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ENVIRONMENTAL AUTHORITY AND PRCP AMENDMENT SUPPORTING INFORMATION REPORT

Georgetown Gold Project

ENVIRONMENTAL AUTHORITY (EA)
EPML00899813

PRCP SCHEDULE: P-PRCP-100766313_V1

KEMPTON MINERALS PTY LTD

APRIL 2026

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1. Introduction and Project Description

1.1 Background

Ardent Group Pty Ltd (Ardent Group) have been commissioned by Kempton Minerals Pty Ltd (Kempton Minerals), a subsidiary of Savannah Goldfields Limited (SVG), to prepare a joint Environmental Authority (EA) and Progressive Rehabilitation and Closure Plan (PRCP) amendment application for the Georgetown Gold Project. The Georgetown Gold Project is located across 12 mining leases (MLs) and is operated in accordance with EA EPML00899813 which authorises the following environmentally relevant activities (ERA):

- Schedule 3, 16: Mining gold ore;
- Ancillary 08 - Chemical Storage; 1 - Storing a total of 50t or more of chemicals of dangerous goods class 1 or class 2, division 2.3 under subsection (1)(a);
- Ancillary 08 - Chemical Storage, 3 - Storing more than 500 cubic metres of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3 under subsection (1)(c);
- Ancillary 31 - Mineral processing, 2(a) - Processing, in a year, the following quantities of mineral products, other than coke - 1000t to 100,000t;
- Ancillary 33 - Crushing, milling, grinding or screening, Crushing, grinding, milling or screening more than 5000t of material in a year;
- Ancillary 61 - Thermal waste reprocessing and treatment, 1(a) - Thermally reprocessing or treating, in a year, the following quantity of general waste - not more than 5,000t; and
- Ancillary 62 - Resource recovery and transfer facility operation; 1(c) - Operating a facility for receiving and sorting, dismantling, baling or temporarily storing category 2 regulated waste.

An application to amend EA EPML00899813 was made by Kempton Minerals on 5 April 2023 (application reference number: A-EA-AMD-100417590) which proposed to increase the tailings storage facility. Since this time, Kempton Minerals has undertaken revised design work to the proposed increase to the TSF. In accordance with section 236(1)(a) of the *Environmental Protection Act 1994* (EP Act), written notice requesting a change to the amendment application accompanies this supporting information report. As such, this report replaces the previous supporting information provided as part of amendment application A-EA-AMD-100417590.

This joint EA and PRCP amendment application relates to the Georgetown Plant Site under the area of ML 3409, ML 3540 and ML 3591. Under EA EPML00899813, Kempton Minerals also operate nine other mining leases: ML 3358, ML 3374, ML 3548, ML 30192, ML 30193, ML 30195, ML 30196, ML 30201 and ML 30203.

This report is prepared in support of the Department of the Environment, Tourism, Science and Innovation (DETSI) form '*Application to amend a progressive rehabilitation and closure plan schedule (PRCP schedule) or joint PRCP schedule and environmental authority*' (ESR/2019/4956)and intends to fulfil the requirements of Sections 226, 226AA, 226A and 226B of the EP Act as outlined in **Table 1**.

Further to the requirements outlined in **Table 1**:

- As this amendment does not involve changes to coal seam gas activities, Section 227 is not applicable to this amendment.
- As this amendment does not involve changes to underground dewatering or groundwater water supply, Section 227AA (Underground Water Rights) is not applicable to this amendment.

Table 1 EP Act Requirements for Amendment Application Supporting Information

Section of EP Act	Requirement	Relevant Section
226(1)(d)	Describe the proposed amendment.	Section **2**
226(1)(e)	Describe the land that will be affected by the proposed amendment.	Section **1.2**
226(1)(f)	Include any other document relating to the application prescribed by regulation.	Section **5.7**
226A(1)(a)	Describe any development permits in effect under the Planning Act for carrying out the relevant activity for the authority.	Section **5.1**
226A(1)(b)	State whether each relevant activity will, if the amendment is made, comply with the eligibility criteria for the activity.	Section **5.2**
226A(1)(c)	If the application states that each relevant activity will, if the amendment is made, comply with the eligibility criteria for the activity—include a declaration that the statement is correct.	Section **5.2**
226A(1)(d)	State whether the application seeks to change a condition identified in the authority as a standard condition.	Section **5.3**
226A(1)(e)	If the application relates to a new relevant resource tenure for the authority that is an exploration permit or GHG permit—state whether the applicant seeks an amended environmental authority that is subject to the standard conditions for the relevant activity or authority, to the extent it relates to the permit.	Section **5.4**
226A(1)(f)	Include an assessment of the likely impact of the proposed amendment on the environmental values, including— (i) a description of the environmental values likely to be affected by the proposed amendment; and (ii) details of emissions or releases likely to be generated by the proposed amendment; and (iii) a description of the risk and likely magnitude of impacts on the environmental values; and (iv) details of the management practices proposed to be implemented to prevent or minimise adverse impacts; and (v) if a PRCP schedule does not apply for each relevant activity—details of how the land the subject of the application will be rehabilitated after each relevant activity ends.	 Section **4.2** Section **4.1** Section **4.3** Section **4.4** Section **4.5** (a PRCP schedule applies)
226A(1)(g)	Include a description of the proposed measures for minimising and managing waste generated by amendments to the relevant activity.	Section **5.5**
226A(1)(h)	Include details of any site management plan or environmental protection order that relates to the land the subject of the application.	Section **5.6**
226B	An amendment application for a PRCP schedule must be accompanied by an amended rehabilitation planning part for the holder's PRC plan that complies with section 126C in relation to the proposed amendment.	Provided separately.

1.2 Description of Location and Activity

Collectively, ML 3358, ML 3374, ML 3409, ML 3540, ML 3548, ML 3591, ML 30192, ML 30193, ML 30195, ML 30196, ML 30201 and ML 30203 is referred to as the Georgetown Gold Project (the Project) (**Figure 1**).

The Georgetown Plant Site (ML 3409, ML 3540 and ML 3591) (the Plant Site) is located off Forsayth Road, approximately 6km southwest of Georgetown, north Queensland within the Etheridge Shire Council local government area (**Figure 2**). Tenement details for the Plant Site are set out in **Table 2**.

Table 2 Tenement Details

Specifications	Details		
ML Number	3409	3540	3591
Tenement name	Black Blow	Big Ben	Comstock
Grant Date	10 July 1986	22 October 1992	22 October 1992
Expiry Date	31 July 2027	31 October 2027	31 October 2012 (Renewal lodged)
Area	3.318 ha	73.2 ha	4.5 ha
Purpose and Minerals	Copper Ore, Gold, Lead Ore, Silver Ore, Zinc Ore	Copper Ore, Gold, Lead Ore, Silver Ore, Zinc Ore	Copper Ore, Gold, Silver Ore

The Site is situated wholly within Lot 53 on SP242966. The underlying land is described in **Table 3** and illustrated in **Figure 2**.

Table 3 Real Property Description Underlying EA Location

Specifications	Details
Background Tenure	Lot 53 on SP242966
Property Name	Mount Sullivan
Tenure type	Lands Lease
Registered Lessee / Owner	Kelvin Ray Bethel
Local government area	Etheridge Shire Council
Zoning	Rural

The Project mining operations (Jubilee Plunger (ML 3374), Electric Light (ML 3548) and Red Dam (ML 30203)) are currently under care and maintenance. These have historically supplied ore to the processing plant through open cut methods. The primary mine related features have been rehabilitated by previous owners/ operators.

The Plant Site recommenced processing ore in late 2025 before a care and maintenance period over the 2025/2026 Wet Season. The Plant Site has recommenced processing in late March 2026. The Plant Site covers approximately 81 hectares and includes pre-existing facilities, including a processing plant capable of processing oxide materials and a TSF. The Plant Site historically received ore from satellite mining leases for processing onsite. The Plant Site is authorised to receive, store and process ore from the Agate Creek Mine (ML 100030), Big Reef Mine (ML 3278, ML 3279 and ML 3280) and Josephine Gold Mine (ML 30139), in addition to the MLs within the Project area.

The Plant Site currently consists of the following mine domains:

- Tailings Storage Facility (TSF);
- Rehabilitated former tailings dams;
- Residual void;
- Backfilled and rehabilitated former voids;
- Waste rock dump;
- Water storage dam;
- Mine infrastructure areas (MIA) (administration, hardstands etc.);
- Run of Mine (ROM);
- Topsoil stockpiles;
- Access tracks; and
- Processing plant.

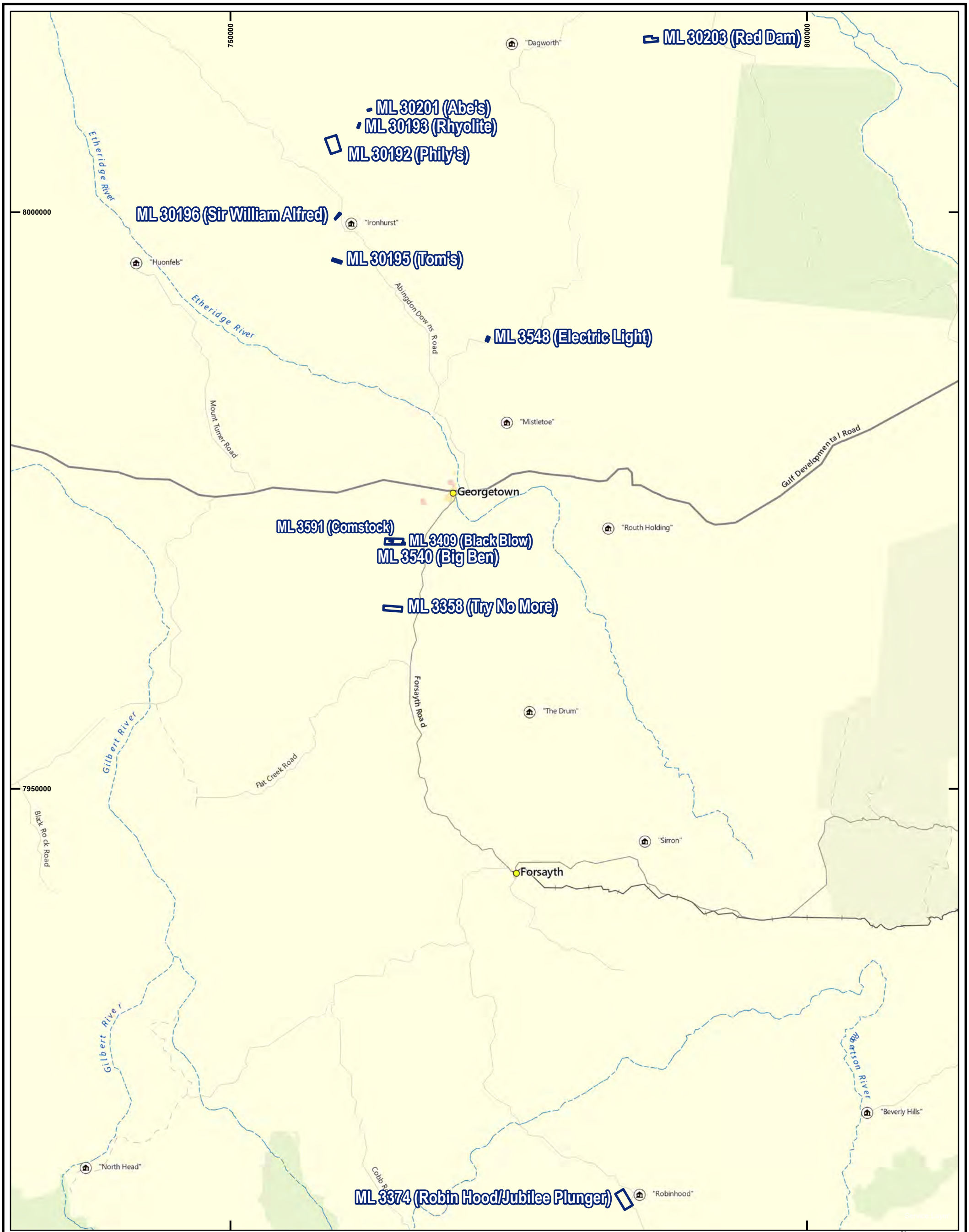


Figure 1
Regional Location of Georgetown Gold Project

Drawn By: Chris Schlebusch
Requested by: Jacob Arnold
Date: 5/06/2025

Sheet No.
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Data sources:
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760000
765000
770000
7975000
7970000
7965000
Gulf Developmental Road
Durham Creek
Four Mile Creek
Manuel Road
Dunham Creek
Orion Creek
Ridge River
St George Street
Georgetown
1
Forsayth Road
Etheridge River
Delaney River
ML 3591 (Comstock)
ML 3409 (Black Blow)
ML 3540 (Big Ben)
Sandy Creek
0 0.5 1 1.5 2 2.5
km

SAVANNAH GOLDFIELDS LIMITED

Project Overview

N
W E
S
GDA2020, MGA Zone 54

Figure 2
Mining Lease and Land Title

Georgetown Processing Plant - Mining Lease
Lot 53 on SP242966
Processing Plant

Cooktown
Cairns
Innisfail
Townsville

Drawn By:	Chris Schlebusch
Requested by:	Jacob Arnold
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Sheet No.
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2. Description of Proposed EA Amendment

This EA amendment application has been prepared for 3 purposes:

- Authorise the proposed Phase 2 TSF Expansion (refer section **2.1**);
- Authorise disturbance of borrow pit areas, required for TSF construction (described in section **2.1.4**); and
- Update EA tables to reflect historical and proposed site disturbance (refer section **2.1.5**).

2.1 Phase 2 TSF Expansion

2.1.1 Description

Kempton Minerals is facilitating a full restart of the processing plant in early 2026 and requires additional tailings storage capacity to support ongoing processing activities. As part of the long-term tailings management strategy, it is proposed to expand the capacity of the existing TSF through a 3 m upstream raise of the existing embankment to RL 326 m. As such, Kempton Minerals is seeking to amend EA EPML00899813 to authorise this proposed "Phase 2 TSF expansion".

The existing TSF is a valley-type earthfill facility constructed in 2010, currently operating with a crest level of approximately RL 323 m and an estimated storage capacity of approximately 163 ML. The proposed raise will increase the crest level to RL 326 m, increasing the available storage capacity to approximately 398 ML while remaining within the existing TSF disturbance footprint.

The proposed expansion will enable an additional 48 months of tailings capacity.

2.1.2 Phase 2 TSF Expansion Design

GeoTails Consulting Pty Ltd (GTC) was engaged to undertake a Feasibility Study (FS) level engineering design for the proposed Phase 2 TSF expansion (**Appendix 1**). The feasibility design comprises a 3 m upstream raise of the existing embankment, constructed using engineered earthfill materials with a minimum crest width of 6 m, upstream batter slopes of 1V:3H, and downstream batter slopes of 1V:2.5H. Surface water management will continue to be controlled through the existing diversion system and an emergency spillway designed to safely convey the 1:1000 AEP storm event, consistent with DETSI requirements.

Engineering assessments were undertaken to evaluate the performance of the proposed raise, including seepage modelling and slope stability analyses. A calibrated steady-state seepage model based on available monitoring data indicates that, subject to appropriate pond management and beach development, seepage from the raised embankment is expected to remain comparable to or lower than existing conditions.

Slope stability analyses were undertaken for representative cross-sections under end-of construction, long-term static and post-seismic loading conditions. The calculated factors of safety satisfy the minimum criteria recommended by the '*Guidelines on Tailings Dams; Planning Design, Construction, Operation and Closure*' (Australian National Committee on Large Dams (ANCOLD), 2019) for a 'Significant' consequence category structure, confirming that the proposed embankment configuration is stable under the assessed loading scenarios.

Operational management of the raised facility will be upgraded to implement subaerial perimeter deposition via spigots installed along the embankment crest, promoting beach development away

from the embankment and maintaining the decant pond at a safe offset to control phreatic levels and minimise seepage gradients. The monitoring framework will be expanded to include vibrating wire piezometers (VWPs) and survey monitoring to verify embankment performance during operations.

2.1.3 Dam Break Analysis and Consequence Category Assessment

GTC completed a detailed Dam Break Analysis (DBA) and updated Consequence Category Assessment (CCA) to evaluate the potential impact from hypothetical failure scenarios for the proposed Phase 2 TSF configuration and confirm the appropriate hazard classification (**Appendix 2**).

A two-dimensional hydraulic model (TUFLOW) was developed to simulate below two failure scenarios under credible failure modes:

- Sunny Day Failure (SDF); and
- Flood Failure (FF) under 1 in 100,000 AEP and Probable Maximum Flood (PMF) conditions.

For the SDF scenario, released tailings were modelled as a non-Newtonian fluid using a Herschel–Bulkley rheological formulation with sensitivity testing to bound uncertainty. For FF scenarios, breach outflow was conservatively modelled as water to represent dilution and water entrainment under extreme flood conditions.

2.1.3.1 Dam Break Modelling Results

Under Sunny Day Failure, release of approximately 68,000 m^3 (tailings and water combined) is predicted to remain largely confined to the immediate downstream corridor, with attenuation prior to significant propagation along Sandy Creek.

Under Flood Failure, up to approximately 370,000 m^3 may be released. While floodwaters extend downstream within the Sandy Creek system and may ultimately discharge to the Etheridge River, incremental impacts attributable solely to the TSF breach attenuate progressively and are minor relative to catchment-scale flooding.

Maximum incremental afflux at Georgetown is generally less than 0.1–0.2 m under the 1 in 100,000 annual exceedance probability (AEP) event and negligible under PMF conditions. Flood velocities and hydraulic hazard (depth × velocity) within Georgetown are governed primarily by regional catchment hydrology rather than breach outflow.

Population at Risk (PAR) attributable to the TSF breach is assessed as zero under both SDF and FF scenarios. Potential Loss of Life (PLL) is therefore assessed as zero.

2.1.3.2 Environmental Assessment

Mapped Matters of State Environmental Significance (MSES) occur within the downstream Sandy Creek corridor. Under both Sunny Day Failure (SDF) and Flood Failure (FF) scenarios, direct dam break discharge may enter these drainage features and result in temporary turbidity, sediment deposition and localised disturbance of aquatic and riparian habitats. Incremental flood impacts at Georgetown remain negligible relative to background extreme flood behaviour.

Detailed modelling indicates that the predicted environmental impact does not exceed DETSI thresholds for the High Consequence Category. The affected area is not expected to exceed 1 km^2,

permanent ecosystem alteration is not anticipated, and long-term remediation (>6 months) or remediation costs exceeding $10 million attributable solely to the breach are not predicted. Environmental harm is therefore assessed as significant but below High thresholds, consistent with the overall consequence classification.

2.1.3.3 Consequence Category Outcome

Based on the results of the detailed Dam Break Analysis and assessment against the criteria in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures*' (DETSI, 2024) ("DETSI (2024) Manual"), the proposed Phase 2 TSF raise to RL 326 m does not result in an increase in consequence classification relative to the existing facility and remains appropriately classified as a Significant Consequence Category regulated structure.

A Consequence Category Assessment has also been undertaken in accordance with the '*Guidelines on The Consequence Categories for Dams*' (ANCOLD, 2012). The ANCOLD classification is consistent with the DETSI outcome and confirms the structure as Significant, with no credible loss of life scenario identified.

2.1.4 Borrow Pits

As specified in Section 6 of the Feasibility Study Engineering Design (**Appendix 1**), it is estimated that up to 110,000m^3 of embankment fill material will be required to construct the upstream embankment raise forming the containment profile of Phase 2 TSF raise. While part of the required clay fill material may be sourced from the Western Cutback excavation, borrow pits will be required to source sufficient suitable material. As such, Kempton Minerals are also seeking to authorise two borrow pit areas, Borrow Pit A and Borrow Pit B, at the Plant Site of approximately 3.95ha and 4ha respectively (**Figure 3**). The area of these borrow pits allows for the pits to be staged based on need.

763500
764000
764500
765000
7972500
7972000
7971500
7971000
7970500

ML 3591
(Comstock)

ML 3540
(Big Ben)

ML 3409
(Black
Blow)

Service Layer: Source: Esri, Vantor, Earthstar Geographics, and the GIS User Community

0 50 100 150 200 250
m

SAVANNAH GOLDFIELDS LIMITED

Georgetown Gold Project EA Amendment

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GDA2020, MGA Zone 54

ARDENT GROUP PTY LTD

ML 3409, ML 3540, and ML 3591 (Plant Site) Proposed Borrow Pits

Georgetown Gold Project Mining Lease

Proposed Borrow Pit

Cooktown
Cairns
Innisfail
Townsville

Figure 3

Sheet No.
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Requested by:	Jacob Arnold
Date:	21/04/2026

Data sources:
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Path: S:\Plans\Project_Specific\Ardent\SVG006\EA Amendment 2026\RTPL_ARD_SVG006_EAAMAP_1002_A A3P Plant Site - Proposed Borrow Pits.aprx

2.1.5 Proposed Amendments to EA

The proposed amendments to authorise the construction (including borrow pits) and operation of the Phase 2 TSF expansion include amendments to:

- Table C5 (Water Storage Monitoring);
- Table F1 (Final Land Use and Rehabilitation Approval Schedule);
- Table F2 (Landform Design);
- Table G1 (Location of All Dams); and
- Table G2 (Basic Details of All Dams).

The proposed amendments to these tables are shown below in **Table 4** to **Table 8**, where proposed deletions have been crossed out and replacement text is included in red font.

It has long been acknowledged by Kempton Minerals and DETSI that the EA projective surface areas were inaccurate, reflecting multiple amalgamations and amendments of this EA in preceding decades. It was recognised that these historical inaccuracies would need rectification via EA amendment at the conclusion of the transitional PRCP process.

While the Phase 2 TSF expansion will generally remain within its existing disturbance footprint, SVG are also seeking update the area of the TSF specified in Table F1 and Table F2 of the EA to align with its existing footprint. While DETSI issued a draft PRCP schedule (P-PRCP-100766313_V1) for EA EPML00899813 on 10 April 2026, a separate EA amendment application will be submitted to remove matters relating to rehabilitation (e.g. Table F1 and Table F2) that are now dealt with under the approved PRCP schedule and proposing a reconciled authorised disturbance table and mapping to be included within the EA.

Regarding the amendments to the projective surface areas specified in **Table 4** and **Table 5**, it is proposed to increase the "*TSF and Western cutback*" area by 5ha. The Phase 2 TSF expansion is largely within its existing footprint, but Kempton Minerals seek to also capture the existing diversion drain and spillway drain and annex areas of minor gaps between features to authorise a single unhindered domain. To balance this increase in disturbance area, it is proposed to reduce the area of the "*Previously back-filled pits and TSF – rehabilitated*" by 5ha. There is currently less than 28ha of "*Previously back-filled pits and TSF – rehabilitated*" known within the Plant Site. As the areas specified in Table F1 and Table F2 of the EA are "projective", it is considered that these projective areas of previously backfilled pits and rehabilitated TSFs did not eventuate or have been superseded by another disturbance type. It is proposed to add the borrow pits to the "*Infrastructure, ROM, and soil stockpile*" column of Table F1. Additionally, there is administrative error in Table F1 where ML 3409 is specified twice in "roads & tracks" instead of ML 3540. In Table F2, it is proposed to amend the slope of the TSF embankment to <40% to align with the Phase 2 TSF expansion design. The current total projective surface area is 80.6ha and the proposed amended table will see a total projective surface area of 88.6ha (a 9.9% increase).

In regard to the control point coordinates specified in Table G1 (**Table 7**), it is proposed to amend the coordinates to ensure that Phase 2 TSF expansion is fully captured within these coordinates, including the diversion drain and spillway drain. Table C5 (**Table 6**) is proposed to be amended to ensure consistency.

Regarding Table G2 (**Table 8**), in addition to amending the maximum surface area, depth and volume of the TSF to authorise the Phase 2 TSF expansion, it is requested to amend the maximum surface areas of the Electric Light Pit and Black Blow Pit to align with those specified in Table F2.

Table 4 Amended Table F1 (Final Land Use and Rehabilitation Approval Schedule)

Item	Pits	Pits (previously rehabilitated)	Waste Dumps	TSF and Western Cutback	Infrastructure, ROM, borrow pits and soil stockpile	Roads & tracks	Raw water pond
Tenure ID	**ML3548 ML30203 ML3409 ML3374**	**ML3540 ML3591**	**ML 3548, ML30203 ML3374**	**ML3540**	**ML3540 ML3374 ML 3591**	**ML3548 ML30203 ML3409 ML3374 ML3358 ML3591 ~~ML3409~~ ML3540 ML30192 ML30193 ML30195 ML30196 ML30201**	**ML3540**
Projective surface area (ha)	7	~~33~~ 28	9.5	~~11.3~~ 16.3	~~8.8~~ 16.8	10	1
Post mine land use	Void	Grazing/Native Bushland	Grazing/Native Bushland	Grazing/ Native Bushland	Grazing/ Native Bushland	Grazing/ Native Bushland	Grazing and stock watering
Post mine land classification	VIII	No more than 10% of all disturbed land is class VII	No more than 30% of all disturbed land is class VII	No more than 10% of all disturbed land is class VII	No more than 10% of all disturbed land is class VII	No more than 30% of all disturbed land is class VII	VII
Cover (%)	N/A	60	60	60	60	60	N/A
Species	N/A	Native shrubs, tree and groundcover species	Native shrubs, tree and groundcover species	Native shrubs, tree and groundcover species	Native shrubs, tree and groundcover species	Native shrubs, tree and groundcover species	N/A

Table 5 Amended Table F2 (Landform Design)

Disturbance Type	Slope Range (%)	Projective Surface Area (ha)
Residual void Black Blow	N/A	1
Residual void Electric Light		1.4
Residual void Red Dam		2.6
Residual void Jubilee Plunger		2
Waste Dump Electric Light – upper surface	<2	0.4
Waste Dump Electric Light – batters	20	0.1
Waste Dumps Red Dam – upper surface	<2	2
Waste Dumps Red Dam – batters	20	0.5
Waste Dump Jubilee Plunger	20	6.5
Previously back-filled pits and TSF - rehabilitated	<5	~~33~~28
TSF - upper surface, diversion drain and Western Cutback	<2	~~9.8~~ 13.8
TSF – ~~batters~~ embankment and spillway	~~30-35~~<40	~~1.5~~ 2.5
Infrastructure, ROM, borrow pits, soil stockpile	1 to 7	~~8.8~~ 16.8
Raw water pond	N/A	1
Internal roads and pipelines	Natural slopes	10

Table 6 Amended Table C5 (Water Storage Monitoring)

Water Storage Description	Location (GDA94 MGA z54)		Monitoring Location	Frequency of Monitoring
	Easting	Northing		
Tailings Storage Facility (TSFWS1 to TSFWS4~~6~~)	~~764935~~764294 ~~764324~~764295 ~~764301~~764555 764855 764976 764840	~~7971567~~7971299 ~~7971538~~7971535 ~~7971322~~7971644 7971656 7971575 7971248	Tailings return pump sampling point.	Quarterly
Red Dam Pit (RDPWS1 to RDPWS4)	786587 786549 786552 785866	8014989 8015020 8015102 8015080	Within the pit.	Quarterly
Electric Light Pit (ELPWS1-ELPWS4)	772219 772417 772370 772164	7988826 7989168 7989195 7988867	Within the pit.	Quarterly
Black Blow Midapa Pit (BBPWS1- BBPWS6)	764911 764974 765028 765027 764971 764917	7971283 7971273 7971300 7971323 7971325 7971313	Within the pit.	Quarterly
Jubilee Plunger Pit	783924 784256 784087 783762	7914635 7914252 7914100 7914544	Within the pit.	Quarterly

Table 7 Amended Table G1 (Location of All Dams)

Name of Dam	Easting (GDA 94 MGA Zone 54)	~~Northern~~ Northing (GDA 94 MGA Zone 54)
Tailings Storage Facility	~~764935~~764294 ~~764324~~764295 ~~764301~~764555 764855 764976 764840	~~7971567~~7971299 ~~7971538~~7971535 ~~7971322~~7971644 7971656 7971575 7971248
Red Dam Pit	785887 786549 786552 785866	8014989 8015020 8015102 8015080
Electric Light Pit	772290 772340 772215 772154	7989214 7989197 7988831 7988860
Black Blow Midapa Pit	764911 764974 765028 765027 764971 764917	7971283 7971273 7971300 7971323 7971325 7971313

Table 8 Amended Table G2 (Basic Details of All Dams)

Name of Dam	Maximum Surface Area (Ha)	Maximum Volume (m^3)	Maximum Depth (m^2)	Purpose of dam (3)
Tailings Storage Facility	~~9~~ 14	~~320,000~~ 398,000	~~8~~ 11	Tailings Storage
TSF Western Cutback[5]	2.3	81,000	7	Tailings Storage
Red Dam Pit	2.6	1,200,000	20	Excavated mining void
Electric Light Pit	~~1.1~~1.4	576,000	18	Excavated mining void
Black Blow Midapa Pit	~~0.44~~ 1	7,000	10	Excavated mining void

3. Description of Proposed PRCP Amendments

As a result of the proposed EA amendment described in Section **2**, it is proposed to amend the approved PRCP to ensure consistency between the two relevant environmental requirements. Specifically, it is proposed to amend the following aspects of the approved PRCP schedule:

- 'Figure 1 – Final Site Design Plant Site (ML3409, ML3540, ML3591)';
- 'Figure 11 – Reference Map Plant Site (ML3409, ML3540, ML3591)';
- The addition of 'Section 4.11 (RA11) Rehabilitation area 11' for the borrow pits;
- The areas specified in Section 4.1 (RA1) Rehabilitation area 1', 'Section 4.3 (RA3) Rehabilitation area 3', and Section 4.7 (RA7) Rehabilitation area 7'.

There are no changes proposed to 'Section A - Conditions of PRCP schedule', 'Section B – Definitions', 'Section 4.11 Rehabilitation area milestones', 'Section E – Non-use management areas' or the 'Appendices' of the PRCP schedule.

An updated 'Figure 1 – Final Site Design Plant Site (ML3409, ML3540, ML3591)' and 'Figure 11 – Reference Map Plant Site (ML3409, ML3540, ML3591)' are attached at **Appendix 3**.

The areas specified in RA3 are proposed to be increased to align with the area of the Phase 2 TSF expansion, including capturing the diversion drain and spillway drain within this rehabilitation area. This has resulted in areas currently designated as RA1 and RA7 being now captured within RA3. In addition, a small area that is currently part of RA1 will be captured within new proposed RA11 for the borrow pits. A summary of the amendments to the rehabilitation area sizes is outlined in **Table 9**.

An amended rehabilitation planning part (including PRCP schedule) reflecting the proposed amendment described in Section **2** has been provided separately. The key amendments include:

- Amendments throughout as a result of changes to area sizes (ha);
- Inclusion of references to RA11 for borrow pits;
- Options analysis included in Section 5.4 for the proposed borrow pit PMLU;
- Erosion and landform evolution modelling of the Phase 2 TSF final landform design has been carried out by Landloch Pty Ltd and is summarised in Section 8.6.3.1, with report attached at Appendix 12; and
- Description of Phase TSF expansion in Section 8.10.4 with design report attached at Appendix 17.

In should be noted that in accordance with Condition PRCP15 of the PRCP Schedule, an appropriately qualified person (AQP) prepared and peer reviewed landform closure design report (which includes detailed engineering designs) will be provided to DETSI for the Phase 2 TSF.

Table 9 Total Rehabilitation Area Size Amendment Summary

Rehabilitation area	Relevant activities	Existing total rehabilitation area size (ha)	Proposed total rehabilitation area size (ha)	Comment
RA1	Previously backfilled pits and TSF - rehabilitated	8.420	7.849	Reduction of area due to some areas now captured within expanded RA3 and new RA11.
RA2	Waste rock dumps (WRD)	9.457	9.457	No change
RA3	Tailings Storage Facility (TSF)	11.296	16.260	Increased area to capture existing disturbance footprint, including diversion drain and spillway drain.
RA4	Processing plant	0.326	0.326	No change
RA5	Plant Site ROM	1.989	1.989	No change
RA6	Jubilee Plunger ROM	1.806	1.806	No change
RA7	Roads and tracks	7.237	5.510	Reduction of area due to some roads and tracks now captured within expanded RA3 footprint.
RA8	Raw Water Pond	0.571	0.571	No change
RA9	Infrastructure (Laydown, Sediment Dams, Support Services, Fuel Store, Groundwater Monitoring Bores)	1.511	1.511	No change
RA10	Soil Stockpile	2.783	2.783	No change
RA11	Borrow pits	0	7.951	Addition of new RA for borrow pits

4. Assessment of Likely Impact on Environmental Values

4.1 Emissions or Releases Likely to be Generated

Activities associated with the construction and operation of the proposed Phase 2 TSF expansion have the potential to generate emissions or releases to air, water and land consistent with the currently approved mining activities. The Phase 2 TSF expansion will be undertaken within the existing TSF disturbance footprint (noting updates to Table F1 and Table F2 of the EA are proposed) and does not introduce new emission sources beyond those associated with previous construction and current tailings deposition.

Potential emissions or releases likely to be generated by activities associated with the proposed amendment include:

- Air
  - Temporary dust generation from construction machinery, haul vehicles and earthworks.
  - Exhaust emissions from diesel-powered equipment and vehicles operating during the construction phase.
- Water
  - Seepage from the TSF, which modelling indicates that, subject to appropriate pond management and beach development, seepage from the raised embankment is expected to remain comparable to or lower than existing conditions (**Appendix 1**).
  - Release from TSF to surface waters (e.g. overtopping, dam break).
  - Release of sediment laden water from area of borrow pits.
- Noise
  - Temporary construction noise from earthmoving equipment and haulage vehicles.
- Land
  - Disturbance to and excavation of required embankment clay fill material from proposed borrow pits.
  - Placement of additional tailings within the existing TSF footprint.

It is estimated that a maximum of 38,640 L of diesel may be used during the construction of the Phase 2 TSF expansion. The proposed amendment does not include an increase in production or activity outside that already authorised. The existing Ergon supply system can provide 800 kW which powers the majority of the Plant Site including the process mills therefore providing relatively low emission power. Approximately 20.2kWh of electricity is used by the plant to produce 1 tonne of tailings. Based on an average dry tailings density of 1.4t/m^3, it is estimated that Phase 2 TSF expansion will allow an additional 329,000 tonnes of tailings to be produced, consuming 6,645,800kWh of electricity by the plant during its production. Using the National Greenhouse and Energy Reporting (NGER) Emissions and Energy Threshold Calculator, it is estimated that there will be a total of 4,824 t CO2-e emissions as a result of the proposed amendment. This results in the proposed amendment being with the “low emission category”. A copy of the NGER Threshold Calculator has been attached in **Appendix 4**.

4.2 Description of Environmental Values likely to be affected by the proposed amendment

4.2.1 Air Environmental Values

The township of Georgetown is located approximately 6km northeast of the Plant Site. Other sensitive receivers include a homestead 3km southeast of the Site, as well as Namuel Station and Lawnvale Station homesteads located approximately 5 km northwest and 13km south-southeast respectively.

The proposed amendment authorising the construction (including borrow pits) and operation of the Phase 2 TSF expansion is not expected to result in any new or increased impacts on air quality compared to those associated with the currently approved mining operations. Activities at the Plant Site will remain aligned with existing processing operations and will utilise existing infrastructure to produce tailings and manage the integrated tailings facility in line with a revised TSF Operations Plan to be developed post approval and prior to first deposition. There is no proposal to increase mining activities or throughput at the Plant Site. Processing activities will continue to operate in accordance with the existing EA approval (24 hours per day, Monday to Sunday).

Air impacts associated with the temporary construction works will be mitigated through implementation of dust suppression measures. These measures will minimise the likelihood of nuisance at sensitive receptors.

Kempton Minerals will continue to ensure that the conditions specified in 'Schedule B – Air' of the EA will be met, ensuring the release of odour, dust or any other airborne contaminant(s), or light will not cause an environmental nuisance at any sensitive place or commercial place. This includes measures to ensure that the release of odour, dust, airborne contaminants, or light does not result in environmental nuisance at any sensitive or commercial location.

4.2.2 Noise (Acoustic) Environmental Values

The township of Georgetown is located approximately 6km northeast of the Plant Site. Other sensitive receivers include a homestead 3km southeast of the Site, as well as Namuel Station and Lawnvale Station homesteads located approximately 5 km northwest and 13km south-southeast respectively.

The proposed amendment authorising the construction (including borrow pits) and operation of the Phase 2 TSF expansion is not expected to result in any new or increased noise or vibration impacts compared to those associated with the currently approved mining operations. Plant Site activities will remain aligned with existing processing operations and will utilise current infrastructure to handle material, process ore and produce tailings.

The construction of the Phase 2 TSF and excavation of the borrow pits uses similar equipment associated with the trucking and dumping of ore (haul trucks and side tippers) and crush and screen mobile equipment (excavators, loaders and jaw crushers) situated adjacent to the Processing Plant. The proposed amendment does not change any currently approved impacts associated with blasting and vibration.

Kempton Minerals will ensure that all construction and operational activities continue to comply with the conditions specified in 'Schedule D – Noise and Vibration' of the EA, such that noise generated by the Plant Site does not cause the specified noise limits to be exceeded at sensitive receptors.

4.2.3 Water Environmental Values

Watercourses at the Site are characterised by 1st order streams (**Figure 4**). Watercourses west of the Site discharge into an unnamed tributary of Four Mile Creek which discharges into Four Mile Creek approximately 2km northwest of the Site. Watercourses east of the Site discharge into Sandy Creek, 1km east of the Site. Sandy Creek discharges into the Etheridge River approximately 6km from the Site.

Environmental values of regional waterways are identified in the *Environmental Protection (Water and Wetland Biodiversity) Policy 2019* (EPP (Water)). The Project area lies within the Gilbert River Basin, part of the Cape York Southern Basins, which currently does not have approved environmental values and water quality objectives (WQOs) under Schedule 1 of the EPP (Water). As such, the environmental values and WQOs are respectively those determined in accordance with section 6 and section 11 of the EPP (Water). Contaminant Release and Trigger Limits are provided in the EA which are designed to protect the identified surface water environmental values.

The proposed amendment authorising the construction (including borrow pits) and operation of the Phase 2 TSF expansion will not introduce new or any greater impacts to identified surface water environmental values than those associated with currently approved mining activities. Construction and operation are consistent with existing activities such as haulage, crush and screen, waste and ore stockpiling, processing and tailings storage. Its construction and operation effectively reduce the risk of impacts to surface water by using modern engineering and construction standards, quality assurance and quality control practices to minimise the development of seepage, manage decant and rainfall runoff. Further, the construction will occur during the dry season over an estimated 90 days immediately post approval of a revised estimated rehabilitation cost decision.

The total TSF catchment is approximately 19.2 ha (**Figure 5**). The upper western sub-catchment of approximately 4.9 ha is diverted around the TSF via a clean water diversion system, while the remaining catchment area (14.3ha), including the proposed Western Cutback (approximately 2.2 ha), reports directly to the TSF impoundment. The surface water management strategy maintains hydraulic separation between clean and impacted water. In extreme storm events where diversion capacity and available TSF storage are exceeded, the emergency spillway provides controlled conveyance of excess flows downstream (**Figure 5**).

The emergency spillway is proposed on the northern embankment, discharging to the existing downstream spillway channel (**Figure 5**). The emergency spillway is designed to safely convey the 1 in 1,000 AEP critical storm event, consistent with the requirements for a “Significant” consequence category structure under the DETSI (2024) Manual.

In accordance with the DETSI (2024) Manual and ANCOLD Guidelines, spillway capacity has been assessed assuming the TSF water level is at the spillway crest level at the commencement of the design storm event and that the upstream clean water diversion drain is inoperable, resulting in a total contributing catchment of approximately 18.9 ha. The spillway will be rock-armoured to provide erosion protection, with 1V:10H side slopes adopted to facilitate safe vehicle access.

Key design parameters are summarised in **Table 10**, which presents the hydraulic capacity of the Phase 2 emergency spillway.

Table 10 Phase 2 TSF Emergency Spillway Design

Parameter	Value
Critical Storm Event	1:1000 AEP, 6 hours
Catchment Area	18.9 ha
Spillway Base Width	6.0 m
Spillway Crest Side Slope	1V:10H
Spillway Crest Level	RL 325.0 m
Spillway Depth	1.0 m
Peak Inflow	3.4 m^3/s
Peak Outflow	1.3 m^3/s
Flow Depth	0.3 m
Available Freeboard	0.7 m

Detailed assessment of the Design Storage Allowance (DSA) and Mandatory Reporting Level (MRL) will be undertaken at the detailed design stage. Compliance will be demonstrated through operational simulation method in accordance with DETSI requirements as part of the site-wide Water Balance Model.

The operational simulation will assess storage performance under long-term climate sequences and design storm conditions to confirm compliance with hydraulic performance requirements for a significant consequence category structure. As part of detailed design, the site-wide water management system will be further defined, including pipeline configuration, pumping capacity, flow rates, return water arrangements and operational controls.

As detailed in Section **2.1.3**, GTC completed a detailed DBA and updated CCA to evaluate the potential impact from hypothetical failure scenarios for the proposed Phase 2 TSF configuration. The CCA was undertaken in accordance with the DETSI (2024) Manual and considered three failure scenarios (seepage, overtopping, and dam break), under both Sunny Day and Flood Failure conditions. Based on the results of the detailed DBA and assessment against the DETSI (2024) Manual criteria, the proposed Phase 2 TSF raise to RL 326 m does not result in an increase in consequence classification relative to the existing facility and remains appropriately classified as a Significant Consequence Category regulated structure. Details of the assessment specific to surface water values are in **Table 11**.

Table 11 Results of CCA relating to Surface Water (adapted from GTG, 2026)

Environmental Harm	Failure to Contain – Overtopping	Failure to Contain - Dam Break
Harm to Humans	The zone of potential influence of uncontrolled release of contaminated water (by overtopping) would include the historic Black Blow pit and drainage line located to the southeast of the TSF. Under this condition, contamination of surface water or groundwater used human consumption would not result in the health of more than 10 people being affected. **Consequence Category: LOW.**	Population at Risk (PAR) is assessed as zero under the Sunny Day Failure scenario and zero incremental PAR under the Flood Failure scenario. Accordingly, Potential Loss of Life is zero. In accordance with the DETSI (2024) Manual (excluding site personnel), no loss of life is expected. **Consequence Category: LOW.**

Environmental Harm	Failure to Contain – Overtopping	Failure to Contain - Dam Break
General environmental harm	A hypothetical TSF breach would discharge to an unnamed tributary, Sandy Creek and downstream riverine systems, intersecting mapped environmental values including aquatic and riparian habitats. Release of tailings and supernatant water has the potential to cause degradation of water quality, sediment deposition and disturbance to downstream ecosystems. Consistent with Clause (a) of the DETSI (2024) Manual, such impacts may result in significant alteration of localised ecosystems and remediation periods exceeding six months; however, the predicted scale and magnitude of impact are not expected to meet the thresholds for the High Consequence Category. Accordingly, the environmental consequence for Failure to Contain - Dam Break is assessed as SIGNIFICANT. **Consequence Category: SIGNIFICANT**.	Under a Sunny Day Failure scenario, release of up to approximately 68 ML may occur, with a modelled runout distance of approximately 1.8 km and potential minor interaction with Sandy Creek. Under a Flood Failure scenario, up to approximately 370 ML may be released, with modelled downstream influence extending toward the Etheridge River (approximately 9 km). While incremental afflux in Sandy Creek is minor relative to background extreme flood conditions, discharge to receiving waters may result in elevated turbidity, sediment deposition and disturbance to aquatic and riparian ecosystems. Consistent with Clause (a) of the DETSI (2024) Manual, such impacts could result in measurable ecosystem disturbance and remediation extending beyond six months; however, the predicted scale and magnitude of impact are not expected to meet the thresholds for the High Consequence Category. Accordingly, the Failure to Contain - Dam Break consequence category is assessed as SIGNIFICANT. **Consequence Category: SIGNIFICANT.**
General economic loss or property damage	Dam overtopping is not expected to result in impact to any third-party assets, as no third-party property or infrastructure is located within the modelled failure impact zone. Accordingly, no rehabilitation, compensation, repair or rectification costs to third parties are anticipated. **Consequence Category: LOW.**	Based on the dam break modelling results, the extent and location of the failure impact zone are not expected to result in material damage to third-party property. Any rehabilitation, compensation, repair or rectification costs associated with assets within the failure pathway are expected to be less than $1 million. **Consequence Category: LOW.**

Kempton Minerals will continue to ensure that the conditions specified in 'Schedule C – Water' of the EA will be met, ensuring contaminants that will, or have the potential to cause environmental harm will not be released directly or indirectly to any waters except as permitted under the conditions of the EA. This includes, but is not limited to, the continued operation of the Site in accordance with the Site Water Management Plan as well as surface water monitoring of receiving waters and water storages conducted at the specified locations and frequency.

7974000

764000

Four Mile Creek

325

ML 30203 (Red Dam)

Elizabeth Creek

ML 30201 (Abe's)

ML 30193 (Rhyolite)

ML 30192 (Phily's)

ML 30196 (Sir William Alfred)

ML 30195 (Tom's)

Einasleigh River

ML 3548 (Electric Light)

Etheridge River

Gilbert River

ML 3409 (Black

ML 3591 (Comstock)

ML 3540 (Big Ben)

ML 3358 (Try No More)

Robertson River

ML 3374 (Robin Hood/Jubilee Plunger)

7972000

325

ML 3591 (Comstock)

ML 3540 (Big Ben)

ML 3409 (Black Blow)

7970000

325

Sandy Creek

Service Layer: Source: Esri, Vantor, Earthstar Geographics, and the GIS User Community

0 200 400 600 800 1,000

m

SAVANNAH GOLDFIELDS LIMITED

Georgetown Gold Project

N W E S

GDA2020, MGA Zone 54

Plant Site Topography and Drainage

Georgetown Gold Project Mining Lease

Watercourse

Major River

Contour 5m (derived from Queensland DEM)

Cooktown

Cairns

Innisfail

Townsville

Figure 4

Sheet No. RTPL_ARD_SVG006_EAAMAP_1005_1A

Drawn By: Chris Schlebusch

Requested by: Jacob Arnold

Date: 23/04/2026

Data sources:
©The State of Queensland (Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development)

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Figure 5 Phase 2 TSF Expansion Catchment and Surface Water Management Layout (GTC, 2026)

4.2.4 Groundwater Environmental Values

Similar to the Water Environmental Values, groundwater environmental values are identified in the EPP (Water). The Project area lies within the Gilbert River Basin, part of the Cape York Southern Basins, which currently does not have approved environmental values and WQOs under Schedule 1 of the EPP (Water). As such, the environmental values and WQOs are respectively those determined in accordance with section 6 and section 11 of the EPP (Water). Groundwater contaminant and trigger limits are provided in the EA (Table C8) which are designed to protect the identified groundwater environmental values.

Geochemical Scientific (2022) describes the geology of the Plant Site as characterised by regolith that has developed from the weathering of the underlying granitic host rocks. The site features a superficial layer of sandy-clay material with low to medium plasticity. Beneath this layer, there are more deeply weathered granite profiles, which exhibit a variety of textures and overlie the fractured granitic basement rock. Regionally the basement geology is dominated by Proterozoic granitic and metamorphic rocks having been altered by three phases of intrusives (Morrison *et al.*, 2019 in Geochemical Scientific (2022)) including:

- Early Devonian Plutonic deposits;
- Early Permian and Early Carboniferous Intrusive deposits and;
- Epithermal rhyolites.

Morrison *et al*. (2019) in Geochemical Scientific (2022) collated multielement data on different geologic domains from 203 prospects in 54 camps in the Georgetown region. This extensive assessment identified elemental enrichment in Te, Au, Pb, Ag, As, Zn, Sb, Bi, Cu throughout the region. Further, mineralisation is linked to the broader Etheridge Goldfield region. Sulfide minerals: such as pyrite, arsenopyrite, galena, chalcopyrite, and sphalerite (Plentex, 2008 in Geochemical Scientific (2022)), have been documented to constitute up to 50% of the mineral content in geothermal deposits that host ore bodies in the areas.

To summarise the local geology, the Plant Site and its region is located within a naturally occurring mineralised zone, historically targeted by many small scale and medium scale mining ventures.

HydroElement Solutions developed a hydrological model for the Plant site (HES, 2024). Further, a review of the available geological and groundwater data identified the main hydrogeological units as:

- Weathered regolith aquifers
  - These shallow, unconfined aquifers occur within the weathered granitic overburden, typically at depths of 10–15 m. They exhibit moderate hydraulic continuity across the Plant Site, with low yields (commonly referred to as "soaks") and delayed response to rainfall events, indicative of low permeability.
- Near-surface fractures in the basement
  - Occurring at depths of 20–50 m, these semi-confined aquifers are hosted within fractured granitic basement. They represent the main groundwater-bearing unit on site, with typical yields ranging from 0.3 to 0.5 L/s. Yields and water quality vary significantly between bores, reflecting poor lateral continuity and the discrete nature of fracture networks.
- Deep fractures in the basement
  - These confined aquifers lie below approximately 70 m depth. Available data indicates generally low yields (<1 L/s), with isolated exceptions (e.g. bore RDMB3 at 4 L/s). These deeper systems are considered low-transmissivity units with limited relevance to shallow groundwater dynamics associated with the TSF.

Permeability testing across the regolith and weathered basement indicates generally low hydraulic conductivity, in the order of 10^{-8} m/s. This is consistent with observed aquifer compartmentalisation and limited hydraulic connectivity, resulting in low recharge rates and subdued groundwater movement.

Groundwater flow at the Plant Site likely follows the surface topography and flows from areas of higher elevation to lower elevation. The potentiometric surface contours indicate that the primary direction of groundwater flow at the Plant Site is towards the south-southeast in the eastern part of the ML. However, near the old tailings storage dam/historical waste rock dump in the western part of the ML, the groundwater flow direction shifts and flows from east to west (HydroElement Solutions, 2024; Conceptual Hydrogeological Model Georgetown Gold Project).

Groundwater levels exhibit seasonal variation, with amplitudes up to 6 m observed near the TSF. Potentiometric surfaces were mapped for both the wet (February 2023) and dry (September 2023) seasons, based on site monitoring data. A conceptual hydrogeological model was developed by HES (2024) and the resulting potentiometric contours are presented in **Figure 6** and **Figure 7**.

Klohn Crippen Berger (KCB) has recently updated the Plant Site hydrogeological model with the consideration of additional data, including, but not limited to:

- Additional groundwater level and quality monitoring data;
- Geochemistry assessment of mine materials Georgetown Goldfields Project (RGS 2026);
- Technical memorandum of existing geochemical data (RGS 2025); and
- Phase 2 TSF Expansion (3 m Raise to RL 326 m) Feasibility Study – Engineering Desing (Geotails 2026).

The KCB hydrogeological conceptualisation report is attached as Appendix 3 to the PRCP planning part.

There has been no material change to the key hydrogeological/hydrostratigraphic units of the Plant Site, only minor nomenclature changes as summarised in **Table 12**. The description of the hydrostratigraphic units in both reports reference Rob Lait & Associates (2013). There has been no additional hydraulic testing in recent years with the median permeability value of 2.75 x 10^{-8} m/s derived from 2010 falling head permeability testing. In terms of groundwater flow, KCB (2026) also interpret that groundwater flow within the regolith and moderately weathered rock is largely influenced by surface topography, moving from higher to lower elevations, as shown in **Figure 8**.

Table 12 Summary of Key Hydrostratigraphic Units Nomenclature Changes

HES (2024) Key Hydrogeological Units	KCB (2026) Key Hydrostratigraphic Units
Weathered regolith aquifers	Regolith to Moderately Weathered Rock
Near-surface fractures in the basement	Slightly weathered fractured rock
Deep fractures in the basement	Deep fractured rock

The recent updates to the hydrogeological model are not material to the TSF design or seepage modelling undertaken. The TSF has been confirmed as overlying a clayey layer extending to depths of 3 to 5 metres. These fine-grained soils have low permeability and can act as a natural barrier to seepage. The low hydraulic conductivity of the underlying regolith to moderately weathered bedrock has an estimated hydraulic conductivity of 2.75 × 10^{-8} m/s. These conditions provide a natural low-permeability foundation consistent with typical TSF design in similar geological settings.

GTC undertook a steady-state seepage assessment to evaluate the hydraulic performance of the existing embankment and drainage system and to predict seepage conditions associated with the proposed 3 m raise (**Appendix 1**). The base-case model was calibrated by comparing simulated seepage discharge along a representative embankment section with available field monitoring data. Following calibration, the model was used to assess pore water pressure distributions and seepage rates for the raised configuration. Two operating scenarios were assessed:

- Maintaining tailings beach with decant pond located approximately 50 m from the embankment; and
- No beach condition with pond located adjacent to the upstream face.

The upstream boundary was conservatively assigned at RL 324.5m representing the Phase 2 end- of-filling condition. Results are summarised in **Table 13** and **Figure 9**.

Table 13 Existing Measured Average Seepage and Phase 2 TSF Seepage Analysis Results (Eastern Embankment length ~350m)

Scenario	Seepage (L/day)
Existing Measured Average Seepage	105,874
Phase 2 TSF - No beach	67,012
Phase 2 TSF – 50m beach maintained	35,230

The modelling results indicate that seepage behaviour under the Phase 2 raise is governed by both the permeability characteristics of the engineered raise materials and the operational position of the decant pond.

With incorporation of engineered low permeability fill in the upstream raise and maintenance of adequate pond setback, the predicted seepage is expected to be lower than current monitored conditions, subject to construction quality and pond management. This reduction is primarily attributable to:

- The lower hydraulic conductivity of the engineered raise materials;
- Increased effective seepage flow path length; and
- Reduction in hydraulic gradient acting across the embankment.

In accordance with Darcy's Law ($q = k\,i$), seepage flux is directly proportional to the hydraulic gradient. Maintaining sufficient beach width increases the horizontal flow path within the tailings mass, allowing hydraulic head dissipation prior to reaching the embankment interface. This results in reduced pore water pressures within the upstream shell and foundation and a lower phreatic surface within the embankment.

Lower phreatic levels reduce the hydraulic driving forces acting within the embankment and foundation, thereby contributing to improved internal stability by limiting pore pressure build-up and preserving effective stress within the embankment body.

Accordingly, subject to construction in accordance with the design intent, including placement of engineered low permeability raise materials, seepage discharge is expected to reduce relative to existing conditions. Further improvement is anticipated through adequate tailings beach management and decant pond setback, provided the TSF is operated in accordance with the design criteria. On this basis, the Phase 2 raise is not expected to exacerbate seepage discharge and is predicted to improve seepage performance relative to existing steady-state conditions.

Therefore, the proposed amendment authorising the construction (including borrow pits) and operation of the Phase 2 TSF expansion is not likely to introduce new or any greater impacts to identified groundwater environmental values than those associated with currently approved mining activities. Construction and operation are consistent with existing activities such as haulage, crush and screen, waste and ore stockpiling, processing and tailings storage. Its construction and operation effectively reduce the risk of impacts to groundwater by using modern engineering and construction standards, quality assurance and quality control practices to minimise the development of seepage, manage decant and rainfall runoff.

Seepage is currently managed via an engineered pump-back system to contain and isolate the water in line with the Seepage Management Plan (WTS, 2024) and TSF Operations Plan. In brief, this comprises of a subsurface trench along the downstream toe of the eastern embankment. The trench drains to two collection sumps located at the invert of the sub-drainage channels. Each sump is fitted with solar-powered pumps, supplemented by diesel generators, which return collected seepage water to the TSF. The system has operated reliably since installation, with no significant performance issues reported.

Terra Solutions Pty Ltd (Terra Solutions) have undertaken the 2025 Annual Groundwater Monitoring Review (AGMR) for the Project which assessed groundwater levels and quality across the Plant Site in accordance with EA requirements (**Appendix 5**). Groundwater monitoring was conducted across a network of 14 bores at the Plant Site, with most locations sampled quarterly in 2025. Monitoring methods and quality assurance procedures were consistent with guidelines, and analytical precision was generally high, confirming that the dataset is reliable for interpretation.

Groundwater level data indicate that hydraulic conditions remain stable and consistent with the conceptual hydrogeological model (CHM). Groundwater elevations largely follow topography and climatic influences, with no evidence of abnormal fluctuations or drawdown that would indicate environmental risk.

Groundwater quality results are primarily driven by natural rock-water interactions within a mineralised geological setting. Major ion chemistry indicates no significant shifts in water types over time. Electrical conductivity and sulfate concentrations vary between bores but remain generally consistent with historical patterns, suggesting no emerging contamination sources.

Metal and metalloid concentrations are generally low across the Project and stable relative to historical data. Localised elevated concentration of metals at bore PSMB11 are linked to historical pH variability rather than new impacts. Most analytes, including aluminium, copper, lead, nickel, and zinc, remain at low concentrations, while others (e.g., bismuth, mercury, cyanide) are consistently negligible or below detection limits.

Terra Solutions considered the current groundwater monitoring program effective for early detection of potential impacts. In summary, groundwater conditions across the Savannah Gold Project remain and consistent with historical behaviour, with no indication of emerging risks.

Kempton Minerals will continue to ensure that the conditions specified in 'Schedule C – Water' of the EA will be met, ensuring contaminants that will, or have the potential to cause environmental harm will not be released directly or indirectly to any waters except as permitted under the conditions of the EA. Groundwater monitoring will continue to be undertaken on a quarterly basis at the 14 plant site monitoring bores.

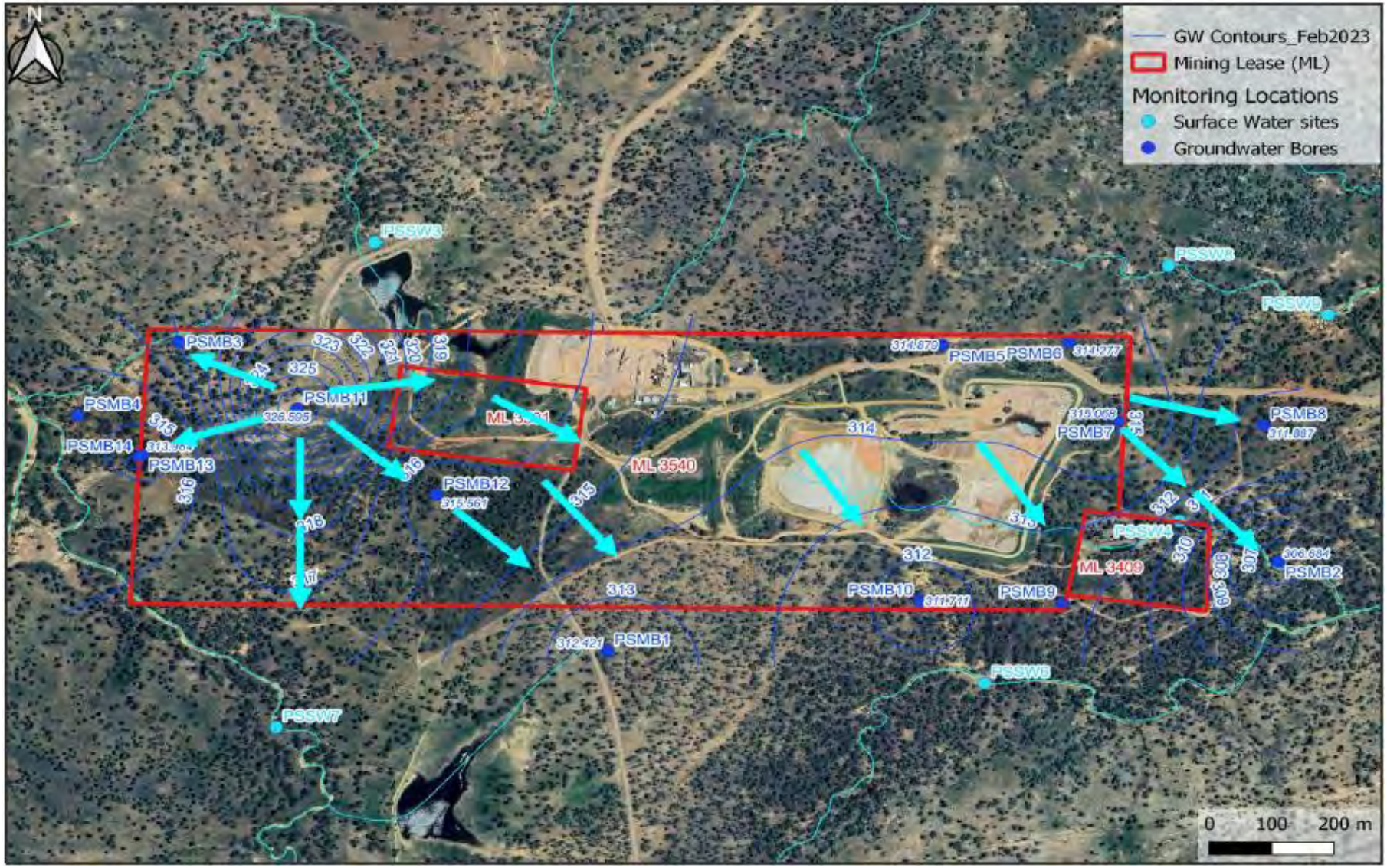


Figure 6 Potentiometric Map showing Groundwater Flow Direction (Wet Season) (HES, 2024)



Figure 7 Potentiometric Map showing Groundwater Flow Direction (Dry Season) (HES, 2024)

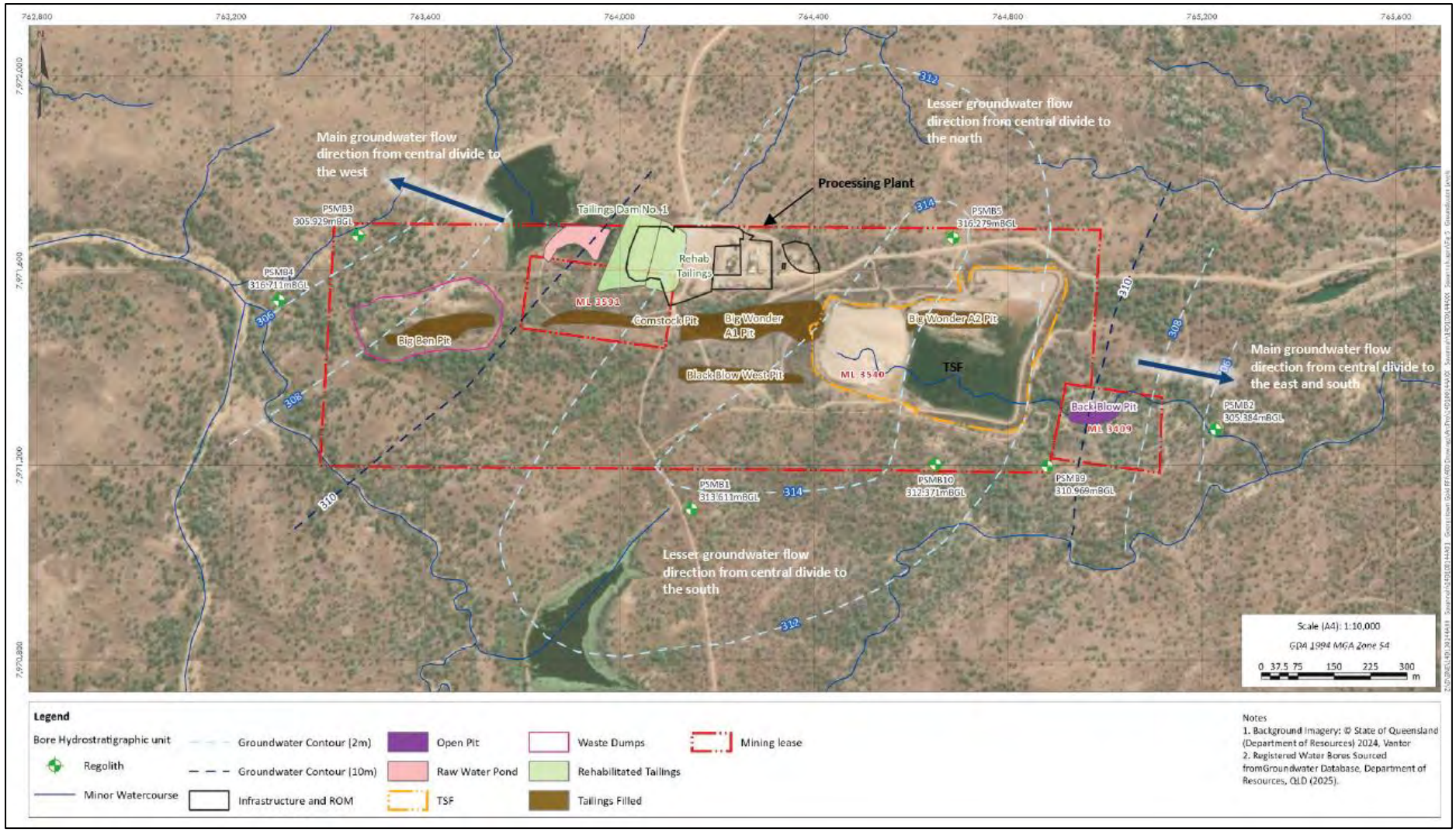


Figure 8 Inferred Groundwater Table Elevations and Main Groundwater Flow Directions (August 2024) (KCB, 2026)

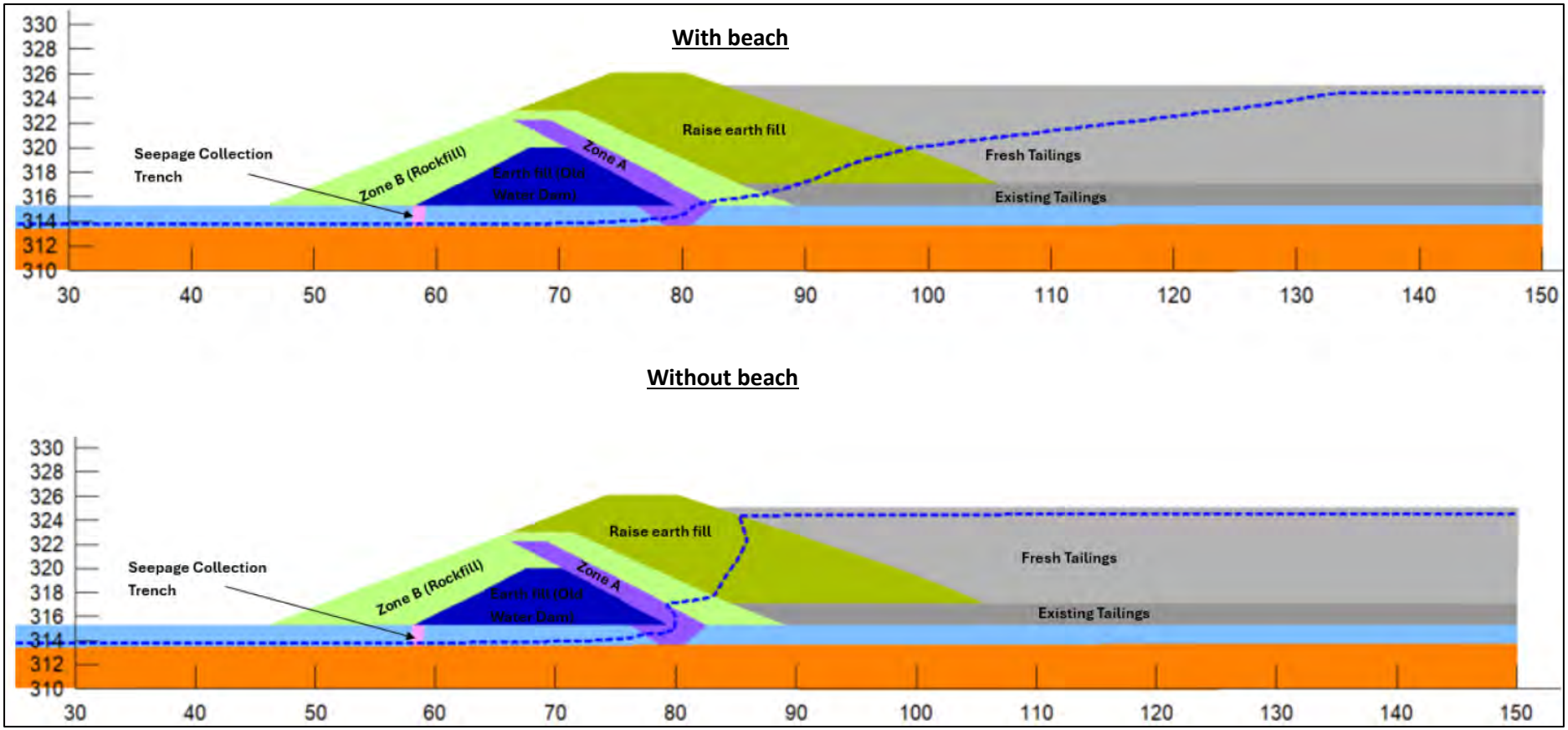


Figure 9 Phase 2 TSF Seepage Modelling Results - With and Without Tailings Beach (GTG, 2026)

4.2.5 Land Use Environmental Values

The land use at the Plant Site currently comprises of mining activities (including processing plant and TSF) surrounded by low-intensity grazing.

The proposed amendment authorising the construction (including borrow pits) and operation of the Phase 2 TSF expansion is expected have minimal additional impact on land use environmental values. Site activities are generally consistent with existing processing activities and no change to existing rehabilitation outcomes is proposed. While the area of the TSF specified in Table F1 and Table F2 are proposed to be increased, the Phase 2 TSF expansion will remain within its existing disturbance footprint. The minor additional impact is primarily due to the land use of the area of the borrow pits being amended. However, land disturbed from mining activities will be rehabilitated as required by the current EA and PRCP Schedule (P-PRCP-100766313_V1).

4.2.6 Land Environmental Values

The Site is situated on the crest of a hill surrounded by undulating to flat land. Elevations of the Site area range from 310 m AHD to 332 m AHD. According to the Atlas of Australian Soils (1:2,000,000), the Site soils are characterised as uniform coarse soils with a nonbleached subsoil underlain by rock or carbonate pan, on rolling to strongly undulating lands with broad rounded ridge crests & occasional low hills.

Under the Australian Soil Classification (ASC), the soils within the Plant Site are mapped as Rudosols, which are defined as soils with little, if any, (rudimentary) pedologic organisation apart from:

(a) Minimal development of an A1 horizon; or
(b) The presence of less than 10% of B horizon material (including pedogenic carbonate) in fissures in the parent rock or saprolite.

Rudosols are apedal or only weakly structured in the A1 horizon and show no pedological colour changes apart from darkening of an A1 horizon. There is little or no texture or colour change with depth unless stratified or buried soils are present.

A Soils and Land Suitability Assessment (SLSA) was undertaken by Wulguru Technical Services (WTS) which included the identification and mapping of soil units within the Plant Site (WTS, 2023). The SLSA focused on areas of minimal disturbance to previously undisturbed land and as such largely did not include the area of the Phase 2 TSF expansion. The area of the borrow pits was largely mapped as being predominately 'brown melic kandosol', as well as 'brown clastic rudosol' (**Figure 10**).

In addition, 3 test pits (3m x 1m) were excavated in 2013 within the proposed areas of the borrow pits which identified clay fill material for the proposed use in the Phase 2 TSF expansion (**Appendix 6**).

The proposed amendment authorising the construction (including borrow pits) and operation of the Phase 2 TSF expansion is expected have minimal additional impact on land environmental values. While the area of the TSF specified in Table F1 and Table F2 are proposed to be increased, the Phase 2 TSF expansion will remain within its existing disturbance footprint. GTG undertook a slope stability analyses for representative cross-sections under end-of-construction, long-term static and post-seismic loading conditions, which confirmed that the proposed embankment configuration is stable under the assessed loading scenarios (**Appendix 1**). The minor additional impact is primarily due to the additional land to be used as borrow pits for the construction of the Phase 2 TSF expansion. However, following the completion of mining-related activities on the land, the area will be rehabilitated as per the requirements within the current EA and PRCP Schedule (P-PRCP-100766313_V1).

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764000
764500
765000
7972500
7972000
7971500
7971000
7970500

ML 3591
(Comstock)

ML 3540
(Big Ben)

ML 3409
(Black
Blow)

Service Layer: Source: Esri, Vantor, Earthstar Geographics, and the GIS User Community

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SAVANNAH GOLDFIELDS LIMITED

Georgetown Gold Project EA Amendment

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GDA2020, MGA Zone 54

ARDENT GROUP PTY LTD

ML 3409, ML 3540, and ML 3591 (Plant Site) Proposed Borrow Pits and Soil Mapping Units

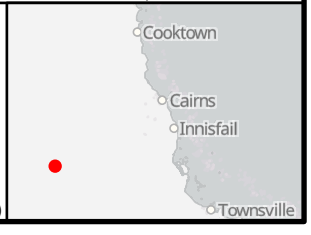
Figure 9

Sheet No.
RTPL_ARD_SVG006_EAAMAP_1003_A

Drawn By:	Chris Schlebusch
Requested by:	Jacob Arnold
Date:	21/04/2026

- Georgetown Gold Project Mining Lease
- Proposed Borrow Pit
- Brown Clastic Rudosol
- Brown Mellic Kandosol

Data sources:
©The State of Queensland (Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development)



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4.2.7 Ecology and Wetlands Environmental Values

The Plant Site does not include any mapped:

- Environmentally Sensitive Areas (ESA) (refer **Appendix 7**);
- Endangered or of concern regional ecosystems;
- Areas of essential habitat on the essential habitat map;
- Wetlands on the vegetation management wetlands map;
- Wetlands in a wetland protection area or wetlands of high ecological significance;
- Strategic environmental areas;
- High risk areas for protected plants;
- Koala habitat areas;
- Protected areas;
- Highly protected zones of State marine parks;
- Fish habitat areas; or
- Legally secured offset areas.

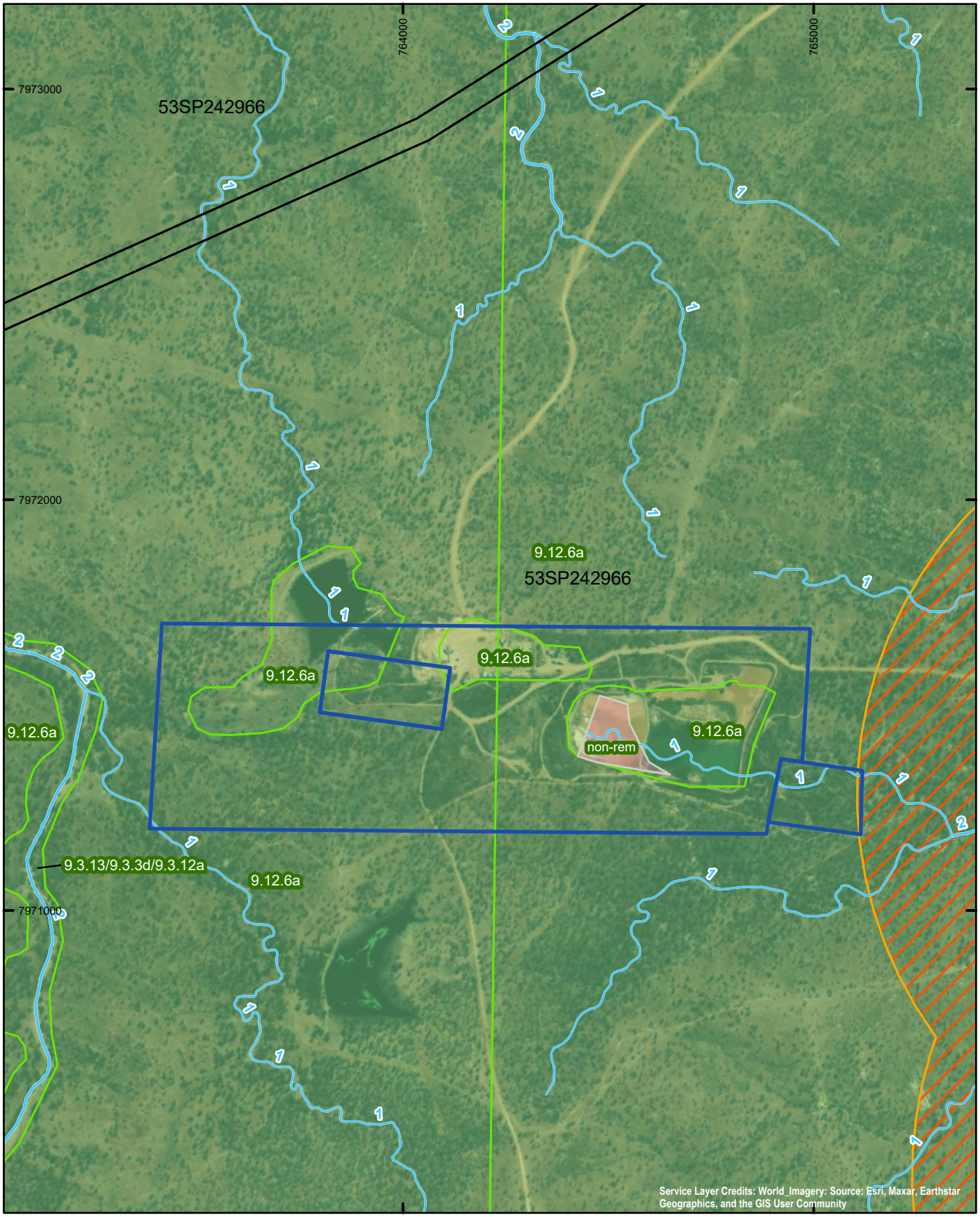
Approximately 73% of the vegetation within the Site is mapped as Regional Ecosystem (RE) 9.12.6a (**Figure 11**), which is classed as 'least concern' under the *Vegetation Management Act 1999* (VM Act). This RE is described in **Table 14** below. The remaining approximate 23% of the Site is mapped as non-remnant vegetation.

There is an area of mapped wildlife habitat (vulnerable or endangered) that extends 0.14ha into the eastern edge of the Plant Site. Additionally, there is approximately a total of 0.8km of mapped stream order 1 watercourses on vegetation management watercourse and drainage feature map within the Site (**Figure 11**).

Table 14 Regional Ecosystems

Regional Ecosystem	Vegetation Management Act class	Short Description
9.12.6a	Least concern	Low open woodland to low woodland of *Eucalyptus microneura* (Georgetown box) +/- *Terminalia spp*. +/- *Corymbia pocillum* on rolling rhyolite or granitic hills.

The proposed amendment authorising the construction (including borrow pits) and operation of the Phase 2 TSF expansion is expected have minimal additional impact on ecological environmental values. While the area of the TSF specified in Table F1 and Table F2 are proposed to be increased, the Phase 2 TSF expansion will remain within its existing disturbance footprint. The minor additional impact is primarily due to mapped least concern RE 9.12.6a to be cleared for borrow pits for the construction of the Phase 2 TSF expansion. However, following the completion of mining-related activities on the land, the area will be rehabilitated as per the requirements within the current EA and PRCP Schedule (P-PRCP-100766313_V1).



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SAVANNAH GOLDFIELDS LIMITED

Project Overview

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GDA2020 MGA Zone 54

ARDENT GROUP PTY LTD

Georgetown Processing Plant Site Ecology

Figure 10

Sheet No.

RTPL_ARD_SVG002_MAP_0003_B

Drawn By:	Chris Schlebusch
Requested by:	Margaret Harris
Date:	5/06/2025

- Georgetown Processing Plant - ML
- Lot 53 on SP242966
- Regulated vegetation - Defined watercourse
- Wildlife Habitat - Endangered or Vulnerable Wildlife VM RE Ver13
- Category A or B that is of least concern
- non-remnant

Data sources:
©The State of Queensland (Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development)

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4.2.8 Waste Environmental Values

Waste will continue to be managed in accordance with the waste management hierarchy as defined in the *Waste Reduction and Recycling Act 2011*, namely;

- Avoid;
- Reduce;
- Re-use;
- Recycle;
- Recover;
- Treat; then
- Dispose.

Non-mining waste generated at the Plant Site will continue to be disposed of at an appropriate facility that is authorised to accept such waste. All regulated waste will continue to be removed from Plant Site by an authorised person and sent to an approved facility licensed to accept such waste.

Other minor waste streams (e.g. general waste, oils and greases, tyres and maintenance wastes) will continue to be generated from routine site activities and managed in accordance with the existing Waste Management Plan and EA conditions.

The proposed amendment authorising the construction and operation of the Phase 2 TSF expansion provides addition capacity for the generation and storage of tailings. Tailings capacity will effectively increase by a designed 235 ML and will contain relatively low risk, oxide tailings. The Plant Site is authorised to receive, store and process ore from the Agate Creek Mine (ML 100030), Big Reef Mine (ML 3278, ML 3279 and ML 3280) and Josephine Gold Mine (ML 30139), in addition to the MLs within the Project area. Geochemical assessments for these third-party ore sources have recently been assessed and approved via previous EA amendment applications. In summary, the assessments concluded:

- Agate Creek Mine ore (C&R Consulting, 2022)
  - The ore samples are considered non-acid forming (NAF). The sulphur concentrations in the samples are extremely low (≤0.02%) and classified as barren with respect to S. The acid neutralising capacity (ANC): maximum potential acidity (MPA) ratio of the Agate Creek ore samples was high at >5 leading to a mineralogy that presents a negligible risk of acid generating conditions and mine drainage.
  - The salinity potential of the Agate Creek ore is also considered very low at <70 µS/cm.
  - Metalliferous drainage potential of the Agate Creek ore is also considered negligible. When analysed, none of the EA contaminant release limits apart from aluminium were exceeded. However, aluminium exceedances occurred in less than half of the samples and were only slightly above the threshold, and most likely associated with colloidal aluminium.
- Big Reef Mine ore (RGS, 2025a)
  - Generally classified as NAF (Barren) (NAF-B) (95%). Only one sample, likely transitional, was classified as potentially acid forming potentially acid forming (PAF) (5%). Acid generation from the NAF-B ore materials is expected to be negligible to low. However, due to the limited buffering capacity of the materials, acid produced by the small proportion of PAF may have the potential to produce a weakly acidic pH. PAF ore materials have a low to moderate risk of generating acid mine drainage (AMD).

- Soluble metals/ metalloids produced from NAF-B materials are likely to be limited to low concentrations of Cu, Pb, and Zn. These materials produce a neutral pH and constitute the bulk of the potential tailings.
- The tailings expected to be produced from the Big Reef ore materials have a similar AMD risk rating to those already present in the Georgetown TSF. While the proportion of PAF material in the Big Reef ore is lower, the existing tailings have a slightly higher ANC.
- Surface water and groundwater monitoring data indicates that contact water from the existing tailings in the Georgetown TSF is pH neutral. The addition of Big Reef tailings is unlikely to pose a significant risk to the quality of seepage and surface runoff water, provided that the minor proportion of PAF materials is monitored and managed appropriately.

- Josephine Mine ore (RGS, 2025b)
  - Josephine oxide ore materials represented by the samples tested are classified as NAF-B (100 %). Ore materials are expected to have moderate to high ANC, which will report to tailings and offer some neutralising capacity to existing materials in the Georgetown TSF. Acid generation from the NAF-B ore materials is expected to be negligible to low. Excess buffering capacity provided by these materials is expected to result in a neutral pH.
  - Soluble metals/ metalloids produced from NAF-B materials are likely to be limited to low concentrations of Al and Cu. The ore materials produce a neutral pH and only a small number of metal/metalloids are likely to be soluble within this range.
  - The tailings expected to be produced from the Josephine ore materials have a lower AMD risk rating compared to those already present in the Georgetown TSF.
  - Surface water and groundwater monitoring data indicates that contact water from the existing tailings in the Georgetown TSF is pH neutral. The addition of Josephine tailings is unlikely to pose a significant risk to the quality of seepage and surface runoff water.

Currently, only oxide material is permitted to be processed at the Plant (EA Condition A5-2). A geochemical assessment will be completed for any new source of ore, prior to ore being received, stored or processed at the site. The ore will be progressively sampled, and a risk assessment will be undertaken if the characteristics of the ore substantially differ to that authorised under the EA (EA Condition A5-3). The risk assessment will:

- Detail controls to manage any risks;
- Be implemented to manage risk; and
- Be documented and made available to the Administering Authority on request.

In addition, all tailings material will be progressively characterised during disposal for net acid producing potential, fluoride and metals (EA Condition E6-3). Tailings dam liquor will also be sampled for total and Weak Acid Dissociable (WAD) cyanide fortnightly (EA Condition E6-4) and managed as required.

The proposed amendments will not introduce new or any greater impacts to waste environmental values than those associated with currently approved mining activities. The Plant Site activities are consistent with existing processing activities. The disposal of tailings within the Phase 2 TSF expansion will be in accordance with the TSF Operations, Maintenance and Surveillance (OMS) Manual which will be updated prior to operation of the Phase 2 TSF to reflect the Operational and Monitoring Considerations described in Section 5 of **Appendix 1**. Kempton Minerals will continue to ensure that the conditions specified in 'Schedule E – Waste' of the EA will be met.

4.3 Risk and likely magnitude of Impacts on Environmental Values

An Environmental Risk Assessment for the potential impacts on environmental values by the proposed amendment to the activity was conducted using the framework outlined below.

4.3.1 Risk Assessment Descriptors and Matrix

Table 15 Likelihood of Event

Likelihood	Description
Rare	May only occur in exceptional circumstances e.g. <3% of the time
Unlikely	Could occur at some time e.g. 3-10% of the time
Possible	Might occur at some time e.g. 11-29% of the time
Likely	Will probably occur in most circumstances e.g. 30-89% of the time
Almost Certain	Expected to occur in most circumstances e.g. >90% of the time

Table 16 Consequence of Event

Consequence	Description
Insignificant	Localised/ reversible environmental impact which can be immediately resolved. Isolated administrative breach. Isolated complaint.
Minor	Localised / reversible environmental impact with recovery within weeks. Localised community impact, one or more complaints.
Moderate	Widespread reversible environmental impact with recovery within months. Substantial community impact, complaints, media attention.
Major	Serious environmental harm on or offsite impact with recovery within years. Regional community impact, complaints, loss of landholder goodwill, widespread media attention.
Catastrophic	Serious offsite impact with ongoing environmental harm, long-term recovery/ irreversible harm. Widespread community impact, loss of landholder goodwill, widespread media attention, potential investor implications.

Using the likelihood and consequence rating system, an overall risk rating for the individual hazard can be assigned using the table below.

Table 17 Risk Rating

Likelihood	Consequence				
	Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
Rare	Low	Low	Low	Medium	Medium
Unlikely	Low	Low	Medium	Medium	High
Possible	Low	Medium	Medium	High	Extreme
Likely	Low	Medium	High	Extreme	Extreme
Almost Certain	Medium	High	High	Extreme	Extreme

4.3.1 Risk Assessment Outcomes

The outcome of the risk assessment for the proposed amendment is included in **Table 18**.

Table 18 Risk Assessment Outcome

Impacted Environmental Value	Risk	Risk Rating			Findings
		L	C	R	
Air Quality	Increased dust generated from vehicles and equipment on sensitive receptors.	Rare	Insignificant	**Low**	Activities at the Plant Site will remain aligned with existing processing operations and will utilise existing infrastructure to produce tailings and manage the integrated tailings facility. The proposed amendment authorising the construction (including borrow pits) and operation of the Phase 2 TSF expansion may result in a short-term increase in localised dust generation during the construction phase. However, it is unlikely to increase the risk to sensitive receptors or increase the long-term dust risk beyond that associated with currently approved activities. Dust suppression measures will be employed to manage dust during construction.
	Release of additional exhaust emissions from vehicles or equipment involved in site activities.	Almost Certain	Insignificant	**Medium**	The proposed amendment authorising the construction (including borrow pits) and operation of the Phase 2 TSF expansion will result in a temporary increase in exhaust emissions during the construction phase due to the operation of additional machinery and haulage equipment. However, it is unlikely to increase ongoing exhaust emission risks beyond those associated with currently approved activities. There is no change to the approved processing rate.
Noise	Additional noise from vehicles or equipment on sensitive receptors.	Rare	Insignificant	**Low**	The proposed amendment authorising the construction (including borrow pits) and operation of the Phase 2 TSF expansion is unlikely to increase the risk of additional noise to sensitive receptors compared to the existing risk associated with currently approved activities. There is no change to the approved processing rate. Plant Site activities will remain aligned with existing processing operations and will utilise current infrastructure to handle material, process ore and produce tailings. The construction of the Phase 2 TSF and excavation of the borrow pits uses similar equipment associated with the trucking and dumping of ore (haul trucks and side tippers) and crush and screen mobile equipment (excavators, loaders and jaw crushers) situated adjacent the Processing Plant.

Impacted Environmental Value	Risk	Risk Rating			Findings
		L	C	R	
Water	Additional risk of surface water contamination.	Rare	Moderate	**Low**	The proposed amendment authorising the construction (including borrow pits) and operation of the Phase 2 TSF expansion is unlikely to increase the risk to surface water environmental values compared to the existing risk associated with currently approved activities. Construction and operation are consistent with existing activities such as haulage, crush and screen, waste and ore stockpiling, processing and tailings storage. The proposed Phase 2 TSF raise to RL 326 m does not result in an increase in consequence classification relative to the existing facility. Its construction and operation effectively reduce the risk of impacts to surface water by using modern engineering and construction standards, quality assurance and quality control practices to minimise the development of seepage, manage decant and rainfall runoff. The Plant Site will continue to be managed in accordance with the Site Water Management Plan (EA Condition C9-1) and Erosion and Sediment Control Plan (EA Condition C11-1), which will be updated following approval of this EA amendment application. Surface water will continue to be monitored as per the conditions detailed in the EA.

Impacted Environmental Value	Risk	Risk Rating			Findings
		L	C	R	
Groundwater	Addition risk to potential groundwater contamination.	Rare	Moderate	**Low**	The proposed amendment authorising the construction (including borrow pits) and operation of the Phase 2 TSF expansion is not likely to introduce new or any greater impacts to identified groundwater environmental values than those associated with currently approved mining activities. Construction and operation are consistent with existing activities such as haulage, crush and screen, waste and ore stockpiling, processing and tailings storage. Its construction and operation effectively reduce the risk of impacts to groundwater by using modern engineering and construction standards, quality assurance and quality control practices to minimise the development of seepage, manage decant and rainfall runoff. Subject to construction in accordance with the design intent, including placement of engineered low permeability raise materials, seepage discharge is expected to reduce relative to existing conditions. Further improvement is anticipated through adequate tailings beach management and decant pond setback, provided the TSF is operated in accordance with the design criteria. On this basis, the Phase 2 raise is not expected to exacerbate seepage discharge and is predicted to improve seepage performance relative to existing steady-state conditions. Seepage is currently managed via an engineered pump-back system to contain and isolate the water in line with the Seepage Management Plan (WTS, 2024) and TSF Operations Plan. Groundwater monitoring will continue to be undertaken on a quarterly basis at the 14 plant site monitoring bores.
Land Use	Additional impact to land use	Almost Certain	Insignificant	**Medium**	The proposed amendment authorising the construction (including borrow pits) and operation of the Phase 2 TSF expansion is expected have minimal additional impact on land use environmental values. Site activities are generally consistent with existing processing activities and no change to existing rehabilitation outcomes is proposed. While the area of the TSF specified in Table F1 and Table F2 are proposed to be increased, the Phase 2 TSF expansion will remain within its existing disturbance footprint. The minor additional impact is primarily due to the land use of the area of the borrow pits being amended. However, land disturbed from mining activities will be rehabilitated as required by the current EA and PRCP Schedule (P-PRCP-100766313_V1).

Impacted Environmental Value	Risk	Risk Rating			Findings
		L	C	R	
Land	Increased disturbance and/or contamination to land	Almost Certain	Insignificant	**Medium**	The proposed amendment authorising the construction (including borrow pits) and operation of the Phase 2 TSF expansion is expected have minimal additional impact on land environmental values. While the area of the TSF specified in Table F1 and Table F2 are proposed to be increased, the Phase 2 TSF expansion will remain within its existing disturbance footprint. The proposed embankment configuration is stable under the assessed loading scenarios (**Appendix 1**). The minor additional impact is primarily due to the additional land to be used as borrow pits for the construction of the Phase 2 TSF expansion. However, following the completion of mining-related activities on the land, the area will be rehabilitated as per the requirements within the current EA and PRCP Schedule (P-PRCP-100766313_V1).
Wetlands / Ecology	Increased impacts on flora and fauna	Almost Certain	Insignificant	**Medium**	The proposed amendment authorising the construction (including borrow pits) and operation of the Phase 2 TSF expansion is expected have minimal additional impact on ecological environmental values. While the area of the TSF specified in Table F1 and Table F2 are proposed to be increased, the Phase 2 TSF expansion will remain within its existing disturbance footprint. The minor additional impact is primarily due to mapped RE 9.12.6a to be cleared for borrow pits for the construction of the Phase 2 TSF expansion. However, following the completion of mining-related activities on the land, the area will be rehabilitated as per the requirements within the current EA and PRCP Schedule (P-PRCP-100766313_V1).
	Increased spread of weeds	Rare	Minor	**Low**	The proposed amendment authorising the construction (including borrow pits) and operation of the Phase 2 TSF expansion is unlikely to increase the risk of weed spread compared to the existing risk associated with currently approved activities. As per site procedures, mobile equipment will be washed down prior to accessing site and prior to leaving site.

Impacted Environmental Value	Risk	Risk Rating			Findings
		L	C	R	
Waste	Incorrect management or disposal of waste.	Rare	Moderate	**Low**	The proposed amendment authorising the construction (including borrow pits) and operation of the Phase 2 TSF expansion is unlikely to increase the risk of incorrectly managing or disposing of waste compared to the existing risk associated with currently approved activities. The Plant Site activities are consistent with existing processing activities. No new types of wastes are proposed. The disposal of tailings within the Phase 2 TSF expansion will be in accordance with an updated TSF OMS Manual. Geochemical characterisation and authorisation must be gained prior to the acceptance of new ore sources. Ongoing sampling of ore in accordance with the EA is also required to monitor for change and trigger a risk assessment should they be identified. All tailings material will be progressively characterised during disposal and managed as required.

C= consequence. L = likelihood. R = risk

4.4 Management Practices to be Implemented

The Project will continue to be managed in accordance with the EA. All management plans currently in place will be reviewed and updated accordingly following the approval of this EA amendment application. In particular, the TSF Operational Plan, Water Management Strategy, Water Management Plan and Erosion and Sediment Control Plan. As-constructed documentation and updated plans will be submitted to the Administering Authority prior to operation. The AGMR concluded the current groundwater monitoring program is considered effective for early detection of potential impacts (**Appendix 5**).

In addition, Kempton Minerals will continue to operate the TSF in compliance with EA EPML00899813 Schedule G as follows:

- The TSF will comply with the design storage allowance (Schedule G - Table G3);
- TSF spillway will be maintained to withstand peak flow from the spillway capacity critical design storm (Schedule G - Table G3);
- The administering authority will be notified when the water level of the TSF, reaches the mandatory reporting level defined in Schedule G - Table G3;
- A water management strategy will be implemented and will include:
    - data collation and identify existing data requirements;
    - the approach to water management in the context of the project development schedule; a water balance/water quality model to optimise the overall system and individual components;
    - design and detail additional works as required; and
    - implement/construct additional works according to a documented schedule.
- An annual review of the water management strategy will be submitted to the administering authority by the end October annually; and
- The TSF will be inspected by a suitably qualified and experienced person before 1 November annually.

Specific management practices to be implemented are detailed in Section 5 of the Feasibility Study level engineering design for the proposed Phase 2 TSF expansion (**Appendix 1**), which is summarised in the following sub-sections.

4.4.1 Tailings Deposition Management

The proposed Phase 2 upstream raise to RL 326 m will not fundamentally alter the operational philosophy of the facility; however, modifications to tailings deposition sequencing, water management practices and instrumentation will be required to reflect the raised configuration. A revised OMS Manual incorporating the final detailed design, updated instrumentation layout and Trigger Action Response Plans (TARPs) will be prepared during the Detailed Design stage. However, a high-level overview of operational principles for the Phase 2 configuration is outlined below.

To support stability performance, seepage control and storage efficiency for the raised embankment, subaerial deposition will continue to be adopted.

Consistent with the Phase 2 deposition plan (refer attached drawings, DRG-030 (**Appendix 1**)), the following operational concepts are proposed:

- Tailings deposition from a peripheral spigotted ring main system along the embankment crest.
- Nominal spigot spacing of approximately 35 m.
- Cycling of spigots to promote thin-lift deposition (~200 mm per cycle).
- Deposition will occur primarily from the eastern, southern and northern embankments to promote progressive beach development toward the western limit of the facility, maintaining separation between the supernatant pond and the eastern embankment.
- Progressive rotation of discharge points to maintain a uniform beach profile.

Subaerial thin-layer deposition will:

- Promote higher in-situ tailings density;
- Accelerate drying and consolidation;
- Enhance shear strength development near the upstream embankment;
- Reduce supernatant pond volume; and
- Assist in limiting phreatic surface elevation within the embankment.

At end-of-filling conditions of Phase 2 TSF, the indicative beach slope is approximately 1% directing the decant pond toward the north-western sector of the facility.

Under the Phase 2 configuration, the decant pond will be managed to remain:

- Remote from the upstream embankment;
- Positioned toward the north-west corner of the storage; and
- Separated from the embankment by a competent tailings beach.

Maintaining pond offset from the upstream face is critical to:

- Control phreatic levels;
- Reduce seepage gradients; and
- Maintain stability performance consistent with the seepage and slope stability analyses.

A pontoon-mounted decant pump (or equivalent floating system) is anticipated to:

- Maximise recovery of supernatant water;
- Minimise pond volume; and
- Support DSA and MRL compliance.

Water level management will continue to comply with:

- DSA requirements; and
- MRL.

Prior to each wet season (1 November), water levels will be drawn down to maintain available DSA in accordance with regulatory requirements.

4.4.2 Instrumentation and Monitoring

The Phase 2 raise will require expansion of the existing instrumentation network to verify design assumptions and confirm embankment performance. A network of Vibrating Wire Piezometers (VWPs) is proposed to monitor pore pressure distribution within the raised embankment and its foundation.

- Foundation materials beneath the raised embankment;
- The central embankment zone and underlying foundation interface; and
- The downstream shell and toe area, where considered necessary.

Survey prisms will be installed along the Phase 2 embankment crest to monitor:

- Vertical settlement;
- Lateral displacement; and
- Differential movement between existing and raised sections.

The survey monitoring program will support verification of design assumptions and provide early identification of abnormal deformation behaviour during operation of the raised embankment. Survey frequency and movement trigger thresholds will be defined in the updated OMS Manual at Detailed Design stage.

4.5 Rehabilitation of the Land

Rehabilitation of disturbance due to mining activities will continue to be undertaken in accordance with the provisions detailed in the current EA and PRCP Schedule.

This application is a joint PRCP schedule and EA amendment application. As a result of the proposed EA amendment described in Section **2**, it is proposed to amend the approved PRCP to ensure consistency between the two relevant environmental requirements. In accordance with Section 226B of the EP Act, an amended rehabilitation planning part (including PRCP schedule) detailing the rehabilitation of the Stage 2 TSF expansion and borrow pits has been provided separately.

The EA has defined the requirements for rehabilitation in ‘Schedule F – Land’. While DETSI issued a draft PRCP schedule (P-PRCP-100766313_V1) for EA EPML00899813 on 10 April 2026, a separate EA amendment application will be submitted to remove matters relating to rehabilitation that are now dealt with under the approved PRCP schedule as well as proposing a reconciled authorised disturbance table and mapping to be included within the EA.

5. Additional Supporting Information

5.1 Development Permit

There are no development permits in effect under the *Planning Act 2016* for carrying out the proposed activities.

5.2 Eligibility Criteria

There is a set of eligibility criteria and standard conditions for mining lease activities, however, the ERAs approved under the EA EPML00899813 are for a site-specific EA. Consequently, the eligibility criteria and standard conditions are not relevant.

5.3 Standard conditions

This EA amendment application does not seek to amend any standard conditions.

5.4 Resource Tenure

This application does not relate to a new relevant resource tenure that is an exploration permit or Greenhouse Gas (GHG) permit.

5.5 Waste Measures

Waste measures will continue to be adhered to under the current Waste Management Plan. In summary, all general (i.e. non-mining) waste generated in conducting the mining activities will be disposed of in a lawful manner at an appropriately licenced off-site waste management facility. Regulated waste generated at the Project is handled and stored as required by regulation. Regulated waste is transported by a suitably licenced company and disposed at a facility licenced to handle regulate waste.

In addition, non-mining waste generated onsite will be assessed and managed in accordance with the waste management hierarchy. In order from most preferred to least preferred management method, the waste management hierarchy is:

- Avoid/Reduce;
- Reuse;
- Recycle;
- Recover Energy;
- Treat; then
- Dispose.

5.6 Site Management Plan

The land underlying the Georgetown Processing Plant site, Lot 53 on SP242966, is not included on either the Environmental Management Register (EMR) or Contaminated Land Register (CLR). The site is not currently subjected to an Environmental Protection Order or Site Management Plan.

5.7 Other Prescribed Documentation

The *Environmental Protection Regulation 2019* does not prescribe any additional documentation relating to an EA amendment application.

6. Assessment Level of Proposed Amendment

An assessment of the proposed amendment against the definition of a 'minor amendment' detailed in Section 223 of the EP Act has been undertaken.

The proposed EA amendment and PRCP amendment is considered to meet the requirements of a "minor amendment (threshold)" and "minor amendment (PRCP threshold)" due to the following reasons listed below in **Table 19** and **Table 20** respectively.

Table 19 EA Minor Amendment Assessment

Item	Minor Change Definition	Response
minor amendment (threshold), for an environmental authority, means an amendment that—		
(a)	*is not a change to a standard condition identified in the EA as a standard condition, other than* *(i) a change that is a condition conversion; or* *(ii) a change that is not a condition conversion but that replaces a standard condition of the authority with a standard condition for the environmentally relevant activity to which the authority relates; or* *(iii) a change that will not result in a change to the impact of the relevant activity on an environmental value; and*	The proposed amendment is not a change to any standard conditions.
(b)	*does not significantly increase the level of environmental harm caused by the relevant activity; and*	The proposed amendment does not significantly increase the level of environmental harm caused by the relevant activity. An assessment of the potential increase in environmental harm as a result of the amendment has been assessed and further supporting information is detailed **Section 4**. The proposed Phase 2 TSF raise to RL 326 m does not result in an increase in consequence category classification relative to the existing facility. Its construction and operation effectively reduce the risk of impacts by using modern engineering and construction standards, quality assurance and quality control practices to minimise the development of seepage, manage decant and rainfall runoff. Subject to construction in accordance with the design intent, including placement of engineered low permeability raise materials, seepage discharge is expected to reduce relative to existing conditions. Further

Item	Minor Change Definition	Response
		improvement is anticipated through adequate tailings beach management and decant pond setback, provided the TSF is operated in accordance with the design criteria.
(c)	*does not change any rehabilitation objectives stated in the authority in a way likely to result in significantly different impacts on environmental values than the impacts previously permitted under the authority; and*	The proposed amendment does not change any rehabilitation objectives currently stated in Schedule F of the EA or that are now outlined in the PRCP Schedule.
(d)	*does not significantly increase the scale or intensity of the relevant activity; and*	The proposed amendment does not significantly increase the scale or intensity of the approved activities. There is no proposed change to the gold mining or mineral processing rate.
(e)	*does not relate to a new relevant resource tenure for the authority that is—* *(i) a new mining lease; or* *(ii) a new petroleum lease; or* *(iii) a new geothermal lease under the Geothermal Energy Act; or* *(iv) a new GHG injection and storage lease under the GHG storage Act; and*	The proposed amendment does not relate to a new relevant resource tenure.
(f)	*involves an addition to the surface area for the relevant activity of no more than 10% of the existing area; and*	The proposed amendment does not involve the addition to the surface area for the relevant activity of no more than 10% of the existing area. The projective surface area currently outlined in Table F1 totals 80.6ha. The proposed amendment seeks to amend Table F1 to have a total projective surface area of 88.6ha, a 9.9% increase.
(g)	*for an environmental authority for a petroleum activity—* *(i) involves constructing a new pipeline that does not exceed 150km; or* *(ii) involves extending an existing pipeline so that the extension does not exceed 10% of the existing length of the pipeline; and*	The EA EPML00899813 is not related to petroleum activities.
(h)	*if the amendment relates to a new relevant resource tenure for the authority that is an exploration permit or GHG permit—seeks, in the amendment application under section 224, an amended environmental authority that is subject to the standard conditions for the relevant activity or authority, to the extent it relates to the permit.*	The proposed amendment does not relate to a new relevant resource tenure.

Table 20 PRCP Minor Amendment Assessment

Item	Minor Change Definition	Response
minor amendment (PRCP threshold), for PRCP schedule, means an amendment that—		
(a)	does not change a post-mining land use or non-use management area	The proposed amendment does not change a post-mining land use (PMLU) or non-use management area (NUMA).
(b)	does not affect whether a stable condition will be achieved for land under the schedule	The proposed amendment does not affect whether a stable condition will be achieved.
(c)	does not change the way a post-mining land use will be achieved, or a non-use management area will be managed, in a way likely to result in significantly different impacts on environmental values compared to the impacts on the values under the schedule before the change	The proposed amendment does not change the way a PMLU will be achieved, or a NUMA will be managed, in a way likely to result in significantly different impacts on environmental values compared to the impacts on the values under the schedule before the change.
(d)	does not relate to a new mining tenure for the schedule	The proposed amendment does not relate to a new mining tenure.
(e)	does not change when a rehabilitation milestone or management milestone will be achieved by more than 5 years after the time stated in the schedule when it was first approved	The proposed amendment does not change when a rehabilitation milestone or management milestone will be achieved.
(f)	does not extend the day by which rehabilitation of land to a stable condition will be achieved	The proposed amendment does not extend the day by which rehabilitation of land to a stable condition will be achieved.

7. Summary and Conclusion

Kempton Minerals is facilitating a full restart of the processing plant in early 2026 and requires additional tailings storage capacity to support ongoing processing activities. As part of the long-term tailings management strategy, it is proposed to expand the capacity of the existing TSF through a 3 m upstream raise of the existing embankment to RL 326 m. As such, Kempton Minerals is seeking to amend EA EPML00899813 to authorise this proposed "Phase 2 TSF expansion".

The proposed amendments to authorise the construction and operation of the Phase 2 TSF expansion, as well as aligning the EA with its existing footprint include amendments to:

- Table C5 (Water Storage Monitoring);
- Table F1 (Final Land Use and Rehabilitation Approval Schedule);
- Table F2 (Landform Design);
- Table G1 (Location of All Dams); and
- Table G2 (Basic Details of All Dams).

The proposed amendment will not introduce any different or increased impacts to environmental values than those associated with the current operations. Construction and operation are consistent with existing activities such as haulage, crush and screen, waste and ore stockpiling, processing and tailings storage. The proposed Phase 2 TSF raise to RL 326 m does not result in an increase in consequence category classification relative to the existing facility. Its construction and operation effectively reduce the risk of impacts by using modern engineering and construction standards, quality assurance and quality control practices to minimise the development of seepage, manage decant and rainfall runoff. Subject to construction in accordance with the design intent, including placement of engineered low permeability raise materials, seepage discharge is expected to reduce relative to existing conditions. Further improvement is anticipated through adequate tailings beach management and decant pond setback, provided the TSF is operated in accordance with the design criteria. On this basis, the Phase 2 raise is not expected to exacerbate seepage discharge and is predicted to improve seepage performance relative to existing steady-state conditions. Environmental impacts will be able to be managed in accordance with the management plans and practices in place for the Project that will be updated to reflect the proposed amendment.

As a result of the proposed EA amendment described in Section **2**, it is proposed to amend the approved PRCP to ensure consistency between the two relevant environmental requirements. Specifically, it is proposed to amend the following aspects of the approved PRCP schedule:

- 'Figure 1 – Final Site Design Plant Site (ML3409, ML3540, ML3591)';
- 'Figure 11 – Reference Map Plant Site (ML3409, ML3540, ML3591)';
- The addition of 'Section 4.11 (RA11) Rehabilitation area 11' for the borrow pits;
- The areas specified in Section 4.1 (RA1) Rehabilitation area 1', 'Section 4.3 (RA3) Rehabilitation area 3', and Section 4.7 (RA7) Rehabilitation area 7'.

It is considered that this joint EA and PRCP amendment is a minor amendment as detailed in Section **6**. The proposed amendment does not significantly increase the scale or intensity of the approved activities, nor does it significantly increase the level of environmental harm. There are no changes proposed to the conditions of the PRCP schedule, final site design, milestones or milestone completion dates. A detailed assessment through the major amendment process would likely result in substantially similar conditions to those applicable under the minor amendment process.

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EA AND PRCP AMENDMENT APPLICATION SUPPORTING INFORMATION REPORT

KEMPTON MINERALS PTY LTD

Appendix 1 Phase 2 TSF Expansion (3 m Raise to RL 326 m) Feasibility Study – Engineering Design (Geotails Consulting Pty Limited, 2026)

SAVANNAH GOLDFIELDS

GEORGETOWN GOLD MINE



REPORT

Phase 2 TSF Expansion (3 m Raise to RL 326 m)

Feasibility Study – Engineering Design

PREPARED FOR:
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EXECUTIVE SUMMARY

Savannah Goldfields Ltd (SVG) plans to recommence operations at the Georgetown Gold Mine and requires additional tailings storage capacity to support ongoing processing activities. As part of the long-term tailings management strategy, SVG proposes to expand the existing Tailings Storage Facility (TSF) through a 3 m upstream raise of the existing embankment to RL 326 m.

GeoTails Consulting Pty Ltd (GTC) was engaged to undertake a Feasibility Study (FS) level engineering design for the proposed Phase 2 TSF expansion. The study has been prepared to support amendment of the site Environmental Authority (EA) and to provide the technical basis for progression to detailed design, consistent with the DETSI (2024) Manual and relevant ANCOLD guidelines.

The existing TSF is a valley-type earthfill facility constructed in 2010, currently operating with a crest level of approximately RL 323 m and an estimated storage capacity of approximately 163 ML. The proposed raise will increase the crest level to RL 326 m, increasing the available storage capacity to approximately 398 ML while remaining within the existing TSF disturbance footprint.

The TSF is classified as a Significant consequence category regulated structure under the current Environmental Authority. A Dam Break Analysis and Consequence Category Assessment completed as part of the Phase 2 study confirmed that the Significant consequence category remains applicable for the proposed raise.

The feasibility design comprises a 3 m upstream raise of the existing embankment, constructed using engineered earthfill materials with a minimum crest width of 6 m, upstream batter slopes of 1V:3H, and downstream batter slopes of 1V:2.5H. Surface water management will continue to be controlled through the existing diversion system and an emergency spillway designed to safely convey the 1:1000 AEP storm event, consistent with DETSI requirements.

Engineering assessments were undertaken to evaluate the performance of the proposed raise, including seepage modelling and slope stability analyses. A calibrated steady-state seepage model based on available monitoring data indicates that, subject to appropriate pond management and beach development, seepage from the raised embankment is expected to remain comparable to or lower than existing conditions.

Slope stability analyses were undertaken for representative cross-sections under end-of-construction, long-term static and post-seismic loading conditions. The calculated factors of safety satisfy the minimum criteria recommended by ANCOLD (2019) for a Significant

consequence category structure, confirming that the proposed embankment configuration is stable under the assessed loading scenarios.

Operational management of the raised facility will be upgraded to implement subaerial perimeter deposition via spigots installed along the embankment crest, promoting beach development away from the embankment and maintaining the decant pond at a safe offset to control phreatic levels and minimise seepage gradients. The monitoring framework will be expanded to include vibrating wire piezometers (VWPs) and survey monitoring to verify embankment performance during operations.

A geotechnical site investigation and laboratory testing program will be undertaken prior to the Detailed Design stage to confirm material parameters and support finalisation of the embankment geometry and design assumptions.

Overall, the feasibility study demonstrates that the proposed Phase 2 TSF raise to RL 326 m is technically viable and capable of achieving compliance with the hydraulic performance, seepage management and stability requirements applicable to a Significant consequence category structure.

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1 INTRODUCTION

1.1 General

Savannah Goldfields (SVG) owns the Georgetown Gold Mine (the Project), which comprises multiple Mining Leases (MLs) and supplies ore to the Georgetown Processing Plant (the Plant). Formerly operating as Laneway Resources Limited, SVG acquired the Plant in February 2022 and is the current holder of the Environmental Authority (EA) **[3]** for the Project.

SVG plans to recommence operations using a staged approach with the aim of expanding tailings storage capacity through short-term and long-term disposal strategies. The short-term strategy, referred to as the Phase 1 TSF expansion, comprises an excavated lined pit within the western margin of the TSF impoundment and is intended to provide tailings containment during the early stages of production, ahead of the implementation of a long-term solution expected in early 2027.

The Phase 2 expansion forms SVG's long-term tailings management strategy and includes lifting the existing TSF embankment by 3m to RL 326 over existing embankment (RL 323m).

SVG engaged GeoTails Consulting (GTC) to undertake the Engineering Design at a Feasibility Study (FS) level for the Phase 2 TSF Expansion.

This report presents the Engineering Design at a FS level for the proposed Phase 2 TSF expansion at the Georgetown Gold Mine, North Queensland.

1.2 Background

The Georgetown Gold Mine (the Project) is located approximately 380 km southwest of Cairns in North Queensland and located 7km to the southwest of Georgetown. Mining began in the 1990s by Union Mining Ltd across Mining Leases ML 3409, ML 3540 and ML 3591, supported by a processing plant with a nominal capacity of 250,000 tpa.

The most recent documented ore processing at the Georgetown Plant occurred between September 2022 and January 2024. During this period, feed material comprised ore sourced from the Agate Creek Gold Mine as well as historic tailings excavated primarily from the south-eastern corner of the existing TSF impoundment. The historic tailings were reprocessed together with the Agate Creek ore. The total tailings tonnage recorded during this processing period is approximately 172,300 tonnes. Tailings generated from this processing campaign were deposited within the internal cell and the northern half of the TSF impoundment (referred as Cell 2).

It has been advised that approximately 31,000 m³ of tailings were deposited during recommissioning of the processing plant prior to a subsequent shutdown to undertake maintenance works in preparation for a full restart once the Western Cutback cell has been constructed. Detailed information regarding tailings deposition management and placement locations during this period has not been made available at the time of reporting. The mine has otherwise remained under care and maintenance since the conclusion of the primary processing period.

1.3 Regulatory Context

The site operates under Environmental Authority (EA) EPML00899813, issued by the Department of Environment, Tourism, Science and Innovation (DETSI) on 11 December 2025 **[3]**.

Under the current EA, the existing Tailings Storage Facility (TSF) is classified as a regulated structure with hydraulic performance requirements corresponding to a "Significant" consequence category, in accordance with the DETSI (DETSI, 2024) **[1].**

As part of the Phase 2 Feasibility Study, GeoTails Consulting (GTC) completed a Dam Break Analysis (DBA) and Consequence Category Assessment (CCA) for the proposed raise to RL 326 m (GTC, 2026) **[4]**. In accordance with the DETSI Manual, a review of the CCA is required where there is a material change to a dam structure. The updated assessment confirms that the "Significant" consequence category remains applicable for the proposed Phase 2 TSF raise.

The specific EA condition relevant to the TSF design requirements is reproduced below:

G3-1 *Prior to commencing construction of a regulated dam, the holder of the environmental authority must submit to the administering authority for acceptance a design plan that has been certified by a suitably qualified and experienced person, as compliant in all respects with this environmental authority, and in accordance with accepted engineering standards.*

1.4 Purpose and Scope of Work

The purpose of this report is to present a comprehensive design documentation package to support the proposed Environmental Authority (EA) amendment for the Phase 2 raise of the Georgetown Tailings Storage Facility (TSF).

This report provides a feasibility-level engineering design prepared by GeoTails Consulting (GTC) for a 3 m upstream raise of the TSF (to RL 326 m). The documentation has been prepared in accordance with the EA requirements outlined in Section 1.3, the DETSI (2024) Manual, accepted industry practice and relevant ANCOLD Guidelines.

Specifically, this report provides:

- Project background and current TSF status;
- Design basis, criteria, and key assumptions adopted for the Phase 2 raise;
- Hydrologic and hydraulic performance assessment of the proposed configuration;
- Seepage, stability, and geotechnical assessments of the proposed raise, including comparative evaluation against existing TSF seepage performance to assess incremental impacts and confirm compliance with performance objectives;
- A risk-informed instrumentation and performance monitoring framework to support detailed design, construction, and ongoing surveillance; and
- Operational requirements to support safe and compliant TSF management.
- Overview of construction aspects, including key activities, general material properties, application, and preliminary material quantities.

Feasibility-level engineering drawings are provided to illustrate the proposed raise configuration and key design elements. These drawings form the basis for subsequent detailed design and construction documentation.

Following completion of this Feasibility Study, the next phase of works will include:

- Geotechnical Site Investigation (SI) to further characterise foundation and embankment conditions, including installation of vibrating wire piezometers (VWPs) to inform detailed design and long-term monitoring;
- Preparation of detailed design documentation suitable for construction and RPEQ certification, including construction methodology and quality management requirements;
- Update of the Operations, Maintenance and Surveillance (OMS) Manual in accordance with ANCOLD and EA requirements; and
- Preparation of a Construction Quality Assurance (CQA) Plan consistent with regulated structure obligations under the EA.

1.5 Report Structure

This report is structured as follows:

- **Section 2.0** - Project background and site setting, including details of the existing TSF.
- **Section 3.0** - Basis of design and design criteria, including key inputs and assumptions.

- **Section 4.0** – Description of the proposed Phase 2 raise and supporting engineering evaluations, including hydrotechnical analysis, seepage assessment, and stability analysis.
- **Section 5.0** – Construction overview, including general construction methodology, material properties, and preliminary quantities.
- **Section 6.0** - Operational and monitoring requirements to achieve the design intent.
- **Section 7.0** - Closure concept and rehabilitation considerations.

2 BACKGROUND DATA

2.1 Description of Existing Tailings Storage Facility

The existing Tailings Storage Facility (TSF) is a regulated structure under the current Environmental Authority (EA) and serves as the primary tailings containment facility for the operation. The existing TSF is a valley-type storage located east of the processing plant. The facility was constructed in 2010 by raising a pre-existing water dam embankment that had been developed across a natural drainage gully discharging east toward Sandy Creek.

The original water dam (constructed circa 2000 as a catch dam and process water storage) was formed using site-won sandy clay materials. Limited construction records are available for the original dam; however, site observations indicate it comprises low- to medium-plasticity sandy clay fill. The 2010 TSF development incorporated a central raise over the historic water dam embankment, with additional embankment sections constructed beyond the limits of the original dam to form the full TSF perimeter (refer Figure 1).

