COBAR MANAGEMENT PTY LTD

The CSA Mine

Annual Environmental Management Report

AEMR 2021

Cobar Management Pty Ltd

The CSA Mine

Annual Environmental Management Report (AEMR) 2021

Name of Mine	CSA Mine
Mining Leases	CML 5
MOP Commencement Date: *01/01/2021*	MOP Completion Date*: 31/12/2022*
AEMR Commencement Date: *01/01/2021*	AEMR End Date: *31/12/2021*
Name of Leaseholder:	*Isokind Pty Ltd*
Name of Mine Operator:	*Cobar Management Pty Ltd*
CML5 Issue Date: 2/12/1993	*Expiry Date: 24/06/2028*
MPL1093 Issue Date: 5/02/1947	*Expiry Date: 5/02/2029*
MPL1094 Issue Date: 5/02/1947	*Expiry Date: 5/02/2029*

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ABBREVIATIONS

ANZECC	Australia and New Zealand Conservation Council	**LFA**	Landform Function Analysis
CHF	Cemented Hydraulic Fill	**Mt**	Mega Tonne
CSA MINE	Cobar Mining Pty Ltd	**m**	Metre
CML	Consolidated Mining Lease	**mm**	Millimetre
Cu	Copper	**MOP**	Mining Operations Plan
CSA	Cornish, Scottish, Australian Mine	**NATA**	National Association of Testing Authorities
DSC	Dam Safety Committee	**NTSF**	North Tailings Storage Facility
DPIE	Department of Planning, Industry, and Environment	**OEH**	Office of Environment and Heritage
DMP	Derelict Mines Program	**PET**	Polyethylene Terephthalate
dmt	Dry Metric Tonnes	**PAF**	Potentially Acid Forming
ESAP	Energy Savings Action Plan	**REMP**	Rehabilitation and Environment Management Plan
EPA	Environment Protection Authority	**RC**	Reverse Circulation
EPL	Environment Protection Licence	**SWMP**	Site Water Management Plan
EL	Exploration Lease	**STSF**	South Tailings Storage Facility
HDPE	High Density Polyethylene	**TSF**	Tailings Storage Facility
KPI	Key Performance Indicator	**t**	Tonnes
SG	Specific Gravity	**WRF**	Waste Rock Fill
LCM	Loose Cubic Meter	**wmt**	Wet Metric Tonne

1. INTRODUCTION

Cobar Management Pty Ltd (CMPL) operates the Cornish, Scottish and Australian (CSA) Mine located 11 km north of Cobar in western NSW. Mining has occurred intermittently on the CSA leases since the discovery of copper (Cu), lead and zinc in 1871. However, it was not until 1961 that a significant resource was proven by Broken Hill South Pty Ltd. Medium-scale mechanised underground mining subsequently commenced in 1965. The mine was acquired by Conzinc Riotinto Australia (CRA) in 1980 and sold to Golden Shamrock Mines Pty Ltd (GSM) in 1993. GSM was in turn acquired by Ashanti Gold Fields in the same year. The mine continued to operate until 1997, when the operation ran into financial difficulties and was placed in receivership. The mine was placed into care and maintenance on the 20th January 1998.

CMPL, a wholly owned Australian subsidiary of Glencore committed to reopening the CSA Mine in February 1999 with current underground and processing operations commencing in July 1999 following the purchase of the leases and site facilities. Prior to opening concessions were obtained from the NSW Government, including the excision of three areas of concern from the lease: the North Tailings Storage Facility (NTSF); the subsidence hole and adjacent old spoil material; and, a major coarse rejects stockpile (Big Mt Brown).

CMPL continues to operate the CSA Mine, which is currently the highest-grade copper mine, and one of the deepest operating mines in Australia.

1.1. Consents, Leases and Licenses

CMPL has a large number of statutory approvals and associated legal obligations that regulate mining activities on site. The status of CSA Mine's main statutory approvals are listed in Tables 1, 2 and 3.

CMPL holds Consolidated Mining Lease 5 (CML5) for the CSA Mine operations and two small mining purposes leases 1093 and 1094 (MPL1093 and MPL1094). CML5 occupies portions of five Western Land Leases and Crown Land including parts of the Cobar Regeneration Belt. MPL1093 and MPL1094 occupy Crown Land. These details are shown in Figure 1. Throughout this document, these leases are collectively referred to as the CSA Mine.

The CSA Mine operates under Environmental Protection Licence (EPL) 1864; this document is attached in Appendix 6. During the period of 1 January 2021 to the 31 December 2021, the CSA Mine operated in accordance with the CSA Mine 2021 – 2022 Mining Operations Plan (MOP) and CMPL's internal Environment and Community Policy.

Table 1 - Mining Leases (as of 31/12/2021).

Lease Number	Details	Issue Date	Expiry Date
CML5	The CSA Mine site. Licensed for Group 1 minerals (Sb, Cu, Zn, Pb, Fe, In, Au, Ge, Co, Cd, Bi & Fe minerals).	2/12/1993	24/06/2028
EL5693	Exploration lease for Group 1 minerals – 111 units around CML5 and surface exclusions of CML5	08/02/2000	07/02/2027
MPL1093	Mining Purposes Lease for Water Harvesting. Not licensed for minerals.	5/2/1947	05/02/2029
MPL1094	Mining Purposes Lease for Water Harvesting. Not licensed for minerals.	5/2/1947	05/02/2029

Table 2 - Land Tenure (as of 31/12/2021).

Property Name	Locality	WLL	County	Parish	Plan Number	Lot Number
Red Tank	The CSA Mine	9565	Robinson	Kaloogleguy	766965	4277
Red Tank	East of Mine	731	Robinson	Kaloogleguy	766922	6336
Red Tank	Immediately south of Mine	13844	Robinson	Kaloogleguy	1105750	1
Red Tank	South and east of tailings facility	3667	Robinson	Mopone	1186316	1
Ascot	Southwest of Mine	13844	Robinson	Kaloogleguy	1105750	2
Council around tip	Southwest of Mine	-	Robinson	Kaloogleguy	870022	22
Mopone	Northeast of tailings facility	1009	Robinson	Mullimutt	768325	5414
Crown Land MPL1093	NNW of Mine	9565	Robinson	Kaloogleguy	766965	7302
Crown Land MPL1094	NW of Mine	9565	Robinson	Kaloogleguy	766965	7301
Red Tank	3km south of Mine	-	Robinson	Kaloogleguy	870022	23
Kaloogley Regeneration Reserve	3km south of Mine	-	Robinson	Kaloogleguy	1170625	7317
Kaloogley Regeneration Reserve	3km SSE of mine	-	Robinson	Kaloogleguy	1117798	7003
Kaloogley Regeneration Reserve	4.3km South of Mine	-	Robinson	Kaloogleguy	1170625	7316

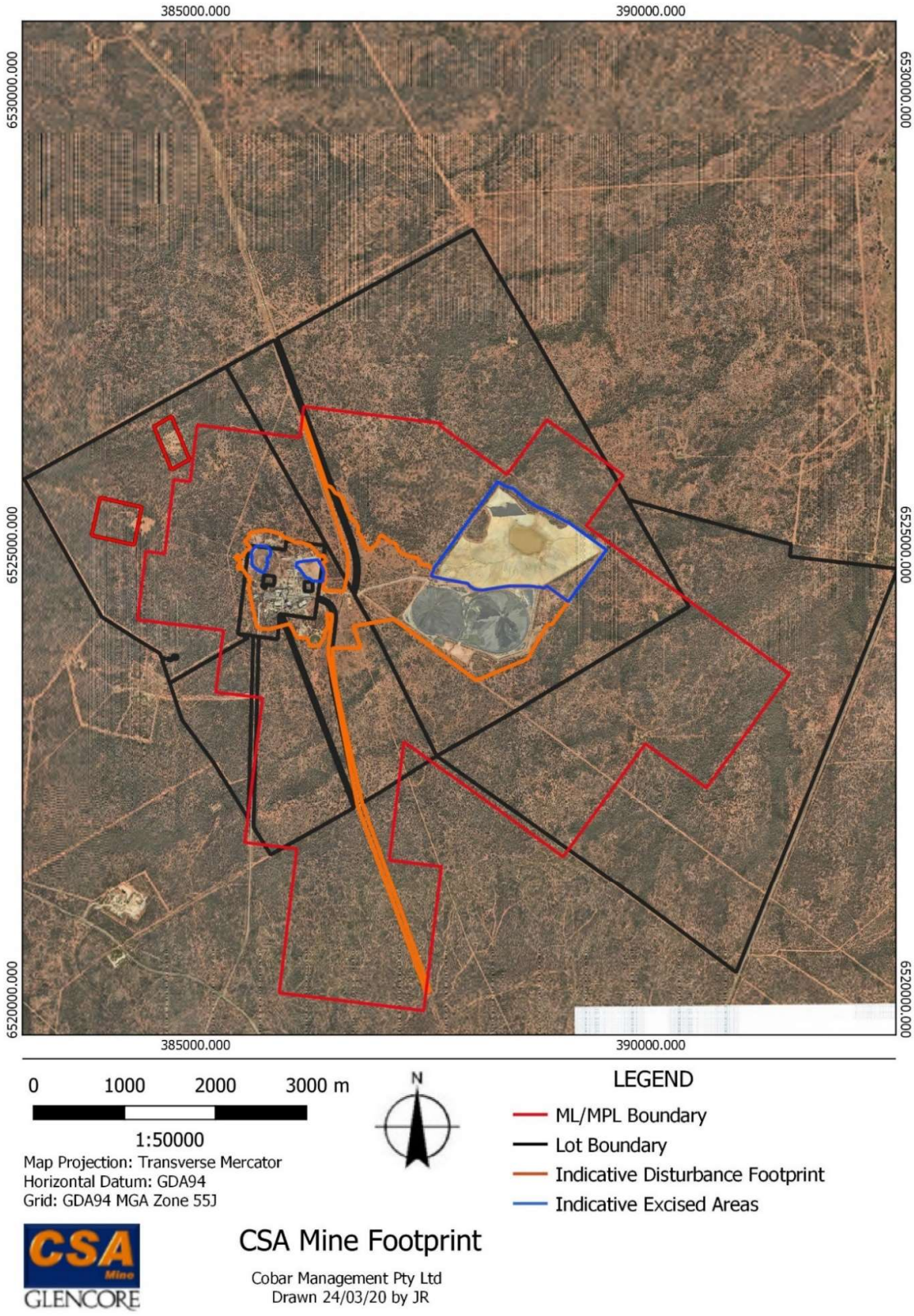


Figure 1 - Indicative mine footprint (as of 31/12/2021).

Table 3 - Licenses and Permits (as of 31/12/2021).

Licence	Details	Expiry/Renewal Date
EPL No. 1864	Environmental Protection License	30-Jun-22
Mining Operations Plan	Cobar Management Pty Ltd, the CSA Mine, Mining Operations Plan	31-Dec-22
WorkCover Licence XSTR100157	WorkCover NSW Licence to store Class 1.1D, 1.1B and 5.1 explosives	8-Apr-23
Radiation Licence No. 5061153	Licence to sell/possess radiation apparatus and/or radioactive substances or items containing radioactive substances RR761, RR1384, RR911, RR907, RR21459, RR12793, RR12484, RR8858, RR8859	20-Oct-22
Refrigerant Trading Authorisation Certificate	Refrigerant trading authorisation under the *Ozone Protection and Synethic Greenhouse Gas Management Regulations 1995*	28-Nov-23
Water Access Licenses	WAL36335 and WAL36336 of the Macquarie and Cudgegong Regulated Rivers Water Source Sharing Plan & WAL28539 and WAL28887 of the Lachlan Fold Belt MDB Groundwater Source Sharing Plan	Perpetuity
Water Supply Works 85WA753710	Water Supply Works for Production Bores WB1 and WB2 of the Lachlan Fold Belt Groundwater Source	26-Jun-26
Local Development Consent No. 31/95	Cobar Shire Council (CSC) Permit for use of the CSA Mine site by CMPL	Granted 26 June 1998
Local Development Consent No. 2006/LDA-00009	CSC Permit for Construction and Operation of South Tailing Dam Extension	Granted 22 June 2006
Local Development Consent No. 2009/LDA-00035	CSC Permit for South Tailings Storage facility Wall Raise	Granted 7 April 2010
Local Development Consent No. 2013/LDA-00037	CSC Permit for South Tailings Storage facility Upgrade	Granted 26 September 2013
Local Development Consent No. 2014/LD-00015	CSC Permit for South Tailings Storage facility Wall Raise	Granted 24 September 2014
Local Development Consent No. 2015/LD-00007	CSC Approval for Installation of Steel Surface Fan	Granted 15 May 2015
Local Development Consent No. 2019/LD-00006	CSC Approval for Stage 9 wall raise Tailings Storage Facility	Granted 14 May 2019
2019/LD-00037	3 Mega litre Raw Water Tank including associated pipelines and pump	27 March 2025

Licence	Details	Expiry/Renewal Date
2021/LD-00012	Installed Surface Vent Fans	12 Nov 2025
2021/LD-00013	Installed Jameson Cell	12 Nov 2025
2021/LD-00013	Installed Diesel Generator	12 Nov 2025
2021/LD-00011	Installed Bulk Air Cooler at No. 1 Shaft	12 Nov 2025
2021/LD-00048	Waste Rock Stockpile	10 Dec 2025
2020/LD-00049	Four Vent Fans and Switch room	15 Oct 2026
2020/LD-00051	Processing Upgrade replace SAG Mills	12 Dec 2025

1.2. Mine Contacts

The CSA Mine management team and environmental contacts are listed in Table 4.

Table 4 - Management and Environmental Contacts.

Title	Name	Phone	Email
General Manager	Peter Christen	6836 5122	peter.christen@glencore.com.au
Ore Processing Manager	Jade Buckman	6836 5334	jade.buckman@glencore.com.au
Mine Production Manager	Matthew Ireland	6836 5329	mattew.ireland@glencore.com.au
Health Safety Environment & Training Manager	Brendan Willard	6836 5302	brendan.willard@glencore.com.au
Environmental Superintendent	Huw Rabone	6836 5384	huw.rabone@glencore.com.au
The CSA Mine Pollution Complaints Line	The CSA Mine Switchboard	6836 5100	(via CSA Website Contact Form)

1.3. Actions Required from the 2021 AEMR Review

Due to COVID restrictions the 2020 AEMR review did not occur. The only feedback CMPL received from the Resources Regulator was to ensure all required development consents were received from Cobar Shire Council, and that work continue on the South Tailings Storage Facility (STSF) closure plan and capping design.

Table 5 - Update on the proposed activities for the 2021 AEMR period.

Proposed Activity	Priority Ranking	Completion
Continue maintenance activities on rehabilitated land.	H	Completed
Implement a new rehabilitation trial on Mount Brown and tailings dam areas and establish new pot trials.	H	Completed
Establish three new exclusion fencing areas for the property vegetation plan rehabilitation site.	H	Not completed
Demarcate and construct a new biodiversity area	M	Not completed
Annual asbestos monitoring and update of site management plan.	M	Completed
Implement joint rehabilitation efforts on site excised areas.	M	Started
Continuation of environmental monitoring of surface water, groundwater and air.	M	Completed
Dangerous Goods Audit and management plan update.	M	Completed
Biodiversity Assessment	M	Not completed
New Biodiversity Management Plan	M	Started
Heritage Management Plan	M	Started
LFA Monitoring (September).	M	Not completed

2. SUMMARY OF OPERATIONS DURING THE REPORTING PERIOD

2.1. Exploration

During the reporting period, exploration undertook no surface disturbing activities; this was a result of planned drilling programs being delayed until 2022 by the COVID-19 pandemic. Despite this, surface exploration work has included desktop reviews of geophysical datasets, re-assaying of historical auger soil samples, field reconnaissance and completion of a large-scale Fixed Loop Electro-Magnetic (FLEM) survey encompassing the CSA Mine, Figure 2. Additionally, an Induced Polarisation (IP) survey was recently conducted by the Environmental Department of CMPL to monitor groundwater in the vicinity of the Tailings Storage Facility. The data obtained in the reporting period, will be interrogated and interpreted in an exploration context with subsequent drill targeting of identified anomalies in the next reporting period.

Underground resource definition and exploration work included the completion of 105 diamond drill holes for a total of 23,589.7 m. The majority of the holes (n= 99) were for resource definition for a total of 22,447.0 m drilled (95.2%). Geotechnical/infrastructure holes (n= 6) accounted for the remainder (4.8%) for a total of 1,142.7 m drilled.

During the reporting period, exploration received 'Notification of Satisfactory Rehabilitation' from the Department for pervious diamond and reverse circulation drilling programs conducted on CML 5. Approval of rehabilitation completion was for the following programs:

- 2018 Diamond Drilling Program (MAAG0010412/ LETT0005896)
- 2018 Reverse Circulation Program (MAAG0010542/ LETT0006407)
- 2019 Diamond Drilling Program (MAAG0010276/ LETT0006378)
- 2019 Reverse Circulation Program (MAAG0010207/ LETT0006513)
- 2021 Diamond Drilling Program (MAAG0010275/ LETT0006598)

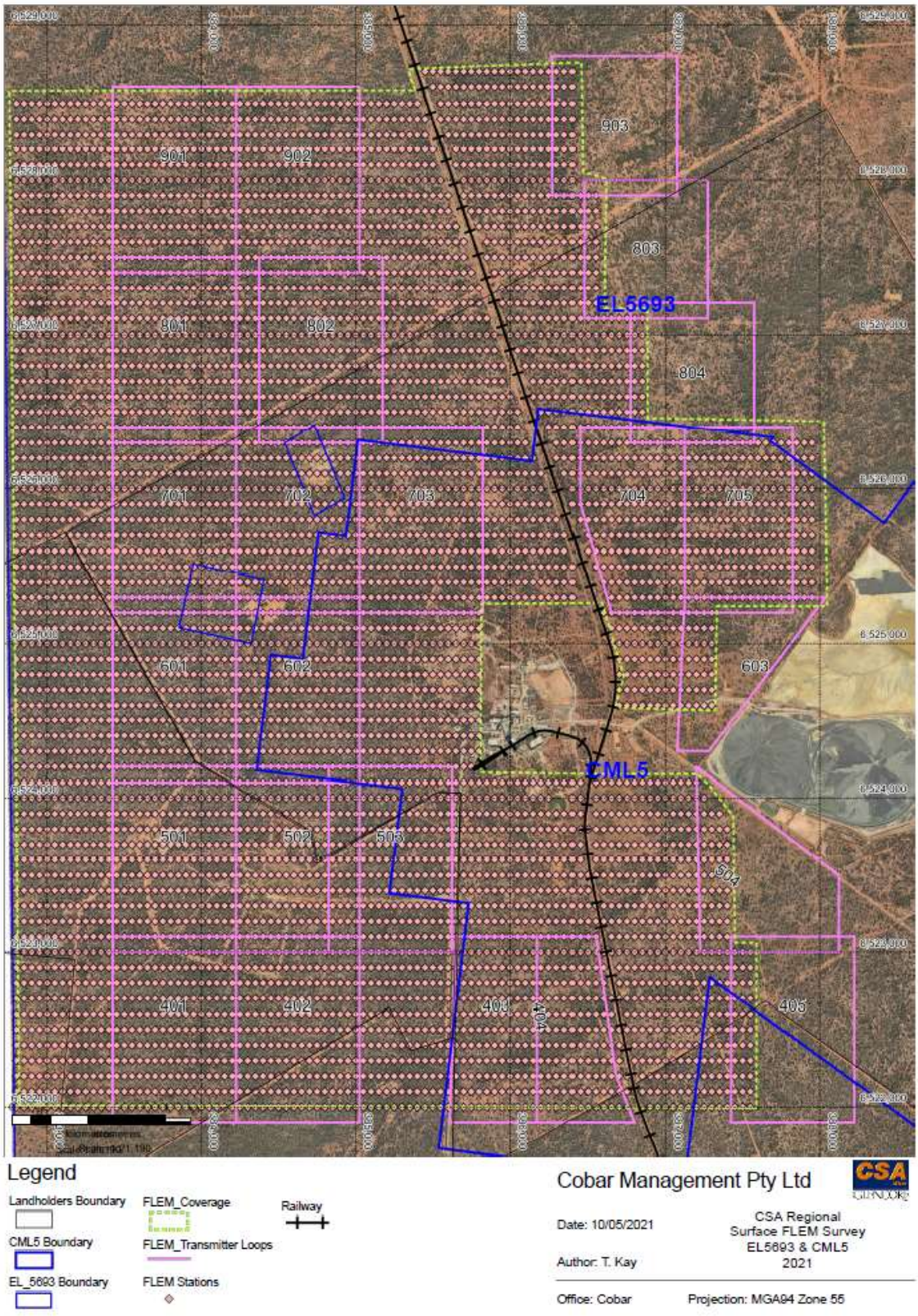


Figure 2 - 2021 Surface exploration drill collar locations.

2.2. Land Preparation

Land preparation during the reporting period proceeded in accordance with the CSA 2021 – 2022 MOP. All land preparation occurred within the existing mining disturbance zone. In total, approximately 2 ha were prepared to facilitate the vent fan infrastructure upgrade project. This project received Development Approval from Cobar Shire Council and was assessed against the Biodiversity Offsets Scheme.

