

YOUNGS QUARRY (PM 214)

Mine Operations Plan

Prepared for: C.L. Land Management Pty Ltd

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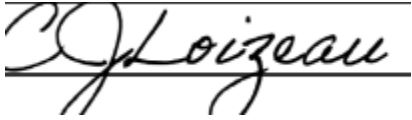
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ATTACHMENTS

Attachment 1	Wind Rose Data Georgetown Station (Site No. 021020)
Attachment 2	Petrographic Report 2020
Attachment 3	Youngs Quarry Desktop Historical Highwall Geotechnical Review
Attachment 4	Groundwater Desktop Study – Youngs Quarry – Private Mine 214
Attachment 5	<i>EPBC Act 1999</i> Protected Matters Report
Attachment 6	Visual Assessment Plates
Attachment 7	Confidential – DPC AAR Search Results
Attachment 8	EPA Licence 50661
Attachment 9	Youngs Quarry Community Engagement Plan and Summary Report
Attachment 10	Legislation and Standards
Attachment 11	Blast Management Plan

Declaration of Accuracy

I declare under regulation 85 of the *Mining Regulations 2020*, that I have taken reasonable steps to review the information provided for the Youngs Quarry (PM 214) MOP to ensure its accuracy.

A handwritten signature in black ink, reading 'C. Loizeau', written over a horizontal line.

Name: Corey Loizeau

Position: Managing Director

Company: C.L. Land Management Pty Ltd

Dated: 26 March 2026

1 Site Details

1.1 Background

C.L. Land Management Pty Ltd (CLM) are the Private Mine Holder and Operator of Youngs Quarry within Private Mine (PM) 214 (the Site). The Site is located on Collaby Hill Road, Warnertown approximately 15 kilometres (km) south east of Port Pirie in South Australia. **Drawing No. 2449.DRG.002 – Site Location Plan** provides an understanding of the Site location in relation to Adelaide and the surrounding area.

The Private Mine was registered in 1973, but historic records of sales dockets show the Site active from the early 1940s. CLM acquired the tenement on 20 April 2019. The PM currently operates under an Approved Development Programme approved on 16 August 1990 (reference MW 100/2 JLB), henceforth referred to as the ADP. PM 214 contains the active extraction areas, mobile crushing plant, primary crushing and screening area and limited stockpiling.

An offsite sale, stockpile area, additional crushing, weighbridge and office is located approximately three (3) km south along Collaby Hill Road (CT 6221/211 and CT 6211/117) with these activities authorised under EPA Licence 50661 and does not form part of this MOPs description of operations refer to **Drawing No. 2449.DRG.019 – Site Layout Map**.

CLM are currently operating two (2) pits within the Site, the locations of which are shown in **Drawing No. 2449.DRG.024AR1 – Quarry Development and Rehabilitation Plan – Stage 1**. The West Pit is mechanically extracted with HME and targets PM2 product, whilst the East Pit targets PM1 products and is extracted via blasting. PM 214 is 252.69 hectares (ha) in area, however this MOP demonstrates extraction areas totalling approximately 6.88 ha at completion of Stage 2. References to residential sensitive receptors and items potentially impacted by operations (environmental, infrastructure etc) are measured in proximity to the operational areas of the PM unless stated.

The Site has been operational since 1973 with historic extraction occurring into the hill faces within the West and East Pits that have created visual amenity impacts that requires future operations to resolve within practical capabilities and ensure future resources are able to continue to be extracted and minimise visual amenity impacts.

Within the drawings for the Site, elevation and survey data is provided in Geocentric Datum of Australia 1994 (GDA94) under Universal Transverse Mercator (UTM) Zone 54. The Reduced Level (RL) references throughout this document are to metres Australian Height Datum (mAHD), the vertical height or elevation above Mean Sea Level which forms the National Standard benchmark to which all height measurements are referred.

CLM engaged Groundwork Plus as part of SLR (Groundwork Plus) to assist with the development of the MOP and associated activities such as consultation and quarry development planning.

CLM submits this updated Mine Operations Plan (MOP) for the purposes of operation of the Site. The updated MOP aligns with requirements against *Minerals Regulatory Guideline MG12: Mine Operations Plans (MOPs)* and Section 72 of the *Mining Regulations 2020* and Section 73G of the *Mining Act 1971*.

1.2 Site Overview

An overview of the tenement details are summarised in **Table 1 – Tenement Detail Summary**.

Table 1 – Tenement Detail Summary

Private Mine Number	PM 214
Private Mine Holder / Operator	C.L. Land Management Pty Ltd
Registration Grant Date	22/11/1973
Commodities	Quartzite
Legal Area (ha)	252.69
Commodity Categories	Construction Materials

1.3 Site Contact

Table 2 – Site Contact Details summaries the Site contact details.

Table 2 – Site Contact Details

Contact Name / Position	Corey Loizeau - Managing Director
Phone Number	0488 127 567
Postal Address	99 Collaby Hill Road, Warnertown, SA 5540
Email Address	corey@clmquarries.com.au

2 Description of the Existing Environment

2.1 Topography and Landscape

The majority of the Site is located within the Telowie Gorge Land System with a small portion of the southern Site area within the Hughes Gap Land System. The dominant topographic feature in the region is the elevated Southern Flinders Ranges immediately to the east of the Site, running in a north to south direction. The western portion of the Site is comprised of gentle sloping outwash fans from the Southern Flinders Range. The eastern portion of the Site is characterised by moderately steep (south eastern portion) to steep (north eastern portion) hills.

The operational areas of the Site were surveyed on 30 October 2019 with the use of an Unmanned Aerial Vehicle (UAV). Topographic elevations recorded during the UAV survey and elevations of the surrounding landscape using data obtained from the South Australian Resources Information Gateway (SARIG) are shown in **Drawing No. 2449.DRG.021 – Orthophoto and Topography Plan 2023-12-01**. Operational areas range from 190 metres Australian Height Datum (mAHD) to 305 mAHD. Major creek bed elevations range from 181 mAHD to 240 mAHD, rising steadily to the east.

2.2 Climate

Site climate data has been sourced from the Georgetown Bureau of Meteorology (BoM) (Site No. 021020) located approximately 29 km north west of the Site. It is noted that this is the closest BoM site able to provide summarised Weather and Climate data.

Climate is characterised as Mediterranean with majority of rainfall between the months of May and October. Average annual rainfall is 474.70 millimetres (mm). **Table 3 – Climate Data Georgetown Station (Site No. 021020)** shows expected mean maximum temperature for the hottest month January, at 31.1 degrees Celsius and mean minimum temperature is 4.2 degrees Celsius for the coldest month of July.

Table 3 – Climate Data Georgetown Station (Site No. 021020)

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years	Plot	Map
Temperature																
Mean maximum temperature (°C)	31.1	30.7	28.1	22.9	18.2	15.0	14.2	15.5	18.7	22.4	26.2	29.2	22.7	65	1912 1976	
Mean minimum temperature (°C)	15.0	15.2	13.1	9.8	7.1	5.1	4.2	4.5	5.7	7.8	10.6	13.1	9.3	65	1912 1976	
Rainfall																
Mean rainfall (mm)	20.3	20.6	20.0	35.3	50.8	58.8	56.4	57.2	52.6	44.7	32.6	26.2	474.7	149	1874 2024	
Decile 5 (median) rainfall (mm)	12.8	10.6	13.4	29.6	42.5	56.4	52.2	56.6	47.2	35.0	25.5	20.9	464.0	140	1874 2024	
Mean number of days of rain ≥ 1 mm	2.3	2.1	2.5	4.3	6.8	8.4	9.1	9.0	7.1	5.7	4.3	3.3	64.9	139	1874 2024	
Other daily elements																
Mean daily sunshine (hours)																
Mean number of clear days	14.4	12.9	14.6	9.6	8.2	7.6	6.0	5.7	8.2	9.3	9.3	12.2	118.0	20	1957 1976	
Mean number of cloudy days	6.5	5.7	6.2	9.8	11.7	12.4	15.1	14.0	12.0	10.8	9.6	8.4	122.2	20	1957 1976	
9 am conditions																
Mean 9am temperature (°C)	23.9	23.5	20.7	16.6	11.9	9.2	8.4	9.5	12.2	16.0	19.3	21.6	18.1	21	1955 1976	
Mean 9am relative humidity (%)	40	44	50	62	74	79	82	78	70	58	49	45	61	10	1955 1970	
Mean 9am wind speed (km/h)	12.5	11.4	11.9	9.9	9.2	8.3	9.5	10.0	11.2	12.4	12.4	12.0	10.9	19	1957 1976	
9am wind speed vs direction plot																
3 pm conditions																
Mean 3pm temperature (°C)	30.0	29.6	26.8	22.4	17.1	14.6	13.5	14.2	16.8	21.0	24.7	27.1	21.5	21	1955 1976	
Mean 3pm relative humidity (%)	27	28	33	41	50	56	59	58	53	41	34	33	43	10	1955 1970	
Mean 3pm wind speed (km/h)	13.4	11.7	12.0	10.9	10.8	10.8	13.6	12.7	12.6	11.8	13.4	13.1	12.2	19	1957 1976	
3pm wind speed vs direction plot																

red = highest value blue = lowest value

Source (BoM, 2024)

Wind direction can vary dependant on the season and on time of day. **Attachment 1 – Wind Rose Data Georgetown Station (Site No. 021020)** shows that morning wind direction is predominately northerly in direction and afternoon wind direction is predominately south westerly in direction.

2.3 Topsoil and Subsoil

Searches of the Department for Environment and Water (DEW) application '*NatureMaps*' (2024) identified the majority of the Site is located with the Telowie Gorge Land System with a small portion of the southern Site area within the Hughes Gap Land System. It describes the main soil types of the area as 'Soils formed on basement rocks – non arable hills and rises with shallow stony soil and variable rock outcrop'.

Topsoil thickness varies across the Site ranging between 50-300 mm in the eastern operational portion of the Site. Topsoils are stony sandy and calcareous loams over rock with very limited subsoil as shown in the below photo, taken on 30 October 2019. However generally topsoil is noted as minimal throughout the area as shown below in **Photo 1 – Topsoil Profile** and has been conservatively estimated as 50 mm for the remaining unextracted areas of the Site for the purposes of this MOP.

There have been no soil characteristics in the topsoil or subsoil that have been identified as issue for disturbance or rehabilitation.



Photo 1 – Topsoil Profile

2.4 Geological Environment

The geological environment of the Site was determined by observations from a Site visit as well as using the geological information on the Department for Energy and Mining's (DEM) portal South Australian Resources Information Gateway (SARIG) and the associated regional geology map, refer to **Drawing No. 2449.DRG.004 – Regional Geology Map**. Field observations noted during Site visits were useful in validating the information contained within the regional geology map.

As shown in **Drawing No. 2449.DRG.004 – Regional Geology Map**, the PM is underlain by several geological units, including:

- Qa – undifferentiated Quaternary alluvial/fluviol sediments.
- Qpap – Pooraka Formation described as clay, sand and carbonate earth, silty, with gravel lenses.
- Nmsm – Marola Sandstone Member (Skillogallee Dolomite) described as sandstone, feldspathic, coarse-grained, commonly dolomite-cemented or with dolomite leached out; sandstone, fine to medium-grained; siltstone, grey.
- Nms6 – Skillogallee Dolomite described as pale dolomite, lower member.
- Nms7 – Skillogallee Dolomite (upper member) described as dark dolomite, upper member.
- Nob – Bungaree Quartzite described as sandstone, fine to coarse grained, feldspathic, quartzitic, to arkosic, ripple marks, cross bedding, lenticular, minor pale grey to greenish siltstone, minor pale grey dolomite.

Existing and future development within the operational areas target the Bungaree Quartzite (the main pit) and Skillogallee Dolomite rock types (eastern pit). Refer to **Photo 2 – East Pit South Wall Geological Profile** for an example of the typical rock profile within the Site.



Photo 2 – East Pit South Wall Geological Profile

2.5 Geohazards

Drawing No. 2449.DRG.005 – Geohazards Map indicates several seismic activities recorded within proximity to the Site ranging between 0.9 and 2.3 in magnitude (SARIG, 2024). A Neoproterozoic - Ordovician fault line traverses the Site in a north – south direction along the boundary of stratigraphic units Wilpena Group and Burra Group.

There are no known radioactive or asbestiform minerals to be quarried at the Site.

A sample taken from the Site and analysed by Geochempet Services Petrographic Testing Laboratory in 2020 identified the sample contains an estimated free silica content of 46 percent, as unstrained to moderately strained quartz as per **Attachment 2 – Petrographic Report 2020**.

Free silica represents the proportion of the rock mass that has the potential to generate Respirable Crystalline Silica (RCS). RCS refers to fine dust particles that can become airborne and includes various

particulate matter such as Total Suspended Particles (TSP), particulate matter with a diameter of 10 micrometres or less (PM₁₀), and particulate matter with a diameter of 2.5 micrometres or less (PM_{2.5}). Free silica is just one component of airborne dust, which may also include pollen, sand, and organic plant material. In addition to extraction activities, other quarrying operations—such as vehicle movement and haulage—can contribute to dust generation. Furthermore, surrounding agricultural practices and unsealed roads are also significant sources of dust in the area.

A Desktop Historical Highwall Geotechnical Review was undertaken in November 2023 as is provided as **Attachment 3 – Youngs Quarry Desktop Historical Highwall Geotechnical Review** outlining Site geotechnical risks and proposed future quarrying methods that have been factored into the Site's Quarry Development and rehabilitation plans for Stage 1 and 2 to ensure a safe and stable landform is achieved prior to further extraction into the West Pit wall face.

Within the West Pit there are historical extraction areas up to 68 m high with angles of 75 degrees or greater. The progressive development of the Pit is intended to improve the geotechnical stability of the historical extraction areas. The QDPs for Stage 1 and Stage 2 will cut back the faces to be 60 degrees with an overall slope angle of 40 degrees. This will ensure a safer and stable area and allow for future development to occur safely into the hillside of the West Pit to commence alleviating visual amenity concerns.

2.6 Groundwater

A search of the DEW 'NatureMaps' application (2024) confirmed the Site is not located within an area prescribed under the *Landscape South Australia Act 2019*.

A groundwater investigation was carried out by Groundwater Science (GWS) in April 2021, refer **Attachment 4 – Groundwater Desktop Study – Youngs Quarry – Private Mine 214**. The groundwater assessment was undertaken to provide recommendations to support quarry development planning.

The key findings and recommendation from the report are as follows:

Key findings from the assessment confirm that:

- "The Site falls outside of a prescribed wells or water resources area. Use of groundwater or surface water does not require a license.
- The quarry targets hard rock of Adelaide Rift sequences. Two pits are in operation, the Main (West) pit and East Pit. The Main pit targets quartzite while the East pit targets dolomite.
- The nearest existing groundwater user is located 2.5 km north-east of the Site. This user is located in a separate sub-catchment in the high part of the ranges.
- Percussion drilling was implemented (14th April 2021) to confirm groundwater elevations at accessible locations. The drilling confirms that groundwater is more than 20 m below ground at drilled locations. Groundwater elevations at hilltop locations have not been confirmed, and for the purpose of this assessment have been inferred via topographic inference.
- There are no groundwater dependent ecosystems identified within the footprint of the Project.

No water supply well exists within the PM. The nearest registered well is located 530 m to the south-east (6531-845, 1.83 m deep). This well could not be located during a Site inspection (M. Jones written comms., January 2020). The nearest third party well is located 2.5 km to the north-east (well 6531-698, drill depth of 14 m). The well targets Adelaide Rift rocks and is in a separate surface water catchment to the Site. A cluster of wells are located on the Coastal Plain near Warnertown, 3.5 km west. These wells target Quaternary and

/ or Tertiary Sediments. Water supply in the area is likely to be sourced from mains water from the Morgan to Whyalla pipeline.

Based on the above there is very limited groundwater use in proximity to the Site.

As per Section 3.3.1 Supplementary Drilling on PM 214 within **Attachment 4 – Groundwater Desktop Study – Youngs Quarry – Private Mine 214**, the following is summarised:

- Due to lack of reliable well data, a percussion drilling program was implemented on 14th April 2021 via four (4) drill holes to between depths of 20.5 m BGL to 24.5 m BGL. No water was reported at any of the drillholes during drilling operations.
- Groundwater level monitoring 2 and 8 days after the drilling did not report groundwater at any of the drillholes.
- Results of the drilling confirm that groundwater elevations reside lower than 163 m AHD at the Main (Western) pit, less than 174 m AHD at the Western Creek hole and less than 190.49 m near the Eastern pit. These values are approximately 20 m below the base of existing creek lines.

Table 4. Drillhole attributes from the percussion drilling program.

Name	Drill date	Easting	Northing	Land Elevation (mAHD)	Original Depth (m)	Current Depth (m)	Water level (m bgl)	Water level (mAHD)	Water level date
Northern Hole	14/04/2021	235870	6319390	198.58	24.5	6	Dry ⁴	< 174.08	22/04/2021
Main pit hole	14/04/2021	236189	6318941	184.1	20.5	19.35	Dry	< 163.6	22/04/2021
Western creek hole	14/04/2021	236285	6318795	195.98	24.5	24.23	Dry	< 171.48	22/04/2021
East pit hole	14/04/2021	236457	6319115	214.99	24.5	24.44	Dry	< 190.49	22/04/2021

Note: ground elevations obtained from UAV survey provided by Groundwork Plus (2019), except Northern Hole which was obtained from the 1 second digital elevation model (GA, 2011).

For quarry pit designs it is recommended to remain five (5) m above the inferred water table position provided in Figure 11 of **Attachment 4 – Groundwater Desktop Study – Youngs Quarry – Private Mine 214**. This recommendation is conservative and allows for uncertainty given limited data availability in high parts of the tenement.” (GWS, 2021)

With Pit floor levels within the West Pit to remain at 180 m AHD and results of drillholes to a depth of 163.6 and 174.08 a buffer of 5.92 to 16.4 m AHD will be achieved. Pit floor levels within the East Pit are planned for 215 m AHD and results of GW investigation s adjacent the pit (East Pit Hole) to 190.49 a buffer of 25 m AHD will be achieved.

A search of the BoM Groundwater Dependent Ecosystem Atlas indicates that one (1) low potential Terrestrial Groundwater Dependent Ecosystems (GDE) is recorded within the north west corner of the PM and 870 m north west of the operational area of the PM refer to **Figure 1 – PM and Groundwater Dependent Ecosystems**.



Figure 1 – PM and Groundwater Dependent Ecosystems

The GDE described as comprising of shrubland > 1m. As per Section 4 Groundwater Dependent Ecosystems within **Attachment 4 – Groundwater Desktop Study – Youngs Quarry – Private Mine 214**, the following is summarised:

- In the hard rock terrain (range front and low-lying hills) groundwater levels occur more than 20 m below creek lines. This demonstrates that creek line vegetation would be reliant on surface water including incident rainfall and / or ephemeral streamflow.
- No groundwater dependent ecosystems are confirmed from the BoM database (Figure 10) on the Coastal Plain. Mapped vegetation is described as having water tables more than 20 m below ground. Similar to above, environmental water requirements for creek line vegetation are expected to be provided by ephemeral streamflow.

Based on available data there are no confirmed GDE's near to the Site. "Mapped vegetation is described as having water tables more than 20 m below ground. Similar to above, environmental water requirements for creek line vegetation are expected to be provided by ephemeral streamflow" as addressed in Section 4 of **Attachment 4 – Groundwater Desktop Study – Youngs Quarry – Private Mine 214**.

2.7 Surface Water

A search of the DEW 'NatureMaps' application (2024) confirmed the Site is not located within a Prescribed Water Resources Area (PWRA), Prescribed Wells Area (PWA) or the Murray Darling Basin and associated Murray River Water Protection Area.

A search of the DEW application 'NatureMaps' (2024) identified the Site is located within the southern portion of the Mambray Coast Surface Water catchment area, refer to **Figure 2 – Mambray Coast Location**, described as "Around 1350 km² in total area, the Mambray Coast is centred 250 km north of Adelaide and comprises a number of small, unconnected catchments, rather than a single drainage system. These

catchments all rise in the southern Flinders Ranges and drain to the west, terminating in eastern Spencer Gulf between Port Pirie and Port Augusta. Major land uses in the region are broadacre cropping and/or grazing, conservation reserves and irrigated horticulture.” (*Report DWLBC, Ecological Condition Assess: Streams of Mambay Coast, 2005*).



Figure 1. Mambay Coast location

(Source: DWLBC Report, 2005)

Figure 2 – Mambay Coast Location

As discussed in **Section 2.1 Topography and Landscape**, the dominant topographic feature in the region is the elevated Southern Flinders Ranges immediately to the east of the Site, running in a north to south direction. The western portion of the Site is comprised of gentle sloping outwash fans from the Southern Flinders Range. The eastern portion of the Site is characterised by moderately steep (south eastern portion) to steep (north eastern portion) hills with surface water drainage lines running from an east to westerly direction with the direction of sloping topography.

Drawing No. 2449.DRG.027AR1 – Erosion and Sediment Control Plan – Stage 1 outlines identified watercourses located within proximity to the Site and catchment areas of the operational area.

The greater PM has multiple mapped watercourses varying in order from Stream order 1 to Stream order 3 following drainage lines and topography of the area refer to **Drawing No. 2449.DRG.008 – Topographic Map**. There are two (2) mapped watercourses that intersect the operational areas of the Site. One (1) is a Third Order stream running from north east to south west of the Site shown as Operational area stream. This is described as an ephemeral creek, vegetated with scattered eucalyptus and does not receive regular flows. Consultation with the Landowner (and Tenement Holder) and the adjacent landowner where the creek line exits to the south have confirmed the creek does not flow. Testimony from both advised the last recorded flow of the creek line was after the region had experienced a bushfire in 2014 that would have altered flow paths upstream that have since revegetated, and the first larger rainfall event occurred. Refer to **Photo 3 – Main Creek Line** demonstrating the typical presentation of the watercourse.



Photo 3 – Main Creek Line

The second mapped watercourse is a Second Order Stream identified as Stream adjacent to processing area on the map that runs adjacent to the processing area from the north east exiting the area to the south east. This stream is created by topographic landform depressions collecting surface water and does not regularly receive flows.

Site based testimonial from the Private Mine Operator advises that flows are not typically experienced during and after rainfall events throughout the mapped drainage lines, and this is most likely attributable to upstream losses. Management of potential flows and surface water run off from disturbed areas is discussed in **Section 3.6.7 Erosion, Sediment and Silt Control**. Downstream environments are utilised for agricultural purposes, regularly cropped with the majority of the watercourses becoming losing watercourses terminating at the Augusta Highway running adjacent to the quarry approximately four (4) km west.

The Site's Approved ADP discusses historical quarrying areas disturbing creek lines and plans for accessing resource within the valley areas (known as East Quarry in this MOP).

The Site's ADP outlined extraction and approved QDP intersecting the mapped drainage paths and therefore these areas are considered as approved existing activities and a Water Affecting Activities Permit is not required for continued works within these areas. Of importance it is noted, the flows of the watercourse however have not planned to be disturbed, and any significant flows of water will continue to traverse through the Site exiting at the southern point of the operation area. Access and haul roads that have historically been developed and cross the watercourses are at grade and do not impede flows.

2.8 Vegetation, Weeds and Plant Pathogens

An *Environment Protection Biodiversity Conservation Act 1999* (EPBC) Protected Matters Search (2024) of the Site and immediate surrounds summarises the Matters of National Environmental Significance (MNES) flora that may occur within three (3) km of the Site, refer **Attachment 5 – EPBC Act 1999 Protected Matters Report**.

The EPBC Protected Matters Search Report identified one (1) Listed Threatened Ecological Community (TEC) – Peppermint Box (*Eucalyptus odorata*) Grassy Woodland of South Australia as potentially occurring in the area. The report also identified two (2) Endangered Species and seven (7) Vulnerable Species of native flora, refer **Attachment 5 – EPBC Act 1999 Protected Matters Report**.

A search of the DEW native vegetation database 'NatureMaps' (2025) for the presence of native vegetation reported that there were no identified State or Nationally Rated Flora Sites within the PM. Two (2) vegetation communities are identified as occurring within the PM (NatureMaps, 2025):

- Low shrubland: emergent *Callitris glaucophylla* (White Cypress-pine) trees over *Cassinia laevis* (Curry Bush), *Olearia decurrens* (Winged Daisy-bush), *Acacia ligulata* (Umbrella Bush), *Acacia calamifolia* (Wallowa) mid shrubland over *Lomandra multiflora ssp. dura* (Hard Mat-rush), *Triodia scariosa ssp.* (Spinifex), *Acacia continua* (Thorn Wattle) shrubs.
- Unidentified vegetation community: Vegetation details for the fourth vegetation community are unavailable on NatureMaps as of 27 March 2025.

An additional vegetation community was identified on adjacent land along the southern boundary of the PM Site:

- Low chenopod shrubland: *Maireana brevifolia* (Short-leaf Bluebush), *Atriplex stipitata* (Bitter Saltbush), *Rhagodia spinescens* (Spiny Saltbush) low open shrubland.

Refer to **Drawing No.DRG.2449.DRG.030 – Mapped Vegetation** for a visual representation of mapped vegetation within the PM.

Onsite observations during a Site visit by Groundwork Plus on 13 January 2020 and January 2025 confirmed that native vegetation is present within the Site. Vegetation consists of areas of low mallee open woodland, low Bluebush (*Maireana spp.*) shrubland, Grass Tree (*Xanthorrhoea australis*), Wattle (*Acacia sp.*) as well as scattered individuals of Eucalyptus spp. and *Callitris glaucophylla* (White Cypress-pine) was noted within the Site in the east to north east portions and along watercourses within the western portion of the Site. Adjacent land to the north, east and south east contains native vegetation that will potentially provide natural seeding for rehabilitated areas throughout the life of the quarry via wind, fauna and surface water movements. No threatened flora species or TEC were observed within the PM at the time of the inspection.

As the PM has been operating continuously since November 1973, the clearance of native vegetation does not require a Significant Environmental Benefit (SEB) offset under the *Native Vegetation Act 1991*. Under provisions of the *Native Vegetation Regulation 2017*, pursuant to section 27(1)(b) of the *Native Vegetation Act 1991*, clearing of native vegetation is exempt on PM 214 as the activities were authorised under the *Mining Act 1971* prior to the Regulations coming into effect.

2.8.1 Weeds and Plant Pathogens

A search of the DEW 'NatureMaps' application (2024) confirmed Phytophthora is not present within the search area of the tenement and immediate surrounds. No vegetation onsite is known to be affected or potentially affected by economically significant pathogens including broomrape.

A search of the Government of South Australia Enviro Data (2024), application *NatureMaps* within three (3) km reported during the previous 10 years of the Site identified the following introduced flora:

- Saffron Thistle (*Asteraceae Carthamus lanatus*)
- Marrow (*Cucurbitaceae Cucurbita pepo*)
- Centaury (*Gentianaceae Centaurium sp.*)
- Hair grass (*Poaceae Aira cupaniana*)
- Large Quaking Grass (*Poaceae Briza maxima*)
- Buffel Grass (*Poaceae Cenchrus ciliaris*)
- Annual Veldt Grass (*Poaceae Ehrharta longiflora*)
- Fescue (*Poaceae Vulpia sp*)

Onsite observations identified the presence of Artichoke (*Cynara cardunculus*) in low lying areas and along watercourses as well as on adjacent land. Wild tobacco trees (*Nicotiana glauca*) were also observed scattered within the Site.

2.9 Fauna

A search of the EPBC Protected Matters Search Tool of the PM and immediate surrounds summarises the MNES (fauna) that may occur within three (3) km of the Site, as detailed in **Attachment 5 – EPBC Act 1999 Protected Matters Report**.

The EPBC Protected Matters Search Report identified one (1) Listed Threatened Species (Mammals) Yellow-footed Rock-wallaby (*Petrogale xanthopus xanthopus*), nine (9) Listed Threatened Species (Birds), 12 Listed Migratory Species (Birds), two (2) Listed Threatened Species (Reptiles) and 11 Listed Marine Species (Birds). Due to the type and degraded nature of the vegetation onsite, the operational areas of the Site are not expected to contain significant habitat or support rare or endangered species and a referral under the *EPBC Act 1999* is not required.

A search of the Government of South Australia Enviro Data (2024) application *NatureMaps* did not identify the presence of any State or National Rated Fauna Sites within a three (3) km search area of the Site.

A search of the Government of South Australia Enviro Data (2024) application *NatureMaps* identified the following presence of introduced Fauna within a three (3) km search area of the Site:

- Goat, Feral Goat (*Capra hircus*)
- Rabbit, European Rabbit (*Oryctolagus cuniculus*).

2.10 Caves

There are no known cave systems within or nearby the application area. There are no significant limestone formations within or nearby the application area.

2.11 Land Use

Historical land use for the Site with and immediate surrounding land parcels has been predominately for the purposes of cropping to the western side of the PM. The registration grant date of PM 214 is 1973, although anecdotal feedback and records of quarry receipts indicate that quarrying activities historically occurred at the Site from as early as 1942. Quarrying activities are currently situated within the south eastern portion of the Site and commonly referred to as the Operational area.

The Site is located with the Port Pirie Regional Council (Council) area adheres to the Planning Design Code zone of Rural (Ru). The surrounding areas are also consistently zoned Rural. Planning and Design Code overlays of the Site include Hazards (Bushfire – General), Hazards (Bushfire – High Risk), Hazards (Flooding – Evidence Required), Limited Land Division, Native Vegetation, Significant Landscape Protection, Water Resources.

An easement for a water mains pipeline runs parallel to the western boundary of the land parcel in a north to south direction refer to **Drawing No. 2449.DRG.003 – Land Access Map** for the location of the water mains in proximity to the Site.

There are no known plans for changes to the adjacent land use at the time of preparing the MOP.

The Site is not used for defence purposes, including the Woomera Prohibited Area or the Cultana Army Training Area.

Exploration Licence (EL) 6561 and a Gas Storage Exploration Licence (GSEL) 766 are identified as present over the Site, however the PM has been operational prior to registration of these licences.

2.12 Proximity to Infrastructure and Housing

The Site is located at the base of the Southern Flinders Ranges within a large rural setting with few residential dwellings located on land surrounding the Site. There are three (3) residential dwellings within one (1) kilometre (km) of the PM boundary. However for the purposes of referencing sensitive residential receptors, distance to the operational areas and development areas of the quarry from residences are approximately 1.7 kilometres (km) to the west, 1.2 km to the south and 2.13 km to the south west of the

Site as outlined in **Drawing No. 2449.DRG.003 – Land Access Map**. The township of Warnertown is located approximately 4.5 km west of the Site, and the regional City of Port Pirie is approximately 15 km north west.

The residential receptor located approximately 1.2 km south east of the Site is located approximately 50 m from the Site's access road outside of the PM that runs from the Sales area through private land and provides access to Collaby Hill Road. The transportable house was placed at this location in December 2024.

Two (2) above ground mild steel concrete lined SA Water pipelines run through the centre of PM 214 entering from the north western corner along the boundary of CT 6211/117 exiting at the south eastern end of PM 214 of CT 6211/117.

A 275 kilovolt (kV) ElectraNet transmission line is located approximately 455 m to the east of the south western corner of the Site, as shown in **Drawing No. 2449.DRG.003 – Land Access Map**.

A Petroleum (Natural Gas) pipeline named the Moomba-Adelaide Gas (Port Pirie Lateral) pipeline is located approximately 560 m south west of the Site as shown in **Drawing No. 2449.DRG.003 – Land Access Map**.

The Coonamia – Port Augusta and Crystal Brook – Broken Hill rail lines operated by Australian Rail Track Corporation are located 2.9 km to the southwest of the Site.

The location of utilities and associated infrastructure surrounding the PM is limited to the public road network and the Augusta Highway.

2.13 Amenity

The Site is comprised of grassy and rocky agricultural cropping land within the western portion and steep to moderately steep hills of the Southern Flinders Range within the eastern portion of the Site.

A visual assessment was undertaken on 30 October 2019 and November 2023 to assess visual amenity impacts at sensitive receptor locations and views from public roads within proximity of the Site. The assessment captured images from nine (9) locations, shown in **Drawing No. 2449.DRG.010 – Visual Assessment Map**. Photos and a description of views from each location are provided in **Attachment 6 – Visual Assessment Plates**.

As seen in the attached visual assessment, views are generally limited to the eastern face of the West pit due to its location on the western face of the rising Southern Flinders Ranges. The predominant visual impact from the Site is associated with historical extraction of this pit, carried out by former operators. The pit is estimated to have been opened and observed from external viewpoints since 1960. Little rehabilitation of this pit face has been implemented in previous years.

Since the time that CLM acquired the quarry and whilst the pit has been operating under the previously approved ADP, works have been undertaken to commence improvements to the visual impacts of this pit. In addition, Quarry Development Plans (QDP) have been designed with consideration for visual amenity impacts long term. However, due to the elevation of the face and the geotechnical stability of the area, limited opportunity exists to rehabilitate this area within the scope of this MOP.

2.14 Air Quality

The Site is located within a large grazing and cropping area of which emissions of dust is expected to be typical of rural settings.

The Site has been an ongoing operational quarry and potential dust generating activities onsite include material extraction, blasting, transport and transfer of material, storage of material (stockpiles), and open areas. Some material processing is currently undertaken onsite via a mobile crushing and screening plant. A water cart is available onsite to undertake dust suppression of crushing and screening plant, haul roads and working areas while the Site is being operated.

2.15 Noise

Noise levels at the Site are generally typical of rural settings with the exception of the influence from the Princess Highway, Collaby Road and the Coonamia to Port Augusta Railway.

The Site has been an ongoing operational extractive quarry and potential noise generating activities onsite include material extraction, crushing, blasting and quarry related traffic movements. As outlined in **Section 3.3.5 Modes and Hours of Operations** the modes and hours of operation at the Site are typical operating hours of Primary Production areas.

2.16 Heritage (Aboriginal and Geological)

A search of the Central Archive of the Department of Premier and Cabinet – Aboriginal Affairs and Reconciliation (DPC-AAR) did not identify any results of Registered Aboriginal sites, objects or remains to be present within the Site or in proximity to the Site, refer to **Attachment 7 – Confidential – DPC AAR Search Results** - provided separately. In accordance with the provisions of the *Aboriginal Heritage Act 1988*, the results of the DPC-AAR search are required to be treated confidentially and are not able to be shared to any third party.

Historically, there has not been any Aboriginal Heritage surveys undertaken for the Site, nor have there been any instances of any Aboriginal Heritage Sites, Objects or Remains encountered during the current land use. The landform within the Site has been altered and disturbed from agricultural cropping activities. Land within the Site is held in Fee Simple of which Native Title has been extinguished.

There were two (2) local heritage places identified approximately four (4) km from the PM 214 boundary, refer to **Drawing 2449.DRG.007 – Heritage and Conservation Areas Map. Table 4 – Heritage Places Listing** provides information on the two (2) local heritage sites.

Table 4 – Heritage Places Listing

Heritage No	Address	LGA	Details	Class	Direction from Site	Approximate Distance from Site
13596	East Terrace, Warnertown	Port Pirie Regional Council	Institute	Local	West	3.4km
13597	Gervase Road, Warnertown	Port Pirie Regional Council	Former Church	Local	West	3.6km

(Source: Nature Maps SA, 2024)

2.17 Proximity to Conservation Areas

A list of conservation areas and Heritage Agreement (HA) areas and their proximity to the Site is provided in **Table 5 – Proximity to Conservation Areas** and as per **Drawing No. 2449.DRG.007 – Heritage and Conservation Areas Map**.

Table 5 – Proximity to Conservation Areas

Conservation feature	Direction from Site	Approximate distance from Site Boundary (km)
Mount Remarkable (NP)	N	7.8
Spaniards Gully Conservation Park	NE	10.9
Telowie Gorge Conservation Park	N	14.3
Wirrabara Range Conservation Park	N	14.3
HA 87	NE	6.8
HA 374	NE	6.8
HA 606	NE	6.8
HA 1606	SE	5.1

(Source: Nature Maps SA, 2024)

2.18 Pre-existing Site Contamination and Previous Disturbance

There is no known pre-existing Site contamination or disturbance identified on the Environment Protection Authority (EPA) contamination site index for the Site.

Previous disturbance of areas within the PM are related to agricultural and extraction activities. The operational area currently has approximately 20 ha of active disturbance areas incorporating haul roads, pit areas and processing areas.

Disturbance and rehabilitation activities located east of the Site outside of the PM boundary are not the responsibility of C.L. Land Management and is subject to a third party rectification order by DEM.

3 Description of the Operations

3.1 General Description and Summary

The rock source will be extracted in a standard open cut quarrying method. Staged Quarry Development and Rehabilitation Plans (QDP) provided in **Section 3.3 Quarrying Activities** highlight how the Site is to be extracted in a staged manner to reduce the potential for environmental impacts.

The Site is an important contributor to high value aggregate (concrete, asphalt and road base) materials to support the South Australian Construction Sector and Local Government. A series of QDP's have been developed to help inform the staging of the future operations at the Site, along with outlining strategies for the progressive rehabilitation of the Site.

CLM Quarries are currently operating two (2) pits within the Site known as the West Pit provides a quartzite resource, and the East Pit provides a dolomite resource, the locations of which are shown in **Drawing No. 2449.DRG.019B – Site Layout Map – PM 214**. The West Pit is extracted using mechanical excavation and targets PM2 product of quartzite, whilst the East Pit targets PM1 products of dolomite and is extracted via blasting.

PM 214 contains the active extraction areas, mobile crushing plant, primary crushing of product and stockpiling. Materials from the Site are sold directly to market or transported to an external sales area located with CT 6221/211 and CT 6211/117. The stockpiling and sales area is authorised under EPA Licence 50661 and does not form part of this MOPs description of operations but may be referenced as the Sales Area when required for context.

The Site has been operational since 1973 with historic extraction occurring into the hill faces within the West and East Pits that have created visual amenity impacts that requires future operations to resolve within geotechnical constraints and ensure future resources are able to continue to be extracted.

A Desktop Historical Highwall Geotechnical Review was undertaken in November 2023 as is provided as **Attachment 3 – Youngs Quarry Desktop Historical Highwall Geotechnical Review** outlining Site's geotechnical risks and proposed future quarrying methods that have been factored into the Site's Quarry Development and rehabilitation plans whilst also developing a stable platform for future extraction into the West Pit wall face.

Within the West Pit there were sections of the 68 m high wall that had angles of 75 degrees or greater. The QDPs for Stage 1 and Stage 2 will cut back the faces to be 60 degrees with an overall slope angle of 40 degrees. This will ensure a safer and stable area and if future demand requires, allow for future development to occur safely into the hillside of the West Pit to commence further alleviating visual amenity concerns.

Quarry development and rehabilitation plans have been staged to create safe and stable landforms within the pits particularly the West Pit, with the first stage establishing access points for future wall extraction and progressive rehabilitation of terminal areas. Stage 2 visualises the majority of extraction within the East Pit and rehabilitation of terminal areas within the East Pit. An area has been highlighted for where future extraction would occur further into the hill face of the West Pit. Stage 1 also incorporates rehabilitation and establishment of visual screening along the western side of the Pit through the planting of native grasses, shrubs and/or trees that can be established prior to works commence further into the hill face.

Drawing No. 2449.DRG.024AR1 – Quarry Development and Rehabilitation Plan – Stage 2 identifies the Conceptual Future Extraction Area that demonstrates future potential extraction footprint into the hill face once safe access is established, however this MOP does not cover any operations within the Conceptual area.

Drawing No. 2449.DRG.025B - Quarry Development and Rehabilitation Plan - Stage 2 Sections A-A' to C-C' and **Drawing No. 2449.DRG.025C - Quarry Development and Rehabilitation Plan - Stage 2 Sections D-D' to F-F'** demonstrate the benched profiles for these future extraction areas that will minimise the visual amenity concerns of the West Pit wall face where future rehabilitation of the terminal areas will occur with planting of native species and grasses to return the area to the desired end use of grazing.

To support the MOP, a series of maps and plans have been provided including:

Site Location Plan	(Drawing No. 2449.DRG.002)
Site Layout Map	(Drawing No. 2449.DRG.019)
Orthophoto and Topography Plan 2023-12-01	(Drawing No. 2449.DRG.021)
Regional Geology Map	(Drawing No. 2449.DRG.004)
Geohazards Map	(Drawing No. 2449.DRG.005)
Mapped Vegetation	(Drawing No. 2449.DRG.030)
Topographic Map	(Drawing No. 2449.DRG.008)
Land Access Map	(Drawing No. 2449.DRG.003)
Visual Assessment Map	(Drawing No. 2449.DRG.010)
Heritage and Conservation Areas Map	(Drawing No. 2449.DRG.007)
Site Layout Map – PM 214	(Drawing No. 2449.DRG.019B)
Quarry Development and Rehabilitation Plan - Stage 1	(Drawing No. 2449.DRG.024AR1)
Quarry Development and Rehabilitation Plan - Stage 1 Section A-A' to F-F'	(Drawing No. 2449.DRG. 024B)
Quarry Development and Rehabilitation Plan - Stage 2	(Drawing No. 2449.DRG.025A)
Quarry Development and Rehabilitation Plan - Stage 2 Sections A-A' to C-C'	(Drawing No. 2449.DRG.025B)
Quarry Development and Rehabilitation Plan - Stage 2 Sections D-D' to G-G'	(Drawing No. 2449.DRG.025C)
Traffic Route Map	(Drawing No. 2449.DRG.023)
Erosion and Sediment Control Plan – Stage 1	(Drawing No. 2449.DRG.027AR1)
Erosion and Sediment Control Plan – Stage 2	(Drawing No. 2449.DRG.027BR1)
Conceptual Final Landform Plan	(Drawing No. 2449.DRG.029A)
Conceptual Final Landform Plan – Sections A-A' to C-C'	(Drawing No. 2449.DRG.029B)
Conceptual Final Landform Plan – Sections D-D' to G-G'	(Drawing No. 2449.DRG.029C)

3.2 Resource

The rock source has been estimated as follows:

- West Pit at an average density of 2.7 tonne per cubic metre (t/m³) for the quartzite resource
- East Pit at an average density of 2.8 t/m³ for the dolomite resource.

It is estimated based on the above average density's that a total collective reserve of approximately 1,555,018 tonnes (t) of extractive rock is available onsite. **Table 6 – Estimate of Site Reserves** identifies reserves available per Stage of extraction, per pit.

Table 6 – Estimate of Site Reserves

	West Pit – 2.7 t/m ³		East Pit – 2.8 t/m ³		Total	
	Volume (m ³)	Tonnes (t)	Volume (m ³)	Tonnes (t)	Volume (m ³)	Tonnes (t)
Stage 1	251,900	680,130	202,600	567,280	454,800	1,247,800
Stage 2			109,600	306,880	109,860	307,218
Total	251,900	680,130	312,200	874,160	564,660	1,555,018

This reserve calculation has been completed by a Principal Resource Consultant at Groundwork Plus, reviewed and deemed to have been appropriately identified and estimated. Reserves within the Site have been estimated based on an Unmanned Aerial Vehicle (UAV) survey undertaken and volumes contained within three-dimensional pit designs created in Civil3D.

Waste (overburden) is dependent on market demand, the target market is unsealed road networks therefore 100 percent of material would suit either a Class 1, Class 2 or Class 3 road base specification. There will be limited "waste" as such and is being utilised for corrective rehabilitation activities onsite and will for ongoing rehabilitation activities.

3.2.1 Production Rate and Products

Estimated production rates have been estimated as 90,000 tonnes per annum (collective from both pits). Annual production volumes are estimated only and may increase to approximately 100 kt per annum or more depending upon market demand and infrastructure project needs within the Region. If required, an Extractive Industries Licence will be obtained under the *Environment Protection Act 1991* if annual production is likely to reach or exceed 100 kt per annum.

At 90,000 tonnes per annum collectively from both pits, Stages 1 & 2 will be completed over 17 years. The West Pit will be extracted over the course of the two (2) stages.

	West Pit – 2.7 t/m ³		East Pit – 2.8 t/m ³		Total	
	Volume (m ³)	Tonnes (t)	Volume (m ³)	Tonnes (t)	Volume (m ³)	Tonnes (t)
Stage 1	251,900	680,130	202,600	567,280	454,800	1,247,800
Stage 2			109,600	306,880	109,860	306,880
Total	251,900	680,130	312,200	874,160	564,660	1,554,680
Years						17

Importantly, the above estimated figure of extraction may fluctuate up and down dependant on project works at that time. Currently at the time of writing this MOP, there is commensurate major project works within the local government area of the Site. Whilst the overall quarry life is long, efforts have been made throughout consultation to ensure disturbance areas are minimised throughout the development of the quarry. It is also noted the life of each pit may vary dependent on the market demand / resource required, one pit may be extracted at a higher rate than the other.

The Site produces the following end use products:

- PM1/20
- PM1/20 OMC
- PM2/20
- PM2/20OMC
- PM2/40
- 40 mm QR
- Soakage Rock
- 20 mm Metal
- 14 mm Metal
- 10 mm Metal
- Crusher Dust

3.3 Quarrying Activities

3.3.1 Type or types of Mining Operation to be Carried Out

Drawing No. 2449.DRG.019 – Site Layout Map highlights the overall layout of the Site. The staged quarry development and rehabilitation plans highlight the proposed layout per stage of development.

There are currently two (2) quarrying methods undertaken onsite including:

- Within the East Pit, blasting by a licensed contractor. Blasted rock is loaded from the face of the blast via the use of a loading tool (Excavator or Front End Loader (FEL)) onto a Rigid or Articulated Dump Truck. The blasted rock is hauled to the primary crushing and screening plant located on onsite and then transferred to the offsite sale yard for further processing and sales where required.
- West Pit is extracted using traditional open cut quarry techniques with the use of a bulldozer (D10 or equivalent). The Site will be using mobile crushing and screening equipment to for primary crushing and screening onsite and transferred to the sales area for final crushing or cleaning and sales of the end products.

Refer to **Drawing No. 2449.DRG.019B – Site Layout Map - PM 214** for the primary crushing and screening and stockpiling location within the PM and **Diagram 1 – Conceptual Extraction Operations** for an illustration of the quarrying methodology.

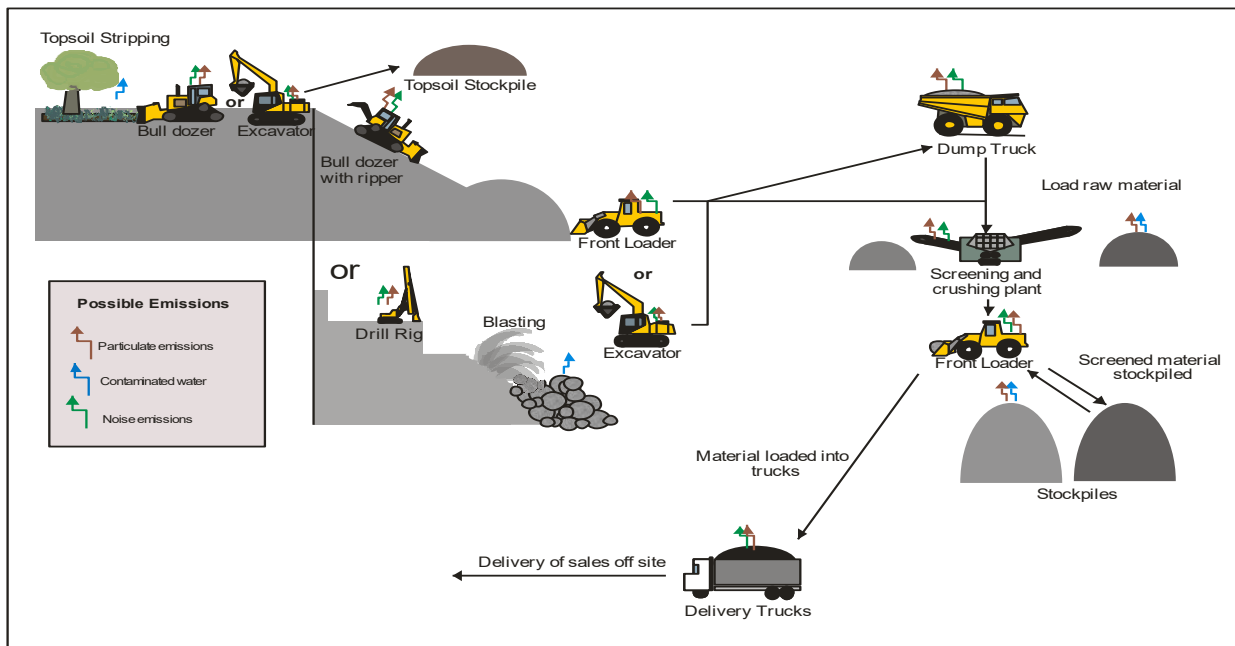


Diagram 1 – Conceptual Extraction Operations.

3.3.2 Sequence of Operation and Progressive Rehabilitation

To assist with the understanding of quarry development, a series of two (2) staged plans per pit have been developed. As outlined in Section 3.2.1 Production Rate and Products each pit will be worked separately due to differing resource types. The volume and rate of extraction of each pit will be driven by the resource demand. For ease of description the plans have been developed across two stages to assist in identification of establishment of benches in the East Pit.

The West Pit still contains a volume of resource to be extracted, and this will occur in order for the rehabilitation of the historic areas but will be worked over the two (2) stages with the result to stabilise the faces and provide safe access to potential resource within the hill.

3.3.2.1 Stage 1 Western Pit

Drawing No. 2449.DRG.024AR1– Quarry Development and Rehabilitation Plan Stage 1

Drawing No. 2449.DRG. 024B – Quarry Development and Rehabilitation Plan Stage 1 Section A-A' to F-F'

Stage 1 of the West Pit will primarily undertake extraction works to correct geotechnical stability of the steep wall batters created through historic extraction.

Based upon the geotechnical review of the Site, it has been determined that creating safe access to the higher potential "Future Extraction Area" is required prior to further extracting the eastern wall face within the West Pit. Please note this MOP does not include description of the conceptual final landform activities as these have not been developed and will form part of future MOP revisions.

Therefore, extraction within this Pit is to rehabilitate steep batters, and process any resource that is extracted in those activities.

Stage 1 shows the pit floor to remain at the current level of 180 m AHD in order to maintain (five (5) metre (m) buffer to groundwater levels.

Since CLM Quarries have owned and operated the Site, works have commenced to batter and contour the north west and western walls within the pit to correct geotechnical concerns of steep faces within the pit. This is planned to continue for the remaining areas of those walls.

Extraction will occur towards the north west end of the pit to create a second bench at 210 m AHD which will facilitate access to future extraction area and connect the main haul road into the current pit and Conceptual future extraction area on the eastern side of the Pit.

Extraction will also occur to the east of the pit creating to new benches at 195 m AHD and 210 m AHD which establish access points and future haul road development areas for the Conceptual Future Extraction Area.

As per **Drawing No. 2449.DRG.024B – Quarry Development and Rehabilitation Plan Stage 1 Section A-A' to F**-cross sections B-B' and C-C' and D-D' show the majority of excavation is to contour and create safe slope angles within the pit walls.

The extraction volumes presented as Stage 1 will be undertaken over the two stages (2) of this PEPR.

Disturbance area per Stage 1 within the West Pit is approximately 4.95 ha.

Progressive Rehabilitation and Milestones

Rehabilitation are for Stage 1 West Pit is approximately 1.24 ha.

Progressive rehabilitation works planned for this stage is to stabilise the exterior of the west pit walls with planting native grass and shrubs to provide additional visual amenity relief of the pit area and batters for future stages of extraction. This stage of rehabilitation is to commence within the next 12 -24 months.

An annual review of the planted vegetation will be undertaken to ensure it has been successful in establishment. Further corrective actions will be undertaken if required (i.e. infill planting).

As described above progressive rehabilitation of the internal western walls of the West Pit has begun (shown in green below as Rehabilitated Area). The length of the wall to be rehabilitated is approximately 300 m long. The Private Mine Holder anticipates rehabilitating the batter through extraction of remaining resource and battering the face in sections of approximately 60 m length per year. This has been demonstrated on the QDP plan in as smaller sections continuing on from the completed area:

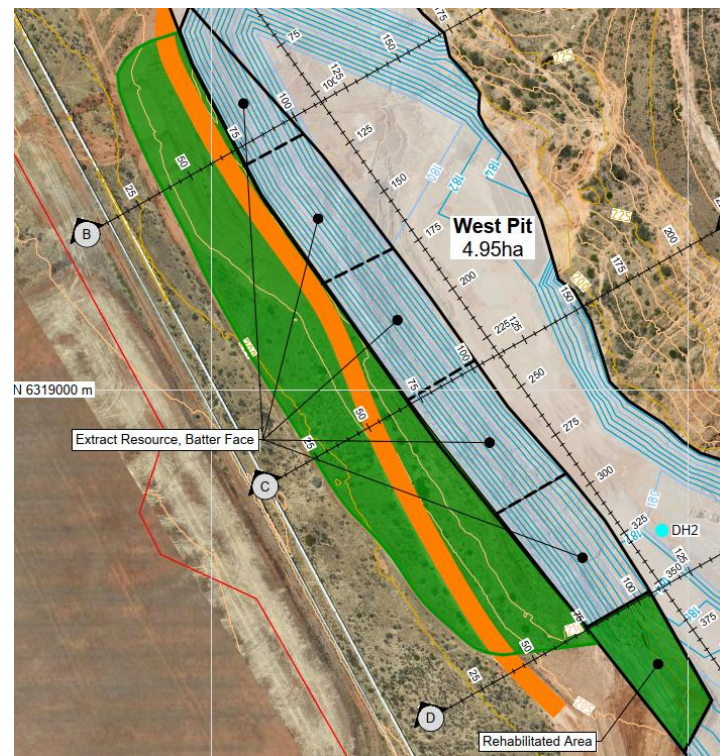


Photo 4 – Battered wall face / rehabilitated area below taken from aerial survey demonstrates this rehabilitation process and completed area:



Photo 4 - Battered wall face / rehabilitated area

Therefore, the timeframe frame for rehabilitation of this pit wall over the course of 60 m sections will be approximately 3 – 4 years.

3.3.2.2 Stage 1 Eastern Pit

Drawing No. 2449.DRG.024AR1 – Quarry Development and Rehabilitation Plan Stage 1

Drawing No. 2449.DRG.024B – Quarry Development and Rehabilitation Plan Stage 1 Section A-A' to F-F'

Stage 1 development within the East Pit shows the pit floor level going to 215 m AHD, as per the recommendations of the Groundwater Desktop assessment. Work will be undertaken to contour the north eastern pit edge and create a bench at 250 m AHD, and second bench at 230 m AHD with batters at 1V:1.5H which is able to provide a safe and stable batter due to the rock type of dolomite providing a competent rock type for this structure.

Disturbance per Stage 1 within the East Pit is approximately 2.23 ha.

Progressive Rehabilitation and Milestones

Progressive rehabilitation will commence within the terminal quarry areas of the top two benches in the northern corner via contouring and batter of the pit walls, scarification of wall faces, application of topsoil and natural vegetation allowed. Pasture grass will be planted and encouraged to naturally revegetate.

Progressive rehabilitation for Stage 1 East Pit is approximately 0.14 ha.

Total progressive rehabilitation area of Stage 1 East and West Pits (combined) is approximately 1.38 ha.

3.3.2.3 Stage 2 Western Pit

Drawing No. 2449.DRG.025A – Quarry Development and Rehabilitation Plan - Stage 2

Drawing No. 2449.DRG.025B – Quarry Development and Rehabilitation Plan - Stage 2 Sections A-A' to C-C'

There are no planned changes to extraction depth or footprint within this Pit. As described Stage 1 extraction volumes are likely to be undertaken over both stages with extraction of rock occurring in order for rehabilitation works to rectify wall faces and provide safe access for future conceptual stages.

This stage focuses on works within the north western end. **Photo 5 – North West Rehabilitation** and ramp development demonstrates the extraction and battering of the northern wall, and the creation of the access road for potential future extraction of the eastern faces.



Photo 5 – North West Rehabilitation

Final rehabilitation is planned for the terminal batters of the western wall faces. Rehabilitation includes completion of contouring, application of topsoil, scarification of the soil and planted with pasture grass seed to stabilise the batters.

Progressive rehabilitation of the West Pit during Stage 2 is approximately 2.30 ha and will be completed by 2043.

Drawing No. 2449.DRG.025B – Quarry Development and Rehabilitation Plan - Stage 2 Sections A-A' to C-C' shows the concept for the future extraction areas, (not included in this MOP for approval) benched design which will be achieved by extraction from the east and west sides of the top benches. A future MOP review will be undertaken prior to the completion of Stage 2 and include planning and assessment of environmental impacts of the future extraction area.

3.3.2.4 Stage 2 – Eastern Pit

Drawing No. 2449.DRG.025A – Quarry Development and Rehabilitation Plan - Stage 2

Drawing No. 2449.DRG.025C – Quarry Development and Rehabilitation Plan - Stage 2 Sections D-D' to G-G'

Stage 2 development shows extraction continuing to the east and south east of the Pit extending the 230 m AHD bench and a second bench of 250 m AHD along the south eastern pit boundary.

Stage 2 does not require any additional surface water treatment to be created as per **Drawing No. 2449.DRG.027B – Erosion and Sediment Control Plan – Stage 2**.

Total disturbance area for Stage 2 within the East Pit is approximately 3.21 ha.

Progressive Rehabilitation and Milestones

Once the new extraction area to the east of the pit is established (level 230 m AHD), the first batter from the pit floor will be rehabilitated with contouring, scarification, application of topsoil and planting a pasture grass to stabilise the rehabilitation.

As extraction of the 230m AHD floor level area is completed, the rehabilitation of the batters continuing from the north of the Pit will occur. Progressive rehabilitation of fully extracted pit areas includes contouring and batter of the pit walls, application of topsoil and scarification of wall faces. Pasture grass seed will be planted on the wall faces and the area will be encouraged to naturally revegetate.

Rehabilitation of the stage is due for completion in 2043. Progressive rehabilitation for Stage 2 East Pit is approximately 0.70 ha.

Total disturbance area for Stage 2 East and West Pits (combined) is approximately 6.40 ha and progressive rehabilitation area for Stage 2 both East and West Pits (combined) is approximately 3.00 ha.

During Stage 2 Quarry Development Plans and Conceptual Final Landform Plans will be created to inform future MOP revisions.

3.3.3 Stockpiles

3.3.3.1 Topsoil and Subsoil Stockpiles

Topsoil when encountered in the quarry development will be stripped and stockpiled to a maximum height of two (2) m for use in progressive rehabilitation. The majority of the works proposed for Stage 1 and 2 have already been cleared with topsoil stored in a bund outlined within **Drawing No. 2449.DRG.019B – Site Layout Map – PM 214**. Topsoil will be added to this stockpile as the quarry progresses.

Based on an estimate of 50 mm topsoil of unextracted and undisturbed areas with Stage 1 and Stage 2 the following amounts of topsoil may be stripped for storage and rehabilitation in **Table 7 – Topsoil to be Stored**:

Table 7 – Topsoil to be Stored

	Topsoil – 1.3t/m ³	
	Volume (m ³)	Tonnes (t)
Stage 1	300	390
Stage 2	260	338
Total	560	728

Overburden is limited with most product being able to be sold as a PM 1 or PM 2 and some PM 3 class product. Limited overburden has been stored within a historic extraction area, however when it becomes available it will be used for rehabilitation purposes throughout the Site and within the historic extraction area and are shown in **Drawing No. 2449.DRG. 019B – Site Layout Map PM214**.