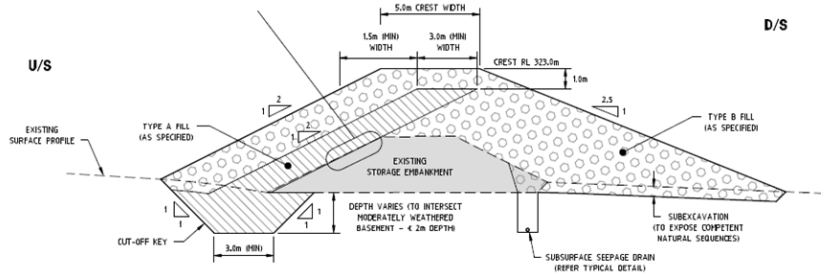
2.1.1 Embankment Zoning and Materials

The TSF raise was constructed as a zoned earthfill embankment comprising:

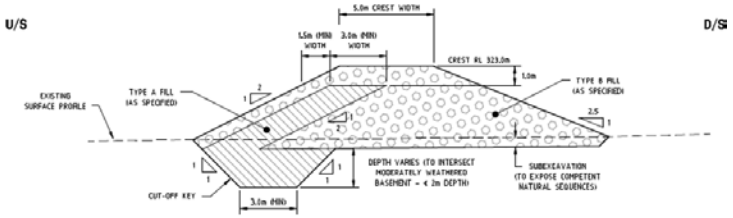
- Type A Fill (fine-grained material / tailings-derived fill) forming the low-permeability core zone, tied into a foundation cut-off key; and
- Type B Fill (rockfill material) forming the structural outer shell on the upstream and downstream faces.

The cut-off key was excavated to intersect potential seepage pathways and provide continuity of the core into foundation materials. Rockfill for the outer shell was sourced from on-site mullock heaps, while deposited tailings recovered from a backfilled pit west of the storage were used to form the core material.

Typical cross-sections of the embankment are shown in Figure 1, including sections over the historic water dam and sections constructed beyond the original dam footprint.



a) over the old water dam



b) outside limits of the old water dam

FIGURE 1 TYPICAL CROSS SECTIONS OF EXISTING TSF EMBANKMENT (AWA 2009) [5]

2.1.2 Existing TSF Configuration

The configuration of the TSF is based on the most recent site survey (October 2024) and is summarised below:

- **Crest Level:** RL 322.8 m
- **Full Supply Level (Spillway Crest):** RL 322.0 m
- **Crest Width:** 5.4–6.2 m
- **Spillway Width:** 9.7 m
- **Embankment Length:** approximately 730 m
- **Maximum Embankment Height:** approximately 10 m
- **Estimated Storage Capacity:** approximately 163 ML (to RL 322.0 m)

The facility comprises a perimeter earthfill embankment constructed across a natural valley. The emergency spillway is located on the northern abutment and discharges to the east via a rock-armoured channel.

2.1.3 Internal Cell

In May 2022, an internal cell was constructed within the western portion of the TSF to support reprocessing of legacy tailings. The cell is separated from the main impoundment by a cross-valley earthfill embankment. The internal cell was operational between September

2022 and October 2023, during which it received approximately 116,000 tonnes of tailings at an average monthly rate of 10,000 tonnes (SVG 2025) **[9]**.

At the time of this assessment, the internal cell is inactive.

2.1.4 Seepage Collection System

The TSF is equipped with a seepage collection system comprising a subsurface trench along the downstream toe of the eastern embankment. The trench drains to two collection sumps located at the invert of the sub-drainage channels.

Each sump is fitted with solar-powered pumps, supplemented by diesel generators, which return collected seepage water to the TSF. The system has operated reliably since installation, with no significant performance issues reported.

2.1.5 Emergency Spillway

The emergency spillway is formed by excavation into natural ground at RL 322.0 m and discharges eastward via a rock-armoured channel.

2.1.6 Clean Water Diversion Drain

The total upstream catchment contributing to the TSF is approximately 19.2 ha. A clean water diversion drain is located along the western boundary of the TSF and diverts runoff from the upper western sub-catchment (approximately 4.9 ha) away from the facility.

The remaining catchment area (approximately 14.3 ha) reports directly to the TSF impoundment.

The general site layout, including the TSF, internal cell, emergency spillway, clean water diversion drain, and processing plant, is shown in Figure 2.

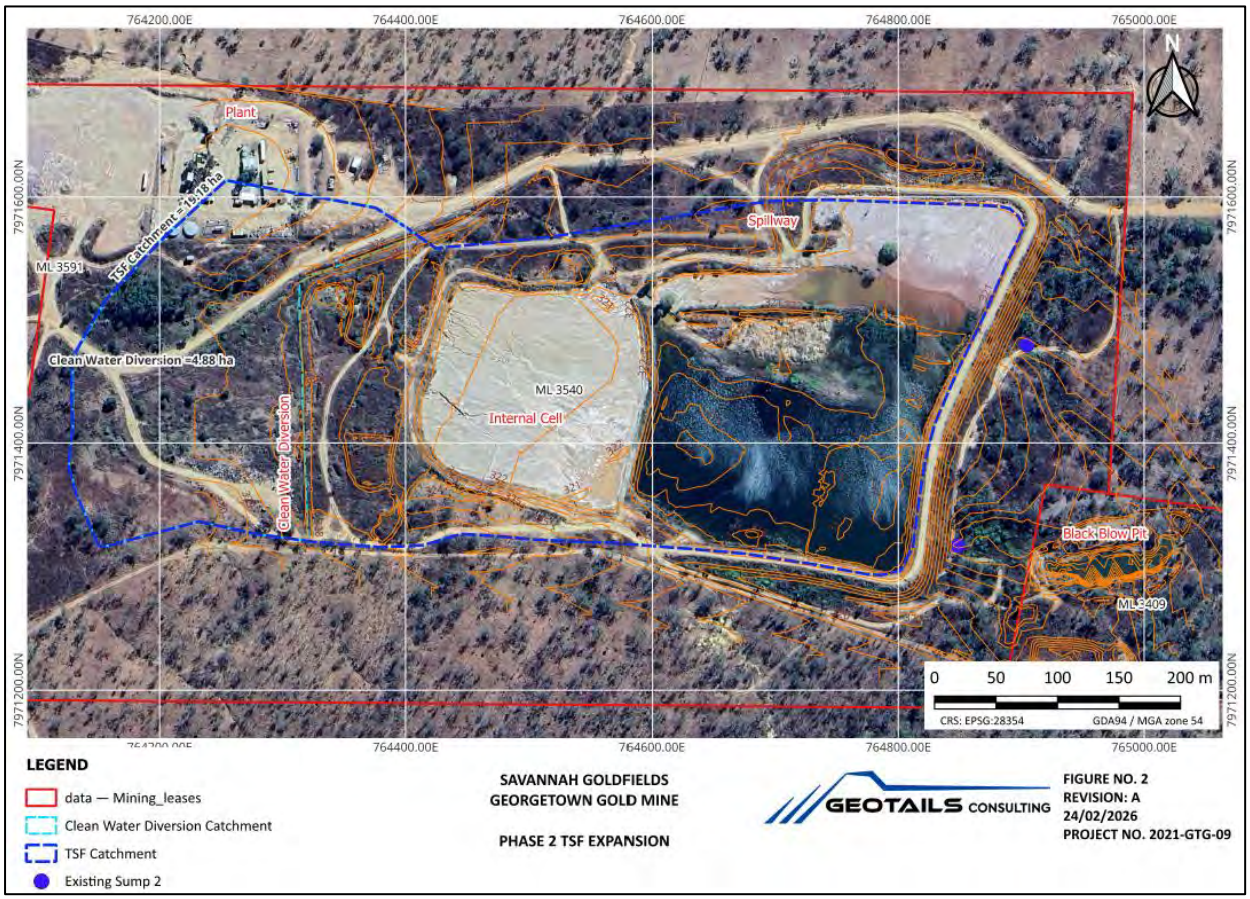
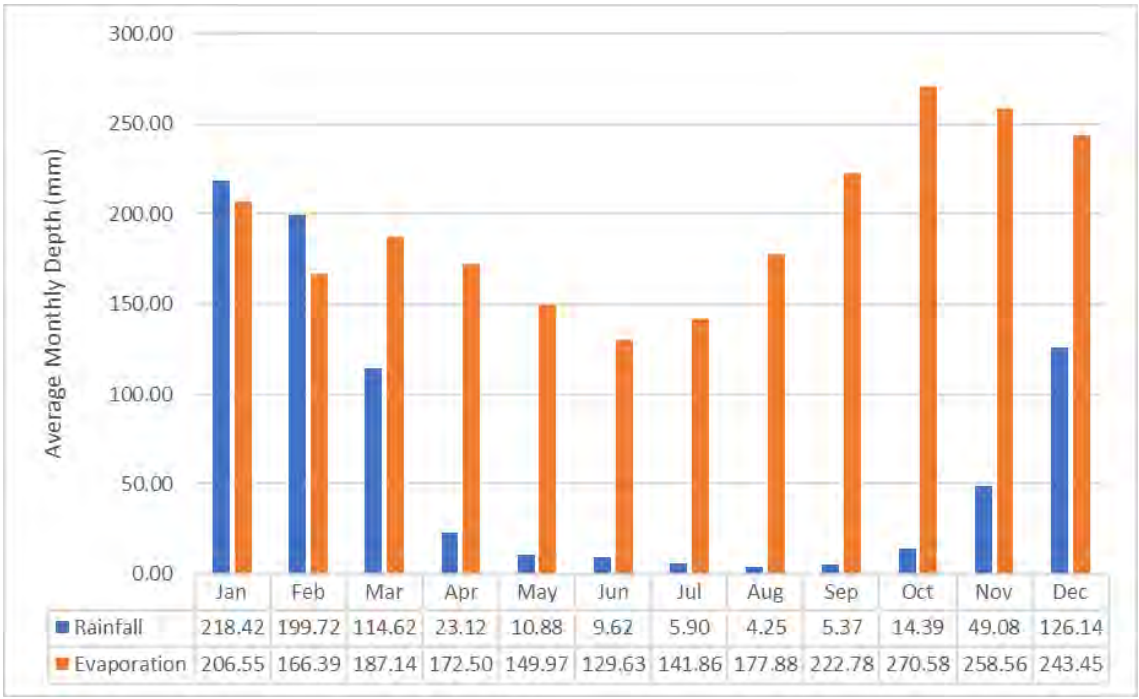


FIGURE 2 EXISTING TSF CONFIGURATION

2.2 Climate

The site is located in North Queensland and is subject to a semi-arid climate with hot and humid summers and drier winters. Average monthly rainfall and evaporation totals specific to the site location was sourced from the SILO Data set (The Long Paddock) [4] as shown in Figure 3. It is indicated that a distinct wet season extends during the summer months from December to March with 84% of mean annual rainfall occurring during these months. Peak rainfalls typically occur during January and February, with lower rainfall during the winter months. The mean annual evaporation (2,327 mm) exceeds mean rainfall (782 mm) by a factor of 3.0. In general, based on the precipitation and evaporation data, the project site is water deficient, with evaporation losses exceeding rainfall depths on an annual average basis.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall	218.42	199.72	114.62	23.12	10.88	9.62	5.90	4.25	5.37	14.39	49.08	126.14
Evaporation	206.55	166.39	187.14	172.50	149.97	129.63	141.86	177.88	222.78	270.58	258.56	243.45

FIGURE 3 AVERAGE MONTHLY RAINFALL AND EVAPORATION [4]

2.3 Subsurface Characterization

A geotechnical site investigation conducted in 2009 by Landline Consulting (AWA, 2009) **[5]** provides the primary understanding of subsurface conditions within the Georgetown TSF footprint. The investigation comprised three geotechnical boreholes drilled to depths of 10–15 m and eight test pits excavated to depths of 1.7–4.6 m along the downstream toe of the embankment.

These works provided information on the stratigraphy, material characteristics, and groundwater conditions relevant to embankment foundation.

2.3.1 Soil and Rock Profile

Based on the 2009 site investigation results, the subsurface profile generally comprises low to medium plasticity sandy clay soils overlying weathered granitic basement rock. The soil horizon extends to approximately 3–5 m depth, transitioning into extremely to highly weathered granite, with weathering intensity decreasing with depth.

At greater depths, moderately weathered granite retaining remnant rock structure is encountered. This material is described as weak to medium strength and geotechnically competent, providing an appropriate and stable foundation horizon for containment infrastructure.

2.3.2 Foundation Permeability

In-situ permeability testing undertaken using falling and rising head methods indicated low hydraulic conductivity in both soil and weathered granite strata. Test results ranged from 1×10^{-8} to 1×10^{-7} m/s, with upper soil layers at the lower end of this range.

The permeability of the upper soil layer provides a relatively impermeable “blanket” layer, limiting vertical infiltration and reducing the potential for groundwater recharge via percolation. In contrast, the underlying basement granite, while still low in permeability, may locally exhibit higher conductivity due to structural features such as fracturing or bedding planes.

2.4 Hydrogeology and Groundwater

A review of available hydrogeological and groundwater information has been undertaken, drawing on key references including RLA (2014) Error! Reference source not found. and HESS (2024) **Error! Reference source not found.**. This summary consolidates overview of the site’s hydrogeological setting, specifically as it relates to the Phase 2 TSF expansion.

2.4.1 Hydrogeological Setting

The Georgetown Gold Project is underlain by a geologically complex environment comprising granitic regolith and fractured basement rock, both of which host groundwater with variable yield and connectivity. Three primary hydrogeological units are identified:

- **Weathered Regolith Aquifers**

These shallow, unconfined aquifers occur within the weathered granitic overburden, typically at depths of 10–15 m. They exhibit moderate hydraulic continuity across the Plant Site, with low yields (commonly referred to as "soaks") and delayed response to rainfall events, indicative of low permeability.

- **Near-Surface Fractured Basement Aquifers**

Occurring at depths of 20–50 m, these semi-confined aquifers are hosted within fractured granitic basement. They represent the main groundwater-bearing unit on site, with typical yields ranging from 0.3 to 0.5 L/s. Yields and water quality vary significantly between bores, reflecting poor lateral continuity and the discrete nature of fracture networks.

- **Deep Fractured Basement Aquifers**

These confined aquifers lie below approximately 70 m depth. Available data indicates generally low yields (<1 L/s), with isolated exceptions (e.g. bore RDMB3 at 4 L/s). These

deeper systems are considered low-transmissivity units with limited relevance to shallow groundwater dynamics associated with the TSF.

2.4.2 Groundwater Flow Directions

Permeability testing across the regolith and weathered basement indicates generally low hydraulic conductivity, in the order of 10^{-8} m/s. This is consistent with observed aquifer compartmentalisation and limited hydraulic connectivity, resulting in low recharge rates and subdued groundwater movement.

Groundwater flow directions are generally consistent with surface topography:

- In the eastern Plant Site area, , flow is directed south-southeast.
- In the western area near the historical TSF, flow diverges east and west from a local topographic high, which also serves as a recharge divide.

Groundwater levels exhibit seasonal variation, with amplitudes up to 6 m observed near the TSF. Potentiometric surfaces were mapped for both the wet (February 2023) and dry (September 2023) seasons, based on site monitoring data. A conceptual hydrogeological model was developed by HESS (2024) **[10]**, and the resulting potentiometric contours are presented in Figure 4 and Figure 5.

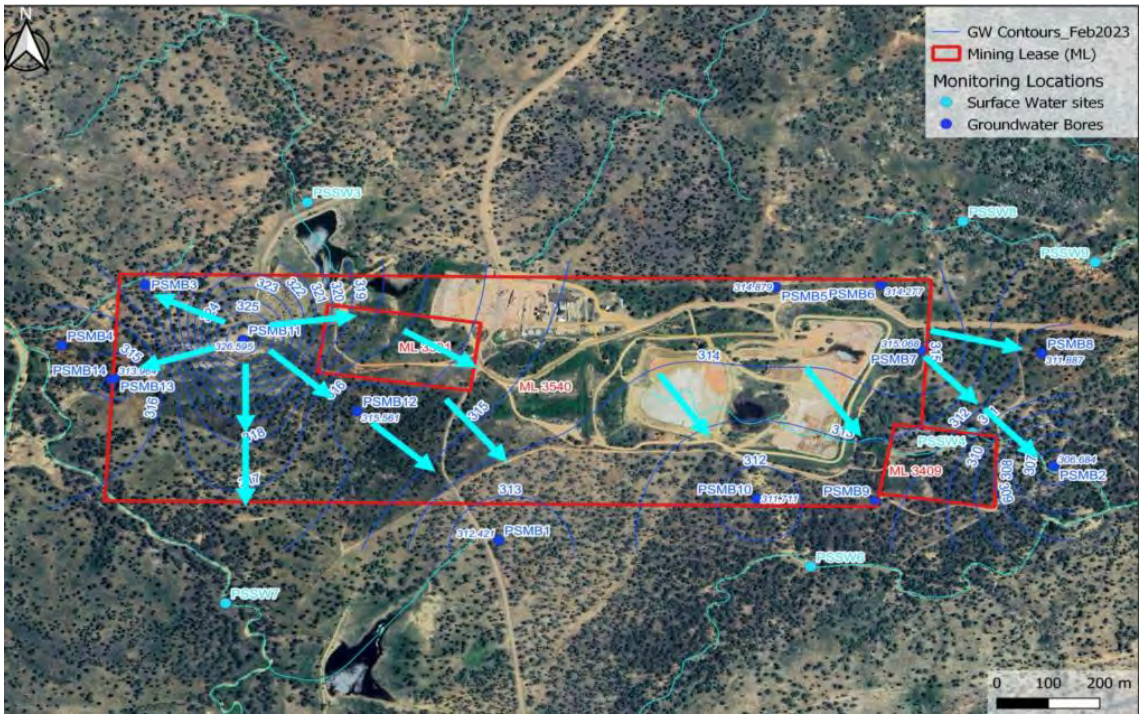


FIGURE 4 GROUDNWATER CONTOURS – WET SEASON (FEBRUARY 2023) FOR GRANITIC REGOLITH (HESS 2024) ERROR! REFERENCE SOURCE NOT FOUND. ERROR! REFERENCE SOURCE NOT FOUND.

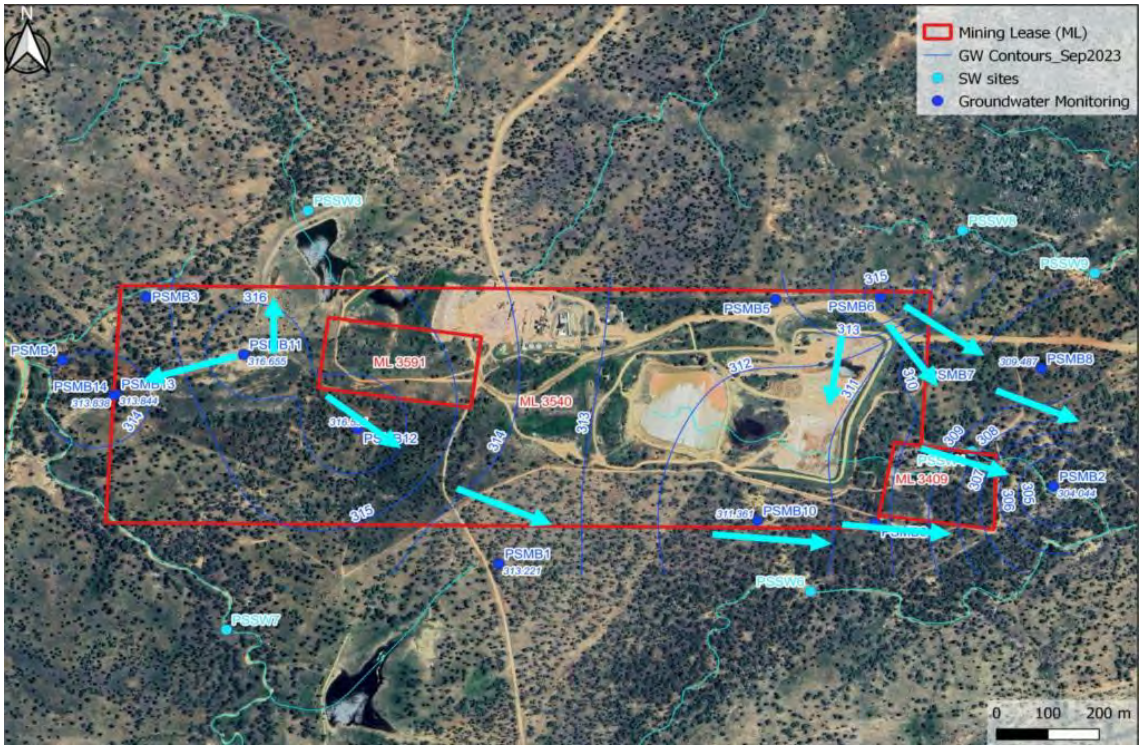


FIGURE 5 GROUNDWATER CONTOURS – DRY SEASON (SEPTEMBER 2023) FOR GRANITIC REGOLITH (HESS 2024) [7]

The site groundwater monitoring network comprises 20 bores, 14 of which are located within the Plant Site. These are monitored quarterly and span the major aquifer types, informing baseline groundwater conditions and the development of the conceptual hydrogeological model.

This hydrogeological context is essential for understanding seepage behaviour, containment performance, and potential groundwater interactions relevant to the Phase 2 TSF expansion.

2.5 Tailings Geotechnical Characteristics

In 2009, laboratory testing including classification and compaction tests were completed on four samples recovered from deposited tailings to assess tailings for potential use in embankment construction (AWA, 2009) **[5]**. The results are summarised below based on four tailings samples.

Classification: Stored tailings can be generally classified as CL-CI in accordance with the Unified Soil Classification System.

Particle Size Distribution: Geotechnical testing on these materials indicates that these materials can be geotechnically classified as Silty CLAY, with some/traces of sand.

Plasticity: These materials are of low to medium plasticity, with Liquid Limit values ranging from 27 to 55% and generally plot above A-line in the Modified Casagrande Chart.

Specific Gravity (SG): No Specific Gravity (SG) testing of Georgetown tailings are available, nonetheless, a SG in the order of 2.7 to 3.0 -was inferred for tailings based on the processed oxidised ore and higher SG of 3.0 associated with sulphide ore.

2.6 Geochemical Characterization

A geochemical impact assessment was undertaken by Geochemical Scientific Pty Ltd (GS 2023) **Error! Reference source not found.** to evaluate the potential for environmental harm related to seepage from the Georgetown TSF. The study reviewed over a decade of surface water, groundwater, and tailings geochemistry data to assess risks to downstream receptors, particularly within the Sandy Creek and Four Mile Creek catchments.

2.6.1 Tailings Geochemical Characterisation

Tailings stored within the TSF are enriched in several potentially toxic metals/metalloids, notably arsenic (As), antimony (Sb), bismuth (Bi), cadmium (Cd), lead (Pb), and zinc (Zn). Static testing classifies the majority of tailings samples as non-acid forming (NAF); however, limited leachate data restricts full understanding of contaminant mobility under field conditions.

2.7 Seismicity

The Georgetown site is located within the Australian continental interior and is classified as part of a Stable Continental Region (SCR) in the 2018 National Seismic Hazard Assessment (NSHA18) undertaken by Geoscience Australia**[6]**. Seismicity in this region is characterised by relatively low recurrence rates but the potential for moderate-to-large intraplate earthquakes. The NSHA18 probabilistic seismic hazard assessment incorporates distributed seismicity and fault-source models to account for source and ground-motion uncertainty.

In the absence of site-specific seismicity study for the Georgetown site, design earthquake loadings are adopted from the NSHA18. For engineering rock conditions (VS30 = 760 m/s; AS1170.4 Site Class Be), the mean peak ground acceleration (PGA) at Georgetown is approximately:

- 0.01 g at 1:475 AEP; and
- 0.02 g at 1:1,000 AEP.

The Phase 2 TSF has been assigned a significant consequence category. Consistent with ANCOLD guidance (ANCOLD, 2019) **[7]**, the 1:475 AEP loading is adopted as the Operating Basis Earthquake (OBE), and the 1:1,000 AEP as the Safety Evaluation Earthquake (SEE).

The SEE is the low probability event which would generate the most critical ground motions for evaluation of the seismic performance of the structure. Under the SEE, the dam could be expected to be damaged but would retain its functionality. The OBE is a higher recurrence interval event. Under OBE loading, the dam should remain serviceable.

3 BASIS OF DESIGN

3.1 General

This Feasibility Study (FS) has been developed based on the criteria and assumptions outlined in the following sections. The Basis of Design (BoD) defines the key inputs, assumptions, standards, industry guidelines, and design criteria that inform and govern the design intent, ensuring alignment with project requirements and regulatory expectations.

The objective of this study is to develop a FS-level design with an estimated accuracy of approximately ±30%, to support progression to detailed design following completion of additional geotechnical site investigations and laboratory testing program. As such, certain conditions and parameters have been assumed where site-specific data is limited.

No new detailed investigations have been undertaken as part of this study; therefore, baseline data and material parameters have been adopted based on previous investigations, available site data, site inspections, and relevant engineering experience.

3.2 Basis of Design

The Phase 2 TSF expansion is based on the design criteria and assumptions summarised in Table 1.

TABLE 1 BASIS OF DESIGN

Item No.	Item	Design Basis/Criteria	Source
1.0 – General Design Basis			
1.1	Available Tailing Storage Element	Georgetown TSF	SVG
1.2	Tailings Production	Tailings Production Rate (dry): 216,000 tonnes per annum (tpa) – (Maximum throughput scenario)	SVG
1.3	Tailings Dry Density	Average Dry Density - 1.4 (t/m^3) To be confirmed following additional site investigation and testing.	GTC
1.4	Risk Management	HIGH – in accordance with DETSI (2016)TSF assigned Significant Consequence Category. Phase 2 (RL 326 m) CCA completed in accordance with DETSI (2024) and ANCOLD, confirming Significant under both frameworks.	GTC

Item No.	Item	Design Basis/Criteria	Source
1.5	Available Borrow Source	To be confirmed based on final design requirements and laboratory testing results. Potential sources include: • Western Cutback footprint • Adjacent Waste Rock Dump area	SVG
1.6	TSF Survey	Latest LiDAR survey (Oct 2024) adopted for design	SVG
1.7	Embankment Raise Methodology	3 m upstream raise over existing embankment, including lateral extension over natural ground to crest RL 326 m.	GTC
1.8	Embankment Crest Width	A minimum crest width of 6.0 m is adopted to accommodate one-way light vehicle (LV) traffic. The crest width includes: • 1.5 m safety berm on both sides (0.5 m high), and • 3.0 m vehicle roadway	DNRME, 2019
2.0 – Geotechnical Design Basis			
2.1	Batter Slopes	Batter slopes have been adopted based on slope stability analyses under both static and seismic loading conditions.	GTC
2.2	Material Strength Parameters	Available data has been reviewed to adopt appropriate material strength parameters for slope stability analyses under the relevant loading conditions in accordance with ANCOLD recommendations.	GTC
2.3	Geotechnical Slope Stability	The slope stability criteria are as follows (as per ANCOLD 2019): • Long-term drained FOS≥1.5 • Short-term undrained (potential loss of containment) FOS≥1.5 • Short-term undrained (no potential loss of containment) FOS≥1.3 • Post-seismic FOS≥1.1	ANCOLD 2019
2.4	Dynamic Deformation Analysis	Simplified deformation analysis in accordance with ANCOLD guidelines on tailings dams (ANCOLD 2019)	GTC
2.5	Seismicity	Seismic parameters have been adopted from the National Seismic Hazard Assessment (NSHA18) undertaken by Geoscience Australia. According to ANCOLD (2019) recommendations for a "Significant" Consequence Category, the following design earthquakes have been adopted	(Geoscience Australia, 2018; ANCOLD, (2019)

Item No.	Item	Design Basis/Criteria	Source
		• Operating Basis Earthquake (OBE) OBE : 1:475 AEP , PGA=0.01 • Safety Evaluation Earthquake SEE : 1:1000 AEP, PGA=0.02	
3.0 – Hydrological and Hydraulic Design Basis			
3.1	Climate Data	Average and monthly rainfall, temperature, and evaporation data adopted for the site to support hydrological assessment and water balance modelling	SILO Data Drill (QLD Gov.)
3.2	Design IFD Data	Site-specific IFD data adopted for design storm estimation and hydraulic assessment.	BoM (2016)
3.3	Flood Storage/Freeboard Requirement	• Design Storage Allowance (DSA): 1:20 AEP, 2-month wet season • Estimating the ESS/MRL based on highest volume/lowest level from the following: ○ Extreme Storm Storage (ESS): 1:10 AEP, 72 hr duration ○ Wave allowance at 1:10 AEP	DETSI (2016)
3.4	Emergency Spillway	Based on 1:1000 AEP, critical storm event	DETSI (2016)
3.5	Seepage Performance	TSF to be designed and operated to minimise seepage losses and prevent environmental harm (Significant consequence category).	DETSI (2016)
3.6	Seepage Management	Potentially acidic toe seepage to be collected, monitored and returned to the TSF during operations.	GTC
4.0 – Tailings and Water Delivery System			
4.1	Tailings Deposition Management	Subaerial perimeter spigot deposition adopted in line with the design intent. Deposition to promote beaching away from the embankment, with the decant pond maintained in the north-west sector of the Phase 2 TSF.	GTC
4.2	Tailings Delivery System	Tailings delivery infrastructure (pipelines, pumps and spigots) to achieve controlled deposition consistent with TSF design intent and approved OMS requirements.	SVG
4.3	Decant Pond Management	Decant pumping and return water system to manage supernatant and rainfall runoff, minimise pond extent and minimum 80 m setback from embankment.	SVG

4 ENGINEERING ASSESSMENT

4.1 Description of the Phase 2 TSF Expansion

The Phase 2 TSF Expansion comprises a 3 m upstream raise of the existing TSF embankment from crest RL 323 m to RL 326 m. The raise will be constructed over the existing embankment footprint, with lateral extension over natural ground where required to achieve the final crest geometry. The expansion increases the available storage capacity within the approved TSF disturbance boundary without expanding the overall footprint.

The raise is designed to maintain compliance with applicable freeboard, stability, seepage and hydraulic performance requirements for a significant consequence category structure. The deposition strategy will continue to utilise subaerial perimeter spigot discharge to promote beach development away from the embankment and maintain the decant pond in the north-west sector of the facility.

The key design parameters adopted for the Phase 2 raise are summarised in Table 2

TABLE 2 PHASE 2 TSF RAISE DESIGN CONFIGURATION

Parameter	Value
Embankment type and raise method	Homogeneous earth fill raised using upstream method
Raise Height	3m
Existing Crest Level	RL 323.0 m (nominal)
Proposed Crest Level	RL 326.0 m
Embankment Crest Width	6.0m (minimum)
Upstream Batter Slope	1V:3H
Downstream Batter Slope	1V:2.5H
Spillway Crest Level (FSL)	RL 325.0 m
Spillway Base Width	6m
Storage Capacity at FSL (RL 325 m)	398 ML

4.2 Surface Water Management

The total TSF catchment is approximately 19.2 ha, as shown in Figure 6. The upper western sub-catchment (~4.9 ha) is diverted around the facility via a clean water diversion system, while the remaining contributing area, including the proposed Western Cutback (~2.2 ha), reports directly to the TSF impoundment.

The surface water management strategy maintains hydraulic separation between clean and impacted water. In extreme storm events where diversion capacity and available TSF storage are exceeded, the emergency spillway provides controlled conveyance of excess flows downstream (refer Figure 6).



FIGURE 6 PHASE 2 TSF EXPANSION CATCHMENT AND SURFACE WATER MANAGEMENT LAYOUT

4.2.1 Emergency Spillway

An emergency spillway is proposed on the northern embankment, discharging to the existing downstream spillway channel (refer Figure 6). The spillway is designed to safely convey the 1 in 1,000 AEP critical storm event, consistent with the requirements for a “Significant” consequence category structure under the DETSI (2024) Manual.

In accordance with the DETSI (2024) Manual and ANCOLD Guidelines, spillway capacity has been assessed assuming the TSF water level is at the spillway crest level at the commencement of the design storm event and that the upstream clean water diversion drain is inoperable, resulting in a total contributing catchment of approximately 18.9 ha. The spillway will be rock-armoured to provide erosion protection, with 1V:10H side slopes adopted to facilitate safe vehicle access.

Key design parameters are summarised in TABLE 3, which presents the hydraulic capacity of the Phase 2 spillway.

TABLE 3 PHASE 2 TSF EMERGENCY SPILLWAY DESIGN

Parameter	Value
Critical Storm Event	1:1000 AEP, 6 hours
Catchment Area	18.9 ha
Spillway Base Width	6.0 m
Spillway Crest Side Slope	1V:10H
Spillway Crest Level	RL 325.0 m
Spillway Depth	1.0 m
Peak Inflow	3.4 m^3/s
Peak Outflow	1.3 m^3/s
Flow Depth	0.3 m
Available Freeboard	0.7 m

4.2.2 DSA and MRL Hydraulic Performance Requirements

Detailed assessment of the Design Storage Allowance (DSA) and Mandatory Reporting Level (MRL) will be undertaken at the detailed design stage. Compliance will be demonstrated through operational simulation method in accordance with DETSI (2016) requirements as part of the site-wide Water Balance Model.

The operational simulation will assess storage performance under long-term climate sequences and design storm conditions to confirm compliance with hydraulic performance requirements for a significant consequence category structure. As part of detailed design, the site-wide water management system will be further defined, including pipeline configuration, pumping capacity, flow rates, return water arrangements and operational controls.

4.3 Geotechnical Analysis

4.3.1 Overview

The geotechnical assessment for the Phase 2 TSF raise comprises seepage analysis and slope stability evaluation for the proposed 3 m upstream raise to RL 326 m.

A two-dimensional steady-state seepage model was developed to represent the embankment, foundation materials, tailings mass and drainage system. The model was

calibrated against monitored seepage discharge and upstream pond level data, demonstrating close agreement with observed field performance. The calibrated model was then applied to the raised configuration to predict steady-state seepage rates and the phreatic surface under proposed operating conditions. The predicted pore water pressure distribution forms the basis for the stability assessment.

Slope stability analyses were undertaken using limit equilibrium methods (Morgenstern-Price) for representative cross-sections under end-of-construction, long-term static and post-seismic loading conditions. Strength parameters were based on available investigation data and relevant literature, with appropriate consideration of post-seismic strength reduction and liquefaction of slurry tailings. The results were assessed against ANCOLD (2019) minimum Factors of Safety for a Significant consequence category structure, and compliance was achieved for all evaluated loading conditions.

4.3.2 Seepage Analysis

4.3.2.1 Introduction

A steady-state seepage assessment was undertaken to evaluate the hydraulic performance of the existing embankment and drainage system and to predict seepage conditions associated with the proposed 3 m raise.

The base-case model was calibrated by comparing simulated seepage discharge along a representative embankment section available field monitoring data. Following calibration, the model was used to assess pore water pressure distributions and seepage rates for the raised configuration.

4.3.2.2 Model description

A two-dimensional steady-state seepage model was developed to represent:

- Existing embankment geometry and zoning (refer Figure 1)
- Drainage configuration
- Foundation materials (weathered granite and bedrock)
- Tailings mass

Figure 7 presents the section from the east embankment of TSF which was selected as the representative critical cross-section for seepage analysis.

All materials were modelled as homogeneous within each defined unit using a fully saturated formulation. Where appropriate, anisotropy was incorporated using assigned Ky/Kx ratios. The permeability parameters adopted for each material is presented in TABLE 4 below

TABLE 4 ADOPTED HYDRAULIC CONDUCTIVITY PARAMETERS

Parameter	K_x (m/s)	K_y /K_x
Phase 2 Raise Earth fill	1×10^{-7}	0.5
Fresh Tailings	5×10^{-7}	1
Existing Tailings	1×10^{-7}	1
Zone B (Rock fill)	1×10^{-6}	0.5
Zone A (Tailings derived fill)	5×10^{-8}	0.5
Drain	1×10^{-2}	1
Earth fill (old water dam)	5×10^{-5}	0.5
Weathered Granite	1×10^{-7}	1
Bedrock	1×10^{-7}	1

The following boundary conditions were applied:

- **Upstream boundary:** Specified total head equal to RL 320 m (average monitored pond level between 1 August 2024 and 23 October 2025).
- **Drainage outlet:** Modelled as a non-pressurised gravity outlet with specified head equal to the drain invert level (RL 313.8 m), representing observed field discharge behaviour.

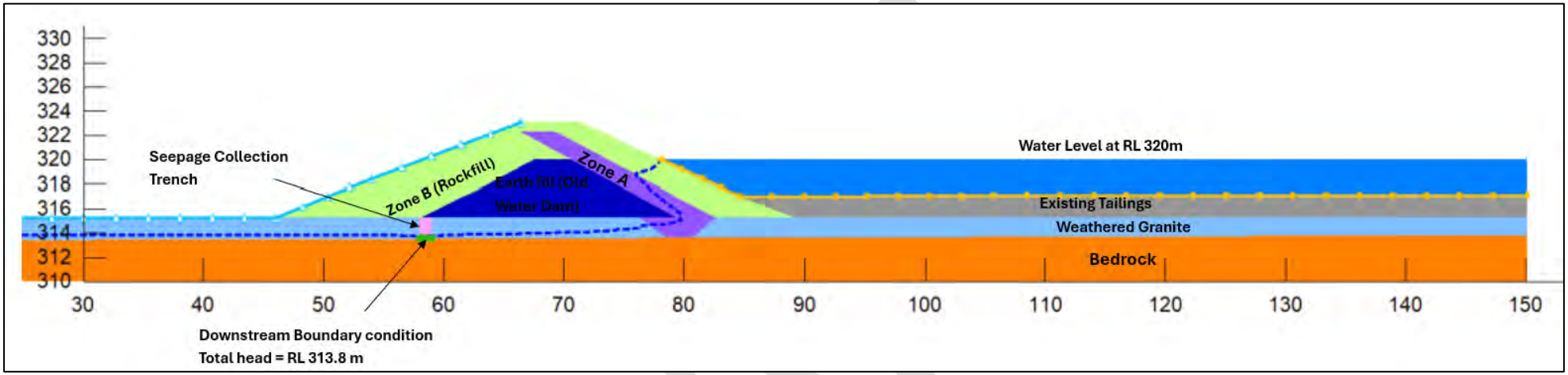


FIGURE 7 SEEPAGE MODEL DETAILS AND SIMULATED PHREATIC SURFACE – EXISTING CONFIGURATION

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4.3.2.3 Monitoring Data Summary

Seepage discharge data collected between 1 August 2024, and 23 October 2025 were used to calibrate the steady-state seepage model.

- Total seepage discharge represents the combined flow from two seepage collection sumps (Flow #1N and Flow #2S).
- Seepage flux was calculated based on the overall length of eastern embankment (~350m)

TSF water level records were limited prior to 5 December 2024; however, the seepage assessment is based on long-term steady-state conditions and therefore adopts the average representative pond level over the monitoring period rather than short-term fluctuations. The use of an averaged operating water level is considered appropriate for calibration of steady-state seepage behaviour, and short-duration variations in pond level are not expected to materially influence the overall seepage regime.

TABLE 5 summarises the available monitoring data used to calibrate the steady-state seepage model.

TABLE 5 MONOTORING SUMMARY

Data	Value
Average Seepage	105,874 L/day
Median Seepage	81,450 L/day
Average seepage flux	3.5×10^{-6} m³/s/m
Median seepage flux	2.7×10^{-6} m³/s/m
Average TSF water level	RL 320.1 m
Median TSF water Level	RL 319.9 m

4.3.2.4 Model Calibration Behaviour Validation and Interpretation

Field observations indicate that no seepage expression occurs at the eastern embankment toe. Instead, seepage is intercepted and collected within the subsurface seepage interception system installed within the weathered granite profile. This observed behaviour demonstrates that seepage pathways are controlled by near-surface flow within the embankment and regolith materials, with discharge occurring via the engineered collection system rather than uncontrolled toe emergence.

The steady-state seepage model successfully reproduces this behaviour (refer Figure 7). Simulated phreatic surface remains internal to the embankment and upper foundation profile, with seepage directed toward the interception trench consistent with field

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observations. This confirms that the adopted conceptualisation , including permeability parameters, anisotropy ratios, zoning, geometry and boundary conditions, appropriately represents the governing seepage mechanisms.

The calibrated model predicted a seepage flux of 2.9×10^{-6} m³/s/m, equivalent to 86,486 L/day, compared to the measured average discharge of 105,874 L/day and median discharge of 81,450 L/day (refer **TABLE 5**). The predicted discharge falls within approximately −6% of the median and +18% of the average monitored seepage rates. Given natural variability in monitored discharge and the inherent simplifications of steady-state modelling, this level of agreement is considered acceptable and confirms that the simulated seepage magnitude is consistent with typical field performance. Accordingly, the model is considered suitably calibrated for predictive assessment of the Phase 2 raised configuration.

4.3.2.5 Model Limitations

The seepage assessment has been undertaken using a two-dimensional steady-state numerical model representing a representative cross-section of the TSF. As such, it does not explicitly simulate three-dimensional geological variability, structural complexity (including the mapped Black Blow and Big Wonder faults), or broader regional groundwater interactions.

Previous geological and hydrogeological investigations (Rob Lait & Associates, 2009, 2010 **[10]** , **[11]**; Hillier (2010) **[12]**) indicate limited hydraulic continuity between the upper soil/weathered granite profile and the deeper regional groundwater system. Groundwater flow within the site is predominantly confined to the regolith aquifer (typically 10–15 m deep), with only minor fracture-controlled flow within the underlying granite.

Given these findings, and the absence of toe seepage expression, seepage performance is interpreted to be governed primarily by near-surface flow pathways intercepted by the installed seepage collection system rather than by deeper regional groundwater connectivity.

While precise replication of measured seepage discharge is not practically achievable due to modelling dimensionality, foundation heterogeneity and monitoring data limitations (including temporal gaps and operational variability), the demonstrated behavioural consistency and order-of-magnitude agreement with monitored seepage magnitudes indicate that the model adequately captures the dominant seepage mechanisms. The model is therefore considered appropriate for comparative assessment of the Phase 2 raise.

4.3.2.6 Seepage Assessment of the Phase 2 Embankment

A steady-state seepage analysis was undertaken to evaluate pore water pressures and seepage discharge for the proposed 3 m upstream raise to RL 326 m. Two operating scenarios were assessed:

- **Maintaining tailings beach** with decant pond located approximately 50 m from the embankment; and
- **No beach condition** with pond located adjacent to the upstream face.

The upstream boundary was conservatively assigned at RL 324.5m representing the Phase 2 end- of- filling condition. Results are summarised in Table 6 and Figure 8.

TABLE 6 PHASE 2 TSF SEEPAGE ANALYSIS RESULTS (EASTERN EMBANKMENT WITH ~ 350M)

Scenario	Seepage Flux ($m^3/s/m$)	Seepage (L/day)
50 m beach maintained	1.2×10^{-7}	35,230
No beach	2.2×10^{-6}	67,012

The modelling results indicate that seepage behaviour under the Phase 2 raise is governed by both the permeability characteristics of the engineered raise materials and the operational position of the decant pond.

With incorporation of engineered low permeability fill in the upstream raise and maintenance of adequate pond setback, the Predicted seepage is expected to be lower than current monitored conditions, subject to construction quality and pond management. This reduction is primarily attributable to:

- The lower hydraulic conductivity of the engineered raise materials;
- Increased effective seepage flow path length; and
- Reduction in hydraulic gradient acting across the embankment.

In accordance with Darcy's Law ($q = k\ i$), seepage flux is directly proportional to the hydraulic gradient. Maintaining sufficient beach width increases the horizontal flow path within the tailings mass, allowing hydraulic head dissipation prior to reaching the embankment interface. This results in reduced pore water pressures within the upstream shell and foundation and a lower phreatic surface within the embankment.

Lower phreatic levels reduce the hydraulic driving forces acting within the embankment and foundation, thereby contributing to improved internal stability by limiting pore pressure build-up and preserving effective stress within the embankment body.

Accordingly, subject to construction in accordance with the design intent , including placement of engineered low permeability raise materials, seepage discharge is expected to reduce relative to existing conditions. Further improvement is anticipated through adequate tailings beach management and decant pond setback, provided the TSF is operated in accordance with the design criteria. On this basis, the Phase 2 raise is not expected to exacerbate seepage discharge and is predicted to improve seepage performance relative to existing steady-state conditions.

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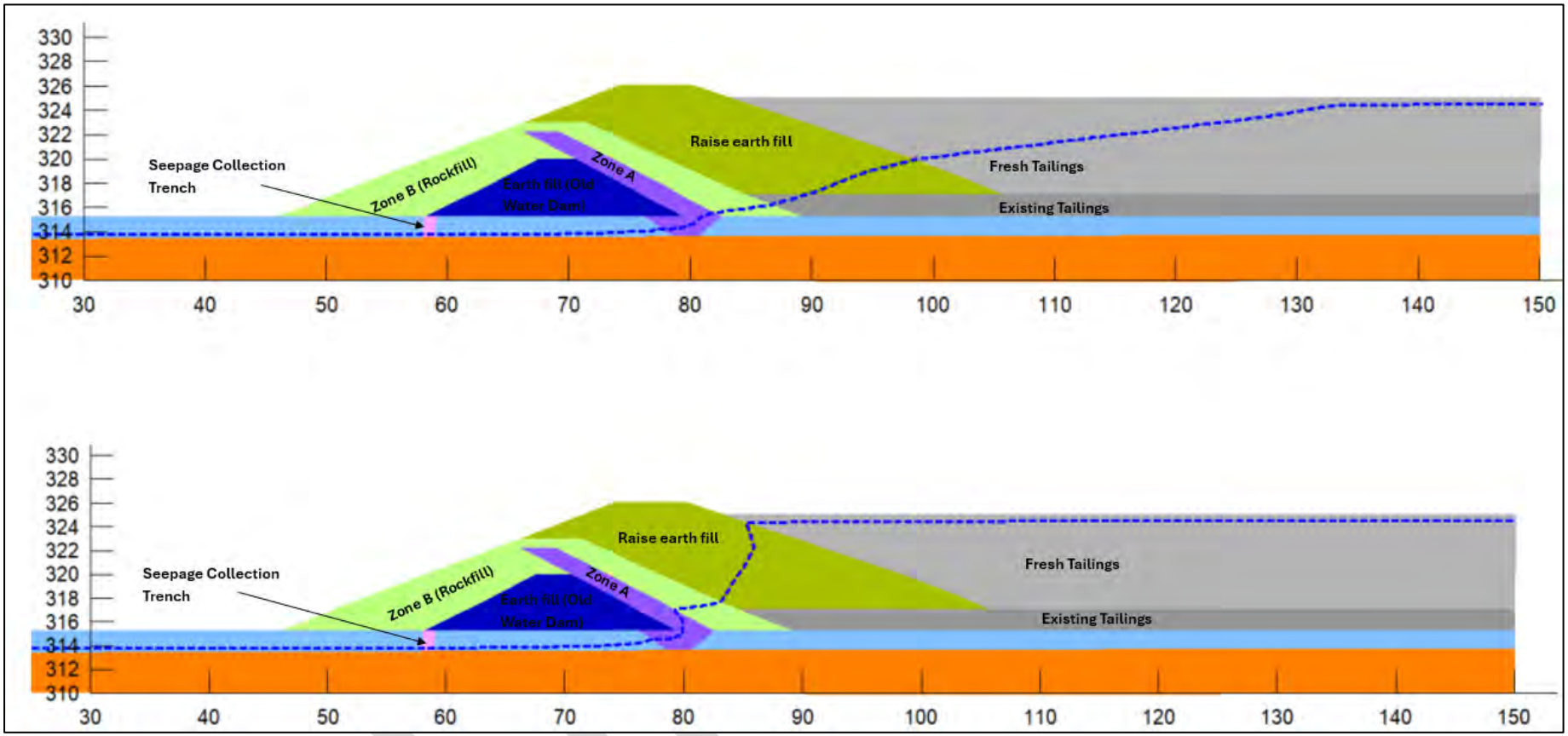


FIGURE 8 PHASE 2 TSF SEEPAGE MODELING RESULT - WITH AND WITHOUT TAILINGS BEACH

4.3.3 Slope Stability Analysis

Slope stability analyses were undertaken to assess the performance of the proposed 3 m upstream raise to RL 326 m under relevant static and seismic loading conditions.

Two representative critical transects were selected for assessment, including the northern and southern section of the eastern embankment, reflecting the most critical geometry and material configurations. The analysed cross-sections incorporate the existing embankment, upstream raise fill, tailings mass, and foundation materials.

4.3.3.1 Target Safety Factors

The recommended minimum safety factors based on the loading conditions pursuant to ANCOLD (2019) guidelines are provided in TABLE 7.

TABLE 7 RECOMMENDED FACTORS OF SAFETY (ANCOLD, 2019) [7]

Loading Condition	Shear Strength Criteria	Minimum FoS
Static_ Long-term (Potential loss of containment)	Peak shear strength (drained)	1.5
Static_ Short-term (Potential loss of containment)	Peak shear strength (undrained)	1.5
Static (Short-term) (No potential loss of containment)	Peak shear strength (undrained)	1.3
Post-seismic	Post-peak Shear Strength	1-0-1.2[1]

Notes:

1. To be related to the confidence in selection of residual shear strength. 1.0 may be adequate for use with lower band results (ANCOLD, 2019)

4.3.3.2 Methodology

Stability analyses were performed using the Limit Equilibrium (LE) method within the SLOPE/W module of GeoStudio. The Morgenstern–Price method was adopted, satisfying both force and moment equilibrium conditions. Both circular and non-circular failure mechanisms were assessed, with optimisation routines applied to identify the critical slip surface for each loading case.

To ensure physically realistic results, geometric constraints were applied during optimisation to avoid selection of non-physical concave slip surfaces under high loading scenarios.

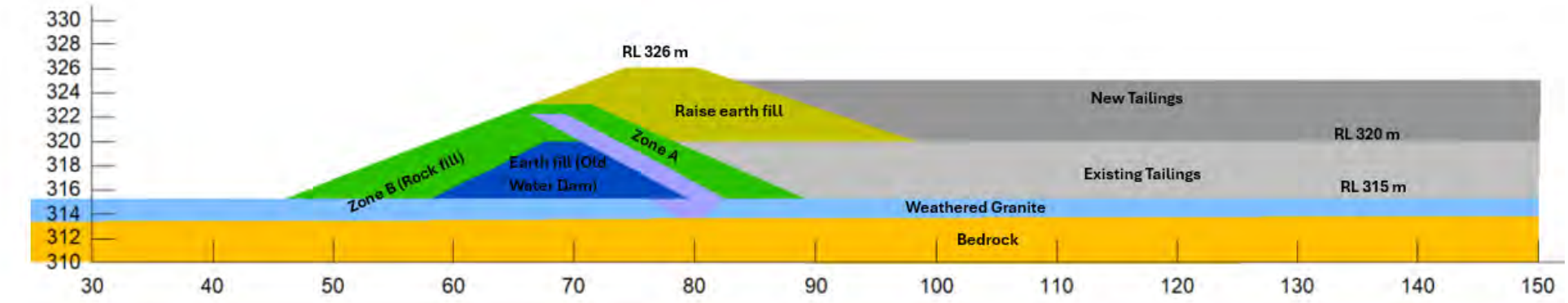
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4.3.3.3 Evaluated Sections

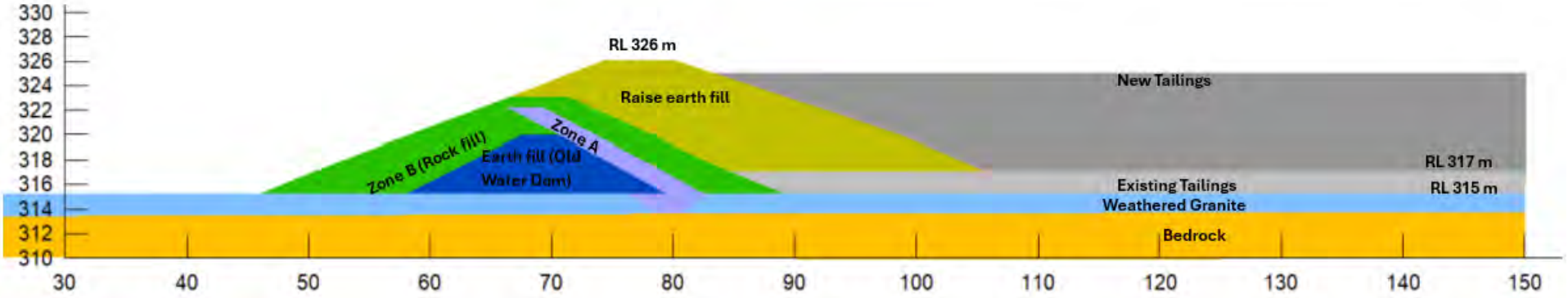
Two critical representative transects (Section B and Section C) were selected to assess the stability of the Phase 2 TSF embankment. These sections were chosen to reflect the most critical embankment geometries and material configurations.

The locations of the analysed sections are shown on Drawing DRG-010 (**Appendix A**). The corresponding cross-sectional geometries adopted in the stability analyses are presented in Figure 9.

DRAFT



Section B



Section C

FIGURE 9 EVALUATED SECTIONS

4.3.3.4 Material Parameters

Material strength parameters adopted in the analyses are summarised in TABLE 8 and are based on available historical investigations (AWA 2009) [5] and engineering judgement.

TABLE 8 - GEOTECHNICAL STRENGTH PARAMETERS

Material	Bulk Unit Weight (kN/m³)	Drained Shear Strength				Undrained Shear Strength			
		Peak		Post-Peak		Peak		Post-Peak	
		ϕ' (◦)	c' (kPa)	ϕ' (◦)	c' (kPa)	Su/σvo'	Minimum Strength (kPa)	Su/σvo'	Minimum Strength (kPa)
New Tailings	14	-	-	-	-	0.2	20	0.03	0
Existing Tailings	14					0.3	20	0.03	0
Existing Embankment Fill	18	30	0	25	0	-	-	-	-
New Embankment Fill	17	35	0	27	0	-	-	-	-
Weathered Granite	18	30 [1]	0	25	0	0.3 [2]	50 [3]	0.24	40
Foundation	18	40	5	34	0	-	-	-	-

Notes:

1. The range between 25 to 35 degrees is recommended for highly to completely Weathered Granite. Source: *Lumb, P. (1970); Terzaghi, Peck and Mesri. (1989)*
2. The range between 0.25 to 0.35 is recommended for highly Weathered Granite. Source: *Lumb, P. (1970); Terzaghi, Peck and Mesri. (1989)*
3. The range 25-80 kPa is recommended for highly Weathered Granite. Source: Lumb, *P. (1970); Terzaghi, Peck and Mesri. (1989)*

Key assumptions adopted include:

- Drained shear strength parameters were applied to materials above the phreatic surface.
- Undrained behaviour was assumed for saturated materials where applicable.
- A 20% shear strength reduction (excluding tailings) was applied for post-seismic loading.
- Liquefaction of slurry tailings was assumed under post-seismic conditions.
- Undrained strength was capped at drained strength in accordance with ANCOLD (2019).

Parameter Confidence and Site Investigation Requirements

The material parameters adopted for this Feasibility Study assessment are considered appropriate for preliminary evaluation of the Phase 2 upstream raise; however, it is recognised that the stability performance of an upstream raise is inherently sensitive to tailings and foundation material properties.

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Given the upstream raise methodology, additional investigation to confirm material characteristics is considered essential prior to Detailed Design

It is understood that Savannah Goldfields Ltd (SVG) will engage a suitably qualified geotechnical contractor, with assistance from GeoTails Consulting (GTC), to undertake additional field investigation and laboratory testing to verify and refine the adopted strength, compressibility and permeability parameters.

The results of the site investigation will be incorporated into the final seepage and slope stability analyses to confirm compliance with ANCOLD (2019) requirements and to finalise the Phase 2 raise design. The verified material parameters will form part of the updated Design Basis adopted for Detailed Design.

4.3.3.5 Pore Water Pressure Conditions

Pore water pressures for long-term conditions were derived from the steady-state seepage analysis described in Section 4.3.2.

For the end-of-construction loading condition, a conservative elevated phreatic surface was assumed, as illustrated in Figure 10 and Figure 11. To account for potential construction-induced excess pore pressures, B-bar parameters were applied in the analyses. A B-bar value of 0.4 was assigned to in situ tailings and 0.2 to weathered granite materials to simulate short-term undrained response.

4.3.3.6 Slope Stability Results

Factors of Safety (FoS) from the limit equilibrium stability analysis for the analysed sections are summarised in TABLE 12. The stability assessment results indicate that the target factors of safety were achieved across all loading conditions for the representative cross sections.

TABLE 9 SLOPE STABILITY ASSESSMENT RESULTS

Loading Condition	Slip Direction	Required FoS	Calculated FoS	
			Section B (Figure 10)	Section C (Figure 11)
Static _End of Construction	Upstream	1.3	1.43	1.38
Static_ Long Term	Downstream	1.5	1.80	1.80
Post Seismic	Downstream	1.2	1.40	1.40

As shown in TABLE 9Error! Reference source not found., the results demonstrate that the calculated factors of safety meet the required factors of safety as indicated in Section 4.3.3.1. Therefore, the proposed Phase 2 TSF raise embankment configuration is considered stable under both short and long term conditions and the recommended seismic events.

Based on the analyses presented herein, the proposed Phase 2 upstream raise to RL 326 m is considered to satisfy the hydraulic performance, seepage performance and stability criteria applicable to a Significant consequence category structure under the DETSI (2024) Manual and ANCOLD (2019) Guidelines at Feasibility Study level

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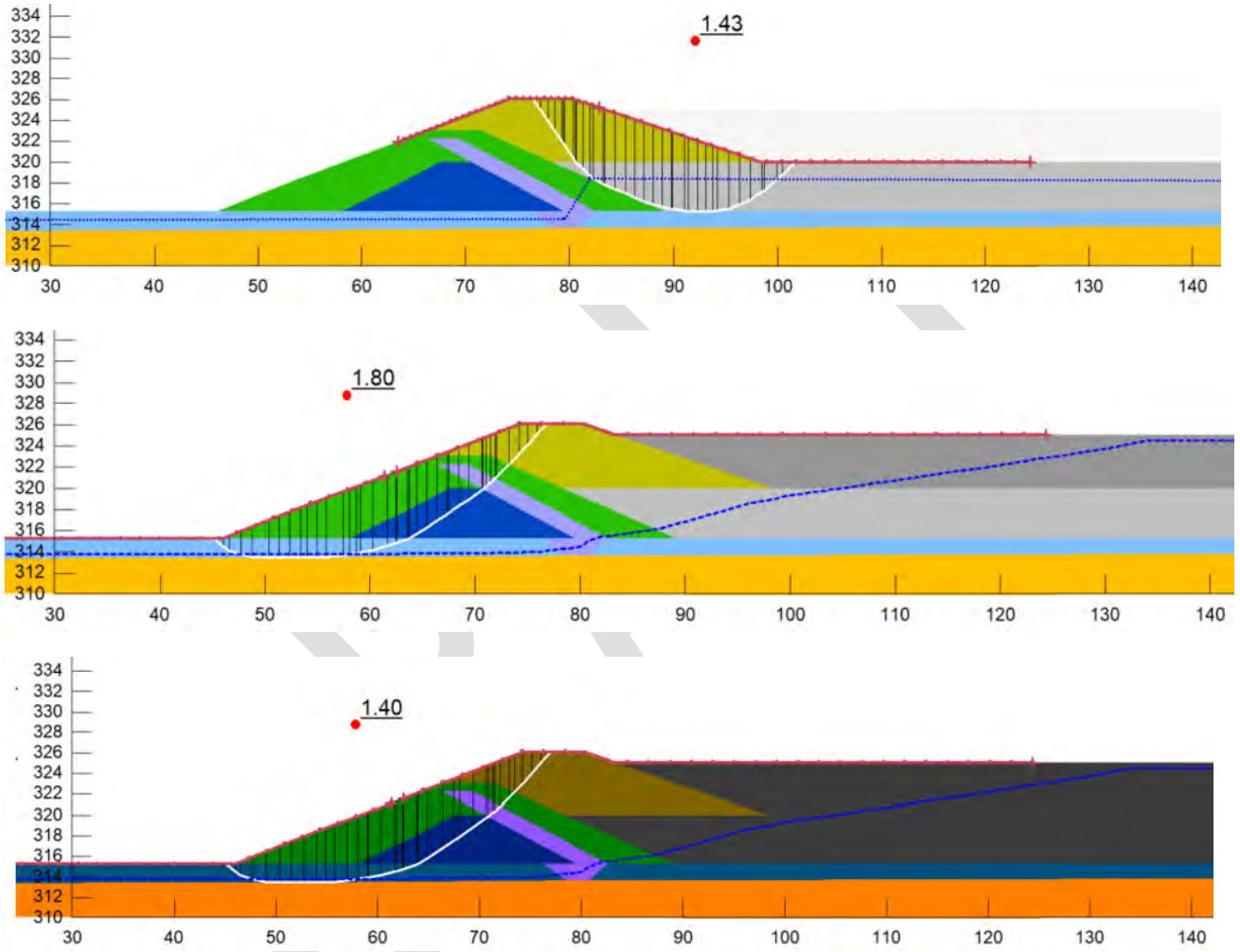


FIGURE 10 - STABILITY ANALYSES RESULTS - SECTION B

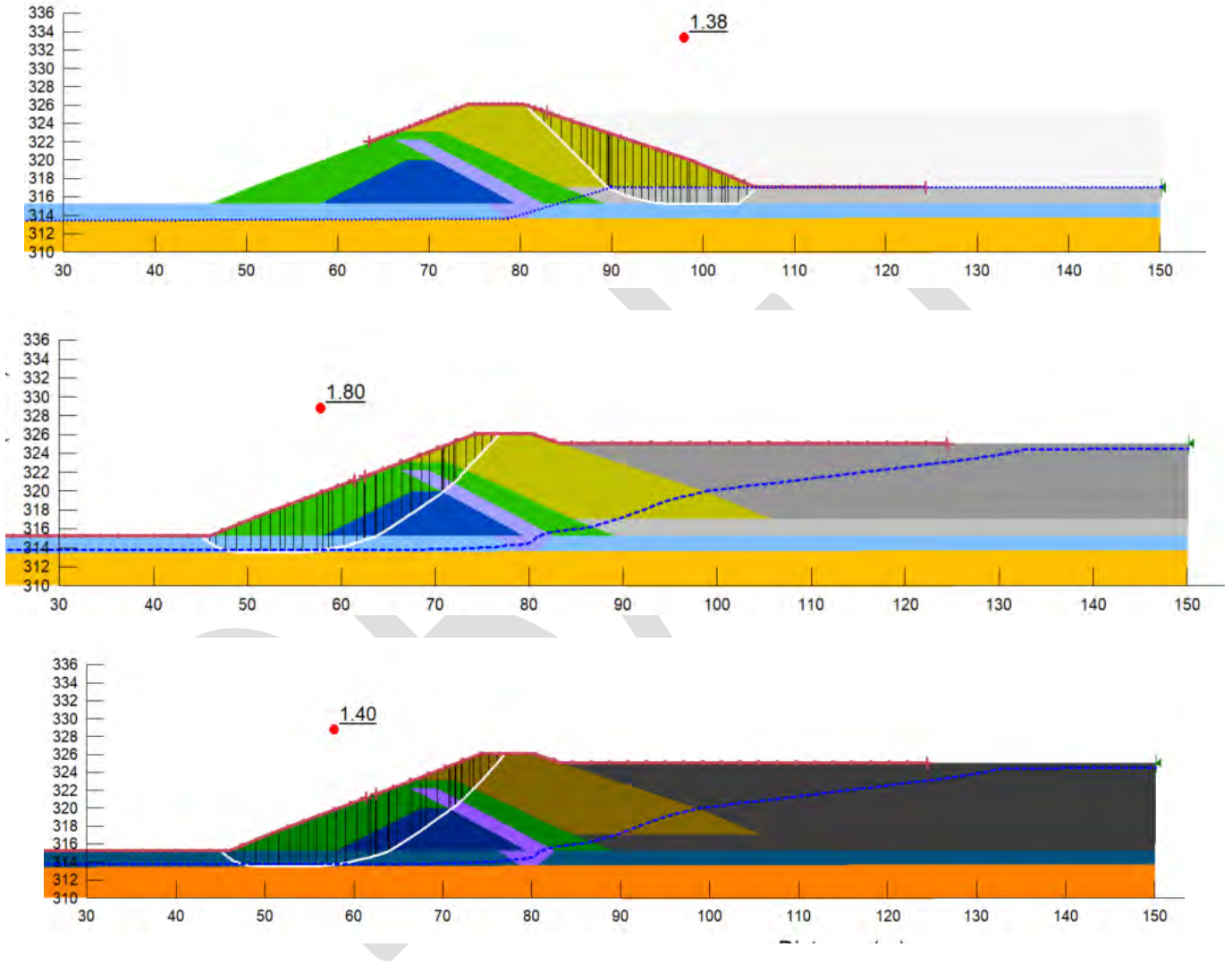


FIGURE 11 - STABILITY ANALYSES RESULTS - SECTION C

5 OPERATIONAL AND MONITORING CONSIDERATIONS

5.1 General

The Georgetown TSF is currently operated under an approved Operations, Maintenance and Surveillance (OMS) Manual (STC 2022) **[13]**.

The proposed Phase 2 upstream raise to RL 326 m will not fundamentally alter the operational philosophy of the facility; however, modifications to tailings deposition sequencing, water management practices and instrumentation will be required to reflect the raised configuration.

This section provides a high-level overview of operational principles for the Phase 2 configuration. A revised OMS Manual incorporating the final detailed design, updated instrumentation layout and Trigger Action Response Plans (TARPs) will be prepared during the Detailed Design stage.

5.2 Tailings Deposition Management – Phase 2 Raise

To support stability performance, seepage control and storage efficiency for the raised embankment, subaerial deposition will continue to be adopted.

5.2.1 Deposition Strategy

Consistent with the Phase 2 deposition plan (refer attached drawings, DRG-030) , the following operational concepts are proposed:

- Tailings deposition from a peripheral spigotted ring main system along the embankment crest.
- Nominal spigot spacing of approximately 35 m.
- Cycling of spigots to promote thin-lift deposition (~200 mm per cycle).
- Deposition will occur primarily from the eastern, southern and northern embankments to promote progressive beach development toward the western limit of the facility, maintaining separation between the supernatant pond and the eastern embankment.
- Progressive rotation of discharge points to maintain a uniform beach profile.

Subaerial thin-layer deposition will:

- Promote higher in-situ tailings density;
- Accelerate drying and consolidation;
- Enhance shear strength development near the upstream embankment;

- Reduce supernatant pond volume; and
- Assist in limiting phreatic surface elevation within the embankment.

At end-of-filling conditions of Phase 2 TSF , the indicative beach slope is approximately 1% directing the decant pond toward the north-western sector of the facility (refer DRG-030).

The detailed mechanical design of the tailings delivery system, including pipeline sizing, pump selection, and valve and fitting configuration, is outside the scope of GeoTails Consulting and will be completed by others to satisfy operational performance requirements.

5.2.2 Decant Pond and Water Management

5.2.3 Decant Pond Location

Under the Phase 2 configuration, the decant pond will be managed to remain:

- Remote from the upstream embankment,
- Positioned toward the north-west corner of the storage,
- Separated from the embankment by a competent tailings beach.

Maintaining pond offset from the upstream face is critical to:

- Control phreatic levels;
- Reduce seepage gradients;
- Maintain stability performance consistent with the seepage and slope stability analyses presented in Section 4.3.

5.2.4 Return Water System

A pontoon-mounted decant pump (or equivalent floating system) is anticipated to:

- Maximise recovery of supernatant water,
- Minimise pond volume,
- Support DSA and MRL compliance.

Water level management will continue to comply with:

- Design Storage Allowance (DSA) requirements;
- Mandatory Reporting Level (MRL);

Prior to each wet season (1 November), water levels will be drawn down to maintain available DSA in accordance with regulatory requirements.

5.3 Instrumentation and Monitoring – Phase 2 Raise

The Phase 2 raise will require expansion of the existing instrumentation network to verify design assumptions and confirm embankment performance.

5.3.1 Vibrating Wire Piezometers (VWPs)

A network of Vibrating Wire Piezometers (VWPs) is proposed to monitor pore pressure distribution within the raised embankment and its foundation .

- Foundation materials beneath the raised embankment;
- The central embankment zone and underlying foundation interface; and
- The downstream shell and toe area, where considered necessary.

Drawing DRG-010 (**Appendix A**) presents indicative VWP locations.

5.3.2 Survey Monitoring

Survey prisms will be installed along the Phase 2 embankment crest to monitor:

- Vertical settlement,
- Lateral displacement,
- Differential movement between existing and raised sections.

The survey monitoring program will support verification of design assumptions and provide early identification of abnormal deformation behaviour during operation of the raised embankment.

Survey frequency and movement trigger thresholds will be defined in the updated OMS Manual at Detailed Design stage.

5.4 Trigger Action Response Plan (TARP)

The existing OMS Manual (STC, 2022) **[13]** includes general operational triggers. however, a revised and stability-specific TARP will be developed during Detailed Design once:

- Final embankment geometry is confirmed,
- Updated seepage analyses are completed,
- Instrumentation layout is finalised.

The updated TARP will define trigger levels and associated response actions for:

- Piezometric response and stability safety factors;
- Crest settlement and lateral displacement;

- Variations in seepage discharge rates or characteristics;
- Supernatant pond proximity to the embankment; and
- Reduced operational freeboard conditions.

The refined TARP will be risk-informed and aligned with the final design analyses to ensure that measurable performance indicators are linked to clear escalation pathways and corrective actions.

This Feasibility Study confirms the intent to develop and implement the updated TARP prior to commencement of Phase 2 operations.

5.5 OMS Manual Update

The existing TSF OMS Manual (STC, 2022) **[13]** will require formal revision to incorporate:

- Phase 2 embankment geometry and crest level (RL 326 m);
- Updated DSA and MRL levels;
- Revised deposition sequencing;
- Expanded instrumentation network;
- Updated inspection checklists;
- Revised TARPs;
- Updated as-constructed drawings.

The revised OMS Manual will be issued as part of the Detailed Design stage deliverables prior to commissioning of the Phase 2 raise.

6 CONSTRUCTION ASPECTS

6.1 General

The drawings presented in **Appendix A** illustrate the proposed TSF raise to a final crest elevation of RL 326.0 m. The embankment will be constructed using an upstream raise methodology in accordance with the approved design intent.

Key construction activities will include:

- Site clearing and topsoil stripping within the raise footprint;
- Excavation and preparation of the foundation subgrade;
- Placement and compaction of engineered fill to raise the TSF embankment to RL 326.0 m;
- Construction of an emergency spillway at RL 325.0 m, formed as a broad-crested weir and protected with a riprap armouring layer; and
- Installation of a seepage interception system along the toe of the southern embankment.

6.2 Construction Materials

The principal material types required for construction of the Phase 2 TSF raise, together with their intended application and typical selection criteria, are summarised in Table 10. The general specifications provided are aligned with the embankment design intent and performance requirements.

TABLE 10 CONSTRUCTION MATERIAL AND GENERAL PROPERTIES

Material Type	Source	Application	General Specifications
Clay Fill	Western Cutback excavation or approved selected borrow source (subject to suitability assessment)	Upstream embankment raise forming the containment profile	• < 90% by mass passing 19 mm sieve • > 50% by mass passing 0.075mm sieve • Clay content (< 2 µm) > 30% • Liquid Limit > 35% • Plastic Index > 10% • Maximum Particle Size: 60mm • Free of deleterious substances and other unsuitable matter
Drainage Aggregate	Externally Supplied	Seepage Interception Trench (south embankment)	• Particle size range: 2.36 mm to 75 mm; • Fines content (passing 75 µm):< 5%; • Free from acid-forming materials;

			• Resistant to degradation or incrustation when in contact with acidic or alkaline water.
Road Base Gravel	Externally Supplied	Wearing surface for access roads	• Free of organic matter, clay lumps and deleterious materials. • Free drain properties.

6.3 Quality Assurance and Quality Control

Recommended Quality Assurance (QA) and Quality Control (QC) measures related to the embankment construction are summarised in **TABLE 11**.

TABLE 11 SUMMARY OF QA/QC REQUIRMENTS

Construction Component	QA/QC Requirements
Embankment Foundation	Supervision of foundation preparation works, including confirmation of topsoil stripping depths and delineation of excavation limits. Inspection of exposed subgrade to verify material integrity, removal of unsuitable material, and confirmation of a competent founding surface to minimise seepage potential.
Clay Fill Construction	Supervision of clay placement to confirm material suitability, moisture conditioning and compaction in accordance with specification. Field control testing to verify compliance, including Particle Size Distribution (PSD), Atterberg Limits, and in situ density and moisture content testing.
Spillway Construction	Verification that the spillway is excavated to the specified alignment and invert level within natural ground. Confirmation of placement of non-woven, needle-punched polyester/polypropylene geotextile (BIDIM A44 or approved equivalent) and rip rap armouring layer. Inspection of Riprap placement to ensure adequate erosion protection across the spillway section.
Seepage Interception System (South Embankment)	Supervision by the Designer's Representative during excavation and installation of the subsurface trench, placement of drainage aggregate, installation of perforated PVC collector pipe, and construction of the precast concrete seepage collection sump. Verification of drainage aggregate compliance with specified grading requirements.

6.4 Quality Control Testing

The Quality Control (QC) objectives for the 3m upstream raise construction are to confirm the suitability of materials and the construction methods adopted in accordance with the design intent. The key QC testing requirements are summarised in TABLE 12 .

TABLE 12 SUMMARY OF QC TESTING REQUIRMENTS

Material	Test	Frequency	Standard
Clay Fill	***Classification Tests***		
	Particle Size Distribution (PSD)	1 test per 2,000 m^3	AS 1289.3.6.1
	Atterberg Limits(LL,PL,PI,LS)	1 test per 2,000 m^3	AS 1289.3 series
	Compaction Tests		
	In Situ Density Ratio	1 test per 500 m^3	AS 1289.5.8.1 or 5.3.1
	Moisture Content	1 test per 500 m^3	AS 1289.2.1.1
Drainage Aggregate	Particle Size Distribution (PSD)	1 test per 500 m^3	AS 1289.3.6.1

All testing shall be undertaken by a NATA-accredited laboratory in accordance with the nominated standards.

6.5 Preliminary Quantities

Key material quantities for the 3 m upstream raise have been estimated at Feasibility Study level and include an allowance of approximately 30% contingency to account for design development and construction variability. These estimates are provided to assist Savannah Goldfields Ltd (SVG) with preliminary planning and budgeting.

A detailed material take-off for all construction components will be completed at the Detailed Design stage, following additional site investigations and confirmation of final design parameters.

Table 13 presents the key earth work quantities for the proposed Phase 2 TSF raise.

TABLE 13 PRELIMINARY CONSTRUCTION QUANTITIES (INCLUDING 30% CONTINGENCY)

Item	Unit	Estimated Quantity
Embankment Fill	m^3	110,000
Surface Preparation	m^2	40,000

7 CLOSURE AND REHABILITATION CONCEPT

7.1 Objectives

The key objectives for rehabilitation and closure of the TSF are to:

- Establish safe, stable and non-polluting landforms compatible with the surrounding landscape;
- Progressively rehabilitate disturbed areas to support self-sustaining vegetation communities representative of the local environment;
- Manage surface water and groundwater during operations, closure and post-closure to prevent long-term environmental liability to Savannah Goldfields Ltd (SVG);
- Engage stakeholders and the local community in closure planning;
- Monitor environmental performance during rehabilitation and post-closure, undertaking corrective actions until completion criteria are met; and
- Implement progressive rehabilitation where practicable to reduce closure risk and overall closure costs.

7.2 Surface Water Management

Surface water management will be maintained to ensure rainfall-runoff capacity complies with regulatory requirements, including the Design Storage Allowance (DSA) freeboard requirement, throughout operations and closure.

The final landform, including beach grading and embankment configuration, will be developed to maintain adequate storage capacity and controlled drainage conditions consistent with DSA requirements. Following demonstration that runoff meets the approved water quality release criteria, the final ponded area may be breached or in-filled to facilitate controlled drainage from the TSF.

7.3 Landform Development

Final landform design will be informed by detailed investigations undertaken prior to closure, including tailings geochemical characterisation, water quality assessment, and evaluation of surrounding environmental conditions.

The final TSF landform is envisaged to comprise a long-term stable upper surface configured to minimise ponding. This may require a final campaign of tailings deposition to infill local depressions and achieve suitable grading.

Formation of a permanent release channel would occur following surface rehabilitation and confirmation that performance monitoring demonstrates compliance with water quality objectives. This process is anticipated to extend over several years following cessation of deposition.

Interim water management during closure may include containment within the TSF footprint or discharge to suitably engineered downstream storage facilities, subject to regulatory approval.

7.4 Closure Cover System

The closure cover and capping system has been developed by a specialist environmental consultant engaged by Savannah Goldfields Ltd (SVG). The conceptual cover design was provided to GTC for incorporation into the Phase 2 TSF Raise Feasibility Study design and is presented in the attached drawings.

The proposed closure system for the Phase 2 TSF raise comprises a multi-layered store-and-release cover designed to:

- Minimise infiltration;
- Control surface erosion; and
- Support long-term vegetation establishment

The configuration has been developed to suit the site's semi-arid climate and tailings geochemistry, consistent with recognised industry practice.

A typical schematic section is presented in Figure 12.

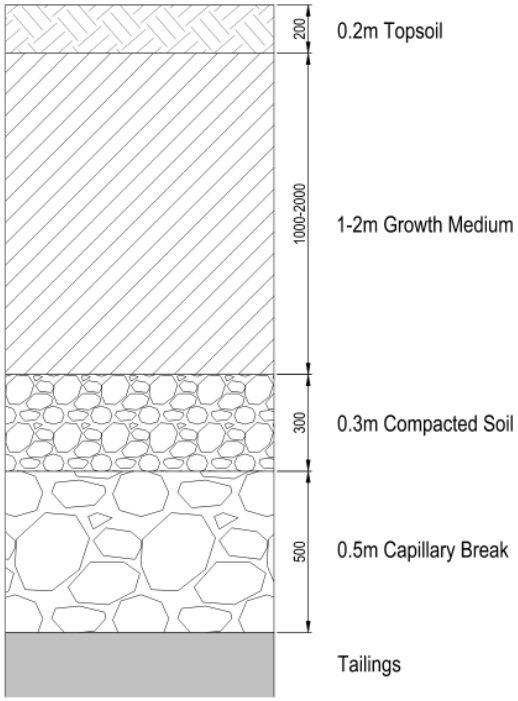


FIGURE 12 SCHEMATIC SECTION OF COVER SYSTEM (PROVIDED BY SVG)

7.5 Performance Monitoring and Adaptive Management

To validate and optimise cover performance, the following measures are recommended:

- Construction of trial cover test pads,
- Installation of field lysimeters and moisture sensors (to monitor percolation and moisture retention within the cover layers),
- Routine inspections for erosion and vegetation establishment;
- Geochemical sampling and analysis,
- Periodic review of performance against design targets.

Where performance deviates from expectations, adaptive management measures will be implemented to ensure long-term effectiveness and regulatory compliance.

REFERENCES

[1] Department of Environment, Science and Innovation (2024), 'Manual for Assessing Consequence Categories and Hydraulic Performance of Structures', ESR/2016/1933, 23 February 2024, version 5.03, Queensland Government.

[2] Australian National Committee on Large Dams (ANCOLD) (2012), Guidelines on The Consequence Categories for Dams, October 2012

[3] Department of Environment, Tourism, Science and Innovation (DETSI) (2025), Environmental Authority EPML00899813, Effective Date 24 September 2025, Queensland Government.

[4] Geotails Consulting (GTC 2026), Georgetown Gold Mine, Phase 2 TSF Raise to RL 326m – Feasibility Study, Dam Break Analysis and Consequence Category Assessment Doc. No. 2201-GTG-09-REP01-RevA, Draft, 17/02/2026

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[9] Savannah Goldfields (2025). Deposition Summary. Unpublished internal data provided by Rodney Cooper, received on 2 May 2025.

[10] Rob Lait & Associates (2009), Groundwater Assessment in Geologocal Structures, Deutsche Rohstoff Mining Leases, Georgetown Area, North Queensland, Project No. 162, December 2009

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[12] Hillier (2010), John R Hillier Consulting Hydrogeologist, Technical Review of Report on Additional Groundwater Assessment - Georgetown Plant Site by Rob Lait & Associates Pty Ltd, Review carried out for Deutsche Rohstoff Australia Pty Ltd, September 2010

[13] Strata Tailings Consulting (2022), "Georgetown Gold Mine – TSF Operations Management Plan", Ref: 122001.03.R02.Rev A, October 2022

APPENDICES

APPENDIX A – PHASE 2 TSF EXPANSION DRAWINGS - FEASIBILITY STUDY (RL 326 M)

GEORGETOWN GOLD MINE

PHASE 2 TSF EXPANSION - UPSTREAM RAISE FEASIBILITY DESIGN (RL 326)

DRAWING INDEX

DWG NO.	DRAWING TITLE	REVISION	ISSUED DATE
DRG-001	LOCALITY PLAN & DRAWING INDEX	REV A	15/02/2026
DRG-005	TSF EXISTING CONDITIONS PLAN	REV A	15/02/2026
DRG-010	GENERAL ARRANGEMENT PLAN	REV A	15/02/2026
DRG-020	TYPICAL SECTIONS - SHEET 1	REV A	15/02/2026
DRG-021	TYPICAL SECTIONS - SHEET 2	REV A	15/02/2026
DRG-030	TAILINGS DEPOSITION PLAN END OF FILLING	REV A	15/02/2026
DRG-040	CLOSURE CONCEPT & TYPICAL COVER SECTION	REV A	15/02/2026



LOCALITY PLAN
SCALE A1 - N.T.S.
A3 - N.T.S.

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DWN	ENG	CHK
A	15/02/26	ISSUED FOR APPROVAL	RS	MM	MM

SITE SPECIFICS
GEORGETOWN GOLD MINE

CLIENT
SAVANNAH GOLDFIELDS

GEOTAILS CONSULTING
ABN : 48654759976

QUALITY

DRAWN:	RS	DATE: 15/02/26
DRAWING CHECKED:	MM	DATE: 15/02/26
ENGINEER:	MM	DATE: 15/02/26
DESIGN CHECKED:	MM	DATE: 15/02/26
RPEQ APPROVED		
DIRECTOR/MANAGER		DATE:

PROJECT NAME
PHASE 2 TSF EXPANSION

PROJECT DESCRIPTION
UPSTREAM RAISE FS DESIGN TO RL 326m

DRAWING TITLE
LOCALITY PLAN & DRAWING INDEX

DRAWING N0.
DRG-001

SCALE:
AS NOTED
FULL SIZE A1

PROJECT NO.
2201-GTG-09

REVISION
A

SCALE BAR(mm) FULL SIZE A1



LAYOUT PLAN

SCALE A1 - 1 : 1000
A3 - 1 : 2000

12.5 0 12.5 25 37.5 50 62.5m

SCALE 1:1250

NOTES:

1- MAP GRID SYSTEM: GDA94 / MGA ZONE 54
2- TOPOGRAPHIC CONTOURS: TSF LIDAR SURVEY DATA PROVIDED BY THE CLIENT (OCTOBER 2024)
3- AERIAL IMAGERY GOOGLE EARTH (JULY 2024)

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DWN	ENG	CHK
A	15/02/26	ISSUED FOR APPROVAL	RS	MM	MM

SITE SPECIFICS

GEORGETOWN GOLD MINE

CLIENT

SAVANNAH GOLDFIELDS

GEOTAILS CONSULTING
ABN : 48654759976

QUALITY		
DRAWN:	RS	DATE: 15/02/26
DRAWING CHECKED:	MM	DATE: 15/02/26
ENGINEER:	MM	DATE: 15/02/26
DESIGN CHECKED:	MM	DATE: 15/02/26
RPEQ APPROVED		
DIRECTOR/MANAGER		DATE:

PROJECT NAME
PHASE 2 TSF EXPANSION

PROJECT DESCRIPTION
UPSTREAM RAISE FS DESIGN TO RL 326m

DRAWING TITLE
TSF EXISTING CONDITIONS PLAN

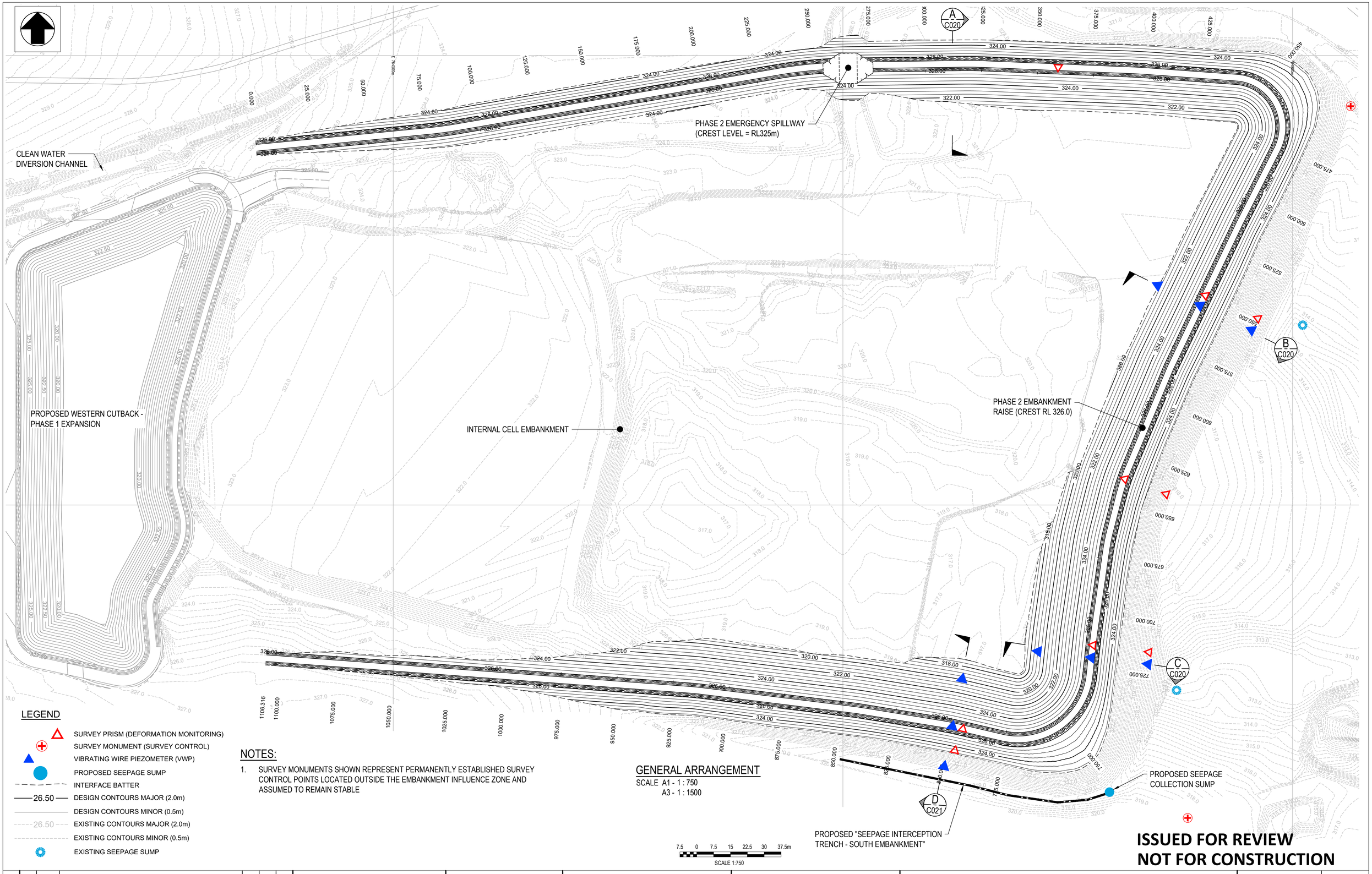
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DRG-005

SCALE:
AS NOTED
FULL SIZE A1

PROJECT NO.
2201-GTG-09

REVISION
A

SCALE BAR(mm) FULL SIZE A1 5 10 20 30 50



LEGEND

- SURVEY PRISM (DEFORMATION MONITORING)
- SURVEY MONUMENT (SURVEY CONTROL)
- VIBRATING WIRE PIEZOMETER (VWP)
- PROPOSED SEEPAGE SUMP
- INTERFACE BATTER
- 26.50 DESIGN CONTOURS MAJOR (2.0m)
- DESIGN CONTOURS MINOR (0.5m)
- 26.50 EXISTING CONTOURS MAJOR (2.0m)
- EXISTING CONTOURS MINOR (0.5m)
- EXISTING SEEPAGE SUMP

NOTES:

1. SURVEY MONUMENTS SHOWN REPRESENT PERMANENTLY ESTABLISHED SURVEY CONTROL POINTS LOCATED OUTSIDE THE EMBANKMENT INFLUENCE ZONE AND ASSUMED TO REMAIN STABLE

GENERAL ARRANGEMENT

SCALE A1 - 1 : 750
A3 - 1 : 1500

7.5 0 7.5 15 22.5 30 37.5m
SCALE 1:750

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NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DWN	ENG	CHK
A	15/02/26	ISSUED FOR APPROVAL	RS	MM	MM

SITE SPECIFICS
GEORGETOWN GOLD MINE

CLIENT
SAVANNAH GOLDFIELDS

GEOTAILS CONSULTING
ABN : 48654759976

QUALITY		
DRAWN:	RS	DATE: 15/02/26
DRAWING CHECKED:	MM	DATE: 15/02/26
ENGINEER:	MM	DATE: 15/02/26
DESIGN CHECKED:	MM	DATE: 15/02/26
RPEQ APPROVED		
DIRECTOR/MANAGER		DATE:

PROJECT NAME
PHASE 2 TSF EXPANSION

PROJECT DESCRIPTION
UPSTREAM RAISE FS DESIGN TO RL 326m

DRAWING TITLE
GENERAL ARRANGEMENT PLAN

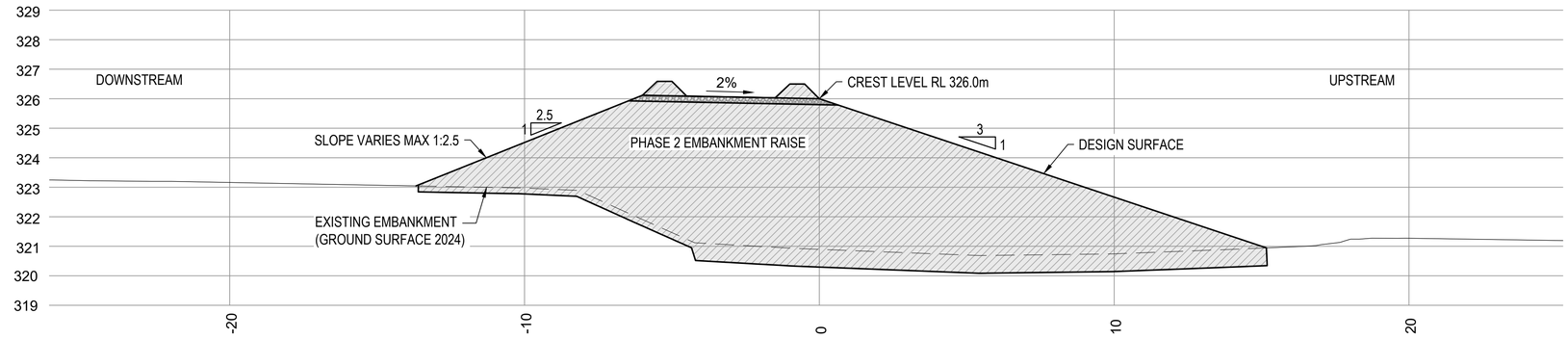
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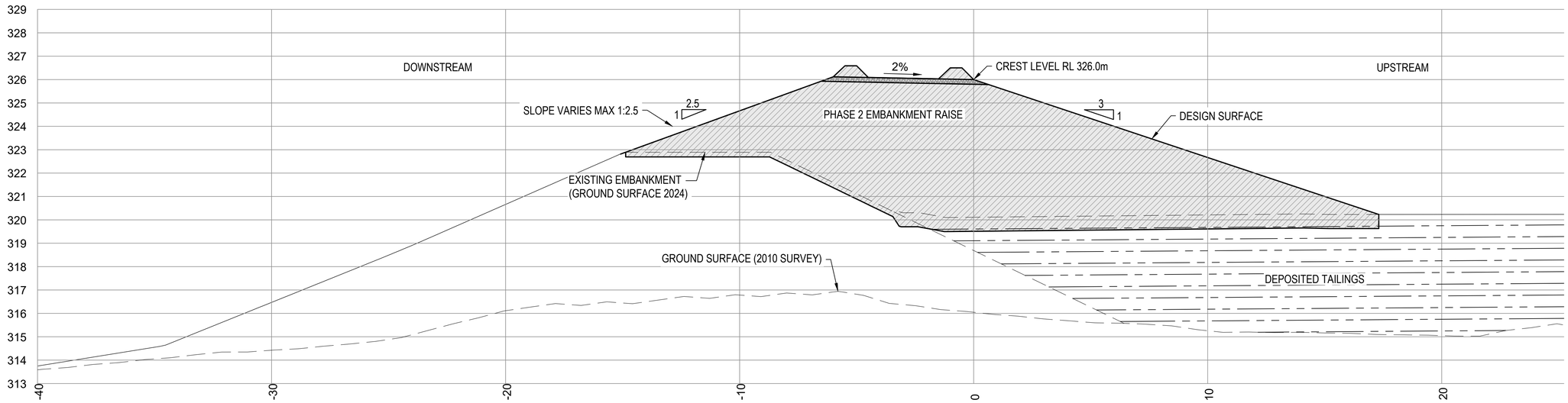
PROJECT NO.
2201-GTG-09

REVISION
A

SCALE BAR(mm) FULL SIZE A1 0 10 20 30 50



SECTION A
SCALE A1 - 1 : 100
A3 - 1 : 200
C010



SECTION B
SCALE A1 - 1 : 100
A3 - 1 : 200
C010

1 0 1 2 3 4 5m
SCALE 1:100

0.5 0 0.5 1.0 1.5 2.0 2.5m
SCALE 1:50

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NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DWN	ENG	CHK
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GEORGETOWN GOLD MINE

CLIENT
SAVANNAH GOLDFIELDS

GEOTAILS CONSULTING
ABN : 48654759976

QUALITY		
DRAWN:	RS	DATE: 15/02/26
DRAWING CHECKED:	MM	DATE: 15/02/26
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DESIGN CHECKED:	MM	DATE: 15/02/26
RPEQ APPROVED		
DIRECTOR/MANAGER		DATE:

PROJECT NAME
PHASE 2 TSF EXPANSION

PROJECT DESCRIPTION
UPSTREAM RAISE FS DESIGN TO RL 326m

DRAWING TITLE
TYPICAL SECTIONS
SHEET 1

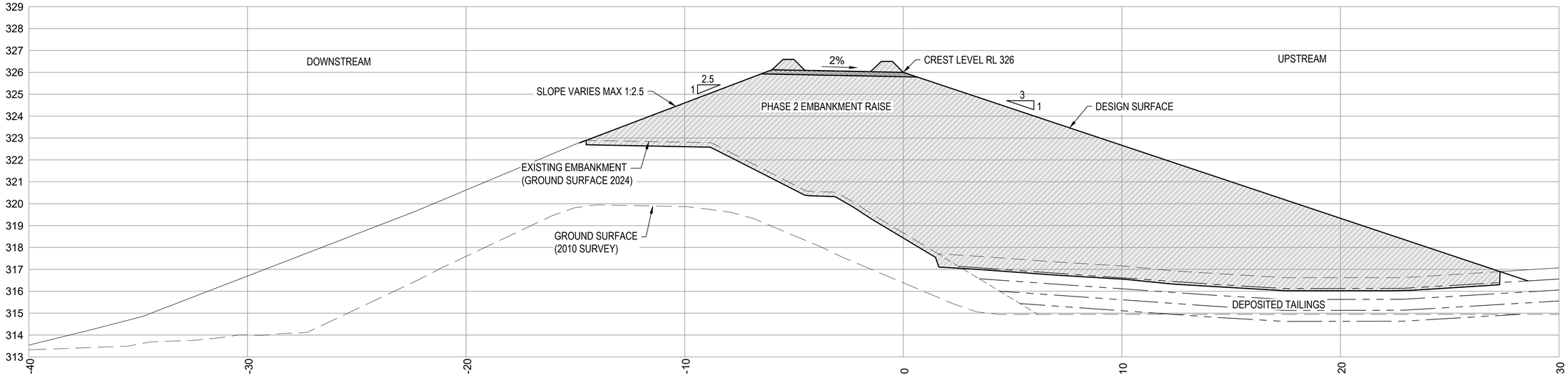
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AS NOTED
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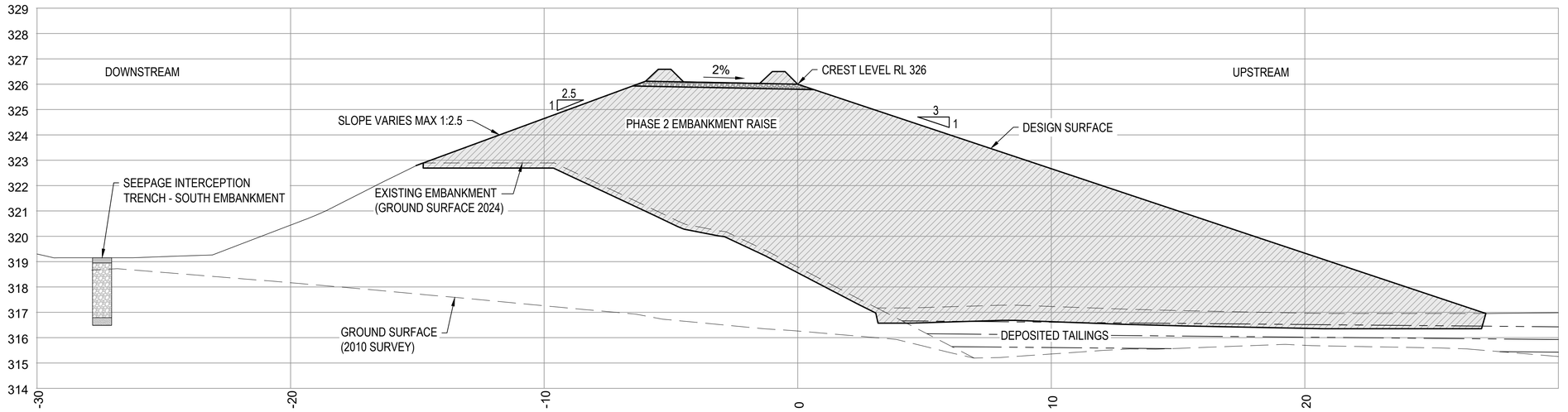
PROJECT NO.
2201-GTG-09

REVISION
A

SCALE BAR(mm) FULL SIZE A1
5 10 20 30 50



SECTION C
SCALE A1 - 1 : 100
A3 - 1 : 200
C010



SECTION D
SCALE A1 - 1 : 100
A3 - 1 : 200
C010

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SCALE 1:100

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SCALE 1:50

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NOT FOR CONSTRUCTION

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A	15/02/26	ISSUED FOR APPROVAL	RS	MM	MM

SITE SPECIFICS
GEORGETOWN GOLD MINE

CLIENT
SAVANNAH GOLDFIELDS

GEOTAILS CONSULTING
ABN : 48654759976

QUALITY

DRAWN:	RS	DATE: 15/02/26
DRAWING CHECKED:	MM	DATE: 15/02/26
ENGINEER:	MM	DATE: 15/02/26
DESIGN CHECKED:	MM	DATE: 15/02/26
RPEQ APPROVED		
DIRECTOR/MANAGER		DATE:

PROJECT NAME
PHASE 2 TSF EXPANSION

PROJECT DESCRIPTION
UPSTREAM RAISE FS DESIGN TO RL 326m

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TYPICAL SECTIONS SHEET 2

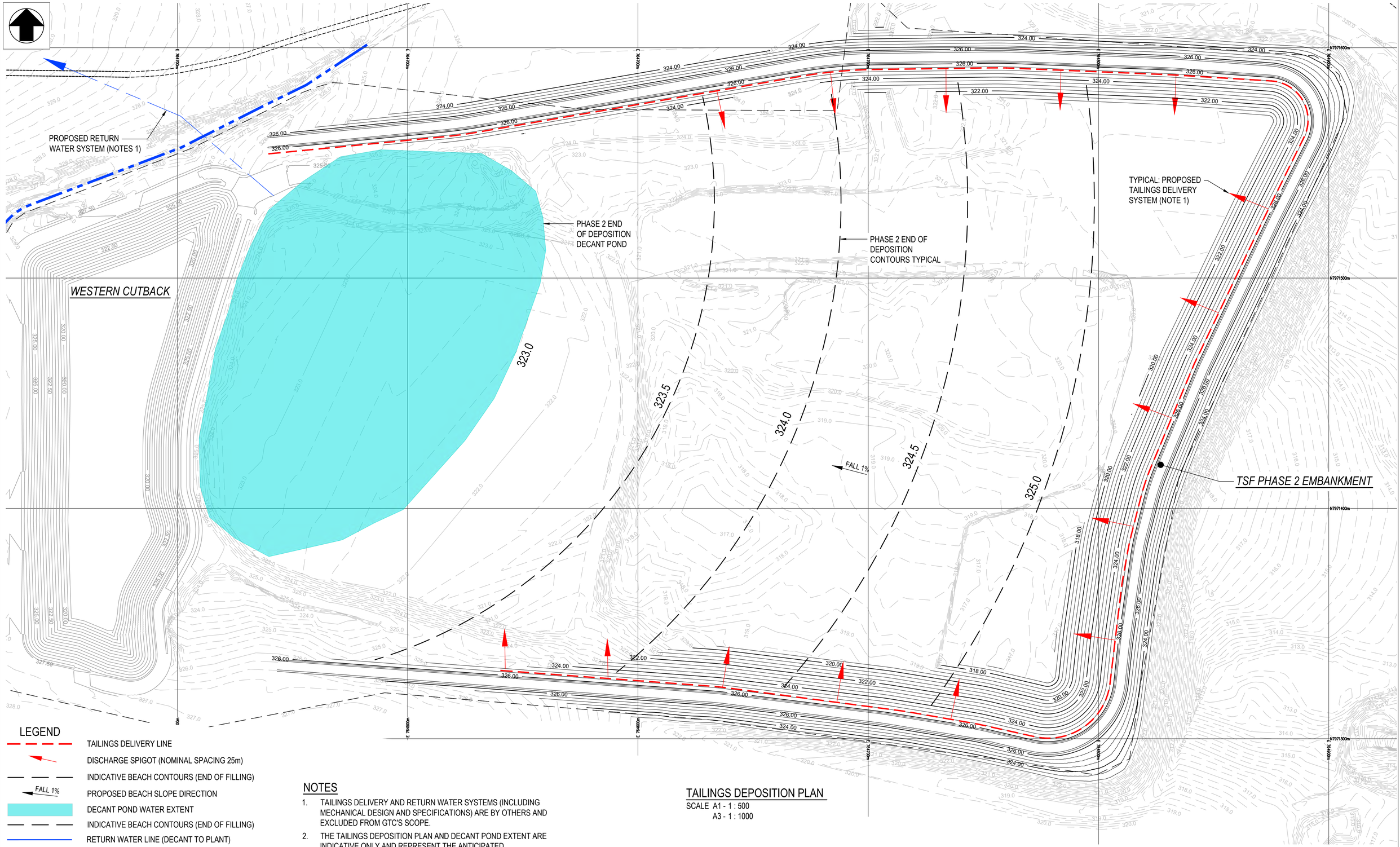
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DRG-021

SCALE:
AS NOTED
FULL SIZE A1

PROJECT NO.
2201-GTG-09

REVISION
A

SCALE BAR(mm) FULL SIZE A1
5 10 20 50 95



LEGEND

- TAILINGS DELIVERY LINE
- DISCHARGE SPIGOT (NOMINAL SPACING 25m)
- INDICATIVE BEACH CONTOURS (END OF FILLING)
- FALL 1% — PROPOSED BEACH SLOPE DIRECTION
- DECANT POND WATER EXTENT
- INDICATIVE BEACH CONTOURS (END OF FILLING)
- RETURN WATER LINE (DECANT TO PLANT)
- 18.00 — DESIGN CONTOURS MAJOR 2.5m INTERVAL
- DESIGN CONTOURS MINOR 0.5m INTERVAL

NOTES

1. TAILINGS DELIVERY AND RETURN WATER SYSTEMS (INCLUDING MECHANICAL DESIGN AND SPECIFICATIONS) ARE BY OTHERS AND EXCLUDED FROM GTC'S SCOPE.
2. THE TAILINGS DEPOSITION PLAN AND DECANT POND EXTENT ARE INDICATIVE ONLY AND REPRESENT THE ANTICIPATED END-OF-FILLING CONDITION FOR THE PHASE 2 TSF RAISE.

TAILINGS DEPOSITION PLAN

SCALE A1 - 1 : 500
A3 - 1 : 1000

5 0 5 10 15 20 25m
SCALE 1:500

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

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SITE SPECIFICS
GEORGETOWN GOLD MINE

CLIENT
SAVANNAH GOLDFIELDS

GEOTAILS CONSULTING
ABN : 48654759976

QUALITY		
DRAWN:	RS	DATE: 15/02/26
DRAWING CHECKED:	MM	DATE: 15/02/26
ENGINEER:	MM	DATE: 15/02/26
DESIGN CHECKED:	MM	DATE: 15/02/26
RPEQ APPROVED		
DIRECTOR/MANAGER		DATE:

PROJECT NAME
PHASE 2 TSF EXPANSION

PROJECT DESCRIPTION
UPSTREAM RAISE FS DESIGN TO RL 326m

DRAWING TITLE
TAILINGS DEPOSITION PLAN END OF FILLING

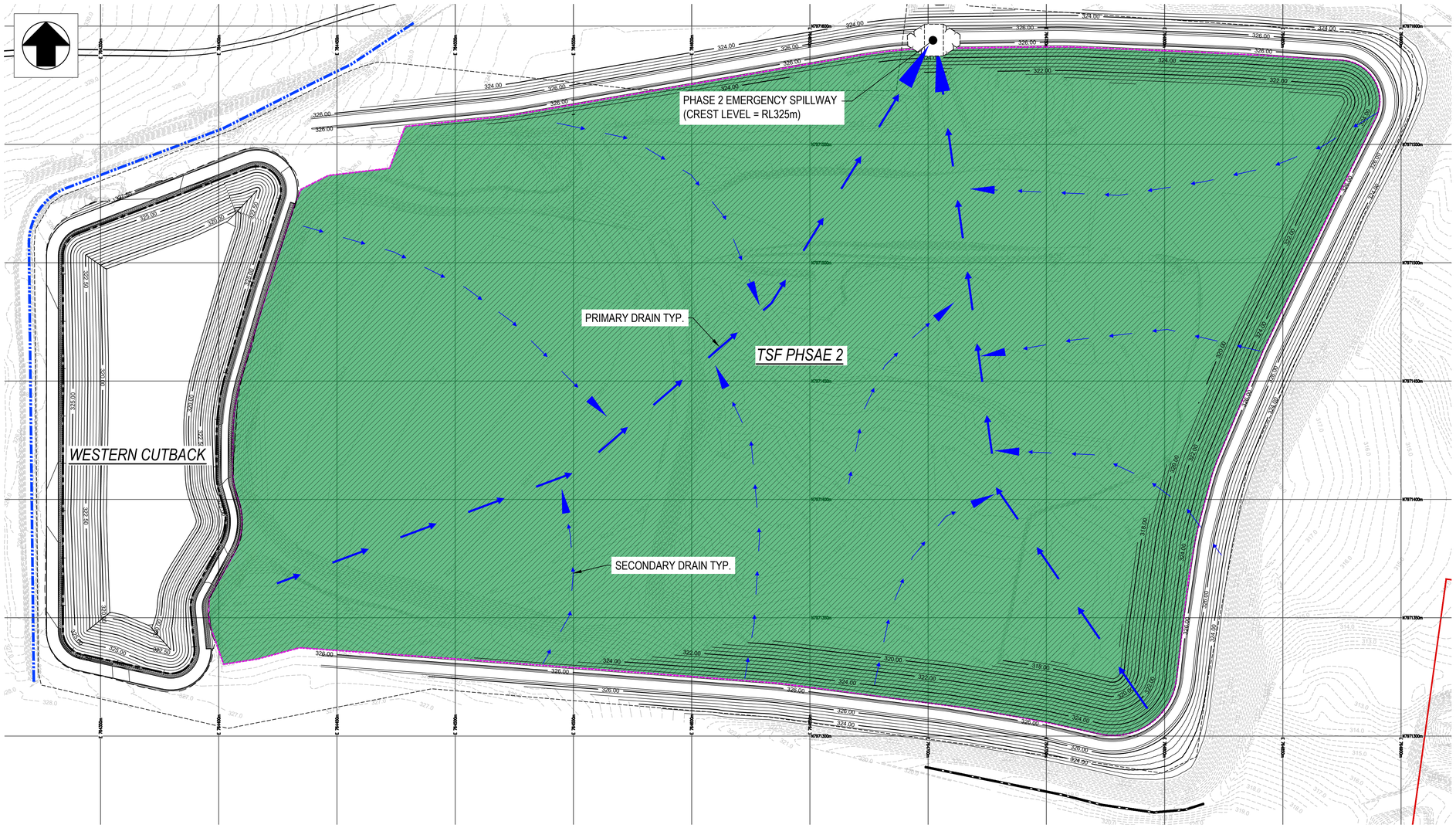
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SCALE:
AS NOTED
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PROJECT NO.
2201-GTG-09

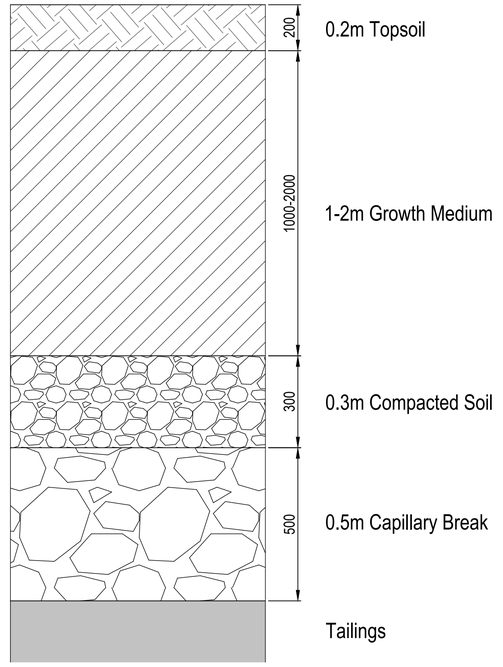
REVISION
A

SCALE BAR(mm) FULL SIZE A1



COVER LAYOUT PLAN

SCALE A1 - 1 : 500
A3 - 1 : 1000



TYPICAL COVER PROFILE

SCALE A1 - 1 : 10
A3 - 1 : 20

NOTE:

THE TYPICAL COVER SYSTEM DETAIL SHOWN HAS BEEN DEVELOPED BY OTHERS AND WAS PROVIDED BY THE CLIENT FOR INCLUSION IN THE CLOSURE CONCEPT. DETAILED COVER SYSTEM DESIGN IS OUTSIDE GTC'S SCOPE OF WORK

HATCH LEGEND

- EXTENT OF CLOSURE COVER LAYER
- PRIMARY DRAINAGE
- SECONDARY DRAINAGE

5 0 5 10 15 20 25m
SCALE 1:500

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DWN	ENG	CHK
A	15/02/26	ISSUED FOR APPROVAL	RS	MM	MM

SITE SPECIFICS

GEORGETOWN GOLD MINE

CLIENT

SAVANNAH GOLDFIELDS

GEOTAILS CONSULTING
ABN : 48654759976

QUALITY		
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ENGINEER:	MM	DATE: 15/02/26
DESIGN CHECKED:	MM	DATE: 15/02/26
RPEQ APPROVED		
DIRECTOR/MANAGER		DATE:

PROJECT NAME
PHASE 2 TSF EXPANSION

PROJECT DESCRIPTION
UPSTREAM RAISE FS DESIGN TO RL 326m

DRAWING TITLE
CLOSURE CONCEPT & TYPICAL COVER SECTION

DRAWING N0.
DRG-040

SCALE:
AS NOTED
FULL SIZE A1

PROJECT NO.
2201-GTG-09

REVISION
A

SCALE BAR(mm) FULL SIZE A1 5 0 5 10 15 20 25

APPENDIX B – FORM OF CERTIFICATION

Form of Certification - Design Plan

Georgetown Gold Mine - TSF Expansion-Phase 1

Name of Registered Professional Engineer providing certification:

Mohsen Moogui

Address of Registered Professional Engineer providing certification:

Geotails Consulting Pty Limited
2/213 Taringa Parade, Taringa, Qld 4068

Statement of Relevant Experience

I hereby state that I am a Registered Professional Engineer of Queensland (RPEQ No. 14397) and meet the requirements of a suitably qualified and experienced person as defined under the relevant legislation and guidelines.

Statement of Certification

All relevant information and material relied upon for this certification is provided and/or referenced in the attached report titled:

Savannah Goldfields Ltd - Georgetown Gold Mine, Phase 2 TSF Expansion (3 m Raise to RL 326 m), Feasibility Study - Engineering Design, Document No. 2201-GTG-09-REP02-Rev0, Dated 12 March 2026.

I, Mohsen Moogui, hereby certify that the above report for the Georgetown Tailings Storage Facility (TSF) Phase 2 Expansion:

a) Has been prepared in accordance with good engineering practice and is generally consistent with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures, 23 February 2024, Version 5.03, subject to the assumptions and limitations outlined in the report.

b) Demonstrates that, subject to completion of detailed design, geotechnical site investigation and laboratory testing, and provided the structure is constructed, operated and maintained in accordance with the final design and recommendations outlined in the report, the proposed TSF raise is capable of achieving the required performance objectives and complying with the relevant Environmental Authority conditions for a regulated structure.

I, Mohsen Moogui, declare that the information provided as part of this certification is true to the best of my knowledge. I acknowledge that it is an offence under Section 480 of the *Environmental Protection Act 1994* to give the administering authority a document containing information that I know is false, misleading or incomplete in a material particular.

Signed:

Mohsen Moogui

RPEQ No. 14397
Date: 12/03/2026

EA AND PRCP AMENDMENT APPLICATION SUPPORTING INFORMATION REPORT

KEMPTON MINERALS PTY LTD

Appendix 2 Phase 2 TSF Raise to RL 326m – Feasibility Study Dam Break Analysis and Consequence Category Assessment (Geotails Consulting Pty Limited, 2026)

SAVANNAH GOLDFIELDS

GEORGETOWN GOLD MINE



REPORT

Phase 2 TSF Raise to RL 326m – Feasibility Study

Dam Break Analysis and Consequence Category Assessment

PREPARED FOR:
Savannah Goldfields
Level 21, Matisse Tower, 110 Mary St, Brisbane, QLD, 4000,

PREPARED BY:
Geotails Consulting Pty Limited
Geotails.com.au | ABN: 48 654 759 976
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2201-GTG-09-REP01-Rev0
16/03/2026

Document Control

Project Name	GEORGETOWN GOLD MINE
Document Title	Phase 2 TSF Raise to RL 326m – Feasibility Study Dam Break Analysis and Consequence Category Assessment
Document No.	2201-GTG-09-REP01-Rev0
Date	16/03/2026

Revision History

REV	DATE	ISSUE	PREPARED	REVIEWED	GTC APPROVAL
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0	16/03/2026	FINAL	Mohsen Moogui	Mohsen Moogui	Mohsen Moogui

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REV	DATE	DESTINATION
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EXECUTIVE SUMMARY

Savannah Goldfields (SVG) proposes to expand the Georgetown Gold Mine Tailings Storage Facility (TSF) through a 3 m upstream raise to embankment crest level RL 326 m (Phase 2 Expansion). As this constitutes a material change to a regulated structure, a reassessment of consequence classification was undertaken in accordance with the following guidelines:

- *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (DETSI, 2024) **[1]**; and
- Australian National Committee on Large Dams (ANCOLD), Guidelines on the Consequence Categories for Dams, (ANCOLD, 2012) **[2]**.

GeoTails Consulting (GTC) completed a detailed Dam Break Analysis (DBA) and updated Consequence Category Assessment (CCA) to evaluate the potential impact from hypothetical failure scenarios for the proposed Phase 2 TSF configuration and confirm the appropriate hazard classification.

A two-dimensional hydraulic model (TUFLOW) was developed to simulate below two failure scenarios under credible failure modes:

- Sunny Day Failure (SDF); and
- Flood Failure (FF) under 1 in 100,000 AEP and Probable Maximum Flood (PMF) conditions.

For the SDF scenario, released tailings were modelled as a non-Newtonian fluid using a Herschel–Bulkley rheological formulation with sensitivity testing to bound uncertainty. For FF scenarios, breach outflow was conservatively modelled as water to represent dilution and water entrainment under extreme flood conditions.

Dam Break Modelling Results

Under Sunny Day Failure, release of approximately 68,000 m³ (tailings and water combined) is predicted to remain largely confined to the immediate downstream corridor, with attenuation prior to significant propagation along Sandy Creek.

Under Flood Failure, up to approximately 370,000 m³ may be released. While floodwaters extend downstream within the Sandy Creek system and may ultimately discharge to the Etheridge River, incremental impacts attributable solely to the TSF breach attenuate progressively and are minor relative to catchment-scale flooding.

Maximum incremental afflux at Georgetown is generally less than 0.1–0.2 m under the 1 in 100,000 AEP event and negligible under PMF conditions. Flood velocities and hydraulic hazard (depth × velocity) within Georgetown are governed primarily by regional catchment hydrology rather than breach outflow.

Population at Risk (PAR) attributable to the TSF breach is assessed as zero under both SDF and FF scenarios. Potential Loss of Life (PLL) is therefore assessed as zero.

Environmental Assessment

Mapped Matters of State Environmental Significance (MSES) occur within the downstream Sandy Creek corridor. Under both Sunny Day Failure (SDF) and Flood Failure (FF) scenarios, direct dam break discharge may enter these drainage features and result in temporary turbidity, sediment deposition and localised disturbance of aquatic and riparian habitats. Incremental flood impacts at Georgetown remain negligible relative to background extreme flood behaviour.

Detailed modelling indicates that the predicted environmental impact does not exceed DETSI thresholds for the High Consequence Category. The affected area is not expected to exceed 1 km², permanent ecosystem alteration is not anticipated, and long-term remediation (>6 months) or remediation costs exceeding $10 million attributable solely to the breach are not predicted. Environmental harm is therefore assessed as significant but below High thresholds, consistent with the overall consequence classification.