2.3. Construction

Construction activities that took place at CSA Mine site for 2021 is summarised in Table 6 below.

Table 6 - 2021 Construction projects summary.

Infrastructure	Instrument of Approval
4 x Vent Fans as part of the ventilation project (started complete in 2022)	2020/LD-00049 Cobar Shire Council
New Fresh Air Rise FAR No. 2 Intake Rise System (Surface to 8720 RL) and Return Air Rise (RAR)	Part of the ventilation project approval
Extension of the underground FAR system between 8820 RL and 8500 RL.	Part of the ventilation project approval
Additional 6.0 MW of rental cooling at FAR No. 2 October 2021 to May 2023.	Temporary development <12 months as part of the ventilation project approval
Mt Brown Stockpile	2021/LD-00048 Cobar Shire Council

2.4. Mining

Table 7 summarises the mines production forecast from 2022 up to 2034. Table 2 summarises the CSA Mine's production history for 2021. Annual production was below the target for 2021 only achieving 40,433t against a planned budget of 47,573t. Copper metal production for 2022 is expected to be in excess of 42,572t. Average forecast mine production for the next four years is planned 1.2Mtpa of ore.

Table 7 - Production forecast (as of 31/12/2021).

Year	Ore (t)	Grade (%)	Cu Metal (t)
2022	1,229,114	3.46%	42,572
2023	1,239,211	3.52%	43,620
2024	1,248,938	3.74%	46,710
2025	1,240,960	3.82%	47,405
2026	1,324,288	3.54%	46,864
2027	1,350,688	4.39%	59,232
2028	1,330,670	3.92%	52,221
2029	1,349,342	3.89%	52,536
2030	1,331,223	3.78%	50,341
2031	1,294,032	4.01%	51,920
2032	1,119,904	4.28%	47,889
2033	827,431	3.81%	31,494
2034	782,106	3.20%	25,044

2.4.1 Underground Resource Status

The current mineral resource (as at 31 December 2021) is estimated at 11.7Mt, with 5.55% Cu between 9010m relative level (RL) to 8100m RL. The 8100m RL is approximately 2,180m below the surface. There is potential for further resources to exist at depth and within this RL range.

2.4.2 Estimated Mine Life

The long term (LoM) plan is to mine at a rate of 1.2 million tonnes per annum. The mining rate equates to approximately 45m vertical advance per year.

Proved and probable ore reserves (as at 31 December 2021) are estimated at 7.7Mt at 3.84% Cu between 9,200 RL to 8,395 RL, which can sustain these extraction rates over the next 6 years. Additionally, there appears to be adequate resource below this depth in the QTS North and within the QTS Central and Western system to sustain the mining rate for an additional two years (up to 2028). Therefore, the minimum mine life at full production rates are approximately 8 years, which excludes a 2-year tail end at reduced production rates.

2.4.3 Mining Equipment

Table 8 - Mining equipment list (as of 31/12/2021).

Equipment	Quantity
Sandvik Axera Jumbo	5
Atlas Copco Simba L6C Production Drill Rig	3
Atlas Copco MT5020 Dump Truck	2
EPIROC MT5020	1
Atlas Copco MT6020 Dump Trucks	8
Caterpillar IT28G Tool Carrier	1
930H Wheel Loader	2
Caterpillar 12H Grader	2
Dieci Telehandler	1
Caterpillar Elphinstone R2900 Loader (LHD)	9
Isuzu FTS 750 Water Truck	1
Isuzu FTS 550 Explosives Truck	1
Isuzu FSR 700 Stores Truck	1
Isuzu NPS300 Service Truck	2
Isuzu 1400 Water Truck	1
Kubota R21	1
Forklifts	4
Hino (Mines Rescue)	1
Terex UC15 Franna Crane	1
Normet Charmec	1
Sandvick 7-5 Cabolter Drill	1
Manitou MT1030S Telehandler	1
Volvo LF90F IT Loader	2
Volvo LF120F IT Loader	2
Roboshot Maxijet Shotcreter	2
Light Vehicles	42

2.4.4 Mining Method

The mining method used at the CSA Mine for the majority of stoping remains as top down, continuous advance, long-hole open stoping. Most stopes to date have been filled with Cemented Hydraulic Fill (CHF) and the balance is filled with development waste, either as clean waste co-disposal with CHF or as CRF. CHF has been phased out and replaced with Cemented Paste Backfill (CPB) commissioned July 2018 with full filter plant commissioning completed in November 2018. The majority of the QTS Nth stope sequences will be filled with CPB. Trials for the uses of the Modified AVOCA mining method have

been undertaken to further increase opportunities to maximise waste disposal and allow mining of marginal mining areas. Modified AVOCA mining method will be used in mining the QTS Central and Western Orebody.

2.4.5 Mine Development

During 2021, underground horizontal development advancement totalled 5,515m. The primary focus was advancing the decline towards the 8465 level; the main decline position at end of year was 40m ahead of original budget position. This advance was completed along with continuing the 8500 and 8450 levels, production-related development in QTS North, and access development to establish mining in QTS Central and Western Zone, both commencing production in Q3 2021.

Mining is almost complete above the 8700 level in the QTS North, except for some already developed remnant material between 8850 - 8950. QTS South mining is complete above the 9015 level. The economic bottom of the QTS South ore body is currently 9015.

During the 2021 reporting period, development will continue for access to the Central System and access to the Western System. Development below the 8465 level in QTS North will continue.

2.4.6 Mine Production

Production mining activities have focused on the I, J, JS, K, O, S and SN lenses of the QTS North system and from the QR1 and Q5 lens in the QTS South system during the past seven years. Stoping will continue to focus in these same lenses in QTS North during the 2021 AEMR period. Ore extraction has commenced from the Central and Western orebodies from QC1 and W4 lenses respectively. Supplementary ore has been extracted as required from other smaller QTS North lenses (M and MS) to supplement the ore supply and to provide an optimal feed grade to the mill, as allowed by mining sequences and ground stress management. A similar approach will be taken during 2021.

The QTS North ore system provided 83% of the ore produced for 2021, while the Central and Western ore zones provided 9% and 8% respectively. Actual stope performance and metal output for 2021 was below budget. Variations in monthly grades, against budgeted figures, reflect timing fluctuations of individual stopes. Table 9 shows the comparison of monthly budget and actual production performance during 2021 for the underground mine.

Table 9 - Budget vs actual production 2021.

	Budget		Actual		Variance	
	Tonnes (dmt)	Grade (% Cu)	Tonnes (dmt)	Grade (% Cu)	Tonnes (dmt)	Grade (% Cu)
Jan-21	105,112	3.92%	89,663	4.13%	-15,449	0.21%
Feb-21	78,581	4.40%	60,203	3.97%	-18,378	-0.43%
Mar-21	108,585	3.49%	74,665	4.01%	-33,920	0.52%
Apr-21	112,323	3.56%	109,586	4.60%	-2,737	1.04%
May-21	117,249	4.74%	66,710	3.35%	-50,539	-1.39%
Jun-21	100,332	4.01%	91,333	3.47%	-8,999	-0.54%
Jul-21	112,855	3.70%	82,471	3.51%	-30,384	-0.19%
Aug-21	111,616	3.45%	93,031	4.08%	-18,585	0.63%
Sep-21	110,657	3.82%	81,125	3.89%	-29,532	0.07%
Oct-21	68,298	3.43%	83,996	3.89%	15,698	0.46%
Nov-21	91,961	3.84%	111,612	3.99%	19,651	0.15%
Dec-21	114,584	3.87%	117,181	3.67%	2,597	-0.20%
2021 TOTAL	1,232,152	3.86%	1,061,576	3.90%	-170,576	0.04%

2.4.7 Backfilling and Tailings

The open stope mining method used requires cemented backfill as the main control for stope ground conditions. The behaviour of the filled mass has a significant impact on the percentage of extracted material and recoveries from processing. Cemented hydraulic fill (CHF) has been used extensively in the past at CSA from 2005 to 2018. Cemented Paste Backfill (CPB) has been used as the primary method for filling voids at CSA since 2017. CPB is produced by using low moisture slurry cake from mill tailings out of the floatation circuit. The placed backfill may be exposed both horizontally and vertically. Strength requirements and cement additions for CPB are 1.4 MPa for horizontal exposures using 10 - 12% binder addition by mass and 0.45 MPa for vertical exposures achieved with 3.0% binder addition.

Paste fill is obtained by removal of water from full stream tailings through vacuum filters to produce slurry cake. This slurry cake will be stockpiled during periods where paste is not required. The installed plant also has the flexibility to utilise reclaimed tailings to further decouple paste production from milling production.

Stopes that do not require future horizontal or vertical exposure are filled with un-cemented bulk fill only, using development waste / backfill dig out (backfill contaminated) waste. With the introduction of paste fill, the cemented hydraulic fill (CHF) plant will remain idle and maintained in a ready to operate state, to provide redundancy throughout the commissioning stage of paste fill and beyond, until such time as the paste backfill system operates optimally.

A total of 428,409 m^3 of cemented paste fill was placed into underground voids during the 2021 period. Table 10 shows monthly backfill production and final tailings deposition for the year 2021. Tailings deposition was higher than expected than expected with 904,309 dry metric tonnes (dmt) entering the tailings storage facility.

Table 10 - Backfill production and final tailings 2021.

	Backfill Production		Final Tailings	
	Cemented Paste Fill	Tailings paste	Tails Produced	Backfill Split
2021	(dmt)	(dmt)	(dmt)	(%)
Jan-21	44,206	29,752	76,418	38%
Feb-21	32,566	22,021	51,359	42%
Mar-21	36,090	24,798	64,053	38%
Apr-21	9,197	5,873	90,971	6%
May-21	54,670	36,440	57,998	62%
Jun-21	19,311	12,601	79,245	16%
Jul-21	50,968	39,679	71,144	56%
Aug-21	14,203	11,313	78,751	14%
Sep-21	12,898	8,954	68,767	13%
Oct-21	37,723	25,664	71,191	36%
Nov-21	54,438	37,049	93,970	39%
Dec-21	62,140	41,808	100,442	42%
2021 TOTAL	**428,409**	**295,951**	**904,309**	**32%**

2.5 Mineral Processing

In 2021, the budgeted production rate was 1,232,152dmt of ore, to produce 176,989dmt of concentrate and 46,537t of Cu. Actual production achieved in 2021 was below target for ore tonnes milled, with 1,061,576dmt milled, concentrate and copper produced was below budget with

157,267dmt of concentrate produced and 40,530dmt of Cu. Actual and budgeted production summary is presented in Table 11.

Table 11 - 2021 Ore processing production summary.

2021 PRODUCTION SUMMARY	Actual	Budget	Var.
Mill Throughput (dmt)	1,061,576	1,232,152	-13.8
Concentrate Production (dmt)	157,267	176,989	-11.1
Contained Copper (t)	40,530	46,537	-12.9
Feed Grade (%Cu)	3.90	3.86	1.2

The primary focus of the Ore Processing Department for 2021 was to optimise recovery through various initiatives whilst maintaining concentrate grades within target range. The primary focus for the Mining Department during 2021 was achieving the planned ore production at the budgeted grade and cost and completing critical reserve development to facilitate the planned production ramp-up. Whilst this work was undertaken a number of projects were completed or commenced in 2021 to add additional mining capacity or debottleneck operations, such as the cconcentrate regrind study.

The key projects planned for the CSA Mine in 2022 include:

- Mill Upgrade and Replacement Project
- QTS North and South exploration drilling;
- Ongoing extension of the underground seismic network;
- Major ventilation expansion works

2.5.1 Metallurgy

The milling circuit consists of two primary Semi-Autogenous (SAG) mills in either open or closed circuit as required, with hydrocyclones. A third mill of the same size is used as a ball mill when further grinding is required. After grinding, ore slurry is pumped to the flotation circuit comprising of rougher, scavenger, cleaner and re-cleaner stages that use mechanically agitated flotation cells. One bank of Wemco rougher cells, one bank of FLSmidth rougher cells and one bank of Outotec scavenger tank cells float the sulphides until generating a final tail that is sent to the tailings thickener. Two Jameson Cells perform the final cleaning of concentrate. Recovery of Cu minerals, mainly chalcopyrite, is excellent with typically 96% to 98.5% of the Cu and around 80% of the silver recoveries. The concentrate grade generally ranges between 25 - 29% Cu and 72 - 88g/t silver (Ag) depending on the mineralogy of the ore. Metal Recovery for 2021 is shown in Table 12.

Table 12 - Metal recovery 2021.

	Tonnes Treated	Feed		Metal		Concentrate		
		Grade		Recovery		Production		
2021	**dmt**	**Cu (%)**	**Ag (g/t)**	**Cu (%)**	**Ag (%)**	**dmt**	**Cu (%)**	**Ag (g/t)**
Jan	89,663	4.13	15.84	98.22	83.01	13,245	27.47	88.98
Feb	60,203	3.97	16.89	98.15	78.90	8,844	26.55	90.71
Mar	74,665	4.01	17.22	97.65	76.09	10,611	27.57	92.22
Apr	109,586	4.60	20.16	97.44	74.82	18,615	26.40	88.78
May	66,710	3.35	12.48	97.33	82.85	8,712	24.94	79.16
Jun	91,333	3.47	14.41	97.99	78.70	12,088	25.71	85.70
Jul	82,471	3.51	14.50	97.23	85.85	11,327	24.84	90.64
Aug	93,031	4.08	17.71	97.83	84.90	14,279	25.99	97.97
Sep	81,125	3.89	18.89	98.25	84.05	12,358	25.09	104.24
Oct	83,996	3.89	16.67	98.18	89.88	12,806	25.05	98.29
Nov	111,612	3.99	18.63	97.87	73.54	17,642	24.71	86.68
Dec	117,181	3.67	14.80	98.30	83.36	16,740	25.27	86.37
Total	1,061,576	3.90	16.65	97.88	80.84	157,267	25.77	90.83
2022 Estimate	1,229,114	3.48	14.92	97.96	78	159,922	26.20	89.45

Flotation concentrate is pumped to a conventional thickener where it is dewatered. Thickener underflow is pumped to a Filter Feed Tank. This slurry is pumped to two pressure Filters where water is removed. The filtered concentrate is discharged and trammed to stockpiles located within either of two concentrate storage sheds. The concentrate has a moisture content of approximately 9.5%. Reagent consumption figures for ore processing in 2021 are provided in Table 13.

Table 13 - Reagent consumption 2021.

2021	Reagent Consumption (t)			
	Grinding Media	Flocculent	Collector	Frother
Jan	71	0.82	1.50	0.18
Feb	70	0.60	0.99	0.18
Mar	137	0.63	1.88	0.27
Apr	107	0.65	1.80	0.24
May	63	0.95	0.82	0.10
Jun	104	0.70	1.19	0.09
Jul	42	0.60	1.00	0.16
Aug	50	0.83	1.11	0.20
Sep	85	0.75	1.33	0.28
Oct	57	0.68	1.56	0.25
Nov	68	1.00	1.78	0.20
Dec	72	2.75	1.88	0.20
Total	927	10.95	16.85	2.37

2020	Reagent consumpstion tonnes (t)				
	Grinding Media	Collector	Frother	Flocculent	Cemenet
Jan	74.705	0.99	0.23	1.05	0.65
Feb	68.37	0.99	0.18	0.725	1.65
Mar	75.12	1.98	0.39	0.925	2.65
Apr	76.55	1.98	0.31	0.85	3.65
May	63.495	0.99	0.43	1.1	4.65
Jun	80.31	0.00	0.30	1.775	5.65
Jul	76.515	2.98	0.34	1.525	6.65
Aug	52.355	1.98	0.21	0.625	7.65
Sep	84.695	0.00	0.25	1.25	8.65
Oct	65.34	1.98	0.33	0.675	9.65
Nov	77.595	0.99	0.28	0.8	10.65
Dec	77.49	1.98	0.53	0.8	11.65
Total	872.54	16.86	3.76	12.1	73.8

2.5. Waste Management

The waste streams generated by the CSA Mine can be broken down into the following categories:

- General waste and Recycling (paper, cardboard, PET/HDPE plastics, aluminium, glass, tin, fluorescent lights and printer cartridges); Collected by JR Richards.
- Industrial waste (steel and batteries); Collected by Culph Metal recycling.
- Hydrocarbon waste (oil, grease, filters); Collected by JR Richards.
- Sewerage; Collected by Copper City Contracting.
- Waste rock; stored onsite at mt brown WRD.
- Process tailings: stored onsite at the STSF.

All waste removed from site is removed in line with current legislation and disposed of at appropriate facilities, while mining related waste, such as tailings and waste rock, is disposed of onsite within an approved facility. Sections 2.6.1 to 2.6.4 breakdown each waste stream and discuss how much waste was generated during 2021, who the licenced removal contractor is, and the final disposal location. During 2021, all waste generated by operations at the CSA Mine, apart from waste rock and tailings, was removed offsite for final disposal or recycling. The volumes of each waste stream generated during 2020 and 2021 are highlighted in Table 14.

Table 14 - Annual waste summary.

Waste type	2020	2021
General Waste (kg)	345,795	310,840
Recyclables (kg)	10,040	10,335
Scrap Steel (kg)	525,000	387,000
Batteries (kg)	12,500	0
Transformers (kg)	14,000	6,000
Waste Oil (L)	157,200	113,236
Waste Grease (kg)	708	17,358
Hydrocarbon Products Recycled (kg)	9138	15,954
Hydrocarbon Waste (kg)	17,056	24,151
Sewage (L)	279,100	277,700

2.6.4 Underground Waste Rock

The underground mining operations produce approximately 200,000-300,000t of waste annually. Wherever possible, waste is directly disposed of into underground voids left by stoping operations. On occasion, the volume of waste rock generated by development exceeds the volume of void produced by stoping operations and the void volume that becomes available as existing workings become

redundant. The waste rock brought to surface is stored in stockpiles at the TSF for use in future wall lifts. In 2021, 52,981 dmt of underground waste rock was hoisted to surface.

2.6. Ore and Product Stockpiles

2.7.1 Ore Stockpiles

Ore hoisted to surface is stored in any of four concrete, open topped storage bins. Total capacity is approximately 7,000 wmt.

2.7.2 Product Stockpiles

Flotation concentrate is stored in either of the two concentrate storage sheds, with a combined storage capacity of approximately 35,000 wmt. The sheds are covered and partially enclosed, which assists in the minimisation of dust generation. Each shed has a concrete floor and wall bunds, which minimises concentrate losses to the environment. Approximately 21,787 dmt of Cu concentrate was stored in the concentrate storage sheds as of 31st December 2021 (Table 15).

Table 15 - Copper Concentrate Stored on Site 2021

Concentration Stocks on Site		
EOM	**Dry Tonnes**	**Wet Tonnes**
Jan	3649	3987
Feb	2041	2232
Mar	4540	4955
Apr	8436	9241
May	6727	7394
Jun	4244	4642
Jul	5504	6095
Aug	7344	8060
Sep	3196	3537
Oct	5500	6039
Nov	11695	12861
Dec	21787	24017

Table 16 summarises stockpile estimates and waste production at the CSA Mine for 2021 and the estimate for 2021. It should be noted that due to a lack of survey capability onsite, the 2019 and 2020 stockpile volumes for topsoil were estimated. A survey completed at the end of 2021 confirmed the actual volumes, and as such the data has been updated to reflect physical stored volumes onsite, which are less than what was reported in previous AEMR's.

Table 16 - Cumulative waste and material production.

	Cumulative Waste & Stockpile Production		
	Start of 2021 reporting period	**End of 2021 reporting period**	***End of 2021 reporting period (estimate)***
Topsoil generated (m^3)	95,327	95,327	*100,000*
Topsoil used / spread (m^3)	0	0	0
Waste Rock (t) (surface hoisted/trucked)	967,788	1,020,769	TBD
Ore (milled) (dmt)	16,448,328	17,509,904	TBD
Processing Waste (tailings) (dmt)	10,031,244	10,935,553	TBD
Backfill (dmt)	5,381,431	5,809,841	TBD
Cu Concentrate (dmt)	2,856,944	3,014,211	TBD

2.7. Water Management

CMPL manage CSA Mine's water in accordance with the conditions stipulated in Environmental Protection license 1864.

2.8.1 Raw Water Supply

A total of 916,817 kL of raw water was supplied to CSA Mine in 2021. This represents an increase of approximately 7 % and 5 % compared to 2020 (850,137) and 2019 (874,470 kL) respectively. The increase in raw water usage was because of a utilisation of groundwater bores in 2019 and 2020 due to drought conditions. A summary of annual raw water supply and water storages is shown in Tables 17 and 18 respectively. CMPL possess a current entitlement of 1,356ML/year of high security water under the Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source. A 30% loss is incurred on this allocation, i.e. maximum raw water supply is 950ML/year. CMPL's water access licenses are summarised in Table 19.

Table 17 - 2021 Raw water supply.

Month	Usage (kL)
January	96,564
February	87,760
March	80,006
April	65,751
May	81,196
June	89,540
July	76,532
August	62,300
September	63,079
October	70,121
November	76,695
December	67,273
Total	916,817

Table 18 - Water storage 2021.

