Appendix B

Groundwater Technical Modelling Details – Coronation Mining Area

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B-1 Introduction

This Appendix outlines the groundwater modelling undertaken for the Coronation Area for the Macraes Phase 4 Fast Track Approvals project. An overview of the site location and project description is provided in Sections 1 and 2, respectively, of the "Macraes Phase 4 FTA – Surface and Groundwater Assessment" report, of which this Appendix forms Appendix B. The limitations and assumptions set out in Section 1 of the "Surface and Groundwater Assessment" report also apply to this Appendix.

B-2 Conceptual Groundwater Flow Model

The Coronation pit is located on the ridgeline that divides the Deepdell Creek and Mare Burn surface water catchments (Figure B-2.2). Given its elevation the Coronation pit is interpreted to also coincide with the groundwater catchment divide which follows the surface water catchment divide shown in Figure B-2.2. The conceptual understanding of the groundwater system in the vicinity of the Coronation and Coronation North pits is as follows:

– Recharge of the groundwater system via rainfall infiltration through fractures within the schist bedrock and within the basalt identified on site on the western wall of the Coronation North Pit (MacKenzie et al. 2021 GNS GM9, 2021).

– Groundwater flow is generally topographically driven, with discharge via seeps and/or springs in topographic lows (streams and depressions).

– Hydraulic conductivity of the schist is primarily influenced by the degree of weathering in the schist bedrock and lithostatic load, with variability (anisotropy) in vertical hydraulic conductivity due to rock mass fracturing by structural features such as foliation-parallel fractures, faults and shear zones.

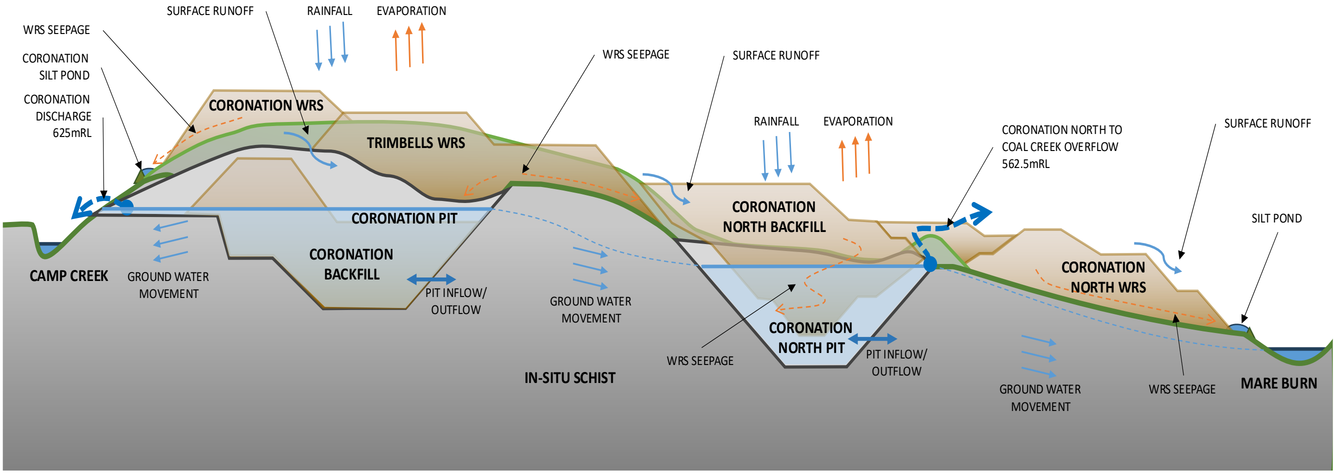


Figure B-2.1 Coronation area conceptual site model

Based on the current hydrogeological understanding of the project area the groundwater flow direction for the Coronation area is presented in Figure B-2.2 and Figure B-2.3.

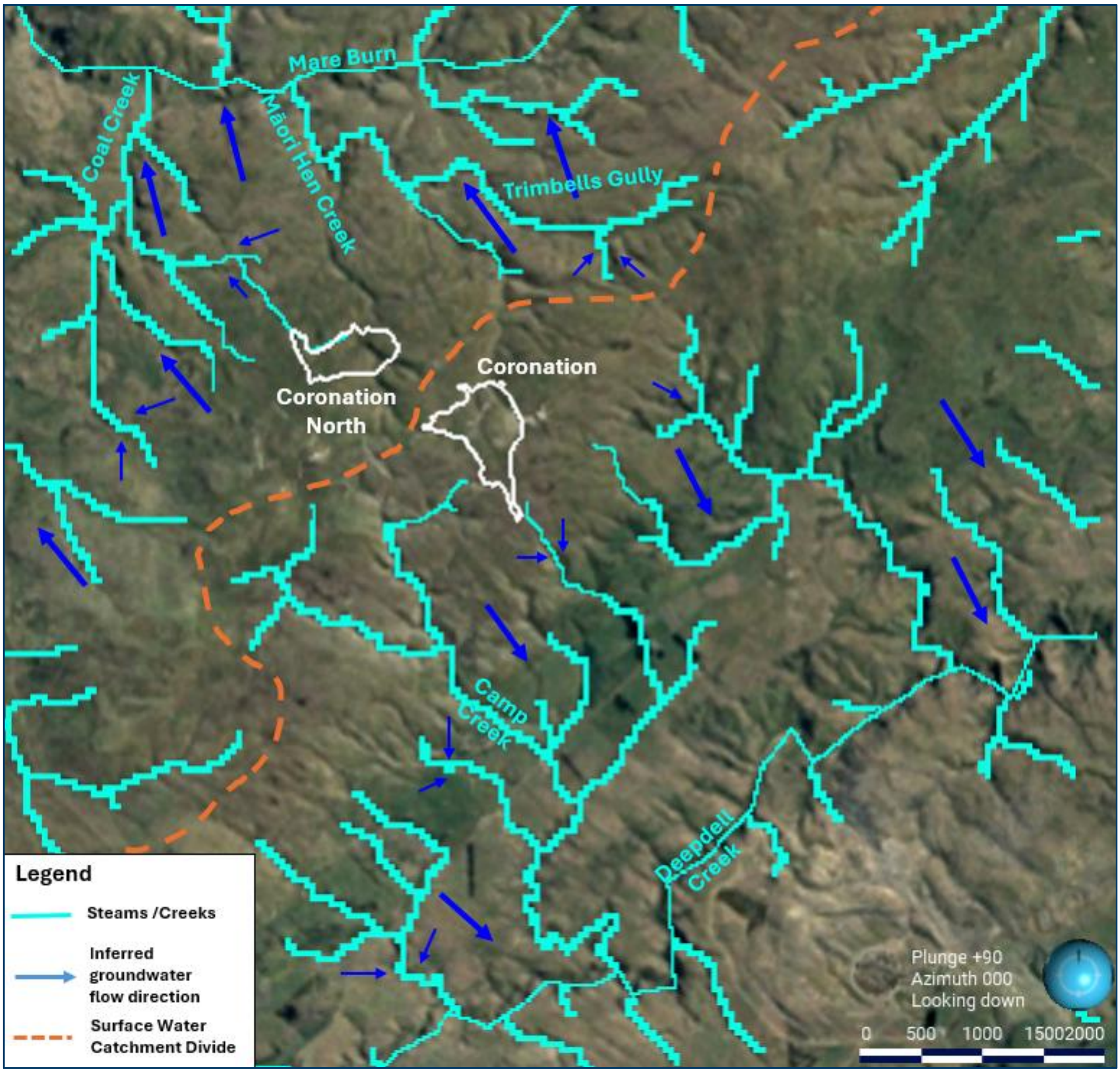


Figure B-2.2 Inferred groundwater flow direction pre mining

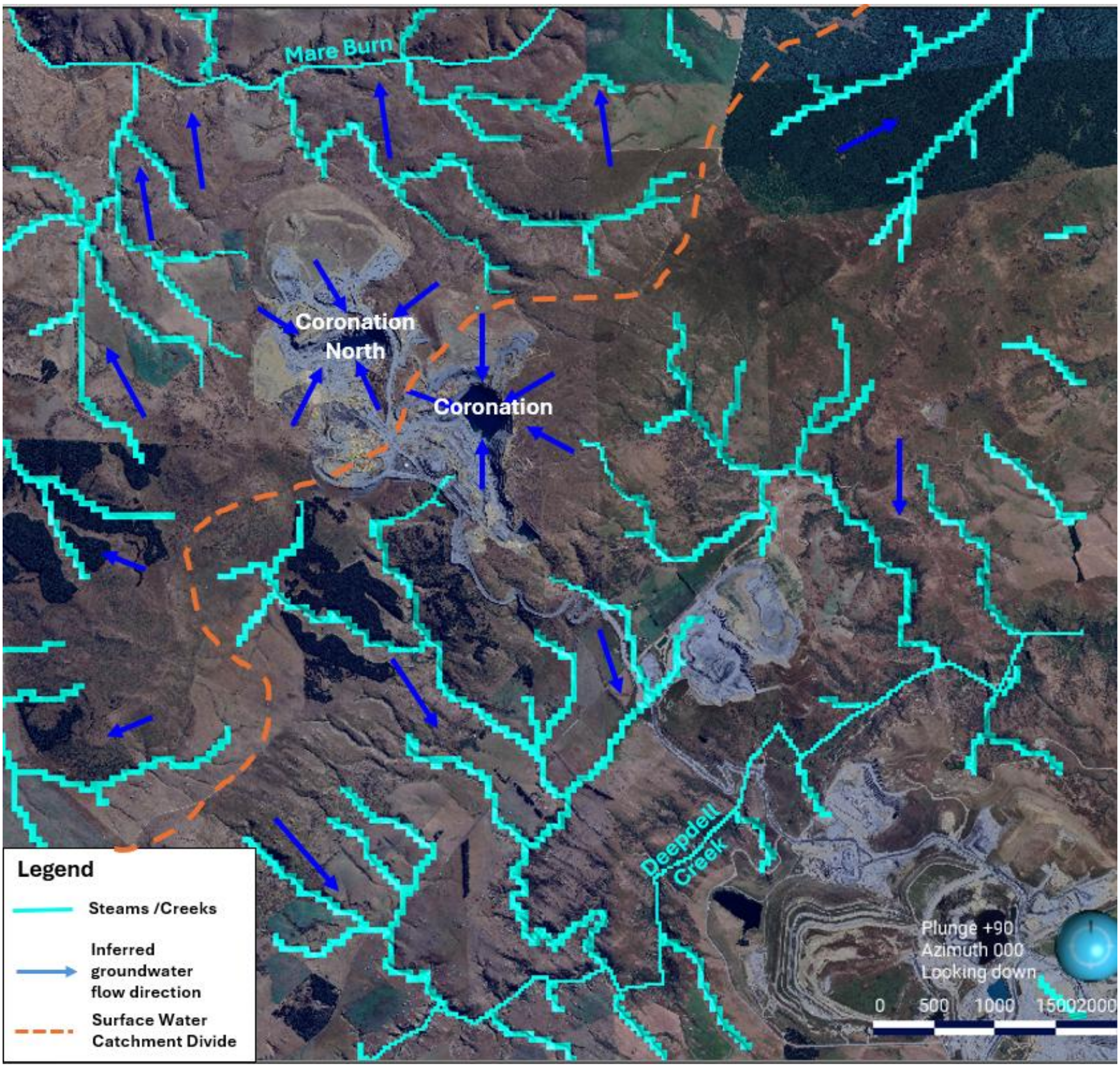


Figure B-2.3 ***Inferred groundwater flow direction existing and proposed mining conditions***

B-3 Groundwater Model Objectives and Setup

In this assessment a 3D numerical groundwater flow model of the Coronation and Coronation North pit area has been setup using MODFLOW-USG (flow modelling code). The objectives of the modelling are to:

- Estimate pit inflow for the existing pit and proposed pit expansions
- Simulate groundwater recovery after the conclusion of the proposed expansion
- Undertake solute transport modelling assess existing conditions, proposed mining conditions and post-mining groundwater recovery

The model domain is 9 km by 9 km in east-west and north-south direction with the proposed pit at the centre of the model domain. The model has been setup in NZTM grid system.

Grid size has been refined to 25 m near the proposed pits and two creeks (Deepdell and Mare Burn); outside of that, a 50 m grid size has been adopted. Vertically, 8 model layers have been setup with the uppermost layer being mostly 30 m thick followed by 50 m thick layers 2 to 8, which has resulted in a total of 358,192 model cells. This provides enough grid resolution for pit-dewatering, recovery, and contaminant transport modelling.

The extent of the Coronation Area model domain is presented in Figure B-3.1 and grid design is presented in Figure B-3.2.

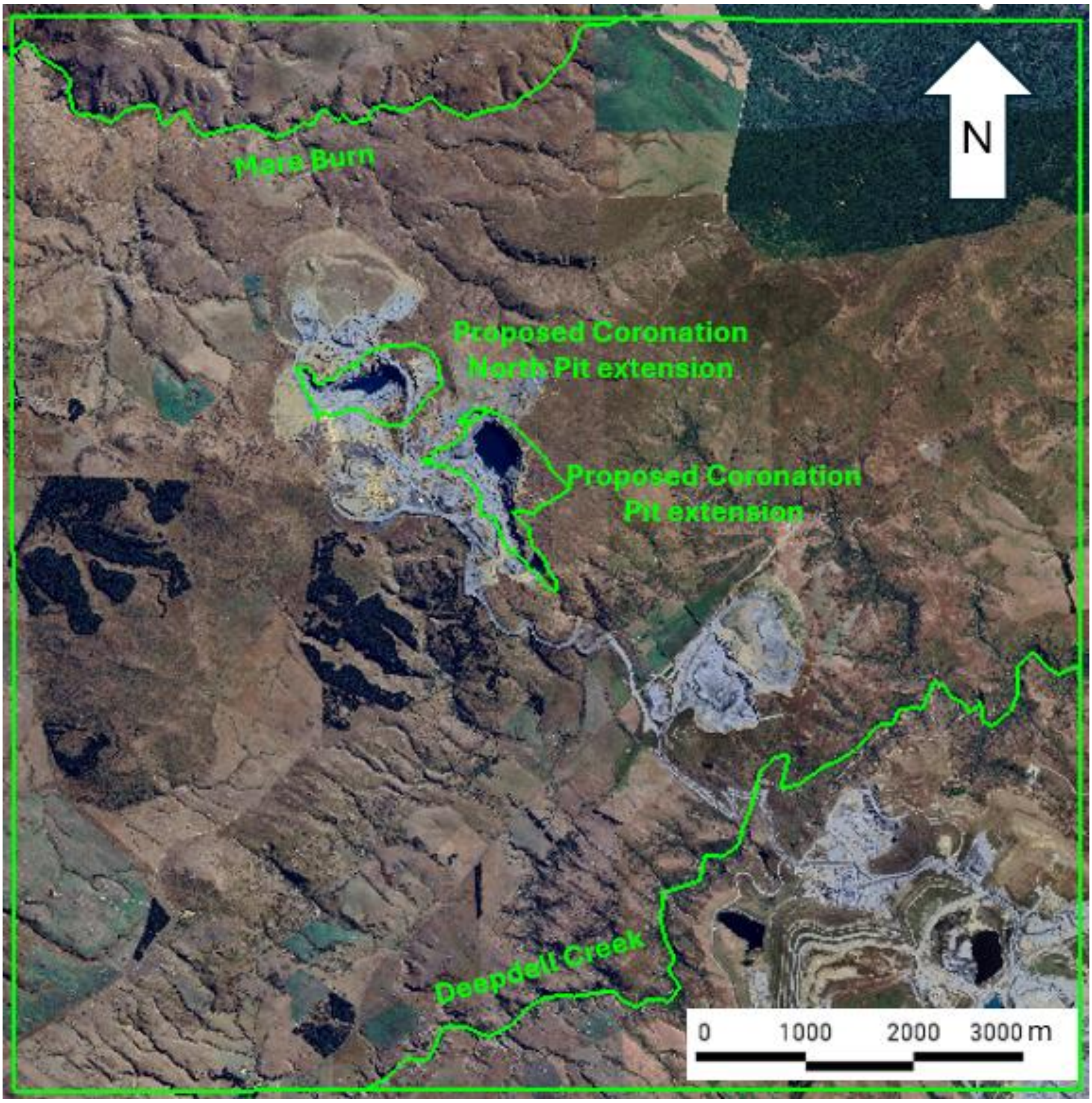


Figure B-3.1 Coronation Area model domain

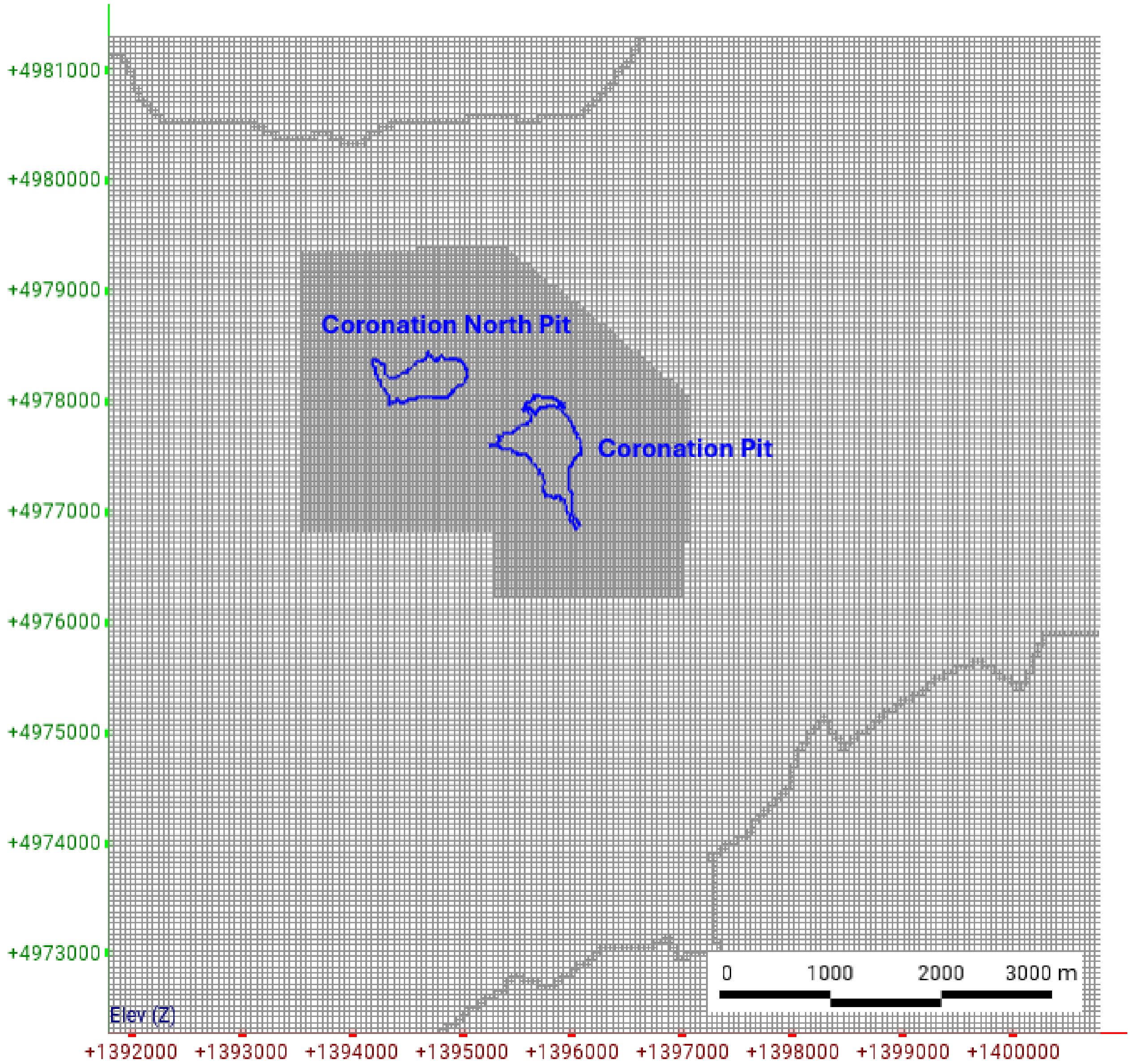


Figure B-3.2 Coronation area model grid design

B-3.1 Boundary Conditions

The following boundary conditions have been applied in the model:

- **River Boundary:** The Deepdell Creek and Mare Burn have been modelled using the MODFLOW River (RIV) package (Figure B-3.3). Riverbed conductance applied was 5 m^2/d/m with river stage applied at the topographic level, river bottom elevation was applied 0.5 m below the river stage level.
- **Drain Boundaries:** The MODFLOW drain (DRN) package (Figure B-3.3) has been used to simulate:
  - Dewatering of the pits, with drain bottom elevation corresponding to the base of the mining
  - Small creeks and tributaries boundaries have also been modelled as drain boundary conditions with drain bottom elevation set at topographic level.
  - Seepage capture drains applied to the Coronation North WRS (recovery model only) have also been modelled as drain boundary with drain bottom elevation set at 0.5m below the topographic schist level.
- **Recharge boundary**: The MODFLOW Recharge (RCH) package was used to simulate diffuse rainfall recharge. Several reports (Kingett Mitchell, 2005a and b, Golder, 2011a and b, CDM Smith, 2016) have stated that the accepted recharge rate of the area is 32 mm/yr (equating to 5.3% of annual rainfall of 607 mm). In this assessment, the following recharge rates were applied:
  - 224 mm/year for the Coronation North WRS and 128 mm/year for the Coronation WRS and Trimbells WRS. These values apply to both existing conditions and dewatering scenarios and are based on site-specific measurements (as detailed in Appendix E).
  - 32 mm/year was applied to the proposed rehabilitated waste rock stacks for the recovery model runs, in line with OceanaGold's proposed WRS rehabilitation efforts.
  - 32 mm/year across the remainder of the model domain, consistent with previous studies.
  - 128 mm/year applied to the WRS for the recovery model run as a sensitivity analysis to assess the effect on the recharge rate applied to the WRS
- **No flow boundary:** Along the edges of the model domain (due to relatively low hydraulic conductivity of the material).
- **Constant Head Boundary:** Applied to the Coronation pit for the existing conditions simulation with a head value of 597 m RL (current water level in the pit). Similarly for the Coronation pit a constant head boundary with a head of 502 m RL has been applied to the existing conditions simulation.
- **General Head Boundary**: The MODFLOW General Head Boundary (GHB) package was used to simulate head-dependent flux boundaries and was applied to model the recovery of water level post-mining within the pit. The location of GHB applied is presented in Figure B-3.4. The head values for the GHB were derived from the surface water modelling results (refer to Appendix G for details) and are presented in Figure B-3.5 and Figure B-3.6. It assumes a nominal fill level of 562.5 m RL for the Coronation North Pit and 625 m RL for the Coronation Pit.

