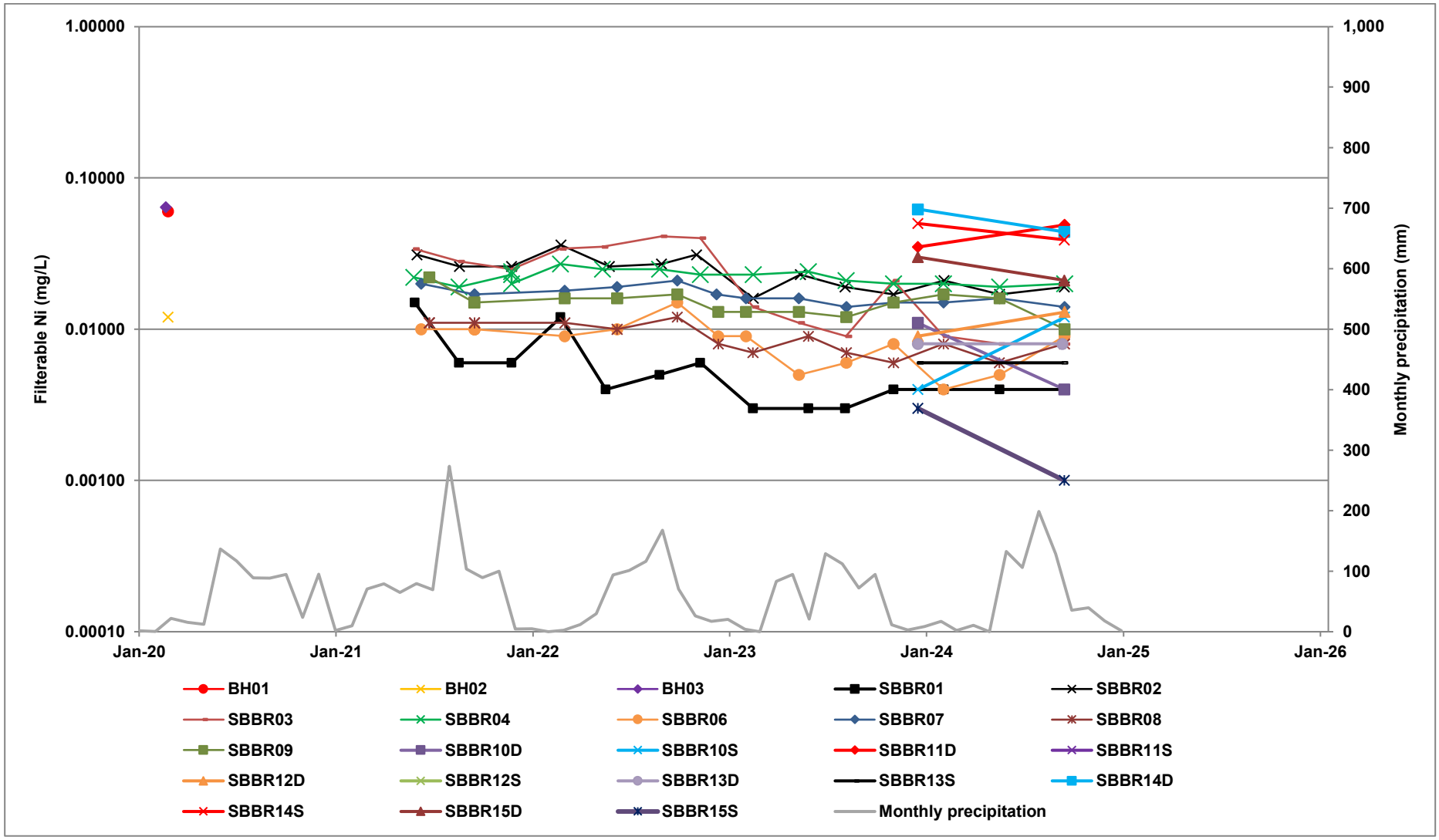
BIG DOG HYDROGEOLOGY

Filterable Ni trends in Gringer Creek surface water

Figure C40

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



BIG DOG HYDROGEOLOGY Pty Ltd