Consequence Category Outcome

Based on the results of the detailed Dam Break Analysis and assessment against the DETSI (2024) criteria, the proposed Phase 2 TSF raise to RL 326 m does not result in an increase in consequence classification relative to the existing facility and remains appropriately classified as a **Significant** Consequence Category regulated structure.

A Consequence Category Assessment has also been undertaken in accordance with ANCOLD (2012). The ANCOLD classification is consistent with the DETSI outcome and confirms the structure as **Significant**, with no credible loss of life scenario identified.

CCA Summary – Phase 2 TSF Raise (RL 326 m)

Criteria	Overall Consequence Category
DETSI (2024)	Significant
ANCOLD (2012)	Significant

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1 INTRODUCTION

1.1 General

Savannah Goldfields (SVG) owns the Georgetown Gold Mine (the Project), which comprises multiple Mining Leases (MLs) and supplies ore to the Georgetown Processing Plant (the Plant). Formerly operating as Laneway Resources Limited, SVG acquired the Plant in February 2022 and is the current holder of the Environmental Authority (EA) **[3]** for the Project.

SVG plans to recommence operations using a staged approach with the aim of expanding tailings storage capacity through short-term and long-term disposal strategies. The short-term strategy, referred to as the Phase 1 TSF expansion, comprises an excavated lined pit within the western margin of the TSF impoundment and is intended to provide tailings containment during the early stages of production, ahead of the implementation of a long-term solution expected in early 2027.

The Phase 2 expansion forms SVG's long-term tailings management strategy and includes lifting the existing TSF embankment by 3m to RL 326 m by an upstream raise construction approach over existing embankment (RL 323m).

SVG engaged GeoTails Consulting (GTC) to undertake the Feasibility Study for the Phase 2 TSF Expansion. As part of the Phase 2 Feasibility Study works, GTC has completed a Dam Break Analysis (DBA) and Consequence Category Assessment (CCA) for the proposed phase 2 TSF expansion.

This report presents the DBA and subsequent CCA for the proposed Phase 2 TSF expansion at the Georgetown Gold Mine, North Queensland.

1.2 Background

The Georgetown Gold Mine (the Project) is located approximately 380 km southwest of Cairns in North Queensland and located 7km to the southwest of Georgetown. Mining began in the 1990s by Union Mining Ltd across Mining Leases ML 3409, ML 3540 and ML 3591, supported by a processing plant with a nominal capacity of 250,000 tpa.

The most recent ore processing at the Georgetown Plant occurred between September 2022 and January 2024, with ore supplied from the Agate Creek Gold Mine. Tailings generated during this period were deposited within the internal cell and the northern area of the TSF's impoundment. The mine has been under care and maintenance since the conclusion of this processing period.

1.3 Regulatory Context

The site operates under Environmental Authority (EA) EPML00899813, issued by the Department of Environment, Tourism, Science and Innovation (DETSI) on 24 September 2025 **[3]**.

In accordance with the DETSI (2024) Manual **[1]**, any material change to a dam's structure, function, or operating conditions, such as the proposed Phase 2 Tailings Storage Facility (TSF) raise, triggers a review of the Consequence Category Assessment (CCA). This requirement ensures that the assigned consequence category remains representative of current and future site conditions, including changes to embankment geometry, stored tailings volumes, and potential downstream impacts.

Accordingly, an updated CCA has been undertaken for the proposed Phase 2 TSF configuration to evaluate the consequences of credible failure scenarios and to assess compliance with the applicable performance criteria set out in the Manual.

1.4 Purpose and Scope of Assessment

The purpose of this report is to determine the consequence of failure classification for the Phase 2 Tailings Storage Facility configuration, corresponding to a proposed raise to RL 326 m. The consequence category is determined by evaluating the consequences associated with a hypothetical failure involving the release of water and tailings, in conjunction with the results of the Dam Break Analysis (DBA) and an assessment of downstream conditions.

This assessment has been carried out to:

- undertake a Dam Break Analysis for the proposed Phase 2 TSF Raise to evaluate inundation extent and failure hazard to the downstream receiving environment;
- assess the potential consequences of a hypothetical failure of the Phase 2 TSF, incorporating current site conditions and proposed modification;
- determine the appropriate consequence category in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (DETSI, 2024) **[1]**; and
- assign the Consequence Categories in accordance with the Guidelines on the Consequence Categories for Dams, (ANCOLD, October 2012)**[2]**

The outcomes of this assessment are intended to inform the design, construction, and operational requirements for the Phase 2 TSF expansion, including applicable design flood capacity, structural performance criteria, and regulatory freeboard provisions in accordance with the requirements of the Manual **[1]**.

1.5 Report Structure

This report is structured to address the purpose and scope of works described above, as follows:

- **Section 2.0** - Presents the project background and site setting, including details of the existing Tailings Storage Facility (TSF) and the proposed Phase 2 expansion.
- **Section 3.0** - Summarises the dam break analysis methodology, modelling approach, key inputs and assumptions, and the resulting outcomes used to inform the Consequence Category Assessment.
- **Section 4.0** - Describes the downstream receiving environment, including relevant ecological values, surface water features, and groundwater receptors.
- **Section 5.0** - Presents the Consequence Category Assessment undertaken in accordance with the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (DETSI, 2024) **[1]**
- **Section 6.0** - Presents the Consequence Category Assessment undertaken in accordance with the *Guidelines on the Consequence Categories for Dams* (ANCOLD, October 2012) **[2]**

2 BACKGROUND DATA

2.1 Topography and Drainage

Regionally, the site is located within the Gilbert River Basin which extends North West from Blackbraes National Park past the Gregory Range to the Gulf of Carpentaria. River conditions within the basin are highly seasonal with flow events being consistent with rainfall periods.

The site is situated between two ephemeral creeks; 4 Mile Creek and Sandy Creek, both of which flow in a northerly direction. The upper catchment of 4 Mile Creek is located to the immediate west of the site area, whereas Sandy Creek originates further southwards, a distance of approximately 30km. Both drainages report to the Etheridge River, which flows generally towards the north, converging with the Einasleigh River and then the Gilbert River.

Figure 1 shows Georgetown TSF and regional drainage system.

FIGURE 1 REGIONAL DRAINAGE SYSTEM

763000E 764000E 765000E 766000E 767000E 768000E 769000E 770000E 771000E 772000E 773000E

7977000N 7976000N 7975000N 7974000N 7973000N 7972000N 7971000N

N

National Highway 1

Etheridge River

Georgetown Airstrip

Georgetown

TSF

ML 3591

ML 3540

ML 3409

Four Mile Creek

Sandy Creek

Delaney Creek

Electrical Substation

0 500 1,000 1,500 2,000 m

CRS: EPSG:28354 GDA94 / MGA zone 54

763000E 764000E 765000E 766000E 767000E 768000E 769000E 770000E 771000E 772000E 773000E

LEGEND

data — Mining_leases

Watercourse_lines

SAVANNAH GOLDFIELDS
GEORGETOWN GOLD MINE

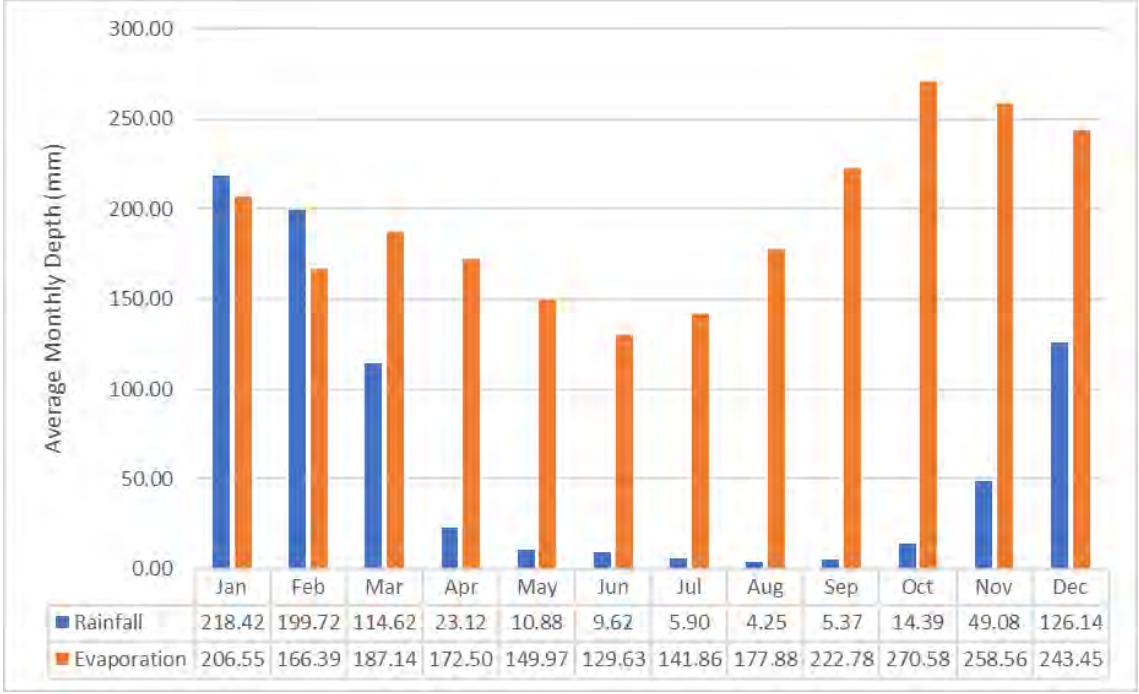
PHASE 2 TSF EXPANSION - DAM BREAK ANALYSIS
REGIONAL DRAINAGE

GEOTAILS CONSULTING

FIGURE NO. 1
REVISION: A
17/02/2026
PROJECT NO. 2021-GTG-09

2.2 Climate

The site is located in North Queensland and is subject to a semi-arid climate with hot and humid summers and drier winters. Average monthly rainfall and evaporation totals specific to the site location was sourced from the SILO Data set (The Long Paddock) **[4]** as shown in Figure 2. It is indicated that a distinct wet season extends during the summer months from December to March with 84% of mean annual rainfall occurring during these months. Peak rainfalls typically occur during January and February, with lower rainfall during the winter months. The mean annual evaporation (2,327 mm) exceeds mean rainfall (782 mm) by a factor of 3.0. In general, based on the precipitation and evaporation data, the project site is water deficient, with evaporation losses exceeding rainfall depths on an annual average basis.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall	218.42	199.72	114.62	23.12	10.88	9.62	5.90	4.25	5.37	14.39	49.08	126.14
Evaporation	206.55	166.39	187.14	172.50	149.97	129.63	141.86	177.88	222.78	270.58	258.56	243.45

FIGURE 2 AVERAGE MONTHLY RAINFALL AND EVAPORATION [4]

2.3 Subsurface Characterization

A geotechnical site investigation conducted in 2009 by Landline Consulting (AWA, 2009) **[9]** provides the primary understanding of subsurface conditions within the Georgetown TSF footprint. The investigation comprised three geotechnical boreholes drilled to depths of 10–15 m and eight test pits excavated to depths of 1.7–4.6 m across the proposed TSF footprint.

2.3.1 Soil and Rock Profile

The subsurface conditions within the TSF area typically consist of low to medium plasticity sandy clay soils overlying weathered granitic basement rock. The soil horizon extends to approximately 3–5 m depth, transitioning into extremely to highly weathered granite, with weathering intensity decreasing with depth. Below this, moderately weathered and geotechnically competent granite with remnant rock structure is encountered. These basement sequences range from weak to medium strength, providing a sound foundation for containment infrastructure.

2.3.2 Foundation Permeability

In-situ permeability testing undertaken using falling and rising head methods indicated low hydraulic conductivity in both soil and weathered granite strata. Test results ranged from 1×10^{-8} to 1×10^{-7} m/s, with upper soil layers at the lower end of this range.

The permeability of the upper soil layer provides a relatively impermeable “blanket” layer, limiting vertical infiltration and reducing the potential for groundwater recharge via percolation. In contrast, the underlying basement granite, while still low in permeability, may locally exhibit higher conductivity due to structural features such as fracturing or bedding planes.

2.4 Hydrogeology and Groundwater

A review of available hydrogeological and groundwater information has been undertaken to support this assessment, drawing on key references including RLA (2014) **[5]**, STC (2022) **[6]**, and HESS (2024; 2024a) . This summary consolidates overview of the site’s hydrogeological setting, specifically as it relates to the Phase 1 TSF expansion.

2.4.1 Hydrogeological Setting

The Georgetown Gold Project is underlain by a geologically complex environment comprising granitic regolith and fractured basement rock, both of which host groundwater with variable yield and connectivity. Three primary hydrogeological units are identified:

- **Weathered Regolith Aquifers**

These shallow, unconfined aquifers occur within the weathered granitic overburden, typically at depths of 10–15 m. They exhibit moderate hydraulic continuity across the Plant Site, with low yields (commonly referred to as "soaks") and delayed response to rainfall events, indicative of low permeability.

- **Near-Surface Fractured Basement Aquifers**

Occurring at depths of 20–50 m, these semi-confined aquifers are hosted within fractured granitic basement. They represent the main groundwater-bearing unit on site, with typical yields ranging from 0.3 to 0.5 L/s. Yields and water quality vary significantly between bores, reflecting poor lateral continuity and the discrete nature of fracture networks.

- **Deep Fractured Basement Aquifers**

These confined aquifers lie below approximately 70 m depth. Available data indicates generally low yields (<1 L/s), with isolated exceptions (e.g. bore RDMB3 at 4 L/s). These deeper systems are considered low-transmissivity units with limited relevance to shallow groundwater dynamics associated with the TSF.

2.4.2 Groundwater Flow Directions

Permeability testing across the regolith and weathered basement indicates generally low hydraulic conductivity, in the order of 10^{-8} m/s. This is consistent with observed aquifer compartmentalisation and limited hydraulic connectivity, resulting in low recharge rates and subdued groundwater movement.

Groundwater flow directions are generally consistent with surface topography:

- In the eastern Plant Site area, , flow is directed south-southeast.
- In the western area near the historical TSF, flow diverges east and west from a local topographic high, which also serves as a recharge divide.

Groundwater levels exhibit seasonal variation, with amplitudes up to 6 m observed near the TSF. Potentiometric surfaces were mapped for both the wet (February 2023) and dry (September 2023) seasons, based on site monitoring data. A conceptual hydrogeological model was developed by HESS (2024) [7], and the resulting potentiometric contours are presented in Figure 3 and Figure 4.

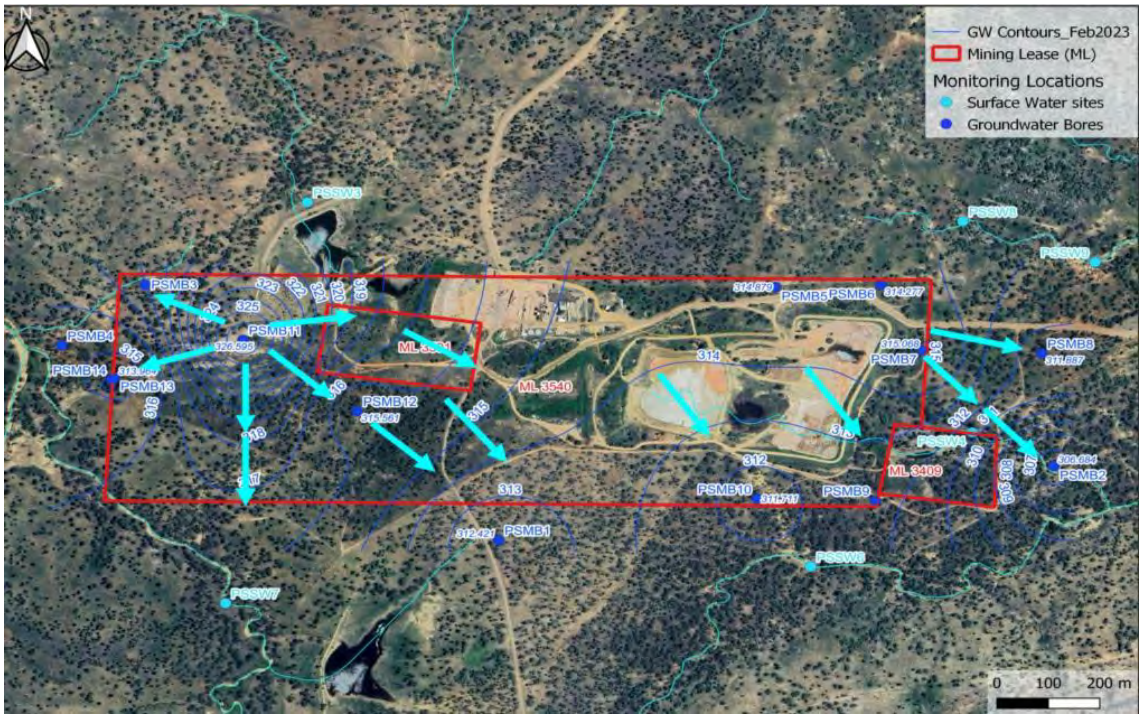


FIGURE 3 GROUDNWATER CONTOURS – WET SEASON (FEBRUARY 2023) FOR GRANITIC REGOLITH (HESS 2024) [7]

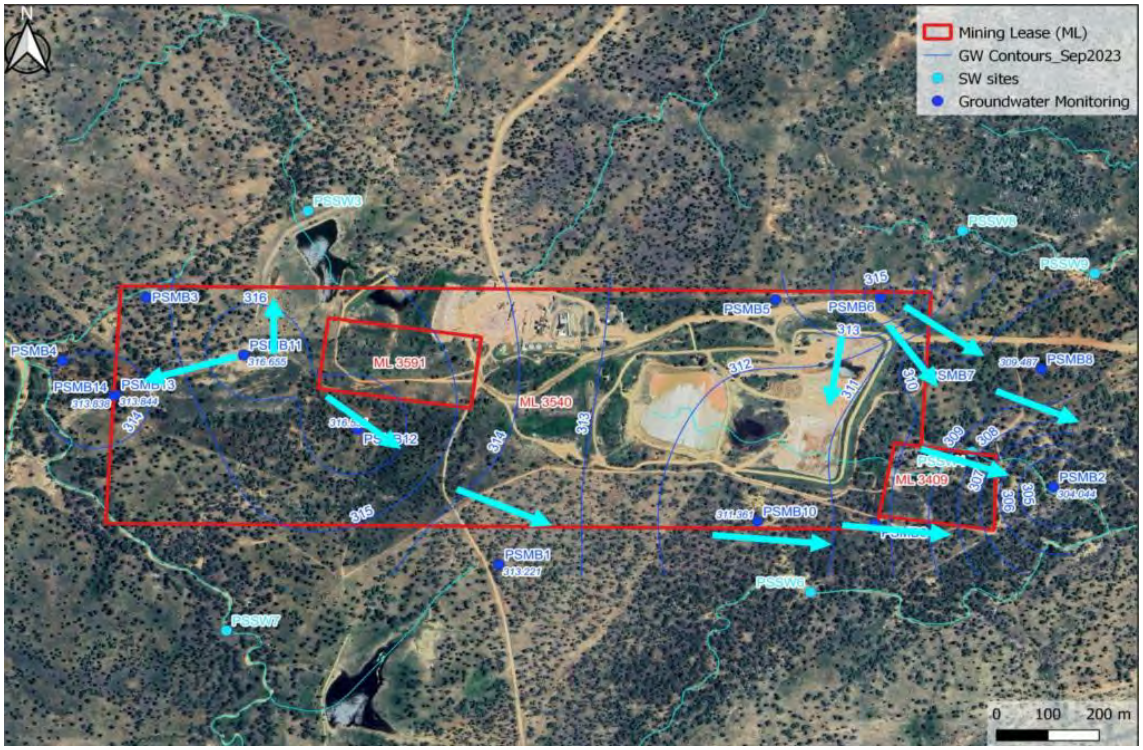


FIGURE 4 GROUNDWATER CONTOURS – DRY SEASON (SEPTEMBER 2023) FOR GRANITIC REGOLITH (HESS 2024) [7]

The site groundwater monitoring network comprises 20 bores, 14 of which are located within the Plant Site. These are monitored quarterly and span the major aquifer types, informing baseline groundwater conditions and the development of the conceptual hydrogeological model.

No groundwater-dependent ecosystems (GDEs) have been identified within or near the site. Additionally, there are no known licensed groundwater users in the vicinity. Environmental values assigned to the groundwater system—based on the EPP (Water) 2009—include suitability for recreational, industrial, and stock watering uses.

RLA 2014 **[5]**, further assessed surrounding private bores and noted they were installed in low-permeability lithologies. That assessment concluded there is no hydraulic connectivity between groundwater beneath the Plant Site and any nearby groundwater stakeholders.

This hydrogeological context is essential for understanding seepage behaviour, containment performance, and potential groundwater interactions relevant to the Phase 2 TSF expansion.

2.5 Tailings Geotechnical Characteristics

In 2009, laboratory testing including classification and compaction tests were completed on four samples recovered from deposited tailings to assess tailings for potential use in embankment construction (AWA, 2009) **[9]**. The results are summarised below based on four tailings samples.

Classification: Stored tailings can be generally classified as CL-CI in accordance with the Unified Soil Classification System.

Particle Size Distribution: Geotechnical testing on these materials indicates that these materials can be geotechnically classified as Silty CLAY, with some/traces of sand.

Plasticity: These materials are of low to medium plasticity, with Liquid Limit values ranging from 27 to 55% and generally plot above A-line in the Modified Casagrande Chart.

Specific Gravity (SG): No Specific Gravity (SG) testing of Georgetown tailings are available, nonetheless, a SG in the order of 2.7 to 3.0 -was inferred for tailings based on the processed oxidised ore and higher SG of 3.0 associated with sulphide ore.

2.6 Geochemical Characterization

A geochemical impact assessment was undertaken by Geochemical Scientific Pty Ltd (GS 2023) **[8]** to evaluate the potential for environmental harm related to seepage from the Georgetown TSF. The study reviewed over a decade of surface water, groundwater, and tailings geochemistry data to assess risks to downstream receptors, particularly within the Sandy Creek and Four Mile Creek catchments.

2.6.1 Tailings Geochemical Characterisation

Tailings stored within the TSF are enriched in several potentially toxic metals/metalloids, notably arsenic (As), antimony (Sb), bismuth (Bi), cadmium (Cd), lead (Pb), and zinc (Zn). Static testing classifies the majority of tailings samples as non-acid forming (NAF); however, limited leachate data restricts full understanding of contaminant mobility under field conditions.

2.6.2 Groundwater Observations and Seepage Influence

The report concludes that current data does not confirm a definitive link between TSF seepage and groundwater impacts. Groundwater in the Sandy Creek catchment may be influenced by point source recharge from the TSF or legacy open pits, while Four Mile Creek groundwater appears driven by diffuse rainfall, with seepage influence unlikely.

Some Sandy Creek bores show elevated sulfate, zinc, and metals, though most are expected to attenuate naturally. Historical data gaps and limited QA/QC reduce confidence in earlier trends.

Seepage is considered minimal due to low-permeability foundations, with declining groundwater mounding post-operations supporting reduced seepage risk. Overall, the environmental harm from localised groundwater impacts is assessed as low.

2.6.3 Uncertainty and Precaution

Despite the generally low risk conclusion, the report highlights uncertainties due to legacy data gaps, analytical inconsistencies, and the need for ongoing monitoring. As such, a precautionary approach remains warranted for regulatory and dam safety classification purposes, particularly regarding:

- Elevated sulfate and zinc concentrations in select bores;
- Uncertain recharge sources and potential pathway connectivity;
- The sensitivity of downstream environments (e.g., Sandy Creek and Etheridge River)

2.7 Tailings Storage Facility

2.7.1 Overview

The Georgetown Tailings Storage Facility (TSF) is located east of the processing plant within the eastern catchment of the site, which drains towards Sandy Creek and ultimately the Etheridge River. TSF is classified as a regulated structure in current EA and serves as the

primary tailings containment system for the operation. In the current EA **[3]**, the TSF is classified as a regulated structure and assigned a "Significant" Consequence Category.

2.7.2 TSF Phase 2 Raise

As discussed in **Section 1.1**, SVG plans to expand TSF storage capacity in 2 phases. Phase 1 TSF expansion (referred as Western Cutback) involves construction of a lined in-pit tailings storage facility within the western limit of the existing TSF impoundment. Phase 2 TSF expansion comprises an upstream raise over the existing embankment by 3m to RL 326m.

Table Table 1 summarises existing TSF configuration and proposed Phase 2 TSF expansion.

TABLE 1 TSF EXISTING AND PROPOSED PHASE 2 RAISE

Description	Existing TSF [10]	Phase 2 TSF
Crest Level	RL 322.8 m	RL 326.0 m
Full Supply Level (Spillway Crest):	RL 322.0 m	RL 325.0 m
Embankment Crest Width	5.4 – 6.2 m	6.0
Spillway Base Width	9.7 m	8.0
Embankment Length	730 m	1,100
Maximum Embankment Height	10.0	13.0
Total Estimated Storage Capacity (To spillway level)	163.0 ML	400.5 ML

3 DAM BREAK ANALYSIS

3.1 General

A detailed dam break analysis has been undertaken for the proposed Phase 2 TSF configuration to estimate the extent of downstream areas potentially impacted by a failure under credible failure scenarios, taking into account site conditions and downstream topography. The results of the dam break analysis, including inundation extent, runout distance, flow depths, and flow velocities, have been used to inform the Consequence Category Assessment (CCA), as discussed in subsequent sections of this report.

Critical breach parameters, including peak outflow discharges and breach geometry for the proposed Phase 2 TSF, have been assessed and are presented in the following sections.

3.2 Methodology

In accordance with ANCOLD **[12]**, the dam break analysis shall identify the credible failure modes and consider both the “Sunny Day Failure” and “Flood Failure” conditions to determine the-worst case scenario.

- **Sunny Day Failure (SDF)**- represents a condition whereby failure of the dam is assumed to happen by means other than a storm-induced flood event, such as a failure triggered by an earthquake where the embankment ruptured instantly, which would result in the loss of containment in a short period of time. Sunny Day Failure can also be triggered by static-induced failure events such as foundation instability, excessive seepage and piping mechanism; and
- **Flood Failure (FF)** - represents a failure condition that occurs in association with a natural flood event. Such a failure is likely to be attributed to overtopping an embankment dam but could also be triggered by piping during or after a flood event.

Both SDF and FF scenarios were modelled to ensure a conservative assessment of downstream consequences.

3.3 Potential Failure Mode

Based on the TSF configuration, site conditions, and GTC’s understanding of the condition of the existing facility, a Potential Failure Modes (PFM) screening assessment has been undertaken as part of the dam break analysis. The screening considered credible mechanisms that could result in a loss of containment under current and proposed Phase 2 TSF conditions.

The potential failure modes identified for the proposed Phase 2 TSF, together with their assessed credibility and justification, are summarised in Table 2.

TABLE 2 PHASE 2 TSF POTENTIAL FAILURE MODES

Potential Failure Mode	Failure Credibility	Justification
Static slope instability (embankment)	Credible	Potential embankment instability under static loading conditions.
Static slope instability (foundation)	Credible	Potential instability resulting from foundation weakness or adverse foundation conditions under static loading.
Static liquefaction / undrained instability	Credible	Potential undrained or static liquefaction of stored tailings leading to loss of stability of the retaining embankment.
Piping through embankment	Credible	Internal erosion or piping through poorly compacted or heterogeneous embankment materials, initiated by sustained ponded water against the embankment.
Piping through foundation	Credible	Internal erosion or piping along foundation stratigraphy or structural features (e.g. defects or preferential seepage paths) initiated by sustained ponded water against the embankment.
Seismic instability	Credible	Post-seismic instability or liquefaction-induced slope failure of the retaining embankment.
Overtopping	Credible	Inadequate freeboard above spillway level or blockage of the spillway system, including crest or downstream spillway channel.
Cascade failure from Internal Cell into Phase 2 TSF (early operation)	Credible	Failure of the Internal Cell during early Phase 2 operation prior to sufficient buttressing from deposited tailings.
Cascade failure from Internal Cell into Phase 2 TSF (later operation)	Non-Credible	Failure of the Internal Cell once the downstream slope is substantially buttressed by deposited tailings is considered extremely remote.
Cascade failure from Western Cutback (Phase 1 TSF Expansion) into Phase 2 TSF	Non-Credible	The Western Cutback is an excavated facility with no above-ground embankment; therefore, this failure mode is considered non-credible.

3.4 Adopted Failure Scenarios for Dam Break Analysis

Based on the potential failure modes screening, a hypothetical breach of the eastern embankment was adopted as the critical failure scenario for the dam break analysis under both Sunny Day and Flood Failure conditions. This breach location represents the most adverse and conservative failure pathway, as it would result in the release of tailings and water towards Sandy Creek, where the greatest downstream consequences are anticipated.

The adopted breach geometry and associated peak outflow discharges were derived from the credible failure mechanisms identified in the PFM assessment and were applied under the respective loading conditions (i.e. Sunny Day and Flood Failure). These scenarios were modelled to estimate potential inundation extent, runout distance, flow depths, and flow velocities of released tailings and water, and form the basis of the dam break analysis results

used to inform the Consequence Category Assessment presented in subsequent sections of this report.

Other potential breach locations were screened out as they resulted in lesser downstream consequences.

3.5 Dam Breach Release Characteristics

This section presents the estimation of breach characteristics and associated tailings and water release volumes for the adopted Sunny Day Failure (SDF) and Flood Failure (FF) scenarios. These parameters define the source conditions used in the subsequent dam break modelling and Consequence Category Assessment.

3.5.1 Estimation of Breach Parameters

Breach parameters, including breach geometry, breach formation time, and peak outflow characteristics, were estimated for the adopted failure scenarios using a combination of empirical relationships, published guidance, and engineering judgement appropriate for tailings storage facilities. Separate breach parameters were developed for Sunny Day Failure (SDF) and Flood Failure (FF) conditions to reflect the differing hydraulic loading conditions at the time of failure. Breach parameters governing the release volume were derived using Froehlich's empirical equations (2008) **[13]**, based on historical embankment dam failures.

The breach parameters adopted for the Sunny Day Failure (SDF) and Flood Failure (FF) scenarios are summarised in Table 3.

TABLE 3 DAM BREACH PARAMETERS

Parameter	SDF	FF
Breach Base Level (RLm)	313	313
Breach Depth (m)	13	13
Breach Base Width (m)	19	12
Breach Top Width (m)	45	30
Breach Side Slopes	1V:1H	1V:1H
Breach Formation Time (minutes)	18	14

3.5.2 Estimation of Tailings and Water Release Volume

Tailings and supernatant water release volumes were estimated for the end-of-filling of Phase 2 TSF and calculated separately for Sunny Day Failure (SDF) and Flood Failure (FF) scenarios. The estimates considered the decant pond level, available freeboard, flood volume, and the volume of tailings mobilised above the post-failure surface and were adopted as inputs to the dam break simulations.

In the absence of site-specific geotechnical data, a conservative lower-bound residual gradient of 6° was adopted for this assessment to define the mobilised tailings volume. This assumption sits in the lower bound of published residual shear strength data for gold tailings for post-failure gradients which is typically in the range of 8-10° (Blight, 2010) **[14]**.

For the SDF scenario, failure of Phase 2 TSF is assumed to result in the release of decant pond and stored tailings. For the FF scenario, overtopping of the Phase 2 TSF embankment is assumed to lead to progressive erosion and subsequent release of flood water and stored tailings.

Table 4 presents the estimated tailings and water release volume

TABLE 4 POTENTIAL RELEASE VOLUME OF WATER AND TAILINGS

Parameter	SDF	FF
TSF Water Level (RLm)*	322.5	326.0
Minimum Tailings Level**	322.0	322.0
Potential Release Volume of Tailings (m^3)	32,000	38,000
Potential Release Volume of Water (m^3)	36,000	332,000
Total Tailings and Water Release Volume (m^3)	68,000	370,000

* For the SDF scenario, the operational decant water level is conservatively assumed at RL 322.5 m at the end of Phase 2 filling. For the FF scenario, the water level is assumed at the embankment crest (RL 326.0 m), representing a maximum credible storage condition.
** The minimum tailings level is estimated assuming a 230 m beach length, 1% average beach slope, and a maximum tailings level of RL 325.5 m (0.5 m below embankment crest).

3.6 Hydrological Model

Hydrological modelling was undertaken to simulate catchment runoff and breach outflow hydrographs associated with the adopted flood failure scenarios. The resulting hydrographs were used to define inflow conditions for the downstream hydraulic modelling and to support assessment of dam break impacts.

3.6.1 Catchment

The TSF is located within a long and narrow catchment draining to Sandy Creek, which subsequently discharges to the Etheridge River downstream of Georgetown. The total contributing catchment area of Sandy Creek is approximately 116 km².

Sandy Creek has an approximate channel length of 38 km from the TSF to its confluence with the Etheridge River and an average longitudinal slope of approximately 4%. The position of the TSF within the catchment and the overall catchment extent are shown in Figure 5 (a) and (b).

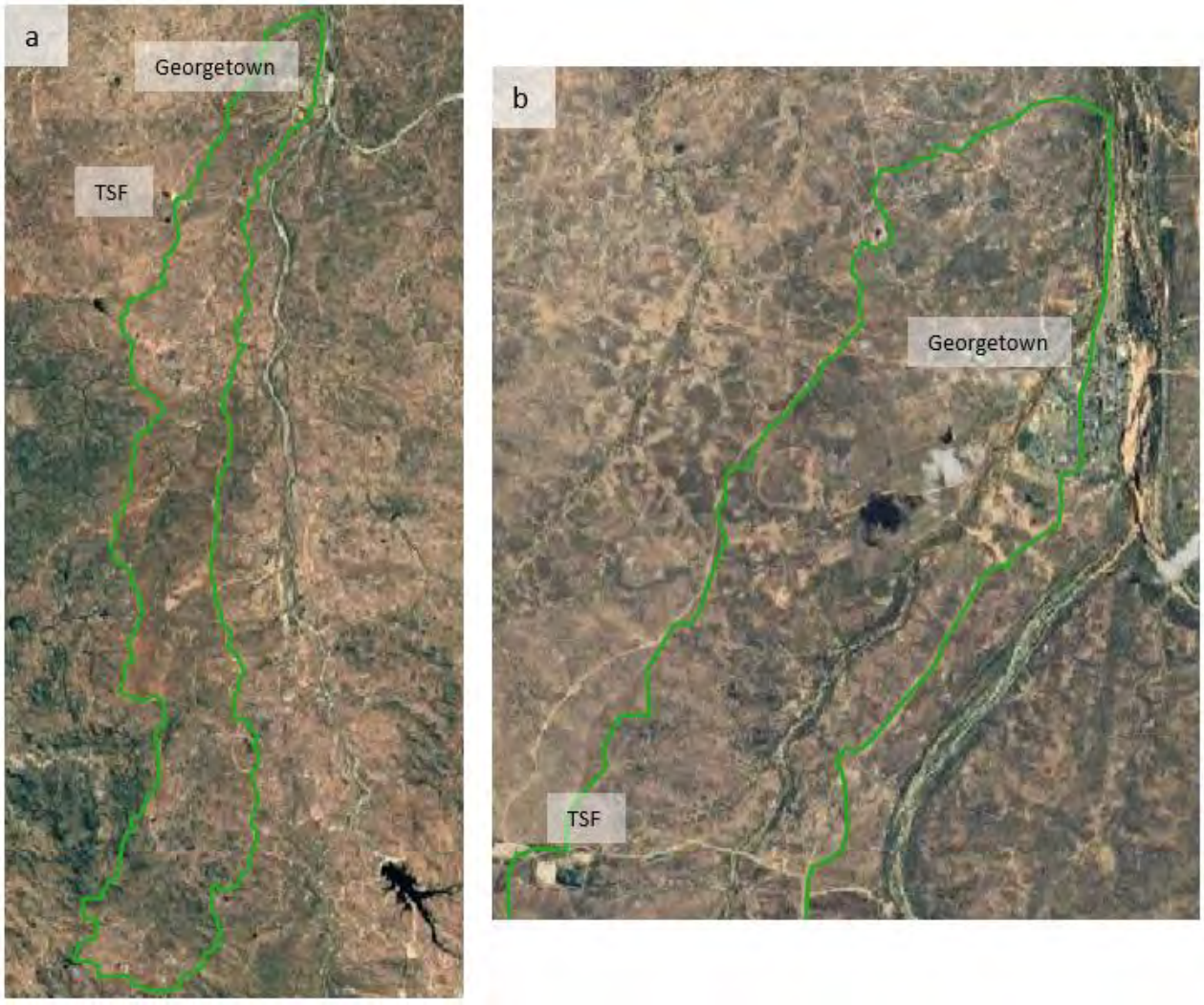


FIGURE 5 LOCATION OF TSF WITHIN THE SANDY CREEK CATCHMENT

(A) CATCHMENT EXTENT SHOWING TSF LOCATION; (B) ENLARGED VIEW SHOWING RELATIONSHIP BETWEEN THE TSF, SANDY CREEK, AND GEORGETOWN TOWNSHIP.

3.6.2 Design Events

Hydrologic inputs were selected to represent extreme storm conditions applicable to the dam break flood failure scenario**.** The following design events were adopted:

- Probable Maximum Flood (PMF); and
- 1 in 100,000 Annual Exceedance Probability (AEP) rainfall event.

These events represent upper-bound flood conditions, consistent with ANCOLD guideline recommendations for the assessment of the theoretically greatest flood events.

3.6.3 Rainfall Inputs

Probable Maximum Precipitation (PMP) rainfall depths and temporal patterns were derived for the site catchment using the methodology outlined in the Generalised Tropical Storm Method, Revised (GTSMR) guidebook. Rainfall depths for the 1 in 100,000 Annual Exceedance Probability (AEP) event were estimated using the interpolation procedure described by Siriwardena (1998) in ARR Book 8 **[20]**, interpolated between the PMP and 1 in 2,000 AEP rainfall depths.

Rainfall depths for the 1 in 2,000 AEP event were obtained from the Bureau of Meteorology (BoM) for the site location. Based on the catchment size, rainfall depths were derived for durations of 24, 36, 48, and 72 hours to enable identification of the critical storm duration for the dam break assessment.

The adopted extreme rainfall depths used in the hydraulic modelling are summarised in Table 5.

TABLE 5 EXTREME DESIGN RAINFALL DEPTHS

Duration (hours)	PMP (mm)	1 in 100,000 AEP (mm)
24	1,100	589
36	1,380	725
48	1,600	829
72	1,990	1,014

The annual exceedance probability of the PMP event is estimated to be approximately 1×10^{-7} AEP, based on catchment-specific guidance provided in ARR Book 8. Given the scale of the catchment, spatially uniform rainfall was assumed across the model domain. Rainfall inputs were transformed into runoff using the hydrologic representation embedded within

the hydraulic modelling framework. The resulting runoff was routed through the catchment-scale model to generate inflow hydrographs for the local TSF model.

3.7 Hydraulic Modelling

3.7.1 Background

Downstream propagation of water and mobilised tailings resulting from the adopted dam break scenarios was simulated using the two-dimensional hydrodynamic software **TUFLOW**. Tailings dam breach flows differ from conventional water dam failures, as the released mixture typically behaves as a hyper-concentrated, non-Newtonian fluid governed by yield stress and shear-rate dependent viscosity. Appropriate representation of rheological behaviour is therefore necessary to provide realistic inundation estimates. TUFLOW incorporates a Herschel–Bulkley rheological formulation, which combines yield stress and non-linear shear-thinning behaviour within the shallow water equation framework. The literature identifies this formulation as suitable for simulating liquefied tailings and mudflows where flow resistance varies with shear rate.

In the absence of site-specific rheological laboratory testing, representative parameter ranges for gold tailings reported in published literature were adopted. Sensitivity testing was undertaken to evaluate the influence of yield stress and consistency parameters on predicted inundation extent and flow characteristics. The adopted modelling framework therefore provides a conservative and technically defensible basis for the Consequence Category Assessment.

3.7.2 Topographic Model and Downstream Setting

The hydraulic modelling framework comprised both a regional (catchment-scale) model and a local (TSF-scale) model to optimise computational efficiency while maintaining appropriate spatial resolution.

The regional terrain model was developed using available SRTM data (30 m grid resolution) and was used to generate upstream creek inflows through application of the direct rainfall method. Outputs from the regional model were subsequently applied as upstream boundary inflows for the local TSF model.

The local model was developed using an 8 m grid resolution, incorporating inflows derived from the regional model at the upstream boundary and applying direct rainfall to the intermediate catchment between the TSF and Georgetown. This approach enabled detailed simulation of breach outflow propagation and downstream inundation extents.

The downstream environment between the TSF and Georgetown is predominantly rural, with no permanent residences identified. Potential receptors include pastoral land, access tracks, minor infrastructure, and environmental values associated with watercourses.

Figure 6 presents the local model used for the dam break analysis, showing the model boundary, merged LiDAR and SRTM digital elevation data, TSF location, upstream inflow boundary, downstream flow measurement locations, and key hydraulic features represented in the model.

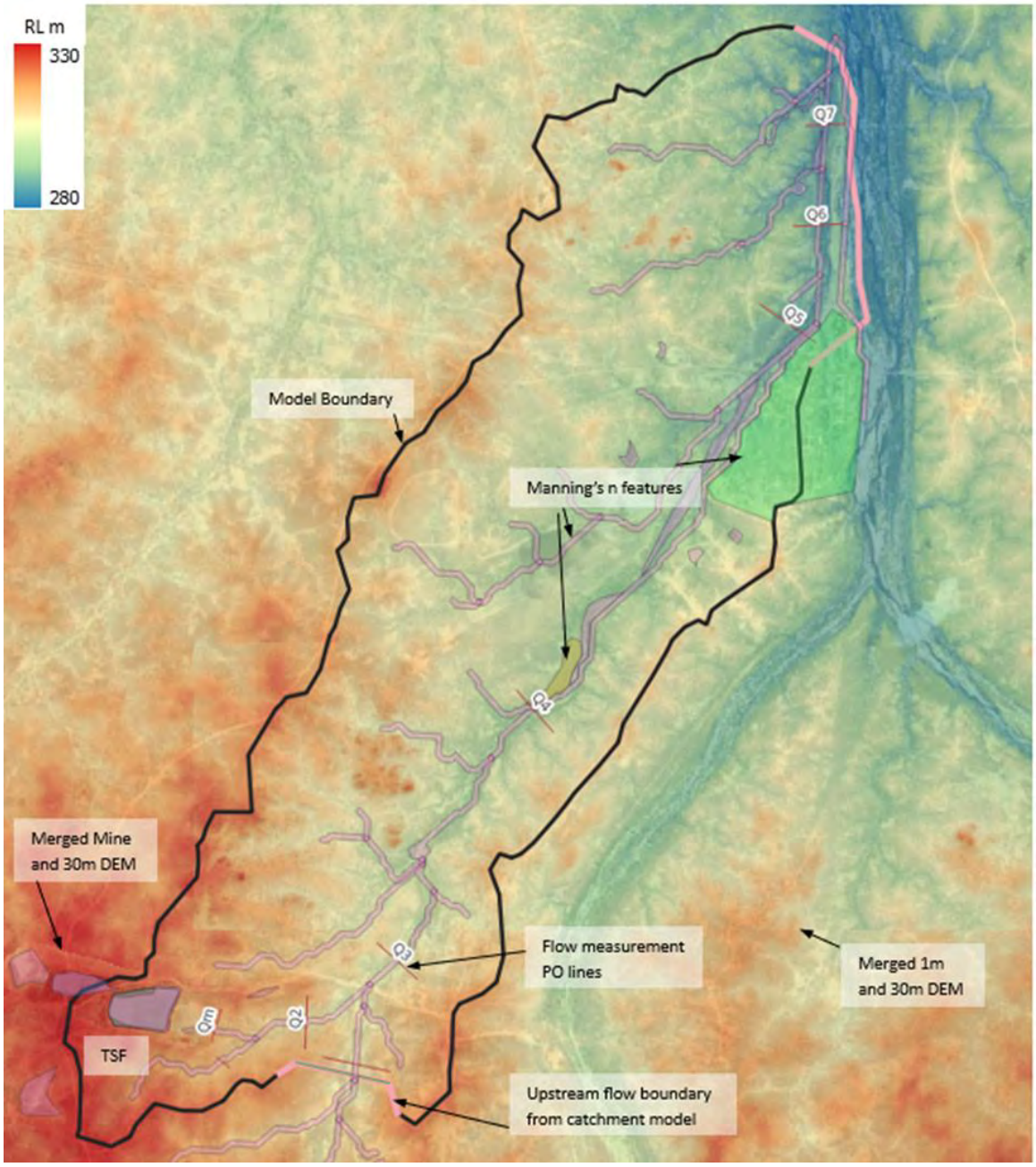


FIGURE 6 TOPOGRAPHIC MODEL ASSEMBY AND DAM BREAK MODEL DOMAIN

3.7.3 Model Inputs

The modelling was undertaken by setting up a regional and local model to enable increasing computational efficiency with using a coarser grid for a catchment wide model. The regional catchment model was used to develop the creek flows upstream of the TSF by implementing direct rainfall method. The local model was developed with 8m grid size with incorporation the catchment flows at the model upstream boundary and implementing direct rainfall on the intermediate catchment between the TSF and Georgetown.

In the context of the tailings slurry routing, a three-parameter rheological and hydraulic inputs to FUFLOW software include the followings:

- Surface roughness conditions.
- Boundary Conditions
- Initial Conditions
- Breach Implementation; and
- Tailings rheological properties

3.7.3.1 Manning's Roughness Coefficients

Manning's n values were assigned based on land use, vegetation cover, and surface characteristics. Representative values adopted in the model include:

- natural channels and water bodies: 0.025;
- town areas: 0.05;
- mine areas: 0.04;
- densely vegetated areas: 0.10; and
- default value for other areas: 0.05.

3.7.3.2 Boundary Conditions

For the regional catchment model, rainfall was applied as a direct boundary condition across the model domain. For the local TSF model, upstream inflow boundaries were derived from regional model outputs, while the runoff from the intermediate catchment between the TSF and Georgetown was quantified by direct runoff methods. In both regional and local models, the downstream boundaries were defined using a normal depth condition based on an estimated 3% creek slope at the downstream extent of the model.

3.7.3.3 Initial Conditions

Initial water levels within the TSF were defined based on the scenario being simulated. The adopted assumptions for each scenario are described in Section 3.5.

3.7.3.4 Breach Implementation

The breach was implemented in TUFLOW as a time-varying reduction in embankment crest elevation, initiated at Hour 28 of the simulation and fully developed over a period of 15

minutes. Breach parameters adopted for Sunny Day Failure and Flood Failure scenarios are described in **Section 3.2**.

3.7.3.5 Tailings Rheological Properties

No site-specific rheological laboratory data are available for the Georgetown tailings. Available geotechnical testing (**Section 2.5**) indicates the stored tailings are classified as CL–CI (low to intermediate plasticity inorganic clay) with Liquid Limits ranging from 27–55% and predominantly fine-grained silty Clay material. Such materials are expected to exhibit yield-stress controlled, shear-thinning behaviour when remoulded and mobilised.

Under the Sunny Day Failure (SDF) scenario, it is assumed that the released tailings and supernatant water behave as a single-phase tailing-water mixture. Conservatively, the stored tailings are assumed to undergo liquefaction upon breach and mobilise in a flow failure state, rather than behaving as a non-liquefied slump or block displacement. Accordingly, the breach outflow has been modelled as a non-Newtonian fluid.

In the absence of rheological testing, rheological parameters were adopted using published empirical relationships linking Atterberg limits and slurry yield stress behaviour (Fitton, Seddon, 2012) **[15]**. A Herschel–Bulkley (HB) formulation was implemented within TUFLOW to represent non-Newtonian flow behaviour.

Three parameter sets were defined to bound potential behaviour under dam break conditions:

- **Scenario A** - Baseline (reportable) case;
- **Scenario B** - Mobile case (maximum runout extent), and ;
- **Scenario C** - Resistive case (lower-bound runout for unthickened tailings).

Parameter magnitudes were checked at a representative shear rate of 100 s^{-1} to confirm physically reasonable apparent viscosities consistent with dilute to moderately concentrated slurry behaviour.

TABLE 6 ADOPTED HERSCHEL–BULKLEY RHEOLOGICAL PARAMETERS FOR DAM BREAK MODELLING

Scenario	Description	Yield Stress τ_0 (Pa)	Consistency Index K ($Pa \cdot s^n$)	Flow Behaviour Index, n (-)	Apparent Viscosity at 100 s^{-1} ($mPa \cdot s$)
A	Baseline (reportable case)	1.0	0.03	0.75	19
B	Mobile/ maximum runout extent	0.2	0.007	0.9	6

C	Resistive (lower bound runout, unthickened)	3	0.1	0.65	50

Note: The Herschel–Bulkley model is defined as

$$\tau = \tau_0 + K\dot{\gamma}^n$$

Apparent viscosity at 100 s^{-1} was used as a reasonableness check consistent with common tailings rheology practice[**15]**.

Scenario A yields an apparent viscosity of approximately 19 mPa·s at a shear rate of 100 s^{-1}. This value falls within the typical range of approximately 10–50 mPa·s for conventional unthickened tailings slurries at approximately 35–40% w/w solids concentration under dynamic (runout) conditions.

Under the Flood Failure (FF) scenario, the stored tailings are assumed to liquefy and be released together with the flood volume contained within the TSF impoundment. Upon breach, the released material is expected to further mix with significant flood runoff generated across the upstream catchment and downstream contributing areas. As a result, the flow is considered likely to exhibit predominantly Newtonian (water-type) behaviour and has therefore been modelled as water.

3.7.4 Modelled Scenario

Figure 7 presents the hierarchy of dam break modelling scenarios assessed in this study, including catchment-scale inflow conditions, existing and Phase 2 TSF configurations, and associated failure cases (Sunny Day Failure and Flood Failure) with corresponding rheological sensitivity analysis.

The adopted dam break scenarios were developed in accordance with the objectives of this study. The assumptions, inputs, and configuration of each modelling case are described in the preceding sections.

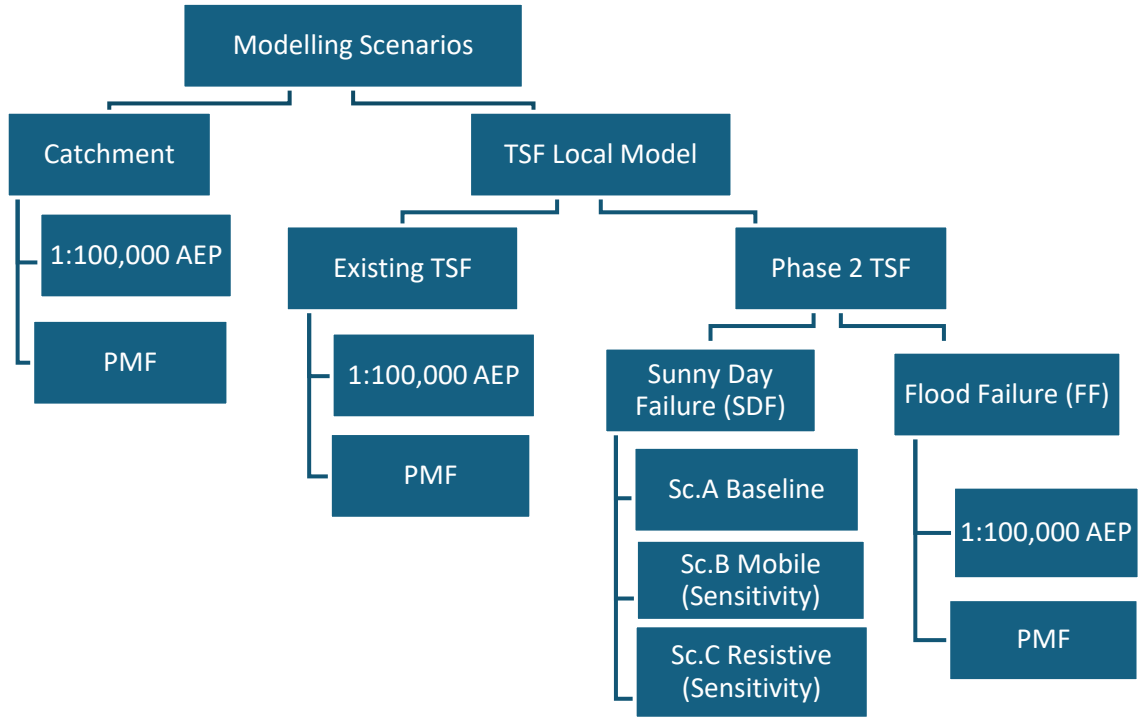


FIGURE 7 DAM BREAK MODELLED SCENARIOS

3.8 Results of Dam Break Analysis

This Section presents the results of the dam break simulations for the assessed scenarios. Results are summarised in terms of downstream flood extents, flows at the measurement lines shown in Figure 6, and the changes in inundated dwellings in Georgetown in a hypothetical dam break event. These outputs form the basis of the subsequent consequence assessment in the Chapter 5.

Inundation mapping for the assessed scenarios is provided in **APPENDIX A** .

3.8.1 Interpretation of Results

Model outputs have been interpreted in the context of consequence category assessment, rather than detailed damage or economic impact quantification.

Key observations focus on:

- Progressive attenuation of breach-related flood severity with distance downstream;
- Breach runout distance and spatial extent of inundation; and
- Incremental flood impacts, particularly changes in hazard (depth × velocity) in the vicinity of Georgetown.

3.8.2 Breach Outflow Hydrographs

Breach outflow hydrographs were extracted at the selected measurement lines shown in Figure 6. A comparison of peak flows for the selected flood events, with and without a TSF breach, is presented in Table 7.

TABLE 7 COMPARISON OF PEAK FLOWS WITH AND WITHOUT A TSF BREACH AT SELECTED LOCATIONS

Event	Description	Downstream of TSF (Q mine)	Upstream of Georgetown (Q4)	At Georgetown (Q5)
1 in 100,000 AEP	No TSF Breach	2.5	844.6	874.7
	With TSF Breach	297.8	949.4	938.1
	Change (m^3/s)	295.3	104.8	63.4
PMF	No TSF Breach	5.2	1902.7	1993.7
	With TSF Breach	305.9	1956.8	2027.2
	Change (m^3/s)	300.7	54.1	33.5

The changes to the flow hydrographs at Georgetown (Q5) resulting from a TSF breach during the PMF and 1 in 100,000 AEP events are shown in

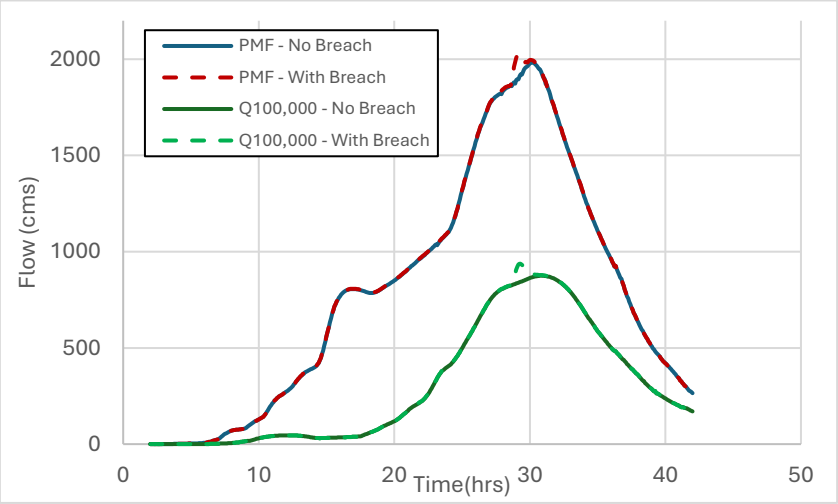


FIGURE 8 CHANGES TO THE FLOW HYDROGRAPH OF SELECTED EVENTS IN A TSF BREACH

The results indicate that the relative increase in peak flow at Georgetown (Q5) due to a TSF breach is greater for the 1 in 100,000 AEP event than for the PMF event. For the 1 in 100,000 AEP event, the breach results in a peak flow increase of approximately 63 m^3/s at Georgetown, compared to an increase of approximately 34 m^3/s under the PMF scenario.

Although the absolute breach outflow downstream of the TSF (Q mine) is similar for both events (approximately 300 m³/s increase), the proportional impact reduces with distance downstream due to attenuation and storage effects along the 8 km reach between the TSF and Georgetown. Under the PMF condition, the substantially larger catchment inflows dominate the hydrograph, and the incremental contribution from the breach becomes relatively small compared to the overall flood magnitude.

Immediately downstream of the TSF (Q mine), the hydrograph shows a significant increase in flow, as expected, reflecting the direct release from the Phase 2 TSF breach into the unnamed tributary of Sandy Creek.

Overall, under the Flood Failure scenario, the incremental impact of a TSF breach on peak flows at Georgetown is minor relative to the catchment flood flows. The modelling indicates no material change in overall flood behaviour or peak magnitude at Georgetown, primarily due to hydraulic attenuation within the reach between the TSF and the township.

3.8.3 Flood Extents

Maximum flood extents were mapped for each assessed scenario. The inundation mapping includes maximum flood depth, maximum velocity, and hydraulic hazard (depth × velocity) for each event. These outputs provide the primary basis for evaluating spatial runout extent, downstream attenuation behaviour, and potential impacts on receptors relevant to the consequence category assessment.

3.8.4 Sunny Day Failure (SDF)

Figures A1 to A3 present the maximum flood depth mapping for the Sunny Day Failure (SDF) scenario, including the baseline and rheological sensitivity cases.

Under all SDF cases, inundation is confined to the immediate downstream environment along the unnamed tributary of Sandy Creek. The breach outflow remains largely channelised, with limited overbank spreading. Depths are greatest immediately downstream of the TSF breach and attenuate progressively with distance.

In the baseline case (Scenario A), the predicted runout extends to the confluence with Sandy Creek but does not meaningfully propagate beyond this point. The mobile case (Scenario B) produces marginally greater local spreading, while the resistive case (Scenario C) results in reduced runout extent.

Overall, the SDF modelling indicates that although tailings release would result in localised downstream inundation, the effects are limited to the immediate receiving environment and attenuate prior to entering the broader Sandy Creek system. Figures A1 to A3 show the inundation maps from the dam break simulations for the SDF scenario. As discussed in

Section 3.7.3.5, SDF scenario includes baseline case and two sensitivity cases to bound the extent of runout due to uncertainty in tailings rheological parameters used for non-Newtonian modelling

3.8.5 Flood Failure (FF)

Flood Failure (FF) scenarios were assessed for two extreme events: the 1 in 100,000 AEP and the PMF. For each event, maximum flood depth, maximum velocity, hydraulic hazard (D × V), and afflux (incremental water level increase due to breach) were mapped. These outputs are presented in **APPENDIX A** (Figures A4–A17).

3.8.6 Maximum Flood Depth

Under both FF events, inundation extent is primarily governed by catchment flood behaviour. The TSF breach results in a noticeable increase in flood depth immediately downstream of the TSF; however, this incremental effect reduces progressively with distance due to routing, floodplain storage and flows from other areas of the catchment.

For the 1 in 100,000 AEP event, localised increases in flood depth are observed along the downstream corridor, with limited extension beyond the established floodplain envelope.

For the PMF event, flood depths are dominated by the magnitude of catchment inflows. While breach-related increases are evident near the TSF, the proportional contribution at Georgetown is small relative to the overall PMF flood depth.

3.8.7 Maximum Flood Velocity

Side-by-side comparison of the “No TSF Breach” and “With TSF Breach” models for the Georgetown area under the Flood Failure (FF) scenario indicates that peak velocities are primarily governed by the Sandy Creek channel and established floodplain flow paths.

For both the 1 in 100,000 AEP (Figure A16) and PMF (Figure A17) events, the highest velocities remain confined to the main channel corridor. Under the PMF event in particular, velocities are dominated by catchment inflows, with only minor and localised increases attributable to the TSF breach.

Overall, the modelling demonstrates that inclusion of the TSF breach does not materially alter the velocity regime within Georgetown, with flood behaviour controlled predominantly by regional catchment hydrology.

3.8.8 Hydraulic Hazard (D × V)

Hydraulic hazard mapping (depth × velocity) indicates that the highest hazard zones are concentrated within defined flow paths and established channel corridors.

For both FF events, downstream hazard conditions reflect the combined influence of regional catchment flood energy and the TSF breach outflow. Consistent with the velocity results presented in Section 3.8.7, the incremental increase in hazard attributable to the breach diminishes with distance downstream as flows attenuate and become dominated by catchment-driven flooding.

Within the Georgetown township, hazard levels are primarily governed by baseline flood behaviour. Breach-related changes are spatially limited and do not materially alter the overall hazard distribution.

3.8.9 Afflux Mapping (Incremental Water Level Increase)

Afflux mapping provides a direct representation of the incremental hydraulic impact of the TSF breach relative to the flood-only condition.

For the 1 in 100,000 AEP event, afflux values are most pronounced within the downstream channel corridor and reduce toward Georgetown.

For the PMF event, afflux is generally minor across the broader floodplain due to the dominance of catchment flows under extreme conditions.

The afflux outputs are used to identify areas where breach-related increases in water level occur and form an input to the subsequent consequence assessment presented in Section 5.

3.8.10 Overall Outcome – Flood Failure Scenarios

The FF modelling indicates that:

- Significant hydraulic changes occur in the immediate downstream reach of the TSF;
- Incremental breach impacts attenuate progressively along the 8 km reach to Georgetown; and
- Within the Georgetown area, flood behaviour is predominantly controlled by catchment-scale flooding rather than breach-related flow.

It is noted that the current assessment does not extend to flooding of the Etheridge River during the modelled events. During a major storm event, depending on the timing and magnitude of rainfall across the broader catchment, elevated river levels may generate

tailwater effects at the confluence with the creek. This could influence water levels and flow conditions within the lower reaches of the creek compared to those presented in this report.

In such circumstances, increased tailwater from the river would tend to reduce the velocity and downstream conveyance capacity of the creek, potentially increasing backwater levels locally. However, the elevated downstream water levels would also act to attenuate the incremental hydraulic impact of the TSF breach by reducing the additional energy gradient and limiting further downstream propagation of breach-related flow. Accordingly, the presence of high river levels is expected to reduce the incremental impact attributable solely to the TSF breach.

The hydraulic outputs presented in this section provide the quantitative basis for assessment of downstream receptors and consequence classification in later chapters.

3.9 Conservatism and Uncertainty

Consistent with ANCOLD guidance, this assessment has adopted a conservative approach.

Key sources of uncertainty include:

- Use of empirical breach equations;
- Resolution and accuracy of terrain data;
- Hydrologic variability;
- Simplified representation of tailings behaviour; and
- Assumptions regarding downstream roughness.

These uncertainties have generally been addressed through conservative assumptions, which are appropriate for consequence assessment purposes.

3.10 Limitations

This Dam Break Analysis (DBA) and Consequence Category Assessment (CCA) has been undertaken to support consequence classification of the Phase 2 TSF Expansion and should be interpreted in that context. The assessment does not constitute a detailed design-level failure analysis or quantitative risk assessment.

- **Breach Parameters**
  Breach geometry and development parameters were derived using empirical relationships (Froehlich methodology), which involve inherent uncertainty and are not site-specific. Actual breach dimensions and formation timing may differ from those adopted in the modelling.
- **Failure Representation**
  The breach development process has been simplified as a time-dependent erosion of the

embankment crest. Detailed geotechnical failure mechanisms, progressive instability, or structural deformation processes have not been explicitly modelled.

- **Tailings Behaviour**
  For the Sunny Day Failure (SDF) scenario, breach outflow was modelled as a non-Newtonian fluid using adopted rheological parameters. For the Flood Failure (FF) scenario, the outflow was modelled as Newtonian (water-type) flow to represent dilution and entrainment effects. Sediment transport, deposition, and post-depositional geomorphic processes were not explicitly modelled.
- **Topographic Data**
  Terrain inputs were based on available digital elevation models (SRTM and site survey data). These datasets may not capture fine-scale topographic features, small drainage paths, or localised obstructions.
- **Hydraulic Parameters**
  Manning's roughness coefficients were assigned based on representative land use classifications and applied uniformly within each mapped class.
- **Scope of Assessment**
  The assessment considers the consequences of a hypothetical failure and does not evaluate the probability of failure or overall dam safety risk.

These limitations are consistent with the objectives of a consequence category assessment and with common industry practice for dam break studies.

4 ENVIRONMENTAL ASSESSMENT

Environmental values with respect to surface waters and groundwater of the receiving environment have been detailed in the Wulguru Technical Services Report (WTS, 2024) **[16]**.

A summary is provided in the following sections.

4.1 Environmental Values – Surface Waters

Although no specific environmental values or water quality objectives are identified for the Einasleigh or Gilbert Rivers under Schedule 1 of the *Environmental Protection (Water) Policy 2009*, the following values are considered relevant to the Project area based on regional context and land use:

- **Aquatic Ecosystems**: Protection of aquatic biodiversity, ecological processes, and habitats in surface and groundwater systems including rivers, wetlands, and riparian zones.
- **Farm Water Use**: Suitability of water for non-potable farm applications such as produce preparation and laundry.
- **Stock Watering**: Water quality adequate to support healthy livestock.
- **Primary Recreation**: Protection of human health during full-body contact with water (e.g., swimming, diving, waterskiing).
- **Secondary Recreation**: Protection of human health during indirect water contact (e.g., boating, fishing).
- **Visual Recreation**: Maintenance of visual amenity for activities like walking and picnicking near waterways.
- **Drinking Water Supply**: Suitability of raw water sources for minimal-treatment potable supply.
- **Industrial Use**: Water suitability for industrial applications including mining and mineral processing.
- **Cultural and Spiritual Values**: Recognition of Indigenous and non-Indigenous heritage, including traditional practices, symbolic associations with waterways, and lifestyle connections such as agriculture and fishing.

4.2 Environmental Values – Groundwater

No specific environmental values (EVs) are defined in existing guidelines for the Gilbert River Basin. In the absence of basin-specific EVs, default values from Part 3 of the Environmental Protection (Water) Policy have been adopted. These include:

- **Ecological Integrity:** Preservation of the biological integrity of aquatic ecosystems across a spectrum of conditions, from high ecological value (unmodified) to highly disturbed (measurably degraded).
- **Aquatic Food Production:** Suitability of groundwater for producing aquatic foods intended for human consumption.
- **Aquaculture:** Suitability of water for aquacultural activities.
- **Agricultural Use:** Suitability of groundwater for agricultural purposes.
- **Recreational and Aesthetic Use:**
    - Primary contact recreation (e.g., swimming),
    - Secondary contact recreation (e.g., boating),
    - Visual amenity (e.g., viewing water features).
- **Drinking Water Supply:** Suitability of groundwater for potable use, considering the level of treatment required.
- **Industrial Use:** Appropriateness of groundwater for industrial applications.
- **Cultural and Spiritual Values:** Recognition of the cultural, spiritual, and traditional significance of groundwater for Indigenous and non-Indigenous communities.

4.3 Desktop Review

According to the requirements of the Manual **[1]**, a desktop assessment of Significant Values in the broader region of the Project site identified several Matters of National Environmental Significance (MNES) **[17]**, Matters of State Environmental Significance (MSES) **[18]** and High Ecological Value (HEV) **[18]**.

4.4 Assessment Criteria

The environmental assessment is in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (DETSI, 2024) **[1]**. Following the Manual,

the Consequence Category Assessment (General Environmental Harm) is concerned with effects to areas with 'Significant values' and 'Moderate Values'. The values are defined as follows:

- Significant Values
    - Matters of National Environmental Significance (MNES)
    - Matters of State Environmental Significance (MSES)
    - High Ecological Value (HEV) waters as per the Queensland Environmental Protection (Water) Policy 2009 (EPP Water)
- Moderate Values
    - Slightly or moderately disturbed waters as per the EPP Water
    - Wetland of general ecological significance (GES) as mapped on the Queensland Government referable wetland mapping
    - Riverine areas, springs or lakes and associated flora and fauna.

4.5 Summary of Environmental Assessment

The Department of Climate Change, Energy, the Environment and Water (DCCEEW) provides the Protected Matters Search Tool (PMST) to identify the presence of Matters of National Environmental Significance (MNES) under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The results of the PMST search for the project area are summarised below.

4.5.1 Matters of National Environmental Significance

4.5.1.1 Threatened Ecological Communities

No Threatened Ecological Communities (TECs), as defined under the EPBC Act, were identified as likely to occur within a 10 km or 50 km radius of the project site based on the desktop assessment.

4.5.1.2 Threatened Species

The desktop assessment identified a total of twenty (20) and thirty-five (35) threatened fauna species as potentially occurring within a 10 km and 50 km radius of the project site, respectively.

It should be noted that the presence of these species in the PMST results does not confirm their occurrence in the immediate receiving environment. Some species may be located in areas upstream of the project site or within adjacent catchments, such as the Four Mile

Creek catchment to the west. TABLE 8 lists all Extinct in the Wild (EW), Endangered (E) and Critically Endangered (CE) Fauna species recorded from database searches, and their status under EPBC Act. No Threatened E or EC Flora species were encountered during the survey in 10km radius buffer of the project.

TABLE 8 MNES LISTED FAUNA SPECIES WITHIN 10 KM AND 50 KM OF THE PROJECT

Common Name	Status†	Buffer 10km radius	Presence Type*	Buffer 50km radius	Presence Type*
Threatened Birds					
Curlew Sandpiper	CE	Yes	may occur	Yes	known to occur
Gouldian Finch	E	Yes	may occur	Yes	known to occur
Red Goshawk	E	Yes	may occur	Yes	known to occur
Red Goshawk	E	Yes	may occur	Yes	known to occur
Australian Painted Snipe	E	Yes	may occur	Yes	likely to occur
Star Finch (eastern), Star Finch	E	No	-	Yes	likely to occur
Common Greenshank, Greenshank	E	Yes	May occur	Yes	May occur
Threatened Mammal					
Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji	E	Yes	may occur	Yes	likely to occur
Koala	E	No	-	Yes	known to occur
Spectacled Flying-fox	E	No	-	Yes	may occur
Threatened Plant					
Salt Pipewort, Button Grass	E	No	-	Yes	known to occur
Lesser Swamp-orchid	E	No	-	Yes	known to occur
Threatened Reptile					
Mertens' Water Monitor, Mertens's Water Monitor	E	Yes	likely to occur	Yes	known to occur

Lyon's Grassland Striped Skink, Lyon's Snake-eyed Skink	CE	No	-	Yes	known to occur

† Notes to conservation status: EW = Extinct in the Wild, E = Endangered, CE = Critically Endangered.

* The presence of species in the PMST results is categorised under the EPBC Act as “known”, “likely”, or “may occur”, based on the availability and quality of data for the receiving environment.

The MNES reports generated for the site are included in **APPENDIX B**.

4.5.2 Matters of State Environmental Significance

4.5.2.1 Watercourse and Wetland

There are no wetland protection areas, wetlands of high ecological significance or wetlands of international importance mapped at the site or surrounds.

4.5.2.2 Protected Wildlife Habitat and Essential Habitat

Two (2) areas of MSES have been mapped to the southeast of the site as follows (Figure 9):

- Threatened (endangered or vulnerable) wildlife approximately 500m from the site
- Essential habitat for regulated vegetation approximately 700m from the site, but it is located in the areas upstream of the site.

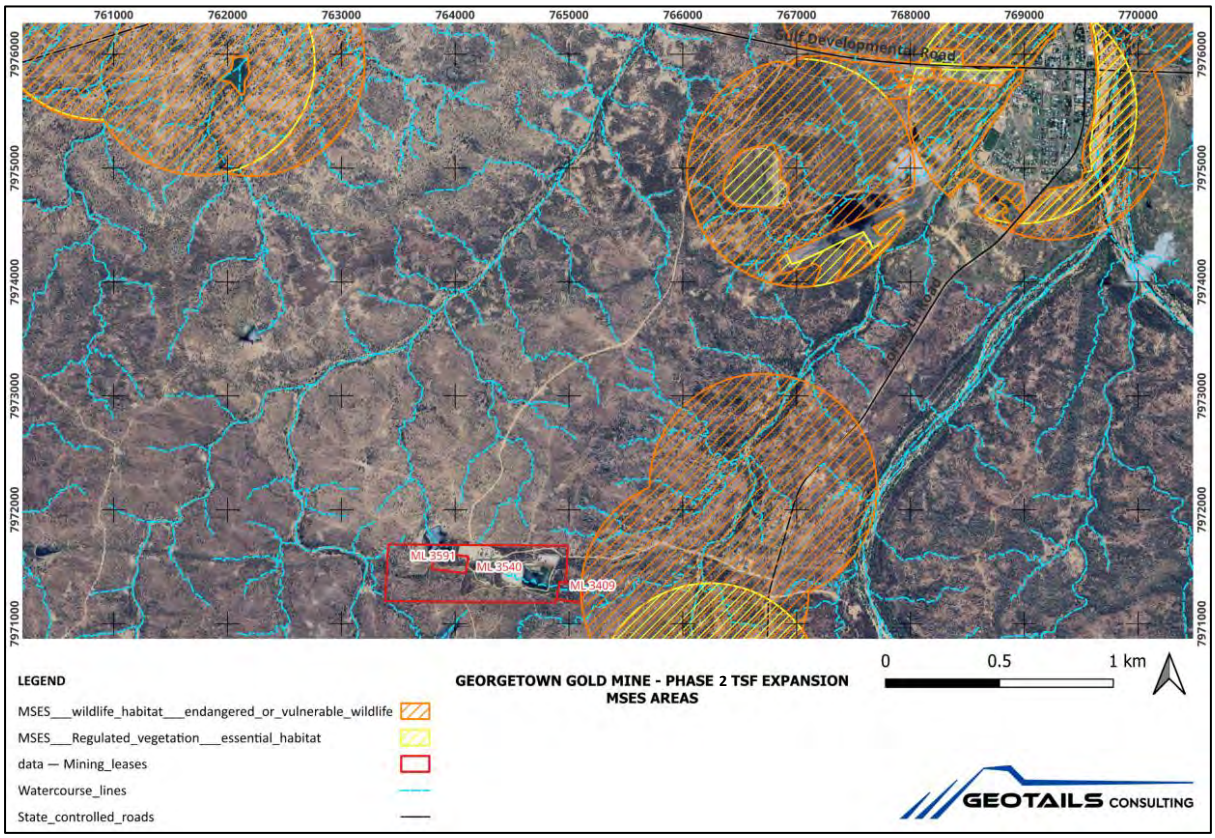


FIGURE 9 MSES AREA (QLD GLOBE 2025)

APPENDIX C contains the MSES report generated for the site.

4.5.2.3 Biodiversity and Conservation Values

The assessment identified areas of State biodiversity significance (43.5% of the AOI), including “Of Concern” regional ecosystems (3.6%). Riverine wetlands associated with Sandy Creek cover the site and hold high to medium aquatic conservation value. No threatened species were recorded within 4 km of the site, though several priority flora and fauna species were identified. Riparian areas within the AOI provide important wildlife refugia, species richness, and habitat diversity.

APPENDIX D provides the Biodiversity and Conservation Values for the site with 2 km buffer.

4.5.2.4 Regional Ecosystems

Within the Area of Interest (AOI), six remnant regional ecosystems were identified, covering 99.9% of the site. Of these, one ecosystem (*RE 9.3.13*, riparian forest) is classified as “Of Concern” (3.6% of AOI), with the remainder classified as “No Concern at Present”. Several ecosystems provide potential habitat for NCA-listed species, and the riparian RE is noted for its role as a drought refuge and wildlife corridor. Representation in protected areas ranges from low to medium across the ecosystems.

APPENDIX E provides the Regional Ecosystem mapped for the site with 2 km buffer.

4.5.2.5 Environmentally Sensitive Areas

There are no Environmentally Sensitive Areas (ESAs) mapped within 20 km of the site. **APPENDIX F** presents the ESA map for the Project.

4.5.2.6 Groundwater Dependent Ecosystem

A review of the Atlas of Groundwater Dependent Ecosystems (GDE) in the Queensland Globe tool (https://qldglobe.information.qld.gov.au/) indicated no GDE within the project area.

5 CONSEQUENCE CATEGORY ASSESSMENT

This section presents the Consequence Category Assessment (CCA) undertaken for the proposed Phase 2 Tailings Storage Facility (TSF) configuration, with embankment crest raised to RL 326 m.

As outlined in **Section 1.4**, the CCA has been completed in accordance with:

- *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (DETSI, 2024) **[1]**; and
- *Guidelines on the Consequence Categories for Dams* (ANCOLD, October 2012) **[2]**.

The assessment is informed by the results of the detailed Dam Break Analysis (DBA) undertaken for the proposed Phase 2 configuration (refer **Section 3**). The DBA outputs, including flood depths, velocities, hazard mapping and downstream impact extents, form the technical basis for consequence classification under credible failure scenarios.

5.1 Previous Consequence Category Assessment

The most recent Consequence Category Assessment for the current TSF crest level (RL 323 m) was undertaken by GeoTails Consulting (GTC, 2025)**[11]**.

The Phase 1 scope comprised:

- The existing TSF configuration; and
- The proposed Western Cutback expansion to the west of the TSF.

A simplified dam breach analysis was undertaken to estimate the potential downstream impact area under credible failure scenarios, incorporating site-specific topography, catchment characteristics and downstream receptors.

The assessment was completed in accordance with DETSI Manual and considered three failure scenarios: seepage, overtopping, and dam break, under both Sunny Day and Flood Failure conditions.

Based on the Manual's criteria and the identified downstream impacts, the Phase 1 TSF expansion was assigned an overall consequence category of **"Significant"** and is therefore classified as a regulated structure under the applicable Queensland regulatory framework.

5.2 Requirement for Reassessment - Phase 2 TSF (RL 326 m)

Although the Phase 1 TSF configuration (RL 323 m) was assigned a consequence category of **Significant**, the proposed Phase 2 upstream raise to RL 326 m represents a material change to the structure and therefore necessitates reassessment.

In accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (DETSI, 2024) and ANCOLD (2012), a Consequence Category Assessment must be reviewed where:

- There is an increase in embankment height;
- There is an increase in stored volume;
- There is a change in potential breach characteristics; or
- There is potential for increased downstream impact extent.

The proposed 3 m upstream raise results in:

- Increased stored tailings volume;
- Increased stored water volume under operational and flood conditions;
- Increased potential breach outflow hydrograph magnitude; and
- Potentially greater downstream inundation depths and velocities.

Accordingly, a detailed Dam Break Analysis (3) has been undertaken for the Phase 2 configuration to reassess downstream consequences and confirm the appropriate consequence category classification.

5.3 Population at Risk (PAR)

In accordance with ANCOLD (2012)**[2]**, Population at Risk (PAR) is defined as all people who would be directly exposed to the failure impact zone, assuming no evacuation or protective action. For consequence classification, the assessment considers the incremental impact attributable to the TSF breach relative to background conditions.

A hypothetical TSF breach would discharge into an unnamed tributary, travel approximately 1.8 km to Sandy Creek, and then continue approximately 6.5 km toward Georgetown before entering the Etheridge River. Identified infrastructure, buildings, and the Georgetown township within the modelled failure impact zone are shown in

Figure 1 regional drainage system

. The downstream corridor between the TSF and Georgetown is predominantly rural with limited permanent population. Transient presence (e.g. mine personnel or pastoral activities) cannot be excluded but is expected to be low.

- **Sunny Day Failure (SDF) Scenario**

Model results for the Sunny Day Failure (SDF) scenario (Figures A1–A3) indicate that no residential or occupied structures are located within the predicted failure impact zone.

Accordingly, no people are expected to be directly exposed to breach flows under SDF conditions.

Therefore, PAR for the SDF scenario is assessed as zero.

- **Flood Failure (FF) Scenario**

Table 9 summarises buildings located within the modelled inundation extent and subject to incremental afflux under the Flood Failure (FF) scenario.

Model results (Figure 14-15) indicate that breach-generated afflux is minor relative to background extreme flood conditions. For the 1 in 100,000 AEP event, incremental increases in peak water level are generally less than 0.1 m, with a maximum localised increase of approximately 0.2m. For the PMF event, incremental afflux is negligible (<0.1 m).

Incremental afflux affects a short (~80 m) section of National Highway 1, with a maximum increase of ~0.15 m. Based on typical travel speeds, exposure duration is minimal and the likelihood of coincident vehicle presence is negligible.

These results demonstrate that, during extreme storm events, the additional flood impact attributable to the TSF breach is minimal and does not materially alter existing flood hazard conditions. Accordingly, there is no increase in PAR above that associated with background flooding under the FF scenario.

TABLE 9 BUILDINGS SUBJECT TO INCREMENTAL AFFLUX

Event	Description	Number	Afflux < 0.1m	0.1m <Afflux < 0.2m
1 in 100,000 AEP	Residential	6	4	2
	Other	1	-	1
PMF	Residential	19	19	0
	Other	2	2	0

Overall PAR Assessment

Based on the above, the incremental Population at Risk attributable to a hypothetical TSF breach is assessed as:

- Sunny Day Failure (SDF): PAR = 0
- Flood Failure (FF): Zero incremental PAR

This assessment excludes transient road users and short-duration local traffic; however, given low traffic volumes and short exposure duration, the probability of coincident presence during peak breach flows is considered low.

5.4 Potential Loss of Life (PLL)

Given that Population at Risk (PAR) is assessed as zero for both the Sunny Day Failure (SDF) and Flood Failure (FF) scenarios, the Potential Loss of Life (PLL) attributable to a hypothetical TSF breach is also assessed as zero.

Accordingly, no further life-loss analysis is required.

5.5 DETSI CCA Assessment

5.5.1 Overview

Dams, water storages, and other land-based containment structures associated with Environmentally Relevant Activities (ERAs), as defined under the Environmental Protection Act 1994, are subject to a Consequence Category Assessment (CCA). The benchmark reference relevant to consequence assessment and definition for design criteria is *the Manual* (DETSI, 2024).

The purpose of *The Manual* is to:

- Guide the assessment of the Consequence Category of all structures constructed as part of activities that require an EA or development approval;
- Guide the determination of the structure that requires formal documentation; and,
- Provide approved methods for specifying the design performance and monitoring requirements for those structures.

Based on the Manual, dams or containment structures classified as ‘Significant’ or ‘High’ consequence are referred to as regulated, with criteria relevant to performance of these structures applied as per DETSI’s guidelines.

5.5.2 Methodology

Assessment criteria for Consequence Category assessments are based on the following failure event scenarios according to the Manual (DETSI 2024):

(a)	‘Failure to contain – seepage’	Spills or releases to ground and/or groundwater via seepage from the floor and/or sides of the structure.

(b) 'Failure to contain – overtopping'	Spills or releases from the structure that result from loss of containment due to overtopping of the structure.
(c) 'Dam Break'	Collapse of the structure due to any possible cause.

In accordance with the Manual, assessment of the "Failure to Contain - Seepage" scenario is applicable to new structures. As the TSF is an existing approved structure, a standalone seepage failure assessment is not required.

The consequence classification criteria adopted from the Manual are reproduced in TABLE 10.

TABLE 10 CONSEQUENCE CATEGORY ASSESSMENT CRITERIA (DETSI 2024) [1]

Environmental Harm	Consequence Category		
	High	**Significant**	**Low**
Harm to Humans	Location such that people are routinely present in the failure path and if present loss of life to greater than 10 people is expected[8]. Note: The requirement to consider the location of people in the failure path is only relevant to the 'dam break' scenario.	Location such that people are routinely present in the failure path and if present loss of life to 1 person or greater but less than 10 people is expected[7]. Note: The requirement to consider the location of people in the failure path is only relevant to the 'dam break' scenario.	Location such that people are not routinely present in the failure path and loss of life is not expected[7]. Note: The requirement to consider the location of people in the failure path is only relevant to the 'dam break' scenario.
	Location such that contamination of waters (surface and/or groundwater[9]) used for human consumption could result in the health of 20 or more people being affected[10].	Location such that contamination of waters (surface and/or groundwater[8]) used for human consumption could result in the health of 10 or more people but less than 20 people being affected[9].	Location such that contamination of waters (surface and/or groundwater[8]) used for human consumption could result in the health of less than 10 people being affected[9].
General environmental harm	Location such that: a) Contaminants may be released to areas of MNES, MSES or HEV waters that are not already authorised to be disturbed to at least the same extent under other conditions of this authority subject to any applicable offset commitment (Significant Values); and b) Adverse effects[11] on Significant Values are likely; and c) The adverse effects[10] are likely to cause at least one of the following: i) loss or damage or remedial costs greater than $50,000,000; or ii) remediation of damage is likely to take 3 years or more; or iii) permanent alteration to existing ecosystems; or iv) the area of damage (including downstream effects) is likely to be at least 5 km².	Location such that contaminants may be released so that adverse effects[10] (that are not already authorised to be disturbed to at least the same extent under other conditions of the authority subject to any applicable offset commitment) either: a) Would be likely to be caused to Significant Values but those adverse effects[10] would not be likely to meet the thresholds for the High Consequence Category and instead would be likely to cause at least one of the following: i) loss or damage or remedial costs greater than $10,000,000 but less than $50,000,000; or ii) remediation of damage is likely to take more than 6 months but less than 3 years; or iii) significant alteration to existing ecosystems; or iv) the area of damage (including downstream effects) is likely to be at least 1km2 but less than 5 km². or b) Would be likely to be caused to environmental values classed as slightly or moderately disturbed waters[12], wetland of general ecological significance[13], riverine areas, springs or lakes	a) Location such that either: a) Contaminants are unlikely to be released to areas of Significant Values or Moderate Values; or b) b) Contaminants are likely to be released to those areas, but would be unlikely to meet any of the minimum thresholds specified for the Significant Consequence Category for adverse effects[10]

Environmental Harm	Consequence Category		
	High	Significant	Low
		and associated flora and fauna (Moderate Values), and the adverse effects[10] are likely to cause at least one of the following: i) loss or damage or remedial costs greater than $20,000,000; or ii) remediation of damage is likely to take more than 1 year; or iii) significant alteration to existing ecosystems; or (iv) the area of damage (including downstream effects) is likely to be at least 2 km².	
General economic loss or property damage	Location such that harm (other than a different category of harm as specified above) to third party assets in the failure path would be expected to require $10 million or greater in rehabilitation, compensation, repair or rectification costs[14].	Location such that harm (other than a different category of harm as specified above) to third party assets in the failure path would be expected to require $1 million and greater but less than $10 million in rehabilitation, compensation, repair or rectification costs[13].	Location such that harm (other than a different category of harm as specified above) to third party assets in the failure path would be expected to require less than $1 million in rehabilitation, compensation, repair or rectification costs[13] .

7 To be used for all failure event scenarios

8.'People routinely present in the failure path' could be considered to be people who occupy buildings or other places of occupation that lie within the failure impact zone. For the purposes of this Manual, this should refer to people other than site personnel engaged by the resource operation and located on the tenements and tenure associated with the resource operation; for other ERAs, it would be the 'premises referred to in the authority'. It should be noted that while this is appropriate for the assessment of consequence categories in accordance with this Manual, adherence to the requirements of this Manual does not limit, amend or change in any way, any other requirements to be complied with under relevant health and safety acts or legislation that requires the safety of site personnel to be considered.

9 When considering potential impacts on groundwater, it is not envisaged that a full hydrogeological assessment will be required in all cases. Any consideration of potential impacts on groundwater systems should consider the water quality of the potential receiving aquifer as well as the quality of fluid stored in the regulated dam. Existing groundwater drawdown in areas surrounding resource operations (e.g. drawdown as a result of mine pit or underground mine dewatering) can also be considered when assessing the consequence of dam seepage on groundwater systems.

10 'An adverse effect on human health means a physiological effect on human health and does not include an impact on the quality of downstream water that merely negatively affects taste and which is unlikely to cause persons to become physically ill.

11 Adverse effects include chronic and acute effects where an acute effect is on living organism/s which results in severe symptoms that develop rapidly, and a chronic effect is an adverse effect on a living organism/s which develops slowly. In some instances, it may be necessary to carry out or reference existing ecological/toxicological studies to assess the impacts of contaminants on living organisms.

12 See Water EPP for definitions

13 Wetland of general ecological significance' means a wetland shown on a map of referable wetland as a 'general ecologically significant wetland' or 'wetland of other environmental value'.

14 This does not include the holder's own mine or gas production, on-site industrial or commercial assets, the holder's workers' accommodation, agricultural facilities on the holder's land such as a farm shed or farm dam or infrastructure solely for servicing the

5.5.3 Consequence Category Assessment

The Consequence Category Assessment for the Phase 2 TSF Expansion is provided in TABLE 11.

TABLE 11 CONSEQUENCE CATEGORY ASSESSMENT- PHASE 2 TSF EXPANSION (EMBANKMENT CREST RL 326M)

Environmental Harm	Consequence Category		
	Failure to Contain - Seepage	**Failure to Contain – Overtopping**	**Failure to Contain - Dam Break**
Harm to Humans	The Georgetown TSF is an existing approved facility and the proposed Phase 2 works comprise a raise of the existing embankment rather than construction of a new structure. In accordance with the DETSI (2024) Manual, a standalone Failure to Contain - Seepage consequence assessment is not required for an existing facility. **Consequence Category**: **Not Applicable**	The zone of potential influence of uncontrolled release of contaminated water (by overtopping) would include the historic Black Blow pit and drainage line located to the southeast of the TSF. Under this condition, contamination of surface water or groundwater used human consumption would not result in the health of more than 10 people being affected. **Consequence Category: LOW.**	Based on Sections 5.3 and 5.4, PAR is assessed as zero under the Sunny Day Failure (SDF) scenario and zero incremental PAR under the Flood Failure (FF) scenario. Accordingly, PLL is zero. In accordance with the DETSI (2024) Manual (excluding site personnel), no loss of life is expected. **Consequence Category: LOW.**
General environmental harm	The Georgetown TSF is an existing approved facility and the proposed Phase 2 works comprise a raise of the existing embankment rather than construction of a new structure. In accordance with the DETSI (2024) Manual, a standalone Failure to Contain - Seepage consequence assessment is not required for an existing facility. **Consequence Category**: **Not Applicable**	A hypothetical TSF breach would discharge to an unnamed tributary, Sandy Creek and downstream riverine systems, intersecting mapped environmental values including aquatic and riparian habitats. Release of tailings and supernatant water has the potential to cause degradation of water quality, sediment deposition and disturbance to downstream ecosystems. Consistent with Clause (a) of the DETSI (2024) Manual, such impacts may result in significant alteration of localised ecosystems and remediation periods exceeding six months; however, the predicted scale and magnitude of impact are not expected to meet the thresholds for the High Consequence Category. Accordingly, the environmental consequence for Failure to Contain - Dam Break is assessed as SIGNIFICANT. **Consequence Category : SIGNIFICANT.**	Under a Sunny Day Failure (SDF) scenario, release of up to approximately 68 ML may occur, with a modelled runout distance of approximately 1.8 km and potential minor interaction with Sandy Creek. Under a Flood Failure (FF) scenario, up to approximately 370 ML may be released, with modelled downstream influence extending toward the Etheridge River (approximately 9 km). While incremental afflux in Sandy Creek is minor relative to background extreme flood conditions, discharge to receiving waters may result in elevated turbidity, sediment deposition and disturbance to aquatic and riparian ecosystems. Consistent with Clause (a) of the DETSI (2024) Manual, such impacts could result in measurable ecosystem disturbance and remediation extending beyond six months; however, the predicted scale and magnitude of impact are not expected to meet the thresholds for the High Consequence Category. Accordingly, the Failure to Contain - Dam Break consequence category is assessed as SIGNIFICANT. **Consequence Category : SIGNIFICANT.**

Environmental Harm	Consequence Category		
	Failure to Contain - Seepage	**Failure to Contain – Overtopping**	**Failure to Contain - Dam Break**
General economic loss or property damage	The Georgetown TSF is an existing approved facility and the proposed Phase 2 works comprise a raise of the existing embankment rather than construction of a new structure. In accordance with the DETSI (2024) Manual, a standalone Failure to Contain - Seepage consequence assessment is not required for an existing facility. **Consequence Category**: **Not Applicable**	Dam overtopping is not expected to result in impact to any third-party assets, as no third-party property or infrastructure is located within the modelled failure impact zone. Accordingly, no rehabilitation, compensation, repair or rectification costs to third parties are anticipated. **Consequence Category: LOW.**	Based on the dam break modelling results, the extent and location of the failure impact zone are not expected to result in material damage to third-party property. Any rehabilitation, compensation, repair or rectification costs associated with assets within the failure pathway are expected to be less than $1 million. **Consequence Category : LOW.**

5.5.4 Consequence Category Summary

The consequence category assessment outcomes in accordance with DETSI Manual from TABLE 11 is summarised in TABLE 12.

TABLE 12 CONSEQUENCE CATEGORY ASSESSMENT SUMMARY- PHASE 2 TSF EXPANSION

Failure Scenario	TSF
Failure to Contain – Seepage	Not Applicable
Failure to Contain – Overtopping	Significant
Failure to Contain – Dam Break	Significant
Overall	**Significant**
Regulated Structure (as defined in the Manual)	**Yes**

As shown in TABLE 12, the Phase 2 TSF Expansion has an overall consequence category of "**Significant**". In accordance with the DETSI (2024) Manual, the Phase 2 TSF is therefore classified as a Regulated Structure.

5.6 ANCOLD (2019) CCA Assessment

5.6.1 Overview

The consequence category, under the ANCOLD methodology, is determined by the severity of loss and damage during a hypothetical 'Dam Break' scenario in the following categories.

- Risk to human life expressed as either Population at Risk (PAR) or Potential Loss of Life (PLL)
- Potential Loss and Damage and Losses in terms of:
    - Cost of damage to property, commerce and infrastructure;
    - The effect on the owner's business such as dam function and operability, financial viability and credibility (corporate risk);
    - Health, social and economic disruption; and,
    - Environmental impacts.

5.6.2 Consequence Category Assessment

The Dam Failure Consequence Category is determined by evaluating the consequence of dam failure with release of water and containments through a risk assessment process. The assessment is undertaken by considering the potential failure modes of the facility and the

resulting consequence to the business, the social and natural environment and the potential loss of life as described in ANCOLD **[2]**.

A summary of the assessment is provided below, with the detailed selection of "Severity of Damage and Loss" presented in **APPENDIX G**

- **Infrastructure** - The severity of damage and loss is assessed as **Minor**. Given the local rural setting, impacts on external property, infrastructure and community assets are expected to result in repair and rehabilitation costs of less than $10 million.
- **Business Importance** - The severity is assessed as **Major**. In the event of a TSF failure, the Georgetown processing plant would likely be unable to operate until the facility is stabilised and made safe. Such a failure could significantly affect business continuity, potentially placing the overall viability of operations under serious strain. Reputational damage and increased regulatory scrutiny may also occur. As detailed financial data is not available within the scope of this study, the severity has conservatively been assessed as "Major." The ultimate financial impact should be confirmed by SVG as the asset owner.
- **Public Health** - The severity is assessed as **Minor**, as Population at Risk (PAR) has been determined to be zero (refer Section 5.3).
- **Social Dislocation** - The severity is assessed as **Minor**, as no residential community is located within the direct failure impact zone that would require relocation or extended displacement.
- **Impact Area and Duration** - The severity is assessed as **Minor**. The modelled impact area is not expected to exceed 1 km², and the period required to repair the TSF and restore site operations is expected to be less than one year.
- **Impact on the Natural Environment** - The severity is assessed as **Medium**. As outlined in Section 3.9, areas of state environmental significance occur within the potential failure pathway, including Sandy Creek and its unnamed tributary originating from the TSF. Potential impacts may include sediment deposition, increased turbidity, and disturbance to aquatic and riparian habitats. While remediation would be achievable, measurable ecosystem disturbance may occur.

The impact assessment and associated consequence category for the Phase 2 TSF is based on the aspects outlined above is summarised in Table 13.

TABLE 13 SUMMARY OF ANCOLD (2019) CONSEQUENCE OF DAM FAILURE

DAMAGE	MINOR	MEDIUM	MAJOR	CATASTROPHIC
Infrastructure (dam, houses, commerce, farms, community	<$10M	$10M-$100M	$100M-$1B	>$1B
Business Importance	Some restrictions	Significant impacts	Severe to crippling	Business dissolution bankruptcy
Public health	<100 people affected	100-1000 people affected	<1000 people affected for more than one month	>10,000 people affected for over one year
Social dislocation	<100 person or < 20 business months	100-1000 person months or 20-2000 business months	>1000 person months or >200 business months	>10,000 person months or numerous business failures
Impact Area	<1km²	<5km²	<20km²	>20km²
Impact Duration	<1 year	<5 years	<20 years	>20 years
Impact on natural environment	Damage limited to items of low conservation value (e.g. degraded or cleared land, ephemeral streams, non-endangered flora and fauna). Remediation possible.	Significant effects on rural land and local flora & fauna. Limited effects on: A. Item(s) of local & state natural heritage B. Native flora and fauna within forestry, aquatic and conservation reserves or recognized habitat corridors, wetlands or fish breeding areas.	Extensive rural effects. Significant effects on river system and areas A & B. Limited effects on: C. Item(s) of National or World natural heritage. D. Native flora and fauna within national parks, recognized wilderness area, RAMSAR wetlands and nationally protected aquatic reserves. Remediation difficult	Extensively affects areas A & B. Significantly affects areas C & D. Remediation involves significantly altered ecosystems.

5.6.3 Consequence Category

Based on the assessment presented above, the Population at Risk (PAR) for the Phase 2 TSF is zero. The highest assessed severity of damage and loss is Major, primarily reflecting potential impacts to business continuity.

In accordance with ANCOLD (2019) and as shown in Table 14, a PAR of <1 combined with a severity classification of "Major" corresponds to a "**Significant"** consequence category.

Accordingly, the Phase 2 TSF is classified as having a Significant Consequence Category under the ANCOLD framework.

TABLE 14 ANCOLD CONSEQUENCE CATEGORY

Population at Risk	Severity of Damage and Loss			
	Minor	Medium	Major	Catastrophic
<1	Very Low	Low	Significant	High C
≥1 to <10	Significant (Note 2)	Significant (Note 2)	High C	High B
≥10 to <100	High C	High C	High B	High A
≥100 to <1,000	(Note 1)	High B	High A	Extreme
≥1,000		(Note 1)	Extreme	Extreme

Note 1: With a PAR in excess of 100, it is unlikely Damage will be minor. Similarly, with a PAR in excess of 1,000 it is unlikely Damage will be classified as Medium.

Note 2: Change to "High C" where there is the potential of one or more lives being lost. The potential for loss of life is determined by the characteristics of the flood area, particularly the depth and velocity of flows.

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APPENDICES

APPENDIX A – DAM BREACH MODELLING RESULTS

764500E 765000E 765500E 766000E 766500E

7972000N

7971500N

7971000N

Depth (m)

- <= 1.0
- 1.0 - 2.0
- 2.0 - 3.0
- 3.0 - 4.0
- > 4.0

N

0 100 200 300 400 m

CRS: EPSG:28354 GDA94 / MGA zone 54

Maximum Flow Depths - Sunny-Day TSF Breach (Base Tailings Material)

Aerial imagery source: Google Earth, July 2024

SAVANNAH GOLDFIELDS
GEORGETOWN GOLD MINE

PHASE 2 TSF RAISE TO RL 326M
DAM BREAK ANALYSIS

GEOTAILS CONSULTING

FIGURE NO. A1
REVISION:A
DATE: 16/02/2026
Project No. 2201-GTG-09

764500E 765000E 765500E 766000E 766500E

Depth (m)

- <= 1.0
- 1.0 - 2.0
- 2.0 - 3.0
- 3.0 - 4.0
- > 4.0

N

7972000N

7971500N

7971000N

0 100 200 300 400 m

CRS: EPSG:28354 GDA94 / MGA zone 54

764500E 765000E 765500E 766000E 766500E

Maximum Flow Depths - Sunny-Day TSF Breach
(Mobile Tailings Material)

Aerial imagery source: Google Earth, July 2024

SAVANNAH GOLDFIELDS
GEORGETOWN GOLD MINE

PHASE 2 TSF RAISE TO RL 326M
DAM BREAK ANALYSIS

GEOTAILS CONSULTING

FIGURE NO. A2
REVISION: A
DATE: 16/02/2026
Project No. 2201-GTG-09

764500E 765000E 765500E 766000E 766500E

Depth (m)

- <= 1.0
- 1.0 - 2.0
- 2.0 - 3.0
- 3.0 - 4.0
- > 4.0

N

7972000N

7971500N

7971000N

0 100 200 300 400 m

CRS: EPSG:28354 GDA94 / MGA zone 54

764500E 765000E 765500E 766000E 766500E

Maximum Flow Depths - Sunny-Day TSF Breach (Resistive Tailings Material)

Aerial imagery source: Google Earth, July 2024

SAVANNAH GOLDFIELDS
GEORGETOWN GOLD MINE

PHASE 2 TSF RAISE TO RL 326M
DAM BREAK ANALYSIS

GEOTAILS CONSULTING

FIGURE NO. A3
REVISION: A
DATE: 16/02/2026
Project No. 2201-GTG-09

766000E

768000E

7978000N

7976000N

7974000N

7972000N

Depth (m)

<= 1.0

1.0 - 2.0

2.0 - 3.0

3.0 - 4.0

> 4.0

N

TSF

0 500 1,000 1,500 m

GDA94 / MGA zone 54 CRS: EPSG:28354

Maximum Flow Depths -1:100,000 AEP (No TSF Breach)

Aerial imagery source: Google Earth, July 2024

SAVANNAH GOLDFIELDS
GEORGETOWN GOLD MINE

PHASE 2 TSF RAISE TO RL 326M
DAM BREAK ANALYSIS

FIGURE NO. A4
REVISION: A
DATE: 16/02/2026
Project No. 2201-GTG-09

GEOTAILS CONSULTING

766000E
768000E
7978000N
7976000N
7974000N
7972000N
Depth (m)
<= 1.0
1.0 - 2.0
2.0 - 3.0
3.0 - 4.0
> 4.0
N
TSF
0
500
1,000
1,500 m
GDA94 / MGA zone 54
CRS: EPSG:28354

Maximum Flow Depths - PMF (No TSF Breach)

Aerial imagery source: Google Earth, July 2024

SAVANNAH GOLDFIELDS
GEORGETOWN GOLD MINE

PHASE 2 TSF RAISE TO RL 326M
DAM BREAK ANALYSIS

FIGURE NO. A5
REVISION: A
DATE: 16/02/2026
Project No. 2201-GTG-09

GEOTAILS CONSULTING

766000E
768000E
7978000N
7976000N
7974000N
7972000N

Depth (m)
<= 1.0
1.0 - 2.0
2.0 - 3.0
3.0 - 4.0
> 4.0

N

TSF

0 500 1,000 1,500 m

GDA94 / MGA zone 54 CRS: EPSG:28354

Maximum Flow Depths - 1:100,000 AEP (With TSF Breach)

Aerial imagery source: Google Earth, July 2024

SAVANNAH GOLDFIELDS
GEORGETOWN GOLD MINE

PHASE 2 TSF RAISE TO RL 326M
DAM BREAK ANALYSIS

FIGURE NO. A7
REVISION: A
DATE: 16/02/2026
Project No. 2201-GTG-09

GEOTAILS CONSULTING

766000E
768000E
7978000N
7976000N
7974000N
7972000N

Depth (m)
<= 1.0
1.0 - 2.0
2.0 - 3.0
3.0 - 4.0
> 4.0

N

TSF

0 500 1,000 1,500 m

GDA94 / MGA zone 54 CRS: EPSG:28354

Maximum Flow Depths - PMF (With TSF Breach)

Aerial imagery source: Google Earth, July 2024

SAVANNAH GOLDFIELDS
GEORGETOWN GOLD MINE

PHASE 2 TSF RAISE TO RL 326M
DAM BREAK ANALYSIS

FIGURE NO. A7
REVISION: A
DATE: 16/02/2026
Project No. 2201-GTG-09

GEOTAILS CONSULTING

766000E

768000E

7978000N

7976000N

7974000N

7972000N

Hazard (m²/s)

- <= 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- 1.2 - 2.0
- 2.0 - 4.0
- > 4.0

N

TSF

0 500 1,000 1,500 m

GDA94 / MGA zone 54 CRS: EPSG:28354

766000E

768000E

Maximum Hazard (D.V) - 1 in 100,000 AEP (No TSF Breach)

Aerial imagery source: Google Earth, July 2024

SAVANNAH GOLDFIELDS
GEORGETOWN GOLD MINE

PHASE 2 TSF RAISE TO RL 326M
DAM BREAK ANALYSIS

FIGURE NO. A8
REVISION: A
DATE: 16/02/2026
Project No. 2201-GTG-09

GEOTAILS CONSULTING

766000E
768000E
7978000N
7976000N
7974000N
7972000N

Hazard (m²/s)

- <= 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- 1.2 - 2.0
- 2.0 - 4.0
- > 4.0

N

TSF

0 500 1,000 1,500 m

GDA94 / MGA zone 54 CRS: EPSG:28354

Maximum Hazard (D.V) - PMF (No TSF Breach)

Aerial imagery source: Google Earth, July 2024

SAVANNAH GOLDFIELDS
GEORGETOWN GOLD MINE

PHASE 2 TSF RAISE TO RL 326M
DAM BREAK ANALYSIS

FIGURE NO. A9
REVISION: A
DATE: 16/02/2026
Project No. 2201-GTG-09

GEOTAILS CONSULTING

766000E

768000E

7978000N

7976000N

7974000N

7972000N

Hazard (m²/s)

<= 0.2

0.2 - 0.4

0.4 - 0.6

0.6 - 0.8

0.8 - 1.0

1.0 - 1.2

1.2 - 2.0

2.0 - 4.0

> 4.0

N

TSF

0 500 1,000 1,500 m

GDA94 / MGA zone 54 CRS: EPSG:28354

766000E

768000E

Maximum Hazard (D.V) - 1:100,000 AEP (With TSF Breach)

Aerial imagery source: Google Earth, July 2024

SAVANNAH GOLDFIELDS
GEORGETOWN GOLD MINE

PHASE 2 TSF RAISE TO RL 326M
DAM BREAK ANALYSIS

FIGURE NO. A10
REVISION: A
DATE: 16/02/2026
Project No. 2201-GTG-09

GEOTAILS CONSULTING

766000E

768000E

7978000N

7976000N

7974000N

7972000N

Hazard (m²/s)

<= 0.2

0.2 - 0.4

0.4 - 0.6

0.6 - 0.8

0.8 - 1.0

1.0 - 1.2

1.2 - 2.0

2.0 - 4.0

> 4.0

N

TSF

0 500 1,000 1,500 m

GDA94 / MGA zone 54 CRS: EPSG:28354

766000E

768000E

Maximum Hazard (D.V) - PMF (With TSF Breach)

Aerial imagery source: Google Earth, July 2024

SAVANNAH GOLDFIELDS
GEORGETOWN GOLD MINE

PHASE 2 TSF RAISE TO RL 326M
DAM BREAK ANALYSIS

FIGURE NO. A11
REVISION: A
DATE: 16/02/2026
Project No. 2201-GTG-09

GEOTAILS CONSULTING

766000E

768000E

7978000N

7976000N

7974000N

7972000N

Afflux (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.15
- 0.15 - 0.20
- 0.20 - 0.25
- > 0.25

N

TSF

0 500 1,000 1,500 m

GDA94 / MGA zone 54 CRS: EPSG:28354

Maximum Afflux Due to TSF Breach - 1:100,000 AEP event

Aerial imagery source: Google Earth, July 2024

SAVANNAH GOLDFIELDS
GEORGETOWN GOLD MINE

PHASE 2 TSF RAISE TO RL 326M
DAM BREAK ANALYSIS

FIGURE NO. A12
REVISION: A
DATE: 16/02/2026
Project No. 2201-GTG-09

GEOTAILS CONSULTING

766000E

768000E

7978000N

7976000N

7974000N

7972000N

Afflux (m)

<= 0.05

0.05 - 0.10

0.10 - 0.15

0.15 - 0.20

0.20 - 0.25

> 0.25

N

TSF

0 500 1,000 1,500 m

GDA94 / MGA zone 54 CRS: EPSG:28354

Maximum Afflux Due to TSF Breach - PMF event

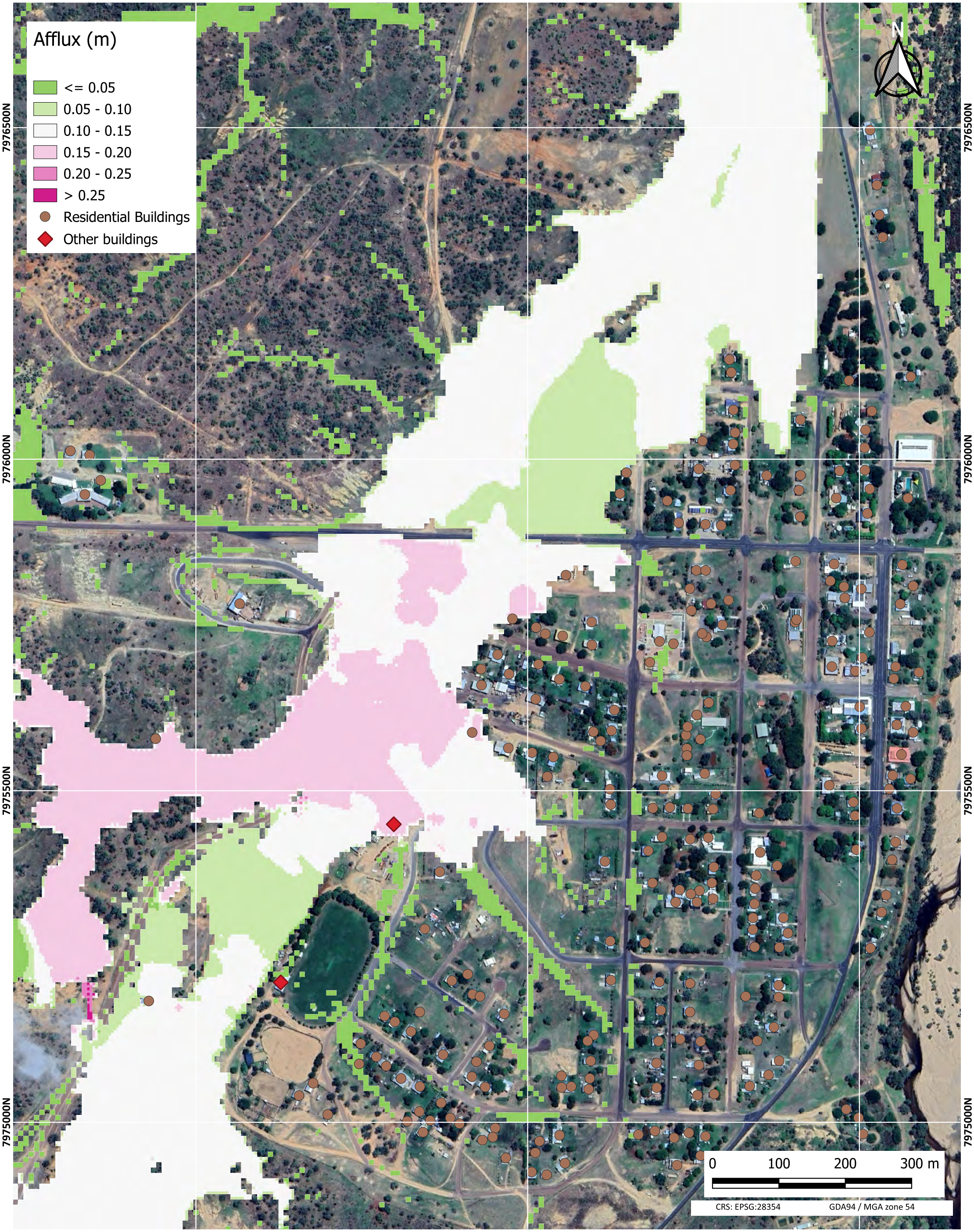
Aerial imagery source: Google Earth, July 2024

SAVANNAH GOLDFIELDS
GEORGETOWN GOLD MINE

PHASE 2 TSF RAISE TO RL 326M
DAM BREAK ANALYSIS

FIGURE NO. A13
REVISION: A
DATE: 16/02/2026
Project No. 2201-GTG-09

GEOTAILS CONSULTING



Maximum Afflux Due to TSF Breach at Georgetown - 1:100,000 AEP event

SAVANNAH GOLDFIELDS
GEORGETOWN GOLD MINE

PHASE 2 TSF RAISE TO RL 326M
DAM BREAK ANALYSIS

FIGURE NO. A14
REVISION: A
DATE: 16/02/2026
Project No. 2201-GTG-09

Aerial imagery source: Google Earth, July 2024

GEOTAILS CONSULTING

768500E 769000E 769500E

7976500N 7976000N 7975500N 7975000N

Afflux (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.15
- 0.15 - 0.20
- 0.20 - 0.25
- > 0.25
- Residential Buildings
- Other buildings

N

0 100 200 300 m

CRS: EPSG:28354 GDA94 / MGA zone 54

Maximum Afflux Due to TSF Breach at Georgetown - PMF event

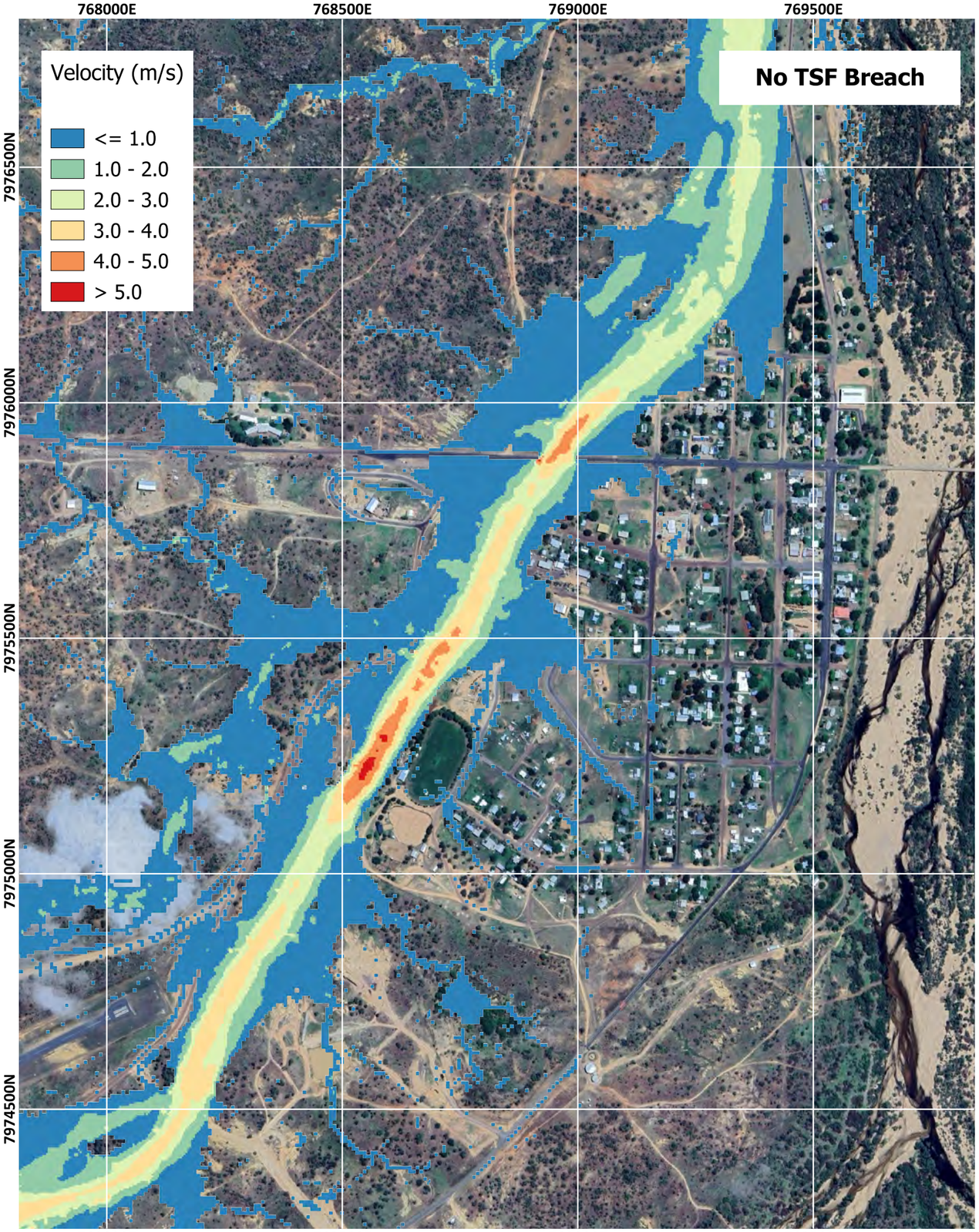
SAVANNAH GOLDFIELDS
GEORGETOWN GOLD MINE

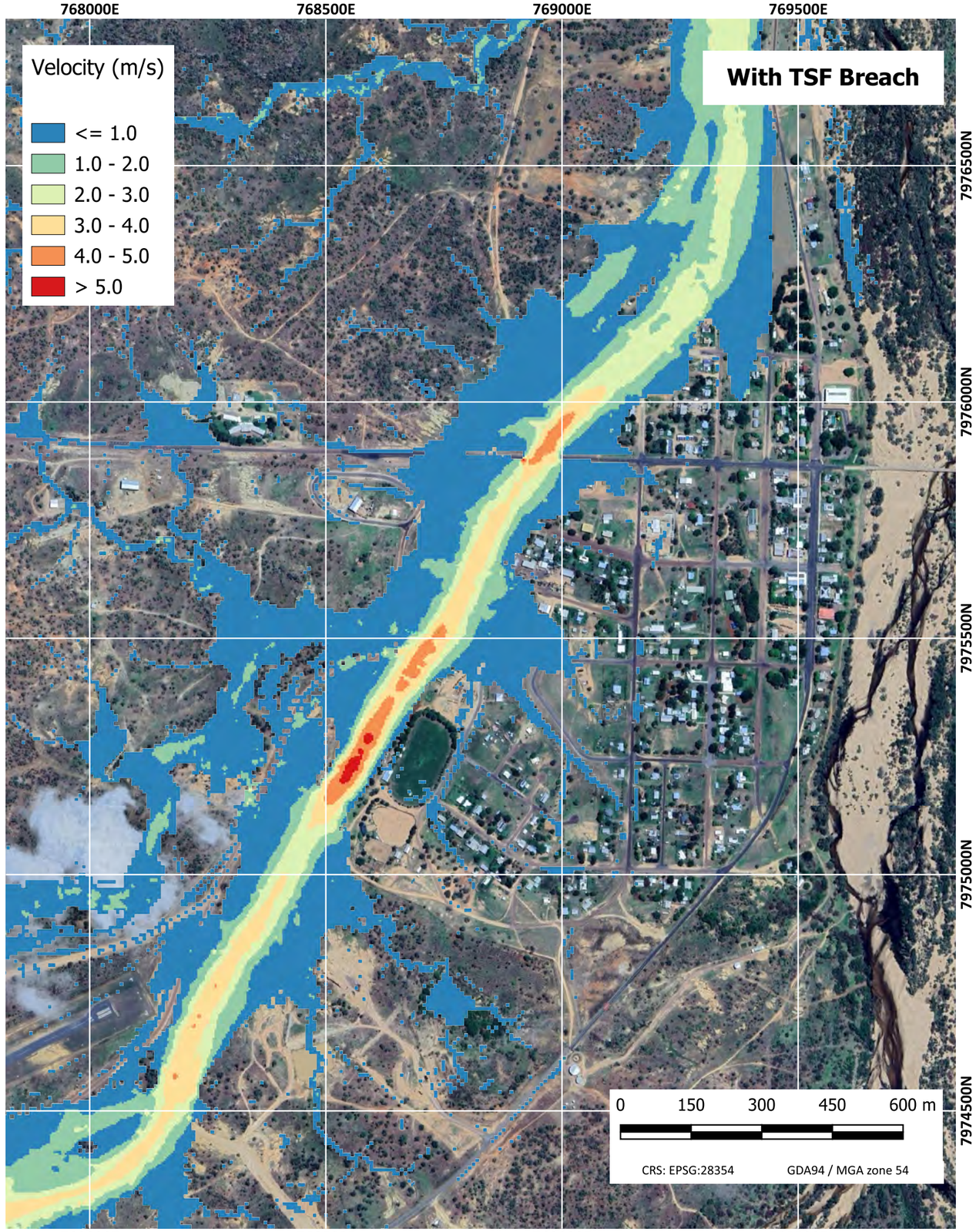
PHASE 2 TSF RAISE TO RL 326M
DAM BREAK ANALYSIS

FIGURE NO. A15
REVISION: A
DATE: 16/02/2026
Project No. 2201-GTG-09

Aerial imagery source: Google Earth, July 2024

GEOTAILS CONSULTING





Maximum Flow Velocities at Georgetown - 1:100,000 AEP

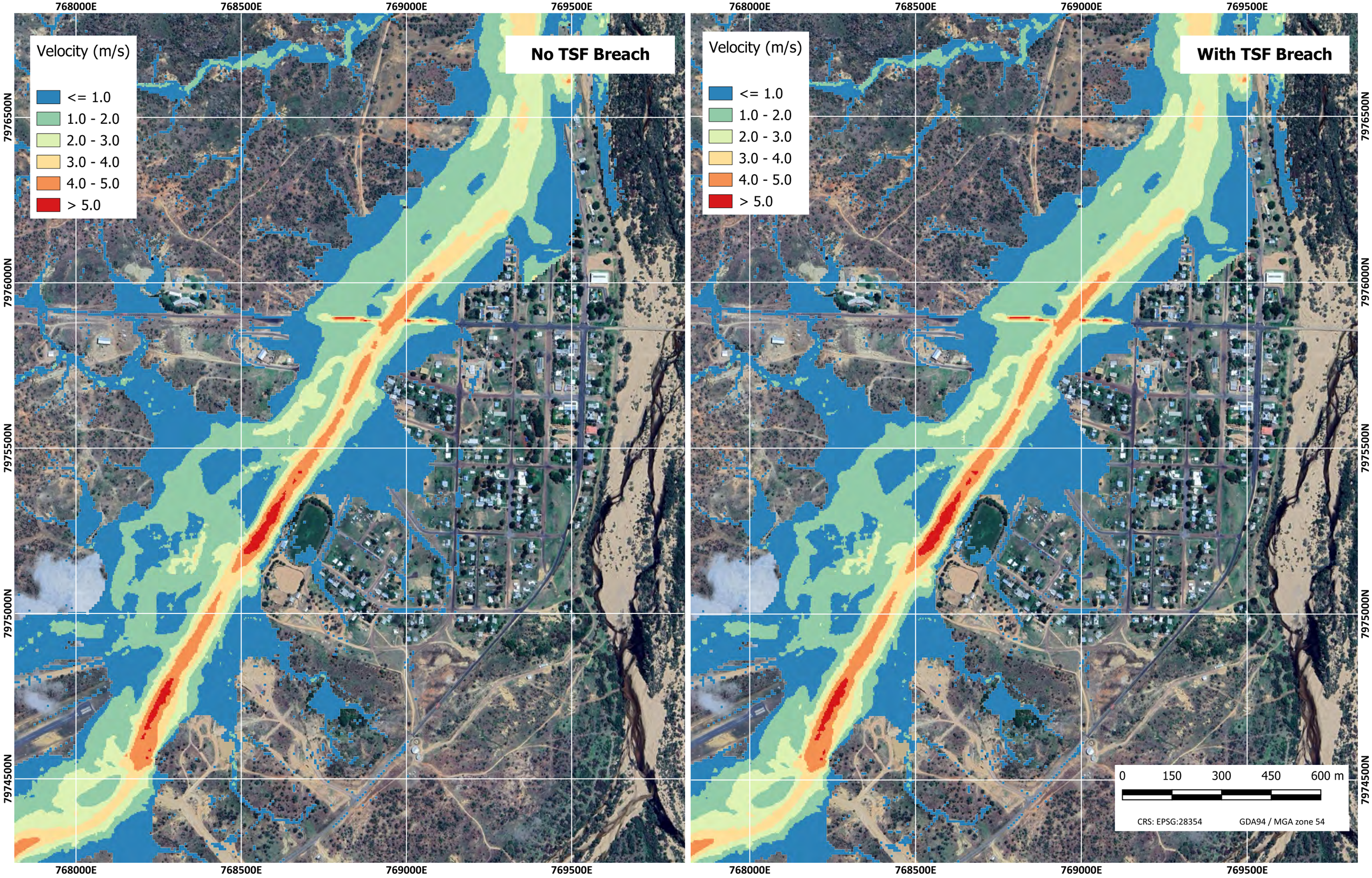
Aerial imagery source: Google Earth, July 2024

SAVANNAH GOLDFIELDS
GEORGETOWN GOLD MINE

PHASE 2 TSF RAISE TO RL 326M
DAM BREAK ANALYSIS

GEOTAILS CONSULTING

FIGURE NO. A16
REVISION: A
DATE: 16/02/2026
Project No. 2201-GTG-09



Maximum Flow Velocities at Georgetown - PMF

Aerial imagery source: Google Earth, July 2024

SAVANNAH GOLDFIELDS
GEORGETOWN GOLD MINE

PHASE 2 TSF RAISE TO RL 326M
DAM BREAK ANALYSIS

GEOTAILS CONSULTING

FIGURE NO. A17
REVISION: A
DATE: 16/02/2026
Project No. 2201-GTG-09

APPENDIX B – MNES REPORT

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 16-May-2025

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	35
Listed Migratory Species:	16

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	23
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	26
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	8
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Status of Conservation Dependent and Extinct are not MNES under the EPBC Act. Number is the current name ID.		
Scientific Name	Threatened Category	Presence Text
BIRD		
Calidris acuminata		
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Chloebia gouldiae listed as Erythrura gouldiae		
Gouldian Finch [90091]	Endangered	Species or species habitat known to occur within area
Erythrotriorchis radiatus		
Red Goshawk [942]	Endangered	Species or species habitat known to occur within area
Falco hypoleucos		
Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area
Geophaps scripta scripta		
Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area
Neochmia ruficauda ruficauda		
Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
[Rostratula australis](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
[Tringa nebularia](#) Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area
[Tyto novaehollandiae kimberli](#) Masked Owl (northern) [26048]	Vulnerable	Species or species habitat may occur within area
MAMMAL		
[Dasyurus hallucatus](#) Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area
[Hipposideros semoni](#) Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat [180]	Vulnerable	Species or species habitat may occur within area
[Macroderma gigas](#) Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area
[Mesembriomys gouldii rattoides](#) Black-footed Tree-rat (north Queensland), Shaggy Rabbit-rat [87620]	Vulnerable	Species or species habitat likely to occur within area
[Petauroides minor](#) Greater Glider (northern), Greater Glider (north-eastern Queensland) [92008]	Vulnerable	Species or species habitat known to occur within area
[Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)](#) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area
[Pteropus conspicillatus](#) Spectacled Flying-fox [185]	Endangered	Species or species habitat may occur within area
[Rhinolophus robertsi](#) Large-eared Horseshoe Bat, Greater Large-eared Horseshoe Bat [87639]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Saccolaimus saccolaimus nudicluniatus Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889]	Vulnerable	Species or species habitat may occur within area
PLANT		
Acacia crombiei Pink Gidgee [10927]	Vulnerable	Species or species habitat known to occur within area
Bulbophyllum globuliforme Miniature Moss-orchid, Hoop Pine Orchid [6649]	Vulnerable	Species or species habitat may occur within area
Cycas cairnsiana a cycad [5780]	Vulnerable	Species or species habitat likely to occur within area
Cycas platyphylla a cycad [55796]	Vulnerable	Species or species habitat likely to occur within area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat known to occur within area
Eriocaulon carsonii Salt Pipewort, Button Grass [10584]	Endangered	Species or species habitat known to occur within area
Euphorbia carissoides [12431]	Vulnerable	Species or species habitat known to occur within area
Macropteranthes montana [9003]	Vulnerable	Species or species habitat known to occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat may occur within area
Tephrosia leveillei [16946]	Vulnerable	Species or species habitat known to occur within area
REPTILE		

Scientific Name	Threatened Category	Presence Text
Austroablepharus barrylyoni		
Lyon's Grassland Striped Skink, Lyon's Snake-eyed Skink [91455]	Critically Endangered	Species or species habitat known to occur within area
Egernia rugosa		
Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area
Elseya irwini		
Irwin's Turtle, White-headed Snapping Turtle [78961]	Vulnerable	Species or species habitat may occur within area
Varanus mertensi		
Mertens' Water Monitor, Mertens's Water Monitor [1568]	Endangered	Species or species habitat known to occur within area
SHARK		
Pristis pristis		
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Marine Species		
Crocodylus porosus		
Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Pristis pristis		
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
Cuculus optatus		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundo rustica		
Barn Swallow [662]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area overfly marine area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area overfly marine area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato)		
Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area
Tringa nebularia		
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area overfly marine area
Reptile		
Crocodylus johnstoni		
Freshwater Crocodile, Johnston's Crocodile, Johnstone's Crocodile [1773]		Species or species habitat may occur within area
Crocodylus porosus		
Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Abingdon Downs North	Nature Refuge	QLD
Bellfield	Nature Refuge	QLD
Blackbraes	National Park	QLD
Bulleringa	National Park	QLD
Canyon	Resources Reserve	QLD
Cobbold Gorge	Nature Refuge	QLD
Eagle's View	Nature Refuge	QLD
Esmeralda	Nature Refuge	QLD
Gilberton	Nature Refuge	QLD
Goanna Spring	Nature Refuge	QLD

Protected Area Name	Reserve Type	State
Granite Creek	Nature Refuge	QLD
Kennedy Road Gravel	Resources Reserve	QLD
Littleton	Resources Reserve	QLD
Moonstone Hill	Resources Reserve	QLD
Mount Rosey	Resources Reserve	QLD
Newcastle Range-The Oaks	Nature Refuge	QLD
North Head	Nature Refuge	QLD
Rungulla	Resources Reserve	QLD
Rungulla	National Park	QLD
South Head	Nature Refuge	QLD
Stuarts Spring	Nature Refuge	QLD
Tagalaka	National Park	QLD
Talaroo	Nature Refuge	QLD
Torwood	Nature Refuge	QLD
Undara Volcanic	National Park	QLD
Werrington	Nature Refuge	QLD

Nationally Important Wetlands	[Resource Information]
Wetland Name	State
Undara Lava Tubes	QLD

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Arnhem Space Centre Operations (Down Range Recovery)	2023/09657		Completed
Greenvale Training Area Main Works	2023/09595		Referral Decision
Kidston Solar Farm Stage 2, near Kidston, Qld	2018/8229		Completed
Kidston Wind Farm	2024/09812		Assessment

Title of referral	Reference	Referral Outcome	Assessment Status
Powerlink Queensland Genex Kidston Connection Project	2021/9060		Post-Approval
Not controlled action			
Forsayth Wind Farm, QLD	2014/7393	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
Waste Disposal Facility at Mount Sullivan Station Forsayth Road	2011/6144	Not Controlled Action	Completed

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Canberra ACT 2601 Australia
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APPENDIX C – MSES REPORT

Queensland Government

Department of the Environment, Tourism, Science and Innovation

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest

Longitude: 143.5 Latitude: -18.5 with 2 kilometre radius

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 2020). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and a field survey may be required to validate values on the ground.

