

EA APPLICATION SUPPORTING REPORT

SAVANNAH GOLDFIELDS LTD

**Appendix 10 Waste Rock Characterisation Review (C&R
Consulting, 2025)**



C&R CONSULTING

Geochemical & Hydrobiological Solutions Pty Ltd

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8 August 2025

Rodney Cooper
Environment Manager
Savannah Goldfields Limited

Re: Waste Rock Characterisation for Agate Creek Gold Mine Expansion

Dear Mr Cooper,

As part of their Flagship Regional Gold Projects, Savannah Goldfields Limited is currently undertaking a resource expansion process at their Agate Creek Gold Project. Submission of an environmental assessment report (EAR) is required as part of this process, including progressive rehabilitation and closure plans (PRCPs), for which waste rock characterisation (WRC) is required.

C&R Consulting Pty Ltd (C&R) completed waste rock characterisation for Agate Creek Gold Mine for Wulguru Technical Services Pty Ltd (WTS) to support an EAR for a proposed mine expansion in July 2022 (C&R; 2022¹). However, it is understood that this initial expansion project (final mine plan dated October 2023) did not proceed through the full approvals process. The new expansion project is largely similar to the initial expansion project assessed in C&R (2022), although the pit disturbance areas and waste rock dumps are generally slightly larger (Table 1 and Figure 1). As such, C&R were requested to review their initial waste rock characterisation and determine whether the outcomes remain suitable for the new expansion project.

C&R (2022) addressed the reporting requirements for WRC as outlined in the PRCP guidelines (Department of Environment, Science and Innovation [DESI], 2023²), describing the likely physical behaviour and chemical reactivity of the waste material under weathering conditions analogous to their storage. The WRC sampling design targeted the rock types above and below the rhyolitic ore body, as well as the rhyolite itself, based on the proposed pit design from the stage 2 expansion plans (as at 2022).

Findings from the C&R (2022) WRC study indicated that static and kinetic geochemical results were broadly consistent, demonstrating chemical stability in the samples tested. A summary of findings includes:

¹ C&R (2022). *Agate Creek Gold Mine – Waste rock characterisation*. Prepared for Wulguru Technical Services, pp. 210.

² DESI (2023). *Statutory guideline: Progressive rehabilitation and closure plan (PRC plans)*. Department of Environment, Science and Innovation, Queensland Government, Brisbane, pp. 76.



- 90% of the waste rock is non-acid forming (NAF), and the material has the potential to buffer any acid that may be produced;
- Consistently low salinity values (mean of 43.5 $\mu\text{S}/\text{cm}$) in waste rock leachate indicate a very low risk of saline drainage;
- Waste rock samples show variable fluoride enrichment, consistent with regional geological trends of high fluoride; and
- Waste rock is not significantly enriched in any of the other analysed elements.

Overall, C&R (2022) found that the waste rock associated with the project is relatively benign and considered to pose a very low to low risk of environmental harm. However, it was noted that representative samples of metadolerite, metasediment, rhyolite and granite were collected from across the site, but not from all pits, with the assumption that their geochemical behaviour is consistent between pits. This assumption is of particular concern for the metasediment units in Pit 1 and Pit 2 (which are to be merged into a single Pit 1 under the new mine plan). These metasediments were not sampled for the C&R (2022) study, which instead assumed that metasediment from Pit 4 was representative of the broader site. A review of the C&R (2022) results indicates potential heterogeneity within the metasediment units, with some samples showing uncertain net acid production potential (NAPP) values, suggesting that further assessment of metasediments in this area is warranted.

Since the completion of the C&R (2022) report, additional waste rock sampling has been regularly conducted by the client. This sampling has targeted stockpiled waste rock, with cartage records reviewed to determine the rock type and the pit from which the material originated. Using this approach, 24 waste rock samples representing metasediments from Pit 1 (as confirmed by on-site geologists) have been analysed. Table 2 summarises the results, with all analytes found to comply with relevant guideline values or are comparable to the previously identified ranges in C&R (2022).