Stored Water	Volumes Held (ML)		
	Storage Capacity	Start of 2021 Reporting Period	End of 2021 Reporting Period
Old Mine Water Dam MPL1093 (S15)	25	4.00	9
Old Mine Water Dam MPL 1094 (S16)	9	3.00	9
TSF Stormwater Collection Dam (S11)	5.00	0.30	1.5
Raw Water Storage Tank (S2)	1.00	0.80	0.95
Borrow Pit Dam (S4)	10.2	0.81	2
Wash Bay Evaporation Pond	0.05	0.02	0.05
Railway Dam (S8)	4.79	0.27	4.79
Retention Dam (S9)	2.99	0	2.5
Old Smelter Runoff Dam (S13)	2.04	0	1.5
North Runoff Dam (S10)	1.34	0	1
Old CSA Spoils Dam (S1)	4.66	0.20	3.5
Pork Pie Dam (S14)	23.4	21.00	22.00
TSF Decant Dams (combined) (S5)	93.00	25.02	45
Operational Water Dam (settling ponds)	7	5.02	5
Total	**189.47**	**60.44**	**107.79**

Table 19 - CSA Mine water access licences.

License Number	Source	Category	Allocation
WAL36335	Macquarie and Cudgegong Regulated Rivers Water Source	Regulated River - High Security	542.4 units
WAL36336	Macquarie and Cudgegong Regulated Rivers Water Source	Regulated River - High Security	813.6 units
WAL28539	Lachlan Fold Belt MDB Groundwater Source	Aquifer	300 units
WAL28887	Lachlan Fold Belt MDB Groundwater Source	Aquifer	210 units

2.8.2 Groundwater Sources

CSA Mine extract groundwater from 13 abstractions across Borefields 1 and 2, 3 (see figure 3). CMPL possess a 510 ML groundwater allocation for the Lachlan Fold Belt MDB Groundwater Source as indicated in Table 21. Rates of abstraction are informed by in house draw down and sustainable yield studies. An analysis of aquifer refill and drawdown, and site geology characteristics, suggests that the groundwater is contained in fractured rock aquifers, which infers that a multitude of separate, viable groundwater resources may exist along fault formations within the CSA site.

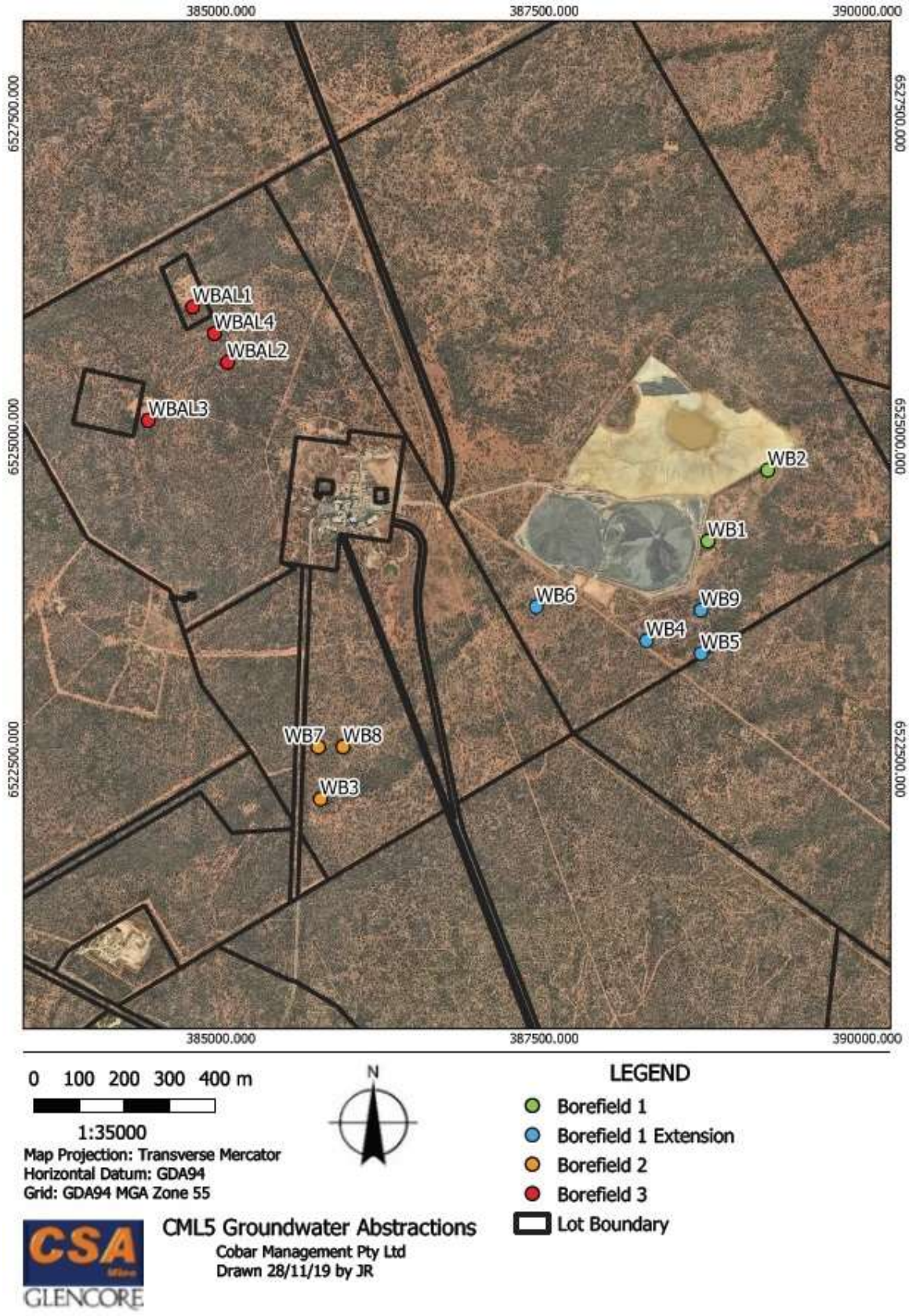


Figure 3 - CSA Mine groundwater abstractions.

2.8.3 Water Balance.

CMPL maintain a water balance model to be used in reporting and as a forecasting tool. The water balance model is informed by the collection of regular water transfer meter readings. By correlating data obtained from these readings with outputs from specific plant, a relationship between water usage and mining and ore processing parameters can be established and future water requirements more accurately estimated. Currently, reticulation volumes are measured with mechanical flow meters located at inflows and outflows of interest. The water balance model is continuously reviewed to ensure that it captures any modifications to water distribution. Water consumption and basic reticulation data are summarised in Table 20.

Table 20 - Water balance output.

Item	2015	2016	2017	2018	2019	2020	2021
Inflows (ML)							
Raw Water Supply	882	883	961	883	874	850	916
Bore Water Supply	-	-	-	108	146	102	68
Water Recycled	418	384	337	232	259	462	191
Mine Raw Water Consumption	399	413	375	294	584	485	520
Mill Raw Water Consumption	456	324	401	475	309	462	262
Surface General Raw Water Consumption	362	49	31	111	113	66	60

2.8. Hazardous Materials Management

CMPL holds a Dangerous Goods Notification for the CSA Mine. Current WorkCover licensing requirements for hazardous materials and dangerous goods management in NSW requires the CSA Mine to submit an annual Notification of Dangerous Goods on Premises form to notify WorkCover of Hazardous and Dangerous Goods stored on the premises.

Monthly inspections are undertaken to ensure that Dangerous Goods storage areas meet the requirements discussed above. The findings of the inspections are actioned to area supervisors, and a time frame given to remedy any compliance issues. Throughout 2021, inspections identified minor issues relating to general housekeeping (example; few chemicals not stored on bunds), restocking of spill kits, the availability of Safety Data Sheets (SDS) for chemicals, and minor hydrocarbon spills on premises. All these minor issues were rectified.

In addition, to the monthly inspections, the CSA Mine conducts a yearly audit on all dangerous goods storage locations. The audit is designed to ensure that the requirements for the storage of dangerous goods and hazardous substances are met onsite. The main issues identified in the 2021 audit were the location of SDS', general housekeeping, spill kits needing restocking or not available, incorrect storage and inadequate signage. The issues identified were rectified.

2.9. Other Infrastructure Management

During 2021 various pieces of redundant infrastructure such as metals, batteries, insulated electrical wires, wooden pallets etc. were removed from site and transferred to a scrap facility.

3. ENVIRONMENTAL MANAGEMENT AND PERFORMANCE

3.1. Air Quality

The objective of air quality management at the CSA Mine is to minimise the generation of airborne nuisance dust and other contaminants. To this end the CSA-HSET-MP-1002 *Surface Dust Management Plan* and the *CSA-MIN-MP-2005 Air Quality; Dust and Other Contaminants Plan* has been developed to establish a monitoring guideline and control procedure for activities with the potential to generate emissions. Identified emission point sources include material handling and storage, operation of mobile equipment, drilling, blasting and ventilation exhaust.

Typical controls included in the aforementioned management plans include:

- Watering of trafficked areas, haul roads and material stockpiles, and the application of dust suppression additives and road sealant where practicable;
- Management of stockpiles such that the ratio of volume to surface area is maximised as best as is practicable i.e. preference is shown to increasing circumference of stockpiles as opposed to height;
- Reverse Circulation surface drill rigs are equipped with a twin cyclone system and a filter box, and are maintained to specification;
- Water droppers are utilised to ensure underground surfaces are kept moist and thus particulate volume brought to the surface via ventilation exhaust is minimized; and
- Minimising surface disturbance by restricting vegetation clearing and top soil removal.

CMPL maintain a network of 16 depositional dust gauges to monitor compliance against the 4 g/m^2/month dust threshold specified by the EPA. Supplementary high volume air samples are also recorded when required. Air quality sampling is undertaken in accordance with AS 3580.10.1 (2003).

The locations of the deposition gauges are listed below and depicted in Figure 4 and a view of the gauge is shown in Figure 5;

- D1 – North-eastern corner of the STSF;
- D2 – North-eastern boundary wall of the NTSF;
- D3 – North-east of the concentrate loading shed;
- D4 – West of the administration building;
- D5 – Adjacent the TSF booster hopper;
- D6 – South-central of the STSF;
- D7 – Adjacent the TSF haul road;
- D8 – North-central of the NTSF;
- D9 – Adjacent the underground decline;
- D10 – Adjacent the backfill plant;
- D11 – North of the Paste Fill Plant;
- D12 – East of the Paste Fill Plant;
- D13 – North-eastern boundary of Red Tank property; and
- D14 – Eastern boundary of CML5.
- D15 – New boundary identified in CML5
- D16 – New boundary identified in CML5

Dust deposition rates for the 2021 recording period is displayed in Table 21. In 2021, samples were routinely collected on a monthly basis and were analysed by an external NATA accredited laboratory for determination of dust composition and mineral content.

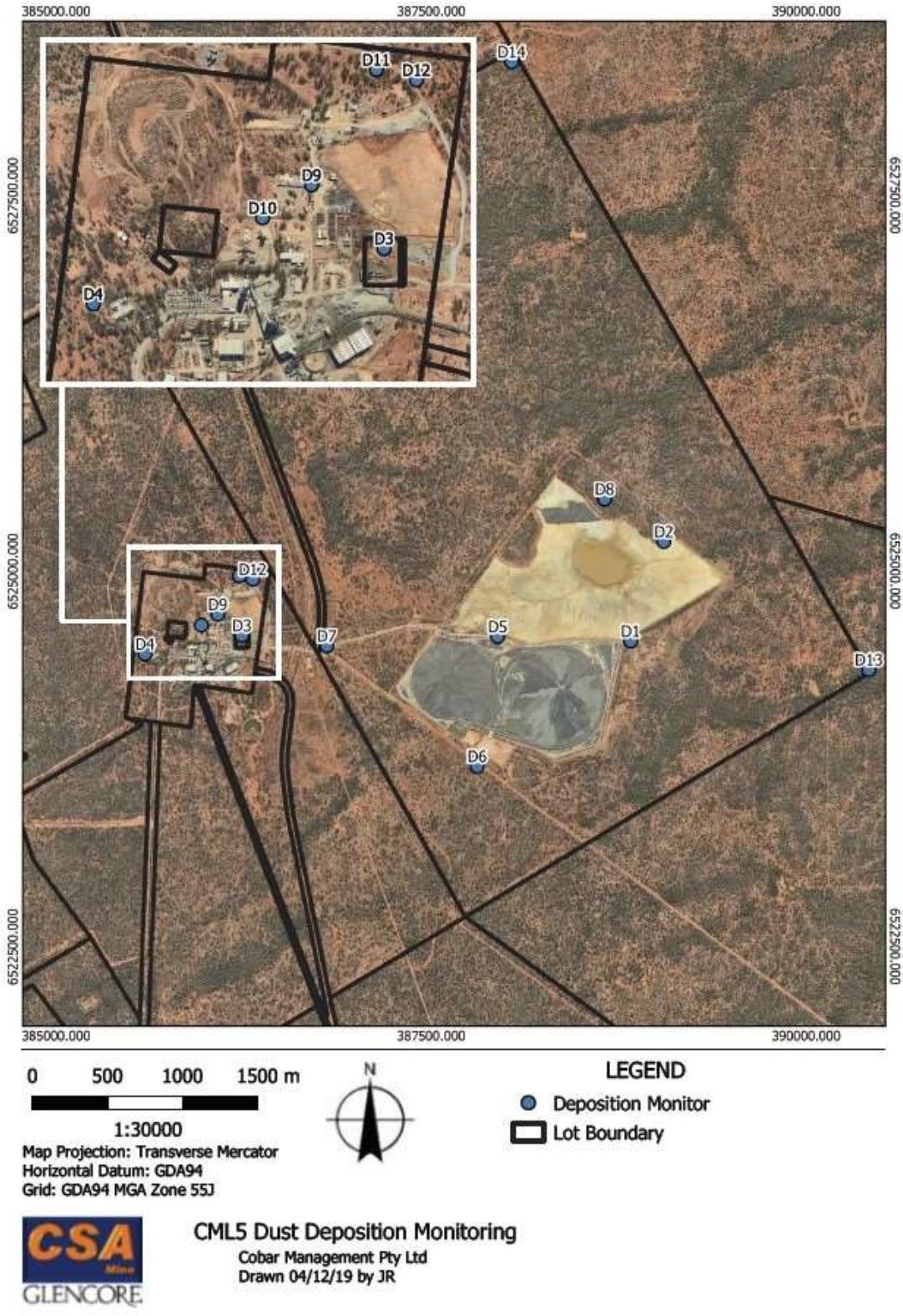


Figure 4 - CSA Mine dust deposition monitoring network.

Figure 5 - Dust deposition gauge.

Table 21 - Tabulated dust deposition data for the 2021 period.

Monitor	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16
Month	**Ash Content (g/m²/month)**															
Jan	1.4	2.1	3.4	1	1.4	1	3.2	1.4	4.1	4.5	4.5	8.5	1	3.6	1.3	2
Feb	8.1	1.6	2.7	1.9	2.5	2.1	2.9	1.9	4.5	4.3	4.4	5.9	1.3	2.1	1.8	2.1
Mar	0.5	1	1.2	0.8	3.1	0.6	1.5	1.3	2.8	3.5	6.8	5.8	0.7	0.8	0.9	1.3
Apr	0.4	0.1	0.5	0.4	0.4	0.2	0.7	0.3	2.7	3	1.6	1.1	0.2	0.5	0.2	0.4
May	0.5	0.2	0.8	0.3	1.2	0.3	1.2	0.3	2.1	2.5	1.8	2.3	0.2	0.3	0.3	2.1
Jun	1.5	1.1	1.2	0.4	1.3	0.3	0.6	0.6	4.2	2.5	1.6	3.3	0.2	0.5	0.4	0.5
Jul	5.5	0.4	0.4	0.2	0.5	0.1	0.2	0.1	1.9	1.4	0.5	0.5	0.2	0.1	0.2	0.2
Aug	5.7	3	0.7	0.3	1.1	0.3	0.5	1.3	1.9	3.9	1.1	1.1	0.2	0.3	0.4	0.4
Sep	1	0.4	0.8	0.4	0.9	0.3	0.4	0.3	2	1.9	1.2	2.5	0.2	0.4	0.3	0.3
Oct	5.1	1.1	1.3	0.8	2.2	0.6	1.2	0.8	3.4	3.5	6.2	4	0.6	0.8	0.9	1.3
Nov	21.9	1.8	1.4	1	0.9	0.6	0.7	1	2	3.9	3	2.7	0.7	1.8	1	1.3
Dec	0.9	0.5	0.7	0.7	1.4	0.3	0.5	0.5	2.4	2.2	1.5	1.4	0.4	0.6	0.5	0.8

There were a total of 16 exceedances in 2021 (shaded in red – Table 21) which is significantly less when compared to 2020, which had 51. This reduction is attributed to better dust management practices onsite, which have included a new dust suppressant additive, frequency of water trucks increased, highly trafficked roads were gravel sealed, and the wetting frequency of tailings reclaim stockpiles at the Paste Fill Plant was increased.

CSA Mine also uses an additional ambient air quality monitoring station or EBAM (Figure 6), set up in 2019 which is located in the centre of site. This unit measures PM_{10} dust particulate emissions continuously and a monthly NATA accredited report is provided by and external consultant. The EBAM station records average daily PM_{10} dust emissions. These values are compared with the National Environment Protection Measures (NEPMs) standard of daily PM_{10} dust emissions of 50 µg/m³. All exceedances are recorded.

Figure 6 - EBAM Dust monitoring station.

The dust exceedances recorded on site in 2021 could be attributed to ongoing drought conditions in Cobar, above average wind run, increased haulage of excess waste rock, material storage associated with the commissioning and running of the Paste Fill Plant and the general construction works on site.

3.2. Erosion and Sediment

The drainage system at CSA Mine has been designed such that all potentially contaminated and/or sediment laden water reports to a fit for purpose receptacle and no off-site discharge occurs. The drainage system is comprised of open channel drains, pipes, pits and dams constructed according to the drain and channel sizing and lining, rock armouring and other erosion mitigation guidelines outlined by Golder in a 2017 site drainage review. Said review, received by CMPL in September of 2017, identified that the CSA Mine is comprised of five distinguishable catchments as per Figure 11. Of particular note, the north-eastern catchment which now encompasses the mine decline portal, paste fill plant and excised area *Big Mt Brown* was found to drain to depressions adjacent the road that formed the eastern boundary of the catchment. Following the commissioning of the Paste Fill Plant it was determined that this catchment should be retrofitted into the primary site catchment, which drains to the Borrow Pit Dam, given the potential of contamination associated with tailings stockpiling at the Paste Fill Plant. This work was completed in early 2019.

Erosion and sediment control inspections are conducted by the CMPL Environment Department within 24 hours after a large rainfall event (greater than 25 mm over 24 hours). A visual inspection is of key water storages, drainage channels and bunds across site is performed to identify any erosion damage, drainage issues, blockages, storage capacities, and risks of overflow or discharge. Corrective actions are assigned with priority given to those that maintain the capacity of storages and minimise the risk of damage to the structural integrity of facilities. An Erosion Inspection Record Sheet (FRM-285) is used to document the results of erosion inspections and record corrective actions identified during the inspection.

Only two significant rainfall events approximately 44.2 mm and 30 mm occurred on 4th April, 2021 and 30th April, 2021 respectively. Erosion inspections were conducted and no significant erosion or drainage impediments were identified.

The TSF is not included as part of the site Stormwater Management Plan because all drainage, erosion and water catchment issues are dealt with through the TSF Operations Plan, dam engineers, surveyors and DSC surveillance reports. The TSF is monitored for structural erosion in the 3 - monthly compliance surveys. In addition, weekly monitoring and inspections are done by the Ore Processing Superintendent after rainfall events exceeding 25 mm in a 24-hour period. Furthermore, a general TSF inspection occurs twice per 12 - hour shift by Mill Operators.

