Section 1

Introduction

PREAMBLE

This section introduces the Tomingley Gold Extension Project and provides:

- *an outline and scope of the document;*
- *an overview of the key terms and terminology used in this document;*
- *an introduction to the Applicant;*
- *relevant background and history of the Tomingley Gold Operation and Tomingley Gold Extension Project;*
- *details of the existing approvals and an overview of existing operations, including environmental performance;*
- *an overview of the proposed operations, including the objectives and strategies to avoid and minimise Project-related impacts;*
- *the personnel involved in the design of the Tomingley Gold Extension Project, document preparation and Specialist Consultant investigations and assessments.*

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1.1 Scope

Tomingley Gold Operations Pty Ltd (The Applicant) proposes to extend the existing Tomingley Gold Operations gold mine (the TGO Mine), located immediately to the south of the Tomingley village in central western NSW, to incorporate mining of the San Antonio and Roswell deposits (SAR). The SAR deposits are located immediately to the south of the TGO Mine (**Figure 1.1**). For the purposes of this application, the Tomingley Gold Extension Project (the Project) would incorporate:

- all currently approved activities associated with the TGO Mine; and
- those activities required for the mining of the SAR deposits.

The TGO Mine is currently operated under development consent MP09_0155. That development consent would be relinquished following receipt of development consent for the Project.

The Project may be classified as State Significant Development and this document has been prepared in accordance with the requirements of the *State significant development guidelines – preparing an environmental impact statement* dated July 2021.

In addition, this document addresses the specific matters identified by the following.

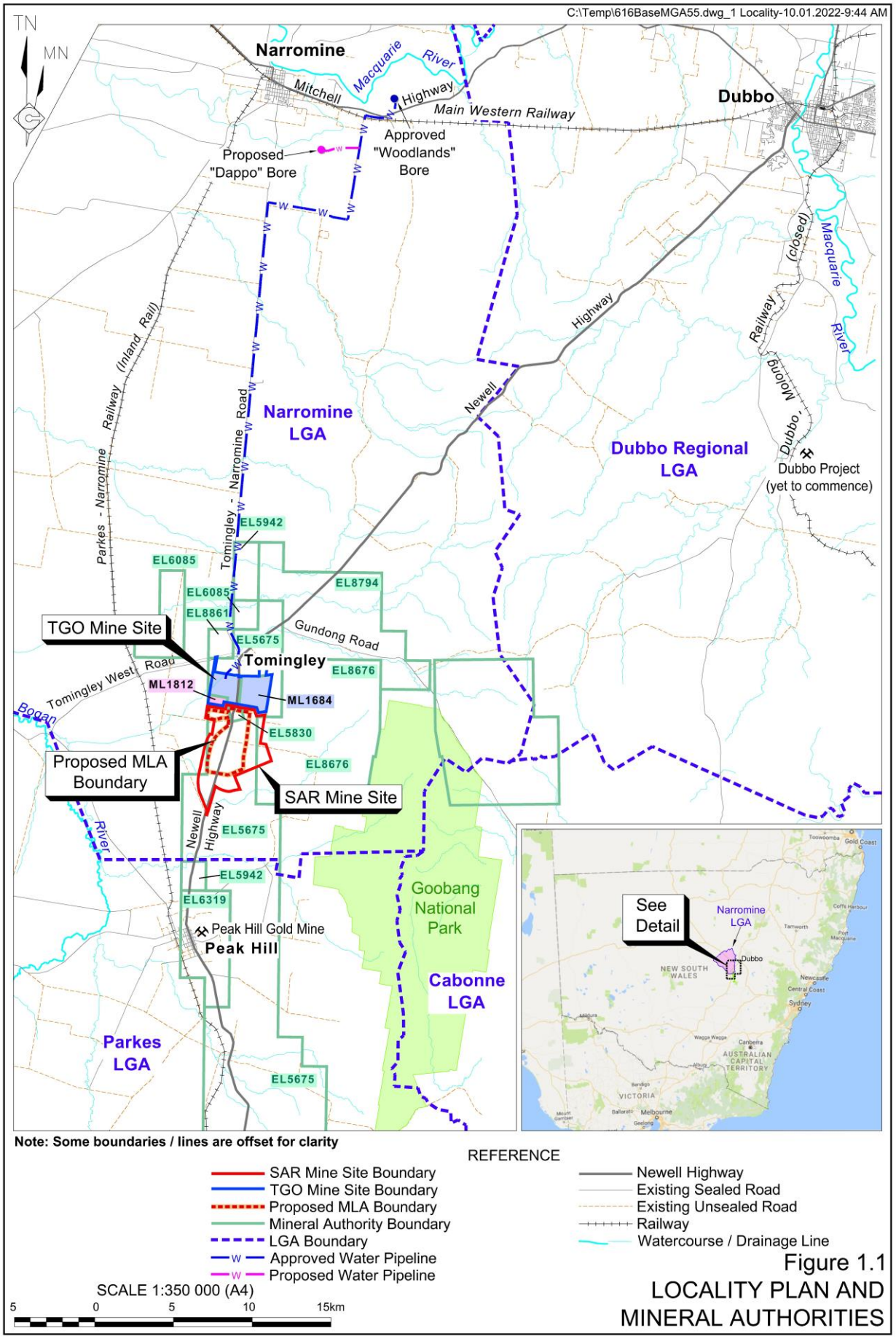
- Secretary's Environmental Assessment Requirements (SEARs) issued by the Department of Planning and Environment (DPE) on 22 November 2021.
- Requirements of other relevant government agencies provided with the SEARs.
- Requirements of the conditional Gateway Certificate issued by the Mining and Petroleum Gateway Panel on 15 November 2021.
- Issues raised during agency and community consultation.
- The experience of the Applicant, R.W. Corkery & Co. Pty Limited (RWC) and the specialist consultants and advisors associated with the Project.

A copy of the SEARs and accompanying agency requirements, as well as the conditional Gateway Certificate are presented in **Appendix 1**. **Appendix 2** identified where each of the matters to be addressed have been covered in this document.

1.2 Key Terms and Terminology

Throughout this document a range of terms and terminology have been used to describe key aspects of the Project, as follows.

The Project	All approved activities that are currently the subject of development consent MP 09_0155, and those additional activities that would be the subject of any new development consent to be granted.
The Applicant	Tomingley Gold Operations Pty Ltd.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TN
MN
Narromine
Macquarie River
Mitchell Highway
Main Western Railway
Dubbo
Approved "Woodlands" Bore
Proposed "Dappo" Bore
Macquarie River (closed) Railway
Dubbo - Molong Railway
Dubbo Project (yet to commence)
Dubbo Regional LGA
Narromine LGA
Newell Highway
Parkes - Narromine Railway (Inland Rail)
Narromine Road
Tomingley - Narromine Road
EL5942
EL6085
EL8794
EL8861
TGO Mine Site
Gundong Road
Tomingley
EL8676
Tomingley West Road
ML1812
ML1684
Bogan River
EL5830
Proposed MLA Boundary
SAR Mine Site
EL5675
EL6319
Peak Hill Gold Mine
Peak Hill
Goobang National Park
Cabonne LGA
Parkes LGA
See Detail
Narromine LGA
Dubbo
NEW SOUTH WALES
AUSTRALIAN CAPITAL TERRITORY
VICTORIA
Melbourne
Sydney
Canberra
Newcastle
Tamworth
Gold Coast
Toowoomba
Note: Some boundaries / lines are offset for clarity
REFERENCE
SAR Mine Site Boundary
TGO Mine Site Boundary
Proposed MLA Boundary
Mineral Authority Boundary
LGA Boundary
Approved Water Pipeline
Proposed Water Pipeline
Newell Highway
Existing Sealed Road
Existing Unsealed Road
Railway
Watercourse / Drainage Line
SCALE 1:350 000 (A4)
5 0 5 10 15km
Figure 1.1
LOCALITY PLAN AND MINERAL AUTHORITIES

TGO Mine	The existing Tomingley Gold Operations undertaken in accordance with the requirements of MP 09_0155.
SAR	San Antonio and Roswell deposits, the subject of the proposed mining operations.
SAR Mine	The proposed surface and underground mining operations that would mine the SAR deposits, including all relevant mining-related infrastructure and activities.
TGO Mine Site	Comprising the area the subject of MP 09_0155 and shown with a solid blue line on **Figure 1.2**.
SAR Mine Site	Comprising the additional area to be incorporated within any new development consent to be granted and shown with a solid red line on **Figure 1.2.**
Project Site	The combined area of the TGO Mine Site and SAR Mine Sites and the area to be the subject of any new development consent to be granted shown with a dashed black line on **Figure 1.2**.
MLA Area	That area the subject of the proposed Mining Lease Applications and shown with a dashed red line on an orange background on **Figure 1.2**.