Filterable Ni trends in Gringer Creek groundwater

Figure C41

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2

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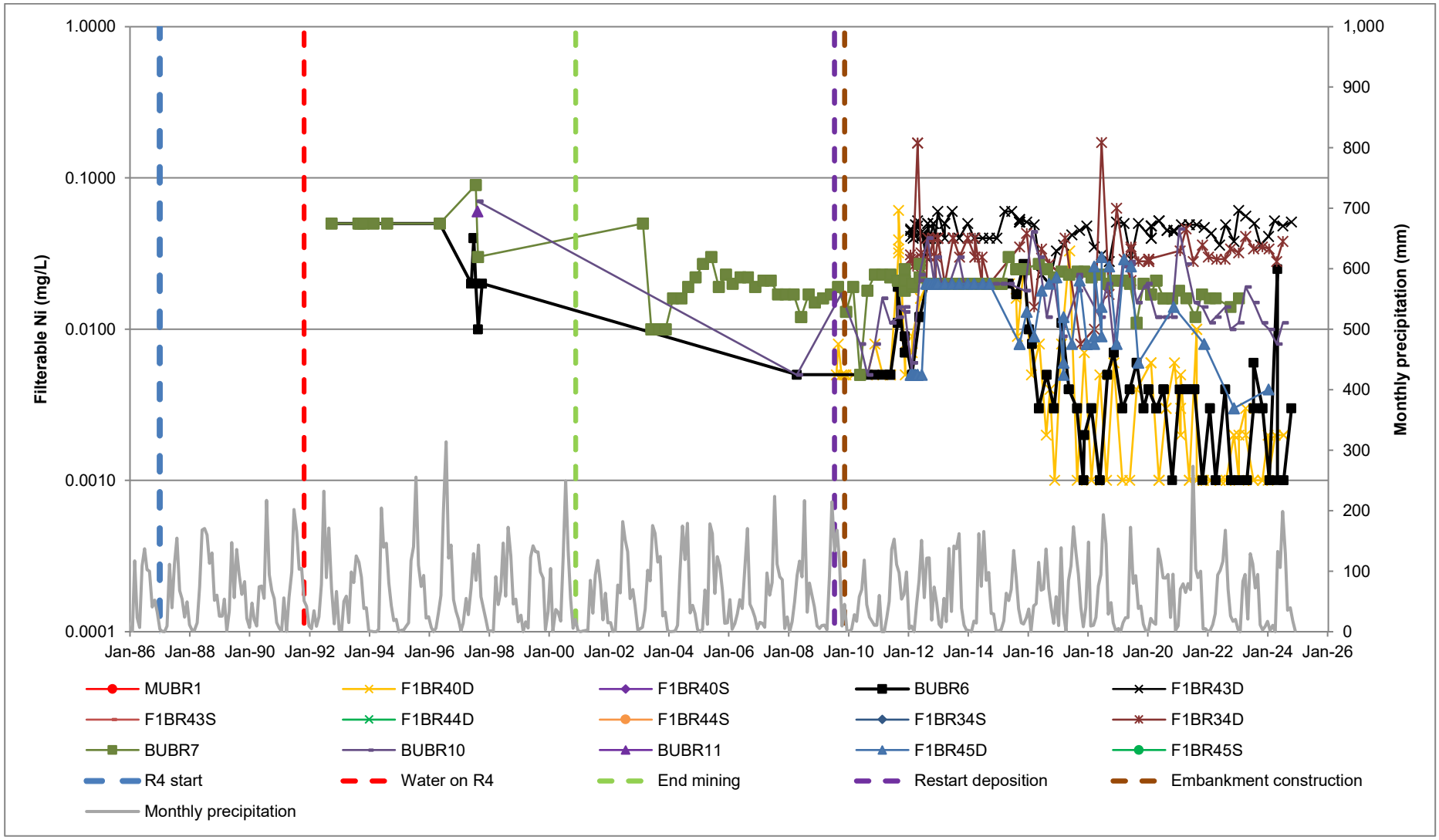