Climate change has not been explicitly included in the groundwater recovery simulations, and the groundwater predictions should be regarded as baseline-condition estimates subject to climate-related uncertainty. The projected shift toward wetter winters, drier summers and more episodic heavy-rainfall events may alter the temporal distribution of recharge. This implies that groundwater recharge may become more seasonally concentrated and episodic, rather than changing uniformly through time (WDC, 2023). Applying eastern Otago climatic drivers using the national methodology of Mourot *et al.* (2022) indicates that the mean rainfall-recharge response for Otago is relatively small; however, the direction and magnitude of change are uncertain, with projected changes spanning approximately ±0.4 mm/day. Therefore, although there may be some potential implications for seasonal groundwater levels and groundwater contributions to streams these effects are expected to be most relevant to the timing and variability of groundwater discharge, rather than to the overall direction of groundwater flow or the broad spatial extent of modelled plumes. Considering the low-permeability nature of the Macraes schist groundwater system and the relatively small but uncertain mean recharge response indicated by regional climate-recharge assessments, the groundwater-related results remain suitable for assessing long-term groundwater recovery and plume behaviour, provided they are interpreted with recognition that future recharge may become more episodic and seasonally variable than represented in the model.

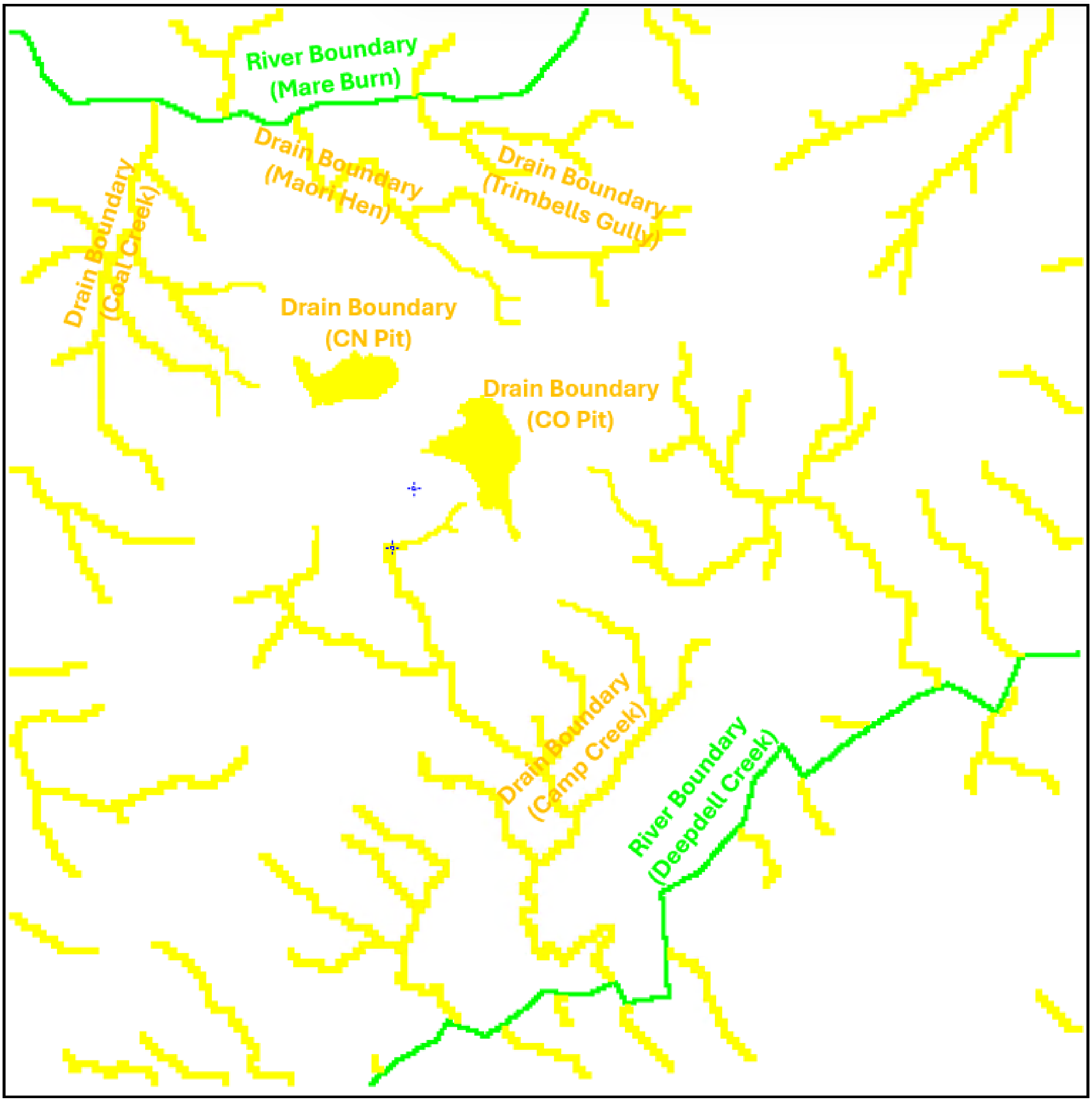


Figure B-3.3 Coronation area model surface boundary conditions (applied to the dewatering conditions model).

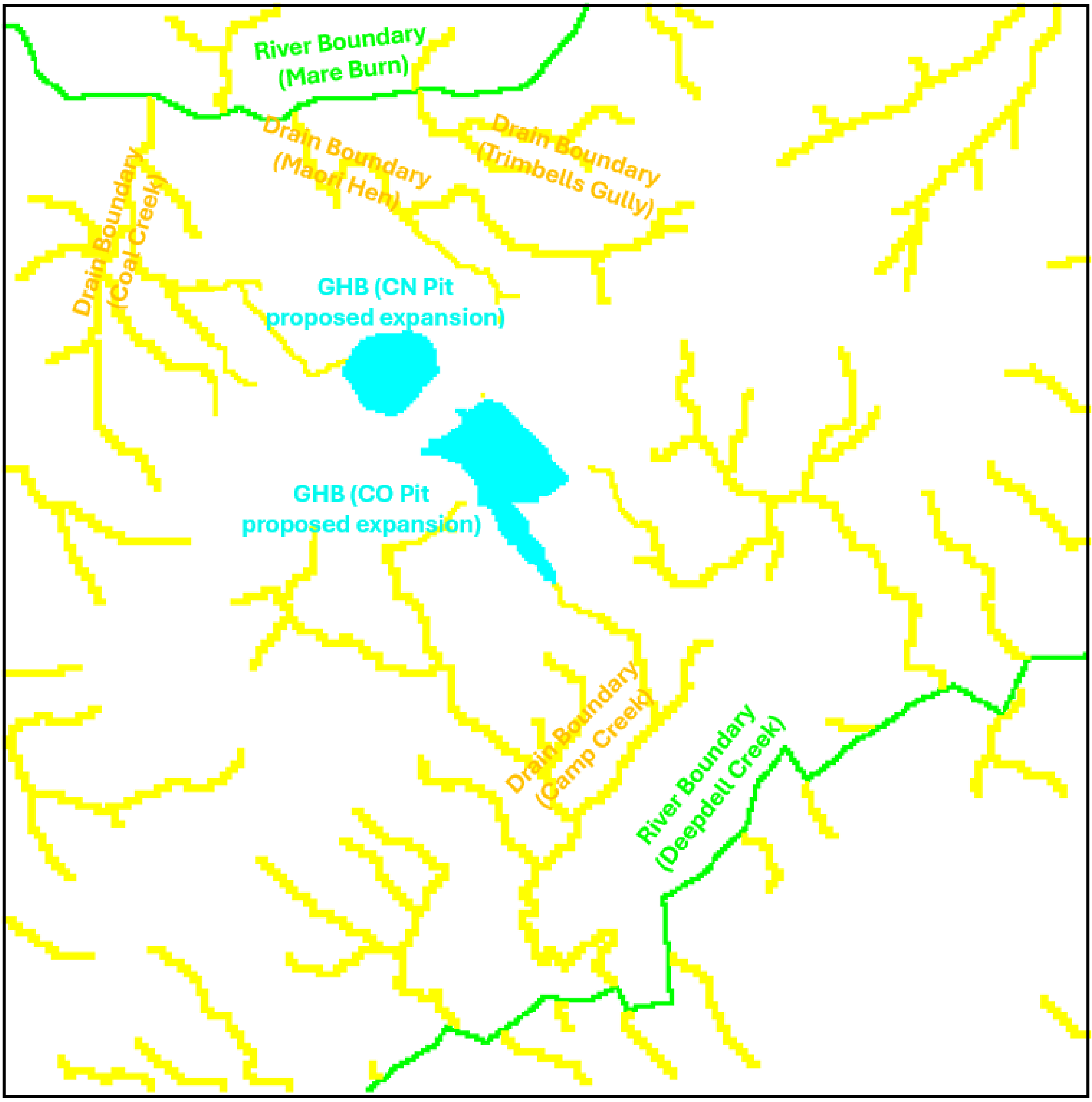


Figure B-3.4 Location of the general head boundary (for the proposed pit lakes) – groundwater recovery model.

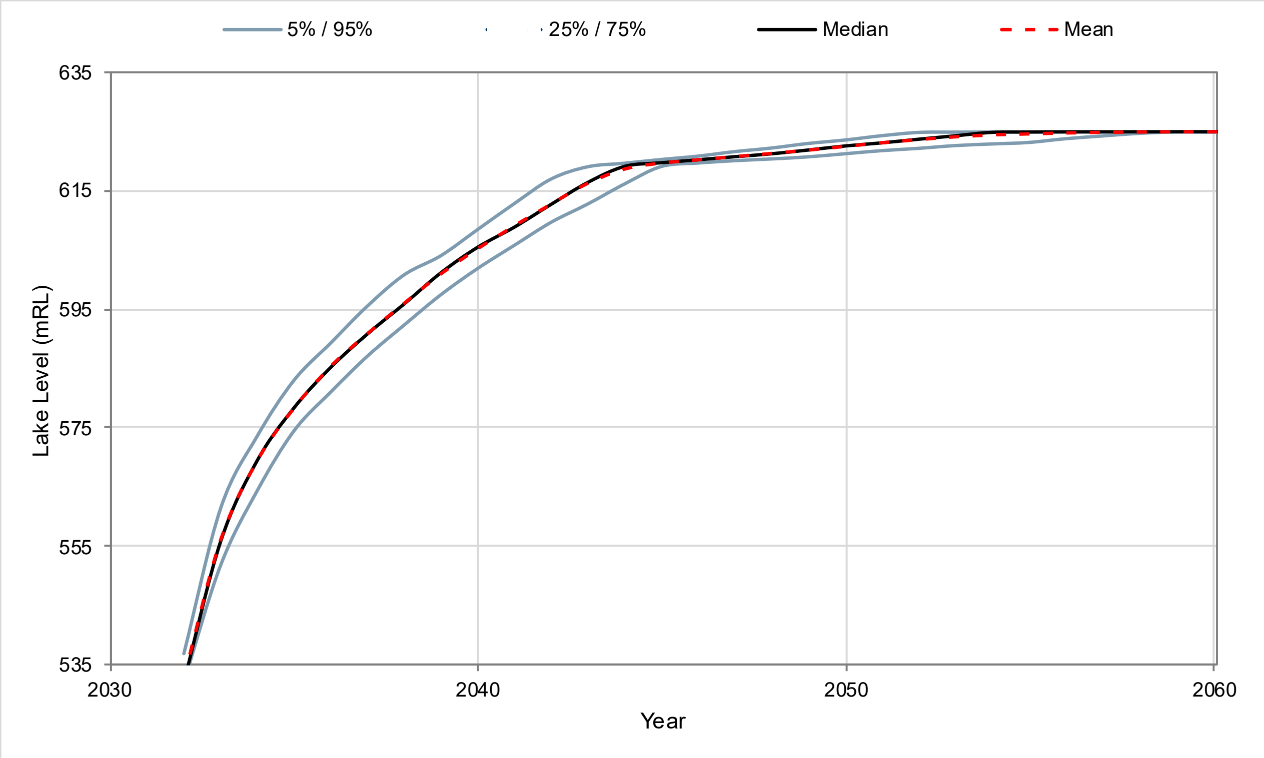


Figure B-3.5 Coronation Pit Lake filling curve adopted in the groundwater recovery model for the General Head Boundary. The model uses the mean lake level trajectory shown in the figure.

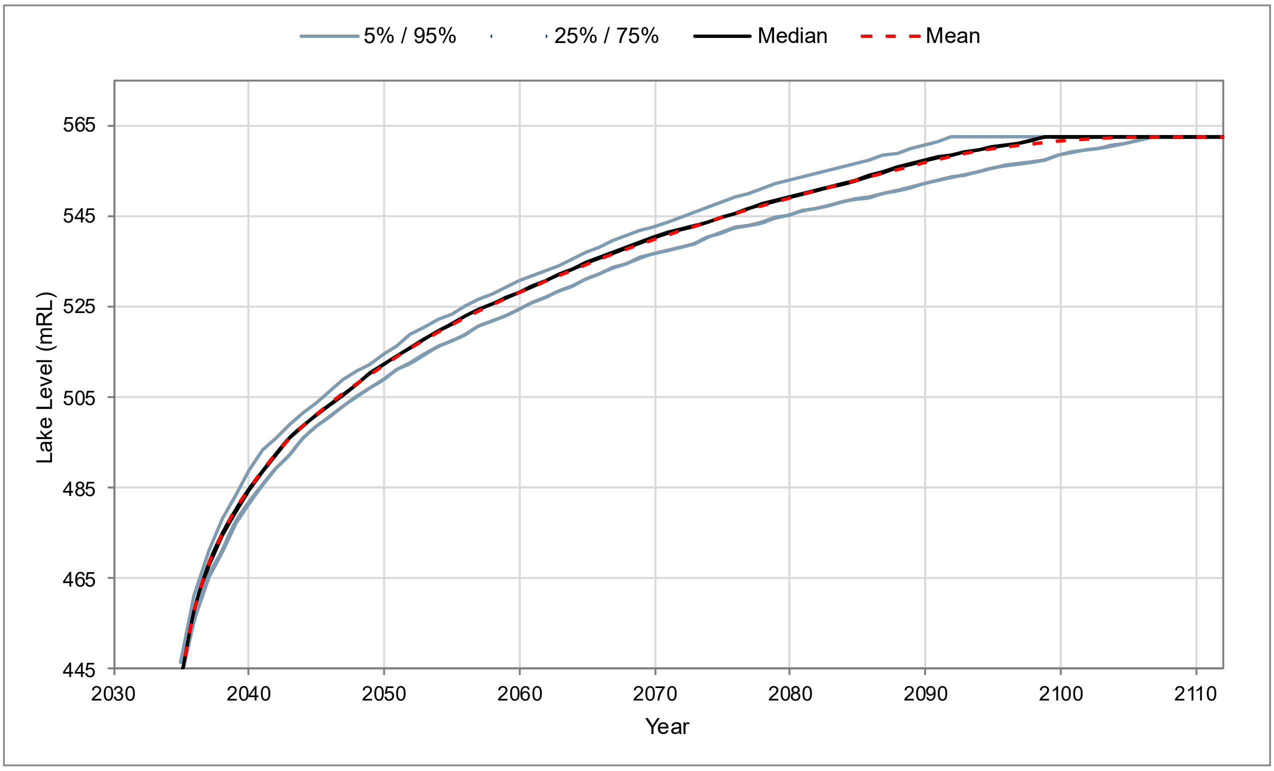


Figure B-3.6 Coronation North Pit Lake filling curve adopted in the groundwater recovery model for the General Head Boundary. The model uses the mean lake level trajectory shown in the figure.

B-4 Steady-state Model Calibration

B-4.1 Pre- Mining Conditions

The pre-mining conditions were modelled using Groundwater Modelling System (GMS) software using MODFLOW-USG (numerical modelling code) developed by the USGS and discussed in GHD, 2024. For completeness the input parameters and results are also presented in this Appendix.

For the model calibration, initial model parameters used were based on previous studies (Golder, 2011a and b, Golder, 2016, GHD, 2021 and WSP- Golder, 2024 and GHD 2024) and values were adjusted during the calibration process to simulate pre-mining conditions (Table B-4.1). A uniform recharge rate of 29.2 mm/year was applied in the pre-mining conditions model (GHD, 2021 and 2024).

Figure B-4.1 shows the locations of boreholes used as groundwater level calibration targets. An enlarged version of the location plan is provided in Attachment 1 of this Appendix. Figure B-4.4 presents difference between measured groundwater levels and the corresponding modelled groundwater heads at each borehole location. Groundwater level data available throughout the model domain (measured January 2016) are assumed to represent pre- mining groundwater level conditions and were used as calibration targets. The groundwater levels used as calibration targets are presented in Attachment 1 of this Appendix.

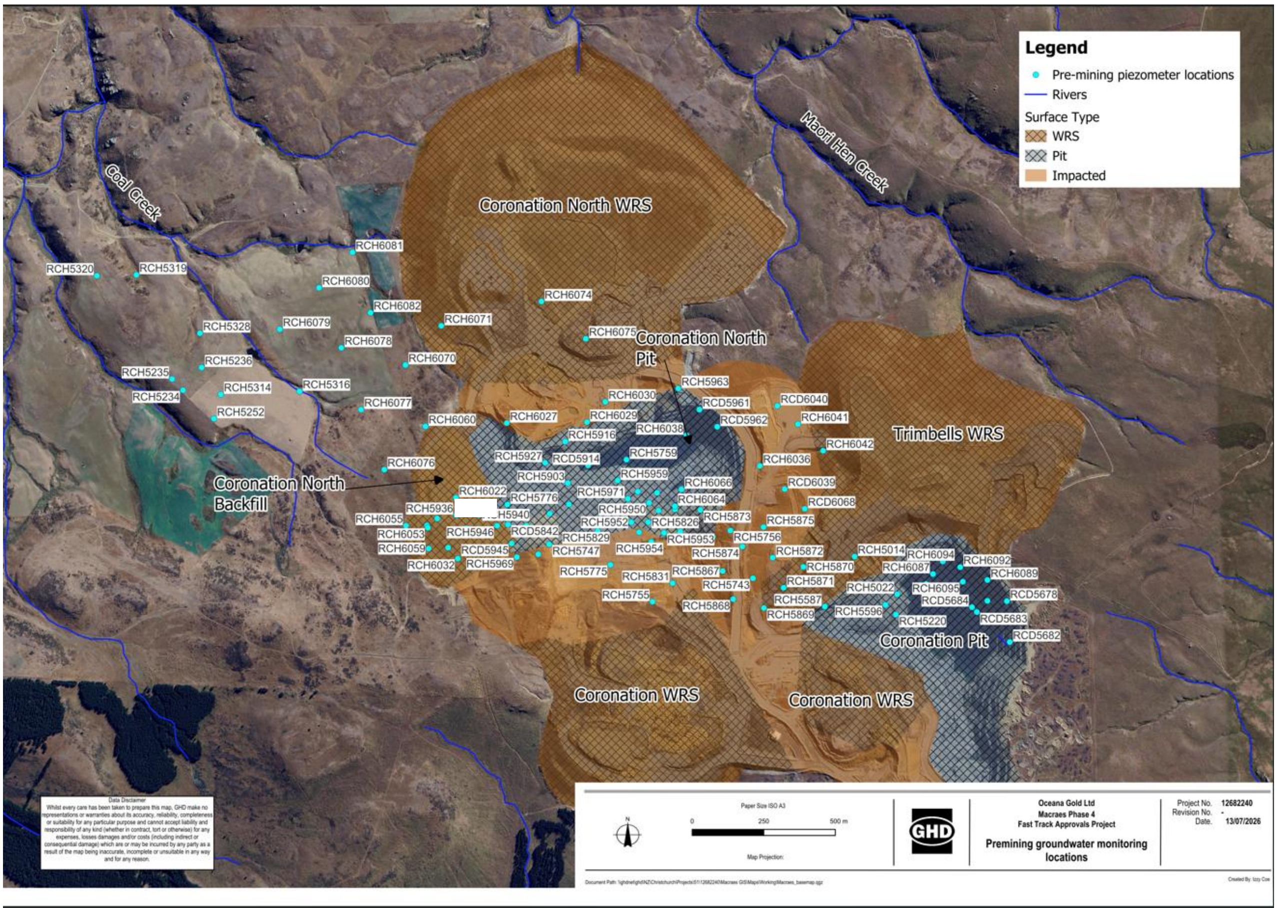


Figure B-4.1 Groundwater head target locations used in steady-state pre-mining calibration

Table B-4.1 Steady-state pre- mining model parameters

Unit Name	Model Layer (Thickness of layer)	Kx m/s (m/d)	Kz m/s (m/d)	Ky m/s (m/d)	Specific Yield *	Specific Storage 1/m*
Moderately Weathered Schist (Shallow)	1 (mostly 30 m thick)	1.0×10^{-7} (0.0086)	6.0×10^{-8} (0.0052)	2.5×10^{-7} (0.022)	0.02	1.0×10^{-5}
Slightly Weathered Schist	2 (50 m thick)	5×10^{-8} (0.0043)	5×10^{-9} (0.00043)	5×10^{-8} (0.0043)	0.01	1.0×10^{-5}
Slightly weathered - Unweathered Schist Bedrock	3 - 5 (50 m thick)	1.5×10^{-8} (0.0013)	1.5×10^{-9} (0.00013)	1.5×10^{-8} (0.0013)	0.01	1.0×10^{-5}
Unweathered Schist	6 – 8 (50 m thick each layer)	5×10^{-9} (0.000432)	5×10^{-10} (0.000043)	5×10^{-9} (0.00043)	0.01	1.0×10^{-5}
Notes:	Kx-denotes horizontal hydraulic conductivity in x direction Ky-denotes horizontal hydraulic conductivity in y direction Kz-denotes vertical hydraulic conductivity Vertical anisotropy represents ratio of hydraulic conductivity in horizontal x (Kx) to z (Kz) directions (Kx/Kz) *Parameter used in transient model only.					

The performance of model calibration is commonly associated with the difference between measured and modelled water levels. This measure is quantified through the scaled root mean square (SRMS) error. The SRMS is expressed as a percentage and is a more representative measure of the fit than the standard root mean square (RMS), as it accounts for the scale of the potential range of data values. Therefore, if the ratio of the RMS error to the total head change is small, the error is only a small part of the overall model response. The steady-state calibration for the Coronation model resulted in SRMS of 5.7% and is considered acceptable as per Australian Groundwater Modelling Guidelines (Barnett et al, 2012).

The modelled computed vs observed head plot (scatter plot) from the steady-state (pre-mining) model calibration is presented in Figure B-4.2.