3.3.3.2 Product Stockpiles

The Site undertakes primary crushing and screening of rock onsite as per **Drawing No. 2449.DRG.019B – Site Layout Map – PM214**. Stockpiling of the primary crushed products is also located within the Site as per **Drawing No. 2449.DRG.019B – Site Layout Map – PM 214** in safe and stable stockpiles up to 10 m

in height. The stockpiles will be generated with the use of the crushing plant conveyor or assisted with the use of a FEL.

As product is required for Sales it is either transported directly from the Site or transferred to the EPA licenced Sales Area where any additional crushing can be undertaken via mobile crushing and screening plant (if required).

3.3.4 Use of Explosives

Explosives will be used for blasting where the rock becomes too hard to rip within the eastern pit and will be undertaken by an experienced licensed contractor. Blasting of stone of this type usually uses detonation of Ammonium Nitrate-Fuel Oil (ANFO) mixture which is common to this type of quarrying. Detonation is undertaken using nonel initiation systems. Details of blasting, equipment and materials used are always dictated and determined by the licensed contractor at the time. Assessments are made in accordance with the geology and weather conditions. There will be no explosives or associated products stored onsite. All consumables will be delivered to Site when required by the licensed contractor.

Blasting will occur on an as needs basis depending upon the hardness of the rock being extracted and market demand, approximately once per annum depending on market demand.

3.3.5 Modes and Hours of Operation

Typically, the modes and hours of operation include:

- Monday to Friday – 7.00 am to 5.00 pm
- Saturday and Sunday – 7.00 am to 5.00 pm
- Sunday and Public Holidays – Load and haul only if required, would be undertaken between 7.00 am to 5.00pm.

Generally, maintenance activities continue outside of the typical hours of operation.

3.4 Exploration Activities

Drilling for resource exploration has not occurred, however drilling was undertaken at four (4) locations within the Site to assist inform the inferred groundwater levels and determine quarry depths. **Attachment 4 – Groundwater Desktop Study – Youngs Quarry – Private Mine 214** Section 3.3.1 Supplementary Drilling on PM 214 describes the following:

“No water well exists at or near the quarry. For this reason a percussion drilling program was implemented to validate the depth to groundwater. The investigation included the drilling of 4 drillholes to depths ranging between 20.5 and 24.5 m. Drilling was implemented using a percussion rig² which is analogous to the downhole hammer method with air. The rig has capacity up to 27 m (refer to **Figure 3 – Drill Hole Locations** and **Figure 4 – Drill Hole GW Inferred Levels**).

The position of the drillholes was within existing pits and at sites that were logistically favourable for access (generally adjacent creek lines, at existing workings or along the range front). No access was possible on hilltop locations due to steep incline and limited road access for the drill rig.

Drilling was undertaken on the 14th of April 2021 with water level monitoring on the 16th and 22nd April. Table 4 presents construction and monitoring information while Figure 6 displays their locations. Results from the drilling include the following:

- Drilling extended to depths ranging between 20 and 24.5 m. No water was reported at any of the drillholes during drilling operations.
- Groundwater level monitoring 2 and 8 days after the drilling did not report groundwater at any of the drillholes.
- Results of the drilling confirm that groundwater elevations reside lower than 163 mAHD at the Main (West) pit, less than 174 mAHD at the Western Creek hole and less than 190.49 m near the Eastern pit. These values are ~20 m below the base of existing creek lines.

Results of the drilling are included in **Table 8 – Drilling April 2021 Results**.

Table 8 – Drilling April 2021 Results

Name	Drill date	Easting	Northing	Land Elevation (mAHD)	Original Depth (m)	Current Depth (m)	Water level (m bgl)	Water level (mAHD)	Water level date
Northern Hole	14/04/2021	235870	6319390	198.58	24.5	6	Dry ⁴	< 174.08	22/04/2021
Main pit hole	14/04/2021	236189	6318941	184.1	20.5	19.35	Dry	< 163.6	22/04/2021
Western creek hole	14/04/2021	236285	6318795	195.98	24.5	24.23	Dry	< 171.48	22/04/2021
East pit hole	14/04/2021	236457	6319115	214.99	24.5	24.44	Dry	< 190.49	22/04/2021

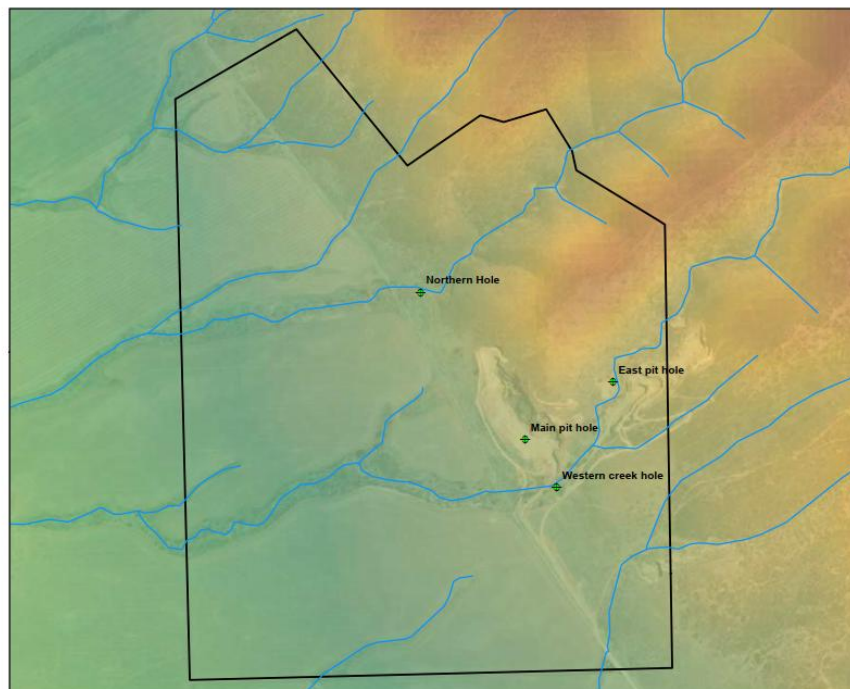


Figure 3 – Drill Hole Locations

At this point in time there is no intention to undertake further resource investigations within the Site, however, future resource investigations may be undertaken at some stage to inform future MOP revisions and / or pit planning and design within the Site.

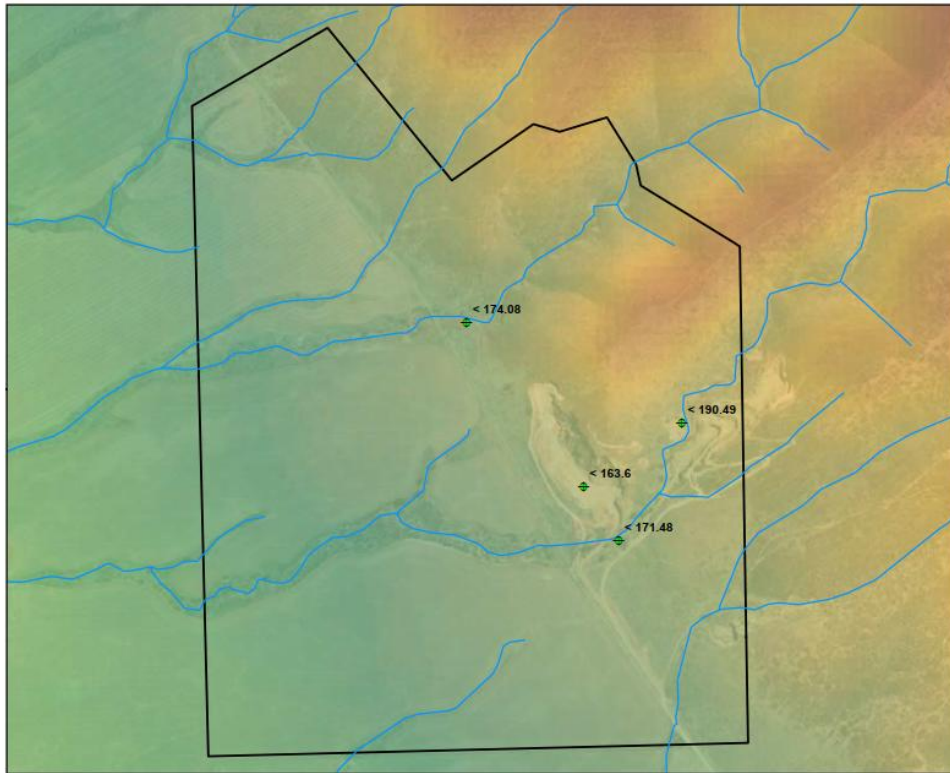


Figure 4 – Drill Hole GW Inferred Levels

3.5 Crushing, Processing and Product Transport

3.5.1 Fixed Plant

The Site does not contain any fixed plant.

The following mobile plant, equipment and vehicles are utilised within PM 214:

- Cone Crusher – McKloskey C44
- Jaw Crusher – Evoquip Bison 280
- Reclaimer Screen – Evoquip Colt 1600
- Excavator 1 – Komatsu PC 450 -8
- Excavator 2 – Hitachi ZX350
- Loader – Komatsu WA480-6
- Small Vehicles – 2 to 3 onsite
- Dump Trucks – 2 x Bell 40D
- Stacker – Telestack 624R
- 2 transfer conveyors (no brand, electric)
- 1 x 90kva trailer mounted generator.

3.5.2 Hours of Operation

Refer to **Section 3.3.5 Modes and Hours of Operation**.

3.5.3 Processing Wastes

There will be no processing wastes produced as part of the operations.

Refer to **Section 3.3.3 Stockpiles** for information regarding overburden storage.

3.5.4 Industrial and Domestic Wastes

All industrial and domestic waste disposal and recycling activities are located within the offsite Sales Area and collected by approved waste disposers.

Contractors undertaking any plant repairs onsite remove all wastes from Site and dispose accordingly.

A mobile fuel tank is onsite for refuelling of plant and equipment, there is no permanent fuel storage onsite.

There is no sewage systems onsite.

3.6 Supporting Surface Infrastructure

3.6.1 Access and Roads

Traffic will access the Site from the Augusta Highway turning left or right onto Collaby Hill Road, traffic along Collaby Hill Road to the Site's offsite Sales Area entry approximately 110 m north from Augusta Highway. The PM Site is accessed via a private access road that runs from the sales site parallel to Collaby Hill Road, to the southern boundary of the PM area's PM Entry and Exit Point, refer to **Drawing No. 2449.DRG.023 – Traffic Route Map**.

An alternate access point bypassing the sales area is accessible utilising Collaby Hill Road to access the private access track to the Site's entrance. Refer to **Drawing No. 2449.DRG.023 – Traffic Route Map**.

A speed limit of 25 km p/h is signed on the access road from Collaby Hill Road turn off into the operational area. Refer to **Photo 6 – Traffic Signage**. This area is demonstrated in **Drawing No. 2449.DRG.023 – Traffic Route Map**.

Number of truck movements is approximately 10 loads per day, this is dependent on market demand and sales.



Photo 6 – Traffic Signage

3.6.2 Accommodation and Offices

There are no accommodation or offices located within the Site. The Site's office and weighbridge are located offsite.

3.6.3 Public Services and Utilities Used by the Operation

The operator sources water from the water main that traverses the Site in a south east to north west direction. The water is used for dust suppression purposes by filling a water truck and is stored in three (3) water tanks, shown in **Drawing 2449.DRG.019B - Site Layout Map – PM 214**, which hold a total of 20,000 litres each.

No power is required as there will be no fixed plant or equipment located onsite.

3.6.4 Visual Screening

Due to the historical extraction into the hillside of the West Pit the Site is visible from the Augusta Highway. The elevated nature of the Site does not facilitate total visual screening to occur with an aim for future works to visually soften views. Quarry Development Plans (QDP) have been designed with consideration for visual amenity impacts long term. However, due to the elevation of the face and the geotechnical stability of the area, limited opportunity exists to rehabilitate this area within the scope of this MOP.

It is proposed future extraction beyond Stage 2, not included in this MOP approval, removes the top of the hill face within the West pit to reduce the “scar” from the hillside. Stage 1 and 2 of quarry development and rehabilitation will seek to commence rehabilitation of the bund south of the East Pit and to include additional screening via planting of shrubs and trees native to the area. Terminal pit areas within the West and East pit will be rehabilitated to visually soften the disturbed areas. All future extraction areas will require a MOP review.

3.6.5 Fuel and Chemical Storage

Blasting will be undertaken by a licenced contractor that will supply all materials required and remove upon completion of activities.

No chemicals are proposed to be stored onsite. All fuel is transported to Site via mobile fuel truck as required and one (1) mobile fuel tank is located onsite. Spill kits are available onsite.

3.6.6 Site Security

The PM is 252.69 ha in size and spans across steep topography of which the majority of the PM is not accessible by the public.

Fences are located around the majority of Site’s operational western perimeter along access roads and at Site entry / exits are established with standard stock fencing and gates that are lockable, as shown in the below images (refer to **Photo 7 – Site access road gate onto Collaby Hill Rd** and **Photo 8 – Site access road fencing**). Additional fencing exists within the greater PM property boundaries maintained by those landowners.



Photo 7 – Site access road gate on Collaby Hill Rd



Photo 8 – Site access road fencing

3.6.7 Erosion, Sediment and Silt Control

Section 2.7 Surface Water discusses the mapped watercourses that are located within the greater PM and operational areas of the PM. These do not generally flow even after rainfall events and the main source of water to be managed is surface water run off.

Drawing No. 2449.DRG.027AR1 – Erosion and Sediment Control Plan – Stage 1 and **Drawing No. 2449.DRG.027BR1 – Erosion and Sediment Control Plan – Stage 2** identifying six (6) catchment areas within the operational area of the PM, the mapped watercourses that remain undisturbed and the proposed combination of sediment basins, silt traps, diversion drains and reprofiled roads to direct surface water to sediment basins. The catchment areas have been based on topographic conditions in relation to the different operational areas.

The sediment basins have been designed to the criteria based on International Erosion Control Association – Australia (IECA) Type D 90th percentile (28.6mm rainfall), with freeboard to be maintained in all sediment basins and silt traps to retain 28.6mm rainfall onsite. A search of BoM Climate Data Online identified six (6) occurrences of rainfall 28mm or greater over a 24 hour period have occurred within the last 10 years.

The extraction areas have been designed to retain surface water within the lowered landform to naturally evaporate or absorb into the ground.

Silt extracted from the sediment basins and silt traps will be either placed directly into rehabilitation areas as the material is a virgin material suitable for rehabilitation or reprocessed with lower class material for sale. The volumes are not expected to be high and to be infrequent.

Stage 1

Drawing No. 2449.DRG.027AR1 – Erosion and Sediment Control Plan – Stage 1 identifies a sediment basin is proposed to be created within the pit floor of the West Pit as per with an additional silt trap located south of the West Pit and haul road to capture surface water runoff. A sediment basin is to be created within the lowest point of the East pit floor.

Three (3) silt traps are to be created within the southern areas of the Processing area to capture surface water run off. Diversion channels are to be created to redirect surface water flows when experienced to silt traps. One (1) Sediment basin is proposed to capture redirected flows within the south east corner of the Processing area.

Stage 2

Stage 2 within the East or West pit does not require any additional surface water treatment to be created as per **Drawing No. 2449.DRG.027BR1 – Erosion and Sediment Control Plan – Stage 2**.

As per **Section 2.7 Surface Water** the Site's ADP outlined extraction and approved QDP intersecting the middle drainage path and therefore these areas are considered as approved existing activities and a Water Affecting Activities Permit is not required for continued works within these areas. It is noted , the flows of the watercourse however have not been disturbed, and any significant flows of water will continue to traverse through the Site exiting at the southern point of the operation area. Access and haul roads that have historically been developed and cross the watercourses are at grade and do not impede flows.

3.7 Vegetation Clearance

Under provisions of the *Native Vegetation Regulation 2017*, pursuant to section 27(1)(b) of the Native Vegetation Act 1991, clearing of native vegetation is understood to be exempt on the PM as the activities were authorised under the *Mining Act 1971* and have not been discontinued for more than 12 months any time after November 1973.

3.8 Site Water Management

The Site utilises water obtained from the rainwater tanks located onsite filled from the SA Water mains to undertake dust suppression activities. This includes spraying haul roads, stockpiles and use on the crushing and screening plant.

There will be no wastewater generated onsite.

Approximately 3,700 kilolitres (kl) per annum may be used.

3.9 Description of Quarry Site at Completion

The MOP outlines the activities for Stage 1 and 2, in preparation to advance the Site into the Future Extraction Area, which will require a new MOP review. Stage 1 and 2 will take approximately 17 years to complete. However, activities for progressive rehabilitation and Site closure have factored the proposed final land use of grazing into conceptual final landform plans at the end of Stage 2 for the creation of a safe and stable final landform as per:

- **Drawing No. 2449.DRG.029A – Conceptual Final Landform Plan**
- **Drawing No. 2449.DRG.029B – Conceptual Final Landform Plan – Stage 2 Sections A-A' to C-C'**
- **Drawing No. 2449.DRG.029C – Conceptual Final Landform Plan – Stage 2 Sections D-D' to G-G'**.

As a general guide, the following measures may be used to prepare the final landform and will be considered in progressive rehabilitation operations:

- Using earthmoving equipment to progressively shape and trim the workings to the desired design profiles and flattening the gradients of batters to a stable angle as per Drawing No. 2449.DRG.029A – **Conceptual Final Landform Plan** on reaching the terminal limits of extraction.
- Rounding or marrying the contours into the natural ground surface to soften the visual impacts and reflect the surrounding landscape.
- Application of overburden where available to pit floor and compacted by HME.
- Topsoiling of contours.
- Seeding with pasture grasses to stabilise topsoil.
- Providing access to the terminal workings to allow maintenance of rehabilitation works.
- Designing landform and drainage to control erosion for the particular hydrological regime.
- Establishment of a gentle final floor gradient within PM 214 that directs surface water towards surface water drains and eventually to the floor of the quarry, or sediment basins preventing surface water flows from the final landform leaving the Site.
- Creating a final landform that is structurally safe and stable and facilitates the proposed post-extraction land use.

The following measures are to be implemented for topsoil spreading:

- Areas to be spread are to be re-profiled prior to placing of overlying materials.
- Equipment used to spread materials should be scheduled to avoid compaction.
- Before spreading, subsoils are to be loosened to break up any compacted or surface sealing and to enable keying of soils.
- Topsoil is to be removed from stockpiles in a manner that avoids vehicles travelling over the stockpiles.
- Topsoil is to be respread in the reverse sequence to its removal where possible so that the original upper soil layer is returned to the surface to re-establish the entrapped seed content of the soil where possible.
- Ensure all exposed subsoils are covered.
- After spreading topsoil, ensure the surface is left in a roughened state to assist moisture infiltration and inhibit soil erosion.
- Prior to any planting, cultivate any compacted or crusted topsoil surfaces.
- Soil spreading will be seeded with pasture grass as agreed with the landowner suitable for grazing.
- If erosion occurs on treated surfaces, the area is to be profiled and re-spread as necessary (note: traversing tracked machinery parallel to the slope gradient may assist in reducing the erosion potential of the re-profiled surface).

At the cessation of quarrying, all plant, equipment and structures will be removed, and the PM will be surrendered. At this time the land will be entirely handed back to the landowner for grazing activities.

A formal landowner agreement will be established prior to the closure of the Site to document the requirements for ongoing management of the Site along with any potential residual liabilities that may remain within the agreed final landform. A copy of the Landowner Agreement will be provided to the administering authority prior to the final rehabilitation and decommissioning of the Site.

4 Consultation

4.1 Introduction

C.L.M Quarries was active in engaging identified stakeholders to inform, consult and involve stakeholders on the project to gain an understanding of the environmental impacts considered most important to them, suggested management strategies and to assist inform the outcomes and criteria measurement for the Site.

Consultation is a requirement of the *Mining Act (SA) 1971* and the *Mining Regulations 2020* and was undertaken utilising the International Association for Public Participation (IAP2) best practice methodologies and framework.

Attachment 9 – Youngs Quarry Community Engagement Plan and Summary Report provides a detailed overview of the consultation undertaken during the development of the MOP. A summary of the consultation, the concerns raised and where they have been addressed in this MOP is provided below.

4.2 Stakeholder Identification

The following stakeholder groups were identified to be consulted:

- Landowners (one (1) within operational area and an additional two (2) within the greater PM area)
- Adjacent landowners to the Site (seven (7))
- Aboriginal Heritage Group – Nukunu Wapma Thura Aboriginal Corporation (NWTAC)
- Infrastructure stakeholder (SA Water)
- Government Agencies – DEM and Local Government (Port Pirie Regional Council).

Refer to **Drawing No. 2449.DRG.022 – Stakeholder Consultation Map** identifying landowners and adjacent landowners consulted and their proximity to Site and operational areas.

For note, SA Water was contacted via email and provided with the MOP update information and proposed plans. As of the date of this MOP submission a response has not been received, however provision for blasting and works within proximity to SA Water pipelines to their required standard has been include as a control and management strategy within **Section 6.8 Blasting**.

4.3 Consultation Methods

A breakdown of the type of consultation undertaken and the number of each type of method is presented below in **Diagram 2 – Consultation Methods**.

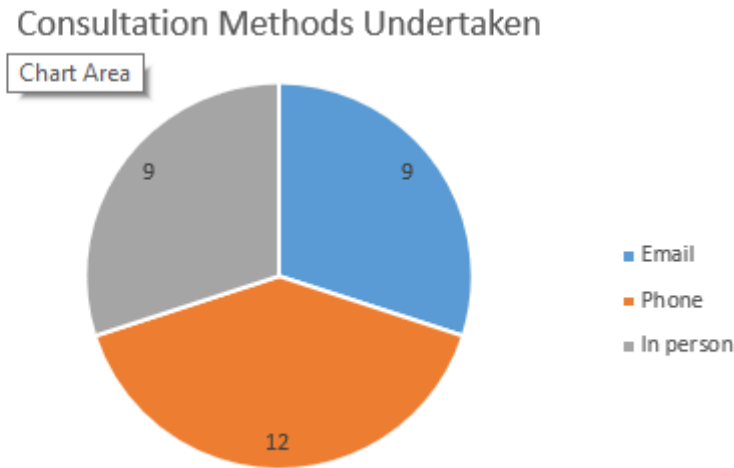


Diagram 2 – Consultation Methods

4.4 Effectiveness of Consultation

A total of 14 stakeholders were consulted of which 40 items of queries and feedback and general discussion on the Mop and Site were received. Through the combined use of the phone calls, one on one meetings and emails, stakeholders were able to discuss their queries regarding the MOP with the summary of the queries and feedback raised covered in **Section 4 – Stakeholder Feedback and Outcomes of Consultation**.

4.5 Stakeholder Feedback and Outcomes of Consultation

A summary of the issues raised and the number of stakeholders who raised the issue are provided below in **Diagram32 – Summary of Environmental Impact Raised**.

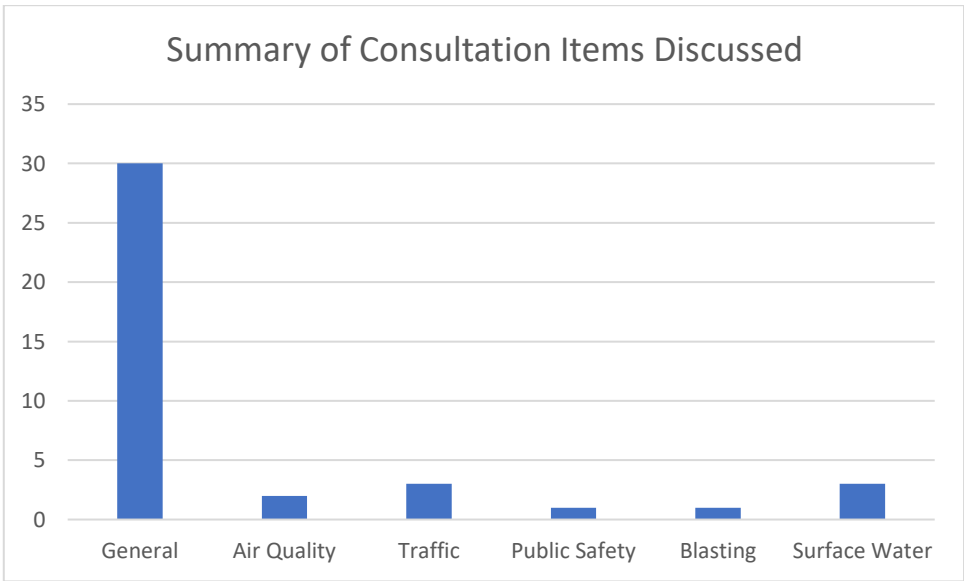


Diagram 3 – Summary of Environmental Impact Raised

The feedback and concerns raised during consultation have been considered and implemented into the control and management strategies if applicable for each of the above identified environmental impacts. The MOP will provide additional detail on which sections address the identified issues. Concerns or queries raised, and by which stakeholder group during consultation are provided below.

4.5.1 Air Quality

Two (2) adjacent landowners commented on air quality and dust suppression.

Both concerns were regarding the level of dust generated by trucks on the internal access roads. Discussion was held regarding mitigation strategies of utilising the water truck regularly on the road and during high use periods during campaigns to dampen the internal site access roads.

Section 6.3 Air Quality outlines the Proposed Environmental Outcome and Measurement Criteria relating to this environmental impact.

4.5.2 Traffic

Two (2) adjacent landowners and one (1) Local Government stakeholder provided feedback regarding the condition of Collaby Hill Road and impact on local road users.

Discussions were held via phone, one on one consultations and emails in January 2025 in which concerns of the condition of Collaby Hill Road was raised, volume of truck movements past an adjacent residence and speed limits on internal access tracks.

The stakeholders were advised the road condition of Collaby Hill Road is the responsibility of the Port Pirie Regional Council and that feedback for more regular maintenance of the road would be provided to the Council. Collaby Hill Road is an unsealed public road, and the majority of the trucks are council contractors accessing the dedicated Council stockpiles directly within the operational area of PM 214 for use within the regional road maintenance program. Additionally, Council have provided a response to the feedback regarding the condition of Collaby Hill Road including recognition that Youngs Quarry donate product to assist with maintenance of the road to improve the asset, that regionally roads are assessed for grading and Collaby Hill Road has been determined to have been used and worn in relation to the road category and type. Council advised they typically only look to grade once the area has had rain and the past year has been quite dry so the perception of road conditions may be heightened due to slightly less maintenance and wearing conditions increased.

The Site's entry and exit point on Collaby Hill Road has been established for many years providing access to the Site from Collaby Hill Road and the internal private access road. One (1) stakeholder who raised concerns regarding traffic movements along Collaby Hill Road has recently constructed a transportable residence approximately 50 m from the property boundary.

Site inspection undertaken by SLR Consulting in January 2025 identified speed limit restrictions (25 km p/h) exist within proximity to the residence located at the northern Collaby Hill Road site entry / exit and as the Site's exit / entry point it also ensures that traffic is moving at a slow pace to stop near the newly placed transportable residence.

Additional dust suppression of the haul road in front of the residence will be undertaken via use of water truck during campaigns and in drier weather conditions.

Section 6.3 Air Quality and **Section 6.11 Traffic** outlines the Proposed Environmental Outcome and Measurement Criteria relating to these environmental impacts.

4.5.3 Public Safety

One (1) adjacent landowner raised a concern of public safety within the Site.

At a one on one consultation undertaken by Groundwork Plus in January 2025, the adjacent landowner expressed a concern the public may be accessing the site (trespassing) at night.

Discussion was undertaken to determine the areas within the quarry concerned and it was determined to be the landowner of the neighbouring property within his own land.

Discussion was held that the Site is well sign posted to advised of potential hazards and private property, and that the planned works are to remediate steep wall faces to increase safety of the Site.

The proposed mitigation strategies discussed were deemed appropriate and have been incorporated into the MOP control and management strategies in **Section 6.10 Public Safety**.

4.5.4 Blasting

One (1) adjacent landowner requested to be notified prior to blasting undertaken within the Site.

Consultation in person undertaken in January 2025 by Groundwork Plus, discussed the frequency proposed in the MOP and within what area (East Pit furthest from their residence) of the quarry it would be undertaken.

As outlined above SA Water was contacted for consultation of the MOP and QDPs, consultation advised SA Water Technical Standard Pipework Access and Protection has been included as a control and management strategy.

Whilst the Adjacent landowner raised no specific concerns with blasting, they did request to be notified prior to a blast occurring and this will be added as a control and management strategy within **Section 6.8 Blasting**.

4.5.5 Surface Water (Erosion and Stormwater Management)

One (1) Landowner raised a concern regarding run off of Surface Water from the operational area (the crushing and stockpile area) within PM 214 entering their property.

The landowner advised surface water is not generally received from the operations unless there has been a short duration high volume rainfall event.

Groundwork Plus undertook two (2) Site inspections, one from the quarry side of the water main pipeline south of the operational areas and another in consultation with the landowner south of the water mains pipeline from within their landholding.

The Site inspections noted two (2) concrete culverts located under the SA Water pipelines installed by the infrastructure owner. A review of Google Maps as early as 2004 shows this culvert has historically managed water through these culverts and downhill towards the mapped watercourse that starts part way through the paddock.

Over the years the landowner has infilled this area to assist passage for farming machinery. Inspection of the paddock identified the landform of the adjacent paddock naturally slopes inwards towards this area.

It was agreed by the quarry operator and in consultation with the landowner that a Stormwater and Erosion Management Plan be created to prevent erosion and surface water run off creating riling within the adjoining paddock. There is no mapped watercourse that feeds directly from the quarry into the mapped watercourse that commences part way through the adjacent landowner's paddock and therefore activities to prevent run off into the adjacent paddock will not trigger a water affecting activity. The adjacent landowner has advised they are happy for water runoff to be rediverted to the mapped watercourse further north that runs through the operational area and continues south through their property or other management protocols to prevent water runoff into the cropping area.

Drawing No. 2449.DRG.027AR1 – Erosion and Sediment Control Plan – Stage 1 and **Drawing No. 2449.DRG.027BR1 – Erosion and Sediment Control Plan – Stage 2** outlines four (4) silt traps to be constructed within the southern portions of the operational area to receive surface water redirected through diversion channels to prevent discharge occurring offsite.

The proposed mitigation strategies discussed were deemed appropriate and have been incorporated into the MOP control and management strategies within **Section 3.6.7 Erosion, Sediment and Silt Control** and **Section 6.1 Surface Water (Erosion, Silt and Stormwater)**.

5 Management of Environmental Impacts

5.1 Introduction to Environmental Impact Assessment

To facilitate the management of potential environmental impacts at the Site in an efficient and effective manner, **Section 6 – Environmental Impacts** has been developed in accordance with the requirements of Section 73 G(1) of the *Mining Act 1971* and Ministerial Regulatory Guidelines – MG12 –*Mine Operations Plans (MOPs)*.

This MOP seeks to address potential environmental impacts and mitigation measures for environmental aspects that are reasonably expected to be affected by the proposed operation. These are identified as the following:

- Surface water (Erosion, Silt and Stormwater Management)
- Noise
- Dust
- Visual Amenity
- Native vegetation and habitat (native fauna)
- Topsoil management
- Waste management
- Weeds, pests and plant pathogens
- Public safety
- Traffic
- Heritage
- Protection of third-party property
- Groundwater
- Blasting

Environmental Impact Assessment, Control and Management Strategies and Objectives / Outcomes presented in the following section identifies:

- The environmental components, context and interests of any affected parties
- The potential environmental impacts that may be associated with the quarry activity
- The potential source, pathway and receptor associated with the impact
- Confirmation that the source, pathway and receptor are present for the associated impact
- A description of the uncertainties and assumptions associated with the impact assessment
- An evaluation of the sensitivity to change of the impact assessment

Where the environmental impact source, pathway and receptor are confirmed to be present for a specific environmental impact the following information will also be provided:

- A description of the impact control and management strategies
- A description of the uncertainties and assumptions associated with the control and management strategies
- An evaluation of the sensitivity to change of the control strategies
- Objective / Outcome and measurement criteria for each impact

Applicable Legislation and Standards for each environmental aspect is provided in **Attachment 10 – Legislation and Standards**.

The proposed outcomes and Objective and Measurement criteria presented at the end of each impact assessment are limited to those associated with environmental aspects that are reasonably expected to be affected.

5.2 Operator Compliance Monitoring

5.2.1 Monitoring Requirements

The Control and Management Strategies nominated in this MOP will require regular surveillance and review, to ensure that performance aligns with design criteria and also reflects the dynamic nature and changing needs of the operation. Monitoring requirements are contained within each of the outcome measurement criteria sections for each environmental aspect as they relate to the Site. Site management shall be responsible for ensuring that all of the monitoring and reporting requirements are implemented and reported to the PM holder on an annual basis.

All instruments used to measure or monitor parameters are to be calibrated, maintained and operated appropriately. All monitoring is to be undertaken by a person or body possessing appropriate experience and qualifications to perform the required measurements.

5.2.2 Records and Reporting

All environmentally relevant documentation, including policies, procedures, forms, records, and reports required to be kept as per this MOP shall be available for a period of at least five (5) years and be available for inspection by an authorised person.

If monitoring is required following a complaint or incident, the report shall:

- Record the date and time of sampling.
- Be endorsed by a person or body possessing appropriate experience and qualifications to perform the required measurements on all records of analysis results.
- Record the results of all analysis, measurements and observations and interpretations (if appropriate).
- Be made available on request to any authorised person who must be permitted to make copies thereof.

6 Environmental Outcomes, Strategies, Criteria and Monitoring

6.1 Surface water (Erosion, Silt and Stormwater Management)

6.1.1 Context

Site hydrology is discussed in **Section 2.7 Surface Water** and sediment control measures are described within **Section 3.6.7 Erosion, Sediment and Silt Control**.

There are two (2) mapped watercourses that intersect the operational areas of the Site. One (1) is a Third Order stream running from north east to south west of the Site. This is described as an ephemeral creek, vegetated with scattered eucalyptus and does not receive regular flows. Both Landowner and the adjacent landowner where the creek line exits to the South have confirmed the creek does not regularly flow.

The second mapped watercourse is a Second Order Stream that runs adjacent to the processing area from the north east exiting the area to the south east. This stream is created by topographic landform depressions collecting surface water and does not regularly receive flows.

The Site visit and Stakeholder Consultation undertaken in January 2025 identified the stockpile and crushing area (Processing Area) within PM 214 required additional erosion management devices. Diversion channels, sediment basins and silt traps have been incorporated to manage the run off as per **Drawing No. 2449.DRG.027AR1 – Erosion and Sediment Control Plan – Stage 1** and **Drawing No. 2449.DRG.027BR1 – Erosion and Sediment Control Plan – Stage 2**. Surface water runoff from future disturbed areas within the Site are expected to be directed inward and captured by the quarry pit floor in the West Pit and East Pit. Therefore, the risk of offsite discharges of sediment laden surface water generated from onsite activities is low.

Silt extracted from the sediment basins and silt traps will be either placed directly into rehabilitation areas as the material is a virgin material suitable for rehabilitation or reprocessed with lower class material for sale. The volumes are not expected to be high and to be infrequent.

Section 2.7 Surface Water discussed the Site's ADP outlined extraction and approved QDP intersecting drainage paths, however as this was a previously approved activity and no further quarry developments for Stage 1 and Stage 2 will intersect or alter the watercourse further, therefore a Water Affecting Activity Permit will not be required.

6.1.2 Impact Assessment

Quarry Phase	Potential impact event			
Operational	Offsite discharge of silt laden waters (contaminated as defined in <i>Environment Protection (Water Quality) Policy 2015</i>) flowing onto adjacent land and non-operational areas of the PM.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
SW1	Disturbed land, surface water runoff.	Overland flow	Adjacent land, receiving waterways	Yes
Uncertainty and assumptions				
Surface water catchments and associated flow paths have been determined based upon existing topographical features of the Site and Stage 1 and 2 QDPs Based on landowner and consultation outcomes, the frequency and duration of flows within the main watercourse is very infrequent. A search of BoM Climate Data Online identified six (6) occurrences of rainfall 28mm or greater over a 24 hour period have occurred within the last 10 years. Watercourse flows are enabled throughout the Site for when flows are irregularly received, and management of surface water impacts from operational areas have been designed to mitigate offsite discharge into neighbouring properties when intense, short duration rainfall events occur. The upstream surface water catchment zone is large and likely to be a losing watercourse due to very infrequent flows being experienced. Clean water from the upstream catchment is able to flow through the Site and will not interact with operational areas.				
Sensitivity to change				
The amount of surface water generated will be dependent on local rainfall and climate changes impacting the water catchment areas upstream and immediately around the quarry. Sensitivity to change is considered low.				
Justification for the confirmation / non-confirmation of Source, Pathway and Receptor				
There is an identified source, pathway and receptor and therefore an impact exists.				

Quarry Phase	Potential impact event			
Operational	Quarry operations intersect mapped watercourses and affect the flow of mapped watercourses reducing availability of surface water for downstream environments.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
SW2	Disturbed land from mining operations.	Overland flow	Receiving waterways within the site	Yes

			and adjacent properties.	
Uncertainty and assumptions				
Two (2) mapped watercourses have been identified to be located within the general proximity of quarry operational areas. Historical Mining approval showed some intersection of the watercourse running between the West and East Pit, however this is a previously approved activity and Stage 1 and 2 QDP and identified Future Extraction Area do not intersect the mapped watercourses. Watercourse flows are enabled throughout the Site for when flows are irregularly received, and management of surface water impacts from operational areas have been designed to mitigate offsite discharge into neighbouring properties when intense, short duration rainfall events occur. The upstream surface water catchment zone is large and likely to be a losing watercourse due to very infrequent flows being experienced. Clean water from the upstream catchment is able to flow through the Site and will not interact with operational areas.				
Sensitivity to change				
Future quarry development plans may require redirection or management of surface water flows, however due to the infrequent flow events, the sensitivity to change is considered low.				
Justification for the confirmation / non-confirmation of Source, Pathway and Receptor				
There is an identified source, pathway and receptor and therefore an impact exists.				

Quarry Phase	Potential impact event			
Closure	Offsite discharge of silt laden waters (contaminated as defined in <i>Environment Protection (Water Quality) Policy 2015</i>) derived from the final landform flowing onto adjacent land or receiving waterways.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
SW3	Disturbed land, surface water runoff.	Overland flow on rehabilitated surface areas.	Adjacent land, receiving waterways.	Yes
Uncertainty and assumptions				
There are mapped watercourses throughout the Site and within the larger PM area. The catchment areas are based on the Stage 1 and 2 plans. Conceptual final landform plans have been developed based on closure commencing at end of Stage 2, however the topography and catchment areas will require continued surface water, erosion and silt control management to contain and prevent offsite discharge of silt laden waters if future extraction occurs beyond these plans. Climatic conditions and upstream development and impacts are unknown and unable to be controlled by PM Holder.				

Sensitivity to change
Future quarry development plans may require redirection or management of surface water flows, however due to the infrequent flow events, the sensitivity to change is considered low.
Justification for the confirmation / non-confirmation of Source, Pathway and Receptor
There is an identified source, pathway and receptor and therefore an impact exists.

6.1.3 Control and Management Strategies

Control and Management Strategies
Operational: • Divert clean catchment run off using a series of suitable banks and / or diversion drains. • Ensure mapped watercourses remain undisturbed • All surface waters affected by disturbed land within the quarry to be directed to pit or to the Sediment Basins / silt traps as per Drawing No. 2449.DRG.027AR1 – Erosion and Sediment Control Plan – Stage 1 and Drawing No. 2449.DRG.027BR1 – Erosion and Sediment Control Plan – Stage 2. • Minimise land disturbance to the extent practicable. • Undertake progressive rehabilitation of disturbed areas to the extent practicable. • Maintain existing access tracks and haul roads at grade within Site crossing the watercourses. • Do not deposit or place any material within the watercourses. • Do not undertake any extraction within the watercourses. • Ensure that historical extraction areas remain at grade and do not obstruct or modify surface water flow in creek. • Cleaning the silt traps to maintain sufficient capacity levels of 28.6 mm rainfall events, and prior to predicted larger rainfall events. • Silt extracted from the sediment basins and silt traps will be either placed directly into rehabilitation or reprocessed with lower class material for sale. Closure • Ensure that erosion and sediment control measures are in place at the completion of the Stage 2 as per Drawing No. 2449.DRG.027BR1 – Erosion and Sediment Control Plan – Stage 2. • Ensure development of plans for future stages and closure of quarry operations include suitable erosion and sediment control plans. • Ensure that all surface water from the disturbed rehabilitated landform is captured within the final rehabilitated landform and pits. • Implementation of progressive and closure rehabilitation plans in an effective manner to achieve maximum vegetated ground cover. • Establishment of ground cover by seeding of native grasses and natural revegetation.
Uncertainty and Assumptions of Control Strategies
The control strategies nominated are known to be effective and apply industry standards for the control and management of sediment laden surface water.
Sensitivity to change of assumptions
The volume of surface water discharge from the Site may be subject to seasonal variation based upon climatic conditions.

6.1.4 Proposed Environmental Objective and Measurement Criteria

Surface Water		
Quarry Phase	Impact ID	Objective
Operational	SW1	The Private Mine Holder must, during operations, ensure no surface water contaminated as a result of mining operations leaves the land.
Objective Achievement		
1. Objective Achievement Quarry records demonstrate that surface water drainage has been established and directs all water from disturbed areas of the quarry into the pit and/or Sediment Basins. Quarry records demonstrate that following heavy rainfall events (>28 mm over 24 hours) and on a quarterly basis, inspections occur confirming that all surface water affected by disturbed land has been directed into the pit and/or Sediment Basin and does not leave the Site. Quarry records demonstrate that surface waters discharged from Site shall be tested for turbidity (NTU) and comply with the ANZECC default trigger value of 50 NTU. 2. What will be measured and the form of measurement Quarry management records demonstrating visual inspection of the drainage pathways. Quarry management records of measurement of Water quality (NTU) prior to discharge events. 3. Location of measurement Within Operational sediment basin outlet areas of PM 214 and stormwater monitoring location as per Drawing No. 2449.DRG.027AR1 – Erosion and Sediment Control Plan – Stage 1 and Drawing No. 2449.DRG.027BR1 – Erosion and Sediment Control Plan – Stage 2. 4. Frequency Following heavy rainfall events (>28 mm over 24 hours) and on a quarterly basis. NTU measurements during flow events. 5. Control / Baseline Data Not applicable. 6. Leading Indicator Criteria Not applicable.		

Surface Water		
Quarry Phase	Impact ID	Objective
Operational	SW2	The Private Mine Holder must ensure there is no adverse impact on surface water quantity or quality as a result of mining operations.
Objective Achievement		
1. Objective Achievement Quarry records demonstrate that mapped watercourses remain intact and unimpeded or altered, and quarry development is undertaken as per Drawing No. 2449.DRG.024AR1 –		

Quarry Development and Rehabilitation Plan – Stage 1 and Drawing No. 2449.DRG.025A – Quarry Development and Rehabilitation Plan – 2.

2. What will be measured and the form of measurement

Quarry management inspection records demonstrate annual visual inspections of the mapped watercourses shows the watercourses remain undisturbed and intact.

3. Location of measurement

Within operation areas of PM 214 mapped watercourses.

4. Frequency

Annually in Spring.

5. Control / Baseline Data

Not applicable.

6. Leading Indicator Criteria

Not applicable.

Surface Water

Quarry Phase	Impact ID	Objective
Post Completion	SW3	The Private Mine Holder must ensure that no surface waters contaminated as a result of the post quarrying landform leaves the land.

Objective Achievement

1. Objective Achievement

An inspection and report from a suitably qualified person conducted once prior to surrender application will verify that watercourses remain undisturbed and the final landform has been constructed as designed and appropriately vegetated preventing contaminated water generated as a result of erosion from rehabilitated areas leaving the Site.

2. What will be measured and the form of measurement

Final landform construction and adherence to final approved design.

3. Location of measurement

Within PM 214.

4. Frequency

Once prior PM revocation application.

5. Control / Baseline Data

Not applicable.

6. Leading Indicator Criteria

Not applicable.

6.2 Noise

6.2.1 Context

Noise levels at the Site are generally typical of rural settings with influence from the Augusta Highway, Collalby Hill Road and the Coonamia to Port Augusta Railway and neighbouring agricultural activities. Potential noise generating activities onsite include material extraction, blasting (irregular) and transport and haulage. As outlined in **Section 3.4 Mining Operations** the modes and hours of operation at the Site are typical operating hours of Primary Production areas.

As per **Section 2.12 Proximity to Housing and Infrastructure** there are three (3) residential dwellings within one (1) km of the PM boundary. However, for the purposes of referencing sensitive residential receptors, distance to the operational areas and development areas of the quarry from residences are approximately 1.7 km to the west, 1.2 km to the south and 2.13 km to the south west of the Site as outlined in **Drawing No. 2449.DRG.003 – Land Access Map**.

There were no concerns regarding noise raised by stakeholders during consultation.

6.2.2 Impact Assessment

Quarry Phase	Potential impact event			
Operational	Potential for noise generated from quarry operations to negatively impact on sensitive receptors (residents).			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
N1	Noise generated from HME, truck movements, operations and blasting.	Air	Sensitive Receptors as per Drawing No. 2449.DRG.003 – Land Access Map .	Yes
Uncertainty and assumptions				
Operating hours for the Site will be as per the Section 3.3.8 Modes and Hours of Operation. The Section 2.12 Proximity to Infrastructure and Housing details the distances to the residences in proximity to the Site and contributing sources of noise within the local area, particularly from the National Highway. Topography and activities occurring within the pit will provide some degree of natural shielding from noise generated from the Site. Blasting will occur on an as needs basis depending upon the hardness of the rock being extracted and market demand, approximately once per annum depending on market demand.				
Sensitivity to change				
Changes to the operational activities and duration could result in changes to noise emissions generated onsite. This may result in a low degree of change to noise emissions related to potential additional HME and haulage trucks utilised onsite.				

Justification for the confirmation / non-confirmation of Source, Pathway and Receptor

Due to the proximity to the adjacent sensitive receptors, it is reasonable to expect that there could be the potential for noise to be generated from the quarry that could be audible.

6.2.3 Control and Management Strategies**Control and Management Strategies****Construction and Operation**

- Operations shall adhere to approved operating hours.
- Equipment is to be maintained in accordance with the original equipment manufacturer's specifications.
- Avoid unnecessary operation of plant and / or revving of engines, pumps, compressors (and shut down when not in use).
- Fit broadband reversing alarms on mobile equipment where practicable.
- Noise complaints from neighbouring residents are recorded, investigated and responded to in a timely manner.
- Manage vehicle speed to 40 km/hr on internal access roads and 25 km/ph entering and exiting the Site as per **Drawing No. 2449.DRG.023 – Traffic Route Map**.

Uncertainty and Assumptions of Control Strategies

Potential impacts associated with noise nuisance are further reduced through the implementation of the control and management strategies which are considered reasonable and industry standard practice to protect sensitive receptors from noise nuisance.

Sensitivity to change of assumptions

Noise nuisance impacts may vary if there are significant changes to the operations of the Site and the sources and location on noise generating activities are changed. The sensitivity to change of assumptions is low based on the local topography and campaign-based nature of the operation.

6.2.4 Proposed Environmental Objective and Measurement Criteria**Noise****Quarry Phase****Impact ID****Objective**

Construction and Operation

N1

The Private Mine Holder must, during construction and operation, ensure no public nuisance impacts from noise as a result of mining operations.

Objective Achievement**1. Objective Achievement**

Quarry records shall demonstrate that all noise related complaints are acknowledged within 48 hours and closed out within seven (7) days to the satisfaction of the Regulator.

In the event the additional control measures do not resolve the complaint to the satisfaction of the Regulator, noise measurements will be undertaken in accordance with Part 3 of the *Environment Protection (Commercial and Industrial Noise) Policy 2023* at locations agreed upon by the operator and Mining Regulator to verify compliance with Part 1 Section 5 — Indicative noise levels.

2. What will be measured and the form of measurement

Acknowledgement and complaint resolution measured through review of quarry management records.

If required, monitoring will measure noise levels (dB) as per Part 3 of the *Environment Protection (Commercial and Industrial Noise) Policy 2023*.

3. Location of measurement

At the sensitive receptor/s or alternative location as agreed with the Mining Regulator.

4. Frequency

As required following a complaint.

5. Control / Baseline Data

Not applicable.

6. Leading Indicator Criteria

Not applicable.

6.3 Air Quality

6.3.1 Context

The Site is located within a large grazing and cropping area of which emissions of dust is expected to be typical of rural settings. The proximity of the nearest sensitive receptors is discussed in **Section 2.12 Proximity to Infrastructure and Housing**.

Potential dust generating activities onsite include material extraction, blasting, processing and transport.

There are three (3) residential dwellings within one (1) km of the PM boundary. However, for the purposes of referencing sensitive residential receptors, distance to the operational areas and development areas of the quarry, sensitive residences receptors are approximately 1.7 km to the west, 1.2 km to the south and 2.13 km to the south west of the operational areas as outlined in **Drawing No. 2449.DRG.003 – Land Access Map**.

As per **Section 4 Consultation** one (1) adjacent landowner stakeholder raised a concern regarding dust generated by traffic entering and exiting the northern Collaby Hill Road Site access point. The stakeholder has recently constructed a transportable residence approximately 50 m from the established access road and entry / exit point. **Section 3.6.1 Access and Roads** and **Drawing No. 2449.DRG.023 – Traffic Route Map** identifies a reduced speed limit of 25 km p/h is in place for this section of the road and trucks are travelling at a lower speed from entering or preparing to exit the Site.

Two (2) stakeholders raised concerns regarding dust generated from truck movements on Callaby Hill Road (public road). CLM Quarries advised Council and Council contractors utilise Collaby Hill Road for accessing the Site and CLM employees and contractors utilise the internal access road. Feedback was provided to Council and Council have advised Collaby Hill Road is included in grading and patrol works and is suitable for its category use. Climate conditions have impacted Council's ability to undertake recent grading due to lack of rain and this can affect the perception of road conditions.

6.3.2 Impact Assessment

Quarry Phase	Potential impact event			
Operational	Potential for nuisance dust emissions generated by quarry extraction and operations resulting in adverse dust impacts to sensitive residential receptors.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
AQ1	Dust generated from onsite activities such as vehicle movements, product handling and dry weather conditions.	Air	Nearest sensitive residential receptors as per Drawing No. 2449.DRG.003 – Land Access Map	Yes
Uncertainty and assumptions				
Dust emissions from the application area may be influenced by changes to operational and climatic conditions. Wind direction predominantly northerly in the morning and south westerly in the afternoon. The wind direction may aid in the reducing the impact from dust emissions to the sensitive receptors located south east and south west and west of the Site respectively. The surrounding landscape is predominantly agricultural with general activity of cropping and grazing that at times generate dust in addition to dust generated from other road users of Collaby Hill Road. A sample taken from the Site and analysed identified the sample contains a free silica content of 96 percent, as unstrained to moderately strained quartz. Based on the proposed extraction volumes per annum and exposure timeframes to the source, exposure limits are considered to be of low risk to receptors. The free silica content is one of many constituents of dust, including pollen, sand, and other plant material. Site access roads and entry and exit points have been established for a number of years prior to development of additional residences. The proximity to the nearest sensitive residential receptors is greater than the EPA minimum distance for evaluation of dust impacts associated with crushing, grinding and milling of 500 m distance. The topography surrounding the Site and prevailing wind direction for the Site further reduce the likelihood of air quality impacts from extraction and processing activities.				
Sensitivity to change				
The level of dust within the ambient environment may influenced by climatic conditions. It is common for drier seasons to contain higher levels of dust due to the extent of exposed soils, unsealed roads and cropped land. Traffic movements along the access road and utilising the Site entry and exit point is variable based on campaigns and market demand.				

Justification for the confirmation / non-confirmation of Source, Pathway and Receptor

It is reasonable to expect that a source, pathway and receptor may exist.

Quarry Phase	Potential impact event			
Site Closure	Potential for nuisance dust emissions generated by the final landform to negatively impact on sensitive receptors (residents).			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
AQ2	Disturbed land and unrehabilitated areas.	Air	Nearest sensitive residential receptors as per Drawing No. 2449.DRG.003 – Land Access Map	Yes
Uncertainty and assumptions				
Success rate of revegetation may vary depending on climatic conditions. Potential erosion from wind and rain may inhibit progress of revegetation across the final landform. The proximity to the nearest sensitive residential receptors is greater than the EPA minimum distance for evaluation of dust impacts associated with crushing, grinding and milling of 500 m distance. The topography surrounding the Site and prevailing wind direction for the Site further reduce the likelihood of air quality impacts from extraction and processing activities.				
Sensitivity to change				
The sensitivity to change of the assumptions is considered to be low, given the absence of dust generating operational activities post closure and offset distances to sensitive receptors.				
Justification for the confirmation / non-confirmation of Source, Pathway and Receptor				
Potential erosion from wind and rain may result in dust generated from the final landform. The final landform will be revegetated with grasses and monitored to manage erosion and limit the potential for dust generation.				

6.3.3 Control and Management Strategies

Control and Management Strategies**Operational**

- Undertake ongoing visual inspections of Site operations and monitoring of wind and weather forecasts (BoM) to determine days when increased dust suppression (watering) regime is required to be implemented.

- Minimise the disturbance footprint and clearing of onsite vegetation to that necessary for the quarry development.
- Water spraying to be carried out to dampen down cleared areas, extraction working areas, haul roads, stockpiles and other hardstand areas.
- Ensure vehicles use established roads and tracks where possible and the speed limit of 40 km/hr is adhered to.
- Adhere to speed limit of 25 km/ph entering and exiting the Site and as per **Drawing No. 2449.DRG.023 – Traffic Route Map**.
- Undertake progressive rehabilitation of disturbed areas to the extent practicable to assist in managing dust emissions from the Site.
- Water cart to be used on section of access road in front of residence near the northern Site entry and exit point on Collaby Hill Road.
- Establishment of vegetation on west pit external batter as per **Drawing No. 2449.DRG.024AR1 – Quarry Development and Rehabilitation Plan – Stage 1**.
- Progressive rehabilitation of terminal pit areas as per **Drawing No. 2449.DRG.024AR1 – Quarry Development and Rehabilitation Plan – Stage 1** and **Drawing No. 2449.DRG.025A – Quarry Development and Rehabilitation Plan – 2**.
- Reduce exposed areas and undertake rehabilitation and seeding with pasture grasses as early as possible during rehabilitation activities.

Closure

- Ongoing battering and establishment of terminal pit area for preparation of the final landform and stabilisation with pasture grasses in accordance with **Drawing No.2449.DRG.029A – Conceptual Final Landform**.
- Seeding of final rehabilitated areas with pasture grass suitable for grazing purposes.

Uncertainty and Assumptions of Control Strategies

Potential impacts associated with air quality are reduced through the implementation of the control and management strategies, which are considered reasonable and industry standard practice to mitigate potential impacts.

Sensitivity to change of assumptions

The sensitivity to change of assumptions is low based upon current land use and established access roads.

6.3.4 Proposed Environmental Objective and Measurement Criteria

Air Quality		
Quarry Phase	Impact ID	Objective
Construction and Operation	AQ1	The Private Mine Holder must during construction, operation and closure, ensure no public health and/or nuisance impacts from dust generated by mining operations.
Objective Achievement		
1. Objective Achievement Dust related complaints acknowledged within 48 hours and actioned appropriately within seven (7) days to the satisfaction of the Quarry Regulator.		

In the event the additional control measures do not resolve the complaint to the satisfaction of the Mining Regulator, air quality monitoring is to occur at locations as agreed with the Mining Regulator to demonstrate that dust deposition conforms with the following:

- dust deposition of 4g/m²/month, when monitored in accordance with Australian Standard AS 3580.10.1 *Methods for sampling and analysis of ambient air – Determination of particulates – Deposited matter – Gravimetric method*, or
- Particulate matter with an aerodynamic diameter of equal to or less than 10 µm (PM₁₀) average less than 50 µg/m³ over a 24-hour period (midnight to midnight) as specified in the SA Environment Protection (Air Quality) Policy 2016, using methods as agreed with the Mining Regulator.

2. What will be measured and the form of measurement

Records of dust complaints acknowledged and actioned with satisfactory resolution.

In the event dust monitoring is undertaken, it will be undertaken in accordance with *Australian Standard AS 3580.10.1 Methods for sampling and analysis of ambient air – Determination of particulates – Deposited matter – Gravimetric method*.

3. Location of measurement

Between the receptor and the operations as agreed with the Mining Regulator.

4. Frequency

As required following a complaint.

As directed by the Mining Regulator

5. Control / Baseline Data

Not applicable.

6. Leading Indicator Criteria

Not applicable.

6.4 Visual Amenity

6.4.1 Context

The visual amenity of the site and surrounding environment is provided within **Section 2.4 Amenity** and outlined in **Drawing No. 2449.DRG.010 – Visual Assessment Map** and **Attachment 6 – Visual Assessment Plates**.

Views are generally limited to the eastern face of the West pit due to its location on the western face of the rising Southern Flinders Ranges. The predominant visual impact from the Site is associated with historical extraction of this pit, carried out by former operators. The pit is estimated to have been opened and observed from external viewpoints since 1960. Little rehabilitation of this pit face has been implemented in previous years.

Since the time that CLM acquired the quarry and whilst the pit has been operating under the previously approved ADP, works have been undertaken to commence improvements to the visual impacts of this pit. In addition, Quarry Development Plans (QDP) have been designed with consideration for visual

amenity impacts long term. However, due to the elevation of the face and the geotechnical stability of the area, limited opportunity exists to rehabilitate this area within the scope of this MOP.

There were no concerns raised about visual amenity of the Site during consultation.

6.4.2 Impact Assessment

Quarry Phase	Potential impact event			
Operational	Potential for negative visual impact of quarrying activities upon sensitive receptors situated within adjacent land.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
VA1	Quarry development, disturbed land.	External viewpoints	Nearest sensitive residential receptors as per Drawing No. 2449.DRG.003 – Land Access Map	Yes
Uncertainty and assumptions				
Assessment of the potential visual amenity impacts from the Site are well understood and informed by the visual impact assessment undertaken October 2019 and shown in Drawing No. 2449.DRG.010 – Visual Assessment Map and Attachment 6 – Visual Assessment Plates. The seven (7) visual assessment locations have been informed via desktop analysis and field assessment of topography, vegetation, and sensitive receptors and are considered representative sensitive receptor locations. Due to the historical extraction into the hillside of the West Pit the Site is visible from the Augusta Highway. The elevated nature of the Site does not facilitate total visual screening to occur with an aim for future works to visually soften views. Quarry Development Plans (QDP) have been designed with consideration for visual amenity impacts long term. However, due to the elevation of the face and the geotechnical stability of the area, limited opportunity exists to rehabilitate this area within the scope of this MOP. It is proposed future extraction beyond Stage 2 removes to the top of the hill face within the West pit to reduce the “scar” from the hillside. Stage 1 and 2 of quarry development and rehabilitation will seek to commence rehabilitation of the bund south of the East Pit and to include additional screening via planting of shrubs and trees native to the area. Terminal pit areas within the West and East pit will be rehabilitated to visually soften the disturbed areas.				
Sensitivity to change				
Development occurring closer to the Site could result in additional visual aspects increasing in some locations, however the sensitivity to change is considered low based upon the current land use for the area. The topography within the Site has been taken into consideration with the development of the QDPs to reduce the existing visual impact.				

