TOMINGLEY
GOLD OPERATIONS PTY LTD
(A wholly owned subsidiary of Alkane Resources Ltd)
ABN 53 149 040 371

Tomingley Gold Extension Project

Amendment Report

Major Project Application
SSD-9176045





Prepared by R.W. CORKERY & CO. PTY. LIMITED

May 2022

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for the

Tomingley Gold Extension Project

Major Project Application SSD-9176045

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ACRONYMS

BC Act	Biodiversity Conservation Act 2016
DSE	dry sheep equivalent
EIS	Environmental Impact Statement
EP&A Act	*Environmental Planning and Assessment Act 1979*
LEP	Local Environmental Plan
MOD6	Modification 6
RWC	R.W. Corkery & Co. Pty Limited
SAR	San Antonio and Roswell
SSD	State Significant Development
TGO	Tomingley Gold Operations

EXECUTIVE SUMMARY

Tomingley Gold Operations Pty Limited (the Applicant) submitted an application for State Significant Development consent (SSD) 9176045) for the Tomingley Gold Extension Project (the Project). The application was accompanied by an *Environmental Impact Statement* (EIS) prepared by R.W. Corkery & Co. Pty Limited (RWC). The EIS and supporting technical assessments were exhibited from 28 February 2022 to 28 March 2022.

Minor changes to the design of the Project since Exhibition have resulted in the need to amend the Applicant's development application (the "Amended Project"). This *Amendment Report* provides a description of the Amended Project, including an overview of the following proposed amendments and potential changes to the previously assessed environmental impacts.

- Relocation of the proposed Roswell Ventilation Rise approximately 250m to the northeast of proposed location.
- Relocation of proposed borrow pits from within the footprint of the SAR Open Cut North Pit to within the SAR Open Cut South and Central Pits.

In summary, the proposed amendments would not result in disturbance of additional land nor any additional biophysical, economic or social impacts.

1. INTRODUCTION

1.1 SCOPE

Tomingley Gold Operations Pty Limited (the Applicant) submitted an application for State Significant Development consent SSD-9176045 for the Tomingley Gold Extension Project (the Project). The application was accompanied by an *Environmental Impact Statement* (EIS) prepared by R.W. Corkery & Co. Pty Limited (RWC). The EIS and supporting technical assessments were exhibited from 28 February 2022 to 28 March 2022. During and following that period, the following submissions and advice was received by Department of Planning and Environment.

- Advice from 14 Government Agencies.
- Additional information from one organisation, namely the Siding Springs Observatory.
- Submissions from six members of the public, including five by way of support for the Project and one by way of objection.
- Submissions from three local councils, none of which objected to the Project.

A *Submissions Report* has been prepared by the Applicant which provides an analysis of, and responses to each of the above submissions and advice, as well as an overview of the actions taken since the EIS was exhibited.

Minor changes to the design of the Project since Exhibition have resulted in the need to amend the Applicant's development application (the "Amended Project"). This *Amendment Report* provides a description of the Amended Project including an overview of the following proposed amendments and potential changes to the previously assessed environmental impacts.

- Relocation of the proposed Roswell Ventilation Rise approximately 250m to the northeast of proposed location.
- Relocation of proposed borrow pits from within the footprint of the SAR Open Cut North Pit to within the SAR Open Cut South and Central Pits.

Appendix A presents the amended Project description including the above. **Appendix A** also includes minor adjustments to the Project description arising from the *Submissions Report*, including the following.

- An update to the Mineral Resource to reflect exploration completed since September 2021.
- Additional land title information to reflect conversion of Crown Roads to freehold land with new Lot and DP numbers.
- An updated *Integrated Transport Assessment* and clarification of site access arrangements during construction and proposed intersection treatments.

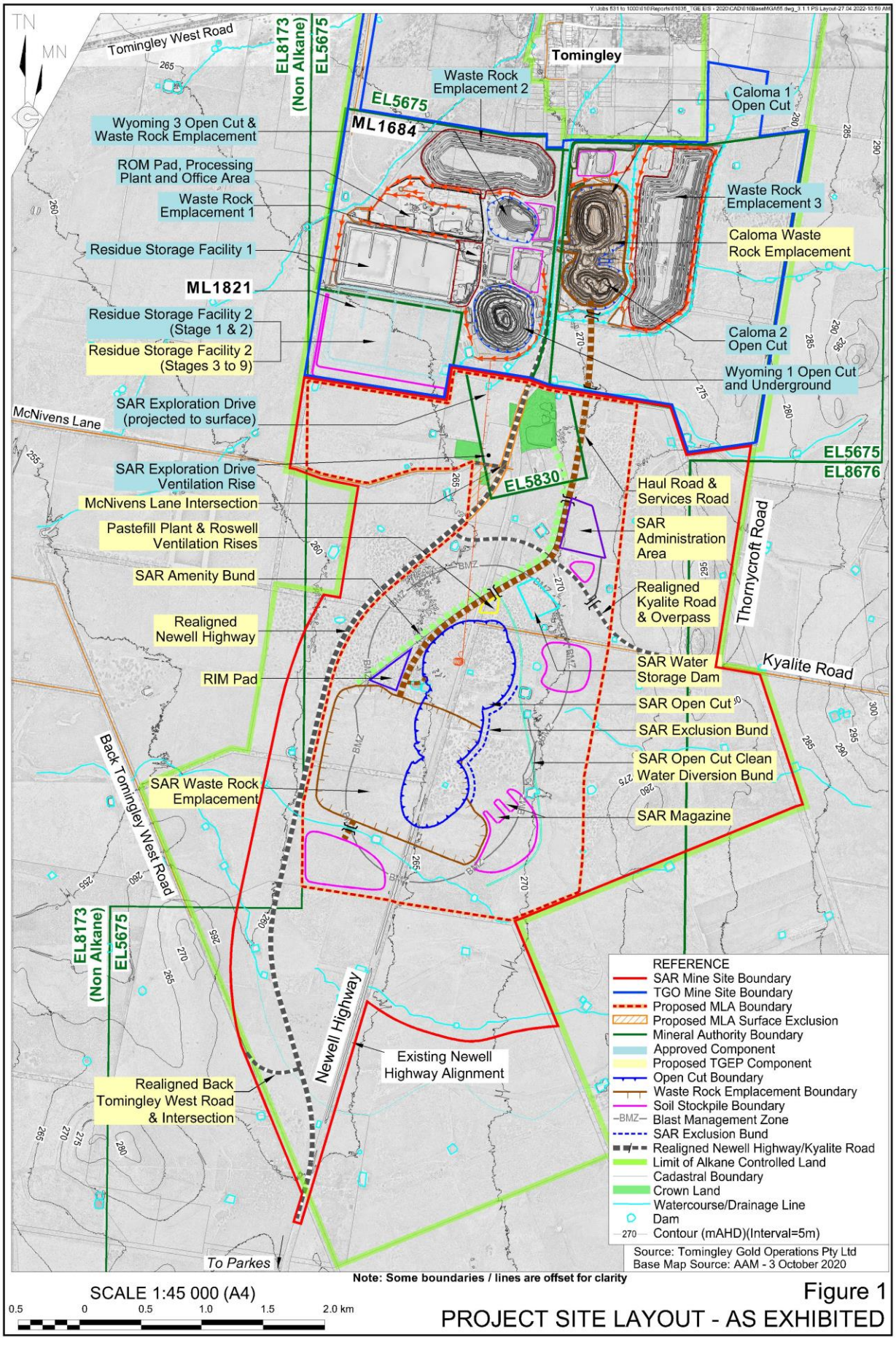


Figure 1
PROJECT SITE LAYOUT - AS EXHIBITED

It is noted that the proposed amendments are generally consistent with the Project as described, including the flexible elements identified in the EIS. Notwithstanding, this Amendment Report has been prepared for the avoidance of doubt and to describe those aspects of the Project that have changed since the Exhibition.

This Report has been prepared generally in accordance with the requirements of *State significant development guidelines – preparing an amendment report* dated November 2021.

1.2 PROJECT OVERVIEW

The Project would involve the extension of the existing Tomingley Gold Operations gold mine (the TGO Mine), located immediately to the south of the Tomingley village in central western NSW (the TGO Mine Site), to incorporate mining of the San Antonio and Roswell (SAR) deposits through the development of the SAR Mine. The SAR Mine Site would be located immediately to the south of the TGO Mine Site (**Figure 1**). For the purposes of this document, the Project would comprise the following core components (**Figure 1**).

- The realignment the Newell Highway and Kyalite Road, including the intersections of the Newell Highway and Kyalite Road, McNivens Lane and Back Tomingley West Road.
- Surface and underground mining operations within the SAR Mine Site, including the delivery of waste rock and ore to the TGO Mine Site for stockpiling and/or processing.
- Continued operation of the TGO Mine as approved under development consent MP 09_0155, beyond the approved end of mine life on 31 December 2025, including construction and use of:
  - Stages 3 to 9 of Residue Storage Facility 2;
  - a grinding mill and associated modification to the crushing circuit within the TGO Processing Plant; and
  - use of the Caloma 1 and 2 Open Cuts for in-pit placement of waste rock.
- The connection of the existing "Dappo" bore to the Applicant's existing and approved water supply pipeline that runs from Narromine to the TGO Mine Site.

At the time of finalisation of this Report, two applications to modify MP 09_0155 were in progress as follows.

- Modification 6 (MOD6) – for the construction and use of Stage 9, Cell 2 of Residue Storage Facility 1.
- MOD7 – for the construction and use of a northern ramp for the Wyoming 1 Open Cut.

1.3 PROJECT OBJECTIVES

Consistent with the objectives of the approved TGO Mine and the Project as presented in the EIS, the objectives of the Amended Project would remain as follows.

- To safely and economically mine the identified gold reserves via both open cut and underground mining methods.
- To operate the Amended 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 Amended 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.

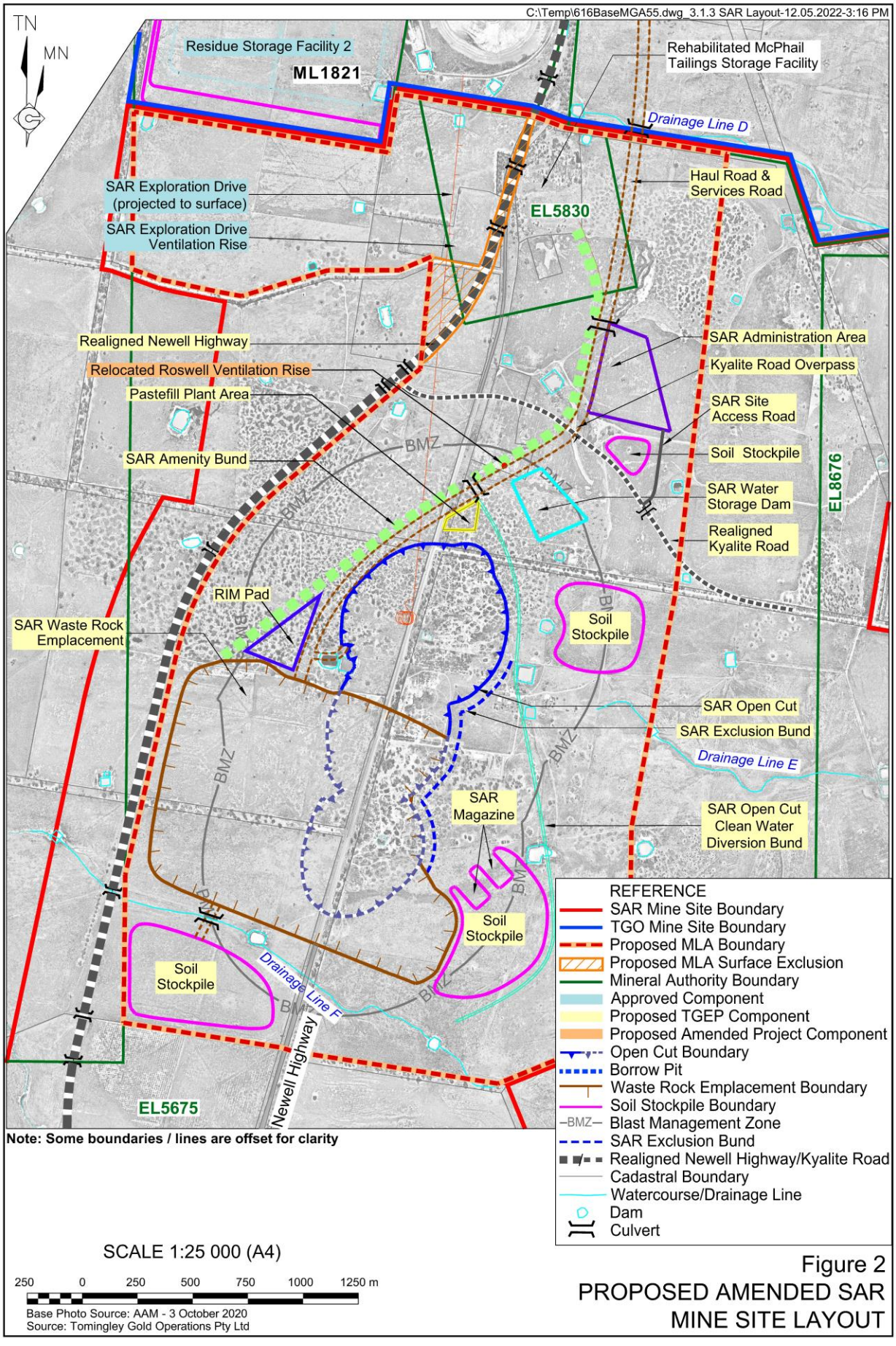
1.4 PROPOSED AMENDMENTS

The Amended Project consists of the following relatively minor changes to the proposed layout.

- Relocation of the proposed Roswell Ventilation Rise approximately 250m to the northeast of proposed location.
- Relocation of proposed borrow pits from within the footprint of the SAR Open Cut North Pit to within the SAR Open Cut South and Central Pits.

The Amended Project does not include and would not require any additional infrastructure elements. The Amended Project would not result in any additional disturbance of land outside of the proposed Limit of Disturbance as exhibited. In addition, the Amended Project does not include and would not require any additional or intensification of any operational activities proposed as part of the Project.

Figure 2 presents the amended layout of the SAR Mine Site.


C:\Temp\616BaseMGA55.dwg_3.1.3 SAR Layout-12.05.2022-3:16 PM
TN
MN
Residue Storage Facility 2
ML1821
Rehabilitated McPhail Tailings Storage Facility
Drainage Line D
Haul Road & Services Road
SAR Exploration Drive (projected to surface)
SAR Exploration Drive Ventilation Rise
EL5830
Realigned Newell Highway
Relocated Roswell Ventilation Rise
Pastefill Plant Area
SAR Amenity Bund
SAR Administration Area
Kyalite Road Overpass
SAR Site Access Road
Soil Stockpile
SAR Water Storage Dam
Realigned Kyalite Road
EL8676
RIM Pad
SAR Waste Rock Emplacement
Soil Stockpile
SAR Open Cut
SAR Exclusion Bund
Drainage Line E
SAR Magazine
SAR Open Cut Clean Water Diversion Bund
Soil Stockpile
Soil Stockpile
Drainage Line F
Newell Highway
EL5675
BMZ
REFERENCE
SAR Mine Site Boundary
TGO Mine Site Boundary
Proposed MLA Boundary
Proposed MLA Surface Exclusion
Mineral Authority Boundary
Approved Component
Proposed TGEP Component
Proposed Amended Project Component
Open Cut Boundary
Borrow Pit
Waste Rock Emplacement Boundary
Soil Stockpile Boundary
Blast Management Zone
SAR Exclusion Bund
Realigned Newell Highway/Kyalite Road
Cadastral Boundary
Watercourse/Drainage Line
Dam
Culvert
Note: Some boundaries / lines are offset for clarity
SCALE 1:25 000 (A4)
250 0 250 500 750 1000 1250 m
Base Photo Source: AAM - 3 October 2020
Source: Tomingley Gold Operations Pty Ltd
Figure 2
PROPOSED AMENDED SAR MINE SITE LAYOUT

1.4.1 Relocation of the Roswell Ventilation Rise

Following completion of the EIS, the Applicant has determined that the proposed Roswell Ventilation Rise, originally proposed within the Paste Fill Plant Area, included a substantial thickness of near surface material with poor geotechnical characteristics. As a result, the ventilation rise is proposed to be relocated to a location where more competent material is located closer to the surface (the "Relocated Roswell Ventilation Rise") (**Figure 3**).

The Relocated Roswell Ventilation Rise would indicatively be located approximately 250m to the northeast of the original location, within the proposed Pastefill Plant Area. The Relocated Roswell Ventilation Rise would require minor adjustments to the design and layout SAR Haul Road and Services Road. These changes would not result any additional disturbance of land than what was assessed and presented in the EIS. The Relocated Ventilation Rise would, however, result in a minor change to the source locations for potential air quality impacts from the ventilation rise itself.

This Report will demonstrate that the Relocated Roswell Ventilation Rise, as part of the Amended Project, would not result in any significant changes to the predicted environmental impacts of the Project and would be consistent with the overall strategic and statutory context of the Project, as exhibited.

1.4.2 Relocated Borrow Pits

Since finalisation of the EIS, the Applicant has revised the location for the proposed borrow pits (**Figure 4**). In summary, two borrow pits within the SAR North Pit footprint are no longer proposed. These would be replaced by a single borrow pit, the Eastern Borrow Pit, within the footprint of the SAR South and Central Pits to the east of the existing Newell Highway. The Western Borrow Pit (located within the footprint of the proposed SAR Waste Rock Emplacement) would remain unchanged.

This Report will demonstrate that the proposed Eastern Borrow Pit, as part of the Amended Project, would not result in any significant changes to the predicted environmental impacts of the Project, and would be consistent with the overall strategic and statutory context of the Project, as exhibited.

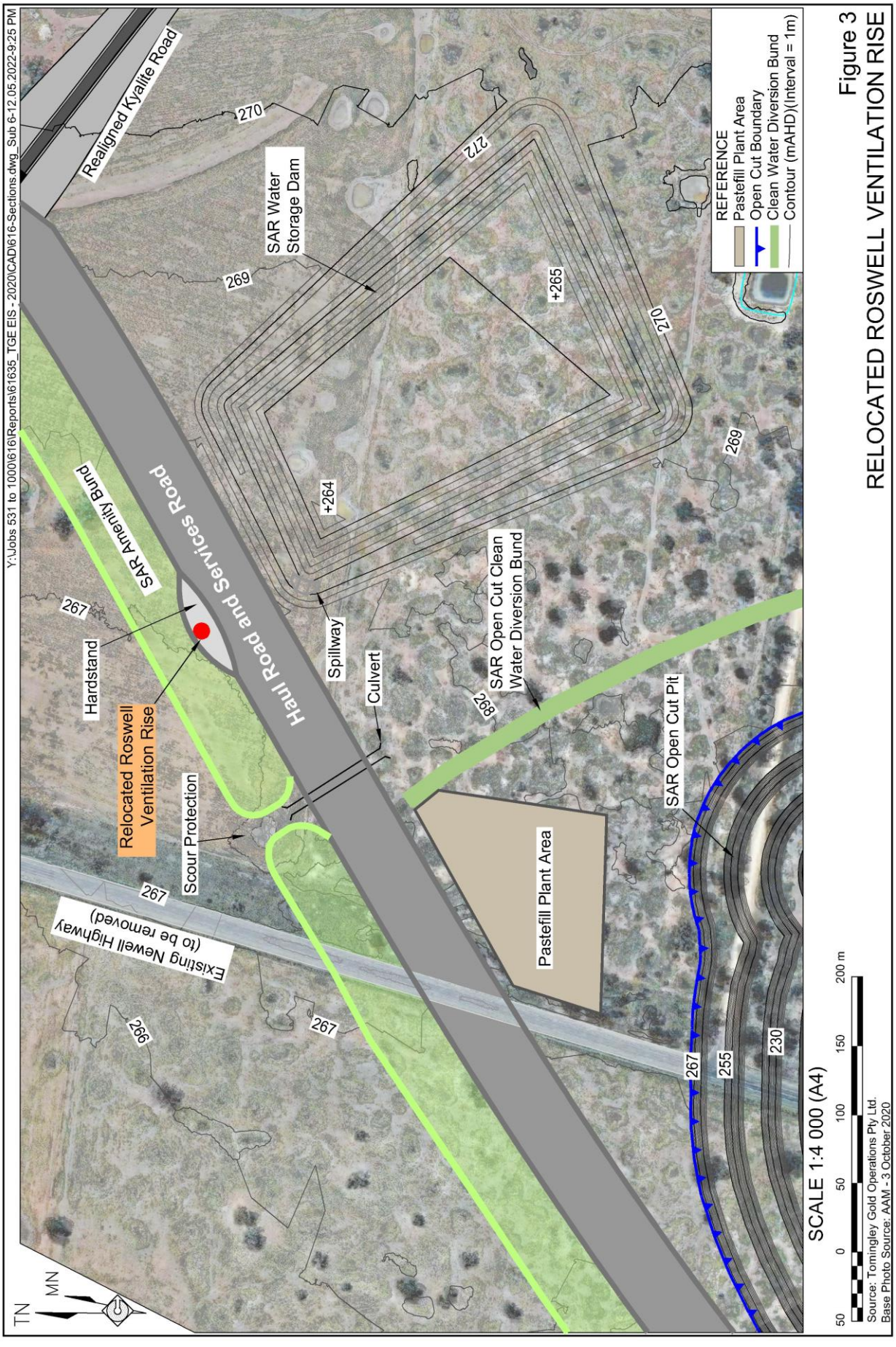


Figure 3
RELOCATED ROSWELL VENTILATION RISE

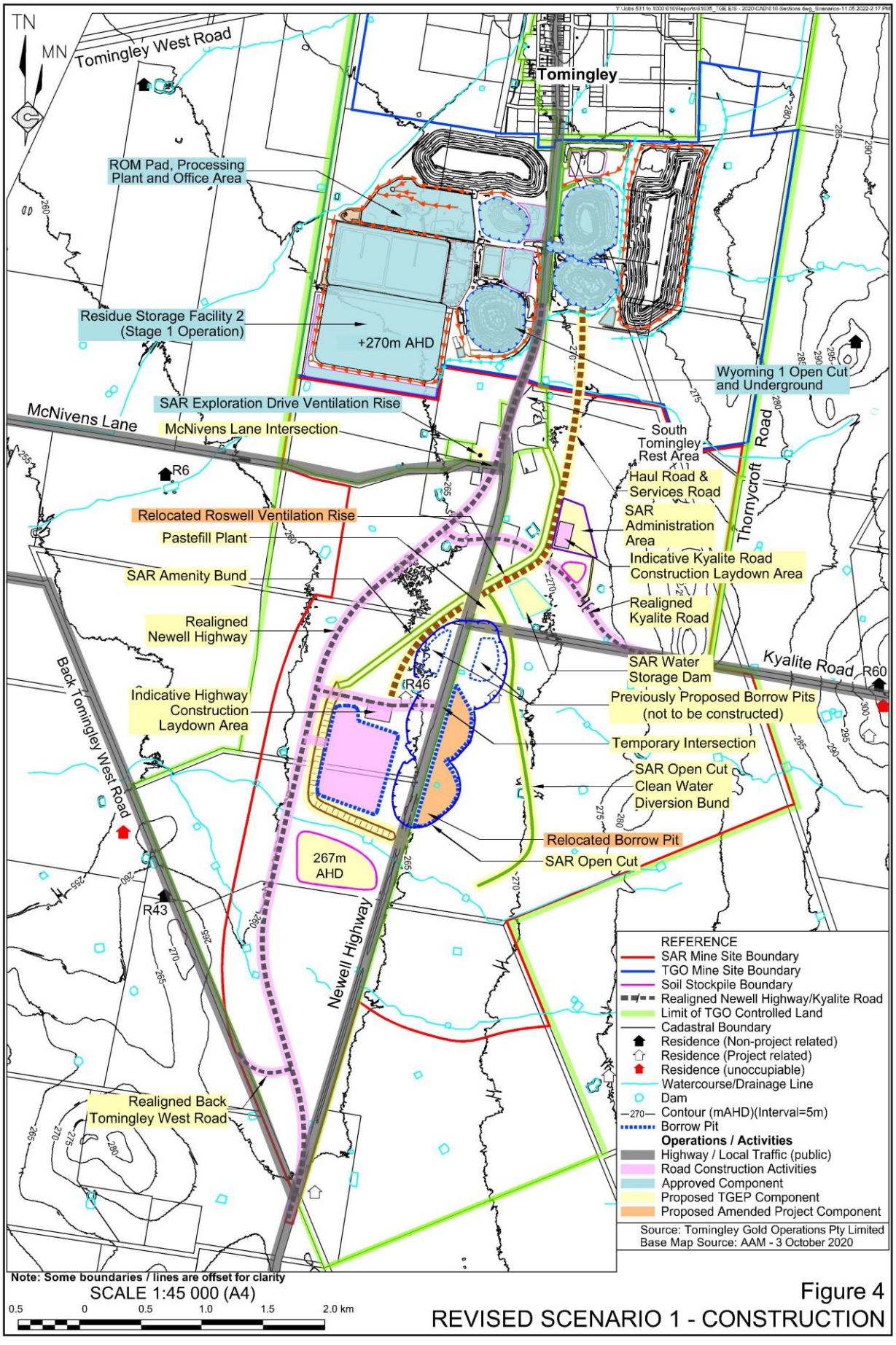


Figure 4
REVISED SCENARIO 1 - CONSTRUCTION

2. STRATEGIC CONTEXT

2.1 INTRODUCTION

The strategic context of the Amended Project would remain unchanged from that of the original Project as presented in the EIS. This Section presents an overview of the State and Regional Strategies, Policies and Plans considered as part of the EIS for the Project.

2.2 GOVERNMENT STRATEGIES, POLICIES AND PLANS

The EIS considered the following Government Strategies, Policies and Plans.

- *Economic Development Strategy for Regional NSW.*
- *Central Orana Regional Economic Development Strategy 2018 – 2022.*
- *Central West and Orana Regional Plan 2036.*
- *Narromine Shire Local Strategic Planning Statement.*
- *Regions at the Ready: Investing in Australia's Future.*
- *NSW Infrastructure Strategy 2018 – 2038.*
- *NSW Freight and Ports Plan 2018-2023.*
- *Residential and Large Lot Residential Land Use Strategy 2018.*
- *Agriculture Land Use Strategy - Intensive Plant Agriculture.*

In summary, the Amended Project would continue to be consistent with each of the documents reviewed for the following reasons.

- The Amended Project would result in the continued and expanded employment of the Applicant's workforce for at least another 7 years, from December 2025 to December 2032, thereby supporting the retention of existing residents and attraction of new residents to population centres such as Tomingley, Peak Hill, Narromine, and Dubbo.
- The Amended Project would result in continued economic contributions for a further 7 years. This would support local business and would promote economic activity and provide diversification for the local and regional economy.
- The Amended Project would not result in disturbance of key natural or built features. The realigned Newell Highway would be of a similar standard to the existing Highway, with a range of safety, flooding and other improvements more than compensating for the minor additional travel distance and time.

The Amended Project is considered by the Applicant to be consistent with the overall strategic context of the Project as exhibited.

3. DESCRIPTION OF AMENDMENTS

3.1 OVERVIEW OF AMENDMENTS

Table 1 presents an overview of the Amended Project. An amended project description is presented as **Appendix A**.

Table 1
Amended Project Summary Table

Element	Original Project[1]	Amended Project[2]
Location of Roswell Ventilation Rise	Within the Pastefill Plant Area.	250m to the northeast of the Pastefill Plant Area, adjacent to the SAR Haul Road and Amenity Bund.
Location of Proposed Borrow Pits	SAR Waste Rock Emplacement SAR North Pit – either side of current Newell Highway alignment.	SAR Waste Rock Emplacement (unchanged) SAR Central and South Pits – east of the current Newell Highway alignment.
Note 1: See **Figure 1** Note 2: See **Figure 2**		

3.2 RELOCATED ROSWELL VENTILATION RISE

3.2.1 Introduction

The proposed SAR Underground Mine would, as presented in the EIS for the Project, be accessed via the existing and approved SAR Exploration Decline. The Roswell Ventilation Rise is one of two ventilation rises that would be required to support the development and operation of the SAR Underground Mine. The approved SAR Exploration Drive Ventilation Rise (**Figure 4**) is subject to a separate approval and therefore outside of the scope of the EIS and this Report. No changes to the approved SAR Exploration Drive Ventilation Rise are proposed as part of the EIS or this Report.

3.2.2 Overview of Proposed Relocation

Following completion of the EIS, the Applicant has determined that the proposed Roswell Ventilation Rise, originally proposed within the Paste Fill Plant Area, included a substantial thickness of material with poor geotechnical characteristics. As a result, the ventilation rise is proposed to be relocated to a location where more competent material is located closer to the surface. **Figure 3** presents the indicative location of the Relocated Roswell Ventilation Rise. In summary, the ventilation rise would be constructed between the Haul Road and the SAR Amenity Bund, approximately 250m northeast of the originally proposed location.

It is noted that Section 3.5.3.2 of the EIS identified that the final location of the Roswell Ventilation Rise may be amended, with the ventilation rise potentially located elsewhere within the proposed disturbance area. This Amendment Report has been prepared to provide further information in relation to the proposed amended location. Further minor adjustment of the final location may be required during the detailed design phase for the rise.

No changes to the proposed construction and operation of the Roswell Ventilation Rise are proposed as part of the Amended Project and the design and operation of the ventilation rise would remain generally unchanged from that described in Section 3.5.3.2 of the EIS, as follows.

- Diameter ..... approximately 4.2m
- Maximum ventilation rate..... approximately 225m^3/s
- Ventilation fan location ..... base of the rise

The layout of the Haul Road and Services Road in the vicinity of the Relocated Roswell Ventilation Rise would adjusted slightly to accommodate the ventilation rise, with all infrastructure to remain within the proposed Limit of Disturbance as exhibited.

No changes to the final rehabilitation, landform or land use of the ventilation rise are proposed as part of the Amended Project.

3.3 RELOCATED BORROW PITS

3.3.1 Introduction

The Project would involve the establishment of several borrow pits during construction operations within the footprint of the proposed SAR Waste Rock Emplacement and SAR Open Cut. The indicative location of the previously proposed borrow pits and the relocated borrow pit is shown on **Figure 4**.

No change to the proposed extraction and use of material from the borrow pits is proposed. In summary, material would be extracted and used for the establishment of infrastructure within the SAR Mine Site as well as the realigned public road network. Borrow material would only be used for purposes for which it would be fit for purpose, with imported material or TGO waste rock used for purposes for which the borrow material would not be suitable.

The borrow pits would be internally draining and following completion, would be incorporated into the proposed SAR Open Cut or backfilled with waste rock during mining operations.

3.3.2 Overview of Proposed Relocation

The Applicant proposes to relocate two proposed borrow pits within the SAR Open Cut from the North Pit (as exhibited) to within the South and Central Pits. The proposed Eastern Borrow Pit would be located to the east of the existing Newell Highway fully within the footprint to the SAR Open Cut (**Figure 4**). The revised borrow pits would remain within the proposed Limit of Disturbance as exhibited.

The borrow pits are proposed to be relocated for the following reasons.

- The SAR North Pit would be last section of the SAR Open Cut to be developed. Establishment of borrow pits within the SAR North Pit would result in disturbance of the originally proposed locations in Financial Year 2023, with mining operations not expected to commence within the SAR North Pit until

Financial Year 2025. By contrast, the South and Central Pits would be mined in Financial Year 2024. As a result, the amended Eastern Borrow Pit would permit the continued agricultural use of the SAR North Pit footprint for longer than would have otherwise been the case.

- Recent exploration drilling continues to refine the Applicant's understanding of the Roswell deposit. Potential exists that by the time that the SAR North Pit is commenced in Financial Year 2025, the optimal design may be smaller than proposed. As a result, the borrow pits as originally proposed may result in disturbance of land that would otherwise not be required to be disturbed. The design of the SAR South and Central Pits is less likely to be refined and, as a result, the relocated Eastern Borrow Pit would be less likely to result in disturbance of land that would otherwise not be required to be disturbed

4. STATUTORY CONTEXT

The statutory context of the Amended Project would generally remain consistent with that presented in the EIS.

Notwithstanding the above, the recent consolidation of State Environmental Planning Policies has resulted in administrative changes to the names and references of certain planning instruments relevant to the Amended Project. Therefore, the following presents an updated overview of the statutory requirements for the Amended Project.

Appendix B presents an amended statutory compliance table for the Amended Project.

4.1 AMENDMENT OF DEVELOPMENT APPLICATIONS

The amendment of the Development Application for the Project is in accordance with Section 37(1) of the *Environmental Planning and Assessment Regulation 2021*.

4.2 POWER TO GRANT APPROVAL

As a mining project with a Capital Investment Value of more than $30 million, the Project is classified as a "State Significant Development" under Clause 5(1)(a) of Schedule 1 of the *State Environmental Planning Policy (Planning Systems) 2021*. The Development Application will therefore require assessment under Division 4.7 of Part 4 of the *Environmental Planning and Assessment Act 1979*.

The consent authority for the Project will be the Minister for Planning and Homes. In practice, it is understood that the Minister has delegated his/her authority to determine such applications to a senior officer of the Department of Planning and Environment.

5. COMMUNITY ENGAGEMENT

In recognition of the relatively minor scale of the proposed changes to the Project, and the low level of community interest in the Project as indicated by the low number of public submissions received during Public Exhibition, consultation in regard to the Amended Project will be limited to tabling of the Amendment Report at the next Community Consultation Committee meeting and identification of the proposed amendment in the next Newsletter.

6. ASSESSMENT OF IMPACTS

6.1 RELOCATED ROSWELL VENTILATION RISE

6.1.1 Assessment of Impacts

Air Quality

The relocated ventilation rise could, potentially, result in changed air quality impacts at surrounding residences. **Table 2** presents the distances from the originally proposed and relocated ventilation rise locations to the closest sensitive receivers (**Figure 4**). In the case of Residences R6 and R43, the relocated ventilation rise would be further from the residence. In the case of Residence R60, the relocated ventilation rise would be approximately 100m closer. However, at a distance 3.2km, this is not considered material. In addition, Residence R60 is located to the east of the proposed and relocated ventilation rises. The prevailing wind (see Figure 6.1.3 of the EIS) in the area is from the east-northeast and would typically result in particulate material from the relocated ventilation rise blowing away from Residence R60. As a result, the relocated ventilation rise would have an air quality impact on surrounding residences that would be no greater than that already assessed.

Table 2
Approximate Distances to Surrounding Residences

Residence	Approximate Distance to Originally Proposed Ventilation Rise (m)	Approximate Distance to Relocated Ventilation Rise (m)
R6	2 825	2 875
R43	3 575	3 800
R60	3 275	3 175

Other Impacts

The proposed relocated ventilation rise would not change the Project's assessed environmental impacts for the following reasons.

- Traffic and transportation – there would be no change in off-site vehicle movements.
- Visibility – the relocated ventilation rise would remain to the east of the SAR Amenity Bund and would not be visible to users of the Newell Highway. Furthermore, there would be no additional surface infrastructure associated with the relocated ventilation rise.
- Noise and blasting – the relocated ventilation rise would be constructed using the same equipment as that assessed in the EIS. Once operational, the ventilation fan would be located underground and would not result in surface noise emissions. There would be no blasting operations associated with construction of the ventilation rise.
- Surface water – the relocated ventilation rise would remain within the proposed dirty water catchment.
- Groundwater – relocated ventilation rise would be above the approved SAR Exploration Drive and would therefore not intersect additional groundwater.

- Soils, agriculture, biodiversity and heritage – there would be no additional disturbance outside of the already assessed Limit of Disturbance.
- Hazards and risks – the relocated ventilation rise would not involve the transport, storage or use of explosives or any other hazardous materials not already assessed.
- Economic and social – the relocated ventilation rise would not result in economic or social impacts greater than those already assessed.

Statutory and Strategic Context

The Relocated Roswell Ventilation Rise would be consistent with the Statutory and Strategic context of the Project as exhibited.

6.1.2 Management and Mitigation Measures

The proposed relocation of the Roswell Ventilation Rise would not require any additional or amended management and mitigation measures.

6.1.3 Conclusion

The relocated Roswell Ventilation Rise would not result in any additional environmental impacts compared to those assessed as part of the EIS for the Project.

6.2 RELOCATED BORROW PITS

6.2.1 Assessment of Impacts

Environmental Impacts

The proposed relocated Eastern Borrow Pit would not change the Project's assessed environmental impacts the following reasons.

- Traffic and transportation – there would be no change in off-site vehicle movements.
- Visibility – the proposed Eastern Borrow Pit would be further from the alignment of the existing and proposed Kyalite Road than the originally proposed borrow pits and would therefore be likely to reduce visual impacts. In addition, the proposed Eastern Borrow Pit would be shielded from motorists travelling on the Newell Highway by roadside existing vegetation.
- Noise, air quality and blasting – the proposed Eastern Borrow Pit would not involve additional mobile plant to that already assessed and, given the distances to surrounding residences (see **Figure 4**), no change in noise or air quality emissions during construction operations would occur. There would be no blasting operations associated with the proposed borrow pit.

- Surface water – the proposed Eastern Borrow Pit would remain within the proposed dirty water catchment.
- Groundwater – The proposed Eastern Borrow Pit would be limited to the near surface and would be substantially above the regional groundwater table.
- Soils, agriculture, biodiversity and heritage – there would be no additional disturbance outside of the already assessed Limit of Disturbance.
- Hazards and risks – the proposed Eastern Borrow Pit would not involve the transport, storage or use of explosives or any other hazardous materials not already assessed.
- Economic and social – the proposed Eastern Borrow Pit would not result in economic or social impacts greater than those already assessed.

Statutory and Strategic Context

The Eastern Borrow Pit would be consistent with the Statutory and Strategic context of the Project as exhibited.

6.2.2 Management and Mitigation Measures

The proposed Eastern Borrow Pit would not require any additional or changes to the management and mitigation measures proposed for the Project as presented in the EIS.

6.2.3 Conclusion

The proposed Eastern Borrow Pit would not result in any additional significant environmental impacts compared to those assessed as part of the EIS for the Project.

7. JUSTIFICATION OF AMENDED PROJECT

7.1 INTRODUCTION

A comprehensive justification of the Project as exhibited was provided in Section 7 of the EIS.

The proposed amendments are required to address geotechnical and mine-scheduling constraints identified since the Exhibition of the EIS. As described in Section 6, the proposed amendments would not result in any increase or significant change in the predicted and assessed environmental impacts of the Project as exhibited. In addition, the proposed amendments would be consistent with the Statutory and Strategic context of the Project as exhibited.

In light of the above, the Applicant contends that the Amended Project remains largely consistent with the Project as exhibited and the previously identified environmental outcomes would remain generally unchanged. There are no additional environmental impacts introduced that have not previously been identified and assessed.

Section 5 of the *Submissions Report* provides an updated justification of the Project incorporating issues raised in the submissions. The following subsections update the evaluation of the Amended Project in the context of the proposed amendment including a summary of the outcomes of the proposed amendment and consideration of the principles of ecologically sustainable development and the mandatory considerations specified in Section 4.15(1) of the *Environmental Planning and Assessment Act 1979*.

7.2 ACTIONS TAKEN TO AVOID / MINIMISE IMPACTS

The following actions have been implemented to avoid and minimise additional impacts associated with the relocated Roswell Ventilation Rise.

- The relocated Roswell Ventilation Rise and associated changes to the SAR Amenity Bund and SAR Haul Road has been designed to ensure that no additional disturbance is required.
- The relocated Roswell Ventilation Rise would result in lower costs associated with the construction and development of the ventilation rise and would therefore represent a more-economic use of resources.
- No change to the proposed design and operation of the Roswell Ventilation Rise is proposed.

The following actions have been implemented to avoid and minimise additional impacts associated with the Eastern Borrow Pit.

- The Eastern Borrow Pit would result in a reduction in the time between surface disturbance and commencement of mining operations compared to the original locations.
- No additional disturbance is proposed.
- No change to the proposed activities within the proposed Eastern Borrow Pit is proposed.

- No changes to the proposed extraction and use of materials from the Eastern Borrow Pit is proposed.
- No additional environmental management and mitigation measures would be required for the Eastern Borrow Pit.
- No changes to the proposed rehabilitation operations and final landform and land use are proposed or would be required for the Eastern Borrow Pit.

7.3 CONSISTENCY WITH STRATEGIC CONTEXT

Section 2.1 presents an overview of the key Government Strategies, Policies and Plans relevant to the Project. In summary, the Amended Project would be consistent with the Strategic Context of the Project as exhibited.

7.4 COMPLIANCE WITH STATUTORY REQUIREMENTS

7.4.1 Introduction

Section 4 and **Appendix B** provide an overview of the Statutory Context of the Amended Project and the Project as exhibited. The following subsections address relevant statutory requirements that have not been addressed elsewhere in the document.

7.4.2 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) is the principal legislation regulating development in NSW. Development consent for the Project is being sought under Part 4, Division 4.7 of the EP&A Act as a State Significant Development (SSD). Section 4.15(1) of the EP&A Act describes the matters for consideration by a consent authority in evaluating a Project for determination. **Appendix B** identifies where each matter has been addressed in this document.

Section 1.3 of the EP&A Act presents the objects of the Act. **Table 3** presents each of the objects of the Act and identifies how the Amended Project is consistent with each.

Table 3
Objects of the EP&A Act

Object	Consistency with the Project	Consistency with the Amended Project
The objects of this Act are as follows.		
a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,	The Project would provide for the continued orderly and professional development and operation of the Applicant's existing operations for further seven years, thereby permitting the existing social and economic benefits associated with the TGO Mine to continue. At all stages of design and planning for the Project the social and economic outcomes that would be experienced in the community have been considered. In addition, the Project has been designed to avoid environmental impacts to the extent practicable and would mitigate or manage residual impacts to an acceptable level. Consultation with the local community has resulted in refinement of the Project during the preparation of the EIS with these refinements presented to the community in order to gauge whether they are deemed acceptable. In all cases, those consulted did not make further comment in relation to the matter raised. It is therefore considered that the Project achieves this objective.	The Amended Project demonstrates the Applicant's commitment to proper and effective management, planning, development, and conservation of the land and resources within the Project Site.
b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,	Section 7.5.2 of the EIS discusses how the Project is consistent with the principles of ecologically sustainable development. The Project has been subject to thorough technical assessment to understand the existing setting, predict potential impacts and identify those matter that require additional measures to manage the risk of impact. It is considered that the Project would be developed in an efficient manner that will take into account the value of environmental and social resources to the local and regional community both now and in the future.	Section 7.6 discusses the Amended Project in the context of the principles of ecologically sustainable development. The Amended Project has been designed in consideration of maximising the benefit of existing proposed disturbance areas in order to minimise the potential impacts as far as practicable.
c) to promote the orderly and economic use and development of land,	Detailed technical assessment has been undertaken to understand the existing setting including through comprehensive exploration programs and assessment of geotechnical characteristics. This has permitted the Applicant to design a Project that not only maximises the economic use of the land but also provides for appropriate staging, the ongoing management of by-products, staffing and supply planning, progressive and final rehabilitation and community-related programs and investment. In this regard the detailed planning and preparation would ensure that the Project is developed to promote the orderly and economic use and development of the site.	The design of the Amended Project has been developed to minimise as far as practicable the economic and environmental impacts of the Amended Project as a whole.
d) to promote the delivery and maintenance of affordable housing,	While not directly relevant to the Project, it is not expected that the supply and availability of housing in the region would significantly change due to the anticipated employment benefits of the Project.	The Amended Project is not likely to affect the delivery and maintenance of affordable housing.

Table 3 (Cont'd)
Objects of the EP&A Act

Object	Consistency with the Project	Consistency with the Amended Project
e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats	Consideration of residual impacts to biodiversity values has been undertaken in accordance with the *Biodiversity Conservation Act 2016* (BC Act). Direct disturbance of native vegetation and potential native fauna habitat has been minimised to the extent practicable to reduce the need for impact to biodiversity values. An offsetting strategy would ensure that residual biodiversity impacts are offset in accordance with the requirements of the BC Act.	The design of the Amended Project has been developed to minimise as far as practicable the environmental impacts of the Amended Project as a whole.
f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),	The Project would require the salvage of Aboriginal artefacts from 12 sites. A further 27 sites would not be directly impacted and would be protected from inadvertent disturbance over the Project life. The Aboriginal sites to be disturbed would be managed in accordance with an approved Aboriginal Heritage Management Plan prepared in consultation with the local Aboriginal community. The Project would require the removal of the "Rosewood" homestead and associated structures. The realigned Newell Highway would also pass through the site of the former McPhail village. Test pitting in the vicinity of the village and archival recording of the "Rosewood" homestead and any structures identified within the proposed highway footprint would ensure that these structures are appropriately managed. It is not anticipated that the Project would significantly constrain the sustainable management of built and cultural heritage.	The Amended Project would not require any additional or change to the proposed management and mitigation measures.
g) to promote good design and amenity of the built environment,	The realigned Newell Highway and Kyalite Road and associated intersections would be designed and constructed in accordance with requirements of the Austroads *Guide to Road Design* in consultation with Transport for NSW and Narromine Shire Council. Potential amenity impacts in the vicinity of the Project Site would be managed through: • improved safety and flood protection on the realigned Newell Highway and Kyalite Road; • construction of the SAR Amenity Bund, outer face of the SAR Waste Rock Emplacement and numerous vegetation screens that would obscure views of the Project Site; • adoptive blast designs that consider potential impacts at privately-owned residences; • preventative management incorporating meteorological forecasting, comprehensive monitoring and response protocols; and • reactive management protocols to address community complaints.	The relocated Roswell Ventilation Rise would be located to the east of the SAR Amenity Bund, and would be largely integrated within the operational landscape of the proposed SAR Mine Site.
h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,	Project-related buildings and other structures would be constructed in accordance with the relevant Australian Building Code and all required construction and occupation certificates would be obtained.	The Amended Project would not include any additional structures compared to the Project as exhibited.

Table 3 (Cont'd)
Objects of the EP&A Act

Object	Consistency with the Project	Consistency with the Amended Project
i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,	The assessment requirements addressed in this EIS include feedback from Narromine Shire Council and relevant State government agencies.	The Applicant continues to maintain open communication with all relevant Government agencies.
j) to provide increased opportunity for community participation in environmental planning and assessment.	Section 5 and Appendix 16 of the EIS describe the extensive community consultation and engagement activities that have been undertaken during the design and planning for the Project. Furthermore, the Applicant has committed to ongoing consultation and community and stakeholder engagement post-approval and over the Project life.	The Amended Project would not require any specific community consultation during the planning and assessment stages. The Applicant would continue to provide community updates as part of its ongoing community outreach program.

7.4.3 Narromine Local Environmental Plan 2011

The principal local planning instrument for the Project is the Narromine Local Environmental Plan (LEP) 2011. Under that plan, the Project Site is located within land zoned RU1 – Primary Production and SP2 – Infrastructure. Section 4.3.2 of the EIS addresses matters related to permissibility of the Project and Table A15.1 of Appendix 15 of the EIS and **Table B.1** of **Appendix B** of this document address matters related to a range of other Clauses within the Narromine LEP. **Table 4** presents an assessment of the Project against the objects of each of the above Zones.

Table 4
Narromine LEP Zone Objectives

Object	Consistency with the Project	Consistency with the Amended Project
Zone RU1 – Primary Production		
To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.	The Project would permanently remove 130ha of land from agricultural production, with 345ha temporarily removed from production. Notwithstanding this, the Applicant would increase the overall agricultural productivity of land under its control from approximately 6 888 dry sheep equivalent (DSE) to 8 371 DSE at the end of mining and 10 562 DSE following completion of rehabilitation operations.	The Amended Project would not require any changes to the proposed agricultural management and mitigation measures.
To encourage diversity in primary industry enterprises and systems appropriate for the area.	The Project would implement best-practice agricultural techniques to maximise agricultural productivity and would provide opportunities for the Applicant and others to diversify agricultural practices within and surrounding the Project Site.	The Amended Project would not require any changes to the proposed agricultural management and mitigation measures.

Table 4 (Cont'd)
Narromine LEP Zone Objectives

Object	Consistency with the Project	Consistency with the Amended Project
Zone RU1 – Primary Production (Cont'd)		
To minimise the fragmentation and alienation of resource lands	The Project would not fragment agricultural land and, following use for mining purposes, the maximum area would be returned to agricultural use.	The Amended Project would not fragment agricultural land and, would not result in significant changes to the maximum area of land returned to agricultural use.
To minimise conflict between land uses within this zone and land uses within adjoining zones.	The Project, has to the extent practicable, been designed to avoid land use conflicts between rural, infrastructure and village zones. In particular, the Applicant has consulted with surrounding landholders in relation to amenity-related impacts and has and would implement a range of measures to minimise potential land use conflicts.	The Amended Project would not change proposed limit of disturbance of the Project as exhibited.
Zone SP2 – Infrastructure		
To provide for infrastructure and related uses.	The Applicant anticipates that the road reserve associated with the realigned Newell Highway would be rezoned to SP2 – Infrastructure and that the road reserve associated with the section of the existing Highway to be decommissioned would be rezoned to RU1 – Primary Production. In this way, the Project would ensure the appropriate zoning and protection for the Newell Highway.	The Amended Project would not involve any changes to the proposed impacts to surrounding infrastructure.
To prevent development that is not compatible with or that may detract from the provision of infrastructure.	The Project has been designed to minimise mining-related impacts to the Newell Highway, including locating the road outside the Blast Management Zone and screening the majority of mining-related activities from motorists using the Highway.	The Amended Project would not involve any changes to the proposed impacts to surrounding infrastructure.

7.5 CONSISTENCY WITH COMMUNITY VIEWS

The Applicant contends that due to the minor nature of the proposed amendments to the Project and the low level of community interest during the Public Exhibition of the EIS, specific community consultation regarding the Amended Project is not required.

In addition, the Amended Project is not considered likely to affect any existing community views of the Applicant's ongoing operations in the local area, including the Project as exhibited. Overall, the Applicant contends that the Project has a high degree of community support and the views of the community have been sought and appropriately addressed.

Finally, as described in Section 5, the Applicant would continue to provide community updates via their existing community outreach programs, namely the Community Consultation Committee and Newsletter.

7.6 SCALE AND NATURE OF ANTICIPATED IMPACTS

The Amended Project would not result in any significant changes to the scale and nature of the anticipated environmental impacts of the Project as exhibited.

Section 7.5 of the EIS presents a detailed analysis of the Project as exhibited in consideration of the principles of ecological sustainable development as well the anticipated biophysical, social, and economic impacts. Section 6 identifies that the Amended Project is not likely to result in any additional biophysical impacts that were not considered as part of the EIS. **Table 5** presents the Amended Project in consideration of the principles of ecologically sustainable development.

Table 5
Principles of Ecological Sustainable Development

Principle	Consistency with the Amended Project
The Precautionary Principle	The Amended Project has been designed to ensure that the proposed layout changes are as close as practicable to that presented in the EIS, with no additional disturbance outside of the proposed Limit of Disturbance as presented in the EIS. In addition, the Eastern Borrow Pit has been positioned to an area with a higher degree of certainty of disturbance. This change could result in the avoidance of unnecessary disturbance.
Inter-generational Equity	The Amended Project would ensure that the economic and social benefits of the Project as exhibited would be realised through effective land management, planning, and design.
Conservation of Biological Diversity	The Amended Project would not result in any additional impacts to biodiversity values within or in the vicinity of the Project Site
Improved Valuation, Pricing and Incentive Mechanisms.	The design of the Amended Project has as far as practicable incorporated existing proposed infrastructure and/or disturbance areas of the Project Site as exhibited.

7.7 COMPLIANCE MONITORING AND COMMUNICATION

The Amended Project would not require any changes to the existing and proposed environmental monitoring and management measures as presented in the EIS.

Notwithstanding the Applicant would continue to monitor and report on the environmental performance of its operations and compliance with the relevant conditional requirements of all approvals, licences and consents in accordance with current procedures, amended as required to reflect SAR-specific commitments and requirements. In summary, the Applicant would implement the following.

- Undertake environmental monitoring in accordance with the commitments presented in **Appendix C** of this document, the revised and approved Management Plans for the Amended Project. The Management Plans would include all monitoring requirements embodied in approvals, licences and consents held for the Amended Project.

- Ensure in the case of real-time monitoring that all equipment is appropriately calibrated, maintained and connected to the existing automated notification system, with appropriate triggers for automated notifications.
- Ensure that when automated notifications from the real-time environmental monitoring network are received that appropriate responses are identified and implemented, including verifying the cause of the notification and implementing appropriate measures, where required, to manage the identified emissions.
- Ensure that the results of all monitoring are reviewed upon receipt for trends and compliance with relevant criteria and implement appropriate measures, where required, to manage identified non-compliances.
- Ensure that all monitoring results are saved to a suitable database to enable future retrieval and analysis.
- Ensure that any non-compliances are reported to the relevant Government authority in accordance with the conditions of the relevant approval, licence or consent.
- Ensure that all monitoring results are collated into monthly and annual reports and that those reports are published on the Applicant's website.
- Ensure that Independent Environmental Audits are undertaken regularly and the results of those audits published on the Applicant's website.
- Ensure that open and honest communication is maintained with the surrounding community, including but not limited to the following.
  - Regular meetings of the Community Consultative Committee.
  - Regular Community Newsletters.
  - Regular one-on-one meetings with all immediate rural neighbours (and residents of Tomingley village as requested or required).
  - Town Hall-style meetings as required.

7.8 REMAINING UNCERTAINTIES

As identified in Section 3.2.2, the exact location of the Relocation Roswell Ventilation Rise will depend on the results of targeted geotechnical drilling and the implications of future geological design constraints.

In addition to the above, a number of remaining uncertainties identified for the Project as exhibited remain current to the Amended Project.

As identified in the EIS, a wide range of measures have been implemented to identify potential Project-related risks and substantial and detailed technical and environmental studies have been undertaken to inform the design of the Project as exhibited. In addition, the Applicant has consulted widely with Government agencies and the surrounding community. As a result, the Applicant contends that it has adequately identified and addressed all substantive Project-related risks and environmental issues.

Throughout the assessment of the Project as exhibited, the Applicant has consistently assessed the worst-case scenario for each of the identified risks and environmental issues. As a result, the Applicant contends that there is limited potential for unanticipated Project-related impacts greater than those assessed, including for the Amended Project. Notwithstanding this, **Table 6** presents remaining Project-related uncertainties that may result in impacts greater than those assessed, and the mitigation measures proposed to manage each.

Table 6
Remaining Uncertainties and Proposed Mitigation Measures

Remaining Uncertainty	Proposed Mitigation Measure(s)
Additional ore may be discovered, requiring additional time, modified rate of processing, modified mining methods or disturbance areas.	• Apply for a modification or new development consent.
Additional waste rock may be extracted, requiring additional waste rock storage.	• Apply for a modification or new development consent.
The volume of residue produced may exceed the combined capacity of Residue Storage Facility 1 and 2.	• Apply for a modification or new development consent.
Rehabilitation operations may not achieve the proposed completion criteria identified in this document or any subsequent Rehabilitation Management Plan.	• Obtain the advice of suitably qualified expert(s) and implement the resulting recommendations to achieve the proposed criteria.
Noise, blasting or air quality emissions maybe greater than those assessed and impacts at surrounding residences may be greater than anticipated	• Continue to monitor noise, blasting and air quality emissions, including in real-time, and modify Project-related activities to ensure compliance with relevant criteria.
Surface water flows, including incident rainfall, may be greater than those assessed, resulting in failure of surface water control structures and/or discharge of water to natural drainage.	• Inspect all surface water control structures following rainfall and ensure that all surface water storages are managed in accordance with the revised and approved Water Management Plan.
Groundwater inflows or the extent of groundwater drawdown maybe greater than those assessed.	• Continue to monitor groundwater inflows to the mine workings and standing water levels in surrounding monitoring bores. • Undertake a review of the groundwater model and, if required, revise the modelling in 2024, prior to the expected peak in groundwater inflows. • Obtain suitable water access licence allocations for observed groundwater inflows and/or revised modelled inflows.
Agricultural productivity gains may be less than anticipated	• Monitor agricultural for all Applicant-owned land. • Obtain the advice of suitably qualified expert(s) and implement the resulting recommendations to achieve the proposed criteria.
Unanticipated Aboriginal or historic heritage objects may be identified.	• Implement the proposed Unanticipated Finds Protocol for both Aboriginal and historic heritage objects.

