Douglas PARTNERS

GROUNDED EXPERTISE

Report on Shaft Condition Assessment

Reids Ridge Abandoned Mine Site (Commodore and Reids North)

Yalgoo-Ninghan Road, Paynes Find WA

Prepared for Department of Energy Mines Industry Regulation & Safety

Project 224768.00

18 November 2024

Douglas Partners Pty Ltd
ABN 75 053 980 117
douglaspartners.com.au
36 O'Malley Street, Osborne Park, WA 6017
(08) 9204 3511

Document History

Details

Project No.	224768.00
Document Title	Report on shaft condition assessment
Site Address	Yalgoo-Ninghan Road, Paynes Find WA
Report Prepared For	Department of Energy Mines Industry Regulation & Safety
Filename	224768.00.R.003.Rev0

Status and Review

Status	Prepared by	Reviewed by	Date issued
Draft A	Damian Jagoe-Banks	Fred Verheyde	18 September 2024
Rev0	Damian Jagoe-Banks	Fred Verheyde	18 November 2024

Distribution of Copies

Status	Issued to
Draft A	Department of Energy, Mines, Industry Regulation and Safety (DEMIRS)
Rev0	Department of Energy, Mines, Industry Regulation and Safety (DEMIRS)

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

Signature	Date
Author	18 November 2024
Reviewer	18 November 2024

Table of Contents

Report on Shaft Condition Assessment Reids Ridge Abandoned Mine Site (Commodore and Reids North Areas) Yalgoo-Ninghan Road, Paynes Find WA

1. Introduction

This report presents the results of a condition assessment undertaken for the mining areas known as 'Commodore' and 'Reids North' as well as an unnamed group of mine features located 500 m southwest of Commodore, all within the dead mining tenement M59/117, 55 km west of Paynes Find in the Karara Rangelands Park. The purpose of this report is to detail the site conditions and discuss the results and findings of the investigation.

The investigation was commissioned in a letter from the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) (letter Ref: DMIRS23250) and was undertaken in accordance with Douglas' proposal dated 21 September 2023 and the conditions outlined in the acceptance letter.

Two reports will discuss the features present in Commodore and Reids North mining areas and the unnamed group of features:

- Condition Assessment Report (this report) – detailing the findings of the assessment; and
- Rehabilitation Report – providing recommendations on suitable rehabilitation options and budget estimates.

The aim of the investigation was to assess the condition of the mining areas and provide an assessment of the following:

- Condition of each feature and the presence of material or obstructions within the features.
- Stability of the features.
- Presence of fauna within the features.
- Potential for noxious and/or flammable gases within the features.

The details of the investigation are presented in this report, together with comments and recommendations on the items listed above.

2. Site Description

2.1 Locations

Commodore and Reids North are located within the Karara Rangelands Park, 7 km north-northwest of Warriedar homestead and approximately 55 km west of Paynes Find, WA. They are two of three main areas of historical mining present within the same dead mining tenement M59/117. The third area, Reids Ridge mine site, is discussed in a separate Douglas report (reference: 224768.00.R.002.Rev0). Commodore is located approximately 800 m northwest of Reids Ridge and Reids North is 1,800 m north-northeast of Reids Ridge. The unnamed mine features (Features

20, 21 and 22) are located between Reids Ridge and Commodore, 210 m northeast of the Reids Ridge. Drawing 1 in Appendix B provides a site locality plan and the location of the three mining areas relative to the boundary of dead mining tenement M59/117.

Drawings 2 to 4 in Appendix B respectively show aerial views of the Commodore, Reids North and unnamed features areas, together with the locations of the mining features within each area.

2.2 Desktop Information

2.2.1 Sources of Information

A search of publicly available desktop information regarding Commodore and Reids North mining features was undertaken as part of this study, including the following relevant databases managed by DEMIRS:

- WABMINES: inventory of abandoned mines.
- MINEDEX: database of mines and mineral deposits.
- TENGRAPH: database of mining leases.

Other publicly available resources, such as historical 'bulletins' published by the Geological Survey of Western Australia and various historical local newspaper articles were also reviewed but yielded little relevant information.

Results of the review indicates that published information regarding the Commodore and Reids North is relatively limited, which is consistent with the relatively small features presently observed in these two mining areas. Commodore is cited in a few sources, however no specific historical references to Reids North was identified. It is noted that another, larger 'Commodore Gold Mine' existed near Meekatharra with numerous references in historical records but irrelevant to the present study.

2.2.2 Commodore

The available literature indicates that mining in the area begun in the 1910's, with records of gold produced from Commodore starting in 1910 and production from the nearby Reids Ridge (formerly known as '*Rose Marie*' gold mine) starting in 1936. A list of cancelled gold mining leases from 1953 indicate that production at Commodore had ceased by 1921, with about 750 tonnes of ore treated at the nearby Warriedar state battery over the associated 11 years of production, for about 800 ounces (about 20 kg) of gold produced following treatment (some slight variation of these weights exists between sources of information reviewed).

Review of TENGRAPH indicates three historical gold mining leases over the 1900-1921 period centred along the present Commodore site: GML 59/588, GML 59/588, and GML 59/588 from which the aforementioned ore was produced (MINEDEX).

Some relevant information was identified from an exploration drilling report from 1985 (Carbon Gold Pty Ltd, 1985). It is noted that the document's main objective focussed on reporting drilling results rather than describing historical shafts, however some depth values were associated to existing shafts in a drilling plan included in this report: 25 m (Feature 2), 15 m (Feature 17), 20 m (Feature 9), 10 m (Feature 10), 20 m (Feature 11), +15 m (Feature 6), 15 m (Feature 11). The depths shown in this 1985 report are notably greater than the depths observed by Douglas during the

2024 investigation, with the deeper shafts shown in the 1985 document being 1.5 to 3 times deeper depths observed in 2024. It is noted that the 1985 depth values appear rounded and are possibly estimated rather than measured, and therefore should be considered with caution.

The 1985 document shows a shaft (marked "*6 m deep, caved*") near present Feature 3 and not assessed during the 2024 investigation. An extract of the 1985 drilling plan is included in Drawing 9, Appendix B and the location of this feature (Feature 3a) is included on Drawing 2, Appendix B and will be considered in the rehabilitation study.

Features not included on the 1985 plan but evident in the field in 2024 include Features 5 and 8, therefore suggesting the possible recent formation of these features, either from the possible roof collapse of shallow workings or recent excavation, as further discussed in this report.

2.2.3 Reids North

No historical tenements centred on the Reids North site are recorded in TENGRAPH, and the first mineral claim (MC 59/7253) that includes this location covers a wider area and was applied in the 1970s (noting the mining features at Reids North appear pre-1970's from field observations).

No specific reference relating to the Reids North mining site was identified in the published literature reviewed as part of this study. In particular, no records of gold production and no reference of Reids North is made in the 1953 list of gold mines (Department of Mines, 1953) previously discussed (Section 2.2.2).

It is noted that a 'mining prospect' (referenced "*MOPOK*") is recorded in MINEDEX adjacent to Reids North site, however, it comprises some 2023 exploration drilling without significance for this study.

2.2.4 Southern Unnamed Features (Features 20, 21 and 22)

The southern unnamed mining features (Features 20, 21 and 22) are located south of the three historical mining leases covering Commodore previously discussed and within the extent of a mining tenement granted in 1939, suggesting the possible later age of these features, possibly concurrent to the nearby Rose Marie mining operations.

A recent ASX announcement (ANOVA Metals Limited, 2022) includes a sketch that shows two vertical shafts, one being continued by a lateral working, possibly 10 m to 20 m deep, at the location of the unnamed features. It is highlighted that the basis of this sketch is unknown and therefore its accuracy should be considered with caution.

Some apparently more detailed information was identified from the previously discussed 1985 exploration drilling report (Carbon Gold Pty Ltd, 1985), in which a zone intercepted within an inclined borehole adjacent to the unnamed features is interpreted as a backfilled stope or shaft at a vertical depth of 23 m beneath the unnamed features. Furthermore, Douglas' interpretation of the reported drilling records regarding another nearby borehole suggest that no backfilled void (stope or shaft) was intercepted at a depth of about 35 m beneath the approximate same location, thus possibly bounding the maximum depth of a backfilled stope at that location to less than 35 m. Also, although feature depths shown in the 1985 report should be considered with caution (as discussed in Section 2.2.2), a maximum visible depth of "*approximately 15 m*" for the workings is discussed in the text of the report at the time of the 1985 drilling, noting however a

possible inconsistency within the report that the deepest feature shown on the drilling plan is a 6 m deep surface stope (filled with rubbish). The drilling plan extracted from this report is included in Drawing 12, Appendix B.

In summary, desktop information regarding the southern unnamed features (Features 20, 21 and 22) indicates the likely occurrence of deep shaft(s) and near vertical stope(s) at that location, to depths of possibly 20 m to 30 m approximately, and partially backfilled with soils and rubbish.

2.2.5 Published Geology

The 1:100,000 Ninghan geological sheet (Ivanic, 2018) indicates that the Commodore site, together with the nearby Reids Ridge and Rose Marie mine sites, are located within colluvium adjacent to both:

- Archaen basalt (symbol ANOs-bb) of the Norie Group, described as '*locally pillowed; thin hyaloclastic or siltstone horizons, metamorphosed*', and
- Archaean gabbro (AAAWog) of the Warriedar Suite described as '*Gabbro; locally includes layers of leucogabbro, gabbronorite, dolerite, minor pyroxenite and pegmatite gabbro; metamorphosed*'.

The non-mineralised bedrock at Reids Ridge is described as 'metabasalt' (WATKINS K, 1990).

Reids North is mapped within Cenozoic ferruginous duricrust (R_rf) described as '*massive to rubbly; includes iron-cemented reworked product*', overlying Archaean Basalt (ANOs-bb) described as "*locally pillowed; thin hyaloclastite or siltstone horizons; metamorphosed*".

The above published descriptions are consistent with Douglas' field observations.

2.3 Field Observations from Ground Surface at Commodore

The Commodore mining area comprises a roughly linear group of mine features (Features 1 to 13), 190 m in length, aligned in the general orientation of the mineralised lode that was mined at the nearby Reids Ridge (understood to be associated with the Warriedar Fault). An aerial view of the features is provided in Drawing 2, Appendix B.

A natural drainage line likely flowing intermittently intersects the line of features. Evidence of erosion and sediment transport towards and into some of the features, specifically into Features 4, 4a, 8 and 9, were noted during the 2024 field investigation by Douglas. Surface water possibly also intermittently enter Feature 11c, based on field observations.

The features at Commodore range from less than 1 m deep (Features 12, 12a and 13) to 16 m deep (Feature 2) and can generally either be described as follows:

- Shallow exploratory holes and costeans – Features 1, 3, 4, 11a, 11b, 12, 12a and 13.
- Relatively shallow (generally less than 5 m) and wide excavations, partially collapsed, with lateral workings parallel to the lode – Features 4a, 5, 5a, 7, 8 and 9.
- Vertical shafts with no or limited visible lateral working – Features 2, 6, 10, 11 and 11c.

At the time of the investigation, Feature 5a was partially backfilled with rubbish including glass, metal, tin, cardboard, plastic, rope, brick and machine parts.

Relatively shallow underground lateral workings were observed linking Features 5a-5-6 and Features 7-8-9. Field observations and their absence on a plan from 1985 (Carbon Gold Pty Ltd, 1985) suggest that the present Features 5 and 8 result from the likely collapse (or possible excavation) of shallow horizontal workings roof, sometimes between 1985 and present.

Dimensions and pertinent details of each observed feature are provided in Table 2 in Section 4.6 of this report.

Three main but relatively small waste rock heaps, with a cumulative volume of say 30 to 50 m^3, were noted within 50 m of the line of features, and mostly comprised fine to coarse clayey cobbly gravel and clayey silty gravel with sand and cobbles (terminology in accordance with the geotechnical standard (AS 1726, 2017)).

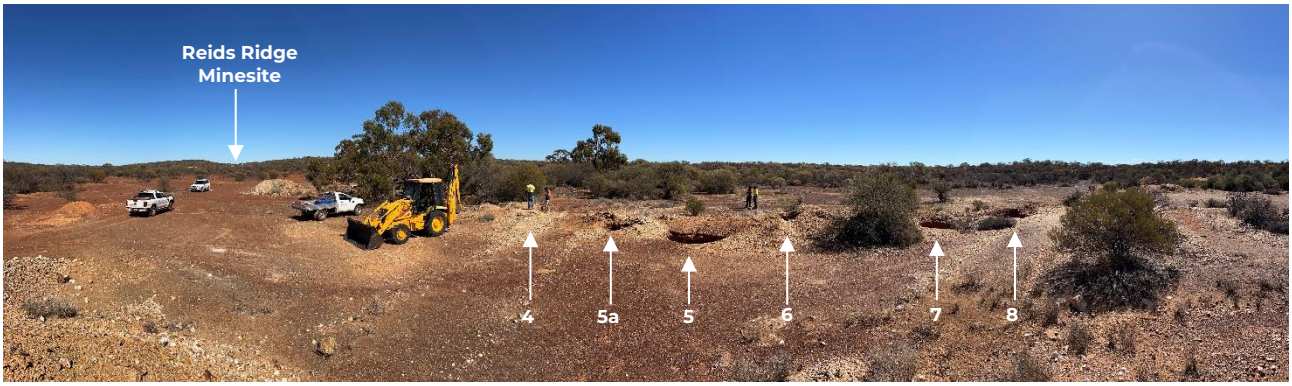


Figure 1: Commodore mining area (facing southwest – Features 4 to 8 visible)

2.4 Field Observations from Ground Surface at Reids North

The Reids North mining area comprises a cluster of five identified mining features (Features 14 to 18), all within 100 m of each other. An aerial view of the features is provided in Drawing 3 in Appendix B.

The features are mostly shallow, vertical with observed depths ranging between 1 m and about 4 m. Each feature appears independent from another (ie with no evidence of lateral connections) nor was there any clear relationship between the feature locations. Some limited lateral continuation, further described in Section 4.1.1, can be seen at the base of Feature 14.

Mullock heaps, essentially located around the shaft openings, comprised sandy gravel with cobbles and silt, with an estimated cumulative volume of 60 to 70 m^3.

Features 16 and 18 were partially backfilled with rubbish.

Figure 2: Reids North area. Feature 17 facing northwest.

2.5 Field Observations from Ground Surface at Features 20, 21 and 22

This area comprised three mining features along a 15 m alignment, located 210 m northeast of the Reids Ridge mine site. These features are located on the same alignment as both the Reids Ridge Mine and Commodore workings, targeting the same lode. Open stope and lateral workings linked the three features together. An aerial view of the features is provided in Drawing 4 in Appendix B.

At the time of the investigation, the three features and lateral workings were backfilled with rubbish, mostly to a level approximately 2.5 m below the natural surface, in turn preventing significant observation or measurement of these workings at greater depths. The visible base of these features at the time of the field work was up to 8 m, noting however that various desktop information suggests deeper historical shafts and lateral workings at this location, including an interpreted backfilled stope or shaft intercepted during exploration drilling at 23 m depth beneath the feature footprints.

Figure 3: Features 20, 21 and 22 (facing north - excavation in progress within Feature 21)

3. Field Work Methods

The field work was carried out under a Safety Management Plan which incorporated measures to manage safety when working around the features and bush fire risk.

Field work to assess the condition of Commodore, Reids North and Features 20, 21 and 22 was undertaken from 15 to 19 of April 2024 and comprised the following:

- A walkover survey and visual inspection of each feature from ground surface, by an experienced Geotechnical Engineer and a Principal Geotechnical Engineer from Douglas assessing the general condition of the features and potential for interconnection.
- Excavation using an 8 tonne backhoe with a 450 mm wide toothed bucket. For features where a safe location for backhoe placement was within reach of the feature, excavation was undertaken within the features to assist in the assessment of the following:
  - The condition/strength/density of the base of the feature; and
  - the likelihood that the base of the feature was either natural soil/rock or competent ground.
- Photos and video footage within all open voids and surrounding area.
- LiDAR scanning of open shafts and open stope and their surrounds.

- Geophysical survey of the areas surrounding the features to assess the subsurface profile for potential anomalies that may be indicative of shallow voids related to mine activity.
- Monitoring for noxious or flammable gases within features; and
- Material that was excavated from the features during the field assessment was replaced immediately following the completion of logging.

The LiDAR scanning was undertaken using a Hovermap Platform and utilised Simultaneous Localisation and Mapping (SLAM) based LiDAR technology. Data were collected using a combination of hand-held and winch mounted scanning methods that were subsequently stitched together into a single, spatially correct model to provide accurate data on the spatial relationship between the features as well as dimensions and volumes of each feature. Douglas engaged the services of specialist contractors, MineLiDAR to undertake this work.

A geophysical survey comprising two methods was undertaken in the vicinity of the features. The methods used comprised:

- Electrical Resistivity Tomography (ERT) – to obtain subsurface electrical resistivity models to a target depth of 15 m; and
- Ground Penetrating Radar (GPR) using 80 MHz antennas to obtain subsurface reflection imagery to a target depth of 10 m.

The data was collected then results analysed by specialist geophysical consultants GBG Group. Relevant results are considered in the following sections of this report. The geophysical survey report, including details about survey lines and results, are provided in Appendix D.

The gas monitoring was undertaken using a Ventis MX4 portable multi gas monitor with pump attachment capable of detecting carbon monoxide, hydrogen sulphide and oxygen concentrations and the lower explosives limit (LEL). The unit was lowered to the base of each feature and air was sampled directly into the unit.

4. Results of Desktop and Field Assessment

4.1 Description of Mine Features and their Stability

Based on the desktop information, visual field observations, photos, video recordings, LiDAR data and geophysical survey interpretation, descriptions of the features observed at the Commodore and Reids North areas as well as Features 20, 21 and 22 are provided in this section.

For consistency, the feature labelling adopted in this report for the Commodore and Reids North areas follows the nomenclature adopted in the previously completed Aboriginal Cultural Heritage survey report. Additional features identified by Douglas were given the suffix a, b, c as required or sequentially added (e.g. features 20, 21 and 22). Feature 19 as detailed in the Aboriginal Cultural Heritage survey was located outside of the site boundaries and therefore, is not part of this study.