Justification for the confirmation / non-confirmation of Source, Pathway and Receptor
Existing visual amenity aspects due to historical nature of extraction at the Site and its location on the western face of the rising Southern Flinders Ranges and it reasonable to expect these to continue.

Quarry Phase	Potential impact event			
Site Closure	Potential for negative visual impact of quarrying activities upon sensitive receptors post closure.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
VA2	Final landform	External viewpoints	Nearest sensitive residential receptors as per Drawing No. 2449.DRG.003 – Land Access Map	Yes
Uncertainty and assumptions				
Existing visual amenity aspects due to historical extraction at the Site and its location on the western face of the rising Southern Flinders Ranges.				
Existing quarry footprint has been present for a long time of which adjacent landowners are aware of the historical operations and acceptance of the scar within the landscape.				
Sensitivity to change				
Not likely to change. No known future residential development or intensification of land use is known within the adjacent land parcels.				
Justification for the confirmation / non-confirmation of Source, Pathway and Receptor				
Existing visual amenity aspects due to historical nature of extraction at the Site and its location on the western face of the rising Southern Flinders Ranges and it reasonable to expect these to continue.				

6.4.3 Control and Management Strategies

Control and Management Strategies
Operational - Quarry development and rehabilitation of terminal pit areas as per Drawing No. 2449.DRG.024AR1 – Quarry Development and Rehabilitation Plan - Stage 1 and Drawing No. 2449.DRG.025A – Quarry Development and Rehabilitation Plan - Stage 2. - Minimise the disturbance footprint to that necessary for the quarry development. - Establish additional screening via planting of trees and shrubs native to the area in front (south) of the West Pit to improve long term visual screening as per Drawing No. 2449.DRG.024AR1 – Quarry Development and Rehabilitation Plan - Stage 1.

Site Closure

- Rehabilitation to be undertaken to achieve approved plans **Drawing No. 2449.DRG.029A – Conceptual Final Landform Plan** and **Drawing No. 2449.DRG.029B – Conceptual Final Pan – Sections A-A' to C-C'** and **Drawing No. 2449.DRG.029C – Conceptual Final Pan – Sections D-D' to G-G'**.
- Backfilled benches to be seeded with pasture grasses to blend in with the surrounding landscape.
- Ensure sufficient overburden and topsoil placement and establishment to support vegetation growth.
- Quarry related infrastructure removed at cessation of quarrying (unless otherwise approved to be retained in accordance with landowner agreement).

Uncertainty and Assumptions of Control Strategies

No known future residential development or intensification of land use is known within the adjacent land parcels.

The control and management strategies are considered to be reasonable given the historical nature of extraction at the Site and its location on the western face of the rising Southern Flinders Ranges. Overburden for use in progressive rehabilitation is a limiting factor in reducing the visual amenity impact at the Site.

Overburden for use in progressive rehabilitation is a limiting factor in availability of material for progressive rehabilitation reducing the visual amenity impact at the Site.

Sensitivity to change of assumptions

QDPs may change due to the long term nature of the Site which may result in moderate sensitivity to change through increased visual impacts.

6.4.4 Proposed Environmental Objective and Measurement Criteria

Visual Amenity		
Quarry Phase	Impact ID	Objective
Operational	VA1	The Private Mine Holder must, during construction and operation, ensure that all rehabilitated landforms integrate and harmonise with the surrounding landscape.
Objective Achievement		
1. Objective Achievement Assessment undertaken at the visual assessment locations as per Drawing No. 2449.DRG.010 – Visual Assessment Map annually and at the end of each Stage of quarry development confirms that the quarry development is undertaken in accordance with the provisions of the approved QDP's and strategies have been implemented to minimise visual amenity impacts. 2. What will be measured and the form of measurement Records of assessments undertaken. 3. Location of measurement Locations shown in Drawing No. 2449.DRG.010 – Visual Assessment Map.		

4. Frequency

Annually and at the end of each Stage of quarry development.

5. Control / Baseline Data

Visual Assessment outlined in **Drawing No. 2449.DRG.010 – Visual Assessment Map** and **Attachment 6 – Visual Assessment Plates**.

6. Leading Indicator Criteria

Not Applicable.

Visual Amenity		
Quarry Phase	Impact ID	Objective
Post Completion	VA2	The Private Mine Holder must, post-completion, ensure that all rehabilitated landforms integrate and harmonise with the surrounding landscape.
Objective Achievement		
1. Objective Achievement Visual assessment of the Site and surrounds undertaken by a suitably qualified person post quarrying confirming final landforms conform to Drawing No. 2449.DRG.029A – Conceptual Final Landform Plan .		
2. What will be measured and the form of measurement Photographic visual assessment of the Site and surrounds is to be undertaken.		
3. Location of measurement Visual assessment locations shown within Drawing No. 2449.DRG.010 – Visual Assessment Map .		
4. Frequency Once prior to the PM revocation application.		
5. Control / Baseline Data Not applicable.		
6. Leading Indicator Criteria Not applicable.		

6.5 Weeds, Pests and Plant Pathogens

6.5.1 Context

Section 2.8.1 Weed and Plant Pathogens discuss weeds, pests and plant pathogens that may be present onsite. **Section 2.9 Fauna** outlines pests and fauna are likely to occur in the area.

Due to the current land use of cropping in non-operational areas of the PM and quarrying, the Site actively undertakes regular weed and pest management. A search of 'NatureMaps' did not list any weed species that are known to occur within the Site.

No concerns regarding weeds and pest management within operational areas of the quarry were identified during consultation.

6.5.2 Impact Assessment

Quarry Phase	Potential Impact Event			
Construction and Operation	Introduction of declared weed or pest species, or plant pathogens as a result of the quarrying activity.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
W1	HME and light vehicles	Movement of vehicles on roads, spreading weeds	Operational area and onsite vegetation	Yes
Uncertainty and Assumptions				
Portions of the PM are actively cultivated and subject to ongoing weed management.				
Weed management practices are established within the operational areas of the quarry.				
The source, pathway and receptor are well understood.				
Sensitivity to Change				
Frequency of heavy vehicle movements from offsite could result in weed propagules being brought onto Site.				
The presence of weed species within the Site may change depending upon seasonal variations, climatic conditions as the quarry development footprint progresses. The Site may contain weed seed and propagules within the soil that were not observed at the time of the Site inspection but could emerge naturally if the Site is not cultivated.				
Justification for the Confirmation / Non-confirmation of Source, Pathway and Receptor				
Quarry sites by their nature contain a lot of exposed soil that is often prone to weed infestation.				

6.5.3 Control and Management Strategies

Control and Management Strategies
Construction and Operation - All earthmoving equipment transported to Site for quarry operations will be clean and weed free prior to being transported to the Site. - Controlling weed infestations to prevent further spread of weeds. - Annual weed spraying campaigns throughout the Site and rehabilitated areas, with additional spraying campaigns (e.g. spot spray, bi-annual sprays) undertaken as necessary. - Restrict movement of vehicles and machinery to project area and established access tracks.
Uncertainty and Assumptions of Control Strategies

Declared weed and pest species will be controlled through regular inspections and implementation of controls. The strategies are considered to be industry standard practice.

Sensitivity to Change of Assumptions

Frequency of heavy vehicle movements from offsite could result in weed propagules being brought onto Site.

The presence of weed species within the Site may change depending upon seasonal variations, climatic conditions as the quarry development footprint progresses.

6.5.4 Proposed Environmental Objective and Measurement Criteria

Weeds, Pests and Plant Pathogens		
Quarry Phase	Impact ID	Objective
Operational	W1	The Private Mine Holder must during construction and operation, ensure no introduction of new species of environmental weed, plant pathogens or pests (including feral animals), nor sustained increased in abundance of existing weed or pest species on the land.
Objective Achievement		
1. Objective Achievement Records of annual inspections undertaken in Spring, are held by the operator to demonstrate no introduction of new weeds, pests or plant pathogens nor an increase in abundance of existing weeds and pests onsite. 2. What will be measured and the form of measurement Records of inspections. 3. Location of measurement Within operational areas of PM 214. 4. Frequency Annually in Spring. 5. Control / Baseline Data Baseline data collected during spring monitoring as part of annual compliance reporting. 6. Leading Indicator Criteria Not applicable.		

6.6 Native Vegetation and Habitat

6.6.1 Context

As discussed within **Section 2.8 Vegetation, Weeds and Plant Pathogens** native vegetation is present within the Site and the larger PM area, however large portions of PM have been heavily disturbed due to cropping and grazing and quarrying. **Section 2.9 Fauna** outlines fauna that are likely to occur in the

area, however due to current and historical land uses it is unlikely that the Site would provide a permanent habitat within proximity to the operational areas and actively farmed areas.

Under provisions of the *Native Vegetation Regulation 2017*, pursuant to section 27(1)(b) of the *Native Vegetation Act 1991*, clearing of native vegetation is understood to be exempt on the PM as the activities were authorised under the *Mining Act 1971* and have not been discontinued for more than 12 months any time after 21 November 1984.

No surrounding stakeholders highlighted native vegetation or habitat as a concern throughout consultation.

6.6.2 Impact Assessment

Quarry Phase	Potential Impact Event			
Construction and Operation	Unauthorised clearance or damage of native vegetation and habitat as a result of quarrying operations.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
NV1	Quarrying development activities, HME and light vehicles	Land	Native Vegetation	No
Uncertainty and Assumptions				
Under provisions of the <i>Native Vegetation Regulation 2017</i> , pursuant to section 27(1)(b) of the <i>Native Vegetation Act 1991</i> , clearing of native vegetation is understood to be exempt on the PM as the activities were authorised under the <i>Mining Act 1971</i> and have not been discontinued for more than 12 months any time after November 1973.				
The Site is largely disturbed by quarrying and agricultural activities.				
Sensitivity to Change				
Unlikely to change.				
Justification for the Confirmation / Non-Confirmation of Source, Pathway and Receptor				
As the Site is exempt from provisions of the <i>Native Vegetation Act 1991</i> , no pathway.				

6.7 Topsoil Management

6.7.1 Context

Section 2.12 Topsoil and Subsoil and **Section 3.3.3.1 Topsoil and Subsoil Stockpiles** provides a description of the existing topsoil and subsoils within the Site and predicted to be stored. Overburden is limited as the Site produce PM1, PM2 and PM3 products for sale.

The Site has been largely disturbed and extracted by historical operations of which historic topsoil removal and storage has not occurred or has been used in previous Site works. Topsoil removal since acquisition of CLM Quarries has been stored in a stockpile as per **Drawing No. 2449.DRG.019B – Site Layout Map – PM 214** and will be added to as new sections of topsoil are stripped or located north of the East Pit for rehabilitation of this pit area. The plans for Stage 1 and Stage 2 of extraction will not generate significant volumes of topsoil requiring storage.

Topsoil that is stripped will be stockpiled onsite for use in future rehabilitation activities.

There were no concerns raised regarding topsoil during consultation.

6.7.2 Impact Assessment

Quarry Phase	Potential impact event			
Operational	Failure to strip, stockpile and conserve topsoils and subsoils in an efficient and effective manner intended for re-use in rehabilitation.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
TS1	Quarry development	Topsoil stripping	Landforms	Yes
Uncertainty and assumptions				
Blending of topsoil and overburden has previously occurred and been applied in historic rehabilitation works within the Site. The Site has commenced storage of topsoil separately.				
Future development of quarry pit will undertake topsoil stripping and storage.				
Topsoils are likely to be shallow and vary in depth throughout the quarry footprint.				
Overburden is limited as the Site produce PM1, PM2 and PM3 products for sale which enables utilisation of most materials extracted within the Site.				
Sensitivity to change				
Unlikely to change as quarry development plans demonstrate limited extraction of new areas containing topsoil.				
Justification for the confirmation / non-confirmation of Source, Pathway and Receptor				
It is reasonable to expect that the source, pathway and receptor exist as topsoil stripping and storage is likely to be required during future stages of quarry development.				
Quarry Phase	Potential impact event			

Site Closure	Insufficient application of topsoil on progressively rehabilitated landforms resulting in failed rehabilitation.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
TS2	Quarry development	Topsoil stripping	Landforms	Yes
Uncertainty and assumptions				
Very limited topsoil will be available as new areas to be stripped is limited with the plans of Stage 1 & 2 operations focused on correcting historical extraction areas rather than disturbing new areas.				
Future extraction area will generate topsoil that will require storage and has been estimated at 50 mm depth.				
Sensitivity to change				
Topsoil amounts may vary across the Site, future extraction plans may involve stripping of undisturbed areas providing for greater amounts of topsoil to be stored for rehabilitation works.				
Justification for the confirmation / non-confirmation of Source, Pathway and Receptor				
It is reasonable to expect that the source, pathway and receptor exist as topsoil stripping will occur where undisturbed areas remain for extraction.				

6.7.3 Control and Management Strategies

Control and Management Strategies
Construction and Operation: • Soils to be stripped ahead of quarrying and temporarily stockpiled. • Stockpiles of topsoil shall not exceed two (2) m in height. • Wherever possible, soils should be used directly on areas being rehabilitated and seeded with native grasses. • Compaction of topsoils by vehicles tracking over stockpiles should be avoided. • All topsoil stockpiles are to be regularly inspected and managed for weed infestation. Closure: • Stockpiles of topsoils are stored, maintained and monitored prior to being used for progressive rehabilitation. • Ensure soils are spread on rehabilitation areas to a sufficient depth to support vegetation growth. • Vegetation of topsoils with native grass and naturally occurring revegetation after application to encourage stabilisation.
Uncertainty and Assumptions of Control Strategies
There is a low degree of uncertainty and assumptions pertaining to the control and management strategies which are considered reasonable and industry standard practice.
Sensitivity to change of assumptions
Unlikely to change.

6.7.4 Proposed Environmental Objective and Measurement Criteria

Topsoil Management		
Quarry Phase	Impact ID	Objective
Operational	TS1	The Private Mine Holder must, during construction, operation and post-completion, ensure the existing (pre-mining) soil quality and quantity is maintained.
Objective Achievement		
1. Objective Achievement Annual inspection and recording of soil stockpiles at the Site to confirm that: • Topsoil stockpiles are kept separate from subsoil stockpiles (if applicable). • There is no evidence of erosion (e.g. rills, gullies) or other evidence of topsoil loss. • Stockpiles of topsoils do not exceed three (3) m in height 2. What will be measured and the form of measurement Records of inspections documenting evidence of topsoil stockpile heights and condition. 3. Location of measurement Within PM 214. 4. Frequency Annually. 5. Control / Baseline Data Not applicable. 6. Leading Indicator Criteria Not applicable.		

Topsoil		
Quarry Phase	Impact ID	Objective
Post Completion	TS2	The Private Mine Holder must during post-completion, ensure the existing (pre-mining) of soil quality and quantity is maintained.
Objective Achievement		
1. Objective Achievement Inspection of the topsoil application is undertaken by a suitably qualified person at the closure of the operations confirms topsoil is of a suitable quality and application and sufficient to ensure long-term establishment and success of vegetation growth. 2. What will be measured and the form of measurement Site inspection records by a suitably qualified person. 3. Location of measurement Rehabilitation areas of PM 214. 4. Frequency Once prior to the completion of quarrying activities and rehabilitation at the Site.		

5. Control / Baseline Data

Not applicable.

6. Leading Indicator Criteria

Not applicable.

6.8 Blasting

6.8.1 Context

As outlined in **Section 3.3.4 Use of Explosives**, drilling and blasting activities are to be undertaken by a licensed contractor. All blasts will be monitored to ensure compliance with AS2187.2 requirements. Blasting will only be undertaken within the East Pit due to hardness of the rock type, with blasting to occur on an as needs basis depending upon the hardness of the rock being extracted and market demand, approximately once per annum depending on market demand.

Proximity to the nearest residential receptors is discussed in **Section 2.12 Proximity to Infrastructure and Housing** with the nearest receptor located approximately 1.3 km south east of the East Pit.

Two (2) above ground mild steel concrete lined SA Water pipelines run through the centre of PM 214 entering from the north western corner along the boundary of CT 6211/117 exiting at the south eastern end of PM 214 of CT 6211/117 as shown in **Drawing No. 24499.DRG.003 – Land Access Map**. The pipes are located approximately 465 m south of the East pit.

SA Water's technical standard, TS 0136 Pipework Access and Protection Section 12.4.2 4 (d) states the following criteria for blasting which is aligned to the Australia Standard and the Site's Outcome / Objective achievement:

- d) Adhere to safe vibrations limits (peak particle velocities (PPV)) which SA Water may specify for a particular asset – in general, the maximum vibrations at the asset shall not exceed the limits provided in Table 8: Safe Vibration Limits (PPV) below.

Table 8: Safe Vibration Limits (PPV)

Vibration Type	Safe PPV Limit for Rigid Pipelines (AC, RC, VC, CI)	Safe PPV Limit for Flexible Pipelines	Safe PPV Limit for Masonry/Mass Concrete Oviforms
Continuous vibration	5 mm/s maximum	10 mm/s maximum	2 mm/s maximum
Intermittent or transient	10 mm/s maximum	20 mm/s maximum	

One (1) Adjacent landowner requested during consultation they be notified 24 hours in advance of a planned blast.

6.8.2 Impact Assessment

Quarry Phase	Potential impact event
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Operational	Potential for fly rock, vibration and air overpressure causing damage to nearby infrastructure and / or environmental nuisance to nearby sensitive receptors.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
B1	Blasting of rock	Air and land	Residential structures and adjacent land owners, third part property / infrastructure as per Drawing No. 2449.DRG.003 – Land Access Map.	Yes
Uncertainty and assumptions				
Blasting is planned to occur only within the East Pit. Blasting frequency has been nominated as once per annum but is likely to be less frequent dependent on campaign and market demand. Blasting has been undertaken within the East Pit historically and is a continuation of activities. The water main pipes are located approximately 465 m south of the East pit. No blasting will occur in the West Pit for the duration of these plans. Blasting activities will be required for the development of the quarry extraction area and may cause fly rock, vibration and overpressure.				
Sensitivity to change				
The degree of fly rock, vibration and overpressure that may occur is dependent upon the planning and design of each blast.				
Justification for the confirmation / non-confirmation of Source, Pathway and Receptor				
An impact could potentially occur given the proximity of nearby sensitive receptors.				

6.8.3 Control and Management Strategies

Control and Management Strategies
- Adhere to a blast management plan (refer to Attachment 11 – Blast Management Plan). - Design process to consider the Maximum Instantaneous Charge (MIC) and drill hole diameter to ensure that maximum ground vibration and overpressure of each blast does not exceed the specified limits. - Quarry records demonstrate that all blast related complaints are acknowledged and actioned in a timely manner. - All blasts will be monitored to ensure compliance with AS2187.2 requirements. - Blasting operations will be designed and implemented by suitable qualified contractors. - Blasting will be undertaken by a suitable qualified and licenced contractor.

- Explosives will be transported and handled by the blasting contractors and will not be stored at the Site.
- Visual assessment of pipeline prior to blasting and after each blast for presence of fly rock.
- Adherence to SA Water's technical standard, [TS 0136](#) Pipework Access and Protection vibration limits.
- Notify landowner and adjacent landowners of a planned blasts 24 hours prior to blast occurring.
- No blasting to occur on Total Fire Ban days.

Uncertainty and Assumptions of Control Strategies

Control measures are considered standard practice for the quarry industry and are proven to be effective in the prevention of potential impacts.

Sensitivity to change of assumptions

A potential impact could occur if the standard policy and procedures are not implemented, however this is considered unlikely to occur.

6.8.4 Proposed Environmental Objective and Measurement Criteria

Blasting		
Quarry Phase	Impact ID	Objective
Operational	B1	The Private Mine Holder must, during construction and operation, ensure that there are no adverse impacts from airblast, flyrock and vibration caused by blasting to: - public safety - human comfort - third party property (including stock) - adjacent land use, and - adjacent infrastructure and operation.
Objective Achievement		
1. Objective Achievement Quarry records demonstrate that all blast related complaints are acknowledged within 48 hours and closed out within seven (7) days to the satisfaction of the Mining Regulator. If complaints are not able to be resolved to the satisfaction of the Regulator all blasts are monitored to comply with the following; • Ground Vibration – 5 mm / sec with up to 5 percent allowable to 10 mm / sec or less in a 12 month period • Overpressure - 115Db (Lin Peak) with up to 5 percent allowable to 120 Db (Lin Peak) or less in a 12 month period. No incidents of fly rock leaving the Site or causing impacts to utility infrastructure within the Site. 2. What will be measured and the form of measurement Records of blast related complaint acknowledgement and actions(s). Ground vibration and overpressure. Visual monitoring of the SA Water pipeline to monitor the movement of fly rock. 3. Location of measurement SA Water pipeline.		

Additional monitoring locations located at sensitive residential receptors (if complaints received).

4. Frequency

Records maintained following a blast or as requested by Mining Regulator.

5. Control / Baseline Data

Not Applicable

6. Leading Indicator Criteria

Not applicable.

6.9 Waste Management

6.9.1 Context

Section 3.4.4 Industrial and Domestic Wastes discusses waste management at the Site. Industrial and domestic wastes will not be stored onsite. Any waste that is generated from minor servicing of plant and equipment will be removed by the maintenance contractors at the time of undertaking the work.

No chemicals are proposed to be stored onsite. All fuel is transported to Site via mobile fuel truck as required and one (1) mobile fuel tank is located onsite. Spill kits are available onsite.

6.9.2 Impact Assessment

Quarry Phase	Potential impact event			
Operational	Soil and water contamination caused by inappropriate storage, handling and disposal of wastes.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
WM1	Commercial and Industrial waste	Spill to land	Landform, groundwater and post quarry land users	Yes
Uncertainty and assumptions				
The potential source, pathway and receptor is well understood. No chemical storage facilities will be established onsite. A mobile fuel tank is utilised onsite. Servicing of plant and machinery will be undertaken offsite, or contractors will remove all materials used onsite if onsite works are required. Fuel is transported to Site via mobile fuel truck. All spills will be immediately cleaned and disposed of correctly. A spill within the Site is unlikely to affect groundwater quality as the proposed final pit floor levels are planned at 180 m AHD in the West Pit and 215 m AHD in the East Pit and therefore approximately there is a five (5) m AHD buffer or greater to buffer levels expected. Domestic wastes will be generated and disposed of offsite at the PM Sales Area with none to be generated within the PM.				

Sensitivity to change
Not likely to change.
Justification for the confirmation / non-confirmation of Source, Pathway and Receptor
The source, pathway and receptor are well understood.

Quarry Phase	Potential impact event			
Site Closure	Soil and water contamination caused by inappropriate storage, handling and disposal of wastes remaining onsite post quarry closure.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
WM2	Commercial and industrial waste (i.e. oils, tyres etc.), Plant and Equipment	Disused plant and equipment	Landform, groundwater, post quarry land users	Yes
Uncertainty and assumptions				
Industrial and domestic waste are typically associated with the maintenance of plant and machinery associated with quarrying activities.				
Campaign crushing is undertaken with mobile plant machinery. No fixed plant is located onsite.				
Contractors and employees to manage waste and remove from Site appropriately.				
A minimum buffer of five (5) m to groundwater levels will be maintained from the lowest pit floor level.				
Sensitivity to change				
Not likely to change. Unplanned minor plant servicing may be required onsite and therefore control and management strategies are included to ensure appropriate management is undertaken if required.				
Justification for the confirmation / non-confirmation of Source, Pathway and Receptor				
The source, pathway and receptor are well understood.				

6.9.3 Control and Management Strategies

Control and Management Strategies
Operational: - Any spill of potential contaminants shall be cleaned up immediately. - Any industrial waste that is generated from servicing of plant and equipment is removed by the maintenance contractors undertaking the work if required. - Trackable wastes disposed by licenced operator at an approved facility if required.

- Mobile fuel storage and handling contained within a bunded area as per *Australian Standard AS 1940 - The storage and handling of flammable and combustible liquids* and *EPA Guideline: EPA080/16 Bunding and spill management, May 2016*.
- Undertake annual inspections of mobile bunded fuel storage for integrity and cleanliness. Shall be maintained in a liquid-tight and clean condition.
- Dispose of contaminated containment and / or absorbent material and any impacted surface soils in accordance with *EPA Guideline: EPA 378/13 Disposal of used hydrocarbon absorbent materials, August 2013*.

Closure:

- Adherence to final landform closure plans.
- Removal of all plant and equipment unless authorised to remain onsite by landowner(s).

Uncertainty and Assumptions of Control Strategies

There is a low degree of uncertainty and assumptions pertaining to the control and management strategies which are considered reasonable and industry standard practice.

Sensitivity to change of assumptions

Not likely to change.

6.9.4 Proposed Environmental Objective and Measurement Criteria

Waste Management		
Quarry Phase	Impact ID	Objective
Operational	W1	The Private Mine Holder must ensure no adverse impacts to the environment from commercial or industrial waste (not including waste rock) produced as a result of mining operations.
Objective Achievement		
1. Objective Achievement All waste tracking receipts are stored at the Site and will demonstrate that listed waste materials generated by quarry operations have been disposed of at an EPA licenced facility. Records show all fuel is stored and handled in a bunded area, designed and installed in accordance with Australian Standard AS 1940 - The storage and handling of flammable and combustible liquids and EPA Guideline: EPA080/16 Bunding and spill management, May 2016. 2. What will be measured and the form of measurement Site inspection records, photographic evidence of fuel storage area. Quarry management records of waste removal. 3. Location of measurement Within PM 214. 4. Frequency Annually. 5. Control / Baseline Data N/A.		

6. Leading Indicator Criteria

N/A .

Waste Management		
Quarry Phase	Impact ID	Objective
Closure	WM2	The Private Mine Holder must, during post completion, ensure that all commercial, industrial and domestic waste produced as a result of mining operation is disposed of in accordance with relevant legislation.
Objective Achievement		
1. Objective Achievement Closure inspections to confirm no waste spill to the surface. Any items of quarry related infrastructure have been removed (unless agreed in writing with the landowner). 2. What will be measured and the form of measurement Site inspection records, photographic evidence and or landowner agreement. 3. Location of measurement Within PM 214 4. Frequency Once prior to the PM revocation application. 5. Control / Baseline Data Not applicable. 6. Leading Indicator Criteria Not applicable.		

6.10 Public Safety

6.10.1 Context

The Site is located within an agricultural area and as per **Section 3.6.6 Site Security** the PM is 252.69 ha in size and spans across steep topography of which the PM is not accessible by public due to the steep terrain. The operational area currently has approximately 20 ha of active disturbance areas incorporating haul roads, pit areas and processing areas.

A Desktop Historical Highwall Geotechnical Review was undertaken in November 2023 as is provided as **Attachment 3 – Youngs Quarry Desktop Historical Highwall Geotechnical Review** outlining Site geotechnical risks and proposed future quarrying methods that have been factored into the Site's Quarry Development and rehabilitation plans for Stage 1 and 2 to ensure a safe and stable landform is achieved prior to further extraction into the West Pit wall face.

Within the West Pit there are historical extraction areas up to 68 m high with angles of 75 degrees or greater. The progressive development of the Pit is intended to improve the geotechnical stability of the historical extraction areas. The QDPs for Stage 1 and Stage 2 will cut back the faces to be 60 degrees

with an overall slope angle of 40 degrees. This will ensure a safer and stable area and allow for future development to occur safely into the hillside of the West Pit to commence alleviating visual amenity concerns.

Fences are located around the majority of Site's operational western perimeter along access roads and at Site entry / exits are established with standard stock fencing and gates that are lockable. Additional fencing exists within the greater PM property boundaries maintained by those landowners.

Public consultation resulted in one (1) stakeholder questioning if trespassing had occurred onsite historically. It was discussed it would have most likely to have been the neighbouring property (neighbours undertake authorised pest management activities regularly), but if there are any concerns the stakeholder can contact the Quarry to discuss and investigate.

6.10.2 Impact Assessment

Quarry Phase	Potential impact event			
Operational	Public injury and / or death due to members of the public entering the Site and interacting with quarry development / HME during operational phase.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
PS1	Site landform and HME	Unauthorised public access to the quarry	Member of the public	Yes
Uncertainty and assumptions				
The impact assessment assumes that trespassers may enter the Site. Site is sign posted to warn of dangers of quarry site.				
The condition of the fencing and gates will remain in good order; however, it could be subject to vandalism.				
Historic excavation activities have created steep wall faces that will be rehabilitated through multiple Stages of mining.				
Rock sources (quartzite and dolomite) area competent rock sources to maintain stability for the post completion landform.				
Sensitivity to change				
Unlikely to change.				
Justification for the confirmation / non-confirmation of Source, Pathway and Receptor				
It is possible that the Site could be affected by trespassers although the likelihood of this is considered to be low.				

Quarry Phase	Potential impact event
Site Closure	Public injury and / or death due to members of the public entering the Site and interacting with quarry development and final landform post closure

Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
PS2	Site rehabilitated landform	Unauthorised public access	Member of the public	Yes
Uncertainty and assumptions				
The impact assessment assumes that trespassers may enter the Site. The condition of the fencing in proximity to operational areas and access roads will remain in good order; however, it could be subject to vandalism. A large portion of the PM is not operational and difficult to access due to steep terrain or private property. Historic excavation activities have created steep wall faces that will be rehabilitated. Rock sources (quartzite and dolomite) area competent rock sources to maintain stability for the post completion landform.				
Sensitivity to change				
Unlikely to change.				
Justification for the confirmation / non-confirmation of Source, Pathway and Receptor				
It is possible that the Site could be affected by trespassers post closure.				

6.10.3 Control and Management Strategies

Control and Management Strategies
Operational - Regular inspection of the existing site fencing, signage and gates to ensure they are adequately maintained. - Disused haul roads to historically quarried areas north east of the East Pit to be blocked. - Establishment of batters and slope angles as per Drawing No. 2449.DRG. 024B – Quarry Development and Rehabilitation Plan – Stage 1 Sections A-A’ to F-F’ and Drawing No. 2449.DRG. 025B – Quarry Development and Rehabilitation Plan – Stage 2 Sections A-A’ to C-C’ and Drawing No. 2449.DRG. 025C – Quarry Development and Rehabilitation Plan – Stage 2 Sections D-D’ to G-G’. - Lock access gates when Site is not operational. - Regular inspection of Site fencing, signage and gates to ensure that they are adequately maintained. - Installation of signs warning of dangers within the quarry Site. Closure - Ensure the post-extraction landform is safe, stable and suitable for the desired long-term land use. - The Conceptual Final Landform is developed and maintained in accordance with the following QDPs showing establishment of the batter angles and benching to establish a safe and stable

landform Drawing No. 2449.DRG.029B – Conceptual Final Landform Plan – Sections A-A’ to C-C’ and Drawing No. 2449.DRG.029C – Conceptual Final Landform Plan – Sections D-D’ to G-G’.
Uncertainty and Assumptions of Control Strategies
The potential impacts to public safety are reduced provided that the operator adheres to the control and management strategies which are considered reasonable and industry standard practice.
Sensitivity to change of assumptions
Not likely to change.

6.10.4 Proposed Environmental Objective and Measurement Criteria

Public Safety		
Quarry Phase	Impact ID	Objective
Operational	PS1	The Private Mine Holder must during, during construction and operation, ensure that unauthorised entry to the land does not result in public injuries and or deaths that could have been reasonably prevented.
Objective / Outcome Achievement		
1. Objective Achievement All public injuries and / or deaths resulting from unauthorised access to the mine Site are recorded in Mine Logbook and investigated by a suitably qualified third party within one (1) calendar month (or other time as agreed with Mining Regulator), and the results of the investigation show that the incident could not have been reasonably prevented by the Private Mine Holder. 2. What will be measured and the form of measurement Quarry records of incidents and results of investigations by a suitably qualified third-party. 3. Location of measurement Within PM 214. 4. Frequency Within one (1) month (or as agreed with the Mining Regulation) after an incident. 5. Control / Baseline Data Not Applicable 6. Leading Indicator Criteria Not applicable.		

Public Safety		
Quarry Phase	Impact ID	Objective
Closure	PS2	The Private Mine Holder must demonstrate that, post completion, the risks to health and safety of the public so far as they may be affected by mining operations, are as low as reasonably practicable.

Objective Achievement
1. Objective Achievement Final landform to be constructed in accordance with approved final designs and inspected by a certified engineer at completion to ensure geotechnical stability of final landform. 2. What will be measured and the form of measurement Inspection to confirm final batter angles and geotechnical stability as per Drawing No. 2449.DRG.029B – Conceptual Final Landform Plan – Sections A-A’ to C-C’ and Drawing No. 2449.DRG.029C – Conceptual Final Landform Plan – Sections D-D’ to G-G’. 3. Location of measurement Rehabilitated areas within PM 214. 4. Frequency Once post quarry completion prior to tenement revocation. 5. Control / Baseline Data Not Applicable. 6. Leading Indicator Criteria Not applicable.

6.11 Traffic

6.11.1 Context

Site access is discussed in **Section 3.5.1 Access and Roads**. The majority of truck movements and light vehicle movements are via the private access track as per **Drawing No. 2449.DRG.023 – Traffic Route Map**. Some trucks that are required to bypass the Sales Area (i.e. Council contractors) will utilise Collaby Hill Road and enter the Site at the northern Collaby Hill Road entry / exit point. This is campaign based traffic movement as Council require material.

Road condition and dust from traffic movements of the Council managed Collaby Hill Road was raised as a concern by two (2) stakeholders during consultation. Port Pirie Regional Council were provided the feedback on the conditions and requested road maintenance of Collaby Hill Road. Council advised the road hasn't required any additional efforts to maintain as the road has worn over the past years as expected for the category/ use. Notably Council typically only looks to grade once the region has had rain and the past year has been quite dry so the perception of road conditions maybe heightened due to slightly less maintenance and wearing conditions increased.

Dust generated from traffic movements along the Site access track from the northern Collaby Hill Rd site entry / exit point was raised by one (1) stakeholder closest to this point, who has recently constructed a transportable residence approximately 50 m from the property boundary. The speed limit along the access road has been reduced to 25 km p/hr along this section of road.

6.11.2 Impact Assessment

Quarry Phase	Potential impact event			
Operational	Public safety risks such as collision between trucks and vehicles resulting from quarry vehicles entering and exiting the Site at the access points.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
T1	Quarry related traffic	Across Land	Public Traffic	Yes
Uncertainty and assumptions				
Traffic volumes will vary dependent on campaign demands.				
Council and Council contractors utilise the public road for Site access and employees and CLM contractors utilise the private Site Access Road.				
Speed limits restrictions along access road near the northern Collaby Hill Road entry / exit point are implemented.				
Sensitivity to change				
Climate conditions affecting road condition and maintenance schedules.				
Justification for the confirmation / non-confirmation of Source, Pathway and Receptor				
It is likely an impact is present.				

6.11.3 Control and Management Strategies

Control and Management Strategies
- Use of water cart on access roads. - Maintain speed restrictions along Site access roads and public roads as per Drawing No. 2449.DRG.023 – Traffic Route Map. - Redirection of traffic to private access track wherever possible. - All personnel are to comply with the Site traffic management policies / procedures. - Site management must ensure that all employees operating vehicles are licenced to do so. - Site management are to ensure all personnel are aware of their responsibilities in relation to vehicle use through undertaking inductions, issuing notices, and through use of directives. - Site management must ensure road signage is in accordance with <i>Australian Standards AS 1744:1975 and AS/NZS 1906.1:2007.</i> - All contractors and visitors must report to the Site office as directed upon arrival to the Site. - Two-way radios must be readily accessible in all Site vehicles. - Vehicles must be in a roadworthy condition and fit for purpose. - Regular use of the water cart to be used on internal access road adjacent the residence located near the Site's entry / exit point onto Collaby Hill Road.
Uncertainty and Assumptions of Control Strategies

Control and management strategies adopted are standard industry practices and are proven to be effective (low uncertainty).

Sensitivity to change of assumptions

The sensitivity of the control measures to a change of assumptions is low.

6.11.4 Proposed Environmental Objective and Measurement Criteria

Traffic		
Quarry Phase	Impact ID	Objective
Operational	T1	The Private Mine Holder must, during construction and operation, ensure there are no traffic accidents involving members of the public and mine-related traffic that could have been reasonably prevented by the Private Mine Holder.
Objective Achievement		
1. Objective Achievement All traffic accidents resulting in public injury and / or death at quarry access points will be investigated by a suitably qualified independent third-party within one (1) calendar month (or other time as agreed by Mining Regulation) and the results of the investigation show public injuries and / or deaths could not have been reasonably prevented by the Private Mine Holder. 2. What will be measured and the form of measurement The results of the traffic incident investigation. 3. Location of measurement Site of the affected area / incident. 4. Frequency Within one (1) month (or other time as agreed with Mining Regulation) after each incident. 5. Control / Baseline Data N/A. 6. Leading Indicator Criteria N/A.		

6.12 Protection of Third Party Infrastructure

6.12.1 Context

The larger PM area is a combination of the quarry operations, agricultural areas to the south and the north eastern portion of the Site is characterised by moderately steep (south eastern portion) to steep (north eastern portion) hills.

Section 2.12 Proximity to Infrastructure and Housing details sensitive residential receptors distances to the operational areas and development areas of the quarry as approximately 1.7 km to the west, 1.2

km to the south and 2.13 km to the south west of the Site as outlined in **Drawing No. 2449.DRG.003 – Land Access Map**.

The Site has been an operational quarry with historic quarry receipts dating from as far back as the early 1940s and became a registered PM in 1973. The SA Water pipeline is listed as constructed in 1973 running in a north west to south easterly direction adjacent to the quarry operations as outlined in **Drawing No. 2449.DRG.003 – Land Access Map**. There is no other public infrastructure located within the PM.

There were no concerns raised by stakeholders during consultation regarding third party property damage.

6.12.2 Impact Assessment

Quarry Phase	Potential impact event			
Operational	Damage to third party infrastructure – residential structures and adjacent land holdings as a result of quarrying activities including fire.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
TPP1	Quarry operations / hot works	Ground	Residential structures and adjacent land owners as per Drawing No. 2449.DRG.003 – Land Access Map	Yes
Uncertainty and assumptions				
The potential impacts to third-party property are well understood based on observations and monitoring from quarry operations to date.				
The SA Water pipeline infrastructure has been considered for impacts under Section 6.8 Blasting .				
Sensitivity to change				
Unlikely to change.				
Justification for the confirmation / non-confirmation of Source, Pathway and Receptor				
It is reasonable to expect that the source, pathway and receptor could occur.				

6.12.3 Control and Management Strategies

Control and Management Strategies
- Hot works activities if required onsite will be undertaken within the cleared quarry footprint away from vegetation. - Fire-fighting equipment available (extinguishers and water cart). - Employees trained on fire response protocols and management (training in use of extinguishers, emergency response and preparedness). - No hot works (welding) during total fire ban conditions.

No blasting on total fire ban days
Uncertainty and Assumptions of Control Strategies
Control measures are considered standard practice for the quarry industry and are proven to be effective in the prevention of potential impacts.
Sensitivity to change of assumptions
The sensitivity of the control measures to a change of assumptions is low.

6.12.4 Proposed Environmental Outcome and Measurement Criteria

Protection of Third Party Infrastructure		
Quarry Phase	Impact ID	Objective
Operational	PTP1	The Private Mine Holder must, during construction and operation, ensure that there are no adverse impacts to third party land use or property on or off the land as a result from mining operations (including as a result of uncontrolled fires).
Objective Achievement		
1. Objective Achievement All incidents involving damage to third party property resulting from the quarry Site are recorded in Quarry Management Logbook and investigated by a suitably qualified person within one (1) calendar month (or other time as agreed with the Mining Regulator) and the results of the investigation show that the incident could not have reasonably been prevented by the quarrying activity. 2. What will be measured and the form of measurement Quarry Management records for evidence of third-party incident and investigation. 3. Location of measurement At the location of incident. 4. Frequency At the time of incident. 5. Control / Baseline Data Not applicable. 6. Leading Indicator Criteria Not applicable.		

6.13 Groundwater

6.13.1 Context

A search of the DEW 'NatureMaps' application (2024) confirmed the Site is not located within an area prescribed under the *Landscape South Australia Act 2019*.

A groundwater investigation was carried out by Groundwater Science (GWS) in April 2021, refer **Attachment 4 – Groundwater Desktop Study – Youngs Quarry – Private Mine 214**.

The nearest existing groundwater user is located 2.5 km north-east of the Site. This user is located in a separate sub-catchment in the high part of the ranges.

Section 2.6 Groundwater outlines identified Terrestrial GDE's within proximity to the Site, described as comprising of shrubland >1m. **Attachment 4 – Groundwater Desktop Study – Youngs Quarry – Private Mine 214**, the following is summarised:

- In the hard rock terrain (range front and low-lying hills) groundwater levels occur more than 20 m below creek lines. This demonstrates that creek line vegetation would be reliant on surface water including incident rainfall and / or ephemeral streamflow.
- No groundwater dependent ecosystems are confirmed from the BoM database (Figure 10) on the Coastal Plain. Mapped vegetation is described as having water tables more than 20 m below ground. Similar to above, environmental water requirements for creek line vegetation are expected to be provided by ephemeral streamflow.

Based on available data there are no confirmed GDE's near to the Site's operations. "Mapped vegetation is described as having water tables more than 20 m below ground. Similar to above, environmental water requirements for creek line vegetation are expected to be provided by ephemeral streamflow".

The Groundwater Desktop Study – Youngs Quarry – Private Mine 214 recommended a five (5) m buffer from pit floor levels is able to be maintained with proposed quarry floor levels and has been demonstrated in **Drawing No. 2449.DRG.024B – Quarry Development and Rehabilitation Plan – Stage 1 Sections A-A' to F-F'** and **Drawing No. 2449.DRG.025B – Quarry Development and Rehabilitation Plan – Stage 2 Sections A-A' to C-C'** and **Drawing No. 2449.DRG.025C – Quarry Development and Rehabilitation Plan – Stage 2 Sections D-D' to G-G'**.

6.13.2 Impact Assessment

Quarry Phase	Potential impact event			
Operational	Groundwater interaction resulting in adverse impacts on water quality, groundwater flows and groundwater levels.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
GW1	Groundwater interception	Groundwater movement	Nearby groundwater well users and GDEs.	Yes
Uncertainty and assumptions				
The nearest existing groundwater user is located 2.5 km north-east of the Site. This user is located in a separate sub-catchment in the high part of the ranges and not likely to be connected with the groundwater conditions at the Site. Based on available data there are no confirmed GDE's near to the Site's operations. As described in Attachment 4 – Groundwater Desktop Study – Youngs Quarry – Private Mine 214 mapped vegetation is described as having water tables more than 20 m below ground. Environmental water requirements for creek line vegetation are expected to be provided by ephemeral streamflow. A groundwater investigation was carried out by Groundwater Science (GWS) in April 2021, refer Attachment 4 – Groundwater Desktop Study – Youngs Quarry – Private Mine 214 and outlines inferred groundwater levels and known water levels from onsite drilling within accessible areas including two drillholes, one (1) DH2 within the pit floor of the West Pit and one (1) (DH4) adjacent the East Pit. Due to the terrain and inaccessibility to undertake drilling on the northern aspects of the West Pit, it has been recommended additional investigations be undertaken once safe access can be established to determine water levels within the Future Extraction Area. Stage 1 and 2 demonstrate a minimum of seven (7) m AHD from pit floor levels to undetected groundwater levels, two (2) m above the recommended five (5) m buffer.				
Sensitivity to change				
Seasonal variations may cause some fluctuations of groundwater levels.				
Justification for the confirmation / non-confirmation of Source, Pathway and Receptor				
Whilst there are no identified GDEs or groundwater well users located within or adjacent to the Site, limited groundwater information and data uncertainty suggests that a source, pathway and receptor may be present.				

6.13.3 Control and Management Strategies

Control and Management Strategies	
- Adherence to QPD and Drawing No. 2449.DRG.024B – Quarry Development and Rehabilitation Plan – Stage 1 Sections A-A' to F-F' and Drawing No. 2449.DRG.025B – Quarry Development and Rehabilitation Plan – Stage 2 Sections A-A' to C-C' and Drawing No. 2449.DRG.025C – Quarry Development and Rehabilitation Plan – Stage 2 Sections D-D' to G-G' - Undertake groundwater level validation through the establishment of a monitoring well at a suitable location adjacent the West Pit to inform future development plans and subsequent MOP reviews to be approved by DEM. - Regular review of quarry development pit floor levels to ensure operations correspond with QDPs and commitment to remain five (5) m above groundwater levels. - Periodic review of extraction area to ensure no seepage is occurring. If seepage observed, stop work and undertake a risk assessment and management plan to be developed (inclusive of new floor levels). - Monitoring of groundwater levels and quality (EC and PH) twice per annum in Summer and Spring to monitor seasonally high groundwater levels and quality.	
Uncertainty and Assumptions of Control Strategies	
Control and management strategies are considered reasonable and commensurate with potential impacts of groundwater interception.	
Sensitivity to change of assumptions	
Future development plans and establishment of measured groundwater levels may alter control and management strategies.	

6.13.4 Proposed Environmental Objective and Measurement Criteria

Groundwater		
Quarry Phase	Impact ID	Objective
Operational	GW1	The Private Mine Holder must, during construction, operation and closure, ensure that there is no adverse impact to the quantity or quality of groundwater caused by mining operations.
Objective / Outcome Achievement		
1. Objective Achievement Annual inspection or survey (as agreed with Mining Regulator) of the pit floor levels recorded in the Mine Logbook will demonstrate that mining operations do not exceed the mine depth levels stated in Drawing No. 2449.DRG.024AR1 – Quarry Development and Rehabilitation Plan Stage 1 and Drawing No. 2449.DRG.025A - Quarry Development and Rehabilitation Plan - Stage 2. Monthly inspection records during operations of the extraction area confirms that there are no signs of seepage during operation of the Site. Monitoring of groundwater levels and quality (EC and pH) adjacent to East Pit demonstrates a five (5) m buffer is maintained and no changes to groundwater quality as a result of quarry operations.		

2. What will be measured and the form of measurement

Quarry Pit floor levels.
 Inspection records for visual assessment of seepage.
 Seasonal high groundwater levels.
 Groundwater quality (EC and pH).

3. Location of measurement

Within quarry extraction areas of PM 214.
 Location of well as per **Drawing No. 2449.DRG.024AR1 – Quarry Development and Rehabilitation Plan Stage 1.**

4. Frequency

Survey Pit floor levels annually.
 Seepage inspections monthly during operations.
 Annual reporting of biannual water (summer and spring) quality and quantity measurements.

5. Control / Baseline Data

Attachment 4 – Groundwater Desktop Study – Youngs Quarry – Private Mine 214.

6. Leading Indicator Criteria

If trend monitoring of groundwater levels demonstrate groundwater buffer is less than 5.5 metres to planned pit floor levels, initiate a hydrogeological review and reassess pit floor levels if deemed necessary based on review outcomes.

6.14 Heritage

6.14.1 Context

Section 2.16 Heritage (Aboriginal, European, Geological) outlined a search undertaken by the DPC AAR of the Central Archive including the Register of Aboriginal Heritage Sites and Objects has no entries for Aboriginal sites in relation to the Site search area.

A search of the SARIG did not identify any objects and / or sites of geological significance within the Site area.

Consultation did not raise any concerns regarding Heritage, however the Quarry Manager has established a good relationship with the Nukunu Wapma Thura Aboriginal Corporation (Nukunu) members and has hosted members onsite previously to introduce themselves and establish an open relationship.

6.14.2 Impact Assessment

Quarry Phase	Potential impact event			
Operational	Disturbance and / or destruction of Aboriginal, European and / or Geological Heritage sites or objects through development and operation of the Site.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
H1	Quarrying development activities	Quarry development earthworks i.e.	Heritage object and / or site	Yes
Uncertainty and assumptions				
Whilst there is an absence of reported Aboriginal Heritage items within proximity to the Site, it is possible that artefacts, objects or remains could exist that are currently unknown. Due to the presence of shallow soils across the Site above the marble resource the likelihood is low.				
Sensitivity to change				
Additional large scale earthworks could result in unrecorded Heritage sites being uncovered.				
Justification for the confirmation / non-confirmation of Source, Pathway and Receptor				
It is possible that unrecorded heritage items of significance may be present within the Site.				

6.14.3 Control and Management Strategies

Control and Management Strategies
Operational - In the event that any Aboriginal and / or European cultural heritage sites, objects or remains and / or Geological monuments are identified the following is to occur: • Immediately stop work in the vicinity of the find. • Notify the relevant authority (DPC AAR) and the local SA Heritage Council of the find / potential find at the Site. • No activities are to recommence in the vicinity of the find until such time that liaison with the relevant authority and authority to proceed has been granted. - Development is to be undertaken in accordance with the approved QDPs Drawing No. 2449.DRG.024AR1– Quarry Development and Rehabilitation Plan Stage 1 and Drawing No. 2449.DRG.025AR1 – Quarry Development and Rehabilitation Plan - Stage 2
Uncertainty and Assumptions of Control Strategies
The control and management strategies are considered reasonable and commensurate with the potential risk.
Sensitivity to change of assumptions
Unlikely to change.

6.14.4 Proposed Environmental Objective and Measurement Criteria

Heritage		
Quarry Phase	Impact ID	Objective
Operational and Closure	H1	The Private Mine Holder must, during construction, operation and post completion, ensure that there is no damage, disturbance or interference to Aboriginal or non-Aboriginal heritage sites, objects or remains as a result of mining operations unless it is authorised.
Objective Achievement		
1. Objective Achievement Quarry Management Logbook records demonstrate that, upon discovery within the Site of any possible Aboriginal, European and / or Geological Heritage sites or objects, work ceased until the relevant authorities were notified and only recommenced once authorisation was received. 2. What will be measured and the form of measurement Quarry management logbook records of discovery and evidence appropriate procedures followed upon discovery. 3. Location of measurement Within PM 214. 4. Frequency Upon discovery. Upon surrender of PM 214 5. Control / Baseline Data Not applicable. 6. Leading Indicator Criteria Not applicable.		

7 Post Mine Land Use Plan

At the completion of extraction activities and progressive rehabilitation work, it is envisaged that the Site will be returned to grazing land use as determined by the landowner as outlined in **Drawing No. 2449.DRG.028 – Conceptual End of Use Plan**. This plan has been developed based on consultation with current landowner, adjacent land uses and topographic considerations / practicable uses.

Refer to **Attachment 8 – Post Mining Land Use Plan**.

8 Operator Capability

8.1 Effective and efficient mining and outcome achievement

- ☒ There is a reasonable prospect that the land in respect of which the lease is sought could be effectively and efficiently mined.
- ☒ Based on the control strategies provided I consider that the environmental outcomes will be able to be achieved.
- ☒ We / I declare that the mineral resource or ore reserve (or both) has been appropriately identified and estimated.

8.2 Operator capability and compliance history

I/We have the following technical, operational and financial capabilities and resources available for carrying out proposed mining operations:

C.L Land Management Pty Ltd have successfully operated Youngs Quarries PM 214 for six (6) years with demonstrated site improvements and award of continuing contracts particularly with Local Government. The resource extracted from Youngs Quarry is a valuable resource for local development and construction projects.

C.L Land Management Pty Ltd have established induction procedures, safety policies and procedures for all employees and contractors as a commitment to the welfare and safety of contractors and visitors to the Site.

In the last 5 years, a related body corporate or I have failed to comply with a provision of a corresponding Australia Law or designated Australian Act in connection with authorised operations that resulted in:

☐ Yes	☒ No	The revocation or suspension of an authority to carry out authorised operations; or
☐ Yes	☒ No	A prosecution for an offence; or
☐ Yes	☒ No	The imposition of a penalty by a court; or
☐ Yes	☒ No	The issuing of a notice, direction or order that required the suspension or discontinuance of any authorised operations; or
☐ Yes	☒ No	The rectification of any harm to the environment or the rehabilitation of any land, place or other aspect of the environment.