7.9 CONSEQUENCES OF NOT PROCEEDING

Section 7.8 of the EIS presents the consequences of not proceeding with the Project as exhibited. The following presents an overview of the consequences of not proceeding with the proposed amendments.

- The Roswell Ventilation Rise would be constructed in a sub-optimal location, requiring the Applicant to invest significantly more resources into the design and construction of the ventilation rise and reducing the efficiency of the proposed mining operations, reducing the economic benefits arising from the Project. Indeed, the Applicant has been advised that construction of the ventilation rise in the originally proposed location may pose engineering challenges that would not be practicable to overcome.
- The borrow pits would be constructed as exhibited, potentially resulting in disturbance of land that would not otherwise be required to be disturbed.

7.10 THE PUBLIC INTEREST

Section 4.15(1)(e) of the *Environmental Planning and Assessment Act 1979* requires a consent authority to consider the "public interest" in determining an application for development consent. The public interest is generally difficult to define as it depends on contextual factors and intangible and variable matters such as public opinion and public need. It therefore requires a balancing of public expectations of impacts and benefits, as well as support and opposition, but may also be considered in terms of the principles of ecologically sustainable development and the aims or 'objects' of the guiding legislation for the application (in this case, the *Environmental Planning and Assessment Act 1979*).

There is clearly evident support for the employment and other economic opportunities that the Project as exhibited would provide across the local and regional economies. However, it is also acknowledged that there is concern about the Project as exhibited from one immediate neighbour. This is to be expected given that those living closest to the Project Site would be more likely to experience both realised and perceived negative outcomes.

Notwithstanding the above, the Applicant contends that the Amended Project would be consistent with public interest compared to the Project as exhibited. The Amended Project would have environmental impacts no greater than those presented in the EIS and would result in reduced costs associated with development of the Roswell Ventilation Rise and reduced risk of disturbing land that may not otherwise be required to be disturbed,

7.11 CONCLUSION

The Amended Project remains consistent with the outcomes of the comprehensive and extensive environmental impact assessments undertaken for the Project as exhibited. This Report has shown that the Amended Project:

- has been designed in a manner that minimises the potential environmental impacts as far as reasonably practicable;

- is consistent with the Statutory and Strategic context of the Project as exhibited;
- would not result in any additional significant environmental impact; and
- would not require any additional environmental monitoring, management and mitigation measures as proposed in the EIS for the Project as exhibited.

The Amended Project is the result of the iterative planning and design of the overall Project and demonstrates the Applicant's commitment to continual refinements in response to the results of ongoing technical and environmental assessments. The Amended Project, as presented, provides an acceptable balance of environmental and social outcomes in achieving the economic benefits. In addition, the Amended Project would not negatively impact on the legacy of the final rehabilitation and land use of the Project Site.

Appendices

(Total No. of pages including blank pages = 154)

Appendix A Amended Project Description (122 pages)

Appendix B Amended Statutory Compliance Table (12 pages)

Appendix C Amended Mitigation Measures Table (18 pages)

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Appendix A

Amended Project Description

(Total No. of pages including blank pages = 122)

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Amended Project Description

PREAMBLE

This updated description of the Tomingley Gold Extension Project (the "Project") has been prepared as part of the Amendment Report for the Project. Where changes to the description of the Project as exhibited in Section 3 of the Environmental Impact Statement (EIS) have been made, these are indicated in red underlined text.

This section describes the Project's objectives, approvals required and defines the land to which any approval would apply. The section also describes the proposed site establishment / construction, realignment of public roads, mining, waste rock management, processing operations, residue and water management and transportation operations. The proposed non-production waste management, hours of operation, Project life, anticipated workforce, Capital Investment Value and proposed rehabilitation operations are also described.

The Project is described in sufficient detail to provide the reader with an overall understanding of the nature and extent of activities proposed. A range of additional information in relation to the following is provided in Appendix 4 of the EIS.

- *SAR Open Cut layout and design.*
- *Waste rock material characterisation.*
- *Assessment of the SAR Waste Rock Emplacement design.*
- *Mine Closure and Rehabilitation.*

Where appropriate, specialist studies undertaken to support the Project Description are presented in Appendices 5 to 14 of the EIS.

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3.1 Introduction

3.1.1 Project Overview

Table 3.1.1 presents an overview of the Project. **Figures 3.1.1**, **3.1.2** and **3.1.3** present the approved and proposed layout for the Project.

Table 3.1.1
Project Overview

Project Element	Description
Realignment of Public Roads	Realignment of the following public roads in accordance with the Austroads *Guide to Road Design* and the requirements of Transport for NSW and/or Narromine Shire Council. • Newell Highway. • Kyalite Road, including an overpass over the proposed Haul Road and Services Road. • Intersections with Back Tomingley West Road, Kyalite Road and McNivens Lane, including a new section of Back Tomingley West Road.
Relocation of Services/Utilities	The following services and utilities would be relocated. • 22kV transmission line operated by Essential Energy. • Fibreoptic telecommunications cable operated by Vocus. • Copper telephone cable operated by Telstra.
Mining Method	Continued mining from the approved Caloma Eastern Cutback. Continued underground mining within the Wyoming 1, Caloma 1 and Caloma 2 deposits. Proposed open cut mining of the SAR Open Cut. Proposed underground mining of the SAR deposits, rock or paste backfill of completed stopes. Access to the SAR Underground would initially be via a drive from the Wyoming 1 underground workings and, potentially late in the life of the Project, a portal within the SAR Open Cut.
Mineral Resource[1]	TGO – 8.614Mt @ 2.0g/t for 550 000oz Gold SAR – 21.4Mt @ 1.9g/t Au for 1 310 000oz
Ore Reserve[1]	TGO – 2.373Mt @ 1.9g/t for 144 000oz Gold SAR – 9.442Mt @ 1.9g/t Au for 563 000oz
Total Annual Production	Ore, low-grade and waste rock ..... up to 35.25Mtpa
Mine Life	To 31 December 2032
Total Resource Recovered	1 July 2021 to 31 December 2032..... up to 16.350Mt
Processing	Using the existing, approved processing plant, with an additional ball mill and associated infrastructure ..... up to 1.75Mtpa

Table 3.1.1 (Cont'd)
Project Overview

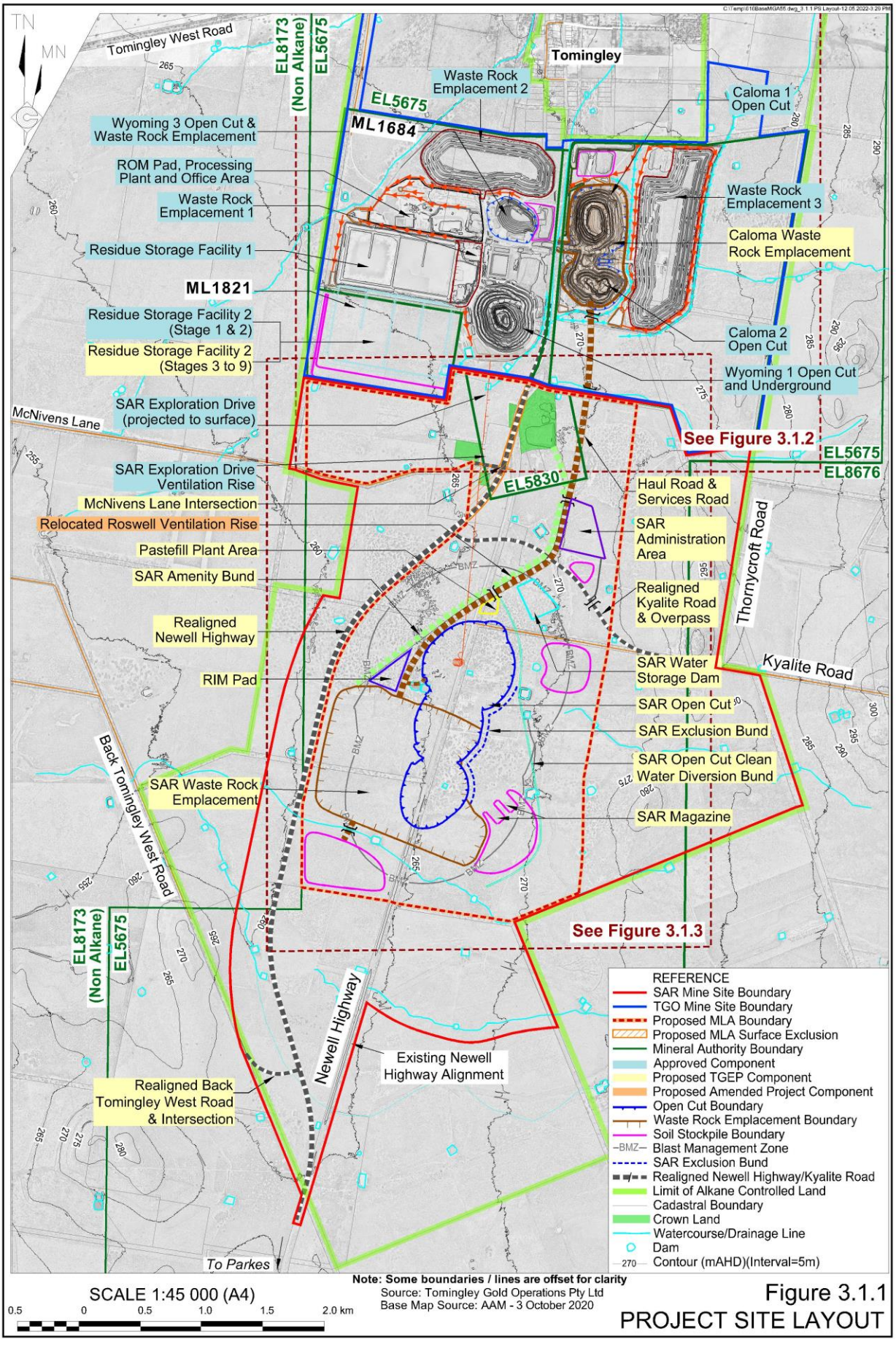
Project Element	Description
Management of Waste Rock	Placement of waste rock into the following. • Infrastructure, including for construction of the Haul Road, Services Road, SAR Amenity Bund, SAR Administration Area and other infrastructure, including public roads if of suitable quality. • Caloma Waste Rock Emplacement comprising an in-pit emplacement that would completely fill the final voids, with a maximum elevation of 277m AHD or approximately 5m above the pre-mining land surface. • SAR Waste Rock Emplacement, comprising an in-pit and out-of-pit emplacement that would completely fill the South and Central Pits, with a maximum elevation of 335m AHD or approximately 72m above the pre-mining land surface. • Wyoming 1 Open Cut, as required. • The embankment for ongoing lifts for Residue Storage Facility 2 and capping and rehabilitation of Residue Storage Facility 1 and 2. • Temporary surface stockpiles to allow material to be stockpiled for use during the Project lifetime.
Management of Residue/Tailings	• Construction and use of the approved RSF1 (to Stage 9, Cell 1) and RSF2 (to Stage 2). • Construction and use of Stages 3 to 9 of RSF2 to form an integrated landform with a maximum elevation of 286.5m AHD or approximately 21m above the pre-mining land surface. • Use for pastefill within the underground workings.
General Infrastructure	• Existing TGO infrastructure. • SAR Amenity Bund. • SAR Administration Area, including but not limited to offices, workshops, stores, a fuel store, wash bay, hardstand and carparks. • SAR Open Cut and SAR Administration Area Clean Water Diversion Bunds. • Surface water control infrastructure, including clean and dirty water diversions, sediment basins, pipelines and the SAR Site Water Storage. • SAR Site Access Road. • Pastefill Plant. • SAR Exploration Drive and Roswell ventilation rises. • Run-in-Mine (RIM) Pad.[2] • SAR Magazine. • Various site roads and hardstand areas.
Transportation	Internal Transportation • Continued use of the existing Newell Highway underpass and existing site roads and haul roads. • Construction and use of the Haul Road and Services Road linking the TGO Mine Site to the SAR Mine Site. External Transportation • Continued use of the TGO Site Access Road and intersection with Tomingley West Road. • Construction and use of the SAR Site Access Road and intersection with the realigned Kyalite Road.

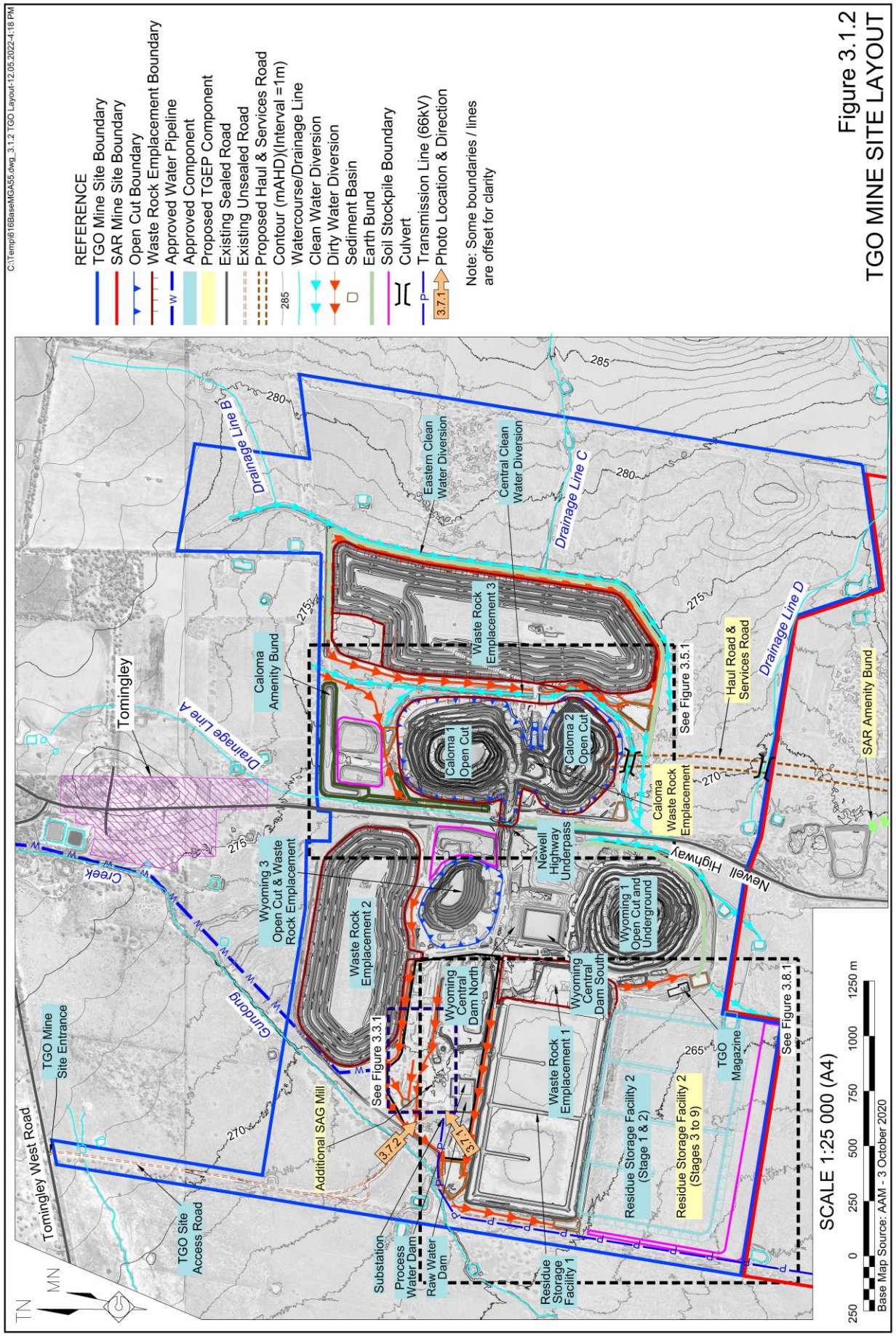
Table 3.1.1 (Cont'd)
Project Overview

Project Element	Description
Water Management	• Continued use of the approved water supply pipeline from the "Woodlands" bore near Narromine. • Construction and use of an approximately 2.4km pipeline from the "Dappo" bore to the approved water supply pipeline. • Transfer of up to 1 400MLpa of water from the above two bores to the TGO Mine Site under existing licences. • Continued separation of process, mine, dirty, raw and clean water, with process, mine and dirty water retained on site for mining-related purposes and clean water permitted to flow to natural watercourses. • Continued collection and management of groundwater inflows to the open cuts and underground operations and licencing under the relevant Water Sharing Plan. • Construction and use of additional water management structures, including the SAR Water Storage Dam and SAR Open Cut and Administration Clean Water Diversion Bunds. • Construction and use of dirty water diversion bunds and associated SAR sediment basins and use of the captured water for mining-related purposes. • Construction of one or more pipelines between the SAR and TGO Mine Site to permit two-way transfer of water.
Hours of Operation	• Construction, including road construction • Principal construction operations .....7am to 6pm/7 days per week • Selected, low impact activities.....24-hours/7 days per week • Mining, processing, waste rock management .....24-hours/7 days per week • Rehabilitation .....7am to 6pm/7 days per week
Operational workforce	Up to approximately 363 full direct time equivalent positions, plus contractors and indirect employment.
Capital Investment Value	$295.50 million.
Final Landform	• One bunded and fenced final void (Wyoming 1 Open Cut). • One partially backfilled final void (SAR Open Cut). • Three fully backfilled open cuts (Caloma 1 and 2 and Wyoming 3 Open Cuts). • Three shaped and rehabilitated Waste Rock Emplacements (Waste Rock Emplacements 2 and 3 and the SAR Waste Rock Emplacement). • A capped, free draining integrated Residue Storage Facility. • All infrastructure not required for the final land use removed or reduced in size.
Final Land Use	Agriculture and native ecosystem, with active investigation of alternative post-mining industrial uses.
Rehabilitation	Rehabilitation would occur progressively throughout the life of the Project, with the outer faces of the SAR Waste Rock Emplacements to be progressively shaped and revegetated, indicatively annually.

Note 1: Source – ASX announcement *Resource and Reserve Statements FY21* dated 7 September 2021 and ASX and Media Release – Dated 02 May 2022.

Note 2: A Run-in-Mine Pad is a hardstand area used to temporarily store ore or low-grade material prior to transportation to the Run-of-Mine (ROM) Pad.


TN
MN
Tomingley West Road
EL8173 (Non Alkane)
EL5675
Tomingley
Waste Rock Emplacement 2
Caloma 1 Open Cut
EL5675
ML1684
Wyoming 3 Open Cut & Waste Rock Emplacement
ROM Pad, Processing Plant and Office Area
Waste Rock Emplacement 1
Waste Rock Emplacement 3
Residue Storage Facility 1
Caloma Waste Rock Emplacement
ML1821
Residue Storage Facility 2 (Stage 1 & 2)
Residue Storage Facility 2 (Stages 3 to 9)
Caloma 2 Open Cut
Wyoming 1 Open Cut and Underground
SAR Exploration Drive (projected to surface)
McNivens Lane
See Figure 3.1.2
EL5675
EL8676
SAR Exploration Drive Ventilation Rise
EL5830
Haul Road & Services Road
McNivens Lane Intersection
Relocated Roswell Ventilation Rise
SAR Administration Area
Thornycroft Road
Pastefill Plant Area
SAR Amenity Bund
Realigned Kyalite Road & Overpass
Realigned Newell Highway
SAR Water Storage Dam
Kyalite Road
RIM Pad
SAR Open Cut
SAR Exclusion Bund
Back Tomingley West Road
SAR Open Cut Clean Water Diversion Bund
SAR Waste Rock Emplacement
SAR Magazine
EL8173 (Non Alkane)
EL5675
See Figure 3.1.3
Newell Highway
Existing Newell Highway Alignment
Realigned Back Tomingley West Road & Intersection
To Parkes
REFERENCE
SAR Mine Site Boundary
TGO Mine Site Boundary
Proposed MLA Boundary
Proposed MLA Surface Exclusion
Mineral Authority Boundary
Approved Component
Proposed TGEP Component
Proposed Amended Project Component
Open Cut Boundary
Waste Rock Emplacement Boundary
Soil Stockpile Boundary
BMZ Blast Management Zone
SAR Exclusion Bund
Realigned Newell Highway/Kyalite Road
Limit of Alkane Controlled Land
Cadastral Boundary
Crown Land
Watercourse/Drainage Line
Dam
270 Contour (mAHD)(Interval=5m)
SCALE 1:45 000 (A4)
0.5 0 0.5 1.0 1.5 2.0 km
Note: Some boundaries / lines are offset for clarity
Source: Tomingley Gold Operations Pty Ltd
Base Map Source: AAM - 3 October 2020
Figure 3.1.1
PROJECT SITE LAYOUT


C:\Temp\616BaseMGA55.dwg_3.1.2 TGO Layout-12.05.2022-4:18 PM
REFERENCE
TGO Mine Site Boundary
SAR Mine Site Boundary
Open Cut Boundary
Waste Rock Emplacement Boundary
Approved Water Pipeline
Approved Component
Proposed TGEP Component
Existing Sealed Road
Existing Unsealed Road
Proposed Haul & Services Road
Contour (mAHD)(Interval =1m)
Watercourse/Drainage Line
Clean Water Diversion
Dirty Water Diversion
Sediment Basin
Earth Bund
Soil Stockpile Boundary
Culvert
Transmission Line (66kV)
Photo Location & Direction
Note: Some boundaries / lines are offset for clarity
Figure 3.1.2
TGO MINE SITE LAYOUT
Drainage Line B
Eastern Clean Water Diversion
Central Clean Water Diversion
Drainage Line C
Drainage Line D
Tomingley
Caloma Amenity Bund
Drainage Line A
Waste Rock Emplacement 3
Caloma 1 Open Cut
Caloma 2 Open Cut
See Figure 3.5.1
Haul Road & Services Road
SAR Amenity Bund
Caloma Waste Rock Emplacement
Newell Highway
Newell Highway Underpass
Creek
Wyoming 3 Open Cut & Waste Rock Emplacement
Waste Rock Emplacement 2
Wyoming 1 Open Cut and Underground
Gundong
Wyoming Central Dam North
Wyoming Central Dam South
TGO Mine Site Entrance
See Figure 3.3.1
Waste Rock Emplacement 1
See Figure 3.8.1
TGO Magazine
Tomingley West Road
Additional SAG Mill
Residue Storage Facility 2 (Stage 1 & 2)
Residue Storage Facility 2 (Stages 3 to 9)
3.7.2
3.7.1
TGO Site Access Road
Substation
Process Water Dam
Raw Water Dam
Residue Storage Facility 1
TN
MN
SCALE 1:25 000 (A4)
250 0 250 500 750 1000 1250 m
Base Map Source: AAM - 3 October 2020

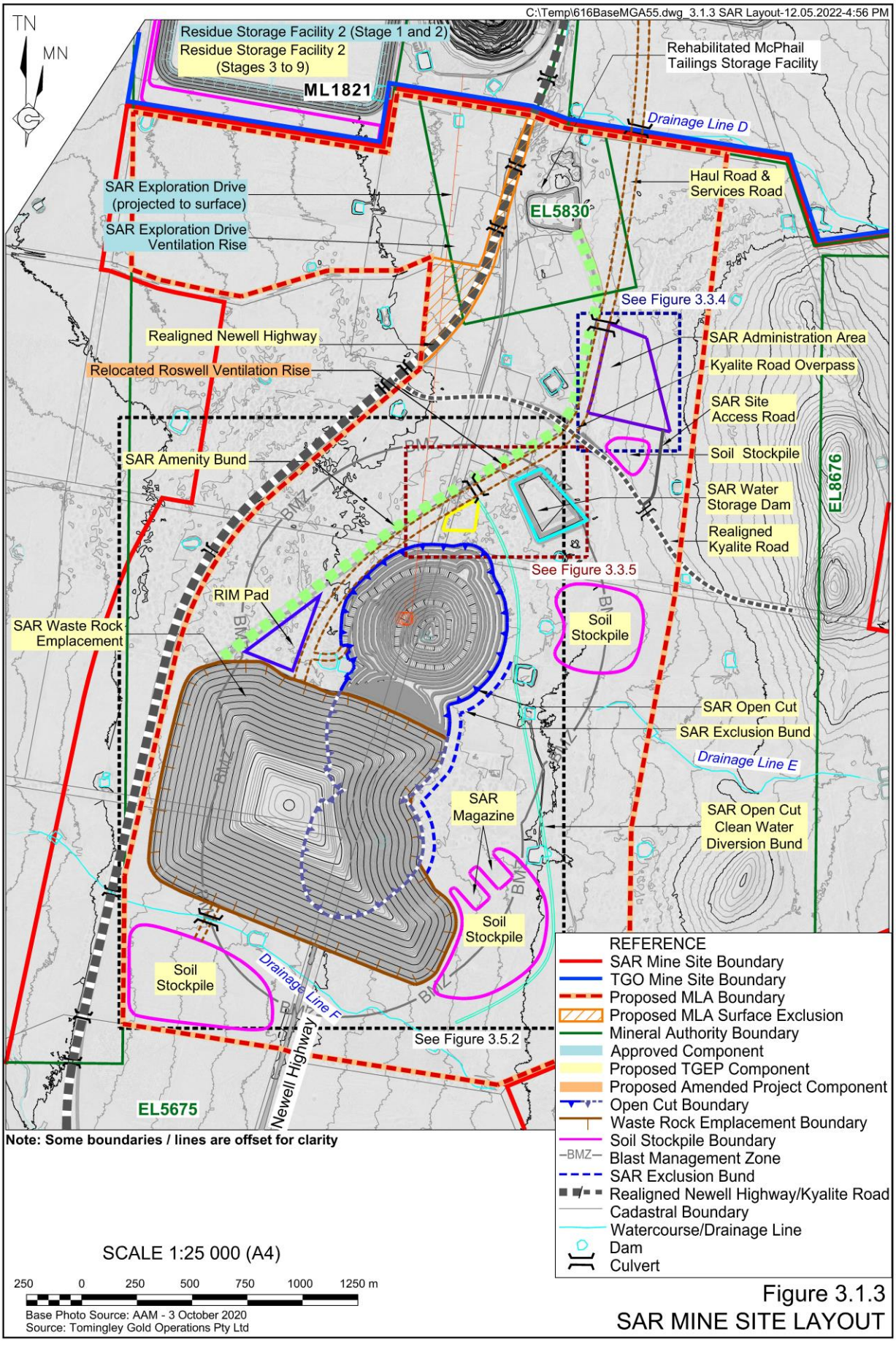


Figure 3.1.3
SAR MINE SITE LAYOUT

3.1.2 Approvals Required

The following approvals would be required for the Project. Consistent with Section 4.42 of the EP&A Act, once Development Consent has been received the following approvals cannot be refused and must be consistent with the development consent, as granted.

- Environment Protection Licence (EPL) under the *Protection of the Environment Operations Act 1997*.

  A modification of EPL20169 would be required to incorporate additional land associated with the SAR Mine Site and the proposed activities.

- Mining Lease under the *Mining Act 1992*.

  The Applicant currently holds Mining Lease (ML) 1684 and ML1821 for TGO (**Figure 3.1.1**). A new Mining Lease would be required over a section of the SAR Mine Site (**Figures 3.1.1** and **3.1.3**). The Applicant has limited the extent of the proposed Mining Lease Application (MLA) Area to that required for mining operations only. To the extent practicable, the MLA Area excludes the realigned Newell Highway and land that would be used for non-mining related purposes. Where the proposed realigned Highway would be constructed within the proposed MLA Area, the Applicant proposes to exclude the surface of the land in the MLA. The proposed MLA Area occupies sections of Exploration Licence (EL) 5830 and EL5675, both held by Alkane Resources Limited, the Applicant's parent company.

- A consent under Section 138 of the *Roads Act 1993.*

  Permits (and an associated Works Authority Deed) would be required from Transport for NSW and/or Narromine Shire Council for the relocation of public roads and associated intersections.

The following additional approvals would be required.

- A range of approvals under the *Water Management Act 2000*, including the following.
  - Bore licences – Licences for additional monitoring bores that have or would be constructed.
  - Water Access Licence(s) – for water that would flow into the existing and proposed open cut and underground workings.

The following approvals would not be required because of the operation of Section 4.41 of the EP&A Act.

- Aboriginal Heritage Impact Permit under Section 90 of the *National Parks and Wildlife Act 1974.*
- Water use approval under Section 89, a water management works approval under Section 90 or an activity approval under Section 91 of the *Water Management Act 2000*.

3.2 Project Site

3.2.1 Project Site Land Titles

The Project Site is the land to which any development consent granted in relation to the Project would apply. As identified in Section 1.2 of the EIS, the Project Site comprises the combined area of the TGO and SAR Mine Sites. Land associated with the "Woodlands" and "Dappo" bores also form a component of the Project Site. **Table 3.2.1** and **Figure 3.2.1** present the land titles within the Project Site.

Table 3.2.1
Project Site Land Titles

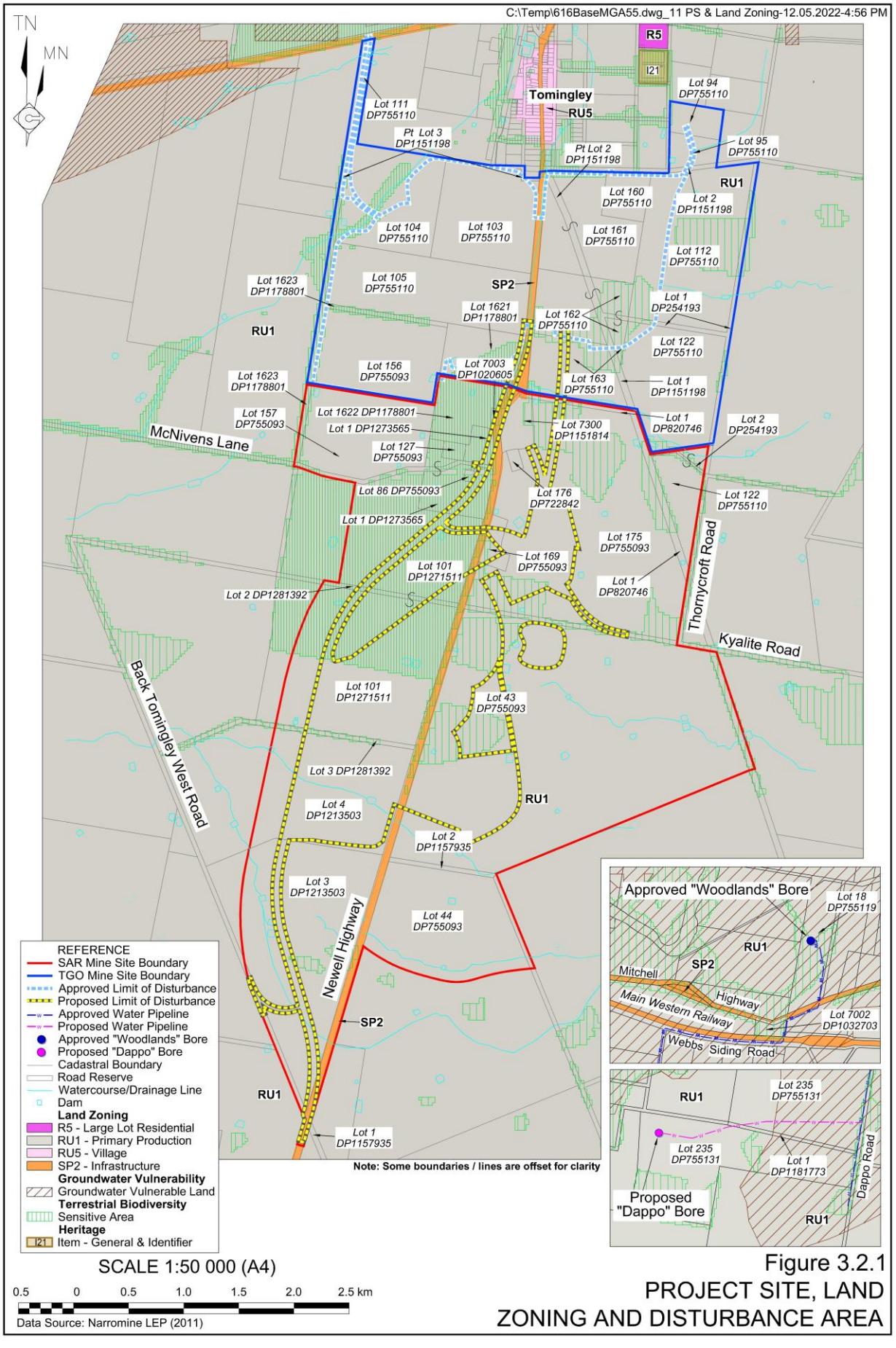
Lot	DP	Lot	DP	Lot	DP
TGO Mine Site					
156	755093	2	1151198	122	755110
1623	1178801	161	755110	112	755110
1621	1178801	160	755110	95	755110
105	755110	162	755110	94	755110
104	755110	163	755110	111	755110
103	755110	1	1151198		
3	1151198	1	254193		
Road reserve associated with the Newell Highway.					
SAR Mine Site					
3	1213503	7003	1020605	2	254193
4	1213503	7300	1151814	43	755093
101	1271511	176	722842	1623	1178801
44	755093	157	755093	2	1157935
86	755093	175	755093	2	1281392
1	1273565	169	755093	3	1281392
127	755093	1	820746		
1622	1178801	122	755110		
Road reserves associated with the Newell Highway, McNivens Lane, Kyalite Road, Back Tomingley West Road.					
"Woodlands" and "Dappo" bores and pipelines					
"Woodlands" bore		18	755119	7002	1032703
"Dappo" bore		235	755131	1	1181773
Road reserves associated with the Mitchell Highway, Webbs Siding Road, Dappo, Wallaby, Bootles, Pinedean and Tomingley Roads.					

3.2.2 Disturbance Area

Figure 3.2.1 presents the land that is currently approved to be disturbed as well as the land that would be disturbed as a result of the Project.

3.2.3 Land with Environmental Constraints

Figure 3.2.1 presents land with environmental constraints as identified by the *Narromine Local Environment Plan 2011*. Section 6 of the EIS identifies land with environmental constraints identified by the specialist consultant team.


C:\Temp\616BaseMGA55.dwg_11 PS & Land Zoning-12.05.2022-4:56 PM
TN
MN
R5
I21
Tomingley
RU5
Lot 111 DP755110
Lot 94 DP755110
Pt Lot 3 DP1151198
Pt Lot 2 DP1151198
Lot 95 DP755110
RU1
Lot 160 DP755110
Lot 2 DP1151198
Lot 104 DP755110
Lot 103 DP755110
Lot 161 DP755110
Lot 112 DP755110
Lot 1623 DP1178801
Lot 105 DP755110
SP2
Lot 1621 DP1178801
Lot 162 DP755110
Lot 1 DP254193
RU1
Lot 122 DP755110
Lot 156 DP755093
Lot 7003 DP1020605
Lot 1623 DP1178801
Lot 163 DP755110
Lot 1 DP1151198
Lot 157 DP755093
Lot 1622 DP1178801
Lot 1 DP1273565
Lot 7300 DP1151814
Lot 1 DP820746
Lot 2 DP254193
McNivens Lane
Lot 127 DP755093
Lot 86 DP755093
Lot 176 DP722842
Lot 122 DP755110
Lot 1 DP1273565
Lot 175 DP755093
Lot 169 DP755093
Lot 101 DP1271511
Lot 1 DP820746
Thornycroft Road
Lot 2 DP1281392
Kyalite Road
Back Tomingley West Road
Lot 101 DP1271511
Lot 43 DP755093
Lot 3 DP1281392
RU1
Lot 4 DP1213503
Lot 2 DP1157935
Lot 3 DP1213503
Newell Highway
Lot 44 DP755093
SP2
RU1
Lot 1 DP1157935
Approved "Woodlands" Bore
Lot 18 DP755119
RU1
SP2
Mitchell
Highway
Main Western Railway
Lot 7002 DP1032703
Webbs Siding Road
RU1
Lot 235 DP755131
Lot 235 DP755131
Lot 1 DP1181773
Dappo Road
Proposed "Dappo" Bore
RU1
REFERENCE
SAR Mine Site Boundary
TGO Mine Site Boundary
Approved Limit of Disturbance
Proposed Limit of Disturbance
Approved Water Pipeline
Proposed Water Pipeline
Approved "Woodlands" Bore
Proposed "Dappo" Bore
Cadastral Boundary
Road Reserve
Watercourse/Drainage Line
Dam
Land Zoning
R5 - Large Lot Residential
RU1 - Primary Production
RU5 - Village
SP2 - Infrastructure
Groundwater Vulnerability
Groundwater Vulnerable Land
Terrestrial Biodiversity
Sensitive Area
Heritage
I21 Item - General & Identifier
Note: Some boundaries / lines are offset for clarity
SCALE 1:50 000 (A4)
0.5 0 0.5 1.0 1.5 2.0 2.5 km
Data Source: Narromine LEP (2011)
Figure 3.2.1
PROJECT SITE, LAND ZONING AND DISTURBANCE AREA

3.3 Infrastructure, Services and Site Establishment

3.3.1 Introduction

The following subsections present the locations of key infrastructure within the Project Site that has previously been approved and would continue to be used for Project-related activities, as well as additional infrastructure that would be constructed to facilitate the proposed activities. A description of the site preparation activities that would apply to all areas of proposed disturbance is also provided.

Section 3.4 presents a description of the proposed realigned public roads.

3.3.2 Infrastructure and Services

3.3.2.1 Infrastructure to be Retained

Figures 3.1.2 and **3.3.1** present the approved infrastructure within the TGO Mine Site that would be retained for the Project. Each of the identified items, as well as ancillary infrastructure, would continue to be used under any new development consent to be granted for the Project.

3.3.2.2 Services to be Relocated

Figure 3.3.2 presents the services that would be required to be relocated for the Project. In summary, the following infrastructure would be relocated. Public roads to be realigned are presented in Section 3.4.

- 22kV transmission line operated by Essential Energy.
- Fibreoptic telecommunications cable operated by Vocus.
- Copper telephone cable operated by Telstra.

In each case, the Applicant has and would continue to consult with the relevant service managers in relation to relocation of the relevant service. Separate approvals would be obtained as required for relocation of each of the identified items. Relocated services would be constructed to the satisfaction of the relevant services manager.

3.3.2.3 Structures to be Removed

Figure 3.3.2 presents the structures and other items that would be removed as a result of the Project. In summary, this would include the following.

- "Rosewood" homestead and associated buildings and agricultural infrastructure not required for ongoing agricultural operations on Applicant-controlled land.
- "Kenilworth" homestead (to be relocated) and associated buildings and agricultural infrastructure not required for ongoing agricultural operations on Applicant-controlled land.
- Ruins of "Old Thornycroft."
- Advertising signage along the current alignment of the Newell Highway.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TGO INFRASTRUCTURE AREA
Figure 3.3.1
TGO Administration Area
TGO Car Park
Stores
Plant Buildings
Processing Plant
Indicative SAG Mill Footprint
Crushing and Screening Circuit
Settling Pond
Process Water Pond
Raw Water Pond
ROM Pad
Workshop
Workshop
Workshop
Geology Core Shed
Waste Rock Emplacement 2
TN
MN
SCALE 1:3 000 (A4)
50
0
50
100
150m
Source: Alkane Resources Pty Ltd

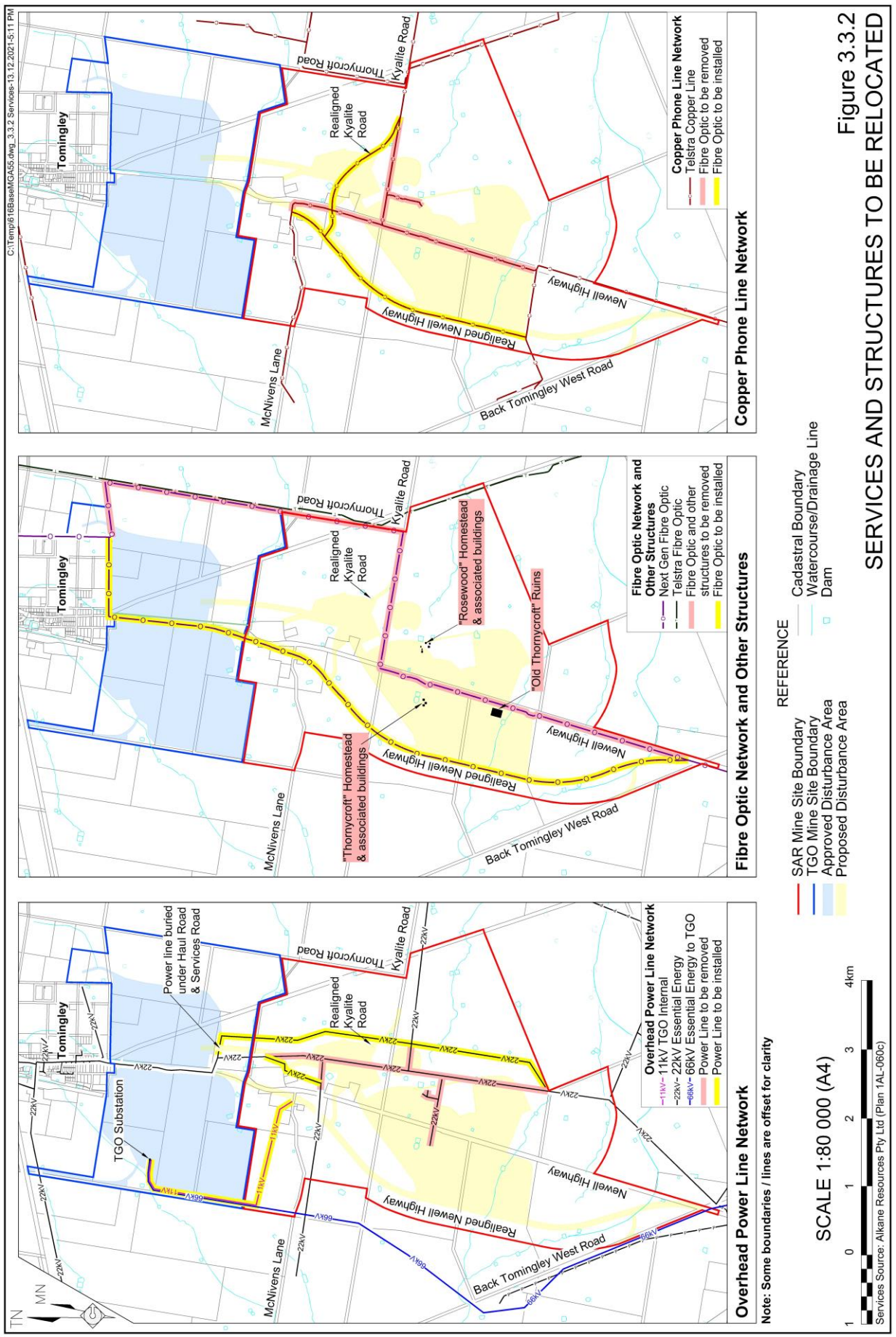


Figure 3.3.2
SERVICES AND STRUCTURES TO BE RELOCATED
Copper Phone Line Network
Fibre Optic Network and Other Structures
Overhead Power Line Network
Note: Some boundaries / lines are offset for clarity
REFERENCE
SAR Mine Site Boundary
TGO Mine Site Boundary
Approved Disturbance Area
Proposed Disturbance Area
Cadastral Boundary
Watercourse/Drainage Line
Dam
SCALE 1:80 000 (A4)
Services Source: Alkane Resources Pty Ltd (Plan 1AL-060c)
Tomingley
Realigned Kyalite Road
Thornycroft Road
Kyalite Road
McNivens Lane
Realigned Newell Highway
Newell Highway
Back Tomingley West Road
Copper Phone Line Network
Telstra Copper Line
Fibre Optic to be removed
Fibre Optic to be installed
"Rosewood" Homestead & associated buildings
"Old Thornycroft" Ruins
"Thornycroft" Homestead & associated buildings
Fibre Optic Network and Other Structures
Next Gen Fibre Optic
Telstra Fibre Optic
Fibre Optic and other structures to be removed
Fibre Optic to be installed
TGO Substation
Power line buried under Haul Road & Services Road
Overhead Power Line Network
11kV TGO Internal
22kV Essential Energy
66kV Essential Energy to TGO
Power Line to be removed
Power Line to be installed

Where practicable, removed items would be reconstructed or reused on site or recycled. Where reuse or recycling is not practicable, material that may be classified as General Solid Waste (non-putrescible) under the EPA's *Waste Classification Guidelines*, including demolition waste, would be placed into the SAR Waste Rock Emplacement. All other waste would be transported to a licenced waste management facility for disposal.

3.3.2.4 Haul Road, Services Road and SAR Amenity Bund

Figures 3.1.1 to **3.1.3** present the location of the proposed Haul Road, Services Road and SAR Amenity Bund. **Figure 3.3.3** presents the indicative design criteria of each of these items.

The Haul Road would permit surface haul trucks to transport ore and waste rock from the SAR Open Cut to the TGO Mine Site. The road would be sufficiently wide to permit two-way use by haul trucks travelling in opposite directions.

The Services Road would be constructed adjacent to the Haul Road and would permit use by smaller vehicles, including light vehicles and service vehicles. The Services Road would be sufficiently wide to permit two-way use by vehicles travelling in opposite directions.

A pipeline corridor would be installed between the Haul Road and Services Road. The pipeline corridor would permit the installation of a range of infrastructure to facilitate transfer of water (and potentially residue – see Section 3.5.3.2) between the SAR Mine Site and TGO Mine Site. Pipelines transferring residue or process water would be bunded and fitted with leak detection equipment and automatic pump shutdown mechanisms. These mechanisms, together with the proposed bunding, would ensure that any leakage or rupture of those pipelines would not result in discharge of material to natural drainage.

Culverts would be installed under the Haul Road and Services Road as shown on **Figures 3.1.2** and **3.1.3**. The culverts would permit water from upslope of disturbed sections of the SAR Mine Site to pass under the Haul Road and Services Road without mixing with water from disturbed areas. In addition, road-side drainage would be installed on both the Haul Road and Services Road to convey and manage surface water in a manner consistent with *Managing Urban Stormwater Volume 2C – Unsealed Roads.*

An amenity bund would be constructed on the western side of the Haul Road. The SAR Amenity Bund would be approximately 7m high, with side slopes of approximately 1:3 (V:H). Once constructed, soil would be spread and the landform revegetated with grass species as described in Section 3.14.8. The bund would be constructed in a manner that would ensure that vehicles operating on the Haul Road would, to the extent practicable, not be visible to motorists using the Newell Highway, limiting the potential for driver distraction on the Highway, as well as minimising visual amenity impacts from public and private vantage points to the west of the SAR Mine Site.

The SAR Amenity Bund would tie into the SAR Waste Rock Emplacement at the southern end and the rehabilitated McPhail Tailings Storage Facility at the northern end. It would also tie into the proposed embankment for the Kyalite Road overpass (see Section 3.4.2.2). Gaps would be left in the bund in the vicinity of the proposed Haul Road and Services Road culverts to permit surface water flows as well in the vicinity of the rehabilitated McPhail Tailings Storage Facility for powerline maintenance access.

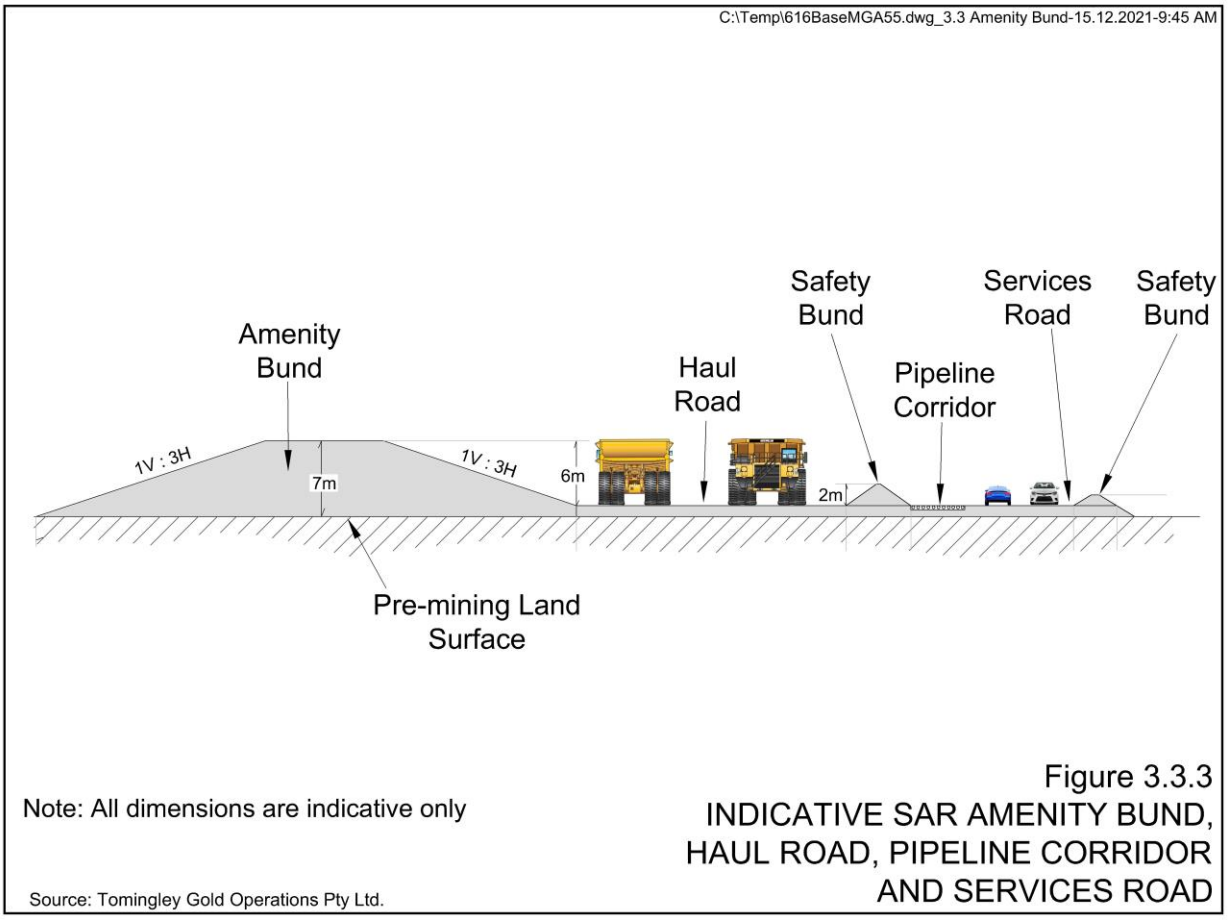


Figure 3.3.3
INDICATIVE SAR AMENITY BUND, HAUL ROAD, PIPELINE CORRIDOR AND SERVICES ROAD

Finally, a temporary amenity bund would be constructed between the Haul Road and Tomingley village from the southern boundary of the Caloma Waste Rock Emplacement to the Newell Highway underpass. Alternatively, the haul road may be constructed in-pit, below natural ground surface, during in-pit waste rock placement operations.

3.3.2.5 Internal Roads

Existing internal roads within the TGO Mine Site would continue to be used for mining-related purposes, including the Newell Highway underpass (**Figure 3.1.2**). In addition, a range of additional internal roads within the SAR Mine Site would be constructed and used as follows.

- The SAR Site Access Road. This road would permit access from the realigned Kyalite Road to the SAR Administration Area. The road would permit two-way access for all road-registered vehicles likely to access the SAR Mine Site. The intersection of the SAR Site Access Road and the realigned Kyalite Road would be a T-intersection with a Basic Auxiliary Left turn treatment (see Section 3.4.2.3). The intersection would be controlled by a Stop sign for traffic entering Kyalite Road.
- Perimeter and access roads and tracks would be constructed as required within the proposed limit of disturbance, including within the proposed SAR Open Cut Buffer Zone. These roads and tracks would permit access for mine-related vehicles to active sections of the SAR Mine Site.

3.3.2.6 SAR Administration Area

Figure 3.3.4 presents the indicative layout of the Administration Area. In summary, the Administration Area would include the following.

- A range of hardstand and laydown areas suitable for all weather access by light and heavy vehicles.
- An unsealed car park for employees and visitors suitable for up to approximately 75 vehicles. The car park would incorporate an Emergency Muster Point.
- A security fence and gate separating the publicly accessible car park from the active sections of the SAR Mine Site.
- An office and associated crib or break room.
- Load and haul workshop and drillers workshop, including hydrocarbon storage facilities constructed in accordance with Australian Standard *AS 1940-2017 - The Storage and Handling of Flammable and Combustible Liquids.*
- A stores facility for receipt and storage of consumables.
- A fuel store comprising storage for up to 500 000L of diesel in accordance with AS1940-2017.
- A wash bay, including a concrete sealed washdown area equipped with a sump that would collect wash water. Accumulated water from the wash bay would be recycled or passed through an oil-water separator to ensure oily water is not permitted to be discharged from the SAR Mine Site.
- Separate road networks for mine and non-mine traffic, with only authorised vehicles and drivers permitted to access the mine road network.
- A substation and associated SAR Mine Site electrical distribution network.
- One or more wastewater treatment system(s) installed in accordance with the requirements of Narromine Shire Council.
- A reverse osmosis plant to produce potable water, with the produced wastewater recycled into the mine water system.
- All buildings, whether temporary or permanent, would be constructed to comply with the Building Code of Australia and, where required, construction and occupation certificates would be obtained prior to use.

3.3.2.7 SAR Power, Water and Communications

Power for operations within the TGO Mine Site would continue to be provided by the existing 66kV transmission line and substation.

Power for surface operations within the SAR Mine Site, would be provided by the relocated 22kV powerline and a proposed substation within the Administration Area.

Figure 3.3.4
INDICATIVE SAR ADMINISTRATION AREA LAYOUT

Power for the SAR Underground operations may be provided via a proposed 11kV distribution line from the existing TGO Substation to a location near the SAR Exploration Decline Ventilation Rise (**Figure 3.3.2**). Alternatively, power for the SAR Underground may be provided from an upgraded TGO Underground power supply.

Water management infrastructure within the TGO Mine Site would remain unchanged as a result of the Project and is described in the approved TGO *Water Management Plan*. Water management infrastructure within the SAR Mine Site is described in Section 3.9.2 and would, in summary, include the following (**Figure 3.1.3**).

- Water transfer pipeline(s) installed within the pipeline corridor adjacent to the Services Road. The pipeline(s) would permit water to be transferred in either direction between the SAR Mine Site and the TGO Mine Site, as required.
- The SAR Water Storage Dam. This dam would be constructed as an off-stream "turkey's nest" dam with no surface catchment (**Figure 3.3.5**). The dam would have an indicative capacity of approximately 180ML.
- Clean water diversion bunds that would divert clean water around the proposed disturbance areas.
- A range of dirty water catch catchment banks and sediment basins constructed in accordance with *Managing Urban Stormwater* (Landcom, 2004) and associated guidelines.

Potable water for the TGO Mine Site would continue to be sourced from the existing reverse osmosis plant. Potable water for the SAR Mine Site would be sourced from a suitably sized reverse osmosis plant located within the SAR Administration Area.

Telephone, internet and data services requirements within the TGO Mine Site would continue to be provided via the existing or an upgraded fibre optic connection. Within the SAR Mine Site, these services would be provided by a proposed fibre optic connection from the relocated Vocus or existing Telstra fibre optic networks. Mobile phones and 2-way radio would also be used.

3.3.2.8 Explosive Storage

Bulk explosives, emulsion and other blasting products would be transported to the TGO and SAR Mine Sites as required by a licensed contractor and stored within the existing TGO magazine or the proposed SAR magazine (**Figures 3.1.2** and **3.1.3**). The magazines are (in the case of the TGO magazine) and would be (in the case of the SAR magazine) located, constructed, secured and licenced in accordance with the relevant guidelines.

3.3.2.9 Flexible Elements – Infrastructure and Services

Table 3.3.1 presents the infrastructure-related flexible elements that cannot be described with certainty at this stage of the Project, together with clear limits on the flexibility sought and a justification of each element. Elements that may be smaller or have lesser impacts than that proposed are not described.