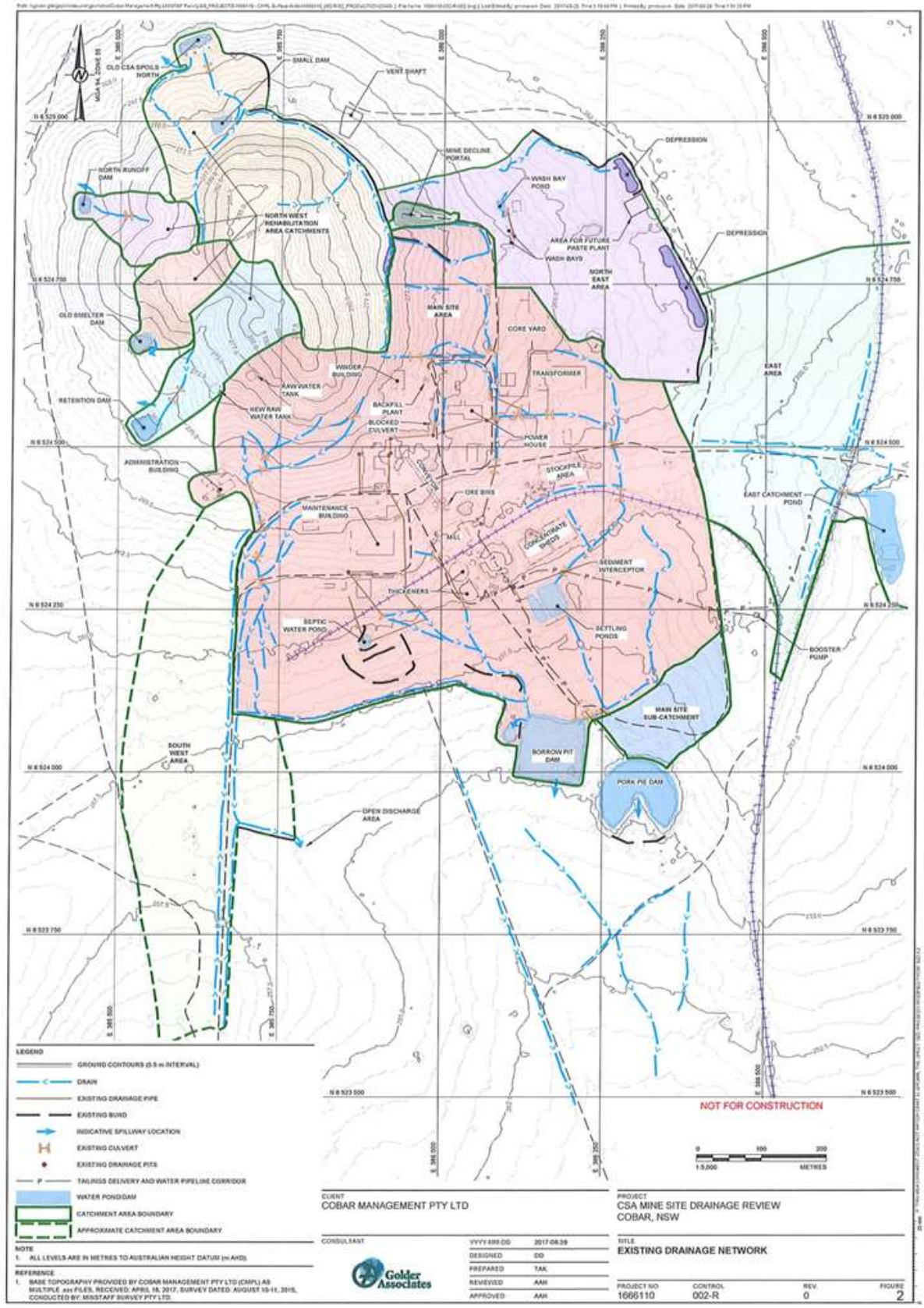


Figure 7 - Site catchments as per Golder drainage report.

3.3. Surface Water Monitoring

CMPL undertake routine surface water monitoring to demonstrate compliance with the conditions of EPL1864 and to provide data to assess the efficacy of site water management practices. Surface water bodies in CML5 do not extend into adjacent land parcels and do not supply a purpose outside of the mining and milling activities at CSA. As CSA does not discharge contaminated water offsite, a number of surface water bodies serve as contaminated water receptacles. The nearest neighbouring water bodies are Yanda Creek 15km east of the TSF, and Buckwaroon Creek 40 km south-west of CML5. Both of these water bodies are ephemeral in nature.

Surface water sampling is conducted as per the principles enunciated in the Standards Association of Australia AS/NZS 55567:1:1998. In lieu of baseline data or a reference water body, monitoring analytes are compared against the short-term trigger values for general water use stipulated in the Australian and New Zealand Environment and Conservation Council (ANZECC, 2000) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCAN, 2002) Guidelines for Fresh and Marine Water Quality (See table 22). Surface water sampling points in CSA Mine is shown in Figure 12.

Table 22 - Adopted surface water quality guidelines.

ANZECC (2000) ***Guidelines for Irrigation and General Water Use***	
pH	6-9
Electrical Conductivity (µS/cm)	7,700
Copper (mg/L)	5
Iron (mg/L)	10
Lead (mg/L)	5
Sulphates (mg/L)	1,000
Zinc (mg/L)	5

Water quality is monitored at 12 sites every quarter and it is briefly described in Table 23 and Figure 8. Given the ephemeral nature of several of the water bodies, routine samples are often not practicable. As such, the monitoring program is supplemented by spontaneous sampling after rainfall whenever the opportunity presents. Sampling is conducted by a member of the Environment Department. A field analysis is performed to determine pH, and a sample sent to a NATA accredited laboratory to determine Electrical Conductivity (EC), turbidity, Copper, Iron, Lead, Zinc and Sulphate content.

Table 23 - Surface water sampling locations.

Sampling Location	Nature
S1 - Catch Dam North of Old CSA Spoils	Ephemeral drainage basin for the excised area Little Mt Brown
S2 - 1ML Tank	Contained & externally supplied via the Cobar Water Storages
S4 - Borrow Pit Dam	Primary site drainage basin
S5 - TSF Decant Dam	STSF drainage basin
S8 - Railway Dam	Ephemeral drainage basin adjacent to the TSF access road
S9 - Retention Basin	Ephemeral drainage basin for the excised area Little Mt Brown
S10 - North Runoff Dam	Ephemeral drainage basin for the excised area Little Mt Brown
S11 - STSF Stormwater Catchment	Ephemeral drainage basin for the south-western outside embankment of the STSF.
S13 - Western Runoff Dam	Ephemeral drainage basin for the excised area Little Mt Brown
S14 - Pork Pie Dam	Primary site process water storage facility
S15 - Old Mine North Dam	Ephemeral rainwater basin
S16 - Old Mine South Dam	Ephemeral rainwater basin

Samples collected from site S2 are taken directly from the 1ML Raw Water Tank, which is the store for the CSA Mine's incoming external water. The CSA Mine has no control over the chemical properties of the incoming water, and therefore exceedances detected in these S2 samples are assumed to be the naturally occurring levels in the uncontaminated water supply. Additionally, S15 and S16 are classified as undisturbed catchments; therefore samples taken from these storages provide suitable baseline data for comparative analysis for other surface water catchments on site.

The 2021 surface water results are in line with the dams designated use (i.e. contaminated storages) and as such have slightly elevated levels of zinc and sulphates. Drought conditions in 2021 have allowed contaminants to become concentrated within storages with few dilution events. Consequently, some of the surface water results show values slightly greater than the ANZECC Guidelines as seen in Table 24.

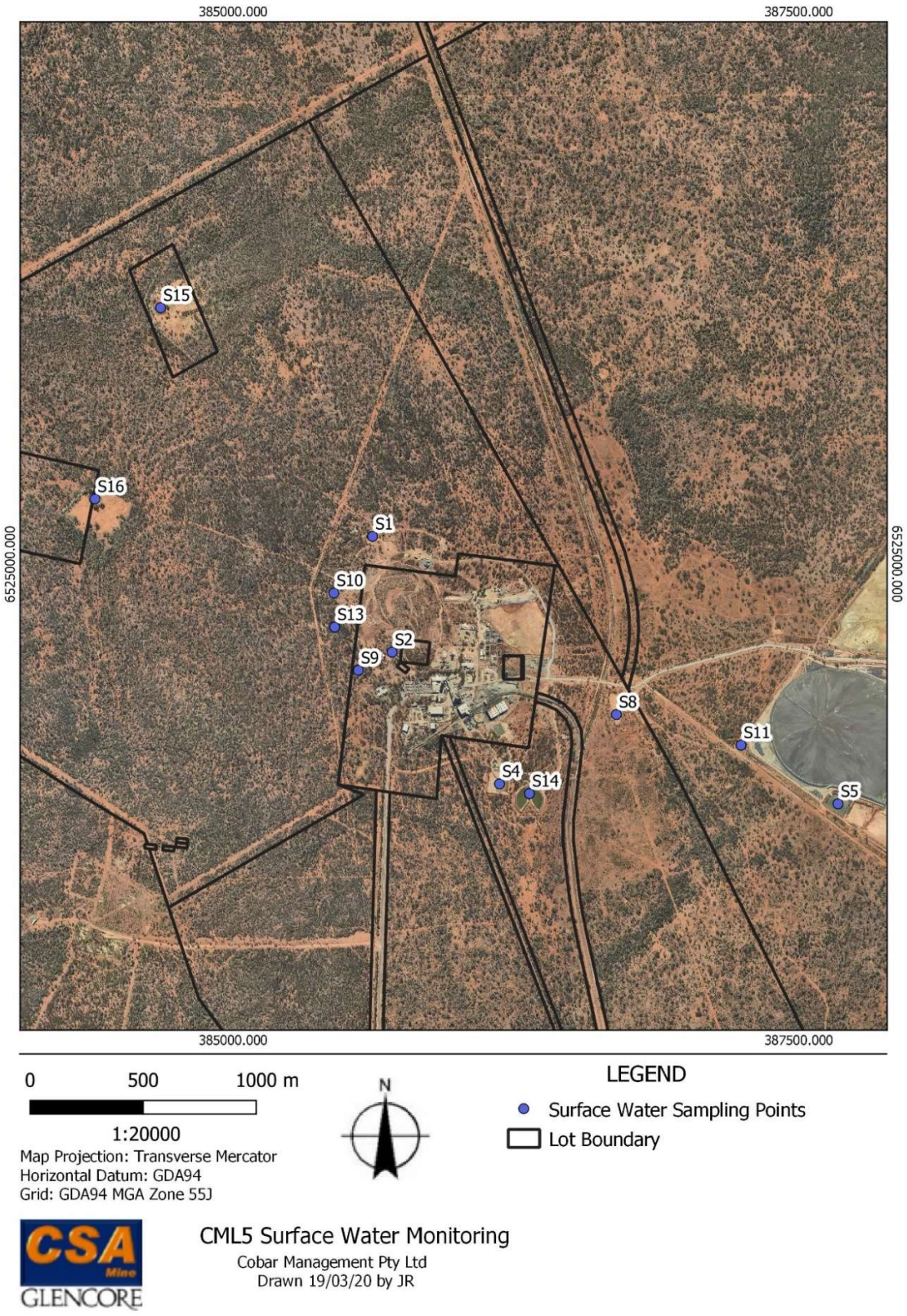


Figure 8 - CSA Mine surface water sampling locations.

Sampling Location	Parameter	pH		Electrical		Total Copper		Total Iron (mg/L)		Total Lead (mg/L)		Sulphates (mg/L)		Total Zinc (mg/L)		Turbidity	
ANZEEC Guideline		6-9		7,700		5		10		5		1,000		5		100	
Year		2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021
S1 - Catch dam North of old CSA spoils	Average	3.75	3.55	1390	1400	10.50	12.70	N/A	2.49	0.06	0.04	676	870	53.60	54.15	2	1
	(± Std Dev)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Minimum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Maximum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
S2 - Raw Water Tank	Average	8.45	7.32	480	346	0.87	0.00	0.33	1.27	0.00	0.00	25	12	0.58	0.05	2	4
	(± Std Dev)	0.37	0.75	51	12	1.74	0.00	0.48	0.86	0.00	0.00	3	1	1.11	0.07	1	4
	Minimum	7.91	6.79	446	337	0.00	0.00	0.06	0.66	0.00	0.00	22	11	0.01	0.00	2	1
	Maximum	8.75	7.85	556	354	3.48	0.00	1.04	1.88	0.01	0.00	28	12	2.24	0.10	4	6
S4 - Borrow Pit Dam	Average	7.62	6.31	2318	3385	2.35	0.68	0.76	1.17	0.02	0.03	916	1140	3.21	0.93	21	6
	(± Std Dev)	0.86	2.26	1090	1082	2.89	0.82	0.89	1.50	0.02	0.04	566	581	4.06	1.04	29	0
	Minimum	6.22	4.71	730	2620	0.62	0.11	0.14	0.11	0.01	0.00	268	729	0.31	0.20	4	6
	Maximum	8.53	7.91	3560	4150	7.42	1.26	2.08	2.23	0.05	0.06	1700	1550	10.30	1.67	72	6
S5 - TSF Decant Dam	Average	7.86	7.57	11767	4970	0.20	0.03	0.68	0.49	0.01	0.00	5010	2020	0.07	0.22	3	3
	(± Std Dev)	0.56	0.16	3202	2277	0.35	0.02	1.10	0.40	0.01	0.00	1155	1018	0.10	0.30	4	3
	Minimum	7.38	7.45	8500	3360	0.00	0.02	0.05	0.20	0.00	0.00	3850	1300	0.01	0.01	0	1
	Maximum	8.47	7.68	14900	6580	0.61	0.05	1.95	0.77	0.02	0.00	6160	2740	0.18	0.44	8	5
S8 - Railway Dam	Average	6.66	6.54	981	290	5.45	0.45	0.49	0.33	0.01	0.01	389	114	3.10	0.45	3	10
	(± Std Dev)	1.90	N/A	201	N/A	5.60	N/A	0.43	N/A	0.01	N/A	145	N/A	3.62	N/A	1	N/A
	Minimum	4.48	N/A	831	N/A	0.00	N/A	0.18	N/A	0.00	N/A	271	N/A	0.01	N/A	2	N/A
	Maximum	7.99	N/A	1210	N/A	11.20	N/A	0.79	N/A	0.02	N/A	551	N/A	7.08	N/A	4	N/A
S9 - Retention Basin	Average	4.05	5.60	699	794	1.94	2.78	N/A	0.48	0.54	0.46	350	459	16.80	20.70	1	1
	(± Std Dev)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Minimum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Maximum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
S10 - North Run off Dam	Average	5.28	5.30	228	215	5.45	0.44	N/A	0.17	0.72	0.02	62	87	2.46	3.92	235	8
	(± Std Dev)	N/A	N/A	N/A	N/A	5.60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Minimum	N/A	N/A	N/A	N/A	0.57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Maximum	N/A	N/A	N/A	N/A	0.57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
S11 - STSFE Stormwater Catchment	Average	6.71	6.88	315	328	0.31	0.47	N/A	0.27	0.23	0.00	174	83	1.95	0.22	213	2
	(± Std Dev)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Minimum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Maximum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
S13 - Western Run-off Dam	Average	N/A	5.60	N/A	285	N/A	0.42	N/A	3.68	N/A	0.18	N/A	113	N/A	3.66	N/A	187
	(± Std Dev)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Minimum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Maximum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
S14 - Pork Pie Dam	Average	7.79	7.42	6635	2820	0.29	0.43	0.21	0.92	0.00	0.01	2543	778	1.29	1.46	4	5
	(± Std Dev)	0.28	0.52	2267	127	0.21	0.04	0.13	0.13	0.00	0.00	961	47	2.30	0.48	2	0
	Minimum	7.55	7.05	4740	2730	0.13	0.40	0.05	0.82	0.00	0.00	1600	744	0.09	1.12	2	5
	Maximum	8.20	7.79	9850	2910	0.58	0.45	0.37	1.01	0.01	0.01	3800	811	4.74	1.80	5	5
S15 - Old Mine Water Dam (MPL 1093)	Average	7.11	6.87	52	67	0.04	0.04	5.89	3.88	0.03	0.01	2	13	0.13	0.23	232	258
	(± Std Dev)	0.77	0.00	25	10	0.00	0.03	N/A	3.94	0.00	0.01	1	1	0.00	0.23	93	198
	Minimum	6.56	6.87	34	60	0.03	0.01	5.89	1.09	0.03	0.01	1	12	0.13	0.07	166	118
	Maximum	7.65	6.87	70	74	0.04	0.06	5.89	6.66	0.03	0.02	2	14	0.13	0.40	297	398
S16 - Old Mine water Dam (MPL 1094)	Average	7.59	6.60	189	73	0.32	0.08	10.47	3.39	0.78	0.13	5	20	0.12	0.13	496	182
	(± Std Dev)	1.33	0.00	155	21	0.47	0.07	14.04	4.38	1.21	0.16	6	10	0.13	0.01	725	239
	Minimum	6.14	6.60	26	58	0.04	0.03	0.54	0.29	0.05	0.02	1	13	0.01	0.13	22	13
	Maximum	8.77	6.60	334	87	0.86	0.12	20.40	6.48	2.18	0.25	12	27	0.26	0.14	1330	351
Note: Exceedance of ANZEEC Guidelines highlighted in red.																	

Table 24 - Surface water monitoring results 2021

3.4. Ground Water Monitoring

CMPL maintains and monitor 38 vibrating wire piezometers, and 13 production bores. Routine data collection from these sites is used to assess the integrity of the STSF wall, and to determine whether any underground seepage of contaminated water into natural areas and/or aquifers has occurred. Water levels are recorded monthly and water quality samples are taken by the Environment Department when required and/or available.

Groundwater sampling is conducted as per the principles enunciated in the Standards Association of Australia AS/NZS 55567:1:1998. Baseline groundwater quality data has not been recorded and is difficult to determine given the long history of tailings deposition and uncertainty regarding groundwater flow direction. Underlying fault sequences occurring in the proximity of the STSF pose a potential pathway for fluid migration over time. Contemporary seepage has been minimal and confined to the south-east corner of the STSF. Geochemical work indicates that historic tailings deposited in the STSF were potentially acid-forming (PAF) with elevated concentrations of leachable metals (Cu, Pb, Zn, Cd) and sulphate which may be a source of contamination. Contemporary tailings deposition is generally found to be non-acid forming (NAF) with lower potential to leach metals.

Figure 9 depicts a cross-sectional drawing of the typical set up of standpipe piezometers at the CSA Mine. The locations of the piezometers are determined by dam engineers (Golder Associates) to provide complete coverage of the facility. Table 25 indicates the location of wet piezometers on the embankment wall or on ground level of the TSF.

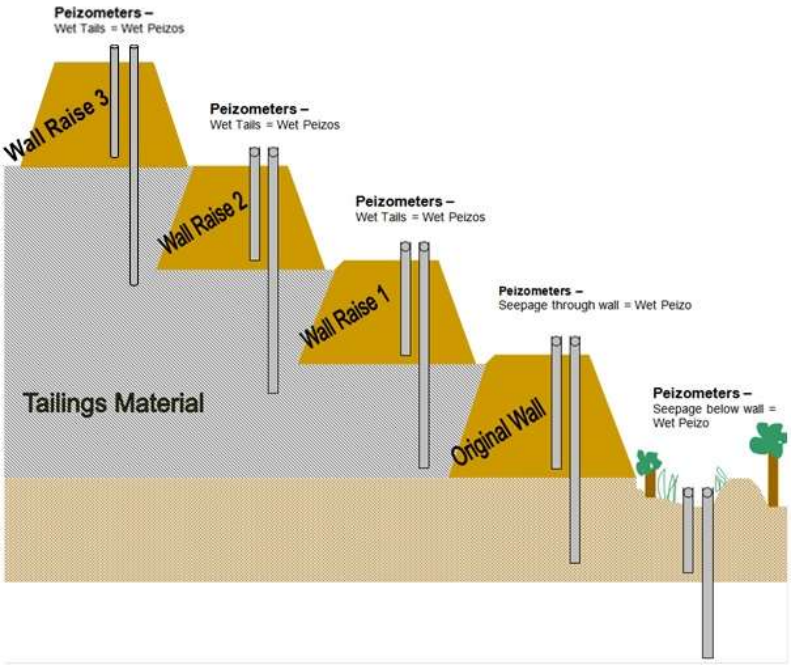


Figure 9 - Cross section of STSF piezometer setup.

Table 25 - STSF piezometer locations on embankment walls or ground level.

Stage	Piezometers
Ground Level	P8, P17, P33, P35
Original Wall	P41, P43, P44, P45
Wall Raise 1	P7, P15, P26, P27, P38
Wall Raise 2	P14, P37
Wall Raise 3	P56, P57
Wall Raise 4	VWPs

There are no requirements from a dam safety perspective to sample water from standpipe piezometers, only the water level of piezometers needs to be measured for dam integrity purposes. Measurement of water depth in standpipe piezometers was undertaken monthly but was changed to every 2 months in 2018. In 2019 Vibrating Wire Piezometers were installed and this equipment automatically sends monitoring data to our Dam Engineers (Golder Associates) and therefore regular monitoring of the standpipes was stopped.

Key piezometers have trigger points set by the CSA Mine consultant TSF Dam Engineers (Golder Associates) to comply with Dams and Safety Committee (DSC) requirements; if water levels within the

piezometers reach this trigger point, it could indicate that the TSF embankments are not operating as designed and will need to be investigated to ensure the structure and integrity of the TSF is still intact. The trigger levels are based on a stability analysis undertaken for each successive STSF wall raise design. Since 2008 run through to 2019 and 2021, the majority of the 26 STSF standpipe piezometers have maintained relatively consistent water levels with only a select few sampling sites fluctuating over time.

CSA Mine's Dam Engineers are automatically notified of any exceedance and are sent all data from the TSF piezometer phreatic surface monitoring for assessment of embankment stability. The engineers conduct a yearly surveillance report, providing comment on performance and maintenance issues. In 2019 and 2021 there was no any performance issues of concern for the STSF.

In addition, to the general TSF inspections that occur twice per 12-hour shift by mill operators, a permanent surveillance camera was installed on Stage 8 wall raise overlooking the STSF from the south in 2015. A snapshot of the STSF beach and causeway is taken at 1pm and downloaded every day for the purpose of remote surveillance and for the long term monitoring of potential water ponding adjacent to the decant dam ladder way.

There are three Groundwater Monitoring Bores (MB) l located to the east of the STSF. These are MB1, MB2 and MB3, which have been installed to 92 m, 14.8 m and 54 m (respectively). The locations for these sampling sites can be seen in Figure 14. These bores are installed on the down gradient of the TSF (the most likely seepage pathway) and are designed to provide data on the potential for TSF and groundwater interaction.