To assist with the description:

- The observed extents in plan view of the mine features, together with recommended access restriction zones, are shown on aerial views of the features in Drawings 9 to 11 in Appendix B.

- 3D representations of the features are provided in Drawings 5 to 8 in Appendix B.
- Photos, at ground surface and into the features, are included in Appendix C.

Ground stability , including under pedestrian traffic, is also discussed below for each feature, and the recommended access restriction zones are illustrated in Drawings 9 to 11 in Appendix B. Vehicular access is discussed separately for all features in Section 4.1.4.

4.1.1 Commodore

Feature 1

A shallow shaft with a short length of lateral working heading in a southerly direction. Meaning approximately 3.5 m x 3.5 m in plan view at ground surface, narrowing to 0.7 m x 2.0 m near its base at 3.1 m depth. The visible length of the lateral working is 2.3 m. No visible interconnection with other features (Drawing 2).

Owing to its shallow depth, the vicinity of this feature is not considered to pose any significant safety risk to pedestrian other than slip, trip and fall on the gravelly sloping internal face of the mullock heap surrounding the feature opening. Ground beyond 2 m on each side of the feature opening at ground level is considered stable with no risk of subsidence under pedestrian traffic (Drawing 3).

Feature 2

A 16 m deep vertical shaft, 1.0 m x 1.5 m in plan view, mostly free of timbering reinforcement inside other than occasional stulls and a timber structure constructed on the northern wall of the shaft at the base. The purpose of the structure is not clear, however it appears to be retaining cobble sized rocks. No lateral working or interconnectivity with other features is visible. The original timber collar at ground surface has mostly decayed and collapsed, leaving a few remnant timbers in poor condition.

Owing to its depth, this feature presents some significant safety risks (from slip, trip and fall) for pedestrians that are in the immediate vicinity of the shaft collar. However, the shaft itself appears relatively stable with no evidence of notable collapse. Ground 2 m away from the shaft opening is considered stable with no risk of subsidence.

Feature 3

A shallow shaft, approximately 1.7 m wide at surface, narrowing to 1.0 m x 1.5 m with depth. Erosion of some edges of the feature indicates that surface water seasonally flows into this feature. Prior to disturbance from the geotechnical investigation, this feature was observed to be 1.3 m deep. Owing to its apparently looser condition, the material at the base of the shaft was inferred to be backfill or sediments from run-off water. No clear change in condition was observed within the material excavated to 2.5 m, indicating that the original base of this feature is potentially deeper than 2.5 m.

Excavation in the base of this shaft undertaken to a depth 2.5 m exposed a potential eastward lateral working beginning from a depth of 2.0 m. Further excavation was undertaken from ground surface along the possible alignment of the lateral working, in an attempt to intercept the

working, however owing to hard ground, backhoe refusal was experienced at a depth of 1.8 m below ground surface, i.e above the lateral working.

The feature has been mostly backfilled at the end of the intrusive assessment during Douglas field investigation. The lateral continuity identified, owing to its small dimension observed and the hard ground cover, is not considered to present a significant risk of subsidence. Ground 2 m away from the original shaft opening is considered stable under pedestrian traffic with no risk of subsidence.

Feature 3a

This feature was identified from a drilling plan (Carbon Gold Pty Ltd, 1985) indicating a shaft "*6 m depth, caved*" in 1985. This possible former shaft was not observed during the geotechnical investigation, and therefore would be presently backfilled. It is considered prudent to discourage access to the immediate vicinity of this feature (shaft envelope + 2 m clearance). Its approximate location is shown on Drawing 9. The rehabilitation programme at Commodore should consider this feature (including identifying its exact location).

Feature 4

A shallow, 1.7 m x 1.9 m wide, 1.2 m deep shaft. Interpretation of the excavation undertaken to a depth of 1.9 m in the base of the feature suggested natural ground conditions were encountered, indicating this feature is shallow.

Owing to its shallow depth, this feature does not present significant safety risks to pedestrians. Ground 1.5 m away from the feature is considered stable, including for pedestrian traffic (this clearance considers unlikely but possible localised collapse of the vertical faces of the feature).

Feature 4a

A wide and shallow excavation, measuring approximately 4 m x 6 m wide and 1.5 m deep. Interpretation of the excavation undertaken to a depth of 2.5 m in the base of the feature suggested natural ground conditions were encountered, indicating this feature is shallow.

The Feature 4a presents no specific risk of subsidence other than possible localised collapse of its vertical faces. Ground 2 m away from the excavation edges is considered stable for pedestrian traffic.

Feature 5

A 2 m x 3 m wide, 2.7 m deep excavation with lateral workings on either the southern and northern ends linking this feature to the neighbouring features (5a and 6). No excavation was undertaken in this feature owing to the base being beyond the reach of the backhoe.

A shallow underground lateral working links Features 5, 5a and 6. As previously noted, Feature 5 (not described in 1985) possibly results from the collapse of this lateral working between the present Features 5a and 6. Therefore the ground between these three features should be considered unstable with risk of collapse with and without pedestrian traffic, and therefore must not be accessed. In addition to the ground between features, ground within 2 m from the openings at ground level of Features 5 and 5a, and 3 m from the opening at ground level of

Feature 6 should be associated with a risk of collapse, with no access to pedestrians (unless specific safety provisions, such as fall-arrester, are implemented). Ground beyond the above-mentioned zone is considered stable.

Feature 5a

A 1.9 m x 2.5 m wide, 2.0 m deep shaft, partially backfilled with refuse including burnt material, glass, tins, cardboard, plastic, rope brick and machine parts. A 1.2 m wide lateral working on the northern side links to Feature 5. LiDAR data and visual observation indicates that the roof of the lateral working is approximately 1.5 m thick.

Ground stability is discussed under Feature 5.

Feature 6

A 1.2 m x 3.2 m at surface, narrowing to 0.6 m x 1.7 m, 5.3 m deep vertical shaft, with some dilapidated remnants of a timber shaft collar. Lateral working, 1.7 m wide and approximately 1.5 m in height on the southern side links to the base of Feature 5 to a point near the base of Feature 6, and a lateral working was observed to extend 3.9 m north from the base of the shaft, deepening the excavation an extra 0.9 m.

Ground stability is discussed under Feature 5.

Feature 7

A 2.3 m wide, 3.9 m deep, approximately circular excavation at surface, widening to 4.8 m at the base (resulting in an overhang of up to 1.5 m). A 1.5 m wide, approximately 1 m high lateral working on the northern side links to the adjacent Feature 8. LiDAR data and visual observation indicate that the roof thickness above the lateral working is approximately 2.5 m. No excavation was undertaken in this feature owing to the base being beyond the reach of the backhoe.

Similar to Features 5, 5a and 6, Features 7, 8 and 9 are linked by a relatively shallow lateral working, and Feature 9 (not recorded in 1985) possibly results from a collapse of this void roof. It is also noted that surface run off is captured into these features, exacerbating possible instability, such as evidenced by relatively deep undermining of the features resulting in overhangs of up to 3 m with a very thin ground cover. As a result, the ground between the openings of Features 7 to 9 should be assumed to be instable with risk of collapse, with or without pedestrian traffic, together with the thin cover of ground extending up to 4 m to the east of the features, and 2 m to the west of the features. The ground outside this zone is considered stable, with no risk of collapse under pedestrian traffic.

Observed scouring of some edges of these features (specifically 8 and 9) indicates that surface water occasionally flows into these features, which favours a future extension of the ground instability zone over time. It is suggested to assume that the zone of ground instability around these features could grow by say 1 m to 2 m every 5 years, largely depending on the intensity of rain events over the period.

Feature 8

A 2.4 m x 4.8 m at surface, 4.5 m deep excavation, widening to 3.7 m x 4.8 m at the base (resulting in an overhang of up to 1 m). Lateral workings on either the southern and northern ends linking this feature to the neighbouring features (7 and 9). No excavation was undertaken in this feature owing to the base being beyond the reach of the backhoe.

Potential for subsidence is discussed under Feature 7.

Feature 9

A 1.8 m x 2.5 m at surface, 4.1 m deep excavation, widening to 5.0 m x 6.1 m at the base (resulting in an overhang of up to 2.7 m). A 1.2 m wide lateral working links to Feature 8. Bird nests were observed on the underside of the overhang on the eastern side of the feature (photo 22 in Appendix C). No excavation was undertaken in this feature owing to the base being beyond the reach of the backhoe.

Potential for subsidence is discussed under Feature 7.

***Feature* 10**

A 1.2 m x 1.5 m wide, 8.4 m deep vertical shaft, with no timbering reinforcement, with lateral workings from approximately 4 m depth, observable to be 2.5 m long in the northern and southern directions, and another extension of the shaft, 1.3 m long, in the eastern direction at the base of the shaft, deepening the feature to 9.7 m in total. The shaft collar is in very poor condition and mostly collapsed. A small mullock heap (less than 1.2 m height) surrounds the shaft collar. Fallen debris, comprising collapsed soil apparently mostly from the upper part of the shaft, and fallen timber from the shaft collar, is mounded at the base of the shaft.

The immediate surroundings of this feature should be assumed to be instable, without and with pedestrian traffic, within a zone extending 5 m to the north and south of the shaft opening, and 2 m to the east and west. Ground outside this zone is considered stable under pedestrian traffic. The gravelly mullock heap (whose extent is included within the above zone) surrounding the shaft opening poses a risk of slip, trip and fall, and therefore poses significant safety risk to pedestrians owing to the depth of the shaft.

***Feature* 11**

A 0.7 m x 1.5 x wide, 5.1 m deep vertical shaft with a prominently raised mullock heap/bund around the shaft collar approximately 2 m in height. It is inferred the purpose of the bund was to prevent surface water entering the shaft that is located near a natural drainage line adjacent to the west. The feature widens to 1.9 m x 2.6 m at the base, with no evidence of lateral workings. The upper 2.5 m of the shaft (i.e. to slightly below the base of the mullock heap) is timbered, with the remaining lower part of the shaft unsupported. The base of the shaft is masked by loose debris (fallen soils), inferred to have collapsed from between the timbering in the upper part of the shaft. The unsupported lower part of the shaft shows no notable sign of instability.

The steepness and height of the gravelly mullock surrounding the shaft collar poses significant risk of slip, trip and fall into this deep feature. Also, the shaft collar together with the timbering of the upper part of the shaft are significantly degraded and pose a risk of collapse. Therefore

pedestrian trafficking onto the mullock mound presents some significant safety risk. The ground beyond the footprint of the mullock mound, ie. 3 m away from the shaft opening, is considered stable with no significant risk of collapse under pedestrian traffic in most directions, except towards the southwest where the mullock footprint intersects Feature 11c, and therefore where the combined zone of ground instability for these two features should be considered.

***Feature* 11a**

A 2.3 m wide, 1.1 m deep, approximately circular excavation. Interpretation of the excavation undertaken to a depth of 2.1 m in the base of the feature suggested natural ground was encountered, indicating this feature is shallow.

Owing to its shallow depth, this feature presents little safety risks to pedestrians. Ground 1 m away from the edges of the feature is considered stable, including for pedestrian traffic.

***Feature* 11b**

A rectangular feature, measuring approximately 2.4 m x 6 m wide and 1.2 m deep. The excavation grades back to natural surface on the eastern side over an additional distance of approximately 6 m, indicating the excavation may have been made with a front-end loader or similar. Interpretation of the excavation undertaken during the geotechnical assessment to a depth of 2.4 m in the base of the feature suggested that natural ground conditions were encountered from a depth of 1.7 m, indicating this feature is shallow. This feature is interpreted to be part of a costean that was excavated further to the west, roughly perpendicular to the lode.

Owing to its shallow depth, this feature presents little safety risks to pedestrians. Ground 1 m away from the feature is considered stable, including for pedestrian traffic.

***Feature* 11c**

A 2.4 m wide, 6.4 m deep, approximately circular excavation, widening to up to 4.5 m below ground (resulting in an overhang of up to 1.7 m on its southern side). Bird nests were noted under this overhang during the review of the video recordings (photos 33 and 34 in Appendix C). The roughly circular shape of this inferred originally rectangular feature results from the collapse of the side walls of the shaft, with a mound of debris (soil and timber) visible at the base of the shaft. No evidence of lateral workings was observed. No excavation was undertaken in this feature owing to the base being beyond the reach of the backhoe. Although no significant ground scouring was noted at ground surface around this feature, field observations suggest that intermittent sheet flow of surface of water enters this feature.

This relatively deep feature shows evidence of wall instability, and therefore a clearance of 3 m is recommended from its opening, in most direction, extended to 4 m to the south. The ground beyond this zone is considered stable for pedestrian traffic.

Owing to surface water possibly entering this feature and exacerbating its erosion, it is recommended to assume that the zone of ground instability around this feature could grow by up to 2 m every 5 years, largely depending on the intensity of rain events over the period, unless surface flow is diverted away from the feature.

***Feature* 12**

A shallow, 1.1 m x 1.6 m wide, 0.8 m deep excavation. Interpretation of the excavation undertaken to a depth of 1.5 m in the base of the feature suggested natural ground conditions were encountered, indicating this feature is shallow.

Owing to its shallow depth, this feature is considered to present little risk to pedestrian traffic. A 1.5 m clearance from its edge is recommended from field observations to consider unlikely localised excavation wall instability.

***Feature* 12a**

A 4.7 m wide, 1.1 m deep, approximately circular excavation. Interpretation of the excavation undertaken to a depth of 2.1 m in the base of the feature suggested natural ground conditions were encountered, indicating this feature is shallow.

Owing to its shallow depth, the vicinity of this feature is not considered to pose any significant safety risk to pedestrian other than slip, trip and fall on the gravelly sloping faces of the mullock surrounding the feature. The ground 1 m away from the excavation edge is considered stable.

***Feature* 13**

A 1.8 m x 2.3 m wide, 0.8 m deep excavation. Interpretation of the excavation undertaken to a depth of 1.7 m in the base of the feature suggested natural ground conditions were encountered, indicating this feature is shallow.

This shallow feature is considered to present little risk to pedestrian traffic. A nominal safety buffer of 1 m is suggested to consider localised excavation wall instability.

4.1.2 Reids North

***Feature* 14**

A 1.2 m x 1.7 m wide, 2.8 m deep unsupported shaft with a 1.1 m wide, lateral working dipping at 40 degree in a north-northeast (bearing 25°) from the base of the shaft. The lateral working widens to 4 m and extends for a visible length of 8 m from the vertical shaft resulting in a total depth of 7.1 m from surface (Drawing 3). Some remnants of timbering in very poor conditions support the upper 0.5 m of the shaft. This feature is surrounded by a mullock heap, up to approximately 1.5 m height.

Considering the generally poor conditions of the upper part of the shaft and the horizontal underground development beneath a significant cover of strong ground, the ground is considered stable under pedestrian traffic 2.5 m away from the shaft opening in most directions - consequently the ground is stable beyond the envelope of the mullock mound - extended to 4 m in a northeast direction above the lateral working (Drawing 10). One main safety risk to pedestrian around this feature is slip, trip and fall owing to the loose gravelly surface of the mullock heap surrounding the shaft.

***Feature* 15**

A 1.0 m x 2.0 m wide, 0.8 m deep excavation. Interpretation of the excavation undertaken to a depth of 1.8 m in the base of the feature suggested natural ground was encountered, indicating this feature is shallow.

This feature presents little safety hazards. A nominal clearance of 0.5 m is suggested for pedestrian traffic.

***Feature* 16**

A 1.8 m x 2.1 m wide, 1.3 m deep excavation, partially backfilled with refuse including bottles, plastic, cans and metal. Excavation was undertaken from the base to a depth of 2 m with site access constraints and adjacent vegetation preventing deeper assessment. Probing within the excavation (below the surface of the refuse) indicated that competent ground possibly occurred from 2.2 m depth. The size of the mullock heap surrounding this feature is small and, together with the rock type (mostly lateritic) of the mullock, suggest a small volume of excavation.

Ground 1.5 m away from the edge of this feature is considered stable to pedestrian traffic.

***Feature* 17**

A 0.75 m x 1.3 m wide, 3.9 m deep vertical shaft, mostly unsupported other than some dilapidated remnants of collar shaft timber in very poor conditions, and no evidence of lateral workings. The shaft generally appears stable other than its upper 1 m owing to the dilapidated collar. The base of the shaft comprises loose gravel (inferred collapsed from collar level) with some rubbish (several plastic containers of various sizes). The feature is surrounded by a mullock heap, up to approximately 1 m heigh.

The ground 2.5 m away from the shaft, i.e. beyond the mullock footprint, is considered stable for pedestrian traffic. One main safety risk to pedestrian around this feature is slip, trip and fall owing to the loose gravelly surface of the mullock heap surrounding the shaft.

***Feature* 18**

A 1.2 m x 1.8 m wide, 1.1 m deep excavation, with some dilapidated remnants of a timber shaft collar. The shaft was partially backfilled with refuse including bottles, tyres, rope, plastic, cans and metal. Excavation was undertaken into the rubbish forming the visible base of the feature at approximately 1 m depth at the start of testing, with limited room to work with the backhoe bucket resulting in termination of testing at a depth of 3.1 m. Base of shaft is inferred to be between 3 m and 4 m depth based on the assessment of the spoil recovered from the shaft and the size of the mullock heap surrounding the shaft (less than 0.5 m height). No evidence of lateral workings was observed.

This feature is assessed to be relatively shallow. It has been mostly backfilled following its assessment during the field work by Douglas. The ground 2 m away from the feature opening is considered stable.

4.1.3 Features 20, 21 and 22

The features are general interpreted likely be a single, linked below ground stope with three openings visible at ground surface. The width of the stoping ranges from 1 m near the surface to up to 2.7 m at a depth of 6.4 m in Feature 22 (Drawing 4). Desktop information suggests that a possible backfilled stope was intersected at 23 m vertical depth beneath these features footprints during exploration drilling (Carbon Gold Pty Ltd, 1985).