Further detail on noncompliance if relevant:

9 Reference List

Department for Environment and Water 2024, *NatureMaps*, viewed April 2024, Government of South Australia, <http://spatialwebapps.environment.sa.gov.au/naturemaps/?locale=en-us&viewer=naturemaps>, accessed April 2024

Bureau of Meteorology (2022), *Monthly climate statistics, Summary statistics Mount Gambier Aero*, Australian Government, viewed April 2024 http://www.bom.gov.au/climate/averages/tables/cw_021020.shtml

South Australian Resources Information Gateway (2024), *Department for Energy and Mining*, South Australian Government, viewed April 2024 <https://map.sarig.sa.gov.au/>

Government of South Australia, Department of Water, Land and Biodiversity Conservation (October 2005), *DWLBC Report 2005/36, Ecological Conditions Assessments: Stream of the Mambray Coast*

DRAWINGS

ATTACHMENTS

Attachment 1

Wind Rose Data Georgetown Station (Site No. 021020)

Attachment 2

Petrographic Report 2020

Attachment 3

Youngs Quarry Desktop Historical Highwall Geotechnical Review

Attachment 4

Groundwater Desktop Study – Youngs Quarry – Private Mine 214

Attachment 5

EPBC Act 1999 Protected Matters Report

Attachment 6

Visual Assessment Plates

Attachment 7

Confidential – DPC AAR Search Results

Attachment 8

EPA Licence 50661

Attachment 9

Youngs Quarry Community Engagement Plan and Summary Report

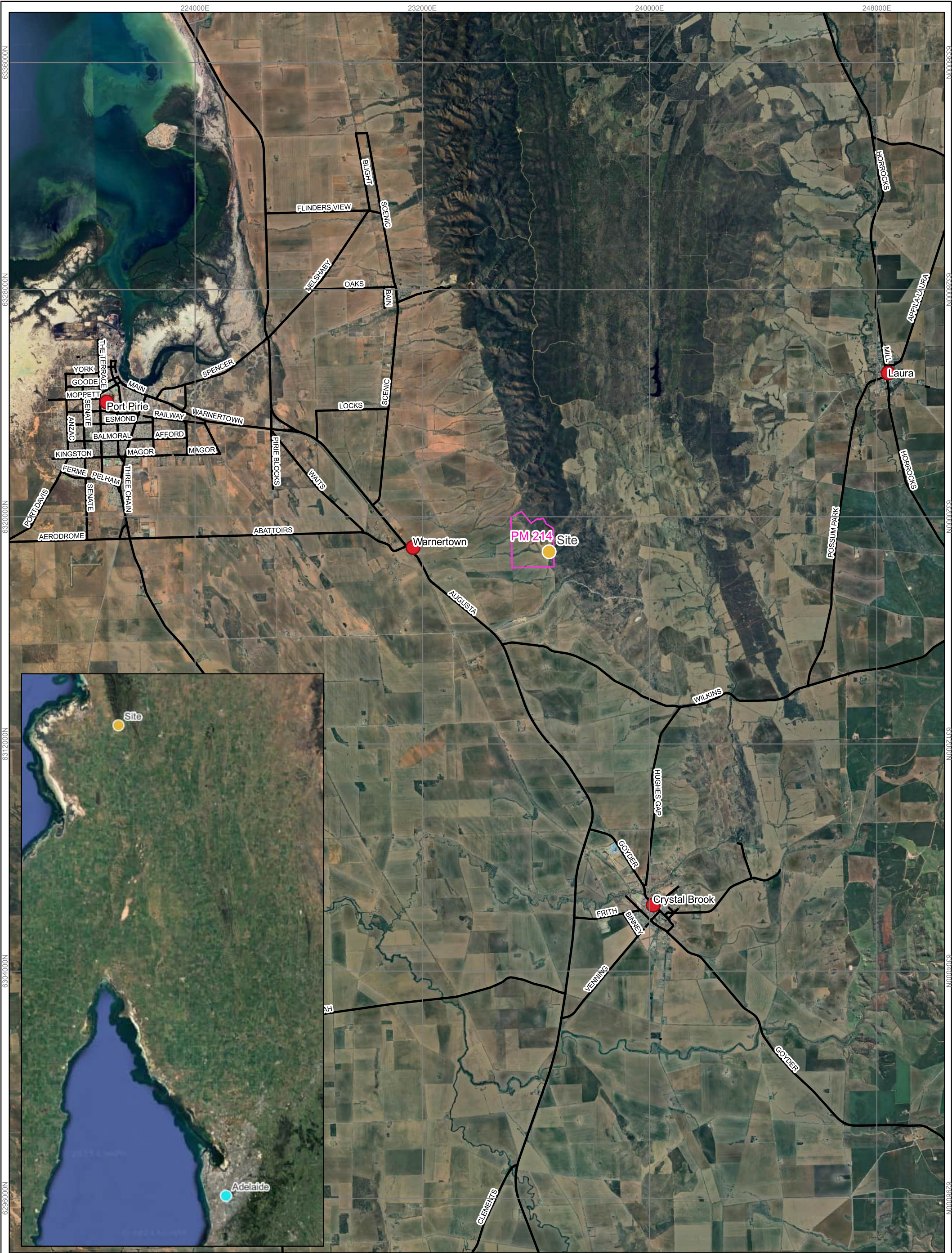
Attachment 10

Legislation and Standards

Attachment 11

Blast Management Plan

DRAWINGS



REV	DESCRIPTION	DATE	BY

Data Sources:

Photography: Google Satellite Imagery accessed: 11-October-2023

Topography: Cadastre: Data.sa.gov.au. Boundaries indicative only, not all boundaries shown

Ecosystem: Other: SARIG, 2023

Legend:

Major Towns

Site Marker

PM 214

N

PROJECT:	Youngs Quarry
CLIENT:	CLM Quarries

GROUNDWORK

plus

PH +61 3871 0411

WWW.GROUNDWORK.COM.AU

SCALE:

1:119,700

When Printed On A3

DATE:

11-October-2023

PRINTED:

11-October-2023

0

500

1,000

1,500

2,000 m

TITLE:

Site Location Plan

DRAWING NUMBER:

2449.DRG.002

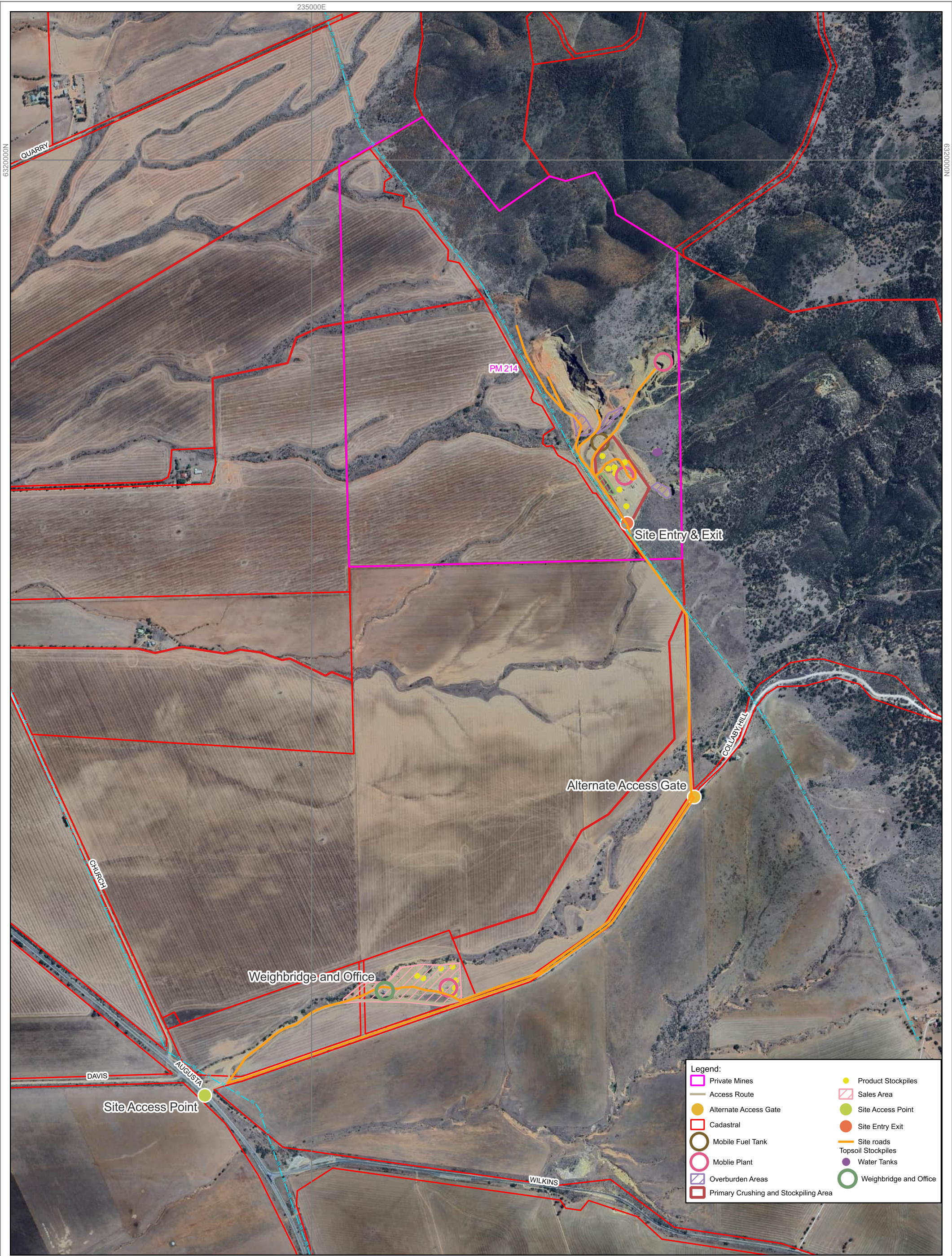
REVISION:

DATUM: HORIZONTAL / VERTICAL / ZONE

EP

MGA / AHD / 54

EPSG:28354

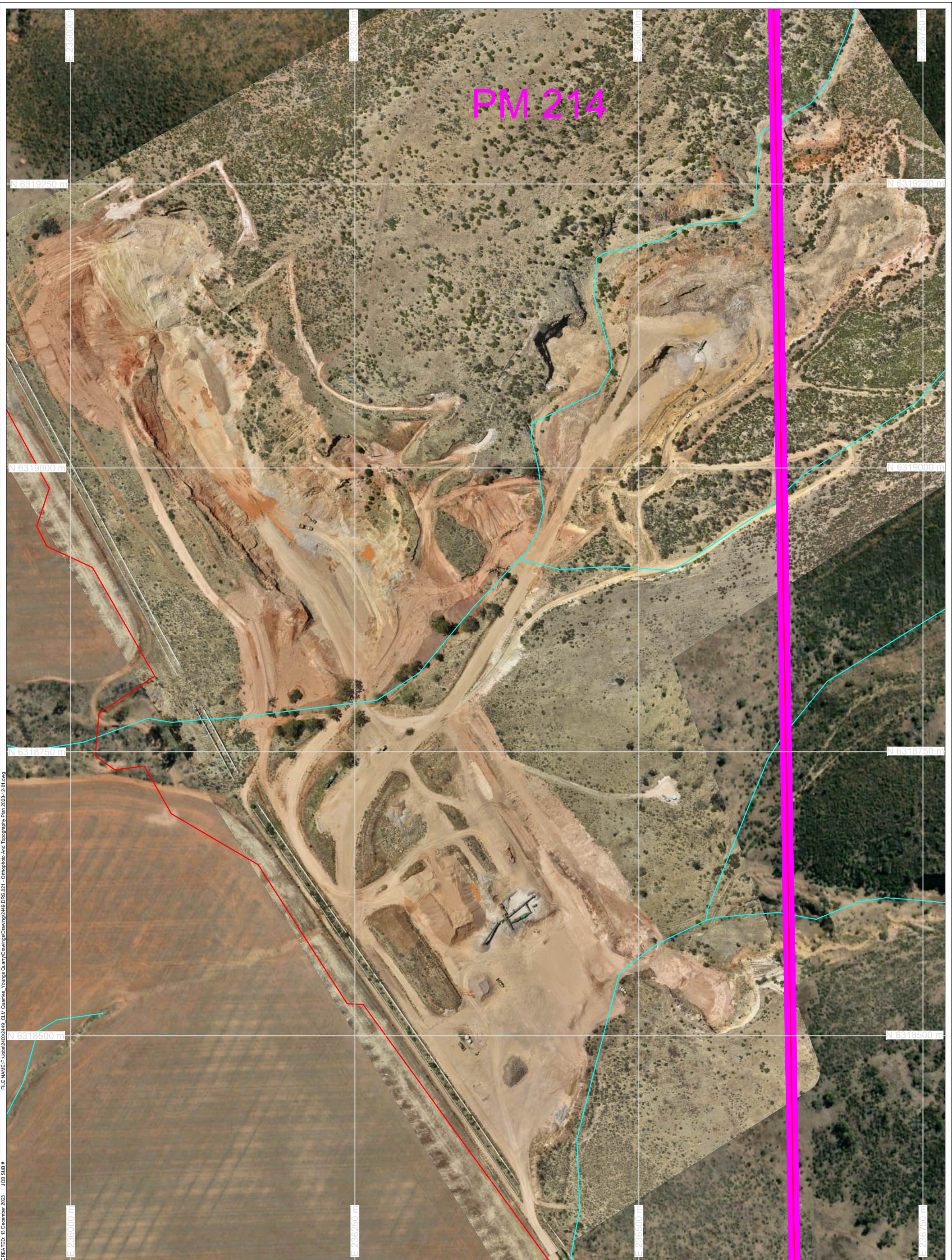


REV	DESCRIPTION	DATE	BY
1	Initial Survey	22-May-2025	PH
2	Topography UAV Survey	22-May-2025	PH
3	Cadastral Data as per plan	22-May-2025	PH
4	Ecosystem shown	22-May-2025	PH
5	Other SPPG, 2024	22-May-2025	PH

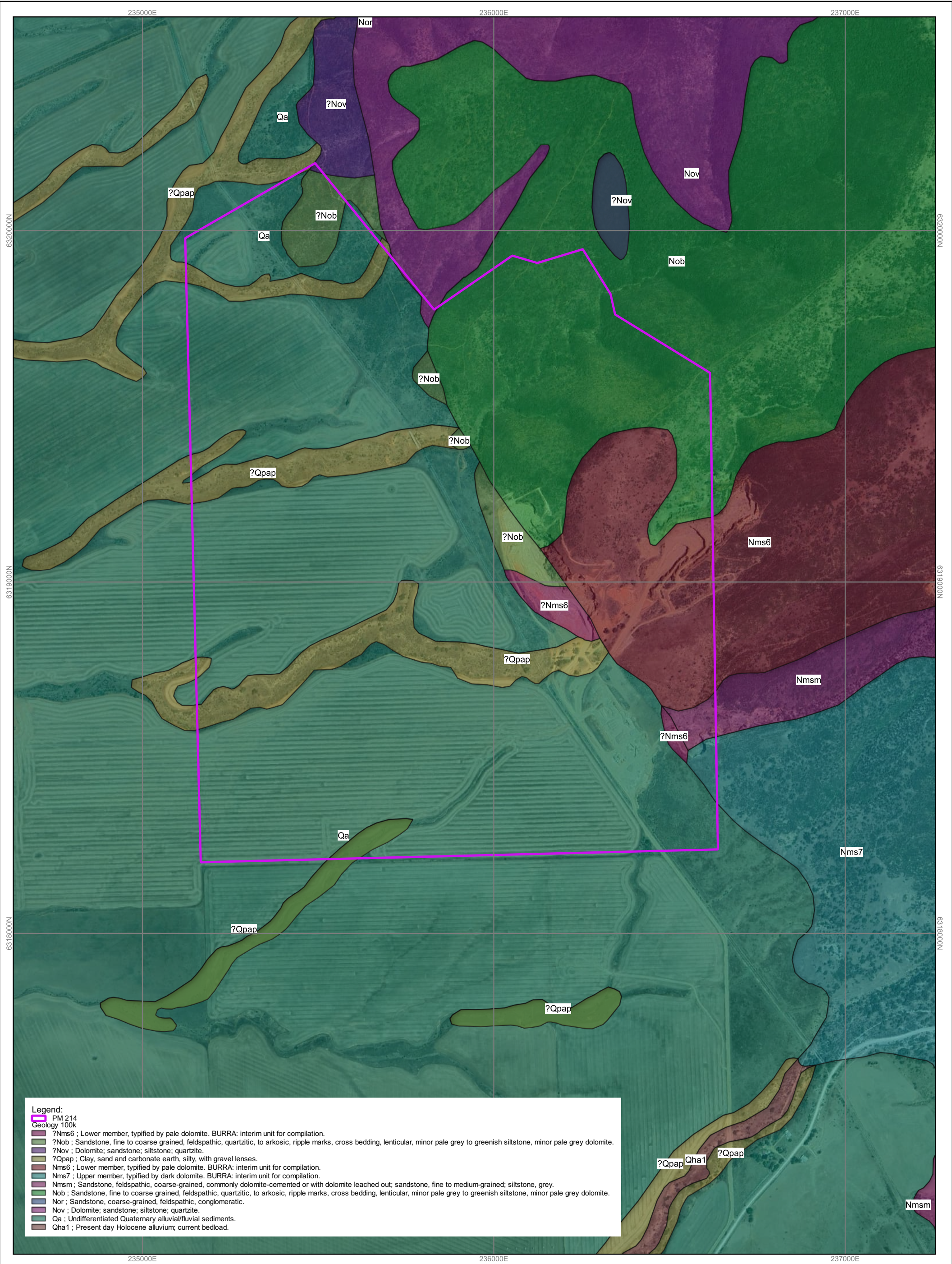
PROJECT:	Youngs Quarry
CLIENT:	CLM Quarries

TITLE:	Site Layout Map
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GROUNDWORK PART OF SLR	SCALE: 1:15,000 When Printed On A3	0 70 140 210 280 m	DRAWING NUMBER: 2449.DRG.019	REVISION:
PH +61 3871 0411 WWW.GROUNDWORKPLUS.COM.AU	DATE: 22-May-2025 PRINTED: 22-May-2025	DRAWN: EM CHECKED: MU	DATUM: HORIZONTAL / VERTICAL / ZONE MGA / AHD / 54	EPSCG 28354



REV	DESCRIPTION	DATE	BY	Legend: Cadastral Boundary Easement Boundary Watercourse Boundary Private Mines Boundary	PROJECT:	TITLE:							
					CLM Quarries Youngs Quarry	Orthophoto Plan 2023-12-01							
						GROUNDWORK plus	SCALE:	1:3,000	0	60m	DRAWING NUMBER:	2449.DRG.021A	REVISION:
							PH: +61 7 3871 0411	DATE:	13 December 2023	DRAWN:	MCK	DATUM: HORIZONTAL / VERTICAL / ZONE	GDMA4 / MGA / AHD / 54
Data Sources:					CLIENT:	When Printed On A3							
Photography: Groundwork Plus Pty Ltd RPA Survey, Captured 2023-12-01						www.groundwork.com.au							
Topography: Cadastre: © The Government of South Australia (DIT) 2021						PRINTED: 13 December 2023							
Ecosystem: Other: © 2023 Microsoft Corporation; SARIG.org and DATA.SA.gov.au						CHECKED:							
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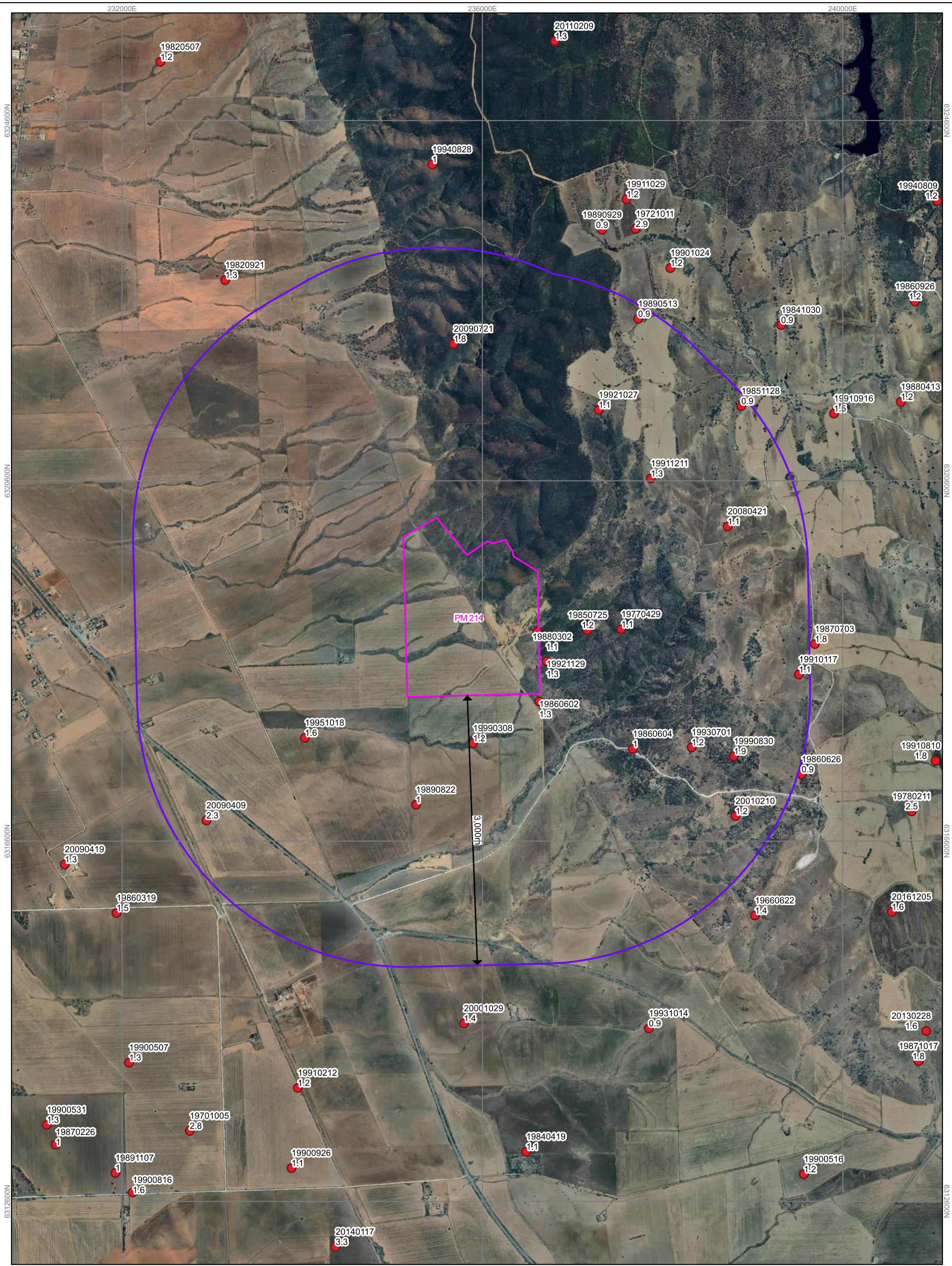
- Legend:**
- PM 214
 - Geology 100k
 - ?Nms6 ; Lower member, typified by pale dolomite. BURRA: interim unit for compilation.
 - ?Nob ; Sandstone, fine to coarse grained, feldspathic, quartzitic, to arkosic, ripple marks, cross bedding, lenticular, minor pale grey to greenish siltstone, minor pale grey dolomite.
 - ?Nov ; Dolomite; sandstone; siltstone; quartzite.
 - ?Qpap ; Clay, sand and carbonate earth, silty, with gravel lenses.
 - Nms6 ; Lower member, typified by pale dolomite. BURRA: interim unit for compilation.
 - Nms7 ; Upper member, typified by dark dolomite. BURRA: interim unit for compilation.
 - Nmsm ; Sandstone, feldspathic, coarse-grained, commonly dolomite-cemented or with dolomite leached out; sandstone, fine to medium-grained; siltstone, grey.
 - Nob ; Sandstone, fine to coarse grained, feldspathic, quartzitic, to arkosic, ripple marks, cross bedding, lenticular, minor pale grey to greenish siltstone, minor pale grey dolomite.
 - Nor ; Sandstone, coarse-grained, feldspathic, conglomeratic.
 - Nov ; Dolomite; sandstone; siltstone; quartzite.
 - Qa ; Undifferentiated Quaternary alluvial/fluvial sediments.
 - Qha1 ; Present day Holocene alluvium; current bedload.

REV	DESCRIPTION	DATE	BY
Data Sources:			
Photography: Google Maps accessed: 11-October-2023			
Topography: Cadastre: Data.sa.gov.au, Boundaries indicative only, not all boundaries shown			
Ecosystem: Other: SARIQ 2023			



PROJECT:	Youngs Quarry
CLIENT:	CLM Quarries

TITLE:	Regional Geology Map		
GROUNDWORK plus		SCALE: 1:9,700 When Printed On A3	DRAWING NUMBER: 2449.DRG.004
PH +61 3871 0411 WWW.GROUNDWORK.COM.AU	DATE: 11-October-2023 PRINTED: 11-October-2023	0 40 80 120 160 m DATE: 11-October-2023 DRAWN: EP CHECKED:	REVISION: EPSG:28354 DATUM: HORIZONTAL / VERTICAL / ZONE MGA / AHD / 54



REV DESCRIPTION		DATE	BY
Data Sources:			
Photography: Google Maps accessed: 11-October-2023			
Topography: Cadastre: Data sa.gov.au, Boundaries indicative only, not all boundaries shown			
Ecology: Other: SARIG, 2023			

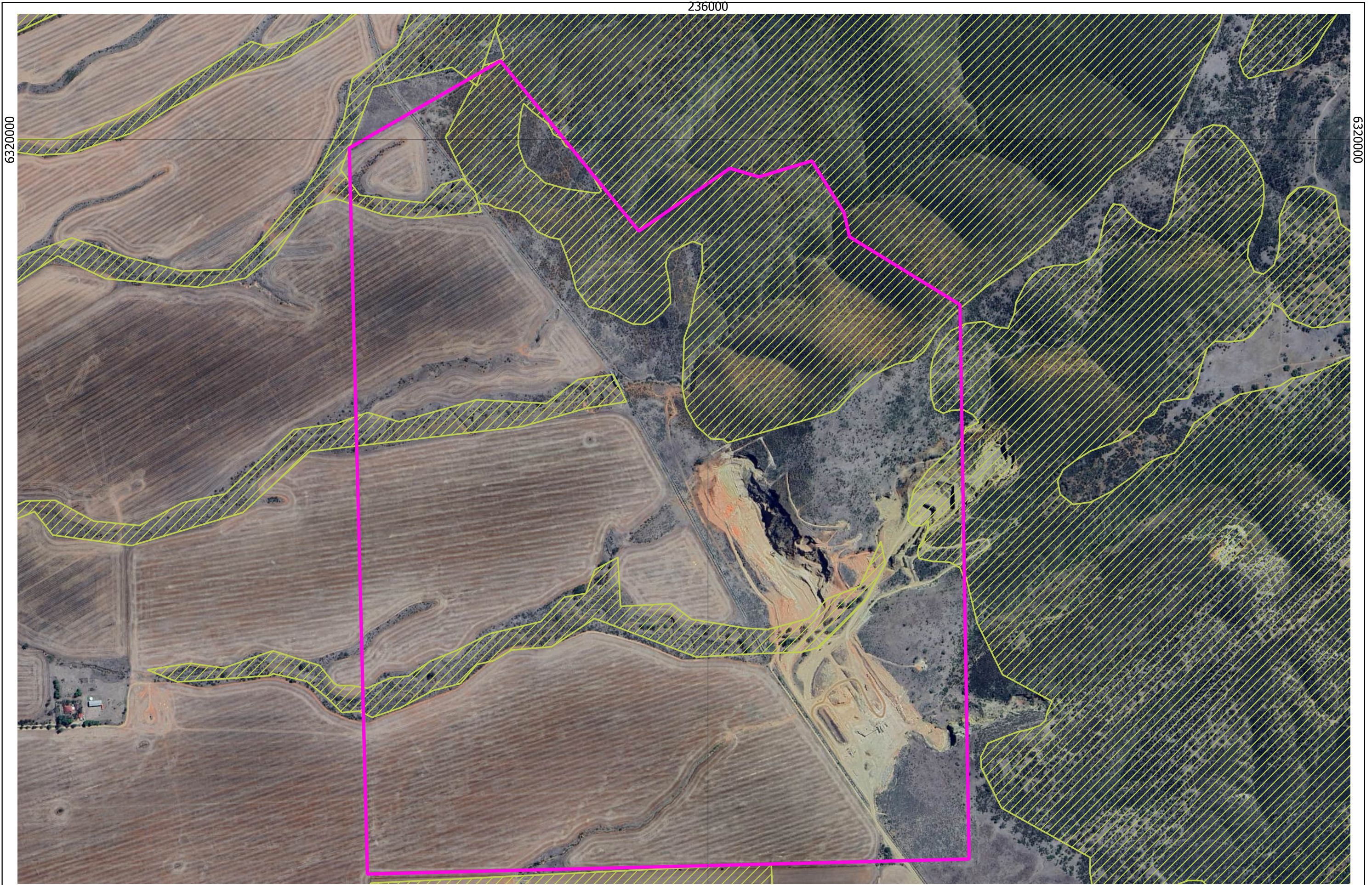
Legend:	
Pink Polygon: Private Mine (PM)	
Red Dot: Earthquakes	
Purple Circle: 3 km Distance	

PROJECT: Youngs Quarry	
CLIENT: CLM Quarries	

TITLE: Geohazards Map	
GROUNDWORK plus	
PH +61 3871 0411 WWW.GROUNDWORK.COM.AU	

SCALE: 1:38,000	0 100 200 300 400 m
DATE: 11-October-2023	DRAWN: EP
PRINTED: 11-October-2023	CHECKED:

DRAWING NUMBER: 2449.DRG.005	REVISION:
DATUM: HORIZONTAL / VERTICAL / ZONE	EPSG:28354
MGA / AHD / 54	



REV	DESCRIPTION	DATE	BY
Data: Photography: Google Satellite Imagery accessed: 03-September-2024 Topography: Cadastre: Data.sa.gov.au/Boundaries are Indicative only, not all boundaries shown Ecosystem: Other: SARIG, 2024			

Legend:

Prive Mine (PM) 214

Vegetation Covers as mapped by Nature Maps



PROJECT:	Youngs Quarry
CLIENT:	CLM Quarries

GROUNDWORK

PART OF SLR

PH 461 3871 0411
WWW.GROUNDWORKPLUS.COM.AU

SCALE: 1:8,500,000,009
When Printed On A3
DATE: 20-August-2024
PRINTED: 20-August-2024

04080120160

m

DRAWN: EM

CHECKED: MJ

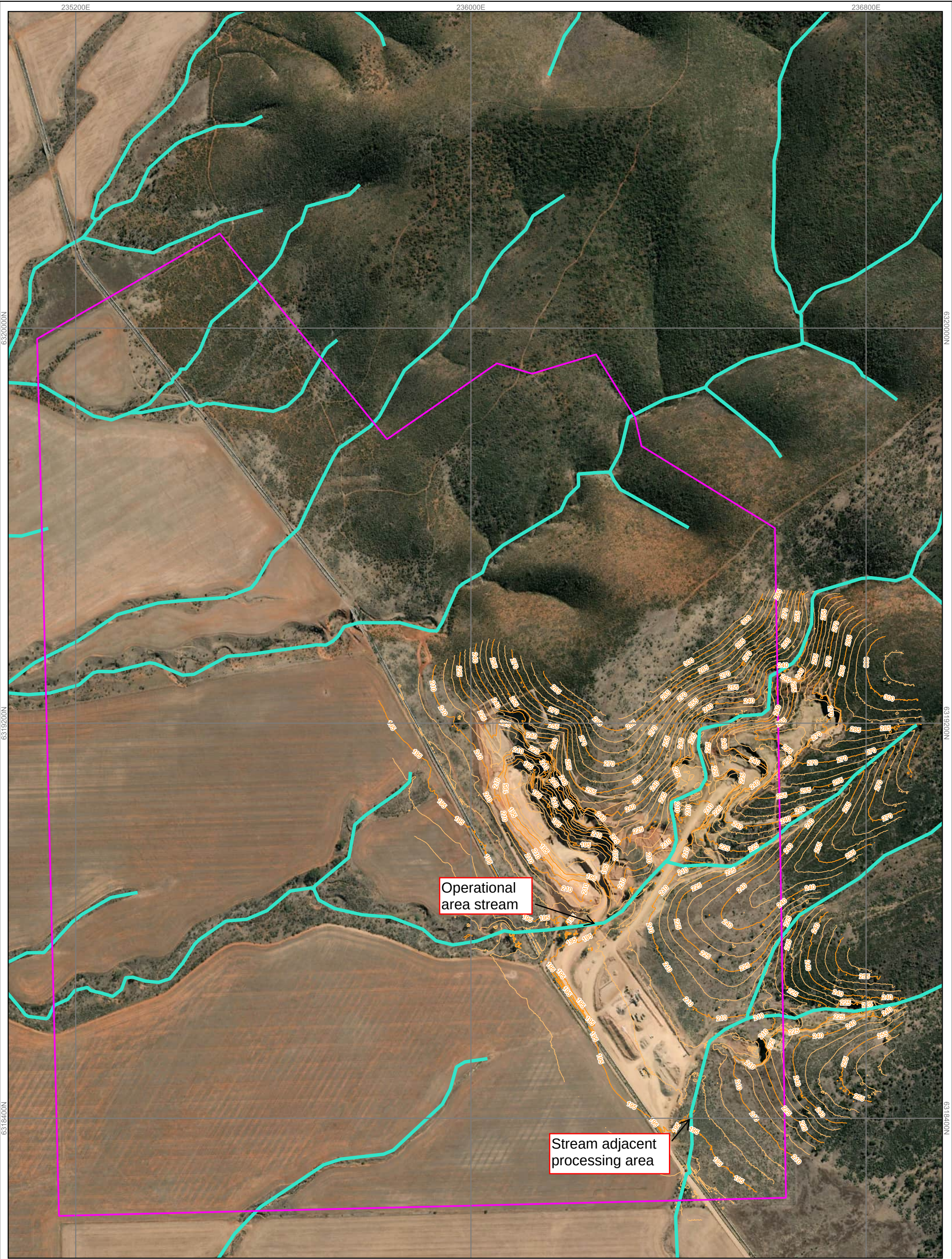
DRAWING NUMBER: 2449.DRG.030

REVISION:

DATUM: HORIZONTAL / VERTICAL /

EPSG:7854

MGA / AHD / 54



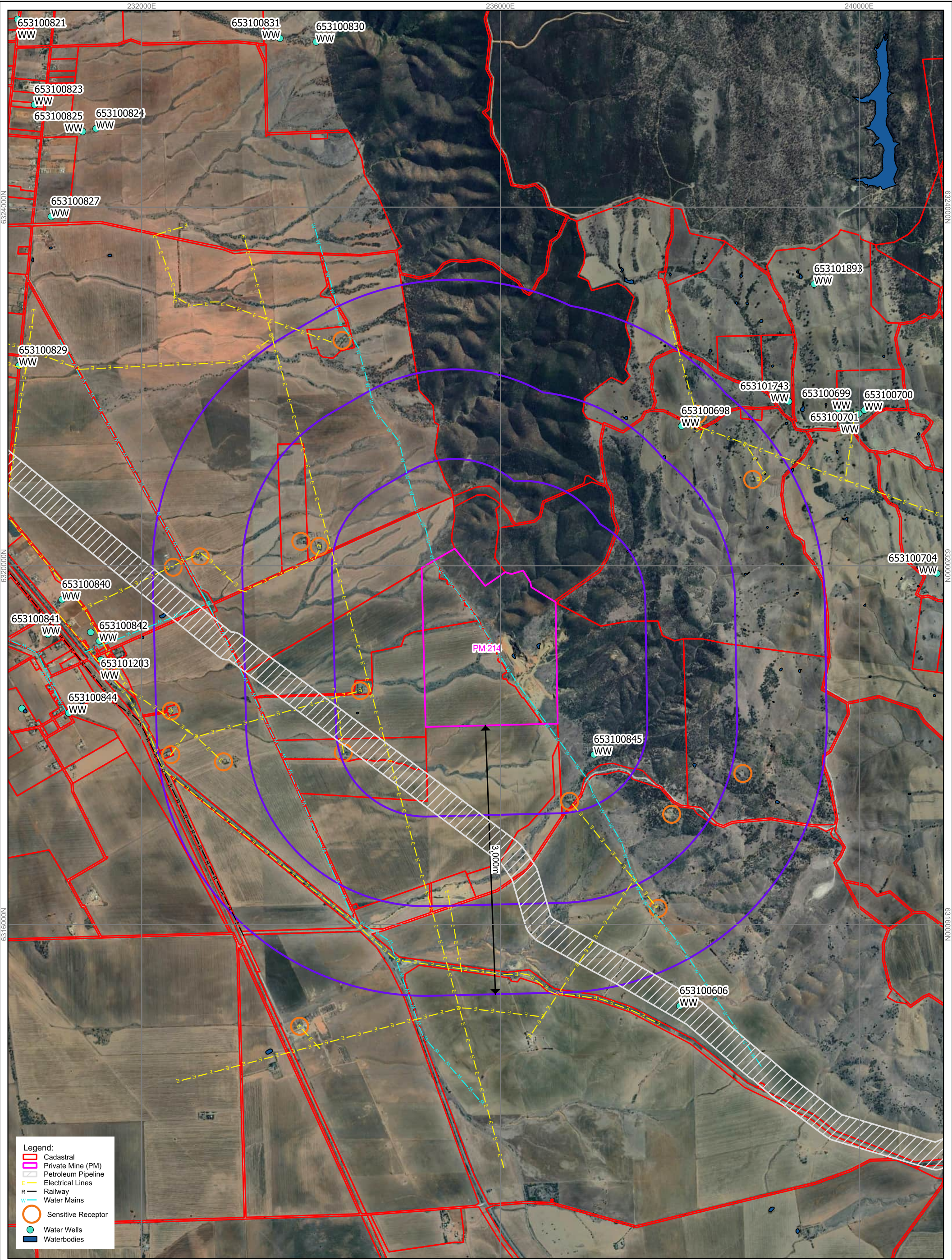
REV	DESCRIPTION	DATE	BY
Data Sources: Photography: Google Maps accessed: 11-October-2023 Topography: Cadastre: Data sa.gov.au, Boundaries indicative only, not all boundaries shown Ecology: Other: SARIQ, 2023			

Legend:
Private Mine (PM)
Watercourses



PROJECT:	Youngs Quarry
CLIENT:	CLM Quarries

TITLE:	Topographic Map
SCALE:	1:6,900 When Printed On A3
DATE:	11-October-2023
PRINTED:	11-October-2023
DRAWN:	EP
CHECKED:	
DRAWING NUMBER:	2449.DRG.008
REVISION:	
DATUM: HORIZONTAL / VERTICAL / ZONE	EP
	MGA / AHD / 54



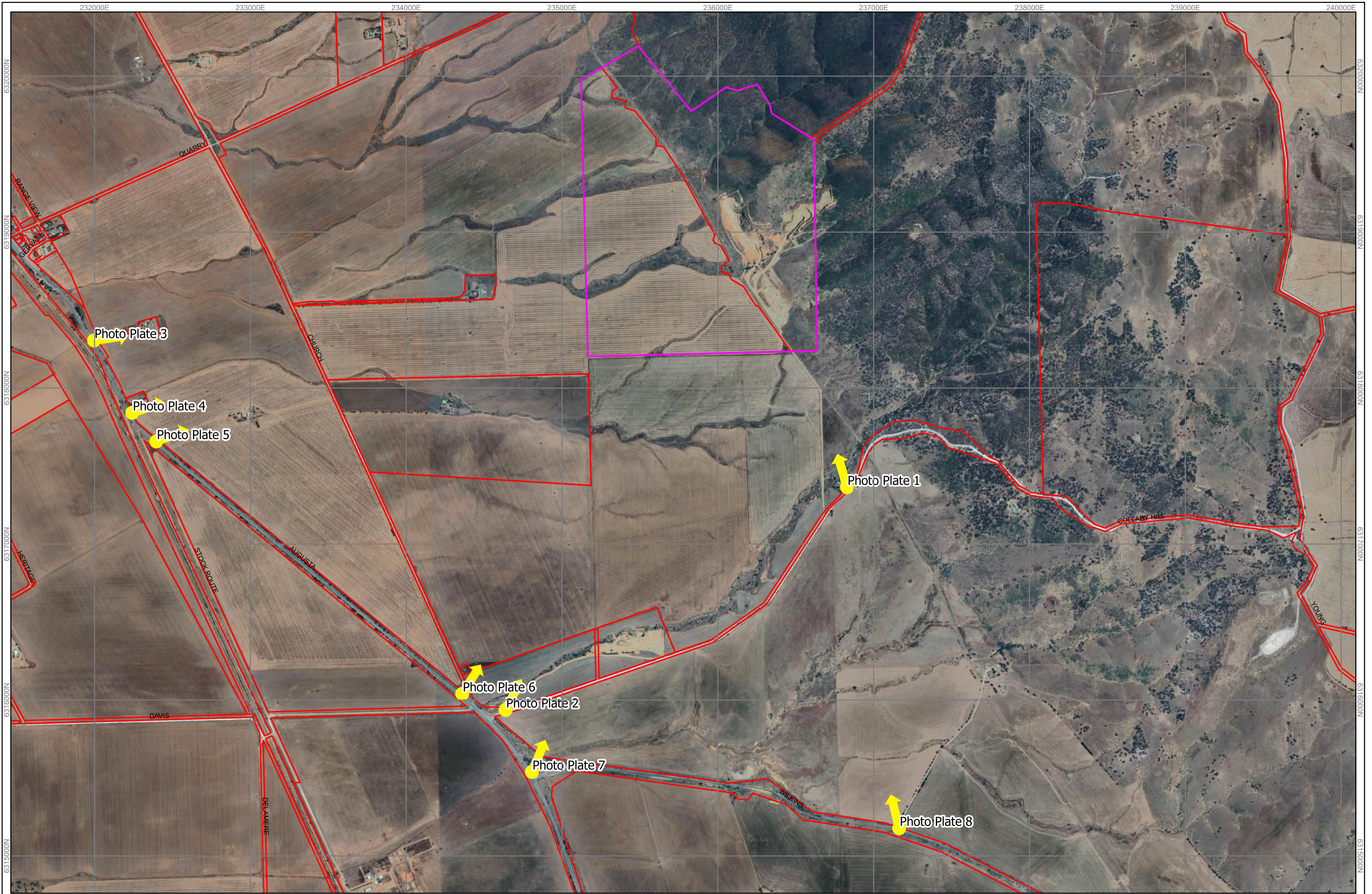
- Legend:
- Cadastral
 - Private Mine (PM)
 - Petroleum Pipeline
 - Electrical Lines
 - Railway
 - Water Mains
 - Sensitive Receptor
 - Water Wells
 - Waterbodies

REV	DESCRIPTION	DATE	BY
Data Sources:			
Photography: Data as.gov.au, Boundaries indicative only, not all boundaries shown			
Topography: Data as.gov.au, Boundaries indicative only, not all boundaries shown			
Cadastral: Data as.gov.au, Boundaries indicative only, not all boundaries shown			
Electrical: Data as.gov.au, Boundaries indicative only, not all boundaries shown			
Other: SARIG 2024			



PROJECT:	Youngs Quarry
CLIENT:	CLM Quarries

TITLE:	Proximity to Infrastructure and Housing Map		
GROUNDWORK	SCALE: 1:38,000	0 100 200 300 400 m	DRAWING NUMBER: 2449.DRG.003
PART OF SLR	DATE: 07 January 2025	DRAWN: MJ	REVISION:
PH 461 3871 0411	PRINTED: 07 January 2025	CHECKED: MJ	DATUM: HORIZONTAL / VERTICAL / ZONE
WWW.GROUNDWORK.COM.AU			EPSC 2024
			MGA / AHD / 54



REV	DESCRIPTION	DATE	BY
Data Sources: Photography: Google Maps accessed: 11-October-2023 Cadastral: Data sa.gov.au, Boundaries indicative only, not all boundaries shown Ecosystem: SARIG, 2023			

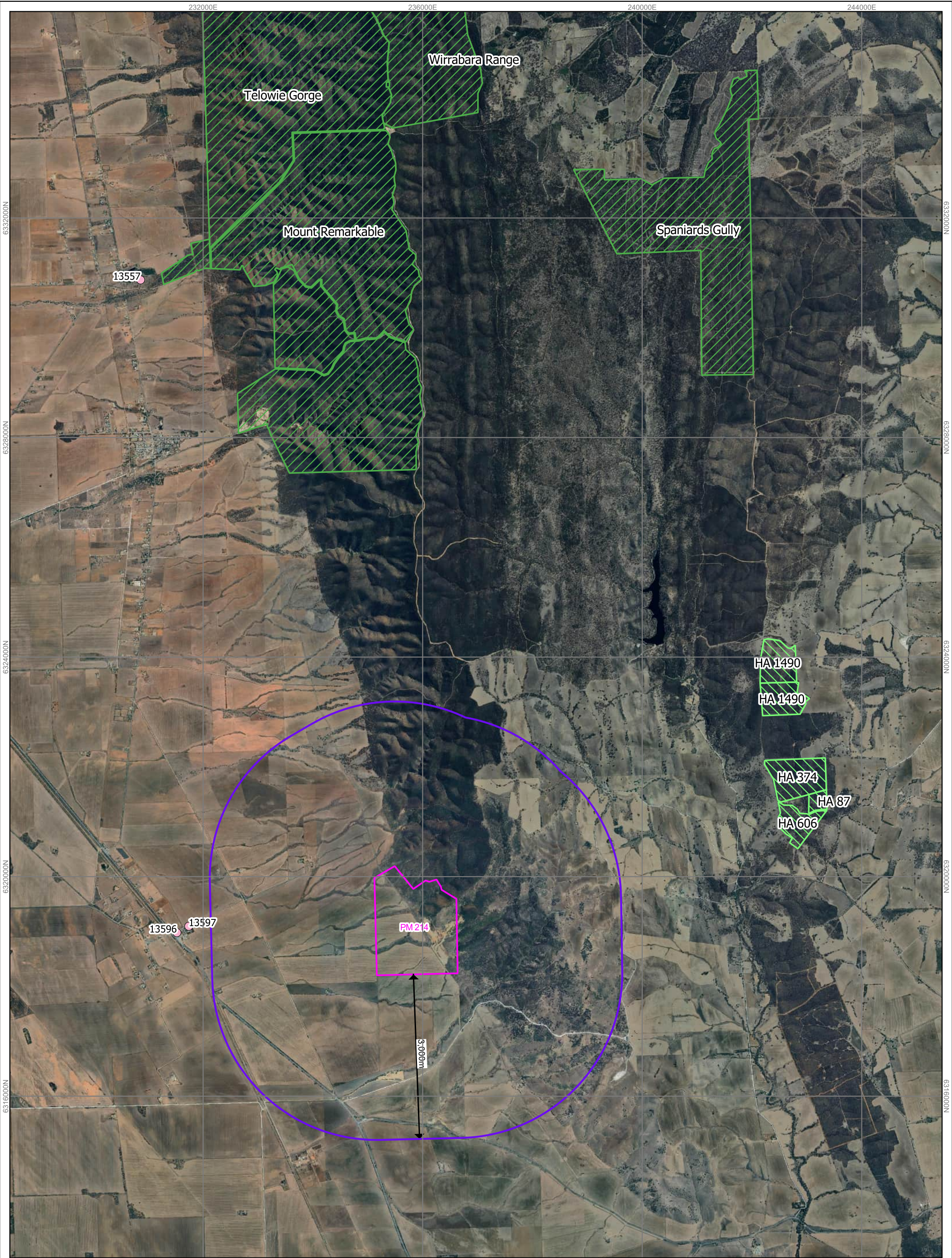
Legend:

- Photo Plate Location
- Private Mines
- Cadastral



PROJECT:	Youngs Quarry
CLIENT:	CLM Quarries

GROUNDWORK plus PH 461 3071 0411 WWW.GROUNDWORKPLUS.COM.AU	SCALE: 1:22,300 When Printed On A3	DRAWING NUMBER 2449.DRG.010 REVISION: EPG2.28354
	DATE: 11-October-2023 DRAWN: EP	
	PRINTED: 11-October-2023 CHECKED:	
	DATUM: HORIZONTAL / VERTICAL / ZONE MGA / AHD / 54	



REV	DESCRIPTION	DATE	BY

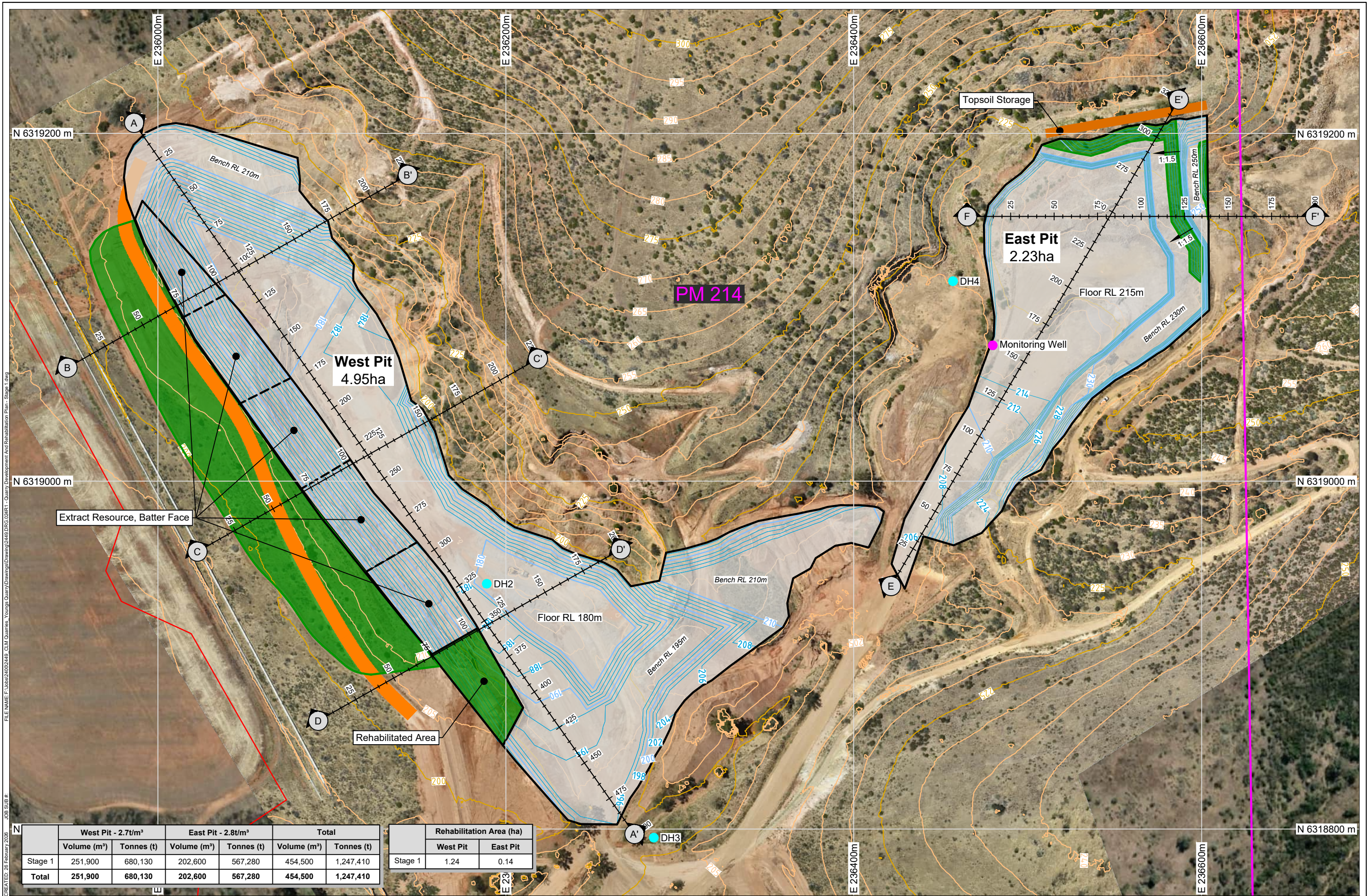
Data Sources:
Photography: Google Satellite Imagery accessed: 22-April-2024
Topography: Cadastre: Data sa.gov.au, Boundaries indicative only, not all boundaries shown
Ecosystem: Other: SARIQ, 2024

Legend:

- 3 km Buffer
- Private Mines
- Heritage Agreements
- Conservation Areas
- State Heritage Places Points

PROJECT:	Youngs Quarry
CLIENT:	CLM Quarries

TITLE: Heritage and Conservation Areas Map					
GROUNDWORK PART OF SLR PH +61 3871 0411 WWW.GROUNDWORK.COM.AU	SCALE: 1:62,100 When Printed On A3		DRAWING NUMBER: 2449.DRG.007	REVISION:	
	DATE: 22-April-2024		DRAWN: LO	DATUM: HORIZONTAL / VERTICAL / ZONE	EP99/28354
	PRINTED: 22-April-2024		CHECKED:	MGA / AHD / 54	



	West Pit - 2.7t/m³		East Pit - 2.8t/m³		Total	
	Volume (m³)	Tonnes (t)	Volume (m³)	Tonnes (t)	Volume (m³)	Tonnes (t)
Stage 1	251,900	680,130	202,600	567,280	454,500	1,247,410
Total	251,900	680,130	202,600	567,280	454,500	1,247,410

	Rehabilitation Area (ha)	
	West Pit	East Pit
Stage 1	1.24	0.14

REV	DESCRIPTION	DATE	BY
1	Added Rehabilitated Area, Added Incremental Extraction Areas	2026/02/26	SA

Data Sources:
Photography: Groundwork part of SLR, RPA Survey, 2023/12/01
Topography: Groundwork part of SLR, RPA Survey, 2023/12/01, DSM 1m
Cadastral: © The Government of South Australia (C) 2024
Ecosystem: © 2024 Microsoft Corporation; © 2024 Maxar; © CNES (2024) Distribution Airbus DS
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Legend:

- Cadastral Boundary
- Private Mine
- Haul Road
- Extraction Area (6.87ha)
- Rehabilitation Area (1.40ha)

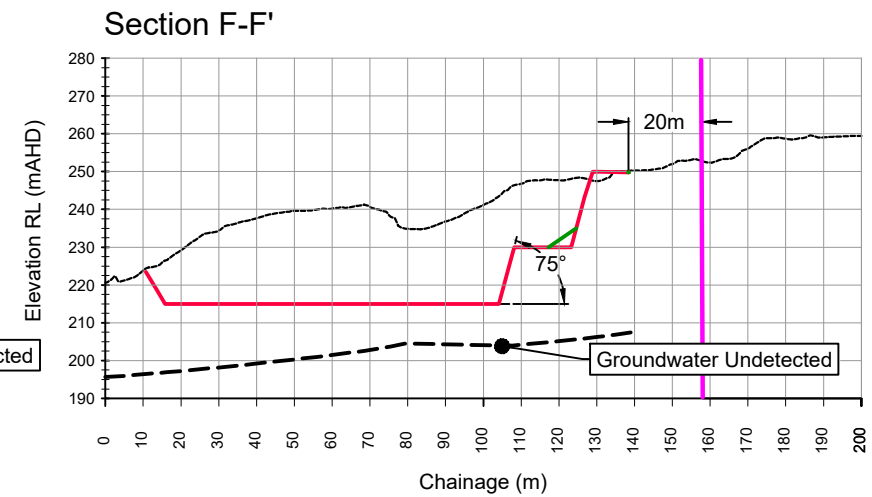
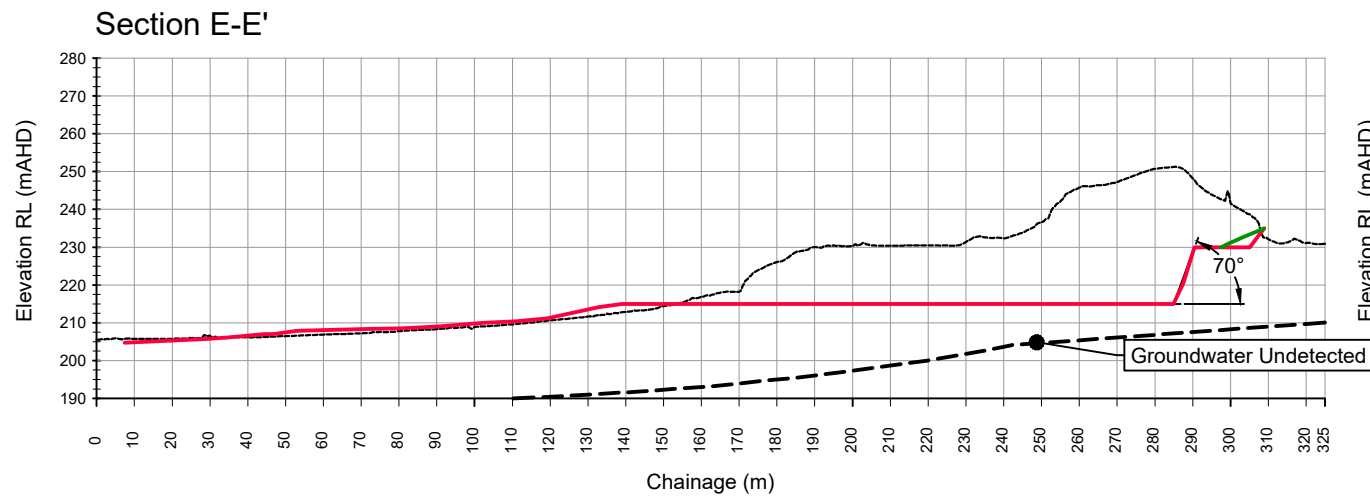
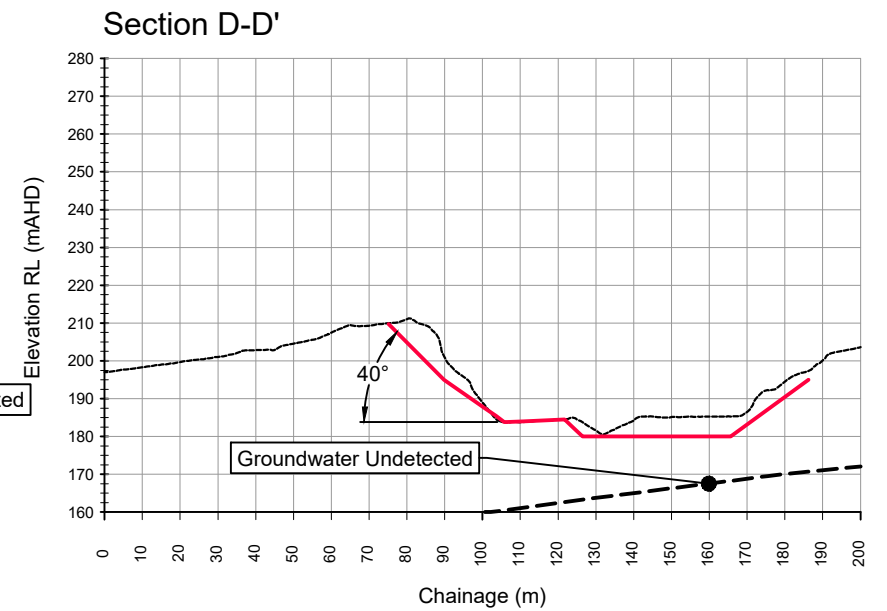
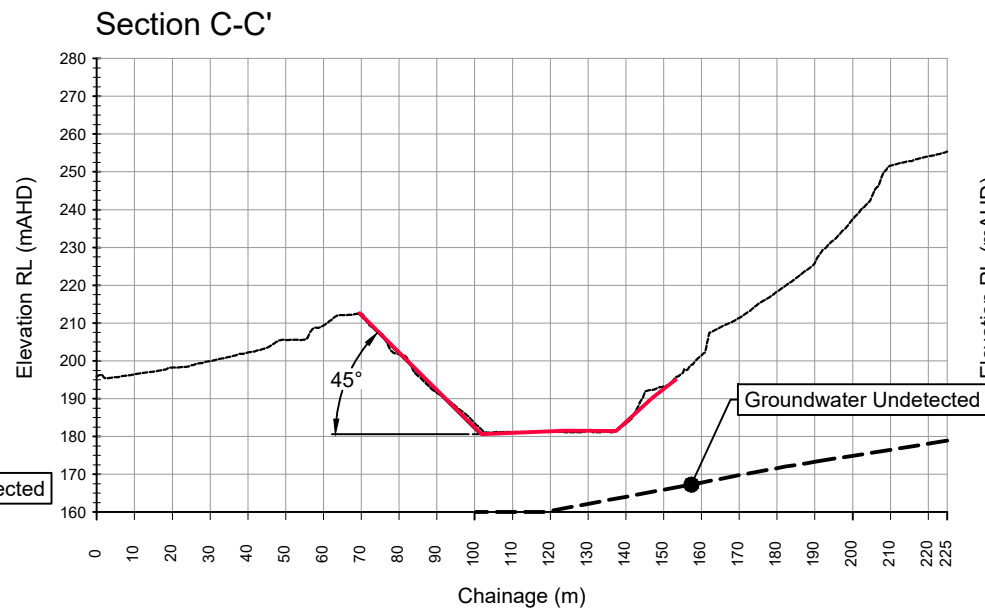
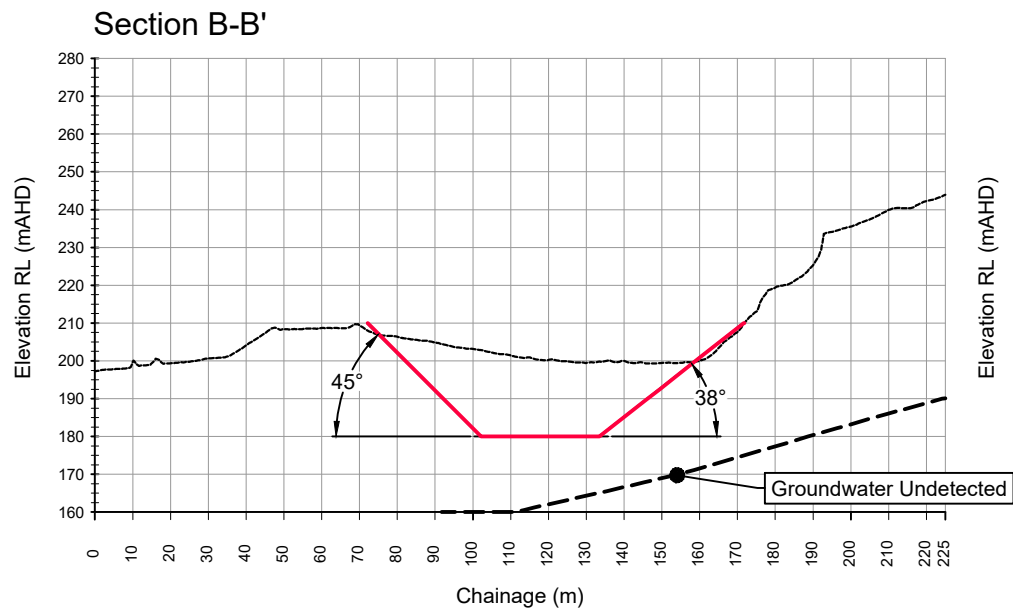
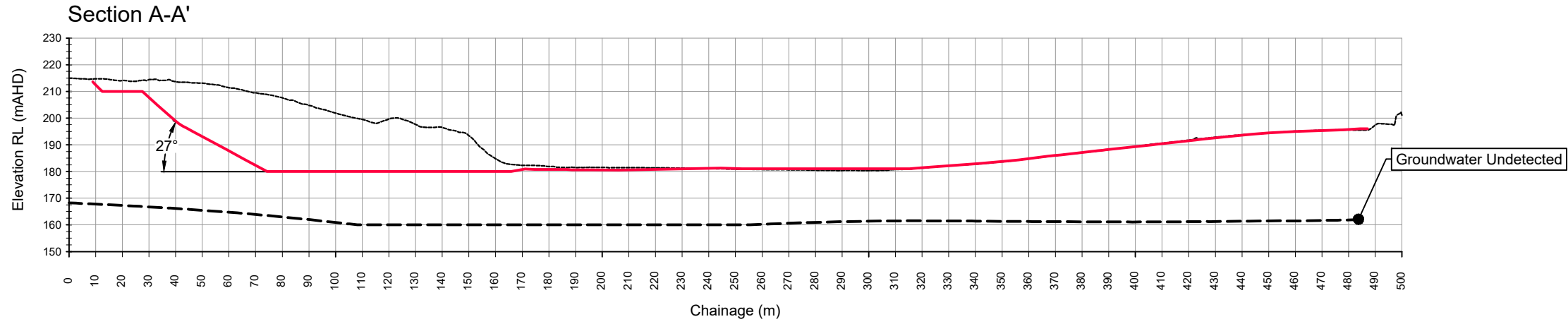
Drill Hole Location
Monitoring Well Location



PROJECT: Youngs Quarry
CLIENT: CLM Quarries

TITLE: Quarry Development and Rehabilitation Plan - Stage 1
DRAWING NUMBER: 2449.DRG.024A
REVISION: 1
SCALE: 1:2,000
DATE: 26 February 2026
PRINTED: 11 March 2026
DRAWN: CP
CHECKED: EM
DATUM: HORIZONTAL / VERTICAL / ZONE
GDA94 / MGA / AHD / 54

FILE NAME: F:\Jobs\240202449_CLM Quarries_Youngs Quarry\Drawing\2449.DRG.024 - Quarry Development and Rehabilitation Plan - Stage 1.dwg
JOB SUB #
CREATED: 21 May 2025