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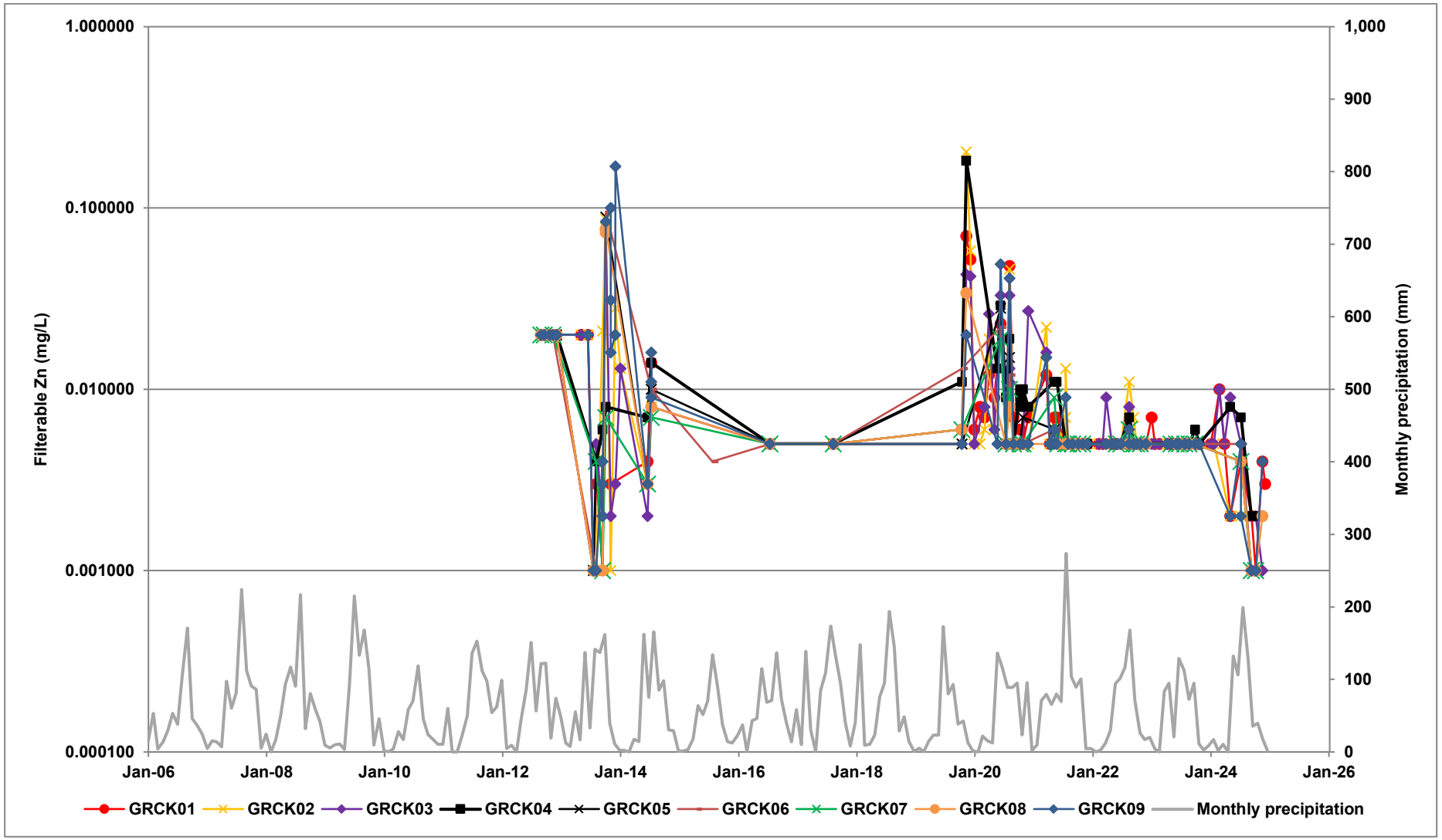
BIG DOG HYDROGEOLOGY

