Final

Costerfield Operation, Victoria, Australia, NI 43-101 Technical Report

Costerfield_2023_NI43-101, Victoria, Australia

Mandalay Resources Costerfield Operations Pty Ltd

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Date of Report: 28 March 2024

Effective Date: 31 December 2023

SRK Consulting (Australasia) Pty Ltd ▪PLI031 ▪March 2024

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Prepared for: Mandalay Resources Corporation
Effective Date: 31 December 2023 31 December 2023
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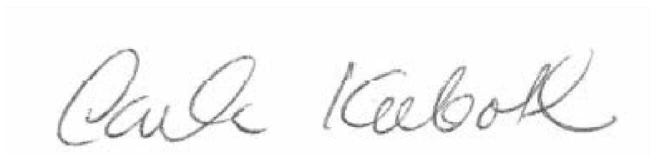

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Important Notice

This report was prepared as a National Instrument 43-101 Technical Report for Mandalay Resources Corporation (Mandalay) by SRK Consulting (Australasia) Pty Ltd (SRK). The quality of information, conclusions, and estimates contained herein is consistent with the level of effort involved in SRK's services, based on: I) information available at the time of preparation, ii) data supplied by outside sources, including without limitation, those sources listed in Section 3 - Reliance on Other Experts, and iii) the assumptions, conditions, and qualifications set forth in this report. This report is intended for use by Mandalay subject to the terms and conditions of its contract with SRK and relevant securities legislation. The contract permits Mandalay to file this report as a Technical Report with Canadian securities regulatory authorities pursuant to National Instrument 43-101, Standards of Disclosure for Mineral Projects. Except for the purposes legislated under provincial securities law, any other uses of this report by any third party is at that party's sole risk. SRK accepts no responsibility with respect to the opinions of those experts listed in Section 3 - Reliance on Other Experts nor determinations made by the Company with respect its obligation to file this Technical Report, or subsequent technical reports, nor any determinations as to the materiality of a mineral project to Mandalay, and SRK is under no obligation to update this Technical Report, except as may be agreed to between Mandalay and SRK by contract from time to time. The user of this document should ensure that this is the most recent Technical Report for the property as it is not valid if a new Technical Report has been issued.

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1 Summary

The Costerfield Property (The Property), wholly owned by Mandalay Resources Corporation (Mandalay Resources or Mandalay) is located within the Costerfield mining district, approximately 10 km northeast of the town of Heathcote, Victoria. The Property mining and processing facilities include an underground mine and a conventional flotation processing plant (Brunswick Processing Plant) with a current capacity of approximately 150,000 tpa of feed.

Mandalay Resources is a publicly listed company trading on the Toronto Stock Exchange (TSX) under the symbol MND, with the head office at 76 Richmond Street East, Suite 330, Toronto, Ontario, Canada M5C 1P1.

SRK was commissioned by Mandalay to provide Qualified Persons (QPs) to undertake personal inspections of the Property, complete detailed reviews of the work completed by Mandalay personnel and take QP responsibility for the 2023 Technical Report and any associated public disclosure. SRK Consulting (Australasia) Pty Ltd's (SRK's) QPs have independently reviewed the work completed by Mandalay Resources and take responsibility for all sections of this Technical Report.

The Mineral Resource and Mineral Reserve Statement reported herein was prepared in accordance with the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) *Definition Standards* (CIM, 2014), *Mineral Exploration Best Practice Guidelines* (CIM, 2018) and *Estimation of Mineral Resource and Mineral Reserves Best Practice Guidelines* (CIM, 2019).

During 2022 and 2023, at Costerfield, Mandalay drilled a total of 82.9 kilometres ('km') of exploration diamond core at a cost of US$14.9 M. The breakdown of this significant drilling campaign is as follows:

- 34.6 km to test extensions of the Youle and Shepherd orebodies
- 21.3 km to test other near-mine targets
- 27.0 km to test regional targets beyond current mine operations.

The 27.0 km of regional testing included 10.4 km drilling on the nearby True Blue deposit located approximately 2 km northwest of the current Youle workings. The maiden Inferred Resource on True Blue consists of gold bearing quartz and stibnite veins hosted in the Costerfield siltstone, which also hosts all other current Resources at Costerfield. The mineralisation style at True Blue is similar to that seen in the Augusta and Cuffley orebodies mined from 2008 to 2018.

In addition to drilling, 1,607 m of on-vein development was completed within the Youle orebody, and 4,341 m development into the Shepherd orebody. Rock chip samples used in mine grade control were also included in the geological database and used in the Mineral Resource Estimation process to improve Mineral Resource classification in areas accessed by development.

Drill core is logged and sampled by Costerfield geologists, who also perform mine sampling. All samples were submitted to On Site Laboratory Services Pty Ltd (On Site) in Bendigo, Victoria, Australia for sample preparation and assay. Site geological and metallurgical personnel have implemented a quality assurance/quality control (QA/QC) process that includes the regular submission of site specific and externally sourced standard reference materials, duplicates and blanks with drill and face samples submitted for assay. Site specific standard reference materials were both produced and certified by Geostats Pty Ltd or ORE Research & Exploration Pty Ltd (OREAS). Both Geostats Pty Ltd and OREAS are Australian consultancies who specialise in laboratory quality control systems.

The acQuire Geoscientific Information Management (GIM) system was used to store and validate all geological data used for the Mineral Resource Estimate. A two-dimensional (2D) accumulation estimation method was used for the estimation of all models. This method is considered most applicable for the narrow veins of Costerfield. The Datamine Studio RM platform supports 2D accumulation estimation and was used to complete the Mineral Resource Estimation. Validated drilling and mine sampling data were imported into Datamine and composited to full intersection width. Gold accumulation, antimony accumulation (accumulation = vein true width × vein grade) and true vein width were estimated into a 2D block model for each lode using ordinary kriging. Gold and antimony grades were back-calculated using the estimated accumulated data and true vein width.

Where vein true widths are less than 1.2 m, vein grades were diluted to a minimum mining width of 1.2 m using dilution grades of zero g/t gold and zero percent antimony for host lithologies. Where vein true widths are greater than or equal to 1.2 m, grades were not diluted.

Mineral Resources were reported above a cut-off of 5.0 g/t gold equivalent (AuEq) which was determined using Costerfield's 2023 production costs, and using a gold price of $1,900/oz and an antimony price of $12,000/t. Cut-off grade is expressed as AuEq to allow for the inclusion and expression of the secondary metal (Sb) in terms of the primary metal (Au). AuEq is calculated using the formula AuEq= Au + (Sb × 1.88) where Sb is expressed as a percentage, and Au is in grams per tonne, both based on 1.2 m diluted grades.

Table 1.1: Mineral Resources at Costerfield, inclusive of Mineral Reserves as at 31 December 2023

Category	Inventory (kt)	Gold (g/t)	Antimony grade (%)	Contained gold (koz)	Contained antimony (kt)
Measured (Underground)	388	15.9	4.1	198	16.0
Measured (Stockpile)	29	5.2	1.0	5	0.3
Indicated	548	7.2	2.3	127	12.5
Measured + Indicated	**965**	**10.6**	**3.0**	**330**	**28.8**
Inferred (Costerfield)	214	7.0	1.8	56	2.5
Inferred (True Blue)	72	3.5	3.7	8	2.6
Inferred	**286**	**7.0**	**1.8**	**64**	**5.1**

Notes:

[1] The Mineral Resource is estimated as at 31 December 2023 with depletion through to this date.

[2] The Mineral Resource is stated according to CIM guidelines and includes Mineral Reserves.

[3] Tonnes are rounded to the nearest thousand; contained gold (oz) is rounded to the nearest thousand; contained antimony (t) is rounded to nearest hundred.

[4] Totals may appear different from the sum of their components due to rounding.

[5] 5.0 g/t AuEq cut-off grade over a minimum mining width of 1.2 m is applied where AuEq is calculated using the formula: AuEq = Au g/t + 1.88 × Sb %.

[6] The AuEq factor of 1.88 is calculated at a gold price of $1,900/oz, an antimony price of $12,000/t, and recoveries of 94% for Au and 89% for Sb.

[7] Veins were diluted to a minimum mining width of 1.2 m before applying the cut-off grade, and peripheral mineralisation far from current development was excluded to comply with the Reasonable Prospects for Eventual Economic Extraction (RPEEE) criteria.

[8] The Stockpile Mineral Resource is estimated based upon surveyed volumes supplemented by production data.

[9] Geological modelling, sample compositing and Mineral Resource Estimation for updated models was performed by Joshua Greene, MAusIMM, a full-time employee of Mandalay Resources.

[10] The Mineral Resource Estimate was independently reviewed and verified by Cael Gniel, MAIG, RPGeo (Mineral Resource Estimation), an employee of SRK. Mr Gniel fulfills the requirements to be a QP for the purposes of NI 43-101, and is the QP under NI 43-101 for the Mineral Resource Estimate.

The Measured and Indicated categories of Mineral Resource were used to update the mine plan using predominantly a long-hole stoping mining method with cemented rock fill (CRF). An operational cut-off grade of 6.0 g/t AuEq was determined from Costerfield's 2023 production costs, and a minimum stoping width of 1.5 m was used, with planned and unplanned dilution at zero grade for both gold and antimony. An incremental cut-off grade of 3.1 g/t AuEq was applied where incremental mining conditions were met. AuEq grade for the Mineral Reserve is calculated using commodity prices of $1,800/oz Au and $11,500/t Sb. AuEq is calculated using the formula AuEq= Au + (Sb × 1.22) where Sb is in % and Au is in grams per tonne. Financial viability of Proven and Probable Mineral Reserves was demonstrated at metal prices of $1,800/oz Au and $11,500/t Sb.

Table 1.2: Mineral Reserve at the Costerfield Property, as at 31 December 2023

Category	Tonnes	Gold grade (g/t)	Antimony grade (%)	Contained gold (koz)	Contained antimony (kt)
Proven (Underground)	**330**	**12.4**	**2.2**	**131**	**7.3**
Proven (Stockpile)	29	5.2	1.0	5	0.3
Probable	**200**	**8.1**	**1.5**	**52**	**3.0**
Proven + Probable	**559**	**10.5**	**1.9**	**188**	**10.6**

Notes:

[1] The Mineral Reserve is estimated as at 31 December 2023, and depleted for production through to 31 December 2023.

[2] Tonnes are rounded to the nearest thousand; contained gold (oz) is rounded to the nearest thousand; contained antimony (t) is rounded to nearest hundred.

[3] Totals may appear different from the sum of their components due to rounding.

[4] Lodes have been diluted to a minimum mining width of 1.5 m for stoping and 1.8 m for ore development.

[5] An operating cut-off grade of 6.0 g/t AuEq is applied. An Incremental cut-off grade of 3.1 g/t AuEq is applied where mining rates do not meet mill capacity and the life of the mine is not extended.

[6] Commodity prices applied are a gold price of US$1,800/oz, an antimony price of US$11,500/t and an exchange rate US$:A$ of 0.70.

[7] AuEq is calculated using the formula: AuEq = Au g/t + 1.22 × Sb %.

[8] The Mineral Reserve is a subset, a Measured and Indicated only schedule, of a Life of Mine (LoM) plan that includes mining of Measured, Indicated and Inferred Resources.

[9] The Mineral Reserve Estimate was prepared by Brett Nevill, MAusIMM, who is a full-time employee of SRK, under the direction of Dylan Goldhahn, MAusIMM, who is a full-time employee of Mandalay Resources. The Mineral Reserve Estimate was independently verified by Robert Urie, FAusIMM, who is a full-time employee of SRK. Robert Urie fulfills the requirements to be a QP for the purposes of NI 43-101, and is the QP under NI 43-101 for the Mineral Reserve.

The net decrease of 123,384 oz of gold in Proven and Probable Mineral Reserves for 2023, relative to 2021, consists of the addition of 13,124 oz of gold added by Mineral Resource conversion and the addition of resources to the Shepherd orebody, and a total of 136,508 oz of gold depleted from the 2021 Mineral Reserves through mining production in 2022–2023 and through mining re-evaluation. The 8,970 t of antimony net decrease in Proven and Probable Mineral Reserves consists of 793 t of antimony added by Mineral Resources conversion and the addition of Mineral Resources to Shepherd, and 9,763 t of antimony depleted from the 2023 Mineral Reserves through mining production in 2022–2023 and through mining re-evaluation.

2 Introduction

SRK Consulting (SRK) has overseen the preparation of this Costerfield Property Technical Report. The report demonstrates the viability of continued mining and processing operations at the Property and was largely compiled by Mandalay Resources personnel.

The Costerfield Property is located within the Costerfield mining district, approximately 10 km northeast of the town of Heathcote, Victoria. The Property's Augusta Mine has been operational since 2006 and has been the sole ore source for the Brunswick Processing Plant, with multiple zones – Augusta (from 2006), Cuffley (from 2013), Brunswick (from 2018), Youle (from 2019), and Shepherd (from 2021) – constituting ore sources. The exploration and resource definition drilling and mining of the Youle and Shepherd deposits has extended the current mine life of the Costerfield Operation, with mining of the Youle Deposit commencing in 2019.

The Costerfield Property mining and processing facilities are contained within Mining Licence MIN4644 and comprise the following:

- An underground mine with production from the Youle and Shepherd lodes.
- A conventional flotation processing plant (Brunswick Processing Plant) with a current capacity of approximately 150,000 tpa of feed.
- Mine and mill infrastructure, including office buildings, workshops, core shed and equipment.

Mandalay Resources is a publicly listed company trading on the Toronto Stock Exchange (TSX) under the symbol MND, with the head office at 76 Richmond Street East, Suite 330, Toronto, Ontario, Canada M5C 1P1. On 1 December 2009, Mandalay Resources completed the acquisition of AGD Mining Pty Ltd (AGD) from Cambrian Mining Limited (Cambrian), a wholly-owned subsidiary of Western Canadian Coal Corporation, resulting in AGD becoming a wholly-owned subsidiary of Mandalay Resources.

2.1 Terms of Reference

SRK was commissioned by Mandalay Resources to provide QPs to undertake personal inspections of the Property, complete detailed reviews of the work completed by Mandalay personnel and take QP responsibility for the 2023 Technical Report and any associated public disclosure. SRK QPs have independently reviewed the work completed by Mandalay Resources and take responsibility for all sections of this Technical Report, with some reliance placed on external experts to the extent permitted under the Canadian National Instrument 43-101 (NI 43-101).

The Mineral Resource and Mineral Reserve Statement reported herein was prepared in accordance with the CIM *Definition Standards* (CIM, 2014), *Mineral Exploration Best Practice Guidelines* (CIM, 2018) and *Estimation of Mineral Resource and Mineral Reserves Best Practice Guidelines* (CIM, 2019).

This Technical Report has been prepared in accordance with NI43-101 and Form 43-101 F1.

The Technical Report was assembled in Melbourne and Perth during the months of January to March 2024.

2.2 Effective Date

This report is dated 28 March 2024 and has an effective date of 31 December 2023.

This date coincides with the following:

- Depletion due to mining up to 31 December 2023.
- Survey of stockpiled ore that was mined and awaiting processing as of 31 December 2023.

All relevant diamond drill hole and underground face samples in the Costerfield Property available as of 31 December 2023 for the Augusta, Cuffley, Brunswick, Youle and Shepherd deposits were used to inform the Mineral Resource Estimate.

2.3 Qualified Persons

Cael Gniel: SRK Senior Consultant, BSc (Geosciences and Chemistry), MAIG, RPGeo (Mineral Resource Estimation), conducted a personal inspection of the Property in August 2023. He is independent of Mandalay Resources, however, has had prior involvement with the Property during 2012–2018 when he was employed by Mandalay Resources. By virtue of his education, membership to a recognised professional association and relevant work experience, he is an independent QP as defined by NI 43-101.

Robert Urie: SRK Principal Consultant, BEng (Mining Engineering), GCert (Applied Finance), FAusIMM reviewed all aspects of the estimation of the Mineral Reserve and associated information. He conducted a personal inspection of the Property in October 2023. By virtue of his education, membership to a recognised professional association and relevant work experience, he is an independent QP as defined by NI 43-101.

Carla Kaboth: Core Resources Principal Process Engineer, BEng Hons (Mineral Processing), FAusIMM(CP), RPEQ, undertook a review of the mineral processing and metallurgical testing, recovery methods and infrastructure aspects of the project. She conducted a personal inspection of the Property in October 2023. By virtue of her education, membership to a recognised professional association and relevant work experience, she is an independent QP as defined by NI 43-101.

2.4 Acknowledgements

SRK would like to acknowledge the support and collaboration provided by Mandalay Resources personnel during the completion of this project. In particular, SRK would like to thank the following people:

- Chloe Cavill: Geological oversight and operational information
- Joshua Greene: Mineral Resource Estimation, and geological modelling
- Dylan Goldhahn: Ore Reserve, scheduling, and mine design
- Daniel Fitzpatrick: Engineering and economic oversight
- Shaun Eibl: Mineral processing and metallurgical test work
- Robyn Wilson: Geological technical report writing.
- April Westcott: Geological technical report writing.

3 Reliance on Other Experts

SRK has relied on a marketing study from an external expert (WEMCO, 2022) to inform the future price estimate for antimony.

4 Property Description and Location

4.1 Property Location

The Costerfield Property is located within the Costerfield mining district of Central Victoria, approximately 10 km northeast of the town of Heathcote and 50 km east of the city of Bendigo (Figure 4.1).

The Property encompasses the underground infrastructure supporting the Augusta, Cuffley, Brunswick, Youle and Shepherd deposits; The Augusta Mine Site (Augusta), the Brunswick Processing Plant; Splitters Creek Evaporation Facility; Brunswick and Bombay Tailings Storage Facilities (TSFs) and associated infrastructure.

Augusta, which houses the main offices for the Costerfield Project is located at latitude of 36°52’ 27” south and longitude 144 47’ 38” east. The Costerfield Property includes the Augusta, Cuffley, Brunswick, Youle and Shepherd deposits (Figure 4.2).

Figure 4.1: Costerfield Property location map

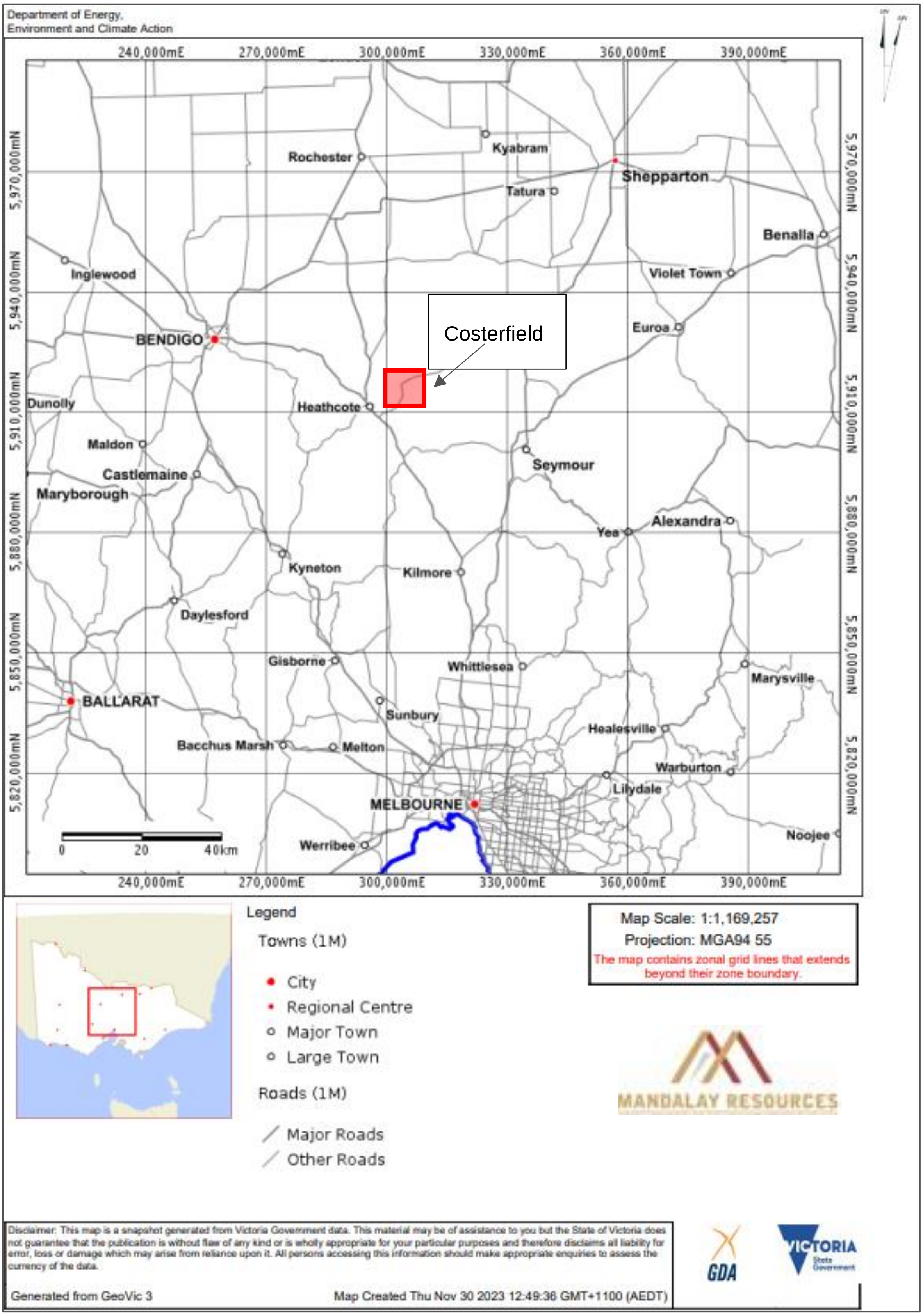
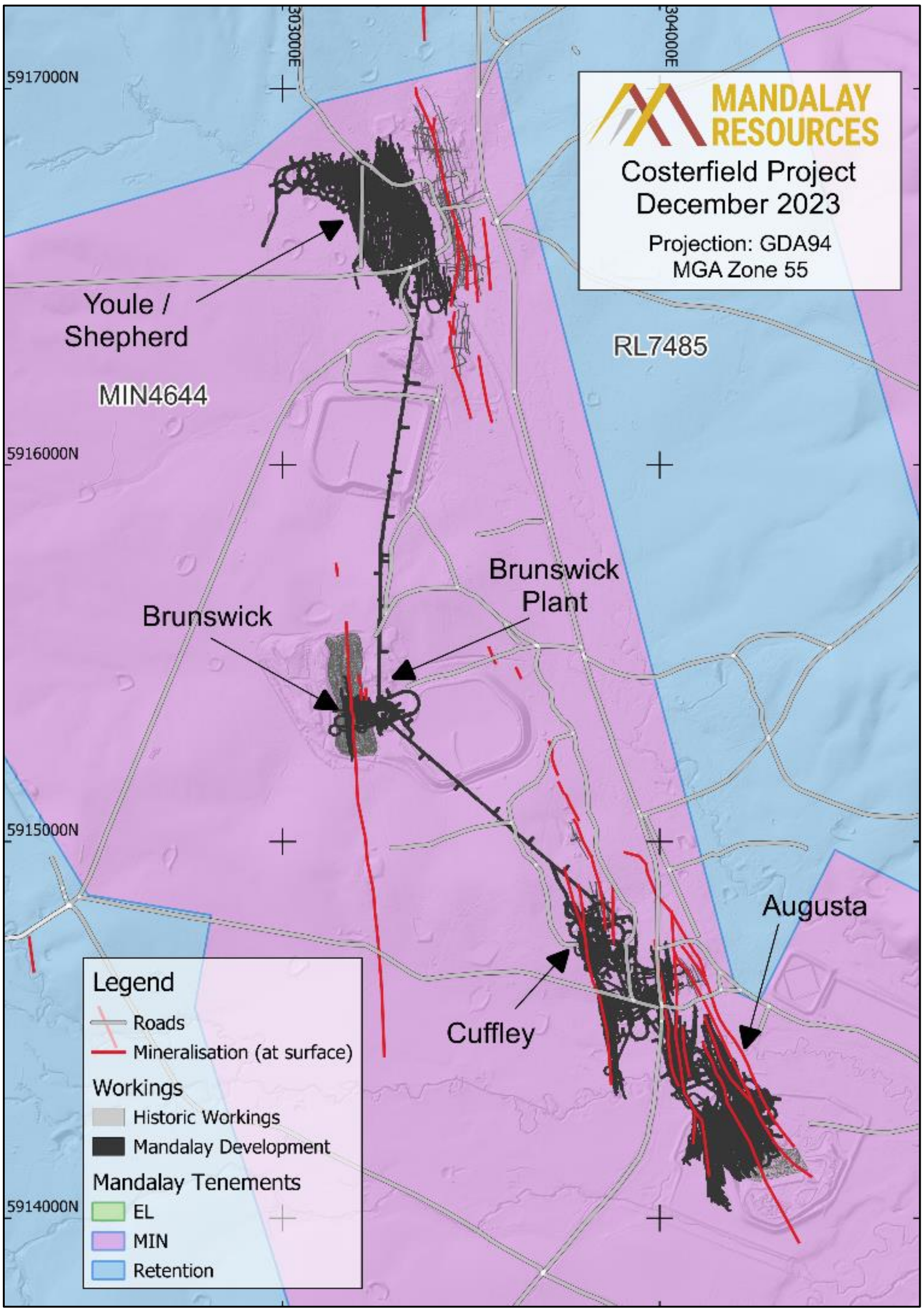


Figure 4.2: Costerfield Property deposits showing underground workings



The deposits are accessed via portals at Augusta and Brunswick. Ore haulage to the run of mine (ROM) takes place through the Brunswick portal, which opened in November 2020.

4.2 Land Tenure

Tenure information for the Costerfield Property has been detailed in Table 4.1. Information has been provided for the two Mining Licences (MLs), five Exploration Licences (ELs), one expired Exploration Licence (EXEL) and one Retention Licence under application (RLAs).

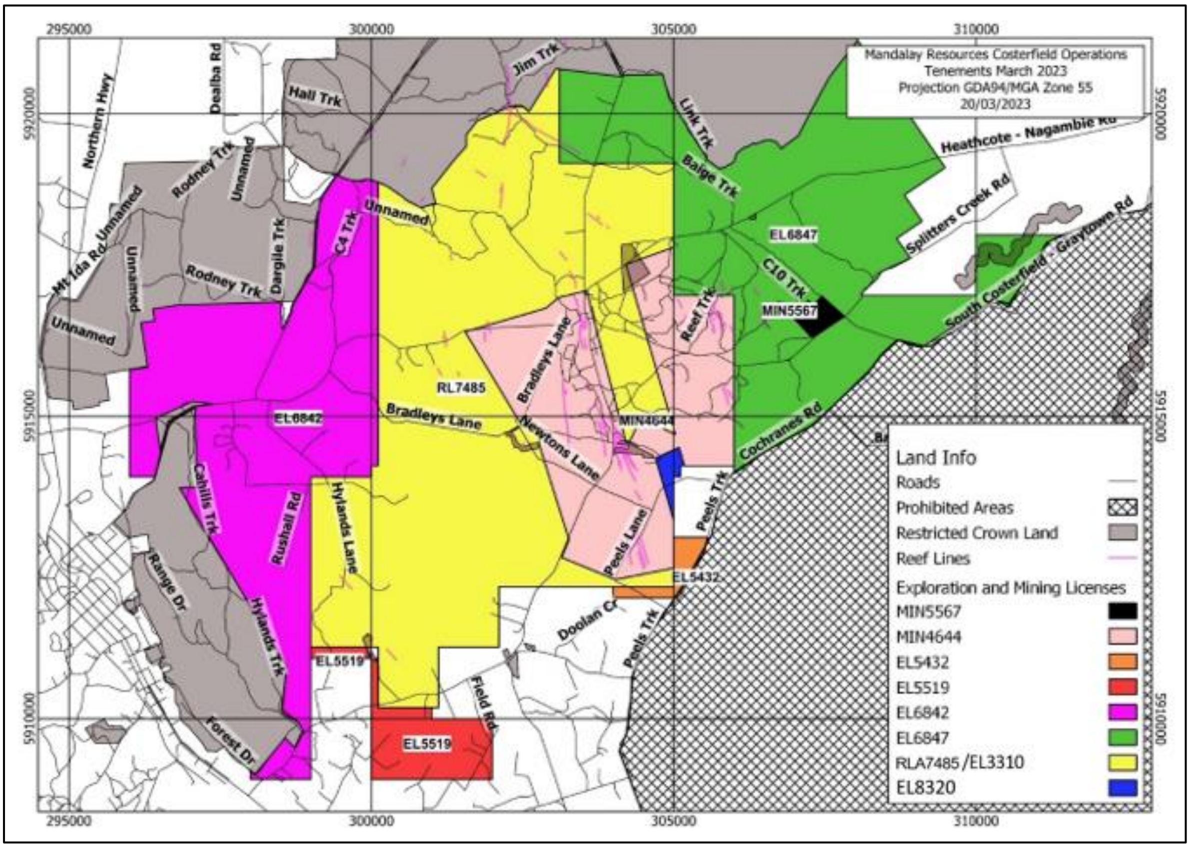
Table 4.1: Property tenement package details

Licence	Name	Status	Company	Area	Grant date	Expiry date
MIN4644	Costerfield	Granted	AGD Operations Pty Ltd	1,219.3 ha	25/02/1986	30/06/2026
MIN5567	Splitters Creek	Pending Renewal	Mandalay Resources Costerfield Operations Pty Ltd	30.0 ha	21/02/2013	Pending
EL5432	Peels Track	Granted	AGD Operations Pty Ltd	2.0 graticules	23/08/2012	22/08/2027
EL5519	Antimony Creek South	Granted	Mandalay Resources Costerfield Operations Pty Ltd	4.0 graticules	28/05/2015	27/05/2028
EL6842	Costerfield West	Granted	Mandalay Resources Costerfield Operations Pty Ltd	29.0 graticules	29/09/2022	28/09/2027
EL6847	Costerfield East	Granted	Mandalay Resources Costerfield Operations Pty Ltd	35.0 graticules	29/09/2022	28/09/2027
EL8320	Costerfield	Granted	Mandalay Resources Costerfield Operations Pty Ltd	3.0 graticules	11/10/2023	10/10/2028
RLA7485	Costerfield	Under Application (covers expired EL3310 area)	Mandalay Resources Costerfield Operations Pty Ltd	3,170.4 ha	Submitted 15/09/2020	Pending

Notes: 1 graticule is equivalent to 1 km^2.

Mandalay Resources manages the Costerfield Property and holds a 100% interest in licences MIN4644, MIN5567, EL5432, EL5519, EL6842, EL6847, EL8320 and RLA7485 (Figure 4.3).

Figure 4.3: Mandalay Resources ML and EL tenement boundaries, displaying RLA7485



On 17 September 2020, tenement EL3310 expired and on 15 September 2020, a RLA (RLA7485 of 3,170.4 ha, Figure 4.3) was lodged in order to retain the licence area, except for an area of national park that will be excised on any granting of the new licence. As of December 2023, the RLA remains pending approval from the Earth Resources Regulator (ERR). As part of the RLA, Mandalay Resources applied for a s16A of the *Mineral Resources (Sustainable Development) Act 1990* (MRSDA Act 1990) to allow work to continue until such time that the RLA has been determined.

The RLA has undergone the Right to Negotiate process in accordance with the *Native Title Act 1993* to allow any potential indigenous claimant/s, if they exist, to reach a Section 31 agreement with Mandalay Resources.

The Native Title requirements for the RLA have been determined and an assessment has been completed in accordance with the *Traditional Owner Settlement Act 2010* (TOSA). It was determined that the application area lies wholly within the Taungurung Recognition and Settlement Area.

In 2023, Mandalay Resources indicated its intention to comply with TOSA by engaging with the Taungurung Land and Waters Council (TLaWC) and is presently in the process of negotiating a Class A agreement for the land encompassed by RLA7485. The Department of Energy, Environment and Climate Action (DEECA) are awaiting the final negotiation contracts between Mandalay Resources and TLaWC before the licence can be granted.

4.3 Underlying Agreements

The sustainable and responsible development of Mineral Resources in Victoria is regulated by the State Government of Victoria through the MRSD Act 1990, administered by the DEECA, and requires that negotiation of access and/or compensation agreements with landowners affected by the work plans is undertaken between the mining licence applicant and the relevant landowner prior to an ML being granted or renewed.

In accordance with this obligation, Mandalay Resources has compensation agreements in place for land allotments owned by third-party landowners that are situated within the boundaries of the ML MIN4644.

Mandalay Resources owns the land that contains the ML MIN5567 and, as such, no compensation agreements are required, nor are they in place.

4.4 Environmental Liability

In October 2023, a bond review was completed and the value of the rehabilitation policy increased by A$5,396,000 to a total of A$9,475,000 for both MLs MIN4644 and MIN5567. The total bond of A$9,475,000 has been fully funded.

There are additional bonds of A$$10,000 each, three held by the DEECA for EL3310, EL5519 and EL5432, and one by VicRoads for licences where pipelines cross roads.

The rehabilitation bond for MIN5567 which holds the Splitters Creek Evaporation Facility was calculated in October 2018 and an amount of A$748,000 has been set aside.

The total bond for tenement MIN4464 which incorporates the Augusta mine site and Brunswick Processing Plant was estimated to be A$8.727 M. This bond has increased due to updated liability calculators and negotiations with government regulators.

Rehabilitation is being undertaken progressively at the Costerfield Operation, with the environmental bond only being reduced when rehabilitation of an area or site has been deemed successful by DEECA. This rehabilitation bond is based on the assumption that all rehabilitation is undertaken by an independent third party. Therefore, various project management and equipment mobilisation costs are incorporated into the rehabilitation bond liability calculation. In practice, rehabilitation costs may be less if Mandalay Resources chooses to use internal resources to complete the rehabilitation.

Other than the rehabilitation bond, the project is not subject to any other environmental liabilities. Table 4.2 presents the breakdown of the liability costs from the recent bond review.

Table 4.2: Total rehabilitation bond liability calculations 2023

Area	A$
Total rehabilitation liability – mine site (MIN4644)	8,727,000
Total rehabilitation liability – Splitters Creek Evaporation Facility (MIN5567)	748,000
Total rehabilitation liability – Costerfield Operations	**9,475,000**

4.5 Royalty

Royalties apply to the production of antimony and gold and are payable to the Victorian State Government through DEECA. Royalties apply at a rate of 2.75% on the revenue realised from the sale of antimony and gold produced, less the selling costs. A royalty exemption applies on the first 2,500 oz of gold produced each year.

There are no royalty agreements in place with previous owners.

Additional royalties are payable to the Victorian State Government through DEECA at a rate of A$0.87/t if waste rock or tailings is sold or provided to any third parties, since they are deemed to be quarry products.

4.6 Taxes

Mandalay Resources reports that, as at December 2023, no tax loss has been carried forward.

Income Tax on Australian company profits is currently set at 30%.

4.7 Legislation and Permitting

Mandalay Resources operates under an approved Work Plan in accordance with Section 39 of the MRSD Act 1990. Work Plan Variations (WPVs) are required when there are significant changes from the Work Plan and it is deemed that the works will have a material impact on the environment and/or community. Various WPVs have been approved by DEECA and are registered against the licence.

Mining Licence MIN4644 includes a series of specific conditions that must be met which become the controlling conditions upon which all associated WPVs are filed with the regulatory authority.

Apart from the primary mining legislation, which consists of the MRSD Act 1990, operations on MIN4644 remain subject to the additional following legislation and regulations, for which all appropriate permits and approvals have been obtained.

Legislation:

- *Environment Protection Act 1970*
- *Planning and Environment Act 1987*
- *Environmental Protection and Biodiversity Conservation Act 1999*
- *Flora and Fauna Guarantee Act 1988*

- *Catchment and Land Protection Act 1994*
- *Archaeological and Aboriginal Relics Preservation Act 1972*
- *Heritage Act 1995*
- *Forests Act 1958*
- *Dangerous Goods Act 1985*
- *Drugs, Poisons and Controlled Substances Act 1981*
- *Public Health and Wellbeing Act 2008*
- *Water Act 1989*
- *Crown Land (Reserves) Act 1978*
- *Radiation Act 2005*
- *Conservation, Forests and Lands Act 1987*
- *Wildlife Act 1975.*

Regulations:

- Dangerous Goods (Explosives) Regulations 2011
- Dangerous Goods (Storage and Handling) Regulations 2000
- Dangerous Goods (HCDG) Regulations 2005
- Drugs, Poisons and Controlled Substances (Commonwealth Standard) Regulations 2011
- Mineral Resources Development Regulations 2002.

To the best of the QP's knowledge, there is no other significant factor or risk that may affect access, title, or the right or ability to perform work on the Property.

5 Accessibility, Climate, Local Resources, Infrastructure and Physiography

5.1 Accessibility

Access to the Costerfield Operation is via the sealed Heathcote–Nagambie Road which is accessed off the Northern Highway to the south of Heathcote. The Northern Highway links Central and North-Central Victoria with Melbourne.

The Augusta Mine site is accessed off the Heathcote–Nagambie Road via McNichols Lane, which comprises a sealed/gravel road that continues for approximately 1.5 km to the Augusta site offices.

The Brunswick Processing Plant and Brunswick Portal are located on the western side of the Heathcote–Nagambie Road, approximately 1 km further north from the McNichols Lane turnoff. The Brunswick site offices are accessed by a gravel road that is approximately 600 m long.

5.2 Land Use

Land use surrounding the Costerfield Property is mainly small-scale farming, consisting of grazing on cleared land, bordered by areas of lightly timbered Box-Ironbark forest. The majority of the undulating land and alluvial flats are privately held freehold land.

The surrounding forest is largely rocky, rugged hill country administered by the DJPR as State Forest. The Puckapunyal Military Area is located on the eastern boundary of the Costerfield Property.

The Augusta Mine site is located on privately held land, while the Brunswick Deposit, Processing Plant and Portal are located on unrestricted Crown land.

The Cuffley Deposit, accessed via the Brunswick Portal, is located beneath unrestricted Crown land that consists of sparse woodland, with numerous abandoned shafts and workings along the historical Alison and New Alison mineralised zone.

The Youle and Shepherd deposits are accessed from the Youle Access off the Brunswick Incline and are located under unrestricted Crown and privately held land.

5.3 Topography

The topography of the Costerfield Property area consists of relatively flat to undulating terrain with elevated areas to the south and west sloping down to a relatively flat plain to the north and east.

The area ranges in elevation from approximately 160 m Above Sea Level (ASL) in the east along Wappentake Creek, to 288 m ASL in the northwest. The low-lying areas are typically floodplains.

5.4 Climate

The climate of central Victoria is 'Mediterranean' in nature and consists of hot, dry summers followed by cool and wet winters. The weather is amendable to year-round mining operations;

however, occasional significant high rainfall events may restrict surface construction activity for a small number of days.

Annual rainfall in the area is approximately 500–600 mm, with the majority occurring between April and October. The annual pan evaporation is between 1,300 and 1,400 mm. The temperature ranges from -2°C in winter (May–August) to +40°C in summer (November–February). Monthly average temperature and rainfall data are from Redesdale, the nearest weather recording station to the Costerfield Property.

5.5 Infrastructure and local resources

The nearest significant population to the Costerfield Property is Bendigo, located 50 km to the west-northwest, with a population of approximately 100,000 people. The Costerfield Property is a residential operation with personnel residing throughout central Victoria as well as Melbourne. Local infrastructure and services are available in Heathcote.

5.5.1 Augusta Mine

The Augusta Mine site consists of a bunded area that includes site offices, underground portal, workshop facilities, a waste rock storage area, settling ponds, a mine dam, change house facilities and a laydown area. Augusta has operated as an underground mine since the commencement of operations in 2006. The Cuffley, Brunswick, Youle and Shepherd operations use the infrastructure associated with the current Augusta operations (Figure 5.1).

Figure 5.1: Augusta mine site with box cut, Augusta Portal (foreground), workshop, offices and holding dams

On 28 July 2018, the first ore was extracted from the Brunswick Deposit and was accessed via an incline ramp from the Augusta Mine. In December 2019, the first ore was extracted from the Youle Deposit which was accessed from the Brunswick incline. The Shepherd Deposit is accessed from the lower Youle Decline with production of first ore taking place in October 2021.

5.5.2 Brunswick Complex

The Brunswick Complex consists of the Brunswick Processing Plant, Run of Mine (ROM) pad, underground portal, site offices, tailing storage facilities, and the Brunswick Open Pit as shown in Figure 5.2. In November 2020, the Brunswick Portal opened and is now the primary access for deposits and ore haulage.

Figure 5.2: Aerial view of the Brunswick Complex with Brunswick Portal (middle of image), Brunswick Processing Plant, offices and tailing storage facilities

5.5.3 Power Supply

The Costerfield Property has a current agreement with Powercor Australia for a 3.227 MVA supply, which is required to be maintained at a power factor of not less than 0.95. There is a single point of connect from the distribution network which is connected at the Augusta Mine site to Substation 1. All site power requirements are supplied via this location, including the underground operations and the Brunswick Processing Plant. The site also has a 750 KVAR power factor correction bank.

In addition, the Costerfield Property has just under 1 MVA of diesel power generation which can be automatically synchronised to connect to all the infrastructure in the event the power demand increases above the 3.277 MVA, which can be provided by Powercor. During periods of high demand on the Victorian electrical network, Mandalay Resources or Powercor can activate this power source to decrease the burden on the distribution network and assist with the state's grid power supply.

5.5.4 Brunswick Processing Plant

The Brunswick Processing Plant consists of a 150,000 tonnes per annum (tpa) gravity-flotation gold-antimony processing plant, with additional workshop facilities, site offices, TSFs, core shed and core farm located nearby. The plant produces an antimony-gold concentrate that is trucked to the Port of Melbourne, 130 km to the south, where it is transferred onto ships for export to foreign smelters.

Process water for the Brunswick Processing Plant is drawn from the brine stream of the Reverse Osmosis (RO) plant and is supplemented by stored brine, while the Augusta Mine re-uses groundwater that has been dewatered from the underground workings.

Potable water is trucked in from Heathcote, while grey water is stored in tanks and sewage is captured in sewage tanks before being trucked off site by a local contractor.

5.5.5 Evaporation and Tailings Facilities

The Splitters Creek Evaporation Facility (Figure 5.3) evaporates groundwater extracted from the operations to maintain dewatering rates from the underground workings (Section 20.1.2).

The Brunswick TSF was operational between June 2015 and December 2018, and from November 2020 to July 2022. At the Bombay TSF, a 2.5 m wall lift for another 140,000 m^3 of storage was completed in 2022 and the TSF was operational between July 2022 and the report date. Design and permissions to construct a new tailings dam are well progressed with construction planned to commence in 2024.

Figure 5.3: Ariel view of the Splitters Creek Evaporation Facility

6 History

Beginning with the initial discovery of the Costerfield Reef in the 1860s, several companies have developed and mined antimony and gold deposits within the Costerfield Property.

Significant exploration of the Costerfield Property using modern exploration techniques did not occur until 1966 with Mandalay Resources taking ownership of the current operations in 2009.

6.1 Ownership and Exploration Work

This section describes the work carried out by different owners of the operation over time.

Table 6.1 provides details of the historical drilling statistics completed by each company at the Costerfield Property since 1966.

Table 6.1: Historical drilling statistics for the Costerfield Property

Company	Year	Diamond core (m)	Percussion/Auger (m)
Mid-East Minerals Limited	1966–1971	3,676.2	
Metals Investment Holdings Limited	1971	1,760.8	
Victoria Mines Department	1975–1981	3,213.0	
Federation Resources NL	1983–2000		2,398.3
Australian Gold Development NL/Planet Resources JV	1987–1988		1,349.2
Australian Gold Development NL	1987–1988		1,680.8
	1994–1995	1,368.5	5,536.0
	1996	195.5	2,310.0
	1997		725.0
AGD Operations Pty Ltd[1]	2001	3,361.1	
	2002	907.5	
	2003	1,522.0	
	2004	3,159.9	
	2005	4,793.4	
	2006–2007	4,763.4	
	2007–2008	2,207.2	
	2008–2009	2585.95	
Mandalay Resources Corporation	2009–2010	574.5	547.0
	2010–2011	9890.0	732.0
	2011–2012	18,581.4	7,295.6
	2012–2013	25,774.8	3,838.0
	2013–2014	20,817.0	3,906.0
	2014–2015	18,439.0	2,732.0
	2016	34,678.0	

Company	Year	Diamond core (m)	Percussion/Auger (m)
	2017	26,403.0	
	2018	34,656.0	
	2019	9,556.0	
	2020	29,080.0	
	2021	36,255.0	
	2022	40,453.0	
	2023	42,518.0	
	Total	362,090.15	33,049.00

Notes:

[1] From 2004, drilling descriptions have been reported in double years (i.e. 2004–2005) due to the fact that reporting has been in keeping with the Australian fiscal year (1 July to 30 June). Please note that from 2016, descriptions, including drilling metres for exploration, will be reported in calendar year to coincide with the Canadian fiscal year (1 January to 31 December).

6.1.1 Mid-East Minerals NL (1968–1971)

From 1968 to 1969, the price of antimony rapidly rose from US$0.45/lb to US$1.70/lb. This encouraged Mid-East Minerals NL (MEM) to acquire large areas of ground around Costerfield.

Between 1969 and 1971, MEM conducted large-scale geochemical, geophysical, and diamond drilling programs. These were conducted across the south Costerfield area encompassing Alison Mine and south towards Margaret's Lode, including both the Cuffley Lode and the Augusta Mine areas. Diamond drilling for MEM was most successful at Brunswick Mine. However, decreasing antimony prices in 1971 caused MEM to abandon the project.

6.1.2 Metals Investment Holdings Limited (1971)

A series of diamond drill holes were completed by Metals Investment Holdings Limited in 1971. Most drilling occurred to the north of the Alison Mine, with the exact locations of the drill holes unknown. Two drill holes were situated to the north of the Tait's Mine (north of Augusta), of which minimal information remains.

6.1.3 Victorian Mines Department (1975–1981)

A series of diamond drill holes were completed by the Victorian Mines Department in the late 1970s. Most drilling occurred to the south of the Brunswick Mine. However, two drill holes (M31 and M32), were drilled approximately 150 m to the south of the South Costerfield Shaft in the Augusta Mine area and intersected a high-grade reef. This reef was interpreted as the East Reef, which was mined as part of the South Costerfield Mine.

6.1.4 Federation Resources NL (1983-2000)

Federation Resources NL undertook several campaigns of exploration in the Costerfield Property area but focused on the Browns-Robinsons prospects to the east of the Alison Mine. The exploration conducted identified a gold target with no evidence of antimony.

Federation Resources NL conducted desktop studies on the area above the Augusta Mine, noting the anomalous results of the soil geochemistry programs conducted by The Victorian Mines Department and MEM; however, no drilling was conducted at this location.

6.1.5 Australian Gold Development NL/Planet Resources JV (1987-1988)

Australian Gold Development NL conducted a short Reverse Circulation (RC) drilling program in 1987, in conjunction with its joint venture (JV) partner Planet Resources. This drilling consisted of a total of 21 drill holes for 1,235 m across the broader Costerfield Property area. Gold was assayed via Atomic Absorption Spectrometry (AAS), which compromised antimony grades. The drilling was completed using a tri-cone bit, which could have led to downhole contamination.

6.1.6 Australian Gold Development NL (1987–1997)

From 1987 to 1997, Australian Gold Development NL undertook several programs of exploration and mining activities predominantly focused around the Brunswick Mine. A series of RC drill holes were drilled during 1997, testing for shallow oxide gold potential to the north of the Alison Mine. Several occurrences of yellow antimony sulfides were noted but these were not followed up on.

6.1.7 AGD Operations Pty Ltd (2001–2009)

In 2001, AGD Operations Pty Ltd (formerly Australian Gold Development NL) and Deepgreen Minerals Corporation Ltd entered into an agreement to form a JV to explore the Costerfield Property tenements. The agreed starting target was the zone now known as the Augusta Mine.

In its 8 years of ownership, AGD Operations Pty Ltd undertook multiple drilling programs focused on the definition, extension, and infill of what is now known to be the Augusta deposit. In total, roughly 150 diamond drill holes comprising more than 12,555 m were undertaken around the Augusta deposit, discovering and defining the W lode, E lode, C lode and N lode.

In Q1 2006, development of the Augusta decline commenced and by the end of Q2 2006 all the surface infrastructure had been completed together with open cut mining of the E and C lodes. Decline development commenced during June 2006 with underground in production by the end of Q3 2006.

By 2009, AGD Operations Pty Ltd had successfully developed down to 1,070 mRL (9 level) of the Augusta Mine.

Additional diamond drilling was also completed on the Brunswick Deposit (31 drill holes for 4,994 m), and Tin Pot Gully prospect (13 drill holes for 1,188m) along with four lines of soil sampling comprising a total of 63 samples and 618 m of aircore to the east and south of the Augusta deposit.

6.1.8 Mandalay Resources Corporation – trading as AGD (2009–2013)

On 1 December 2009, AGD Operations Pty Ltd was acquired by Mandalay Resources Corporation; however, the company continued to trade as AGD Mining Pty Ltd/AGD Operations Pty Ltd up until 7 September 2013 when the company changed its trading name to Mandalay Resources Corporation. Mandalay has been operating the Costerfield Project since this date.

6.2 Historical Resource and Reserve Estimates

Mandalay Resources has reported Mineral Resources and Mineral Reserves for the Costerfield Property from 2010 onwards. A record of the annual Mineral Resources and Mineral Reserves over this period has been provided in Table 6.2 and Table 6.3.

Technical Reports for each of the historical estimates are available for download from SEDAR+ by reference to their effective dates. The historical estimates are considered relevant for historical understanding of the development of the Costerfield Property. They were reliable at the time of reporting as they followed similar processes of sampling, assaying, interpretation and estimation as are currently in use. The historical estimates use the same resource categories as the current estimate. The current estimate is summarised in Section 1 of this Technical Report.

A QP is not classifying the historical estimates as current Mineral Resources or Mineral Reserves and the issuer is not treating the historical estimates as current Mineral Resources or Mineral Reserves.

Table 6.2: Historical Mineral Resources – Costerfield Property

Effective date	US$/ oz Au	US$/ oz Sb	Cut-off grade (AuEq g/t)	Measured Resource					Indicated Resource					Inferred Resource				
				Tonnes (kt)	Au (g/t)	Sb (%)	Au ounces (koz)	Sb (t)	Tonnes (kt)	Au (g/t)	Sb (%)	Au ounces (koz)	Sb (t)	Tonnes (kt)	Au (g/t)	Sb (%)	Au ounces (koz)	Sb (t)
01/03/2010	1,000	6,000		67.2	16.9	10.0	36.4	6,749	189.6	9.6	4.6	58.4	8,683	245.7	7.8	4.2	61.5	10,202
31/12/2011	1,600	12,000	4.6	158.4	12.9	7.8	65.5	12,291	202.4	7.3	3.7	47.7	7,502	375.0	12.7	5.6	152.9	21,183
31/12/2012	1,600	12,500	4.7	167.0	8.0	4.9	42.7	8,202	367.0	10.0	3.5	117.9	12,912	610.0	7.1	3.2	139.8	19,490
31/12/2013	1,400	12,000	3.9	191.4	8.4	4.3	51.5	8,157	606.0	9.6	4.0	186.4	24,237	570.0	7.4	3.7	135.3	21,342
31/12/2014	1,400	12,000	3.8	213	9.8	4.5	67	9,600	786	6.9	3.3	175	26,300	519.0	5.3	2.6	89.0	13,700
31/12/2015	1,400	11,000	3.8	247	12.1	4.6	96	11,000	798	7.6	3.4	194	27,000	491	4.3	2.0	68.0	9,700
31/12/2016	1,400	10,000	3.5	286	9.5	4	88	11,400	812	5.9	2.5	155	20,600	611	5.5	1.5	108.0	9000
31/12/2017	1,400	10,000	3.5	290	9.2	4.2	86	12,100	971	5.7	2.5	177	23,900	379	6.6	1.1	80.0	4,000
31/12/2018	1,400	10,000	3.5	245	8.5	4.0	67	9,800	1073	8.2	2.9	283	31,000	497	8.0	1.9	128	9,500
31/12/2019	1,500	10,000	3.5	283	9.6	4.5	87	12,700	830	9.6	2.9	256	24,000	533	6.8	1.7	117	9,000
31/12/2020	1,700	8,000	3.0	360	14.1	5.7	164	20,600	798	8.5	2.4	218	18,800	473	5.8	1.3	89	6,000
31/12/2021	1,700	8,500	3.0	449	15.4	5.0	216	21,800	938	8.6	1.9	259	17,500	532	6.7	1.3	144	6,700

Table 6.3: Historical Mineral Reserves – Costerfield Property

Effective date	US$/ oz Au	US$/ oz Sb	Cut-off grade (AuEq g/t)	Proven Reserves					Probable Reserves					Total Reserves				
				Tonnes (kt)	Au (g/t)	Sb (%)	Au ounces (koz)	Sb (t)	Tonnes (kt)	Au (g/t)	Sb (%)	Au ounces (koz)	Sb (t)	Tonnes (kt)	Au (g/t)	Sb (%)	Au ounces (koz)	Sb (t)
01/03/2010	1,000	6,000		20.1	16.9	9.7	10.9	1,953	45.4	11.4	5.8	16.7	2,636	65.6	13.1	7.0	27.6	4,588
31/12/2011	1,600	12,000	4.6	41.9	13.2	7.9	17.7	3,300	46.5	6.4	4.0	9.6	1,860	88.4	9.6	5.8	27.3	5,160
31/12/2012	1,600	12,500	4.7	48.1	11.0	6.5	17.0	3,128	130.0	8.1	3.2	33.9	4,161	178.2	8.9	4.1	50.9	7,289
31/12/2013	1,200	10,000	5.0	71.0	8.3	4.4	18.9	3,124	350.0	9.4	3.4	106.0	11,900	421.0	9.2	3.6	124.9	15,024
31/12/2014	1,200	10,000	5.0	98.0	10.4	4.5	32.0	4,400	333.0	7.4	3.3	80.0	11,200	431.0	8.1	3.6	112.0	15,600
31/12/2015	1,200	9,000	4.0	125	12.0	3.9	48.0	5,500	366	8.2	3.7	97.0	13,400	491	9.2	3.9	145.0	18,900
31/12/2016	1,200	8,000	4.0	184	8.1	3.5	48	6,400	434	5.7	2.6	80.0	11,100	619	6.5	2.8	128.0	17,501
31/12/2017	1,200	8,500	4.0	152	7.3	3.5	36	5,300	470	5.7	2.5	86.0	12,000	622	6.1	2.8	122.0	17,200
31/12/2018	1,200	8,500	4.0	76	8.4	4.0	20	3100	461	10.8	3.1	160.0	14,200	537	10.4	3.2	180.0	17,200
31/12/2019	1,300	7,000	4.0	114	9.5	4.8	35	5,400	360	14.6	3.4	169	12,400	474	13.4	3.8	204	17,800
31/12/2020	1,500	7,000	4.0	222	15.26	5.7	110	12,800	394	11.5	2.3	145	9,000	616	12.8	3.5	255	21,700
21/12/2021	1,500	7,500	3.8	308	15.9	4.3	150	13,100	460	10.9	1.4	162	6,500	769	12.6	2.5	312	19,600

6.3 Historical Production

The operation of the Augusta Mine was taken over by Mandalay Resources in December 2009. At the time, the mine had been operating since early 2006, with a short 3-month period of closure during 2008/2009. Prior to Mandalay's ownership, approximately 95,000 t had been extracted to produce 25,000 oz Au and 4,200 t Sb.

A record of mine production history for the Costerfield Property has been provided in Table 6.4.

Table 6.4: Costerfield Property mining production history

Year	Inventory (kt)	Gold grade (g/t)	Antimony grade (%)	Gold metal ounces (koz)	Antimony metal (t)
2010	50.7	7.4	4.2	12.0	2,140
2011	72.0	7.3	3.7	16.8	2,637
2012	96.3	8.3	4.3	25.6	4,166
2013	129.6	9.1	4.2	37.7	5,418
2014	167.1	9.1	3.8	48.8	6,345
2015	153.6	11.2	4.2	55.6	6,484
2016	158.4	9.6	3.4	49.0	5,407
2017	140.6	8.2	3.3	37.1	4,612
2018	151.6	5.7	2.4	27.6	3,572
2019	137.5	5.2	2.6	23.0	3,538
2020	164.2	12.1	4.50	64.0	7,394
2021	173.7	11.0	3.5	61.3	6,087
2022	132.3	12.3	2.7	52.3	3,602
2023	128.8	9.4	2.0	38.9	2,606

7 Geological Setting and Mineralisation

7.1 Regional Geology

The Costerfield Property gold-antimony mineralisation zone is located at the northern end of the Darraweit Guim Province in the Western portion of the Melbourne Zone. In the Heathcote area of the Melbourne Zone, the Murrindindi Supergroup within the Darraweit Guim Province encompasses a very thick sequence of Siluro-Devonian marine sediments, which consist predominantly of siltstone, mudstone, and turbidite sequences (Figure 7.1).

The western boundary of the Darraweit Guim Province is demarcated by the Cambrian Heathcote Volcanic Belt and north-trending Mt William Fault, a major structural terrain boundary which separates the Bendigo Zone from the Melbourne Zone.

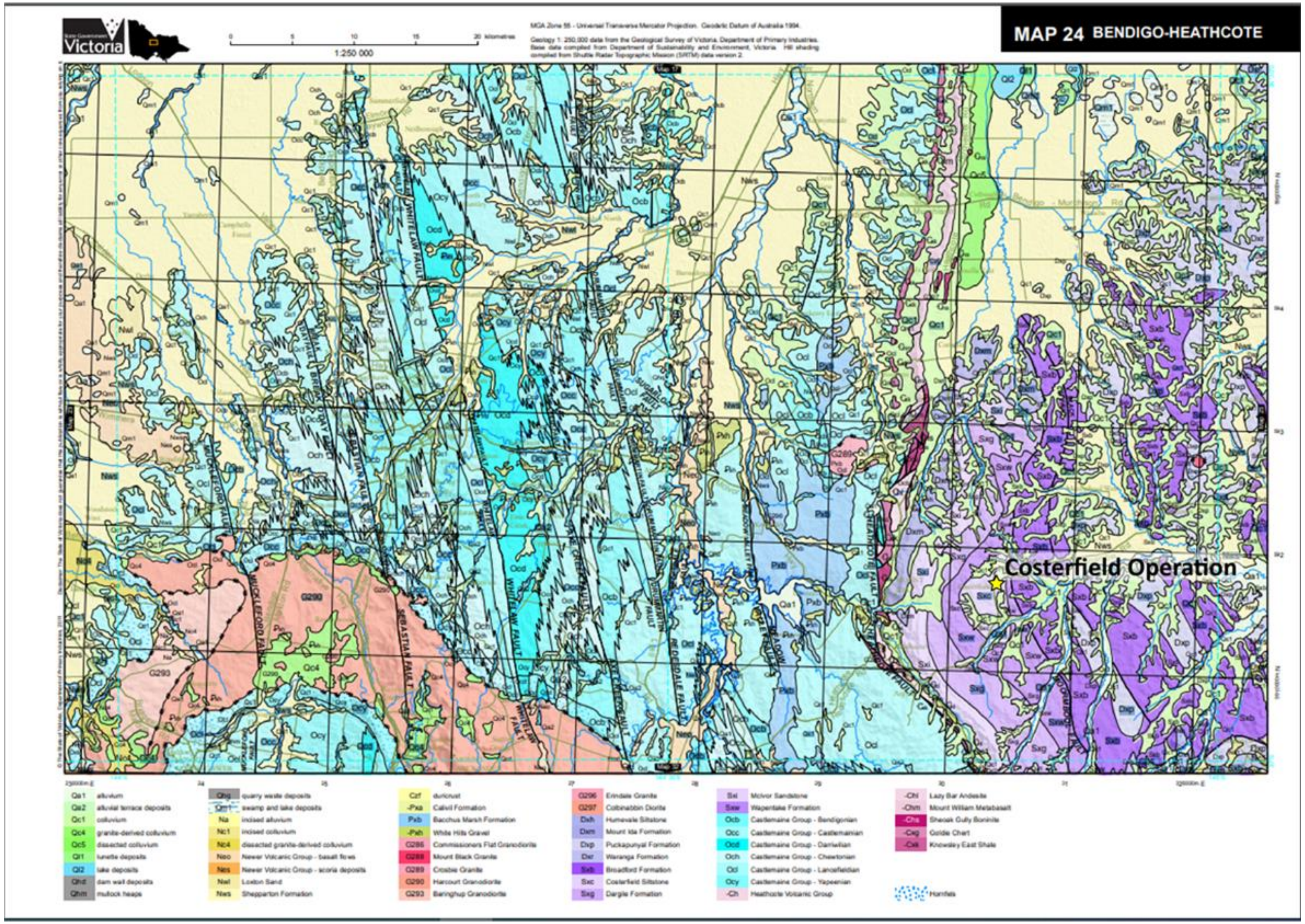
The Lower Silurian Costerfield Siltstone is the oldest unit in the Heathcote area and is conformably overlain by the Wappentake Formation (sandstone/siltstone), the Dargile Formation (mudstone), the McIvor Sandstone and the Mount Ida Formation (sandstone/mudstone).

The Melbourne Zone sedimentary sequence has been deformed into a series of large-scale domal folds, which tend to be upright, open folds with large wavelength curvilinear structures. The major north-trending sub-parallel folds in the Darraweit Guim Province include, from west to east:

- the Mount Ida Syncline
- the Costerfield Dome/Anticline
- the Black Cat and Graytown anticlines
- the Rifle Range Syncline.

The folds have been truncated by significant offsets along two major north-trending faults: the Moormbool and Black Cat faults. The Moormbool Fault has truncated the eastern limb of the Costerfield Anticline, resulting in an asymmetric dome structure. The Moormbool Fault is a major structural boundary separating two structural subdomains in the Melbourne Zone. West of the Moormbool Fault is the Siluro-Devonian sedimentary sequence, hosting the gold-antimony lodes. The thick, predominantly Devonian Broadford Formation sequence occurs to the east of the fault and contains minor gold-dominant mineralisation.

Figure 7.1: Geological map of the Bendigo/Heathcote region



Sources: Welch et al (2011)

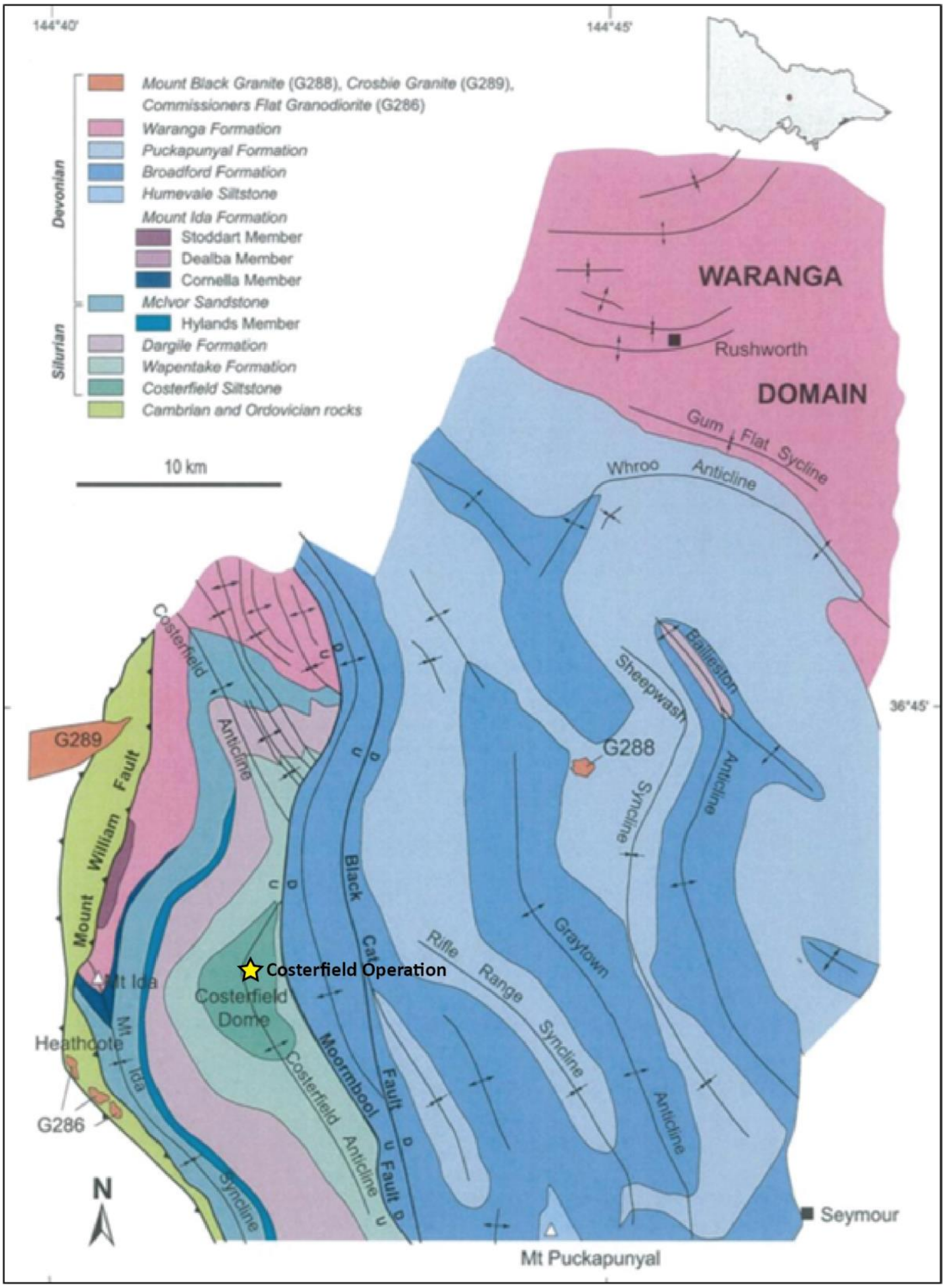
7.2 Property Geology

The Costerfield Property gold-antimony mineralisation is located in the Costerfield Dome, which contains poorly exposed Lower Silurian Costerfield Siltstone at its core (Figure 7.2). Within the Costerfield Property, four north-northwest trending zones of mineralisation have been identified, which comprise from west to east:

- Antimony Creek Zone, approximately 6.5 km southwest of Costerfield, on the outer western flank of the Costerfield Dome.
- Western Zone, approximately 1.5 km west of Costerfield, on the western flank of the Costerfield Dome and includes the True Blue and West Costerfield .
- Costerfield Zone, near the crest of the dome, centred on the Costerfield township and hosting the major producing mines and deposits.
- Robinsons Zone, 2 km east of Costerfield.

The Costerfield Property Siltstone-hosted quartz in the Costerfield Zone are controlled by north-northwest trending faults and fractures located predominantly on the western flank of the Costerfield Anticline. The host rocks are the Silurian Costerfield Formation siltstones and mudstones which are estimated to be between 450 m and 550 m thick and are the oldest exposed rocks in the local area.

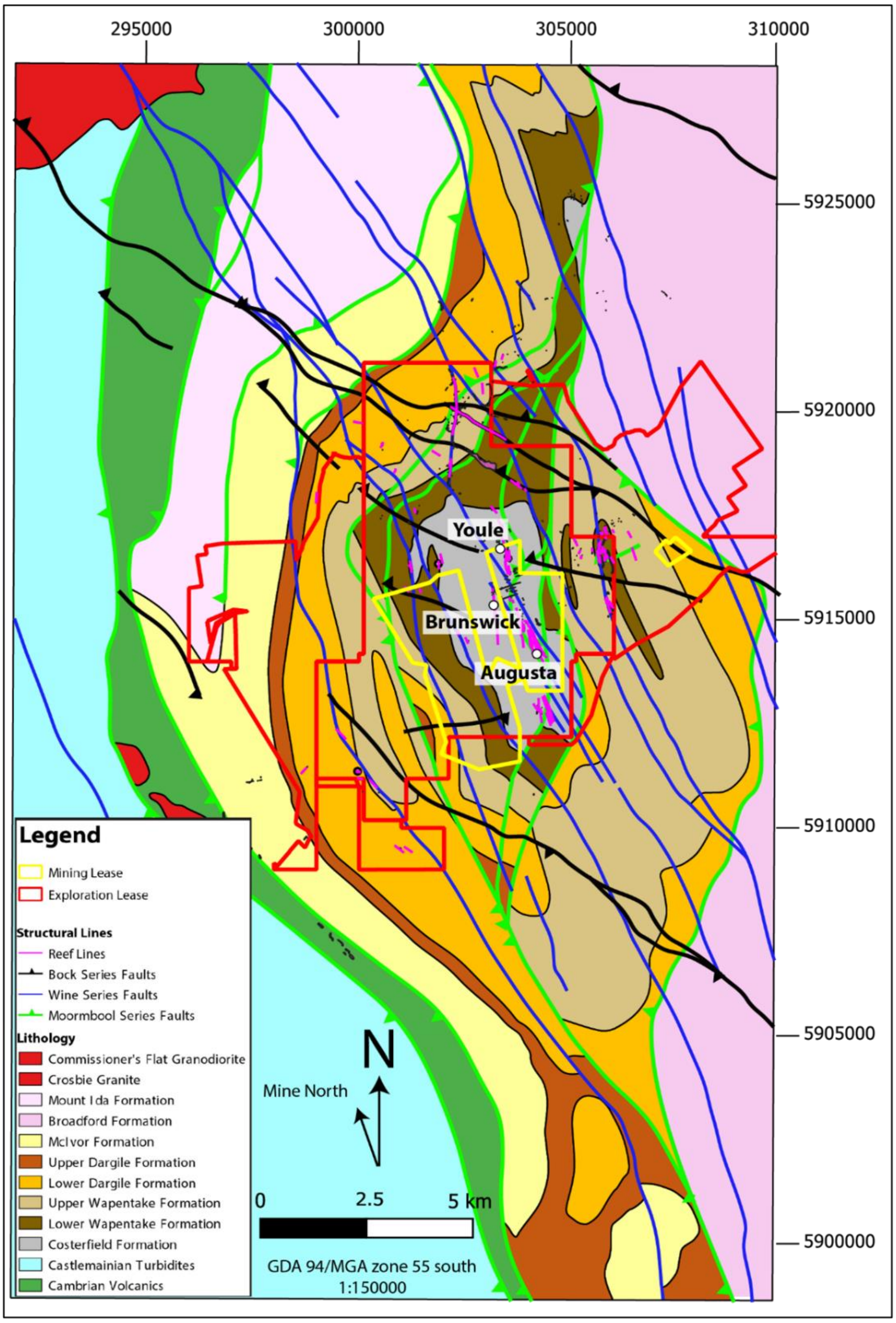
Figure 7.2: Sulfide deposits geological map of the Heathcote/Colbinabbin/Nagambie region



Sources: Modified from Vandenberg et al. (2000)

Locally, the sedimentary succession of the Costerfield Property has been deformed into a broad anticlinal dome structure with numerous cross-cutting reverse thrust faults. This domal structure is thought to have resulted from two separate tectonic events, the first producing shortening in an east–west direction (folding and thrust faulting) and the second producing north–south shortening (gentle warping and mild folding). The anticlinal hinge zone of the Costerfield Anticline has been thrust over its eastern limb by the north–south trending King Cobra Fault Zone (Figure 7.3).

Figure 7.3: Regional geology and the Costerfield Property geology



7.3 Property Stratigraphy

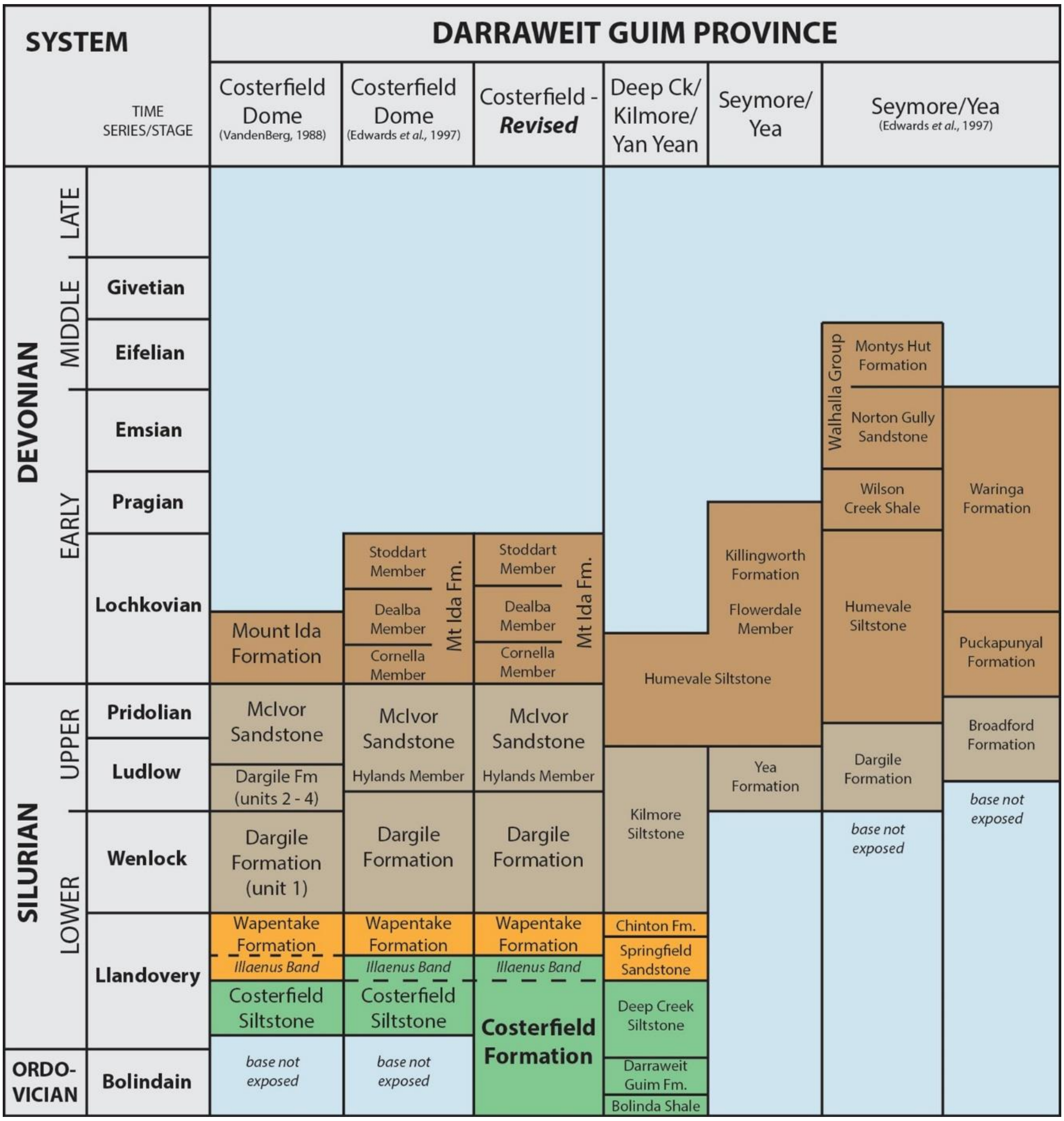
Stratigraphic investigations focused around the Augusta workings within the South Costerfield area, have found many previously unrecognised stratigraphic units and structural features. Sub-surface stratigraphic mapping from drill hole data has indicated that the local host of the mineralisation, the Costerfield Formation, is far more stratigraphically complex than previous investigations have documented.

7.3.1 The Darraweit Guim Province

The oldest outcropping strata documented in the region is the Costerfield Formation and is believed to be Lower Silurian in age (Sandford and Holloway, 2006). The Costerfield Formation, in the Costerfield area, is overlain by muddy siltstones and sandstones of the Lower Silurian aged Wappentake Formation and the Dargile Formation. Upper Silurian sedimentation is recorded in coarser siliciclastic successions of the McIvor Sandstone which is then finally overlain by the early-Devonian Mt Ida Formation. The Mt Ida Formation records the final phase of sedimentation in the greater Heathcote region.

The overall stratigraphic thickness of the Darraweit Guim Province is unknown; however, estimates of the true stratigraphic thickness are in the range of 6–7 km, all of which occurred without any significant depositional hiatus (Figure 7.4).

Figure 7.4: Regional stratigraphy of the Darraweit Guim Province, by locality



Sources: Modified from Edwards et al. (1998)

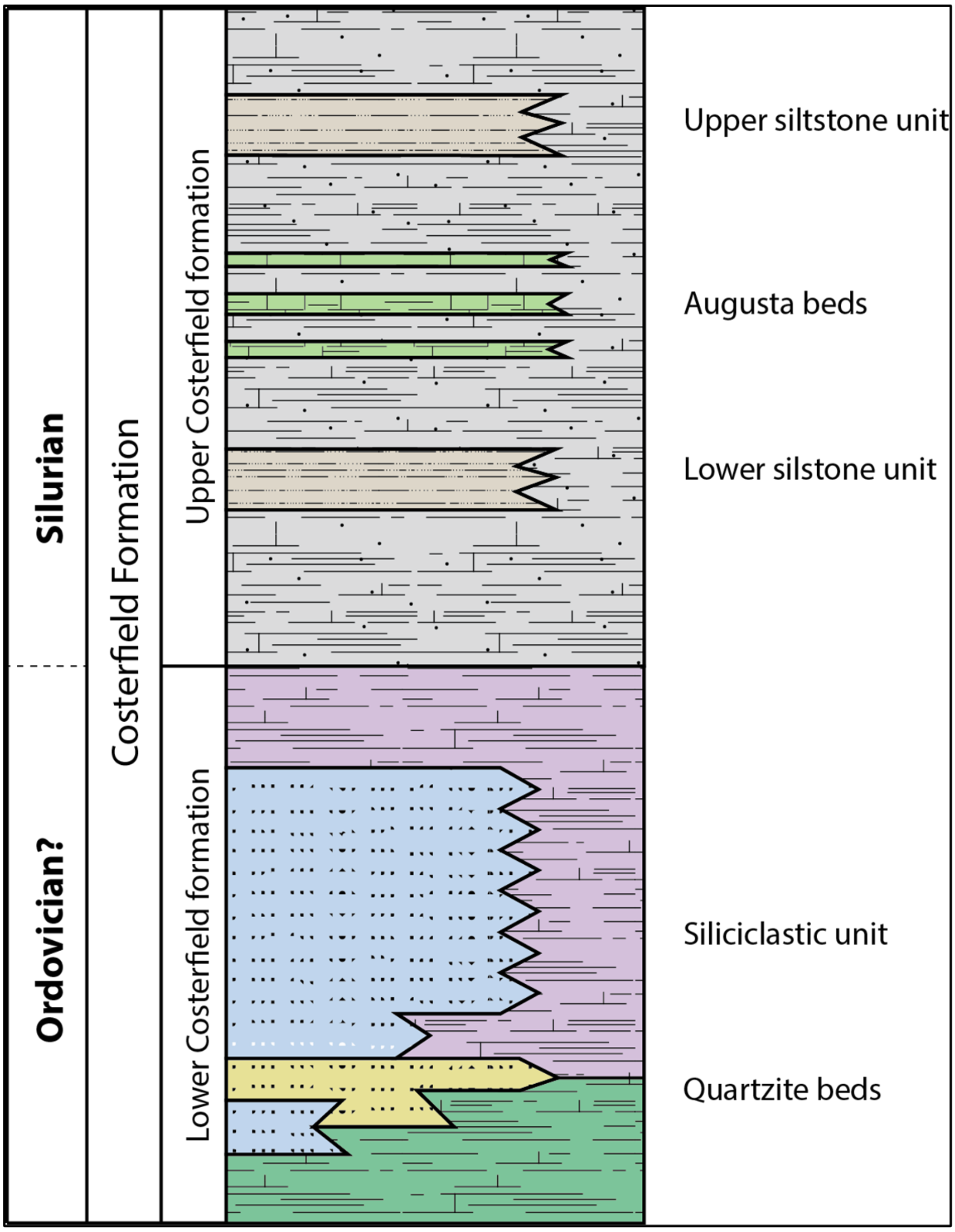
7.3.2 The Costerfield Formation

The Costerfield Formation (as defined by Talent, 1965) is a series of thickly bedded mudstones and siltstones featuring heavy bioturbation. The ‘Formation’ nomenclature of Talent (1965), has been adopted for use within this report instead of the later re-assigned name of ‘Costerfield Siltstone’, as re-defined by VandenBerg (1988), since the formation consists of predominantly mudstone lithologies, with siltstones and sandstones representing the lesser constituents as relatively thin interbedded occurrences. It is recommended that the ‘Siltstone’ nomenclature be abandoned since it has become a misleading term, inferring that the unit is composed of siltstone dominant lithologies when this is not the case.

The Costerfield Formation is dominated by weakly bedded mudstones and silty mudstones with some lesser siltstone and sandstone constituents. The formation is informally divided into lower and upper portions based on a significant lithological change midway through the succession. Estimates of the true stratigraphic thickness of the formation are made difficult due to significant faulting in the area; however, it is estimated to be in the range of 450–550 m in thickness, with the lower and upper portions of the formation being around 200 m and 300 m thick, respectively.

Informal lithostratigraphic units of the Lower Costerfield Formation are named the Siliciclastic unit and Quartzite beds, while the lithostratigraphic units of the Upper Costerfield Formation are named the Lower siltstone unit, Augusta beds and the Upper siltstone unit (Figure 7.5).

Figure 7.5: Stratigraphy of the Costerfield Formation, illustrating the relative positions of the newly defined informal stratigraphic unit



7.4 Property Structural Geology

7.4.1 South Costerfield Area

Resource definition diamond drilling for the Augusta and Cuffley deposits has resulted in the collection of a large volume of geological data in the South Costerfield area, enabling the construction of highly refined cross sectional interpretations. These cross sections have revealed that the Augusta and Cuffley deposits are bounded vertically between two large, low angle west-dipping parallel thrust faults named the Adder Fault (upper) and the King Cobra Fault (lower). The faults are typically 250 m apart in the South Costerfield area where they have been recognised.

The area between these two large structures is also heavily faulted, resulting in a defined zone of intense brittle deformation. Three significant second-order faults occur within the fault zone – the Flat, Red Belly and Tiger faults – which are interpreted as having listric geometry, most likely mimicking the larger structure of the Adder and King Cobra faults.

The faults are all observed to be extremely brittle structures. The large-scale Adder and King Cobra faults are typically represented by a 1–2 m zone of fault gouge, associated with several metres of extremely heavily fractured and sheared lithologies in both the footwall (FW) and hangingwall (HW) blocks, which is regarded as representing regional scale thrust faults or a thrust zone. This zone has been informally named the Costerfield Thrust.

Mandalay Resources interprets the Costerfield Thrust to be the southern extent of the historically recognised Costerfield Fault. Stratigraphic interpretations suggest that the overall shortening and stratigraphic displacement across the Costerfield Thrust is in the order of approximately 1 km.

An additional series of brittle faults are observed within this thrust system, striking in a north-northeast direction, such as the East Fault. These faults have a subvertical dip and are generally observed as 1–2 m thick zones of unconsolidated breccia with minor pug on the fault plane itself. The lateral extent of these faults is uncertain; however, they appear to be localised structures as the interpretation of these structures between drilling sections is highly difficult. Offsets across these steep dipping faults appears to mostly represent strike-slip and overall vertical movement, estimated to be on the scale of less than 50 m. Lateral offset on the faults is presently unknown.

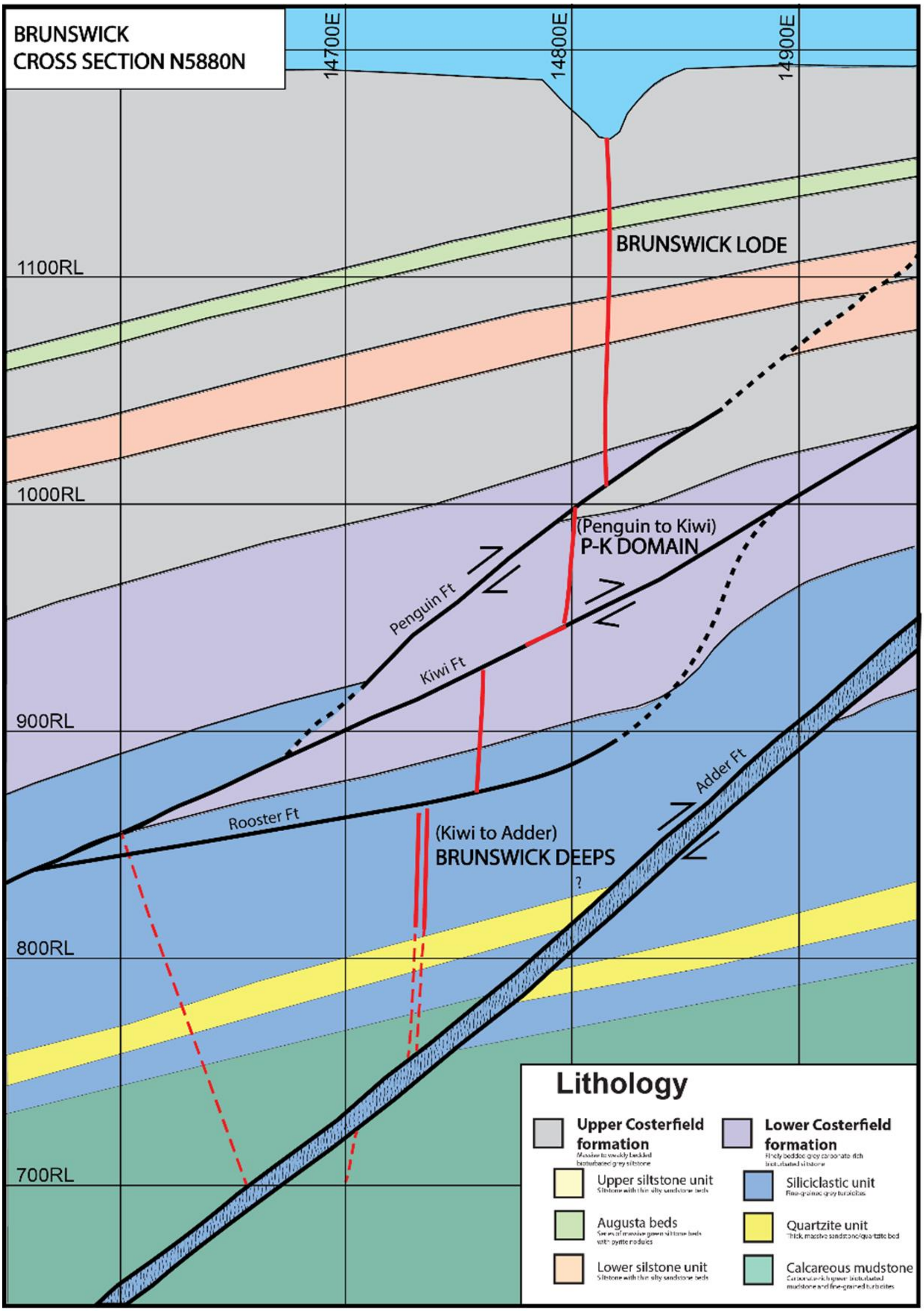
Ductile deformation of the Costerfield Formation occurs as a broad anticlinal structure with a wavelength estimated in the range of 1.5–2 km. Smaller parasitic folds are observed to have a northerly striking fold-axis that dips slightly to the east and are assumed to mimic the larger scale folding of the area. Ductile to semi-ductile veining and/or faulting is evident within the Costerfield Formation and occurs as 20–100 mm laminated quartz veins. They are typically bedding parallel, although laminated veins cross-cutting stratigraphy is not uncommon. Displacement across these faults/veins is uncertain as their bedding-parallel characteristics make the determination of displacement through stratigraphic observations difficult. However, the veins that cross-cut the bedding do appear to record displacement in the range of 10 m to potentially hundreds of metres.