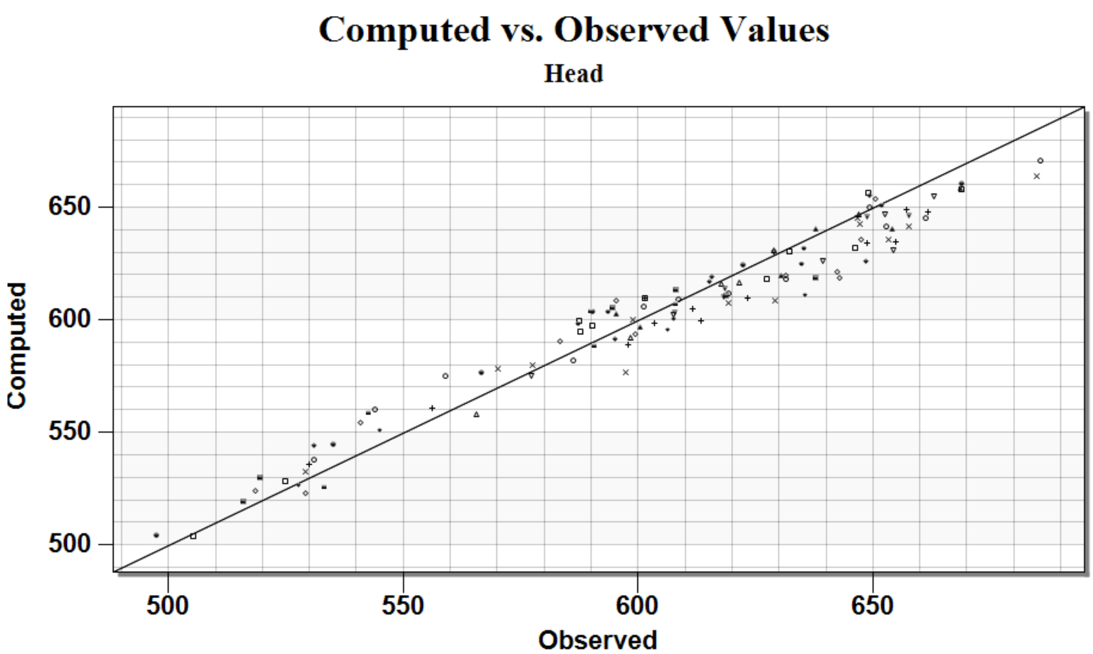


Figure B-4.2 Steady state pre-mining model scatter plot (model computed vs observed head)

The overall mass balance error (outflows - inflows) for the steady state model (Figure B-4.3) is <0.01%, suggesting that the model is numerically stable.

```
 VOLUMETRIC BUDGET FOR ENTIRE MODEL AT END OF TIME STEP       1 IN STRESS PERIOD       1
 -------------------------------------------------------------------------------------

    CUMULATIVE VOLUMES      L**3       RATES FOR THIS TIME STEP      L**3/T
    ------------------                 ------------------------

          IN:                                   IN:
          ---                                   ---
            STORAGE =           0.0000            STORAGE =           0.0000
      CONSTANT HEAD =           0.0000      CONSTANT HEAD =           0.0000
             DRAINS =           0.0000             DRAINS =           0.0000
      RIVER LEAKAGE =         966.0818      RIVER LEAKAGE =         966.0818
           RECHARGE =        6479.8994           RECHARGE =        6479.8994

           TOTAL IN =        7445.9813           TOTAL IN =        7445.9813

         OUT:                                  OUT:
         ----                                  ----
            STORAGE =           0.0000            STORAGE =           0.0000
      CONSTANT HEAD =           0.0000      CONSTANT HEAD =           0.0000
             DRAINS =        5994.2279             DRAINS =        5994.2279
      RIVER LEAKAGE =        1451.7548      RIVER LEAKAGE =        1451.7548
           RECHARGE =           0.0000           RECHARGE =           0.0000

          TOTAL OUT =        7445.9827          TOTAL OUT =        7445.9827

           IN - OUT =      -1.4458E-03           IN - OUT =      -1.4458E-03

PERCENT DISCREPANCY =            -0.00     PERCENT DISCREPANCY =            -0.00
```

Figure B-4.3 Steady state pre-mining model water balance summary (Coronation area)

Pre-mining modelled head contours using the parameters presented in Table B-4.1 are plotted in Figure B-4.4.

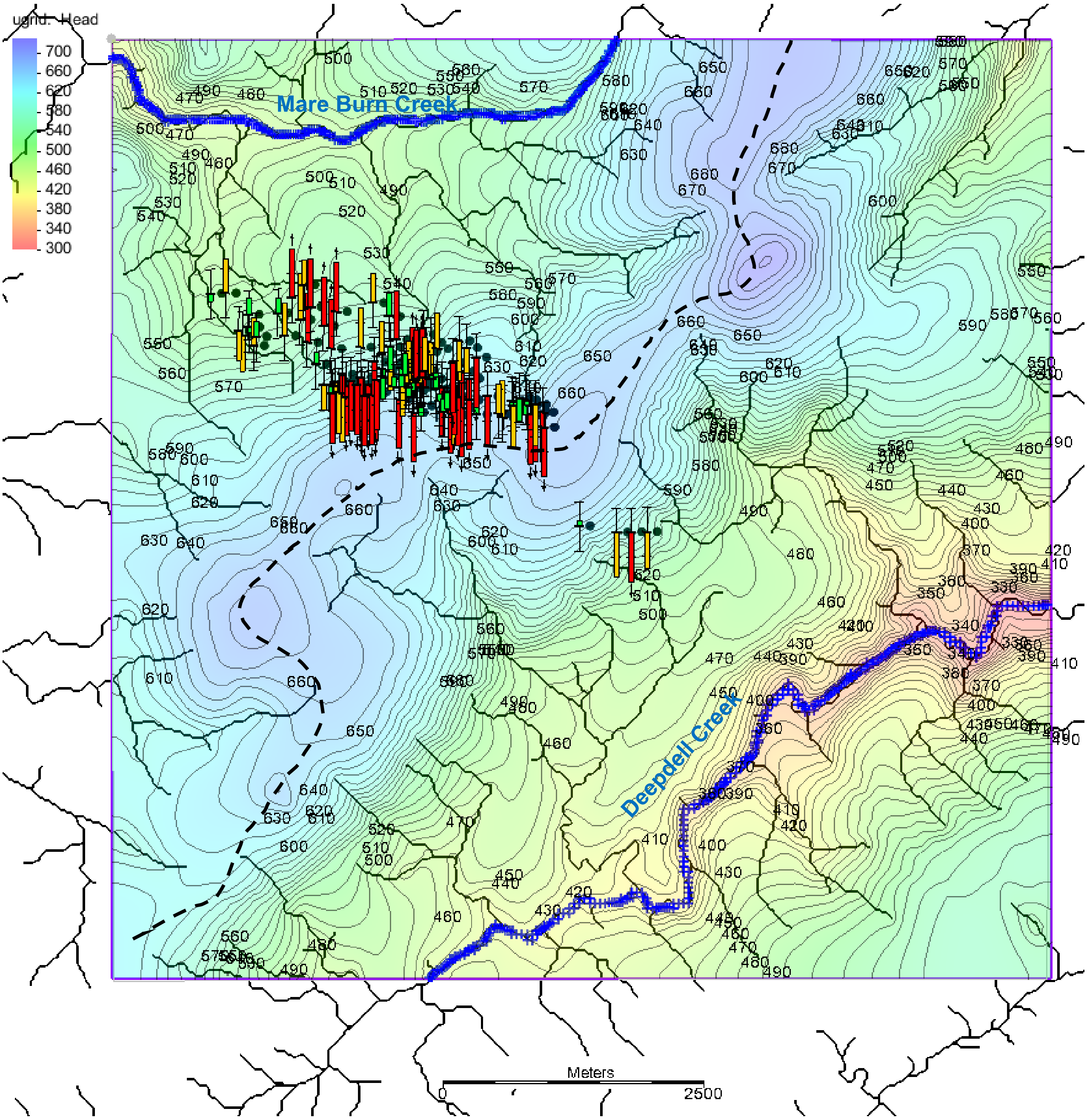


Figure B-4.4 Pre-mining steady-state modelled head contours and location of bores used in calibration. Red bars represent difference between modelled and observed head >10 m, Yellow bars represent difference between modelled and observed head <10 m but >5 m and Green bars represent difference between modelled and observed head <5 m

B-4.2 Existing Conditions Model

Coronation Pit has been operational since 2014 and currently has a water level of approximately 597 m RL. The Coronation North Pit has been operating since 2017, with a current pit water level of approximately 502 m RL. Existing conditions were represented using a steady-state groundwater flow model based on 2025 topographic data.

Consistent with the Golden Bar and Main Site ming areas models, some of the parameters derived from the pre-mining model were manually adjusted (Table B-4.2), together with the recharge rate (see Section 3.1), to assess the model fit against recent groundwater monitoring data, although the available dataset is limited. Calibration was evaluated against the conceptual understanding of the groundwater system and available monitoring data, recognising that groundwater levels in the vicinity of the pits are influenced by ongoing mining activities, with the pits acting as hydraulic sinks.

Table B-4.2 Steady-state existing conditions model parameters

Unit Name	Model Layer (Thickness of layer)	Kx m/s (m/d)	Kz m/s (m/d)	Ky m/s (m/d)	Specific Yield *	Specific Storage 1/m*
Moderately Weathered Schist (Shallow)	1 (mostly 30 m thick)	8.7×10^{-8} (0.0075)	5.2×10^{-8} (0.0045)	2.2×10^{-7} (0.0188)	0.02	1.0×10^{-5}
Slightly Weathered Schist	2 (50 m thick)	2.9×10^{-8} (0.0025)	2.9×10^{-9} (0.00025)	2.9×10^{-8} (0.0025)	0.01	1.0×10^{-5}
Slightly Weathered - Unweathered Schist Bedrock	3 - 5 (50 m thick each layer)	1.2×10^{-8} (0.001)	1.2×10^{-9} (0.0001)	1.2×10^{-8} (0.001)	0.01	1.0×10^{-5}
Unweathered Schist	6 – 8 (50 m thick each layer)	1×10^{-8} (0.0009)	1×10^{-9} (0.00009)	1×10^{-8} (0.0009)	0.01	1.0×10^{-5}
Waste Rock	1 (0 to 160 m thick)	1.0×10^{-6} (0.086)	1.0×10^{-6} (0.086)	1.0×10^{-6} (0.086)	0.18	1.0×10^{-5}
Notes:	Kx-denotes horizontal hydraulic conductivity in x direction Ky-denotes horizontal hydraulic conductivity in y direction Kz-denotes vertical hydraulic conductivity Vertical anisotropy represents ratio of hydraulic conductivity in horizontal x (Kx) to z (Kz) directions (Kx/Kz) *Parameter used in transient model only.					

Only two wells (MAC-CP03 and MAC-CP04) in the surrounding area have recent groundwater level measurements (September 2025) available for calibration checking. Figure B-4.5 shows the locations of the two wells used for calibration checking. Known borehole details, including measured levels, modelled levels, and residuals, is provided in Table B-4.3.

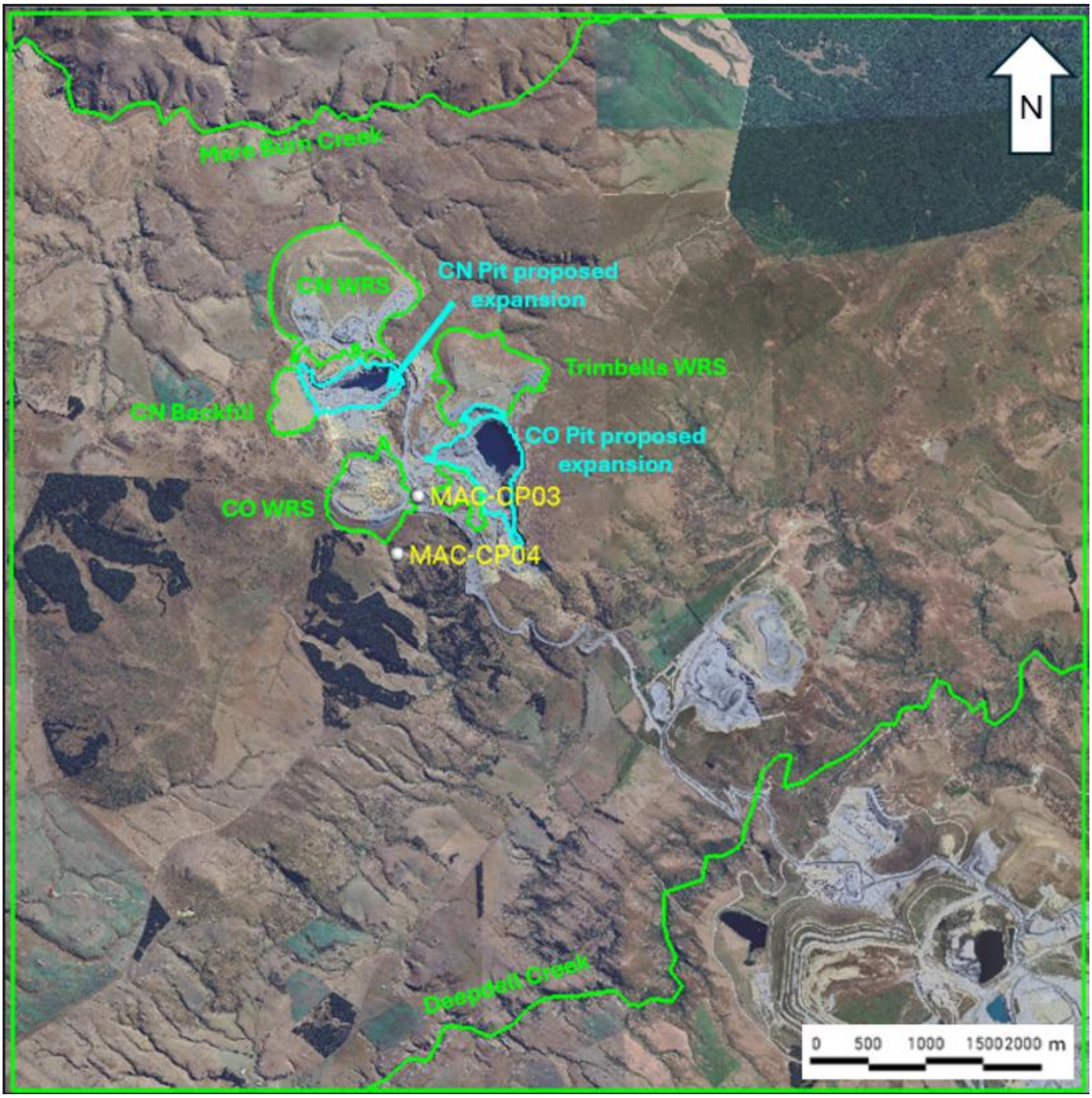


Figure B-4.5 Location of boreholes used in model calibration check.

Table B-4.3 Existing conditions model, measured and modelled groundwater level data

Hole ID	Easting (NZTM2000)	Northing (NZTM200)	Measured Groundwater level (m RL)	Modelled groundwater level (m RL)	Residual (m)
MAC-CP03	1395180	4977278	657.74	657.41	0.33
MAC-CP04	1395004	4976790	605.50	606.45	-0.95

Steady-state water table contours of the existing conditions model are presented in Figure B-4.6. The overall mass balance error (outflows - inflows) for the steady state existing conditions model is <0.01%, suggesting that the model is numerically stable (Figure B-4.7).

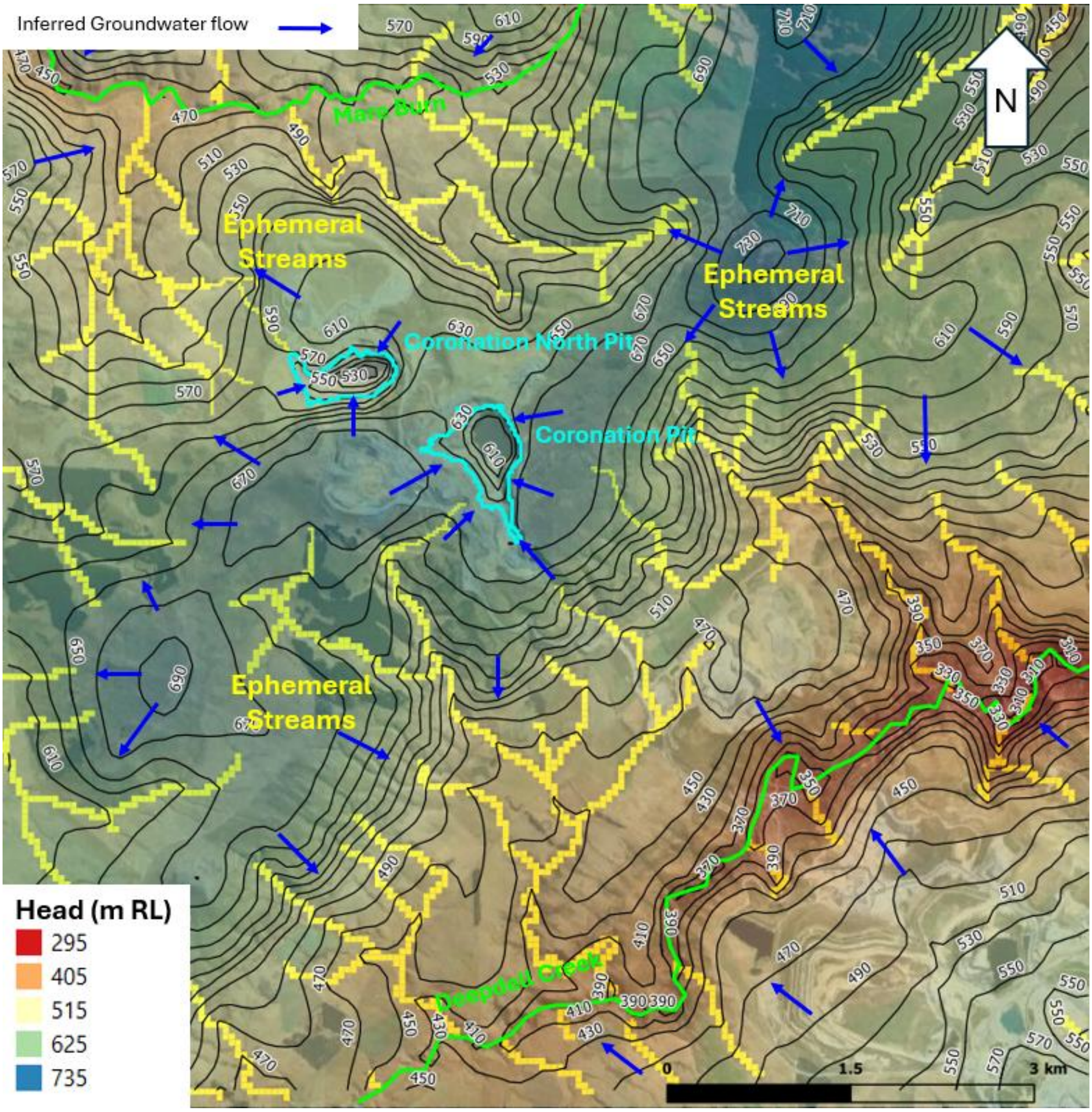


Figure B-4.6 Existing conditions steady-state modelled water table (m RL) and inferred groundwater flow (Coronation area model).

```
  VOLUMETRIC BUDGET FOR ENTIRE MODEL AT END OF TIME STEP       1 IN STRESS PERIOD       1
  -----------------------------------------------------------------------------------------

     CUMULATIVE VOLUMES      L**3       RATES FOR THIS TIME STEP      L**3/T
     ------------------                 ------------------------

           IN:                                      IN:
           ---                                      ---
             STORAGE =           0.0000               STORAGE =           0.0000
       CONSTANT HEAD =           0.0000         CONSTANT HEAD =           0.0000
              DRAINS =           0.0000                DRAINS =           0.0000
       RIVER LEAKAGE =       18851.9465         RIVER LEAKAGE =         619.7221
            RECHARGE =      242490.7135              RECHARGE =        7971.4238

            TOTAL IN =      261342.6600              TOTAL IN =        8591.1459

          OUT:                                     OUT:
          ----                                     ----
             STORAGE =           0.0000               STORAGE =           0.0000
       CONSTANT HEAD =        2031.5331         CONSTANT HEAD =          66.7828
              DRAINS =      202752.7177                DRAINS =        6665.1123
       RIVER LEAKAGE =       56558.4111         RIVER LEAKAGE =        1859.2509
            RECHARGE =           0.0000              RECHARGE =           0.0000

           TOTAL OUT =      261342.6620             TOTAL OUT =        8591.1460

            IN - OUT =      -1.9546E-03              IN - OUT =      -6.4255E-05

 PERCENT DISCREPANCY =           -0.00    PERCENT DISCREPANCY =           -0.00
```

Figure B-4.7 Steady state existing conditions model water balance summary (Coronation area model)

B-5 Predictive Analysis

B-5.1 Proposed Mining Activities - Dewatering

Proposed mining activities and associated dewatering for the Coronation Pit and Coronation North Pit extensions were simulated using two sequential groundwater models. The first model simulated concurrent dewatering of both pits over a seven-year period. Simulated groundwater heads at the end of this period were used as initial conditions for a second model, which simulated continued dewatering of the Coronation North Pit only and the commencement of groundwater recovery within the Coronation Pit over a subsequent three-year period. The assumed dewatering durations are consistent with the indicative Macraes mining schedule shown in Figure 2.2 in Section 2.2 of the Surface and Groundwater Assessment report.

For both dewatering simulations the greater and deeper extent of the proposed design for both pits were assumed throughout the dewatering period. This represents a conservative approach, as it maximises the duration and extent of dewatering effects and is therefore considered appropriate for assessment purposes. The simulated dewatering period starts once the pits are empty of water and have been excavated to the proposed design. The hydraulic boundary conditions (Drain boundary) are applied to the proposed extend depth and area.