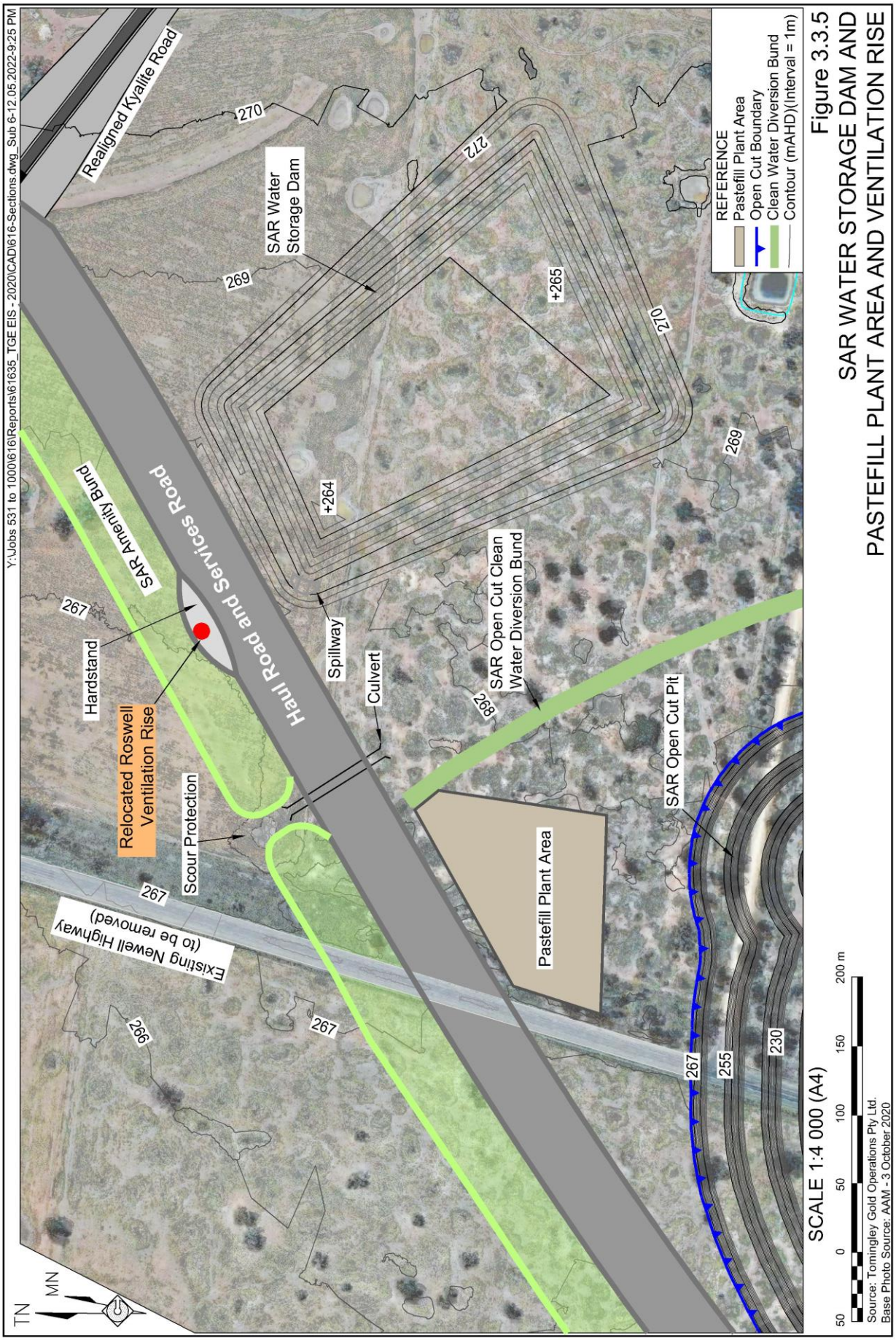


Figure 3.3.5
SAR WATER STORAGE DAM AND
PASTEFILL PLANT AREA AND VENTILATION RISE

Table 3.3.1
Flexible Elements – Mining Operations

Flexible Element	Limit on Flexibility	Justification
Location and size of proposed infrastructure	All infrastructure-related surface disturbance, including surface tracks, to be located within the proposed limit of disturbance. All buildings and structures to be constructed in accordance with the Building Code of Australia and appropriate construction and operation certificates obtained.	Detailed design for aspects of the infrastructure required for the Project was ongoing at the time of finalisation of this document. As a result, it is possible that the location and size of infrastructure described in this subsection may vary from that described. Notwithstanding this, all infrastructure would be constructed within the approved limit of disturbance and in accordance with the relevant guidelines.

3.3.3 Site Preparation

3.3.3.1 Introduction

The site preparation activities for all key components for the Project would be sequenced to achieve the commencement of mining operations approximately 9 months after all pre-conditions to Project commencement have been satisfied. A brief description of general SAR site establishment activities is provided in the following subsections. A description of the site establishment and construction components for the public road network is described in Section 3.4.

The Applicant would prepare a *Mine Site Construction Environmental Management Plan* that would address all relevant construction-related environmental management measures to be implemented during construction of on-site infrastructure in accordance with the conditional requirements of any development consent that may be issued for the Project.

3.3.3.2 Site Mark Out

The approved boundaries of areas to be disturbed during the site preparation stage would be surveyed and marked out prior to the commencement of disturbance.

3.3.3.3 Installation of Initial Site Infrastructure

Erosion and sediment controls for each operational area would be established in accordance with one or more *Erosion and Sediment Control Plans* to be prepared for the Project. No substantial vegetation clearing or earthworks would commence until all required erosion and sediment controls are in place.

A mine construction laydown area, comprising a hardstand area, a range of transportable buildings, a temporary workshop and materials management facilities would be established within the SAR Administration Area.

The SAR Water Storage Dam and water supply pipeline from the TGO Mine Site would be installed to ensure adequate supply of water for dust suppression and other purposes.

3.3.3.4 Vegetation Clearing

Vegetation clearing would be undertaken in accordance with an approved *Biodiversity Management Plan*. In summary, available seed would be collected where practicable prior to clearing of vegetation. Larger vegetation would be removed using a bulldozer. Larger trees with hollows would be gently nudged to allow nesting or roosting fauna to escape prior to clearing. Cleared timber would either be mulched or used for biochar, habitat reconstruction or off-site beneficial uses such as saw logs, firewood or fencing.

Ground cover vegetation would be removed with the topsoil.

3.3.3.5 Soil Mapping Units and Soil Balance

Soil for rehabilitation of the TGO Mine Site has either already been stripped and is in existing soil stockpiles or, in the case of Residue Storage Facility 2, would be stripped and stockpiled in accordance with the existing development consent and approved Mining Operations Plan. In summary, between 0.4m and 0.6m of soil would be stripped from the footprint of Residue Storage Facility 2 and stockpiled immediately to the south of the facility. Approximately 760 000m^3 of soil would be available for rehabilitation of the TGO Mine Site, with approximately 641 000m^3 required for rehabilitation operations.

Soil for rehabilitation of the SAR Mine Site would be stripped, stockpiled and respread over the rehabilitated landform in accordance with the procedures described in Section 6.8 of the EIS. In summary, six Soil Mapping Units (SMUs) were identified within the SAR Mine Site (**Figure 3.3.6**). **Table 3.3.2** presents the soil stripping depths and volume of soil available to be stripped **Table 3.3.3** presents proposed soil placement depths and volume of soil required to be placed. In summary, approximately 2.88Mm^3 of soil would be available to be stripped and 0.83Mm^3 of soil would be required for rehabilitation operations.

Table 3.3.2
SAR Mine Site Soil Stripping Depths and Volume

Soil Mapping Unit	Area to be disturbed (ha)	Recommended Stripping Depth (cm)		Volume available to be stripped (m^3)	
		Topsoil	Subsoil	Topsoil	Subsoil
Chromosol	189	30	50	567 000	945 000
Andesite Chromosol	28		70	84 000	196 00
Sodosol	111		50[1]	333 000	555 000
Gilgai	133	30[2]	Nil	199 500	Nil
Disturbed	1	Nil	Nil	Nil	Nil
Total	**462**			**1 183 500**	**1 696 000**

Note 1: Sodosol subsoil would require the addition of gypsum at a rate of 2 t/ha for each 10cm of subsoil stripped during stripping operations.

Note 2: Topsoil would only be stripped from the elevated sections of the Gilgai SMU, conservatively assumed to be 50% of the available area.

Source: SSM (2021a) – modified after Table 8.2

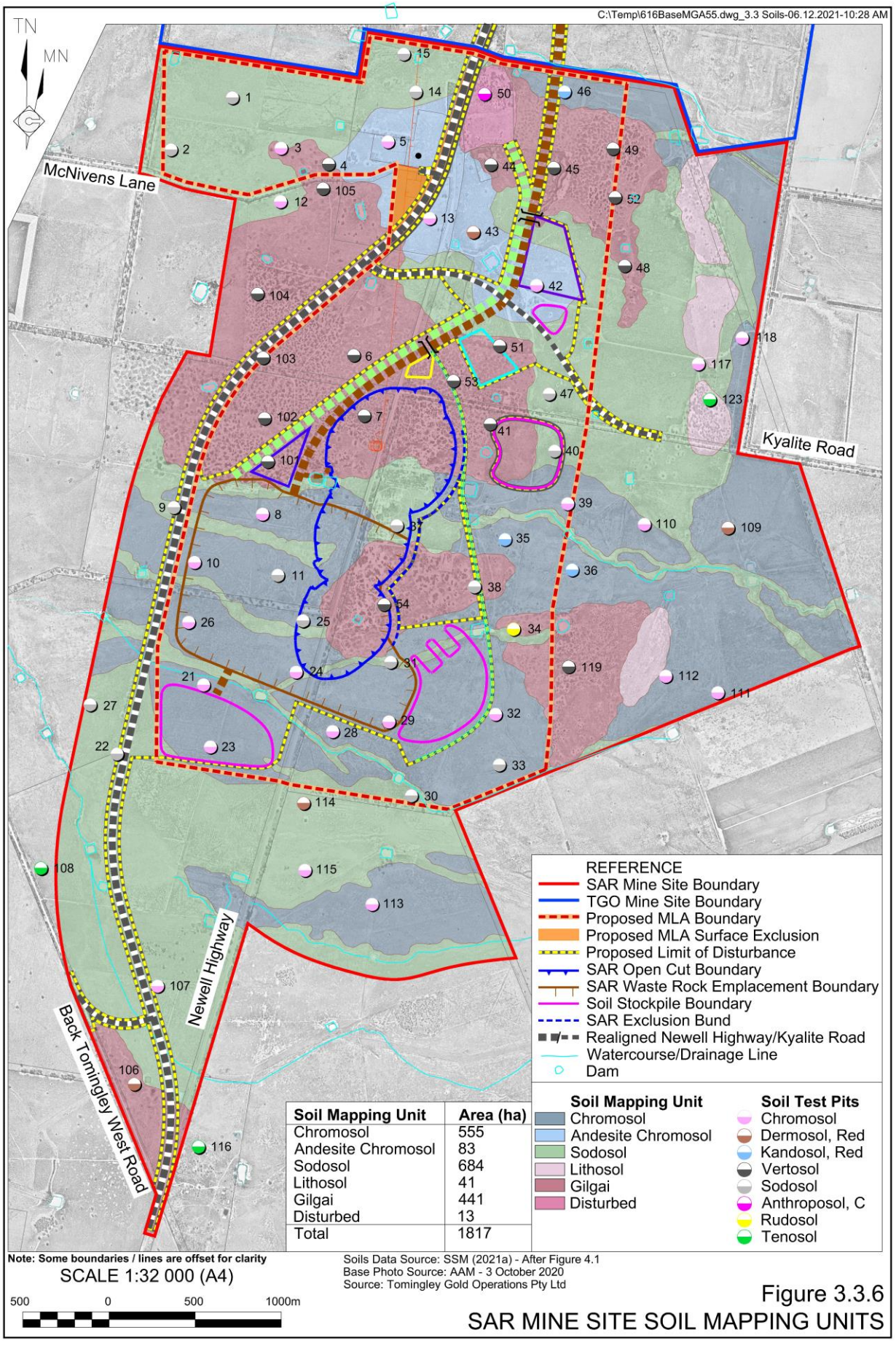

C:\Temp\616BaseMGA55.dwg_3.3 Soils-06.12.2021-10:28 AM
TN
MN
McNivens Lane
Kyalite Road
Newell Highway
Back Tomingley West Road
REFERENCE
SAR Mine Site Boundary
TGO Mine Site Boundary
Proposed MLA Boundary
Proposed MLA Surface Exclusion
Proposed Limit of Disturbance
SAR Open Cut Boundary
SAR Waste Rock Emplacement Boundary
Soil Stockpile Boundary
SAR Exclusion Bund
Realigned Newell Highway/Kyalite Road
Watercourse/Drainage Line
Dam
Soil Mapping Unit
Chromosol
Andesite Chromosol
Sodosol
Lithosol
Gilgai
Disturbed
Soil Test Pits
Chromosol
Dermosol, Red
Kandosol, Red
Vertosol
Sodosol
Anthroposol, C
Rudosol
Tenosol
Soil Mapping Unit | Area (ha)
Chromosol | 555
Andesite Chromosol | 83
Sodosol | 684
Lithosol | 41
Gilgai | 441
Disturbed | 13
Total | 1817
Note: Some boundaries / lines are offset for clarity
SCALE 1:32 000 (A4)
500 0 500 1000m
Soils Data Source: SSM (2021a) - After Figure 4.1
Base Photo Source: AAM - 3 October 2020
Source: Tomingley Gold Operations Pty Ltd
Figure 3.3.6
SAR MINE SITE SOIL MAPPING UNITS

Table 3.3.3
SAR Mine Site Soil Placement Depths and Volume

Final Landform Element	Area to be rehabilitated	Recommended Minimum Placement Depth	Volume to be Placed
SAR Waste Rock Emplacement	140ha[1]	30cm	420 000m^3
All other mining-related disturbance	209ha	20cm	418 000m^3
		Total	**838 000m^3**
Note 1: Footprint of the SAR Waste Rock Emplacement = 136ha. Surface area of the constructed SAR Waste Rock Emplacement = 140ha.			
Source: SSM (2021a) – modified after Table 8.4			

3.3.3.6 Borrow Pits

Finally, the Applicant would establish a number of borrow pits within the footprint of the proposed SAR Waste Rock Emplacement and SAR Open Cut (see **Figure 3.5.8** in Section 3.5.4.3). Material would be extracted and used for the establishment of infrastructure within the SAR Mine Site, including the Haul Road, Services Road, SAR Amenity Bund, Administration Area and RIM Pad, as well as the realigned public road network. Borrow material would only be used for purposes for which it would be fit for purpose, with imported material or TGO waste rock used for purposes for which the borrow material would not be suitable.

The borrow pits would be internally draining and following completion, would be incorporated into the proposed SAR Open Cut or backfilled with waste rock during mining operations.

3.4 Realigned Public Roads

3.4.1 Introduction

The current alignment of sections of the Newell Highway and Kyalite Road are within the proposed SAR Open Cut (**Figure 3.1.1**). The Applicant proposes to realign the Newell Highway and Kyalite Road to ensure that the realigned roads are outside the blast management zone for the SAR Open Cut and therefore do not need to be closed during surface blasting operations. In addition, a section of Back Tomingley West Road would be realigned and the intersections of Kyalite Road, McNivens Lane and Back Tomingley West Road would be reconstructed.

This subsection presents a brief description of the proposed realigned public roads and modified intersections. The Applicant has appointed Constructive Solutions Pty Ltd (Constructive Solutions) to prepare the designs for the realigned public roads and modified intersections. Those designs are being prepared in consultation with the roads authorities, namely Transport for NSW and Narromine Shire Council, with a Works Authority Deed currently in negotiation with Transport for NSW.

The road design process is an iterative one, with conceptual designs submitted to Transport for NSW and Narromine Shire Council, with feedback then incorporated into the next design round. For the purpose of this EIS, the Applicant has adopted the 100% concept design (Rev 0).

Appendix 5 of the EIS presents the 100% Concept Design Report (Constructive Solutions, 2021a) relied upon in preparing the following description. Reliance was also placed upon the updated Integrated Transport Assessment (Constructive Solutions, 2022) presented as Appendix 4 of the *Submissions Report*.

Finally, the Applicant would prepare a *Public Road Construction Environmental Management Plan* that would address all relevant construction-related environmental management measures to be implemented during construction of the realigned Newell Highway and Kyalite Road and associated intersections. That Plan would be prepared in accordance with:

- Transport for NSW QA Specification G36 – Environmental Protection; and
- any conditional requirements of any development consent that may be issued for the Project.

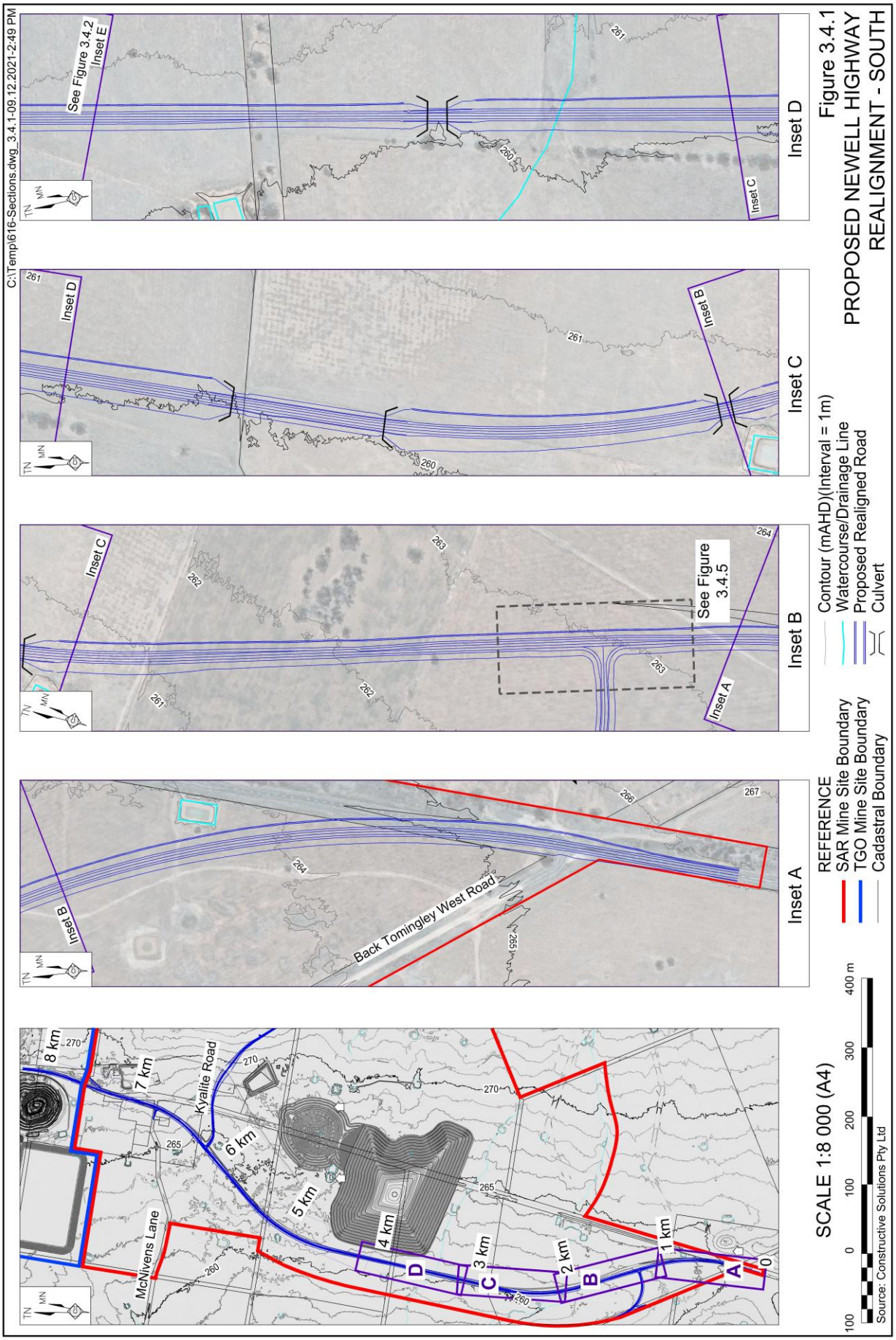
3.4.2 Layout and Design

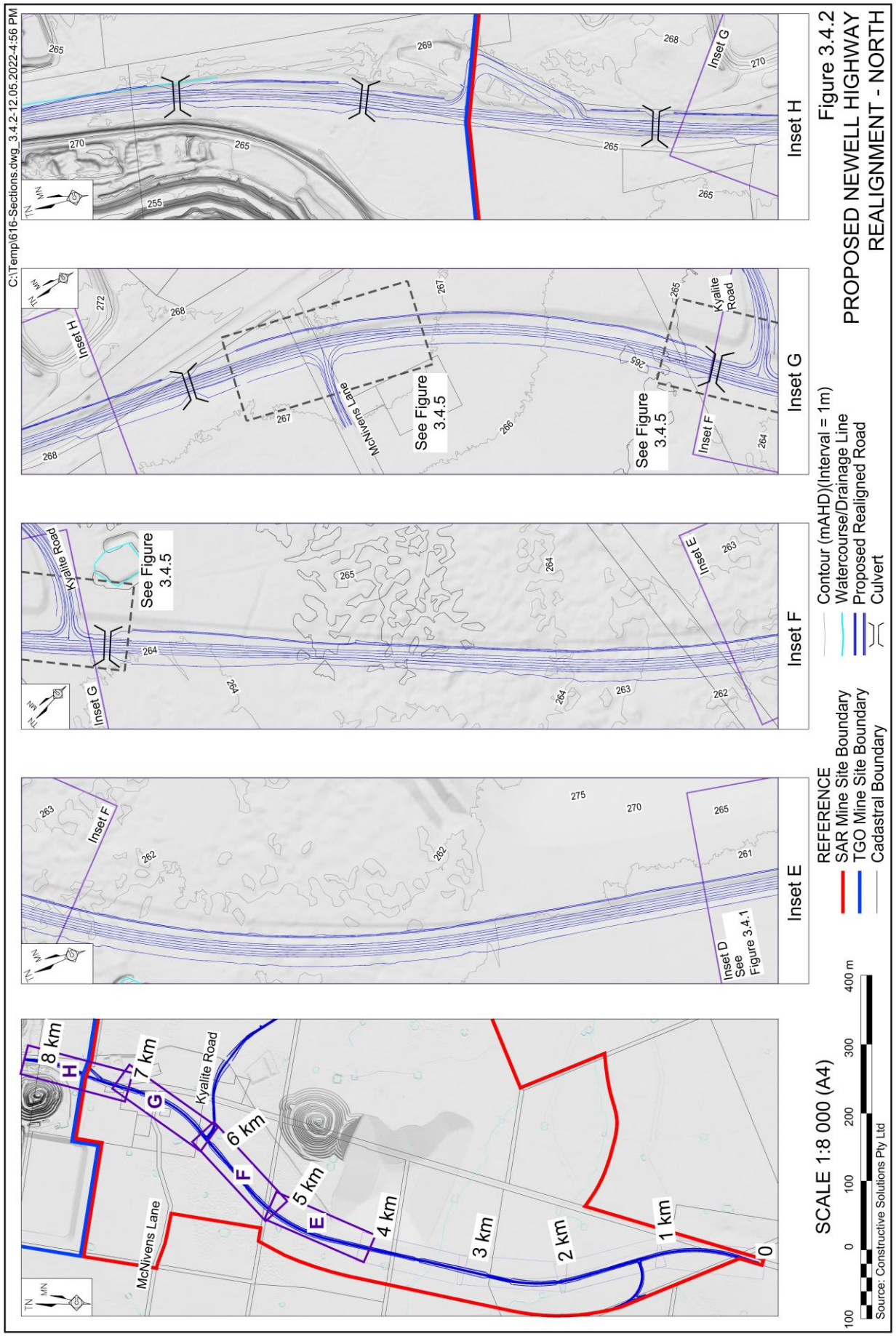
3.4.2.1 Newell Highway

Table 3.4.1 and **Figures 3.4.1** and **3.4.2** present an overview of the 100% concept design for the proposed realigned Newell Highway. In summary, the realigned Highway would have the same or improved design criteria as the existing Highway.

Table 3.4.1
Newell Highway Design Criteria

Parameter	Design Criteria
Design speed	120km/h
Posted speed limit	110km/h
Number of lanes	One in each direction, with an overtaking lane approximately 1 500m long in each direction.
Lane width	3.5m
Shoulder	2.0m (sealed)
Fill batter slopes	1:6 (V:H) except in the vicinity of culverts.
Safety Barrier	Over culverts and where batters steeper than 1:2 (V:H).
Design vehicle	B-triple (36.5m)
Distance from SAR Open Cut	Minimum 650m
Flood protection	Underside of pavement above 20% AEP flood level 1.
Road reserve	80m wide, except where constrained by Crown land or non-Applicant owned land.
Note 1: AEP = Annual Exceedance Probability or the probability of a rainfall event occurring in any 12 month period. A 5% AEP flood event would have a 5% probability of occurring each year. Such a flood event is colloquially known as a 1 in 20 year flood event.	
Source: Constructive Solutions (2022) – modified after Table 3 and Constructive Solutions (2021b) – after Section 4.4.	


C:\Temp\616-Sections.dwg_3.4.1-09.12.2021-2:49 PM
Figure 3.4.1
PROPOSED NEWELL HIGHWAY
REALIGNMENT - SOUTH
Inset D
Inset C
Inset B
Inset A
See Figure 3.4.2
See Figure 3.4.5
Back Tomingley West Road
Kyalite Road
McNivens Lane
8 km
7 km
6 km
5 km
4 km
3 km
2 km
1 km
A
B
C
D
0
Contour (mAHD)(Interval = 1m)
Watercourse/Drainage Line
Proposed Realigned Road
Culvert
REFERENCE
SAR Mine Site Boundary
TGO Mine Site Boundary
Cadastral Boundary
SCALE 1:8 000 (A4)
100 0 100 200 300 400 m
Source: Constructive Solutions Pty Ltd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Inset H
Inset G
Inset F
Inset E
Inset D See Figure 3.4.1
See Figure 3.4.5
McNivens Lane
Kyalite Road
Inset G
Inset F
Inset E
Inset H
8 km
7 km
6 km
5 km
4 km
3 km
2 km
1 km
0
H
G
F
E
REFERENCE
SAR Mine Site Boundary
TGO Mine Site Boundary
Cadastral Boundary
Contour (mAHD)(Interval = 1m)
Watercourse/Drainage Line
Proposed Realigned Road
Culvert
SCALE 1:8 000 (A4)
100 0 100 200 300 400 m
Source: Constructive Solutions Pty Ltd
Figure 3.4.2
PROPOSED NEWELL HIGHWAY
REALIGNMENT - NORTH

3.4.2.2 Local Roads

Table 3.4.2 and **Figures 3.4.3** and **3.4.4** present an overview of the design for the proposed realigned local roads, namely Kyalite Road and Back Tomingley West Road. The principal works required for McNivens Lane would involve reconstruction of the intersection with the Newell Highway which is described in Section 3.4.2.3.

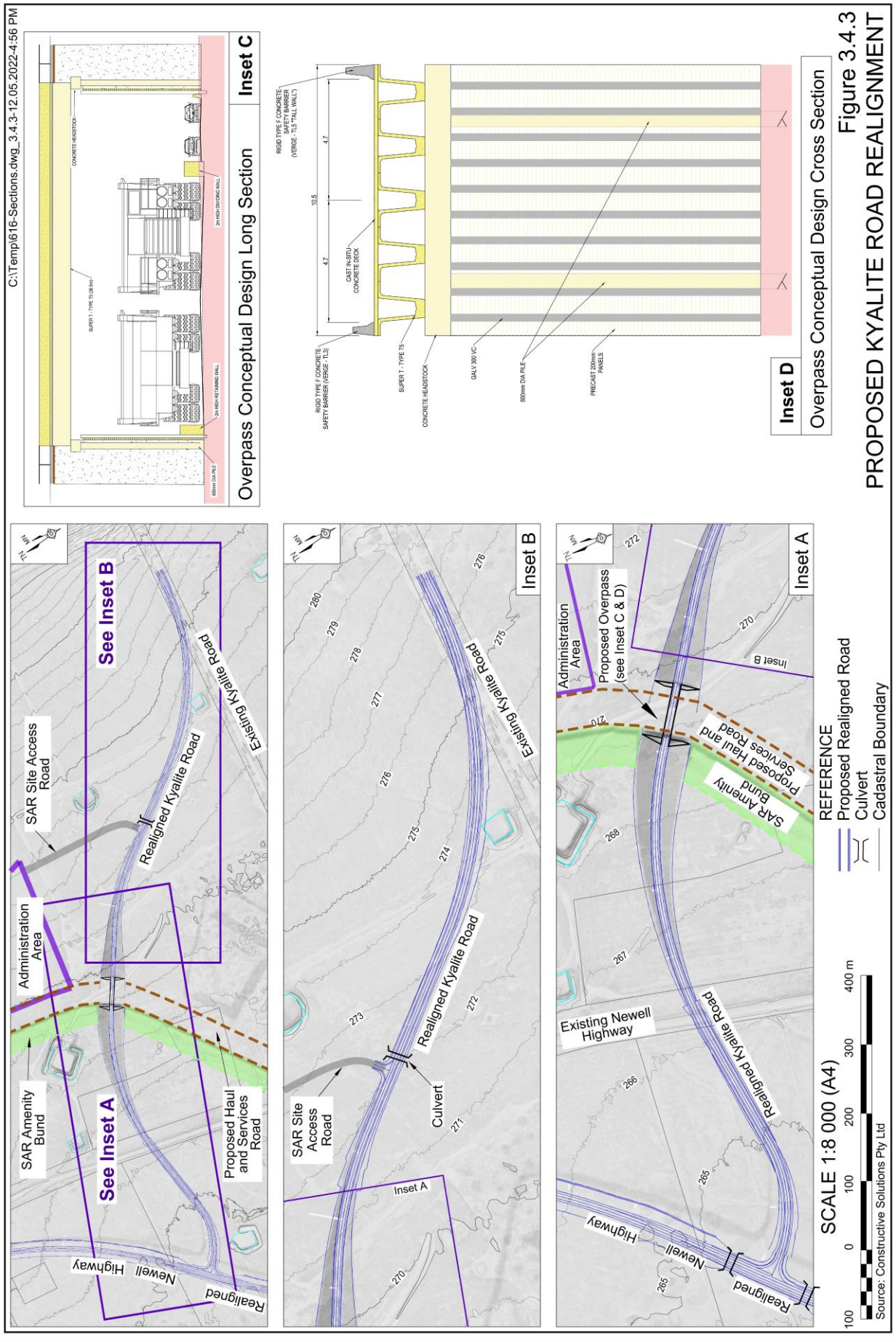
Table 3.4.2
Local Roads Design Criteria

Parameter	Design Criteria
Design speed	110km/h
Posted speed limit	100km/h
Pavement • Kyalite Road – Newell Highway to 30m east of SAR Site Access Road • Kyalite Road –30m east of SAR Site Access Road to existing • Back Tomingley West Road	 Sealed Unsealed 30m from highway – sealed, Remainder – unsealed.
Number of lanes	2
Lane width	3.5m
Shoulder	1.0m (unsealed)
Crossfall	3%
Fill batter slopes	1:4 (V:H) where less than 2m high and 1:6 (V:H) where greater than 2m high, except in the vicinity of culverts.
Safety Barrier	Where batters steeper than 1:2 (V:H)
Design vehicle	B-triple (36.5m)
Distance from SAR Open Cut	Minimum 650m
Source: Constructive Solutions (2022) – modified after Table 6 and Constructive Solutions (2021b) – after Section 4.5	

In addition, the proposed realigned Kyalite Road would include an overpass over the proposed Haul Road and Services Road. **Table 3.4.3** and **Figure 3.4.3** present an overview of the design for the proposed overpass. Constructive Solutions (2021b) state that the proposed overpass would cater for any oversize vehicles required to access the SAR Mine Site or oversize agricultural equipment associated with rural properties along Kyalite Road. The overpass approaches would be constructed to ensure safe access to the overpass, including safety barriers, and, where required, visual screens.

Table 3.4.3
Kyalite Road Overpass Concept Design Criteria

Parameter	Design Criteria
Deck length	36.5m
Deck width	9.4m between barriers
Width between abutments for mine vehicles	Approximately 33m
Height clearance for mine vehicles	Approximately 15m
Design traffic loading	SM1600 in accordance with the Australian Standard AS5100 Bridge Design Code.
Design Vehicle	B-triple


PROPOSED KYALITE ROAD REALIGNMENT
Figure 3.4.3
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Inset C
Overpass Conceptual Design Long Section
CONCRETE HEADSTOCK
SUPER T - TYPE T5 (26.5m)
2m HIGH RETAINING WALL
800mm DIA PILE
Inset D
Overpass Conceptual Design Cross Section
RIGID TYPE F CONCRETE SAFETY BARRIER (VERGE - TL5 "TALL WALL")
10.5
4.7
4.7
CAST IN-SITU CONCRETE DECK
RIGID TYPE F CONCRETE SAFETY BARRIER (VERGE - TL3)
SUPER T - TYPE T5
CONCRETE HEADSTOCK
GALV 300 UC
800mm DIA PILE
PRECAST 200mm PANELS
Inset A
Inset B
See Inset A
See Inset B
Existing Kyalite Road
Realigned Kyalite Road
SAR Site Access Road
Administration Area
SAR Amenity Bund
Proposed Haul and Services Road
Proposed Overpass (see Inset C & D)
Existing Newell Highway
Realigned Newell Highway
Culvert
REFERENCE
Proposed Realigned Road
Culvert
Cadastral Boundary
SCALE 1:8 000 (A4)
100 0 100 200 300 400 m
Source: Constructive Solutions Pty Ltd

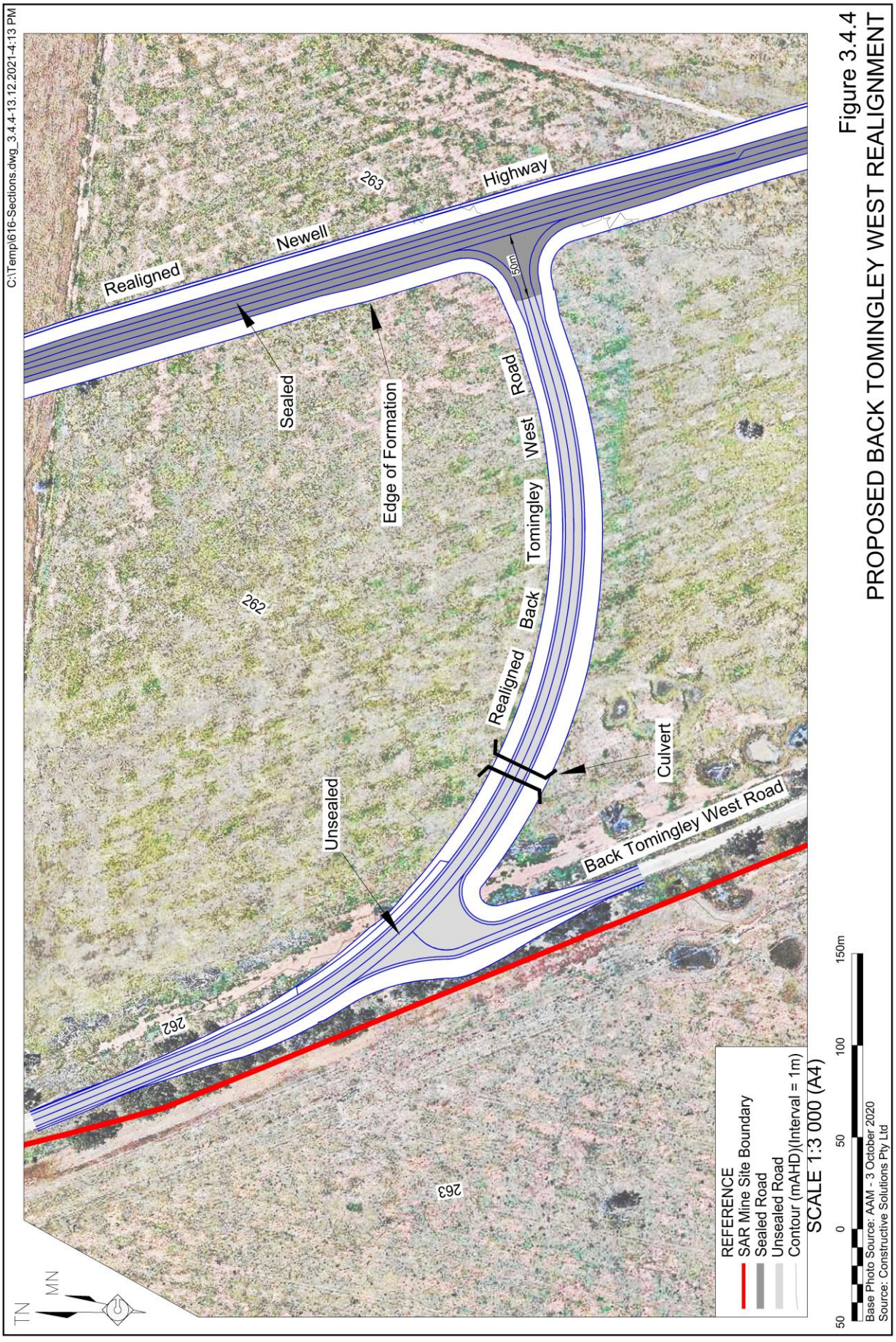
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Figure 3.4.4
PROPOSED BACK TOMINGLEY WEST REALIGNMENT
Realigned
Newell
Highway
263
Sealed
Edge of Formation
50m
Road
West
Tomingley
Back
Realigned
Culvert
Unsealed
Back Tomingley West Road
262
262
263
TN
MN
REFERENCE
SAR Mine Site Boundary
Sealed Road
Unsealed Road
Contour (mAHD)(Interval = 1m)
SCALE 1:3 000 (A4)
50
0
50
100
150m
Base Photo Source: AAM - 3 October 2020
Source: Constructive Solutions Pty Ltd

3.4.2.3 Modified Intersections

The proposed realignment of the Newell Highway and Kyalite Road would require modification to the intersections between the Newell Highway and the following roads.

- Back Tomingley West Road.
- Kyalite Road.
- McNivens Lane.

Constructive Solutions determined, based on existing and proposed traffic volumes, that the Kyalite Road intersection would require a Channelised Right (CHR) and Auxiliary Left (AUL) turn treatment.[1] By contrast, the Back Tomingley West Road and McNivens Lane intersections would simply require a Basic Auxiliary Left (BAL) and Basic Auxiliary Right (BAR) turn treatment.[2] Following consultation with the local community and Transport for NSW, the Applicant determined to apply a CHR/AUL treatment to each of the proposed intersections.

Table 3.4.4 presents an overview of the design criteria for the proposed modified intersections and **Figure 3.4.5** presents the indicative layout of the intersections.

Table 3.4.4
Modified Intersection Design Criteria

Parameter	Kyalite Road Intersection	Back Tomingley West Road Intersection	McNivens Lane Intersection	SAR Site Access Road Intersection
Turn treatment	CHR and AUL	CHR and AUL	CHR and AUL	BAR and BAL
Design speed	110km/h	110km/h	110km/h	110km/h
Lane widths	3.5m	3.5m	3.5m	3.5m
Shoulder	2.0m (sealed)	2.0m (sealed)	2.0m (sealed)	2.0m (sealed)
Crossfall	3%	3%	3%	3%
Sealed distance from Newell Highway	To 75m past SAR Site Access Road	50m	50m	-
Signage	Give way sign and sight board	Give way sign and sight board	Give way sign and sight board	Give way sign and sight board
Source: Constructive Solutions				

[1] A CHR / AUL treatment includes a dedicated right-hand turn lane and left-hand deceleration lane for traffic turning off the Newell Highway onto the adjoining road.
[2] A BAL/BAR treatment simply requires widening of the shoulders of the Newell Highway, with no dedicated turning lanes.

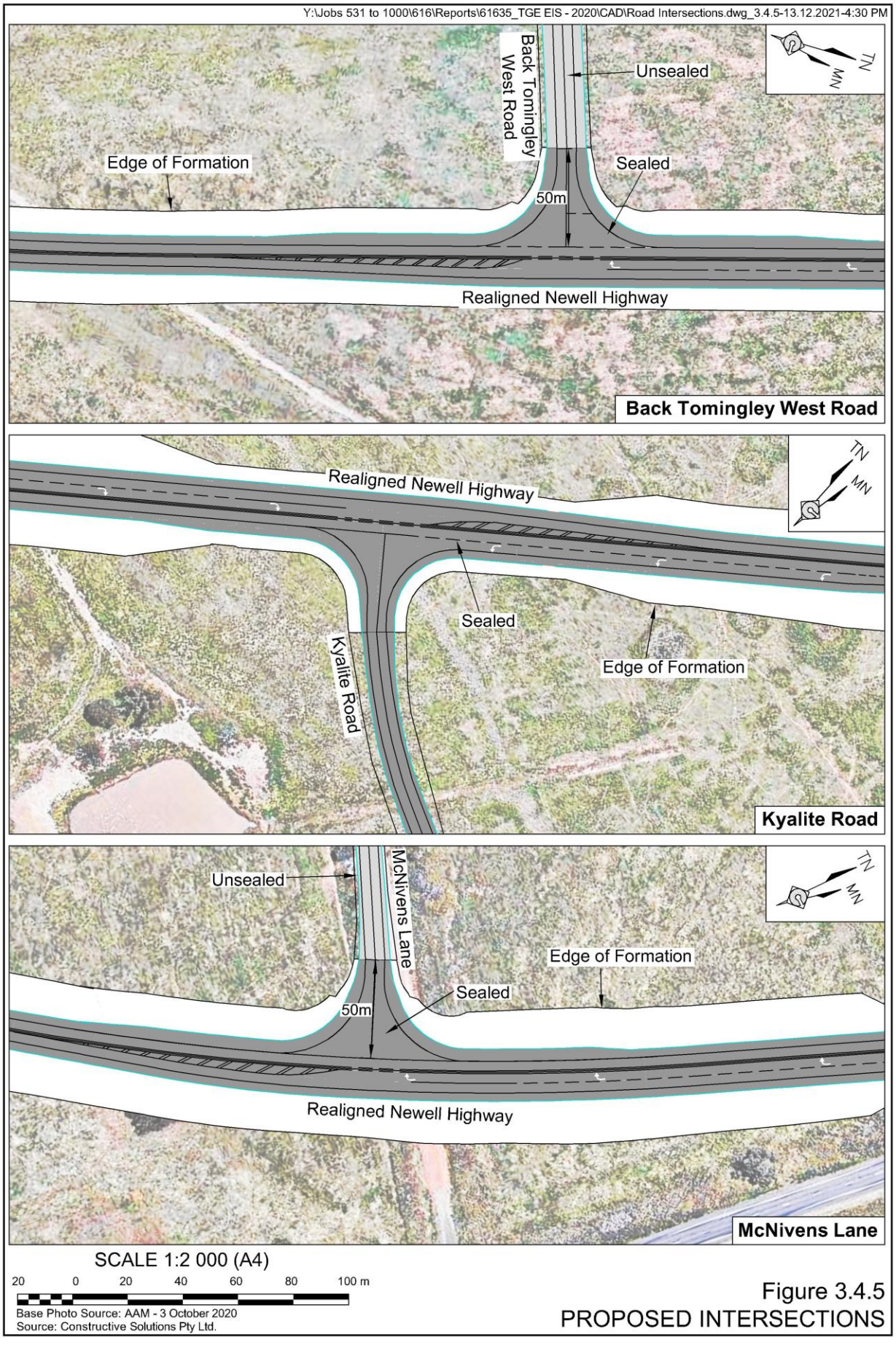


Figure 3.4.5
PROPOSED INTERSECTIONS

3.4.3 Public Road Construction

Construction of the proposed realigned public roads would be undertaken concurrently with site establishment activities within the SAR Mine Site. Construction operations would initially be undertaken off-line, with those sections of the realigned public roads largely completed before undertaking works within the existing road reserves.

Prior to the commencement of road construction operations, one or more detailed *Construction Environmental Management Plans* would be prepared to meet the requirements of Transport for NSW (for the Newell Highway construction) and Narromine Shire Council (for the local road construction). The Plan(s) would require approval by the respective roads authorities.

The Plan(s) would likely include a range of sub-plans including the following. These Plans would be implemented throughout the road construction operations.

- *Spoil and Fill Management Subplan.*
- *Flora and Fauna Management Subplan.*
- *Soil and Water Management Subplan,* incorporating an *Erosion and Sediment Control Plan* prepared in accordance with the requirements of *Managing Urban Stormwater.*
- *Construction Traffic Management Subplan.*
- *Construction Noise and Vibration Management Subplan.*
- *Construction Air Quality Management Subplan.*
- *Construction Heritage Management Subplan* incorporating both Aboriginal and Historic Unexpected Finds Protocols.
- *Waste Management Subplan.*
- *Hazards and Risk Management Subplan.*

For the purposes of this application for development consent, the following activities would be undertaken during road construction operations (see **Figure 3.5.8** in Section 3.5.4.3).

- Establish the major works compound to the west of the existing Newell Highway within areas of proposed mining-related disturbance. A minor works compound would be established near the Kyalite Road overbridge site.
- Establish suitable entrances for each works compound, including the following.
  - A temporary CHR / BAL intersection on the Newell Highway at the entrance to "Kenilworth" property to permit light and heavy vehicles to enter and light vehicles only to exit.
  - Temporary intersections onto Back Tomingley West Road and McNivens Lane to permit heavy vehicles to exit. Such vehicles would then use the existing intersections of these roads with the Newell Highway.
  - A temporary intersection with Kyalite Road to permit light and heavy vehicles to enter and exit. No works are proposed for the Kyalite Road and Newell Highway intersection as all construction-related traffic movements would be left into Kyalite Road.

Construction-related traffic approaching from the south would be required to travel to the existing South Tomingley Rest Area to complete a U-turn before returning to Kyalite Road.

Alternatively, in the event that Transport for NSW does not concur with the temporary closure of the Tomingley South Heavy Vehicle Rest Bay, the Applicant would, in consultation with Transport for NSW, extend the temporary 80km/h speed zone proposed for the "Kenilworth" site entrance during construction operations to include the existing Kyalite Road intersection and establish a temporary Channelised Right turn short treatment (CHR(s)) at the intersection of the existing Kyalite Road and Newell Highway. A second, non-preferred alternative would be to establish a turning bay on the Applicant's own land off McNivens Lane.

- Clearly mark all areas of disturbance and no-go areas on the ground.
- Install Erosion and sediment control measures prior to any substantive earthworks or culvert construction commencing.
- Establish traffic control measures as required.
- Remove vegetation and strip and stockpile soil in accordance with the procedures described in Section 3.3.3.
- Establish borrow pits as described in Section 3.3.3.6.
- Construct required culverts, including ensuring that suitable temporary erosion and sediment control measures have been implemented.
- Construct and shape the road formation, including table drains, in accordance with detailed designed approved by the relevant roads authority, using material sourced from the on-site borrow pits as well as off-site sources, where required.
- Construct the Kyalite Road overpass.
- Re-establish rural property entrances to the public road network.
- Construct the pavement, including sealed and unsealed surfaces.
- Apply line marking, and install signage and road safety infrastructure as required.
- Fence the proposed road reserves.
- Remove traffic controls, works compounds, stockpile areas and erosion and sediment controls.
- Commission the realigned roads and close and decommission the existing alignment, including transferring ownership of the new road reserves to the roads authorities and ownership of the former road reserves to the Applicant.
- Remove redundant sections of the existing road formations, as required.

Section 3.10.3.1 describes the anticipated construction-related traffic movements and Section 3.12.1 the proposed construction hours of operation. The Applicant anticipates that road construction operations would require approximately 9 months to complete.

3.4.4 Public Road Operation

Following commissioning of the realigned public roads, responsibility for ongoing management of the roads would fall to the road authorities. The Applicant anticipates that a range of warranties would remain in place to remediate any construction-related issues following commissioning.

In addition, the Applicant anticipates that the Planning Agreement negotiated with Narromine Shire Council would include a clause providing for the maintenance of Kyalite Road between the Newell Highway and the SAR Site Access Road at the Applicant's cost for the duration of the Project.

Finally, the Applicant would retain or remove the Kyalite Road overpass at the end of the life of the Project at the direction of Narromine Shire Council.

3.4.5 Flexible Elements

Table 3.4.5 presents the public road-related flexible elements that cannot be described with certainty at this stage of the Project, together with clear limits on the flexibility sought and a justification of each element. Elements that may be smaller or with lesser impacts with lesser impacts than that proposed are not described.

Table 3.4.5
Flexible Elements – Mining Operations

Flexible Element	Limit on Flexibility	Justification
Detailed design of the public road network	Location of the road alignment and design of the proposed roads and intersections as approved by the relevant roads authority.	The design process for the realigned Newell Highway, and therefore the local roads that connect with the Highway, requires preparation of 100% concept and 50%, 80% and 100% detailed designs, each of which require consultation with Transport for NSW. Narromine Shire Council has been provided with 50% Concept Design and will be provided with 50% and 100% Detailed Design. Detailed contractual and legal agreements also need to be finalised. The 100% concept design was complete at the time of finalisation of this document, with the remaining steps expected to be finalised during exhibition and assessment of the application for development consent.
Timing of construction	± 3 months	The proposed road construction operations are expected to require 9 months to complete. However, construction operations may take more or less time than anticipated, due to factors such as inclement weather, materials availability, etc.

3.5 Mining Operations

3.5.1 Introduction

Given the planned interaction of the existing approved and proposed mining operations, this subsection describes the approved Caloma Eastern Cutback and TGO Underground mining operations as well as the layout and design of the proposed SAR Open Cut and Underground mining operations. The anticipated sequencing and scheduling of the proposed mining operations are also described, as well as flexible elements relevant to the described activities.

3.5.2 Open Cut Mining Operations

3.5.2.1 Approved Open Cut Mining Operations

Caloma Open Cuts

Figure 3.5.1 presents the approved layout for the Caloma 1 and 2 Open Cuts, including the Caloma Eastern Cutback. Mining of the Caloma Eastern Cutback, approved as part of MOD3 for MP09_0155, is currently in progress. Ore is transported via the Newell Highway Underpass to the TGO ROM Pad and processed using the TGO Processing Plant. Waste rock is placed in pit within the Caloma 2 Open Cut or stockpiled within Waste Rock Emplacement 1 for use in construction or capping of residue storage facilities.

Mining of the Caloma Eastern Cutback will complete open cut mining within the Caloma 1 Open Cut. No other open cut mining operations are ongoing or are proposed within the TGO Mine Site at the time of finalisation of this document.

The Caloma Open Cuts would be backfilled to surface with waste rock from the SAR Open Cut (see Section 3.6.4). As a result, no assessment of the long-term geotechnical stability of the Caloma Open Cuts has been undertaken.

Wyoming 1 Open Cut

Approved Mining Operations

Figure 3.5.2 presents the approved layout for the Wyoming 1 Open Cut. Open cut mining operations are complete within the Wyoming 1 Open Cut, with access to the TGO Underground via portals located within the open cut.

Geotechnical Assessment

The Wyoming 1 Open Cut is proposed to be retained within the final landform as a final void. As a result, the Applicant engaged AMC Consultants Pty Ltd to prepare a geotechnical assessment of the long-term stability of the open cut. That report, referenced hereafter as AMC (2021a), is presented as Appendix 6 of the EIS.

AMC (2021a) identify that the most likely long-term failure mechanism within the Wyoming 1 Open Cut is the ongoing deterioration of the alluvium and saprolite, as well as rock mass style failures. AMC (2021a) identified that risk of rock mass failures would increase if transient or high groundwater pressures occur in the slope and that rainfall and surface water flows also promote ongoing instability.

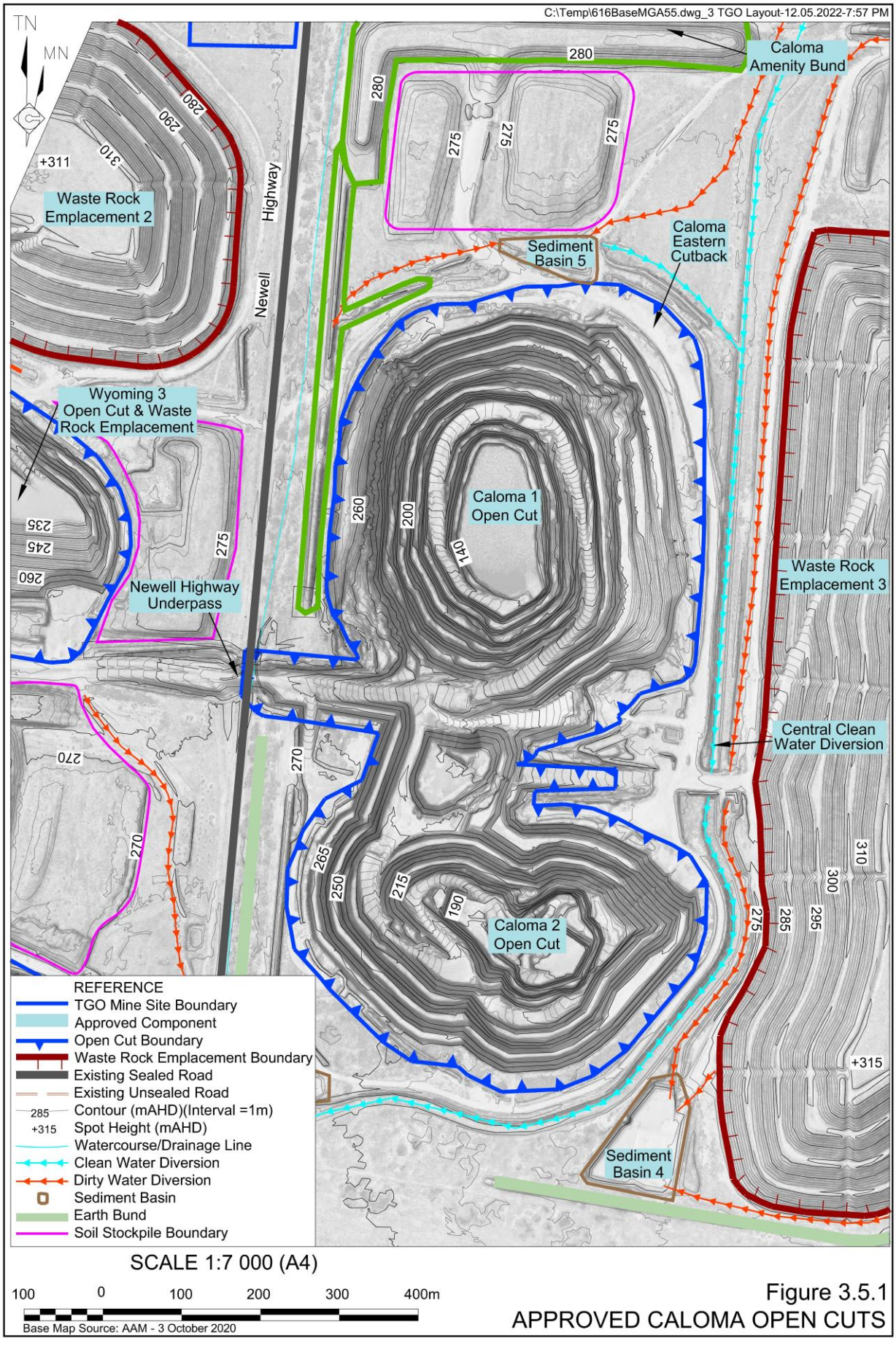


Figure 3.5.1
APPROVED CALOMA OPEN CUTS

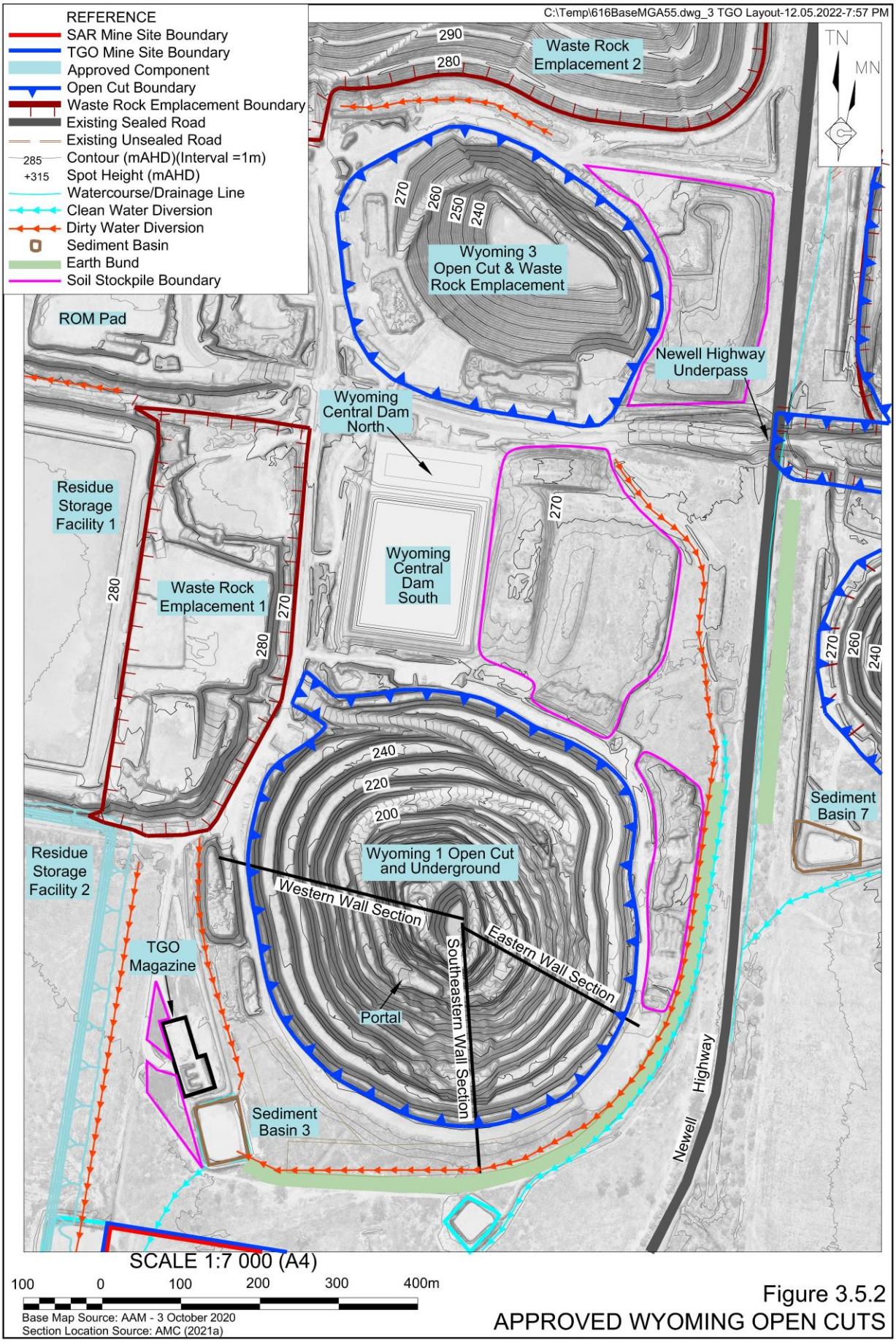


Figure 3.5.2
APPROVED WYOMING OPEN CUTS

AMC (2021a) undertook an assessment of the stability of three key sections through the Wyoming 1 Open Cut walls (**Figure 3.5.2**) using SLIDE, a limit equilibrium analysis software package developed by Rocscience. The results of the analysis are summarised as follows.