1.3 The Applicant

The Applicant, Tomingley Gold Operations Pty Ltd, is the operator of the TGO Mine and is a subsidiary company of Alkane Resources Ltd (Alkane). Alkane is an Australian publicly listed mining and exploration company which has been in existence since 1969. Alkane has a long-term involvement and ongoing commitment to the Central West of New South Wales and has substantial investment in the people and resources of the region. Alkane developed and operated the Peak Hill Gold Mine on the outskirts of Peak Hill from 1996 to 2005 and has now largely rehabilitated that mine site (**Figure 1.1**).

Alkane also developed the TGO Mine in 2013 and is currently operating the Mine, with mining operations approved to continue until 31 December 2025.

In addition, Alkane also discovered and successfully obtained all required approvals for the Dubbo Project (SSD-5251), located at Toongi, approximately 25km south of Dubbo (**Figure 1.1)**. That project is now held by Australian Strategic Materials Limited which demerged from Alkane in July 2020. Alkane also discovered the McPhillamys Gold Project located near Blayney and this is currently the subject of an application for development consent by Regis Resources Pty Limited.

Finally, Alkane has an extensive package of exploration tenements throughout the Central West of NSW, with a recent discovery at Boda, north of Wellington, a significant focus for Alkane.

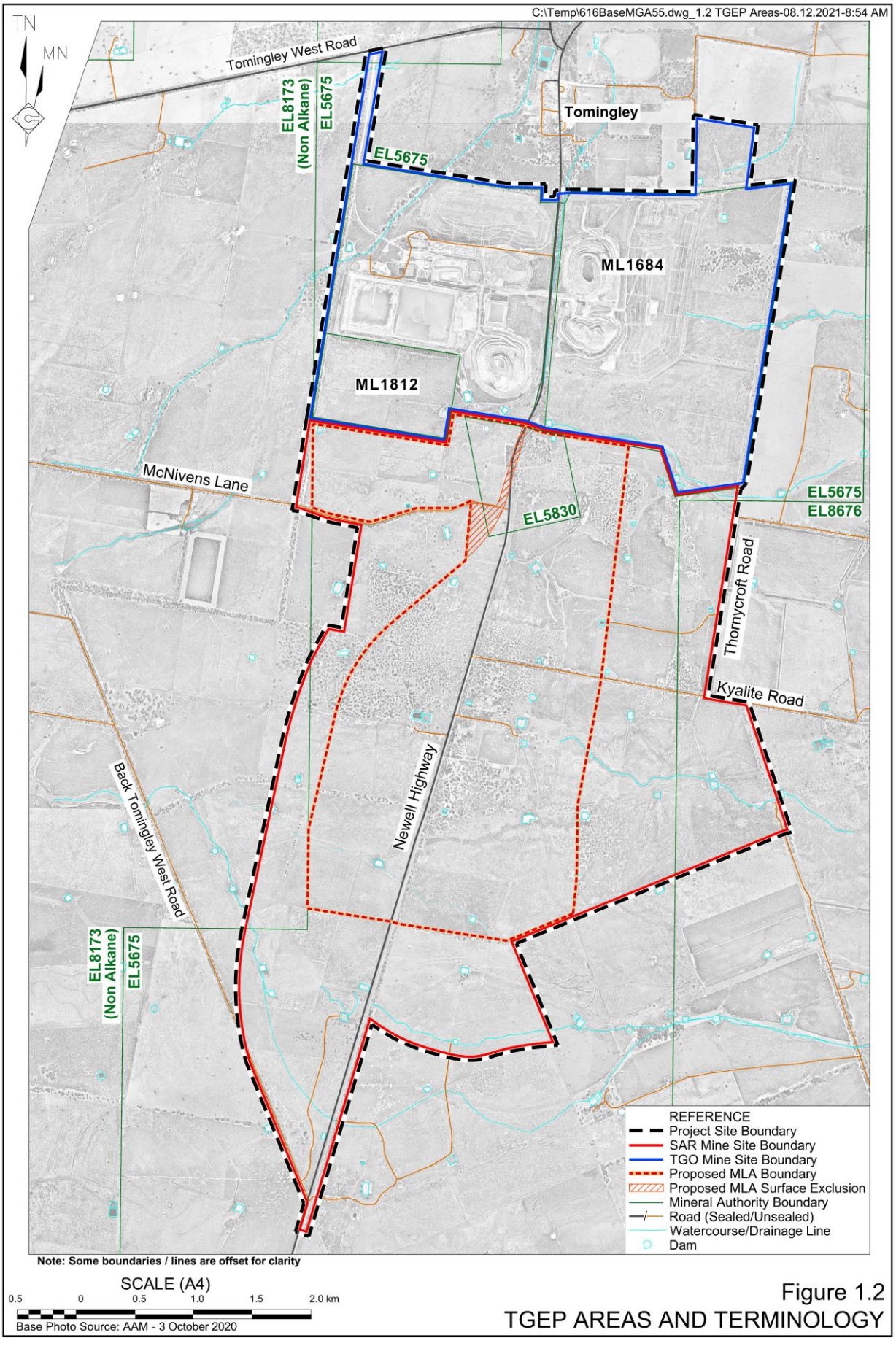


Figure 1.2
TGEP AREAS AND TERMINOLOGY

1.4 Project Background

1.4.1 Site History

Gold was first discovered in the vicinity of Tomingley in 1879, with the Tomingley Goldfield proclaimed on 19 June 1882 and the Tomingley village proclaimed on 15 June 1894. A number of underground mining operations were located adjacent to the village and in the McPhail area within EL5830 (**Figures 1.2** and **1.3**). One of these, the Myall United Gold Mine (later referred to as the McPhail Mine), produced approximately 70 000 ounces of gold over a 30-year period from 1883.

In 1913, mining ceased at the McPhail Mine, with tailings and slimes re-treated until 1924. These materials were again re-treated in the late 1990s by Tailings Treatment Pty Ltd during which time a new tailings dam, the McPhail Tailings Dam, was constructed and subsequently rehabilitated.

In 2001, the Applicant entered into an agreement with Compass Resources NL in relation to EL 5675 and Golden Cross NL in relation to EL 5830 to earn 100% of both tenements (**Figures 1.1** and **1.2**). The Applicant identified the Wyoming 1 deposit in 2001, followed by the Wyoming 3 deposit in 2002, the Caloma 1 deposit in 2006 and the Caloma 2 deposit in 2010. MP09_0155 for the operation of the TGO Mine was granted on 24 July 2012. Section 1.4.4 provides an overview of the approved operations within the TGO Mine Site.

1.4.2 Geological Setting and Mineral Resources

The TGO and SAR deposits are hosted by the Mingelo Volcanics, a north-south orientated unit of Ordovician-aged volcaniclastic breccias, andesitic lavas, volcaniclastic sandstones and siltstones intruded by sub-volcanic feldspar porphyries (**Figure 1.3**). Immediately to the west of the Mingelo Volcanics is the slightly younger siltstones and sandstones of the Cotton Formation. The basement geology is almost entirely covered by alluvial sequences of clays, sand and gravel up to approximately 70m thick.

Gold deposits within the Project Site are interpreted as orogenic gold systems positioned within a major north-south orientated structural zone (**Figures 1.3**). **Figures 1.4** and **1.5** present the plan and section views of the Roswell and San Antonio deposits. In summary, the deposits are separated by the Rosewood Fault and are each steeply dipping, lenticular ore deposits. The upper sections of the deposits have been extensively drilled out, however the deeper sections will be the subject of further drilling from the approved SAR Exploration Drive (see Section 1.4.5). The Applicant has provided Mining, Exploration and Geoscience with a number of detailed briefings on the geology and mineralisation of the SAR deposits and that information is not repeated here.

The Applicant has completed a number of Joint Ore Reserve Committee (JORC) compliant resources and reserves statements for TGO and SAR. **Tables 1.1** and **1.2** present an overview of the most recent resources and reserves estimates and **Figure 1.6** presents a three-dimensional view of the most recent SAR resource block model.