The overall mass balance (outflows - inflows) at the end of dewatering models (Figure B-5.1 and Figure B-5.2) is <0.01%, suggesting that the model is numerically stable.

```
 VOLUMETRIC BUDGET FOR ENTIRE MODEL AT END OF TIME STEP      12 IN STRESS PERIOD       7
 -----------------------------------------------------------------------------------------

    CUMULATIVE VOLUMES      L**3       RATES FOR THIS TIME STEP      L**3/T
    ------------------                 ------------------------

          IN:                                      IN:
          ---                                      ---
            STORAGE =     2353964.4267               STORAGE =         388.5008
      CONSTANT HEAD =           0.0000         CONSTANT HEAD =           0.0000
              WELLS =           0.0000                 WELLS =           0.0000
             DRAINS =           0.0000                DRAINS =           0.0000
      RIVER LEAKAGE =     1368759.6853         RIVER LEAKAGE =         538.9383
           RECHARGE =    20702515.0220              RECHARGE =        8102.7456

           TOTAL IN =    24425239.1340              TOTAL IN =        9030.1847

         OUT:                                     OUT:
         ----                                     ----
            STORAGE =     2028411.8499               STORAGE =         361.5631
      CONSTANT HEAD =           0.0000         CONSTANT HEAD =           0.0000
              WELLS =           0.0000                 WELLS =           0.0000
             DRAINS =    17850849.2832                DRAINS =        6910.8879
      RIVER LEAKAGE =     4546315.8531         RIVER LEAKAGE =        1757.7435
           RECHARGE =           0.0000              RECHARGE =           0.0000

          TOTAL OUT =    24425576.9862             TOTAL OUT =        9030.1945

           IN - OUT =        -337.8522              IN - OUT =     -9.8639E-03

PERCENT DISCREPANCY =           -0.00     PERCENT DISCREPANCY =           -0.00
```

Figure B-5.1 Water balance summary at the end of the dewatering of Coronation Pit.

```
  VOLUMETRIC BUDGET FOR ENTIRE MODEL AT END OF TIME STEP     12 IN STRESS PERIOD       3
  ------------------------------------------------------------------------------------

     CUMULATIVE VOLUMES      L**3       RATES FOR THIS TIME STEP      L**3/T
     ------------------                 ------------------------

           IN:                                      IN:
           ---                                      ---
             STORAGE =      557513.8763             STORAGE =        283.6071
       CONSTANT HEAD =           0.0000       CONSTANT HEAD =          0.0000
               WELLS =           0.0000               WELLS =          0.0000
              DRAINS =           0.0000              DRAINS =          0.0000
       RIVER LEAKAGE =      591141.9555       RIVER LEAKAGE =        540.4155
     HEAD DEP BOUNDS =     1049275.8047     HEAD DEP BOUNDS =        216.5444
            RECHARGE =     9007278.5889            RECHARGE =       8225.8252

            TOTAL IN =    11205210.2253            TOTAL IN =       9266.3923

          OUT:                                     OUT:
          ----                                     ----
             STORAGE =     1342332.7415             STORAGE =        297.0029
       CONSTANT HEAD =           0.0000       CONSTANT HEAD =          0.0000
               WELLS =           0.0000               WELLS =          0.0000
              DRAINS =     7340536.0387              DRAINS =       6707.3747
       RIVER LEAKAGE =     1920535.9913       RIVER LEAKAGE =       1751.7162
     HEAD DEP BOUNDS =      602094.5949     HEAD DEP BOUNDS =        510.3055
            RECHARGE =           0.0000            RECHARGE =          0.0000

           TOTAL OUT =    11205499.3664           TOTAL OUT =       9266.3992

            IN - OUT =        -289.1411            IN - OUT =     -6.9851E-03

 PERCENT DISCREPANCY =          -0.00     PERCENT DISCREPANCY =          -0.00
```

Figure B-5.2 Water balance at the end of the dewatering of Coronation North Pit (and 3 years into the recovery of Coronation Pit

Modelled groundwater head contours at the end of the dewatering of Coronation pit are presented in Figure B-5.3, while the head contours at the end of the dewatering of Coronation North pit (and three years into the recovery of Coronation Pit) are presented in Figure B-5.4.

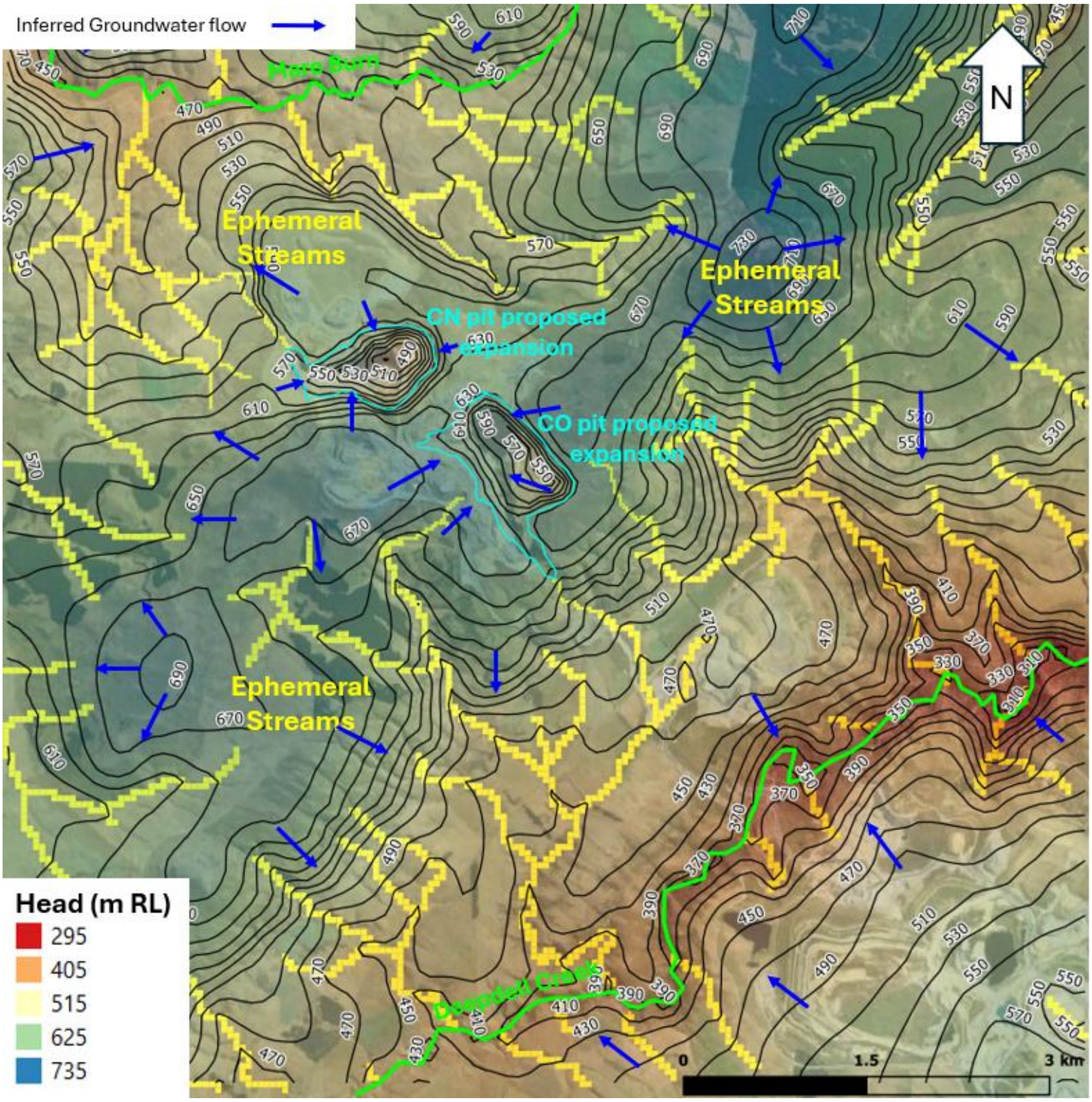


Figure B-5.3 Estimated water table and inferred groundwater flow after 7 years of dewatering both Coronation and Coronation North pits.

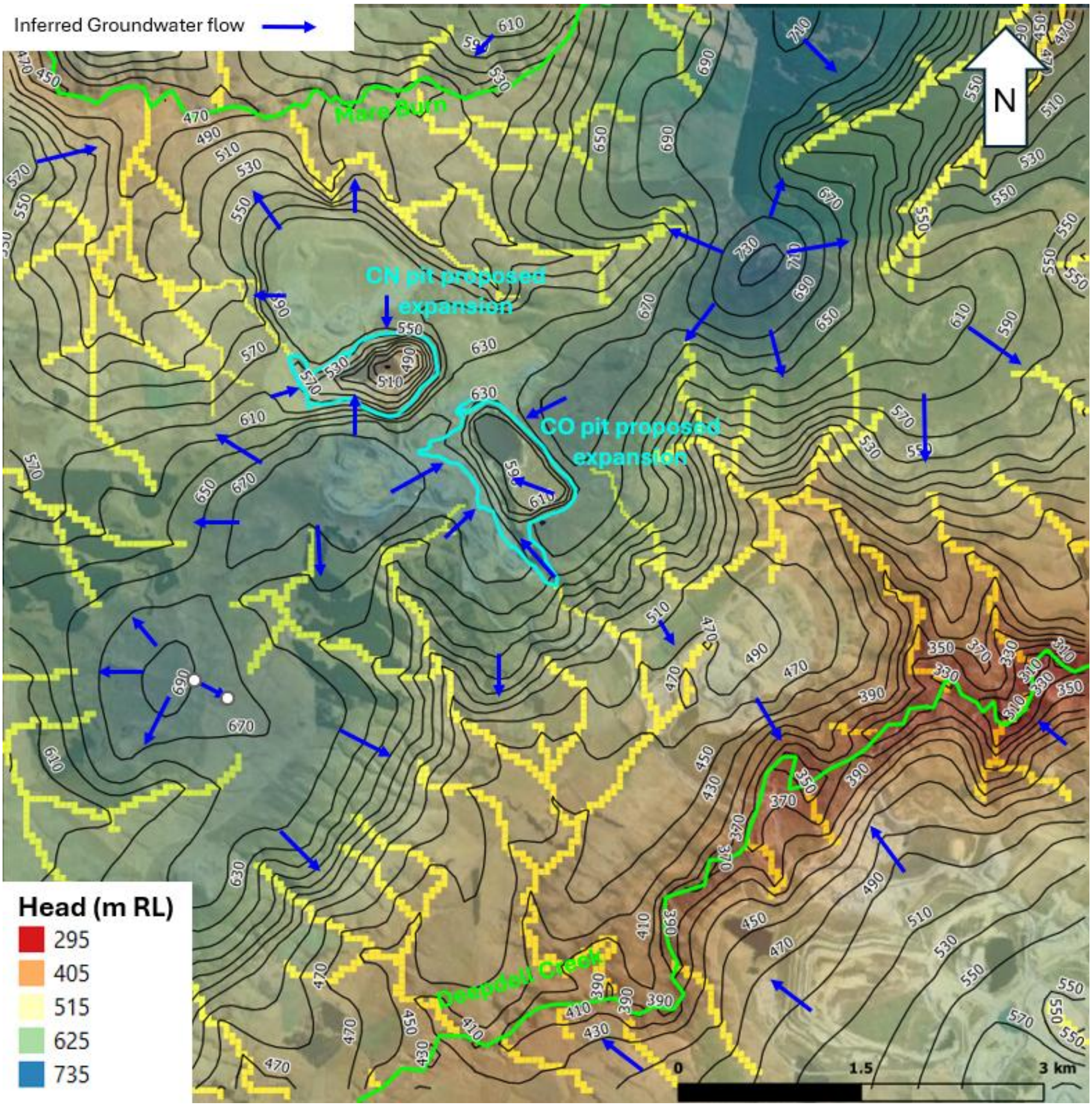


Figure B-5.4 Estimated water table at the end of the dewatering of Coronation North Pit (and 3 years into the recovery of Coronation Pit)

Estimated groundwater dewatering rates (groundwater inflow in the pits) for the proposed expansion of the Coronation & Coronation North pits are presented in Figure B-5.5. As presented in this figure, the predicted groundwater inflows for the Coronation pit decrease from approximately 7.3 L/s at the start of dewatering to approximately 2.4 L/s towards the end of the 7-year dewatering period. Predicted groundwater inflows for the Coronation North pit decrease from approximately 10.5 L/s at the start of dewatering to approximately 6.4 L/s towards the end of the 10-year dewatering period.

Initial pit inflows are predicted to be higher because dewatering initially drains the groundwater stored within the rock mass that is excavated and immediately surrounding the pit, driven by the relatively steep hydraulic gradient created by excavation and pit dewatering. These modelled pit groundwater inflows were adopted as inputs to the surface water model used to assess pit lake filling, as detailed in Appendix G.

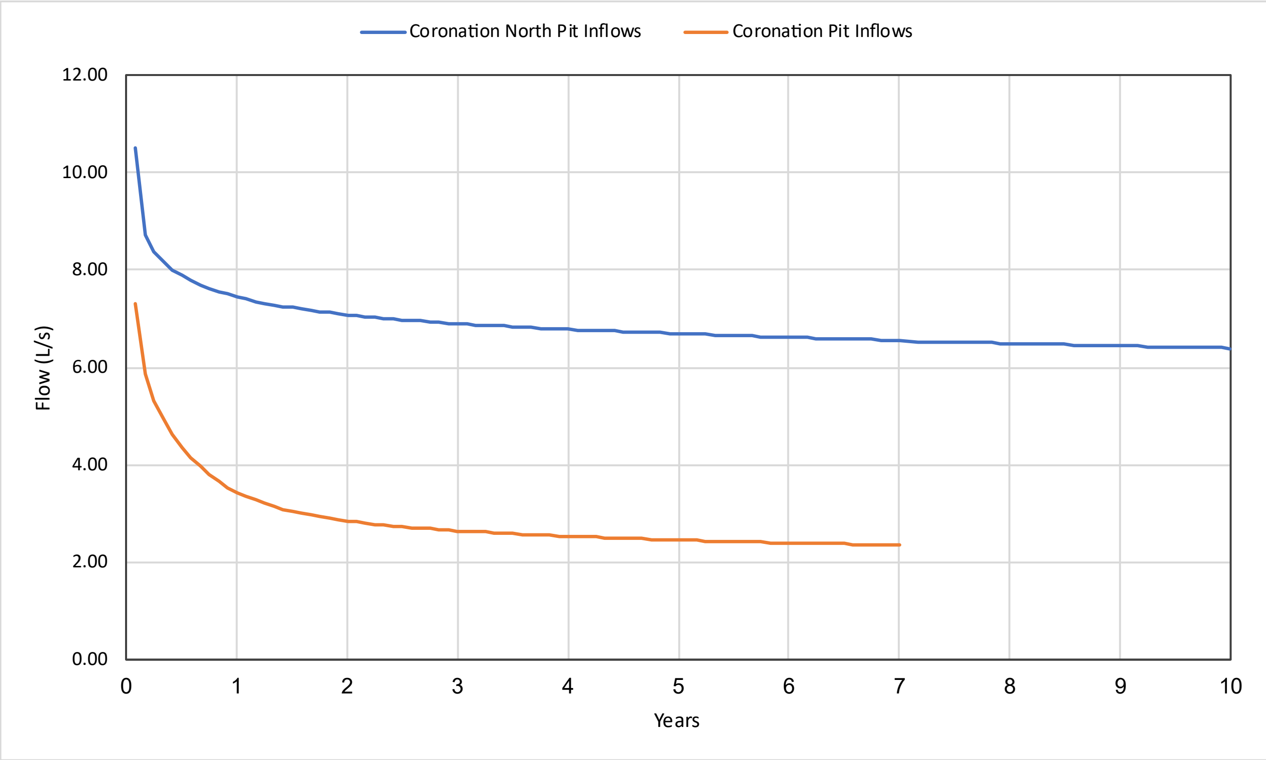


Figure B-5.5 Modelled dewatering rates for the proposed Coronation and Coronation North pits expansion

B-5.1.1 Drawdown effects to surrounding creeks/streams

The simulated spatial extent of drawdown greater than 1m associated with dewatering of the proposed Coronation and Coronation North pits expansion is presented in Figure B-5.6 and Figure B-5.7.

Modelling results indicate that drawdown greater than 1 m is predicted to extend approximately 1,000 m to the northwest, 850 m to the northeast, 800 m to the southwest, and 700 m to the southeast of the proposed pits area (Figure B-5.6 and Figure B-5.7).

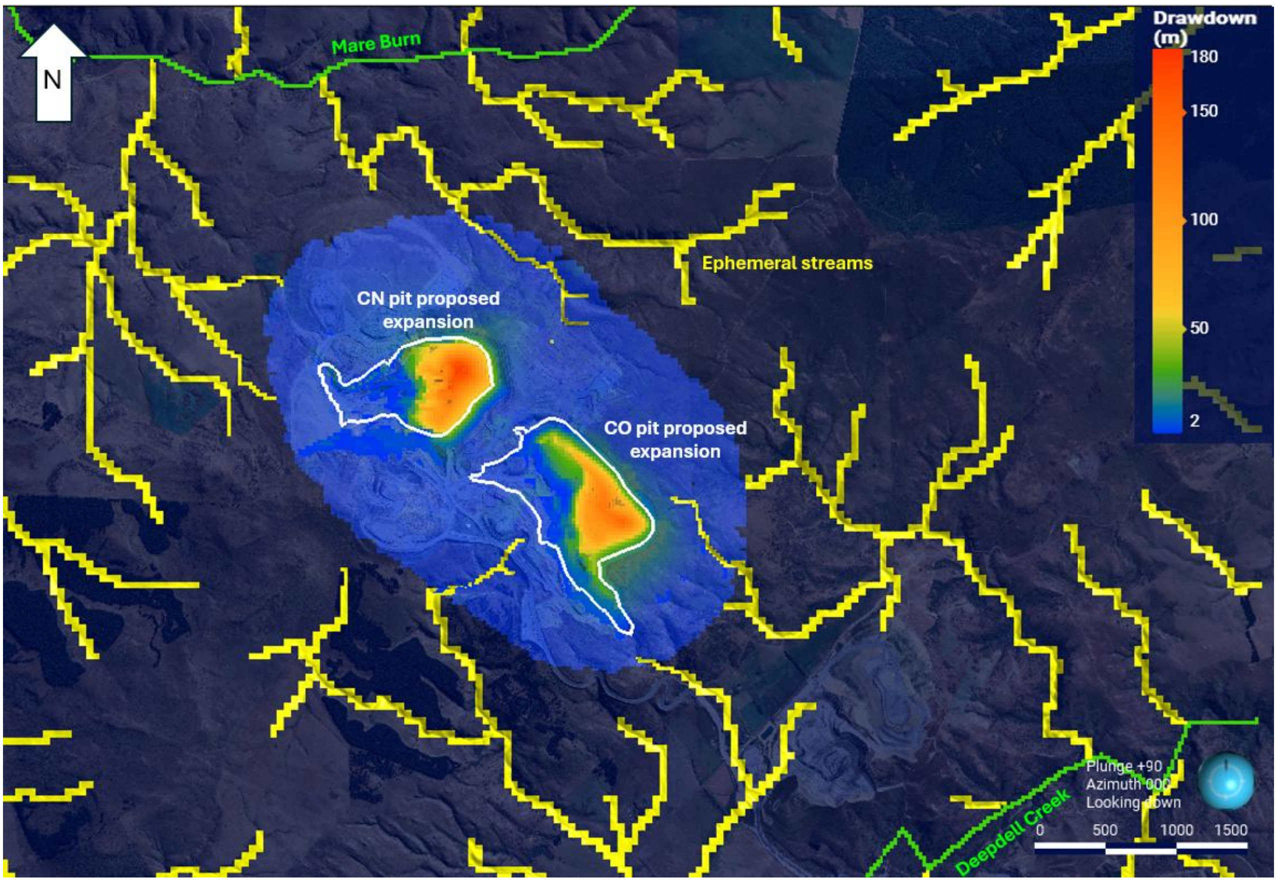


Figure B-5.6 Modelled extent of drawdown greater than 1 m after 7 years of dewatering of the proposed pits (end of Coronation Pit dewatering)

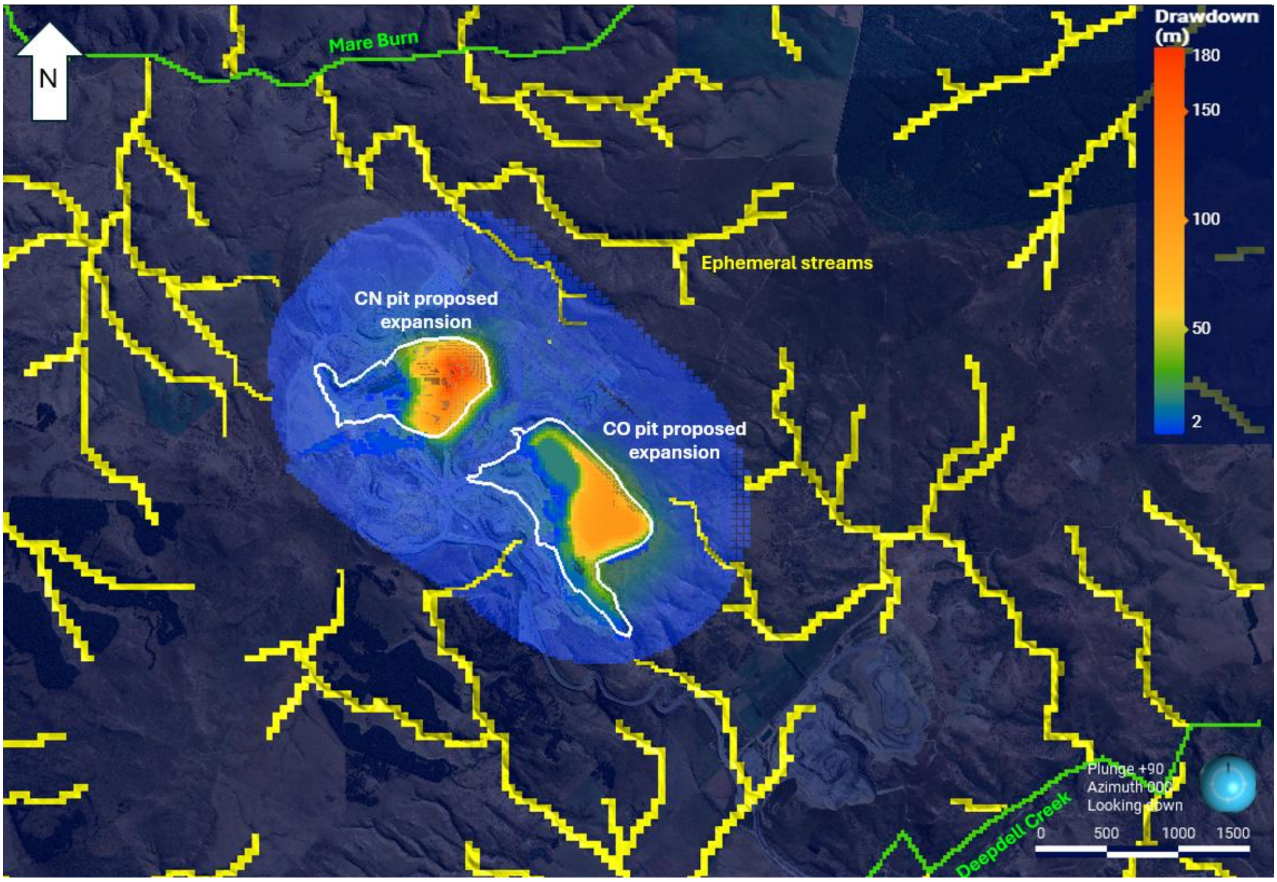


Figure B-5.7 Modelled extent of drawdown greater than 1 m at the end of the dewatering of Coronation North Pit (and 3 years into the recovery of Coronation Pit)

Modelling results indicate that pit dewatering is expected to have a very small increase on groundwater contributions to Mare Burn and tributary ephemeral streams. The increase is estimated to be approximately 1 L/s relative to the modelled base case (existing) conditions representing approximately 3% of the modelled contribution of 33.9 L/s to Mare Burn and tributary ephemeral streams within the model domain as presented in Figure B-5.8. The increase is primarily attributable to the expanded WRSs footprints, which have a higher recharge rate, and exceeds the influence of pit dewatering on groundwater discharge to the catchment.