- Southeastern Wall Section – this section of wall has a current Factor of Safety[3] of 1.0. The Applicant is closely monitoring and managing this section of the Open Cut.
- Eastern Wall Section – this section of wall has a current Factor of Safety of 1.3. with a low potential for rock mass failure during the life of the Project.
- Western Wall Section – this section of wall has a current Factor of Safety of 1.3. with a low potential for rock mass failure during the life of the Project.

Erosion and Landform Stability Assessment

The Applicant engaged Landloch Pty Ltd to prepare an assessment of the long-term erosional stability of the Wyoming 1 Open Cut. That report, referenced hereafter as Landloch (2021a), is presented as Appendix 7 of the EIS.

Landloch (2021a) utilised the SIBERIA, a 3-dimensional topographic model that predicts the long-term development of channels and hillslopes in a catchment, based on runoff, erosion, and deposition. The SIBERIA model was used to determine the likely effect of erosion on the upper benches of the Wyoming 1 Open Cut over 10, 100 and 1 000 year time frames. Landloch (2021a) derived erodibility parameters for three materials within the open cut walls, namely alluvium and two saprolite materials, based on an ultra-high resolution LiDAR survey of the Wyoming 1 Open Cut from August 2021.

The results of that analysis are presented in Section 4 of Landloch (2021a) and are summarised as follows.

- Saprolite was the most erodible material.
- Open cut expansion due to erosion is expected to have an average rate of approximately 2m/100 years or 20m over 1 000 years.
- The open cut crest is not expected to erode back far enough to impact on critical infrastructure, including the realigned Newell Highway or the RFS 1 or 2.

Long-term Stabilisation of the Wyoming 1 Open Cut

The Applicant would continuously monitor and manage the geotechnical stability of each of the approved and proposed open cuts, including the Wyoming 1 Open Cut. If required, sections of the Wyoming 1 Open Cut would either be cutback or be covered with waste rock to ensure the long-term stability of the final landform.

[3] Factor of Safety (FoS) is a measure used to represent how much greater the resisting capacity of a structure or component is relative to an assumed load. A FoS greater than 1.0 implies the available shear strength to resist failure is greater than the driving force to initiate failure. FoS is used to quantify safety, but it is not directly correlated to the risk (i.e. the likelihood and consequence) of failure (Source: After https://www.klohn.com/blog/geotechnical-factor-of-safety-and-risk/ - accessed 26/10/21).
The document *Guidelines for Open Pit Slope Design* (Read and Stacey, 2009) recommend a FoS of between 1.3 and 1.5 for final voids with a high consequence in the event of a failure.

Wyoming 3 Open Cut

Mining operations within the Wyoming 3 Open Cut have been completed. The Open Cut is partly backfilled with waste rock and is currently used for storage of water within the TGO Mine Site, with a capacity in excess of 1 000ML (**Figure 3.5.2**).

The Wyoming 3 Open Cut would be backfilled to surface with waste rock that has been used to construct the ROM Pad and other infrastructure within the TGO Mine Site. As a result, no assessment of the long-term geotechnical stability of the Wyoming 3 Open Cut has been undertaken.

3.5.2.2 Proposed SAR Open Cut

Open Cut Layout and Design

The design of the SAR Open Cut comprising three separate, but connected pits, has been an iterative process with three principal inputs as follows.

- Open Cut optimisation using the Whittle optimisation software package.
- Geotechnical assessment undertaken by geotechnics and ground engineering firm WSP. The resulting report is presented as Appendix 8 of the EIS and is referred to hereafter as WSP (2021).
- Analysis of the long-term, post-closure stability of the SAR North Pit final void undertaken by AMC based on drill hole information only. That report, referenced hereafter as AMC (2021b), is presented as Appendix 9 of the EIS.
- Erosional stability assessment and analysis of the post-closure SAR Open Cut North Pit final void undertaken by Landloch. The resulting report is presented as Appendix 7 of the EIS and is referred to hereafter as Landloch (2021a).

Appendix 4 of the EIS presents an overview of the results of those studies. **Figure 3.5.3** and **Table 3.5.1** present the proposed layout and design criteria for the three pits within the SAR Open Cut based on the optimisation and geotechnical studies. Bench heights and angles, bench heights, berm widths and inter ramp angles would be as recommended by WSP (2021).

Table 3.5.1
Proposed SAR Open Cut Design Criteria

Component	South Pit	Central Pit	North Pit	Total
Area	24.9ha	25.5ha	40.8ha	91.2ha
Wall Angles	As determined by WSP (2021) – see Appendix 4 of the EIS			
Maximum Depth	167m or 100m AHD	207m or 60m AHD	294m or -27m AHD	-
Indicative Volume	13.2Mm^3	17.1Mm^3	37.4Mm^3	67.7Mm^3
Source: Tomingley Gold Operations Pty Ltd				

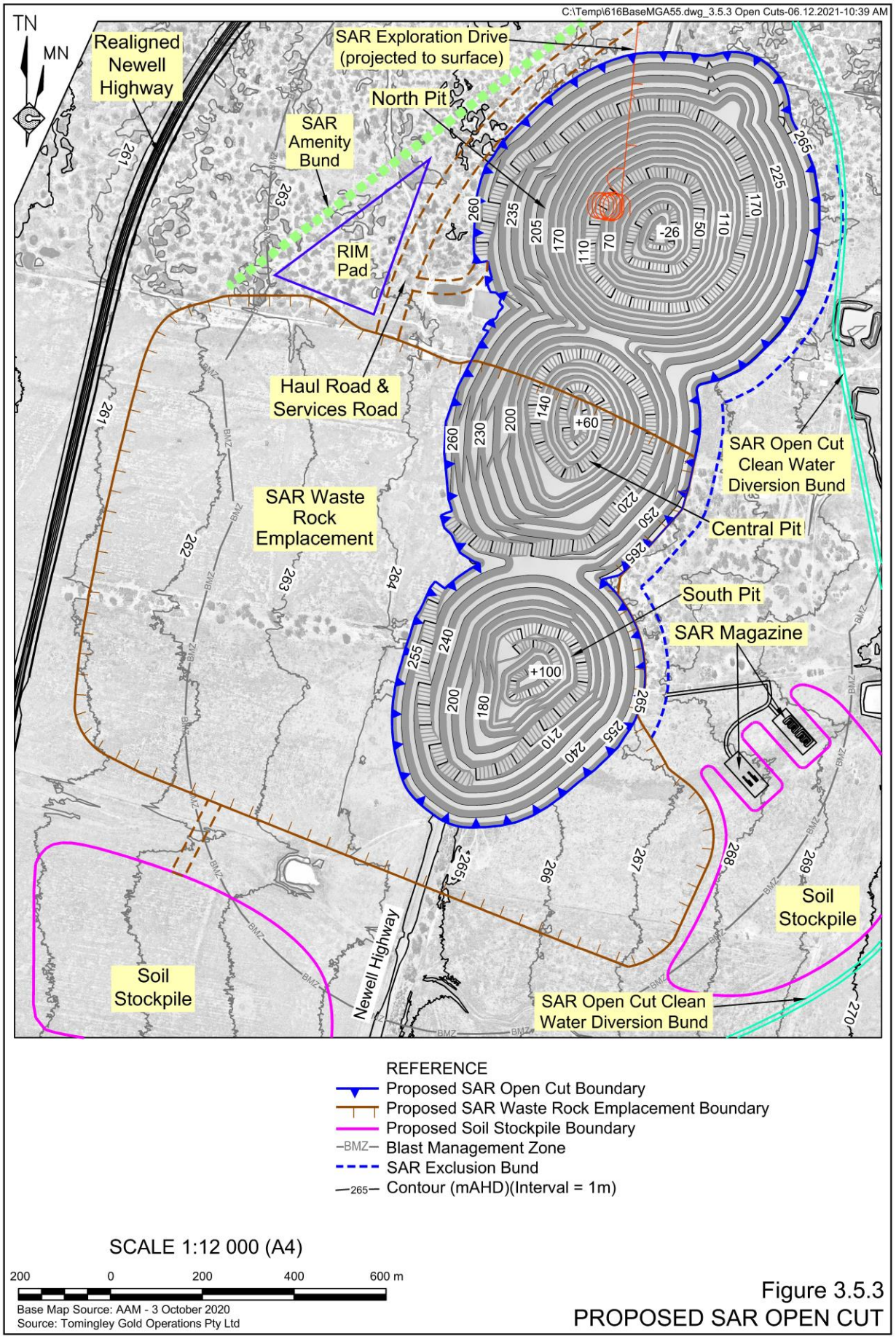


Figure 3.5.3
PROPOSED SAR OPEN CUT

In addition, the Applicant would implement the following throughout the life of the Project to ensure that the long-term footprint of the SAR North Pit final void would remain within the approved limit of disturbance.

- Establish a minimum 50m offset distance between the SAR North Pit crest and SAR Open Cut Clean Water Diversion Bund.
- Engage a suitably qualified and experienced geotechnical engineer to review the performance of the SAR South and Central Pits, as well as Stage 1 of the North Pit and provide recommendations in relation to the long-term stability of the SAR Open Cut North Pit.

Proposed Open Cut Mining Operations

Extraction of Friable Material

Following removal of vegetation and soil materials as described in Section 3.3.3, mining would commence with the removal of alluvium and saprolite. These materials would be extracted using an excavator or ripped and pushed up using a bulldozer and loaded into haul trucks using an excavator or front-end loader or removed using scrapers. Waste rock would be managed as described in Section 3.6 and ore would be transported to the TGO ROM Pad.

Drill and Blast

Where the material becomes too competent to be extracted using the above methods, it would be extracted using traditional drill and blast methods. All blasts would be designed by a suitably qualified and experienced blast engineer to ensure the following.

- Appropriate fragmentation of the in-situ material.
- Compliance with required blasting parameters at surrounding sensitive receptors and key infrastructure locations.
- All fly rock is contained within the identified blast management zone and that there is no impact on the operation of surrounding public roads (**Figure 3.5.2**).

Blast holes would be drilled using hydraulic blast holes drill rigs operating 24-hours per day, 7 days per week. The blast holes would be loaded with detonators, pre-packaged boosters and bulk explosives. The Maximum Instantaneous Charge would be approximately 400kg or less. Blasts would be initiated under the supervision of a suitably licenced and experienced shot firer. Detonators, boosters and bulk explosives would be stored within approved structures within the SAR Magazine Area in accordance with *Australian Standard AS2187:2006 – Explosives Storage, Transport and Use*. The SAR Magazine Area would be secured by a security fence and a lockable gate and would be the subject of regular inspections.

Open cut blasting would be undertaken between the hours of 9:00am to 5:00pm, Monday to Saturday. No blasting operations would be undertaken on Sundays or Public Holidays[4].

[4] It is possible that blasting outside of the nominated hours of operation may be required to alleviate a safety or other hazard.

Signs advising employees, contractors and visitors to the SAR Mine Site of the date and time of the next blast would be positioned at one or more appropriate locations. In addition, the Applicant would consult with surrounding residents to determine the most appropriate method to notify them of blast times and would implement the agreed notification methods.

Finally, all blasts would be monitored in accordance with the procedures identified in an updated *Blast Management Plan* to be prepared in the event development consent is granted. In summary, however, blasts would be monitored at the closest non-Project related residences surrounding the SAR Mine Site, as well as adjacent to key public infrastructure, including the Newell Highway and Kyalite Road overpass.

Load and Haul

Following completion of each blast, boundaries between ore and each type of waste rock would, if required, be identified and marked out on the fragmented materials. Fragmented material would then be loaded into haul trucks using an excavator.

Ore and low-grade material would be transported directly to the TGO ROM Pad or temporarily stockpiled within the RIM Pad, the Caloma Temporary Stockpile Area or elsewhere within the approved or proposed limit of disturbance. Waste rock would periodically be directly used for or temporarily stockpiled for use for construction of Project-related infrastructure or placed within the Caloma or SAR Waste Rock Emplacements (see Section 3.6) or used for rehabilitation purposes.

Section 3.5.4.4 identifies the mining equipment that would be utilised for open cut mining. In summary, however, two classes of haul trucks would be used, larger CAT785 trucks (or equivalent) and smaller CAT777 trucks (or equivalent). The larger trucks, which are more efficient at moving large volumes of material longer distances, would primarily be used for transporting material to the Caloma Waste Rock Emplacement or Temporary Stockpile Area. The Kyalite Road overpass has been designed to cater for these larger vehicles.

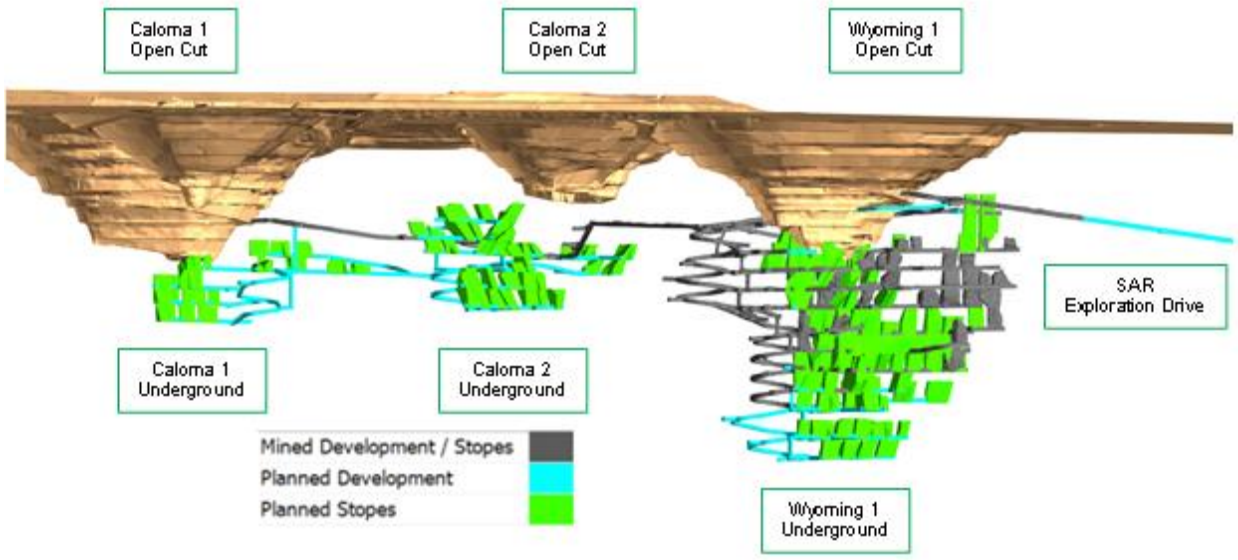
The smaller trucks would primarily be used for transporting ore and waste rock. The smaller trucks would also be used for transportation of material through the existing Newell Highway underpass as the larger trucks are too large to pass through the underpass safely.

3.5.3 Underground Mining Operations

3.5.3.1 Approved TGO Underground Mining Operations

The Wyoming 1 Underground mine was approved as part of the original application for development consent in 2011. The Caloma 1 and Caloma 2 Underground mines were approved in MOD3 of MP09_0155. For the purposes of this document, these operations are collectively referred to as the TGO Underground Mine.

Figure 3.5.4 presents an isometric view of the TGO Underground Mine. Access and ventilation is provided via a number of portals in the Wyoming 1 Open Cut. A portal has also been established within the southern wall of the Caloma 1 Open Cut, primarily for ventilation and emergency egress.



Source: Tomingley Gold Operations Pty Ltd

Figure 3.5.4
TGO Underground Mining Operations – Looking East

Underground development currently utilises a jumbo, or underground drill rig, to drill a pattern of holes which are loaded with explosives and the in-situ material fragmented. Underground blasting operations are undertaken 24-hours per day, 7 days per week. Fragmented material is loaded into underground haul trucks using an underground loader.

Ore is extracted using long-hole open stoping (see Section 3.5.3.2) and is transported to the TGO ROM Pad and processed using the TGO Processing Plant. Waste rock is either used to backfill completed stopes or is transported to the surface and placed within the Wyoming 1 Open Cut or Waste Rock Emplacement 1.

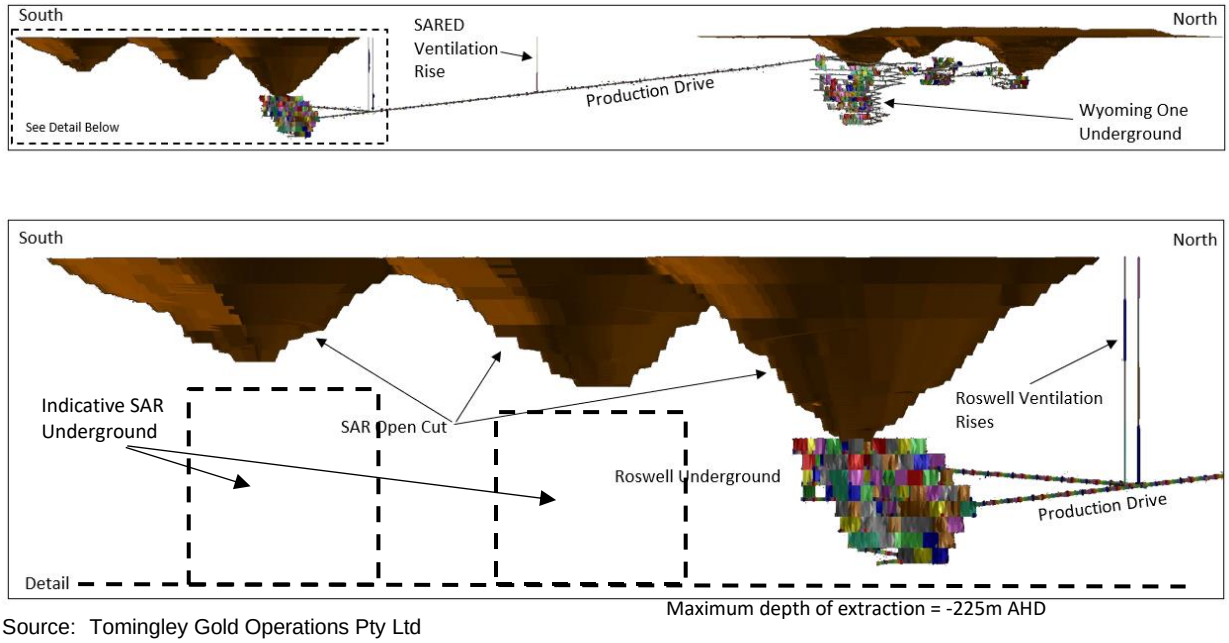
3.5.3.2 Proposed SAR Underground Mining Operations

Proposed SAR Underground Layout

Underground mining would be undertaken utilising the SAR Exploration Drive (**Figures 3.1.1**, **3.1.3** and **3.5.5**). The drive was approved by the Resources Regulator for exploration activities on 7 May 2020, with further approval granted on 13 September 2021. The approved activities included the following.

- Development of an exploration drive from the existing TGO Underground Mine.
- Establishment and use of ancillary infrastructure, including a ventilation rise to the north of McNivens Lane.
- Drilling of approximately 72 000m of exploration drill holes.
- Extraction of one or more bulk samples totalling no greater than 20 000t.

In the event development consent is granted, the SAR Exploration Drive would be converted into a haulage drive between SAR and TGO Mine Sites. As the drive would be well established prior to granting of development consent, it would permit early access to the SAR deposits for underground mining operations, likely before open cut mining commences.



Source: Tomingley Gold Operations Pty Ltd

Figure 3.5.5
Proposed SAR Underground Mining Operations

At the time of preparation of this document, detailed exploration drilling and mine planning had yet to be competed. As a result, the Applicant has only designed underground mining operations within the Roswell deposit (see Section 1.4.2 of the EIS). Underground mining withing the San Antonio deposit would also be undertaken. In addition, mineralisation within the SAR deposits remains open at depth. As a result, it is very likely that additional underground ore will be identified. As a result, for the purpose of this application, the SAR Underground Mine would be no deeper than 490m below surface or -225m AHD. This maximum depth of extraction has been used by Jacobs (2021c) when modelling potential groundwater impacts. The Applicant has committed to reviewing the groundwater model in 2024 based on groundwater monitoring data collected in the intervening period. In the event that a revised groundwater model is required, the Applicant may, based on exploration data collected, extend the maximum depth of extraction in consultation with the Secretary of the Department of Planning and Environment.

Mining Method

Underground development would utilise traditional jumbo drill and blast, with broken waste rock either used to backfill completed stopes or transported to the TGO Underground Mine where it would be managed in accordance with the Applicant's current procedures.

Underground mining of ore material would be undertaken using a long hole open stoping mining method, or similar. This would require development of a number of drives within the ore zone at regular spaced intervals. A series of holes would then be drilled in rings between each drive. These rings would then be sequentially loaded with explosives and the ore blasted.

The detailed design of each stope would be undertaken by a suitably qualified and experienced Mining Engineer. There would be no surface subsidence within the SAR Mine Site, with the exception of potential break though of the underground workings into the base of the proposed SAR Open Cut North Pit towards the end of the life of the Project.

The fragmented ore would be removed using an underground loader. Ore would be loaded into underground dump trucks and transported to the TGO ROM Pad via the SAR Exploration Drive. Alternatively, late in the life of Project, a portal may be established in the SAR Open Cut and SAR Underground ore would be transported to the surface and placed within the SAR RIM Pad, from where it would be transported to the TGO ROM Pad and Processing Plant on surface via the Haul Road.

Water that seeps or is pumped into the proposed workings would be pumped to the SAR Site Water Storage Dam.

Ventilation and Emergency Egress

Ventilation for the approved SAR Exploration Drive is provided from the Wyoming 1 Underground Mine and SAR Exploration Drive Ventilation Rise (**Figure 3.1.3**). The SAR Exploration Drive ventilation rise will have a diameter of 2.4m or less and will initially act as an exhaust air rise with a ventilation rate of up to approximately 80m^3/s. The SAR Exploration Drive Ventilation Rise will be protected by a slightly elevated structure to prevent the entry of surface water and covered by a grate. The ventilation fan would be located at the base of the rise.

An additional ventilation rise, the Roswell Ventilation Rise, would indicatively be constructed to the north of the SAR Open Cut (**Figures 3.1.3** and **3.3.5**). Alternatively, the Roswell Ventilation Rise may be constructed elsewhere within the approved disturbance area. Construction of the ventilation rise would involve a raise-bore drill rig which would drill an initial pilot hole to intersect a ventilation drive underground. The pilot hole would then be progressively widened from the bottom up, with the drill cuttings permitted to fall to the bottom of the hole where they would be removed as described above. The ventilation rise would have a diameter of up to 4.2m and would act as an exhaust air rise, with an estimated maximum ventilation rate of approximately 225m^3/s. The ventilation fan would be located at the base of the rise. Following commissioning of the Roswell Ventilation Rise, the SAR Exploration Drive Ventilation Rise would be converted to a fresh air intake.

In addition, appropriate emergency egress infrastructure, including ladderways or hoist frame and platforms, would be installed with the SAR Exploration Drive and Roswell Ventilation Rises. Other mine services such as power and water may also be installed within the rises or in dedicated service holes.

Stope Backfilling and Paste Fill Plant

Long hole open stoping often requires completed stopes to be backfilled to ensure stability of the completed stopes and to maximise recovery of the identified resource. Stope backfilling within the TGO Underground Mine is undertaken using waste rock, with or without the addition of a binding agent such as cement.

Given the greater width of the ore lenses and therefore the stopes within the SAR Underground Mine compared to the TGO Underground Mine, the Applicant proposes to install and use a paste fill plant to the north of the SAR Open Cut (**Figure 3.3.5**). Paste fill is a type of backfill that is widely used in the mining industry in Australia and across the world. Paste fill comprises a mixture of finely crushed rock or residue and cement that is pumped underground and used to backfill completed stopes. Once cured, the paste fill is sufficiently competent to permit mining immediately adjacent or underneath the filled area, resulting in maximum extraction of the resource.

The Paste Fill Plant would indicatively comprise the following components.

- Cement/binder silo.
- A residue feed hopper with belt feeder.
- A paste mixer, including feed and discharge chutes.
- Paste distribution infrastructure, including pumps, pipeline and boreholes into the underground workings.

Two options for supply of residue for paste mixing are being considered and are as follows. The preferred option would be selected following further feasibility and optimisation studies.

- Dewatered residue would be extracted from the residue storage facilities and transported by truck via the Services Road to the Paste Fill Plant. All loads would be covered, and the Applicant would ensure that the residue transported was sufficiently dewatered to ensure that no supernatant water would seep from the vehicle during transport.
- Thickened tailings would be diverted from the thickener at the processing plant following completion of cyanide destruction and pumped to the Paste Fill Plant where it would be dewatered using a filter press or similar. The filtrate would be pumped back to the Settling Pond at the Processing Plant and used for processing operations. The residue and filtrate pipes would be located within the pipeline corridor in the vicinity of the Haul Road and Services Road and would be bunded and equipped with automatic leak/rupture detection and pump shutdown equipment.

The residue or thickened tailings would be stockpiled within bunkers adjacent to the Roswell Paste Fill Plant. The storage area would be internally draining, and all accumulated water would be treated as contaminated process water and either used for the manufacture of paste fill or transported back to the TGO Mine Site and disposed of within the process water circuit there. Residue stockpiles would be managed to minimise the generation of wind-blown dust.

The Applicant anticipates that between 10 000m^3 and 30 000m^3 of pastefill per month would be required, with occasional peaks in demand in excess of this.

Cement/binder would be delivered to the SAR Mine Site in bulk via the Newell Highway and Kyalite Road. The cement/binder silo would be fitted with a filter and over filling cut-off sensors to prevent emissions during filling operations.

During paste manufacture, residue material would be transferred to the residue feed hopper. A belt feeder would extract the residue from the hopper at a predetermined rate. This material would be combined with between 2% and 6% cement/binder and mixed with water to produce a paste fill mix with the required composition. This material would then be passed, via one or more boreholes to the relevant underground stopes.

The Paste Fill Plant would operate on an as required basis.

3.5.4 Mine Sequencing, Schedule, Scenarios and Equipment

3.5.4.1 Mine Sequencing

Figure 3.5.6 presents the anticipated mining and backfilling/waste rock placement sequence for the life of the Project.

	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33
Mining Sequence												
Caloma 1 Open Cut Cutback												
TGO Underground					Projected							
SAR Underground								Projected				
South Pit												
Central Pit												
North Pit												
Waste Rock Placement Sequence												
SAR WRE												
Caloma 1 and Caloma 2 Open Cuts												
SAR Open Cut South Pit												
SAR Open Cut Central Pit												

Note : Mining is proposed to cease by 31 December 2032

Source: Tomingley Gold Operations Pty Ltd

Figure 3.5.6
Indicative Mining and Backfilling Sequence

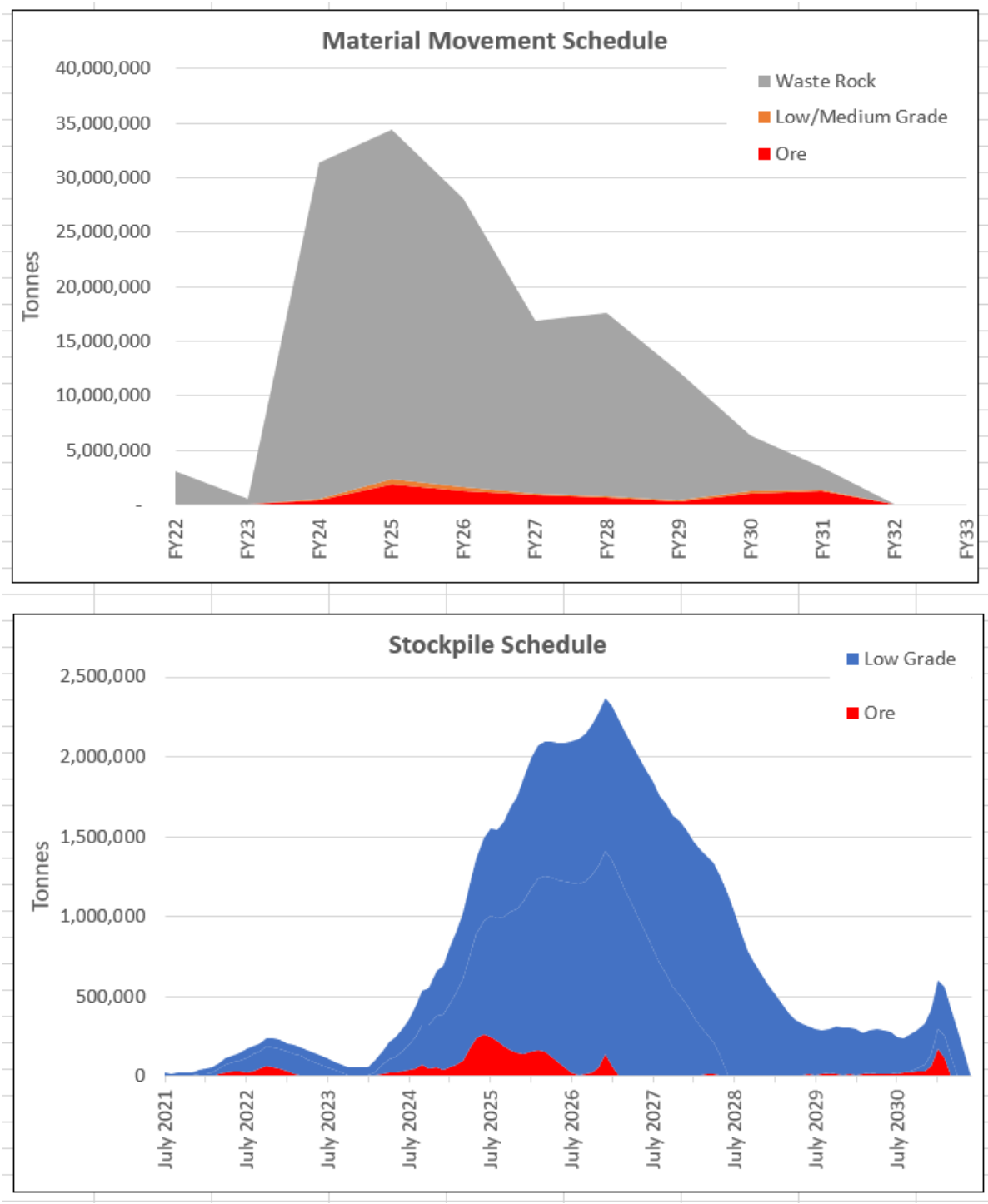
3.5.4.2 Mine Schedule

Table 3.5.2 and **Figure 3.5.7** present the anticipated life of mine maximum material movement schedule for the Project. The Applicant will continue to review and optimise the proposed material movement schedule. As a result, actual material movements may vary from those presented in **Table 3.5.2** and **Figure 3.5.7**.

It is noted that ore and low-grade material may be produced at a rate that would, at times, exceed the proposed rate at which that material would be processed. As a result, material that cannot be transported to the ROM Pad would be temporarily stockpiled within the RIM Pad, the Caloma Temporary Stockpile Area or elsewhere within the approved or proposed limit of disturbance, before being transferred to the ROM Pad as required (see **Figure 3.6.1**). **Figure 3.5.7** presents the anticipated volume of ore and low-grade material stockpiled throughout the life of the Project.

3.5.4.3 Mining Scenarios

Figures 3.5.8 to **3.5.12** presents the indicative layout of the Project at key stages throughout the life of the Project. These layouts have been selected to represent periods of greatest potential noise, visual or air quality impacts for surrounding residents.



Source: Tomingley Gold Operations Pty Ltd

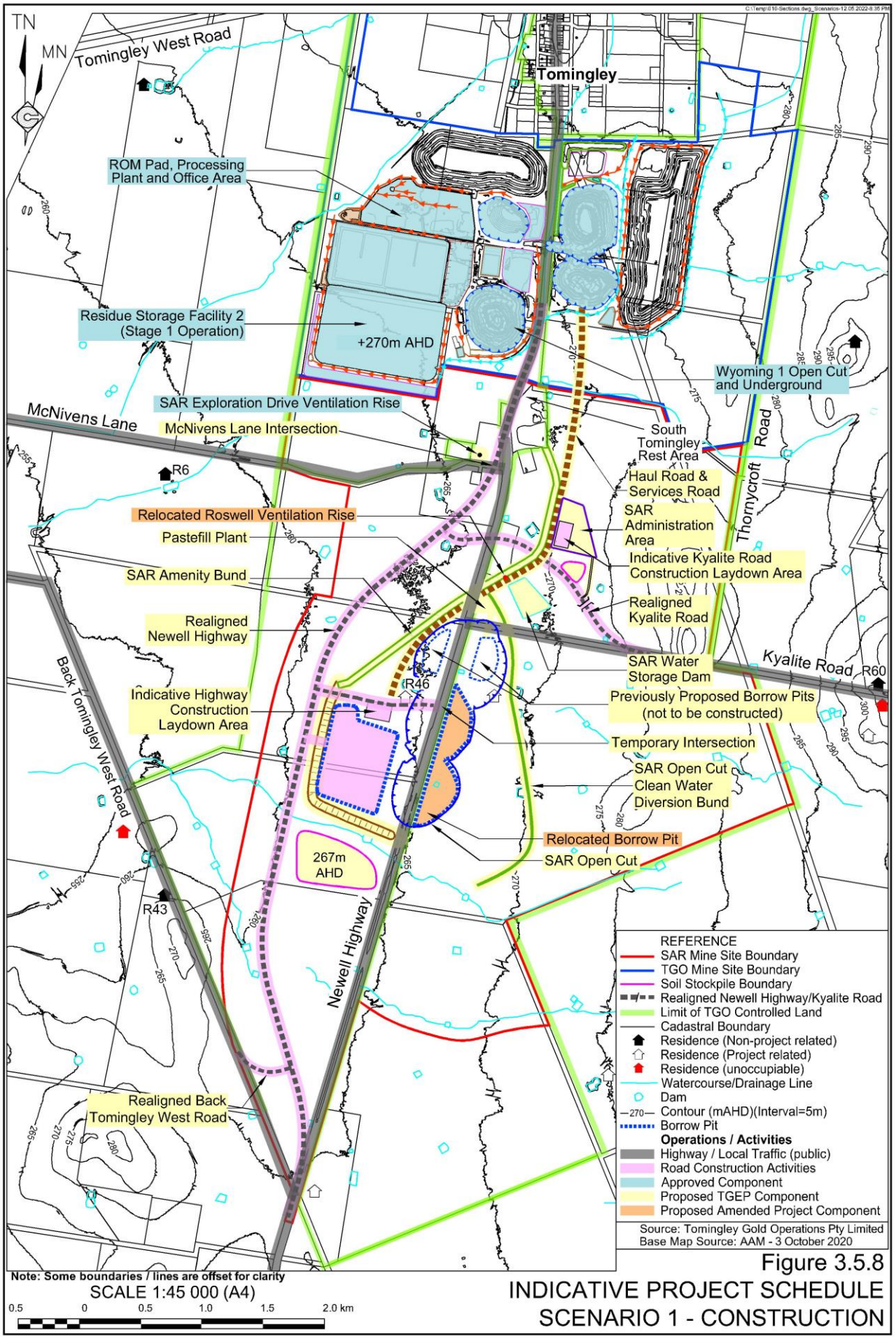
Figure 3.5.7
Anticipated Material Movement and Stockpile Schedules

Table 3.5.2
Anticipated Life of Mine Material Movement Schedule

	Units	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	Total
Ore Mined														
SAR Open Cut	t	-	-	425,000	1,925,000	1,225,000	900,000	675,000	300,000	1,000,000	1,300,000	-	-	**7,750,000**
SAR Underground	t	-	25,000	325,000	575,000	775,000	350,000	300,000	300,000	300,000	300,000	275,000	250,000	**3,775,000**
Caloma 1 Open Cut Cutback	t	300,000	175,000	-	-	-	-	-	-	-	-	-	-	**475,000**
TGO Underground	t	850,000	825,000	525,000	275,000	150,000	100,000	50,000	-	-	-	-	-	**2,775,000**
Total	**t**	**1,150,000**	**1,025,000**	**1,275,000**	**2,775,000**	**2,150,000**	**1,350,000**	**1,025,000**	**600,000**	**1,300,000**	**1,600,000**	**275,000**	**250,000**	**14,775,000**
Low Grade Mined														
SAR Open Cut	t	-	-	75,000	375,000	350,000	150,000	100,000	125,000	225,000	125,000	-	-	**1,525,000**
Caloma 1 Open Cut Cutback	t	50,000	-	-	-	-	-	-	-	-	-	-	-	**50,000**
Total	**t**	50,000	-	75,000	375,000	350,000	150,000	100,000	125,000	225,000	125,000	-	-	**1,575,000**
Waste Rock Mined														
SAR Open Cut	t	-	-	30,850,000	32,100,000	26,600,000	15,850,000	16,800,000	11,900,000	5,100,000	2,000,000	-	-	**141,200,000**
Caloma 1 Open Cut Cutback	t	3,000,000	570,000	-	-	-	-	-	-	-	-	-	-	**3,570,000**
Total	**t**	**3,000,000**	**570,000**	**30,850,000**	**32,100,000**	**26,600,000**	**15,850,000**	**16,800,000**	**11,900,000**	**5,100,000**	**2,000,000**	**-**	**-**	**144,770,000**
Processing														
Ore Processed	t	1,025,000	1,025,000	1,125,000	1,750,000	1,450,000	1,450,000	1,450,000	1,125,000	1,025,000	1,450,000	300,000	300,000	**13,475,000**
Gold Produced	Oz	60,000	50,000	70,000	115,000	105,000	115,000	65,000	35,000	55,000	95,000	-	-	**765,000**

Note 1: Units = Tonnes
Note 2: Grey Highlight = estimated production from future exploration success
Note 3: Mining is proposed to cease by 31 December 2032

Source: Tomingley Gold Operations Pty Ltd


TN
MN
Tomingley West Road
Tomingley
ROM Pad, Processing Plant and Office Area
Residue Storage Facility 2 (Stage 1 Operation)
+270m AHD
Wyoming 1 Open Cut and Underground
SAR Exploration Drive Ventilation Rise
McNivens Lane
McNivens Lane Intersection
South Tomingley Rest Area
Thornycroft Road
R6
Haul Road & Services Road
Relocated Roswell Ventilation Rise
SAR Administration Area
Pastefill Plant
Indicative Kyalite Road Construction Laydown Area
SAR Amenity Bund
Realigned Kyalite Road
Realigned Newell Highway
SAR Water Storage Dam
Kyalite Road
R60
R46
Back Tomingley West Road
Indicative Highway Construction Laydown Area
Previously Proposed Borrow Pits (not to be constructed)
Temporary Intersection
SAR Open Cut
Clean Water Diversion Bund
Relocated Borrow Pit
267m AHD
SAR Open Cut
R43
Newell Highway
Realigned Back Tomingley West Road
REFERENCE
SAR Mine Site Boundary
TGO Mine Site Boundary
Soil Stockpile Boundary
Realigned Newell Highway/Kyalite Road
Limit of TGO Controlled Land
Cadastral Boundary
Residence (Non-project related)
Residence (Project related)
Residence (unoccupiable)
Watercourse/Drainage Line
Dam
Contour (mAHD)(Interval=5m)
Borrow Pit
Operations / Activities
Highway / Local Traffic (public)
Road Construction Activities
Approved Component
Proposed TGEP Component
Proposed Amended Project Component
Source: Tomingley Gold Operations Pty Limited
Base Map Source: AAM - 3 October 2020
Note: Some boundaries / lines are offset for clarity
SCALE 1:45 000 (A4)
0.5 0 0.5 1.0 1.5 2.0 km
Figure 3.5.8
INDICATIVE PROJECT SCHEDULE
SCENARIO 1 - CONSTRUCTION

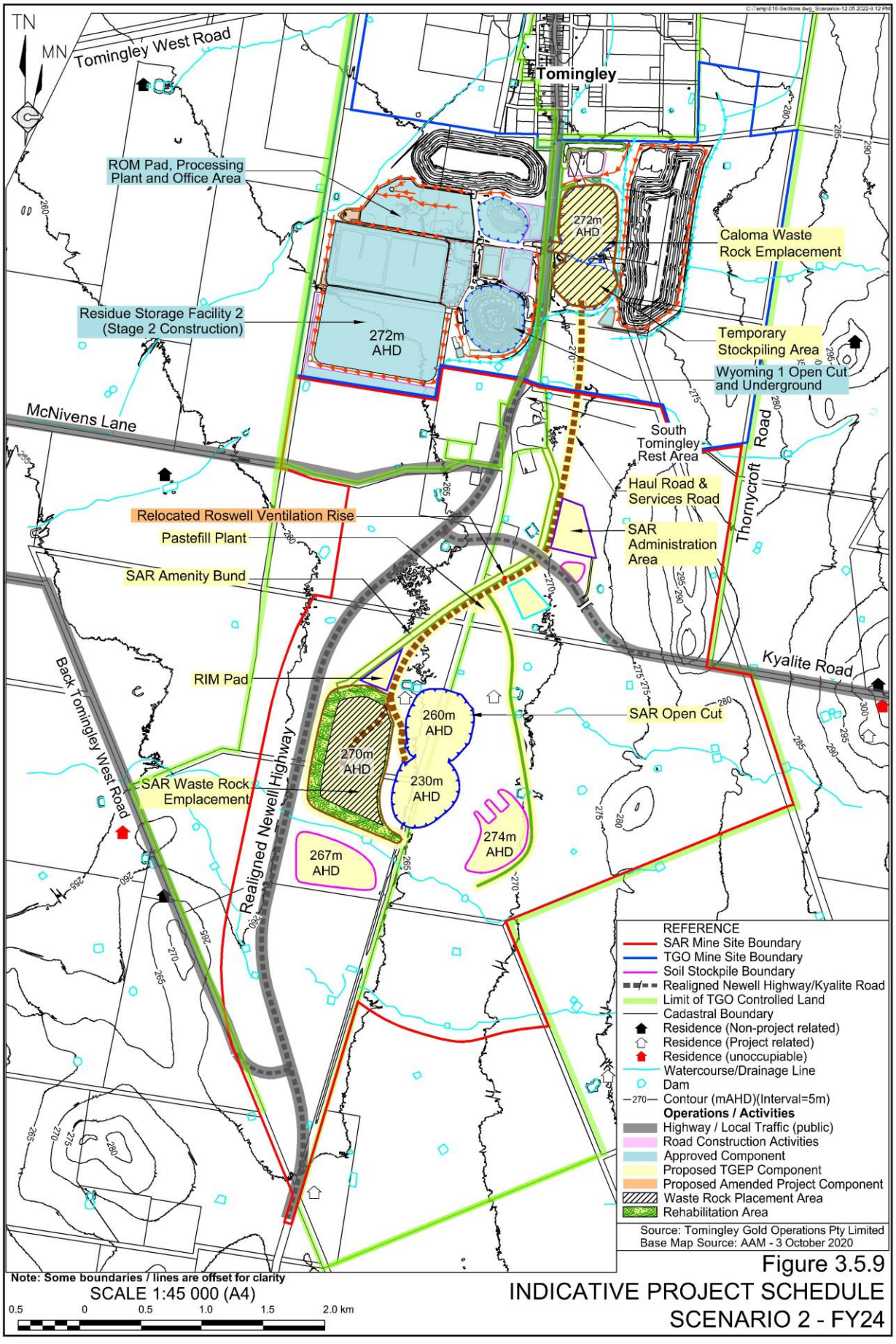

TN
MN
Tomingley West Road
Tomingley
ROM Pad, Processing Plant and Office Area
272m AHD
Caloma Waste Rock Emplacement
Residue Storage Facility 2 (Stage 2 Construction)
272m AHD
Temporary Stockpiling Area
Wyoming 1 Open Cut and Underground
McNivens Lane
South Tomingley Rest Area
Thornycroft Road
Haul Road & Services Road
Relocated Roswell Ventilation Rise
Pastefill Plant
SAR Administration Area
SAR Amenity Bund
Kyalite Road
RIM Pad
SAR Open Cut
260m AHD
270m AHD
230m AHD
Back Tomingley West Road
SAR Waste Rock Emplacement
Realigned Newell Highway
274m AHD
267m AHD
REFERENCE
SAR Mine Site Boundary
TGO Mine Site Boundary
Soil Stockpile Boundary
Realigned Newell Highway/Kyalite Road
Limit of TGO Controlled Land
Cadastral Boundary
Residence (Non-project related)
Residence (Project related)
Residence (unoccupiable)
Watercourse/Drainage Line
Dam
Contour (mAHD)(Interval=5m)
Operations / Activities
Highway / Local Traffic (public)
Road Construction Activities
Approved Component
Proposed TGEP Component
Proposed Amended Project Component
Waste Rock Placement Area
Rehabilitation Area
Source: Tomingley Gold Operations Pty Limited
Base Map Source: AAM - 3 October 2020
Note: Some boundaries / lines are offset for clarity
SCALE 1:45 000 (A4)
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Figure 3.5.9
INDICATIVE PROJECT SCHEDULE
SCENARIO 2 - FY24

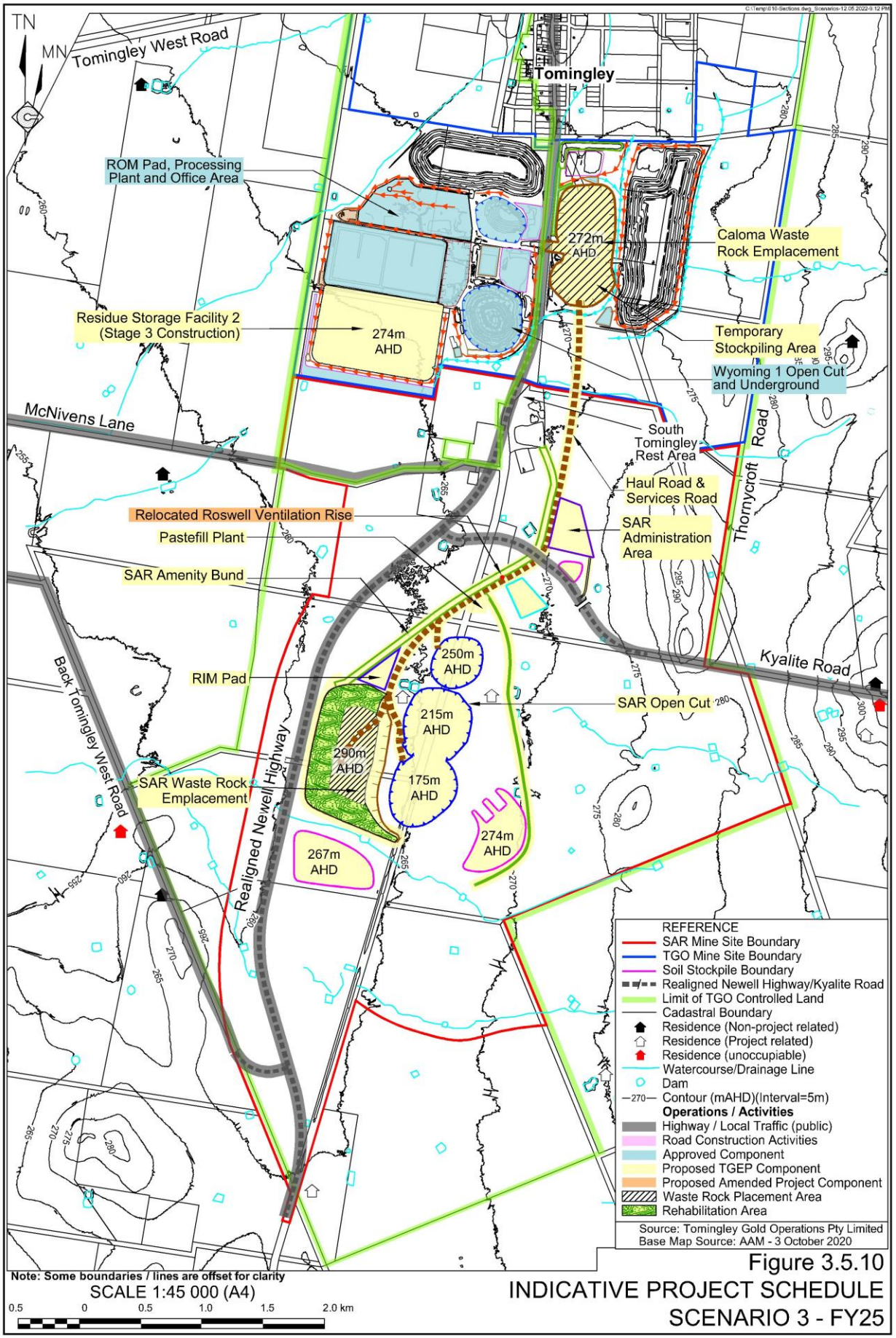
TN
MN
Tomingley West Road
Tomingley
ROM Pad, Processing Plant and Office Area
272m AHD
Caloma Waste Rock Emplacement
Residue Storage Facility 2 (Stage 3 Construction)
274m AHD
Temporary Stockpiling Area
Wyoming 1 Open Cut and Underground
McNivens Lane
South Tomingley Rest Area
Thornycroft Road
Haul Road & Services Road
Relocated Roswell Ventilation Rise
Pastefill Plant
SAR Administration Area
SAR Amenity Bund
Kyalite Road
250m AHD
RIM Pad
SAR Open Cut
215m AHD
290m AHD
175m AHD
Back Tomingley West Road
Realigned Newell Highway
SAR Waste Rock Emplacement
274m AHD
267m AHD
REFERENCE
SAR Mine Site Boundary
TGO Mine Site Boundary
Soil Stockpile Boundary
Realigned Newell Highway/Kyalite Road
Limit of TGO Controlled Land
Cadastral Boundary
Residence (Non-project related)
Residence (Project related)
Residence (unoccupiable)
Watercourse/Drainage Line
Dam
Contour (mAHD)(Interval=5m)
Operations / Activities
Highway / Local Traffic (public)
Road Construction Activities
Approved Component
Proposed TGEP Component
Proposed Amended Project Component
Waste Rock Placement Area
Rehabilitation Area
Source: Tomingley Gold Operations Pty Limited
Base Map Source: AAM - 3 October 2020
Note: Some boundaries / lines are offset for clarity
SCALE 1:45 000 (A4)
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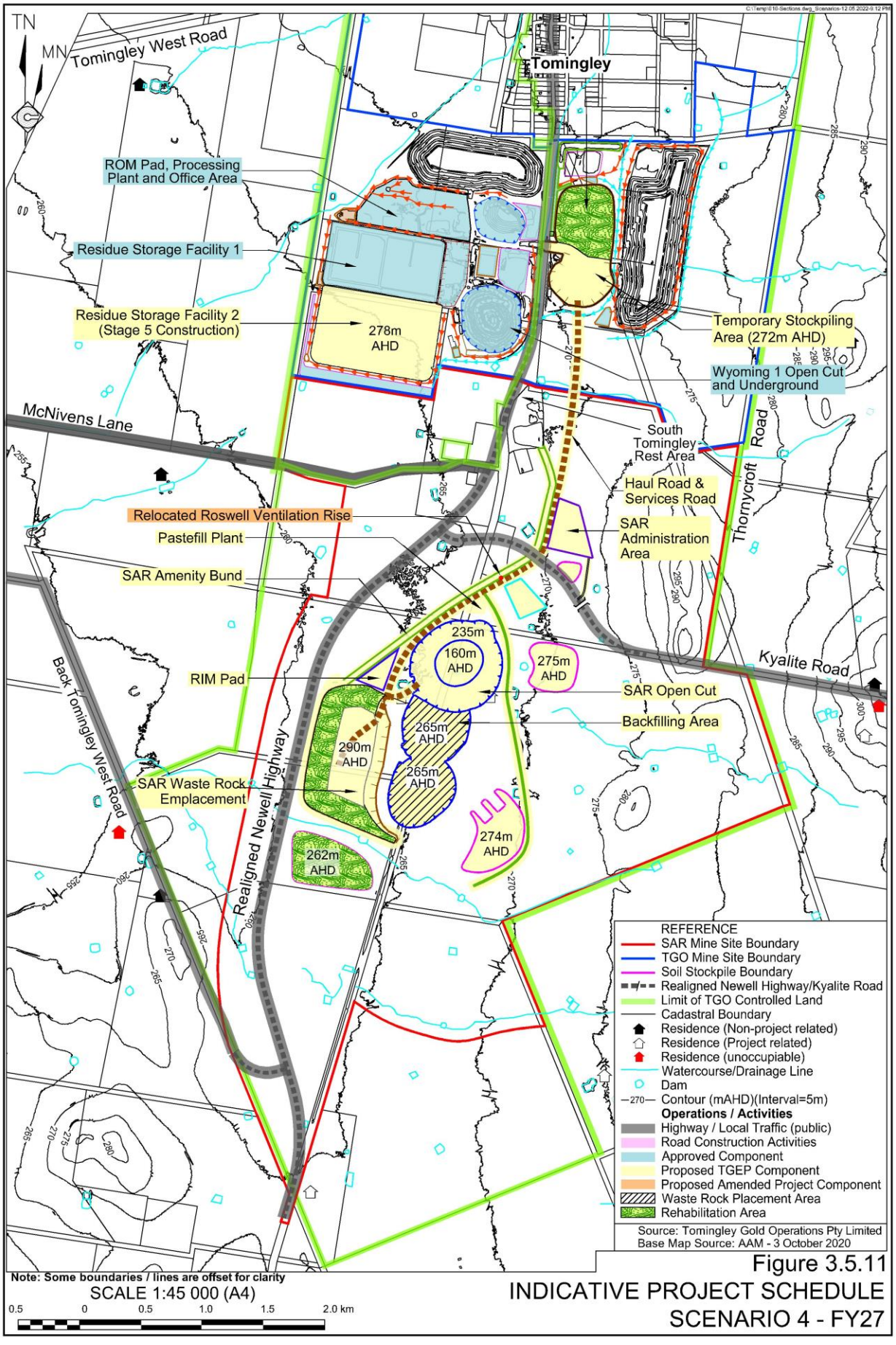
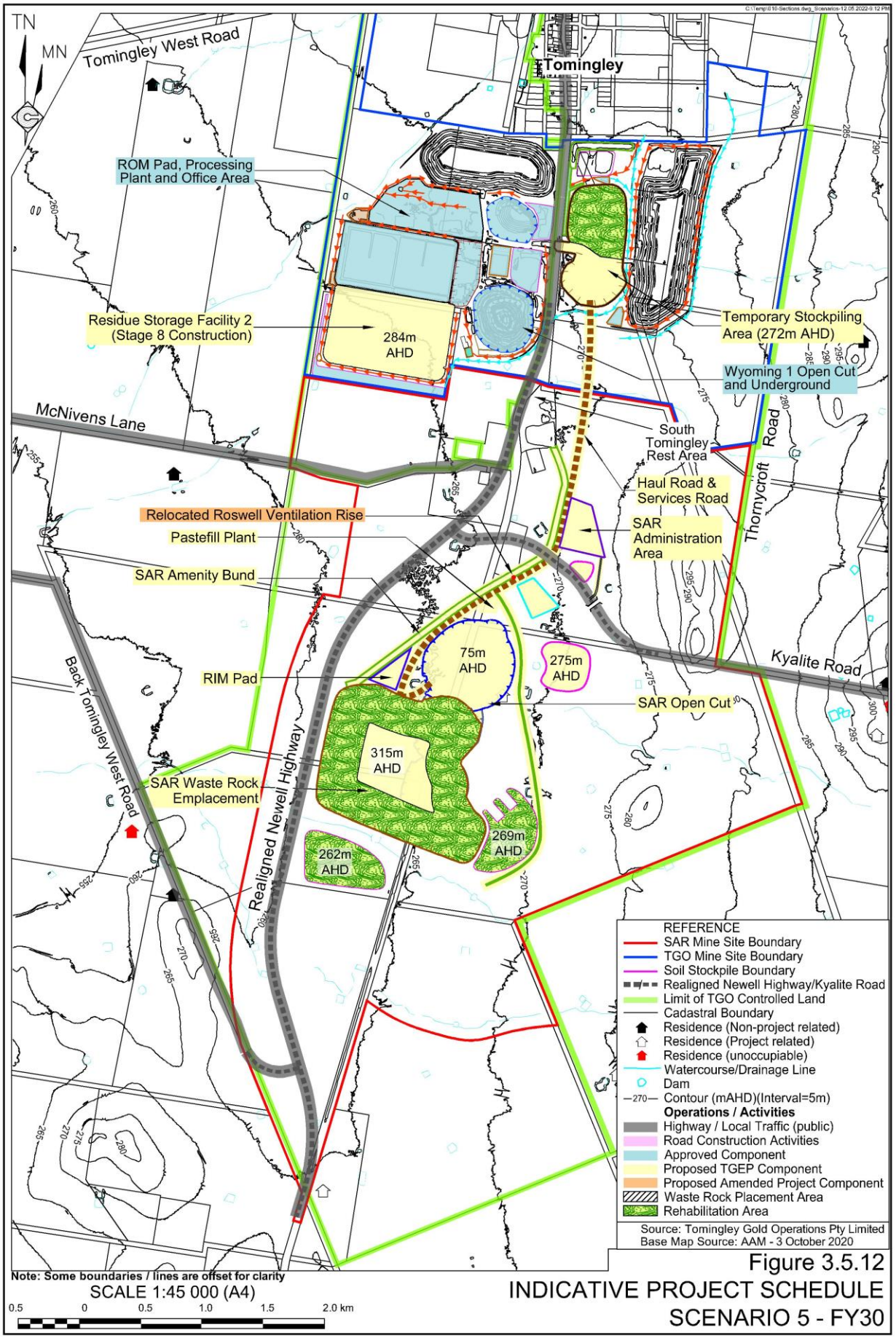
Figure 3.5.10
INDICATIVE PROJECT SCHEDULE
SCENARIO 3 - FY25


TN
MN
Tomingley West Road
Tomingley
ROM Pad, Processing Plant and Office Area
Residue Storage Facility 1
Residue Storage Facility 2 (Stage 5 Construction)
278m AHD
Temporary Stockpiling Area (272m AHD)
Wyoming 1 Open Cut and Underground
McNivens Lane
South Tomingley Rest Area
Thornycroft Road
Haul Road & Services Road
Relocated Roswell Ventilation Rise
Pastefill Plant
SAR Administration Area
SAR Amenity Bund
235m
160m AHD
275m AHD
Kyalite Road
RIM Pad
SAR Open Cut
Backfilling Area
265m AHD
290m AHD
265m AHD
Back Tomingley West Road
SAR Waste Rock Emplacement
Realigned Newell Highway
274m AHD
262m AHD
REFERENCE
SAR Mine Site Boundary
TGO Mine Site Boundary
Soil Stockpile Boundary
Realigned Newell Highway/Kyalite Road
Limit of TGO Controlled Land
Cadastral Boundary
Residence (Non-project related)
Residence (Project related)
Residence (unoccupiable)
Watercourse/Drainage Line
Dam
Contour (mAHD)(Interval=5m)
Operations / Activities
Highway / Local Traffic (public)
Road Construction Activities
Approved Component
Proposed TGEP Component
Proposed Amended Project Component
Waste Rock Placement Area
Rehabilitation Area
Source: Tomingley Gold Operations Pty Limited
Base Map Source: AAM - 3 October 2020
Note: Some boundaries / lines are offset for clarity
SCALE 1:45 000 (A4)
0.5 0 0.5 1.0 1.5 2.0 km
Figure 3.5.11
INDICATIVE PROJECT SCHEDULE
SCENARIO 4 - FY27


TN
MN
Tomingley West Road
Tomingley
ROM Pad, Processing Plant and Office Area
Residue Storage Facility 2 (Stage 8 Construction)
284m AHD
Temporary Stockpiling Area (272m AHD)
Wyoming 1 Open Cut and Underground
McNivens Lane
South Tomingley Rest Area
Thornycroft Road
Haul Road & Services Road
Relocated Roswell Ventilation Rise
Pastefill Plant
SAR Administration Area
SAR Amenity Bund
75m AHD
275m AHD
Kyalite Road
RIM Pad
SAR Open Cut
Back Tomingley West Road
315m AHD
SAR Waste Rock Emplacement
Realigned Newell Highway
269m AHD
262m AHD
REFERENCE
SAR Mine Site Boundary
TGO Mine Site Boundary
Soil Stockpile Boundary
Realigned Newell Highway/Kyalite Road
Limit of TGO Controlled Land
Cadastral Boundary
Residence (Non-project related)
Residence (Project related)
Residence (unoccupiable)
Watercourse/Drainage Line
Dam
Contour (mAHD)(Interval=5m)
Operations / Activities
Highway / Local Traffic (public)
Road Construction Activities
Approved Component
Proposed TGEP Component
Proposed Amended Project Component
Waste Rock Placement Area
Rehabilitation Area
Source: Tomingley Gold Operations Pty Limited
Base Map Source: AAM - 3 October 2020
Note: Some boundaries / lines are offset for clarity
SCALE 1:45 000 (A4)
0.5 0 0.5 1.0 1.5 2.0 km
Figure 3.5.12
INDICATIVE PROJECT SCHEDULE
SCENARIO 5 - FY30

3.5.4.4 Mining Equipment

Table 3.5.3 presents the mobile open cut mining equipment, the anticipated models and indicative numbers[5] of items required throughout the life of the Project. Additional equipment, including light vehicles and service vehicles, would be used but are not identified individually because they would not contribute significantly to noise, dust or other emissions.