NAPP values were all found to be low and non-acid-forming when compared with $\text{NAG}_{(\text{pH})}$ results (Figure 2). $\text{NAG}_{(\text{pH})}$, or net acid generation pH, is a measure of the pH of a sample following a standardised oxidation and neutralisation test, used to assess acid-forming potential. Similar to the C&R (2022) results, only total fluoride concentrations exceeded guideline values (noting that these guidelines apply to water quality). These findings confirm that the metasediments within the current Pit 1 do not present a greater risk than previously indicated by C&R (2022).

Based on this assessment, the findings of C&R (2022) remain relevant to the proposed resource expansion. However, it should be noted that the evaluations undertaken to date have been limited in terms of the spatial distribution of samples and the rock types sampled. The core samples from the 2022 study – along with subsequent waste rock stockpile sampling – were localised to partial pit areas aligned with the October 2023 mine plan. These results have been extrapolated to represent the broader expansion area. Reverse circulation drilling (RCD) within the updated pit extents indicates lithological similarity, supporting this extrapolation. Nevertheless, there remains a very low risk that geochemical heterogeneity across the expanded pit extent may not yet be fully identified.

To reduce this uncertainty and improve confidence in the geochemical characterisation across the expanded footprint and three-dimensional structure of each pit, ongoing static testing is recommended. Where possible, representative samples of all rock types should be opportunistically collected from each pit as mining progresses, consistent with best practice.

Recipient: Savannah Goldfields Limited
Subject: Agate Creek Gold Mine – Waste Rock Characterisation
Date: 8 August 2025



Regards,

A handwritten signature in black ink, appearing to be 'M. Knott', is written over a light yellow rectangular background.

Matt Knott

Principal Scientist / Director
C&R Consulting Pty Ltd

Table 1: Locations and proposed differences of various sub-domains in mine plans (TBC = to be confirmed).

Domain	Subdomain	Eastings	Northing	Subdomain area (ha)		Comment
				October 2023	10 April 2025	
Infrastructure	Haul road	–	–	4.63	Same	–
	Landowner tracks	–	–	7.58	Same	–
	Magazine tracks	–	–	0.14	Same	–
	Accommodation village	768,451	7,895,805	1.14	Same	–
	Administration buildings					
	Core shed					
	Workshop and maintenance area					
	STP and irrigation area	768,408	7,895,858			
	Explosives magazine	768,046	7,896,782	0.05	Same	–
	Run-of-mine pad	768,307	7,896,491	1.14	Same	–
Waste rock dumps	Northwest waste rock dump (Pit 4 WRD) (temporary)	767,226	7,898,037	5.61	1.4	Existing disturbance footprint only
	North waste rock dump (Pit 6 WRD) (temporary)	768,237	7,898,116	3.2	3.9	–
	Southwest waste rock dump (Pit 1 WRD) (temporary)	767,302	7,897,184	3.04	4.8	–
	South waste rock dump (low-grade waste rock)	767,970	7,897,410	11.35	4.1	The only stockpile remaining in post mining landform
	Sherwood waste rock dump (temporary)	768,252	7,897,882	2.59	2.59	existing
Water storage and management	Water storage dam	768298	7896929	4.5	TBC	All dams to be confirmed
	Sediment pond A	768478	7898207	0.21	TBC	
	Sediment pond B	768082	7898357	0.15	TBC	
	Sediment pond C	767532	7897874	0.34	TBC	
	Sediment pond D	768039	7897233	0.43	TBC	
	Sediment pond E	767811	7897575	0.28	TBC	