Please direct queries about these reports to: Planning.Support@des.qld.gov.au

Disclaimer

Whilst every care is taken to ensure the accuracy of the information provided in this report, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness, or suitability, for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which the user may incur as a consequence of the information being inaccurate or incomplete in any way and for any reason.



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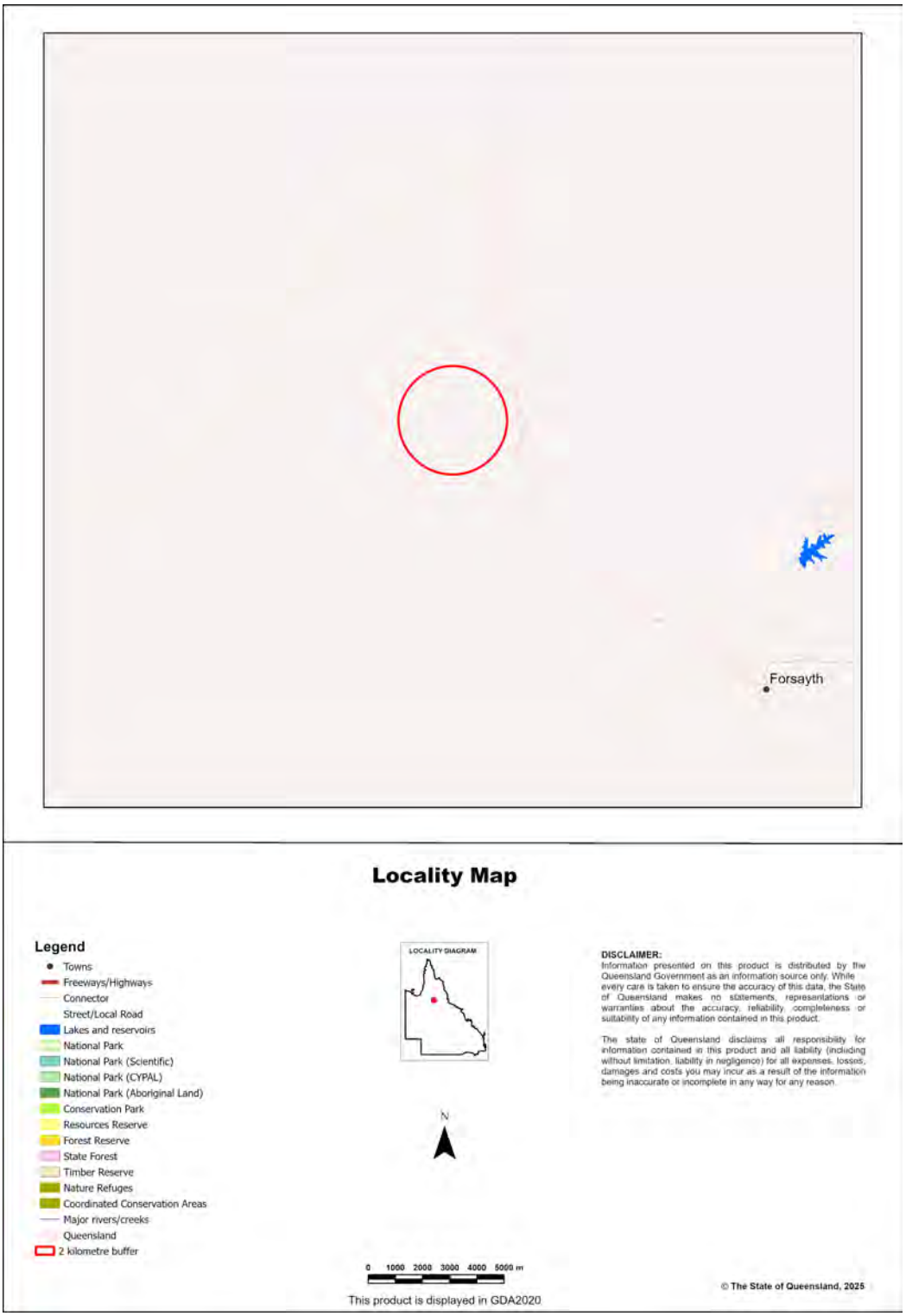
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Assessment Area Details

The following table provides an overview of the area of interest (AOI) with respect to selected topographic and environmental values.

Table 1: Summary table, details for AOI: Longitude: 143.5 Latitude: -18.5 with 2 kilometre radius, with area 1256.64 ha

Local Government(s)	Catchment(s)	Bioregion(s)	Subregion(s)
Etheridge Shire	Gilbert	Einasleigh Uplands	Georgetown - Croydon



Matters of State Environmental Significance (MSES)

MSES Categories

Queensland's State Planning Policy (SPP) includes a biodiversity State interest that states:

'The sustainable, long-term conservation of biodiversity is supported. Significant impacts on matters of national or state environmental significance are avoided, or where this cannot be reasonably achieved; impacts are minimised and residual impacts offset.'

The MSES mapping product is a guide to assist implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992;*

- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the Marine Parks Act 2004 ;

- Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008;

- *Threatened wildlife under the Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;

- Regulated vegetation under the *Vegetation Management Act 1999* that is:

  - Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;
  - Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;
  - Category R areas on the regulated vegetation management map;
  - Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;
  - Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;

- Strategic Environmental Areas under the *Regional Planning Interests Act 2014* ;

- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Queensland Wetland Environmental Values under the Environment Protection Regulation 2019;

- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;
- Legally secured offset areas.

MSES Values Present

The MSES values that are present in the area of interest are summarised in the table below:

Table 2: Summary of MSES present within the AOI

1a Protected Areas- estates	0 ha	0.0%
1b Protected Areas- nature refuges	0 ha	0.0%
1c Protected Areas- special wildlife reserves	0 ha	0.0%
2 State Marine Parks- highly protected zones	0 ha	0.0%
3 Fish habitat areas (A and B areas)	0 ha	0.0%
4 Strategic Environmental Areas (SEA)	0 ha	0.0%
5 High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values	0 ha	0.0%
6a High Ecological Value (HEV) wetlands	0 ha	
6b High Ecological Value (HEV) waterways	0 km	Not applicable
7a Threatened (endangered or vulnerable) wildlife	0 ha	0.0%
7b Special least concern animals	0 ha	0.0%
7c i Koala habitat area - core (SEQ)	0 ha	0.0%
7c ii Koala habitat area - locally refined (SEQ)	0 ha	0.0%
7d Sea turtle nesting areas	0 km	Not applicable
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	0 ha	0.0%
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	0 ha	0.0%
8c Regulated Vegetation - Category R (GBR riverine regrowth)	0 ha	0.0%
8d Regulated Vegetation - Essential habitat	0 ha	0.0%
8e Regulated Vegetation - intersecting a watercourse	30.8 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	0 ha	0.0%
9a Legally secured offset areas- offset register areas	0 ha	0.0%
9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation	0 ha	0.0%

Additional Information with Respect to MSES Values Present

MSES - State Conservation Areas

1a. Protected Areas - estates

(No results)

1b. Protected Areas - nature refuges

(No results)

1c. Protected Areas - special wildlife reserves

(No results)

2. State Marine Parks - highly protected zones

(No results)

3. Fish habitat areas (A and B areas)

(No results)

Refer to **Map 1 - MSES - State Conservation Areas** for an overview of the relevant MSES.

MSES - Wetlands and Waterways

4. Strategic Environmental Areas (SEA)

(No results)

5. High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values

(no results)

6a. Wetlands in High Ecological Value (HEV) waters

(no results)

6b. Waterways in High Ecological Value (HEV) waters

(no results)

Refer to **Map 2 - MSES - Wetlands and Waterways** for an overview of the relevant MSES.

MSES - Species

7a. Threatened (endangered or vulnerable) wildlife

Not applicable

7b. Special least concern animals

Not applicable

7c i. Koala habitat area - core (SEQ)

Not applicable

7c ii. Koala habitat area - locally refined (SEQ)

Not applicable

7d. Wildlife habitat (sea turtle nesting areas)

Not applicable

Threatened (endangered or vulnerable) wildlife habitat suitability models

Species	Common name	NCA status	Presence
Boronia keysii	Keys boronia	V	None
Calyptorhynchus lathami	Glossy black cockatoo	V	None
Casuarius casuarius johnsonii	Sthn population cassowary	E	None
Crinia tinnula	Wallum froglet	V	None
Denisonia maculata	Ornamental snake	V	None
Euastacus bindal	Mount Elliot crayfish	CR	None
Euastacus binzayedi		CR	None
Euastacus eungella		E	None
Euastacus hystricosus		E	None
Euastacus jagara	Jagara hairy crayfish	CR	None
Euastacus maidae		CR	None
Euastacus monteithorum		E	None
Euastacus robertsi		E	None
Taudactylus pleione	Kroombit tinkerfrog	E	None
Litoria freycineti	Wallum rocketfrog	V	None
Litoria olongburensis	Wallum sedgefrog	V	None
Macadamia integrifolia		V	None
Melaleuca irbyana	swamp tea-tree	E	None
Macadamia ternifolia		V	None
Macadamia tetraphylla	bopple nut	V	None
Petrogale penicillata	brush-tailed rock-wallaby	V	None
Petrogale coenensis	Cape York rock-wallaby	E	None
Petrogale purpureicollis	purple-necked rock-wallaby	V	None
Petrogale sharmani	Sharmans rock-wallaby	V	None
Petrogale xanthopus celeris	yellow-footed rock-wallaby (Qld subspecies)	V	None
Petaurus gracilis	Mahogany Glider	E	None
Petrogale persephone	Proserpine rock-wallaby	E	None
Phascolarctos cinereus	Koala - outside SEQ*	E	None
Pezoporus wallicus wallicus	Eastern ground parrot	V	None
Xeromys myoides	Water Mouse	V	None

*For koala model, this includes areas outside SEQ. Check 7c SEQ koala habitat for presence/absence.

Threatened (endangered or vulnerable) wildlife species records

(No results)

Special least concern animal species records

(No results)

Shorebird habitat (critically endangered/endangered/vulnerable)

Not applicable

Shorebird habitat (special least concern)

Not applicable

**Nature Conservation Act 1992 (NCA) Status- Endangered (E), Vulnerable (V) or Special Least Concern Animal (SL). Environment Protection and Biodiversity Conservation Act 1999 (EPBC) status: Critically Endangered (CE) Endangered (E), Vulnerable (V)*

Migratory status (M) - China and Australia Migratory Bird Agreement (C), Japan and Australia Migratory Bird Agreement (J), Republic of Korea and Australia Migratory Bird Agreement (R), Bonn Migratory Convention (B), Eastern Flyway (E)

To request a species list for an area, or search for a species profile, access Wildlife Online at:

https://www.qld.gov.au/environment/plants-animals/species-list/

Refer to **Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals** and **Map 3b - MSES - Species - Koala habitat area (SEQ)** and **Map 3c - MSES - Wildlife habitat (sea turtle nesting areas)** for an overview of the relevant MSES.

MSES - Regulated Vegetation

For further information relating to regional ecosystems in general, go to:

https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/

For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:

https://environment.ehp.qld.gov.au/regional-ecosystems/

8a. Regulated Vegetation - Endangered/Of concern in Category B (remnant)

Not applicable

8b. Regulated Vegetation - Endangered/Of concern in Category C (regrowth)

Not applicable

8c. Regulated Vegetation - Category R (GBR riverine regrowth)

Not applicable

8d. Regulated Vegetation - Essential habitat

Not applicable

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

8f. Regulated Vegetation - within 100m of a Vegetation Management wetland

Not applicable

Refer to **Map 4 - MSES - Regulated Vegetation** for an overview of the relevant MSES.

MSES - Offsets

9a. Legally secured offset areas - offset register areas

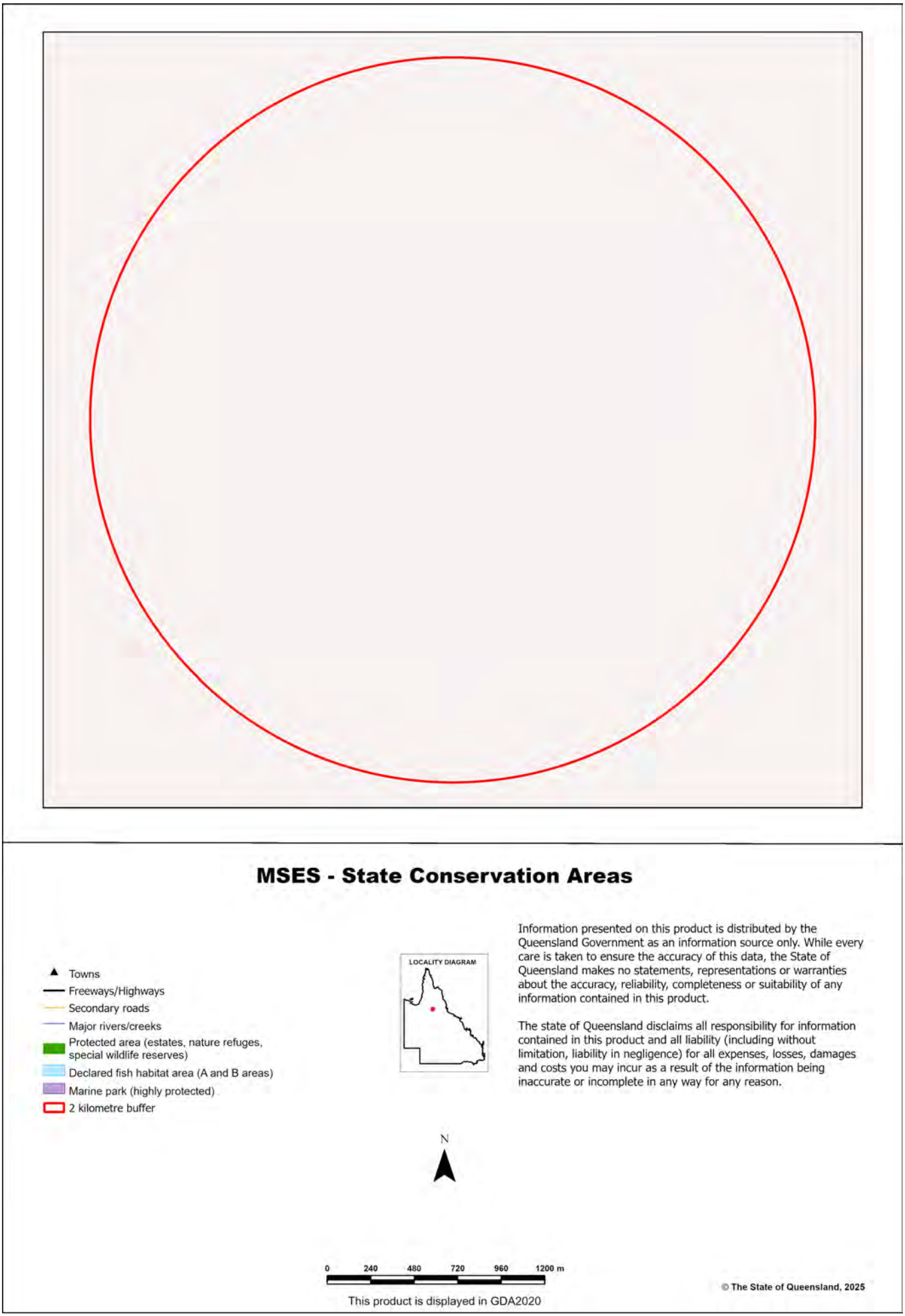
(No results)

9b. Legally secured offset areas - vegetation offsets through a Property Map of Assessable Vegetation

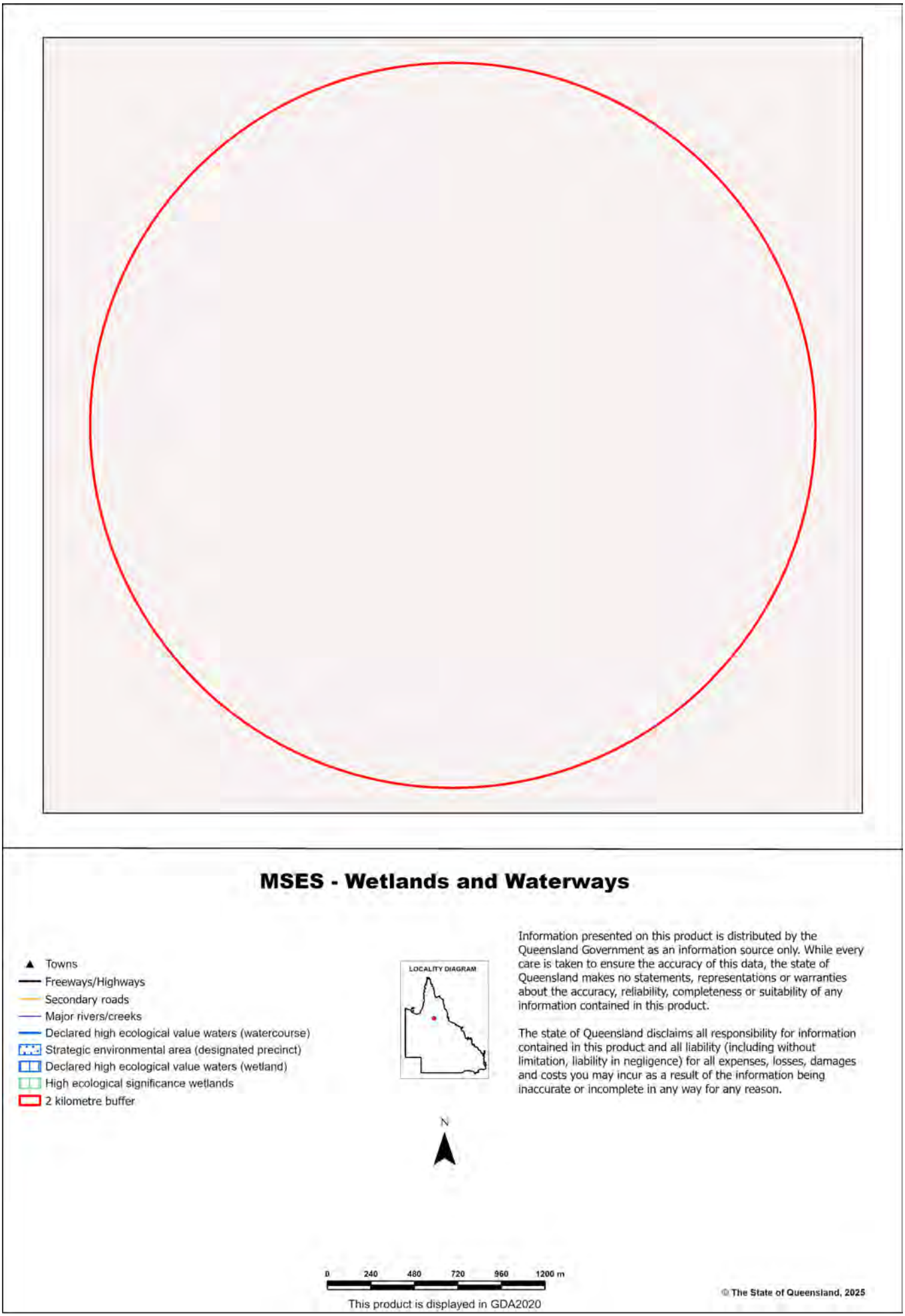
(No results)

Refer to **Map 5 - MSES - Offset Areas** for an overview of the relevant MSES.

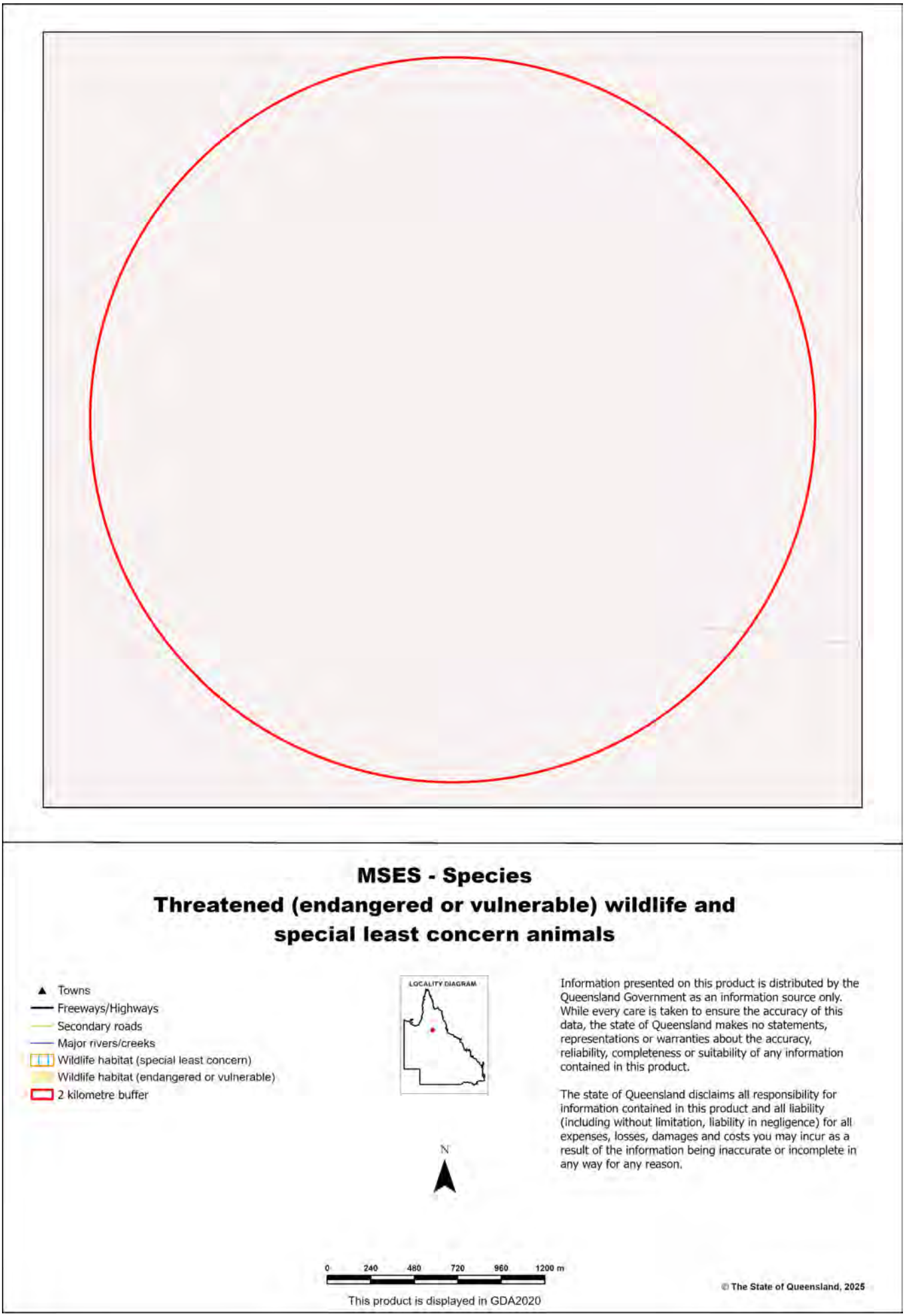
Map 1 - MSES - State Conservation Areas



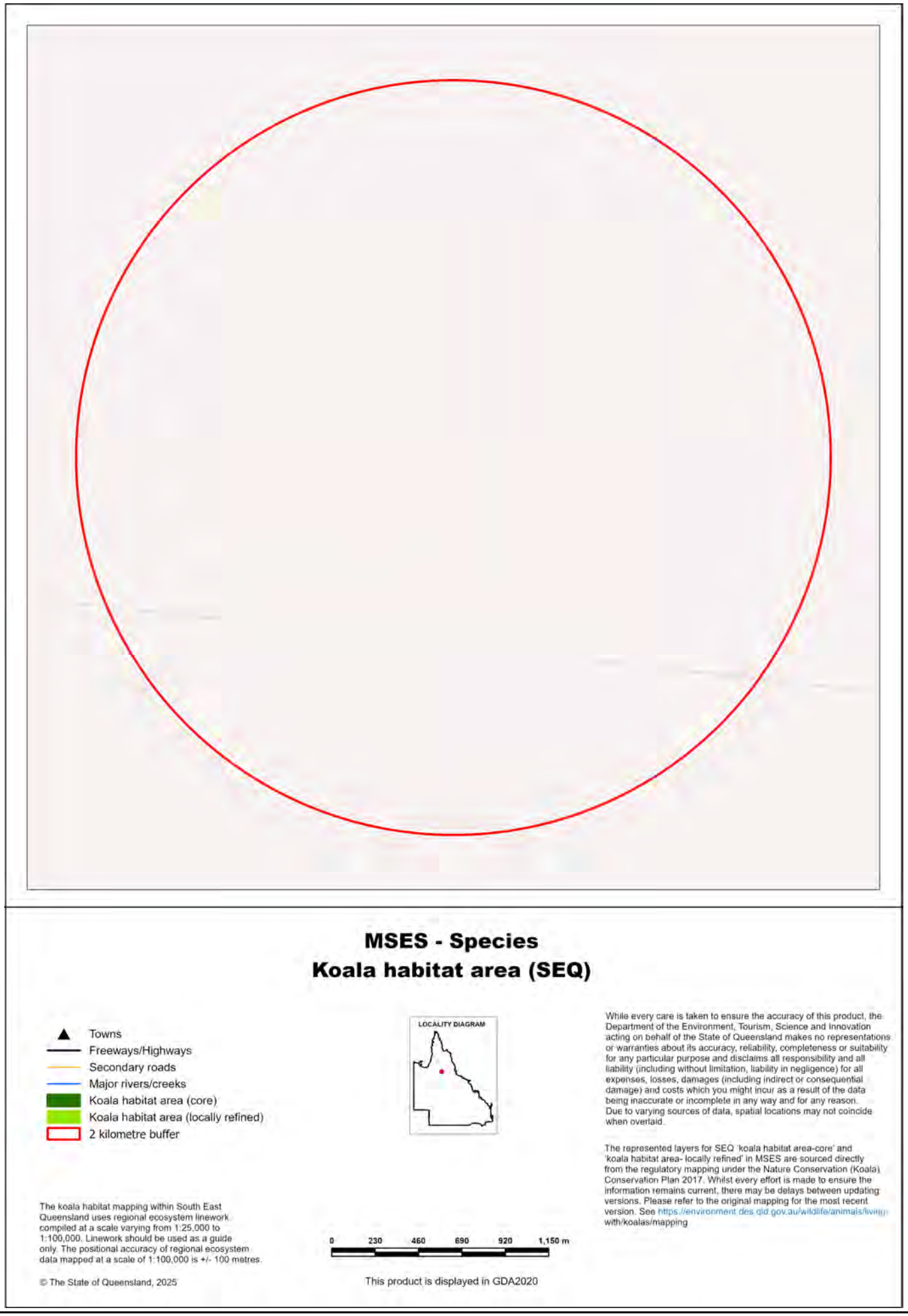
Map 2 - MSES - Wetlands and Waterways



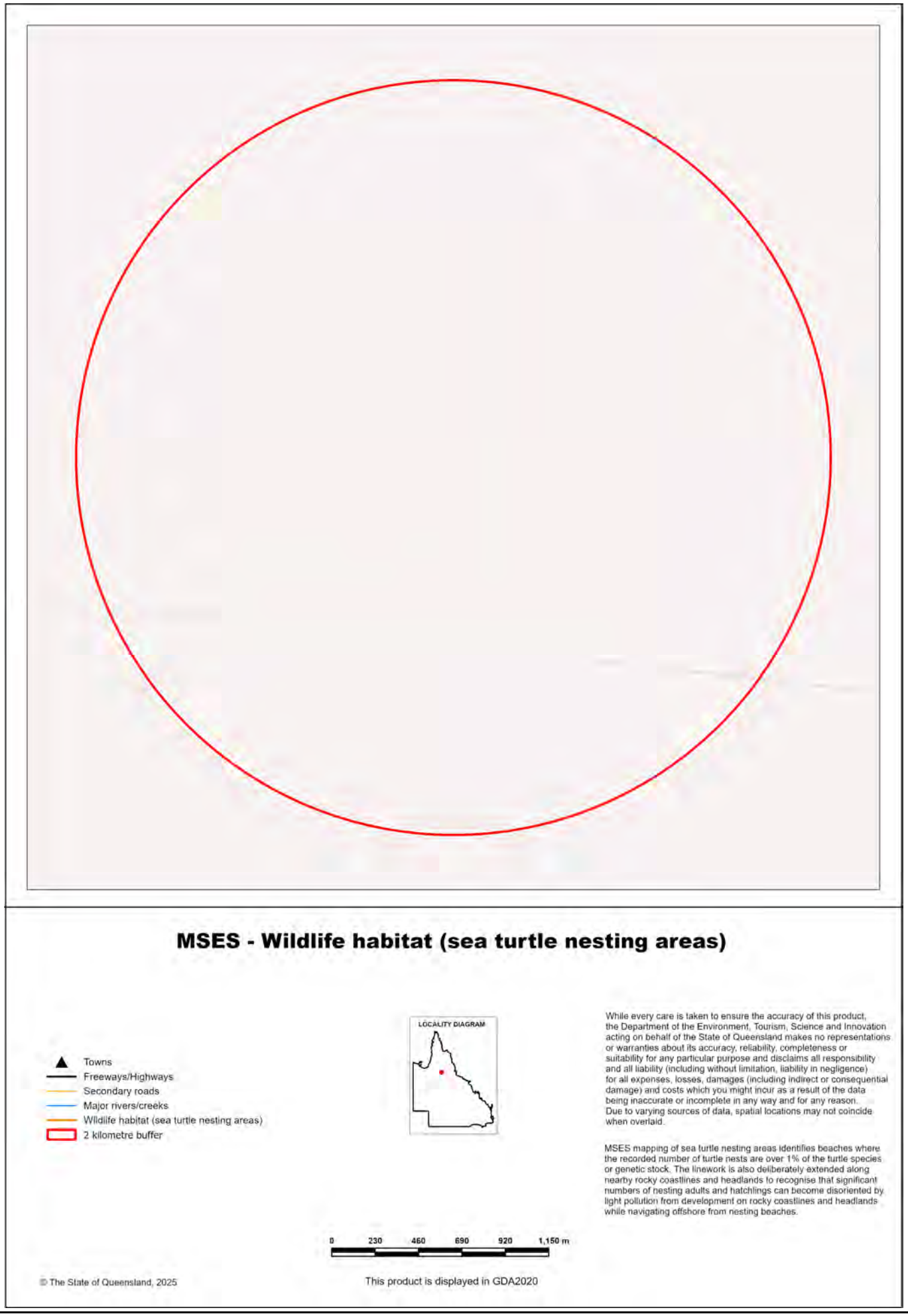
Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals



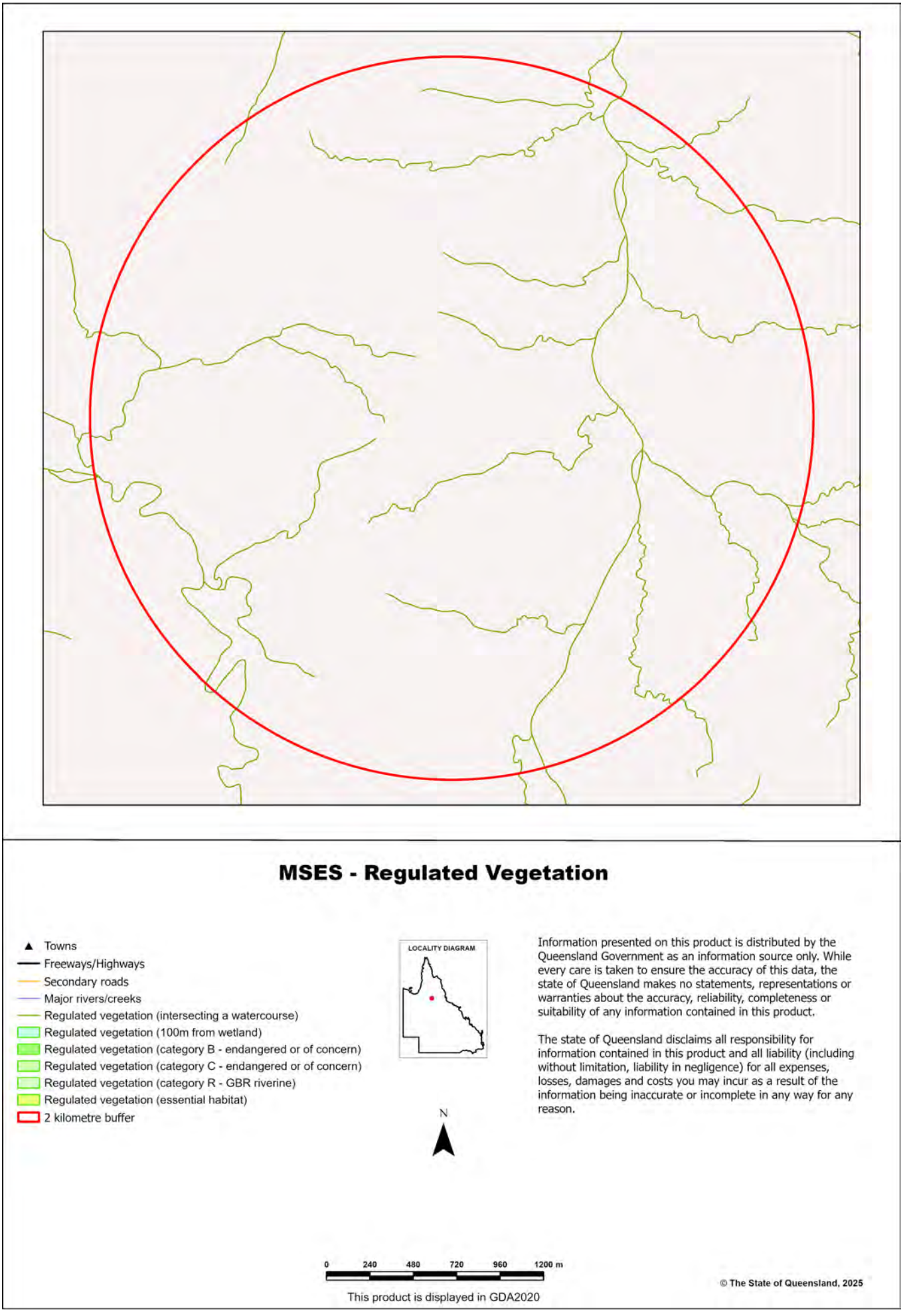
Map 3b - MSES - Species - Koala habitat area (SEQ)



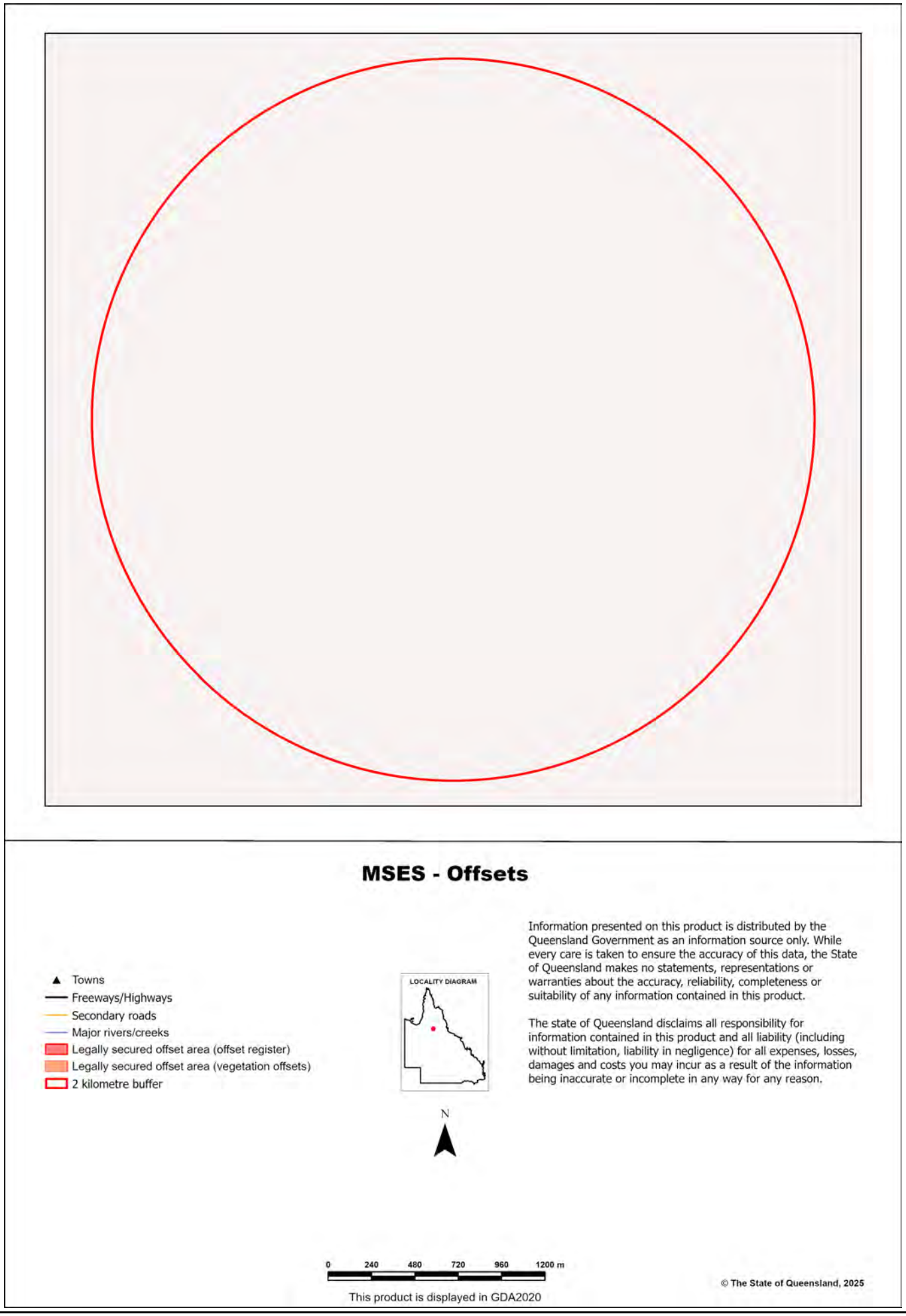
Map 3c - MSES - Species - Wildlife habitat (sea turtle nesting areas)



Map 4 - MSES - Regulated Vegetation



Map 5 - MSES - Offset Areas



Appendices

Appendix 1 - Matters of State Environmental Significance (MSES) methodology

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). Its primary purpose is to support implementation of the SPP biodiversity policy.

MSES mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations.

MSES mapping does not determine whether state or local development assessment is required. For state assessment triggers refer to the Development Assessment Mapping System (DAMS). For local assessment triggers, refer to the relevant local planning scheme.

The Queensland Government's "Method for mapping - matters of state environmental significance can be downloaded from:

http://www.ehp.qld.gov.au/land/natural-resource/method-mapping-mses.html .

Appendix 2 - Source Data

The datasets listed below are available on request from:

http://qldspatial.information.qld.gov.au/catalogue/custom/index.page

- Matters of State environmental significance

Note: MSES mapping is not based on new or unique data. The primary mapping product draws data from a number of underlying environment databases and geo-referenced information sources. MSES mapping is a versioned product that is updated generally on a twice-yearly basis to incorporate the changes to underlying data sources. Several components of MSES mapping made for the current version may differ from the current underlying data sources. To ensure accuracy, or proper representation of MSES values, it is strongly recommended that users refer to the underlying data sources and review the current definition of MSES in the State Planning Policy, before applying the MSES mapping.

Individual MSES layers can be attributed to the following source data available at QSpatial:

MSES layers	**current QSpatial data (http://qspatial.information.qld.gov.au)**
Protected Areas-Estates, Nature Refuges, Special Wildlife Reserves	- Protected areas of Queensland - Nature Refuges - Queensland - Special Wildlife Reserves- Queensland
Marine Park-Highly Protected Zones	Moreton Bay marine park zoning 2008
Fish Habitat Areas	Queensland fish habitat areas
Strategic Environmental Areas-designated	Regional Planning Interests Act - Strategic Environmental Areas
HES wetlands	Map of Queensland Wetland Environmental Values
Wetlands in HEV waters	HEV waters: - EPP Water intent for waters Source Wetlands: - Queensland Wetland Mapping (Current version 5) Source Watercourses: - Vegetation management watercourse and drainage feature map (1:100000 and 1:250000)
Wildlife habitat (threatened and special least concern)	-WildNet database species records - habitat suitability models (various) - SEQ koala habitat areas under the Koala Conservation Plan 2019
VMA regulated regional ecosystems	Vegetation management regional ecosystem and remnant map
VMA Essential Habitat	Vegetation management - essential habitat map
VMA Wetlands	Vegetation management wetlands map
Legally secured offsets	Vegetation Management Act property maps of assessable vegetation. For offset register data-contact DETSI
Regulated Vegetation Map	Vegetation management - regulated vegetation management map

Appendix 3 - Acronyms and Abbreviations

AOI	- Area of Interest
DETSI	- Department of the Environment, Tourism, Science and Innovation
EP Act	- Environmental Protection Act 1994
EPP	- Environmental Protection Policy
GDA2020	- Geocentric Datum of Australia 2020
GEM	- General Environmental Matters
GIS	- Geographic Information System
MSES	- Matters of State Environmental Significance
NCA	- Nature Conservation Act 1992
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- Vegetation Management Act 1999

APPENDIX D – BIODIVERSITY AND CONSERVATION VALUES REPORT

Queensland Government

Department of the Environment, Tourism, Science and Innovation

Environmental Reports

Biodiversity and Conservation Values

Biodiversity Planning Assessments and Aquatic Conservation Assessments

For the selected area of interest

Longitude: 143.5 Latitude: -18.5 with 2 kilometre buffer

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or Area of Interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "Central co-ordinates" option, the resulting assessment area encompasses an area extending from 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 2020). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Please direct queries about these reports to: biodiversity.planning@qld.gov.au

Disclaimer

Whilst every care is taken to ensure the accuracy of the information provided in this report, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness, or suitability, for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which the user may incur as a consequence of the information being inaccurate or incomplete in any way and for any reason.



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Summary Information

Tables 1 to 8 provide an overview of the AOI with respect to selected topographic and environmental values.

Table 1: Details for area of interest: Longitude: 143.5 Latitude: -18.5 with 2 kilometre buffer, with area 1256.64 ha

Local Government(s)	
Etheridge Shire	
Bioregion(s)	**Subregion(s)**
Einasleigh Uplands	Georgetown - Croydon
Catchment(s)	
Gilbert	

The following table identifies available Biodiversity Planning Assessments (BPAs) and Aquatic Conservation Assessments (ACAs) with respect to the AOI.

Table 2: Available Biodiversity Planning and Aquatic Conservation Assessments

Biodiversity Planning Assessment(s)	Aquatic Conservation Assessment(s) (riverine)	Aquatic Conservation Assessment(s) (non-riverine)
Einasleigh Uplands v1.1	Eastern Gulf of Carpentaria v1.1	Eastern Gulf of Carpentaria v.1.1

Table 3: Remnant regional ecosystems within the AOI as per the Qld Herbarium's 'biodiversity status'

Biodiversity Status	Area (Ha)	% of AOI
Endangered	0.00	0.00
Of concern	45.09	3.59
No concern at present	1,210.72	96.35

The following table identifies the extent and proportion of the user specified area of interest (AOI) which is mapped as being of "State", "Regional" or "Local" significance via application of the Queensland Department of the Environment, Tourism, Science and Innovation's *Biodiversity Assessment and Mapping Methodology* (BAMM).

Table 4: Summary table, biodiversity significance

Biodiversity Status	Area (Ha)	% of AOI
State	547.11	43.54
Local or Other Values	708.70	56.40

Table 5: Non-riverine wetlands intersecting the AOI

(No Records)

NB. The figures presented in the table above are derived from the relevant non-riverine Aquatic Conservation Assessment(s). Later releases of wetland mapping produced via the Queensland Wetland Mapping Program may provide more recent information in regards to wetland extent.

Table 6: Named waterways intersecting the AOI

Name	Permanency
SANDY CREEK	Non-perennial

Refer to **Map 1** for general locality information.

The following two tables identify the extent and proportion of the user specified AOI which is mapped as being of "Very High", "High", "Medium", "Low", or "Very Low" aquatic conservation value for riverine and non-riverine wetlands via application of the Queensland Department of the Environment, Tourism, Science and Innovation's *Aquatic Biodiversity Assessment and Mapping Method* (AquaBAMM).

Table 7: Summary table, aquatic conservation significance (riverine)

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
High	882.97	70.26
Medium	372.85	29.67

Table 8: Summary table, aquatic conservation significance (non-riverine)

(No Records)

Biodiversity Planning Assessments

Introduction

The Department of the Environment, Tourism, Science and Innovation (DETSI) attributes biodiversity significance on a bioregional scale through a Biodiversity Planning Assessment (BPA). A BPA involves the integration of ecological criteria using the *Biodiversity assessment and Mapping Methodology* (BAMM) and is developed in two stages: 1) **diagnostic criteria**, and 2) **expert panel criteria**. The diagnostic criteria are based on existing data which is reliable and uniformly available across a bioregion, while the expert panel criteria allows for the refinement of the mapped information from the diagnostic output by incorporating local knowledge and expert opinion.

The BAMM methodology has application for identifying areas with various levels of significance solely for biodiversity reasons. These include threatened ecosystems or taxa, large tracts of habitat in good condition, ecosystem diversity, landscape context and connection, and buffers to wetlands or other types of habitat important for the maintenance of biodiversity or ecological processes. While natural resource values such as dryland salinity, soil erosion potential or land capability are not dealt with explicitly, they are included to some extent within the biodiversity status of regional ecosystems recognised by the DETSI. Biodiversity Planning Assessments (BPAs) assign three levels of overall biodiversity significance.

- **State significance** - areas assessed as being significant for biodiversity at the bioregional or state scales. They also include areas assessed by other studies/processes as being significant at national or international scales. In addition, areas flagged as being of State significance due to the presence of endangered, vulnerable and/or near threatened taxa, are identified as "State Habitat for EVNT taxa".
- **Regional significance** - areas assessed as being significant for biodiversity at the subregional scale. These areas have lower significance for biodiversity than areas assessed as being of State significance.
- **Local significance and/or other values** - areas assessed as not being significant for biodiversity at state or regional scales. Local values are of significance at the local government scale.

For further information on released BPAs and a copy of the underlying methodology, go to:

http://www.qld.gov.au/environment/plants-animals/biodiversity/planning/

The GIS results can be downloaded from the Queensland Spatial Catalogue at:

https://qldspatial.information.qld.gov.au/catalogue/custom/index.page

The following table identifies the extent and proportion of the user specified AOI which is mapped as being of "State", "Regional" or "Local" significance via application of the BAMM.

Table 9: Summary table, biodiversity significance

Biodiversity Status	Area (Ha)	% of AOI
State	547.11	43.54
Local or Other Values	708.70	56.40

Refer to **Map 2** for further information.

Diagnostic Criteria

Diagnostic criteria are based on existing data which is reliable and uniformly available across a bioregion. These criteria are diagnostic in that they are used to filter the available data and provide a "first-cut" or initial determination of biodiversity significance. This initial assessment is then combined through a second group of other essential criteria.

A description of the individual diagnostic criteria is provided in the following sections.

Criteria A. Habitat for EVNT taxa: Classifies areas according to their significance based on the presence of endangered, vulnerable and/or rare (EVNT) taxa. EVNT taxa are those scheduled under the *Nature Conservation Act 1992* and/or the *Environment Protection and Biodiversity Conservation Act 1999*. It excludes highly mobile fauna taxa which are instead considered in Criterion H and brings together information on EVNT taxa using buffering of recorded sites or habitat suitability models (HSM) where available.

Criteria B. Ecosystem value: Classifies on the basis of biodiversity status of regional ecosystems, their extent in

protected areas (presence of poorly conserved regional ecosystems), the presence of significant wetlands; and areas of national importance such as the presence of Threatened Ecological Communities, World Heritage areas and Ramsar sites. Ecosystem value is applied at a bioregional (**B1**) and regional (**B2**) scale.

Criteria C. Tract size: Measures the relative size of tracts of vegetation in the landscape. The size of any tract is a major indicator of ecological significance, and is also strongly correlated with the long-term viability of biodiversity values. Larger tracts are less susceptible to ecological edge effects and are more likely to sustain viable populations of native flora and fauna than smaller tracts.

Criteria D. Relative size of regional ecosystems: Classifies the relative size of each regional ecosystem unit within its bioregion (**D1**) and its subregion (**D2**). Remnant units are compared with all other occurrences with the same regional ecosystem. Large examples of a regional ecosystem are more significant than smaller examples of the same regional ecosystem because they are more representative of the biodiversity values particular to the regional ecosystem, are more resilient to the effects of disturbance, and constitute a significant proportion of the total area of the regional ecosystem.

Criteria F. Ecosystem diversity: Is an indicator of the number of regional ecosystems occurring within an area. An area with high ecosystem diversity will have many regional ecosystems and ecotones relative to other areas within the bioregion.

Criteria G. Context and connection: Represents the extent to which a remnant unit incorporates, borders or buffers areas such as significant wetlands, endangered ecosystems; and the degree to which it is connected to other vegetation.

A summary of the biodiversity status based upon the diagnostic criteria is provided in the following table.

Table 10: Summary of biodiversity significance based upon diagnostic criteria with respect to the AOI

Biodiversity significance	Description	Area (Ha)	% of AOI
State	Remnant contains an RE that is one of the largest of its type in the bioregion (D1) & Remnant has high connectivity or buffers an endangered RE or Sig. Wetland (G)	331.55	26.38
Regional	Remnant contains at least one Of Concern RE (B1)	45.09	3.59
Local or Other Values	Refer to diagnostic data for additional information	879.17	69.96

Assessment of diagnostic criteria with respect to the AOI

The following table reflects an assessment of the individual diagnostic criteria noted above in regards to the AOI.

Table 11: Assessment of individual diagnostic criteria with respect to the AOI

Diagnostic Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
A: Habitat for EVNT Taxa	0.00	0.00	0.00	0.00	331.55	26.38	924.26	73.55
B1: Ecosystem Value (Bioregion)	0.00	0.00	45.09	3.59	1,210.72	96.35	0.00	0.00
B2: Ecosystem Value (Subregion)	0.00	0.00	0.00	0.00	1,255.81	99.93	0.00	0.00
C: Tract Size	0.00	0.00	1,255.81	99.93	0.00	0.00	0.00	0.00
D1: Relative RE Size (Bioregion)	331.55	26.38	0.00	0.00	398.57	31.72	525.69	41.83

Diagnostic Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
D2: Relative RE Size (Subregion)	331.55	26.38	0.00	0.00	398.57	31.72	525.69	41.83
F: Ecosystem Diversity	0.00	0.00	525.69	41.83	730.12	58.10	0.00	0.00
G: Context and Connection	1,255.81	99.93	0.00	0.00	0.00	0.00	0.00	0.00

Other Essential Criteria

Other essential criteria (also known as expert panel criteria) are based on non-uniform information sources and which may rely more upon expert opinion than on quantitative data. These criteria are used to provide a "second-cut" determination of biodiversity significance, which is then combined with the diagnostic criteria for an overall assessment of relative biodiversity significance. A summary of the biodiversity status based upon the other essential criteria is provided in the following table.

Table 12: Summary of biodiversity significance based upon other essential criteria with respect to the AOI

Biodiversity significance	Description	Area (Ha)	% of AOI
State	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I)	215.56	17.15

A description of each of the other essential criteria and associated assessment in regards to the AOI is provided in the following sections.

Criteria H. Essential and general habitat for priority taxa: Priority taxa are those which are at risk or of management concern, taxa of scientific interest as relictual (ancient or primitive), endemic taxa or locally significant populations (such as a flying fox camp or heronry), highly specialised taxa whose habitat requirements are complex and distributions are not well correlated with any particular regional ecosystem, taxa important for maintaining genetic diversity (such as complex spatial patterns of genetic variation, geographic range limits, highly disjunct populations), taxa critical for management or monitoring of biodiversity (functionally important or ecological indicators), or economic and culturally important taxa.

Criteria I. Special biodiversity values: areas with special biodiversity values are important because they contain multiple taxa in a unique ecological and often highly biodiverse environment. Areas with special biodiversity values can include the following:

- Ia - centres of endemism - areas where concentrations of taxa are endemic to a bioregion or subregion are found.
- Ib - wildlife refugia (Morton *et al*. 1995), for example, islands, mound springs, caves, wetlands, gorges, mountain ranges and topographic isolates, ecological refuges, refuges from exotic animals, and refuges from clearing. The latter may include large areas that are not suitable for clearing because of land suitability/capability.
- Ic - areas with concentrations of disjunct populations.
- Id - areas with concentrations of taxa at the limits of their geographic ranges.
- Ie - areas with high species richness.
- If - areas with concentrations of relictual populations (ancient and primitive taxa).
- Ig - areas containing REs with distinct variation in species composition associated with geomorphology and other environmental variables.
- Ih - an artificial waterbody or managed/manipulated wetland considered by the panel/s to be of ecological significance.
- Ii - areas with a high density of hollow-bearing trees that provide habitat for animals.
- Ij - breeding or roosting sites used by a significant number of individuals.
- Ik - climate change refuge.

The following table identifies the value and extent area of the Other Essential Criteria H and I within the AOI.

Table 13: Relative importance of expert panel criteria (H and I) used to access overall biodiversity significance with respect to the AOI

Expert Panel	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
H: Core Habitat Priority Taxa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ia: Centres of Endemism	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ib: Wildlife Refugia	215.56	17.15	0.00	0.00	0.00	0.00	0.00	0.00
Ic: Disjunct Populations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Id: Limits of Geographic Ranges	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ie: High Species Richness	215.56	17.15	0.00	0.00	0.00	0.00	0.00	0.00
If: Relictual Populations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ig: Variation in Species Composition	215.56	17.15	0.00	0.00	0.00	0.00	0.00	0.00
Ih: Artificial Wetland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ii: Hollow Bearing Trees	0.00	0.00	215.56	17.15	0.00	0.00	0.00	0.00
Ij: Breeding or Roosting Site	215.56	17.15	0.00	0.00	0.00	0.00	0.00	0.00
Ik: Climate Refugia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NB. Whilst biodiversity values associated with Criteria I may be present within the site (refer to tables 12 and 15), for the New England Tableland and Central Queensland Coast BPAs, area and % area figures associated with Criteria Ia through to Ij cannot be listed in the table above (due to slight variations in data formats between BPAs).

Criteria J. Corridors: areas identified under this criterion qualify either because they are existing vegetated corridors important for contiguity, or cleared areas that could serve this purpose if revegetated. Some examples of corridors include riparian habitats, transport corridors and "stepping stones".

Bioregional and subregional conservation corridors have been identified in the more developed bioregions of Queensland through the BPAs, using an intensive process involving expert panels. Map 3 displays the location of corridors as identified under the Statewide Corridor network. The Statewide Corridor network incorporates BPA derived corridors and for bioregions where no BPA has been assessed yet, corridors derived under other planning processes. *Note: as a result of updating and developing a statewide network, the alignment of corridors may differ slightly in some instances when compared to those used in individual BPAs.*

The functions of these corridors are:

- **Terrestrial** Bioregional corridors, in conjunction with large tracts of remnant vegetation, maintain ecological and evolutionary processes at a landscape scale, by:

- Maintaining long term evolutionary/genetic processes that allow the natural change in distributions of species and connectivity between populations of species over long periods of time;
- Maintaining landscape/ecosystems processes associated with geological, altitudinal and climatic gradients, to allow for ecological responses to climate change;
- Maintaining large scale seasonal/migratory species processes and movement of fauna;
- Maximising connectivity between large tracts/patches of remnant vegetation;
- Identifying key areas for rehabilitation and offsets; and

- **Riparian** Bioregional Corridors also maintain and encourage connectivity of riparian and associated ecosystems.

The location of the corridors is determined by the following principles:

- Terrestrial

  - Complement riparian landscape corridors (i.e. minimise overlap and maximise connectivity);
  - Follow major watershed/catchment and/or coastal boundaries;
  - Incorporate major altitudinal/geological/climatic gradients;
  - Include and maximise connectivity between large tracts/patches of remnant vegetation;
  - Include and maximise connectivity between remnant vegetation in good condition; and

- Riparian

  - Located on the major river or creek systems within the bioregion in question.

The total extent of remnant vegetation triggered as being of "State", "Regional" or "Local" significance due to the presence of an overlying BPA derived terrestrial or riparian corridor within the AOI, is provided in the following table. For further information on how remnant vegetation is triggered due to the presence of an overlying BPA derived corridor, refer to the relevant landscape BPA expert panel report(s).

Table 14: Extent of triggered remnant vegetation due to the presence of BPA derived corridors with respect to the AOI

(No Records)

NB: area figures associated with the extent of corridor triggered remnant vegetation are only available for those bioregions where a BPA has been undertaken.

Refer to **Map 3** for further information.

Threatening process/condition (Criteria K) - areas identified by experts under this criterion may be used to amend (upgrade or downgrade) biodiversity significance arising from the "first-cut" analysis. The condition of remnant vegetation is affected by threatening processes such as weeds, ferals, grazing and burning regime, selective timber harvesting/removal, salinity, soil erosion, and climate change.

Assessment of Criteria K with respect to the AOI is not currently included in the "Biodiversity and Conservation Values" report, as it has not been applied to the majority of Queensland due to data/information limitations and availability.

Special Area Decisions

Expert panel derived "Special Area Decisions" are used to assign values to Other Essential Criteria. The specific decisions which relate to the AOI in question are listed in the table below.

Table 15: Expert panel decisions for assigning levels of biodiversity significance with respect to the AOI

Decision Number	Description	Panel Recommended Significance	Criteria Values
eiu_l_03	Riparian ecosystems and associated areas.	State	Ib (wildlife refugia): VERY HIGH Ie (high species richness): VERY HIGH Ig (RE's with distinct variation): VERY HIGH Ii (high density of hollow-bearing trees): HIGH Ij (significant breeding or roosting sites): VERY HIGH

Expert panel decision descriptions:

Decision Number	Description
eiu_l_03	Most of the Einasleigh Uplands is dominated by open vegetation on shallow or skeletal soils. Riparian RE's associated with the larger river systems function as important refuges for many species of flora and fauna because of the relatively high nutrient levels associated with most of these areas, their better moisture balance and their generally well developed vegetation. These mesic ribbons of habitat provide an important seasonal refuge and resources for a variety of species, in particular arboreal mammals, woodland birds, hollow-roosting species and amphibians. Many raptor species preferentially nest in tall riparian trees. Riparian areas are also biogeographically significant habitat as they allow inland incursions of many east coast species into drier areas on the edge of their geographic range. Riparian areas were given a 200m buffer with the same significance rating to ensure that adjacent habitat used opportunistically by species using the riparian areas was also included. This decision includes Landscape decision 4.

Aquatic Conservation Assessments

Introduction

The Aquatic Biodiversity Assessment and Mapping Method or AquaBAMM (Clayton *et al.* 2006), was developed to assess conservation values of wetlands in queensland, and may also have application in broader geographical contexts. It is a comprehensive method that uses available data, including data resulting from expert opinion, to identify relative wetland conservation/ecological values within a specified study area (usually a catchment). The product of applying this method is an Aquatic Conservation Assessment (ACA) for the study area.

An ACA using AquaBAMM is non-social, non-economic and identifies the conservation/ecological values of wetlands at a user-defined scale. It provides a robust and objective conservation assessment using criteria, indicators and measures that are founded upon a large body of national and international literature. The criteria, each of which may have variable numbers of indicators and measures, are naturalness (aquatic), naturalness (catchment), diversity and richness, threatened species and ecosystems, priority species and ecosystems, special features, connectivity and representativeness. An ACA using AquaBAMM is a powerful decision support tool that is easily updated and simply interrogated through a geographic information system (GIS).

Where they have been conducted, ACAs can provide a source of baseline wetland conservation/ecological information to support natural resource management and planning processes. They are useful as an independent product or as an important foundation upon which a variety of additional environmental and socio-economic elements can be added and considered (i.e. an early input to broader 'triple-bottom-line' decision-making processes). An ACA can have application in:

- determining priorities for protection, regulation or rehabilitation of wetlands and other aquatic ecosystems
- on-ground investment in wetlands and other aquatic ecosystems
- contributing to impact assessment of large-scale development (e.g. dams)
- water resource and strategic regional planning prcesses

For a detailed explanation of the methodology please refer to the summary and expert panel reports relevant to the ACA utilised in this assessment. These reports can be accessed at Wetland *Info*:

http://wetlandinfo.des.qld.gov.au/wetlands/assessment/assessment-methods/aca

The GIS results can be downloaded from the Queensland Spatial Catalogue at:

https://qldspatial.information.qld.gov.au/catalogue/custom/index.page

Explanation of Criteria

Under the AquaBAMM, eight criteria are assessed to derive an overall conservation value. Similar to the Biodiversity Assessment and Mapping Methodology, the criteria may be primarily diagnostic (quantitative) or primarily expert opinion (qualitative) in nature. The following sections provide a brief description of each of the 8 criteria.

Criteria 1. Naturalness - Aquatic: This attribute reflects the extent to which a wetland's (riverine, non-riverine, estuarine) aquatic state of naturalness is affected through relevant influencing indicators which include: presence of exotic flora and fauna; presence of aquatic communities; degree of habitat modification and degree of hydrological modification.

Criteria 2. Naturalness - Catchment: The naturalness of the terrestrial systems of a catchment can have an influence on many wetland characteristics including: natural ecological processes e.g. nutrient cycling, riparian vegetation, water chemistry, and flow. The indicators utilised to assess this criterion include: presence of exotic flora and/or fauna; riparian, catchment and flow modification.

Criteria 3. Naturalness - Diversity and Richness: This criterion is common to many ecological assessment methods and can include both physical and biological features. It includes such indicators as species richness, riparian ecosystem richness and geomorphological diversity.

Criteria 4. Threatened Species and Ecosystems: This criterion evaluates ecological rarity characteristics of a wetland. This includes both species rarity and rarity of communities / assemblages. The communities and assemblages are best represented by regional ecosystems. Species rarity is determined by NCA and EPBC status with Endangered, Vulnerable or Near-threatened species being included in the evaluation. Ecosystem rarity is determined by regional ecosystem biodiversity status i.e. Endangered, Of Concern, or Not of Concern.

Criteria 5. Priority Species and Ecosystems: Priority flora and fauna species lists are expert panel derived. These are aquatic, semi-aquatic and riparian species which exhibit at least 1 particular trait in order to be eligible for consideration. For flora species the traits included:

- It forms significant macrophyte beds (in shallow or deep water).
- It is an important food source.
- It is important/critical habitat.
- It is implicated in spawning or reproduction for other fauna and/or flora species.
- It is at its distributional limit or is a disjunct population.
- It provides stream bank or bed stabilisation or has soil binding properties.
- It is a small population and subject to threatening processes.

Fauna species are included if they meet at least one of the following traits:

- It is endemic to the study area (>75 per cent of its distribution is in the study area/catchment).
- It has experienced, or is suspected of experiencing, a serious population decline.
- It has experienced a significant reduction in its distribution and has a naturally restricted distribution in the study area/catchment.
- It is currently a small population and threatened by loss of habitat.
- It is a significant disjunct population.
- It is a migratory species (other than birds).
- A significant proportion of the breeding population (>one per cent for waterbirds, >75 per cent other species) occurs in the waterbody (see Ramsar criterion 6 for waterbirds).
- Limit of species range.

See the individual expert panel reports for the priority species traits specific to an ACA.

Criteria 6. Special Features: Special features are areas identified by flora, fauna and ecology expert panels which exhibit characteristics beyond those identified in other criteria and which the expert panels consider to be of the highest ecological importance. Special feature traits can relate to, but are not solely restricted to geomorphic features, unique ecological processes, presence of unique or distinct habitat, presence of unique or special hydrological regimes e.g. spring-fed streams. Special features are rated on a 1 - 4 scale (4 being the highest).

Criteria 7. Connectivity: This criterion is based on the concept that appropriately connected aquatic ecosystems are healthy and resilient, with maximum potential biodiversity and delivery of ecosystem services.

Criteria 8. Representativeness: This criterion applies primarily to non-riverine assessments, evaluates the rarity and uniqueness of a wetland type in relation to specific geographic areas. Rarity is determined by the degree of wetland protection within "protected Areas" estate or within an area subject to the *Fisheries Act 1994*, *Coastal Protection and Management Act 1995*, or *Marine Parks Act 2004*. Wetland uniqueness evaluates the relative abundance and size of a wetland or wetland management group within geographic areas such as catchment and subcatchment.

Riverine Wetlands

Riverine wetlands are all wetlands and deepwater habitats within a channel. The channels are naturally or artificially created, periodically or continuously contain moving water, or connecting two bodies of standing water. AquaBAMM, when applied to riverine wetlands uses a discrete spatial unit termed subsections. A subsection can be considered as an area which encompasses discrete homogeneous stream sections in terms of their natural attributes (i.e. physical, chemical, biological and utilitarian values) and natural resources. Thus in an ACA, an aquatic conservation significance score is calculated for each subsection and applies to all streams within a subsection, rather than individual streams as such.

Please note, the area figures provided in Tables 16 and 17, are derived using the extent of riverine subsections within the AOI. Refer to **Map 5** for further information. A summary of the conservation significance of riverine wetlands within the AOI is provided in the following table.

Table 16: Overall level/s of riverine aquatic conservation significance

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
High	882.97	70.26
Medium	372.85	29.67

The individual aquatic conservation criteria ratings for riverine wetlands within the AOI are listed below.

Table 17: Level/s of riverine aquatic conservation significance based on selected criteria

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
1. Naturalness aquatic	0.00	0.00	1,255.81	99.93	0.00	0.00	0.00	0.00
2. Naturalness catchment	0.00	0.00	0.00	0.00	1,255.81	99.93	0.00	0.00
3. Diversity and richness	882.97	70.26	372.85	29.67	0.00	0.00	0.00	0.00
4. Threatened species and ecosystems	1,255.81	99.93	0.00	0.00	0.00	0.00	0.00	0.00
5. Priority species and ecosystems	882.97	70.26	0.00	0.00	0.00	0.00	0.00	0.00
6. Special features	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7. Connectivity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8. Representativeness	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The table below lists and describes the relevant expert panel decisions used to assign conservation significance values to riverine wetlands within the AOI.

Table 18: Expert panel decisions for assigning overall levels of riverine aquatic conservation significance

Decision number	Special feature	Catchment	Criteria/Indicator/Measure	Conservation rating (1-4)
(No Records)				

4 is the highest rating/value

Expert panel decision descriptions:

Decision number	Description
(No Records)	

Non-riverine Wetlands

Non-riverine wetlands include both lacustrine and palustrine wetlands, however, do not currently incorporate estuarine, marine or subterranean wetland types. A summary of the conservation significance of non-riverine wetlands within the AOI is provided in the following table. Refer to **Map 6** for further information.

Table 19: Overall level/s of non-riverine aquatic conservation significance

(No Records)

The following table provides an assessment of non-riverine wetlands within the AOI and associated aquatic conservation criteria values.

Table 20: Level/s of non-riverine aquatic conservation significance based on selected criteria

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
1. Naturalness aquatic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Naturalness catchment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Diversity and richness	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. Threatened species and ecosystems	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5. Priority species and ecosystems	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6. Special features	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7. Connectivity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8. Representativeness	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The table below lists and describes the relevant expert panel decisions used to assign conservation significance values to non-riverine wetlands within the AOI.

Table 21: Expert panel decisions for assigning overall levels of non-riverine aquatic conservation significance.

Decision number	Special feature	Catchment	Criteria/Indicator/ Measure	Conservation rating (1-4)
(No Records)				

4 is the highest rating/value

Expert panel decision descriptions:

Decision number	Description
(No Records)	

Threatened and Priority Species

Introduction

This chapter contains a list of threatened and priority flora and/or fauna species that have been recorded on, or within 4km of the Assessment Area.

The information presented in this chapter with respect to species presence is derived from compiled databases developed primarily for the purpose of BPAs and ACAs. Data is collated from a number of sources and is updated periodically.

It is important to note that the list of species provided in this report, may differ when compared to other reports generated from other sources such as the State government's WildNet, Herbrecs or the federal government's EPBC database for a number of reasons.

Records for threatened and priority species are filtered and checked based on a number of rules including:

- Taxonomic nomenclature - current scientific names and status,
- Location - cross-check co-ordinates with location description,
- Taxon by location - requires good knowledge of the taxon and history of the record,
- Duplicate records - identify and remove,
- Expert panels - check records and provide new records,
- Flora cultivated records excluded,
- Use precise records less than or equal to 2000m,
- Use recent records greater than or equal to 1975 animals, greater than or equal to 1950 plants.

Threatened Species

Threatened species are those species classified as "Endangered" or "Vulnerable" under the *Environment Protection and Biodiversity Conservation Act 1999* or "Endangered", "Vulnerable" or "Near threatened" under the *Nature Conservation Act 1992*.

The following threatened species have been recorded on, or within approximately 4km of the AOI.

Table 22: Threatened species recorded on, or within 4km of the AOI

(No Records)

NB. Please note that the threatened species listed in this section are based upon the most recently compiled DETSI internal state-wide threatened species dataset. This dataset may contain additional records that were not originally available for inclusion in the relevant individual BPAs and ACAs.

**JAMBA - Japan-Australia Migratory Bird Agreement; CAMBA - China-Australia Migratory Bird Agreement; ROKAMBA - Republic of Korea-Australia Migratory Bird Agreement; CMS - Convention on the Conservation of Migratory Species.*

***I - wetland indicator species; D - wetland dependent species.*

BPA Priority Species

A list of BPA priority species that have been recorded on, or within approximately 4km of the AOI is contained in the following table.

Table 23: Priority species recorded on, or within 4km of the AOI

Species	Common name	Identified flora/fauna
Brachychiton chillagoensis		FL
Climacteris picumnus	brown treecreeper	FA

Species	Common name	Identified flora/fauna
Tephrosia filipes var. (Mt Blackjack A.R.Bean+ 7332)		FL
Tephrosia juncea		FL

NB. Please note that the list of priority species is based on those species identified in the BPAs, however records for these species may be more recent than the originals used. furthermore, the BPA priority species databases are updated from time to time. At each update, the taxonomic details for all species are amended as necessary to reflect current taxonomic name and/or status changes.

ACA Priority Species

A list of ACA priority species used in riverine and non-riverine ACAs that have been recorded on, or within approximately 4km of the AOI are contained in the following tables.

Table 24: Priority species recorded on, or within 4 km of the AOI - riverine

(No Records)

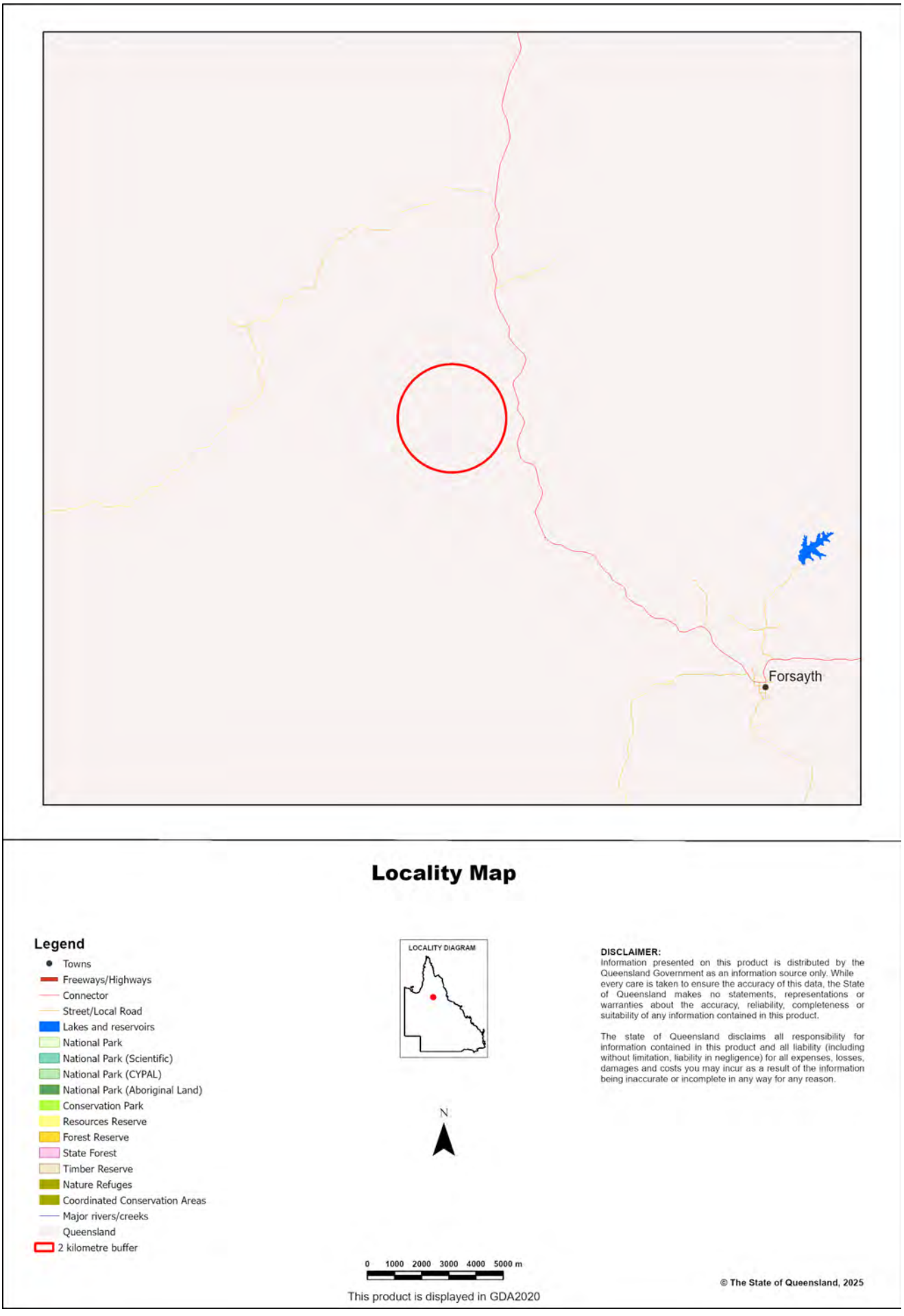
Table 25: Priority species recorded on, or within 4 km of the AOI - non-riverine

(No Records)

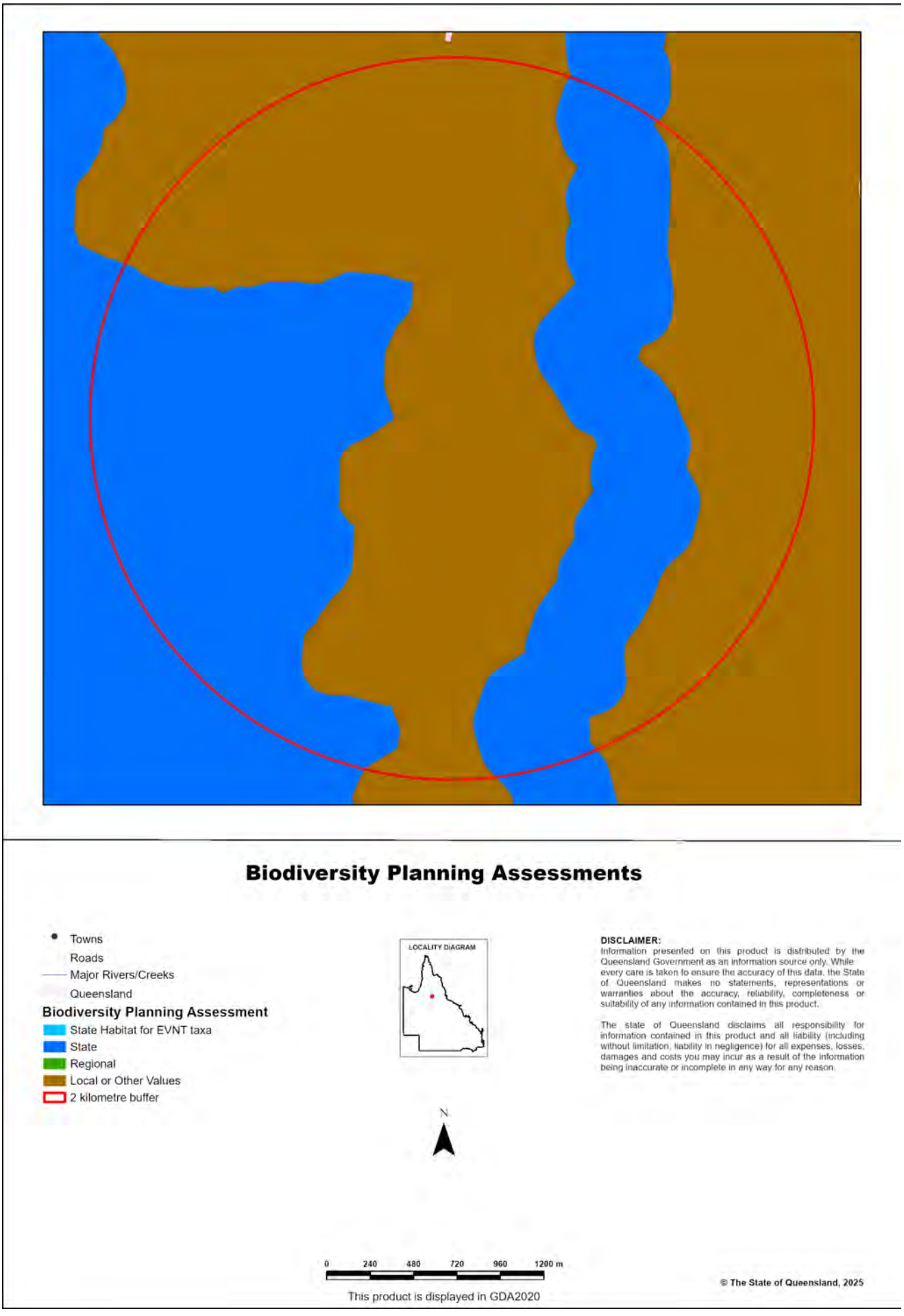
NB. Please note that the priority species records used in the above two tables are comprised of those adopted for the released individual ACAs. The ACA riverine and non-riverine priority species databases are updated from time to time to reflect new release of ACAs. At each update, the taxonomic details for all ACAs records are amended as necessary to reflect current taxonomic name and/or status changes.

Maps

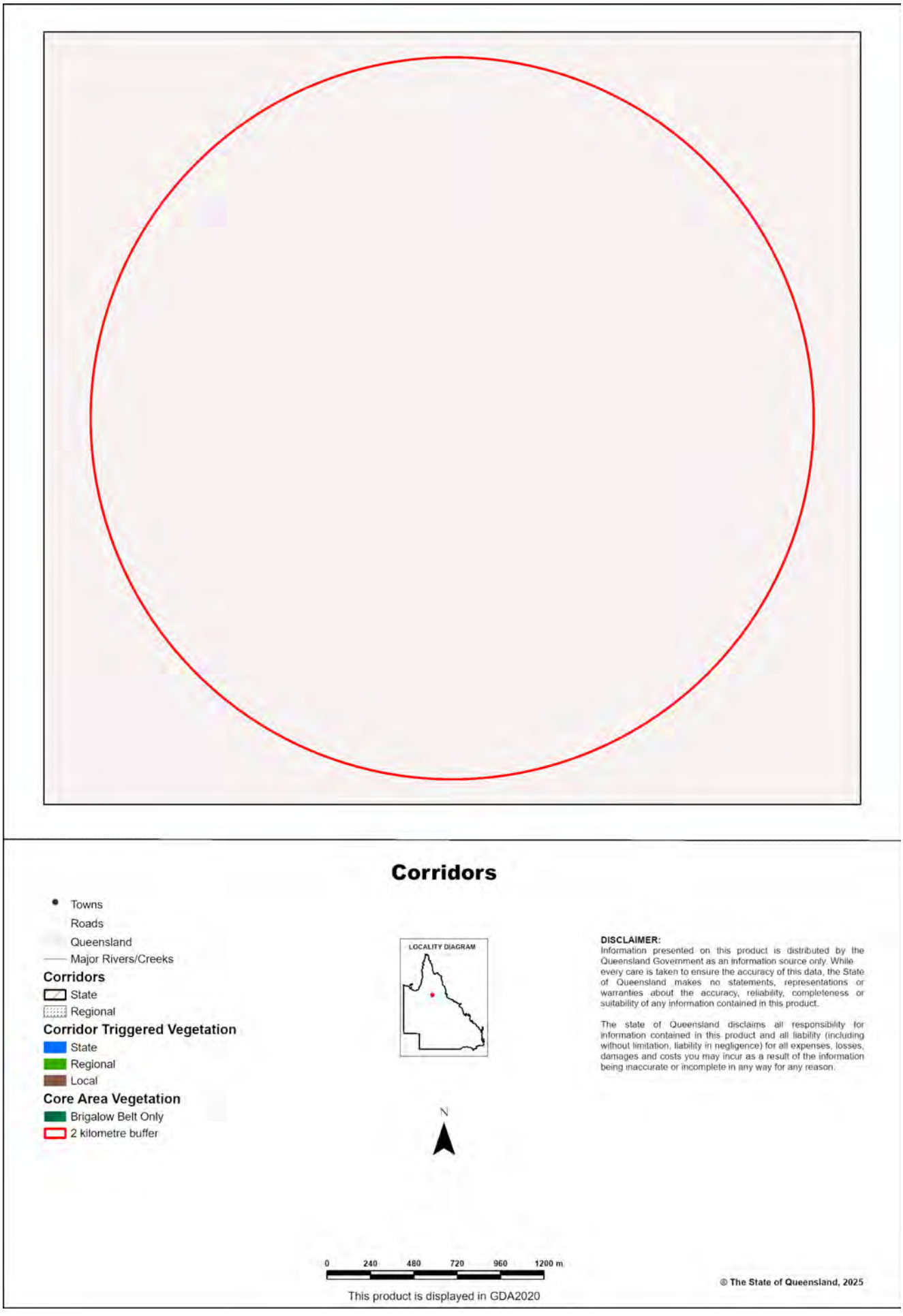
Map 1 - Locality Map



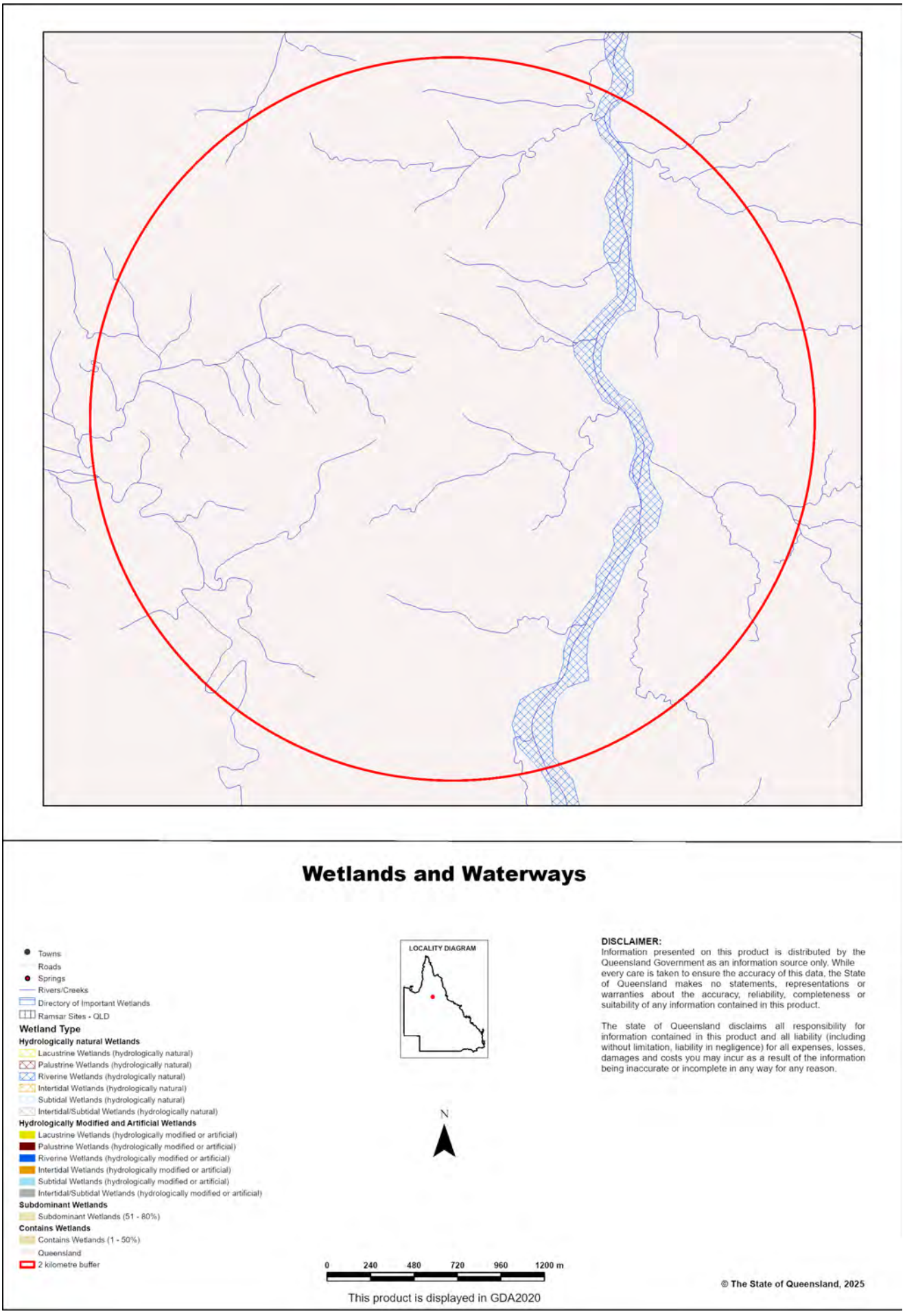
Map 2 - Biodiversity Planning Assessment (BPA)



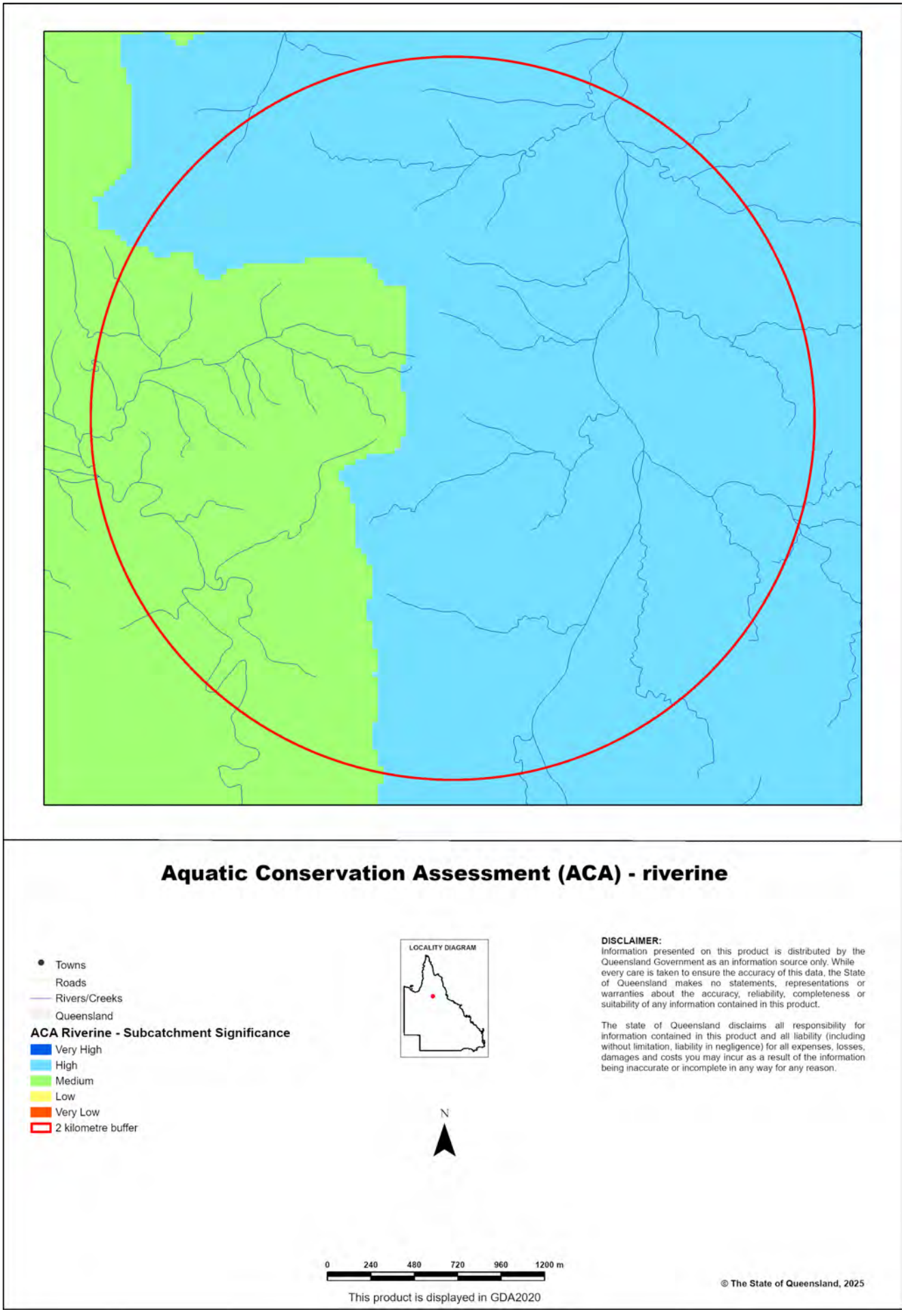
Map 3 - Corridors



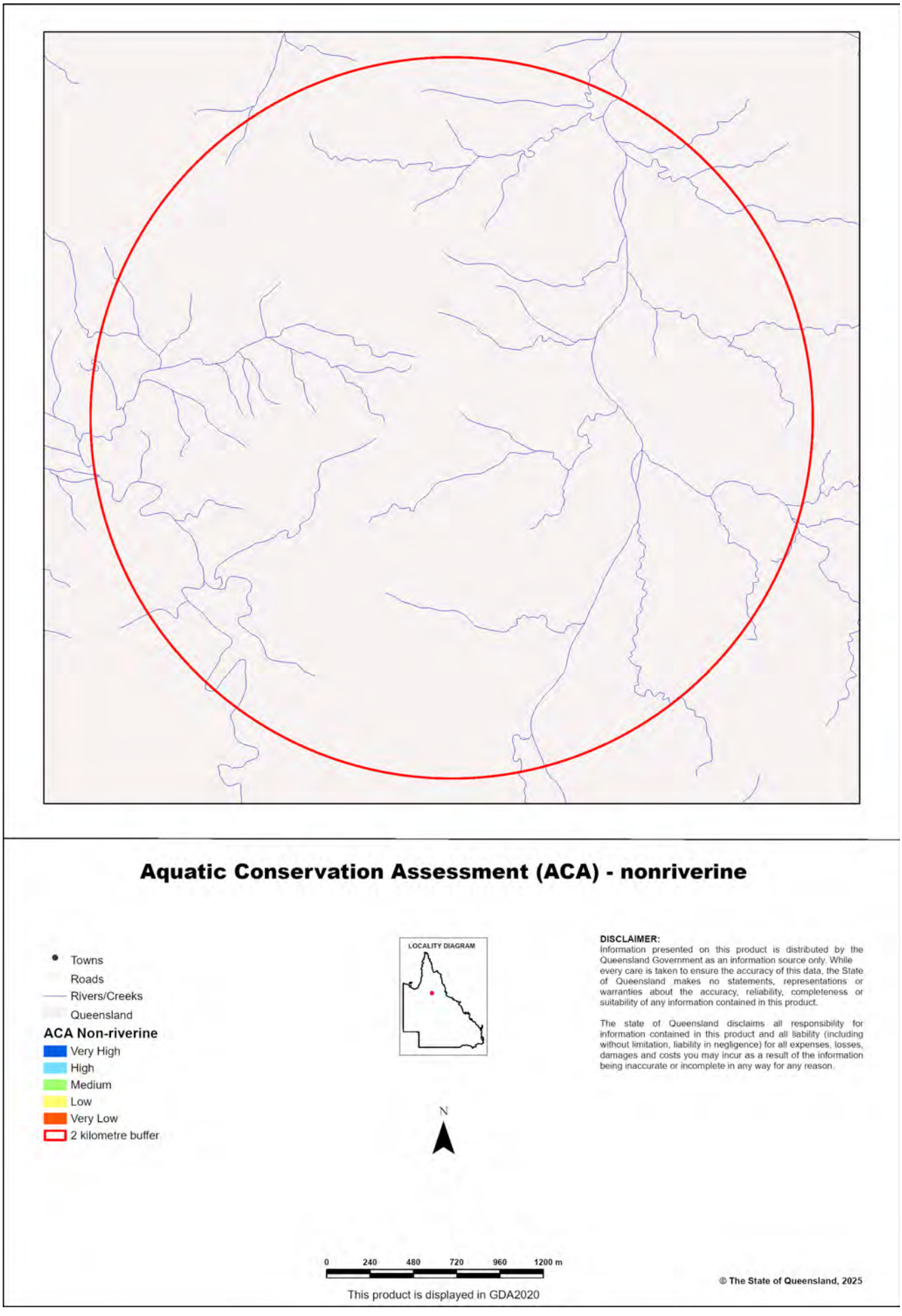
Map 4 - Wetlands and waterways



Map 5 - Aquatic Conservation Assessment (ACA) - riverine



Map 6 - Aquatic Conservation Assessment (ACA) - non-riverine



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Appendices

Appendix 1 - Source Data

Theme	Datasets
Aquatic Conservation Assessments Non-riverine*	Combination of the following datasets: Cape York Peninsula Non-riverine v1.1 Eastern Gulf of Carpentaria v1.1 Great Barrier Reef Catchment Non-riverine v1.3 Lake Eyre and Bulloo Basins v1.1 QMDBB Non-riverine ACA v2.1 Southeast Queensland ACA v1.1 WBB Non-riverine ACA v1.1 Southern Gulf Catchments Non-riverine ACA v1.1 WBBGBRCC Non-riverine ACA v2.1
Aquatic Conservation Assessments Riverine*	Combination of the following datasets: Cape York Peninsula Riverine v1.1 Eastern Gulf of Carpentaria v1.1 Great Barrier Reef Catchment Riverine v1.1 Lake Eyre and Bulloo Basins v1.1 QMDBB Riverine ACA v2.1 Southeast Queensland ACA v1.1 WBB Riverine ACA v1.1 Southern Gulf Catchments Riverine ACA v1.1 WBBGBRCC Riverine ACA v2.1
Biodiversity Planning Assessments*	Combination of the following datasets: Brigalow Belt BPA v2.1 Cape York Peninsula BPA v1.1 Central Queensland Coast BPA v1.3 Channel Country BPA v1.1 Desert Uplands BPA v1.3 Einasleigh Uplands BPA v1.1 Gulf Plains BPA v1.1 Mitchell Grass Downs BPA v1.1 Mulga Lands BPA v1.4 New England Tableland v3.1 Northwest Highlands v1.1 Southeast Queensland v4.1 Wet Tropics v1.1
Statewide BPA Corridors*	Statewide corridors v1.7
Threatened Species	An internal DETSI database compiled from Wildnet, Herbrecs, Corveg, the QLD Museum, as well as other incidental sources.
BPA Priority Species	An internal DETSI database compiled from Wildnet, Herbrecs, Corveg, the QLD Museum, as well as other incidental sources.
ACA Priority Species	An internal DETSI database compiled from Wildnet, Herbrecs, Corveg, the QLD Museum, as well as other incidental sources.

These datasets are available at:
http://dds.information.qld.gov.au/DDS

Appendix 2 - Acronyms and Abbreviations

AOI	- Area of Interest
ACA	- Aquatic Conservation Assessment
AQUABAMM	- Aquatic Biodiversity Assessment and Mapping Methodology
BAMM	- Biodiversity Assessment and Mapping Methodology
BoT	- Back on Track
BPA	- Biodiversity Planning Assessment
CAMBA	- China-Australia Migratory Bird Agreement
DETSI	- Department of the Environment, Tourism, Science and Innovation
EPBC	- *Environment Protection and Biodiversity Conservation Act 1999*
EVNT	- Endangered, Vulnerable, Near Threatened
GDA2020	- Geocentric Datum of Australia 2020
GIS	- Geographic Information System
JAMBA	- Japan-Australia Migratory Bird Agreement
NCA	- *Nature Conservation Act 1992*
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
ROKAMBA	- Republic of Korea-Australia Migratory Bird Agreement

APPENDIX E – REGIONAL ECOSYSTEMS REPORT

Queensland Government

Department of the Environment, Tourism, Science and Innovation

Environmental Reports

Regional Ecosystems

Biodiversity Status

For the selected area of interest
Longitude: 143.5 Latitude: -18.5 with 2 kilometre buffer

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the input coordinates.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 2020). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Important Note to User

Information presented in this report is based upon the Queensland Herbarium & Biodiversity Science's Regional Ecosystem framework. The Biodiversity Status has been used to depict the extent of "Endangered", "Of Concern" and "No Concern at Present" regional ecosystems in all cases, rather than the classes used for the purposes of the *Vegetation Management Act 1999* (VMA). Mapping and figures presented in this document reflect the Queensland Herbarium & Biodiversity Science's Remnant and Pre-clearing Regional Ecosystem Datasets, and not the certified mapping used for the purpose of the VMA.

For matters relevant to vegetation management under the VMA, please refer to the Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development website https://www.nrmmrrd.qld.gov.au/

Please direct queries about these reports to: Queensland.Herbarium@qld.gov.au

Disclaimer

Whilst every care is taken to ensure the accuracy of the information provided in this report, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness, or suitability, for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which the user may incur as a consequence of the information being inaccurate or incomplete in any way and for any reason.



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Summary Information

The following table provides an overview of the AOI with respect to selected topographic and environmental themes. Refer to **Map 1** for locality information.

Table 1: Details for area of interest:
Longitude: 143.5 Latitude: -18.5 with 2 kilometre buffer, with area 1256.64 ha

Local Government(s)	Catchment(s)	Bioregion(s)	Subregion(s)
Etheridge Shire	Gilbert	Einasleigh Uplands	Georgetown - Croydon

The table below summarizes the extent of remnant vegetation classed as "Endangered", "Of concern" and "No concern at present" regional ecosystems classified by Biodiversity Status within the area of interest (AOI).

Table 2: Summary table, biodiversity status of regional ecosystems within the AOI

Biodiversity Status	Area (Ha)	% of AOI
Endangered	0.00	0.00
Of concern	45.09	3.59
No concern at present	1,210.72	96.35
Total remnant vegetation	1,255.81	99.93

Refer to **Map 2** for further information.

Regional Ecosystems

1. Introduction

Regional ecosystems are vegetation communities in a bioregion that are consistently associated with particular combinations of geology, landform and soil (Sattler and Williams 1999). Descriptions of Queensland's Regional ecosystems are available online from the Regional Ecosystem Description Database (REDD). Descriptions are compiled from a broad range of information sources including vegetation, land system and geology survey and mapping and detailed vegetation site data. The regional ecosystem classification and descriptions are reviewed as new information becomes available. A number of vegetation communities may form a single regional ecosystem and may be distinguished by differences in structure or sub-dominant species in the ecologically dominant layer. Vegetation communities with different dominant species in the ecologically dominant layer may be amalgamated in to a regional ecosystem if they are not mappable and predictable in the landscape at 1:100 000 scale. Vegetation communities may be mappable at a scale larger than 1:100 000. Vegetation communities within a regional ecosystem are denoted by a letter following the regional ecosystem code (e.g. a, b, c). Vegetation communities and regional ecosystems are amalgamated into a higher level classification of broad vegetation groups (BVGs).

A published methodology for survey and mapping of regional ecosystems across Queensland (Neldner et al 2023) provides further details on regional ecosystem concepts and terminology.

This report provides information on the type, status, and extent of vegetation communities, regional ecosystems and broad vegetation groups present within a user specified area of interest. Please note, for the purpose of this report, the Biodiversity Status is used. This report has not been developed for application of the *Vegetation Management Act 1999* (VMA). Additionally, information generated in this report has been derived from the Queensland Herbarium & Biodiversity Science's Regional Ecosystem Mapping, and not the regulated mapping certified for the purposes of the VMA. If your interest/matter relates to regional ecosystems and the VMA, users should refer to the Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development website https://www.nrmmrrd.qld.gov.au/.

With respect to the Queensland Biodiversity Status,

"Endangered" regional ecosystems are described as those where:

- remnant vegetation is less than 10 per cent of its pre-clearing extent across the bioregion; or 10-30% of its pre-clearing extent remains and the remnant vegetation is less than 10,000 hectares, or
- less than 10 per cent of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss*, or
- 10-30 percent of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss and the remnant vegetation is less than 10,000 hectares; or
- it is a rare** regional ecosystem subject to a threatening process.***

"Of concern" regional ecosystems are described as those where:

- the degradation criteria listed above for 'Endangered' regional ecosystems are not met and,
- remnant vegetation is 10-30 per cent of its pre-clearing extent across the bioregion; or more than 20 per cent of its pre-clearing extent remains and the remnant extent is less than 10,000 hectares, or
- 10-30 percent of its pre-clearing extent remains unaffected by moderate degradation and/or biodiversity loss.****

and "No concern at present" regional ecosystems are described as those where:

- remnant vegetation is over 30 percent of its pre-clearing extent across the bioregion, and the remnant area is greater than 10,000 hectares, and
- the degradation criteria listed above for 'Endangered' or 'Of concern' regional ecosystems are not met.

**Severe degradation and/or biodiversity loss is defined as: floristic and/or faunal diversity is greatly reduced but unlikely to recover within the next 50 years even with the removal of threatening processes; or soil surface is severely degraded, for example, by loss of A horizon, surface expression of salinity; surface compaction, loss of organic matter or sheet erosion.*

***Rare regional ecosystem: pre-clearing extent (<1000 ha); or patch size (<100 ha and of limited total extent across its range).*

****Threatening processes are those that are reducing or will reduce the biodiversity and ecological integrity of a regional ecosystem. For example, clearing, weed invasion, fragmentation, inappropriate fire regime or grazing pressure, or infrastructure development.*

*****Moderate degradation and/or biodiversity loss is defined as: floristic and/or faunal diversity is greatly reduced but unlikely to recover within the next 20 years even with the removal of threatening processes; or soil surface is moderately degraded.*

2. Remnant Regional Ecosystems

The following table identifies the remnant regional ecosystems and vegetation communities mapped within the AOI and provides their short descriptions, Biodiversity Status, and remnant extent within the selected AOI. Please note, where heterogeneous vegetated patches (mixed patches of remnant vegetation mapped as containing multiple regional ecosystems) occur within the AOI, they have been split and listed as individual regional ecosystems (or vegetation communities where present) for the purposes of the table below. In such instances, associated area figures have been generated based upon the estimated proportion of each regional ecosystem (or vegetation community) predicted to be present within the larger mixed patch.

Table 3: Remnant regional ecosystems, description and status within the AOI

Regional Ecosystem	Short Description	BD Status	Area (Ha)	% of AOI
9.11.15b	Eucalyptus crebra and/or E. cullenii and/or E. whitei +/- Corymbia pocillum or C. erythrophloia woodland on metamorphic hills	No concern at present	298.40	23.75
9.11.16	Eucalyptus crebra +/- Corymbia erythrophloia or C. pocillum woodland on steep to rolling hills	No concern at present	33.16	2.64
9.11.23c	Eucalyptus microneura +/- Corymbia erythrophloia or C. pocillum low open woodland on rolling metamorphic hills and rises	No concern at present	398.57	31.72
9.12.6a	Eucalyptus microneura +/- Terminalia spp. +/- Corymbia spp. low open woodland on igneous hills	No concern at present	355.61	28.30
9.3.13	Melaleuca spp., Eucalyptus camaldulensis and Casuarina cunninghamiana fringing open forest on streams and channels	Of concern	45.09	3.59
9.5.10a	Eucalyptus microneura +/- Terminalia spp. low woodland on sand sheets	No concern at present	124.99	9.95

Refer to **Map 2** for further information. **Map 3** also provides a visual estimate of the distribution of regional ecosystems present before clearing.

Table 4 provides further information in regards to the remnant regional ecosystems present within the AOI. Specifically, the extent of remnant vegetation remaining within the bioregion, the 1:1,000,000 broad vegetation group (BVG) classification, whether the regional ecosystem is identified as a wetland, and extent of representation in Queensland's Protected Area Estate. For a description of the vegetation communities within the AOI and classified according to the 1:1,000,000 BVG, refer to **Table 6**.

Table 4: Remnant regional ecosystems within the AOI, additional information

Regional Ecosystem	Remnant Extent	BVG (1 Million)	Wetland	Representation in protected estate
9.11.15b	Pre-clearing 175000 ha; Remnant 2021 174000 ha	13a	Not a Wetland	Low
9.11.16	Pre-clearing 312000 ha; Remnant 2021 312000 ha	13c	Not a Wetland	Medium

Regional Ecosystem	Remnant Extent	BVG (1 Million)	Wetland	Representation in protected estate
9.11.23c	Pre-clearing 257000 ha; Remnant 2021 256000 ha	13b	Not a Wetland	Low
9.12.6a	Pre-clearing 232000 ha; Remnant 2021 231000 ha	13b	Not a Wetland	Low
9.3.13	Pre-clearing 95000 ha; Remnant 2021 93000 ha	22c	Riverine	Low
9.5.10a	Pre-clearing 109000 ha; Remnant 2021 107000 ha	18d	Not a Wetland	Medium

Representation in Protected Area Estate: High greater than 10% of pre-clearing extent is represented; Medium 4 - 10% is represented; Low less than 4% is represented, No representation.

The distribution of mapped wetland systems within the area of interest is displayed in **Map 6**.

The following table lists known special values associated with a regional ecosystem type.

Table 5: Remnant regional ecosystems within the AOI, special values

Regional Ecosystem	Special Values
9.11.15b	9.11.15: Potential habitat for NCA listed species: Cycas cairnsiana, Solanum carduiforme.
9.11.16	9.11.16: Potential habitat for NCA listed species: Labichea brassii, Macropteranthes montana.
9.11.23c	9.11.23: Potential habitat for NCA listed species: Euphorbia carissoides.
9.12.6a	9.12.6: Potential habitat for NCA listed species: Euphorbia carissoides, Macropteranthes montana.
9.3.13	9.3.13: Significant habitat as drought refuge, wildlife corridors and for arboreal animals.
9.5.10a	None

3. Remnant Regional Ecosystems by Broad Vegetation Group

BVGs are a higher-level grouping of vegetation communities. Queensland encompasses a wide variety of landscapes across temperate, wet and dry tropics and semi-arid climatic zones. BVGs provide an overview of vegetation communities across the state or a bioregion and allow comparison with other states. There are three levels of BVGs which reflect the approximate scale at which they are designed to be used: the 1:5,000,000 (national), 1:2,000,000 (state) and 1:1,000,000 (regional) scales.