Underground mining equipment would include jumbos, drill rigs, haul trucks and underground loaders. These items, with the exception of an underground haul truck, have not been individually identified because they would not contribute to surface noise, dust or other emissions.

3.5.5 Flexible Elements

Table 3.5.4 presents the mining-related flexible elements that cannot be described with certainty at this stage of the Project, together with clear limits on the flexibility sought and a justification of each element. Elements that may be smaller or with lesser impacts than that proposed are not described.

[5] Listed equipment would not achieve 100% utilisation, with allowance made for equipment downtime and redundancies.

Table 3.5.3
Surface Mining Equipment

Type	Indicative Model/Capacity[1]	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33
TGO Open Cut Mining Fleet											
Front-end Loader	Komatsu WA700	1	1	1	1	1	1	1	1	1	1
Underground Haul Truck[2]	CAT AD55	1	1	1	1	1	1	1	1	1	1
SAR Open Cut Mining Fleet											
Excavator	Hatachi EX1200	2	2	2	1	1	1	1	1	-	-
Excavator	Hatachi EX1900	1	1	1	1	1	1	-	-	-	-
Excavator	Hatachi EX2600	1	1	1	-	-	-	-	-	-	-
Haul Truck	CAT785	9	6	6	-	-	-	-	-	-	-
Haul Truck	CAT 777F	18	10	13	11	11	10	7	7	-	-
Articulated Haul Truck	CAT 740	2	2	2	2	2	2	2	2	-	-
Bulldozer	CAT D11R	2	2	2	2	2	2	1	1	-	-
Bulldozer	CAT D10T	3	3	3	2	2	2	1	1	-	-
Wheel Dozer	CAT 854K	1	1	1	1	1	1	1	1	-	-
Front-end Loader	CAT 988H	1	1	1	1	1	1	1	1	-	-
Grader	CAT 18M	2	2	2	1	1	1	1	1	-	-
Grader	CAT 16M	1	1	1	1	1	1	1	1	-	-
Water Cart	CAT 773WC	2	2	2	2	2	2	2	2	-	-
Drill rig	45T	1	5	4	3	4	8	2	2	-	-

Note 1: Equipment models and numbers of items are indicative only.

Note2: Underground haul truck surface operations would be limited to transporting ore from the Wyoming 1 Portal to the ROM Pad and return and unloading operations within the Wyoming 1 Open Cut.

Source: Tomingley Gold Operations Pty Ltd

Table 3.5.4
Flexible Elements – Mining Operations

Flexible Element	Limit on Flexibility	Justification
Open Cut Layout and Design		
Outer limit of the SAR Open Cut	50m from the proposed crest of the SAR Open Cut.	WSP (2021b) identifies the recommended design criteria for the SAR Open Cut. It is possible that lower wall angles or wider berms would be required. Alternatively, minor cutbacks may be required for a range of other reasons. The proposed limit of disturbance around the SAR Open Cut has been offset by a minimum of 50m from the proposed open cut crest. The SAR Open Cut may therefore extend outwards by up to 50m without impacting on land that has not been assessed as part of the Project.
Depth of the SAR Open Cut	50m below the base of the proposed SAR Open Cut or as determined by a geotechnical assessment, without commensurate increase in the proposed area of open cut disturbance	The depth of the SAR Open Cut has been determined based on the result of the open cut optimisation and an assessment of underground mining potential. It is possible that the open cut may, depending on geotechnical limitations or other factors, extend below the proposed maximum depth in order to extract ore that would not otherwise be extracted.
Underground Layout and Design		
Depth/elevation of top level of SAR Underground	Increase above current design to the base of oxidation, associated with a commensurate reduction in the depth of the SAR Open Cut.	The upper limit of the SAR Underground has been determined based on the result of the open cut optimisation and an assessment of underground mining potential. It is possible that the open cut may not be developed to the currently proposed depth. If that were to occur, the underground operations would be extended upwards to extract the ore that would not otherwise be extracted.
Timing, including mine sequence and schedule,	End of mining – December 2032. Maximum annual rate of ore and waste extracted and transported - 35.25Mtpa. Maximum life of Project (FY22 to FY33) ore extraction – 14.775Mt.	The life-of-mine sequence has been prepared based on information available at the time of preparation of this document, including assumptions in relation to the timing of determination or granting of the required approvals and the success of the Applicant in identifying additional resources within the SAR and TGO Mine Sites. It is possible that the actual timing for particular aspects may vary from that proposed or that exploration success may be less or more successful than anticipated. Notwithstanding this, mining operations would, in the absence of further approval, cease on 31 December 2032 and annual ore and waste rock and life of Project ore production would be no greater than that identified in this document.
Mining Equipment	Equipment to be used to be of equivalent capacity/productivity to that proposed, with combined noise or dust emissions no greater than the proposed equipment	The identified equipment list has been assembled based on current equipment availability, costs and productivity. It is possible that alternate equipment may be used. Notwithstanding this, the Applicant would ensure that the combined fleet noise or dust emissions are no greater than the proposed equipment.

3.6 Waste Rock Management

3.6.1 Introduction

Material containing an insufficient concentration of gold to justify processing would be classified as waste rock and would be used for construction and site establishment, mining or rehabilitation purposes, including capping of the residue storage facilities, or would be placed into the Caloma or SAR Waste Rock Emplacements.

Similarly, material that contains insufficient gold to justify processing immediately, but enough that may justify processing at a later date may be classified as low-grade ore. Low-grade ore would be stockpiled on the ROM Pad, within the southern section of the Caloma Waste Rock Emplacement or within the approved disturbance footprint for future processing or incorporation into the final Waste Rock Emplacement landform, if not processed.

This subsection describes the characteristics of the waste rock and low-grade material that would be generated throughout the life of the Project, the anticipated quantities and uses of that material, the design of the waste rock emplacements and the procedures to be used during construction and shaping of those emplacements.

3.6.2 Waste Rock Characterisation

3.6.2.1 Introduction

Waste rock material characterisation is critical for determining the measures required to manage waste rock material throughout and following the life of the Project. The Applicant engaged RGS Environmental Consultants Pty Ltd (RGS) to undertake a material characterisation of Project-related waste rock to be generated from the Caloma Eastern Cutback and the SAR Open Cut. Appendix 4 of the EIS presents an overview of those assessments and Appendices 10 and 11 of the EIS present the reports themselves, referred to hereafter as RGS (2021a) and RGS (2021b) respectively. Section 3.6.5 presents the waste rock management measures that would be implemented to address matters identified by the material characterisation assessments.

3.6.2.2 Caloma Eastern Cutback

Selected waste rock from the Caloma Eastern Cutback would be used for construction of Project-related infrastructure, including on-site roads and potentially for selected use during construction of the realigned Newell Highway and Kyalite Road and associated intersections. RGS (2021a) tested 50 waste rock samples from six distinct lithologies from below the base of oxidation within the Caloma Eastern Cutback and concluded the following.

- The dolerite and feldspar-phyric porphyry waste rock (referred to hereafter as “andesite”) materials are classified as Non-Acid Forming (NAF), with a low risk of acid generation and a high factor of safety with respect to acid mine drainage.
- The only lithologies sampled that contain material classified as Potentially Acid Forming (PAF) are mudstone and mudstone/volcaniclastic siltstone.
- Total metal concentrations in waste rock are generally not significantly enriched compared to median crustal abundance, with the exception minor sporadic enrichment of arsenic and copper in diorite and andesite waste rock.

- Initial water contact with the waste rock materials is likely to be slightly to moderately alkaline, fresh (non-saline) with metals/metalloids in material represented by the NAF waste rock samples likely to be sparingly soluble with concentrations expected to remain within applied freshwater aquatic ecosystem and livestock drinking water quality guideline criteria. Some metal/metalloids may be marginally more soluble in initial contact water from waste rock compared to applied freshwater aquatic ecosystem guideline values. However, all trace metal/metalloid concentrations are well within the livestock drinking water guideline values. In the short-term, soluble metal/metalloid concentrations are unlikely to impact upon the quality of surface and groundwater resources.
- In the longer-term, metal/metalloid solubility from any PAF materials has the potential to increase, if these materials are not covered and are left exposed to oxidising conditions.

3.6.2.3 SAR Open Cut

Waste rock from within the SAR Open Cut would be used for initial site establishment, ongoing site maintenance activities, construction or capping of the Residue Storage Facilities or placement into the Caloma or SAR Waste Rock Emplacements.

RGS (2021b) tested 85 waste rock samples from nine distinct lithologies within the SAR Open Cut, including alluvium and oxidised and fresh rock and concluded the following.

- The overwhelming majority of tested materials may be classified as NAF, with a low risk of acid generation and a high factor of safety with respect to acid mine drainage.
- Some of the igneous lithologies have elevated sulphur content (as sulphide) and have the potential to oxidise over time and be a potential source of neutral mine drainage and saline drainage.
- Total metal concentrations in waste rock are generally not significantly enriched compared to applied guideline values and median crustal abundance in un-mineralised soils. The only exception is arsenic in some of the fresh igneous and quartz-rich lithologies.
- The majority of metals/metalloids in samples tested are likely to be sparingly soluble, with aluminium, arsenic and chromium potentially marginally more soluble. However, all trace metal / metalloid concentrations are well within the livestock drinking water guideline values.
- In the short-term, soluble metal/metalloid concentrations are unlikely to impact upon the quality of surface and groundwater resources. However, in the longer-term, metal/metalloid solubility from any PAF materials has the potential to increase, if these materials are not covered and are left exposed to oxidising conditions.
- Some waste rock materials may potentially be susceptible to dispersion and erosion.

3.6.3 Waste Rock Quantities and Uses

The Applicant anticipates that approximately 64.2 million bank (or *in situ*) cubic metres (Mbcm) of waste rock would be produced from the SAR Open Cut. A further 1.2Mbcm of waste rock would be produced from the Caloma Eastern Cutback. Assuming a swell factor based on the Applicant's experience at the TGO Mine, approximately 81.8 million loose cubic metres (Mlcm) of waste rock would be produced by the Project.

Initially, open cut waste rock would be utilised for a range of site establishment-related purposes. **Table 3.6.1** presents the anticipated uses, volumes, classes and post-mining fate of the materials used.

Table 3.6.1
Indicative Waste Rock Destinations

Infrastructure	Indicative Volume (Mlcm)	Material Source	Post-mining Fate
SAR Amenity Bund	0.5	Alluvium	Removed and used for rehabilitation.
SAR Haul and Services Road	0.2	SAR Alluvium ECB[1] hard rock	Removed and used for rehabilitation.
Administration Area	0.1	SAR Alluvium ECB[1] hard rock	Removed and used for rehabilitation.
Residue Storage Facilities	5.0	ECB and SAR hard rock	Remain in place.
RIM Pad	0.1	SAR Alluvium ECB[1] hard rock	Removed and used for rehabilitation.
Various site roads and other uses	0.1	SAR Alluvium ECB[1] hard rock	Removed and used for rehabilitation.
Caloma Waste Rock Emplacement	17.6	All	Remain in place.
SAR Waste Rock Emplacement	58.2[2]	All	Remain in place.
Total	**81.8**		

Note 1: ECB = Caloma Eastern Cutback.
Note 2: See also Section 3.6.4.2.

Source: Tomingley Gold Operations Pty Ltd

Waste rock produced during underground mining operations would, to the extent practicable, be placed within completed stopes underground. Alternatively, waste rock from underground operations would be transported to surface via the TGO underground workings and placed within the Wyoming 1 Open Cut or stored temporally in surface stockpiles in the vicinity of the Wyoming 1 Open Cut prior to being used for construction or being transferred back underground.

3.6.4 Waste Rock Emplacement Design

3.6.4.1 Caloma Waste Rock Emplacement

Figure 3.6.1 presents the layout of the proposed Caloma Waste Rock Emplacement, and the following presents the indicative design criteria for the Emplacement. In summary, the Caloma 1 and 2 Open Cuts would be backfilled to surface, with the final landform to be a low rise with slopes of approximately 1% to facilitate water drainage from the final landform.

- Area ..... approximately 45ha
- Slope .....approximately 1%
- Maximum elevation..... approximately 277m AHD
- Maximum height above pre-mining landform .....up to approximately 7m
- Contained volume[6] .....approximately 17.6Mm^3

3.6.4.2 SAR Waste Rock Emplacement

Figure 3.6.2 presents the layout of the proposed SAR Waste Rock Emplacement. The following presents the indicative design criteria for the emplacement.

- Area 145ha
- Maximum crest elevation ..... approximately 335m AHD
- Slope - distance from crest
  - 0m to 100m .....approximately 2% or 1:50 (V:H)
  - 100m to 200m ..... Increase from 2% to 16.7%
  - 200m to base .....approximately 16.7% or 1:6 (V:H)
- Maximum height above pre-mining landform .....Approximately 70m
- Contained volume .....approximately 71.8Mm^3

As identified in **Table 3.6.1**, the Applicant anticipates that approximately 58.2Mm^3 of waste rock will be required to be stored within the SAR Waste Rock Emplacement. The proposed SAR Waste Rock Emplacement would therefore have an excess capacity of approximately 13.6Mm^3. This excess capacity has conservatively allowed for the production of a greater volume of waste rock than is currently anticipated. In the event that the final waste volume produced is less than the design storage capacity, the SAR Waste Rock Emplacement would be lower than proposed.

[6] At 1 July 2021, including the approved Caloma Eastern Cutback.

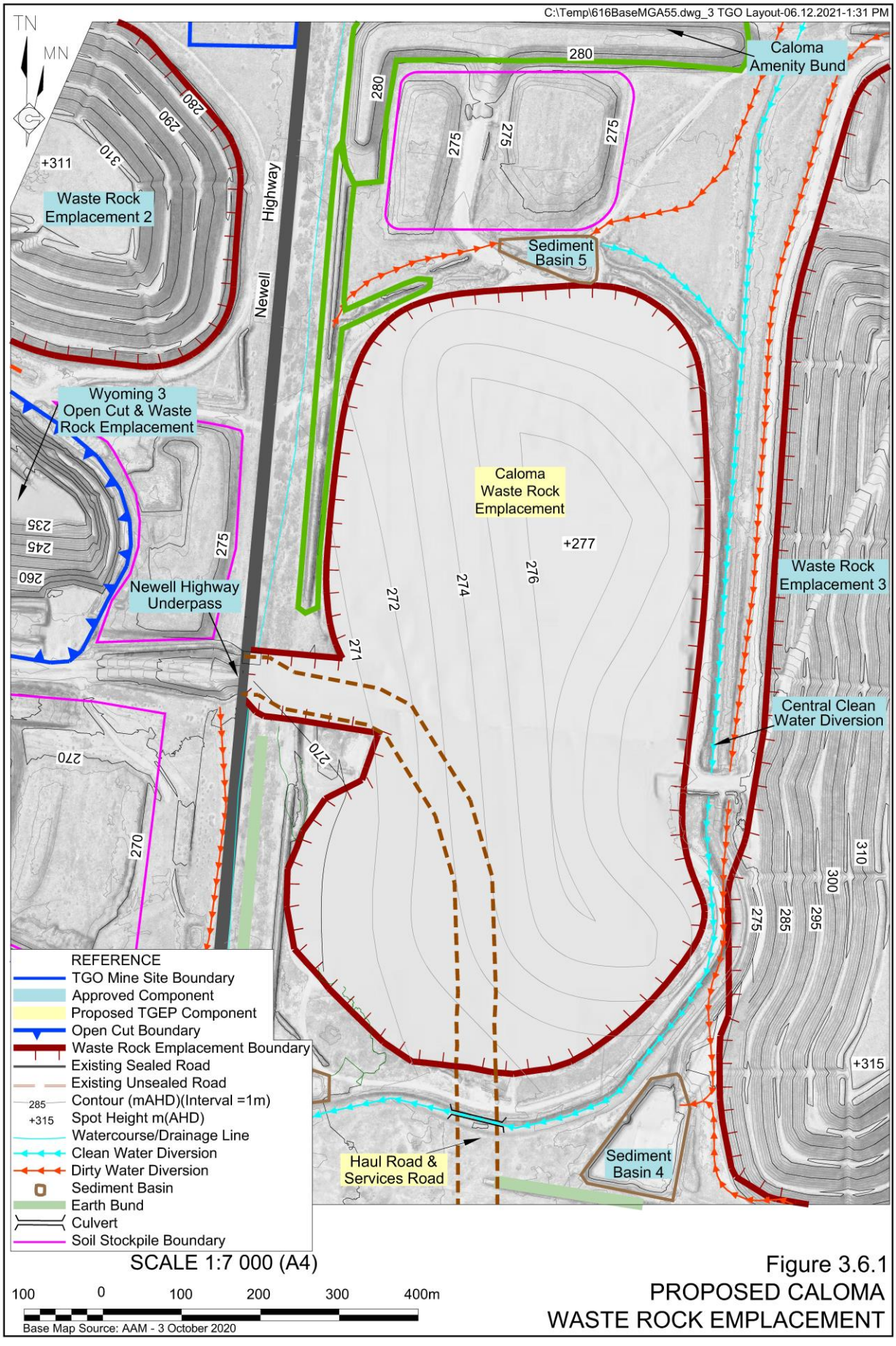


Figure 3.6.1
PROPOSED CALOMA WASTE ROCK EMPLACEMENT

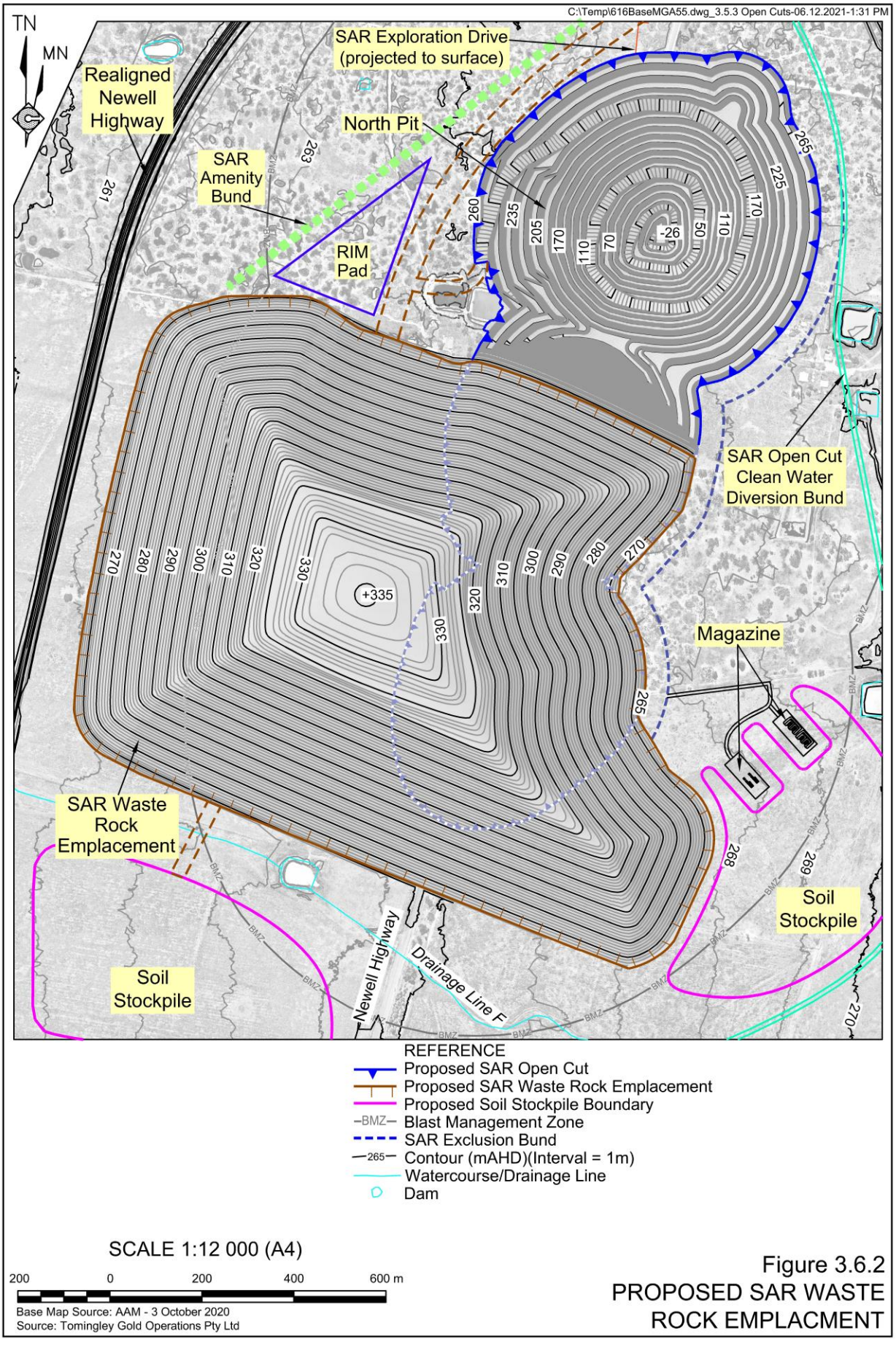


Figure 3.6.2
PROPOSED SAR WASTE ROCK EMPLACMENT

Landloch (2021b) assessed the erodibility and stability of the proposed SAR Waste Rock Emplacement design using the SIBERIA modelling software (see Appendices 4 and 12 of the EIS) and determined the following.

- Long-term average soil loss would be less than the target 5t/ha/y under a 60% vegetation cover scenario. The Applicant notes that the current vegetation cover at both TGO and the Peak Hill Gold Mine is approximately 90% and therefore the target soil loss should easily be achieved.
- Gullies are expected to begin to erode through the proposed 300mm of soil cover after 500 years. These gullies primarily form at the convex section of the proposed emplacement where the slope transitions from 5% to 16.7%. In order to mitigate the formation of gullies in this area, Landloch (2021b) has recommended placement of a soil/rock matrix in that location (see Section 3.14.8).

3.6.5 Waste Rock Placement and Management

Waste rock would be classified as follows prior to extraction.

- Construction and rehabilitation raw materials – materials suitable for use during site establishment, in particular for sheeting site roads and in construction of the public road network would be largely comprised of dolerite and andesite from the Caloma Eastern Cutback. Alternatively, friable, clay-rich material may be suitable for use in constructing and rehabilitating the Residue Storage Facilities, in particular for establishing the required permeability barriers. These materials would be separately stockpiled prior to use.
- Potentially acid forming material – comprising primarily mudstone and volcaniclastic siltstone from the Caloma Eastern Cutback. This material would be placed as deep as possible within the in-pit sections of the waste rock emplacements. This material would then be covered with non-acid forming waste rock and growth medium to limit the potential for oxidation and generation of an acidic leachate.
- Material with elevated arsenic concentrations – RGS (2021b) (See Section A4.3.3.5 of Appendix 4 of the EIS) identified that Fresh Andesite and Quartz may be relatively enriched and arsenic. These materials would be preferentially placed in-pit or above the in-pit section of the waste rock emplacements and would not be placed in close proximity to the final surface of the waste rock emplacement landforms.
- Friable or weathered material - comprising primarily alluvium and saprolite. This material has the potential to be dispersible. As a result, it would, where practicable, be placed within the in-pit or in central sections of the waste rock emplacements.
- Unweathered material – comprising unoxidized rock that would be non-dispersive and would, to the extent practicable, be placed on the outer batters of the proposed waste rock emplacements, prior to being covered with soil/growth medium. To the extent practicable, large rocks would not be placed close to the final surface of the SAR Waste Rock Emplacement.

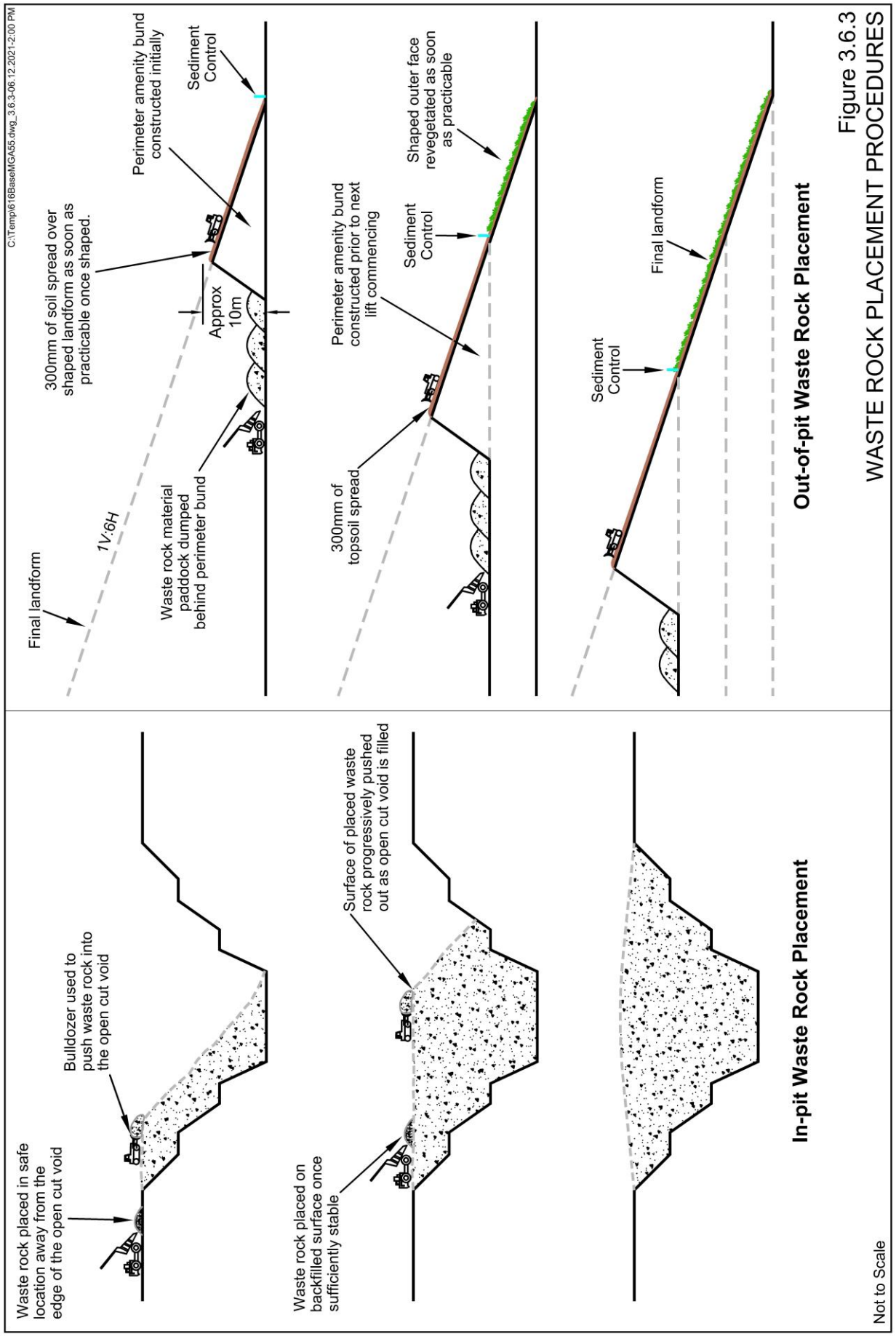
Material would be placed using a combination of in-pit and out-of-pit placement techniques. The following presents a brief overview of the proposed in-pit and out-of-pit placement techniques, both of which are currently, or have previously been used at the TGO Mine Site (**Figure 3.6.3**). Material with the potential to be used for rehabilitation operations, would be stockpiled separately and an inventory would be maintained to ensure an adequate volume of that material is available during rehabilitation operations.

In-pit Placement

- Waste rock would initially be paddocked dumped on natural ground adjacent to the open cut to be backfilled.
- A bulldozer would push waste rock into the open cut, resulting in a rill surface within the open cut.
- Only when sufficient material has been pushed into the open cut to ensure the stability of the placed material would haul trucks be permitted to access the backfilled surface.
- Bulldozers would continue to push placed material into the open cut void until it is completely backfilled. At no time would haul trucks direct tip into the open cut void.
- Immediately prior to establishment of the terminal northern face of the in-pit waste rock emplacement between the SAR Open Cut Central and Northern Pits, the advice of a suitably qualified geotechnical engineer would be sought to determine the appropriate terminal face design.

Out-of-pit Placement

- Waste rock would initially be placed around the perimeter of the waste rock emplacement to create a perimeter amenity bund with an outer terminal face with a slope of approximately 1:6 (V:H). The terminal face would be shaped and revegetated as soon as practicable, as described in Section 3.14.
- Once the perimeter amenity bund has been established, waste rock would be paddocked dumped behind the bund and levelled with a bulldozer.
- As the elevation of the inner section of the waste rock emplacement increases, the perimeter amenity bund would be extended upwards (nominally in 10m lifts), shaped, soil spread and revegetated as described above. The Applicant would ensure that a minimum 5m high amenity bund is retained on all sides of the upper surface of the waste rock emplacement to minimise the potential for noise and visual impacts.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Final landform
1V:6H
Waste rock material paddock dumped behind perimeter bund
300mm of soil spread over shaped landform as soon as practicable once shaped.
Approx 10m
Perimeter amenity bund constructed initially
Sediment Control
300mm of topsoil spread
Perimeter amenity bund constructed prior to next lift commencing
Sediment Control
Shaped outer face revegetated as soon as practicable
Sediment Control
Final landform
Out-of-pit Waste Rock Placement
Figure 3.6.3
WASTE ROCK PLACEMENT PROCEDURES
Waste rock placed in safe location away from the edge of the open cut void
Bulldozer used to push waste rock into the open cut void
Waste rock placed on backfilled surface once sufficiently stable
Surface of placed waste rock progressively pushed out as open cut void is filled
In-pit Waste Rock Placement
Not to Scale

3.6.6 Flexible Elements

Table 3.6.2 presents the waste rock-related flexible elements that cannot be described with certainty at this stage of the Project, together with clear limits on the flexibility sought and a justification of each element. Elements that may be smaller or with lesser impacts than that proposed are not described.

Table 3.6.2
Flexible Elements – Waste Rock and Low-grade Management

Flexible Element	Limit on Flexibility	Justification
Final design of the SAR Waste Rock Emplacement	Side Slopes - <1:6 (V:H) Maximum elevation – 335m AHD	The proposed SAR Waste Rock Emplacement has been conservatively designed to allow for a greater volume of waste rock to be mined than currently anticipated. It is likely, therefore, that the final Waste Rock Emplacements would be lower and / or have less steep side slopes than proposed.
Material movement schedule or destination	Maximum annual waste production - >32.1Mtpa	It is possible that material movement schedule may vary throughout the life of the Project. However, total maximum material movements would be less than 35.25Mt during any financial year throughout the life of the Project.
Use of the RIM Pad	RIM Pad no larger than proposed. Stockpiled material no higher than 7m.	The RIM Pad has been identified as a temporary stockpile area. The material stockpiled within the area may include ROM ore, low-grade material or waste rock. Notwithstanding this, the area of the RIM Pad would be no larger than that proposed and the stockpiles materials no higher than the adjacent SAR Amenity Bund.

3.7 Processing Operations

3.7.1 Introduction

Processing operations would be undertaken using the existing, approved Processing Plant, largely as described in RWC (2011) and approved under MP 09_0155. In order to facilitate the proposed increase in the approved maximum rate of processing from 1.5Mtpa to 1.75Mtpa, an additional ball mill and associated changes to the crushing and grinding circuit are proposed. This subsection briefly describes the existing, approved processing operations, as well as the proposed additional processing-related infrastructure. Management of residue or tailings material from the Processing Plant is described in Section 3.8.

3.7.2 Approved Processing Operations

Plates 3.7.1 and **3.7.2** present oblique aerial views of the existing, approved Processing Plant.

The principal components of the Processing Plant include the following.

ROM Pad and Crushing and Grinding Circuit

Ore material is transported to and stockpiled on the ROM pad. A front-end loader is used to transfer ore to the ROM bin from where it is transferred to a primary jaw crusher and then a secondary cone crusher. A range of screens and conveyors sort and recirculate crushed material to achieve a nominal size of 16mm or less. The crushed material is transferred via conveyor either directly to the grinding circuit or to a crushed ore stockpile. Material from the crushed ore stockpile is transferred to the grinding circuit using a front-end loader.

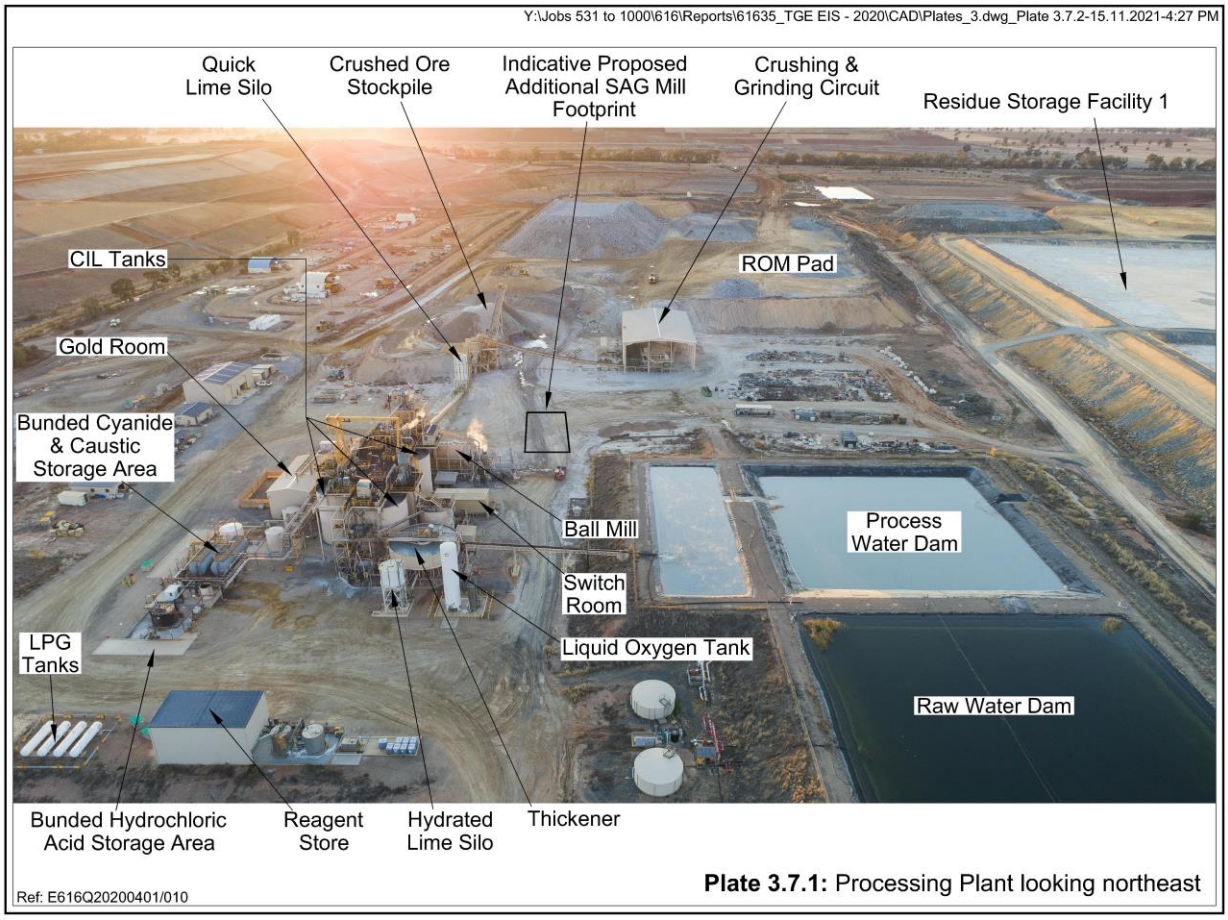


Plate 3.7.1: Processing Plant looking northeast

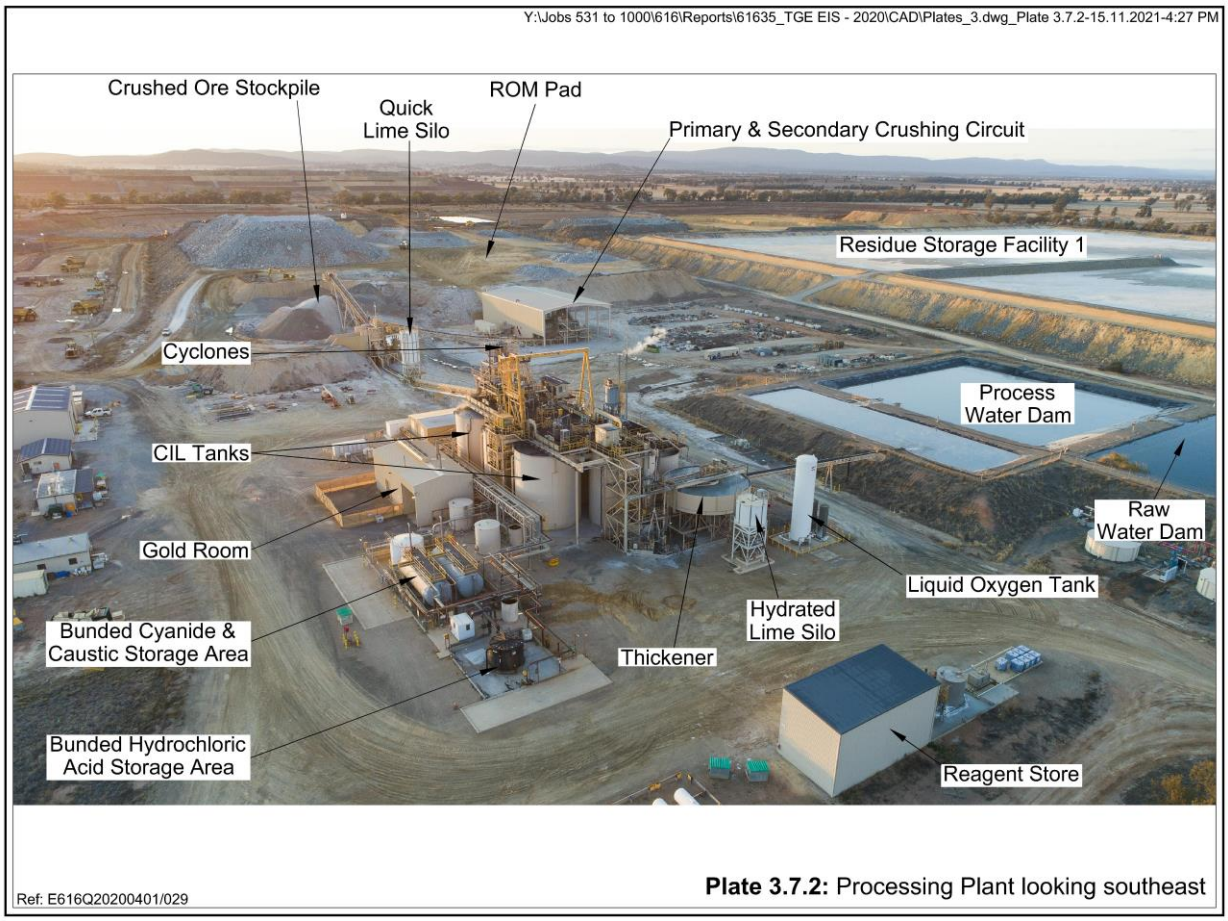


Plate 3.7.2: Processing Plant looking southeast

The grinding circuit comprises a single stage ball mill with a diameter of 5m and a grinding length of 8.2m. The ore is combined with water and steel balls to further reduce the size of the crushed ore. The overflow from the ball mill flows to a trommel, to remove scat material, with the trommel underflow pumped to a bank of cyclones which classify the material, returning oversize material of greater than 106µm to the ball mill. The dense material in the cyclone underflow is passed to the gravity circuit. Cyclone overflow material less than 106µm is sent to the Carbon-in-Leach circuit.

The grinding circuit has a nominal feed rate of 125t/h for unweathered material, with higher throughputs achievable when processing softer, oxidised material.

Gravity and Leach Circuits

The gravity circuit comprises a centrifugal concentrator which further separates dense and less dense material, with the dense, gravity concentrate pumped to an intensive leach circuit and the less dense material pumped back to the grinding circuit.

The CIL circuit comprises six 979m^3 agitated tanks. The ground ore flows to Tank 1 where a weak solution of sodium cyanide and other additives are added. The cyanide dissolves the gold into solution as the ore and cyanide solution is passed from Tank 1 to Tank 6. Lime is added to increase the pH of the solution and prevent volatilisation of the cyanide and compressed air or oxygen is added to increase the dissolved oxygen concentration. In each tank, the additives are managed to maximise the recovery of gold.

The dissolved gold is recovered from the solution through adsorption onto activated carbon granules which flow counter current, namely from Tank 6 to Tank 2 where it is removed from the circuit. The gold-loaded carbon is then collected and transferred to the elution circuit.

In addition, the gravity concentrate, which typically contains much higher concentrations of gold than the feed for the CIL circuit, is passed to an intensive leach circuit where the concentrate is subjected to an intensive cyanidation process, operated at higher temperatures and pressures than a standard CIL circuit. The gold-bearing solution from the intensive leach circuit is transferred to the elution circuit and the tail from the intensive leach circuit is passed to the grinding circuit.

Gold Room Operations

Loaded carbon from the CIL circuit is transferred to an elution circuit which contains a strong solution of hot caustic and cyanide. This step re-dissolves the adsorbed gold into a concentrated solution. The gold-bearing solution from the intensive leach is then combined with the elution solution and together they are recovered onto steel wool using electrowinning. Activated carbon stripped of gold is returned to the CIL circuit for re-use.

The gold-covered steel wool is then fired with a range of fluxes in a furnace to produce gold doré, or unrefined gold bars, which are then transferred securely from the TGO Mine Site for further refining off site.

Residue Thickening and Cyanide Destruction

The remaining slurry from the CIL circuit is removed and flows to a thickener where water is removed to recover as much of the cyanide as possible for reuse in the CIL circuit. The remaining material is then treated using a cyanide destruction circuit and the residue is pumped to the residue storage facilities (see Section 3.8).

Reagent Management

Table 3.7.1 presents the reagents and consumables regularly used within the Processing Plant. All reagents are received, stored, used and managed in accordance with the Applicant's *Hazardous Materials Management Plan* available on the Applicant's website.

Table 3.7.1
Processing Reagents and Consumables

Reagent	Purpose	Form	Maximum Storage Capacity	Dangerous Goods Code
Cyanide and cyanide compounds	Leaching of gold	Liquid	2 x 100 000L tanks	6.1 (toxic)
Sodium hydroxide (caustic)	pH management during elution and intensive leach	Liquid	20 000L tank	8 (corrosive)
Hydrochloric acid (33%)	Regeneration of activated carbon	Liquid	30 000L tank	8 (corrosive)
Lime (quick lime and hydrated lime)	pH management during leaching and cyanide detoxification	Solid	2 x silos	nil
Sodium Metabisulphite	cyanide detoxification	Solid	35 x 1.2m^3 bulka bags stored in a bunded reagent store	Nil
Copper sulphate	Catalyst in the cyanide detoxification process	Liquid	25 x 1m^3 Intermediate Bulk Containers in a bunded reagent store	9 (misc)
Liquefied Petroleum Gas (LPG)	Heating	Liquified gas	4 x 7.5m^3 tanks	2.1 (flammable gas)
Liquid oxygen	Management of dissolved oxygen in CIL Circuit	Liquified gas	60m^3 tank	2.2 (non-flammable, non-toxic gas)
Source: Tomingley Gold Operations Pty Ltd – *Hazardous Materials Management Plan* – after Section 5				

Cyanide and cyanide compounds

Cyanide is transported to the TGO Mine Site as solid briquettes using 22t isotainers. On arrival on site, the isotainers are connected to the cyanide storage tanks within a bunded, concrete sealed area (**Plates 3.7.1** and **3.7.2**) and water is pumped from the storage tanks into the isotainers to dissolve the briquettes. The resulting solution is stored within the two tanks in a concrete bunded area adjacent to the Processing Plant.

Cyanide solution is added to the leach circuit in the quantities required. The pH of the cyanide leach solution is managed through the addition of lime and caustic to minimise the potential for volatilization of hydrogen cyanide, a gas with the potential for adverse impacts on humans and animals. Monitoring of cyanide concentrations in the leach solution and air is undertaken continuously and personnel evacuated in the event that excessive cyanide gas is detected. Measures are implemented immediately to reduce the concentration of hydrogen cyanide within the Processing Plant.

EPL 20169 nominates the following discharge limits for weak acid dissociable cyanide discharged into the residue storage facilities as follows. These limits are achieved through the use of a cyanide destruction circuit prior to discharge of residue.

- 90th percentile limit..... 20mg/L
- 100th limit 30mg/L

Finally, the Applicant inspects the residue storage facilities twice daily for stranded or cyanide affected wildlife. Section 1.4.7.2 of the EIS presents the results of that monitoring, in summary, however 4 bird deaths and one wallaby death have been recorded, with none attributable to cyanide toxicity.

Other Reagents

All other reagents are managed in accordance with their Safety Data Sheets, manufacturer's instructions and the procedures identified in the *Hazardous Materials Management Plan.*

3.7.3 Proposed Processing Operations

MP 09_0155 permits processing operations up to a maximum of 1.5Mtpa. Notwithstanding this, the current design of the Processing Plant has permitted processing of a maximum of only 1.14Mtpa during the Financial Year 2015 when the approved TGO Open Cuts were mining saprolite and oxide ore (see Table 1.3 of the EIS). The principal constraint to achieving a higher processing rate has been the crushing and grinding circuit. As a result, the Applicant proposes to install a Semi-autogenous grinding (SAG) Mill to increase capacity and throughput. The SAG mill would be located adjacent to the existing Processing Plant in an area previously disturbed by mining-related activities (**Figure 3.3.1** and **Plate 3.7.1**).

The proposed SAG mill would indicatively have a diameter of 5.5m and a grinding length of 3.65m. The SAG mill would operate in a similar manner to the existing ball mill, with crushed ore and water added and rotation of the mill would result in the reduction in the size of the crushed ore through attrition with steel balls within the mill. The SAG mill would permit larger sized ore to be discharged from the crushing circuit, thereby increasing the throughput of that circuit. The coarsely crushed material would then be ground using the SAG mill which would be discharge to the ball mill for further grinding of the ore. The Applicant would retain the ability to bypass the SAG Mill, if required.

The Applicant anticipates that the proposed SAG Mill would increase the nominal feed rate for the Processing Plant when processing unweathered ore from 125t/h to approximately 188t/h. Allowing for a 91% availability, this would equate to a production rate that would be unchanged from the approved rate of 1.5Mtpa. Notwithstanding this, a substantial proportion of the ore within the upper sections of the SAR deposits is saprolite or oxidised material. This material is significantly softer and more easily crushed and ground than unweathered material. As a result, the Applicant anticipates that when processing such ore, nominally in Financial Year 2025, a production rate of up to 1.75Mtpa may be achieved. In all other years, the production rate would be less than the currently approved 1.5Mtpa (see Section 3.5.4.2 and **Table 3.5.2**).

No other substantive changes to the operation of the Processing Plant or processing operations are proposed.

3.7.4 Flexible Elements

Table 3.7.2 presents the processing-related flexible elements that cannot be described with certainty at this stage of the Project, together with clear limits on the flexibility sought and a justification of each element. Elements that may be smaller or with lesser impacts than that proposed are not described.

Table 3.7.2
Flexible Elements – Processing Operations

Flexible Element	Limit on Flexibility	Justification
Processing procedures, plant, equipment and reagents	No additional substantial plant or equipment other than that described. No significant additional emissions of noise, dust, gases or odour. No substantial change to the reagents used. Maximum rate of processing no greater than 1.75Mtpa.	Processing methodology, equipment and techniques are continually evolving and being optimised to maximise recovery of contained gold or the efficiency of processing operations. Minor adjustments to the processing equipment, process flow sheet or reagents used may be identified and implemented throughout the life of the Project.

3.8 Residue Management

3.8.1 Introduction

Following completion of processing operations, the residue or tailings in the form of a slurry from which the majority of the gold and cyanide has been removed would be pumped to Residue Storage Facility 1 or Residue Storage Facility 2. Residue Storage Facility 1 is approved to Stage 9, Cell 1, while Residue Storage Facility 2 is approved to Stage 2. This application seeks development consent for the construction of Stages 3 to 9 of Residue Storage Facility 2.

This subsection provides an overview of the material characteristics of the residue produced, the design and operation of the approved and proposed residue storage facilities as well as the proposed monitoring and closure of the facilities. Section 3.5.3.2 describes the proposed pastefill plant which would utilise residue from Processing Plant or the Residue Storage Facilities.