For Deepdell Creek and its tributary ephemeral streams, the predicted change in groundwater discharge is estimated to be a reduction of approximately 0.6 L/s relative to the modelled groundwater contributions to the base case (existing) conditions. This reduction represents approximately 2% of the modelled existing conditions groundwater contribution of 27.2 L/s to Deepdell Creek and tributary ephemeral streams across the model domain, as presented in Figure B-5.8. These results represent changes to the groundwater component of flow only, rather than total streamflow, which will also be influenced by rainfall runoff, catchment storage, seasonal variability and other surface water processes.

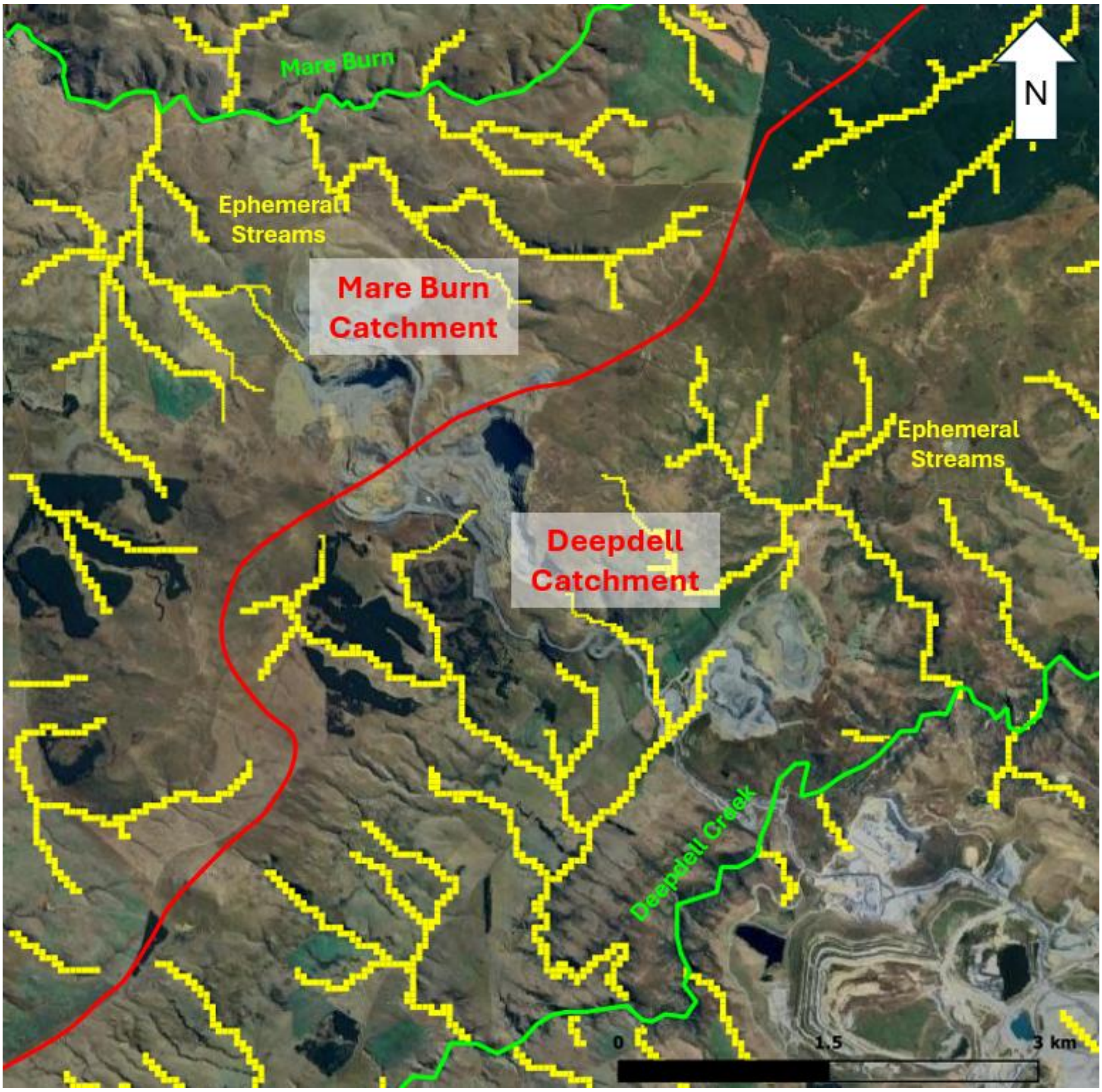


Figure B-5.8 Mare Burn Creek and Deepdell Creek "catchments" as defined in groundwater model.

B-5.2 Groundwater Recovery

Groundwater recovery was modelled for 400 years, with the proposed Coronation and Coronation North pit-lake levels modelled as a general head boundary condition. The head value applied with time (Figure B-3.5 and Figure B-3.6) were derived from the surface water modelling results and details are presented in **Appendix G**, with the overflow elevation at 563 mRL for Coronation North Pit and 625 mRL for Coronation Pit.

Seepage capture drains are proposed to be installed at the toe of Coronation North WRS to capture seepage generated from percolation through the WRS. The seepage capture drains will comprise a series of trenches connecting to collection sumps, intercepting WRS seepage before it enters surface water. Collected seepage will be pumped from the sumps to a water treatment facility or for use onsite within the mine water management system. The concept design for the seepage capture drains is included in "Macraes Phase 4 FTA Project. Engineered Seepage Capture Drain – Concept Design Report, GHD (2026a), with an excerpt shown below (Figure B-5.9). The seepage capture drains have been modelled as drain boundaries located immediately north of the Coronation North WRS, consistent with the mine design intended to intercept and manage potentially contaminated seepage originating from the waste rock stack.

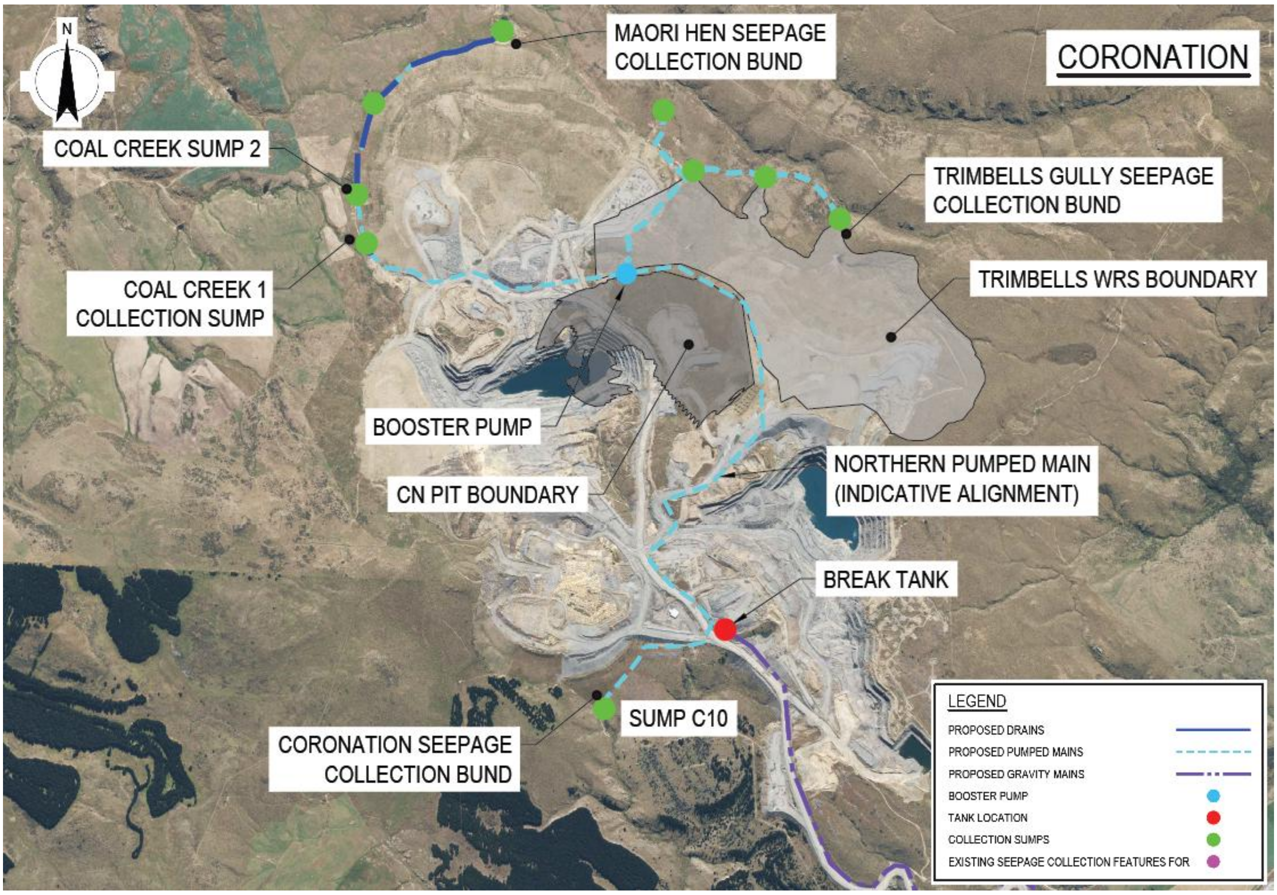


Figure B-5.9 Coronation North WRS seepage capture drains location plan (not in scale), GHD, 2026a

Modelled pressure head contours at the end of the recovery run in model layer 1 are presented in Figure B-5.10. Modelling results indicate that groundwater levels surrounding the Coronation and Coronation North pits are predicted to stabilise approximately 20 m to 35 m below existing-condition levels about 150 years after mining ceases. This indicates that the pit lakes will continue to act as hydraulic sinks under long-term post-closure conditions.

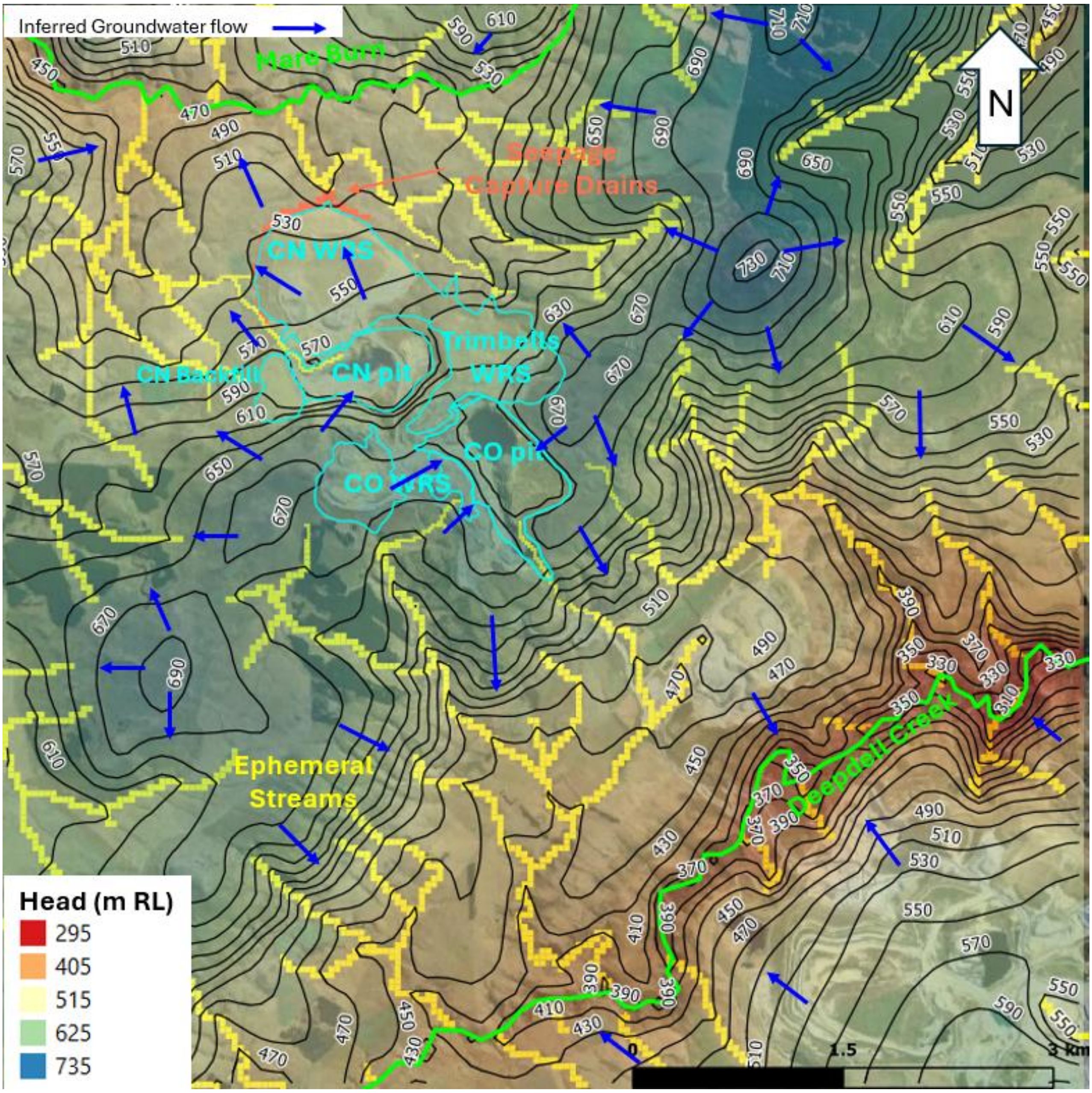


Figure B-5.10 Water table (mRL) and inferred groundwater flow at the end of 400 years of recovery.

B-5.3 Contaminant Transport

Sulphate contaminant transport modelling was undertaken using the solute transport modelling code (MODFLOW USG-TRANSPORT) in the Existing Conditions, Dewatering and Recovery models. Sulphate is considered to be a conservative element with which to assess contaminant mobilisation and transport in groundwater at the site, as it is:

- Elevated (relative to other contaminants) in some of the receiving surface water bodies around the MGP site due to current site activities
- Likely to be elevated as a result of future site activities
- Undergoes limited attenuation within the groundwater system and can be used to assess the effects from backfilled waste, WRSs and subsequent pit lakes to receiving surface water bodies via the groundwater system.

The following inputs were used in the contaminant transport models:

- Effective porosity values equal to specific yield values (Table B-4.2).

– Longitudinal dispersivity value = 20 m (assumed 10% of plume length based on initial test run where plume was expected to migrate approximately 200 m)
– Transverse dispersivity value = 2 m (10% of the longitudinal)
– The adopted sulphate concentrations are presented in Figure B-5.11 and were derived from MWM (2026b) as outlined in Appendix E. These concentrations were implemented in the groundwater contaminant transport model as time-varying Constant Concentration Boundary conditions, with concentration values updated at each stress period. Annual stress periods were adopted during the existing conditions, dewatering, and early recovery phases to represent relatively rapid changes in sulphate concentrations while 10-year stress periods were used during the later recovery phase when concentration changes were less pronounced. The extent of the plume from the existing conditions model has been applied as initial concentrations for the dewatering model. Similarly for the recovery model, the predicted extent of the sulphate plume at the end of dewatering model are applied as initial concentrations.
– The background sulphate concentration in the groundwater models is set at 0 mg/L.
– Sulphate concentrations within the Coronation Pit (7 years of dewatering) and Coronation North Pit (10 years of dewatering) were assigned a value of 0 mg/L during the dewatering phase. This reflects the assumption that both pits remain effectively dry, with groundwater flow directed towards the pit voids, causing the pits to function as hydraulic sinks rather than sources of sulphate loading. Initial sulphate concentrations beyond the pit shells were adopted from the sulphate plume distribution simulated by the existing conditions model.

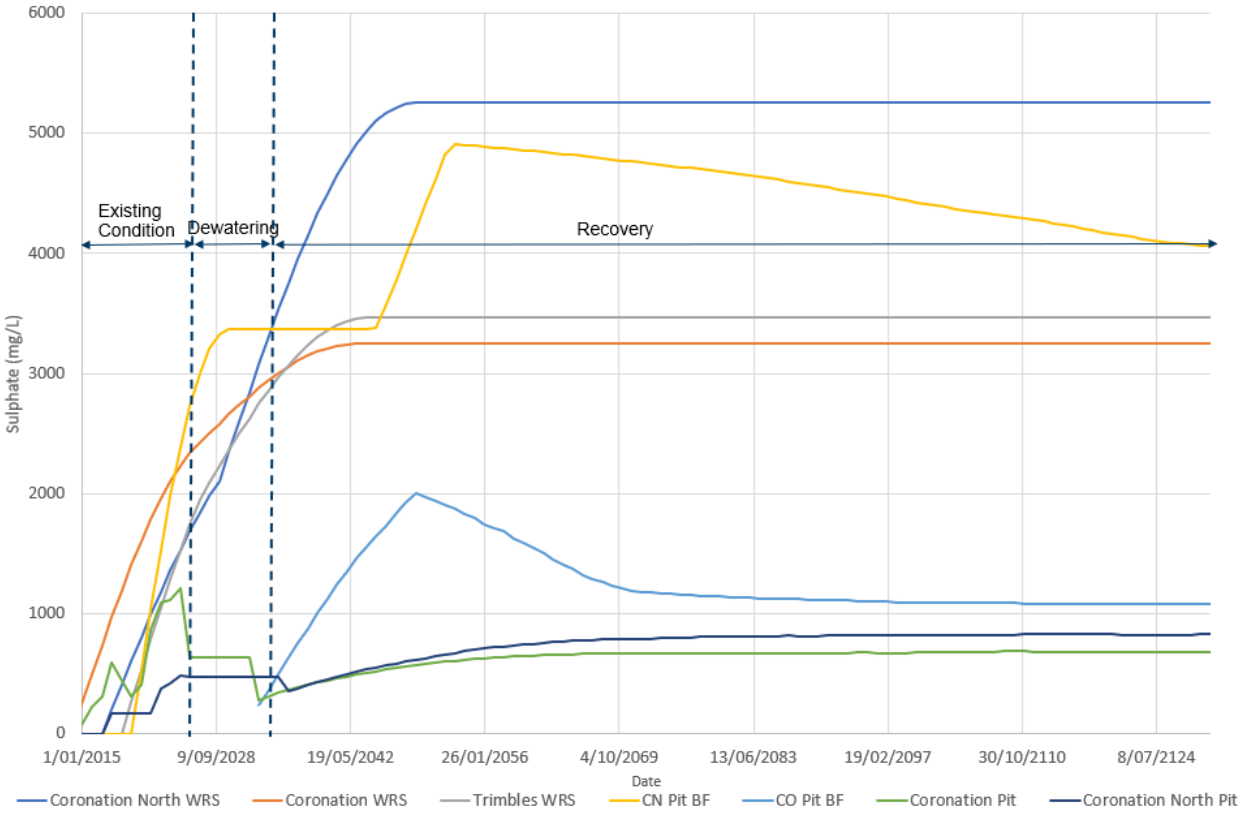


Figure B-5.11 Sulphate concentrations used as inputs for groundwater contaminant transport modelling.

Water balance error and solute transport mass balance error for all contaminant transport runs (existing conditions, dewatering and recovery models) were <0.01%, indicating all model runs completed were numerically stable (Attachment 2 of this Appendix). The extent of the predicted sulphate plume in Layer 1 of the model is shown in Figure B-5.12 to Figure B-5.16 and with enlarged views provided in Attachment 3 of this Appendix. These figures provide a spatial summary of the modelled sulphate distribution for the key stages of the assessment, including under existing conditions, at the end of the dewatering phase, and at the end of the 400-year recovery simulation. A sensitivity analysis was undertaken by increasing the recharge applied to the WRSs from 32 mm/year to 128 mm/year to evaluate the effect of higher recharge rates on plume behaviour during the recovery period and the results are presented in Figure B-5.16.

For consistency across the model outputs, the plume extent has been interpreted using the 10 mg/L sulphate concentration contour as the outer plume boundary. This concentration value was adopted as a practical indicator of plume extent because it is considered to be broadly compatible with background sulphate concentrations in schist.

Modelling results indicate that:

- The predicted sulphate plume develops primarily from the WRSs source areas and migrates along the interpreted groundwater flow paths (Figure B-5.12 to Figure B-5.16).
- Plume migration around the pits, particularly the Coronation Pit, is limited during the dewatering phase by groundwater flow towards the pit voids. Acting as hydraulic sinks, the pits locally capture groundwater and dissolved sulphate, thereby constraining plume migration (Figure B-5.13 and Figure B-5.14).
- Application of a recharge rate of 32 mm/year to the rehabilitated WRSs results in a reduced Layer 1 sulphate plume extent after 400 years (Figure B-5.15) relative to the base-case and dewatering recharge rates of 224 mm/year for the Coronation North Waste Rock Stack and 128 mm/year for all other WRSs. Figure B-5.16 shows the sensitivity scenario where recharge of 128 mm/year is applied during the recovery period.