A comprehensive description of BVGs is available at: https://publications.qld.gov.au/dataset/redd/resource/

The following table provides a description of the 1:1,000,000 BVGs present and their associated extent within the AOI.

Table 6: Broad vegetation groups (1 million) within the AOI

BVG (1 Million)	Description	Area (Ha)	% of AOI
13a	Woodlands and open woodlands dominated by ironbarks such Eucalyptus cullenii (Cullen's ironbark), E. staigeriana (lemon-scented ironbark) or E. melanophloia (silver-leaved ironbark) and bloodwoods such as Corymbia stockeri subsp. peninsularis, C. clarksoniana (grey bloodwood) or C. leichhardtii (rustyjacket).	298.40	23.75
13b	Woodlands to open woodlands dominated by Eucalyptus microneura (Gilbert River box) on shallow soils on rolling hills.	754.18	60.02
13c	Woodlands of Eucalyptus crebra (sens. lat.) (narrow-leaved red ironbark), E. drepanophylla (grey ironbark), E. fibrosa (dusky-leaved ironbark), E. shirleyi (shirley's silver-leaved ironbark) on granitic and metamorphic ranges.	33.16	2.64
18d	Woodlands to low open woodlands dominated by Eucalyptus microneura (Gilbert River box) sometimes with Corymbia spp.	124.99	9.95
22c	Open forests dominated by Melaleuca spp. (M. argentea (silver tea-tree), M. leucadendra (broad-leaved tea-tree), M. dealbata (swamp tea-tree) or M. fluviatilis), fringing major streams with Melaleuca saligna or M. bracteata (black tea-tree) in minor streams.	45.09	3.59

Refer to **Map 4** for further information. **Map 5** also provides a representation of the distribution of vegetation communities as per the 1:5,000,000 BVG believed to be present prior to European settlement.

4. Technical and BioCondition Benchmark Descriptions

Technical descriptions provide a detailed description of the full range in structure and floristic composition of regional ecosystems (e.g. 11.3.1) and their component vegetation communities (e.g. 11.3.1a, 11.3.1b). See: http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/technical-descriptions/

The descriptions are compiled using site survey data from the Queensland Herbarium & Biodiversity Science's QBEIS database. Distribution maps, representative images (if available) and the pre-clearing and remnant extent (hectares) of each vegetation community derived from the regional ecosystem mapping data are included. The technical descriptions should be used in conjunction with the fields from the regional ecosystem description database (REDD) for a full description of the regional ecosystem.

Technical descriptions include data on canopy height, canopy cover and native plant species composition of the predominant layer, which are attributes relevant to assessment of the remnant status of vegetation under the *Vegetation Management Act 1999*. However, as technical descriptions reflect the full range in structure and floristic composition across the climatic, natural disturbance and geographic range of the regional ecosystem, local reference sites should be used for remnant assessment where possible (Neldner et al. 2023 (PDF)* section 3.3 of: https://www.qld.gov.au/__data/assets/pdf_file/0033/459186/methodology-mapping-surveying-v7.pdf

The technical descriptions are subject to review and are updated as additional data becomes available.

When conducting a BioCondition assessment, these technical descriptions should be used in conjunction with BioCondition benchmarks for the specific regional ecosystem, or component vegetation community. http://www.qld.gov.au/environment/plants-animals/biodiversity/benchmarks/

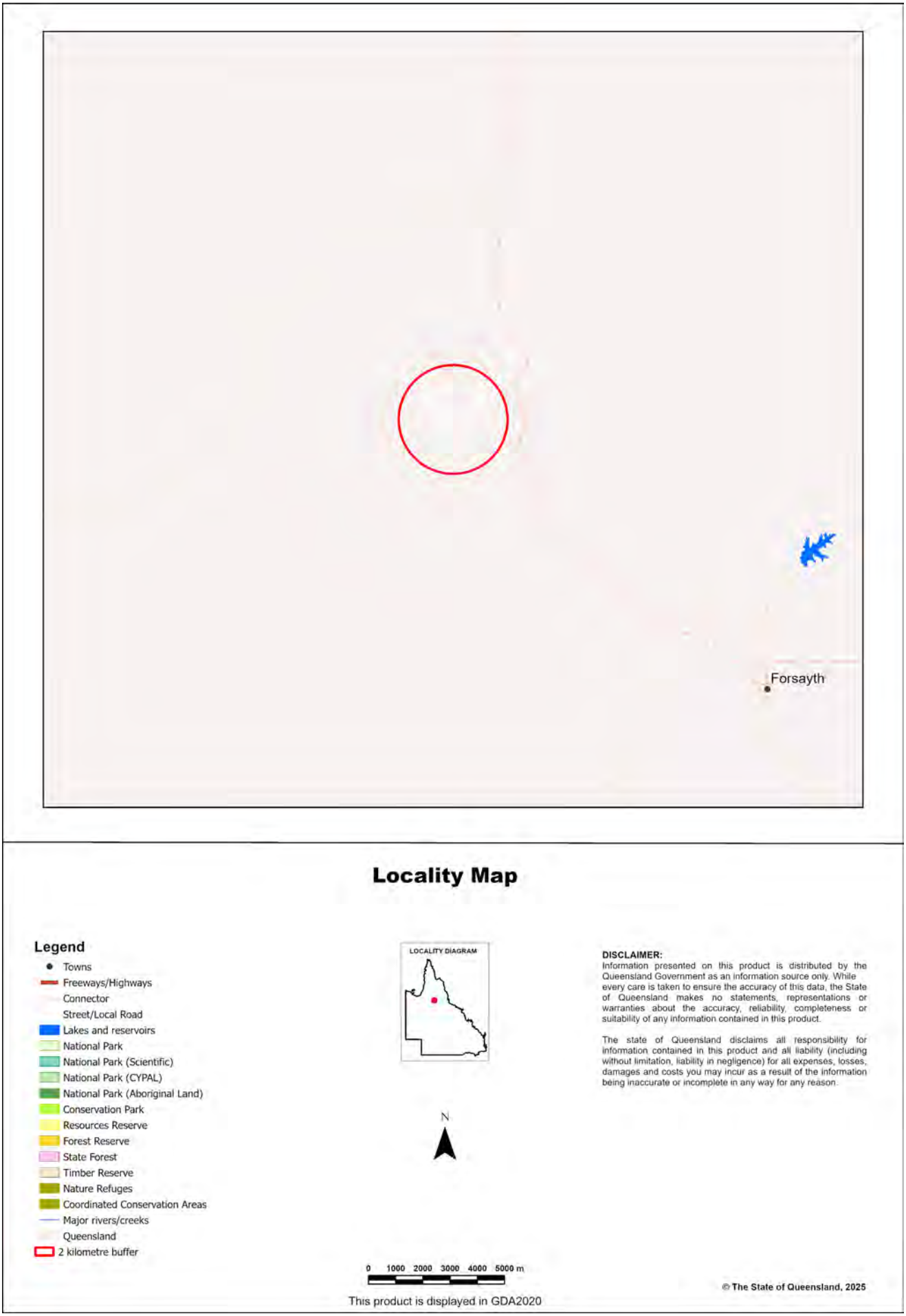
Benchmarks are based on a combination of quantitative and qualitative information and should be used as a guide only. Benchmarks are specific to one regional ecosystem vegetation community, however, the natural variability in structure and floristic composition under a range of climatic and natural disturbance regimes has been considered throughout the geographic extent of the regional ecosystem. Local reference sites should be used for this spatial and temporal (seasonal and annual) variability.

Table 7: List of remnant regional ecosystems within the AOI for which technical and biocondition benchmark descriptions are available

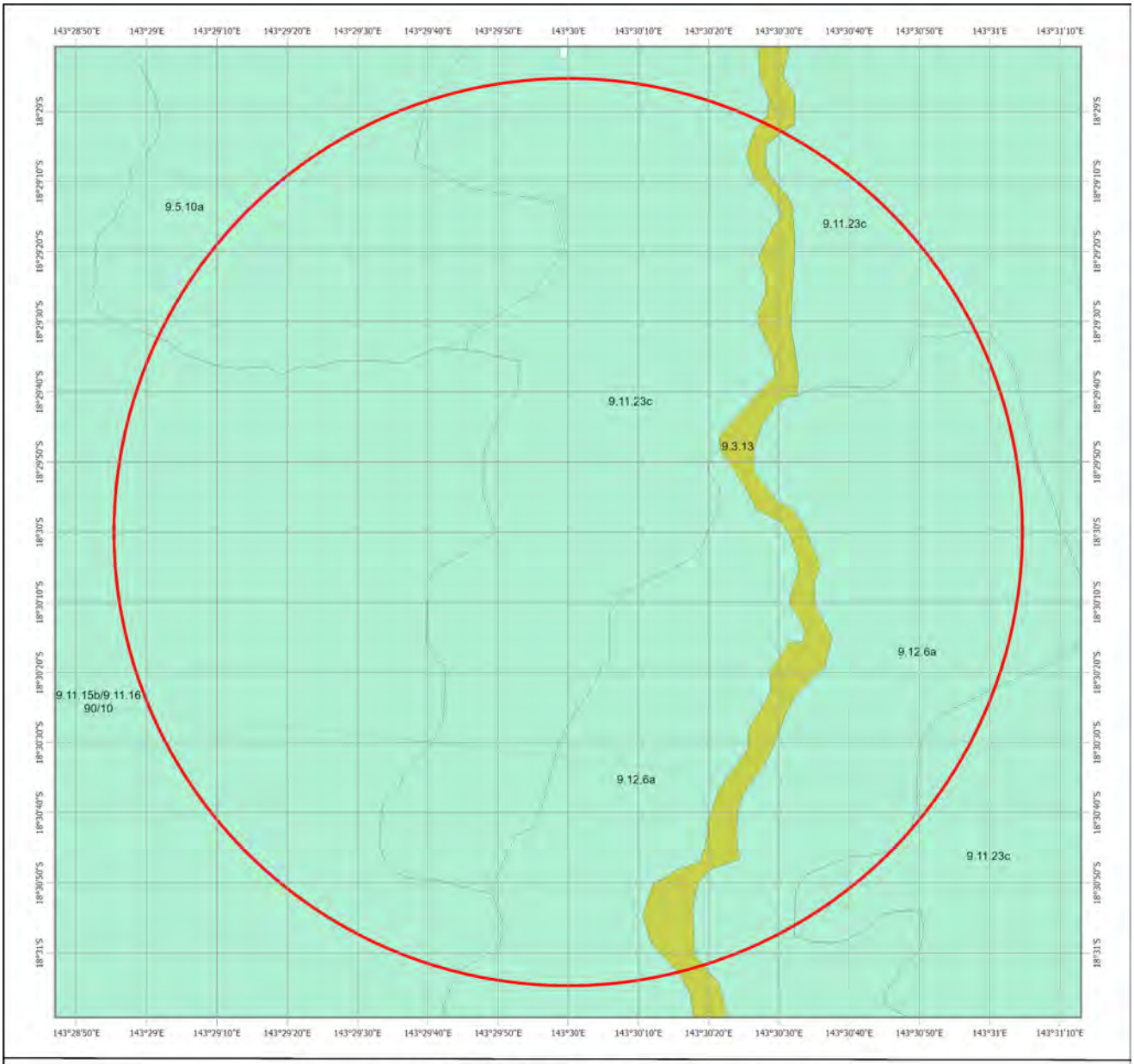
Regional ecosystems mapped as within the AOI	Technical Descriptions	Biocondition Benchmarks
9.11.15b	Available	Not currently available
9.11.16	Available	Not currently available
9.11.23c	Available	Not currently available
9.12.6a	Available	Not currently available
9.3.13	Available	Not currently available
9.5.10a	Available	Not currently available

Maps

Map 1 - Location



Map 2 - Remnant 2021 regional ecosystems



Remnant 2021 Regional Ecosystems

Biodiversity Status

- Endangered - Dominant vegetation
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- No concern at present
- Non-remnant vegetation, cultivated or built environment
- Plantation
- Water
- Cadastral Boundaries
- 2 kilometre buffer

LOCALITY DIAGRAM

N

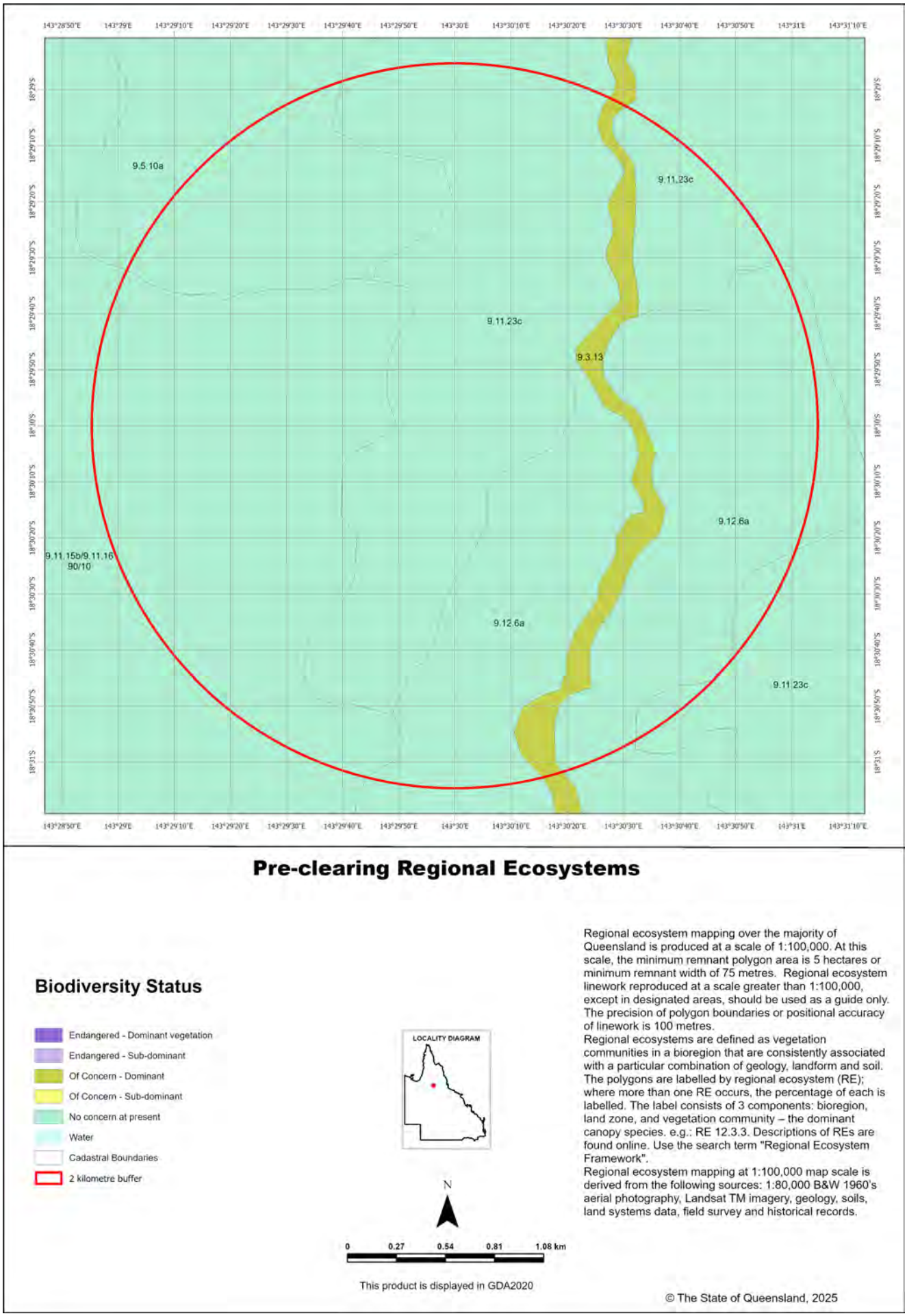
0 0.27 0.53 0.8 1.06 km

This product is projected into GDA2020

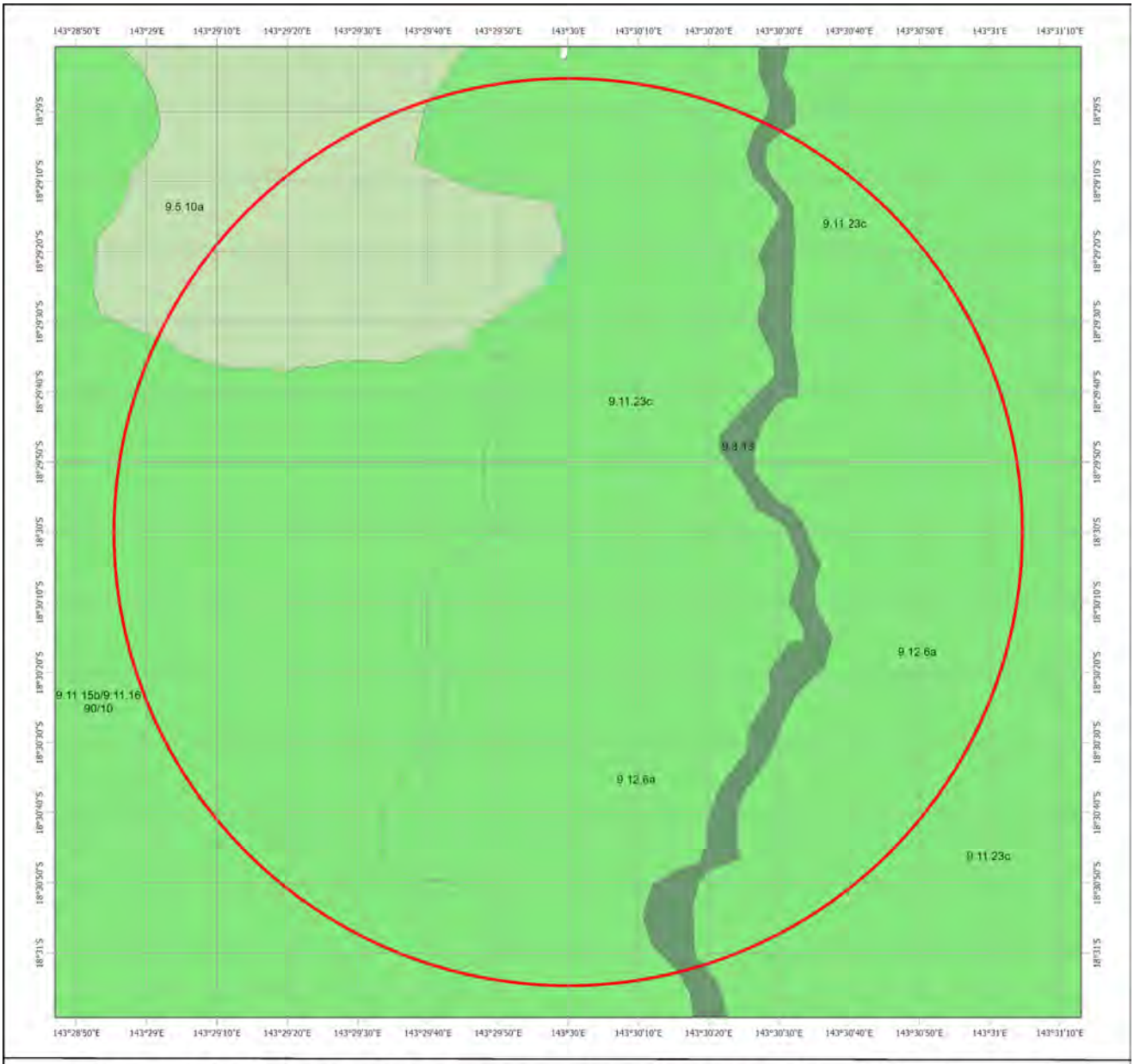
Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.
Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. The polygons are labelled by regional ecosystem (RE); where more than one RE occurs, the percentage of each is labelled. The label consists of 3 components: bioregion, land zone, and vegetation community – the dominant canopy species. e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".
Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.

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Map 3 - Pre-clearing regional ecosystems



Map 4 - Remnant 2021 regional ecosystems by BVG (5M)



Remnant 2021 Regional Ecosystems coloured by Broad Vegetation Groups

Broad Vegetation Groups
BVG5M Description (BVG1M codes)

1. Rainforests and scrubs (1-7b)
2. Wet eucalypt open forests (8-8b)
3. Eucalypt woodlands to open forests (mainly eastern Qld) (9-15b)
4. Eucalypt open forests to woodlands on floodplains (16-16d)
5. Eucalypt dry woodlands on inland depositional plains (17-18d)
6. Eucalypt low open woodlands usually with spinifex understorey (19-19d)
7. Callitris woodland - open forests (20a)
8. Melaleuca open woodlands on depositional plains (21-22c)
9. Acacia aneura (mulga) dominated open forests, woodlands and shrublands (23-23b)
10. Other acacia dominated open forests, woodlands and shrublands (24-26a)
11. Mixed species woodlands, open woodland - (inland bioregions) includes wooded downs (27-27c)
12. Other coastal communities or heaths (28-29b)
13. Tussock grasslands, forblands (30-32b)
14. Hummock grasslands (33-33b)
15. Wetlands (swamps and lakes) (34-34g)
16. Mangroves and saltmarshes (35-35b)

Non-remnant vegetation, cultivated or built environment
Water
Cadastral Boundaries
2 kilometre buffer

LOCALITY DIAGRAM

N

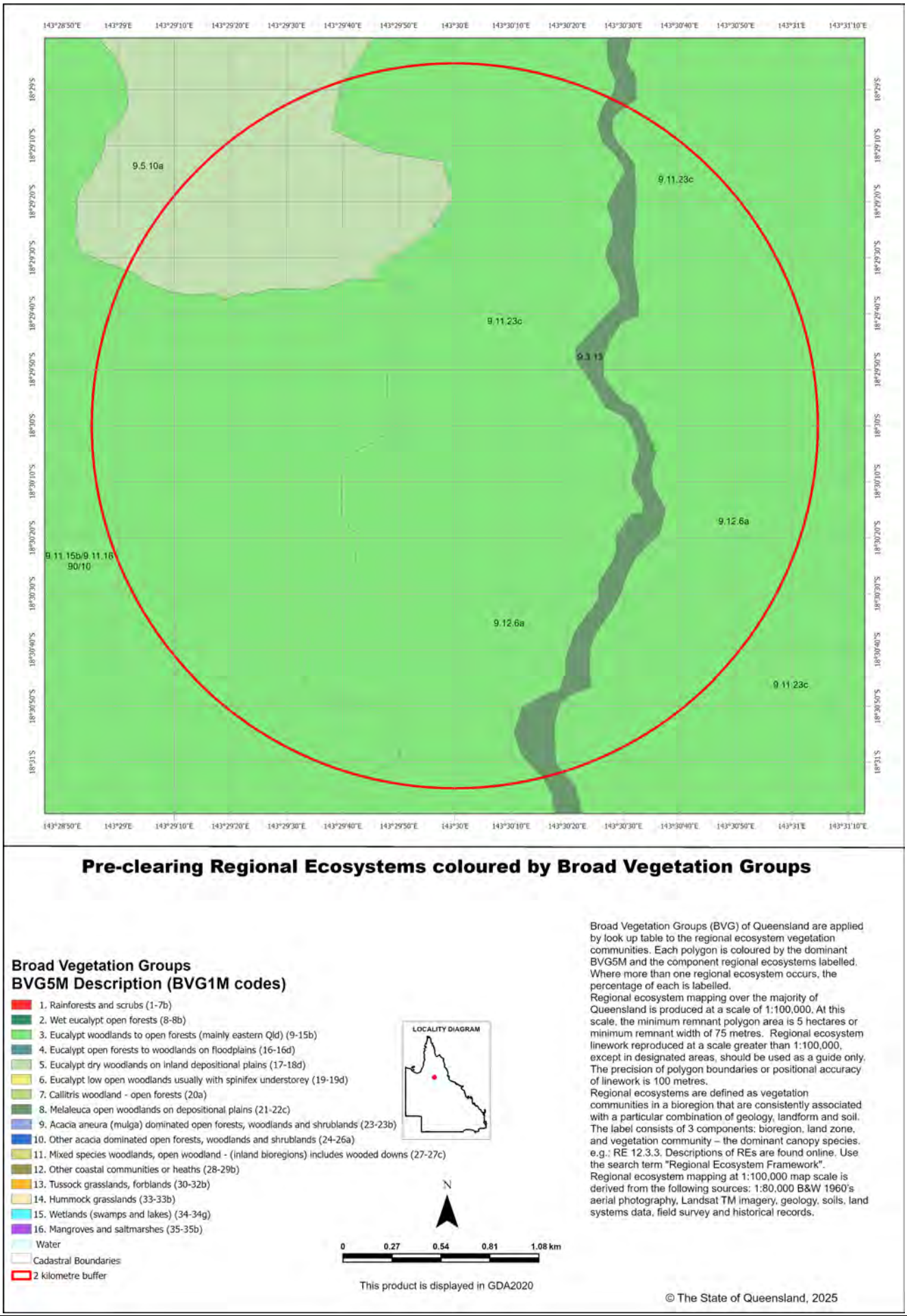
0 0.27 0.53 0.8 1.06 km

This product is displayed in GDA2020

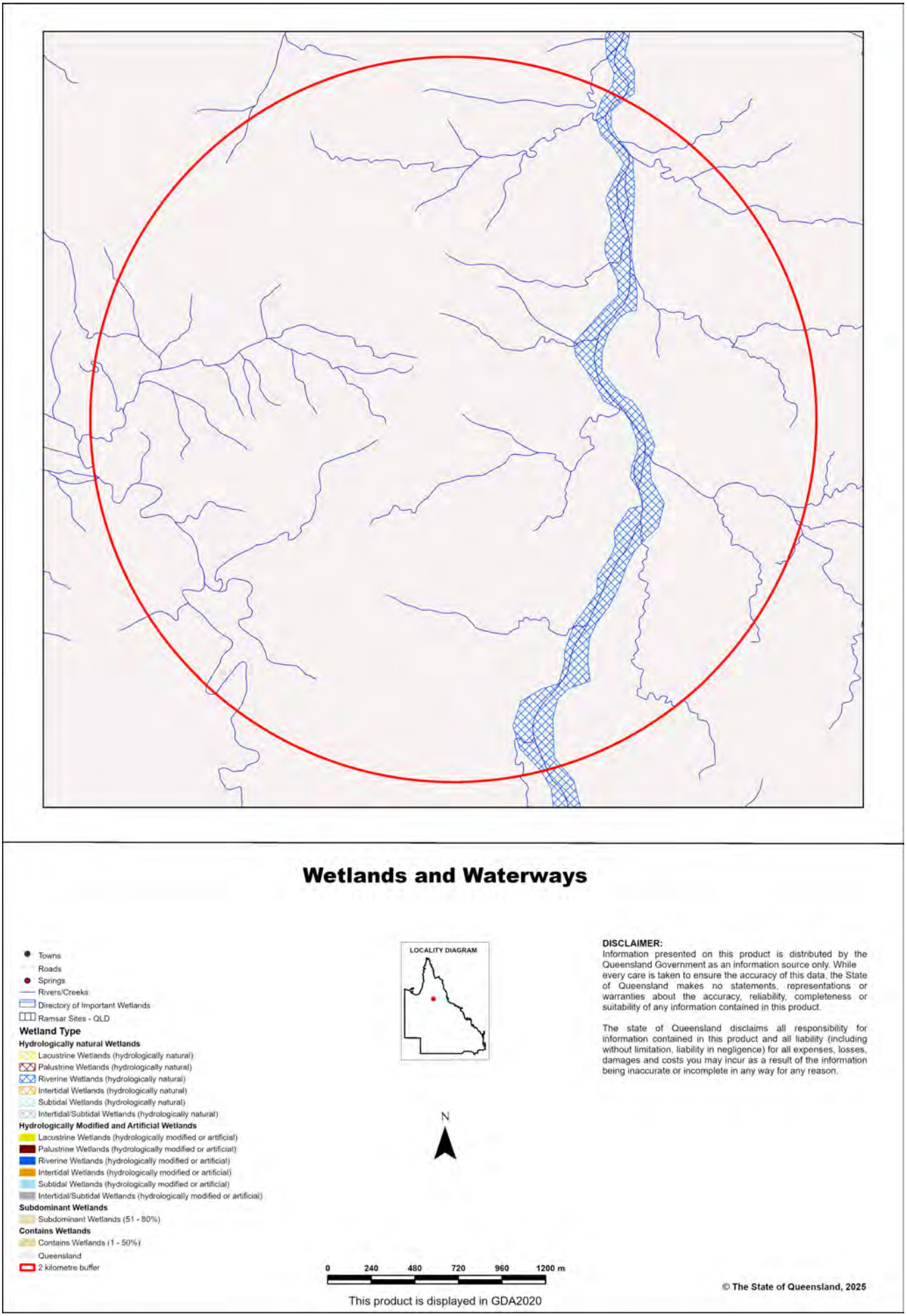
Broad Vegetation Groups (BVG) of Queensland are applied by look up table to the regional ecosystem vegetation communities. Each polygon is coloured by the dominant BVG5M and the component regional ecosystems labelled. Where more than one regional ecosystem occurs, the percentage of each is labelled.
Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.
Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil.
The label consists of 3 components: bioregion, land zone, and vegetation community – the dominant canopy species. e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".
Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.
Remnant woody vegetation is defined as vegetation that has not been cleared or vegetation that has been cleared but where the dominant canopy has >70% of the height and >50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy.
Non-remnant vegetation includes regrowth and disturbed native vegetation.

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Map 5 - Pre-clearing regional ecosystems by BVG (5M)



Map 6 - Wetlands and waterways



Links and Other Information Sources

The Department of the Environment, Tourism, Science and Innovation's Website - http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/ provides further information on the regional ecosystem framework, including access to links to the Regional Ecosystem Database, Broad Vegetation Group Definitions, Regional Ecosystem and Land zone descriptions.

Descriptions of the broad vegetation groups of Queensland can be downloaded from: https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/broad-vegetation

The methodology for mapping regional ecosystems can be downloaded from: https://www.qld.gov.au/__data/assets/pdf_file/0033/459186/methodology-mapping-surveying-v7.pdf

Technical descriptions for regional ecosystems can be obtained from: http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/technical-descriptions/

Benchmarks can be obtained from: http://www.qld.gov.au/environment/plants-animals/biodiversity/benchmarks/

For further information associated with the remnant regional ecosystem dataset used by this report, refer to the metadata associated with the Biodiversity status of pre-clearing and Remnant Regional Ecosystems of Queensland dataset (version listed in **Appendix 1**) which is available through the Queensland Spatial Catalogue, Queensland Spatial Catalogue : Queensland Government (information.qld.gov.au)

The Queensland Globe is a mapping and data application. As an interactive online tool, Queensland Globe allows you to view and explore Queensland maps, imagery (including up-to-date satellite images) and other spatial data, including regional ecosystem mapping. To further view and explore regional ecosystems over an area of interest, access the Biota Globe (a component of the Queensland Globe). The Queensland Globe can be accessed via the following link: https://qldglobe.information.qld.gov.au/

References

Neldner, V.J., Niehus, R.E., Wilson, B.A., McDonald, W.J.F., Ford, A.J. and Accad, A. (2023). The Vegetation of Queensland. Descriptions of Broad Vegetation Groups. Version 6.0. Queensland Herbarium, Department of Environment and Science. (https://publications.qld.gov.au/dataset/redd/resource/78209e74-c7f2-4589-90c1-c33188359086)

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Sattler, P.S. and Williams, R.D. (eds) (1999). *The Conservation Status of Queensland's Bioregional Ecosystems.* Environmental Protection Agency, Brisbane.

Appendices

Appendix 1 - Source Data

The dataset listed below is available for download from:
http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/download/

- Regional Ecosystem Description Database

The datasets listed below are available for download from:
Queensland Spatial Catalogue : Queensland Government (information.qld.gov.au)

- Biodiversity status of pre-clearing and 2021 remnant regional ecosystems of Queensland
- Pre-clearing Vegetation Communities and Regional Ecosystems of Queensland
- Queensland Wetland Data Version - Wetland lines
- Queensland Wetland Data Version - Wetland points
- Queensland Wetland Data Version - Wetland areas
- Pre-clearing broad vegetation groups of Queensland
- Remnant 2021 broad vegetation groups of Queensland

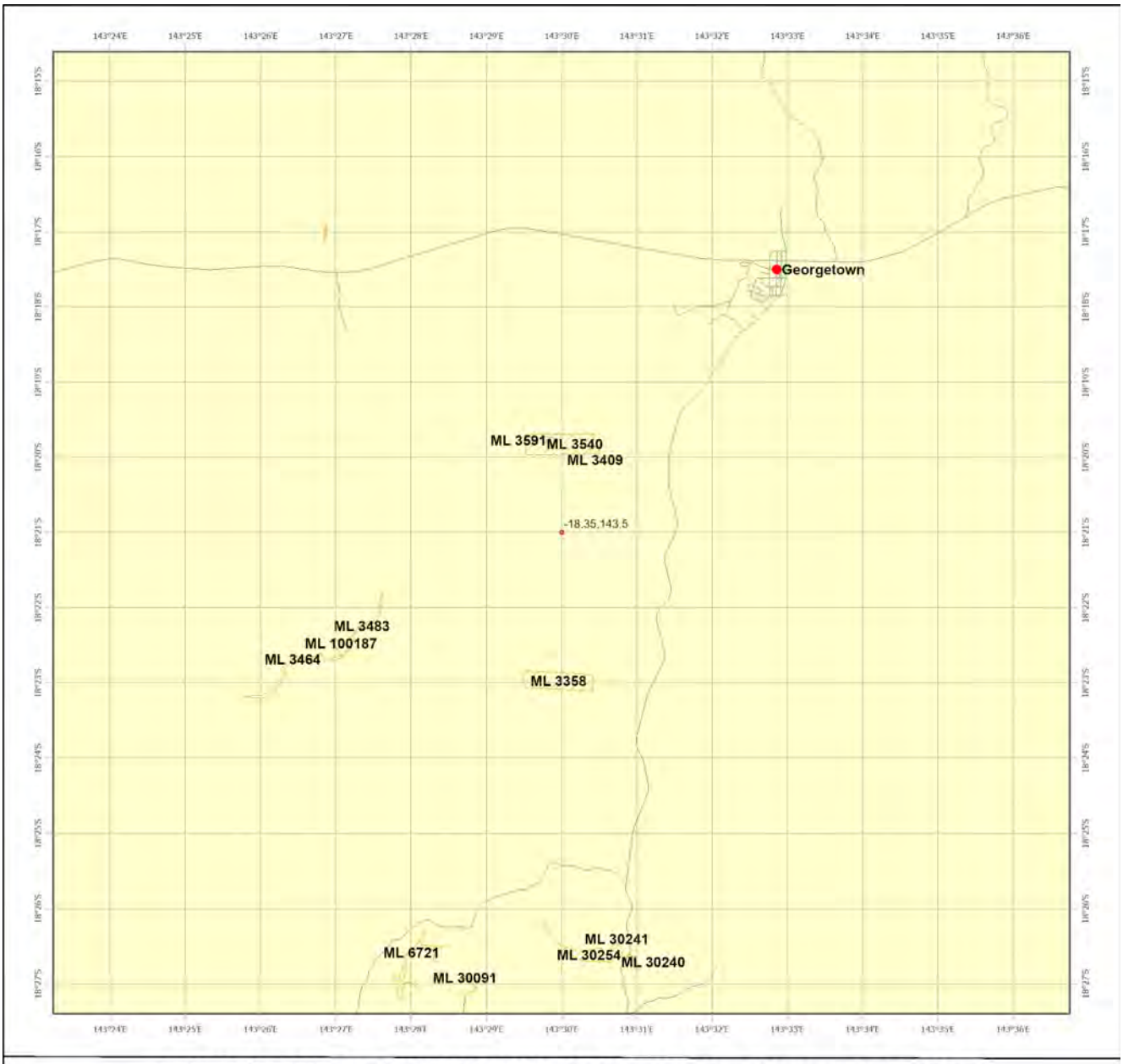
Appendix 2 - Acronyms and Abbreviations

AOI - Area of Interest
GIS - Geographic Information System
RE - Regional Ecosystem
REDD - Regional Ecosystem Description Database
VMA - *Vegetation Management Act 1999*

APPENDIX F – ENVIRONMENTALLY SENSITIVE AREAS MAP

Tenure type: Mining Lease
Centred on point position: Longitude: 143.5 Latitude: -18.35

Map produced: 15/05/2025 20:49:50



ENVIRONMENTALLY SENSITIVE AREAS - Mining Activities

CATEGORY A
- National Parks
- Conservation Parks
- Forest Reserves
- Special Wildlife Reserve
- Wet Tropics World Heritage Area
- Great Barrier Reef Region
- Marine Parks other than General Use Zones

CATEGORY B
- Queensland Heritage Register Places
- Ramsar Sites
- Cultural Heritage Registered Areas and DLA's other than Stanbroke
- Special Forestry Areas
- Seaward Side of Highest Astronomical Tide
- Fish Habitat Areas
- Coordinated Conservation Areas
- Endangered Regional Ecosystems - regrowth and remnant (Biodiversity Status)
- General Use Zones of Marine Parks
- Marine Plants
- Coordinates
- Mining Leases

CATEGORY C
- Nature Refuges
- Resources Reserve
- State Forests
- Timber Reserves
- River Improvement Areas
- Stanbroke DLA
- Coastal Management District
- Dams and Weirs

OTHERS
- Towns
- Roads
- Repealed Wild River Nominated Waterways
- Repealed Wild River Preservation Areas
- Repealed Wild River High Preservation Areas
- Mahogany Glider Habitat
- Directory of Important Wetlands
- Queensland

LOCALITY DIAGRAM

N

0 1,000 2,000 3,000 4,000 5,000 m

This product is displayed in GDA2020

Information presented on this product is distributed by the Queensland Government as an information source only. While every care is taken to ensure the accuracy of this data, The State of Queensland makes no statements, representations or warranties about the accuracy, reliability, completeness or suitability of any information contained in this product.

The State of Queensland disclaims all responsibility for information contained in this product and all liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs you may incur as a result of the information being inaccurate or incomplete in any way for any reason.

NOTE TO USER: Themes presented in this map are indicative only. Field survey may be required to verify the 'true' spatial extent and value. Not all environmentally sensitive areas are presented in this map. A user should refer to the particular circumstances relevant to their situation to assess the 'completeness' of themes provided.

The user should note that some boundaries and indicated values are ambient and may change over time (e.g. regional ecosystem boundaries and conservation status, watercourse mapping etc.).

The user should be aware that due to multiple overlapping themes/ layers present, some themes/layers may be obscured by others. Ordering in the Legend does not accurately reflect the order by which themes/layers are displayed.

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Queensland Government

APPENDIX G – ANCOLD 2012 CCA EXPLANATORY TABLES [2]

G1 Total infrastructure costs

Total infrastructure costs are considered for residential and commercial as well as community infrastructure. Costs associated with replacement or repair to the dam are also included.

TYPE	MINOR	MEDIUM	MAJOR	CATASTROPHIC
See Below	< $10M	$10M - $100M	$100M - $1B	> $1B

Explanatory Notes for Infrastructure Costs

TYPE	DESCRIPTION
Residential	Total number of houses affected, some destroyed and others damaged.
Commercial	Including businesses and agriculture, E.g. retail, manufacturing, resources. Loss of stock and/or produce as a direct result of the flood wave.
Community infrastructure	Such as roads, railways, power, communications, gas, water supply, sewerage, irrigation, drainage, schools, hospitals, community facilities and public buildings.
Dam replacement or repair cost	Repairs to the embankment or wall and appurtenant works which will return the dam to its previous level of service.
Residential	Total number of houses affected, some destroyed and others damaged.

G2 Impact on Dam Owner's Business

IMPACT	MINOR	MEDIUM	MAJOR	CATASTROPHIC
Importance to the business	Restrictions needed during dry periods	Restrictions needed during peak days and peak hours	Essential to maintain supply	Dissolution of business / entity
Effect on services provided by the owner	Minor difficulties in replacing services	Reduced services are possible with reasonable restrictions	Severe restrictions would be applied for at least one year	Services cannot be replaced or cannot get services from another source
Effect on continuing credibility	Some reaction but short lived	Severe widespread reaction	Extreme discontent	Total loss of confidence and credibility
Community reaction and political implications	Some reaction but short lived	Severe widespread reaction	Extreme discontent	Total loss of confidence and credibility
Impact on financial viability	Able to absorb in one financial year	Significant with considerable	Severe to crippling in the long term	Bankruptcy

		impact in the long term		
Value of water in the storage	Can be absorbed in one financial year	Loss of income for at least 1 year	Loss of income for more than 1 year	Bankruptcy

Explanatory Notes for Dam Owner's Business

TYPE	DESCRIPTION
Importance to the business	Loss of storage is likely to affect the service provided to some degree. It may be appropriate to increase the severity level because of the importance of the reservoir. However, a less vital water resource may lead to a reduction in the severity of the cost of replacement or repair.
Effect on services provided by the owner	Water supply, power or recreational facility is no longer available or disrupted to a proportion of the community supplied by the agency.
Effect on continuing credibility	Standing or reputation of the organisation in the community.
Community reaction and political implications	There may be community objection to replacement of the dam. Also, the relationship between the dam owner and local, state and federal legislature.
Impact on financial viability	Economic and legal liability; ability to meet the costs of repairs and damage; ability to meet claims from others.
Value of water in the storage	Loss of income from the loss of the stored water.

G3 Health and Social Impacts

IMPACT	MINOR	MEDIUM	MAJOR	CATASTROPHIC
Human health	<100 people affected	100 to 1000 people affected	>1000 people affected for greater than one month	>10 000 people affected for a year or more
Loss of services to the community	<100 people affected	100 to 1000 people affected	>1000 people affected for greater than one month	>10 000 people affected for a year or more
Cost of emergency management	<1000 person days	1000 to 10 000 person days	>10 000 person days	>100 000 person days
Dislocation of people	<100 person months	100 to 1000 person months	>1000 person months	>10 000 person months

Dislocation of businesses	<20 business months	20 to 200 business months	>200 business months and some business failures	Numerous business failures
Employment affected	<100 jobs lost	100 to 1000 jobs lost	>1000 jobs lost	>10 000 jobs lost
Loss of heritage	Local facility	Regional facility	National facility	International facility
Loss of recreational facility	Local facility	Regional facility	National facility	International facility

Explanatory Notes for Health and Social Impacts

TYPE	DESCRIPTION
Human Health	Human health could be affected by: ➢ Contamination of drinking water ➢ Failure or lack of water supplies, sewage treatment works, power. Contamination of services such as food, health, recreation areas and facilities caused by the uncontrolled release of sewage, industrial or toxic waste as a result of a dambreak.
Loss of services to the community	Loss of gas/power/communications and transport. Distribution of medical supplies, food, especially perishable food items.
Cost of emergency management	Police, Emergency Services and volunteers will incur a cost both direct and indirect.
Dislocation of people	People whose homes are destroyed or damaged will need to be re-housed or billeted for various times.
Dislocation of businesses	Businesses will be prevented from trading in the short term and may be affected in the long term.
Employment affected	Loss of employment

G4 Environmental Impacts

IMPACT	MINOR	MEDIUM	MAJOR	CATASTROPHIC
Area of impact	< 1 km^2	< 5 km^2	< 20 km^2	> 20 km^2
Duration of impact	< 1 year	< 5 years	< 20 years	>20 years
Stock and fauna	Discharge from dambreak would not contaminate water supplies	Discharge from dambreak would contaminate water supplies used by stock	Discharge from dambreak would contaminate water supplies used by stock and fauna with contaminant uptake.	Discharge from dambreak would contaminate water supplies used by stock

IMPACT	MINOR	MEDIUM	MAJOR	CATASTROPHIC
	used by stock and fauna.	and fauna. Health impacts not expected.		and fauna with contaminant uptake and measurable health impacts expected.
Ecosystems	Discharge from dambreak is not expected to impact on ecosystems. Remediation possible.	Discharge from dambreak would have short term impacts on ecosystems with natural recovery expected after one wet season. Remediation possible.	Discharge from dambreak would have significant impacts on ecosystems with natural recovery expected with natural recovery expected after several wet seasons. Remediation possible over many years.	Discharge from dambreak would have significant permanent impacts on ecosystems. Remediation involves altered ecosystems.
Rare and endangered species	Species exist but minimal damage expected. Recovery within one year.	Species exist with losses expected to be recovered over a number of years.	Rare and endangered species will be severely impacted. Recovery will take many years	Endangered species will be lost from the area. Permanent loss of species will occur

Explanatory Notes for Environmental Impacts

TYPE	DESCRIPTION
Area of impact	Land damaged by dam failure exclusive of land prone to natural flooding. For tailings dams, the damage will relate to the toxicity of the material in relation to both area of impact and the depth of penetration of the toxic materials.
Duration of impact	Habitats may take a long time to recover (e.g. Substantial erosion, deposition of flood borne materials). The duration of the impact will also relate to the toxicity of discharged material (e.g. saline, tailings, sewerage, cold water, deoxygenated water).
Stock and fauna	Stock and fauna may ingest contaminated water/fodder. Stock may need to be removed from the area or destroyed. Contaminants may cause damage in relation to reproduction cycle. The impact on stock and fauna may not be immediately identified unless testing of food source is carried out.
Ecosystems	Includes organisms and non-living components which interact to form a stable system. Consideration should be given to their environment, habitat, breeding grounds and food chain.
Rare and endangered species	Information can be gained from state and federal government agencies in relation to areas known to contain rare and endangered flora and fauna.
Area of impact	Land damaged by dam failure exclusive of land prone to natural flooding. For tailings dams, the damage will relate to the toxicity of the material in relation to both area of impact and the depth of penetration of the toxic materials.

APPENDIX H – FORM OF CERTIFICATION

Form of Certification (Consequence Category Assessment)

Georgetown Gold Mine – Phase 2 TSF Raise to RL 326 m- Feasibility Study

Name of Registered Professional Engineer providing certification:

Mohsen Moogui

Address of Registered Professional Engineer providing certification:

Geotails Consulting Pty Ltd
2/213 Taringa Parade, Taringa, QLD 4068

Statement of Relevant Experience

I hereby state that I am a Registered Professional Engineer of Queensland (RPEQ No. 14397) and meet the requirements of a suitably qualified and experienced person as defined under the relevant legislation and guidelines.

Statement of Certification

All relevant information and material relied upon for this certification is provided and/or referenced in the attached report titled:
Savannah Goldfields, Georgetown Gold Mine, Phase 2 TSF Raise to RL 326 m – Feasibility Study, Dam Break Analysis and Consequence Category Assessment, Reference No. 2201-GTG-09-REP01-Rev0, dated 16 March 2026.

I, Mohsen Moogui, hereby certify that the Consequence Category Assessment or the Georgetown Gold Mine Phase 2 TSF Expansion (3 m Raise to RL 326 m) has been prepared in accordance with the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (ESR/2016/1933, Version 5.03, 23 February 2024) published by the Queensland administering authority , and with reference to the Australian National Committee on Large Dams (ANCOLD), *Guidelines on the Consequence Categories for Dams* (ANCOLD, 2012).

I, Mohsen Moogui, declare that the information provided as part of this certification is true to the best of my knowledge. I acknowledge that it is an offence under Section 480 of the *Environmental Protection Act 1994* to give the administering authority a document containing information that I know is false, misleading or incomplete in a material particular.

Signed:

Mohsen Moogui

RPEQ No. 14397

Date: 16 March 2026

EA AND PRCP AMENDMENT APPLICATION SUPPORTING INFORMATION REPORT

KEMPTON MINERALS PTY LTD

Appendix 3 Updated Plant Site Final Site Design Map and Reference Map

764000

765000

7972000

7971000

ML 3591 (Comstock)

ML 3540
(Big Ben)

ML 3409 (Black Blow)

**Post Mining Land Uses &
Non-Use Management Areas**

- PMLU - Native Bushland which may support low intensity grazing (undisturbed)
- PMLU - Native Bushland which may support low intensity grazing
- PMLU - Permanent infrastructure
- PMLU - Water storage
- Black Blow Pit: PMLU - Other, NUMA
- Maximum Disturbance Footprint

Service Layer: Source: Esri, Vantor, Earthstar Geographics, and the GIS User Community

0 100 200 300 400 500
m

SAVANNAH GOLDFIELDS LIMITED

Georgetown Gold Project PRCP

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GDA2020, MGA Zone 54

Figure 1
Final Site Design Plant Site
(ML3409, ML3540, ML3591)

- Georgetown Gold Project Mining Lease
- Floodplain Assessment Overlay (not within map extent)

Cooktown
Cairns
Innisfail
Townsville

Drawn By: Chris Schlebusch
Requested by: Jacob Arnold
Date: 24/04/2026

Sheet No.
RTPL_ARD_SVG006_EAAMAP_1008_1A

Data sources:
©The State of Queensland (Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development)

Path: S:\Plans\Project_Specific\Ardent\SVG006\EA Amendment 2026\RTPL_ARD_SVG006_EAAMAP_1008_A A3P PMLU and NUMA Series.aprx

764000

765000

7972000

7971000

ML 3591 (Comstock)

ML 3540
(Big Ben)

ML 3409 (Black Blow)

Rehabilitation / Improvement Area

- IA3 – Black Blow Pit
- RA1 – Previously backfilled pits and TSF - rehabilitated
- RA3 – Tailings Storage Facility
- RA4 – Processing Plant
- RA5 – Plant Site ROM
- RA7 – Roads and tracks
- RA8 – Raw Water Pond
- RA9 – Infrastructure (Laydown, Sediment Dams, Support Services, Fuel Store, Groundwater Monitoring Bores)
- RA10 – Soil Stockpile
- RA11 – Borrow Pit

Service Layer: Source: Esri, Vantor, Earthstar Geographics, and the GIS User Community

0 100 200 300 400 500
m

SAVANNAH GOLDFIELDS LIMITED

Georgetown Gold Project PRCP

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GDA2020, MGA Zone 54

ARDENT GROUP PTY LTD

Figure 11
Reference Map Plant Site (ML3409, ML3540, ML3591)

Georgetown Gold Project Mining Lease

Cooktown
Cairns
Innisfail
Townsville

Drawn By: Chris Schlebusch

Requested by: Jacob Arnold

Date: 24/04/2026

Sheet No.
RTPL_ARD_SVG006_EAAMAP_1007_1A

Data sources:
©The State of Queensland (Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development)

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EA AND PRCP AMENDMENT APPLICATION SUPPORTING INFORMATION REPORT

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Appendix 4 National Greenhouse and Energy Reporting (NGER) Threshold Calculator

Australian Government
Clean Energy Regulator

Emissions and energy threshold calculator

About this calculator

The National Greenhouse and Energy Reporting Threshold Calculator (the Calculator) has been developed by the Clean Energy Regulator (CER) to assist entities to comply with their reporting obligations under the *National Greenhouse and Energy Reporting Act 2007* (NGER Act) and associated legislation. The Calculator should be used in conjunction with the NGER Act, National Greenhouse and Energy Reporting Regulations 2008 and National Greenhouse and Energy Reporting (Measurement) Determination 2008 in their current form. These laws and their interpretation are subject to change, which may affect the accuracy of the outputs of the Calculator.

This Calculator (version 1.6) is valid for the 2024-2025 reporting year and is valid for subsequent reporting years until a newer calculator has been made available. Reporters must check the CER website https://cer.gov.au/schemes/national-greenhouse-and-energy-reporting-scheme/report-emissions-and-energy/nger-calculators to ensure that they are using the most current version of the Calculator.

The information to be input in the Calculator is not exhaustive of all matters required to be reported, nor does the Calculator cover all circumstances applicable to all entities. The Calculator is not intended to comprehensively deal with its subject area; nor is it a substitute for independent legal advice. The calculations that are generated by the Calculator are an estimate only, intended to be used for guidance purposes and to assist entities in their reporting. The CER and the Commonwealth of Australia do not warrant that any estimates or outputs generated by the Calculator will be accurate, complete, or up to date. Entities are not required to use the estimates generated by the Calculator, however, entities must ensure they meet their obligations under the National Greenhouse and Energy Reporting scheme at all times. The CER encourages all users of the Calculator to seek independent legal advice before taking any action or decision, including finalising any report, on the basis of the Calculator.

Entities are responsible for determining their obligations under the law and for applying the law to their individual circumstances. The CER and the Commonwealth of Australia bear no responsibility for the data input to the Calculator by users, or for the outputs of the Calculator, and will in no event be liable for any direct, incidental, or consequential loss or damage of any kind, arising out of or in connection with, any use of the Calculator, reliance on the Calculator's output, or reliance on any other information or advice on this website.

The CER and the Commonwealth of Australia do not guarantee uninterrupted access to the Calculator or that the associated website and files obtained from or through this website are free from harmful code including viruses or spyware, and recommend the use of appropriate software to protect your systems.

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This calculator is meant as a guide only. While reasonable efforts have been made to ensure that the contents of the calculator are factually correct, the Commonwealth does not accept responsibility for the accuracy or completeness of the contents, and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the data produced by the calculator.

How to use this calculator

Emissions and energy data is entered by first clicking on the Facility tabs below. The Calculator allows for data to be entered for up to six facilities. To report, first select the fuel/energy source from the appropriate drop-down menu and then enter an appropriate amount in the next field according the unit selected by the Calculator.

The Calculator will calculate the associated emissions or energy and threshold status based on the data you have entered. To view an example, click on the Example tab below.

If you are reporting part-year data then you will need to enter the number of days that the data covers. The Calculator will determine the full year emissions and energy data based on the amount you have entered for the number of days you have selected. The calculator will determine if the reporting threshold has been reached based on the calculated full year data.

The Output tab will display the total emissions and energy data at the corporate level. This amount will be the calculated annual amount based on the data entered for each facility.

Resources

The following resources, located on the agency website, may assist you in determining if you have reporting obligations under the National Greenhouse and Energy Reporting legislation.

Guidelines

Transport fuel combustion

Select fuels below	Amount Enter amount below	Unit	Greenhouse gases CO_2	CH_4	N_2O	Total scope 1 emissions (t CO_2-e)	Total energy (GJ) (Gigajoules)
Diesel oil	38.640	kL	104	0	1	105	1,492
-		-					
-		-					
-		-					
-		-					
-		-					
-		-					
Total Scope 1 transport emissions (t CO_2-e) and energy consumed (GJ)						**105**	**1,492**

Non-transport fuel combustion

Select fuels below	Amount Enter amount below	Unit	Greenhouse gasses CO_2	CH_4	N_2O	Total scope 1 emissions (t CO_2-e)	Total energy (GJ) (Gigajoules)
-		-					
-		-					
-		-					
-		-					
-		-					
-		-					
-		-					
Total Scope 1 non-transport emissions (t CO_2-e) and energy consumed (GJ)						**0**	**0**

Purchased electricity

Select state/territory below	Amount Enter amount below	Unit	Emission factor EF	Total scope 2 emissions (t CO_2-e)	Total energy (GJ) (Gigajoules)
Queensland	6645800.000	kWh	0.710	4,719	23,925
-		kWh			
Total Scope 2 emissions (t CO_2-e) and energy consumed (GJ)				**4,719**	**23,925**

Consumed without combustion

Select energy source below	Amount Enter amount below	Unit	Total energy (GJ) (Gigajoules)
-		-	
-		-	
-		-	
Total energy consumed (GJ)			**0**

Electricity/energy produced

Select energy product below	Amount Enter amount below	Unit	Total energy (GJ) (Gigajoules)
-		-	
-		-	
-		-	

Australian Government
Clean Energy Regulator

Corporation emissions & energy calculator

Data as entered

	Scope 1 emissions	Scope 2 emissions	TOTAL EMISSIONS	ENERGY CONSUMED	ENERGY PRODUCED	DAYS COVERED
Facility 1	105	4,719	4,824	25,416	0	365
Facility 2	0	0	0	0	0	365
Facility 3	0	0	0	0	0	365
Facility 4	0	0	0	0	0	365
Facility 5	0	0	0	0	0	365
Facility 6	0	0	0	0	0	365
Total for corporation - as entered	105	4,719	**4,824**	**25,416**	**0**	

Full-year data

	Scope 1 emissions	Scope 2 emissions	TOTAL EMISSIONS	ENERGY CONSUMED	ENERGY PRODUCED
Facility 1	105	4,719	4,824	25,416	0
Facility 2	0	0	0	0	0
Facility 3	0	0	0	0	0
Facility 4	0	0	0	0	0
Facility 5	0	0	0	0	0
Facility 6	0	0	0	0	0
Total for corporation - full year	105	4,719	**4,824**	**25,416**	**0**

Annual reporting thresholds

	EMISSIONS THRESHOLD	ENERGY CONSUMED THRESHOLD	ENERGY PRODUCED THRESHOLD
Facility 1	Not met	Not met	Not met
Facility 2	Not met	Not met	Not met
Facility 3	Not met	Not met	Not met
Facility 4	Not met	Not met	Not met
Facility 5	Not met	Not met	Not met
Facility 6	Not met	Not met	Not met
Corporation	**Not met**	**Not met**	**Not met**

Annual corporate reporting thresholds

Total emissions threshold	0 tCO_2-e	50,000 tCO_2-e
Energy consumption threshold	0 GJ	200,000 GJ
Energy production threshold	0 GJ	200,000 GJ

Australian Government
Clean Energy Regulator

Emissions and energy threshold calculator

About this calculator

Title — Emissions and energy threshold calculator

Version — 1.6 - July 2025

Author — The Clean Energy Regulator

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EA AND PRCP AMENDMENT APPLICATION SUPPORTING INFORMATION REPORT

KEMPTON MINERALS PTY LTD

Appendix 5 Annual Groundwater Monitoring Review (Terra Solutions, 2026)

Terra SOLUTIONS
ENVIRONMENTAL CONSULTANTS



Annual Groundwater Monitoring Review

Savannah Gold

Reference No. 26002-1

Prepared for Savannah Gold Pty Ltd

1 April 2026

Document Control

Client	Savannah Goldfield Pty Ltd
Document	26002-1_Savannah_Gold_AGMR_v1.0
Project Name	Savannah Gold
Project Number	26002-1
Revision Number	01

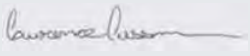
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Version No.	Date	Prepared By	Reviewed By	Approved By
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The report supersedes all previous draft or interim reports, whether written or presented orally, before the date of this report. This report has not and will not be updated for events or transactions occurring after the date of the report or any other matters which might have a material effect on its contents, or which come to light after the date of the report. Terra Solutions is not obliged to inform you of any such event, transaction, or matter nor to update the report for anything that occurs, or of which Terra Solutions becomes aware, after the date of this report.

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Executive Summary

The 2025 Annual Groundwater Monitoring Review (AGMR) for the Savannah Gold Project assessed groundwater levels and quality across the Processing Plant, Electric Light, and Red Dam sites in accordance with Environmental Authority (EA) EPML00899813 requirements. Groundwater monitoring was conducted across a network of 20 compliance bores, with most locations sampled quarterly in 2025. Monitoring methods and quality assurance procedures were consistent with guidelines, and analytical precision was generally high, confirming that the dataset is reliable for interpretation.

Groundwater level data indicate that hydraulic conditions remain stable and consistent with the conceptual hydrogeological model (CHM). Groundwater elevations largely follow topography and climatic influences, with no evidence of abnormal fluctuations or drawdown that would indicate environmental risk. Recent above-average rainfall trends since 2022, would typically result in increasing groundwater level, and the water level declines in bores PSMB11 and PSMB14 over the review period are somewhat anomalous in the regard.

Groundwater quality results show variability across the three sites, primarily driven by natural rock-water interactions within a mineralised geological setting. Major ion chemistry indicates no significant shifts in water types over time. Electrical conductivity and sulfate concentrations vary between bores but remain generally consistent with historical patterns, suggesting no emerging contamination sources.

Metal and metalloid concentrations are generally low across the Project and stable relative to historical data. Localised elevated concentration of metals at bore PSMB11 are linked to historical pH variability rather than new impacts. Most analytes, including aluminium, copper, lead, nickel, and zinc, remain at low concentrations, while others (e.g., bismuth, mercury, cyanide) are consistently negligible or below detection limits.

The current groundwater monitoring program is considered effective for early detection of potential impacts. However, the development of site-specific trigger values (SSTVs) and rationalisation of monitoring parameters to focus on constituents relevant to site-specific sources and risks would improve the monitoring program.

In summary, groundwater conditions across the Savannah Gold Project remain and consistent with historical behaviour, with no indication of emerging risks.

1 Introduction

The Savannah Gold Annual Groundwater Monitoring Review (AGMR) was prepared by Terra Solutions on behalf of Savannah Goldfields Pty Ltd (Savannah Gold) for the Georgetown Gold Project (the Project; **Figure 1**). The Project is located within the Etheridge Region and includes the Georgetown processing plant and the Red Dam and Electric Light satellite mines. Kempton Minerals Pty Ltd (owned by Savannah Gold) hold the Environmental Authority (EA) EPML00899813 (the EA), which authorised environmental relevant activities (ERAs) on the MLs.

This report presents an analysis and interpretation of groundwater for the 2025 reporting period. The report includes:

- A summary of the site conceptual model, with subsequent discussion of how observed trends relate to the model
- A description of the monitoring that occurred over the past year, including methods and quality control
- A summary and evaluation of groundwater conditions and trends for both groundwater level and quality, and
- Recommendations for improvements in the monitoring program and areas for further investigation, if required.

2 Environmental Authority Requirements

Monitoring of groundwater is required under conditions *C6-1 to C6-7* the EA. An annual report summarising the groundwater monitoring findings, including all monitoring results and interpretations must be submitted to the administering authority. Conditions *C6-1 to C6-7* are relevant to this report and are summarised in **Table 1**.

The EA requires monitoring of 17 groundwater compliance and three reference bores as identified in *Table C7 (Groundwater Monitoring and Frequency)* of the EA as summarised in **Table 2**. The locations of these bores are shown on **Figure 2**, **Figure 3** and **Figure 4**.

Compliance bore contaminant trigger values and contaminant limits are identified in *Table C8 (Groundwater Quality Triggers and Limits)* and summarised in **Table 3**. The EA specifies that the dissolved constituent of a metal should be used for compliance against the triggers, but the EA does not specify which metal fraction should be used for compliance against the contaminant limits. However, it is noted that the dissolved fraction is considered the most appropriate measure for assessing groundwater water quality, as total metals/metalloids concentrations can be biased by colloidal and absorbed material; for this reason, only the dissolved component is discussed in the context of this review.

Table 1: EA Groundwater Conditions

Condition	Details
C6-1	Groundwater quality and level must be monitored at the locations and frequencies defined in Table C7 and Schedule I – Maps for parameters identified in Table C8.
C6-2	If quality characteristics of groundwater from compliance bores identified in Table C7 exceed any of the trigger levels stated in Table C8, the environmental authority holder must compare the compliance monitoring bore results to the reference bore results and: (a) if the level of contaminants at the downstream site does not exceed the reference monitoring site data, then no action is to be taken; and (b) if the level of contaminants at the downstream site is greater than the reference monitoring site data, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority within 3 months, outlining: i. details of the investigations carried out; and ii. actions taken to prevent environmental harm. *Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with C6-2(b)(ii) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic within the three month investigation period.*
C6-3	If an exceedance in accordance with condition C6-2 (b)(ii) is identified, the holder of the authority must notify the administering authority within 14 days of receiving the result.
C6-4	Groundwaters from bores identified in Table C7, must not exceed any of the limits defined in Table C8.
C6-5	Groundwater monitoring bores must be constructed and operated in accordance with methods prescribed in the latest edition of the Agriculture and Resource Management Council of Australia and New Zealand manual titled Minimum Construction Requirements for Water Bores in Australia.
C6-6	Annual groundwater monitoring reports analysing groundwater chemistry and hydro-geological status of all groundwater bores and groundwater conditions must be prepared and submitted to the administering authority with each annual return.
C6-7	Groundwater levels must be monitored and ground level fluctuations in excess of 1m per year, not resulting from the pumping of licensed bores the administering authority must be notified within 14 days following completion of monitoring.

Table 2: Groundwater Monitoring Locations and Frequency (Table C7 of EPML00899813)

Monitoring Point	Location (GDA 94 MGA Z54)		Surface RL (m) or AHD	Monitoring Frequency
	Easting	Northing		
Compliance Bores				
Plant Site				
PSMB1	764184	7971110	326.691	Quarterly
PSMB2	765228	7971273	309.584	
PSMB3	763461	7971672	319.429	
PSMB4	763298	7971539	316.711	
PSMB5	764687	7971667	324.859	
PSMB7	764973	7971528	317.468	
PSMB8	765204	7971521	320.687	
PSMB9	764881	7971197	319.439	
PSMB10	764651	7971201	319.181	
PSMB11	763651	7971551	330.795	
PSMB12	763873	7971394	326.401	
PSMB13	763401	7971468	319.914	
PSMB14	763399	7971467	319.678	
Electric Light				
ELMB1	772455	7989229	324.845	Quarterly
ELMB2	772264	7988601	313.625	
Red Dam				
RDMB1	785974	8015064	301.905	Quarterly
RDMB2	786995	8015060	281.019	
Reference Bores				
Plant Site				
PSMB6	764891	7971672	320.127	Quarterly
Electric Light				
ELMB3	772621	7899282	319.982	Quarterly
Red Dam				
RDMB3	786878	8014924	282.621	Quarterly

Table 3: Groundwater Contaminant and Trigger Limits (Table C8 of EPML00899813)

Quality Characteristic	Contaminant Release Limit[6] (mg/L unless otherwise specified)	Trigger Levels[6] (mg/L unless otherwise specified)
Electrical Conductivity	1000[2] (µS/cm)	500[1] (µS/cm)
pH (pH Unit)	4.0[3] (minimum) 9.0[3] (maximum)	6.0[4] (minimum) 7.5[4] (maximum)
Standing Water Level	For Interpretation purposes	
Chloride		
Sulfate (SO_4^{2-})	1000[3]	80th percentile of the reference
Aluminium	5[3]	0.055[4]
Antimony	Reference value	80th percentile of reference value
Arsenic	0.5[3]	0.0013[4]
Bismuth	Reference value	80th percentile of reference value
Cadmium	0.01[3]	0.0002[2]
Chromium	1[3]	0.001[4]
Cobalt	1[3]	0.0028[4]
Copper	1[3]	0.0014[4]
Iron	Reference value	0.3[4]
Lead	0.1[3]	0.0034[4]
Manganese	-	1.9[4]
Mercury	0.002[3]	0.0006[4]
Nickel	1[3]	0.011[4]
Selenium	0.02[3]	0.011[4]
Silver	Reference value	0.00005[4]
Tin	Reference value	0.003[4]
Uranium	0.2[3]	80th percentile of reference value
Zinc	20[3]	0.008[4]
Cyanide (Free)	0.5[5]	0.007[4]
Cyanide (WAD)	For interpretation purposes	

1. Numbers based on Table G.4 of the Queensland Water Quality Guidelines.
2. Numbers based on Hart, 2008 Review of the Fitzroy Water Quality Issues. Water Science Pty Ltd, November 2008.
3. Numbers based on ANZECC 2000 Livestock Drinking Water Guidelines.
4. Numbers based on ANZECC 2000 Ecosystems (95%) moderately to slightly disturbed.
5. Number based on Cyanide Management guideline May 2008.



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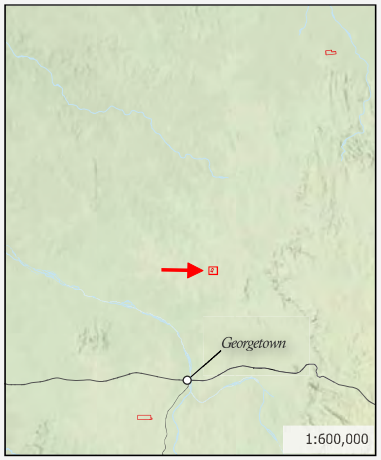
FIGURE 2: ELECTRIC LIGHT INFRASTRUCTURE (ML3548)

0 50 100 150 m

1:3,000

LEGEND:

- Compliance Bores
- Reference Bores
- Watercourse
- WRD
- PIT
- Mining Lease



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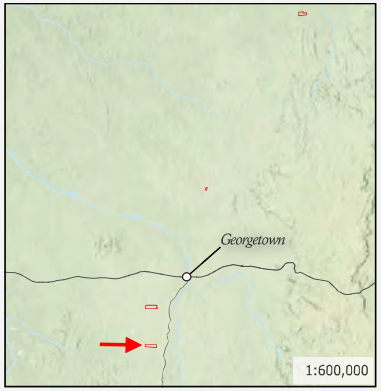
FIGURE 3: PLANT SITE INFRASTRUCTURE (ML 3540)

0 100 200 300 m

1:6,000

LEGEND:

- Compliance Bores
- Reference Bores
- Watercourse
- Infrastructure and ROM
- Open Pit
- Raw Water Pond
- Rehabilitated Tailings
- Tailings Filled
- TSF
- Waste Dumps
- Farm Dam
- Mining Lease



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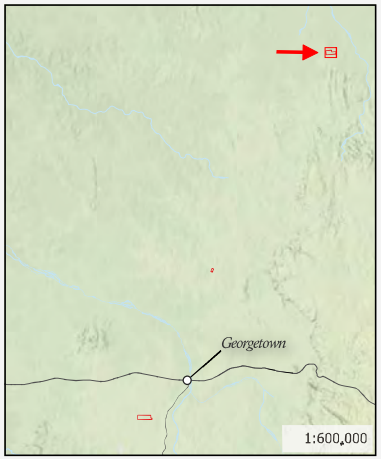
FIGURE 4: RED DAM INFRASTRUCTURE (ML30203)

0 50 100 150 200 m

1:4,000

LEGEND:

- Reference Bores
- Compliance Bores
- Watercourses
- WRD
- PIT
- Mining Lease



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3 Site Descriptions

3.1 Background

The Project is comprised of three sites:

- the Processing Plant (ML3591, ML3540 and ML3409), and
- two satellite MLs that are currently in care and maintenance:
  - Red Dam (ML30203), and
  - Electric Light (ML3548).

Processing at the Georgetown Plant Site recommenced in September 2022, with ancillary activities such as maintenance, tailings disposal and environmental management also occurring. The Plant Site is authorised to produce 100,000 ton/annum of mineral product and is currently processing ore from the Agate Creek Mine. The satellite mines were historically mined using open cut mining methods with ore supplied to the Processing Plant.

3.1.1 Processing Plant

The Processing Plant is located approximately 6.5 km southwest of Georgetown (**Figure 1**). Mining in the 1990's included the development of five open pits. Four of these pits (Black Blow West, Comstock, Big Wonder A2, and Big Wonder A1) were used as tailings storage facilities (TSFs) after the maximum capacity of the historical above ground TSF was reached (Klohn Crippen Berger (KCB), 2026). The infrastructure (**Figure 2)** currently at the Processing Plant site is comprised of:

- Tailings Dam No. 1 and Rehab Tailings Facility – The TSF was deposited by beaching into a broad natural depression. The facility comprised two sections separated by a loose rock wall:
  - an upper section, referred to as the Rehab Tailings.
  - and a lower section, known as Tailings Dam No. 1. The lower section was retained by a clay-lined embankment. Down-gradient of Tailings Dam No. 1 is a catch dam, which was generally kept empty to capture any overflow from the TSF.
- Black Blow West Pit – This pit was backfilled with tailings and rehabilitated to the surface by previous owners.
- Big Wonder A2 Pit – This pit is located within the footprint of the existing TSF and was historically used to dispose of tailings. The active TSF was later deposited over it and a saddle dam that was built to the east of the pit to prevent leakage to Sandy Creek.
- Comstock Pit (Tailings Dam No. 2) – This pit was backfilled with tailings material and rehabilitated to surface.
- Big Ben Pit (Tailings Dam No. 3) and waste rock dump (WRD) – This pit was backfilled with tailings and was also utilised as a waste rock dump.
- Big Wonder A1 Pit (Tailings Dam No. 4) – This pit was historically utilised as a TSF and has been rehabilitated to surface with a cover.

3.1.2 Electric Light

The Electric Light site is located approximately 13 km northeast of Georgetown (**Figure 1**). The site is currently in care and maintenance. The historical infrastructure currently at the Electric Light site (**Figure 3)** is comprised of:

- Electric light pit, and
- Electric light Waste Rock Dump (WRD).

3.1.3 Red Dam

The Red Dam site is located approximately 42 km northeast of Georgetown (**Figure 1**). The site is currently in care and maintenance. The historical infrastructure currently at the Red Dam site (Klohn Crippen Berger (KCB), 2026) is summarised below and shown on **Figure 4**:

- Red Dam pit, and
- Red Dam Waste Rock Dump (WRD)

3.2 Climate

The climate of Georgetown area is dominated by hot, dry summers, and mild winters. Summer rainfall occurs in intense, small bursts and winters are generally dry. Rainfall data was sourced from the nearest Bureau of Meteorology (BoM) Station, Georgetown Airport (Station No. 030134; **Figure 1**) (Bureau of Meteorology, 2026). The weather station has existed since 2004 and has rainfall data available until February 2026. The average annual precipitation (2004–2026) is 831 mm, although as little as 303 mm and as much as 1572 mm is possible in a given year. Rainfall is highest during the summer months of December, January, and February, and lowest between April and October.

Cumulative rainfall departure (CRD) is a method of analysing long-term rainfall trends to understand water-balance variations. The CRD is a summation of the monthly departure of rainfall from the long-term average monthly rainfall. A rising trend in the CRD indicates periods of above average rainfall, whereas a negative slope indicates below average rainfall periods. Because diffuse infiltration of rainwater is the primary source of groundwater in most landscape settings, CRD is also an analysis tool for groundwater assessments. Positive CRD values occur after progressive periods of above average rainfall, which typically results in greater groundwater recharge volumes and elevated groundwater levels. Conversely, negative CRD values occur after prolonged periods of below average rainfall and correspond to lower recharge volumes and suppressed groundwater levels. Similarly, increasing and decreasing CRD trends generally correspond to rising and falling groundwater levels, respectively.

The CRD was increasing during the reporting period, (**Figure 5**). Prior to 2025, there was a positive trend in the CRD that began in mid-2022, indicating a period of above-average rainfall had occurred. This period of positive CRD was preceded by a long period of negative trending CRD between 2012 and 2022, which correlated to a ten-year period of below-average rainfall (**Figure 5**).

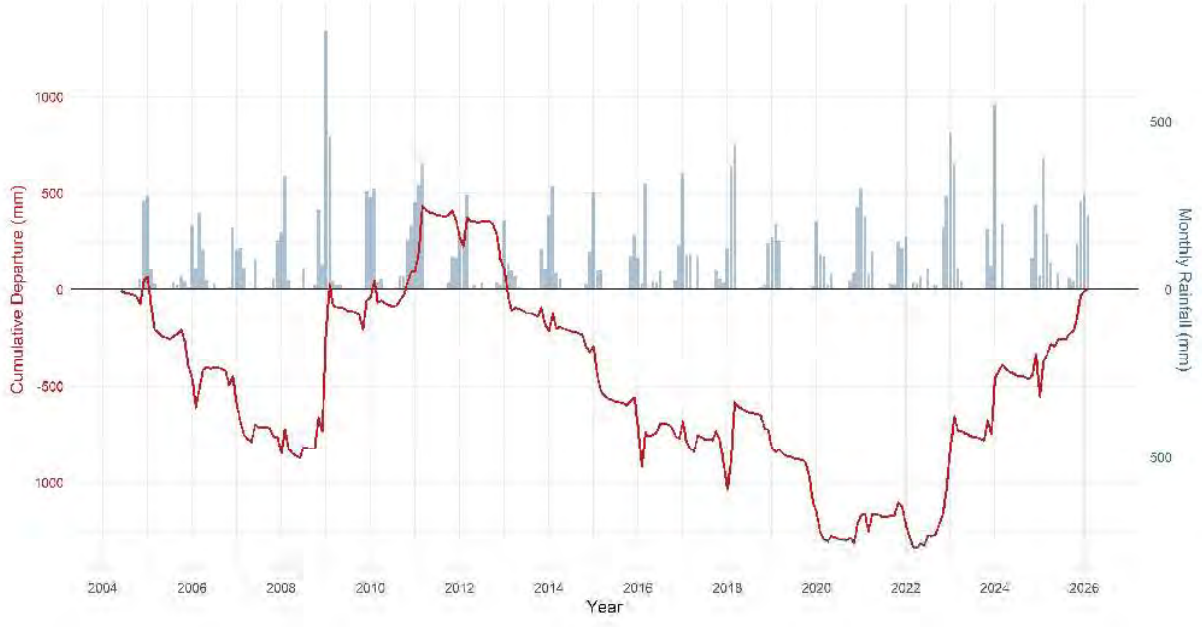


Figure 5: Monthly Rainfall Total from 2004 to 2026 (Station no. 030134, Georgetown Airport) with Cumulative Rainfall Departure

3.3 Geology

Located within the Mount Isa Inlier, Project sites sit within a highly mineralised catchment, with significant deposits in the greater region. Mineralisation within the study area is predominantly associated with the regional-scale Etheridge Goldfield, which is characterised by gold-bearing vein systems that are largely mesothermal in nature and spatially and genetically linked to episodic acidic igneous intrusions (Klohn Crippen Berger (KCB), 2026).

3.3.1 Processing Plant

The Processing Plant site is underlain by the Delaney Granite, Forsayth Granite, and the Lane Creek Formation (**Figure 6**; **Table 4**). A significant unnamed fault, cuts through the centre of the Processing Plant site (**Figure 6)** but the hydraulic characteristics of the fault structure is unknown. Quaternary alluvium is also present along creek systems located approximately 1.7 km to the northeast of the site.

Table 4: Processing Plant Site Geology

Rock Unit Symbol/ Name	Lithological Summary	Dominant Rock	Age[1]
Qa-QLD	Clay, silt, sand and gravel; flood plain alluvium	Alluvium	Quaternary
PLgy?/Delaney Granite?	Pale to dark grey locally foliated medium-grained, mostly porphyritic muscovite-biotite Granite with 1-1.5cm tabular K-feldspar phenocrysts	Granitoid	Mesoproterozoic
PLgf/1/ Forsayth Granite	Grey, medium to coarse-grained, generally strongly porphyritic biotite Granite, commonly foliated, with tabular K-feldspar megacrysts to 5cm	Granitoid	Mesoproterozoic
PLn/s - Lane Creek Formations	Mica schist (commonly graphitic +/- andalusite, cordierite, sillimanite), quartzite and calc-silicate rocks; grades into mudstone and siltstone, commonly carbonaceous, locally calcareous; minor sandstone	Metamorphosed Sedimentary Rocks	Paleoproterozoic

Notes: 1 From Australian Stratigraphic Units Database (Geoscience Australia (Commonwealth of Australia), 2025)

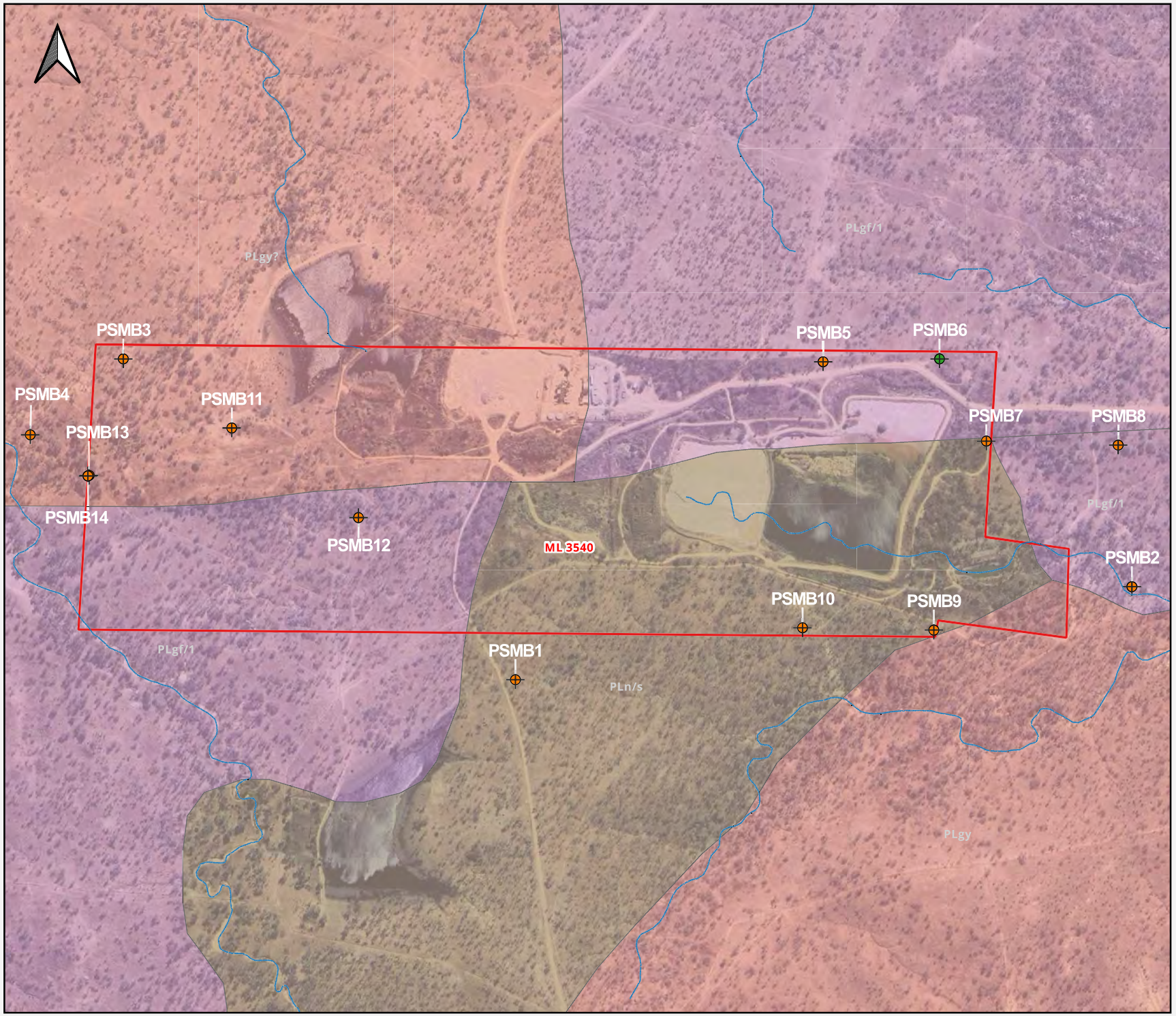


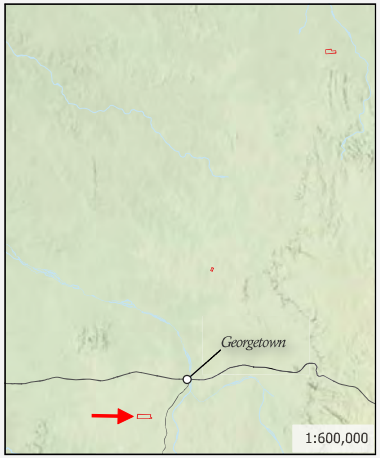
FIGURE 6: PLANT SITE SOLID GEOLOGY (ML 3540)

0 100 200 300 m

1:6,000

LEGEND:

- Compliance Bores
- Reference Bores
- Watercourse
- Delaney Granite (PLgy)
- Delaney Granite? (PLgy?)
- Forsayth Granite/1 (PLgf/1)
- Lane Creek Formation/s (PLn/s)
- Mining Lease



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3.3.2 Electric Light

The Electric Light site is underlain by the by metamorphosed sedimentary rocks of the Daniel Creek Formation, which has been intruded by the Delaney Granite (**Figure 7**, **Table 5)**. Additional intrusive are present in the area (**Figure 7, Table 5**). The ore deposit is associated with brecciated rocks, with the main mineralised vein dipping northwest along the Delaney Fault and subordinate structures (**Figure 7**).

Table 5: Electric Light Site Geology

Rock Unit Symbol/ Name	Lithological Summary	Dominant Rock	Age[1]
PLgm/ Mistletoe Granite	Grey variably foliated, locally nebulitic, medium-grained muscovite-biotite Granite, commonly with abundant mafic clots and schlieren, and abundant metamorphic xenoliths and screens	Granitoid	Mesoproterozoic
PLg/3	Unassigned muscovite-biotite, biotite-muscovite and muscovite leucogranite and pegmatite	Granitoid	Mesoproterozoic
PLgy /Delaney Granite	Pale to dark grey locally foliated medium-grained, mostly porphyritic muscovite-biotite Granite with 1-1.5 cm tabular K-feldspar phenocrysts	Granitoid	Mesoproterozoic
PLx /Cobbold Metadolerite	Metagabbro and metadolerite grading into orthoamphibolite	Gabbroid	Paleoproterozoic
PLa/s/Daniel Creek Formation/s	Mica schist, quartzite and some calc-silicate rocks; grades into mudstone, siltstone, and fine subfeldspathic sandstone, locally calcareous and/or dolomitic	Metamorphosed Sedimentary Rocks	Paleoproterozoic
PLe/3a/ Einasleigh Metamorphics/3a	Biotite gneiss, sillimanite-biotite schist and micaceous quartzite grading locally into migmatite; subordinate calc-silicate gneiss and ortho-amphibolite; commonly abundant leucogranite and pegmatite	Metamorphosed Sedimentary Rocks	Paleoproterozoic

Notes: [1] From Australian Stratigraphic Units Database (Geoscience Australia (Commonwealth of Australia), 2025)



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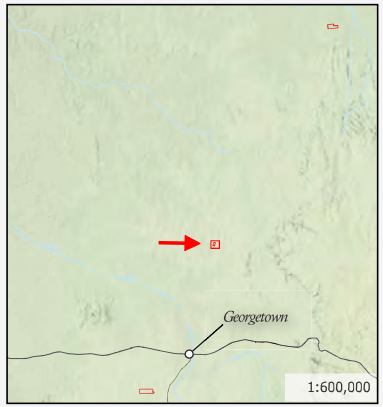
FIGURE 7 : ELECTRIC LIGHT SOLID GEOLOGY (ML3548)

0 50 100 150 m

1:3,000

LEGEND:

- Compliance Bores
- Reference Bores
- Watercourse
- Cobbold Metadolerite (PLx)
- Daniel Creek Formation/s (PLa/s)
- Delaney Granite (PLgy)
- Einasleigh Metamorphics/3a (PLe/3a)
- Mistletoe Granite (PLgm)
- PLg/3-Gt (PLg/3)
- Mining Lease



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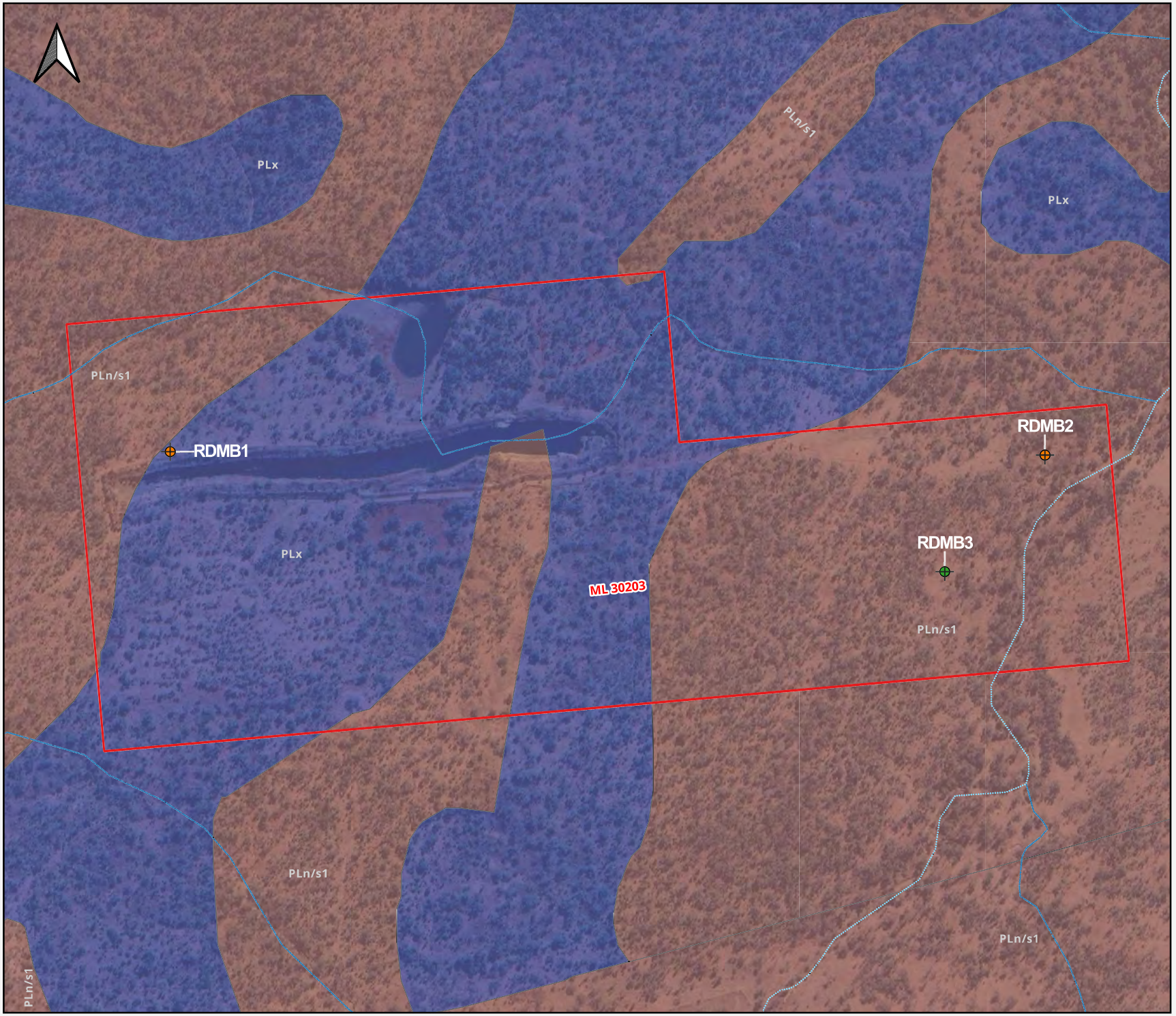
3.3.3 Red Dam

The Red Dam site is underlain by metamorphosed sedimentary rock of the Lane Creek Formation, which has been intruded by the Cobbold Metadolerite dolerite unit (**Figure 8**, **Table 6**). The broader geological setting includes additional granitics. A significant unnamed fault is located approximately 350 metres south of the ML boundary, trending in a northeast–southwesterly direction. A lineament, oriented roughly perpendicular to the main structure, transects the centre of the ML (Error! Reference source not found.). These structures are reportedly infilled with weathered, dark kaolinitic clay (Klohn Crippen Berger (KCB), 2026).

Table 6: Red Dam Site Geology

Rock Unit Symbol/ Name	Lithological Summary	Dominant Rock	Age[1]
Cgnl/ Lubrina Granite	Pinkish-grey fine-grained sparsely to abundantly porphyritic biotite leucogranite	Granitoid	Carboniferous
PLg/2?-Gt	Biotite to biotite-muscovite granite	Granitoid	Mesoproterozoic
PLx/ Cobbold Metadolerite	Metagabbro and metadolerite grading into orthoamphibolite	Gabbroid	Paleoproterozoic
Lane Creek Formation	Grey to brown muscovite-biotite schist to gneiss; commonly graphitic; contains andalusite or sillimanite in places; minor amphibolite; rare quartzite, laminated calc-silicate rocks; with mainly medium-high magnetism	Metamorphosed Sedimentary Rocks	Paleoproterozoic

Notes: [1] From Australian Stratigraphic Units Database (Geoscience Australia (Commonwealth of Australia), 2025)



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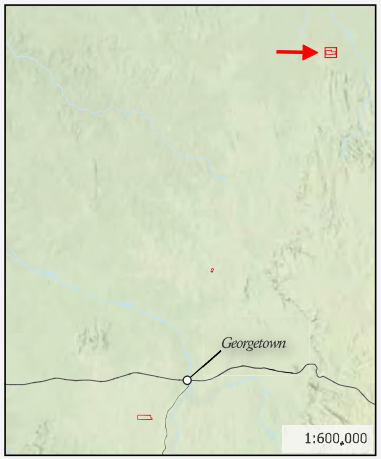
FIGURE 8: RED DAM SOLID GEOLOGY (ML30203)

0 50 100 150 200 m

1:4,000

LEGEND:

- Reference Bores
- Compliance Bores
- Watercourses
- Cobbold Metadolerite (PLx)
- Lane Creek Formation/s1 (PLn/s1)
- Mining Lease



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4 Conceptual Hydrogeological Model (CHM)

The conceptual hydrogeological model (CHM) for the Project was recently updated (Klohn Crippen Berger (KCB), 2026). The key elements of the CHM that apply to all sites are:

- The main Contaminants of Potential Concern (CoPC) are:
  - salinity
  - pH
  - metals, and
  - sulfate.
- The main hydrostratigraphic units are:
  - The regolith and moderately weathered rock. This is the most productive hydrostratigraphic unit. It is a unconfined unit, generally located less than 15 meters below the land surface. Flow in the weathered unit occurs within interstitial spaces of the weathered rock.
  - Slightly weathered fractured rock. This is a considered to be semi-confined unit and is not expected to be laterally extensive at any of the sites.
  - Deeper fresh fractured rock and fault zone. There is less information on the deeper fractured rock aquifer, although water is assumed to be variable present, particularly along open fault and fracture zones.

The site-specific CHM for the Processing Plant (Klohn Crippen Berger (KCB), 2026; **Figure 9**) indicates that:

- The site is located at the crest of a hill, with radial surface drainage, mostly flowing northeasterly.
- Groundwater levels in the regolith to moderately weathered unit generally follow topography.
  - Hydrographs generally show a response or lagged response to climate.
- An upward hydraulic gradient is present in the deeper fractured rock system, limiting potential for water quality impacts to this hydrostratigraphic unit.
- Potential sources of solutes include the TSFs, the rehabilitated pits, and the existing Black Blow pit.
  - The Black Blow pit is likely a groundwater flow through, with a geochemical profile similar to that of local groundwater.
- Potential groundwater receptors are water supply bores (3-5 km from the site), and potential aquatic and terrestrial GDE located along drainages (1-2 km distance from the site).

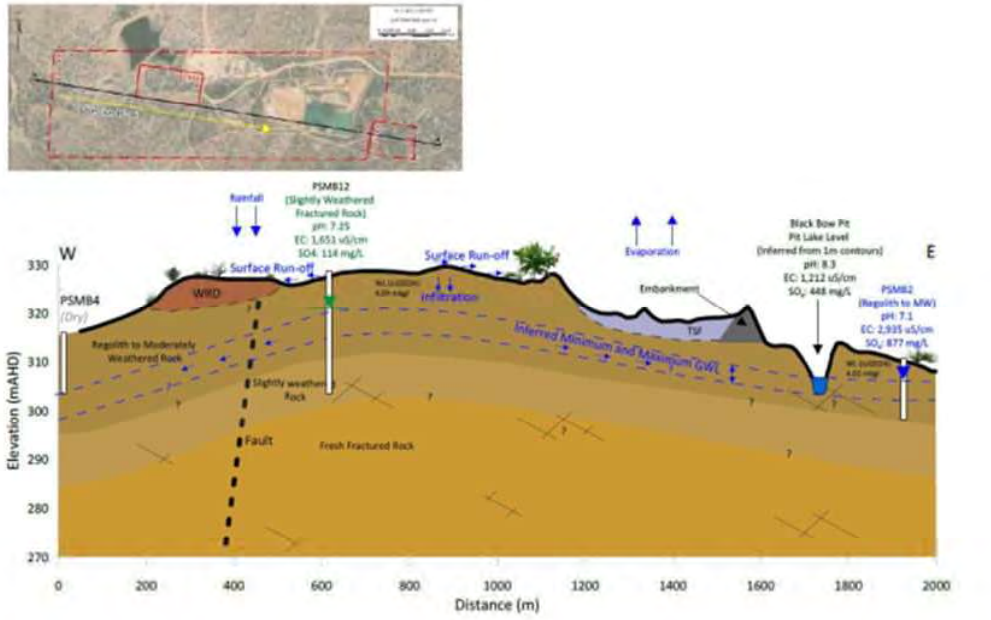


Figure 9: CHM of the Processing Plant Site (from Klohn Crippen Berger (KCB), 2026)

The site-specific CHM for the Electric Light site (Klohn Crippen Berger (KCB), 2026; **Figure 10**) indicates that:

- Groundwater level in the regolith to moderately weathered unit generally follows topography.
  - Hydrographs show that the unit is highly responsive to climate.
- Potential sources of impact are the pit and the WRD.
  - The pit is likely disconnected from groundwater or a groundwater source.
- Groundwater flow is inferred to follow topography towards the south.
- The presence of shallow groundwater (<5 meters below ground level (mBGL)) at the site suggests the potential for groundwater-surface water interaction.
  - The relationship between groundwater and the pit lake remains unresolved.
- Potential groundwater receptors are water supply bores (more than 4 km from the site), and potential aquatic and terrestrial GDE located along drainages (~2 km distance from the site).

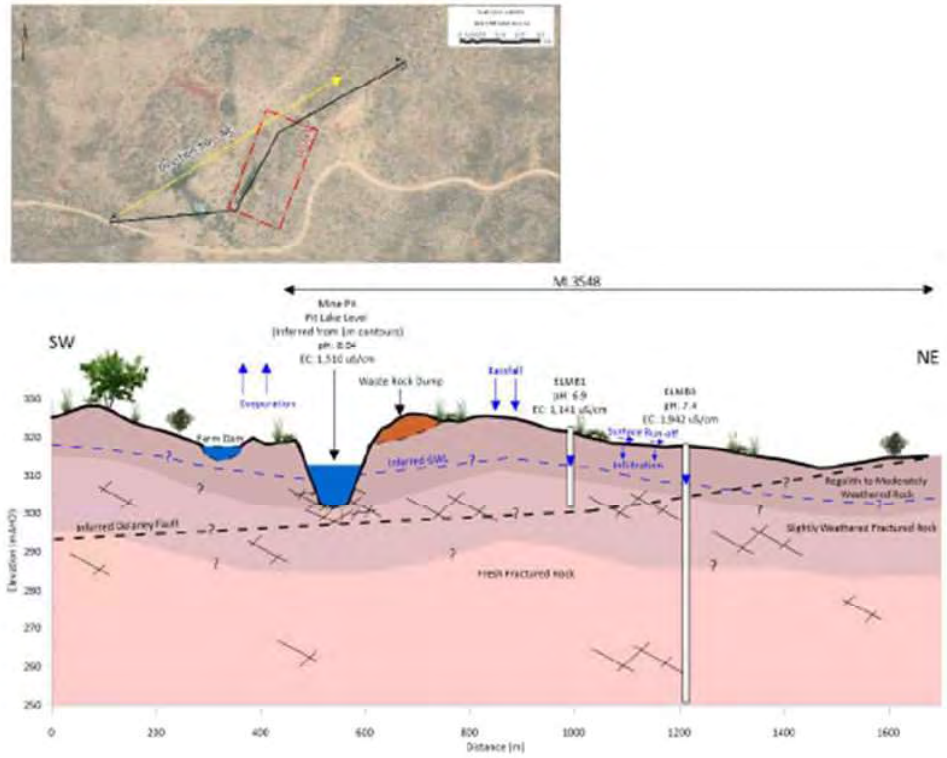


Figure 10: CHM of the Electric Light Site (from Klohn Crippen Berger (KCB), 2026)

The site-specific CHM for the Red Dam site (Klohn Crippen Berger (KCB), 2026; **Figure 11**) indicates that:

- The site is situated on the eastern slope of a gently sloping ridge.
- The moderately weathered unit is not very productive at the site.
- Fault zones in the deeper units are filled with clay, limiting groundwater productivity in this unit.
- Groundwater levels in the regolith to moderately weathered unit likely follow topography, with the pit situated on a local topographic high.
  - Hydrographs show that both the regolith to moderately weathered unit and the deeper fractured rock aquifer is responsive to climate.
  - An upward hydraulic gradient is present in the deeper (confined unit).
- Potential sources of impact are the pit and the WRD.
  - Available data suggest the pit is a groundwater sink.
- Groundwater is generally >15 mBGL, which suggests limited potential for groundwater-surface water interaction.
- Potential groundwater receptors are water supply bores (with four private bores located within 5 km of the site), and potential aquatic and terrestrial GDE located along drainages (~3 km distance from the site).

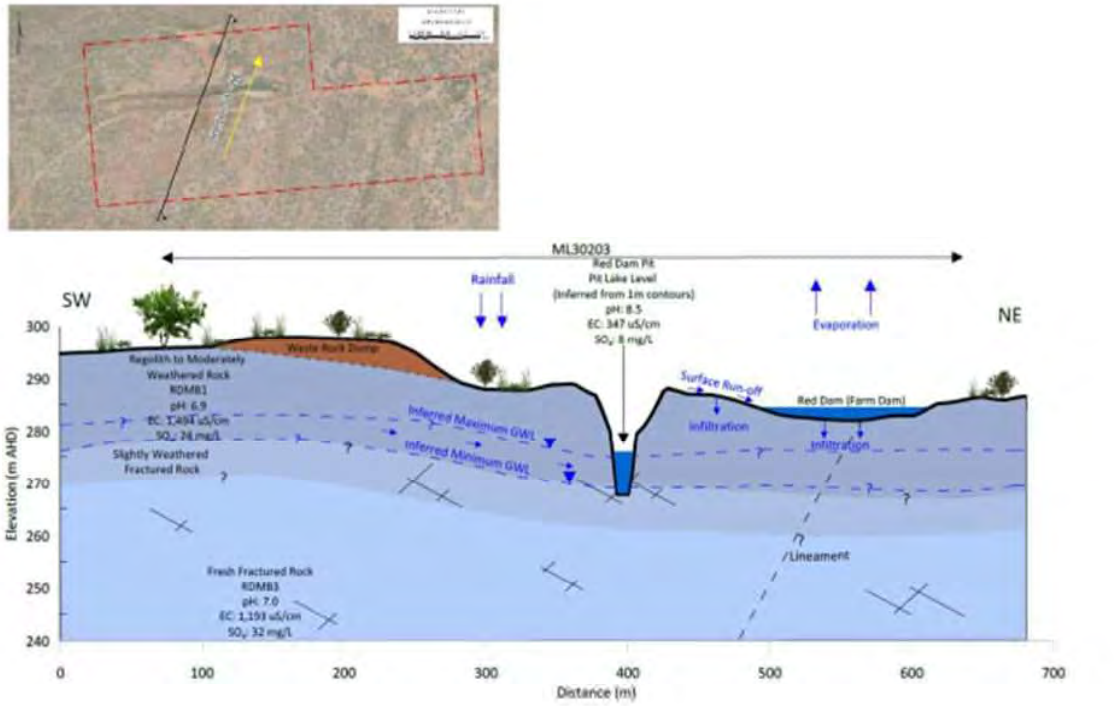


Figure 11: CHM of the Red Dam Site (from Klohn Crippen Berger (KCB), 2026))

5 Monitoring Bore Network

There are 20 compliance monitoring bores listed on the EA. The majority of these bores (14) are located at the Processing Plant site; the Electric Light and Red Dam site each have three monitoring bores. The details of the groundwater bores are presented in **Table 7** below.

Table 7: Details of Groundwater bores

Bore ID	RL (mAHD)	Depth (m)	Screened Interval (m)	Aquifer	Catchment
Processing Plant					
PSMB1	326.691	29	17-29	Unconfined granitic regolith	Sandy Creek
PSMB2	309.584	11	0.8-14		
PSMB3	319.429	14	0.8-14		Four Mile Creek
PSMB4	316.711	14	0.8-14		
PSMB5	324.859	10.5	4.5-10.5		Sandy Creek
PSMB6	320.127	11	0.5-11	Fracture Granite (semi-confined)	
PSMB7	317.468	29	23-29		
PSMB8	320.687	29	23-29		
PSMB9	319.439	11	0.5-11	Unconfined granitic regolith	
PSMB10	319.181	12	0.6-12		
PSMB11	330.795	29	23-29	Granite (semi-confined)	Four Mile Creek
PSMB12	326.401	29	23-29	Fracture Granite (semi-confined)	
PSMB13	319.914	11	0.5-11		
PSMB14	319.678	29	23-29		
Electric Light					
ELMB1	324.845	22	13-22	Regolith	Quartz Blow Creek
ELMB2	313.625	21	9-21		
ELMB3	319.982	100	68-98	Deep Granite	
Red Dam					
RDMB1	301.905	28	16-28	Fracture Granite	Cattle Creek
RDMB2	281.019	-	-	Exploration Bore now stock water	
RDMB3	282.621	100	77-101	Deep Granite	

6 2025 Monitoring

As per condition Table C8 in the EA, data from the compliance bores was collected for following parameters:

- Electrical Conductivity
- pH (pH Unit)
- Standing Water Level
- Chloride
- Sulfate
- Aluminium
- Antimony
- Arsenic
- Bismuth
- Cadmium
- Cobalt
- Copper
- Iron
- Lead
- Mercury
- Nickel
- Selenium
- Silver
- Tin
- Uranium
- Zinc
- Cyanide (Free)
- Cyanide (WAD)

In 2025, the only parameters required by the EA that were not monitored were chromium, manganese and uranium. In accordance with the EA conditions, monitoring bores are required to be sampled on a quarterly basis. Groundwater monitoring was undertaken against the EA-listed compliance network during 2025. Most compliance bores were sampled on four occasions during the reporting period (in February, June, September, and December). A small number of bores returned fewer events due to bore-specific field or operational constraints (**Table 8**).

Table 8: Number of Samples for Each Compliance Bore in 2025

Bore	Number of Samples in 2025	Bore	Number of Samples in 2025
PSMB1	4	PSMB11	4
PSMB2	4	PSMB12	4
PSMB3	2	PSMB13	4
PSMB4	0	PSMB14	4
PSMB5	0	ELMB1	4
PSMB6	4	ELMB2	1
PSMB7	4	ELMB3	4
PSMB8	4	RDMB1	4
PSMB9	4	RDMB2	3
PSMB10	4	RDMB3	4

6.1 Monitoring Methods

Groundwater sampling, field testing, and quality determinations were undertaken in accordance with the Monitoring and Sampling Manual (DES, 2018) and the Groundwater Sampling and Analysis – A Field Guide (Sundaram et al., 2009).

In addition to the above generic guidelines, the following specific methods apply to the Project:

- Standing water levels were measured in all bores using a dip meter prior to sampling.
- Groundwater samples were collected after three volumes of the standing water within a bore was purged using a bailer. Sample collection was initiated once field parameters had stabilised following purging.
- Field water quality parameters (pH, temperature, electrical conductivity, redox potential and dissolved oxygen) were measured after the sonde was rinsed three times in the sample water, using calibrated field instrumentation.
- A sample was collected using the following steps:
  - Rinse unpreserved sample containers 3 times with sample water.
  - Decant sample into preserved or rinsed container and label.
  - For dissolved metals analysis, samples were filtered using a 0.45 µm filter.
- Samples were placed on ice or refrigerated during transport for laboratory analysis, which was undertaken by ALS, a NATA accredited laboratory.

6.2 Quality Assurance / Quality Control

6.2.1 Quality Assurance Methodology

The following Quality Assurance / Quality Control (QA/QC) procedures were undertaken during the water quality sampling and analysis:

- Duplicate water sample were collected at one site to assess the analytical reliability of laboratory analyses.
- The duplicate samples were submitted to the laboratory for analysis with each batch of site samples.
- Duplicate samples were labelled 'QA' (or similar).
- Field data sheets recorded the monitoring site from which the QA sample was collected.

6.2.1.1 Duplicate Precision Assessment

Duplicate sample reproducibility was assessed using replicate sample sets. Relative Percent Deviation (RPD) was calculated between primary and duplicate results using the following formula equation (for results above the laboratory limits of reporting):

$$RPD = \frac{(x_1 - y_1)}{(x_1 + y_1/2)} \times 100$$

Where:

- x_1 is the primary sample analyte concentration, and
- y_1 is the duplicate sample analyte concentration.

For inorganic analytes, RPD values were required to be less than 30%.

6.2.2 Quality Assurance Calculations

Overall, duplicate sample precision was acceptable (**Table 9**), with most analytes meeting the adopted RPD quality objective of ≤30%. Exceedances of these criteria were primarily associated with dissolved metals, occurring infrequently in samples with relatively low concentration. Major ions, alkalinity, hardness, and general chemistry parameters demonstrated consistently good analytical precision. The observed variability is typical for low-concentration environmental samples and does not indicate a systemic sampling or laboratory issue affecting interpretation of the dataset.

Table 9: QAQC RPD Calculations Summary

Analyte	Number of RPD calculated	RPD range	RPD target range	Number of RPD within Target Range
PSMB13 / Dup (June 2025)				
Total Metals	4	0-40	0-30%	3
Dissolved Metals	2	0	0-30%	2
Major Ions	7	0-1.68	0-30%	7
Alkalinity & Hardness	3	0	0-30%	3
PSMB10 / Dup (September 2025)				
Total Metals	10	0-22.22	0-30%	10
Dissolved Metals	8	0-15.38	0-30%	8
Major Ions	7	0-178.66	0-30%	6
Physical Chemistry	1	0	0-30%	1
Alkalinity & Hardness	3	0	0-30%	3
PSMB1/Dup (December 2025)				
Total Metals	8	0-40	0-30%	7
Dissolved Metals	7	0-8	0-30%	7
Major Ions	7	0-6.06	0-30%	7
Physical Chemistry	1	3.97	0-30%	1
Alkalinity & Hardness	3	2.40-4.08	0-30%	3

7 Groundwater Levels

Analyses of the groundwater level elevations provide understanding of how groundwater movement is controlled by the hydrostratigraphic framework and if it might interact with surface water. There are no groundwater level triggers listed in the EA, reflecting that groundwater drawdown is not considered a risk to environmental harm for the Project. Instead, water level trends are considered primarily relevant to the interpretation of water quality data and in the understanding of groundwater movement.

Groundwater levels were assessed temporally as hydrographs (Error! Reference source not found., **Figure 13**, and **Figure 14**); levels were also assessed spatially as a contour map for the Processing Plant site (**Figure 15**). The contour maps were generated in Surfer® (Golden Software, LLC) using the kriging interpolation method to derive a continuous surface from discrete groundwater level measurements.

The 2025 water level data indicates that:

- Water levels in 2025 remained consistent with those historically observed at each individual bore
- Water levels in most bores did not vary by more than 2 meters throughout the reporting period
  - Bores PSMB11 and PSMB14 experienced 3 to 5 meters of water level decline over the reporting period
    - This is unexpected as the CRD was generally increasing over the reporting period.
    - Both of these bores are located on the western portion of the Processing Plant site, somewhat proximal to the farm dam.
- There were no groundwater bores that experienced a rapid, or unexpected increase in groundwater level in 2025; thus, there are no water level indicators of an increase in seepage at any bore.
- The potentiometric map for the Processing Plant site indicates that flow directions across the site are variable, which is consistent with radial groundwater flow directions from a topographic high.
  - These flow directions are consistent with the CHM (Section 4).

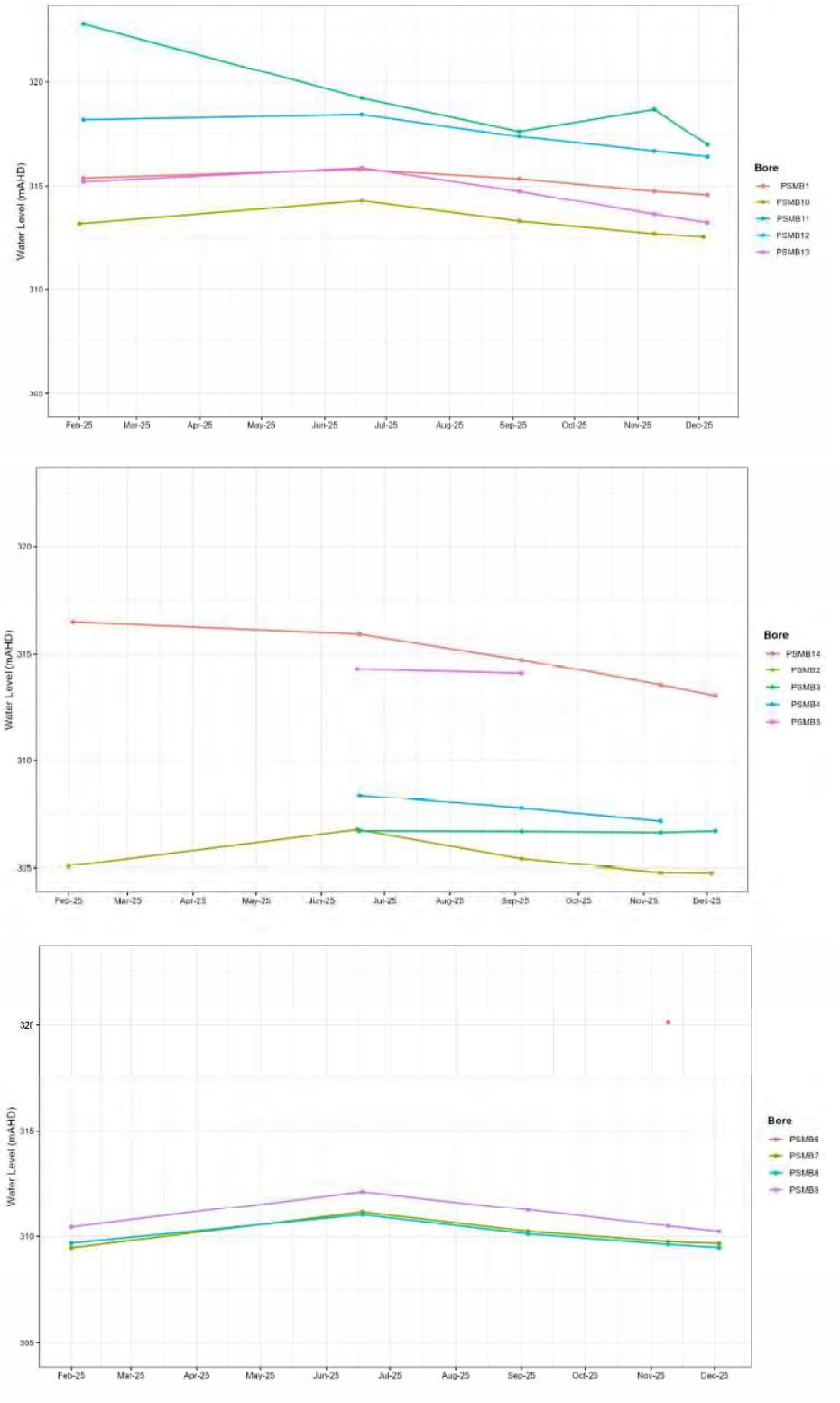


Figure 12: Groundwater elevations at the Processing Plant

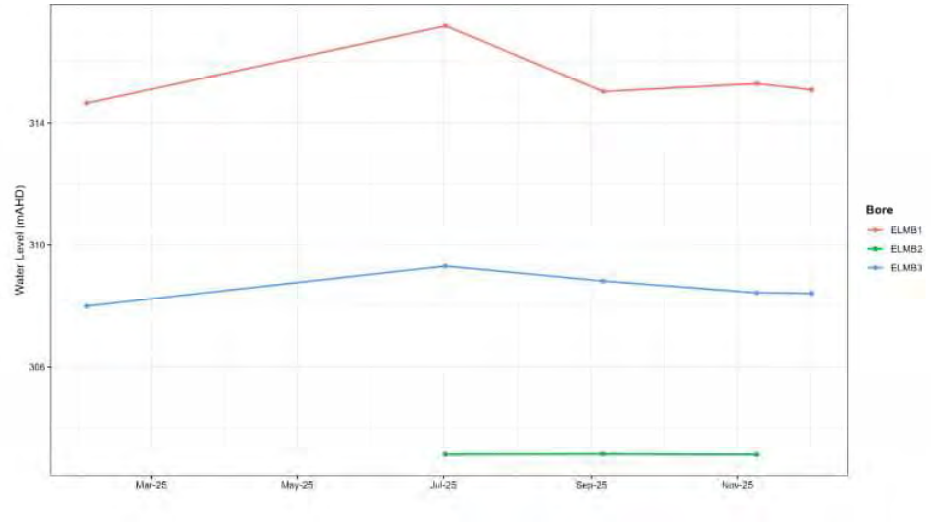


Figure 13: Groundwater elevations at Electric Light

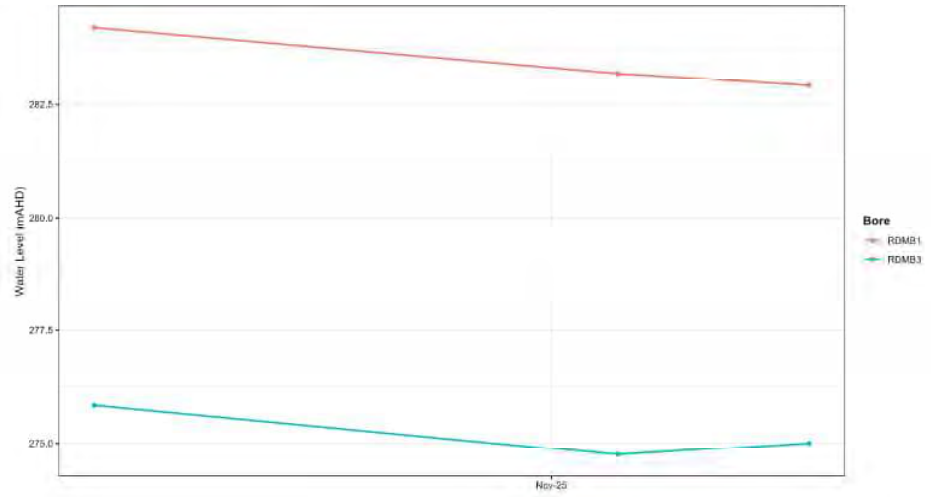


Figure 14: Groundwater elevations at Red Dam



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FIGURE 15: INFERRED POTENTIOMETRIC CONTOURS (ML 3540)

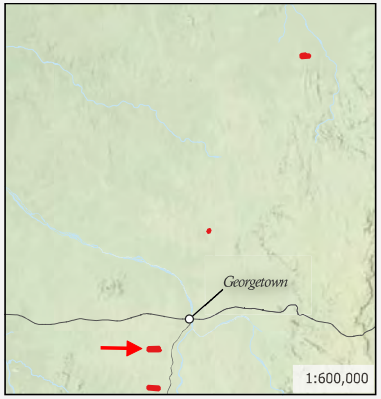
0 100 200 300 m

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LEGEND:

Bore_locations1 copy

- Compliance Bore
- Reference Bores
- Watercourse
- Potentiometric GWL (m AHD) Contours - 0.5 m Interval
- Inferred Groundwater Flow Direction
- Mining Lease



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8 Water Quality

The EA specified groundwater quality compliance trigger and limits for the Project require updating. As such, for the purposes of this assessment, EA condition C6-6, which states the annual review should include *"analysing groundwater chemistry"* was address using:

- Piper Diagram, and
- Time-series analysis.