7.4.2 Brunswick Area

Resource definition diamond drilling of the Brunswick Deposit has resulted in the collection of a large volume of geological data, particularly below the previously mined Brunswick Lode. The Brunswick Deposit is located northwest of the current Cuffley workings, proximal to the Brunswick Processing Plant. Drilling completed in 2008, confirmed that the deposit is composed of a single main fault structure, which occurs as a strongly sheared, well-mineralised gouge zone as well as a large stibnite-bearing quartz vein/lode.

Since late 2015, the conceptual structural model of the Brunswick Lode evolved from a relatively linear single plane fault into a series of thrusted panels, progressively separated by low-angle thrust faults. The flat dipping thrust faults have the effect of transposing each lode panel above several metres toward the east (Figure 7.6). Flat faults bisect the lode structures in many other places throughout the field, including Alison-Cuffley, Costerfield (the Kendall system), Margaret and Margaret East, and N Lode, to varying degrees.

Figure 7.6: Cross section 5,880N, through the Brunswick System



The Penguin to Kiwi (PK) panel, located between 900 mRL and 1,000 mRL, is the first down-dip, major offset of the Brunswick Lode, with an apparent displacement of around 15 m to the west. The panel is separated into two portions in the north by a HW splay of the Penguin Fault. Most drill holes in the splay-bound portion of the PK panel are low grade, although typically they are close to the bounding faults and potentially reflect fault blanks.

The Brunswick Emperor to Kiwi Panel is bounded down-dip by the FW plane of the Kiwi Fault and is interpreted to dip predominantly to the west with proximity to the fault plane.

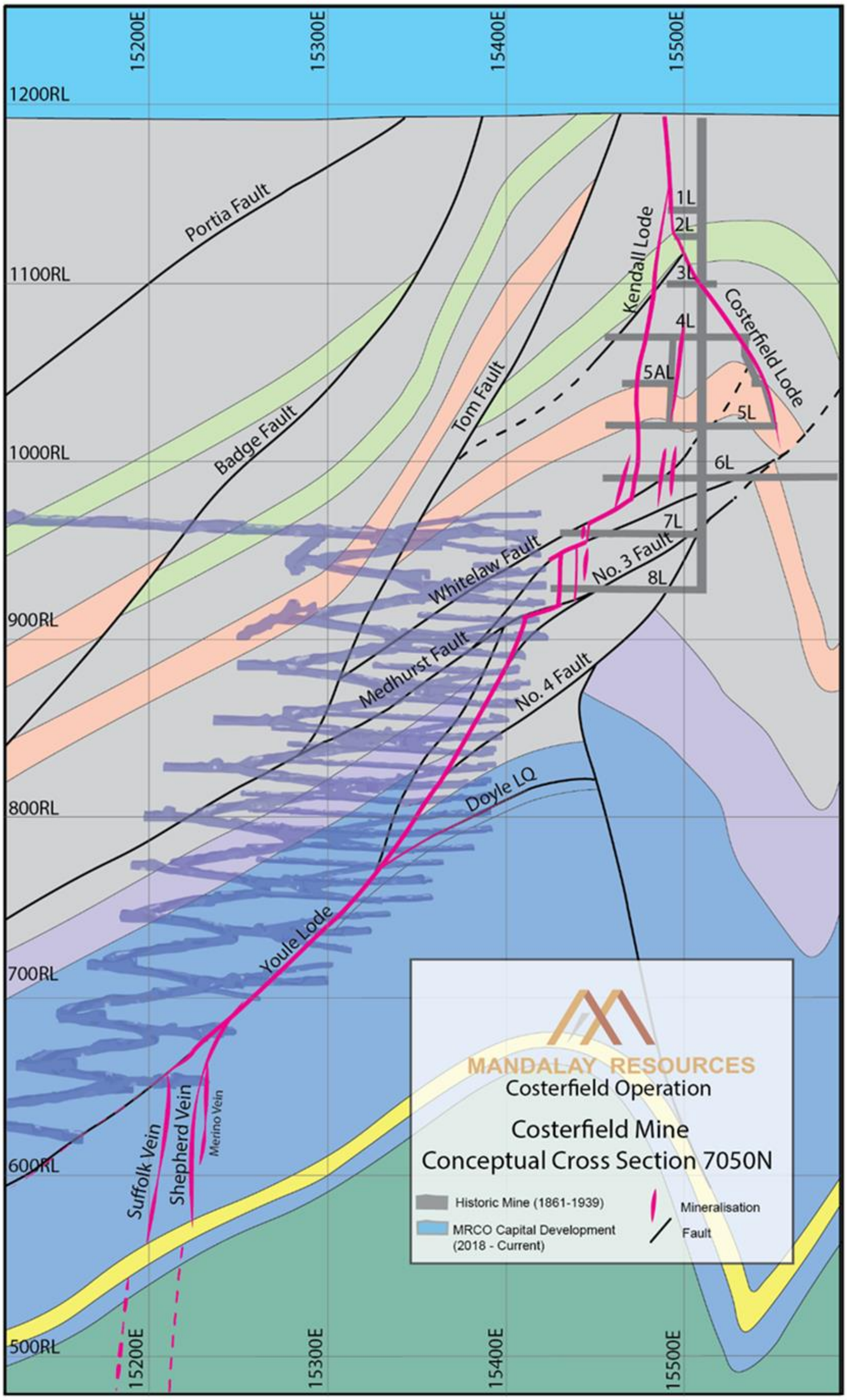
The Brunswick Kiwi to Rooster (KR) Panel is bounded up-dip by the HW plane of the Kiwi Fault. A duplex of the Kiwi Fault is seen to the west of the Emperor to Kiwi Panel and is interpreted to be an indicator of post-mineralisation movement on the Kiwi Fault. The complex relationship between the FW and HW blocks of the Kiwi Fault is now interpreted to represent both pre-syn and post Brunswick Shear mineralisation. This interpretation is key to identifying the presence of mineralisation on the different bounding fault planes. The continuity of mineralised shoots across the flat thrust faults, such as the Kiwi Fault, highlight the potential for mineralisation to continue at depth below the Kiwi Fault.

7.4.3 Costerfield – Youle Area

The Youle Lode, named after one of the original prospectors in the district, dips west and is identified as the down-dip continuation of the vertical Kendall Lode, which has been offset westward over the west-dipping No.4 thrust fault (Figure 7.7). The Youle Lode extends over a strike length of approximately 600 m and has a vertical extent of approximately 150 m down-dip.

Mineralisation exists at surface and is vertically continuous in one plane until the intersection with a flat fault (Whitelaw back) where mineralisation switches planes to the west (Section 8). Historically, both the east-dipping Costerfield Reef and west-dipping Kendal Reefs were mined underground to a depth of approximately 270 m below surface (Figure 7.7).

Figure 7.7: Cross section 7,030N through the Costerfield – Youle/Shepherd System



The Shepherd Zone is a recently discovered swarm of mineralised veins proximal and underlying the Youle orebody (Figure 7.7). In January 2021, an initial step-out hole intercepted what the Company now refers to as the Suffolk Vein within the Shepherd Zone. This initial intercept was a subvertical to east-dipping quartz vein. Follow-up drilling undertaken to confirm the targeted Suffolk Vein intercepted a parallel swarm of veins that is now referred to as the Shepherd Vein within the Shepherd Zone.

7.4.4 True Blue Area

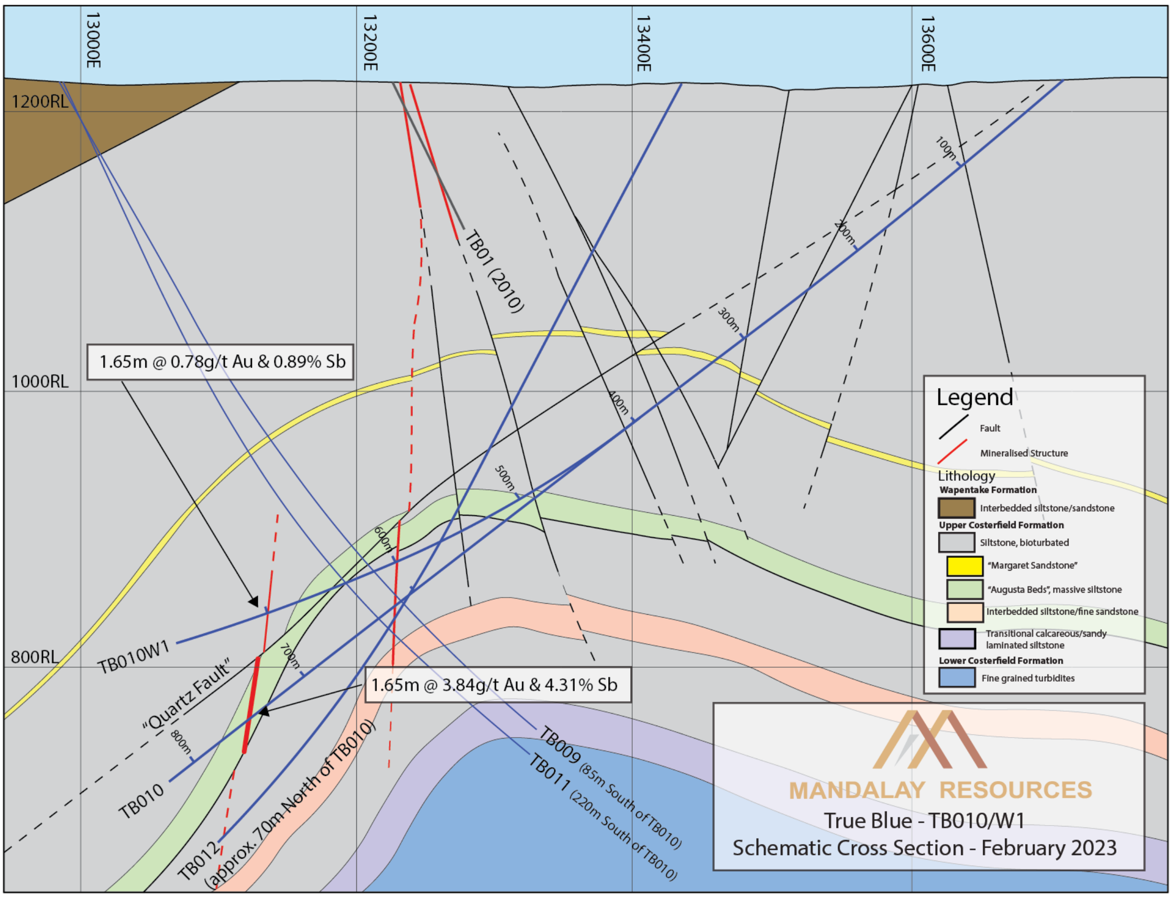
True Blue is located approximately 1800m west-southwest of the Costerfield-Youle deposit, on the western flank of the Costerfield Dome. The quartz-stibnite mineralisation was discovered prior to early 1863 and was exploited through minor surface stoping down to the water table. The host rocks of this deposit are the upper portions of the Costerfield Siltstone, the overlying Wapentake Formation outcropping a short distance to the west. The steeply east-dipping near surface veins (including the Irwin vein) are located within a broad anticline (Figure 7.8), exploiting a weak axial fabric, and are dissected by low-angle thrust faults which together with locally common subvertical oblique faults serve to create a dissected structural environment that has hindered early understanding of the system.

At a depth of approximately 830RL in the centre of the prospect, a west-dipping thrust fault that is regularly found to be filled with quartz and low to moderate tenor sulphide mineralisation, creatively termed the Quartz Fault.

Below the Quartz Fault, the geological setting is similar, but mineralisation becomes more discrete and geological continuity improves, hosting a continuous panel of quartz-stibnite veining named the Freeman Vein. The Freeman vein has been the target of the bulk of testing to date at True Blue. It is currently understood that the Freeman panel window closes out to the north due to the convergence of the Quartz Fault (which plunges north in the plane of the Freeman Vein) and the FW Komodo Fault. The Komodo Fault is a gently west-dipping thrust fault that is understood to also underlie the nearby West Costerfield prospect. The down-dip continuity of the Freeman vein has not yet been identified in the FW of the Komodo Fault, which truncates the vein at approximately 680RL. Controls on the southern end of the mineralisation are not currently understood and the deposit is not bound here.

True Blue is notable for its metallurgical and geological similarity to the main Costerfield lodes, particularly N Lode and Brunswick. Familiar, continuous quartz-stibnite-gold veins associated with or exploiting an antiform’s axial fabric and hosted by mine-sequence Upper Costerfield Siltstone including well understood marker beds such as the Augusta Beds has resulted in Mandalay Resources Costerfield Operations placing high importance on defining a resource at this prospect.

Figure 7.8: True Blue deposit cross section at approximately 7320N



7.5 Property Mineralisation

The Costerfield Property lies within a broad gold-antimony province mainly confined to the Siluro-Devonian Melbourne Zone of Victoria. The narrow quartz-stibnite-gold veins of the Melbourne Zone are mesothermal to orogenic in nature and are a product of a 380–370 Ma tectonic event. Gold in Central Victoria is believed to have been derived from the Cambrian greenstones that underlie the entire province at depth; however, the origin of the associated antimony has been less studied. Significant portions of the local area are obscured by alluvium and colluvium deposits, which have been washed over the surrounding flood plains by braided streams flowing east off the uplifted Heathcote Fault Zone. Some of this alluvial material has been worked for gold but workings are small-scale and limited in extent. Most of the previously mined hard rock deposits were found either outcropping or discovered by trenching within a few metres of the surface.

The mineralised structures in the Costerfield Property, which typically dip steeply east or west (Augusta, Brunswick, Kendall, Shepherd), or moderately west (Youle) are likely to be related to the formation of the Costerfield Dome and the subsequent development of the Moormbool Fault. The main reef system(s) appear to be developed in proximity to the axial planar region of the Costerfield Dome or hosted in reactivated west-dipping thrust faults.

The economic mineralisation at the Costerfield Property occurs in a north–south corridor that includes the Costerfield, Brunswick and Augusta zones. The moderately west to steeply-dipping quartz-stibnite-gold veins have thicknesses ranging from several millimetres to 1 metre, and extend over a strike of at least four kilometres. The vein systems are centred in the core of the doubly-plunging Costerfield Anticline and are hosted by unmetamorphosed (anchizone) Costerfield siltstones. Individual veins can persist for up to 800 m along-strike and 300 m down-dip. Each deposit on the Costerfield Property consists of multiple lodes that are within close proximity of each other as outlined in Section 14.

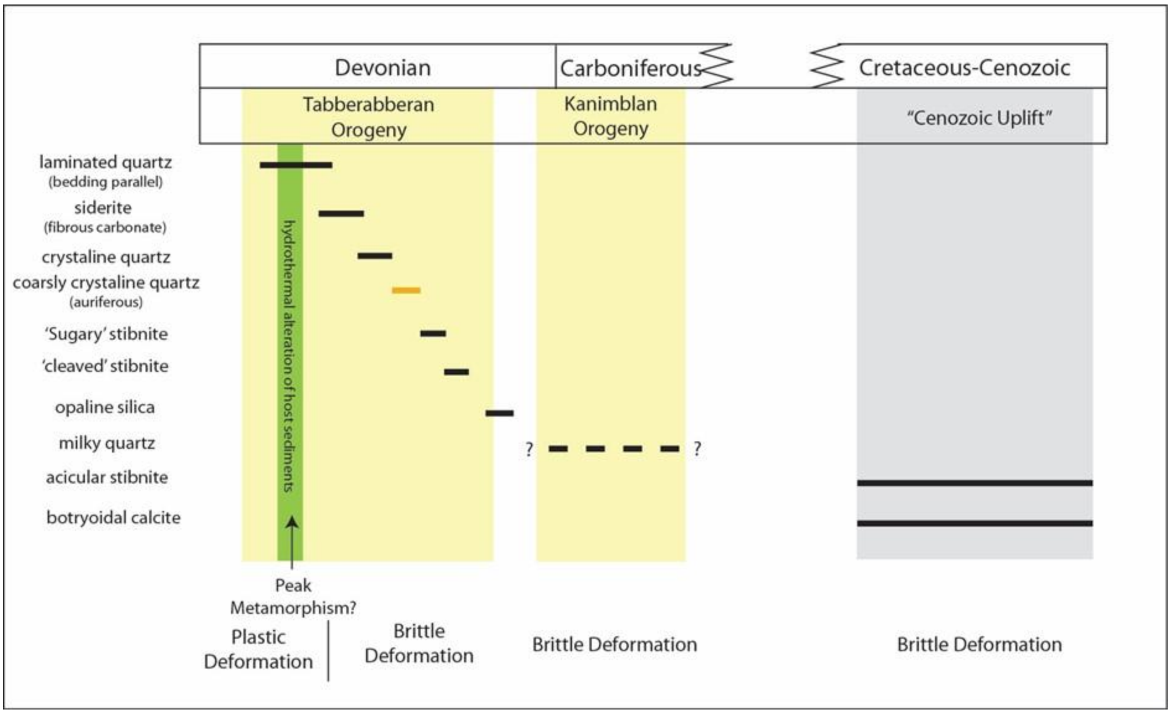
The mineralogy of the vein contents and mineral proportions differ from vein to vein throughout the Augusta, Cuffley, Brunswick and Youle lodes. However, the texture and chronological order of each vein/mineral generation remains remarkably consistent across all lodes.

A diagrammatic illustration of the paragenesis of the Augusta and Cuffley deposits is illustrated in Figure 7.9. The overall paragenetic sequence is ordered as follows:

- laminated quartz
- fibrous carbonate (siderite and ankerite)
- crystalline quartz (rhombic quartz)
- stibnite
- opaline quartz
- milky quartz.

Acicular stibnite and botryoidal calcite are not generally associated with the main quartz-stibnite vein structures, and are therefore regarded as post-mineralisation mineralogical occurrences, most likely associated with meteoric events.

Figure 7.9: Paragenetic history and vein genesis of the Costerfield region



The Costerfield Property lodes are typically anastomosing, *en echelon* style, narrow-vein systems, which dip from 25–70° west to 70–90° east. Mineralised shoots are observed to plunge to the north when structurally controlled and south when bedding controlled.

The mineralisation occurs as single lodes and vein stockworks associated with brittle fault zones. These bedding and cleavage parallel faults that influence the lode structures range from sharp breaks of less than 1 mm to dilated shears up 3 m wide that locally contain fault gouge, quartz, carbonate and stibnite.

Cross faults, such as those seen offsetting other Costerfield Property lodes, have been identified in both open-pit and underground workings.

7.6 Deposit Mineralisation

There are two main types of mineralised lodes found on the Costerfield Property. Typically they consist of stibnite dominant lodes and gold only lodes. The stibnite dominant lodes vary from massive stibnite with microscopic gold to quartz-stibnite, with minor visible gold, pyrite, and arsenopyrite. The stibnite is clearly seen to replace quartz, and gold can also be hosted by quartz. Costerfield's gold-only veins typically consist of single-generation quartz-carbonate matrix (Figure 7.11) hosting free gold, usually sub-millimetre grains but rarely up to 3–4 mm across with minor pyrite and arsenopyrite. The best grades in gold-only veins often are associated with antimony-bearing sulfosalts such as tetrahedrite, bournonite and boulangerite. Depth of emplacement appears to be the major control on the abundance of stibnite; the gold-only vein systems are generally found below the level of or at the base of stibnite-bearing lodes. Systems considered 'gold only' include the bulk of the Shepherd veins (the southwestern portion of Shepherd contains some significant stibnite), and the Sub-King Cobra Fault West veins.

A variety of accessory minerals are associated with the mineralisation, including pyrite, arsenopyrite, aurostibite, pyrrhotite, muscovite, sphalerite and galena within the vein. Wallrock alteration minerals are predominantly pyrite, arsenopyrite and ferroan carbonate spotting, surrounded by a broader, visually cryptic halo of muscovite replacing phengite. Small crystals of barite and bournonite are often seen in chlorite-coated joints near the lodes.

Figure 7.10: Typical Youle vein in 837 level on cross section 6,955N

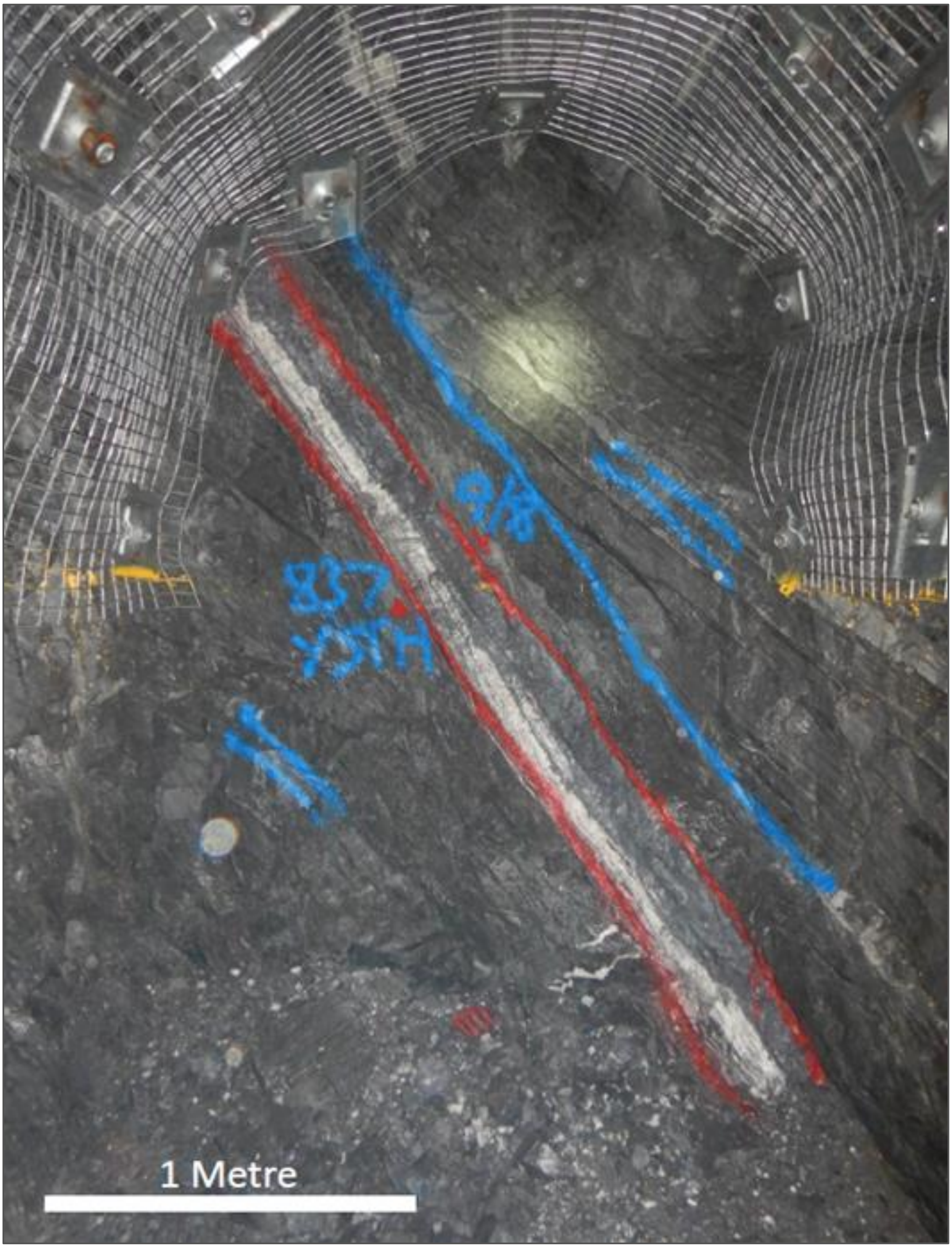
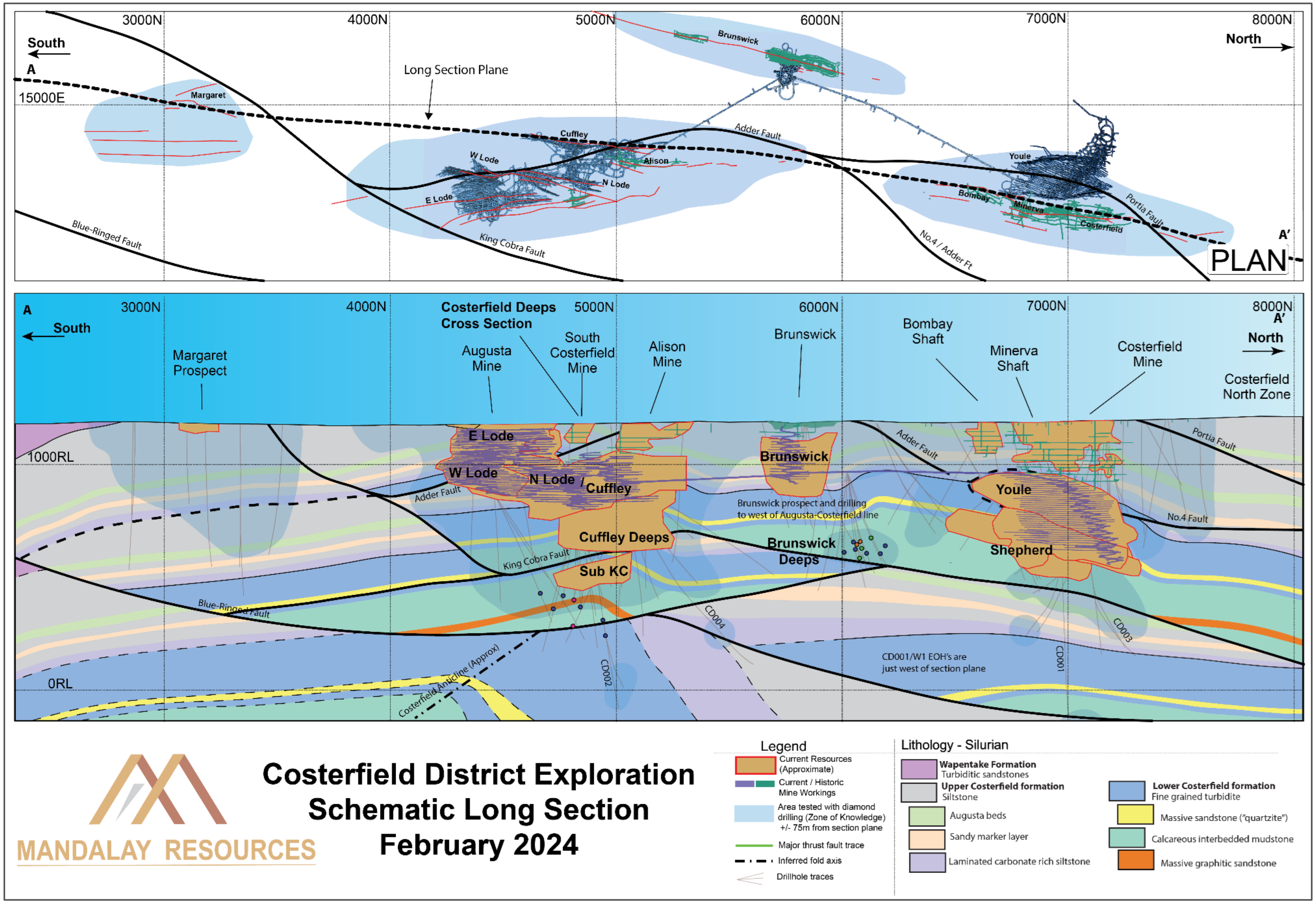


Figure 7.11: A well-developed Shepherd gold-only vein in the 600 lode face, Youle 617 Level at 7014N looking south

Figure 7.12: Schematic long-section and plan view of the Augusta, Cuffley, Brunswick and Youle lodes



8 Deposit Types

Narrow vein, antimony-gold and gold-only lodes are the targeted deposit styles at the Costerfield Property. Economic lode material consists of either a 'typical' gold-bearing quartz and carbonate with massive stibnite (for example, the Augusta C, D, and E Lodes, N Lode, Cuffley and Youle), or gold-only quartz and carbonate veining as seen in the Shepherd system.

The mineralised shoots are understood to be structurally controlled, typically by the intersection of the lodes with major cross-cutting, gouge filled fault structures and shears. Notable west to northwest dipping thrust faults typically bound the mineralisation packages at the Costerfield Property but can become significantly mineralised themselves along the fault planes. Shallower and dominantly west dipping thrust faults, typically at very low angles or even parallel to bedding with a laminated quartz component, link between the larger order thrust faults. The link faults can also offset the vertical lode structures up to 50 m in an east–west sense. This structural framework leads to the subvertical, north–south extensional veining seen in the Augusta, Brunswick, Kendall and Shepherd systems, along with the moderately west-dipping fault reactivated deposit at Youle.

Exploration efforts at the Costerfield Property are focused on identifying further such mineralised extensional zones through an understanding of this litho-structural setting.

9 Exploration

The exploration work that led to the discovery of the Augusta, Cuffley, Brunswick, Youle, and Shepherd deposits has included predominantly diamond drilling of interpreted geological targets complimented by geological mapping, and geophysical and geochemical analysis. Geochemical exploratory methods have proven to be applicable in detecting gold-antimony mineralisation.

9.1 Costeans/Trenching

Previous owners have undertaken trenching at the Costerfield Property; however, records of these exploration activities were inconsistent and have not been relied upon for quantitative means.

9.2 Petrophysical Analysis

In 2006, AGD submitted 22 whole-rock and mineralised samples from all known deposits around the Costerfield Property for testing by Systems Exploration (NSW) Pty Ltd. The aim of the work was to determine the petrophysical properties of the mineralisation and identify the most effective geophysical exploration methods that could be used at the project to detect similar styles of mineralisation. The breakdown of the 22 samples submitted is:

- thirteen mineralised samples sourced from Augusta, Margaret, Antimony Creek, Costerfield, Bombay, Alison and Brunswick
- two weathered mineralised samples sourced from Augusta
- seven unmineralised samples.

The following petrophysical measurements were completed:

- mass properties
- dry bulk density
- apparent porosity
- grain density
- wet bulk density
- inductive properties:
- magnetic susceptibility
- diamagnetic susceptibility
- electromagnetic conductivity
- galvanic properties:
- galvanic resistivity
- chargeability.

Although measurable differences in the physical properties of the mineralised and non-mineralised material at the Costerfield Property was identified, the contrast proved to be marginal at best, and it was deemed unlikely that these differences would deliver clear geophysical signatures.

The only field geophysical techniques recommended for trialling were ground-based magnetics, ground-based gravity and induced polarisation (IP) profiling.

9.3 Geophysics

Several programs of geophysical surveys were completed at the Costerfield Property.

9.3.1 Ground Geophysics

Based on the results of the petrophysical testing, a limited program of ground-based magnetics, gravity, and IP profiling, with optimal measurement parameters, was carried out across the Augusta Deposit. None of the techniques were found to be effective at detecting the known mineralisation at Augusta.

In early 2022, HiSeis Pty Ltd was commissioned to acquire, process, and interpret three 2D seismic lines at Costerfield. Pre-stack depth migration seismic sections were produced along with a suite of attributes applied to enhance the acoustic signal. The general objectives set for the project were to (1) image the gross geological architecture down to 2 km depth, (2) help ground-truthing of the 3D district-scale model, and (3) assist with targeting by informing deep drilling campaigns.

9.3.2 Airborne Geophysics

A low-level detailed airborne magnetic and radiometric survey was undertaken in 2008 by AGD over its tenements, including both Augusta and Costerfield. The airborne survey was conducted on east–west lines spaced 50 m apart, with a terrain clearance of approximately 50 m. Survey details are included in a logistics report prepared by UTS Geophysics Pty Ltd (UTS, 2008).

Magnetic data were recorded at 0.1 second intervals and radiometric data were recorded at 1 second intervals. Additional processing was undertaken by Greenfields Geophysics.

The interpretation of the radiometric and magnetic data resulted in the generation of regional lineament trends across the tenements, which assisted in interpreting the local buried structures.

9.4 Geochemistry

Geochemical exploration has been undertaken extensively at the Costerfield Property.

9.4.1 Mobile Metal Ion

A trial Mobile Metal Ion (MMI) analytical techniques was completed on samples collected from traverses across the Augusta Lodes in 2005.

The trial included two geophysical traverse lines across the Augusta Deposit, with 5 m spaced soil samples and submitted to Genalysis Laboratory Services for MMI analysis of gold, arsenic, mercury, molybdenum, and antimony via Inductively Coupled Plasma (ICP).

While the other elements showed no correlation to the underlying mineralisation, the gold and antimony results appeared to show a broad anomaly across the mineralisation, indicating that the technique could be useful for regional exploration.

9.4.2 Soil Geochemistry

In October 2017, a soil geochemistry program was conducted at Brunswick South to verify historical sample lines along the southern strike of the Brunswick Lode. A mechanical handheld auger was used to take 28 samples over two traverse lines at an average depth of 720 mm. This program successfully verified the historical assay data and demonstrated a possible strike extension to the Brunswick Lode.

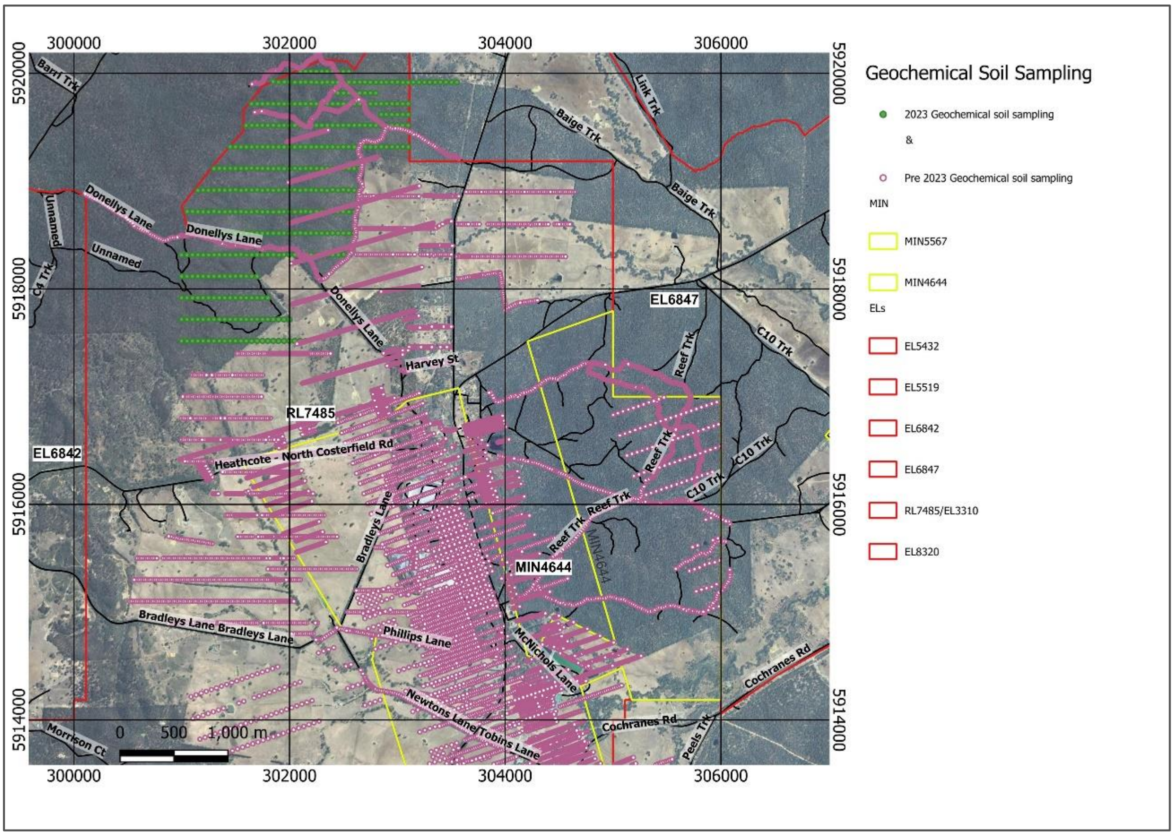
In September 2021, a soil geochemistry campaign was conducted to cover the areas south of True Blue and the eastern corridor (Brown and Robinson Prospects). A mechanical handheld auger was used to take 854 samples over 200 m spaced traverse lines with samples spaced at 50 m intervals.

In 2023, soil geochemistry was undertaken to cover the areas north of MIN4644. This sampling encompassed the Bocks Reef and Damper Gully prospects. A mechanical handheld auger was used to take 384 samples with geochemical traverses spaced over 200 m lines and samples spaced at 50 m intervals (Figure 9.1).

Samples were first analysed using portable X-Ray Fluorescence (XRF) and followed up by aqua regia digest ICP Mass Spectrometry (ICP-MS) analysis. The work aimed at producing a large surface geochemical dataset and aiding target generation along known mineralised corridors.

Data interrogation and analysis was ongoing at the time of writing, with assay results pending.

Figure 9.1: Surface topography and mining lease overlaid with the existing geochemical lines and acquired 2022/2023 soil sampling lines



9.4.3 Bedrock Chemistry – Auger and Aircore Drilling

The effectiveness of bedrock geochemistry was demonstrated by MEM in 1968–1970, when a grid south of the South Costerfield/Tait's Shafts was sampled. What is now known as the Augusta Deposit was highlighted by the resultant anomalies.

Although MEM drilled three shallow diamond drill holes, which ranged from 22 m to 57 m, to test the anomalies and intersected stibnite stringers, they did not proceed any further. Both conventional surface soil and drilled-bedrock samples were collected to compare techniques; although the surface samples were anomalous and cheaper to collect, the drilled-bedrock samples defined the lodes more precisely.

A geochemical aircore drilling program was carried out during March 2010 to test the zone between Augusta South and the Margaret Mine, south of the operating Augusta Mine. The three east–west traverses were completed across cleared grazing paddocks, south of Tobin's Lane, Costerfield. A total of 104 aircore drill holes were drilled for a cumulative total of 547 m, with the average drill hole depth being 5.2 m. The identified antimony halo was subdued in areas where the high-grade lode was greater than 50 m below the top of bedrock, considered to infer that either a low-grade lode existed at shallow depth or a high-grade lode existed at depth.

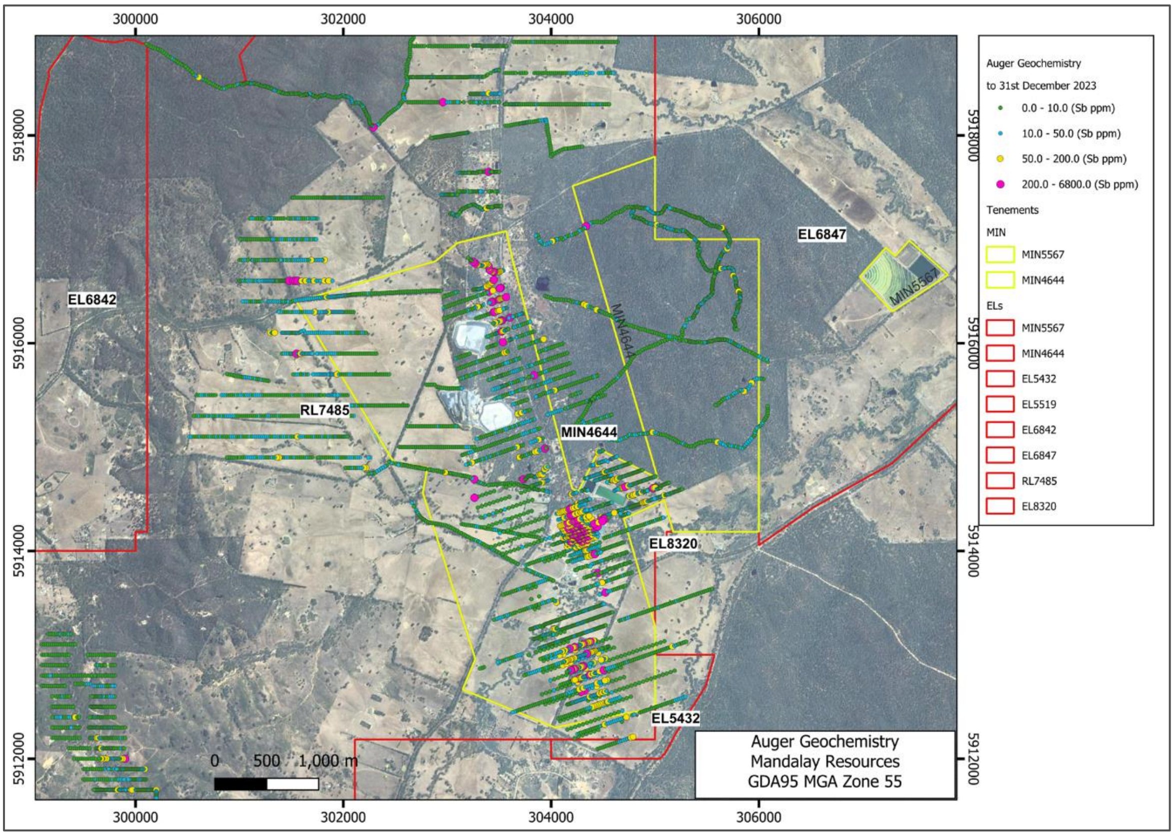
From December 2011, Mandalay Resources engaged Starwest Pty Ltd to undertake the Augusta East Auger drilling program. A total of 2,615 auger drill holes were drilled for 7,295.6 m between December 2011 and June 2012. The survey revealed three anomalous zones (Figure 9.2).

A total of 1,375 auger drill holes were then drilled by Mandalay Resources from 15 April 2014 to June 2014 for 3,906 m. Drill holes were completed on exploration licences EL3310 and EL5432 and mining licence MIN4644 covering six of the prospect areas comprising Augusta (124 holes), Cuffley (76 holes), Brunswick (247 holes), West Costerfield (336 holes) and Margaret's Reef (536 holes).

The program was designed to understand the relationship between bedrock geochemistry, soil sampling and known gold-antimony deposits. This program revealed a previously unknown mineralisation 500 m south of the Brunswick Pit extending the orebody along with a broad anomaly over the West Costerfield sample area.

The Margaret's Reef auger drilling extended a previous program and tightened the spacing to 10 m over previously identified anomalous results for greater definition. The discontinuous nature of anomalism indicated a structurally complicated vein system at the Margaret's Reef prospect.

Figure 9.2: Auger drilling geochemistry results for antimony



9.5 Aerial Photogrammetry Survey

AGD commissioned Quarry Survey Solutions of Healesville and United Photo and Graphic Services Pty Ltd of Melbourne to organise and complete aerial photogrammetry of the Costerfield Property tenement package and the Augusta Mine Site in 2005.

A high-level photogrammetry survey was completed in November 2005 at 24,000 ft. This was followed by a low-level photo survey over the Augusta Mine Site in January 2006 at 8,000 ft.

A second low-level photo survey was completed in April 2006 at a height of 4,000 ft, at the time of maximum surface excavation, prior to the commencement of backfilling of the E Lode Pit.

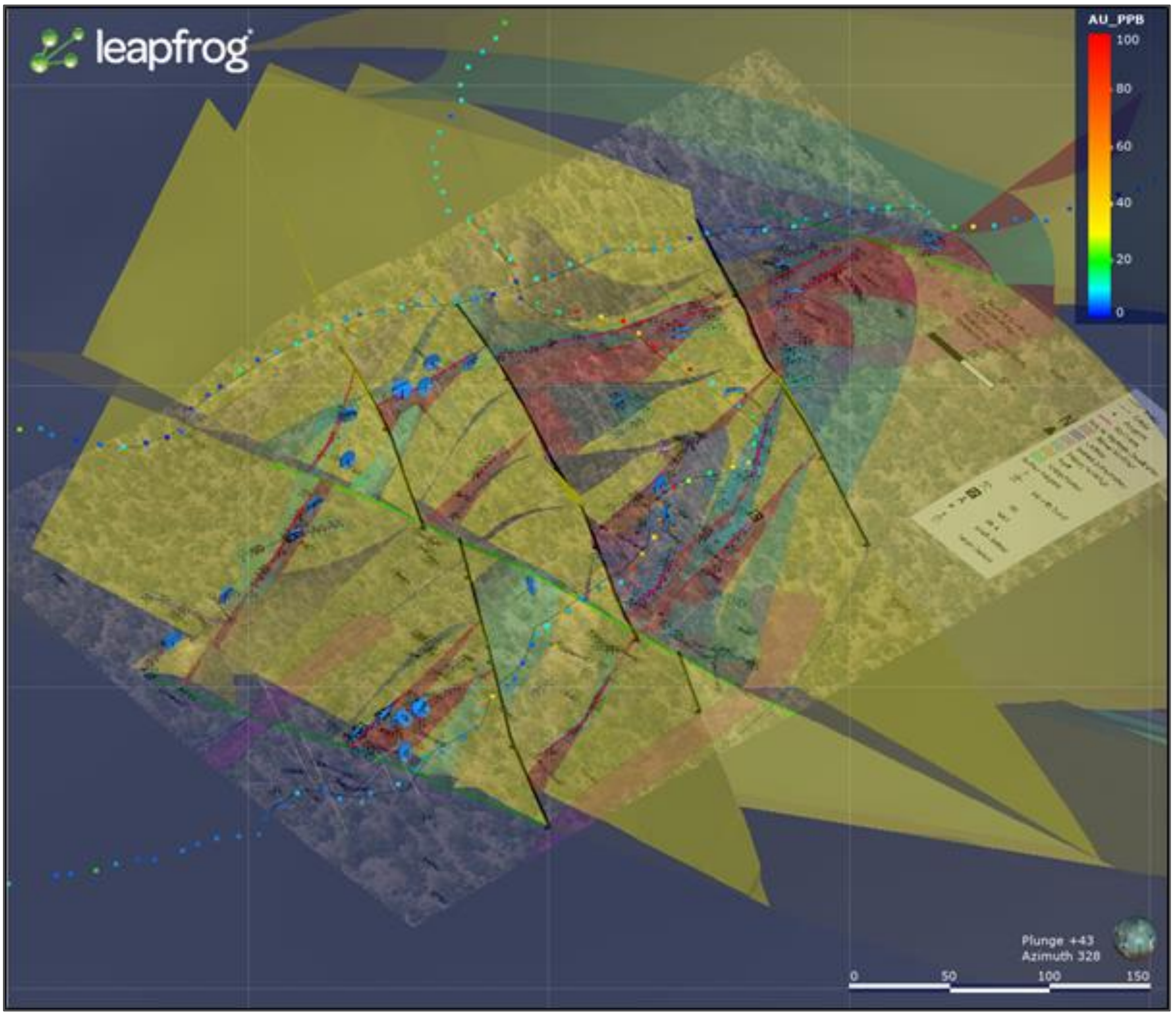
The various photo surveys were subsequently used to generate a digital terrain model and a referenced ortho-photographic scan of the Costerfield central mine area. This area essentially extended from Costerfield South to the Margaret's Reef area, thereby encompassing most of ML MIN4644.

In 2019, Mandalay Resources engaged AAM Group to carry out a detailed Light Detection and Ranging (LiDAR) aerial survey over a 175 km^2 area, covering the entire tenement package. This survey generated a highly accurate and detailed photographic model of the surface with accuracy to +/- 10 cm. The survey had a two-fold benefit for both the Mandalay Resources Future Ore project and the Youle in-rush risk assessment. The LiDAR survey provided an accurate topographical surface that assisted the company to undertake flood simulation studies in order to plan for any 100-year flooding events at the Costerfield Property.

9.6 Surface Mapping and 3D Geological Modelling

The Mandalay Resources Future Ore project was undertaken from 2018 to 2022, with the collection of surface geological information from traverse mapping and continued refinement of a comprehensive regional three-dimensional (3D) model using Leapfrog Geo (Figure 9.3).

Figure 9.3: Perspective view to the northwest: Leapfrog Geo geological model, regional geology



Traverse mapping and compilation of geological data onto comprehensive geological maps of the Costerfield Property has been completed since 2018, and remains an ongoing priority in understanding the gold-antimony system.

10 Drilling

Drilling at the Costerfield Property is undertaken in line with industry best practices, including the following:

- Drilling is undertaken by reputable drilling contractors, with modern drilling equipment.
- The accurate location of Mandalay Resources drill hole collars by differential Global Positioning Survey (GPS) or theodolite surveying methods, either by external surveyors or Mandalay Resources surveyors.
- Measurement of downhole surveys at 30 m intervals.
- Transporting of diamond core in stacked core trays and secured in a dedicated facility.

10.1 Mandalay Resources (2009 to Present)

On 1 December 2009, Mandalay Resources took over the Costerfield Operations from AGD and continued with exploration across MIN4644 and exploration tenements.

A summary of drilling completed by Mandalay Resources from 2009 to 2023 has been outlined in Table 10.1.

Table 10.1: Drill hole summary

Year	Diamond core (m)	Percussion/auger (m)
2009	458.9	547.0
2010	4,032.0	Nil
2011	13,515.0	Nil
2012	18,581.4	7,295.6
2013	24,329.0	3,838.0
2014	20,817.0	3,906.0
2015	18,439.0	2,732.0
2016	32,995.0	Nil
2017	27,827.0	Nil
2018	34,656.0	Nil
2019	9,556.0	Nil
2020	29,080.0	Nil
2021	36,255.0	Nil
2022	40,453.0	Nil
2023	42,518.0	Nil
Total	**353,512.3**	**18,318.6**

10.1.1 2009 to 2010

Drilling from 1 July 2009 to 30 June 2010 mainly consisted of drilling along-strike and down-dip from the existing Augusta Resource, along with drilling undertaken on the True Blue and Hirds Reef prospects. In total, 458.9 m of diamond drilling was undertaken.

In addition, 547 m of bedrock geochemistry aircore drilling was completed within MIN4644 at Augusta South.

Augusta drilling during from 1 July 2009 to 30 June 2010 concentrated on the definition of the W Lode resource. Four drill holes tested the depth extent of W Lode, while another six drill holes were designed as infill drill holes to test mineralised shoots and gather geotechnical data.

10.1.2 2010 to 2011

Exploration from 1 July 2010 to 30 June 2011 was undertaken on two projects: the Augusta Deeps Project and the Brownfields Exploration Project. The Augusta Deeps project was undertaken with the view to extending the existing Augusta Resource to depth.

Augusta drilling concentrated on the infill and extension beneath Augusta to further define the Resource below 1,000 mRL. In total, 10,622.7 m of drilling was completed beneath the Augusta mine workings and resulted in the definition of further Indicated and Inferred Mineral Resources. The initial emphasis of the Brownfields Project was to identify sources of ore within 1 km of the Augusta Decline.

10.1.3 2011 to 2012

Exploration from 1 July 2011 to 30 June 2012 was undertaken on four projects: the Augusta Deeps drilling project (W Lode and N Main Lode), the Alison/Cuffley drilling project, the Brownfields/Target Testing drilling project and the Target Generation/Bedrock Geochemistry auger drilling project.

In total, 18,581.4 m of diamond drilling and 7,295.6 m of auger drilling were undertaken over the four projects. All drilling was carried out by Starwest Pty Ltd using one LM75 diamond drill rig, two LM90 diamond rigs, one Kempe underground diamond drill rig and a modified Gemco 210B track-mounted auger rig.

Augusta Deeps

Drilling of the Augusta Deposit from 1 July 2011 to 30 December 2012 was undertaken with the view to extend the W Lode, E Lode and N Main Lode Inferred and Indicated Mineral Resource, and give confidence in the structural continuity of W Lode and N Main Lode.

A total of 78 drill holes were drilled from surface and underground, totalling 16,170.4 m of drilling.

Cuffley

The Alison/Cuffley drilling project was designed to infill drill a portion of the lode and upgrade it to the Indicated Resource category, and to extend the limits of the lode in the Inferred Resource category.

The Cuffley Lode resource drilling program began in July 2011 with the Augusta Deeps (AD) series of drill holes, following the MB007 discovery. As a follow-up program, four drill holes were drilled (AD001–ADD004). AD004 intersected the fault blank and AD003 appeared to have only intersected the Alison Lode above the Adder Fault in the vicinity of some old stopes. From drill hole AD005 onwards, the drilling strategy involved drilling at least two drill holes on each mine grid cross section at an approximate spacing of 80–100 m. Drill holes were drilled on both west–east and east–west orientations, depending on the site logistics.

One deep drill hole, AD022, on the 5,025N cross section intersected the Cuffley Lode at 700 mRL, 490 m below the surface, with results of 1.04 m at 59.7 g/t Au, 0.37% Sb returned. This drill hole provided confidence in the depth continuity of the lode to Inferred Resource category.

A portion of the drilling in 2011–2012 was infill drilling, 100 m below the Alison Shaft 5 level, at a spacing of 40 m, to define the lode to Indicated Resource category where the planned access decline was expected to first intersect the lode.

10.1.4 2012 to 2023 – Cuffley Lode Drilling

From 1 July 2012 to 30 June 2013, Mandalay Resources drilled 24,329 m of diamond drilling, targeting the Cuffley Lode from surface. These drill holes focused on infill drilling the central, high-grade portion of the Cuffley Lode in order to convert a portion of the Inferred Mineral Resources to the Indicated category.

10.1.5 2014 – Cuffley and N Lode Drilling

In 2014, the focus was on finalising the Cuffley and Augusta Resource Drilling. The goals achieved included the following:

- Expanding the existing Inferred Resource of the Cuffley Lode, both along-strike and at depth.
- Increasing the confidence of the central portion of the Cuffley Lode to aid mine development and stoping of the Cuffley Lode.
- Expanding the existing Inferred Resource of the Augusta Deposit, specifically targeting N Lode along-strike from the existing N Lode development.
- Infill and extension of the Cuffley resource to the north and south along with Cuffley Shallows in between the Flat Fault and the Adder Fault.

In total, 20,817 m of diamond drilling and 3,906 m of auger drilling was undertaken. A total of 5,735 m was drilled for the purposes of target testing, 9,390 m for resource expansion and resource conversions, and 5,692 m for resource infill drilling.

All drilling activity was conducted by Starwest Pty Ltd using two Boart Longyear LM90s, one Boart Longyear LM75, one pneumatic Kempe U2 rig and a modified Gemco 210B Track-mounted Auger.

10.1.6 2015 – Cuffley, N Lode, Cuffley Deeps and Sub King Cobra Drilling

Drilling in 2015 was focused on extending the Cuffley and Augusta Resources, both along-strike and at depth. The expansion of the Cuffley resource included the commencement of drilling in the Cuffley Deeps and Sub King Cobra regions. The goals achieved included the following:

- Expanding the existing Inferred Resource of the Cuffley Lode along-strike and defining a resource below the Cuffley Lode at depth.
- Commencement of drilling at depth below the Cuffley Deposit into the Cuffley Deeps and Sub King Cobra areas.
- Increased the confidence of the central portion of the Cuffley Lode to aid mine development and stoping.
- Expanding the existing Inferred Resource of the Augusta Deposit, specifically targeting N Lode along-strike from the existing N Lode development.
- Infill and extension of the Cuffley resource to the north and south along with Cuffley Shallows in between the Flat Fault and the Adder Fault.
- Follow-up RC drilling at West Costerfield to test the geochemical anomaly identified in 2014 by the Auger Bedrock drilling program.

In total, 18,439 m of diamond drilling and 2,732 m of RC drilling was undertaken. The majority of drilling was conducted by Starwest Pty Ltd using two Boart Longyear LM90s, one Boart Longyear LM75 and one pneumatic Kempe U2 rig. The RC drilling was conducted by Blacklaws Drilling Pty Ltd using a Hanjin surface rig.

10.1.7 2016 – Cuffley Deeps, Cuffley South, M Lode, New Lode, Sub King Cobra, Margaret and Brunswick Drilling

Exploration from January to December 2016 was focused on extending and upgrading the Cuffley and Augusta Resources to extend the LoM plan, replace the mined portion of the Mineral Resource and explore near-mine targets in close proximity to existing underground infrastructure.

The expansion of the Cuffley resource included the continuation of drilling in the Cuffley Deeps, Cuffley South and Sub King Cobra regions, along with the addition of new target areas. The goals achieved included the following:

- Expanding the existing Inferred Resource in the Cuffley Lode, and further defining the Cuffley Deeps and Sub King Cobra Resources below the Cuffley Lode at depth.
- Infill and exploration drilling of the Cuffley Deeps and Sub King Cobra areas, leading to a resource expansion in Cuffley Deeps and an Inferred Resource at the Sub King Cobra area.
- Infill drilling of Cuffley Deeps delineated further prospective zones and a new ore system, namely Mid Lode (M Lode) located between the Cuffley line of lode and N Lode.
- Further development on the Cuffley Lode informed the understanding of, and increased confidence in, the Cuffley Deeps Deposit at depth and along-strike.
- Infill and extension of the Cuffley resource to the north and south along with Cuffley Shallows in between the Flat Fault and the Adder Fault.
- Recommencement of drilling on Brunswick and further testing of the deposit to the south and at depth.
- Brownfields drilling on the Margaret Reef identified the Margaret East mineralisation.

In total, 32,995 m of diamond drilling was undertaken. All drilling activity was conducted by Starwest Pty Ltd using four Boart Longyear LM90s, one Boart Longyear LM75 and one pneumatic Kempe U2 rig.

10.1.8 2017 – Brunswick, K Lode and N Lode

Exploration from January to December 2017 was focused on extending and upgrading the Brunswick Resource with the aim to convert as much to Reserve as possible. The focus in the second half of 2017 was also on extending the Resource around Cuffley and Augusta to extend the LoM plan, replace the mined portion of the Mineral Resource and explore near-mine targets in close proximity to existing underground infrastructure. The goals achieved included the following:

- Expanding and increasing the existing Indicated Resource of the Brunswick Lode, and further definition and testing of Brunswick at depth and Brunswick South.
- Expanding the geological knowledge of and resource in the near-mine environment, in particular the extension and infill of the K Lode and N Lode splays, including N Lode East in the Augusta system.
- Definition and grade increase of C Lode.

In total, 26,403 m of diamond drilling was undertaken. All drilling activity was conducted by Starwest Pty Ltd using four Boart Longyear LM90s, one Boart Longyear LM75 and one pneumatic Kempe U2 rig.

10.1.9 2018 – Youle and Brunswick

Exploration from January to December 2018 was predominantly focused on extending, defining, and upgrading the Youle Mineral Resource. A total of 20,847 m was devoted to resource expansion and conversion drilling, with the remaining 13,809 m invested in target generation.

Additionally, the focus for the second half of 2018 was on increasing the Resource around Brunswick and Augusta to extend the LoM, replace the mined portion of the Mineral Resource and explore near-mine targets in close proximity to existing underground infrastructure. The goals achieved included the following:

- Defining the Youle Lode, a west-dipping, high-grade orebody, identified as a continuation of Kendall-style mineralisation.
- Delineating an Indicated Resource around Youle, which could be integrated into the LoM plan.
- Completing further definition and testing of Brunswick at depth.
- Expanding the geological knowledge of and resources in the near-mine environment. This included the extension and infill of Cuffley North Lode (1,272 m), D Lode (240 m) and Cuffley line drilling (335 m).
- Brownfields drilling was also undertaken at Augusta East (1,479 m) looking for the southern extension of the Augusta Deposit, and Mountain Creek (1,253 m) testing to the south of the Brunswick Deposit.

In total, 34,656 m of diamond drilling was undertaken. All drilling activity was conducted by Starwest Pty Ltd using five Boart Longyear LM90s, one Boart Longyear LM75 and one pneumatic Kempe U2 rig.

10.1.10 2019 – Youle and Brunswick

Drilling from January to December 2019 was predominantly focused on extending, defining, and upgrading the Youle Resource. This drilling involved both infill and extensional drilling, designed to delineate the high-grade Youle zone to the north and define mineralisation near current and planned development. A total of 3,863 m was devoted to resource expansion and resource conversion drilling, with the remaining 5,693 m designed for target generation. The main focus of the target generation drilling was the close proximity to the Youle Resource, in particular, the northern extension of Youle and the McDonald's Prospect to the north.

In May 2019, Mandalay Resources kicked off the Costerfield Property deep drilling program, targeting below the Youle orebody. One parent drill hole and wedge were drilled as part of this program totalling 2,510 m.

With the commencement of mining on the Youle Lode, underground resource definition drilling continued at Youle together with the extensional drilling of production areas to be mined in the next 6–12 months. Further confirmation of capital development was undertaken through grade control drilling in order to provide confidence in the grade, location of veining, geotechnical performance and viability of the mineralisation ahead of mining.

As Mandalay Resources continued with the Youle expansion program, it also commenced deep target testing of the Costerfield line of lode with the view to testing and understanding the gold enrichment environment. This drilling program provided additional context for previous deep high-grade gold intercepts at Augusta.

In 2019, the goals achieved included the following:

- Expanding and increasing the existing Indicated Resource of the Youle Lode.
- Regional target generation by conducting extensive surface mapping, drill hole database integration, soil geochemistry and evaluation of geophysical data. This work aided the generation of a 3D Leapfrog Geo integrated structural and geological model of the Costerfield Property region.
- Expanding the orebody knowledge and resource tonnage in the near mine environment, in particular, the extension and infill of the Brunswick mineralised system.

In total, 9,556.0 m of diamond drilling was undertaken. All drilling activity was conducted by Starwest Pty Ltd using five Boart Longyear LM90s, one Boart Longyear LM75, one pneumatic Kempe U2 rig and one LM30 rig.

10.1.11 2020 – Youle, Brunswick, Minerva, Browns/Robinsons, True Blue, Damper Gully, Costerfield Deeps, and Minerva Testing

Exploration drilling during 2020 was predominantly focused on extending, defining, and upgrading the Youle Resource. It involved both infill and extensional drilling designed to delineate the high-grade Youle zone to the north, south, down-plunge, and above the orebody in areas of historical mining, adjacent to current and planned development.

The focus of target generation was near the Youle Resource, in particular, the northern extension and at depth. Throughout 2020, 29,080 m of diamond drilling was undertaken. The goals achieved included the following:

- Continued extensional drilling at depth, north and south of Youle, allowing the definition of a high-grade gold domain at depth, as well as another emerging high-grade plunge extension to the north at depth.
- Expansion of the existing Indicated Mineral Resource of the Youle Lode.
- Drilling above Youle to investigate instances of veining that were not extracted during the historical mining at the Costerfield Property, suggesting the potential for further undiscovered mineralisation around the historical workings that could be accessed from the Youle infrastructure.
- A series of regional diamond testing programs (Browns, Robinsons, Damper Gully and True Blue prospects) were designed and executed with the intent of testing the potential around the Costerfield Property that could add to the life of the operation.
- Expansion of the Youle orebody knowledge and resource tonnage in the near-mine environment.

A four drill hole program testing the line of lode was completed for 1,977 m and provided additional geological context for the previously intersected deep high-grade intercepts at Augusta. Underground resource definition drilling continued at Youle, together with extensional drilling of production areas to be mined in the next 6–12 months.

A series of regional diamond drilling programs were executed in Browns/Robinsons (6,123 m), True Blue (695 m) and Damper Gully (561 m). Near-mine drilling, designed to test areas immediately adjacent to the current mining operations that could add to the LoM plan, included Kendell Upper (4,579 m), Youle Growth, Youle North, Youle South extension drilling (13,990 m), and Minerva Testing (1,253 m).

In addition, Brunswick KR Panel definition drilling (315 m) was undertaken in an attempt to define mineralisation in the KR panel below the existing Brunswick mine workings.

10.1.12 2021 – Youle Plunge, Shepard, Brunswick, Margaret Deeps, Browns, Cuffley Deeps, Fox Fault, Bogong

In total, 36.2 km of exploration drilling was completed during 2021 at Costerfield. The majority (26.4 km) of this drilling focussed on the mineralisation at the Youle and newly identified Shepherd orebodies. The following was achieved:

- Down-plunge northern extension of the Youle orebody was realised, along with the identification of a new series of gold-rich veins intersecting the FW of Youle early in the year (Shepherd zone).
- The Shepherd zone was then tested and expanded, resolving into several discrete veins. A considerable amount of material was brought into the Reserve, with scope to continue expansion drilling into 2022.

- A significant portion of the down-dip central portion of Youle with sparse drilling (the 'Youle Bight') was infilled and converted to resource.
- A deep hole (Shepherd Deeps, CD003) was drilled from underground at Youle, aimed to locate a significant down-dip continuation of the Shepherd veining in the HW of the King Cobra Fault as delineated by the earlier CD001 deep testing hole.
- An attempt to infill and upgrade the Cuffley Deeps mineralisation panel was made, with no material change to the sub-economic mineralisation.
- Surface drill testing of the Fox Fault and associated mineralisation known from historical Cuffley Deeps drilling, immediately down-dip of Cuffley Deeps.
- Down-dip testing of the Brunswick system, between the Rooster and Adder Faults, was initiated.
- Continued testing of several different targets at Browns Prospect. The deep Swallowtail thrust fault target was found to be mineralised in several drill holes, although narrow and of moderate grade. The Bogong vein testing was completed early in the year with mixed results, and earned a follow-up program to extend the highest-grade portion identified in the previous program. The final drill hole of the Browns Bogong follow-up program resulted in the highest grade intercept on the lode system to date.

Deep drilling at the Margaret Prospect was undertaken to test a newly generated model of the area suggesting the zone of mineralisation at depth had not been adequately tested with previous drilling.

10.1.13 2022 to 2023 – Youle, Shepard, Ture Blue, Browns/Robinsons, Taits North, Margaret East, McDonald's, West Costerfield and Bocks Reef

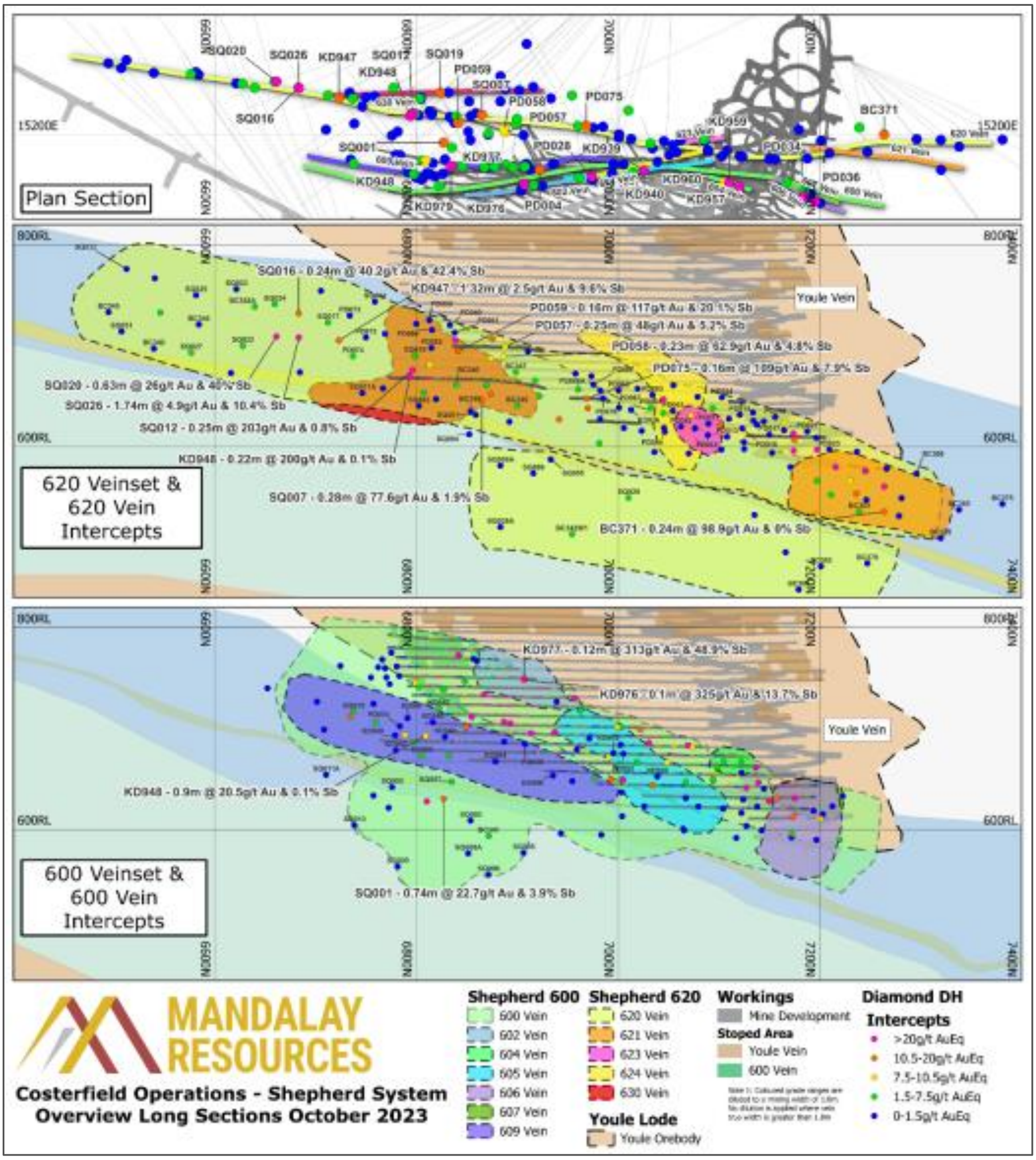
During the period January 2022 to December 2023, a total of 82,171 m of drilling was completed on the Costerfield Property, comprising infill and extensional drilling near current and planned development, near-mine target generation, and regional diamond testing programs. The following was achieved during the previous 2 years:

- Diamond drilling underneath the Youle orebody resolved the Shepherd Zone into five distinct veins. Drilling determined grade continuity through Shepherd and extended veining along strike and down-dip.
- Drilling continued on the Shepherd resource aimed at extending the Shepherd resource with near-mine targets such as Shepherd below quartzite.
- Three additional wedges were drilled on CD003 in the continuation of the Costerfield Deeps drilling program and another deep hole (Shepherd Deeps, CD004) was drilled to test for sub-vertical 'Shepherd Style' splays and cover a wide east–west corridor at the northern end of the Augusta mine area, below the northernmost extent of the Cuffley Lode.
- Down-dip testing of the Brunswick system, between the Rooster and Adder Faults, has continued.
- Continued testing at the Robinsons Prospect designed to test potential westward offset and strike extensions of the Robinsons line of lode.

- Deep drilling at the Margaret Prospect has continued to test a newly generated model of the area, suggesting the zone of mineralisation at depth had not been adequately tested with previous drilling.
- Further deep drilling at the True Blue Prospect to test under the flat lying west structures to the west of known mineralisation.
- Testing at the historical Taits North Prospect to test the continuity of strike from the previously mined N Lode, E-Lode and D-Lode.

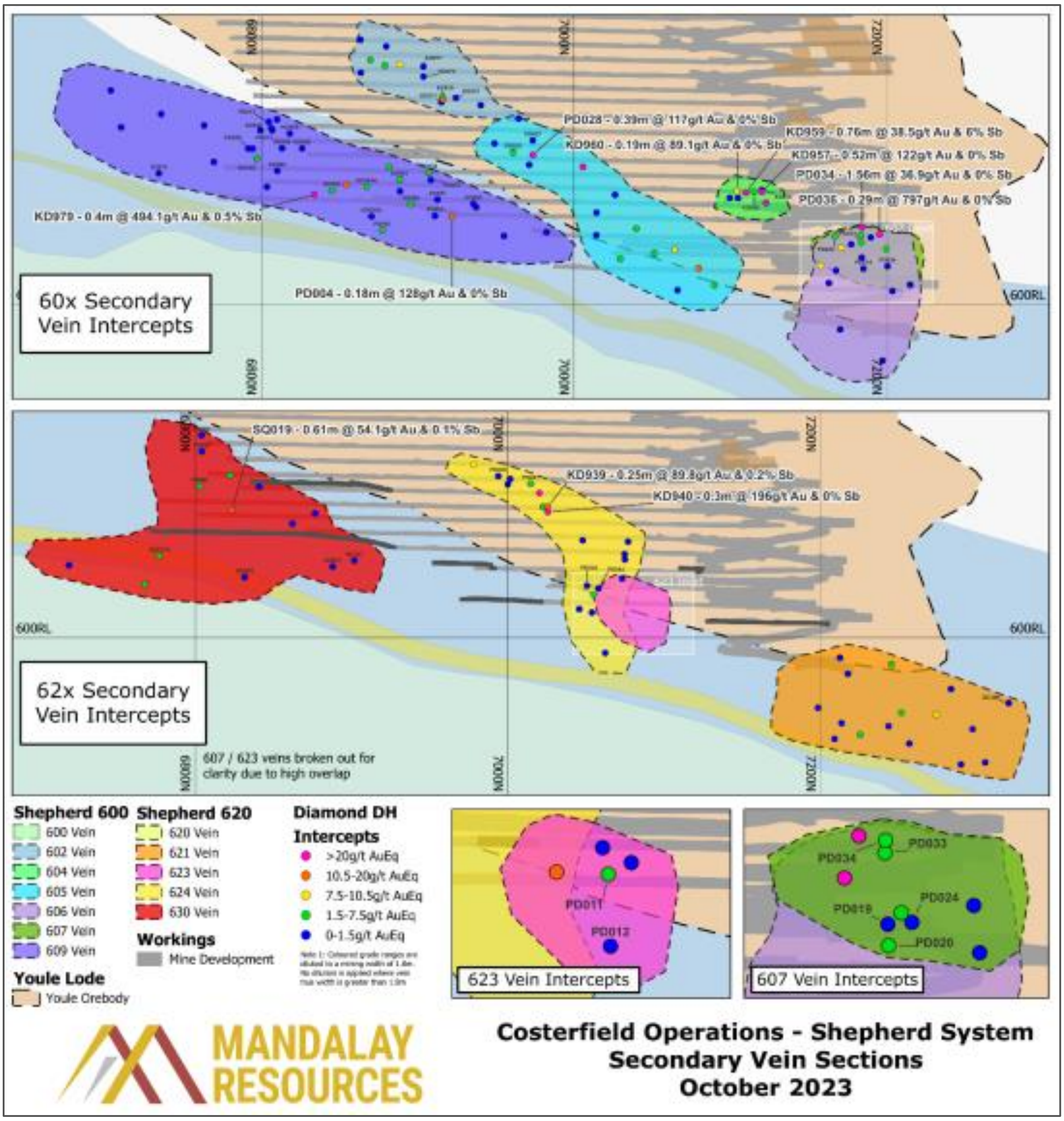
Significant intercepts recovered for the Shepherd Lode have been presented in longitudinal projection view in Figure 10.1 and Figure 10.2, and the Youle/Shepherd system is presented in cross sectional view in Figure 10.3.

Figure 10.1: Longitudinal sections of Shepherd and Suffolk veining with examples of new results (2023) labelled with hole ID



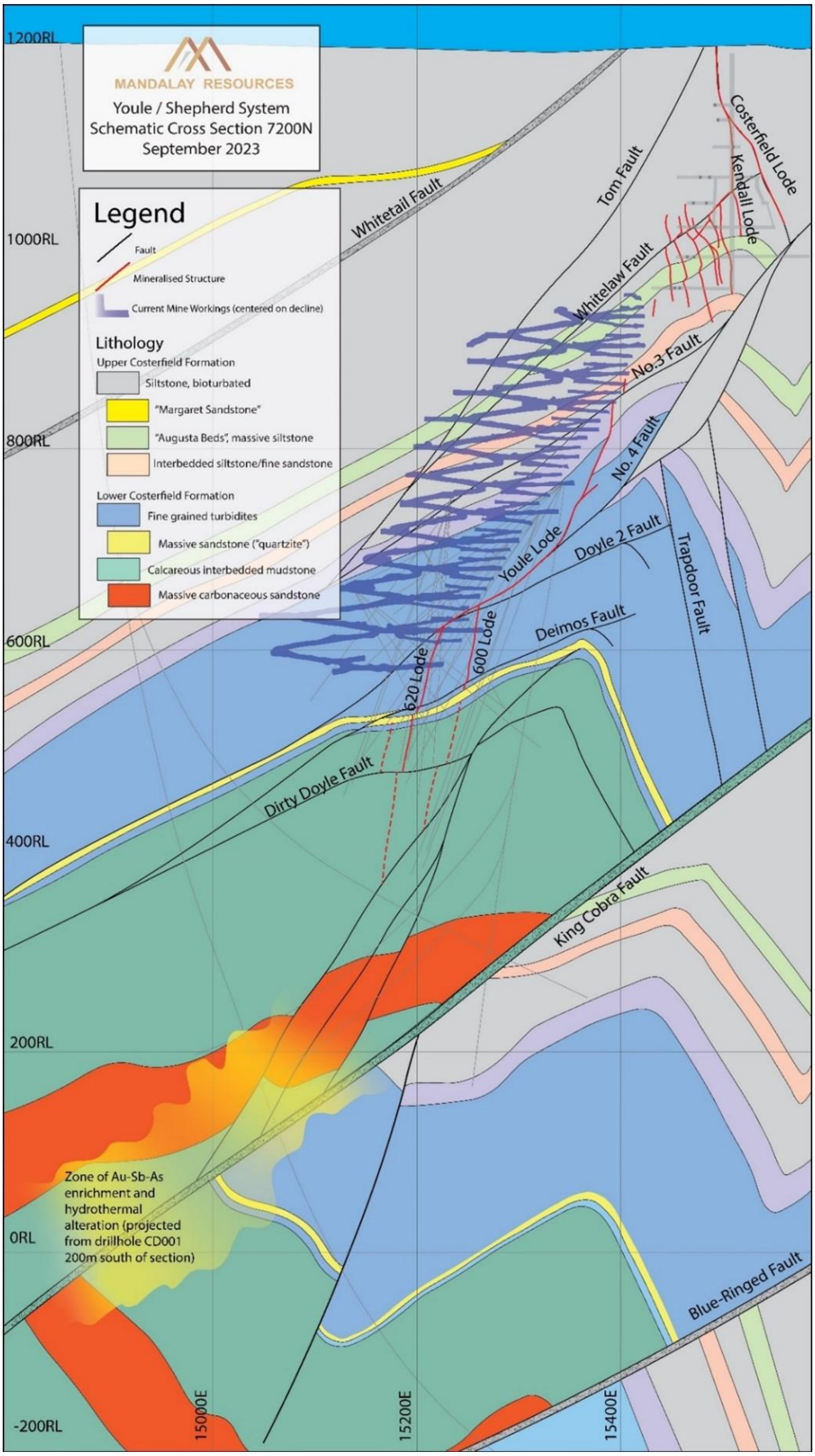
Notes: Results of grade above 7.5 g/t AuEq when diluted to 1.8 m are also annotated with estimated true width and grade.

Figure 10.2: Longitudinal sections of smaller veins associated with the 600 and 620 main structures, with examples of new results (2023) labelled with hole ID



Notes: Results of grade above 7.5 g/t AuEq when diluted to 1.8 m are also annotated with estimated true width and grade.

Figure 10.3: Cross section at 7,050N displaying the relationship between the Youle and Shepherd Zone veins



10.2 Drilling Methods

The Augusta Deposit has been subject to ongoing development and diamond drilling since the commencement of mining operations in 2006. The current Mineral Resource Estimates are completed using all historical drilling and then depleted for areas already mined.

Between 2006 and 2011, several drilling companies were contracted to provide both surface and underground drilling services at the Costerfield Property. To ensure consistent results and quality of drilling, Starwest Drilling Pty Ltd was selected as the preferred drilling services supplier in 2011 and has been operating on site since. Due to an increase is drilling metres required, in July 2022, Deepcore drilling Pty Ltd was contracted to complete all underground drilling, with surface drilling remaining with Starwest Pty Ltd.

Prior to 2011, various sized drill holes and drilling methods were used, including HQ2, HQ3, NQ2, LTK60, LTK48 diamond core sizes, and 5”1/8’ to 5”5/8’ RC hammers. Details of these drill holes were not always recorded, however, because the majority of this drilling was in areas that have now been depleted by mining; any risk associated with this drilling is considered to be low.

Since 2011, underground diamond drilling has been completed predominantly using an LM90 drill rig in HQ2 or NQ2 sized diamond drill holes. Underground grade control drilling has been completed by either a Kempe or Diamec drill rig producing LTK48-sized diamond core. Data collected from these drill holes have provided both structural and detailed grade information.

In 2019, a LM30 drill rig, drilling BQ™TK, was used underground for additional grade control drilling. Surface drilling was undertaken using HQ2 and NQ2 sized core barrels, with HQ3 used in zones of poor ground conditions or for noise reduction reasons.

10.3 Collar Surveys

Between the late 1990s and 2001, the majority of drill holes appear to have been located using a GPS survey instrument, while drill hole collar locations prior to the 1990s were usually sighted by tape and compass. Where possible, historical drill holes were surveyed in 2005 by Adrian Cummins & Associates, but this was not always possible.

Collars surveyed after 2001 have been recorded in the acQuire drill hole database as being surveyed, while unsurveyed/unknown drill holes have been recorded as being surveyed by either GPS or an unknown method, and have been given an accuracy of within 1 m.

In 2006, drill hole collars began being surveyed using the Costerfield Property Mine Grid, and were surveyed either by Mandalay Resources surveyors or by GWB Survey Pty Ltd. In addition, between 2006 and 2011, Adrian Cummins & Associates provided surveying of both underground and surface collar locations.

Currently, initial collar locations are sighted and pegged using a handheld GPS, with drilling azimuths set out by compass. Drill holes are then surveyed by Mandalay Resources surveyors on completion. In some instances, drill hole collar data are modified to account for known and quantified survey error within the mine.

10.4 Downhole Surveys

Between 2001 and 2023, all drill holes were downhole surveyed by either electronic single-shot or film single-shot survey methods. Prior to 2001, survey information exists for the majority of drill holes; however, the method of collection and records of these surveys are no longer available.

The exclusive use of an electronic, single-shot survey tool has been in place since 2011. An initial check survey is completed at 15 m to ensure that the collar set-up is accurate. Thereafter, surveys are conducted at 30 m intervals, unless ground conditions are unsuitable to conduct a survey, in which case the survey is completed when suitable ground conditions are re-encountered.

In 2021, the IMDEXHUB-IQ system for recording, storing and transferring downhole survey measurements was implemented on site. This system removed the need for transcription of surveys between the tool and the database.

Coinciding with the implementation of IMDEXHUB-IQ, the REFLEX EZ-TRAC downhole survey tool replaced all REFLEX EZ-SHOT single-shot downhole tool. The REFLEX EZ-TRAC provided the ability for direct interfacing with IMDEXHIB-IQ and to complete multi-shot surveys, which became routine for end of hole surveys in 2021. Multi-shot surveys are completed at 3 m intervals unless ground conditions or magnetic interference is unsuitable.

10.5 Data Management

In November 2016, Mandalay Resources Exploration purchased the GIM software acQuire, due to the high rate of data collection occurring at the Costerfield Property.

The installation of acQuire improved the overall efficiency of the data collection and handling systems, and the improved data integrity by minimising the likelihood of human error.

10.6 Logging Procedures

The following information only relates to drilling completed after 1 January 2010 and below 1,000 mRL in the Augusta and Cuffley deposits. Details of the full procedures are captured in the internal Standard Operating Procedure *EXG_EXP_3007_PRC_Diamond Drilling Core Logging Procedure.*

All diamond drill core is geologically logged at the core preparation facility located at the Brunswick Complex. Core is initially brought to the facility by either the drill crews at the end of shift or by field technicians who work in the core preparation facility. Core is generally stored on pallets while waiting for processing.

Field technicians initially orientate all core using the orientation line provided by the drill crews through the use of an electronic core orientation device during drilling. The orientation line is transferred down along the length of the core run, where possible. If no orientation is recorded by the drill crews, the core is simply rotated to a consistent alignment of bedding or cleavage, with no orientation mark made on the core.

Downhole depths are marked on the core at 1 m intervals using a tape measure, taking into account core loss and any over-drill. If core loss is encountered, a block is placed in the zone of core loss and the core loss is recorded.

Field technicians collect rock quality designation (RQD) data directly onto a digital tablet device using acQuire software. RQD data are collected corresponding to drill runs and include the from-depth, to-depth, run length in metres, the recovered length in metres, the recovery as a percentage, the length of recovered core greater than or equal to 10 cm, and the number of fractures. From these data, an RQD value is calculated. These data are logged directly into acQuire via a Toughbook computer and stored on the company server.