3.8.2 Residue Characterisation

DE Cooper & Associates Pty Ltd (Cooper, 2011) prepared an initial assessment of material characterisation of residue to be produced at TGO. That assessment was reviewed and confirmed by GHD (2016). As the mineralogy of ore within the SAR deposits is nearly identical to that at TGO, the Applicant contends that the residue to be produced from SAR ore would be consistent with that produced to date at TGO.

Cooper (2011) and GHD (2016) determined the following.

- All residue samples tested were non-acid forming.
- Decant water collected from the settled tailings had concentrations of dissolved arsenic and copper that exceeded the ANZECC (2000) stock watering guidelines.

The Applicant notes that since commissioning of Residue Storage Facility 1 in 2013, that there have been no significant issues related to material characterisation of the residue produced at TGO, including no evidence of generation of a low pH leachate or generation of a leachate with metal concentrations that requires anything other than industry standard management measures.

3.8.3 Design of the Residue Storage Facilities

3.8.3.1 Approved Residue Storage Facilities

Figure 3.8.1 and **Table 3.8.1** present the layout and design criteria for the approved residue storage facilities. In summary, development consent for the approved residue storage facilities were granted as follows.

- Residue Storage Facility 1 (Stages 1 to 6) .....Original Project Approval (2012)
- Residue Storage Facility 1 (Stages 7 to 9) MOD4 (2020)
- Residue Storage Facility 2 (Stages 1 and 2).....MOD5 (2021)

Table 3.8.1
Approved Residue Storage Facilities Design Criteria

Design Component	Residue Storage Facility 1		Residue Storage Facility 2
Maximum approved stage	Stage 9, Cell 1	Stage 8, Cell 2	Stage 2
Maximum crest elevation	286.5m AHD	284.5m AHD	272.0m AHD
Maximum residue elevation	286.0m AHD	284.0m AHD	271.3m AHD
Slope of outer face	1:3 (V:H)		1:3 (V:H)
Design capacity (approximate)	8.93Mt		7.40Mt
Residue discharge	Perimeter discharge		Perimeter discharge
Decant system	Central decant		Central decant
Minimum decant pond capacity	1:10 000-year AEP flood event		1:10 000-year AEP flood event
External decant storage	Caloma Central Dam		Caloma Central Dam
Basal liner • Material • Permeability	Clay Maximum 1 x 10^{-9} over 1m		Clay Maximum 1 x 10^{-9} over 1m
Spillway	Not required, designed for no spill		designed for no spill Emergency spillway for 1:1 000 AEP rainfall event
ANCOLD Category • Dam Failure Consequence • Environmental Spill Consequence	Significant Significant		Significant Low

A modification application for in-pit residue placement within the Wyoming 3 Open Cut was prepared prior to the MOD4 application but was withdrawn in 2016 following extensive consultation with the Environment Protection Authority. The principal issue of concern for the Environment Protection Authority was the fact that a permeability barrier that complied with the Authority's *Tailings Dam Liner Policy* could not be established.

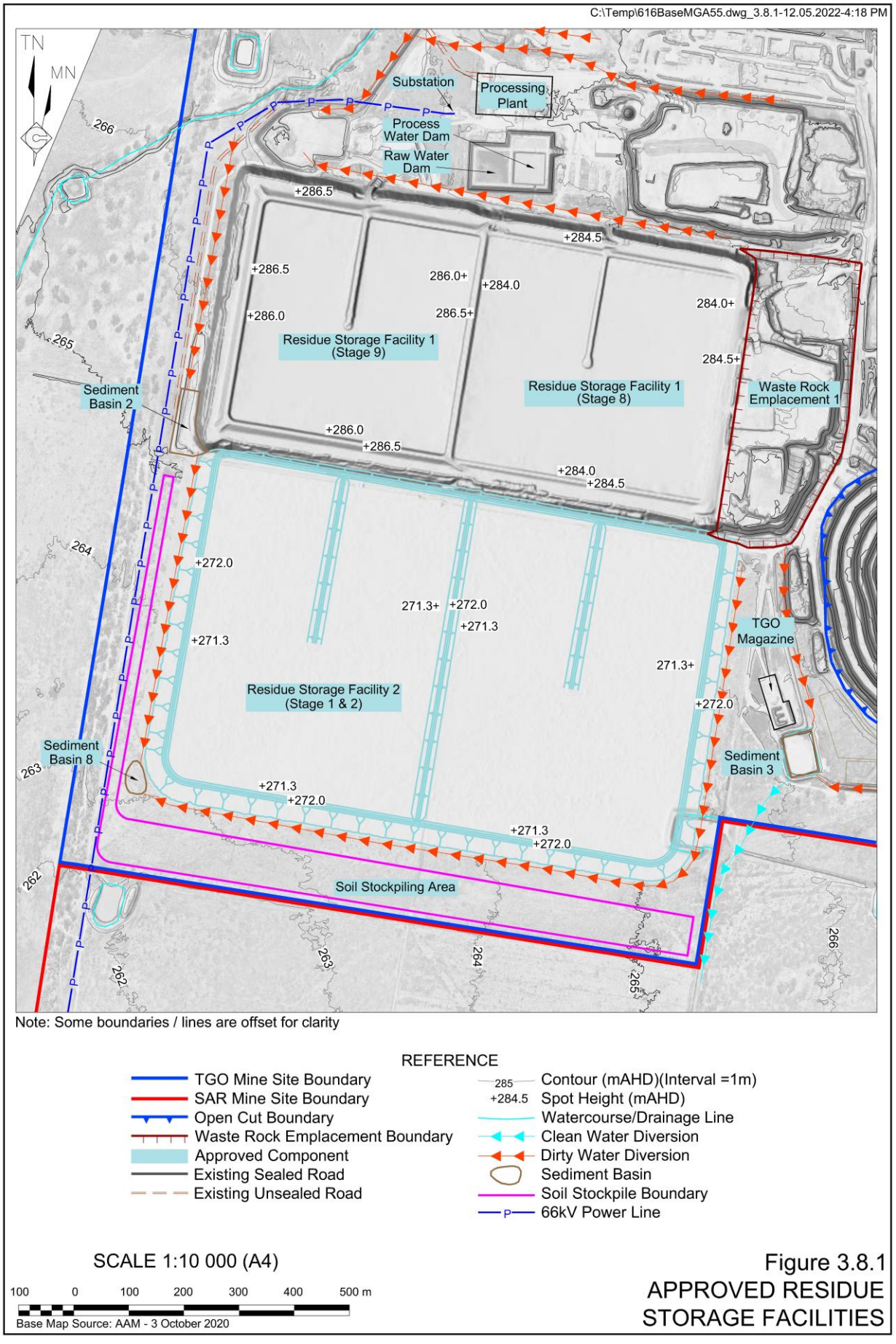


Figure 3.8.1
APPROVED RESIDUE STORAGE FACILITIES

3.8.3.2 Proposed Residue Storage Facility 2 – Stages 3 to 9

GHD prepared a design report for Residue Storage Facility 2, incorporating a detailed design for the approved Stage 1 and conceptual design for Stages 2 to 9. The resulting report is referred to hereafter as GHD (2021a) and is presented as Appendix 13 of the EIS. The detailed design for Stage 1 is largely consistent with the design presented in the *Modification Report* for MOD5 for MP 09_0155. The following presents an overview of the conceptual design criteria for Stages 3 to 9 of Residue Storage Facility 2. It is noted that the design of Stages 3 to 9 may be adjusted from that proposed in this document to reflect performance of Stages 1 and 2 or other relevant matters. Any revised design would be no higher or larger than that proposed in this document.

GHD (2021a) have prepared the conceptual RSF2 Stage 3 to 9 design based on the following.

- ANCOLD Guidelines on Tailings Dams.
- Relevant International Commission on Large Dams Guidelines.
- *Dam Safety NSW Regulation 2019*.
- NSW Environment Protection Authority, *Tailings Dam Liner Policy* Letter (2016).

Figures 3.8.2 to **3.8.4** and **Table 3.8.2** present the layout and design criteria for the proposed Residue Storage Facility 2 Stages 3 to 9. For comparison purposes, the approved design criteria for Residue Storage Facility 2 Stages 1 and 2 are also presented in **Table 3.8.2**.

Table 3.8.2
Proposed Residue Storage Facility 2 (Stages 3 to 9) Design Criteria

Design Component	Approved Design Criteria (Stages 1 and 2)	Proposed Design Criteria (Stages 3 to 9)
Maximum crest elevation	272.0m AHD	286.0m AHD
Maximum residue elevation	271.3m AHD	285.3m AHD
Construction Methodology	Centre line lift	Indicatively centre line lift
Slope of outer face (except northern embankment)	1:3 (V:H)	1:3 (V:H)
Cumulative maximum volume	3.2Mm^3	10.7Mm^3
Assumed residue density	1.4t/m^3	1.4t/m^3
Design capacity (approximate)	4.5Mt	15.0Mt
Proposed footprint	64.3ha	77.4ha
Residue discharge	Perimeter discharge	Perimeter discharge
Decant system	Central decant	Central decant
Minimum decant pond capacity	1:10 000-year AEP flood event	1:10 000-year AEP flood event
External decant storage	Caloma Central Dam	Caloma Central Dam
Basal liner • Material • Permeability	 Clay Maximum 1 x 10^{-9} over 1m	 Clay Maximum 1 x 10^{-9} over 1m
Spillway	designed for no spill Emergency spillway for 1:1 000 AEP 72-hour rainfall event	designed for no spill Emergency spillway for 1:1 000 AEP 72-hour rainfall event
ANCOLD Category • Dam Failure Consequence • Environmental Spill Consequence	 Significant Low	 Significant Low
Source: GHD (2021a)		

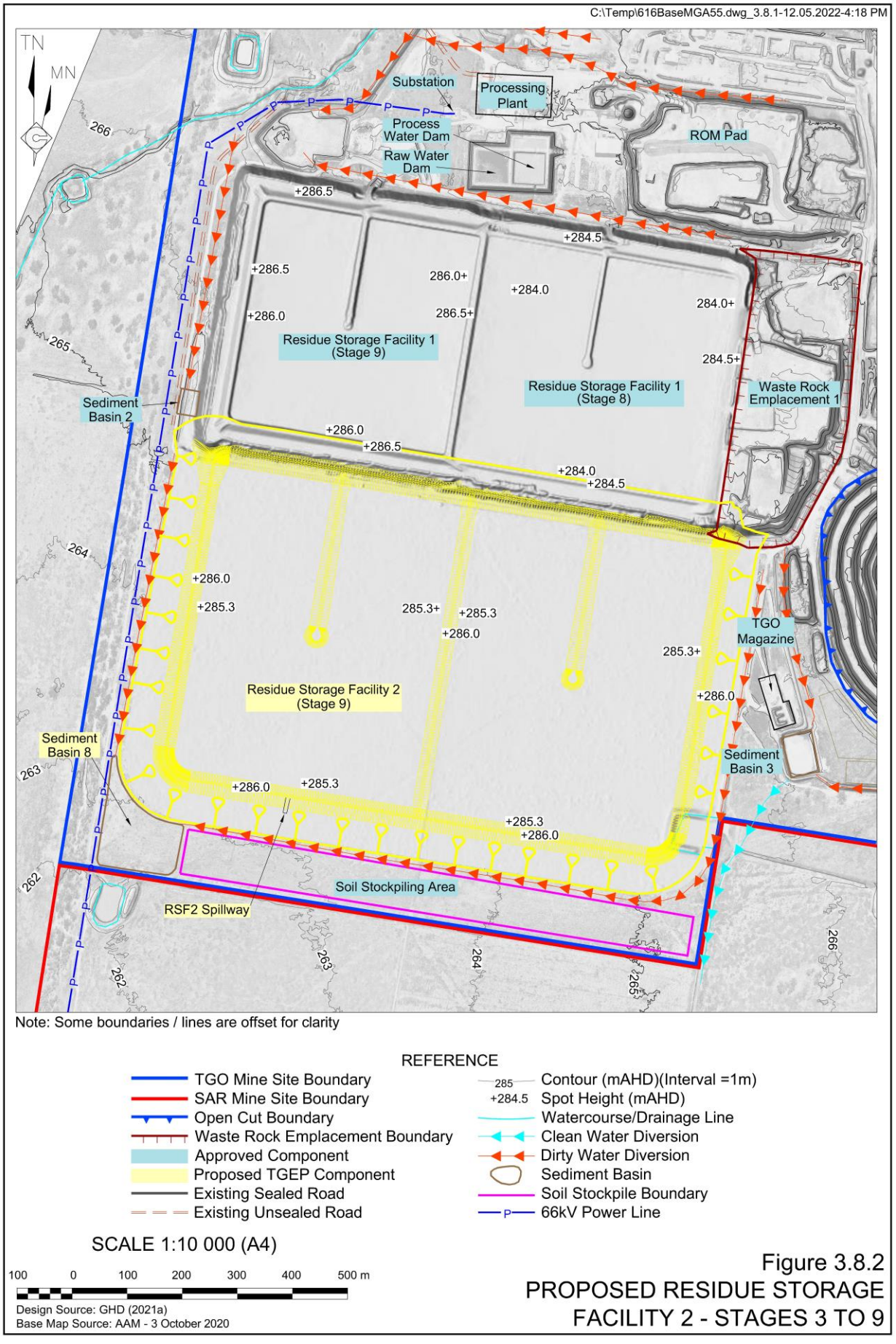
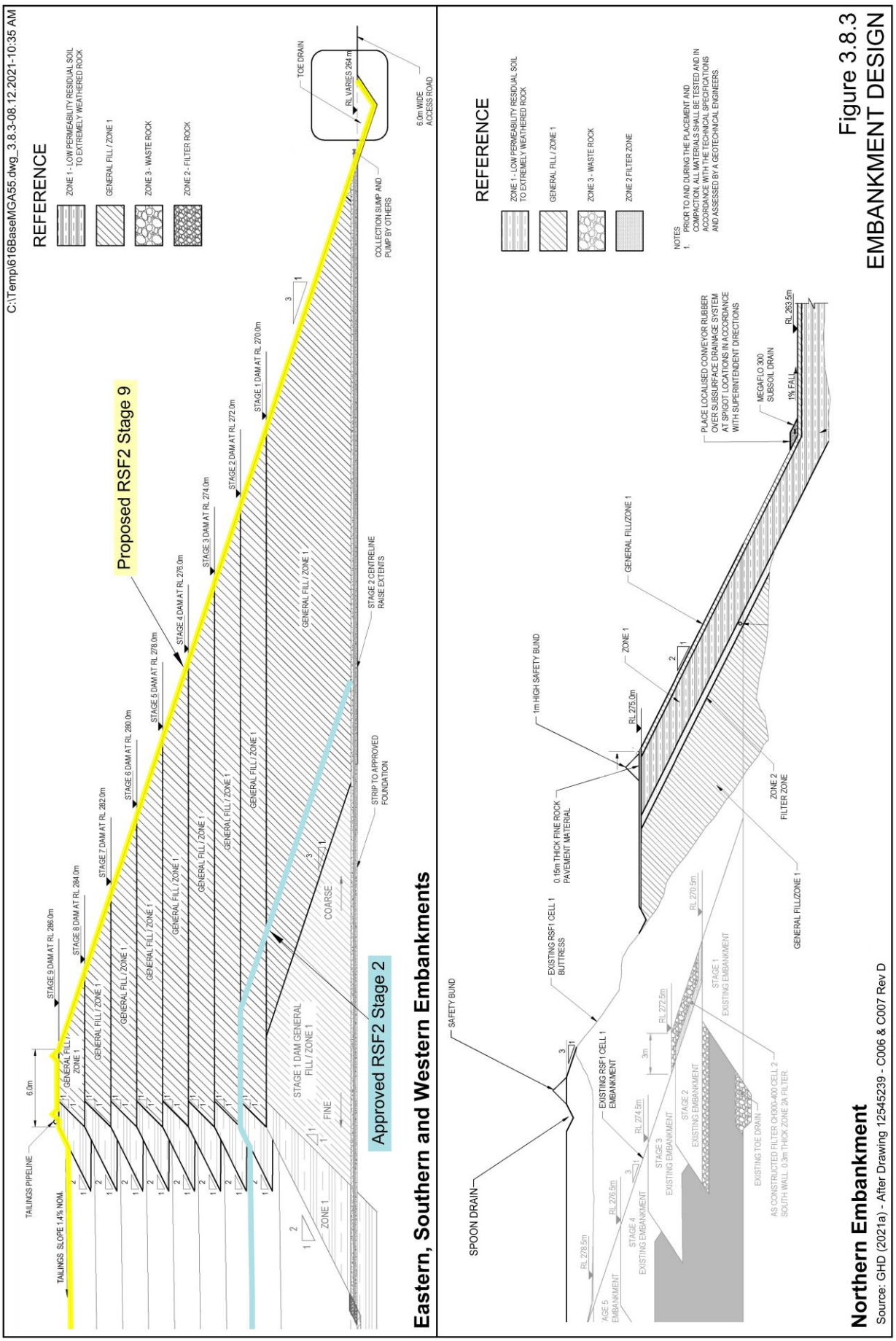


Figure 3.8.2
PROPOSED RESIDUE STORAGE FACILITY 2 - STAGES 3 TO 9


C:\Temp\616BaseMGA55.dwg_3.8.3-08.12.2021-10:35 AM
REFERENCE
ZONE 1 - LOW PERMEABILITY RESIDUAL SOIL TO EXTREMELY WEATHERED ROCK
GENERAL FILL / ZONE 1
ZONE 3 - WASTE ROCK
ZONE 2 - FILTER ROCK
Proposed RSF2 Stage 9
Approved RSF2 Stage 2
TAILINGS PIPELINE
TAILINGS SLOPE 1.4% NOM.
6.0m
STAGE 9 DAM AT RL 286.0m
STAGE 8 DAM AT RL 284.0m
STAGE 7 DAM AT RL 282.0m
STAGE 6 DAM AT RL 280.0m
STAGE 5 DAM AT RL 278.0m
STAGE 4 DAM AT RL 276.0m
STAGE 3 DAM AT RL 274.0m
STAGE 2 DAM AT RL 272.0m
STAGE 1 DAM AT RL 270.0m
STAGE 1 DAM GENERAL FILL / ZONE 1
ZONE 1
FINE
COARSE
STRIP TO APPROVED FOUNDATION
STAGE 2 CENTRELINE RAISE EXTENTS
COLLECTION SUMP AND PUMP BY OTHERS
TOE DRAIN
RL VARIES 284 m
6.0m WIDE ACCESS ROAD
Eastern, Southern and Western Embankments
REFERENCE
ZONE 1 - LOW PERMEABILITY RESIDUAL SOIL TO EXTREMELY WEATHERED ROCK
GENERAL FILL / ZONE 1
ZONE 3 - WASTE ROCK
ZONE 2 FILTER ZONE
NOTES
1. PRIOR TO AND DURING THE PLACEMENT AND COMPACTION, ALL MATERIALS SHALL BE TESTED AND IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS AND ASSESSED BY A GEOTECHNICAL ENGINEERS.
SAFETY BUND
SPOON DRAIN
EXISTING RSF1 CELL 1 BUTTRESS
0.15m THICK FINE ROCK PAVEMENT MATERIAL
1m HIGH SAFETY BUND
EXISTING RSF1 CELL 1 EMBANKMENT
GENERAL FILL/ZONE 1
ZONE 1
RL 275.0m
PLACE LOCALISED CONVEYOR RUBBER OVER SUBSURFACE DRAINAGE SYSTEM AT SPIGOT LOCATIONS IN ACCORDANCE WITH SUPERINTENDENT DIRECTIONS
MEGAFLO 300 SUBSOIL DRAIN
1% FALL
RL 283.5m
ZONE 2 FILTER ZONE
GENERAL FILL/ZONE 1
RL 278.5m
RL 275.5m
RL 274.5m
RL 272.5m
RL 270.5m
3m
AGE 5 EMBANKMENT
STAGE 4 EXISTING EMBANKMENT
STAGE 3 EXISTING EMBANKMENT
STAGE 2 EXISTING EMBANKMENT
STAGE 1 EXISTING EMBANKMENT
EXISTING TOE DRAIN
AS CONSTRUCTED FILTER CH300-400 CELL 2 SOUTH WALL 0.3m THICK ZONE 2A FILTER
Northern Embankment
Source: GHD (2021a) - After Drawing 12545239 - C006 & C007 Rev D
Figure 3.8.3
EMBANKMENT DESIGN

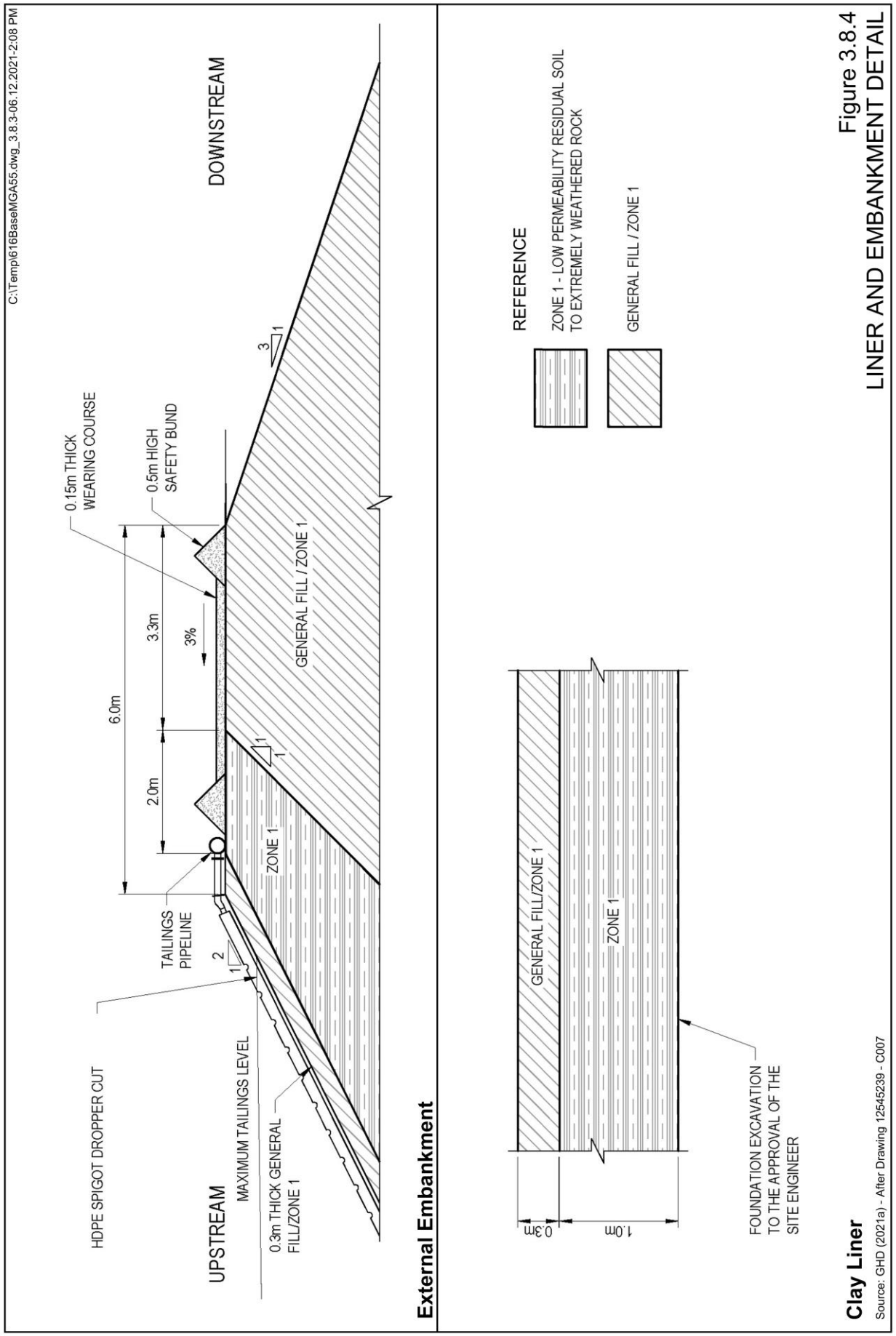


Figure 3.8.4
LINER AND EMBANKMENT DETAIL

Following establishment of the eastern, southern and western starter embankments, subsequent lifts would be designed as centreline lifts, whereby the crest of the subsequent embankment would be established vertically above the crest of the previous embankment.

The northern embankment would be integrated into to southern embankment of Residue Storage Facility 1 and the facilities would essentially buttress each other. A suitable zone of engineered fill would be established between the facilities to enable a stable and uniformly shaped foundation for the establishment of the Residue Storage Facility 2 northern embankment. Suitable drainage would be established between the facilities to ensure that the central embankment is adequately drained.

Residue Storage Facility 2 would be constructed using a range of engineered materials as follows.

- Zone 1: Low permeability clay material, including alluvial and saprolite material. This material would form the liner and inner low permeability section of the embankments. The liner material in particular would be water conditioned and roller compacted in layers to achieve the required permeability and thickness.
- Zone 2: Filter rock, including crushed, screened and graded waste rock. This material would be used between Residue Storage Facility 1 and 2 to ensure that the embankment is appropriately drained.
- Zone 3: General fill, comprising waste rock or material extracted from the basin of the Residue Storage Facility and would provide the structural support for the facility.

The combined capacity of Residue Storage Facility 1 and 2 would be 8.93Mt and 15Mt respectively, for a combined total of 23.93Mt. The Applicant estimates that ore milled and therefore residue produced to 30 June 2021 is 7.5Mt (see Table 1.3 of the EIS). At that date, ore reserves of approximately 11.82Mt and mineral resources of approximately 27.01Mt remained. The proposed mining schedule (see **Table 3.5.2**) identified that approximately 16.35Mt of ore and low-grade material would be processed between July 2021 and December 2032 for a total life of mine production of 23.85Mt. As a result, the proposed Residue Storage Facility 2 would include sufficient capacity for all residue likely to be produced throughout the life of the Project.

Residue Storage Facility 2 would be equipped with a range of instrumentation to ensure the ongoing safe operation of the Facility, including the following.

- GPS monuments and other monitoring tools capable of detecting small movements in the Facility embankments.
- Vibrating wire piezometers to monitor the pore water through the tailings and the efficiency of the underdrainage system.
- Piezometers to monitor for seepage of leachate from the Facility, with the number and location to be approved as a component of the *Water Management Plan* prior to commissioning of the Facility.

3.8.4 Construction of Residue Storage Facility 2

The approved Residue Storage Facility 2 Stage 1 would be constructed as described by GHD (2021a). Construction is expected to commence in early 2022 and would comprise the following activities.

- Excavation of the floor of the facility to expose the foundation material and establish the required slopes to permit appropriate placement and consolidation of residue.
- Construction of the starter embankments and decant infrastructure using material extracted from the basin of Residue Storage Facility 2.
- Establishment of the clay liner across the floor and inner faces of the embankments (**Figure 3.8.4**). The liner would be designed and constructed to achieve a maximum permeability of 1 x 10^{-9}m/s over 1m. The geotechnical investigation presented as Appendix C of GHD (2021a) identified the foundation material to be clay rich with measured permeability between 2 x 10^{-10}m/s and 4 x 10^{-11}m/s. Water conditioning and compaction of this material would ensure that the proposed permeability of 1 x 10^{9}m/s over 1m is achieved.
- Establishment of a cover layer over the liner material to facilitate dewatering of the residue and to protect the liner during filling.
- Establishment of required infrastructure to operate the facility, including an emergency spillway, residue discharge pipes, monitoring infrastructure, access tracks around the crest and perimeter of the facility and a perimeter drain and seepage collection infrastructure.

Following establishment of the starter embankment, Residue Storage Facility 2 would be progressively raised in 2m lifts using the centreline lift methodology. Each lift would be constructed as the previous lift approached its maximum storage capacity. The Applicant would ensure that the maximum filling level of each stage is not exceeded.

Construction operations would be supervised by a suitably qualified and experienced person who would certify that the Facility had been constructed to the appropriate standard and that all identified construction criteria, including achieving the design liner permeability, had been achieved.

3.8.5 Operation of the Residue Storage Facilities

Operation of the residue storage facilities would be undertaken largely as it has been since the commencement of TGO. A detailed Operating Manual would be prepared by the design engineer and the Applicant would strictly implement the manual throughout the life of the Project.

Residue would continue to be deposited from spigots around the perimeter of each cell to form a "beach", with supernatant water permitted to flow to central decant towers from where it would continue to be pumped to either the Process Water Pond (see **Figure 3.8.1**) or the Wyoming Central Dam (see **Figure 3.1.2**). Excess surface water would not, under normal operating conditions, be stored within the Facility.

The Applicant would continue to manage dust emissions through the management of the residue discharge cycles to maintain a damp surface. In the event that tailings discharge is halted for a period, chemical polymer dust suppressants may be applied to the surface of the residue to prevent dust lift off.

The Applicant would continue to ensure that the concentration of weak acid dissociable cyanide in residue discharged to the Facility is less than 20mg/L 90% of the time, with a maximum concentration of 30mg/L at all times.

Seepage from the facilities would continue to be collected using perimeter collection drains and would be directed to one or more seepage collection ponds from where it would be pumped to the surface of the facility. A network of piezometers would be installed and monitored to detect seepage from the Facility.

3.8.6 Flexible Elements

Table 3.8.3 presents the residue-related flexible elements that cannot be described with certainty at this stage of the Project, together with clear limits on the flexibility sought and a justification of each element. Elements that may be smaller or with lesser impacts than that proposed are not described.

Table 3.8.3
Flexible Elements – Residue Management

Flexible Element	Limit on Flexibility	Justification
Design of the residue storage facilities	Area – maximum 77.4ha Height – maximum 286m AHD Compliance with ANCOLD and related standards	Design and construction standards for residue storage facilities are periodically updated. As GHD (2021a) presents a detailed design for Stage 1 of Residue Storage Facility 2 only, with Stages 2 to 9 presented as conceptual designs, it is possible that subsequent amendments to the relevant design guidelines may result in the detailed design for Stages 2 to 9 being different to that presented in this document. Notwithstanding this, Residue Storage Facility 2 would be no higher and have a footprint no larger than that described in **Table 3.8.2**.
Operation of the residue storage facilities	Perimeter discharge Environmental impacts no greater than that described in this EIS	Operational requirements, including changing best practice standards for residue management, may result in operational procedures that may differ slightly from those described in Section 3.8.5. Notwithstanding this, Residue Storage Facility 2 would continue to operate as a perimeter discharge facility with Environmental impacts no greater than that described in this EIS.

3.9 Water Management Strategy

3.9.1 Introduction

Management of water within the Project Site would a critical component of Project-related activities. This Section provides a brief description of the existing and proposed water management system within the TGO and SAR Mine Sites respectively, as well as an overview of the proposed additional water supply bore and pipeline and water balance for the Project. Sections 6.6 and 6.7 present a detailed description and assessment of Project-related surface water and groundwater management and impacts.

3.9.2 Water Management System

3.9.2.1 Water Management Plan

The approved TGO *Water Management Plan*[7] describes the water management system for the TGO Mine Site. The *Water Management Plan* would be updated to reflect the proposed activities within the SAR Mine Site, including construction activities, prior to those activities commencing. In particular, one or more detailed *Construction Environmental Management Plans* would be prepared for road construction operations, including a *Soil and Water Management Subplan*, incorporating an *Erosion and Sediment Control Plan* prepared in accordance with the requirements of *Managing Urban Stormwater*. A similar plan would be prepared for mining-related site establishment operations

The water management principles currently applied at the TGO Mine Site would be extended to the SAR Mine Site following the commencement of construction and mining operations.

3.9.2.2 Classes of Water

All water within the Project Site would continue to be classified as follows.

- Clean water – comprising surface water from areas upslope of the Project Site. Clean water is currently, and would continue to be, diverted around disturbed sections within the Project Site and permitted to flow to natural drainage. Existing and proposed clean water diversions provide flood protection for flood events up to a 1% Annual Exceedance Probability[8] (AEP) flood event.
- Raw water – comprising externally sourced water that is and would continue to be imported to site for mining-related purposes. Raw water is currently supplied via the approved water pipeline from the approved "Woodlands" borefield. Additional raw water may be supplied from the proposed "Dappo" bore via the same pipeline (see Section 3.9.3).
- Dirty water – comprising surface runoff generated within disturbed sections of the Project Site that are not within the process water catchment. Dirty water runoff is and would continue to be intercepted and managed by a series of dirty water drains and sediment basins.

  Existing and proposed sediment basins are and would be designed to manage sediment-laden runoff generated by the 10 day, 90th percentile rainfall event. Dirty water intercepted by the TGO sediment basins is currently used for mining-related purposes. Dirty water intercepted by the SAR sediment basins would be similarly used for mining-related purposes. A pipeline would permit two-way transfer of water between the Wyoming 3 Open Cut and the SAR Water Storage Dam.

[7] All TGO Management Plans are available at https://www.alkane.com.au/projects/tomingley-gold-project/tomingley-gold-operations/tgo-reports/management-plans/

[8] The Annual Exceedance Probability is the probability that a rainfall event will occur in any 12-month period. A 1% AEP rainfall event has a 1 in 100 chance of occurring in any one year. Such a rainfall event is commonly referred to as a 1 in 100-year rainfall event.

Accumulated surface water within the existing TGO sediment basins may be discharged off site following testing to confirm that the water meets the relevant criteria nominated under EPL 20169. Notwithstanding this, the TGO Mine Site currently operates as a nil discharge site. The Applicant would seek a similar arrangement for the proposed SAR Mine Site sediment basins.

- Mine water – comprising water accumulating with the existing and proposed open cuts and underground workings. Mine water is and would to be retained on site within the existing Wyoming 3 Open Cut and the proposed SAR Water Storage Dam for reuse for mining-related purposes. Mine water would not be discharged to natural drainage.
- Process water – comprising water that has been used for ore processing and or exposed to residue. Process water is stored within the lined Process Water Dam or Wyoming Central Dam – South and would continue to be used for processing purposes only.
- Wastewater – comprising effluent generated on site. Wastewater is and would be managed as described in Section 3.11.5.

3.9.2.3 Water Management Infrastructure

TGO Mine Site Water Management Infrastructure

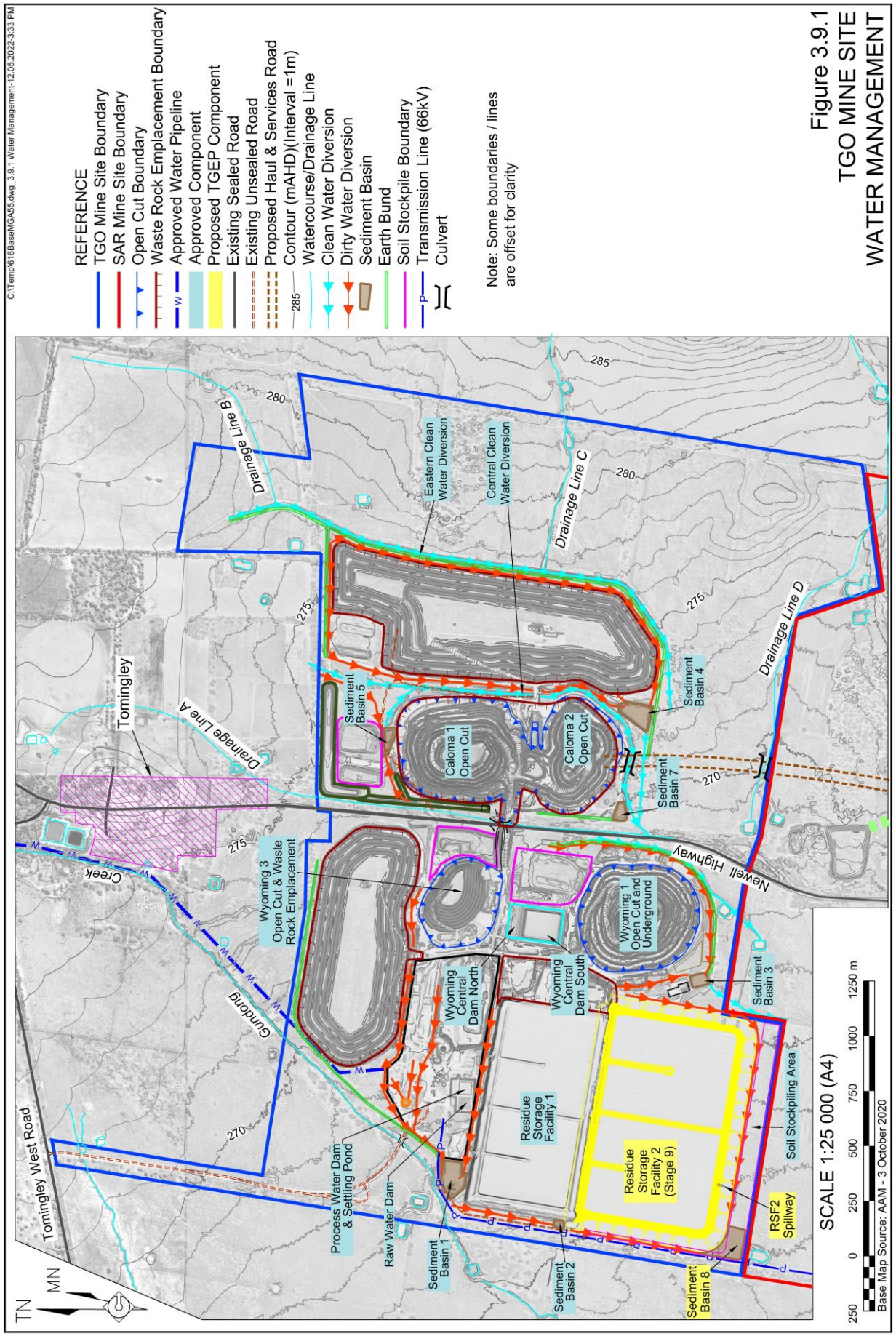
Figure 3.9.1 and **Table 3.9.1** present the existing water management infrastructure within the TGO Mine Site.

SAR Mine Site Water Management Infrastructure

Figure 3.9.2 presents the proposed water management infrastructure within the SAR Mine Site. In summary, SAR water management infrastructure would include the following. **Table 3.9.2** presents details of the SAR Mine Site water management infrastructure. Detailed designs, including storage capacities for all infrastructure would be presented in the updated *Water Management Plan* to be prepared following receipt of development consent.

- SAR Water Storage Dam – described in Section 3.3.2.7. This dam would be constructed as an off-stream "turkey's nest" dam with no surface catchment and an indicative capacity of 180ML (**Figure 3.3.4**). The dam would receive pumped water only from the following sources.
  - Sediment basins within the SAR Mine Site.
  - Water accumulated within the proposed open cut and underground mining operations.
  - Water pumped from the TGO Mine Site via the proposed water transfer pipeline between the TGO and SAR Mine Sites.

  Water outflows would be limited to water for construction or mining-related purposes and water pumped to the Wyoming 3 Open Cut. Water from the SAR Water Storage Dam would not be discharged to natural drainage.


C:\Temp\616BaseMGA55.dwg_3.9.1 Water Management-12.05.2022-3:33 PM
REFERENCE
TGO Mine Site Boundary
SAR Mine Site Boundary
Open Cut Boundary
Waste Rock Emplacement Boundary
Approved Water Pipeline
Approved Component
Proposed TGEP Component
Existing Sealed Road
Existing Unsealed Road
Proposed Haul & Services Road
Contour (mAHD)(Interval =1m)
Watercourse/Drainage Line
Clean Water Diversion
Dirty Water Diversion
Sediment Basin
Earth Bund
Soil Stockpile Boundary
Transmission Line (66kV)
Culvert
Note: Some boundaries / lines are offset for clarity
Figure 3.9.1
TGO MINE SITE
WATER MANAGEMENT
Drainage Line B
Drainage Line C
Drainage Line D
Drainage Line A
Eastern Clean Water Diversion
Central Clean Water Diversion
Sediment Basin 5
Sediment Basin 4
Sediment Basin 7
Caloma 1 Open Cut
Caloma 2 Open Cut
Tomingley
Newell Highway
Wyoming 3 Open Cut & Waste Rock Emplacement
Wyoming 1 Open Cut and Underground
Wyoming Central Dam North
Wyoming Central Dam South
Sediment Basin 3
Residue Storage Facility 1
Residue Storage Facility 2 (Stage 9)
Soil Stockpiling Area
RSF2 Spillway
Process Water Dam & Settling Pond
Raw Water Dam
Sediment Basin 1
Sediment Basin 2
Sediment Basin 8
Tomingley West Road
Gundong Creek
TN
MN
SCALE 1:25 000 (A4)
250 0 250 500 750 1000 1250 m
Base Map Source: AAM - 3 October 2020

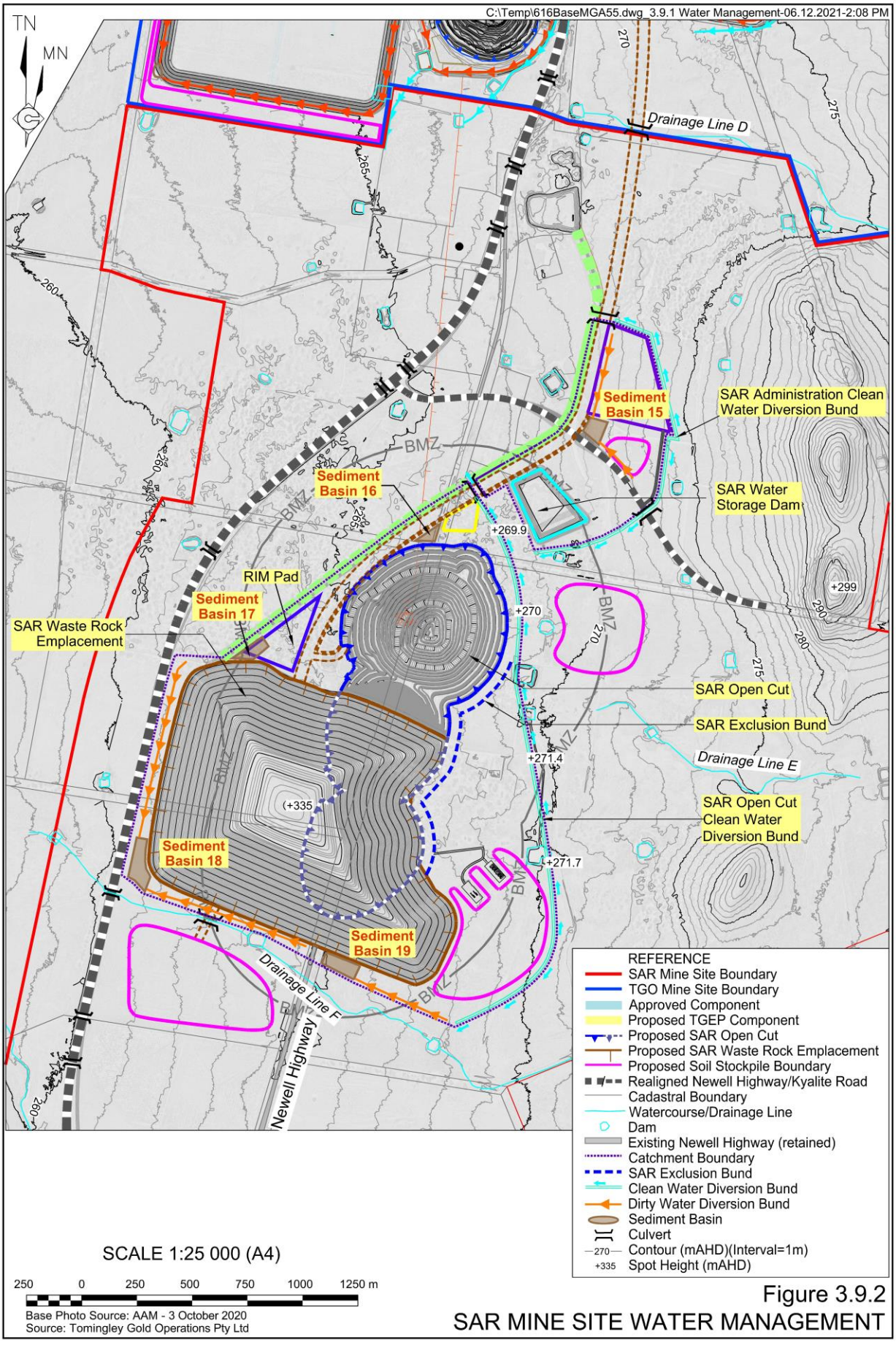


Figure 3.9.2
SAR MINE SITE WATER MANAGEMENT

Table 3.9.1
TGO Mine Site Water Management Infrastructure

Water Storage	Volume (ML)	Source[2]	Destination/Use[2]
Raw water			
Raw Water Dam	10.7	External supply pipeline	Process Water Dam Wyoming Central Dam North Processing Plant
Dirty water[1]			
Sediment Basin 1	35	Overland flows from disturbed sections of the TGO Mine Site	Wyoming 3 Open Cut Discharged via Licenced Discharge Points (emergency only)
Sediment Basin 2	8		
Sediment Basin 3	11.7		
Sediment Basin 4	32.8		
Sediment Basin 5	12.8		
Sediment Basin 7	2.7		
Sediment Basin 8	42		
Mine water			
Wyoming 3 Open Cut	1 300 (nominal)	Sediment Basins Open Cut and underground workings SAR Water Storage Dam	Wyoming Central Dam North SAR Water Storage Dam
Wyoming Central Dam North	17.4	Wyoming 3 Open Cut Raw Water Dam	Dust suppression Process Water Dam TGO Underground
Process water			
Process Water Dam (including Settling Pond)	13.4	Wyoming Central Dam South Wyoming Central Dam North Raw Water Dam Thickener Residue Storage Facilities	Processing plant
Wyoming Central Dam South	162.5	Residue Storage Facilities	Process Water Dam
Residue Storage Facilities	Variable (200ML assumed for site water balance)	Processing Plant	Process Water Dam Processing Plant Wyoming Central Dam South

Note 1: Sediment Basin 6 has not been constructed.
Note 2: See **Figures 3.9.1** and **3.9.2**.

Source: GHD (2021b) – after Section 2.3 and 3.5.

Table 3.9.2
SAR Mine Site Water Management Infrastructure

Water Storage	Volume (ML)	Inflows	Outflows
Mine Water			
SAR Water Storage Dam	180	Sediment Basins Wyoming 3 Open Cut SAR Open Cut and Underground	Dust Suppression SAR Underground Pastefill Plant Wyoming 3 Open Cut
Dirty water[1]			
Sediment Basin 15	4.7	Overland flows from disturbed sections of the TGO Mine Site	Wyoming 3 Open Cut Discharged via Licenced Discharge Points (emergency only)
Sediment Basin 16	1.8		
Sediment Basin 17	9.1		
Sediment Basin 18	21.0		
Sediment Basin 19	14.1		

Note 1: Proposed sediment basin volumes are minimum volumes. As the SAR Mine Site is proposed to be operated as a nil-discharge site, the volumes of the proposed sediment basins may be increased once pump and pipe designs are complete.

- SAR Clean Water Diversion Bund – would divert all surface water flows from east of the disturbed areas to the north and south of the SAR Open Cut. The bund would be designed with a minimum 0.5m freeboard above the modelled 0.1% AEP flood level (see Section 6.6.6.2 of the EIS) and would vary from 0.6m to 2.0m above natural ground level. Water diverted to the north by the bund would pass under the Haul Road and Services Road and the Newell Highway via box culverts. Water diverted to the south by the bund would enter Drainage Line F before passing under the Newell Highway via box culverts.
- SAR Administration Clean Water Diversion Bund – would divert surface water flows to the north of the SAR Administration Area and the south of the SAR Water Storage Dam. Water diverted to the north would pass under the Haul Road and Services Road and the Newell Highway via box culverts. Water diverted to the south would pass under the realigned Kyalite Road via a box culvert before passing south of the SAR Water Storage Dam and under the Haul Road and Services Road and the Newell Highway via box culverts.
- SAR Exclusion Bund – incident rainfall between the SAR Open Cut Clean Water Bund and the SAR Exclusion Bund would accumulate adjacent to the Exclusion Bund and would be pumped to the SAR Water Storage Dam.
- Sediment Basins 15 to 19 and associated dirty water collection bunds – would be constructed in key locations within the disturbed sections of the SAR Mine Site in accordance with the requirements of *Managing Urban Stormwater*. The sediment basins would, consistent with those at TGO, be designed as Type D sediment basins with adequate capacity to contain a 10 day, 90th percentile rainfall event with a nominal rainfall depth of 50.5mm. The storage capacity of each sediment basin would be re-established within 5 days of a rainfall event, either by pumping to the SAR Water Storage Dam or via controlled discharge following testing and confirmation that the water quality meets the required discharge criteria. As the water within the sediment basins would be used for Project-related purposes, they have been accounted for under the Applicant's Harvestable Right (see Section 6.6.7 of the EIS).

- Culverts – A series of box culverts have been included in the design for the realigned Newell Highway and Kyalite Road as well as the Haul Road and Services Road. In addition, the SAR Amenity Bund would include gaps to permit surface water to pass from the Haul Road culverts to the Newell Highway culverts.

Given the dispersive nature of the subsoil, the clean and dirty water diversions would, where practicable, be constructed using bunds constructed using topsoil rather than excavating into the natural surface. Emphasis would be placed on maintaining a grassed channel for all diversions to minimise the potential for erosion.

Where required, temporary sediment control fencing would be established where disturbed surfaces are expected to be revegetated and stabilised within a short period following construction. This would include at the toe of soil stockpiles and the SAR Amenity Bund.

Finally, roadside drainage would be installed adjacent to the Haul Road and Services Road in accordance with the requirements of *Managing Urban Stormwater – Volume 2E – Unsealed Roads.*

3.9.3 Proposed Water Supply Bore and Pipeline

The Applicant currently operates a water supply bore on the "Woodlands" property[9] located approximately 7km to the east of Narromine (**Figure 3.9.3**). Water Access Licence (WAL) 20270, issued under the Lower Macquarie Zone 6 Groundwater Source, permits extraction of up to 1 000Mlpa from that bore. Extracted water is pumped via an approved water supply pipeline to the TGO Mine Site. That pipeline and water supply is also used to supplement the water supply for Tomingley village.

The Site Water Balance (see section 3.9.4) identifies that under certain circumstances, more than 1 000Mlpa of water may be required. As a result, the Applicant proposes to replace an existing dilapidated bore[10] on the "Dappo" property (Lot 235, DP 755131). The replacement bore would:

- extract water from the same groundwater source and the same depth as the existing bore;
- be within 20m of the existing bore; and
- have an internal diameter the same as the existing bore.

In accordance with Clause 44 of the *Water Sharing Plan for the Macquarie-Castlereagh Groundwater Sources Order 2020,* the proposed bore would be classified as a "replacement bore" and no additional hydrogeological impact assessment is required.

The existing "Dappo" bore has an existing water allocation of 716Mlpa under WAL11692. The Applicant proposes to subdivide WAL11692 and acquire a part of that licence to permit extraction of up to 400Mlpa from the replacement bore. As the existing bore and associated WAL are already licenced and approved, the Applicant contends that a change of purpose from "irrigation" to "mining" is the only approval required and that no further groundwater assessment is required.

[9] Water Supply Works Authority 80WA705442.
[10] Water Supply Works Authority 80CA703364.

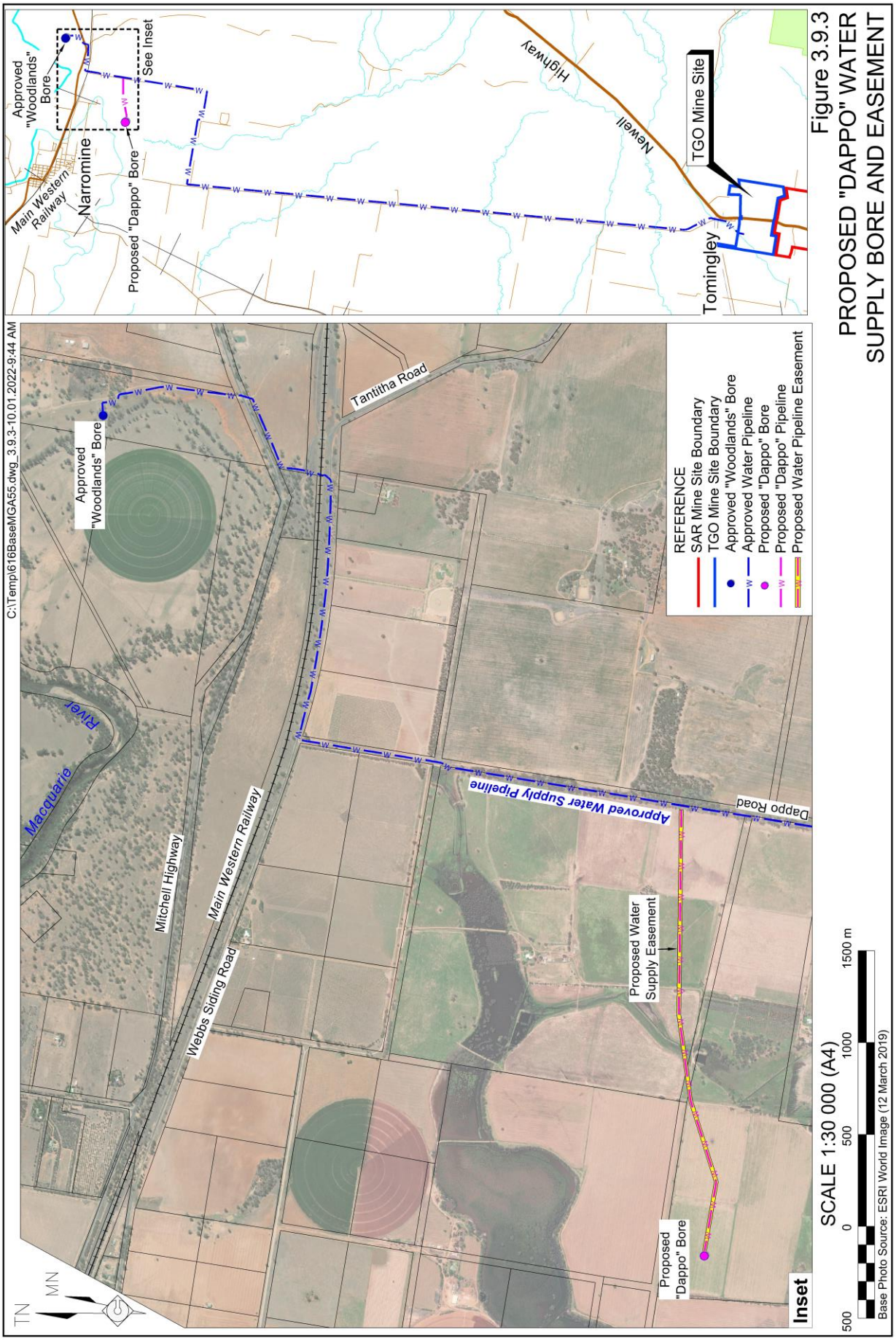


Figure 3.9.3
PROPOSED "DAPPO" WATER SUPPLY BORE AND EASEMENT
C:\Temp\616BaseMGA55.dwg_3.9.3-10.01.2022-9:44 AM
REFERENCE
SAR Mine Site Boundary
TGO Mine Site Boundary
Approved "Woodlands" Bore
Approved Water Pipeline
Proposed "Dappo" Bore
Proposed "Dappo" Pipeline
Proposed Water Pipeline Easement
Approved "Woodlands" Bore
Tantitha Road
Approved Water Supply Pipeline
Dappo Road
Proposed Water Supply Easement
Proposed "Dappo" Bore
Mitchell Highway
Main Western Railway
Webbs Siding Road
Macquarie River
Inset
TN
MN
SCALE 1:30 000 (A4)
500 0 500 1000 1500 m
Base Photo Source: ESRI World Image (12 March 2019)
Approved "Woodlands" Bore
See Inset
Narromine
Main Western Railway
Proposed "Dappo" Bore
Newell Highway
TGO Mine Site
Tomingley

In addition, the Applicant proposes to construct and operate an approximately 2.4km buried pipeline from the replacement bore to the existing water supply pipeline (see **Figure 3.9.3**). The proposed pipeline would join the approved pipeline which has adequate capacity to transfer the combined 1 400Mlpa of water from the "Woodlands" and "Dappo" bores to the TGO Mine Site. The route of the pipeline has been selected to minimise potential ecological and heritage related impacts. Development consent for the construction and operation of the proposed pipeline is sought as part of this application.