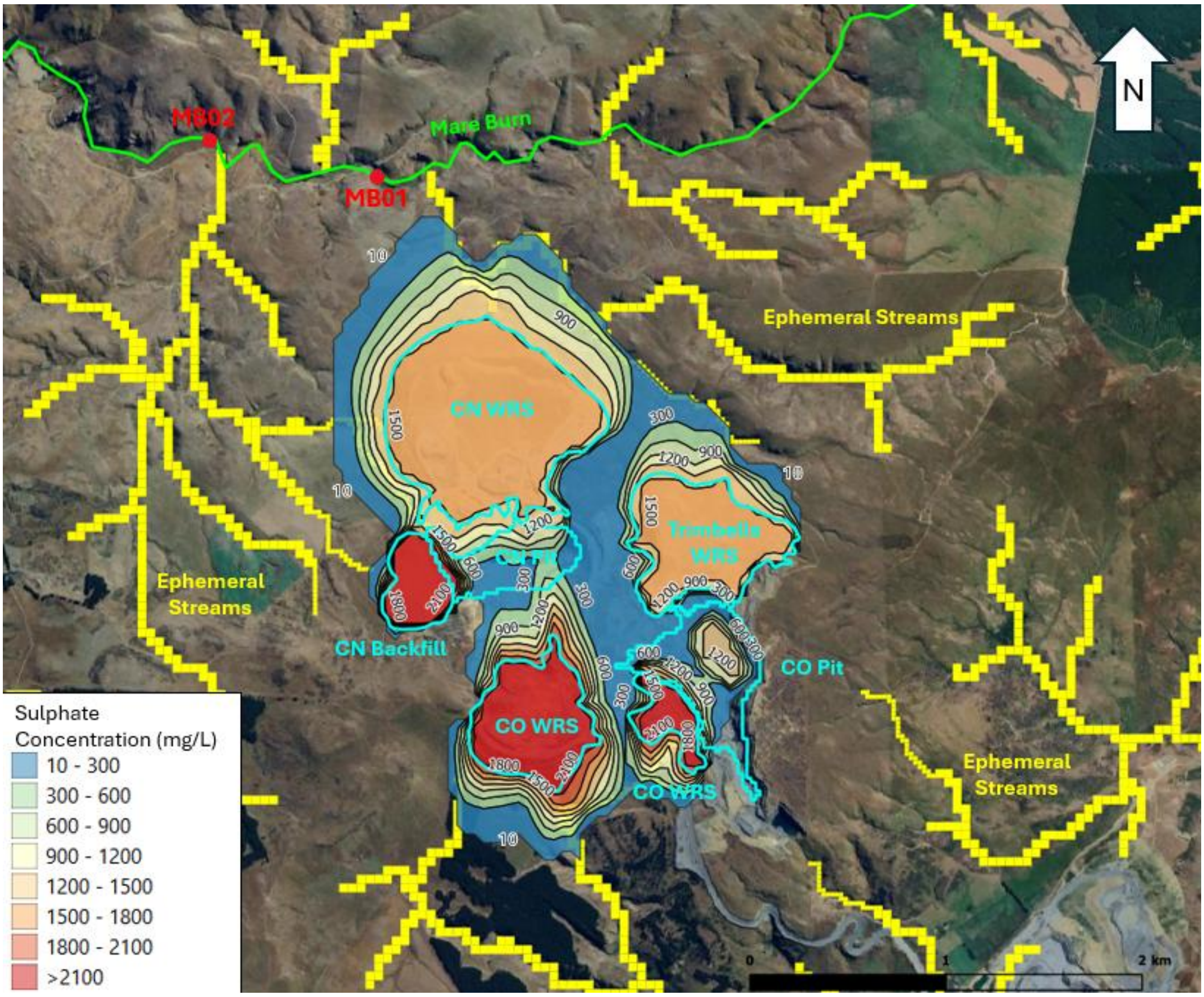


Figure B-5.12 Contour plot showing sulphate plume extent in Model Layer 1 for the existing conditions model

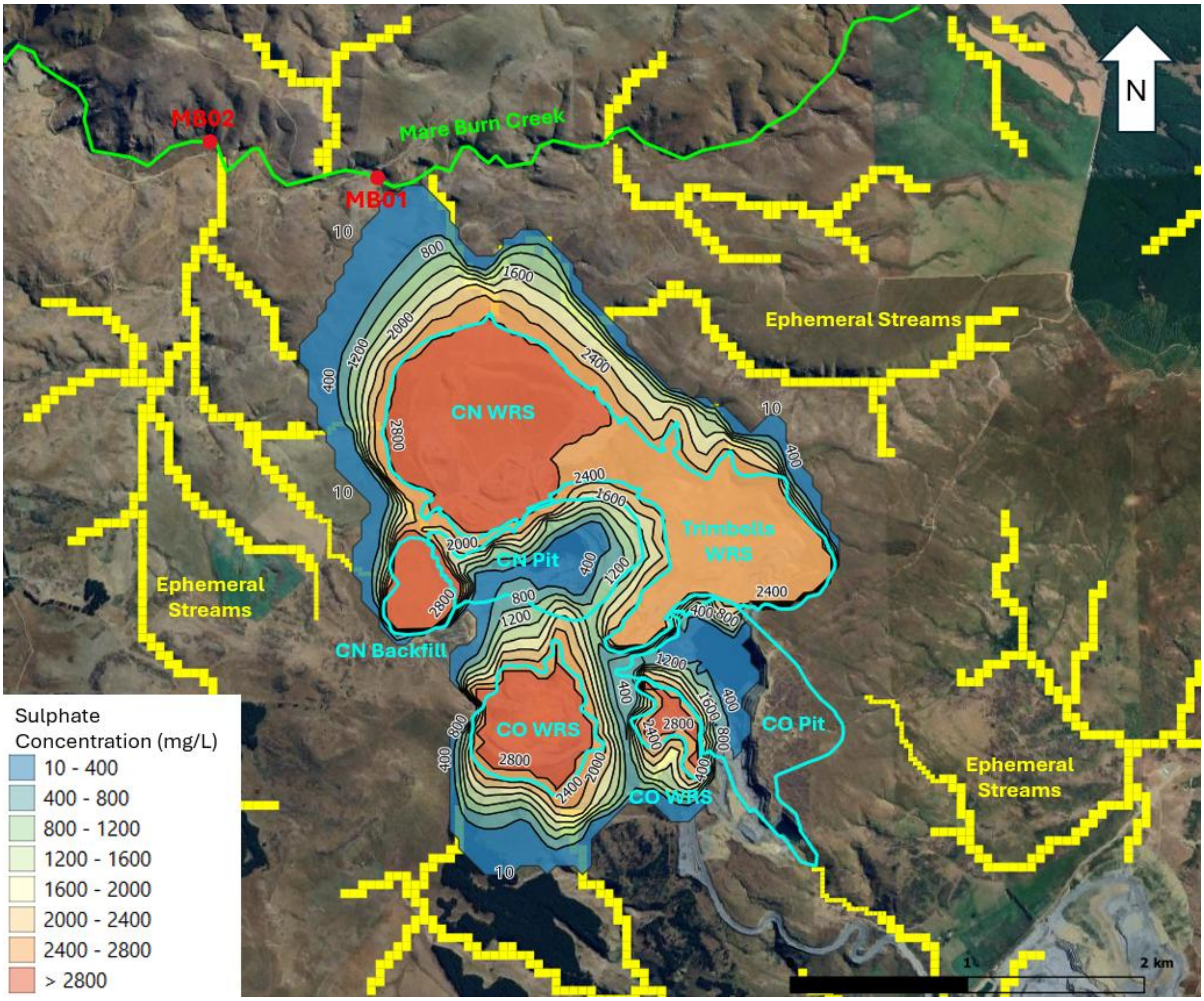


Figure B-5.13 Contour plot showing sulphate plume extent at the end of the Coronation Pit dewatering model in model layer 1.

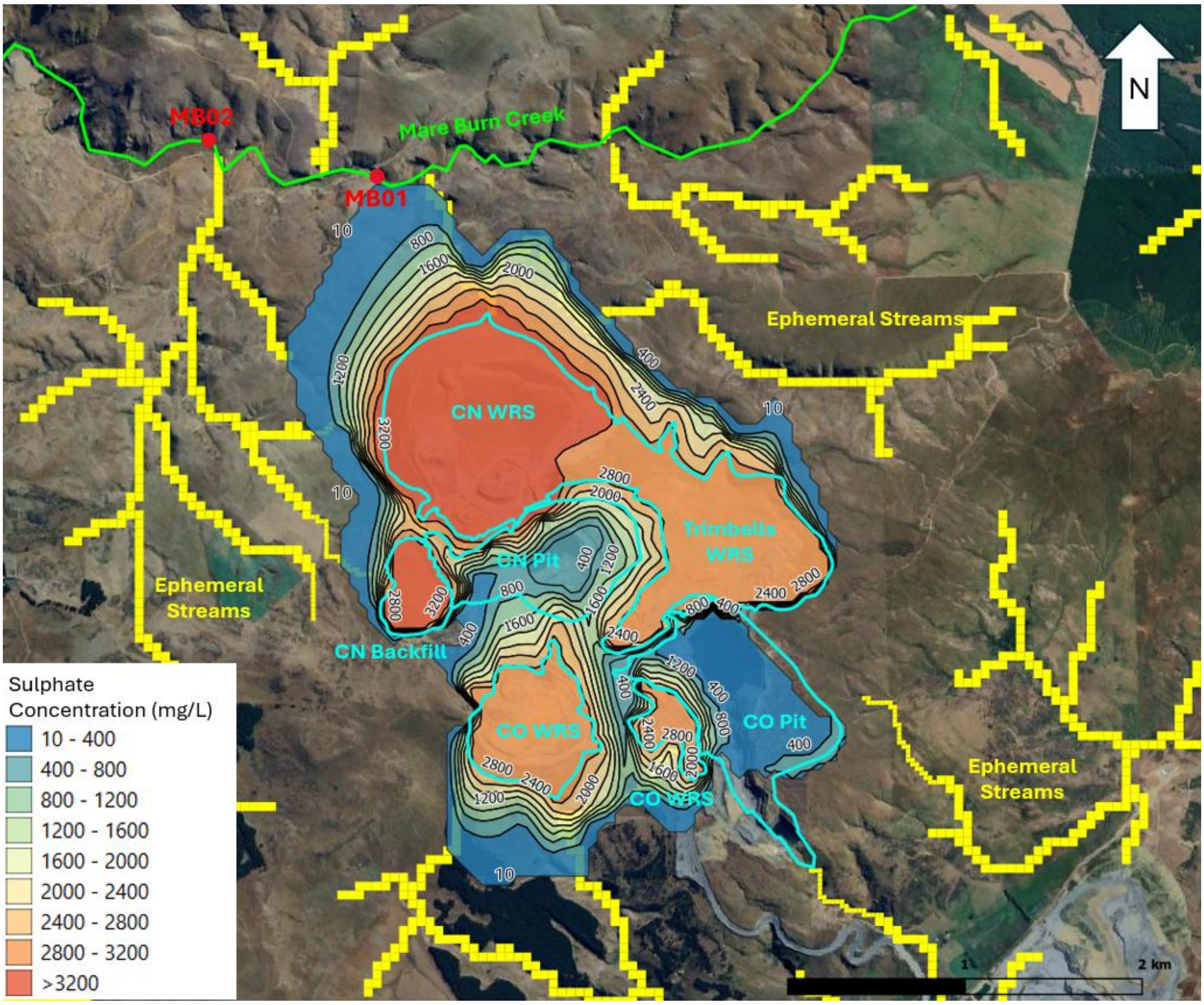


Figure B-5.14 Contour plot showing sulphate plume extent at the end of the Coronation North Pit dewatering (and 3 years into the recovery of Coronation Pit) model in model layer 1.

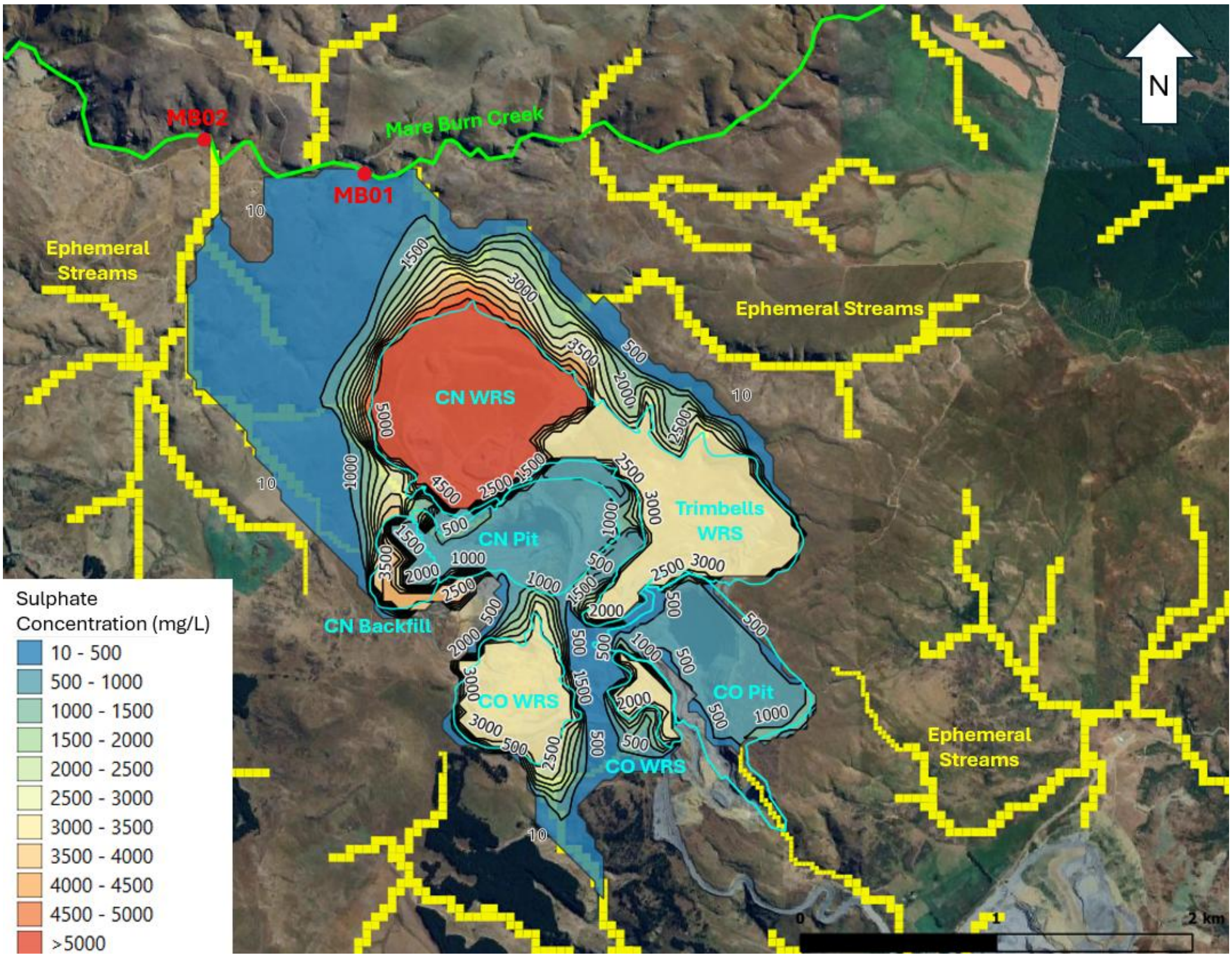


Figure B-5.15 Contour plot showing sulphate plume extent at the end of the recovery model (400 years of recovery) in model layer 1.

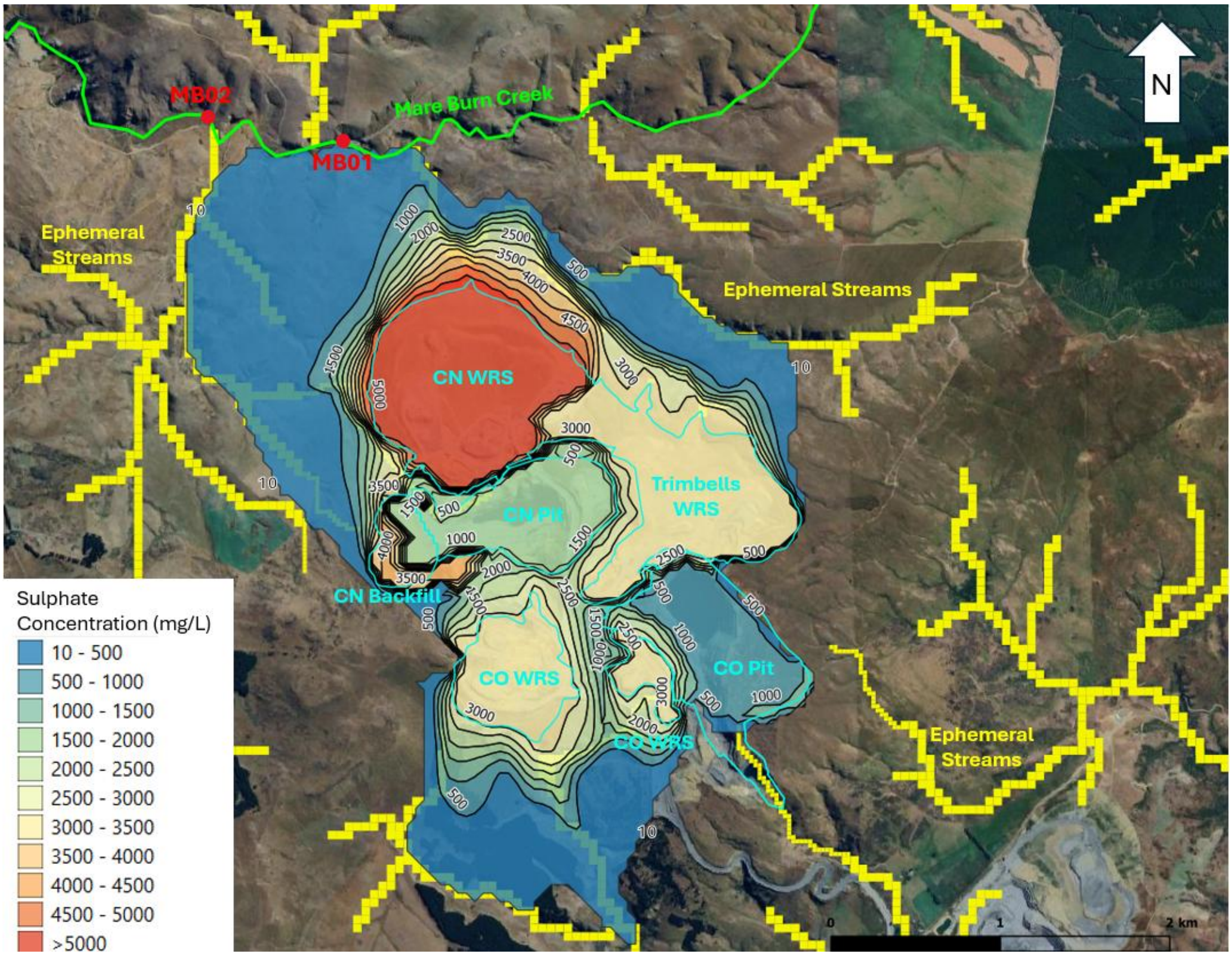


Figure B-5.16 Contour plot showing the extent of the sulphate plume at the end of the recovery simulation (400 years) in model layer 1, assuming recharge within the waste rock stack of 128 mm/year (sensitivity scenario).

The maximum horizontal extent of the plume is predicted to be approximately 1,500 m to the northwest of the source areas and approximately 1,400 m to the south of the source area.

The total modelled sulphate mass discharged to the seepage capture drains, Mare Burn Creek catchment, and Deepdell Creek catchment (Figure 19) was estimated by combining contaminant transport model results with simulated flows across surface-water boundaries, including river boundaries representing the creeks and drain boundaries representing the ephemeral streams and seepage capture drains.

At 400 years post-closure, the seepage capture drains are predicted to intercept approximately 531 kg/day of sulphate. Over the same period, the estimated sulphate flux to the Mare Burn Creek catchment (including both streams and rivers) is approximately 402 kg/day, while the Deepdell Creek catchment is estimated to receive approximately 68 kg/day.

B-6 Groundwater Assessment Summary

A three-dimensional numerical groundwater flow and solute transport model has been developed for the Coronation and Coronation North mining area using MODFLOW-USG and MODFLOW-USG-TRANSPORT. The model was developed to represent the current conceptual understanding of the groundwater system and to assess the potential groundwater effects associated with the proposed Coronation and Coronation North pit extensions. The assessment considered pre-mining and existing groundwater conditions, groundwater inflows during the proposed dewatering period, the potential effects of pit dewatering on groundwater contributions to nearby surface water features, post-mining groundwater recovery over a 400-year period, and sulphate transport from the Coronation pit, Coronation North pit and associated waste rock stack source areas.

Modelling results indicate that groundwater levels surrounding the Coronation and Coronation North pits are predicted to stabilise approximately 20 m to 35 m below existing-condition levels about 150 years after mining ceases. This indicates that the pit lakes will continue to act as hydraulic sinks under long-term post-closure conditions. A summary of the modelled groundwater effects during dewatering are summarised in Table B-6.1.

Table B-6.1 Summary of modelled groundwater effects associated with Coronation and Coronation North pits dewatering.

Groundwater Inflows Coronation Pit	Groundwater Inflows Coronation North Pit	Extent of modelled drawdown (<1m) from the extension of pit	Change in GW discharge to Mare Burn*	Change in GW discharge to Deepdell Creek*
~7.3 L/s at the start of dewatering to ~2.4 L/s toward the end of the 7-year dewatering period	~10.5 L/s at the start of dewatering to ~6.4 L/s toward the end of the 10-year dewatering period.	1,000 m to the northwest, 850 m to the northeast, 800 m to the southwest, and 700 m to the southeast	~1 L/s ^increase of ~ 3%	0.6 L/s decrease ~ 2%
Notes	**Representing changes to the groundwater flow component only* *^ Attributed to the expanded WRSs footprints that have been modelled with a higher recharge rate*			

Sulphate transport modelling was undertaken for the existing-conditions, dewatering and recovery model stages. Sulphate was selected as a conservative indicator of contaminant transport due to its expected elevated concentrations relative to other key contaminants, its existing elevated nature in some receiving surface water bodies around the Macraes Gold Project area, and its limited attenuation within the groundwater system. Sulphate transport modelling results are summarised in Table B-6.2.