***Feature* 20**

A 1.6 m x 1.7 m wide, 2.9 m deep excavation, partially backfilled to 2.9 m from the surface with refuse including bottles, drums, rope, plastic, cans and metal. A lateral working linking to Feature 21 to the north is visible.

***Feature* 21**

A 2 m x 6.8 m wide, 2.7 m deep excavation, partially backfilled to within 1 m of the surface with refuse including bottles, drums, rope, plastic, cans and metal, with lateral workings on its southern and northern ends linking this feature to the neighbouring features (20 and 22). Excavation was undertaken within the centre of the feature to 3.2 m depth and terminated within refuse indicating it extends deeper. The lateral link to Feature 20 to the south begins from a depth of 2.3 m and the link to Feature 22 to the north begins from a depth of 4 m.

***Feature* 22**

A 1.1 m x 2.6 m wide, 7.7 m deep excavation, with refuse visible at the base. Laterally connected to Feature 21 to the south.

Ground Stability near Features 20, 21 and 22

Results of the assessment indicates that Features 20, 21 and 22 form a single mining feature, likely a near vertical stope backfilled at depth and subsequently used as a rubbish dump. The presence along this stope of open vertical shaft(s) masked by the rubbish cannot be precluded.

Based on the available information and considering the observed strong conditions of the natural ground surrounding the features, the ground is considered stable for pedestrian access within 2 m of the present feature openings at ground surface. Pedestrian access is not considered safe between individual openings of this group of features. The pedestrian access restriction zone is illustrated in Drawing 11, Appendix B.

4.1.4 Ground Stability for Vehicular Access (All Mining Areas)

For the purpose of discussing ground stability in this section, '*vehicular traffic*' is assumed to comprise highway-type vehicles such as typical 4x4 vehicles and small truck or similar up to 5 tonne in mass. Specific assessment would be required for other vehicles or machinery.

Considering the strong natural ground conditions adjacent to the features, it is considered that the ground near the features in all areas (Commodore, Reids North and Features 20, 21 and 22) is stable under vehicular access under the following conditions:

A. Within a distance from the features that is at least 2 m beyond the limit of ground considered stable under pedestrian access (detailed in Sections 4.1.1 to 4.1.3); and

B. Within a distance from the features that is at least 2 m away from any underground lateral extent of the features shown on Drawing 2 to 4, Appendix B; and

C. At the Commodore mining area, outside a 15 m wide corridor between individual feature, with the following exceptions where the ground can be assumed to be stable under vehicular access between features:

    a. Stable ground between Features 1 and 2 (providing Conditions A and B above are met);

    b. Stable ground between Features 9 and 10 (providing Conditions A and B above are met);

    c. Stable ground between the group of Features 11 (including 11, 11a, 11b, and 11c) and Feature 12a.

The resulting vehicular access restriction zones around features is illustrated for each mining area in Drawings 9 to 11, Appendix B.

4.2 Gas Meter Monitoring

A Ventis MX4 gas monitor was lowered to base of each feature. No abnormal or harmful gas concentrations were detected. The monitor assessed oxygen, carbon monoxide, hydrogen sulphide and lower explosive limit (LEL) levels.

4.3 Evidence of Fauna

Bird nests were observed on the underside of overhanging ground in Features 9 and 11c via camera lowered into the features (photos 22, 33 and 34 in Appendix C). No other evidence, such as smell, guano or other excrements, were noted during the field work by Douglas.

4.4 LiDAR Volumes

The visible volume of each feature, i.e. the volume of all areas visible to the LiDAR scanning equipment as shown in Drawings 5 to 8 (Appendix B), are summarised in Table 1 below. It is highlighted that some features in the table include some lateral workings whose parts may have been locally beyond the detection capabilities of a LiDAR scanner. Therefore, the observed volumes in Table 1 represent a lower bound of total voids.

Table 1: LiDAR detected and estimated volumes

Feature	Volume (m^3)
1	14.3 [1]
2	47.8 [1]
3	<5 [2]
4	<5 [2]
5	69.2 [1]
4a	40 [2]

Feature	Volume (m^3)
5a	10 [2]
6	41.6 [1]
7-8-9	126.8 [1]
10	47.1 [1]
11	21.5 [1]
11a	8 [2]
11b	25 [2]
11c	42 [1]
12	21 [1]
12a	7 [1]
13	<5 [2]
14	27.4 [1]
15	<5 [2]
16	<5 [2]
17	9.2 [1]
18	5.5 [1]
20-21-22	85 [1]

Note [1]: Visible volume captured by LiDAR.
[2]: Field measurements and visible assessment by Douglas field personnel.

4.5 Geophysical Survey Results

Following data interpretation by GBG Group, no geophysical anomalies were identified in the geophysical data collected around Commodore, Reids North or Features 20, 21 and 22.

The locations of data collection alignments and details on the methods and results are provided in the plan in the geophysical survey report, included in Appendix D.

4.6 Summary of Field Work Data, Observations and Interpretation

The table on the following pages summarises the pertinent information collected and interpreted regarding the Commodore and Reids North areas and Features 20, 21 and 22.

Table 2: Summary

Feature	Dimensions[1] (LxWxD) (m)	Volume (m^3)	Lateral Working Observed	Gas Detected	Fauna Detected
1	3.5 x 3.5 x3.1	14.3	2.3 m long in a southerly direction	No	No
2	1.0 x 1.5 x 16.0	47.8	No	No	No
3	1.7 x 1.7 x >2.5	<5	Possible lateral working beginning from 2.0 m depth, heading in an easterly direction.	No	No
4	1.7 x 1.9 x 1.2	<5	No	No	No
5	2.0 x 3.0 x 2.7	69.2	On southern and northern side of the feature linking to 5a and 6 respectively	No	No
4a	4 x 6 x 1.5	40	No	No	No
5a	1.9 x 2.5 x 2.0	10	On northern side, linking to Feature 5	No	No
6	1.2 x 3.2 x 5.3	41.6	On southern side linking to Feature 5	No	No
7	2.3 x 2.3x 3.9-4.8	126.8	On northern side linking to Feature 8	No	No
8	2.4-3.7 x 4.8 x 4.5		On southern and northern side of the feature linking to 7 and 9 respectively	No	No
9	1.8-5.0 x 2.5-6.1 x 4.1		On southern side linking to Feature 8	No	Bird nests on underside of overhang
10	1.2 x 1.5 x 8.4-9.7	47.1	Multiple directions, up to 2.52 m in length, starting from a depth of approximately 4 m	No	No
11	0.7-1.9 x 1.5-2.6 x 5.1	21.5	No	No	No
11a	2.3 x 2.3 x 1.1	8	No	No	No
11b	2.4 x 6 x 1.2	25	No	No	No

Feature	Dimensions[1] (LxWxD) (m)	Volume (m3)	Lateral Working Observed	Gas Detected	Fauna Detected
11c	2.4-4.5 x 2.4-4.5 x 6.4	42	No	No	Bird nests on underside of overhang
12	1.1 x 1.6 x 0.8	21	No	No	No
12a	4.7 x 4.7 x 1.1	7			
13	1.8 x 2.5 x 0.8	<5	No	No	No
14	1.2 x 1.7 x 2.8-7.1	27.4	A 40° downward drive on a bearing of 25° for an observed length of 8 m	No	No
15	1.0 x 2.0 x 0.8	<5	No	No	No
16	1.8 x 2.1 x 2.2	<5	No	No	No
17	0.75 x 1.3 x 3.9	9.2	No	No	No
18	1.2x 1.8 x >3.1 (estimated likely to be less than 4 m deep)	5.5	No	No	No
20	1.6 x 1.7 x >2.9	85	On northern side linking to Feature 21	No	No
21	2.0x 6.8 x >4		On southern and northern side of the feature linking to 20 and 22 respectively	No	No
22	1.1 x 2.6 x >7.7		On southern side linking to Feature 21	No	No

Notes: [1]: Dimensions reference to where interpreted natural or competent material exists, not necessarily the depth of excavation or investigation.

Recommended zones beyond which ground is considered stable with no risk of subsidence for pedestrians and vehicles are illustrated in Drawings 9 to 11.

5. References

ANOVA Metals Limited. (2022, August 16). Strategic acquisition of high-grade Warriedar Gold Project - ASX announcement.

AS 1726. (2017). *Geotechnical Site Investigations.* Standards Australia.

Carbon Gold Pty Ltd. (1985, October). Reids Ridge Gold Mine Composite Plan.

Department of Mines. (1954). List of Cancelled Gold Mining Leases Which Have Produced Gold.

Geological Survey of Western Australia. (2018, June 29). 1:100 000 Geological Series Map, Ningham, WA Sheet 2339.

Gilbert Gokus Joint Venture. (2005). Notice of intent, Reids Ridge Mine - Payne's Find WA.

WATKINS K, H. A. (1990). *Geological Evolution and Mineralization of the Murchinson Province Western Australia.* Perth: Geological Survey of Western Australia.

6. Limitations

Douglas Partners Pty Ltd (Douglas) has prepared this report for this project at Reids Ridge abandoned mine site in accordance with Douglas' proposal dated 21 September 2023 and acceptance received via letter from the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) (letter Ref: DMIRS23250). This report is provided for the exclusive use of Department of Energy Mines Industry Regulation & Safety for this project only and for the purposes as described in the report. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of Douglas, does so entirely at its own risk and without recourse to Douglas for any loss or damage. In preparing this report Douglas has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after Douglas' field testing has been completed.

Douglas' advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by Douglas in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the (geotechnical / environmental / groundwater) components set out in this report and based on

known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. Douglas cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by Douglas. This is because this report has been written as advice and opinion rather than instructions for construction.

Appendix A

About this Report

About this Report

November 2023

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

continued next page

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

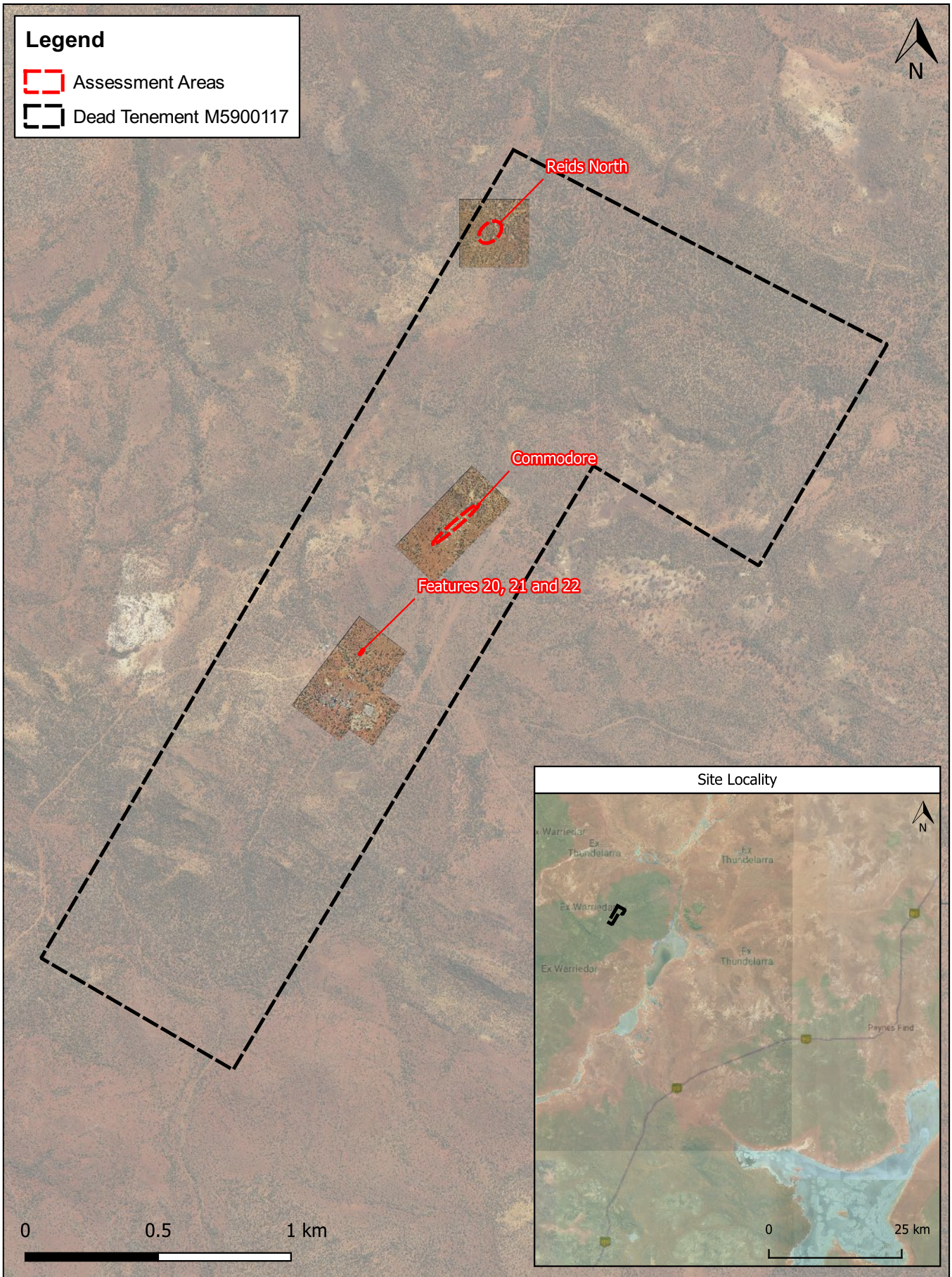
The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

intentionally blank

intentionally blank

Appendix B

Drawings 1 to 12



Douglas PARTNERS	**Site Locality** **Condition Assessment** **Reids Ridge Abandoned Mine Site (Commodore and Reids North)**	PROJECT: 224768.00 Drawing No: 1 REV: 0
	CLIENT: DEMIRS	DATE: 13/9/2024

Legend

- Commodore Features - Extent at Surface
- Commodore Features - Observed extent at Depth

Feature 1
Feature 2
Feature 3
Feature 4
Feature 4a
Feature 5
Feature 5a
Feature 6
Feature 7
Feature 8
Feature 9
Feature 10
Feature 11
Feature 11a
Feature 11b
Feature 11c
Feature 12
Feature 12a
Feature 13
Feature 3a (approx.)
See insert

Features 5 to 9 - Detail

0 5 10 m

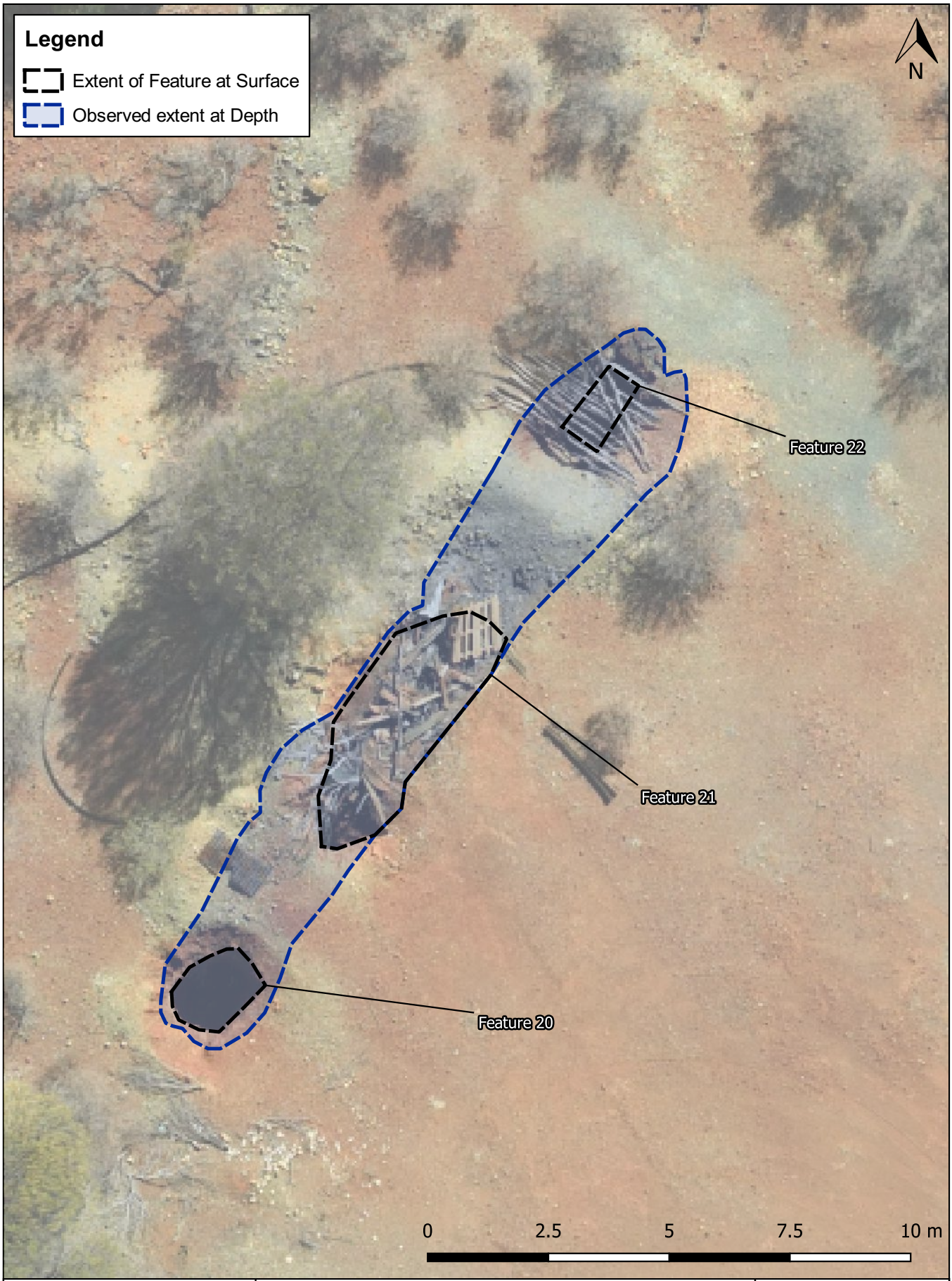
0 10 20 30 m

Commodore Features
Condition Assessment
Reids Ridge Abandoned Mine Site (Commodore and Reids North)