Filterable Ni trends in regional groundwater

Figure C42

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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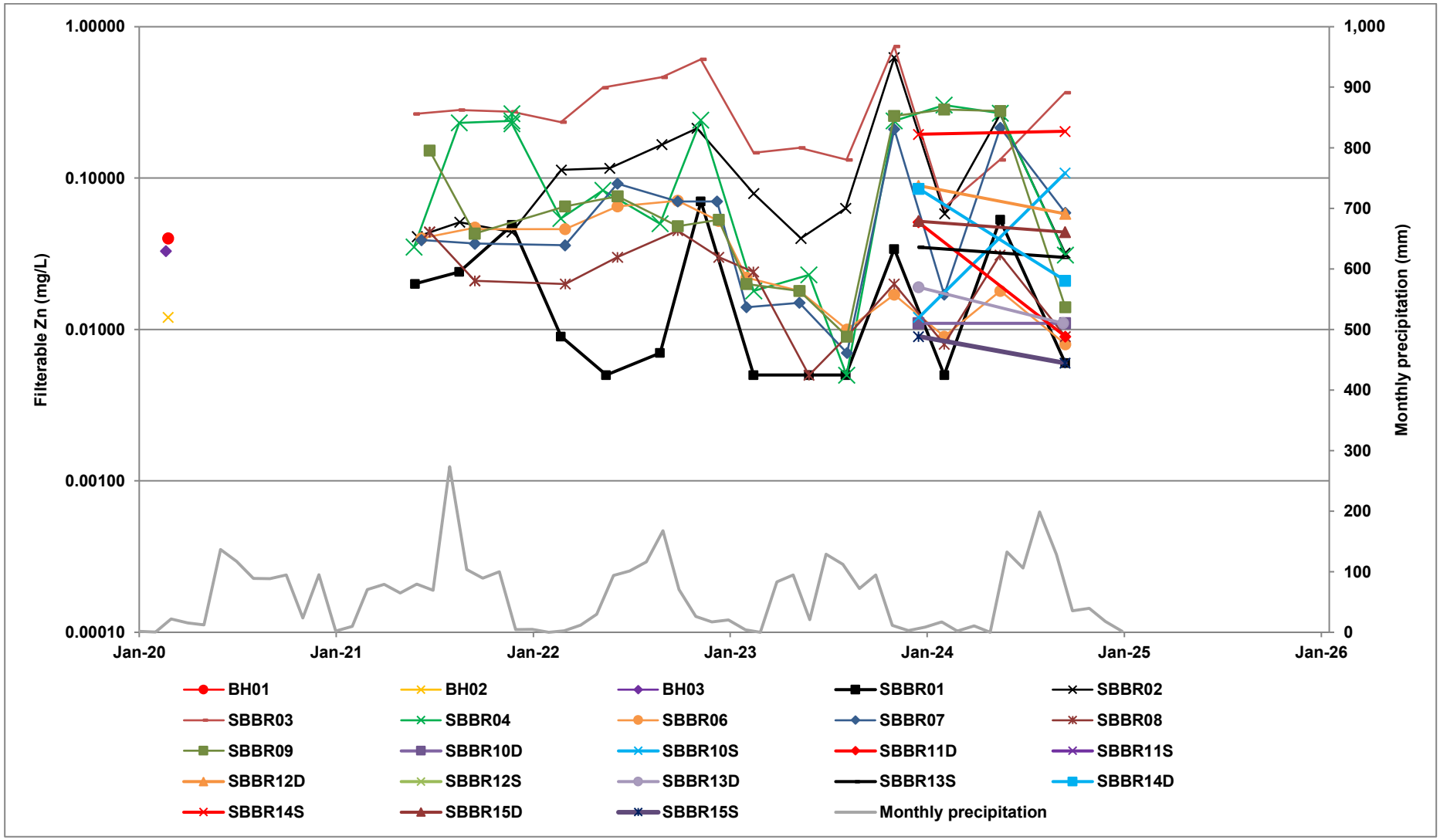
BIG DOG HYDROGEOLOGY