REV	DESCRIPTION	DATE	BY

Data Sources:

Photography:	Groundwork part of SLR, UAV Survey, 2023/12/01, DSM 1m
Topography:	
Cadastral:	
Ecosystem:	
Other:	

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Legend:

- Existing Ground Surface
- Pit Design Surface
- Rehabilitation Surface
- Private Mine Boundary



PROJECT: Youngs Quarry

CLIENT: CLM Quarries

TITLE: Quarry Development and Rehabilitation Plan - Stage 1 Sections A-A' to F-F'

SCALE: 1:2,000

DRAWING NUMBER: 2449.DRG.024B

REVISION:

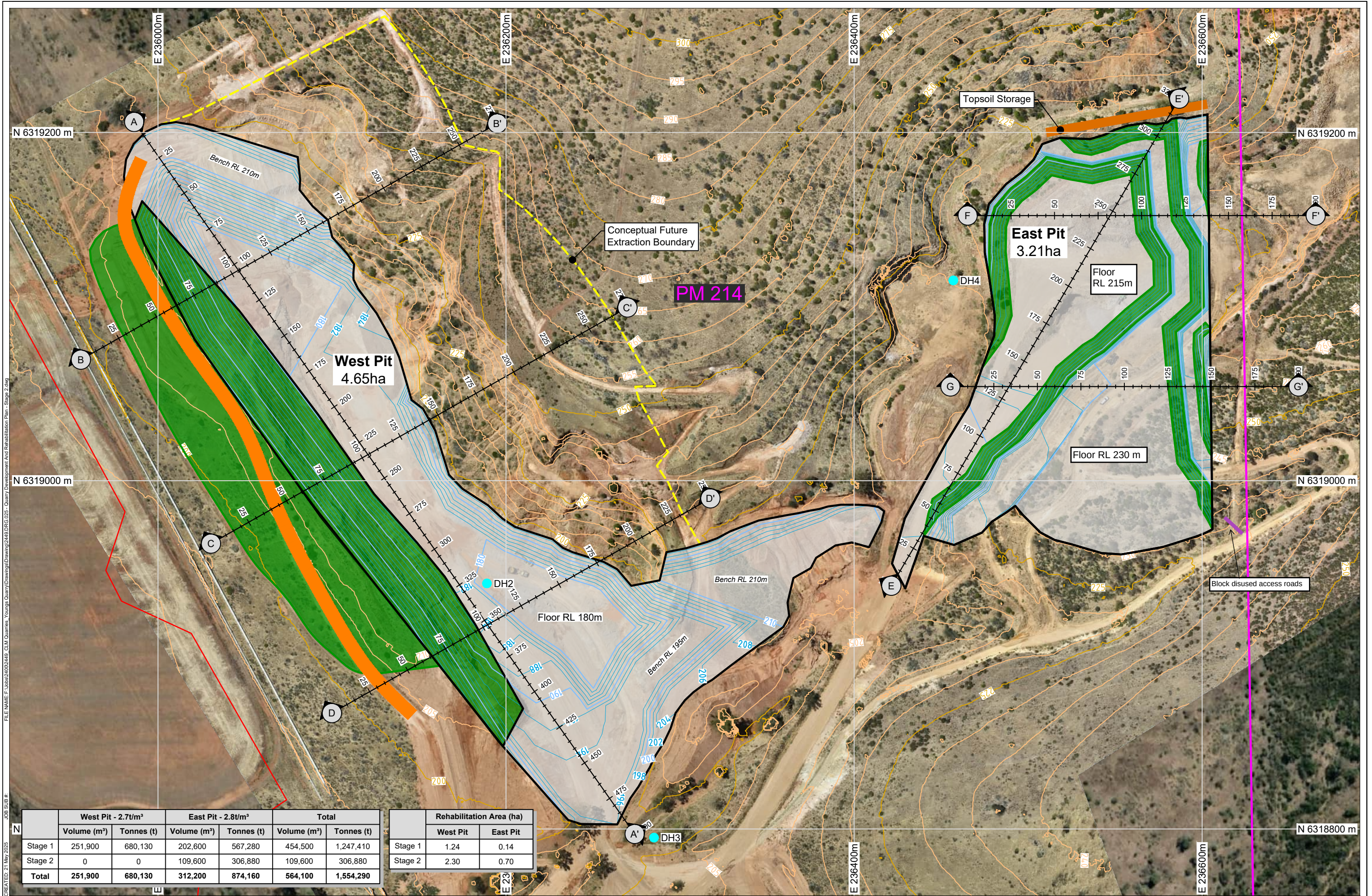
DATE: 21 May 2025

PRINTED: 21 May 2025

CHECKED: EM

DATUM: HORIZONTAL / VERTICAL / ZONE

GDA94 / MGA / AHD / 54



	West Pit - 2.7t/m³		East Pit - 2.8t/m³		Total	
	Volume (m³)	Tonnes (t)	Volume (m³)	Tonnes (t)	Volume (m³)	Tonnes (t)
Stage 1	251,900	680,130	202,600	567,280	454,500	1,247,410
Stage 2	0	0	109,600	306,880	109,600	306,880
Total	251,900	680,130	312,200	874,160	564,100	1,554,290

	Rehabilitation Area (ha)	
	West Pit	East Pit
Stage 1	1.24	0.14
Stage 2	2.30	0.70

REV	DESCRIPTION	DATE	BY

Data Sources:
Photography: Groundwork part of SLR, RPA Survey, 2023/12/01
Topography: Groundwork part of SLR, RPA Survey, 2023/12/01, DSM 1m
Cadastral: © The Government of South Australia (C11) 2024
Ecosystem: Other: © 2024 Microsoft Corporation; © 2024 Maxar; © CNES (2024) Distribution Airbus DS
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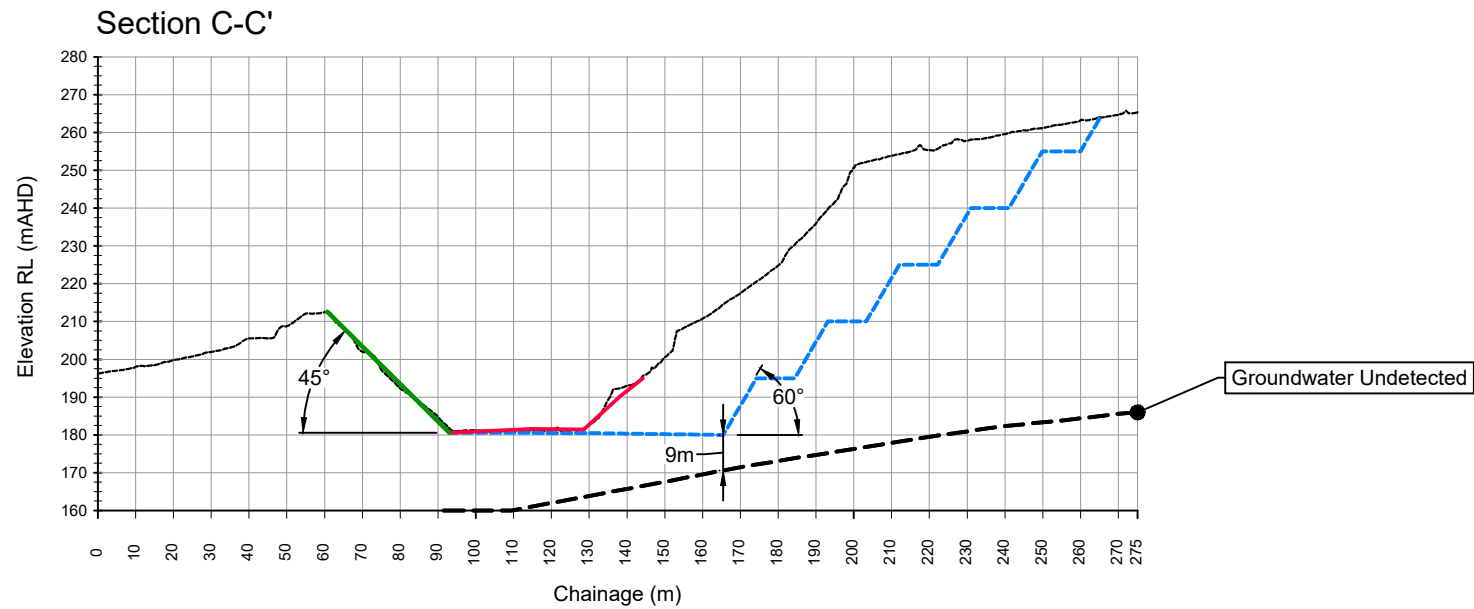
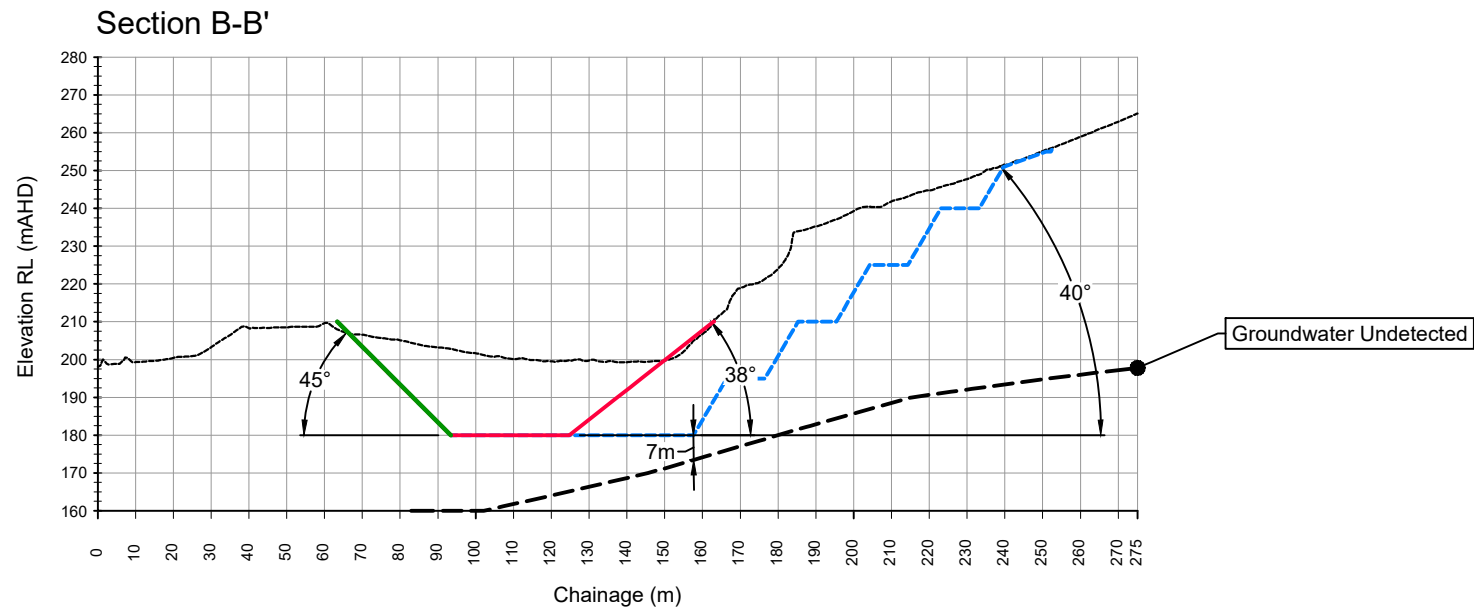
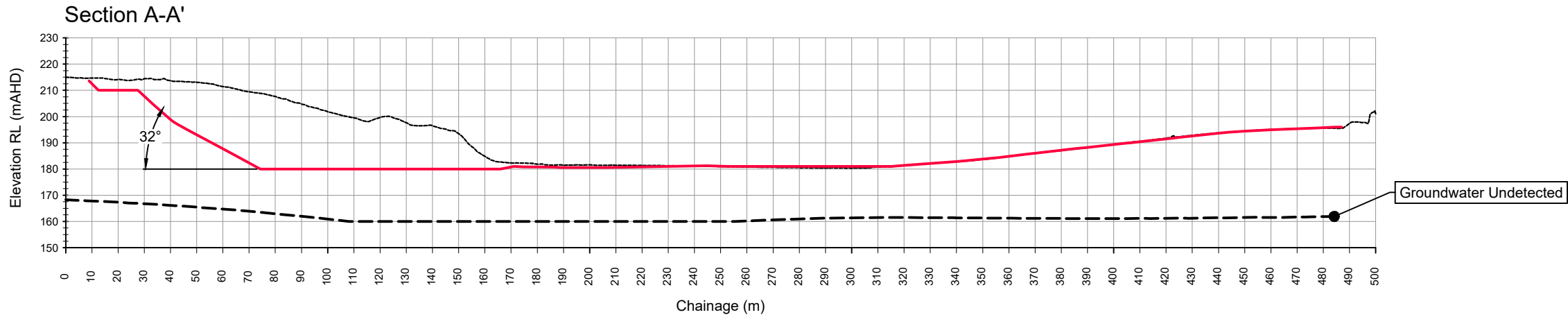
- Legend:**
- Cadastral Boundary
 - Private Mine
 - Haul Road
 - Future Extraction Area

- Legend:**
- Drill Hole Location
 - Extraction Area (6.40ha)
 - Rehabilitation Area (3.00ha)
 - Monitoring Well Location



PROJECT: Youngs Quarry		TITLE: Quarry Development and Rehabilitation Plan - Stage 2	
CLIENT: CLM Quarries		GROUNDWORK PART OF SLR	
SCALE: 1:2,000		DRAWING NUMBER: 2449.DRG.025A	
PH: +61 7 3871 0411		DATE: 21 May 2025	
WWW.GROUNDWORK.COM.AU		DRAWN: CP	
PRINTED: 21 May 2025		CHECKED: EM	
DATUM: HORIZONTAL / VERTICAL / ZONE		GDA94 / MGA / AHD / 54	

FILE NAME: F:\Jobs\240202449_CLM Quarries_Youngs Quarry\Drawing\Drawing\2449.DRG.02B - Quarry Development And Rehabilitation Plan - Stage 2.dwg
JCB SUB #
CREATED: 21 May 2025



REV	DESCRIPTION	DATE	BY

Data Sources:

Photography:	Groundwork part of SLR, UAV Survey, 2023/12/01, DSM 1m
Topography:	
Cadastral:	
Ecosystem:	
Other:	

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- Legend:
- Existing Ground Surface
 - Pit Design Surface
 - Conceptual Future Extraction Surface
 - Rehabilitation Surface

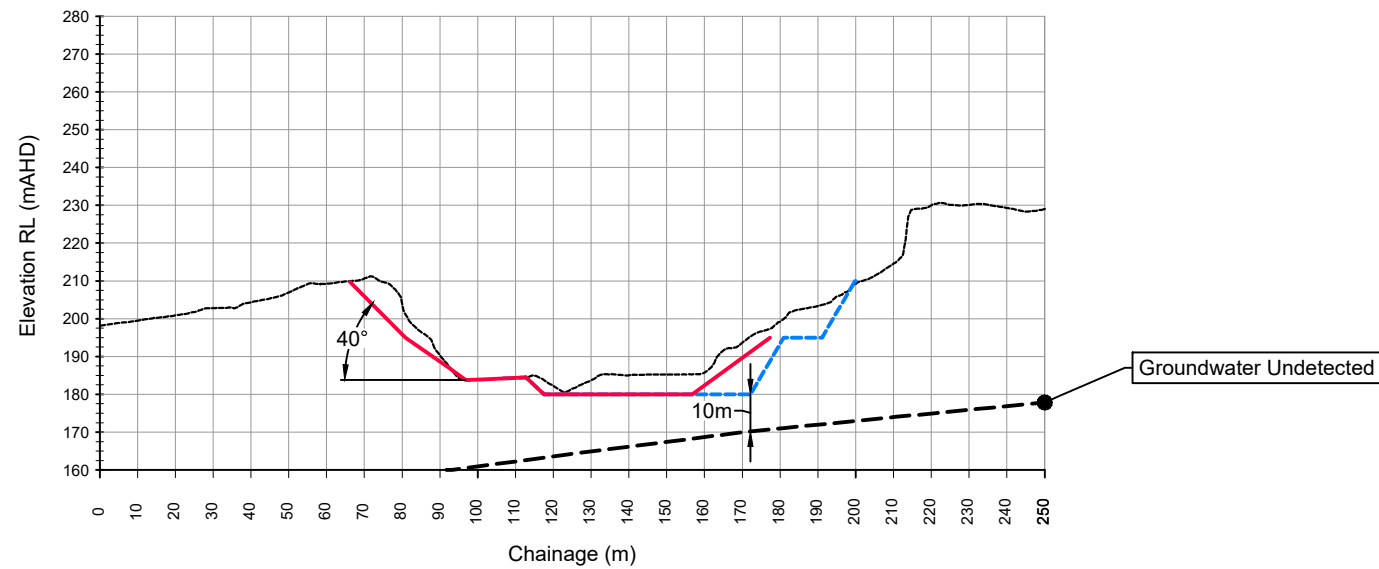


PROJECT:	Youngs Quarry
CLIENT:	CLM Quarries

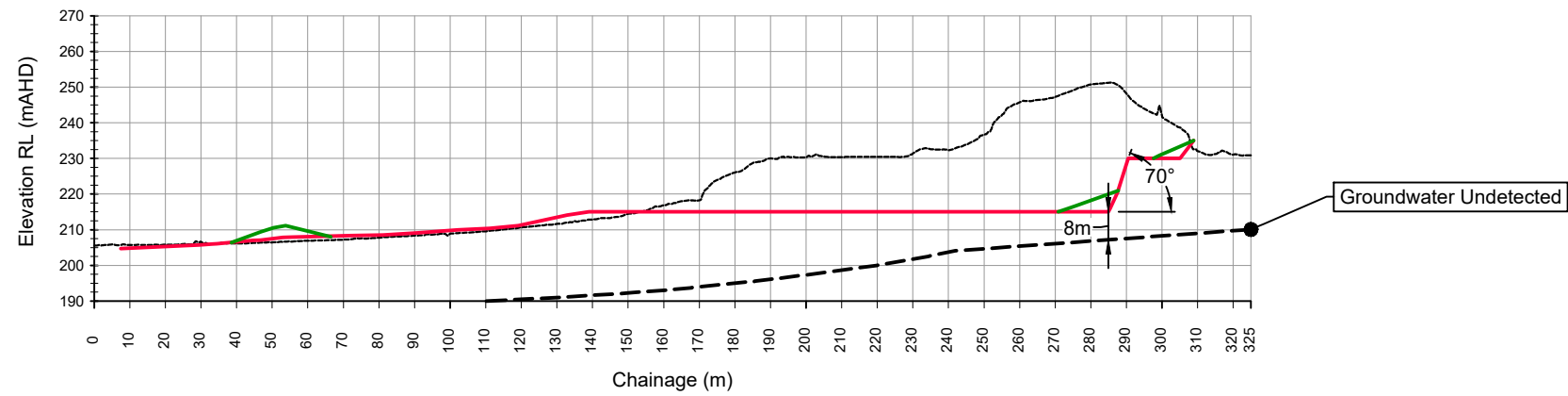
TITLE:	Quarry Development and Rehabilitation Plan - Stage 2 Sections A-A' to C-C'
SCALE:	1:2,000
DATE:	21 May 2025
PRINTED:	21 May 2025
DRAWN:	CP
CHECKED:	EM
DRAWING NUMBER:	2449.DRG.024B
REVISION:	
DATUM:	HORIZONTAL / VERTICAL / ZONE
GDA94 / MGA / AHD /	54

FILE NAME: F:\Jobs\240202449_CLM Quarries_Youngs Quarry\Drawing\2449.DRG.024 - Quarry Development And Rehabilitation Plan - Stage 2.dwg
JOB SUB #
CREATED: 21 May 2025

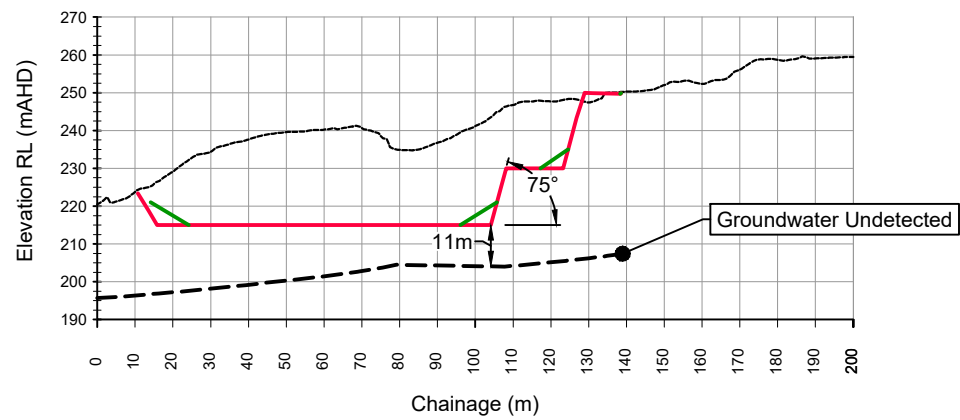
Section D-D'



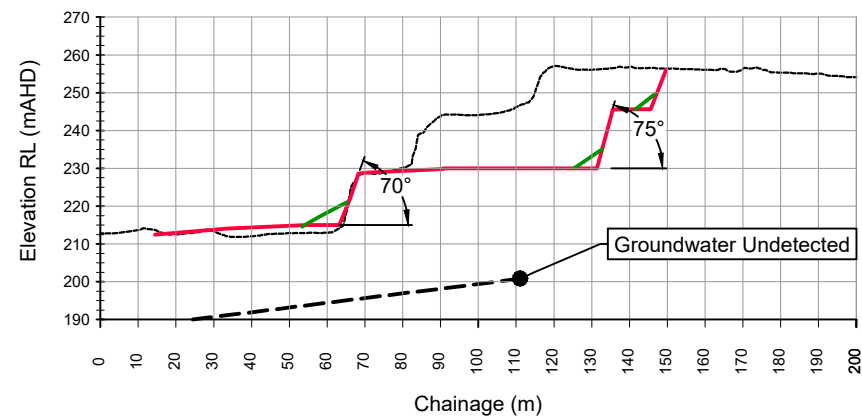
Section E-E'



Section F-F'



Section G-G'



REV	DESCRIPTION	DATE	BY

Data Sources:

Photography:	Groundwork part of SLR, UAV Survey, 2023/12/01, DSM 1m
Topography:	
Cadastral:	
Ecosystem:	
Other:	

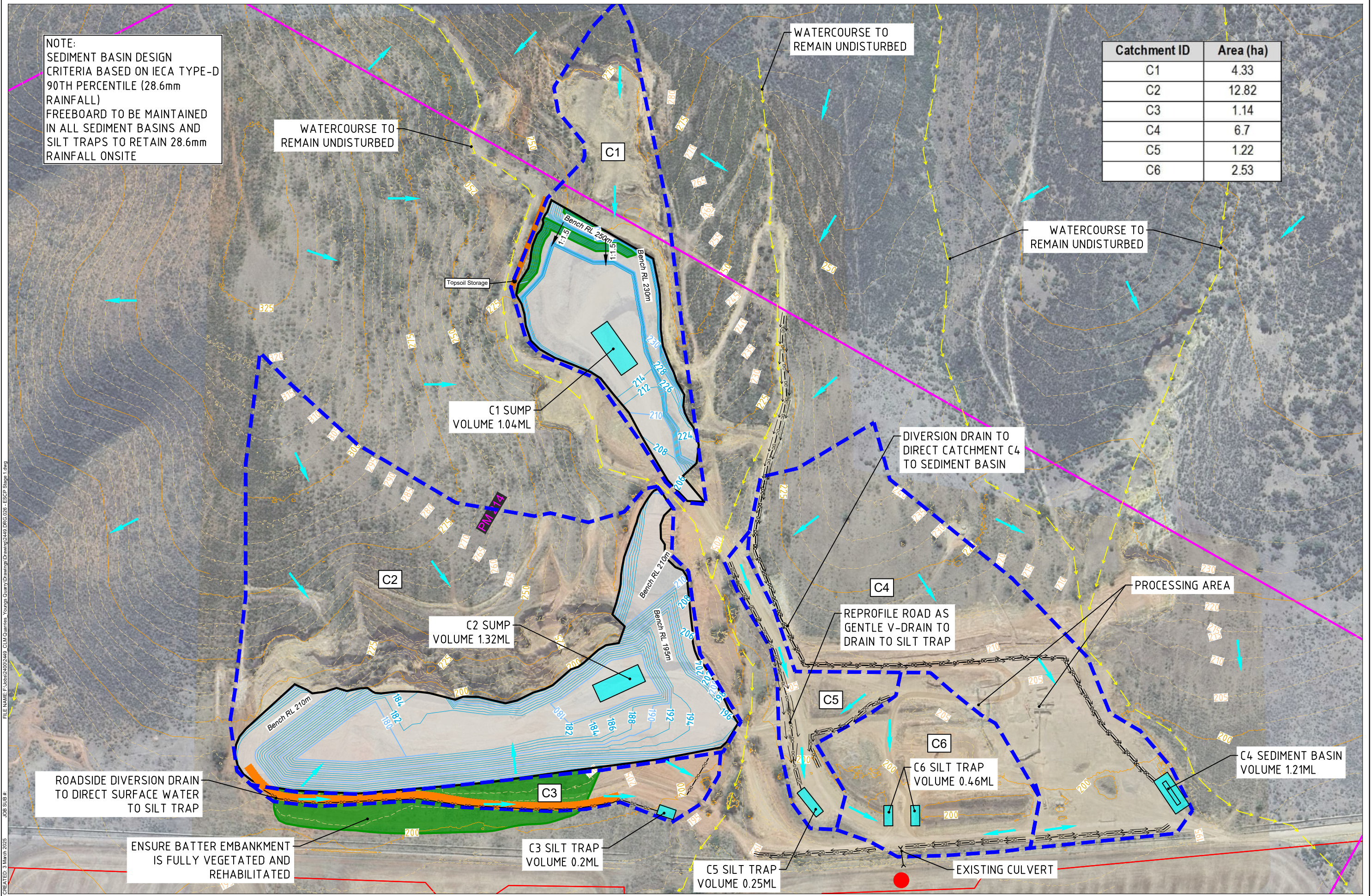
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- Legend:
- Existing Ground Surface
 - Pit Design Surface
 - - - Conceptual Future Extraction Surface
 - Rehabilitation Surface



PROJECT:	Youngs Quarry
CLIENT:	CLM Quarries

TITLE:	Quarry Development and Rehabilitation Plan - Stage 2 Sections D-D' to G-G'
SCALE:	1:2,000
0 40m	
DRAWING NUMBER:	2449.DRG.024C
REVISION:	
DATE:	21 May 2025
DRAWN:	CP
PRINTED:	21 May 2025
CHECKED:	EM
DATUM:	HORIZONTAL / VERTICAL / ZONE
GDA94 / MGA /	AHD / 54



Catchment ID	Area (ha)
C1	4.33
C2	12.82
C3	1.14
C4	6.7
C5	1.22
C6	2.53

FILE NAME: P:\Jobs\2400\2449 CLM Quarries - Youngs Quarry\Drawings\2449.DRG.DWG - ESCP Stage 1.dwg
JOB SUB #
CREATED: 3 March 2025

REV	DESCRIPTION	DATE	BY

Data Sources:
Photography: Groundwork part of SLR, RPA Survey, 2023/12/01
Topography: Groundwork part of SLR, RPA Survey, 2023/12/01, DSM 1m
Cadastral: © The Government of South Australia (C1) 2024
Ecosystem: © 2024 Microsoft Corporation; © 2024 Maxar; © CNES (2024) Distribution Airbus DS
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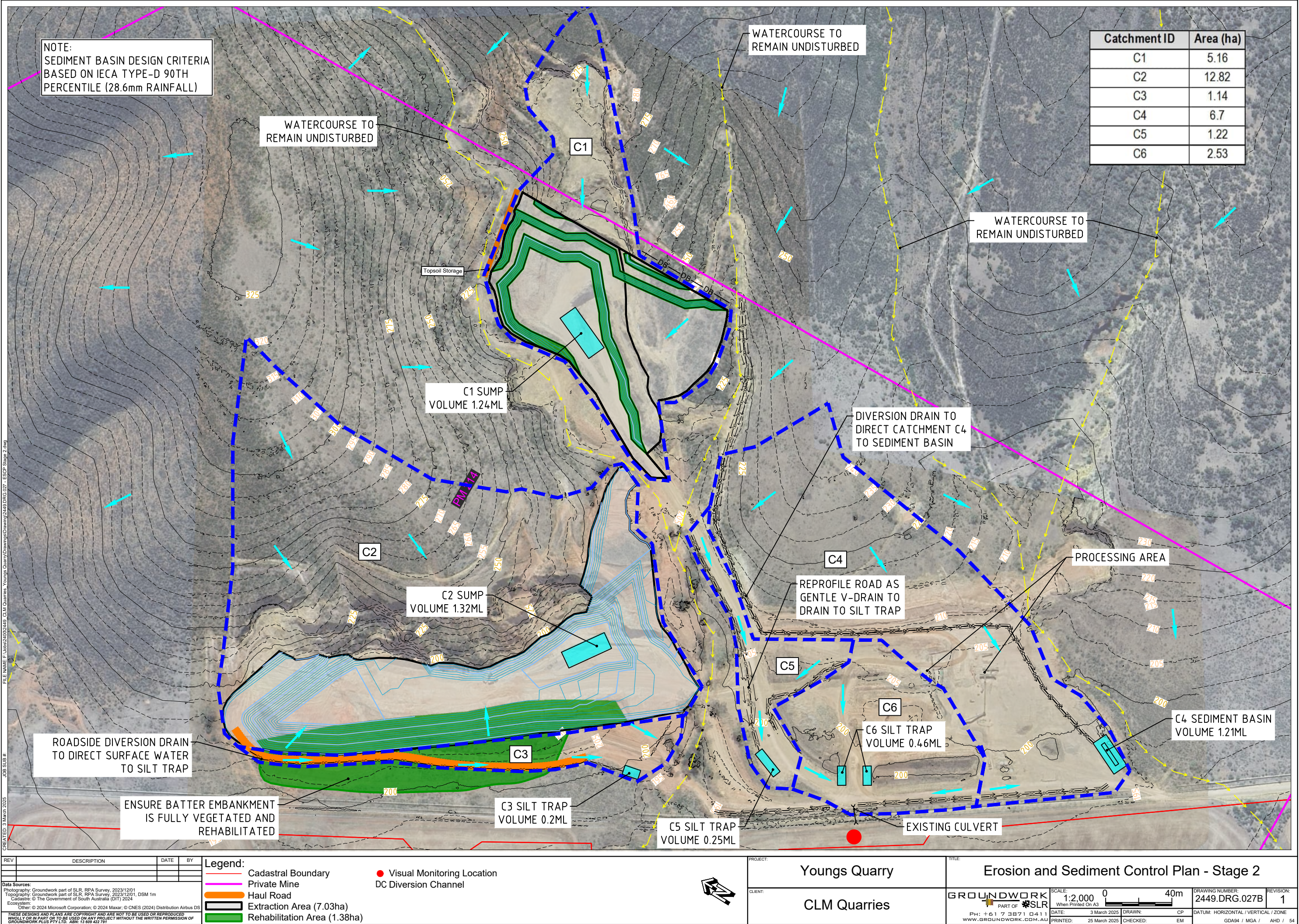
Legend:

- Cadastral Boundary
- Private Mine
- Haul Road
- Extraction Area (7.03ha)
- Rehabilitation Area (1.38ha)
- Visual Monitoring Location
- DC Diversion Channel



PROJECT: Youngs Quarry	TITLE: Erosion and Sediment Control Plan - Stage 1	
CLIENT: CLM Quarries	SCALE: 1:2,000 0 40m	DRAWING NUMBER: 2449.DRG.027A REVISION: 1
GROUNDWORK PART OF SLR PH: +61 7 3871 0411 WWW.GROUNDWORK.COM.AU		DATE: 3 March 2025 DRAWN: CP PRINTED: 25 March 2025 CHECKED: EM

DATUM: HORIZONTAL / VERTICAL / ZONE
GDA94 / MGA / AHD / 54





FILE NAME: F:\Jobs\240202449 - CLM Quarries - Youngs Quarry\Drawings\2449.DRG.029 - Conceptual Final Landform.dwg
JOB SUB #
CREATED: 25 March 2025

REV	DESCRIPTION	DATE	BY

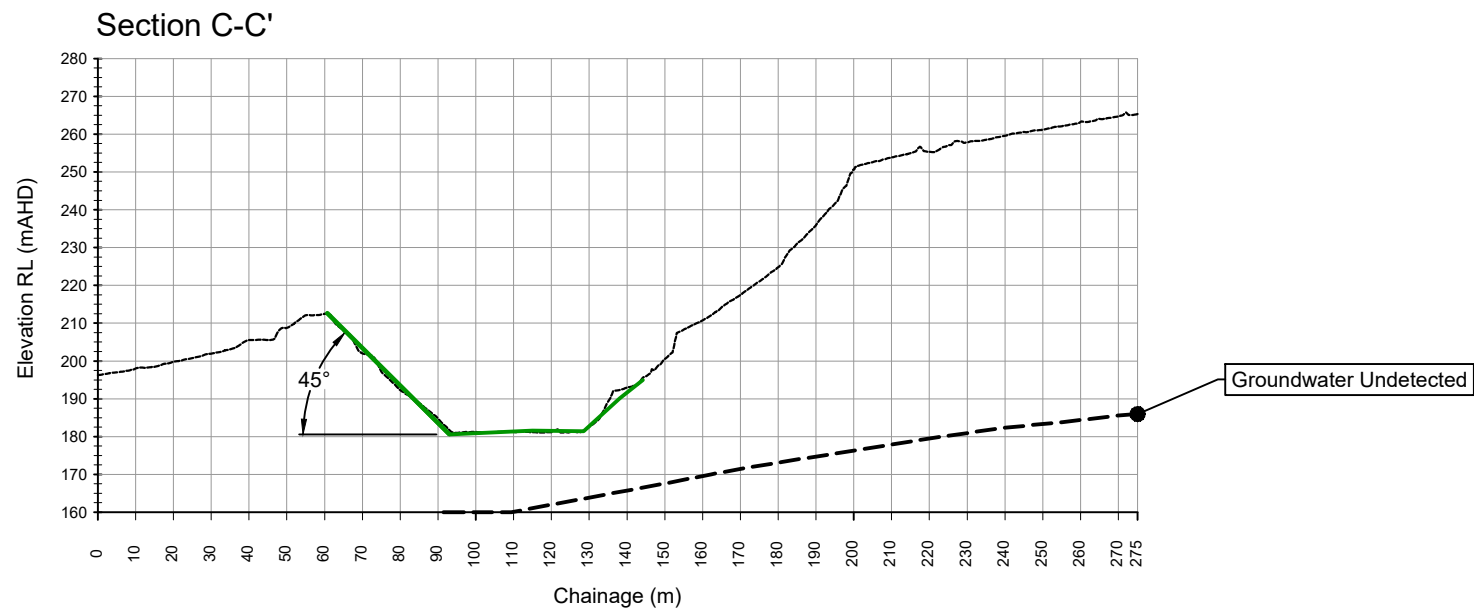
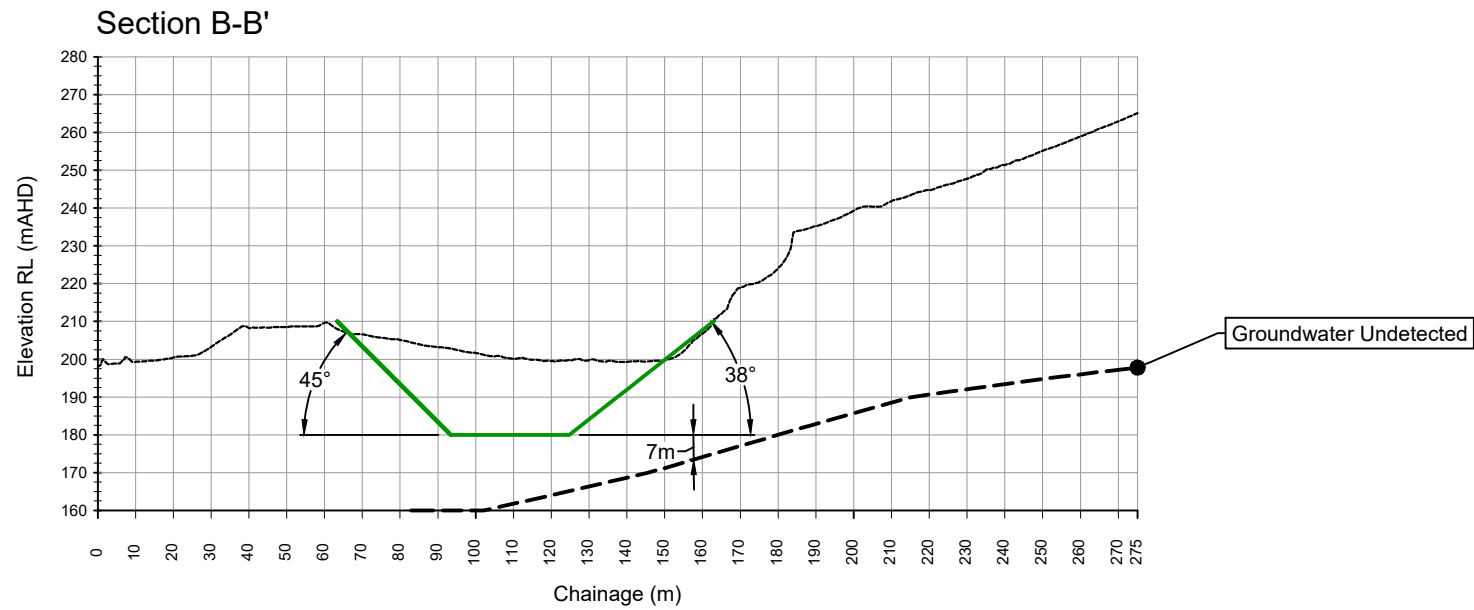
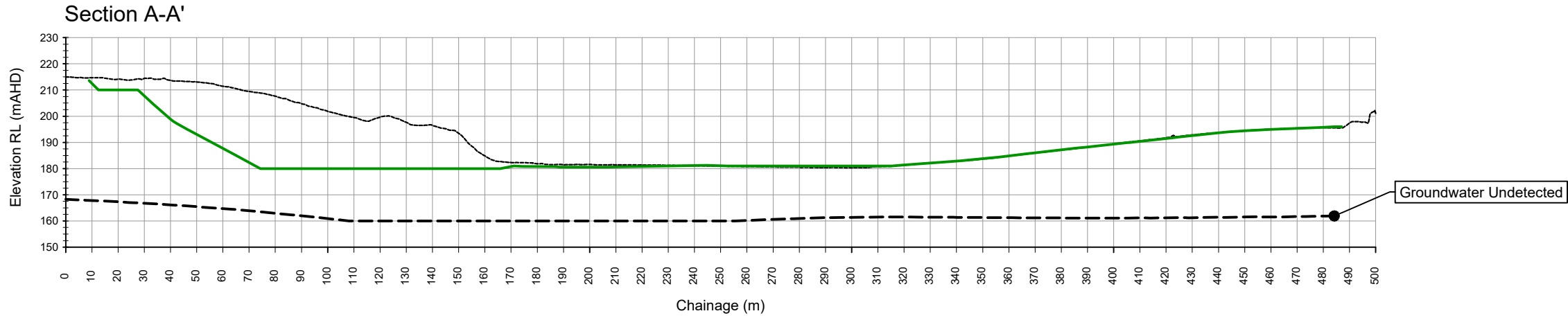
Data Sources:
Photography: Groundwork part of SLR, RPA Survey, 2023/12/01
Topography: Groundwork part of SLR, RPA Survey, 2023/12/01, DSM 1m
Cadastral: © The Government of South Australia (C11) 2024
Ecosystem: © 2024 Microsoft Corporation; © 2024 Maxar; © CNES (2024) Distribution Airbus DS
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Legend:
— Cadastral Boundary
— Private Mine
— Haul Road
● Drill Hole Location
 Rehabilitated Area (9.40ha)



PROJECT:	Youngs Quarry	TITLE:	Conceptual Final Landform Plan	
CLIENT:	CLM Quarries	GROUNDWORK	SCALE: 1:2,000 When Printed On A3	DRAWING NUMBER: 2449.DRG.029A
		PH: +61 7 3871 0411 WWW.GROUNDWORK.COM.AU	DATE: 25 March 2025 PRINTED: 25 March 2025	REVISION:
			DRAWN: CP CHECKED: EM	DATUM: HORIZONTAL / VERTICAL / ZONE GDA94 / MGA / AHD / 54

FILE NAME: F:\Jobs\2400\2449_CLM Quarries_Youngs Quarry\Drawings\Drawing\2449.DRG.024 - Conceptual Final Landform.dwg
JOB SUB #
CREATED: 25 March 2025



REV	DESCRIPTION	DATE	BY

Data Sources:

Photography:	Groundwork part of SLR, UAV Survey, 2023/12/01, DSM 1m
Topography:	
Cadastral:	
Ecosystem:	
Other:	

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Legend:

----- Existing Ground Surface

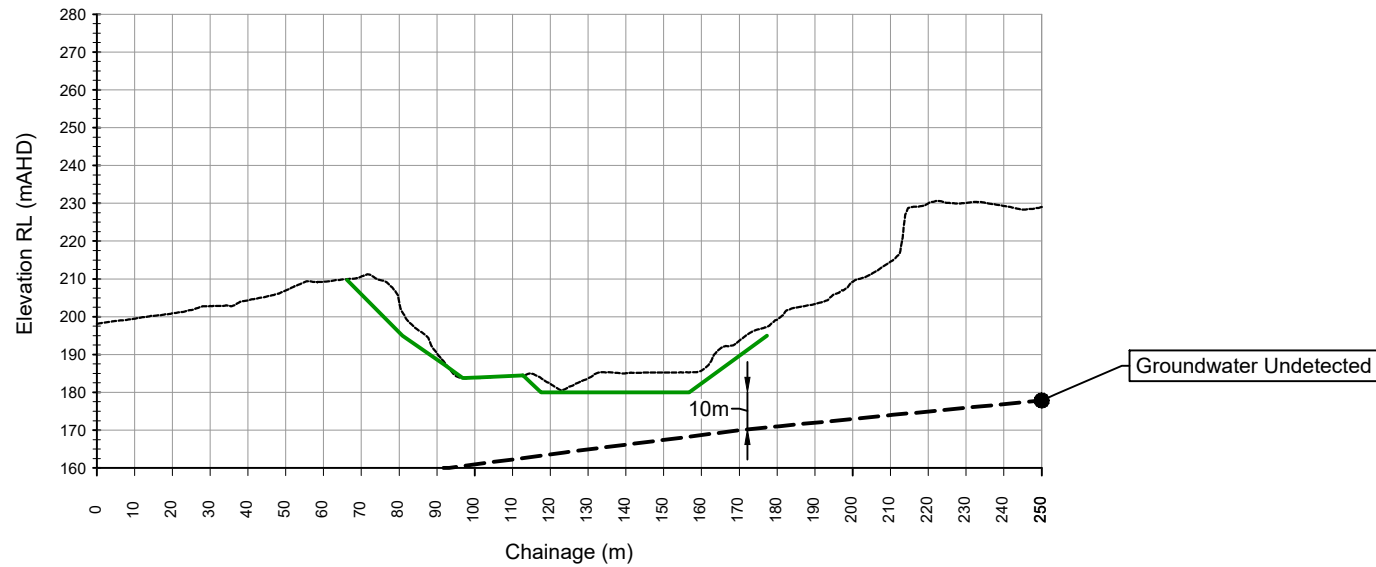
———— Rehabilitated Surface



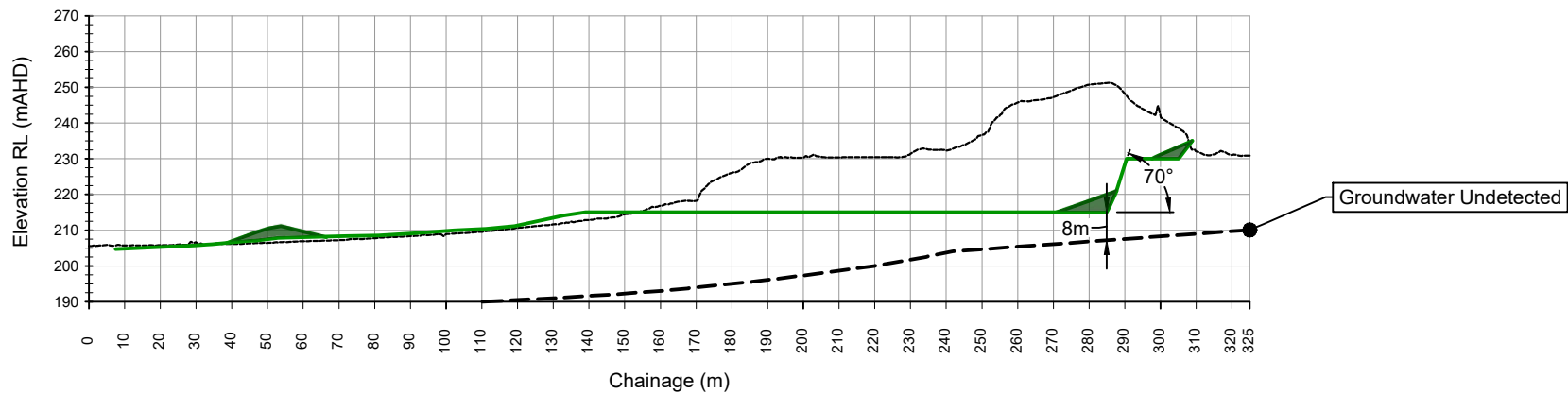
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CLIENT:	CLM Quarries	SCALE:	1:2,000
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			When Printed On A3
			DATE: 25 March 2025 DRAWN: CP
			PRINTED: 25 March 2025 CHECKED: EM
		DRAWING NUMBER:	2449.DRG.024B
		REVISION:	
		DATUM:	HORIZONTAL / VERTICAL / ZONE
			GDA94 / MGA / AHD / 54

FILE NAME: F:\Jobs\240202449_CLM Quarries_Youngs Quarry\Drawings\2449.DRG.024 - Conceptual Final Landform.dwg
JOB SUB #
CREATED: 25 March 2025

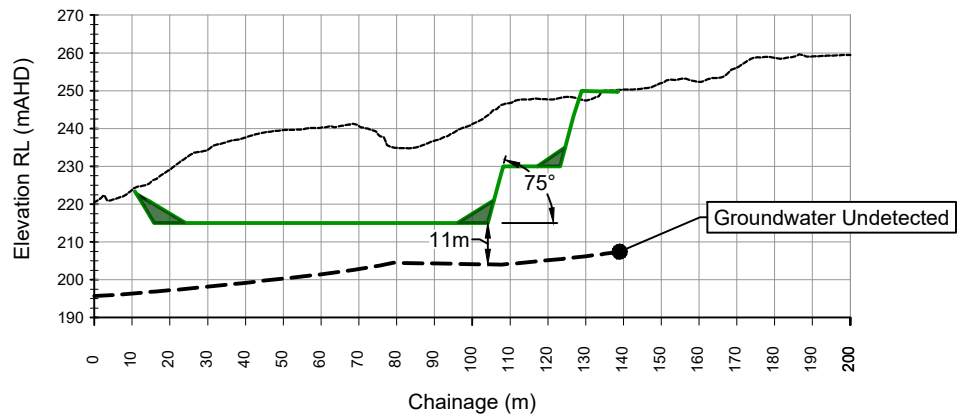
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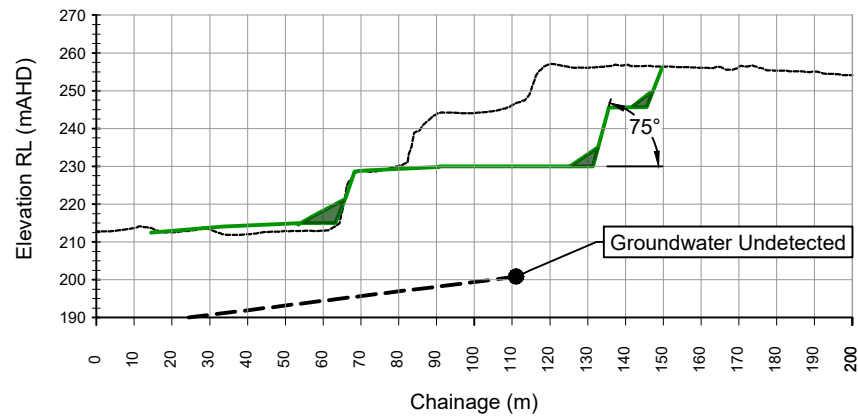
Section E-E'



Section F-F'



Section G-G'



REV	DESCRIPTION	DATE	BY

Data Sources:

Photography:	Groundwork part of SLR, UAV Survey, 2023/12/01, DSM 1m
Topography:	
Cadastral:	
Ecosystem:	
Other:	

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Legend:

----- Existing Ground Surface

----- Rehabilitated Surface



PROJECT:	Youngs Quarry
CLIENT:	CLM Quarries

TITLE:	Conceptual Final Landform Plan - Stage 2 Sections D-D' to G-G'
SCALE:	1:2,000
DATE:	25 March 2025
PRINTED:	25 March 2025
DRAWN:	CP
CHECKED:	EM
DRAWING NUMBER:	2449.DRG.024C
REVISION:	
DATUM:	HORIZONTAL / VERTICAL / ZONE
GDA94 / MGA /	AHD / 54

ATTACHMENTS

Attachment 1

Wind Rose Data Georgetown Station (Site No. 021020)

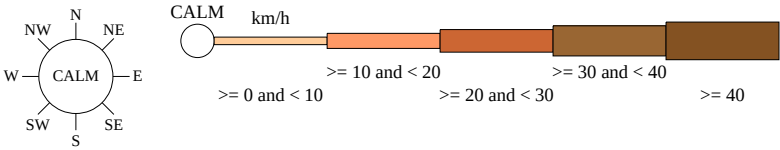
Rose of Wind direction versus Wind speed in km/h (01 Jan 1957 to 29 Oct 1976)

Custom times selected, refer to attached note for details

GEORGETOWN

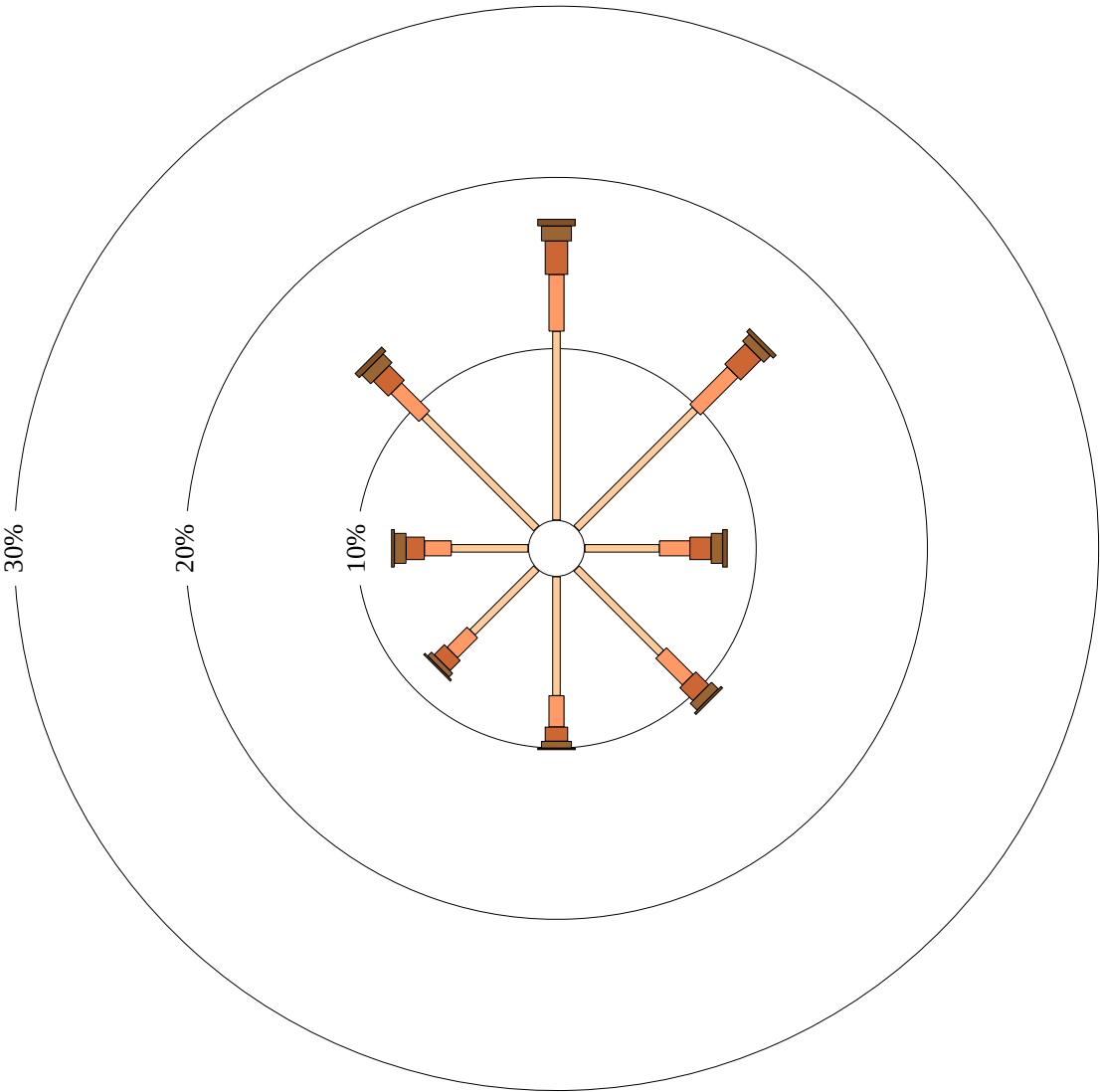
Site No: 021020 • Opened Jan 1874 • Still Open • Latitude: -33.359° • Longitude: 138.393° • Elevation 273m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.



9 am
6965 Total Observations

Calm 8%



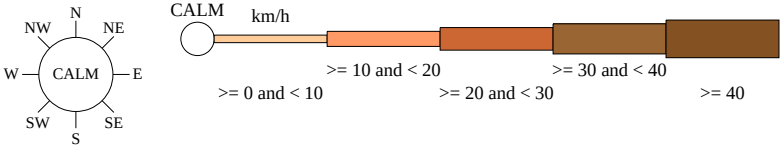
Rose of Wind direction versus Wind speed in km/h (01 Jan 1957 to 29 Oct 1976)

Custom times selected, refer to attached note for details

GEORGETOWN

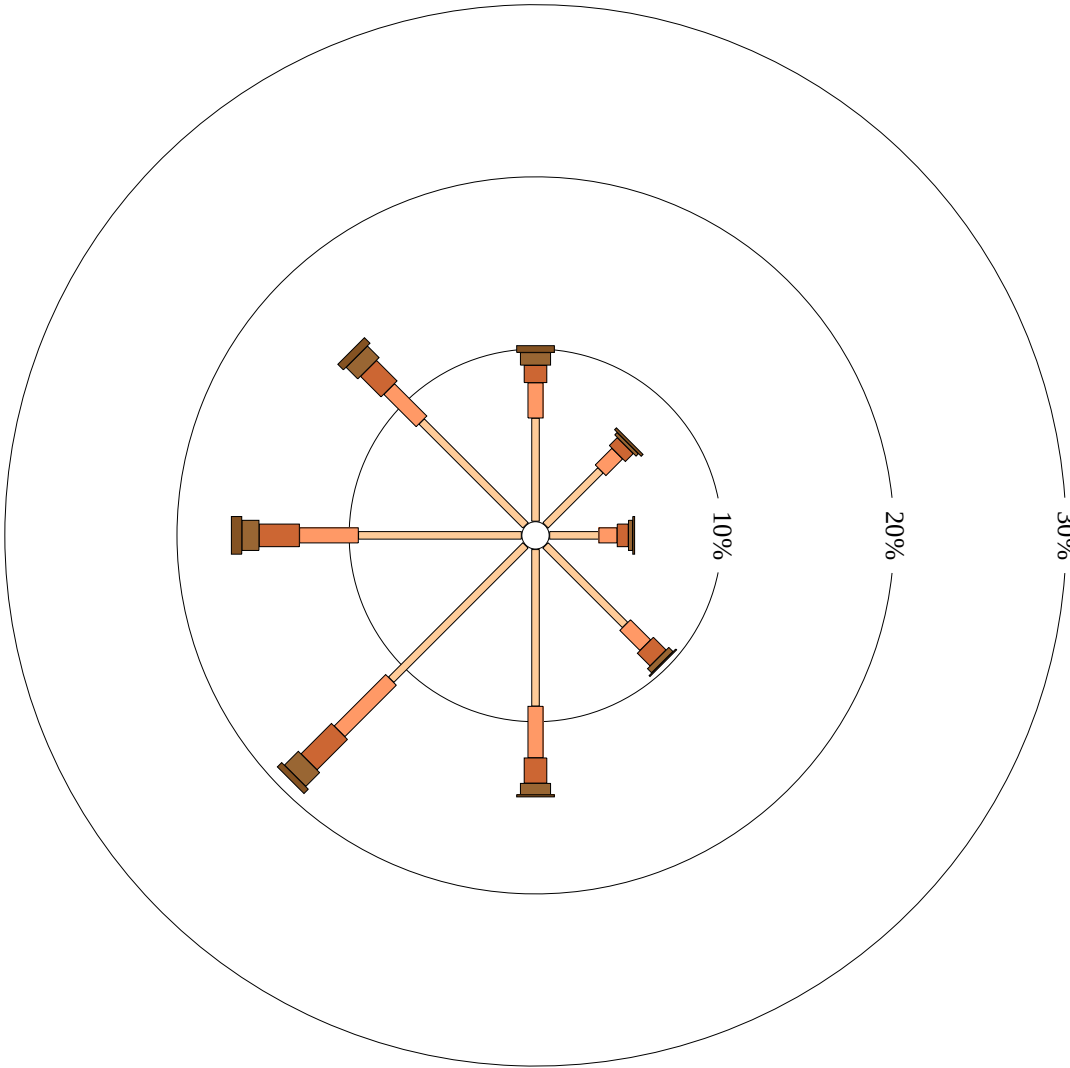
Site No: 021020 • Opened Jan 1874 • Still Open • Latitude: -33.359° • Longitude: 138.393° • Elevation 273m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.