CLIENT: DEMIRS

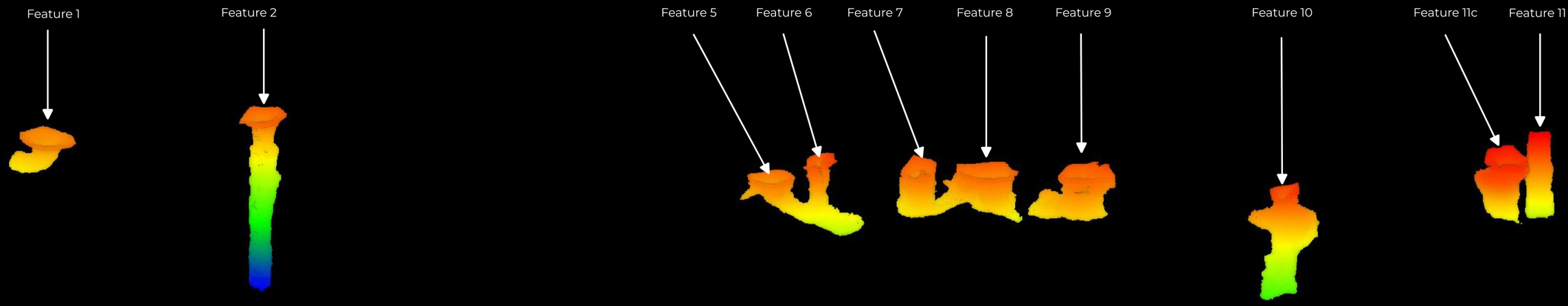
PROJECT:	224768.00
Drawing No:	2
REV:	0
DATE:	17/9/2024

Douglas PARTNERS	**Reids North Features**	PROJECT: 224768.00
	Condition Assessment	Drawing No: 3
	Reids Ridge Abandoned Mine Site (Commodore and Reids North)	REV: 0
	CLIENT: DEMIRS	DATE: 13/9/2024



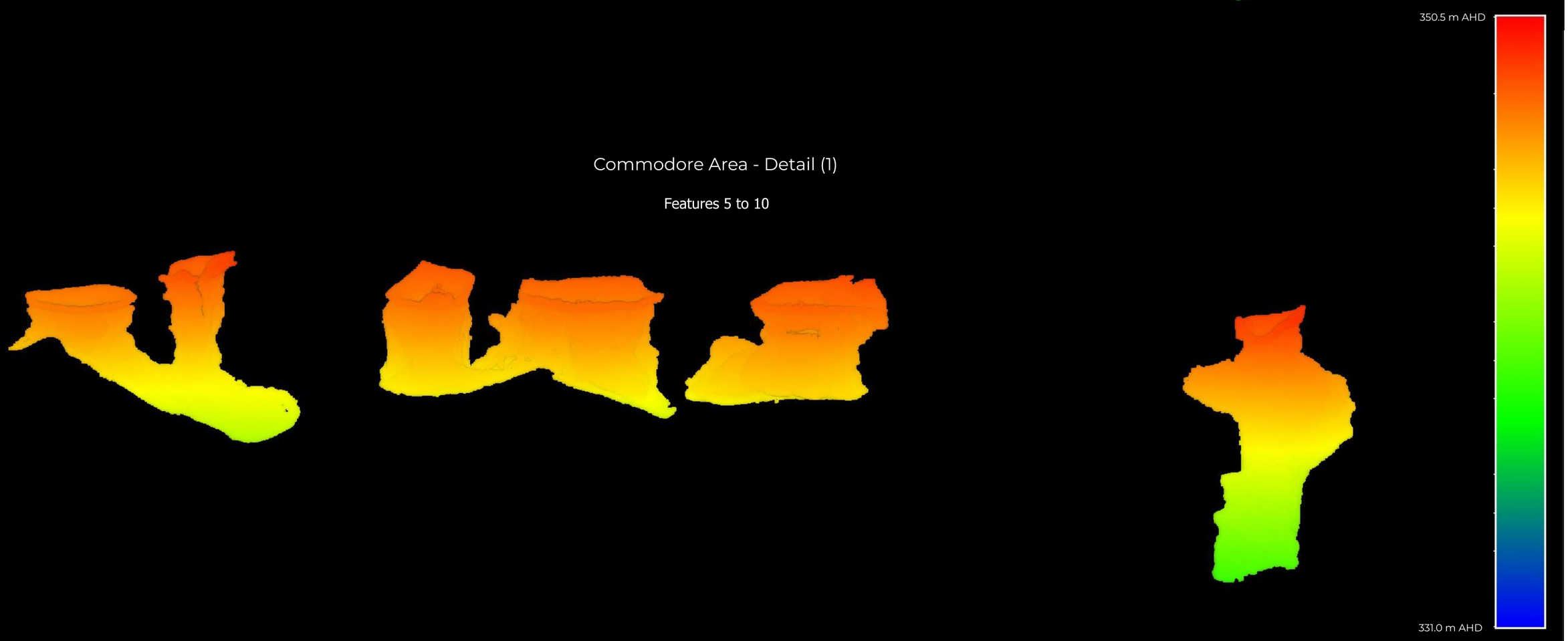
Douglas PARTNERS	**Features 20, 21 and 22** **Condition Assessment** **Reids Ridge Abandoned Mine Site (Commodore and Reids North)**	PROJECT: 224768.00 Drawing No: 4 REV: 0
	CLIENT: DEMIRS	DATE: 13/9/2024

Commodore Area - Deep Features



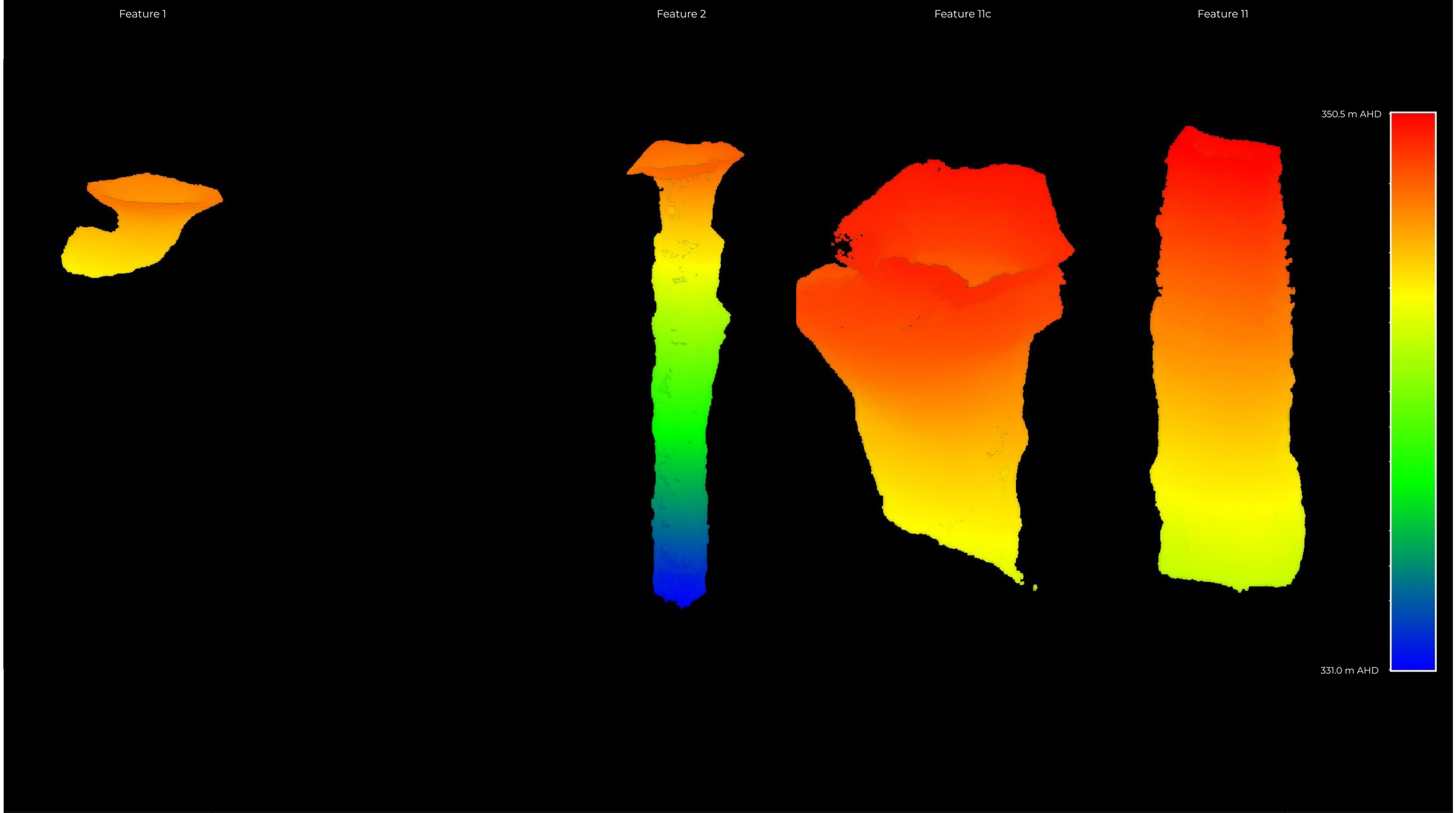
Commodore Area - Detail (1)

Features 5 to 10



Douglas PARTNERS	**Commodore LiDAR Data Mine Cross Section** **Condition Assessment** **Reids Ridge Abandoned Mine Site (Commodore and Reids North)**	PROJECT: 224768.00 Drawing No: 5 REV: 0
	CLIENT: DEMIRS	DATE: 18/9/2024

Commodore Area - Detail (2)

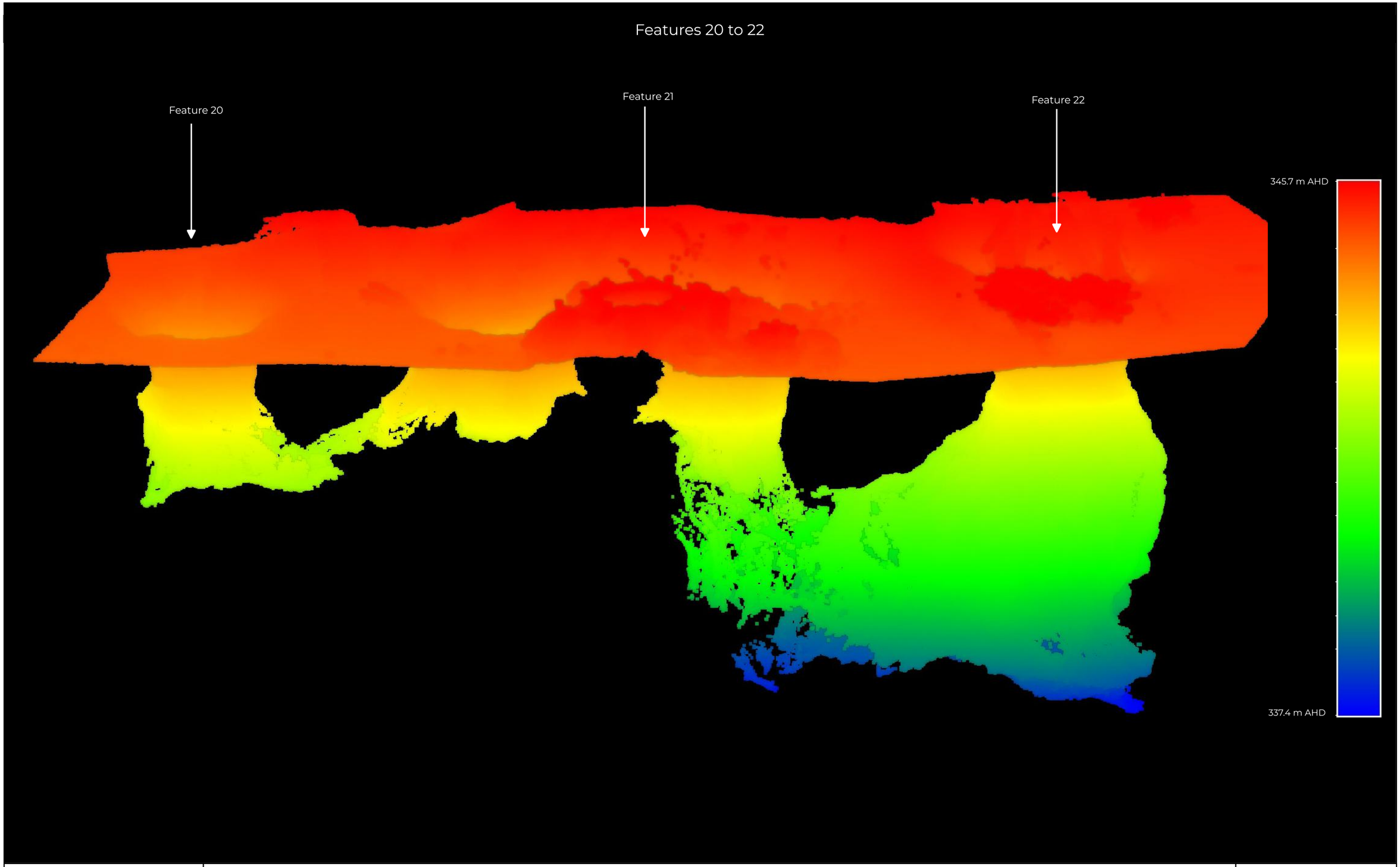


Douglas PARTNERS	**Commodore LiDAR Data - Features 1, 2, 11 and 11c** **Condition Assessment** **Reids Ridge Abandoned Mine Site (Commodore and Reids North)**	PROJECT: 224768.00 Drawing No: 6 REV: 0
	CLIENT: DEMIRS	DATE: 18/9/2024

Reids North Area - Deep Features

Douglas PARTNERS	**Reids North LiDAR Data**	PROJECT: 224768.00
	Condition Assessment	Drawing No: 7
	Reids Ridge Abandoned Mine Site (Commodore and Reids North)	REV: 0
	CLIENT: DEMIRS	DATE: 18/9/2024

Features 20 to 22



Douglas PARTNERS

Features 20, 21 and 22 LiDAR Data

Condition Assessment

Reids Ridge Abandoned Mine Site (Commodore and Reids North)

CLIENT: DEMIRS

PROJECT:	224768.00
Drawing No:	8
REV:	0
DATE:	18/9/2024

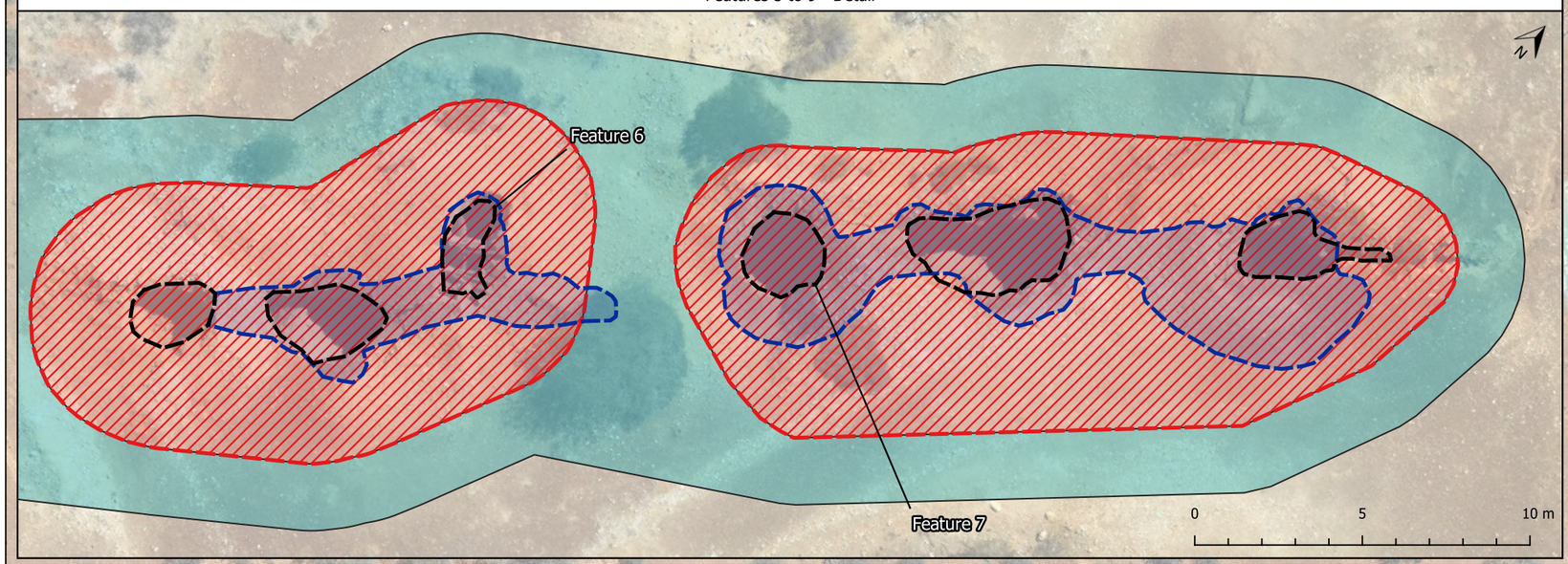
Legend

- Commodore Features - Extent at Surface
- Commodore Features - Observed extent at Depth
- Pedestrian Access Restriction Zone
- Vehicle Access Restriction Zone