The data presented in the Piper diagrams is for the last two years. For the time-series analysis, the focus of the discussion is on the data from the reporting period, but a time series of all available data is presented to put the review period in content.

8.1 Major Ions (Water Types)

The major ion data indicates a high level of variability in water chemistry across the sites, reflecting differing degree of rock-water interaction, marine aerosol deposition, soil salts inputs, and soil gas contributions. The Piper diagram for the Processing Plant site (**Figure 16**) indicates that:

- Most water are either mixed type, sodium-potassium bicarbonate type, or calcium-magnesium bicarbonate type.
- There are no groundwaters with chloride as the dominant anion, indicating that rock-water interactions have a significant impact on groundwater chemistry.
- There are no individual bores that display significant changes in water type over the last two years.

The Piper diagram for the Electric Light site (**Figure 17**) indicates that:

- Most water are either mixed type or sodium-potassium bicarbonate type.
- There are no groundwaters with chloride as the dominant anion, indicating that rock-water interactions have a significant impact on groundwater chemistry.
- There are no individual bores that display significant changes in water type over the last two years.

The Piper diagram for the Red Dam site (**Figure 18**) indicates that:

- All groundwater samples are calcium-magnesium bicarbonate type.
  - This water type reflects cation input from rock weathering and anion input from soil gases and rock weathering.
- There are no individual bores that display significant changes in water type over the last two years.

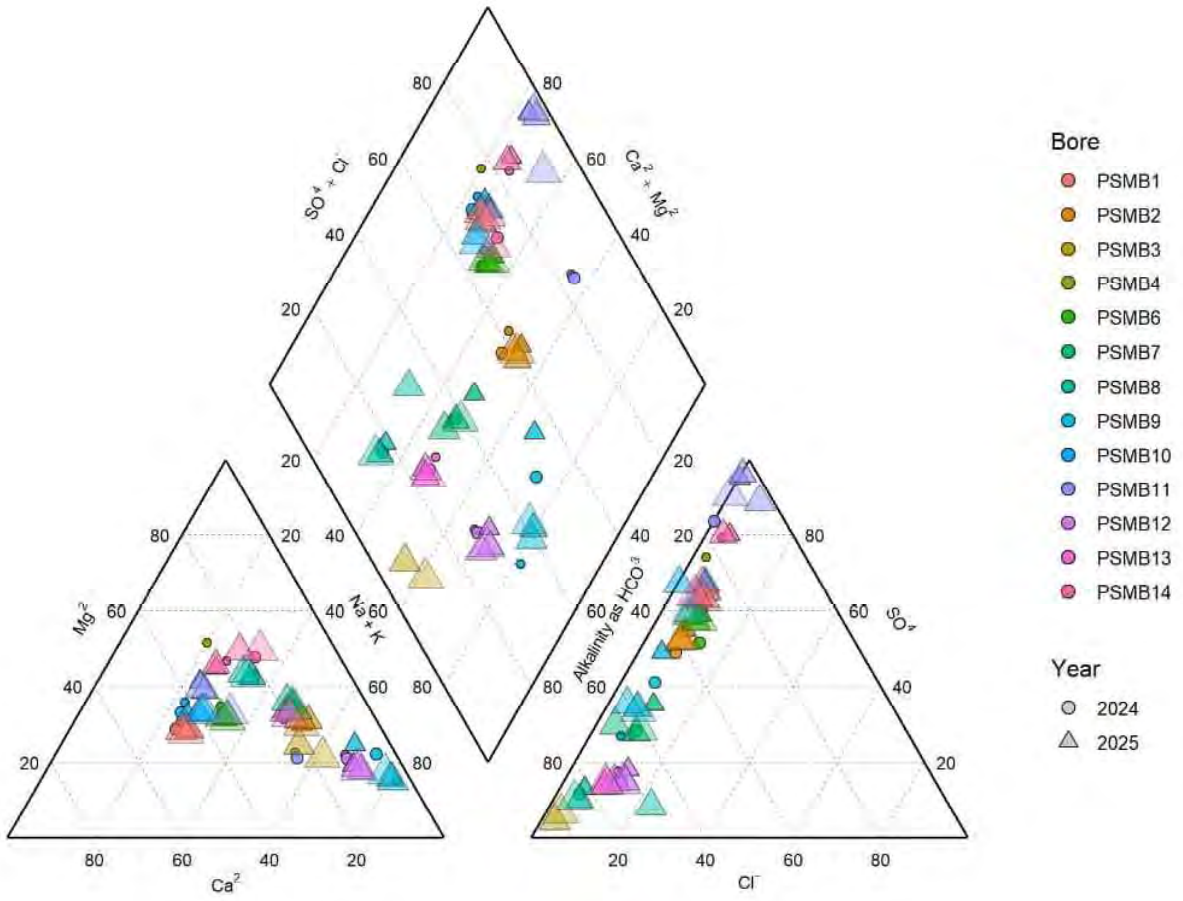


Figure 16: Processing Plant Piper Diagram (2024 – 2025)

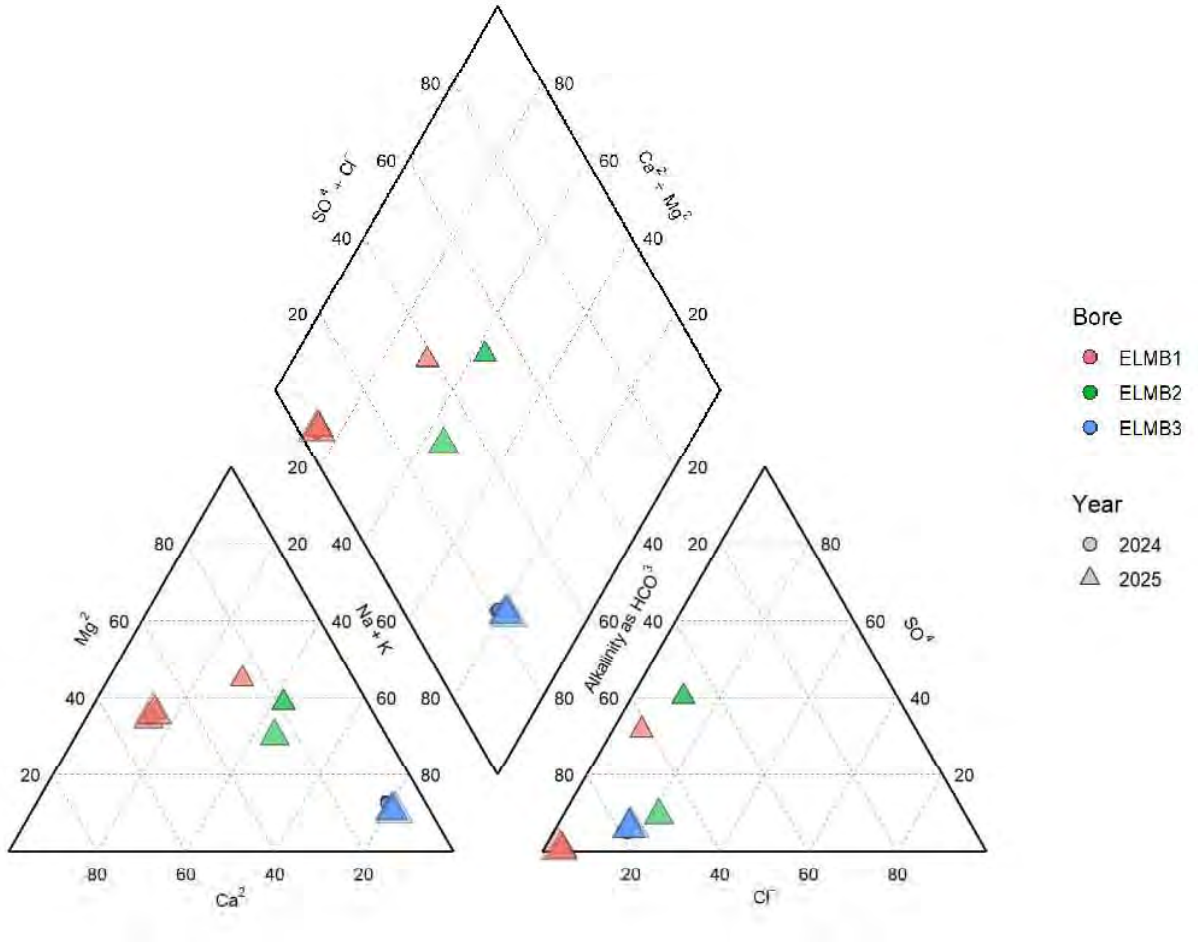


Figure 17: Electric Light Piper Diagram (2024 – 2025)

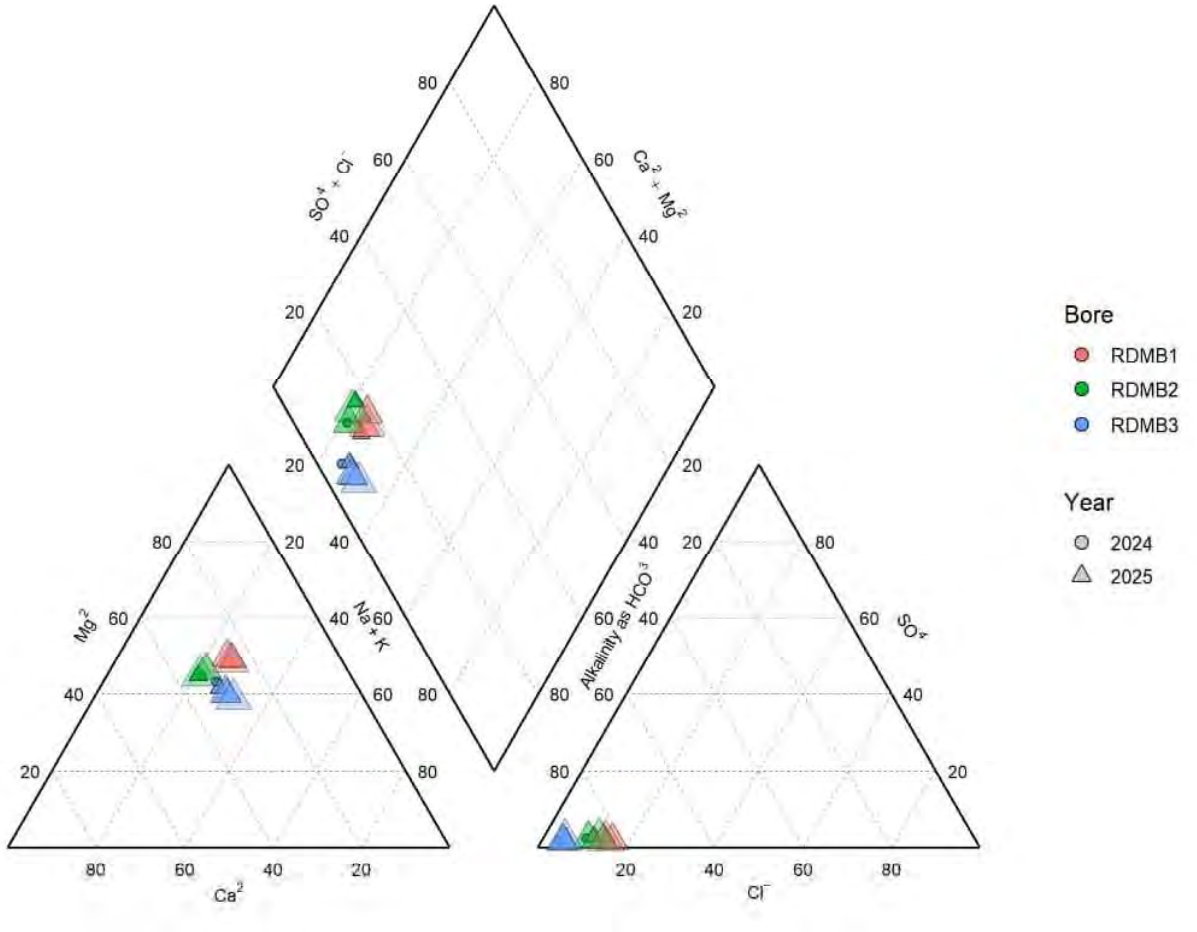


Figure 18: Red Dam Piper Diagram (2024 – 2025)

8.2 Electrical Conductivity

Salinity across the Project sites is highly variable, reflecting different degrees of rock-water interaction and variable rates of solute concentration via evapotranspiration.

8.2.1 Processing Plant

- The EC recorded at the Processing Plant compliance bores ranged from 1,183 to 4,730 mS/cm in 2025 (**Figure 19**).
- The EC recorded at the Processing Plant reference bore ranged from 2,110 to 2,420 mS/cm in 2025.
- The 2025 data from each individual bore is consistent with historical data from that bore.
  - It is noted that several bores have a notable increase in EC in 2023; this could be due to resumed water quality monitoring after a long period of care and maintenance.

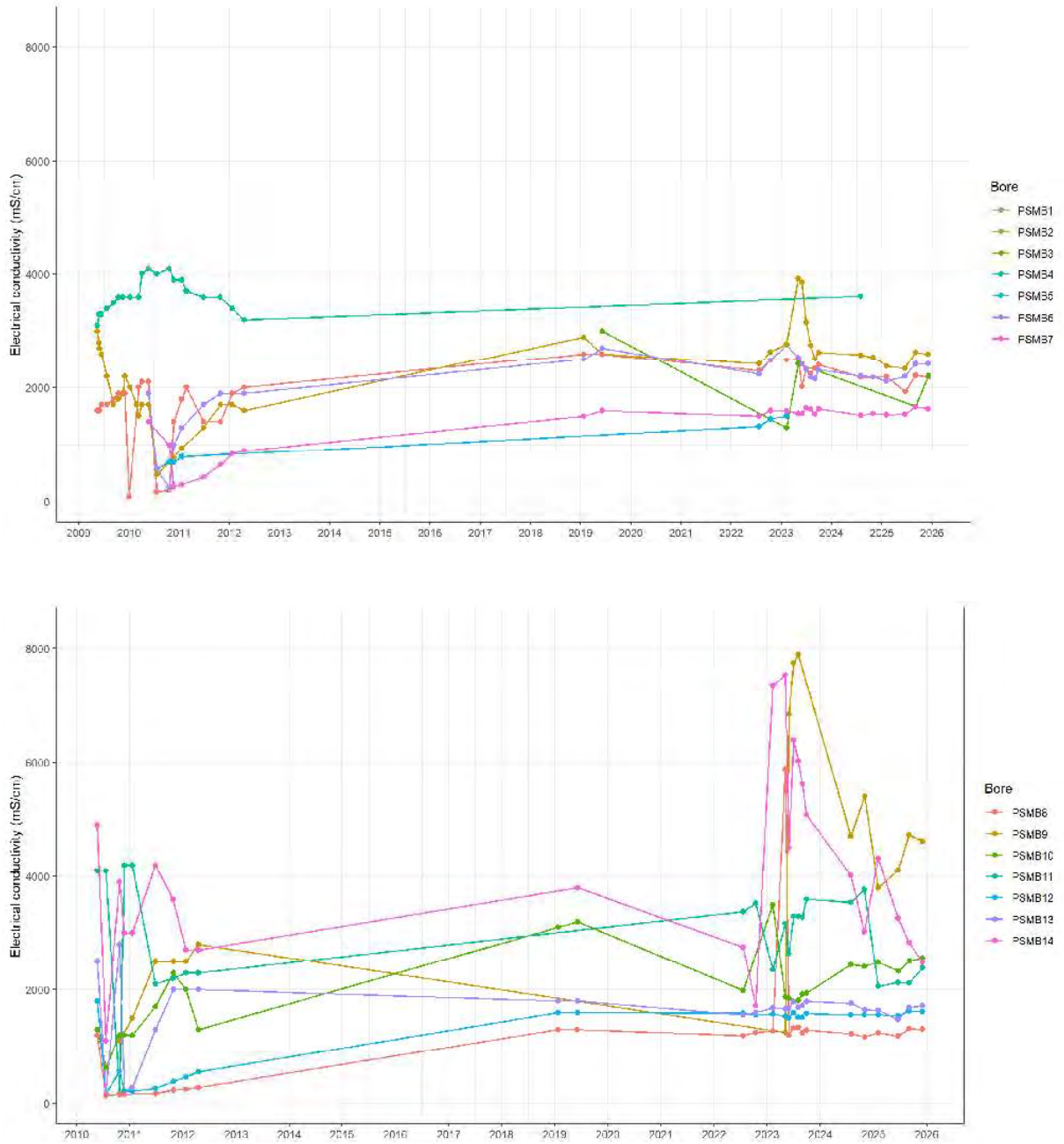


Figure 19: Time Series of EC at the Processing Plant Site

8.2.2 Electric Light

- The EC recorded at Electric Light compliance bores ranged from 898.3 to 1468 mS/cm in 2025 (**Figure 20).**
- The EC recorded at the Electric Light reference bore ranged from 1648 to 1906 mS/cm in 2025.
- The 2025 data from each individual bore is consistent with historical data from that bore.

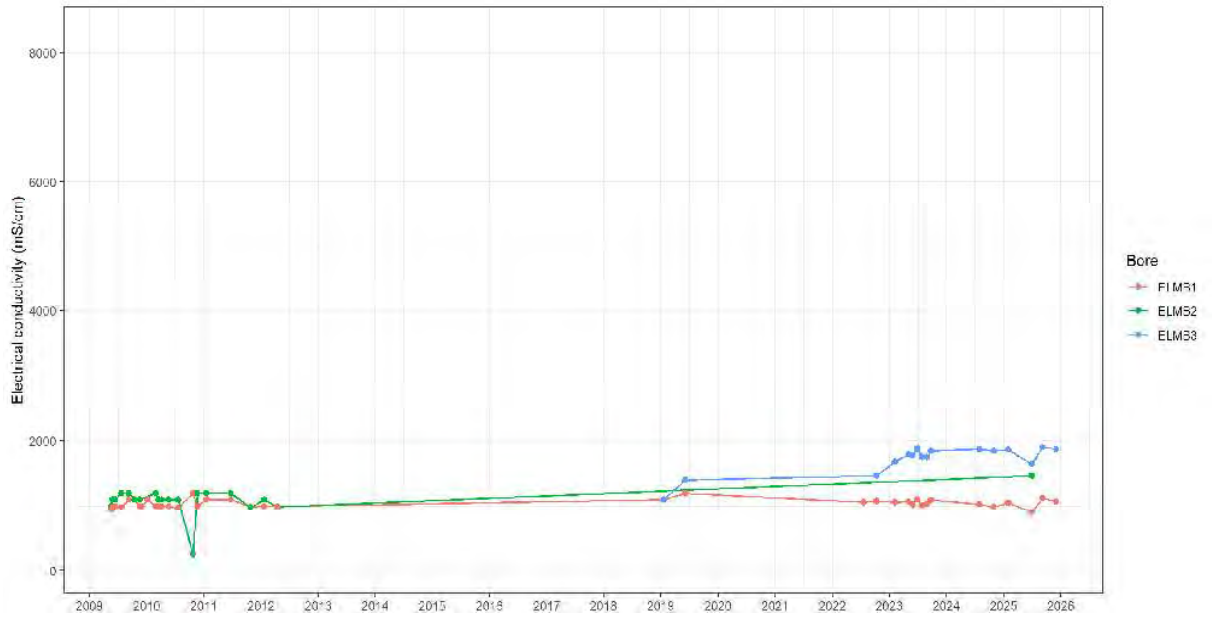


Figure 20: Time Series of EC at the Electric Light Site

8.2.3 Red Dam

- The EC recorded at the Red Dam compliance bores ranged from 1165 to 1625 mS/cm in 2025 (**Figure 21**).
- The EC recorded at the Red Dam reference bore ranged from 1126 to 1161 mS/cm in 2025.
- The 2025 data from each individual bore is consistent with historical data from that bore.

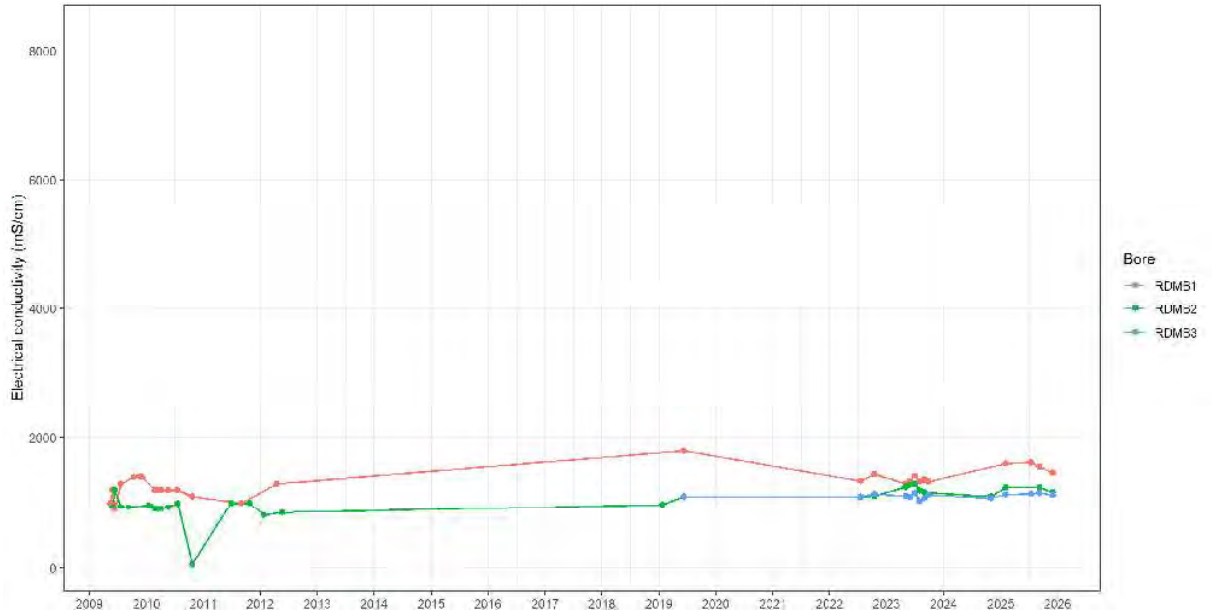


Figure 21: Time Series of EC at the Red Dam Site

8.3 pH

Values of lab pH across the Project sites is variable, reflecting different degree of rock water interaction and soil gas inputs.

8.3.1 Processing Plant

- The pH values recorded at the Processing Plant compliance bores was generally circum-neutral to alkaline and ranged from 6.6 to 8.3 in 2025 (**Figure 19**).
- The pH recorded at the Processing Plant reference bore ranged from 7.6 to 8.3 in 2025.
- The 2025 data from each individual bore is consistent with historical data from that bore.
  - It is noted that PSMB11 was characterised by relatively low pH values prior to 2013, which suggests a historical impact at this specific bore.
  - PSMB11 also experienced an anomalous (~5m) water level decline over the reporting period (Section 7).

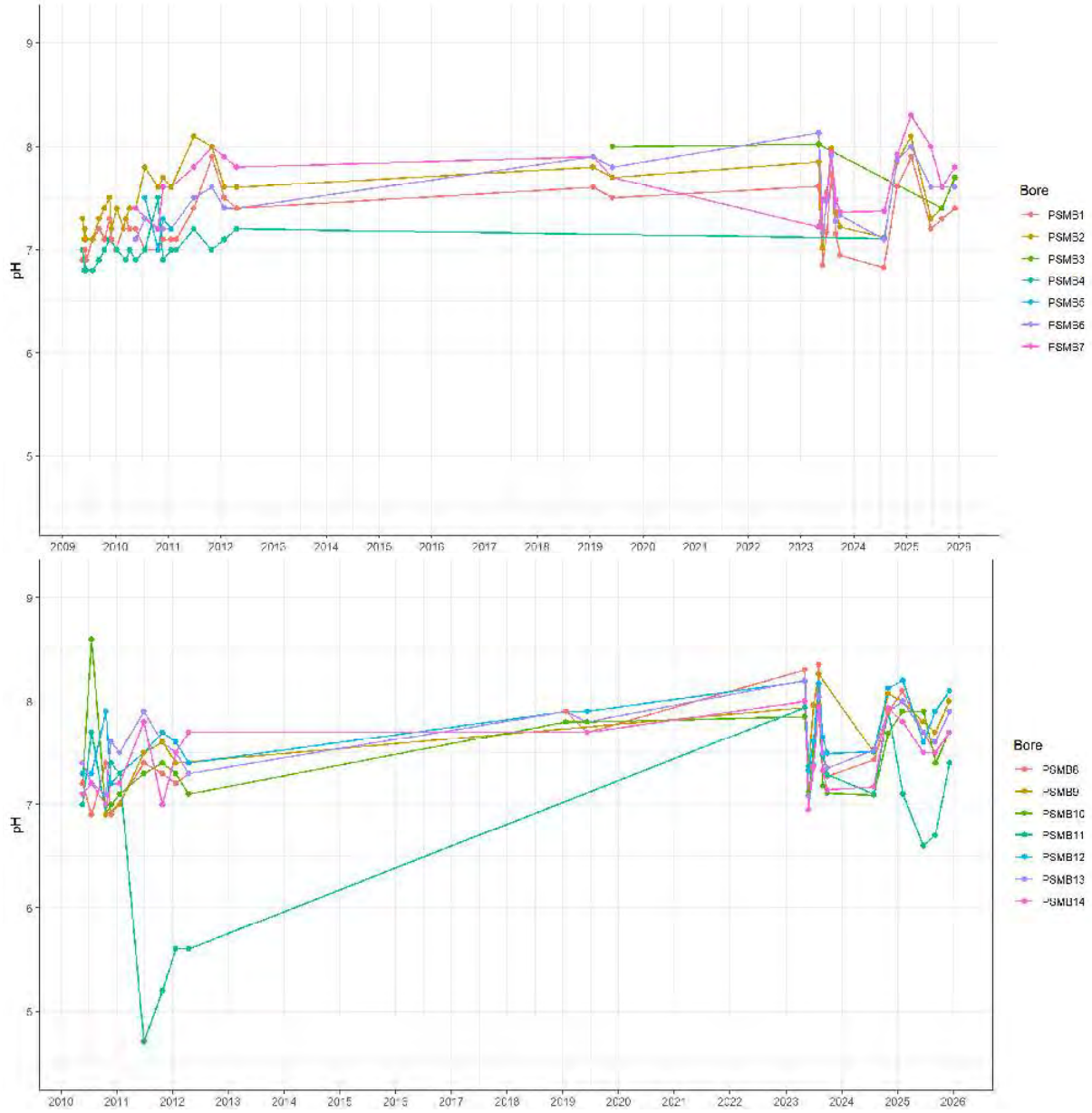


Figure 22: Time Series of pH at Processing Plant Site

8.3.2 Electric Light

- The pH values recorded at the Electric Light compliance bores was generally circum-neutral to alkaline and ranged from 7.3 to 7.9 in 2025 (**Figure 23**).
- The pH recorded at the Processing Plant reference bore ranged from 7.8 to 8.3 in 2025.
- The 2025 data from each individual bore is consistent with historical data from that bore.

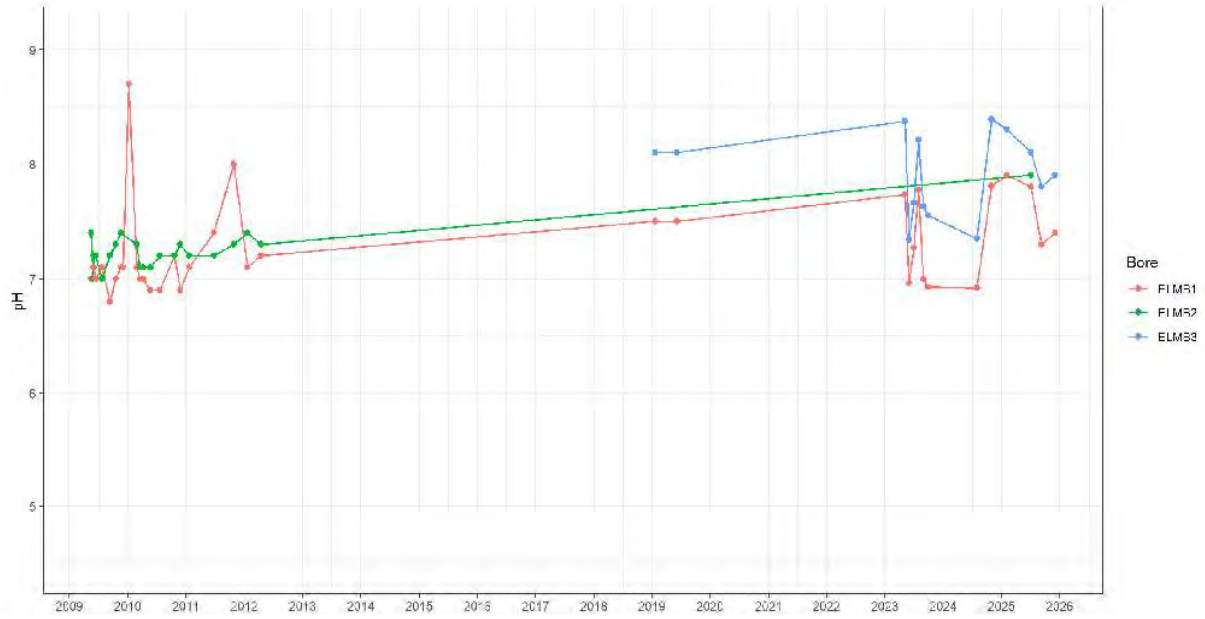


Figure 23: Time Series of pH at Electric Light Site

8.3.3 Red Dam

- The pH values recorded at the Red Dam compliance bores was generally circum-neutral to alkaline and ranged from 7.3 to 8.1 in 2025 (**Figure 24**).
- The pH recorded at the Red Dam reference bore ranged from 7.9 to 8.1 in 2025.
- The 2025 data from each individual bore is consistent with historical data from that bore.



Figure 24: Time Series of pH at Red Dam Site

8.4 Sulfate

Sulfate concentrations across the Project sites is highly variable, reflecting different degrees of rock-water interaction within mineralised terrain and variable rates of solute concentration via evapotranspiration.

8.4.1 Processing Plant

- The sulfate concentrations recorded at the Processing Plant compliance bores ranged from 42 to 2400 mg/L in 2025 (**Figure 25**).
- The sulfate concentrations recorded at the Processing Plant reference bore ranged from 720 to 760 mg/L in 2025.
- The 2025 data from each individual bore is consistent with historical data from that bore.
  - It is noted that several bores have a notable increase in both EC and sulfate in 2023; this could be due to resumed water quality monitoring after a long period of care and maintenance.

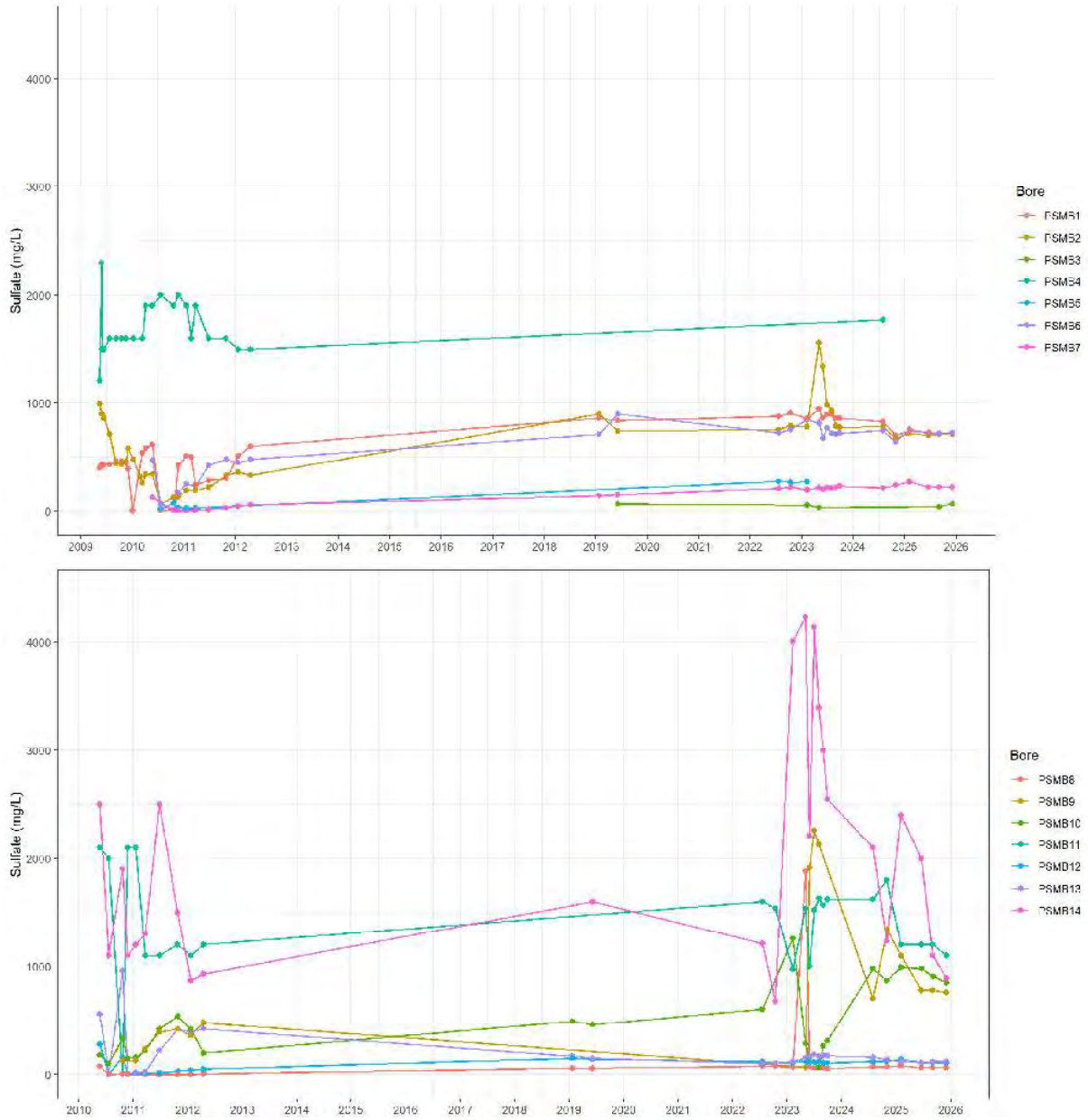


Figure 25: Time Series of Sulfate at Processing Plant Site

8.4.2 Electric Light

- The sulfate concentrations recorded at the Electric Light compliance bores ranged from 3.2 to 77 mg/L in 2025 (Figure 26).
- The sulfate concentrations recorded at the Electric Light reference bore ranged from 55 to 65 mg/L in 2025.
- The 2025 concentrations from each individual bore is consistent with historical data from that bore, indicating that sulfate concentrations in groundwater are generally low.

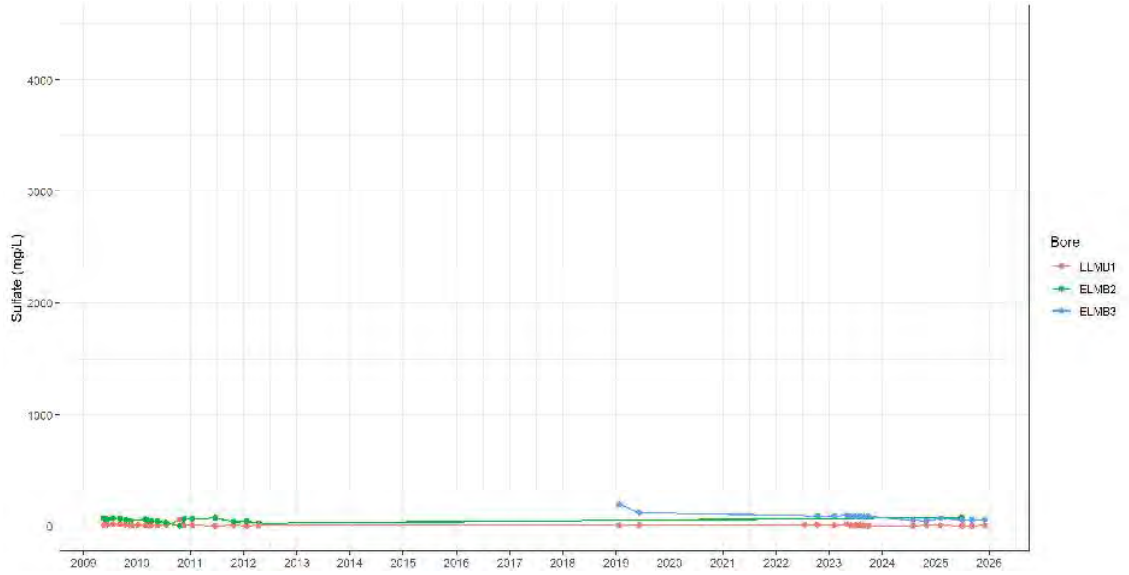


Figure 26: Time Series of Sulfate at Electric Light Site

8.4.3 Red Dam

- The sulfate concentrations recorded at the Red Dam compliance bores ranged from 13 to 18 mg/L in 2025 (Figure 26).
- The sulfate concentrations recorded at the Red Dam reference bore ranged from 8.5 to 12 mg/L in 2025.
- The 2025 concentrations from each individual bore is consistent with historical data from that bore, indicating that sulfate concentrations in groundwater are generally low.

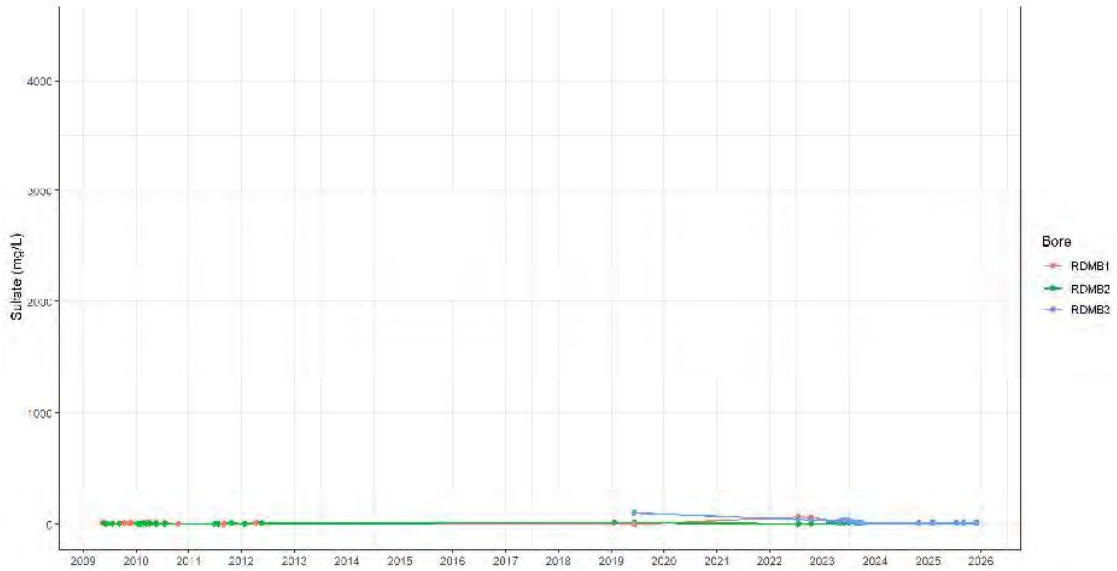


Figure 27: Time Series of Sulfate at Red Dam Site

8.5 Aluminium

Aluminium concentrations across the Project sites are generally very low (**Figure 28**, **Figure 29**, and **Figure 30**), reflecting the low solubility of aluminium under the pH conditions observed across the sites.

- The 2025 concentrations from each individual bore across all sites is consistent with historical data from that bore.
- The only bore with historical concentrations of aluminium that is above the Limit of Reporting (LOR) is PSMB11 (**Figure 28**); in this bore, elevated aluminium concentration prior to 2013 correspond with relatively low pH values. A similar covariation between lower pH (**Figure 22**) and aluminium concentration is potentially present in the recent (2024/2025) data from this bore.

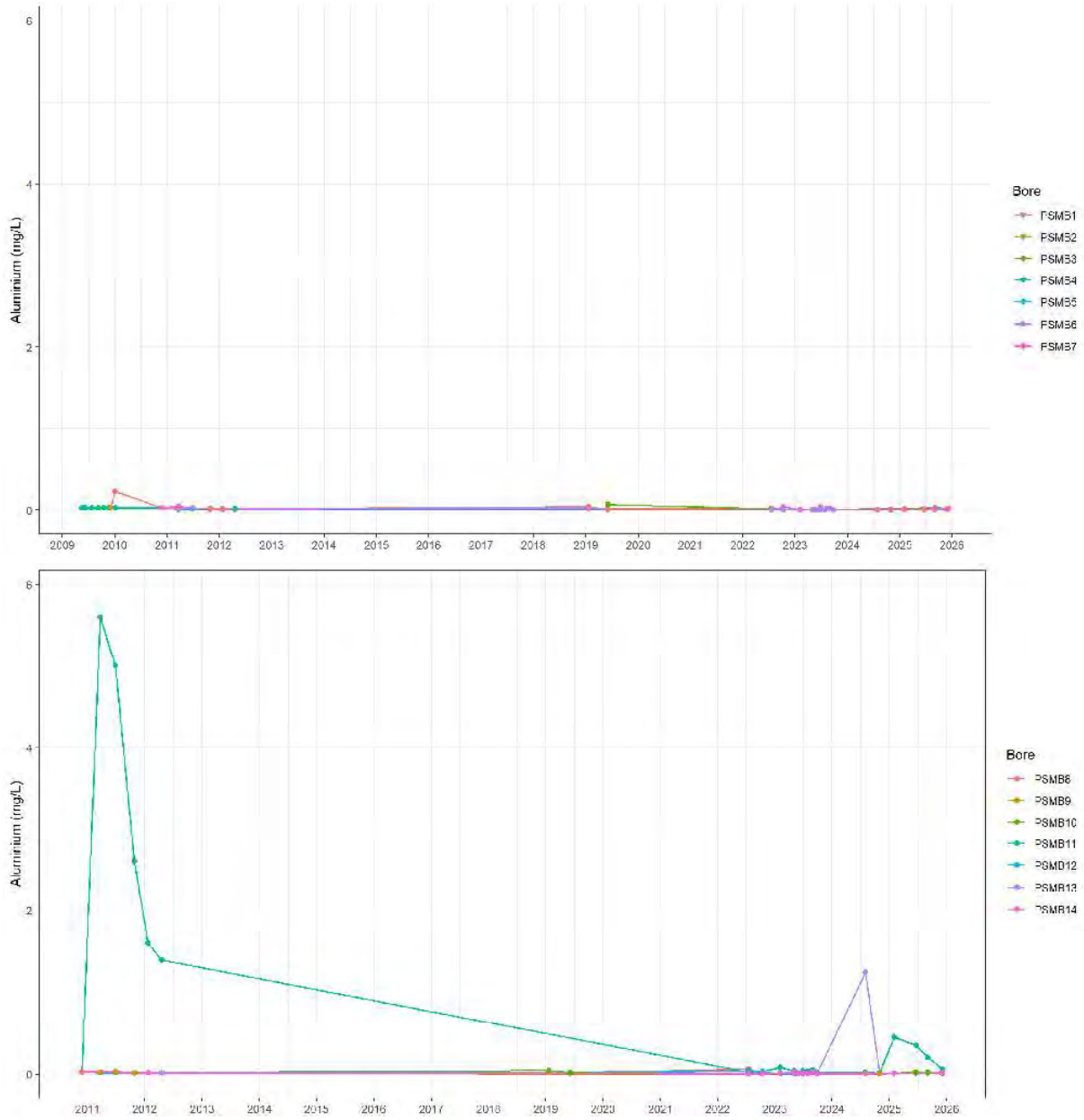


Figure 28: Time Series of Aluminium at Processing Plant Site

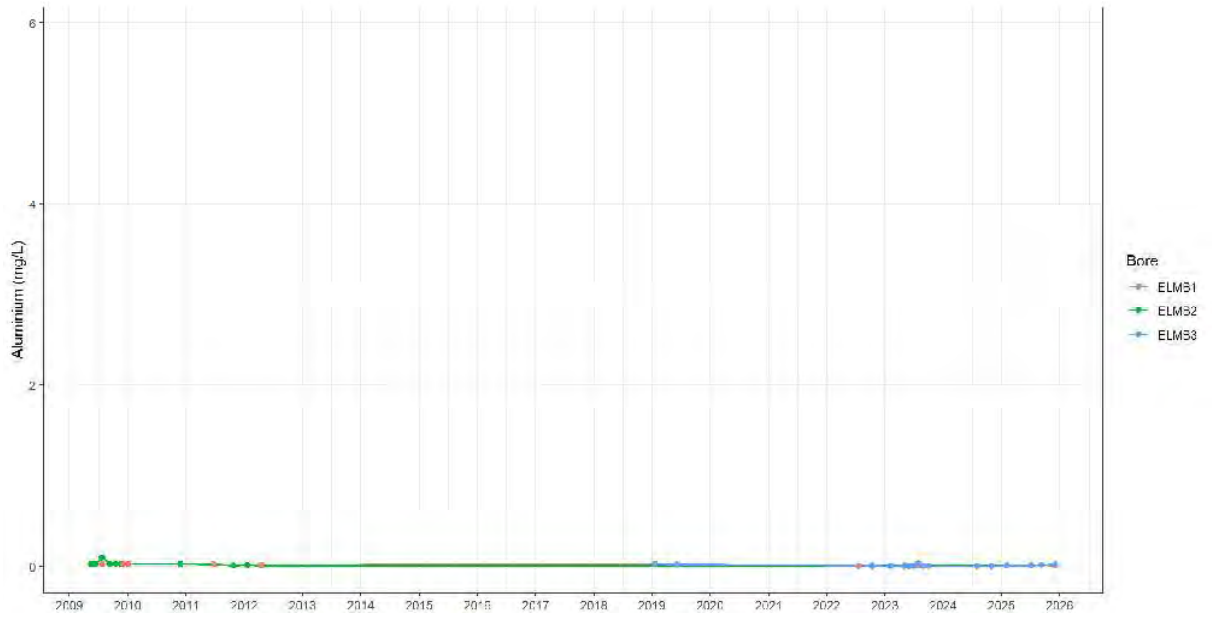


Figure 29: Time Series of Aluminium at Electric Light Site

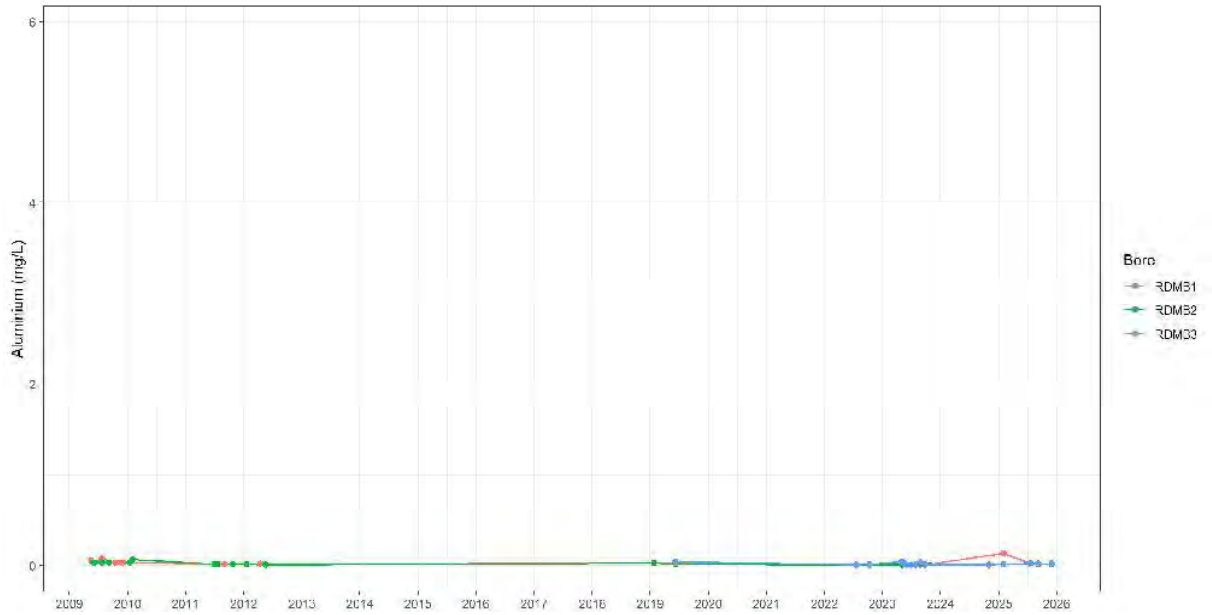


Figure 30: Time Series of Aluminium at Red Dam Site

8.6 Antimony

Concentrations of Antimony across the Project sites are somewhat variable, but generally low, reflecting different degrees of rock-water interaction in a mineralised terrain. Due to the generally low concentration of antimony observed across all sites, this parameter should be further evaluated to determine if it remains relevant for compliance purposes.

8.6.1 Processing Plant

- The antimony concentrations recorded at the Processing Plant compliance bores was generally low and ranged from 0.0005 to 0.012 mg/L in 2025 (**Figure 31**).
- The antimony concentrations recorded at the Processing Plant reference bore were 0.0005 mg/L in 2025.
- The 2025 antimony concentrations from each individual bore is consistent with historical data from that bore.

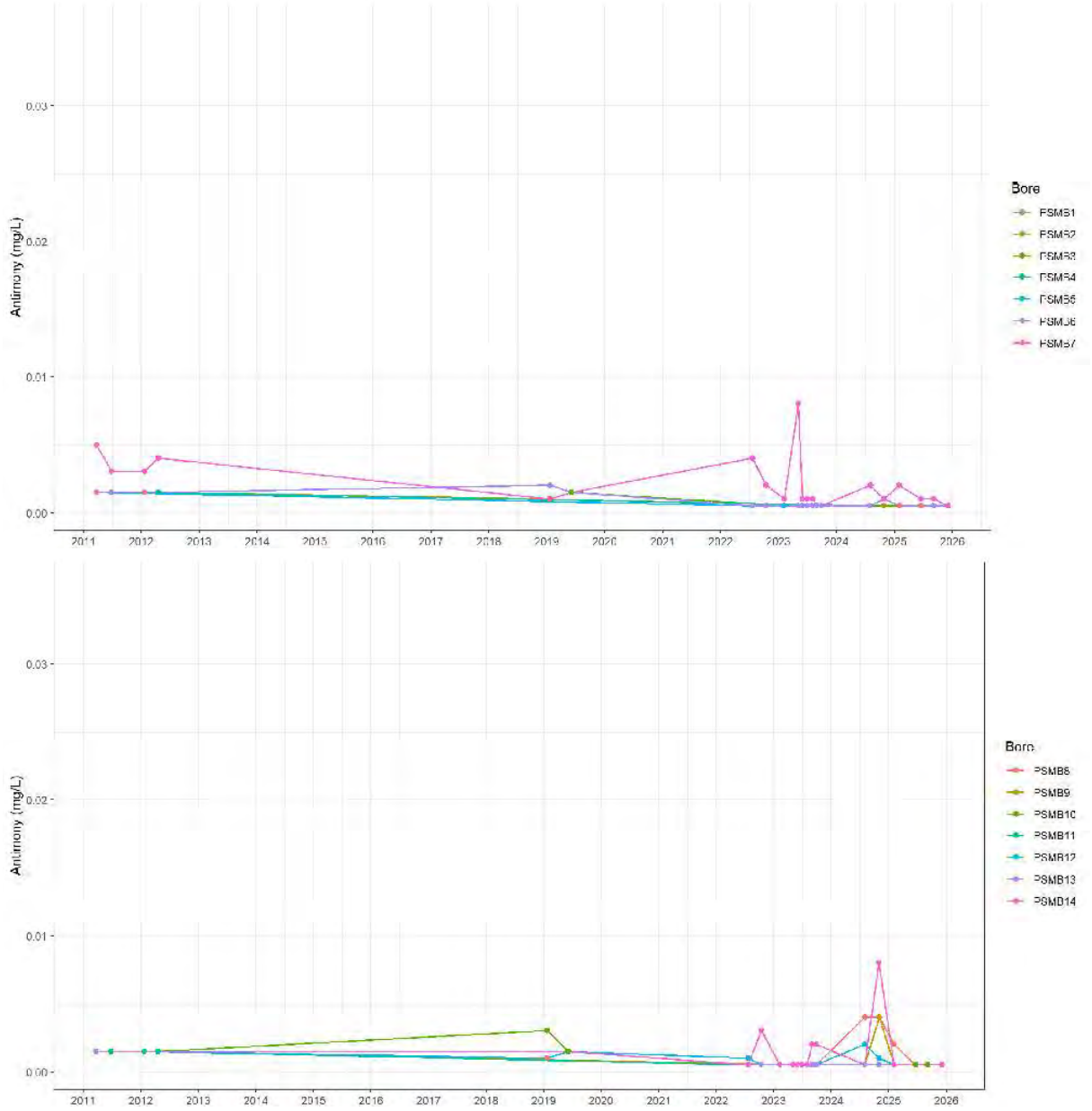


Figure 31: Time Series of Antimony at Processing Plant Site

8.6.2 Electric Light

- The antimony concentrations recorded at the Electric Light compliance bores was generally low at 0.0005 mg/L in 2025 (**Figure 32**).
- The antimony concentrations recorded at the Electric Light reference bore ranged from 0.0005 to 0.002 mg/L in 2025.
- The 2025 antimony concentrations from each individual bore is consistent with historical data from that bore.

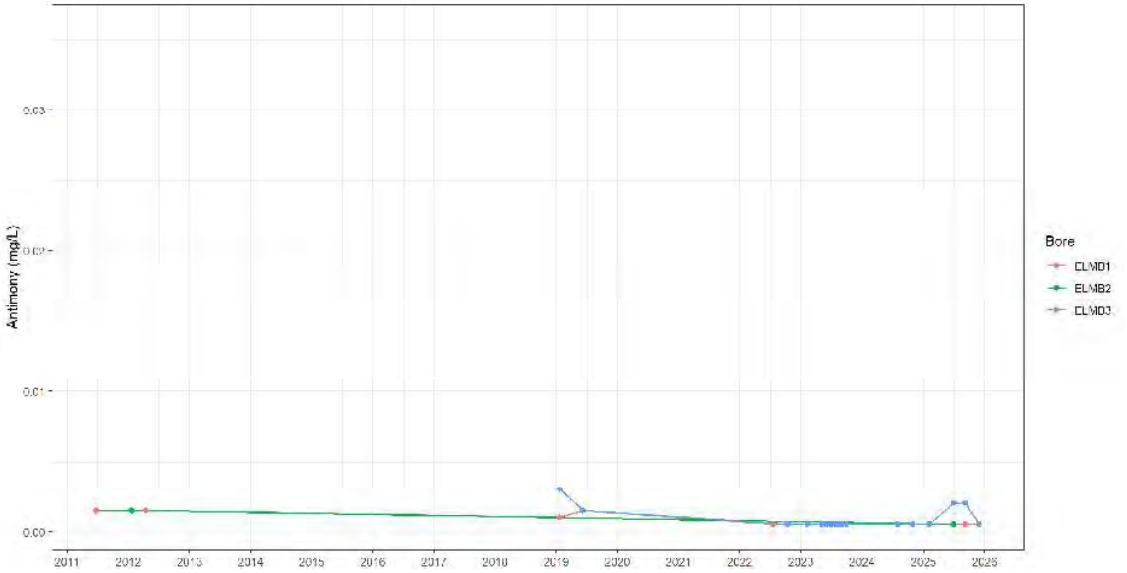


Figure 32: Time Series of Antimony at Electric Light Site

8.6.3 Red Dam

- The antimony concentrations recorded at the Red Dam compliance bores was generally low and ranged from 0.0005 to 0.009 mg/L in 2025 (**Figure 33**).
- The antimony concentrations recorded at the Red Dam reference bore ranged from 0.0005 to 0.002 mg/L in 2025.
- The 2025 antimony concentrations from each individual bore is consistent with historical data from that bore.
  - Concentrations of antimony in RDMB2 are generally decreasing.



Figure 33: Time Series of Antimony at Red Dam Site

8.7 Arsenic

Concentrations of arsenic across the Project sites is somewhat variable, reflecting different degree of weathering inputs within a mineralised terrain.

8.7.1 Processing Plant

- The arsenic concentrations recorded at the Processing Plant compliance bores was generally low and ranged from 0.0005 to 0.26 mg/L in 2025 (**Figure 34**).
- The arsenic concentrations recorded at the Processing Plant reference bore ranged from 0.001 to 0.003 mg/L in 2025.
- The 2025 arsenic concentrations from each individual bore is generally consistent with historical data from that bore.
  - Arsenic concentrations in bore PSMB7 became elevated relative to historical values in 2023; however, the 2025 concentrations are lower than the 2024 concentrations, indicating that there are no new processes impacting groundwater chemistry in this bore.

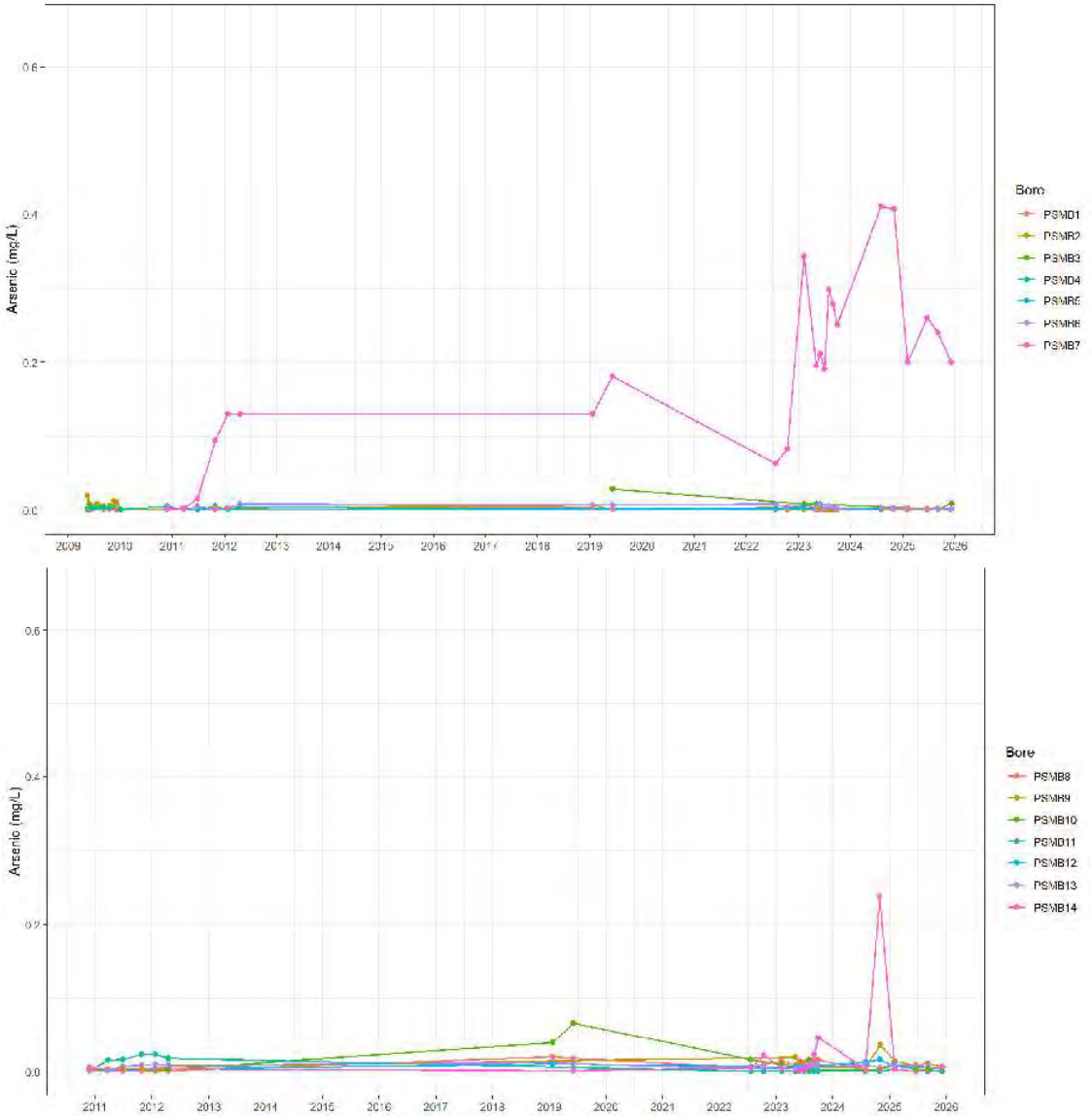


Figure 34: Time Series of Arsenic at Processing Plant Site

8.7.2 Electric Light

- The arsenic concentrations recorded at the Electric Light compliance bores was generally low and ranged from 0.0005 to 0.006 mg/L in 2025 (**Figure 35**).
- The arsenic concentrations recorded at the Electric Light reference bore ranged from 0.009 to 0.011 mg/Lin 2025.
- The 2025 arsenic concentrations from each individual bore is generally consistent with historical data from that bore.

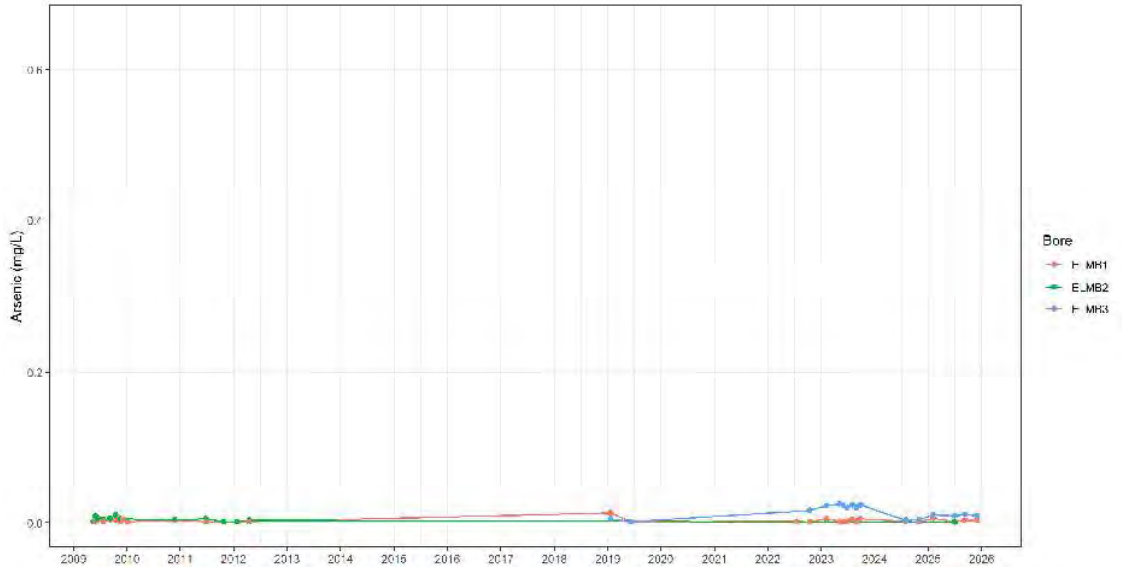


Figure 35: Time Series of Arsenic at Electric Light Site

8.7.3 Red Dam

- The arsenic concentrations recorded at the Red Dam compliance bores was generally low and ranged from 0.044 to 0.31 mg/L in 2025 (**Figure 36**).
- The arsenic concentrations recorded at the Red Dam reference bore ranged from 0.003 to 0.006 mg/L in 2025.
- The 2025 arsenic concentrations from each individual bore is generally consistent with historical data from that bore, with bores RDMB1 and RDMB3 generally have trends of decreasing arsenic concentrations.

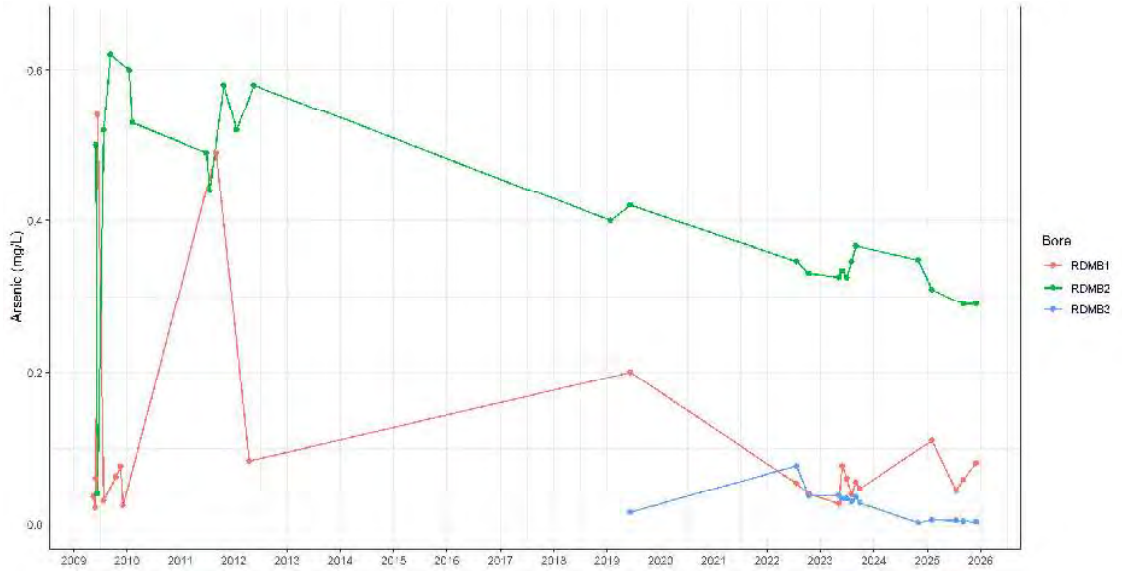


Figure 36: Time Series of Arsenic at Red Dam Site

8.8 Bismuth

Bismuth concentrations across the Project sites are always below the LOR at all sites (**Figure 37**, **Figure 38**, and **Figure 39**), reflecting either the absence of bismuth in the host rock and/or the low solubility of bismuth under the pH and redox conditions observed across the sites. Due to the lack of detections of bismuth observed across all sites, this parameter should be further evaluated to determine if it remains relevant for compliance or interpretation purposes.

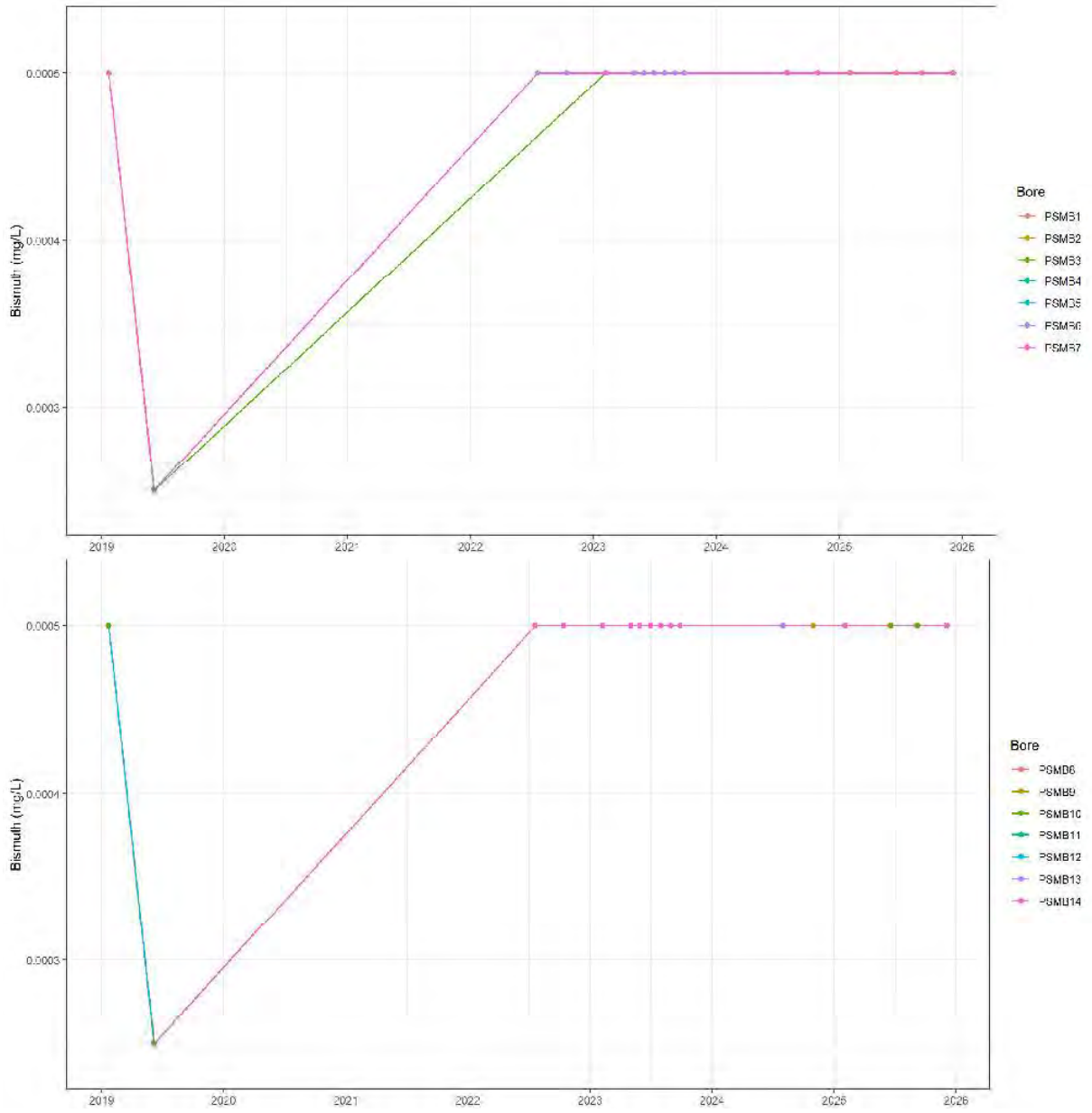


Figure 37: Time Series of Bismuth at Processing Plant Site

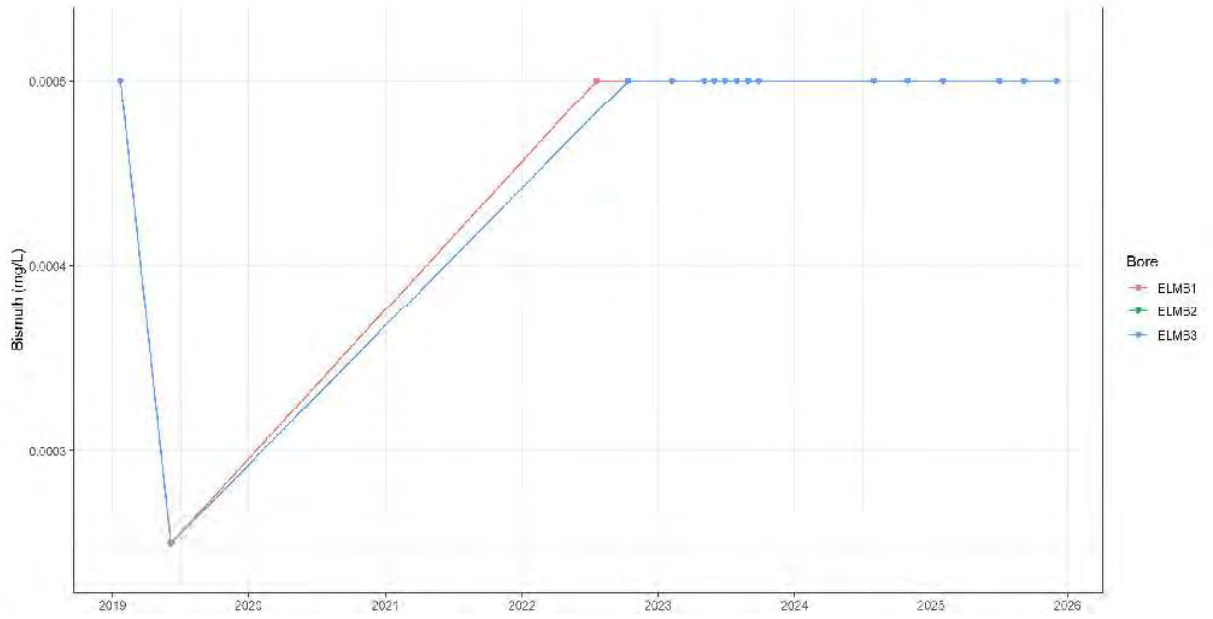


Figure 38: Time Series of Bismuth at Electric Light Site

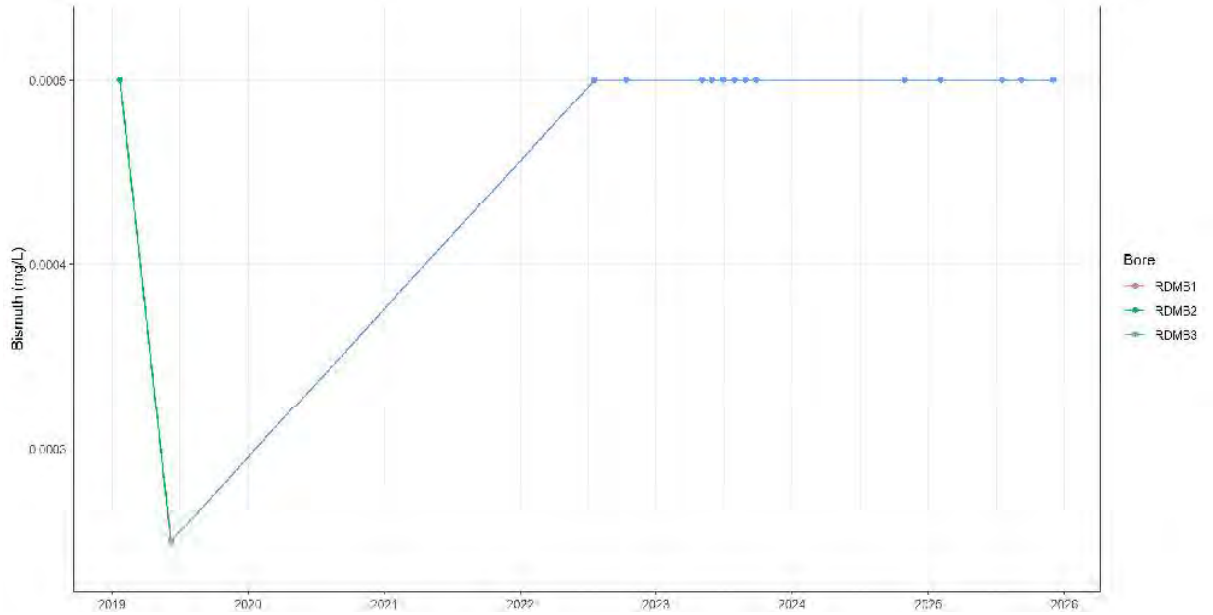


Figure 39: Time Series of Bismuth at Red Dam Site

8.9 Cadmium

Cadmium concentrations across the Project sites are generally very low (**Figure 40**, **Figure 41, and Figure 42**), reflecting the low solubility of cadmium under the pH and redox conditions observed across the sites.

- The 2025 concentrations from each individual bore across all sites is consistent with historical data from that bore.
- The only bore with historically elevated concentrations of cadmium is PSMB11 (**Figure 40**); in this bore elevated cadmium concentrations prior to 2013 and in 2024/2025 correspond with relatively low pH values. A similar covariation between lower pH (**Figure 22**) and elevated aluminium concentrations is also observed (**Section 8.5**)

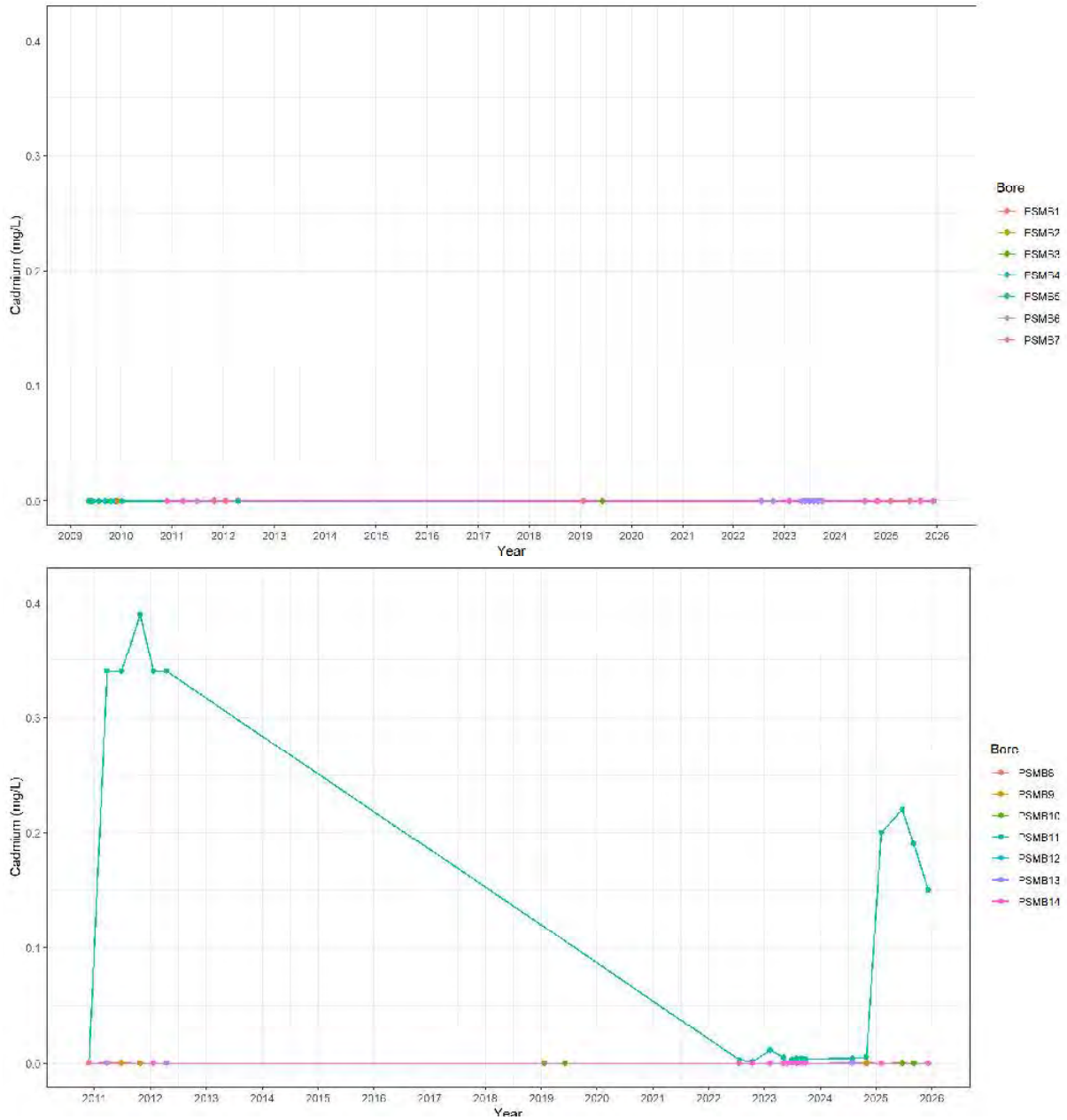


Figure 40: Time Series of Cadmium at Processing Plant Site

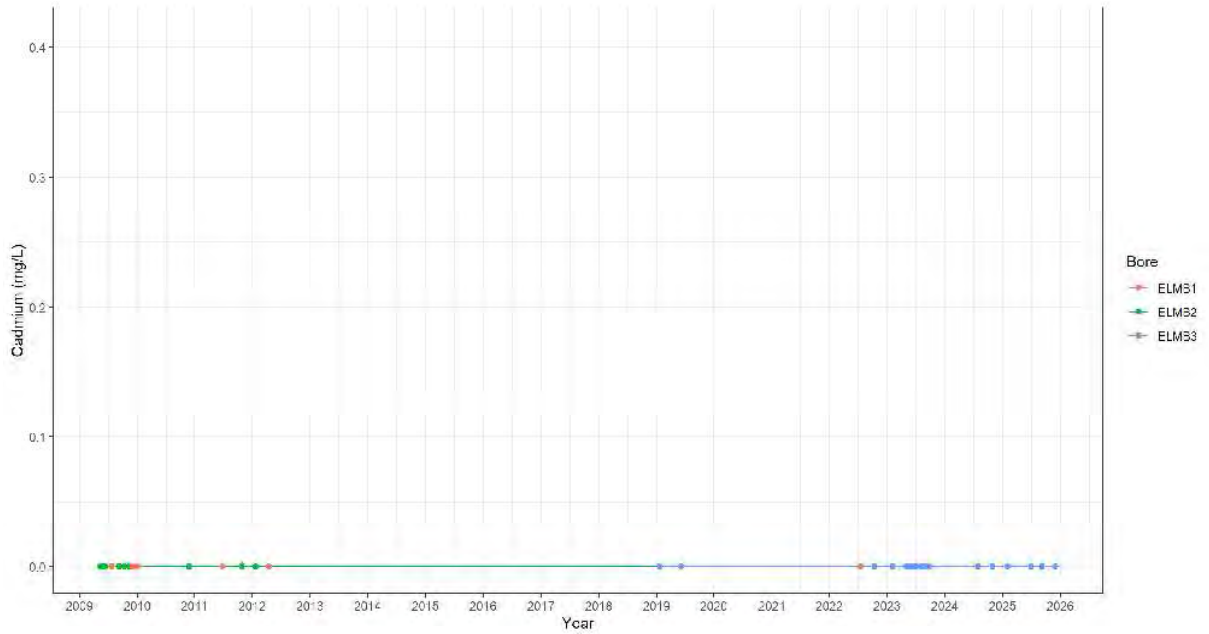


Figure 41: Time Series of Cadmium at Electric Light Site

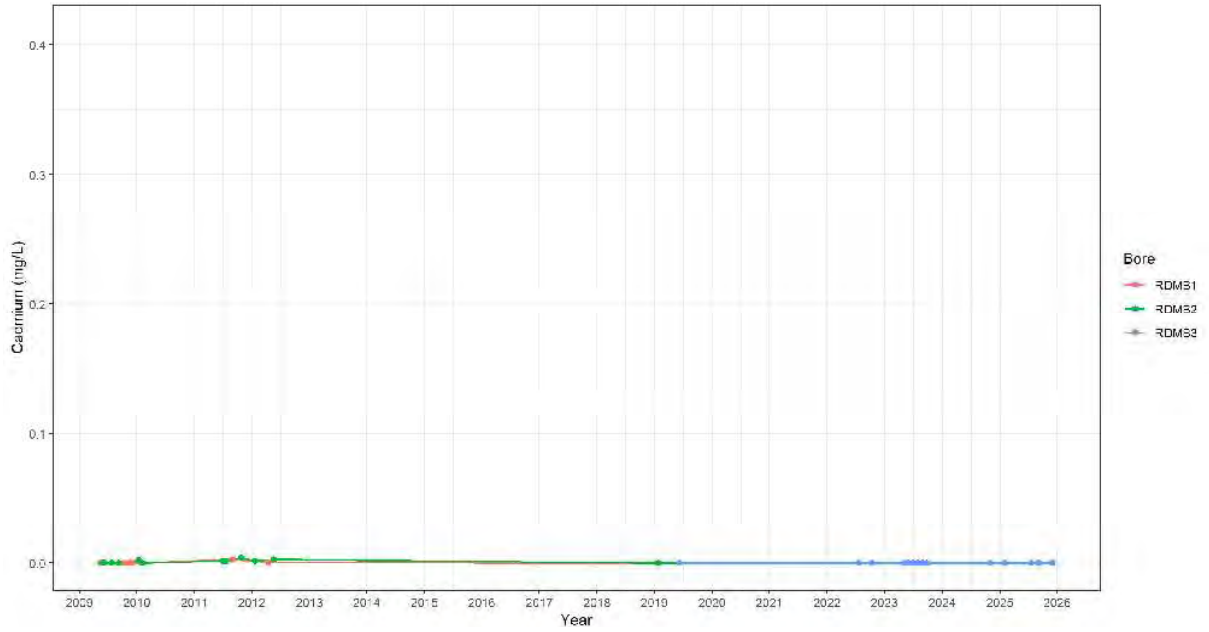


Figure 42: Time Series of Cadmium at Red Dam Site

8.10 Chromium

Chromium concentrations across the Project sites are generally very low, if not below the LOR (**Figure 43, Figure 44,** and **Figure 45**), reflecting the low solubility of chromium under the pH and redox conditions observed across the sites.

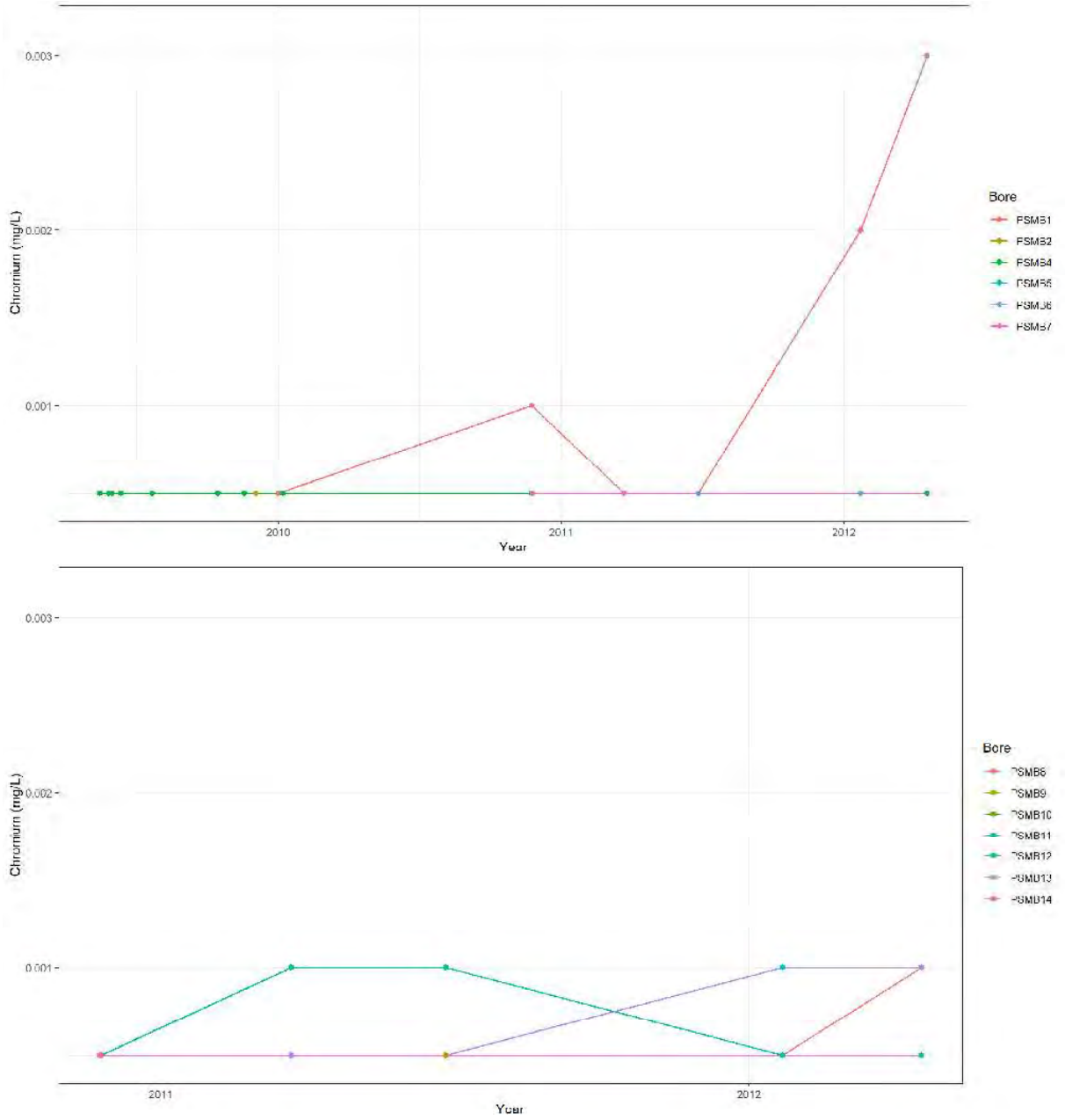


Figure 43: Time Series of Chromium at Processing Plant Site

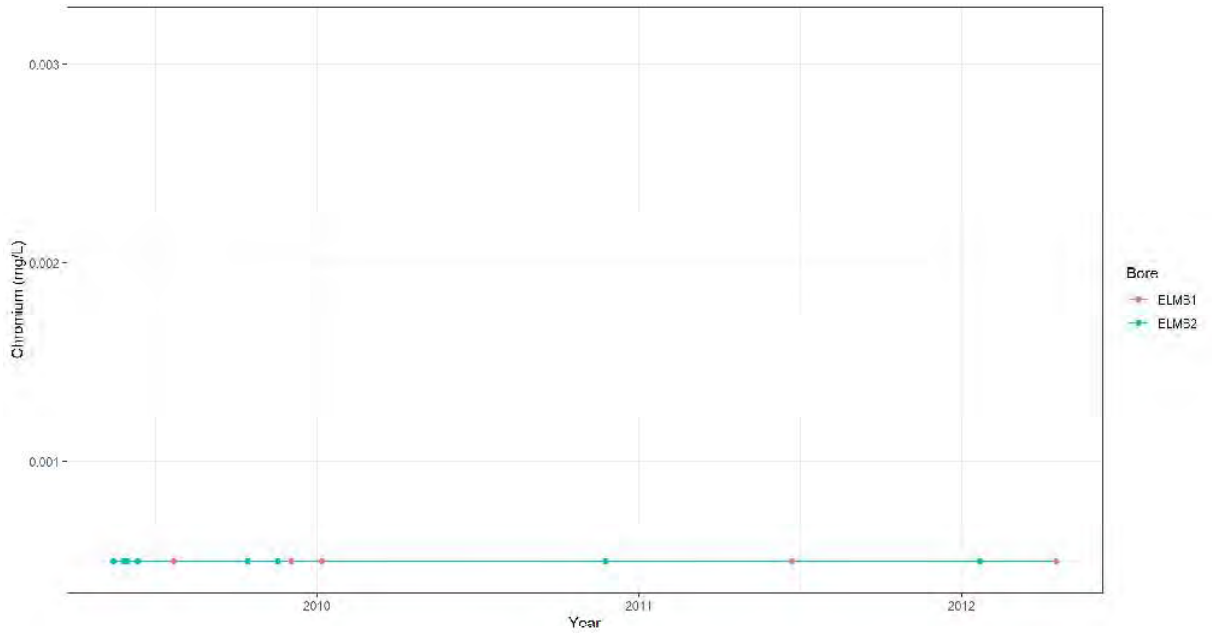


Figure 44: Time Series of Chromium at Electric Light Site

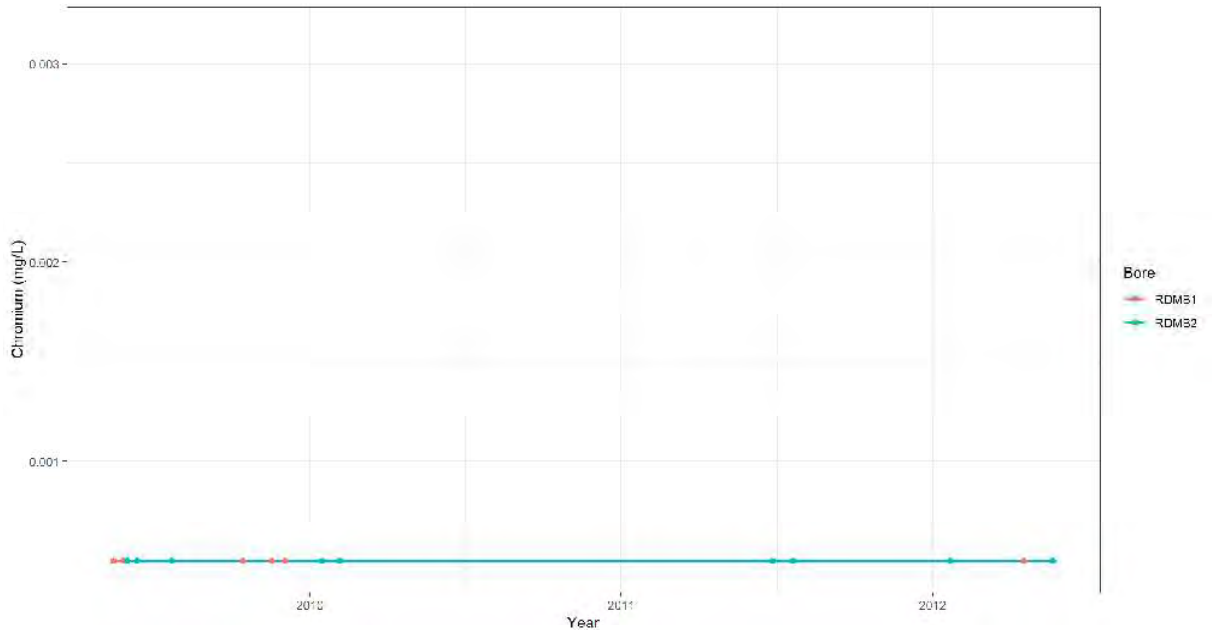


Figure 45: Time Series of Chromium at Red Dam Site

8.11 Cobalt

Concentrations of cobalt across the Project sites is somewhat variable, but generally low, reflecting different degree of rock-water interaction in a mineralised terrain.

8.11.1 Processing Plant

- The cobalt concentrations recorded at the Processing Plant compliance bores was generally low and ranged from 0.0005 to 0.23 mg/L in 2025 (**Figure 46**).
- The cobalt concentrations recorded at the Processing Plant reference bore ranged from 0.036 to 0.057 mg/L in 2025.
- The 2025 cobalt concentrations from each individual bore is generally consistent with historical data from that bore.
  - Cobalt concentrations in bore PSMB11 were elevated prior to 2013 and again in 2025. This pattern is likely related to changing pH values in this bore (Section 8.3.1), and there is no data indicating that there are new processes impacting groundwater chemistry in this bore.

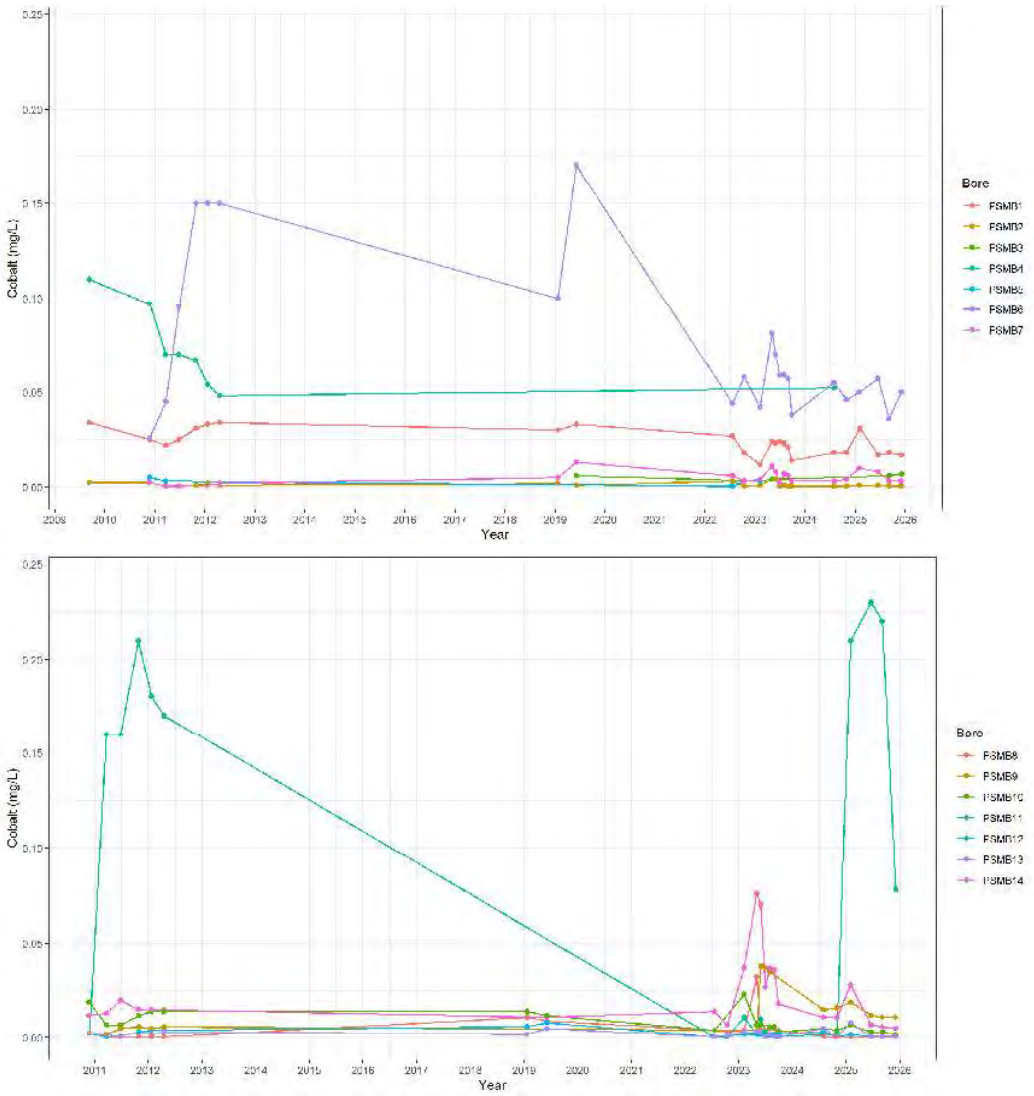


Figure 46: Time Series of Cobalt at Processing Plant Site

8.11.2 Electric Light

- The cobalt concentrations recorded at the Electric Light compliance bores was generally very low at 0.0005 mg/L in 2025 (**Figure 47**).
- The cobalt concentrations recorded at the Electric Light reference bore were also low at 0.0005 mg/L in 2025.
- The 2025 cobalt concentrations from each individual bore is consistent with historical data from that bore.

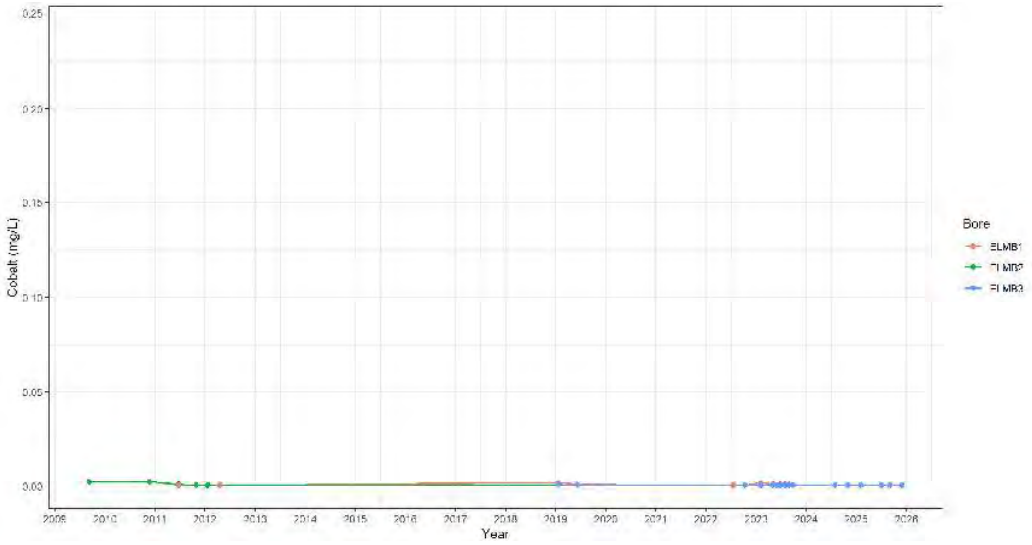


Figure 47: Time Series of Cobalt at Electric Light Site

8.11.3 Red Dam

- The cobalt concentrations recorded at the Electric Light compliance bores was generally very low at 0.0005 mg/L in 2025 (**Figure 48**).
- The cobalt concentrations recorded at the Electric Light reference bore were also very low at 0.0005 mg/L in 2025.
- The 2025 cobalt concentrations from each individual bore is consistent with historical data from that bore.

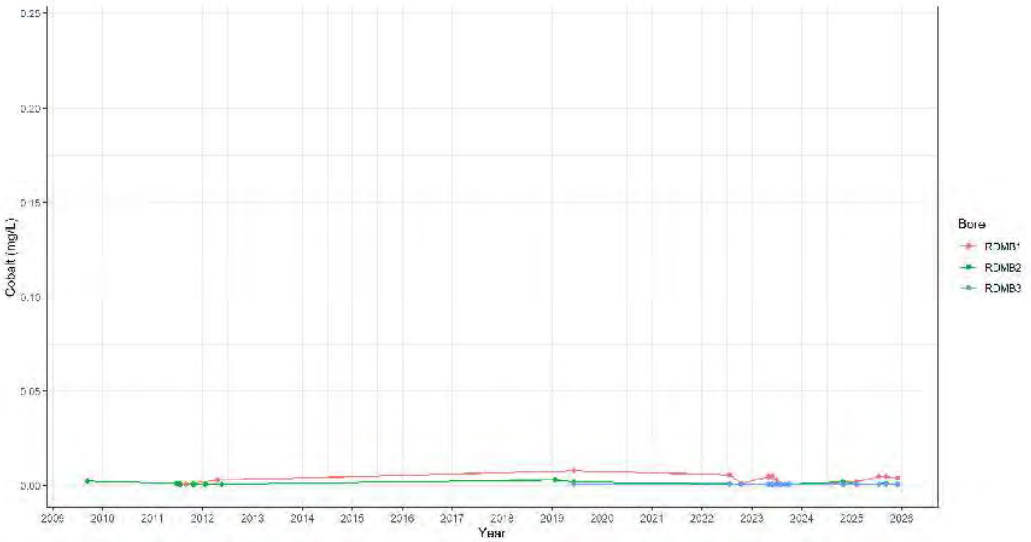


Figure 48: Time Series of Cobalt at Red Dam Site

8.12 Copper

Copper concentrations across the Project sites are generally very low (**Figure 49**, **Figure 50**, and **Figure 51**), reflecting the low solubility of copper under the pH conditions observed across the Project sites.

- The 2025 concentrations from each individual bore is consistent with historical data from that bore.
- The only bore with historically elevated concentrations of copper is PSMB11 (**Figure 49**); in this bore elevated copper concentration prior to 2013 correspond with relatively low pH values. A similar covariation between lower pH values (**Figure 22**) and copper concentrations is potentially present in the 2024/2025 data from this bore.

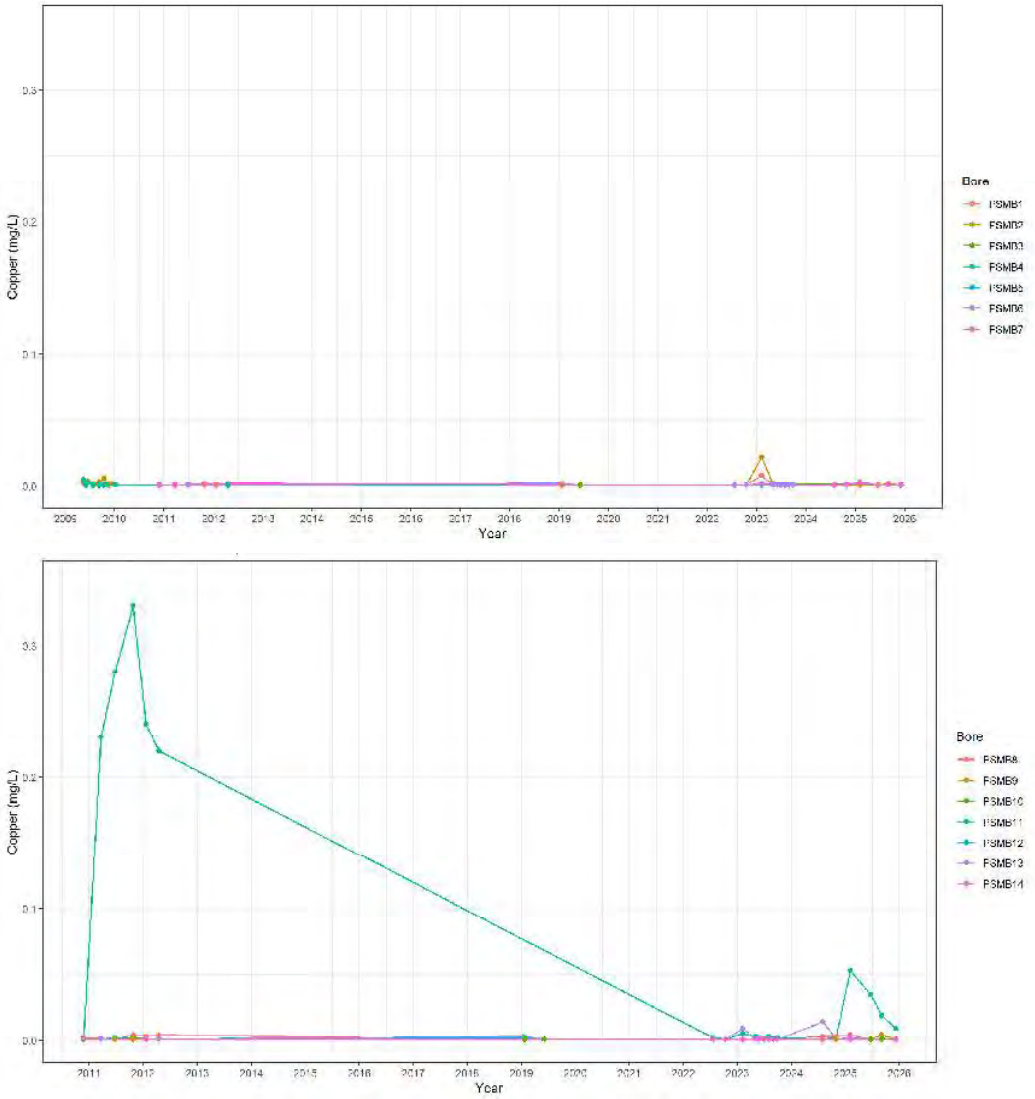


Figure 49: Time Series of Copper at Processing Plant Site

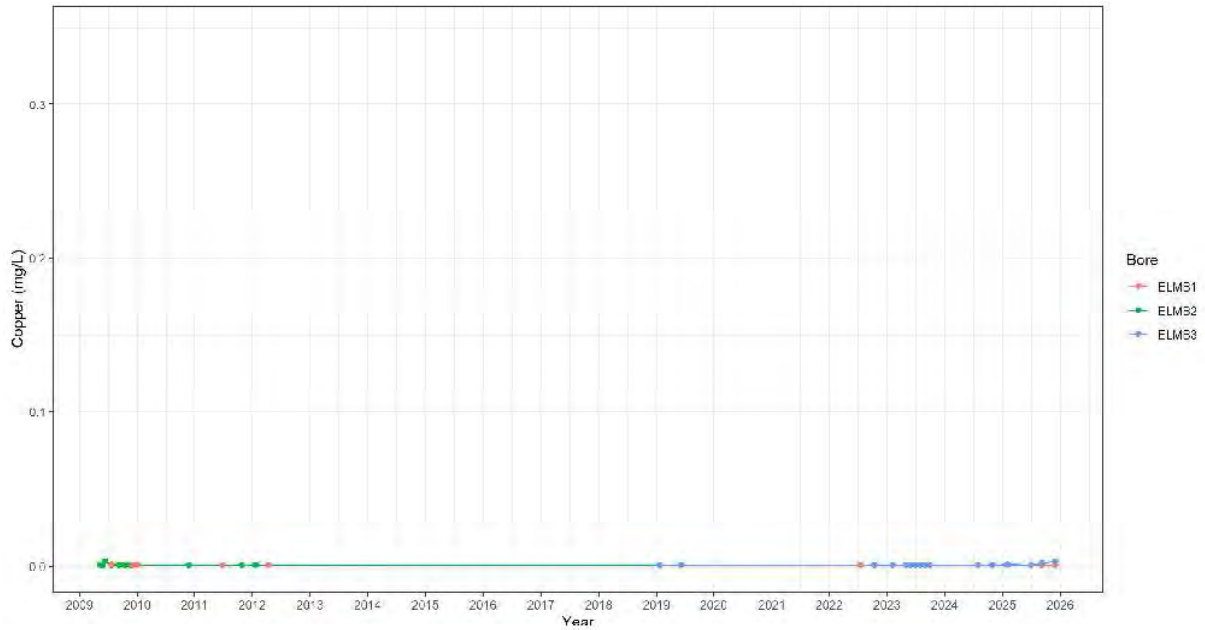


Figure 50: Time Series of Copper at Electric Light Site

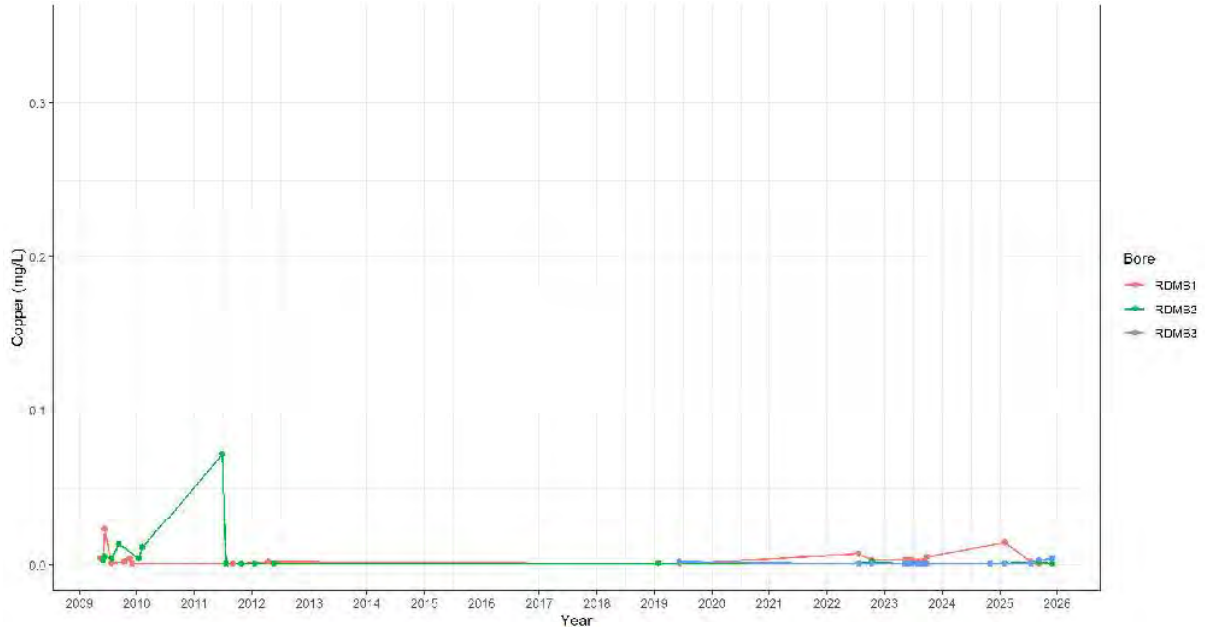


Figure 51: Time Series of Copper at Red Dam Site

8.13 Iron

Iron concentrations across the Project are generally low at all sites (**Figure 52, Figure 53,** and **Figure 54**). These concentrations range between 0.01 and 10 mg/L, which is generally below both the 95% ecosystems protection guideline value (0.28 and (ANZG, 2025)). Iron concentrations are important to understanding the solubility of other metal toxicants, but this parameter should be further evaluated to determine if it remains relevant for compliance purposes or if it should continue to be monitored only for interpretation purposes.

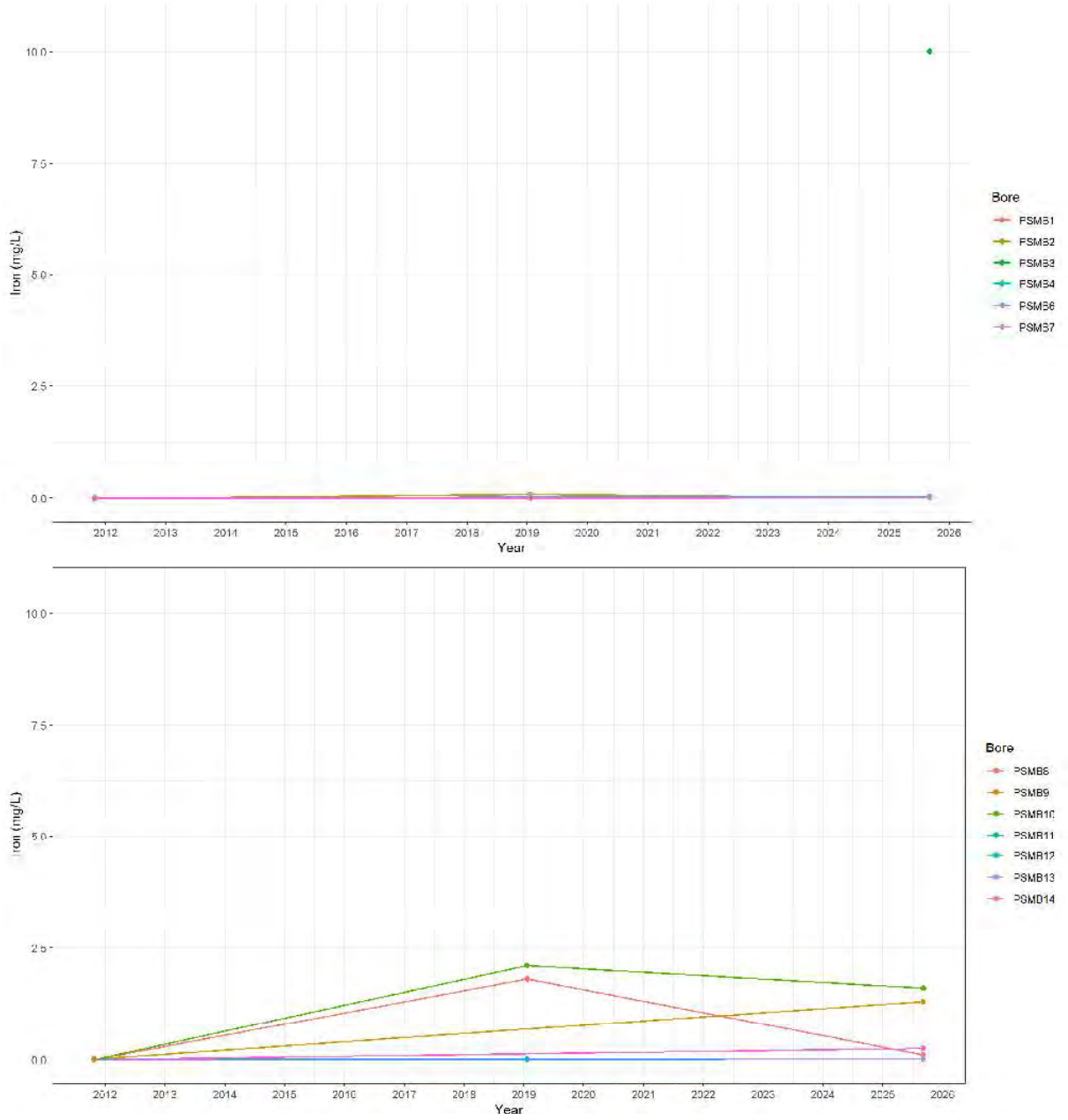


Figure 52: Time Series of Iron at Processing Plant Site

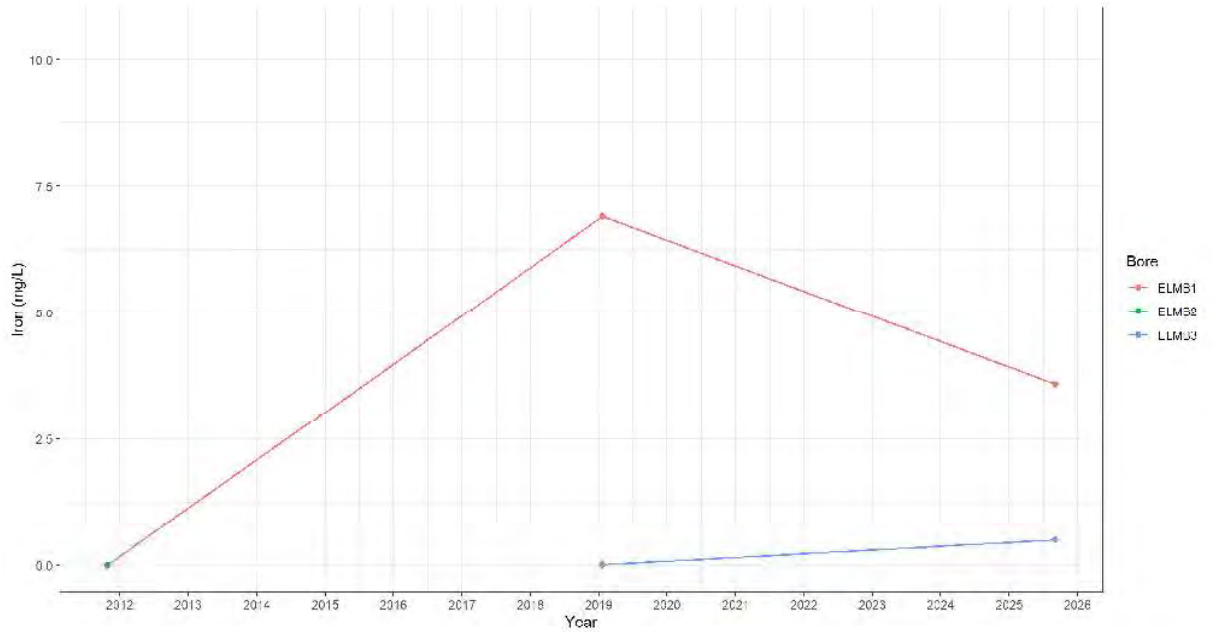


Figure 53: Time Series of Iron at Electric Light Site

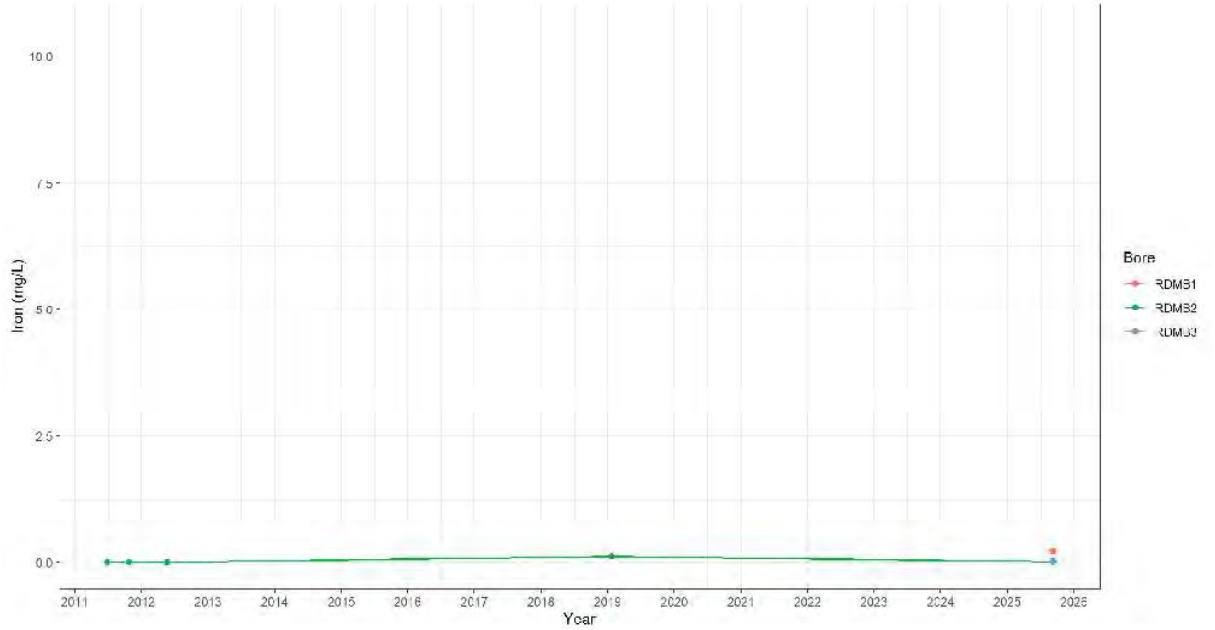


Figure 54: Time Series of Iron at Red Dam Site

8.14 Lead

Lead concentrations across the Project are generally low (**Figure 55**, **Figure 56**, and **Figure 57**), reflecting the low solubility of lead under the pH and redox conditions observed across the sites.

