23 May 2023

TAILINGS STORAGE FACILITY NO. 1 (TSF1)

MT GIBSON GOLD PROJECT, WA

DESIGN REPORT

Capricorn Metals Ltd

Ref. PER2022-0011AD Design Report Rev 2

Table of Contents

1 TSF PROPOSAL SUMMARY 1
1.1 Tenure 4
1.2 Location 4
1.3 Ownership 5
1.4 History 5
2 TAILINGS STORAGE FACILITY DESIGN CONSIDERATIONS 6
2.1 Introduction 6
2.2 Storage Capacity 6
2.3 Site Conditions 7
2.3.1 Climate 7
2.3.2 Surface Topography 7
2.3.3 Geology 7
2.3.4 Hydrology 8
2.3.5 Hydrogeology 8
2.3.6 Subsurface and Foundations 8
2.3.7 Orion 2/3 Pit and Waste Dump 10
2.3.8 Seismicity 11
2.4 Retaining Structure Properties 11
2.5 Tailings Properties 11
2.5.1 Tailings Testwork 11
2.5.2 Geotechnical Characteristics 12
2.5.3 Geochemistry and Mineralogy Characteristics 13
3 TAILINGS STORAGE FACILITY DESIGN 13
3.1 Introduction 13
3.2 Hazard / Consequence Rating 13
3.2.1 Drawings 14
3.2.2 TSF Storage Characteristics 14
3.2.3 Embankment Design 15
3.2.4 Embankment Geometry 17
3.2.5 Water Recovery System 17
3.3 Modelling and Design Studies 18
3.3.1 Structural Stability 18
3.3.1.1 Method of Analysis 18
3.3.1.2 Parameters 19
3.3.1.3 Results of the Stability Analyses 19
3.3.1.4 Deformation Analyses 20
3.3.1.5 General Comments in Respect to Stability 20
3.3.2 Design Acceptance Criteria 21
3.3.2.1 Dam Break Assessment 21
3.3.3 Erosion Control 24
3.3.4 Seepage Analyses 24
3.3.4.1 Method of Analyses 24

3.3.4.2 Model Assumptions 24
3.3.4.3 Results of Analyses 25
3.3.5 Water Balance 25
3.4 Design and Construction Details 26
3.5 Tailings Discharge and Water Management 27
3.6 Basin Preparation 27
3.7 Quality Assurance 28
4 OPERATIONAL REQUIREMENTS 28
4.1 Management of Tailings Deposition and Water 28
4.1.1 Freeboard 28
4.2 Dust Control 31
4.3 Performance Monitoring and Instrumentation 31
4.3.1 Vibrating Wire Piezometers and Monitoring Bores 31
4.3.2 Displacement Monitoring 33
4.3.3 Visual Inspections 33
4.4 Emergency Action Plan 33
5 CLOSURE CONSIDERATIONS 33
5.1 Overview 33
5.2 Rehabilitation 34
5.3 Performance Monitoring against Closure Criteria 34
6 REFERENCES 34

APPENDICES
Appendix A – Tailings Storage Data Sheet (TSDS) and Explanatory Notes 37
Appendix B – Drawings 38
Appendix C – Prefeasibility Study 39
Appendix D – Geotechnical Investigation Report 40
Appendix E – Tailings Testwork 41
Appendix F – Seepage Analyses 42
Appendix G – Stability Analyses 43
Appendix H – Deformation Estimate 44
Appendix I – Water Balance Analyses 45
Appendix J – Dam Break Assessment 46
Appendix K – Geochemical Study 47
Appendix L – Scope of Works and Technical Specification Document 48
Appendix M – Operations Manual 49

TABLES

Table 1 – Soil/Rock Stratigraphy at TSF1 Locations

Table 2 – Drawings

Table 3 – Estimated Footprint Areas, Storage Volumes and Storage Capacities

Table 4 – Estimated Volume of Materials

Table 5 – Summary of Strength Parameters

Table 6 – Results of Stability Analyses

Table 7 – Summary of Dam Break Case Study Data

Table 8 – Results of Dam Break Analyses

Table 9 – Permeability Values Adopted

Table 10 – Results of Seepage Analyses

Table 11 – Locations of Monitoring Bores and Vibrating Wire Piezometers

1 TSF PROPOSAL SUMMARY

This document presents the design details required by the Department of Mines, Industry, Regulation and Safety (DMIRS), formerly the Department of Mines and Petroleum (DMP), Western Australia (WA), for the above-ground Tailings Storage Facility No. 1 (TSF1) at the Mt Gibson Gold Project (MGGP). The MGGP is located in the Mid West Region of WA, approximately 280 km northeast of Perth and 70 km southwest of Paynes Find. The location plan is shown in Figure 1.

TSF1 is located on Mining Leases M59/772. It has an approximate centre located at (MGA, Zone 50J) coordinates 6,709,150 m North and 517,700 m East. TSF1 will be located approximately 0.7 km from the east of the existing Orion 2/3 Pit, and 0.8 km from the proposed site office and process plant compound.

TSF1 has been designed to store approximately 55.0 Mt of tailings over an 11-years life assuming an ore processing rate of 5.0 Mtpa and tailings in-situ density of 1.35 t/m^3 (dry).

Capricorn Metals Ltd (CMM) proposes to construct TSF1 in order to store processed tailings from the proposed Carbon-in-Leach / Carbon-in-Pulp (CIL/CIP) plant located to the south of its proposed location. TSF1 has been designed as a circular facility incorporated within a waste rock storage, producing what is known as an Integrated Waste Landform (IWL). An IWL is considered to be the preferred option for tailings storage from an environmental and economic perspective as the proposed open cut mining operation using pit cut-back will produce mine waste with a strip ratio of 4.2:1 and there will be upfront waste mining and waste dump removal (nominally 18.5 Mt) which will enable the construction of Stage 1 (Starter) embankment of the IWL prior to plant commissioning.

TSF1 will be constructed within a clay/silt-lined perimeter embankment and raised utilising the downstream construction method. The clayey/silty (upstream) low permeability zone will have a minimum width of 6.0 m and be roller compacted. The mine waste or waste dump (downstream) zone will have a nominal width of 14.0 m and be traffic compacted.

At Stage 1 construction, to crest RL 345.0 m AHD, the upstream zone of TSF1 will incorporate a cut-off trench 0.5 – 1.5 m deep founded on a cemented Ferricrete layer in order to reduce seepage losses. Its footprint area will be approximately 144.5 ha, with a diameter of approximately 1,360 m for a circumference of 4,270 m. Stage 1 will be split into Stage 1A and Stage 1B. Stage 1A will be constructed prior to commissioning and Stage 1B in the early operations.

Stage 2 to Stage 7 (Final) raises will each incorporate a 1.5 m offset (bench) from the upstream crest of the preceding construction. Each construction raise will be 5 m high except for Stage 7 where the raise will be 2 m high. The crest level at Stage 7 construction is RL 372.0 m AHD.

At Stage 7 construction, TSF1 will occupy a total footprint area of approximately 207 ha and a maximum embankment height of 46.0 m (final crest RL 372.0 m AHD). Its footprint will have a diameter of approximately 1,625 m for a circumference of 5,105 m.

Embankment stability, embankment deformation, seepage, dam break and water balance analyses have been performed to support the design for a maximum crest embankment height of 46.0 m above the lowest natural ground levels.

Surface water will be removed from the TSF by a pontoon-mounted decant pump located within a rock ring-type central decant structure with low fines content. The decant area will be ‘lined’ using 0.5 m thick compacted clay/silt low permeability material. Return water will be pumped directly to the process plant for reuse. The water recovery system is designed to include the additional capacity to recover water from designed storm events. Access to the decant will be by a decant accessway constructed using silty/clayey and gravelly silt/clay mine waste.

At the early stages of deposition, surface water will be recovered by temporary decants at two locations. The temporary decants may comprise rock ring-type decant structures with low filter rock wall. A turret pump or similar will be installed behind the wall to pump return water to the process plant for reuse.

TSF1 will also incorporate an underdrainage system comprising perforated pipe underdrainage lines in seepage interception trenches grading to a concrete well tower via a seepage collection trench. These will be constructed along the northern half of the embankment alignments where the topographical levels are at or lower than the decant rock ring. Water will be pumped back from the concrete well tower to the process plant or utilised in construction.

The facility is classified, in accordance with Tables 1 and 2 of the DMP (2013) code, as hazard rating 'Category 1 – Medium'. The ANCOLD (2019) consequence rating is 'High C'. A dam break assessment has been performed and the hazard rating is based on this assessment.

The results of the design assessments for TSF1 indicate that the facility can be safely operated on the basis that:

- Liberated water is continually removed from the surface of the tailings.
- Tailings deposition is cycled around the facility to maximise tailings density and therefore the storage volume.
- The facility will be operated in accordance with the details contained in the Operations Manual.
- The safe operation of the storage relies upon the implementation of the tailings' operation, management inspection and maintenance procedures.

The closure objectives for TSF1 are to leave the facility in a safe, stable, erosion resistant and non-polluting state. These will be achieved through the following in the design:

- Downstream slopes of the TSF embankment will be rehabilitated. The maximum slope angle will be approximately 18^{o} or 1:3 (v:h) with no intermediate bench.
- The decant system will be decommissioned and the decant area sealed.
- The tailings top surface will be covered with a layer of non-acid forming (NAF) clay/rock/mine waste. The thickness of the capping layer must be determined based on the results of the ongoing geochemical characterisation study.
- Topsoil to suit local flora species will be applied once TSF1 is 'sealed'.

CMM as the operator of MGGP will have the following commitments to adhere to:

- TSF1 will be constructed, operated, maintained, rehabilitated, monitored and closed in accordance with the specifications and drawings, including where appropriate other studies made in consultation with relevant stakeholders.
- Construction will be supervised and monitored by personnel with experience in this type of construction. Details of construction will be provided in a construction report.
- All investigation and exploration drill holes within the footprint of TSF1 are to be sealed prior to construction.
- TSF1 will be managed and operated in general accordance with the Operations Manual. Independent audits will be performed annually.

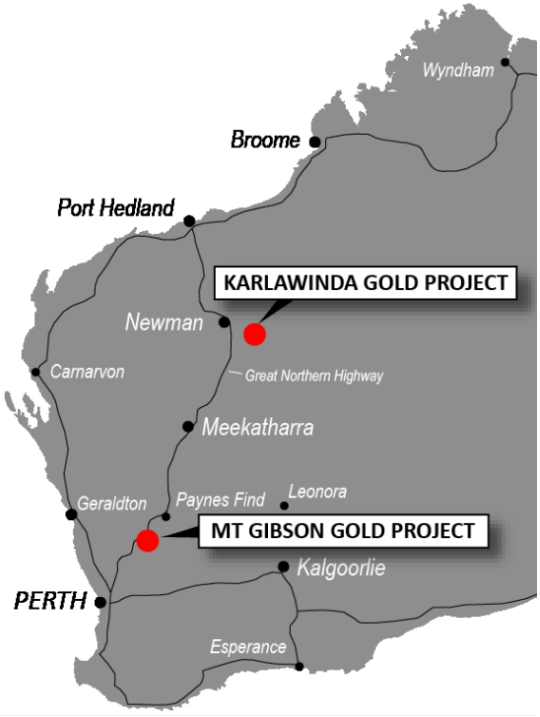

Figure 1: Location Plan of the Mt Gibson Gold Project (MGGP)

The following appendices complete this report:

- Appendix A – Tailings Storage Data Sheet (TSDS) and Explanatory Notes
- Appendix B – Drawings
- Appendix C – Prefeasibility Study
- Appendix D – Geotechnical Investigation Report
- Appendix E – Tailings Testwork
- Appendix F – Seepage Analyses
- Appendix G – Stability Analyses
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- Appendix M – Operations Manual

1.1 Tenure

The MGGP is located across mining tenements held by wholly owned CMM subsidiaries Crimson Metals Pty Ltd and Metrovex Pty Ltd. These include E59/2594, E59/2606, E59/2450, E59/2546, P59/2286-306, P59/2309 and P59/2310, M59/328, M59/402-404, G59/11, G59/12-18, G59/48, L59/12, L59/140, L59/16, L59/45, L59/46 and L59/53.

1.2 Location

TSF1 is located on mining tenement M59/772 in the Mid West Region of WA. It is part of the Mt Gibson Gold Project (MGGP) which is located approximately 280 km northeast of Perth and 70 km southwest of Paynes Find, WA.

TSF1 has been designed as a circular IWL with an approximate centre located at (MGA, Zone 50J) coordinates 6,709,150 m North and 517,700 m East. It will be located to the east of the existing open pits, the nearest being the Orion 2/3 Pit at approximately 0.7 km away. Other pits include Hornet, Enterprise, Yorktown, Lexington, Orion North, Orion, Orion 4, Sheldon, and Deep South. The proposed site office and process plant compound will be located at approximately 0.7 km to the south of TSF1.

The location and layout of TSF1 have been selected by CMM, using the prefeasibility study undertaken by CMW ref. PER2022-0011AB Rev 1 dated 2 May 2022 (CMW 2022). The CMW (2022) prefeasibility study is presented in Appendix C. The site was selected as it was close to the Orion 2/3 Pit where the initial pit cutbacks will commence, providing the supply of construction materials for the TSF. The location is also downslope from the proposed site office and process plant. Further, it avoids heritage sites, reduces intersects with a major flood path identified by the Project Hydrologist, and maintains safe blasting distances from the proposed pit cutbacks.

TSF1 and the associated boundaries, as shown in Figure 2, fit within the currently granted tenement boundary of the MGGP. Layout plans showing the locations of TSF1 Stage 7 (Final) and Stage 1 (Starter) embankments in relation to the nearby pits are presented as Drawings PER2022-0011-01 and PER2022-0011-02, respectively.

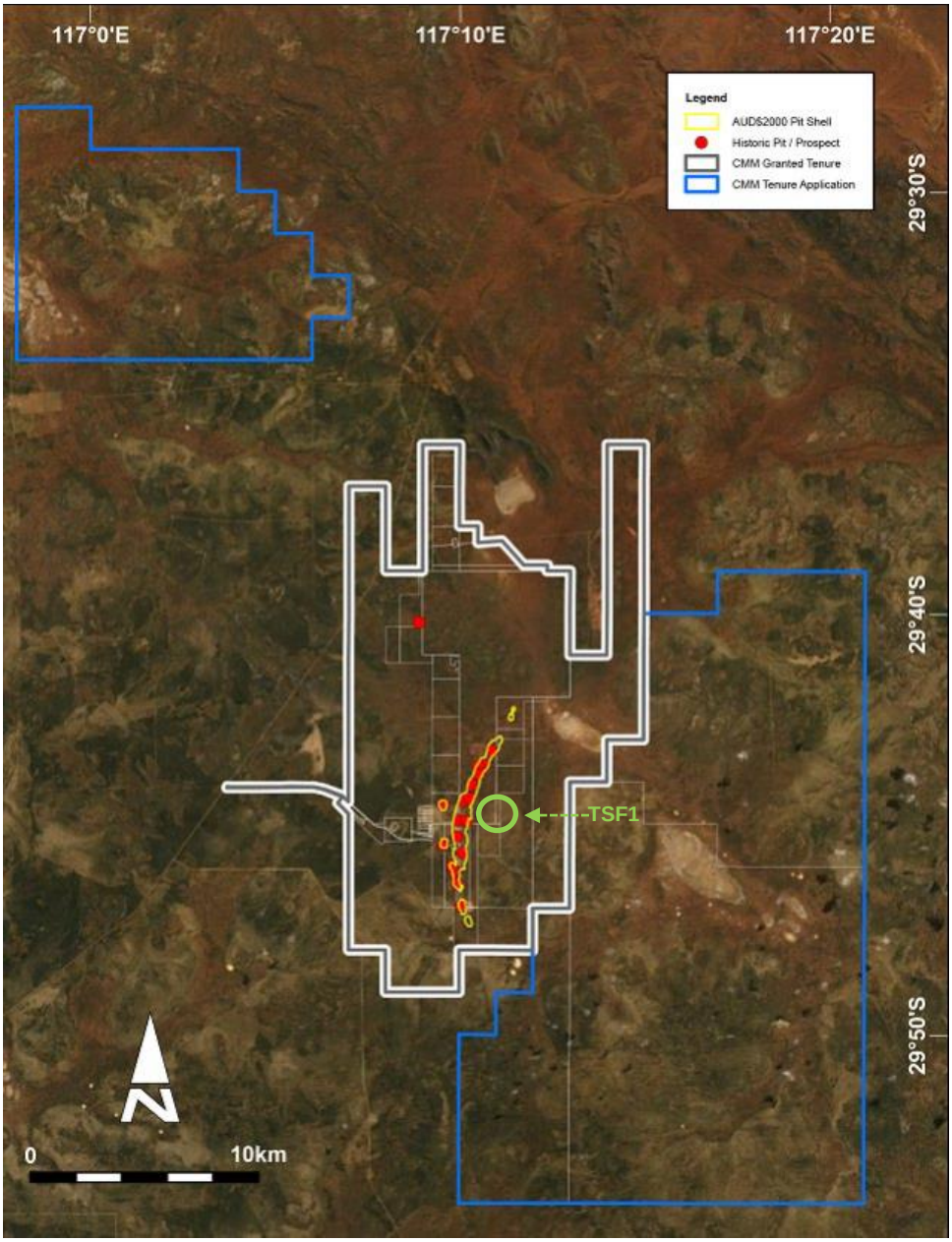

Figure 2: MGGP Tenement Plan & TSF1 Location

1.3 Ownership

The MGGP is owned and operated by Capricorn Metals Ltd, a publicly listed company (ASX: CMM).

1.4 History

Historical gold mining at the MGGP between 1986 and 1999 resulted in 14 open pits with an average depth of 60 metres below ground level (mbgl) and a maximum depth of 100 mbgl, and an underground mine. The Carbon-in-Leach (CIL) plant, which has since been decommissioned and removed, processed 12.5 Mt of ore at an average grade of 1.99 g/t for 799,600 oz of production. A further

68,868 oz of gold was recovered from a 4 Mt heap leach operation, taking total historic gold production at the MGGP to 868,468 ounces. Historical gold recoveries through the CIL plant were >90% by free milling.

The site has since been placed on care and maintenance with its processing plant subsequently decommissioned and removed.

CMM acquired MGGP in July 2021. At the time of acquisition, the mineral resources estimate was 79.7 Mt at 0.8 g/t of gold for 2,083,000 oz gold. It owned >660,000 m drill database, of which 5% was deeper than 150 m.

Since acquisition, CMM has carried out substantial resource definition drilling and modelling to inform the Pre-Feasibility Study for the project, having completed some 120,000m of RC and diamond drilling.

2 TAILINGS STORAGE FACILITY DESIGN CONSIDERATIONS

2.1 Introduction

Details contained in this report were compiled to DMIRS requirements and in accordance with the following guidelines:

- Department of Mines and Petroleum (2013), '*Code of practice: tailings storage facilities in Western Australia*'.
- Department of Mines and Petroleum (2015), *'Guide to the preparation of a design report for tailings storage facilities (TSFs)*'.

In addition to the DMIRS documents above, the design presented in this report has been undertaken using ANCOLD Guidelines (2019) *'Guidelines on Tailings Dams – Planning, Design, Construction, Operation and Closure'*. The consequence category will determine the water management (e.g. freeboard and stormwater storage capacity required) and geotechnical embankment design requirements.

2.2 Storage Capacity

Factors that are considered in TSF1 design:

- Annual tailings production of 5.0 Mtpa.
- Total tailings production of approximately 55.0 Mt.
- Tailings density of 1.35 t/m^3 (dry).
- Tailings deposited at 42.7% (oxide) to 63% (fresh) solids.
- Tailings beach slope of 1.0%.
- Storage for 2 years of storage capacity of Stage 1 (Starter) embankment.
- Stage 1 is split into Stage 1A and Stage 1B to reduce construction required before start-up.
- Ore is processed using the Carbon-in-Leach / Carbon-in-Pulp (CIL/CIP) method.

Details of the storage characteristics are further discussed in Section 3.2.2.

2.3 Site Conditions

2.3.1 Climate

The project area climate comprises hot and dry summers, and cold and dry winters. The following data has been utilised in the design.

- Mean annual rainfall of 330.5 mm (BOM 2016 data for Mt Gibson, WA Station 010075).
- Mean annual evaporation 3,243 mm (Luke et al 1987 for Paynes Find).
- Average annual evapotranspiration 320 mm (BOM 2005).
- 1:100 yr. Annual Exceedance Probability (AEP) event of 72 hr duration, 179 mm (BOM 2016 data for Latitude 29.7375 South and Longitude 117.1875 East).
- Probable Maximum Precipitation (PMP) storm event, 6-hour duration of 680 mm (BOM (2002) '*The Estimation of Probable Maximum Precipitation in Australia: Generalised Short-Duration Method*').

2.3.2 Surface Topography

The topography of the TSF1 project area is characterised by minor topographical relief with grade across the site of approximately 2%. The elevations range from approximately RL 350 m on the south to RL 326 m on the north. Surface undulation is generally minimal except at some localities of the granite mounds where gradients were as steep as 5% (CMW 2022).

TSF1 site is overlain by sandy colluvium plain with pockets of granite mounds which exhibit exfoliation in almost all occurrences. Quartz and feldspar form the primary mineral grains of the surficial sand, which generally is yellow in colour and dry. With the exception of the thin loose layer on the surface (+/-20 mm) the sand is considered medium dense (CMW 2022).

The granite mounds are encountered mostly on the south and east of the TSF basin. On a similar setting, a heritage-listed waterhole is located well away to the southeast of TSF1. Some granite mounds to the east and southeast of TSF1 also contained sites of heritage value.

The vegetation at and around the TSF1 project area comprises of mainly low-lying Acacia woodland. Occasional chenopod/saltbush shrub in open spaces, and to a lesser extent Tussock grass, are also present. Eucalyptus woodland, mainly the York gum and mallee, occur on finer-textured soils (silt, clay) in local sheetwash or gully features.

2.3.3 Geology

The MGGP tenements are located at the southern extremity of the Retaliation Greenstone Belt, in the southwest portion of the Yalgoo-Singleton Greenstone Belt, a supracrustal complex of the Yilgarn Craton. The tenements are mostly covered by a veneer of alluvial quartz sands and laterite gravels, with sporadic greenstone subcrop and outcrop, increasingly exposed in the north of the project area.

Within the TSF1 project area, the regolith consists of thin surficial sandy soils with increasing fines (silt, clay) and lateritic gravel contents with depth, overlying slightly to moderately cemented (hardpan) which further down became cemented by iron oxides (ferricrete). The soil layers including the gravelly soils typically range between 1 m to 2 m thick, overlying above the underlying ferricrete that is typically up to 3 m thick.

Saprolite underlying the surficial layers and above the bedrock extends to depths of between 20 mbgl to 40 mbgl. It displays an upper zone with shades of pale brown to brown layer with red and yellow hues, overlying a lower zone that is white and grey in colours. Both saprolite zones exhibit little indication of texture degradation. For the purpose of the geotechnical investigations (refer to Section

2.3.6), the two saprolite zones are referred to as the 'upper saprolite' and 'lower saprolite', respectively.

The Archaean basement is dominantly volcanic, intrusive mafic and felsic rocks and their sheared equivalents, which have been metamorphosed to the mid-amphibolite facies. Metasedimentary rocks are rare and consist of thin, discontinuous, interflow ferruginous cherts. The basement of the mine area consists of volcanic sequences.

2.3.4 Hydrology

The TSF1 site has no intersecting major drainage lines or creeks. There are no permanent water bodies in the project area except for the existing open pits, Orion 2/3 Pit being the closest at approximately 0.5 km to the west of TSF1 at its Stage 7 (Final) embankment. Drainage is through sheetflow with no distinct drainage line (CMW 2022). The drainage flows to the north-northeast and into nearby salt lakes, the closest of which being the Karpa Spring at approximately 4 km to the northeast.

2.3.5 Hydrogeology

KP (2003) indicated that groundwater was saline and its regional distribution indicated an increase in salinity towards drainage lines particularly the palaeodrainages. The lowest salinity groundwater occurred along the drainage divides, and the highest at >140,000 mg/L occurred along the palaeodrainage systems. At the salt lakes, the groundwater salinity increased downstream due to the concentration of salts through evaporation at lake surfaces (KP 2003).

Groundwater was not encountered within any of the test pits and boreholes at the TSF1 project area during the geotechnical investigations supervised by CMW (refer to Section 2.3.6). At the time of the investigations, a water body was noted at approximately 60-70 m depth within Orion 2/3 Pit which lies to the north of Orion 4 Pit, and approximately 0.5 km to the west of TSF1.

Rockwater (2003) indicated that historically, groundwater was encountered at between RL 297.91 m to RL 311.01 m around Orion 4 Pit and at RL 336.73 m in Tailings Dam No. 1 (TD1) and Tailings Dam No. 2 (TD2). The records in TD1 and TD2 are considered as not applicable as it was noted from the KP (2003) report that there were occurrences of historic seepage adjacent to TD2 embankments, in the past when TD1 and TD2 were operated recovery/pumping bores were used to recover seepage.

The current elevations at the proposed TSF1 location are RL 326-350 m therefore groundwater is expected at between 15 mbgl and 52 mbgl if the historical levels around Orion 4 Pit are taken as a reference.

2.3.6 Subsurface and Foundations

CMW carried out two geotechnical investigation campaigns of the proposed TSF1 site, summarised in the report referenced PER2022-0011AC Rev 0 dated 27 February 2023, attached as Appendix D.

The second geotechnical investigation was undertaken due to the relocation of TSF1 to approximately 400 m to the north-northwest of the original intended location. The relocation was proposed to protect locations with heritage value, and to avoid an extensive remediation over rock outcrops requiring the application of a thick clay liner on TSF storage area (basin).

Overall, the scope of fieldworks completed was as follows:

- A walkover survey of the site to assess the general landform and site conditions.
- Fifty-four (54) test pits denoted TP01 to TP22, TP30 to TP50 including two locations of TP45 (TP45A and TP45B), TP51, TP52, TP55 to TP58, and TP61 to TP64. The test pits were excavated using a 24 t Doosan DX225LC hydraulic excavator to depths ranging between 0.25

m to 1.35 m to assess the subsurface conditions. Test pits were generally terminated on a cemented (Ferricrete) layer prior to reaching the target depth of 3.0 m;

- Representative bulk samples were taken from the test pits for subsequent laboratory testing which included Particle Size Distribution (PSD, 10 no. of tests), PSD with Hydrometer (5 no.), Atterberg Limits (13 no.), Falling Head Permeability (5 no.), Dry Density/Moisture Content Relationship (5 no.), Soil Particle Density (5 no.), Emerson Class Number (7 no.) and Multistage Consolidated Undrained (UC) Triaxial Test (2 no.);
- Eleven (11) hand auger boreholes denoted HA23 to HA29, HA53, HA54, HA59 and HA60 were undertaken using a 100 mm dia. auger to depths ranging between 0.15 m to 1 m. These were undertaken in place of the test pits where clearing, for access by excavator, was not allowed due to the presence of active mallee fowl nests. The majority of hand auger boreholes were terminated on cemented layer with the exception of HA26 to HA29 which refused on granite outcrops;
- Eighteen (18) reverse circulation (RC) boreholes at six locations, and Nine (9) air core (AC) boreholes at three locations, were drilled to facilitate in-situ falling head permeability tests. Boreholes were drilled to 1 m, 10 m and 15 m at each of the locations denoted as BH01 to BH09;

Engineering logs and photographs of the test pits are presented in the Geotechnical Investigation Report, included in Appendix D of this report.

At the current proposed TSF1 site, the encountered subsurface profiles can be generalised to the sequence of the following units:

Silty SAND (Colluvial)	fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; trace gravel fine to coarse, subrounded to rounded, pale grey/grey.
Overlying	
Gravelly Silty SAND to Gravelly SAND (Colluvial)	fine to coarse grained, poorly graded, subangular to subrounded, red-brown; silt non-plastic; gravel fine to coarse, subrounded to rounded; slightly cemented.
or	
Sandy GRAVEL (Alluvial)	fine to coarse, rounded to subrounded, red-brown-patchy pale grey/mottled dark grey-pale green; with sand fine to coarse grained, subrounded to subangular, well graded, red-brown; with silt/clay low plasticity.
Overlying	
FERRICRETE	retrieved as Silty SAND with Gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented.
Overlying	
GRANITE (Saprolite)	recovered as Sandy SILT; silt non-plastic to low plasticity, white; sand fine to coarse, well graded, subangular to subrounded.

The overall distribution of subsurface conditions encountered is presented in Table 1. It must be noted that not every unit is present in all locations.

Table 1: Soil/Rock Stratigraphy at TSF1 Locations				
Description	**Depths Encountered (mbgl)**			**Averaged Thickness (m)**
	Top	**Bottom**		
		Min	**Max**	
Silty SAND (Colluvial)	0	0.1	0.9	0.4
Gravelly Silty SAND to Gravelly SAND (Colluvial)	0	0.1	1.2	0.6
Sandy GRAVEL (Alluvial)	0.2	0.5	1.0	0.5
FERRICRETE	0.1 – 1.5	2.0	9.0	3.5
GRANITE (Saprolite)	0.5	-	>15.1	-

Permeability tests were carried out by CMW in the 27 no. of boreholes drilled to 1 m, 10 m and 15 m (9 no. of boreholes each).

The permeability tests were carried out using a groundwater dipmeter over a duration of up to 2 days each. A minimum of one set of measurements was made in each of the 27 boreholes. The results were recorded along with the depth of boreholes including the changes in dimensions due to partial collapses of the wall after water was added in, if any. The records were then used to estimate the soil permeabilities based on the Hvorslev method.

The averaged soil permeabilities of the 1 m, 10 m and 15 m boreholes were 8.9×10^{-6} m/s, 1.0×10^{-7} m/s and 5.4×10^{-6} m/s, respectively.

Based on the results of the investigations, the following was adopted in design:

- Stripping to approximately 0.1 m depth, followed by subgrade moisture conditioning and compaction to improve the consistency and reduce the permeability of the overlying soil layer.
- A cut-off trench, to 0.5 – 1.5 m below ground level in the surficial colluvial layer has been included in the embankment design to reduce horizontal seepage losses.
- Underdrainage system comprising seepage interception trenches, and seepage collection trench and concrete tower.

2.3.7 Orion 2/3 Pit and Waste Dump

Based on the prefeasibility study undertaken by CMW (CMW 2022), the following points are understood from the materials found within the Orion 2/3 Pit:

- The overburden soil layer in Orion 2/3 Pit was described as gravelly CLAY with sand with soil classification ‘CL’. The fines content was 43% and were low plasticity. It has a very low permeability of around 1×10^{-8} m/s. The material is non-dispersive with an Emerson Class Number (ECN) of 4.
- The upper saprolite material in Orion 2/3 Pit was described as sandy SILT trace gravel, and assigned a soil classification ‘ML’. It has substantial fines content (62% fines) of medium plasticity. The materials are non-dispersive with an ECN of 5.
- The lower saprolite material in Orion 2/3 Pit was described as non-plastic SILT with sand trace gravel, which indicated a structure where fines were dominant. It has a very low permeability of

around 1 x 10^{-8} m/s. Similar to the upper saprolite materials, its soil classification is 'ML' and is generally non-dispersive. The lower saprolite materials, however, are non-plastic.

- Tests on the samples from the Orion 2/3 Waste Dump indicated materials which would be defined as poorly graded sandy silty GRAVEL trace cobbles, and a soil classification 'GM'. The fines (silt) component has low plasticity. It was noted that the coarse grained contents of the sample from Orion 2/3 Waste Dump, especially cobbles and boulders could be higher, however, these coarse grained materials were removed prior to testing in order to comply with the upper limit of 75 mm for suitable sieve sizes of a Particle Size Distribution (PSD) test in accordance with AS1289.3.6.1 (2009).

The overburden soil and saprolite layers in the Orion 2/3 Pit are considered as suitable materials for the construction of the upstream zone (Zone A) of TSF1. The materials from the Orion 2/3 Waste Dump should be used as the downstream zone (Zone B) of the TSF.

2.3.8 Seismicity

The project area is located in a region of low seismic risk. The Operating Basis Earthquake (OBE) of 0.12 g, as derived from AS 1170.4 (2007) for 1:475 year AEP of the 'High C' consequence category (refer Section 3.2), has been used in the seismic design of TSF1 embankment. The corresponding Maximum Design Earthquake (MDE) / Safety Evaluation Earthquake (SEE) is 0.21 g for 1:2,000 year AEP with a probability factor k_p of 1.7.

2.4 Retaining Structure Properties

The TSF1 embankments will be constructed out of clayey/silty mine waste (Zone A) and mine waste (waste dump) materials (Zone B) from the mining operations at MGGP with the clayey/silty mine waste forming the upstream zone and the waste dump forming the downstream zone. The upstream zone is to be roller compacted and the downstream zone is to be traffic compacted.

The clayey/silty mine waste materials to be used in the upstream zone should be predominantly the gravelly CLAY with sand materials of the overburden soil layer in Orion 2/3 Pit, plus the low permeable sandy SILT trace gravel of the upper saprolite and the low permeable SILT with sand trace gravel of the pit. The materials are considered as stable and non-dispersive, and are classified as non-liquefiable under dynamic loadings or seismic activity.

The Zone A and B materials will be non-acid forming (NAF). The physical properties of the Zone A materials should be confirmed by laboratory testing as part of construction.

Appendix L provides the technical specifications for the embankment construction materials.

2.5 Tailings Properties

2.5.1 Tailings Testwork

Tailings testwork was performed on two samples comprising a sample each of the Oxide and Fresh tailings from the Orion Pit metallurgical testwork program carried out by Minelogix. The samples were denoted OOMC and OFMC, respectively. The testwork was undertaken by Western Geotechnical and Laboratory Services (WGLS), a NATA registered laboratory in January 2023. The laboratory certificates are presented in Appendix E.

The OOMC sample was medium plasticity CLAY with fine to medium grained sand. The soil classification, in accordance with the Unified Soil Classification System (USCS) is 'CI'. OOMC has 77% fines and specific gravity (SG) of 2.83 t/m^3. The settling test results indicated it has poor settling characteristics and will have low insitu densities at likely around 1.1 t/m^3 (dry).

The OFMC sample was non-plastic SILT with fine to medium grained sand. The soil classification is 'ML'. OFMC has 57% fines and SG of 3.04 t/m^3. It has rapid settling characteristics and will have higher insitu densities at likely around 1.5 t/m^3 (dry).

The consolidation characteristics would indicate a slower consolidation of OOMC as compared to OFMC. OOMC has coefficients of consolidation (Cv) of between 2 m^2/yr to 6 m^2/yr with corresponding permeabilities (k) of 5x10^{-8} m/s to 1x10^{-10} m/s. OFMC has Cv of between 6.8 m^2/yr to 8.5 m^2/yr with corresponding k of 1x10^{-8} m/s to 5x10^{-10} m/s. Based on these findings, OOMC is expected to potentially 'seal' the base of the TSF1 basin as it consolidates. The use of underdrainage has been proposed in the TSF1 design as discussed in Section 3.4, with the system to be constructed internally underneath the embankment instead of within the basin to avoid the 'sealing' of the system.