Table B-6.2 Summary of contaminant transport results in the Coronation mining area

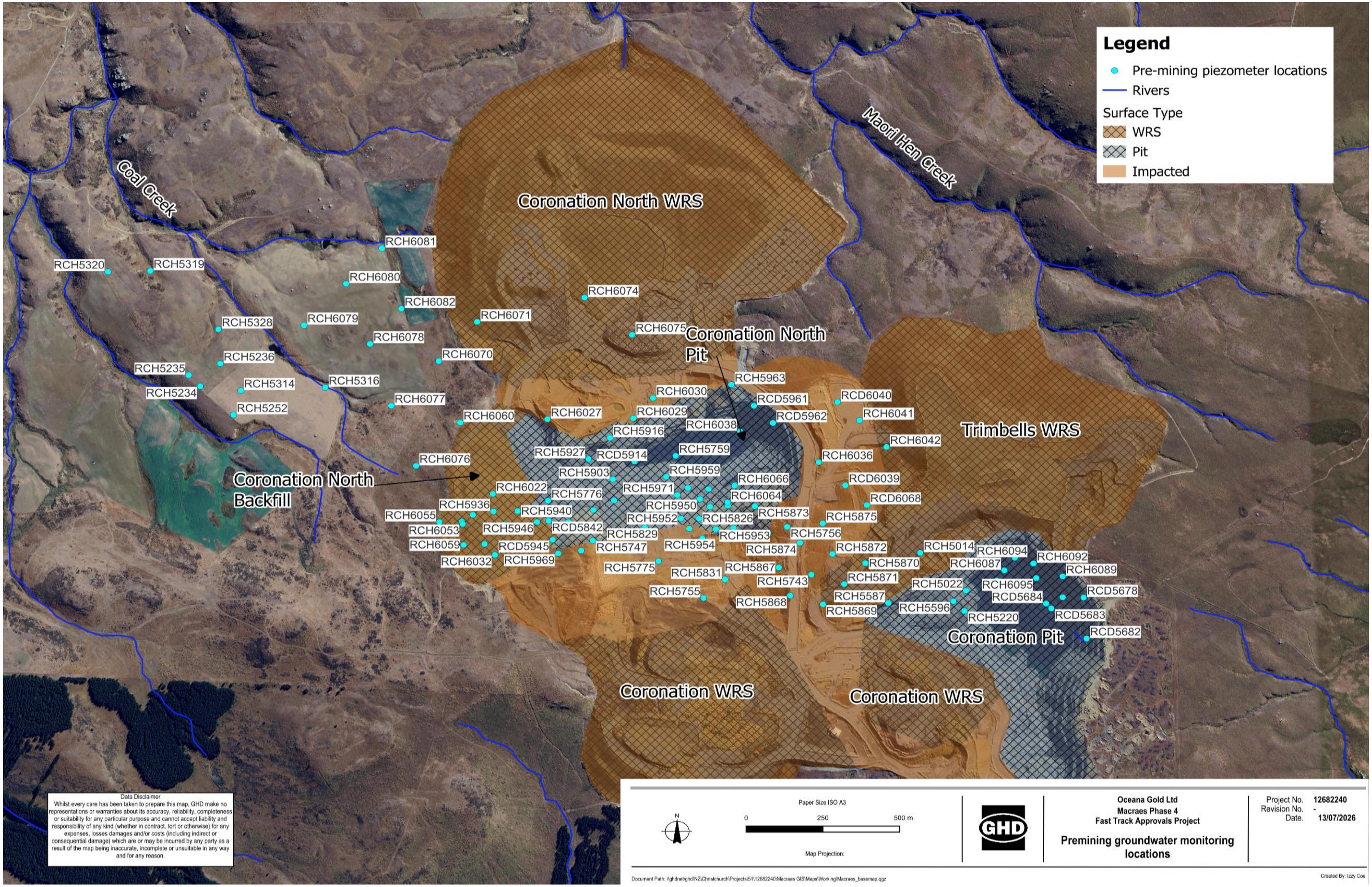
Maximum extent of modelled sulphate plume*	GW sulphate flux to Mare Burn catchment	GW sulphate flux to Deepdell Creek catchment	Seepage capture drains
~1,500 m to the northwest and ~1,400 m to the south	68 kg/day	402 kg/day	531 kg/day
Notes	**10 mg/L sulphate contour used to define the outer plume extent*		

The proposed Coal Creek augmentation dam has not been explicitly represented in the dewatering or groundwater recovery model runs. The dam is intended to provide augmentation flows to Deepdell Creek, during low-flow periods, when receiving-water dilution capacity is reduced and the potential influence of uncaptured seepage on water quality compliance is greatest. its proposed operation is described in Appendix F. As the dam's function primarily as surface-water flow augmentation measures, rather than controls on groundwater flow or contaminant transport, their inclusion in the groundwater model would not be expected to materially alter the predicted extent of sulphate plume or the estimated groundwater contributions to receiving streams. Their principal effect is instead represented within the receiving water quality assessment, through increased dilution and improved compliance resilience during critical low-flow conditions.

Attachments

Attachment 1

Borehole location plan and groundwater levels



Legend
Pre-mining piezometer locations
Rivers
Surface Type
WRS
Pit
Impacted
Coal Creek
Maori Hen Creek
Coronation North WRS
Coronation North Pit
Coronation North Backfill
Trimbells WRS
Coronation WRS
Coronation WRS
Coronation Pit
RCH5320
RCH5319
RCH6081
RCH6080
RCH6082
RCH6074
RCH5328
RCH6079
RCH6071
RCH6078
RCH6075
RCH5236
RCH6070
RCH5235
RCH5314
RCH5316
RCH5234
RCH5252
RCH6077
RCH5963
RCH6030
RCD5961
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RCH6029
RCD5962
RCH6041
RCH5916
RCH6038
RCH6042
RCH5927
RCD5914
RCH5759
RCH6036
RCH6076
RCH5903
RCH5959
RCH6066
RCD6039
RCH6022
RCH5776
RCH5971
RCH6064
RCD6068
RCH5936
RCH5950
RCH6055
RCH5940
RCH5952
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RCH5756
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RCH6092
RCH6032
RCH5969
RCH5775
RCH5831
RCH5867
RCH5870
RCH6087
RCH6089
RCH5743
RCH5871
RCH5022
RCH6095
RCD5678
RCH5755
RCH5868
RCH5587
RCD5684
RCH5869
RCH5596
RCH5220
RCD5683
RCD5682
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Map Projection:
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Oceana Gold Ltd
Macraes Phase 4
Fast Track Approvals Project
Premining groundwater monitoring locations
Project No. 12682240
Revision No. -
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Created By: Izzy Coe

Table 1.1 Measured groundwater level data measured in 2016, representing pre- mining conditions

Hole ID	Easting	Northing	Elevation (m RL)	Depth to water (m)	Groundwater elevation (m RL)
DDW6025	1394141	4977983	635.15	11.84	623.31
RCD5678	1396030	4977728	696.011	11.04	684.97
RCD5682	1396040	4977585	699.768	14.22	685.55
RCD5683	1395925	4977690	688.012	19.1	668.91
RCD5684	1395908	4977707	685.531	16.67	668.86
RCD5842	1394287	4977996	652.478	14.74	637.74
RCD5914	1394567	4978203	610.908	11.57	599.34
RCD5945	1394300	4977930	666.505	17.91	648.60
RCD5961	1394956	4978398	615.767	17.37	598.40
RCD5962	1395018	4978338	625.25	30.03	595.22
RCD6039	1395254	4978120	649.817	10.44	639.38
RCD6040	1395228	4978411	637.692	19.48	618.21
RCD6068	1395324	4978051	661.015	6.06	654.96
RCH5007	1395731	4977837	665.884	19.1	646.78
RCH5014	1395498	4977884	670.847	9.67	661.18
RCH5022	1395647	4977752	677.942	26.12	651.82
RCH5220	1395642	4977681	683.718	34.75	648.97
RCH5234	1393152	4978466	538.747	5.56	533.19
RCH5235	1393114	4978505	534.795	5.61	529.19
RCH5236	1393217	4978545	529.518	1.92	527.60
RCH5252	1393260	4978366	540.416	10.37	530.05
RCH5314	1393284	4978451	533	3.8	529.20
RCH5316	1393559	4978462	531.29	0.43	530.86
RCH5319	1392989	4978869	501.95	4.45	497.50
RCH5320	1392851	4978866	518.59	13.24	505.35
RCH5328	1393211	4978665	520.34	4.47	515.87
RCH5587	1395394	4977709	679.421	28.93	650.49
RCH5596	1395606	4977715	681.591	32.36	649.23
RCH5739	1397022	4976585	585.066	19.51	565.56
RCH5743	1395143	4977808	670.64	16.42	654.22
RCH5747	1394431	4977927	689.789	35.39	654.40

Hole ID	Easting	Northing	Elevation (m RL)	Depth to water (m)	Groundwater elevation (m RL)
RCH5748	1396380	4976640	693.114	64.13	628.98
RCH5751	1396736	4976579	631.344	33.52	597.82
RCH5752	1396875	4976583	607.501	10.18	597.32
RCH5755	1394792	4977726	665.998	13.27	652.73
RCH5756	1395064	4977975	645.718	10.94	634.78
RCH5757	1394871	4978049	601.436	13.96	587.48
RCH5759	1394701	4978223	599.501	8.66	590.84
RCH5775	1394645	4977855	667.12	19.69	647.43
RCH5776	1394285	4978066	646.904	11.32	635.58
RCH5826	1394777	4978004	623.017	21.49	601.53
RCH5827	1394741	4978111	619.577	20.69	598.89
RCH5828	1394681	4978046	633.42	14.19	619.23
RCH5829	1394601	4977973	656.944	34.71	622.23
RCH5831	1394862	4977791	643.557	11.25	632.31
RCH5833	1394889	4977971	599.513	4.92	594.59
RCH5844	1394352	4977992	659.39	16.86	642.53
RCH5866	1395003	4977953	632.092	16.36	615.73
RCH5867	1395037	4977833	646.97	17.94	629.03
RCH5868	1395074	4977735	654.755	16.9	637.86
RCH5869	1395181	4977704	671.847	19.29	652.56
RCH5870	1395319	4977848	676.163	18.52	657.64
RCH5871	1395250	4977775	677.865	16.04	661.83
RCH5872	1395212	4977880	674.313	16.71	657.60
RCH5873	1394959	4978047	627.011	18.49	608.52
RCH5874	1395106	4977919	655.541	20.33	635.21
RCH5875	1395180	4977987	655.644	9.48	646.16
RCH5903	1394496	4978141	632.958	24.98	607.98
RCH5916	1394487	4978286	611.904	28.45	583.45
RCH5927	1394417	4978212	625.017	18.75	606.27
RCH5936	1394107	4978029	625.97	14.33	611.64
RCH5939	1394141	4977983	635.15	11.85	623.30
RCH5940	1394186	4978030	634.803	5.55	629.25
RCH5946	1394249	4977992	648.189	16.75	631.44
RCH5950	1394780	4978072	615.765	25.44	590.33

Hole ID	Easting	Northing	Elevation (m RL)	Depth to water (m)	Groundwater elevation (m RL)
RCH5951	1394745	4978043	626.602	25.03	601.57
RCH5952	1394718	4978004	634.912	26.89	608.02
RCH5953	1394832	4977967	613.902	18.54	595.36
RCH5954	1394788	4977935	624.504	9.29	615.21
RCH5955	1394745	4977969	628.957	11.27	617.69
RCH5959	1394670	4978150	617.735	17.23	600.51
RCH5963	1394882	4978472	587.934	10.66	577.27
RCH5967	1394500	4978067	645.994	27.41	618.58
RCH5969	1394318	4977882	687.271	38.58	648.69
RCH5970	1394393	4977892	692.964	39.7	653.26
RCH5971	1394706	4978086	626.464	25.16	601.30
RCH5973	1394849	4978009	594.805	1.22	593.59
RCH5974	1394808	4978107	600.807	10.64	590.17
RCH5975	1394813	4978045	600.004	10	590.00
RCH6011	1394433	4978034	654.534	11.65	642.88
RCH6020	1394040	4978017	619.685	12.06	607.63
RCH6022	1394105	4978090	620.334	6.87	613.46
RCH6027	1394283	4978351	598.491	28.36	570.13
RCH6029	1394563	4978354	596.969	10.7	586.27
RCH6030	1394627	4978425	587.077	20.56	566.52
RCH6032	1394112	4977877	642.193	14.74	627.45
RCH6034	1394078	4977915	632.597	13.88	618.72
RCH6036	1395167	4978201	646.278	14.87	631.41
RCH6038	1394911	4978308	616.817	21.72	595.10
RCH6041	1395300	4978347	639.535	18.03	621.51
RCH6042	1395388	4978254	633.878	3.41	630.47
RCH6052	1394004	4977993	616.109	8.5	607.61
RCH6053	1394007	4977985	616.489	8.7	607.79
RCH6055	1393931	4977992	609.458	5.99	603.47
RCH6059	1394010	4977912	623.693	4.49	619.20
RCH6060	1393999	4978339	578.526	19.5	559.03
RCH6064	1394870	4978060	601.69	14.48	587.21
RCH6066	1394893	4978119	602.967	15.19	587.78
RCH6070	1393929	4978554	549.005	6.26	542.75

Hole ID	Easting	Northing	Elevation (m RL)	Depth to water (m)	Groundwater elevation (m RL)
RCH6071	1394054	4978691	544.616	3.77	540.85
RCH6074	1394404	4978776	554.546	9.64	544.91
RCH6075	1394559	4978646	571.024	14.94	556.08
RCH6076	1393855	4978188	585.824	8.4	577.42
RCH6077	1393774	4978398	554.342	10.43	543.91
RCH6078	1393705	4978614	541.415	6.45	534.97
RCH6079	1393490	4978679	530	5.09	524.91
RCH6080	1393627	4978824	528.71	9.31	519.40
RCH6081	1393744	4978948	520.179	1.56	518.62
RCH6082	1393807	4978737	533.992	3.04	530.95
RCH6087	1395772	4977823	669.688	22.65	647.04
RCH6088	1395962	4977729	681.045	12.42	668.63
RCH6089	1395962	4977802	676.034	12.92	663.11
RCH6092	1395867	4977847	655	6.11	648.89
RCH6093	1395747	4977788	670.042	12.76	657.28
RCH6094	1395806	4977867	660.45	13.32	647.13
RCH6095	1395876	4977796	669.522	20.21	649.31

Attachment 2

Contaminant Mass Balance Summary Reports

Mass balance summary at the end of the existing conditions model

```
 MASS BUDGET FOR ENTIRE MODEL AT END OF TIME STEP      12 IN STRESS PERIOD      11
 -------------------------------------------------------------------------------------

    CUMULATIVE MASS         M/L^3 * L^3       RATES FOR THIS TIME STEP      M/L^3 * L^3/T
    ------------------                   -----------------------

          IN:                                       IN:
          ---                                       ---
       MASS STORAGE =       2180.6420          MASS STORAGE =          0.0000
      ADSORBED MASS =          0.0000         ADSORBED MASS =          0.0000
   PRESCRIBED CONCS =   34612973.3286      PRESCRIBED CONCS =       1909.3521
   CNST H MASS FLUX =          0.0000      CNST H MASS FLUX =          0.0000
     WELL MASS FLUX =          0.0000        WELL MASS FLUX =          0.0000
      DRN MASS FLUX =      1.6311E-72         DRN MASS FLUX =          0.0000
      RIV MASS FLUX =      1.1723E-84         RIV MASS FLUX =          0.0000
      RCH MASS FLUX =          0.0000         RCH MASS FLUX =          0.0000

           TOTAL IN =   34615153.9706              TOTAL IN =       1909.3521

         OUT:                                      OUT:
         ----                                      ----
       MASS STORAGE =   33183224.6882          MASS STORAGE =        857.7718
      ADSORBED MASS =          0.0000         ADSORBED MASS =          0.0000
   PRESCRIBED CONCS =      57654.5234      PRESCRIBED CONCS =         47.2726
   CNST H MASS FLUX =         29.7993      CNST H MASS FLUX =          0.0000
     WELL MASS FLUX =          0.0000        WELL MASS FLUX =          0.0000
      DRN MASS FLUX =    1374243.7664         DRN MASS FLUX =       1004.3039
      RIV MASS FLUX =          1.1929         RIV MASS FLUX =      3.8175E-03
      RCH MASS FLUX =          0.0000         RCH MASS FLUX =          0.0000

          TOTAL OUT =   34615153.9702             TOTAL OUT =       1909.3521

           IN - OUT =      3.6795E-04              IN - OUT =     -8.6740E-05

PERCENT DISCREPANCY =            0.00   PERCENT DISCREPANCY =           -0.00
```

Mass balance summary at the end of the dewatering of Coronation Pit

```
 MASS BUDGET FOR ENTIRE MODEL AT END OF TIME STEP      12 IN STRESS PERIOD       7
 -------------------------------------------------------------------------------------

    CUMULATIVE MASS         M/L^3 * L^3       RATES FOR THIS TIME STEP      M/L^3 * L^3/T
    -----------------                  ------------------------

          IN:                                       IN:
          ---                                       ---
       MASS STORAGE =     1599737.2224           MASS STORAGE =        560.5503
      ADSORBED MASS =           0.0000          ADSORBED MASS =          0.0000
   PRESCRIBED CONCS =    38324195.1279       PRESCRIBED CONCS =       3547.5771
   CNST H MASS FLUX =           0.0000       CNST H MASS FLUX =          0.0000
     WELL MASS FLUX =           0.0000         WELL MASS FLUX =          0.0000
      DRN MASS FLUX =       2.2865E-17          DRN MASS FLUX =          0.0000
      RIV MASS FLUX =           0.0000          RIV MASS FLUX =          0.0000
      RCH MASS FLUX =           0.0000          RCH MASS FLUX =          0.0000

           TOTAL IN =    39923932.3503               TOTAL IN =       4108.1274

         OUT:                                      OUT:
         ----                                      ----
       MASS STORAGE =    34585611.3940           MASS STORAGE =       1354.1382
      ADSORBED MASS =           0.0000          ADSORBED MASS =          0.0000
   PRESCRIBED CONCS =         914.7291       PRESCRIBED CONCS =          0.5836
   CNST H MASS FLUX =           0.0000       CNST H MASS FLUX =          0.0000
     WELL MASS FLUX =           0.0000         WELL MASS FLUX =          0.0000
      DRN MASS FLUX =     5337066.5268          DRN MASS FLUX =       2752.9634
      RIV MASS FLUX =         339.7002          RIV MASS FLUX =          0.4422
      RCH MASS FLUX =           0.0000          RCH MASS FLUX =          0.0000

          TOTAL OUT =    39923932.3501              TOTAL OUT =       4108.1274

           IN - OUT =       2.2142E-04               IN - OUT =      3.0696E-05

 PERCENT DISCREPANCY =           0.00     PERCENT DISCREPANCY =          0.00
```

Mass balance at the end of the dewatering of Coronation North Pit and 3 years into the recovery of Coronation Pit

```
   MASS BUDGET FOR ENTIRE MODEL AT END OF TIME STEP      12 IN STRESS PERIOD       3
   -------------------------------------------------------------------------------------

      CUMULATIVE MASS         M/L^3 * L^3       RATES FOR THIS TIME STEP      M/L^3 * L^3/T
      ------------------                 ------------------------

            IN:                                       IN:
            ---                                       ---
         MASS STORAGE =     654065.3565         MASS STORAGE =        574.1713
        ADSORBED MASS =          0.0000        ADSORBED MASS =          0.0000
     PRESCRIBED CONCS =   17503287.1260     PRESCRIBED CONCS =       4245.7178
     CNST H MASS FLUX =          0.0000     CNST H MASS FLUX =          0.0000
       WELL MASS FLUX =          0.0000       WELL MASS FLUX =          0.0000
        GHB MASS FLUX =          0.0000        GHB MASS FLUX =          0.0000
        DRN MASS FLUX =      9.1627E-90        DRN MASS FLUX =          0.0000
        RIV MASS FLUX =          0.0000        RIV MASS FLUX =          0.0000
        RCH MASS FLUX =          0.0000        RCH MASS FLUX =          0.0000

             TOTAL IN =   18157352.4825             TOTAL IN =       4819.8891

           OUT:                                      OUT:
           ----                                      ----
         MASS STORAGE =   14640036.3036         MASS STORAGE =       1395.0557
        ADSORBED MASS =          0.0000        ADSORBED MASS =          0.0000
     PRESCRIBED CONCS =     287285.4414     PRESCRIBED CONCS =        242.0857
     CNST H MASS FLUX =          0.0000     CNST H MASS FLUX =          0.0000
       WELL MASS FLUX =          0.0000       WELL MASS FLUX =          0.0000
        GHB MASS FLUX =          0.0000        GHB MASS FLUX =          0.0000
        DRN MASS FLUX =    3229190.8915        DRN MASS FLUX =       3181.6118
        RIV MASS FLUX =        839.8459        RIV MASS FLUX =          1.1360
        RCH MASS FLUX =          0.0000        RCH MASS FLUX =          0.0000

            TOTAL OUT =   18157352.4825            TOTAL OUT =       4819.8892

             IN - OUT =      3.7570E-05             IN - OUT =     -8.7142E-05

  PERCENT DISCREPANCY =            0.00  PERCENT DISCREPANCY =           -0.00
```