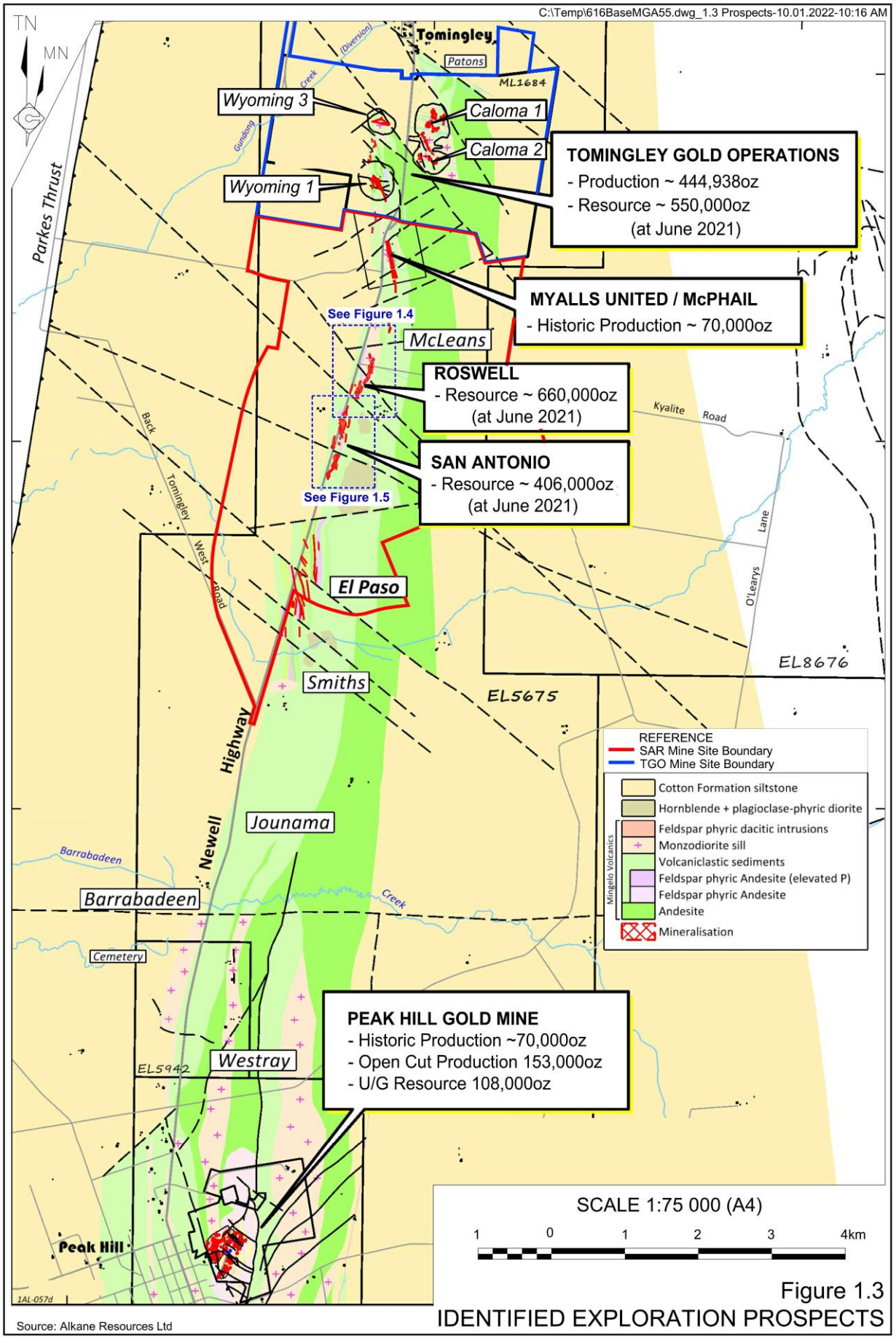


Figure 1.3
IDENTIFIED EXPLORATION PROSPECTS

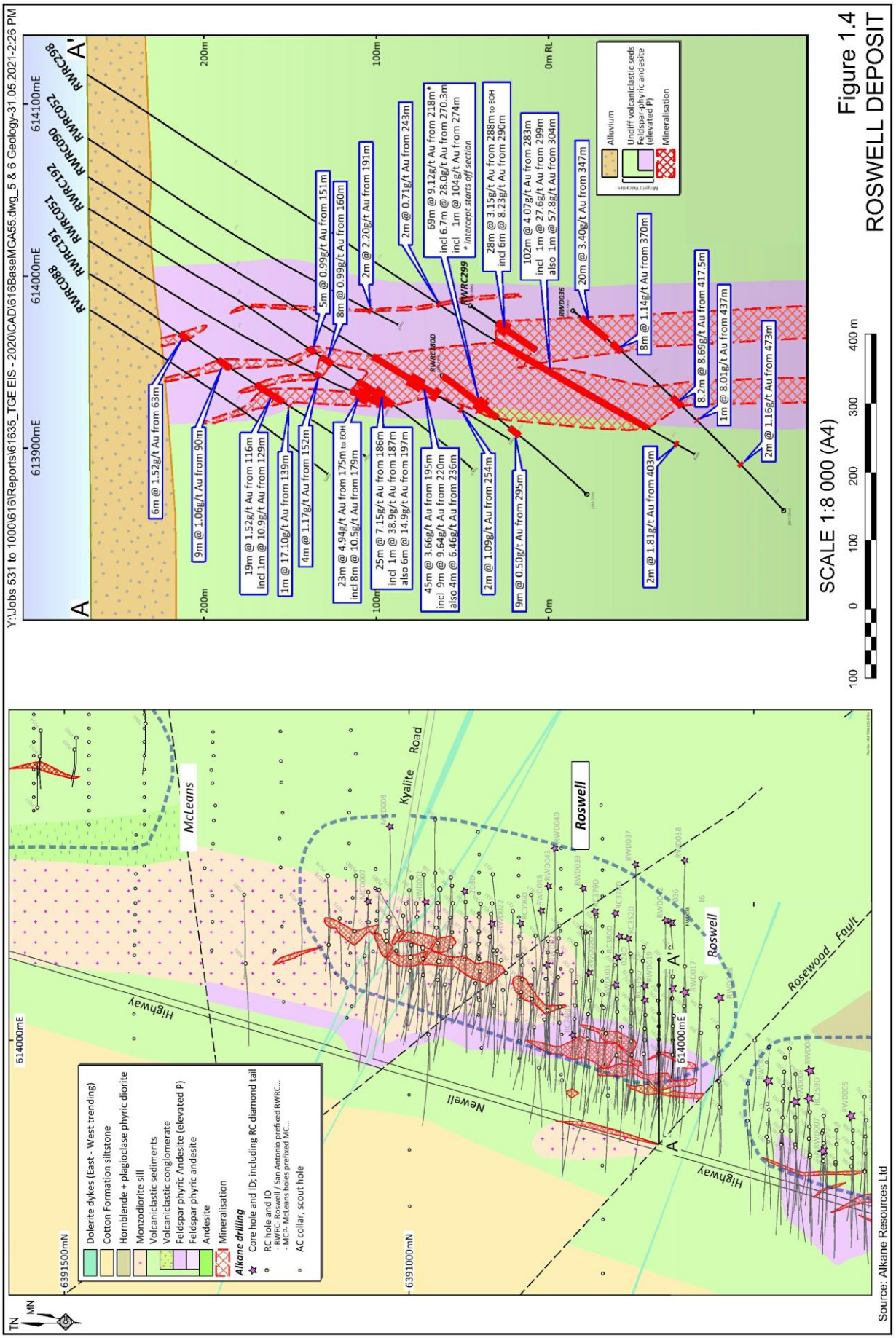


Figure 1.4
ROSWELL DEPOSIT
SCALE 1:8 000 (A4)
Source: Alkane Resources Ltd
Y:\Jobs 531 to 1000\616\Reports\61635_TGE EIS - 2020\CAD\616BaseMGA55.dwg_5 & 6 Geology-31.05.2021-2:26 PM
Alluvium
Undiff volcaniclastic seds
Feldspar-phyric andesite (elevated P)
Mineralisation
Dolerite dykes (East - West trending)
Cotton Formation siltstone
Hornblende + plagioclase phyric diorite
Monzodiorite sill
Volcaniclastic sediments
Volcaniclastic conglomerate
Feldspar phyric Andesite (elevated P)
Feldspar phyric andesite
Andesite
Mineralisation
Alkane drilling
Core hole and ID; including RC diamond tail
RC hole and ID
- RWRC Roswell / San Antonio prefixed RWRC...
- MCR- McLeans holes prefixed MC...
AC collar, scout hole
McLeans
Roswell
Kyalite Road
Newell
Highway
Rosewood Fault
6391500mN
6391000mN
614000mE
613900mE
614100mE