3 pm
6908 Total Observations

Calm 4%



Attachment 2

Petrographic Report 2020



GEOCHEMPET SERVICES

ABN 25 065 630 506

PETROGRAPHIC, GEOLOGICAL & GEOCHEMICAL CONSULTANTS

28 Cameron Street
Clontarf, QLD 4019

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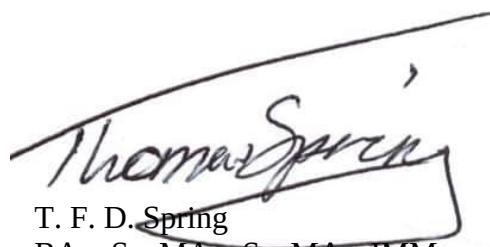
PETROGRAPHIC REPORT ON A SOURCE ROCK SAMPLE (2200309) FROM PORT LINCOLN

prepared for

**SMS GEOTECHNICAL
PORT LINCOLN, SA**

Order Number: 2-20015
Invoice Number: G2110546
Client Ref: Allan Gilland

Issued by



T. F. D. Spring
BAppSc. MAppSc. MAusIMM
21 October 2020

OCTOBER, 2020

Sm201001

Page 1 of 5

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GEOCHEMPET SERVICES, BRISBANE

<u>Sample No.:</u>	2200309	<u>Date Sampled:</u>	16/09/2020
<u>Sample Type:</u>	Source Rock	<u>Date Received:</u>	29/09/2020
<u>Source:</u>	Port Lincoln	<u>Project:</u>	Material Testing
<u>Project D:</u>	SMS2.20014		
<u>Work Requested</u>	Petrographic analysis in relation to suitability for use as a source for concrete aggregate and sealing aggregate		

Methods Account taken of ASTM C 295 Standard Guide for *Petrographic Assessment of Aggregates for Concrete*, the AS2758.1 – 2014 *Aggregates and rock for engineering purposes part 1; Concrete aggregates (Appendix B)*, the AS1141 Standard Guide for the *Method for sampling and testing aggregates*, of the content of the 2002 joint publication of the Cement and Concrete Association of Australia and Standards Australia, (HB 79-2015) entitled *Alkali Aggregate Reaction - Guidelines on Minimising the Risk of Damage to Concrete Structures in Australia*

Identification weathered, fine-grained, quartzofeldspathic sandstone

Description

The sample consisted of four hand specimens of moderately weathered, finely bedded, light brown, fine-grained sandstone. The rock can be lightly scratched with a steel tool.



Figure 1: Image of supplied rock samples.

GEOCHEMPET SERVICES, BRISBANE

A thin section was prepared for microscopic examination from the specimen in transmitted polarized light. In terms of textural components, an approximate composition of the rock, expressed in volume percent and based on a brief count of 100 widely spaced points in thin section, is:

46%	quartz sand grains (13% moderately strained)
32%	feldspar sand grains
<1%	acid tuffaceous/volcanic sand clasts (now largely sericitized)
5%	secondary iron oxide
2%	argillized and sericitized clasts of uncertain origin
2%	muscovite flakes
2%	illite/sericite cement
8%	earthy secondary iron oxide
1%	chlorite
2%	pores

In thin section the rock is a fine-grained, clast-supported sandstone, with an average grain size of about 0.1 - 0.2 mm, however some grains ranging up to 0.4 mm. It is moderately well-sorted, sandstone with an iron-stained clay matrix. Some of the fragments have had their matrix partly altered to secondary iron oxide, and weathered to earthy secondary iron oxide.

The framework grains are dominated by sub-rounded to sub-angular detrital quartz and feldspar grains. Lithic clasts included acid volcanic/tuffaceous rock, being composed of very fine-grained quartzo-feldspathic grains with fairly strong pale brown iron-stained chlorite alteration. Due to their fine grain size, it is difficult to be sure that these were derived from formerly glassy rhyolite/dacite lava fragments. Angular detrital quartz and blocky sub-rounded to euhedral feldspar grains are more common, they show features suggesting derivation from phenocrysts in felsic volcanic or explosive volcanoclastic rocks.

The matrix of this rock is composed of largely fine quartz and illite/sericite clay.

An extensive secondary mineral count was performed according to AS1141.26, using three slides with 600 counts per slide. The average soft, weak mineral content was seen to be 14.5%, specifically;

4.5%	sericite/illite matrix
0.1%	chlorite
7.0%	earthy secondary iron oxide
1.3%	muscovite
1.6%	sericitized clasts

Comments and Interpretations

The supplied rock sample (labelled 2200309) from Port Lincoln is identified as fine sandstone which has suffered at least moderate weathering. The presence of detrital muscovite flakes suggests some input from a pelitic metamorphic source, but most of the detrital grains indicate a felsic volcanic source.

GEOCHEMPET SERVICES, BRISBANE

For engineering purposes, the supplied rock sample may be summarised as consisting of:

- **weathered, fine-grained sandstone** (a sedimentary rock type)
- slightly porous (about 2%)
- moderately weathered
- contains about 15% of soft, weak minerals as interstitial material, earthy secondary iron oxide and in sericitized lithic clasts
- **moderately hard**
- **moderately strong**

The rock is predicted to be **moderately durable**.

The rock is predicted to have **potential for mild and/or slow alkali-silica reaction in concrete** because 13% of the quartz is moderately strained, and <1% finely microcrystalline quartz in the groundmass (which is concentrated in the siltstone fragment).

Thus, rock of the type represented in the supplied sample is predicted to be **adequate for use as concrete aggregate**, provided that appropriate precautions are taken in mix and engineering design to take account of its perceived potential for mild or slow deleterious alkali-silica reactivity. Further physical testing is recommended to assess the suitability of the material for this use

Appropriate guidance can be obtained from the 2015 joint publication of the *Cement and Concrete Association of Australia and Standards Australia, entitled Alkali Aggregate Reaction - Guidelines on Minimising the Risk of Damage to Concrete Structures in Australia*.

The rock of the type represented by the supplied sample is **adequate for use as a source of sealing aggregate**.

Free Silica Content

The free silica content is estimated to be about 46%.

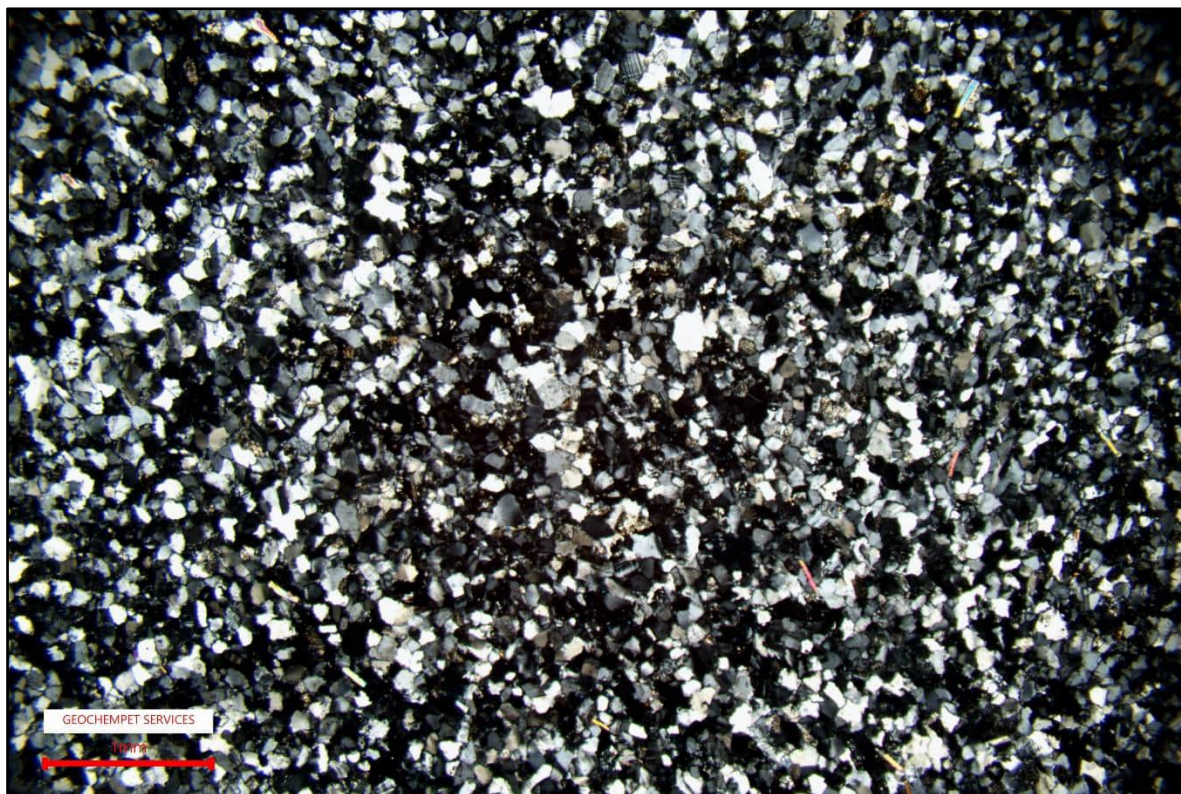


Figure 1: Microscopic image of supplied rock spall sample submitted for petrographic analysis, taken at low magnification with transmitted cross polarised light. Image shows the sandstone is dominated by quartz and feldspar grains and a few acid volcanic/tuffaceous clasts in the hematite/goethite matrix.

Attachment 3

Youngs Quarry Desktop Historical Highwall Geotechnical Review

Date: 21st November 2023
Ref: 2449_200_001

Youngs Quarry Desktop Historical Highwall Geotechnical Review

Site Geology

The site generally consists of a layer of dark brown topsoil measuring between 300 mm and 500 mm thick, underlain by light brownish-red weathered dolomite of varying thickness. The dolomite exhibits varying levels of weathering and alteration, a condition partly attributed to the prolonged exposure to weathering elements and the historical aspects of the pit areas.

The primary geology on site is the Skillogalee Dolomite, with minor sandstones and other sediments dispersed throughout the pit areas. Geologically, the Skillogalee Dolomite is characterised by its composition of blue-grey dolomites, magnesites, bands of black cherts, and stromatolites and is a part of the Late Proterozoic Adelaide Geosyncline, according to SARIG online spatial mapping.

Rock Mass Characteristics

The rock structure within the quarry, particularly in areas with historical mining activities, is distorted and folded. This complex geology has created a pattern of tabular to prismatic-shaped blocks formed by intersecting one to three sets of roughly perpendicular fractures.

The orientation of the fold is advantageous for stability; they dip into the surrounding terrain rather than into the pit void. This orientation helps prevent large-scale movement of materials. However, the area is still prone to rockfalls, toppling, and small wedge-shaped failures. Evidence of these failure modes is seen in the large amounts of debris and fallen rocks scattered around the quarry.

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Figure 1: Image displaying the tabular to prismatic blocks of the dolomite rock mass.



Figure 2: Image displaying the fold structures in the historical highwall workings.



Figure 3: Image displaying the fold structures in the historical highwall workings.



Figure 4: Image displaying the jointed and broken nature of the highwall rock mass.

Geotechnical Risks

The primary risks on site are from rockfall and topple failure modes; however, the site presents little in the way of large-scale failure risk. Rock mass failure happens when the forces driving a material exceed its internal resistance, often determined by the rock's shear strength, geological structure, and the slope's geometry. In softer rocks, failure can happen through the rock or along geological structures, while in harder rocks, it typically occurs along pre-existing defects. The failure mechanisms at Youngs Quarry are anticipated to be predominantly structurally controlled and gravitationally driven, resulting from extraction practices such as blasting and the rock mass's highly jointed cross-cut nature.

The primary risks on site are as follows:

- **Rockfall:**
 - Rockfall involves pieces of rock detaching from the face of a high wall or slope due to gravitational forces. These failures are often unpredictable and can be triggered by weathering, seismic activity, inadequate slope design, poor slope construction and implementation, and vibration from daily operations. Mitigation strategies include daily inspections of high-risk faces and scaling and trimming loose or high-risk blocks. Physical barriers such as bunds can also be constructed offset from the toe of slopes to catch and prevent rockfall run-out from interacting with pit floor or bench operations. Additionally, operations should be limited close to the working faces unless necessary.
- **Toppling:**
 - Toppling failure occurs when a slope, under the influence of gravity, tends to rotate about a point or axis below its centre of gravity; this usually happens when the discontinuities in the rock mass dip steeply into the excavated slope. Mitigation of toppling will include the same strategies as rockfall, such as scaling and trimming as needed, slope toe exclusion zone bunds, or, in extreme cases, reducing the batter angle.
- **Blasting:**
 - Blasting can significantly affect bench performance and stability. While the structural geology and rock mass characteristics are relatively fixed, the impact of blasting on wall stability can be controlled through careful design and implementation. The rock mass's highly jointed and cross-cut nature at Youngs Quarry will require continual blast review, optimisation, and modification of critical parameters to minimise blast-induced damage and flyrock, prevent overhang or undercut bench faces and ensure optimal bench design achievement and a safe operational environment. The propagation of blast-induced seismic waves through a highly jointed rock mass generates tensional and compressional dynamics. These forces act on the material joints and blocks within the rock structure, leading to loosening and localised rockfall and undercutting of slopes.

The effects of blasting activities are anticipated to notably affect the rock mass, bench configuration, and slope faces at Youngs Quarry. These effects are manifest across numerous slopes, evidenced by loosened blocks and material that is mildly undercut or overhanging, outcomes unequivocally attributable to blasting procedures or extraction methods, particularly given the context of the extensively jointed nature of the rock mass. The properties of the Youngs Quarry dolomite rock mass, including the orientation, continuity, and distribution of geological structures, will significantly influence and determine the extent of wall damage resulting from drilling and blasting or mechanical extraction activities.

- **Historical workings:**
 - The historical work zones will pose challenges for upcoming developments, particularly in historical regions where the pit terrain may be more weathered and fragmented. These areas often become sites of localised instability, primarily manifested as rockfalls and topples, especially at intersection points. Therefore, extreme caution is necessary at these locations.
- **Slope Height:**
 - According to the current pit data from 2021, the height of the high wall does not appear to cause significant issues on-site, except for the potential risks associated with high-velocity rockfalls. However, for optimal operational efficiency and stability, it would be preferable to incorporate some structural modifications, such as benches 15 meters in height and width, into the slope design as this addition would not only enhance the operational efficiency but also contribute to the overall stability of the highwall.

Future Geotechnical Input

The desktop geotechnical assessment was based on pit survey data collected on 24 October 2021. Given the likelihood of changes in the pit topography since that date, conducting a more current evaluation is essential. To ensure an accurate and up-to-date assessment that reflects the latest pit conditions, an on-site inspection by a geotechnical engineer is advised. This becomes even more critical if there are plans for significant development or expansion in the existing pit areas in the future.

Current Slope Geometry

At its highest, the historical highwall measures approximately 68 metres in height, with total slope angles varying between 37 and 46 degrees, averaging about 42.5 degrees according to the cut cross-sections. This pit is notably high at 68 metres, without benching or significant structural features to segment the height. In isolation, the height of the highwall would not typically present a significant risk, for example, if the slope angle were around 15 degrees. However, the combination of height and steep wall angles increases the highwalls risk profile. Keeping total slope angles below 45 degrees for open pits is recommended, although steeper angles are acceptable for individual bench faces and batter slopes. The stability of a pit is directly influenced by its angle, and a slope angle below 45 degrees generally provides a more stable configuration, reducing the risk of slope failures. Rock and soil failure mechanics indicate that steeper slopes are more prone to gravitational and shear failures; therefore, by keeping the slope angle lower, the forces driving potential failure are reduced, enhancing the overall stability of the slope.

The Youngs Quarry total slope angles of the highwall are considered appropriate, even when considering the pit's height. This combination of height and slope angle elevates rockfall risk due to potential increases in rockfall velocities and bounce heights; however, as per the 2021 pit topography data, this does not significantly increase the risk of large-scale material movement. However, it is anticipated that small-scale material movements will occur over the medium to long term, especially following significant rainfall events. This is attributed to the ongoing weathering, erosion, and scouring processes. Water flowing freely down a slope of this length and height will likely reach high flow velocities, accelerating the erosion rate. A site visit and geotechnical evaluation are recommended to validate this desktop assessment further, particularly if there is an anticipated increase in future pit operations or modifications to pit geometry.

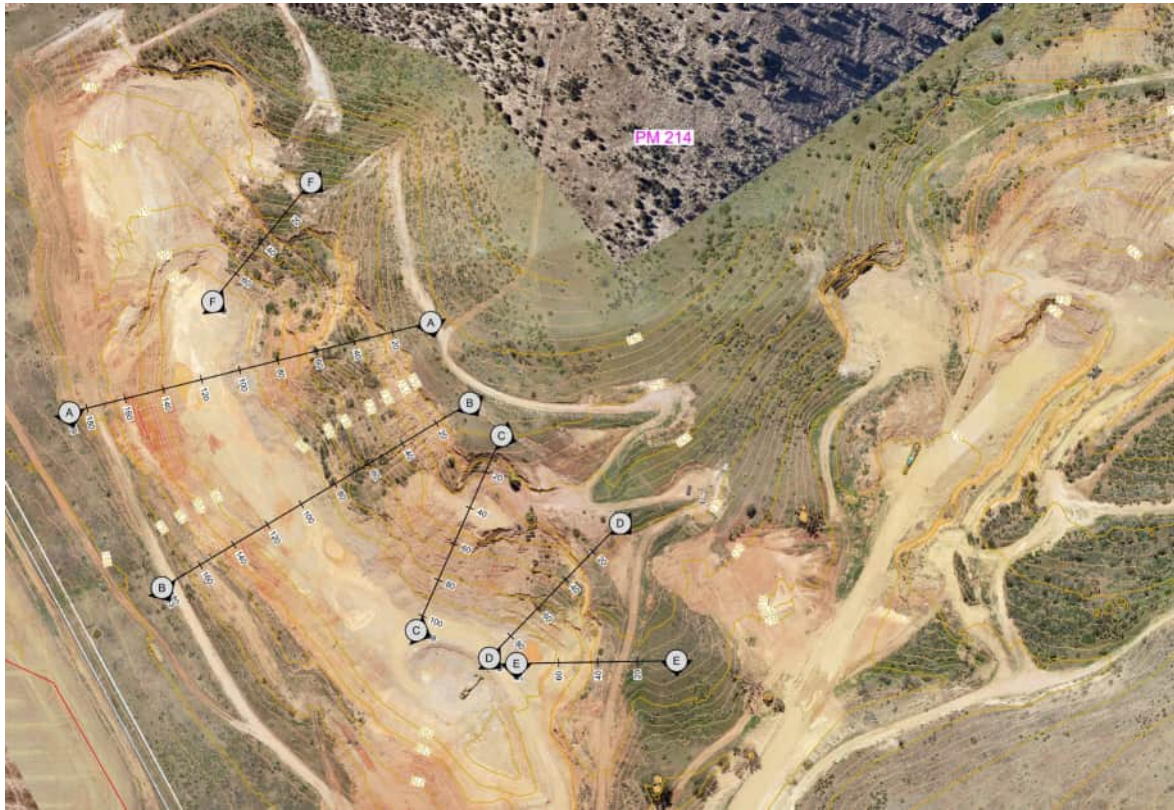


Figure 5: Cross-section locations.

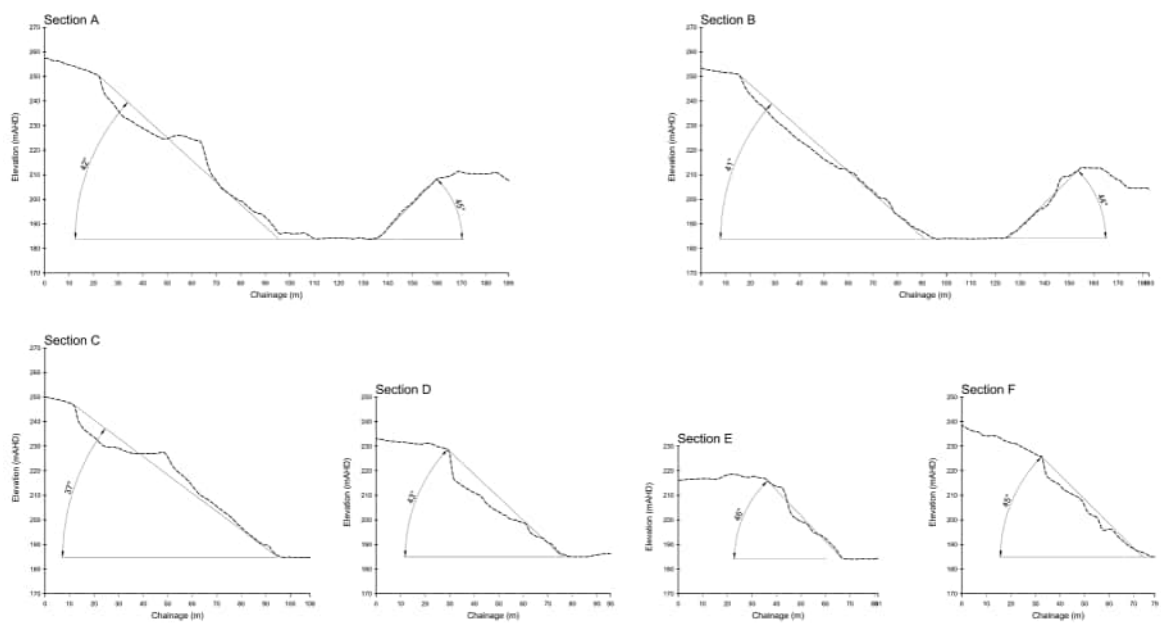


Figure 6: Slope total slope angles.

3D Limit Equilibrium Slope Stability Analysis

In order to determine the in-situ Factors of Safety (FOS), slope stability modelling was conducted in Rocscience Slide 3 V3.020, which incorporated the site topography, interpreted geology, groundwater conditions and primary structural discontinuities. This application serves as a three-dimensional platform for evaluating slope stability, utilising criteria such as the FOS or the Probability of Failure (POF) pertaining to either circular or non-circular failure surfaces in soil or rock slopes. In addition, Slide 3 employs the vertical column limit equilibrium method for analysing the stability of potential slip surfaces. This method breaks down the anticipated failure mass into square vertical columns, and four distinct methodologies - Bishop, Janbu, Spencer, and Morgenstern-Price (GLE) - are incorporated for determining the FOS associated with a particular column. The outcomes of these calculations can exhibit variations in critical failure region location, geometry, scale, and respective FOS.

Traditional slope stability assessments have often focused on locating a singular failure surface. However, the reality is that a slope can present multiple critical zones, each with its unique potential for failure, rather than being restricted to a single critical region. To address this, Slide 3 leverages the Particle Swarm Optimisation technique paired with the Multi-Modal Optimisation feature (MMO). This approach enables the software to simultaneously search for and optimise multiple critical failure regions for each of the four calculation methodologies. The advantage of this approach lies in its capacity to enhance the search process and identify multiple regions that are susceptible to failure. It is critical to recognise that Slide 3 possesses certain constraints in accurately capturing the entire rock mass variability and failure modes. As a result, the results should be viewed primarily as a reference on potential current slope stability rather than being perceived as a definitive measure of stability. Rock mass is highly complex, characterised by extensive variability in terms of geotechnical properties and, structural conditions and failure modes.

Therefore, it is imperative to approach the outcomes from SLIDE 3 analyses with an understanding of these limitations. The primary intention behind these analytical results is to identify potential zones of concern within the pit and site that may necessitate additional slope management strategies. By identifying these areas, the software facilitates the process of introducing strategic measures to enhance slope stability, thereby optimising the safety and efficiency of operations.

Consequently, while the software results should not be the sole determinant of slope stability, they serve as a valuable tool for informing slope management strategies and design modifications. Expert judgment and continual monitoring of the slope conditions remain paramount to maintaining slope stability. The software is a tool to assist, not replace, the expertise and vigilance of geotechnical engineers and site personnel.

Model Assumptions

The integration of assumed shear strength parameters in the three-dimensional limit equilibrium modelling is necessitated due to the current unavailability of comprehensive shear strength data for all site materials, encompassing both weathered and unweathered dolomite. The parameters utilised are predicated on informed engineering judgement, relying on prior experience with analogous materials in mining environments with similar geomechanical characteristics. It's imperative, however, that this approach be considered an interim solution. As material-specific strength parameters become available, updating and reanalysing these geomechanical models is critical. This continual refinement is essential not only for validating the initial assumptions but also for enhancing the reliability and accuracy of the models, thereby ensuring they are reflective of the most current and site-specific geotechnical understanding. The model has also integrated a simplified perspective of the in-pit geology.

Additionally, a probabilistic analysis is performed on dolomite shear strength parameters to quantify the inherent uncertainties in material properties. Deterministic analysis uses fixed values for

geotechnical parameters to assess slope stability. It calculates the FOS and identifies the most critical potential failure surfaces. Its advantage lies in simplicity and quick computation. However, it doesn't account for the natural variability in geotechnical properties. Probabilistic analysis incorporates variability and uncertainty of geotechnical parameters using statistical distributions. It conducts a Stochastic Response Surface simulation, producing a range of potential outcomes with associated probabilities and offers a nuanced understanding of slope behaviours and risks.

Design Acceptance Criteria

The Design Acceptance Criteria for an open pit mine, as outlined by Read and Stacey in their 2009 publication "Guidelines for Open Pit Slope Design", encompasses various key elements crucial for ensuring optimal and safe slope design. The guidelines aim to delineate the requisite levels of effort and acceptance criteria to uphold the best practices for pit slope investigation, design, implementation, and performance monitoring. These criteria are instrumental in bridging the gap between theoretical understanding and practical execution, thereby minimising risks associated with slope failures in open pit mines.

Specific design acceptance criteria have been adopted when conducting the limit equilibrium slope stability analysis for Youngs Quarry. An acceptable mean factor of safety (FOS) has been set at 1.6. Additionally, the acceptable probability of failure (POF) is defined within a range, with a minimum threshold of 1% and a maximum allowance of 10%.

Table 1: FOS and POF guidelines by Read and Stacey (2009) and Priest and Brown (1983)

Consequence of failure	Examples	Acceptable values		
		Mean FoS	Minimum P [FOS < 1.0]	Maximum P [FOS < 1.5]
Not serious	Individual benches; small (< 50 m), temporary slopes, not adjacent to haulage roads	1.3	10%	20%
Moderately serious	Any slope of a permanent or semi-permanent nature	1.6	1%	10%
Very serious	Medium-sized (50–100 m) and high slopes (<150 m) carrying major haulage roads or underlying permanent mine installations	2.0	0.30%	5%

Results

The assessment of Youngs Quarry highlights the higher risk slopes, notably the current highwall, as denoted by the yellow to orange hues on the FOS map which display the spatial distribution of FOS across the site. According to the FOS map, the model exhibits FOS of 1.565. The FOS and POF results are summarised in Table 2.

Table 2: Limit equilibrium modelling results

Model	Analysis Method	Groundwater Conditions	FOS	POF (%)
1	Probabilistic	Drained (dry)	1.565	0.2

In regard to the FOS and POF acceptance criteria outlined in the preceding section, the limit equilibrium analysis results for Youngs Quarry somewhat meet the established minimum acceptance criteria for open pit mining as detailed by Read and Stacey in "Guidelines for Open Pit Slope Design" (2009); however, FOS results over 1.5 are generally acceptable. It is essential to emphasise that this analysis strictly applies to the current pit and bench geometry, assumed groundwater conditions and material shear strength parameters. Future amendments to pit geometry, including changes in bench heights, widths, deviations in hydrogeological conditions, or results from material testing, necessitate a subsequent stability reassessment under the new conditions.

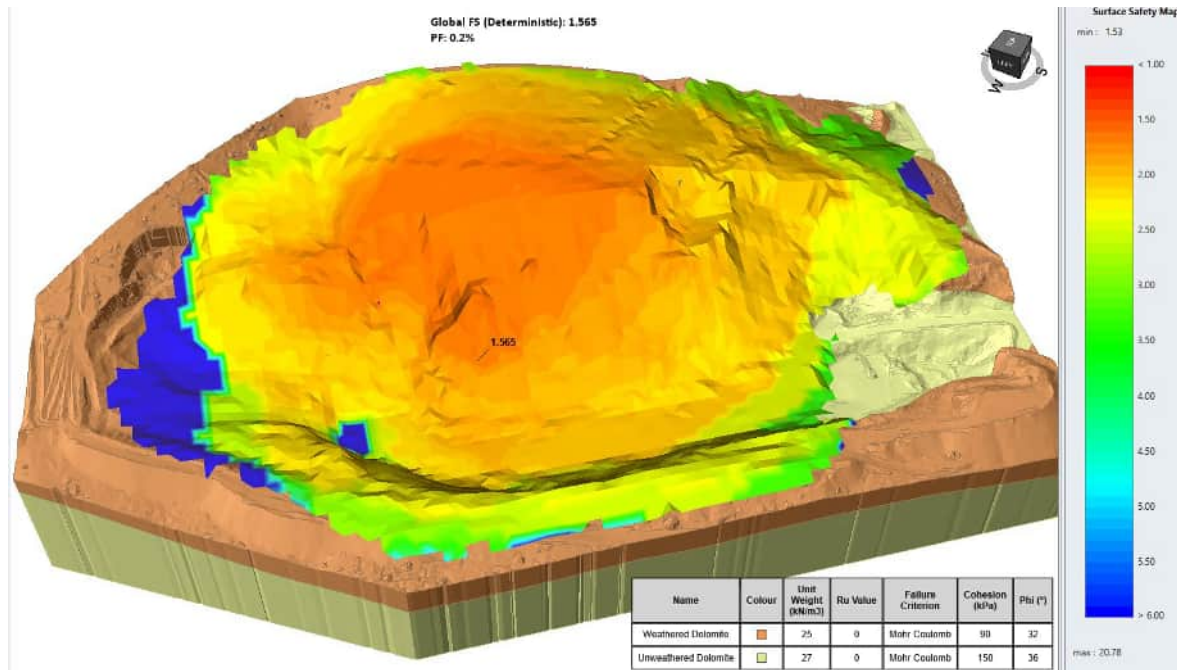


Figure 7: Slide 3 results for the highwall area displaying spatial variation in FOS. The highwall exhibits a FOS of 1.565 and a POF of 0.2% for the current site and highwall conditions.

Proposed Future Quarrying Method

In planning the future extraction of the site, the selected quarrying method entails systematically reducing the hill crest area, commencing from the uppermost area. This approach will incorporate the use of the existing switchback haul road network, which should ideally maintain a 1:10 gradient, although variations to steeper gradients are permissible in certain sections for limited extents, not exceeding a 1:8 gradient. This limitation is crucial to uphold operational efficiency and ensure safety. As the quarry operations advance and the hill is progressively diminished, the existing switchback haul road will be gradually incorporated into each working level.

The design of the quarry should include benches that are 15 metres in width and height, with batters angled between 45 to 60 degrees. However, a minimum width of 25 metres is recommended for operational benches to provide a safe and adequate working space. Additionally, restricting bench heights to less than 15 metres can facilitate more effective management of rockfall risks by reducing the velocity of falling materials.

Considering the jointed and blocky characteristics of the rock mass, coupled with a consistent risk of low-volume rockfalls, it is imperative to establish slope toe exclusion zones and safety bunds as necessary. Furthermore, scaling operations should be conducted as needed to mitigate rockfall hazards. Special attention must be paid to the interfaces between new and historical workings, as these areas are often susceptible to increased localised instability. It is paramount that personnel operating in these areas exercise extreme caution to avoid potential safety hazards.

For future conceptual development design of the quarry, it is essential to conduct an Unmanned Aerial Vehicle (UAV) survey of the site. This will ensure that the designs and associated material volume calculations are grounded in the most current and accurate representation of the pit's topography.

Attachment 4

Groundwater Desktop Study – Youngs Quarry – Private Mine 214

James Rowe
SA Manager
Groundwork Plus

30 May 2021

Dear James

RE: Groundwater Desktop Study – Youngs Quarry – Private Mine 214

Please find the following report that summarises groundwater conditions near Private Mine (PM) 214, Collaby Hill Road, Warnertown ("the Site" – Figure 1). The work has been commissioned to support the Mine Operations Plan (MOP).

Groundwater Science (GWS) have undertaken a groundwater review. Scope of work includes:

- Collate and present available groundwater information from available data sources.
- Provide recommendations to support quarry development planning. This includes a recommendation for pit floor elevations to avoid or minimise the potential for groundwater interception.

Key findings from the work confirm that:

- The Site falls outside of a prescribed wells or water resources area. Use of groundwater or surface water does not require a license.
- The quarry targets hard rock of Adelaide Rift sequences. Two pits are in operation, the Main pit and Eastern Pit. The Main pit targets quartzite while the Eastern pit targets dolomite.
- The nearest existing groundwater user is located 2.5 km north-east of the Site. This user is located in a separate sub-catchment in the high part of the ranges.
- Percussion drilling was implanted to confirm groundwater elevations at accessible locations. The drilling confirms that groundwater is more than 20 m below ground at drilled locations. Groundwater elevations at hilltop locations have not been confirmed, and for the purpose of this assessment have been inferred via topographic inference.
- There are no groundwater dependent ecosystems identified within the footprint of the Project.

For quarry pit designs it is recommended to remain 5 m above the inferred water table position provided in Figure 11. This recommendation is conservative and allows for uncertainty given limited data availability in high parts of the tenement.

The inferred groundwater table elevation for this site is uncertain. It is based on a conceptual understanding of the groundwater system by extrapolating data from available drillholes. A monitoring and management plan that provides for monitoring of the groundwater elevation, and management contingency if the water table is higher than inferred will be necessary for this Site.

1 Introduction

Groundwater Science have been engaged by Groundwork Plus Pty Ltd (Groundwork Plus) to undertake a groundwater desktop study for C.L. Land Management Pty Ltd (Youngs Quarry) incorporating PM 214 'the Site'. The Site is located approximately 5 km east of Warnertown and 25 km south-east of Port Pirie (Figure 1).

The purpose of this assessment is to:

- Collate baseline groundwater conditions in proximity to the Site.
- Assess levels to which quarrying can be conducted to minimise pit inflows and potential impacts to groundwater receptors (if present).

The following report summarise findings from the work while Table 1 provides a summary of key project data.

Table 1. Summary of Desktop Review – Youngs Quarry – PM 214.

Project Attribute	Details
Tenement Details	The quarry operates within Private Mine (PM) 214. Future expansion will remain within the hard rock area of PM 214.
Landscape Region	Northern and Yorke Landscape Board
Prescribed Water Resource Area?	The Private Mine falls outside of a prescribed wells or prescribed water resources area (PWA / PWRA). Extraction of groundwater or surface water does not require a license. The nearest PWA is Baroota approximately 40 km north.
Rainfall and recharge	Rainfall varies from 350 mm on the Coastal Plain rising to ~550 mm in the Ranges to the east (Deane et al, 2005).
Topography	Bench heights within the existing northern quartzite pit range from 183.7 to 207 mAHD.
	Bench heights within the existing eastern dolomite pit range from 205 to 262 mAHD.
	Undeveloped extraction areas rise above 300 mAHD
	Major creek bed elevations range from 181 to 240 mAHD rising steadily to the east.
Local Geology and Quarry Targets	The quarry targets two rock types, Bungaree Quartzite and Skillogalee Dolomite. Both rock types belong to Adelaide Rift sequences and comprise metamorphosed sediments.
	Future development will target both rock formations.
	Quaternary sediments are mapped west of the quarries beneath the Coastal Plain. Rock types include undifferentiated Quaternary sediments (Qa) and Pooraka Formation (Qpap). These rocks will not be targeted as part of quarrying.
Regional aquifer systems / groundwater attributes	Regionally groundwater is contained within 2 aquifer types: 1) fractured rock aquifers beneath the quarry and in hills to the east. 2) sedimentary aquifers beneath the Coastal Plain to the west of the quarry (Quaternary and potentially a Tertiary Aquifer; Deane et al, 2005).
	The fractured rock aquifer reports groundwater salinity between 300 to 1998 milligrams per litre total dissolved solids (mg/L TDS). Sedimentary aquifers beneath the Coastal Plain report salinity between 1631 to 3750 mg/L. In general salinity is predominantly suited to stock usage. Fresh groundwater to the east of the quarry is suitable for domestic purposes.
	Shallow percussion drilling at the quarry did not intercept or report groundwater at sites of drilling. once drillhole in the Main pit extended to 163.6 mAHD and was reported as dry.
	Groundwater elevations on the Coastal Plain (west of the existing quarries) report between 25 and 46 mAHD.
	Groundwater elevation to the east of the Site range from 225 to 387.45 mAHD.

Project Attribute	Details
3 rd party groundwater users	No water supply well exists within the PM. The nearest registered well is located 530 m to the south-east (6531-845, 1.83 m deep). This well could not be located during a Site inspection (M. Jones written comms., January 2020). The nearest 3rd party well is located 2.5 km to the north-east (well 6531-698, drill depth of 14 m). The well targets Adelaide Rift rocks and is in a separate surface water catchment to the Site. A cluster of wells are located on the Coastal Plain near Warnertown, 3.5 km west. These wells target Quaternary and / or Tertiary Sediments. Based on the above there is very limited groundwater use in proximity to the Site. Water supply in the area is likely to be sourced from mains water from the Morgan to Whyalla pipeline. Potential impacts of quarry operations on 3rd party users is considered to be very low, given the distance to receptors and quarry intention to remain above groundwater.
Potential for Groundwater Dependent Ecosystems	According to the Bureau of Meteorology GDE Atlas there are no GDE's within the PM that are reliant on surface expression of groundwater. Mapped vegetation is described as having low potential for groundwater interaction with water tables > 20 m below ground surface. The above is supported by drilling investigations that confirm that the water table is more than 20 m below ground at the sites of investigation (including below creek lines). A water point (unit number 6531-604) is located 915 m south in a neighbouring catchment (outside of the PM). No surface expression of water was noted at marked location based on fieldwork in January 2020 (M. Jones, written comms., 2020).

2 Data Review

2.1 Rainfall and Topography

Mean rainfall in the area is reported at approximately 360 mm near Port Pirie, rising to approximately 550 mm in the ranges to the east (Deane et al, 2005). Rainfall in the upper parts of the PM is expected to be moderately higher than the coastal plain, in the order of 400 mm (see Figure 8 of Deane et al, 2005).

The Site is situated at the base of the Southern Flinders Ranges. The western part of the PM (on the Coastal Plain) reports a minimum elevation of ~148 mAHD. Ground elevations rise above 300 mAHD at hill-top locations. Topography falls to the west in the direction of the coast.

2.2 Geology

The surface geology of the Site and surrounding area is presented in Figure 2 while a summary surface geology is provided in Table 2. Principal rock types on the Site comprise:

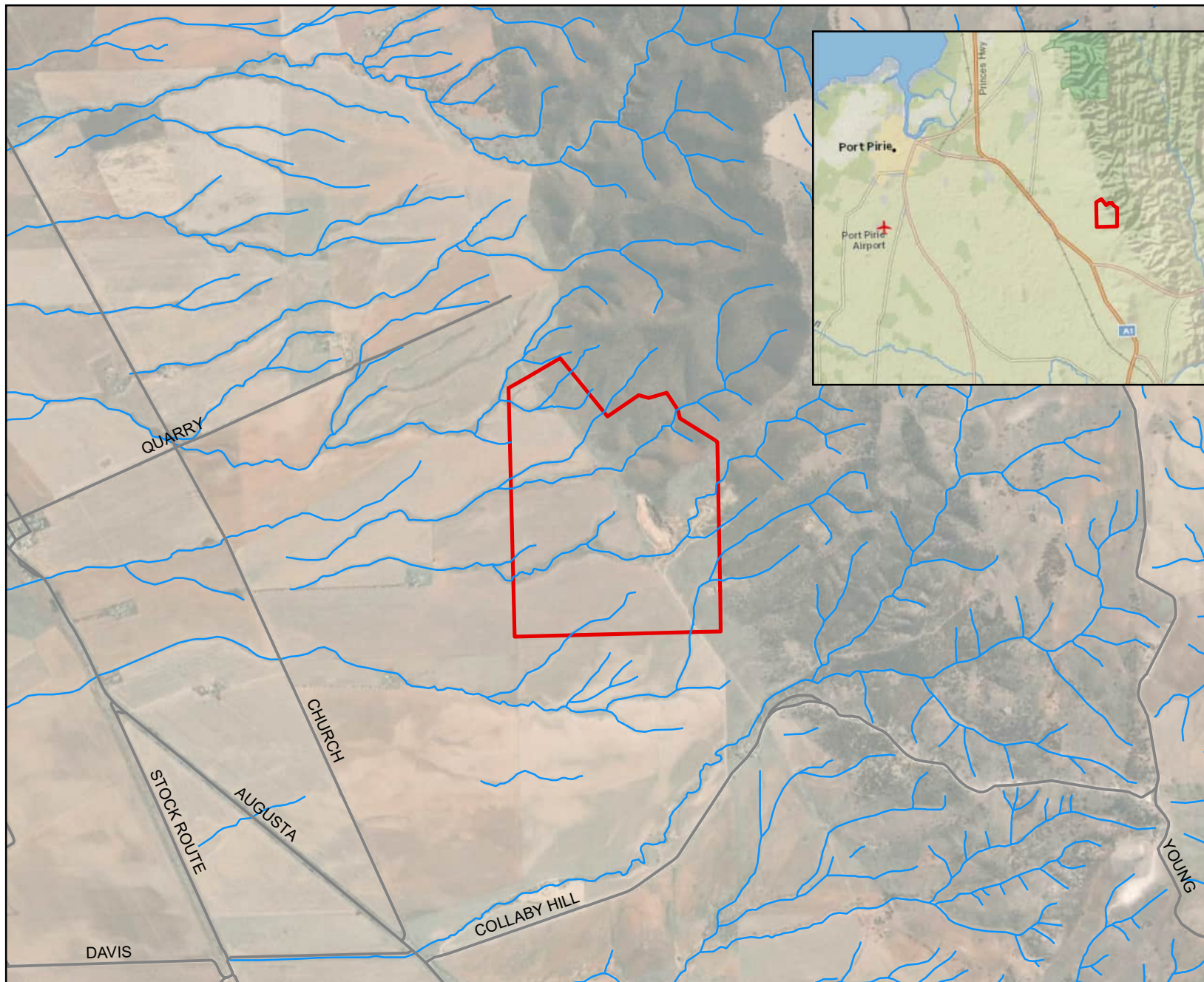
- Bungaree Quartzite – currently extracted in the northern pit (also described as the Main pit).
- Skillogallee Dolomite – currently extracted in the eastern pit.

Quaternary sediments are mapped in the western part of the PM but are not targeted by quarrying.

Table 2: Summary Table – Surface Geology mapped at PM 214.

Map Unit	Name / Formation	Era	Description
Qa	Undifferentiated Quaternary Sediments	Quaternary (recent)	Undifferentiated Quaternary.
Qpap	Pooraka Formation	Quaternary (recent)	Clay, sand and carbonate earth, silty, with gravel lenses. Includes outwash from current drainage lines.
Nmsm	Marola Sandstone Member (Skillogallee Dolomite)	Neoproterozoic (Torrensian)	Sandstone, feldspathic, coarse-grained, commonly dolomite-cemented or with dolomite leached out; sandstone, fine to medium-grained; siltstone, grey.
Nms6	Skillogallee Dolomite (Lower member)		Pale dolomite, lower member
Nms7	Skillogallee Dolomite (upper member)		Dark dolomite, upper member
Nob	Bungaree Quartzite		Sandstone, fine to coarse grained, feldspathic, quartzitic, to arkosic, ripple marks, cross bedding, lenticular, minor pale grey to greenish siltstone, minor pale grey dolomite.

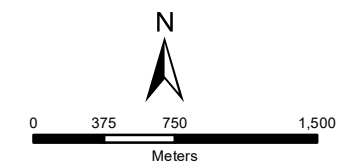
Data sources: SARIG (2019).



- Private Mine 214
- Major Roads
- Streams



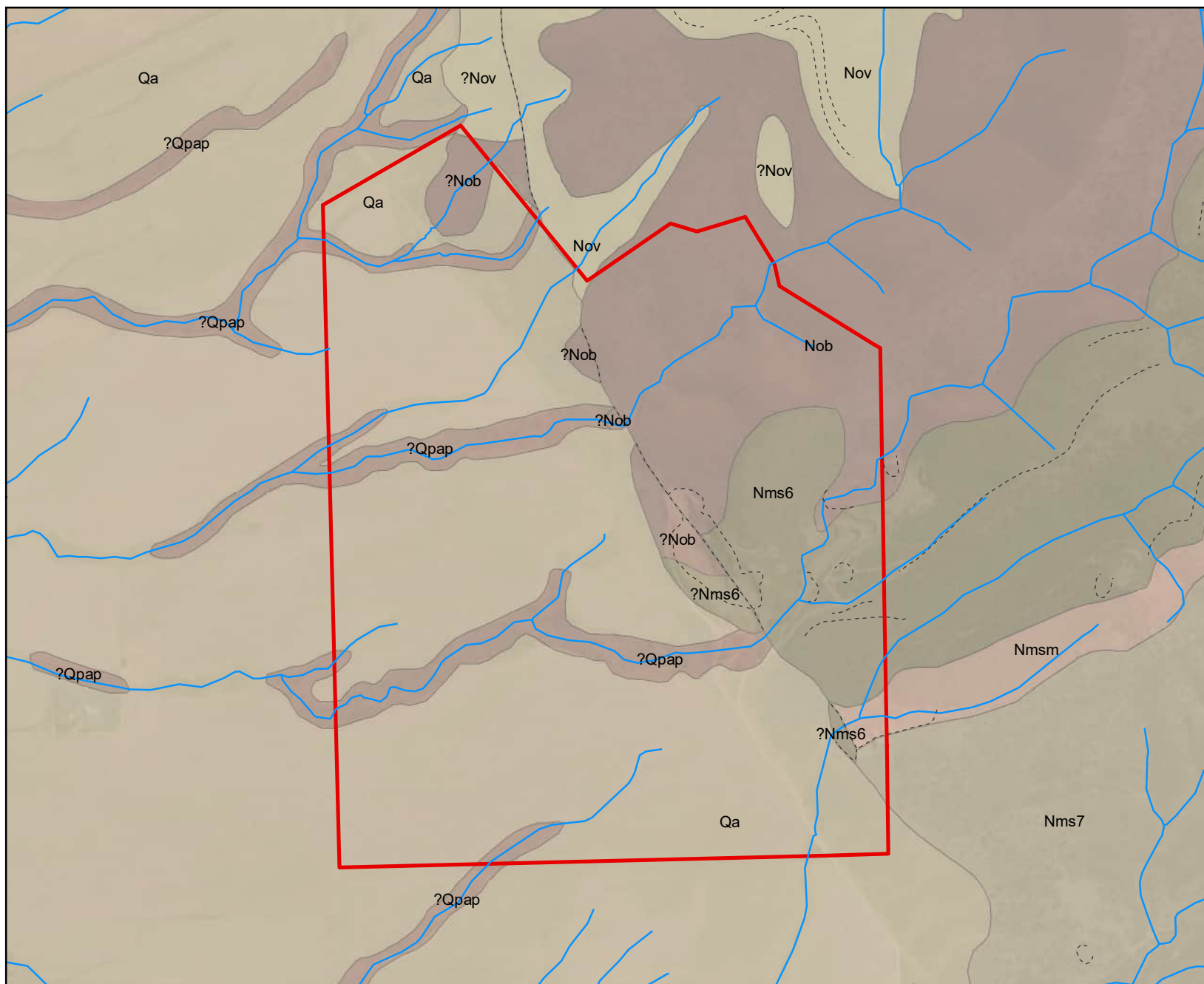
Job Number: GWP-20-1	
Client: Groundwork Plus	
Version: 1	Date: 2/05/2021
Drawn by: PM	



Coordinate System: GDA 1994 MGA Zone 54

**Site Location Map -
CLM Youngs Quarry
Private Mine 214**

Figure 1.



- Streams
- - - - - Faults / Structures / Linear Features
- Private Mine 214

MAINUNIT

- Pooraka Formation - Qpap
- Undifferentiated Alluvial - Qa
- Skillogalee Dolomite - Nms7
- River Wakefield Formation - Nov
- Marola Sandstone member - Nmsm
- Skillogalee Dolomite - Nms6
- Bungaree Quartzite - Nob



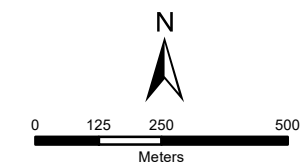
Job Number: GWP-20-1

Client: Groundwork Plus

Version: 3

Date: 2/05/2021

Drawn by: PM



Coordinate System: GDA 1994 MGA Zone 54

Surface Geology Map
(source: SARIG, 2020).

Figure 2.

3 Water Well Data

Two information sources were utilised to evaluate groundwater conditions in proximity to Site.

- 1) Water well information obtained from the DEW's groundwater data application (WaterConnect, 2019).
- 2) Results from percussion drilling at the Site including the drilling of 4 drillholes to depths between 20 to 24.5 m.

A summary of available data is provided in Sections 3.1 to 3.5.

3.1 Well Classes

Figure 3 reports well classes labelled by unit number. The map indicates that no water well exists at the Site. The nearest 3rd party well is located 530 m to the south east (unit no 6531-845). This well is only 1.83 m deep and not representative of a regional aquifer. An attempt to locate the well was undertaken in January 2020 but was unsuccessful (M Jones, written comms. 2020). The landowner had no knowledge of its existence.

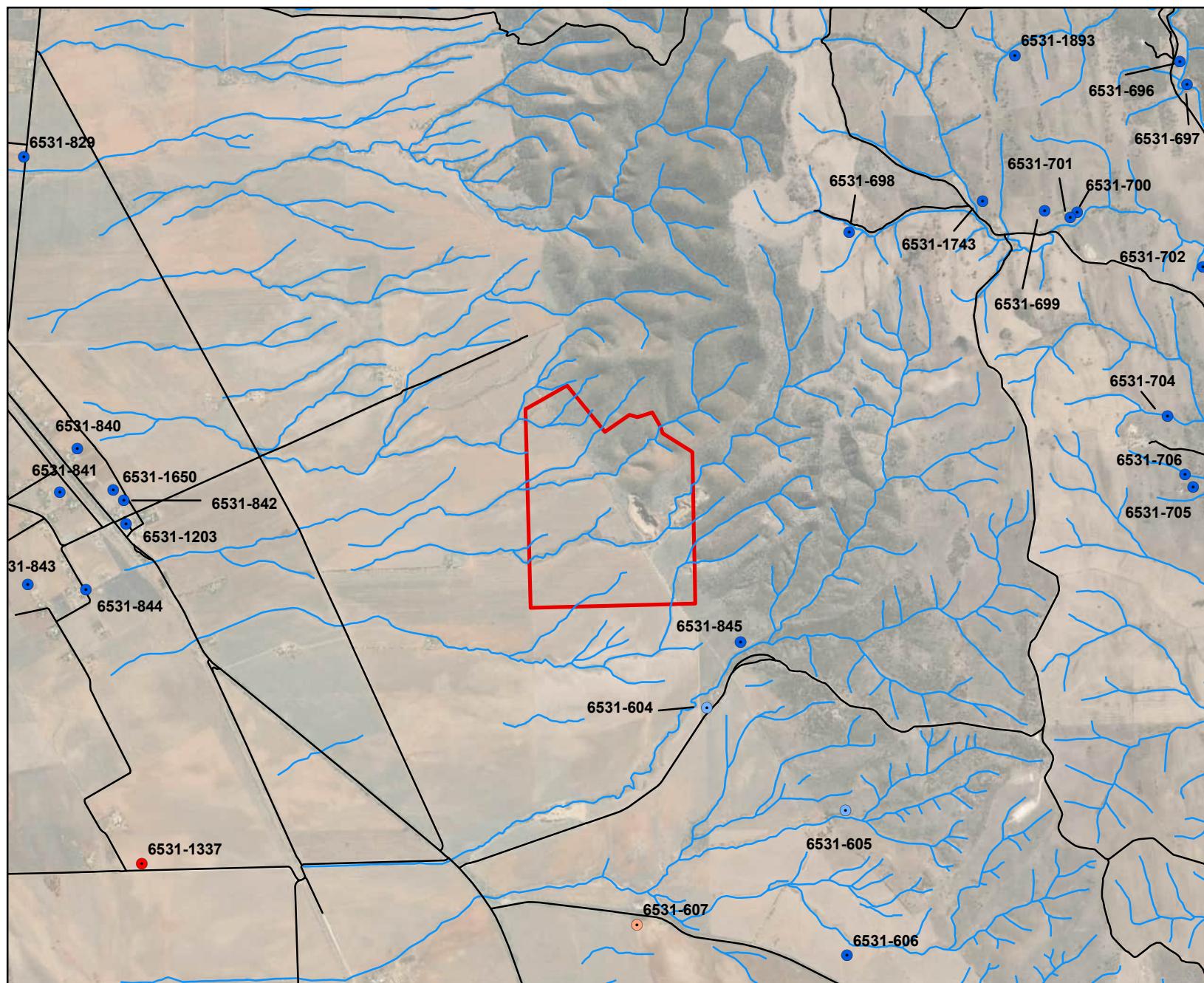
Remaining 3rd party wells are located at a distance of more than 2.5 km.

- The nearest 3rd party well to the north-east is well 6531-698. This well is drilled to 14 m and was monitored for standing water levels in January 2020 (results discussed below).
- The nearest 3rd party well to the west includes wells 6531-842, 6531-1203 and 6531-1650. These wells are located more than 3.5 m from the Site and target sedimentary aquifers.
- A water point is marked near a drainage line 915 m south of the PM (labelled 6531-604). Historical images on SARIG (2020) indicate the well is a spring, however discussions with the landowner indicate the spring has been backfilled or does not exist (M. Jones, written comm., 2020).

3.2 Total depth and drill date

Figure 4 displays water wells labelled by their drill date and depth. Findings from the Figure indicate that:

- Many wells are historical at more than 50 years old. Their operational status is not known but some are likely to have corroded due to age.
- Wells vary in depth from 1.5 m to 97 m.



Drillhole Class

- Water well
- Engineering
- Mineral well
- Water point
- Mineral well / water well

— Major Roads

— Streams

Private Mine 214



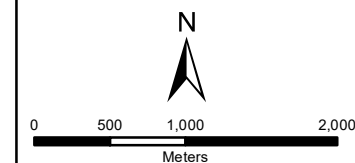
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Client: Groundwork Plus

Version: 2

Date: 12/2/2020

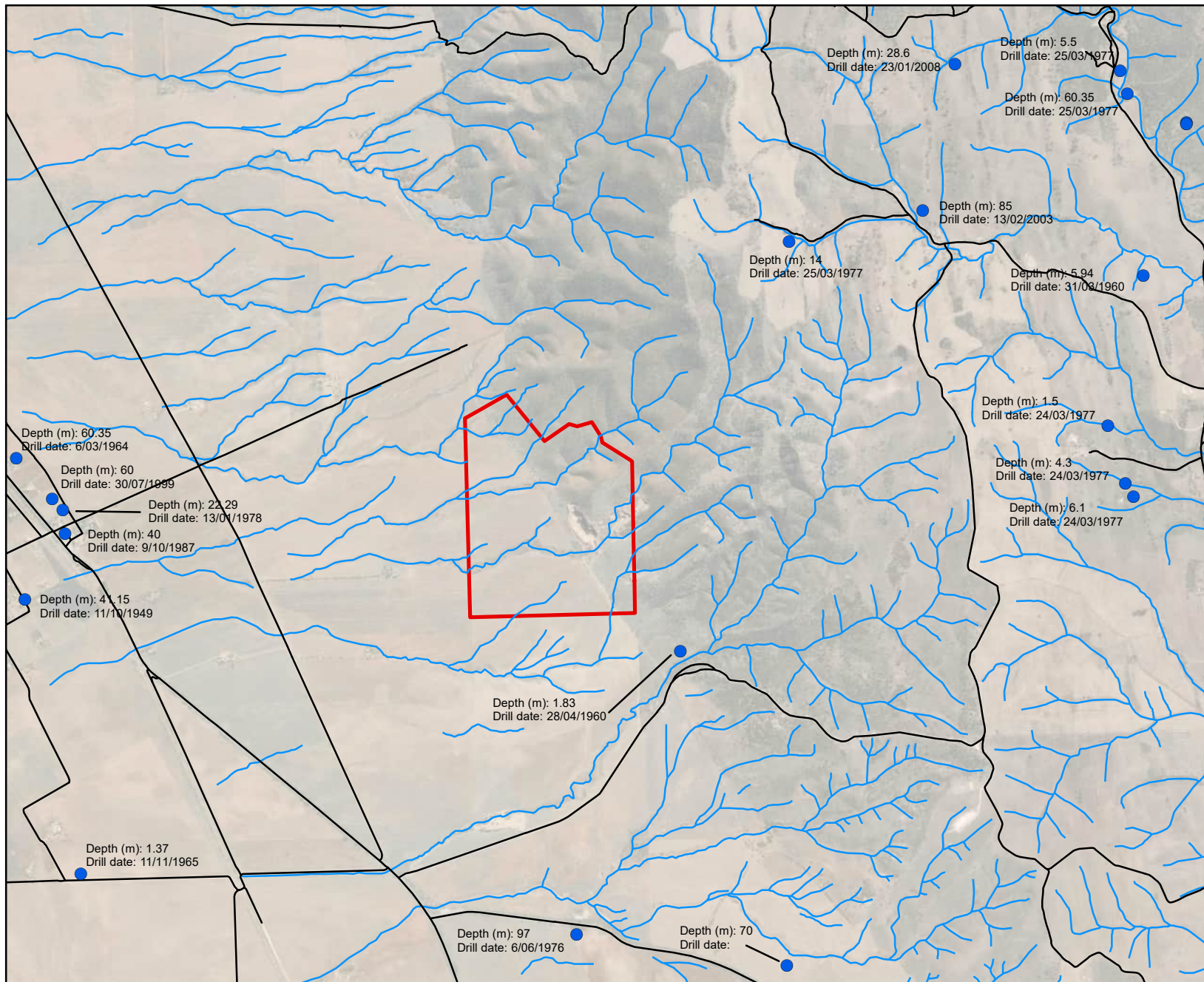
Drawn by: PM



Coordinate System: GDA 1994 MGA Zone 54

Wells displayed by class and labelled by unit number.

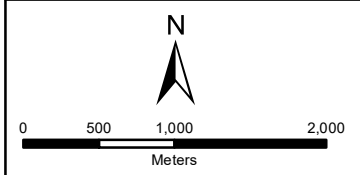
Figure 3.



- Well depth / drill date
- Major Roads
- Streams
- Private Mine 214



Job Number: GWP-20-1	
Client: Groundwork Plus	
Version: 2	Date: 21/2/2020
Drawn by: PM	



Coordinate System: GDA 1994 MGA Zone 54

Nearby wells labelled by depth (m) and drill date.

Figure 4.

3.3 Groundwater Elevations

Figure 5 displays groundwater elevations (mAHD) at nearby water wells. The figure indicates that groundwater resides at elevations of 24 to 46 mAHD west of the Site. Groundwater is reported up to 387.45 mAHD north-east of the Site (well 6628-698). The results are based on the following information:

- Historical water level data from WaterConnect (2020).
- Water level monitoring at two drillholes to the north-east and west of the Site. This monitoring was undertaken in January 2020 at wells 6531-1203, 6531-698.

Recent monitoring data is presented in Table 3 for wells that could be located and accessed.

Table 3: Results from groundwater monitoring at 3rd party wells.