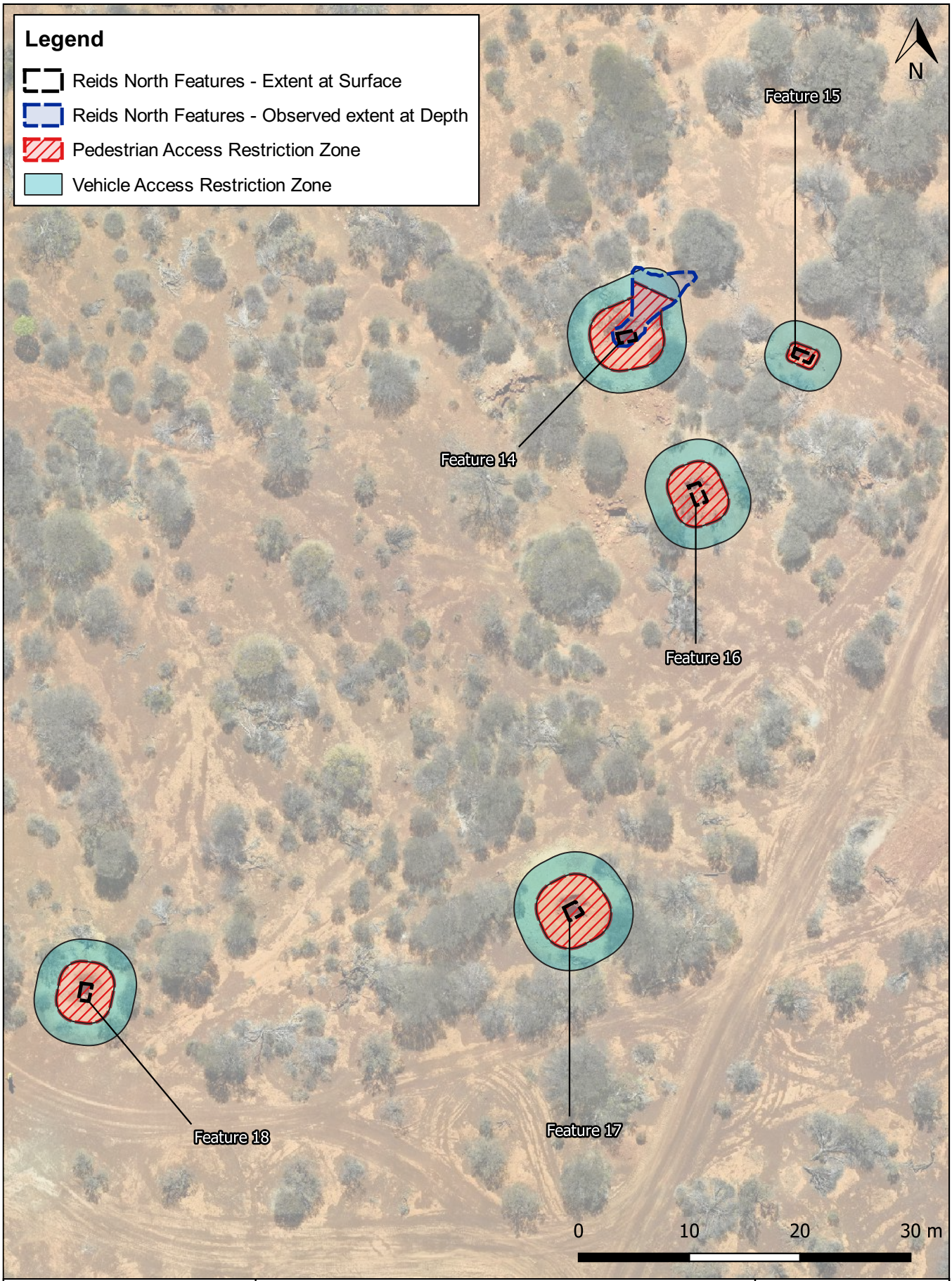
Feature 1
Feature 2
Feature 3
Feature 3a (approx.)
Feature 4
Feature 4a
Feature 5
Feature 5a
Feature 6
Feature 7
Feature 8
Feature 9
Feature 10
Feature 11
Feature 11a
Feature 11b
Feature 11c
Feature 12
Feature 12a
Feature 13
See insert

0 10 20 30 m

Features 5 to 9 - Detail



Douglas PARTNERS	**Commodore Features** **Pedestrian and Vehicle Access Restriction Zones (refer to Sections 4.1.1 to 4.4.4 in Report)** **Reids Ridge Abandoned Mine Site (Commodore and Reids North)**	PROJECT: 224768.00 Drawing No: 9 REV: 0
	CLIENT: DEMIRS	DATE: 18/9/2024



Douglas PARTNERS

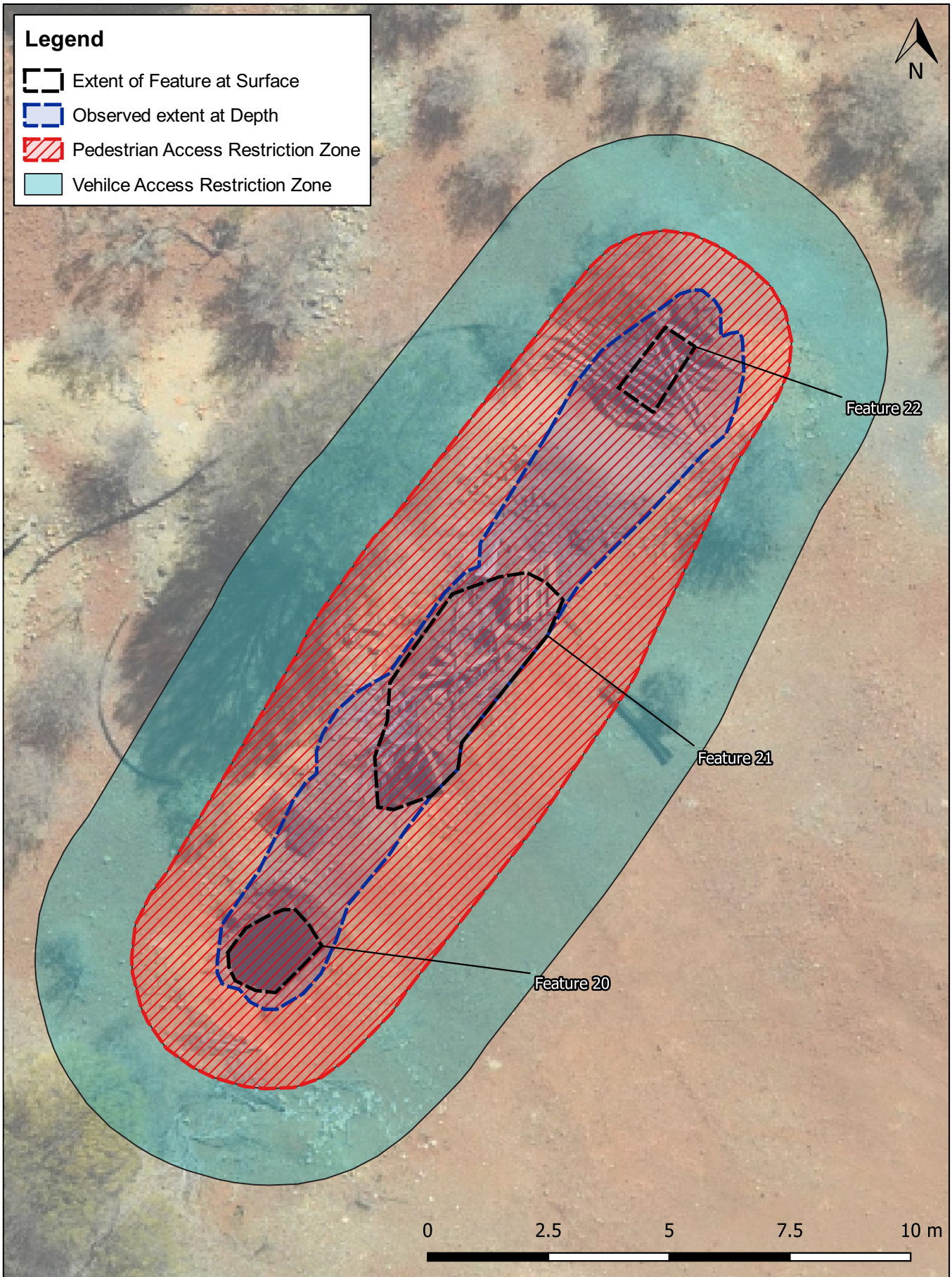
Reids North Features

Pedestrian and Vehiclular Access Restriction Zones (refer to Sections 4.1.2 and 4.1.4 in Report)

Reids Ridge Abandoned Mine Site (Commodore and Reids North)

CLIENT: DEMIRS

PROJECT:	224768.00
Drawing No:	10
REV:	0
DATE:	18/9/2024



Douglas PARTNERS

Features 20, 21 and 22

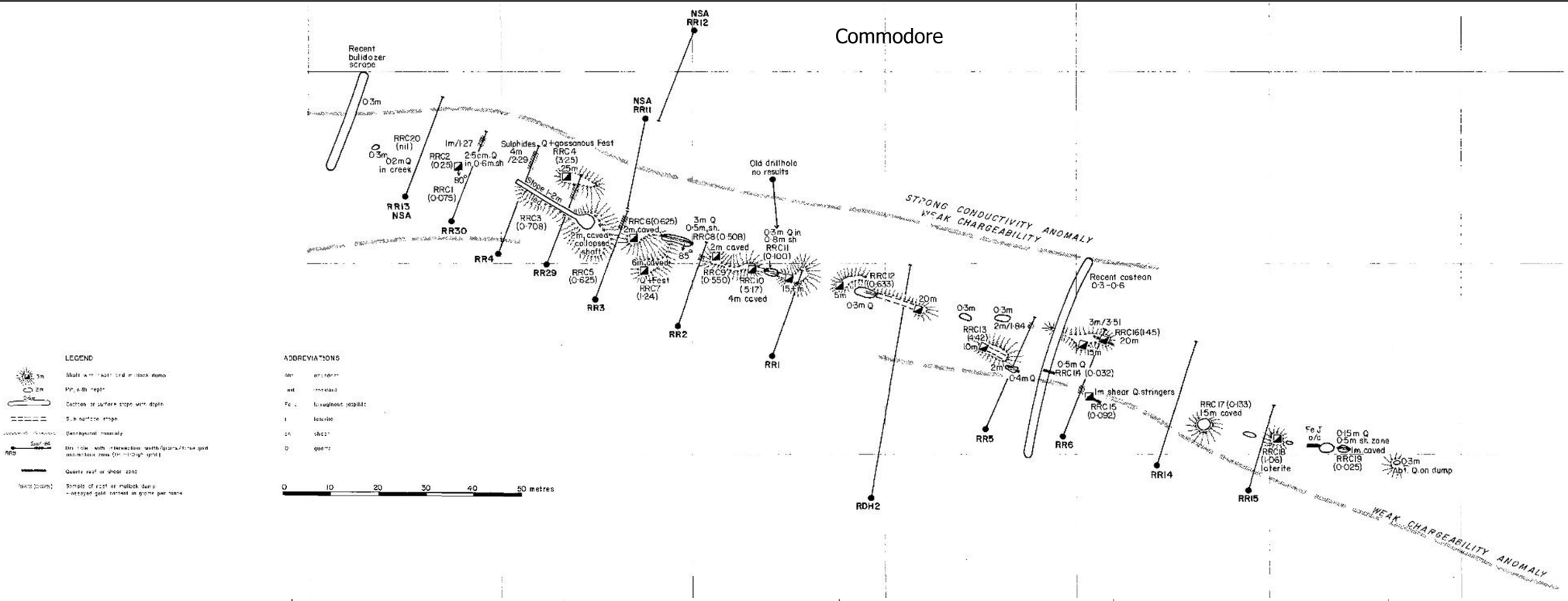
Pedestrian and Vehicle Access Restriction Zone (refer to Sections 4.1.3 and 4.1.4 in Report)

Reids Ridge Abandoned Mine Site (Commodore and Reids North)

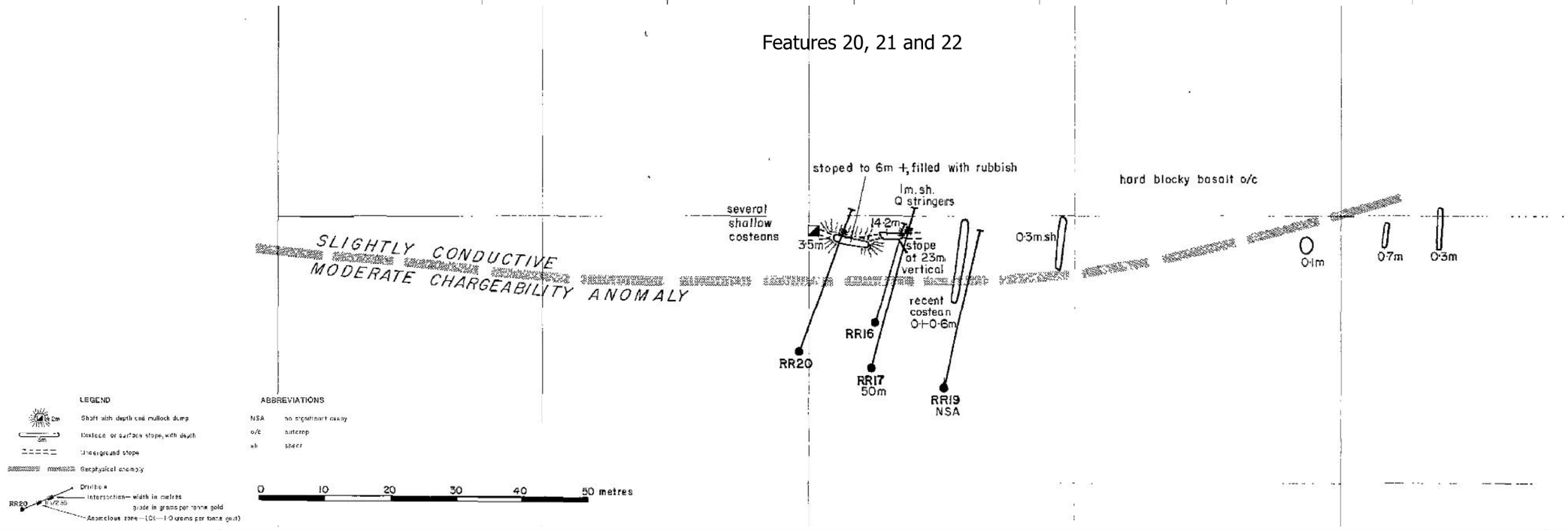
CLIENT: DEMIRS

PROJECT:	224768.00
Drawing No:	11
REV:	0
DATE:	17/9/2024

Commodore



Features 20, 21 and 22

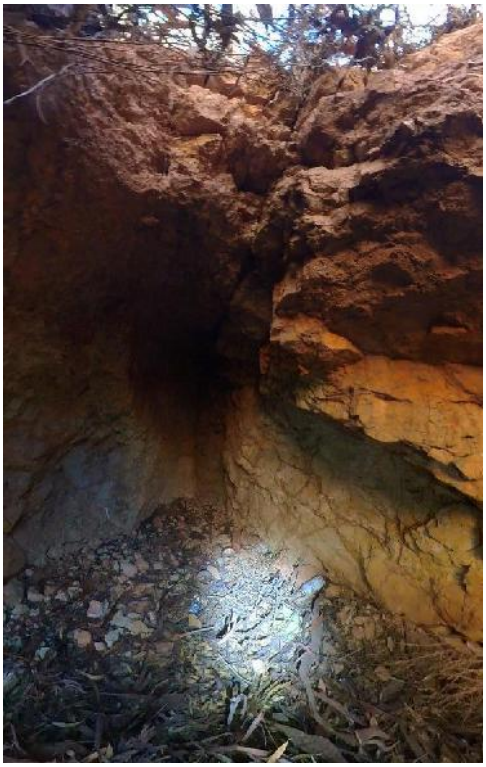


Douglas PARTNERS	**Plans of Commodore and Features 20, 21 and 22 - Sourced from Carbon Gold 1985 Exploration Drilling Report**	PROJECT:	224768.00
	Condition Assessment	Drawing No:	12
	Reids Ridge Abandoned Mine Site (Commodore and Reids North)	REV:	0
	CLIENT: DEMIRS	DATE:	18/9/2024

Appendix C

Photoplates

Photograph 1: Feature 1 at surface



Photograph 2: Feature 1 looking south, showing no lateral continuation

Douglas PARTNERS	**Photographs - Feature 1**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	1
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 3: Feature 2 at surface

Photograph 4: Feature 2 looking down, 2 m deep

Douglas PARTNERS	**Photographs - Feature 2**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	2
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 5: Feature 2, looking down, 8 m deep

Photograph 6: Feature 2 base of shaft

Douglas PARTNERS	**Photographs - Feature 2**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	3
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 7: Feature 3 at surface

Photograph 8: Feature 3 looking south, following excavation and eastern excavation

Douglas PARTNERS	**Photographs - Feature 3**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	4
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 9: Feature 4a, looking southwest

Photograph 10: Feature 4

Douglas PARTNERS	**Photographs - Feature 4a and 4**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	5
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 11: Feature 5a, looking southwest

Photograph 12: Feature 5a, looking north showing link to Feature 5

Douglas PARTNERS	**Photographs - Feature 5a**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	6
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 13: Feature 5a, post excavation through refuse backfill

Photograph 14: Feature 5, looking north showing link to Feature 5

Douglas PARTNERS	**Photographs - Feature 5a and 5**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	7
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 15: Feature 6

Photograph 16: Feature 6, looking south, showing link to Feature 5

Douglas PARTNERS	**Photographs - Feature 6**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	8
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 17: Feature 7, facing west

Photograph 18: Feature 7, looking north, showing link to Feature 8

Douglas PARTNERS	**Photographs - Feature 7**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	9
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 19: Feature 8, facing east

Photograph 20: Feature 8, facing north

Douglas PARTNERS	**Photographs - Feature 8**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	10
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 21: Feature 9, facing south

Photograph 22: Feature 9, facing east. Birds nests on overhang visible.

Douglas PARTNERS	**Photographs - Feature 9**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	11
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 23: Feature 10, facing south

Photograph 24: Feature 10, approximately 1.5 m deep, facing north.

Douglas PARTNERS	**Photographs - Feature 10**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	12
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 25: Feature 10, facing north

Photograph 26: Feature 10, base

Douglas PARTNERS	**Photographs - Feature 10**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	13
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 27: Feature 11, facing west

Photograph 28: Feature 11, 1 m deep

Douglas PARTNERS	**Photographs - Feature 11**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	14
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 29: Feature 11, 3 m deep, facing down

Photograph 30: Feature 11, base

Douglas PARTNERS	**Photographs - Feature 11**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	15
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 31: Feature 11a

Photograph 32: Feature 11b

Douglas PARTNERS	**Photographs - Features 11a and 11b**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	15
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 33: Feature 11c, 2 m deep, facing west. Bird nests visible on overhang.