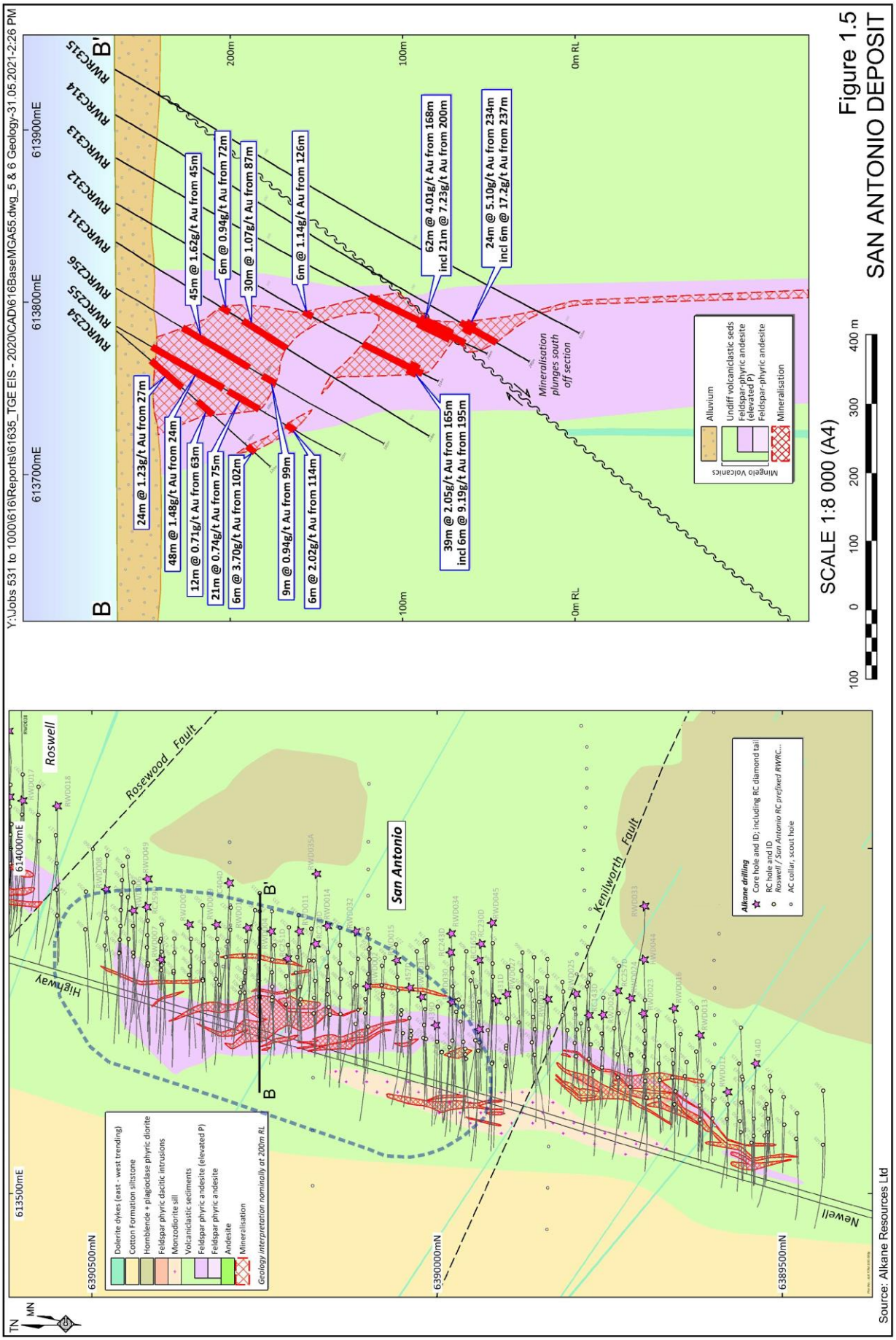
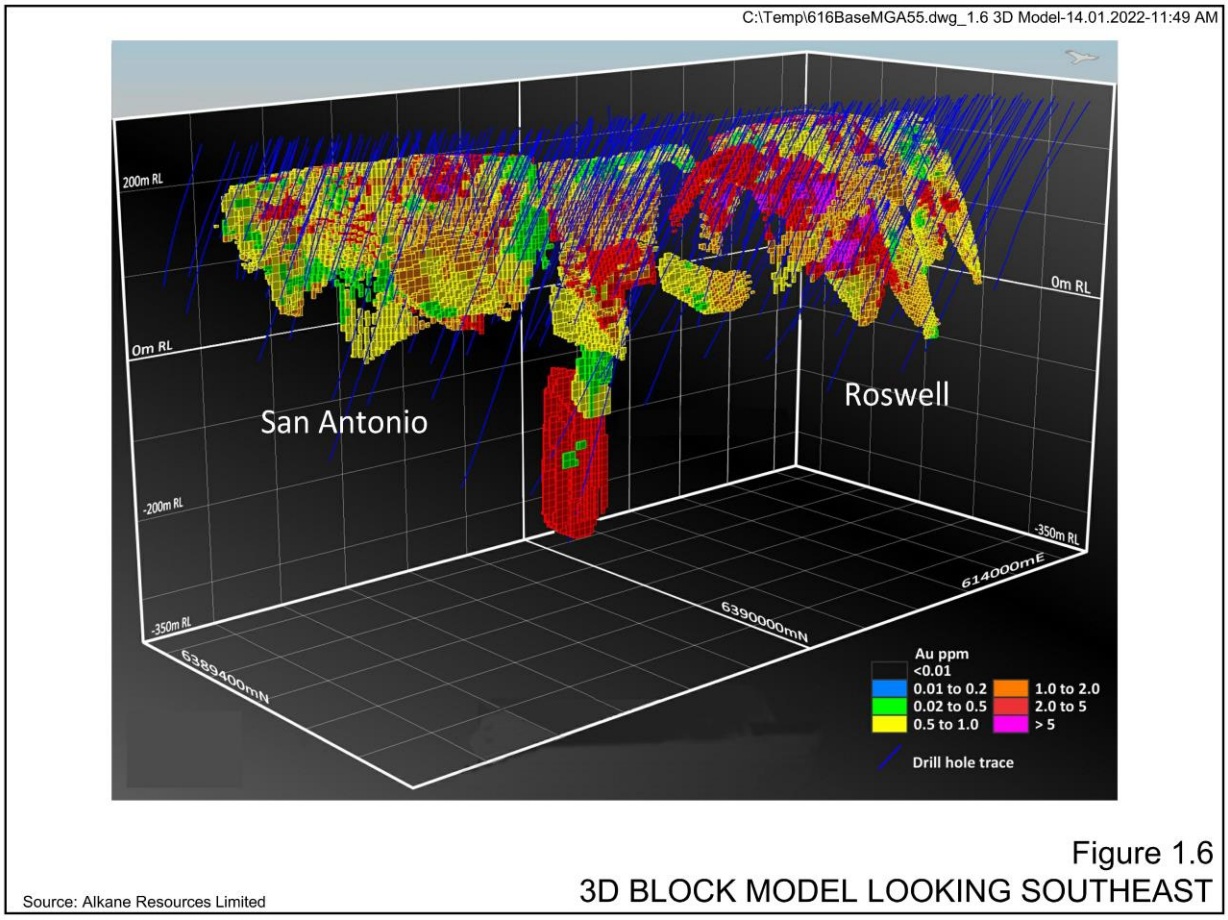


Figure 1.5
SAN ANTONIO DEPOSIT
SCALE 1:8 000 (A4)
Y:\Jobs 531 to 1000\616\Reports\61635_TGE EIS - 2020\CAD\616BaseMGA55.dwg_5 & 6 Geology-31.05.2021-2:26 PM
B
B'
613700mE
613800mE
613900mE
200m
100m
0m RL
RWRC315
RWRC314
RWRC313
RWRC312
RWRC311
RWRC256
RWRC255
RWRC254
24m @ 1.23g/t Au from 27m
48m @ 1.48g/t Au from 24m
12m @ 0.71g/t Au from 63m
21m @ 0.74g/t Au from 75m
6m @ 3.70g/t Au from 102m
45m @ 1.62g/t Au from 45m
6m @ 0.94g/t Au from 72m
30m @ 1.07g/t Au from 87m
9m @ 0.94g/t Au from 99m
6m @ 2.02g/t Au from 114m
6m @ 1.14g/t Au from 126m
39m @ 2.05g/t Au from 165m
incl 6m @ 9.19g/t Au from 195m
62m @ 4.01g/t Au from 168m
incl 21m @ 7.23g/t Au from 200m
24m @ 5.10g/t Au from 234m
incl 6m @ 17.2g/t Au from 237m
Mineralisation plunges south off section
Alluvium
Undiff volcaniclastic seds
Feldspar-phyric andesite (elevated P)
Feldspar-phyric andesite
Mineralisation
Mineralisation Volcanics
100
0
100
200
300
400 m
Roswell
Rosewood Fault
San Antonio
Kenilworth Fault
Newell
Highway
614000mE
613500mE
6390500mN
6390000mN
6389500mN
Alkane drilling
Core hole and ID; including RC diamond tail
RC hole and ID
Roswell / San Antonio RC prefixed RWRC...
AC collar, scout hole
Dolerite dykes (east - west trending)
Cotton Formation siltstone
Hornblende + plagioclase phyric diorite
Feldspar phyric dacitic intrusions
Monzodiorite sill
Volcaniclastic sediments
Feldspar phyric andesite (elevated P)
Feldspar phyric andesite
Andesite
Mineralisation
Geology interpretation nominally at 200m RL
TN
MN
Source: Alkane Resources Ltd