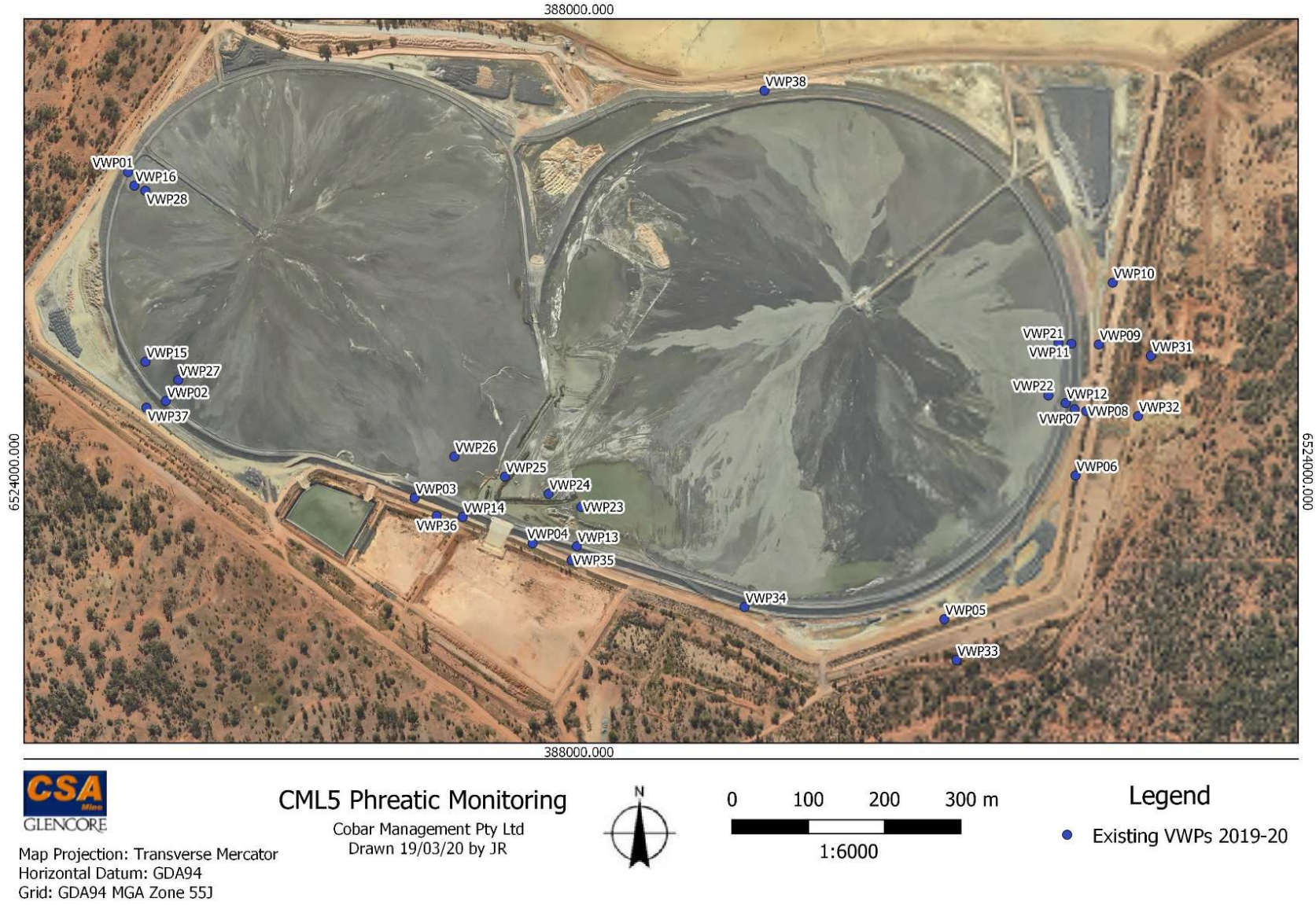


Figure 10 - CSA Mine groundwater monitoring network.

3.5. Contaminated Land

Sites of contamination at the CSA Mine are primarily the result of elevated heavy metal concentrations above background levels, particularly lead, copper, zinc and aluminium. Contaminated sites exhibited a lower pH likely to prohibit the establishment of vegetation, as well as higher salinity levels, based on the background soil results. These exceedances were across the main site operational area, associated with mining activities, principally in historic areas of mine waste stockpiles.

Past contaminated land assessments have concluded that the elevated concentrations of metal contaminants in soil, as well as soil acidity and salinity, have the potential to significantly inhibit future rehabilitation efforts, especially in regards to meeting closure criteria. The measures implemented to improve the rehabilitation success of contaminated areas are discussed in Section 5.

The areas at the CSA Mine identified as exceeding the National Environmental Protection Measures (NEPM) and EPA assessment criteria are classified as contaminated, and surface disturbance works are restricted to ensure present contamination is not mobilised and does not pose a risk to human and environmental health. In addition to this, the CSA Mine has a Surface Water Management Plan in place that prevents offsite discharge of surface water to local surface water bodies, further reducing the risk of offsite impact.

Background sites not impacted by mining activities, as well as areas off site, will continue to be sampled throughout operations in order to capture local baseline conditions and the level of contamination within operational areas of the site. Data on the nature and level of contamination will assist in defining the requirements for progressive rehabilitation to meet performance and closure criteria set out in the CSA Mines Rehabilitation Monitoring Methodology and Determination of Completion Criteria for Rehabilitation Ecosystems report.

The excised areas, although classified as contaminated areas, are not part of CML5 and the CSA Mine has no operational control over these areas. Therefore, these areas are not assessed or managed by the CSA Mine.

The last contamination assessment was conducted in 2013, and as not new major disturbance or contamination activities were conducted in 2021, a full site assessment was not deemed necessary for 2021.

3.6. Threatened Flora

The 2012 Biodiversity Assessment found 197 flora species presently or previously recorded within CML5 and concluded the area has high floral diversity. Six Biometric vegetation communities were identified as occurring at the site, including:

- Gum Coolabah woodland on sedimentary substrates mainly in the Cobar Peneplain Bioregion;
- Gum Coolabah - Mulga open woodland on gravel ridges of the Cobar Peneplain Bioregion;
- Poplar Box - Gum Coolabah and White Cypress Pine Shrubby Woodland mainly in the Cobar Peneplain Bioregion;
- Mallee - Gum Coolabah woodland on red earth flats of the eastern Cobar Peneplain Bioregion;
- Green Mallee - White Cypress Pine very tall mallee woodland on gravel rises mainly in the Cobar Peneplain Bioregion;
- Derived mixed shrubland on loamy-clay soils in the Cobar Peneplain Bioregion; and
- Cleared/developed land (Non-native vegetation).

None of these vegetation communities are representative of an Endangered Ecological Community (EEC) listed under the *Threatened Species Conservation Act 1995* (TSC Act) or the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). However, two vegetation communities present within the study area are likely to be of conservation significance. According to Benson et al. (2006), 'Popular Box-Gum Coolabah and White Cypress Shrubby Woodland' is considered 'near threatened' while 'Mallee-Gum Coolabah Woodland' is considered 'vulnerable'. Both communities are threatened by inappropriate fire regimes, clearing, grazing by stock and goats, woody weed invasion (likely a result of changes to grazing and fire regimes) and sheet erosion.

No threatened flora species as listed by the TSC Act or the EPBC Act were detected on CML5 during the 1999, 2006 or 2012 biodiversity assessments.

Several factors relating to vegetation condition and disturbance were identified during the 2012 study, these being overgrazing, and alterations to fire regimes, weeds, previous timber harvesting and seasonal variations.

Workers of the CSA Mine undertaking surface exploration activities are provided with information to allow them to recognise relevant flora and fauna species. All proposed drill sites, roads and tracks are inspected by a member of the Environment Department prior to any exploration activity taking place. The inspections include an assessment of potential risks to flora, fauna and cultural heritage. The CSA Mine employees and contractors are instructed to notify the Environment Team of the presence of

any species or sites of potential importance so that they may be further examined and appropriate controls or actions put in place. Details of the inspection are documented including the location and any identified species. The appropriate department is then notified of any follow up and management conditions required. If exploration personnel have any doubt they are instructed not to proceed with the exploration activities until clearance is received.

3.7. Threatened Fauna

A total of 160 fauna species have been identified within CML5 during the 2006 and 2012 biodiversity surveys, comprising of: 110 bird species; 20 reptile species; 3 frog species, 15 mammal species and 12 bat species.

Nine threatened fauna species and one migratory fauna species listed under TSC Act and EPBC Act were detected within CML5 during the 2012 Biodiversity Assessment, including:

- Chestnut Quail Thrush (*Cinclosoma castanotum*) listed as Vulnerable under TSC Act;
- Grey-crowned Babbler (*Pomatostomus temporalis temporalis*) listed as Vulnerable under TSC Act;
- Hooded Robin (*Melanodryas cucullata cucullata*) listed as Vulnerable under TSC Act;
- Little Eagle (*Hieraaetus morphnoides*) listed as Vulnerable under TSC Act;
- Pink Cockatoo (*Lophochroa leadbeateri*) listed as Vulnerable under TSC Act;
- Varied Sittella (*Daphoenositta chrysoptera*) listed as Vulnerable under TSC Act;
- Little Pied Bat (*Chalinolobus picatus*) listed as Vulnerable under TSC Act;
- Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*) listed as Vulnerable under TSC Act;
- Inland Forest Bat (*Vespadelus baverstocki*) listed as Vulnerable under TSC Act; and
- Rainbow Bee-eater (*Merops ornatus*) listed as Migratory under EPBC Act.

Six key threatening processes listed under the TSC or EPBC Acts which could threaten (or potentially threaten) the survival or evolutionary development of a species, population or ecological community, have been identified as relevant to CML5. These include:

- Competition and habitat degradation by Feral Goats;
- Removal of dead wood and dead trees;
- Clearing of Native Vegetation;
- Predation by European Red Fox;
- Predation by Feral Cats;
- Predation and hybridisation by feral dogs.

The CSA Mine's environmental objectives aim to ensure the clearing of native vegetation is minimised where possible. The mine understands the value of connectivity and is fortunate to be within the Cobar Peneplain Bioregion, which is the most extensive woodland community to remain in western NSW.

3.8. Weeds

During the 2012 Biodiversity Assessment, nine noxious or environmental weeds were identified within the study area:

- Onion Weed (*Asphodelus fistulosus*), intermittent along bitumen road and railway line.
- Patterson's Curse (*Echium plantagineum*), intermittent along bitumen road and railway line.
- Bathurst Burr (*Xanthium spinosum*), found downslope of straw mulch in rehabilitation area and at old house estate.
- Fierce Thornapple (*Datura ferox*), found downslope of straw mulch in rehabilitation area and at old housing estate.
- Century Plant (*Agave americana*), found at old housing estate.
- Aloe (*Aloe* sp.), found at old housing estate.
- Prickly Pear (*Opuntia stricta*), found at old housing estate.
- Saffron Thistle (*Carthamus lanatus*) and Spear Thistle (*Cirsium vulgare*), occasional around perimeter of mine facility and highly disturbed areas such as tanks.

Exotic flora species are generally only present in developed areas (e.g. bitumen roadsides, railway easement, some parts of the electricity transmission easements, farm dams, and in/around the mine facility.

In previous years, the Cobar Shire Council (CSC) Weeds Officer has conducted annual Noxious Weeds Inspections of the CSA Mine site. The Noxious Weeds Inspection focuses on the most likely locations for weed establishment including topsoil stockpiles and newly disturbed areas. In previous years, there have been issues with Prickly Pear infestations; however, due to its successful control in 2013, it has no longer been an issue. In 2014, the CSC Weeds Officer reported that the CSA Mine-owned property, Red Tank, has been compliant with Local, State and Federal statutory requirements in regards to the control of listed noxious weeds and deemed the area as low risk.

The Environmental and Exploration Personnel are trained in the identification and reporting of noxious weeds. In late 2017, the poisonous plant green cestrum (*Cestrum parqui)* was identified on site and reported to Cobar Shire Council.

Competition, grazing and predation by feral animals on the CML5 lease are addressed in the CSA Mine Pest Animal Management Plan. This management plan was first implemented in 2007 and was last updated in 2012. This management plan will continue to be implemented in the future in order to keep identified feral animals under control.

A new contractor was commissioned in 2017 to remove feral goats from site. Throughout 2021, a total of 31 goats were removed from CSA Mine site consisting of 15 Billies, 11 Nannies and 5 kids. When goats are removed from site, they are recorded through a Livestock Production Assurance National Vendor Declaration (NVD). A goat cannot be sold without an NVD, which is used to document numbers and locations of goats harvested, provide assurance landholder access was granted and more importantly, to declare information about the food safety status of the livestock. This compulsory process is managed by Meat and Livestock Australia (MLA).

3.9. Blasting

All blasting is confined to the underground mine workings at a depth greater than 1.6 km. The mining method adopted at the CSA Mine uses bulk emulsion for production firings and ANFO, initiated by the use of electronic detonation, for development firings. Less than 500 kg of explosives are consumed per delay. While this method remains in use, no surface monitoring for vibration is required.

3.10. Operational Noise

Blasting and crushing are the two noisiest operations at the CSA Mine site. Both occur more than 700 m underground and are not audible at the surface. The grinding circuit, adjacent to the concentrator, is the loudest operation on the mines surface. Various mobile plant equipment are occasionally used for surface projects, such as continuous trucking of waste rocks to the STSF and other special projects. Such surface activities are typical operations of a mine site, and thus do not require noise monitoring. The distance of the CSA Mine site from the township of Cobar (11 km) and from residential properties on surrounding land (minimum 3 km) contributes to a lack of operational noise complaints.

3.11. Visual, Stray Light

Stray light pollution does not impact on surrounding neighbours due to lighted areas on surface being restricted to a small operational area, and the location of the mine being over 3 km from the nearest residence and 11 km from the township of Cobar. The CSA Mine has never received a complaint in regard to light, and as such has no need to amend current practices.

3.12. Aboriginal Heritage

The CSA Mine is located on the traditional homelands of the Ngiyampaa people. This land is of cultural, economic and spiritual importance to the Ngiyampaa people, and many Elders still hold a deep interest in cultural matters. Any potential disturbance is therefore carefully considered and agreed upon by all relevant parties prior to works commencing.

The CSA Mine is committed to maintaining good relations with all external stakeholders. Any Aboriginal archaeological finds, artefacts or information concerning aboriginal sites that are passed on to the company are appropriately handled and reported to the Office of Environment and Heritage (OEH) as soon as practicable. No Aboriginal place, object or relic is to be disturbed or damaged without the consent or authorisation of the OEH. The following potential and actual Aboriginal significant sites have been identified on CSA Mine site; CSA IS 01, CSA IS 02, CSA 1 Cobar, CSA 2 Cobar, CSA 3 Cobar and CSA Tailings. Most of these objects believed to be of significance are sandstone, gravel, quartz, silcrete flakes and artefacts. Figures 11 and 12 show the maps for the sites where objects of Aboriginal and historical importance have been identified at CSA Mine.

3.13. Natural Heritage

Heritage items within CML5 are managed according to the relevant legislation and guidelines, namely the three pieces of legislation governing the conservation of environmental heritage in NSW: the *National Parks and Wildlife Act 1974*, the *Heritage Act 1977*, and the *Environmental Planning and Assessment Act 1979.* Any heritage assessments required will be conducted in line with the CSC Local Environmental Plan (LEP).

There are no identified species, habitats or ecosystems within CML5 that require particular attention, or management, concerning natural heritage. No significant geological and physiographical features have been identified on site that is not common throughout the district.

European heritage sites on CML5 include:

- Mining quarters
- “Eloura”
- The CSA Mine Power House

3.14.1 Mining Quarters

The site of a miner’s quarters (old housing estate) which was erected in the 1960s is located on CML5 approximately 400 m south-west of the administration building. The site once contained five houses and one swimming pool; these were removed after mine closure in 1998. The only remaining remnants

are the bitumen road, some cleared areas with stockpiles of topsoil, and some garden beds that continue to grow exotic garden species.

3.14.2 "Eloura"

The *"Eloura"* site is located 1.5 km from the CSA Mine site. This area shows remnants of old rock gardens and buildings. It is understood that most of the older buildings were removed during mine upgrades in the 1950s and 1960s. There are some remains of human settlement, including scattered broken glass, ceramics, tin and some intact ornate brick and rock garden beds. The uppermost corner of the site is located within CML5; however, the majority of the site is on the property 'Gattaca' on land not owned or managed by the CSA Mine.

3.14.3 The CSA Mine Power House

The CSA Mine powerhouse contains five HSF8 Mirrlees diesel engines, manufactured in 1951 by Mirrlees, Bickerton and Day in Stockport, England. These engines provided the main power supply for the CSA Mine from the early 1960s, when they were relocated to Cobar from Kempsey, until Cobar was connected to the State power grid in 1966. The five engines represent excellent examples of medium sized stationary engines of the mid-20th century and combined with the brush alternators they are an increasingly rare example of turbocharged technology fitted to diesel engines, a technology previously used to provide power in rural Australia. The powerhouse building and engines are not listed on any statutory heritage registers (NSW State Heritage Register, CSC LEP or the Commonwealth Heritage List).

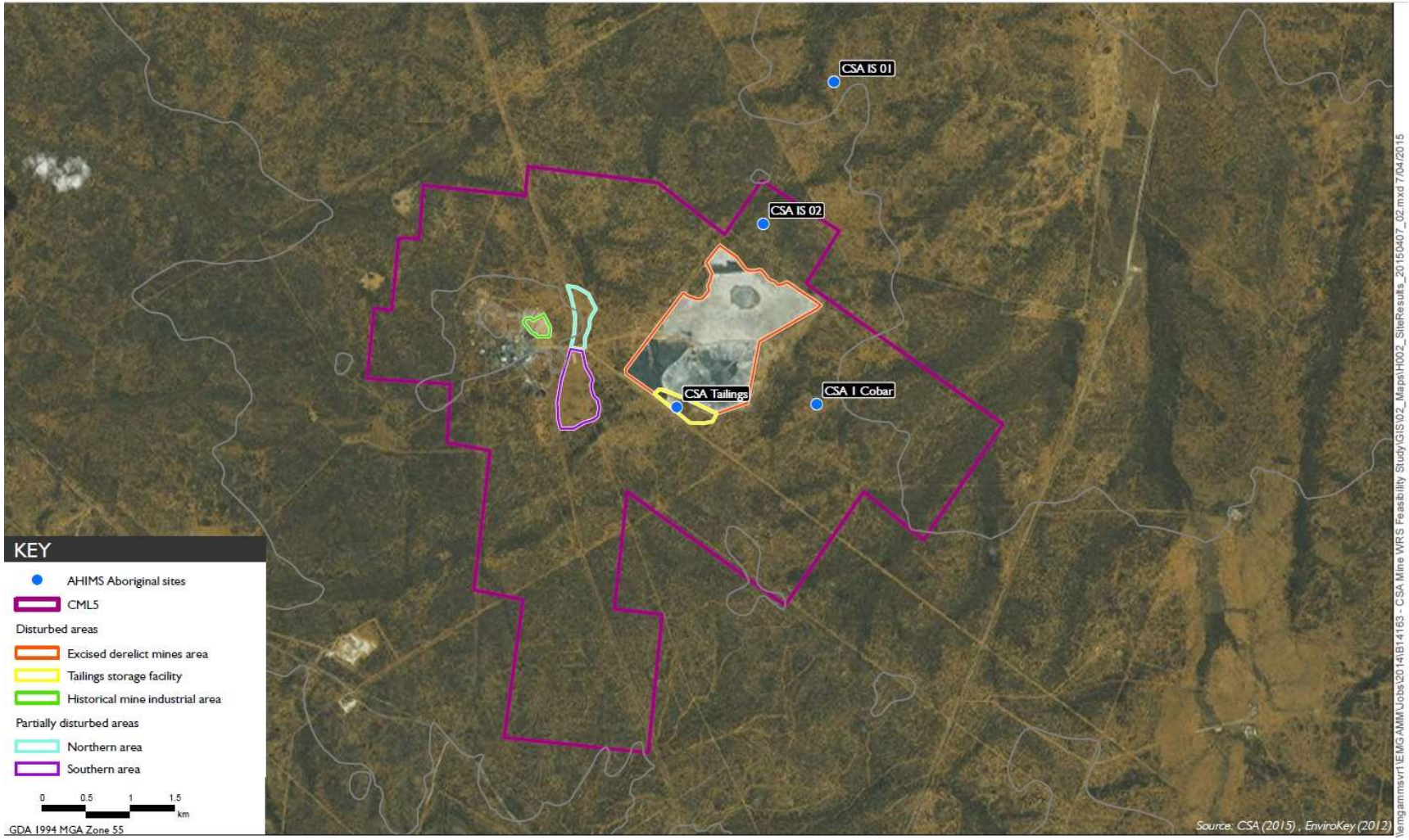


Figure 11 - Map of identified Aboriginal significant sites.

Figure 12 - Map of identified Aboriginal and historic significant sites.