The results of the tailings testwork are summarised below:

- OOMC undrained and drained settled density of 0.72 t/m^3 (dry) and 1.1 t/m^3 (dry) achieved in 7 days. For OFMC, these were 1.4 t/m^3 (dry) and 1.8 t/m^3 (dry), respectively.
- Air drying test, final densities of 1.12 t/m^3 (dry, OOMC) and 1.36 t/m^3 (dry, OFMC) after 14 days.
- Consolidation test, vertical displacements of 16.1 mm and 6.9 mm at 1,600 kPa for OOMC and OFMC, respectively.

Based on the tailings testwork the following has been utilised in the design:

- Oxide tailings: insitu density 1.1 t/m^3 (dry)
- Fresh tailings: insitu density 1.5 t/m^3 (dry).
- Overall insitu density used in design 1.35 t/m^3 (dry)
- Tailings beach slopes: oxide <0.5%, design slope used 1%.

2.5.2 Geotechnical Characteristics

The engineering properties of the tailings based on information provided by the tailings testwork are summarised below:

- Slurry density ex-plant of 42.7% solids (OOMC) and 63% solids (OFMC).
- Tailings in-situ density 1.35 t/m^3 (dry).
- Specific gravity of approximately 2.8 (lowest).
- Effective angle of internal friction, ϕ of between 27^0 and 32º (assumed based on PSD and Atterberg Limits testing).
- PSD, % passing 75 µm of 77% and 57% for OOMC and OFMC, respectively.
- PSD, % passing 3 µm of 20% and 3% for OOMC and OFMC, respectively.
- Tailings beach slope of 1%.
- Permeability, k of 10^{-8} m/s.
- Coefficient of Consolidation, C_v of 5 m^2/year (overall).

Based on the above parameters and traditional consolidation theory, a 46.0 m depth of tailings would likely consolidate over 5 years, assuming 1-way drainage. It is recommended that during deposition the tailings consolidation parameters are confirmed by testing. This confirmation should also be done as part of future closure planning.

2.5.3 Geochemistry and Mineralogy Characteristics

A geochemical characterisation of the tailings was performed by Graeme Campbell and Associates (GCA). A summary of the geochemical characterisation work by GCA is provided below:

- Tailings slurry samples comprised Oxide Ore, Transition Ore and Fresh Ore samples.
- The Oxide Ore tailings were classified as non-acid forming (NAF) whereas the Transition Ore and Fresh Ore were classified as potentially acid forming (PAF). Weathering of the PAF tailings would take ≥16 weeks.
- Tailings slurry waters were hypersaline with Total Dissolved Solids (TDS) values of 60-70 g/L.
- Weak Acid Dissociable Cyanide (WAD CN) concentration below the industry target of 50 mg/L for TSF decant waters.
- During operation of TSF1, the hypersaline decant water (CN detoxified) should pose minimal risk for wildlife (e.g. birds). It was understood that the foundation of the TSF would act as a barrier to seepage of tailings porewaters, and that the groundwater beneath the TSF site is hypersaline.
- Decommissioning and rehabilitation of TSF1 would likely require remediation for surface zone tailings (e.g. uppermost 1-2 m) which were classified as PAF. A form of store and release cover system comprising NAF mine waste should be developed as dust control and to constrain the weathering of the PAF tailings. Future technical investigations would be required to facilitate the development of an appropriate TSF cover design.

3 TAILINGS STORAGE FACILITY DESIGN

3.1 Introduction

The design objectives for this facility are:

- Optimising the removal of water from the facility and return to the plant for re-use in processing, which will assist in maximising the in-situ dry density of the deposited tailings.
- Optimising tailings storage capacity by maximising the deposited tailings density (i.e. undertaking cyclic tailings deposition between different locations of spigot) and reducing tailings drying time.
- Reducing environmental impact by maximising water recovery and minimising the potential for seepage losses.

Drawings PER2022-0011-01 to PER2022-0011-04 provide the general arrangements, and sections and details for the TSF1 design (refer to Appendix B). Scope of Works and Technical Specification Document (SoW) for the construction of TSF1 is included in Appendix L. Schedules of quantities for the staged construction of TSF1 are also included in Appendix L.

3.2 Hazard / Consequence Rating

Based on the DMP Code of Practice (2013), the hazard rating for the TSF has been assessed as 'Category 1 – Medium' based on the following:

- Possible loss of life, for the purposes of design, we have conservatively estimated a Population at Risk (PAR) of ≥10 and <100 (noting the PAR are mine personnel). The potential for tailings to flow >0.7 km to the west towards the open pit operations, and >0.8 km to the south towards the site office and processing plant;
- Loss of TSF storage capacity, and permanent loss of assets including infrastructure. No loss of public infrastructure is expected;

- Permanent loss of assets (mine infrastructure) is possible;
- Adverse effects on natural environment, flora and fauna, are possible;
- Adverse effects on items of heritage values are possible;
- An ultimate embankment height of approximately 46.0 m.

Based on the above considerations and Table 1 of ANCOLD (2019), a 'Medium' damage is assigned. It is characterised by loss of infrastructure of the order $10M to $100M, significant impacts to business (i.e. the mine and plant), impact area 5 km^2 or less, and impact duration less than 5 years. For the purposes of the design, the consequence category for 'Medium' damage, based on Table 2 of ANCOLD (2019) and with an estimated PAR of ≥10 to <100, is 'High C'.

3.2.1 Drawings

The following design drawings are presented in Appendix B.

Table 2: Drawings

Title	Drawing No.
TSF – Final Stage Plan	PER2022-0011-01
TSF – Stage 1 Plan	PER2022-0011-02
TSF – Final Stage Sections	PER2022-0011-03
TSF – Stage 1 Sections	PER2022-0011-04
Pipeline and Spigot Details	PER2022-0011-05
Instrumentation and Underdrainage Plan	PER2022-0011-06
Instrumentation Details	PER2022-0011-07
Underdrainage Sections and Details	PER2022-0011-08
Inundation Plan	PER2022-0011-09
TSF – Deposition Levels Plan	PER2022-0011-10

3.2.2 TSF Storage Characteristics

TSF1 has been designed with a storage volume of 40 Mm^3. The storage capacity will be 55.0 Mt of tailings over an 11-years life assuming an ore processing rate of 5.0 Mtpa, a tailings in-situ density of 1.35 t/m^3 (dry) and a beach slope of 1%. CMM indicated that 27% of tailings will be from oxide and transitional ores, and 73% from fresh ores.

The estimated stage-by-stage footprint areas, storage volumes and storage capacities of TSF1 are summarised in Table 3.

Table 3: Estimate Footprint Areas, Storage Volumes and Storage Capacities

Stage	Crest RL (m AHD)	Cumulative Footprint Area (ha)	Cumulative Volume (Mm^3)	Cumulative Storage Capacity (Mt)	Cumulative Storage Life (years)
1A (Starter)	340.0	89.5	2.3	3.1	5 months
1B	345.0	144.5	6.0	8.1	1.6
2	350.0	155.0	11.9	16.1	3.2
3	355.0	165.0	18.3	24.8	5.0
4	360.0	175.0	24.9	33.9	6.8
5	365.0	185.0	31.9	43.2	8.6
6	370.0	195.0	39.1	52.9	10.6

Table 3: Estimate Footprint Areas, Storage Volumes and Storage Capacities					
Stage	**Crest RL (m AHD)**	**Cumulative Footprint Area (ha)**	**Cumulative Volume (Mm^3)**	**Cumulative Storage Capacity (Mt)**	**Cumulative Storage Life (years)**
7 (Final)	372.0	207.0	42.1	56.8	11.4

The storage capacity curve of TSF1, plotting the storage volume against the rise in RL, is shown by Figure 3.

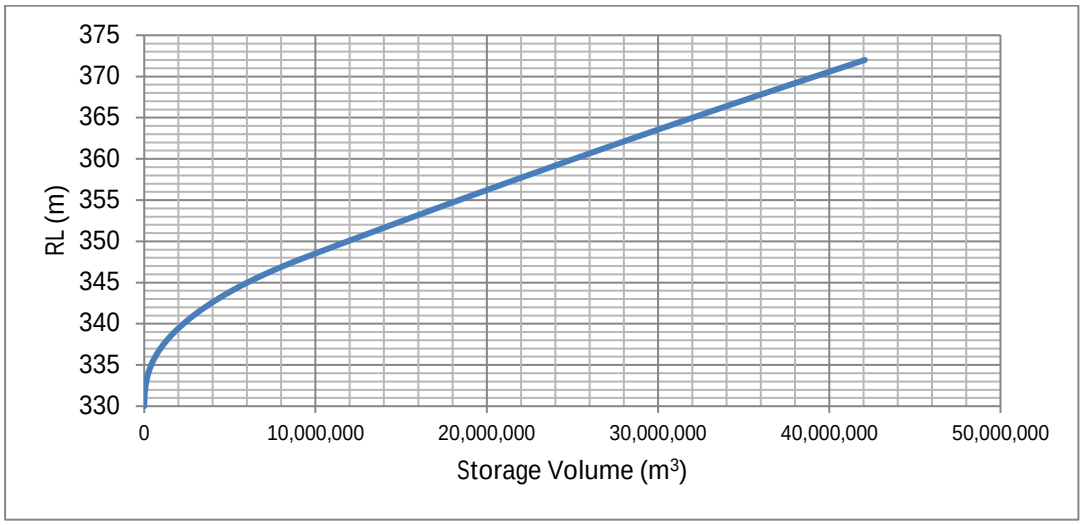

Figure 3: Storage Capacity Curve

3.2.3 Embankment Design

TSF1 will be a single cell circular facility constructed within a mine waste (waste dump) constructed in 7 no. of stages. Stage 1 construction will be split into Stage 1A (Starter) and Stage 1B. Stage 1A will be constructed prior to commissioning and Stage 1B in the early operations. The total footprint area at Stage 1A will be approximately 89.5 ha with a diameter of approximately 1,070 m and a circumference of 3,360 m. The total footprint area at Stage 1B will be approximately 144.5 ha with a diameter of approximately 1,360 m and a circumference of 4,270 m. At Stage 7 (Final) construction, the total footprint area will be approximately 207 ha with a diameter of approximately 1,625 m and a circumference of 5,105 m.

The embankment will be zoned comprising an upstream zone of low permeability roller compacted clayey/silty mine waste (Zone A) and a downstream zone of the traffic compacted mine waste (waste dump) materials (Zone B). The decant accessway will be constructed using clayey/silty and gravelly silt/clay mine waste (Zone C). The decant rock ring will be constructed using select filter rock (Zone D).

The materials will be internally sourced from the pit cutbacks within the MGGP tenements. A figure showing the general arrangement of TSF1 at Stage 7 (Final) construction is presented in Figure 4. The maximum and averaged embankment heights will be approximately 46 m and 34 m, respectively. The embankment incorporates a cut-off trench excavated to a competent Ferricrete layer, for 0.5 – 1.5 m depth in order to reduce seepage losses.

The estimated stage-by-stage volumes of materials required are summarised in Table 4.

Table 4: Estimated Volume of Materials				
Stage	**Zone A (m^3)**	**Zone B (m^3)**	**Zone C (m^3)**	**Zone D (m^3)**
1A (Starter)	119,000 (1)	636,000	0	0
1B	144,000 (2)	824,000	13,000	6,500
2	123,000	1,430,000	63,000	30,000
3	125,000	2,060,000	77,000	38,000
4	127,000	2,700,000	78,000	46,000
5	129,000	3,370,000	79,000	54,000
6	131,000	4,060,000	81,000	62,000
7 (Final)	53,000	1,720,000	41,000	26,000
Total	951,000	16,800,000	432,000	262,500
(1) Includes materials for the cut-off trench. (2) Includes 0.5 m thick 'liner' constructed of clay/silt low permeability material around the decant area.				

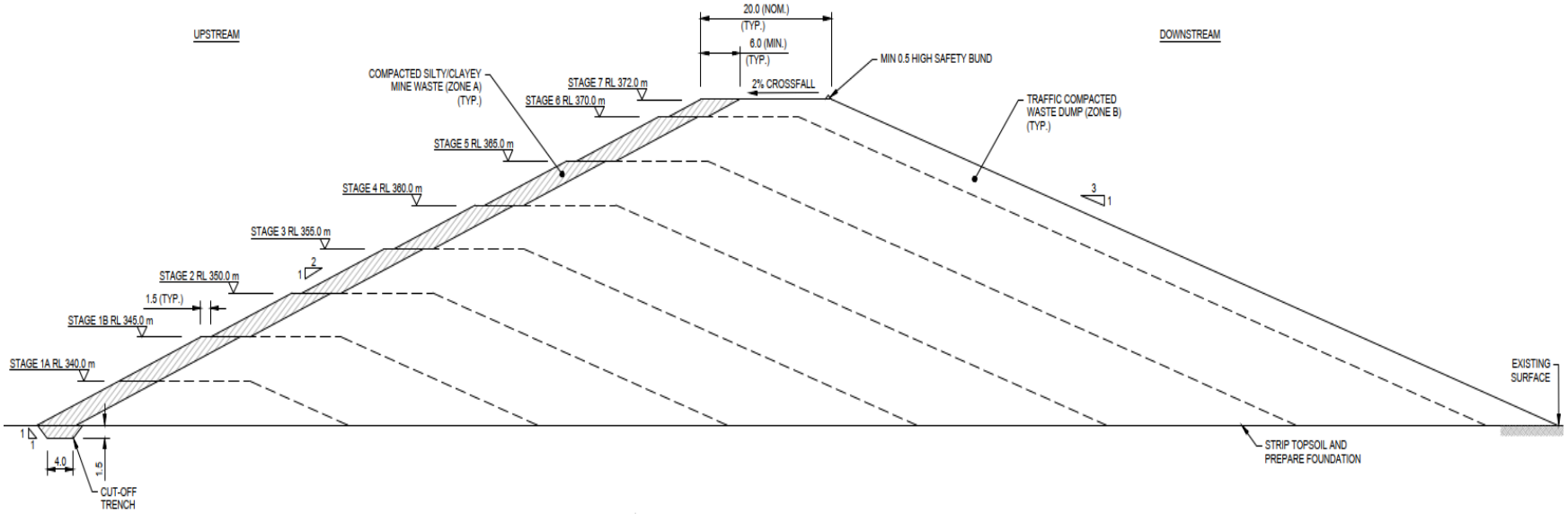

Figure 4: Typical Cross Section of TSF1 Stage 7 (Final) Embankment *(not to scale)*

3.2.4 Embankment Geometry

TSF1 embankment will have design slopes of 1:2 (v:h) upstream and 1:3 (v:h) downstream, with a minimum crest width of 20.0 m. The crest width comprises of the 6.0 m (min.) of the upstream zone and 14.0 m (nom.) of the downstream zone. The designs have considered the required a minimum clearance of 150 m from any heritage area, and for crest only a minimum clearance of 500 m from blast radius of pit cutback. Based on the current design of the Waste Rock Dump (WRD), it is expected that 20-25% of the downstream zone will be exposed, and the remainder will be abutted by the WRD i.e. a composite downstream zone larger than the design section of the IWL.

The embankment crest will have a 2% cross-fall towards the upstream side, 0.5 m (min.) high rock/mine waste windrow at the downstream crest, and above ground tailings pipeline at the upstream crest.

The decant accessway has design slopes of 1:1.5 (v:h), 15.0 m crest width, and a transversal slope of 1^0 from the embankment down to the rock-ring decant. The crest of the decant causeway will have 0.5 m (min.) high rock/mine windrows on both sides, with breaks in the windrow on the low side to allow surface water to run off.

The rock-ring decant will be 70.0 m in diameter and has design slopes of 1:1 (v:h) and a crest width of 6.0 m.

A seepage collection system, comprising seepage interception trenches plus a collection trench and concrete tower will be constructed underneath the downslope parts of the embankment to reduce potential seepage. The seepage interception trenches will extend approximately 1.6 km underneath the northern half of Stage 1 (Starter) embankment. The seepage interception trenches are connected to a concrete well tower by a collection trench that each extends approximately 215 m perpendicular to the (Stage 1 to Stage 7) embankments. The collection trench and concrete tower are located on the north of TSF1, at the lowest natural elevations.

The design geometry of the proposed TSF1 construction is presented on Drawings PER2022-0011-03 to PER2022-0011-04 in Appendix B.

3.2.5 Water Recovery System

Surface water will be removed from TSF1 by a pontoon-mounted decant pump located within a rock-ring type central decant structure. The decant area will be lined using 0.5 m thick compacted clayey liner to reduce seepage and improve water recovery. Return water will be pumped directly to the processing plant for reuse. The efficacy of the water return system is the key to achieving a high in-situ dry density within the tailings stack. The minimum capacity of the water recovery system should be not less than 940 tph (62% water return) including the additional capacity needed to recover water from design storm events.

At the early stages of deposition, surface water will be recovered by temporary decants within the tailings storage basin. The locations (2 no.) of the temporary decant structures are shown on Drawing PER2022-0011-02. It should be noted that given the sloping nature of the ground, decant water will not enter the central decant for 2-3 months.

The temporary decants may comprise rock ring-type decant structures with low filter rock wall. A turret pump or similar will be installed behind the wall to pump return water to the process plant for reuse. The temporary decant will allow early water return and hence reduce the potential for seepage.

3.3 Modelling and Design Studies

3.3.1 Structural Stability

3.3.1.1 Method of Analysis

Stability analyses were undertaken to assess the stability of the TSF embankment at crest levels of RL 345.0 m and RL 372.0 m of the Stage 1 (Starter) and Stage 7 (Final) constructions, respectively. These are equivalent to maximum embankment heights on the north (tallest) of 19.0 m and 46.0 m, respectively. The analyses were undertaken in general accordance with ANCOLD (2019).

The computer software package 'Slide' was utilised to undertake the analyses. Slide is a two-dimensional slope stability program for evaluating the safety factor of circular and non-circular failure surfaces in soil and rock slopes. The stability of the slip surfaces for static and seismic loadings was assessed using vertical slice limit equilibrium methods. The simplified Bishop and GLE/Morgenstern-Price methods were used in the analyses of circular slip (no loss of containment) and non-circular or wedge (with loss of containment) failures, respectively.

The design earthquake loads for the TSF embankment *(Safety Evaluation Earthquake, SEE (previously Maximum Design Earthquake or MDE), Operational Basis Earthquake, OBE and Maximum Credible Earthquake, MCE)* was determined by consideration of the consequence category of the tailings storage and are selected as earthquakes with given AEP. ANCOLD (2019) gives guidance in selecting the AEP of the OBE and SEE, and in calculating the MCE. This guidance considers 'defensive' earthquake design through the use of TSF principles.

Since the TSF has been designed as a 'High C' consequence category storage, the OBE is 1:475 years AEP and SEE is 1:2,000 years AEP.

The following cases were examined in the stability analyses:

Case 1: Static Analysis – Downstream failure of TSF1 embankment with crest levels of RL 345.0 m and RL 372.0 m (19.0 m and 46.0 m maximum embankment heights) under drained condition based on limit equilibrium method.

Case 2: Static Analysis – Upstream failure of TSF1 embankment with crest levels of RL 345.0 m and RL 372.0 m (19.0 m and 46.0 m maximum embankment heights) under undrained condition based on limit equilibrium method.

Case 3*: Pseudo-Static Earthquake Case – As for Case 1, but under seismic loading of PGA of 0.12 g (OBE) corresponds to 1:475 year AEP.

Case 4*: Pseudo-Static Earthquake Case – As for Case 1, but under seismic loading of PGA of 0.21 g (SEE) corresponds to 1:2,000 year AEP.

Case 5: Post-Seismic Analysis – As for Case 1 utilising post-seismic strength parameters. Strength parameters in general were reduced by 20% for embankment materials and tailings are assumed to have liquefied (post liquefaction Su/σ'_v).

* ANCOLD (2019) requires deformation analysis and this is presented in Section 3.3.1.4. Analyses of Case 3 and Case 4 are presented for screening/completeness.

It should be noted that TSF1 embankment foundations are not liquefiable, however, post-seismic stability is made to account for tailings liquefaction based on the concept of MCE at the post-closure stage.

The phreatic surface adopted in all cases was based on the seepage analyses results, refer to Section 3.3.4. Seepage analyses have considered the scenario with a maximum pond level of 0.5 m below the crest levels, and where the phreatic level extends to the embankment toe (worst-case).

3.3.1.2 Parameters

The stability analyses of the embankment were carried out using the effective stress condition (c', φ') with pore pressure derived from the seepage analyses. The effective strength parameters were assumed, with a level of conservativism, based on the results of the geotechnical investigation by CMW and the subsequent laboratory test results and past experience with similar materials. Table 5 provides a summary of the strength parameters used in the stability analyses.

Table 5: Summary of Strength Parameters

Material Type	Bulk Density γ (kN/m^3)	Effective Strength Parameter		Undrained Strength Parameter
		Cohesion c' (kPa)	Friction Angle φ' (degs)	Cohesion S_u (kPa)
Deposited Tailings	10	-	-	0.2 σ'_v, min. 0 kPa
Deposited Tailings (consolidated)	13	5	27	0.25 σ'_v, min. 5 kPa
Deposited Tailings (liquefied)	10	-	-	0.05 σ'_v, min. 0 kPa
Compacted Silt/Clay Mine Waste	15.5	20	30	150
Traffic Compacted Mine Waste (Waste Dump)	20	0	40	-
Surface, Silty SAND (compacted)	20	5	35	-
Subsurface, Gravelly Silty SAND - Gravelly SAND	20	0	38	-
Foundation, upper (Ferricrete)	18	-	-	300
Foundation, lower (Saprolite, Granite)	23	-	-	400

3.3.1.3 Results of the Stability Analyses

The results of the stability analyses for the embankment at maximum embankment heights of 19.0 m (Stage 1) and 46.0 m (Stage 7), under 'worst-case' phreatic loadings where the pond is at the embankment and extends to the embankment toe, are summarised in Table 6. The graphical outputs of the analyses are presented in Appendix G.

Table 6: Results of Stability Analyses

Case [1]	Factor of Safety (FoS)		Recommended Minimum FoS [2]
	Stage 1 (Starter)	Stage 7 (Final)	
1	2.25	1.72	1.5
1a	2.56	2.06	1.3
2	2.49	3.83	1.5
2a	2.81	5.06	1.3
3	1.62	1.19	> 1.0
3a	1.80	1.45	
4	1.30	0.94	> 1.0
4a	1.45	1.32	
5	1.65	1.22	1.0 – 1.2
5a	1.90	1.46	

[1] 'a' denotes non-circular or wedge (with loss of containment) analyses.

[(2)] Recommended factors of safety (FoS) in accordance with ANCOLD (2019).

The stability analyses indicate adequate factors of safety for the drained and undrained conditions when compared with the recommended minimum factors of safety in ANCOLD (2019).

Due to the relatively conservative parameters adopted the factor of safety obtained in Case 4 – downstream failure of TSF1 under drained conditions and seismic loading of PGA of 0.21 g (SEE) corresponds to 1:2,000 year AEP, at Stage 7 (Final) construction, indicated that there will likely be some minor movement during a maximum credible earthquake event. Section 3.3.1.4 summarises the deformation analyses undertaken to determine the magnitude of movements due to the earthquake events applied in Cases 3 and 4.

Pseudo-static analyses were presented as for completeness as an initial screen purpose (i.e. ANCOLD (2019) requires deformation analyses to assess earthquake loading).

It is to be noted that the stability analyses have included solely the IWL section of TSF1 and the presence of WRD downstream of the IWL will increase the stability of the TSF.

3.3.1.4 Deformation Analyses

A preliminary assessment of embankment deformation due to an earthquake was estimated using the Swaisgood (2003) method. This method utilises an empirical formula based on observed crest settlement resulting from analysed 'real' earthquakes, with no liquefaction of foundation and embankment materials.

The permanent displacements and settlements expected for a 46.0 m high embankment were estimated under a magnitude 6.6 earthquake, corresponding with a PGA loading of 0.21 g for 1:2,000 years AEP for the SEE event. The parameters were conservatively derived based on respectively the maximum earthquake magnitude on land recorded in Western Australia (Meckering) as gathered by Geoscience Australia, and the intensity measure as outlined in AS 1170.4 (2007). The nearest earthquake to the TSF1 site was a magnitude 2.0 recorded at Beacon, WA, approximately 90 km to the southeast in 2022.

From the analysis, it is concluded that for the highest embankment section, the deformation due to an SEE (MDE) event is likely to be in the order of 24 mm. Such deformation is insignificant when compared with a minimum total freeboard of 0.7 m.

3.3.1.5 General Comments in Respect to Stability

TSF1 is a robust structure and the factors of safety, which are presented in Table 6, are generally above the minimum requirements under worst-case conditions. The design concept provides for 'defensive' earthquake design as called for in ANCOLD (2019), through the use of downstream raising.

Stability is significantly influenced by the position of the phreatic surface within the deposited tailings and confining embankment. The seepage analyses have considered the 'worst-case' phreatic surface allowed in design. Under normal operating conditions with a lower phreatic surface, the factors of safety will be higher than those summarised in Table 6. Operation of the underdrainage system has an important role in reducing the phreatic surface within the embankment, therefore this should be regularly monitored.

TSF1 has been designed to provide temporary water storage following extreme storm events. If water does extend to the embankment, which is considered very unlikely, it is anticipated this will be a temporary occurrence given continuous water removal from TSF1. The tailings storage should be operated in such a manner as to ensure that the `normal' supernatant pond is kept well away (≥375 m) from the embankment at all times (refer to the Operations Manual in Appendix M of this report).

3.3.2 Design Acceptance Criteria

The design of TSF1 is based on the ANCOLD Guidelines (2019) *'Guidelines on Tailings Dams – Planning, Design, Construction, Operation and Closure'*. The consequence category will determine the water management (e.g. freeboard and stormwater storage capacity required) and geotechnical embankment design requirements. Classification of TSF1, at its ultimate height of 46.0 m, in accordance with Tables 1 and 2 of the DMP (2013) code results in a hazard rating of 'Category 1 – Medium' (Section 3.1). The ANCOLD (2019) consequence rating is 'High C' (refer to Tables 1 and 2 of ANCOLD (2019).

Embankment Design analysis should consider:

Operations Phase

- Operating Basis Earthquake (OBE) is 1 in 475 years annual exceedance probability (AEP).
- Safety Evaluation Earthquake (SEE) (previously MDE) is 1 in 2,000 years AEP.

Post Closure

- Maximum credible earthquake (MCE).

Freeboard and Water Management in accordance with ANCOLD guidelines (2019):

- Storage of 1:100 yr. AEP event of 72-hour duration, plus an allowance for wave run-up for 1:10 AEP and 0.5 m of additional freeboard.
- No spillway will be required during operations or at closure. Stormwater during operations will be largely re-used in the plant over several weeks to months. Stormwater from large storm events at closure will be disposed of on top-surface of TSF1 by evaporation.
- Minimum frequency of inspections of TSF in accordance with DMIRS guidelines.

The results of the design assessments for TSF1 indicate that the facility can be safely operated on the basis that:

- Liberated water is continually removed from the surface of the tailings.
- Tailings deposition is cycled around the facility to maximise tailings density and therefore the storage volume.
- The facility will be operated in accordance with the details contained in the Operations Manual.
- The safe operation of the storage relies upon the implementation of the tailings operation, management inspection and maintenance procedures.

The probability of major embankment failure during the life of TSF1 is assessed as being extremely low provided TSF1 is implemented (constructed and operated) within the intent of the design in accordance with the SoW for the construction and Operations Manual.

3.3.2.1 Dam Break Assessment

3.3.2.1.1 Volume Released

If TSF1 embankment breach were to occur, tailings would only be partially released from the storage impoundment, as the majority of the tailings beaches would have dried back. In addition, remobilised tailings will behave as a thickened slurry, with some shear strength and therefore will not be as free flowing as water, which has no shear strength.

Under worst-case probable maximum precipitation (PMP) rainy day failure conditions:

- The storage capacity of TSF1 is estimated at 42,100,000 m^3.

- PMP storm volume is estimated at a nominal 1,408,000 m³. This was based on a 6-hour probable maximum precipitation event (PMP) rainfall depth of 680 mm over TSF1 catchment of 207 ha at Stage 7 (Final) construction.
- The tailings failure volume likely to be released from TSF1 at the maximum height of nominally 46.0 m, in the event of an embankment failure under PMP rainy day conditions, would be of the order 15.3 Mm³ i.e. approximately 33 % of the impounded storage capacity plus the PMP storm volume.
- Based on T MacDonald and J Langridge - Monopolis (1984), embankment breaches typically occur relatively quickly (typically 0.5 hour to 4 hours), however in the instance of an IWL with a wide embankment development of a breach will occur over a longer period of time. Based on this methodology, it is estimated that the breach will occur over at least 6 hours.

The calculation of breach characteristics is included in Appendix J.

The Rourke and Luppnow Method (ref: H Rourke, D Luppnow, 2015) for estimating volume released from the TSF was utilised to assess potential stored volume release. This method is based on a relation between the potential volume released from a TSF and the size of the decant pond. The greater the ratio of the pond area to the total area, the greater the ratio of release volume to stored volume. Table 7 presents a summary of case data used in the analyses taken from Table 1 of the referenced paper.

Table 7: Summary of Dam Break Case Study Data (ref: H Rourke, D Luppnow, 2015)

Name	Impoundment Storage Volume (Mm^3)	Release Volume (m^3)	Release Volume relative to Stored Volume (%)	Pool Area relative to Total Area (%)
Merriespruit	7.0	0.6	9	14
Bafokeng	13.0	3.0	23	30
Mount Polley	50.0	24.4	49	72
Kolontar	1.2	0.7	58	88
Stava	0.3	0.2	67	100

It was noted from Rourke and Luppnow analysis of past tailings storage facility (TSF) failures, that the release volume varies between 9% and 67% of stored volume. The 33% of TSF volume plus a PMP event, or approximately 15.3 Mm^3 scenario represents a likely maximum release from a relatively low-moderate embankment height IWL (TSF) in a climatic region such as the Mid West region of WA (i.e. the water pond should not be this large as the water balance is a negative water gain and water should not accumulate on the facility).

The Rourke and Luppnow Method demonstrates that in order to mitigate the consequence of a dam-break, the pond volume and area should be minimised by the adoption of good operating practices.

3.3.2.1.2 Breach characteristics

Breach characteristics for a breach from TSF1 due to a dam break were assessed utilising published empirical (algebraic) methods. These methods are based on studies of past failures to provide relationships between release volume, breach development time and peak flow; and dam height and dam factor (height x stored volume).

For TSF failure, the method of Rico M, Beniti G, Diez-Herrero G (2008) was utilised to estimate peak flow. This study was based on examining historic tailings dam failures. The peak flows estimated by Rico M, Beniti G, Diez-Herrero G (2008) are skewed with the peak occurring quickly (i.e. less than the breach development time). For comparison, if a triangular hydrograph is assumed, the flow peak is not skewed and the peak is 'normally' distributed.

Tables 8 summarises the beach development time and estimated peak flows from a dam break utilising various methods.

Table 8: Results of Dam Break Analyses

Scenario	Peak Flow (m^3/s) Rico M, Beniti G, Diez-Herrero G 2008*	Peak Flow (m^3/s) triangular hydrograph**	Approx. Breach Development time (hrs)	Flood Volume (m^3)
Sunny Day	4,900	1,286	6	13,893,000
Worst-Case	5,103	1,417	6	15,300,600

*upper bound, **lower bound

3.3.2.1.3 Energy Methods

The sunny day case was examined by assessing a dam break using energy methods as referenced in K D Seddon (2010) and estimate tailings run-out distance. The method presented in the paper assumes the tailings and the embankment are assumed to liquefy and move as a block downstream.

The height of the block was assumed to be 46.0 m and the run-out distance a function of the residual shear strength and material density. For a residual shear strength of 4 kPa and 7 kPa, the run-out distances were estimated to be 2.7 km and 1.6 km, respectively.

Based on the analyses performed, the tailings from a sunny day dam break are not expected to reach the site office or the processing plant areas, however, it is expected to reach the open pits to the west of TSF1 and the infrastructure around the pits and the TSF.

The calculations of the run-out distance for a sunny day case are presented in Appendix J.

3.3.2.1.4 Hydraulic modelling

The result from breach modelling indicates that the maximum (peak) run-out flow from a 'dam break' under 'worst-case' (PMP) rainy day conditions will be approximately 1,417 to 5,103 m^3/s over 6 hours.

As drainage at TSF1 location is defined by sheetflow with no distinct drainage line, as discussed in Section 2.3.4, the flow in the project area is expected to flow to the north-northeast and into the Karpa Spring approximately 4 km away.

Flows in Table 8 was estimated to be approximately 500 m wide, with a maximum flow depth of approximately 1.5 m. Flow towards the site office and processing plant to the south of TSF1 is considered highly unlikely due to the higher elevations of these locations. It would however potentially flow into the adjacent pits, the closest being the Orion 2/3 Pit approximately 0.7 km away to the west. Refer to the preliminary inundation plan in Appendix B.

The following consequences of a dam break are considered most likely:

- A dam break will unlikely inundate the plant or the camp, which are to be situated on higher grounds at >0.8 km, however, there is potential for loss of life due to the presence of the open pits to the west of TSF1, and infrastructure around the pits and TSF1. For the purposes of design, the Population at Risk (PAR) is estimated as ≥10 and <100 therefore for the purposes of stability

analyses etc. a consequence category of 'High C' in accordance with ANCOLD (2019) has been used.

- Loss of TSF storage capacity, and economic loss from permanent loss of assets including mine infrastructure, repairs of damaged sections of TSF1, damage to plant and local mine site roads.
- No public infrastructure is likely to be affected.
- Limited damage to natural environment including flora and fauna. Damage would reasonably be expected to be concentrated in the ephemeral streams.
- Some damage to items of heritage values.

3.3.2.1.5 Controls

The conditions for TSF1 embankment failure to occur would be driven largely by the embankment mass and crest width adopted, the size and extent of the decant pond on the facility, and the magnitude of a trigger seismic event, embankment deformation, the grading of the tailings and saturation of the tailings adjacent to the embankment. Effective management of the decant pond to ensure excess water is continually removed from TSF1, will minimise the risk of a perimeter embankment breach and release of saturated tailings.

The TSF is an integrated waste landform type structure and as such the design is considered robust. The TSF embankment failure is not expected provided the facility is operated in accordance with the requirements set out in the TSF Operations Manual.

The water recovery system, pumps and piping must be designed for a minimum recovery of not less than 940 tph (62% water return).

In the event that the TSF was in imminent danger of failure and breach, the Emergency Action Plan (EAP) would need to be enacted (see Section 4.4).