After depth marks are placed on the core, site geologists log the lithology, structural data, geotechnical data (if applicable) and mark the sampling intervals, all of which is then uploaded directly to the acQuire database.

All measurements of structural features, such as bedding, cleavage, faults, and shears, are collected using an orientated core, a wrap-around protractor for measuring beta angles and a standard protractor for measuring alpha angles. If no orientation line is available, only alpha measurements are collected. Measurements are recorded directly into the acQuire database via the Toughbook computer, and are also scribed onto the core using a wax pencil.

After geological logging has been completed and the core marked up, all core trays are photographed before sampling. Once sampling is completed, the trays are placed on pallets and moved to the permanent core storage area.

10.7 Drilling Pattern and Quality

10.7.1 Augusta

Surface drilling, targeting depth extensions of the Augusta Deposit, is generally conducted on 100 m sections along-strike, with intersections spaced at 80–100 m in the dip plane. Infill drilling is generally conducted from underground at a spacing of approximately 40 m × 30 m in the dip plane.

10.7.2 Cuffley

Initial drilling of the Cuffley Lode was intended to be done in a dice-five pattern on an approximate 50 m × 50 m offset grid. This pattern started with AD001 through to, and including, AD004; however, in order to aid interpretation, the drill spacing was expanded to a 100 m grid based on mine grid northings, with 50–80 m between drill holes on each section. This change of drill pattern enabled the interpretation to be completed on mine northing sections.

Infill drilling between the 820 mRL and 1,020 mRL used a dice-five pattern to maximise information in the strike direction. This infill drilling was conducted on a nominal 30 m (RL) × 40 m (northing) grid.

10.7.3 Brunswick

Drilling post 2010 has been conducted by defining and infilling the existing Inferred Resource, based on the updated fault interpretation. Extension within the PK fault panel used an initial dice-five pattern, which was then infilled using daughter wedge drill holes.

The KR fault panel was also drilled using a dice-five pattern with an approximate spacing of 40 m.

10.7.4 Youle/Shepard

Drilling was completed on an initial spacing of approximately 100 m to define the extent of the mineralisation and determine an Inferred Resource. The infill drill hole spacing accomplished was approximately 40–50 m, using a combination of parent and daughter wedge drill holes. Several drill holes were twinned by daughter wedge drill holes in order to obtain metallurgical samples and duplicates of several high-grade gold zones.

A combination of west–east and east–west drill holes were used to test both west-dipping and sub-vertical mineralisation; however, the dominant drill hole orientation in the infill program at Youle was drilled west–east.

Youle and Shepherd underground drilling was completed to provide increased geological confidence ahead of mining, and for near-mine exploration along-strike and down-dip of the lodes.

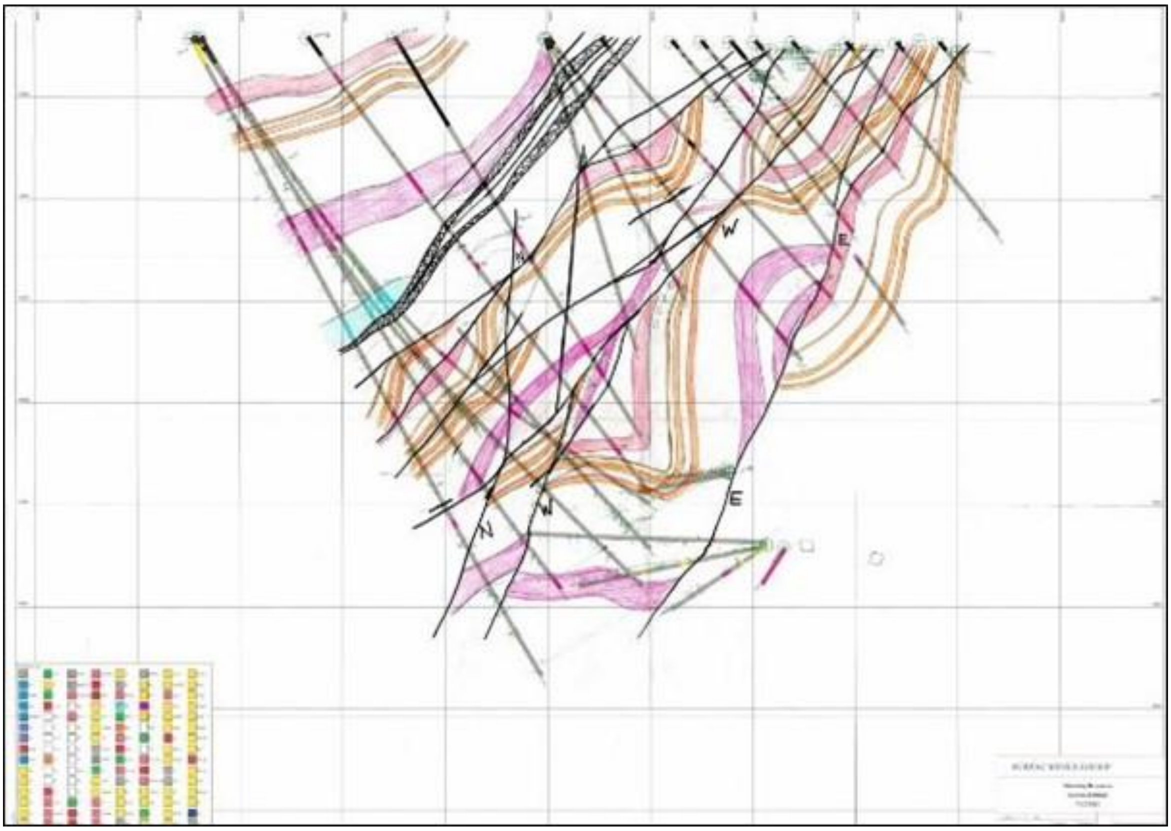
10.7.5 True Blue

Drilling on the maiden resource of True Blue was completed at an initial spacing of 80–100 m to confirm structural and grade continuity. Infill drilling is pending further testing along-strike and at depth.

10.8 Interpretation of Drilling Results

Drilling results are initially interpreted on paper cross sections, which are then scanned and geo-referenced in the mine planning software package Surpac or Leapfrog Geo. The scanned sections are then used to generate wireframes (Figure 10.4). Mappable stratigraphic units have been represented by various colours, while faults and mineralised lodes have been marked with heavy black lines.

Figure 10.4: Example cross section of the Augusta Deposit at 4,300 mN, post drilling and geological interpretation



Mandalay Resources implemented the use of Leapfrog Geo to assist in the structural, geological and geochemical interpretation of drill hole data and surface mapping in 3D space.

10.9 Factors that could Materially Impact the Accuracy of the Results

The factor that has the greatest potential to materially impact the accuracy of drilling results is the core recovery. Historically, this was an issue for all methods of drilling in the Augusta area. Mandalay Resources has employed methods of drilling and associated procedures to ensure the highest recovery of sample possible. Where sample recovery is poor (typically >0.1 m core loss, or when there is clear textual evidence), a repeat drill hole is completed by drilling a daughter wedge drill hole.

Information gained from drilling by previous operators has been used in resource estimation of the Augusta and Brunswick deposits; however, as much of the historically drilled area has now had additional data from, and been depleted by, mining, the risk associated with these historical holes was considered minimal.

Surveys of the collar location and downhole surveying methods applied at the Costerfield Property follow industry best practice.

11 Sample Preparation, Analyses, and Security

11.1 Sampling Techniques

Samples were routinely collected and analysed from diamond drill core and channel samples from the ore development drive faces.

Sample test weights for samples collected in the 2022–2023 period are summarised in Table 11.1, comparing the two primary sample methods of diamond drilling and face sampling.

Table 11.1: Summary of sample weights for testing in 2022–2023

	Diamond drill hole samples	Underground channel samples	All samples combined
Count	33,685	1,876	35,561
Mean (kg)	1.35	2.19	1.39
Standard deviation (kg)	0.92	0.98	0.94
Minimum (kg)	0.12	0.11	0.11
Maximum (kg)	5.78	10.70	10.70

11.1.1 Diamond Core Sampling

The mineralisation style at the Costerfield Property is well understood and the geological controls on mineralisation well established. Sampling intervals were based on geological characteristics and marked on the diamond drill core by Mandalay Resources geologists. Mineralisation is always clearly visible and therefore, systematic sampling of complete drill holes is not required.

The general rules that were followed in the selection of sample intervals were:

- All known lode structures and stibnite-bearing veins were sampled.
- Intersections of stockwork veins, laminated quartz veins or massive quartz veins were routinely sampled.
- Waste samples were collected from either side of the mineralised vein to determine the grade of the waste material immediately adjacent to the mineralisation. These waste samples ranged from 0.3 m to 1 m in downhole length.
- Siltstone was sampled where disseminated arsenopyrite was observed.
- Fault gouge zones were sampled at the discretion of the geologist.
- Diamond core sampling intervals were standardised wherever possible and ranged from 0.1 m to 1 m in length. The average sample length for drill core samples within the 2022–2023 Youle and Shepherd drilling programs was approximately 0.37 m.
- Samples were cut close to and honouring definitive lithological and mineralisation contacts.

A Mandalay Resources exploration field technician undertook the sampling of the diamond drill core. To obtain consistent samples for analysis and retention, the diamond drill core was cut perpendicular to the core axis at the downhole sampling points and then cut in half (where half core sampling was completed) lengthways with an Almonte automated diamond saw.

In response to the visible gold in Shepherd, whole core samples were taken through the Shepherd orebody.

11.1.2 Underground Channel Sampling

Ore drive face channel samples (face samples) were collected by Mandalay Resources geologists on portable handheld computers (iPad) using the digital capture software Rock Mapper. The following method was used:

- Sample locations were determined so that the sample was collected perpendicular to the dip of the mineralisation, from the FW to the HW.
- The face size and sample lengths were measured.
- Each sample was collected as a channel sample using a geological hammer and placed into a pre-numbered sample bag with a unique ID.
- Where there were two or more mineralised structures in the face, samples were also taken of the intervening waste.
- Sample lengths ranged from 5 cm to 1.0 m across the mineralisation, and typically weighed between 1 kg and 3 kg.
- The face was labelled with the heading, dated, and photographed into Rock Mapper.
- The area of lode and waste was drawn onto the photograph in Rock Mapper.
- Key features were sketched digitally directly onto the Rock Mapper software and sampling and structural data were recorded.
- On completion, data from the Rock Mapper files were automatically uploaded to the drill hole database.
- A record of the face photographs, annotations, and sampling files was saved on the Mandalay Resources server.
- The location and orientation of the face was derived using the distance from survey marks and the survey pickup of the drive using Surpac and Rock Mapper to produce a georeferenced face photograph.
- The coordinates, orientation and dip of the channel were derived from the georeferenced face photograph using Rock Mapper with the resulting data stored in the drill hole database.
- The face photograph and channel data were validated against the survey pickup.
- A digital mesh derived from photogrammetry by Rock Mapper had the drive photograph overlayed and was then displayed in Leapfrog for validation against the channel sample.

Occasional wall channel samples are also taken at the Costerfield Property and follow the same process as above.

11.2 Data Spacing and Distribution

Within the Augusta, Cuffley, Brunswick, Youle and Shepherd Deposits, the distance between drill hole intercepts was approximately 40 m × 40 m. This was reduced to 20 m × 20 m in areas of structural complexity.

Underground channel samples were taken every 1.8–5 m along development drives on ore, with level spacing 7–10 m dependent on the lode dip.

11.3 Assaying Laboratories

Routine assaying of the diamond drill core and face samples was completed by On Site in Bendigo, who is independent of Mandalay Resources and holds current ISO/IEC 17025 accreditation.

Mandalay Resources dispatched samples to On Site after which On Site's assay laboratory personnel completed sample preparation and chemical analysis. Results were returned to Mandalay Resources staff, who validated and loaded the assay data into the relevant databases.

ALS Global Brisbane, SGS Perth and Bureau Veritas Perth have been used to verify the accuracy of assays completed by On Site through the completion of quarterly umpire check analyses of selected samples (Section 11.8).

11.4 Sample Preparation

The following sample preparation activities were undertaken by Mandalay Resources staff for both diamond drill core and underground channel samples:

- Sample information and characteristics were measured, logged, recorded in the acQuire database and assigned a unique sample ID.
- Sample material was placed into a calico bag previously marked with the unique sample ID.
- Calico bags were loaded into plastic bags such that the plastic bags weighed less than 10 kg.
- An assay submission sheet was generated and placed into the plastic bag.
- Plastic bags containing samples were sealed with a metal or plastic tie and transported to On Site in Bendigo via private courier or Mandalay Resources staff.

The following sample preparation activities were undertaken by On Site staff:

- Samples were received and checked for labelling, missing samples, etc. against the submission sheet.
- If the sample batch matched the submission sheet, sample metadata were entered into On Site's Laboratory Information Management System (LIMS). In the event that discrepancies were noted, Mandalay Resources was contacted by On Site to resolve the discrepancy prior to further work commencing. Records of all discrepancies and corrective actions taken are recorded by the Mandalay database administrator.
- A job number was assigned, and worksheets and sample bags were prepared.
- Samples were placed in an oven and dried overnight at 106°C.

- Samples were weighed and recorded.
- The entire dried sample was crushed using a Rocklabs Smart BOYD Crusher RSD Combo with a jaw closed side setting of 2 mm.
- If the dried sample weight was less than 3 kg, the entire sample was retained for pulverisation. If the dried sample weight was greater than 3 kg, the sample was spilt to 3 kg using the rotary splitter that is incorporated in the BOYD crusher.
- Rejects from splits greater than 3 kg were retained as coarse rejects in labelled calico bags and returned to Mandalay Resources.
- The 3 kg sample was then pulverised in an Essa LM5 Pulverising Mill to 90% passing 75 µm.

For fire assay and base metal samples:

- The 3 kg pulverised samples were then subsampled to take a master 200 g pulp split for assay by a manual scooping procedure across the full width and depth of the mill bowl and loaded sequentially into labelled pulp packets.

For photon assay:

- The 3 kg pulverised samples were then subsampled to fill a ~280 g photon assay jar by a manual scooping procedure across the full width and depth of the mill bowl.

For all methods:

- For every 21 primary samples, a sample was randomly selected by LIMS and a duplicate 200 g split for FA or second jar for PA was submitted for analysis using the same analytical procedure as the primary sample.
- The remaining pulp was returned to its sample bag and then returned to Mandalay Resources for retention following the completion of assay.

Data regarding the percentage of sample passing < 75 µm was provided by On Site for the period between January 2023 and January 2024. The target is 90% passing and this was achieved with the mean for this subset of data sitting at 92%.

11.5 Sample Analysis

Diamond drill core and face/wall channel samples were routinely assayed by On Site for gold, antimony, arsenic, and iron.

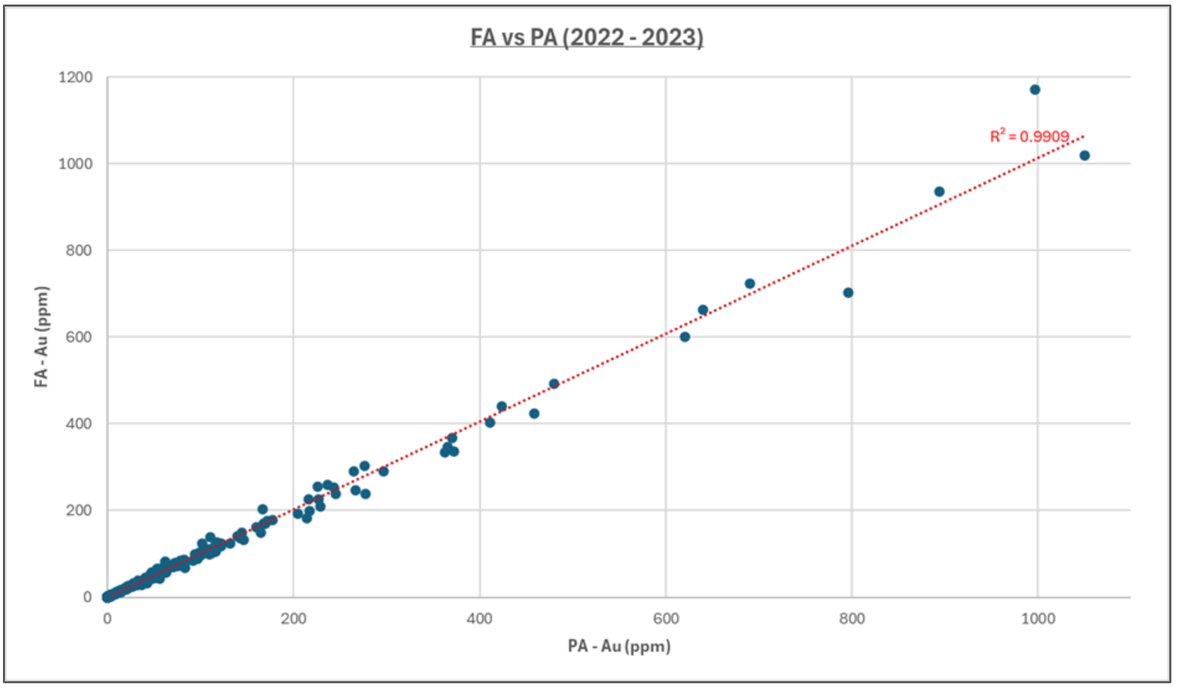
11.5.1 Gold Analysis

Gold grades for the 2022-2023 period were determined by either fire assay (FA) with an AAS finish or using the Chrysos Photon Assay™ technology (PA). The initial infill drilling of the Shepherd lodes (MP, 2021 and MP, 2022) was completed utilising screen fire assay (SFA) as well as FA and are included in the Mineral Resource Estimate.

In 2022, PA was tested in parallel with FA. From 2023, all production face samples used PA to take advantage of the faster turnaround time and larger aliquot size. Where multiple assay results existed, gold analysis was prioritised SFA > FA > PA where the higher priority result was used in the Mineral Resource Estimate.

A comparison can be seen below for samples tested by both FA and PA during the 2022–2023 period. There were 318 comparable samples available during this period with a 99% R^2 relationship, as shown in Figure 11.1.These data provided confidence for the overall use of PA testing primarily for production samples with the check-assay analysis of these methods discussed later in this report.

Figure 11.1: Analysis for gold via fire assay or photon assay, illustrating a comparison of 449 pairs on a logarithmic scale



The following summary statistics are also available for this data subset:

Table 11.2: Summary statistics of photon assay versus fire assay comparison

	Fire Assay	Photon Assay
Mean	68.6	69.0
Minimum	0.1	0.1
Maximum	1050.0	1170.0
Standard deviation	141.3	143.6
CV	2.1	2.1
Bias	-0.49%	
Correlation coefficient	0.995	

Notes: CV – Coefficient of Variation.

11.5.2 Antimony Analysis

On Site has considerable experience in the analysis of high-grade antimony samples typical of the Costerfield Property and other regional operations, and it follows a proprietary assaying method that has been developed to report ore-grade level antimony values. On Site uses an Aqua Regia style preparation to negate analytical technique issues encountered with antimony chloride precipitation and is finished with an Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES – low-level detection limit) or an AAS finish (>0.6% Sb).

Umpire laboratory checks of quarterly antimony results were undertaken by fusion digestion with an XRF finish. The use of an XRF finish negated the issues associated with dissolution and chloride precipitation and are considered by Mandalay and the QP to be the most reliable.

11.5.3 Arsenic and Iron Analysis

Arsenic and iron were prepared as above with aqua regia digestion and an AAS or ICP-OES finish.

11.6 Laboratory Reviews

Mandalay Resources personnel have conducted periodic visits to the On Site facility in Bendigo and met monthly with the laboratory managers to review laboratory performance.

Tours of the laboratory were normally completed in the presence of On Site's Laboratory Manager, Mr Wendell Goyne, or owner, Mr Garry Goyne. Notes and minutes from laboratory visits and meetings with laboratory staff have been maintained as records on the Mandalay Resources server.

11.7 Assay Quality Assurance/Quality Control

The following sections relate to the QA/QC samples submitted and returned to Mandalay Resources between 1 January 2022 and 31 December 2023.

A detailed review of the QA/QC from previous drilling programs informing the 2023 year-end block models can be found in the following previously issued NI 43-101 Technical Reports.

For the relevant report years covering the QA/QC of the historical Brunswick and Augusta Mineral Resource Estimates, the reader is referred to the drilling summary (Section 10.1).

11.7.1 Certified Reference Material Results

In 2022 and 2023, additional certified reference materials (CRMs) were prepared for Costerfield to address antimony precipitation issues encountered in the previous 2021 Mineral Resource Estimate (MP, 2022). MR11-01 was replaced early in 2022 and was only analysed three times through the period; it will not be discussed further in this report. GSB-02 was replaced in 2023 by new project-specific standards.

In total, four project-specific CRMs produced from Costerfield Property ore and five commercial CRMs were inserted into dispatches during 2022–2023 to monitor the performance of assay quality and accuracy (Table 11.3).

The homogenisation, analysis and certification of these CRMs was performed and/or coordinated by OREAS and Geostats Pty Ltd (Table 11.3).

Table 11.3: Certified reference materials and certified assay methods

CRM name	Material source	Certifying laboratory	Au method 1	Au method 2	Sb method 1	Sb method 2
GSB-02	Costerfield	Geostats	Fire assay	–	Fusion/ICP or XRF	–
OREAS239	Commercial	OREAS	Fire assay	–	–	–
OREAS239b	Commercial	OREAS	Fire assay	Photon assay	–	–
OREAS238	Commercial	OREAS	Fire assay	–	–	–
MR22	Costerfield	OREAS	Fire assay	–	Aqua regia/ICP	Fusion/XRF
MR23	Costerfield	OREAS	Fire assay	–	Aqua regia/ICP	Fusion/XRF
OREAS292	Costerfield	OREAS	Fire assay	–	4AD or AR /ICP	Fusion/ICP
OREAS247	Commercial	OREAS	Fire assay	Photon assay	4AD/ICP	–
OREAS243	Commercial	OREAS	Fire assay	Photon assay	–	–

Notes: Sb for OREAS CRMs denoted as '–' are below the routine analysis sensitivity and not used for quality control.

At least one CRM was submitted with every batch of diamond core samples and typically at a rate of 1 standard per 25 samples. CRMs were submitted at a similar rate in the underground face/wall channel sample batches, which typically included two different CRMs per batch.

An assay result for a CRM was considered acceptable when the returned assay fell within three standard deviations (SD) of the CRM certification grade. Outside this range, the CRM assay was considered to have failed and all significant mineralised samples within the batch were re-assayed. In this context, significant grades were defined on a case-by-case basis by Mandalay's resource geologist as mineralised samples that may have a material impact on future resource estimates. All actions or outcomes were recorded as comments in the QA/QC register.

The assay results for the reporting period are presented in Table 11.4 for gold by FA, Table 11.5 for gold by PA, and Table 11.6 for antimony.

Table 11.4: Routine certified reference material results for gold by fire assay

CRM – Au(FA)	Number submitted	Mean Au(FA) value g/t	% Mean bias	Au(FA) std. dev.	% Rel. std. dev.	Au(FA) cert. value g/t	Au(FA) cert. std. dev.	>3SD
MR22	292	83.19	2.78	1.36	1.63	80.94	3.22	0
OREAS247	429	42.78	-0.41	0.90	2.10	42.96	0.90	1
GSB-02	162	24.87	5.20	0.55	2.23	23.64	0.72	0
MR23	75	21.42	-1.81	0.38	1.76	21.81	0.49	3
OREAS243	50	12.41	0.13	0.28	2.25	12.39	0.31	1
OREAS292	304	11.15	0.78	0.27	2.46	11.06	0.35	0
OREAS239b	266	3.59	-0.44	0.05	1.53	3.61	0.11	0
OREAS239	545	3.50	-1.52	0.08	2.20	3.55	0.09	3
OREAS238	773	3.02	-0.36	0.09	2.90	3.03	0.08	22

Table 11.5: Routine certified reference material results for gold by photon assay

CRM – Au(PA)	Number submitted	Mean Au(PA) value g/t	% Mean bias	Au(PA) std. dev.	% Rel. std. dev.	Au(PA) cert. value g/t	Au(PA) cert. std. dev.	>3SD
OREAS247	87	43.86	0.19	0.74	1.70	43.77	0.88	0
OREAS243	256	12.35	-1.90	0.30	2.44	12.59	0.24	17

Table 11.6: Routine certified reference material results for antimony

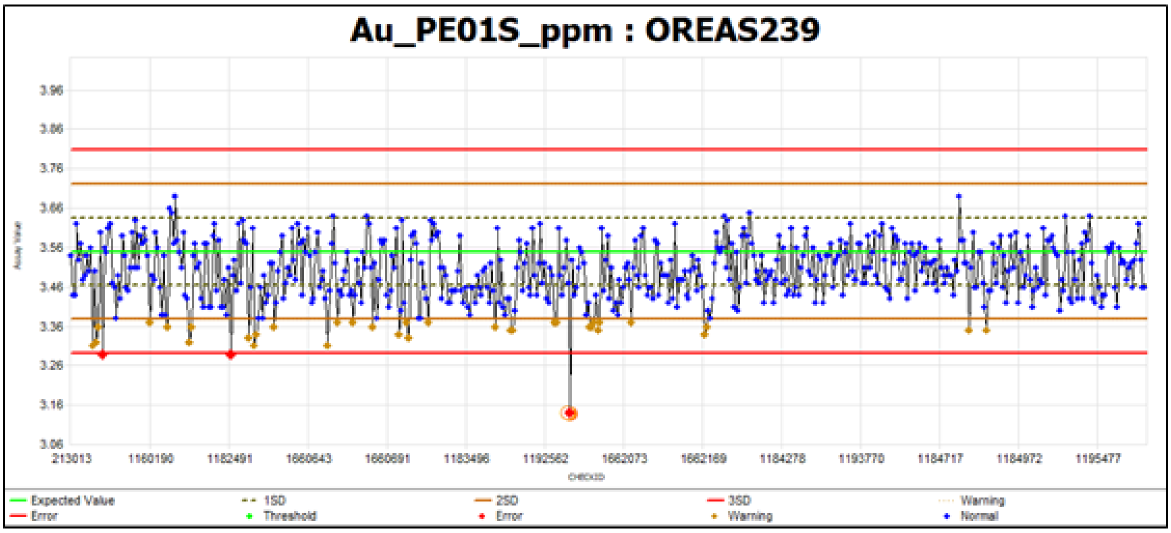
CRM – Sb	Number submitted	Mean value Sb %	% Mean bias	std. dev.	% Rel. std. dev.	Sb cert. value %	Sb cert. std. dev.	>3SD
MR22	310	43.58	-1.89	0.52	1.20	44.42	0.80	1
GSB-02	162	30.89	-0.64	0.89	2.87	31.0838	1.0206	0
MR23	98	18.58	-0.95	0.26	1.42	18.76	0.57	0
OREAS292	326	4.46	-3.09	0.24	5.44	4.60	0.24	0
OREAS247	463	0.31	-4.60	0.01	4.50	0.33	0.01	33

11.7.2 Certified Reference Material Results Discussion

The routine analysis undertaken by On Site is deemed to be performing well relative to the new project-specific CRMs introduced through the 2022–2023 period. In general, tight precision was observed for the gold and antimony CRM results through the period with only minor trends. This included both the FA and PA results.

While some outliers and failures did occur, these were considered in the context of the batch and results accepted if they were not material or relevant (for instance, when a high-grade CRM was added to a sub-economic batch). OREAS247 had several fails in the low-range antimony but is not relied upon, often being paired with a high-grade CRM or in non-grading batches. An example control plot is illustrated in Figure 11.2 for OREAS239.

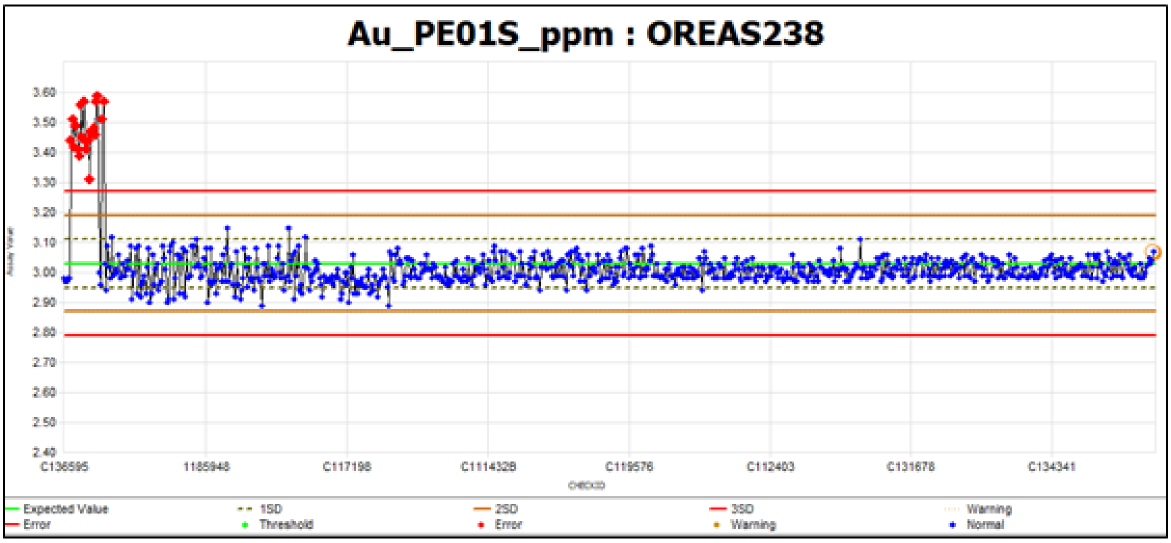
Figure 11.2: OREAS239 gold by fire assay certified reference material control plot



Five issues effected the CRM results in 2022 and have been resolved in 2023:

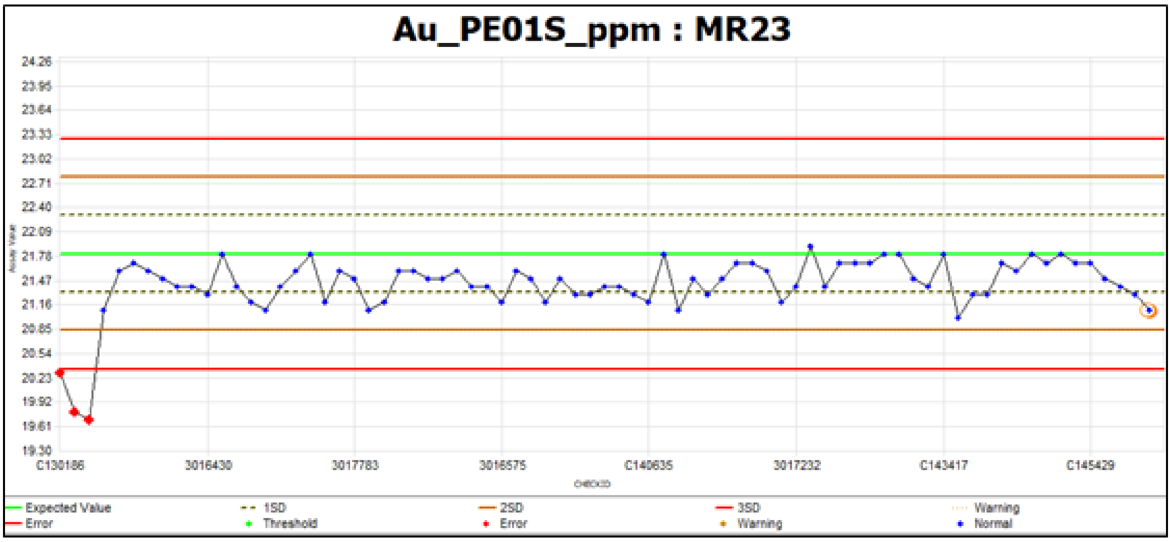
- A high bias in GSB-02's mean for gold by FA (Figure 11.4) was addressed with the replacement CRM MR23.
- OREAS238 (Gold by FA – Figure 11.3): This standard was introduced at a time when one of On Site's AAS calibration standards were incorrect, leading to bias in the low-grade gold. This CRM and the grade range being tested was not material to the Mineral Resource Estimation, predominantly affecting regional drilling batches outside the resource.

Figure 11.3: OREAS238 gold by fire assay certified reference material control plot



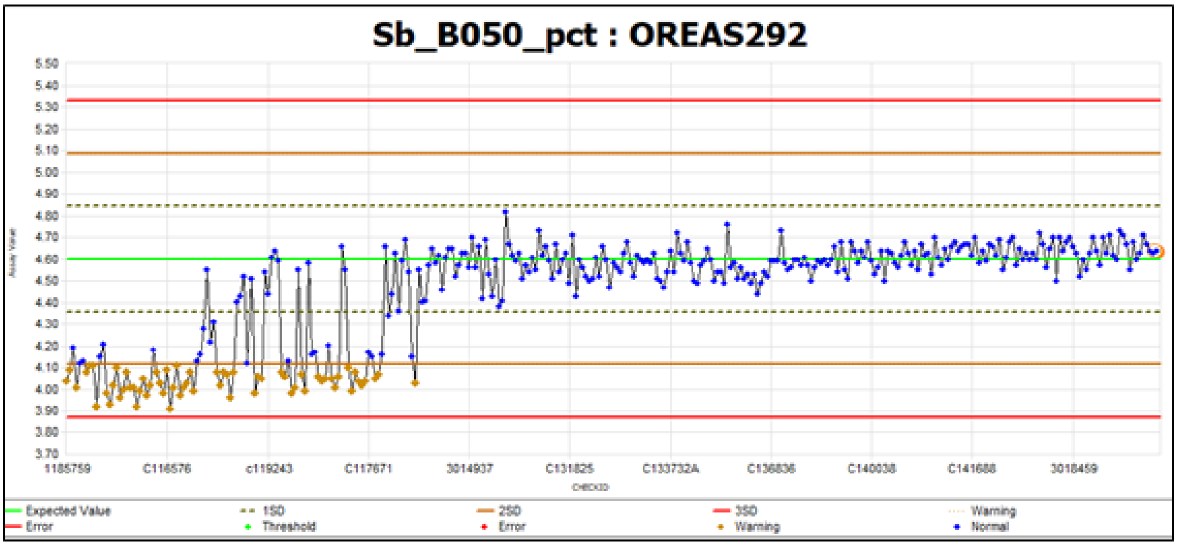
- Initial failures during the pre-certification period for MR22 and MR23 were at a time when they were included with other CRMs of confidence. These batches were accepted based on alternative CRM performance. MR23 is given as an example (gold by FA – Figure 11.4):

Figure 11.4: MR23 gold by fire assay certified reference material control plot



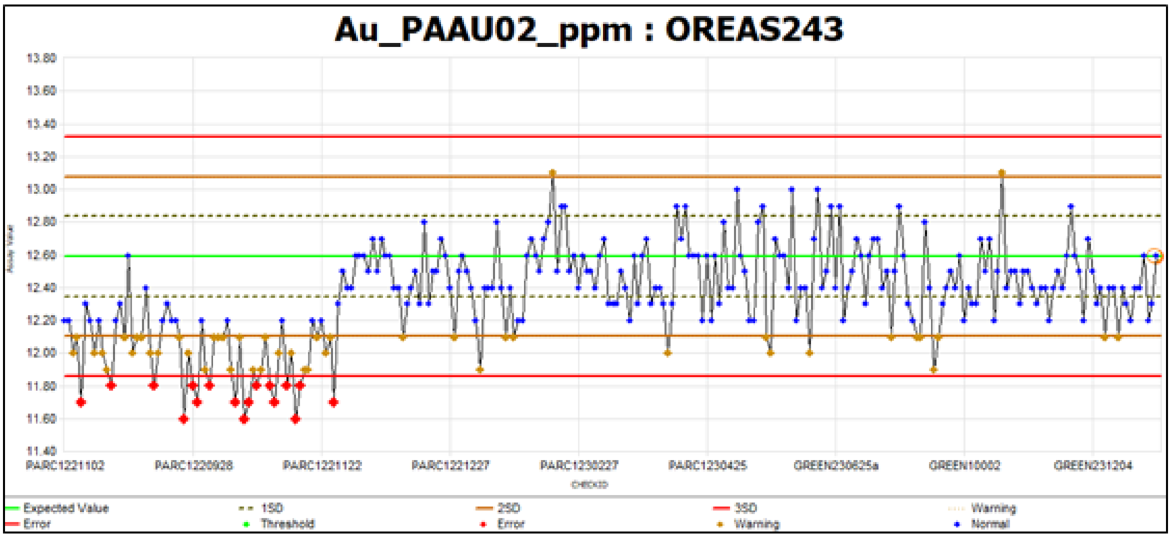
- OREAS292 antimony results saw an initial low bias (Figure 11.5) when first introduced. This was reviewed with On Site leading to a step change in results at this lower antimony grade.

Figure 11.5: OREAS292 antimony standard certified reference material control plot



- OREAS243 (gold by PA – Figure 11.6): Initial certification had the CRM performing within range. A change in the CRM certification and the PA internal reference desk led to a step change and retrospectively 17 >3SD fails. The period in error corresponds to the time when face samples were tested by both PA and FA analysis methods. FA results have priority over the PA results.

Figure 11.6: OREAS243 photon assay gold standard certified reference material control plot



11.7.3 Blanks

Mandalay Resources submitted uncrushed samples of basalt as blank material sourced from Geostats Pty Ltd into assay sample lots, at a rate of 1 in every 30 samples, to test for contamination during sample preparation. Additionally, quartz washes were added after every high-grade sample to prevent contamination from high-grade gold for all samples assayed in the

2022–2023 period. Quartz washes were not assayed unless contamination was detected in the batch and additional information was required.

The failure threshold for gold and antimony is 0.10 g/t, which was chosen since it represents ten times the detection limit of 0.01 g/t for AAS.

Blanks had a 99% passing rate for gold and antimony. Seven failures in FA and PA accepted were investigated with re-assayed blanks and quartz washes and found to be localised in extent and/or not material to the primary assays.

In addition, there was one antimony failure (0.33% Sb) which was accepted due to being deemed a non-material fail and limited to localised carry-over contamination.

11.7.4 Pulp Duplicates

A total of 3,163 results for pulp duplicated FA, 516 for PA and 1,161 for antimony. The duplicates were assayed as separate aliquots from the same sample pulp from both exploration drill core samples and mine face/wall channel samples. The summary of results for each can be found in Table 11.7, Table 11.8 and Notes: Statistics for primary duplicates >0.1g/t Au

Table 11.9. A lower threshold representing ten times detection limit of 0.1g/t Au or 0.1% Sb has been applied.

Table 11.7: Pulp duplicate (fire assay) statistics

Description	Original	Duplicate
Number of samples	1835	1835
Mean	36.62	36.74
Maximum	1230	1260
Minimum	0.1	0.05
Population Std Dev	92.94	94.21
Coefficient of Variation	2.54	2.56
Bias	-0.32%	
Correlation Coefficient	0.99	
Percentage of samples < 10% relative paired difference	**87.47**	

Notes: Statistics for primary duplicates >0.1g/t Au

Table 11.8: Pulp duplicate gold (photon assay) statistics

Description	Original	Duplicate
Number of samples	510	510
Mean	74.74	75.08
Maximum	3640	3710
Minimum	0.1	0.09
Population standard deviation	215.85	218.42
Coefficient of variation	2.89	2.91
Bias	-0.46%	
Correlation coefficient	1.00	
Percentage of samples < 10% relative paired difference	**75.29**	

Notes: Statistics for primary duplicates >0.1g/t Au

Table 11.9: Pulp duplicate antimony statistics

Description	Original	Duplicate
Number of samples	613	613
Mean	12.09	12.05
Maximum	63.8	63.8
Minimum	0.1	0.07
Population standard deviation	16.60	16.53
Coefficient of variation	1.37	1.37
Bias	0.31%	
Correlation coefficient	0.99	
Percentage of samples < 10% relative paired difference	**95.92**	

Notes: Statistics for primary duplicates >0.1% Sb

Scatter plots of the pulp duplicate results have been presented in Figure 11.7, Figure 11.8 and Figure 11.9 and display good correlation between the original and duplicate assays in either gold or antimony.

Figure 11.7: Scatter plot of On Site gold fire assay pulp duplicates (g/t)

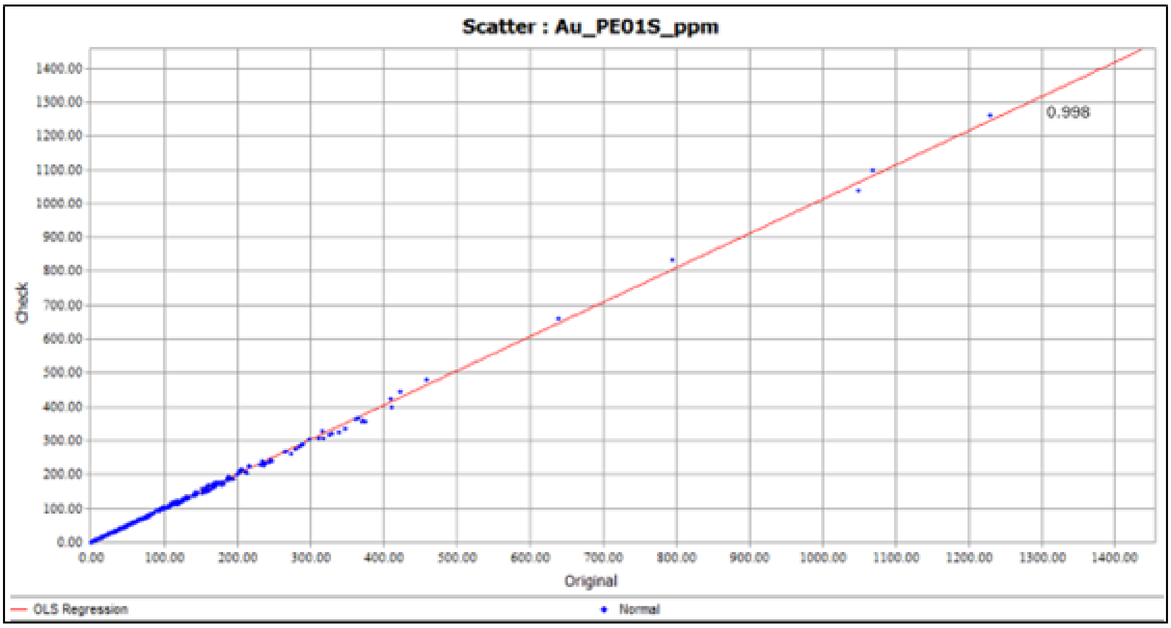


Figure 11.8: Scatter plot of On Site gold photon assay pulp duplicates (g/t)

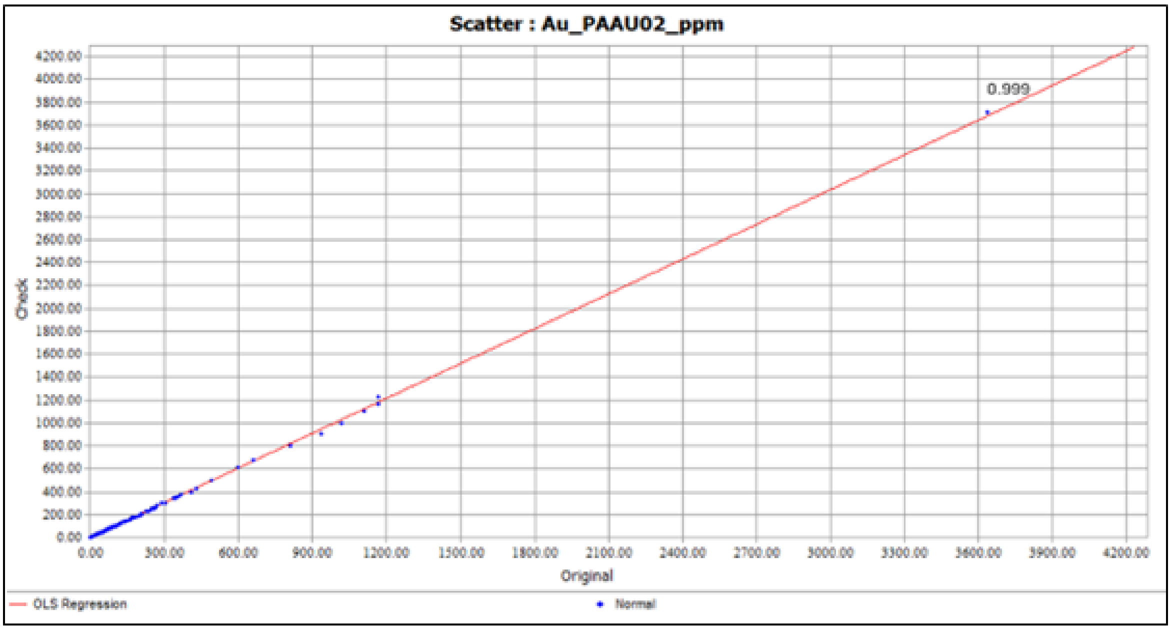
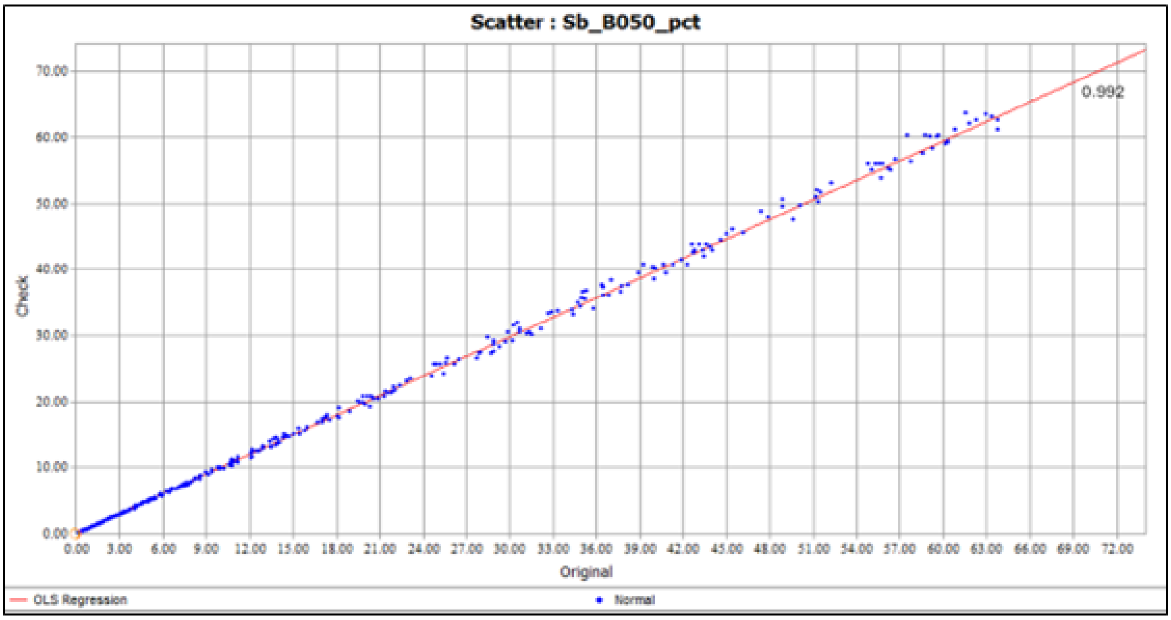


Figure 11.9: Scatter plot of On Site antimony duplicates (%)



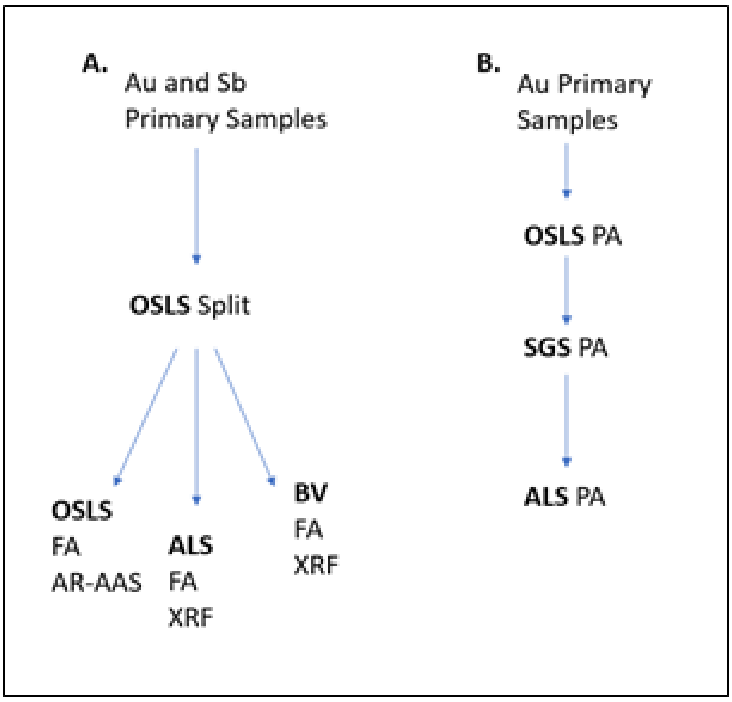
11.8 Umpire Check-Assay Program

Quarterly pulp umpire laboratory check-assay programs were conducted for the reporting period in 2022 and up until, and including, Q3 of 2023 for the routine pulp samples assayed by On Site. Selected pulp samples were dispatched to ALS Global Brisbane, SGS Perth and Bureau Veritas Perth for re-analysis of gold and antimony. Results from the check-assay have been summarised in Section 11.8.1 for the primary results and Section 11.8.2 for the alternative laboratories' CRM data.

As illustrated in Figure 11.10(A), Q1, Q2, and Q3 of 2022 and Q3 2023 check-assay programs included a split of the master pulps and despatch to ALS Global and Bureau Veritas for gold by FA and antimony by fusion XRF. Q3 of 2023 also included a second stream of samples as illustrated in Figure 11.10(B) for PA.

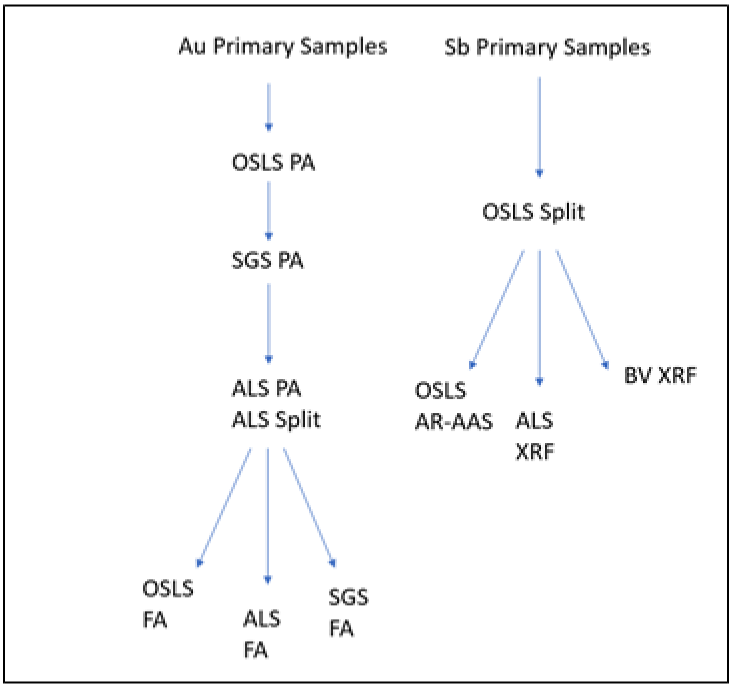
PA was trialled in 2022 and implemented for all face samples in 2023; check-assay methodologies were updated to test this dataset. Bureau Veritas does not have the capabilities to run PA and therefore a fourth laboratory, SGS, was utilised for PA and associated FA work. SGS Global does not analyse antimony at the concentrations encountered routinely at Costerfield and so was not used for antimony check-assay work.

Figure 11.10: (A) Regular gold by fire assay and antimony by XRF analysis, and (B) Standalone photon assay only stream



As illustrated in Figure 11.11, Q4 2022, and Q1 and Q2 of 2023 included a combined FA and PA stream for gold analysis. Antimony was completed in a standalone stream. This was discontinued in Q3 2023 due to time constraints.

Figure 11.11: Combined gold by fire assay and photon assay check-assay stream with standalone antimony stream



Because of PA requirements, the third laboratory in the umpire check-assay program was either SGS or Bureau Veritas depending on the data being compared. Individual laboratory results are illustrated for FA, as well as a combination of SGS and Bureau Veritas for a complete dataset over the full range of tests.

11.8.1 Umpire Check-Assay Program – Pulp Samples

A total of 463 primary samples were reanalysed across all check-assay streams for the 2022–2023 period.

It was found several sample splitting issues occurred, particularly in Q3 2023 (n=15), that saw mixed or swapped samples as compared with the primary results and confirmed in the geochemical analysis of both gold and antimony. This led to a total of 21 errors and clear outliers to be removed. One high-grade outlier, primary sample 3015664, was also removed from the analysis due to skewing the FA statistics (Table 11.10).

Table 11.10: Primary results for high-grade gold by fire assay outlier, removed from analysis due to skewing original results

Sample	On Site original	On Site duplicate	ALS umpire	SGS umpire
3015664	7110	525	637	643

Results are outlined in:

- Table 11.11: Gold by FA
- Table 11.12: Gold by PA
- Table 11.13: Gold by FA below 20g/t
- Table 11.14 Antimony analysis
- Table 11.15: A comparison of FA and PA averaged results.

Table 11.11: Gold by fire assay

Description	On Site original	On Site duplicate	ALS umpire	Collated SGS+BV umpire	SGS umpire	BV umpire
Number of samples	341	341	341	341	144	197
Mean	70.58	70.44	72.60	66.65	40.20	85.98
Maximum	1090.00	1270.00	1260.00	787.00	533.00	787.00
Minimum	0.11	0.05	0.07	0.05	0.08	0.05
Pop std. dev.	130.33	134.38	139.26	121.22	82.29	140.22
CV	1.85	1.91	1.92	1.82	2.05	1.63
Bias	0.19%		-2.87%	5.38%	4.10%	6.06%
Cor. coeff.	0.99		0.98	0.97	0.97	0.97
Percent of samples < 20% RPD	**86.38**		**64.02**	**65.33**	**67.50**	**63.16**
Percent of samples < 35% RPD	**95.67**		**80.49**	**79.67**	**82.50**	**76.84**

Notes: Summary of On Site original, On Site duplicate, ALS, BV, and SGS umpire check statistics. As noted, SGS and BV have been collated. RPD = Relatively Paired Difference

Figure 11.12: Relative paired difference plot, original versus umpire checks, gold by fire assay

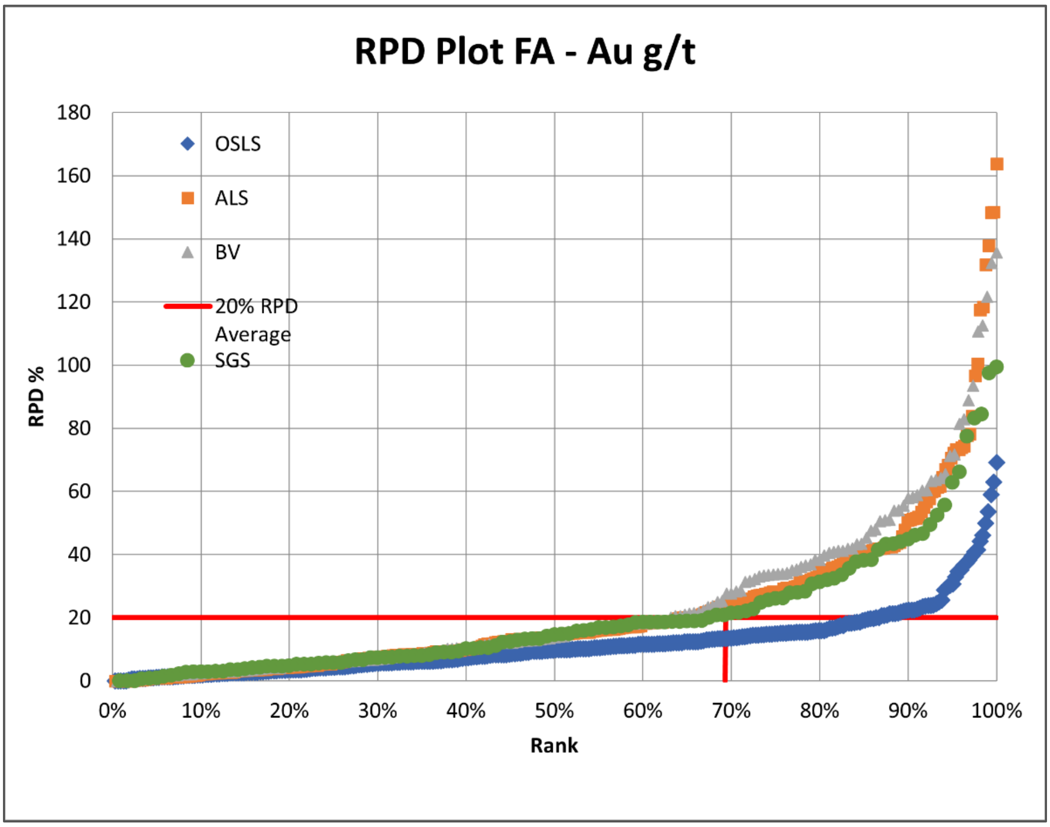


Table 11.12: Gold by photon assay

Description	On Site original	On Site duplicate	ALS umpire	SGS umpire
Number of samples	145	145	145	145
Mean	54.34	55.15	56.86	54.99
Maximum	606.00	645.00	657.00	657.00
Minimum	0.13	0.11	0.10	0.13
Pop std. dev.	93.70	95.87	99.04	96.21
CV	1.72	1.74	1.74	1.75
Bias	-1.49%		-4.64%	-1.20%
Cor. coeff.	1.00		1.00	1.00
Percent of samples < 20% RPD	**97.12**		**97.10**	**97.16**
Percent of samples < 35% RPD	**98.56**		**98.55**	**98.58**

Notes: Summary of On Site original, On Site duplicate, ALS, and SGS umpire check statistics.

Figure 11.13: Relative paired difference plot, original versus umpire checks, gold by photon assay

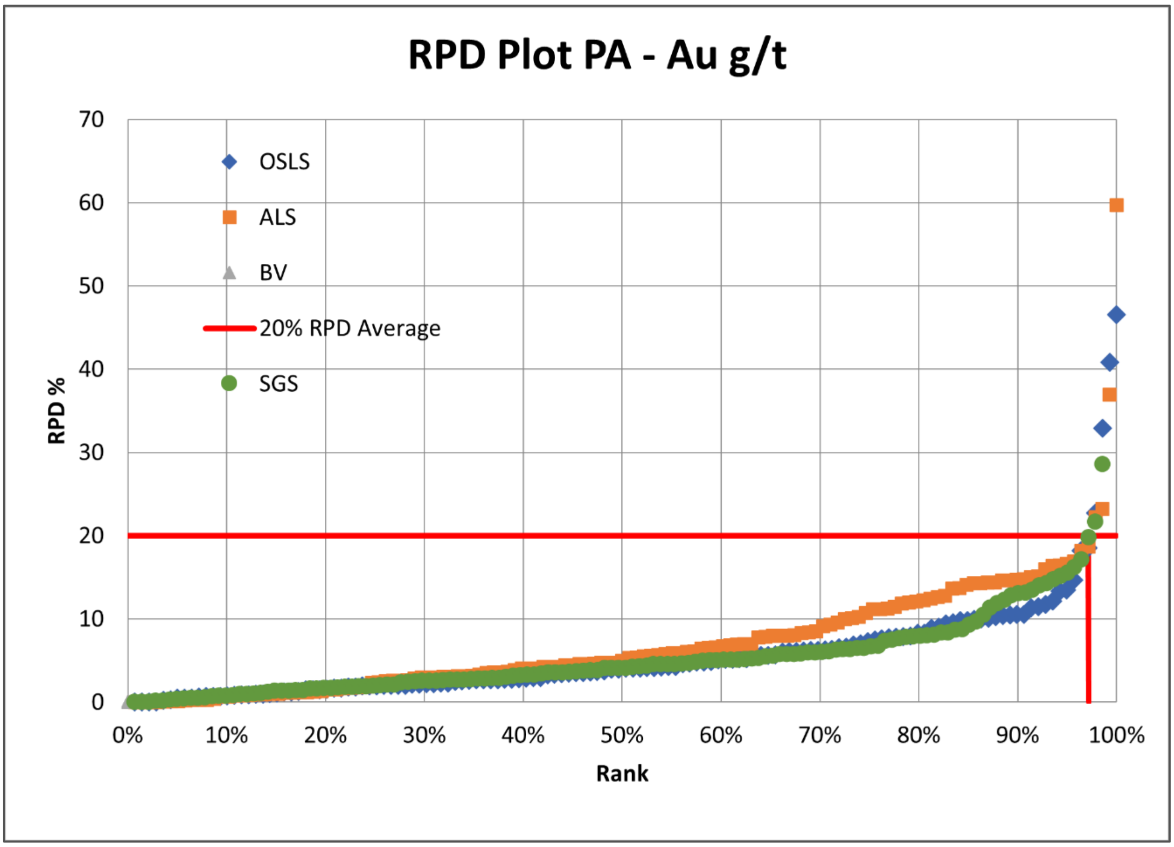


Table 11.13: Low-level gold (< 20 g/t)

Description	On Site original	On Site duplicate	ALS umpire	Collated SGS+BV Umpire	SGS umpire	BV umpire
Number of samples	163	163	163	163	85	78
Mean	4.51	4.40	5.11	5.18	3.94	6.53
Maximum	19.30	22.00	74.10	54.00	24.43	54.00
Minimum	0.11	0.05	0.07	0.05	0.08	0.05
Pop std dev	5.48	5.47	8.20	8.10	5.58	10.02
CV	1.21	1.24	1.60	1.56	1.42	1.53
Bias	2.57%		-13.33%	-17.86%	-2.01%	-25.17%
Cor Coeff	0.98		0.70	0.91	0.91	0.73
Percent of samples < 20% RPD	**80.14**		**54.30**	**56.33**	**62.67**	**50.00**
Percent of samples < 35% RPD	**93.84**		**72.19**	**70.61**	**77.33**	**63.89**

Notes: Summary of On Site original, On Site duplicate, ALS, and BV umpire check statistics.

Figure 11.14: Relative paired difference plot, original versus umpire checks, < 20 g/t (primary result) gold by fire assay

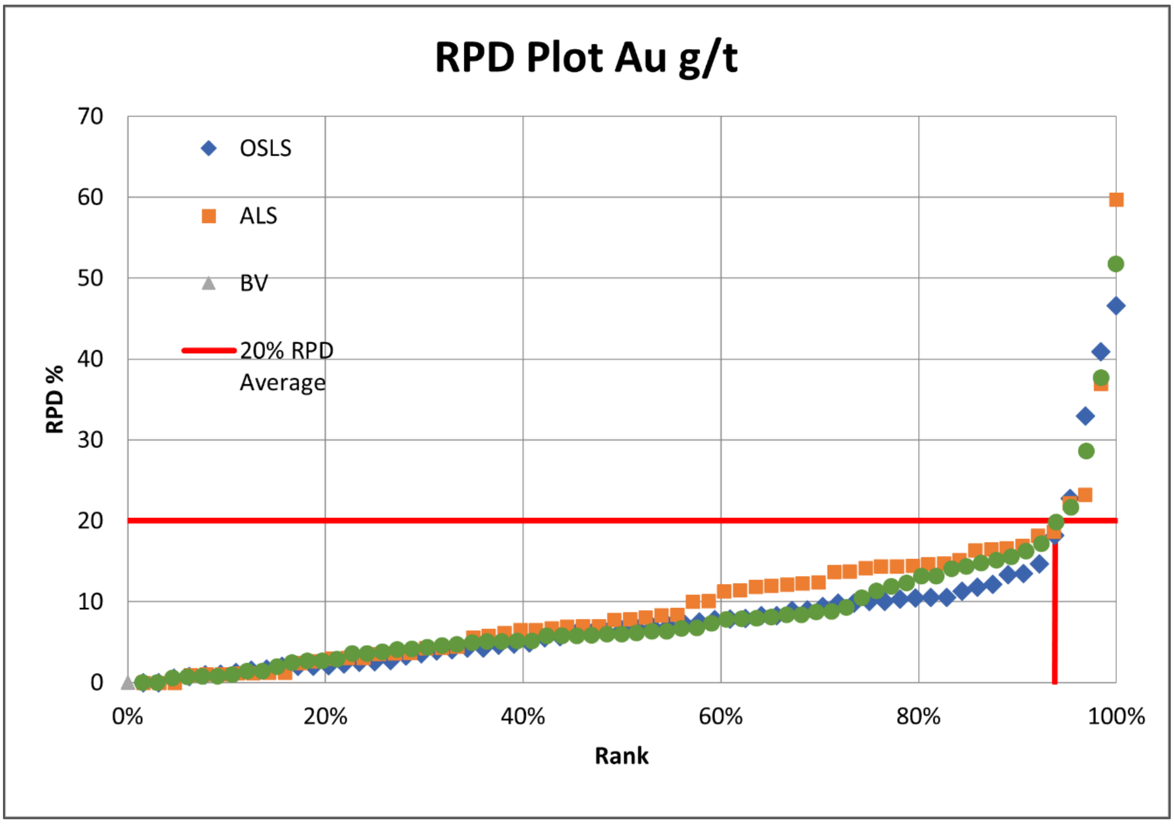
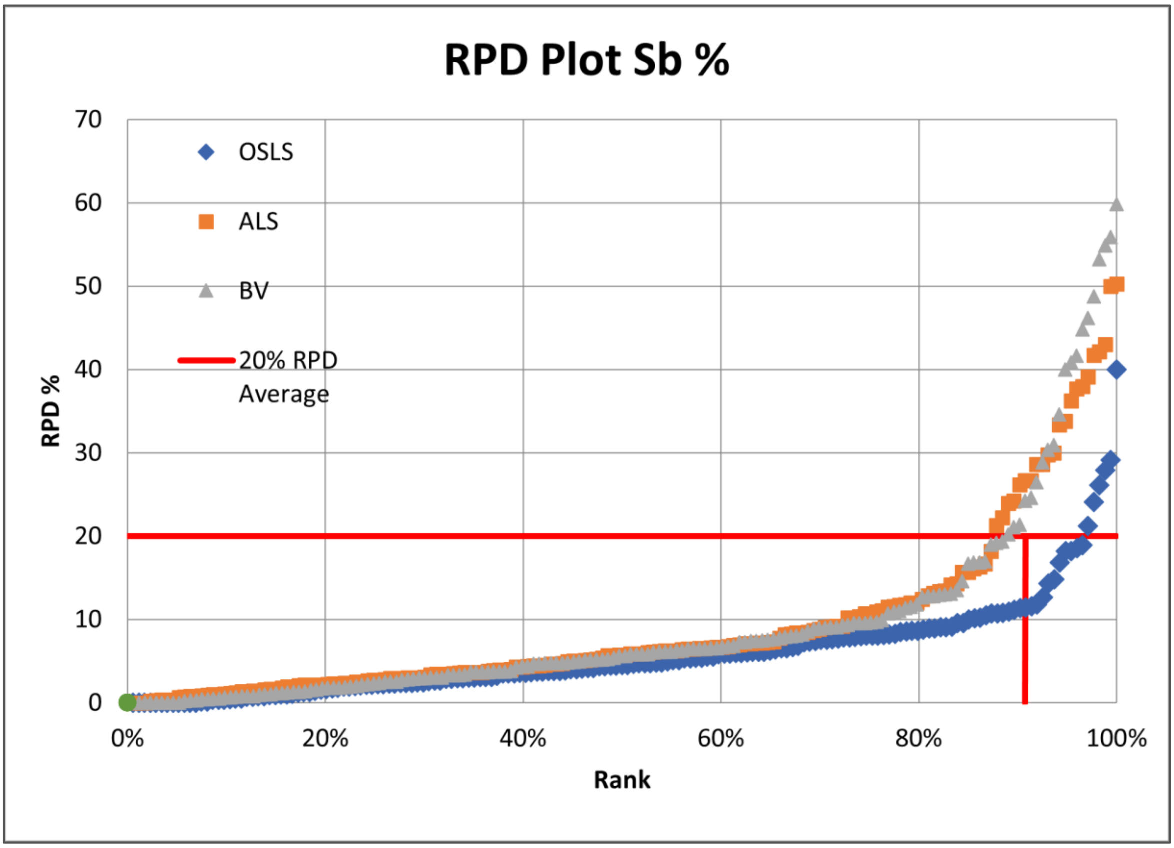


Table 11.14: Antimony

Description	On Site original	On Site duplicate	ALS umpire	BV umpire
Number of samples	255	253	253	252
Mean	10.43	10.28	10.05	10.18
Maximum	64.10	61.70	61.20	62.10
Minimum	0.01	0.01	0.01	-0.01
Pop std dev	15.96	15.77	15.44	15.54
CV	1.53	1.53	1.54	1.53
Bias	1.37%		3.63%	2.31%
Cor coeff	1.00		1.00	1.00
Percent of samples < 20% RPD	**96.55**		**87.28**	**88.44**
Percent of samples < 35% RPD	**99.43**		**94.80**	**94.22**

Notes: Summary of On Site original versus On Site duplicate, ALS, and BV umpire check statistics.

Figure 11.15: Relative paired difference plot, original versus umpire checks, for antimony analyses



11.8.2 Umpire Check-Assay Program – Certified Reference Materials

A total of 156 CRMs were submitted during this process, divided between the four participating laboratories. Table 11.15 details the results of this study.

Table 11.15: Results for certified reference materials submitted to participating laboratories for umpire checks

CRM	Lab	Number submitted	Average Au value g/t	Average value Sb %	Au cert value g/t	Au cert std dev	Sb cert value %	Sb cert std dev
MR22		**24**	**80.82**	**43.89**	**80.94**	**3.22**	**44.42**	**0.80**
	ALS	6	78.95	43.93	80.94	3.22	44.42	0.80
	BV	6	79.52	44.29	80.94	3.22	44.42	0.80
	OSLS	9	83.73	43.46	80.94	3.22	44.42	0.80
	SGS	3	78.43		80.94	3.22	44.42	0.80
MR23		**18**	**21.38**	**18.54**	**21.81**	**0.49**	**18.76**	**0.57**
	ALS	4	22.38	18.38	21.81	0.49	18.76	0.57
	BV	4	20.85	18.79	21.81	0.49	18.76	0.57
	OSLS	7	21.21	18.46	21.81	0.49	18.76	0.57
	SGS	3	21.16		21.81	0.49	18.76	0.57
OREAS238		**6**	**3.05**	**0.09**	**3.03**	**0.08**	**0.05**	**0.01**
	ALS	2	3.03	0.07	3.03	0.08	0.05	0.01
	BV	2	3.13	0.15	3.03	0.08	0.05	0.01
	OSLS	2	3.01	0.06	3.03	0.08	0.05	0.01
OREAS239b		**9**	**3.63**		**3.61**	**0.11**	**0.00**	**0.00**
	ALS	3	3.81		3.61	0.11	0.00	0.00
	OSLS	3	3.51		3.61	0.11	0.00	0.00
	SGS	3	3.53		3.61	0.11	0.00	0.00
OREAS243		**9**	**12.02**		**12.39**	**0.30**	**0.00**	**0.00**
	ALS	3	11.17		12.39	0.30	0.00	0.00
	OSLS	3	12.60		12.39	0.30	0.00	0.00
	SGS	3	12.28		12.39	0.30	0.00	0.00
OREAS247		**21**	**42.08**	**0.36**	**42.96**	**0.90**	**0.33**	**0.01**
	ALS	7	41.64	0.36	42.96	0.90	0.33	0.01
	BV	4	42.25	0.41	42.96	0.90	0.33	0.01
	OSLS	7	42.81	0.32	42.96	0.90	0.33	0.01
	SGS	3	41.16		42.96	0.90	0.33	0.01
OREAS292		**24**	**10.98**	**4.69**	**11.06**	**0.35**	**4.60**	**0.24**
	ALS	6	10.93	4.64	11.06	0.35	4.60	0.24
	BV[1]	6	11.18	4.87	11.06	0.35	4.60	0.24
	OSLS	9	11.01	4.57	11.06	0.35	4.60	0.24
	SGS	3	10.57		11.06	0.35	4.60	0.24

Notes:

[1] Two outliers removed for Sb, OREAS292.

[2] OSLS – On Site Laboratory Services.

Table 11.16: Photon assay results for the certified reference materials submitted to participating umpire check-assay laboratories

CRM	Lab	Number Submitted	Average PA Au value g/t	Au cert. PA value g/t	Au PA cert Std dev
OREAS239b		**15**	3.7	3.7	1.8
	ALS-PA	5	3.8	3.7	0.6
	OSLS-PA	5	3.6	3.7	0.6
	SGS-PA	5	3.7	3.7	0.6
OREAS243		**15**	11.9	12.6	5.6
	ALS-PA	5	12.0	12.6	1.9
	OSLS-PA	5	12.1	12.6	1.9
	SGS-PA	5	11.4	12.6	1.9
OREAS247		**15**	43.8	43.8	13.2
	ALS-PA	5	45.4	43.8	4.4
	OSLS-PA	5	43.0	43.8	4.4
	SGS-PA	5	43.1	43.8	4.4

Key observations were that:

- OREAS247 is performing low to the mean for some laboratories (FA and PA). Some variability and trends are encountered in routine sampling.
- MR23 gold sits below the mean, which is also encountered in routine analysis (Figure 11.4).
- OREAS247 is variable in antimony across the laboratories, with On Site performing low and ALS and BV performing high. High results are not unexpected due to the potential undercall by the 4 acid-digest certification method.

11.8.3 Umpire Check-Assay Discussion

The results of the 2022–2023 umpire check-assay program are detailed below:

Gold check-assay results:

- Poor results in the < 20% RPD. The < 35% RPD has been added for further information and relevance with nuggety gold deposits.
- PA, by comparison, had good agreement between laboratories and highlights the reproducibility of the methodology. The good comparison between laboratories contrasts with the FA results, and it is believed this increased FA variance is due to the additional splitting step required in the FA program (Figure 11.10 and Figure 11.11).
- Low < 20g/t Au had greater variance which is interpreted to represent more heterogeneity in the sample at lower grade. This appears to have exacerbated any error induced by the splitting variance as routine PA duplicates had more variance than FA duplicates (Section 11.7.4: Pulp Duplicates).

Antimony check-assay results:

- Antimony check-assay results are acceptable for this style of mineralisation and show the proprietary method used by On Site perform well compared to the XRF methodologies.

11.9 Sample Transport and Security

The Brunswick and Augusta sites are securely gated, with video surveillance and time stamped swipe card access. This included areas used for storage and collection of drill and face samples.

All sample bags that contained sampled material were placed in heavy duty plastic bags, along with the sample submission sheet. The plastic bags were sealed with a metal twisting wire or heavy-duty plastic cable ties. This process was applied to both underground channel samples and diamond drill core samples.

Samples were delivered by a private contractor or directly by Mandalay Resources staff on a daily basis to On Site in Bendigo, where they were accepted by On Site laboratory personnel.

Returned sample pulps from the On Site laboratory remained in a secure On Site warehouse with a scheduled return to Mandalay Resources for storage in secured and monitored shipping containers, wrapped in plastic.

11.10 Qualified Person's Opinion

The QP considers that the assay QA/QC results contain some minor issues regarding CRM performance that have already been addressed with the primary laboratory (On Site). The umpire check-assay program highlighted instances of high variability between laboratories; however, the bias is typically low and is in line with previous results. The QP considers that the assay QA/QC results, demonstrate acceptable precision and accuracy for use in the Mineral Resource Estimation.

12 Data Verification

In fulfilment of the NI43-101 requirements, SRK Geologist and QP Cael Gniel completed an inspection of the Property on 28 and 29 August 2023. In addition to the site visit, the QP worked as an exploration, mine and resource geologist at Costerfield from 2012 to 2018. The Property inspection focused on a review of the geological setting and mineralisation style, as well as the processes and procedures in place to ensure that they are at an acceptable standard for inclusion in a Mineral Resource Estimate.

The QP completed the following activities during the Property inspection/immediately following the visit:

- Source data validation checks for 5% of the drill holes completed within the 24 months since the last Mineral Resource Estimate, with a focus on verifying the gold and antimony assays and locational data (collar and downhole surveys).
- Locational data storage and management processes, including:
  - collar and downhole survey methods, storage and data entry processes
- Drill core logging and sampling processes, including:
  - core processing procedures from initial mark-up through to sample selection and sampling
  - inspection and verification of some current resource definition holes and their integration into the geological model
- Storage and security of the core processing facility.
- Chain of custody process for core samples to the laboratory.
- Assay data accuracy, precision and data management process, including:
  - sampling and analytical protocols in place
  - QAQC reports and raw results
  - underground inspection to review face mapping and sampling processes
- Bulk density (BD) data review, including adjustments made to specific gravity (SG) calculations used in tonnage calculations.
- Discussion of the geological interpretation and key changes since the initiation of mining on the Shepherd lode.
- Discussion regarding the changes to stockpile management and reconciliation.

The following observations have been made from the property inspection and subsequent data checks:

- Source data checks of the assays revealed no errors for the 5% of the samples checked.
- The digital collar survey records supplied by the surveyors were consistent with the database entries and were coincident with underground as-built shapes.
- No issues were identified in the core logging procedures and subsequent integration of new data into the geological model.

- The change to using open and closed stockpiles in conjunction with the stockpile management software Centric is supported by the QP. This change will enable more accurate reconciliation and reduce the likelihood of future write-downs of stockpiled material.
- The chain of custody protocols in place at the time of the visit were adequate.
- Issues with the mill weightometer have been identified as causing issue with the reconciliation data between late 2022 and mid-2023. These issues have been rectified and no longer have an impact.
- Despite issues with reconciliation and expressed difficulties mining the Shepard Lode, the QP considers that Mandalay Resources' geologists have a good understanding on the controls on mineralisation which is reflected in their geological and resource models. The geology model that has been developed is of a high standard and developed iteratively incorporating geochemistry and structural geology.
- The QP notes that Mandalay Resources commissioned a review of its resource modelling processes by AMC Consultants. This review made minor recommendations aimed and streamlining the existing workflow but endorsed the estimation methodology. The QP worked with Mandalay geologists to implement these workflow improvements.

The QP considers that the qualitative and quantitative geological data used to inform the Costerfield Property Mineral Resource Estimates have been collected, validated and stored in line with industry best practice as defined in the CIM *Mineral Exploration Best Practice Guidelines* (CIM, 2018) and the CIM *Estimation of Mineral Resource and Mineral Reserves Best Practice Guidelines* (CIM, 2019). The QP considers that the data are suitable for use in the estimation of Mineral Resources.

13 Mineral Processing and Metallurgical Testing

13.1 Metallurgical Testing

Over the years, extensive metallurgical testwork has been undertaken on samples taken from the Augusta deposit in 2004, the Cuffley deposit in 2012, the Brunswick deposit in 2016, the Youle deposit in 2018, and the recent Shepherd deposit in 2022. Historical operating data now validate the testwork from each of these deposits. No additional testwork was conducted in 2023 on the Shepherd deposit as it is now superseded by processing this feed.

When required, mill feed blend characterisation and metallurgical tests are undertaken by Mandalay in order to verify the expected behaviour of new domains, lithology types, lodes, or deposits. The following reputable, accredited, and appropriately experienced metallurgical laboratories have been involved with various aspects of the original metallurgical evaluation and ongoing testwork:

- ALS Metallurgy (previously Metcon Laboratories) – New South Wales
- Amdel Mineral Services Laboratory (now Bureau Veritas Minerals) – South Australia
- Australian Minmet Metallurgical Laboratories – New South Wales.

The Brunswick Processing Plant has been operated by Mandalay since late 2009, with several years of operating data on the Cuffley/Augusta ore blend, the Brunswick ore from Q3 2018, the Youle underground ore from late Q3 2019, and the Shepherd orebody from Q1 2022. The Shepherd samples exhibited similar metallurgical behaviour to the Cuffley/Augusta/Youle ores during testwork and operations, so initially, historical Youle production data were used for forecasting purposes. A blend of the Youle and Shepherd deposits now provide the sole feed to the plant. As a result, the metallurgical testwork on all deposits, including the most recently tested Shepherd ore, has been replaced by actual plant performance. The use of comprehensive historical operating data are a more accurate basis upon which to forecast future metallurgical behaviour when processing similar ores.

The Shepherd underground deposit was first processed in October 2021 (5% of feed), with significant Shepherd ore blending with Youle beginning in Q1 2022. Shepherd ore has been a considerable feed source from the beginning of 2022 and has been blended with Youle ore since this time. The Youle and Shepherd underground ore blend will remain the dominant feed for the forward Life of Mine (LoM) production schedule, with some remnant mining toward the end of mine life. These blended feed operating data provide a good understanding of the processing behaviour expected on these and similar ores.

These data allow antimony and gold recovery relationships to be developed and used to forecast future recoveries, as well as forecasting plant throughput capacity.

13.1.1 Metallurgical Testwork Summary

A summary of metallurgical characterisation testwork is provided in Table 13.1. This testwork remains valid. Testing of the Brunswick Main ores indicated a decrease in gravity gold recovery, flotation antimony and gold recovery and flotation kinetics. The full extent of the recovery impacts of the Brunswick ores are now understood after processing this ore as part of the overall feed blend between 2018 and 2020. The Brunswick ores had been largely depleted by the end of 2020; only small parcels have been processed since. The 2024 forecast is for 70,801 t of Youle ore, 71,633 t of Shepherd ore and 239 t of Brunswick ore. Brunswick will continue to represent a very small percentage of the feed. The metallurgical testwork and historical performance of the Youle and Shepherd deposits is of the most importance to the production forecast.

Metallurgical testwork was undertaken on one area of the Shepherd deposit where lower antimony grades were present. Metallurgical performance for gold was similar to that of the Youle ore, with slightly higher gravity gold recovery. Plant data from 2022 to 2023 confirm the performance of the Shepherd ore to be similar to that of Youle.

The Shepherd Bond Ball Mill Work Index (BBMWi) test returned a higher value of 18.6 kWh/t compared to Youle values of 16.1 kWh/t for the low-grade sample and 15.2 kWh/t for the high-grade sample. During actual operations, the Shepherd throughput has not been limited by ore hardness.

Historical testwork results for the Shepherd metallurgical testwork are provided in Table 13.1 alongside testing for the other deposits. Flotation testing has shown the Shepherd gold recoveries to be relatively insensitive to a grind size between 38 µm and 75 µm. The gold recovery for the Shepherd sample was marginally higher than historical deposit testwork records. The gravity gold recovery was increased in the LoM model to 55% (from 45%) to account for the higher percentage of Shepherd ore in the blend from 2021 onwards.

Table 13.1: Historical metallurgical testwork

Variable	Brunswick Main	Brunswick PKi	Cuffley LG 0358-1	Cuffley HG M2569	Youle low grade	Youle high grade	Shepherd
BBMWi	12.9	14.3	16.0	16.0	16.1	15.2	18.6
Feed Au g/t	8.65	11.9	9	17.7	4.89	13	7.98
Feed Sb %	3.31	3.88	3	7.98	2.56	5.1	0.12
Feed As %	0.5	0.13	0.12	0.07	0.02	0.03	0.03
Concentrate As %	3.2	0.87	0.98	0.002	0.22	0.25	0.42
Gravity Au Rec. %	22.1–25.5	30	41	54	43	57	71
Recovery Au %	87.1	93.7	98	95	96	97	99.2
Recovery Sb %	98.3	99	99	95	99	99	N/A[1]

Notes:

[1] The Sb head grade of this sample at 0.12% Sb is not representative of ore grade and was far too low to make saleable Sb concentrate grade.

Compared to the Youle ores, Shepherd has similar arsenic grades and therefore, elevated arsenic grades in the antimony-gold concentrate are not considered to be an issue for the saleability or payability of the product. In the current off-take agreement, there are no arsenic penalties below 0.5% in the concentrate. Arsenic grades between 0.5% and 2.0% incur a penalty of US$2/t concentrate for each 0.1% above 2.0%. This increases to US$2.5/t when between 2.0% and 3.0% arsenic but the concentrate remains saleable. As a gold/antimony concentrate, it is not subject to the same arsenic grade importation limits that some base metal concentrates are imposed with.

With proper management, the penalty element payments can be minimised and are not a risk to the ongoing operation.

13.2 Ore Blend Effect on Throughput and Recovery Forecasts

From January 2014, Cuffley ores were processed in a blend with Augusta ores. Prior to this, only Augusta ore was processed. The Cuffley ores and remaining Augusta ores were depleted by January 2020 and gradually replaced by Brunswick feed. The proportion of Brunswick ores reduced significantly from the beginning of 2020 and continues to represent only a small fraction (~1%) of the mill feed. Since this time, Youle has dominated the feed blend. The historical blend ratios of Augusta, Cuffley, Brunswick, Youle and Shepherd ores and the proposed forward LoM blend are summarised below:

- 2014: 44% Augusta and 56% Cuffley
- 2015: 42% Augusta and 58% Cuffley
- 2016: 52% Augusta and 48% Cuffley
- 2017: 64% Augusta and 36% Cuffley
- 2018: 72% Augusta, 21% Cuffley and 7% Brunswick (Brunswick from Q3)
- 2019: 38% Augusta, 5% Cuffley, 47% Brunswick and 10% Youle
- 2020: 14% Brunswick and 86% Youle
- 2021: 1% Brunswick and 99% Youle
- 2022: 0.5% Shepherd and 99.5% Youle
- 2023: 39% Shepherd and 61% Youle
- LoM 2024: 50% Shepherd and 50% Youle.

Over the same period, plant throughput has been relatively consistent, i.e. it has been robust to changes in the feed blend. On this basis, throughput (and recovery) data from January 2022 to September 2023 have been used to predict mill performance.