Photograph 34: Feature 11c. Bird nests

Douglas PARTNERS	**Photographs - Features 11c**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	15
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 35: Feature 11c, base, facing northwest

Photograph 36: Feature 12a

Douglas PARTNERS	**Photographs - Features 11c and 12a**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	18
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 37: Feature 12

Photograph 38: Feature 13. During excavation of base.

Douglas PARTNERS	**Photographs - Features 11c and 12a**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	19
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 39: Feature 14, facing west

Photograph 40: Feature 14, 1 m deep, facing northeast

Douglas PARTNERS	**Photographs - Feature 14**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	20
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 41: Feature 14, 3 m deep, facing northeast

Photograph 42: Feature 15

Douglas PARTNERS	**Photographs - Feature 14 and 15**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	21
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 43: Feature 16, facing north

Photograph 44: Feature 17, facing north

Douglas PARTNERS	**Photographs - Feature 16 and 17**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	22
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 45: Feature 17, 1 m deep, facing down

Photograph 46: Feature 17, base

Douglas PARTNERS	**Photographs - Feature 17**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	23
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 47: Feature 18, facing east

Photograph 48: Feature 18, excavated refuse, facing north

Douglas PARTNERS	**Photographs - Feature 18**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	24
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 49: Features 20 and 21, facing north

Photograph 50: Feature 21, facing northwest

Douglas PARTNERS	**Photographs - Feature 20 and 21**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	25
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 51: Features 21 and 22, facing northeast, following some excavation

Photograph 52: Feature 21, excavated refuse

Douglas PARTNERS	**Photographs - Feature 20 and 21**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	26
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Photograph 53: Feature 22, approximately 1 m deep, facing down

Photograph 54: Feature 22, near base, facing south to Feature 21

Douglas PARTNERS	**Photographs - Feature 22**	Project No.:	224768.0
	Shaft Condition Assessment	Photo Plate No.:	27
	Reids Ridge Abandoned Mine Site, WA	Revision:	0
	CLIENT: DEMIRS	Date:	Sep-24

Appendix D

GBG Group Geophysical Survey Results

GBGGROUP

Geophysical Consultants

Sydney
28/7 Salisbury Road
Castle Hill, NSW 2154
+61 02 9890 2122

Perth
1/11 Gympie Way
Willetton, WA 6155
+61 08 9354 6300

info@gbgoz.com.au

REPORT

Geophysical Subsurface Investigation for Abandoned Mine Features

Reids Ridge, WA

Date: 28 May 2024

Project Number: 3105

PROJECT DETAILS

Project Number	3105
Document Title	Geophysical Subsurface Investigation for Abandoned Mine Features
Site Address	Reids Ridge, Western Australia
Client	Damian Jagoe-Banks Associate Geotechnical Engineer Douglas Partners

COMPANY DETAILS

Registered Name	GB Geotechnics (Australia) Pty Ltd
ABN	77 009 550 869
Address	1/11 Gympie Way Willetton WA 6155
Phone	08 9354 6300
Web	gbg-group.com.au
Email	info@gbgoz.com.au

DOCUMENT HISTORY

Revision	Prepared by	Reviewed by	Date issued
0	Andrew Spyrou	-	28 May 2024

TABLE OF CONTENTS

1 INTRODUCTION

At the request of Douglas Partners, GBG Group carried out a geophysical investigation as part of the Geotechnical Engineering Services for the Reids Ridge abandoned mine site within the Karara Rangeland Park, Shire of Yalgoo Western Australia.

During the investigation, Ground Penetrating Radar (GPR) and Electrical Resistivity Tomography (ERT) datasets were acquired as a series of transects at accessible locations and extending around the perimeter of recorded abandoned surface mine features. The acquired GPR data was processed to obtain high resolution subsurface reflection imagery to a maximum target depth of 10m Below Ground Level (BGL). The acquired ERT data was processed to obtain subsurface electrical resistivity models to a maximum target depth of 15mBGL. The processed data was subsequently analysed for the detection and mapping of potential underground mine workings emanating from the identified surface mine features.

The results of the geophysical investigation forms part of a broader scope geotechnical study commissioned by the Department of Mines, Industry Regulation and Safety for the Abandoned Mines Program. The aim of the study is to support the assessment and rehabilitation of the shafts, mine subsidence and subsidence risk zones within the abandoned mine site.

2 INVESTIGATION SITE

The geophysical investigation was carried out 3 sites located from south to north Reids Ridge, Commodore and Reids North. An overview map of the sites with associated MINEDEX mine and mineral deposits is presented in Figure 3.

At each site, surface mine shafts have been identified including the main Reids Ridge Mine shaft, Rose Marie shaft and 3 smaller shafts at Reids Ridge, 13 shafts at Commodore, and 5 shafts at Reids North. The identified shafts are shown in drawings 3105-01 to 3105-03 and classified according to estimated depth either less than 1m depth (yellow), 1 to 5m depth (orange), or greater than 5m depth (red).

Surface conditions at the sites were suitable for geophysical data acquisition and included sparse to moderate vegetation with low trees and open areas with remnant mining infrastructure. Photographs showing the typical site conditions are presented in Figures 1 and 2.

Figure 1: Ground surface conditions at Reids Ridge.

Figure 2: Ground surface conditions at Commodore.

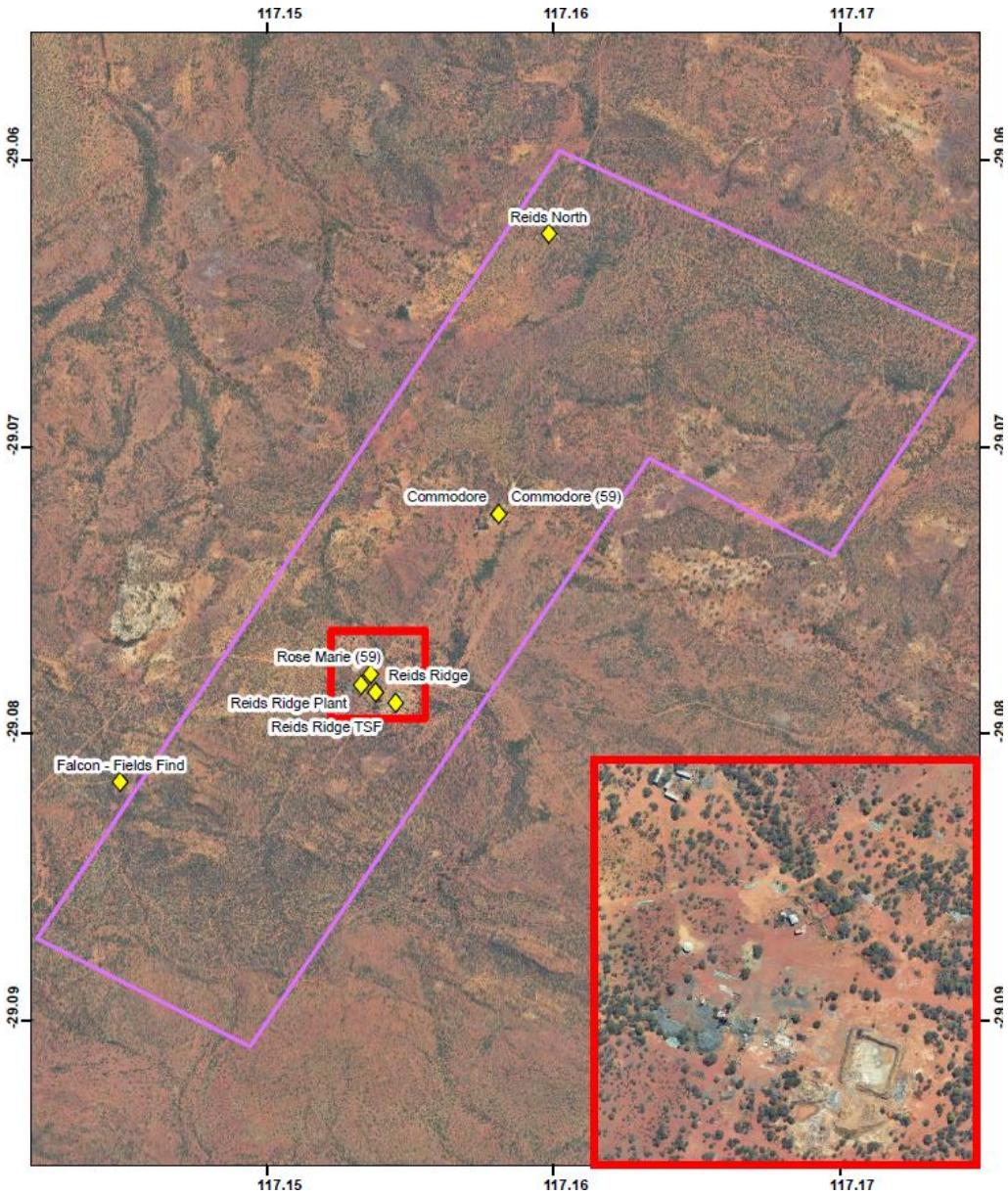


Figure 3: Site map of Reids Ridge, Commodore and Reids North. Drawing from DMIRS, 22 Feb 2023.

3 GEOPHYSICAL DATA ACQUISITION & PROCESSING

3.1 SITE WORK LOGISTICS

The geophysical investigation site work was carried out over 4 days from the 15 to 18 April 2024 by a two-person team from GBG Group including a qualified geophysicist and field assistant.

A total of 186 GPR transects were acquired using multiple antenna frequencies along accessible areas around the identified surface mine shafts. The GPR dataset was analysed in order to detect potential shallow lateral mine workings emanating from the shafts. The extents of the acquired GPR transects are shown as dark blue lines for the 300MHz antenna and light blue lines for the 80MHz antenna in drawings 3105-01, -02 and -03.

A total of 7 ERT transects were acquired parallel and offset to the interpreted strike of the geological feature in which the surface shafts were founded. The ERT dataset was analysed in order to assess the overall shallow geology at the sites and potential areas of ground disturbance. The extents of the acquired ERT transects are shown as green lines in drawings 3105-01, -02 and -03.

3.2 GROUND PENETRATING RADAR

GPR data was acquired using 2 systems including a GSSI Instruments DF with a 300MHz ground coupled antenna, and a MALA Ground Explorer GX HDR with an 80MHz ground coupled antenna. Data acquisition involved moving the GPR systems along the ground surface over accessible areas of the sites with both the 300MHz and 80MHz antennas used at Reids Ridge, and the 80MHz antenna used at Commodore and Reids North. Acquisition parameters for both GPR systems are provided in Table 1.

The acquired GPR data was processed and analysed using ReflexW (Sandmeier Software, 2022). Data processing steps included surface correction, manual gain function, 1D bandpass filtering, and 2D background removal and running average filtering.

The subsurface responses were identified in the processed radar-grams and compared across the entire dataset. Identified responses interpreted to be related to shallow subsurface features such as potential mine workings and previously excavated material were digitised and exported with their corresponding easting and northing coordinates. Example radar-grams from this investigation are shown in Figures 4 to 7.

Table 1: GPR Acquisition Parameters

Parameter	GSSI	MALA
Antenna centre frequency	300MHz	80MHz
Two-way travel time	100ns	300ns
Uncalibrated imaging depth	6m	18m
Scans per metre	100	50
Sample number	512	542
Sample rate	32 bit	32 bit

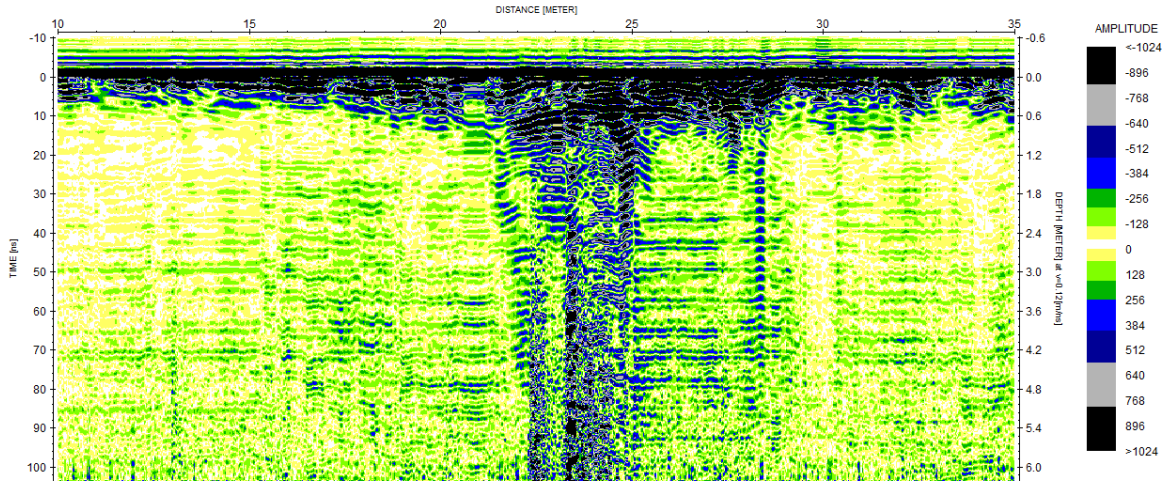


Figure 4: GPR radar-gram (300MHz antenna) with identified near surface anomaly at x=22-26m interpreted as excavated and infilled ground.

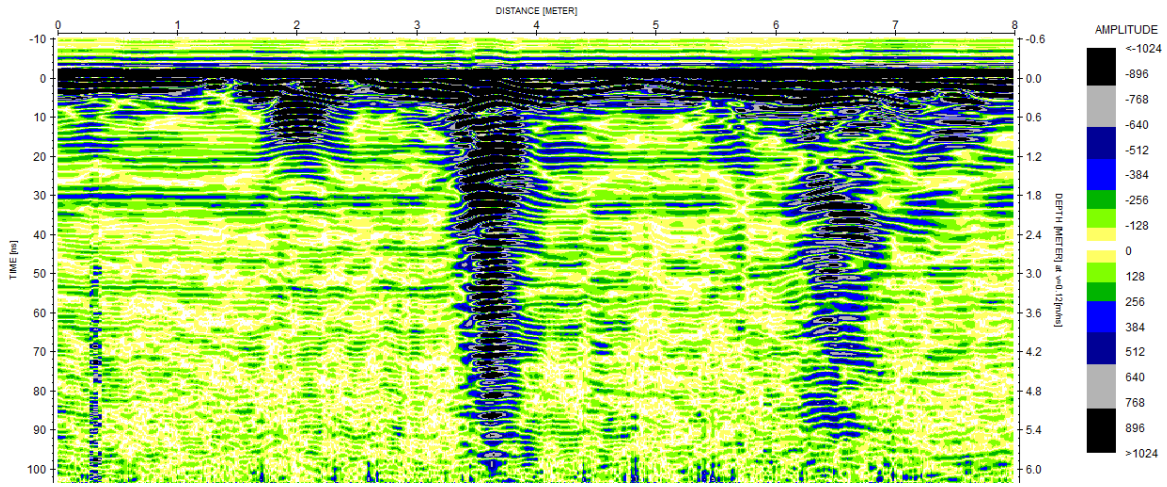


Figure 5: GPR radar-gram (300MHz antenna) with identified near surface anomalies at x=2m, x=3.5m and x=6.5m interpreted as shallow buried metal and pipes.

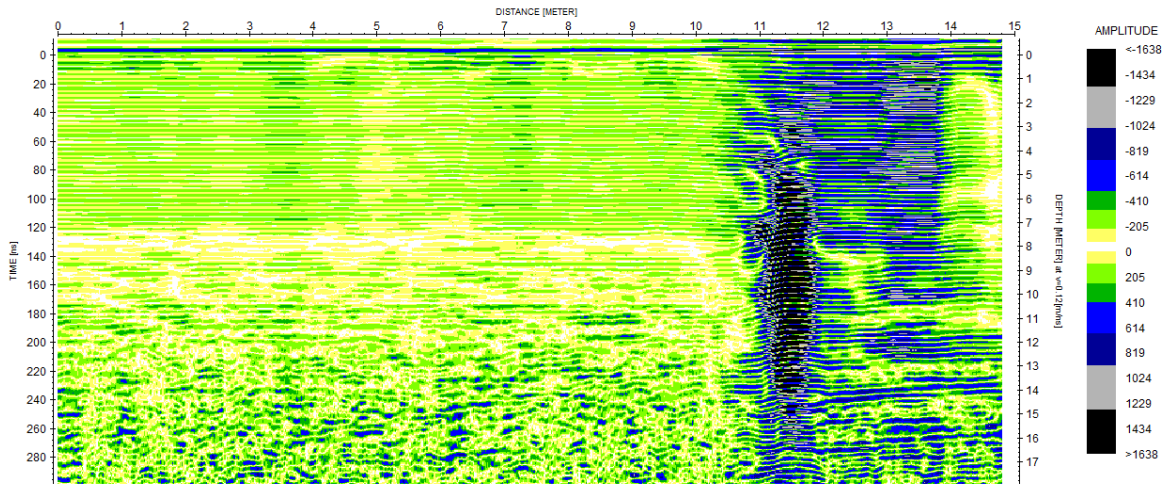


Figure 6: GPR radar-gram (80MHz antenna) with identified near surface anomaly at x=11m interpreted as a potential mine working.