3.14. Spontaneous Combustion

History has shown that there are no items that pose a high direct risk of spontaneous combustion at the CSA Mine. Two minor incidents have been recorded since reopening the CSA Mine in 1999. Both incidents occurred on surface and involved smouldering Cu concentrate at the mill. Mineralogical assessment of the concentrate at the time failed to identify any contributing factors for these incidents. Whilst some of the CSA Mine Cu concentrate has shown signs of spontaneous combustion, it is considered a minor risk, and has not occurred on site in a number of years. Spontaneous combustion is easily prevented by regular hosing down, clean-up and stockpile management including stock rotation.

3.15. Bushfire

No fires have been recorded on site in the past and as a result of the prolonged drought and minimal groundcover, the current threat is quite low. To reduce the risk of fire, firebreaks are maintained around the perimeter of the operational and infrastructure areas. No open fires are permitted on site for land clearing or firebreaks, except in accordance with a bushfire hazard reduction certificate issued by local council. All total fire bans are observed. Hot work permits are mandatory on site for all work performed outside workshops (and other designated areas) that could generate a flame, fire, heat or sparks. This could include (but is not limited to) welding, soldering, thermal cutting/heating, grinding, use of electric power tools or lighting fires.

All on site staff are inducted and educated on the dangers of fire. They are trained in the location and correct use of fire extinguishers and hydrants in their work areas. The Cobar Rural Fire Brigade is situated on the north side of town and can be at the CSA Mine site within 15 minutes to respond to any surface vegetation fires. The CSA Mines Rescue Team is equipped and trained to assist in the event of bushfires on or near the mining lease. In addition to this, CSA Mine transitioned to a smoke free site in 2017 and is still continue to be smoke free. The potential of smoking causing bushfires is very minimal because of the smoke free policy on CSA Mine site.

3.16. Mine Subsidence

The CSA Mine subsidence zone is located over 1 km from the current stoping and development activities. The activity in the identified subsidence zone occurred prior to the CSA Mine's current operation of the mine; hence the area is excised from the mining lease. It is very unlikely that there will be another failure through to the surface due to the current mining operation being significantly deeper in the mine and much more advanced in the mining technique and ground support used today. The only open void of concern is located underground at 4 Level (9860 RL) just off the main decline.

This underground stope has been open for approximately 20 years and is monitored periodically. There have been no changes to the void recorded during the past 10 years.

The current backfilling method is a combination of Cement Paste Backfill (CPB), Cement Rock Fill (CRF) and waste rock fill (WRF). The method is to fill all voids created by stope extraction. Stope voids which are going to be exposed again by the stope extraction activities adjacent to them are filled by placing an engineered plug or beam of material, generally 10-15 m high, of a strength suitable to support exposure again, currently 11% CPB and then filling the remaining void with 4% CPB. If only one side of the stope void is to be exposed by the next stope then WRF or CRF can be placed in the non-exposed side of the void creating what is termed co-disposal. Stope voids that are not going to be exposed are filled with a CPB 'plug' followed by WRF. The top down mining method used at the CSA Mine requires that a CPB 'plug' be placed at the bottom of stope voids to allow development back through the bottom of the stopes for the extraction of the stopes below. If there are no stopes planned below a stope void then the void is completely WRF.

Given these backfilling methods, it is considered that the likelihood of any underground voids undergoing an uncontrolled failure and propagating to the surface is extremely unlikely.

3.17. Hydrocarbon Contamination

Hydrocarbon storage, handling and disposal are carried out in accordance with the CSA Mine *Chemical and Hydrocarbon Storage and Disposal Procedure (PRO-159)* developed in compliance with all relevant Dangerous Goods legislation, WorkCover Codes of Practice, and applicable Australian Standards.

Spill kits are available at various locations around the site, and staff and contractors are trained in the use of such kits during site inductions. Hydrocarbon contaminated soils are removed and disposed of in the STSF.

During 2021, two minor spillage of hydrocarbons were observed. Monthly inspections of all hydrocarbon areas are conducted to ensure that storage and handling of hydrocarbons is done in line with legislation and site approvals.

3.18. Methane Drainage/Ventilation

Deep exploration and infill diamond drilling within the underground mine occasionally encounters a flammable gas mixture comprising hydrogen (approximately 75%) and methane (approximately 25%). Such occurrences are occasional, short term (hours to several days) and of a small magnitude. Gas levels are generally undetectable or at trace levels when measured in the exhaust airway. The minimal

amounts of gas that may occur in the mine are released, with all other underground air exhausted, via the Main Return Air Ways (RAW) on surface RAR #1 and RAR#2. These releases are highly unlikely to have any reportable detrimental effect on the environment, if any at all, due to the minuscule levels encountered and the dilution of any contaminants with the surface air mass.

All localised and short-term safety implications at the CSA Mine site are managed as per the CSA Mine Underground Flammable Gas Management Plan (MHP-003) under the guidance of the mine Ventilation Control Plan.

Ventilation in the underground mine is managed through the Mine Ventilation System. This system circulates fresh air through the underground workings in order to:

- Supply breathable, oxygenated air to underground personnel and active work areas;
- Remove dust, fumes, toxic and flammable gases from the underground environment (through return airways) and;
- Cool working areas by exhausting heat generated by the surrounding rock mass and diesel equipment.

3.19. Public Safety

The CSA Mine site is clearly signposted on the main access road and is fenced to prevent accidental entry. The main entry area is subject to high security gates and an electronic tag entry system. The CSA Mine ensures no activities permitted on the lease interfere with or damage fences and that all gates within the lease areas are closed or left open in accordance with the requirements of the landholder. The boundary fences are signposted and monitored regularly for damage or any sign of intrusion.

All persons entering the site must undergo a site induction. Employees and contractors complete (at a minimum) a general surface induction, with additional inductions also completed for specific work areas (e.g. underground). All visitors, delivery drivers or short-term contractors are inducted through the CSA Mine visitor induction program. They are required to conform to site PPE requirements and are accompanied on site at all times by a fully inducted representative.

3.20. Other Issues and Risks

CMPL maintain a detailed internal incident database for the recording of all incidents reported on site. All workers and contractors are trained in incident reporting as part of the site induction program. An online event report is submitted following any environmental incident, personal injury, property loss or damage, hazards and near misses. The degree of reporting undertaken by the CSA Mine is much

greater than is statutorily required, and the general culture at the CSA Mine is a preference to reporting everything over under reporting. The majority of environmental incidents generally involve leaks and spills, which are reported regardless of whether they are contained in a bund or not, and regardless of the volume or type of material spilt (e.g. tailings, process water, oil and backfill).

4. COMMUNITY RELATIONS

The CSA Mine is an owner-operated mine currently employing 491 permanent staff (including 20 apprentices) and on average 250 contractors. The mine operates on a 24-hour basis, 365 days a year. The majority of underground and mill workers do shift work on a seven-on seven-off roster system, whilst day staff (management, administration and site services) work 5 days per week. The bulk of the CSA Mine workforce lives within the Cobar Township, contributing a considerable flow on economic benefit to the local community and local economy. The CSA Mine also hosts visitors from several universities for vocational work experience and major projects; during 2021, two students were employed at the CSA Mine.

4.1. Environmental Complaints

In compliance with the CSA Mine's EPL conditions, the CSA Mine maintains a 24-hour telephone pollution complaints line through the CSA Mine reception switchboard. The phone number is advertised to the local community via the local newspapers and the White Pages. All environmental complaints are directed to the Health, Safety, Environment & Training Team, and are recorded as per the CSA Mine Environmental Complaints Procedure and Record Form. No complaints were received from the public during 2021.

4.2. Community Liaison

Community support is essential in maintaining the CSA Mine's future operations in Cobar. The CSA Mine regularly communicates its operational plans to the local community. This is undertaken through:

- Ongoing liaison with Cobar Shire Council (CSC);
- Providing open and honest feedback to the workforce and contracting companies;
- Local newspaper media releases; and
- Involvement with key community groups and projects.
- Regular consultation days.

During the reporting period, Exploration undertook an airborne Magnetics and Radiometrics geophysical survey covering CML5, MPL 1093 and MPL 1094. Community consultation was completed

via informative posters and advertisements with information relating to the airborne survey parameters, aircraft and company details, survey dates and contact details for any queries from the public. The poster was displayed on notice boards throughout Cobar and an advertisement was placed in the Cobar Weekly newspaper for seven weeks leading up to the survey and throughout the duration of the program. In addition to the community consultation regarding the survey, landholders property which is overlain by CML5 were contacted via mail and in person to discuss the parameters of the survey. Accompanying this, landholders subject to CML5 were also delivered a letter stating CMPL's intention to enter into a Land Access Arrangement.

4.2.2 Community Contributions

CMPL contributed $70,750.00 to the local economy over the 2021 period through awarding employees with Cobar Quids to be spent as part of our Rewards and Recognition program.

CMPL contributed $40,513.74 in donations during 2021; the recipients are listed in **Error! Reference source not found.**26, below. Due to the impacts of COVID-19 on Community events throughout 2021, the contributions and sponsorships by CMPL due to a number of events being postponed have been carried over to 2022. CMPL have also made a number of in-kind contributions to community groups and community members.

Table 26 - Donation recipients 2021.

Local Community Groups	Sporting Organisations	Charities	Local Schools
• Cobar Miners Race Club • Cobar Show Society • Cobar Girl Guides • Copper City Men's Shed	• Cobar Cricket Club • Cobar Junior Roosters • Cobar & District RUFC • Cobar Clay Target Club • Cobar Rugby League and Football Club • Cobar Intermine Golf Challenge • Cobar Swimming Club Inc • Cobar Clay Target Club	• Cobar Day View Club	• Cobar Public School • Cobar High School • Ngaali Preschool • Outback Science and Engineering Challenge **Other** • Cobar Business Association • GP Housing

5. REHABILITATION

The CSA Mining Lease conditions require land disturbed by mining activities to be rehabilitated to a stable and permanent form, which is compatible with the surrounding landscape and suitable for future land use requirements. In the following sections, rehabilitation refers to areas that are undergoing works to improve the landform, biodiversity and ecosystem function of disturbed areas at the CSA Mine. Rehabilitation work usually involves bulk earthworks, such as reshaping and contouring, removal of contamination, soil remediation, seeding, and provision of groundcover / erosion control. Maintenance refers to ongoing works to preserve previously rehabilitated areas, such as weeding, additional seeding, ongoing soil remediation and the provision of groundcover.

The total area of the CML5 Mining Lease is 2,474 ha, with approximately 350 ha of this allowed for disturbance with the CSA Mine surface operations. Of the 350 ha of allowable site disturbance, 138 ha of disturbed land is excised from the lease, leaving approximately 212 ha of land that will require rehabilitation by the CSA Mine prior to mine closure if all the 212 ha remaining that is allowed for disturbance is exhausted at mine closure. Currently our total disturbance footprint is around 173 ha.

The CSA Mine is currently in the operational stage of mining, with most surface disturbance already taken place and the mine in steady production. All expansion and upgrade works that occurred in 2021, was within the existing operational footprint, with the exception of two laydown yards created for the new ventilation project, which was assessed and approved by local Council. Figure 13 shows all existing rehabilitation areas across the CSA Mine site. A summary of rehabilitation works to date at the CSA Mine is shown in table 27.

Table 27 - Rehabilitation summary.

	Area Affected/Rehabilitated (hectares)		
	Last Report	**To Date**	**Next Reported**
A: Mine Lease Area			
A1 Mine Lease(s) Area	2474.1		
B: Disturbed Areas			
B1 Infrastructure Area	66.1	67.1	72.7
B2 Active Mining Area	0	0	0
B3 Waste Emplacements	0	0	0
B4 Tailings Emplacements	104.9	104.9	104.9
B5 Shaped Waste Emplacements	0	0	0
All Disturbed Areas	173	173	185.2
C: Rehabilitation Progress			
C1 Total Rehabilitated Area (excluding maintenance)	16.5	16.5	16.5
D: Rehabilitation on Slopes			
D1 10 to 18 Degrees	12.5	12.5	13.5
D2 Greater than 18 Degrees	4	4	6
E: Surface of Rehabilitated Land			
E1 Pasture and Grasses	16.5	16.5	16.5
E2 Native Forest/Ecosystems	0	0	0
E3 Plantations and Crops	0	0	0
E4 Other	0	0	0

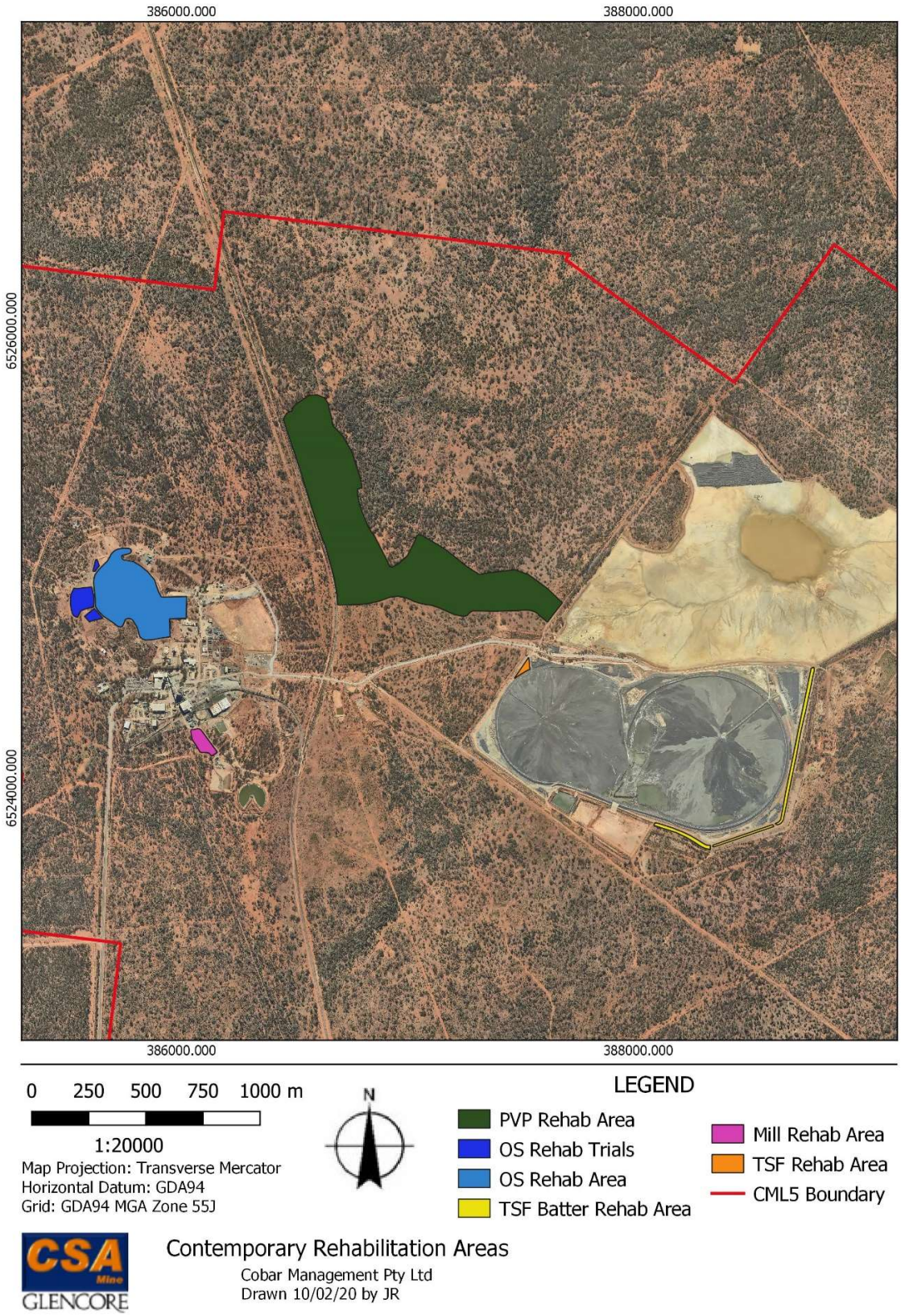


Figure 13 - Existing rehabilitation areas at CSA Mine.

5.1. Rehabilitation of Disturbed Areas

5.1.1 Mill Rehabilitation Area

This site is located directly south of the CSA Mill and was previously contaminated with mine process run-off. The contaminated soil was removed in 2007. Some more mature trees of *E. populnea* and *Eremophila mitchellii* were retained within the site and some have since regenerated. There were a variety of volunteer shrubs *Senna artemisioides* subsp *artemisioides, Acacia aneura* and *Geijera parviflora*. In 2014 the monitoring site at the Mill rehabilitation area was relocated further downhill to capture changes in recent rehabilitation which incorporated deep ripping, application of lime, and application of straw mulch followed by seeding of cover crops of *Avena fatua* (Oats) and native seed mix. The area was irrigated by effluent water and fenced to exclude grazing. LFA and vegetation transect were aligned along the same transect. The site contained large and deep rip lines with large clods of earth containing white salt crystals. The ponded effluent water had initiated algal growth in some of the deeper depressions. There were some scattered oats seedlings but generally there was no vegetative cover. Several eucalypt seedlings were located but these had recently died. In 2015, it was evident that there had been considerable movement of the topsoil layers with the loss of the protruding banks/soil clods and sedimentation occurring within the depressions. There were small scattered clumps of *Chloris truncata* (Windmill Grass) as a result of seed application, and the occasional oat plant has established within remnant rip lines. Proganics, an organic growth medium, was also applied to the area in random pockets. There were seedlings of several unknown species of eucalypts establishing in ponded irrigated depressions. In 2016 there was a dramatic improvement with the site having an abundance of ground cover vegetation with many native shrubs tree and shrub seedlings establishing. In 2017 the ground covers had mostly died off but there were pockets of *Lactuca serriola* (Prickly Lettuce) in depressions. Persisting eucalypts have grown significantly but some leaves appear to be burnt possibly from heavy metal toxicity. Tops of the soil mounds remain bare. In 2018, many shrubs had died while the remainder had significantly grown. Dead leaf litter had accumulated in depressions. Tops of the soil mounds mostly remain bare and there was some cryptogam cover. In 2019, there was further shrub mortality and persisting shrubs were very stressed. There has been further loss of and deterioration of the litter and cryptogam patches, and there was limited live ground cover. In 2021 there was a declining trend in patch area despite the improved seasonal conditions. Photos for the past years are shown on the next page.

2018 2019 2020

5.1.2 Over Subsidence (OS)

This site is situated over an old subsidence area which was built up in the late 1990s. Topsoil stripped from the tailings extension area was applied over the area in 2004/05. The area contains an extensive pile of large trees, logs and branches which were removed from the tailings extension area. The area has not been seeded but in 2011 and 2012 there were scattered shrubs and ground cover species establishing amongst the woody debris including *E. sturtii, Geijera parviflora, Acacia aneura, Dodonaea viscosa* subsp*. mucronata and D. lobulata*. There was a wide range of ground cover species in patches, but they provided limited ground cover. Several weed species were also recorded. In 2013, there continued to be extensive movement of exposed soils with the log piles providing critical retention. Sulfate crystals continued to be evident on the soil surface and feral goats continued to significantly impact on any establishing vegetation. There continued to be a relatively high diversity of species, but these provided limited ground cover. In 2014, there continued to be further degradation of the site with a decline in the diversity and abundance of ground cover as a direct result of grazing. Persisting shrubs had grown. In 2015, there continued to be extensive movement on the site with the logs piles appearing to be slowly sliding down the slope resulting in extensive erosion and sedimentation of exposed soils. Sulfate crystals continued to be evident on the soil surface and feral goats continued to significantly impact on establishing vegetation. In 2015 there continued to be a relatively high diversity of species, but these provided limited ground cover. In 2016 although there continued to be pockets of annual ground covers the site continued to be unstable with active erosion occurring within the bare and contaminated interpatch areas. In 2017 the area had been fenced off however it continues to be subjected to grazing (gates not closed?). Persisting shrubs have grown but otherwise there was little to no live ground cover. The new areas of rehabilitation on the lower batters contained patches of cryptogams and scattered shrubs were colonising the area and appear to be performing better than the upper slopes, perhaps due to the healthier soil chemistry. In 2018, several more shrubs had died, while the remainder had significantly grown, and there was little other apparent change. In 2019, the persisting shrubs had grown, however there continued to be extensive movement on the site with the

log piles appearing to be slowly sliding down the slope and there was extensive erosion and sedimentation of exposed soils. Sulfate crystals continued to be evident on the soil surface. Not much change was observed in 2021

2018 2019 2020

5.1.3 South Tailings Storage Facility (STSF)

The lowest batter of the TSF had been rehabilitated using a combination of brush matting of green waste and seeded with a native species mix in 2011. Due to the short length of slope, the LFA transect was 10m and replicated at an additional 10m interval. The total size of the monitoring quadrat was therefore reduced to 10x50m. The site was characterised as having a heavy cover of branches and litter material but between these patches the soils were bare, scalded and subjected to erosion. It was evident where good quality topsoil had been applied as this tended to be where there was successful establishment of shrubs and ground cover plants. Although overall ground covers were relatively low in abundance, there was a considerably high diversity of species, including a relatively high number of exotic species such as Hedypnois rhagadioloides subsp. cretica (Cretan Weed), Hypochaeris glabra (Smooth Catsear), Medicago laciniata (Cut-leaf Medic), Polycarpon tetraphyllum (Four-leaved Allseed) and Vulpia myuros (Rat's-tail Fescue). In 2015 recent rainfall resulted in an increase of annual wildflowers, especially beneath protective shrub patches, but in exposed areas there continued to be erosion of the soils. There continued to be a relatively high diversity of species, but these provided limited ground cover. Feral goats continued to have an impact on the establishing vegetation. In 2016 there was a significant improvement with the site having an abundance of ground cover vegetation with many native tree and shrub seedlings establishing. In 2017 the ground covers had mostly died off but there continued to be relatively good ground cover in areas where topsoil and annual plants had established, but bare patches remain. Persisting shrubs had grown. In 2018, many shrubs had died especially on the upper banks while the remainder had grown with many also being very stressed. The dead leaf litter patches had deteriorated and there was little to no live ground cover. In 2019, there was further shrub mortality and persisting shrubs were very stressed. There has been further loss of

and deterioration of the litter and cryptogam patches, and there was limited live ground cover. In 2021 there has been minor increase in seeding densities which might be attributed to the result of natural colonisation from adjacent remnant vegetation and or having germinated from stripped top soil.