It is noted that during 2019, there was a deterioration in metallurgical performance, particularly for gold recovery. This was due to the introduction of Brunswick ore as the dominant component of the mill feed blend. The moderate decline of the plant gold recovery performance from the start of 2019 through to mid-2020 is shown in Figure 13.2 and Figure 17.2. This period is considered to represent outlying behaviour associated with Brunswick ores and has been excluded from the data used to develop the gold recovery algorithm. Instead, operating data from when the mill have been fed with predominantly Youle and Shepherd blended ore has been used to develop the current recovery equations.

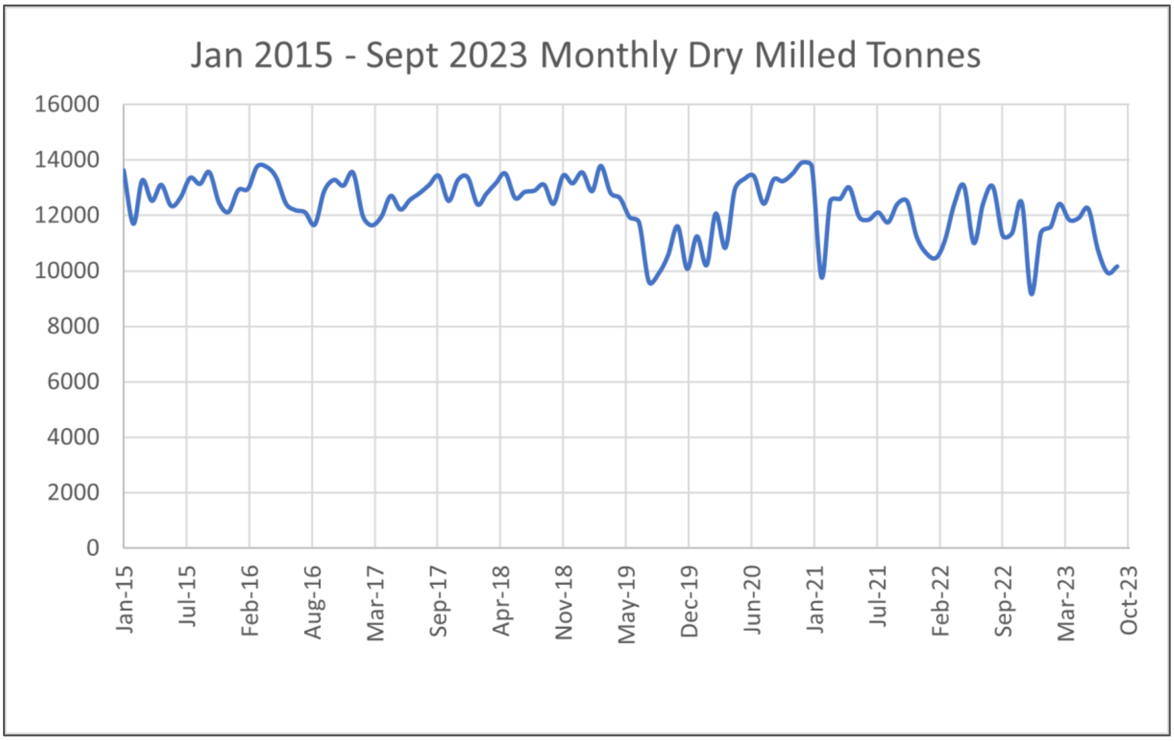
13.3 Throughput

Historical throughput is considered to be the best indicator of future forecast throughput when processing similar ores. Through ongoing optimisation and relatively minor, low capital cost debottlenecking projects, the capacity of the Brunswick Concentrator has been increased to the current capacity, which can consistently exceed 10,000 t/month and has regularly approached

14,000 t/month. Annual production data from 2015 to 2023 demonstrates this rate can be consistently achieved, as presented in (Figure 13.1).

The reduction in plant throughput in the latter half of 2019 was not process related, i.e. it was not a mill constraint. It was related to constrained underground mine production and as a result of the historical scats stockpile being depleted (it had previously provided up to 400 t per month in 2018). Budgeted mill capacities have been reduced from 2022 to present. The budget 2024 mill throughput has been reforecast to 138 kt, which is similar to the mining rate.

Figure 13.1: Historical Brunswick Processing Plant throughput – 2015 to 2023



With mining production rates marginally exceeding processing throughput over the last 24 months, there is currently approximately 25,000 t stored on the ROM pad. A conscious decision has been made to maintain a stockpile around this level as it provides a comfortable buffer for any disruption to mining and allows for more stable mill operations. Budgeted mine production is just above mill throughput for 2024 and this will maintain these ROM stocks.

The mill capacity still exceeds the forecast LoM production rate of 11,500 t/month. The forecast processing rates are therefore considered to be justified and are well supported by historical production. No other changes are expected that would impact the scheduled throughput such as increasing ore hardness or a reduction to the target grind size P_{80} of 53 µm. At this rate, the plant will be operating marginally below maximum capacity. This provides potential modest production upside if mining production rates increase.

13.4 Metallurgical Recovery

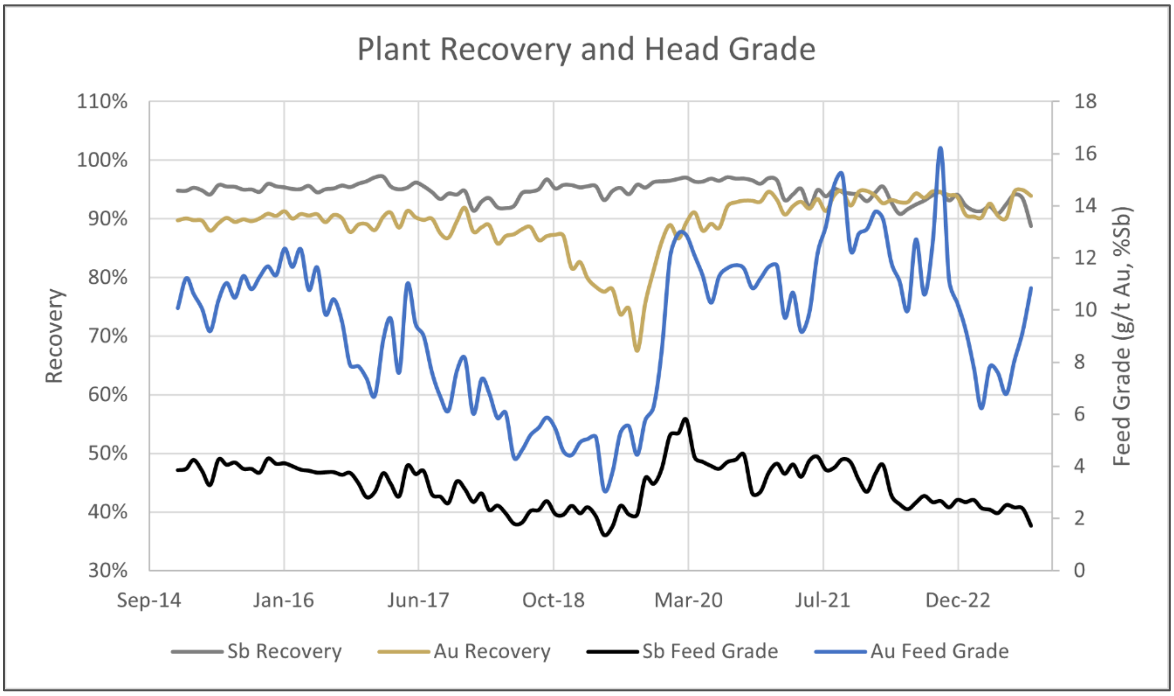
There is a relationship between the plant feed head grade and the recovery for both gold and antimony. This is a common occurrence across flotation type concentrators as it is a function of having a relatively constant tail grade. Over the years, the Costerfield Operation has shown these relationships to be generally robust and effective in predicting both the antimony and total gold recovery.

Forecast antimony and gold recoveries used for LoM planning, budgeting and economic modelling are based on historical feed grades and metallurgical recovery relationships developed using historical production data. This is the best method of forecasting recovery when processing a similar feed blend. These algorithms are updated annually. The latest update uses the recovery data between July 2022 and September 2023 for antimony to reflect the lower grades when processing higher proportions of Shepherd ore, and between January 2022 and September 2023 for gold.

A period of lower gold recovery is highlighted in Figure 13.2. This deterioration was a direct result of introducing the Brunswick underground ore into the feed blend. The subsequent improvement was due to the depletion of Brunswick ores and the introduction of Youle into the mill feed blend, particularly from mid-2020 (see Figure 17.2). The Brunswick ore had a lower gold feed grade, a lower gravity recovery, and presented further challenges to the gold recovery due to the gold mineral associations, including those with arsenopyrite and slower flotation kinetics.

The 2022 end of year (EOY) reconciled plant recoveries were 93.7% and 93.2% for antimony and gold, respectively. Plant recoveries from January to September 2023 were 92.1% and 93.1% for antimony and gold, respectively.

Figure 13.2: Antimony and gold grade versus recovery trends – January 2015 to September 2023



13.4.1 Shepherd Ores

With the addition of Shepherd ore into the Youle ore feed consistently since January 2022, metallurgical performance has remained similar and is expected to do so throughout the LoM. A reduction in antimony feed grade is expected over the LoM and this is factored into the metallurgical recovery calculations, which are based on Shepherd and Youle Blends.

13.4.2 Antimony Recovery

The antimony recovery forecast is based on algorithms based on the relationship between the antimony feed grade and metallurgical recovery using historical operating data. The most recent algorithm incorporates daily plant operating data from July 2022 to September 2023. The antimony recovery algorithm used for mine planning, and process budgeting and forecasting is provided below:

$$Sb\ Recovery = 9.1392 \times \ln(Sb\ Feed\ Grade) + 84.172$$

The natural logarithmic model is capped at 99% recovery to account for high-grade ore block anomalies in the ore reserve and probable mine inventory. This algorithm is based on Youle/Shepherd blended feed and is representative of LoM expected recovery.

Recent historical antimony recoveries for the LoM were:

- 2016 actual Sb recovery = 95.4% at a 3.7% Sb feed grade
- 2017 actual Sb recovery = 95.3% at a 3.3% Sb feed grade
- 2018 actual Sb recovery = 93.8% at a 2.3% Sb feed grade
- 2019 actual Sb recovery = 95.3% at a 3.9% Sb feed grade
- 2020 actual Sb recovery = 96% at a 3.03% Sb feed grade
- 2021 actual Sb recovery = 94.6% at a 3.97% Sb feed grade
- 2022 Sb recovery = 94.1% at a 2.95% Sb feed grade
- 2023 Sb Recovery = 92.1% at a 2.3% Sb feed grade.

In 2022, the concentrate grade produced was 53% Sb, and in 2023, the grade produced was 51.5% Sb. A flotation concentrate grade of 51.5% Sb is incorporated in the LoM plan. The operating aim going forward is to maximise recovery from the CavTubes while ensuring that the concentrate grade stays above 50% as this is the minimum grade in the concentrate offtake agreements. A StackCell can be used as a secondary cleaner during times of low antimony head grade to ensure payables are met. The forward forecast concentrate grade is 51.5% Sb and remains the budgeted target. This provides a buffer against discrepancies between internal concentrate analysis and customer analysis.

There is a high degree of confidence in the relationship and the associated antimony recovery algorithm across a range of feed grades. It is supported by historical operating data and metallurgical testwork. It provides the most reliable method of estimating the antimony recovery at variable head grades assuming a constant final antimony concentrate grade of 51.5%, the value used in the forward LoM plan.

13.4.3 Gold Recovery

The gold in feed reports to the gravity gold concentrate and to the flotation concentrate, together making up the overall gold recovery. Historically, the total gold recovery has been relatively consistent and independent of gravity recovery, i.e. the gold not recovered initially through the gravity circuit is recovered through flotation. Therefore, the difference in the calculated gravity gold recovery and overall recovery is apportioned to the flotation circuit.

It was determined that the most appropriate time period for the updated algorithm would be from January 2022 to September 2023 when treating Youle and Shepherd ores. A logarithmic relationship was used for gold recovery as it plateaus at higher grade, drops at lower grades, and has a better correlation than a linear relationship. The updated relationship is presented below:

$$\textit{Au recovery} = 5.7564 \times \ln(\textit{Au Feed Grade}) + 79.603$$

The model is capped at 95% Au recovery as this is the practical maximum that the plant has achieved on higher grade ores.

This is used to calculate the total gold recovery for any given feed grade. The gold recovery data used to develop the algorithms for LoM recovery forecasting for 2024 are provided below:

- January 2022 to September 2023
- total gold recovery 93.2%
- gravity recovery 58.7%
- 10.5 g/t Au head grade.

The gravity gold recovery shows a level of variability and has increased from 40–55% Au (absolute) to 55–60% Au (absolute). This gravity gold increase has occurred through plant recovery improvements and from the introduction of Shepherd ore into the feed blend. A nominal gravity gold recovery factor of 55% is used for forecasting purposes as the operating data variability complicates the application of a more sophisticated gravity gold recovery relationship.

The annual gold recovery has been consistent over many years and there is a high degree of confidence in the gold recovery algorithm across a range of feed grades in forecasting the annual gold recovery. It is supported by historical operating data and is verified by metallurgical testwork. It provides the most reliable method of estimating the gold recovery at variable head grades.

13.4.4 Circuit upgrades

No plant upgrades are currently planned that will have a material impact on plant throughput rate, gravity, or flotation recovery. All current plant improvement projects are essentially sustaining capital to maintain plant and infrastructure in good working order.

14 Mineral Resource Estimates

Gold and antimony grades, and lode thicknesses were estimated using the 2D accumulation estimation method for all lodes. This method has been discussed in Bertoli et. Al., (2003), and is considered by the QP to be more suitable for modelling narrow vein systems than conventional 3D block grade estimation due to its ability to more accurately model thin tabular geometry. The 2D accumulation method has remained the preferred Mineral Resource Estimation methodology for the Costerfield Property lodes since 2008 (AMC, 2008), and is often called a seam-model estimation method.

The 2D accumulation method requires that gold and antimony grades be multiplied by the true thickness of the intersection to generate variables referred to as accumulations or accumulated grades, measured in gram-metres or percent-metres. This method assigns weights to composites of different lengths during estimation. Estimated gold and antimony block grades are then back-calculated from the estimated accumulated block grade by dividing by the estimated true vein thickness.

Only those lode models that feature new drilling, face sampling and assay data and/or revised geological interpretation have been re-estimated. The focus of mining, exploration and hence the estimations were Youle (500 series models), Shepherd (600 series models) and True Blue (700) with limited additional mining data and updated estimation on the KR Model (310) at Brunswick.

Cut-off grade, AuEq factor, reasonable prospects of eventual economic extraction (RPEEE) evaluation assessment, and sterilisation were updated on all historical models.

14.1 Diamond Drill Hole and Underground Face Sample Statistics

The resource estimation was undertaken on full-length composites of vein intercepts with no residuals for both face samples and drill hole samples. Statistics for the fully composited gold grades, antimony grades, and true thickness for the Shepherd (600, 610, 620), Youle (500), and True Blue (700) are presented in Table 14.1. These models make up 84% of the measured and indicated Mineral Resource Estimate in this update and will be the focus of the discussion. True Blue represents a new resource.

Table 14.1: Composited face and diamond drilling sample statistics – uncapped

Lode	Zone	Type	Variable	No. of Samples	Min	Max	Mean	CV
Youle	500	Drill hole	AU	309	0.0	540.2	32.4	2.0
			SB		0.0	56.6	8.1	1.5
			TRUETHK		0.0	1.7	0.4	0.9
		Face sample	AU	2853	0.0	2480.0	99.4	1.4
			SB		0.0	67.1	24.2	0.8
			TRUETHK		0.0	3.7	0.3	1.2
Youle	500	Drill hole	AU	309	0.0	540.2	32.4	2.0
			SB		0.0	56.6	8.1	1.5
			TRUETHK		0.0	1.7	0.4	0.9
		Face sample	AU	2853	0.0	2480.0	99.4	1.4
			SB		0.0	67.1	24.2	0.8
			TRUETHK		0.0	3.7	0.3	1.2
610 Lode	610	Drill hole	AU	16	0.0	773.0	120.8	2.0
			SB		0.0	19.2	4.0	1.4
			TRUETHK		0.1	0.4	0.2	0.4
		Face sample	AU	71	0.0	4010.0	450.3	1.6
			SB		0.0	44.7	10.8	1.0
			TRUETHK		0.0	0.7	0.1	1.0
Suffolk	620	Drill hole	AU	130	0.0	874.0	44.1	2.5
			SB		0.0	15.9	0.5	4.4
			TRUETHK		0.0	0.7	0.2	0.6
		Face sample	AU	171	0.0	3370.0	124.0	2.5
			SB		0.0	73.1	5.6	2.1
			TRUETHK		0.0	1.4	0.2	0.9
True Blue	700	Drill hole	AU	8	0.1	15.2	4.0	1.1
			SB		0.0	16.6	3.9	1.3
			TRUETHK		0.1	1.8	0.7	0.8

The tabulated data indicate that the unweighted average gold and antimony grades are higher within the face sample data than the drill holes. This is attributed to the following factors:

1. Face sample data are collected representatively within ore drives; however, these ore drives exist only in areas of the deposit that are deemed economically viable. Therefore, the average grade of these samples is higher than that of the drilling data which include intercepts within areas that are sub-economic.
2. Separation between face samples can be as little as a production cut of 1.8 m versus the ~40 m indicated spacing for drilling, leading to highly clustered data in economic areas.

3. Drill core is sampled at an angle perpendicular to the long axis of the core rather than along the boundary of the targeted vein. The sample is taken so that the entire vein is within the sample, and therefore, there is commonly a wedge of waste rock that is included with the lode sample. During face sampling, the material is only collected within the vein boundary. This difference in sampling manifests as proportional lower average grades and higher average widths within drill data when compared to face sample data.

A comparison of face samples and drill holes was completed for the dominant lodes Youle (500) and Shepherd (600) and Suffolk veins (620+610). This was achieved by restricting the face sample dataset to only include face samples within 10 m diameter of a drill hole intersection, approximating the 10 m level separation. The drill hole results were restricted to look at the measured resource category, which occurs only with ore-drive development and face sampling.

Results showed face sampling in Youle (500) had a positive bias in low grades in both Au-Accumulation and Sb-Accumulation (Figure 14.1), with Shepherd and Suffolk veins (600, 610, 620) observing a positive bias in drilling for Au-Accumulation above 3 and a positive bias in face-sampling for Sb-Accumulation

Figure 14.1: Q-Q plot of Au-Accumulation comparisons of drill hole data and face sample data for Youle (500) and Shepherd veins (600, 610, 620), capped to 100 Au-accumulation for clarity in the lower ranges

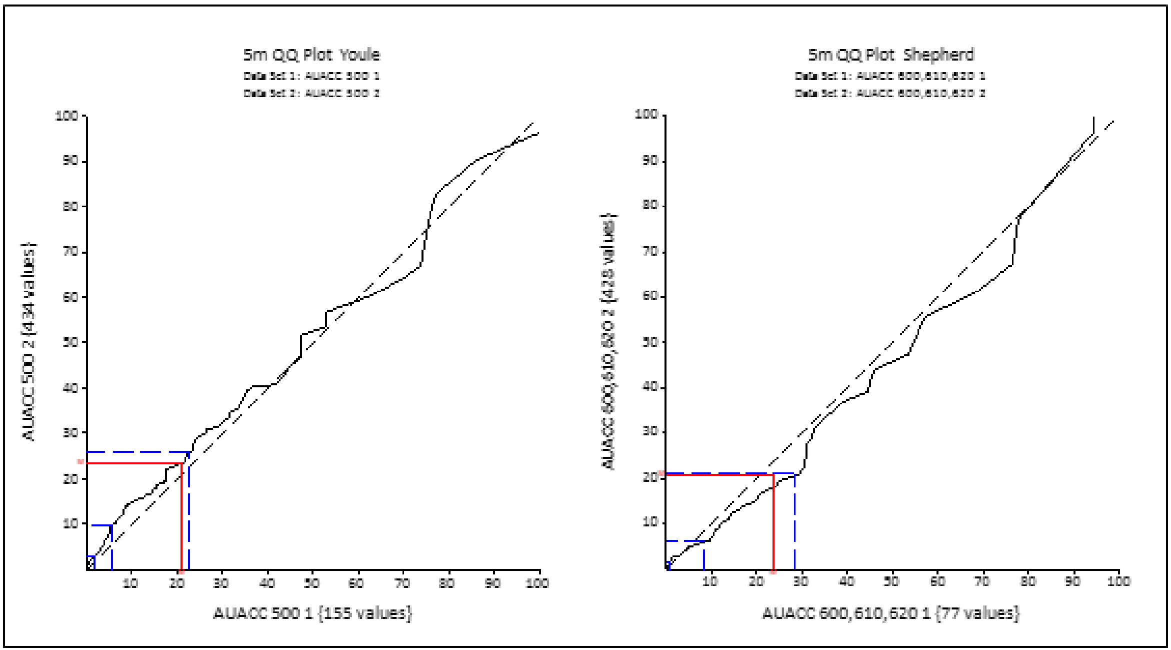
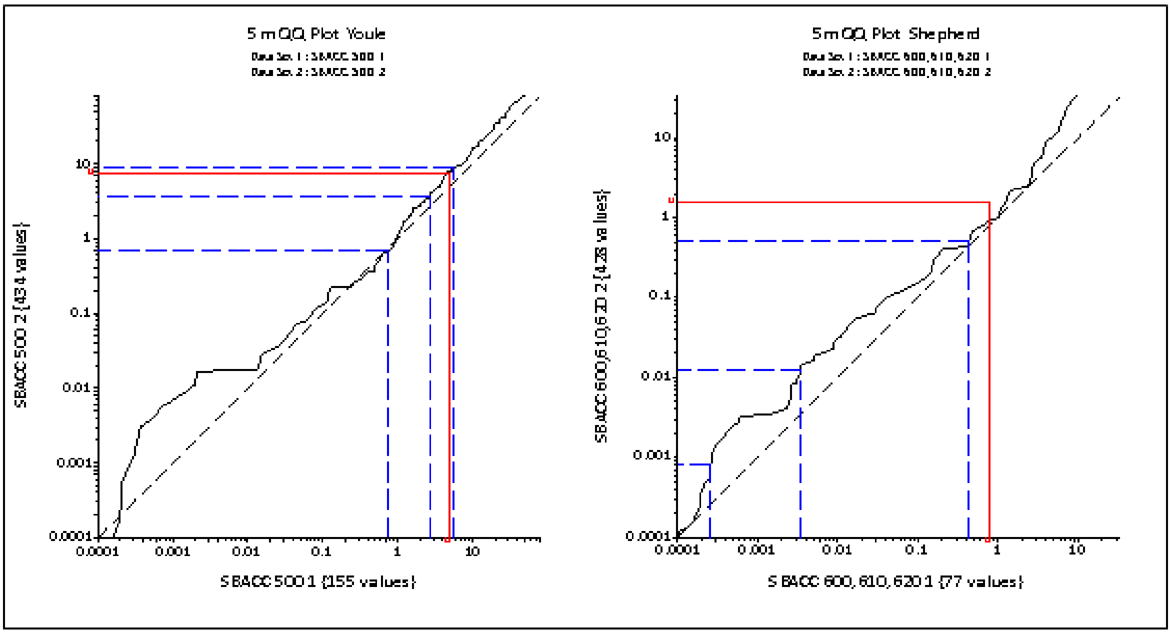
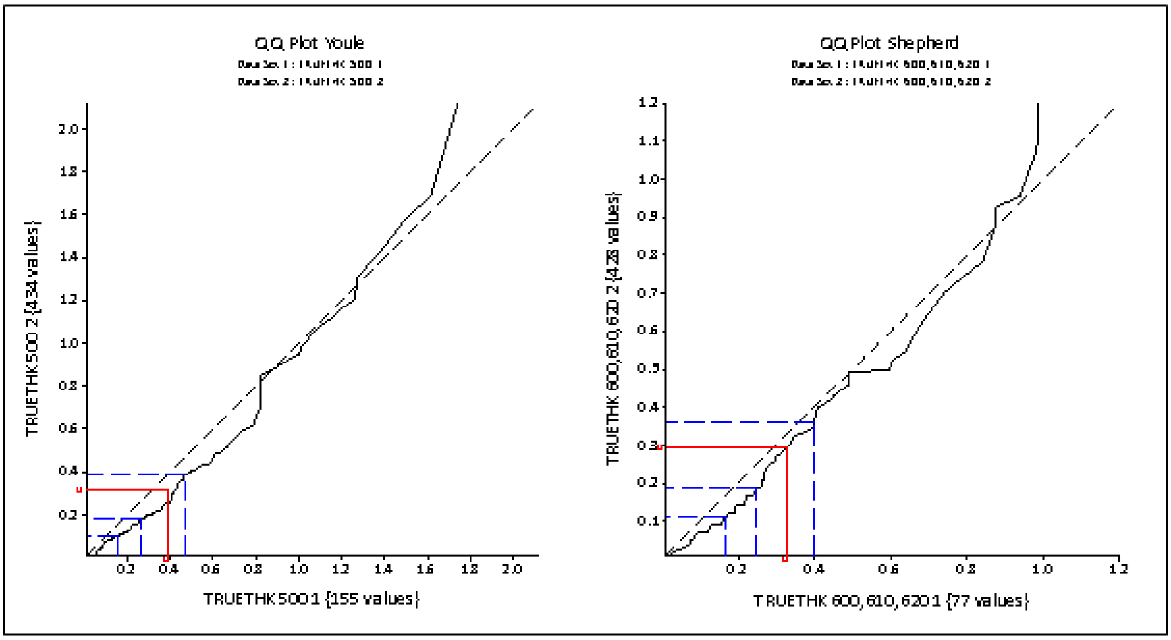


Figure 14.2: Log Q-Q plot of Sb-Accumulation comparison of drill hole data and face sample data, for Youle (500) and Shepherd veins (600, 610, 620)



True thickness of intersections displayed the reverse bias for the reasons outlined in point three above, with a positive bias at low widths, changing to a negative bias at a true thickness above one metre thickness (Figure 14.3).

Figure 14.3: Q-Q plot of true-thickness comparisons of drill data and face sample data – Youle (500) and Shepherd veins (600, 610, 620), capped to 1.2 true-thicnkess for clarity in the lower ranges



The QP considers that, at grades and thicknesses of economic interest, the small positive biases seen in the grade accumulation variables and negative bias seen in thickness variable in the face samples relative to the drill hole samples are not material and support the combination of these two datasets for the purposes of Mineral Resource Estimation.

14.2 Geological Interpretation and Domaining

Data and observations from drill logs, core photography, underground face mapping, georeferenced face photography and backs mapping were considered during the process of wireframe modelling. The identified intervals within both drill hole data and underground face sample data are incorporated into the wireframe of each lode structure. Interval flagging and wireframe creation on updated models was done via the Seequent Leapfrog Geo software suite, using a vein model methodology.

Each lode structure has been modelled separately and assigned a unique numeric zone code. The assays have been composited over the full width of the intersections (including any intervening waste) by lode.

Grade domaining on each lode/zone code was driven by geological interpretations of the structural context and grade tenor. Grade domains were used on both the Youle 500 series and Shepherd 600 series models (Table 14.2) to separate high-grade and low-grade populations to an acceptable degree, and to further limit data trends of grade-shoots.

Table 14.2 Number of grade domains used in 2023 Youle and Shepherd Resource models

Youle series models	Model #	Num. grade domains	Shepard East models	Model #	Num. grade domains	Shepard West models	Model #	Num. grade domains
Youle	500	8	Shepherd	600	9		610	2
Youle East	501	1		602	2		613	1
Kendal Splay	503	1		603	1	Suffolk	620	7
	507	1	Ryeland	604	1	Drysdale	621	1
Peacock	508	4	Merino	605	3		623	1
	509	2	Dorset	606	1		624	1
Youle South Splay	525	1		607	1		625	2
Peacock Splay	531	1		609	3		630	3

Where there were limited data attributed to a lode, a single grade domain coincident with the model boundary string was used. A single domain was used in both the Brunswick-KR and True Blue estimates.

Domains for the Youle Lode (500) and Shepherd Lode (600), including sample locations, are displayed in Figure 14.4 and Figure 14.5 as an example, with a brief description of the domains and their geological context outlined in Table 14.3.

Figure 14.4: Longitudinal projection of the Youle Lode (500), displaying eight grade domains determined by grade and structural controls on mineralisation. Sample points in grey, with the mining as-constructed shape. North to the right

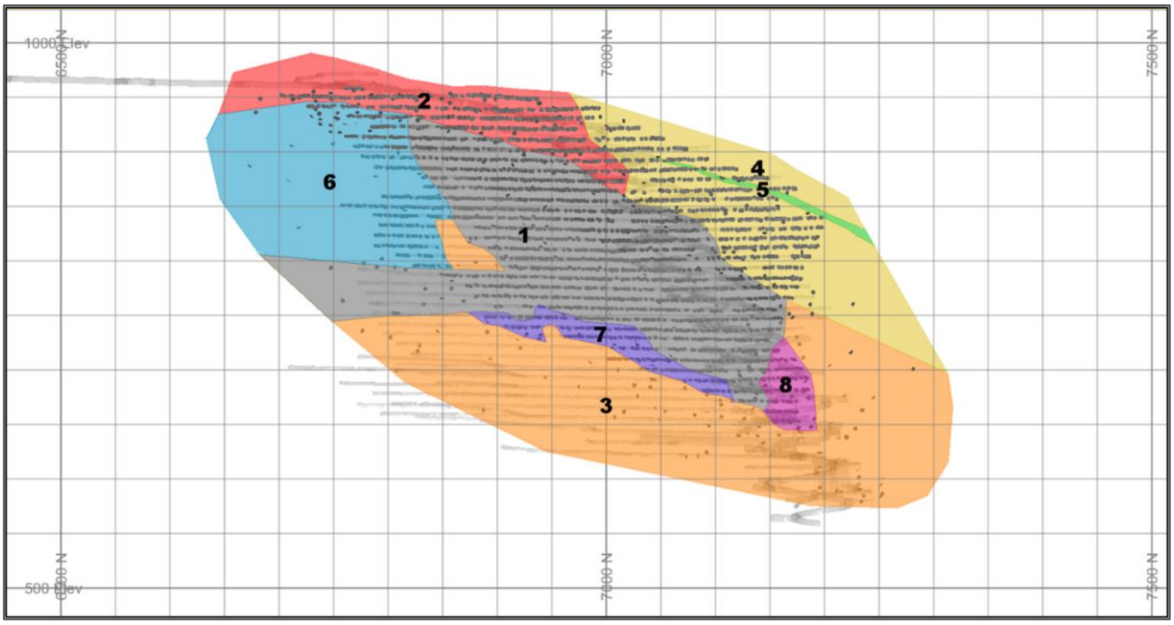


Figure 14.5: Longitudinal projection of the Shepherd Lode (600), displaying nine grade domains determined by grade and structural controls on mineralisation. Sample points in grey, with the mining as-constructed shape. North to the right

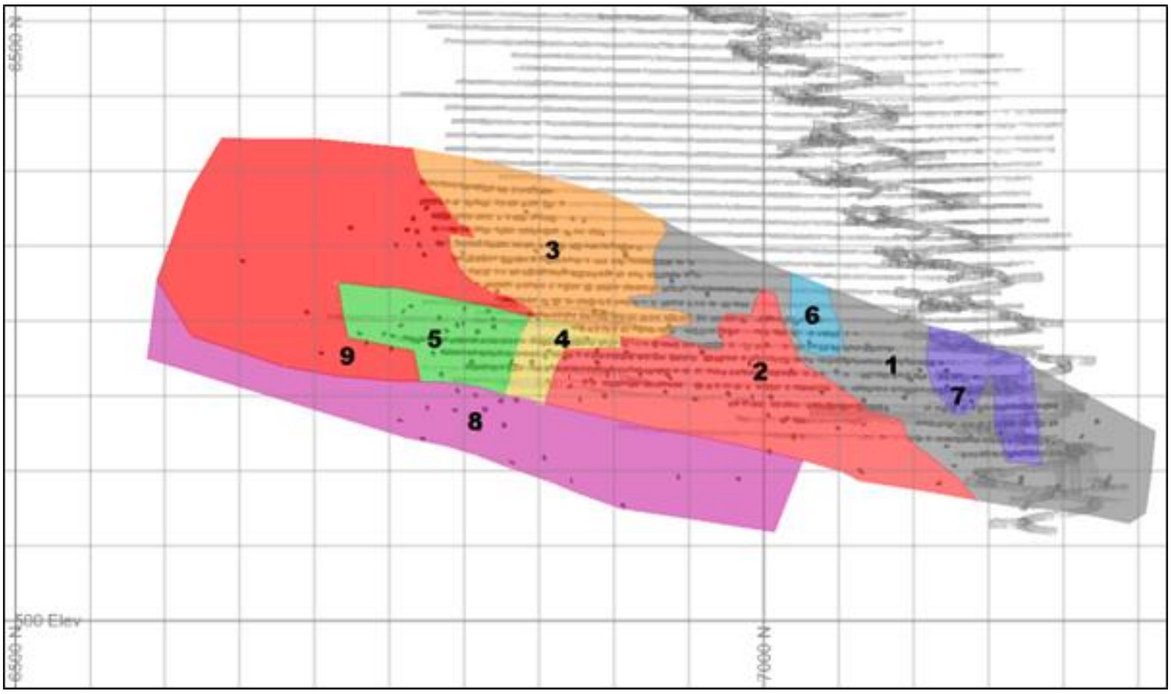


Table 14.3: Youle and Shepherd estimation domains and descriptions with geological context

Model	Domain description	Domain code	Description
Youle (500)	Youle – shallow dip	1	Youle proper observing a ~50 degree dip. Reactivated and mineralised west-dip thrust
	Youle - Steepened	2	High-grade upper domain, steeper dip than lower Youle
	Youle - shallow - LG	3	Waste domain after major grade decrease in Youle. Structure Only
	Kendal Style	4	Sub-vertical Au-Sb extension veining representing mineralisation continuity as Youle flattens
	Vulture Flt domain	5	Fault disruption of the Kendal-style zone. Syn-post relationship with entrained mineralisation. Thin and low grade
	South Zone	6	Southern Zone, final grade pod with strike difference. With the Doyle HW/FW Zone.
	Lower Au Zone	7	Drop off in Sb to north and south approaching the Shepherd transition
	North Au Zone	8	Northern gold rich section
Shepard (600)	North Gold	1	Au zone, north of the 605 vein merge, higher Au, sporadic Sb
	Sporadic Gold	2	Au zone, south of the 605 vein split, sporadic Au, no Sb
	Sb HG zone	3	Southern HG Sb and Au area, bounded by FW Doyle 3 and 4
	Lower South	4	Lower South, under Doyle, Au only zone
	Far South	5	Southern LG-Au Zone after strike change
	Sb Pod 1	6	Sb pod 1 in the North Au Zone
	Sb Pod 2	7	Sb pod 1 in the North Au Zone
	Sub-Deimos Zone	8	Au with minor Sb below the Deimos Bounding Fault
	South Waste	9	Au zone, north of the 605 merge, higher Au, sporadic Sb

14.3 Grade Capping

Grade capping was conducted as a part of the estimation process to mitigate the disproportionally large influence of extremely high grades on the estimated mean grade. Statistical analysis of each domain for all lodes included in the 2023 Mineral Resource Estimation was completed using Datamine Supervisor software to identify statistical outliers that may cause over-estimation of grade.

Examples of statistical plots generated with the Datamine Supervisor package, and used in this process, are provided in Figure 14.6 to Figure 14.11 for Shepherd domains 1 (Au) and 3 (Au+Sb).

Figure 14.6: Shepherd (600) Domain 1 – Grade capping statistical plots for Au-Accumulation

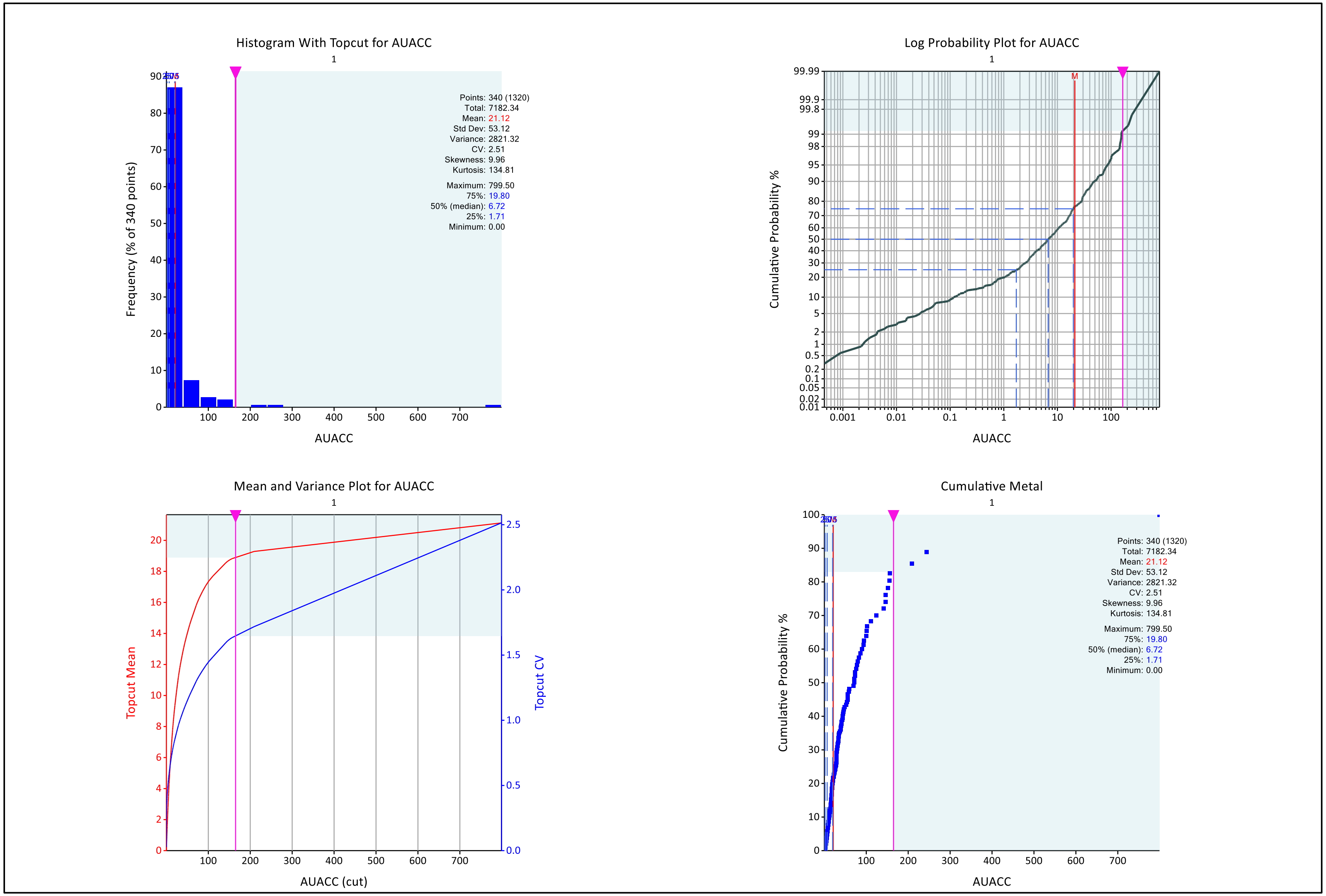


Figure 14.7: Shepherd (600) Domain 1 – Grade capping statistical plots for Sb-Accumulated

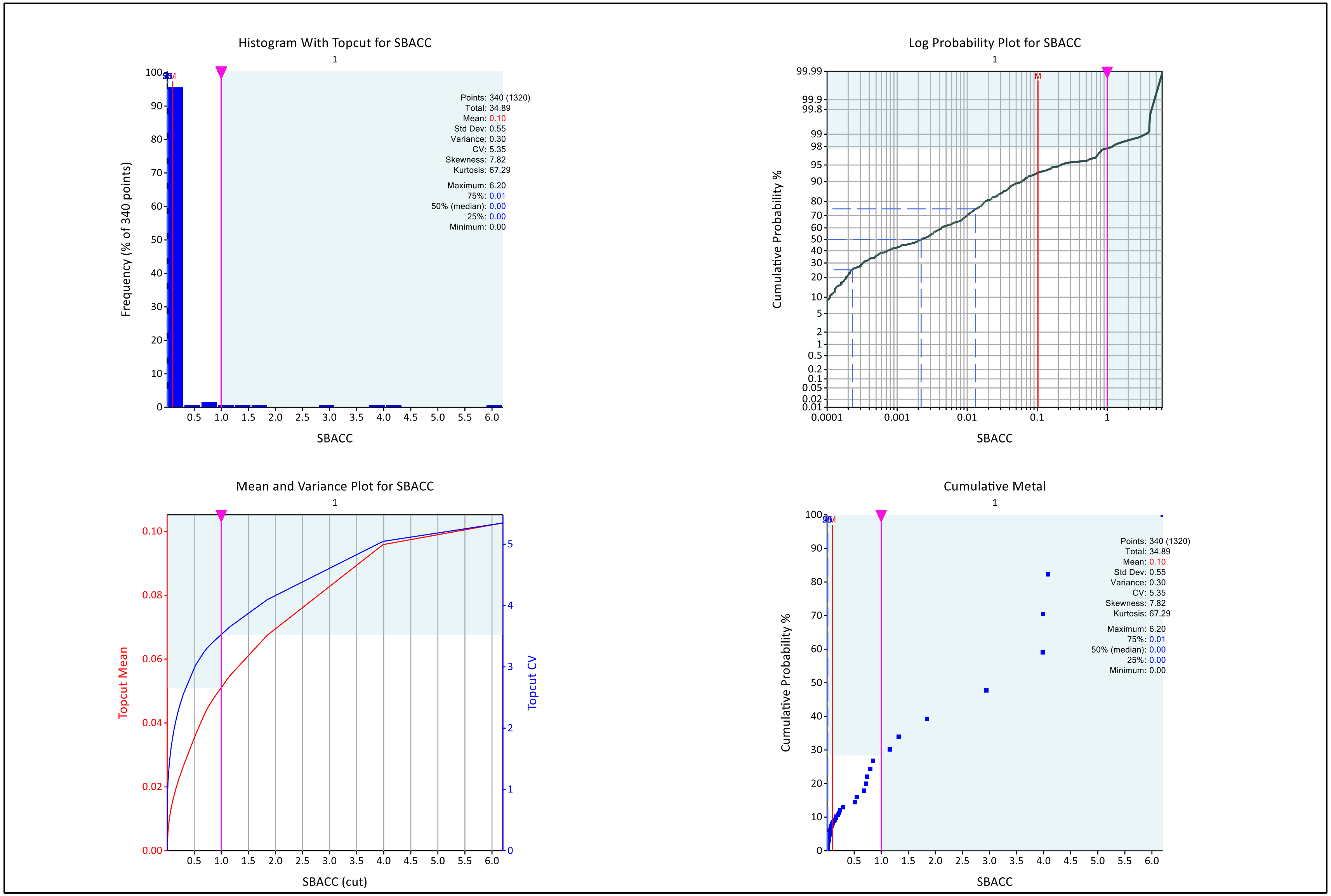


Figure 14.8: Shepherd (600) Domain 1 – Grade capping statistical plots for true thickness

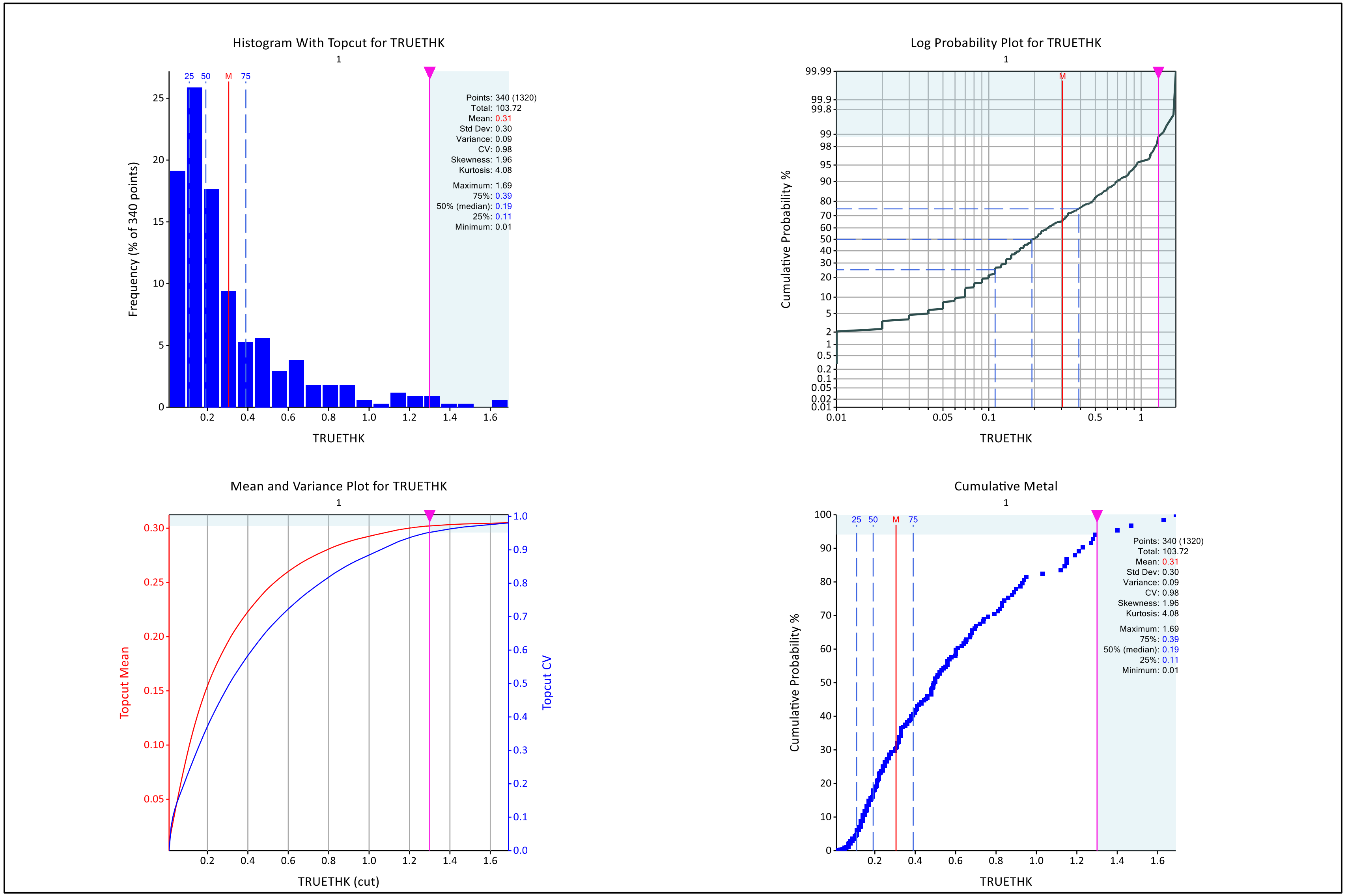


Figure 14.9: Shepherd (600) Domain 3 – Grade capping statistical plots for Au-Accumulation

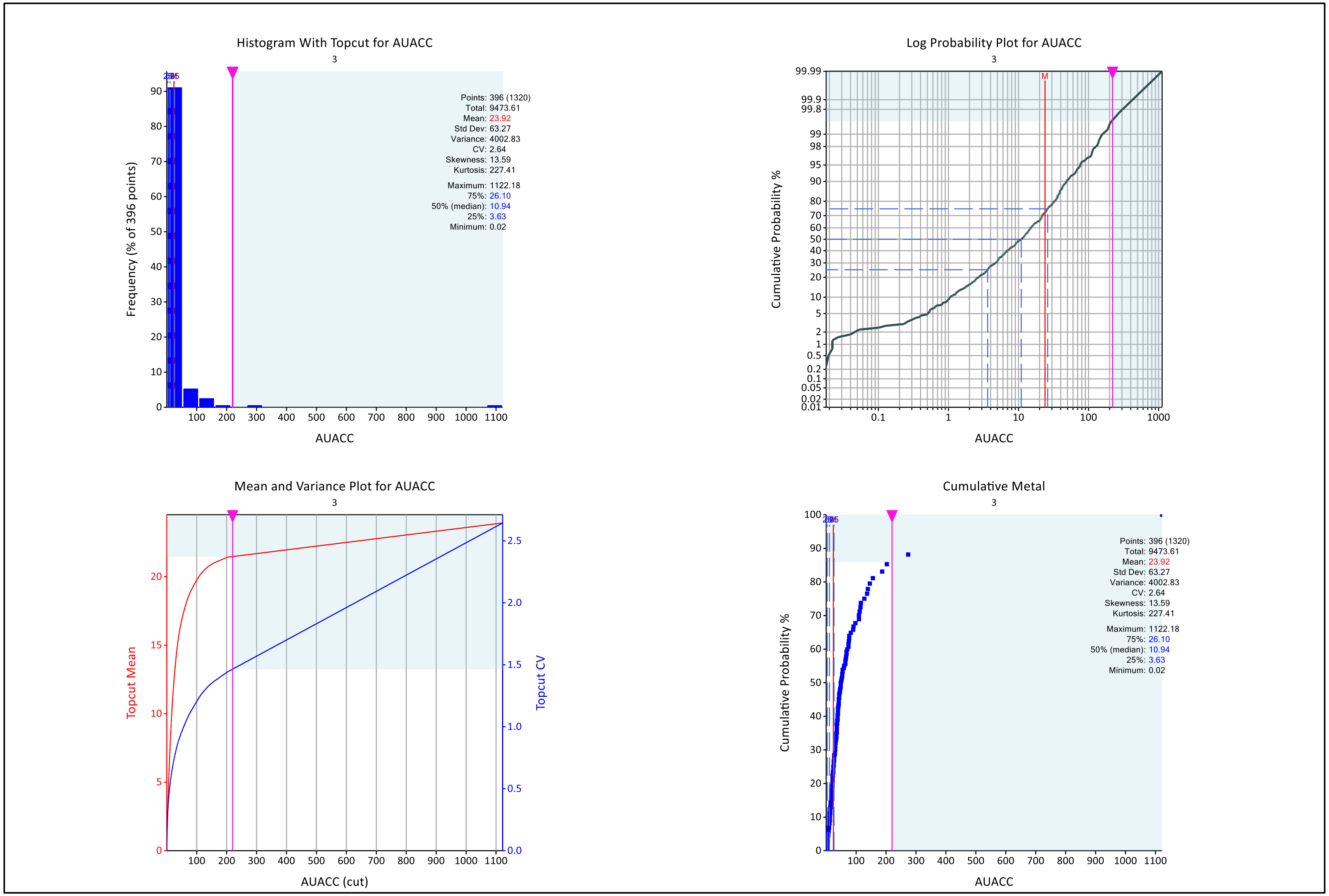


Figure 14.10: Shepherd (600) Domain 3 – Grade capping statistical plots for Sb-Accumulated

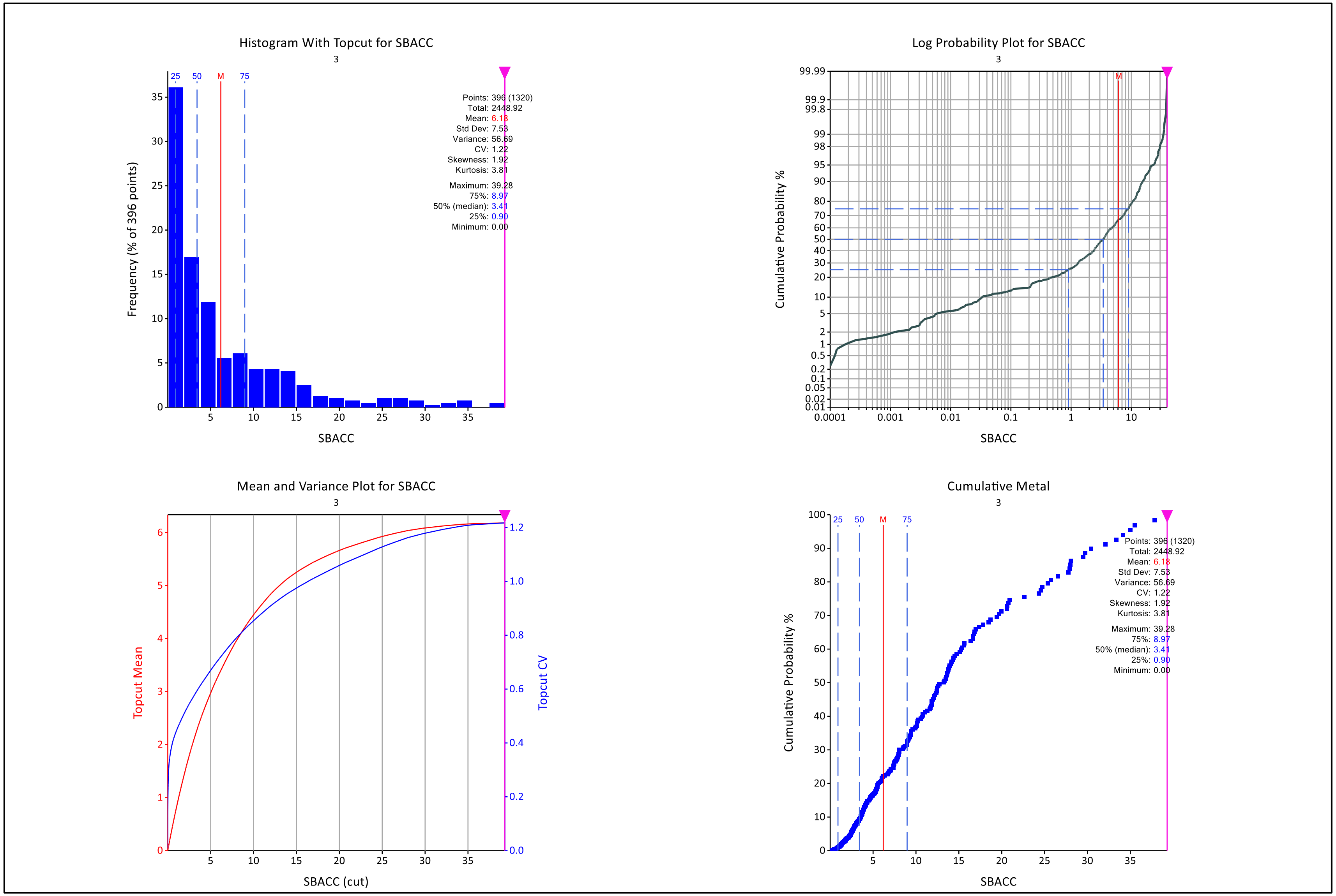
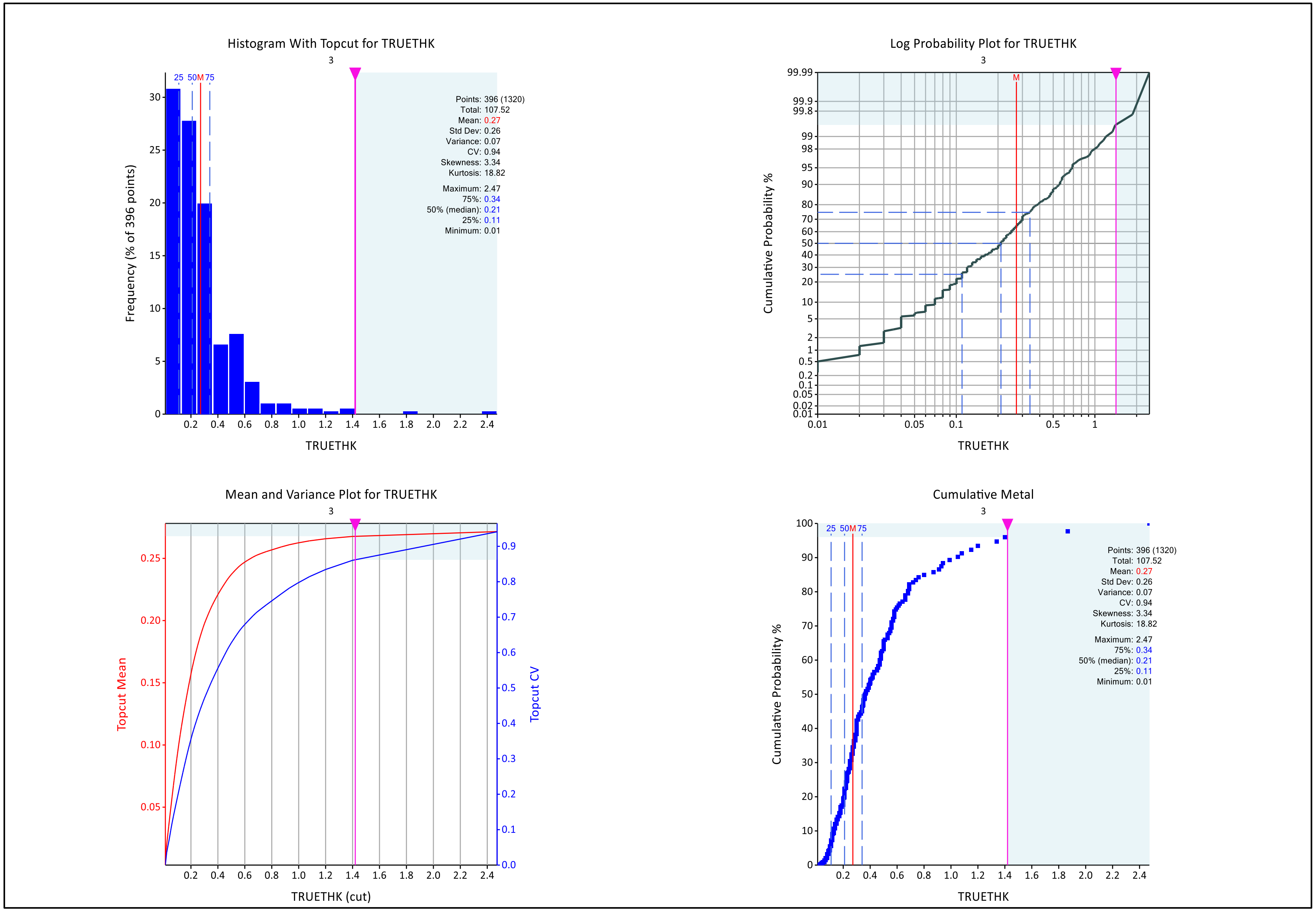


Figure 14.11: Shepherd (600) Domain 3 – Grade capping statistical plots for true thickness



The uncapped and grade capped values, and the effect of grade outliers on the overall sample statistics for the 2023 models, are provided in Table 14.4.

Table 14.4: Sample statistics for the 2023 models, before and after grade caps

Model	Variable	Domain	Number of samples		Mean grade			Capping value	Standard deviation		CV		Max uncapped grade	Capped percentile
			Capped	Uncapped	Uncapped	Capped	% Diff		Uncapped	Capped	Uncapped	Capped		
Brunswick 310	AUACC	1	37	36	5.14	4.92	-4.3	32.5	7.83	6.78	1.52	1.38	46.54	97%
	SBACC	1	37	-	2.28	-	0%	-	3.95	-	1.73	-	17.74	-
	TRUETHK	1	37	35	0.53	0.5	6%	1.5	0.48	0.37	0.91	0.75	2.78	95%
Youle (500)	AUACC	1	1574	1567	32.2	31.7	-1%	310	48.6	45.5	1.5	1.4	553.6	100%
		2	375	363	44.2	41.4	-7%	180	56.5	45.9	1.3	1.1	374.9	97%
		3	108	105	0.1	0.0	-50%	0.4	0.2	0.1	3.9	2.3	2.2	97%
		4	513	503	13.1	11.9	-11%	65	23.3	13.9	1.8	1.2	308.1	98%
		5	10	5	3.5	0.3	-1161%	0.5	7.7	0.2	2.2	0.8	26.0	50%
		6	322	313	4.6	4.3	-6%	18	6.1	4.9	1.3	1.1	46.4	97%
		7	155	143	21.0	13.3	-57%	55	45.7	17.5	2.2	1.3	355.2	92%
		8	105	101	11.3	10.4	-9%	36	13.3	10.3	1.2	1.0	68.1	96%
	SBACC	1	1574	1567	6.2	6.1	-1%	40	7.5	6.9	1.2	1.1	87.6	100%
		2	375	367	16.5	16.2	-2%	55	14.7	13.7	0.9	0.8	80.2	98%
		3	108	102	0.0	0.0	N/A	0.1	0.1	0.0	3.8	2.7	0.5	94%
		4	513	504	6.8	6.5	-4%	30	8.1	6.6	1.2	1.0	80.5	98%
		5	10	7	0.5	0.2	-117%	0.4	0.7	0.2	1.4	0.7	2.5	70%
		6	322	310	3.0	2.8	-7%	10.5	3.7	3.0	1.2	1.1	28.4	96%
		7	155	151	0.2	0.1	-15%	1	0.4	0.2	2.5	1.9	3.5	97%
		8	105	98	0.1	0.0	-350%	0.15	0.4	0.0	4.3	1.9	3.2	93%
	TRUETHK	1	1574	1563	0.3	0.3	0%	1.6	0.3	0.3	1.0	0.9	3.0	99%
		2	375	361	0.7	0.6	-3%	1.9	0.6	0.5	0.9	0.8	3.7	96%
		3	108	97	0.3	0.2	-21%	0.55	0.3	0.2	1.0	0.7	1.7	90%
		4	513	505	0.2	0.2	0%	1	0.2	0.2	1.1	1.0	1.8	98%
		5	10	8	0.1	0.1	0%	0.2	0.1	0.1	0.8	0.7	0.2	80%
		6	322	316	0.2	0.2	-5%	0.8	0.2	0.2	1.0	0.8	1.5	98%
		7	155	148	0.2	0.2	-6%	0.55	0.2	0.1	1.1	0.9	1.0	96%
		8	105	100	0.2	0.2	-13%	0.45	0.2	0.1	1.1	0.7	1.5	95%
501	AUACC	1	62	61	0.3	0.3	-4%	0.98	0.3	0.3	1.1	1.0	1.4	98%
	SBACC	1	62	60	4.4	4.1	-6%	14.1	5.1	4.4	1.2	1.1	23.9	97%
	TRUETHK	1	62	-	5.2	-	-	-	7.3	-	1.4	-	37.1	-
508	AUACC	1	100	95	29.2	23.2	-26%	85	49.0	22.8	1.7	1.0	390.0	95%
		2	84	82	8.6	7.9	-9%	35	11.8	8.5	1.4	1.1	78.3	98%
		3	13	10	0.1	0.1	-120%	0.1	0.2	0.0	1.6	0.9	0.6	77%
		4	88	84	1.5	1.4	-12%	5.7	2.2	1.7	1.5	1.2	10.2	96%
	SBACC	1	100	95	8.6	8.2	-5%	21	7.3	6.2	0.9	0.8	34.8	95%
		2	84	81	4.0	4.0	-2%	10.6	3.1	3.0	0.8	0.7	13.2	96%
		3	13	11	0.1	0.0	-250%	0.1	0.2	0.0	2.4	1.5	0.6	85%
		4	88	86	8.2	8.0	-2%	32	10.0	9.5	1.2	1.2	41.1	98%
	TRUETHK	1	100	96	0.3	0.3	-7%	0.8	0.3	0.2	0.9	0.7	1.8	96%
		2	84	80	0.2	0.1	-7%	0.37	0.1	0.1	0.8	0.6	0.6	95%
		3	13	9	0.4	0.3	-30%	0.45	0.3	0.2	0.8	0.6	0.9	69%
		4	88	87	1.1	1.1	0%	2.8	0.8	0.8	0.8	0.8	3.0	99%
509	AUACC	1	37	36	39.8	27.6	-44%	150	100.3	40.8	2.5	1.5	603.0	97%
		2	3	-	0.0	-	-	-	0.0	-	0.9	-	0.0	-
	SBACC	1	37	35	1.6	1.2	-36%	5.2	3.0	1.6	1.9	1.4	14.4	95%
		2	3	-	0.0	-	-	-	0.0	-	0.9	-	0.0	-
	TRUETHK	1	37	34	0.2	0.2	-14%	0.52	0.2	0.2	1.0	0.8	1.0	92%
		2	3	-	0.7	-	-	-	0.2	-	0.3	-	0.9	-
525	AUACC	1	103	98	12.2	10.3	-19%	37	17.3	10.1	1.4	1.0	101.4	95%
	SBACC	1	103	102	4.4	4.4	0%	11.3	3.1	3.1	0.7	0.7	13.2	99%
	TRUETHK	1	103	99	0.2	0.2	-6%	0.36	0.1	0.1	0.5	0.5	0.5	96%
Shepherd (600)	AUACC	1	340	337	21.1	18.9	-12%	165	53.1	31.1	2.5	1.7	799.5	99%
		2	281	274	7.7	6.0	-27%	50	22.4	10.8	2.9	1.8	287.0	98%
		3	396	394	23.9	21.5	-11%	220	63.3	31.4	2.6	1.5	273.6	100%
		4	51	48	26.7	22.3	-20%	80	38.8	23.1	1.5	1.0	0.8	94%
		5	76	75	7.1	7.1	0%	28	7.2	7.2	1.0	1.0	0.6	99%
		6	35	34	25.1	22.9	-10%	65	26.8	19.2	1.1	0.8	0.0	97%
		7	80	79	62.3	49.9	-25%	355	158.1	71.1	2.5	1.4	0.5	99%

Model	Variable	Domain	Number of samples		Mean grade			Capping value	Standard deviation		CV		Max uncapped grade	Capped percentile
			Capped	Uncapped	Uncapped	Capped	% Diff		Uncapped	Capped	Uncapped	Capped		
		8	17	16	10.0	8.4	-19%	45	18.5	13.6	1.9	1.6	355.0	94%
		9	44	42	0.7	0.7	-14%	2.5	1.0	0.7	1.4	1.0	45.0	96%
	SBACC	1	340	332	0.1	0.1	-100%	1	0.6	0.2	5.4	3.5	6.2	98%
		2	281	269	0.2	0.0	-1500%	0.1	1.2	0.0	7.7	2.6	12.1	96%
		3	396	-	6.2	-	-	-	7.5	-	1.2	-	39.3	-
		4	51	41	1.0	0.3	-277%	1	2.3	0.4	2.3	1.4	11.7	80%
		5	76	66	0.5	0.0	-2150%	0.1	2.2	0.0	4.9	1.5	15.6	87%
		6	35	-	0.6	-	-	-	0.8	-	1.4	-	3.3	-
		7	80	76	1.8	1.1	-61%	9	5.2	2.3	2.9	2.1	32.0	95%
		8	17	15	0.2	0.0	-	0.01	0.7	0.0	4.0	1.9	2.8	88%
		9	44	41	0.1	0.0	-500%	0.05	0.3	0.0	4.9	2.4	1.9	93%
	TRUETHK	1	340	336	0.3	0.3	-3%	1.3	0.3	0.3	1.0	1.0	1.7	99%
		2	281	278	0.4	0.4	-3%	1.5	0.3	0.3	0.9	0.8	2.5	99%
		3	396	394	0.3	0.3	0%	1.42	0.3	0.2	0.9	0.9	2.5	100%
		4	51	-	0.6	-	-	-	0.4	-	0.7	-	1.3	-
		5	76	73	0.2	0.2	-6%	0.5	0.1	0.1	0.7	0.7	0.8	96%
		6	35	33	0.4	0.4	-2%	1	0.3	0.3	0.7	0.7	1.2	94%
		7	80	79	0.4	0.4	-2%	1.75	0.5	0.4	1.1	1.1	2.5	99%
		8	17	-	0.4	-	-	-	0.3	-	0.9	-	1.2	-
		9	44	-	0.3	-	-	-	0.2	-	0.9	-	0.9	-
602	AUACC	1	11	-	41.8	-	-	-	29.3	-	0.7	-	83.0	-
		2	34	-	3.7	-	-	-	4.6	-	1.3	-	17.1	-
	SBACC	1	11	-	8.4	-	-	-	9.2	-	1.1	-	26.4	-
		2	34	-	0.9	-	-	-	1.5	-	1.6	-	4.7	-
	TRUETHK	1	11	-	0.4	-	-	-	0.2	-	0.5	-	0.8	-
		2	34	-	0.2	-	-	-	0.1	-	0.7	-	0.6	-
603	AUACC	1	11	10	2.7	1.4	-98%	6	5.8	2.1	2.2	1.6	20.5	91%
	SBACC	1	11	10	1.0	0.6	-50%	2.65	1.8	1.0	1.9	1.6	6.3	91%
	TRUETHK	1	11	10	0.4	0.4	-8%	0.8	0.3	0.3	0.8	0.8	1.1	91%
604	AUACC	1	15	14	30.2	26.9	-12%	77	35.4	27.6	1.2	1.0	126.9	93%
	SBACC	1	15	13	0.3	0.0	N/A	0.05	1.1	0.0	3.6	1.5	4.6	87%
	TRUETHK	1	15	14	0.5	0.4	-15%	0.8	0.4	0.2	0.8	0.5	1.7	93%
605	AUACC	1	57	56	10.7	9.7	-11%	65	20.3	15.4	1.9	1.6	124.4	98%
		2	39	-	8.3	-	-	-	8.1	-	1.0	-	29.8	-
		3	18	17	1.2	0.6	-87%	2.5	2.8	0.7	2.4	1.1	12.4	94%
	SBACC	1	57	51	0.1	0.0	-	0.02	0.6	0.0	5.5	1.6	4.6	90%
		2	39	38	0.0	0.0	0%	0.04	0.0	0.0	2.4	1.8	0.1	97%
		3	18	16	0.0	0.0	-	0.01	0.0	0.0	2.1	1.5	0.0	89%
	TRUETHK	1	57	56	0.3	0.3	-4%	0.65	0.2	0.2	0.8	0.6	1.6	98%
		2	39	37	0.2	0.2	-12%	0.32	0.2	0.1	0.8	0.5	0.9	95%
		3	18	-	0.5	-	-	-	0.4	-	0.8	-	1.2	-
606	AUACC	1	20	18	17.0	4.1	-315%	14.5	50.4	5.5	3.0	1.3	229.5	90%
	SBACC	1	20	19	0.0	0.0	N/A	0.01	0.0	0.0	2.3	1.5	0.0	95%
	TRUETHK	1	20	19	0.2	0.1	-46%	0.37	0.3	0.1	1.7	0.8	1.6	95%
607	AUACC	1	12	-	13.3	-	-	-	19.6	-	1.5	-	65.3	-
	SBACC	1	12	-	0.0	-	-	-	0.0	-	1.6	-	0.0	-
	TRUETHK	1	12	-	0.3	-	-	-	0.2	-	0.8	-	0.9	-
609	AUACC	1	17	15	56.5	39.1	-44%	93	73.7	35.7	1.3	0.9	251.6	88%
		2	19	17	1.8	1.3	-40%	2.7	2.2	1.1	1.2	0.8	7.9	90%
		3	28	25	1.3	0.2	-421%	1	4.7	0.3	3.7	1.4	25.2	89%
	SBACC	1	17	15	6.6	4.4	-51%	12	9.5	4.3	1.4	1.0	33.4	88%
		2	19	17	0.5	0.1	-475%	0.3	1.2	0.1	2.6	1.4	4.5	90%
		3	28	26	0.0	0.0	-	0.01	0.1	0.0	4.1	2.0	0.6	93%
	TRUETHK	1	17	16	0.4	0.4	-5%	0.92	0.3	0.3	0.9	0.8	1.3	94%
		2	19	18	0.2	0.2	0%	0.38	0.1	0.1	0.6	0.5	0.5	95%
		3	28	27	0.2	0.2	-6%	0.52	0.2	0.1	1.0	0.9	0.8	96%
610	AUACC	1	82	81	45.9	44.8	-3%	225	62.2	57.7	1.4	1.3	320.8	99%
		2	5	4	0.3	0.1	-560%	0.2	0.7	0.1	2.0	1.7	1.6	80%
	SBACC	1	82	-	1.3	-	-	-	1.4	-	1.1	-	5.3	-
		2	5	-	0.0	-	-	-	0.0	-	1.1	-	0.0	-
	TRUETHK	1	82	80	0.1	0.1	-8%	0.45	0.1	0.1	0.9	0.7	0.7	98%

Model	Variable	Domain	Number of samples		Mean grade			Capping value	Standard deviation		CV		Max uncapped grade	Capped percentile
			Capped	Uncapped	Uncapped	Capped	% Diff		Uncapped	Capped	Uncapped	Capped		
		2	5	-	0.1	-	-	-	0.1	-	0.6	-	0.2	-
620	AUACC	1	73	70	26.8	23.8	-13%	100	40.7	30.6	1.5	1.3	205.5	96%
		2	44	42	0.6	0.5	-22%	2.48	1.2	0.8	2.0	1.7	6.2	96%
		3	5	-	5.1	-	-	-	8.1	-	1.6	-	21.2	-
		4	14	-	12.2	-	-	-	17.2	-	1.4	-	61.0	-
		5	56	55	5.7	5.1	-11%	25	9.2	6.7	1.6	1.3	56.4	98%
		6	79	78	17.4	16.1	-8%	100	28.7	21.7	1.7	1.4	203.4	99%
		7	27	25	1.0	0.8	-23%	4.5	1.9	1.3	1.9	1.6	7.1	93%
	SBACC	1	73	71	0.0	0.0	0%	0.05	0.0	0.0	3.5	1.7	0.2	97%
		2	44	42	0.0	0.0	-	0.01	0.0	0.0	3.1	1.6	0.1	96%
		3	5	-	0.0	-	-	-	0.0	-	1.9	-	0.0	-
		4	14	-	0.0	-	-	-	0.0	-	1.7	-	0.0	-
		5	56	-	0.0	-	-	-	0.0	-	1.9	-	0.1	-
		6	79	76	2.1	1.8	-18%	7.5	3.3	2.0	1.6	1.1	19.4	96%
		7	27	26	0.0	0.0	-	0.01	0.0	0.0	3.5	2.2	0.1	96%
	TRUETHK	1	73	71	0.2	0.2	-10%	0.6	0.2	0.1	0.9	0.6	1.4	97%
		2	44	42	0.3	0.2	-4%	0.7	0.2	0.2	0.8	0.8	1.0	96%
		3	5	-	0.2	-	-	-	0.1	-	0.4	-	0.3	-
		4	14	13	0.2	0.2	-22%	0.4	0.2	0.1	0.9	0.6	0.9	93%
		5	56	-	0.2	-	-	-	0.1	-	0.6	-	0.5	-
		6	79	76	0.2	0.2	-6%	0.42	0.1	0.1	0.7	0.6	0.6	96%
		7	27	-	0.2	-	-	-	0.1	-	0.6	-	0.5	-
621	AUACC	1	15	14	5.4	3.9	-38%	18	10.8	6.5	2.0	1.7	40.4	93%
	SBACC	1	15	12	0.1	0.0	-	0.02	0.5	0.0	3.1	1.6	1.8	80%
	TRUETHK	1	15	14	0.1	0.1	-1%	0.165	0.0	0.0	0.3	0.3	0.2	93%
623	AUACC	1	12	-	5.0	-	-	-	6.7	-	1.4	-	22.1	-
	SBACC	1	12	11	0.0	0.0	-	0.01	0.0	0.0	2.3	1.4	0.0	92%
	TRUETHK	1	12	11	0.2	0.1	-15%	0.18	0.1	0.0	0.7	0.3	0.5	92%
624	AUACC	1	28	25	14.7	11.0	-34%	57	29.8	19.7	2.0	1.8	114.5	89%
	SBACC	1	28	23	0.1	0.0	-	0.01	0.6	0.0	4.8	1.4	3.1	82%
	TRUETHK	1	28	25	0.3	0.3	-8%	0.5	0.2	0.2	0.7	0.6	0.8	89%
625	AUACC	1	43	42	3.8	3.2	-19%	17	7.2	4.4	1.9	1.4	42.8	98%
		2	4	-	0.6	-	-	-	0.8	-	1.3	-	2.1	-
	SBACC	1	43	-	0.7	-	-	-	1.0	-	1.6	-	4.1	-
		2	4	-	0.0	-	-	-	0.0	-	1.7	-	0.0	-
	TRUETHK	1	43	-	0.2	-	-	-	0.2	-	0.9	-	0.8	-
		2	4	-	0.1	-	-	-	0.0	-	0.2	-	0.2	-
630	AUACC	1	23	22	4.7	4.0	-19%	17	7.5	4.8	1.6	1.2	34.7	96%
		2	34	33	2.3	1.4	-67%	8	6.8	2.3	2.9	1.7	39.7	97%
		3	13	12	0.3	0.2	-63%	0.7	0.5	0.2	2.0	1.5	2.0	92%
	SBACC	1	23	21	3.0	2.3	-34%	11	6.1	3.9	2.0	1.7	25.0	91%
		2	34	28	0.4	0.1	-300%	0.3	1.2	0.1	2.7	1.8	5.8	82%
		3	13	12	0.0	0.0	-	0.02	0.1	0.0	2.9	1.4	0.2	92%
	TRUETHK	1	23	22	0.3	0.3	-15%	0.75	0.3	0.2	1.0	0.8	1.5	96%
		2	34	34	0.2	0.2	0%	0.73	0.2	0.2	0.9	0.9	0.7	100%
		3	13	13	0.2	0.2	0%	0.38	0.1	0.1	0.5	0.5	0.4	100%
True Blue 700	AUACC	1	8	-	2.3	-	-	-	2.24	-	0.97	-	6.82	100%
	SBACC	1	8	-	2.15	-	-	-	2.61	-	1.21	-	7.68	100%
	TRUETHK	1	8	-	0.7	-	-	-	0.52	-	0.75	-	1.78	100%

14.4 Estimation Domain Boundaries

Structural controls on mineralisation have been identified through underground mapping and structural interpretation of drill core. These relationships and the grade distribution have been used to guide estimation domain boundaries, which are predominantly hard boundaries (refer to Section 14.2 and Figure 14.4, Figure 14.5).

In the Shepherd (600 series) models, a strong flexure divides the lode into a distinct north and south zone and is spatially correlated with a change in antimony and gold grades in the lodes (see figures and tables in Section 14.5: Vein Orientation Domains).

14.5 Vein Orientation Domains

To use the 2D accumulation method to estimate a Mineral Resource, dip and dip-direction domains were assigned to the input data area to calculate true thickness of intercepts and volume correctly. Drill intercept thickness corrections factors used previously for the 2021 Mineral Resource Estimate were removed due to improved resolution through mining and drilling at Shepherd.

The dip and dip-direction of each domain was determined by adjusting a plane of best fit to the dip and dip-direction of the domain. The details of this plane were then coded into the drill data associated with the domain.

The dip and dip-direction domains have been used to create volume correction factors for 2D to 3D conversion within the Z and Y directions using the following formula:

$$Z\ Correction\ Factor = 1/\sin(dip)$$

$$Y\ Correction\ Factor = Absolute\ (1/\sin(dip\text{-}direction)).$$

$$Volume\ Correction\ Factor = Z\ Correction\ Factor \times Y\ Correction\ Factor.$$

The vein orientation domain examples are given for Shepherd 600 Lode in Figure 14.12 and Table 14.5.

Figure 14.12: Shepherd-600 lode dip and dip-direction domains

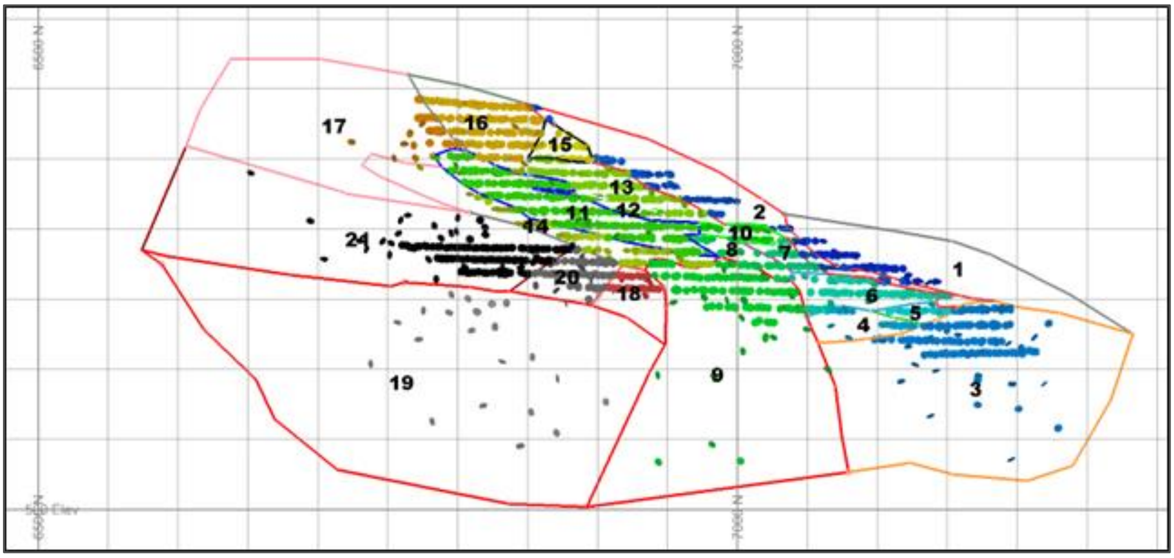


Table 14.5: Shepherd-600 lode dip domains – dip and dip direction

Dip domain	Dip (degree)	Dip direction (degrees)
1	65	287
2	54	289
3	87	285
4	62	281
5	77	275
6	88	278
7	64	274
8	54	285
9	86	275
10	70	280
11	82	264
12	52	276
13	85	84
14	50	274
15	80	261
16	85	88
17	85	286
18	88	260
19	84	273
20	80	86
21	82	278

14.6 Bulk Density Determinations

Bulk density has been previously assessed in underground and drill core samples during 2021 (MP,2022) throughout the Youle and Shepherd Lode systems. The determinations were from whole-core samples, which were aligned with assay sample intervals, and are considered by the QP to still be representative for the purposes of the Mineral Resource Estimate.

True Blue used the Shepherd and Youle methodologies, being of comparable nature in the lode and host lithologies.

14.6.1 Mineralised Material

A summary of the bulk densities applied to mineralised material in the resource models is given in Table 14.6. Stibnite concentration continued to have the dominant effect on bulk density, and the formulas retain the stoichiometric based formula in all historical models. The exception is Youle, Shepherd and True Blue (Equation 2) where quartz occurs as the dominant gangue mineral in some domains.

Table 14.6: Summary of the two derivations of the bulk density formula in use for the Mineral Resource Estimate

Models	Equation No	Equation
Augusta, Cuffley, Brunswick Lodes	1	$BD = ((1.3951 * \mathrm{Sb\%}) + (100 - (1.3951 * \mathrm{Sb\%})))/(((1.3951 * \mathrm{Sb\%})/4.56) + ((100 - (1.3951 * \mathrm{Sb\%}))/2.74))$
Youle & Shepherd 500/600 Series & True Blue (700)	2	$If\ (Sb\% > 1)\ BD = ((1.3951 * \mathrm{Sb\%}) + (100 - (1.3951 * \mathrm{Sb\%})))/(((1.3951 * \mathrm{Sb\%})/4.56) + ((100 - (1.3951 * \mathrm{Sb\%}))/2.69))$ $If (Sb\% < 1)\ BD = (0.05661 * \mathrm{Fe\%}) + 2.5259$

Augusta, Cuffley and Brunswick Models

The bulk density for all Augusta, Cuffley and Brunswick lodes have historically been estimated using a stoichiometric formula which uses the assayed antimony grade as the principal variable, and the bulk density of waste rock set as a constant value as displayed below, using Equation 1.

$$Eq\ 1 - BD = ((1.3951 * Sb\%) + (100 - (1.3951 * Sb\%)))/(((1.3951 * Sb\%)/4.56) + ((100 - (1.3951 * Sb\%))/2.74))$$

Where:

- empirical formula of stibnite: Sb_2S_3
- Sb%: antimony assay as a percentage by mass
- molecular weight of antimony (Sb): 121.757
- molecular weight of sulfur: (S): 32.066
- 1.3951 is a constant calculated by 339.712/243.514 where 339.712 is the molar mass of Sb_2S_3, and 243.514 is the molar mass of antimony contained in one mole of pure stibnite
- Bulk density of pure stibnite: 4.56

- Bulk density of unmineralised waste: 2.74.

This method of bulk density estimation for mineralisation was developed and implemented in the 2005 Mineral Resource Estimate conducted by McArthur Ore Deposit Assessments Pty Ltd (MODA, 2005), and has continued to be used in the estimation of the Augusta, Cuffley and Brunswick mineralisation since that date. Equation 1 was applied to the Brunswick-KR (310) estimate.

Youle, Shepard and True Blue Models

The bulk density for all Youle, Shepherd and True Blue lodes has been estimated using a variation of the stoichiometric formula of stibnite presented in Equation 1, with an adjustment to gangue constant to create Equation 2. In addition, gold-only grade domains have been interpreted in both the Shepherd and Youle deposits where the dominant gangue material was quartz. These lodes often contained < 1% antimony rendering an antimony-based equation unsuitable at this low grade. An iron-based regression formula was used in these cases.

$$Eq\ 2 - Youle\ and\ Shepherd\ BD$$

$$If(Sb\% > 1)BD = ((1.3951 * \mathrm{Sb\%}) + (100 - (1.3951 * \mathrm{Sb\%})))/(((1.3951 * \mathrm{Sb\%})/4.56) + ((100 - (1.3951 * \mathrm{Sb\%}))/2.69)\ )$$

$$If(Sb\% < 1)\ BD = (0.05661 * \mathrm{Fe\%}) + 2.5259$$

Where:

- empirical formula of stibnite: Sb_2S_3
- Sb%: antimony assay as a percentage by mass
- molecular weight of antimony (Sb): 121.757
- molecular weight of sulfur: (S): 32.066
- 1.3951 is a constant calculated by 339.712/243.514 where 339.712 is the molar mass of Sb_2S_3, and 243.514 is the molar mass of antimony contained in one mole of pure stibnite
- Bulk density of pure stibnite: 4.56
- Buk density of unmineralised gangue: 2.69, representing a ratio of 1:3 siltstone to quartz
- Fe%: iron assay as a percentage by mass.