Source: Alkane Resources Limited

Figure 1.6
3D BLOCK MODEL LOOKING SOUTHEAST

Table 1.1
Summary of Mineral Resources – 30 June 2021

Deposit	Measured		Indicated		Inferred		Total		
	Tonnage (Mt)	Grade (g/t Au)	Tonnage (Mt)	Grade (g/t Au)	Tonnage (Mt)	Grade (g/t Au)	Tonnage (Mt)	Grade (g/t Au)	Total Gold (koz)
Tomingley Gold Operations									
Open cut	1.517	1.7	2.373	1.4	0.777	1.1	4.667	1.5	222
Underground	1.307	2.9	2.007	2.6	0.633	2.1	3.947	2.6	328
TGO Total	**2.824**	**2.3**	**4.380**	**1.7**	**1.410**	**1.8**	**8.614**	**2.0**	**550**
San Antonio and Roswell									
Roswell	-	-	7.871	2.07	2.188	1.93	10.059	2.04	666
San Antonio	-	-	5.930	1.82	1.389	1.32	7.319	1.73	406
SAR Total	**-**	**-**	**13.801**	**1.96**	**3.577**	**1.69**	**17.378**	**1.91**	**1 066**
Note: Apparent arithmetic inconsistencies are due to rounding									
Source: ASX announcement *Resource and Reserve Statements FY21* dated 7 September 2021									

Table 1.2
Summary of Ore Reserves – 30 June 2021

Deposit	Proved		Probable		Total		
	Tonnage (Mt)	Grade (g/t Au)	Tonnage (Mt)	Grade (g/t Au)	Tonnage (Mt)	Grade (g/t Au)	Total Gold (koz)
Tomingley Gold Operations							
Open cut	0.470	1.6	0.078	1.2	0.548	1.6	28
Underground	0.783	2.1	1.042	1.9	1.825	2.0	117
TGO Total	1.253	1.8	1.120	1.9	2.373	1.9	144
San Antonio and Roswell							
Open cut	-	-	8.867	1.7	7.867	1.7	420
Underground	-	-	1.575	2.8	1.575	2.8	142
SAR Total	**-**	**-**	**9.442**	**1.9**	**9.442**	**1.9**	**563**
Note: Apparent arithmetic inconsistencies are due to rounding							
Source: ASX announcement *Resource and Reserve Statements FY21* dated 7 September 2021							

In addition to the TGO and SAR deposits, a number of exploration targets exist within the Project Site and the Applicant's Exploration Licence package. These prospects will be the subject of further exploration drilling over the life of the Project and may be the subject of subsequent applications for development consent should that exploration prove successful.

1.4.3 Existing Approvals and Licences

Table 1.3 presents the consents, authorisations and licences held in relation to the Mine.

Table 1.3
Current Consents, Authorisations and Licenses

Page 1 of 3

Number	Granted by	Grant Date	Expiry Date	Purpose
Development Consent MP09_0155				
PA09_0155	Minister for Planning and Infrastructure	24 Jul 2012	31 Dec 2022	• Original Development Consent granted under the now repealed Part 3A of the *Environmental Planning and Assessment Act 1979.*
PA09_0155 – MOD 1	Minister for Planning and Infrastructure	7 Nov 2013	31 Dec 2022	• Deferment of the Tomingley West Road upgrade. • Amendments to proposed fauna deterrents on Residue Storage Facility 1. • Amendments to the location of Weak Acid Dissociable cyanide monitoring point. • Amendments to the frequency of total cyanide monitoring.
PA09_0155 – MOD 2	Minister for Planning and Infrastructure	16 Apr 2015	31 Dec 2022	• Cut back of the Caloma 1 Open Cut. • Enhancement of the existing amenity bund between the Caloma Open Cut and Tomingley village. • Construction of a range of haul roads.

Table 1.3 (Cont'd)
Current Consents, Authorisations and Licenses

Number	Granted by	Grant Date	Expiry Date	Purpose
Development Consent MP09_0155 (Cont'd)				
PA09_0155 – MOD 3	Minister for Planning and Infrastructure	5 Jul 2016	31 Dec 2022	• Further cutback of the Caloma Open Cut. • Establishment of Caloma 2 open cut. • Establishment of underground workings below the Caloma Open Cut. • Extension of Waste Rock Emplacement 3. • Backfill of the Wyoming 3 Open Cut. • Downstream lift of the Residue Storage Facility 1. • Modifications to the TGO Mine Site drainage.
Transitioned from a Part 3A Project to a State Significant Development on 31 August 2018				
PA09_0155 – MOD 4	Minister for Planning and Public Spaces	25 May 2020	31 Dec 2022	• An increase the capacity of the Residue Storage Facility 1 from approximately 6.57Mt to approximately 8.93Mt. • An increase in the approved maximum elevation of the Residue Storage Facility 1 of 6m from 280.5m AHD to 286.5m AHD. • An increase in the approved footprint of the Residue Storage Facility 1 from approximately 50ha to approximately 55ha.
PA09_0155 – MOD 5	Minister for Planning and Public Spaces	5 May 2021	31 Dec 2025	• Construction and use of Stage 1 and 2 of Residue Storage Facility 2. • An extension of Mine Life from 31 December 2022 to 31 December 2025. • Extension of the TGO Mine Site boundary to incorporate Residue Storage Facility 2. • Use of Caloma 2 Open Cut for backfilling operations.
Mineral Authorities				
ML1684	Minister for Mineral Resources	11 Feb 2013	11 Feb 2034	Mining activities at the TGO Mine.
ML1812		19 Nov 2021	11 Feb 2034	
EL5675		17 Jan 2000	16 Jan 2023	Exploration Activities.
EL5830		05 Apr 2001	04 Apr 2022	
EL5942		03 May 2002	02 May 2024	
EL6085		20 May 2003	20 May 2024	
EL6319		12 Oct 2004	11 Oct 2020	
EL8676		27 Nov 2017	27 Nov 2023	
EL8794		20 Sep 2018	20 Sep 2024	
GL5884		12 Dec 1969	17 Jan 2022	Mining activities at the Peak Hill Gold Mine.
ML1351		15 Jun 1994	17 Jan 2022	
ML1364		14 Mar 1995	17 Jan 2022	
ML1479		18 Jan 2001	17 Jan 2022	
ML6036		07 Mar 1968	17 Jan 2022	
ML6042		21 Feb 1968	17 Jan 2022	
ML6277		12 Mar 1971	17 Jan 2022	
ML6310		27 Aug 1971	17 Jan 2022	
ML6389		06 Apr 1973	17 Jan 2022	
ML6406		25 Jan 1974	17 Jan 2022	

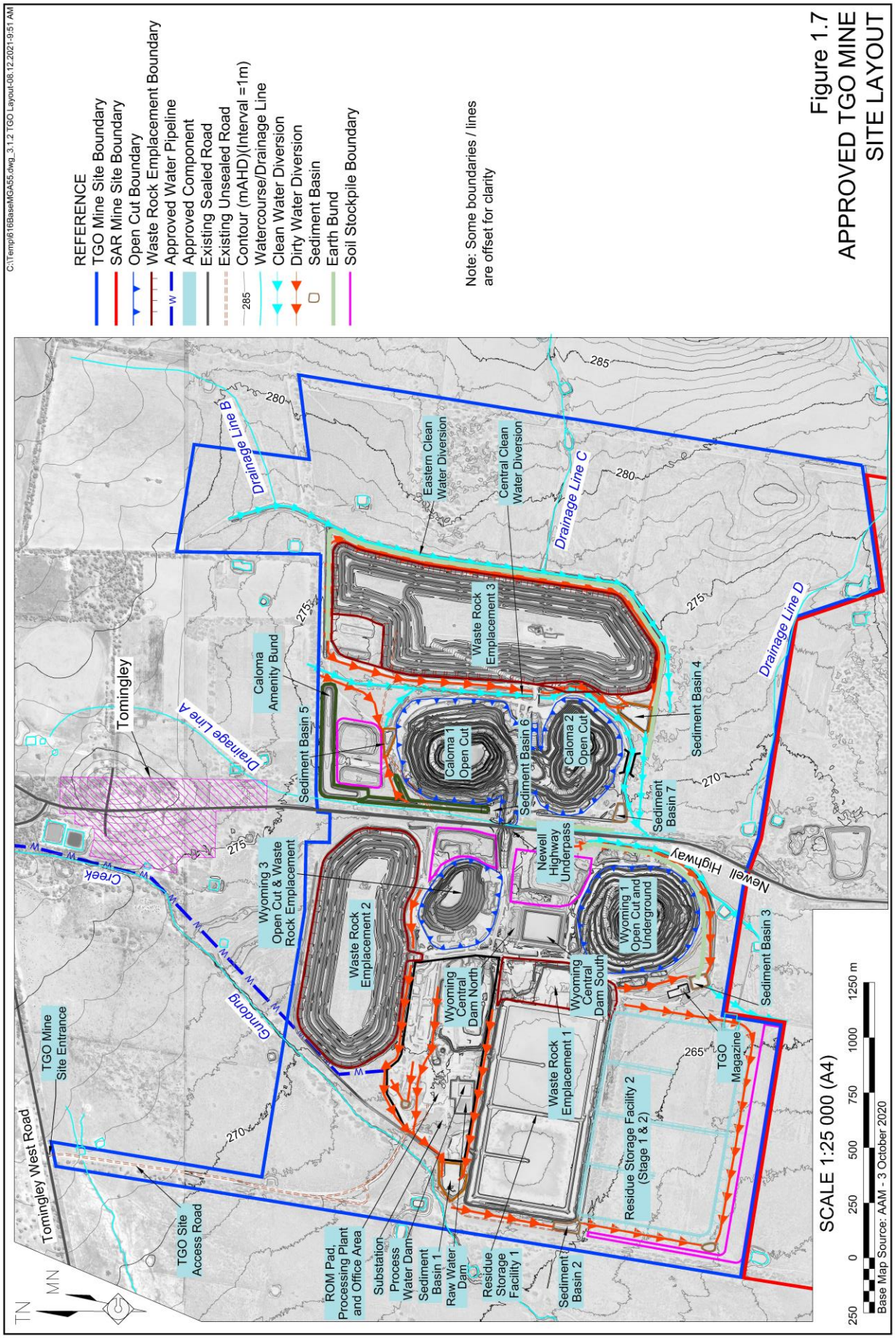
Table 1.3 (Cont'd)
Current Consents, Authorisations and Licenses