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Domain	Subdomain	Eastings	Northing	Subdomain area (ha)		Comment
				October 2023	10 April 2025	
	Sediment pond F	767335	7897340	0.34	TBC	
	ROM pad pond	768365	7896626	0.24	TBC	
Open-cut pits	Pit 1	767435	7897339	1.37	4.3	–
	Pit 2	767407	7897488	1.03	1.6	–
	Pit 3	767512	7897571	0.49	0.49	Rehabilitated disturbed area
	Pit 4	767401	7897849	0.94	1.9	–
	Pit 5	768477	7897602	0.64	0	Removed from mine plan
	Pit 6	768407	7897849	4.46	4.1	–
Soil stockpiles	Soil stockpile A	768448	7898221	0.04	TBC	All to be confirmed once operations commence
	Soil stockpile B	768113	7898377	0.03	TBC	
	Soil stockpile C	767457	7897821	0.06	TBC	
	Soil stockpile D	768068	7897260	0.08	TBC	
	Soil stockpile E	767846	7897586	0.05	TBC	
	Soil stockpile F	767375	7897285	0.06	TBC	
	Soil stockpile G	768352	7896523	0.20	TBC	
	Water storage dam soil stockpiles	768380	7897031	0.79	TBC	
		768337	7897103			
Total disturbance area				57.2	51.66*	–

* Using the proposed areas from October 2023 for the subdomains that are TBC.