Figure 14.13: Comparison of the 2021 bulk density testwork for Youle and Shepherd against the new gangue constant in Equation 2

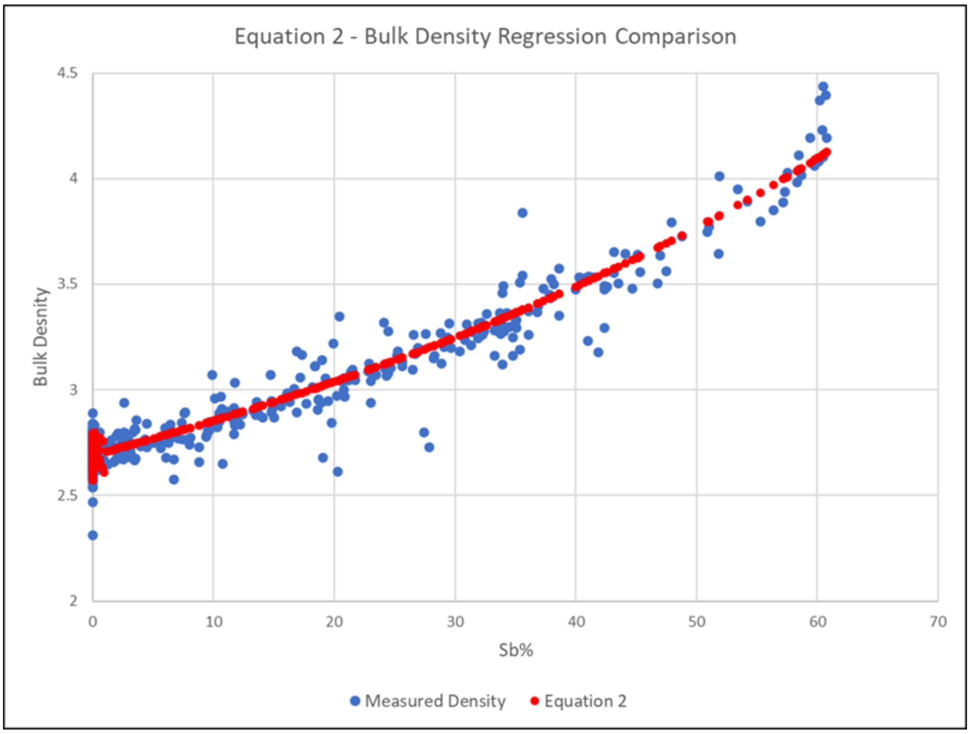
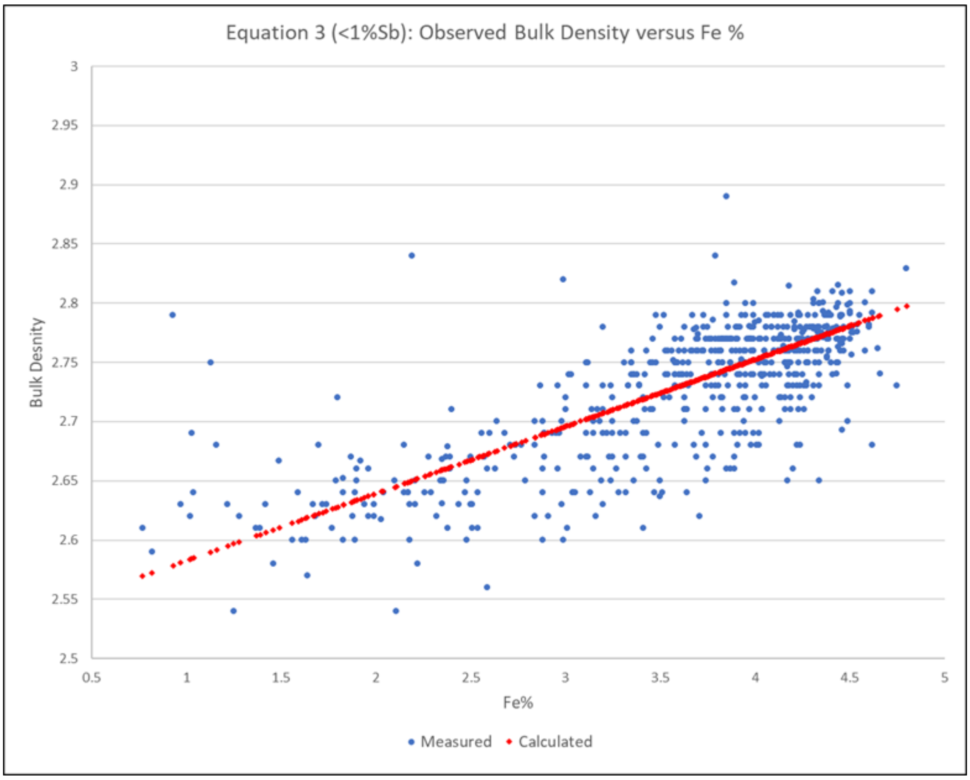


Figure 14.14: Bulk density testwork for samples below 1% antimony versus the predicted bulk density from the linear iron regression in Equation 2



14.6.2 Unmineralised Material

Augusta, Brunswick and Cuffley

The unmineralised rock bulk density of 2.74 g/cm^3 has been averaged from 1,060 samples of drill core measured using the water immersion method during 2014.

The basic statistics for this series of samples has been shown in Table 14.7 and demonstrates very little variability in the waste material bulk densities. Waste rock density remained unchanged for pre-2021 models.

Table 14.7: Descriptive statistics of bulk density in waste material – Augusta, Brunswick, Cuffley

Statistic	Bulk density (g/cm^3)
Mean	2.74
Median	2.77
Mode	2.80
Standard deviation	0.11
Sample variance	0.01
Range	1.23
Minimum	2.01
Maximum	3.24
Count	1,060

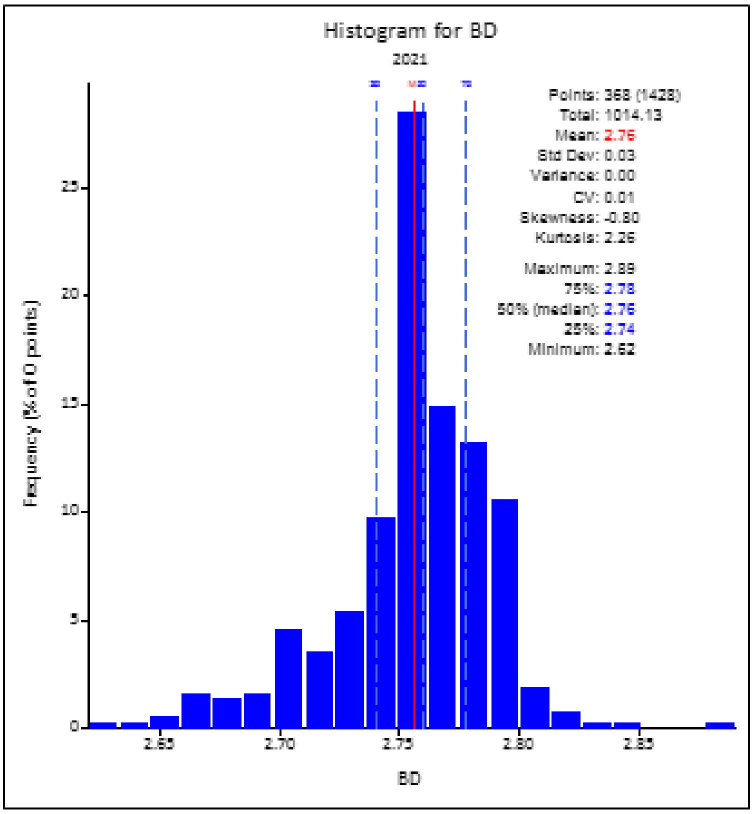
Youle and Shepard

Testwork on the bulk density of unmineralised Youle and Shepherd underground samples and drill core was completed during 2021 (MP, 2022). Summary statistics for waste material with < 5% quartz have been presented in Table 14.8 and Figure 14.15; these showed very little variation around the mean of 2.76 g/cm^3. Therefore, 2.76 g/cm^3 has been applied to waste material in the Youle, Shepherd and True Blue estimates.

Table 14.8: Descriptive statistics of bulk density in waste material – Youle/Shepherd

Statistic	Bulk density (g/cm^3)
Mean	2.76
Median	2.76
Mode	2.78
Standard Deviation	0.03
Sample Variance	0.01
Range	0.27
Minimum	2.62
Maximum	2.89
Count	368

Figure 14.15: Histogram of unmineralised rock bulk density values at Youle/Shepherd



14.7 Variography

A variographic analysis was carried out on the combined composited face and drill hole samples for true thickness, gold accumulation and antimony accumulation. Variography was undertaken in two dimensions after projecting the data onto a constant easting. Variograms were produced using Supervisor v8.15 software using a normal scores transform after grade capping of the grade accumulation and true thickness variables had taken place. The variogram models were back-transformed prior to importing into Datamine software for the estimate. Where required, variogram orientations and ranges were altered to conform to observed grade trends within mineralised domains.

The nugget value was estimated using omnidirectional variograms with a short lag, as downhole variograms cannot be calculated on this dataset due to the samples being composited to the full width of the mineralisation. Therefore, the omnidirectional variogram with short lag most closely represents the small-scale geological and/or sampling grade variability of the data.

An example of the experimental normal scores variograms and fitted models for the Shepherd (600) Lode for gold and antimony accumulation, and lode true thickness is displayed in Figure 14.16 to Figure 14.18. Where a domain lacked sufficient pairs to produce meaningful variograms, domains of similar characters were combined (for instance the gold-only domains 1, 3 and 4 for the 620). Where entire models lacked sufficient pairs to produce meaningful variograms, variograms were borrowed from other domains of similar geological character and controls on mineralisation.

Figure 14.16: Shepherd 600 combined domain 1,2,6,7 Au-Accumulation (AUACC) variograms, illustrating the major direction, semi-major direction, back transform model, and omni-directional variogram in clockwise order

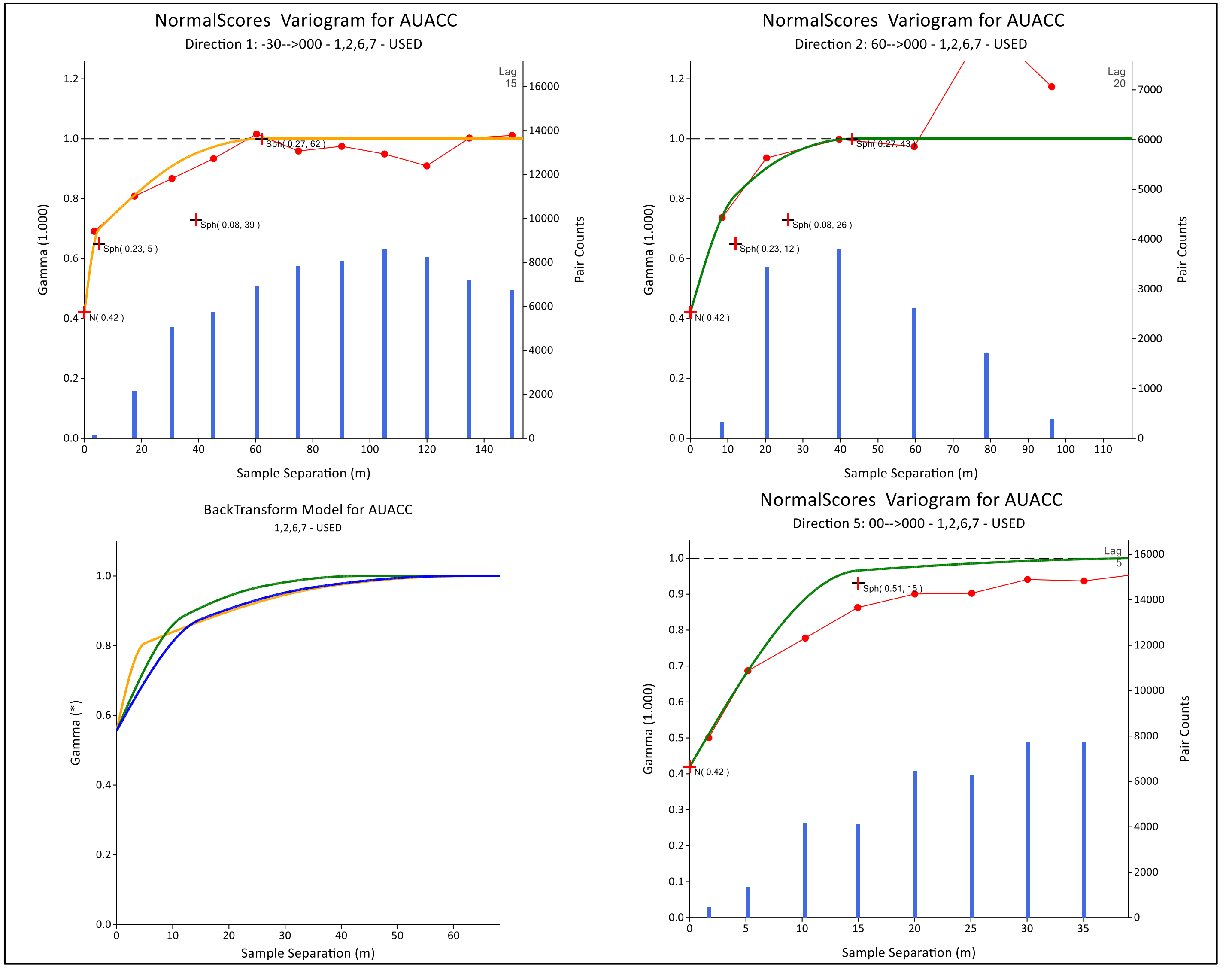


Figure 14.17: Shepherd 600 combined domain 1,2,6,7 Sb-Accumulation (SBACC) variograms, illustrating the major direction, semi-major direction, back transform model, and omni-directional variogram in clockwise order

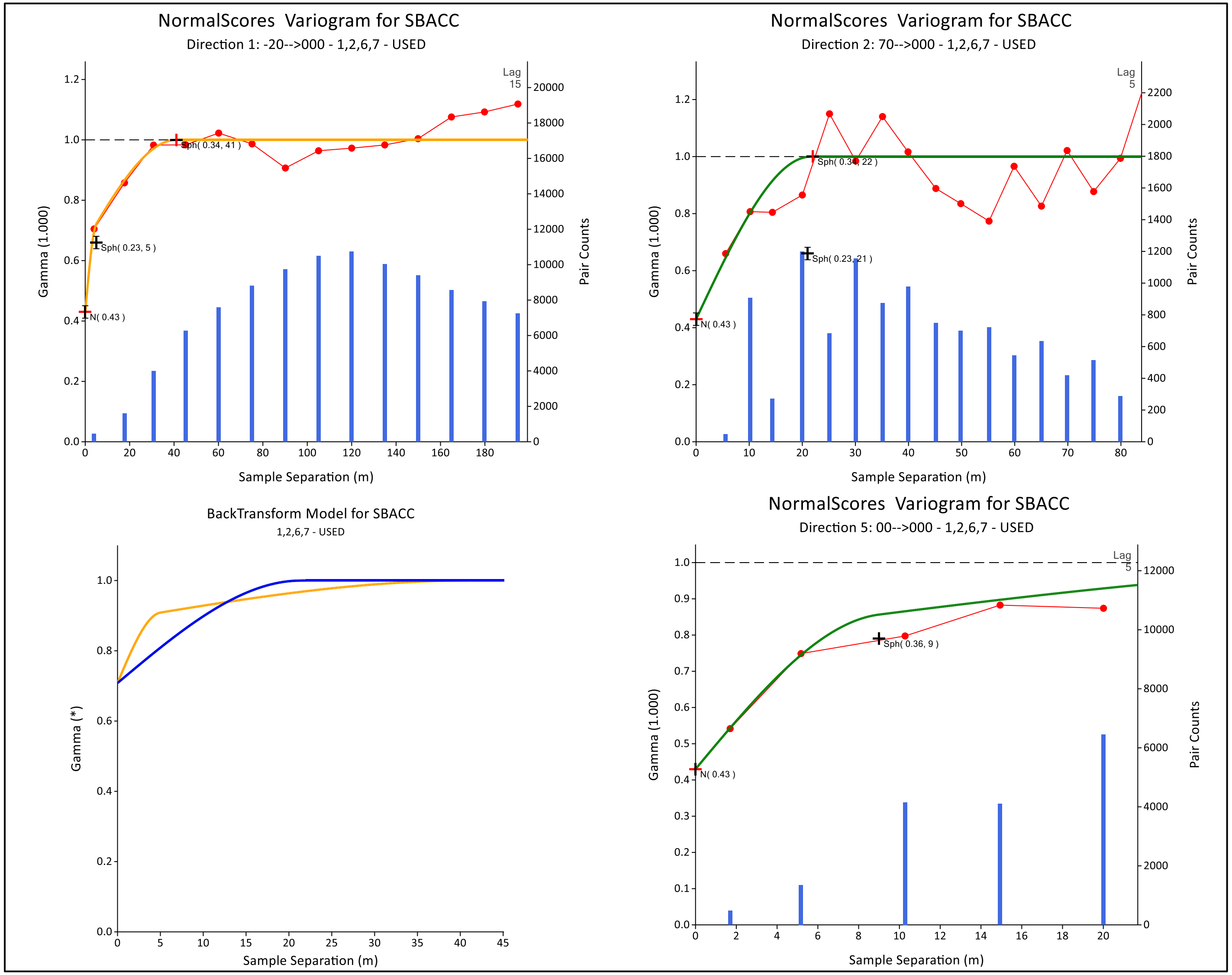


Figure 14.18: Shepherd 600 combined domain 1,2,6,7 true thickness (TRUETHK) variograms, illustrating the major direction, semi-major direction, back transform model, and omni-directional variogram in clockwise order

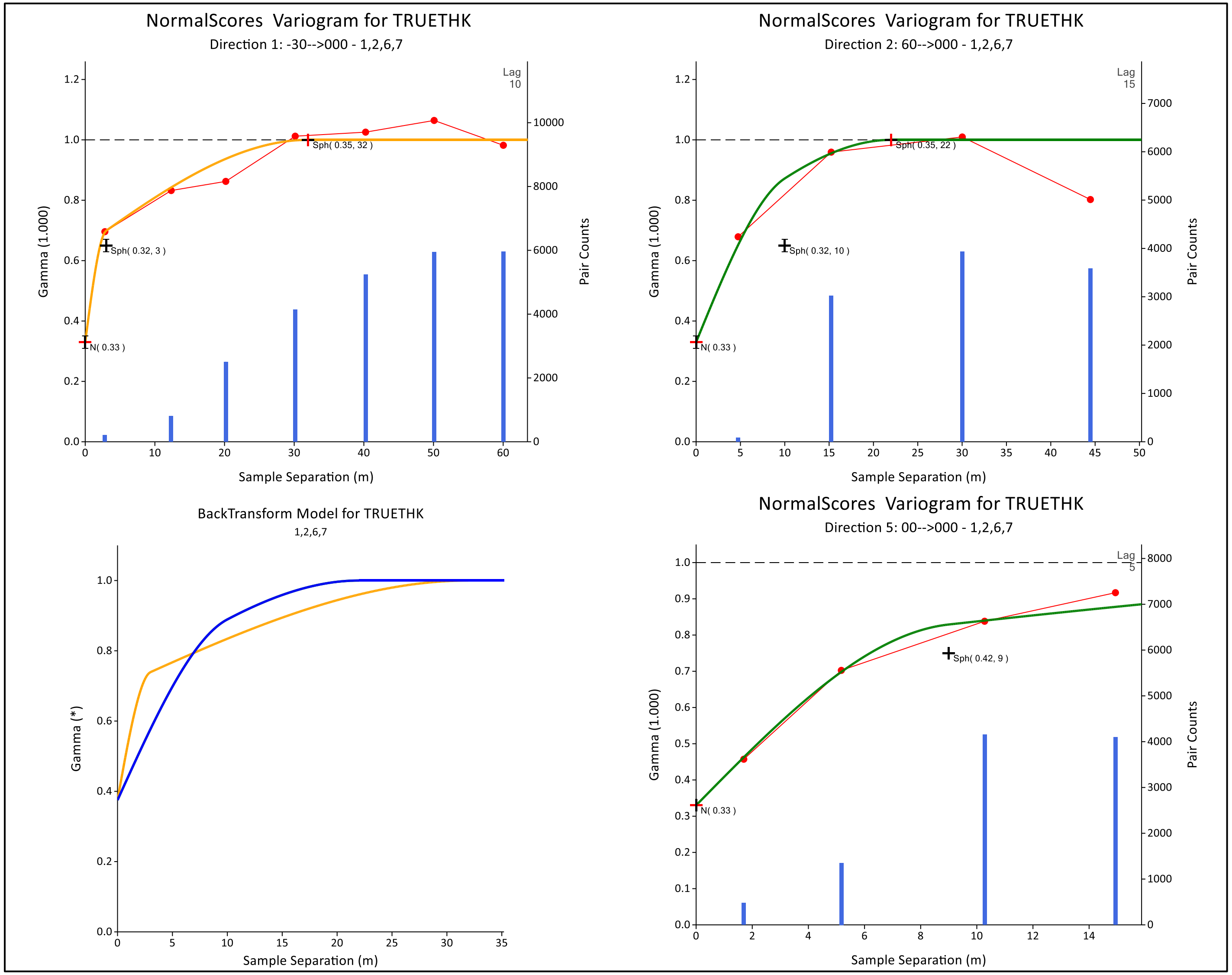


Figure 14.19: Shepherd 600 combined domain 3,4,5 Au-Accumulation (AUACC) variograms, illustrating the major direction, semi-major direction, back transform model, and omni-directional variogram in clockwise order

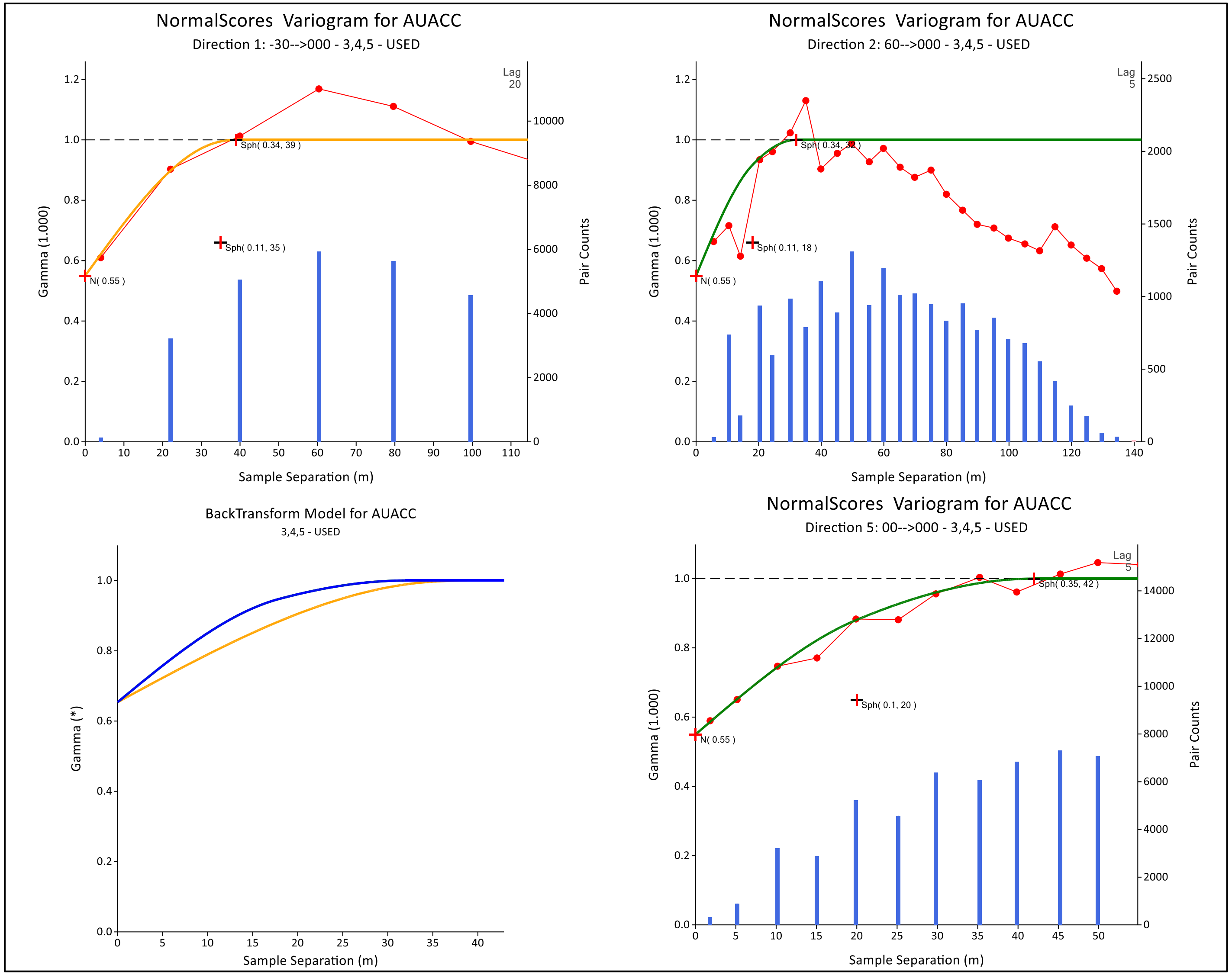


Figure 14.20: Shepherd 600 combined domain 3,4,5 Sb-Accumulation (SBACC) variograms , illustrating the major direction, semi-major direction, back transform model, and omni-directional variogram in clockwise order

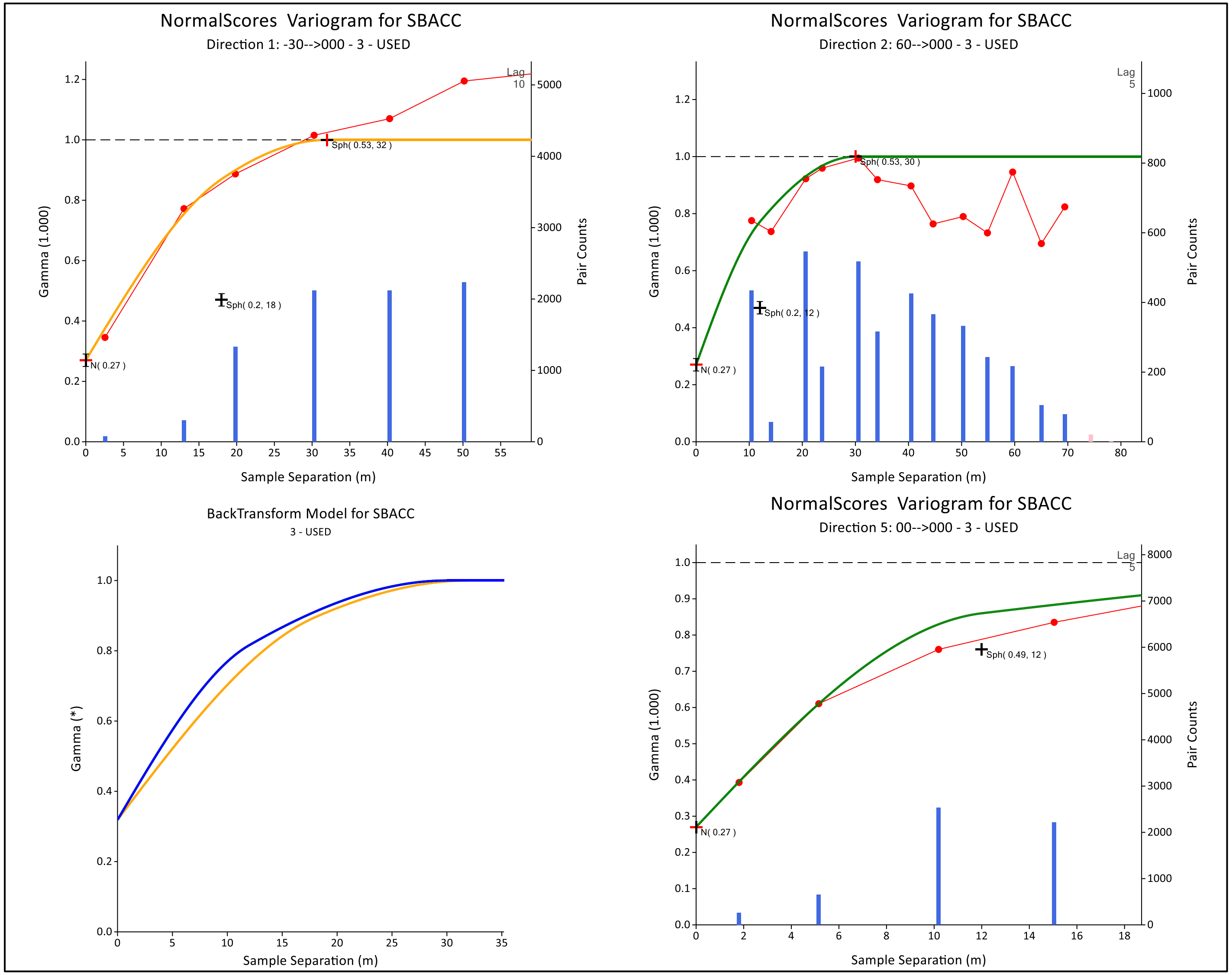
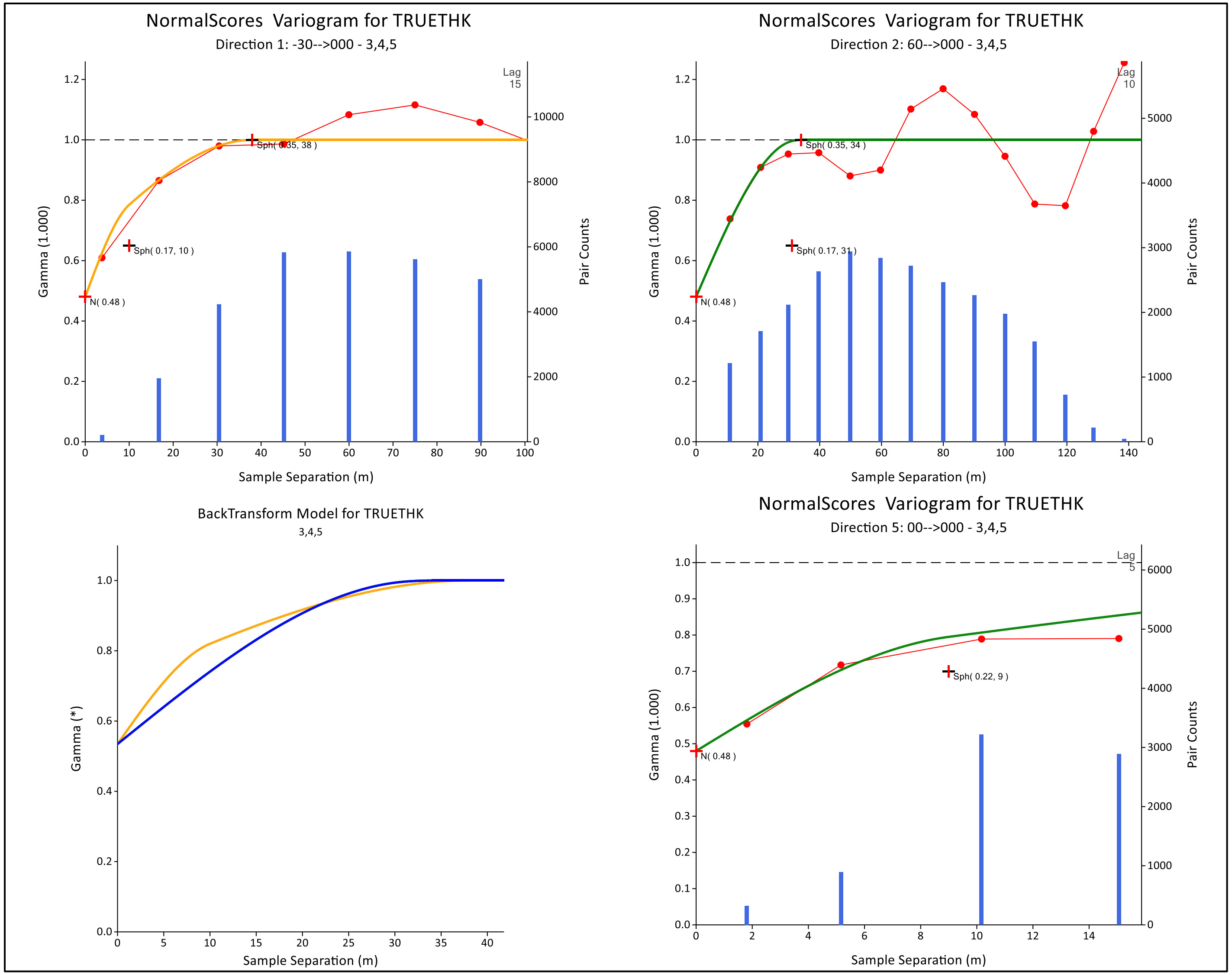


Figure 14.21: Shepherd 600 combined domain 3,4,5 true thickness (TRUETHK) variograms, illustrating the major direction, semi-major direction, back transform model, and omni-directional variogram in clockwise order



The orientation of the best grade continuity was selected based on the variographic analysis, and was verified by observations made during underground mapping, logging, and geological modelling. The orientations and ranges identified during the variographic analysis were used to generate 3D ellipsoid wireframes, which were validated against the composite values in longitudinal projection (examples: Figure 14.22 and Figure 14.23).

Figure 14.22: Youle long-section with grade domains and Au-Accumulation for intercepts shown with the Domain 1 search ellipse for Au-Accumulation

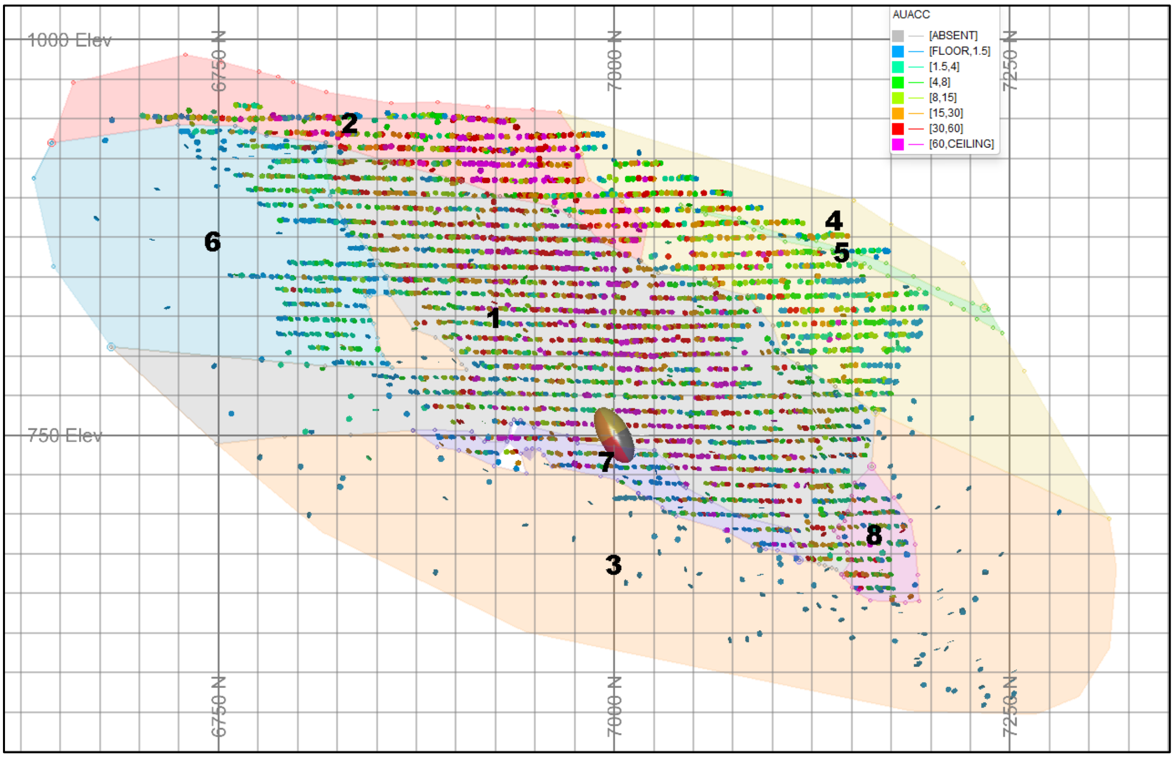
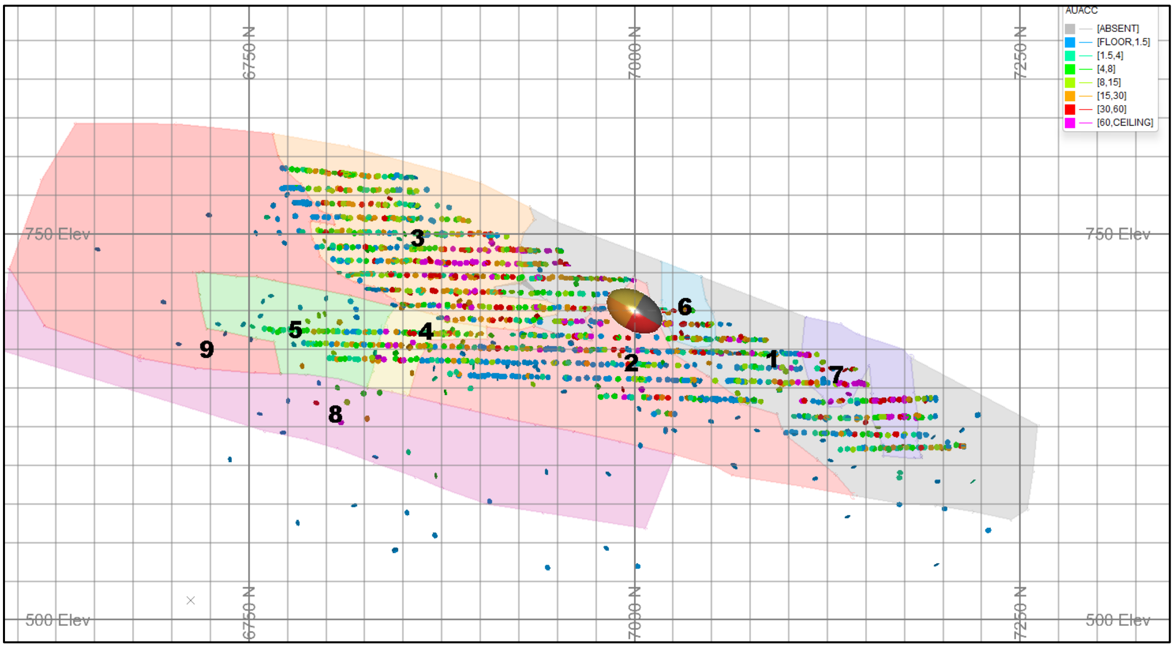


Figure 14.23: Shepherd (600) long-section with grade domains and Au-Accumulation for intercepts shown with the combined domain 1,2,6,7 search ellipse for Au-Accumulation



The updated variographic parameters determined for the Youle (500) and Shepherd series 600, 610 and 620 Lodes are detailed in Table 14.9.

Table 14.9 Variogram model parameters for the major lodes of Youle (500), and Shepherd (600, 610, 620) zones

Model	Domain	Element	Variogram orientations			Datamine rotations			C0	A1			C1	A2			C2	A3			C3
			Dir 1	Dir 2	Dir 3	Dir 1	Dir 2	Dir 3		Dir 1	Dir 2	Dir 3		Dir 1	Dir 2	Dir 3		Dir 1	Dir 2	Dir 3	
Youle (500)	1	AUACC	90	90	-120	3	1	3	0.504	13	14	14	0.309	41	20	20	0.188	-	-	-	-
		SBACC	90	90	-120	3	1	3	0.268	10	7	7	0.453	32	19	19	0.279	-	-	-	-
		TRUETHK	90	90	-120	3	1	3	0.267	17	16	16	0.451	50	20	20	0.282	-	-	-	-
	2	AUACC	90	90	-140	3	1	3	0.355	26	21	21	0.442	29	25	25	0.203	-	-	-	-
		SBACC	90	90	-140	3	1	3	0.248	19	14	14	0.555	38	30	30	0.197	-	-	-	-
		TRUETHK	90	90	-120	3	1	3	0.248	9	22	22	0.488	42	40	40	0.264	-	-	-	-
	3	Utilises Domain 1 Variography																			
	4	AUACC	90	90	-110	3	1	3	0.392	34	27	10	0.477	60	44	22	0.131	-	-	-	-
		SBACC	90	90	-110	3	1	3	0.287	24	15	16	0.351	66	39	35	0.362	-	-	-	-
		TRUETHK	90	90	-110	3	1	3	0.445	13	7	7	0.221	40	22	22	0.334	-	-	-	-
	5	Utilises Domain 4 Variography																			
	6	AUACC	90	90	-120	3	1	3	0.418	21	10	10	0.446	32	22	22	0.136	-	-	-	-
		SBACC	90	90	-110	3	1	3	0.387	10	26	26	0.227	34	27	27	0.385	-	-	-	-
		TRUETHK	90	90	-110	3	1	3	0.471	17	8	8	0.465	40	11	11	0.064	-	-	-	-
	7	AUACC	90	90	-150	3	1	3	0.605	31	9	9	0.258	36	20	20	0.137	-	-	-	-
		SBACC	90	90	-120	3	1	3	0.466	14	11	10	0.356	15	15	22	0.179	-	-	-	-
		TRUETHK	90	90	-120	3	1	3	0.338	18	9	9	0.393	20	15	15	0.269	-	-	-	-
	8	AUACC	90	90	-140	3	1	3	0.644	22	14	14	0.194	28	16	16	0.162	-	-	-	-
		SBACC	90	90	-110	3	1	3	0.676	26	21	21	0.156	37	22	22	0.167	-	-	-	-
		TRUETHK	90	90	-120	3	1	3	0.363	16	11	10	0.378	21	15	11	0.259	-	-	-	-
Shepherd (600)	Combined: 1, 2, 6, 7	AUACC	90	90	-150	3	1	3	0.556	5	12	15	0.218	39	26	35	0.081	62	43	60	0.145
		SBACC	90	90	-160	3	1	3	0.708	5	21	21	0.18	41	22	22	0.112	-	-	-	-
		TRUETHK	90	90	-150	3	1	3	0.375	3	10	10	0.322	32	22	22	0.303	-	-	-	-
	Combined: 3, 4, 5	AUACC	90	90	-150	3	1	3	0.654	35	18	18	0.134	39	32	32	0.212	-	-	-	-
		SBACC	90	90	-150	3	1	3	0.319	18	12	12	0.255	32	30	30	0.426	-	-	-	-
		TRUETHK	90	90	-150	3	1	3	0.535	10	31	31	0.172	38	34	34	0.293	-	-	-	-
	8	Utilises Domain 1 Variography																			
	9	Utilises Domain 3 Variography																			
610	1	AUACC	90	90	-160	3	1	3	0.481	18	15	15	0.185	33	21	21	0.334	-	-	-	-
		SBACC	90	90	-170	3	1	3	0.559	32	15	15	0.121	33	20	20	0.32	-	-	-	-
		TRUETHK	90	90	-170	3	1	3	0.598	21	15	15	0.116	25	16	21	0.286	-	-	-	-
	2	Utilises Domain 1 Variography																			
620	Combined: 1, 3, 4	AUACC	90	90	-160	3	1	3	0.586	8	28	23	0.118	54	29	24	0.296	-	-	-	-
		SBACC	90	90	-150	3	1	3	0.53	42	8	8	0.246	63	15	15	0.224	-	-	-	-
		TRUETHK	90	90	-130	3	1	3	0.4	25	22	22	0.515	36	23	23	0.085	-	-	-	-
	2	Utilises Domain 1 Variography																			
	Combined: 5, 6	AUACC	90	90	-170	3	1	3	0.482	31	20	20	0.377	35	21	21	0.142	-	-	-	-
		SBACC	90	90	-160	3	1	3	0.437	39	18	18	0.324	40	21	21	0.24	-	-	-	-
		TRUETHK	90	90	-170	3	1	3	0.616	6	10	10	0.231	22	15	15	0.152	-	-	-	-
	7	Utilises Domain 1 Variography																			

Notes: Dir 1: Major; Dir 2: Semi-Major; Dir 3: Minor; C0: nugget variance; C1 & C2: sills of autocorrelated variance; A1 & A2: Range of spatial dependence.

14.8 Search and Estimation Parameters

True thickness, gold accumulation, and antimony accumulation were estimated using ordinary kriging into the block model for each lode. The models were oriented north–south and were one block wide in the east–west direction. All search ellipses used for this method were parallel with the north–south block model orientation.

Where there were insufficient data to generate adequate variograms, and where the borrowing of variograms was not considered appropriate, inverse distance (ID) estimation was employed.

The following summarises the estimation process:

- Drill hole and face samples for each lode were projected into an arbitrary north–south oriented vertical plane.
- The orientation and anisotropy of the search ellipsoid for each lode was guided by the grade and thickness continuity modelled in the variographic analysis.
- The variogram parameters for the Youle and Shepherd lodes are detailed above in Section 14.7. Where the variogram lacked sufficient data pairs to produce meaningful variograms, variograms were borrowed from the adjacent lode domains that have a comparable geological setting.
- In the case of True Blue, no variogram could be modelled. As a result, an ID (cubed) estimation was undertaken using an anisotropic search modelled from the 500 model grade domain 4, which is a north plunging grade pod in sub-vertical mineralisation comparable with this style of mineralisation across the Costerfield Property.
- Each estimate involved three search passes:
  - The first search pass dimensions were approximately equivalent to half of the gold accumulation variogram model range.
  - The second was twice the first pass in all three directions.
  - The third pass was generally six times the first pass in all three directions but adjusted to ensure all blocks were estimated.
- Where grade sub-domains were present, the estimation was completed separately within each sub-domain. Sub-domains had hard boundaries in most cases to divide high- and low-grade domains.
- The estimation was undertaken using a combined dataset of face sample and drill hole data. A limit to the number of face samples was applied to the regions of the estimate with low sample density (exploration drilling) zones. These regions correspond to the large blocks in Table 14.14. The face sample limit was reviewed domain by domain within each model, and commonly set to a maximum of two.

The estimation parameters applied to the estimation of the Youle 500, Shepherd 600, Suffolk 620, and True Blue models are detailed in Table 14.10, Table 14.11, Table 14.12, and Table 14.13, respectively. As iron percentage (Fe%) was required for density determinations (Equation 2, Section 14.6) in the Youle and Shepherd deposits; iron-accumulation was calculated using the antimony-accumulation estimation parameters.

Table 14.10: Youle (500) block model search parameters

Resource class	Domain	Variable	First pass					Second pass					Third pass					
			Search			# Samples		Second pass			# Samples		Third pass			# Samples		DH
			Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	Limit
Measured	1	AUACC	50	20	20	2	8	100	40	40	2	10	300	120	120	1	5	0
		SBACC	50	20	20	2	8	100	40	40	2	10	300	120	120	1	5	0
		TRUETHK	50	20	20	2	8	100	40	40	2	10	300	120	120	1	5	0
	2	AUACC	15	13	13	2	8	30	26	26	2	10	90	78	78	1	5	0
		SBACC	15	13	13	2	8	30	26	26	2	10	90	78	78	1	5	0
		TRUETHK	15	13	13	2	12	30	26	26	2	12	90	78	78	1	5	0
	3	AUACC	50	20	20	3	8	100	40	40	2	10	300	120	120	1	5	0
		SBACC	50	20	20	3	8	100	40	40	2	10	300	120	120	1	5	0
		TRUETHK	50	20	20	3	8	100	40	40	2	10	300	120	120	1	5	0
	4	AUACC	30	17	17	2	6	60	34	34	2	10	180	102	102	1	5	0
		SBACC	30	17	17	2	6	60	34	34	2	10	180	102	102	1	5	0
		TRUETHK	30	17	17	2	6	60	34	34	2	12	180	102	102	1	5	0
	5	AUACC	30	17	17	2	12	60	34	34	2	15	180	102	102	1	5	0
		SBACC	30	17	17	2	8	60	34	34	2	15	180	102	102	1	5	0
		TRUETHK	30	17	17	2	12	60	34	34	2	10	180	102	102	1	5	0
	6	AUACC	17	10	10	4	8	34	20	20	2	10	102	60	60	1	5	0
		SBACC	17	10	10	4	8	34	20	20	2	10	102	60	60	1	5	0
		TRUETHK	17	10	10	4	8	34	20	20	2	10	102	60	60	1	5	0
	7	AUACC	18	10	10	2	8	36	20	20	2	10	108	60	60	1	5	0
		SBACC	18	10	10	2	8	36	20	20	2	10	108	60	60	1	5	0
		TRUETHK	18	10	10	2	8	36	20	20	2	10	108	60	60	1	5	0
	8	AUACC	15	12	12	2	4	30	24	24	2	10	90	72	72	1	5	0
		SBACC	15	12	12	2	4	30	24	24	2	10	90	72	72	1	5	0
		TRUETHK	15	12	12	2	4	30	24	24	2	10	90	72	72	1	5	0
Indicated & Inferred	1	AUACC	50	20	20	2	6	100	40	40	2	10	300	120	120	1	5	4
		SBACC	50	20	20	2	6	100	40	40	2	10	300	120	120	1	5	4
		TRUETHK	50	20	20	2	6	100	40	40	2	10	300	120	120	1	5	4
	2	AUACC	15	13	13	1	8	30	26	26	2	8	90	78	78	1	5	1
		SBACC	15	13	13	1	8	30	26	26	2	8	90	78	78	1	5	1
		TRUETHK	15	13	13	1	8	30	26	26	2	8	90	78	78	1	5	1
	3	AUACC	50	20	20	3	8	100	40	40	2	10	300	120	120	1	5	2
		SBACC	50	20	20	3	8	100	40	40	2	10	300	120	120	1	5	2
		TRUETHK	50	20	20	3	8	100	40	40	2	10	300	120	120	1	5	2
	4	AUACC	30	17	17	2	8	60	34	34	2	10	180	102	102	1	5	2
		SBACC	30	17	17	2	8	60	34	34	2	10	180	102	102	1	5	2
		TRUETHK	30	17	17	2	6	60	34	34	2	12	180	102	102	1	5	2
	5	AUACC	30	17	17	2	8	60	34	34	1	10	180	102	102	1	5	0
		SBACC	30	17	17	2	8	60	34	34	1	10	180	102	102	1	5	0
		TRUETHK	30	17	17	2	12	60	34	34	1	12	180	102	102	1	5	0
	6	AUACC	17	10	10	4	8	34	20	20	2	10	102	60	60	1	5	1
		SBACC	17	10	10	4	8	34	20	20	2	10	102	60	60	1	5	1
		TRUETHK	17	10	10	4	8	34	20	20	2	10	102	60	60	1	5	1
	7	AUACC	18	10	10	2	8	36	20	20	2	10	108	60	60	1	5	1
		SBACC	18	10	10	2	8	36	20	20	2	10	108	60	60	1	5	1
		TRUETHK	18	10	10	2	8	36	20	20	2	10	108	60	60	1	5	1
	8	AUACC	15	12	12	2	8	30	24	24	2	10	90	72	72	1	5	1
		SBACC	15	12	12	2	8	30	24	24	2	10	90	72	72	1	5	1
		TRUETHK	15	12	12	2	8	30	24	24	2	10	90	72	72	1	5	1

Notes: Iron-accumulation (FEACC) calculated utilising the antimony-accumulation (SBACC) parameters. AUTT, SBTT calculated from AUACC and SBACC parameters, respectively.

Table 14.11: Shepherd 600 block model search parameters

Resource class	Domain	Variable	First pass					Second pass					Third pass					
			Search			# Samples		Second pass			# Samples		Third pass			# Samples		DH
			Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	Limit
Measured	1	AUACC	20	13	13	2	6	40	26	26	2	10	120	78	78	1	15	0
		SBACC	20	13	13	2	6	40	26	26	2	10	120	78	78	1	15	0
		TRUETHK	20	13	13	2	6	40	26	26	2	10	120	78	78	1	15	0
	2	AUACC	20	13	13	3	8	40	26	26	3	8	120	78	78	1	10	0
		SBACC	20	13	13	3	8	40	26	26	3	8	120	78	78	1	10	0
		TRUETHK	20	13	13	3	8	40	26	26	3	8	120	78	78	1	10	0
	3	AUACC	20	16	16	2	6	40	32	32	2	10	120	96	96	1	10	0
		SBACC	20	16	16	2	8	40	32	32	2	10	120	96	96	1	10	0
		TRUETHK	20	16	16	2	6	40	32	32	2	12	120	96	96	1	10	0
	4	AUACC	20	16	16	2	6	40	32	32	2	10	120	96	96	1	10	0
		SBACC	20	16	16	2	6	40	32	32	2	10	120	96	96	1	10	0
		TRUETHK	20	16	16	2	6	40	32	32	2	12	120	96	96	1	10	0
	5	AUACC	20	16	16	2	8	40	32	32	2	10	120	96	96	1	10	0
		SBACC	20	16	16	2	8	40	32	32	2	10	120	96	96	1	10	0
		TRUETHK	20	16	16	2	8	40	32	32	2	12	120	96	96	1	10	0
	6	AUACC	20	13	13	2	8	40	26	26	2	10	120	78	78	1	10	0
		SBACC	20	13	13	2	6	40	26	26	2	10	120	78	78	1	10	0
		TRUETHK	20	13	13	2	6	40	26	26	2	12	120	78	78	1	10	0
	7	AUACC	20	13	13	2	6	40	26	26	2	6	120	78	78	1	10	0
		SBACC	20	13	13	2	6	40	26	26	2	6	120	78	78	1	10	0
		TRUETHK	20	13	13	2	6	40	26	26	2	6	120	78	78	1	10	0
	8	AUACC	20	13	13	2	8	40	26	26	2	10	120	78	78	1	10	0
		SBACC	20	13	13	2	8	40	26	26	2	10	120	78	78	1	10	0
		TRUETHK	20	13	13	2	8	40	26	26	2	12	120	78	78	1	10	0
	9	AUACC	20	16	16	2	8	40	32	32	2	10	120	96	96	1	10	0
		SBACC	20	16	16	2	8	40	32	32	2	10	120	96	96	1	10	0
		TRUETHK	20	16	16	2	8	40	32	32	2	12	120	96	96	1	10	0
Indicated & Inferred	1	AUACC	20	13	13	2	6	40	26	26	2	4	120	78	78	1	3	1
		SBACC	20	13	13	2	6	40	26	26	2	4	120	78	78	1	3	1
		TRUETHK	20	13	13	2	6	40	26	26	2	4	120	78	78	1	3	1
	2	AUACC	20	13	13	3	8	40	26	26	3	8	120	78	78	1	4	2
		SBACC	20	13	13	3	8	40	26	26	3	8	120	78	78	1	4	2
		TRUETHK	20	13	13	3	8	40	26	26	3	8	120	78	78	1	4	2
	3	AUACC	20	16	16	2	6	40	32	32	2	4	120	96	96	1	4	2
		SBACC	20	16	16	2	6	40	32	32	2	4	120	96	96	1	4	2
		TRUETHK	20	16	16	2	6	40	32	32	2	4	120	96	96	1	4	2
	4	AUACC	20	16	16	2	4	40	32	32	2	6	120	96	96	1	6	6
		SBACC	20	16	16	2	4	40	32	32	2	6	120	96	96	1	2	6
		TRUETHK	20	16	16	3	4	40	32	32	2	6	120	96	96	1	2	6
	5	AUACC	20	16	16	2	8	40	32	32	2	10	120	96	96	1	10	4
		SBACC	20	16	16	2	8	40	32	32	2	10	120	96	96	1	10	4
		TRUETHK	20	16	16	2	8	40	32	32	2	12	120	96	96	1	10	4
	6	AUACC	20	13	13	2	8	40	26	26	2	10	120	78	78	1	10	2
		SBACC	20	13	13	2	6	40	26	26	2	10	120	78	78	1	10	2
		TRUETHK	20	13	13	2	8	40	26	26	2	12	120	78	78	1	10	2
	7	AUACC	20	13	13	2	8	40	26	26	2	10	120	78	78	1	10	2
		SBACC	20	13	13	2	4	40	26	26	2	10	120	78	78	1	10	2
		TRUETHK	20	13	13	2	8	40	26	26	2	12	120	78	78	1	10	2
	8	AUACC	20	13	13	2	8	40	26	26	2	10	120	78	78	1	2	2
		SBACC	20	13	13	2	8	40	26	26	2	10	120	78	78	1	2	2
		TRUETHK	20	13	13	2	8	40	26	26	2	6	120	78	78	1	4	2
	9	AUACC	20	16	16	2	8	40	32	32	2	10	120	96	96	1	10	2
		SBACC	20	16	16	2	8	40	32	32	2	10	120	96	96	1	10	2
		TRUETHK	20	16	16	2	8	40	32	32	2	12	120	96	96	1	10	2

Notes: Iron-accumulation (FEACC) calculated utilising the antimony-accumulation (SBACC) parameters. AUTT, SBTT calculated from AUACC and SBACC parameters, respectively.

Table 14.12: Suffolk 620 block model search parameters

Resource class	Domain	Variable	First pass					Second pass					Third pass					
			Search			# Samples		Second pass			# Samples		Third pass			# Samples		DH
			Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	Limit
Measured	1	AUACC	27	15	15	2	6	54	30	30	2	6	162	90	90	1	10	0
		SBACC	27	15	15	2	8	54	30	30	2	8	162	90	90	1	10	0
		TRUETHK	27	15	15	2	6	54	30	30	2	6	162	90	90	1	10	0
	2	AUACC	27	15	15	2	6	54	30	30	2	6	162	90	90	1	10	0
		SBACC	27	15	15	2	8	54	30	30	2	8	162	90	90	1	10	0
		TRUETHK	27	15	15	2	6	54	30	30	2	6	162	90	90	1	10	0
	3	AUACC	27	15	15	2	6	54	30	30	2	6	162	90	90	1	10	0
		SBACC	27	15	15	2	8	54	30	30	2	8	162	90	90	1	10	0
		TRUETHK	27	15	15	2	6	54	30	30	2	6	162	90	90	1	10	0
	4	AUACC	27	15	15	2	6	54	30	30	2	6	162	90	90	1	10	0
		SBACC	27	15	15	2	8	54	30	30	2	8	162	90	90	1	10	0
		TRUETHK	27	15	15	2	6	54	30	30	2	6	162	90	90	1	10	0
	5	AUACC	18	10	10	2	8	36	20	20	2	8	108	60	60	1	10	0
		SBACC	18	10	10	2	8	36	20	20	2	8	108	60	60	1	10	0
		TRUETHK	18	10	10	2	8	36	20	20	2	8	108	60	60	1	10	0
	6	AUACC	18	10	10	2	8	36	20	20	2	8	108	60	60	1	10	0
		SBACC	18	10	10	2	8	36	20	20	2	8	108	60	60	1	10	0
		TRUETHK	18	10	10	2	8	36	20	20	2	8	108	60	60	1	10	0
	7	AUACC	27	15	15	2	8	54	30	30	2	8	162	90	90	1	10	0
		SBACC	27	15	15	2	8	54	30	30	2	8	162	90	90	1	10	0
		TRUETHK	27	15	15	2	8	54	30	30	2	8	162	90	90	1	10	0
Indicated & Inferred	1	AUACC	27	15	15	2	6	54	30	30	2	2	162	90	90	1	4	4
		SBACC	27	15	15	2	8	54	30	30	2	2	162	90	90	1	4	4
		TRUETHK	27	15	15	2	6	54	30	30	2	2	162	90	90	1	4	4
	2	AUACC	27	15	15	2	3	54	30	30	2	8	162	90	90	1	10	2
		SBACC	27	15	15	2	3	54	30	30	2	8	162	90	90	1	10	2
		TRUETHK	27	15	15	2	3	54	30	30	2	8	162	90	90	1	10	2
	3	AUACC	27	15	15	2	6	54	30	30	2	6	162	90	90	1	10	2
		SBACC	27	15	15	2	8	54	30	30	2	8	162	90	90	1	10	2
		TRUETHK	27	15	15	2	6	54	30	30	2	6	162	90	90	1	10	2
	4	AUACC	27	15	15	3	6	54	30	30	2	2	162	90	90	1	2	3
		SBACC	27	15	15	3	8	54	30	30	2	2	162	90	90	1	2	3
		TRUETHK	27	15	15	3	6	54	30	30	2	2	162	90	90	1	2	3
	5	AUACC	18	10	10	4	8	36	20	20	2	4	108	60	60	1	10	2
		SBACC	18	10	10	4	8	36	20	20	2	4	108	60	60	1	10	2
		TRUETHK	18	10	10	4	8	36	20	20	2	4	108	60	60	1	10	2
	6	AUACC	18	10	10	2	8	36	20	20	2	4	108	60	60	1	10	4
		SBACC	18	10	10	2	8	36	20	20	2	4	108	60	60	1	10	4
		TRUETHK	18	10	10	2	8	36	20	20	2	4	108	60	60	1	10	4
	7	AUACC	27	15	15	2	8	54	30	30	2	8	162	90	90	1	10	2
		SBACC	27	15	15	2	8	54	30	30	2	8	162	90	90	1	10	2
		TRUETHK	27	15	15	2	8	54	30	30	2	8	162	90	90	1	10	2

Notes: Iron-accumulation (FEACC) calculated utilising the antimony-accumulation (SBACC) parameters. AUTT, SBTT calculated from AUACC and SBACC parameters, respectively.

Table 14.13: True Blue 700 block model search parameters

Resource class	Domain	Variable	First pass					Second pass					Third pass					
			Search			# Samples		Second pass			# Samples		Third pass			# Samples		DH
			Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	Limit
Inferred	1	AUACC	30	20	20	2	8	60	40	40	2	8	180	120	120	1	2	0
		SBACC	30	20	20	2	8	60	40	40	2	8	180	120	120	1	2	0
		TRUETHK	30	20	20	2	8	60	40	40	2	8	180	120	120	1	2	0

Notes: Iron-accumulation (FEACC) calculated utilising the antimony-accumulation (SBACC) parameters. AUTT, SBTT calculated from AUACC and SBACC parameters, respectively.

14.9 Block Model Definitions

The 2D estimates were run with all data, including face samples and diamond drill hole samples, for two different cell sizes resulting in two models with small and large block sizes, respectively. The block sizes were selected based on the sample spacing of each area.

Areas of high sample density contain face samples collected in mineralisation during mine development, while areas of low sample density are usually from drill intercepts only ranging from 20 m to 80 m spacing.

The small block estimation was overprinted onto the large block estimation in order to generate a final combined block model. Both the small and large block models were then regularised into a common cell size of 0.5 mY by 0.5 mZ in order to facilitate merging and to better define the mining depletion and domain boundaries.

The block model origins and number of cells are specific to each modelled lode. The common specifications for the block models are detailed in Table 14.14. The block model discretisation of 1,3,3 (XYZ) ensured the 2D data on a single easting coincided with the mid-point of the estimated block.

Table 14.14: Block model dimensions

	High sample data density (face samples)		Low sample data density (drilling only)	
	Block dimensions (m)	**Discretisation**	**Block dimensions (m)**	**Discretisation**
X	1	1	1	1
Y	2.5	3	10	3
Z	5	3	10	3

The east–west dimension (XINC) of each block was then converted to the horizontal thickness derived from the estimated true thickness multiplied by the Volume Correction Factor (see Section 14.5) to produce a 3D block model where:

$$XINC = Corrected\ Thickness$$

$$Corrected\ Thickness = True\ Thickness \times Volume\ Correction\ Factor$$

After the block models have been depleted and Mineral Resource categories applied, the block models were repositioned into true 3D space by projecting the centroid of the block to the western contact of the relevant lode and offsetting eastwards by half the block width (XINC).

14.10 Block Model Validation

The grade and thickness estimates were validated by the following:

- Visual comparison of sample inputs and geological understanding against the estimated model accumulation and grades in longitudinal projection.

- Global statistical comparisons by domain of the declustered input composites with the corresponding estimated variables: Au-Accumulation, Sb-Accumulation and true thickness (as shown in Table 14.17 to Table 14.19). A percentage difference less than 10% between the declustered samples and estimated grades is considered acceptable.
- Local validation using Y and Z swath plots comparing the declustered composites against estimated values (Youle: Figure 14.24 to Figure 14.26; Shepherd: Figure 14.27 to Figure 14.29).

Polygonal sample declustering in Datamine RM was applied due to the clustered nature of face samples along the ore drives. The declustered means presented in the swathe plots are generated by Supervisor using the cell declustering method and are therefore different to the polygonal declustered means presented in Table 14.5.

Table 14.15: Global validation of Youle 500 block model by domain against composites and polygonally declustered composites

Variable	Domain	No. comps	Block model mean	Composite mean comparisons			Declustered composite
			Estimated grade	Composite grade (TC)	Polygonal declustered composite grade (TC)	% Diff. est. grade to composite	% Diff. est. grade to declustered composite
AUACC	1	1574	27.42	31.64	26.79	-13%	**2.4%**
AUACC	2	375	38.07	41.02	38.37	-7%	**-0.8%**
AUACC	3	108	0.04	Not material			
AUACC	4	513	9.05	11.85	8.86	**-24%**	**2.1%**
AUACC	5	10	0.85	Not material			
AUACC	6	322	1.79	4.32	1.82	-59%	**-1.6%**
AUACC	7	155	13.6	13.20	13.63	3%	**-0.2%**
AUACC	8	105	8.75	10.16	8.64	-14%	**1.3%**
SBACC	1	1574	5.3	6.09	5.16	-13%	**2.7%**
SBACC	2	375	14.55	16.02	14.11	-9%	**3.1%**
SBACC	3	108	0.01	Not material			
SBACC	4	513	5.04	6.52	4.96	-23%	**1.6%**
SBACC	5	10	0.23	Not material			
SBACC	6	322	1.21	2.84	1.18	-57%	**2.5%**
SBACC	7	155	0.12	0.12	0.11	0%	**9.1%**
SBACC	8	105	0.05	Not material			
TRUETHK	1	1574	0.28	0.28	0.27	0%	**3.7%**
TRUETHK	2	375	0.63	0.64	0.63	-2%	**0.0%**
TRUETHK	3	108	0.25	Not material			
TRUETHK	4	513	0.19	0.20	0.18	-5%	**5.6%**
TRUETHK	5	10	0.13	Not material			
TRUETHK	6	322	0.21	0.20	0.23	5%	**-8.7%**
TRUETHK	7	155	0.16	0.16	0.16	0%	**0.0%**
TRUETHK	8	105	0.15	0.15	0.15	0%	**0.0%**

Table 14.16: Global validation of Shepherd 600 block model by domain against composites and polygonally declustered composites

Variable	Domain	No. comps	Block model mean	Composite mean comparisons			Declustered composite
			Estimated grade	Composite grade (TC)	Polygonal declustered composite grade (TC)	% Diff. est. grade to composite	% Diff. est. grade to declustered composite
AUACC	1	340	11.6	18.9	11.3	-38%	**3.2%**
AUACC	2	274	4.6	5.9	4.5	-21%	**3.3%**
AUACC	3	396	21.6	21.5	22.5	0%	**-4.2%**
AUACC	4	58	24.3	20.6	22.7	18%	**7.0%**
AUACC	5	77	4.7	6.9	4.4	-32%	**6.2%**
AUACC	6	35	24.2	22.6	23.4	7%	**3.6%**
AUACC	7	80	48.0	49.2	47.4	-3%	**1.2%**
AUACC	8	17	4.8	8.4	4.7	-43%	**1.7%**
AUACC	9	45	0.51	Not material			
SBACC	1	340	0.1	Not material			
SBACC	2	274	0.0	Not material			
SBACC	3	396	6.33	6.27	6.56	1%	**-3.5%**
SBACC	4	58	0.26	0.24	0.29	8%	**-10.3%**
SBACC	5	77	0.03	Not material			
SBACC	6	35	0.68	0.64	0.78	6%	**-12.8%**
SBACC	7	80	1.16	1.16	1.12	0%	**3.6%**
SBACC	8	17	0.00	Not material			
SBACC	9	45	0.01	Not material			
TRUETHK	1	340	0.27	0.3	0.26	-10%	**3.8%**
TRUETHK	2	274	0.31	0.36	0.31	-14%	**0.0%**
TRUETHK	3	396	0.27	0.27	0.27	0%	**0.0%**
TRUETHK	4	58	0.52	0.55	0.51	-5%	**2.0%**
TRUETHK	5	77	0.17	0.18	0.16	-6%	**6.3%**
TRUETHK	6	35	0.47	0.43	0.44	9%	**6.8%**
TRUETHK	7	80	0.39	0.4	0.39	-3%	**0.0%**
TRUETHK	8	17	0.25	0.36	0.22	-31%	**13.6%**
TRUETHK	9	45	0.2	0.27	0.21	-26%	**-4.8%**

Table 14.17: Global validation of Suffolk 620 block model by domain against composites and polygonally declustered composites

Variable	Domain	No. comps	Block model mean	Composite mean comparisons			Declustered composite
			Estimated grade	Composite grade (TC)	Polygonal declustered composite grade (TC)	% Diff. est. grade to composite	% Diff. est. grade to declustered composite
AUACC	1	73	21.44	23.7	21.7	-10%	**-1.2%**
AUACC	2	44	0.22	0.4	0.2	-50%	**4.8%**
AUACC	3	5	2.56	5.1	2.6	-50%	**-1.5%**
AUACC	4	14	8.95	11.7	8.3	-24%	**7.4%**
AUACC	5	57	2.58	5.8	2.4	-55%	**6.2%**
AUACC	6	81	8.18	15.6	7.7	-47%	**6.0%**
SBACC	1	73	0.00	Not material			
SBACC	2	44	0.00	Not material			
SBACC	3	5	0.00	Not material			
SBACC	4	14	0.01	Not material			
SBACC	5	57	0.00	Not material			
SBACC	6	81	0.97	1.8	1.0	-45%	**2.1%**
TRUETHK	1	73	0.22	0.2	0.2	5%	**-4.3%**
TRUETHK	2	44	0.22	0.2	0.2	-4%	**-4.3%**
TRUETHK	3	5	0.17	0.2	0.2	0%	**13.3%**
TRUETHK	4	14	0.17	0.2	0.2	-11%	**-5.6%**
TRUETHK	5	57	0.12	0.2	0.1	-25%	**0.0%**
TRUETHK	6	81	0.17	0.2	0.2	-6%	**-5.6%**

The Youle 500 global validation shows a good fit typically below 5% through the economic domains of 1, 2, 4, 6, 7 and 8 in all three of the estimated parameters. Of these, the dominant stoping areas remaining are on domain 1, 7 and 8. The largest variance is in Sb-accumulation for domain 7 at 9.1% above the declustered sample mean. However, both domains 7 and 8 are non-material for Sb-accumulation, being gold dominated. Domains 3 and 5 are waste domains at the model margins or representing apparent fault offsets respectively.

The Shepherd 600 model has good performance of < 5% variance in domains 1, 2 and 3 across all variables. Au-accumulation in Domain 4 and 5 is 7% and 6.2%, respectively, above the declustered samples; however visual and swathe plot validation shows the estimate to be performing well. Sb-accumulation is only material in domains 3, 4, 6 and 7, with only domains 3 and 7 having grades above 1. Domains 4 and 6, while having some significant Sb-accumulation vales, under-performed in the estimations at -10.3% and -12.8%, respectively. Visual inspection and swathe plots show sporadic higher-grade zones have been smoothed, considered more representative of these zones.

The Suffolk 620 lode estimation is all within 10% for the three variables, except for true thickness of domain 3. Visual inspection highlights the model is performing as expected in domain 3 with the five samples provided in the discreet domain.

Figure 14.24: Youle 500 Global Au-Accumulation swathe plot by northing and elevation. Naïve sample mean (red), cell declustered sample mean (blue), and estimation mean (black)

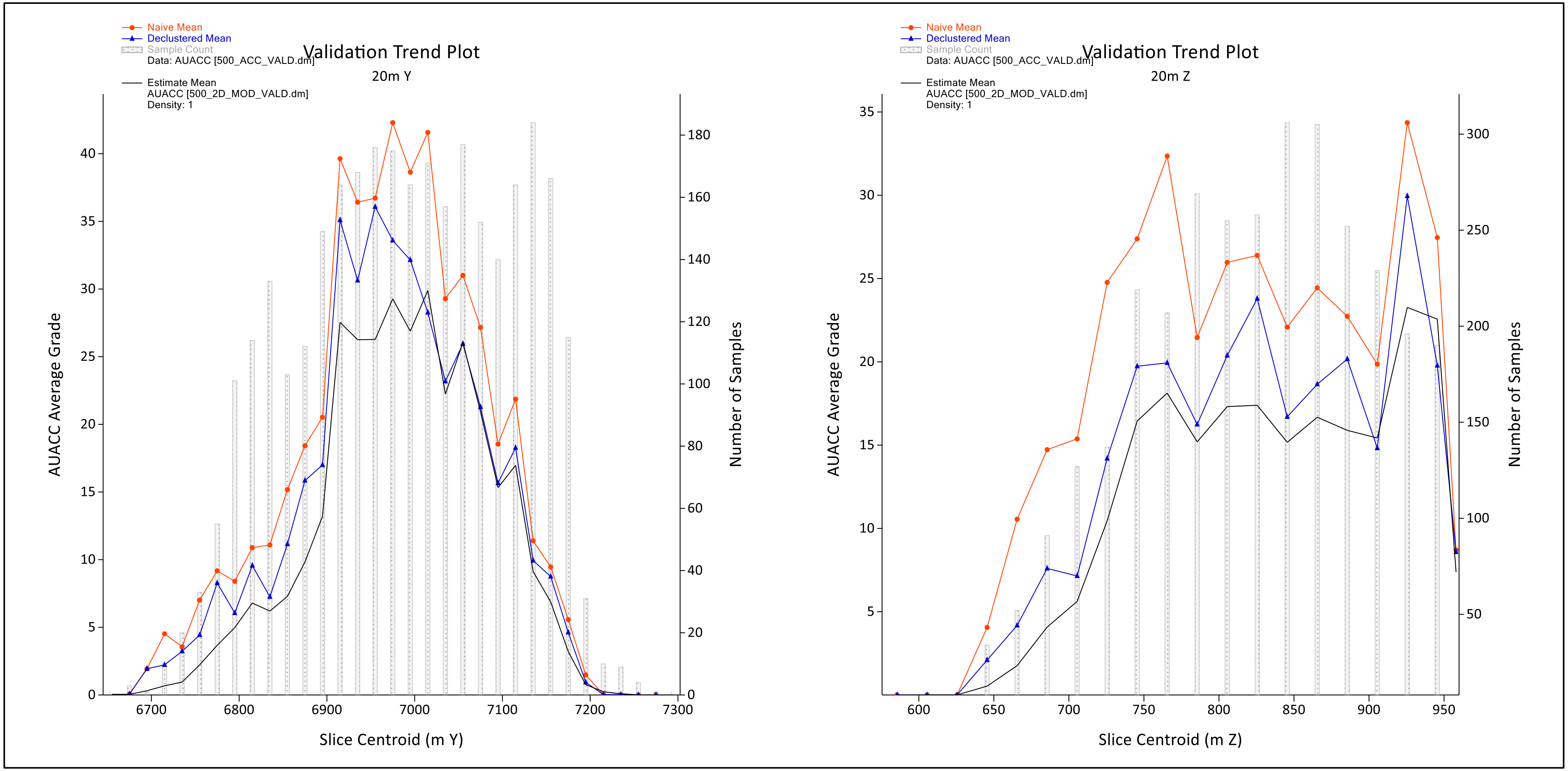


Figure 14.25: Youle 500 Global Sb-Accumulation swathe plot by northing and elevation. Naïve sample mean (red), cell declustered sample mean (blue), and estimation mean (black)

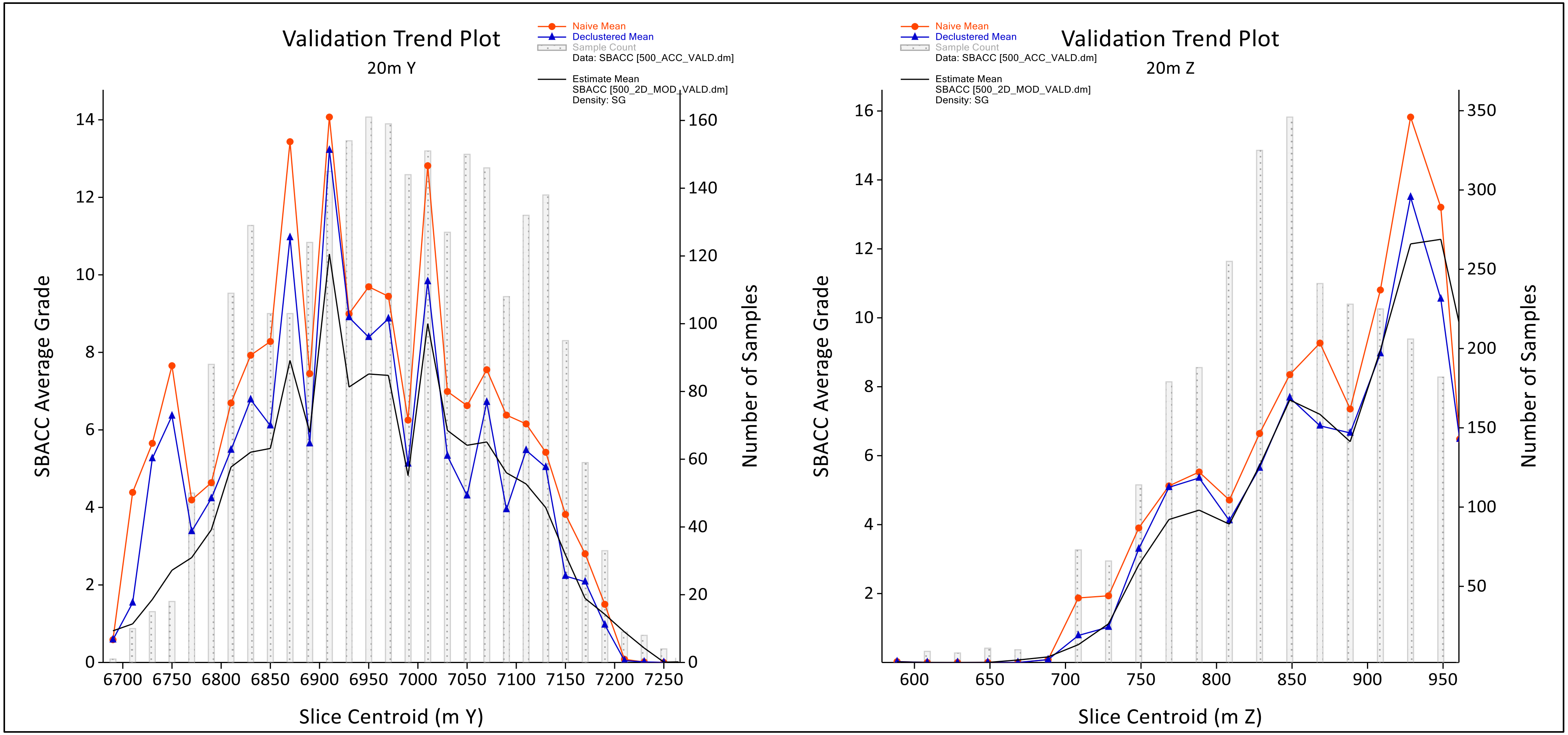


Figure 14.26: Youle 500 Global true thickness swathe plot by northing and elevation. Naïve sample mean (red), cell declustered sample mean (blue), and estimation mean (black)

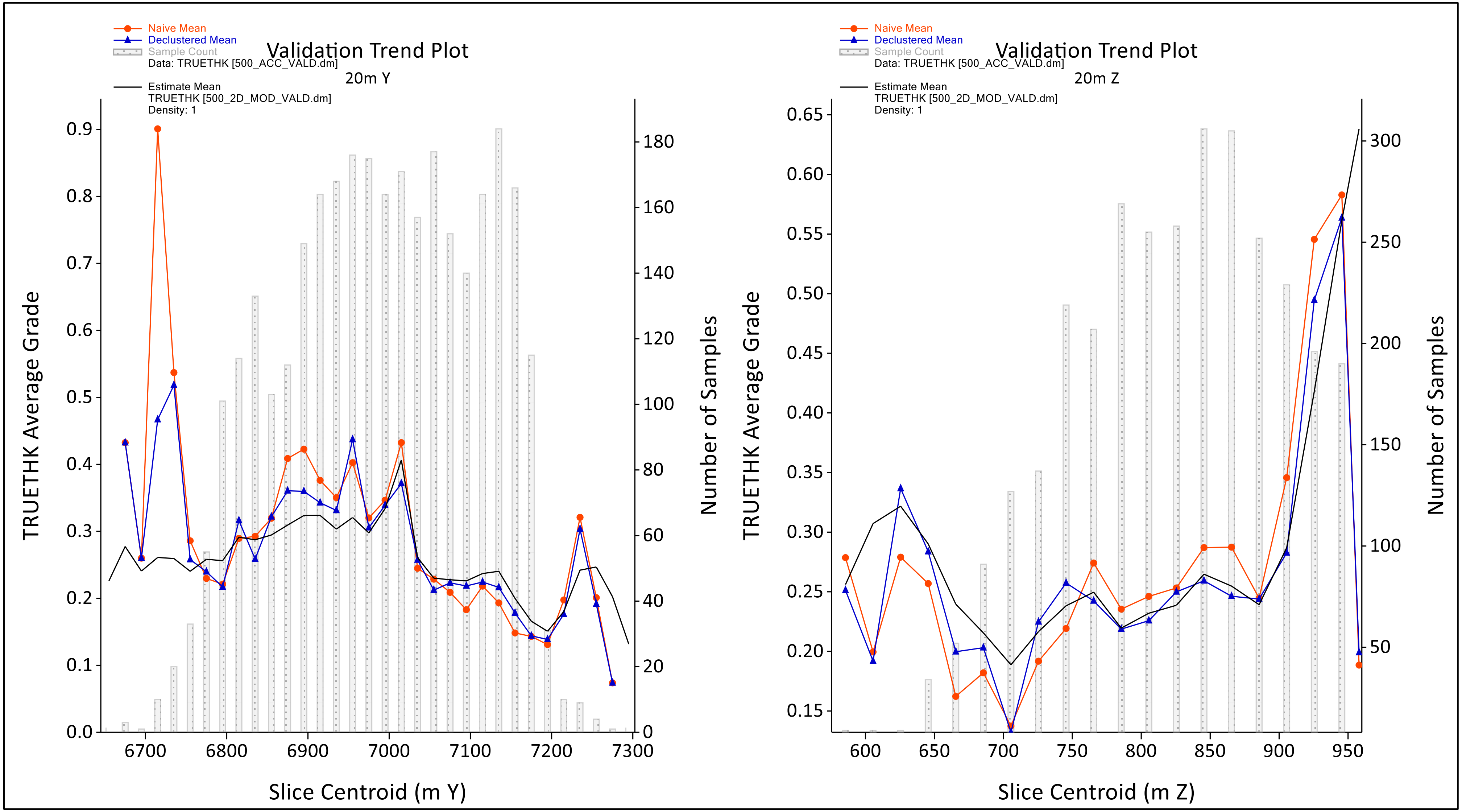


Figure 14.27: Shepherd 600 Global Au-Accumulation swathe plot by northing and elevation. Naïve sample mean (red), cell declustered sample mean (blue), and estimation mean (black)

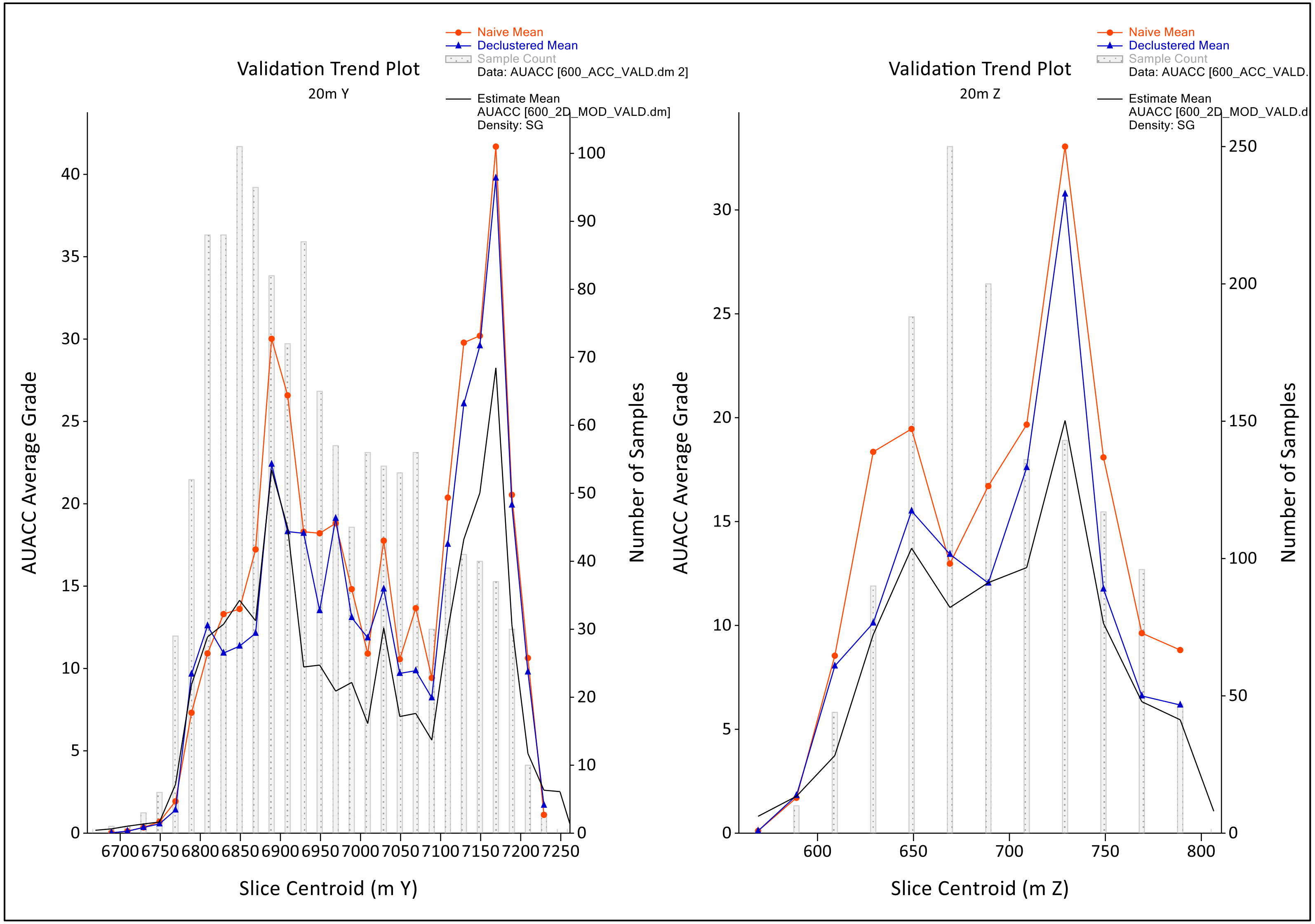


Figure 14.28: Shepherd 600 Global Sb-Accumulation swathe plot by northing and elevation. Naïve sample mean (red), cell declustered sample mean (blue), and estimation mean (black)