Well ID (unit no)	Easting	Northing	Well depth (m)	Depth to water (mAHD)	Water level date	Land elevation (mAHD)	Groundwater elevation (mAHD)	Comment
6531-1203	231531	6319097	40	26.52	14/01/2020	58.92 ¹	32.4	unequipped well
6531-698	238020	6321560	14	7.65	14/01/2020	395.1	387.45	Shallow stock / domestic well

Note: data courtesy of Groundwork Plus (2020).

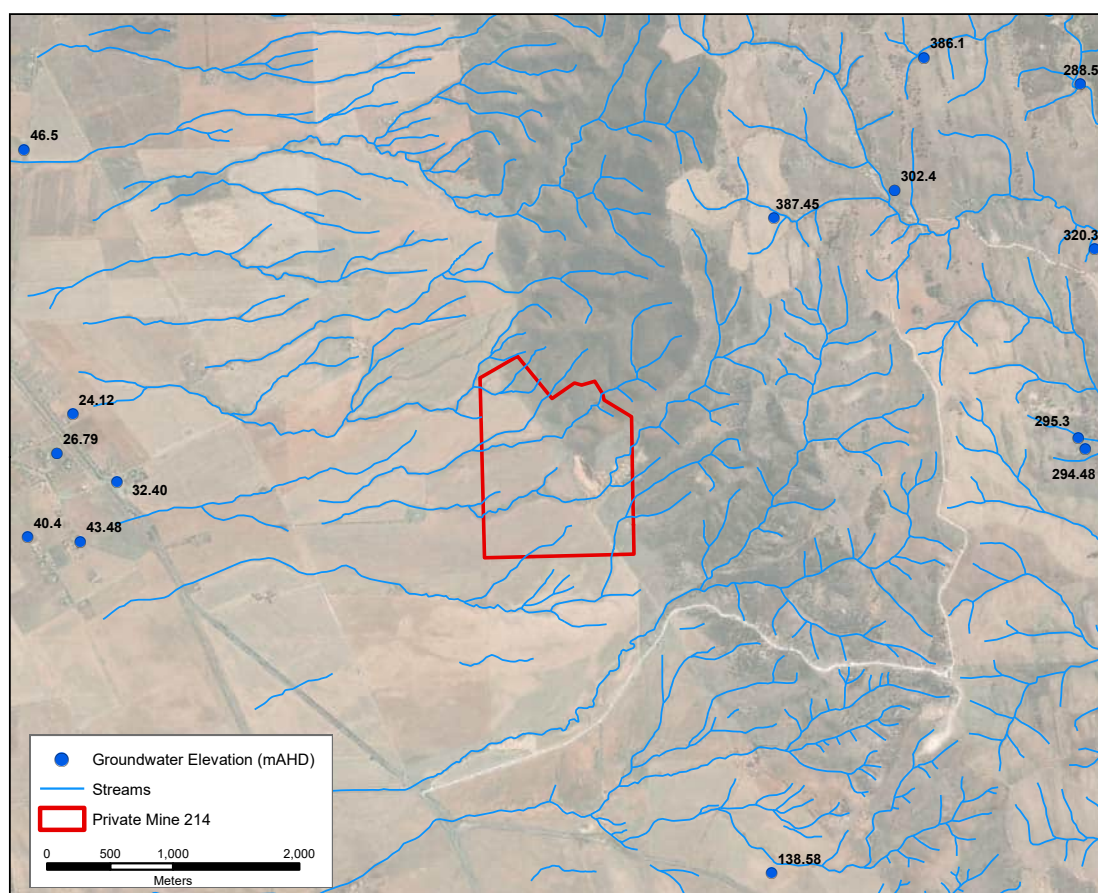


Figure 5. Groundwater Elevations at 3rd party wells, referenced to mAHD.

¹ Land elevations based on 1s digital elevation model.

3.3.1 Supplementary Drilling on PM 214

No water well exists at or near the quarry. For this reason a percussion drilling program was implemented to validate the depth to groundwater. The investigation included the drilling of 4 drillholes to depths ranging between 20.5 and 24.5 m. Drilling was implemented using a percussion rig² which is analogous to the downhole hammer method with air. The rig has capacity up to 27 m³.

The position of the drillholes was within existing pits and at sites that were logistically favourable for access (generally adjacent creek lines, at existing workings or along the range front). No access was possible on hilltop locations due to steep incline and limited road access.

Drilling was undertaken on the 14th of April 2021 with water level monitoring on the 16th and 22nd April. Table 4 presents construction and monitoring information while Figure 6 displays their locations. Results from the drilling include the following:

- Drilling extended to depths ranging between 20 and 24.5 m. No water was reported at any of the drillholes during drilling operations.
- Groundwater level monitoring 2 and 8 days after the drilling did not report groundwater at any of the drillholes.
- Results of the drilling confirm that groundwater elevations reside lower than 163 mAHD at the Main (Northern) pit, less than 174 mAHD at the Western Creek hole and less than 190.49 m near the Eastern pit. These values are ~20 m below the base of existing creek lines.

Base of drillhole elevations are displayed visually in Figure 7. The figure illustrates that groundwater is lower than these depths.

Table 4. Drillhole attributes from the percussion drilling program.

Name	Drill date	Easting	Northing	Land Elevation (mAHD)	Original Depth (m)	Current Depth (m)	Water level (m bgl)	Water level (mAHD)	Water level date
Northern Hole	14/04/2021	235870	6319390	198.58	24.5	6	Dry ⁴	< 174.08	22/04/2021
Main pit hole	14/04/2021	236189	6318941	184.1	20.5	19.35	Dry	< 163.6	22/04/2021
Western creek hole	14/04/2021	236285	6318795	195.98	24.5	24.23	Dry	< 171.48	22/04/2021
East pit hole	14/04/2021	236457	6319115	214.99	24.5	24.44	Dry	< 190.49	22/04/2021

Note: ground elevations obtained from UAV survey provided by Groundwork Plus (2019), except Northern Hole which was obtained from the 1 second digital elevation model (GA, 2011).

² Blast rig.

³ Maximum drilling depth is limited by compressor capability.

⁴ Drillhole was dry on 16th April 2021, before collapsing for the monitoring round on 22nd April.

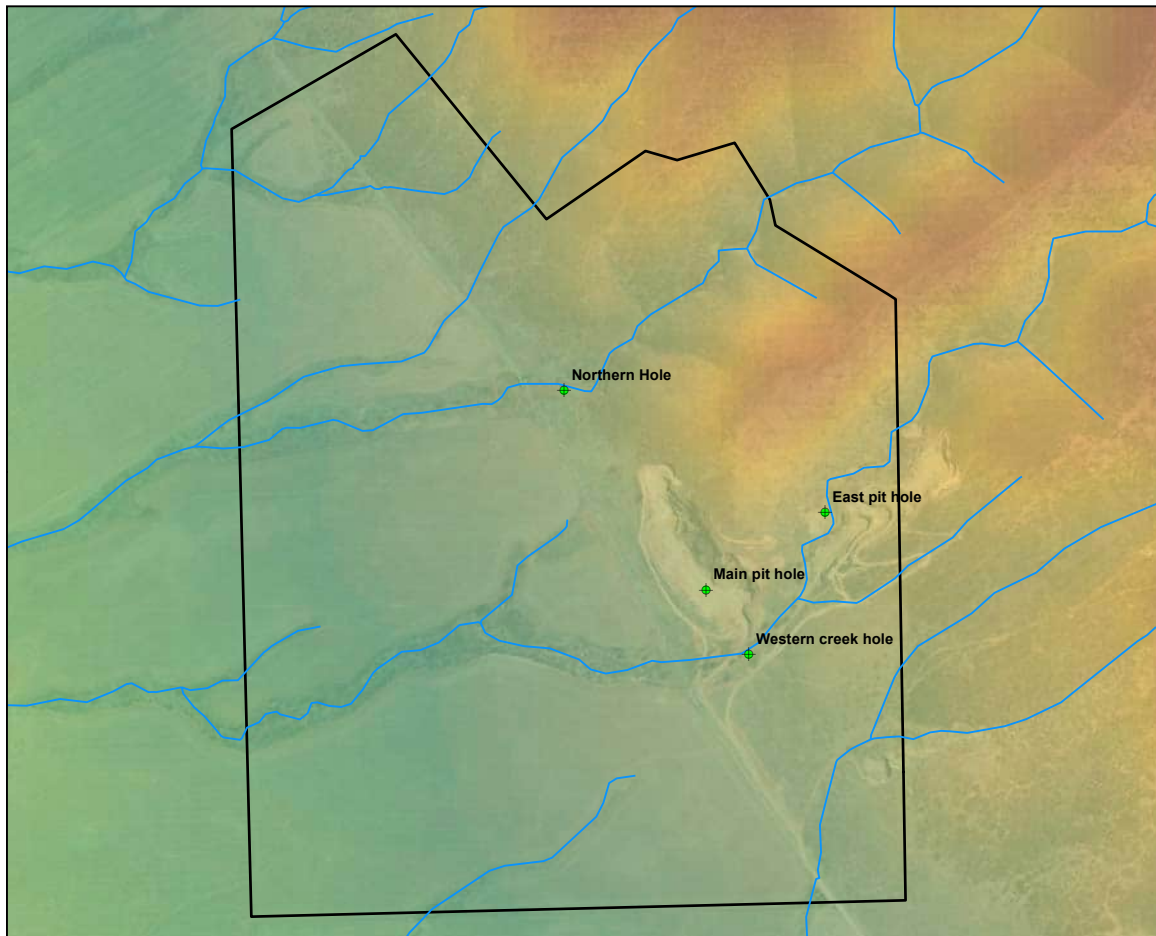


Figure 6. Locations of Shallow Percussion Drillholes, April 2021.

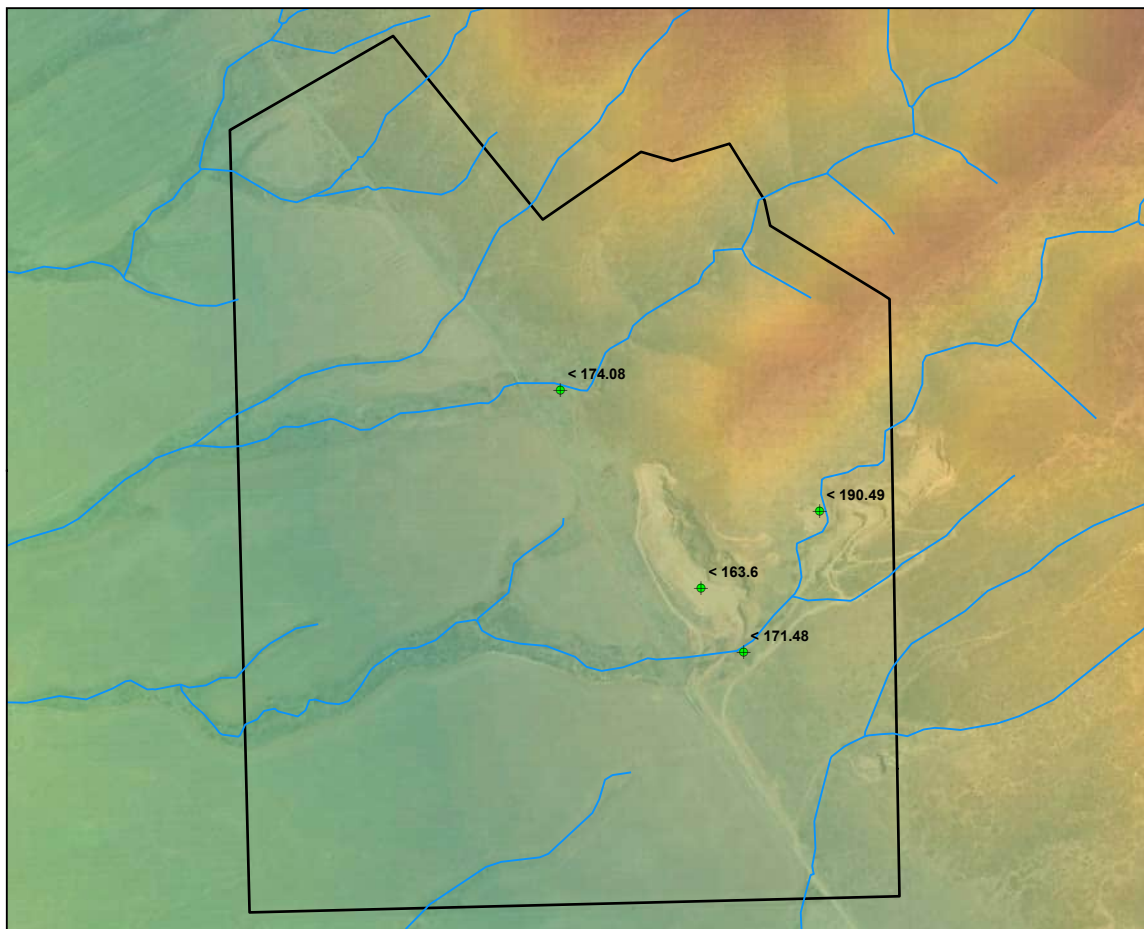


Figure 7. Groundwater elevation (mAHD) at percussion drillholes. NOTE: all wells were dry and levels represent base of the drillhole.

3.4 Groundwater Salinity

Figure 8 displays groundwater salinity in milligrams per litre total dissolved solids (mg/L TDS). The only well reporting salinity near the Site is well 6531-845. This well (142 mg/L) was reported as having fresh water in 1960. The well no longer exists as confirmed by a site inspection.

Wells to the east of the quarry are generally also fresh (< 1500 mg/L) while wells to the west and south are brackish to saline. Groundwater beneficial use in the high parts of the range is suited to domestic, stock and irrigation. Beneficial use on the Coastal plain is limited to stock or industrial purposes. The differences in groundwater salinity between the two regions is likely a reflection of recharge processes:

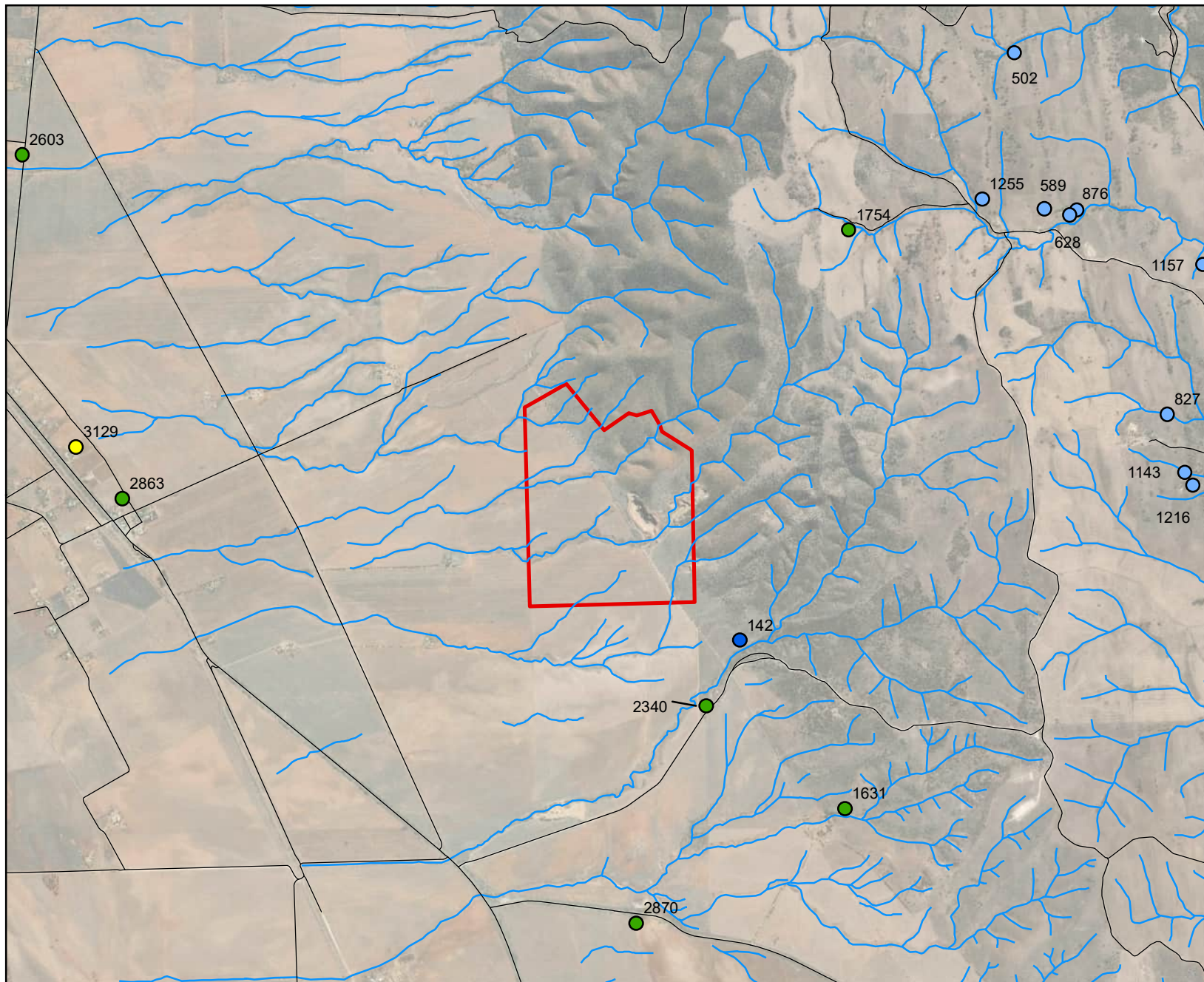
- Recharge in the ranges likely occurs via direction infiltration from rainfall, particularly the plateau area (~3 km east) where rainfall is higher.
- Recharge to the Coastal plain has potential to occur via:
 - o Infiltration to stream bed alluvium (Quaternary Aquifers) where streams emanate from the ranges. Drainage lines along the Mambray Coast typically terminate before reaching the ocean. Thus, stream losses are expected to account for a portion of recharge to shallow Quaternary sediments.
 - o Infiltration at the range front to the deeper Tertiary Aquifer. This could occur where streamlines cross faults and recharge vertically to the deeper aquifer. This is

observed at other locations in the mid north region (e.g. Willochra Basin; O'Driscoll, 1956).

- Direct precipitation landing on the ground surface. This may occur during prolonged and larger rainfall events.
- Throughflow via the basement rock aquifer where it is saturated and abuts permeable sediments.

3.5 Well Yields

Figure 8 displays yield data at nearby wells. Yields are reported less than 2 L/s.



Salinity (mg/L TDS)

- 0 - 500
- 501 - 1500
- 1501 - 3000
- 3001 - 5000
- 5001 - 7840

— Major Roads

— Streams

□ Private Mine 214



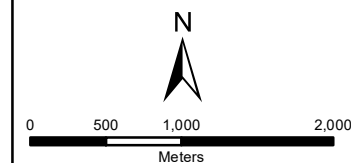
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Client: Groundwork Plus

Version: 2

Date: 12/2/2020

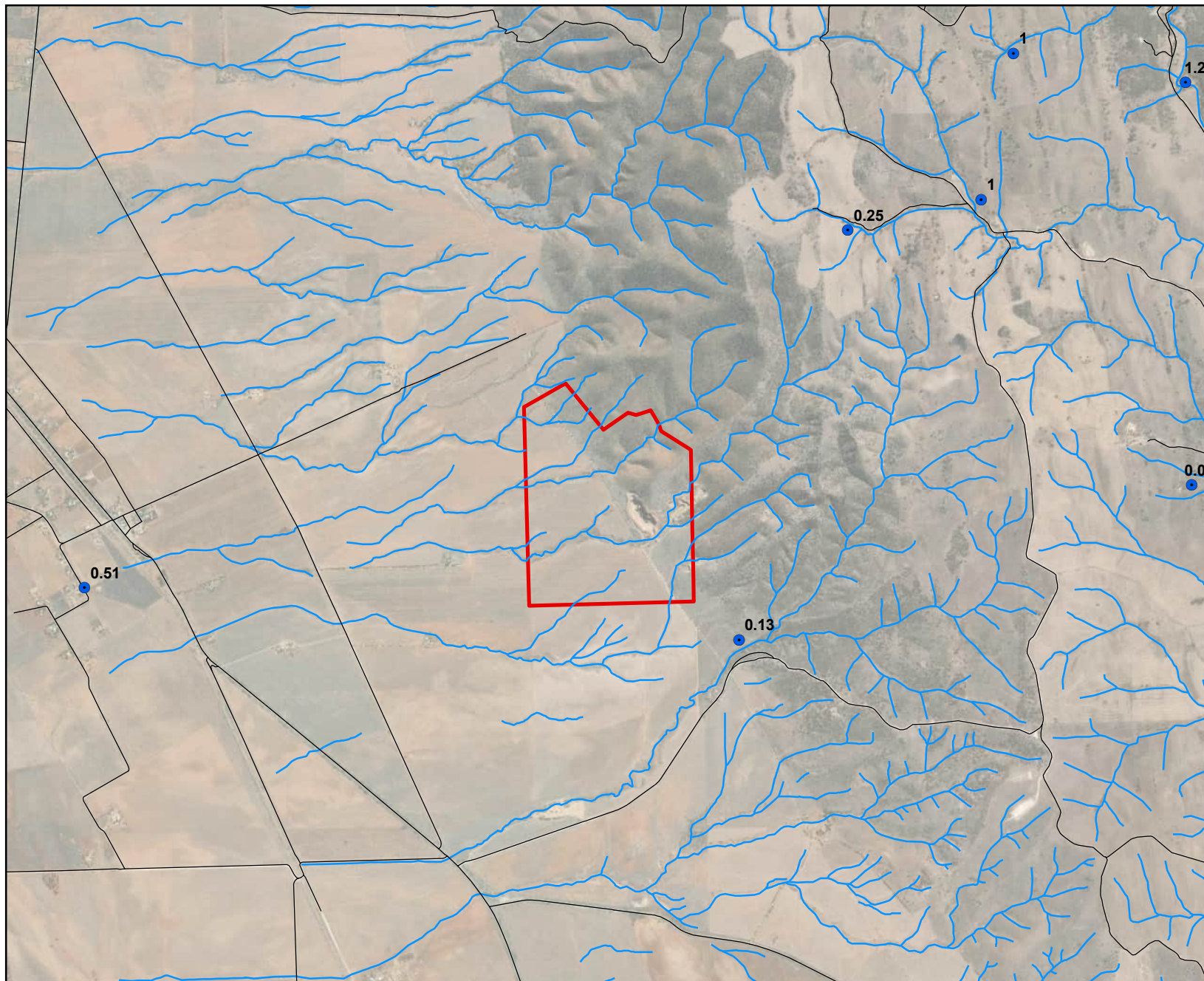
Drawn by: PM



Coordinate System: GDA 1994 MGA Zone 54

**Nearby wells labelled
by groundwater salinity
(mg/L TDS).**

Figure 8.



- Water well
- Major Roads
- Streams
- Private Mine 214

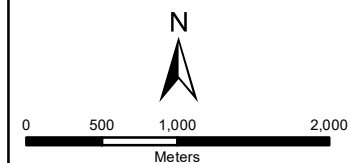


Job Number: GWP-20-1

Client: Groundwork Plus

Version: 2 Date: 21/02/2020

Drawn by: PM



Coordinate System: GDA 1994 MGA Zone 54

Nearby water wells labelled by yield (L/s).

Figure 9.

4 Groundwater Dependent Ecosystems

Two methods have been used to evaluate the potential for groundwater dependent ecosystems in proximity to Site.

- 1) The Bureau of Meteorology Groundwater Dependant Ecosystem Atlas (BoM, 2020). This webpage can be viewed electronically at:
<http://www.bom.gov.au/water/groundwater/gde/map.shtml>
- 2) Evaluation of water level data from shallow percussion drilling.

Based on the data the following is apparent:

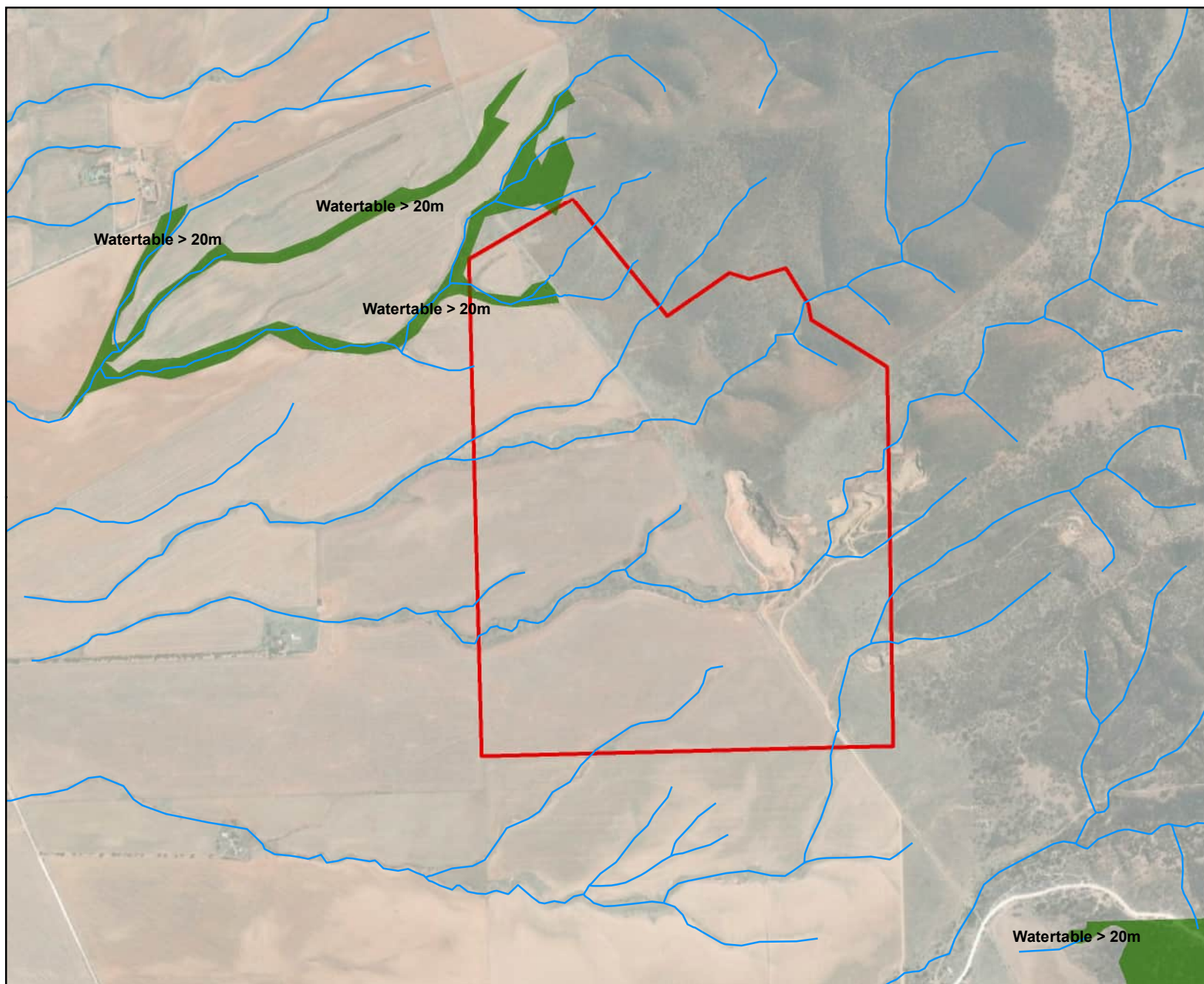
- In the hard rock terrain (range front and low-lying hills) groundwater levels occur more than 20 m below creek lines. This demonstrates that creek line vegetation would be reliant on surface water including incident rainfall and / or ephemeral streamflow.
- No groundwater dependent ecosystems are confirmed from the BoM database (Figure 10) on the Coastal Plain. Mapped vegetation is described as having water tables more than 20 m below ground. Similar to above, environmental water requirements for creek line vegetation are expected to be provided by ephemeral streamflow.

Based on available data there are no confirmed GDE's near to the Site.

5 Groundwater Licensing

The Site falls outside of a prescribed wells or prescribed water resources area. Extraction of groundwater does not require a license.

A well construction permit would be required for the drilling of water wells.



- Streams
- Potential GDE
- Private Mine 214

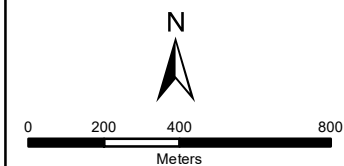


Job Number: GWP-20-1

Client: Groundwork Plus

Version: 2 Date: 12/2/2020

Drawn by: PM



Coordinate System: GDA 1994 MGA Zone 54

Potential GDE's within the Study area, labelled by database comment.

Figure 10.

6 Groundwater Management

6.1 Inferred water table position

To date groundwater has not been intercepted at the existing quarry area, either in the pits or at shallow percussion drillholes. Shallow drilling has confirmed that groundwater is beyond the depth of investigation at depths between 20 to 24.5 m below ground. Additionally, groundwater has never been intercepted during drilling and blasting (C. Loizeau⁵, pers comm., 2021). If so, wet emulsion product would be required for the firing of holes. This information, along with interferences about groundwater behaviour have been used to infer the water table position. This is displayed as Figure 11. Cross sections that illustrate the inferred water table position are provided as Figure 12 and 13.

Assumptions for the water table position are described as follows:

- The water table at the sites of drilling is adopted as the base of the percussion drillholes (which are confirmed as dry – see Figure 7 and 11).
- Areas without drillhole coverage have been inferred as follows:
 - o Groundwater elevations have been extrapolated along creek lines in line with gradients from the shallow percussion drillholes e.g. western creek line and eastern pit hole. That is, groundwater is inferred to rise as topography rises.
 - o Groundwater elevations at hilltop locations have been inferred considering height of the ranges. For smaller ranges in the north-west of the PM water tables are inferred as ~15 m higher than levels inferred below creek beds. At the highest range in the centre of the Site more conservative levels have been adopted in the order of 30 m higher than the water table at creek beds. Once more, this estimate allows for a conservative water table rise with topography.

6.2 Implications for Quarry Development

The inferred water table position utilise available information and principles accepted in hydrogeological literature e.g. groundwater elevation following a subdued version of topography (Fetter, 2001). However, given the uncertainty with actual groundwater position it is recommended that new development areas remain 5 m above the inferred water table position as displayed in Figure 11. This buffer accounts for:

- Uncertainty associated with actual groundwater position resulting from limited data availability in high parts of the Site.
- Seasonal groundwater level variation which could occur from periodic recharge.

The buffer also reduces the likelihood of material inflows should groundwater be intercepted.

6.3 Groundwater Monitoring and Management

Operations at the Site would benefit from validation of groundwater elevations at hilltop locations and in the central and northern-western areas of the Private Mine. However, due to access restrictions (steep terrain, no roads) it is very difficult to obtain access at these locations. It is recommended that staged groundwater validation be undertaken as parts of the quarry become more accessible. Current development areas are understood to have a long quarry life, so obtaining this information is recommended in subsequent MOP updates.

Nonetheless, if the planned quarry intersects the water table a groundwater impact assessment will be required. A groundwater management plan will also be required to address the impacts (if relevant).

⁵ Quarry Manager at Youngs Quarry.

If the groundwater table is measured below the inferred position presented in this report, the Operator may consider a deeper quarry plan in order to maximise the available resource.

6.4 Risk assessment

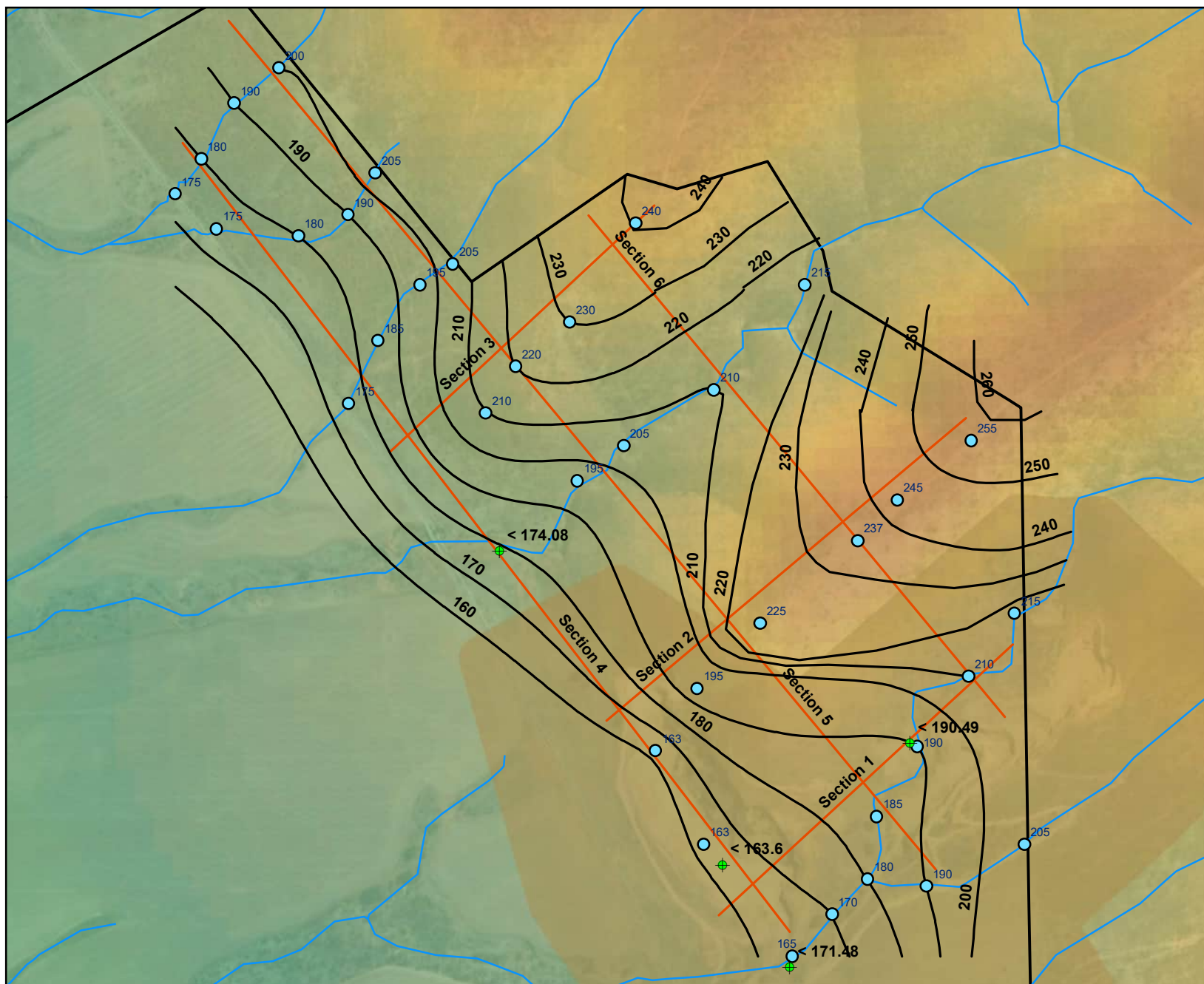
The risks to groundwater are quarrying below the water table which would result in the removal of groundwater and aquifer drawdown. This risk is managed by planning the quarry to remain a conservative distance above the inferred water table.

In the case that drilling and monitoring indicates that the water table will be intercepted by the planned quarry, then a risk assessment and management plan should be developed and submitted as an amendment to the MOP. One management option may be a change in the quarry plan to remain above the measured water table elevation.

However, from information at hand there is very low risk of material groundwater impacts to 3rd party users under the proposed pit levels. This is justified further per Table 4.

Table 4. Impact Assessment for Groundwater – PM 214.

Quarry Phase	Potential impact event			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the Source, Pathway and Receptor
GWS1	Removal of groundwater by quarry dewatering	Interception of groundwater by quarrying results in lowered groundwater levels	Nearest Existing groundwater user 2.5 km north-east of Site – unit number 6531-698.	Yes
Uncertainty and assumptions		The pits will be designed to remain above the inferred water table elevation with an additional 5 m buffer to account for uncertainty. Hence no removal of groundwater is expected that would impact 3rd party groundwater users. Future works will include groundwater validation as part of the management and monitoring plan and this will inform the groundwater elevation under each pit.		
Sensitivity to change		Not sensitive to change due to the distance to receptors and the low likelihood of impact.		
Justification for the confirmation / non-confirmation of Source, Pathway and Receptor		Based on the groundwater assessment, the proposed floor levels are not expected to intercept the water table. The inferred water table position above hill top locations accounts for potential recharge due to slightly higher rainfall and rising elevations due to topography. An additional 5 m buffer has been applied due to limited data and to allow for seasonal variation.		

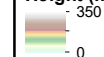


Legend

- Groundwater Elevations
- Groundwater Elevations (mAHd) - inferred
- Groundwater Contours
- Cross Section Lines
- Streams
- Private Mine 214

Digital Elevation Model (1s)

Height (mAHd)



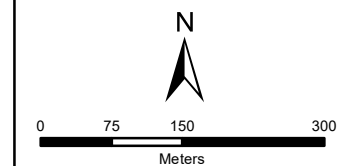
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Client: Groundwork Plus

Version: 1

Date: 30/05/2021

Drawn by: PM

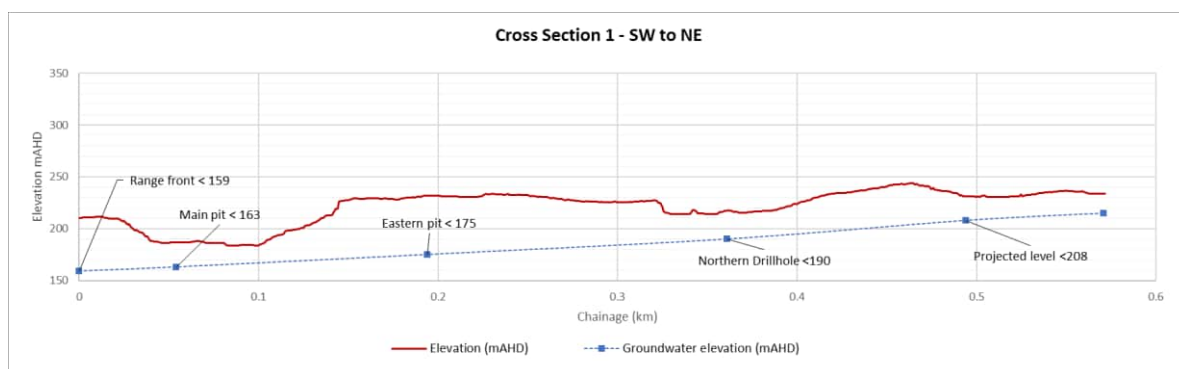


Coordinate System: GDA 1994 MGA Zone 54

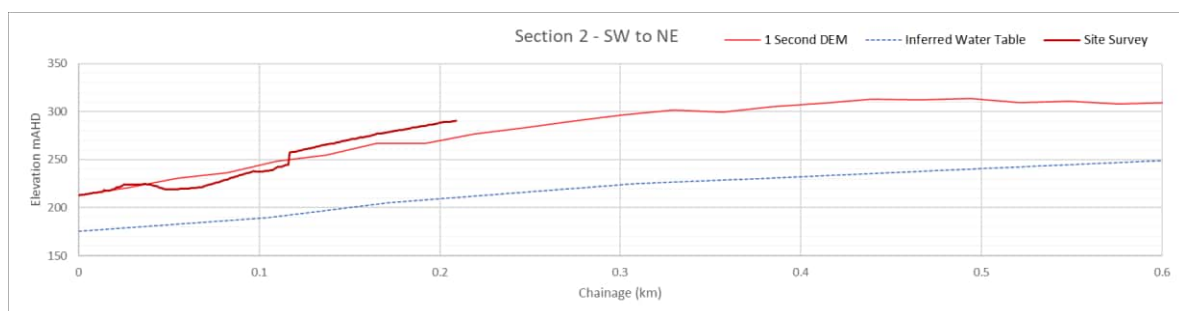
Inferred Groundwater Elevations (mAHd).

Figure 11.

Cross Section 1.



Cross Section 2.



Cross Section 3.

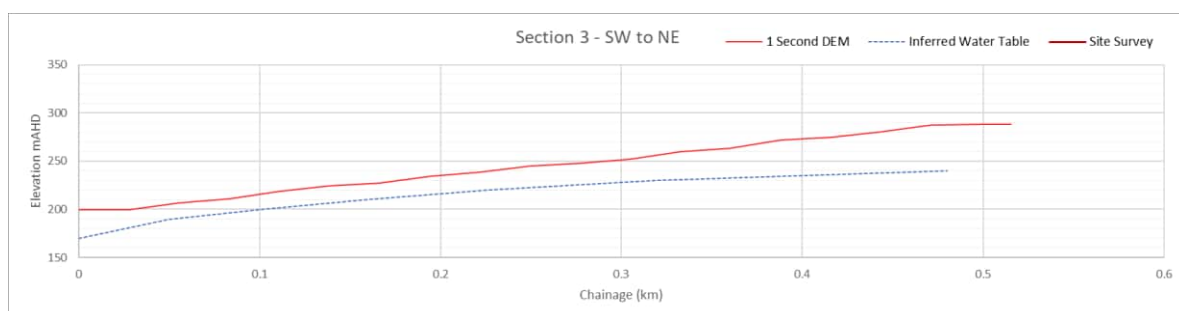
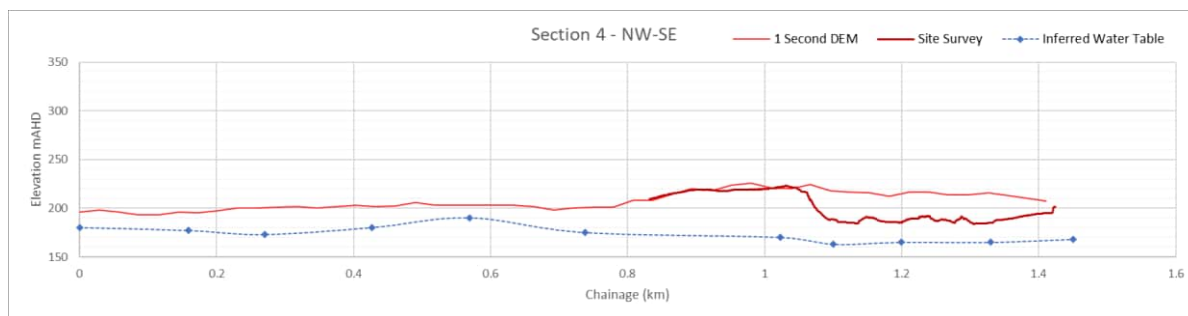
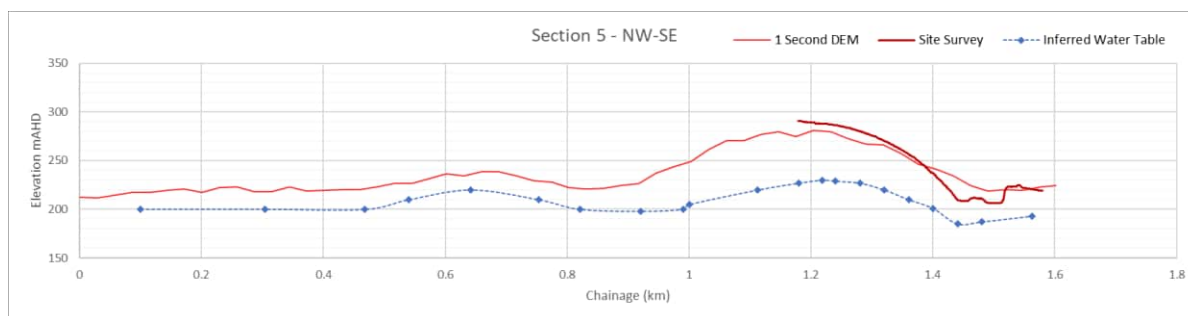


Figure 12. Cross Sections 1,2 and 3.

Cross Section 4.



Cross Section 5.



Cross Section 6.

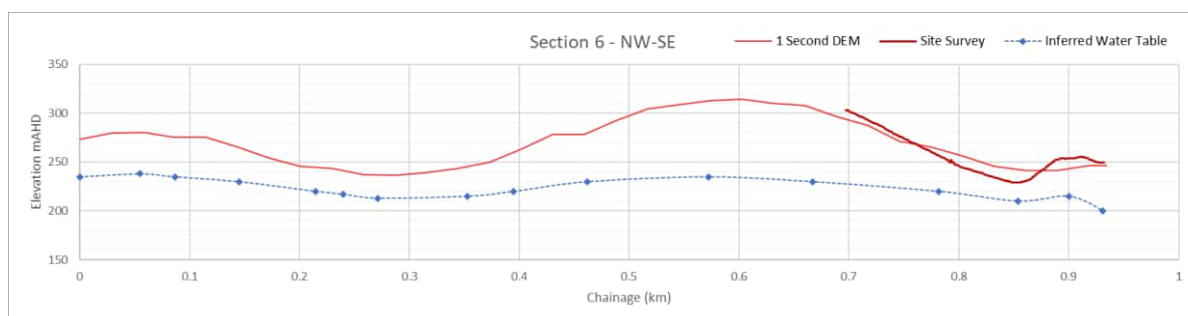


Figure 13. Cross Sections 4, 5 and 6.

7 Closing remarks

Thank you for the opportunity to conduct this assessment. If you have any queries' please contact Paul Magarey on 0438 856 442.

Regards



Paul Magarey
Senior Hydrogeologist

8 References

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Attachment 1. Photos of existing pits demonstrating no groundwater inflow (photos courtesy M. Jones, 2020).



Eastern Dolomitic Pit looking east – Pit floor is at relative level of 205 mAHD, 8 m below adjacent drainage line. Floor level measured by unmanned aerial vehicle survey (UAV) and accessed via Propeller (2020).



Eastern Dolomitic Pit looking west – Pit floor is at relative level of 213 mAHD. Floor level measured by unmanned aerial vehicle survey (UAV) and accessed via Propeller (2020).



Northern quartzite pit looking south. Minimum floor level is at 183.7 mAHD, 13 m below adjacent drainage line. Floor elevations measured by unmanned aerial vehicle survey (UAV) and accessed via Propeller (2020).



Northern quartzite pit looking north. Minimum floor level is at 183.7 mAHD, 13 m below adjacent drainage line. Floor elevations measured by unmanned aerial vehicle survey (UAV) and accessed via Propeller (2020).

Attachment 5

EPBC Act 1999 Protected Matters Report



Australian Government

Department of Climate Change, Energy,
the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 10-Apr-2024

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	26
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <https://www.dcceew.gov.au/parks-heritage/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	17
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	6
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[[Resource Information](#)]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Peppermint Box (<i>Eucalyptus odorata</i>) Grassy Woodland of South Australia	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species

[[Resource Information](#)]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.

Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In feature area
MAMMAL			
Petrogale xanthopus xanthopus Yellow-footed Rock-wallaby (SA and NSW) [66646]	Vulnerable	Species or species habitat may occur within area	In feature area
PLANT			
Caladenia macroclavia Large-club Spider-orchid [55012]	Endangered	Species or species habitat may occur within area	In buffer area only
Caladenia tensa Greencomb Spider-orchid, Rigid Spider-orchid [24390]	Endangered	Species or species habitat known to occur within area	In feature area
Olearia pannosa subsp. pannosa Silver Daisy-bush, Silver-leaved Daisy, Velvet Daisy-bush [12348]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Prasophyllum pallidum Pale Leek-orchid [20351]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Prasophyllum validum Sturdy Leek-orchid, Mount Remarkable Leek-orchid [10268]	Vulnerable	Species or species habitat may occur within area	In feature area
Pterostylis xerophila Desert Greenhood [7997]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Senecio macrocarpus Large-fruit Fireweed, Large-fruit Groundsel [16333]	Vulnerable	Species or species habitat may occur within area	In feature area
Senecio megaglossus Superb Groundsel [13374]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Swainsona pyrophila Yellow Swainson-pea [56344]	Vulnerable	Species or species habitat may occur within area	In feature area
REPTILE			
Aprasia pseudopulchella Flinders Ranges Worm-lizard [1666]	Vulnerable	Species or species habitat known to occur within area	In feature area
Notechis scutatus ater Krefft's Tiger Snake (Flinders Ranges) [82287]	Vulnerable	Species or species habitat may occur within area	In feature area
Tiliqua adelaidensis Pygmy Blue-tongue Lizard, Adelaide Blue-tongue Lizard [1270]	Endangered	Species or species habitat may occur within area	In feature area
Listed Migratory Species [Resource Information]			
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Sterna striata White-fronted Tern [799]		Migration route may occur within area	In feature area

Extra Information

EPBC Act Referrals					[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status	
Controlled action					
Nava-1 Cable System	2001/510	Controlled Action	Completed		In buffer area only
Not controlled action					
Collaby Hill Wind Farm	2005/2050	Not Controlled Action	Completed		In feature area
Improving rabbit biocontrol: releasing another strain of RHDV.	2015/7522	Not Controlled Action	Completed		In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
sthrrn two thirds of Australia				
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
upgrade existing Bungama substation & install 7km transmission line	2004/1903	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact us](#) page.

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Department of Climate Change, Energy, the Environment and Water

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Canberra ACT 2601 Australia

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Attachment 6

Visual Assessment Plates



Photo Plate 1: 285 Collaby Road. The nearest house. Minor view of eastern face of northern pit.



Photo Plate 2: Access road.



Photo Plate 3: 11124 Augusta Highway. Minor view of upper eastern face of northern pit.



Photo Plate 4: 11072 Augusta Highway. Moderate view of upper eastern face of northern pit.

Youngs Quarry	Visual Assessment Plates – Sheet 1		
CLM Quarries	GROUNDWORK p 1 u s	Date: 30 October, 2019	Ref. 2449.610.002



Photo Plate 5: 11046 Augusta Highway. Moderate view of upper eastern face of northern pit.



Photo Plate 6: Church Road. Moderate view of upper eastern face of northern pit.



Photo Plate 7: Augusta Highway and Wilkins Highway intersection. Minor view of upper eastern face of northern pit.



Photo Plate 8: 241 Wilkins Highway southern approach. Minor view of upper eastern face of northern pit.

Youngs Quarry	Visual Assessment Plates – Sheet 2		
CLM Quarries	GROUNDWORK p 1 u s	Date: 30 October, 2019	Ref. 2449.610.002



Photo Plate 9: Augusta Highway southern approach. Minor view of upper eastern face of northern pit.

Youngs Quarry	Visual Assessment Plates – Sheet 3		
CLM Quarries	GROUNDWORK p 1 u s	Date: 30 October, 2019	Ref. 2449.610.002

Attachment 7

Confidential – DPC AAR Search Results

Attachment 8

EPA Licence 50661



Licence No. 50661

**C L ASSET MANAGEMENT PTY
LTD**

ISSUED:

01 Dec 2021

EXPIRY:

30 Nov 2026

ACN:

629 041 470

Environmental Authorisation
under Part 6 of the
*Environment Protection
Act 1993*

**South Australian
Environment
Protection Authority**
GPO Box 2607
Adelaide SA 5001
Tel: 08 8204 2004

EPA

Environment Protection Authority



LICENCE NUMBER 50661

LICENSEE DETAILS

Licence Holder: C L ASSET MANAGEMENT PTY LTD
ACN: 629 041 470
Registered Address: C/- Rowe Partners, 33 Florence Street, PORT PIRIE SA 5540

LICENSED ACTIVITIES

The Licensee is authorised to undertake, at the location(s) shown above, the following prescribed activities of environmental significance under Schedule 1 Part A of the Act, subject to the conditions in this Licence.

7(3)(c) Crushing, grinding or milling works (rock, ores or minerals)

TERMS OF LICENCE

Commencement Date: 01 Dec 2021
Expiry Date: 30 Nov 2026

PREMISES ADDRESS

Pieces 91 and 92 (FP 204048) ,
HUNDRED OF NAPPERBY, SA

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Licence Explanatory Notes – Do Not Form Part of the Licence

Compliance with this licence

The EPA seeks to ensure that all reasonable and practicable measures are taken to protect, restore and enhance the quality of the environment according to the principles of ecologically sustainable development. To achieve this objective, the EPA uses a number of regulatory decision making principles and actions outlined in the 'Compliance and enforcement regulatory options and tools' document available on the EPA website.

Notification – serious or material environmental harm caused or threatened

If serious or material environmental harm from pollution is caused or threatened in the course of an activity, the licence holder must, as soon as reasonably practicable after becoming aware of the harm or threatened harm, notify the EPA (preferably on EPA emergency phone number 1800 100 833) of the harm or threatened harm, its nature, the circumstances in which it occurred and the action taken to deal with it in accordance with section 83 of the [Environment Protection Act 1993](#) (the Act). In the event that the primary emergency phone number is out of order, the licence holder should phone (08) 8204 2004.

Variations, transfers and surrender of a licence

The EPA may impose or vary the conditions of a licence by notice in writing to the licence holder in accordance with sections 45 and 46 of the Act. Public notice may be required where the variation of licence conditions results in a relaxation of the requirements imposed for the protection or restoration of the environment and results in an adverse effect on any adjoining land or its amenity.

If a licence holder wishes to vary the conditions of a licence, transfer a licence to another entity, or surrender a licence, the licence holder must submit an application to the EPA in accordance with the applicable provisions of the Act (sections 45, 49 and 56, respectively). A licence remains in effect and in its original form until such time as any proposed variation, application for surrender, or transfer has been made and approved in writing by the EPA.

Suspension or cancellation of a licence

The EPA may suspend or cancel a licence by notice in writing to the licence holder in accordance with section 55 of the Act if satisfied the licence holder has either obtained the licence improperly, contravened a requirement under the Act or if the holder is a body corporate, a director of the body corporate has been guilty of misconduct of a prescribed kind (whether in this State or elsewhere).

Responsibilities under Environment Protection legislation

In addition to the conditions of any licence, a licence holder must comply with their obligations under all State and Federal legislation (as amended from time to time) including: the [Environment Protection Act 1993](#); the [Environment Protection Regulations 2009](#); all Environment Protection Policies made under the [Environment Protection Act 1993](#); and any National Environment Protection Measures not operating as an Environment Protection Policy under the [Environment Protection Act 1993](#)

Public Register Information

The EPA maintains and makes available a Public Register of details related to its determinations and other information it considers appropriate (i.e. excluding trade processes or financial information) in accordance with section 109 of the Act. These details include, but are not limited to:

- licensing and beverage container applications and approvals
- enforcement actions
- site contamination
- serious or material environmental harm caused or threatened in the course of an activity
- environment improvement programmes and environment performance agreements
- environment assessment reports; results of testing, monitoring or evaluation required by a licence
- EPA advice or direction regarding development approvals referred to the EPA by a planning authority

Definitions

Unless the contrary intention appears, terms used in this licence that are defined in the Act (including any regulations or environment protection policies made pursuant to the Act) have the respective meanings assigned to those terms by the Act.

THE ACT: The *Environment Protection Act 1993*

PREMISES: The whole of the land comprised in Titles Register - Certificate of Title, Crown Lease and Crown Record.

CT6211/117

CT6211/211

AUTHORISATION FEE PAYMENT DATE: means the anniversary of the grant or renewal of this authorisation.

ENVIRONMENTAL HARM: means the same as is defined in section 5 of the Environment Protection Act 1993.

POLLUTION CONTROL EQUIPMENT: means 'control equipment' as defined in the Environment Protection (Air Quality) Policy: any device that controls, limits, measures, records or indicates air pollution.

WASTE: means -

1. As defined under the Environment Protection Act 1993,

1(a) any discarded, dumped, rejected, abandoned, unwanted or surplus matter, whether or not intended for sale or for purification or resource recovery by a separate operation from that which produced the matter; or

1(b) any matter declared by regulation to be waste for the purposes of this Act (following consultation by the Minister on the regulation with prescribed bodies in accordance with the regulations); or

1(c) any matter declared by an environment protection policy to be waste for the purposes of this Act,

whether or not of value.

2. However, waste does not include—

2(a) an approved recovered resource whilst it is being dealt with in accordance with the declaration of that resource—see section 4A; or

2(b) anything declared by regulation or an environment protection policy not to be waste for the purposes of this Act,

even though the resource or the thing so declared might otherwise, but for the declaration, fall within the definition of waste in subsection (1).

Acronyms

EPA: means Environment Protection Authority

Conditions of Licence

The Licensee is authorised to conduct the prescribed activities as described in this Licence at the Premises nominated, subject to the following conditions:

1 CONTROL OF EMISSIONS

1.1 DUST PREVENTION (S - 7)

The Licensee must take all reasonable and practicable measures to prevent dust from leaving the Premises.

2 OPERATIONAL MANAGEMENT

2.1 BUNDING (S - 5)

The licensee must ensure that all chemicals or chemical products are stored, loaded or unloaded in an appropriately bunded area.

NOTES

The EPA will assess the appropriateness of any bund against the EPA's 'Bunding and Spill Management Guidelines'.

2.2 POLLUTION CONTROL EQUIPMENT REGISTER (S - 2)

The Licensee must:

- 2.2.1 maintain all Pollution Control Equipment to ensure that pollution is minimised; and
- 2.2.2 keep a written record of all inspections of Pollution Control Equipment, which includes:
 - a the name of the recording officer;
 - b the date of each inspection of the equipment;
 - c details of the equipment that was inspected;
 - d an assessment of whether the equipment was working effectively; and
 - e the action taken (if required) to rectify any faults or failures.

3 ADMINISTRATION

3.1 ANNUAL RETURN AND PAYMENT OF ANNUAL FEES (A - 4)

For the purposes of section 48(2)(a) of the Act, the date in each year for the lodgement of the Annual Return is no later than 90 days before the anniversary of the grant or renewal of the Licence; and

- 3.1.1 For the purposes of section 48(2)(b) of the Act, the date in each year for the payment of Annual Authorisation Fee is the anniversary of the grant of the Licence.

3.2 APPROVAL OF OPERATING PROCESSES (A - 6)

The Licensee must not undertake changes to operating processes conducted pursuant to the Licence at the Premises without written approval from the EPA, where such changes:

- 3.2.1 have the potential to increase emissions or alter the nature of pollutants or waste currently generated by, or from the licensed activity; or
- 3.2.2 have the potential to increase the risk of environmental harm; or
- 3.2.3 would relocate the point of discharge of pollution or waste at the Premises.

3.3 APPROVAL OF WORKS (A - 5)

The Licensee must not construct or alter a building or structure, or install or alter any plant or equipment, for use of an activity undertaken pursuant to the Licence at the Premises without written approval from the EPA, where such changes:

- 3.3.1 have the potential to increase the emissions or alter the nature of pollutants or waste currently generated by, or from the licensed activity; or
- 3.3.2 have the potential to increase the risk of environmental harm; or
- 3.3.3 would relocate the point of discharge of pollution or waste at the Premises.

3.4 CHANGE OF LICENSEE DETAILS (A - 3)

If the Licensee's name or postal address (or both) changes, the Licensee must inform the EPA within 28 days of the change occurring.

3.5 LICENCE RENEWAL (A - 2)

For the purposes of section 43(3) of the Act, an application for Renewal of the Licence must be made no later than 90 days before the expiry date of the Licence.

3.6 OBLIGATIONS TO EMPLOYEES, AGENTS AND CONTRACTORS (A - 1)

The Licensee must ensure that every employee, agent or contractor responsible for undertaking any activity regulated by the Licence, is informed as to the conditions of the Licence.