2018 2019 2020

5.1.4 Property Vegetation Plan (PVP) Monitoring Sites

2019 Photo-point	2021 Photo-point
PVP 01: This site was cleared in 2014 as part of the PVP project initiated by the LLS. There were large bare patches, and occasional litter patches had developed (annual plants had died off). There were occasional large deep holes which were probably created with the removal of mature trees. Scattered were scattered seedlings of Senna (two species), *Geijera parvifolia* (Wilga), *Eremophila mitchellii* (Budda) and *E. sturtii* (Turpentine). The soil was extremely hard. In 2018 there was little live ground cover and the litter and cryptogam patches had also deteriorated. Some *Calotis* spp. had germinated after relatively recent rainfall. Persisting shrubs had grown. In 2019, persisting shrubs had grown however there has been further loss of and deterioration of the litter and cryptogam patches, and there was limited live ground cover. In 2021 patch area continued to be very low ranging from 0 – 14%.	
	
PVP 02: This site was cleared in 2014 as part of the PVP project initiated by the LLS. There were large bare patches, and occasional litter patches had developed (annual plants had died off). There were scattered *E.*	

2019 Photo-point	2021 Photo-point
sturtii (Turpentine) seedlings. The soil was extremely hard. In 2018 there was little live ground cover and the litter and cryptogam patches had also deteriorated. Some *Calotis* spp. had germinated after relatively recent rainfall. Persisting shrubs had grown. *Medicago* seed had accumulated in some depressions. In 2019, persisting shrubs had grown however there has been further loss of and deterioration of the litter and cryptogam patches, and there was limited live ground cover. In 2021 patch area continued to be very low ranging from 0 – 14%.	
	
PVP 03: This site was cleared in 2014 as part of the PVP project initiated by the LLS. There were large bare patches, and occasional litter patches had developed (annual plants had died off). There were scattered seedlings of Senna (two species), *Eremophila mitchellii* (Budda) and *E. sturtii* (Turpentine). The soil was extremely hard. In 2018 there was little live ground cover and the litter and cryptogam patches had also deteriorated. Some *Calotis* spp. had germinated after relatively recent rainfall. Persisting shrubs had grown. *Medicago* seed had accumulated in some depressions. In 2019, persisting shrubs had grown however there has been further loss of and deterioration of the litter and cryptogam patches, and there was limited live ground cover. In 2021 patch area continued to be very low ranging from 0 – 14%.	
	

5.1.5 Buildings

The old Nitric acid tank for the mill was rehabilitated during the reporting period.

5.1.6 Other Infrastructure

During 2021 there was significant removal of old infrastructure such as redundant mills and old project equipment. This resulted in the removal of approximately 500 tonnes of scrap, the majority being recyclable steel. This activity is planned to continue extensively in 2022, as CSA endeavours to remove all old infrastructure and scrap onsite.

5.2. Rehabilitation Trials and Research

The annual CSA Mine Land Function Analysis (LFA) Trial by DnA Environmental consultants was not conducted during 2021 due to COVID restrictions, this work will continue in 2022.

CSA also started a major project on tailings dam closure in 2021 which has included the construction of 4 x column trials for the south tailings storage facility. These trials as intended to replace the construction of a field trial on the surface of the tailings itself and will provide approximately 10 years with of simulated rainfall data over a period of 12 months.

The intent of these columns is to give the below data on the performance of cover materials.

- Interpretation of volumetric water content trends with time and depth in response to wetting and drying from simulated rainfall;
- Interpretation of matric suction trends with time and depth in response to wetting and drying from simulated rainfall;
- Interpretation of bulk and pore water EC concentrations with time and depth in response to wetting and drying from simulated rainfall;
- Interpretation of the trial water balance using seepage measured by the rain gauge tipping buckets and the calculated stored infiltration from the volumetric water content;
- Prediction of the long-term performance of the trials by building a model in SVFlux using patched rainfall data from the SILO database, potential evapotranspiration derived from the cover column trial
- Water balance and soil water characteristic curves derived from the volumetric water content and matric suction sensors. The model would be calibrated using the wetting and drying trends from the volumetric water content sensors; and
- Predicting potential performance of the four cover options for the TSF.

5.3. Further Development of the Final Rehabilitation Plan

The CSA Mine Rehabilitation cost estimate was updated in 2021 and the scientific rationale behind some of the closure strategies updated in regards to cover material and use of organic material. All future rehabilitation planned for CSA Mine, is intended to test this rationale and confirm if the closure strategy is applicable. As discussed previously the disturbance area of CSA Mine is quite small in relative to the operations and the vast majority of potential rehabilitation areas are critical to support current mining activities. At present CSA Mine is still more than 10 years away from closure with the current MOP expiring in 2022. The final rehabilitation plan will be further addressed in 2022 with the implementation of the new rehabilitation reforms.

5.4. Rehabilitation Status Summary

Presently the rehabilitation sites have low total ground cover and there is a lack of or low abundance of cryptogams which may be linked to the relative structural instability, as the results of the soil analyses continue to indicate adverse soil chemistry and high levels of salts and heavy metals. The levels of contaminants have also increased in the PVP areas probably as a result of wind-borne dust, suggesting improved dust suppression management is required. At Mill 2, the area has very high levels of salts and heavy metal contaminants as it continues to be subjected to run-off from the processing mill and is unlikely to improve in the short-term without significant intervention.

The OS rehabilitation site requires additional amelioration via methods such as capping and/or placement of healthy topsoil. Previous trials at CSA indicated that soil contaminants are capable of leaching upward via capillary processes and requires intervention. This may include the capping of the contaminated soils with NAF waste rock, use of geotechnical fabric and/or clay capping followed by the placement of 'healthy topsoil'. Trials and liaison with other local mines or geotechnical experts to determine outcomes of any similar trials or treatments is recommended. Complete removal of unsuitable surface material and its replacement with more suitable topsoil material may also be a viable option in some areas where this is possible.

Testing of waste rock materials and topsoils prior to application on rehabilitation areas should also be undertaken to ensure suitable substrates are used prior to spreading onto rehabilitation areas. The TSF sites and areas on the lower batters of the wider OS area appear to be establishing well with large pockets of cryptogams becoming established thus indicating suitable soil conditions and these are stable and appear to be developing well. There were also scattered shrub seedlings voluntarily establishing across the site, however soil contamination may be an ongoing issue which will require monitoring. The addition of Large Woody Debris (LWD) and brush matting is encouraged it need not be in such high densities such as those on OS.

Many of the targets associated with structural complexity and ground cover composition were also not met and these are related to low tree and shrub densities and low levels of perennial ground covers. While these are in part due of the relatively young age of the rehabilitation areas, these attributes could be improved via the implementation of a seeding program *after suitable substrate management has been achieved*, which should aim to provide species which will mimic the reference sites once they have become established. While many rehabilitation areas have been naturally regenerating, rehabilitation outcomes could be improved by applying a selection of local native tree, shrub, herb and grass seed and a seed collection program should be considered.

The long-term success of the woodland rehabilitation and its ability to meet completion targets will largely depend on the capacity of the native perennial plants to drive the ecological function and integrity of the rehabilitated sites. The establishment of native perennial plants in rehabilitation sites should therefore be a primary rehabilitation objective. Due to clearing and over grazing, many native colonising species have become established in uncharacteristically high densities in the Cobar rangelands and are referred to as Invasive Native Species (INS). However, habitat traits of INS could be used to accelerate the development of woodland rehabilitation communities, providing the sites remain *free from ongoing disturbances*. Site stabilisation and recovery may be fast tracked by applying high seeding densities of short-lived colonising species such acacia, senna and dodonaea combined with lower seeding densities of long-lived eucalypt and callitris species.

Other later successional species such as native perennial grasses and ground covers should also be included, however many are likely to establish voluntarily from the soil seed bank and/or other natural dispersal mechanisms. Colonising species will naturally decline from the community once the site has reached a particular successional stage; however it is crucial the areas remain free from ongoing disturbances such as unmanaged grazing, therefore exclusion fencing is required. Additional ecological targets and conservation objectives can be achieved by introducing missing structural components, such as tree hollows for nesting sites in order to satisfy completion criteria targets where required.

The PVP program aimed to improve floristic diversity by reducing the impacts of Invasive Native Scrub (INS). The program aimed to create minimal ground disturbance, whilst retaining non-INS species. The plan also aimed to preserve biodiversity by ensuring that patches of large trees, drainage lines etc. are retained. Intensive monitoring of the PVP sites over the past four years has indicated that extensive disturbance of the remnant woodland via direct clearing has occurred, thus significantly reducing the structural complexity and diversity of the local woodland vegetation. The large-scale clearing has not only removed colonising shrubs but also mature habitat trees, ground cover plants and a range of organic material, which are vital in creating protective microclimates, buffering against extremes in temperatures and providing germination niches. In addition, the clearing process has also resulted in the reduction in the cover abundance and diversity of ground cover plants and subsequently has resulted in a net loss of biodiversity and ecological function.

The loss of plants and organic materials has led to the development of particularly hard and compacted soils which have a limited ability to support plant establishment of desirable grass species, particularly

when there is a lack of extant populations from which seeding material is required. The disturbance created has only encouraged a new generation of INS species, with scattered Eremophila and senna species already establishing across the disturbed areas and continued overgrazing and disturbances created by feral animals will limit the potential for herbaceous ground covers to establish.

The soils in the PVP sites continue to be extremely hard and compacted (amongst the hardest soils we have ever encountered), and while cryptogams had begun to establish in pockets however these were also being impacted on by animal tracks and overgrazing and few were recorded this year. While three years of drought has probably decreased the recovery rates of these cleared areas, they remain exposed to unmanaged grazing especially by feral goats. The impacts of grazing on the recovery of PVP cleared areas could be quantified via the establishment of grazing exclusion fences (~50x 20m) in PVP cleared areas.

Fencing which aims to exclude grazing by feral goats from all sensitive rehabilitation areas, in conjunction with controlling the goat populations in the local area should continue to be a high management priority.

5.5. Rehabilitation plans for the next reporting period

The planned rehabilitation activities for 2022 will not involve any additional ground works, or establishment of new areas, until the results of the tailings capping trials can be completed and a final landform cover agreed upon with the Resources Regulator. Instead they are likely to be a continuation of maintenance of existing rehabilitation areas in the form of weeding, pest exclusion, and possible seeding/ ameliorant addition. CSA will also endeavour to continue the topsoil sourcing project kicked off in 2020 which involves the importation of closure material to the mine site to ensure that the projected deficit can be met prior to mine closure.

Additional work that is proposed, but is largely dependent on the generation of mining waste is the waste rock emplacement project on the STSF, which endeavours to meet final landform design on the old embankments of the STSF and reduce the risk of exposed tailings on the lower facility raises which it was switched from perimeter to central deposition.

6. ACTIVITIES PROPOSED IN THE NEXT AEMR PERIOD

Table 28 - Proposed environmental activities for 2022.

Proposed Activity	Priority Ranking	Scheduled Completion Date
Continue the STSF closure column trials	H	2022
Finalise the STSF conceptual capping project	H	Q4 2022
Site exclusion fencing project to improve biodiversity value and exclude feral grazing animals	H	Q1 2021
Annual asbestos monitoring and update of site management plan.	M	Q4 2021
Implement joint rehabilitation efforts on site excised areas.	M	2022
Continuation of environmental monitoring of surface water, groundwater and air.	M	2022
Dangerous Goods Audit and management plan update.	M	Q3 2021
Biodiversity Assessment	M	Q3 2021
New Biodiversity Management Plan	M	Q4 2021
Heritage Management Plan	M	Q4 2021
LFA Monitoring (September).	M	Q3 2021

7. APPENDICES

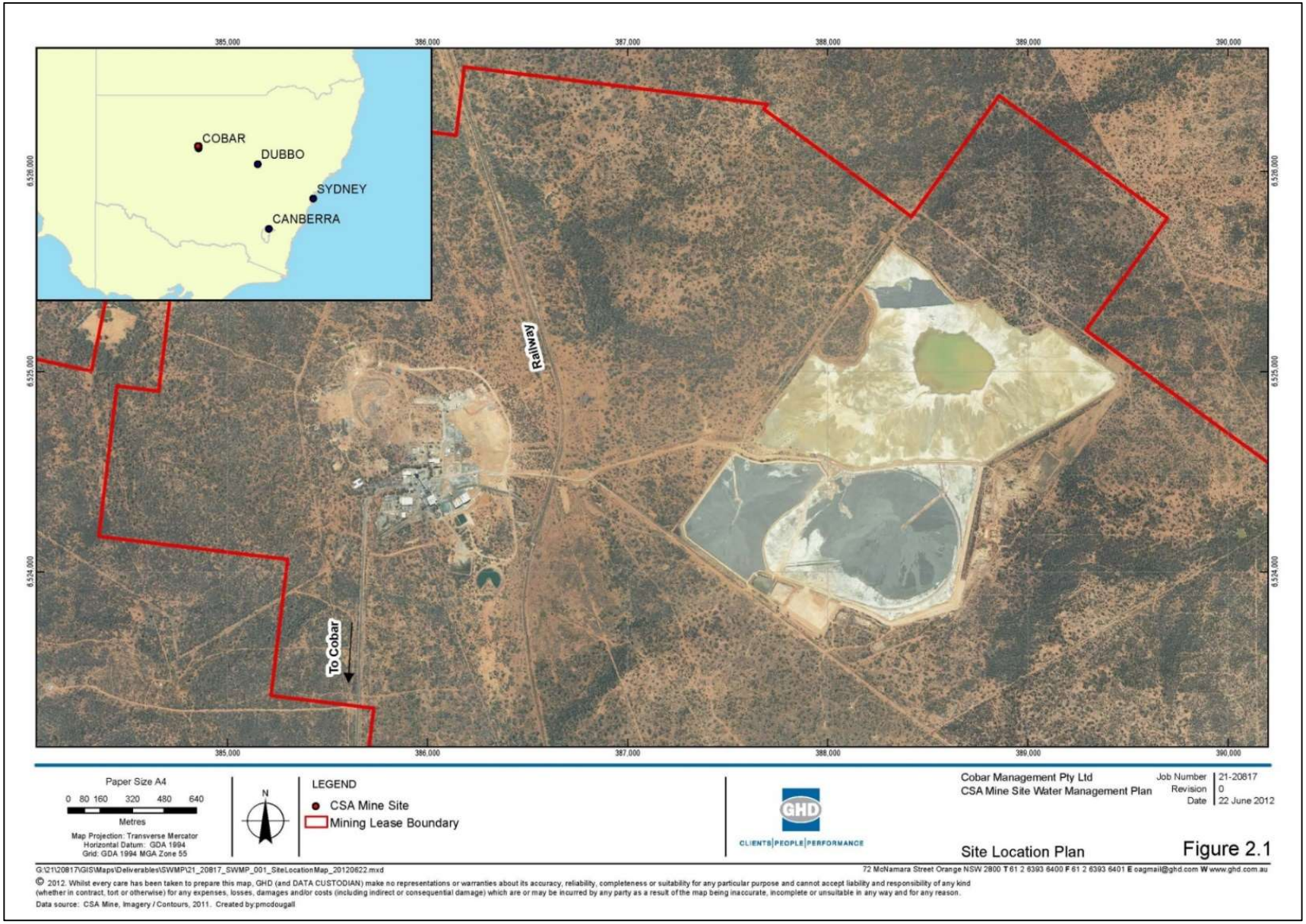
Appendice 1 - CSA Mine Site Location Plan.

Appendice 2 - CSA Mine Disturbed Areas and Infrastructure.

Appendice 3 - CSA Mine Topsoil Stockpile Areas.

Appendice 4 - Mine Proposed Final Rehabilitation - Post Mining Land Use.