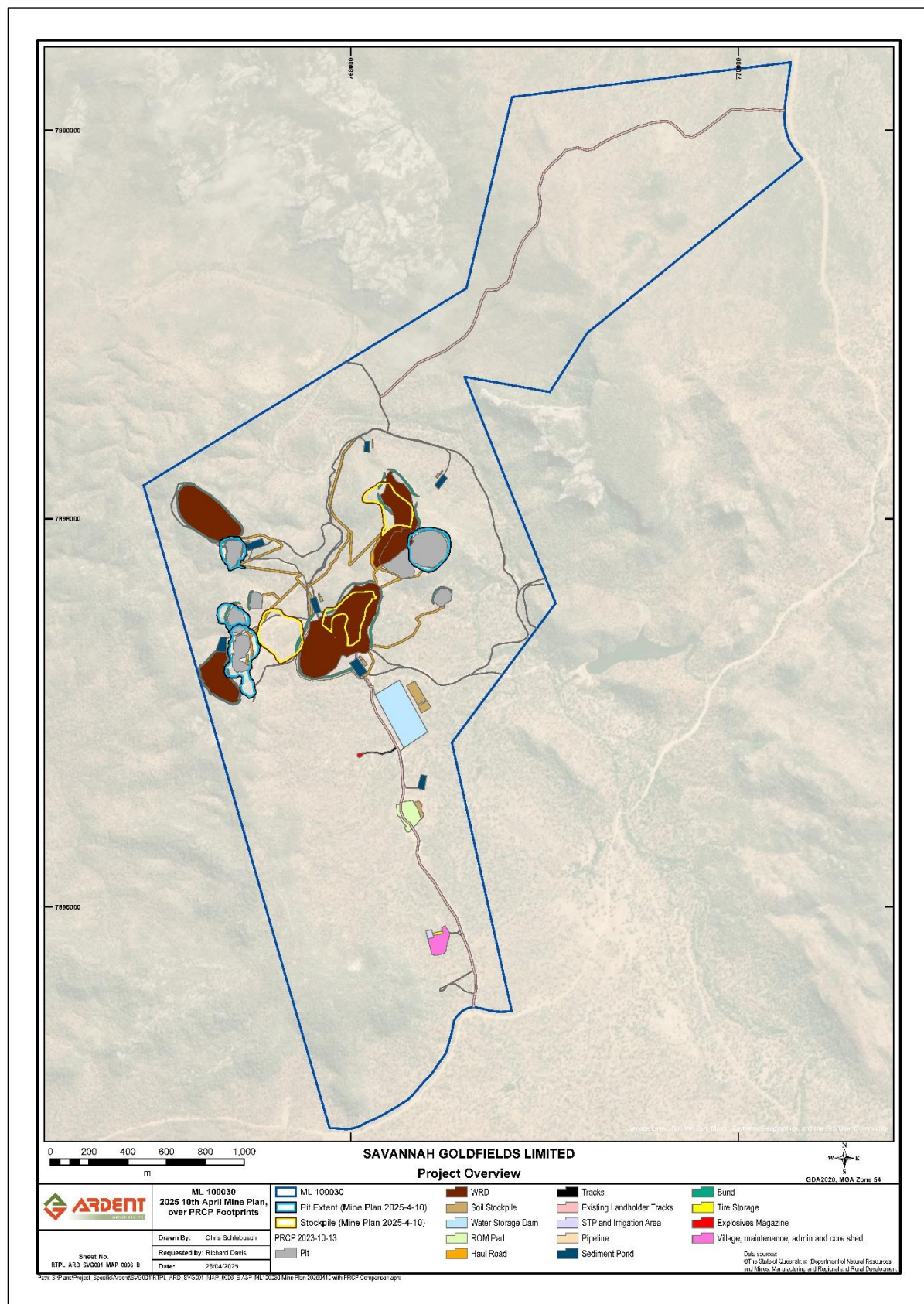


Figure 1: Project overview comparing the initial mine plan to the new expansion works, as provided by Ardent on 5 August 2025.



Table 2: Waste rock analysis from Pit 1 metasediments for samples collected since 2022 (LOR = limit of reporting; n = number of samples tested; n# = number of results above the LOR).

Parameter / element	Unit	LOR	n	n#	Min.	Median	Max.	NEPM guideline HIL 'recreational C'
pH	–	0.1	24	24	5	7	8.1	6 – 8 ²
NAPP	kg H ₂ SO ₄ /t	0.5	24	24	–21.8	–6.2	–1.4	–50 – 0 ³
Electrical conductivity @ 25°C	µS/cm	1	24	24	5	40.5	100	250 ²
pH _(ox)	–	0.1	24	24	5.5	7.4	8	>4.5 ⁴
NAG (pH 4.5)	kg H ₂ SO ₄ /t	0.1	24	0	<LOR	<LOR	<LOR	–
NAG (pH 7.0)	kg H ₂ SO ₄ /t	0.1	24	4	<LOR	<LOR	5.2	–
Acid neutralising capacity (ANC) as H ₂ SO ₄	kg H ₂ SO ₄ equiv./t	0.5	24	24	2	6.65	22.4	–
ANC as CaCO ₃	% CaCO ₃	0.1	24	24	0.2	0.7	2.3	–
Fizz rating	Fizz unit	0	24	24	0	0	1	–
Sulfate as SO ₄ ²⁻ dissolved	mg/kg	10	24	6	<LOR	<LOR	40	1,000 ¹
Sulfur – Total as S (LECO) total	%	0.01	24	24	0.01	0.02	0.03	0.1 ⁵
Sodium total	mg/kg	50	25	10	<LOR	<LOR	120	–
Potassium total	mg/kg	50	26	24	240	475	1050	–
Calcium total	mg/kg	50	27	23	<LOR	850	3950	–
Magnesium total	mg/kg	50	28	24	130	3260	25400	–
Fluoride	mg/kg	1	29	22	<LOR	22	54	2 ¹
Au	mg/kg	0.01	24	24	0.03	0.125	1.19	–
Ag	mg/kg	0.01	24	24	0.03	0.115	0.36	–
Al	mg/kg	100	24	24	3100	16750	53500	–
As	mg/kg	0.01	24	24	14.6	45.45	138.5	300
Au	mg/kg	0.02	24	24	0.02	0.09	0.44	–
B	mg/kg	10	24	0	<LOR	<LOR	<LOR	20,000
Ba	mg/kg	10	24	24	40	90	290	–
Be	mg/kg	0.05	24	24	0.26	1.6	3.06	90
Bi	mg/kg	0.01	24	24	0.03	0.19	21.6	–
Ca	mg/kg	100	24	23	<LOR	1200	14800	–
Cd	mg/kg	0.01	24	24	0.01	0.195	0.52	90
Ce	mg/kg	0.02	24	24	4.93	16.3	56.9	–
Co	mg/kg	0.1	24	24	1.4	42.65	82.6	300
Cr	mg/kg	1	24	24	7	34	78	300
Cs	mg/kg	0.05	24	24	0.85	4.525	11.55	–
Cu	mg/kg	0.2	24	24	14.7	137.25	199.5	17,000