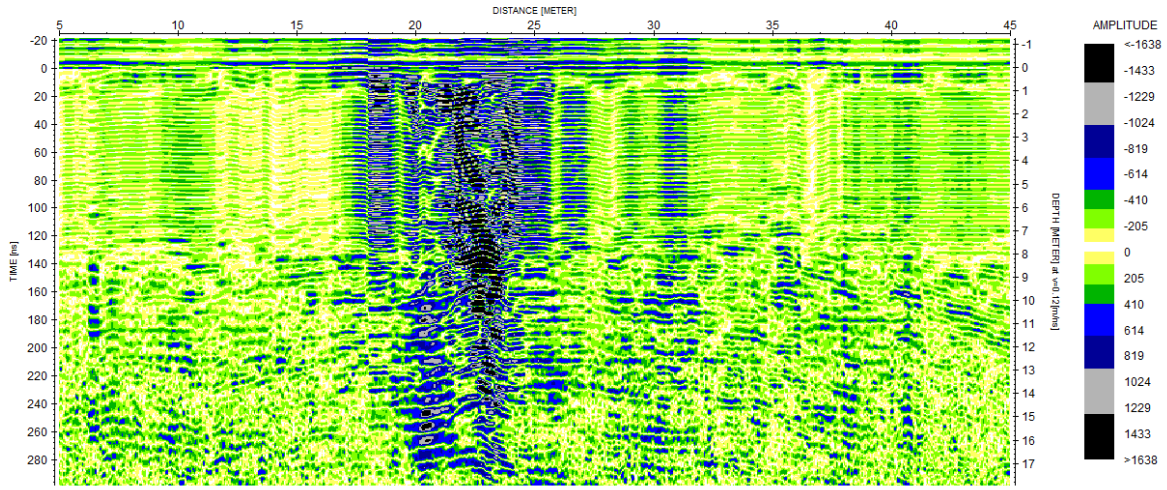


Figure 7: GPR radar-gram (80MHz antenna) with identified near surface anomaly at x=22m interpreted as a potential mine working.

3.3 ELECTRICAL RESISTIVITY TOMOGRAPHY

ERT data was acquired using a Syscal KID (IRIS Instruments) resistivity receiver. Data acquisition involved hammering 24 electrodes into the ground along the transects at 5m increments for a total maximum array length of 115m and connecting these to the control unit situated at the centre of the array via multicore cables. Resistivity measurements were made using a Dipole-Dipole array type providing both high vertical resolution and sensitivity to lateral variations. Acquisition parameters for ERT are provided in Table 2.

The ERT data was processed using EarthImager 2D (AGI Software). The inverted resistivity models were gridded with Surfer (Golden Software) to produce contoured cross-sections showing the variation in electrical resistivity of the subsurface material in Ohm metres (plotted as log base 10) laterally along each of the transects and with elevation.

Table 2: ERT Acquisition Parameters

Parameter	Value
Max no. electrodes	24
Electrode spacing	5 m
Max array length	115 m
Array type	Dipole-Dipole
Injection on/off time	500 ms
Injection voltage	200 mV
Number of stacks	5
Quality factor	2%
Roll-along (number of electrodes)	12
Quadripoles (full spread / roll-along)	153 / 108

3.4 SPATIAL POSITIONING

Spatial positioning of the acquired geophysical transects was achieved using a Reach 2 (Emlid) GNSS receiver with an expected accuracy of +/-0.5m for both vertical and horizontal components. Note a reduction in accuracy is expected in areas where dense tree cover was present.

Coordinates have been provided in GDA2020, MGA zone 50 for horizontal component and Australian Height Datum (mAHD) for vertical component.

4 RESULTS AND INTERPRETATION

The results of the geophysical investigation carried out at Reids Ridge, Commodore and Reids North are presented in Appendix A of this report as follows:

- **3105-01** – Reids Ridge investigation site map
- **3105-02** – Commodore investigation site map
- **3105-03** – Reids North investigation site map
- **3105-04** – Electrical resistivity sections

4.1 GROUND PENETRATING RADAR

Analysis of the processed GPR dataset has identified shallow subsurface anomalies within the Reids Ridge site, details of which are provided in Table 3. No such anomalies were detected at Commodore or Reids North sites. The lateral extent of the identified features are shown in drawing 3105-01.

Table 3: Reids Ridge GPR Anomaly Details

Feature ID	Easting (GDA2020)	Northing (GDA2020)	Depth (m)	Description
RR-01	514918.1	6783313.4	2	Region of fill material related to nearby excavation
RR-02	514917.2	6783323.4	4	Linear feature potentially from Reids Ridge Main shaft
RR-03	514918.3	6783335.4	5	Linear feature potentially from Reids Ridge Main shaft
RR-04	514924.1	6783345.1	1	Linear feature potentially from Reids Ridge Main shaft
RR-05	514954.2	6783365.0	1	Small feature potentially related to Rose Marie shaft
RR-06	514953.4	6783370.0	7	Small feature potentially related to Rose Marie shaft
RR-07	514949.9	6783371.9	6	Small feature potentially related to Rose Marie shaft
RR-08	514937.8	6783319.0	7	Region of fill material related to Reids Ridge Main shaft and adjacent processing site
RR-09	514941.3	6783328.3	1	Small feature potentially related to Reids Ridge Main shaft
RR-10	514942.1	6783334.3	1	Small feature potentially related to Reids Ridge Main shaft
RR-11	514972.6	6783365.4	2	Small feature unrelated to mine workings
RR-12	514991.0	6783374.4	7	Small feature unrelated to mine workings

4.2 ELECTRICAL RESISTIVITY TOMOGRAPHY

The sections presented for each ERT transect show the variation in modelled electrical resistivity of the subsurface material in Ohm metres (Ω.m). Dominant factors affecting the bulk electric resistivity of soil or rock are:

- Porosity and permeability including the presence of voids and cavities
- Degree of saturation – the fraction of pore space/fractures filled with fluid
- Fluid type, including salt content – the composition of the fluid filling the pore spaces/fractures
- Presence of clays with moderate to high cation exchange capacity (CEC)

For this type of investigation, high resistivity responses (typically greater than 1500 Ω.m [>3.2 Log10 Ω.m]) over background would be considered as potential open and air-filled subsurface mine workings, noting that resistivity may reduce slightly if the mine working has been partially or entirely collapsed and infilled with local material. The above assumes that the subsurface material sits above the local water table, and as such where present mine workings will have little to no water content.

The presence of groundwater within voided or loose ground will alter the interpretation with water-filled mine workings either open or, partially or entirely collapsed tending to have a low resistivity (high conductivity) response over background.

Analysis of the electrical resistivity sections indicates that no highly resistive anomalous features are present beneath the ERT transects. A low resistivity (conductive) feature was observed on Transect 4 which is likely to be related to an edge effect from the Rose Marie Shaft.

5 PROJECT SUMMARY

A geophysical subsurface investigation has been carried out as part the Geotechnical Engineering Services for Abandoned Mine Features at Reids Ridge, Commodore and Reids North, Western Australia. During the investigation, GPR and ERT datasets were acquired as a series of transects extending around the perimeter of recorded abandoned surface mine features.

The acquired GPR dataset was processed and analysed for features relating to shallow mine workings with a number of features being identified and relating to near surface previously worked ground at the Reids Ridge site, with no such features being identified at the Commodore or Reids North sites.

The acquired ERT dataset was inverted to model the electrical resistivity distribution of the subsurface material along the transects. The electrical resistivity sections were analysed for high resistivity responses over background which would indicate the presence of potential open mine workings of which none were identified at all sites.

The methods used during the investigation are geophysical and as such the results are based on indirect measurements and the processing and interpretation of electrical wave signals. At the time of the investigation, calibration of the geophysical results with intrusive geotechnical testing has not been carried out. The findings in this report represent the professional opinions of the authors, based on experience gained during previous similar investigations.

We trust that this report and the attached drawings provide you with the information required. If you require clarification on any points arising from this geophysical investigation, please do not hesitate to contact the undersigned on 08 9354 6300.

For and on behalf of
GBG GEOTECHNICS (AUSTRALIA)

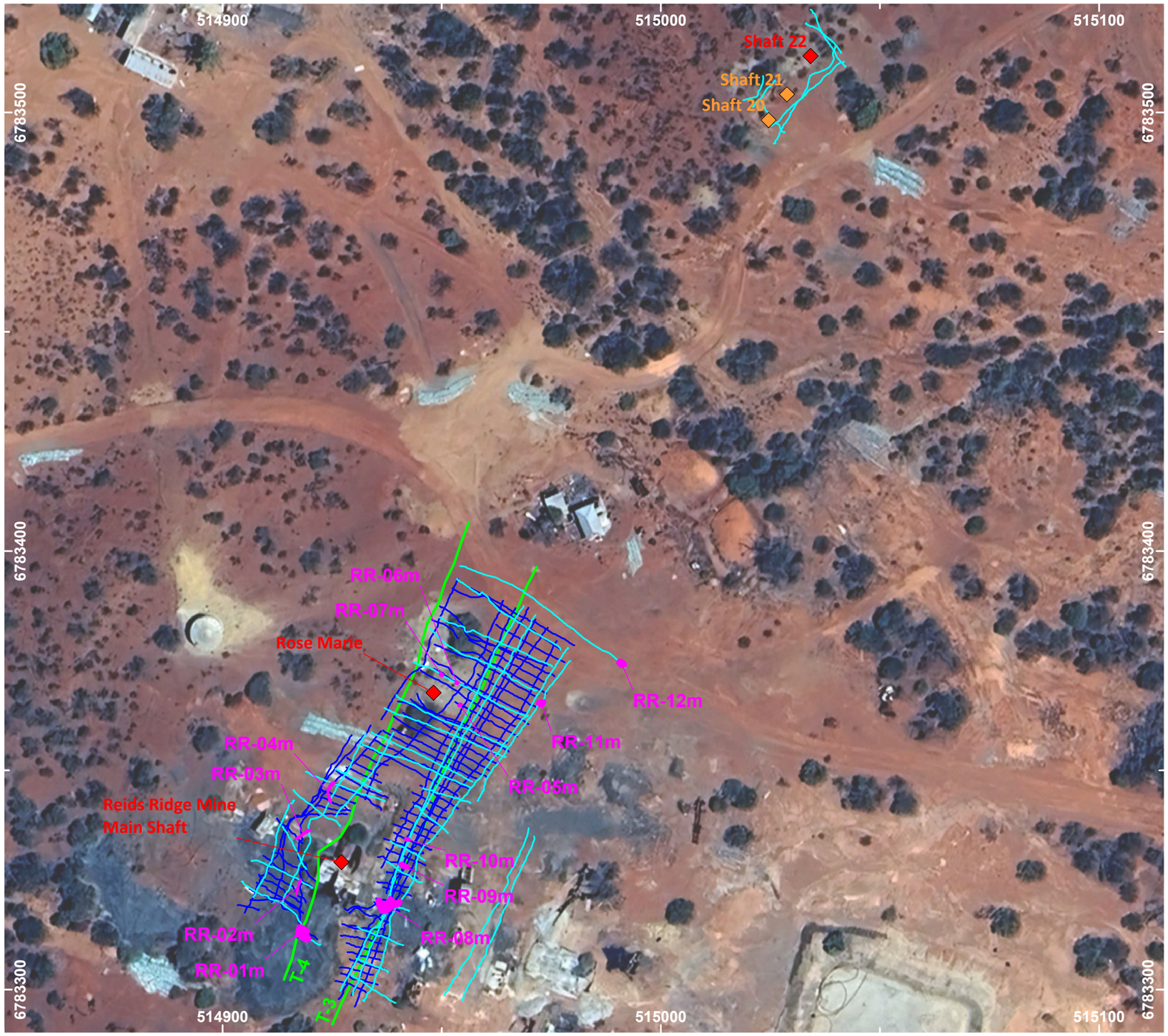
ANDREW SPYROU
Operations Manager, Western Australia / Senior Geophysicist

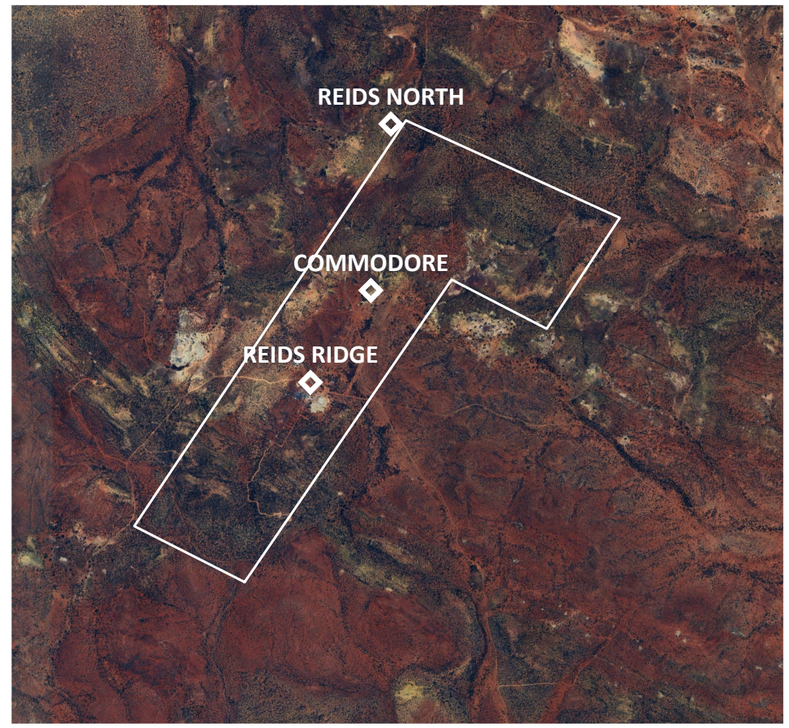
APPENDIX A – INVESTIGATION RESULTS

GBGGROUP

GEOPHYSICAL INVESTIGATION FOR ABANDONED MINE FEATURES, SHIRE OF YALGOO WESTERN AUSTRALIA.

REIDS RIDGE INVESTIGATION SITE MAP





Legend

Abandoned surface mine feature

- Shallow shaft (up to 1m below surface)
- Moderate depth shaft (1m to 5m below surface)
- Deep shaft (greater than 1m below surface)

Geophysical Testing

- 300MHz Ground Penetrating Radar (GPR) transect
- 80MHz Ground Penetrating Radar (GPR) transect
- Electrical Resistivity Tomography (ERT) transect
- Identified subsurface feature (potential mine working)
- RR-01 Feature ID (refer to report for details)

NOTES

Drawing to be used in conjunction with Report 3105.
Map Projection GDA2020 MGA Zone 50.
Aerial image from Google Earth Pro.

0 10 20 30 40 50
Distance (metres)

N

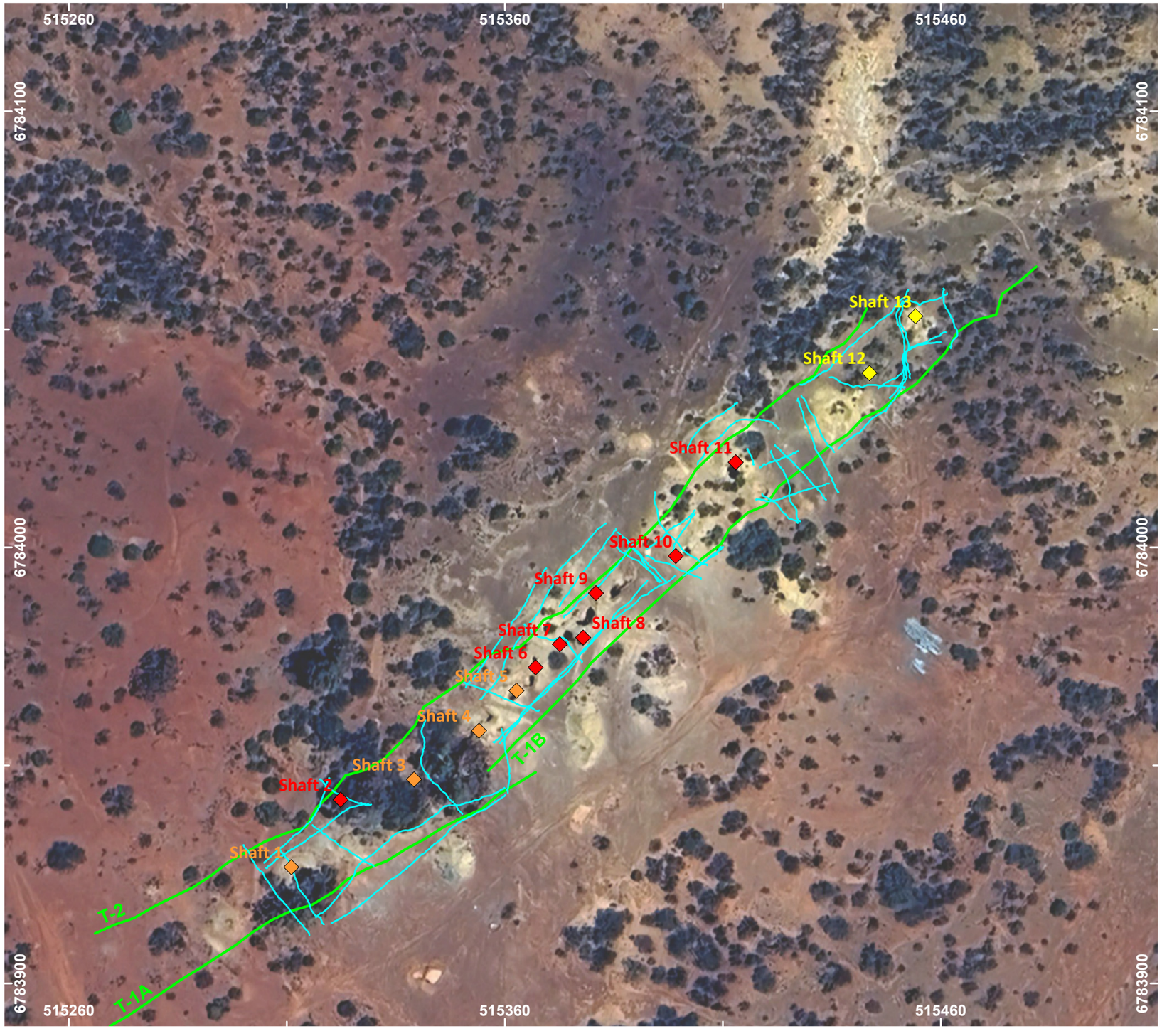
CLIENT	DOUGLAS PARTNERS	Date	5 March 2024	Paper Size	A3
	GEOPHYSICAL INVESTIGATION FOR ABANDONED MINE FEATURES SHIRE OF YALGOO WESTERN AUSTRALIA	Scale	1:1000	Drawn	AHWS
		Drawing	3105-01	Revision	0

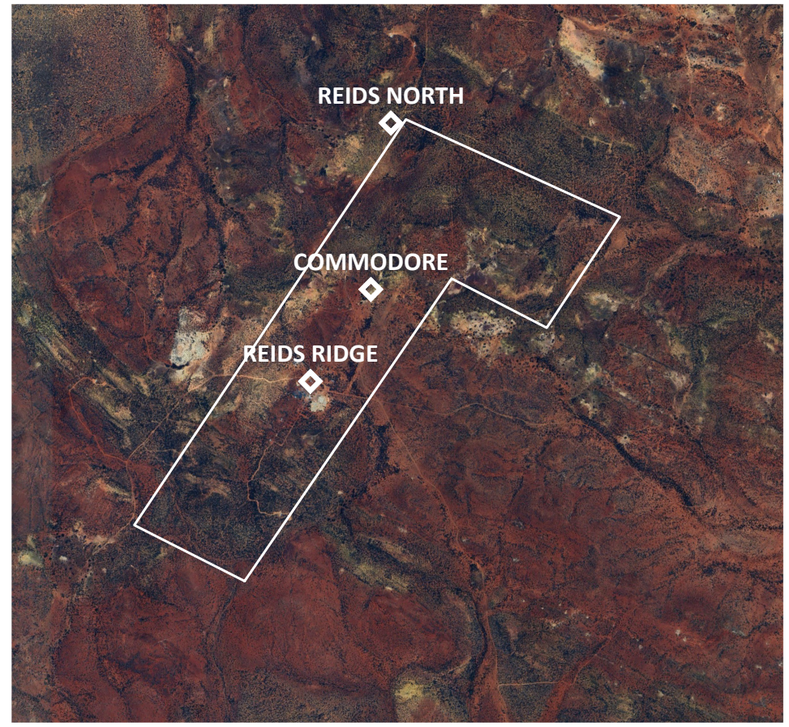
GBGGROUP
G B Geotechnics (Australia) Pty Ltd
1/11 Gympie Way Willetton WA 6155
ABN: 77 009 550 869
Telephone: 02 9890 2122
Email: info@gbgoz.com.au

GBGGROUP

GEOPHYSICAL INVESTIGATION FOR ABANDONED MINE FEATURES, SHIRE OF YALGOO WESTERN AUSTRALIA.