3.9.4 Site Water Balance

GHD prepared a Site Water Balance for the Project, including TGO and SAR mining operations. The resulting report, referred hereafter as GHD (2021b), is presented as Appendix 14 of the EIS. The following subsection presents a brief overview of the site water balance. Readers requiring greater technical detail are referred to Appendix 14 of the EIS.

In preparing the Site Water Balance, GHD (2021b) relied upon the existing TGO Site Water Balance, adjusted to incorporate the proposed activities. Section 3.9.2.3 and **Figures 3.9.1** and **3.9.2** present the water management infrastructure within the TGO and SAR Mine Sites and provide a brief overview of water movement within the Project Site.

In addition, the following data was relied upon in preparing the site water balance.

- Rainfall data from the Bureau of Meteorology Peak Hill Post Office for a period of 132 years to the end of 2020, with missing data 'patched in' by interpolating data from nearby stations.
- Evaporation data estimated based on equilibrium temperature concepts using the methodology described in *Water Management Review* (PSM 2014) and monthly pan evaporation factors for Scone (the closest available reference location) included in McMahon *et al*. (2013).
- Groundwater inflows determined by Jacobs (2021) and described in Section 6.7 of the EIS.

The site water balance was modelled using the *Australian Water Balance Model* of Boughton & Chiew (2003) and the GoldSim modelling software (ver 12.1). The full proposed mine schedule from 1 January 2021 to 31 December 2032 to was run using 1 day time steps, with 132 simulations, each beginning in a different year of the historical rainfall record and proceeding consecutively through the record (and looped where required). The model was validated based on existing TGO operations, with GHD (2021b) indicating that the model adequately represented the existing observations.

Model results are presented based on the 132 simulations run, with the water balance determined for average as well as the 10th percentile and 90th percentile values for each component.

Table 3.9.3 presents the annual average site water balance results for the existing TGO operations in 2021 and the proposed combined TGO and SAR operations in 2026. The year 2026 was selected because that corresponded with the maximum modelled groundwater inflows modelled by Jacobs (2021) (see Section 6.7). The results may be summarised as follows.

Table 3.9.3
Annual Average Site Water Balance Results

Mine Stage	Existing conditions (2021) (ML/year)	Proposed conditions (2026) (ML/year)
Inputs		
Direct rainfall and catchment runoff	414	850
Supplied external borefield	500	356
Moisture in ore	56	72
Secondary release from residue	22	21
Groundwater inflows	238	766
Total Inputs	**1 230**	**2 065**
Outputs		
Evaporation from water storages	78	145
Discharge from sediment dams	1	1
Potable use	1	2
Water in residue	553	669
Evaporation from active residue	120	178
Losses from rewetting of inactive residue	220	529
Dust Suppression	250	388
Losses from underground workings	8	16
Total Outputs	**1 231**	**1 928**
Change in Storage	**-1**	**137**
Balance	**0**	**0**
Source: GHD (2021b) – Table 6.1		

Annual external water supply and water security

The annual average water supply from the "Dappo" and "Woodlands" bores is expected to decrease slightly from 500Mlpa for TGO alone to 356Mlpa for the combined operation as a result of increased groundwater inflows to the SAR Open Cut and underground. This is less than the current 1 000Mlpa and proposed 1 400Mlpa licenced allocation associated with those bores.

In order to ensure adequate water supply for the Project, GHD (2021b) assumed nil groundwater inflows to the mine workings. That analysis determined that the mean water demand from the "Dappo" and "Woodlands" bores, in the absence of groundwater inflow to the workings, would be 930Mlpa. The 95th percentile water demand, namely in the unlikely scenario of concurrent nil groundwater inflows and extreme low rainfall, would be 1 360Mlpa. This is less than the proposed 1 400Mlpa licenced allocation for the "Dappo" and "Woodlands" bores.

Discharge from sediment basins

GHD (2021b) determined that the Project would not result in increased risk of discharge of surface water from the Project Site. This, however, is contingent upon adequate dewatering capacity at each of the proposed SAR Sediment Basins and sufficient capacity to store pumped water within the SAR Water Storage Dam.

Water inventory

GHD (2021b) determined that site water storage within the Project Site is likely to vary seasonally throughout the life of the Project. In summary, GHD (2021b) conservatively assumed a storage capacity of approximately 1 700ML. The site water balance indicates that the volume of water stored within the Project Site under mean conditions would be between 400ML and 500ML. Under 95th percentile conditions, that would increase to 1 500ML. This is less than the total storage capacity of approximately 1 612ML.

3.9.5 Flexible Elements

Table 3.9.4 presents the water-management related flexible elements that cannot be described with certainty at this stage of the Project, together with clear limits on the flexibility sought and a justification of each element. Elements that may be smaller or with lesser impacts than that proposed are not described.

Table 3.9.4
Flexible Elements – Mining Operations

Flexible Element	Limit on Flexibility	Justification
Location, size and number of water management structures, including sediment basins, diversion bunds and water storages.	All surface disturbance within the approved limit of disturbance.	Detailed design of the proposed water management system would be completed post receipt of development consent. As a result, the arrangement of the proposed water management infrastructure may vary slightly from that described. However, as all infrastructure would be constructed within the approved limit of disturbance, there would be no additional environmental impacts.

3.10 External Transportation Operations

3.10.1 Introduction

Section 3.4 describes the design, construction and operation of the proposed realigned public road network. Similarly, Sections 3.3.2.4 and 3.3.2.5 describe the design and operation of the internal road network. This subsection describes the TGO and SAR Site Access Roads and the traffic types and volumes of traffic that would access the Project Site during the construction and operational phases of the Project.

3.10.2 Access to the Project Site

Access to the Project Site during construction operations would be as described in Section 3.4.3, including the following.

- A temporary Channelised Right / Basic Auxiliary Left intersection on the Newell Highway at the entrance to “Kenilworth” to permit light and heavy vehicles to enter and light vehicles only to exit.
- Temporary intersections in the vicinity of the proposed Newell Highway alignment onto Back Tomingley West Road and McNivens Lane to permit vehicles to exit. Such vehicles would then use the existing intersections of these roads with the Newell Highway.

- A temporary intersection from the SAR Mine Site onto Kyalite Road to permit light and heavy vehicles to enter and exit.

Access to the TGO Mine Site throughout the life of the Project would continue to occur via the existing TGO Site Access Road from the Tomingley West Road (**Figure 3.1.2**). The road has a sign posted speed limit of 40km/h and is maintained by the Applicant as an all-weather access. The road includes a crossing over Gundong Creek.

Access to the SAR Mine Site would be via the proposed SAR Site Access Road from the realigned Kyalite Road (**Figures 3.1.3** and **3.4.3**). That road would, with the exception of a 30m section closest to the intersection with Kyalite Road, be an unsealed, two-lane private road with a sign posted speed limit of 40km/h. The section of the SAR Site Access Road closest to the realigned Kyalite Road would be sealed.

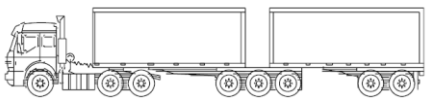
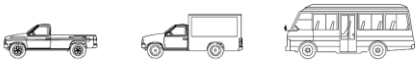
The intersection between the SAR Site Access Road and the realigned Kyalite Road would be an Auxiliary Left intersection to cater for the predominantly left-in, right out traffic movements. A "Give Way" sign and associated linework would be installed on the SAR Site Access Road, together with a sightboard on Kyalite Road opposite the intersection.

3.10.3 Traffic Types and Volumes

3.10.3.1 Construction Traffic

During public road and SAR Mine Site construction operations, a range of vehicles would access the SAR Mine Site. **Table 3.10.1** presents an overview of the anticipated classes of vehicles and their purposes. In addition, during construction and at the commencement and completion of mining or processing, a limited number of low loaders transporting mobile plant and materials would access the Mine Site. Any over size or overweight vehicles would be required to obtain appropriate permits or approvals prior to being transported on the public road network.

Table 3.10.1
Vehicle Types and Purposes

Vehicle Class	Description	Example[1]	Purpose
10	B-double truck and Trailer		Delivery of bulk consumables such as road construction materials, processing reagents, mining consumables and diesel
6 to 9	Articulated or semi-trailer trucks		
3 to 5	Light Truck or large bus		Delivery of general goods to the Mine Site
1 and 2	Light vehicles, including small buses		Transportation of personnel to and from the Mine Site
Note 1: Image Source – AustRoads Vehicle Classification System: Asset and Network Information – January 2002			

It is anticipated that approximately 80% of construction-related traffic would approach the Project Site from the north (from Dubbo and Narromine) and approximately 20% would originate from the south (from Peak Hill and Parkes). **Table 3.10.2** presents the anticipated construction-related traffic levels. It is noted that there is a substantial difference between "typical day" and "maximum day" heavy vehicle movements, with "maximum day" movements expected during periods when substantial volumes of road base and other material would be delivered from off-site sources. The Applicant has conservatively assumed that there would be limited use of buses to transport workers to and from the Project Site as most workers would reside within a 40-minute drive of the Project Site.

Table 3.10.2
Proposed Construction Traffic Levels

	Light Vehicles[2]	Heavy Vehicles[3]
Road Construction Site Compound		
Typical Daily Movements[1]	100	6
Estimated Maximum Daily Movements[1]	120	120
Estimated Peak Hour Movements[1]	48	48
SAR Mine Site Construction Site Compound		
Typical Daily Movements[1]	120	6
Estimated Maximum Daily Movements[1]	170	60
Estimated Peak Hour Movements[1]	68	24
Note 1: Two vehicle movements = one return trip Note 2: Light Vehicles – Class 1 or 2 vehicles Note 3: Heavy vehicles – Class 3 to 10 vehicles		
Source: Tomingley Gold Operations Pty Ltd		

3.10.3.2 Operational Traffic

TGO Mine Site

During the operational phase of the Project, traffic would continue to access the TGO Mine Site via the existing TGO Site Access Road. Vehicles and personnel accessing the TGO Mine Site would primarily be associated with the following activities.

- Open cut and underground mining operations.
- Processing operations.
- Administrative and technical management operations, with the majority of the ongoing administrative and management personnel based at the TGO Mine Site.

Classes of vehicles that would access the TGO Mine Site would be consistent with those presented in **Table 3.10.1**. It is expected that the vast majority of vehicles would continue to access the TGO Mine Site from the east via Tomingley West Road, with approximately 80% of traffic approaching Tomingley West Road from the north (from Dubbo and Narromine) via the Newell Highway or Tomingley Road and approximately 20% approaching Tomingley West Road from the south (from Peak Hill and Parkes). It is the Applicant's experience with the TGO mining operations that there is limited demand for bus services to and from the TGO Mine as most workers reside within a 40-minute drive of the Project Site.

Table 3.10.3 presents the anticipated TGO Mine Site traffic levels, which would remain largely unchanged from the existing, approved traffic levels. The peak period for light vehicle movements is typically at shift start and finish times, namely 5:00am to 7:00am and 5:00pm to 7:00pm. Heavy vehicle movements are distributed throughout the day.

Table 3.10.3
TGO Mine Site Operational Traffic Levels

	Light Vehicles	Heavy Vehicles
Daily Movements[1]	156	12
Note 1: Two vehicle movements = one return trip		
Source: Tomingley Gold Operations Pty Ltd		

SAR Mine Site

During the operational phase of the Project, traffic would access the SAR Mine Site via the SAR Site Access Road. Vehicles and personnel accessing the SAR Mine Site would primarily be associated with open cut mining operations including administrative and technical management operations.

Classes of vehicles that would access the TGO Mine Site would be consistent with those presented in **Table 3.10.1**. It is expected that the vast majority of vehicles would continue to access the TGO Mine Site from the west via the realigned Kyalite Road, with approximately 80% of traffic approaching Kyalite Road from the north (from Dubbo and Narromine) and approximately 20% approaching Kyalite Road from the south (from Peak Hill and Parkes).

Table 3.10.4 presents the anticipated SAR Mine Site traffic levels. The peak period for light vehicle movements would typically be at shift start and finish times, namely 5:00am to 7:00am and 5:00pm to 7:00pm. Heavy vehicle movements would be distributed throughout the day.

Table 3.10.4
SAR Mine Site Operational Traffic Levels

	Light Vehicles[2]	Heavy Vehicles[3]
Average Daily Movements[1, 2]	100	6
Maximum Daily Movements[1, 3] (indicative only)	240	8
Peak Hour Movements[1]	96	4
Note 1: Two vehicle movements = one return trip		
Note 2: An "Average Day" would be representative of operations during FY27 when anticipated direct employment levels would be approximately 155 people, plus contractors.		
Note 3: A "Maximum Day" would be representative of operations during FY25 when anticipated employment levels would be approximately 235 people, plus contractors.		
Source: Tomingley Gold Operations Pty Ltd		

3.10.4 Flexible Elements

Table 3.10.5 presents the transportation-related flexible elements that cannot be described with certainty at this stage of the Project, together with clear limits on the flexibility sought and a justification of each element. Elements that may be smaller or with lesser impacts than that proposed are not described.

Table 3.10.5
Flexible Elements – Mining Operations

Flexible Element	Limit on Flexibility	Justification
Vehicle type	All vehicles accessing the Project Site would be road registered and/or hold a suitable permit to access the public road network	At times there may be the need to deliver or remove oversize equipment or changes to the transport regulations/economics may make larger vehicles the preferred option for particular transportation tasks. Notwithstanding this, all vehicles accessing the Project Site would have the required approvals to access the public road network
Traffic level	+20% of the proposed traffic level	Potential exists for short periods when traffic levels higher that that proposed may be required, including during shutdowns when substantial maintenance works are undertaken.

3.11 Non-production Waste Management

3.11.1 Introduction

The principal non-production wastes that would be generated throughout the life of the Project would include the following.

- Materials remaining after the removal of sections of decommissioned public roads and demolition of the "Rosewood" homestead and associated farm buildings.
- General solid wastes and recyclables.
- Hazardous wastes.
- Wastewater, including sewage.

In general, these materials would be classified in accordance with the *Waste Classification Guidelines* (EPA, 2014) and managed in accordance with the *Protection of the Environment Operations Act 1997* and *Waste Avoidance and Resource Recovery Act 2001* and associated regulations. The Applicant would maintain records of all wastes generated and removed from the Project Site.

3.11.2 Demolition Materials

Sections of the existing road network would be removed following commissioning of the realigned public roads. Salvaged material would be reused within the Project Site, including for construction and maintenance of the internal road network. Material unable to be used within the Project Site that may be classified as General Solid Waste – non-putrescible would be placed within the Waste Rock Emplacements.

During demolition of the "Rosewood" homestead and associated farm buildings, the following procedures would be implemented.

- Hazardous or contaminated wastes such as asbestos or hydrocarbon-contaminated soils would be identified and removed to a licenced waste facility in accordance with the requirements for such waste.

- Any recyclable material such as steel, copper, etc would be recovered and recycled.
- The buildings would be demolished and, to the extent practicable, construction waste would be reused within the Project Site. Where that is not possible, waste that may be classified as building and demolition waste, namely glass, plasterboard, ceramic, bricks, concrete, metal and wood, would be placed within the central sections of the Waste Rock Emplacements. All other waste would be transported to a licenced waste facility.

3.11.3 General Solid Wastes and Recyclables

Wastes from offices, crib rooms, workshops (not including hazardous wastes), etc. would continue to be divided into two streams, namely recyclables and general waste.

Recyclables collected would include steel, aluminium, glass, paper, certain types of plastics and cardboard. Bins and/or collection skips would be located in or adjacent to buildings in which the wastes are generated. These bins and skips would be collected on an as needs basis for off-site recycling.

General solid waste collected would include food scraps, non-recyclable plastics and other non-recyclable materials. Bins and/or collection skips would be located in or adjacent to buildings in which the wastes are generated and would be collected on a weekly basis and transported to a licenced waste management facility.

3.11.4 Hazardous and Special Wastes

Routine maintenance of mobile mining and earthmoving equipment would continue to generate wastes that are classified as hazardous under the *Waste Classification Guidelines* (EPA, 2014), including principally waste oil and hydrocarbons and associated containers and contaminated materials such as oily rags. Similarly, processing operations would continue to generate wastes contaminated with reagents, including used containers.

Waste oil would be stored in self-bunded waste oil tanks or on bunded pallets under cover within the TGO and SAR Administration Areas or the TGO Processing Plant area from where it would be collected and removed from site for disposal/reuse by an appropriately licensed waste contractor. Other hydrocarbon contaminated wastes, such as used containers and oily rags would be stored in sealed containers and would similarly be collected by an appropriately licensed waste contractor. Oily water separation facilities would be installed in the vicinity of the SAR Wash Bay and in workshops, with the separated hydrocarbons sent to the waste oil tank and the treated water used for mining-related purposes.

Contaminated reagent containers would be stored in the same area that the reagents are stored until such time they can be removed, either by the supplier or for disposal at a licenced waste management facility.

Used batteries would continue to be stored in a covered area and collected as required by an appropriately licensed waste contractor for recycling.

As identified in Section 3.3.2.2, non-putrescible General Solid Waste from removal of infrastructure during site establishment operations, including demolition material, that cannot be reused or recycled would be placed within the central sections of the Waste Rock Emplacements. Waste that cannot be classified as General Solid Waste would be transported to a licenced waste management facility for disposal.

Used tyres >1.2m in diameter would, where practicable, be reused for retaining walls, traffic control, etc or recycled. Where that is not practicable, such tyres would be placed into the waste rock emplacements in a location where they would not adversely impact on settling and compaction of the waste rock.

3.11.5 Wastewater

All wastewater generated within the TGO Mine Site would continue to be treated using the existing, aerated wastewater treatment facility. A similar facility would be installed within the SAR Administration Area and all amenities, toilets, wash basins, sinks and showers would be connected to that facility. The SAR wastewater treatment facility would be designed, installed and operated in accordance with the requirements of Narromine Shire Council.

All water treated through the TGO and SAR wastewater treatment facilities would be irrigated. in compliance with the EPA's guidelines "*The Use of Effluent by Irrigation*" with the remaining water treated in compliance with Australian Standard AS/NZS 1547:2012 "*On-site Domestic Wastewater Management*".

Finally, all wastewater generated by reverse osmosis plants within the Project Site would be incorporated into the Mine Water circuit.

3.12 Hours of Operation and Project Life

3.12.1 Hours of Operation

Table 3.12.1 presents the proposed hours of operation. It is noted that particular noise and dust emitting activities identified in Section 6 of the EIS may be limited during particular times of day, such as 10:00pm until 7:00am, or under particular weather conditions, including temperature inversions, or in response to real-time noise or air quality monitoring results and discussions with surrounding landholders.

3.12.2 Project Life

The Applicant anticipates that after an initial site preparation phase of approximately 9 to 12 months, open cut mining operations within the SAR Mine Site would commence with the decommissioning of the existing Newell Highway and Kyalite Road and commissioning of the realigned roads. Underground mining operations would commence once the SAR Exploration Drive has been completed and exploration operations have provided the required certainty to permit mine development and stoping operations to commence.

Table 3.12.1
Proposed Hours of Operation

Activity	Proposed Days of Operation	Proposed Hours of Operation
Construction and site preparation, including public road construction		
• Out of hours construction operations [2]	7 days per week	24 hours per day
• All other construction operations	Monday to Saturday, not including public holidays	7:00am to 10:00pm
Mining operations	7 days per week	24 hours per day
Waste rock management	7 days per week	24 hours per day
Processing operations	7 days per week	24 hours per day
Transportation operations	7 days per week	24 hours per day
Maintenance operations	7 days per week	24 hours per day
Rehabilitation operations[2]		
• During surface mining operations	7 days per week	7:00am to 6:00pm
• Following the completion of surface mining operations		

Note 1: Out of hours activities would be activities that satisfy the requirements for out of hours construction operations as identified by the *Interim Construction Noise Guideline*, background noise levels + 5dB ($LA_{eq(15\ min)}$). Examples may include but are not limited to installation of formwork, maintenance of plant and equipment, internal fit out of buildings, delivery of equipment and/or selected consumables.

Note 2: To be undertaken on a campaign basis.

Source: Tomingley Gold Operations Pty Ltd

Section 3.5.4.2 presents the anticipated mining schedule for the Project assuming that development consent is granted in mid-2022 and that all conditions precedent for the commencement of site establishment and public road realignment are complete by the end of 2022. That would permit road construction operations to commence in early 2023 and SAR open cut mining operations to commence in late Q3 2023. Based on those assumptions, mining and processing operations are anticipated to be completed by December 2032.

Following the completion of mining and processing operations. a period of rehabilitation would be required (see Section 3.14). Rehabilitation of sections of the Project Site would be undertaken progressively throughout the life the Project, however, substantial sections of the Project Site would be utilised until the end of the proposed mining and processing operations, including the Processing Plant, residue storage facilities, TGO and SAR Administration Areas and other areas. Rehabilitation operations are expected to require a further period to complete.

Ongoing maintenance and management of the rehabilitated landform would be required after this date until all rehabilitation criteria have been achieved and the mining leases may be relinquished. No time period has been set for relinquishment of the Mining Leases.

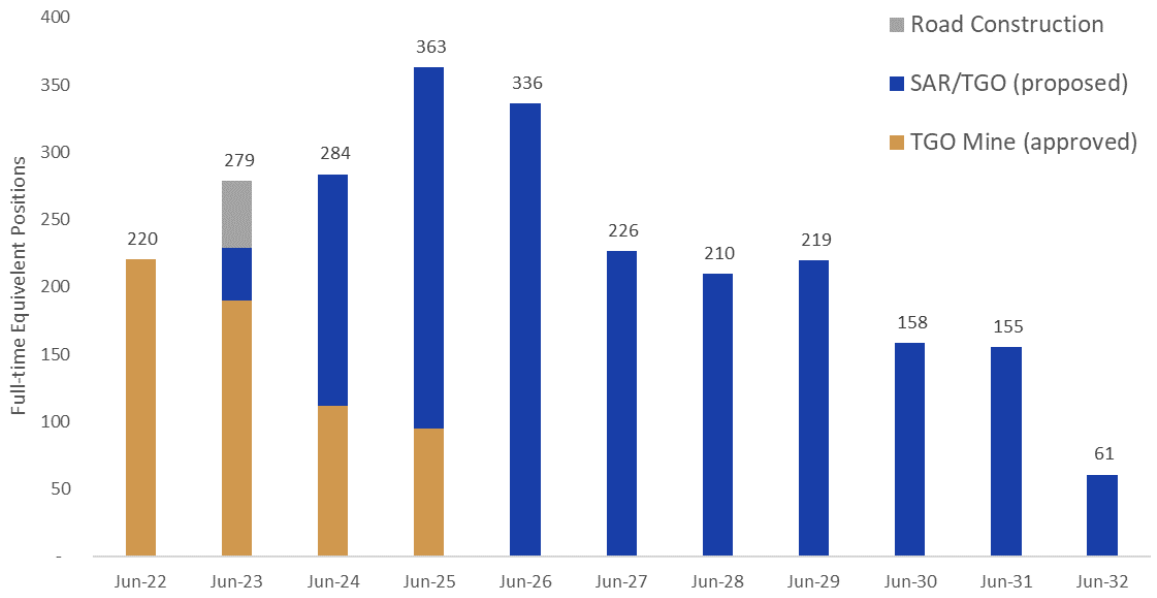
Notwithstanding the above, the Applicant anticipates identifying additional resources within or in the vicinity of the Project Site during the life of the Project. Should additional resources be identified, the Applicant would submit an application to extend the life of the Project or an application for a new development consent.

3.13 Employment, Economic Contributions and Capital Investment Value

3.13.1 Employment

Figure 3.13.1 presents the anticipated number of full-time equivalent employees that would be engaged by the Applicant for the Project. Additional contract personnel would also be required, as well as indirect employment associated with suppliers or service providers. Finally, additional personnel required during peak periods, including shutdowns and for other reasons.

The vast majority of positions would be residential in surrounding towns and cities, including Dubbo, Narromine, Peak Hill, Parkes, Tomingley and surrounding rural areas. Limited numbers of employees and contractors may be engaged on a drive-in / drive-out or fly-in / fly-out basis. It has been the Applicant's experience that such arrangements are primarily required for specialist technical or highly qualified roles where locally based expertise may not be available.



Source: Tomingley Gold Operations Pty Ltd

Figure 3.13.1
Anticipated Project-related Employment

3.13.2 Economic Contributions

Section 6.14 of the EIS presents an overview of the Economic Assessment for the Project prepared by Diana Gibbs and Partners (2021). In summary, the Applicant anticipates that the Project would generate the following additional economic contributions within NSW over the life of the Project. It is noted that these figures have been subjected to a 7%pa discount rate to convert future contributions into a present value.

- Capital expenditure in NSW ..... $100.58 million
- Operating expenditure in NSW ..... $432.31 million
- NSW and Local government taxes, royalties and duties ..... $90.94 million

In summary, the Project would contribute approximately **$633.17 million** in 2021 dollar terms to the economy of NSW, of which the vast majority would be retained within the local and regional areas. This would further support the economy of Narromine, Dubbo and Parkes Local Government Areas and ongoing employment of numerous, non-Mine personnel. Additional contributions would be made to the National economy for goods and services not available within NSW.

3.13.3 Capital Investment Value

The Applicant and its advisors have undertaken a detailed assessment of the anticipated Capital Investment Value (CIV) of the Project in accordance with Planning Circular PS 21-020 dated 2 December 2021. **Table 3.13.1** presents an overview of the results of that assessment. It is noted that the CIV for the Project is different to the capital cost if $115 million identified in the Economic Assessment presented Section 6.14 of the EIS because the methodologies used to determine each is different. In particular, the CIV includes the cost of mobile open cut mining plant, whereas in reality the Applicant anticipates undertaking contract mining operations and that plant has been excluded from the capital cost use for determining the feasibility of the Project.

Table 3.13.1
Summary Capital Investment Value Estimate

Item	Value (A$ million)
Approvals costs and other fees and bonds	1.86
Site development and services relocation	3.69
Newell Highway Realignment	42.11
Council roads realignment – include overpass	11.12
Surface infrastructure	12.41
Underground mine development, including replacement mobile plant	12.68
Open cut mine development, including mobile plant	189.55
Ore processing and waste rock management	22.07
Total	**295.50**
Note: Apparent arithmetic inconsistencies are due to rounding	
Source: Tomingley Gold Operations Pty Ltd	

3.14 Mine Closure and Rehabilitation Strategy

3.14.1 Introduction

Rehabilitation of all areas disturbed by mining-related activities is an integral aspect of the Project. Emphasis would be placed upon progressively creating final landforms and progressive rehabilitation wherever practicable. Sections of the Project Site would, however, remain active throughout the life of the Project and, as a consequence, rehabilitation of those sections of the Project Site would be undertaken following the completion of mining operations.

Rehabilitation activities within the Project Site would be planned and undertaken in accordance with a *Rehabilitation Management Plan* (RMP) prepared following the receipt of development consent and the SAR Mining Lease. Components of the RMP would be reviewed and approved by the Resources Regulator prior to commencement of SAR-related mining activities.

This subsection provides a brief overview of the approved and proposed mine closure and rehabilitation strategy for the Project, including those aspects already approved for the TGO Mine Site. Appendix 4 of the EIS presents additional detail in relation to mine closure and rehabilitation.

3.14.2 Rehabilitation Consultation and Reference Documentation

Successful rehabilitation of mining-related disturbance is best achieved with ongoing consultation with the surrounding community and relevant government agencies and structured rehabilitation planning. Appendix 16 of the EIS presents an overview of consultation undertaken and reference documentation relied upon in preparing this rehabilitation and mine closure strategy. In summary, consultation identified the following aspects of the strategy would be important for the community.

- A "natural" final landform.
- Limited final voids.
- Ongoing productive use of the land, including agriculture and industrial/commercial use, to generate local employment and economic activity.
- Post-mining surface water flows largely unchanged from pre-mining flows.
- Management of weeds and pests during and following mining.
- Manage and preserve existing biodiversity.
- Prefer agricultural land not lost to biodiversity offsets.
- Public roads, including the Newell Highway, in the same standard or better than at the start of mining operations.

3.14.3 Final Landform and Infrastructure to be Retained

Figures 3.14.1 to **3.14.3** present the approved and proposed final landform for the Project. In summary, the combined final landform would include the following. A detailed description of the design of each of each component of the final landform is presented in Sections 3.4 to 3.9 and associated sections of Appendix 4 of the EIS.

- Two bunded and fenced final voids, namely the Wyoming 1 Open Cut and the SAR North Pit.
- Three fully backfilled open cuts, namely the Wyoming 3, Caloma 1 and Caloma 2 Open Cuts and one partially backfilled open cut, namely the SAR South and Central Pits.

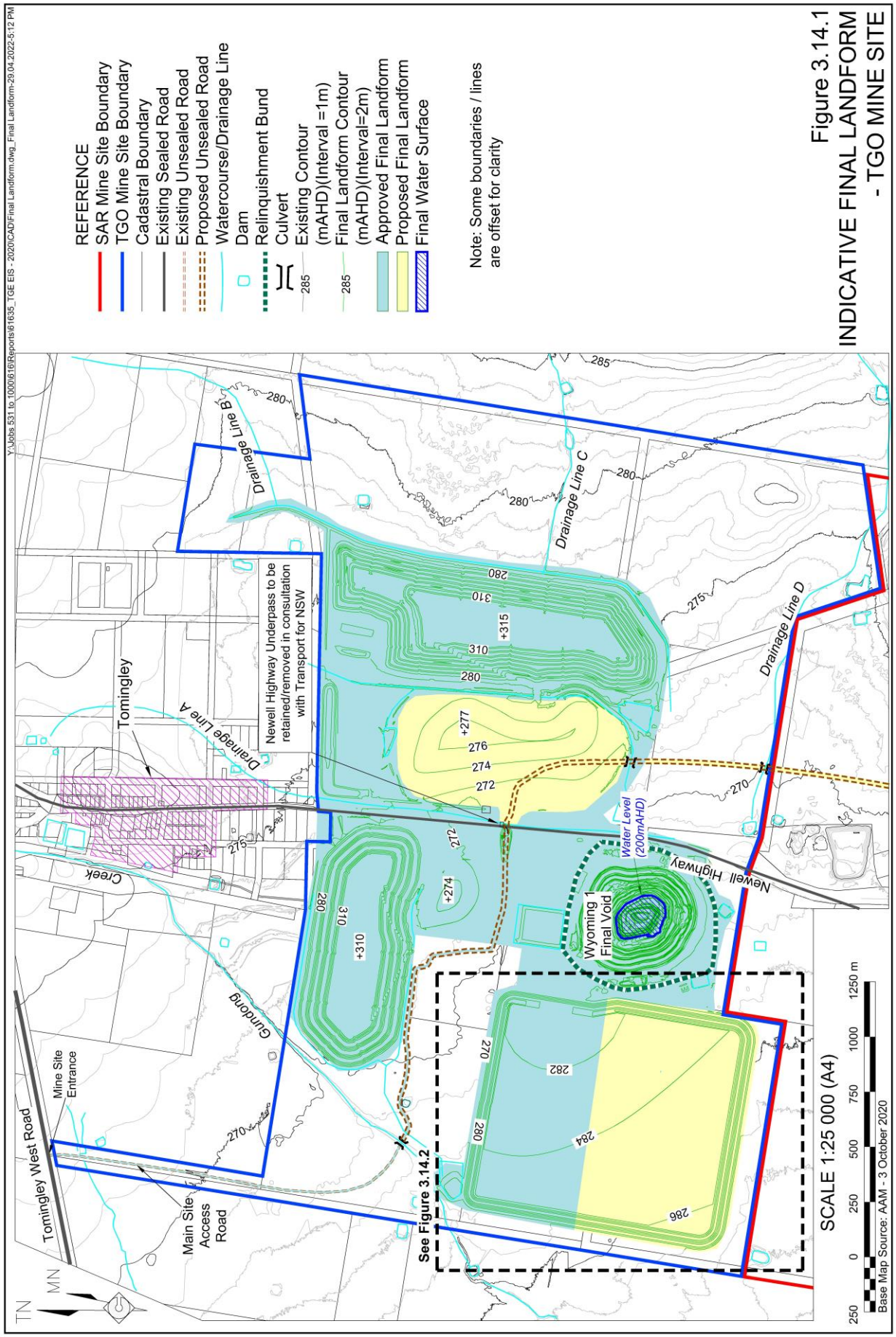


Figure 3.14.1
INDICATIVE FINAL LANDFORM
- TGO MINE SITE
REFERENCE
SAR Mine Site Boundary
TGO Mine Site Boundary
Cadastral Boundary
Existing Sealed Road
Existing Unsealed Road
Proposed Unsealed Road
Watercourse/Drainage Line
Dam
Relinquishment Bund
Culvert
Existing Contour (mAHD)(Interval =1m)
Final Landform Contour (mAHD)(Interval=2m)
Approved Final Landform
Proposed Final Landform
Final Water Surface
Note: Some boundaries / lines are offset for clarity
Drainage Line B
Drainage Line C
Drainage Line D
Drainage Line A
Tomingley
Newell Highway Underpass to be retained/removed in consultation with Transport for NSW
Newell Highway
Water Level (200mAHD)
Wyoming 1 Final Void
Creek
Gundong
Tomingley West Road
Mine Site Entrance
Main Site Access Road
See Figure 3.14.2
TN
MN
SCALE 1:25 000 (A4)
250 0 250 500 750 1000 1250 m
Base Map Source: AAM - 3 October 2020
Y:\Jobs 531 to 1000\616\Reports\61635_TGE EIS - 2020\CAD\Final Landform.dwg_Final Landform=29.04.2022-5:12 PM

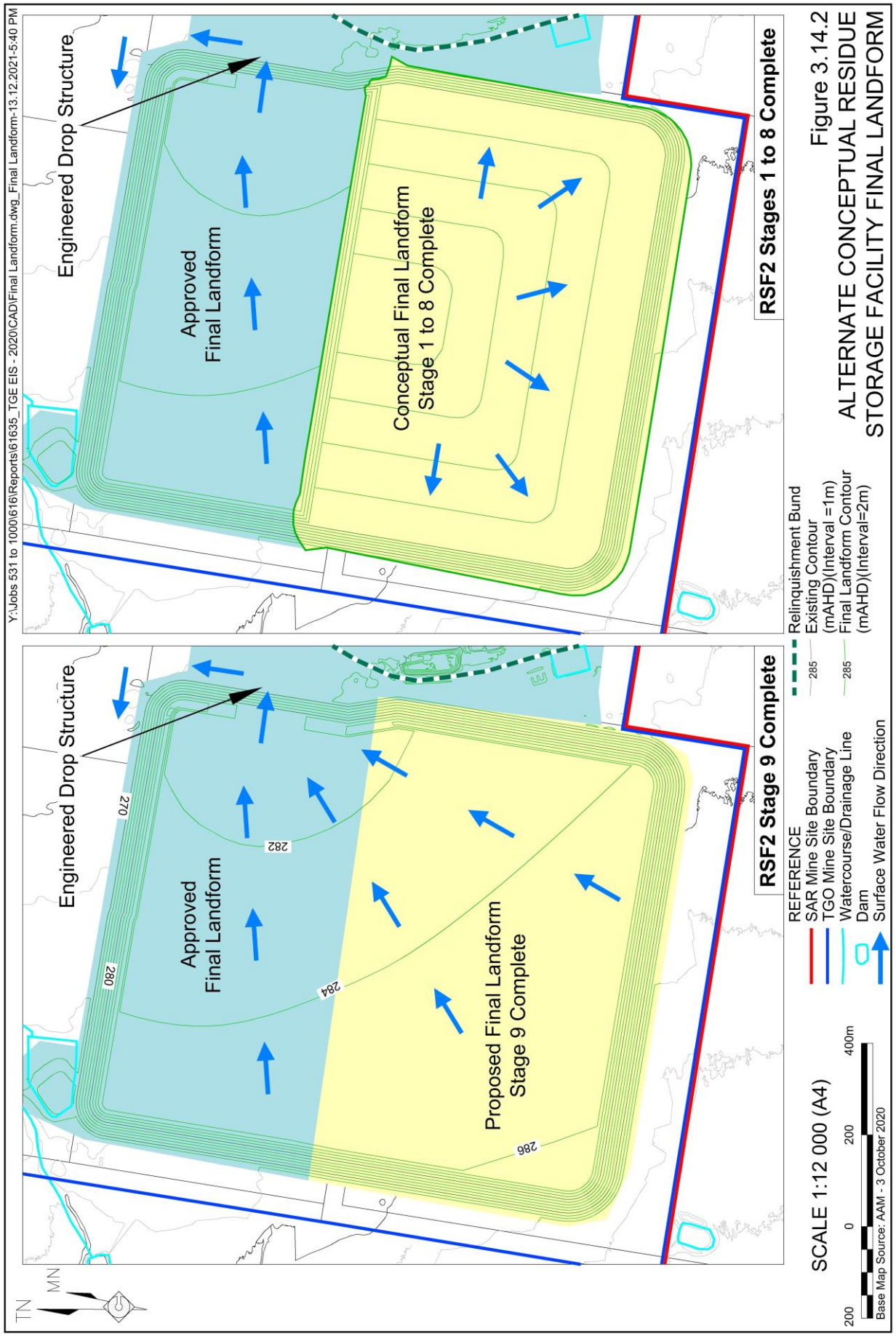


Figure 3.14.2
ALTERNATE CONCEPTUAL RESIDUE STORAGE FACILITY FINAL LANDFORM

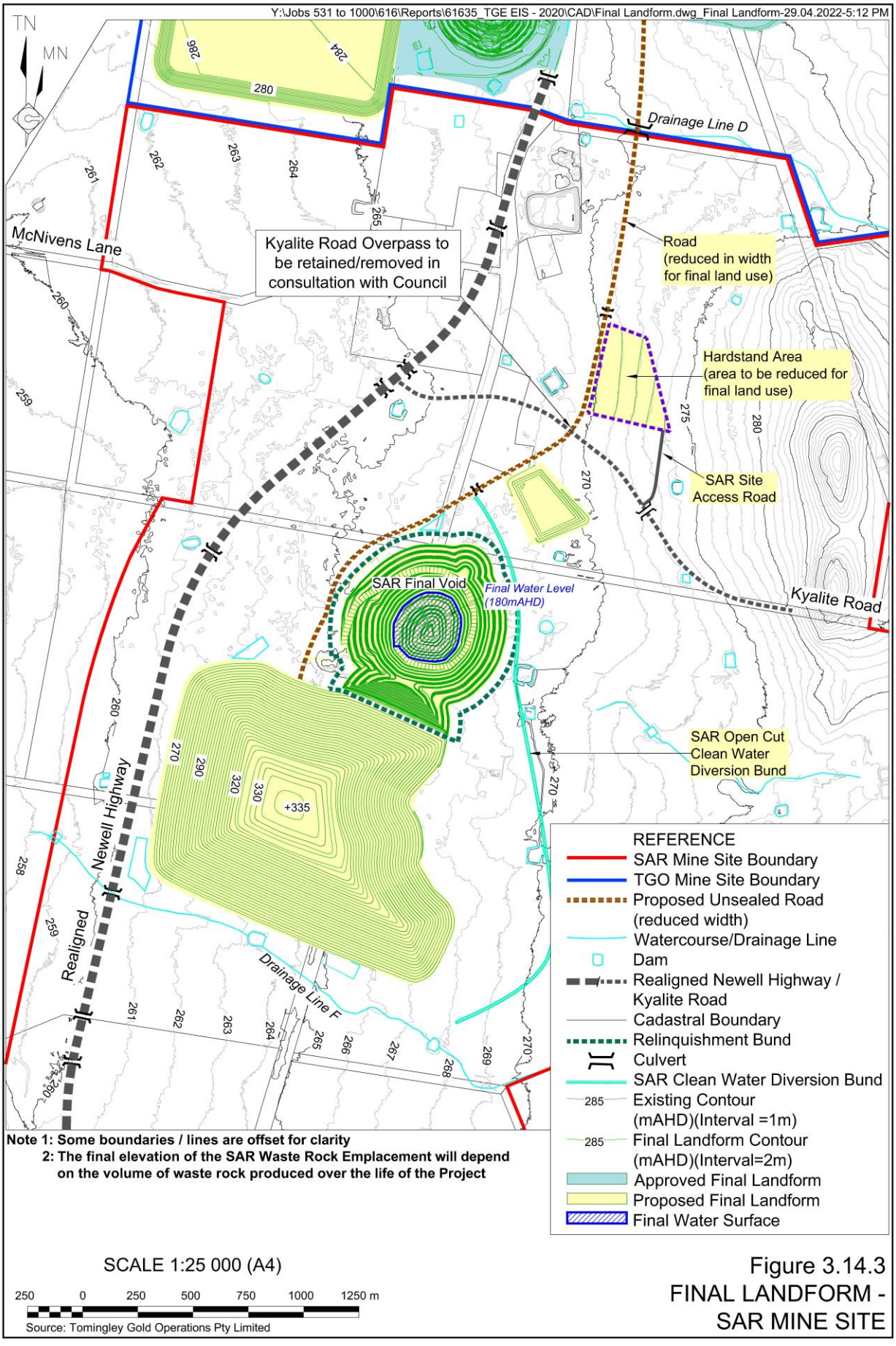


Figure 3.14.3
FINAL LANDFORM - SAR MINE SITE

- Three shaped and rehabilitated waste rock emplacements, namely Waste Rock Emplacements 2 and 3 and the SAR Waste Rock Emplacement. Material contained within Waste Rock Emplacement 1 would be largely consumed during rehabilitation of the residue storage facilities. Material contained within the Wyoming 3 Open Cut and Caloma Waste Rock Emplacement would be shaped to form a low rise with slopes of approximately 1%.
- A capped, free-draining integrated Residue Storage Facility. **Figure 3.14.2** presents two alternate final landforms for the Residue Storage Facility. In the event that Stage 9 of the Residue Storage Facility 2 is completed, the final landform would be constructed in a manner that would drain to a single drop structure in the northeast section of the Facility consistent with the approved final landform for Residue Storage Facility 1. In the event that the Residue Storage Facility 2 is not completely filled, the Facility would be shaped to drain to the west, south and east and Residue Storage Facility 1 would be shaped in a manner consistent with the approved final landform.

All infrastructure not required for the final land use would be removed or reduced in area or width and would be shaped and revegetated as required. Infrastructure to be retained would, indicatively include the following.

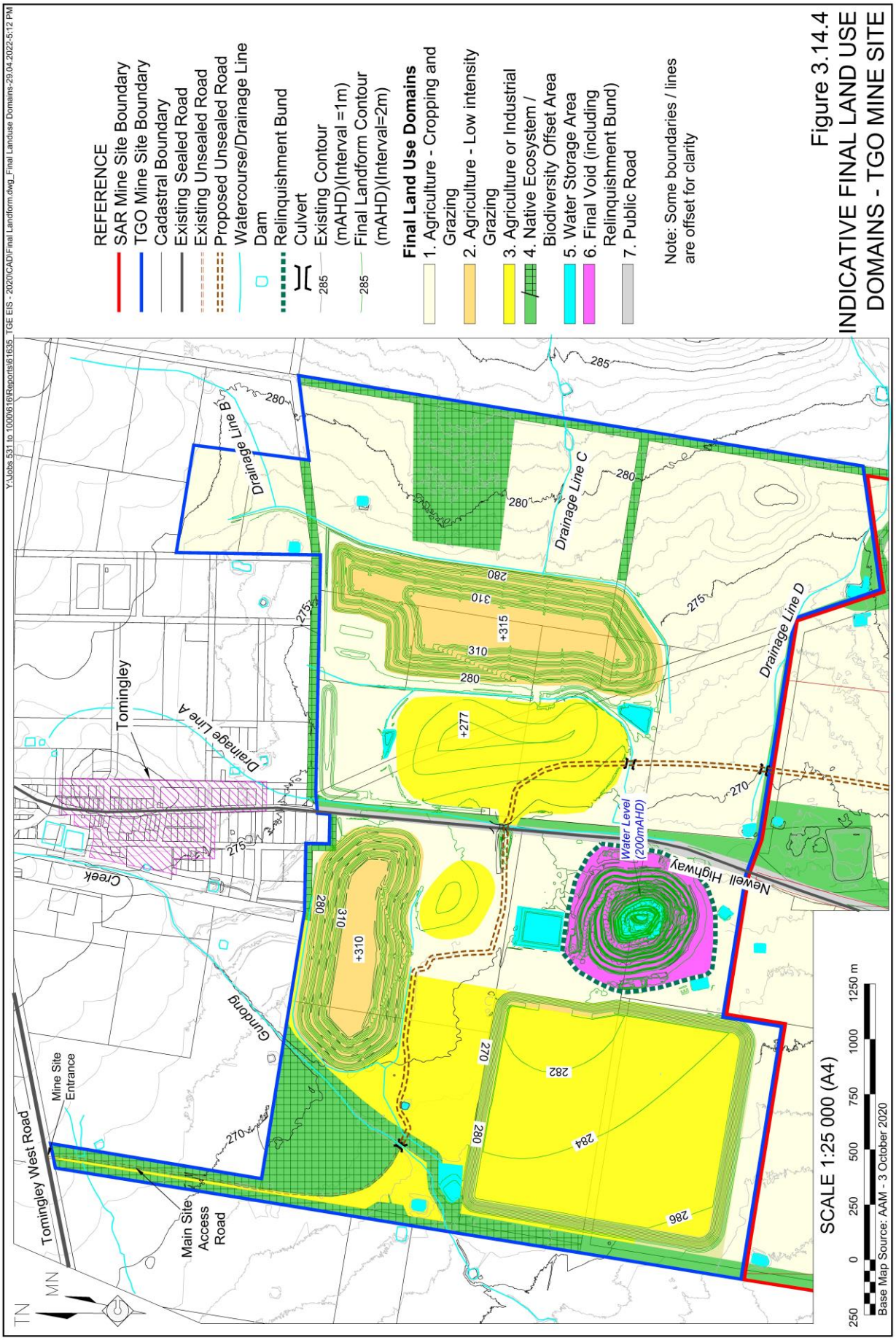
- Unsealed roads, reduced in width to that required for post-mining land management (indicatively 5m to 10m wide), with under road drainage retained.
- Hardstand areas, reduced in size to that required for post-mining land use.
- Limited sheds and buildings required for post-mining land use.
- Powerlines and substations where these may facilitate the proposed or future land use.
- Water supply pipeline from the "Woodlands" and "Dappo" bores to facilitate the ongoing supply of water to Tomingley village and for the post-mining land uses.
- Water management infrastructure, including clean water bunds and water storages, including the Wyoming Central Dam, SAR Water Storage Dam and selected sediment basins.

Realigned public roads would be retained, including the realigned Newell Highway and Kyalite Road and intersections with Back Tomingley West Road and McNivens Lane. The Newell Highway underpass and Kyalite Road overpass would be retained or removed in consultation with the relevant roads authority.

3.14.4 Final Land Use Domains

Figures 3.14.4 and **3.14.5** present the proposed final land use domains. Appendix 4 of the EIS presents an overview of the final land use options assessed and a more detailed discussion of the proposed final land use domains.

- Domain 1 - Agriculture – Cropping and Grazing.
- Domain 2 - Agriculture – Low Intensity Grazing.


REFERENCE
SAR Mine Site Boundary
TGO Mine Site Boundary
Cadastral Boundary
Existing Sealed Road
Existing Unsealed Road
Proposed Unsealed Road
Watercourse/Drainage Line
Dam
Relinquishment Bund
Culvert
Existing Contour (mAHD)(Interval =1m)
Final Landform Contour (mAHD)(Interval=2m)
Final Land Use Domains
1. Agriculture - Cropping and Grazing
2. Agriculture - Low intensity Grazing
3. Agriculture or Industrial
4. Native Ecosystem / Biodiversity Offset Area
5. Water Storage Area
6. Final Void (including Relinquishment Bund)
7. Public Road
Note: Some boundaries / lines are offset for clarity
Figure 3.14.4
INDICATIVE FINAL LAND USE DOMAINS - TGO MINE SITE
Y:\Jobs 531 to 1000\616\Reports\61635_TGE EIS - 2020\CAD\Final Landform.dwg_Final Landuse Domains-29.04.2022-5:12 PM
Tomingley
Drainage Line A
Drainage Line B
Drainage Line C
Drainage Line D
Newell Highway
Water Level (200mAHD)
Tomingley West Road
Mine Site Entrance
Main Site Access Road
Gundong
Creek
TN
MN
SCALE 1:25 000 (A4)
250 0 250 500 750 1000 1250 m
Base Map Source: AAM - 3 October 2020

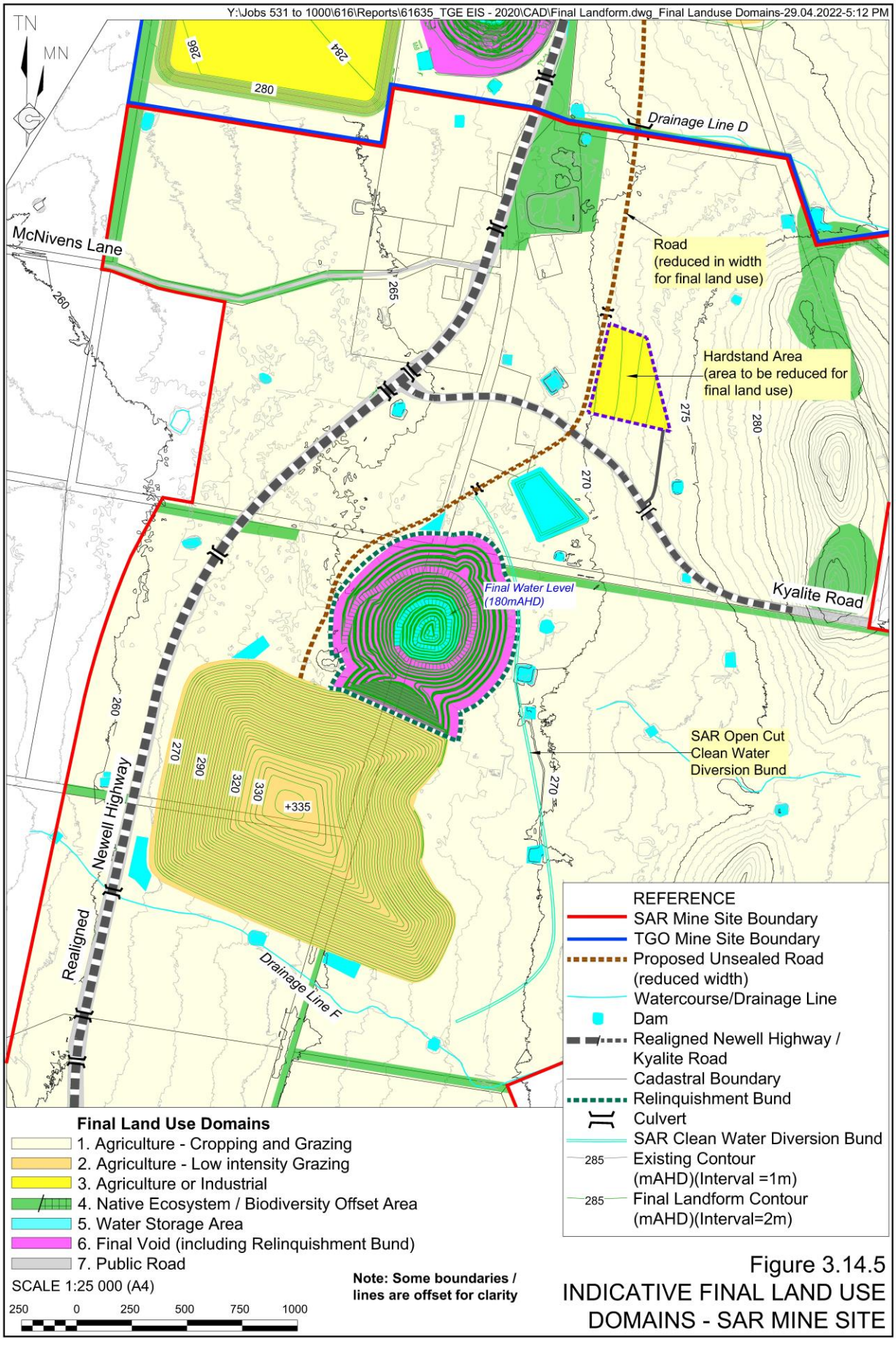


Figure 3.14.5
INDICATIVE FINAL LAND USE DOMAINS - SAR MINE SITE

- Domain 3 - Agriculture/Industrial Use.
- Domain 4 - Native Ecosystem / Biodiversity Offset.
- Domain 5 - Water Storage Areas.
- Domain 6 - Final Voids.
- Domain 7 - Public Road.

3.14.5 Rehabilitation Risk Assessment

The Applicant undertook a preliminary rehabilitation risk assessment for the Project generally in accordance with procedures identified by the document *Guideline: Rehabilitation Risk Assessment* published by the Resources Regulator in July 2021. Appendix 3 of the EIS presents the risk assessment. Rehabilitation risks with a ranking of Moderate or above included the following together with a summary of how each of the identified risks would be managed.

- Exposure or access to final voids (moderate risk) or underground workings (high risk) .....Moderate risk

  Potential exists for unauthorised access to the final voids or underground workings following the completion of mining operations. However, the backfilling of the Wyoming 3 and Caloma 1 and 2 Open Cuts and SAR Open Cut South and Central Pits would remove the risk associated with those voids. In addition, installation of the proposed relinquishment bund and security fence and blocking of the access ramps for the Wyoming 1 Open Cut and SAR Open Cut North Pit final voids would mitigate risks associated with unauthorised access to the remaining final voids.

  Finally, all portals and ventilation rises would be blocked or capped in accordance with the relevant guidelines to prevent unauthorised access.

- Erosion or mass movement of the SAR Waste Rock Emplacement...Moderate risk

  Section 3.6.4.2 presents an overview of the landform stability assessment of the SAR Waste Rock Emplacement undertaken by Landloch (2021b). That assessment determined that the landform as designed, together with the proposed rehabilitation materials, would not result in unacceptable erosion, provided adequate vegetation cover is established and maintained on the landform.

  In addition, the Applicant would engage a suitably qualified geotechnical engineer to determine the long-term stability of the final landform prior to mine closure.

- Erosion or mass movement of the final voids ..... High risk

  Section 3.5.2.2 presents an overview of the long-term geotechnical assessment of the SAR Open Cut North Pit final void. A relinquishment bund and security fence would be established around that void and the consequence of any unplanned failure of that structure would be minor given the distance to public infrastructure.

Section 3.5.2.1 presents an overview of the long-term geotechnical assessment of the Wyoming 1 Open Cut final void. The Applicant would ensure that the final landform would achieve a Factor of Safety of 1.3 through either cutting back the upper sections of the open cut or covering and supporting selected sections of the wall of the open cut with waste rock.

- Failure of revegetation as a result of adverse climatic conditions..... Moderate risk

  Drought and periods of low rainfall, or periods of excessive rainfall, are common occurrences. The Applicant would mitigate against such eventualities by undertaking progressive rehabilitation of sections of the SAR and Caloma Waste Rock Emplacement throughout the life of the Project, indicatively annually during the cooler months of March to June. In the event that revegetation operations achieve a strike rate that does not comply with the identified completion criteria, remediation operations would be undertaken.

3.14.6 Rehabilitation Objectives

Rehabilitation objectives for the Project as a whole include the following. Detailed rehabilitation objectives for each final land use domain would be developed as part of the Rehabilitation Management Plan for the Project.

- Minimise adverse social and economic impacts associated with mine closure.
- Ensure that all surface infrastructure not required for the final land uses is removed or reduced in area.
- Undertake progressive rehabilitation as soon as practical in areas no longer required for mining-related operations.
- Ensure that the rehabilitated landform, including final voids, is safe, stable and non-polluting with maintenance requirements consistent with the agreed post mining land use(s).
- Ensure that surface water flows of suitable quality continue to flow to downstream catchments.
- Provide for a final land use comprising a mixture of agriculture and native ecosystem, with potential industrial land uses following receipt of required approvals or consents at that time.
- Ensure that the SAR Waste Rock Emplacement reflects, to the extent practicable, natural landforms surrounding the Project Site.
- Ensure that areas to be retained for agricultural use achieve the nominated agricultural land capability and that the agricultural productivity of this land managed by the Applicant is higher at the end of mining operations than at the start.
- Ensure that areas to be retained for Native Ecosystem maintain or improve species diversity and habitat value.

- Ensure that the approach to rehabilitation is continually reviewed throughout the life of the Project based on site specific knowledge, research and monitoring.
- Allow for the rehabilitation security to be returned progressively and the Mining Leases to be relinquished within a reasonable timeframe after the successful completion of rehabilitation activities.