Number	Granted by	Grant Date	Expiry Date	Purpose
Licences – Environmental				
EPL20169	Environment Protection Authority	23 Oct 2012	Renewed annually	Regulation of noise, dust and water emissions from the Mine Site
Flood Work Approval 80FW723901	Department of Primary Industries – Office of Water	21 Sep 2015	2 Jan 2028	Approval for Gundong Creek levy.
WAL20270	Department of Primary Industries – Office of Water	20 Aug 2012	NA	Licence to extract groundwater up to 1 000ML/year from the water supply bore east of Narromine.
WAL28643	Department of Primary Industries – Office of Water	13 Aug 2013	NA	Licence to extract groundwater up to 220ML/year from NSW Murray Darling Basin Fractured Rock Aquifer.
WAL29266	Department of Primary Industries – Office of Water	16 Jan 2012	N/A	Licence to extract groundwater up to 70ML/year from NSW Murray Darling Basin Fractured Rock Aquifer.
Works Authority Deed	RMS	-	-	Newell Highway underpass.
S34A Crowns Lands Licence RI517394	Minister for Crown Lands	26 Jun 2013	Ongoing	Licence to permit construction of electricity infrastructure.
On-Site Sewerage Management System Approval	Narromine Shire Council	30 Sep 2013	Ongoing	Approval to operate sewage treatment facility within the Mine Site.
Source: Tomingley Gold Operations Pty Ltd				

1.4.4 Approved TGO Operations

Tomingley Gold Operations operates under State Significant Development Consent MP09_0155 originally granted on 24 July 2012. MP09_0155 has been modified five times, most recently on 5 May 2021 (**Figure 1.7**).

- Mining of four open cuts, with underground mining under three of the approved open cuts, namely Wyoming 1, Caloma 1 and Caloma 2 Open Cuts, until 31 December 2025.
- Placement of waste rock into three out-of-pit waste rock emplacements and two in-pit waste rock emplacement, namely the Wyoming 3 and Caloma 2 Open Cuts. It is noted that Waste Rock Emplacements 2 and 3 are complete, and with the exception of a small area on the upper surface of Waste Rock Emplacement 3, have been rehabilitated, with ongoing monitoring to confirm progression towards the approved completion criteria.


C:\Temp\616BaseMGA55.dwg_3.1.2 TGO Layout-08.12.2021-9:51 AM
REFERENCE
TGO Mine Site Boundary
SAR Mine Site Boundary
Open Cut Boundary
Waste Rock Emplacement Boundary
Approved Water Pipeline
Approved Component
Existing Sealed Road
Existing Unsealed Road
Contour (mAHD)(Interval =1m)
Watercourse/Drainage Line
Clean Water Diversion
Dirty Water Diversion
Sediment Basin
Earth Bund
Soil Stockpile Boundary
Note: Some boundaries / lines are offset for clarity
Figure 1.7
APPROVED TGO MINE SITE LAYOUT
Drainage Line B
Drainage Line C
Drainage Line D
Drainage Line A
Eastern Clean Water Diversion
Central Clean Water Diversion
Caloma Amenity Bund
Tomingley
Waste Rock Emplacement 3
Caloma 1 Open Cut
Caloma 2 Open Cut
Sediment Basin 4
Sediment Basin 5
Sediment Basin 6
Sediment Basin 7
Newell Highway
Newell Highway Underpass
Wyoming 3 Open Cut & Waste Rock Emplacement
Waste Rock Emplacement 2
Wyoming 1 Open Cut and Underground
Sediment Basin 3
Wyoming Central Dam North
Wyoming Central Dam South
Waste Rock Emplacement 1
TGO Magazine
Residue Storage Facility 2 (Stage 1 & 2)
Gundong Creek
TGO Mine Site Entrance
Tomingley West Road
TGO Site Access Road
ROM Pad, Processing Plant and Office Area
Substation
Process Water Dam
Sediment Basin 1
Raw Water Dam
Residue Storage Facility 1
Sediment Basin 2
TN
MN
SCALE 1:25 000 (A4)
250 0 250 500 750 1000 1250 m
Base Map Source: AAM - 3 October 2020

- Construction and use of a carbon-in-leach processing plant and associated infrastructure, including:
  - a run-of-mine (ROM) pad;
  - a crushing and screening circuit:
  - a ball mill and grinding circuit; and
  - a cyanide leaching and gold extraction circuit.

  The approved processing plant also includes workshops, ablutions facilities, stores, office area and car parking. The maximum approved rate of processing is 1.5Mtpa.
- Construction and use of Residue Storage Facility 1 (to Cell 1, Stage 9) for the storage of process residues, with a maximum approved elevation of 291.5m AHD.
- Construction and use of Residue Storage Facility 2 (to Stage 2) for the storage of process residues, with a maximum approved elevation of 272.0m AHD.
- Construction and use of infrastructure required for the TGO Mine, including:
  - dewatering ponds;
  - a water pipeline, from a licensed bore located approximately 7km to the east of Narromine;
  - various internal and external roads, including an underpass beneath the Newell Highway and upgrades to Tomingley West Road and associated intersections;
  - a transformer and electrical distribution network within the TGO Mine Site;
  - various clean and dirty water management structures; and
  - fenced biodiversity offsets and vegetated amenity bunds.

Construction of the TGO Mine commenced in February 2013 with open cut mining commencing in November 2013. Underground mining development from a portal in the Wyoming 1 Open Cut commenced in January 2019, with ore production from stopes commencing in December 2019.

Table 1.4 presents the publicly available production figures for the TGO Mine. In summary, approximately 7.5Mt of ore has been mined and processed. The maximum annual rate of processing was 1.14Mt in 2015, less than the approved maximum rate of processing of 1.5Mtpa.

Table 1.4
Previous Production Statistics

		Financial Year								
Production	**Units**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
Waste rock mined	bcm	4 635 684	5 730 661	6 199 820	7 679 110	3 165 414	657 647	50 473	1 218 779	29 337 588
Ore mined	t	545 550	1 286 291	1 285 454	1 222 868	1 589 811	400 187	335 879	778 236	7 464 276
Ore milled	t	359 096	1 140 704	1 096 105	1 087 983	1 092 602	998 703	838 743	928 531	7 542 467
Gold produced	oz	20 711	69 612	67 812	68 836	78 533	48 969	33 507	56 958	444 938
Source: Alkane Resources Ltd – Annual Reports for each financial year										

The TGO Mine operates up to 365 days per year and 24 hours per day using two 12-hour shifts. As at December 2021, the TGO Mine employed 230 full time equivalent positions.

The Applicant anticipates contributing between $135 million to $145 million to the local, NSW and Australian economy during Financial Year 2022, including salaries and wages (including taxes), energy costs, equipment maintenance and contractors

1.4.5 Approved SAR Exploration Drive

As identified in Section 1.4.2, the SAR deposits are steeply dipping, lenticular deposits. The geometry of these deposits requires inclined drillholes to be drilled from surface, with increasingly longer drill holes requires to test deeper sections of the deposits. As a result, the Applicant sought and obtained approval under the *Mining Act 1992* for the following exploration-related activities.

- Development of an exploration drive from the existing Wyoming 1 underground workings to the SAR deposits.
- Establishment and use of ancillary infrastructure, including a ventilation rise.
- Drilling of approximately 72 000m of exploration drill holes.
- Extraction of one or more bulk samples totalling no greater than 20 000t.