Parameter / element	Unit	LOR	n	n#	Min.	Median	Max.	NEPM guideline HIL 'recreational C'~
Fe	mg/kg	100	24	24	4,600	66,850	121,500	–
Ga	mg/kg	0.05	24	24	2.5	8.38	23	–
Ge	mg/kg	0.05	24	24	0.07	0.12	0.19	–
Hf	mg/kg	0.02	24	24	0.04	0.1	0.23	–
Hg	mg/kg	0.01	24	23	<LOR	0.02	0.05	80
In	mg/kg	0.005	24	24	0.007	0.0375	0.056	–
K	mg/kg	100	24	24	1100	1550	2700	–
La	mg/kg	0.2	24	24	2.1	6.55	27.4	–
Li	mg/kg	0.1	24	24	0.6	30.75	122	–
Mg	mg/kg	100	24	24	100	5,000	29,800	–
Mn	mg/kg	5	24	24	13	1,085	3,680	19,000
Mo	mg/kg	0.05	24	24	0.11	1.005	5.34	–
Na	mg/kg	100	24	18	<LOR	100	200	–
Nb	mg/kg	0.05	24	13	<LOR	0.055	0.14	–
Ni	mg/kg	0.2	24	24	3	66.8	163	1,200
P	mg/kg	10	24	24	50	210	350	–
Pb	mg/kg	0.2	24	24	4.5	12.3	17.7	–
Rb	mg/kg	0.1	24	24	8.4	24.3	45.9	–
Re	mg/kg	0.001	24	7	<LOR	<LOR	0.001	–
S	mg/kg	100	24	1	<LOR	<LOR	100	–
Sb	mg/kg	0.05	24	24	0.65	1.76	4.23	–
Sc	mg/kg	0.1	24	24	2.4	11.15	20.6	–
Se	mg/kg	0.2	24	20	<LOR	0.3	0.5	700
Sn	mg/kg	0.2	24	21	<LOR	0.5	1.3	–
Sr	mg/kg	0.2	24	24	3.2	11.7	24.1	–
Ta	mg/kg	0.01	24	5	<LOR	<LOR	0.01	–
Te	mg/kg	0.01	24	23	<LOR	0.03	0.14	–
Th	mg/kg	0.2	24	24	0.2	1.8	9.3	–
Ti	mg/kg	50	24	12	<LOR	<LOR	100	–
Tl	mg/kg	0.02	24	24	0.07	0.44	1.26	–
U	mg/kg	0.05	24	24	0.39	0.985	2.93	–
V	mg/kg	1	24	24	19	130	245	–
W	mg/kg	0.05	24	24	0.2	2.45	14.2	–
Y	mg/kg	0.05	24	24	4.6	10.325	15.95	–
Zn	mg/kg	0.2	24	24	9	106.5	273	30,000
Zr	mg/kg	0.5	24	24	1	3.1	4.1	–

~ NEPM guideline HIL 'recreational C' – National Environment Protection Measure guideline health investigation level category C: recreational land use (e.g. parks, ovals, sports grounds).

¹ Livestock and irrigation water quality guidelines from ANZECC and ARMCANZ (2000)³.

² Tropical Australia trigger values for lowland rivers.

³ Range for non-acid forming (NAF) material stipulated within Miller (1997)⁴.

⁴ Samples with a $NAG_{(pH)}$ (i.e. oxidised pH) equal or greater than 4.5 (≥ 4.5) are unlikely to be acid-producing (AMIRA, 2002)⁵.

⁵ Based on the average crustal abundance, as detailed in INAP (2014)⁶.