3.3.3 Erosion Control

The embankment has been designed with a downstream slope of approximately 18^{o} or 1:3 (v:h). The downstream slopes constructed at this angle with mine waste (waste dump) should be resistant to erosion. Further assessments will be required during mining on the erodibility of the materials to be included in the downstream batters of TSF1.

3.3.4 Seepage Analyses

3.3.4.1 Method of Analyses

Seepage analyses were undertaken to estimate the position of the phreatic surface for the embankment design at the Stage 1 (Starter) and Stage 7 (Final) crest levels of RL 345.0 m and RL 372.0 m (i.e. at the 19.0 m and 46.0 m embankment heights, respectively). The analyses were undertaken using the groundwater module of the Slide software package. Slide uses a 2D finite element analysis to determine groundwater seepage for saturated, steady-state flow conditions. It should be noted that 2D modelling is a simplified approach, which does not consider 3D effects (e.g. seepage flow through geological structures such as joints).

3.3.4.2 Model Assumptions

The upstream boundary condition used in the analyses was determined based on a maximum water pond level of 0.5 m below the crest levels of RL 345.0 m and RL 372.0 m of the Stage 1 and Stage 7 constructions, respectively. Models have been based on normal operating conditions where the decant pond is maintained well away (at least 375 m) from the embankment, and during a period when the decant pond extends to the embankment (a conservative assumption).

The downstream boundary condition was assumed based on the groundwater located at the ground surface level at the downstream toe of the embankment.

The material permeabilities used in the seepage analyses are based on values derived from CMW site geotechnical investigation and materials laboratory testing supplemented with assumed textbook values, appropriate to the materials. Table 9 provides a summary of the permeability used in the analyses.

Table 9: Permeability Values Adopted

Material Type	Permeability, K (m/s)
Deposited Tailings	1×10^{-6}
Deposited Tailings (consolidated)	5×10^{-8}
Compacted Silt/Clay Mine Waste	1×10^{-8}
Traffic Compacted Mine Waste (Waste Dump)	1×10^{-6}
Surface, Silty SAND (compacted)	1×10^{-6}
Subsurface, Gravelly Silty SAND - Gravelly SAND	8.9×10^{-6}
Foundation, upper (Ferricrete)	1×10^{-7}
Foundation, lower (Saprolite, Granite)	4.4×10^{-8}

3.3.4.3 Results of Analyses

The seepage flow determinations from the analyses are summarised in Table 10, below.

Table 10: Results of Seepage Analyses

Stage	Scenario	Seepage Flow (m^3/day/m of embankment)	Approximate Embankment Length (m)	Estimated Seepage per day for embankment section (m^3/day)
1 (Starter)	Decant Pond ≥375m from Embankment	2.1×10^{-2}	4,020	85
7 (Final)	Decant Pond ≥375m from Embankment	6.3×10^{-2}	5,105	320

Plots of the phreatic surfaces and distribution of pore pressures throughout the embankments are presented in Appendix F. The seepage from the facility is expected to be low. The seepage estimates in the table above are conservative and largely dependent on the hydraulic head and tailings permeability.

Seepage recovery measure in the form of an underdrainage system has been included in the design will further reduce the potential of impact from seepage. This is explained further in Section 3.4.

3.3.5 Water Balance

A water balance analysis for the proposed TSF1 operation has been undertaken using a spreadsheet to examine expected TSF1 inflows and outflows.

Inflows and outflows for the facility were estimated on a monthly basis. Inflows include rainfall and slurry water. Outflows include evaporation, seepage losses and water retained in tailings (pore water). Water balance calculations are included in Appendix I.

Assumptions and other data adopted for the water balance are listed below:

- Climate data were obtained from the BOM website and Luke et al (1987) for Paynes Find. Average monthly rainfall figures for Mt Gibson, WA (recording period: 1982 to 2021) with an annual average

of 330.5 mm/year, and average annual evaporation and evapotranspiration at approximately 3,243 mm/year and 320 mm/year, respectively.

- Tailings area of approx. 92.3 ha.
- A tailings runoff coefficient of 0.4 was assumed.
- Pool area equal to approximately 15% of tailings area (radius approx. 240 m).
- Running beaches equal to approximately 6% of the tailings area.
- Evaporation pan factor of 0.7.
- Average tailings residual moisture content of 40%.
- Tailings slurry density of 42.7% solids.
- Tailings production rate of 5.0 Mtpa.
- Seepage rate from seepage analyses of approximately 320 m^3/day.

The results of the analysis indicate potential annual average water returns of 62% of the tailings slurry water deposited into the facility can be expected under average climatic conditions.

The results also indicate that water recovery will vary according to the management of the facility, specifically the size of the pond and running beaches. The actual quantity of water available for return to the plant may vary from the figures presented based on the following factors:

- Variations in slurry density.
- Continuity of tailings discharge.
- Distance between the discharge point and decant pond.
- Size of the decant pond and running beaches from where evaporation is greatest.
- Climatic conditions at the time of operation.
- The efficiency of the decant system during operation.

The efficacy of the water return system is the key to achieving a higher in-situ tailings dry density within the TSF. The minimum capacity of the water recovery system should be not less than 940 tph including the additional capacity needed to recover water from design storm events.

3.4 Design and Construction Details

TSF1 will have a zoned embankment and be constructed to the Stage 1A crest RL 340.0 m prior to commissioning. Stage 1B crest RL 345.0 m will be constructed during the initial 5 months of operations. Construction of the embankment is likely to utilise a mining contractor.

As part of preparation works, the footprint of the facility will be cleared of vegetation and its subgrade at the embankment foundation must be compacted. The topsoil from the footprint, nominally 0.1 m in thicknesses, will be stripped and stockpiled for use in rehabilitation. The vegetation and topsoil will be stockpiled separately. The subgrade must be compacted to achieve a minimum of 95% dry density ratio in accordance with AS1289.5.1.1.

The earthworks will comprise the construction of upstream (or inner) silty/clayey mine waste zone (Zone A) and downstream (or outer) mine waste (waste dump) zone (Zone B). The estimated volumes required for each zone are shown in Table 4.

Construction of TSF1 embankment should be integrated with the upcoming mine planning, to ensure that adequate volumes of construction materials are available and scheduled. It will also be necessary to ensure that the planning of upstream (or inner) Zone A is coordinated with planned

downstream (or outer) Zone B construction as the latter has to be in place prior to the placement of the upstream (inner) zone materials.

A decant accessway and central decant structure will be constructed. These will be constructed from traffic compacted silty/clayey and gravelly silt/clay mine waste (Zone C) and select filter rock (Zone D) materials, respectively. The decant accessway has a transversal slope of 1% from the embankment down to the rock-ring decant that reduces materials required for construction. The angle of 1% is designed to be consistent with the expected beach angles.

The embankment and decant accessway crests will be sheeted with a nominal 0.1 m thick gravelly wearing course materials. These are expected to be sourced from within the MGGP operation. Safety windrows will be utilised during construction and on the final prepared crest. Gaps in the windrows will be placed intermittently to facilitate the shedding of rainfall runoff.

An underdrainage system comprising perforated pipe underdrainage lines in seepage interception trenches grading to a concrete well tower via a seepage collection trench will be constructed along the northern part of the embankment alignments where the topographical levels are at or lower than the decant rock ring. The seepage interception trenches will be nominally 1 m wide and 0.6 m deep, with the seepage collection trench having a similar depth (dozer ripping etc may be required). The concrete well tower will comprise a 2.5 m x 2.5 m x 0.15 m thick concrete base plus vertically stacked 1.8 m dia., 1.2 m long solid concrete wells. Water will then be pumped back from the concrete well tower to the process plant, onto the tailings beach or utilised in construction.

3.5 Tailings Discharge and Water Management

The following operational considerations have been incorporated into the design:

- Tailings in the form of slurry will be discharged sub-aerially and cyclically into TSF1 in thin discrete layers, not exceeding 0.3 m thickness, from multipoint spigots in order to allow optimum density and strength gain by subjecting each layer to a drying cycle. Deposition will take place via multiple spigots located on the upstream perimeter embankment crest.
- Tailings deposition is to be carried out such that the supernatant pond is maintained within and around the rock ring decant. The pond is to be maintained away from the perimeter embankments at all times.
- Water will be removed from the facility and pumped back to the process plant via a decant pump located within the rock ring decant.
- The tailings storage area will assume the form of a truncated prism with a depressed cone on the top surface. The facility will have the capacity to store a considerable volume of water during a storm event. The minimum freeboard for the TSF under normal operating conditions is 0.7 m, which includes an allowance for the temporary storage of the 1:100 years or 1% average exceedance probability (AEP) storm event of 72-hour duration whilst maintaining the required total freeboard (Section 4.1.1).
- On eventual decommissioning, the facility will remain as a permanent feature of the landscape and drain to an increasingly stable mass. The top surface and batters will be stabilised and rehabilitated as described in Section 5.

3.6 Basin Preparation

In order to reduce seepage at start-up prior to tailings becoming consolidated and ‘seal’ the TSF1 basin, the basin will be partially ‘lined’. This will involve moisture conditioning and compacting the TSF basin subgrade, followed by placing and compacting a minimum of 0.5 m thick clay/silt low permeability material similar to the upstream (Zone A) of the embankment. Both the subgrade and

the ‘liner’ are to be compacted to achieve a minimum of 95% dry density ratio in accordance with AS1289.5.1.1.

This partial ‘liner’ must extend to a minimum of 150 m radius when measured from the centre of the rock ring decant.

3.7 Quality Assurance

The SoW document is attached as Appendix L. This document specifies the responsibilities, procedures, and quality control tests which verify that TSF1 retaining structure has been constructed in accordance with the design intent.

4 OPERATIONAL REQUIREMENTS

4.1 Management of Tailings Deposition and Water

A summary of the operations design for TSF1 is presented in Section 3.2. An Operations Manual for TSF1 outlining the operating procedures, inspection criteria, monitoring requirements and log sheets for the facility has been compiled in Appendix M.

The following routine inspection and maintenance procedures are to be carried out for the various components of the system. A minimum of one inspection is to be undertaken during each shift by an operator or shift supervisor.

The inspections should cover:

- The pipelines (tailings delivery line and water return lines) to and from TSF1.
- Leak detection.
- Pumps.
- Valves.
- Discharge locations.
- Location and size of the decant pond.
- Decant and return water pumps.
- Seepage collection pipe flow and pumps.
- The general integrity of the embankment i.e. any new cracking (daily).
- Seepage downstream of TSF1.
- Any changes to existing cracking or seepage.

A monthly independent inspection should also be performed by senior site management. The operation, safety and environmental aspects should be periodically reviewed during an annual audit inspection by a suitably experienced and qualified engineer.

4.1.1 Freeboard

The following considerations were made regarding freeboard criteria and requirements for a ‘High C’ consequence category TSF (Section 3.2) based on ANCOLD (2019):

- The proposed TSF1 has been designed such that a 1:100 yr. AEP, 72-hour duration storm event can be temporarily stored on top of the facility. The design, however, assumes correct operational controls are adhered to and that water is continually removed from the facility, such that minimum freeboard allowances are maintained.

- Provision of a minimum of 0.7 m freeboard comprising minimum operational freeboard (vertical height between the tailings beach and embankment crest) of 0.3 m plus a minimum beach freeboard of 0.2 m and the allowance for the 1:100 yr. AEP 72-hour event of 0.179 m.

ANCOLD guidelines (2019) also recommend an allowance for wave run-up for 1:10 AEP wind for a 'High C' consequence category TSF (refer to Section 3.2). However, it is expected that with perimeter tailings deposition and an expected beach slope of 1.0%, the separation distance between the perimeter embankments and design storm pond will be adequate to prevent wave action reaching the embankments.

Freeboard nomenclature is illustrated in Figure 5. Intensity-frequency-duration (IFD) data pertaining to the site is presented in Figure 6. From the chart presented in Figure 6, a 1:100 yr. AEP, 72-hour duration rainfall depth of 179 mm was adopted for the design. Temporary storage of a stormwater volume of approximately 370,530 m^3 (i.e. approx. 207 ha x 179 mm) on top of TSF was considered in the design. This stormwater volume will occupy approximately 1 % of the TSF basin. The TSF also has sufficient capacity to contain the probable maximum flood (PMF) of approximately 1,408,000 m^3 (i.e. 207 ha x 680 mm).

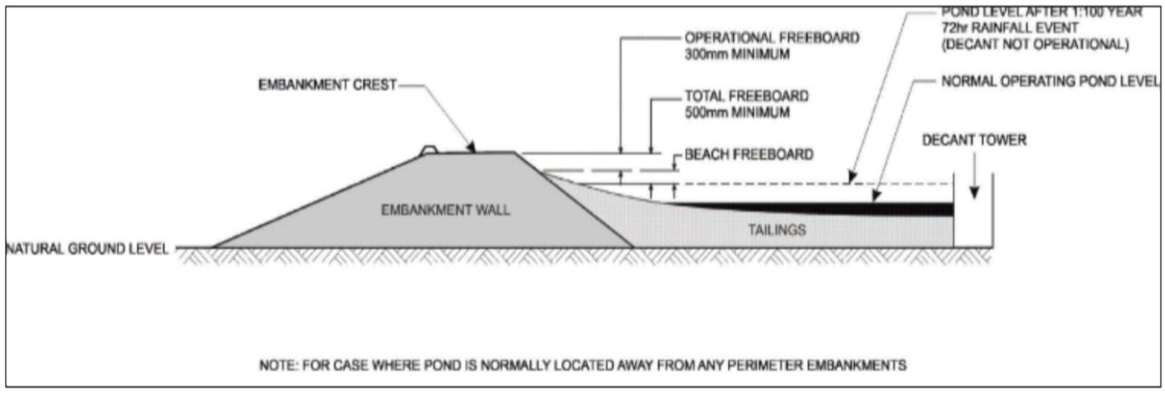

Figure 5: Freeboard Nomenclature

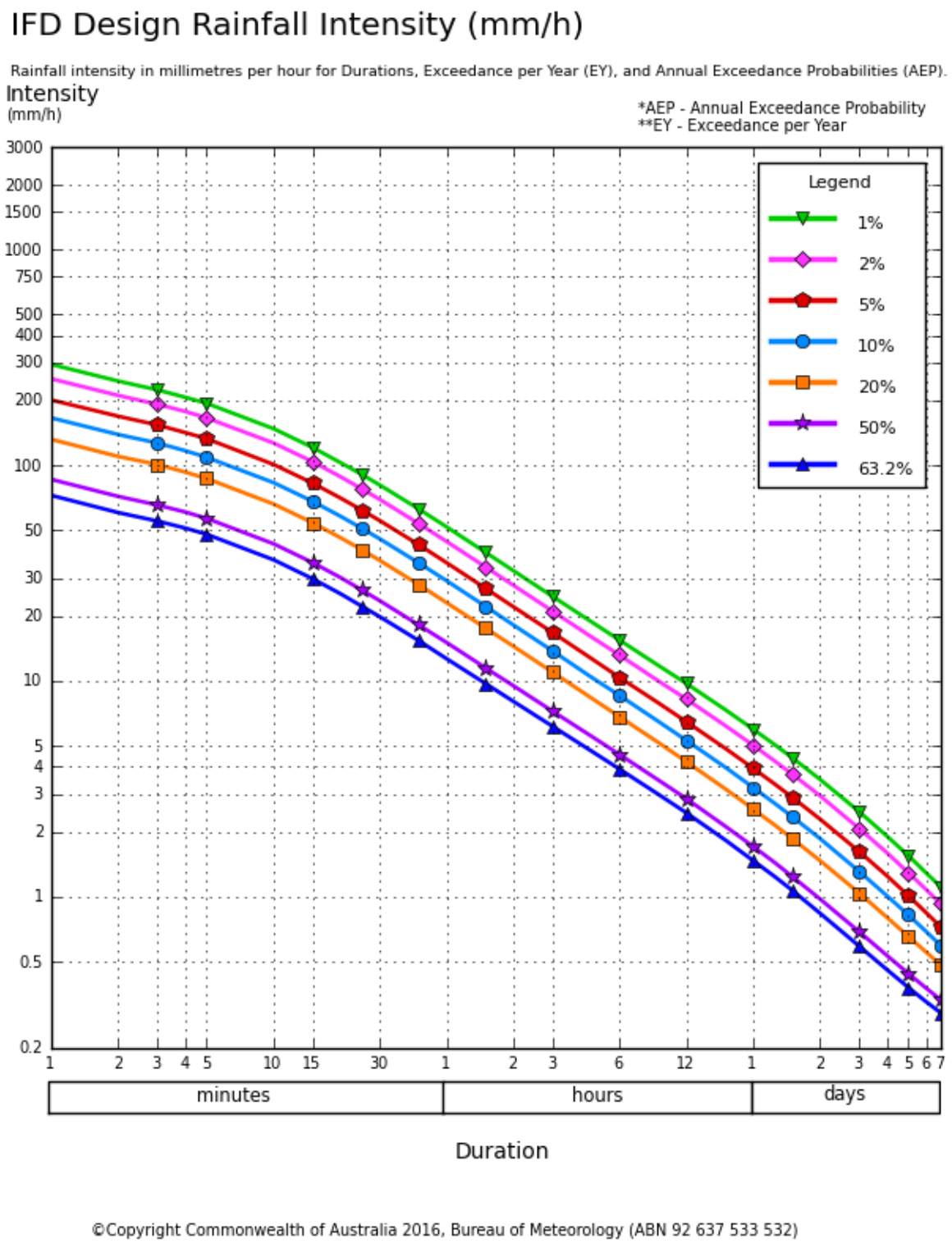

Figure 6: IFD Data

4.2 Dust Control

Provision for TSF1 construction works will include a water cart on location to provide dust suppression as required. This control measure will prevent dust from becoming airborne and subsequently being mobilised into the surrounding environment, from becoming a visibility issue, or from becoming a respiratory hazard for construction personnel.

Based on experience with TSF1, dust generation from the tailings beaches is not expected as the tailings are saline and a crust is likely to form on the beaches, binding the tailings surface and reducing the potential for dusting. If dust generation becomes an issue (i.e. in periods TSF1 may be inactive), the tailings beaches could be irrigated (i.e. by discharge from spigots, with sprinklers or similar) or tailings deposition managed such that beach areas do not dry back to such that dust generation occurs.

4.3 Performance Monitoring and Instrumentation

4.3.1 Vibrating Wire Piezometers and Monitoring Bores

Groundwater monitoring bores (MB) will be established around TSF1 perimeter. The geotechnical investigation carried out by CMW encountered no groundwater within the investigated depths of up to 15 m. Groundwater levels were interpolated from information in the Rockwater (2003) report (refer to Section 2.3.4 of this report), and inferred at between 23 mbgl to 68 mbgl. For the purpose of performance monitoring, an allowance for 4 no. of boreholes drilled to depths of between 38 mbgl and 72 mbgl should be made (see Table 11).

Installation of vibrating wire piezometers (VWP) will need to be developed internally within TSF1 to enable the phreatic surface within the TSF embankments to be monitored and stability analyses to be validated in the future. These VWPs will also give early warning of seepage from the TSF.

VWP are to be installed as part of the embankment construction. Allowance needs to be made for 4 pairs for a total of 8 no. of VWP. Each pair will have VWP installed in a trench 0.5 m wide and 0.3 m deep, with one VWP installed at nominally 10 m away from the upstream toe of TSF1 Stage 1 embankment, and another VWP directly underneath the upstream crest of TSF1 Stage 1 embankment. Bentonite collars will be required to reduce the potential for the development of a seepage pathway. The read-out cables are to be installed in PVC electrical conduit to ensure they are not damaged during deposition.

A terminal box containing the data loggers is to be placed downstream of the final embankment toe to avoid vehicular damage and to allow future embankment raises. A total of 2 no. terminal boxes will be installed to the east and southeast of TSF1, away from the proposed location of waste dump around the TSF. The loggers are to be downloaded periodically (typically monthly depending upon the variability of pore pressure responses) for analysis. The collected information should be reviewed regularly, acted upon as necessary, and reported in the annual audit. The MB casing and the VWP terminal box are to be raised as part of the WRD construction, where impacted.

The pore pressure readings collected from the VWP and the standing water levels recorded in the MB are also used if required to adjust the design phreatic surfaces used in the stability analysis models.

The positions of the proposed MB and VWP are detailed on drawings PER2022-0011-06 and PER2022-0011-07, and shown in Table 11 and Figure 7.

For both the MB and VWP, it is recommended that as a minimum:

- Groundwater level readings are taken monthly.
- Groundwater samples for laboratory analyses are taken quarterly.

- Water level readings from the VWP are taken on a minimum monthly basis, with the readings plotted and graphed to allow an inferred phreatic surface within the facility to be modelled, and trends to be recognised.

The requirement for additional instrumentation (i.e. MB, VWP) associated with TSF1 should be reviewed as part of the yearly audit.

Table 11: Locations of Monitoring Bores and Vibrating Wire Piezometers

Instrument No.	Easting (m)	Northing (m)	Borehole Depth (mbgl)	Max. Casing Height* (MB, m)
MB01	517,679	6,710,003	34	47
MB02	518,477	6,709,497	43	38
MB03	517,872	6,708,362	59	22
MB04	516,981	6,708,787	49	32
VWP01	517,688	6,709,769	-	-
VWP01A	517,690	6,709,725	-	
VWP02	518,290	6,709,409	-	
VWP02A	518,260	6,709,395	-	
VWP03	517,846	6,708,520	-	
VWP03A	517,844	6,708,534	-	
VWP04	517,149	6,708,868	-	
VWP04A	517,168	6,708,877	-	

* include 1 m high section above ground.

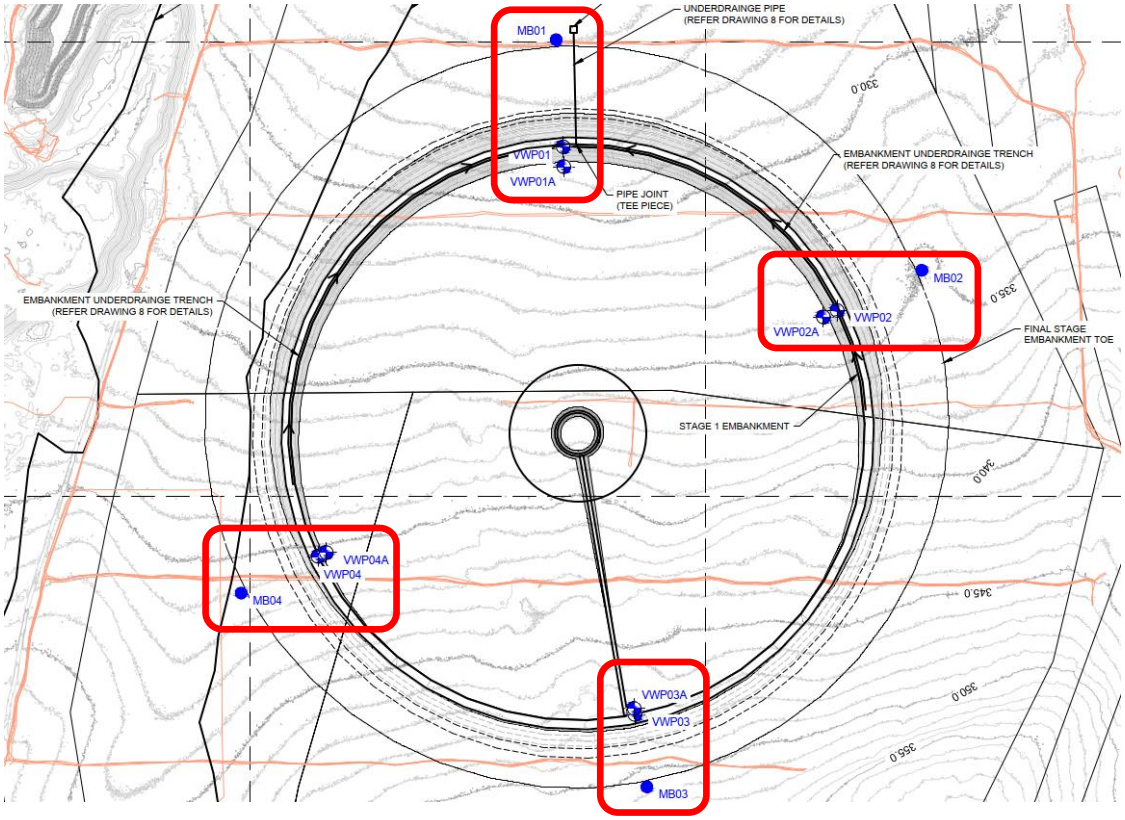

Figure 7: TSF1 Plan showing MB and VWP Locations

4.3.2 Displacement Monitoring

High-resolution surveys are conducted every 6 months from an unmanned aerial vehicle (UAV) or "drone". These provide a detailed survey of the surface of TSF1 to +/- 100 mm resolution. Surveys are conducted every 4 to 6 months. Digital terrain models are prepared from the survey data and successive models can be compared to determine any deformation magnitude greater than the LIDAR limits of vertical accuracy of +/-100 mm.

4.3.3 Visual Inspections

Driving or walk-around inspections of TSF1 are to be undertaken to observe any irregularities in the normal configuration of the embankment, embankment toe areas, and tailings beach that may indicate internal erosion of the embankment or instability. In particular, any embankment cracking and damp or wet areas on batter slopes or toe areas are to be noted.

Informal inspections should be carried out daily, whilst documented independent inspections should be undertaken as part of an annual audit for submission to regulatory authorities.

4.4 Emergency Action Plan

TSF1 Operations Manual provides a description of the operating procedures for the facility and includes an Emergency Action Plan (EAP). The EAP for the plant site and pits should be updated based on the results of the dam break analyses presented in Section 3.3.2.1. The plan should be reviewed and updated as a minimum on a yearly basis.

The plan should include:

- Management responsibilities and emergency coordination.
- Muster points.
- Seeking specialist geotechnical advice.
- Emergency Plan Triggers:
    - Freeboard less than design values.
    - Elevated piezometer levels.
    - Significant embankment distress.
    - Imminent overtopping.
- Seepage from the embankment should be investigated and VWP installed to allow further assessment by a Geotechnical Engineer, as required.

5 CLOSURE CONSIDERATIONS

5.1 Overview

The closure objectives for TSF1 are to leave the facility in a safe, stable, erosion resistant and non-polluting state.

The top surface and batters will be stabilised and rehabilitated through cross ripping and topsoiling. The maximum slope angle will be 18^0 or 1:3 (v:h), with no intermediate bench.

Once tailings deposition has been completed within TSF1 and the top surface of the tailings has gained adequate bearing capacity, the surface zone tailings which was classified as PAF will be capped with a layer of NAF oxide or transition mine waste to minimise dust generation from dried

tailings and provide support for topsoil/growth medium for re-vegetation. The thickness of the capping layer must be determined based on the results of the future geochemical investigation.

5.2 Rehabilitation

Upon completion of tailings placement within the facility, the surface will undergo a rehabilitation program. The rehabilitation program will include the identification of appropriate capping material and local flora species to revegetate the surface of the facility.

Prior to the commencement of the rehabilitation program, the tailings will need to be allowed to gain strength. Based on consolidation testing the tailings have very low consolidation characteristics (an average C_v of 3 m^2/year to 7 m^2/year). Based on the parameters derived from the tailings testwork and traditional consolidation theory, the tailings (up to 46.0 m thick within TSF1) is expected to take up to 5 years to consolidate and develop a surface 'crust', hence become trafficable and allow work to cover the top surface of the tailings within the TSF. Testing (e.g. Cone Penetration Test or CPT, and Dynamic Cone Penetrometer or DCP) will be required to assess trafficability for placement of cover over TSF1. The use of geotextiles and geogrids may assist trafficability in some areas to allow the construction of TSF1 cover to proceed.

Following the development of 'crust', a waste cover comprising uncompacted NAF oxide and transition mine waste will be pushed from the perimeter of TSF1 out over the tailings towards the centre.

5.3 Performance Monitoring against Closure Criteria

Rehabilitation closure criteria for TSF1 including observations specific to the tailings and consolidation will be developed and progressed as part of a Mine Closure Plan. Details of the criteria will be documented in the Mine Closure Plan associated with the Mining Proposal.

6 REFERENCES

The following standards and references were used in the preparation of this report.

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For and on behalf of
CMW Geosciences Pty Ltd

Christopher Hogg

Principal Tailings Engineer

Distribution: 1 copy to Capricorn Metals Ltd (electronic)
Original copy held by CMW Geosciences Pty Ltd

Appendix A – Tailings Storage Data Sheet (TSDS) and Explanatory Notes

TAILINGS STORAGE DATA SHEET

Project operator: Capricorn Metals Ltd (CMM)			
Project name: Mt Gibson Gold Project		Date: March 2023	
TSF name: TSF1		Commodity: Gold	
Name of data provider: CMW / CMM		Phone: +61 8 9442 2200 and +61 9212 4600	
TSF centre co-ordinates: 6,709,150 m North and 517,700 m East on Zone 50J of the MGA geodetic datum			
Mining Tenement and Holder(s) details: Mining Leases M59/772			
TSF Data			
TSF status: Proposed			
Type of TSF: [1] Paddock		Number of cells: [2] 1	
Hazard rating: [3] High C		TSF category: [4] 1	
Catchment area ha: [5] ~1,700		Nearest watercourse: Karpa Spring (~4 km to northeast)	
Date deposition started (mm/yy): -		Date deposition completed (mm/yy): -	
Tailings discharge method: [6] Multi-point spigot		Water recovery method: [7] Pumped Central Decant	
Bottom of facility sealed or lined? Y / N (Partial)		Type of seal or liner: [8] Silty/clayey mine waste	
Depth to original groundwater level m below GL: ≥15		Original groundwater TDS mg/L: -	
Ore process: [9] CIL/CIP		Tailings Deposition rate Mtpa: [10] 5.0	
Impoundment volume (present) m^3: 0		Expected maximum m^3: 4.21×10^7	
Mass of solids stored (present): tonnes 0		Expected maximum tonnes: 5.68×10^7	
Above ground facilities			
Foundation soils: Compacted silty sand		Foundation rocks: Granite	
Starter bund construction materials: [11] Silty/clayey mine waste against waste dump		Wall lifting by: Mechanical	
Wall construction method/ materials: Downstream Method		Wall lifting material: [12] Silty/clayey mine waste against waste dump	
Maximum wall height (present) m above GL: [13] 0		Expected maximum m: 46.0	
Crest length (present) m: 0		Expected maximum m: 5,105	
Impoundment area (present) ha: 0		Expected maximum ha: 207	
Below ground (in-pit) facilities NA			
Initial pit depth (maximum) m: -		Area of pit base ha: -	
Thickness of tailings (present) m: -		Expected maximum m: -	
Current surface area of tailings ha: -		Final surface area of tailings ha:	
Properties of tailings and return water			
TDS mg/l: -	pH: -	Solids content %: 42.7 - 63	Deposited density t/m^3: 1.35 dry
Potentially hazardous substances: [14] Cyanide, cyanide ions		WAD CN mg/l: -	Total CN mg/l: -
Any other NPI listed substances in the TSF? [15] Y / N			

Explanatory notes for completing tailings storage data sheet

The following notes are provided to assist the proponent to complete the tailings storage data sheet.