3.14.7 Rehabilitation Implementation

3.14.7.1 Rehabilitation Completed and in Progress

The Applicant has undertaken the following rehabilitation operations on Waste Rock Emplacements 2 and 3 within the TGO Mine Site. These operations have been undertaken in a manner that is consistent with MP 09_0155 and the approved *Mining Operations Plan*. The Applicant would continue to liaise with the Resources Regulator to facilitate acceptance and signoff of the completed rehabilitation.

- Shaping and installation of surface water controls, including rock-lined drop structures.
- Spreading of previously stockpiled growth medium.
- Establishment of grassland vegetation on rehabilitated areas.

Plates 3.14.1 and **3.14.2** present views of rehabilitation completed to date within the TGO Mine Site. In addition, the Applicant rehabilitated the Peak Hill Gold Mine, located approximately 11km south of the SAR Open Cut. **Plates 3.14.3** and **3.14.4** present views of the completed rehabilitation of the Peak Hill Gold Mine Waste Rock Emplacement. The Applicant anticipates that rehabilitation operations within the Project Site would be equally as successful as rehabilitation completed at the Peak Hill Gold Mine.

3.14.7.2 Opportunities for Improved Rehabilitation Outcomes for Rehabilitated Areas

The Applicant notes that current NSW Government guidelines for Mine Site rehabilitation require a focus on continuous review and implementation of best practice rehabilitation procedures to achieve optimal outcomes. The rehabilitation risk assessment presented in Section 3.14.5 identifies barriers or limitations to rehabilitation operations with the Project Site.

The Applicant has and would implement the following to improve rehabilitation and environmental outcomes for existing disturbed and rehabilitated areas.

- Incorporate all existing disturbed areas with the *Rehabilitation Management Plan* to be prepared for the Project.
- Continue to monitor environmental performance of existing rehabilitated areas to ensure that those areas continue to progress towards the progressive and final completion criteria identified in the existing *Mining Operations Plan* and future *Rehabilitation Management Plan.*

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Plate 3.14.1: Oblique aerial view of rehabilitated Waste Rock Emplacement 2 looking south-southeast - prior to site decommissioning
(Source - Tomingley Gold Operations Pty Ltd)

Plate 3.14.2: View of rehabilitation in progress on the western face of Waste Rock Emplacement 3
(Date of photograph - 6 May 2021)

Plate 3.14.3: View of rehabilitated northern face of the Peak Hill Gold Mine Waste Rock Emplacement
(Date of Photograph - 6 May 2021)

Plate 3.14.4: View of rehabilitated upper surface of the Peak Hill Gold Mine Waste Rock Emplacement
(Date of Photograph - 6 May 2021)

- Undertake remedial action to address issues where progression towards the agreed progressive and final completion criteria is not progressing at the required rate.
- Continue to investigate methods or procedures to improve rehabilitation and environmental outcomes for areas of existing rehabilitation.
- Continue to investigate alternate final landform or land use options for existing and disturbed areas that may generate improved rehabilitation and environmental outcomes.
- Continue to undertake agricultural improvements as described in Section 6.9.3 of the EIS to undisturbed and rehabilitated lands.

3.14.8 Proposed Progressive and Final Rehabilitation

3.14.8.1 Introduction

The following subsections present a brief overview of the progressive, temporary and final rehabilitation implementation to be undertaken throughout the life of the Project.

3.14.8.2 Progressive and Temporary Rehabilitation

Sections of the Project Site that would be available for progressive rehabilitation, and the timing for each, would include the following.

- SAR Amenity Bund – immediately following construction.
- Newell Highway and Kyalite Road road-side disturbance areas, including the Kyalite Road overpass embankment - immediately following construction.
- Clean water diversion bunds - immediately following construction.
- The outer face of each lift of the SAR Waste Rock Emplacement – progressively as each lift is completed.
- Northern section of the Caloma Waste Rock Emplacement – following completion of backfilling operations. It is noted that the northern section of the Caloma Waste Rock Emplacement only would be available for progressive rehabilitation as the southern section would continue to be used for stockpiling operations for the life of the Project.

In addition, the proposed soil stockpiles would be temporarily rehabilitated and stabilised as soon as practicable following establishment, with final rehabilitation of the stockpile footprints to be undertaken once the stockpiled soil has been used for rehabilitation elsewhere within the Project Site.

Progressive and temporary rehabilitation implementation operations would be largely as described for the proposed final rehabilitation operations.

3.14.8.3 Final Rehabilitation

Final rehabilitation operations would largely be consistent with those described in the approved MOP for the TGO Mine Site. Broadly, rehabilitation operations would include the following. The *Rehabilitation Management Plan* would provide additional guidance in relation to rehabilitation implementation.

Decommissioning

- Remove all consumables, equipment, stores and other materials not required for rehabilitation operations.
- Remove all buildings, plant (including concrete foundations), infrastructure, and water storages not required for the final land use.
- Undertake a contamination assessment and treat or remove any contaminated material.
- Block underground portals and cap ventilation rises in accordance with relevant guidelines applicable at the time.
- Undertake an assessment of all structures, infrastructure and landforms to be retained.

Landform Establishment

- Remove or reduce in size stockpile/hardstand areas and roads not required for the final land use, including the SAR Amenity Bund and TGO ROM Pad. Use extracted material for rehabilitation operations.
- Install temporary surface water controls, as required.
- Progressively shape the final landform in a manner that is generally consistent with that described in Section 3.14.3 and shown in **Figures 3.14.1** to **3.14.3**. The *Rehabilitation Management Plan* would provide additional detail in relation to the final landform design based on final material volumes close to the end of the life of the Project.
- Cap and shape the residue storage facilities to ensure encapsulation of contained materials and a free draining landform.
- Undertake a geotechnical assessment of the final voids and establish relinquishment bunds and security fencing with signage at a suitable distance from the voids.
- Undertake a geotechnical assessment of the Residue Storage Facilities and establish suitable capping of the upper surface of the facility, surface water drainage, including engineered drop structures if required, and buttressing, if required.

Growth Medium Development

- Test soils prior to placement and apply suitable ameliorants.
- Where available, place friable material on the upper surface of the final landform and deep rip prior to placement of soil.

- Place soils in a manner consistent with the recommendations of SSM (2021), including ensuring that a minimum of 300mm of Chromosol and Sodosol topsoil is used for rehabilitation of moderately sloped lands and 200mm of topsoil in other areas.
- Preserve the structure of placed soils to ensure that subsoil and topsoil are moist to just moist when spreading, not dry or excessively wet.
- Place a soil/rock matrix approximately 80m wide at the break of slope on the upper face of the SAR Waste Rock Emplacement as described in Section 10.4 of Landloch (2021b). In summary:
  - rip the waste rock to a depth of 500mm; and
  - mix approximately 2 parts angular, durable rock with a D_{50} >53mm with 1 part soil and place the matrix material to a minimum depth of 400mm.
- Apply temporary soil stabilisation products such as polymer-based sprays to stabilise the final landform if a vegetation cover of 70% coverage will not be established within 3 months of soil placement.
- Install temporary sediment and erosion control structures on the final landform.

Ecosystem and Land Use Establishment

- Revegetate the final landform using species consistent with those identified in the approved TGO *Mining Operations Plan* based on the proposed final land use. Appendix 4 of the EIS reproduces the approved species mix.
- Undertake revegetation operations using mechanical or direct seeding techniques, including mulches or stabilising agents as required.
- Undertake weed and pest management, as required, until relinquishment.

Ecosystem and Land Use Development

- Monitor the rehabilitated landform to determine initial germination success and success of other measures, including soil ameliorants, erosion controls, weed and grazing management.
- Monitor vegetation establishment on the rehabilitated landform against existing TGO and SAR analogue sites.
- Monitor the agricultural productivity of the rehabilitated landform against surrounding lands to benchmark progress towards achieving closure criteria.
- Undertake remediation, as required, including:
  - re-seeding, including with alternate species, if required;
  - addition of ameliorants, as required;
  - weed and grazing control; and
  - maintenance of erosion controls.

3.14.9 Rehabilitation Quality Assurance and Monitoring

Section 3.14.6 presents conceptual rehabilitation completion objectives for the Project and Appendix 4 of the EIS presents the completion criteria for each land use domain. In order to achieve those criteria, the following quality assurance measures would be implemented.

- Identify key roles and responsibilities for rehabilitation and mine closure and include relevant performance indicators in position descriptions. Broadly, the following responsibilities would apply.
  - TGO General Manager - ensure that appropriate resources are available to site management and personnel to enable the implementation of the mine closure and rehabilitation measures identified in the *Rehabilitation Management Plan*.
  - TGO Environment and Community Manager - Ensure that the activities identified in the *Rehabilitation Management Plan* are fully implemented and a *Rehabilitation Quality Assurance Registe*r is maintained.
  - All Mine Personnel - follow direction provided by the Environment and Community Manager.
- Develop a *Rehabilitation Quality Assurance Register* of all commitments included in this document and the *Rehabilitation Management Plan*. The register would include checklists for site personnel undertaking rehabilitation activities and a compliance register.
- Report annually on the progress of rehabilitation within the Project Site.

Finally, the existing TGO rehabilitation monitoring that is routinely undertaken for rehabilitation operations within the TGO Mine Site would be continued and extended to the SAR Mine Site. That program is described in the approved *Mining Operations Plan* and includes monitoring of nine analogue sites and five rehabilitated sites. Additional analogue sites would be established within or in the vicinity of the SAR Mine Site and identified in the *Rehabilitation Management Plan.* In summary, however, rehabilitation monitoring throughout the life of the Project would include the following.

- Undertake continued monitoring to track progress towards the relinquishment criteria identified in the *Rehabilitation Management Plan*, including monitoring of:
  - erosion or subsidence of rehabilitated lands, including in particular sections of the final landform with moderate slopes (>6%);
  - the success (or otherwise) of the vegetation communities established on the final landform against selected analogue sites, including pasture communities; and
  - agricultural productivity of rehabilitated lands, including measuring key metrics against selected analogue sites.
- Undertake remediation, as required, to ensure continued tracking towards the relinquishment criteria identified in the *Rehabilitation Management Plan*.
- Annual reporting on the status of rehabilitation within the TGO and SAR Mine Sites, including, where appropriate, progress towards the identified relinquishment criteria.

3.14.10 Rehabilitation Research and Trials

While the Applicant has extensive experience rehabilitating both the Peak Hill Gold Mine and Waste Rock Emplacements 2 and 3 within the TGO Mine Site, additional rehabilitation trials would be undertaken throughout the life of the Project.

Trial sites would be established within areas undergoing progressive rehabilitation. A range of rehabilitation methodologies would be tested in consultation with a person suitably experienced in landform establishment and rehabilitation. A range of parameters would be tested to determine the optimum combination of rehabilitation techniques and procedures, including the following.

- Final landform preparation, including nature and preparation of the substrate and preferred microrelief.
- Soil depth and preferred ameliorants.
- Vegetation methodology and preferred seed mix, fertiliser and stabiliser.

The results of these trials would be reported annually and used to refine rehabilitation practices on site.

3.14.11 Flexible Elements

Table 3.14.1 presents the rehabilitation-related flexible elements that cannot be described with certainty at this stage of the Project, together with clear limits on the flexibility sought and a justification of each element. Elements that may be smaller or with lesser impacts than that proposed are not described.

Table 3.14.1
Flexible Elements – Mine Closure and Rehabilitation

Flexible Element	Limit on Flexibility	Justification
Final SAR Waste Rock Emplacement landform	Final landform to be no larger or steeper that that proposed.	The Applicant has designed the SAR Waste Rock Emplacement to accommodate all waste rock that may be generated over the life of the Project. In determining the volumes of these materials likely to be generated, conservative assumptions have been made. Priority would be given to completely backfilling the Caloma 1 and 2 Open Cuts as well as the SAR Open Cut South and Central Pits. Remaining materials would be placed within the SAR Waste Rock Emplacement. As a result, it is likely that final SAR Waste Rock Emplacement may be lower and/or less steep than that proposed.
Final Wyoming 3 or Caloma Waste Rock Emplacement landform	Final landform may not completely backfill the final voids. Final void to be safe, stable, secure and non-polluting.	The final landform for each of these voids is proposed to be a low rise with slopes of approximately 1% to facilitate shedding of water. It is possible that additional waste rock may be required during the final stages of the life of the Project for rehabilitation operations or stabilisation of the Wyoming 1 final void. As a result, there is potential that the Wyoming 3 or Caloma Waste Rock Emplacements may not be completely backfilled. Should this occur, the Applicant would establish a final landform that is safe, stable, secure and non-polluting, with internal slopes as gentle as possible.

Table 3.14.1 (Cont'd)
Flexible Elements – Mine Closure and Rehabilitation

Flexible Element	Limit on Flexibility	Justification
Final Residue Storage Facilities landform	Final landform to be no larger or steeper that that proposed. Final landform to be capped to achieve relevant permeability criteria. Final landform to be free draining.	The Applicant has designed Residue Storage Facility 2 to accommodate all residue that may be generated over the life of the Project. In determining the volumes of these materials likely to be generated, conservative assumptions have been made. As a result, Residue Storage Facility 2 may not be constructed to Stage 9 and a final landform that is lower than that proposed may remain at the end of the life of the Project. That may result in alternate surface water management to that proposed.
Final land use	Final land uses to have appropriate planning approval or exemption prior to adoption and acceptance under the *Rehabilitation Management Plan.*	A range of alternative final land uses may be relevant for the Project Site at the time when the Project is decommissioned. However, with limited exceptions, each would require further planning approval, or a relevant exemption. In the event that such an alternate land use is proposed, relevant planning approval (or an exemption) would be obtained, and the modified final land use, including modified completion criteria, would be incorporated into the *Rehabilitation Management Plan.*

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Appendix B

Amended Statutory Compliance Table

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Table B.1
Pre-conditions to Granting Approval

Statutory Reference	Pre-condition	Relevance	EIS Section	Amendment Report Section
Biodiversity Conservation Act 2016 (BC Act)				
Section 7.14	If the Minister for Planning is of the opinion that proposed SSD is likely to have serious or irreversible impacts on biodiversity values, the Minister: (a) is required to take those impacts into consideration, and (b) is required to determine whether there are any additional and appropriate measures that will minimise those impacts if consent or approval is granted.	The Project would result in the removal of native vegetation. The consent authority may form the opinion that the Project is likely to have serious or irreversible impacts on biodiversity values. AREA (2021) presents *Biodiversity Development Assessment Report* prepared in accordance with in accordance with the requirements of Section 7.9 of the *Biodiversity Conservation Act 2016* and the *Biodiversity Assessment Method* (DPIE, 2020a).	6.10	No change
Narromine Local Environmental Plan 2011 (Narromine LEP)				
Clause 2.3(2)	**Zone objectives and Land Use Table** The consent authority must have regard to the objectives for development in a zone when determining a development application in respect of land within the zone.	An assessment of the Project against the objectives of each zone is presented.	7.3.3	7.4.3
Clause 6.1(3)	**Earthworks** Before granting development consent for earthworks (or for development involving ancillary earthworks), the consent authority must consider the following matters: (a) the likely disruption of, or any detrimental effect on, drainage patterns and soil stability in the locality of the development, (b) the effect of the proposed development on the likely future use or redevelopment of the land, (c) the quality of the fill or the soil to be excavated, or both, (d) the effect of the proposed development on the existing and likely amenity of adjoining properties, (e) the source of any fill material and the destination of any excavated material, (f) the likelihood of disturbing relics,	The Project would result in ground disturbing activities, including earthworks. Each of the matters identified have been addressed in this document.	6.3 6.4 6.5 6.6 6.7 6.9 6.11 6.12 Appendix 18	No change

Table B.1 (Cont'd)
Pre-conditions to Granting Approval

Statutory Reference	Pre-condition	Relevance	EIS Section	Amendment Report Section
Narromine Local Environmental Plan 2011 (Narromine LEP) (Cont'd)				
Clause 6.1(3) (Cont'd)	(g) the proximity to, and potential for adverse impacts on, any waterway, drinking water catchment or environmentally sensitive area, (h) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.			
Clause 6.3(3)	**Stormwater** Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development— (a) is designed to maximise the use of water permeable surfaces on the land, having regard to the soil characteristics affecting on-site infiltration of water, and (b) includes, if practicable, on-site stormwater retention for use as an alternative supply to mains water, groundwater or river water, and (c) avoids any significant impacts of stormwater runoff on adjoining downstream properties, native bushland and receiving waters, or if that impact cannot be reasonably avoided, minimises and mitigates the impact.	The Project would result changed surface water flows, including the diversion, collection and re-direction of surface water both within and around the Project Disturbance Footprint.	6.6	No change
Clause 6.4(3) and (4)	**Terrestrial Biodiversity** Before determining a development application for development on land to which this clause applies, the consent authority must consider whether or not the development— (a) is likely to have any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and (b) is likely to have any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and	The Project would result in the removal of native vegetation, including within areas shown as sensitive land on the Narromine LEP Terrestrial Biodiversity Map.	6.10	No change

Table B.1 (Cont'd)
Pre-conditions to Granting Approval

Statutory Reference	Pre-condition	Relevance	EIS Section	Amendment Report Section
Narromine Local Environmental Plan 2011 (Narromine LEP) (Cont'd)				
Clause 6.4(3) and (4) (Cont'd)	(c) has any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and (d) is likely to have any adverse impact on the habitat elements providing connectivity on the land.			
	Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that— (a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or (b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or (c) if that impact cannot be minimised—the development will be managed to mitigate that impact.	The design of the Project has been significantly designed around the avoidance or minimisation of environmental impacts, particularly for impacts to biodiversity.	2.5 and 6.10	No change
Clause 6.5(3)	**Riparian land and watercourses** Before determining a development application to carry out development on land to which this clause applies, the consent authority must consider whether or not the development— (a) is likely to have any adverse impact on the following— (i) the water quality and flows within the watercourse, (ii) aquatic and riparian species, habitats and ecosystems of the watercourse, (iii) the stability of the bed and banks of the watercourse, (iv) the free passage of fish and other aquatic organisms within or along the watercourse, (v) any future rehabilitation of the watercourse and its riparian areas, and (b) is likely to increase water extraction from the watercourse.	The Project would result changed surface water flows, including the diversion, collection and re-direction of surface water both within and around the Project Disturbance Footprint.	6.6	No change

Table B.1 (Cont'd)
Pre-conditions to Granting Approval

Statutory Reference	Pre-condition	Relevance	EIS Section	Amendment Report Section
Narromine Local Environmental Plan 2011 (Narromine LEP) (Cont'd)				
Clause 6.8(3)	**Essential services** Development consent must not be granted to development unless the consent authority is satisfied that any of the following services that are essential for the proposed development are available or that adequate arrangements have been made to make them available when required— (a) the supply of water, (b) the supply of electricity, (c) the disposal and management of sewage, (d) stormwater drainage or on-site conservation, (e) suitable road access.	The Project would result in the relocation of electrical supply infrastructure, installation of waste water treatment facility and realignment of public roads.	3.3.2, 3.4 and 3.11.5	No change
State Environmental Planning Policy (Resources and Energy) 2021				
Clause 2.16.	Consent authority must be satisfied that consideration is given to development standards on particular matters related to mining that, if complied with, prevents the consent authority from requiring more onerous standards for those matters.	Each of the non-discretionary standards are addressed by the specialist assessments.	6.4, 6.5 and 6.7	No change
Clause 2.17	Consent authority must be satisfied that • proper consideration is given to the existing and approved land uses in the vicinity of the development, whether or not the development is likely to have a significant impact on the uses and any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses • the respective public benefits of the development and the land uses are evaluated measures proposed by the applicant to avoid or minimise any incompatibility	The Project Site is surrounded by agricultural land and is bisected by the Newell Highway. Existing landuses are described and considered in the EIS.	2.2.2 and 6 (generally)	No change

Table B.1 (Cont'd)
Pre-conditions to Granting Approval

Statutory Reference	Pre-condition	Relevance	EIS Section	Amendment Report Section
State Environmental Planning Policy (Resources and Energy) 2021 (Cont'd)				
Clause 2.18	Consent authority must be satisfied that proper consideration is given to any applicable provisions of the voluntary land acquisition and mitigation policy	The Voluntary Land Acquisition and Mitigation Policy has been addressed in relation to noise and air quality.	6.4 and 6.5	No change
Clause 2.19	Consent authority must be satisfied that proper consideration is given to; • the existing uses and approved uses of land in the vicinity of the development, and • whether or not the development is likely to have a significant impact on current or future extraction or recovery of minerals, petroleum or extractive materials (including by limiting access to, or impeding assessment of, those resources), and • any ways in which the development may be incompatible with any of those existing or approved uses or that current or future extraction or recovery and, evaluation of the respective public benefits of the development and the uses, extraction and recovery	The Project would not be incompatible with surrounding land uses and would result in substantial additional public benefit when compared with the existing and potential future public benefit that may be obtained from the existing uses.	2.2.2, 6 (generally), 7.5	No change
Clause 2.20	Consent authority must consider whether or not impacts on significant water resources and threatened species and biodiversity are avoided or minimised and that greenhouse gas emissions are minimised to the greatest extent practicable	Specialist assessments have been prepared for groundwater, biodiversity and air quality and the relevant impacts have been minimised to the greatest extent practicable.	6.5, 6.7 and 6.10	No change
Clause 2.21	Consent authority must consider whether the Project will be carried out in such a way as to optimise the efficiency of recovery of minerals and to minimise the creation of waste in association with the extraction, recovery or processing of minerals.	The Project has been designed to extract the known resource in the most efficient manner practicable, with waste rock to be placed back in-pit and sections of the final voids to be backfilled.	1.4.2 and 3.5	No change

Table B.1 (Cont'd)
Pre-conditions to Granting Approval

Statutory Reference	Pre-condition	Relevance	EIS Section	Amendment Report Section
State Environmental Planning Policy (Resources and Energy) 2021 (Cont'd)				
Clause 2.22(1)	Consent authority consider whether the Proposal is subject to any conditions that; require all or some of the transport of materials to not be by public road, limit or preclude truck movements and/or require the preparation of a code of conduct for the transport of materials on public roads.	The Project would involve limited transportation on public roads and transportation of waste rock on an internal Haul Road.	3.10 and 6.2	No change
Clause 2.23	Consent authority must consider whether or not the consent should be issued subject to conditions aimed at ensuring the rehabilitation of land that will be affected by the development.	The Applicant would backfill the Caloma 1 and 2 Open Cuts and the SAR Open Cut South and Central Pits and rehabilitate all areas of proposed disturbance. A Rehabilitation Management Plan would be prepared prior to commencement of site establishment activities.	2.14	No change
State Environmental Planning Policy (Resilience and Hazards) 2021				
Clause 3.12	In determining an application to carry out development to which this Part applies, the consent authority must consider: (a) current circulars or guidelines relating to hazardous or offensive development, and (b) whether any public authority should be consulted concerning any environmental and land use safety requirements, and (c) in the case of development for the purpose of a potentially hazardous industry—a preliminary hazard analysis prepared by or on behalf of the applicant, and (d) any feasible alternatives to the carrying out of the development, and (e) any likely future use of the land surrounding the development.	A preliminary Hazard Analysis has been undertaken for the Project.	6.13 and Appendix 17	No change

Table B.1 (Cont'd)
Pre-conditions to Granting Approval

Statutory Reference	Pre-condition	Relevance	EIS Section	Amendment Report Section
State Environmental Planning Policy (Transport and Infrastructure) 2021				
Clause 2.15(1)	**Consultation with Public Authorities other than Councils** A public authority, or a person acting on behalf of a public authority, must not carry out *specified development* that this Policy provides may be carried out without consent unless the authority or person has- (a) given written notice of the intention to carry out the development (together with a scope of works) to the *specified authority* in relation to the development, and (b) taken into consideration any response to the notice that is received from that authority within 21 days after the notice is given.	The Director of the Observatory was provided with a copy of the Light and Sky Glow Assessment on 21 September 2021 and feedback was received on 21 September 2021. No objections were made.	6.3 and Annexure C of Part 2 of SCSC	No change
Clause 2.15(2)	For the purposes of subclause (1), the following development is *specified development* and the following authorities are *specified authorities* in relation to that development- (g) development that may increase the amount of artificial light in the night sky and that is on land within the dark sky region as identified on the dark sky region map—the Director of the Observatory,	The results of the Light and Sky Glow assessment were provided to the Director of the Siding Spring Observatory for consultation who did not raise any objection or comment regarding the potential impact of the Project on the operation of Siding Spring Observatory.	6.3.5.4	No change
Clause 2.45(2)	**Electricity Transmission or Distribution Networks** Before determining a development application for development to which this clause applies, the consent authority must— (a) give written notice to the electricity supply authority for the area in which the development is to be carried out, inviting comments about potential safety risks, and (b) take into consideration any response to the notice that is received within 21 days after the notice is given.	This is a matter for the Consent Authority.	NA	No change

Table B.1 (Cont'd)
Pre-conditions to Granting Approval

Statutory Reference	Pre-condition	Relevance	EIS Section	Amendment Report Section
State Environmental Planning Policy (Transport and Infrastructure) 2021 (Cont'd)				
Clause 2.118(2)	**Roads and Traffic** The consent authority must not grant consent to development on land that has a frontage to a classified road unless it is satisfied that— (a) where practicable and safe, vehicular access to the land is provided by a road other than the classified road, and (b) the safety, efficiency and ongoing operation of the classified road will not be adversely affected by the development as a result of— (i) the design of the vehicular access to the land, or (ii) the emission of smoke or dust from the development, or (iii) the nature, volume or frequency of vehicles using the classified road to gain access to the land, and	The Project Site would not be accessed via the Newell Highway. Rather access would continue to be via Tomingley West Road and the realigned Kyalite Road. The realigned Newell Highway has been designed and would be constructed in consultation with Transport for NSW.	3.4, 6.2, 6.3 and 6.5	No change
Clause 2.121(3)	Before determining a development application for development to which this clause applies, the consent authority must— (a) give written notice of the application to TfNSW , and (b) take into consideration any submission that TfNSW provides	This is a matter for the consent authority.	NA	No change

Table B.2
Mandatory Considerations

Statutory Reference	Mandatory Consideration	EIS Section	Amendment Report Section
Considerations under the EP&A Act			
Section 1.3	Relevant objects of the Act: • to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources, • to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment, • to promote the orderly and economic use and development of land, • to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats, • to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage), • to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State, • to provide increased opportunity for community participation in environmental planning and assessment.	7.3.2	7.4.2
Section 4.15	• Relevant environmental planning instruments.	See above	See above
	• Proposed planning instrument	NA	NA
	• Development Control Plan	NA	NA
	• The EP&A Regulation – to the extent that it prescribes matters for the purposes of Section 4.15(1)(a)(iv) of the EP&A Act.	See below	See below
	• The likely impacts of the development, including environmental impacts on both the natural and built environment, and social and economic impacts in the locality.	6 (generally)	6.2 and 6.3
	• The suitability of the site for the development.	6 (generally)	No change
	• Any submissions made in accordance with the EP&A Act or the regulations.	NA	Submissions Report
	• The public interest.	7.9	7.10
Considerations under the EP&A Reg.			
Clause 7 of Schedule 2	An environmental impact statement must also include each of the following- (a) a summary of the environmental impact statement,	Executive Summary	NA
	(b) a statement of the objectives of the development, activity or infrastructure,	1.5	NA

Table B.2 (Cont'd)
Mandatory Considerations

Statutory Reference	Mandatory Consideration	EIS Section	Amendment Report Section
Considerations under the EP&A Reg. (Cont'd)			
Clause 7 of Schedule 2 (Cont'd)	(c) an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to its objectives, including the consequences of not carrying out the development, activity or infrastructure,	2.5	NA
	(d) an analysis of the development, activity or infrastructure, including— (i) a full description of the development, activity or infrastructure, and	3 generally	3.2 and 3.3
	(ii) a general description of the environment likely to be affected by the development, activity or infrastructure, together with a detailed description of those aspects of the environment that are likely to be significantly affected, and	6 generally	6.2 and 6.3
	(iii) the likely impact on the environment of the development, activity or infrastructure, and	6 generally	6.2 and 6.3
	(iv) a full description of the measures proposed to mitigate any adverse effects of the development, activity or infrastructure on the environment, and	6 generally	6.2 and 6.3
	(v) a list of any approvals that must be obtained under any other Act or law before the development, activity or infrastructure may lawfully be carried out,	4.3.3	No change
	(e) a compilation (in a single section of the environmental impact statement) of the measures referred to in item (d)(iv),	Appendix 18	Appendix C
	(f) the reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development set out in subclause (4).	7	7
Clause 92(1)	For the purposes of Section 4.15(1)(a)(iv) of the EP&A Act, the following matters to be taken into consideration be a consent authority in determining a development application- (d) in the case of the following development, the *Dark Sky Planning Guideline*- (ii) development of a class or description included in Section 4A of the EP&A Act, State Significant Development or designated development on land less than 200km from the Siding Spring Observatory	6.3	No change
Considerations under Environmental Planning Instruments			
See **Table B.1**			

Appendix C

Updated Compilation of Measures to Mitigate Environmental Impacts

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This *updated* compilation of the proposed management and mitigation measures for the Amended Tomingley Gold Extension Project (the "Amended Project") has been prepared in accordance with the NSW Government's *State Significant Development Guidelines – Preparing an Amendment Report* (November 2021).

Tables C.1 and **C.2** present a comprehensive list of the management and mitigation measures that Tomingley Gold Operations Pty Limited (the "Applicant") would implement for the Amended Project in order to minimise the potential environmental impacts as far as practicable.

Any information presented in this Appendix supersedes that presented in Appendix 18 of the EIS. Where changes have been made they have been in identified as red underlined text.

Table C.1
Proposed Construction Phase Environmental Management and Monitoring Measures

Management Strategy	Measure	Timing
Off-site Construction of Public Roads		
Management Plans	The Applicant would prepare a *Public Road Construction Environmental Management Plan* that would address all relevant construction-related environmental management measures to be implemented during construction of the realigned Newell Highway and Kyalite Road and associated intersections. That Plan would be prepared in accordance with Transport for NSW *QA Specification G36 – Environmental Protection* and any conditional requirements of any development consent that may be issued for the Project.	Prior to commencement of road construction operations
On-site Construction of Site Infrastructure		
Management Plans	The Applicant would prepare a Mine Site Construction Environmental Management Plan that would address all relevant construction-related environmental management measures to be implemented during construction of on-site infrastructure in accordance with the conditional requirements of any development consent that may be issued for the Project.	Prior to commencement of site establishment operations

Table C.2
Proposed Operational Environmental Management and Monitoring Measures

Management Strategy	Measure	Timing
Traffic and Transportation		
Infrastructure and Design	Design the realigned Newell Highway and Kyalite Road and associated intersections, including the temporary intersections in consultation with the road authorities (Transport for NSW and Narromine Shire Council) and ensure that the designs are consistent with the *Austroads Guide to Road Design*.	Prior to site establishment
Operational Measures	Obtain all necessary approvals from TfNSW and Council for all proposed road upgrade works prior to commencing these works.	Prior to site establishment
	Commission the infrastructure upgrade and road improvement works identified in Section 3.4 in accordance with the requirements of the *Roads Act 1993* prior to the commencement of mining operations within the SAR Mine Site.	Following the completion of road construction
	Decommission redundant sections of the Newell Highway, McNivens Lane and Kyalite Road and redundant property access points in accordance with the requirements of the *Roads Act 1993*.	Following the completion of road construction
	Decommission the Kyalite Road overpass and Newell Highway underpass prior to Mining Lease relinquishment in consultation with Narromine Shire Council and TfNSW.	End of Project life or as required
Management Plans	Prepare and implement a *Construction Traffic Management Plan* for the road construction phase of the Project.	Prior to site establishment
	Prepare and implement an *Operational Traffic Management Plan* (OTMP) for the operational phase of the Project.	Prior to Project operations
Visibility		
Infrastructure and Design	Construct the SAR Amenity Bund.	During site establishment
	Progressively construct and rehabilitate the outer face of the SAR Waste Rock Emplacement in a series of lifts.	Throughout Project operations
	Maintain existing and establish additional vegetation screens.	During site establishment and ongoing
	Construct built infrastructure using non-reflective, neutral coloured materials or outer coatings.	During site establishment
	Ensure to the extent practicable that lights with diffusing covers or with visible bare lamps that emit light above the horizontal plane are not be used on the outside of buildings or structures.	Ongoing

Table C.2 (Cont'd)
Proposed Operational Environmental Management and Monitoring Measures

Management Strategy	Measure	Timing
Visibility (Cont'd)		
Operational Measures	Limit to the extent practicable, operation of mobile plant on the outer faces of the SAR Amenity Bund and SAR Waste Rock Emplacement to daylight hours.	Throughout Project operations
	Manage dust emissions and blasting to limit the potential for dust clouds or blast fume to be visible from outside active sections of the Project Site.	Throughout Project operations
	Ensure, to the extent practicable, that the light from all mobile lighting towers is directed away from surrounding residences and public roads.	Throughout Project operations
	Construct the SAR WRE access ramp in consideration of the direction and intensity of lighting from Project-related vehicles on users of the Newell Highway.	Throughout Project operations
	Turn off external lighting in non-operational or non-active sections of the Project Site.	Throughout Project operations
	Consider any reasonable request by a potentially affected resident for assistance to create a visual screen between a residence and the SAR Mine Site.	Throughout Project operations
Noise and Blasting		
Infrastructure and Design	**Noise**	
	Construct the SAR Amenity Bund	During site establishment
	Progressively construct and rehabilitate the outer face of the SAR Waste Rock Emplacement in a series of lifts.	Throughout Project operations
	Construct a bund adjacent to the proposed Haul Road or operate the Haul Road at least 6m below the natural ground surface between the southern boundary the Caloma Waste Rock Emplacement and the Newell Highway underpass.	If required once Caloma Waste Rock Emplacement has reached surface
	Consult with the owners of Residences R6, R26, R40 and R43 in relation to the predicted operational noise levels and, if requested to do so, enter into a suitable agreement to undertake mitigation works in a manner similar to the existing mitigation at residences within Tomingley village.	Prior to site establishment and ongoing
	Blasting	
	Construct all blasting-sensitive infrastructure, including public roads, powerlines and Project-related buildings outside of the identified Blast Management Zone.	During site establishment
	Construct or utilise existing fences and install warning signs surrounding the active mining areas to prevent inadvertent or unauthorised access to the Blast Management Zone.	Prior to Project operations

Table C.2 (Cont'd)
Proposed Operational Environmental Management and Monitoring Measures

Management Strategy	Measure	Timing
Noise and Blasting (Cont'd)		
Operational measures	**Noise**	
	Install broadband reversing alarms on all mobile earthmoving equipment.	Throughout site establishment and Project operations
	Undertake land preparation operations, including vegetation clearing and soil stripping, during the daytime only.	During site establishment
	Preferentially operate noisy equipment during the evening and night as close as possible to the acoustic bunds and SAR Haul Road and in the deepest sections of the open cuts.	Throughout Project operations
	Ensure that noisy equipment is operated in exposed locations during the daytime and preferentially when the wind is blowing from the closest receptors towards the operational area.	Throughout Project operations
	Blasting	
	Ensure that all surface blasts are designed and supervised by a suitably qualified and experienced blasting engineer or shotfirer to comply with the relevant blasting criteria at surrounding residences and infrastructure.	Throughout Project operations
	Establish and maintain the Blast Management Zone and ensure that only authorised personnel are permitted within that zone during blasting operations.	During blasting operations
	Store all explosives within a licenced Magazine in accordance with the relevant guidelines, regulatory requirements and licence conditions.	Throughout Project operations
	Implement best blast practice methodology to minimise fly-rock and fumes.	Throughout Project operations
Monitoring	**Noise**	
	Install two additional real time noise monitoring terminals Throughout Project operations.	Prior to site establishment
	Continue to undertake attended noise monitoring at selected locations surrounding the Project Site.	Throughout site establishment and Project operations
	Blasting	
	Monitor meteorological conditions prior to blast events and, where required, postpone blasting until more favourable meteorological conditions occur.	Prior to blasting operations
	Install permanent blast monitors at selected residences and monitor all blasts.	Prior to and during blasting operations
	Install temporary blast monitors at selected residences or locations where a substantiated complaint has been made or as otherwise required.	As required

Table C.2 (Cont'd)
Proposed Operational Environmental Management and Monitoring Measures

Management Strategy	Measure	Timing
Noise and Blasting (Cont'd)		
Community Consultation	Initiate regular discussions with potentially affected residents to identify if any concerns exist.	Throughout site establishment and Project operations
	Promptly respond to any issue of concern.	Throughout site establishment and Project operations
	Refine on-site noise mitigation measures and operating procedures, where practicable, in response to noise exceedances or substantiated community complaint	As required
Management Plans	Prepare and implement an updated *Noise Management Plan* and *Blasting Management Plan*	Prior to site establishment
Air Quality and Greenhouse Gas		
Infrastructure and Design	Sheet roads, particularly the Haul Road and Services Road, with low silt, durable materials to limit generation of silt-sized particles.	Throughout site establishment and Project operations
	Operate largest class of vehicle practicable to transport waste rock from the SAR Open Cut to the Caloma Waste Rock Emplacement.	Throughout Project operations
	Schedule transportation of waste rock from the SAR Open Cut to the Caloma Waste Rock Emplacement over the initial two to three years of mining.	Throughout Project operations
	Seal the initial 50m of Back Tomingley West Road and McNivens Lane from the edge of the Newell Highway and the SAR Access Road from the edge of Kyalite Road to limit tracking of mud and sediment onto the public road network.	During site establishment
	Continue to assess the feasibility of installing a solar power generation facility adjacent to the TGO Mine Site.	Ongoing
Operational Measures	Disturb only the minimum area necessary for mining operations.	Throughout site establishment and Project operations
	Undertake progressive rehabilitation of areas no longer required for mining operations as soon as practicable.	Throughout site establishment and Project operations
	Avoid material movement operations on elevated sections of the Project Site during periods of high wind.	Throughout Project operations
	Clearly mark all haul roads and other roads and tracks and ensure that signposted speed limits are complied with.	Throughout site establishment and Project operations
	Avoid blasting operations or other activities likely to generate significant dust emissions during periods of strong southerly wind, where practicable.	During blasting operations
	Ensure adequate stemming is used.	During blasting operations
	Minimise dust emissions from the existing crushing and screening operations to the extent practicable.	Throughout Project operations
	Use of water sprays/sprinklers or water carts on internal, unsealed roads and in other areas to minimise dust emissions, as required.	Throughout Project operations

Table C.2 (Cont'd)
Proposed Operational Environmental Management and Monitoring Measures

Management Strategy	Measure	Timing
Air Quality and Greenhouse Gas (Cont'd)		
Operational Measures (Cont'd)	Minimise drop heights during loading and unloading of waste rock and ore and avoid tipping material down a tip face.	Throughout Project operations
	Apply water to stockpiles prior to loading, transportation and unloading to limit dust emissions, as required.	Throughout site establishment and Project operations
	Review and implement energy efficiency measures where reasonable and practicable.	Throughout Project operations
	Maintain plant and equipment to maximise efficiency and reduce emissions.	Throughout Project operations
	Source locally produced goods and services to reduce transport fuel emissions.	Throughout Project operations
Monitoring and Management Plans	Monitor meteorological conditions (including via automated alerts) to identify periods of adverse weather and implement appropriate additional mitigation measures.	Throughout site establishment and Project operations
	Undertake visual monitoring and mandatory reporting of visible dust emissions to site supervisors and implement measures to minimise or reduce observed dust emissions.	Throughout site establishment and Project operations
	Monitor real-time dust emissions (including via automated alerts) using the existing TEOM and proposed PM_{10} dust monitors and implement measures to minimise or reduce observed dust emissions when predefined triggers are exceeded.	Throughout site establishment and Project operations
	Prepare and implement an updated *Air Quality and Greenhouse Gas Management Plan*.	Prior to site establishment
Surface Water		
Infrastructure and Design	Construct the proposed SAR Open Cut and SAR Administration Area Clean Water Diversions with a minimum freeboard of 0.5m above the anticipated 0.1% AEP flood level.	During site establishment
	Construct dirty water diversion structures, sediment basins and the SAR Water Storage Dam.	During site establishment
	Establish pump and pipe infrastructure between the proposed sediment basins and the SAR Water Storage Dam.	During site establishment
	Establish pump and pipe infrastructure between the SAR Water Storage Dam and the TGO Mine Site.	During site establishment
	Construct culverts under all public roads and the proposed Haul Road and Services Road.	During site establishment

Table C.2 (Cont'd)
Proposed Operational Environmental Management and Monitoring Measures

Management Strategy	Measure	Timing
Surface Water (Cont'd)		
Operational Measures	Install all erosion and sediment control structures prior to undertaking substantial surface disturbing activities.	During site establishment
	Ensure that dirty, mine or process water is separated and retained within the Project Site for use for mining-related purposes.	Throughout Project operations
	Ensure that all clean water from upslope of the Project Site is conveyed around disturbed sections of the Project Site at non-erosive velocities and is discharged to the downstream environment.	Throughout Project operations
	Inspect and maintain all surface water management infrastructure to ensure it continues to operate as designed and maintain surface water storages to ensure adequate capacity is maintained to capture and store surface water within the Project Site.	Regularly and as required after significant rainfall events
	Rehabilitate all disturbed areas as soon as practicable once no longer required for mining-related purposes.	Throughout site establishment and Project operations
	Store hydrocarbons, reagents and chemicals in accordance with the relevant Australian Standard or manufactured instructions.	Throughout site establishment and Project operations
	Undertake refuelling and maintenance activities in designated sections of the Project Site with spill capture and management infrastructure and protocols.	Throughout site establishment and Project operations
	Securely store and regularly remove all waste oil and contaminated waste from the Project Site.	Throughout site establishment and Project operations
	Ensure that the proposed pastefill plant is bunded to prevent discharge of low pH water.	Throughout Project operations
	Ensure that water use within the Project Site is managed in accordance with the water balance presented in Section 3.9.4 or subsequent versions included within the Water Management Plan.	Throughout Project operations
Monitoring and Management Plans	Monitor surface water flows and quality at a range of locations upslope, within and downslope of the Project Site.	Prior to and throughout site establishment and Project operations
	Prepare and implement an updated *Surface Water Management Plan.*	Prior to site establishment
Groundwater		
Infrastructure and Design	Backfill the Caloma 1 and 2 Open Cuts and SAR Open Cut South and Central Pits.	Throughout Project operations
	Construct the Residue Storage Facilities and all water storages that would store process or mine water in a manner that would minimise the potential for seepage of contaminated water into the groundwater system.	During site establishment

Table C.2 (Cont'd)
Proposed Operational Environmental Management and Monitoring Measures

Management Strategy	Measure	Timing
Groundwater (Cont'd)		
Operational Measures	Construct paired monitoring bores in the vicinity of Gundong and Bulldog Creeks to demonstrate separation of the shallow alluvial aquifer and the deeper fractured rock aquifer.	Prior to site establishment
	Obtain water access licenses for a minimum annual extraction rate of 427ML from the Lachlan Fold Belt Murray Darling Basin (MDB) Groundwater Source of the Water Sharing Plan for the *NSW MDB Fractured Rock Groundwater Sources 2020*.	Prior to Project operations
	Undertake remodelling of the anticipated groundwater inflows to the TGO and SAR workings, taking into consideration groundwater monitoring results collected in the intervening period.	Prior to 31 December 2024
	Ensure that additional water access licences are obtained in light of the results of the proposed groundwater remodelling.	Post groundwater remodelling and no later than 31 December 2025
	Ensure that where groundwater is not permitted to flow to natural land surface or surface drainages.	Throughout Project operations
Monitoring and Management Plans	Prepare and implement a revised *Groundwater Management Plan*.	Prior to site establishment
Land and Soil Capability		
Operational Measures	**Soil Stripping**	
	Delineate the areas to be stripped using suitable ground markers.	Throughout soil stripping operations
	Strip soil materials in accordance with the identified stripping depths and ensure soils of different classes are not mixed.	Throughout soil stripping operations
	Locate machinery circuits to minimise compaction of both undisturbed and stockpiled soil.	Throughout soil stripping operations
	Apply water where required to soils prior to and during stripping to maintain a 'slightly moist' condition.	Throughout soil stripping operations
	Minimise the handling and rehandling of salvaged soil as far as practicable.	Prior to and throughout site establishment and Project operations
	Soil Stockpiling	
	Directly place stripped soil onto areas undergoing rehabilitation where practicable.	Throughout soil stripping operations
	Stockpile soils of different classes separately.	Throughout soil stockpiling operations

Table C.2 (Cont'd)
Proposed Operational Environmental Management and Monitoring Measures

Management Strategy	Measure	Timing
Land and Soil Capability (Cont'd)		
Operational Measures (Cont'd)	Construct soil stockpiles with a maximum side slope of 1:3 (V:H).	Throughout soil stockpiling operations
	Construct soil stockpiles with a maximum height of 4m.	Throughout soil stockpiling operations
	Retain a 'rough' surface profile for soil stockpiles to promote water infiltration rather than runoff.	Throughout soil stockpiling operations
	Seed soil stockpiles with appropriate groundcover species, where practicable.	Throughout soil stockpiling operations
	Maintain all erosion and sediment control infrastructure in the vicinity of soil stockpiles throughout the life of the Project.	Throughout Project operations
	Monitor the condition of soil stockpiles throughout the life of the Project, including the presence of avoidable soil erosion or degradation.	Annually during Project operations
	Minimise rehandling of soil as far as practicable, unless it is required to address loss of soil stockpile integrity.	Throughout Project operations
	Soil Respreading	
	Place subsoil and topsoil in the locations and to the depths identified.	Throughout rehabilitation operations
	Test stockpiled soils prior to use to determine soil properties and identify required ameliorants including fertilizer treatments.	Prior to rehabilitation operations
	Monitor for adverse meteorological conditions prior to and during soil handing operations and do not commence or continue works until favourable conditions are present.	Throughout rehabilitation operations
	Reshape and rip, where practicable, all land surfaces prior to the placement of soil.	Prior to rehabilitation operations
	Apply any required ameliorants during soil spreading operations.	Prior to and during rehabilitation operations
	Plan and manage vehicle movements to reduce the compaction of soils as far as practicable.	Throughout rehabilitation operations
	Ensure soils and surfaces have adequate moisture content during respreading operations to minimise loss of soil and other dust related impacts.	Prior to and during rehabilitation operations
	Lightly scarify upper surface of topsoils to encourage rainfall infiltration.	During rehabilitation operations
	Stabilise final landform with appropriate pasture or other species as soon as practicable after respreading operations.	Following soil placement

Table C.2 (Cont'd)
Proposed Operational Environmental Management and Monitoring Measures

Management Strategy	Measure	Timing
Agriculture		
Monitoring and Management Plans	**Weed, Pest and Disease Management**	
	Manage weeds, pests and diseases in accordance with the *Mining Operations Plan* and *Biodiversity Management Plan.*	Throughout Project operations
	Agricultural Productivity	
	Include as part of a *Rehabilitation Management Plan* detailed rehabilitation completion criteria for agricultural productivity of rehabilitated lands.	Throughout Project operations
Biodiversity		
Infrastructure and Design	Consider potential resource sterilisation as part of any potential Stewardship Sites in accordance with the Biodiversity Offset Scheme.	Prior to site establishment or as required
Operational Measures	Ensure all workers are inducted in relation to Project environmental procedures, including environmental risk and emergency management.	Throughout site establishment and Project operations
	Survey and mark out the limits of approved native vegetation clearing and areas of native biodiversity to be retained and ensure that surface disturbing activities are limited to approved areas.	Throughout site establishment
	Construct temporary fencing around significant areas of native biodiversity during construction operations.	Throughout site establishment
	Avoid clearing native vegetation and hollow-bearing trees during the breeding season of hollow-dwelling fauna	Throughout site establishment
	Undertake pre-clearing inspections of hollow-bearing trees to confirm the absence of roosting/breeding threatened species and manage any vertebrate fauna identified during inspections to minimise the risk of mortality or injury.	Throughout site establishment
	Salvage, where practicable, suitable habitat features (e.g. tree hollows, large woody material, etc.) located within areas to be disturbed.	Throughout site establishment
	Relocate all salvaged habitat features as soon as reasonably practicable to surrounding areas of increased biodiversity value that would not be impacted by the Project.	Throughout site establishment
	Undertake vegetation clearance and any mulching in accordance with best practice principles, including staged vegetation clearance where practicable.	Throughout site establishment
	Respond to native fauna detected during vegetation clearing operations in accordance with the Fauna Handling and Rescue Procedure outlined in the *TGO Biodiversity Management Plan.*	Throughout site establishment
	Ensure machinery entering the Project Site has been adequately cleaned and inspected for foreign plant material including seeds prior to operating on site.	Throughout site establishment
	Control weed species within the Project Site	Throughout site establishment and Project operations
	Install warning signs at known wildlife crossing locations and adhere to speed limits to reduce the risk of vehicle strike to native fauna.	Throughout site establishment and Project operations

Table C.2 (Cont'd)
Proposed Operational Environmental Management and Monitoring Measures

Management Strategy	Measure	Timing
Biodiversity (Cont'd)		
Operational Measures (Cont'd)	Continue to source seed or other propagation material from local populations as far as practicable to maintain genetic integrity of the local plant populations.	Throughout site establishment and Project operations
	Engage and inform the local community on the importance of Fuzzy Box Woodland TEC as part of ongoing stakeholder engagement sessions, newsletters and/or other community engagement activities.	Throughout site establishment and Project operations
Monitoring and Management Plans	Prepare and implement a Biodiversity Management Plan	Prior to site establishment
Aboriginal Heritage		
Operational Measures	Ensure that areas outside the proposed Limit of Disturbance are not subject to Project-related disturbance.	Throughout site establishment and Project operations
	Ensure that all identified Aboriginal objects and sites are recorded in the Mine's spatial database.	Throughout site establishment and Project operations
Management Plans and Protocols	Prepare and implement an *Aboriginal Cultural Heritage Management Plan*	Prior to site establishment
	Implement the following management strategies identified for each site as listed in Table 6.11.8. Group 1 – Sites to be mapped, described and collected • Flag all visible surface artefacts at a site in the field. • Photograph the site after flagging and before recording. • Record key artefact information for all artefacts. • Photograph a selection of indicative and / or unusual artefacts from each site. • Collect the artefacts once all recording is complete according to site with artefacts from each site being kept separate. • Incorporate data recorded in a report. • Submit an Aboriginal Site Impact Recording Form (ASIRF) detailing the salvage process and results of the sites. Group 2 – Scarred trees to be relocated • Photograph the scarred section of the tree prior to removal. • Follow the advice of a suitably qualified arborist during the removal of the scarred section of each tree. • Place the scarred portion of the trees in a place of safe-keeping, and with the agreement of the RAPs, potentially place the salvaged portions on display to allow continued interpretation.	Prior to site establishment

Table C.2 (Cont'd)
Proposed Operational Environmental Management and Monitoring Measures

Management Strategy	Measure	Timing
Aboriginal Heritage (Cont'd)		
Management Plans and Protocols (Cont'd)	Group 3 – Sites to be fenced to prevent inadvertent disturbance. • Erect a high-visibility fence around each site or group of sites, including a 5m buffer. • Maintain fencing for the duration of site construction operations at a minimum. • Ensure fenced areas are managed as no-go areas.	
	Implement an unanticipated finds protocol in the event that a previously unknown Aboriginal site is identified within the proposed areas of disturbance.	Throughout site establishment and Project operations
Historic Heritage		
Operational Measures	Ensure that areas outside the proposed Limit of Disturbance are not subject to Project-related disturbance.	Throughout site establishment and Project operations
	Ensure that all identified historic heritage sites are recorded in the Mine's spatial database.	Throughout site establishment and Project operations
	Undertake a test excavation program under the supervision of a qualified Archaeologist within selected sections of the footprint of the realigned Newell Highway in the vicinity of the former McPhail village.	Prior to site establishment
	Undertake photographic archival recording of the "Rosewood" Homestead prior to disturbance.	Prior to site establishment
Management Plans and Protocols	Prepare and implement a *Historic Heritage Management Plan*.	Prior to site establishment
	Implement an Unanticipated Finds Protocol in the event that a historic artefact is identified	Throughout site establishment and Project operations
Hazards and Risks		
Infrastructure and Design	**Explosives**	
	Ensure that the SAR Magazine complies with all relevant engineering and safety standards.	Throughout Project operations
	Ensure that the SAR Magazines has a perimeter security fence and gate with access restricted to authorised personnel.	Throughout Project operations
	Bushfire	
	Establish and maintain an Asset Protection Zone of at least 50m around the buildings of the SAR Administration Area.	Throughout Project operations
Operational Measures	**Explosives**	
	Ensure that all authorised employees managing explosives would have a Security Clearance.	Throughout Project operations
	Bushfire	
	Maintain all roads and tracks within the Project Site to ensure safe access and egress in the event evacuation is required.	Throughout Project operations
	Ensure training is provided to site personnel in relation to specific firefighting tasks and procedures.	Throughout Project operations

Table C.2 (Cont'd)
Proposed Operational Environmental Management and Monitoring Measures

Management Strategy	Measure	Timing
Hazards and Risks (Cont'd)		
Operational Measures (Cont'd)	Store all hydrocarbons, waste oils and explosives in accordance with relevant guidelines.	Throughout Project operations
	Facilitate access to the Project Site for Rural Fire Service equipment and personnel, including access to standpipes and water filling points, in the event of a fire emergency.	Throughout Project operations
	Fully comply with the requirements of Rural Fire Service and other emergency services in the event of a fire emergency.	Throughout Project operations
	Consult regularly with the Rural Fire Service.	Throughout Project operations
	Monitor and reduce fuel loads within the Asset Protection Zone as required.	Throughout Project operations
	Undertake monitoring and reduction of fuel loads within the Project Site in accordance with existing programs.	Throughout Project operations
Monitoring and Management Plans	**Bushfire**	
	Develop site-specific Emergency and Evacuation Management Procedures.	Prior to site establishment
Economic Impacts		
Operational Measures	Extend the existing Planning Agreement with Narromine Shire Council for the life of the Project.	Prior to determination of the application for development consent
	Continue to implement the current local employment and procurement process that: • give preference when engaging new employees to candidates who live within the Narromine, Parkes and Dubbo LGAs; • give preference to suppliers of equipment, services or consumables located within the Narromine, Parkes and Dubbo LGAs; • encourage and support participation of potential locally-based employees and contractors in appropriate training or education programs to build capacity within the surrounding areas; and • encourage and support participation of Aboriginal people and organisations in Project-related employment and supply services.	Throughout site establishment and Project operations
Social		
Infrastructure and Design	Construct the SAR Amenity Bund and outer face of the SAR Waste Rock Emplacement to obscure views of active sections of the Project Site.	Throughout site establishment and Project operations
	Construct the realigned Kyalite Road as close as possible to the existing alignment, including an overpass over the Haul Road and Services Road.	During site establishment
	Construct the SAR Waste Rock Emplacement using geomorphic design principles.	Throughout Project operations

Table C.2 (Cont'd)
Proposed Operational Environmental Management and Monitoring Measures

Management Strategy	Measure	Timing
Social (Cont'd)		
Infrastructure and Design (Cont'd)	Construct the Back Tomingley West Road, Kyalite Road and McNivens Lane intersections with the realigned Newell Highway with channelised turning lanes.	During site establishment
Operational measures	Continue to preferentially engage local employees and/or suppliers, where available.	Throughout site establishment and Project operations
	Continue to provide support to local and Regional community groups, organisations and individuals to undertake community-based activities that support and benefit the Local and Regional communities.	Throughout site establishment and Project operations
Consultation, Agreements and Management Plans	Develop and implement a *Community Engagement Plan* for the Project	Prior to site establishment
	Negotiate commercial agreements with key affected landholders for the leasing of key dwellings for the life of the Project.	Prior to site establishment or as required
	Continue ongoing open and transparent consultation via regular Community Consultative Committee meetings, consultation with individual landholders and community information sessions.	Throughout site establishment and Project operations
	Establish and build upon existing frameworks to monitor and report on social impacts.	Throughout site establishment and Project operations
	Liaise with surrounding local Councils in regard to housing pressures and availability.	As required
	Extend the existing Planning Agreement with Narromine Shire Council for the life of the Project.	Prior to determination of the application for development consent
	Support the preparation of a long-term development plan for Tomingley village, to ensure that the village continues to thrive following the completion of mining operations.	As required

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