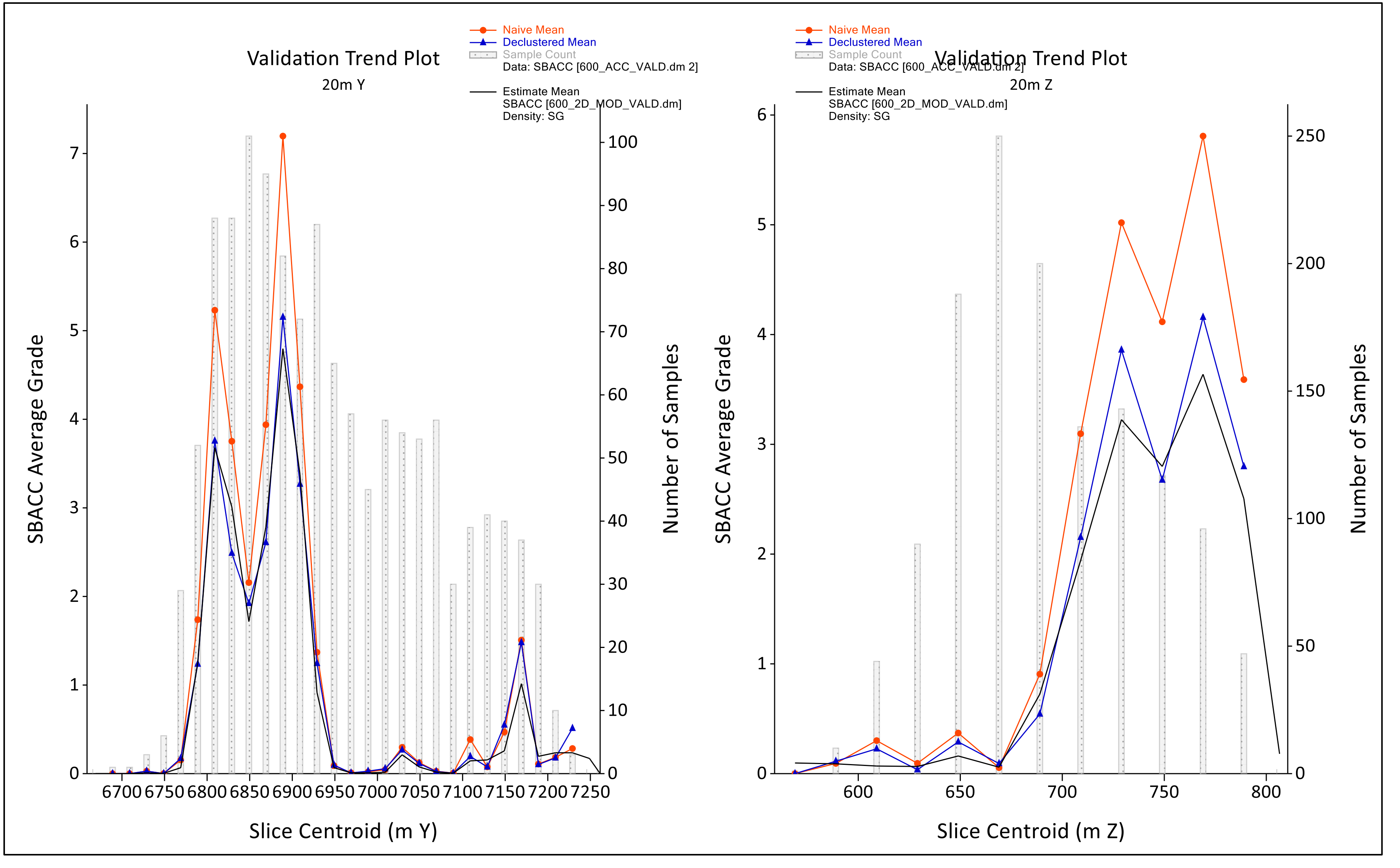


Figure 14.29: Shepherd 600 Global true thickness swathe plot by northing and elevation. Naïve sample mean (red), cell declustered sample mean (blue), and estimation mean (black)

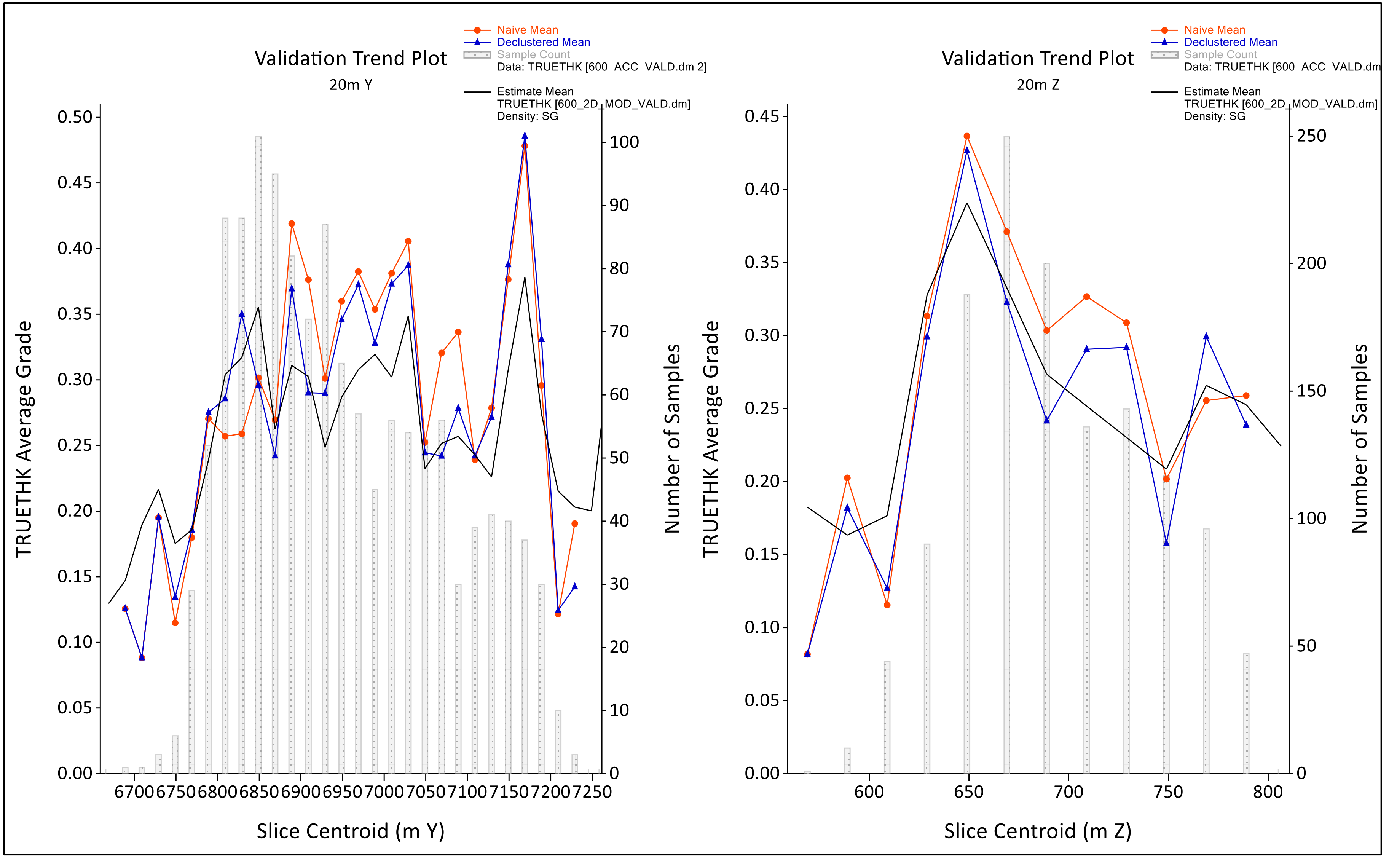


Figure 14.30: Suffolk 620 Global Au-Accumulation swathe plot by northing and elevation. Naïve sample mean (red), cell declustered sample mean (blue), and estimation mean (black)

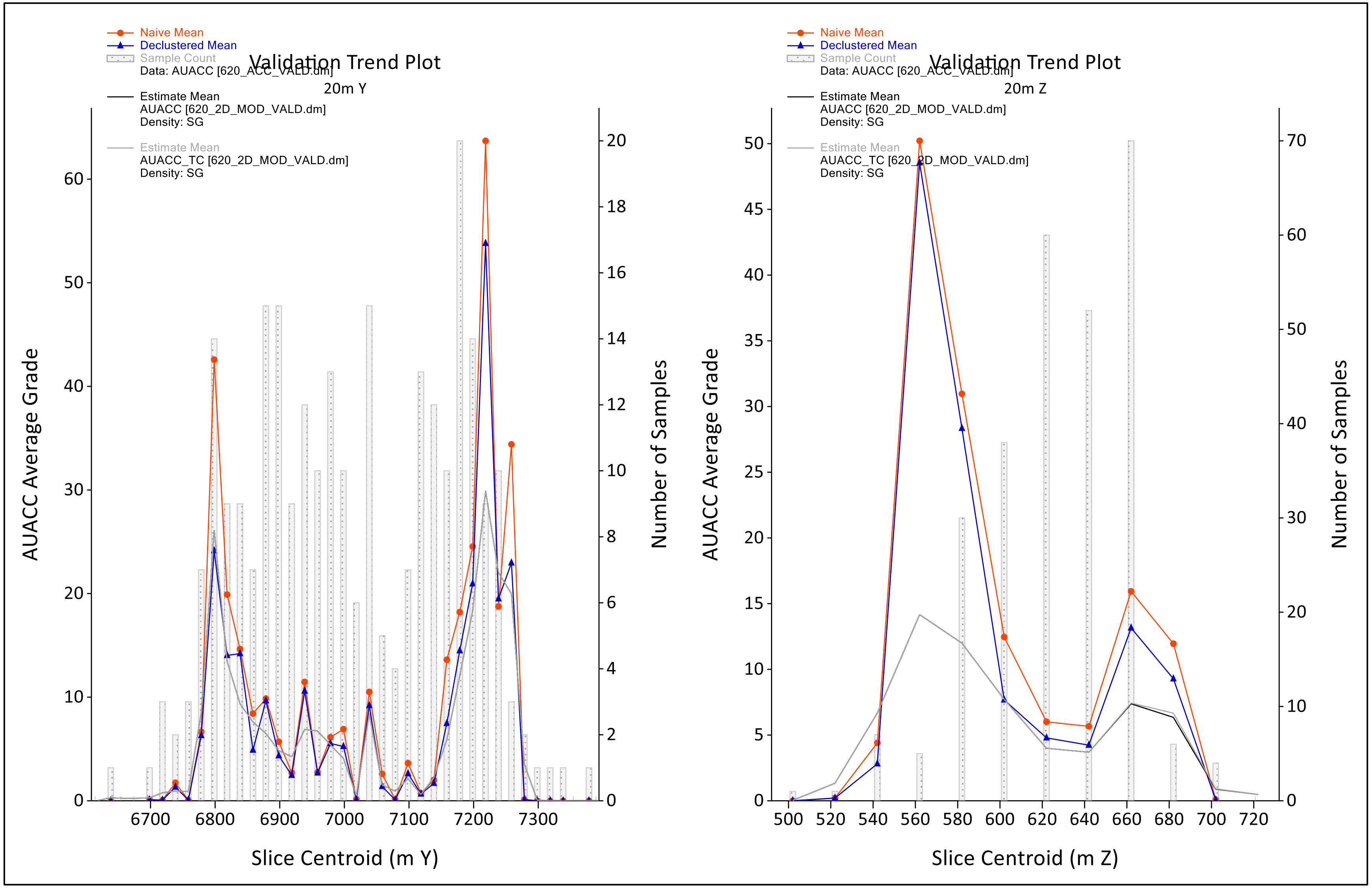


Figure 14.31: Suffolk 620 Global Sb-Accumulation swathe plot by northing and elevation. Naïve sample mean (red), cell declustered sample mean (blue), and estimation mean (black)

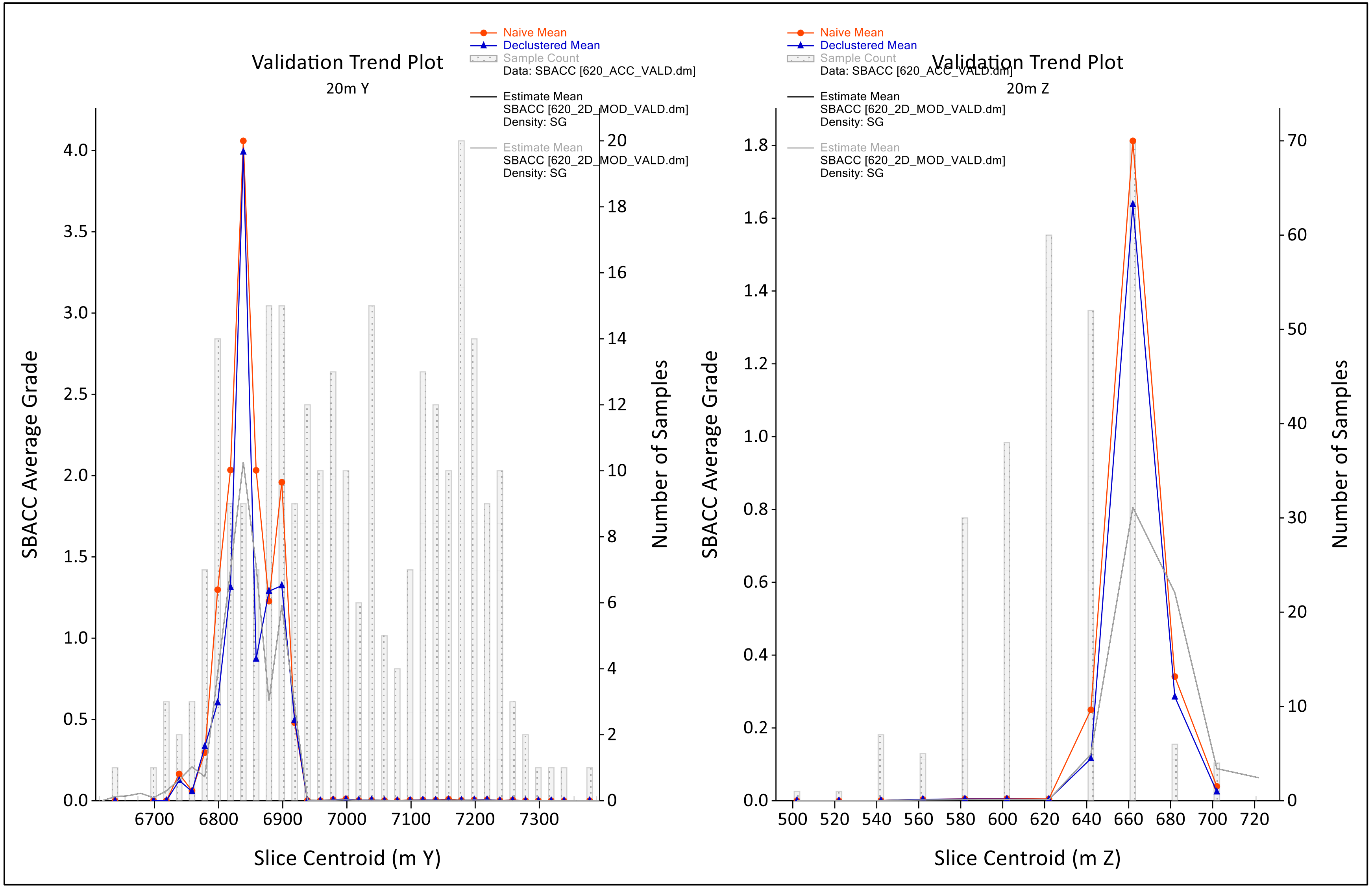
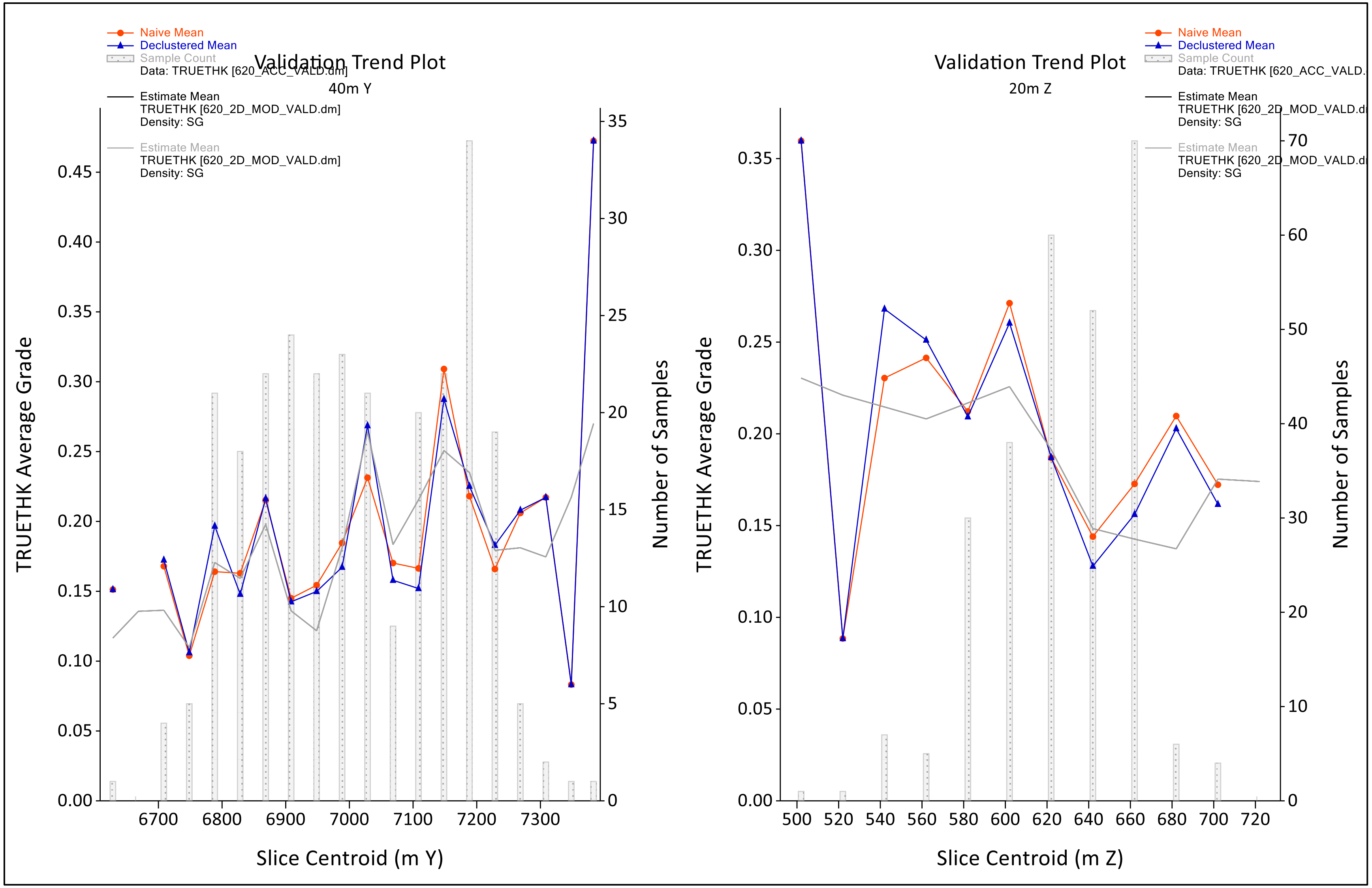


Figure 14.32: Suffolk 620 Global true thickness swathe plot by northing and elevation. Naïve sample mean (red), cell declustered sample mean (blue), and estimation mean (black)



14.11 Mineral Resource Classification

Classification of the Mineral Resource Estimate takes into account Mandalay Resources' experience mining the deposit, the satisfactory reconciliation observed over many years and the well-established sampling, assaying, interpretation, and estimation processes in place.

Mandalay Resources' ongoing mining experience continues to improve the geological confidence and understanding of the controls on the mineralisation, which guides decisions made during the construction of the geological model and the block models.

The classification criteria include the following:

- The Measured Resources are located within, and are defined by, the developed areas of the mine. This criterion ensures the block model estimate is supported by close-spaced underground face sampling, at approximately 2–5 m spacing, and mapping.
- The Indicated Resources are located where the drill hole spacing in longitudinal projection is on a nominal 40 mN by 40 mRL grid, and where there is high geological confidence in the geological interpretation and the block model estimations.
  - The Slope of Regression (SoR) is used to assess the quality of the estimate and natural breaks are referenced to inform confidence boundaries, with a confidence of greater than 0.5 SoR used to guide the Indicated category.
  - The first search pass is used as an additional guide, related to sample density, which means that the majority of zones in the Indicated category are limited to approximately half the range of variogram for each domain.
- The Inferred Resource has irregular or widely-spaced drill hole intercepts that display geological continuity but limited or patchy grade continuity,
  - The SoR is typically below 0.5 and the blocks have been estimated in search pass of 2 or 3.

Figure 14.33: Youle 500 block model with resource category boundaries, including depletion

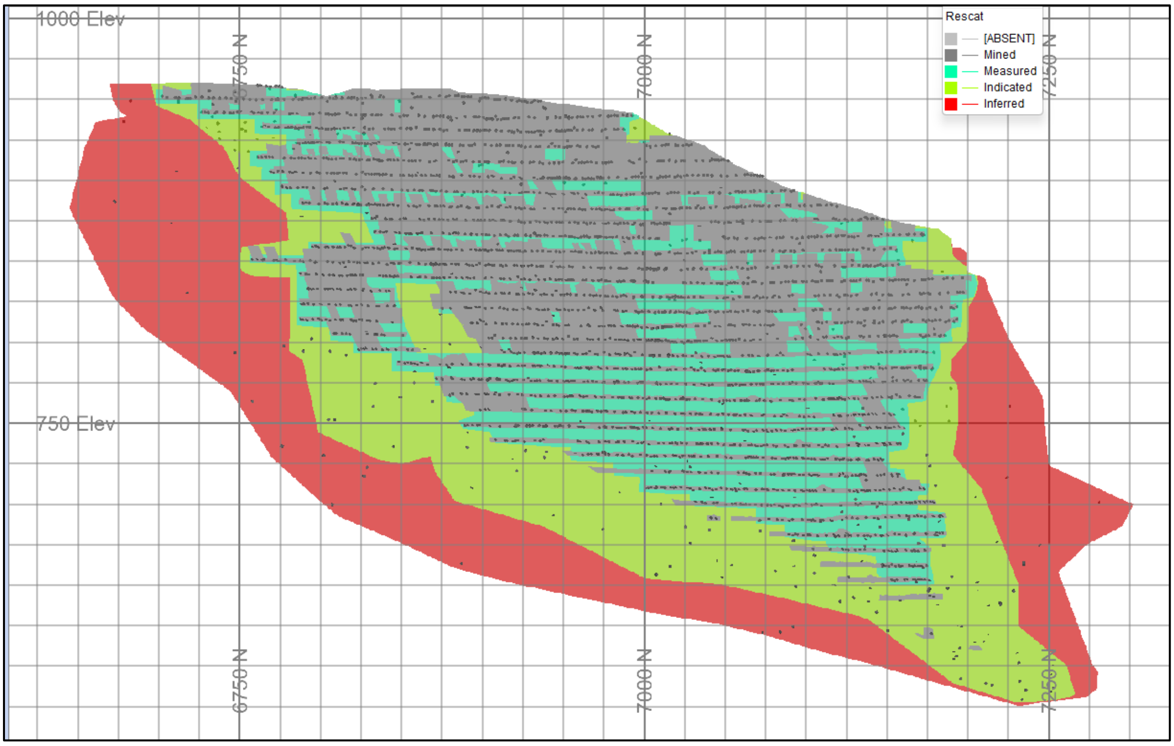


Figure 14.34: Shepherd 600 block model with resource category boundaries

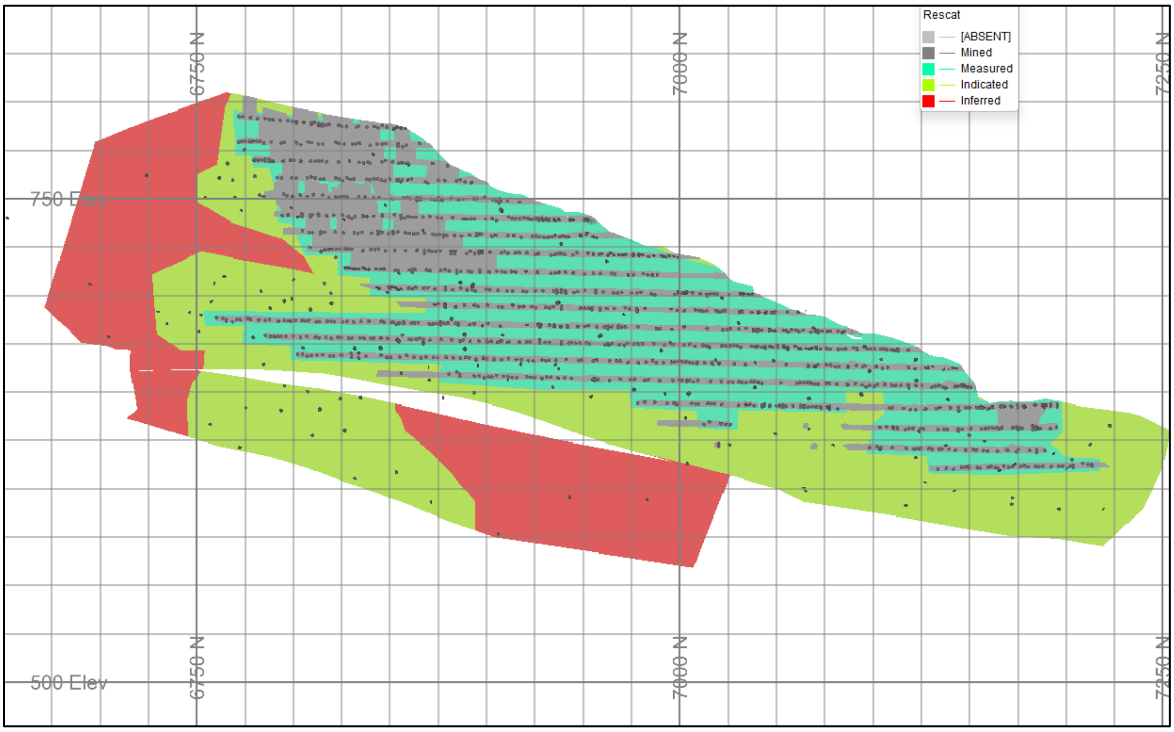
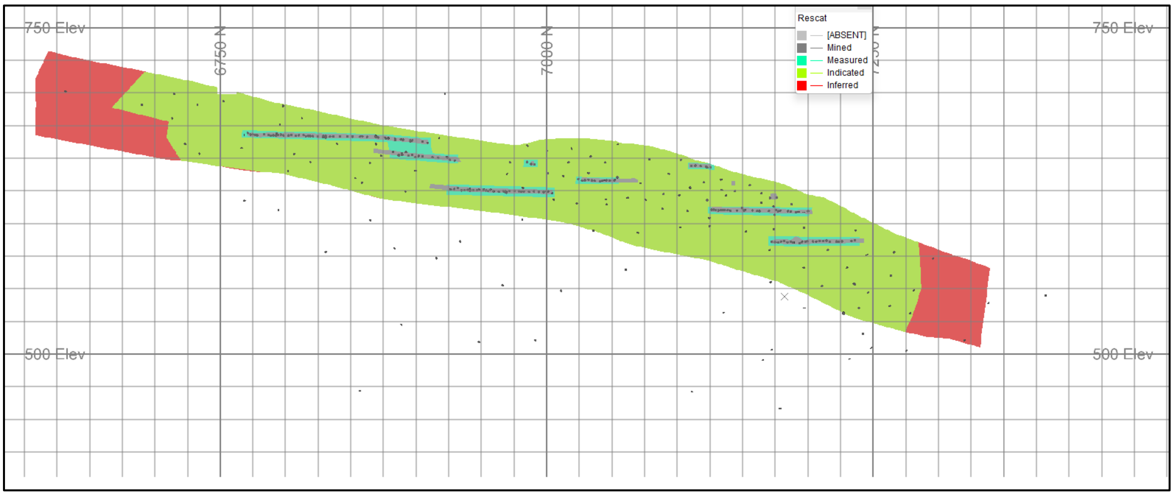


Figure 14.35: Suffolk 620 block model with resource category boundaries. lower intercepts not included were non-material below a bounding fault



The classification criteria are consistent with the previous Mineral Resource Estimate reported in March 2022 (MP, 2022).

14.12 Mineral Resources

The Mineral Resources are stated here for the Augusta, Cuffley, Brunswick and Youle deposits with an effective date of 31 December 2023. This date coincides with the following:

- Depletion due to mining up to 31 December 2023.
- Survey of stockpiled ore that was mined and awaiting processing as of 31 December 2023.

All relevant diamond drill hole and underground face samples in the Costerfield Property, available as of 31 December 2023, were used to inform the Mineral Resource Estimate.

The Mineral Resources are reported at a cut-off grade of 5.0 g/t AuEq, after diluting to a minimum mining width of 1.2 m. The Augusta, Cuffley, Brunswick, Youle and Shepherd deposits consist of a combined Measured and Indicated Mineral Resource of 936,000 t at 10.8 g/t gold and 3.0% antimony, and an Inferred Mineral Resource of 286,000 t at 7.0 g/t gold and 1.8% antimony.

Stockpiles retained at the Brunswick Processing Plant represent a Measured Mineral Resource of 29,000 t at 5.2 g/t gold and 1.0% antimony. Stockpile tonnage balances were calculated using drone acquired survey pickups, bulk density factors, and grades from production movements. For the Mineral Resource Estimate, only surface stockpiles with accurate surveyed volumes were included.

The gold equivalence formula used is calculated using the 12-month average of modelled recovery factors (Refer to Section 17) at the Costerfield Property Brunswick Processing Plant for 2024, and is as follows:

$$\text{AuEq} = \text{Au (g/t)} + 1.88 \times \text{Sb (\%)}$$

Where the AuEq factor of 1.88 is calculated:

- at a gold price of $1,900/oz
- an antimony price of $12,000/t
- with 2024 predicted metal recoveries of 94% for gold and 89% for antimony.

Commodity prices used in the equivalence formula are US$1,900/oz for gold and US$12,000/t for antimony. Refer to (Resource and Reserve Pricing, Section 19.2.3), for an explanation on the source of the prices.

The 2023 Mineral Resource is detailed in Table 14.18.

Table 14.18: Mineral Resources at the Costerfield Property, inclusive of Mineral Reserves, as at 31 December 2023

Category	Inventory (kt)	Gold grade (g/t)	Antimony grade (%)	Contained gold (koz)	Contained antimony
Measured (Underground)	388	15.9	4.1	198	16.0
Measured (Stockpile)	29	5.2	1.0	5	0.3
Indicated	548	7.2	2.3	127	12.5
Measured + Indicated	**965**	**10.6**	**3.0**	**330**	**28.8**
Inferred – Costerfield	214	7.0	1.8	56	2.5
Inferred (True Blue)	72	3.5	3.7	8	2.6
Inferred	**286**	**7.0**	**1.8**	**64**	**5.1**

Notes:

1 The Mineral Resource is estimated as at December 31 2023 with depletion through to this date.
2 The Mineral Resource is stated according to CIM guidelines and includes Mineral Reserves.
3 Tonnes are rounded to the nearest thousand; contained gold (oz) is rounded to the nearest thousand; contained antimony (t) is rounded to nearest hundred.
4 Totals may appear different from the sum of their components due to rounding.
5 5.0 g/t AuEq cut-off grade over a minimum mining width of 1.2 m is applied where AuEq is calculated using the formula: AuEq = Au g/t + 1.88 × Sb %
6 The AuEq factor of 1.88 is calculated at a gold price of $1,900/oz, an antimony price of $12,000/t, and recoveries of 94% for Au and 89% for Sb.
7 Veins were diluted to a minimum mining width of 1.2 m before applying the cut-off grade and peripheral mineralisation far from current development was excluded to comply with RPEEE criteria.
8 The Stockpile Mineral Resource is estimated based upon surveyed volumes supplemented by production data.
9 Geological modelling, sample compositing and Mineral Resource Estimation for updated models was performed by Joshua Greene, MAusIMM, a full-time employee of Mandalay Resources.
10 The Mineral Resource Estimate was independently reviewed and verified by Cael Gniel, MAIG, RPGeo (Mineral Resource Estimation), an employee of SRK Consulting. Mr Gniel fulfils the requirements to be a QP for the purposes of NI 43-101 and is the QP under NI 43-101 for the Mineral Resource Estimate.

Longitudinal projections of the diluted AuEq grade and resource categories for Youle 500 and Shepherd 600 and 620 block models are displayed in Figure 14.36 where drill hole intersections are displayed as black dots.

Figure 14.36: Youle 500 block model showing model grade in gold equivalent g/t diluted to resource width of 1.2 m

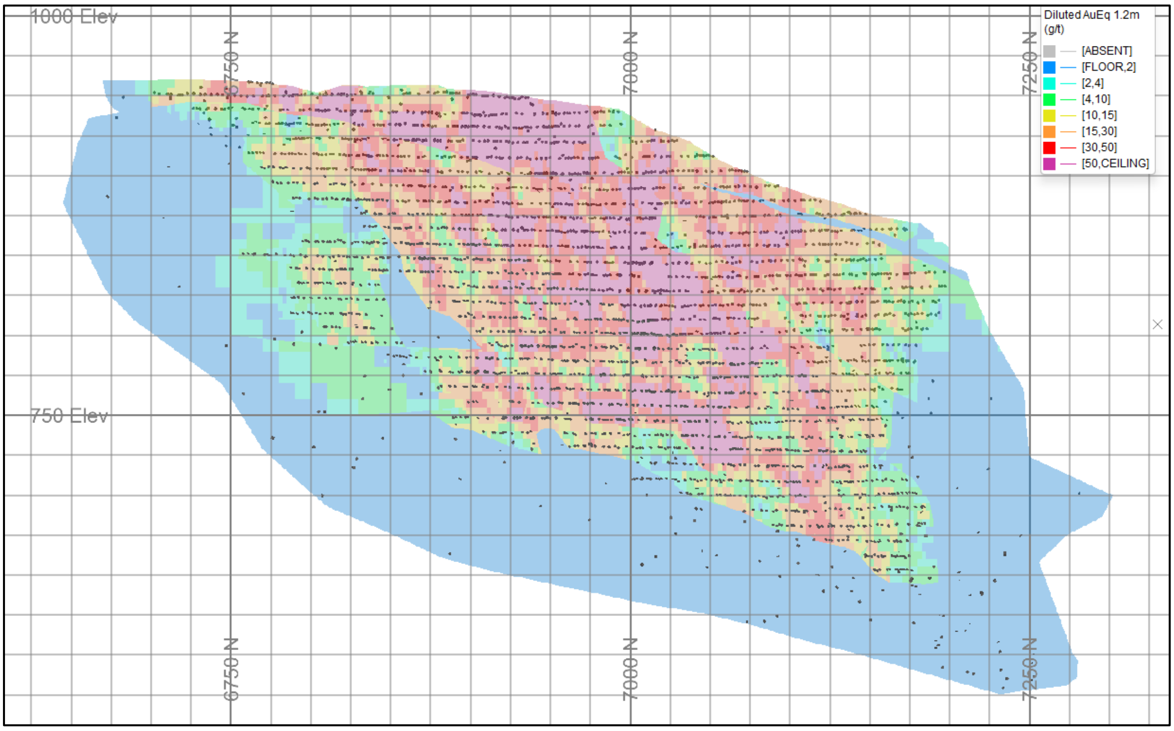


Figure 14.37: Shepherd 600 block model showing model grade in gold equivalent g/t diluted to resource width of 1.2 m

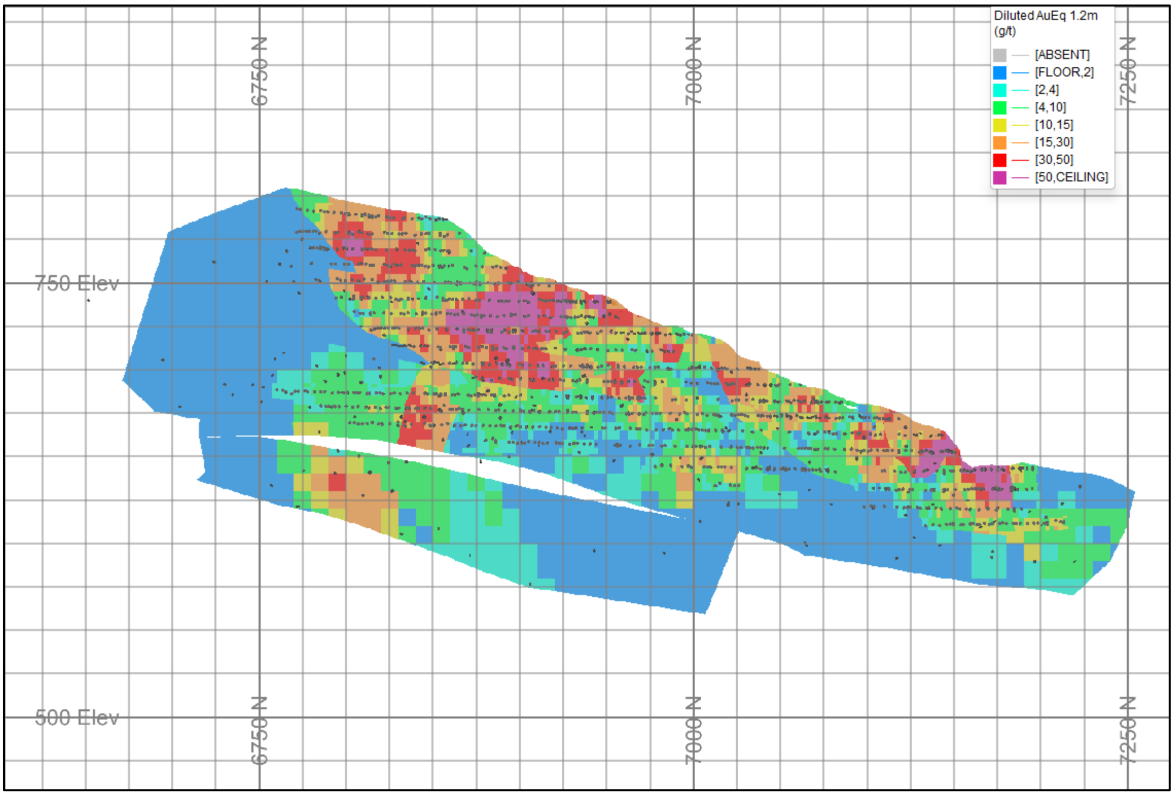
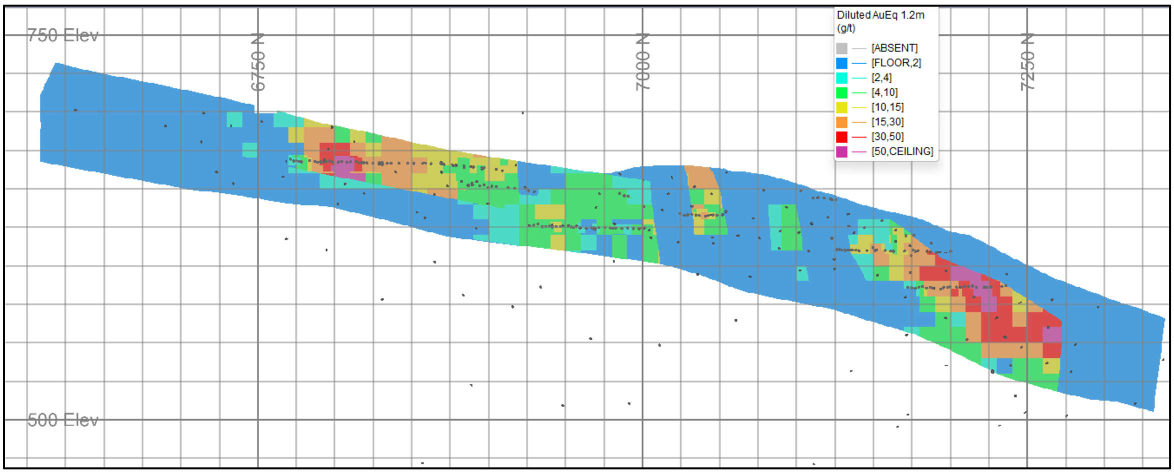


Figure 14.38: Suffolk 620 block model showing model grade in gold equivalent g/t diluted to resource width of 1.2 m. Lower intercepts not included were non-material below a bounding fault



Details of the Costerfield Property Mineral Resources, by area and lode, are outlined in Table 14.19.

Table 14.19: Summary of Costerfield Property Mineral Resources, inclusive of Mineral Reserves

Deposit	Lode name	Model #	Resource category	Tonnes	Au (g/t)	Sb (%)	Au (oz)	Sb (t)
Augusta Deposit	**E Lode**	**10**	Measured	41,000	9.8	6.2	12,900	2,600
			Indicated	42,000	3.9	2.3	5,200	1,000
			Inferred	8,000	3.7	1.8	1,000	100
	B Lode	**15**	Measured	7,000	6.4	2.6	1,400	200
			Indicated	20,000	6.4	2.3	4,100	500
	B Splay	**16**	Measured	2,000	4.0	2.9	300	100
			Indicated	2,000	8.1	2.4	500	0
			Inferred	12,000	4.2	1.2	1,500	100
	W Lode	**20**	Measured	26,000	10.4	5.9	8,800	1,500
			Indicated	30,000	5.8	2.6	5,600	800
			Inferred	18,000	3.9	1.9	2,300	300
	C Lode	**30**	Indicated	46,000	6.0	3.1	8,800	1,400
	N Lode	**40**	Measured	47,000	11.1	4.9	16,500	2,300
			Indicated	45,000	5.1	2.4	7,400	1,100
			Inferred	26,000	5.1	1.8	4,300	500
	NW Lode	**47**	Indicated	2,000	5.5	4.1	300	100
	NS 48	**48**	Measured	1,000	4.1	3.2	200	0
			Indicated	3,000	6.6	4.0	500	100
	P1 Lode	**55**	Measured	9,000	11.0	2.9	3,300	300

Deposit	Lode name	Model #	Resource category	Tonnes	Au (g/t)	Sb (%)	Au (oz)	Sb (t)
			Indicated	7,000	10.6	2.7	2,400	200
	K Lode	**60**	Measured	7,000	5.9	2.8	1,400	200
			Indicated	39,000	3.9	2.3	5,000	900
			Inferred	18,000	4.4	2.3	2,600	400
Cuffley Deposit	**CM Lode**	**210**	Measured	33,000	12.6	4.4	13,400	1,500
			Indicated	33,000	7.9	3.4	8,400	1,100
			Inferred	2,000	10.2	3.1	800	100
	CE Lode	**211**	Measured	9,000	14.1	5.1	4,200	500
			Indicated	11,000	7.7	2.4	2,700	300
	CD Lode	**220**	Measured	3,000	11.3	3.6	1,300	100
			Indicated	36,000	6.8	2.1	7,800	800
			Inferred	2,000	6.3	2.1	500	100
	CDL Lode	**225**	Inferred	19,000	8.5	0.1	5,300	0
	AS Lode	**230**	Measured	1,000	11.3	1.3	300	0
			Indicated	18,000	6.3	1.8	3,700	300
			Inferred	3,000	6.2	1.3	600	0
Brunswick Deposit	**Main Lode**	**300**	Measured	24,000	8.2	4.1	6,400	1,000
			Indicated	40,000	5.2	2.6	6,800	1,000
	KR Lode	**310**	Indicated	23,000	4.5	2.2	3,300	500
			Inferred	1,000	26.6	7.0	900	100
Sub King Cobra	**SKC CE**	**400**	Inferred	3,000	2.7	1.6	200	0
	SKC LQ	**405**	Inferred	2,000	28.5	0.1	2,000	0
	SKC C	**410**	Inferred	43,000	9.7	1.1	13,200	500
	SKC W	**420**	Inferred	49,000	12.1	0.0	19,100	0
Youle Deposit	**Main Lode**	**500**	Measured	107,000	24.3	4.1	83,800	4,400
			Indicated	17,000	5.4	1.9	2,900	300
	Youle East	**501**	Indicated	12,000	4.9	4.2	1,900	500
	507 Splay	**507**	Indicated	3,000	8.1	5.5	800	200
			Inferred	1,000	10.7	6.5	200	0
	Peacock Vn	**508**	Measured	5,000	16.0	6.9	2,800	400
			Indicated	7,000	4.4	2.0	1,000	100
	YN 509 Splay	**509**	Measured	3,000	27.0	1.2	2,500	0
	YS 525 Splay	**525**	Measured	1,000	8.0	3.7	200	0
			Indicated	1,000	6.9	4.2	200	0
Shepherd Deposit	**Shepherd Lode**	**600**	Measured	46,000	19.7	1.5	29,200	700
			Indicated	21,000	12.2	0.1	8,100	0

Deposit	Lode name	Model #	Resource category	Tonnes	Au (g/t)	Sb (%)	Au (oz)	Sb (t)
			Inferred	1,000	8.1	0.0	200	0
	602 Splay	**602**	Indicated	5,000	8.2	1.5	1,200	100
	603 Splay	**603**	Indicated	2,000	2.8	1.9	100	0
	Merino Lode	**605**	Measured	2,000	11.2	0.0	900	0
			Indicated	5,000	9.4	0.0	1,500	0
	606 Splay	**606**	Indicated	1,000	6.3	0.0	300	0
	607 Splay	**607**	Indicated	3,000	16.5	0.0	1,400	0
	609 Splay	**609**	Measured	1,000	31.1	3.8	700	0
	610 Lode	**610**	Measured	3,000	45.2	1.3	4,700	0
			Indicated	4,000	39.0	0.8	5,400	0
	613 Splay	**613**	Indicated	1,000	5.9	0.0	200	0
	Suffolk Lode	**620**	Measured	4,000	14.7	1.0	2,000	0
			Indicated	36,000	18.3	0.5	21,000	200
	621 Splay	**621**	Indicated	6,000	7.1	0.0	1,400	0
			Inferred	1,000	6.3	0.0	100	0
	624 Splay	**624**	Indicated	3,000	18.1	0.0	1,800	0
	625 Splay	**625**	Indicated	1,000	4.8	0.6	200	0
	630 Lode	**630**	Indicated	22,000	5.8	4.2	4,100	900
			Inferred	3,000	8.0	4.3	800	100
True Blue	**True Blue**	**700**	Inferred	72,000	3.5	3.7	7,900	2,600
			Measured and Indicated	936,000	10.8	3.0	325,300	28,500
			Inferred	286,000	7.0	1.8	63,900	5,100

Notes: Refer to notes for Table 14.18.

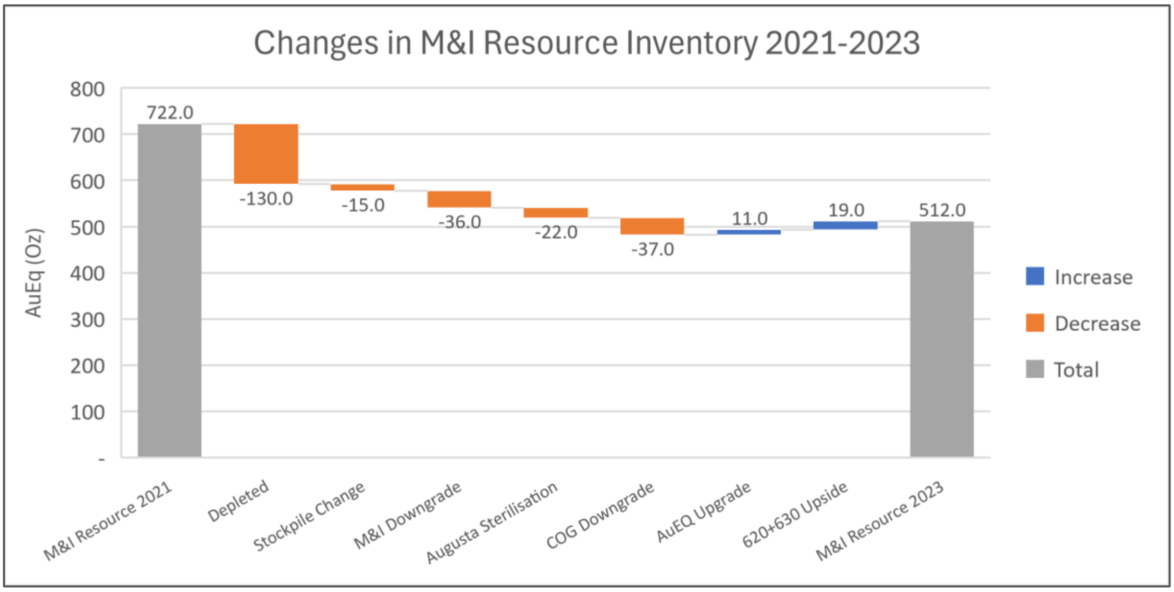
14.13 Comparison to 2021 Mineral Resource

A high-level comparison between the 2021 and 2023 Mineral Resource Estimates has been undertaken (Figure 14.39). In order to demonstrate areas of variance between the two reporting periods, the gold and antimony grades have been converted into AuEq values determined using the equation:

$$AuEq\ (oz) = Au\ (oz) + (Sb\ (t) \times (Sb\ price/t\ /\ Au\ price/oz)$$

Where Sb price = USD$12,000/t and Au price = USD$1,900/oz.

Figure 14.39: Comparison between 2021 and 2023 Mineral Resource Estimates



Key areas of variance between the two Mineral Resources are:

- The Mineral Resource was depleted by 130 koz AuEq, including both Youle and Shepherd sources.
- Stockpiles decreased throughout 2021–2023, a net change of 15 koz AuEq.
- With mining and continued drilling, a downgrade of 36 koz AuEq for the Youle and Shepherd block models occurred from 2021-23
- Upper portions of E-lode remnants were sterilised due to reassessment of ground conditions, leading to a reduction of -22 koz AuEq
- The cut-off grade increased from 3 g/t AuEq in 2021 to 5 g/t AuEq in 2023, leading to a reduction of -37 koz AuEq.
- Additional grade and minor veins were discovered in the Shepherd area, with 25 koz AuEq in the western portion on the 610, 620 and 630 models.
- The AuEq factor was increased from 1.58 to 1.88 due to stronger antimony resource prices and contributed to 11 koz AuEq upside.

14.14 Reasonable Prospects for Eventual Economic Extraction

The RPEEE have been satisfied by applying a minimum mining width of 1.2 m and ensuring that isolated blocks above cut-off grade, which are unlikely to ever be mined due to distance from the main body of mineralisation, were excluded from the Mineral Resource.

The width of 1.2 m is the practical minimum mining width applied at the Costerfield Property for stoping. For blocks with widths less than 1.2 m, diluted grades were estimated by adding a waste envelope with zero grade and 2.74 t/m^3 (Augusta, Brunswick and Cuffley) or 2.76 t/m^3 (Youle, Shepherd and True Blue) bulk density to the lode.

A 5.0 g/t AuEq cut-off grade over a minimum mining width of 1.2 m has been applied. The cut-off has been derived by Mandalay Resources based on cost, revenue, mining and recovery data from the year ending 31 December 2023, and updated commodity price forecasts and exchange rates. This reflects an increase from the previous Mineral Resource cut-off grade of 3.0 g/t AuEq (MP, 2022) reflecting rising operating costs and a move to a non-sustaining cut-off without incremental cut-off consideration.

Significant pillars and remnant material that is above 5.0 g/t AuEq has been included in the Mineral Resource Estimate. From 2017 onwards, extraction of these areas has been an ongoing success and mining has been considered viable under RPEEE with several zones satisfying the modifying factors for Reserves.

Poor ground encountered in the upper portions of Augusta lead to a review of the remnants. Informed by drilling and testing, areas in Augusta no longer satisfying RPEEE were sterilised from the resource as illustrated in Figure 14.39.

14.15 Reconciliation

Both the previous 2021 Mineral Resource Estimate (MP, 2022) and the 2023 Mineral Resource Estimate (this report) were reconciled against the January 2022 to December 2023 official mine production (Table 14.20).

- 2021 Mineral Resource Estimate reconciliation provides an indication of long-term predictiveness.
- 2023 Mineral Resource Estimate reconciliation provides an indication of the new Mineral Resource Estimate to adequately represent mineralisation.

The model reconciliation was completed according to the following process:

- For pre-2023: A string was digitised in longitudinal projection for each of the relevant lodes to outline areas that were mined each month during 2022.
- The mined material was then coded into the block models for each lode so that tonnes, grades and contained metal could be reported by type, month, and level.
- Post-2022: Solid wireframe of planned stoping and development actuals were used to code into the combined 3D located block model and report by type, month, and level.
- As block model tonnage and grades did not reflect actual tonnage after waste dilution for the majority of the period of interest, block model tonnage and grades were fixed to the mine-call tonnage, independent of any stockpile variance.

ROM ore is currently stockpiled according to grade bins rather than by named mining area or mining level, therefore reconciliation by individual named deposit is not possible. The reconciliation presented below is therefore combined for the Youle and Shepherd lodes.

14.15.1 Official Mine Production

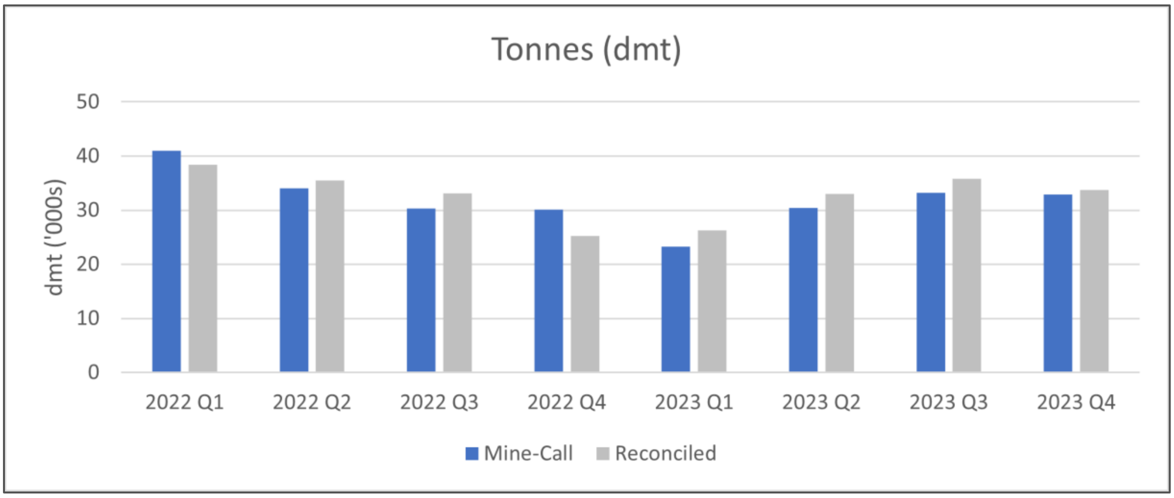
Official Mine Production has been defined using the conservation of mass equation below, for both tonnes and metal content.

Mine Production = Milled Production + Change (Δ) in Stockpile Inventory

Official Mine Production tonnage and grades were reconciled against the Brunswick Process Plant, with a total of 261,097 t grading at 10.9 g/t Au and 2.4% Sb for 91,192 oz of contained gold and 6,209 t of antimony for 1 January 2022 to 31 December 2023 (Table 14.20). For the reconciliation period, production consisted of stopes and development from Youle lodes (66.8% of the AuEq ounces) and Shepherd lodes (33.2% AuEq ounces). Other sources contributed less than 0.1% AuEq ounces and will not be discussed further in this report.

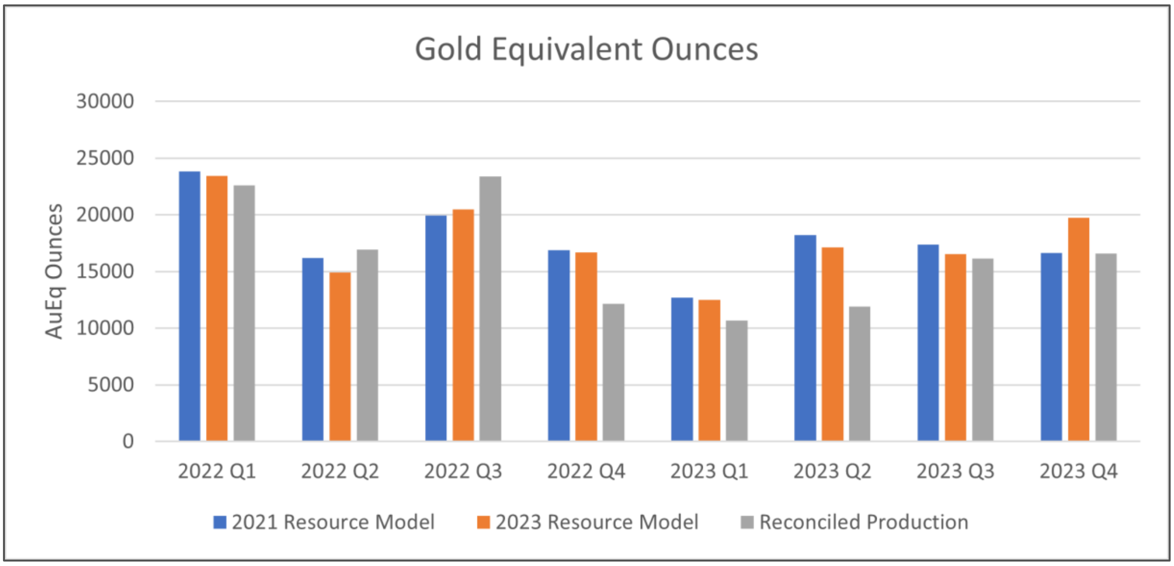
Figure 14.40 displays a comparison between the mine-call and mill reconciled produced tonnes, while Figure 14.41 display the reconciled production, 2021 Mineral Resource Estimate and 2023 Mineral Resource Estimate over the January 2022 to December 2023 production period.

Figure 14.40: Mine call tonnage versus reconciled 2022–2023 mine production – tonnes.



Notes: This tonnage is used in the grade calculations in the absence of actual mined shapes

Figure 14.41: Reconciliation of the 2021 and 2023 Mineral Resource versus Jan 2022–Dec 2023 mine production – gold equivalent ounces.



Notes: The AuEq ounces is calculated at a gold price of $1,900/oz, an antimony price of $12,000/t

14.15.2 Stockpile inventory

End of month stockpile tonnage balances are estimated using drone acquired survey pickups, bulk density factors, and stockpile grades. Stockpile grades are populated from production movements tracked within the Centric database (by Centric Mining Systems), which facilitates all movement tracking from stope to mill.

Open and closed stockpiles tracking were enacted throughout Q4 2022, allowing for grades, volumes and wet tonnages to be tracked. Volumes were informed by the airborne drone surveys and by project work using the hand-held Hovermap LiDAR system. A fixed moisture content of 3.5% is used for all stockpile calculations. This is derived from, and validated against, the daily moisture content for ROM material reported daily by the Brunswick Processing Plant for 2023.

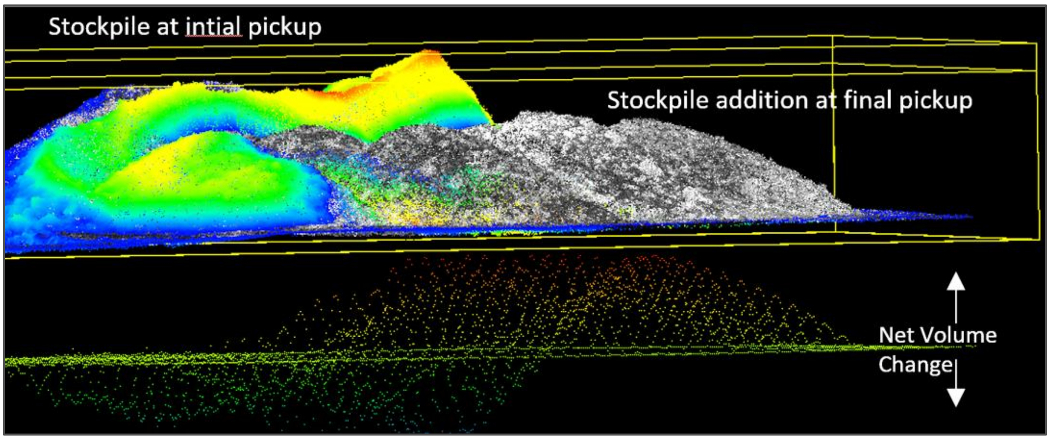
A single 1.93 t/m^3 (dry) bulk density of the stockpiles has been updated (Table 14.20) from the initial 2013 testwork presented in the previous report (MP, 2022).

Table 14.20: Comparison of broken stockpile density between 2021 and 2023

Grade classification	2021 broken bulk density	2023 broken bulk density
HG	1.93	1.9
OG	1.93	1.9
LG	1.93	1.85
GG	1.93	1.85
Other	1.93	1.85

Notes: HG = High Grade (>6% Sb), OG = Ore Grade (>3% Sb), LG = Low Grade, GG = Gold Grade (LG with >7g/t Au)

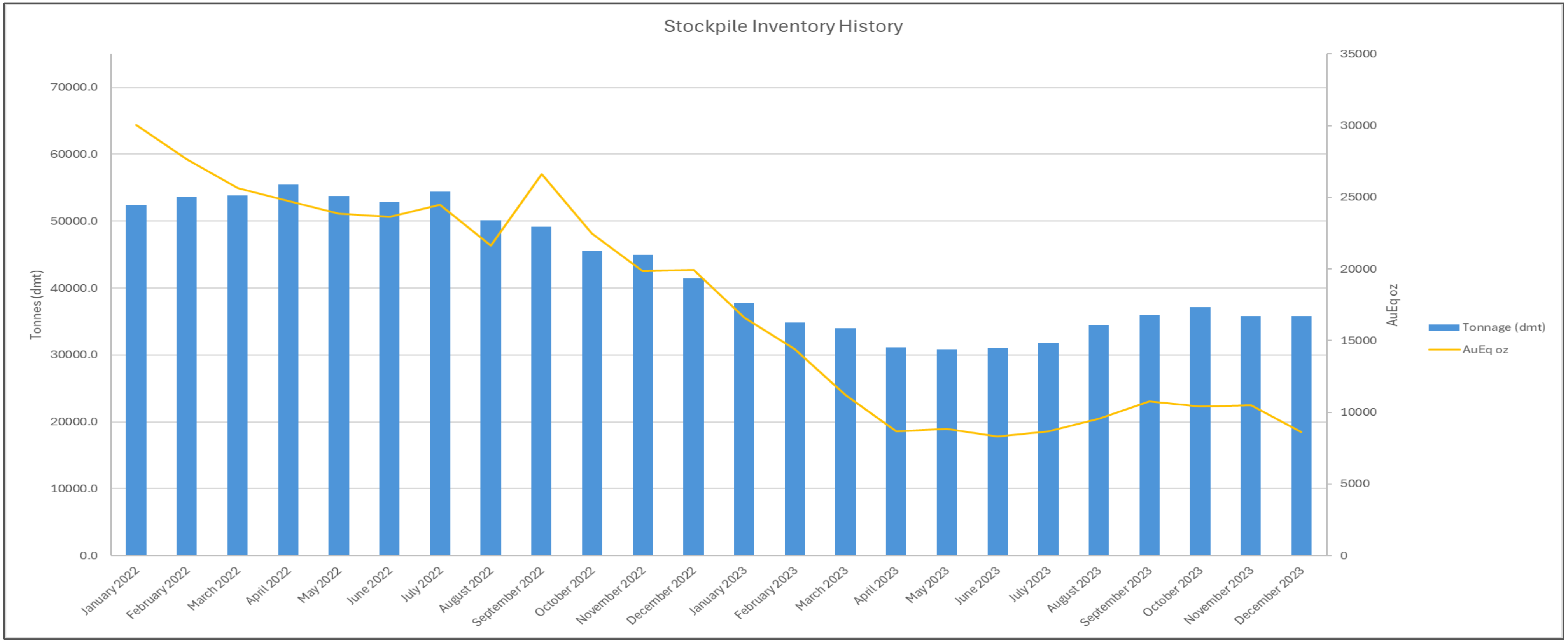
Figure 14.42: Example of hand-held (Hovermap) LiDAR acquired survey data tracking volume changes of the LG stockpile



Notes: Elevation coloured hot to cold on the initial pickup, with greyscale representing material added to the stockpile. Green point cloud below the floor of the primary image illustrates the net volume change of the point cloud.

Stockpile inventories decreased 12.8 kt from 41.4 kt at the beginning of 2022 to 28.7 kt. Closing grades of the stockpiles decreased from 10.1g/t Au to 5.2 g/t Au and 3.3% Sb to 1.0% Sb for a closing contained metal content of 4.8 koz gold and 0.3 kt antimony. Figure 14.43 illustrates the change in stockpile inventories from 2021 to 2023 inclusive of unsurveyed underground stocks. While this differs from the final figure, it is indicative of the long-term trends of the stockpile tonnages and grades.

Figure 14.43: Costerfield Property stockpile inventory – 2022 to 2023 illustrating the steady decrease of tonnage and grade



Notes: Graph is inclusive of unsurveyed stocks underground and will vary to final figures but is indicative of long-term trend.

14.15.3 Long-term Performance of 2021 Resource Models

Table 14.21: Resource Model breakdown by resource category for the 2022-2023 production

2021 resource model		
Resource category	**% tonne**	**%AuEq ounces**
Measured	26%	54%
Indicated	64%	40%
Inferred	10%	6%

14.15.4 Reconciliation of 2023 Resource Models

The representative nature of 2023 Mineral Resource Estimate (this report) was investigated by a reconciliation against the January 2022 to December 2023 depletion shapes. The 2023 resource models report 255,234 t at 12.2 Au g/t and 2.6 Sb % for an estimated contained 60,737 oz of gold and 6,055 t of antimony. The reconciliation of the 2023 resource model is summarised in Table 14.23. See also Figure 14.40 and Figure 14.41 above.

Table 14.22: Tonne Reconciliation of mine-call versus mine reconciled 2022–2023

Claimed dmt	Reconciled dmt	Tonnage variance (%)
255,234	261,097	-2%

Table 14.23: 2021 and 2023 Mineral Resource Estimate (MRE) reconciliation against Official Mine Production

Jan 2022 to Dec 2023	Grade reconciliation				Metal reconciliation					
	Au g/t	**Au variance (%)**	**Sb %**	**Sb variance (%)**	**Au g/t**	**Au variance (%)**	**Sb %**	**Sb variance (%)**	**AuEq (oz)**	**AuEq oz variance (%)**
Produced	10.9	-	2.4	-	91,192	-	6,209	-	130,407	-
2021 MRE	12.2	12.4%	2.6	8.70%	100,159	9.8%	6,599	6.3%	141,837	8.8%
2023 MRE	11.8	8.4%	2.8	16.9%	96,630	6.0%	7,095	14.3%	141,441	8.5%

Notes: Grade based on mine-call claimed tonnes.

14.15.5 Reconciliation discussion

The review of the 2021 Resource model has demonstrated the estimation methodology's long-term suitability and data density as reconciled against 2 years of production data since the last NI43-101. It is the opinion of Mandalay Resources staff and the QP that the variance of +9.8% for gold ounces and +6.3% (Table 14.23) for antimony tonnes is an acceptable variance for a narrow-vein gold deposit with consideration that 46% of the Mineral Resource extracted for the period by AuEq (oz) came from Indicated and Inferred categories (Table 14.21).

The 2023 Resource model reconciliation has highlighted some concerns in the retrospective performance to the 2022–2023 production. The variance of +6.0% in gold ounces and +14.3% in antimony tonnes highlights an issue in antimony estimation (Table 14.20). This variance in reconciliation has been reviewed over the course of the 2022–2023 years and Mineral Resource Estimate. There were several compounding issues considered by the Mandalay Resource staff and the QP to have affected the comparison between the 2023 resource model and the Official Mine Production numbers. Main areas of review are listed below in the following Stockpile Drawdown and Adjustment, Brunswick Processing Plant Weightometer Issues, and Resource Estimation Methodology sections.

It is considered by the Mandalay Resource staff and the QP that the 2023 resource models are doing an acceptable job of representing the Costerfield orebody based on the following:

- The stockpile corrected reconciliation for the 2023 resource model in Table 14.24.
- The model's long-term performance of < 1% variance in both gold ounces and antimony tonnes for the full production of the Youle and Shepherd mining areas to date (Table 14.25).
- The long-term predictive performance of the resource estimation methodology at representing the style of mineralisation (Table 14.23).
- Resource estimation methodology's 16-year history of use and acceptable reconciliation

Stockpile Drawdown and Adjustment

Noted in Section 14.13, stockpiles have reduced in size and grade through 2022–2023. Several trials for both grade and bulk density led to revisions in long-term stockpiles, particularly in the low-grade classification, that were greater than 2 years old and outside the block model reconciliation range. This affected at least 7,313 AuEq oz over the 2 years. A reconciliation comparison with this difference in AuEq ounces is made in Table 14.24. Several actions have been taken address grade uncertainty, stockpile bulk density and age of stockpiles, including implementing the production movement software Centric, and open and closed stockpiles.

Table 14.24: Gold equivalent reconciliation of the 2023 models against the produced and produced with stockpile corrections removed for comparison of performance

Metal reconciliation				
2023 MRE AuEq (oz)	**Produced AuEq (oz)**	**AuEq variance (%)**	**Stockpile corrected prod.[1] AuEq (oz)**	**AuEq variance (%)**
141,441	130,405	8.5%	137,717	2.7%

Notes:

[1] Where historical stockpile (> 2 years old) revisions have been removed to relate production directly to block model performance.

Brunswick Processing Plant Weightometer Issues

The belt installed weightometer at the Brunswick Processing Plant had issues with the old load cells and historical correction factors that potentially influenced tonnage and grade calculations through Q2–Q3 2023.

- January 2023 – weightometer load cells had a service and technician increased the correction factor by +19%
- 27 June 2023 – technician came to site and replaced weightometer load cells, did not recalibrate and did not notice the correction set so high.
- August 2023 – calibrated weightometer with new load cells and found reading +15.37%.
- Metallurgists adjusted August 2023 and June 2023 numbers by -15.37%.

Regular calibration work is planned through 2024.

Resource Estimation Methodology

The Resource Estimation methodology was developed in 2008 by AMC (AMC, 2008) and has been in use since this time. To confirm it was still relevant and performing as expected, the 2D accumulation methodology and macros associated with this process were independently reviewed by AMC in July 2023 (AMC, 2023). No fatal flaws were identified in the 2D estimation, with a high-level 3D comparison found to be performing similarly.

To further confirm the long-term health of the estimation methodology and remove stockpile variance errors, the reconciliation was completed back to the previous zero out of long-term stockpile stocks. This also corresponds with the commencement of Youle as the dominant ore source and covers the full development of the orebody.

Table 14.25: Long-term model performance for metal and grade since last zeroing of stockpiles, Nov 2019 to Dec 2023, coinciding with full history of Youle and Shepherd production

2023 resource models compared to Nov 2019 to Dec 2023 official production			
Metal/grade	**2023 resource**	**Produced**	**2023 resource variance**
Au (oz)	222,424	221,575	0.4%
Sb (t)	20,480	20,480	0.0%
Tonnes	604,123	621,588	-2.8%
Au g/t	11.5	11.1	3.3%
Sb %	3.4	3.3	2.9%
AuEq (oz)	351,771	350,925	0.2%

14.16 Other Material Factors

SRK is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, or political factors that could materially influence the Mineral Resources other than the modifying factors already described in other sections of this report.

15 Mineral Reserve Estimates

A mine plan was prepared from the 2023 year-end Mineral Resource based only on Measured and Indicated Resource blocks, and mined primarily using a long-hole stoping mining method with cemented rock fill (CRF). The minimum stoping width of 1.5 m was used, with planned and unplanned dilution at zero grade for both gold and antimony.

An AuEq grade for Mineral Reserve has been calculated using commodity prices of US$1,800/oz Au and US$11,500/t Sb. AuEq grade is calculated using the formula:

$$AuEq = Au + (Sb \times 1.22)$$

where Sb is in % and Au is in grams/tonne

An operating cut-off grade of 6.0 g/t AuEq was determined from the Costerfield Property 2023 production costs.

The financial viability of Proven and Probable Mineral Reserve was demonstrated at metal prices of US$1,800/oz Au and US$11,500/t Sb. Refer to Market Studies and Contracts, Section 19, for an explanation on the source of the prices.

The 2023 Mineral Reserve is detailed in Table 15.1.

Table 15.1: Mineral Reserve at the Costerfield Property as at 31 December 2023

Category	Tonnes (kt)	Gold grade (Gt)	Antimony grade (%)	Contained gold (koz)	Contained antimony (kt)
Proven Underground	**330**	**12.4**	**2.2**	**131**	**7.3**
Proven Stockpile	29	5.2	1.0	5	0.3
Probable	**200**	**8.1**	**1.5**	**52**	**3.0**
Proven + Probable	**559**	**10.5**	**1.9**	**188**	**10.6**

Notes:

[1] The Mineral Reserve is estimated as at 31 December 2023 and depleted for production through to 31 December 2023.

[2] Tonnes are rounded to the nearest thousand; contained gold (oz) is rounded to the nearest thousand; contained antimony (t) is rounded to nearest hundred.

[3] Totals may appear different from the sum of their components due to rounding.

[4] Lodes have been diluted to a minimum mining width of 1.5 m for stoping and 1.8 m for ore development.

[5] An operating cut-off grade of 6.0 g/t AuEq is applied. An incremental cut-off grade of 3.1 g/t AuEq is applied where mining rates do not meet mill capacity and the life of the mine is not extended.

[6] Commodity prices applied are US$1,800/oz Au, USD11,500/t Sb and a US$:A$ exchange rate of 0.70.

[7] AuEq is calculated using the formula: AuEq = Au g/t + 1.22 × Sb %.

[8] The Mineral Reserve is a subset, a Measured and Indicated only schedule, of a LoM plan that includes mining of Measured, Indicated and Inferred Resources.

[9] The Mineral Reserve Estimate was prepared by Brett Nevill, MAusIMM, who is a full-time employee of SRK, under the direction of Dylan Goldhahn, MAusIMM, who is a full-time employee of Mandalay Resources. The Mineral Reserve Estimate was independently verified by Robert Urie, FAusIMM, who is a full-time employee of SRK. Robert Urie fulfills the requirements to be a QP for the purposes of NI 43-101, and is the QP under NI 43-101 for the Mineral Reserve.

The net decrease of 123,384 oz of gold in Proven and Probable Mineral Reserves for 2023, relative to 2021, consists of the addition of 13,124 oz of gold added by Mineral Resource conversion and addition of resources to the Shepherd orebody, and a total of 136,508 oz of gold depleted from the 2021 Mineral Reserves through mining production in 2022–2023 and through mining re-evaluation.

The 8,970 t of antimony net decrease in Proven and Probable Mineral Reserves consists of 793 t of antimony added by Mineral Resources conversion and addition of Mineral Resources to Shepherd, and 9,763 t of antimony depleted from the 2023 Mineral Reserves through mining production in 2022–2023 and through mining re-evaluation.

15.1 Modifying Factors

The modifying factors of mining dilution and recovery have been taken into account when generating the Mineral Reserve. The modifying factors applied are based on mining method, lode type and structural considerations.

15.1.1 Mining Dilution

Jumbo development, long-hole stoping with CRF, long-hole half-upper stoping with no backfill and remnant pillar slash stopes are the current mining methods used at the Costerfield Property for the extraction of underground Mineral Reserve.

Due to the narrow width of mineralisation at the Augusta, Cuffley, Brunswick, Youle and Shepherd lodes, the Mineral Reserve includes a portion of planned mining dilution, since the Mineral Reserve is reported to conform to a minimum 1.5 m mining width. Where the lode width is greater than 1.2 m, the minimum mining width is the lode width plus a total of 0.3 m planned dilution from the HW and FW. Unplanned dilution includes waste rock from outside the planned drive profile or stope limits which is loaded and hauled to the mill. Unplanned dilution is generally the sum of overbreak caused by excessive explosive energy and/or geotechnical failures due to unfavourable ground conditions.

Surveys of the mined development drives and stopes to date are consistent with the recovery and dilution factors applied to the generation of the Mineral Reserve (Table 15.2).

Table 15.2: Costerfield Property mine recovery and dilution assumptions

Mining method	Planned width (m)	Unplanned dilution (%)	Tonnage recovery Factor (%)
Ore development	1.8–4.5	5–20	100
Long-hole CRF	1.5–4.5	10–42	95
Long-hole half upper stopes	1.5–2.0	10–42	93
Remnant pillar slash stopes	1.5–1.6	10–42	60

The long-hole overbreak and dilution factors are consistent with operational results since there is adequate reconciliation between forecast tonnes and actual tonnes. These factors are based on stope inspections as well as stope scans that produce a 3D model of the open void which is then interrogated using mine planning software to generate the final void volume. Development dilution is based on the end of month survey reports which compare actual drive volume against the designed volume.

Both planned and unplanned dilution has been considered for establishing the production schedule. Planned dilution includes waste rock that will be mined and is not segregated from the design. Sources of planned dilution include the following:

- Waste rock that is drilled and blasted within the drive profile and where the overall grade of the blasted material is economically justified.
- Waste rock within the confines of the stope limits, including FW and/or HW material that has been drilled and blasted to maximise mining recovery and/or maintain favourable wall geometry for stability.

15.1.2 Mining Recovery

The tonnage recovery factors (Table 15.2) represent the recovered portion of the planned mining areas for the different mining methods and include in situ ore plus dilution material.

In stoping areas, visual inspections are carried out to estimate the stope void volume and determine if any ore is left in the stopes, which is recorded on the stope inspection sheets. Stope volumetric scans are also conducted to confirm the qualitative data captured during the stope inspections. These data are used in combination to estimate the recovery factors applied to the Mineral Reserve.

The remnant pillar slash stoping method is applied on a minor portion of the Mineral Reserve. This mining method has a reduced mining recovery in comparison to other long-hole stoping methods, having an estimated recovery factor of 60%. This value considers the factors of limited remote loader access when extracting ore from the remnant drive/draw point and unfavourable ground conditions around draw points that may potentially limit the recovery of material.

15.2 Cut-off Grade

The cut-off grade determined for Mineral Reserve is based on the 2023 operating costs, operational data and the Mineral Reserve economic parameters.

Parameters input into the cut-off grade calculation are:

- Gold price of US$1,800/oz.
- Antimony price of US$11,500/t
- US$:A$ exchange rate of 0.70
- Process recoveries are based upon a variable recovery formula applied at cut-off grade.
- Product payables are the weighted average payables of the 2024 LoM budget.
- The production schedule is sourced from the Mineral Reserve LoM plan.
- Unit costs for mining are based on 2023 operating cost data.
- Variable mining cost per tonne is the weighted average of development and stoping from 2023 operating cost data
- Mining costs are in A$ and commodity prices are in US$
- The cut-off grade determination does not include planned capital costs.

The resulting operating and incremental cut-off grades determined for the Mineral Reserve is summarised in Table 15.3, along with the values used in the determination of each cut-off grade.

Table 15.3: Mineral Reserve cut-off grade variables and cut-off grades

	Operating COG	Incremental COG
Mining cost (A$/t)	234.33	109.69
Processing cost (A$/t)	85.10	65.26
G&A cost (A$/t)	59.11	–
Sustaining capital	20.16	20.16
Gold price (US$/oz)	1,800	1,800
US$:A$ conversion value	0.70	0.70
Gold payable and recovery	89.9%	86.2%
Cut-off grade (g/t AuEq)	6.0	3.1

Notes: COG – cut-off grade; G&A – general and administrative.

An operating cut-off grade of 6.0 g/t AuEq was used for the Mineral Reserve with an incremental cut-off grade of 3.1 g/t AuEq applied where incremental mining conditions were met.

15.3 Mine Design and Planning Process

The mine design work is completed using Deswik.CAD and Deswik.ASD. The Mineral Reserve LoM scheduling is completed through Deswik.IS.

The Mineral Reserve is calculated from mine designs based on the 2023 Mineral Resource block models, which have been depleted for the production through to 31 December 2023.

The mine design methodology considers the Mineral Reserve cut-off grade, mining feasibility and economic assessment of individual mining blocks, and comprises the following general methodology:

- Determination of the mining method applied to individual areas based on access options, geological grade distribution, geometry of the lode, historical mining shapes and geotechnical constraints.
- Design of ore development and stope mining shapes in order to capture the geological block model using manual design (Deswik.CAD) and optimisation packages (Deswik.ASD).
- Assessment and validation of the output mining shapes and application of adjustments as required.
- Determination of the mining dilution and recovery factors to apply to design shapes
- Interrogation of the mining shapes against 3D geological block models in Deswik.IS to calculate and assign ore tonnes and grade.
- Identification of mining shapes of Measured and Indicated material above the cut-off grade for further design and assessment.
- Assessment and design of the waste development required to access ore development and stope blocks.

- Economic assessment of individual ore development and stope blocks on a level-by-level basis, based on variable mining costs applicable to the mining method and including waste access, haulage, processing, selling, royalty, and administrative costs.
- Inclusion of economically viable areas in the Mineral Reserve LoM schedule. Removal of uneconomic areas, or re-design and inclusion in the plan if re-assessment proves to be profitable.
- Application of dependency rules, mining rates and schedule constraints to the design shapes to link the mining activities in a logical manner within the Deswik.IS scheduling project.
- Export of the resulting Mineral Reserve LoM schedule is exported for further economic validation through the financial model.

16 Mining Methods

The Augusta Mine is serviced by a decline development from a portal within the Augusta box-cut. The Augusta decline dimensions are primarily 4.8 m high by 4.5 m wide at a gradient of 1:7 down. The majority of the decline development has been completed with a twin-boom jumbo. However, development of the decline from the portal to 2 Level was completed with a road-header; this section of decline has dimensions of 4.0 m high by 4.0 m wide. The Augusta decline provides primary access for personnel, equipment, and materials to the underground workings.

The Cuffley Decline extends as a branch off the Augusta Decline at 1028 mRL and continues down to approximately 895 mRL. At 935 mRL, the Cuffley Incline extends off the Cuffley Decline and accesses mineral resources from the 945 mRL to the 1,050 mRL. This incline was used to extract N and Cuffley lodes. Mining in the Cuffley incline is complete and it is now the location of the High Explosive (HE) Magazine.

A second decline within Cuffley, known as the 4800 decline, accesses the southern part of the Cuffley Lode which is positioned south of the East Fault. This decline commences at 960 mRL and extends to 814 mRL. The Mineral Reserve in the 4800 decline consists of remnant pillars from past stoping and long-hole Half Upper Stopes (HUS) and CRF stopes.

The Brunswick Access, 5.5 m high by 4.5 m wide development, starts from 925 mRL on the Cuffley Decline and accesses the Brunswick Deposit at 955 mRL.