1. Paddock (ring-dyke), cross-valley, side-hill, in-pit, depression, waste fill, central thickened discharge, stacked tailings
2. Number of cells operated using the same decant arrangement
3. See Table 1 – Hazard rating system in the Code of practice
4. See Table 2 – Matrix of hazard ratings in the Code of practice
5. Internal for paddock (ring-dyke) type, internal plus external catchment for other facilities
6. End of pipe, (fixed), end of pipe (movable), single spigot, multi-spigots, cyclone, central thickened discharge (CTD)
7. Gravity feed decant, pumped central decant, floating pump, wall/side mounted pump
8. Clay, synthetic
9. See list below for ore process method
10. Tonnes of solids per year
11. Record only the main material(s) used for construction, e.g. clay, sand, silt, gravel, laterite, fresh rock, weathered rock, tailings, clayey sand, clayey gravel, sandy clay, silty clay, gravelly clay or any combination of these materials
12. Any one or combination of the materials listed under item 11 above
13. Maximum wall height above the ground level (not AHD or RL)
14. Arsenic, Asbestos, Caustic soda, Copper sulphide, Cyanide, Iron sulphide, Lead, Mercury, Nickel sulphide, Sulphuric acid, Xanthates, radioactive elements
15. NPI – National pollution inventory (contact Department of Environmental Protection for information on NPI listed substances)

Ore process methods

The ore process methods may be recorded as follows:

Acid leaching (Atmospheric)	Flotation
Acid leaching (Pressure)	Gravity separation
Alkali leaching (Atmospheric)	Heap leaching
Alkali leaching (Pressure)	Magnetic separation
Bayer process	Ore sorters
Becher process	Pyromet
BIOX	SX/EW (Solvent extraction/Electro wining)
Crushing and screening	Vat leaching
CIL/CIP	Washing and screening

Appendix B – Drawings

516000 mE
517000 mE
518000 mE
519000 mE
6710000 mN
6709000 mN
PIT SHELL
500 m BUFFER
DECANT ROCK RING
CREST RL 365.6 m
0.5 m THICK COMPACTED
CLAY LINER
R150 m
DECANT ACCESSWAY
1% TRANSVERSAL
SLOPE TO ROCK RING
TSF EMBANKMENT
CREST RL 372 m
A 03
B 03
C 03
325.0
330.0
335.0
340.0
345.0
350.0
355.0
360.0

LEGEND:

SOUTH STERILISATION LINES

NOTES:

1. CONTOURS GENERATED FROM CLIENT SUPPLIED FILE: Lidar1m Contours
2. COORDINATE SYSTEM: MGA ZONE 50, GDA94

1:10 000 0 100 200 300 400 500 m

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		DRAWN: DE	PROJECT: PER2022-0011
PROJECT: MT GIBSON GOLD MINE TSF DESIGN		CHECKED: PA	DRAWING: 01
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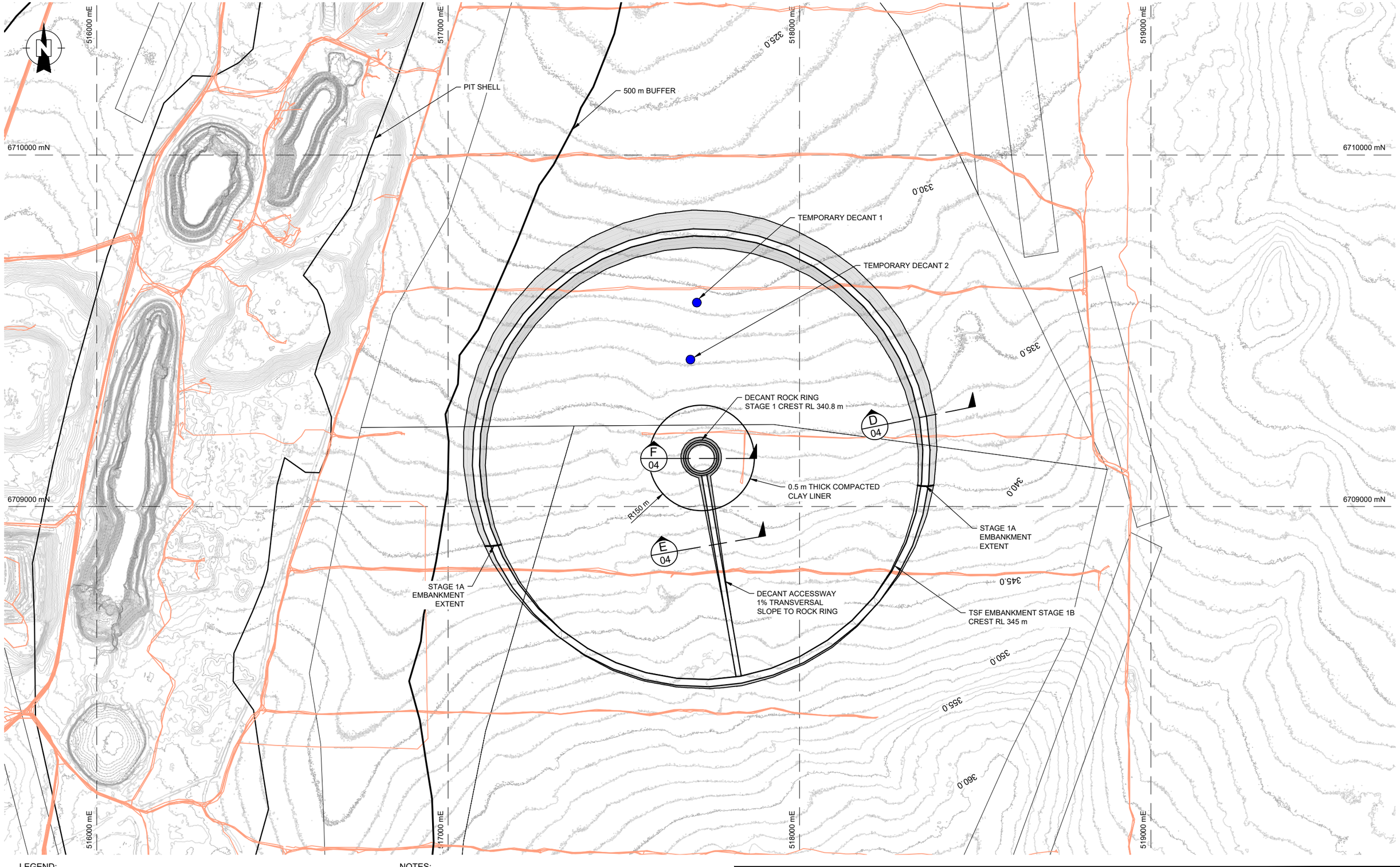

LEGEND:

SOUTH STERILISATION LINES

NOTES:

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2. COORDINATE SYSTEM: MGA ZONE 50, GDA94

1:10 000

0 100 200 300 400 500 m

CMW Geosciences

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PROJECT: MT GIBSON GOLD MINE TSF DESIGN		CHECKED: PA	DRAWING: 02
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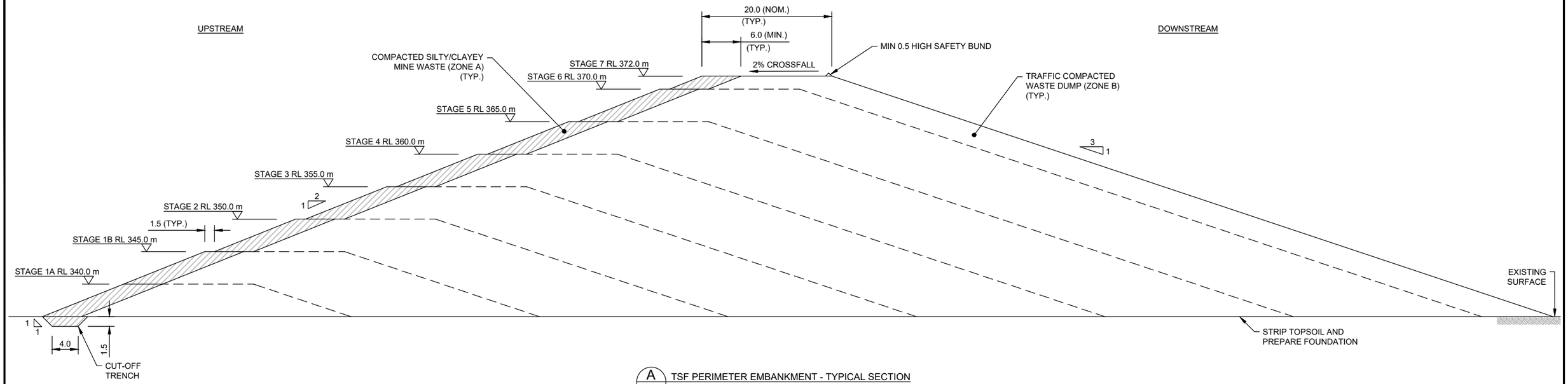
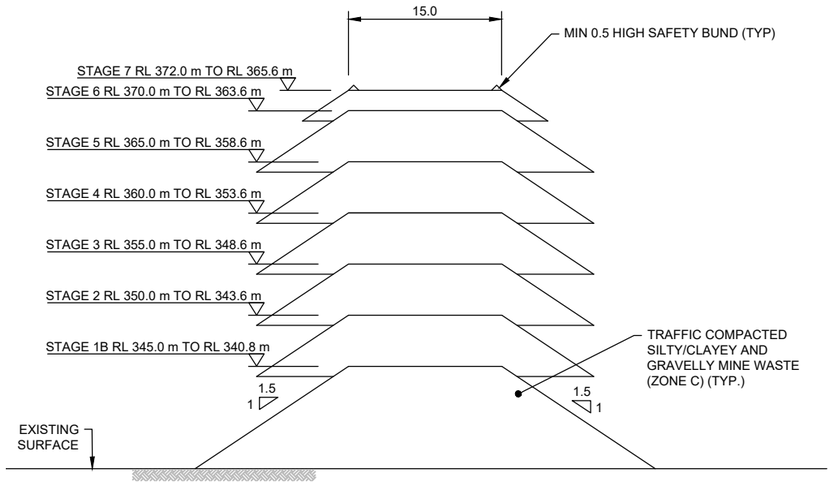
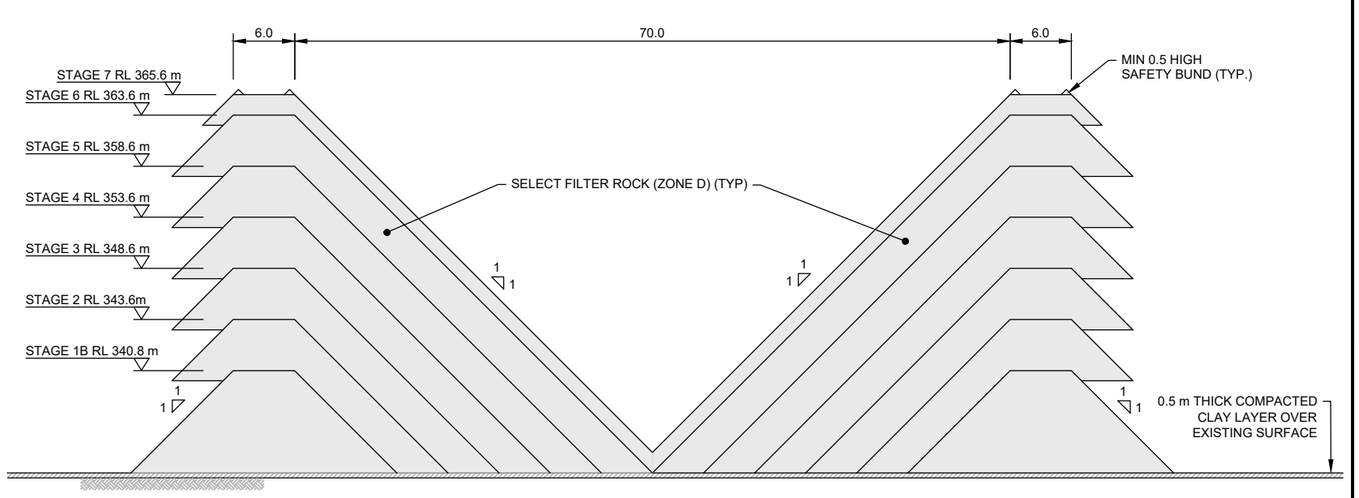


A 01 TSF PERIMETER EMBANKMENT - TYPICAL SECTION
1:600



B 01 DECANT ACCESSWAY - TYPICAL SECTION
1:600



C 01 DECANT ROCK RING - TYPICAL SECTION
1:600

NOTES:

1. ALL DIMENSIONS IN METRES UNO

1:600 0 6 12 18 24 30 m

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		DRAWN: DE	PROJECT: PER2022-0011
PROJECT: MT GIBSON GOLD MINE TSF DESIGN		CHECKED: PA	DRAWING: 03
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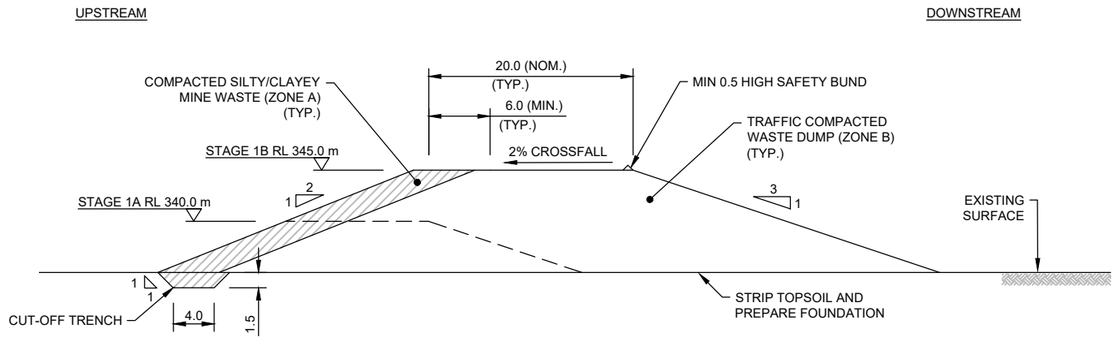

D/02 TSF PERIMETER EMBANKMENT - TYPICAL SECTION
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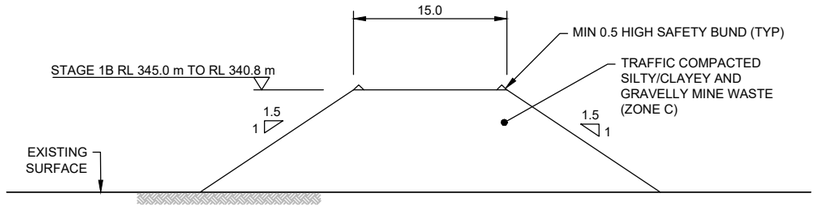

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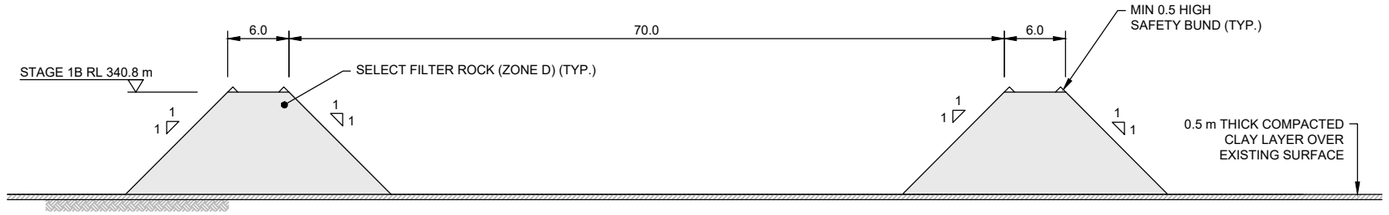

F/02 DECANT ROCK RING - TYPICAL SECTION
1:600

NOTES:

1. ALL DIMENSIONS IN METRES UNO

1:600 0 6 12 18 24 30 m

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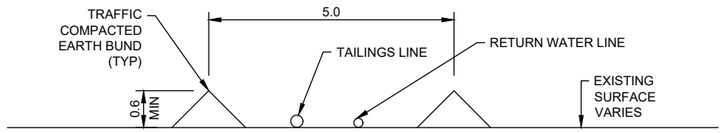
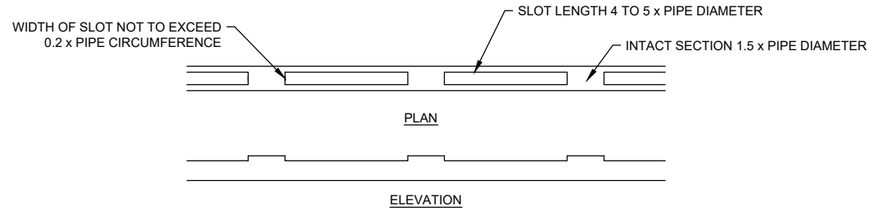
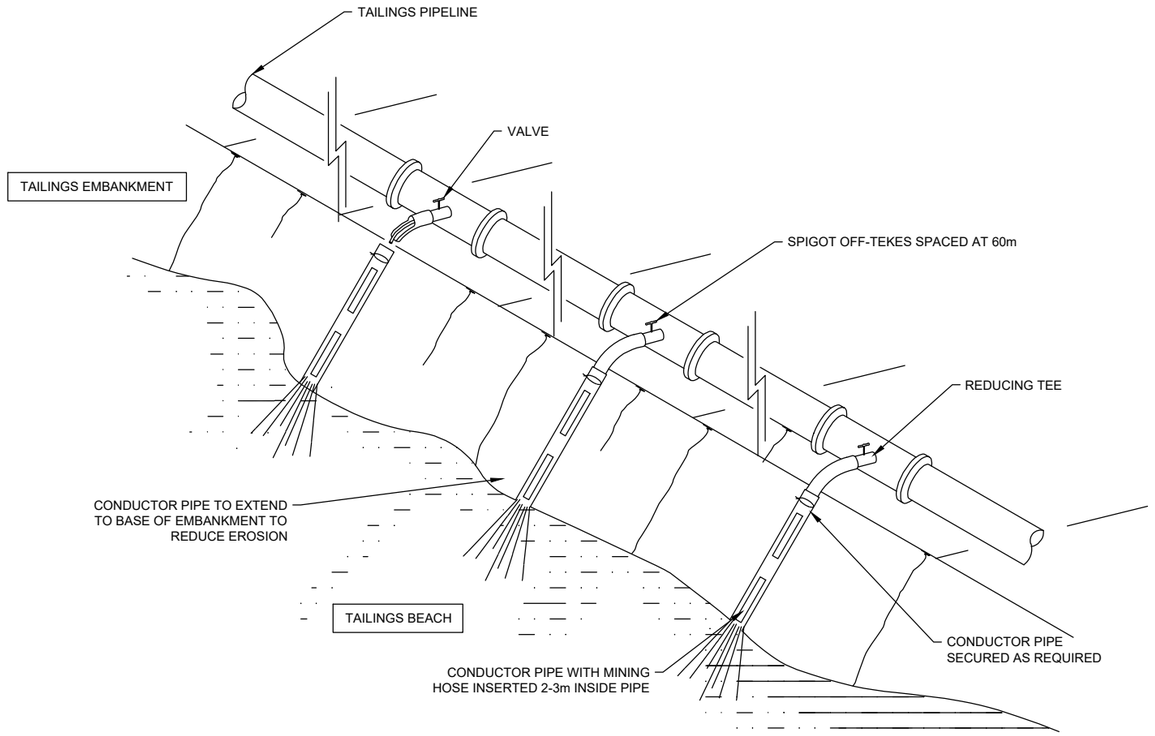


PIPELINE BUNDING - TYPICAL SECTION
1:100



CONDUCTER PIPE (SLOTTED PVC) - TYPICAL DETAIL
1:50



PROPOSED SPIGOT ARRANGEMENT
ISOMETRIC VIEW (NTS)

NOTES:

1. ALL DIMENSIONS IN METRES UNLESS SPECIFIED

1:100 0 1 2 3 4 5 m

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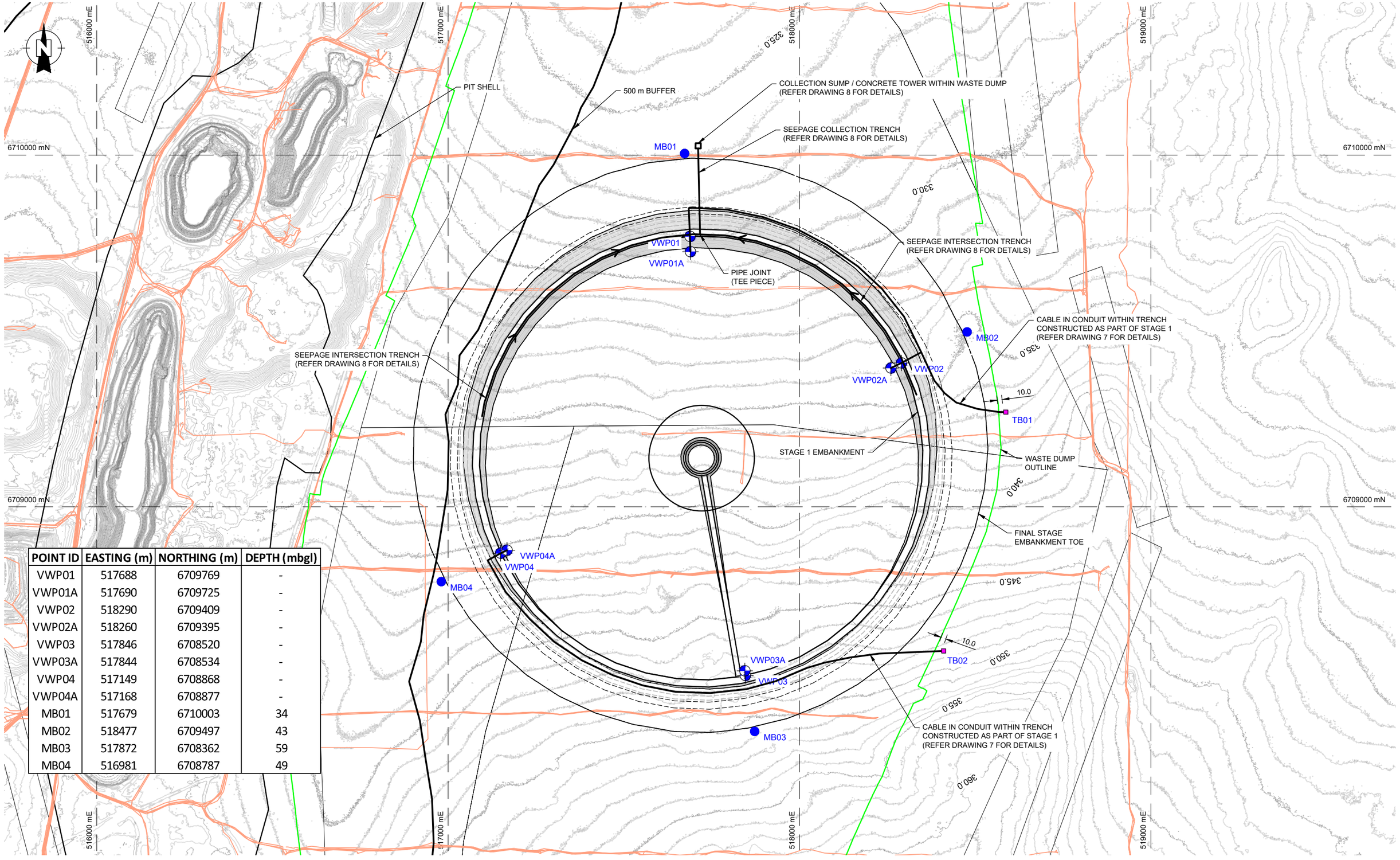

POINT ID	EASTING (m)	NORTHING (m)	DEPTH (mbgl)
VWP01	517688	6709769	-
VWP01A	517690	6709725	-
VWP02	518290	6709409	-
VWP02A	518260	6709395	-
VWP03	517846	6708520	-
VWP03A	517844	6708534	-
VWP04	517149	6708868	-
VWP04A	517168	6708877	-
MB01	517679	6710003	34
MB02	518477	6709497	43
MB03	517872	6708362	59
MB04	516981	6708787	49

LEGEND:

- WASTE DUMP OUTLINE
- SOUTH STERILISATION LINES
- VWP01 VIBRATING WIRE PIEZOMETER LOCATION
- MB01 MONITORING BORE LOCATION
- TB01 TERMINAL BOX

NOTES:

1. CONTOURS GENERATED FROM CLIENT SUPPLIED FILE: Lidar1m Contours
2. COORDINATE SYSTEM: MGA ZONE 50, GDA94

1:10 000 — 0 100 200 300 400 500 m

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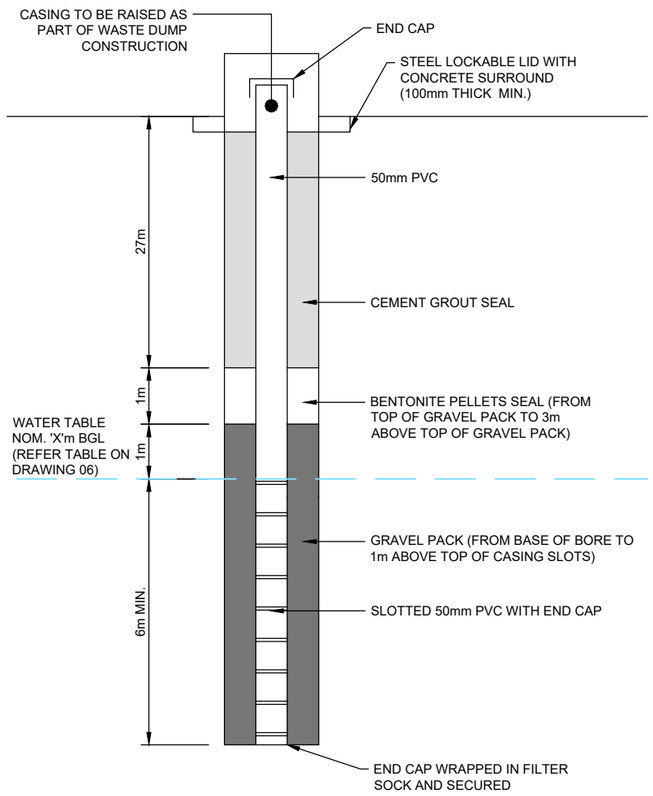
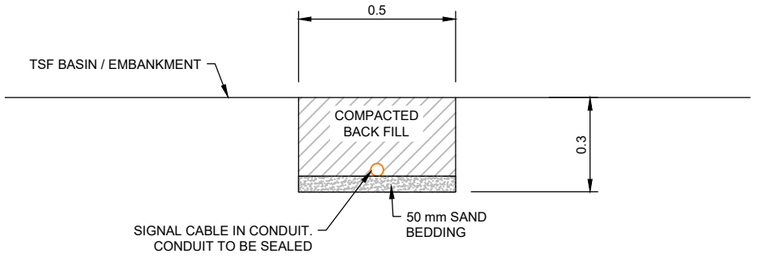
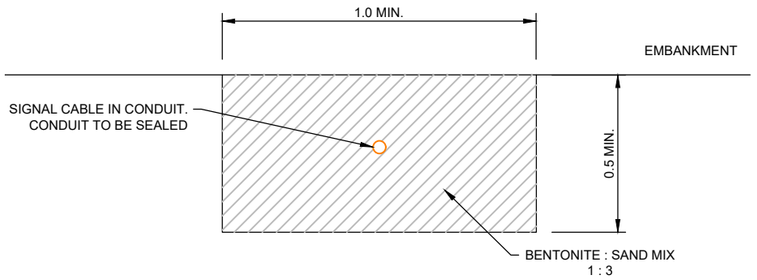


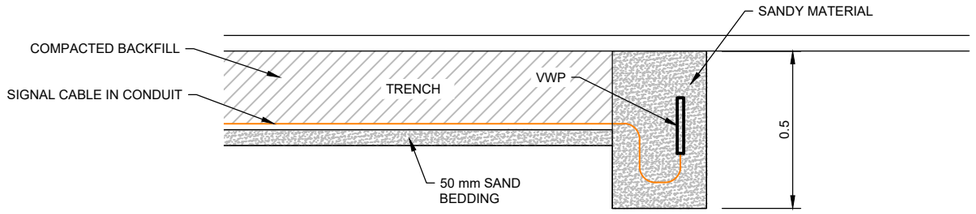
MONITORING BORE - TYPICAL DETAIL
NTS



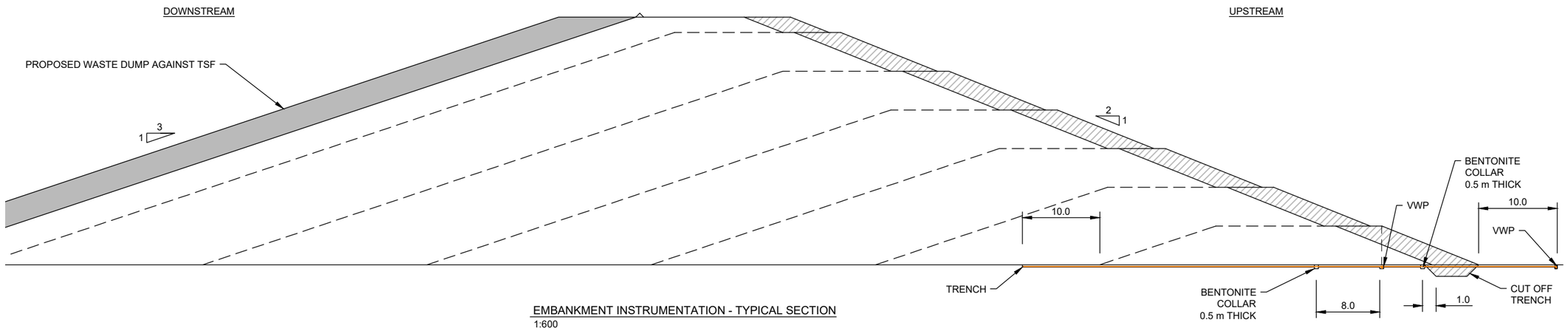
VWP TRENCH - TYPICAL DETAIL
1:20



BENTONITE COLLAR - TYPICAL DETAIL
1:20



VIBRATING WIRE PIEZOMETER - TYPICAL DETAIL
1:20



EMBANKMENT INSTRUMENTATION - TYPICAL SECTION
1:600

NOTES:

1. VIBRATING WIRE PIEZOMETER REFERS TO 3.5 BAR (50 PSI) PIEZOMETER MODEL NO. 52610520 BY DGSI
2. SIGNAL CABLE MODEL NO. 50613824 BY DGSI
3. ALL DIMENSION IN METRES UNO

1:20 0 0.2 0.4 0.6 0.8 1.0 m

1:600 0 6 12 18 24 30 m

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		DRAWN: DE	PROJECT: PER2022-0011
PROJECT: MT GIBSON GOLD MINE TSF DESIGN		CHECKED: PA	DRAWING: 07
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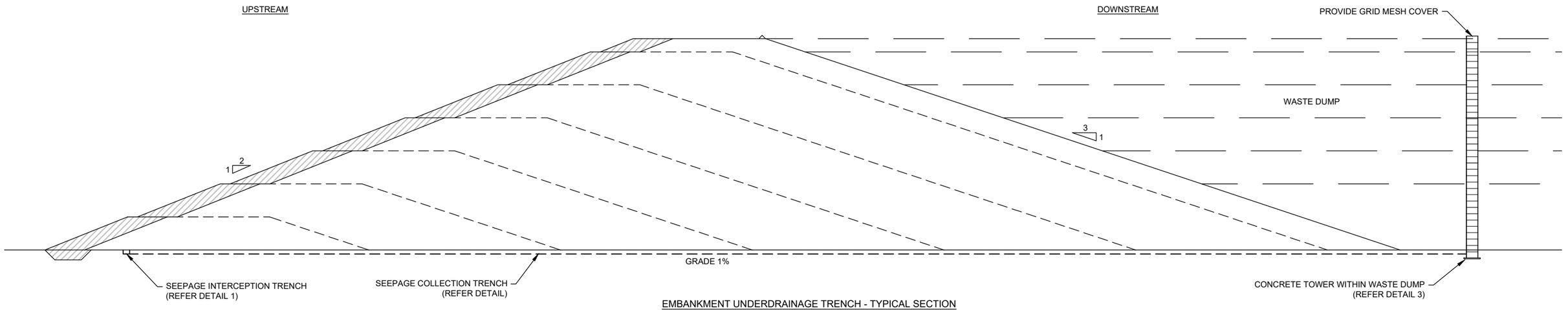
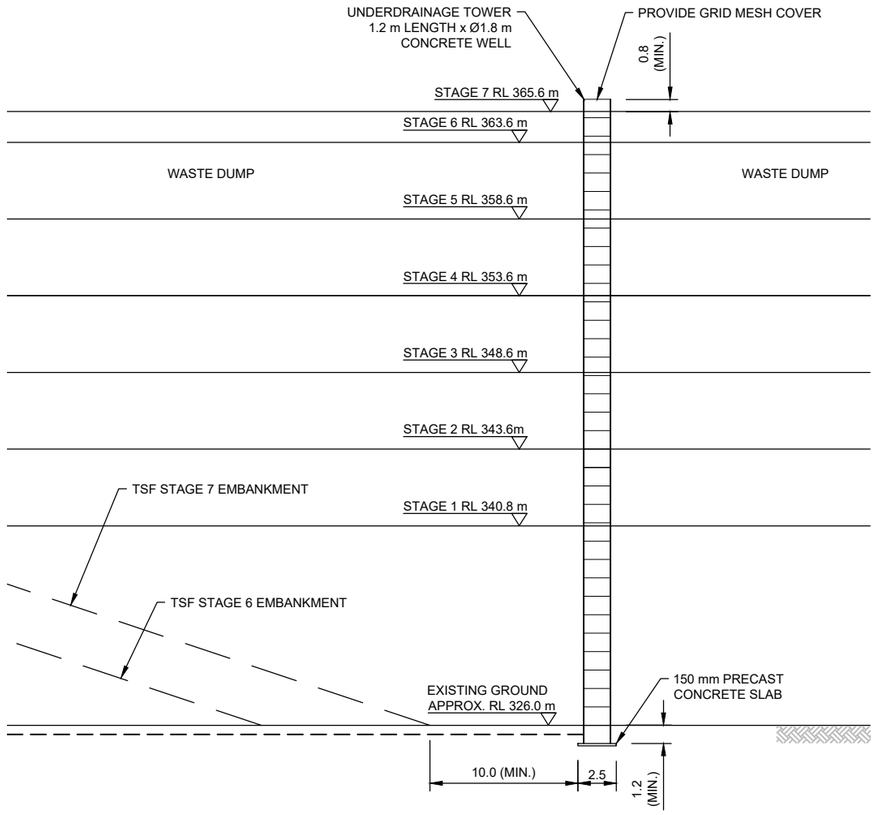
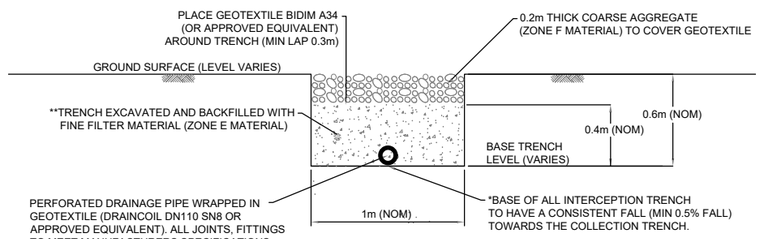


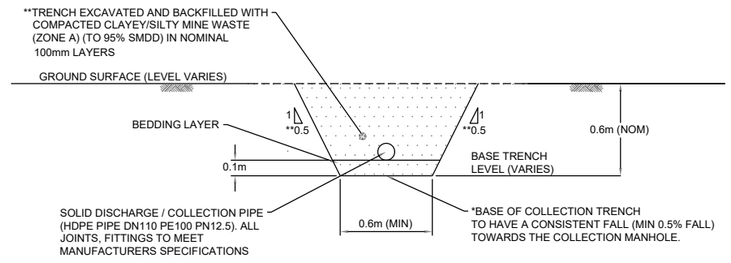
EMBANKMENT UNDERDRAINAGE TRENCH - TYPICAL SECTION
1:600



3 - CONCRETE TOWER WITHIN WASTE DUMP - TYPICAL SECTION
1:400



1 - SEEPAGE INTERCEPTION TRENCH - TYPICAL DETAIL
1:40



NOTES:
*ENSURE THERE ARE NO LOW POINTS
ALONG FULL LENGTH OF THE COLLECTION PIPE.
PROVIDE LOCAL CUTTING (WHERE REQUIRED)
TO PROVIDE CONSISTENT FALL (MIN 0.5% FALL) ALONG THE PIPE.

**EXCAVATE INTO NATURAL GROUND TO FORM TRENCH
(BATTER SLOPES MAY BE VARIED ON SITE TO SUIT SITE CONDITIONS AS DIRECTED).
COLLECTION TRENCH WILL BE CONSTRUCTED PRIOR TO
CONSTRUCTION OF WASTE DUMP EMBANKMENT.

**BACKFILL TO BE COMPACTED IN THE COLLECTION TRENCH BY HAND TAMPING
AROUND THE PIPE WITH SMALL PLATE COMPACTORS.
NO TRAFFIC SHALL CROSS PIPEWORK UNTIL A MINIMUM COVER OF 0.5m
HAS BEEN PLACED AND COMPACTED OVER THE PIPEWORK.