COMMODORE INVESTIGATION SITE MAP





Legend

Abandoned surface mine feature

- Shallow shaft (up to 1m below surface)
- Moderate depth shaft (1m to 5m below surface)
- Deep shaft (greater than 1m below surface)

Geophysical Testing

- 300MHz Ground Penetrating Radar (GPR) transect
- 80MHz Ground Penetrating Radar (GPR) transect
- Electrical Resistivity Tomography (ERT) transect
- Identified subsurface feature (potential mine working)
- 3m — Depth to top of feature

NOTES

Drawing to be used in conjunction with Report 3105.
Map Projection GDA2020 MGA Zone 50.
Aerial image from Google Earth Pro.

0 10 20 30 40 50
Distance (metres)

N

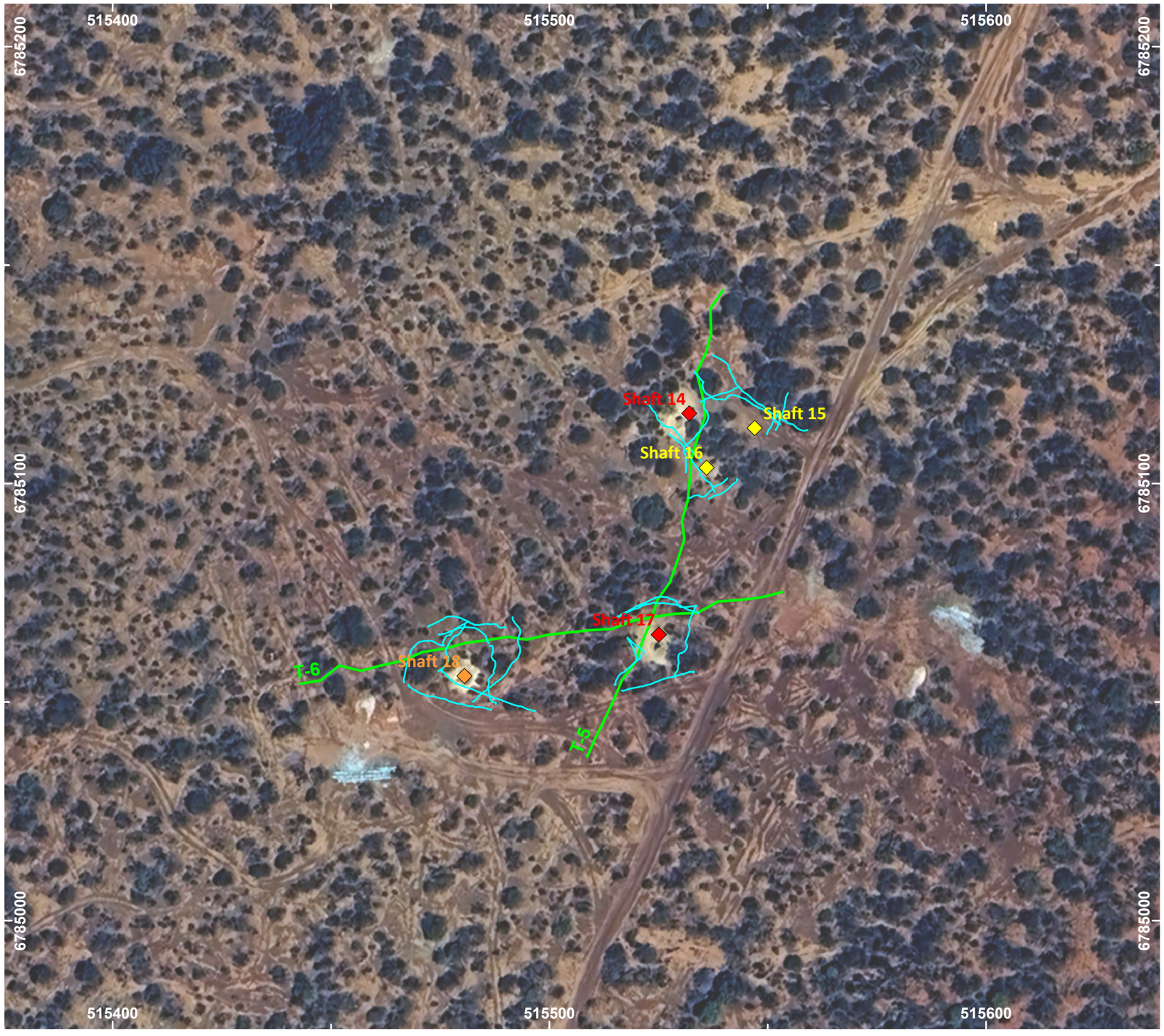
CLIENT	DOUGLAS PARTNERS	Date	5 March 2024	Paper Size	A3
	GEOPHYSICAL INVESTIGATION FOR ABANDONED MINE FEATURES SHIRE OF YALGOO WESTERN AUSTRALIA	Scale	1:1000	Drawn	AHWS
		Drawing	3105-02	Revision	0

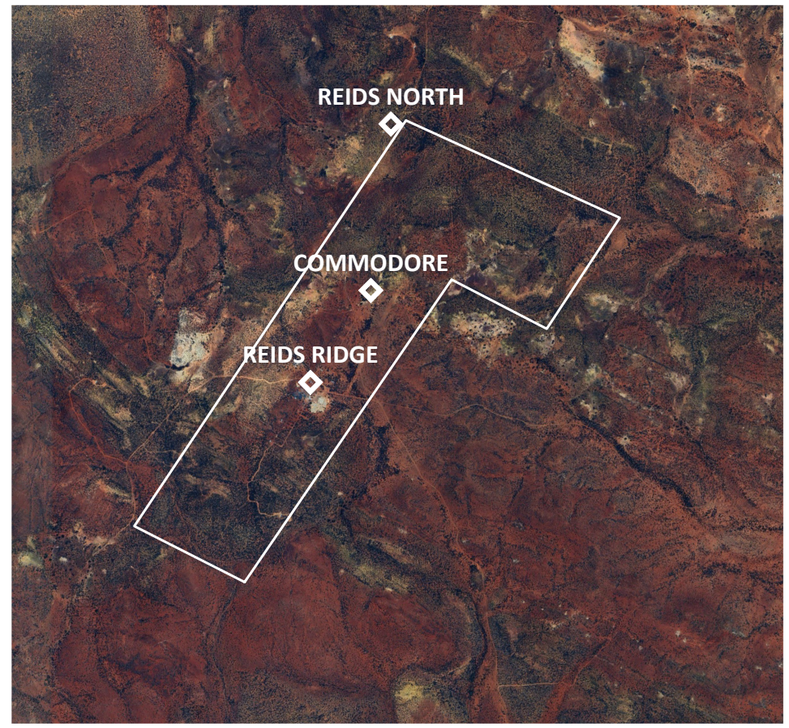
GBGGROUP
G B Geotechnics (Australia) Pty Ltd
1/11 Gympie Way Willetton WA 6155
ABN: 77 009 550 869
Telephone: 02 9890 2122
Email: info@gbgoz.com.au

GBGGROUP

GEOPHYSICAL INVESTIGATION FOR ABANDONED MINE FEATURES, SHIRE OF YALGOO WESTERN AUSTRALIA.

REIDS NORTH INVESTIGATION SITE MAP





Legend

Abandoned surface mine feature

- Shallow shaft (up to 1m below surface)
- Moderate depth shaft (1m to 5m below surface)
- Deep shaft (greater than 1m below surface)

Geophysical Testing

- 300MHz Ground Penetrating Radar (GPR) transect
- 80MHz Ground Penetrating Radar (GPR) transect
- Electrical Resistivity Tomography (ERT) transect
- Identified subsurface feature (potential mine working)
- 3m — Depth to top of feature

NOTES

Drawing to be used in conjunction with Report 3105.
Map Projection GDA2020 MGA Zone 50.
Aerial image from Google Earth Pro.

0 10 20 30 40 50
Distance (metres)

N

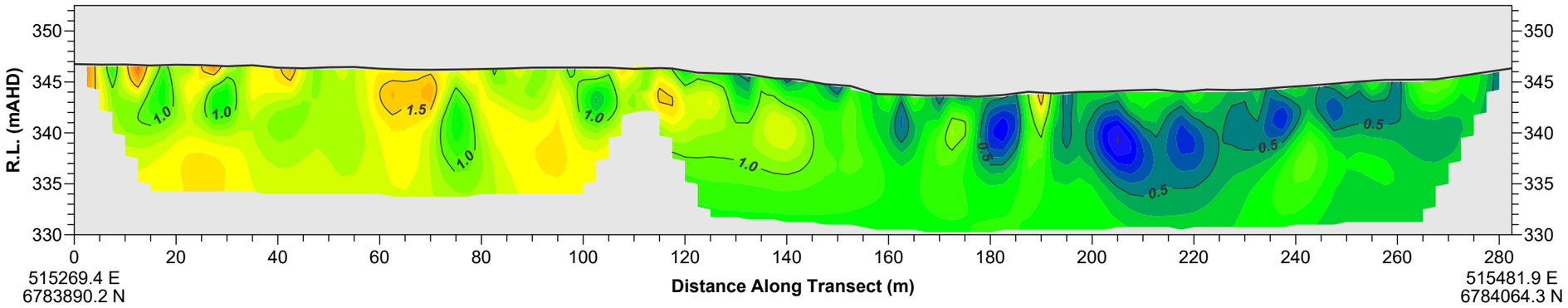
CLIENT	DOUGLAS PARTNERS	Date	5 March 2024	Paper Size	A3
	GEOPHYSICAL INVESTIGATION FOR ABANDONED MINE FEATURES SHIRE OF YALGOO WESTERN AUSTRALIA	Scale	1:1000	Drawn	AHWS
		Drawing	3105-03	Revision	0

GBGGROUP
G B Geotechnics (Australia) Pty Ltd
1/11 Gympie Way Willetton WA 6155
ABN: 77 009 550 869
Telephone: 02 9890 2122
Email: info@gbgoz.com.au

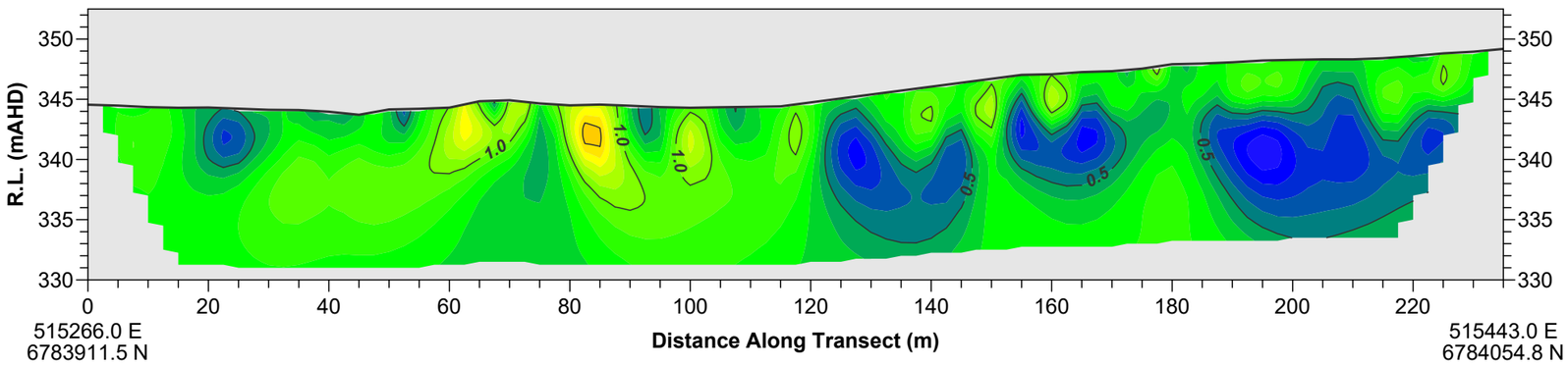
GBGGROUP

GEOPHYSICAL INVESTIGATION FOR ABANDONED MINE FEATURES, SHIRE OF YALGOO WESTERN AUSTRALIA.

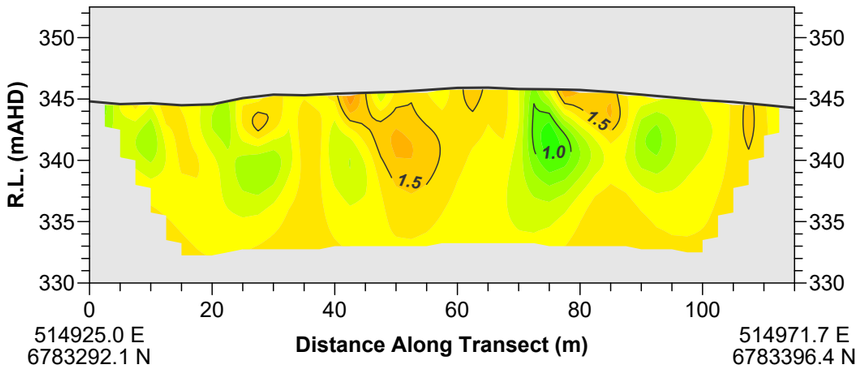
TRANSECT 1 - ELECTRICAL RESISTIVITY SECTION



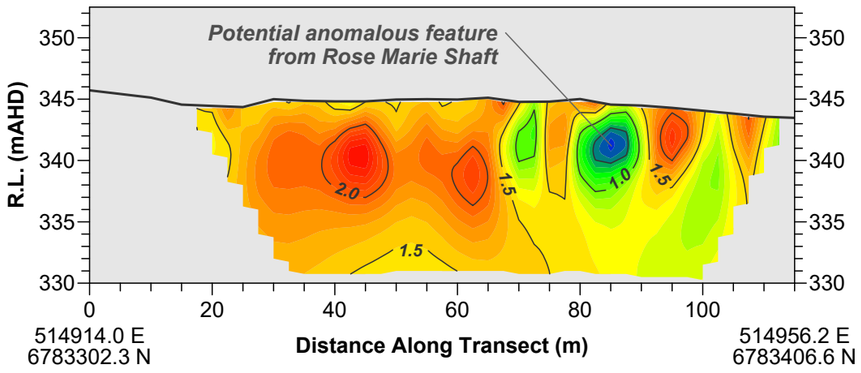
TRANSECT 2 - ELECTRICAL RESISTIVITY SECTION

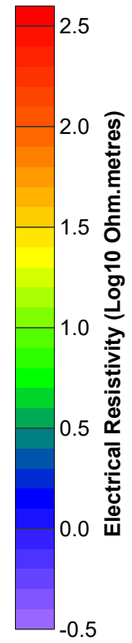


TRANSECT 3 - ELECTRICAL RESISTIVITY SECTION



TRANSECT 4 - ELECTRICAL RESISTIVITY SECTION





NOTES

Drawing to be used in conjunction with Report 3105.
Map Projection GDA2020 MGA Zone 50.
Aerial image from Google Earth Pro.

N

CLIENT	DOUGLAS PARTNERS	Date	22 May 2024	Paper Size	A3
	GEOPHYSICAL INVESTIGATION FOR ABANDONED MINE FEATURES SHIRE OF YALGOO WESTERN AUSTRALIA	Scale	1:1000(H), 1:500(V)	Drawn	AHWS
		Drawing	3105-04	Revision	0

GBGGROUP

G B Geotechnics (Australia) Pty Ltd
1/11 Gympie Way Willetton WA 6155
ABN: 77 009 550 869
Telephone: 02 9890 2122
Email: info@gbgoz.com.au

GBGGROUP

Sydney
28/7 Salisbury Road
Castle Hill, NSW, 2154
+61 02 9890 2122

Perth
1/11 Gympie Way
Willetton, WA 6155
+61 08 9354 6300

info@gbgoz.com.au