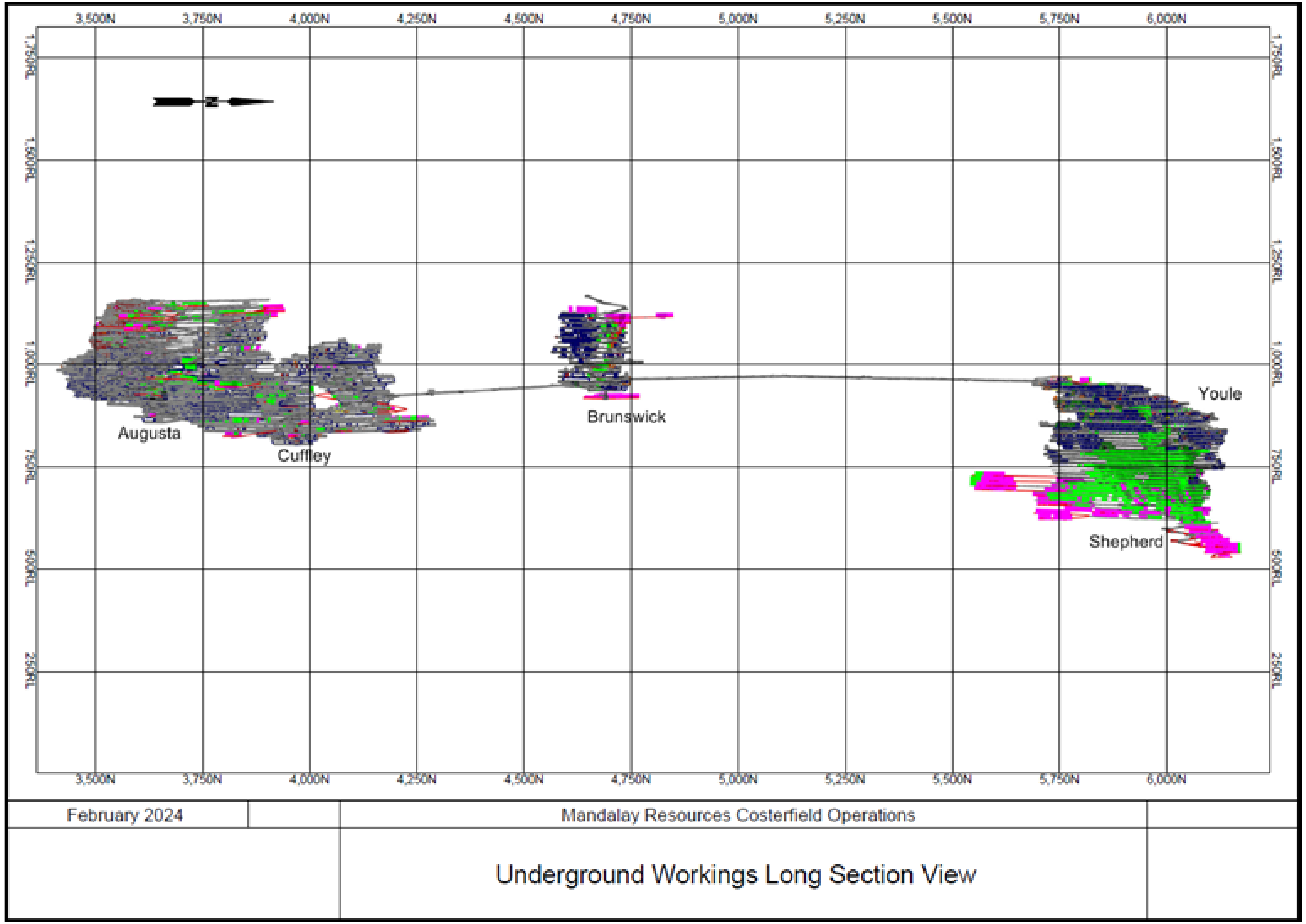
The Brunswick Incline continues from 955 mRL up to the Brunswick Portal. The Brunswick Incline development was mined to breakthrough into the Brunswick Open pit, establishing the Brunswick Portal during the second half of 2020. The Brunswick Incline has the dimensions 4.8 m high by 4.5m wide at a gradient of 1:7 up and was mined with a twin-boom jumbo. The Brunswick Open Pit was prepared for the portal breakthrough with a pushback completed by a combination of road-header and drill and blast supported by a twin-boom jumbo. The first 20 m advance of Brunswick Portal was completed by a road-header with the dimensions 5.0 m high by 5.0 m wide at a gradient of 1:25 up. The establishment of the Brunswick Portal provides an additional means of egress from the mine and is the primary material haulage route from underground to the Brunswick Mill for ore processing and waste storage.

The Youle access, 5.5 m high by 5.5 m wide, extends from the Brunswick Incline at 961 mRL and accesses the Youle Deposit at 957 mRL. From this level, the Youle Decline, 4.8 m high and 4.5 m wide, continues down to 588 mRL, accessing both the Youle and Shepherd deposits, and is planned to extend down to 548 mRL.

Mill feed is produced from three different mining methods: full-face jumbo development, long-hole CRF stoping and HUS. All mined ore material is hauled from the underground working areas to the Brunswick ROM via the Brunswick Incline and Portal. Waste material produced from mining is stored underground for use as stope backfill.

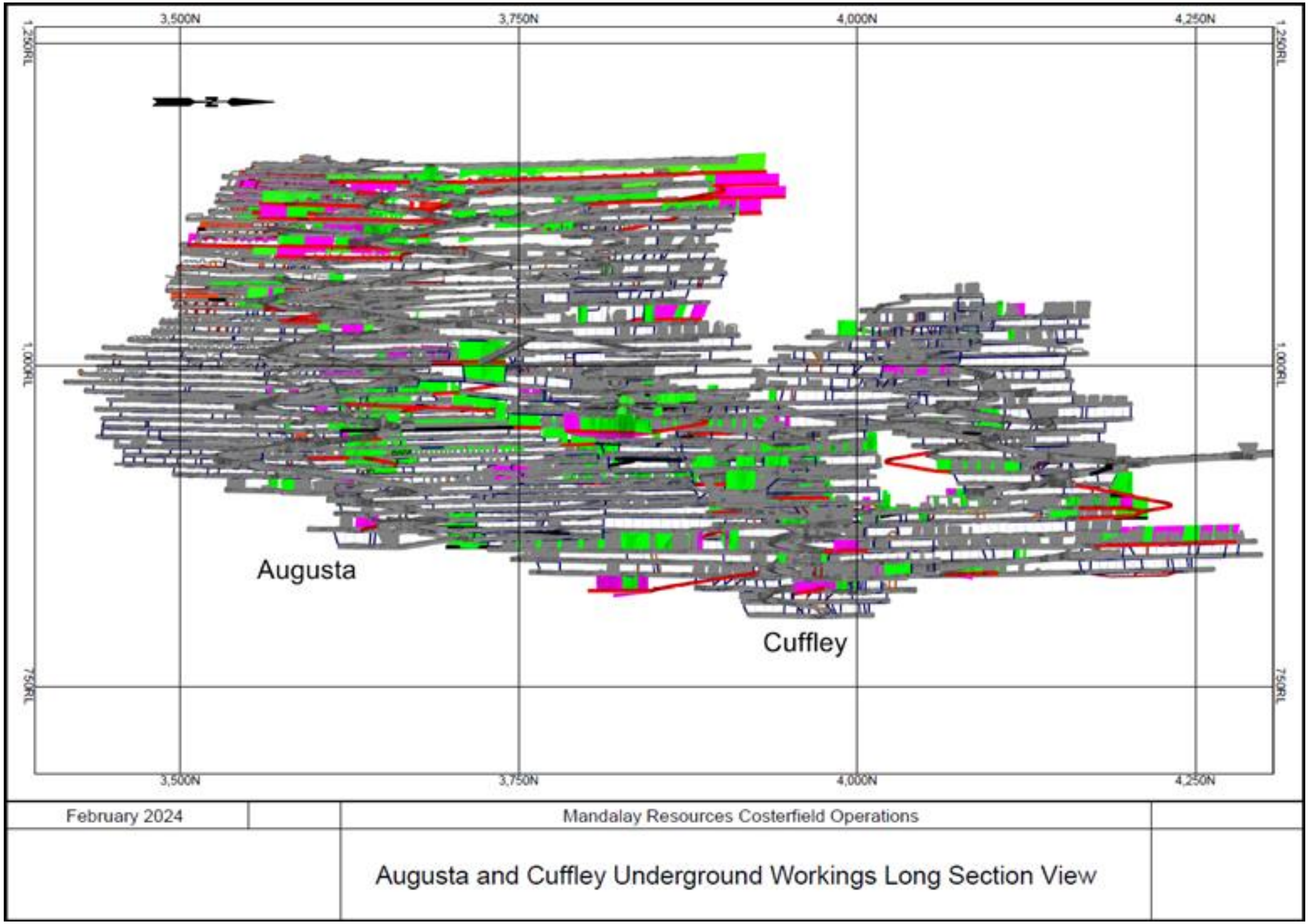
A schematic of the Augusta, Cuffley, Brunswick and Youle underground workings is presented in Figure 16.1 and the designed Reserve stope shapes are presented in Figure 16.2 to Figure 16.4.

Figure 16.1: Long-section of the as-built and Mineral Reserve designs – Augusta, Cuffley, Brunswick and Youle



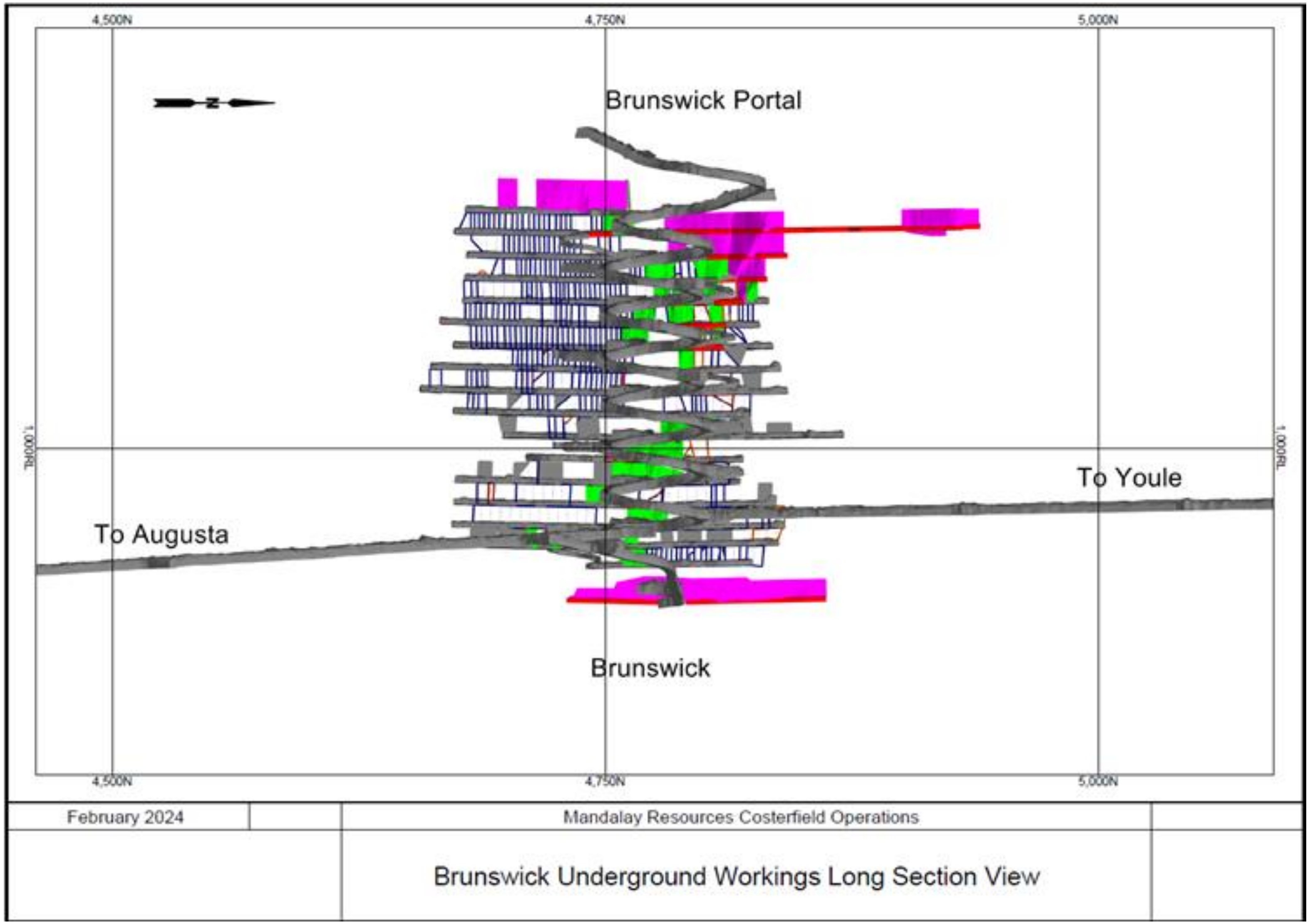
Notes: Red – planned development; green– measured planned production; purple – indicated planned production; grey – depleted workings.

Figure 16.2: Long-section of Augusta and Cuffley Mineral Reserve mine design



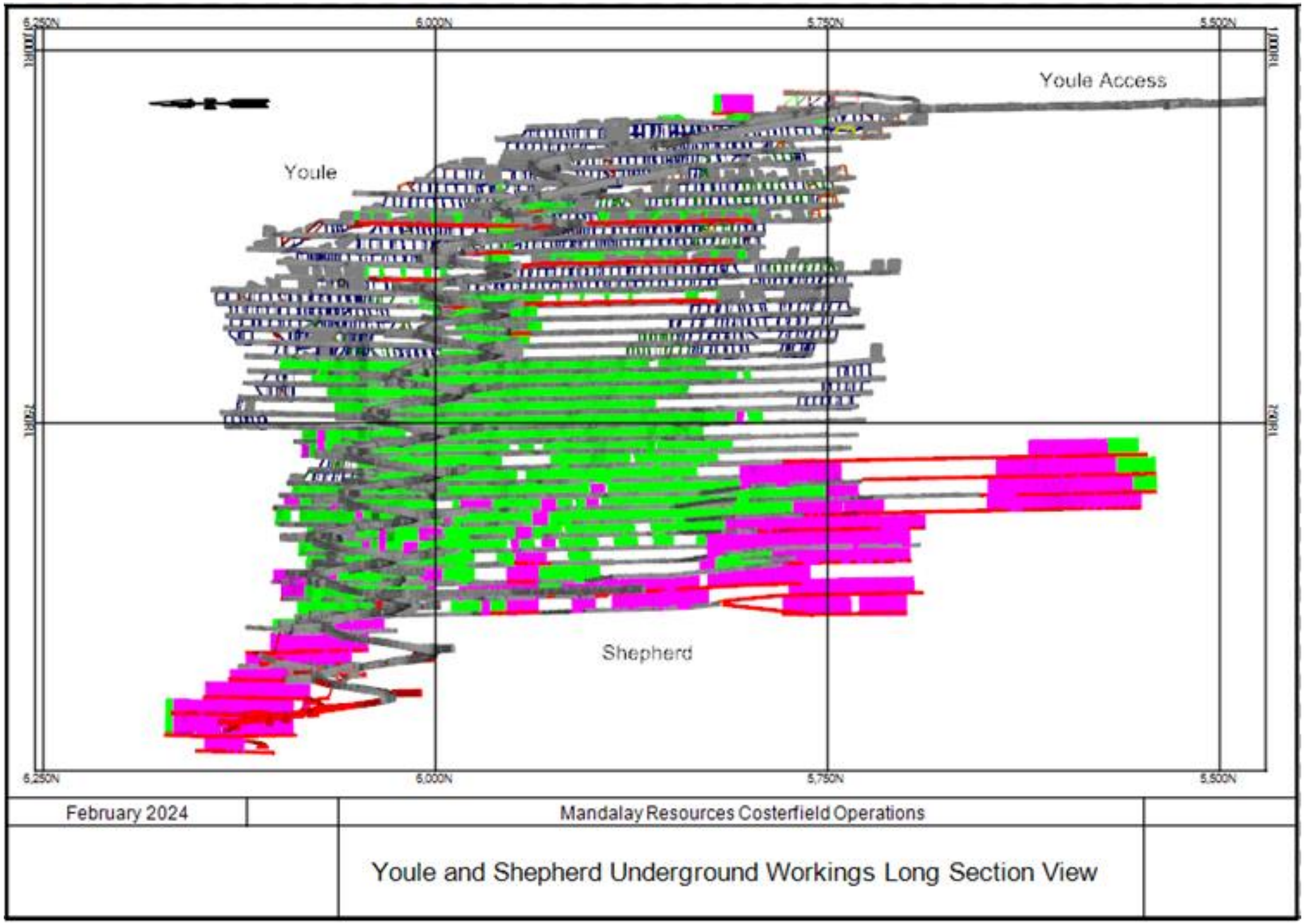
Notes: Red – planned development; green– measured planned stoping; purple – indicated planned stoping; grey – depleted workings.

Figure 16.3: Long-section of Brunswick Mineral Reserve mine design



Notes: Red – planned operating development; green– measured planned stoping; purple – indicated planned stoping; grey – as built.

Figure 16.4: Long-section of proposed Youle mine design on Youle and Shepherd lodes



Notes: Red – planned operating and capital development; green – measured planned stoping; purple – indicated planned stoping; grey – as built.

16.1 Geotechnical

16.1.1 Rock Properties

Rock Mass Classification

The Q-System of rock mass classification has been adopted at the Costerfield Property. Rock mass classifications completed within all underground working domains show that rock mass quality varies ranging from ‘extremely poor’ to ‘fair’ rock mass in close proximity to target mineralisation according to the Q-System. Table 16.1 and Table 16.2 detail the underlying observations for the best case and worst case rock mass classifications, respectively.

Table 16.1: Best case rock mass classification

Best Case		
Q parameter	**Measure**	**Comments/observations**
RQD	90%	Excellent, (0–7 joints per m³)
Jn	6	Two joint sets plus random joints
Jr	2	Rock wall contact and smooth undulating roughness
Ja	3	Rock wall contact with silty or sandy clay coatings and a small clay fraction
Jw	1	Dry excavations with minor inflow (humid or a few drips)
SRF	2.5	Weak zones intersecting the underground opening, which may cause loosening of rock mass. Single weak zones with or without clay or chemical disintegrated rock (depth > 50 m). 105 MPa Rock strength in lower levels with stress levels estimated at approximately 25 MPa (from regional stress measurements), $\sigma c/\sigma 1 = 4.2$. Rock strength < 20 MPa in the upper levels of the mine (down to ~50 m below surface)
Q	**4**	**Fair rock mass**

Table 16.2: Worst case rock mass classification

Worst Case		
Q Parameter	**Measure**	**Comments/Observations**
RQD	40%	Poor, (20–27 joints per m³)
Jn	15	Four joint sets plus random joints, heavily jointed sugar cube effect
Jr	1	Rock wall contact and smooth planar roughness
Ja	10	Thick mineral filling. Zones or bands of thick clay preventing rock wall contact with shear displacement
Jw	0.66	Medium inflow, occasional outwash of joint fillings (many drips or ‘rain’)
SRF	5	Weak zones intersecting the underground opening, which may cause loosening of rock mass. Loose, open joints, heavily jointed or ‘sugar cube’. 105 MPa rock strength in lower Cuffley levels with stress levels estimated at approximately 25 MPa (from regional stress measurements) giving $\sigma c/\sigma 1 = 4.2$. Rock strength < 20 MPa in the upper levels of the mine (down to ~50 m below surface)
Q	**0.04**	**Extremely poor rock mass**

Rock Strength

The Costerfield Formation (Section 7) siltstone has had a total of 84 Unconfined Compressive Strength tests carried out since 2009. Test results indicate that intact rock strength increases with depth due to sustained weathering in the upper strata. At levels less than 100 m below surface, intact rock strength exceeds 80 MPa.

Rock Stress

In situ stress measurements have been undertaken at the Costerfield Property in proximity to the Youle lode, using the Deformation Rate Analysis technique on core samples at 520 m and 903 m below the surface.

At 520 m below the surface, the maximum principal stress is orientated at 300º/43º (trend/plunge) with a magnitude of 25 MPa, the intermediate principal stress is oriented at 184°/25° with a magnitude of 12.6 MPa, and the minimum principal stress is oriented at 074°/36° with a magnitude of 8.3 MPa.

At 903 m, the maximum principal stress is oriented at 346°/5.2° and a magnitude of 30 MPa, the intermediate principal stress is oriented at 091°/71° with a magnitude of 19.6 MPa, and the minimum principal stress is oriented at 018°/15° with a magnitude of 15 MPa.

In situ stress in levels below 895 mRL in Cuffley and 936 mRL in Brunswick has caused minor convergence, or squeezing ground, in isolated areas around major fault zones. In the Youle deposit, approximately between 880 mRL to 760 mRL induced stresses from retreat of the stoping front has exhibited convergence of variable magnitude throughout the ore drives with multiple factors driving the magnitude of convergence encountered (e.g. orientation of major structures and bedding, tunnel orientation and rock mass rating). Below 760 mRL convergence has been encountered within on lode development. To date, convergence encountered is in the light to fair squeezing classification, with tunnel strains between 0% and 2.5% encountered. Dynamic support is installed to ensure drive stability in areas expected to exhibit convergence with monitoring of convergence undertaken using a Hovermap hand held LiDAR scanner and damage mapping. Rehabilitation is undertaken as required when monitoring identifies the need for ground support reinstatement or upgrade.

In October 2021, stress modelling for the LoM extraction of Youle was completed. The modelling did not identify any areas where mining induced stress would cause regional instability. However, due to the complex nature of the rock mass, isolated cases of converging ground had potential to occur. Since completion of the modelling in 2021, the frequency and varying magnitude of encountered convergence in the on lode development has triggered an update of the model to be undertaken to proactively understand convergence to be expected as mining continues. The data collected through LiDAR monitoring will be used to precisely calibrate the model, thus allowing for a more accurate model output compared to the 2021 model. Completion of the updated numerical stress model is expected in early 2024.

Rock Mass Alteration

Rock mass in the vicinity of mineralised structures is heavily fractured with multiple joint orientations, often with a portion of clay fill and smooth planar joint surfaces. In waste rock, away from mineralised lodes and discrete structures, the rock mass improves with lower fracture frequency and rough tightly healed joint surfaces present.

Hydrogeology

The regional hydrogeology is comprised of two main aquifers, the Shallow Alluvial Aquifer (SAA) and the Regional Basement Aquifer (RBA).

- The SAA is comprised of silts, sands and gravels, and is a perched groundwater system occurring across the site and within the confines of the creek and valley floors. There is clear evidence that this aquifer is perched, is laterally discontinuous and is less common in the area.
- The RBA is comprised of Silurian metasediments and forms the basement aquifer, where groundwater mainly occurs within and is transmitted through fracture systems beneath the upper weathered profile, at depths of greater than 20 m below the natural surface.

Details of the underground dewatering system are covered in Section 16.5.3.

Mine Design Parameters

Mining Methods

The dominant mining method is longitudinal long-hole stoping filled using CRF, with stope panels generally consisting of three to four operating levels mined bottom-up over CRF with a longitudinal retreat to a quasi-central access. Several other mining methods are applied to access and optimise the extraction of ore at the Costerfield Property:

- Capital development with twin-boom jumbo.
- Operating development with single boom jumbo.
- Blind up-hole longitudinal long-hole open stoping (‘half uppers’ or HUS).
- Floor benching of level ore development.
- Avoca stoping with CRF (‘reverse fill’).
- Avoca stoping with rockfill (‘reverse fill’).
- Overhand cut and fill (Flat backing ore level development).
- Air leg rise mining.

Mining methods are selected to suit ore drive/lode geometry and maximise ore recovery while minimising unplanned dilution.

Development Geometry

Standard development profiles adopted at the Costerfield Property include:

- 1.8 m wide × 3.0m high ore drives
- 2.0 m wide × 3.0m high access drives
- 3.5 m wide × 4.0m high access drives

- 3.5 m wide × 4.2m high access drives
- 4.5 m wide × 4.8m high decline/incline
- 5.5 m wide × 5.5m high decline/incline
- 5.0 m wide × 4.8m high level access
- 5.0 m wide × 6.5m high truck tips
- 4.5 m wide × 4.8m high ore stockpiles
- 6.5 m wide × 4.8 m high vent rise access drives.

Non-standard development profiles may be mined for major infrastructure, such as pump stations, explosives magazines, fan chambers etc., or for variations to the applied mining methods, such as flat-backing, and floor benching, etc. Development spans and associated ground support are designed using empirical data to ensure the stability of mined spans.

Stope Geometry

In response to observed ground conditions and production drill capability, inter-level spacing at the Costerfield Property is variable. Stope strike length varies based on the applied mining method, observed ground conditions and machinery capability. Stope geometry parameters include:

- stope height: Up to 17 m
- stope strike length: depends on ground conditions, but generally 3.6 m–13 m; however, HUS strikes can be extended further, ground conditions permitting
- stope design width: 1.5 m
- stope dip: 45–90º.

Non-standard stope geometry may be mined to maximise ore extraction under unique circumstances, such as remnant mining, flat dipping orebodies and geological complexity. The empirical stope performance chart is consulted to ensure that designed stope spans will allow safe efficient extraction of target mineralisation.

Pillars and Offsets

In mine design and planning, the following pillars and offsets are observed to ensure the stability of mined excavations:

- Decline development is designed and mined with a 30 m offset to target mineralised structures; to date, stope production blasting has not influenced decline stability having applied the 30 m offset. This distance has been maintained as a minimum for the Brunswick, Youle and Shepherd lode.
- The minimum inter-level pillar width to height ratio is 1:2; for example, for 1.8 m wide ore drives, the minimum inter-level spacing is 3.6 m
- Minimum horizontal clearance between sub-parallel ore drives is 2 m
- The minimum pillar strike between unfilled blind up-hole longitudinal open stopes or HUS is 3 m.

Backfill

The practice of placing backfill in stope voids is undertaken to improve local ground stability, reduce unplanned dilution and improve mining recoveries. Details on the types of backfill and methods of placement is covered in Section 16.6.

Ground Support

Development and Support

Ground support elements installed in standard development profiles include:

- galvanised resin bolts 2.1–3.0 m length
- galvanised hybrid bolts 1.5–2.1 m length
- galvanised friction bolts 1.8–2.4 m length
- 2.4 m × 3.6 m 5.6 mm diameter gauge galvanised mesh
- 2.4 m × 4.2 m 5.6 mm diameter gauge galvanised mesh
- 2.4 m × 3.0 m 4.0 mm diameter gauge galvanised mesh
- 2.4 m × 1.5 m 4.0 mm diameter gauge galvanised mesh.

When spans exceed 5.5 m in development intersections or in response to deteriorating ground conditions and discreet structures, cement grouted single strand or twin strand, non-galvanised, bulbed, 4.5 m–6.0 m cable bolts are installed and tensioned to ensure the stability of development profiles.

Additional ground support may be installed to support non-standard development profiles or in response to poor ground conditions. Fibrecrete, resin injection, spiling, sets and straps have been installed in the past to support poor ground, development/stoping interactions and faults/shear zones. In addition, 2.4 m and 1.8 m Yield-Lok bolts have been installed in areas where squeezing ground is expected, however, hybrid bolts are now used.

Stoping Ground Support

Additional support for designed stopes is installed on an as-required basis in response to compromised stope geometry, poor rock mass, interactions with faults/shears or interactions with other stopes and development. Single strand, non-galvanised, bulbed, 4.5 m–6 m cable bolts are generally installed as secondary support for stopes.

Other forms of ground support, including resin bolts, hybrid bolts, friction bolts, mesh, fibrecrete, resin injection and straps, may also be installed to provide secondary support for designed stopes.

16.2 Mine Design

16.2.1 Method Selection

Long-hole CRF stoping has been selected as the preferred mining method for the Mineral Reserve on the Youle and Shepherd lodes. This is based on the orebody geometry and current production fleet, as well as the experience gained through the application of this method during mining of Cuffley and Brunswick.

The long-hole CRF stoping method allows for a ‘bottom-up’ mining sequence with the benefit of minimising the number of crown/sill pillars required to remain in place. The location of the crown and sill pillars is determined by the grade distribution of the orebody and the local mine stability requirements. Recovery of the pillars is planned to be undertaken with the use of half-upper production stoping and remnant pillar extraction where grade and ground conditions permit.

16.2.2 Method Description

The Youle orebody has been mined with a sub-level spacing of 9 m floor to floor, or 6 m backs to the floor vertically and 6–13 m backs to the floor along the dip of the orebody. This sub-level spacing has been implemented in order to minimise dilution and improve recovery in the flatter dipping Youle ore. It also allows for stable vertical spacing between levels and optimal stope height for drilling accuracy. The orebody dip varies greatly in Youle between 38° and 85°, which is dependent on the influence of major structures interacting with the Youle lode. In areas where the dip of the ore is below 40°, extraction drives are widened to steepen the FW of the stope to ensure full recovery. Stope HWs designed less than 45° require backfill with cemented aggregate fill (CAF) rather than CRF to ensure fill confinement and stability of the HW.

The Shepherd ore deposit consists of multiple lodes that are positioned in the FW of the Youle structure which range from moderately flat dipping (~55°) to sub-vertical between 70° and 90° dip. The Shepherd deposit was first mined in the second half of 2021 on the extents of the southern Youle lode at 757 mRL. The Youle mine predominantly accesses the sub-vertical Shepherd deposit below 650 mRL. Here the sub-level spacing has been increased to 11–13 m floor to floor to account for the sub-verticality of the lodes. The increased level spacing ensures that final stope height is optimised within the limits of the mining method, as well as improving design efficiency by reducing overall ore and waste development. The Shepherd deposit is designed to be extracted primarily by a long-hole CRF stoping method on each of the individual lodes. Where separate lodes run parallel and the separation between the lodes does not allow individual ore drives or stope panels, ore drives and stopes have been designed to capture the mineralisation up to a width of 4.5 m. This method has been used successfully on the Youle lodes by stripping the development out to the required width on retreat with stoping.

Mining within the Augusta Mine has targeted several individual lodes, including the W, NM, E, K and Cuffley lodes, which vary in width from 0.1 m to 1.5 m and dip between 45° and 85°. This lode geometry is favourable for long-hole CRF and HUS when using mechanised mining techniques. However, in the past, ore was also extracted using air-leg CRF and half upper stoping methods.

The current Mineral Reserve in the Augusta Mine is planned to be extracted using various mechanised methods depending on the ore location, access requirements, and the proximity to previously mined areas. The majority of Augusta Mineral Reserve is planned to be extracted using long-hole HUS due to limited development access for fill drives. Areas that have access for both an extraction and fill drive use the long-hole CRF stoping method.

Remnant pillar slashing is the planned method for areas where HUS has previously been undertaken. This method involves developing a waste access parallel to the original production drive, with draw points breaking through to the ore zone. Production slash-holes are drilled into the remnant rib pillars to be fired and the ore extracted with remote loading operations. Areas of remnant ore are individually assessed and those deemed both economically viable and safe to extract remotely have been included in the Mineral Reserve.

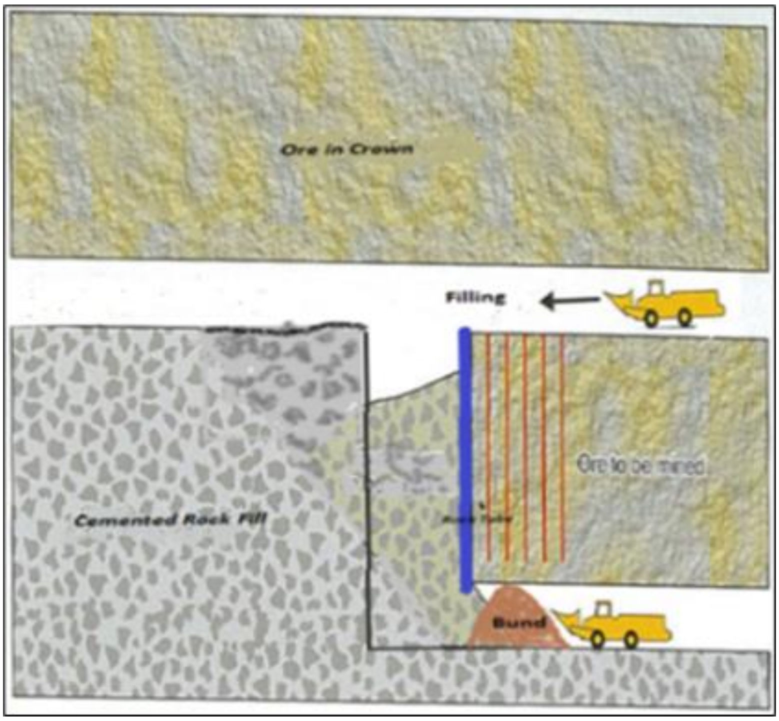
Throughout the Cuffley lodes, a sub-level spacing of 10 m floor to floor, or 7 m backs to the floor, has been established to ensure stable spans, acceptable drilling accuracies and blast-hole lengths. A sub-level spacing of 15 m was developed for two select areas. This involved drilling up from the lower level to 8 m and drilling and firing the remainder from the upper level using downholes. While this has been a success, it has not been implemented elsewhere in the mine.

The Brunswick orebody has applied a sub-level spacing of 12 m floor to floor, or 9 m backs to the floor. This has been established due to improved drill accuracy, steep lode geometry and the wider orebody, with the average diluted stope width of 2.0 m versus 1.5 m in Cuffley and Augusta. Brunswick has primarily been mined with long-hole CRF stoping due to it being accessed and developed from the bottom up. The Brunswick Mineral Reserve consists of the remaining level closeout stopes, ore development and CRF/HUS stoping on northern extents, and remnant extraction of pillars left in place for localised ground stability.

The production cycle for long-hole CRF/CAF stoping, as illustrated by Figure 16.5, comprises the following:

- Develop access to the orebody.
- Establish bottom sill drive and upper fill drive.
- Drill production blastholes in a minimum two-hole per ring pattern, depending on the ore width. The nominal stope design width is 1.5 m.
- Fire the blast of 5.4 m to 13 m strike and extract ore with a tele-remote loader.
- Place rock bund at the brow of the empty stope and place mesh tubes in the stope. Mesh tubes are tightly rolled steel mesh placed in the leading edge of stope prior to filling and eliminates the need for boring reamer holes in next stoping panel.
- Place CRF into the stope.
- Remove rock bund at the brow of the stope after 12-hour curing time.
- Commence extraction of adjacent stope once the CRF has cured for 24 hours.

Figure 16.5: Long-hole CRF stoping method



Sources: Potvin, Thomas, Fourie, (2005)

The half upper stope method is similar to CRF stope method however, it is implemented where there is no access to a fill drive. The mining cycle comprises the following:

- Drill up to 13 m length blind production long-holes for a strike length of 3 to 13 m,
- Fire stope and extract ore with a tele-remote loader,
- Leave a 3 m strike rib pillar where required by ground conditions,
- Commence the next stope.

16.2.3 Materials Handling

Since the completion of the Brunswick Portal, all underground ore is trucked to the surface via the Brunswick Incline. Once on the surface, the ore is transferred to the Brunswick ROM pad where it is stockpiled, screened, blended and crushed prior to being fed into the Brunswick Processing Plant.

Waste material from development headings is trucked internally underground and used for backfill or trucked to the surface and stockpiled at the Bombay Waste Rock Storage Facility. Small portions of suitable waste material is screened on the surface and trucked underground to be used as road base and CAF fill. In times of reduced underground waste production, trucks are backloaded on the surface with stockpiled waste to haul underground and use in stope filling.

16.3 Mine Design Guidelines

The mining schedule follows a predominantly bottom-up stoping sequence where possible, mining from the northern and southern extents retreating toward the central access. This sequence enables a consistent production profile to be maintained because it allows for dual development headings on each level.

The current and planned sequence for the Youle and Shepherd orebodies uses crown pillars at various intervals to allow for a consistent production profile and optimised recovery of ore.

16.3.1 Level Development

Production drive development is mined to ensure the ore is positioned in the face for maximum recovery and feasible long-hole production drilling. Production development is mostly directed under geology control and sometimes survey control where stand-off/pillars need to be maintained. Production drives are excavated and supported with a single boom jumbo and are loaded with a manual or tele-remote operated load haul dump (LHD).

16.3.2 Vertical Development

Vertical development at the Costerfield Property exists in the way of primary ventilation shafts, return/fresh ventilation rises and escapeway ladders. Throughout Cuffley, ventilation rises of 3.5 m × 3.5 m have been excavated between levels to extend the existing primary exhaust system both above and below the Cuffley fan chamber and exhaust shaft. The Brunswick Mine used a 3.5 m diameter shaft to supply fresh air to the workings and act as a second means of egress. Since the Brunswick Portal breakthrough, the Brunswick shaft has been decommissioned and the portal is now the Fresh Air Intake (FAI). The Youle ventilation shaft has a diameter of 4.0 m, exhausting air from Youle workings and a providing secondary means of egress. The Youle primary exhaust system is extended with 4.0 m × 4.0 m ventilation rises between the levels as development progresses below the ventilation shaft and fan chamber. Ladder rising with a diameter of 0.8–1.2 m has been developed for the installation of escape ways providing a second means of egress between working levels.

16.3.3 Stoping

The strike length of stopes is determined using a case-by-case assessment of the overall mining sequence, ore orientation, geological considerations and geotechnical stability. All blasted material is assumed to have a swell factor of 30% and non-mineralised material is allocated a default relative density of 2.74 t/m^3 for Augusta, Cuffley and Brunswick and 2.76 t/m^3 for Youle and Shepherd. The relative density of mineralised material is estimated within the geological resource block model.

16.3.4 Mine Design Inventory

The planned mining inventory for each lode is summarised in Table 16.3.

Table 16.3: Mineral Reserve inventory by lode

Lode	Ore tonnes	Au g/t	Sb %
YOULE 500	165,931	14.5	2.0
YOULE 501	2,088	3.4	2.7
YOULE 508	2,027	3.8	4.0
SHEPHERD 600	102,547	10.3	0.5
SHEPHERD 602	2,672	21.2	1.9
SHEPHERD 605	3,958	6.5	0.0
SHEPHERD 609	1,194	11.0	0.6
SHEPHERD 610	17,898	17.7	1.2
SHEPHERD 620	56,766	11.1	0.4
SHEPHERD 621	5,036	4.9	0.0
SHEPHERD 630	16,075	4.2	3.6
KR 310	4,800	2.5	1.5
BRUNSWICK 300	31,566	5.1	2.7
AS 230	602	2.7	2.0
B 16	4,502	5.0	2.8
C 30	13,235	7.4	3.5
CD 220	2,752	8.1	2.7
CE 211	1,625	11.7	1.8
CM 210	17,832	8.8	3.1
E 10	27,536	6.9	4.4
K 60	3,729	6.3	3.0
N 40	25,497	9.5	4.2
NS 48	921	6.0	3.9
NW 47	1,231	5.2	3.6
P1 55	8,399	8.6	2.2
W 20	9,657	7.5	4.8
Total	**530,076**	**10.8**	**1.9**

16.4 Ventilation

The current Costerfield Property mine ventilation circuit is comprised of fresh air being sourced from four surface intakes, these being:

- The Augusta portal, and the Augusta ladder ways, where fresh air enters the ladder ways via a 20 m shaft from the surface.
- The Augusta Fresh Air Rise (FAR).
- The Brunswick Portal and a small amount of airflow entering the mine through the Brunswick FAR, regulated to 98%, which services the 1056 Fresh Air Base (FAB). This airflow is pulled into the mine via two separate underground primary chambers that exhaust air out of the mine

via the Cuffley return airway (RAW) at a flow rate of 54–56 m^3/s and the Youle RAW at 103m^3/s.

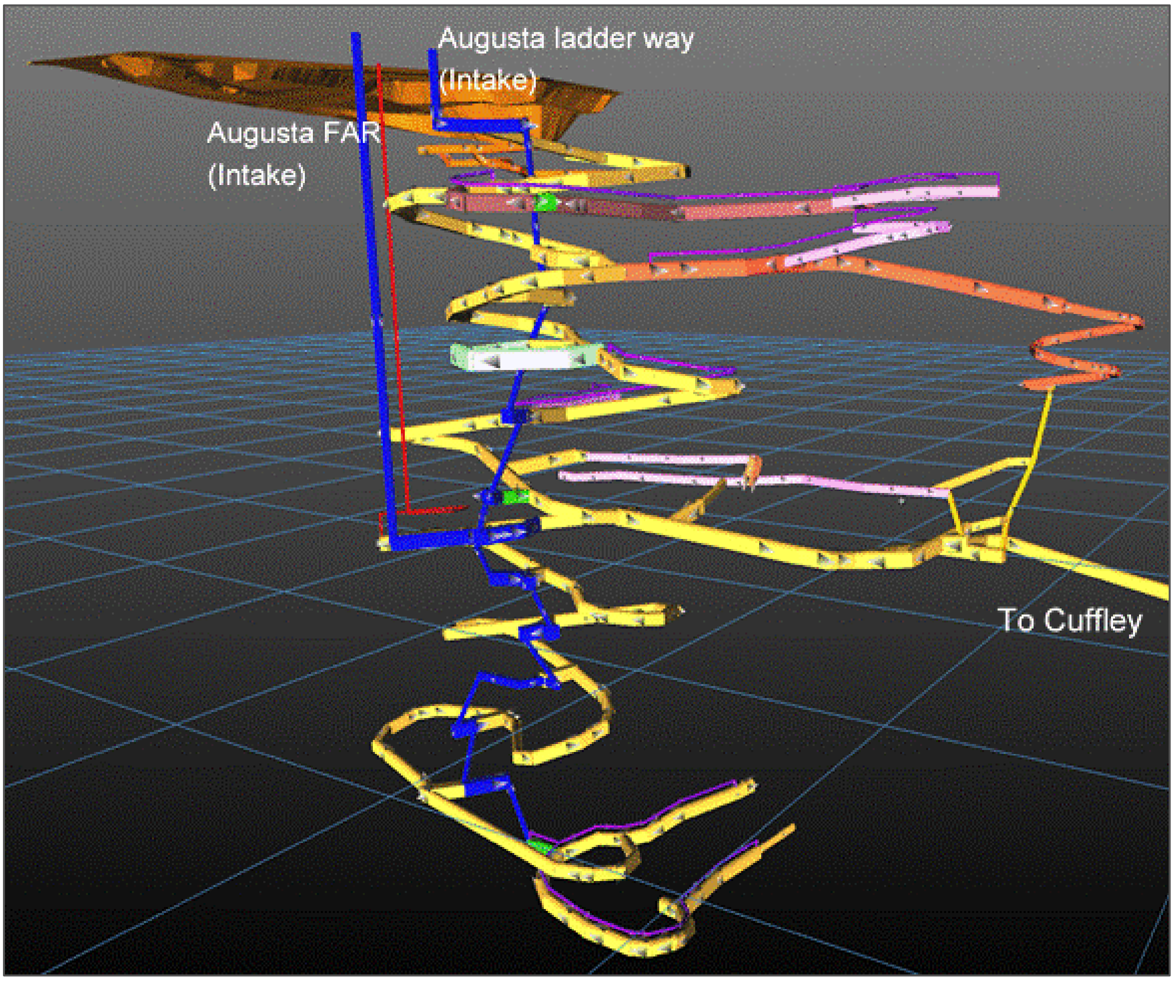
16.4.1 Primary Ventilation Circuit – Augusta/Cuffley

At Augusta/Cuffley fresh air travels to the bottom of the old Augusta workings via internal rises and enters the Augusta side of the mine at the 900 mRL, at which point it flows back up the Augusta decline where it enters the Cuffley decline and joins the primary flow entering the mine from the Augusta portal. This airflow travelling down the Cuffley decline, splits at the 4800 decline and the Cuffley incline, with the remaining airflow continuing towards the Brunswick access. At the Brunswick access, the airflow splits and travels towards the Youle via the Brunswick straight (21–23 m^3/s), with the remaining airflow (31 m^3/s) reporting to the Cuffley 915 RAW, where it will exhaust via the Cuffley RAW.

The Cuffley incline is also where the current High Explosive (HE) magazine is located. Primary airflow in the 4800 decline and Cuffley incline reports to the Cuffley RAW where it exhausts to surface.

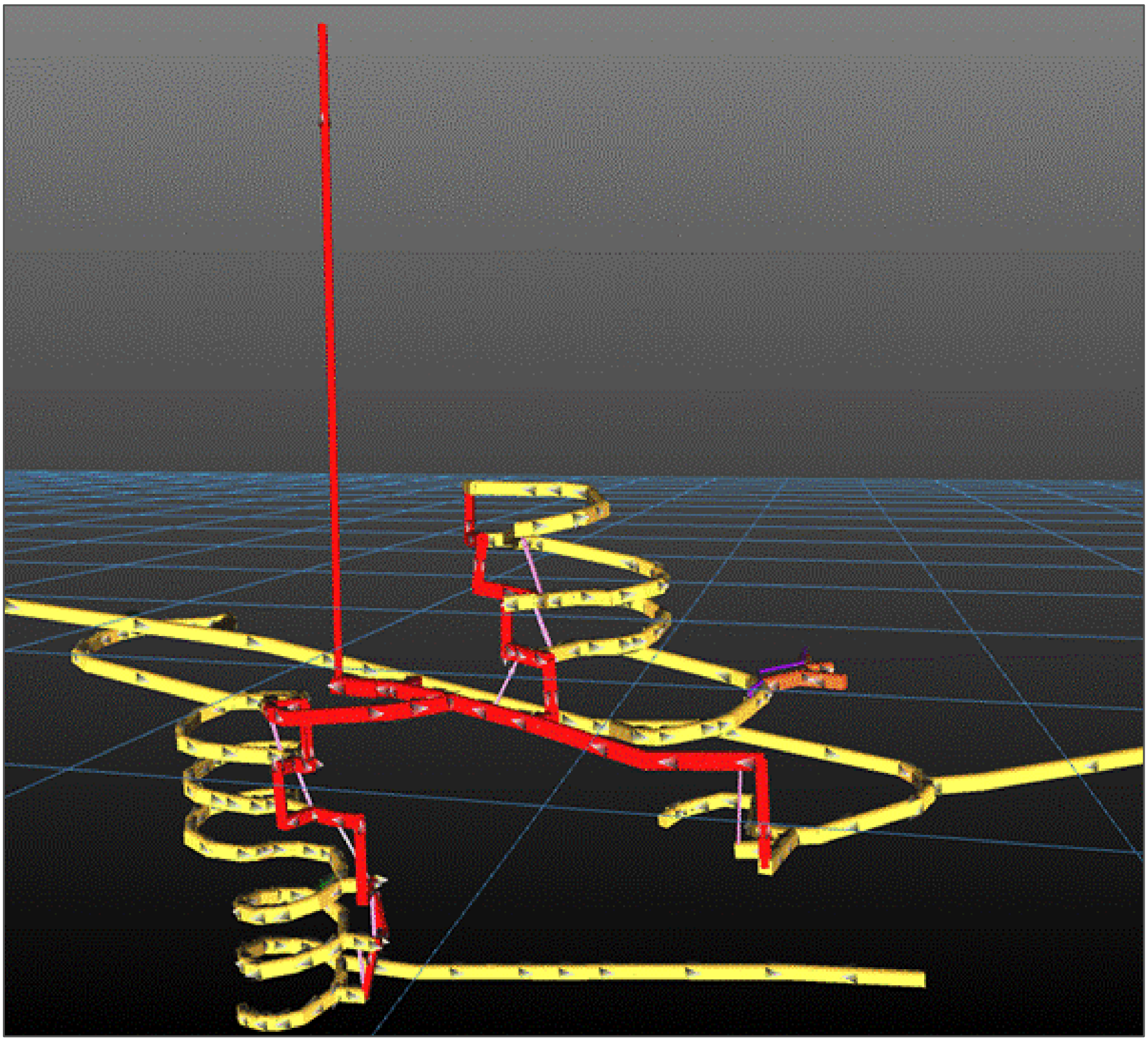
The primary ventilation circuit for Augusta is presented in Figure 16.6. FAIs through the Augusta FAR and ladder ways (in blue), with primary flow continuing to the Cuffley decline.

Figure 16.6: Augusta primary ventilation circuit



The primary ventilation circuit for Cuffley is presented in Figure 16.7. Fresh air is drawn through the Cuffley decline from Augusta and return air (in red) is exhausted through the Cuffley Return Air Rise (RAR) by either the 4800 decline or 915 RAW.

Figure 16.7: Cuffley primary ventilation circuit

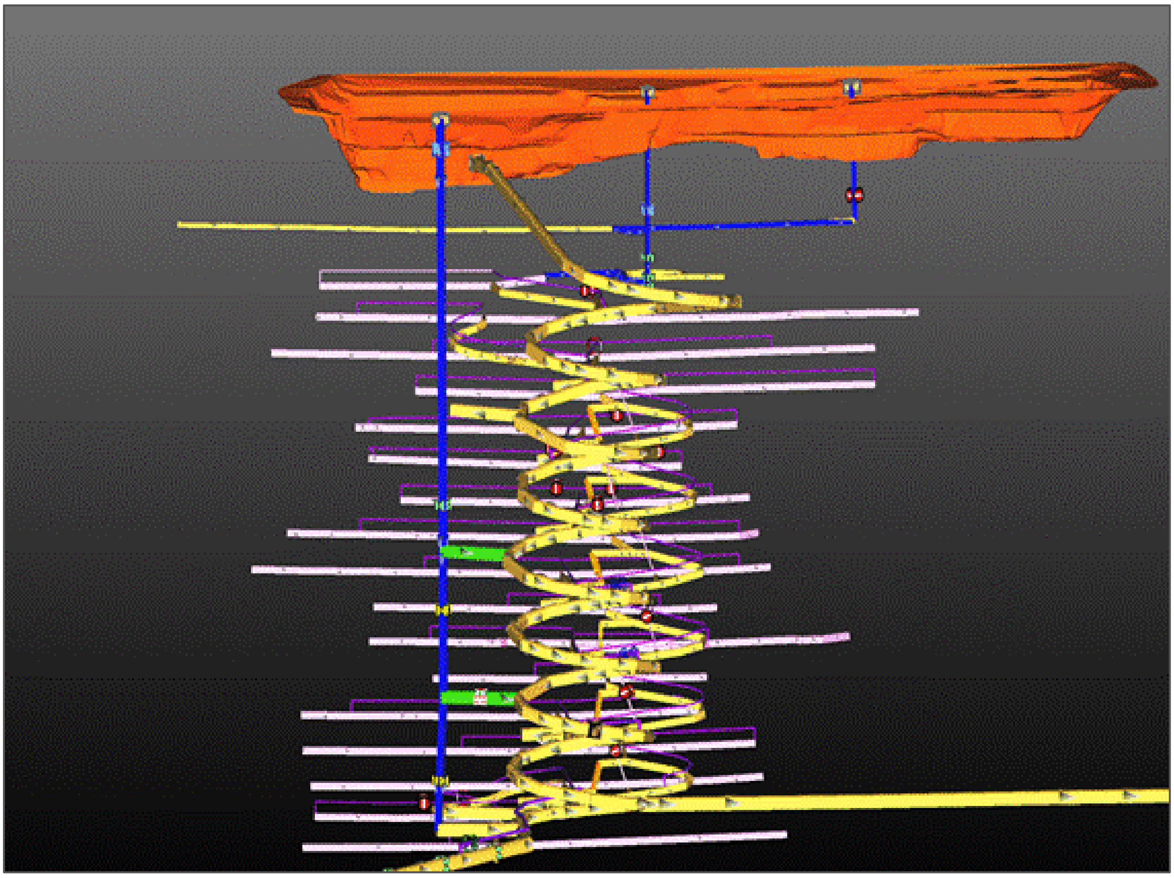


16.4.2 Primary Ventilation Circuit – Brunswick/Youle

The Brunswick workings are supplied primary airflow from the Brunswick portal (80 m^3/s), while the Youle workings are currently supplied fresh air from the Brunswick portal (80 m^3/s) and the remaining primary airflow from the Augusta/Cuffley side of the mine (21–23 m^3/s). The Youle working levels are supplied airflow via the use of secondary ventilation fans.

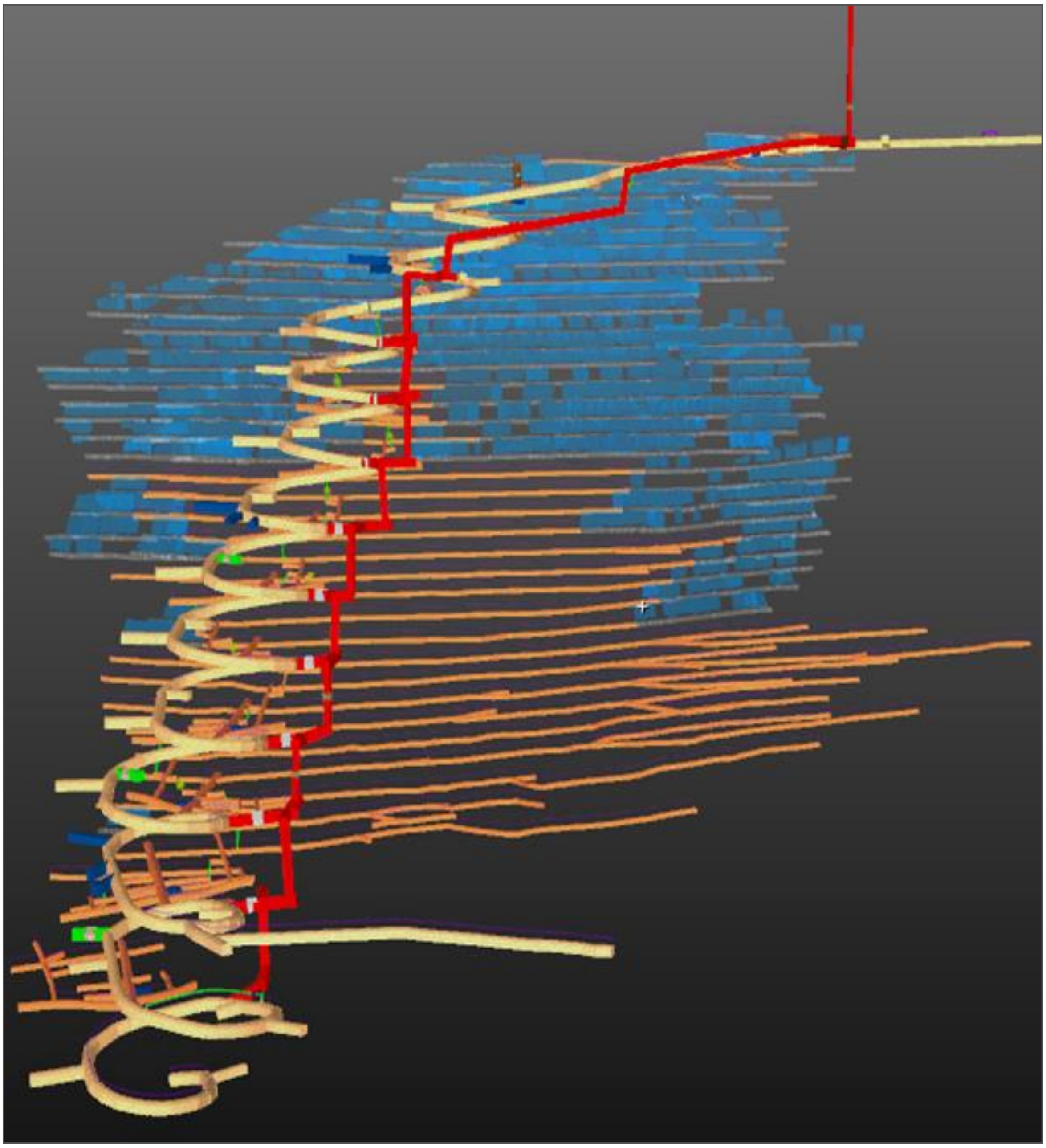
The primary ventilation circuit for Brunswick is presented in Figure 16.8. Fresh air is drawn through the Brunswick Portal and Brunswick FAR which joins the primary flow from Cuffley at the bottom of the Brunswick Incline and continues to Youle.

Figure 16.8: Brunswick primary ventilation circuit



The Youle primary ventilation circuit is presented in Figure 16.9. Fresh air is drawn through the Youle Access and down the Youle Decline to the 618 RAW. From the 618 RAW, air is exhausted through the Youle RAW system to the Youle 957 RAR shown in red.

Figure 16.9: Youle primary ventilation circuit



16.4.3 Primary Ventilation Rises and Fans

The specifications of the existing Augusta, Cuffley and Youle ventilation rises are as follows:

- Augusta Ladder Rise (surface to 900 mRL), 2.4 m diameter
- Augusta FAR (1020 mRL to the surface), 3.0 m diameter
- Cuffley RAR (950 mRL to the surface), 3.0 m diameter
- Cuffley RAR (above the 955 mRL – from the 1010 level), 3.5 m × 3.5 m diameter

- Cuffley RAR (below the 955 mRL – from the 814 level), 3.5 m × 3.5 m diameter
- Brunswick FAW (1056 mRL to the surface) – 3.5 m diameter – regulated Shaft.
- Youle RAW (current) 957 mRL – 4.0 m diameter.

Three single stage 110 kW axial fans have been built into a bulkhead at the 950 mRL Cuffley RAW; however, only one fan is currently operational. This was designed as to lower resistance along the Brunswick straight, while still providing adequate airflow to the 4800 decline and the Cuffley incline where the HE magazine is located, ensuring that the HE magazine ventilation reports directly to the Cuffley RAW. There are no current working levels in the 4800 decline.

The Cuffley primary ventilation fan has been designed with a final duty of 56m^3/s. One of the primary 110kW fans in the Cuffley ventilation chamber will be re-located to the Youle primary chamber to increase airflow in the Youle as mining gets deeper.

The existing Cuffley primary fan is a Clemcorp CC1400 MK4 single stage 110 kW axial fan installed in a bulkhead on the 950 mRL. The operating parameters of this fan are:

- Current operating fan total pressure of 306 Pa for 56 m^3/s.
- Maximum operating fan total pressure of 2,380 Pa at 42 m^3/s.

The Youle primary fans comprises two Clemcorp CC1400 MK4 single-stage fans, located at the 957 mRL Youle RAW. These two fans are installed in parallel in a fit for purpose bulkhead, capable of running four primary fans. The operating parameters of two fans in parallel are:

- Current operating fan total pressure of 990 Pa for 101m^3/s.
- Maximum operating fan total pressure of 2,480 Pa for 42m^3/s per fan.

A summary of the primary ventilation fan statistics are detailed in Table 16.4.

Table 16.4: Primary ventilation fan details

Fan location	Fan type	Quantity	Installation type	Operating pressure (Pa)	Total airflow (m^3/s)	Fan shaft power (kW)
950 Cuffley RAW	Clemcorp CC1400 MK4 110kW	1	Parallel	306	56	110
957 Youle RAW	Clemcorp CC1400 MK4 110kW	2	Parallel	990	103	110

January 2024 Ventilation Survey

The latest ventilation survey, conducted in January 2024, measured total primary airflow at 158 m^3/s within the Costerfield Property underground mine. This survey was conducted with a total of three primary fans operating in the following locations:

- One in Cuffley at a fan total pressure of 306 Pa.
- Two primary fans in Youle, which recorded a fan total pressure of 990 Pa.

All airflow velocities measured throughout the mine are currently measuring under 6 m/s. There were also no temperature readings recorded above 27° wet bulb, showing that the primary circuit has no areas of concerns due to heat.

Secondary Ventilation Auxiliary Fans

The Costerfield Property is currently adopting a secondary ventilation strategy using single and twin stage Clemcorp and Zitron fans no larger than 1200 mm in diameter. Secondary fan selection is determined by:

- the dimensions of the excavation
- the rate of extraction
- diesel equipment requirement
- the length of ventilation ducting
- the primary airflow available
- maintaining a minimum air velocity of 0.5 m/s where diesel equipment operates.

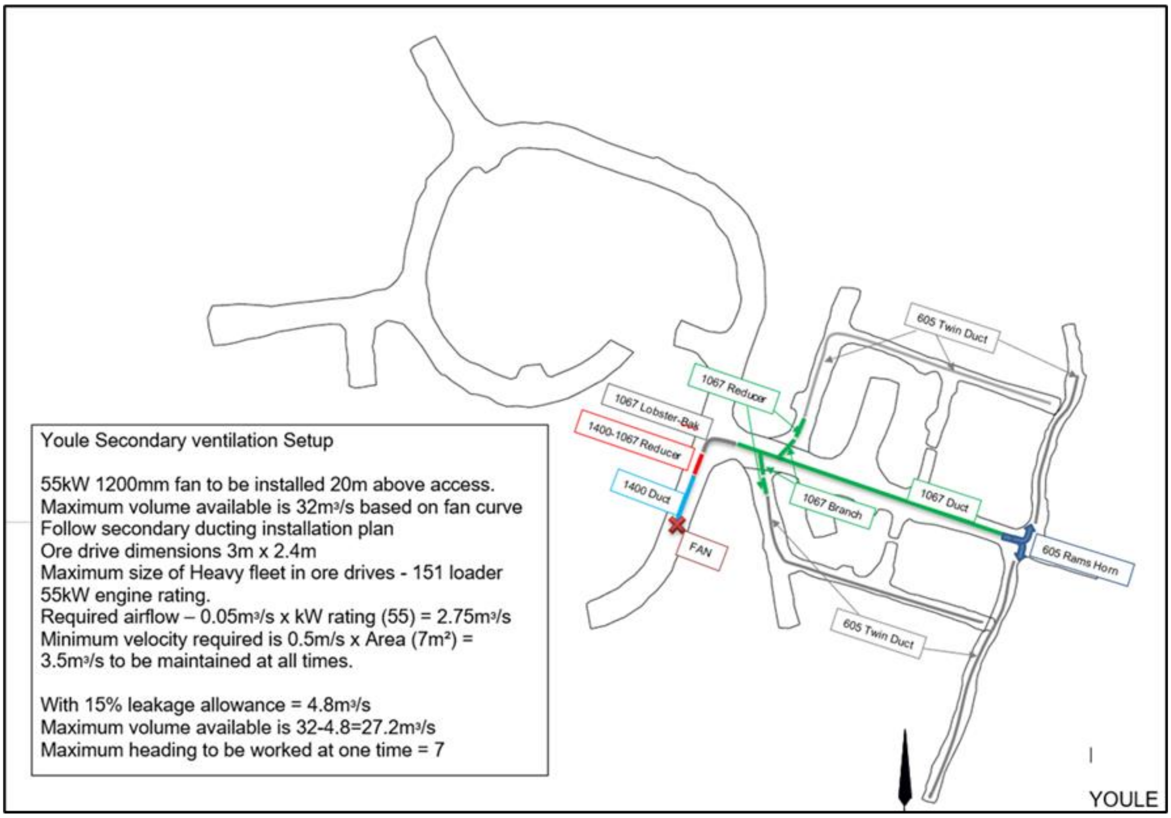
The secondary ventilation ducting used at the Costerfield Property consists of ventilation bag with diameters of:

- 1,400 mm
- 1,220 mm
- 1,075 mm
- 605 mm twin duct.

Generally, 55 kW single or twin stage fans are used to ventilate level access and ore drives. Twin stage fans are used when ore drives are scheduled to extend further than typical development. Capital decline development is ventilated by a 75 kW twin stage fan and 1,400 mm diameter ducting.

A standard secondary ventilation installation for an operating level in Youle is shown in Figure 16.10. The installation includes a fan placed in primary flow above a working level access which ventilates three ore drive levels and six ore drive headings. Ventilation chokers are used in all levels for when additional flow may be required in other areas on the same secondary system. The return air from the ore drives joins the primary flow on the decline and continues to the Youle RAW.

Figure 16.10: Standard secondary ventilation installation for Youle level access



16.5 Mine Services

16.5.1 Compressed Air

Compressed air is generated for the underground mining activities by the Augusta surface compressed air plant and is supplemented by a backup compressor at the Brunswick Plant. Further detail of the compressed air plant specifications can be found in Section 18.2.3.

16.5.2 Raw Mine Water

Raw mine water is sourced from the Augusta Mine Dam located on the Augusta site, and water is delivered to the underground workings through two separate supply lines. The Augusta and Cuffley areas of the mine are supplied from header tanks at the Augusta portal via 4" HDPE pipe run through mine development. Youle and Brunswick are supplied via a service-hole connected to a header tank on surface at the Brunswick site. Pressure reducer valves are installed in the water supply lines at 60 m vertical intervals to manage the water pressure underground.

The Augusta Mine Dam is fed directly from the rising main that extends from the Cuffley 945 Pump Station.

16.5.3 Dewatering

Dewatering of the underground workings is managed through a series of collection sumps that report to various pump stations throughout the mine. From the intermediate pump stations and sumps, groundwater reports to the bottom of the 4800 decline Settlement Sump via gravity for silt management. From the 4800 decline, the water is pumped to the underground Cuffley 945 Pump Station where it is discharged via the Rising Main to the surface storage dams.

16.6 Backfill

The practice of placing CRF in stope voids has been undertaken in Cuffley, Augusta, Brunswick and Youle to improve local ground stability, reduce unplanned dilution and improve mining recoveries. Cemented aggregate fill (CAF) is also selectively used as an alternative to CRF in Youle for improved confinement and stability in flat dipping stopes. Loose rockfill is placed as backfill in stopes where the filled void will not be exposed by an adjacent stope. Loose sand fill is used on a limited basis where a low slump material is required to fill voids that cannot be filled adequately with CAF or CRF. The use of paste fill was also considered as a possible alternative, but it was found that the tailings from the Brunswick Processing Plant were unsuitable for backfill purposes due to the high moisture, clay content and cost considerations.

The CRF uses waste rock sourced from development with the addition of a cement slurry mix that results in a final product composing of 4% cement. CAF uses waste rock that is screened to a smaller diameter aggregate, with the addition of a cement slurry to form a final product composing of 8% cement.

Dry cement is stored on surface at the Brunswick site in a cement silo on contract by Mawson Concrete. The dry cement is delivered underground to mixing bays via an Iveco Acco 2350G cement truck. At the mixing bay, the dry cement is hydrated and dumped by the cement truck to be mixed with waste rock in varying size batches using a Caterpillar 1700G loader.

Once mixed, the cemented fill is trammed to the fill point of the open stope using a Toro 151 or Sandvik LH203 loader. A bund is placed at an appropriate distance from the top of the stope to minimise potential for loader to overbalance or drive into the stope void. Care is taken during placement of the fill that the mesh tube is not displaced which is secured by chains during the filling process.

The quality of the cemented fill is ensured by the use of a PLC control at the cement batching plant and standardised bucket filling of the waste rock. Records are kept of batch quantities for all batches.

The nominal curing time before firing the adjacent stope is 24 hours. After 12 hours, the rock bund placed at the brow of the stope can be removed in preparation for drilling and/or charging the adjacent stope panel.

The cemented fill methods have proved effective in minimising dilution during subsequent panel extraction as well as providing better ground stability and has improved recovery by eliminating the requirement for rib pillars.

16.7 Mineral Reserve Schedule Assumptions

The Mineral Reserve schedule was completed using the assumed mining rates shown in Table 16.5. Total development and production rates are constrained by the combination of development headings or stoping fronts available at the one time and the resources available.

Table 16.5: Schedule assumptions

Description	Value
Operating dev m advance/cut	1.8–2.8
Max. operating dev m/mth/heading	25–40
Max. total operating dev m/mth	350
Capital dev m advance/cut	3.7
Max. capital Dev m/mth/heading	50
Max. production drilling rate m/day/drill	144–180
Max. production bogging rate t/day/loader	63–285
Max. production backfill rate t/day/loader	41–250

16.7.1 Equipment Requirements

The existing development, production and auxiliary underground equipment fleet will continue to be used, where applicable, with additional equipment purchased to meet the planned replacement schedule or meet increased production demands.

The existing mobile equipment fleet is summarised in Table 16.6.

Table 16.6: Underground mobile equipment fleet

Equipment type	Equipment model	Existing fleet
Single-boom jumbo	Resemin MUKI FF	4
Production drill	Resemin MUKI LHBP 2R	2
LHD – loader	CAT R1700G	2
LHD – loader	Toro 151-D	1
LHD – loader	Sandvik LH203	6
Haulage truck	Atlas Copco MT436	1
Haulage truck	Epiroc MT42	1
Cement agi	Jacon Transmixer 5003	1
Integrated Tool Carrier	Volvo L90	1
Telehandler	Dieci 33.11	2
Service tractor	Carraro TN5800	2
Light vehicle	Toyota Land Cruiser	15
Light vehicle	Kubota 4x4 Utility	7
Total		**45**

16.7.2 Personnel

An existing core group of management, environmental, technical services (Engineering, Survey, Geology), administration, maintenance, supervisory, and production personnel continue to operate at the Costerfield Property. As a residential operation, all employees commute daily from their place of residence.

Level access and decline capital development in Youle is currently completed by a contractor using its own twin-boom jumbo and Normet charge rig.

Shift Schedule

The Costerfield Property functions a continuous mining operation, 24 hours a day, 365 days per year. Operators and maintenance personnel work 11-hour shifts, 7 days on, 7 days off, alternating between dayshift and nightshift.

Augusta support staff work a standard Australian working week of 5 days on, 2 days off, 8 hours per workday.

All on-costs for annual/sick leave and training have been estimated in the direct and indirect operating costs, respectively.

Personnel Levels

All equipment has been assigned with one operator per crew per machine where applicable. Cross-training occurs for all operators, ensuring that each shift panel is adequately multi-skilled to cover for any unplanned sickness, annual leave and general absenteeism.

The current personnel numbers for the Mandalay Resources workforce totals 232 employees.

16.8 Schedule Summary

A summary of the key physicals in the Mineral Reserve schedule is presented in Table 16.7.

Table 16.7: Summary of schedule physicals

Description	Units	Quantity
Capital Development	m	340
Operating Development (Waste)	m	9,040
Operating Development (Ore)	m	2,593
Development Ore Tonnes	tonnes	44,438
Development Ore Grade Au	g/t	6.3
Development Ore Grade Sb	%	1.5
Stoping Ore Tonnes	tonnes	500,096
Stoping Ore Grade Au	g/t	10.9
Stoping Ore Grade Sb	%	1.9
Total Ore Tonnes	tonnes	544,646
Total Ore Grade Au	g/t	10.5
Contained Au	ounces	183,617
Total Ore Grade Sb	%	1.9
Contained Sb	tonnes	10,330
Opening stocks		
ROM Ore Tonnes	tonnes	28,677
ROM Ore Grade Au	g/t	5.2
ROM Ore Grade Sb	%	1.0

Notes: Ore tonne totals differ from reported Reserve tonnes. The Reserve schedule includes mining of inferred and below cut-off grade development (assigned zero grade) to access proven and probable material.

17 Recovery Methods

17.1 Brunswick Processing Plant

The Brunswick Processing Plant treats an antimony and gold rich sulfide ore through a conventional comminution and flotation style concentrator. It has been operating since 2007, and by Mandalay Resources since late 2009. Since then, several plant upgrades have resulted in production capacity increases to the current rate of approximately 10,000–13,000 t/month over the 2015–2023 calendar years. The concentrator operates 24 hours per day, 7 days per week, while crushing operates under noise restriction guidelines during extended dayshift hours.

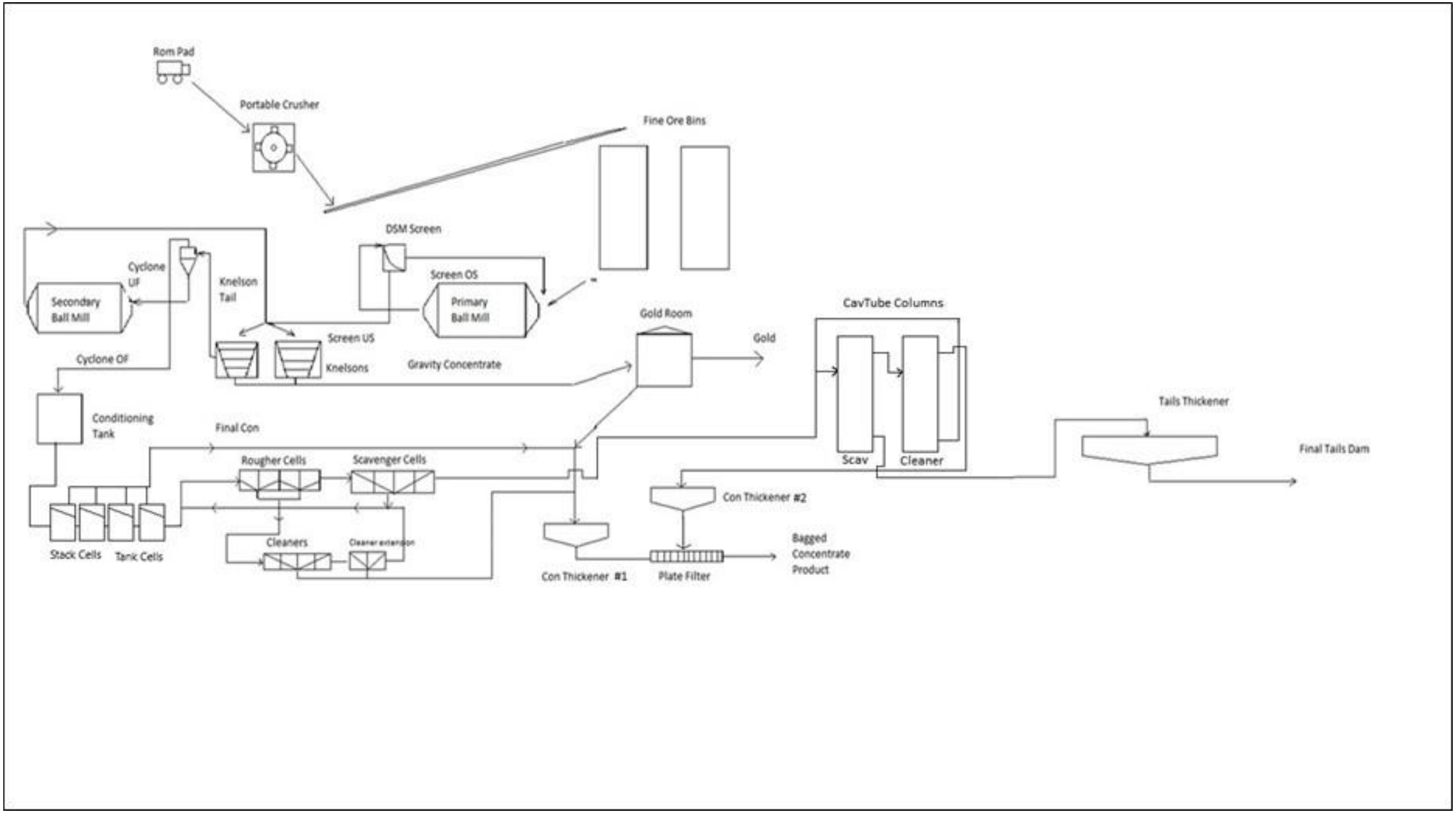
The surface crushing and screening facility processes underground feed down to a particle size range suitable for milling through a two-stage, closed circuit ball milling circuit. Centrifugal style gravity concentrators are used on the combined primary milling product and secondary mill discharge to recover a gold-rich gravity concentrate. This is upgraded further over a shaking table and sold as a separate gold concentrate product which is transported to local refineries.

Secondary milled products are classified according to size and processed through a simple flotation circuit comprising of two StackCell roughers, two additional rougher tank cells followed by the original flotation train rougher, scavenger and single stage cleaning. Two CavTube flotation columns were added to the tailings end of the existing flotation circuit and were successfully commissioned in April 2021.

The flotation concentrate is dewatered through thickeners and with filtration to produce a final antimony-gold concentrate product which is bagged, packed into shipping containers and shipped to customers overseas. The flotation tailings are thickened before being pumped to one of two TSFs with one located to the east and one to the north of the Brunswick Processing Plant.

The Brunswick Processing Plant flowsheet is a simple, conventional, well-proven circuit with more than 14 years of operation and is suited to processing of the Costerfield ores remaining in the LoM plan. A summary processing flowsheet has been provided in Figure 17.1.

Figure 17.1: Brunswick Processing Plant summary flowsheet



17.1.1 Crushing and Screening Circuit

The crushing and screening plant consists of a primary crushing circuit in closed circuit with a 12 mm vibrating screen. It uses a duty and a standby diesel-powered Finlay I-130RS mobile impact crusher and a Finlay I-140RS mobile impact crusher. Having two crushing units provides additional capacity and crushing circuit redundancy. Crushed ore is conveyed to two 120t fine ore bins operating in parallel. The crushing and milling circuit has a demonstrated average throughput capacity of 10,000–13,000 dry metric tonnes (dmt) per month.

17.1.2 Milling Circuit

Crushed ore is reclaimed from the fine ore bins which both discharge onto the primary mill feed conveyor and feed into the milling circuit. The milling circuit comprises two ball mills in series, both operating in closed circuit. The primary mill operates in closed circuit with a Dutch State Mines (DSM) screen, with the screen oversize returning to the primary mill for further grinding and the screen undersize being fed to a centrifugal style gravity concentrator. This recovers a small mass of high-grade gold concentrate that is sent to the gold room for further gravity upgrading using a shaking table. The final gravity concentrate is sent directly to a local gold refinery as a separate saleable product. The gravity gold production varies but recoveries from the Youle and Shepherd blend feed are typically around 55% and can be as high as 63% of the gold delivered in the feed. The gravity tailings are pumped to a classifying hydrocyclone (cyclone) with the overflow going to feed for the flotation plant. The underflow is returned to the secondary ball mill for further grinding. The milling circuit has a target grind size P_{80} of 53 µm. The secondary ball mill discharge is combined with the DSM screen undersize so is also fed to the centrifugal gravity concentrator.

17.1.3 Flotation Circuit

The flotation circuit is designed to recover an antimony-gold rich sulfide concentrate. The flotation circuit is fed from the secondary ball mill cyclone overflow. The cyclone overflow is fed to a conditioning tank where lead nitrate, an activator, and potassium amyl xanthate, a collector, are added. The conditioning tank feeds two 48-inch flotation StackCells currently operating in series with two site fabricated rougher tank style flotation cells again in series. The StackCell and rougher tank cell concentrates are combined with the final cleaner concentrate as the final product.

The rougher tank cell tailings flow to the original flotation circuit. This consists of eight square Denver DR100 cells for the remaining rougher and scavenging duties, followed by six Denver DR15 cells used for cleaning duties. The concentrate from the Denver rougher flotation cells is pumped to the cleaner flotation cells while the tailings become feed for the scavenger flotation cells. The concentrate from the scavenger flotation cells is recycled to the feed of the Denver rougher flotation cells while the scavenger tailings are pumped to the tailings thickener. The concentrate from the cleaner flotation cells is pumped to the concentrate thickener while the cleaner tailings are also recycled to the rougher flotation cells.

Following the Denver scavenger cells, rougher and cleaner CavTube column flotation cells have been installed. These were supplied by Eriez Manufacturing Co and were commissioned in April 2021. They produce a separate low-grade antimony-gold concentrate. The first stage of this circuit, the rougher column tail, has now become the final tail stream. The flotation circuit effectively recovers the antimony and any gold not collected in the gravity gold circuit.

17.1.4 Concentrate Thickening and Filtration

Product from the Final Concentrate, the combined StackCell and tank rougher cell products and the cleaner flotation products are all pumped to Concentrate Thickener 1. Product from the CavTube® cleaner concentrate is pumped to Concentrate Thickener 2. The thickened underflow is pumped directly to a plate and frame pressure filter for final dewatering.

The concentrate filter cake is discharged directly into concentrate bags. The filtrate is recycled to the concentrate thickener while the concentrate thickener overflow is recycled back to the plant as process water to maximise water re-use and minimise concentrate losses. An additional smaller concentrate thickener was installed in late 2019 to increase the dewatering capacity of the flotation plant concentrate.

17.1.5 Tailings Circuit

The flotation circuit tailings are settled in a thickener. The tailings thickener overflow is recycled back to the plant as process water and the thickened solids are pumped to a TSF where they are discharged via a conventional spigot system. Any additional water from the tailings is decanted and pumped back to the plant for use as recycled process water.

17.1.6 Throughput

The Brunswick Processing Plant has a throughput capacity of up to 14,000 dmt/month but typically averages closer to 13,000 dmt/month. Since operations commenced, the plant has demonstrated ongoing production creep, from around 5,000 t/month achieved in January 2012 to its current status.

Annual plant throughput has been matched to mining rates in recent years as the underground mine production has at times limited the available mill feed. The forecast production rates are well supported by consistent historical production over several years as well as ongoing plant upgrades and debottlenecking projects. Average throughput was 12,867 dmt/month, 12,647 dmt/month, 12,979 dmt/month, 11,900 dmt/month, 12,536 dmt/month and 12,123 dmt/month between 2016 and 2021, respectively. The moderate fall in 2019 was largely due to restrictions in plant feed supply.

There is currently approximately 25,000 dmt of feed on the ROM pad, and for 2024 mining volumes will be maintained at similar levels to milling volumes to maintain a ROM of approximately the same size throughout the year.

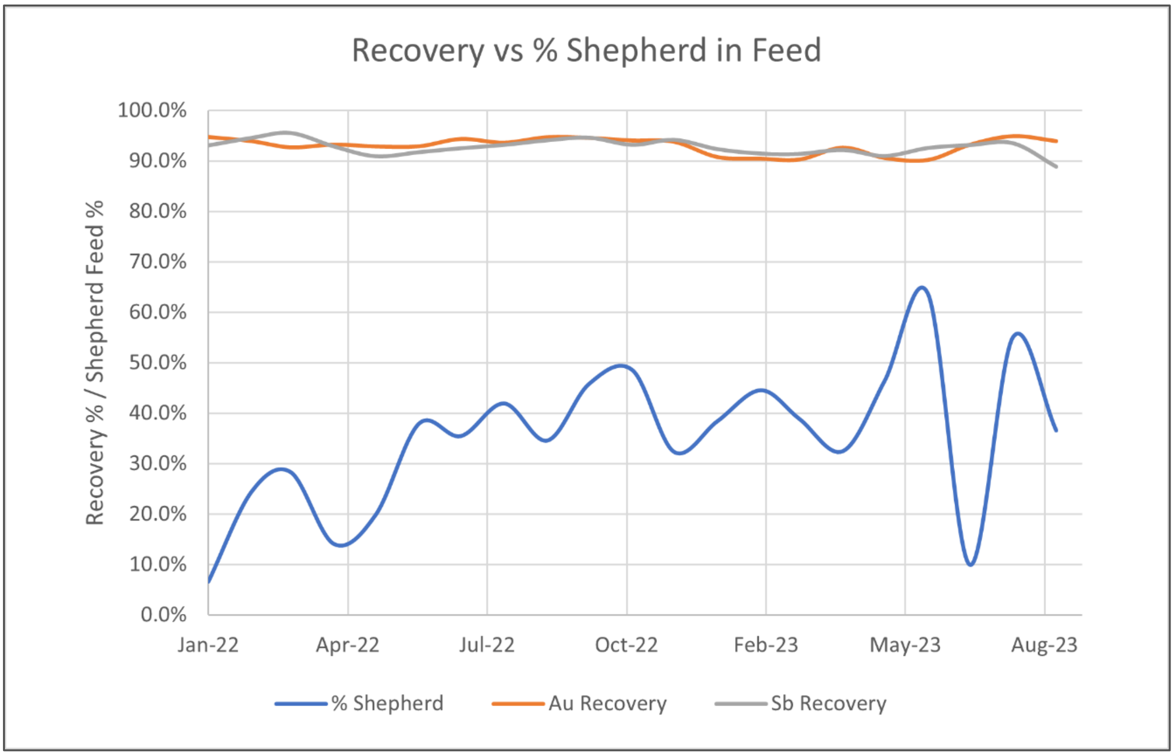
Further discussion of historical production and forecast LoM plant throughput on the current ore feed blend is provided in Section 13.

17.1.7 Metallurgical Recovery

Simple head grade versus recovery relationships have been developed for both antimony and gold using plant operating data (Figure 17.2). The gold head grade versus tailings grade recovery relationship is based on January 2022 to September 2023 monthly production data. Previously, a more expansive dataset has been used; however, this is not representative of the Youle and Shepherd ore blends recently processed, which will be similar throughout the LoM.

Similarly, the antimony recovery algorithm has been updated due to the processing of Youle and Shepherd blended ores. The monthly operational data for July 2022 to September 2023 has been used for antimony to reflect the lower head grades typically associated with higher proportions of Shepherd ore.

Figure 17.2: Plant antimony and gold recovery with Youle and Shepherd blending



Forecast antimony and gold recoveries used for LoM planning, budgeting and economic modelling are based on these recovery relationships. This is the best method of forecasting recovery when processing a similar feed blend. These algorithms are updated annually. Based on these algorithms, the forecast average LoM 2024 recoveries are 90% and 93.6% for antimony and gold respectively. These are not dissimilar to the 2023 EOY reconciled plant recoveries of 92.1% Sb and 93.1% Au, with lower antimony recovery in LoM 2024 due to the lower anticipated head grade.

The recovery relationships are well understood and are appropriate for metallurgical recovery estimation purposes. They are supported by historical concentrator recoveries at similar feed grades and compare well to previous grade/recovery relationships on Youle-only feed. Further recovery confidence is provided by the consistent recoveries of both antimony and gold achieved over a number of years across a range of feed grades. Full details have been provided in Section 13 of this report.

17.2 Services

17.2.1 Water

The water services at the Brunswick Processing Plant consist of the raw water, process water and excess water disposal systems. The process water supply consists of concentrate thickener overflow, tailings thickener overflow and TSF decant return water.

Most of the raw make-up water is provided by dewatering of the underground operations at approximately 1.5 ML/day to 2 ML/day. The plant operates with a positive water balance, with excess water requiring disposal. Mandalay constructed a 2 ML/day permeate RO plant at the Brunswick Processing Plant in 2014. The 2 ML/day plant has remained in operation as per regulatory approvals. A pre-treatment plant to feed the RO plant was installed in 2017. This has enhanced the robustness of the RO operation, limiting downtime and reducing consumables consumption.

The Splitters Creek evaporation facility has the capacity to treat approximately 104 ML/year net (evaporation minus rainfall) and treats the bulk of the excess water.

The TSF and process water is stored in and distributed from a dedicated tank system. As the site has a positive water balance due to underground dewatering, adequate process water supplies are available to meet the LoM requirements.

17.2.2 Air

The Brunswick Processing Plant requires both low pressure (LP) and high pressure (HP) air supplies. Currently, three separate LP blowers supply the rougher, scavenger and cleaner cells, with the existing tank cells running off HP air.

The HP air supply was upgraded to a variable speed compressor in 2017 in order to increase the capacity and availability of high-pressure air and reduce the shock load on the power supply on start-up of the fixed speed compressor units. The pressure filter also runs using HP air.