Filterable Zn trends in Gringer Creek surface water

Figure C43

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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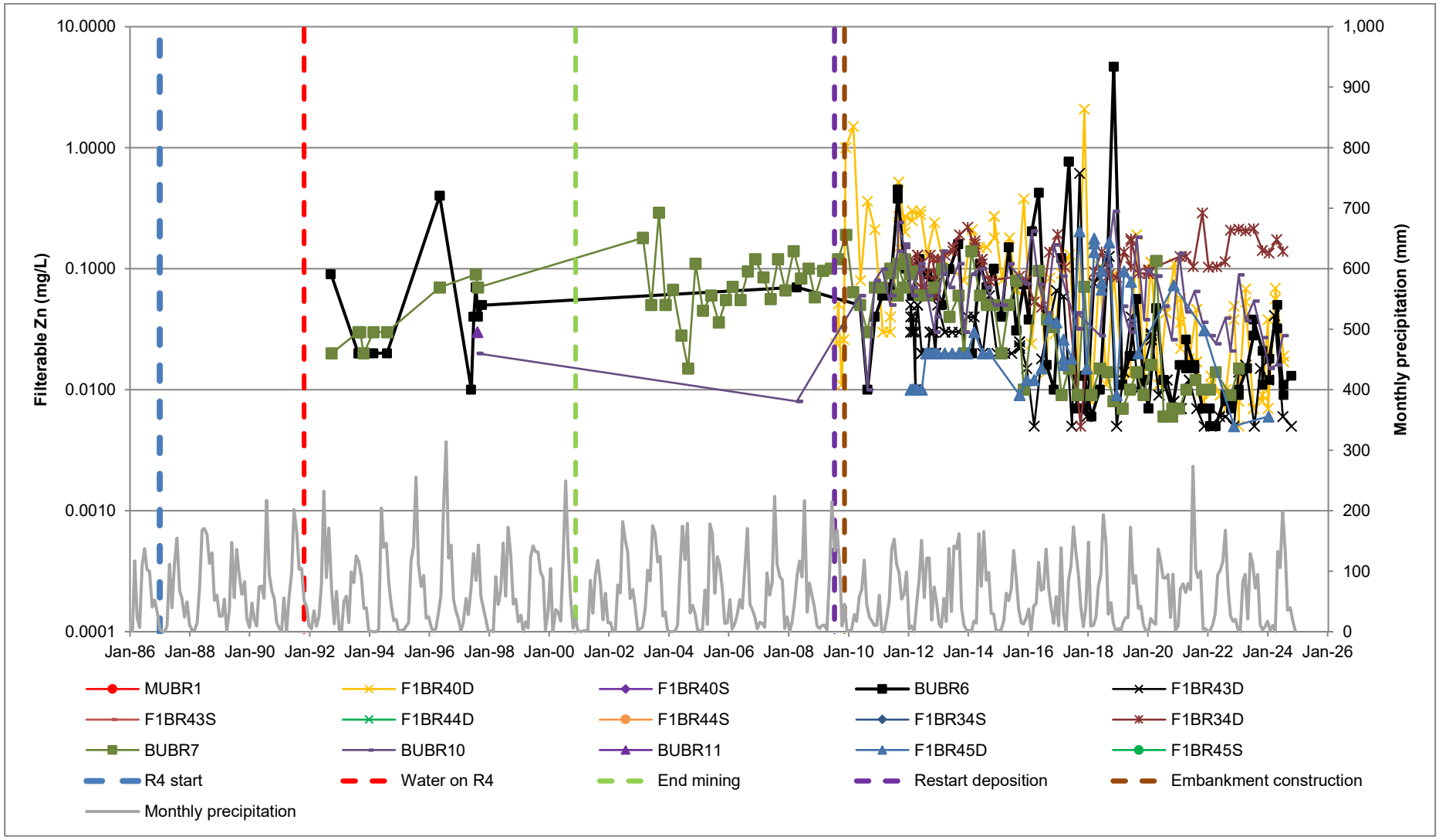
BIG DOG HYDROGEOLOGY Pty Ltd