The SAR Exploration Drive was approved on 7 May 2020 and a revised location for the ventilation rise was approved on 21 September 2021. Construction of the SAR Exploration Drive commenced on 28 May 2020 and as of 30 November 2021, approximately 750m of decline development had been completed.

1.4.6 Surrounding Developments

Land use surrounding the Project Site is dominated by agricultural operations, with occasional villages, towns and cities (see Section 2.2.2). The following presents an overview of the key operational, approved and proposed developments surrounding the Project Site (**Figure 1.1**). The potential interactions and/or cumulative impacts between the Project and the following operations are addressed where relevant in Section 6.

Peak Hill Gold Mine

Located 15km south of the TGO Mine Site, Alkane's Peak Hill Gold Mine operated from 1996 to 2005. Around 153 000 ounces of gold were recovered from the oxide cap of a large sulphide (pyrite) body, which was mined to a depth of 100 metres and processed using heap leach techniques. Since mining ended in 2005, the site has been extensively rehabilitated by the Applicant.

Alkane retains its Mining Lease and Environment Protection Licence for Peak Hill Gold Mine, but any further mine development would require further environmental assessment, government approval, and consultation with the community and Parkes Shire Council.

Northparkes Mine

The Northparkes Mine is a copper-gold mine owned by a joint venture between China Molybdenum Co., Ltd and Sumitomo Australia Pty Ltd, located approximately 38km to the south of the TGO Mine Site. In operation since 1993, the Northparkes Mine is currently approved until 2032. The Northparkes Mine was the first mine in Australia to implement the highly efficient 'block cave' mining method, with production from the first block cave commencing in 1997. Production from a second block cave mine began in 2010, with further development of the initial block cave mine commencing in 2016.

The Northparkes Mine is largely serviced from Parkes and there is very limited interaction between that operation and the TGO Mine. As a result, the Northparkes Mine is not considered further in this document.

Dubbo Project

The Dubbo Project is an approved (Development Consent SSD-5251) polymetallic mining development that is wholly owned by Australian Strategic Materials Ltd (ASM) and located near the village of Toongi, approximately 40km to the north-east of the TGO Mine Site. The Dubbo Project represents a large in-ground polymetallic resource of rare earths, zirconium, niobium, hafnium, tantalum and yttrium. The Dubbo Project is currently in the project finance and Front End Engineering Design stage, with ground-disturbance activities anticipated to commence in 2022 and processing operations expected to commence in 2024. ASM anticipate that between 400 to 1 000 construction jobs and 270 operational positions would be created by the Dubbo Project.

The Dubbo Project would be largely serviced from Dubbo and there may be some interaction between the TGEP and Dubbo Projects, particularly in relation to competition for skilled personnel and services.

Inland Rail

The Inland Rail Project is a 1 700km freight rail line that will connect Melbourne and Brisbane via regional Victoria, New South Wales and Queensland. That Project will use a combination of existing upgraded and new rail line. In the vicinity of the Project Site, the Inland Rail route is located approximately 2.7km to the west of the SAR Mine Site, with construction operations on that section of rail complete.

The Inland Rail will have limited stopping points, with the closest intermodal terminal to the Project Site being at Parkes. As the TGEP Project relies primarily on road transport and the Newell Highway, there is limited potential for traffic and transportation-related interactions with the Inland Rail. In addition, as noise emissions from Inland Rail will be limited to intermittent trains using the rail line, there is limited potential for noise-related interactions. As a result, the Inland Rail is not considered further in this document.

1.4.7 TGO Environmental Performance and Compliance

1.4.7.1 Environmental Management and Documentation

The environmental management of TGO's current mining operations is undertaken in accordance with the conditional requirements of MP09_0155 and all relevant approvals and licences (see

Section 1.4.7.4). In addition, operation of the TGO Mine is guided by the following approved Environmental Management Plans.

- *Traffic Management Plan* (Revision 4, 2016).
- *Pollution Incident Response Management Plan* (Revision 9, August 2021).
- *Mining Operations Plan: Amendment 5* (November, 2021).
- *Rehabilitation Management Plan* – incorporated into the current *Mining Operations Plan.*
- *Noise Management Plan* (Revision 6, November 2016, Revision 7 in preparation December 2021).
- *Blast Management Plan* (Revision 6, September 2016, Revision 7 submitted for approval December 2021).
- *Air Quality and Greenhouse Gas Management Plan* (Revision 6, December 2018, Revision 7 in progress December 2021).
- *Water Management Plan* (Revision 3, November 2017, Revision 4 in progress December 2021).
- *Biodiversity Management Plan* (Revision 8, October 2021).
- *Cultural Heritage Management Plan* (Revision 4, 2016).
- *Hazardous Materials Management Plan* (Revision 5, November 2018, Revision 6 in preparation December 2021).
- *Environmental Management Strategy (*Revision 4, December 2017, Revision 5 in progress December 2021).

1.4.7.2 Environmental Performance

Ongoing monitoring of environmental conditions within and surrounding the TGO Mine Site is presented with the Annual Reviews prepared for the TGO Mine and available from the Mine's website.[1] The following presents a necessarily brief overview of the environmental performance of the TGO Mine. In summary, the Applicant contends that is has a strong track record of responsible and effective environmental management and performance.

Air, Noise and Blasting

Monitoring of air quality, noise and blasting shows that mining operations within the TGO Mine Site are in accordance with the relevant conditional requirements.

Air quality monitoring during the period of between January and early February 2020 indicated a number of elevated dust levels attributed to the intense period of bushfires and dust storms experienced by greater NSW over that period. As part of ongoing TGO Mine Site management, daily meteorological forecasts are provided to ensure site operations are undertaken in respect of local weather conditions.

[1]https://www.alkane.com.au/projects/tomingley-gold-project/tomingley-gold-operations/tgo-reports/environmental-reports/

Noise monitoring programs have been undertaken, with monthly attended monitoring and continuous unattended monitoring undertaken. The results of this monitoring show that the TGO Mine Site is generally compliant with noise-related compliance criteria.

Monitoring of airblast and vibration from blasting operations indicates that blasting-related impacts are below threshold values.

Biodiversity

Ongoing biodiversity monitoring for the TGO Mine is undertaken at seventeen established monitoring sites and demonstrates that the surrounding natural systems are performing as expected based on local environmental conditions. Vegetation communities were largely affected by regional drought conditions leading up to early parts of 2020. However, these communities are responding well to more favourable climatic conditions since that time. The removal of intensive grazing from certain vegetation zones has resulted in favourable increase in floristic biodiversity, with some areas seeing an increase in exotic species, as is typical of rural and agricultural landscapes. Weed control operations continue to be undertaken as part of the TGO Mine Site management operations.

The Applicant inspects the residue storage facility twice daily for stranded or cyanide affected wildlife. The following fauna deaths have been recorded since the commencement of mining operations. In each case where the bodies were able to be retrieved, the deaths were determined not to be cyanide-related.

- 2017 – 1 bird and 1 wallaby
- 2015 – 1 bird
- 2014 – 2 birds

Surface Water

Surface water within the TGO Mine Site is divided into two broad classes, namely:

- process, mine, dirty and raw water that is retained on site; and
- clean water that is permitted to flow around the TGO Mine Site.

Water quality sampling of Gundong Creek (**Figure 1.7**) occurs during periods of water flow. Comparison of upstream and downstream sampling results during the years where sampling has been possible identify that background levels of copper, lead, phosphorus and zinc may be naturally higher than the concentration limits included in EPL20169. Concentrations of total suspended solids both upstream and downstream of the TGO Mine Site are similarly higher that the nominated EPL20169 limits. The Applicant contends that this is indicative of the degraded nature of the of the stream and surrounding lands upstream of the TGO Mine Site as a result of historic construction and farming practices and the storm/flood flows that occur in Gundong Creek.

The capacity of the primary sediment basins were doubled in 2017 to minimise the likelihood of the occurrence of discharge. Through an ongoing process of continual improvement and review of the water catchments, the Applicant continues to improve performance in relation to dirty water surface management with discharge of dirty water from the TGO Mine Site now only occurring under extreme rainfall events.

Process, mine and raw water are not permitted to discharge from the TGO Mine Site.

Groundwater

Groundwater levels and quality is monitored through an extensive network of local groundwater bores and monitoring piezometers. Groundwater inflow to the TGO mine workings is generally so low that it is not measurable. Ongoing monitoring shows that groundwater levels are generally stable and, with the exception of a single bore located in close proximity to the Wyoming1 Open Cut, are not impacted by mining-related operations.

1.4.7.3 Complaints

Contact details for the Applicant, including for its Community Information Line, which is available 24 hours a day, seven days a week, are provided on the Applicant's website.

The Applicant maintains a Complaints Register and provides a summarised version of all complaints received since 2013 on it's website. No complaints have been received since 2018, when a substantiated complaint was made regarding UHF radio interference. The Applicant revised their operational practices and no further complaints were received. Complaints prior to this were generally in regards to dust and noise levels. Subsequent investigation and analysis of environmental monitoring results showed that the TGO Mine was operating generally in accordance with conditions. Where complaints were found to be substantiated, the Applicant adjusted operational practices (e.g. repositioning equipment and restricting activity in some areas during night-time periods) to the satisfaction of the complainant.