- The 2025 concentrations, which has a few oscillating concentrations, from each individual bore is consistent with historical data from that bore across all sites.
- The only bore with historical concentrations of lead that are elevated is PSMB11 (**Figure 55**); in this bore elevated concentrations of several metals prior to 2013 correspond with relatively low pH values.

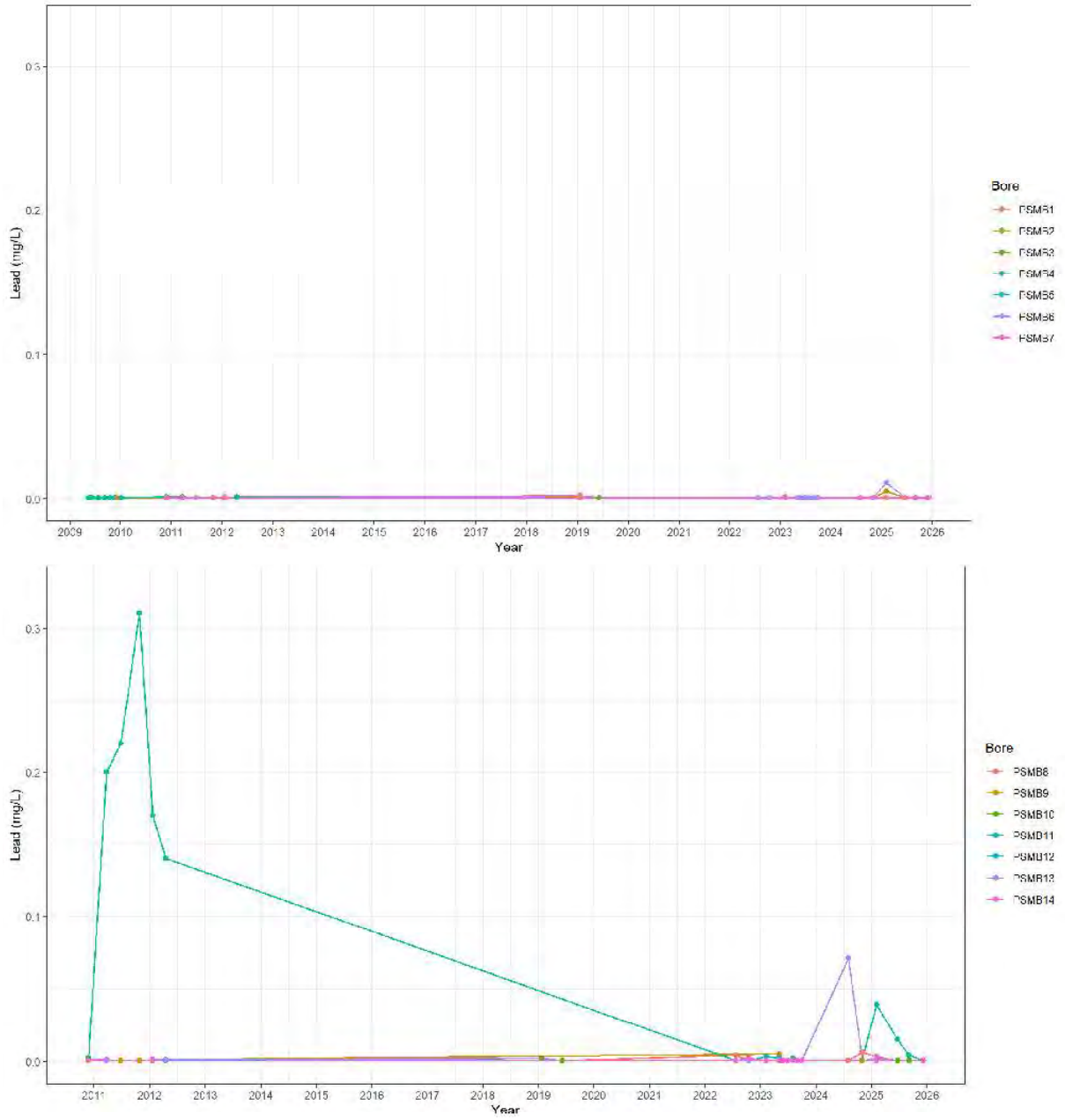


Figure 55: Time Series of Lead at Processing Plant Site

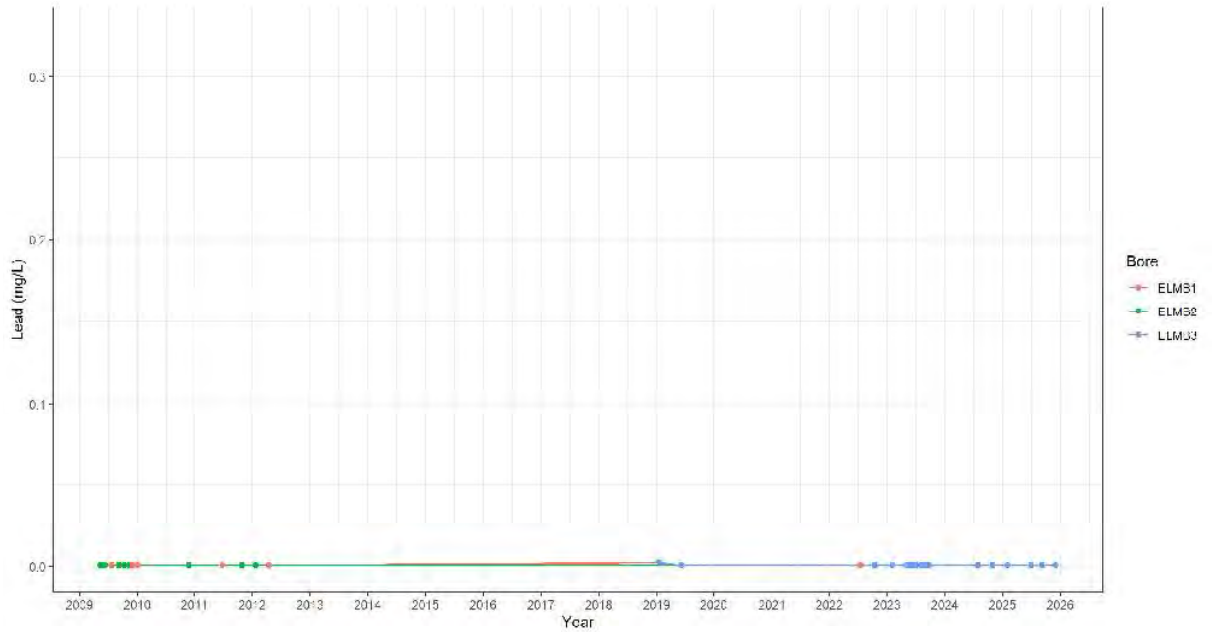


Figure 56: Time Series of Lead at Electric Light Site

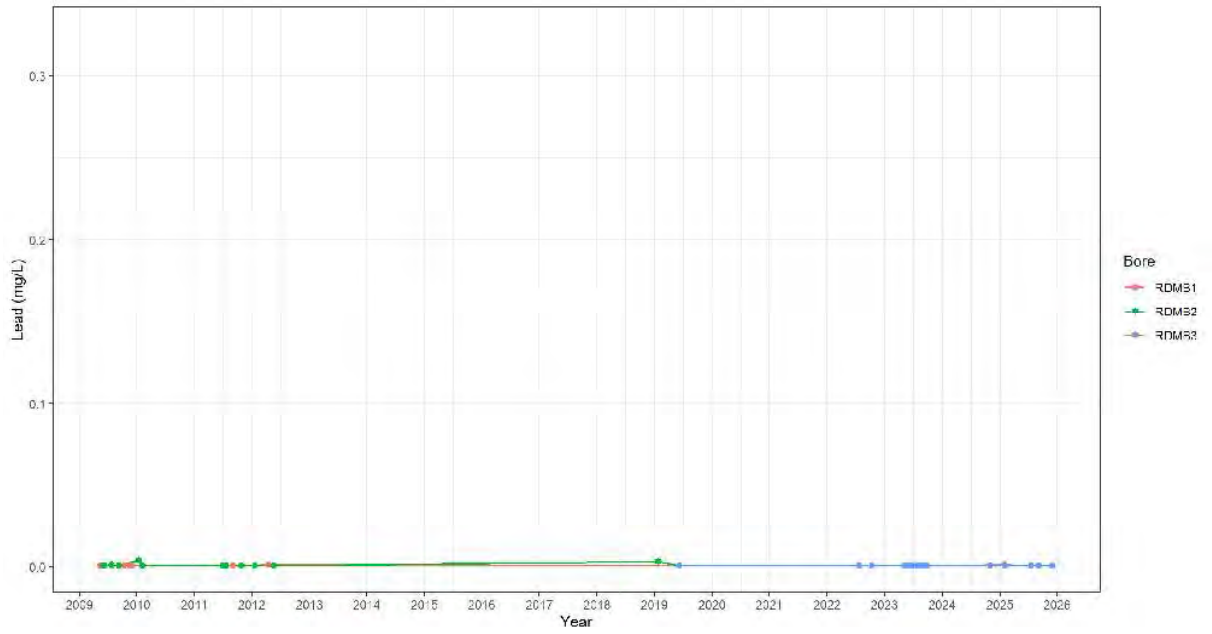


Figure 57: Time Series of Lead at Red Dam Site

8.15 Manganese

Manganese concentrations across the Project sites are generally low at all sites (**Figure 58**, **Figure 59**, and **Figure 60**). These concentrations range between 0.0025 and 20 mg/L, which is well below both the 95% ecosystems protection guideline value (1.9 mg/L (ANZG, 2018)) and the livestock watering guideline value (27.8 mg/L (ANZG, 2023)). Manganese is a major rock forming element and this parameter should be further evaluated to determine if it remains relevant for compliance purposes. There is no manganese data available over the reporting period.

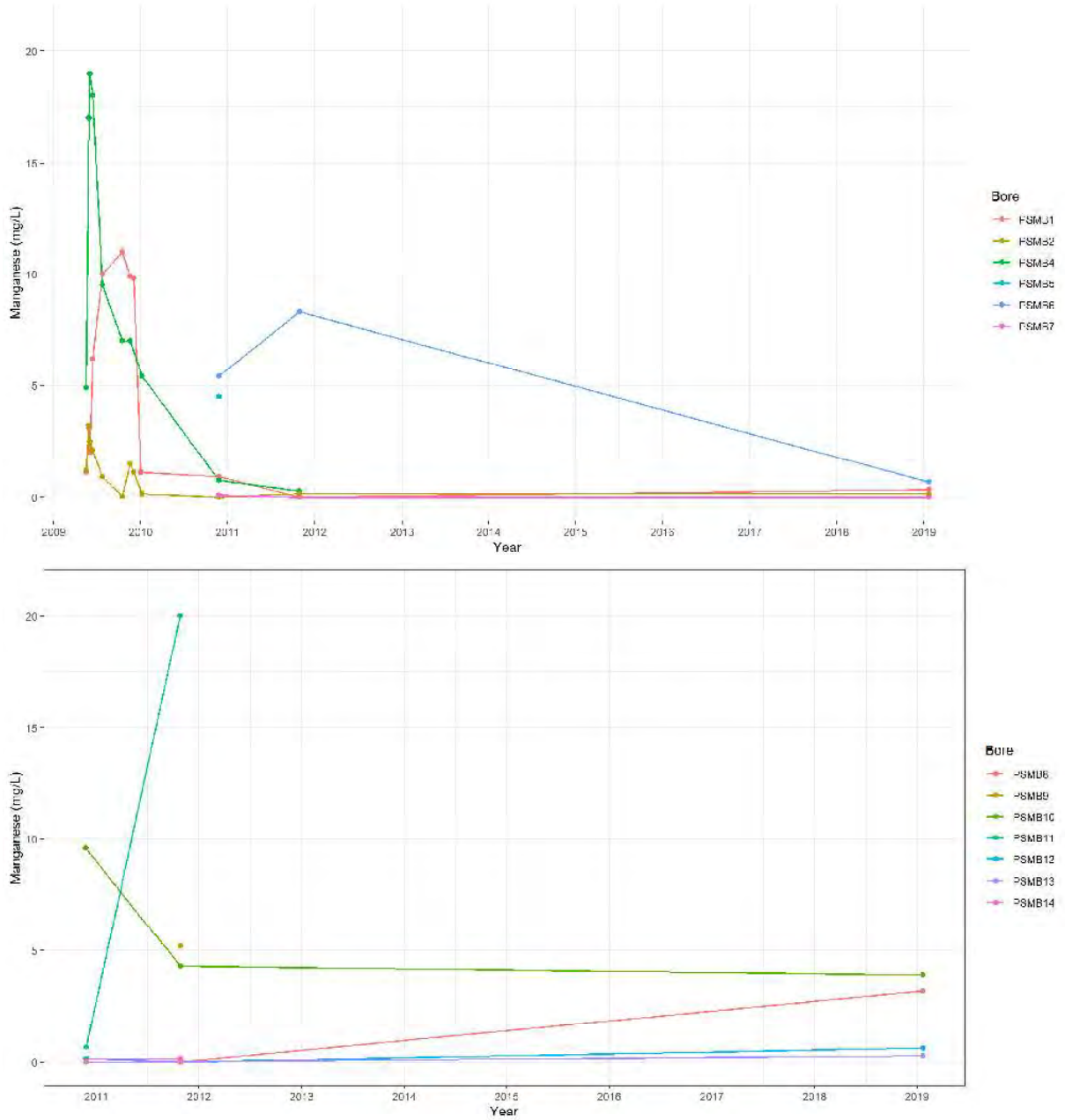


Figure 58: Time Series of Manganese at Processing Plant Site

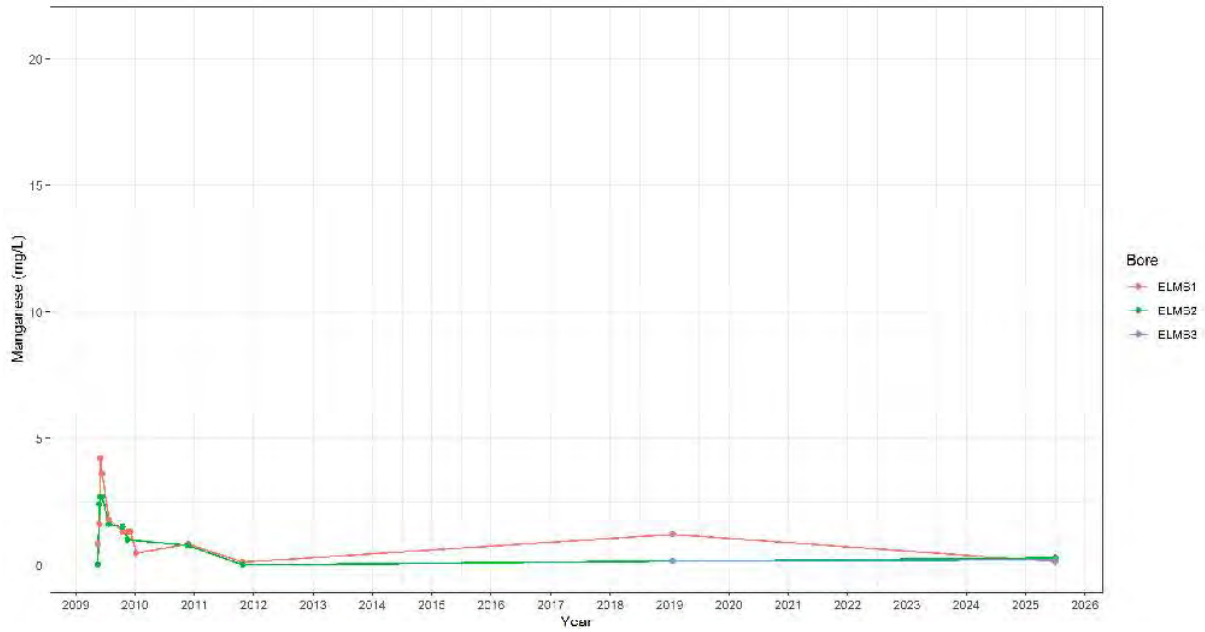


Figure 59: Time Series of Manganese at Electric Light Site

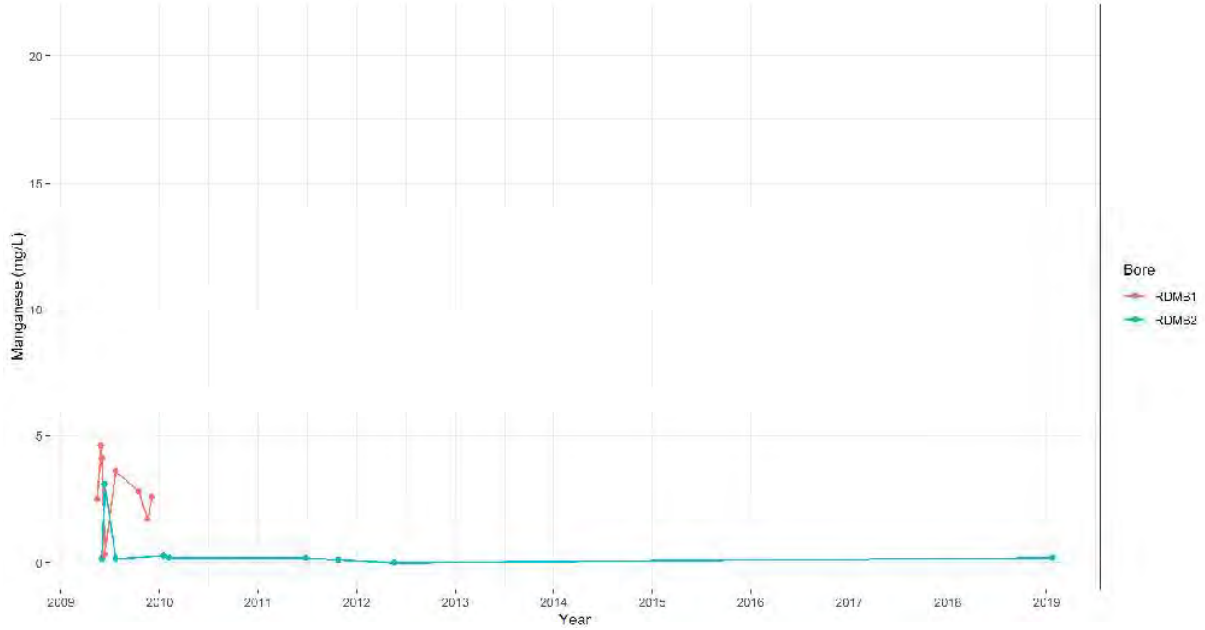


Figure 60: Time Series of Manganese at Red Dam Site

8.16 Mercury

Mercury concentrations across the Project sites are generally low at all sites (**Figure 61, Figure 62**, and **Figure 63**) across the entire historical record. These concentrations range between 0.000025 and 0.0016 mg/L, which is well below both the 95% ecosystems protection guideline value (0.0006 (ANZECC & ARMCANZ, 2000)) and the livestock watering guideline value (0.002 (ANZG, 2023)). Mercury is not a likely contaminant of concern for this type of deposit, and this parameter should be further evaluated to determine if it remains relevant for compliance purposes.

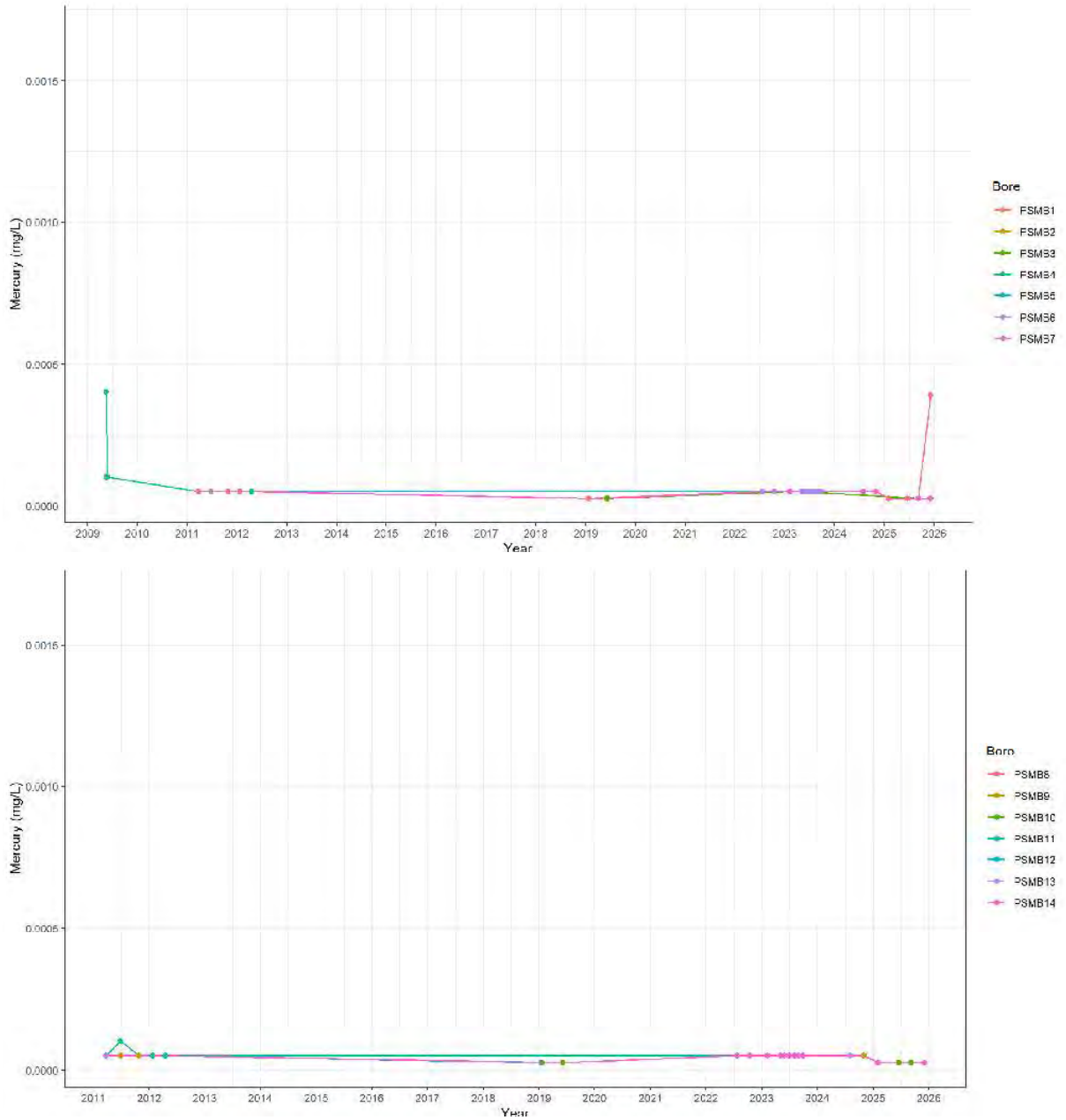


Figure 61: Time Series of Mercury at Processing Plant Site

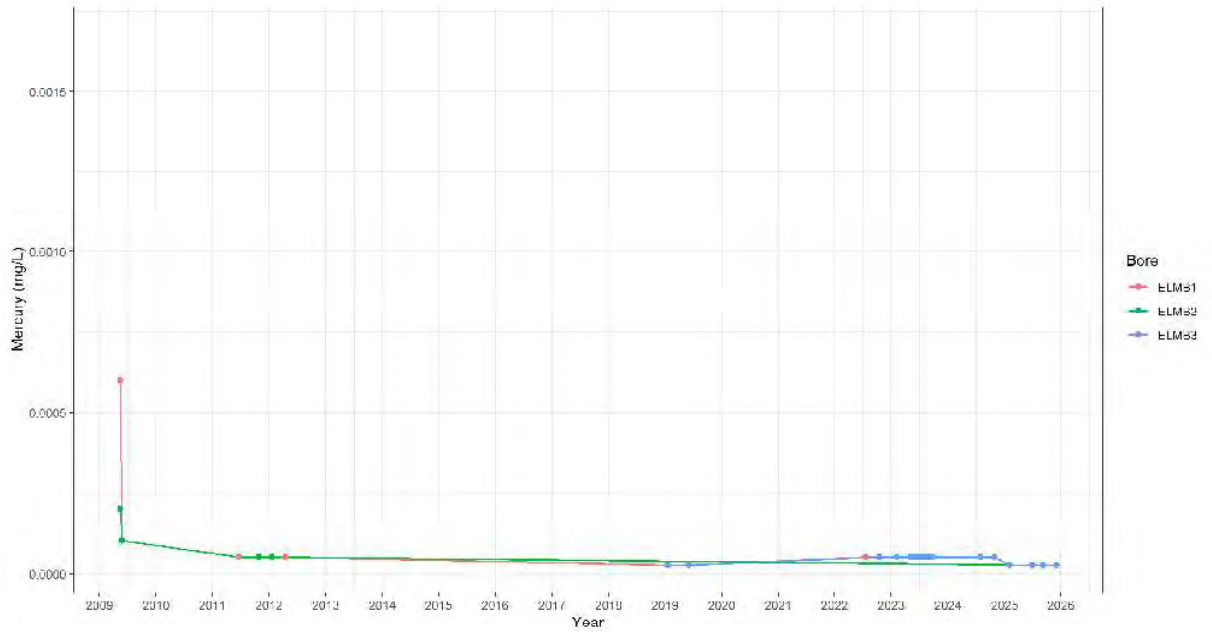


Figure 62: Time Series of Mercury at Electric Light Site

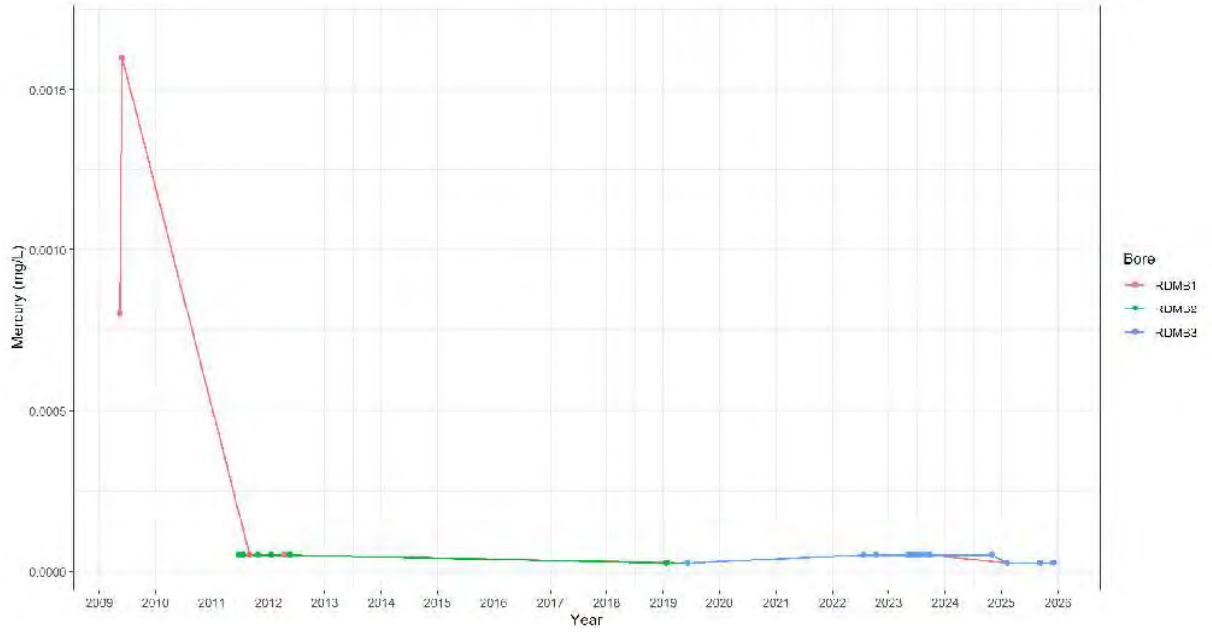


Figure 63: Time Series of Mercury at Red Dam Site

8.17 Nickel

Nickel concentrations across the Project sites are generally low (**Figure 64**, **Figure 65**, and **Figure 66**), reflecting the low solubility of nickel under the pH and redox conditions observed across the Project.

- The 2025 concentrations, which has a few oscillating concentrations, from each individual bore is consistent with historical data from that bore across all sites.
- The only bore with historical concentrations of nickel that are elevated is PSMB11 (**Figure 64**); in this bore elevated concentrations of several metals is observed prior to 2013 and in 2024/2025; this corresponds with periods of relatively low pH values.

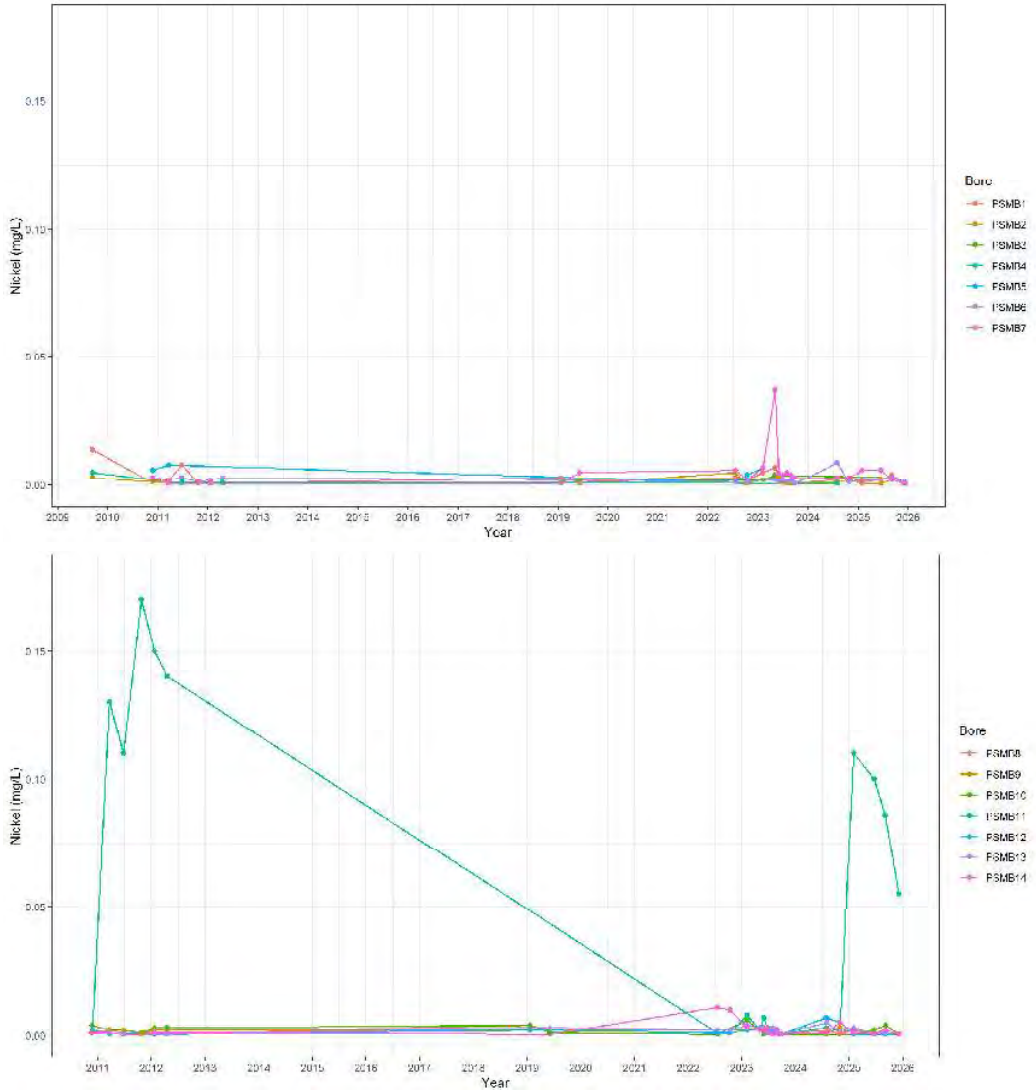


Figure 64: Time Series of Nickel at Processing Plant Site

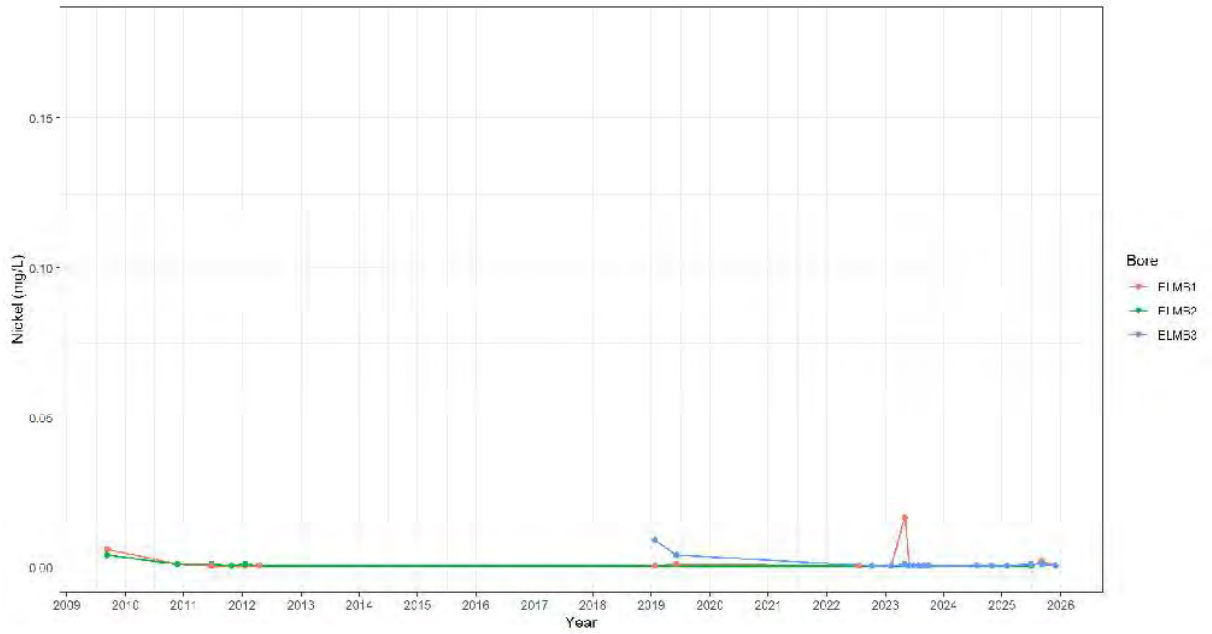


Figure 65: Time Series of Nickel at Electric Light Site

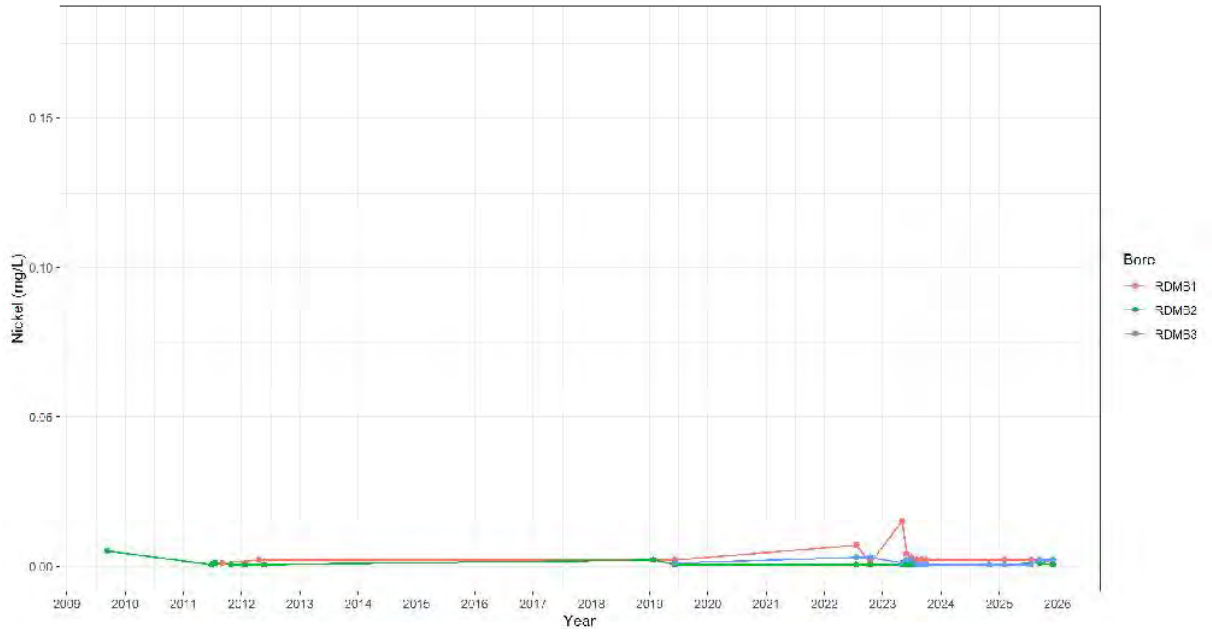


Figure 66: Time Series of Nickel at Red Dam Site

8.18 Selenium

Selenium concentrations across the Project sites are generally low or at the LOR (**Figure 67**, **Figure 68**, and **Figure 69**) across the entire historical record. These concentrations range between 0.005 and 0.014 mg/L, which is well below both the 95% ecosystems protection guideline value (0.011 (ANZECC & ARMCANZ, 2000)) and the livestock watering guideline value (STATE 0.02 (ANZG, 2023)). Selenium is not a likely contaminant of concern for this type of deposit, and this parameter should be further evaluated to determine if it remains relevant for compliance purposes.

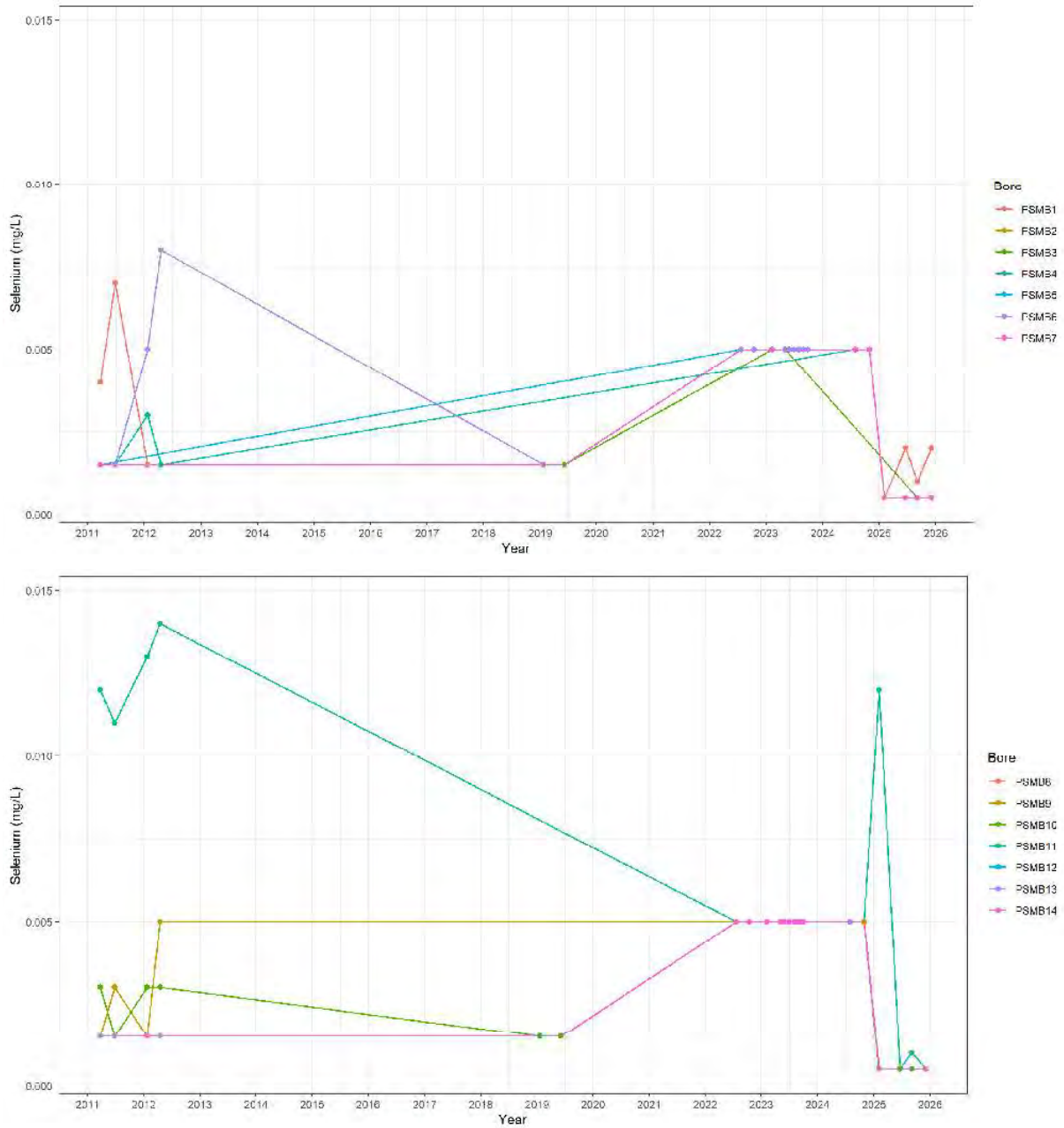


Figure 67: Time Series of Selenium at Processing Plant Site

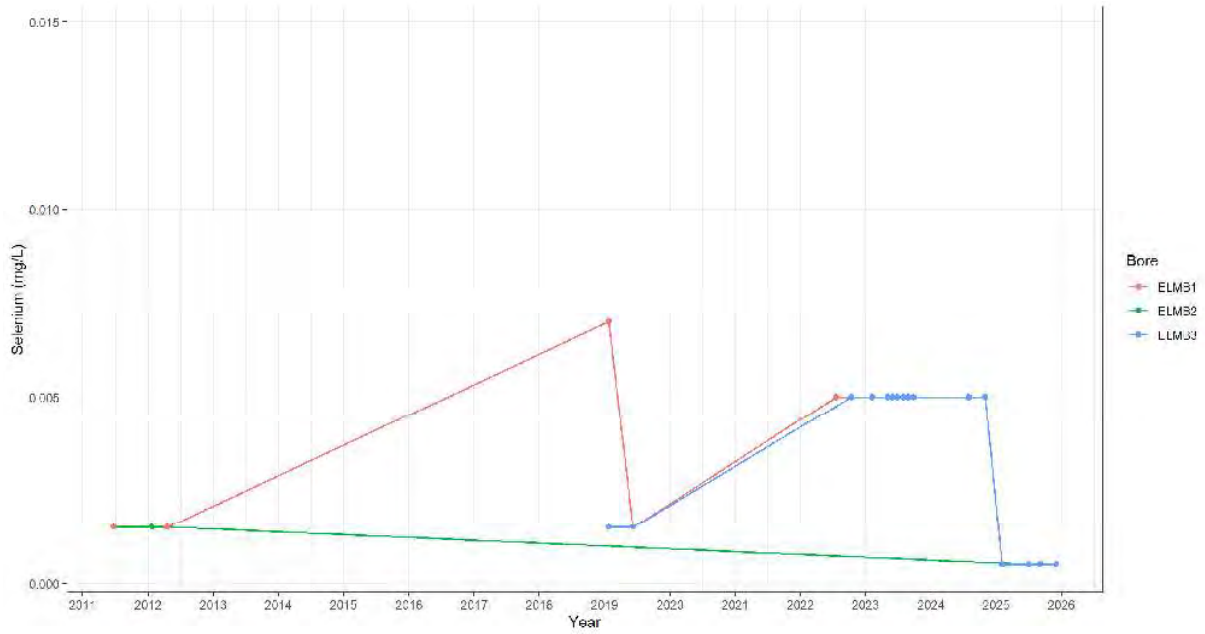


Figure 68: Time Series of Selenium at Electric Light Site

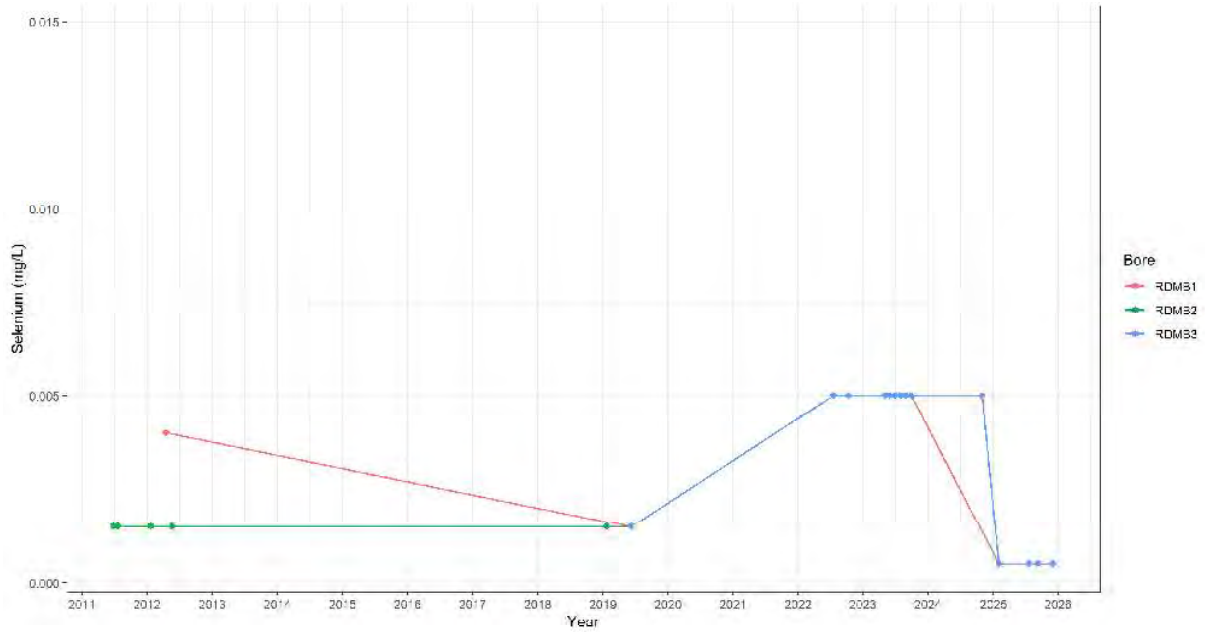


Figure 69: Time Series of Selenium at Red Dam Site

8.19 Silver

Silver concentrations over the review period and historically are generally low or at the LOR (**Figure 70**, **Figure 71**, and **Figure 72**). These concentrations range between 0.000005 and 0.003 mg/L, which is well below both the 95% ecosystems protection guideline value (0.00005 (ANZECC & ARMCANZ, 2000)). Silver is not expected to be soluble under the pH conditions observed for the Project and this parameter should be further evaluated to determine if it remains relevant for compliance purposes.

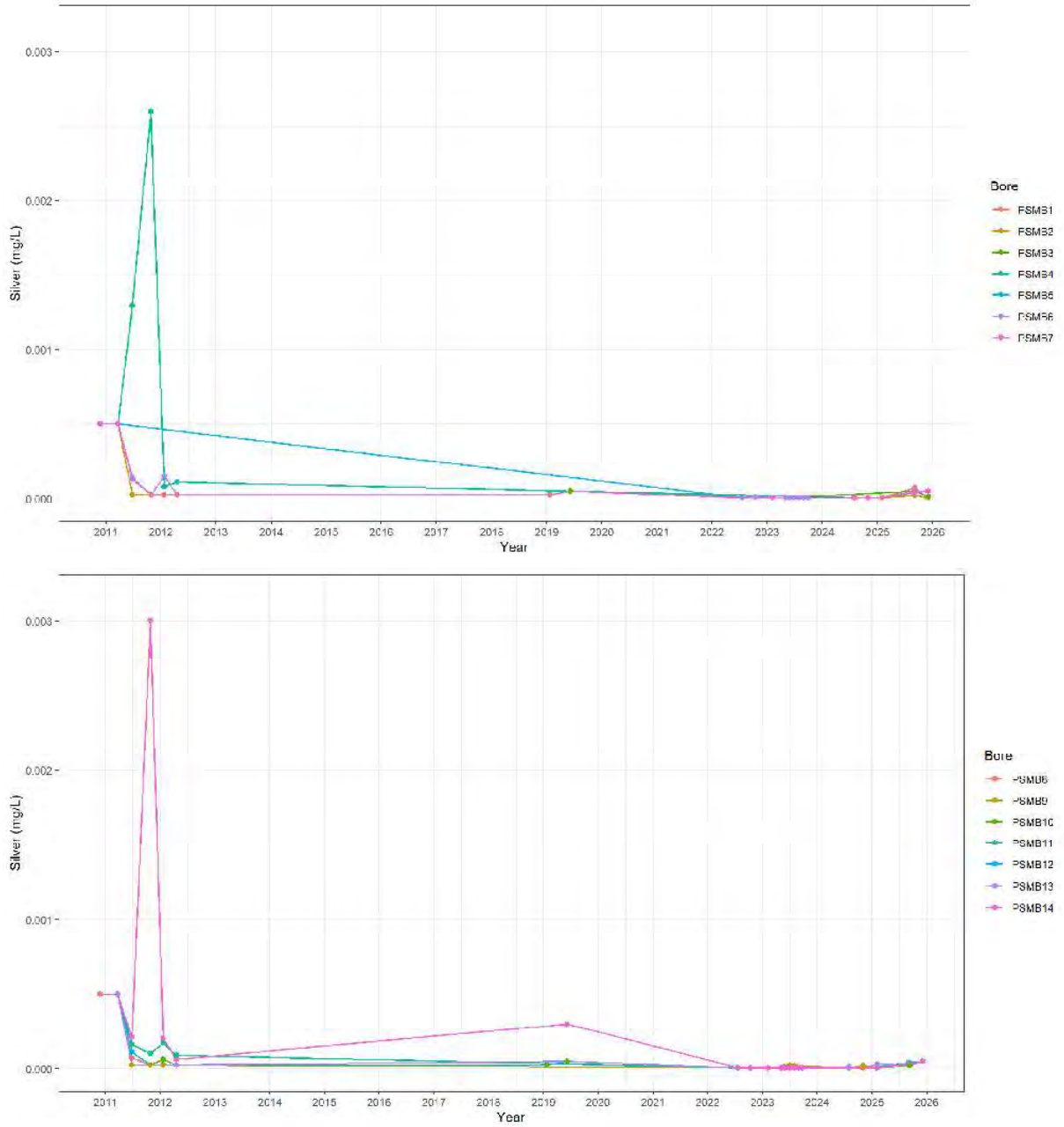


Figure 70: Time Series of Silver at Processing Plant Site

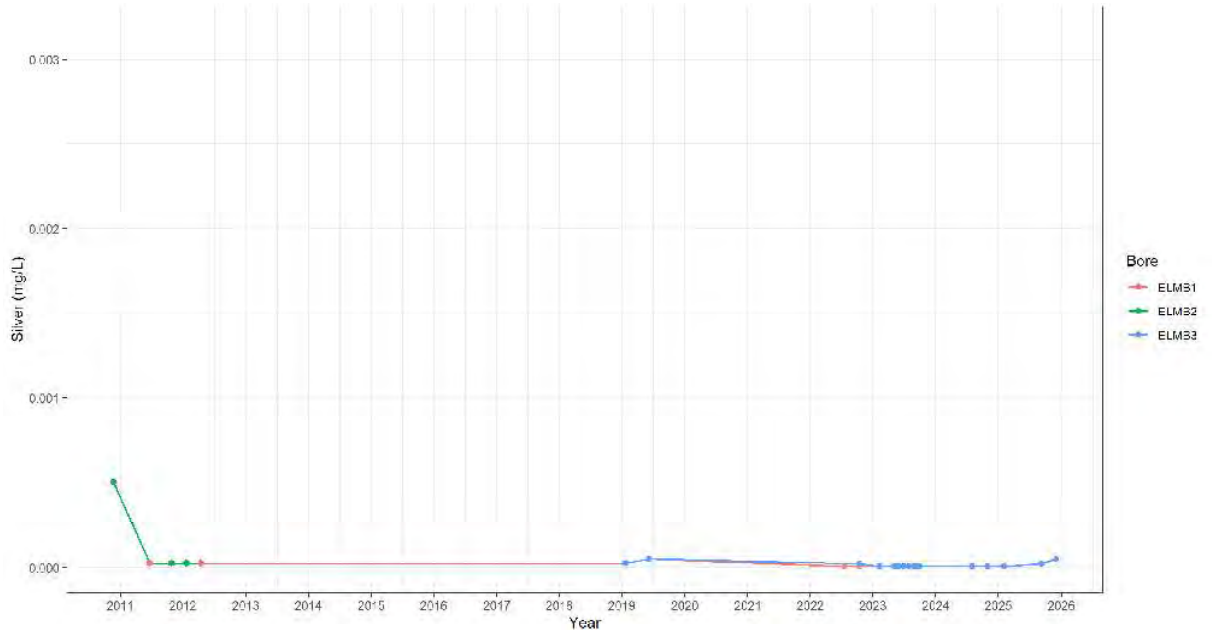


Figure 71: Time Series of Silver at Electric Light Site

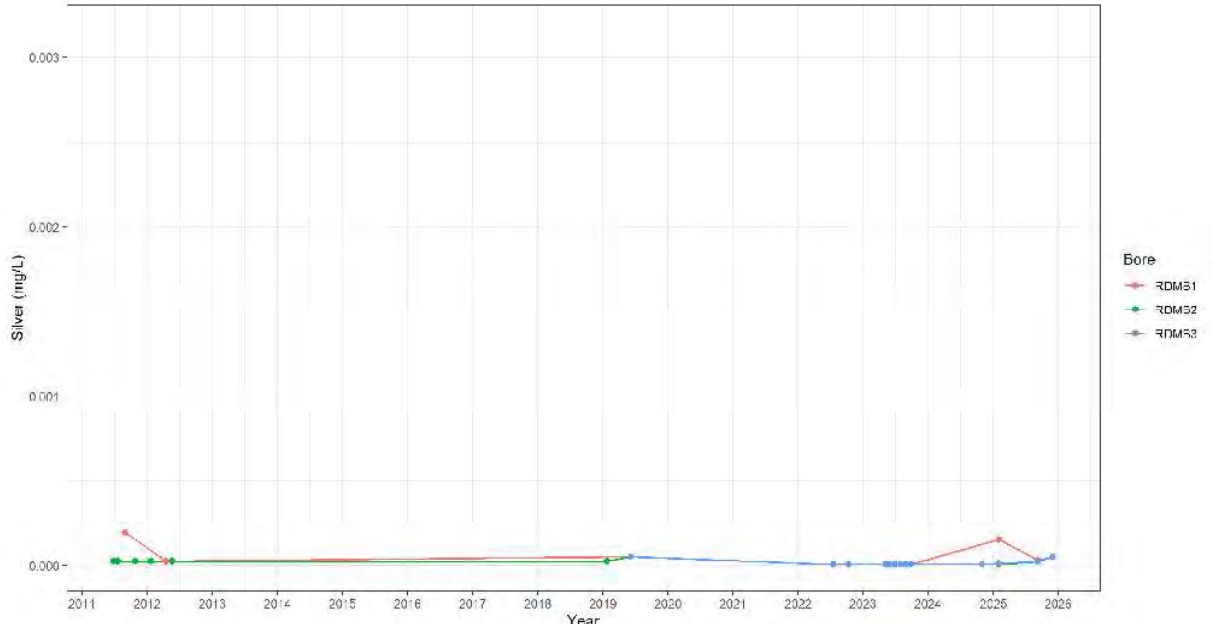


Figure 72: Time Series of Silver at Red Dam Site

8.20 Tin

Tin concentrations over the review period and historically are generally low or at the LOR (**Figure 73**, **Figure 74**, and **Figure 75**). These concentrations range between 0.005 and 0.025 mg/L, which is well below both the 95% ecosystems protection guideline value (0.003 (ANZECC & ARMCANZ, 2000))). Tin is not expected to be soluble under the pH conditions observed for the Project and this parameter should be further evaluated to determine if it remains relevant for compliance purposes.

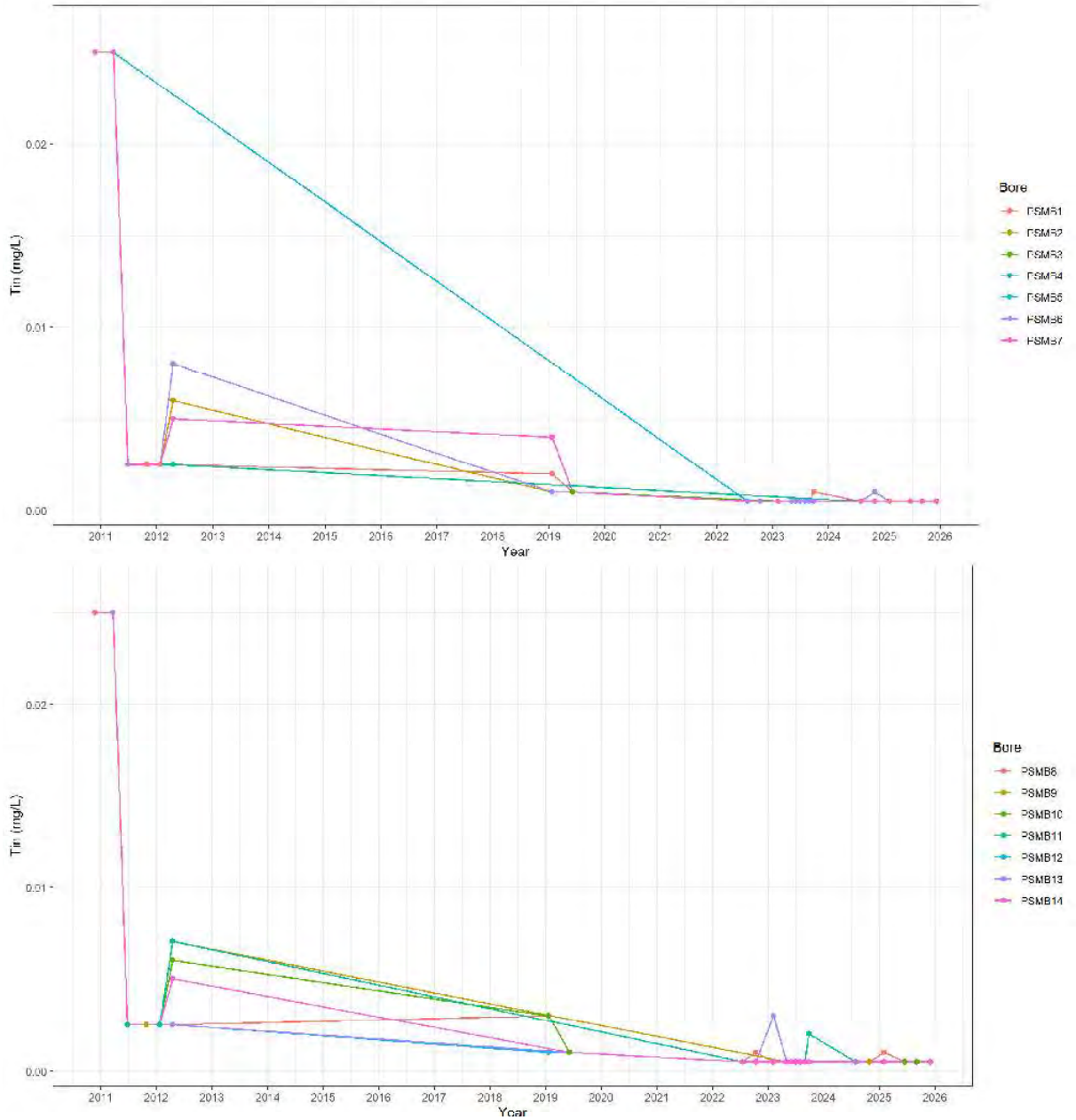


Figure 73: Time Series of Tin at Processing Plant Site

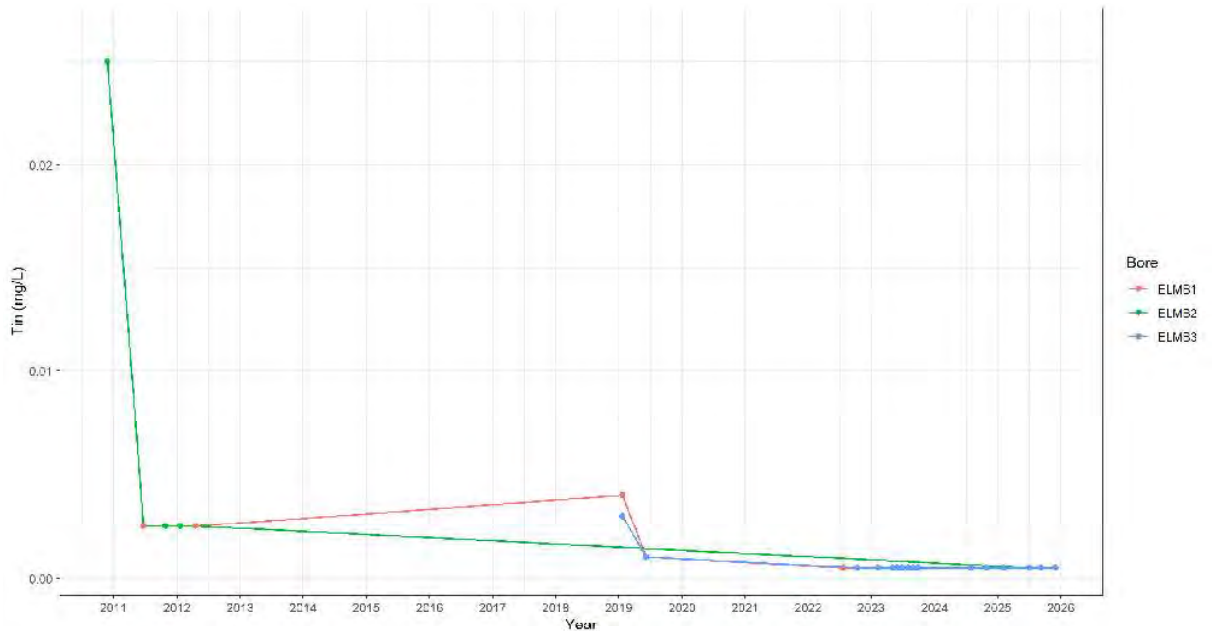


Figure 74: Time Series of Tin at Electric Light Site

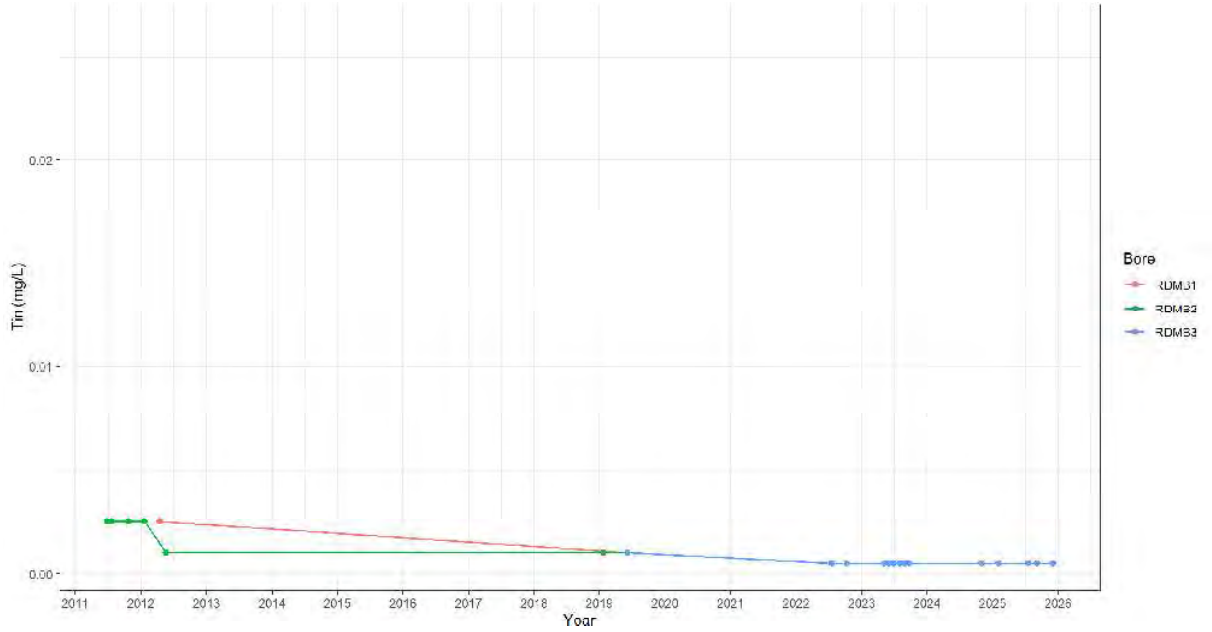


Figure 75: Time Series of Tin at Red Dam Site

8.21 Uranium

Uranium concentrations were not measured over the review period, but historically concentrations are generally low (**Figure 76**, Figure **77**, **Figure 78**). These concentrations range between 0.0005 and 0.51, which can be above both the 95% ecosystems protection guideline value (0.00005 (ANZECC & ARMCANZ, 2000)) and the livestock watering guideline value (0.2 (ANZG, 2023)). Uranium is not expected to be a contaminant of concern for the Project and its solubility is dependent on the redox condition of the water sample. As such, this parameter should be further evaluated to determine if it remains relevant for compliance purposes.

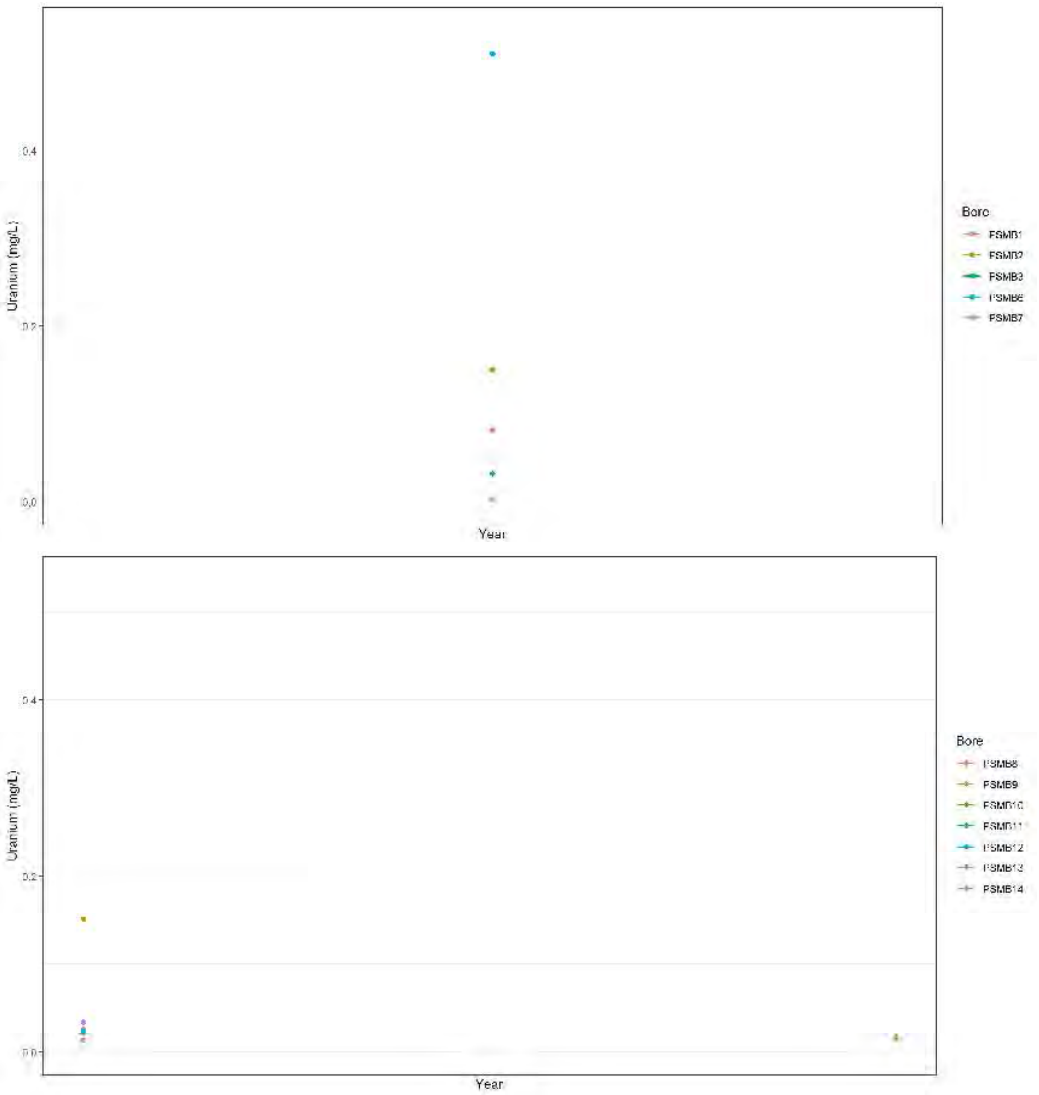


Figure 76: Time Series of Uranium at Processing Plant Site



Figure 77: Time Series of Uranium at Electric Light Site

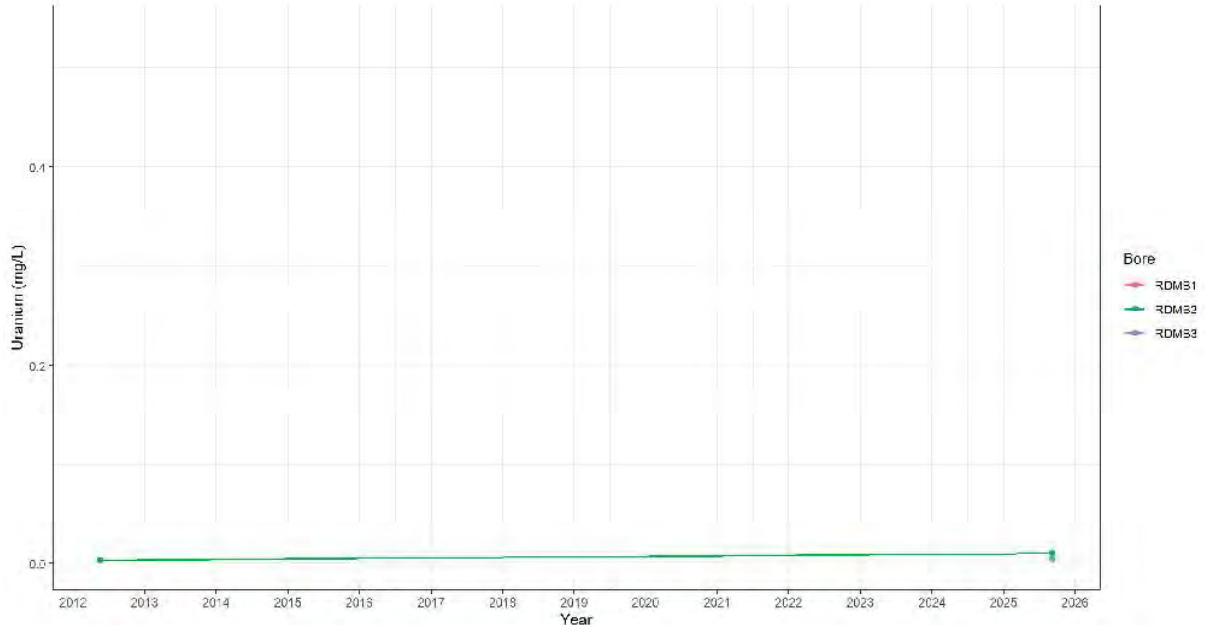


Figure 78: Time Series of Uranium at Red Dam Site

8.22 Zinc

Zinc concentrations across the Project sites are generally very low (**Figure 79**, **Figure 80**, and **Figure 81**), reflecting the high natural attenuation capacity of zinc under the pH and redox conditions observed across the Project.

- The 2025 concentrations from each individual bore is consistent with historical data from that bore.
- The only bore with historical concentrations of zinc that are elevated is PSMB11 (**Figure 79**); in this bore elevated zinc concentration prior to 2013 correspond with relatively low pH values. A similar covariation between lower pH is and higher concentrations of other metals has been observed for this bore.

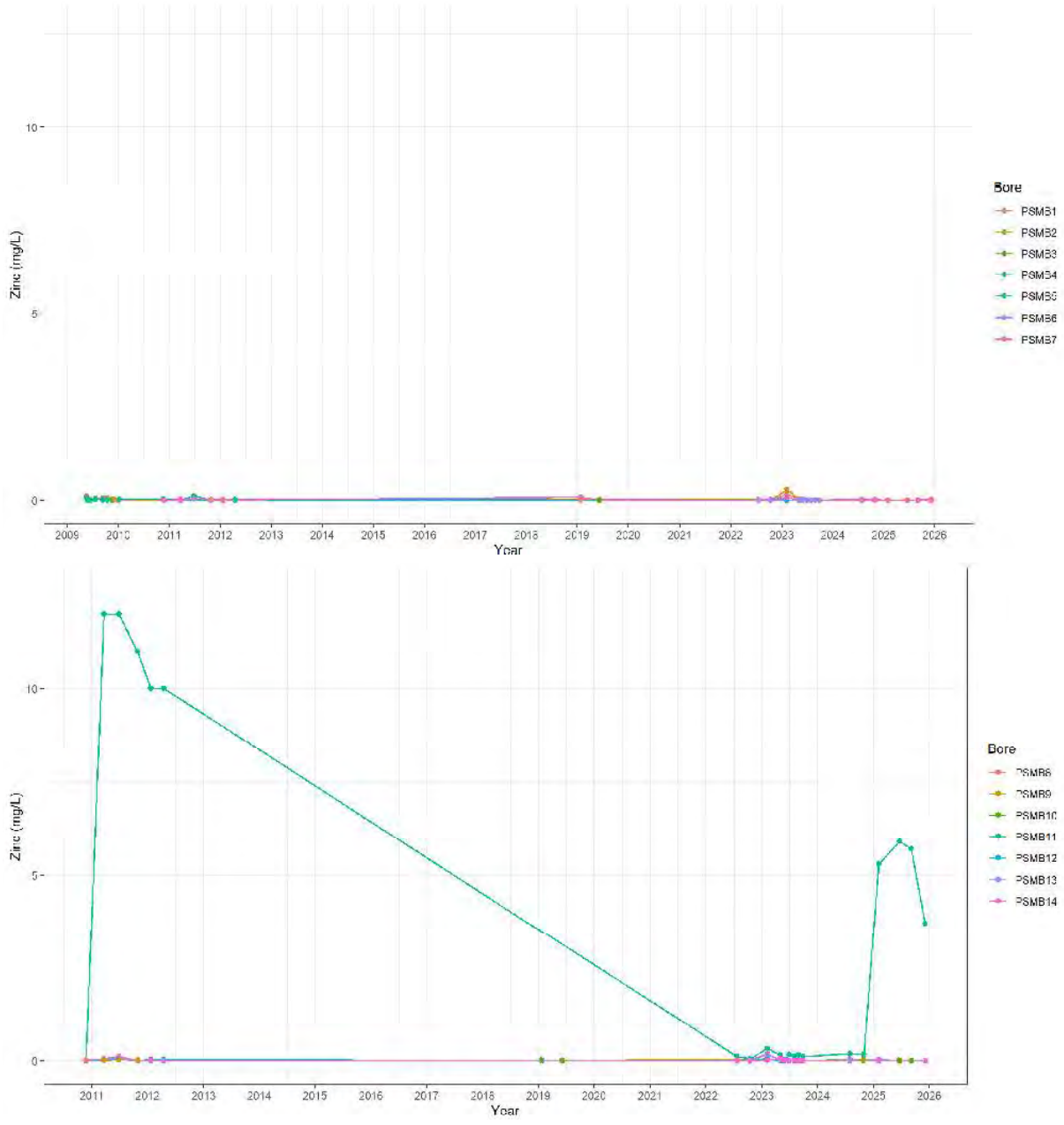


Figure 79: Time Series of Zinc at Processing Plant Site

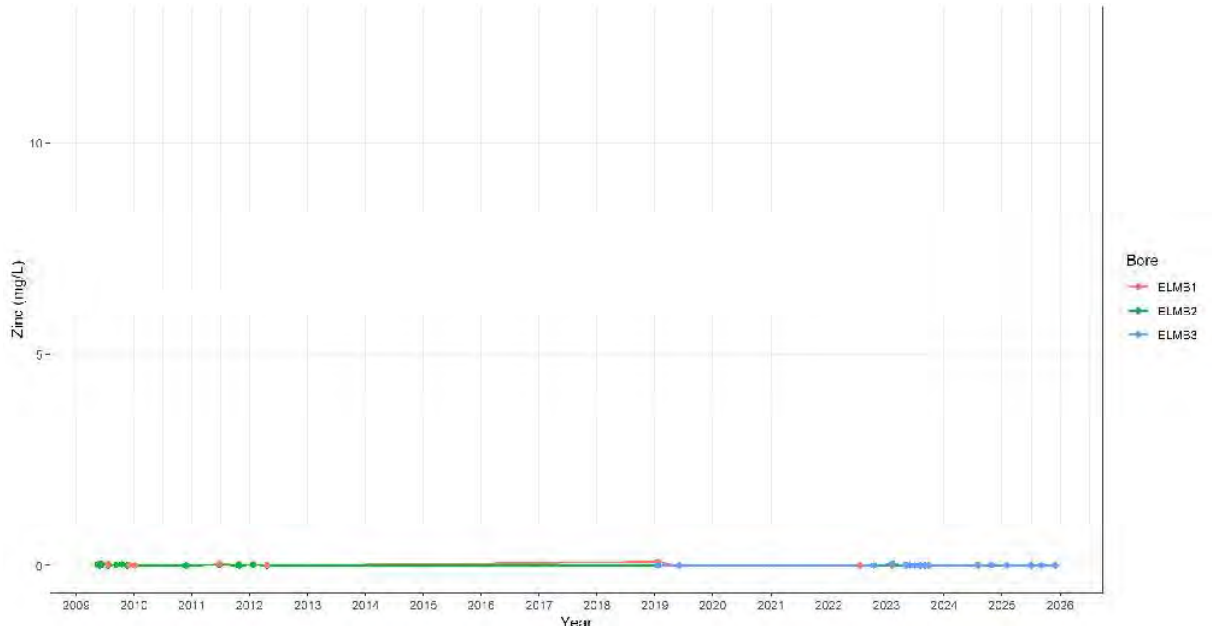


Figure 80: Time Series of Zinc at Electric Light Site

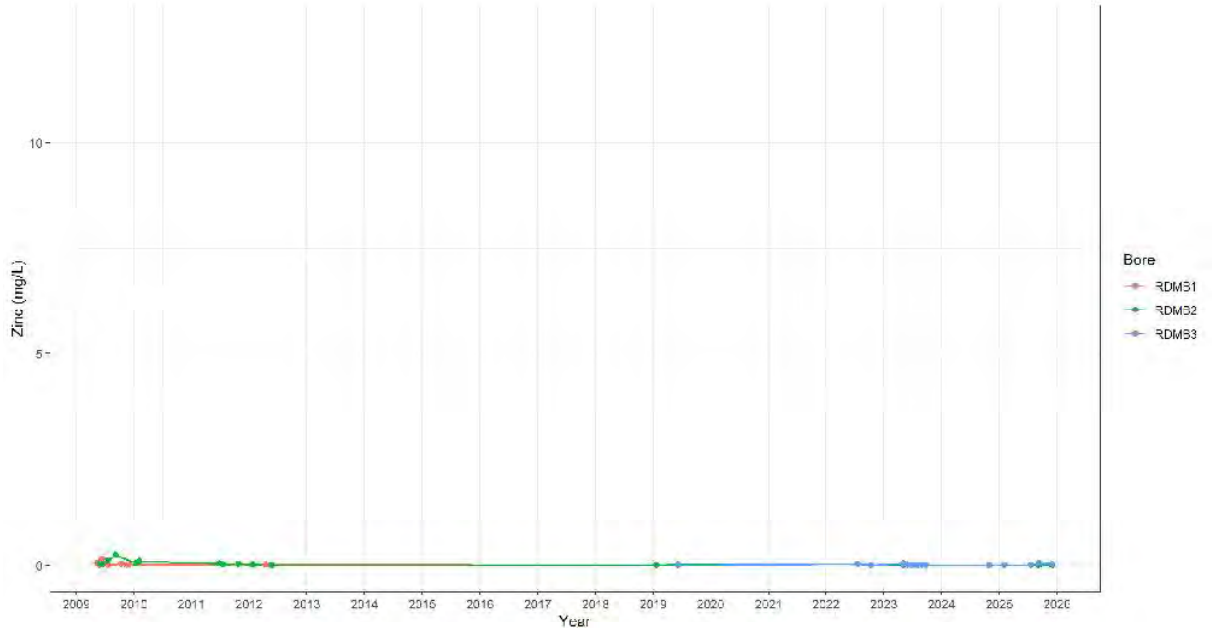


Figure 81: Time Series of Zinc at Red Dam Site

8.23 Cyanide

Cyanide concentrations across the Project sites are generally undetectable over the review period (**Figure 82, Figure 83**, and **Figure 84**). Across the entire historical record, detections of cyanide occurred prior to 2011, but in only in a few bores at the Processing Plant site. Cyanide has never been used at the Electric Light or Red Dam sites, so this parameter should be further evaluated a these sites to determine if it remains relevant for compliance purposes at all sites.

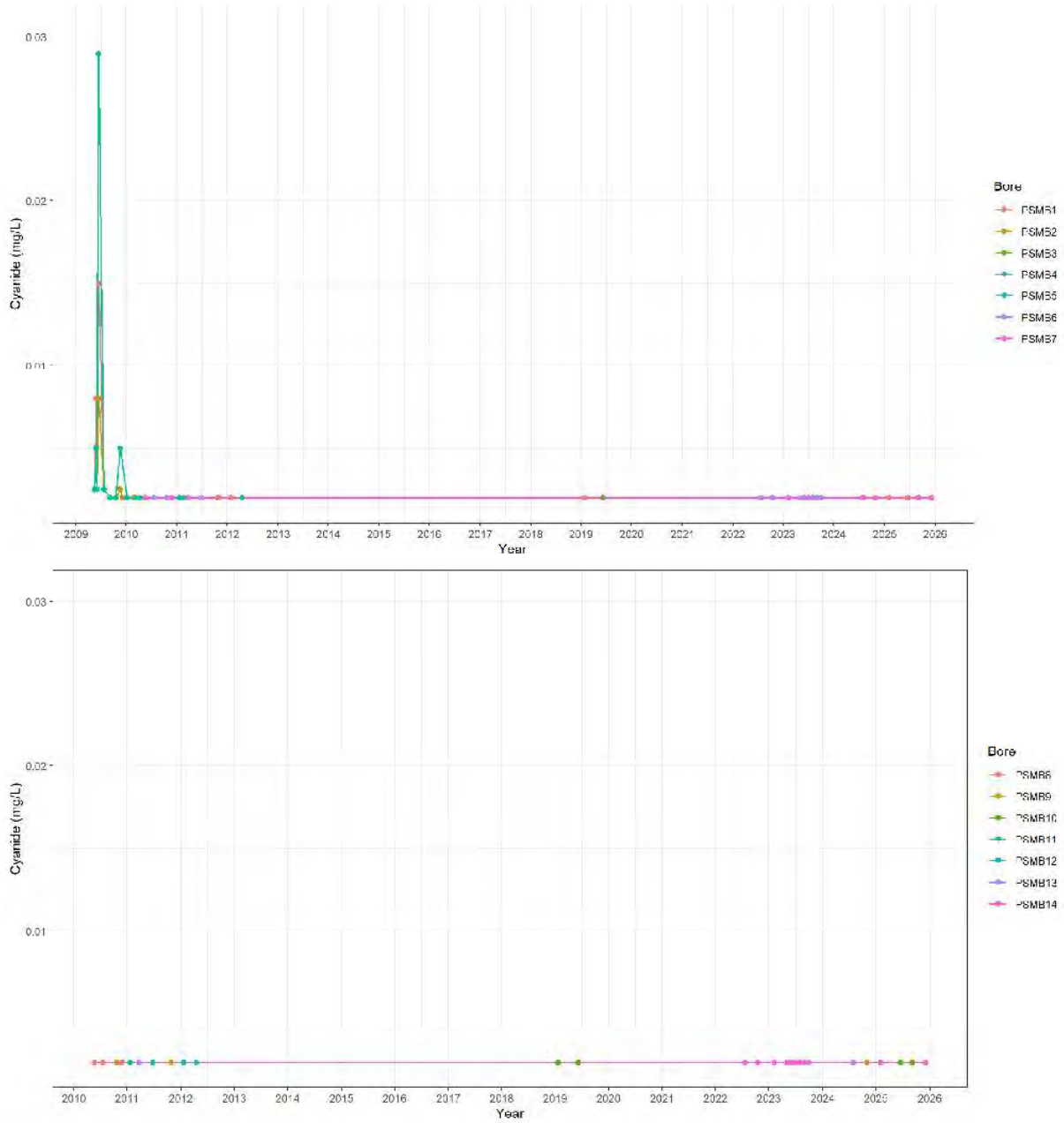


Figure 82: Time Series of Cyanide at Processing Plant Site

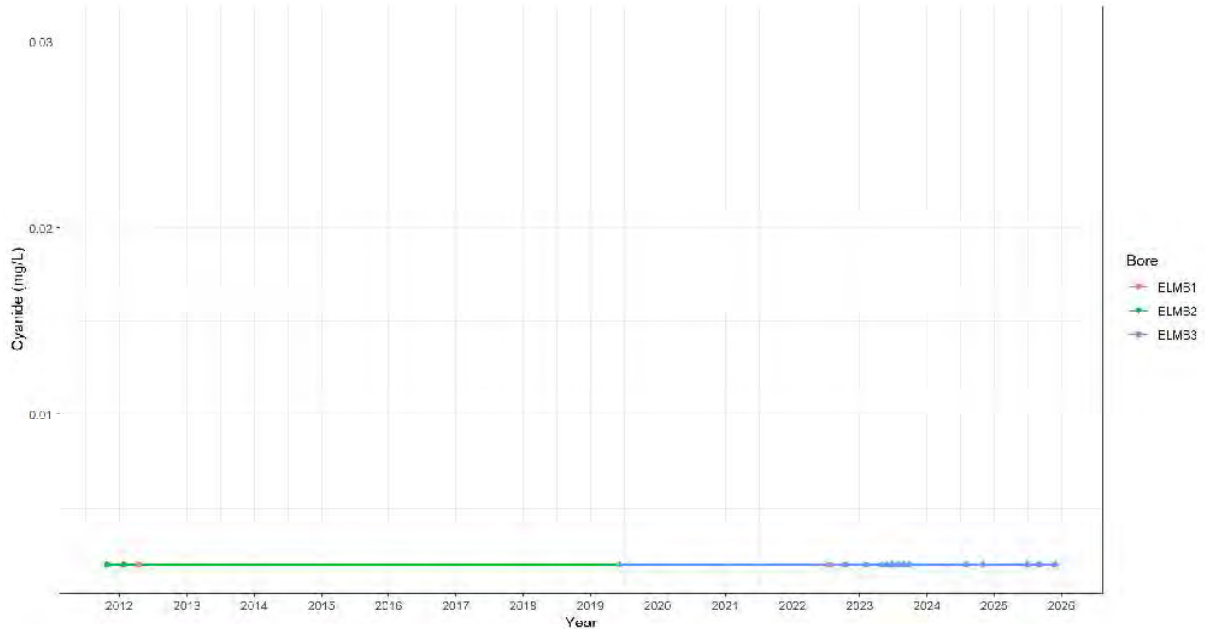


Figure 83: Time Series of Cyanide at Electric Light Site

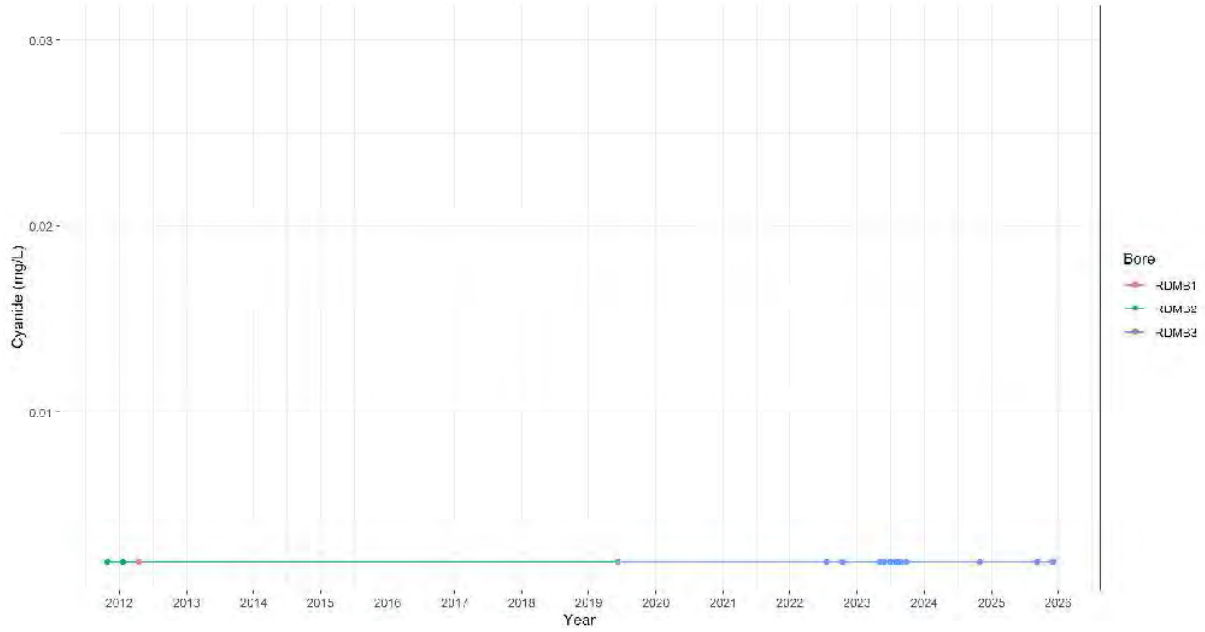


Figure 84: Time Series of Cyanide at Red Dam Site

9 Conclusions and Recommendations

This AGMR presents the results for groundwater levels and quality and fulfils the reporting requirements of the AGMR as required under the EA. This includes reviewing the water level and water quality at the groundwater bores listed in the current EA and preparing a summary, evaluation, and discussion the results. The overall risk to EVs associated with groundwater remains low and there are no new or unexpected trends in the data set that require immediate action. The main finding of the AGMR are presented in **Table 10**.

Table 10: Summary of Key Findings

Topic	Key Finding
Analyses of groundwater level data for all monitoring bores	Water levels were assessed temporally as hydrographs and spatially as contour maps of the potentiometric surface. The 2025 groundwater monitoring results indicate that the overall condition of the groundwater remains broadly consistent with historical observations and with the existing CHM.
Analyses of groundwater quality data for all monitoring bores	Water quality results were assessed using time-series analyses, comparisons to historical data, and Piper Diagrams. Overall, the data confirmed that variability water quality between bores exists, but that changes at individual bores are consistent with historical results and with the CHM.
Discuss effectiveness of the current groundwater monitoring regime and any improvements that could be made to ensure early detection of impacts to groundwater	The 2025 monitoring data and associated methodology and quality control indicate that the current groundwater monitoring regime is broadly effective for ensuring the early detection of impacts to groundwater. However, the following improvements would allow for more effective groundwater management: • Adopt site specific trigger values (SSTVs) for water quality, which would better align compliance criteria with actual changes in water quality. • As part of the adoption of SSTVs, rationalise the monitoring parameters to correspond with solutes that are actually related to the various sources present for the Project.

10 References

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Sundaram, B., Caritat, P., Plazinska, A., Brodie, R., Coram, J., & Ransley, T. (2009). *Groundwater Sampling and Analysis – A Field Guide* (No. 2009/27). Geoscience Australia. https://www.gfcq.org.au/wp-content/uploads/2022/01/GA_Record_Groundwater-Sampling-and-Analysis%E2%80%94A-Field-Guide_2009-27.pdf

Appendix A EA number EPML00899813

Permit

Environmental Protection Act 1994

Environmental authority EPML00899813

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Environmental authority number: EPML00899813

Environmental authority takes effect on 11 December 2025.

The anniversary date of this environmental authority is 1 June each year.

Environmental authority holder

Name	Registered address
Kempton Minerals Pty Ltd	Level 21, Matisse Tower, 110 Mary Street, Brisbane QLD 4000

Environmentally relevant activity and location details

Environmentally relevant activities	Locations
Resource Activity, Schedule 3, 16: Mining gold ore	ML3358, ML3374, ML3409, ML3540, ML3548, ML3591, ML30192, ML30193, ML30195, ML30196, ML30201, ML30203
Ancillary 08 - Chemical Storage, 1: Storing a total of 50t or more of chemicals of dangerous goods class 1 or class 2, division 2.3 under subsection (1)(a)	
Ancillary 08 - Chemical Storage, 3: Storing more than 500 cubic metres of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3 under subsection (1)(c)	
Ancillary 31 - Mineral processing, 2: Processing, in a year, the following quantities of mineral products, other than coke, (a) 1000t to 100,000t	
Ancillary 33 - Crushing, milling, grinding or screening, Crushing, grinding, milling or screening more than 5000t of material in a year	
Ancillary 61 - Waste incineration and thermal treatment, 2: Incinerating or thermally treating, in a year, the following quantity of general waste, (a) less than 5000t	
Ancillary 62 – Resource recovery and transfer facility operation, 1(c) – Operating a facility for receiving and	

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Permit

Environmental Protection Act 1994

Environmental authority EPML00899813

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Environmentally relevant activities	Locations
sorting, dismantling, baling or temporarily storing category 2 regulated waste	

Additional information for applicants

Environmentally relevant activities

The description of any environmentally relevant activity (ERA) for which an environmental authority (EA) is issued is a restatement of the ERA as defined by legislation at the time the EA is issued. Where there is any inconsistency between that description of an ERA and the conditions stated by an EA as to the scale, intensity or manner of carrying out an ERA, the conditions prevail to the extent of the inconsistency.

An EA authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the EA specifically authorises environmental harm.

A person carrying out an ERA must also be a registered suitable operator under the *Environmental Protection Act 1994* (EP Act).

Contaminated land

It is a requirement of the EP Act that an owner or occupier of land give written notice to the administering authority if they become aware of the following:

- the presence of, or happening of an event involving, a hazardous contaminant on the land that is causing, or is reasonably likely to cause, serious or material environmental harm (notice must be given within 24 hours); or
- if the land is contaminated land – a change in the condition of the land that is causing, or is reasonably likely to cause, serious or material environmental harm (notice must be given within 24 hours); or
- a notifiable activity (as defined in Schedule 3) having been carried out, or is being carried out, on the land (notice must be given within 20 business days).

For further information, including the form for giving written notice, refer to the Queensland Government website www.qld.gov.au, using the search term 'duty to notify'.

Take effect

Please note that, in accordance with section 200 of the EP Act, an EA has effect:

a) if the authority is for a prescribed ERA and it states that it takes effect on the day nominated by the holder of the authority in a written notice given to the administering authority – on the nominated day; or

b) if the authority states a day or an event for it to take effect – on the stated day or when the stated event happens; or

c) otherwise – on the day the authority is issued.

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Environmental Protection Act 1994

Environmental authority EPML00899813

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However, if the EA is authorising an activity that requires an additional authorisation (a relevant tenure for a resource activity, a development permit under the *Planning Act 2016* or an SDA Approval under the *State Development and Public Works Organisation Act 1971*), this EA will not take effect until the additional authorisation has taken effect.

If this EA takes effect when the additional authorisation takes effect, you must provide the administering authority written notice within 5 business days of receiving notification of the related additional authorisation taking effect.

If you have incorrectly claimed that an additional authorisation is not required, carrying out the ERA without the additional authorisation is not legal and could result in your prosecution for providing false or misleading information or operating without a valid environmental authority.

	11 December 2025
Signature	Date

Sara Staunton

Department of the Environment, Tourism, Science and Innovation
Delegate of the administering authority
Environmental Protection Act 1994

Enquiries:

Minerals Business Centre
PO Box 7230, Cairns QLD 4870
Phone: (07) 4222 5352
Email: ESCairns@detsi.qld.gov.au

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Environmental Protection Act 1994

Environmental authority EPML00899813

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Obligations under the *Environmental Protection Act 1994*

In addition to the requirements found in the conditions of this environmental authority, the holder must also meet their obligations under the EP Act, and the regulations made under the EP Act. For example, the holder must comply with the following provisions of the Act:

- general environmental duty (section 319)
- duty to notify environmental harm (section 320-320G)
- offence of causing serious or material environmental harm (sections 437-439)
- offence of causing environmental nuisance (section 440)
- offence of depositing prescribed water contaminants in waters and related matters (section 440ZG)
- offence to place contaminant where environmental harm or nuisance may be caused (section 443).

Other permits required

This permit only provides an approval under the *Environmental Protection Act 1994*. In order to lawfully operate you may also require permits / approvals from your local government authority, other business units within the department, and other State and Federal Government agencies prior to commencing any activity at the site. For example, this may include permits / approvals with your local Council (for planning approval), the Department of Transport and Main Roads (to access State controlled roads), the Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development (to clear vegetation), and the Department of Primary Industries (to clear marine plants or to obtain a quarry material allocation).

Obligations under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

Matters of national environmental significance (MNES) are regulated under the Commonwealth EPBC Act rather than under state legislation. You may need to submit a referral if your project potentially impacts any matters protected under the EPBC Act. For more information on self-assessments, and referral and assessment processes please visit the Department of Climate Change, Energy, the Environment and Water webpage, https://www.dcceew.gov.au/environment/epbc/advice.

Obligations under the *Aboriginal Cultural Heritage Act 2003* and *Torres Strait Islander Cultural Heritage Act 2003* (the Cultural Heritage Acts)

The Cultural Heritage Acts require anyone who carries out a land-use activity to exercise a duty of care. This 'duty of care' means land users must take all reasonable and practicable measures to ensure their activity does not harm Aboriginal or Torres Strait Islander cultural heritage, and applies to any activity where Aboriginal or Torres Strait Islander cultural heritage is located. For more information on your obligations under this legislation, please visit the Department of Women, Aboriginal and Torres Strait Islander Partnerships and Multiculturalism webpage at, https://www.dwatsipm.qld.gov.au/.

Environmental Protection Act 1994

Environmental authority EPML00899813

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Conditions of environmental authority

This environmental authority is subject to the conditions set out in the attached schedules. The conditions of this environmental authority should be read in conjunction with the Environmental Management Plan for the Georgetown Gold Project, dated September 2009. Where there is a discrepancy between the conditions of this environmental authority and the environmental management plan, the conditions of the environmental authority will apply.

This **environmental authority** incorporates the following schedules:

- Schedule A – General
- Schedule B – Air
- Schedule C – Water
- Schedule D – Noise and Vibration
- Schedule E – Waste
- Schedule F – Land
- Schedule G – Hazardous Dams
- Schedule H – Definitions
- Schedule I – Maps

Location:

Authorised Mining Tenements	Location (Schedule I – Maps)	Title
ML3409	6.5 km SE of Georgetown	Plant Site
ML3540		
ML3591		
ML3548	14 km NNE of Georgetown	Electric Light
ML30203	43 km NNE of Georgetown	Red Dam
ML3374	62.5 km SSE of Georgetown	Jubilee Plunger
ML30192	31.9 km NNW of Georgetown	Philey's
ML30193	32.8 km NNW of Georgetown	Rhyolite
ML30195	22.3 km NNW of Georgetown	Tom's
ML30196	25.9 km NNW of Georgetown	Sir William Alfred
ML30201	34 km NNW of Georgetown	Abe's
ML3358	10.8 km SSW of Georgetown	Try No More
Authorised Third Party Mining Tenements for acceptance of ore only		
ML100030	40km S of Forsayth	Agate Creek
ML3278	6km SSE of Forsayth	Big Reef
ML3279		
ML3280		
ML30139	60km SSE of Forsayth	Josephine

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Environmental Protection Act 1994

Environmental authority EPML00899813

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Schedule A – General

Financial Assurance

(A1-1) The activity must not be carried out until the environmental authority holder has given financial assurance to the administering authority as security for compliance with this environmental authority and any costs or expenses, or likely costs or expenses, mentioned in section 298 of the Act.

(A1-2) The amount of financial assurance must be reviewed by the holder of this environmental authority when a plan of operations is amended or replaced or the authority is amended.

Maintenance of Measures, Plant and Equipment

(A2-1) The environmental authority holder must:

(a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority;

(b) maintain such measures, plant and equipment in a proper condition; and

(c) operate such measures, plant and equipment in a proper manner.

(A2-2) No change, replacement or alteration of any plant or equipment is permitted if the change, replacement or alteration increases, or is likely to increase, the risk of environmental harm caused by the mining activities.

(A2-3) All instruments and devices used for the measurement or monitoring of any parameter under any condition of this environmental authority must be calibrated, and appropriately operated and maintained.

Monitoring and Measurements

(A3-1) Record, compile and keep for a minimum of five years all monitoring results required by this environmental authority and make available these records any time in the form requested by the administering authority.

(A3-2) Where monitoring is a requirement of this environmental authority, ensure that a competent person(s) conducts all monitoring.

(A3-3) All analyses and tests required to be conducted under this environmental authority must be carried out by a laboratory that has NATA certification for such analyses and tests, except as otherwise authorised by the administering authority.

Storage and Handling of Flammable and Combustible Liquids

(A4-1) All explosives, hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids must be stored and handled in accordance with the relevant Australian Standard where such is available.

(A4-2) Notwithstanding the requirements of any Australian Standard, any liquids stored on site that have the potential to cause environmental harm must be stored in or serviced by an effective containment system that is impervious to the materials stored and managed to prevent the release of liquids to waters or land. Where no relevant Australian Standard is available, the following must be applied:

(a) storage tanks must be bunded so that the capacity and construction of the bund is sufficient to contain at least 110% of a single storage tank or 100% of the largest storage tank plus 10% of the second largest storage tank in multiple storage areas; and

(b) All chemical product drum storages must be bunded so that the capacity of the bund is sufficient to contain at least 100% of the maximum design storage volume within the bund.

(A4-3) All containment systems for chemicals and flammable or combustible liquids must be designed to minimise rainfall collection within the system.

(A4-4) Spillage of any contaminant must be contained and rectified to prevent environmental harm.

Activity

(A5-1) This environmental authority does not authorise environmental harm unless a condition contained within this authority explicitly authorises that harm. Where there is no condition or the environmental authority is silent on a matter, the lack of a condition or silence shall not be construed as authorising harm.

(A5-2) Only oxide material can be extracted and processed.

(A5-3) Ore from the Agate Creek Mine (mining lease 100030), Big Reef Mine (mining leases 3278, 3279 and 3280) and Josephine Gold Mine (mining lease 30139) is authorised to be received, stored and processed at the site, provided:

(a) a geochemical assessment of three (3) ore samples is undertaken every 10,000 tonnes; and

(b) a risk assessment is undertaken prior to processing, if the characteristics of the ore are substantially different to the characteristics of material authorised for processing under this environmental authority.

(A5-4) The risk assessment undertaken under condition (A5-3), must:

(a) detail controls identified to manage any risks;

(b) be implemented to manage risk; and

(c) be documented and made available to the administering authority upon request.

(A5-5) Records must be kept of the quantity and tonnage of ore received from the Agate Creek Mine (mining lease 100030), Big Reef Mine (mining leases 3278, 3279 and 3280) and Josephine Gold Mine (mining lease 30139) in accordance with condition (A3-1).

Emergency Response/Contingency

(A6-1) An emergency response/contingency plan must be developed, contained within the current plan of operations and implemented to respond to emergency events and incidents.

(A6-2) The emergency response/contingency plan required under condition A6-1 must address the following matters as a minimum:

(a) response procedures to be implemented to prevent or minimise the risk of environmental harm arising from incidents;

(b) response procedures to minimise the extent and duration of environmental harm caused by an incident;

(c) the practices and procedures to be employed to restore the environment or mitigate any environmental harm caused;

(d) the resources to be used in response to an incident;

(e) procedures to investigate the cause of any incidents, including releases, and where necessary, implement remedial actions to reduce the likelihood of recurrence of similar events;

(f) the provision and availability of documented procedures to staff attending any incident to enable them to effectively respond;

(g) training of staff that will be called upon to respond to incidents to enable them to effectively respond;

(h) timely and accurate reporting of the circumstance and nature of incidents to the administering authority in accordance with conditions A7-1 to A7-3;

(i) procedures for accessing monitoring points during incidents; and

(j) procedures to notify any person who may be affected by the event within 24 hours, with information to be provided at a minimum:

(i) the location of the release;

(ii) the date and time of the release;

(iii) the estimated quantity and type of any substances (if available concentrations) involved in the incident; and

(iv) the potential impacts to environmental values caused by the release.

Notification of Emergencies, Incidents and Exceptions

(A7-1) The authority holder must, as soon as possible (no later than 12 hours) after becoming aware of:

(a) any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with the conditions of this environmental authority; or

(b) any monitoring result that indicates an exceedance of any environmental authority limit, notify the administering authority of the release by telephone or facsimile.

(A7-2) The notification must include, but not be limited to, the following:

(a) the environmental authority number and name of the holder;

(b) the name and telephone number of the designated contact person;

(c) the location of the emergency or incident;

(d) the date and time of the incident;

(e) the time the holder of the environmental authority became aware of the incident;

(f) the estimated quantity and type of substances involved in the incident;

(g) the actual or potential cause of the incident;

(h) a description of the nature and effects of the incident including environmental risks, any risks to public health or live stock;

(i) immediate actions taken to prevent or mitigate any further environmental harm caused by the release; and

(j) what notification of persons who may be affected by the event has occurred/is being undertaken.

(A7-3) Within fourteen (14) days following the initial notification of an emergency or incident, further written advice must be provided to the administering authority, including the following:

(a) results and interpretation of any samples taken and analysed.

(b) outcomes of actions taken at the time to prevent or minimise unlawful environmental harm.

(c) proposed actions to prevent a recurrence of the emergency or incident.

Water Release Events

(A8-1) For any water release event the authority holder must notify the administering authority as soon as possible (no later than 12 hours of having commenced releasing mine affected water to the receiving environment) and provide the following information in writing:

(a) release commencement date/time;

(b) expected release cessation date/time;

(c) release point/s;

(d) release volume (estimated);

(e) receiving water/s including the natural flow rate;

(f) any details (including available data) regarding likely impacts on the receiving water(s); and

(g) notification of persons who may be affected by the event has occurred/is being undertaken.

Note: Notification to the administering authority must be addressed to the Manager and Project Manager via phone or facsimile.

(A8-2) The authority holder must notify the administering authority as soon as possible (no later within twenty-four (24) hours) of the cessation of a water release and within 28 days provide the following information in writing:

(a) release cessation date/time;

(b) the reason for the release;

(c) the location of the release;

(d) natural flow volume in receiving water;

(e) volume of water released;

(f) all water quality monitoring results;

(g) any general observations;

(h) all calculations;

(i) details regarding the compliance of the release with the conditions of Agency Interest: Water of this environmental authority (i.e. contamination limits, natural flow, discharge volume); and

(j) any other matters pertinent to the water release event.

Complaints and Community

(A9-1) Records must be kept of all environmental complaints received about the mining activities including the following details:

(a) name, address and contact number for complainant (if not available record – not identified);

(b) time and date of complaint;

(c) reasons for the complaint;

(d) investigations undertaken;

(e) conclusions formed;

(f) actions taken to resolve complaint;

(g) any abatement measures implemented; and

(h) person responsible for resolving the complaint.

This information must be made available for inspection by the administering authority on request.

(A9-2) When requested by the administering authority, the environmental authority holder must undertake relevant specified monitoring within a period of 4 weeks to investigate any complaint of environmental harm at any sensitive place or commercial place. The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures implemented must be provided to the administering authority within fourteen (14) days of completion of the investigation.

(A9-3) The holder of this environmental authority must establish, promote and maintain easily accessible lines of communication between residents and land owners to ensure that social impacts are identified and managed.

Cultural Heritage

(A10-1) The holder of the environmental authority must develop and implement a Cultural Heritage Management Plan for protection of the scar tree located on the Red Dam mining lease (ML30203) and include it in the plan of operations.

(A10-2) In the carrying out of the mining activity the holder of this environmental authority must not adversely impact on the cultural heritage values of any place registered on the Queensland Heritage Register.

Third Party Auditing

(A11-1) Compliance with the conditions of this environmental authority must be audited by an appropriately qualified third party auditor, nominated by the environmental authority holder and accepted by the administering authority, within one year of the commencement of the operation, and then at regular intervals not exceeding once every three years.

(A11-2) Upon receipt of the third party audit report, the environmental authority holder must submit a copy to the administering authority.

(A11-3) The third party auditor must certify the independent findings of the audit in the report.

(A11-4) The financial cost of the third party audit is the responsibility of the holder of this environmental authority.

(A11-5) The holder of this environmental authority must immediately act upon any recommendations arising from the audit report by:

(a) investigating any non-compliance issues identified; and

(b) as soon as practicable, implementing measures or taking necessary action to ensure compliance with the requirements of this environmental authority.

(A11-6) Subject to condition (A11-5), and not more than three (3) months following the submission of the audit report to the administering authority, the holder of this environmental authority must provide a written report to the administering authority addressing the:

(a) actions taken by the holder to ensure compliance with this environmental authority; and

(b) actions taken to prevent a recurrence of any non-compliance issues identified.

Risk Management

(A12-1) The environmental authority holder must develop and implement a risk management system for mining activities which conforms to the Australian Standard for Risk Management (AS/NZ 4360:2004) or the latest edition of Australian Standard for Risk Management by 31 October 2010.

Transition to New Standards

(A13-1) Where a condition requires compliance with a standard published externally to this environmental authority and the standard is amended or changed subsequent to the issues of this environmental authority:

(a) comply with the amended or changed standard within 2 years, unless a different period is specified in the amended standard or relevant legislation.

(b) until compliance with the amended or changed standard can be achieved, continue to remain in compliance with the standard that was current immediately prior to the relevant amendment or change.

Definitions

(A14-1) Words and phrases used throughout the environmental authority are defined in Schedule H- Definitions. Where a definition for a term used in the environmental authority is sought and the term is not defined within the environmental authority, the definitions in the *Environmental Protection Act 1994*, its Regulations and Environmental Protection Policies must be used.

Exploration

(A15-1) All exploration activities carried out on the mining leases must comply with each of the standard environmental conditions contained in the most recent version of the *Code of Environmental Compliance for exploration and mineral development projects*.

Western Cutback and Soil Stockpile

(A16-1) The construction and operation of the integrated TSF Western Cutback and Soil Stockpile area must be within the bounds nominated in Schedule I – Map 10 and must not exceed 2.3 hectares and 2.8 hectares, respectively.

END OF CONDITIONS FOR SCHEDULE A

Schedule B – Air

(B1-1) The release of odour, dust or any other airborne contaminant(s), or light from the mining activity must not cause an environmental nuisance at any sensitive place or commercial place.

Dust Nuisance

(B2-1) When requested by the administering authority, dust and particulate monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive place, and the results must be notified within 14 days to the administering authority following completion of monitoring.

(B2-2) If the environmental authority holder can provide evidence through monitoring that the following limits are not being exceeded then the holder is not in breach of (B1-1):

(a) dust deposition of 120 milligrams per square metre per day, averaged over one month, when monitored in accordance with AS 3580.10.1 Methods for sampling and analysis of ambient air - Determination of particulates -Deposited matter - Gravimetric method of 1991.

(b) total suspended particulates (TSP) of 130 micrograms per cubic metre expressed as an 24 hour average, when monitored in accordance with any method for measuring TSP recommended in the latest edition of the Environmental Protection Agency's Air Quality Sampling Manual;

(c) a concentration of particulate matter with an aerodynamic diameter of less than 10 micrometres (PM_{10}) suspended in the atmosphere of 150 micrograms per cubic metre over a 24 hour averaging time, when monitored in accordance with the most recent version of Australian Standard AS 3580.9.6 Determination of suspended particulate matter - PM (sub) 10 high volume sampler with size-selective inlet - Gravimetric method;

(d) total suspended particulates (TSP) of 200 micrograms per cubic metre expressed as a one hour average, when monitored in accordance with any method for measuring TSP recommended in the latest edition of the administering authority's *Air Quality Sampling Manual*.

(B2-3) If monitoring indicates exceedance of the relevant limits in Condition (B2-2), then the environmental authority holder must:

(a) address the complaint including the use of appropriate dispute resolution if required; or

(b) immediately implement dust abatement measures so that emissions of dust from the activity do not result in further environmental nuisance.

(B2-4) Ensure that vehicles (including trains) used for transporting materials to and from the mining tenements, have appropriate load preparation to prevent the spillage and/or loss of particulate matter and/or windblown dust during transport.

Point Source Release of Contaminants to the Atmosphere

(B3-1) Contaminants must not be released to the atmosphere from any diesel powered generator or the gold furnace other than:

(a) in accordance with the manufacturers specifications; and

(b) directed vertically upwards, with no impedance.

(B3-2) Combustion efficiency of the one diesel generator used at Electric Light and Red Dam mining leases must comply with the manufacturer's specifications.

END OF CONDITIONS FOR SCHEDULE B

Schedule C – Water

Contaminant Release

(C1-1) Contaminants that will, or have the potential to cause environmental harm must not be released directly or indirectly to any waters except as permitted under the conditions of this environmental authority.

(C1-2) The release of contaminants to waters must only occur from the release points specified in Table C1 and depicted in Schedule I – Maps 2, 3 and 4 attached to this environmental authority.

(C1-3) The release of contaminants to waters must not exceed the release limits stated in Table C2 when measured at the release monitoring points specified in Table C1 for each quality characteristic.

(C1-4) The release of contaminants to waters from the release points must be monitored at the locations and frequency specified in Table C1 for each quality characteristics specified in Table C2.

(C1-5) If quality characteristics of the release exceed any of the trigger levels specified in Table C2 during a release event, the environmental authority holder must compare the results of the downstream site to the data from reference monitoring sites and:

(a) if the level of contaminants at the downstream site does not exceed the reference monitoring site data, then no action is to be taken; and

(b) if the level of contaminants at the downstream site is greater than the reference monitoring site data, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority within 3 months, outlining:

(i) details of the investigations carried out; and

(ii) actions taken to prevent environmental harm.

Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with (C1-5) *b (ii) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic within the three month investigation period.*

(C1-6) If an exceedance in accordance with condition (C1-5) is identified, the holder of the authority must notify the administering authority within 14 days of receiving the result.

(C1-7) The holder must install, operate and maintain a stream flow gauging station to determine and record stream flows at the locations upstream of each Release Point as specified in Table C3 for any receiving water into which a release occurs.

(C1-8) Notwithstanding any other condition of this environmental authority, the release of contaminants to waters must only take place during periods of natural flow events specified as minimum flow in Table C3 for the contaminant release point(s) specified in Table C1.

(C1-9) At the time of release the flow rate in the receiving water must be at least twenty (20) times the rate at which treated waste waters are released.

(C1-10) The daily quantity of contaminants released from each release point must be measured and recorded at the monitoring points in Table C1.

(C1-11) Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build-up of sediment in such waters.

Table C1 (Contaminant Release Points, Sources Monitoring Points and Receiving Waters and Monitoring Frequency)

Monitoring Point	Location (GDA94 MGA z54)		Contaminant Source and Location	Receiving Waters Description	Monitoring Frequency
	Easting	Northing			
Release points					
Tailings Dam (spillway)	764701	7971588	Release from tailings dam.	Ephemeral Unnamed Creek.	Daily during release (the first sample must be taken within two (2) hours of commencement of release).
Receiving Waters - Impacted sites					
PSSW2	762965	7971670	Plant site	Downstream towards the North West.	Upon commencement of release and thereafter weekly during release. Upon commencement of flow of river and weekly thereafter whilst river is flowing.
PSSW3	763776	7971854	Plant site	Flowing north from the process plant.	
PSSW5	765405	7971198	Plant site	Flowing east downstream of the tailings dam.	
PSSW6	764755	7971052	Plant site	Creek draining south east from tailings dam.	
PSSW7	763617	7970971	Plant site	Flowing north towards mining lease.	
PSSW8	765051	7971812	Plant site	Flowing North East from tailings dam.	
PSSW9	765308	7971722	Plant site	Flowing East from tailings dam.	
ELSW2	772273	7988341	Electric light	Downstream of extraction pit.	