Filterable Zn trends in Gringer Creek groundwater

Figure C44

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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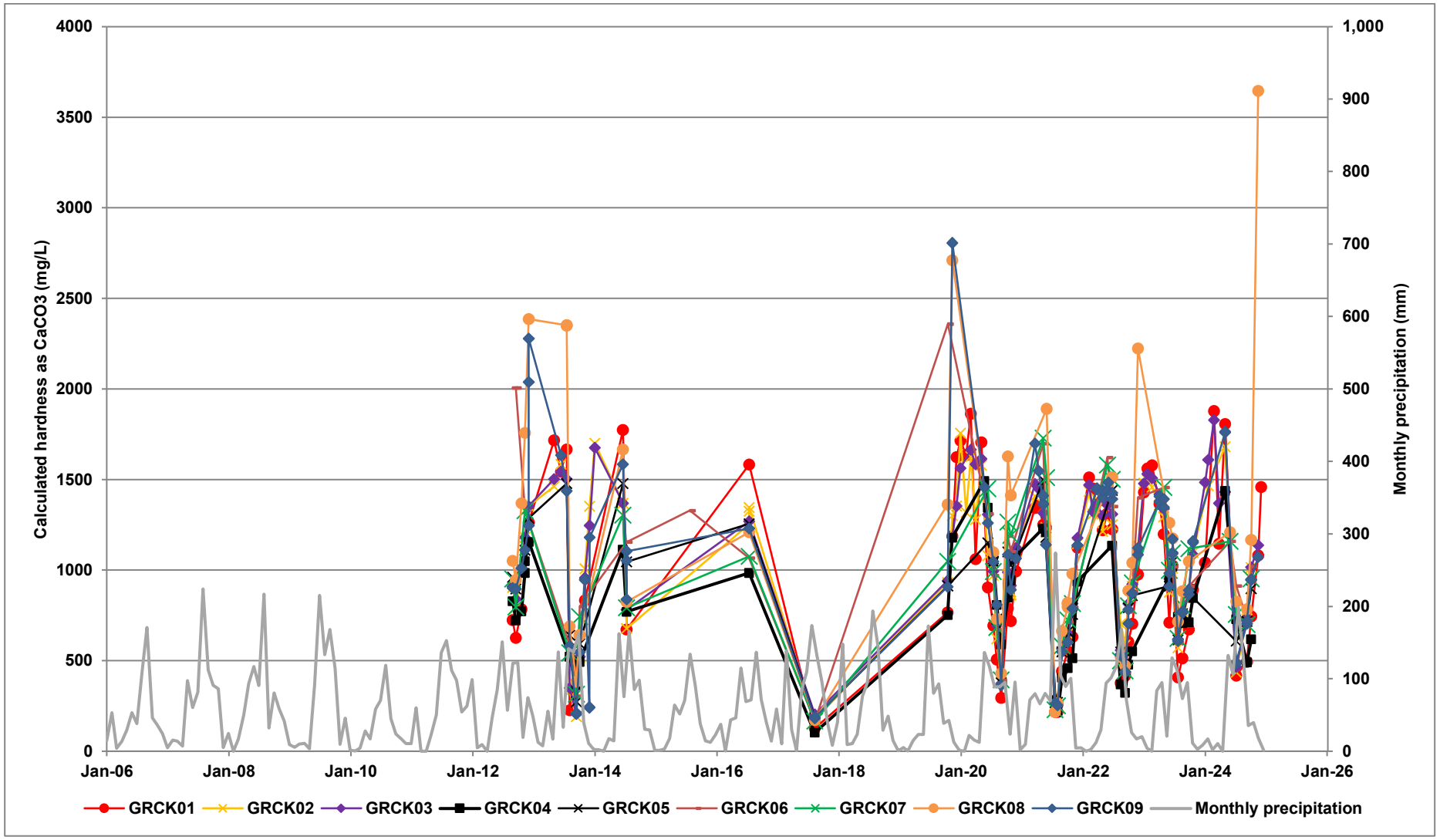
BIG DOG HYDROGEOLOGY Pty Ltd