1.4.7.4 Compliance with Approval Conditions

Schedule 5 Condition 8 of MP 09_0155 for the TGO Mine requires that regular independent audits of environmental compliance are undertaken. The results of the most recent Independent Environmental Audit for the period 9 March 2018 to 11 May 2021 have been made available on the Applicant's website and are summarised as follows.

- There were 5 low-risk non-compliances and 15 administrative non-compliances against the Project Approval;
- There were 2 low-risk non-compliances and 5 administrative non-compliances against the Statement of Commitments;
- There was 1 low risk non-compliance and 1 administrative non-compliance against the Environment Protection Licence;
- There were no non-compliances against the Mining Lease; and
- There were no non-compliances against the Property Vegetation Plan.

The response to the findings of the Independent Environmental Audit was prepared by the Applicant. In summary, the following commitments will be undertaken by the Applicant.

- Maintain a record of instances when operations within the TGO Mine Site were adjusted in response to noise levels.

- Investigate the implementation of an integrated noise management system based on real-time monitoring and predictive meteorological forecasting.
- Review and revise recording protocols for environmental monitoring results.
- Review the effectiveness of the existing air quality monitoring network, including a review of the existing trigger levels for when further investigations are required.
- Review and revise the procedures for the temporary storage of waste hydrocarbons with the TGO Mine Site.
- Review and revise refuelling infrastructure and procedures, where required.
- Include additional information in the Annual Reviews in regards to:
  - blasting criteria;
  - rehabilitation; and
  - waste management
- Review and revise following specific Management Plans in consideration with current environmental conditions and operational practices within the TGO Mine Site:
  - *Noise Management Plan;*
  - *Air Quality and Greenhouse Gas Management Plan;*
  - *Water Management Plan;*
  - *Groundwater Management Plan;*
  - *Biodiversity Management Plan;*
  - *Heritage Management Plan; and*
  - *Traffic Management Plan.*

The above commitments have been considered as part of the planning stages of the Project and during the preparation of this EIS.

1.5 Project Objectives

Consistent with the objectives of the approved TGO Mine, the objectives of the Project would be as follows.

- To safely and economically mine the identified gold reserves via both open cut and underground mining methods.
- To operate the Project in a manner that would minimise surface disturbance and impacts on surrounding residents and the local environment.
- To implement a suitable level of management control and mitigation measures to ensure compliance with appropriate environmental criteria and reasonable community expectations.

- To develop and operate the Project in compliance with all relevant statutory requirements.
- To create a final landform that is suitable for a post-mining land use of agriculture, nature conservation or, following receipt of additional approvals, an alternative industrial land use.
- To continue to maintain an open and honest relationship with, and to work cooperatively with, the surrounding community to build upon the socio-economic capacity of the communities surrounding the Project Site.
- To achieve the above objectives in a cost-effective manner to ensure security of employment of employees and contractors and the continued economic viability of the Applicant, its suppliers and partners.

1.6 Key Strategies to Avoid/Minimise Impacts

Section 6 presents a range of measures to avoid, manage, mitigate and monitor Project-related impacts. In summary, however, the following key strategies have been adopted during the design process for the Project to avoid and minimise Project-related impacts.

- Engagement of recognised experts to complete selected aspects of the Project design to ensure that the Project would be constructed and operated in accordance with relevant regulatory standards and requirements, as well as reasonable community expectations.
- Consideration of all reasonable and feasible development alternatives (see Section 2.5).
- Early and regular consultation with the surrounding community and relevant government agencies to ensure that the Applicant and the Project team had a detailed understanding of the expectations of key stakeholders throughout the design phase for the Project.
- Engagement of recognised experts to complete assessments of key aspects of the Project to ensure that the Project as designed would in fact comply with relevant regulatory standards and requirements, as well as reasonable community expectations.

In addition, the Applicant would implement the following key strategies throughout the life of the Project to avoid and minimise Project-related impacts.

- Ensure that the Project is developed strictly in accordance with the commitments included within this document and all regulatory conditional requirements.
- Review and, where required, update and implement all Management Plans for the TGO Mine to incorporate the SAR-related components of the Project.

- Continue to engage a highly qualified, experienced and appropriately resourced management team to manage day to day operations within the Project Site.
- Continue and extend the existing real-time and periodic monitoring program and review all results against the relevant compliance and assessment criteria to ensure that the Project is operating in compliance with all approvals and the predictions included within this document.
- Continue to engage closely with the surrounding community to maintain open and honest communication and facilitate feedback in relation to the Project's impacts on residents in the vicinity of the Project Site.
- Continue to engage closely with relevant government agencies to ensure that the Project's impacts on the environment are within relevant conditional and assessment criteria.
- Continue to focus on continual improvement and refine Project-related processes and procedures to avoid and minimise impacts.

1.7 Management of Investigations

The preparation of this document has involved a study team managed by Mr Mitchell Bland (BSc (Hons), MEcon Geol, LLB), Principal and Managing Director of R.W. Corkery & Co. Pty Limited and Mr Mike Fake (BSc, M.Env.Stud), Environmental Consultant with the same Company. Internal peer review was undertaken by Mr Rob Corkery (BApplSc (Hons), MApplSc), Principal Environmental Consultant with the same Company.

Several professional staff within Tomingley Gold Operations Pty Ltd and Alkane Resources Ltd assisted with the preparation of this document including, but not limited to:

- Mr Simon Parsons (B. Eng) – Executive General Manager - Operations;
- Mr Mike Sutherland (BSc, GCComRel) - General Manager NSW;
- Mr James Carter (BBus, GradDipApCorpGov) – Chief Financial Officer - Alkane
- Mr Dan Short (B. Eng (Mining & Civil (Hons)) – Open Cut Mine Manager – TGO;
- Mr James Didovich (B.Eng (Minerals Eng)) – Processing Manager – TGO;
- Mr Dave Pritchard (B.AppSc Env.Analysis, MEnv. Mgt & Sust.) – Environment and Community Manager – TGO; and
- Mr David Meates (BSc) – Exploration Manager NSW.

Finally, strong emphasis has been placed upon a multi-disciplinary team approach to the design of the Project, the description of the existing environment, identification of key environmental issues, development of appropriate safeguards and assessment of impacts.

The following consultancy firms were commissioned by the Proponent to prepare nominated specialist consultant studies for the Project.

Part 1: **Integrated Transport Assessment**
Constructive Solutions Pty Limited
Steve O'Rourke (BE MBA FIE Aust CPEng RPEQ NER APEC Engineer IntPE (Aus)) – Company Director
Michael Bloem (BE (Civil)) – Engineering Manager

Part 2: **Lighting and Sky Glow Assessment**
Lighting, Art & Science Pty Limited
Peter McLean (MbdgSc, BE (Electrical Engineering) – Senior Lighting Designer

Part 3: **Noise and Blasting Impact Assessment**
Muller Acoustic Consulting Pty Ltd
Rod Linnet (B.Sc.) – Senior Acoustic Consultant

Part 4: **Air Quality Impact Assessment**
Northstar Air Quality Pty Ltd
Dr. Martin Doyle (PhD, Bsc (Hons)) – Company Director

Part 5: **Surface Water – EIS Technical Report**
Jacobs Australia Pty Limited
Shilin Chen (BEnvEng, BFin) – Surface Water Engineer

Part 6: **Groundwater Assessment**
Jacobs Australia Pty Limited
Ben Rose (BEnvMgt) – Associate Hydrologist

Part 7: **Land and Soil Capability Assessment**
Sustainable Soils Management Pty Ltd
Dr. Pat Hulme (BScAg (Hons), PhD) – Managing Director

Part 8: **Agricultural Impact Statement**
Tomingley Gold Operations Pty Ltd
Mr Mike Sutherland (BSc, GCComRel) – General Manager NSW

Part 9: **Biodiversity Development Assessment Report**
AREA Environmental & Heritage Consultants
Phil Cameron (CEnvP, AsDAppSci, Bsc) – Managing Director
Addy Watson (BEnvSc, GCSocImp) – Manager – Biodiversity

Part 10: **Aboriginal Cultural Heritage Assessment Report**
OzArk Environment and Heritage
Stephanie Rusden (BA, BSc) – Senior Archaeologist

Part 11: **Historic Heritage Assessment Report**
OzArk Environment and Heritage
Stephanie Rusden (BA, BSc) – Senior Archaeologist

Part 12: **Economic Assessment**
Diana Gibbs & Partners
Diana Gibbs (BSc. (Hons), M. Env.Stud) – Company Director

Part 13: **Social Assessment**
The Regional Development Company
Susan Benedyka (GDBus) – Managing Director

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