Appendice 5 – CML5 Plans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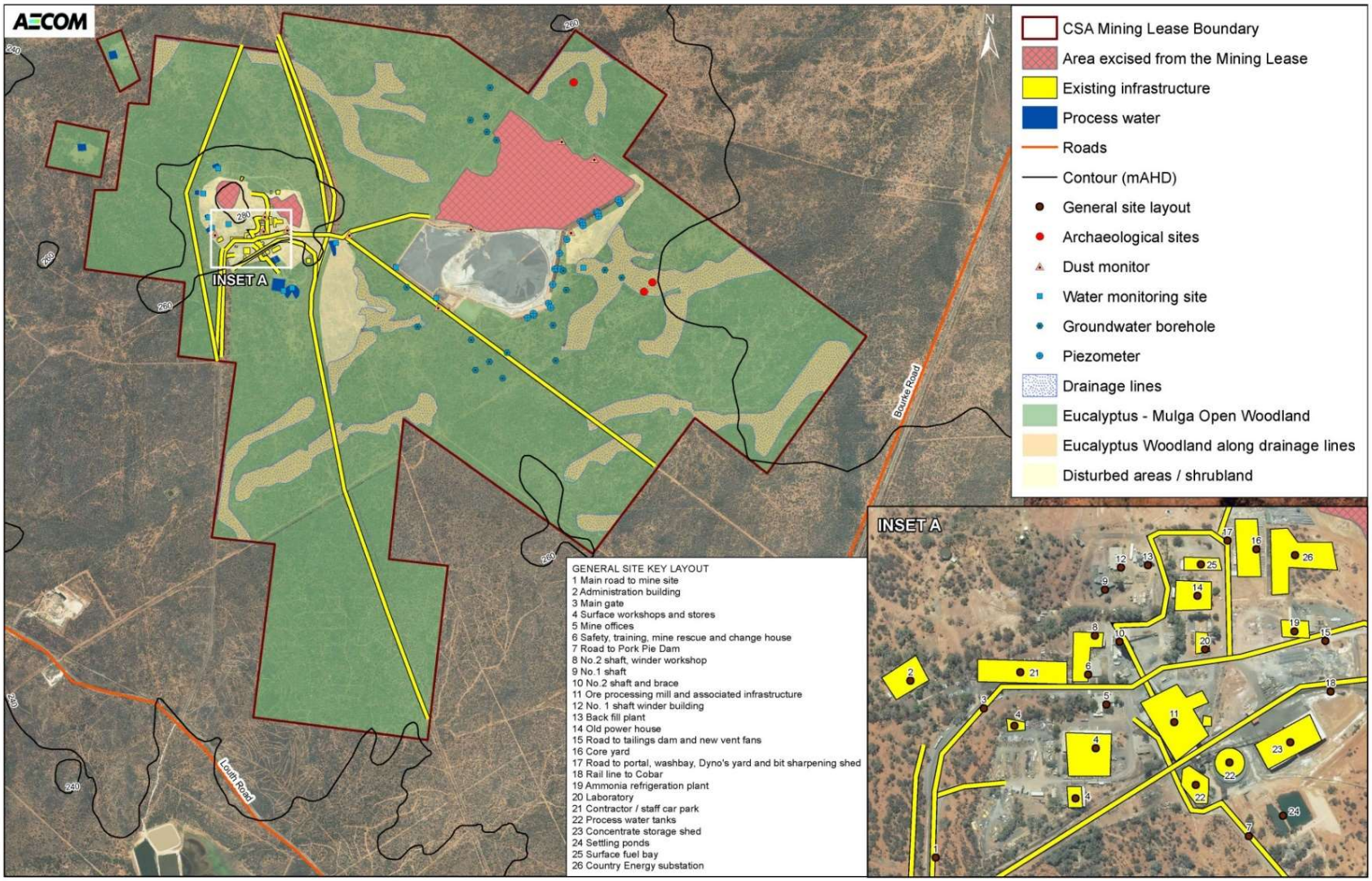
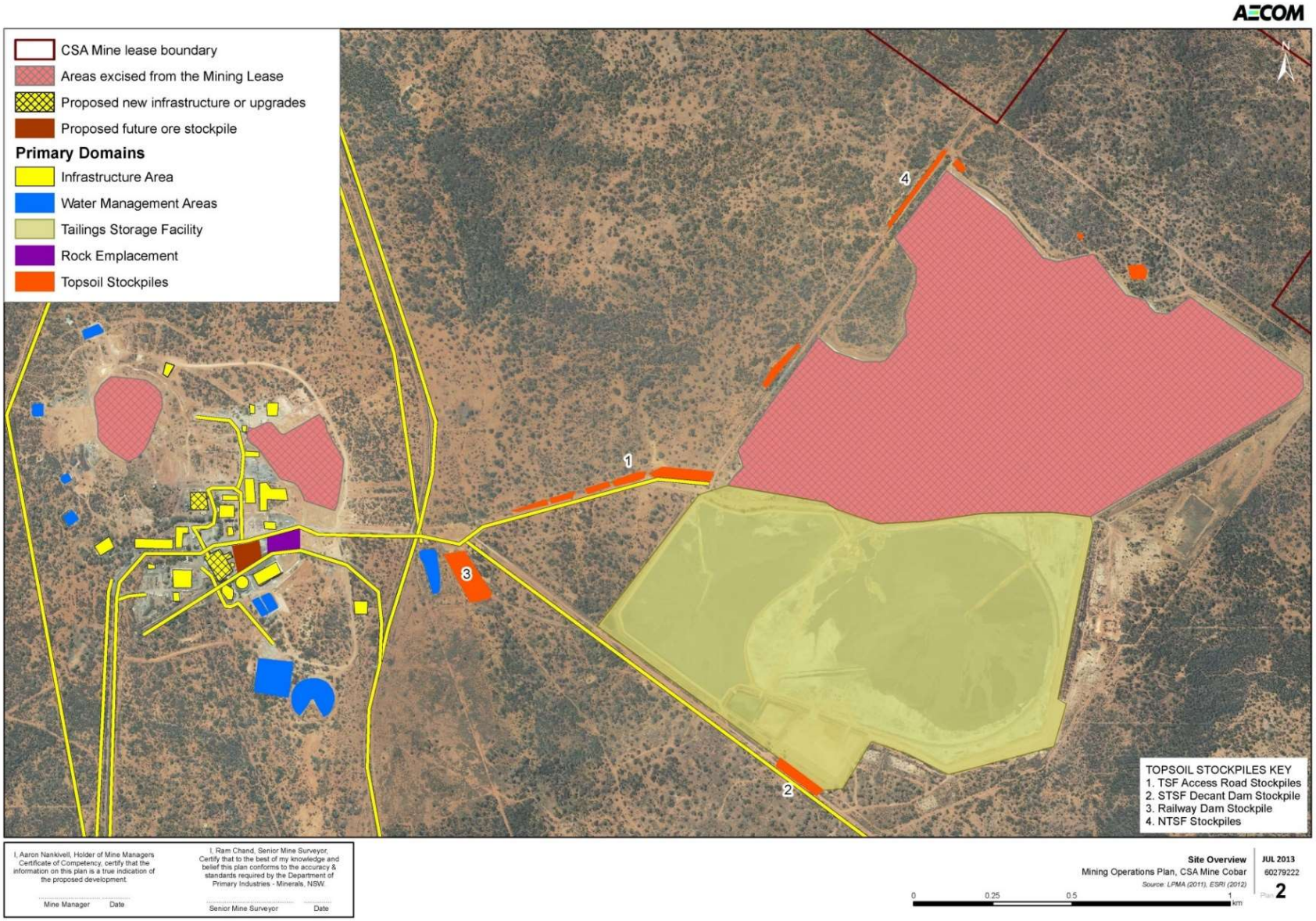
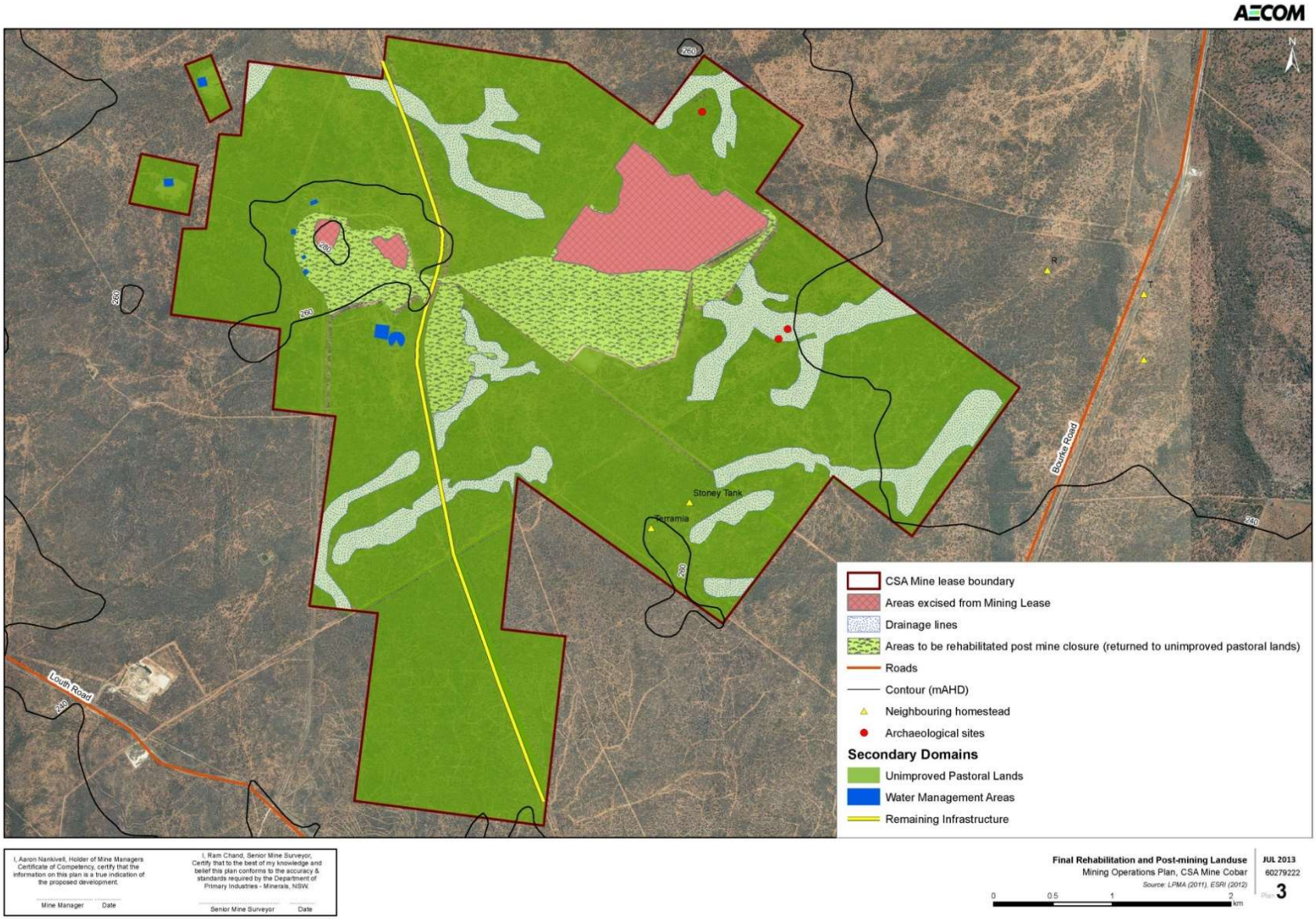
386,000
387,000
388,000
389,000
390,000
6,526,000
6,525,000
6,524,000
COBAR
DUBBO
SYDNEY
CANBERRA
Railway
To Cobar
Paper Size A4
0 80 160 320 480 640
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55
N
LEGEND
CSA Mine Site
Mining Lease Boundary
GHD
CLIENTS|PEOPLE|PERFORMANCE
Cobar Management Pty Ltd
CSA Mine Site Water Management Plan
Job Number 21-20817
Revision 0
Date 22 June 2012
Site Location Plan
Figure 2.1
G:\21\20817\GIS\Maps\Deliverables\SWMP\21_20817_SWMP_001_SiteLocationMap_20120622.mxd
72 McNamara Street Orange NSW 2800 T 61 2 6393 6400 F 61 2 6393 6401 E oagmail@ghd.com W www.ghd.com.au
© 2012. Whilst every care has been taken to prepare this map, GHD (and DATA CUSTODIAN) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
Data source: CSA Mine, Imagery / Contours, 2011. Created by:pmodougall


AECOM
N
CSA Mining Lease Boundary
Area excised from the Mining Lease
Existing infrastructure
Process water
Roads
Contour (mAHD)
General site layout
Archaeological sites
Dust monitor
Water monitoring site
Groundwater borehole
Piezometer
Drainage lines
Eucalyptus - Mulga Open Woodland
Eucalyptus Woodland along drainage lines
Disturbed areas / shrubland
INSET A
Bourke Road
Louth Road
GENERAL SITE KEY LAYOUT
1 Main road to mine site
2 Administration building
3 Main gate
4 Surface workshops and stores
5 Mine offices
6 Safety, training, mine rescue and change house
7 Road to Pork Pie Dam
8 No.2 shaft, winder workshop
9 No.1 shaft
10 No.2 shaft and brace
11 Ore processing mill and associated infrastructure
12 No. 1 shaft winder building
13 Back fill plant
14 Old power house
15 Road to tailings dam and new vent fans
16 Core yard
17 Road to portal, washbay, Dyno's yard and bit sharpening shed
18 Rail line to Cobar
19 Ammonia refrigeration plant
20 Laboratory
21 Contractor / staff car park
22 Process water tanks
23 Concentrate storage shed
24 Settling ponds
25 Surface fuel bay
26 Country Energy substation
I, Aaron Nankivell, Holder of Mine Managers Certificate of Competency, certify that the information on this plan is a true indication of the proposed development.
Mine Manager Date
I, Ram Chand, Senior Mine Surveyor, Certify that to the best of my knowledge and belief this plan conforms to the accuracy & standards required by the Department of Primary Industries - Minerals, NSW.
Senior Mine Surveyor Date
Lease Overview
Mining Operations Plan, CSA Mine Cobar
Source: LPMA (2011), ESRI (2012)
0 0.5 1 2 km
JUL 2013
60279222
Plan 1B

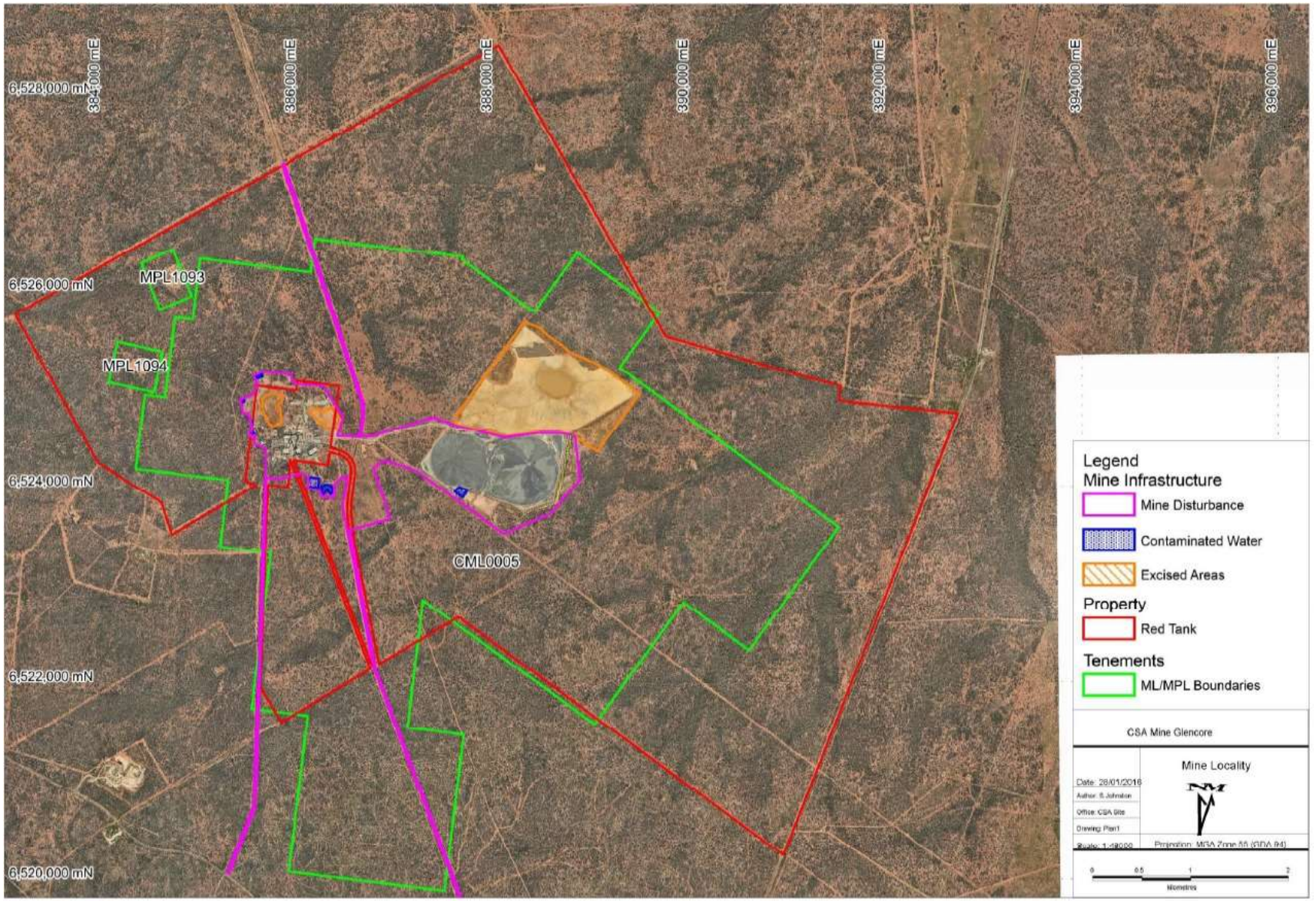
Appendice 3 - CSA Mine Topsoil Stockpile Areas



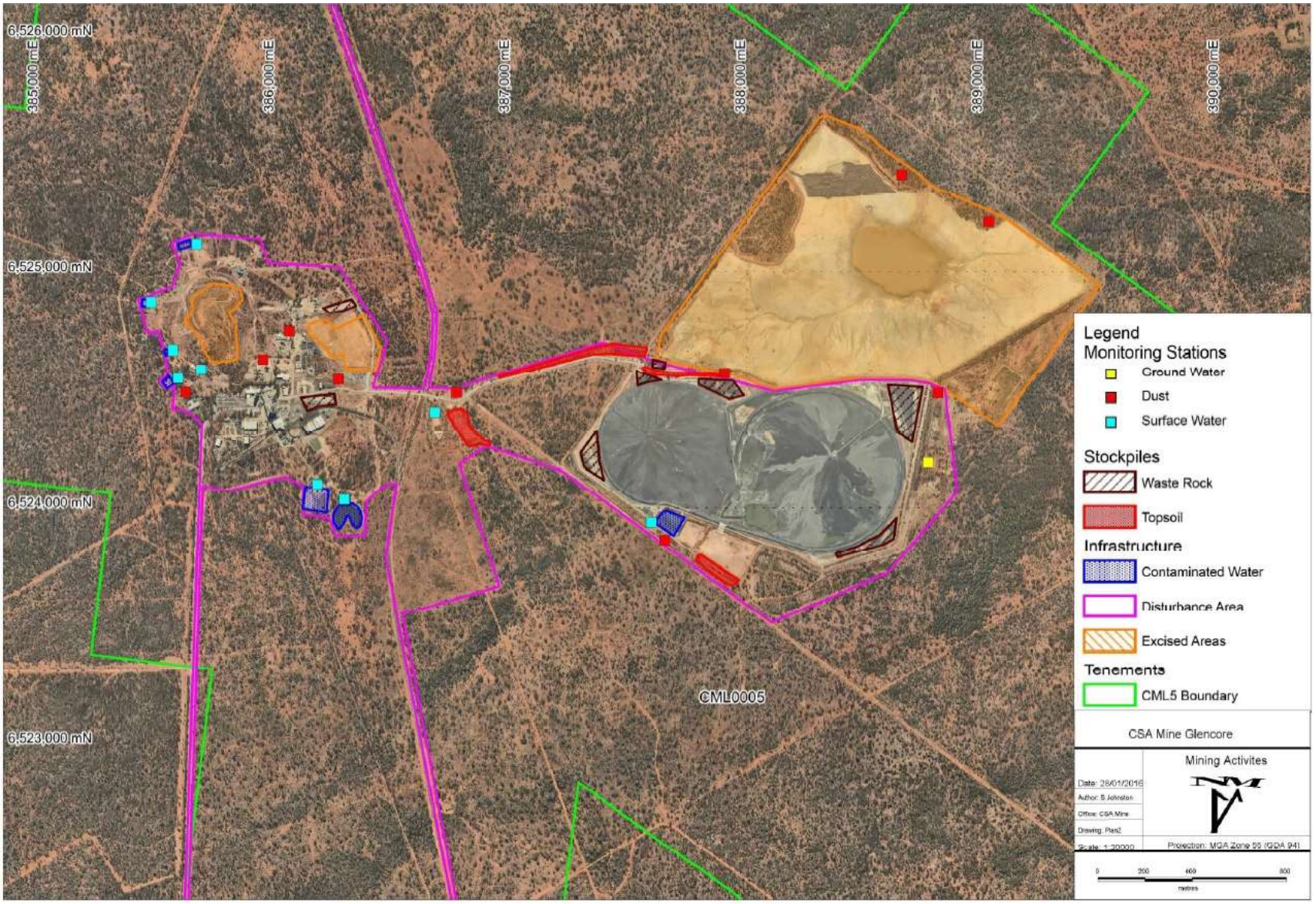
Appendice 4 - Mine Proposed Final Rehabilitation - Post Mining Land Use



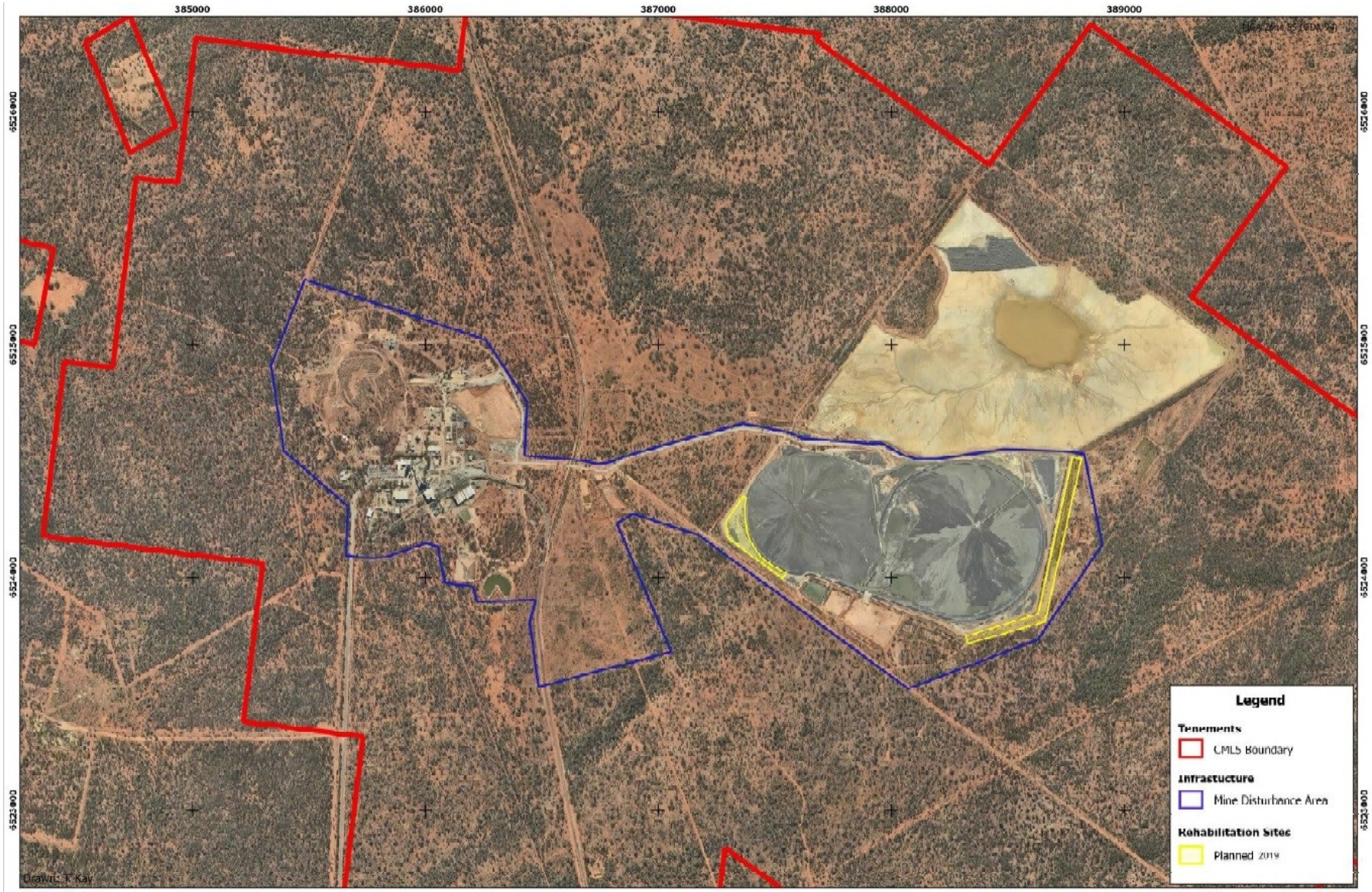
Appendice 5 - CSA Mine Plans 1, 2, & 3



Plan 1 - Mine Locality



Plan 2 - Mining Activities



Plan 3 - **CML5 Rehabilitation Sites**