Filterable Zn trends in regional groundwater

Figure C45

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



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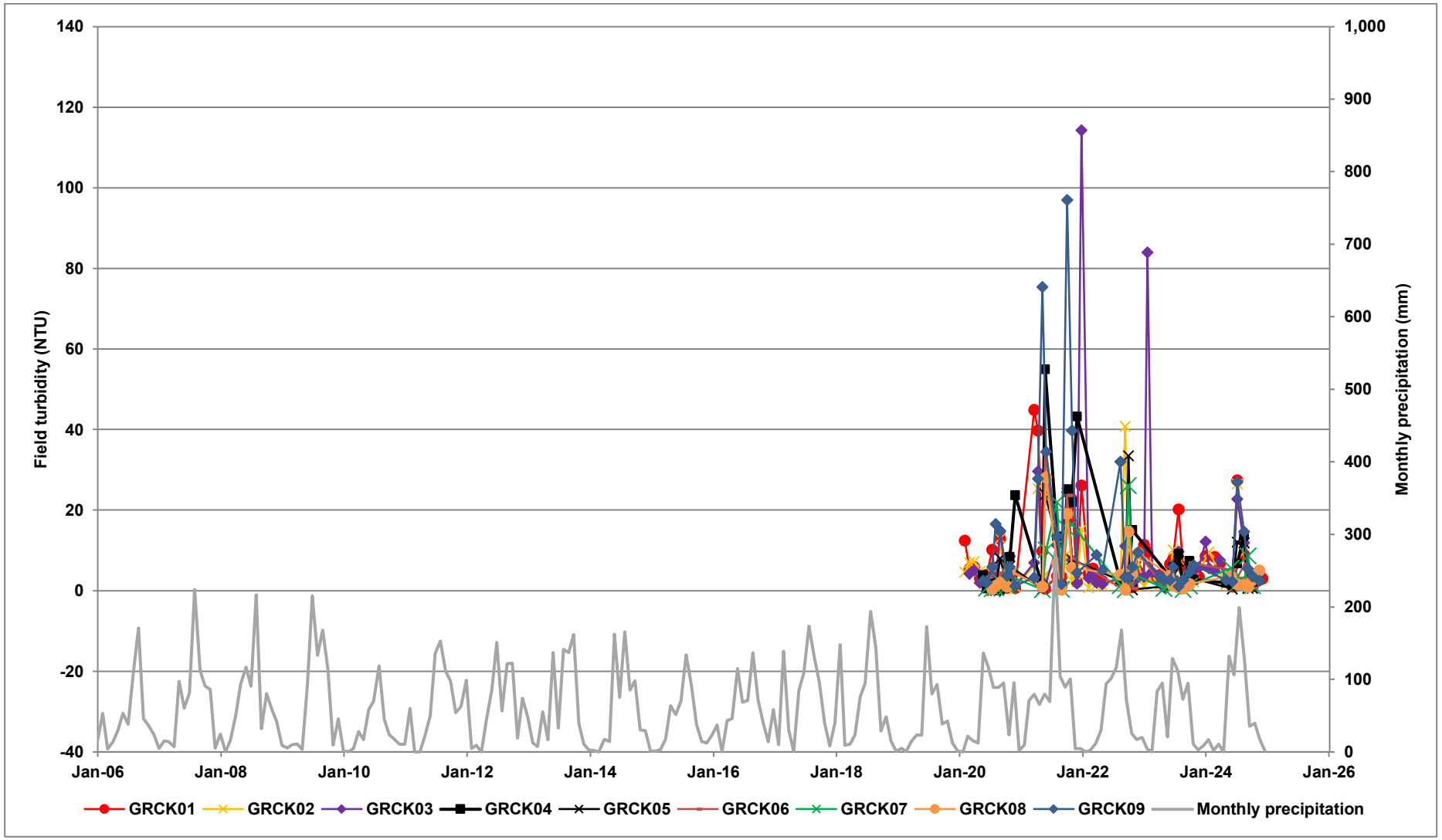
BIG DOG HYDROGEOLOGY Pty Ltd