2 - SEEPAGE COLLECTION TRENCH - TYPICAL DETAIL
1:40

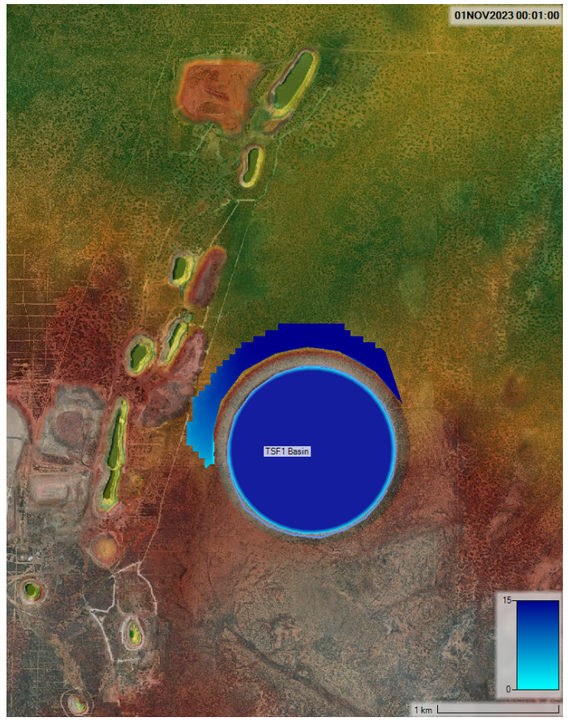
NOTES:

1. ALL DIMENSIONS IN METRES UNO

1:600 0 6 12 18 24 30 m

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		DE	PER2022-0011
PROJECT: MT GIBSON GOLD MINE TSF DESIGN		CHECKED: PA	DRAWING: 08
		REVISION: C	SCALE: AS SHOWN
TITLE: UNDERDRAINAGE SECTIONS AND DETAILS		DATE: 17.05.23	SHEET: A3 L



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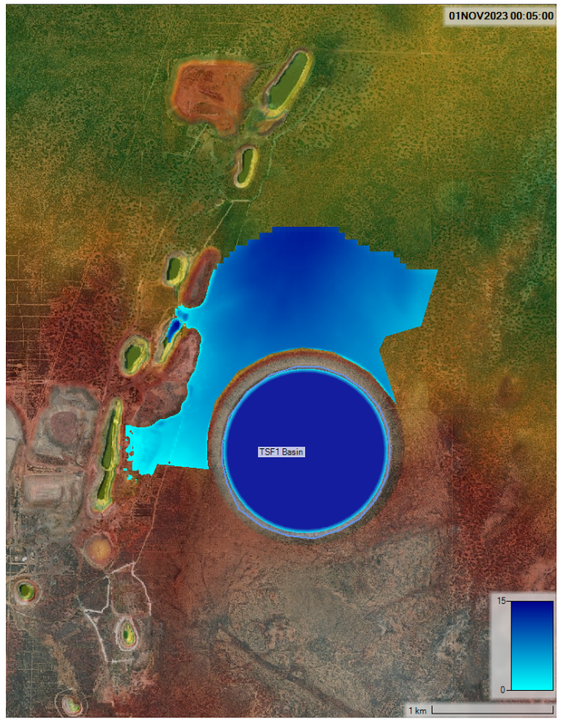

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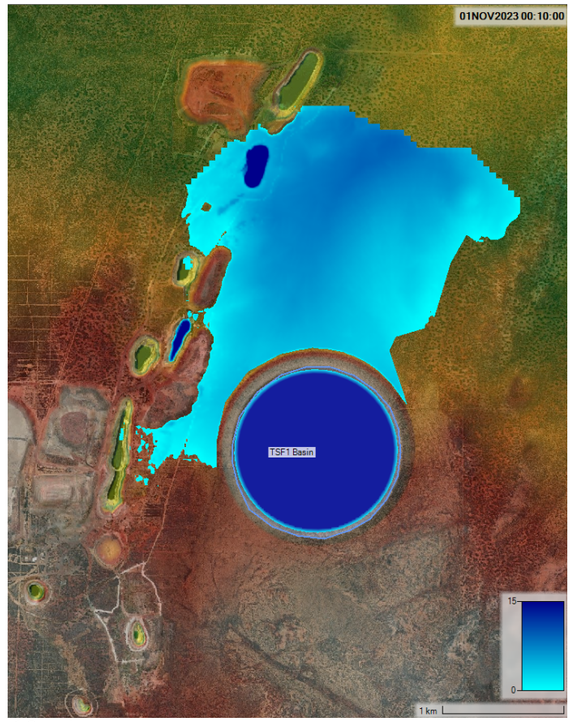
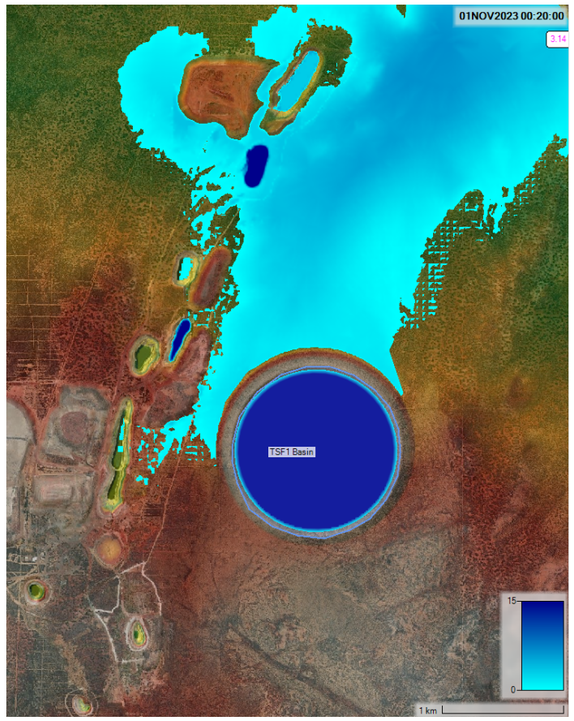


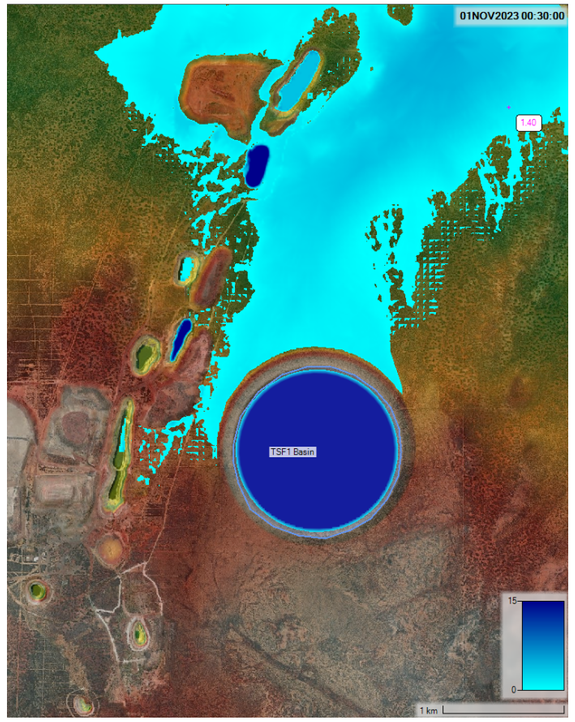
10 min.

DAM BREAK

DEPTH**S** v **TIME**



20 min.



30 min.

CMW Geosciences

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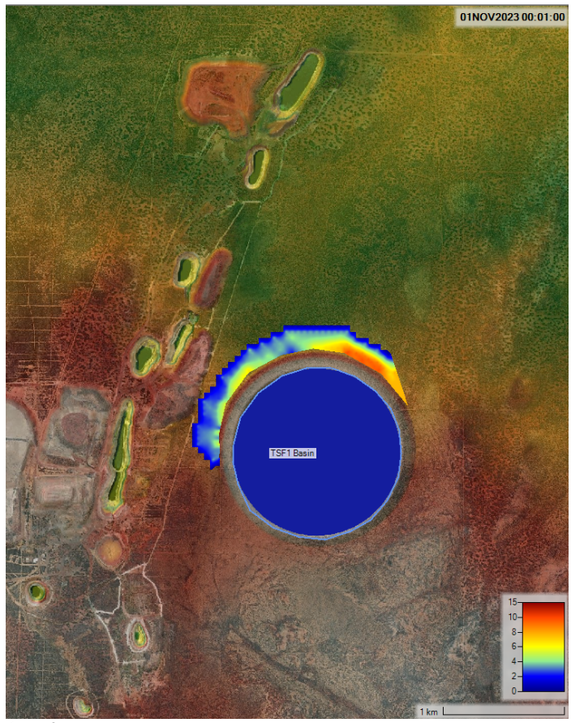
PROJECT: **MT GIBSON GOLD MINE TSF DESIGN**		CHECKED: CH	DRAWING: 09A
		REVISION: A	SCALE: AS SHOWN
TITLE: **INUNDATION PLAN (DEPTHS)**		DATE: 02.03.23	SHEET: A3 L

DAM BREAK
VELOCITIES v TIME



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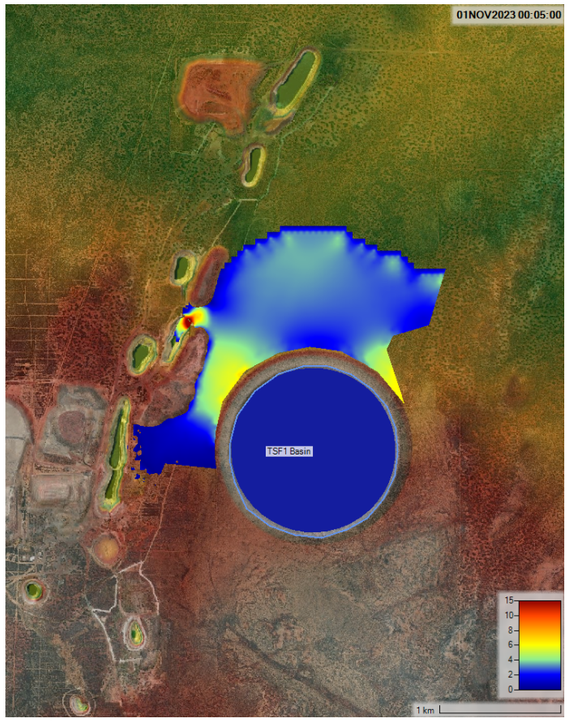

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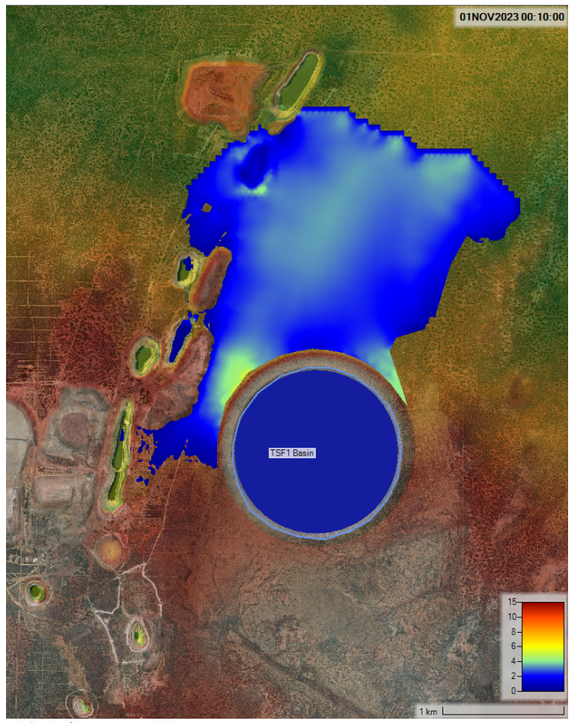

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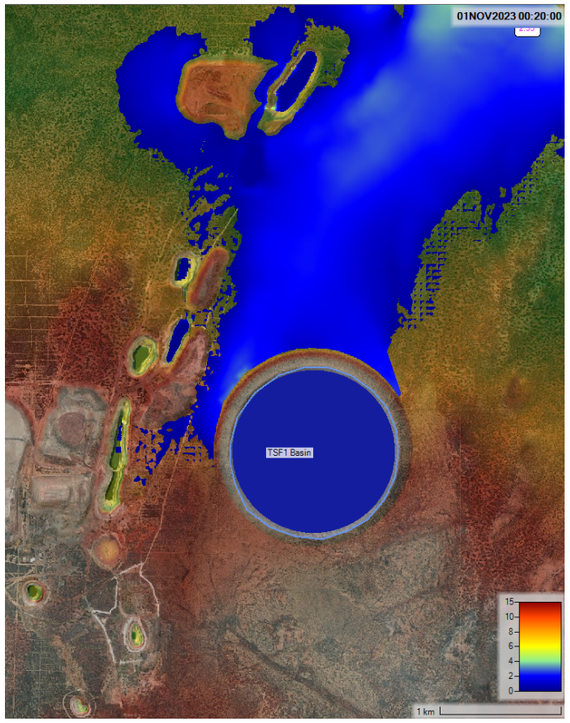

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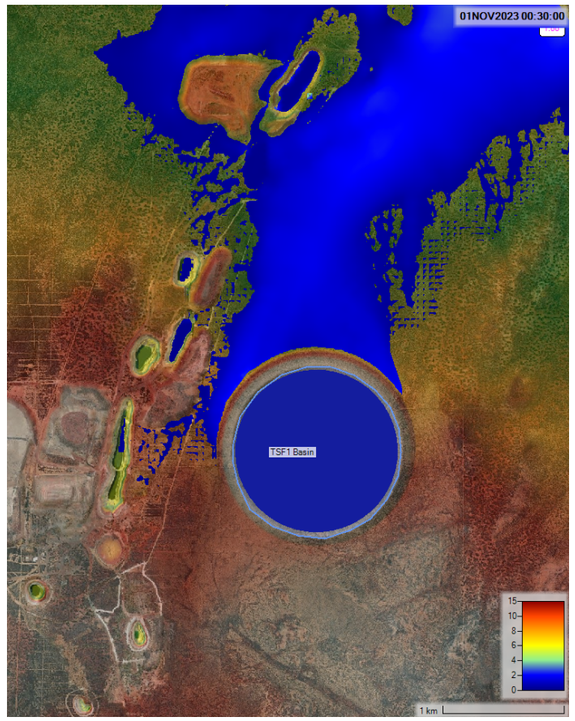
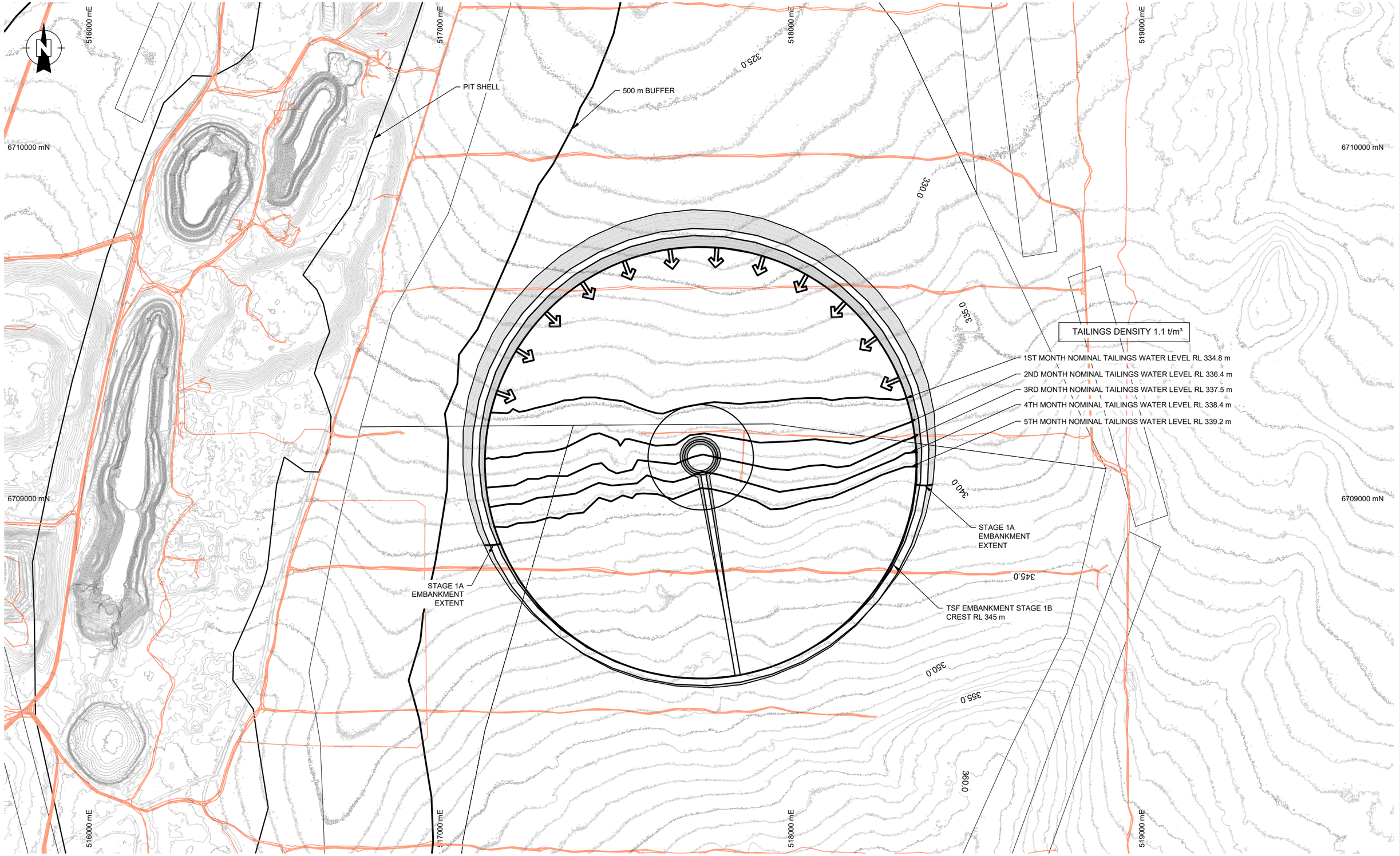


30 min.

CMW Geosciences

CLIENT: **CAPRICORN METALS LTD**		DRAWN: PA	PROJECT: PER2022-0011
PROJECT: **MT GIBSON GOLD MINE TSF DESIGN**		CHECKED: CH	DRAWING: 09B
		REVISION: A	SCALE: AS SHOWN
TITLE: **INUNDATION PLAN** (V**ELOCITIES**)		DATE: 02.03.23	SHEET: A3 L



LEGEND:

- SOUTH STERILISATION LINES
- SPIGOT LOCATION

NOTES:

1. CONTOURS GENERATED FROM CLIENT SUPPLIED FILE: Lidar1m Contours
2. COORDINATE SYSTEM: MGA ZONE 50, GDA94

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CMW Geosciences

CLIENT: **CAPRICORN METALS LTD**		DRAWN: DE	PROJECT: PER2022-0011
PROJECT: **MT GIBSON GOLD MINE TSF DESIGN**		CHECKED: PA	DRAWING: 10
		REVISION: D	SCALE: 1:10,000
TITLE: **TSF - DEPOSITION LEVELS PLAN**		DATE: 24.05.23	SHEET: A3 L

Appendix C – Prefeasibility Study

TECHNICAL MEMORANDUM

To:	Capricorn Metals Ltd	From:	Prasudi Atmajaya / Chris Hogg
Attention:	Laurie Chew	Date:	2 May 2022
Email:	lchew@capmet.com.au	Reference:	PER2022-0011AB Rev 1
Cc:	Wade Stephenson	Pages:	45
Subject:	**Tailings Storage Facility (TSF) Prefeasibility Study, Mt Gibson Gold Project**		

1 INTRODUCTION

This memorandum (report) presents the preliminary discussion on the future Tailings Storage Facility (TSF) site location at the Mt Gibson Gold Project (MGGP). MGFP is located approximately 65 km northwest of Wubin and 280 km northwest of Perth in Western Australia. The site was selected by Capricorn Metals (CMM) and a preliminary design concept developed by CMW Geosciences Pty Ltd (CMW) to CMM prior to the initial site visits by a project engineer from CMW on 24 February 2022 and 17-18 March 2022. This report includes the qualitative assessment of the site based on the visits.

2 BACKGROUND

MGGP is fully owned by Capricorn Metals Ltd (ASX: CMM). The projects covers an area of 139 km^2 of tenure including over 15 km strike on the gold-bearing Retaliation Greenstone Belt.

The historical gold mining at the MGGP between 1986 and 1999 resulted in 14 open pits with an average of 60 mbgl and a maximum depth of 100 metres below ground level (mbgl), and an underground mine. The site has since been placed on care and maintenance with its processing plant subsequently decommissioned and removed.

It is understood that studies are underway for the re-opening of the MGGP in 2023. These include a resource definition program that is allocated with up to 80,000 m of reverse circulation (RC) drilling. The drilling has commenced and in part is intended to assess pit cutbacks and expansions.

The re-opening of the MGGP is currently based on an estimated 3-5 Mt of ore throughput annually. The Life of Mine (LoM) is subject to further exploration, however, a TSF has been proposed to store a minimum of 30 Mm^3 processed tailings, or 40.4 Mt of tailings at 1.35 t/m^3 dry density. The capacity would be revised to 47 Mt, captured in Section 5.1 of this report.

3 TSF CONCEPT

The current concept has the TSF being built as an Integrated Waste Landform (IWL), where the TSF is surrounded by a wide buttress of mine waste forming a waste dump within which a clay-lined perimeter embankment is constructed utilising the downstream construction method. The proposed open-cut operations using pit cut-back will produce mine waste with a strip ratio of 4:1, an IWL was considered to be the best option from an environmental and economic perspective. Furthermore, there will be upfront waste mining and waste dump removal (nominally 18.5 Mt) which will enable construction of the starter stage of the IWL prior to plant commissioning.

A site for a TSF has been identified approximately 1 km to the east of the main pits area (Mt Gibson – General Site Layout drawing dated 17/1/2022), specifically the Orion 2/3 Pit. This area is nominally 2.2 km^2 (1.4 km by 1.6 km) and comprises bushland with no existing access tracks.

Based on the dimensions of the proposed TSF area, a preliminary design has been produced by CMW for a circular IWL with a radius of 691 m for a circumference of 4,342 m and an area of 150 ha. The centre of the IWL is at 517,848 m East and 6,708,369 m South (MGA, Zone 50J). The crest has currently been designed to RL 377.0 m, equivalent to embankment heights ranging from approximately 40 m to 15 m grading from the north to the south-southeast. The preliminary design allows an estimated storage capacity of 31.5 Mm^3, an equivalent of 42.5 Mt at a tailings density of 1.35 t/m^3 (dry). The average rate of tailings rise would be approximately 2.5-3.0 m/year.

Plans showing the extent of the TSF embankment, with respect to the existing pits and infrastructures, are attached to this report.

4 TSF DESIGN

The embankment design concept for the IWL is similar to the TSF at the Karlawinda Gold Project (KGP) that CMW has provided to CMM. The embankment will be zoned and will comprise the following:

- An upstream (or inner) zone of compacted clayey mine waste which will be a low permeability zone.
- A downstream (or outer) zone of traffic compacted gravel mine waste which provides bulk/strength and buttresses the low permeability upstream zone.
- A cut-off trench underneath the upstream zone in order to reduce seepage losses.

A typical section for the embankment will have an upstream or internal slope of 1: 2.0 (V:H) and an overall downstream or external slope of nominally 1:3 (V:H). The geometry of the downstream slope at this stage will not include benches.

Both the clayey and gravel mine wastes will be sourced from the nearby cutbacks and expansions. The gravel mine waste could also be sourced from the existing waste dumps.

The IWL will have a central decant comprising a rock ring built with select rock fill material with low fines content. Surface water will be removed from the rock ring by a pontoon mounted decant pump. Access to the decant will be by a decant accessway constructed using mine waste.

The IWL storage area (basin) may require a (part or full) liner to reduce seepage losses. Options for this liner include the less expensive remedial earthworks comprising moisture conditioning and compaction of the basin to create a low permeable layer at the base, and the more expensive HDPE liner or compacted clay mine waste to form a clay liner (k approx. 10^{-8} m/s) . An underdrainage system within the IWL basin may also be included in the design to further reduce the phreatic surface within the tailings, hence enhancing stability and reducing seepage losses.

5 DESIGN CONSIDERATIONS

The selection of a circular IWL as a TSF has the following benefits:

- Economic benefits include savings in capital and operating costs for perimeter embankment construction by optimising the use of mine waste to construct and ultimately rehabilitate the upper surface of the TSF.
- A circular shape TSF provides a higher storage efficiency with less construction materials required for the same storage capacity.
- Similarly, less materials are required for a single cell TSF if compared to the multiple cells option as no internal embankment is needed for the former.

- A single cell will have more storm water capacity on top of the facility to store the probable maximum precipitation (PMP), if compared with multiple smaller cells.
- In the IWL concept, continued staged construction is in the downstream direction, that is, each lift is laid back against the surrounding mine waste rock storage and is placed over previously placed mine waste. Construction of future embankment lifts therefore does not rely on the strength of the deposited tailings and, as such, the rate of rise and strength of the tailings does not impact construction considerations.
- Tailings distribution lines (pipes), which normally have to be removed prior to construction with conventional paddock storage facilities, can be retained in place during construction and are only moved after the construction has been completed. The circular shape of a TSF would further enhance the operational efficiency of these pipes.
- By selectively placing waste, which will be used for rehabilitation adjacent to the edge of the TSF (on top of the waste dump), considerable savings will be apparent during the rehabilitation of the final top surface as material rehandling from distant points will not be required.
- Other benefits include a more robust TSF that should not be subject to liquefaction failure as lifts are not founded on tailings. Factors of safety for embankment stability will be higher, due to the mass of waste in place surrounding the TSF when compared with conventional TSF construction.

The circular IWL option does possess disadvantages as follows:

- The circular shape means a new TSF cell (if required) cannot be readily joined with the existing TSF (i.e. as in multiple square cells).
- At closure, more storage will be lost to allow for tailings beach angle (i.e. when compared with multiple cells of the same total size).

Based on the above, the advantages of a circular IWL outweigh the disadvantages.

5.1 Design Changes

Based on the communique between CMW and CMM on 9 March 2022, it is understood that a total of 47 Mt of processed tailings would be expected. This would lead to an increase of approximately 2.5 m in embankment height of the current TSF design (TSF1), or to RL 379.5 m.

A second TSF cell (TSF2) will be required for an additional 20 Mt of tailings capacity. TSF2 is to be designed separate to TSF1. If this capacity was added to TSF1 further raising of 10 m would be required.

TSF2 will be constructed either to the north or the east of TSF1, subject to the verification from the initial site visits and the subsequent geotechnical investigation by CMW. It could alternatively be constructed at the north of the open pits, should the other options be found undesirable. It is understood that TSF2 had previously been proposed either to the north of the decommissioned Tailings Dam 2 (TD2). This is no longer the option as more ore bodies are expected north TD2.

6 GEOTECHNICAL APPRAISAL

6.1 Site Visits

The initial site visits by CMW covered the following:

- Reconnaissance over the TSF1 location comprising walkover survey on a chainage of approximately 3.5 km, predominantly over the basin of the TSF but also parts of the footprint of the embankment. Photographs and coordinates were taken at multiple locations of significant representation of the site. The locations are shown on the aerial and geological maps attached to this report. Representative photographs follow the maps.

- Inspection of the existing TD1, TD2, Orion 2/3 Pit and waste dump, and Orion 1, Orion North, Lexington, Enterprise and Hornett Pits. Photographs were taken at vantage points at each location. Bulk samples were collected from the dried tailings in TD1, clayey materials of the embankment at TD2 and of the subsurface layer at Orion 2/3, upper and lower saprolite materials from the Orion 2/3 Pit, and mine waste from the Orion 2/3 Waste Dump.

6.1.1 TSF1 Setting

Based on the site visits, the majority of the TSF1 location was noted to be overlain by sandy colluvium plain with pockets of granite mounds which exhibit exfoliation in almost all occurrences. Quartz and feldspar formed the primary crystals of the surficial sand, which generally was yellow in colour and dry, noting the site visits were undertaken during the dry season when. With the exception of the thin loose layer on the surface (+/- 20 mm) the sand was considered medium dense, as gauged through footprints during the walkover and the minimal animal digs seen.

Over the walkover chainage, the granite mounds were encountered mostly on the south and east of the TSF basin, at the photograph locations P02, P04, P17-21 and P24 (refer to the maps on the attachment).

Surface undulation was generally minimal and consistent with the estimated slope of 1v: 50h, except at the locality of the granite mounds where gradients were as steep as 1v: 20h.

The vegetation encountered during the walkover consisted of mainly the low-lying Acacia woodland. Occasional chenopod/saltbush shrub in open spaces, and to a lesser extent Tussock grass, was also noted. Eucalyptus woodland, mainly the York gum and mallee, occurred on finer-textured soils (silt, clay) in local sheetwash or gully features. A single pocket of dried unvegetated area covered with microbial mat was also encountered on the northwest of the basin, indicative of a localised low-lying area where sheetwash converges. The presence of the finer-textured soils was at best minimal and is considered as insignificant when consider a low-permeability base within the TSF basin.

The gully features noted were concentrated over a strip stretching southeast-northwest near the photograph locations P21 and P33 (refer to the maps on the attachment), and on another bearing south-north at a location to the west of the TSF; the latter is understood to be outside the tenement boundary.

At the time of the site visits, no visible body of water was noted within the TSF site. Drainage was through sheetflow with no distinct drainage line observed. Drainage is to the north-northeast and into nearby salt lakes, the closest of which being the Karpa Spring at approximately 4 km to the northeast.

6.1.2 Open Pits Setting

In-depth geological appraisal of the existing open pits was not undertaken during the site visits by CMW, as historical reports have been relied upon for this assessment. It is understood that the MGGP is located at the southern extremity of the Retaliation Greenstone Belt, in the southwest portion of the Yalgoo-Singleton Greenstone Belt in the Murchison Province of the Yilgarn Craton. The Archaean basement is dominantly volcanic and intrusive mafic and felsic rocks and their sheared equivalents, which have been metamorphosed to the mid-amphibolite facies. Metasedimentary rocks are rare and consist of thin, discontinuous, interflow ferruginous cherts. The basement of the mine area consists of volcanic sequences.

Based on the observation of the face of the open pits, the regolith cross-section is described as consisting of thin surficial sandy soils with increasing fines (silt, clay) and lateritic gravel contents with depth, overlying slightly to moderately cemented (hardpan) which further down became cemented by iron oxides (ferricrete). Saprolite underlying the surficial layers and above the bedrock displayed an upper zone with shades of pale brown to brown layer with red and yellow hues, overlying a lower zone that was white and grey in colour. Both saprolite zones exhibited little indication of texture degradation. For the purpose of this report, the two saprolite zones are referred to as the ‘upper saprolite’ and ‘lower saprolite’, respectively.

The soil layers including the gravelly soil were present at all of the pits albeit with different thicknesses, which typically ranged between 1 m to 2 m above the hardpan. The underlying ferricrete was typically up to 3 m thick. The saprolite extended to depths between 20 m to 40 m.

The water level inside the pits was estimated to be between 70 m to 80 m below the surface.

6.2 Laboratory Test

Following the site visits, samples were sent to Western Geotechnical and Laboratory Services (WGLS), a NATA registered testing authority, for laboratory testing comprising the following in Table 1.

Table 1: Laboratory Test Schedule Summary

Type of Test	**Test Method**	Quantity
Particle Size Distribution	AS1289.3.6.1	3
Particle Size Distribution with Hydrometer	AS1289.3.6.3	1
Atterberg Limits	AS1289.3.1.1, 3.2.1, 3.3.1	4
Soil Particle Density	AS1289.3.5.1	1
Dry Density/Moisture Content Relationship	AS1289.5.1.1	4
Falling Head Permeability	AS1289.6.7.2	2
Emerson Class Number	AS1289.3.8.1	3
Multistage Consolidated Undrained (CU) Triaxial Test	AS1289.6.4.2	1

The results of tests to date are summarised in Table 2 on the next page.

For the purpose of materials evaluation, the following draft only material specifications will be applied:

- Clayey Mine Waste
  - Soil Classification: CL, CI or CH (based on *USCS – Unified Soil Classification System*)
  - Particle Size Distribution: 100% passing 150 mm, >20% to <66% passing 0.075 mm (fines)
  - Liquid Limit: <60%
  - Plasticity Index: >15% to <30%
- Gravel Mine Waste
  - Soil Classification: CL, CI, CH, GM or GC allowing a trace of cobbles
  - Particle Size Distribution: <15% over 60 mm, ≥10% passing 0.075 mm (fines)
  - Plasticity Index: ≤15%

Table 2: Summary of Laboratory Test Results

Location & Coordinates	Approx. RL (m AHD)	Particle Size Distribution				Density	Atterberg Limits				SMDD		ECN	K_{20} (m/s)	Multi-Stage CU Triaxial		
		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	ρ_b (t/m^3)	LL (%)	PL (%)	PI (%)	LS (%)	OMC (%)	SMDD (t/m^3)			c' (kPa)	ϕ' (^{0})	c_v
Orion 2/3 Clayey Materials 516,089 m E 6,709,489 m N	360	30	27	43		-	35	17	18	8	14.5	1.86	4	$1.18e^{-8}$	-	-	-
Orion 2/3 Upper Saprolite 516,008 m E 6,709,089 m N	340	7	31	62		-	37	28	9	3	18.5	1.64	5	-	-	-	-
Orion 2/3 Lower Saprolite 516,089 m E 6,709,397 m N	330	3	20	58	19	2.59	NO	NP	NP	0	16.0	1.71	5	$8.50e^{-9}$	24	29	0.04
Orion 2/3 Waste Dump 515,820 m E 6,709,151 m N	370	41	39	20		-	26	19	7	3	10.0	2.03	-	-	-	-	-

Gravel, sand, silt and clay percentages are by weight, ρ_b = apparent (bulk) density, LL = liquid limit, PL = plasticity limit, PI = plasticity index, LS = linear shrinkage, NO = Not obtainable, NP = Non-Plastic, MC = Natural Moisture Content, OMC = Optimum Moisture Content, SMDD = Standard Maximum Dry Density, ECN = Emerson Class Number, k_{20} = coefficient of permeability, c' = cohesion, φ' = angle of shear resistance, cv = coefficient of consolidation.

6.2.1 Orion 2/3 Pit Samples

The clayey sample in Orion 2/3 Pit is described as gravelly CLAY with sand with soil classification 'CL'. The fines content was 43% and were low plasticity. The sample has a very low permeability of around 1 x 10^{-8} m/s. The Emerson Class Number (ECN) 4 indicates that in addition to the materials being non-dispersive, the presence of calcium carbonate and calcium sulphate was noted. These chemicals promote the lowering of soil acidity and reduction of thick cation layers around fines particles associated with dispersion issues with soil.

The upper saprolite materials in Orion 2/3 Pit are described as sandy SILT trace gravel, and assigned a soil classification 'ML' as although it has substantial fines content (62% fines) of medium plasticity. The ECN of 5 indicates that while the soil is non-dispersive, the remoulding and breaking down of soil bonds can result in dispersive behaviour. Remoulding of the soil at a moisture content near the optimum for compaction (simulating the use of these soils in a filling and compaction operation) does not increase the potential for dispersive behaviour, however further breakdown of the soil may occur, by water turbulence or concentrated rapid water flow. Under these circumstances this class of soil may disperse.

The lower saprolite materials in Orion 2/3 Pit are described as non plastic SILT with sand trace gravel, which indicated a structure where fines were dominant. The sample has a very low permeability of around 1 x 10^{-8} m/s. Similar to the upper saprolite materials, its soil classification is 'ML' and is generally non-dispersive. The lower saprolite materials, however, are non-plastic.

6.2.2 Orion 2/3 Waste Dump Samples

The sample obtained from Orion 2/3 Waste Dump indicated materials defined as poorly graded sandy silty GRAVEL trace cobbles, and a USCS of 'GM'. The silt component has low plasticity.