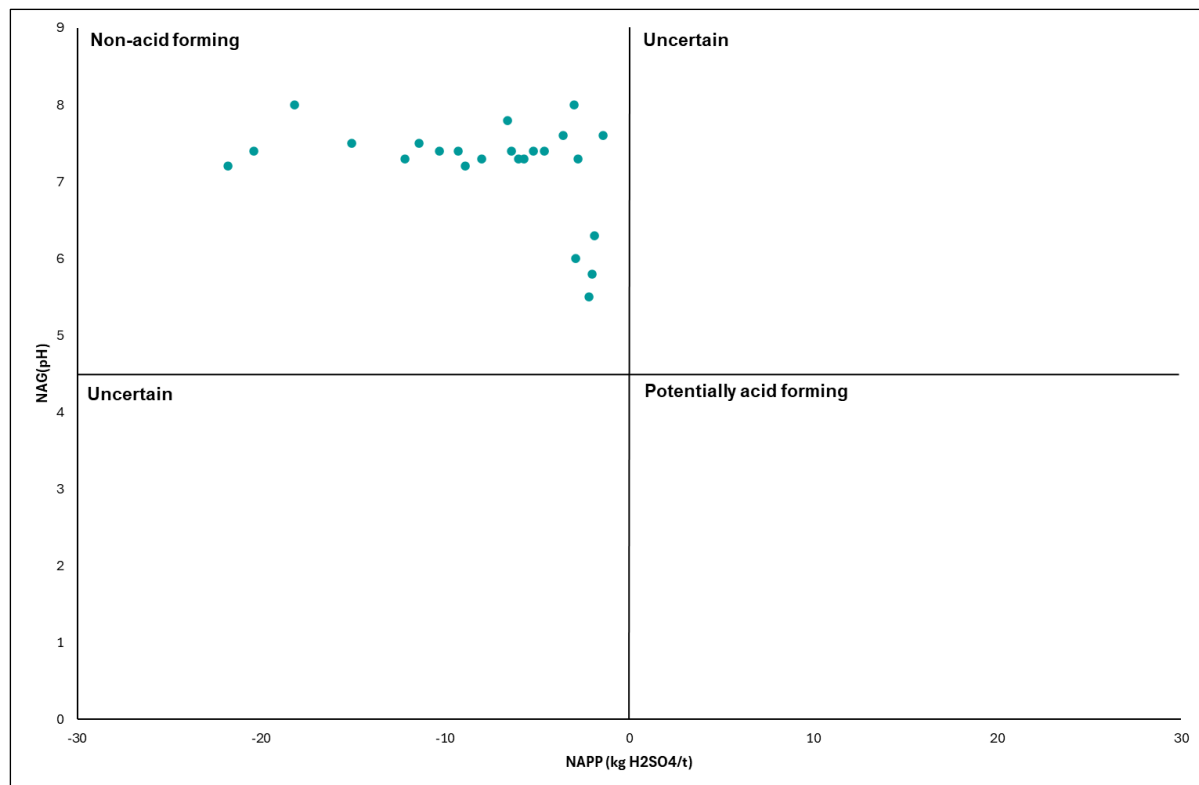


Figure 2: $NAG_{(pH)}$ against NAPP in Pit 1 metasediment samples.

³ ANZECC, ARMCANZ (2000). *Australian and New Zealand guidelines for fresh and marine water quality*. National Water Quality Management Strategy. Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra.

⁴ Miller, S.D. (1997). *Advances in acid mine drainage prediction and implications for risk management*. Proceedings of the 3rd International and the 21st Annual Minerals Council of Australia, Environmental Workshop. 14-18 October, Newcastle Australia.

⁵ AMIRA (2002). *ARD test handbook: Prediction & kinetic control of acid mine drainage*. Project 387A prepared by the Ian Wark Research Institute.

⁶ INAP (2014). *Global acid rock drainage guide*. Sponsored by the International Network for Acid Prevention with the support of the Global Alliance, pp. 473.