Hardness trends in Gringer Creek surface water

Figure C46

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2



BIG DOG HYDROGEOLOGY

Field turbidity trends in Gringer Creek surface water

Figure C47

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2

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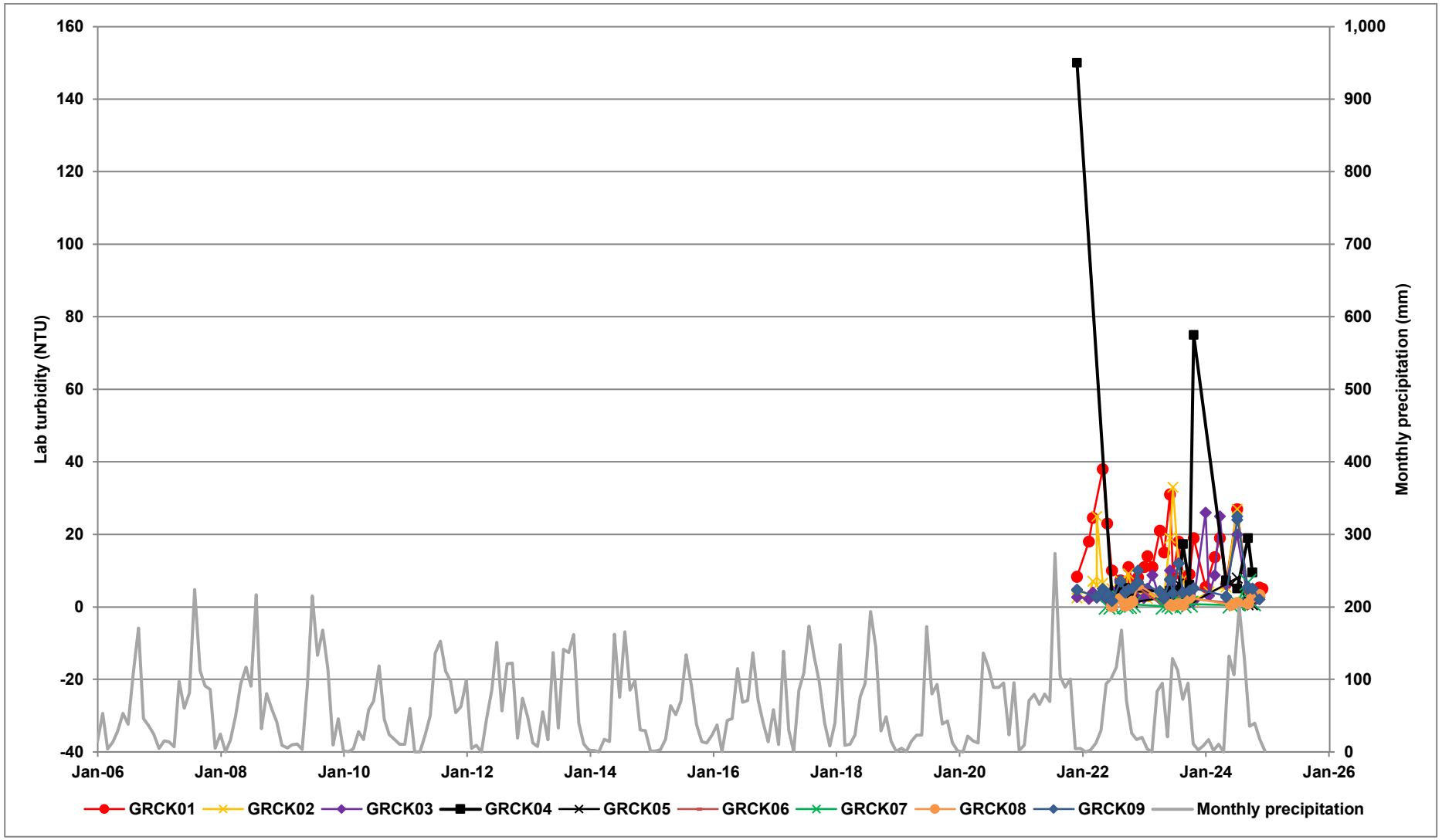

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BIG DOG HYDROGEOLOGY Pty Ltd

Laboratory turbidity trends in Gringer Creek surface water

Figure C48

Date: May 2025

Report: NBG Baseline Hydrological Assessment for RDA2