Attachments

There are no documents attached to this licence.

Attachment 9

Youngs Quarry Community Engagement Plan and Summary Report

Youngs Quarry (PM 214)

Community Engagement Plan and Evaluation Report

Prepared for: C. L. Land Management Pty Ltd.

Date: March 2025

File Reference: 2449.040.003

DOCUMENT CONTROL

PROJECT / DETAILS REPORT

Document Title:	Youngs Quarry Community Engagement Plan and Evaluation Report
Principal Author:	Jessica Cooney
Client:	C. L. Land Management Pty Ltd.
Reference Number:	2449.040.003

DOCUMENT STATUS

Issue	Description	Date	Author	Reviewer
0	Youngs Quarry Community Engagement Plan and Evaluation Report	March 2025	E Manuel	M Jones

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DRAWINGS**Name**

Site Location Plan
Site Layout Map – PM 214
Site Layout Map -Sales Area
Quarry Development and Rehabilitation Plan – Stage 1
Proximity to Infrastructure and Housing Map
Stakeholder Consultation Map

Drawing Number

(Drawing No. 2449.DRG.002)
(Drawing No. 2449.DRG.019B)
(Drawing No. 2449.DRG.019A)
(Drawing No. 2449.DRG.024A)
(Drawing No. 2449.DRG.003)
(Drawing No. 2449.DRG.022)

1 Introduction

This Community Engagement and Evaluation Report has been developed for C.L. Land Management Pty Ltd (CLM Quarries) the Private Mine Holder and Operator of Youngs Quarry (Private Mine (PM) 214) (the Site). CLM Quarries acquired the tenement on 20 April 2019. The Site is located on Collaby Hill Road, Warnertown approximately 15 kilometres (km) south east of Port Pirie in South Australia. **Drawing No. 2449.DRG.002 – Site Location Plan** gives an understanding of the Site location in relation to Adelaide and the surrounding area.

The Tenement currently operates under the Approved Development Programme approved on 16 August 1990 (reference MW 100/2 JLB), henceforth referred to as the ADP. The Site has updated it's operations and is required to consult on these updates and development of the Mine Operations Plan (MOP).

PM 214 contains the active extraction areas, mobile crushing plant, primary crushing and screening area and limited stockpiling as per **Drawing No. 2449.DRG.019B – Site Layout Map – PM 214**.

The main sales stockpile areas, additional crushing area, sales, weighbridge and office area is located offsite approximately three (3) km south along Collaby Hill Road (CT 6221/211 and CT 6211/117) as per **Drawing No. 2449.DRG.019A – Site Layout Map -Sales Area**. The stockpiling area and sales area is authorised under EPA Licence 50661 and does not form part of this MOPs description of operations.

CLM Quarries are currently operating two (2) pits within the Site, the locations of which are shown in **Drawing No. 2449.DRG.024A – Quarry Development and Rehabilitation Plan – Stage 1**. The West Pit is dug using excavation and targets PM2 product, whilst the East Pit targets PM1 products and is extracted via blasting.

The PM is 252.9 hectares (ha) with approximately nine (9) km disturbed during Stage 1 and Stage 2, with an extraction life of approximately 17 years. It is expected the quarry will continue development beyond these 17 years and further plans and MOPs will be amended in line with the long term proposed end of life land use.

Further information on how the outcomes of consultation were addressed in operational activities and control and measurements are in the MOP **Section 5 Consultation**.

1.1 Engagement Undertaken to Date

Youngs Quarry has been an active quarry since 1979 with CLM acquiring the PM in 2019. Ongoing engagement has occurred regarding the Site with adjoining landowners, Local Council, Indigenous Heritage Groups and Department for Environment and Mining (DEM).

2 Engagement Strategies

2.1 Identifying Stakeholders

The process and consideration in identifying stakeholders to consult with included:

- Stakeholders most likely to be directly impacted given the Quarry has limited sensitive residential receptors within proximity
- Who makes up the broader community / has knowledge of the local area and represents the local area
- That the Quarry has been operational since 1979 and contains legacy issues that are required to be safely rectified in a Staged approach
- Who the Quarry has had prior / ongoing engagement with
- Mandatory stakeholders that are required to be consulted with.

At the time of writing this summary, the broad stakeholder groups for the project include:

- Residents / Landowner (adjacent and neighbouring)
- Local Government – Port Pirie Regional Council
- Department for Energy and Mining (DEM)
- Department for Environment and Water (DEW)
- Indigenous Groups
- SA Water (water main through PM 214)

Refer to **Drawing No. 2449.DRG.003 - Proximity to Infrastructure and Housing Map**, **Drawing No. 2449.DRG.022 - Stakeholder Consultation Map**.

2.2 Strategies Undertaken

As the project evolved and the initial round of consultation with adjacent landowners was undertaken, preferences for future consultation were discussed and amendments to the stakeholder consultation strategy were included for ongoing consultation.

2.2.1 Stakeholders Consulted

The following were the final stakeholders who actively participated in consultation and provided feedback:

- LIST HERE

2.2.2 Consultation Methods Undertaken

The International Association for Public Participation Spectrum (IAP2) framework for stakeholder consultation was used to inform the consultation strategies, key messaging for project stages and level of engagement undertaken for each project stage.

Below **Table 1 – Engagement Strategies Undertaken** outlines the consultation undertaken up to the lodgement of the MLP outlining methods of engagement, project phase, key materials and stakeholder group.

Table 1 – Engagement Strategies Undertaken

Project Stage	Engagement Level	Target Group	Objectives of Engagement Stage	Methods of Engagement Undertaken	Key Materials Used
Project initiation	Inform	• Landowner • Adjacent landowner • Local Government • Indigenous Group	To inform the stakeholder of the project. To provide stakeholders with balanced and objective information to understand the project.	• Initial contact via phone and / or email • One on one meeting with landowner • One on one meeting with adjacent landowners	• Brief information on the Site, proposed activities and timeframes of project
Development of MOP to final draft stages	Inform and consult	• Landowner • Adjacent landowner • Local Government • Indigenous Group • Government agencies	To obtain stakeholder feedback on areas of concern or lack of to inform control and measurement criteria. To advise stakeholders of how feedback was considered in MLP.	• One on one meeting with landowner • One on one meeting with adjacent landowners • Email communication providing updates • Contact via phone and / or email	• Draft QDP provided • Amended Quarry Development and Rehabilitation Plans • Draft control and measurement criteria • Written feedback on how and where feedback was addressed in MOP. • Provide stakeholders with contact information to provide written feedback / comment
MOP Development and Pre-lodgement	Consult and involve	• Landowner • DEM	To work directly with the stakeholders to ensure that concerns are consistently understood and considered and included in the MLP.	• One on one meetings or emails with stakeholders as required • Workshop / pre-lodgement meetings	• Updated Quarry Development and Rehabilitation Plans (if required) • Updated draft control and measurement criteria (if required) • Provide stakeholders with contact information to provide written feedback / comment • Technical assessments

(Ref: IAP2, 2020)

3 Summary of Consultation Outcomes

Methods Undertaken and Statistics

A breakdown of the type of consultation undertaken and the number of each type of method is presented below in **Diagram 1 – Consultation Methods**.

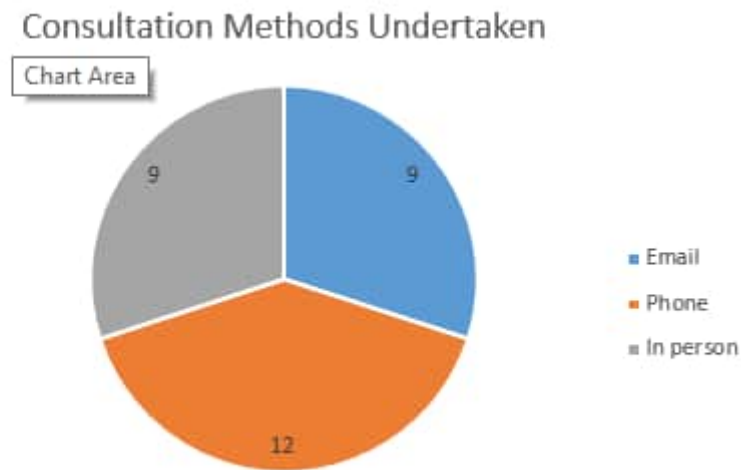


Diagram 1 – Consultation Methods

3.1 Effectiveness of Consultation

A total of 14 stakeholders were consulted of which 40 items of queries and feedback and general discussion on the Mop and Site were received. Through the combined use of the phone calls, one on one meetings and emails, stakeholders were able to discuss their queries regarding the MOP with the summary of the queries and feedback raised covered in **Section 4 – Stakeholder Feedback and Outcomes of Consultation**.

4 Stakeholder Feedback and Outcomes of Consultation

A summary of the issues raised and the number of stakeholders who raised the issue are provided below in **Diagram 2 – Summary of Environmental Impact Raised**.

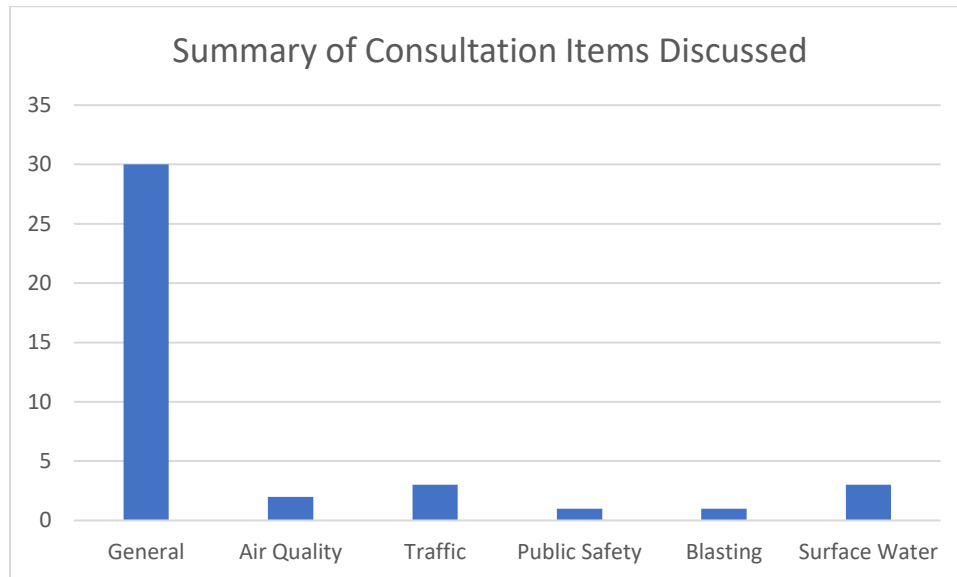


Diagram 2 – Summary of Environmental Impact Raised

The feedback and concerns raised during consultation have been considered and implemented into the control and management strategies if applicable for each of the above identified environmental impacts. The MOP will provide additional detail on which sections address the identified issues. Concerns or queries raised, and by which stakeholder group during consultation are provided below.

4.1 Air Quality

Two (2) adjacent landowners commented on air quality and dust suppression.

Both concerns were regarding the level of dust generated by trucks on the internal access roads. Discussion was held regarding utilising the water truck regularly on the road and during high use periods during campaigns to dampen the internal site access roads.

The proposed mitigation strategies discussed were deemed appropriate and have been incorporated into the MOP control and management strategies.

4.2 Traffic

Two (2) adjacent landowners and one (1) Local Government stakeholder provided feedback regarding the condition of Collaby Hill Road and impact on local road users.

Discussions via phone and one on one consultation in January 2025 in which concerns of the condition of Collaby Hill Road was raised, volume of truck movements past an adjacent residence and speed limits.

The stakeholders were advised the road condition of Collaby Hill Road is the responsibility of the local council and that feedback of more regular maintenance of the road could be provided the Local Council. Collaby Hill Road is a public road and the majority of the trucks are council contractors accessing the dedicated Council stockpiles directly within the operational area of PM 214 for use within the regional road program. Additionally Council have provided a response to feedback regarding the condition of Collaby Hill Road including recognition that Youngs Quarry donate product to assist with maintenance of the road to improve the asset, that roads are assessed for grading and has been determined to have been used and worn in relation to the road category and type. Council typically only look to grade once we have had rain and this past year has been quite dry so the perception of road conditions maybe heightened due to slightly less maintenance and wearing conditions increased.

The Site's entry and exit point on Collaby Hill Road has been established for many years providing access to the Site from Collaby Hill Road and the internal private access road. One (1) stakeholder who raised concerns regarding traffic movements along Collaby Hill Road has recently constructed a transportable residence approximately 30 metre (m) from the property boundary.

Site inspection undertaken by SLR Consulting in January 2025 identified speed limit restrictions (25 km p/h) exist within proximity to the residence located at the northern Collaby Hill Road site entry / exit and as the Site's exit / entry point it also ensures that traffic is moving at a slow to stopping pace near the newly placed transportable residence.

Additional dust suppression of the haul road in front of the residence will be undertaken via use of water truck during campaigns and in drier weather conditions.

The proposed mitigation strategies discussed were deemed appropriate and have been incorporated into the MOP control and management strategies.

4.3 Public Safety

One (1) adjacent landowner raised a concern of public safety within the Site.

At a one on one consultation undertaken by SLR Consulting in January 2025, the adjacent landowner expressed a concern the public may be accessing the site (trespassing) at night.

Discussion was undertaken to determine the areas within the quarry concerned and it was determined to be the landowner of the neighbouring property within his own land.

Discussion was held that the Site is well sign posted to advised of potential hazards and private property, and that the planned works are to remediate steep wall faces to increase safety of the Site.

The proposed mitigation strategies discussed were deemed appropriate and have been incorporated into the MOP control and management strategies.

4.4 Blasting

One (1) adjacent landowner requested to be notified prior to blasting undertaken within the Site.

Consultation in person undertaken in January 2025 by SLR Consulting, discussed the frequency proposed in the MOP and within what area (furthest from their residence) of the quarry it would be undertaken.

Whilst the Adjacent landowner raised no specific concerns with blasting, they did request to be notified prior to a blast occurring and this will be added as a control and management strategy.

4.5 Surface Water (Erosion and Stormwater Management)

One (1) Landowner raised a concern regarding run off of Surface Water from the operational area from the crushing and stockpile area within PM 214 entering their property.

SLR Consulting undertook two (2) Site inspections, one from the quarry side of the water main south of the operational areas and another with the consultation landowner south of the water mains from within their landholding.

The landowner advised surface water is not generally received from the operations unless there has been a short duration high volume rainfall event.

The Site inspections noted two (2) concrete culverts located under the SA Water pipelines installed by the infrastructure owner. A review of Google Maps as early as 2004 shows this culvert has historically managed water through these culverts and downhill towards the mapped watercourse that starts part way through the paddock.

Over the years the landowner has infilled this area to assist passage for farming machinery.

It was agreed by the quarry operator and consultation landowner that the Stormwater and Erosion Management Plan be reviewed to prevent erosion and surface water run creating riling within the adjoining paddock. There is no mapped watercourse that feeds directly from the quarry into the mapped watercourse that commences part way through the adjacent landowner's paddock and therefore activities to prevent run off into the adjacent paddock will not trigger a water affecting activity. The adjacent landowner has advised they are happy for water runoff to be redirected to the mapped watercourse that runs through the operational area and continues south through their property or other management protocols to prevent water runoff into the cropping area.

The proposed mitigation strategies discussed were deemed appropriate and have been incorporated into the MOP control and management strategies.

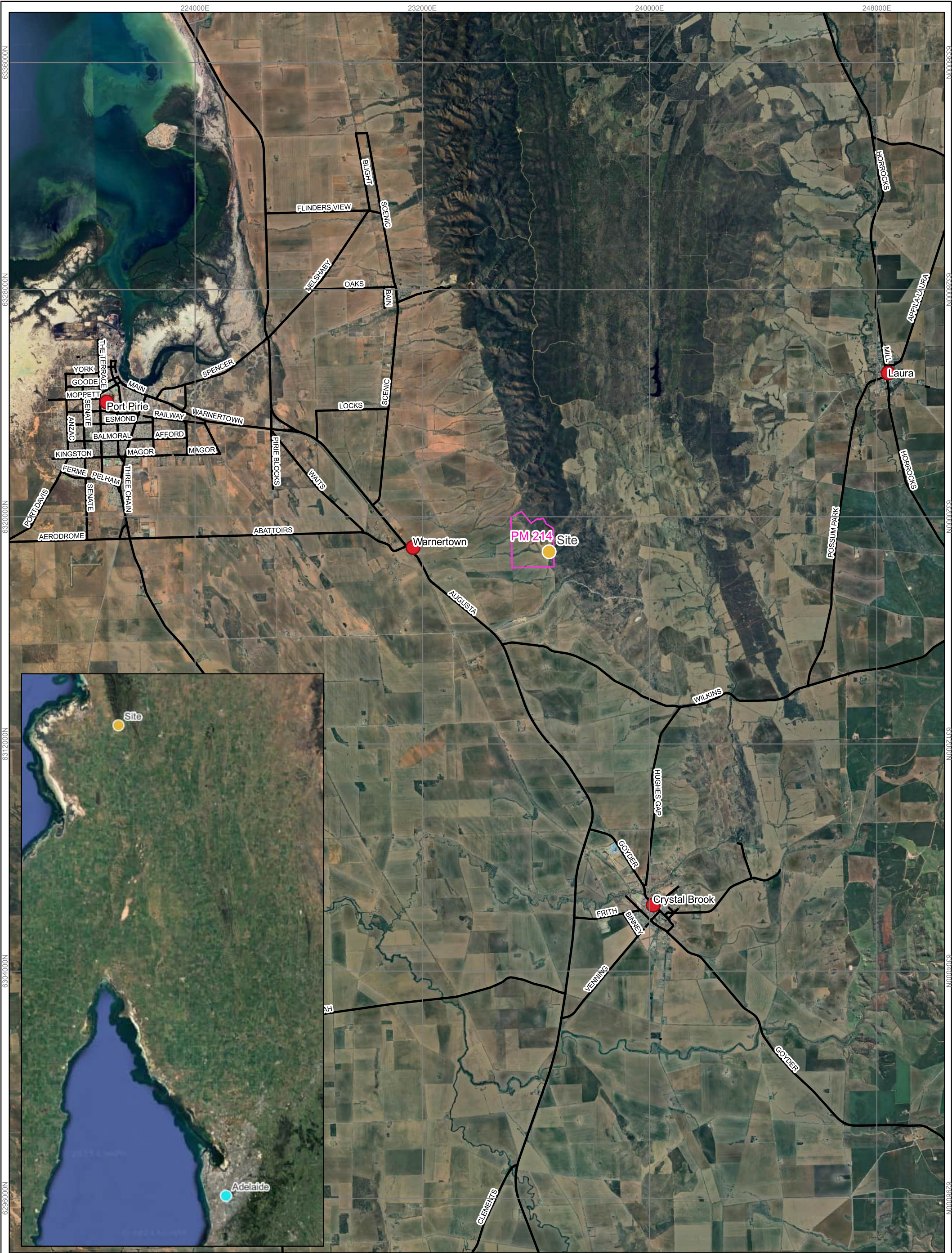
5 Ongoing Stakeholder Consultation

CLM has committed to maintaining open communication relationship with the landowners and adjacent landowners. All stakeholders have been provided contact details for Youngs Quarries for future enquiries.

This included one (1) adjacent landowner requesting notifications of planned blasts.

During the consultation on the MOP all stakeholders were also advised the DEM must undertake statutory consultation regarding the MLP and stakeholders were advised they could participate in this phase.

DRAWINGS



REV	DESCRIPTION	DATE	BY

Data Sources:

Photography: Google Satellite Imagery accessed: 11-October-2023

Topography: Cadastre: Data.sa.gov.au. Boundaries indicative only, not all boundaries shown

Ecosystem: Other: SARIG, 2023

Legend:

Major Towns

Site Marker

PM 214

N

PROJECT:	Youngs Quarry
CLIENT:	CLM Quarries

GROUNDWORK

plus

PH +61 3871 0411

WWW.GROUNDWORK.COM.AU

SCALE:

1:119,700

When Printed On A3

DATE:

11-October-2023

PRINTED:

11-October-2023

0

500

1,000

1,500

2,000 m

TITLE:

Site Location Plan

DRAWING NUMBER:

2449.DRG.002

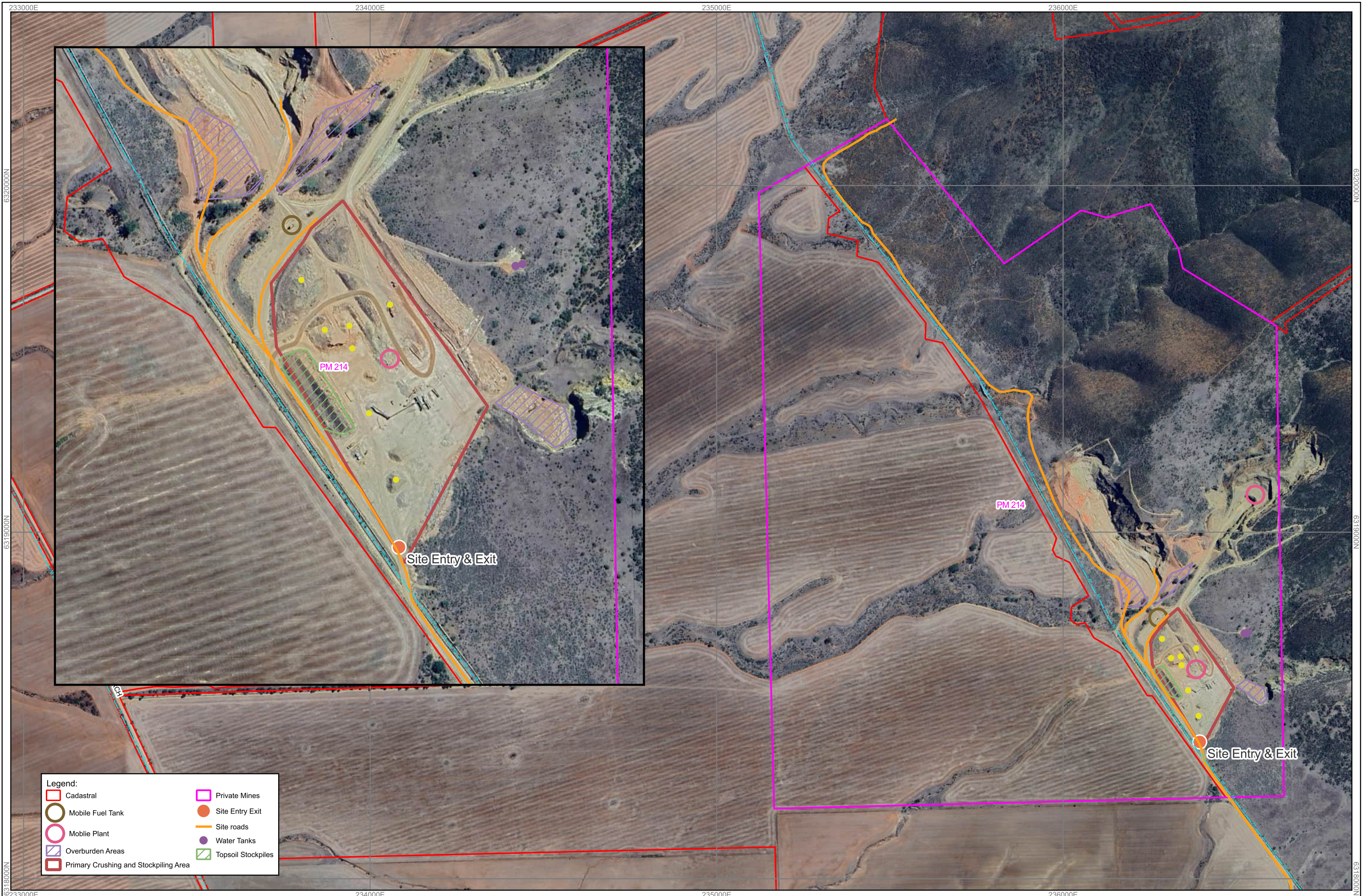
REVISION:

DATUM: HORIZONTAL / VERTICAL / ZONE

EP

MGA / AHD / 54

EP99/28354



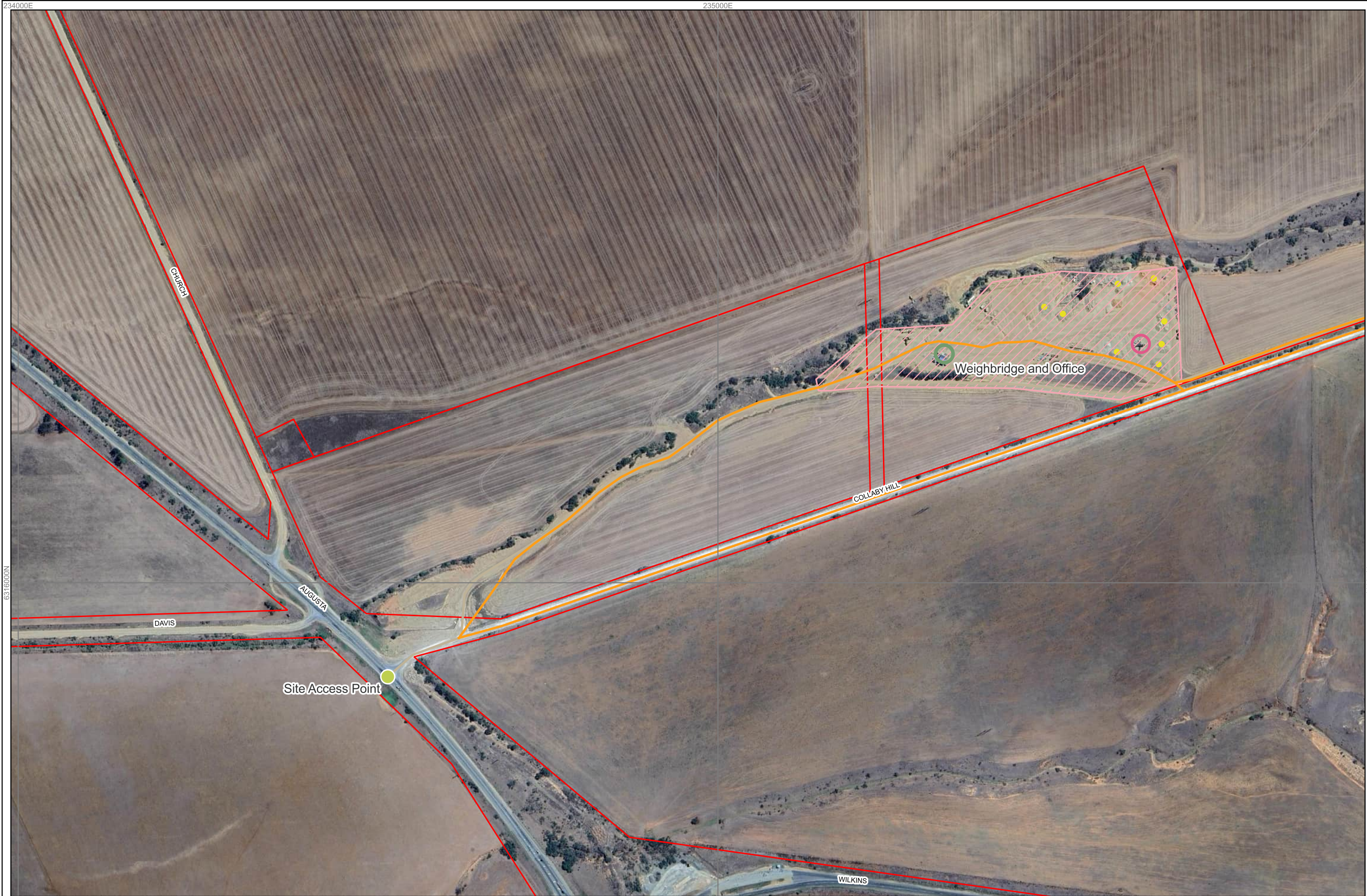
Legend:			
	Cadastral		Private Mines
	Mobile Fuel Tank		Site Entry Exit
	Mobile Plant		Site roads
	Overburden Areas		Water Tanks
	Primary Crushing and Stockpiling Area		Topsoil Stockpiles

REV	DESCRIPTION	DATE	BY
Data			
Photography: Data via gov.au, Boundaries indicative only, not all boundaries shown			
Topography: Cadastral: Data via gov.au, Boundaries indicative only, not all boundaries shown			
Ecosystem: Other: SARIG, 2023			



PROJECT:	Youngs Quarry
CLIENT:	CLM Quarries

TITLE:		Site Layout Map - PM 214			
GROUNDWORK PART OF SLR PM 41/301/041 WWW.GROUNDWORKPLUS.COM.AU		SCALE: 1:10,000 When Printed On A3 0 50 100 150 200 m		DRAWING NUMBER: 2449.DRG.019B	REVISION:
DATE: 05-November-2024		DRAWN: EM	DATUM: HORIZONTAL / VERTICAL / EPSG:28354		
PRINTED: 05-November-2024		CHECKED: MJ	MGA / AHD / 54		

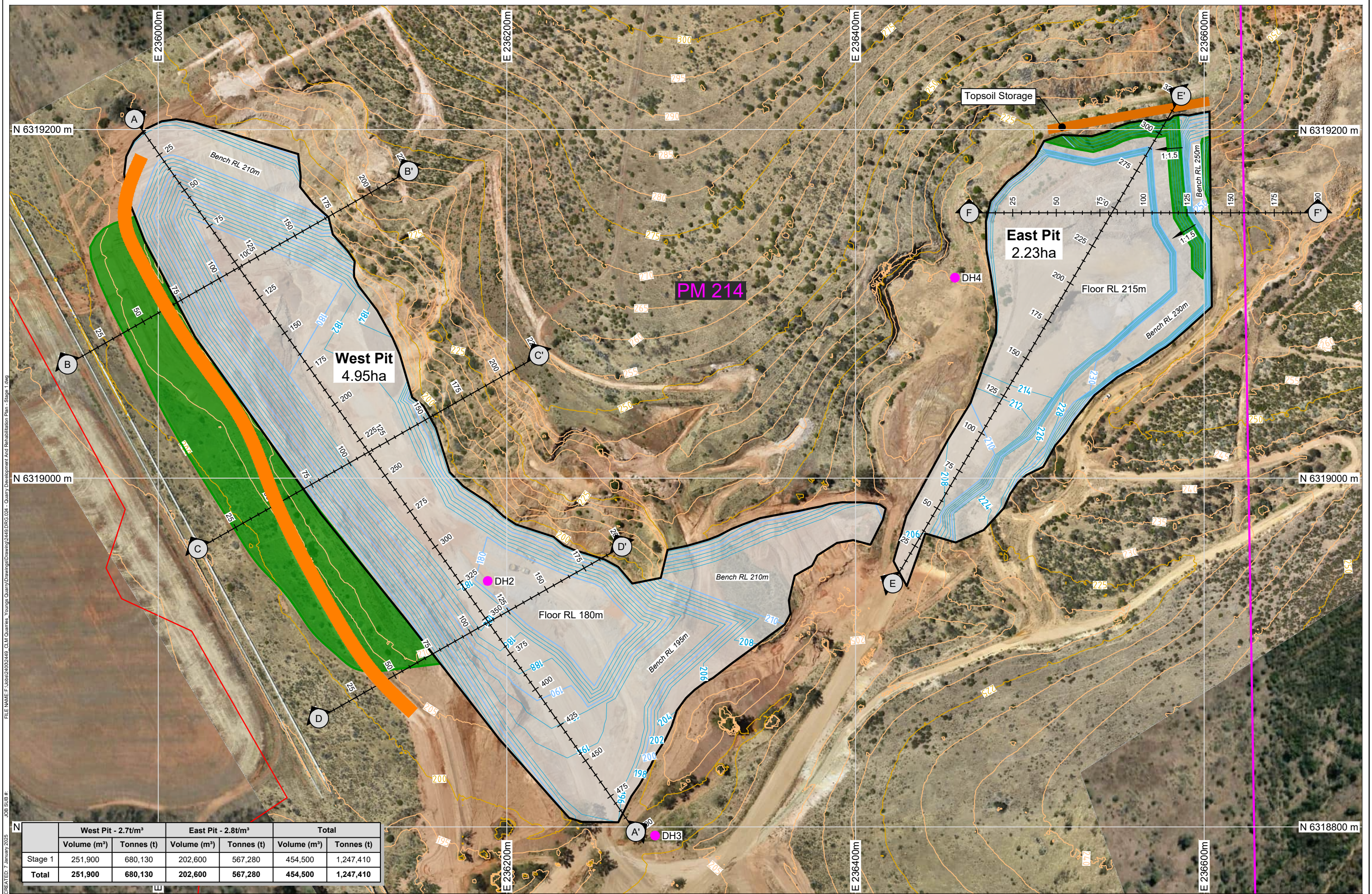


REV		DESCRIPTION	DATE	BY
Data: Photography: Data.ssa.gov.au, Boundaries indicative only, not all boundaries shown Cadastral: Data.ssa.gov.au, Boundaries indicative only, not all boundaries shown Ecosystem: SARIG, 2023				

Legend:	
Cadastral	Sales Area
Mobile Plant	Site Access Point
Product Stockpiles	Weighbridge and Office

PROJECT:	Youngs Quarry	TITLE:	Site Layout Map - Sales Area	
CLIENT:	CLM Quarries			

GROUNDWORK PART OF SLR PH 461 3871 0411 WWW.GROUNDWORKPLUS.COM.AU	SCALE: 1:5,000 When Printed On A3		DRAWING NUMBER: 2449.DRG.019A	REVISION:
	DATE: 05-November-2024	DRAWN: EM	DATUM: HORIZONTAL / VERTICAL /	EPSG:28354
	PRINTED: 05-November-2024	CHECKED: FD	MGA / AHD / 54	



	West Pit - 2.7t/m³		East Pit - 2.8t/m³		Total	
	Volume (m³)	Tonnes (t)	Volume (m³)	Tonnes (t)	Volume (m³)	Tonnes (t)
Stage 1	251,900	680,130	202,600	567,280	454,500	1,247,410
Total	251,900	680,130	202,600	567,280	454,500	1,247,410

REV

REV	DESCRIPTION	DATE	BY

Data Sources:

Photography: Groundwork part of SLR, RPA Survey, 2023/12/01
Topography: Groundwork part of SLR, RPA Survey, 2023/12/01, DSM 1m
Cadastral: © The Government of South Australia (C11) 2024
Ecosystem: © 2024 Microsoft Corporation; © 2024 Maxar; © CNES (2024) Distribution Airbus DS
Other: © 2024 Microsoft Corporation; © 2024 Maxar; © CNES (2024) Distribution Airbus DS

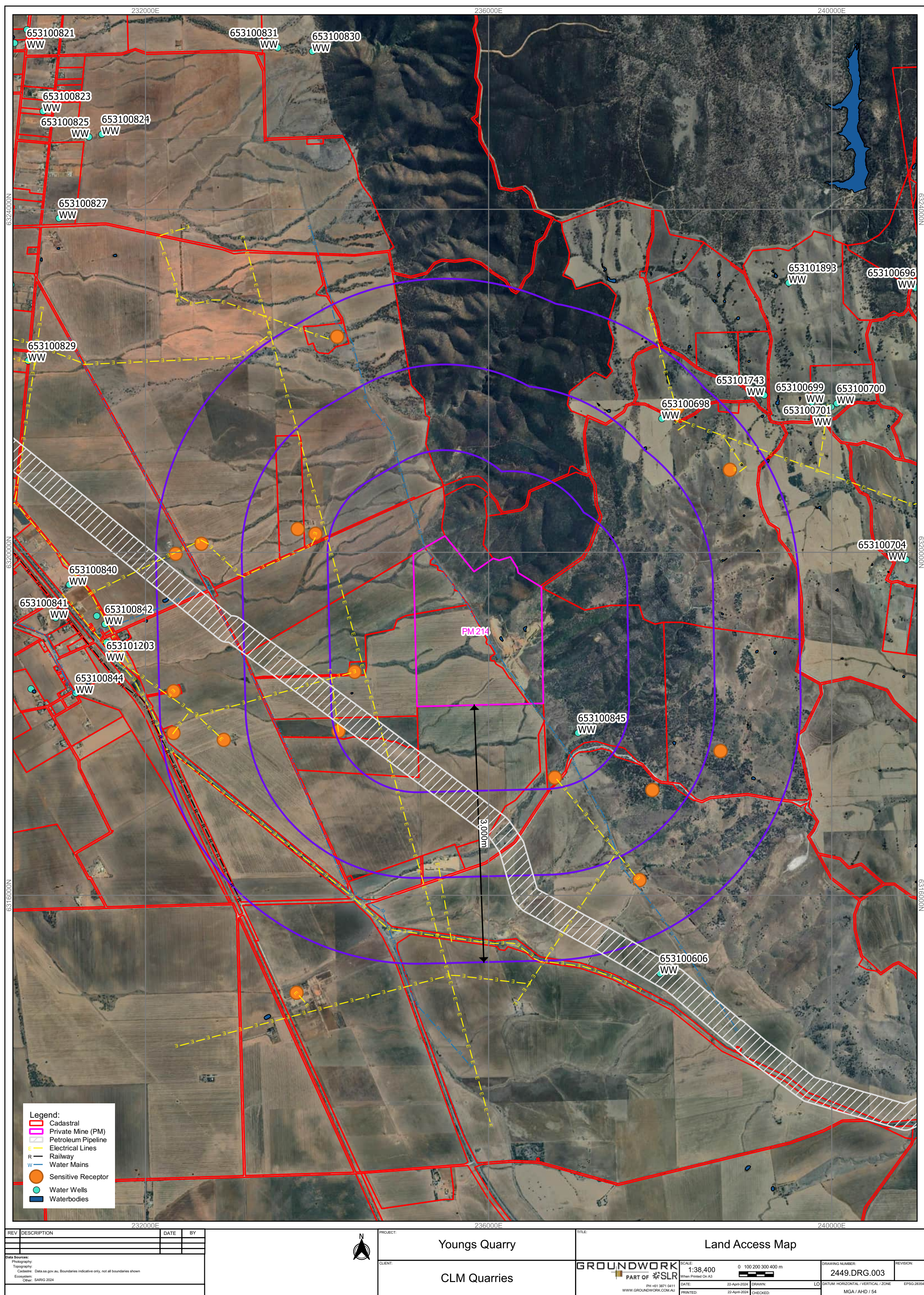
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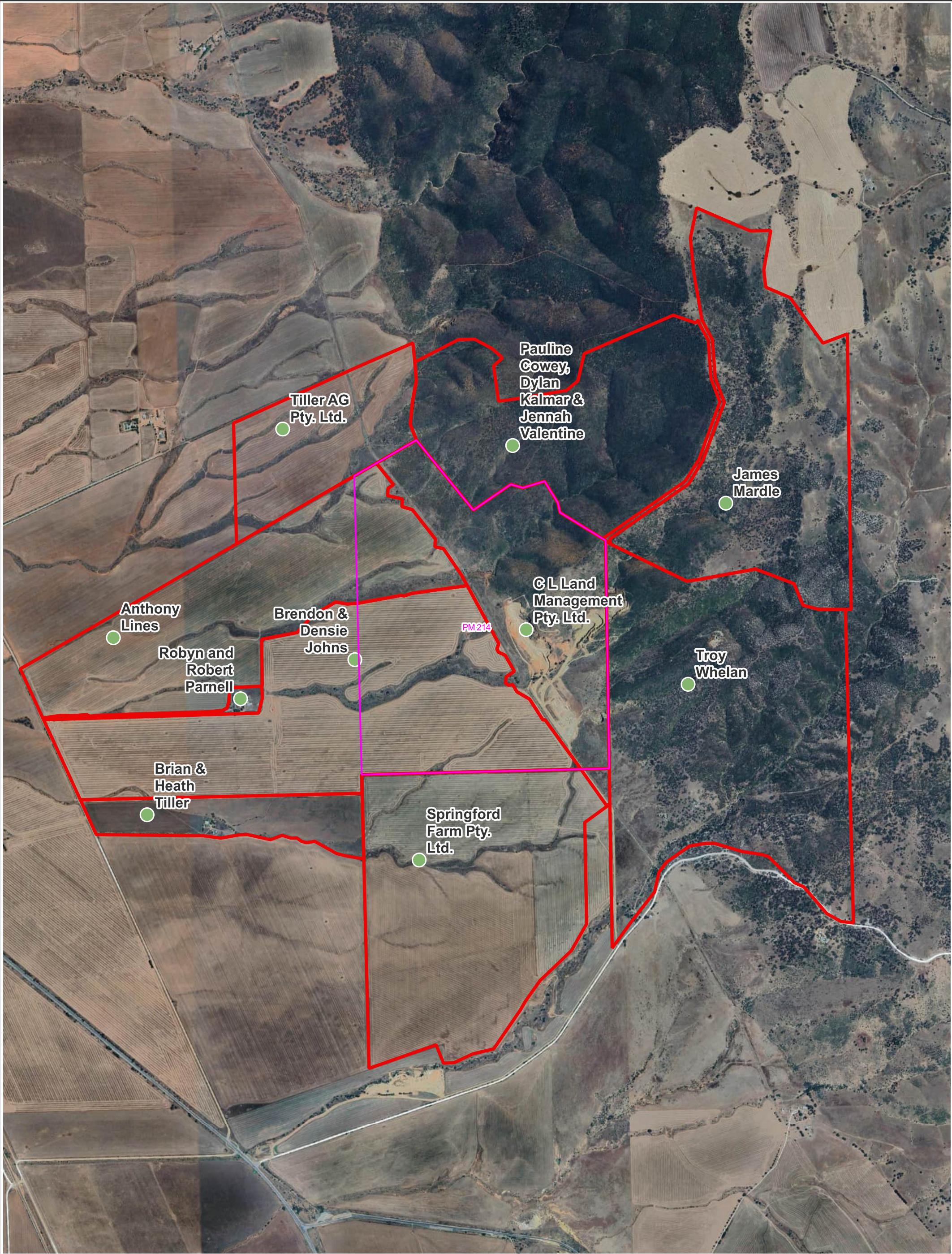
Legend:

- Cadastral Boundary
- Private Mine
- Haul Road
- Extraction Area (7.03ha)
- Rehabilitation Area (1.38ha)



PROJECT:	Youngs Quarry	TITLE:	Quarry Development and Rehabilitation Plan - Stage 1
CLIENT:	CLM Quarries	GROUNDWORK	SCALE: 1:2,000
		PART OF SLR	0 40m
		PH: +61 7 3871 0411	DRAWING NUMBER: 2449.DRG.024A
		WWW.GROUNDWORK.COM.AU	REVISION:
		DATE: 7 January 2025	DATUM: HORIZONTAL / VERTICAL / ZONE
		PRINTED: 7 January 2025	CP
		CHECKED: EM	GDA94 / MGA / AHD / 54





REV	DESCRIPTION	DATE	BY

Data Sources:
Photography: Google Satellite Imagery accessed: 10-April-2024
Topography: Data.sa.gov.au. Boundaries shown are indicative only
Easements: Other: SARIG.2024

Legend:

Private mines

Cadastral Boundaries

Adjacent Landowners



PROJECT:	Youngs Quarry
CLIENT:	CLM Quarries

GROUNDWORK

PART OF SLR

PH +61 3871 0411
WWW.GROUNDWORK.COM.AU

SCALE: 1:20,000
When Printed On A3

0

100

200

300

400 m

DATE: 10-April-2024

DATE: 10-April-2024

PRINTED: 10-April-2024

DRAWN: JC

CHECKED:

DRAWING NUMBER: 2449.DRG.022

DATUM: HORIZONTAL / VERTICAL / ZONE

DATUM: MGA / AHD / 54

REVISION:

EPSG:7854

Attachment 10

Legislation and Standards

Environmental Aspect	Applicable Legislation	Applicable Non-Legislated Standard/s
Public Safety	<i>Work Health and Safety Act 2012 (SA) and Regulations</i> <i>Mining Act 1971 (SA)</i> <i>Local Government Act 1999 (SA)</i>	Mine Closure and Completion: Leading Practice Sustainable Development Program for the Mining Industry (Department of Industry, Tourism and Resources, 2016).
Traffic	<i>Work Health and Safety Act 2012 (SA) and Regulations</i> <i>Road Traffic Act 1961 (SA)</i> <i>Local Government Act 1999 (SA)</i>	N/A
Protection of Third Party Property	<i>Work Health and Safety Act 2012 (SA) and Regulations</i> <i>Mining Act 1971</i> <i>Local Government Act 1999</i> <i>Electricity Act 1996</i> <i>Electricity (General) Regulations 2012</i>	Network Information for Customers and Contractors (NICC) 404 – Working in the Vicinity of SA Power Networks Infrastructure – Network Access Permit Process (January, 2015)
Heritage	<i>Aboriginal Heritage Act 1988 (SA)</i> <i>Heritage Places Act 1993 (SA)</i> <i>Mining Act 1971 (SA) and Regulations</i> <i>Development Act 1993 (SA)</i> <i>Aboriginal and Torres Strait Island Heritage Protection Act 1987 (Cth)</i>	Cultural Heritage Guidelines, A handbook for Staff and Contractors, (Transport SA 1999) Section 20 of the Aboriginal Heritage Act 1988: Discovery of sites, objects or remains
Weeds, Pests and Plant pathogens	<i>Landscape South Australia Act 2019</i> <i>Controlled Substances Act 1984 (SA) and Regulations (SA) 2017</i> <i>Agricultural and Veterinary Products Act (Control of Use) Act 2002 (SA) and Regulations 2017</i>	Weed control handbook for declared plants in South Australia (Government of South Australia, 2017)
Topsoil management	<i>Landscape South Australia Act 2019</i>	Mine Closure and Completion: Leading Practice Sustainable Development Program for the Mining Industry (Department of Industry, Tourism and Resources, 2006).

Environmental Aspect	Applicable Legislation	Applicable Non-Legislated Standard/s
Waste management	<i>Zero Waste SA Act 2004 (SA)</i> <i>Environmental Protection Act 1993 (SA)</i> <i>Environment Protection (Waste to Resources) Policy 2010 (SA)</i> <i>Environment Protection (National Pollutant Inventory) Policy 2008 (Cth)</i>	EPA Guideline: Site contamination—what is site contamination? (EPA, 2009) EPA Guideline: EPA080/16 Bunding and spill management (EPA, 2016)
Visual amenity	<i>Mining Act 1971 (SA) and Mining Regulations 2020</i>	South Australian Planning And Design Code (May 2025)
Noise	<i>Environment Protection Act 1993 (SA)</i> <i>Environment Protection (Commercial and Industrial Noise) Policy 2023</i>	South Australian Planning And Design Code (May 2025)
Dust	<i>Environment Protection Act 1993 (SA)</i> <i>Environment Protection (Air Quality) Policy 2016 (SA)</i> <i>The South Australian Public Health Act 2011 (SA)</i> <i>Local Government Act 1999 (SA)</i>	World Health Organisation (WHO) Air Quality Guidelines, 2005 National Environment Protection (Ambient Air Quality) Measure Australian Standard AS 3580.10.1 Methods for sampling and analysis of ambient air – Determination of particulates – Deposited matter – Gravimetric method Australian Standard AS 3580.9.6 Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM10 high volume sampler with size-selective inlet – Gravimetric method
Blast vibration and overpressure	<i>Mining Act 1971 (SA) and Mining Regulations 2020</i> <i>Explosives Act 1936 (SA) and Regulations</i> <i>Dangerous Substances Act 1979 (SA)</i> <i>Environment Protection (Commercial & Industrial Noise) Policy 2023</i> <i>Work Health and Safety Act 2012 (SA) and Regulations</i>	Australian Standard AS 2187 Explosives—Storage, transport and use Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration (ANZECC, 1990) SA Water Technical Standard TS 0136 – Pipework Access and Protection
Groundwater	<i>Environment Protection Act 1993 (SA)</i> <i>Environment Protection (Water Quality) Policy 2015 (SA)</i> <i>Landscape South Australia Act 2019</i>	Australian and New Zealand Guidelines for Fresh and Marine Waters (ANZECC and ARMCANZ, 2000)

Environmental Aspect	Applicable Legislation	Applicable Non-Legislated Standard/s
Native vegetation	<i>Landscape South Australia Act 2019</i> <i>Native Vegetation Act 1991 (SA)</i> <i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>	Guide to the <i>Native Vegetation Regulations 2017</i> , Native Vegetation Council (April, 2017)
Surface water (Erosion, Sediment and Stormwater Management)	<i>Environment Protection Act 1993 (SA)</i> <i>Environment Protection (Water Quality) Policy 2015 (SA)</i>	Australian and New Zealand Guidelines for Fresh and Marine Waters (ANZECC and ARMCANZ, 2000) Code of practice for wastewater overflow management (EPA, 2017) Stormwater pollution prevention: Code of practice for the building and construction industry (EPA, 1999)

Attachment 11

Blast Management Plan

Blast Management Plan/Report

. Summary of the blast			
Requirement	Details		Requirements
Blast date:			Firing Time:
Location of blast:	CLM Quarries Warnertown		Shot Number:
Blast Type:	Production	X	
	Over Burden		
	Toe Holes		

2. Person responsible for the blast	
Shotfirer Details	
Requirements	Details
Name:	Murray Gannon
Blasting License:	E40312
Company:	TecBlast Services
Position:	Proprietor
Mobile:	0403 942351
Email:	mtgannon@iinet.net.au

Other key personnel assisting (complete for each person)					
Requirements	Details				
Name:					
Company:					
Position:					
Mobile:	0438 230 737				
Email:	sales@clmquarries.com.au				
Requirements	Details				
Name:	Aaron Wallace				
Company:	Tecblast				
Position:					
Mobile:	0421720855				
Email:					
Requirements	Details				
Name:	Andrew Cooper				
Company:					
Position:					
Mobile:	0402 049742				
Email:					
Requirements	Names				
Blast Crew:	Carl Loader	0474 767903			
Blast Guards:					

3. Blast Design

This provides details of the layout of the blast, and its approval, in relation to the pattern, depth of holes and stemming designed to minimise the potential for fly rock or other incidents.

Requirements	Rock Details					
Type of ground:	hard	X	No. of holes:	36	Diameter (mm) of holes:	115
	soft		Hole Depth (m)	15.5	Toe Holes (m)	
	sandy		Face Height (m):	15 - 16	Orientation:	To sth west°
Drill Pattern:	Burden	4 x 4.3m nominal		Yield Tonnes	Approx. 24000 tonne	
	Spacing	4.3 M		Water in Holes	minimal	
	Shot Volumes	M3				
Net explosive quantity (NEQ) per hole:	162kg		Type/height of stemming		25mm cr 3m	
Delay per hole	25ms		Number of rows		5	

Blast Plan

This illustrates the blast pattern, spacing of holes, firing points and direction of the blast. The plan should include orientation, hole layout/spacing, any blast mats or covers, delays, burden, initiation point and firing lines. **See attached Blast Plan**

4. Explosives/Charging

This details the quantity and types of explosives to be used and confirms whether procedures have been prepared for the storage and handling of explosives and for the conduct of the blast.

Requirements	Details
Type of Explosive:	Orica emulsion
Quantity of Detonators:	36
Quantity bulk Explosive Used:	5700kg
Drilling procedures:	yes
Loading & charging procedures:	yes
Storage & handling procedures:	yes

Initiation method

This provides details of the initiation and firing equipment to be used, recording of times tested and the function of equipment to be used in the blast.

Requirements	Details
Initiation System Used:	nonel
Surface Delays Used:	25,42
In Hole Delays Used:	400ms
Lead In Delay:	x
Total kg of Bulk Explosives Used (Calculated):	5400kg
Total kg of Bulk Explosives Used (Actual):	5700 kg
Powder Factor (Actual):	0.67 kg/bcm
Initiation equipment exploder:	Beethoven

5. Blast Area, Licences and Permits

This details the blast area (in relation to other structures and operations) and lists the Licences and Permits related to the area.

Requirements	Details	
Blast location:	Eastern main pit	
Exclusion zone (m):	400m	
Distance (m) to:	Nearest dwelling: 1k	Nearest structure: 600m
Nearest personnel:	Nearest public access: 1k	

Nearest services (eg water/electricity):	Water mains pipeline – 520 m	
Blast licences / permits	Yes/No	Permits/licence No. :
Details of licences / permits :		
Supporting documents consulted:		

6. Blast risk management

This summarises the risks identified during a risk assessment and the risk controls determined for the site and site security arrangements. Examples of risks and risk controls that may apply are provided.

Identified risk	Risk controls
Unauthorised access to blast area.	•
Unauthorised access to explosives store/portable magazine:	• Secure stores and restrict access to site.
Inadequate training and competency for staff:	• Ensure shotfirer is licensed and all personnel assisting in handling and loading explosives have a trainee blasters licence • Train personnel in explosives products and blast design. • Develop and implement procedures to check training and competency
Competency of contractors:	• Review competency and training. • Ensure drillers are competent and have required experience. • Set minimum standards. • State requirements in contracts.
Blasting procedure:	• Develop and maintain safe blasting procedures. • Involve competent people in development.
Inconsistent performance of explosives:	• Use a reliable supplier. • Test explosives. • Develop procedures for use of explosives. • Ensure shotfirer are licensed, competent and experienced.
Unreliable firing methods:	• Use reliable products. • Test safety fuses, if used, and other equipment. • Ensure equipment is maintained by competent people. • Develop procedures for checking firing method.
Hot ground causing premature firing:	• Use appropriate firing method and types of explosives. • Test in hot conditions. • Check ground before designing the blast.
Damage to structures:	• Evaluate the effect of ground vibration and air blast overpressure on structures or ground conditions. • Revise blasting procedure to minimise damage.
Risk of fly rock:	• Calculate quantity of explosives, stemming and capping. • Conduct laser profiling. • Conduct bore hole tracking. • Provide appropriate supervision. • Check blast pattern is as designed. • Set up exclusion zones. • Use blast mats. • Use correct stemming material including size.

Security arrangements:

Requirements	Details
Security procedures for the site and the blast: Matters to consider: • manning of all entrances and exits • closed circuit TV • use of blast guards and preventing access inside the exclusion zone • documented sentry procedures provided to each sentry • location of explosives storage keys • warning signs	

procedures for emergency services vehicles.			
Communication system/s between people involved or in the vicinity of the blast: Matters to consider: - two-way communication - siren system - communication to neighbours in a built up area - back up communications system - emergency services contact details.	Radio comms.15		
Requirements	If Yes – Provide Details		
Advanced warning:	Yes/No	E.g. sirens, communication prior to firing.	
Audible warning:	Yes/No	E.g. sirens, communication prior to firing.	
Blast Guards period:	Yes/No	E.g. number of blast guards.	
Signs:	Yes/No	E.g. location and type.	Standard no entry
Traffic management	Yes/No	E.g. documented procedure provided to sentries	Guards
ALL CLEAR' signal	Yes/No	Provide details if required	Standard signal

7. Record of the Blast This should be completed by the shotfirer after the blast. It covers weather conditions at the time of the blast, results of any monitoring and analysis of the blast which could be used to improve risk management at subsequent blasts.		
Weather conditions This provides details of the weather conditions at the time of the blast and whether any changes were necessary to the original blast plan due to changing conditions.		
Requirements	Details	
Temperature:		
Wind:	Speed:	Direction:
Overall conditions: (Please Tick)	Dry ☐ Overcast ☐ Wet ☒ Sunny ☐ Sultry ☐ Thunder/lightning ☐ Windy ☐	
Fire ban day: detail restrictions that applied if on the day of a fire ban	Yes/No	
Describe how weather conditions affected blast: such as: - lightning activity affecting electrical firing - wind direction affecting fly rock - conditions causing delay, postponement or cancellation.		

Environmental monitoring

This provides details of the type of equipment and any measurements taken during the blast as well as key environmental considerations for the blast to ensure that factors such as noise or vibration did not exceed acceptable levels. These measurements could be important should there be any complaint or incident as a result of a blast.

Requirements	Details													
Environmental considerations and exposure limits required:	SA Water's technical standard, TS 0136 Pipework Access and Protection Section 12.4.2 4 (d) states the following criteria for blasting which is aligned to the Australia Standard and the Site's Outcome / Objective achievement: d) Adhere to safe vibrations limits (peak particle velocities (PPV)) which SA Water may specify for a particular asset – in general, the maximum vibrations at the asset shall not exceed the limits provided in Table 8: Safe Vibration Limits (PPV) below. Table 8: Safe Vibration Limits (PPV) <table border="1"> <thead> <tr> <th>Vibration Type</th><th>Safe PPV Limit for Rigid Pipelines (AC, RC, VC, CI)</th><th>Safe PPV Limit for Flexible Pipelines</th><th>Safe PPV Limit for Masonry/Mass Concrete Oviforms</th></tr> </thead> <tbody> <tr> <td>Continuous vibration</td><td>5 mm/s maximum</td><td>10 mm/s maximum</td><td rowspan="2">2 mm/s maximum</td></tr> <tr> <td>Intermittent or transient</td><td>10 mm/s maximum</td><td>20 mm/s maximum</td></tr> </tbody> </table> Adherence to Quarry PEPR Section 6.8.4 measurement criteria: If complaints are not able to be resolved to the satisfaction of the Regulator all blasts are monitored to comply with the following: → Ground Vibration – 5 mm/s maximum with up to 5 percent allowable to 10 mm/s maximum or less in a 12 month period. → Overpressure – 115Db (Lin Peak) with up to 5 percent allowable to 120 Db (Lin Peak) or less in a 12 month period.			Vibration Type	Safe PPV Limit for Rigid Pipelines (AC, RC, VC, CI)	Safe PPV Limit for Flexible Pipelines	Safe PPV Limit for Masonry/Mass Concrete Oviforms	Continuous vibration	5 mm/s maximum	10 mm/s maximum	2 mm/s maximum	Intermittent or transient	10 mm/s maximum	20 mm/s maximum
Vibration Type	Safe PPV Limit for Rigid Pipelines (AC, RC, VC, CI)	Safe PPV Limit for Flexible Pipelines	Safe PPV Limit for Masonry/Mass Concrete Oviforms											
Continuous vibration	5 mm/s maximum	10 mm/s maximum	2 mm/s maximum											
Intermittent or transient	10 mm/s maximum	20 mm/s maximum												
Monitoring equipment used:	Type:	Serial no:	Location											
Vibration:	vibsensor		300m w											
Noise:	Smart tool		300m w											
Air Blast / Pressure:														
Details of measurements recorded during the blast:	Vibration Results:	5.3 mm/sec												
	Noise Results:	34 dB												
	Air Blast / Pressure													
9. Post blast analysis This assesses whether the blast design, firing and Blast Management Plan met the objectives.														
Requirements	If Yes – Provide Details													
Was there a misfire?	Yes/No													
Was a misfire management system used and followed?	Yes/No													
Was any fly rock/fly generated?	Yes/No													

Results of post blast assessment and inspection	Yes/No	
Were there incidents/complaints?	Yes/No	
Are changes proposed to future blasts?	Yes/No	
Post blast comments:		

Blast Management Plan Sign Off		
Shotfirer Name	Manager Name	Approver of the plan Name
Signature	Signature	Signature
Date	Date	Date