The processing plant has adequate air to meet the LoM requirements and no current upgrades are required or planned.

17.2.3 Power

Due to the need for additional electrical power for the development of the Brunswick and Youle underground orebodies, upgrades to the power supply and reticulation circuits were completed in 2019. This involved consolidating three separate incoming sources of electrical supply into a single supply source and distributing electrical power from that single point. This has allowed for greater efficiencies through minimising losses from each supply point and also allows additional local site back-up generation to occur from a single point.

This has simplified the starting and stopping of supplementary site diesel fired power depending on the demand. The mill and RO plant will continue to be powered from this single point. There is also provision for additional power demand for the mill up to 2 kVA (refer to Section 18).

Further improvements to electrical switchboard controls have been ongoing in order to remove local power boards and relocate them to a central location.

17.3 Plant Upgrades

There have been no major fixed plant upgrades since 2021 when the second StackCell and rougher and cleaner CavTube columns were installed. A third mobile impact crusher was purchased in 2022 and has added redundancy to the crushing regime.

Further details of recent plant upgrades in each processing circuit are provided in the following subsections.

17.3.1 Crushing and Screening Circuit

In early 2022 a Finlay I-140RS mobile impact crusher was delivered to site. This crusher is used in the same way as the existing crushers, although the sidecasting ability can allow it to feed a second crusher when needed. This helps to improve throughput during wetter months when crushed feed can become constrained by crusher capacity.

17.3.2 Milling Circuit

The milling circuit remains unchanged. The finer crushed ore feed size allows the target throughput to be achieved. All planned upgrade work will be to maintain the current infrastructure around the mill.

17.3.3 Flotation Circuit

No changes to the flotation circuit have been made other than some pipework modifications giving the option of using a StackCell as a second cleaner rather than a rougher during low antimony head grade campaigns.

Rougher and cleaner CavTube column flotation cells were installed and commissioned on the flotation tail in April 2021. This new flotation circuit on the tailings stream produces a separate low-grade antimony-gold concentrate, which has been blended with existing plant concentrate and sold to customers in regular shipments. The rougher column tail from this additional circuit is the final plant tail. The columns are sized for the full tailings slurry capacity.

17.3.4 Concentrate Thickening and Filtration

Two concentrate thickeners operate in parallel, with the concentrate from the main plant reporting into one and the lower grade CavTube cleaner column concentrate reporting to the other. This allows for blending after the concentrate has been bagged and sampled.

Both thickeners feed the pressure plate and frame filter press in parallel. Loading and pressing time for the filter press is not a bottleneck for production, whereas settling capacity in the concentrate thickener can be a bottleneck at higher metal production rates and needs to be carefully managed.

17.3.5 Tailings Circuit

The tailings thickener has sufficient capacity to meet the current throughput. The average tails thickener underflow solids density will be maintained at approximately 50% w/w solids (+/- 10%).

The Brunswick TSF returned to service as the replacement storage facility following the completion of a hybrid wall lift and was used as the primary storage facility during 2021. Capacity of the Brunswick TSF was exhausted in July 2022.

The Bombay TSF wall lift was completed in June 2022 and is available for deposition until March 2024. A detailed analysis and plan has been developed independently for future storage on top of Brunswick TSF using Geotubes. A full-scale trial was conducted and proved successful. A 5-year operating TSF, with a design capacity of approximately 788,000 dmt, situated to the west of the Brunswick Processing Plant is planned to commence construction in September 2024. Geotubes will be used as the primary tailings storage until the new facility is completed.

Underground pastefilling will be used in campaigns throughout 2024, with approximately 17,000 t expected to be deposited in old workings. This will take pressure off the construction of the new TSF as well as the Geotubes. There are ample locations for the underground storage of cemented tailings in the mine if required.

17.3.6 Reagent Mixing and Storage

No upgrade work is required for the reagent mixing and storage area.

18 Project Infrastructure

The infrastructure associated with the Costerfield Property consists of surface, underground, tailings storage, power and water supply, waste rock storage, diesel storage, explosives storage, maintenance and housing facilities.

18.1 Surface Infrastructure

The Costerfield Property's surface infrastructure facilities are typical of a conventional flotation style concentrator and underground mining operation of this size.

18.1.1 Augusta Mine Site

The Augusta Mine site comprises the following infrastructure, which is also referenced in Figure 18.1:

- office and administration complex, including change house
- store and laydown facilities
- heavy underground equipment workshop
- evaporation and storage dams
- temporary surface waste rock stockpile area
- Augusta Mine box-cut and portal
- ventilation exhaust raise
- ventilation intake raises
- mine water recirculation dam and silt settlement channel
- exploration drilling contractor offices and workshop
- capital development contractor workshop.

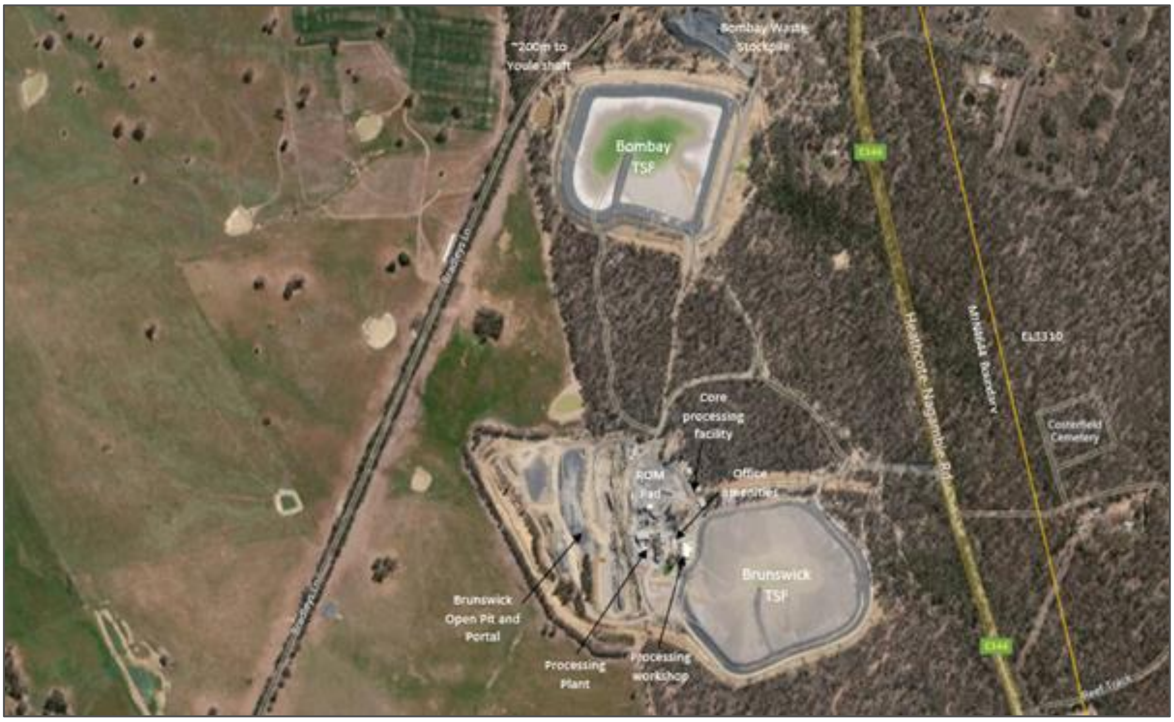
Figure 18.1: August Mine Site – aerial view

18.1.2 Brunswick Mine Site

The Brunswick site comprises the following infrastructure – refer to Figure 18.2:

- gold-antimony processing plant and associated facilities
- central administration complex
- process plant workshop
- TSFs
- ROM stockpiles
- waste rock stockpiles
- RO plant capable of treating 2 ML of water per day
- previously mined Brunswick Open Pit
- Brunswick mine portal and backfill cement silo
- Brunswick Primary Ventilation Raise
- Youle Primary Ventilation Raise
- exploration geology offices, core farm and core processing facility.

Figure 18.2: Brunswick Mine Site – aerial view



18.1.3 Splitters Creek Evaporation Facility

The Splitters Creek Evaporation Facility is situated on a 30 ha parcel of land that is located approximately 3 km from the Augusta site and lies within ML MIN5567. The facility facilitates the evaporation of a combination of groundwater extracted from the Costerfield Property mines and brine which is a by-product of the RO filtration plant. The Facility enables underground dewatering rates to be maintained ahead of mining operations.

The evaporation facility site comprises the following:

- 150 ML storage dam
- 40 ML evaporation terraces
- recirculation pumping system that directs water from the storage dam to the evaporation terraces
- Splitters Creek rising main that feeds water from the Augusta Mine Dam to the evaporation terraces
- leakage detection system on the Splitters Creek rising main.

In 2020, permits were amended and approved to allow brine to be discharged to the Splitters Creek Evaporation Facility.

18.1.4 Margarets Aquifer Recharge Borefield

The Margarets Aquifer Recharge Borefield is located approximately 1 km south of the Augusta operations. Aquifer recharge infrastructure at the Margarets Borefield includes several bores. A 2-year research development and demonstration approval is now complete and the project is awaiting final approval for ongoing operation.

18.2 Underground Infrastructure

The underground infrastructure at the Costerfield Property is typical of an underground mining operation.

18.2.1 Secondary Means of Egress

The secondary means of egress consists of a ladderway system that connects all underground workings to the surface in parallel with the main development declines. The ladderway system comprises the following:

- The Augusta ladderways from surface to the 900 mRL within the Augusta underground workings.
- The Cuffley ladderways extend from the Cuffley Incline, Cuffley Decline and 4800 Decline to the 945 mRL. From the 945 mRL level, extraction is performed via the Cuffley Primary Ventilation Shaft in an emergency gig.
- The Brunswick ladderways are mined between every second operating level cross-cut, allowing a secondary means of egress parallel to the main decline travel way to the 1056 FAB, where the emergency gig can be landed for final extraction to surface.
- The Youle ladderways are mined between every operating level of the Youle development with the exception of the 947, 957 and 967 levels. These ladderways allow a secondary means of access to the bottom of the Youle Primary Ventilation Shaft. The 947, 957 and 967 levels have secondary access to the bottom of the Youle Primary Ventilation Shaft via the Youle decline and parallel RAW development. The emergency gig can also be operated in the Youle Primary Ventilation Shaft to allow extraction of personnel from this point if required.
- The emergency gig attaches to a standard crane hook and hoists personnel in an emergency up and down the Cuffley Primary Ventilation Shaft using a 200 t mobile crane as the hoist. The emergency jig is capable of evacuating five persons or 600 kg (120 kg per person) at a time.

18.2.2 Refuge Chambers and Fresh Air Bases

Six underground refuge chambers and two permanent FABs are strategically placed within the mine to mitigate hazards posed by irrespirable atmospheres and entrapment.

The capacity of the refuge chamber required is dictated by the number of personnel planned to be working in the immediate vicinity serviced by the refuge chamber. The position of the refuge chamber facilities enables all personnel to be within 750 m of a refuge chamber, as recommended in the Western Australian *Refuge Chambers in Underground Metalliferous Mines Guideline* (Department of Mines and Petroleum, 2013).

It is not intended for refuge chambers to substitute a secondary means of egress, but to provide refuge during an incident where the underground atmosphere is irrespirable or when ladderways may be inoperative or inaccessible.

The refuge chambers and FABs are located in the following places:

- The Brunswick workings has a 16-man refuge chamber located at stockpile #5 in the Brunswick access, and a FAB at the 1056 Vent Access.
- The Youle workings has a 20-man refuge chamber located at stockpile 10, a 16-man refuge chamber located at the 747 Refuge Chamber Cuddy, a 10-man refuge chamber at the 657 Refuge Chamber Cuddy, and a 20 man refuge chamber at the 618 refuge chamber cuddy
- The 4-man refuge chamber is a travelling chamber that may be positioned in areas not serviced by fixed refuge chambers if the need arises.

18.2.3 Compressed Air

The existing compressed air plant comprises of three 593 cfm compressors located at the Augusta site, plus one additional compressor at the Brunswick Mill site. The overall plant capacity is 67.2 m^3/min(2,373 cfm). Compressed air is delivered underground via a 4-inch HDPE ‘poly’ pipe. Each level is then supplied from the decline via 2-inch HDPE piping.

Air receivers have been placed at the Brunswick 1006 mRL and Stockpile 5 Youle to increase the system efficiency. Compressed air is used to power pneumatic equipment and/or activities including:

- airleg drills
- Pneumatic Ammonium Nitrate-Fuel Oil (ANFO) loaders
- blasthole cleaning/prepping for development rounds
- diaphragm air pumps
- long-hole cleaning/preparation.

18.2.4 Ventilation System

The primary ventilation infrastructure currently consists of five FAIs and two primary exhaust shafts. The FAI system consists of the following :

- Augusta Portal, which has 56 m^3/s (of air) entering the portal.
- Augusta FAI, which is a series of air leg rises from the surface to the 1020 Level (RL) in the Augusta workings, contributing 12 m^3/s of air flow.
- The Augusta FAR is a 150 m vertical raise bore shaft from surface to the 1020 Level in the Augusta workings. The Augusta FAR is 3 m in diameter and approximately 11 m^3/s of fresh air enters the mine through this shaft.
- Brunswick FAR is a 230 m, 3.5m diameter vertical raise bore shaft from the surface to the 956 m RL in the Brunswick workings. The shaft is currently backfilled with waste rock up to the 1056 m RL. Approximately 3m^3/s enters the mine through the Brunswick FAR, which is

currently regulated to 98% closed. The air flow through the Brunswick FAR supplies adequate air flow to the 1056 FAB which serves as a refuge point in the event of an emergency.

- Brunswick Portal is a 5 mW × 5 mH arched profile which reduces to 4.5 mW × 4.8 mH after approximately 20 m of development. The Brunswick Portal allows 80–83 m^3/s of fresh air to enter the mine under the current configuration.

The RAR system includes the following:

- Cuffley RAR is a 230 m, 3 m diameter vertical raise bore shaft from surface to the 950 Return Air Way (RAW). The Cuffley primary fan chamber is positioned at the bottom of this shaft, which is capable of running three single stage Clemcorp CC1400 Mk4 fans driven by 110 kW motors. The three fans are installed in a fan bulkhead in parallel. Currently, the primary ventilation is configured such that only one of the three primary fans at the Cuffley primary fan chamber is required to operate. The Cuffley RAR exhausts 54–56m^3/s from the mine workings.
- Youle RAR is a 232 m, 4 m diameter vertical raise bore shaft from surface to the 957 RAW. The Youle primary fan chamber is positioned at the bottom of this shaft, which is capable of housing four single stage Clemcorp CC1400 Mk4 fans driven by 110 kW motors. The four fans are installed in a fan bulkhead in parallel. Currently, the primary ventilation is configured such that only two of the four primary fans at the Youle primary fan chamber are required to operate. The Youle RAR exhausts 103 m^3/s.

The primary ventilation flow is distributed through the mine using secondary fans positioned in areas of primary air flow that force ventilate the active development and stoping levels as required.

18.2.5 Dewatering System

The process of dewatering in advance of the mining level development is achieved by leaving diamond drill holes drilled from underground open to drain. Due to the fractured nature of the aquifer, the groundwater inflows are not predictable. Total mine inflow for the active workings is approximately 1.7 ML per day.

In order to manage silt, all inflowing groundwater is pumped or gravity fed to the 4800 Decline Silt Settlement Sump. Clarified water is transferred from the 4800 Pump Station (comprising two duty and one standby WT084 WEARTUFF Mono Pumps) to the 945 Pump Station and Rising Main infrastructure (comprised of four WT088 WEARTUFF Mono Pumps) where it is discharged to surface storage and transfer dams.

The Cuffley, 4800 and Augusta workings are all gravity fed systems to feed the 4800 Decline Silt Settlement Sump.

Brunswick has a series of sumps connected by gravity fed drain holes that feed into the decline sump at the 956 mRL; a 20 kW pump transfers water from this sump to the 4800 Decline Silt Settlement Sump.

Youle has a series of sumps connected by gravity fed drain holes that feed into three linked pump stations (each comprising one duty and one standby WT084 WEARTUFF Mono Pump), located at the 897 mRL, 777 mRL and 657 mRL pump stations.

The Rising Main extends to the mine dam. From here, water is distributed to the RO water treatment facility or to the Splitters Creek Evaporation Facility.

18.2.6 Other Underground Infrastructure

An underground crib room is positioned at the 957 mRL Youle and the underground magazine is positioned at the 955 mRL Cuffley Incline. The magazine allows for the safe storage of mine explosives.

In addition to fixed plant, Mandalay owns, operates, and maintains a full underground mining equipment fleet, including production drills, loaders, trucks, jumbos and ancillary equipment required to undertake ore development and production operations.

18.3 Tailings Storage

Two TSFs are in operation currently, comprising the TSF and Brunswick TSF.

Both facilities are constructed of earthen embankments in a conventional turkey nest configuration.

Tailings are currently being deposited into the Bombay TSF, which currently has capacity until March 2024.

Storage of tailings beyond March 2024 will be provided through the following methods:

- Brunswick TSF Geotube Storage – 7–8 months capacity
- Bombay TSF Geotube Storage – 7–8 months capacity
- Augusta Stabilisation – 6 months capacity.

Construction of the new tailings dam Brunswick West TSF is expected to start in September 2024 with a construction period of 9 months (completed June 2025). Statutory endorsement of a Work Plan Variation has been received from DEECA. Mandalay is now seeking planning approval and Work Plan Variation approval which is expected to be received in August 2024.

Brunswick West TSF will have a 5-year capacity and will meet the requirements of the current LoM.

18.4 Power Supply

The Costerfield Property's electrical power is supplied by grid power and supplemented on site by on-demand diesel fired generator sets. This is comprised of High Voltage (HV) 22 kV, 11 kV and low voltage (LV) 415 V systems.

The HV infrastructure is supplied via a single 22 kV feeder from Powercor (network provider) at the Augusta Substation 1. The system then steps down this power on site to 11 kV, 1000 V and 415 V using separate transformers. The 11 kV power is dispersed to six HV substations via the HV network. At the six 11 kV transformers, power is stepped down further to 1 kV and 415 V.

The 11 kV system extends from the underground operations back to the surface to supply the Brunswick Processing Plant where it is stepped down to 415 V from 11 kV.

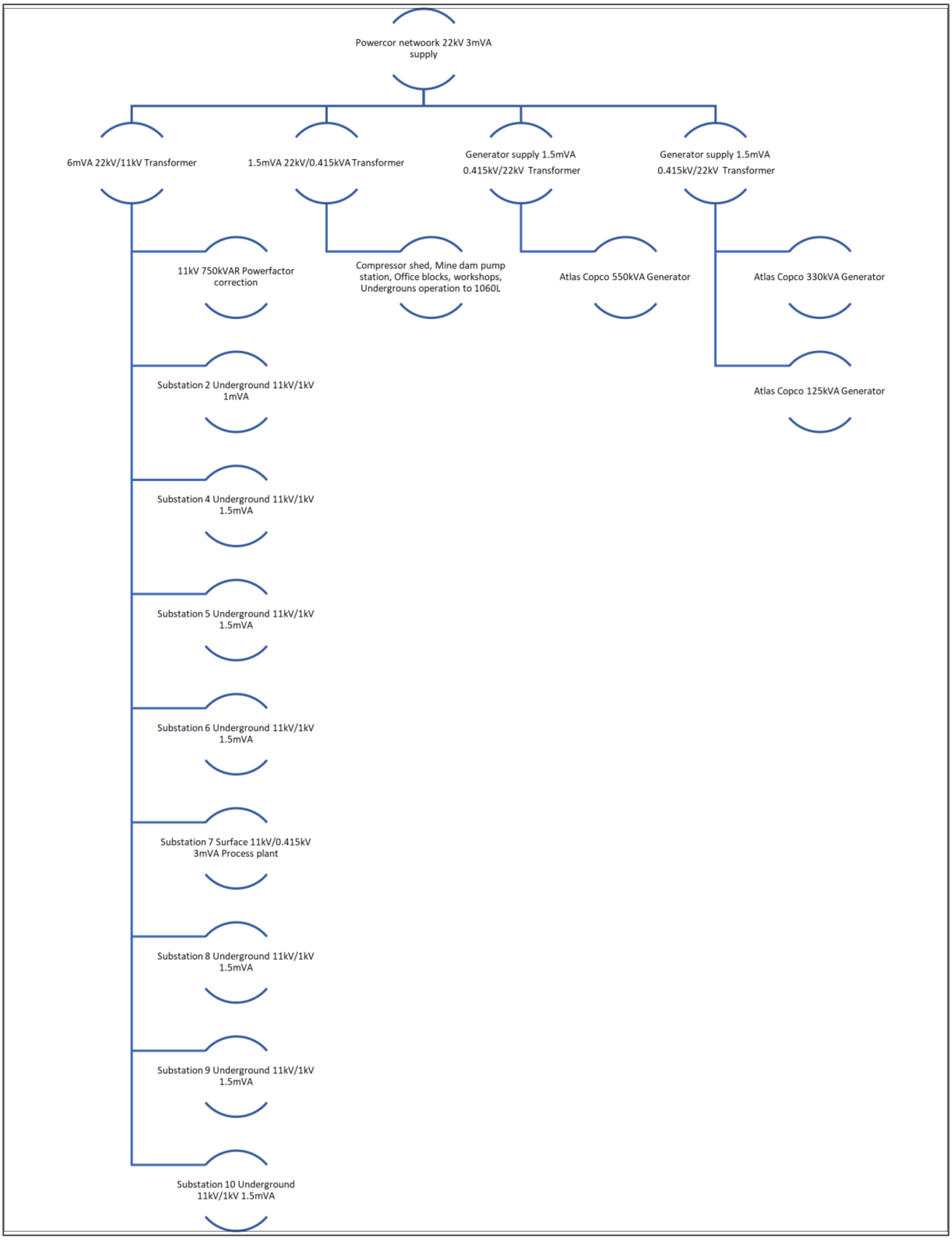
The majority of site electrical power demand is provided by 3 MVA of network power with the remainder provided through synchronised diesel fired generation on site if needed. The system's power quality is also supported by means of an 11 kV Power Factor Correction Unit (PFCU).

The main power system equipment on site consists of:

- overhead powerlines
- HV substations
- HV ring main units (RMUs)
- HV transformers
- HV PFCU
- three synchronised generators and one island mode generator
- site electrical power reticulation.

The operation uses between 3 MVA and 3.5 MVA of demand at any given time. The summary Costerfield electrical power reticulation diagram is presented in Figure 18.3.

Figure 18.3: Costerfield power reticulation diagram



18.5 Water Supply

Water for underground and surface operations is sourced from the Augusta Mine Dam which is fed directly from the rising main that extends from the Cuffley 945 Pump Station to surface, i.e. raw water is sourced from underground dewatering.

The Brunswick Processing Plant sources water from a number of sources including recycled process water from the Brunswick and Bombay TSFs.

Potable water is trucked to site by a private contractor and is placed in surface holding tanks for use in the change house and office amenities. Potable water for drinking is provided in 15 L containers.

Water disposal is discussed in Section 20.1.2.

18.6 Water Management

Groundwater is currently pumped from the underground workings to the Mine Dam at a rate of approximately 1.7 ML per day. Mine water is then pumped from the Mine Dam to either the Splitters Creek Evaporation Facility, or a series of water treatment and disposal facilities (located at the Brunswick site).

The Augusta Evaporation Facility comprises three dams with a total storage capacity of 137 ML. The total site water storage capacity, including smaller catchment and operational dams at Splitters Creek, Brunswick and Augusta, is approximately 289 ML.

The water services at the Brunswick Processing Plant consist of the raw water, process water and excess water disposal systems. The process water supply consists of concentrate thickener overflow, tailings thickener overflow and Brunswick and Bombay TSFs decant return water. While the process plant uses water from a closed circuit, make-up process water is required to supplement water evaporated at the Brunswick and Bombay TSFs.

The total evaporation and water disposal capacity, including discharge of RO treated water and from the Splitters Creek Evaporation Facility, and is currently estimated at 555 ML per year, assuming the long-term average Heathcote climatic conditions.

Aquifer recharge trials have been successful at the Costerfield Property through the Margarets Aquifer Recharge Project. Aquifer recharge is not currently part of Costerfield’s water management plan as the project is awaiting final approval for ongoing operation.

18.7 Waste Rock Storage

Waste from underground capital and operating waste development is hauled to surface at the Brunswick site via the Brunswick portal. Surface haulage trucks shift waste from intermediate stockpiles predominantly to the Bombay Waste Stockpile, where it is stored for future use in CRF, capital projects (e.g. tailings dam construction) and for rehabilitation purposes.

A small percentage of waste material hauled to surface is screened or crushed, to be used for road base underground and CAF. Further detail is provided in Section 20.1.3.

18.8 Surface Ore and Waste Haulage

The completion of the Brunswick Portal Project in 2020 allowed a significant reduction in the requirement to haul ore and waste in road registered trucks along Heathcote-Nagambie Road. Underground trucks now haul directly to the Brunswick Pit where a surface haulage contractor manages the load, haul, dump operations for both ore and waste rock to their respective final stockpiles.

18.9 Diesel Storage

A self-bunded diesel storage tank of 68,000 L capacity exists at the Augusta Mine site. This diesel storage caters for all underground and surface diesel needs for Augusta.

The Brunswick site is catered by a self-bunded diesel storage tank of 65,000 L capacity.

18.10 Explosives Storage

All storage, import, transport and use of explosives is conducted in accordance with the *WorkSafe Dangerous Goods (Explosives) Regulations 2011*.

Mandalay uses its own licensed personnel and equipment to handle, store, transport and use explosives on the Augusta site. The designated explosives supplier produces all the explosives products off site. The ANFO is supplied in 20 kg bags, while the emulsion is supplied as a packaged product. ANFO is primarily used for development and production purposes, with emulsion used when wet conditions are encountered.

The current Underground Magazine is located at the 955 mRL and is operated under the control of the designated 'black ticket holder' on behalf of Mandalay Resources, who is the licensee. The current Augusta Magazine licence allowances are summarised in Table 18.1.

Table 18.1: Current Augusta licence maximum quantities and types of explosives

Class code	Type of explosive	Maximum quantity
1.1D	Blasting explosives	40,000 kg
1.1D	Detonating cord	10,000 m
1.1B	Detonators	21,000 items

18.11 Maintenance Facilities

Maintenance facilities at the Costerfield Property comprise the following:

- A surface mine maintenance workshop facility is located adjacent to the box-cut at Augusta. This workshop is capable of servicing all mobile underground equipment both electrically and mechanically. The surface mine maintenance workshop also includes a bay for an on-site boiler maker and facilities for an auto-electrician; mobile fleet parts stores are also incorporated into this facility.
- A mine electrical workshop allows electrical maintenance of all electrical assets, including fixed, mobile, LV and HV.

- The Brunswick Processing Plant is equipped with under-cover maintenance facilities capable of servicing fixed and mobile processing plant, including the Finlay primary crushers. This facility also allows for fabrication works where necessary.

18.12 Housing and Land

Mandalay owns 16 land allotments surrounding the Augusta, Brunswick and Splitters Creek Evaporation Facility sites. Of these properties, five have residential dwellings. The remaining seven consist of vacant land. The residential dwellings are used as temporary housing for company employees.

The land allotment located on Peels Lane and Costerfield South acts as an offset area for Mandalay's mining and processing activities. It has been identified that the Peels Lane Offset has 'the potential to generate a total of 4.35 habitat hectares' and associated large trees (Biosis Research, 2005).

The Peels Lane Offset was purchased as part of the Work Plan for MIN4644 and acted as an offset for the vegetation loss due to the construction of the Augusta Mine Site. The offset site has also been used to meet the offset requirements for the Brunswick TSF.

19 Market Studies and Contracts

19.1 Antimony

19.1.1 Concentrate Transport

The concentrate is discharged directly into 1.5 t capacity bulk bags ready for transportation by road train to the Port of Melbourne for shipping to overseas markets. The average payload of each road train is approximately 42 t, and sea shipments are scheduled at least once per month on a Cartage, Insurance, Freight (CIF) basis to the destination port.

A third-party haulage company collects the concentrate from the Brunswick site and transports, stores and loads the concentrate at the port.

All logistics and shipping documentation services are provided by Minalysis Pty Ltd.

19.1.2 Contracts

The antimony-gold concentrate produced from the Costerfield Property is sold directly to smelters capable of recovering both the gold and antimony from the concentrates, such that Mandalay Resources receives payment based on the concentration of the antimony and gold within the concentrate.

The terms and conditions of commercial sale are not disclosed, pursuant to confidentiality requirements and agreements.

19.1.3 Markets

The antimony price is determined through the Metals Bulletin as outlined in the contractual agreement with the customer, in US dollars. The payable factor is dependent on the quality and form of antimony product sold.

Figure 19.1: Antimony price daily over 2 years

Sources: www.transamine.com

Notes: https://www.transamine.com/price-and-review.html

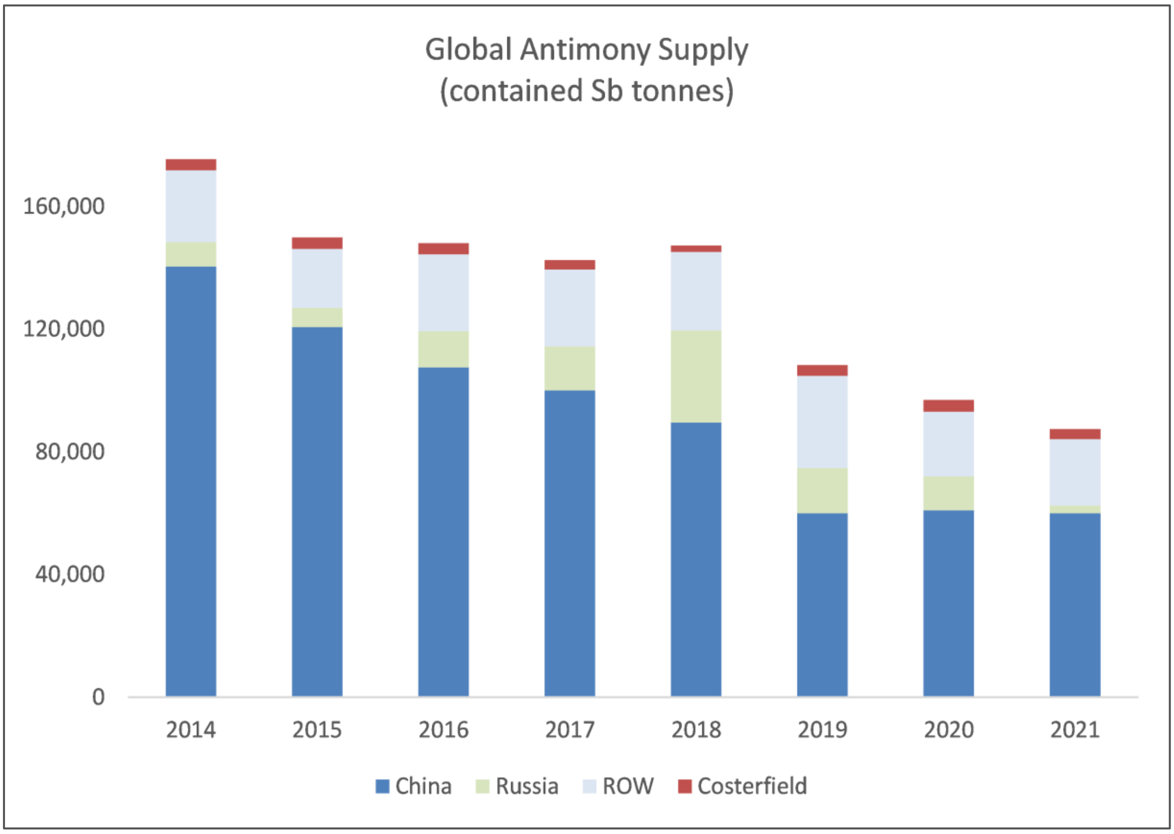
19.1.4 Global Outlook

The comments and graphs in this section are based on a Marketing Update report prepared by West End Mining & Consulting Pty Ltd (WEMCO) in November 2022 for the Mandalay Resources Board.

Globally, antimony production statistics are very difficult to source. United States Geological Survey (USGS) is the most widely quoted source, but it is unreliable. Mined production statistics from China and Russia vary widely according to source. All analysts are aligned in their belief that global mined antimony production has declined significantly since 2018.

Russian sanctions, Chinese lockdowns, and general scarcity of capital for antimony investment are the driving factors.

Figure 19.2: Global antimony supply by year



Sources: WEMCO (2022)

Declining production has been the biggest driver of increasing prices.

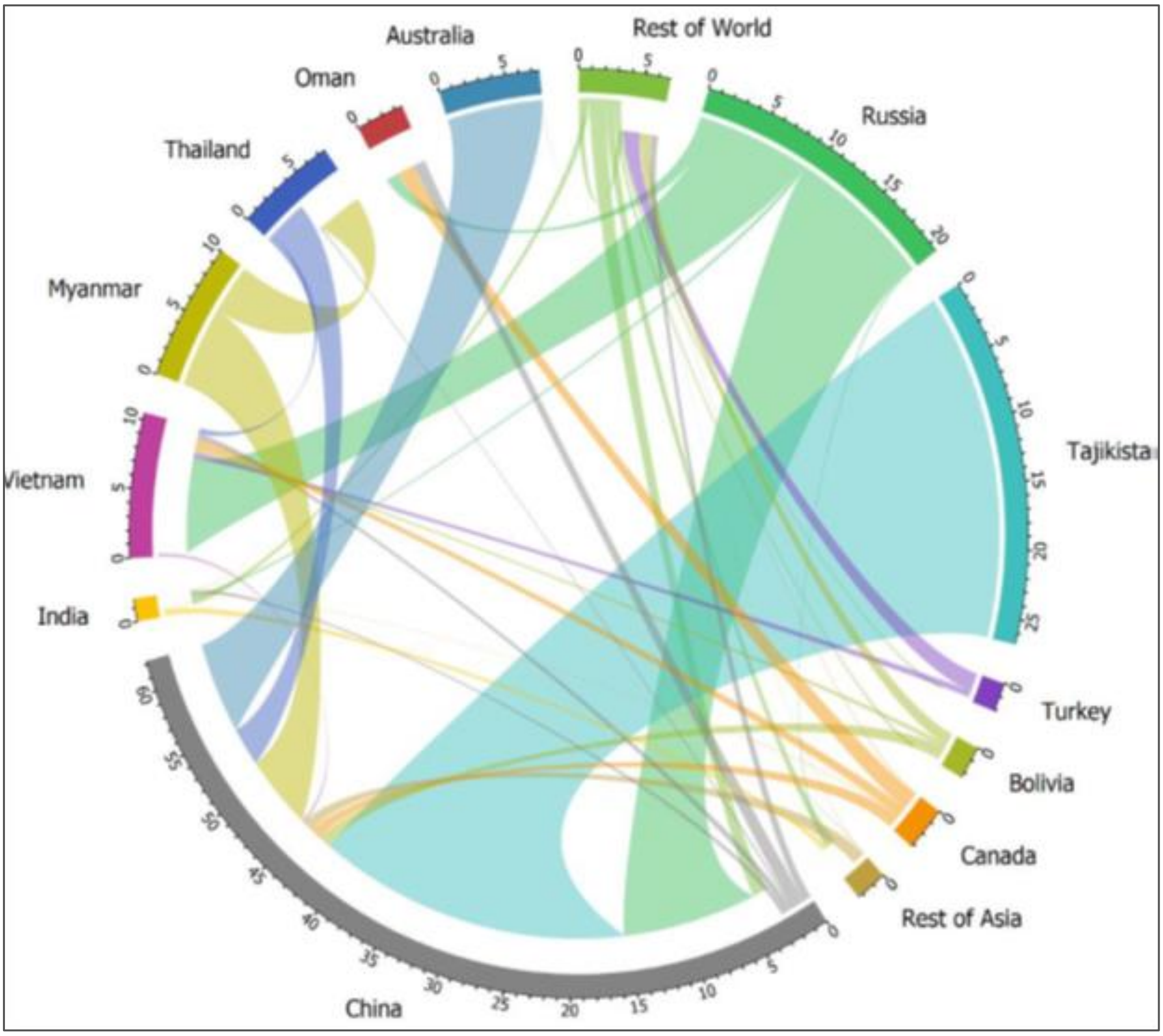
China continues to be the leading global antimony producer in 2021, accounting for 55% of global mine production, followed by Russia with 23% and Tajikistan with 12%, according to USGS.

Depletion and COVID-19 forced closures of small, low-grade Chinese mines has constrained mined production. USGS figures show Chinese production declining from over 140,000 t in 2014 to 60,000 t in 2020 and 2021.

Supply from Polyus (Russia) Olimpiada Mine declined. From a high of 23,602 t in 2018, production has steadily decreased to a reported 400 t in concentrate in H1 2022.

Red River Resources Limited's (Red River's) Hillgrove Project in Australia has been returned to care and maintenance without any production. Mining had been scheduled to commence in CY2022.[1]

Figure 19.3: Global supply flow for antimony



Sources: Roskill (2019)

19.1.5 Raw Material Trade Flows

China remains the main destination for global antimony-gold concentrate processing. They receive material from all producing regions. The large installed smelter capacity is currently under fed due to domestic raw materials supply constraints.

[1] As per MiningNews.net dated 23 January 2023, Red River has been put into administration.

China is the only country that has the technological know-how to efficiently recover both antimony and gold from antimony-gold concentrates, although Strategic and Precious Metals Processing (FZC) LLC (SPMP, Oman) is paying competitive terms (Figure 19.3 is 2019 data not showing Costerfield/Australia to Oman).

19.1.6 Antimony Usage

WEMCO (2022) reported that the traditional antimony applications have been steady to declining for several years, these being:

- flame retardants
- ceramics and glass
- military applications
- solar panel glass.

However, new applications for antimony are expected to drive sustained consumption increases into the future.

Antimony is a listed critical mineral in the USA and in Australia.

19.2 Gold

19.2.1 Markets

There are two forms of gold product sold from the Costerfield Operation, one in concentrate form which is sold to overseas customers, the other a purer form of concentrate which is sold within Australian borders. Each customer has different payable terms stated in the contract, all of which are contingent on the quality of the concentrate sold.

The terms and conditions of commercial sale are not disclosed, pursuant to confidentiality requirements and agreements.

19.2.2 Global Outlook

Gold is a widely available and traded commodity. Information on global outlook is altered daily and is readily available through expert reports. It is not the intent of this report to review and validate all information.

There are many different sources on the global outlook for the price of gold. The trend in the gold price over the last 2 years has followed a relatively flat price (see Figure 19.4).

Figure 19.4: Monthly Gold Price average over 2 years

Sources: www.transamine.com

19.2.3 Resource and Reserve Pricing

For the Mineral Reserve, the gold price used is based on the rounded 3-year trailing average while for the Mineral Resource the gold price used is based on the rounded 2-year trailing average (Figure 19.4).

For antimony, the Mineral Reserve price is the rounded 3-year training average, and for the Mineral Resource, it is based on the rounded 2-year trailing average. This calculation is also conservative of currently observed price increases (Figure 19.4).

Table 19.1: Gold and antimony prices used for Resource and Reserve (US$)

	2021YE Resource price	2021YE Reserve price	2023YE Resource price	2023YE Reserve price
Gold	$1,700	$1,500	**$1,900**	**$1,800**
Antimony	$8,500	$7,500	**$12,000**	**$11,500**

20 Environmental Studies, Permitting, and Social or Community Impact

20.1 Environmental and Social Aspects

20.1.1 Mine Ventilation

Ventilation shafts have been installed in the Cuffley, Brunswick and Youle mines to maintain suitable air quality and volumes within the expanded underground mine.

The Cuffley ventilation shaft is located on freehold land owned by Mandalay Resources and is an exhaust air outlet.

The Brunswick ventilation shaft is located on Crown land near the Brunswick Processing Plant and is a FAI.

The Youle ventilation shaft is located on freehold land owned by Mandalay Resources and is an exhaust air outlet.

20.1.2 Water Disposal

The disposal of groundwater extracted from the mine workings is a critical aspect of the Costerfield Property. The current approved Work Plan does not allow for off-site disposal of groundwater or surface water.

The climate in Central Victoria enables water to be removed through evaporation. Average pan evaporation is 1,400 mm per year according to the nearest Bureau of Meteorology monitoring station at Tatura, 65 km northwest of Costerfield. Mean rainfall in the area is 576 mm per year, recorded at the Bureau of Meteorology monitoring station at Heathcote, with the highest annual rainfall recorded in 1973 as 1,048 mm. The average rainfall by year in the Heathcote area between 2013 and 2019 is detailed in Table 20.1.

Table 20.1: Rainfall measurements from 2013 to 2021

Year	Rainfall (mm)	Above/below average
2013	554	Below
2014	510	Below
2015	299	Below
2016	687	Above
2017	504	Below
2018	379	Below
2019	350	Below
2020	675	Above
2021	590	Above
2022	893	Above
2023	589	Above

The Costerfield Property currently operates a series of water storage and evaporation dams, including the following major storage facilities:

- Splitters Creek Evaporation Facility, comprising 20 terraces and a HDPE lined storage dam
- three HDPE lined evaporation and storage dams at the Augusta site.

An RO plant was installed in 2014 at the Brunswick Processing Plant in order to treat groundwater pumped to surface for mine dewatering purposes. In 2017, an ACTIFLO® unit was also installed as a pre-treatment to the RO plant, which is used to decrease the antimony and dissolved solid levels prior to RO treatment.

Treated water from the RO plant is licensed to be discharged into a neighbouring waterway, to be provided to local community members for stock watering or gardening or used for dust suppression purposes on roads around the site. The creek discharge is licensed by the Environment Protection Authority (EPA), and permits up to 360 ML/year of RO treated permeate to be discharged into the Mountain Creek South diversion, which feeds into the Wappentake creek at a maximum rate of 2.0 ML/day.

The waste product from the RO plant, known as brine, contains concentrated levels of salt, antimony and other elements removed from the groundwater. The RO plant brine is stored in the plastic lined evaporation dams at Augusta, discharged to the Splitter Creek Evaporation Facility, reused in the Brunswick Processing Plant or evaporated in the TSFs.

The Splitters Creek Evaporation Facility, completed in 2015, has the capacity to treat 104 ML/year net (evaporation minus rainfall). The purpose of the facility is to evaporate water surplus to the operation’s needs that is extracted from the Costerfield Property and thereby allow continued dewatering from the underground workings. The facility consists of a series of shallow evaporation terraces that follow the natural topographic contours. Groundwater is pumped from the Augusta mine site and discharged to the terraces. The water cascades down the slope via the terrace spillways to the storage dam at the lowest point. A water pump recirculates water from the storage dam back up to the terraces in order to enable the evaporation terraces to be filled from the storage dam as evaporation rates allow.

Current evaporation, RO plant processing and re-use capacity is calculated to be approximately equivalent to the current dewatering rates; however, additional complementary treatment options are being investigated and trialled to ensure adequate capacity in the future.

20.1.3 Waste Rock

Waste rock that is surplus to underground backfilling requirements is stockpiled on the surface in various locations. Testing of the waste rock has confirmed that the material is non-acid generating and therefore does not pose an acid-mine drainage risk.

Waste rock is currently stockpiled next to the Augusta Mine box-cut, with the maximum height and shape of the stockpile prescribed in the approved Work Plan. The approved Work Plan requires that this stockpile be removed on closure in order to return the land to the prior use as grazing pasture. The waste rock will ultimately be used to fill the box-cut and cap the TSFs.

Waste rock has also been transported to both the Bombay and Brunswick TSFs to increase the height of the TSFs and was used for construction of the Splitters Creek Evaporation Facility.

A portion of waste rock is screened and used in backfilling the underground stopes; however, sufficient waste rock will need to be retained in order to fulfil rehabilitation and TSF expansion requirements.

20.1.4 Tailings Disposal

Mandalay Resources has two operational TSFs, being the Brunswick TSF and the Bombay TSF.

The Bombay TSF returned to service as the replacement storage facility after the completion of a hybrid wall lift and remained the primary storage facility for 2023.

Construction of a new tailings dam known as the Brunswick West TSF is planned to commence construction in 2024. The design capacity of this new tailings dam is 584,000 m^3. The Bombay TSF is expected to reach capacity in March 2024, after which time Geotubes will be used on the Brunswick TSF. There is also capacity for storage using Geotubes on the Bombay TSF should there be delays in the Brunswick West TSF construction.

Underground pastefilling will be used in campaigns throughout 2024, with approximately 17,000 t expected to be deposited into old workings. Both Geotubes and pastefilling were trialled successfully in campaigns during 2024.

The Brunswick Processing Plant employs a tailings thickener that has sufficient capacity to handle the current throughput. The average tailings thickener underflow solids density continues to be maintained at around 50% (+/- 10%).

20.1.5 Air Quality

The approved Environmental Monitoring Plan for the Augusta Mine includes an air quality monitoring program, consisting of dust deposition gauges located at various places surrounding the Costerfield Property, and five dust deposition gauges at the Splitters Creek Evaporation Facility.

The monitoring data are provided to the regulatory authorities and Community Representatives through the quarterly Environmental Review Committee (ERC) meetings.

Control measures currently in place to manage dust emissions from the operations include:

- a road watering program with treated groundwater
- proactive monitoring of dust with portable DustTrak monitors
- moisture control of mill feed during processing
- sealing of sections of haul roads
- maintaining moisture on TSFs and waste rock stockpiles.

Ventilation shafts emission detection reports are carried out biannually and indicate that the ventilation shafts are not a significant source of dust emissions. These results are communicated quarterly at the ERC meetings.

20.1.6 Groundwater

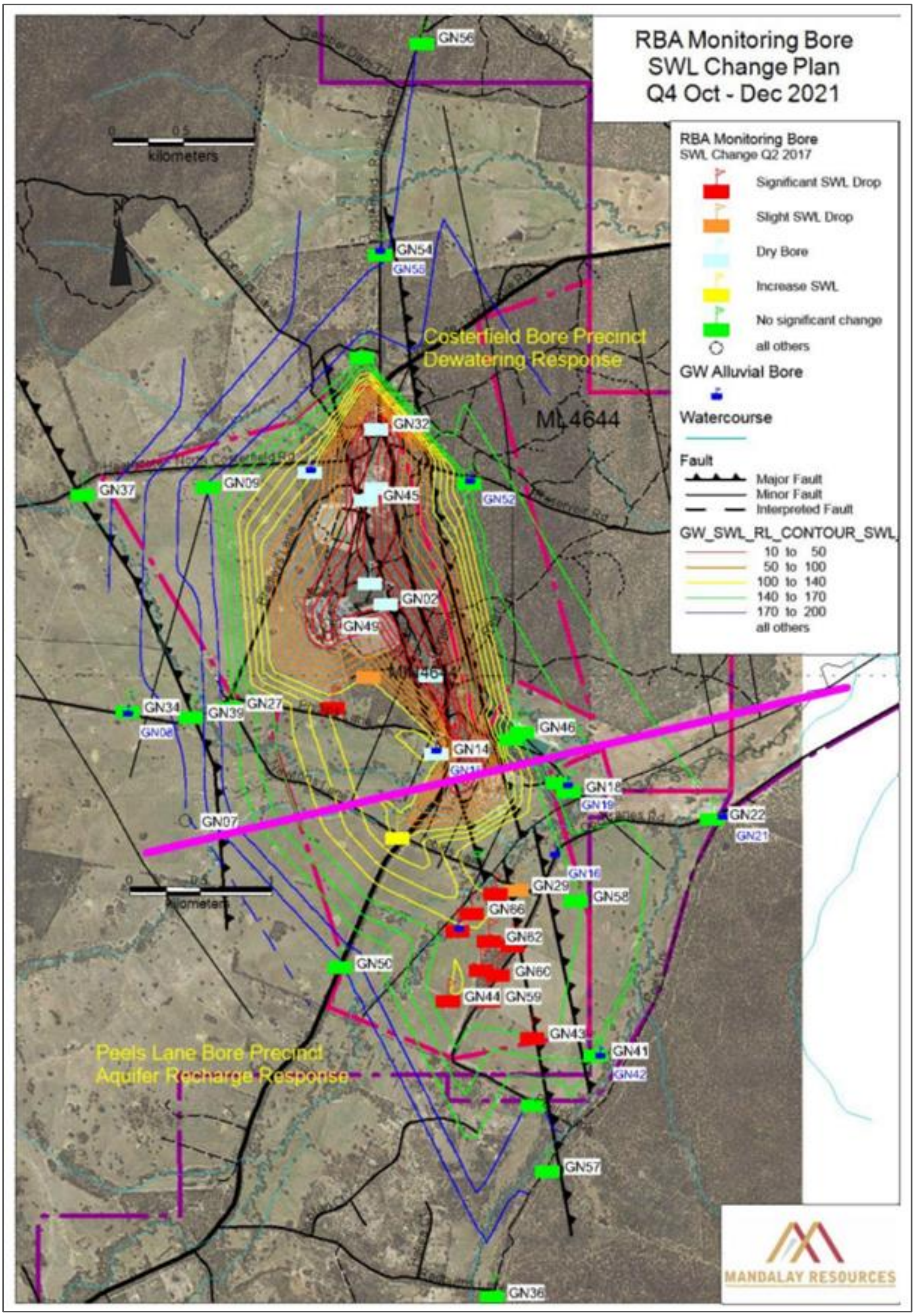
A conceptual hydrogeological model was developed for the Costerfield Property in 2014 based on current groundwater monitoring data, which indicated that the Augusta, Cuffley, Brunswick and Youle deposits are located in the regional groundwater aquifer.

Key aspects of the groundwater for the reporting year include the following:

- Dewatering from the mine totalled 729 ML in 2023.
- The current groundwater extraction licence of 700 ML/year has been approved by Goulburn-Murray Water and is up for renewal in June 2034.

The groundwater model was reviewed in 2021 to confirm the current impact on groundwater levels by dewatering from the mine as the underground workings extended laterally and vertically. The model shows a cone of depression in the bedrock aquifer trending in a north–south orientation, parallel to the deposits (Figure 20.1).

Figure 20.1: Groundwater elevation contour map of the areas surrounding the Augusta Mine, as at December 2021



The regional groundwater aquifer is confined to semi-confined, and is comprised of Silurian siltstones and mudstones, with groundwater flow occurring within fractures and fissures in the rock. This is overlain by a perched alluvial aquifer comprised of recent gravels, sands and silt, which is connected to the surface water system.

Based on the monitoring data and the conceptual hydrogeological model, it appears that the current dewatering activities at the operation do not affect the alluvial aquifer. Therefore, there is no impact to local landowners or the surface water system.

20.1.7 Noise

The approved Environmental Monitoring Plan for the Costerfield Property includes a noise monitoring program which comprises routine attended and unattended noise monitoring at six locations and reactive monitoring at sensitive receptors in the event of complaints or enquiries. Monitoring is carried out in accordance with Environmental Protection Authority (EPA) Victoria's SEPP N–1 policy.

Noise from the Costerfield Property is a sensitive issue for nearby neighbours, and Mandalay Resources operates a 24-hour, 7 days a week complaints line in order to deal with noise complaints or any other issues from members of the public. The Mandalay Resources Complaints Procedure includes processes to record complaints, and to identify and implement immediate and longer term actions. All complaints are discussed at the quarterly ERC meetings.

The current Costerfield Property is not expected to significantly change the nature of noise emissions from the site. Construction of new waste rock storage, TSF or evaporation facilities may require some additional noise monitoring which will be identified as part of the WPV approval process.

During construction, an additional 10 dBA of noise is permitted to be generated. Existing resources and procedures are adequate to accommodate any required modifications to the noise monitoring program.

20.1.8 Blasting and Vibration

DEECA prescribes blast vibration limits for the protection of buildings and public amenities. Mandalay Resources undertakes constant blast vibration monitoring in order to assess compliance with the prescribed limits and reports this information to the ERC quarterly.

20.1.9 Native Vegetation

The Costerfield Property has been developed and is operated with the aim of avoiding and minimising impacts on native vegetation. Where native vegetation has been impacted, Mandalay Resources has obligations to secure native vegetation offsets.

Mandalay Resources has purchased approved native vegetation offset at Peels Lane in Costerfield to fulfil obligations relating to *Victoria's Native Vegetation Management – A Framework for Action*, associated with the original clearing of native vegetation at the Augusta Mine site and the Bombay TSF. The Peels Lane offset site has been assessed as containing 4.35 habitat hectares of various

Ecological Vegetation Classes and associated large trees in accordance with the framework guidelines.

Expansion of the Costerfield Operation through construction of the Splitters Creek Evaporation Facility, Brunswick TSF and Bombay TSF has had a minimal impact on the native vegetation and the Peel Lane site has sufficient offset credits to meet the site's foreseeable future needs.

20.1.10 Visual Amenity

The key aspect of the Costerfield Operation that might have affected visual amenity was the construction of the Splitters Creek Evaporation Facility.

Community consultation took place as part of the planning for the facilities, and mitigation measures were implemented where appropriate. Screening vegetation was planted in consultation with the relevant land manager and nearby neighbours.

20.1.11 Heritage

A heritage survey of the South Costerfield Shaft, Alison and New Alison surface workings was completed by LRGM Services Pty Ltd in Q1 2012. The purpose of this survey was to identify and record cultural heritage features in the areas of interest that exist within the current ML (MIN4644). The Taungurung Clans Aboriginal Corporation is the Registered Aboriginal Party designated as the Traditional Owners of the land on which ML MIN4644 is located.

The survey identified that no features of higher than local cultural heritage significance were identified, with the following features of local cultural heritage significance being noted:

- South Costerfield (Tait's) Mine Shaft
- Old Alison Mine Shaft
- New Alison Mine Shaft.

The expansion of the mining operations did not result in any disturbance to historical mine workings or other heritage features.

20.1.12 Community

The Costerfield Operation is one of the largest employers in the region and is a significant contributor to the local economy. Mandalay Resources preferentially employs appropriately skilled personnel from the local community and sources goods and services from local suppliers wherever possible.

Mandalay Resources has developed and implemented the Costerfield Property's Community Engagement Plan, which has been approved by DEECA in accordance with the requirements of the MRSD Act 1990. This plan sets the framework for communication with all of the business's stakeholders in order to ensure transparent and ongoing consultative relationships are developed and maintained.

The Community Engagement Plan includes processes to manage community inquiries and complaints to ensure timely and effective responses to issues affecting members of the community.

The current Community Engagement Plan is considered an appropriate framework to address the needs of stakeholders through the planning and implementation of the proposed mine expansion.

In early 2016, Mandalay Resources initiated regular community reference meetings under the auspices of the ERC. This forum, the Community Reference Sub-Committee, gives community members the opportunity to find out about current and future issues at the mine, to provide their input and to ask questions.

20.1.13 Mine Closure and Revegetation

The MRSD Act 1990 requires proponents to identify rehabilitation requirements as part of the Work Plan approvals process and ensures that rehabilitation bonds are lodged in the form of a bank guarantee to cover the full cost of rehabilitation up front, prior to commencing work. Rehabilitation bonds are also reviewed on a regular basis to ensure that unit cost assumptions and the scope of work is kept up to date. WPVs also trigger a review of the rehabilitation bond if the work to be carried out affects final rehabilitation.

Mandalay Resources has developed a Mine Closure Plan, which provides an overview of the various aspects of closure and rehabilitation that have been included in the rehabilitation bond calculation and reflects the rehabilitation requirements described in the approved Work Plans and Variations.

The Mine Closure Plan describes how the Augusta site, including the box-cut, waste rock storage, office area and evaporation dams, will be rehabilitated back to the former land use as grazing pasture. The mine decline will be blocked and the portal backfilled with waste rock, with the box-cut being levelled back to its original surface contours. Topsoil and subsoil have been stored on site to facilitate the final revegetation.

The rehabilitation plan for the Brunswick Complex includes removal of all plant and infrastructure, returning the disturbed area back to native forest, and to create a safe and stable landform that can be used for passive recreation. The TSFs will be dried out, capped with waste rock and topsoil, and planted with native vegetation. The plan includes provisions for monitoring the TSFs post closure.

The rehabilitation plan for the Splitters Creek Evaporation Facility includes evaporation of the remaining stored groundwater and removing the clay lining from the terraces, which is placed back into the HDPE line storage dam. The liner in the storage dam will be folded back over the clay and capped with waste rock, clay and topsoil, and planted with grasses. Topsoil and subsoil has been stored on site to enable this final vegetation.

20.2 Regulatory Approvals

20.2.1 Work Plan Variation

Future changes to mining activities, such as potential changes to waste rock storage facilities, will require a risk based WPV to be approved. DEECA facilitates this approval process and will engage with relevant referral authorities, as required. DEECA may prescribe certain conditions on the approval, which may include amendments to the environmental monitoring program. The Work Plan approval process involves a thorough consultation process with regulatory authorities, and any conditions or proposed amendments requested to the WPV are generally negotiated to the satisfaction of both parties.

All on-site and off-site risks must be assessed in the new Work Plan review process and adequate controls and monitoring programs implemented to mitigate any negative impacts.

20.2.2 Other Permitting

In addition to the approval of a WPV, any future expansion of the current Costerfield Operation will require a number of other potential consents, approvals and permits (Table 20.2).

Table 20.2: Permit requirements

Stakeholder	Instrument
Private Landholders	Consent/compensation agreement with owner of the land on which the mine is located.
City of Greater Bendigo	Responsible authority holder and issuer on the Planning Permit for existing and new TSFs.
Minister for Planning	Planning Permit decision maker for new authorisations via Development Facilitation Program.
DEECA	Compliance with Native Vegetation Management Framework for removal of native vegetation associated with the power supply, evaporation facility and expansion of TSF footprints.
EPA	EPA consent to discharge RO treated water to a local waterway.

21 Capital and Operating Costs

The capital and operating cost estimates for the Costerfield Operation described in the following section have been derived from a variety of sources, including:

- historical production from the Costerfield Property, predominantly the past 12 months completed by Mandalay Resources
- manufacturers, contractors and suppliers
- first principle calculations, based on historical production values
- costs including allowances for power, consumables, labour and maintenance.

All cost estimates are provided in 2024 Australian dollars (A$) and are to a level of accuracy of ± 10%. Escalation, taxes, import duties and custom fees have been excluded from the cost estimates.

21.1 Capital Costs

The estimated total capital requirements for the Costerfield Operation are outlined in Table 21.1.

A detailed breakdown of the individual capital items was sourced from the 2024 budget document. Sustaining capital costs listed in the 2024 budget are extended out through the duration of the reserves in the LoM.

Table 21.1: Costerfield Operation – capital cost estimate

Area	Total	CY24 (A$ M)	CY25 (A$ M)	CY26 (A$ M)	CY27 (A$ M)	CY28 (A$ M)
Capital development	2.9	2.9	0.0	0.0	0.0	0.0
Processing plant	15.1	9.3	5.4	0.1	0.1	0.1
Administration	1.0	0.6	0.1	0.1	0.1	0.0
Environmental	10.3	0.1	0.1	0.1	0.1	10.1[3]
OH&S	0.1	0.0	0.0	0.0	0.0	0.0
Operational geology	0.1	0.1	0.0	0.0	0.0	0.0
Exploration	0.1	0.1	0.0	0.0	0.0	0.0
Mining	18.5	6.6	5.7	3.7	1.3	1.2
Total capital cost	**48.3**	**19.7**	**11.5**	**4.1**	**1.6**	**11.4**

Notes:

[1] Totals may not sum due to rounding.

[2] OH&S – occupational health and safety.

[3] Bank guarantees held in favour of the government of $9.425 M are refundable on signed-off completion of rehabilitation works.

21.1.1 Processing Plant

Mandalay Resources has identified and estimated the capital costs associated with the maintenance of the Brunswick Processing Plant and other mill site related initiatives, including:

- Brunswick West TSF construction
- plant front end re-design, including Ball Mill #1 feed hopper
- refurbishment of existing plant and key components
- purchase of critical spares
- miscellaneous upgrades to surface facilities.

The main processing plant infrastructure cost items are plant front end redesign, including the purchase of a reclaim feeder, as well as works associated with the early works and construction of the Brunswick West TSF. All associated costs are based on tendered rates.

21.1.2 Administration

Administration related capital costs include optic fibre and telephone network upgrades and minor software and reporting improvements.

21.1.3 Environmental and Occupational Health and Safety

Capital costs related to the environmental and occupational health and safety departments include predominantly sustaining capital. The sustaining capital expenditure allows for ongoing operation of environmental monitoring and permitting activities.

21.1.4 Mining

Mining related capital costs consist of sustaining capital to ensure production rates are achieved, and project capital that further improves the efficiency of the mining process. Planned costs will include additional expenditure on safety initiatives including tele-remote loader upgrades.

Sustaining capital allows for replacement of light vehicles, rebuilds of 1700 and LH 203 loaders, MT436 truck, production drills and development drills.

The cost estimates have been based on recent quotations or agreements from appropriate suppliers.

21.1.5 Capital Development

Decline development quantities have been based on the mine designs prepared for the project. The lateral development quantities are based on each production level in the mine being accessed by the decline system with allowance for stockpiles, level access, sumps, refuge chamber cuddies, vent accesses, truck tips and CRF mixing bays.

The unit cost for lateral development has been based on a combination of the agreed development rates with the mining contractor undertaking the capital development and historical costs for consumables (explosives, fuel, ground support and rehabilitation) and services. The capital development rates include an allowance for the haulage of waste rock to the surface and also haulage, handling and stockpiling of waste once it is on surface.

21.1.6 Closure

Closure costs are estimated using a calculation tool to estimate rehabilitation bonds. Bond amounts are reviewed when major changes are made to the operation, for example construction of a TSF. In the case of this Reserve, a closure cost of AUD$10M has been used.

Bank guarantees held in favour of the government of $9.425 M are refundable on signed-off completion of rehabilitation works.

21.2 Operating Costs

Operating costs are derived from tracked historical expenditure under operating expenditure cost codes and financial analysis split costs using a combination of mining and milling physicals, along with mining operations timesheet and payroll data. This method ensures an accurate split of operational costs for estimating purposes.

The operating cost estimates applied in this Technical Report are summarised in Table 21.2 and described further in the following sections.

Table 21.2: Costerfield Property Operating cost inputs

Description	Unit	A$	Data source
Jumbo operational development	A$/t	198	2023 average
Stoping	A$/t	171	2023 average
Mining administrative	A$/day	2,882	2023 average
Geology	A$/day	8,533	2023 average
ROM haulage	A$/t	5	2023 average
Processing plant	A$/t milled	85	2023 average
Site services	A$/day	6,903	2023 average
General and administrative	A$/day	15,044	2023 average
Selling expenses excluding royalty	A$/t con	224	2023 average

Notes: Royalty costs are calculated in accordance with royalty payment structures. Antimony royalty is paid at a rate of 2.75% of revenue less selling costs. Gold royalty is also paid at 2.75% of revenue less selling costs with 2,500 of saleable gold ounces exempt from royalty payment.

21.2.1 Lateral Development

The estimated unit cost for lateral development has been developed from 2023 average costs for labour, equipment, consumables, and services, as well as achieved development physicals. An allowance for the haulage to surface has also been included.

The lateral development (operating) for Augusta, Cuffley, Brunswick and Youle will continue to be undertaken on an owner-operator basis.

The required lateral development is summarised in Table 21.3.

Table 21.3: Summary of lateral development requirements

Description	Metres
Capital development	340
Operating development (waste)	9,040
Operating development (ore)	2,593

The direct operating costs related to lateral development include:

- direct labour including superannuation, workers compensation, payroll tax and partial allowances for leave accrual
- drilling consumables, such as drill steel, bits, hammers, etc.
- explosives
- ground support supplies
- direct mobile plant operating costs for fuel and lubricants, tyres and spare parts
- services materials, including poly pipe, ventilation bag and electrical cables
- reallocation of costs associated with maintenance, ventilation, power supply, compressed air supply, dewatering, water supply and underground communications
- miscellaneous materials required to support development activities.

21.2.2 Production Stoping

The direct costs for stoping have been developed from 2023 average costs for direct labour (including superannuation, workers compensation, payroll tax and partial allowances for leave accrual), consumable materials, and equipment operating and maintenance, as well as achieved productivities associated with the following:

- installation of secondary ground support
- drilling, loading, and blasting long-holes by Mandalay Resources employees
- production from the stope with an underground loader (remote or manual) and tramming to a stockpile or truck loading area
- loading haul trucks from stockpile (if required)
- backfill preparation and placement
- reallocation of costs associated with maintenance, ventilation, power supply, compressed air supply, dewatering, water supply and underground communications.

21.2.3 Mining Administration

Mining administration includes costs associated with mining management, supervision, and technical services, such as Mining Engineering, Survey, Geotechnical Engineering and Mine Geology. These costs have been estimated from actual Mandalay Resources 2023 mining administration costs.

21.2.4 Geology

Geology includes costs associated with resource estimation, resource definition drilling, sampling, assaying, and laboratory expenses as well as associated management and labour. These costs have been estimated from actual Mandalay Resources 2023 geology costs.

21.2.5 Run of Mine Haulage

The cost of trucking from the Brunswick Pit ROM to the Brunswick Processing Plant ROM pad has been calculated based on the average of the 2023 total costs of this short distance surface haulage. Costs calculated include indirect costs and profit.

21.3 Processing Plant

The Brunswick Processing Plant costs include:

- tailings disposal
- ROM management
- ball mill crushing and grinding
- general operating and maintenance
- reagent mixing, thickening and flotation
- gold room expenses
- all flocculants and reagent chemicals
- plant maintenance and reallocated electrical costs associated with plant operation.

The processing costs have been estimated from 2023 average processing costs.

21.4 Site Services

Site service costs refer to indirect costs related to Health and Safety, Environment and Community Relations, as well as costs related to the water treatment plant, water disposal and the RO plant. Compensation expenses are also included in this cost item.

These costs have been estimated from actual Mandalay Resources 2023 site services costs.

21.5 General and Administrative

The general and administrative costs refer to site-wide operational costs rather than costs directly associated with operational departments. This cost includes General Site Management, including all staff costs, Human Resources, Finance and Administration.

These costs have been sourced from Mandalay Resources actual 2023 general and administrative costs.

21.6 Selling Expenses

Mandalay Resources uses a third-party company to arrange the sale and transport of concentrate from the Brunswick Processing Plant to the smelter in China. The Mandalay Resources portion of the selling expenses is calculated from historical costs and comprises road transport from the Brunswick Processing Plant to the Port of Melbourne, shipping from Melbourne to China, shipment documentation, freight administration and assay exchange/returns.

22 Economic Analysis

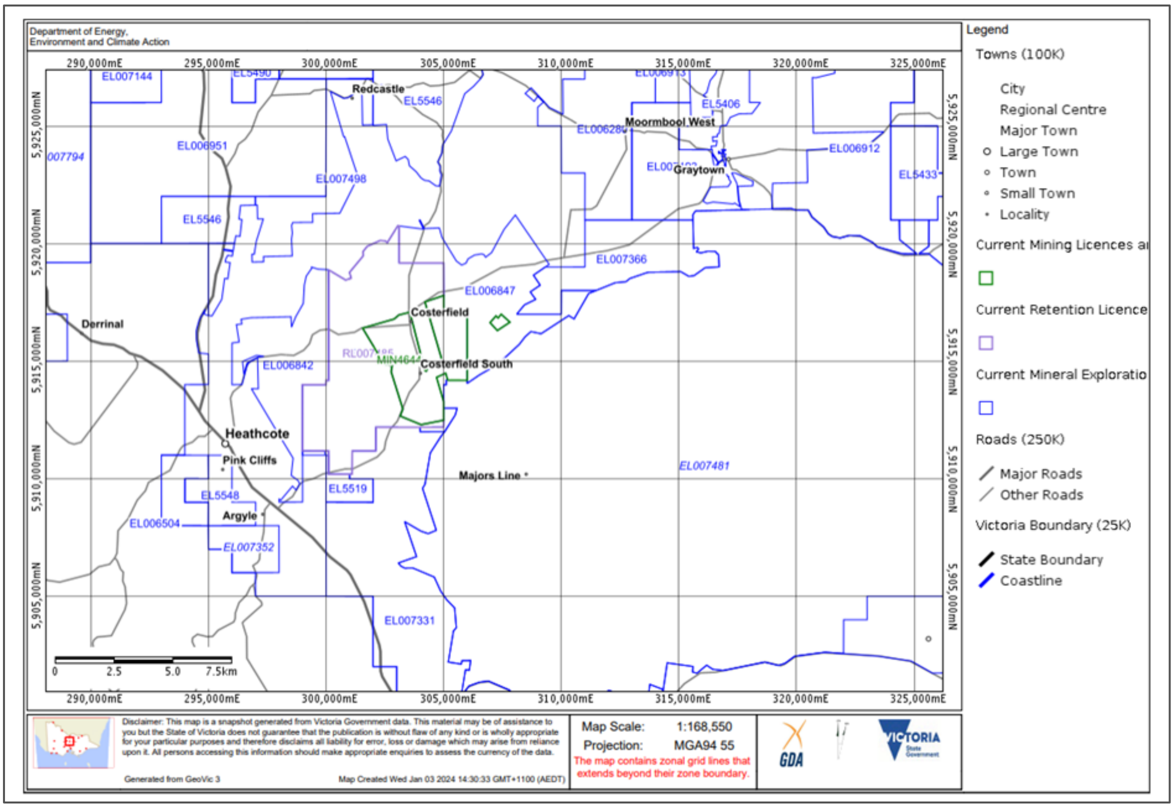
This section is not required as the property is currently in production. Mandalay is a producing issuer and there is no planned material expansion of the current production. SRK has verified the economic viability of the Mineral Reserve via financial modelling using the inputs discussed in this report.

23 Adjacent Properties

Mandalay Resources manages the Costerfield Operation and holds a 100% interest in licences MIN4644, MIN5567, EL5432, EL5519, EL6842, EL6847, EL8320 and RLA7485 (operating under S16A EL3310) which comprise the Property. There are no advanced projects in the immediate vicinity of the Property, and there are no other Augusta-style antimony-gold operations in production within the Costerfield district.

Exploration on adjacent tenements (EL5546, EL006504, EL006280, EL5490, EL006001, EL6951, EL7352, EL007348, EL007366, EL007382, EL007498, EL007499 and EL007481), are shown in Figure 23.1. The ownership and status of each of the surrounding ELs are detailed in Table 23.1.

Figure 23.1: Augusta Mine adjacent properties



Source: Geovic (2022)

Table 23.1: Ownership details – Augusta Mine adjacent properties

Title	Owner	Status	First granted	Expiry
EL5490	Golden Camel Mining Pty Ltd	Current	06/12/2013	05/12/2028
EL006504	Fosterville Gold Mine Pty Ltd	Pending Renewal	19/03/2018	19/03/2023
EL007352	Fosterville Gold Mine Pty Ltd	Under Application		
EL007366	Kalamazoo Resources Limited	Current	15/03/2021	14/03/2026
EL007331	Kalamazoo Resources Limited	Current	08/04/2021	07/04/2026
EL007498	Nagambie Resources Ltd	Current	28/05/2021	27/05/2026
EL007499	Nagambie Resources Ltd	Current	28/05/2021	27/05/2026
EL007481	Torrens Gold Exploration Ltd	Under Application		
EL007366	Kalamazoo Resources Ltd	Granted	15/03/2021	14/03/2026
EL5546	Nagambie Mining Limited	Pending Renewal	08/05/2017	07/05/2022
EL006001	AIS Resources Aust Pty Ltd	Current	01/10/2015	30/09/2025
EL006280	Currawong Resources Pty Ltd	Current	11/07/2017	10/07/2022
EL006951	Petratherm Ltd	Current	16/03/2023	15/03/2028

24 Other Relevant Data and Information

There is no other relevant data or information material to the Costerfield Property that has not been documented in the other sections of this Technical Report.

25 Interpretation and Conclusions

The QPs summarise here the results and interpretations of the information and analysis being reported on.

25.1 Geology and Mineral Resource

During 2022–2023, Mandalay drilled a total of 82.9 km of exploration diamond core. In addition to drilling, 5948 m of on-vein development was completed within the Youle and Shepherd orebodies. Rock chip samples used in mine grade control were also included in the geological database and used in the Mineral Resource Estimate process to improve resource classification in areas accessed by development.

All relevant diamond drill holes and underground face samples in the Costerfield Property, available as of 31 December 2023, were used to inform the Mineral Resource Estimate. The Mineral Resource is estimated as at 31 December 2023, with depletion through to this date.

The in situ Augusta, Cuffley, Brunswick, Youle, Shepherd and True Blue deposits plus stockpiles consist of a combined Measured and Indicated Mineral Resource of 965,000 t at 10.6 g/t Au and 2.8% Sb, and an Inferred Mineral Resource of 286,000 t at 7.0 g/t Au and 1.3% Sb.

The Mineral Resource Estimate is reported at a cut-off grade of 5.0 g/t AuEq after diluting to a minimum mining width of 1.2 m.

The gold equivalence formula used is calculated using recoveries achieved at the Costerfield Property Brunswick Processing Plant during 2020, and is as follows:

$$AuEq = Au\ (g/t) + 1.88 \times Sb\ (\%)$$

Commodity prices used in the equivalence formula are US$$1,900/oz Au and USD$12,000/t Sb, and 2023 total year metal recoveries of 94% for Au and 89% for Sb.

The RPEEE has been satisfied by applying the minimum mining width of 1.2 m and ensuring that isolated blocks above cut-off grade, which are unlikely to ever be mined due to distance from the main body of mineralisation, were excluded from the Mineral Resource.

The width of 1.2 m is the practical minimum mining width applied at the Costerfield Property for stoping. For blocks with widths less than 1.2 m, diluted grades were estimated by adding a waste envelope with zero grade and 2.76 t/m^3 bulk density (Youle, Shepherd and True Blue) to the lode.

The QP for the Mineral Resource considers that the geological and assay data used as input to the Mineral Resource Estimate have been collected, interpreted and estimated in line with best practice as defined by CIM (CIM 2018, 2019). Data verification work showed the geological data are suitable for use as input to the Mineral Resource Estimate. Validation of the Mineral Resource Estimate block model showed good agreement with the input data. A retrospective reconciliation exercise showed acceptable agreement between 2022–2023 production tonnes and grades with the equivalent tonnes and grades reported out of the current block model.

Additionally, the QP for the Mineral Resource considers that the key risk to the operation is being able to maintain the resource base to stay ahead of ongoing mining depletion and does not consider any other significant risks or uncertainties could reasonably be expected to affect the reliability or confidence in the exploration information or Mineral Resource Estimate.

25.2 Mining, Ore Reserve and the Mining Schedule

SRK makes the following observations regarding the mining operations:

- The Costerfield Operation has considerable experience in successfully mining the narrow vein gold and antimony mineralisation in the deposits at the operation using the long-hole CRF stoping mining method.
- The planned mining methods, production rates, costs and modifying factors that have been used to inform the Mineral Reserve are closely based on actual performance from recent site operations.
- The Mineral Reserve is based on the Measured and Indicated Resource material with the application of appropriate modifying factors.
- Inferred Resources have not been included in the financial evaluation that has been completed to confirm the economic viability of the Mineral Reserve.
- There has been a history of conversion of Inferred to Indicated Resources resulting in additional Resources from outside the Mineral Reserve being included in the LoM plans that have the potential to improve the project economics.

25.3 Mineral Processing and Metallurgical Testwork

SRK makes the following observations regarding the processing aspects of the operation:

- The Brunswick concentrator is a conventional flotation style concentrator incorporating a gravity gold recovery circuit. It has a well demonstrated production record of consistent throughput and metallurgical recoveries across a range of feed types. The forecast LoM feed is similar to the ores historically processed and the metallurgical behaviour of the Youle and Shepherd ore blend is not expected to materially change. SRK considers that the processing plant is, and will remain, amenable to processing the LoM ores.
- The updated antimony and gold feed grade versus metallurgical recovery algorithms used for the 2024 Mineral Reserve Estimation use an operational dataset from 2022 and 2023, which reflects the forecast LoM Youle and Shepherd dominated feed. This blend has slightly higher gravity gold recovery and lower antimony recoveries, in line with the lower antimony head grades, than the Youle only feed previously used. SRK endorses its use for the purposes of the Mineral Reserve Estimation.
- The forecast throughput and associated processing costs reflects the historical capacity of the plant and are appropriate for use as metallurgical modifying factors for the Mineral Reserve Estimate.

26 Recommendations

26.1 Geology

The Costerfield Property is an advanced operation and Mandalay Resources has a history of successful exploration and mining on the Property. SRK considers that the continued success of the operation is underpinned by near-mine and regional exploration success. Considering this, SRK recommends the following:

- The Shepherd deposit series of lodes have represented a challenge during mining due to their highly variable nature. SRK recommends further technical analysis of these domains, focusing on structural geology, in order to better understand the controls on mineralisation.
- This report represents the maiden resource estimate for the True Blue deposit. SRK recommends continuing to infill and extend the mineralisation at True Blue.

26.2 Mining

SRK makes the following recommendations regarding the mining operations:

- Complete the numerical stress modelling work that has commenced including using closure data to calibrate the model.
- Continue to collect and analyse stope dilution and mining recovery performance data

26.3 Mineral Processing and Metallurgical Testwork

SRK recommends that Mandalay continue to update the gold and antimony metallurgical recovery algorithms annually based on actual production data. These relationships should then be applied to any Mineral Reserve Estimate and LoM production schedule updates.

Mandalay has previously undertaken annual metallurgical recovery algorithm updates, which has contributed to the reliable forecasting of antimony and gold recoveries.

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Date 28/03/2024

Certificate of Qualified Person

a. I, Cael Gniel am a Senior Consultant (Resource Geology) with SRK Consulting (Australasia) Pty Ltd with a business address at Level 3, 18–32 Parliament Place, West Perth WA 6005 Australia.

b. This certificate applies to the technical report entitled Costerfield Operation, Victoria, Australia, NI 43-101 Technical Report, dated 28 March 2024 (the “Technical Report”).

c. I am a graduate of Monash University, Bachelor of Science, 2012. I am a member in good standing of the Australian Institute of Geoscientists (Member number: 7710). My relevant experience is 7 years working in Victorian gold operations and 6 years working as a consultant performing Mineral Resource Estimtion. I am a “Qualified Person” for purposes of National Instrument 43-101 (the “Instrument”).

d. My most recent personal inspection of the Property was 28 August 2023 for 2 days.

e. I am responsible for Sections 2, 4, 6 to 12, 14, 23 of the Technical Report.

f. I am independent of Mandalay Resources Corporation as defined by Section 1.5 of the Instrument.

g. I have previously worked for Mandalay Resources Corporation from 2012-2018

h. I have read the Instrument and the Technical Report has been prepared in compliance with the Instrument.

i. At the effective date of the technical report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

“Original document dated, signed and sealed by Cael Gniel, BSc (Geosciences and Chemistry, MAIG, RPGeo (Mineral Resource Estimation)”.

Cael Gniel

Senior Consultant (Resource Geology)

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Date 28/03/2024

Certificate of Qualified Person

a. I, Robert Urie am a Principal Consultant (Mining) with SRK Consulting (Australasia) Pty Ltd with a business address at Level 3, 18–32 Parliament Place, West Perth WA 6005 Australia.

b. This certificate applies to the technical report entitled Costerfield Operation, Victoria, Australia, NI 43-101 Technical Report, dated 28 March 2024 (the "Technical Report").

c. I am a graduate of the University of New South Wales, Bachelor of Mining Engineering, 1997. I am a member in good standing of the Australian Institute of Mining and Metallurgy (Member number: 111309). My relevant experience is 26 years of mining engineering experience in both operations and consulting. I am a "Qualified Person" for purposes of National Instrument 43-101 (the "Instrument").

d. My most recent personal inspection of the Property was 30 October 2023 for 2 days.

e. I am responsible for Sections 3, 5, 15, 16, 18 to 22 and 24 of the Technical Report.

f. I am independent of Mandalay Resources Corporation as defined by Section 1.5 of the Instrument.

g. I have no prior involvement with the Property that is the subject of the Technical Report.

h. I have read the Instrument and the Technical Report has been prepared in compliance with the Instrument.

i. At the effective date of the technical report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

"Original document dated, signed and sealed by Robert Urie, BEng Mining (Hons), Grad Cert (Applied Finance) Securities Institute, FAusIMM".

Robert Urie

Principal Consultant (Mining)

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Date 28 March 2024

Certificate of Qualified Person

a. I, **Carla Margaret Kaboth** am a **Principal Process Engineer** with **Core Resources Pty Ltd** with a business address at **36 Corunna St, Albion, QLD, 4010, Australia**.

b. This certificate applies to the technical report entitled Costerfield Operation, Victoria, Australia, NI 43-101 Technical Report, dated 28 March 2023 (the “Technical Report”).

c. I am a graduate of University of Queensland, [Bachelor of Engineering (Mineral Processing), Hons, 1994]. I am a member, Fellow and Chartered Professional (CP) in good standing of the Australasian Institute of Mining and Metallurgy (AusIMM) [Member # 111430]. My relevant experience is 27 years as a practising metallurgist / process engineer in the field of base metal concentrator and gold plant operation, testwork, plant design and Feasibility Studies. I am a “Qualified Person” for purposes of National Instrument 43-101 (the “Instrument”).

d. My most recent personal inspection of the Property, Costerfield, was from 30 October 2023 for 2 days.

e. I am responsible for Sections 13 and 17 of the Technical Report.

f. I am independent of Mandalay Resources Corporation as defined by Section 1.5 of the Instrument.

g. I have no prior involvement with the Property that is the subject of the Technical Report.

h. I have read the Instrument and the Technical Report, Sections 13 and 17 have been prepared in compliance with the Instrument.

i. At the effective date of the technical report, to the best of my knowledge, information and belief, the Technical Report, Sections 13 and 17, contain all scientific and technical information that is required to be disclosed to make the technical report not misleading.

“Original document dated, signed and sealed by Carla Margaret Kaboth, BE (Min Proc) Hons, FAusIMM(CP)”

Carla Kaboth

Carla Margaret Kaboth

Principal Process Engineer

Core Resources Pty Ltd

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PLI031

Melbourne

To:

British Columbia Securities Commission
Alberta Securities Commission
Ontario Securities Commission
Saskatchewan Financial and Consumer Affairs Authority
The Manitoba Securities Commission
Financial and Consumer Services Commission, New Brunswick
Nova Scotia Securities Commission
Office of the Superintendent of Securities, Government of Newfoundland and Labrador
Office of the Superintendent of Securities, Prince Edward Island
Toronto Stock Exchange

Consent of Qualified Person

I, Cael Gniel, consent to the public filing of the technical report titled, Costerfield Operation, Victoria, Australia, NI 43-101 Technical Report and dated 28 March, 2024 (the “Technical Report”) by Mandalay Resources Corporation.

I also consent to any extracts from or a summary of the Technical Report in the press release of Mandalay Resources Corporation dated February 22, 2024 (the “Release”) and the annual information form dated 28 March, 2024 (the AIF) of Mandalay Resources Corporation.

I certify that I have read the Release and the AIF that the technical Report supports being filed by Mandalay Resources Corporation and that it fairly and accurately represents the information in the sections of the technical report for which I am responsible.

Dated this 28 March 2024

Regards
SRK Consulting (Australasia) Pty Ltd

Cael Gniel

Qualified Person Signature
Senior Consultant (Resource Geology), BSc (Geosciences and Chemistry), MAIG, RPGeo (Mineral Resource Estimation)

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PLI031

Perth

To:

British Columbia Securities Commission
Alberta Securities Commission
Ontario Securities Commission
Saskatchewan Financial and Consumer Affairs Authority
The Manitoba Securities Commission
Financial and Consumer Services Commission, New Brunswick
Nova Scotia Securities Commission
Office of the Superintendent of Securities, Government of Newfoundland and Labrador
Office of the Superintendent of Securities, Prince Edward Island
Toronto Stock Exchange

Consent of Qualified Person

I, Robert Urie, consent to the public filing of the technical report titled, Costerfield Operation, Victoria, Australia, NI 43-101 Technical Report and dated 28 March, 2024 (the "Technical Report") by Mandalay Resources Corporation.

I also consent to any extracts from or a summary of the Technical Report in the press release of Mandalay Resources Corporation dated February 22, 2024 (the "Release") and the annual information form dated 28 March, 2024 (the AIF) of Mandalay Resources Corporation.

I certify that I have read the Release and the AIF that the technical Report supports being filed by Mandalay Resources Corporation and that it fairly and accurately represents the information in the sections of the technical report for which I am responsible.

Dated this 28 March 2024

Regards
SRK Consulting (Australasia) Pty Ltd

Robert Urie

Qualified Person Signature
Principal Consultant (Mining), BEng Mining (Hons), Grad Cert (Applied Finance) Securities Institute, FAusIMM

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Melbourne

To:

British Columbia Securities Commission
Alberta Securities Commission
Ontario Securities Commission
Saskatchewan Financial and Consumer Affairs Authority
The Manitoba Securities Commission
Financial and Consumer Services Commission, New Brunswick
Nova Scotia Securities Commission
Office of the Superintendent of Securities, Government of Newfoundland and Labrador
Office of the Superintendent of Securities, Prince Edward Island
Toronto Stock Exchange

Consent of Qualified Person

I, Carla Kaboth, consent to the public filing of the technical report titled, Costerfield Operation, Victoria, Australia, NI 43-101 Technical Report and dated 28 March, 2024 (the "Technical Report") by Mandalay Resources Corporation.

I also consent to any extracts from or a summary of the Technical Report in the press release of Mandalay Resources Corporation dated February 22, 2024 (the "Release") and the annual information form dated 28 March, 2024 (the AIF) of Mandalay Resources Corporation.

I certify that I have read the Release and the AIF that the technical Report supports being filed by Mandalay Resources Corporation and that it fairly and accurately represents the information in the sections of the technical report for which I am responsible.

Dated this 28th March 2024

Regards
Core Resources Pty Ltd

Carla Kaboth

Carla Kaboth

Principal Process Engineer, BE (Min Proc) Hons, FAusIMM(CP)