It is acknowledged that the coarse grained contents of the sample from Orion 2/3 Waste Dump, especially cobbles and boulders could be higher, however, these coarse grained materials were removed prior to testing in order to comply with the upper limit of 75 mm for suitable sieve sizes of a PSD test in accordance with AS1289.3.6.1 (2009).

7 DISCUSSION

We make the following observations based on the geological appraisal comprising of site reconnaissance, sampling and laboratory testing:

- The current proposed TSF1 location is considered adequate for tailings storage due to the gently sloping topography with minor undulations, relatively minimal flora clearance, proximity to the designated source of materials and future mill, and potential for other structures (e.g. TSF2) to be built nearby.
- The proposed TSF1 location will likely require imported clay or artificial liners over at least part of the TSF basin. An underdrainage system will be required in conjunction with a liner.
- Potential challenges to the current TSF1 setting include space limitation if there is a need to raise the TSF above the design height in the future as the TSF will be built adjacent to the future plant.
- The clayey materials in the Orion 2/3 Pit are considered adequate for use in the upstream (including cut-off trench) zone of the proposed TSF1. The materials from the Orion 2/3 Waste Dump are suitable for the downstream zone of the TSF.
- The upper and lower saprolites materials in the Orion 2/3 Pit could be used as the upstream zone and liner materials due to their very low permeability.
- A liner will be required to provide a low permeable surface and to reduce vertical seepage. The reduction in permeability cannot be achieved through compaction of the existing surface due to the sandy surficial soils. It is understood that HDPE liner is an expensive option hence preference is to be made for using clayey materials as a compacted clay liner. It is estimated that approximately 450,000 m^3 of clayey

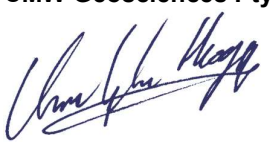
materials will be required to provide a low permeable of nominally 0.3 m thick over the current TSF basin. The extent of the liner will be verified after the geotechnical investigation. The possibility of having to import clayey materials to provide a liner should however be consider by CMM in mine planning (i.e. ensuring clay material availability).

- The existing TD1 and TD2 could provide alternative sources for clayey materials, or dried tailings to be used in lieu of the pit clayey materials. However, it is noted that these sources are further away from the TSF1 site that the pits. If required such options could be explored, however, these will be subject to future materials testing to confirm their suitability.
- CMM will need to consider the total height of the IWL landform in obtaining environmental approvals. CMW are not aware of a height restriction for landforms at Mt Gibson.

8 CLOSURE

We trust the above and the attached meet your requirements. Should you require further information or clarification of any details, please do not hesitate to contact the undersigned.

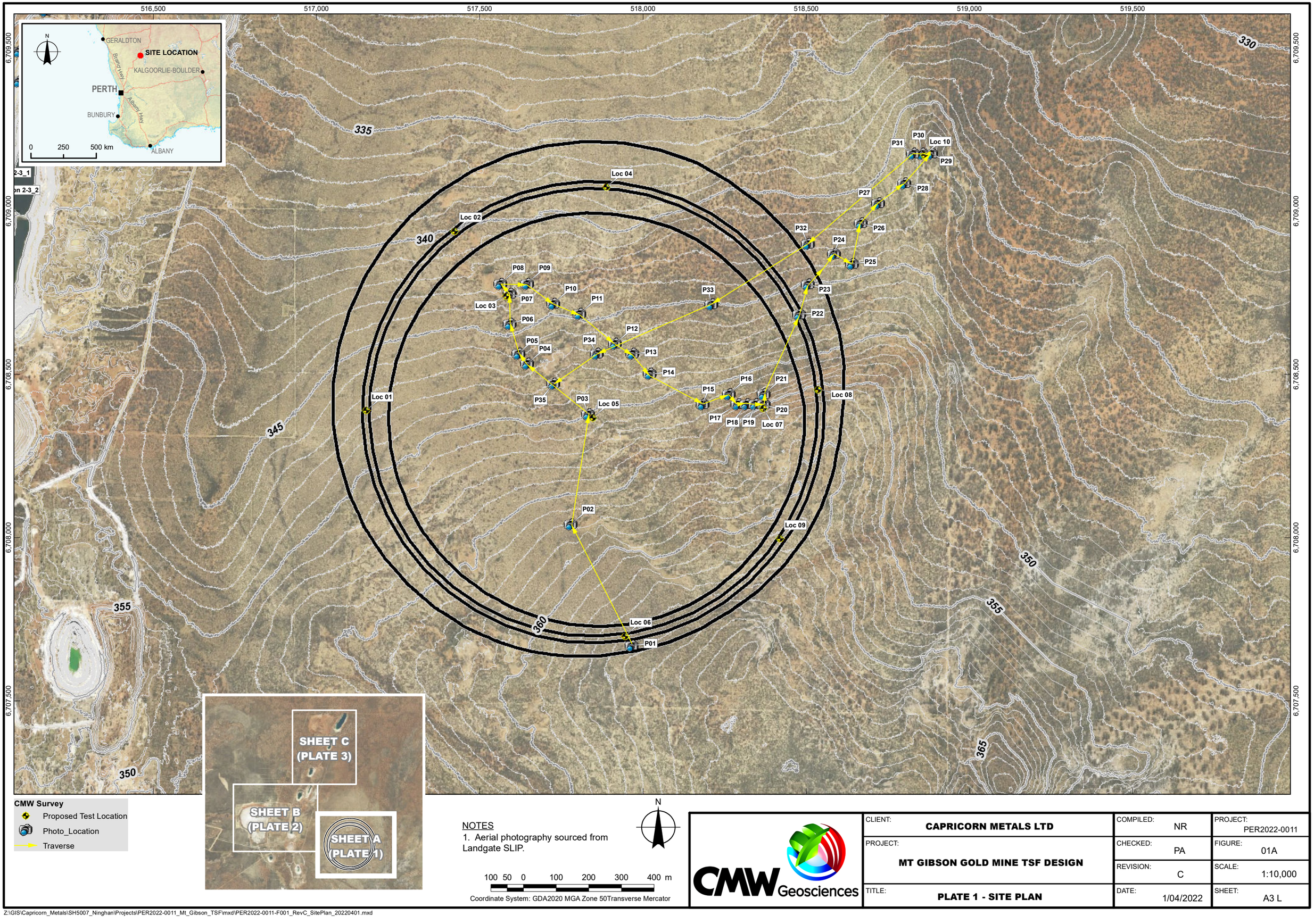
For and on behalf of
CMW Geosciences Pty Ltd



Christopher Hogg
Principal Tailings Engineer

Attachments Drawings (6 no.)
Photographs (7 no.)
Laboratory Test Certificates (23 no.)

Distribution: 1 electronic copy to Capricorn Metals Ltd via email
Original held at CMW Geosciences



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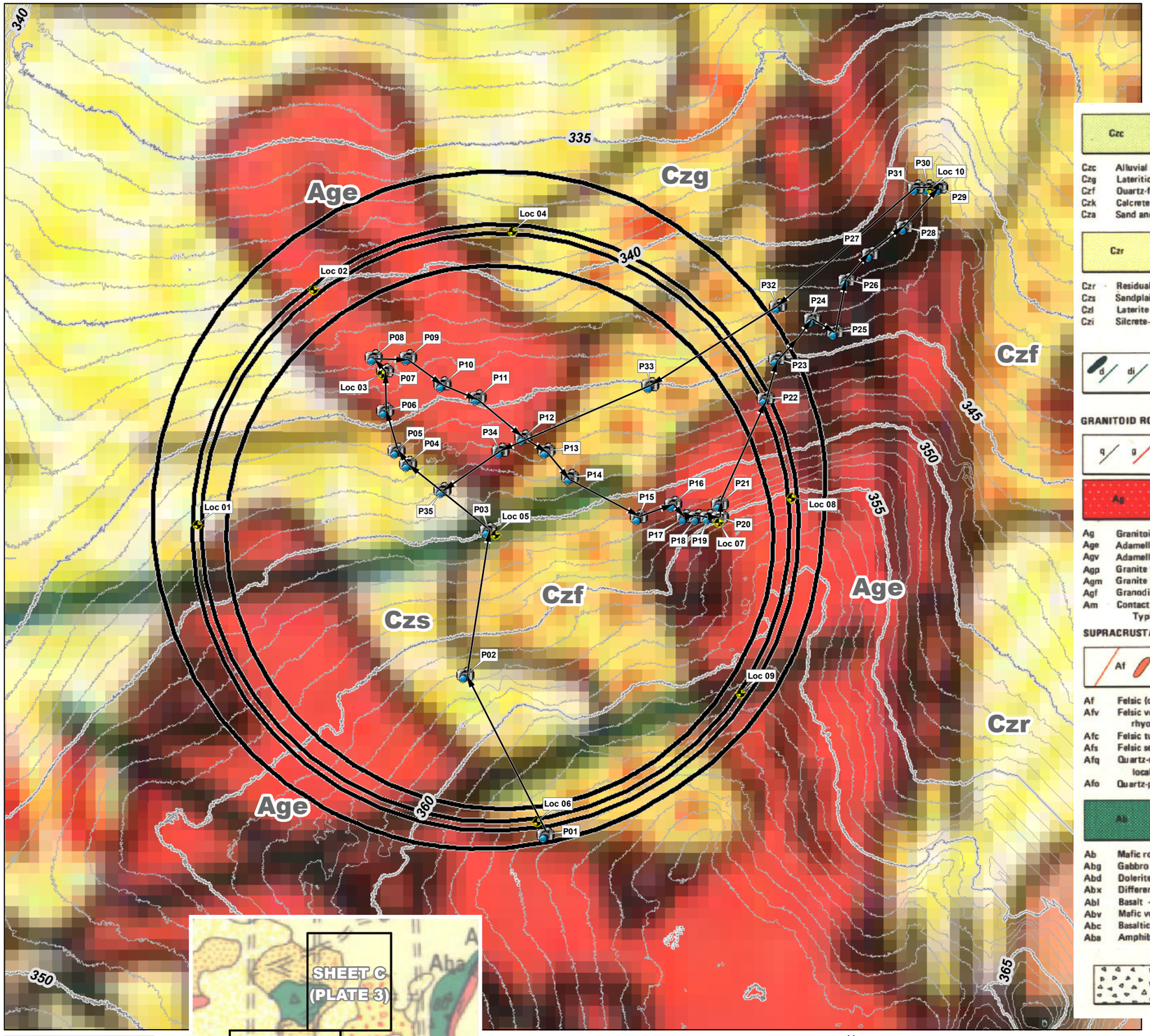
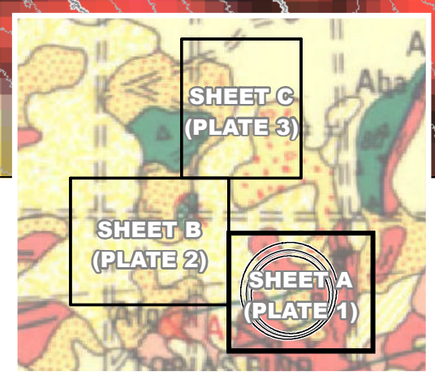




CMW Survey

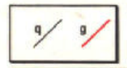
- Proposed Test Location
- Photo_Location
- Traverse

Czc Alluvial and colluvial deposits — transported clay, sand and lithic fragments; may be indurated
Czg Lateritic gravel, sand and minor clay
Czf Quartz-feldspar sand and lithic fragments from granitoid rocks
Czk Calcrete in mature drainage zones and around playas
Cza Sand and clay deposited in channels and adjacent flood plains; may occur in broad valleys with no defined drainage

Czr Residual deposits — sand, clay, duricrust
Czs Sandplain — yellow sand; commonly reworked by wind; includes red colluvial sand on plateau remnants
Czl Laterite — commonly on top of breakaways; may include consolidated grit on stripped surface
Czi Silcrete—siliceous duricrust

Dykes — d : mafic, commonly dolerite; di : coarse-grained leucogabbro

GRANITOID ROCKS



Veins — q: quartz
g : granitoid; quartz diorite to adamellite

Overprint indicating granitoid rocks strongly foliated, lineated and/or recrystallized

Ag Granitoid rock unassigned — most is variably recrystallized and some is deformed
Age Adamellite to granodiorite — medium even-grained; includes minor xenoliths
Agv Adamellite — medium-grained with less than 10 per cent feldspar megacrysts; includes megacrysts of quartz
Agp Granite to adamellite — medium to coarse-grained and porphyritic; megacrysts both idiomorphic and corroded
Agm Granite to granodiorite — even-grained and porphyritic; intimate mixtures of Age, Agp, Agv and Agf
Agf Granodiorite — fine to medium even-grained; commonly contains abundant biotite and feldspar megacrysts. Widespread as xenolith phase
Am Contact migmatite — includes supracrustal remnants associated with various textural granitoid types. Typically developed near supracrustal belts

SUPRACRUSTAL ROCKS

Af Felsic (quartzo-feldspathic) volcanic and sedimentary rocks unassigned
Afv Felsic volcanic rocks — banded to massive, fine to medium-grained amygdaloidal lavas with tuffaceous and agglomeratic layers; rhyolitic to dacitic composition; may include minor sedimentary rocks
Afc Felsic tuff and agglomerate — banded and crystal tuffs
Afs Felsic sedimentary rocks — fine to medium-grained; laminated to massive; includes minor Asp units; may contain felsic volcanic rocks
Afq Quartz-muscovite schist — fine to medium-grained; occurs mainly in contact zones adjacent to granitoids; local biotite-hornblende tonalite gneiss
Afo Quartz-plagioclase porphyry — includes fine-grained massive dacitic rocks

Ab Mafic rocks unassigned — may include minor felsic and ultramafic rocks
Abg Gabbro — medium to coarse-grained actinolite-plagioclase rock, some with accessory quartz; may contain minor ultramafic differentiates
Abd Dolerite — fine to medium-grained actinolite-plagioclase rock; may contain minor ultramafic differentiates
Abx Differentiated mafic flow and sill rocks with pyroxenite or peridotite bases
Abl Basalt – fine-grained to aphanitic plagioclase-pale amphibole rocks; includes massive, variolitic, amygdaloidal and pillowed varieties
Abv Mafic volcanic rocks — intermixed layers of felsic and ultramafic volcanic rocks common
Abc Basaltic agglomerates and minor tuffaceous rocks — may include minor felsic volcanic rocks
Aba Amphibolite — pale and dark amphibole-plagioclase rocks; commonly in supracrustal remnants; developed in zones of high strain

Overprint indicating deeply weathered or soil covered rock

N

100 50 0 100 200 300 400 m

Coordinate System: GDA2020 MGA Zone 50Transverse Mercator

CMW Geosciences

CLIENT: CAPRICORN METALS LTD	COMPILED: NR	PROJECT: PER2022-0011
PROJECT: MT GIBSON GOLD MINE TSF DESIGN	CHECKED: PA	FIGURE: 02A
	REVISION: C	SCALE: 1:10,000
TITLE: PLATE 1 - GEOLOGY	DATE: 1/04/2022	SHEET: A3 L

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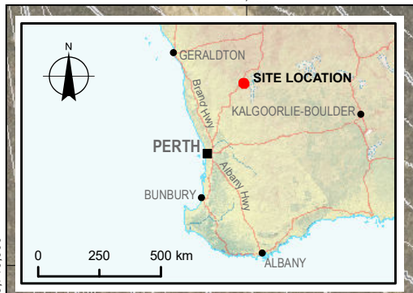
6,710,000 6,709,500 6,709,000 6,708,500



335 325 295 295 330 350 361 373 335 345 355 370 380 375 300 340 345 350

Orion North
Orion 1
Orion 2-3_5
Orion 2-3_6
Orion 2-3_4
TD2
Orion 2-3 WD_1
Orion 2-3 WD_2
Orion 2-3_3
Orion 2-3_1
Orion 2-3_2
TD1
Loc 02
Loc
Loc 01

CMW Survey
- Proposed Test Location
- Photo_Location

NOTES
1. Aerial photography sourced from Landgate SLIP.

N

100 50 0 100 200 300 400 m

Coordinate System: GDA2020 MGA Zone 50Transverse Mercator

CMW Geosciences

CLIENT: CAPRICORN METALS LTD	COMPILED: NR	PROJECT: PER2022-0011	
PROJECT: MT GIBSON GOLD MINE TSF DESIGN	CHECKED: PA	FIGURE: 01B	
	REVISION: C	SCALE: 1:10,000	
TITLE: PLATE 2 - SITE PLAN	DATE: 1/04/2022	SHEET: A3 L	

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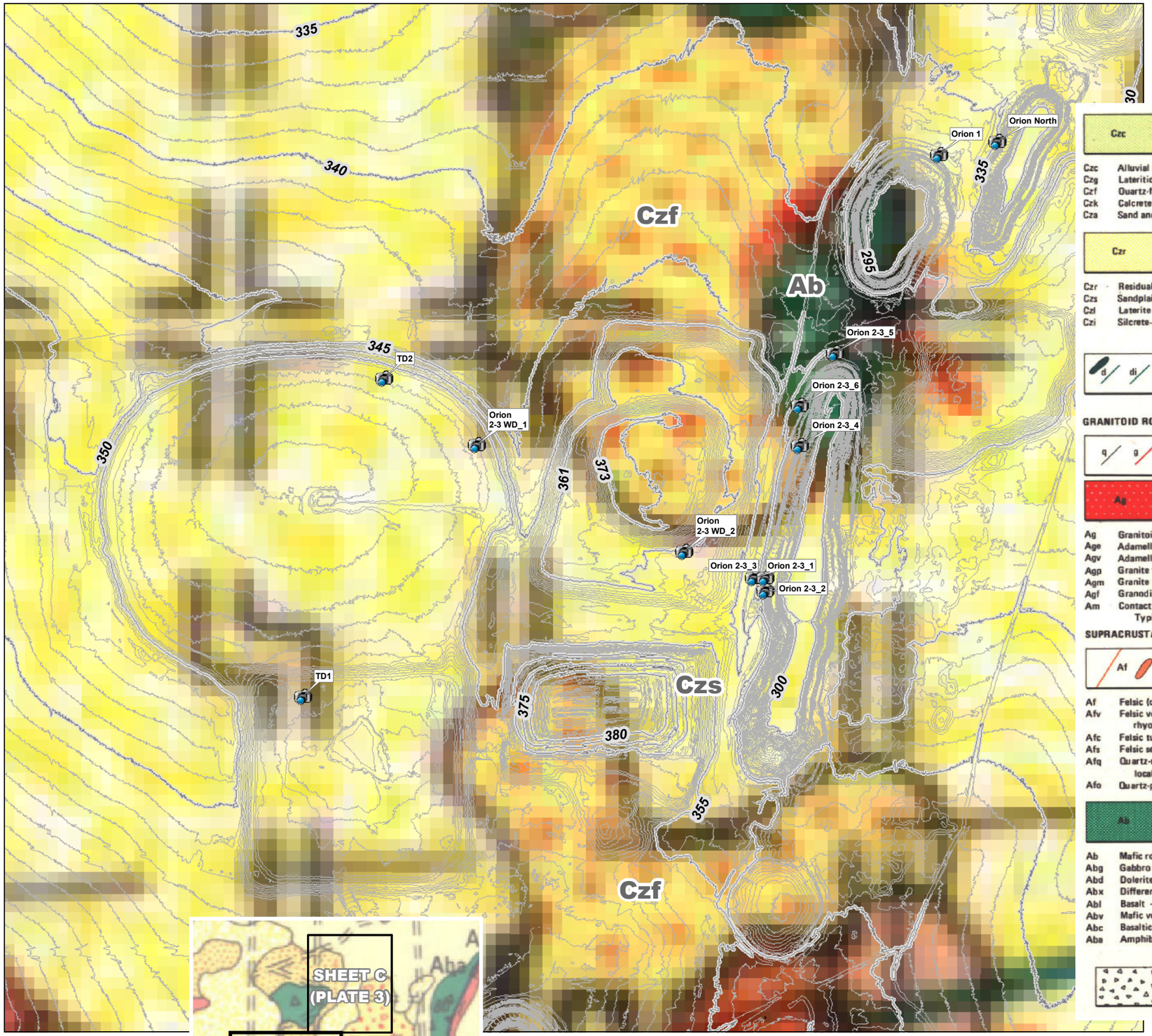

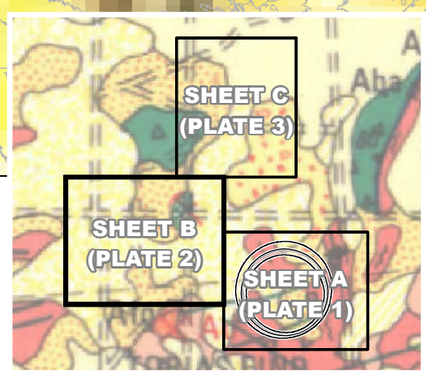

CMW Survey

Photo_Location

Czc Alluvial and colluvial deposits – transported clay, sand and lithic fragments; may be indurated
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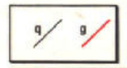
Czl Laterite – commonly on top of breakaways; may include consolidated grit on stripped surface
Czi Silcrete–siliceous duricrust

Dykes – d : mafic, commonly dolerite; di : coarse-grained leucogabbro

GRANITOID ROCKS



Veins – q: quartz
g : granitoid; quartz diorite to adamellite

Overprint indicating granitoid rocks strongly foliated, lineated and/or recrystallized

Ag Granitoid rock unassigned – most is variably recrystallized and some is deformed
Age Adamellite to granodiorite – medium even-grained; includes minor xenoliths
Agv Adamellite – medium-grained with less than 10 per cent feldspar megacrysts; includes megacrysts of quartz
Agp Granite to adamellite – medium to coarse-grained and porphyritic; megacrysts both idiomorphic and corroded
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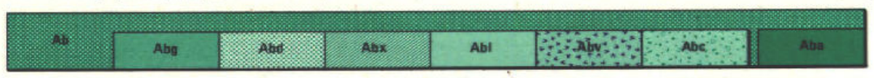

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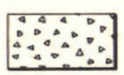

Overprint indicating deeply weathered or soil covered rock

N

100 50 0 100 200 300 400 m

Coordinate System: GDA2020 MGA Zone 50Transverse Mercator

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		COMPILED: NR	PROJECT: PER2022-0011
PROJECT: MT GIBSON GOLD MINE TSF DESIGN		CHECKED: PA	FIGURE: 02B
		REVISION: C	SCALE: 1:10,000
TITLE: PLATE 2 - GEOLOGY		DATE: 1/04/2022	SHEET: A3 L

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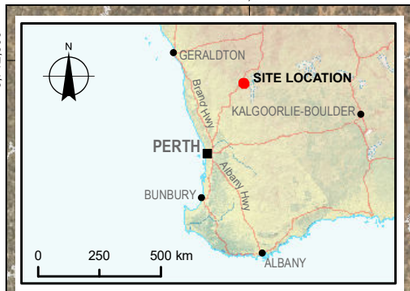


515,500 516,000 516,500 517,000 517,500 518,000 518,500 519,000

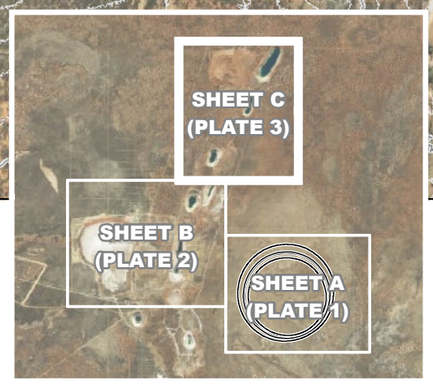
6,712,500 6,712,000 6,711,500 6,711,000 6,710,500

320 315 325 290 321 330 320 335 325 295 330

Hornett

Enterprise

Lexington



CMW Survey

Photo_Location

NOTES

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N

100 50 0 100 200 300 400 m

Coordinate System: GDA2020 MGA Zone 50Transverse Mercator

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		COMPILED: NR	PROJECT: PER2022-0011
PROJECT: MT GIBSON GOLD MINE TSF DESIGN		CHECKED: PA	FIGURE: 01C
		REVISION: C	SCALE: 1:10,000
TITLE: PLATE 3 - SITE PLAN		DATE: 1/04/2022	SHEET: A3 L

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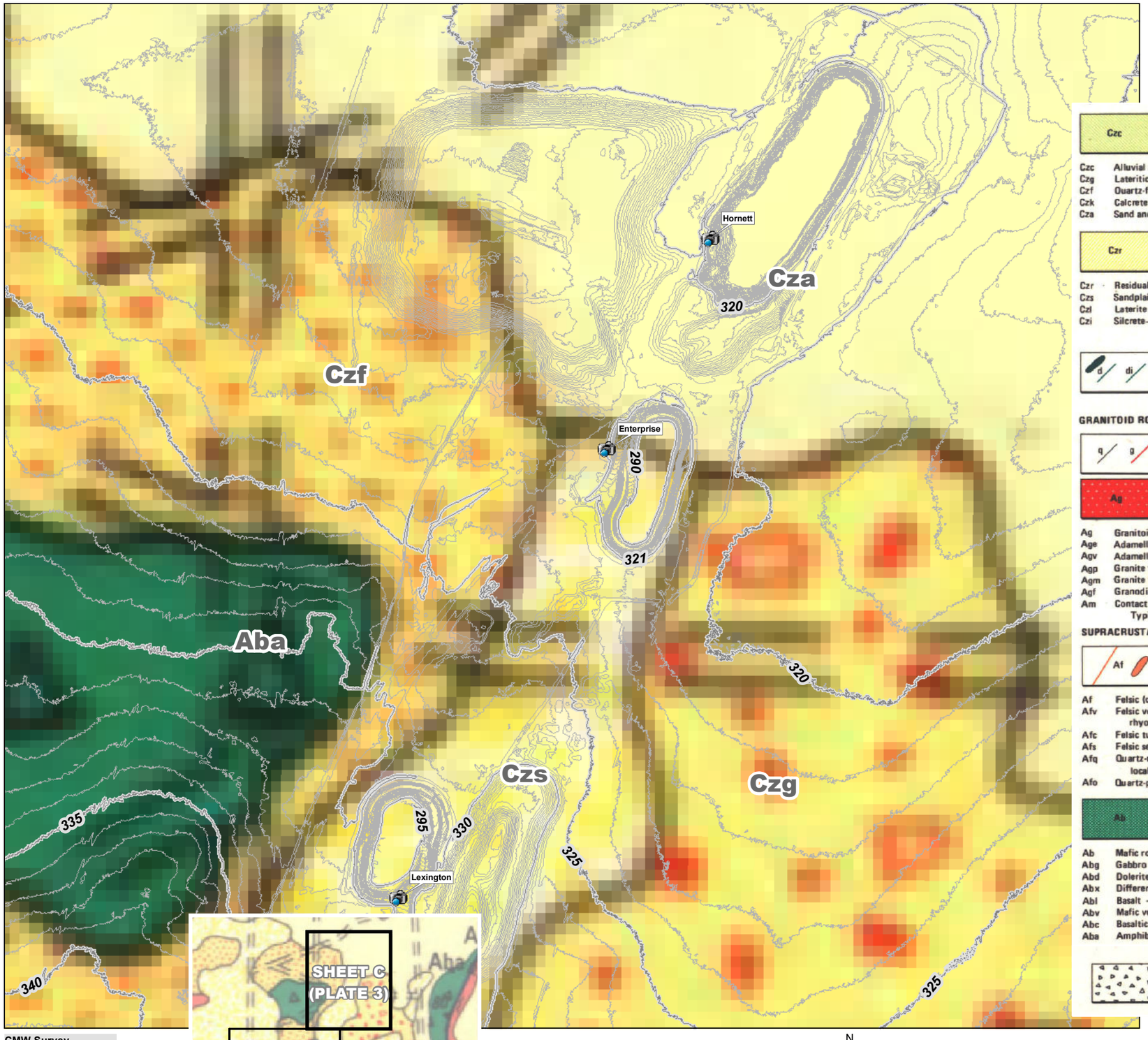

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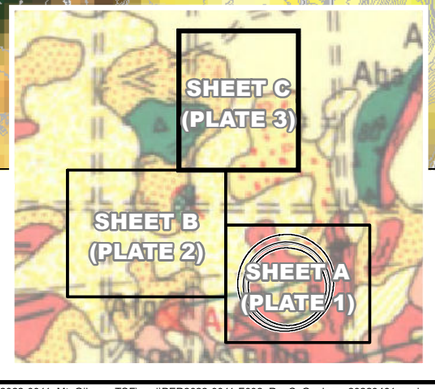

CMW Survey
Photo_Location

N

100 50 0 100 200 300 400 m

Coordinate System: GDA2020 MGA Zone 50Transverse Mercator

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		COMPILED: NR	PROJECT: PER2022-0011
PROJECT: MT GIBSON GOLD MINE TSF DESIGN		CHECKED: PA	FIGURE: 02C
		REVISION: C	SCALE: 1:10,000
TITLE: PLATE 3 - GEOLOGY		DATE: 1/04/2022	SHEET: A3 L

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Site Visits Photographs
24 February 2022, 17-18 March 2022

Photo 1 – Typical ground cover; seen also at the locations of Photos 3, 13, 23, 25, 30 and the majority of the proposed TSF area.

Photo 12 – Typical ground cover with pockets of finer-textured soils; seen also in the vicinity of Photos 5-7, 9-11, 14-16, 22, 26-28, 31-35.

Photo 8 – Localised presence of microbial mat.

Photo 2 – Granite mounds.

Photo 4 – Granite outcrop and subcrop; seen also in the vicinity of Photo 24.

Photo 17 – Granite outcrop and subcrop with scattered boulders; seen also at the locations of Photos 18 and 19.

Photo 20 – Granite mounds with scattered boulders; seen also at the locations of Photo 21.

Photo 29 – Gully feature.

Photo Orion 2/3_3 – Facing east from the west of the Orion 2/3 Pit.

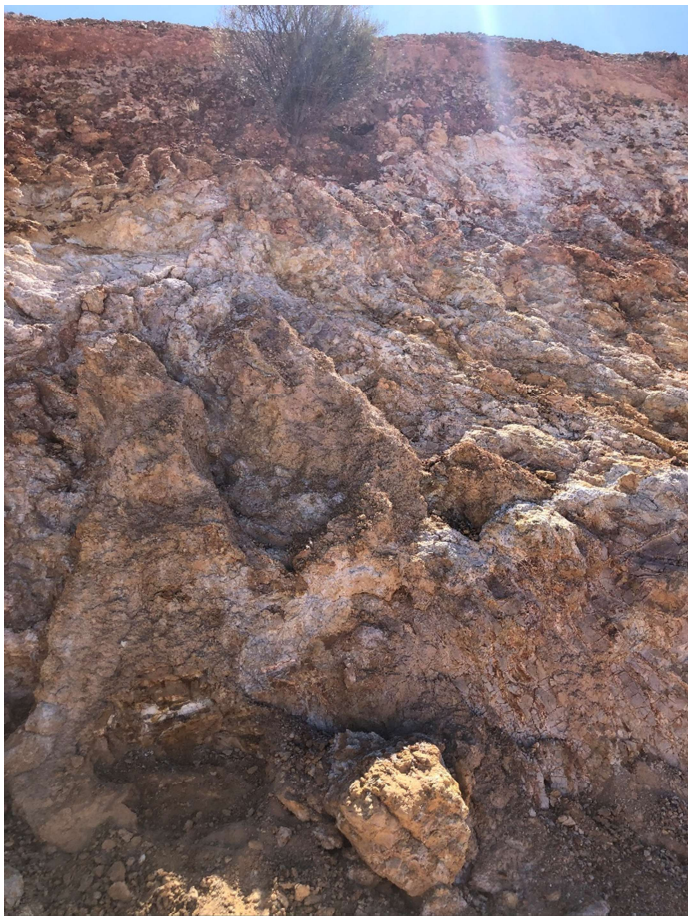


Photo Orion 2/3_1 – Upper saprolite face at the west of Orion 2/3 Pit.

Photo Orion 2/3_4 – Upper saprolite face at the west of Orion 2/3 Pit.

Photo Orion 2/3 WD_1 – Orion 2/3 Waste Dump as seen from the northeast of TD2.

WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

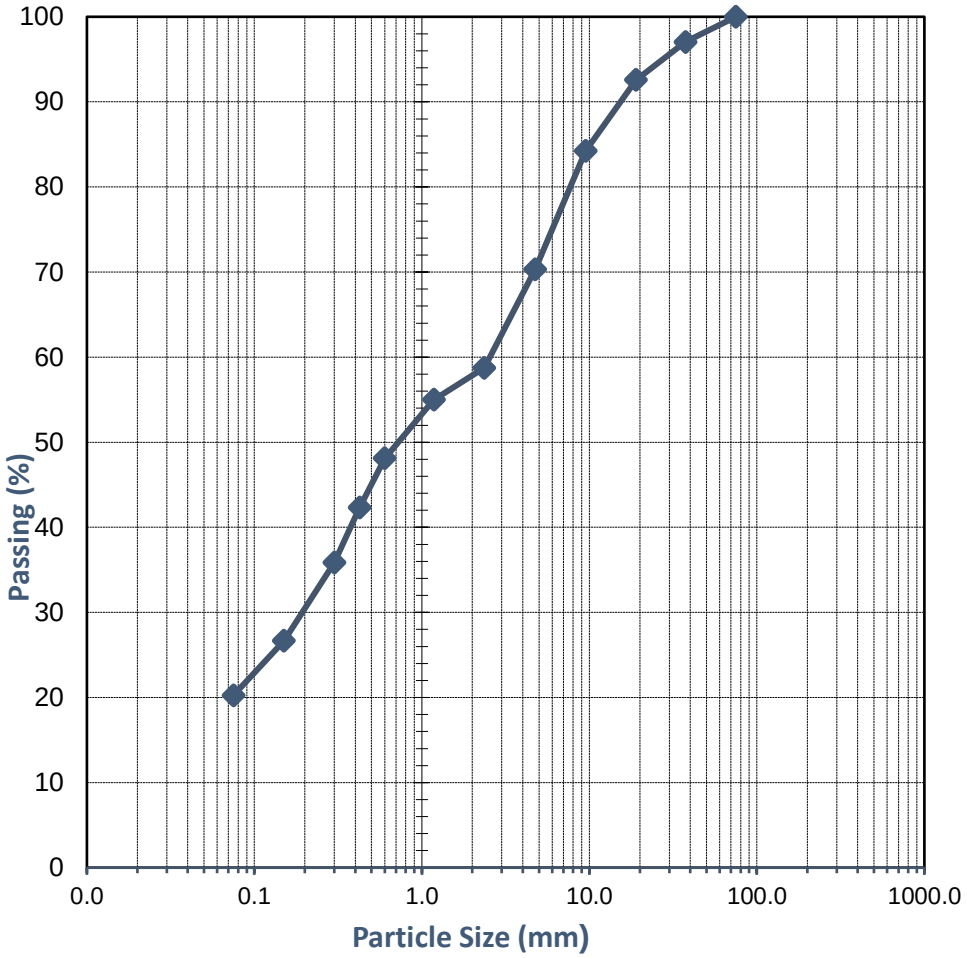
TEST REPORT - AS 1289.3.6.1

Client:	CMW Geosciences	*Ticket No.*	S5878
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.4573_1_PSD
Project:	Mt Gibson TSF	*Sample No.*	WG22.4573
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	Orion 2/3 Waste Dump	*Date Tested:*	24/03/2022

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	100
37.5	97
19.0	93
9.5	84
4.75	70
2.36	59
1.18	55
0.600	48
0.425	42
0.300	36
0.150	27
0.075	20



Comments:

Approved Signatory:

Name: Natasha Bielawski

Date: 25/March/2022

NATA WORLD RECOGNISED ACCREDITATION

Accreditation No. 20599
Accredited for compliance with ISO/IEC 17025 - Testing

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

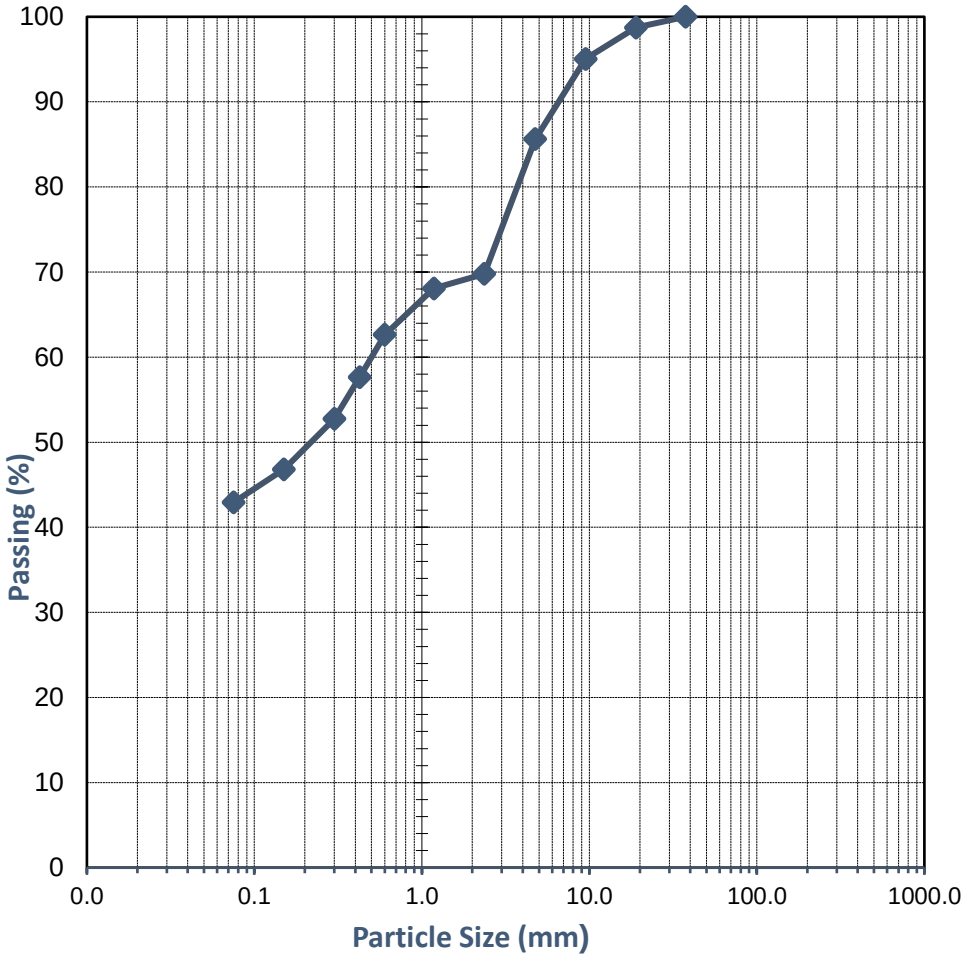
TEST REPORT - AS 1289.3.6.1

Client:	CMW Geosciences	*Ticket No.*	S5878
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.4574_1_PSD
Project:	Mt Gibson TSF	*Sample No.*	WG22.4574
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	Orion 2/3 Pit - Clayey Materials	*Date Tested:*	24/03/2022

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	100
19.0	99
9.5	95
4.75	86
2.36	70
1.18	68
0.600	63
0.425	58
0.300	53
0.150	47
0.075	43



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SOIL | AGGREGATE | CONCRETE | CRUSHING

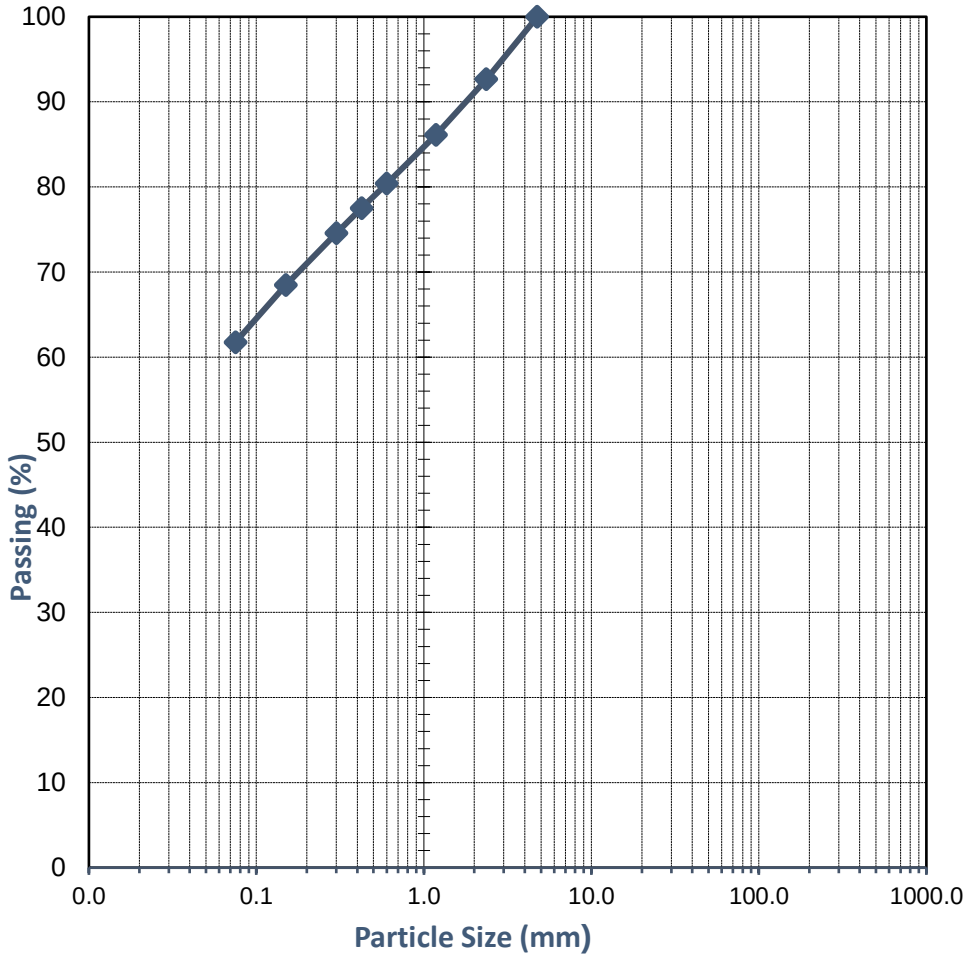
TEST REPORT - AS 1289.3.6.1

Client:	CMW Geosciences	*Ticket No.*	S5878
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.4575_1_PSD
Project:	Mt Gibson TSF	*Sample No.*	WG22.4575
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	Orion 2/3 Pit -Upper Saprolite	*Date Tested:*	24/03/2022

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	
4.75	100
2.36	93
1.18	86
0.600	80
0.425	78
0.300	75
0.150	68
0.075	62



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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.6.1 & ψ AS 1289. 3.6.3

Client:	CMW Geosciences	*Ticket No.*	S5878
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.4576_1_PSDHY
Project:	Mt Gibson TSF	*Sample No.*	WG22.4576
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	Orion 2/3 Pit -Lower Saprolite	*Date Tested:*	24/3-27/3/22

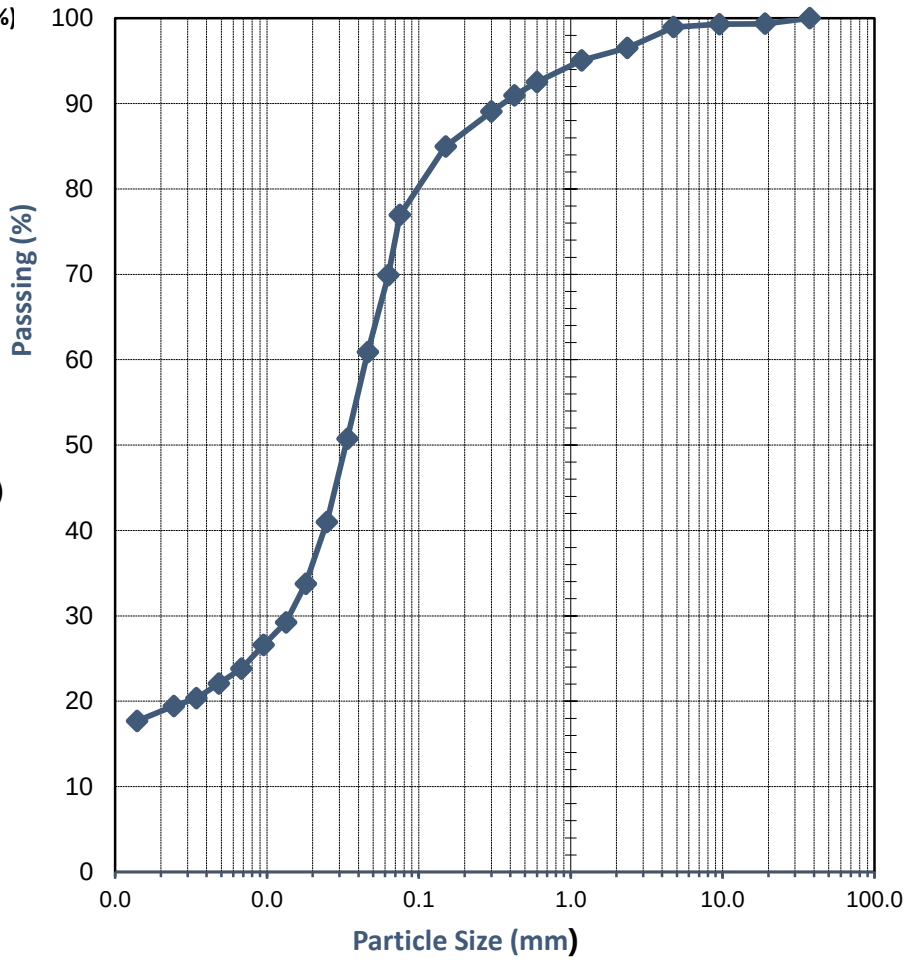
TEST RESULTS - Particle Size Distribution of Soil & Hydrometer Analysis

Sampling Method: **Sampled by Client, Tested as Received**

Sieve Size (mm)	Percent Passing (%)
75.0	
37.5	100
19.0	99
9.5	99
4.75	99
2.36	97
1.18	95
0.600	93
0.425	91
0.300	89
0.150	85
0.075	77

Particle Diameter (mm ψ	Percent Finer (%)
0.0629	70
0.0460	61
0.0338	51
0.0248	41
0.0133	29
0.0095	27
0.0068	24
0.0048	22
0.0034	20
0.0024	19
0.0014	18

ψ AS 1289.3.5.1 -2.36mm Particle Density
2.59 g/cm3



Comments: ψ- AS 1289.3.5.1 & ψ AS 1289.3.6.3 - NATA Accreditation does not cover the performance of this service.

Approved Signatory:

Name: Brooke Elliott
Date: 28/March/2022

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	CMW Geosciences	*Ticket No.*	S5878
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.4573_1_PI
Project:	Mt Gibson TSF	*Sample No.*	WG22.4573
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	Orion 2/3 Waste Dump	*Date Tested:*	25/03/2022

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**26**
AS 1289.3.2.1	**Plastic Limit (%)**	**19**
AS 1289.3.3.1	**Plasticity Index (%)**	**7**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**3.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 28/March/2022

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	CMW Geosciences	*Ticket No.*	S5878
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.4574_1_PI
Project:	Mt Gibson TSF	*Sample No.*	WG22.4574
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	Orion 2/3 Pit - Clayey Materials	*Date Tested:*	25/03/2022

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**35**
AS 1289.3.2.1	**Plastic Limit (%)**	**17**
AS 1289.3.3.1	**Plasticity Index (%)**	**18**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**8.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 28/March/2022

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	CMW Geosciences	*Ticket No.*	S5878
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.4575_1_PI
Project:	Mt Gibson TSF	*Sample No.*	WG22.4575
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	Orion 2/3 Pit -Upper Saprolite	*Date Tested:*	25/03/2022

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**37**
AS 1289.3.2.1	**Plastic Limit (%)**	**28**
AS 1289.3.3.1	**Plasticity Index (%)**	**9**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**3.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 28/March/2022

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.2, 3.2.1, 3.3.1 & 3.4.1

Client:	CMW Geosciences	*Ticket No.*	S5878
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.4576_1_PI
Project:	Mt Gibson TSF	*Sample No.*	WG22.4576
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	Orion 2/3 Pit -Lower Saprolite	*Date Tested:*	25/03/2022

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.2	**Liquid Limit (%)**	**Not Obtainable**
AS 1289.3.2.1	**Plastic Limit (%)**	**Non-Plastic**
AS 1289.3.3.1	**Plasticity Index (%)**	**Non-Plastic**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**0.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen**	**-**

Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 28/March/2022

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - ψ AS 1289.3.5.1

Client:	CMW Geosciences	*Ticket No.*	S5878
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.4576_1_PD
Project:	Mt Gibson TSF	*Sample No.*	WG22.4576
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	Orion 2/3 Pit -Lower Saprolite	*Date Tested:*	25/03/2022

TEST RESULTS - SOIL PARTICLE DENSITY -FINE

Sampling Method: **Sampled by Client, Tested as Received**

SOIL APPARENT PARTICLE DENSITY g/cm^3	**2.59**

***Comments:* ψ - NATA Accreditation does not cover the performance of this service.**

Approved Signatory:

Name: Cody O'Neill

Date: 28/03/2022

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.5.1.1

Client:	CMW Geosciences	*Ticket No.*	S5878
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.4573_1_SMDD
Project:	Mt Gibson TSF	*Sample No.*	WG22.4573
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	Orion 2/3 Waste Dump	*Date Tested:*	24-03-2022

TEST RESULTS - Standard Maximum Dry Density

Sampling Method: Sampled by Client, Tested as Received

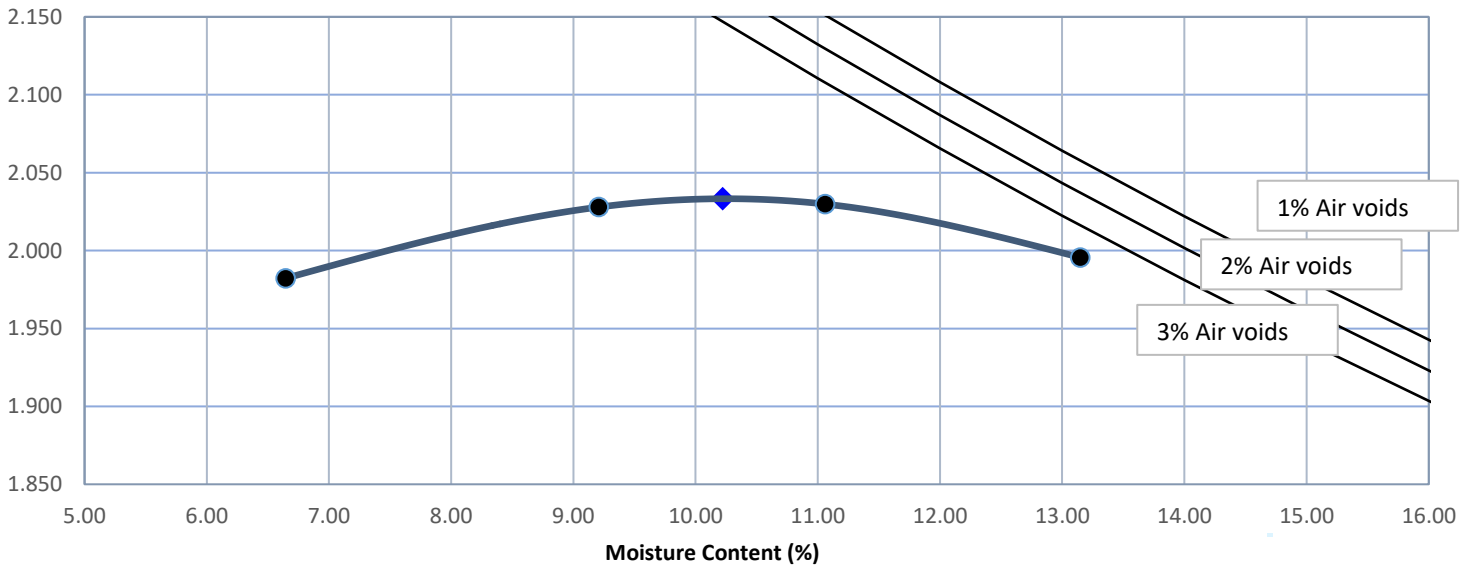
Sample Curing Time: 24 hrs

Method used to Determine Liquid Limit: Visual / Tactile Assessment by Competent Technician

Material + 19.0mm (%): 4 **Material + 37.5mm (%)** -

Moisture Content (%)	**6.6**	**9.2**	**11.1**	**13.1**	
Dry Density (t/m³)	**1.982**	**2.028**	**2.030**	**1.996**	

Dry Density (t/m³)



Standard Maximum Dry Density (t/m³) **2.03**

Optimum Moisture Content (%) **10.0**

Comments: *The above air void lines are derived from a calculated apparent particle density of 2.86 t/m³*

Approved Signatory:

Name: Brooke Elliott

Date: 25-March-2022

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.5.1.1

Client:	CMW Geosciences	*Ticket No.*	S5878
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.4574_1_SMDD
Project:	Mt Gibson TSF	*Sample No.*	WG22.4574
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	Orion 2/3 Pit - Clayey Materials	*Date Tested:*	24-03-2022

TEST RESULTS - Standard Maximum Dry Density

Sampling Method: Sampled by Client, Tested as Received

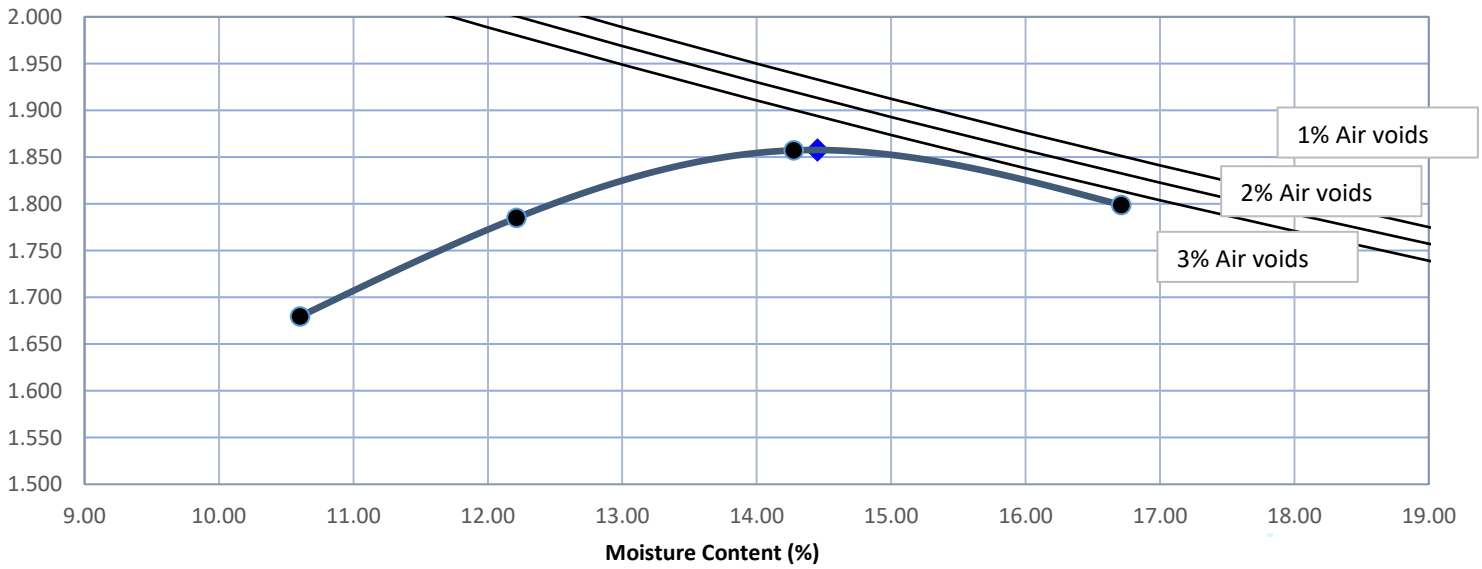
Sample Curing Time: 24 hrs

Method used to Determine Liquid Limit: Visual / Tactile Assessment by Competent Technician

Material + 19.0mm (%): 1 **Material + 37.5mm (%)** -

Moisture Content (%)	**10.6**	**12.2**	**14.3**	**16.7**	
Dry Density (t/m³)	**1.680**	**1.785**	**1.857**	**1.799**	

Dry Density (t/m³)



Standard Maximum Dry Density (t/m³) **1.86**

Optimum Moisture Content (%) **14.5**

Comments: *The above air void lines are derived from a calculated apparent particle density of 2.72 t/m³*

Approved Signatory:

Name: Brooke Elliott

Date: 25-March-2022

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.5.1.1

Client:	CMW Geosciences	*Ticket No.*	S5878
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.4575_1_SMDD
Project:	Mt Gibson TSF	*Sample No.*	WG22.4575
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	Orion 2/3 Pit -Upper Saprolite	*Date Tested:*	24-03-2022

TEST RESULTS - Standard Maximum Dry Density

Sampling Method: Sampled by Client, Tested as Received

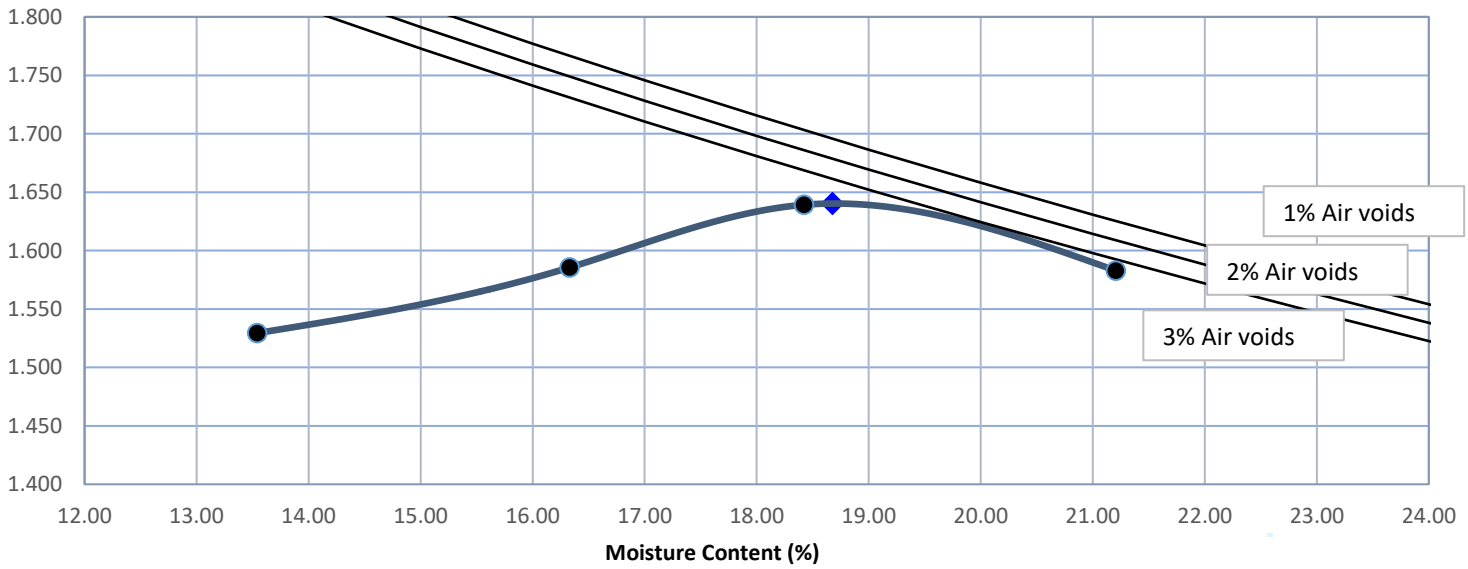
Sample Curing Time: 24 hrs

Method used to Determine Liquid Limit: Visual / Tactile Assessment by Competent Technician

Material + 19.0mm (%): 0 **Material + 37.5mm (%)** -

Moisture Content (%)	**13.5**	**16.3**	**18.4**	**21.2**	
Dry Density (t/m³)	**1.529**	**1.586**	**1.639**	**1.583**	

Dry Density (t/m³)



Standard Maximum Dry Density (t/m³) **1.64**

Optimum Moisture Content (%) **18.5**

Comments: *The above air void lines are derived from a calculated apparent particle density of 2.518 t/m³*

Approved Signatory:

Name: Brooke Elliott

Date: 25-March-2022

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.5.1.1

Client:	CMW Geosciences	*Ticket No.*	S5878
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.4576_1_SMDD
Project:	Mt Gibson TSF	*Sample No.*	WG22.4576
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	Orion 2/3 Pit -Lower Saprolite	*Date Tested:*	24-03-2022

TEST RESULTS - Standard Maximum Dry Density

Sampling Method: Sampled by Client, Tested as Received

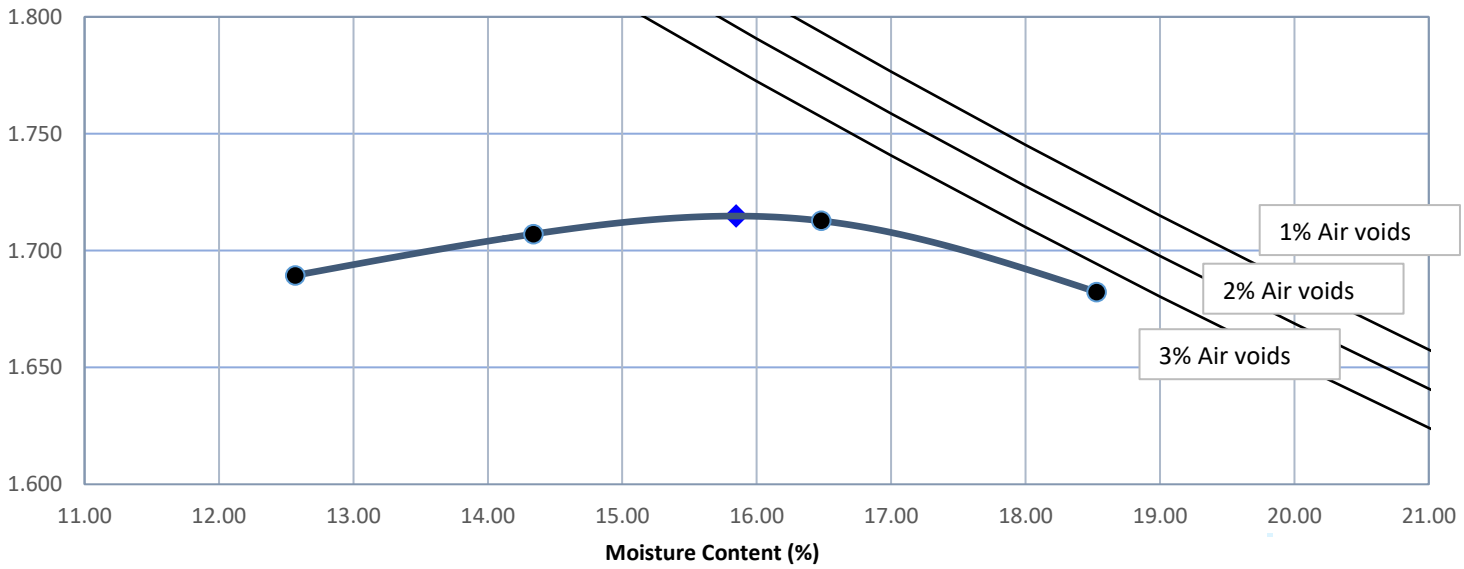
Sample Curing Time: 24 hrs

Method used to Determine Liquid Limit: Visual / Tactile Assessment by Competent Technician

Material + 19.0mm (%): 1 **Material + 37.5mm (%)** -

Moisture Content (%)	**12.6**	**14.3**	**16.5**	**18.5**	
Dry Density (t/m³)	**1.689**	**1.707**	**1.713**	**1.682**	

Dry Density (t/m³)



Standard Maximum Dry Density (t/m³) **1.71**

Optimum Moisture Content (%) **16.0**

Comments: *The above air void lines are derived from a calculated apparent particle density of 2.582 t/m³*

Approved Signatory:

Name: Brooke Elliott

Date: 25-March-2022

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.8.1

Client:	CMW Geosciences	*Ticket No.*	S5878
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.4574_1_ECN
Project:	Mt Gibson TSF	*Sample No.*	WG22.4574
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	Orion 2/3 Pit - Clayey Materials	*Date Tested:*	23/03/2022

TEST RESULTS - Emerson Class Number

Sampling Method:	**Sampled by Client, Tested as Received**
Source of Material:	**Not Specified**
Soil Description:	**Silty Clay trace Gravel**
Water Used:	**Distilled**

EMERSON CLASS NUMBER

4

Comments: Calcite present in sample.