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Monitoring Point	Location (GDA94 MGA z54)		Contaminant Source and Location	Receiving Waters Description	Monitoring Frequency
	Easting	Northing			
RDSW3	787127	8015155	Red Dam	Downstream of extraction pit.	
PSSW4	765069	7971347	Plant site	Flowing east downstream of tailings dam.	
JPSW5	784936	7913590	Jubilee Plunger	Downstream of extraction pit.	
JPSD1	784315	7914405	Jubilee Plunger	Spillway of ROM sediment dam	
JPSD2	784193	7914135	Jubilee Plunger	Spillway of WRD sediment dam	
Reference sites[1]					
PSSW1-Reference	763113	7971189	Plant Site reference	Upstream of mining activities.	Upon commencement of release and thereafter weekly during release. Upon commencement of flow of river and weekly thereafter whilst river is flowing.
RDSW1-Reference	786261	8015157	Red dam reference	Upstream of mining activities.	
ELSW1-Reference	772080	7988855	Electric light reference	Upstream of mining activities.	
RDSW2-Reference	785965	8014265	Red dam reference	Upstream of mining activities.	
JPSW04-Reference	784205	7913122	Jubilee Plunger reference 1	Upstream of mining activities.	
JPSW09-Reference	784004	7913690	Jubilee Plunger reference 2	Upstream of mining activities.	

1 Reference sites must:

(a) be from the same bio-geographic and climatic region; and
(b) have similar geology, soil types and topography; and
(c) contain a range of habitats similar to those at the test sites; and
(d) have a similar flow regime; and
(e) not be so close to the test sites that any disturbance at the test site also results in a change at the reference site

Notes:

a) The reference / upstream monitoring point should be within 300m the release point.
b) The downstream point should not be greater than 500m from the release point.
c) The data from reference monitoring points must not be used where they are affected by releases from other mines.

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Table C2 (Contaminant Release and Trigger Limits)

Quality Characteristic	Contaminant Release Limit[6] (mg/L unless otherwise specified)	Trigger Levels[6] (mg/L unless otherwise specified)
Electrical Conductivity	1000[2] µS/cm	500[1] µS/cm
pH (pH Unit)	4.0 [3] (minimum) 9.0[3] (maximum)	6.0[4] (minimum) 7.5[4] (maximum)
Turbidity (NTU)	Reference value	80th percentile of reference value
Suspended Solids	50 or reference value, whichever is higher	80th percentile of reference value
Hardness	For interpretation purposes	
Sulphate (SO_4^{2-})	1000[3]	80th percentile of reference value
Aluminium	5[3]	0.055[4]
Antimony	Reference value	80th percentile of reference value
Arsenic	0.5[3]	0.013[4]
Bismuth	Reference value	80th percentile of reference value
Cadmium	0.01[3]	0.0002[4]
Chromium	1[3]	0.001[4]
Cobalt	1[3]	0.0028[4]
Copper	1[3]	0.0014[4]
Iron	Reference value	0.3[4]
Lead	0.1[3]	0.0034[4]
Manganese	-	1.9[4]
Mercury	0.002[3]	0.0006[4]
Nickel	1[3]	0.011[4]
Selenium	0.02[3]	0.011[4]
Silver	Reference value	0.00005[4]
Tin	Reference value	0.003[4]
Uranium	0.2[3]	80th percentile of reference value
Zinc	20[3]	0.008[4]

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Quality Characteristic	Contaminant Release Limit[6] (mg/L unless otherwise specified)	Trigger Levels[6] (mg/L unless otherwise specified)
Cyanide (Free)	0.5[5]	0.007[4]
Cyanide (WAD)	For interpretation purposes	

1 Numbers based on table G4 of the Queensland Water Quality Guidelines.
2 Number based on Hart, 2008 Review of the Fitzroy River Water Quality Issues. Water Science Pty Ltd, November 2008
3 Numbers based on ANZECC 2000 Livestock Drinking Water Guidelines.
4 Numbers based on ANZECC 2000 Ecosystems (95%) moderately to slightly disturbed.
5 Number based on Cyanide Management guideline October 2008.
6 All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.
7 The list of quality characteristics required to be monitored as per Table C2 will be reviewed once the results of the monitoring data is gathered, or becomes, available and if its is determined that there is no need to monitor for certain individual quality characteristics these can be removed from Table C2.
8 SMD – slightly moderately disturbed level of protection, guideline refers ANZECC & ARMCANZ (2000).
9 LOR – typical reporting for method stated. ICPMS/CV FIMS – analytical method required to achieve LOR.

Table C3 (Contaminant Release During Flow Events)

Receiving Water Description	Release Point	Gauging Station Description	Location (GDA94 MGA z54)		Minimum Flow in Receiving Water Required for a Release Event	Flow Recording Frequency
			Easting	Northing		
PSSW1-Reference	200m downstream of gauging location.	Located in ephemeral creek upstream of mining operation.	7971189	763113	Depending on individual catchment this minimum flow trigger will be either the release comprising less than 20th /30th percentiles of the natural flow The volume of flow can be determined by height of water or flow. The actual flow must be a quantifiable measure. Example: > or = 5 m^3/sec	Continuous (minimum daily)
RDSW1-Reference	On mining lease.	Located in ephemeral creek upstream of mining operation.	8015157	786261	Depending on individual catchment this minimum flow trigger will be either the release comprising less than 20th /30th percentiles of the natural flow The volume of flow can be determined by height of water or flow. The actual flow must be a quantifiable measure. Example: > or = 5 m^3/sec	Continuous (minimum daily)
ELSW1-Reference	At the base of collection	Located in ephemeral	7988855	772080	Depending on individual catchment this minimum flow trigger will be either the	Continuous (minimum

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Receiving Water Description	Release Point	Gauging Station Description	Location (GDA94 MGA z54)		Minimum Flow in Receiving Water Required for a Release Event	Flow Recording Frequency
			Easting	Northing		
	dam.	creek upstream of mining operation.			release comprising less than 20th /30th percentiles of the natural flow The volume of flow can be determined by height of water or flow. The actual flow must be a quantifiable measure. Example: > or = 5 m^3/sec	daily)
RDSW2-Reference	200m south of mining lease boundary.	Located in ephemeral creek upstream of mining operation.	8014617	786865	Depending on individual catchment this minimum flow trigger will be either the release comprising less than 20th /30th percentiles of the natural flow The volume of flow can be determined by height of water or flow. The actual flow must be a quantifiable measure. Example: > or = 5 m^3/sec	Continuous (minimum daily)

Receiving Environment Monitoring and Contaminant Trigger Levels

(C2-1) The quality of the receiving waters must be monitored at the locations and frequency specified in Table C1 for each quality characteristic stated in Table C2.

(C2-2) If quality characteristics of the receiving water at the downstream monitoring points exceed any of the trigger levels specified in Table C2 the environmental authority holder must compare the downstream results to the reference results in the receiving waters and:

(a) if the level of contaminants at the downstream site is the same or a lower value than the reference value for the quality characteristic then no action is to be taken; and

(b) if the level of contaminants at the downstream site is greater than the reference monitoring site data complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority within 3 months, outlining:

(i) details of the investigations carried out; and

(ii) actions taken to prevent environmental harm.

Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with (C2-2)(b)(ii) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic within the three month investigation period.

(C2-3) The release of contaminants to waters must not exceed the contaminant release limits stated in Schedule C – Table 2 (Contaminant Release and Trigger Limits) for each quality characteristic.

Stream Sediment Contaminant Levels

(C3-1) Sediment quality of receiving waters and reference waters must be monitored twice a year (once at the end of the wet season and once at the end of the dry season) at the monitoring locations defined in Table C1 and Schedule I – Map 2 – Surface Water, Groundwater and Sediment Monitoring Sites for the Plant Site (ML3409, ML3540 and ML3591), Map 3 – Surface Water, Groundwater and Sediment Monitoring Sites for Electric Light (ML3548), Map 4 – Surface Water and Sediment Monitoring Sites for Red Dam (ML30203) and Map 5 – Surface Water and Sediment Monitoring Sites for Jubilee Plunger (ML3374) and for the parameters defined in Table C4.

(C3-2) If quality characteristics of the release exceed any of the trigger levels specified in Table C4 during a release event, the environmental authority holder must compare the results of the downstream site to the data from reference monitoring sites and:

(a) if the level of contaminants at the downstream site does not exceed the reference monitoring site data, then no action is to be taken; and

(b) if the level of contaminants at the downstream site is greater than the reference monitoring site data, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority within 3 months, outlining:

(i) details of the investigations carried out; and

(ii) actions taken to prevent environmental harm.

Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with (C3-2) *b (ii) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic within the three month investigation period.*

(C3-3) If an exceedance in accordance with condition (C3-2)(b)(ii) is identified, the holder of the authority must notify the administering authority within 14 days of receiving the result.

(C3-4) The release of contaminants to water must not result in an exceedance of sediment contaminant limits stated in Table C4 when measured at the monitoring points specified in Table C1 for each quality characteristic.

(C3-5) All stream sediment sampling must be undertaken in accordance with AS 5667.12 Guidance on Sampling of Bottom Sediments of 1998.

Table C4 - Stream sediment trigger and contaminant levels

Parameter	Contaminant Limit (mg/kg unless otherwise specified)	Trigger Limit (mg/kg unless otherwise specified)
Antimony	25[3] or three times the reference value[1], whichever is higher	Reference value[1] or 2[2], whichever is higher.
Arsenic	70[3] or three times the reference value[1], whichever is higher	Reference value[1] or 20[2], whichever is higher.
Bismuth	Three times the reference value[1]	Reference[1]
Cadmium	10[3] or three times the reference value[2], whichever is higher	Reference value[1] or 1.5[3], whichever is higher.
Cobalt	Three times the reference value[1]	Reference[1]
Copper	270[3] or three times the reference value[1], whichever is higher	Reference[1]or 65[2], whichever is higher.
Lead	220[3] or three times the reference value[1], whichever is higher	Reference value[1] or 50[2] whichever is higher.
Mercury	1[3] or three times the reference value[1], whichever is higher	Reference value[1] or 0.15[2] whichever is higher.
Nickel	52[3] or three times the reference value[1], whichever is higher.	Reference value[1]or 21[2], whichever is higher
Selenium	Three times the reference value[1]	Reference[1]
Tin	Three times the reference value[1]	Reference value[1]
Zinc	410[3] or three times the reference value[1], whichever is higher.	Reference value[1] or 200[2], whichever is higher.
Total Cyanide	50[4] or three times the reference value[1] whichever is higher.	Reference value[1] or 25[4] whichever is higher.
Particle size distribution on all samples for interpretation purposes		

1 Reference sites are defined in Table 1.

2 ANZECC (2000) Interim Sediment Quality Guidelines – low values based on total sediments.

3 ANZECC (2000) Interim Sediment Quality Guidelines – high values based on total sediments.

4 The 25mg/kg is based on half of GHD, 1993. Guidelines for Assessment and Management of Land Contamination. Dept of Mineral and Energy Draft Technical Guidelines for Environmental Management for Mining in Qld.

5 The 50mg/kg is based on the GHD, 1993. Guidelines for Assessment and Management of Land Contamination. Dept of Mineral and Energy Draft Technical Guidelines for Environmental Management for Mining in Qld.

Receiving Environment Monitoring Program (REMP)

(C4-1) A REMP must be developed and implemented by 20 August 2010 to monitor and record the effects of the release of contaminants on the receiving environment periodically and whilst contaminants are being discharged from the site, with the aims of identifying and describing the extent of any adverse impacts to local environmental values, and monitoring any changes in the receiving water. A copy of the REMP must be provided to the administering authority prior to its implementation and due consideration given to any comments made on the REMP by the administering authority. For the purposes of the REMP, the receiving environment is the waters of the downstream environment and connected waterways within 2km downstream of the release.

(C4-2) The REMP must address (but not necessarily be limited to) the following:

(a) description of potentially affected receiving waters including key communities and reference water quality and sediment characteristics based on accurate and reliable monitoring data that takes into consideration any temporal variation (e.g. seasonality); and

(b) description of applicable environmental values and water quality objectives to be achieved (i.e. as scheduled pursuant to the Environmental Protection (Water) Policy); and

(c) any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment within which the REMP is proposed; and

(d) water and sediment quality targets within the receiving environment to be achieved, and clarification of contaminant concentrations or levels indicating adverse environmental impacts during the REMP.

(e) monitoring for any potential adverse environmental impacts caused by the release;

(f) monitoring of stream flow and hydrology;

(g) monitoring of toxicants should consider the indicators specified in Table 3 to assess the extent of the compliance of concentrations with water quality objectives and/or the ANZECC & ARMCANZ 2000 guidelines for slightly to moderately disturbed ecosystems;

(h) monitoring of physical chemical parameters as a minimum those specified in Table 2 (in addition to dissolved oxygen saturation and temperature);

(i) monitoring biological indicators (for macroinvertebrates in accordance with the administering authorities' monitoring and sampling manual (AusRivas methodology) and metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ 2000, BATLEY and/or the most recent version of AS5667.*1 Guidance on Sampling of Bottom Sediments*) for permanent, semi-permanent water holes and water storages;

(j) the locations of monitoring points (including the locations specified in Table 8 which are reference/upstream and downstream impacted sites for each release point);

(k) the frequency or scheduling of sampling and analysis sufficient to determine water quality objectives and to derive site specific reference values within 2 years (depending on wet season flows) in accordance with the *Queensland Water Quality Guidelines*. For ephemeral streams, this should include periods of flow irrespective of mine or other discharges;

(l) specify sampling and analysis methods and quality assurance and control;

(m) any historical datasets to be relied upon;

(n) description of the statistical basis on which conclusions are drawn; and

(o) any spatial and temporal controls to exclude potential confounding factors.

(C4-3) A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with conditions C4-2 must be prepared and submitted in writing to the administering authority by 1 July 2012. This should include an assessment of reference water quality, any assimilative capacity for those contaminants monitored and the suitability of current discharge limits to protect downstream environment values.

Environmental Protection Act 1994

Environmental authority EPML00899813

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Monitoring of Water Storage Quality

(C5-1) Water storages stated in Table C5 must be monitored for the water quality characteristics specified in Table C6 at the monitoring locations and at the monitoring frequency specified in Table C5.

(C5-2) In the event that waters storages defined in Table C5 exceed the contaminant limits defined in Table C6, the holder of the environmental authority must implement measures to prevent access to waters by all livestock and minimise access by native fauna.

Table C5 (Water Storage Monitoring)

Water Storage Description	Location (GDA94 MGA z54)		Monitoring Location	Frequency of Monitoring
	Easting	Northing		
Tailings Storage Facility (TSFWS1 to TSFWS4)	764935 764324 764301 764840	7971567 7971538 7971322 7971248	Tailings return pump sampling point.	Quarterly
Red Dam Pit (RDPWS1 to RDPWS4)	786587 786549 786552 785866	8014989 8015020 8015102 8015080	Within the pit.	Quarterly
Electric Light Pit (ELPWS1-ELPWS4)	772219 772417 772370 772164	7988826 7989168 7989195 7988867	Within the pit.	Quarterly
Black Blow Midapa Pit (BBPWS1- BBPWS6)	764911 764974 765028 765027 764971 764917	7971283 7971273 7971300 7971323 7971325 7971313	Within the pit.	Quarterly
Jubilee Plunger Pit	783924 784256 784087 783762	7914635 7914252 7914100 7914544	Within the pit.	Quarterly

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Table C6 (Onsite Water Storage Contaminant Limits)

Parameter	Test Value	Contaminant Limit (mg/L unless otherwise specified)
pH (pH unit)	Range	Greater than 5, less than 9[1]
EC	Maximum	5970[1]
Aluminium		5[1]
Antimony		Reference value
Arsenic		0.5[1]
Bismuth		Reference value
Cadmium		0.01[1]
Cobalt		1[1]
Copper		1[1]
Fluoride		2[1]
Lead		0.1[1]
Nickel		1[1]
Selenium		0.02[1]
Sulphate		1000[1]
Zinc		20[1]
WAD Cyanide		50[2]

1 Contaminant limit based on ANZECC (2000) stock water quality guidelines.

2 Contaminant limit based on the Guideline Cyanide Management May 2008.

Groundwater

(C6-1) Groundwater quality and level must be monitored at the locations and frequencies defined in Table C7 and Schedule I – Maps for parameters identified in Table C8.

(C6-2) If quality characteristics of groundwater from compliance bores identified in Table C7 exceed any of the trigger levels stated in Table C8, the environmental authority holder must compare the compliance monitoring bore results to the reference bore results and:

(a) if the level of contaminants at the downstream site does not exceed the reference monitoring site data, then no action is to be taken; and

(b) if the level of contaminants at the downstream site is greater than the reference monitoring site data, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority within 3 months, outlining:

(i) details of the investigations carried out; and

(ii) actions taken to prevent environmental harm.

Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with C6-2(b)(ii) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic within the three month investigation period.

(C6-3) If an exceedance in accordance with condition C6-2 (b)(ii) is identified, the holder of the authority must notify the administering authority within 14 days of receiving the result.

(C6-4) Groundwaters from bores identified in Table C7, must not exceed any of the limits defined in Table C8.

(C6-5) Groundwater monitoring bores must be constructed and operated in accordance with methods prescribed in the latest edition of the Agriculture and Resource Management Council of Australia and New Zealand manual titled *Minimum Construction Requirements for Water Bores in Australia.*

(C6-6) Annual groundwater monitoring reports analysing groundwater chemistry and hydro-geological status of all groundwater bores and groundwater conditions must be prepared and submitted to the administering authority with each annual return.

(C6-7) Groundwater levels must be monitored and ground level fluctuations in excess of 1m per year, not resulting from the pumping of licensed bores the administering authority must be notified within 14 days following completion of monitoring.

Table C7 - Groundwater Monitoring Locations and Frequency

Monitoring Point	Location (GDA94 MGA z54)		Surface RL[1] (m) or AHD	Monitoring Frequency
	Easting	Northing		
Compliance Bores				
Plant Site Leases				
PSMB1	764148	7971110	326.691	Quarterly
PSMB2	765228	7971273	309.584	
PSMB3	763461	7971672	319.429	
PSMB4	763298	7971539	316.711	
PSMB5	764687	7971667	324.859	
PSMB7	764973	7971528	317.468	
PSMB8	765204	7971521	320.687	
PSMB9	764881	7971197	319.439	
PSMB10	764651	7971201	319.181	
PSMB11	763651	7971551	330.795	
PSMB12	763873	7971394	326.401	
PSMB13	763401	7971468	319.914	
PSMB14	763399	7971467	319.678	
Electric Light				
ELMB1	772455	7989229	324.845	Quarterly
ELMB2	772264	7988601	313.625	
Red Dam				
RDMB1	785974	8015064	301.905	Quarterly
RDMB2	786995	8015060	281.019	
Reference Bores[2]				

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Monitoring Point	Location (GDA94 MGA z54)		Surface RL[1] (m) or AHD	Monitoring Frequency
	Easting	Northing		
Plant Site Leases				
PSMB6	764891	7971672	320.127	Quarterly
Electric Light				
ELMB3	772621	7989282	319.982	Quarterly
Red Dam				
RDMB3	786878	8014924	282.621	Quarterly

1 RL must be measured to the nearest 5cm from top of bore casing.

2 Reference sites must:

(a) be from the same bio-geographic and climatic region; and
(b) have similar geology, soil types and topography; and
(c) not be so close to the test sites that any disturbance at the test site also results in a change at the reference site

Table C8 - Groundwater Contaminant and Trigger Limits

Quality Characteristic	Contaminant Release Limit[6] (mg/L unless otherwise specified)	Trigger Levels[6] (mg/L unless otherwise specified)
Electrical Conductivity	1000[2] (µS/cm)	500[1] (µS/cm)
pH (pH Unit)	4.0[3] (minimum) 9.0[3] (maximum)	6.0[4] (minimum) 7.5[4] (maximum)
Standing Water Level	For interpretation purposes	
Chloride	For interpretation purposes	
Sulphate (SO_4^{2-})	1000[3]	80th percentile of the reference
Aluminium	5[3]	0.055[4]
Antimony	Reference value	80th percentile of reference value
Arsenic	0.5[3]	0.013[4]
Bismuth	Reference value	80th percentile of reference value
Cadmium	0.01[3]	0.0002[4]
Chromium	1[3]	0.001[4]
Cobalt	1[3]	0.0028[4]
Copper	1[3]	0.0014[4]
Iron	Reference value	0.3[4]
Lead	0.1[3]	0.0034[4]

Quality Characteristic	Contaminant Release Limit[6] (mg/L unless otherwise specified)	Trigger Levels[6] (mg/L unless otherwise specified)
Manganese	-	1.9[4]
Mercury	0.002[3]	0.0006[4]
Nickel	1[3]	0.011[4]
Selenium	0.02[3]	0.011[4]
Silver	Reference value	0.00005[4]
Tin	Reference value	0.003[4]
Uranium	0.2[3]	80th percentile of reference value
Zinc	20[3]	0.008[4]
Cyanide (Free)	0.5[5]	0.007[4]
Cyanide (WAD)	For interpretation purposes	

1 Numbers based on table G.4 of the Queensland Water Quality Guidelines.
2 Number based on Hart, 2008 Review of the Fitzroy River Water Quality Issues. Water Science Pty Ltd, November 2008.
3 Numbers based on ANZECC 2000 Livestock Drinking Water Guidelines.
4 Numbers based on ANZECC 2000 Ecosystems (95%) moderately to slightly disturbed.
5 Number based on Cyanide Management guideline May 2008.
6 All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.
7 The list of quality characteristics required to be monitored as per Table C2 will be reviewed once the results of the monitoring data is gathered, or becomes, available and if its is determined that there is no need to monitor for certain individual quality characteristics these can be removed from Table C2.
8 SMD – slightly moderately disturbed level of protection, guideline refers ANZECC & ARMCANZ (2000).

Water General

(C7-1) All determinations of water quality must be:

(a) performed by a person or body possessing appropriate experience and qualifications to perform the required measurements;

(b) made in accordance with methods prescribed in the latest edition of the administering authority's *monitoring and sampling manual*;

(c) collected from the monitoring locations identified within this environmental authority, within 2 hours of each other (reference/downstream) where possible; and

(d) carried out on representative samples.

(e) laboratory testing must be undertaken using a laboratory accredited (e.g. NATA) for the method of analysis being used.

Water Monitoring Reporting

(C8-1) The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority in the specified format when requested:

(a) the date on which the sample was taken;

(b) the time at which the sample was taken;

(c) the monitoring point at which the sample was taken;

(d) the measured or estimated daily quantity of the contaminants released from all release points;

(e) the release flow rate at the time of sampling for each release point;

(f) the results of all monitoring and details of any exceedences with the conditions of this environmental authority; and

(g) water quality monitoring data must be provided to the administering authority in the specified electronic format upon request.

(C8-2) The release of contaminants directly or indirectly to waters:

(a) must not produce any visible discolouration of receiving waters; or

(b) must not produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease, scum, litter or other objectionable matter.

Water Management Plan

(C9-1) A Water Management Plan must be developed and implemented by 1 September 2010 that provides for the proper and effective management of the actual and potential environmental impacts resulting from the mining activity and to ensure compliance with the conditions of this environmental authority.

(C9-2) The Water Management Plan must be developed in accordance with administering authority *Guideline for Preparing a Water Management Plan 2009* or any updates that become available from time to time and must include at least the following components:

(a) contaminant source study;

(b) site water balance and model;

(c) water management system;

(d) saline and metalliferous drainage prevention and management measures;

(e) acid rock drainage prevention and management measures (if applicable);

(f) emergency and contingency planning; and

(g) monitoring and review.

(C9-3) Each year the holder of the environmental authority must undertake a review of the Water Management Plan prior to the wet season (and no later than 1 November) and a further review following the wet season (i.e. by 1 May the following year) to ensure that proper and effective *measures, practices or procedures are in place so that the mine is* operated in accordance with the conditions of this environmental authority and that environmental harm is prevented or minimised.

(C9-4) A copy of the Water Management Plan and/or a review of the Water Management Plan must be provided to the administering authority on request.

Saline, Acid Rock and Metalliferous Drainage

(C10-1) The holder of this environmental authority must ensure proper and effective measures are taken to avoid or otherwise minimise the generation and/or release of saline, acid rock and/or metalliferous drainage.

Stormwater, Sediment and Erosion Controls

(C11-1) An Erosion and Sediment Control Plan must be developed by an appropriately qualified person and implemented for all stages of the mining activities on the site to prevent or minimise erosion and the release of sediment to receiving waters and the contamination of storm water.

(C11-2) The Erosion and Sediment Control Plan must be included in the plan of operations, and provides for at least the following storm water management functions:

(a) prevent or minimise the contamination of stormwater;

(b) diverting uncontaminated stormwater run-off around areas disturbed by mining activities or where contaminants or wastes are stored or handled;

(c) contaminated stormwater runoff, incident rainfall and leachate is collected; and treated, reused, or released in accordance with the conditions of this environmental authority;

(d) roofing or minimising the size of areas where contaminants or wastes are stored or handled;

(e) using alternate materials and or processes (such as dry absorbents) to clean up spills that will minimise the generation of contaminated waters;

(f) erosion and sediment control structures are placed to minimise erosion of disturbed areas and prevent the contamination of any waters;

(g) procedures to ensure that erosion and sediment control structures are maintained and adequate storage is available in sediment dams in accordance with design criteria; and

(h) training of staff that will be responsible for maintenance and operations of sediment and erosion control structures.

(C11-3) Erosion protection measures and sediment control measures must be implemented and maintained to minimise erosion and the release of sediment and contamination of storm water.

(C11-4) The maintenance and cleaning of any vehicles, plant or equipment must not be carried out in areas from which contaminants can be released into any receiving waters.

(C11-5) Any spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable to minimise the release of wastes, contaminants or materials to any stormwater drainage system or receiving waters.

Sewage Treatment

(C12-1) Any release from the sewage treatment system must not result in environmental harm.

Water Reuse

(C13-1) Mine affected water from Jubilee Plunger Pit must not be used by a third party unless written consent has been obtained from the third party.

(C13-2) Records of all transferred mine affected water must be maintained and provided to the administering authority upon request. These records must include the following details:

(a) The source of the transferred water;

(b) The quantity (volume) of water transferred;

(c) The details for the third-party that will receive the transferred water;

(d) The quality of the transferred water, including an assessment against the quality limits specified in Table C6 (Onsite Water Storage Contaminant Limits);

(e) The locations where the quality of the water to be transferred was measured; and

(f) The date of the transfer.

(C13-3) A copy of the written consent must be kept by the holder of this environmental authority and made available to the administering authority upon request.

END OF CONDITIONS FOR SCHEDULE C

Environmental Protection Act 1994

Environmental authority EPML00899813

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Schedule D – Noise and Vibration

Noise

(D1-1) Ensure that noise generated by the mining activities does not cause the criteria in Table D1 – Noise limits to be exceeded.

(D1-2) When requested by the administering authority, noise monitoring and recording must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint of environmental nuisance at any sensitive place or commercial place, and the results must be notified within 14 days to the administering authority following completion of monitoring.

(D1-3) Noise monitoring and recording must include the following descriptor characteristics and matters:

(a) LAN,T (where N equals the statistical levels of 1, 10 and 90 percentiles and T = 15 mins);

(b) background noise LA90,T;

(c) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels;

(d) atmospheric conditions including temperature, relative humidity and wind speed and directions;

(e) effects due to any extraneous factors such as traffic noise;

(f) location, date and time of monitoring;

(g) if the complaint concerns low frequency noise, Max LpLIN,T;

(h) if the complaint concerns low frequency noise, one third octave band measurements in dB(LIN) for centre frequencies in the 10 – 200 Hz range; and

(D1-4) The method of measurement and reporting of noise levels must comply with the latest edition of the administering authority's *Noise Measurement Manual* or the most recent version of AS1055 Acoustics – description and measurement of environmental noise.

Table D1 Noise Limits

Sensitive Place						
Noise Level dB(A) measured as:	Monday to Saturday			Sundays and Public Holidays		
	7am to 6pm	6pm to 10pm	10pm to 7am	9am to 6pm	6pm to 10pm	10pm to 9am
$L_{A10, adj, 10 mins}$	BG+5	BG+5	BG+3	BG+5	BG+5	BG+0
$L_{A1, adj, 10 mins}$	BG+10	BG+10	BG+5	BG+10	BG+10	BG+5

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Air Blast and Ground Vibration

(D2-1) Ensure that blasting does not cause the limits for peak particle velocity and air blast overpressure in Table D2 – Blasting noise limits to be exceeded.

Table D2 Air Blast Overpressure Level Blasting Noise Limits

Blasting Noise Limits	Sensitive or Commercial Place
Airblast overpressure level	115 dB (Linear) Peak for nine (9) out of ten (10) consecutive blasts initiated and not greater than 120 dB (Linear) Peak at any time
Ground vibration peak particle velocity	5mm/second peak particle velocity for nine (9) out of ten (10) consecutive blasts and not greater than 10 mm/second peak particle velocity at any time
Low frequency noise	At or below 200 Hz measured on the linear weighting scale indoor sound pressure level of 50 dB (Linear), or an outdoor sound pressure level of 55 dB (Linear)

(D2-2) The ground vibration transducer (or array) must be attached to a buried block so as to ensure good coupling with the ground. The mass shall be buried so that its upper most surface is at the same level as the ground surface.

(D2-3) The ground vibration transducer (or array) must be placed at the same point at which the air blast is monitored.

(D2-4) When requested by the administering authority, air blast and vibration monitoring and recording must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint of environmental nuisance at any sensitive place or commercial place, and the results must be notified within 14 days to the administering authority following completion of monitoring.

(D2-5) The method of measurement and reporting of vibration levels must comply with the latest edition of the administering authority's *Noise and vibration from blasting guideline.*

END OF CONDITIONS FOR SCHEDULE D

Environmental Protection Act 1994

Environmental authority EPML00899813

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Schedule E – Waste

Fire Prevention

(E1-1) The holder of this environmental authority must not:

(a) burn waste or allow waste to be burnt at the licensed place covered by this environmental authority other then cyanide transport and handling package material; or

(b) remove waste from the licensed place covered by this environmental authority and burn such waste elsewhere except in accordance with the requirements of the *Environmental Protection Act 1994*.

(E1-2) Tyres stored awaiting disposal or transport for take-back and recycling or waste-to-energy options must be stockpiled in stable stacks in volumes less than 500 equivalent passenger-tyre units (EPU), less than 3m in height and 200 sq m in area and at least 10m from any other tyre storage area or combustible or flammable material, including vegetation.

(E1-3) All reasonable and practicable fire prevention measures must be implemented, including removal of grass and other materials within a 10m radius of any tyre storage area.

Off Site Movement of Regulated Wastes

(E2-1) Where regulated waste is removed from the licensed place (other than by a release as permitted under another schedule of this environmental authority), the holder of this environmental authority must ensure that:

(a) the removal and transport of such wastes, where it constitutes an environmentally relevant activity under the *Environmental Protection Regulation 2008*, is carried out by a person licensed for carrying out this activity under the *Environmental Protection Act 1994*; and

(b) records are kept of the following:

(i) the date, quantity and type of waste removed;

(ii) name of the regulated waste transporter that removed the waste; and

(iii) the intended treatment/disposal destination of the waste.

Note: Records of documents maintained in compliance with a waste tracking system established under the Environmental Protection Act 1994 or any other law for regulated waste will be deemed to satisfy this environmental authority condition.

(E2-2) Regulated waste awaiting removal may be temporarily stored on site.

(E2-3) Each container of regulated waste stored awaiting movement off-site must be clearly marked to identify the contents.

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Notification of Improper Disposal of Regulated Waste

(E3-1) If the holder of this environmental authority becomes aware that a person has removed regulated waste from the licensed place and disposed of the regulated waste in a manner which is not authorised by this environmental authority or improper or unlawful, then the holder of this environmental authority must, as soon as practicable, notify the administering authority of all relevant facts, matters and circumstances known concerning the disposal.

(E3-2) Regulated waste generated by maintenance of plant and equipment and absorbent materials used to clean up spills must only be disposed off at a facility whose operator is permitted to accept such waste in accordance with the requirements of the *Environmental Protection Act 1994.*

Other Wastes

(E4-1) The only wastes that may be disposed of on site are those authorised under this environmental authority.

General Waste Disposal

(E5-1) All waste (other than mined waste rock and tailings or their derivatives) produced as part of the mining operation must be transported to the Georgetown licensed waste disposal facility and disposed of correctly at a minimum on a weekly basis.

(E5-2) The environmental authority holder shall not cause, allow or permit any waste generated outside the mine to be received at the mine for storage, treatment, processing or disposal.

Tailings Management

(E6-1) Construction of the tailings storage facility must be in accordance with the following:

(a) the design criteria set out under Schedule G and Water Management Plan of the tailings dam; and

(b) all investigation and exploration drill holes in the area of the tailings storage facility must be backfilled with concrete to the total depth of the hole.

(E6-2) The reclamation of tailings from the tailings storage facility for processing on site must be:

(a) located in the area identified in Schedule I - Map 9 (Dry Stack Tailings Project Layout); and

(b) not exceed an area of 18 hectares.

(E6-3) Tailings disposal must be in accordance with the following:

(a) all tailings material must be progressively characterised during disposal for net acid producing potential (NAPP) and the following contaminants: arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, tin, zinc and fluoride;

(b) tailings characterisation must be undertaken at a minimum rate of 8 regularly spaced samples per 100,000 tonnes of tailings material discharged;

(c) records must be kept of the tailings disposal to indicate locations and characteristics of tailings stored

within the tailings storage facility;

(d) where the net acid producing potential of tailings material has not been conclusively determined geochemical kinetic testing must be conducted to indicate oxidation rates, potential reaction products and effectiveness of control strategies; and

(e) maximum duration of surface exposure of potentially acid producing tailings to oxidising conditions is one (1) month.

(E6-4) The tailings dam liquor must be sampled for total and WAD cyanide fortnightly.

(E6-5) WAD cyanide concentrations in the tailings surface liquor must not exceed 50mg/l.

(E6-6) The environmental authority holder must immediately commence cyanide destruction if total cyanide concentrations in the tailings surface liquor exceed 10mg/l.

(E6-7) A cyanide balance must be prepared and updated monthly to ensure that cyanide treatment and recovery is maximised.

Waste Rock Management

(E7-1) The holder of the environmental authority must develop and include in the plan of operations a waste rock management plan, together with the certification of an appropriately qualified person that the plan is compliant with the conditions in this environmental authority and in accordance with best practice environmental management. The waste rock management plan must incorporate the following items;

(a) effective characterisation of the waste rock and spoil to predict under the proposed placement and disposal strategy the quality of runoff and seepage generated concerning potentially environmentally significant effects including salinity, acidity, seepage, leachate, alkalinity and dissolved metals, metalloids and non-metallic inorganic substances;

(b) a program of progressive sampling and characterisation to identify dispersive and non-dispersive spoil and the salinity, acid and alkali producing potential and metal concentrations of waste rock;

(c) a materials balance and disposal plan demonstrating how potentially acid forming and acid forming waste rock will be selectively placed and/or encapsulated to minimise the potential generation of acid mine drainage;

(d) where relevant, a sampling program to verify encapsulation and/or placement of potentially acid forming and acid forming waste rock;

(e) how often the performance of the plan will be assessed;

(f) the indicators or other criteria on which the performance of the plan will be assessed;

(g) a rehabilitation strategy that must be in accordance with the administering authority's *Guideline for Rehabilitation Requirements for Mining Projects* to ensure waste rock dumps are safe, non polluting, self sustaining and geotechnical and geochemical stable; and

(h) monitoring or rehabilitation, research and/or trials to verify the requirements and methods for decommissioning and final rehabilitation of the placed materials, including the prevention and management of acid mine drainage, erosion minimisation and establishment of vegetation cover.

(E7-2) Research undertaken in accordance with condition number (E7-1) must be finalised at least 36 months prior to mine closure.

Waste Rock

(E8-1) Waste rock dumps must be constructed to prevent any water other than incidental rainfall from entering the waste rock dump.

(E8-2) Any seepage from waste rock dumps on ML3409, ML3540, ML3591, ML3548 and ML30203 must be effectively intercepted and treated at the licensed place.

(E8-3) All seepage from waste rock dumps located on ML3374 must be captured and discharged to the open pit.

(E8-4) No ore or waste rock characterised as having acid forming potential can be mined or disposed of as part of the mining activity.

END OF CONDITIONS FOR SCHEDULE E

Environmental Protection Act 1994

Environmental authority EPML00899813

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Schedule F – Land

Rehabilitation Landform Criteria

(F1-1) All areas significantly disturbed by mining activities must be rehabilitated to a stable landform with a self-sustaining vegetation cover in accordance with Schedule F – Table F1 and F2.

Table F1 (Final Land Use and Rehabilitation Approval Schedule)

Item	Pits	Pits (previously rehabilitated)	Waste Dumps	TSF and Western Cutback	Infrastructure, ROM and soil stockpile	Roads & tracks	Raw water pond
Tenure ID	**ML3548 ML30203 ML3409 ML3374**	**ML3540 ML3591**	**ML 3548, ML30203 ML3374**	**ML3540**	**ML3540 ML3374**	**ML3548 ML30203 ML3409 ML3374 ML3358 ML3591 ML3409 ML30192 ML30193 ML30195 ML30196 ML30201**	**ML3540**
Projective surface area (ha)	7	33	9.5	11.3	8.8	10	1
Post mine land use	Void	Grazing/Native Bushland	Grazing/Native Bushland	Grazing/ Native Bushland	Grazing/ Native Bushland	Grazing/ Native Bushland	Grazing and stock watering
Post mine land classification	VIII	No more than 10% of all disturbed land is class VII	No more than 30% of all disturbed land is class VII	No more than 10% of all disturbed land is class VII	No more than 10% of all disturbed land is class VII	No more than 30% of all disturbed land is class VII	VII
Cover (%)	N/A	60	60	60	60	60	N/A
Species	N/A	Native shrubs, tree and groundcover species	Native shrubs, tree and groundcover species	Native shrubs, tree and groundcover species	Native shrubs, tree and groundcover species	Native shrubs, tree and groundcover species	N/A

Table F2 (Landform Design)

Disturbance Type	Slope Range (%)	Projective Surface Area (ha)
Residual void Black Blow	N/A	1
Residual void Electric Light		1.4
Residual void Red Dam		2.6
Residual void Jubilee Plunger		2
Waste Dump Electric Light – upper surface	<2	0.4
Waste Dump Electric Light – batters	20	0.1
Waste Dumps Red Dam – upper surface	<2	2
Waste Dumps Red Dam – batters	20	0.5
Waste Dump Jubilee Plunger	20	6.5
Previously back-filled pits and TSF - rehabilitated	<5	33
TSF - upper surface and Western Cutback	<2	9.8
TSF – batters	30-35	1.5
Infrastructure, ROM, soil stockpile	1 to 7	8.8
Raw water pond	N/A	1
Internal roads and pipelines	Natural slopes	10

(F1-2) Progressive rehabilitation must commence when operational areas become available in accordance with the plan of operations.

(F1-3) Rehabilitated areas must be managed to minimise the proliferation of species not consistent with rehabilitation objectives.

(F1-4) All land subject to mining activities must be rehabilitated to:

(a) a stable landform and with a self-sustaining vegetation cover and species that are similar to adjoining undisturbed areas;

(b) a safe landform, which is non-polluting, geo-chemically and geo-technically stable.

(c) ensure that all land is reinstated to the pre-disturbed land use and suitability class (excluding open pits);

(d) ensure that the maintenance requirements for rehabilitated land is no greater than that required for the land prior to its disturbance by mining activities; and

(e) ensure that the water quality of any residual void or water bodies constructed by mining activities meets criteria for subsequent uses and does not have potential to cause environmental harm.

(F1-5) Maintenance of rehabilitated areas must take place to ensure and demonstrate:

(a) stability of landforms;

(b) erosion control measures remain effective;

(c) stormwater runoff and seepage from rehabilitated areas does not negatively affect the environmental values of any waters;

(d) plants show healthy growth and recruitment is occurring; and

(e) rehabilitated areas are free of any declared pest plants.

(F1-6) Rehabilitation can be considered successful when:

(a) the site can be managed for its designated land-use (e.g. similar to that of surrounding undisturbed areas);

(b) no greater management input than for other land in the area being used for a similar purpose is required and there is evidence that the rehabilitation has been successful for at least three (3) years;

(c) the rehabilitation is carried out in accordance with the goals, objectives indicators and completion criteria as specified in Schedule F – Table F1 and F2 and in the Post Mine Land Use Plan; and

(d) written agreement is obtained from the landowner/holder and administering authority.

(F1-7) Topsoil and subsoils must be stripped and stockpiled ahead of mining to a depth determined from soil surveys to ensure that useable soil resources are preserved for rehabilitation.

(F1-8) When topsoil is stored in stockpiles it should be in a manner that ensures stability. Measures must include:

(a) vegetating stockpiles;

(b) minimising the height of stockpiles; and

(c) re-using stockpiles as soon as possible.

Post Mine Land Use Plan

(F2-1) The Post Mine Land Use Plan must be included in the plan of operations by 1 March 2011 and updated with each subsequent plan of operations, describing how the rehabilitation objectives in Schedule F – Table F1 and landform design criteria in Schedule F – Table F2 will be achieved. The Post Mine Land Use Plan must include:

(a) schematic representation of final land form inclusive of drainage features;

(b) slope designs;

(c) cover design;

(d) drainage design;

(e) erosion controls proposed on reformed land;

(f) description of experimental design for monitoring of analogue and rehabilitated areas inclusive of statistical design; and

(g) proposed revegetation criteria including:

(i) species diversity, abundance and composition;

(ii) projective cover;

(iii) dry matter production; and

(iv) stocking rates to ensure self-sustaining vegetation is maintained.

(h) proposed revegetation methods inclusive of plant species selection, re-profiling, respreading soil, soil ameliorants/amendments, surface preparation and method of propagation;

(i) materials balance including available top soil and low permeability capping material;

(j) research program and associated milestones;

(k) geotechnical, geochemical and hydrological studies;

(l) chemical, physical and biological properties of soil and water;

(m) clear objectives and success criteria for the each land unit including establishment in accordance with outcomes stipulated in the administering authority's *Guideline for Rehabilitation Requirements for Mining Projects*;

(n) measurable completion criteria for each rehabilitation indicator (for each land unit) that enables determination of rehabilitation success for each disturbance type (or land unit); and

(o) rehabilitation monitoring program.

Rehabilitation Monitoring Program

(**F3-1**) The holder of the environmental authority must conduct a Rehabilitation Monitoring Program on at least a yearly basis, which must include sufficient spatial and temporal replication to enable scientifically justifiable conclusions as established under the rehabilitation program or other methodology to the satisfaction of the administering authority.

(**F3-2**) The rehabilitation monitoring program must be developed by 31 December 2010 and be implemented by a person nominated by the environmental authority holder possessing appropriate qualifications and experience in the field of mine site rehabilitation.

Pest Management

(F4-1) In carrying out the mining activity(ies) the holder of this environmental authority must develop and implement an effective pest management program that includes but is not limited to the following:

(a) identification of pest species and infestation areas;

(b) prevents and/or minimises the introduction and/or spread of pests;

(c) control and management of pest outbreaks as a result of mining activities including measures to ensure that all vehicle movements are controlled to prevent the spread of declared weeds; and

(d) strategies to prevent introduction of declared weeds to the mine site and surrounding areas.

(F4-2) A copy of the pest management program must be made available to the administering authority on request.

Infrastructure

(F5-1) All infrastructure, mining equipment and processing plant constructed by or for the environmental authority holder during the mining activities including water storage structures, must be removed from the site prior to mining lease surrender, except where agreed to in writing by the post mining landholder and the Minister administering the *Mineral Resource Act 1989*.

Contaminated Land

(F6-1) Upon decommissioning the environmental authority holder must undertake a contaminated land assessment / investigation of the licensed place in accordance with the administering authority's *Guidelines for the Assessment & Management of Contaminated Land in Queensland*.

(F6-2) The Run of Mine (ROM) pad at ML3374 (Jubilee Plunger) must be decontaminated and not used for the storage of mined material after 1 December 2011.

Residual Void Outcome

(F7-1) Residual voids must not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer, other than the environmental harm constituted by the existence of the residual void itself, and subject to any other condition within this environmental authority.

(F7-2) Mining voids must be managed during the operation and decommissioning phases to maximise the potential post mine beneficial uses, by consideration of the following:

(a) limiting sulphide exposures in void walls;

(b) capping of sulphide exposures in void base;

(c) limiting period of exposure of sulphides in void walls and base to oxidising conditions;

(d) managing catchment into the void; and

(e) geo-technical stability of final void.

(F7-3) Decommissioning strategies for the final voids must be provided in the plan of operations including the following information:

(a) final potential wall and base rock exposure quality in terms of acid producing potential and levels of environmentally relevant salts and metals;

(b) expected periods of exposure for wall and base rock with acid producing potential;

(c) management options for maximising final void water quality; and

(d) assessment of potential final void water quality.

(F7-4) Decommissioning strategies for the final voids must be updated with each update of the plan of operations.

Post Closure Management Plan

(F8-1) A Post Closure Management Plan for the site must be developed and implemented for a nominal period of:

(a) at least thirty (30) years following final ore processing on site; or

(b) a shorter period if the site is proven to be geo-technically and geo-chemically stable and it can be demonstrated to the satisfaction of the administering authority that no release of contaminants from the site will result in environmental harm and be prepared at least 6 months prior to final ore processing onsite.

(F8-2) The Post Closure Management Plan must include the following elements:

(a) operation and maintenance of:

(i) wastewater collection and reticulation systems;

(ii) wastewater treatment systems;

(iii) the groundwater monitoring network;

(iv) final cover systems; and

(v) vegetative cover.

(b) monitoring of:

(i) surface water quality;

(ii) groundwater quality;

(iii) seepage rates;

(iv) erosion rates;

(v) the integrity and effectiveness of final cover systems; and

(vi) the health and resilience of vegetative cover.

END OF CONDITIONS FOR SCHEDULE F

Environmental Protection Act 1994

Environmental authority EPML00899813

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Schedule G – Dams

All Dams – Location and Limits

(G1-1) Any dam constructed or operated within the operational land must be located within the control points defined in Schedule G - Table G1, below.

Table G1 (Location of All Dams)

Name of Dam	Easting (GDA 94)	Northern (GDA 94)
Tailings Storage Facility	764935 764324 764301 764840	7971567 7971538 7971322 7971248
Red Dam Pit	785887 786549 786552 785866	8014989 8015020 8015102 8015080
Electric Light Pit	772290 772340 772215 772154	7989214 7989197 7988831 7988860
Black Blow Midapa Pit	764911 764974 765028 765027 764971 764917	7971283 7971273 7971300 7971323 7971325 7971313

Note (4): A minimum of 3 control points is required to constrain the location of all activities associated with the dam. Additional infrastructure which forms part of any dam may include appurtenant works consisting of tailings discharge pipelines, seepage collection systems, runoff diversion bunds, containment systems, pressure relief wells, decant and recycle water systems.

(G1-2) The construction or operation of any dam within the operational land must comply with Schedule G - Table G2, below.

Table G2 (Basic Details of All Dams)

Name of Dam	Maximum Surface Area (Ha)	Maximum Volume (m^3)	Maximum Depth (m^2)	Purpose of dam (3)
Tailings Storage Facility	9	320,000	8	Tailings Storage
TSF Western Cutback[5]	2.3	81,000	7	Tailings Storage
Red Dam Pit	2.6	1,200,000	20	Excavated mining void
Electric Light Pit	1.1	576,000	18	Excavated mining void

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Environmental Protection Act 1994

Environmental authority EPML00899813

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Name of Dam	Maximum Surface Area (Ha)	Maximum Volume (m^3)	Maximum Depth (m^2)	Purpose of dam (3)
Black Blow Midapa Pit	0.44	7,000	10	Excavated mining void

Note (1): The name of the dam should refer to the name used in the design plan e.g. process residue facility or decant dam, etc.

Note (2): Where a dam does not incorporate a void, the height of the dam is the difference between the lowest point of the external toe of the dam and the highest point of the dam.

Note (3): Where a dam does incorporate a void, the height of the dam is the difference between the deepest point in the void and the highest point of the dam e.g. where dams are formed partially or fully formed by either excavating below the land surface or backfilling an existing void.

Note (4): Purpose of the dam should outline the designed function, e.g. "the permanent containment of tailings resulting from the extraction of nickel, cobalt and other metals at the XYZ Refinery".

Note (5): The TSF Western Cutback is an integrated cell of the TSF and must only be constructed within the area indicated by Schedule I – Map 10 – TSF Western Cutback and Soil Stockpile authorised bounds.

Standards and Criteria for All Dams

(G2-1) All high hazard dams containing hazardous waste must comply with the *Code of Environmental Compliance for High Hazard Dams Containing Hazardous Waste*.

(G2-2) All low hazard dams containing hazardous waste must comply with the criteria outlined in Appendix B of the *Code of Environmental Compliance for Mining Lease Projects*.

Regulated Dams – Design, Certification and Construction

(G3-1) Prior to commencing construction of a regulated dam, the holder of the environmental authority must submit to the administering authority for acceptance a design plan that has been certified by a suitably qualified and experienced person, as compliant in all respects with this environmental authority, and in accordance with accepted engineering standards.

(G3-2) Prior to commencing construction of a regulated dam, the holder of the environmental authority must submit to the administering authority for acceptance, an operations plan covering the use of all regulated dams on the operational land.

(G3-3) Construction or modification of regulated dams shall be done only in accordance with an accepted design plan.

(G3-4) When construction or modification of a regulated dam is complete, the holder of this environmental authority must submit to the administering authority a set of 'as constructed' drawings, and a certification by a suitably qualified and experienced person that either:

(a) the construction is substantially as per the accepted design plan; or

(b) the suitably qualified and experienced person certifies that the as constructed plan is compliant in all respects with this environmental authority, and in accordance with accepted engineering standards.

High Hazard Dams – Hydraulic Requirements

(G4-1) The design storage allowance on 1st November of each year for any regulated dam constructed or operated within the operational land must comply with Schedule G - Table G3, below.

(G4-2) The design storage allowance for dams specified in Table G3 are a minimum design storage requirement and any releases from any dams must meet the requirements set out under the water schedule.

Table G3 (Storage Design[1] Criteria for Regulated Dams)

Name of Regulated Dam	Design Storage Allowance[2] Critical Wet Period	Spillway Capacity Critical Design Storm[3]	Mandatory[4] Reporting Level
Tailings Storage Facility	1 in 20 AEP, 2-month wet season plus other inputs for the 2-month wet season	1 in 100 AEP	1 in 10 AEP

1 Calculations are to be carried out in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (Queensland Government, 2024).

2 The design storage allowance on 1st November of each year for any regulated dam constructed within the operational land must be sufficient to contain the run-off from the critical wet period - plus the volume of any other inputs to the storage facility during that critical wet period, as part of operations. Such inputs could be tailings, contaminated site waters, process waters, and any other materials.

3 The critical storm has a duration that produces the peak discharge for the catchment.

4 The level below spillway crest that can accommodate runoff from a 72 hour storm at the specified AEP, or the wave allowance at the specified AEP - whichever level is lower.

NOTE: AEP means Annual Exceedance Probability – being the probability that at least one event as specified will occur in a particular year.

(G4-3) The spillway for any regulated dam, constructed or operated within the operational land must be designed and maintained to withstand the peak flow from the spillway capacity critical design storm defined in Schedule G - Table G3.

(G4-4) The holder of the environmental authority must mark the mandatory reporting level defined in Schedule G - Table G3 on the spillway of all regulated dams within the operational land.

(G4-5) The holder of the environmental authority must notify the administering authority when the water level of any regulated structure, reaches the mandatory reporting level defined in Schedule G - Table G3.

(G4-6) A water management strategy for the licensed place will be prepared for and included in the plan of operations. The strategy must include:

(a) data collation and identify existing data requirements;

(b) the approach to water management in the context of the project development schedule;

(c) a water balance/water quality model to optimize the overall system and individual components;

(d) design and detail additional works as required; and

(e) implement/construct additional works according to a documented schedule.

(G4-7) Annual review of the water management strategy must be submitted by the end October of each year.

Regulated Dams - Inspection

(G5-1) Regulated dams shall be inspected by a suitably qualified and experienced person on or about 1 September, but definitely before 1 November each year.

(G5-2) Regulated dams shall also be inspected by a suitably qualified and experienced person, if at any time unusual conditions are observed by the holder of this environmental authority, or their agent.

(G5-3) The inspection shall include a review of the hazard assessment of all dams in Table 1 of Schedule G of this environmental authority.

(G5-4) For each inspection, the suitably qualified and experienced person shall assess the condition of each regulated dam and its foundations, determine the hydraulic adequacy of the regulated dam and assess the adequacy of the works with respect to dam safety.

(G5-5) For each inspection, two copies of a report by the suitably qualified and experienced person, including any recommendations as to measures to be taken to ensure the integrity of each regulated dam, shall be furnished to the administering authority within 28 days of the inspection.

Decommissioning of the Tailings Storage Facility and Other Dams – Objective

(G6-1) The environmental authority holder must, prior to surrender of the mining leases on which the tailings storage facility is located, implement either:

a) a plan for de-commissioning the dams such that, amongst other things, water will no longer be stored in the dams, the dams and their contents will be structurally stable and resistant to erosion and any seepage or other emissions will not cause environmental harm; or
b) a site management plan for the continued operation and maintenance of the dams.

Decommissioning of the Tailings Storage Facility and Other Dams – Documentation and Compliance

(G7-1) Decommissioning activities for dams must be documented. Where the detailed documentation is not already contained in the design plan for the dam, the detailed documentation is considered to be an amendment to the design plan and must be submitted as an amendment to the design plan required by the *Code of Environmental Compliance for High Hazard Dams Containing Hazardous Waste*.

End of Life of Dam Criteria – Transfer to Contaminated Land

(G8-1) Dams containing hazardous waste must not be abandoned, and must be dealt with in accordance with the conditions of this environmental authority.

Commencement of Mining Activities

(G9-1) Prior to the commencement of any metallurgical extraction on ML3409, ML3540 and ML3591, the tailings storage facility identified in Schedule G Table G1 must be fully lined or alternatively, enough information be supplied to the administering authority in order for it to make a decision regarding the migration of TSF liquor along known fault zones located underneath the base of the structure.

Note: Metallurgical extraction is defined as: any treatment of gold bearing ores by chemical or physical processes that destroys the crystallographic bond in order to recover the sought after element or compound.

(G9-2) In accordance with condition (G9-1) the administering authority will review information supplied by the environmental authority holder and give approval for any metallurgical extraction to commence only once it is satisfied TSF liquor will not migrate alone fault zones to the west of the operation.

END OF CONDITIONS FOR SCHEDULE G

Schedule H – Definitions

"acceptance criteria" means the measures by which the actions implemented to rehabilitate the land are deemed to be complete. The acceptance criteria indicate the success of the rehabilitation outcome or remediation of areas which have been significantly been disturbed by the mining activities. Acceptance criteria may include information regarding:

(a) vegetation establishment, survival and succession;

(b) vegetation productivity, sustained growth and structure development;

(c) fauna colonisation and habitat development;

(d) ecosystem processes such as soil development and nutrient cycling, and the recolonisation of specific fauna groups such as collembola, mites and termites which are involved in these processes;

(e) microbiological studies including recolonisation by mycorrhizal fungi, microbial biomass and respiration;

(f) effects of various establishment treatments such as deep ripping, topsoil handling, seeding and fertiliser application on vegetation growth and development;

(g) resilience of vegetation to disease, insect attack, drought and fire;

(h) vegetation water use and effects on ground water levels and catchment yields.

"acid rock drainage" means any low pH waters, contaminated as a result of the mining activities.

"ambient (or total) noise" at a place, means the level of noise at the place from all sources (near and far), measured as the Leq for an appropriate time interval.

"Annual Exceedance Probability" or **"AEP"** means the probability that at least one event in excess of a particular magnitude will occur in any given year.

"ANZECC 2000" means Australian and New Zealand Environment Conservation Council Marine and Freshwater Quality Guidelines.

"authority" means environmental authority (mining activities) under the *Environmental Protection Act 1994*.

"background" means the average of samples taken prior to the commencement of mining from the same waterway that the current sample has been taken.

"chemical" means:

(a) an agricultural chemical product or veterinary chemical product within the meaning of the *Agricultural and Veterinary Chemicals Code Act 1994* (Commonwealth); or

(b) a dangerous good under the Australian Code for the Transport of Dangerous Goods by Road and Rail approved by the Australian Transport Council; or

(c) a lead hazardous substance within the meaning of the *Workplace Health and Safety Regulation 1997*;

(d) a drug or poison in the Standard for the Uniform Scheduling of Drugs and Poisons prepared by the Australian Health Ministers' Advisory Council and published by the Commonwealth; or

(e) any substance used as, or intended for use as:

(i) a pesticide, insecticide, fungicide, herbicide, rodenticide, nematocide, miticide, fumigant or related

product; or

(ii) a surface active agent, including, for example, soap or related detergent; or

(iii) a paint solvent, pigment, dye, printing ink, industrial polish, adhesive, sealant, food additive, bleach, sanitiser, disinfectant, or biocide; or

(iv) a fertiliser for agricultural, horticultural or garden use; or

(v) a substance used for, or intended for use for mineral processing or treatment of metal, pulp and paper, textile, timber, water or wastewater; or

(vi) manufacture of plastic or synthetic rubber.

"commercial place" means a work place used as an office or for business or commercial purposes, which is not part of the mining activity and does not include employees' accommodation or public roads.

"competent person" means a person with the demonstrated skill and knowledge required to carry out the task to a standard necessary for the reliance upon collected data or protection of the environment.

"contaminant" can be a gas, liquid or solid; or an odour; or an organism (whether alive or dead), including a virus; or energy, including noise, heat, radioactivity and electromagnetic radiation; or a combination of contaminants

"contaminated" means the substance has come into contact with a contaminant.

"control measure" means any action or activity that can be used to prevent or eliminate a hazard or reduce it to an acceptable level.

"dam" means a containment or proposed containment whether permanent or temporary, which is designed to contain, divert or control flowable substances. However this does not include a fabricated or manufactured tank or container designed to a recognised standard.

"design plan" in the context of a dam design is the documentation required under the Code of Environmental Compliance for High Hazard Dams Containing Hazardous Waste to describe the physical dimensions of the dam, the materials and standards to be used for construction of the dam, the procedures and criteria to be used for operating the dam and the decommissioning and rehabilitation objectives in terms procedures, works and outcomes at the end of dam life. The documents can include design and investigation reports, drawings, specifications and certifications.

"EC" means electrical conductivity.

"environmental authority holder" means the holder of this environmental authority.

"flowable substance" means matter or mixture of materials which can be forced to or otherwise flow under any conditions possible in a situation. It includes water, other liquids or a mixture that includes water or any other liquid or suspended solids.

"geochemical assessment" means establishing all elements present in the ore material and their likelihood to produce acid, saline or neutral mine drainage.

"hazardous waste" means any substance, whether liquid, solid or gaseous, derived by or resulting from, the processing of minerals that tends to destroy life or impair or endanger health.

"infrastructure" means water storage dams, roads and tracks, buildings and other structures built for the purpose of mining activities but does not include facilities required for the long term management of mining impacts or the

protection of potential resources. Such facilities include dams containing hazardous waste, waste rock dumps, voids, or ore stockpiles and buildings or other structures whose ownership can be transferred and which have a residual beneficial use for the next owner of the operational land or the background land owner.

"land" in the "land schedule" of this document means land excluding waters and the atmosphere.

"land capability" has the meaning as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

"land suitability" has the meaning as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

"land use" means the term to describe the selected post mining use of the land, which is planned to occur after the cessation of mining operations.

"mandatory reporting level" means the volume below the spillway crest, equivalent to the lower of the AEP, 72 hour storm or the AEP wave allowance (AEP is the annual exceedance probability).

"measures" includes any measures to prevent or minimise environmental impacts of the activity such as bunds, silt fences, diversion drains, capping, and containment systems.

"metaliferous mine drainage" means any waters, contaminated with metals / metalloids or other contaminants as a result of the mining activities.

"mg/L" means milligrams per litre.

"mineral" means a substance which normally occurs naturally as part of the earth's crust or is dissolved or suspended in water within or upon the earth's crust and includes a substance which may be extracted from such a substance, and includes—

(a) clay if mined for use for its ceramic properties, kaolin and bentonite;

(b) foundry sand;

(c) hydrocarbons and other substances or matter occurring in association with shale or coal and necessarily mined, extracted, produced or released by or in connection with mining for shale or coal or for the purpose of enhancing the safety of current or future mining operations for coal or the extraction or production of mineral oil there from;

(d) limestone if mined for use for its chemical properties;

(e) marble;

(f) mineral oil or gas extracted or produced from shale or coal by in situ processes;

(g) peat;

(h) salt including brine;

(i) shale from which mineral oil may be extracted or produced;

(j) silica, including silica sand, if mined for use for its chemical properties;

(k) rock mined in block or slab form for building or monumental purposes;

(l) but does not include—

(m) living matter;

(n) petroleum within the meaning of the Petroleum Act 1923;

(o) soil, sand, gravel or rock (other than rock mined in block or slab form for building or monumental purposes) to be used or to be supplied for use as such, whether intact or in broken form; or

(p) water.

"ML" means megalitres.

"mL" means millilitres.

"natural flow" means the flow of water through waters caused by nature.

"no-release works" means sewage treatment works from which neither solid nor liquid contaminants are released to the environment, whether from inside or outside the works.

"offensive" means causing reasonable offence or displeasure; is disagreeable to the sense; disgusting, nauseous or repulsive, other than trivial harm.

"oxide ore" means fully oxidised rock which has no acid forming potential.

"ore or waste rock characterised as having acid forming potential" means any rock with either a Net Acid Producing Potential of greater than 5 kg of H_2SO_4/tonne or a Net Acid Generation oxidation pH of less than 4.5 (pH unit).

"peak particle velocity (ppv)" means a measure of ground vibration magnitude which is the maximum rate of change of ground displacement with time, usually measured in millimetres/second (mms^{-1}).

"protected area" means a protected area under the *Nature Conservation Act 1992*; or

(a) a marine park under the *Marine Parks Act 1992*; or

(b) a World Heritage Area.

"progressive rehabilitation" means rehabilitation (defined below) undertaken progressively or a staged approach to rehabilitation as mining operations are ongoing.

"reference site" (or analogue site) may reflect the original location, adjacent area or another area where rehabilitation success has been completed for a similar biodiversity. Details of the reference site may be as photographs, computer generated images and vegetation models etc.

"rehabilitation" means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.

"receiving environment" means all groundwater, surface water, land, and sediments that are not disturbed areas authorised by this environmental authority.

"receiving waters" means all groundwater and surface water that are not disturbed areas authorised by this environmental authority.

"representative" means a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the mining activities.

"residual void" means an open pit resulting from the removal of ore and/or waste rock which will remain following

the cessation of all mining activities and completion of rehabilitation processes.

"self-sustaining" means an area of land which has been rehabilitated and has maintained the required acceptance criteria without human intervention for a period nominated by the administering authority.

"sensitive place" means

(a) a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises;

(b) a motel, hotel or hostel;

(c) an educational institution;

(d) a medical centre or hospital;

(e) a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 1992* or a World Heritage Area; or

(f) a public park or gardens.

"significant disturbance" - includes land;

(a) if it is contaminated land; or

(b) it has been disturbed and human intervention is needed to rehabilitate it;

(i) to a state required under the relevant environmental authority; or

(ii) if the environmental authority does not require the land to be rehabilitated to a particular state - to its state immediately before the disturbance.

Some examples of disturbed land include:

(a) areas where soil has been compacted, removed, covered, exposed or stockpiled;

(b) areas where vegetation has been removed or destroyed to an extent where the land has been made susceptible to erosion; (vegetation & topsoil)

(c) areas where land use suitability or capability has been diminished;

(d) areas within a watercourse, waterway, wetland or lake where mining activities occur;

(e) areas submerged by tailings or hazardous contaminant storage and dam walls in all cases;

(f) areas under temporary infrastructure. Temporary infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dams, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be removed after mining activities have ceased; or

(g) areas where land has been contaminated and a suitability statement has not been issued.

However, the following areas are not included:

(a) areas off lease (e.g. roads or tracks which provide access to the mining lease);

(b) areas previously significantly disturbed which have achieved the rehabilitation outcomes;

(c) by agreement with the EPA, areas previously significantly disturbed which have not achieved the

rehabilitation objective(s) due to circumstances beyond the control of the mine operator (such as climatic conditions);

(d) areas under permanent infrastructure. Permanent infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dams, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be left by agreement with the landowner. The agreement to leave permanent infrastructure must be recorded in the Landowner Agreement and lodged with the EPA;

(e) disturbances that pre-existed the grant of the tenure unless those areas are disturbed during the term of the tenure.

"spillway" means a passage or outlet from the dam through which surplus water flows.

"stable" means land form dimensions are or will be stable within tolerable limits now and in the foreseeable future. Stability includes consideration of geotechnical stability, settlement and consolidation allowances, bearing capacity (traffic ability), erosion resistance and geochemical stability with respect to seepage and contaminant generation.

"suitably qualified and experienced person" means a person who is a Registered Professional Engineer of Queensland under the provisions of the *Professional Engineers Act 1988* or a Corporate Member of the Institution of Engineers Australia or holds equivalent professional qualifications and has the following:

(a) knowledge of engineering principles related to the structures, geomechanics, hydrology, hydraulics, chemistry and environmental impact of dams; and

(b) at least a total of five years of suitable experience and demonstrated expertise in at least four of the following areas:

(i) investigation, design or construction of dams;

(ii) operation and maintenance of dams;

(iii) geomechanics with particular emphasis stability, geology and geochemistry;

(iv) hydrology with particular reference to flooding, estimation of extreme storms, water management or meteorology;

(v) hydraulics with particular reference to sediment transport and deposition, erosion control, beach processes;

(vi) hydrogeology with particular reference to seepage, groundwater,

(vii) solute transport processes and monitoring thereof; or

(viii) dam safety.

"tolerable limits" means that a range of values could be accepted to achieve an overall environmental management objective (eg a range of settlement of a tailing capping could still meet the objective of draining the cap quickly, preventing pondage and limiting infiltration and percolation).

"trivial harm" means environmental harm which is not material or serious environmental harm and will not cause actual or potential loss or damage to property of an amount of, or amounts totalling more than $5,000.

"saline mine drainage" means the movement of waters contaminated with salt(s) as a result of the mining activity.

"watercourse" means a river, creek or stream in which water flows permanently or intermittently in a visibly defined channel (natural, artificial or artificially improved) with:

(a) continuous bed and banks;

(b) an extended period of flow for some months after rain ceases, and

(c) an adequacy of flow that sustains basic ecological processes and maintains biodiversity.

"waters" includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, and groundwater and any part thereof.

"water release event" means release of any waters that are or may be contaminated by the mining activity.

END OF SCHEDULE H

Environmental Protection Act 1994

Environmental authority EPML00899813

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Schedule I – Maps

Map 1 – Location Map



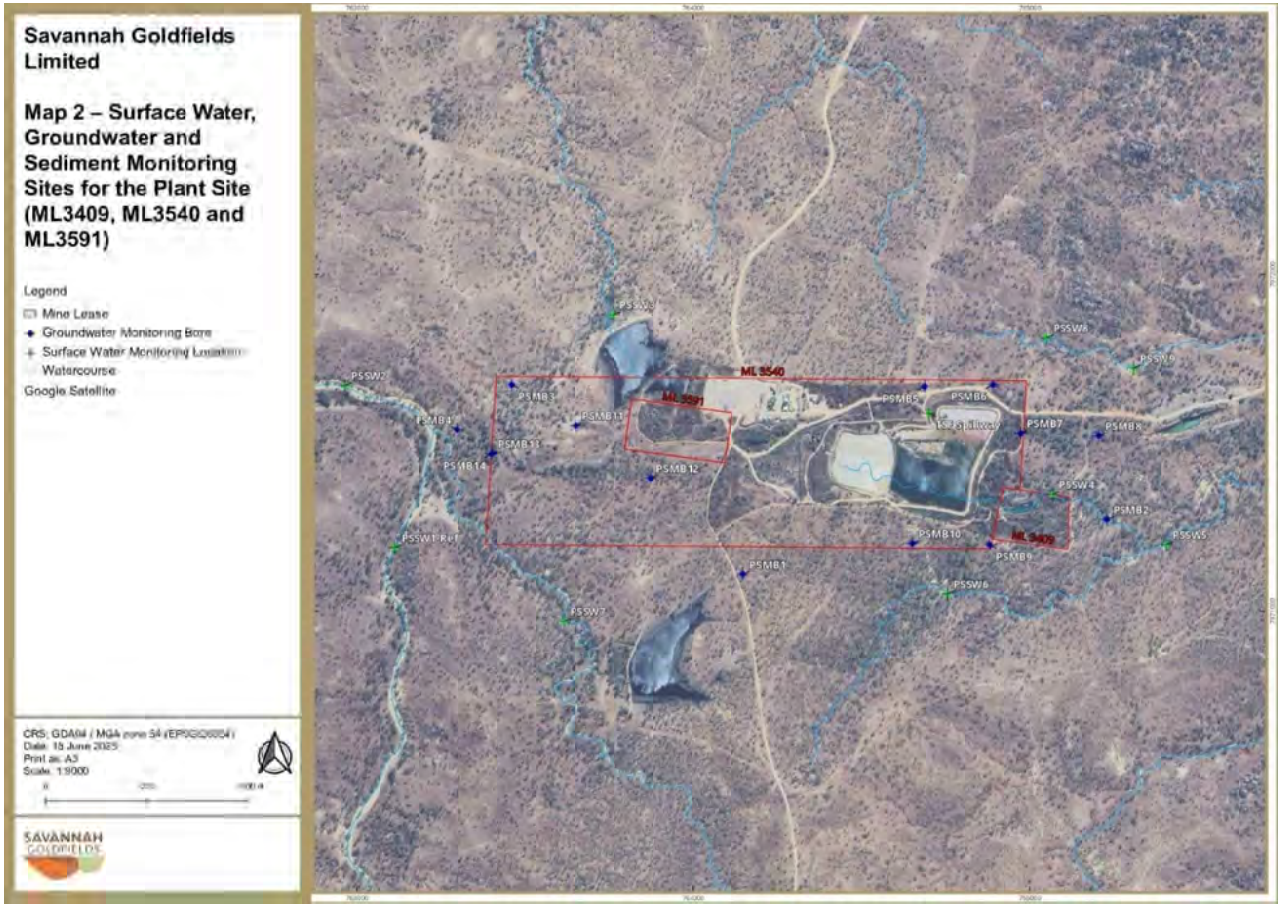
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Environmental Protection Act 1994

Environmental authority EPML00899813

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Map 2 – Surface Water, Groundwater and Sediment Monitoring Sites for the Plant Site (ML3409, ML3540 and ML3591)

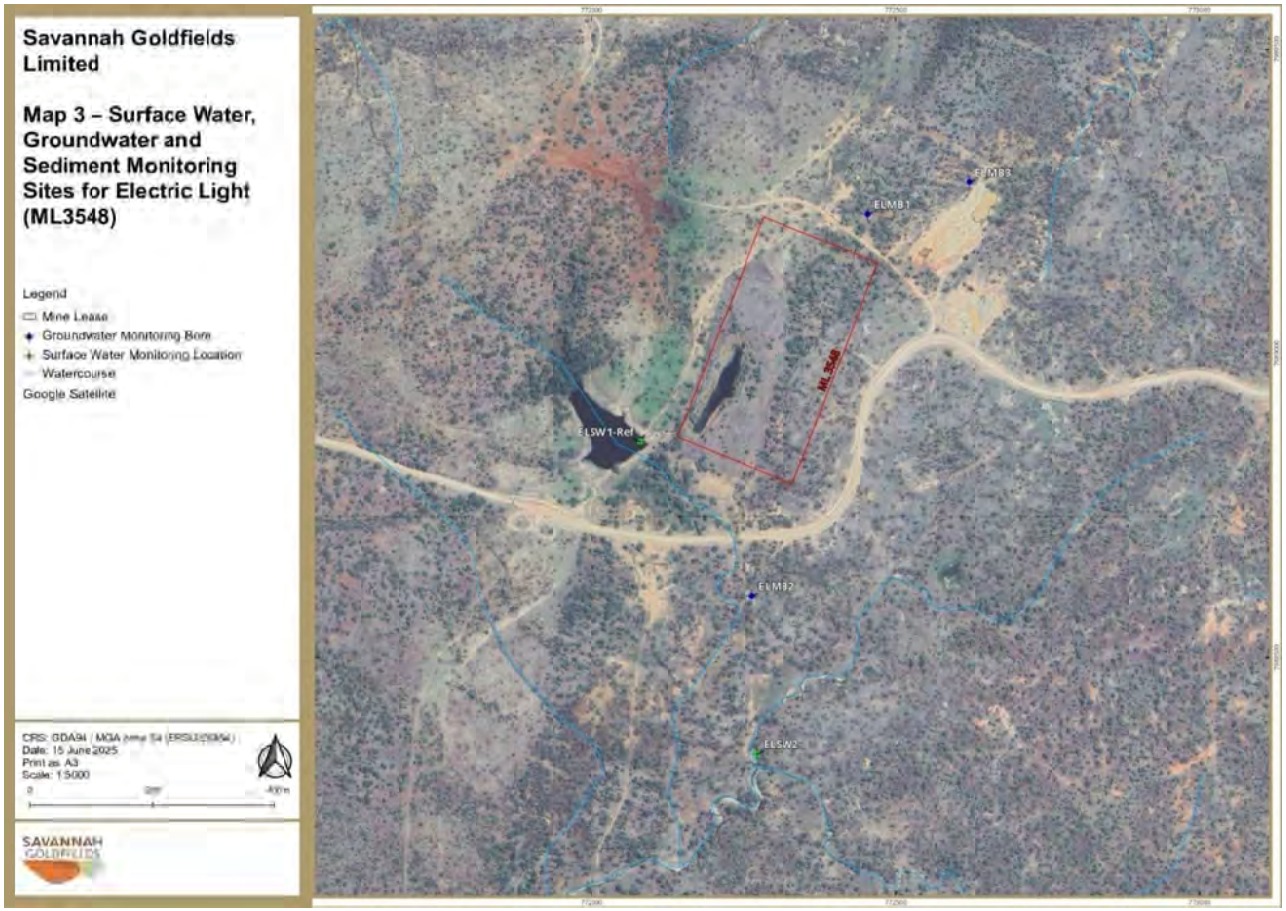


Environmental Protection Act 1994

Environmental authority EPML00899813

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Map 3 – Surface Water, Groundwater and Sediment Monitoring Sites for Electric Light (ML3548)

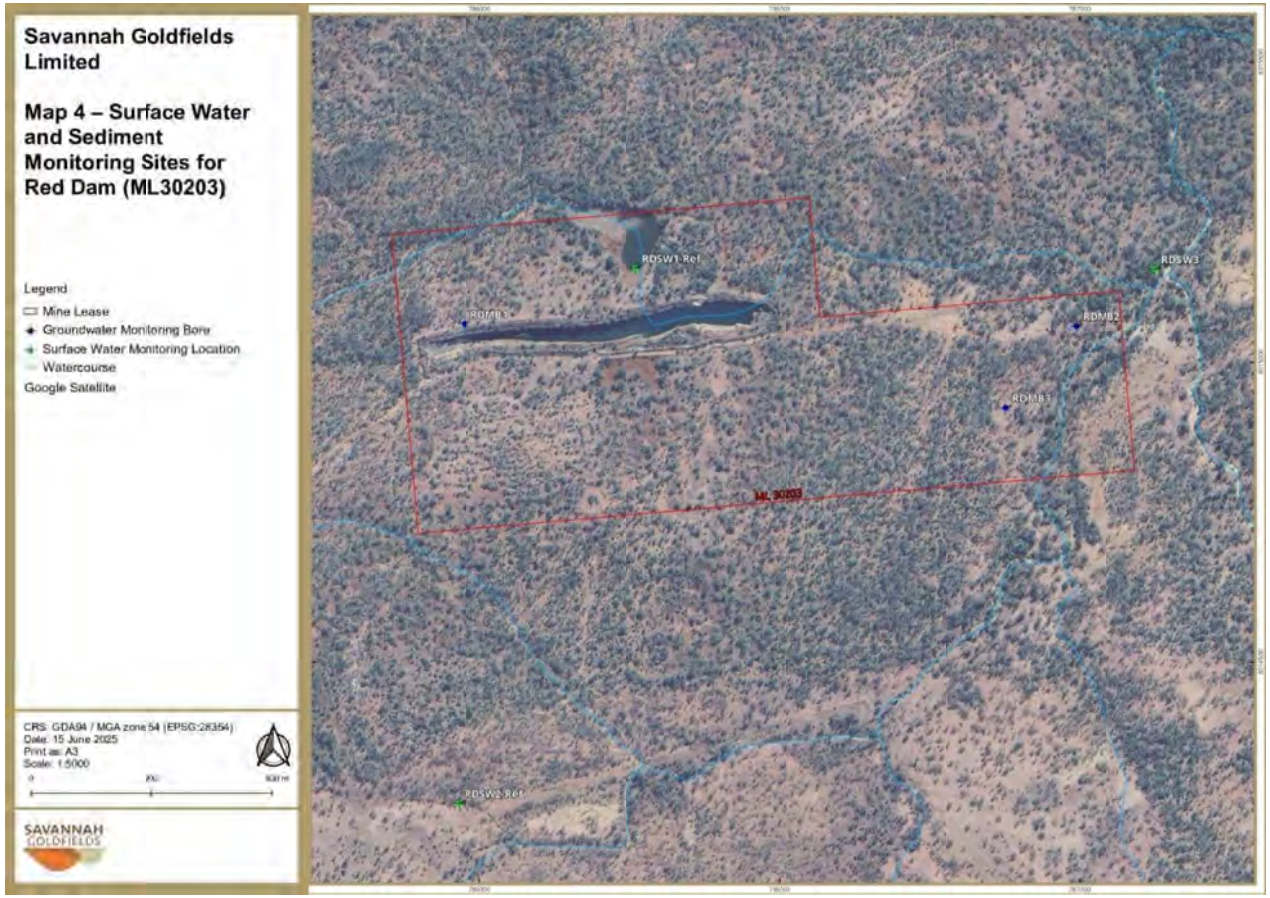


Environmental Protection Act 1994

Environmental authority EPML00899813

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Map 4 – Surface Water and Sediment Monitoring Sites for Red Dam (ML30203)

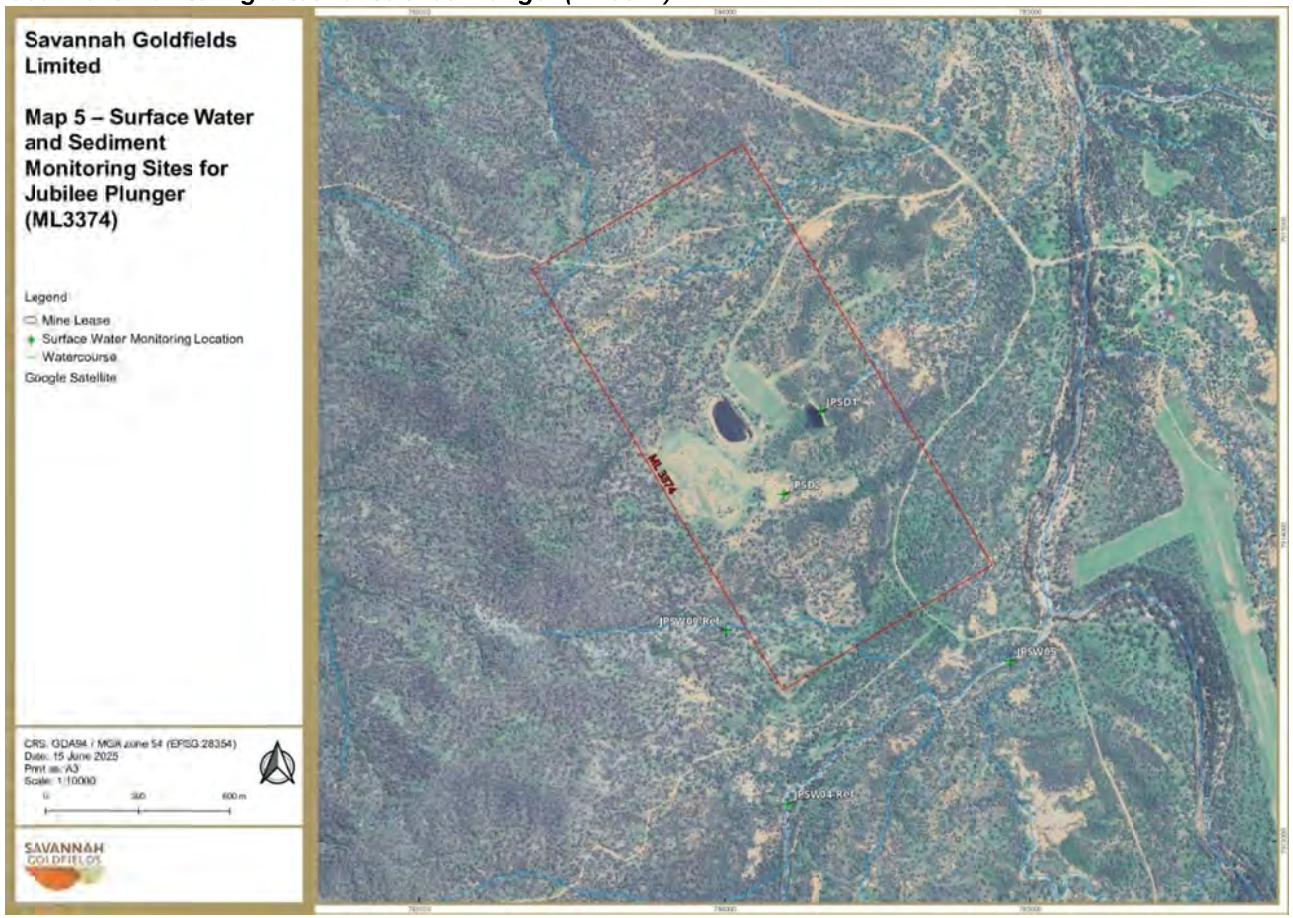


Environmental Protection Act 1994

Environmental authority EPML00899813

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Map 5 – Surface Water and Sediment Monitoring Sites for Jubilee Plunger (ML3374)

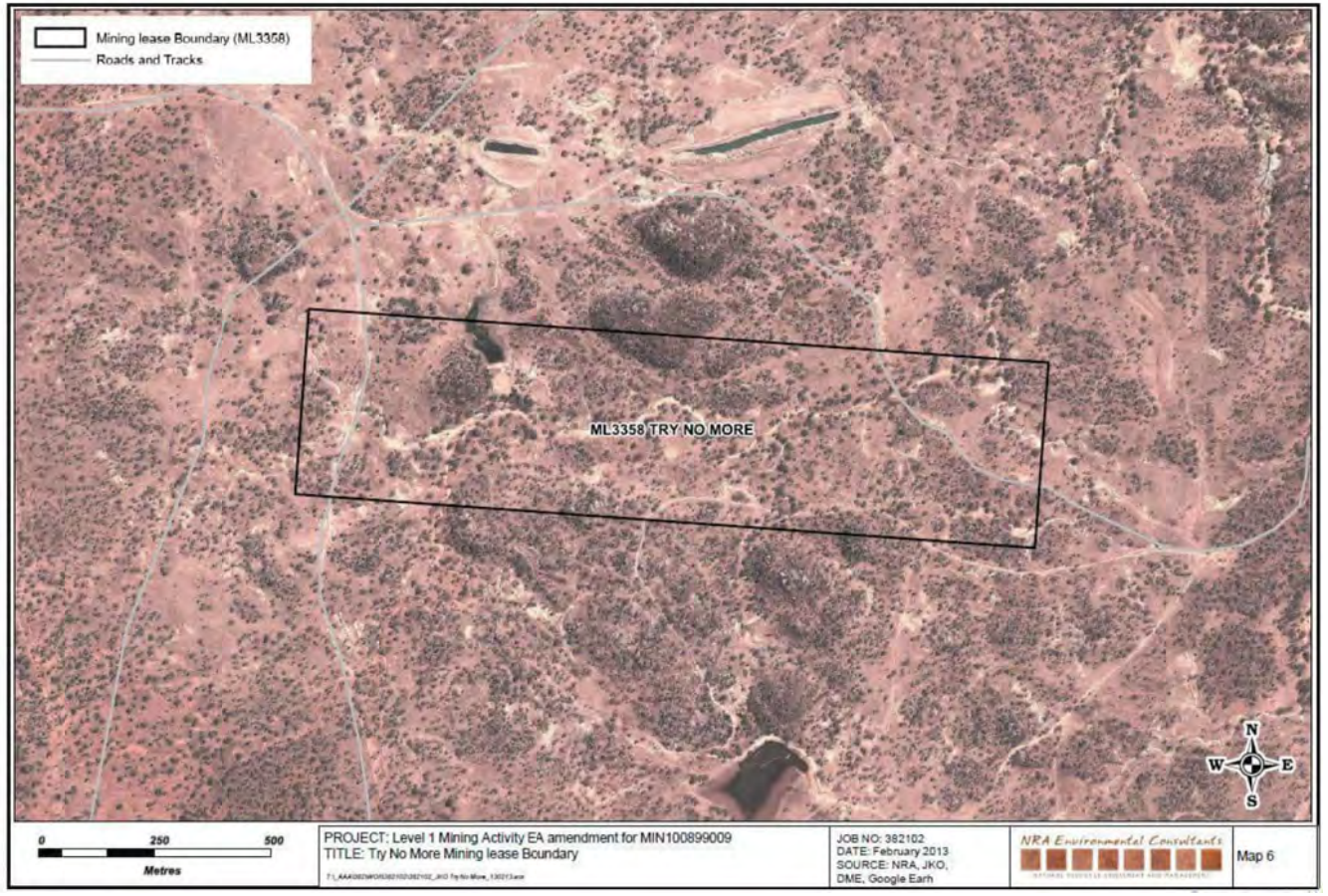


Environmental Protection Act 1994

Environmental authority EPML00899813

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Map 6 – Try No More (ML3358)

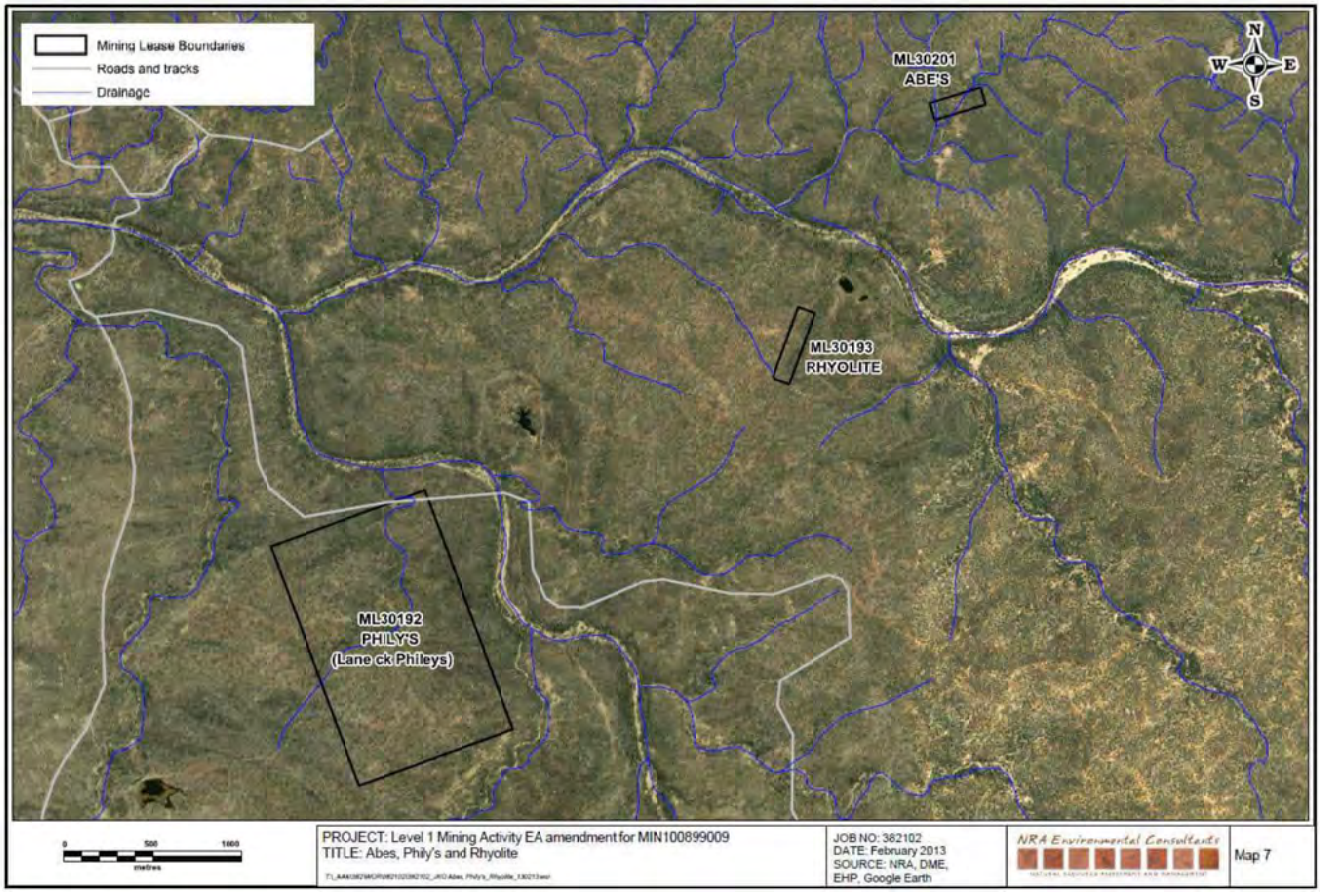


Environmental Protection Act 1994

Environmental authority EPML00899813

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Map 7 – Phily's (ML30192) and Rhyolite (ML30193) and Abe's (ML30201)



Environmental Protection Act 1994

Environmental authority EPML00899813

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Map 8 – Tom's (ML30195), Sir William Alfred (ML30196) and Silver Queen (ML30197)

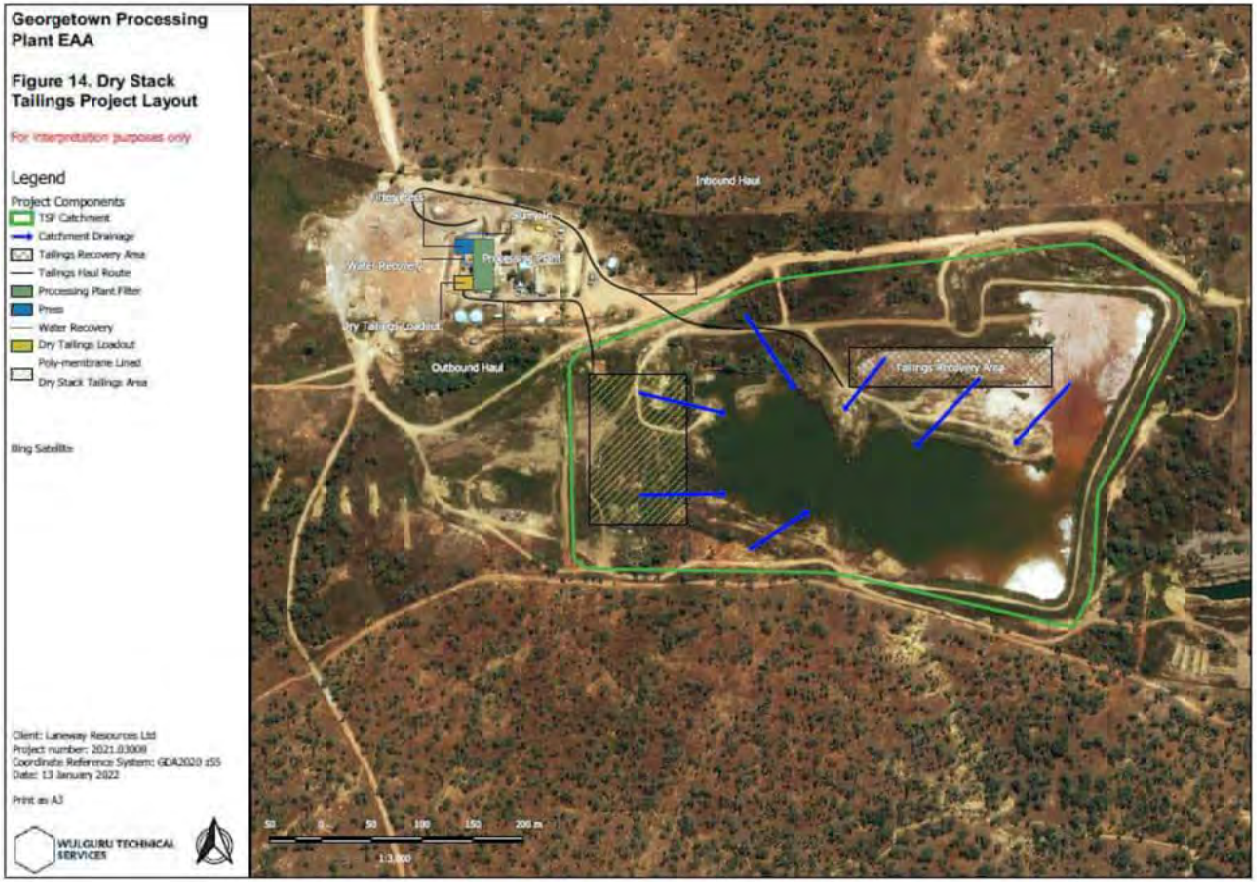


Environmental Protection Act 1994

Environmental authority EPML00899813

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Map 9 – Dry Stack Tailings Project Layout

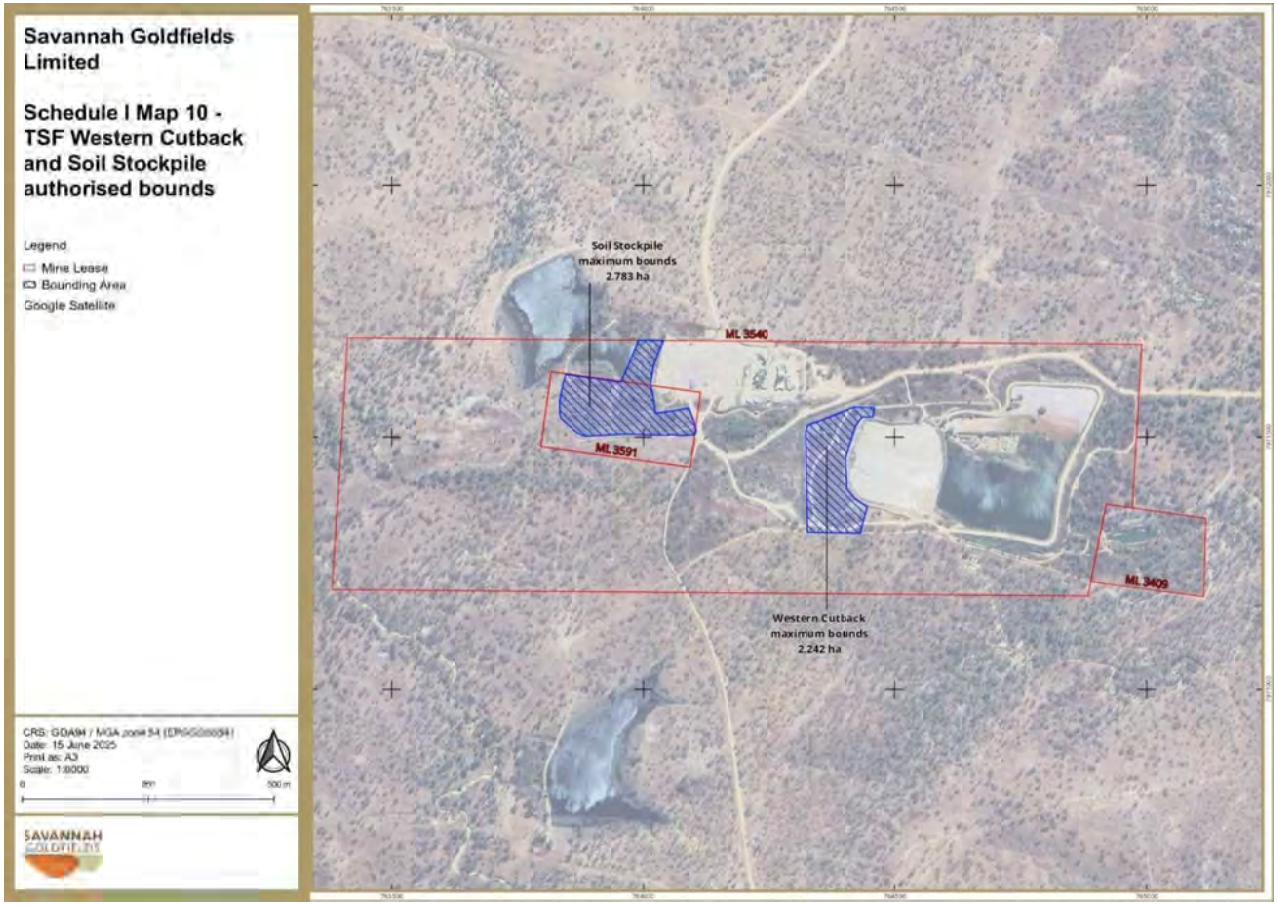


Environmental Protection Act 1994

Environmental authority EPML00899813

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Map 10 – TSF Western Cutback and Soil Stockpile Authorised Bounds



END OF SCHEDULE I

END OF ENVIRONMENTAL AUTHORITY

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KEMPTON MINERALS PTY LTD

Appendix 6 2013 Test Pit Logs

TEST PIT NUMBER TP02

ATC Williams
GROUNDED IN DESIGN

ATC Williams Pty Ltd
222-225 Beach Road, Mordialloc, VIC 3195
Tel: (03) 8587 0900 Fax: (03) 8587 0901
email: mel@atcwilliams.com.au

CLIENT CGM **PROJECT NAME** GEORGETOWN TSF

JOB NUMBER 111301-10 **PROJECT LOCATION**

DATE STARTED 4/12/13 **R.L. SURFACE (m)** Not Recorded **DATUM**

GROUNDWATER **LOCATION** TSF GEORGETOWN

EQUIPMENT CASE 590 **EASTING (m)** 763984 **NORTHING (m)** 7971272

TEST PIT SIZE 3m x 1m **LOGGED BY** SP **CHECKED BY**

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w_l) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
Topsoil											
Sandy CLAY, dark brown, mottled red, high plasticity, sand is fine to coarse grained, moist, medium dense											
Clayey SAND with gravel, brown, medium plasticity, sand is fine to coarse grained, angular, moist, medium dense		1									
Silty Gravelly SAND, orange, mottled white and red, low plasticity, sand is fine to coarse grained, angular, wet, medium dense		2									
Highly Weathered Rock logged as SM, Silty Gravelly SAND, grey, mottled orange and red, low plasticity, wet, medium dense, residual											
Test Pit TP02 terminated at 2.7 m		3 4 5 6									

ATC Williams
GROUNDED IN DESIGN

ATC Williams Pty Ltd
222-225 Beach Road, Mordialloc, VIC 3195
Tel: (03) 8587 0900 Fax: (03) 8587 0901
email: mel@atcwilliams.com.au

TEST PIT NUMBER TP03

CLIENT CGM **PROJECT NAME** GEORGETOWN TSF

JOB NUMBER 111301-10 **PROJECT LOCATION**

DATE STARTED 4/12/13 **R.L. SURFACE (m)** Not Recorded **DATUM**

GROUNDWATER **LOCATION** TSF GEORGETOWN

EQUIPMENT CASE 590 **EASTING (m)** 763834 **NORTHING (m)** 7971330

TEST PIT SIZE 3m x 1m **LOGGED BY** SP **CHECKED BY**

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Topsoil											
Clayey Gravelly SAND, with boulders to 400mm, brown, medium plasticity, sand is fine to coarse grained, gravel is fine to coarse grained, subangular, moist, medium dense		1									
Silty Sandy CLAY, with boulders to 300mm, dark brown, mottled grey, high plasticity, clay is fine to coarse grained, moist, medium dense		2									
Silty Sandy CLAY, with boulders to 200mm, dark brown, high plasticity, clay is fine to coarse grained, moist, medium dense											
Test Pit TP03 terminated at 2.9 m		3 4 5 6									

TEST PIT NUMBER TP04

ATC Williams
GROUNDED IN DESIGN

ATC Williams Pty Ltd
222-225 Beach Road, Mordialloc, VIC 3195
Tel: (03) 8587 0900 Fax: (03) 8587 0901
email: mel@atcwilliams.com.au

CLIENT CGM **PROJECT NAME** GEORGETOWN TSF

JOB NUMBER 111301-10 **PROJECT LOCATION**

DATE STARTED 4/12/13 **R.L. SURFACE (m)** Not Recorded **DATUM**

GROUNDWATER **LOCATION** TSF GEORGETOWN

EQUIPMENT CASE 590 **EASTING (m)** 763725 **NORTHING (m)** 7971360

TEST PIT SIZE 3m x 1m **LOGGED BY** SP **CHECKED BY**

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w_l) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
Topsoil											
Clayey Silty SAND, with boulders to 600mm, dark brown, low plasticity, sand is fine to coarse grained, moist, medium dense											
Clayey Silty SAND, with gravel, brown, low plasticity, sand is fine to coarse grained, gravel is fine to coarse grained, angular, moist, medium dense		1									
Highly Weathered Rock logged as SC, Clayey Silty SAND, orange, mottled off-white and grey, low plasticity, moist, medium dense, residual		2									
Highly Weathered Rock logged as SC, Clayey Silty SAND, orange, mottled off-white and grey, low plasticity, moist, medium dense, residual											
Test Pit TP04 terminated at 2.5 m		3 4 5 6									

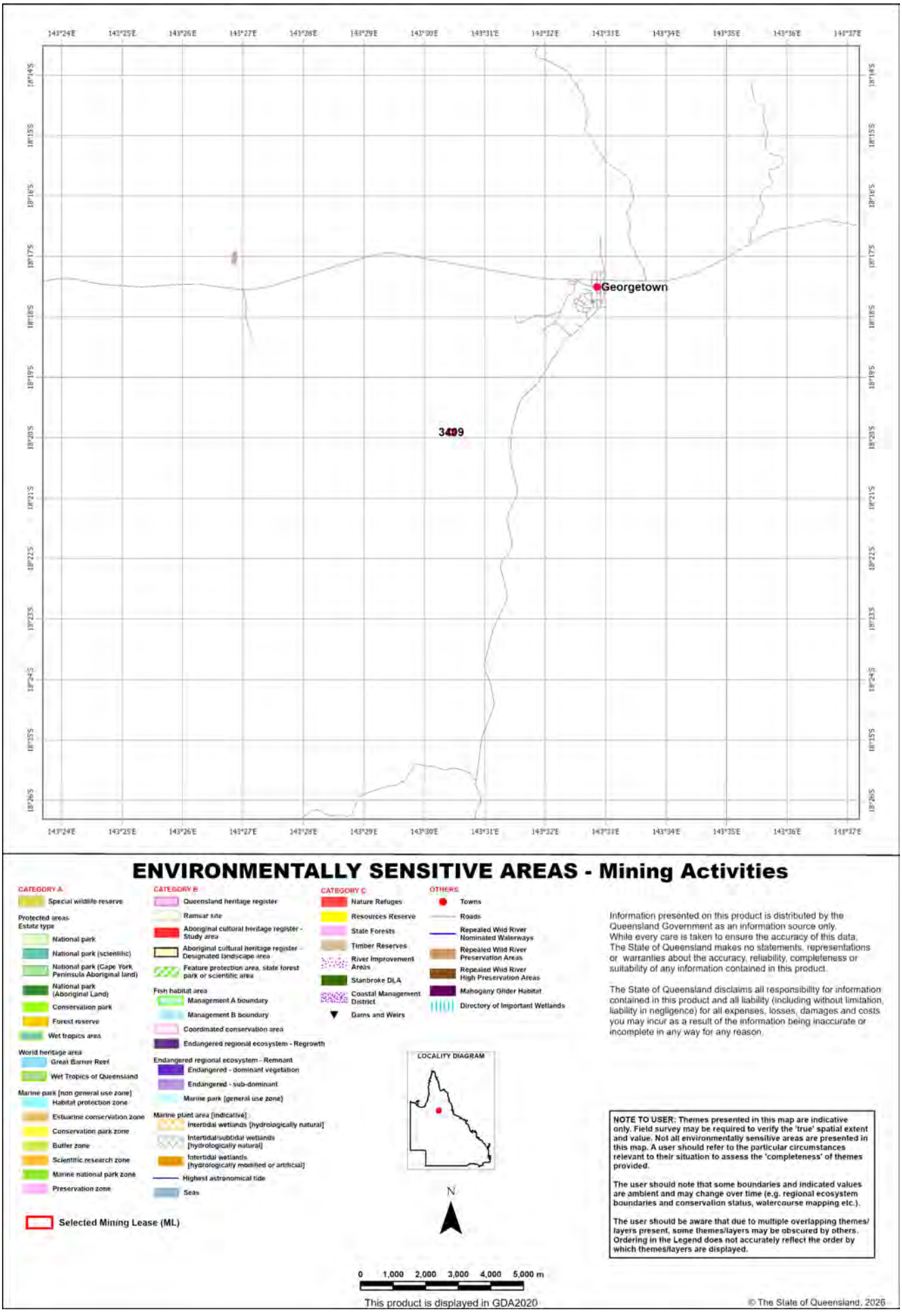
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KEMPTON MINERALS PTY LTD

Appendix 7 Environmentally Sensitive Areas Map

Centred on tenure: ML: 3409

Map requested: 14/04/2026 15:28:46



ENVIRONMENTALLY SENSITIVE AREAS - Mining Activities

CATEGORY A
- Special wildlife reserve

Protected areas Estate type
- National park
- National park (scientific)
- National park (Cape York Peninsula Aboriginal land)
- National park (Aboriginal Land)
- Conservation park
- Forest reserve
- Wet tropics area

World heritage area
- Great Barrier Reef
- Wet Tropics of Queensland

Marine park (non general use zone)
- Habitat protection zone
- Estuarine conservation zone
- Conservation park zone
- Buffer zone
- Scientific research zone
- Marine national park zone
- Preservation zone

CATEGORY B
- Queensland heritage register
- Ramsar site
- Aboriginal cultural heritage register - Study area
- Aboriginal cultural heritage register - Designated landscape area
- Feature protection area, state forest park or scientific area

Fish habitat area
- Management A boundary
- Management B boundary
- Coordinated conservation area
- Endangered regional ecosystem - Regrowth

Endangered regional ecosystem - Remnant
- Endangered - dominant vegetation
- Endangered - sub-dominant
- Marine park (general use zone)

Marine plant area (indicative)
- Intertidal wetlands (hydrologically natural)
- Intertidal/subtidal wetlands (hydrologically natural)
- Intertidal wetlands (hydrologically modified or artificial)
- Highest astronomical tide
- Seas

CATEGORY C
- Nature Refuges
- Resources Reserve
- State Forests
- Timber Reserves
- River Improvement Areas
- Stanbroke DLA
- Coastal Management District
- Dams and Weirs

OTHERS
- Towns
- Roads
- Repealed Wild River Nominated Waterways
- Repealed Wild River Preservation Areas
- Repealed Wild River High Preservation Areas
- Mahogany Glider Habitat
- Directory of Important Wetlands

Selected Mining Lease (ML)

LOCALITY DIAGRAM

N

0 1,000 2,000 3,000 4,000 5,000 m

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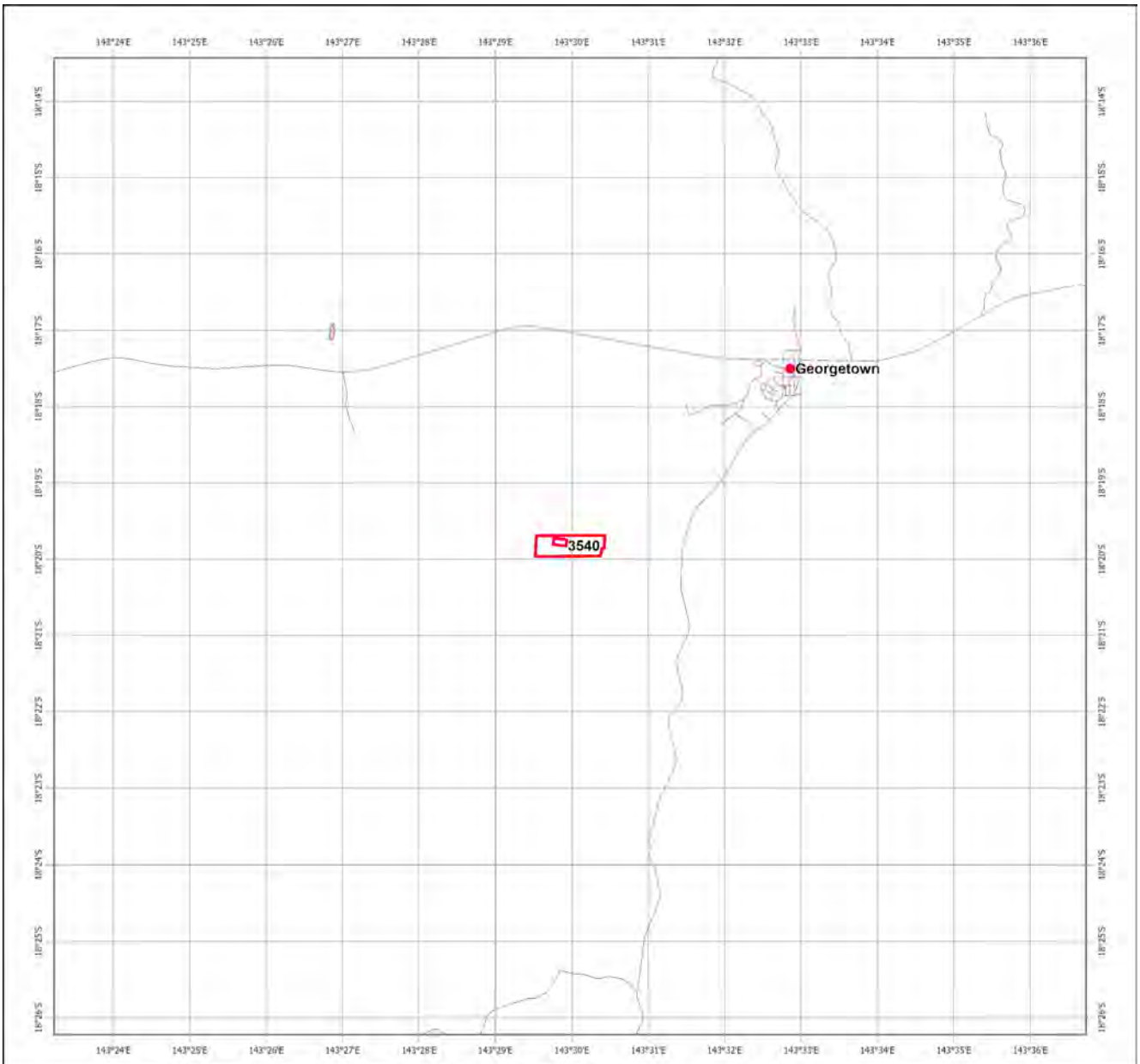
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Centred on tenure: ML: 3540 Map requested: 14/04/2026 15:29:45



ENVIRONMENTALLY SENSITIVE AREAS - Mining Activities

CATEGORY A
- Special wildlife reserve

Protected areas Estate type
- National park
- National park (scientific)
- National park (Cape York Peninsula Aboriginal land)
- National park (Aboriginal Land)
- Conservation park
- Forest reserve
- Wet tropics area

World heritage area
- Great Barrier Reef
- Wet Tropics of Queensland

Marine park (non general use zone)
- Habitat protection zone
- Estuarine conservation zone
- Conservation park zone
- Buffer zone
- Scientific research zone
- Marine national park zone
- Preservation zone

CATEGORY B
- Queensland heritage register
- Ramsar site
- Aboriginal cultural heritage register - Study area
- Aboriginal cultural heritage register - Designated landscape area
- Feature protection area, state forest park or scientific area

Fish habitat area
- Management A boundary
- Management B boundary
- Coordinated conservation area
- Endangered regional ecosystem - Regrowth

Endangered regional ecosystem - Remnant
- Endangered - dominant vegetation
- Endangered - sub-dominant
- Marine park (general use zone)

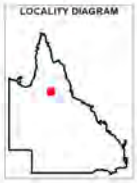
Marine plant area (indicative)
- Intertidal wetlands (hydrologically natural)
- Intertidal/subtidal wetlands (hydrologically natural)
- Intertidal wetlands (hydrologically modified or artificial)
- Highest astronomical tide
- Seas

CATEGORY C
- Nature Refuges
- Resources Reserve
- State Forests
- Timber Reserves
- River Improvement Areas
- Stanbroke DLA
- Coastal Management District
- Dams and Weirs

OTHERS
- Towns
- Roads
- Repealed Wild River Nominated Waterways
- Repealed Wild River Preservation Areas
- Repealed Wild River High Preservation Areas
- Mahogany Glider Habitat
- Directory of Important Wetlands

Selected Mining Lease (ML)

LOCALITY DIAGRAM



N

0 1,000 2,000 3,000 4,000 5,000 m

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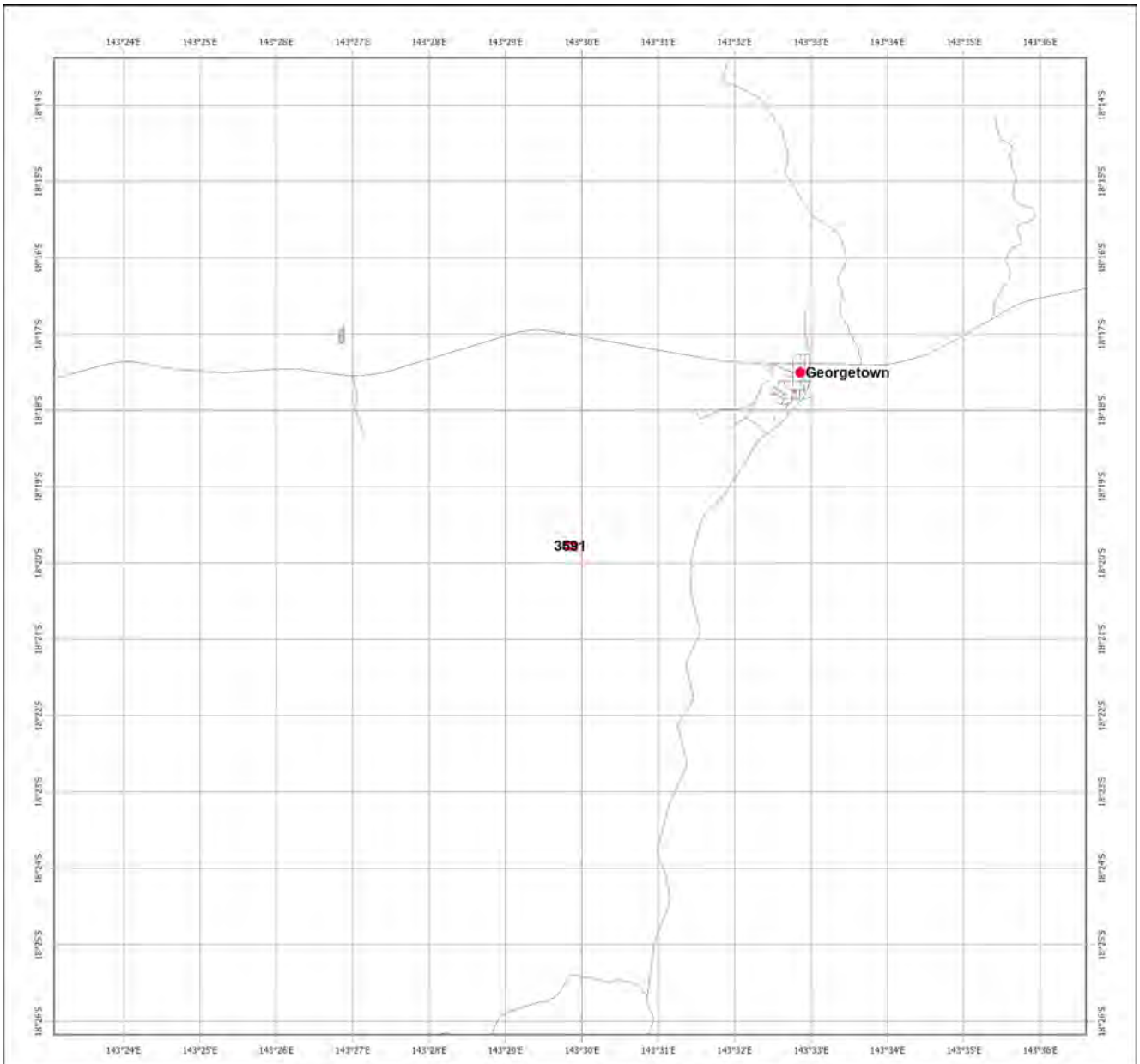
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Centred on tenure: ML: 3591 Map requested: 14/04/2026 15:30:06



ENVIRONMENTALLY SENSITIVE AREAS - Mining Activities

CATEGORY A
- Special wildlife reserve

Protected areas Estate type
- National park
- National park (scientific)
- National park (Cape York Peninsula Aboriginal land)
- National park (Aboriginal Land)
- Conservation park
- Forest reserve
- Wet tropics area

World heritage area
- Great Barrier Reef
- Wet Tropics of Queensland

Marine park (non general use zone)
- Habitat protection zone
- Estuarine conservation zone
- Conservation park zone
- Buffer zone
- Scientific research zone
- Marine national park zone
- Preservation zone

CATEGORY B
- Queensland heritage register
- Ramsar site
- Aboriginal cultural heritage register - Study area
- Aboriginal cultural heritage register - Designated landscape area
- Feature protection area, state forest park or scientific area

Fish habitat area
- Management A boundary
- Management B boundary
- Coordinated conservation area
- Endangered regional ecosystem - Regrowth

Endangered regional ecosystem - Remnant
- Endangered - dominant vegetation
- Endangered - sub-dominant
- Marine park (general use zone)

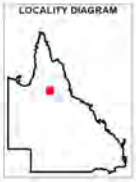
Marine plant area (indicative)
- Intertidal wetlands (hydrologically natural)
- Intertidal/subtidal wetlands (hydrologically natural)
- Intertidal wetlands (hydrologically modified or artificial)
- Highest astronomical tide
- Seas

CATEGORY C
- Nature Refuges
- Resources Reserve
- State Forests
- Timber Reserves
- River Improvement Areas
- Stanbroke DLA
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- Dams and Weirs

OTHERS
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- Repealed Wild River Nominated Waterways
- Repealed Wild River Preservation Areas
- Repealed Wild River High Preservation Areas
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Selected Mining Lease (ML)

LOCALITY DIAGRAM



N

0 1,000 2,000 3,000 4,000 5,000 m

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