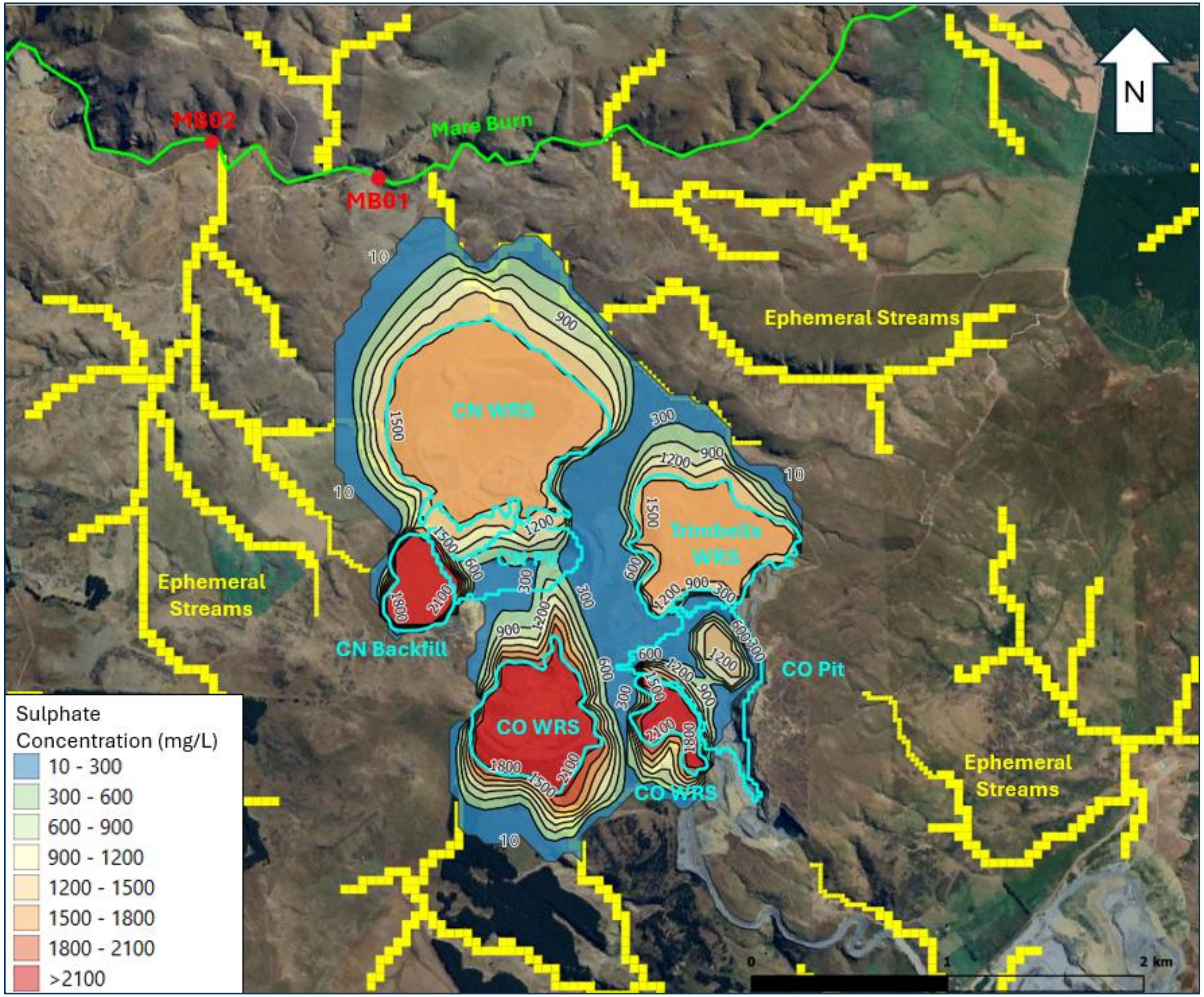
Mass balance at the end of the recovery model

```
  MASS BUDGET FOR ENTIRE MODEL AT END OF TIME STEP      60 IN STRESS PERIOD      74
  -------------------------------------------------------------------------------------

     CUMULATIVE MASS         M/L^3 * L^3       RATES FOR THIS TIME STEP      M/L^3 * L^3/T
     ------------------                  ------------------------

           IN:                                       IN:
           ---                                       ---
        MASS STORAGE =    64685842.1522          MASS STORAGE =          4.7715
       ADSORBED MASS =           0.0000         ADSORBED MASS =          0.0000
    PRESCRIBED CONCS =   278253391.2787      PRESCRIBED CONCS =       1704.9476
    CNST H MASS FLUX =           0.0000      CNST H MASS FLUX =          0.0000
      WELL MASS FLUX =           0.0000        WELL MASS FLUX =          0.0000
       GHB MASS FLUX =           0.0000         GHB MASS FLUX =          0.0000
       DRN MASS FLUX =       1.4797E-43         DRN MASS FLUX =          0.0000
       RIV MASS FLUX =       6.9021-137         RIV MASS FLUX =          0.0000
       RCH MASS FLUX =           0.0000         RCH MASS FLUX =          0.0000

            TOTAL IN =   342939233.4309              TOTAL IN =       1709.7191

          OUT:                                      OUT:
          ----                                      ----
        MASS STORAGE =    43620016.4427          MASS STORAGE =         41.7778
       ADSORBED MASS =           0.0000         ADSORBED MASS =          0.0000
    PRESCRIBED CONCS =    93252379.8487      PRESCRIBED CONCS =        550.8701
    CNST H MASS FLUX =           0.0000      CNST H MASS FLUX =          0.0000
      WELL MASS FLUX =           0.0000        WELL MASS FLUX =          0.0000
       GHB MASS FLUX =           0.0000         GHB MASS FLUX =          0.0000
       DRN MASS FLUX =   205682627.6377         DRN MASS FLUX =       1114.1077
       RIV MASS FLUX =      384209.4880         RIV MASS FLUX =          2.9636
       RCH MASS FLUX =           0.0000         RCH MASS FLUX =          0.0000

           TOTAL OUT =   342939233.4170             TOTAL OUT =       1709.7191

            IN - OUT =       1.3869E-02              IN - OUT =     -3.2425E-05

 PERCENT DISCREPANCY =            0.00    PERCENT DISCREPANCY =           -0.00
```

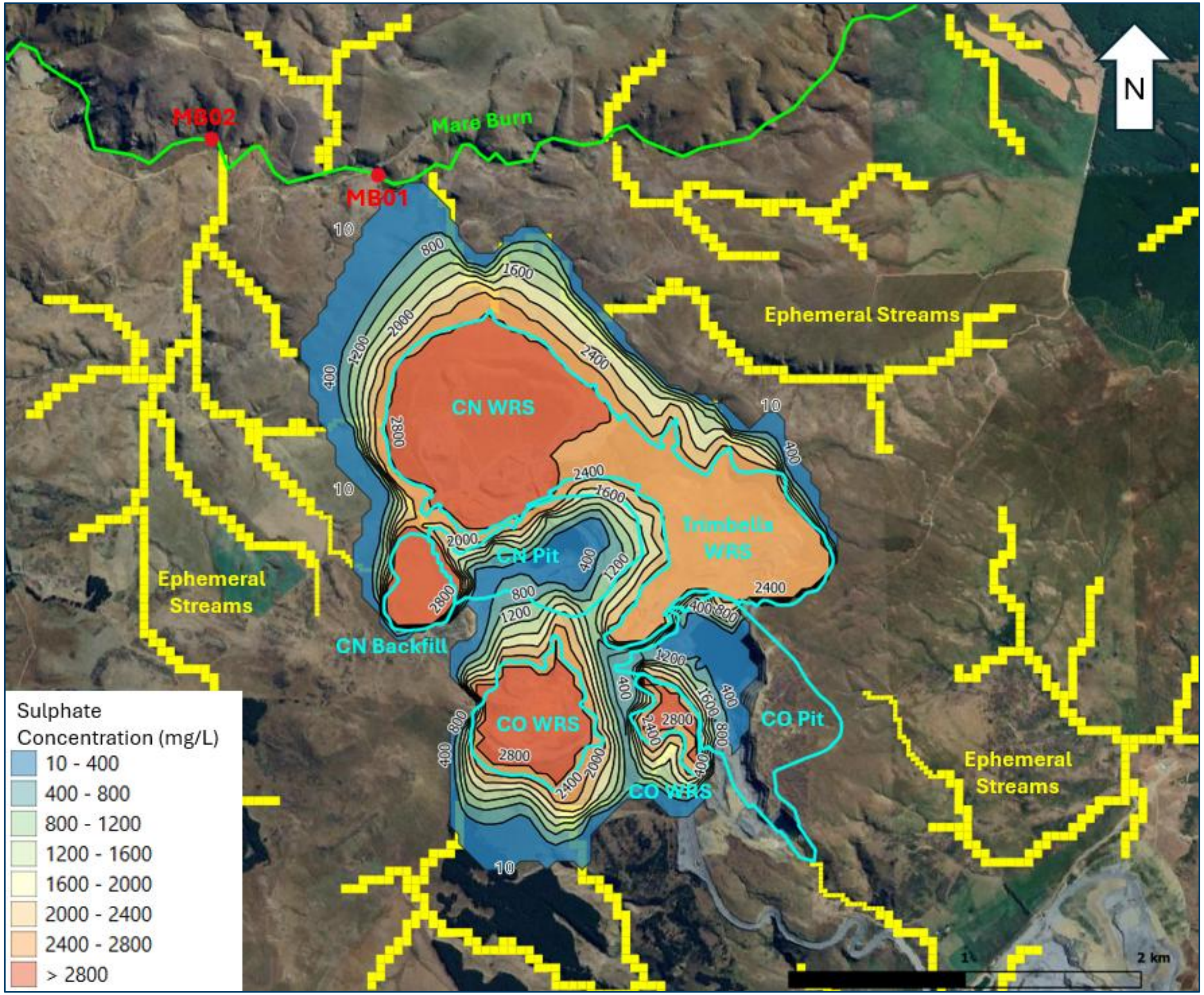
Attachment 3

Sulphate Plume Contours

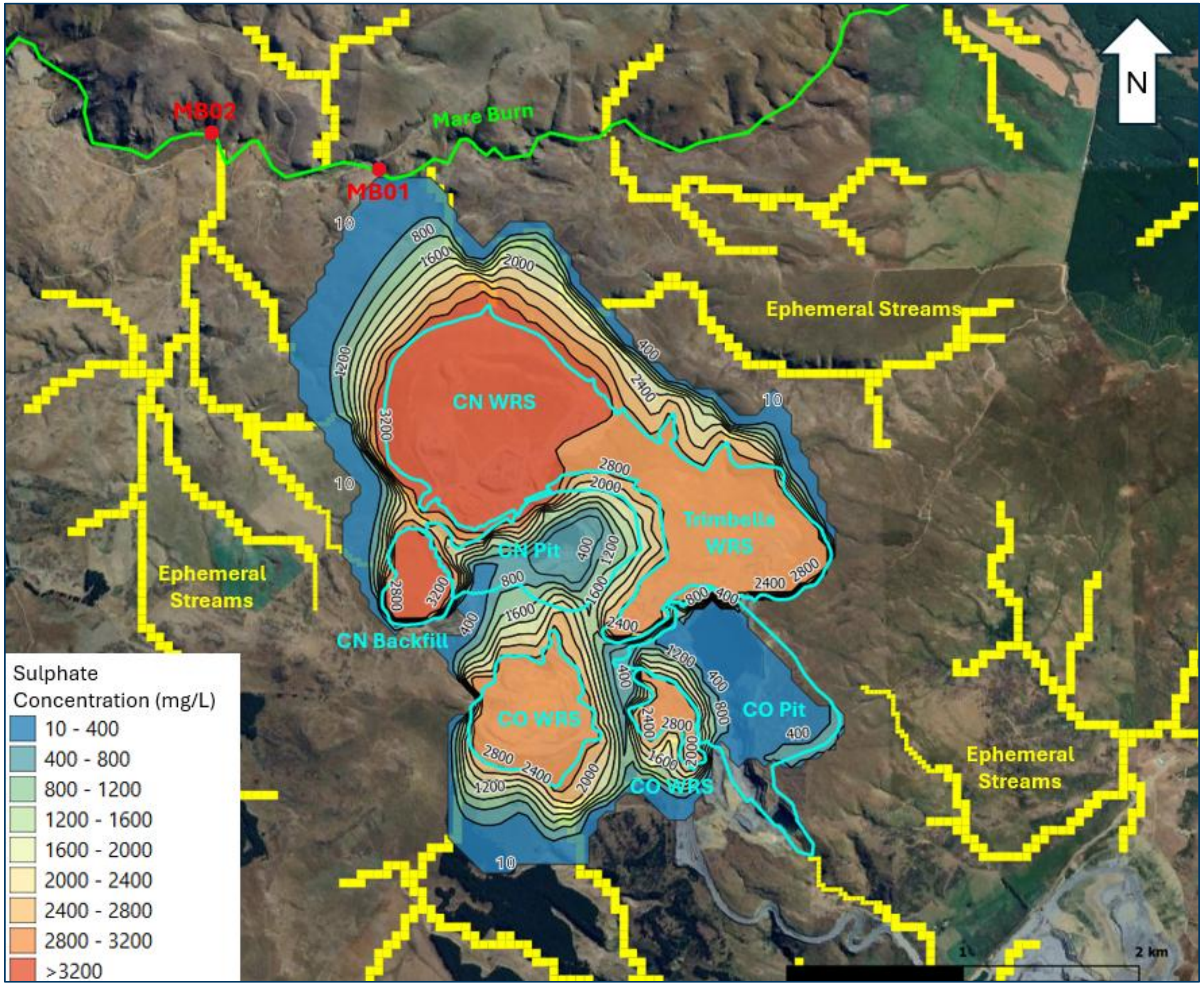
Contour plot showing sulphate plume extent and the end of the existing conditions model in model layer 1



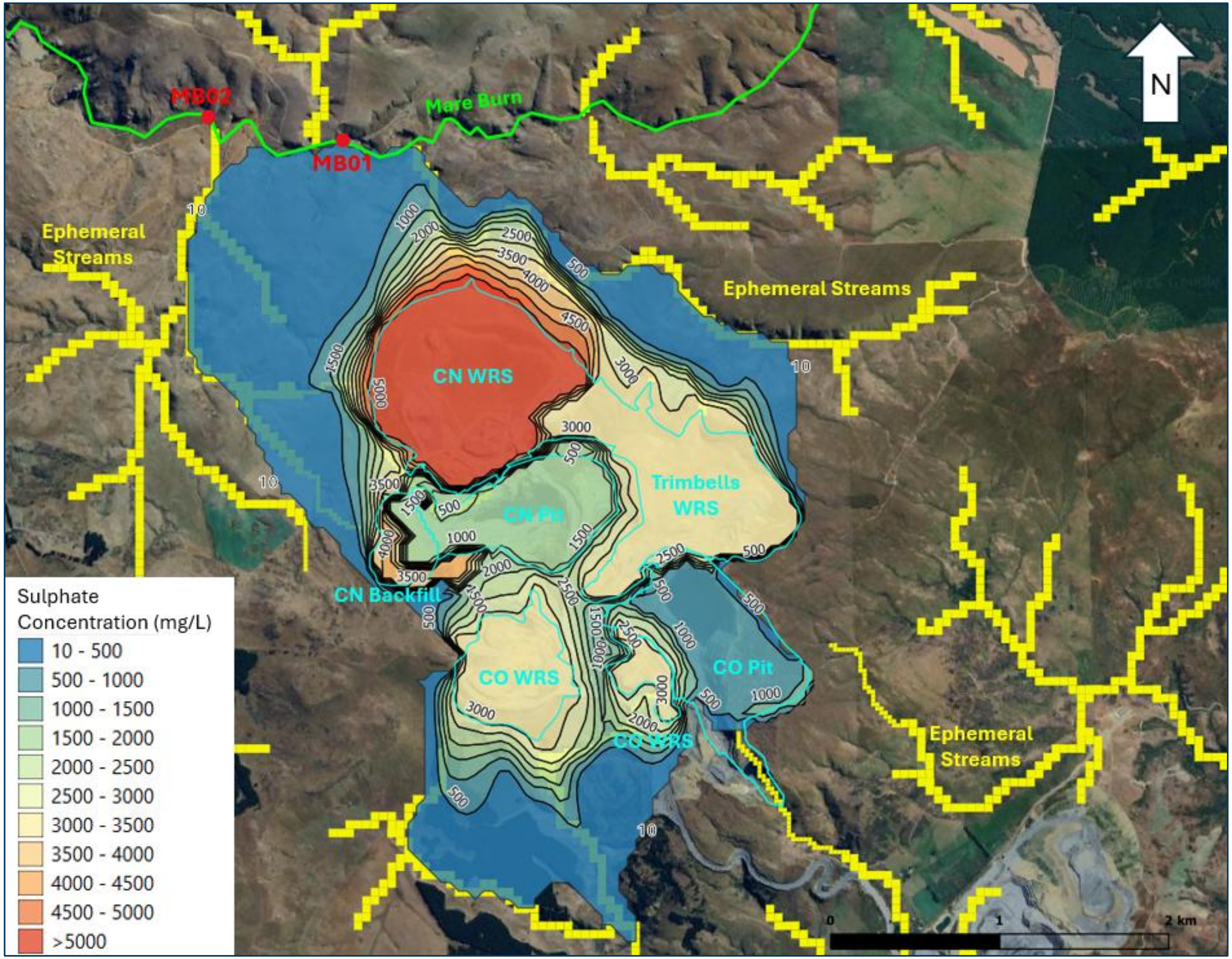
Contour plot showing sulphate plume extent at the end of the Coronation Pit dewatering model in model layer 1.



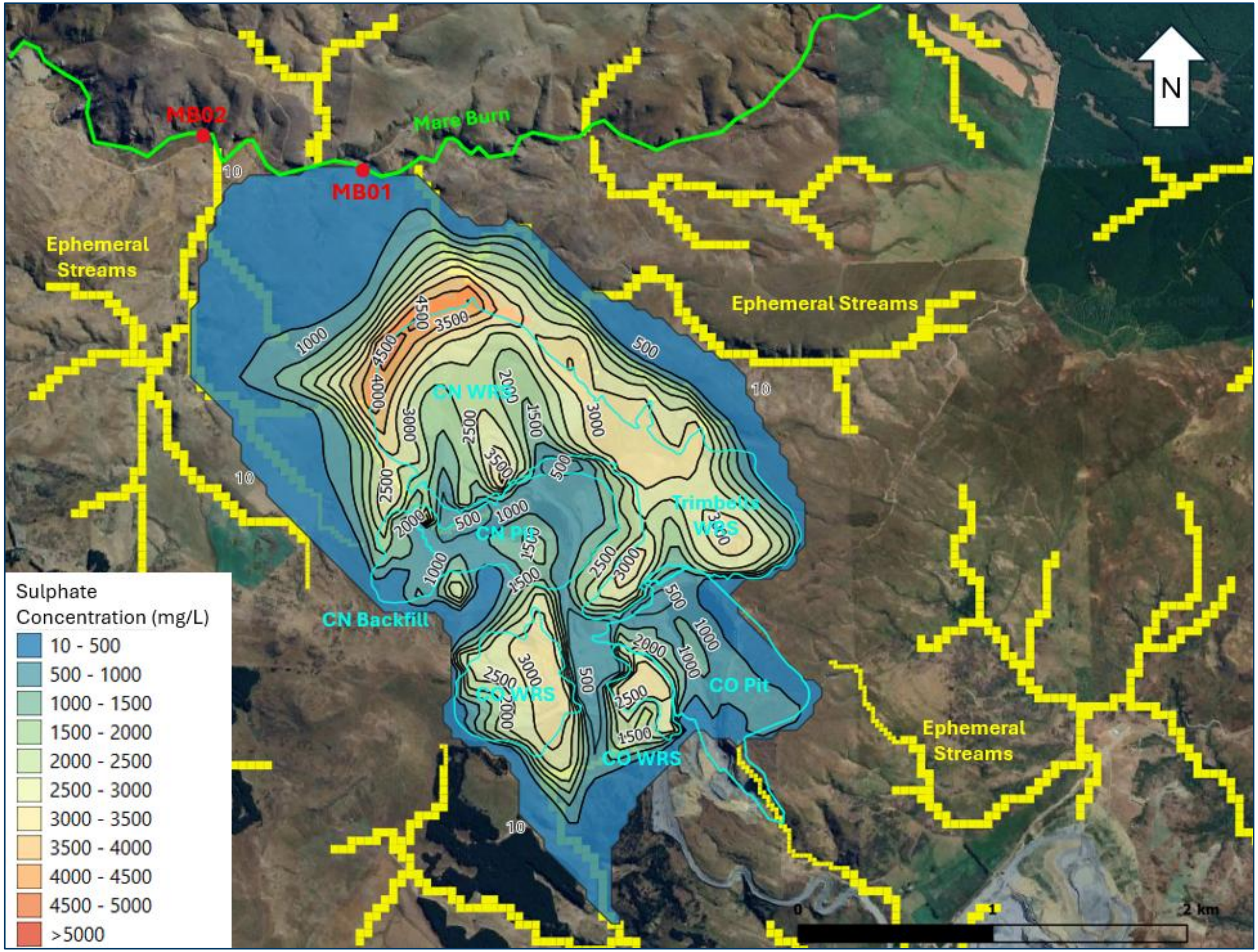
Contour plot showing sulphate plume extent at the end of the Coronation North Pit dewatering (and 3 years into the recovery of Coronation Pit) model in model layer 1.



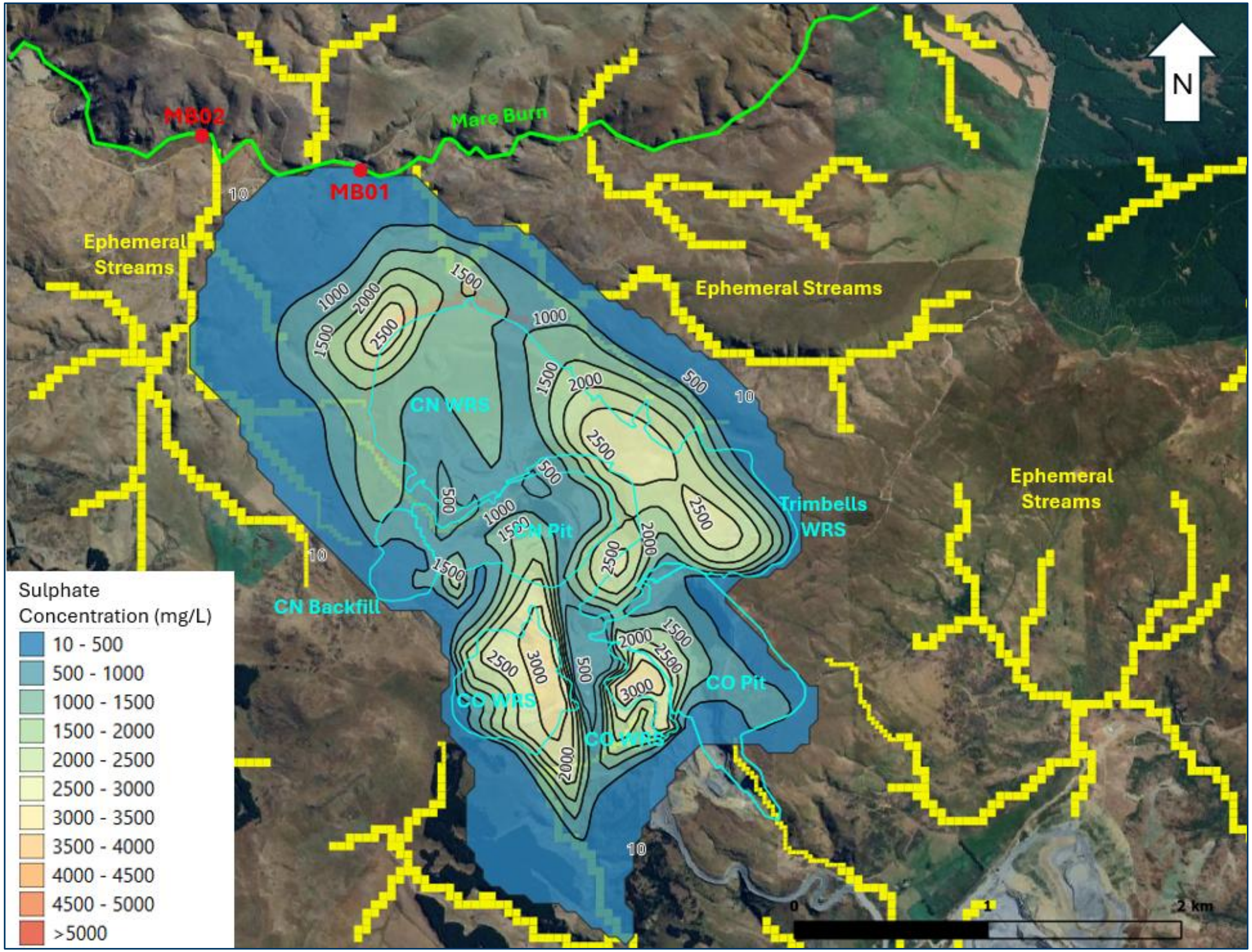
Contour plot showing sulphate plume extent and the end of the recovery model (400 years of recovery) in model layer 1.



Contour plot showing sulphate plume extent and the end of the recovery model (400 years of recovery) in model layer 2.



Contour plot showing sulphate plume extent and the end of the recovery model (400 years of recovery) in model layer 3.



Contour plot showing sulphate plume extent and the end of the recovery model (400 years of recovery) in model layer 8.