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 24/March/2022

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.8.1

Client:	CMW Geosciences	*Ticket No.*	S5878
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.4575_1_ECN
Project:	Mt Gibson TSF	*Sample No.*	WG22.4575
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	Orion 2/3 Pit -Upper Saprolite	*Date Tested:*	23/03/2022

TEST RESULTS - Emerson Class Number

Sampling Method:	**Sampled by Client, Tested as Received**
Source of Material:	**Not Specified**
Soil Description:	**Silty Clay**
Water Used:	**Distilled**

EMERSON CLASS NUMBER	**5**

Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 24/March/2022

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.8.1

Client:	CMW Geosciences	*Ticket No.*	S5878
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.4576_1_ECN
Project:	Mt Gibson TSF	*Sample No.*	WG22.4576
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	Orion 2/3 Pit -Lower Saprolite	*Date Tested:*	23/03/2022

TEST RESULTS - Emerson Class Number

Sampling Method:	**Sampled by Client, Tested as Received**
Source of Material:	**Not Specified**
Soil Description:	**Silty Clay**
Water Used:	**Distilled**

EMERSON CLASS NUMBER

5

Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 24/March/2022

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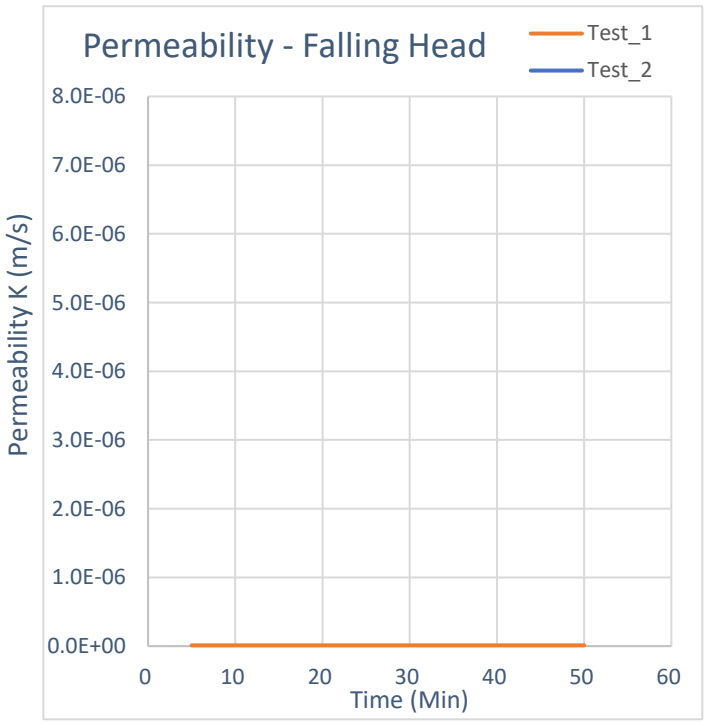
SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT AS 1289.6.7.2

Client:	CMW Geosciences	*Ticket No.*	S5878
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.4574_1_FHPERM
Project:	Mt Gibson TSF	*Sample No.*	WG22.4574
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification	Orion 2/3 Pit - Clayey Materials	*Date Tested:*	24/3 - 31/3/22

TEST RESULTS - FALLING HEAD PERMEABILITY

Sampling Method: Sampled by Client, Tested as Received



Compaction Details	
Compaction Method	AS1289.5.1.1
Hammer Type	Standard
% Retained of 19.0mm	1
Maximum Dry Density (t/m^3)	1.858
Optimum Moisture (%)	14.5
Target Dry Density Ratio	95
Target Moisture Ratio	100

Specimen Conditions at Compaction	
Laboratory Density Ratio (%)	95.6
Laboratory Moisture Ratio (%)	96.7
Surcharge (kPa)	3

Coefficient of Permeability K_{20} (m/s) 1.18E-08

Comments:

Approved Signatory:

Name: Brooke Elliott

Date: 01-April-2022

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WESTERN GEOTECHNICAL & Laboratory Services

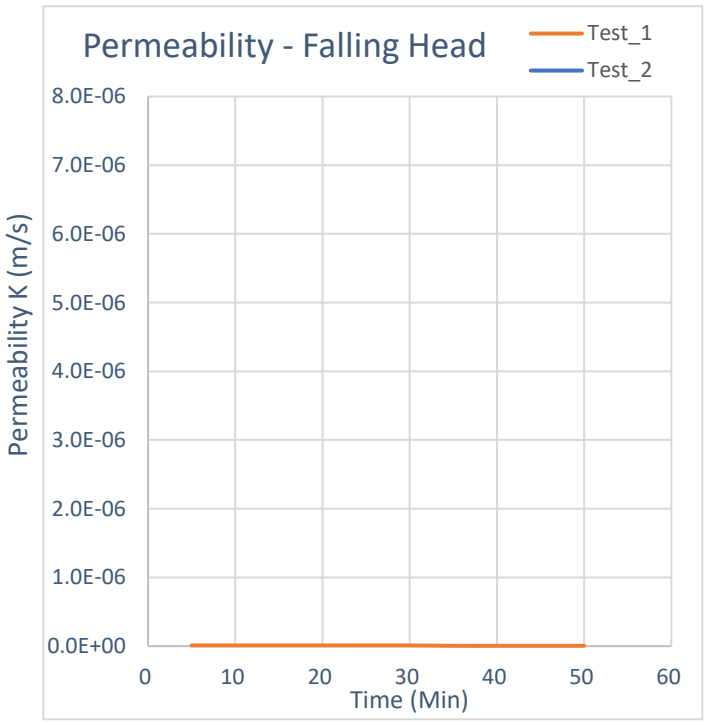
SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT AS 1289.6.7.2

Client:	CMW Geosciences	*Ticket No.*	S5878
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.4576_1_FHPERM
Project:	Mt Gibson TSF	*Sample No.*	WG22.4576
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification	Orion 2/3 Pit -Lower Saprolite	*Date Tested:*	24/3 - 31/3/22

TEST RESULTS - FALLING HEAD PERMEABILITY

Sampling Method: Sampled by Client, Tested as Received



Compaction Details	
Compaction Method	AS1289.5.1.1
Hammer Type	Standard
% Retained of 19.0mm	1.3
Maximum Dry Density (t/m^3)	1.715
Optimum Moisture (%)	15.8
Target Dry Density Ratio	95
Target Moisture Ratio	100

Specimen Conditions at Compaction	
Laboratory Density Ratio (%)	94.3
Laboratory Moisture Ratio (%)	100.3
Surcharge (kPa)	3

Coefficient of Permeability K_{20} (m/s) 8.50E-09

Comments:

Approved Signatory:

Name: Brooke Elliott

Date: 01-April-2022

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Ph: (08) 9418 8742
E-mail: Phillip.li@eprecisionlab.com
Mob: 0422 814 231

E-Precision Laboratory

MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

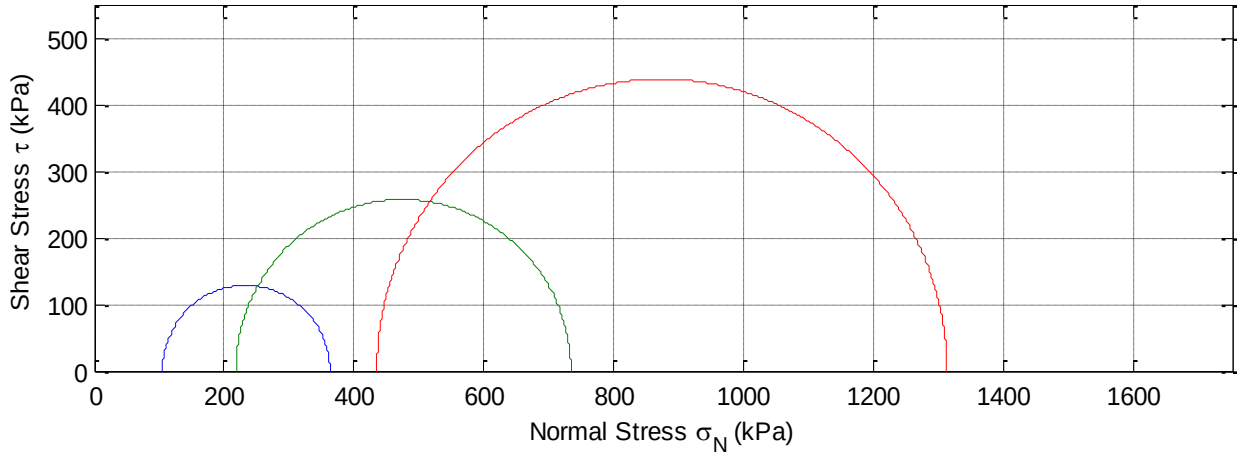
Method: AS1289.6.4.2 / In-house Method

Client:	Western Geotechnical Lab Services	Date Tested:	05/04/2022
Project:	Mt Gibson TSF	EP Lab Job Number:	WGEO
Sample No:	Orion 2/3 Pit - Lower saprolite	Lab:	EPLab
Sample ID:	WG22_4576_CU3		
Depth (m):	-	Room Temperature at Test:	~ 18°c

Tested by:	Phil Li	Initial Moisture (%):	16.08	Strain Rate (mm/min):	0.006
Height (mm):	125.41	Final Moisture (%):	22.32	Skempton's (B):	1
Diameter (mm):	61.80	Bulk Density (t/m³):	1.89	Geology:	-
L/D Ratio:	2.03	Dry Density (t/m³):	1.63	Particle Density (t/m^3):	-

Failure Criteria used: Peak Principle Stress Ratio

Mohr Circle Diagram



Interpretations conducted using Matlab

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	5.04	17.89	46.63
Angle of Shear Resistance Φ' (Degrees) :	32.21	28.81	27.02

Accredited for compliance with ISO/IEC 17025-TESTING
NATA: 19078

Authorised Signatory (Geotechnical Engineer):

NATA ACCREDITATION NO: 19078

Integrity Precision Innovation

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16 Gympie Way, Willetton
WA 6155
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E-mail: Phillip.li@eprecisionlab.com
Mob: 0422 814 231

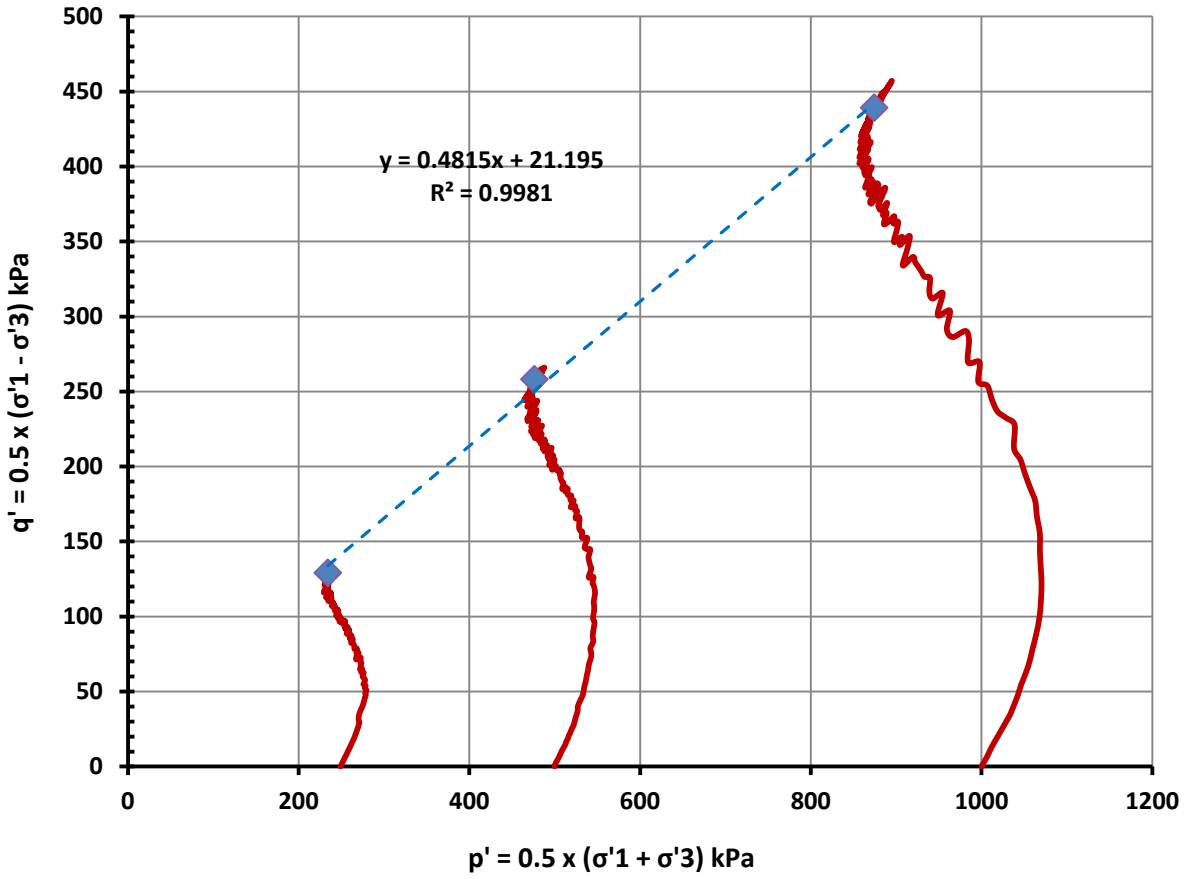
E-Precision Laboratory

MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	Western Geotechnical Lab Services	Date Tested:	05/04/2022
Project:	Mt Gibson TSF	EP Lab Job Number:	WGEO
Sample No:	Orion 2/3 Pit - Lower saprolite	Lab:	EPLab
Sample ID:	WG22_4576_CU3		
Depth (m):	-	Room Temperature at Test:	~ 18°C

MIT Effective Stress Path (q' vs p' diagram)



MIT Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	**24.15**
Angle of Shear Resistance Φ' (Deg) :	**28.69**

Integrity Precision Innovation

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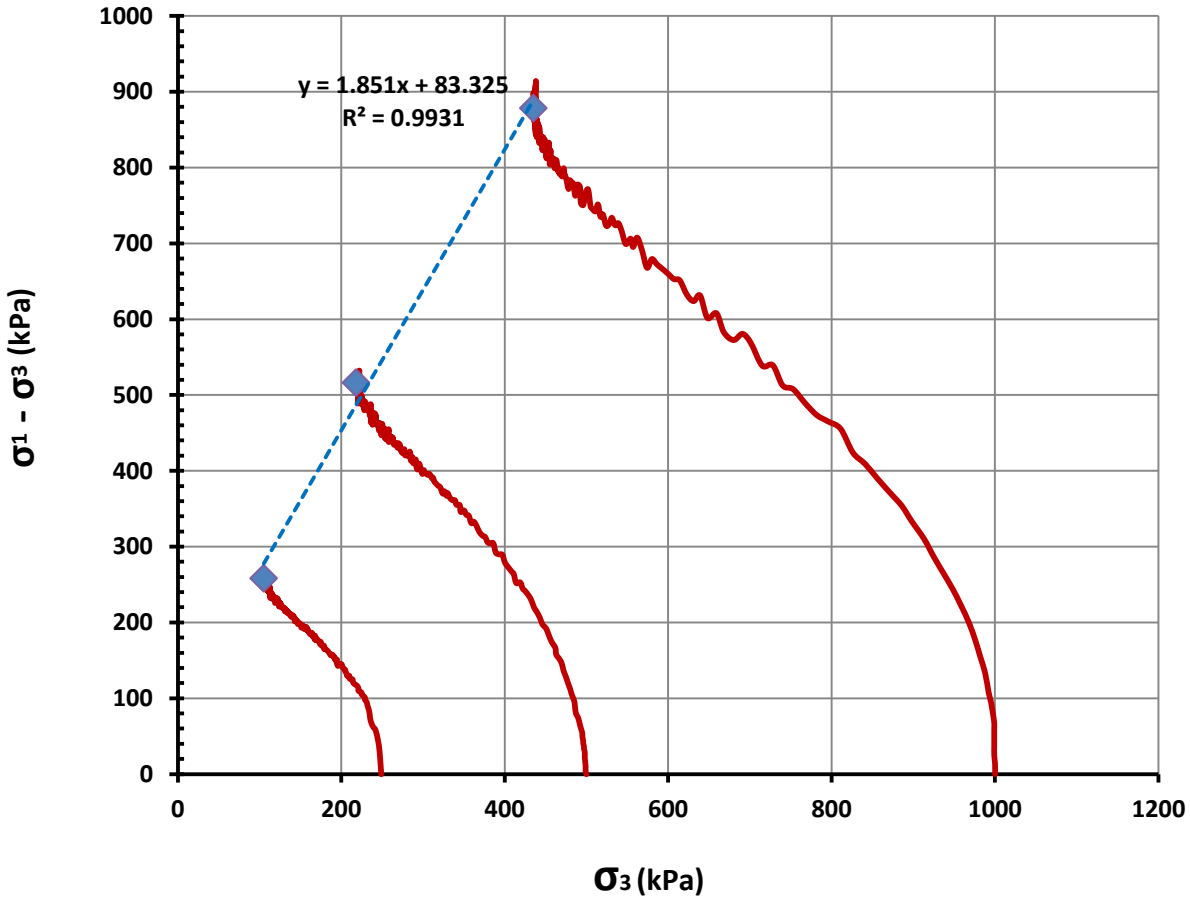
E-Precision Laboratory

MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	Western Geotechnical Lab Services	Date Tested:	05/04/2022
Project:	Mt Gibson TSF	EP Lab Job Number:	WGEO
Sample No:	Orion 2/3 Pit - Lower saprolite	Lab:	EPLab
Sample ID:	WG22_4576_CU3		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Modified Mohr Coulomb Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	**24.68**
Angle of Shear Resistance Φ' (Deg) :	**28.72**

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WA 6155
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E-mail: Phillip.li@eprecisionlab.com
Mob: 0422 814 231

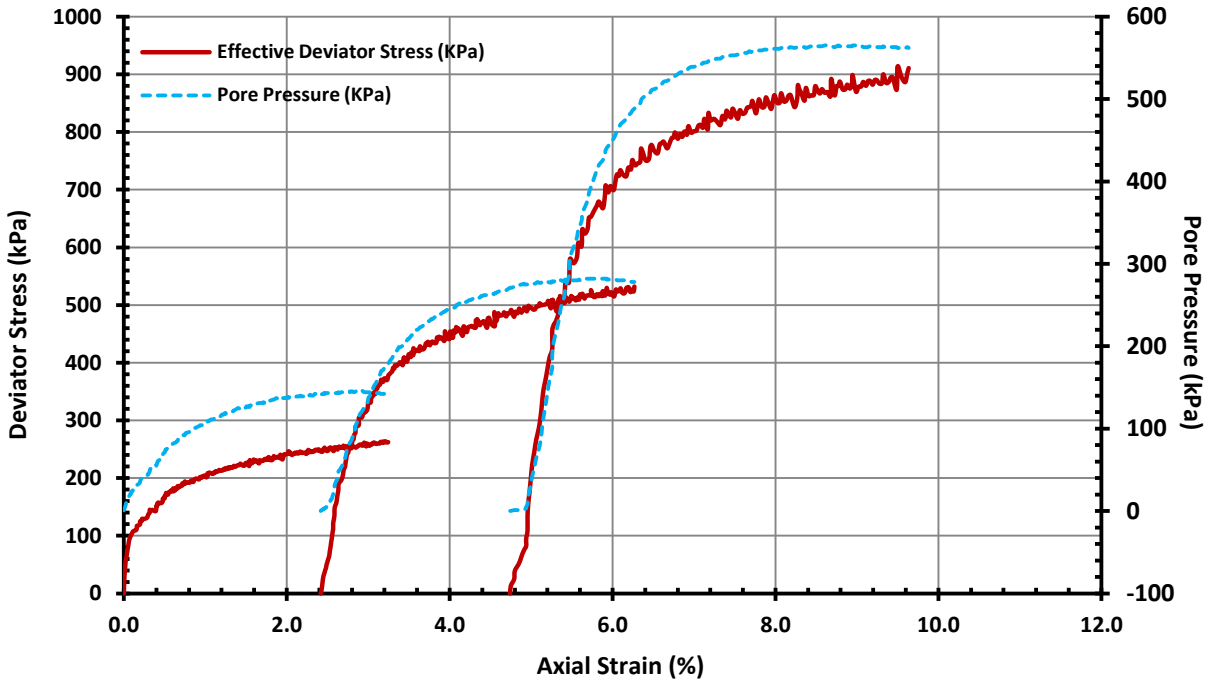
E-Precision Laboratory

MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	Western Geotechnical Lab Services	Date Tested:	05/04/2022
Project:	Mt Gibson TSF	EP Lab Job Number:	WGEO
Sample No:	Orion 2/3 Pit - Lower saprolite	Lab:	EPLab
Sample ID:	WG22_4576_CU3		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'0	U'f	Principal Effective Stresses			σ'1 - σ'3	Strain (%)
				σ'1	σ'3	σ'1 / σ'3		
1	250	0	145	363	105	3.46	258	2.91
2	500	0	282	734	218	3.37	516	5.91
3	1000	0	565	1313	435	3.02	878	9.02

Integrity Precision Innovation

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E-Precision Laboratory

MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 / In-house Method

Client:	Western Geotechnical Lab Services	Date Tested:	05/04/2022
Project:	Mt Gibson TSF	EP Lab Job Number:	WGEO
Sample No:	Orion 2/3 Pit - Lower saprolite	Lab:	EPLab
Sample ID:	WG22_4576_CU3		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: Orion 2/3 Pit - Lower saprolite **Depth (m):** -
Lab ID: WG22_4576_CU3 **Date Tested:** 05/04/2022

Failure Mode: Bulging Failure

Notes: **Sample remolded as requested by client**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078

Authorised Signatory (Geotechnical Engineer):

NATA ACCREDITATION NO: 19078

The results of tests performed apply only to the specific sample at time of test unless otherwise clearly stated. Reference should be made to E-Precision Laboratory's "Standard Terms and Conditions" E-Precision Laboratory ABN 431 559 578 87

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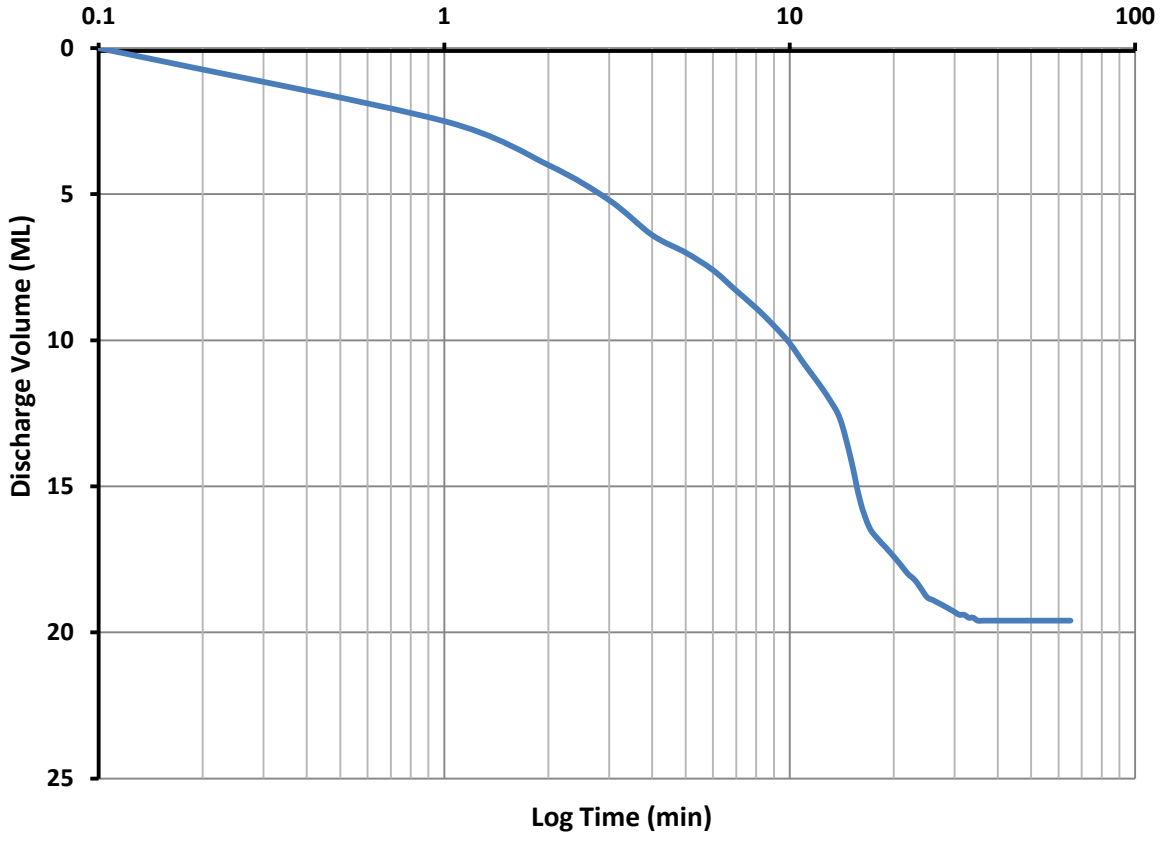
Method: AS1289.6.4.2 / In-house Method

Client:	Western Geotechnical Lab Services	Date Tested:	05/04/2022
Project:	Mt Gibson TSF	EP Lab Job Number:	WGEO
Sample No:	Orion 2/3 Pit - Lower saprolite	Lab:	EPLab
Sample ID:	WG22_4576_CU3		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.041 based on t_{90}

Integrity Precision Innovation

Appendix D – Geotechnical Investigation Report

1 March 2023

TAILINGS STORAGE FACILITY NO. 1 (TSF1)
MT GIBSON GOLD PROJECT

GEOTECHNICAL INVESTIGATION REPORT

Capricorn Metals Ltd

PER2022-0011AC Rev 0

PER2022-0011AC		
Date	Revision	Comments
16 November 2022	A	Internal review
20 February 2023	B	Additional geotechnical investigation
1 March 2023	0	Issued for inclusion in CMW design report ref. PER2022-0011AD Rev 0

Table of Contents

1 INTRODUCTION 1
2 BACKGROUND 1
3 DESIGN CONCEPT 1
4 FIELD INVESTIGATION 3
4.1 2nd Campaign 3
5 LABORATORY TESTING 4
6 GEOTECHNICAL ASSESSMENT 5
6.1 Geology 5
6.1.1 Regional Geology 5
6.1.2 Local Geology 5
6.2 Subsurface Profiles 5
6.2.1 1st Campaign 5
6.2.2 2nd Campaign 8
6.3 Groundwater 9
6.4 In-situ Permeability 9
6.5 Laboratory Test Results 10
6.6 Materials Assessment 3
6.6.1 Silty SAND and Gravelly Silty SAND to Gravelly SAND 3
6.6.2 Ferricrete 3
6.6.3 Sandy CLAY to Clayey SAND 3
6.6.4 Gravel 4
7 DISCUSSIONS 4
7.1 Geotechnical Design Parameters 4
8 CLOSURE 6
9 REFERENCES 7

Figures

Figure 1 – TSF Aerial Plan

Figure 2 – Geotechnical Investigation Plans

Figure 3 – Cross-Sections

Figure 4 – LiDAR Intensity Map

Figure 5 – Landscape Map (DPIRD)

Appendices

Appendix A – Explanatory Notes

Appendix B – Test Pit Logs

Appendix C – Borehole Logs

Appendix D – Permeability Test Results

Appendix E – Laboratory Test Results

1 INTRODUCTION

CMW Geosciences Pty Ltd (CMW) was authorised by Capricorn Metals Ltd (CMM) to carry out geotechnical investigations of the proposed Tailings Storage Facility No. 1 (TSF1) site at the Mt Gibson Gold Project (MGGP) by way of a purchase order (Order #30000031 dated 21 January 2022). The scope of work and associated terms and conditions of our engagement were detailed in our services proposal letter referenced PER2022-0011AA Rev 0 dated 19 January 2022. This report should be read in conjunction with the technical memorandum on the initial site assessment and geotechnical assessment of mine waste materials for use in construction (ref. PER2022-0011AB Rev 0 dated 8 April 2022).

TSF1 will form a part of MGGP which is approximately 280 km northeast of Perth, and 65 km northeast of Wubin in Western Australia. TSF1 will be located on mining tenement M 59/772. The general site layout plan relevant to TSF1 is shown on Map 1.

2 BACKGROUND

Gold was mined at the MGGP in 1986 on a modest laterite resource. By 1999, when the mine was placed on care and maintenance, the MGGP had mined several shallow laterite pits, 14 open pits with a maximum depth of approximately 100 metres, mining oxide, transitional and primary ore zones and an underground mine.

A site nominally 2.2 km^2 (1.4 km by 1.6 km) for TSF1 was selected approximately 1 km to the east of the main pits area, specifically the Orion 2/3 Pit (refer to Map 1).

In order to protect locations with heritage value, and to avoid an extensive remediation over rock outcrops requiring the application of a thick clay liner on TSF storage area (basin), the site was shifted approximately 400 m to the north-northwest of the original intended location.

There were two (2) geotechnical investigations which covered the two (2) abovementioned locations. These are further discussed in Section 4 of this report.

3 DESIGN CONCEPT

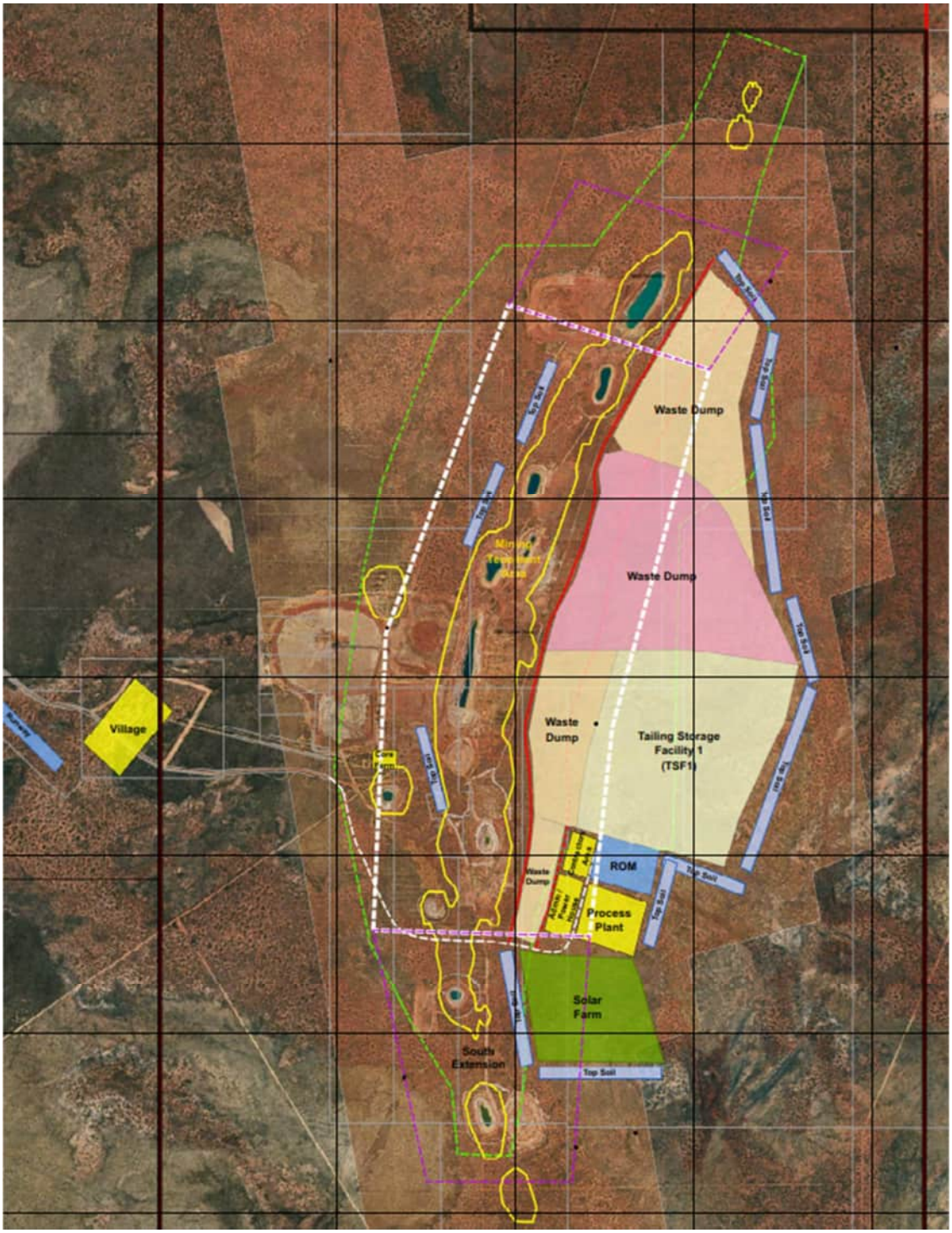
Based on the proposed mining operations and dimensions of the selected site, TSF1 has been designed as an Integrated Waste Landform (IWL), where it will be surrounded by a wide buttress of mine waste forming a waste dump within which a clay-lined perimeter embankment is constructed utilising the downstream construction method.

TSF1 has been designed to store approximately 55.0 Mt of tailings over an 11-years life assuming an ore processing rate of 5.0 Mtpa and tailings in-situ density of 1.35 t/m3 (dry).

The TSF1 perimeter embankment (upstream zone) will be constructed using clayey mine waste and raised utilising the downstream construction method. The clayey/silty (upstream) low permeability zone will have a minimum width of 6.0 m and be roller compacted. The mine waste (downstream) zone will have a nominal width of 14.0 m and will be traffic compacted.

At Stage 1 construction, to crest RL 345.0 m AHD, the upstream zone of TSF1 will incorporate a cut-off trench 1.5 m (nominal) deep founded on a cemented Ferricrete layer in order to reduce seepage losses. Stage 2 to Stage 7 (Final) raises will each incorporate a 1.5 m offset (bench) from the upstream crest of the preceding construction. Each construction raise will be 5 m high except for Stage 7 where the raise will be 2 m high. The crest level at Stage 7 construction will be RL 372.0 m AHD.

At Stage 7 construction, TSF1 will occupy a total impoundment area of approximately 207 ha and a maximum embankment height of 46.0 m (final crest RL 372.0 m AHD). Its impoundment will have a diameter of approximately 1,625 m for a circumference of 5,105 m.



Map 1: Tenement Plan (Source: CMM Mt Gibson General Site Layout 17 January 2022)

4 FIELD INVESTIGATION

Following confirmation by CMM that a clearing permit has been acquired for the sterilisation corridors within and around TSF1, and subsequently, the establishment of access and pegging of the proposed test locations, a geotechnical investigation was carried out between 21 and 26 September 2022. All fieldwork was carried out under the direction of CMW in accordance with AS1726 (2017), Geotechnical Site Investigations. The scope of fieldwork completed was as follows:

- Undertake a walkover survey of the cleared sterilisation corridors to assess the general landform and site conditions of the proposed test locations;
- Forty-four (4) test pits denoted TP01 to TP22, and TP30 to TP50 including two locations of TP45 (TP45A and TP45B) were excavated using a 24 t Doosan DX225LC hydraulic excavator to depths ranging between 0.25 m to 1.35 m to assess the subsurface conditions at the proposed location of TSF1. Test pits were generally terminated on a cemented (Ferricrete) layer prior to reaching the target depth of 3.0 m;
- Representative bulk samples were taken for subsequent laboratory testing. Explanatory notes and engineering logs of the test pits and photographs are provided in Appendix A and Appendix B, respectively;
- Seven (7) hand auger boreholes denoted HA23 to HA29 were undertaken using a 100 mm dia. auger to depths ranging between 0.15 m to 1 m. These were undertaken in place of the test pits for a cluster on the east of TSF1 where clearing, for access by excavator, was not allowed due to the presence of an active mallee fowl nest. HA23 to HA25 terminated on cemented layer and HA26 to HA29 refused on granite outcrops;
- Eighteen (18) reverse circulation (RC) boreholes at six locations were drilled to facilitate in-situ falling head permeability tests. Boreholes were drilled to 1 m, 10 m and 15 m at each of the locations denoted as BH01 to BH06. Borehole logs and graphical results of the permeability testing are presented in Appendix C and Appendix D, respectively.

The original layout of TSF1 and the locations of the respective in-situ tests in are shown on the attached TSF Aerial Plan (Figure 1) and Geotechnical Investigation Plan (Figure 2A), respectively. Test locations were measured using dGPS by the surveyor assigned by CMM, and confirmed with hand-held GPS by the CMW representative during the geotechnical investigation. Elevations were obtained from the LiDAR data provided by CMM to CMW.

4.1 2nd Campaign

The second geotechnical investigation campaign was undertaken between 25 and 27 January 2023, with the fieldwork being carried out under the direction of CMW in accordance with AS 1726 (2017).

This additional investigation focussed on the particular areas of the revised TSF1 location not covered by the first geotechnical investigation. The revised TSF1 location and the additional test locations are shown by Figure 2B.

The scope of fieldwork completed during the second geotechnical investigation was as follows:

- Undertake a walkover survey of the cleared sterilisation corridors to assess the general landform and site conditions of the proposed test locations;
- Ten (10) test pits denoted TP51, TP52, TP55 to TP58, and TP61 to TP64 were excavated using the 24 t Doosan DX225LC hydraulic excavator to depths ranging between 0.55 m to 1.35 m to assess the subsurface conditions. As with the first geotechnical investigation, test pits were generally terminated on Ferricrete layer when the 24 t excavator met refusal. The exceptions being TP51 and TP52 where the test pits were terminated on granite sub-crops;

- Representative bulk samples were taken for subsequent laboratory testing. Explanatory notes and engineering logs of the test pits and photographs are provided in Appendix A and Appendix B, respectively;
- Four (4) hand auger boreholes denoted HA53, HA54, HA59 and HA60 were undertaken using a 100 mm dia. auger to depths ranging between 0.3 m to 0.6 m. These were undertaken in place of the test pits for a cluster on the east of TSF1 where clearing, for access by excavator, was not allowed due to the presence of an active mallee fowl nest. All hand auger locations were terminated on a Ferricrete layer;
- Nine (9) air core (AC) boreholes at three locations were drilled to facilitate in-situ falling head permeability tests. Boreholes were drilled to 1 m, 10 m and 15 m at each of the locations denoted as BH07 to BH09. Borehole logs and graphical results of the permeability testing are presented in Appendix C and Appendix D, respectively.

5 LABORATORY TESTING

Laboratory testing was carried out in accordance with the requirements of the current edition of AS 1289 (where applicable). Where a test was not covered by an Australian standard, a local or international standard was adopted and noted on the laboratory test certificate.

All testing was scheduled by CMW and was carried out by Western Geotechnical and Laboratory Services (WGLS), a NATA-registered testing authority.

The laboratory test certificates are attached in Appendix E. The type of laboratory tests and their quantities for each field investigation campaign are presented in Table 1.

Table 1: Laboratory Test Schedule Summary

Type of Test	Test Method	Quantities	
		1st Campaign	2nd Campaign
Particle Size Distribution (PSD)	AS1289.3.6.1	6	4
PSD with Hydrometer	AS1289.3.6.3	2	3
Atterberg Limits	AS1289.3.1.1, 3.2.1, 3.3.1	6	7
Falling Head Permeability	AS 1289.6.7.2	2	3
Dry Density/Moisture Content Relationship	AS1289.5.1.1	2	3
Soil Particle Density	AS1289.3.5.1	2	3
Emerson Class Number	AS1289.3.8.1	4	3
Multistage Consolidated Isotropic Undrained (CIU) Triaxial Test	AS1289.6.4.2	2	-

6 GEOTECHNICAL ASSESSMENT

6.1 Geology

6.1.1 Regional Geology

MGGP is located at the southern extremity of the Retaliation Greenstone Belt, in the southwest portion of the Yalgoo-Singleton Greenstone Belt in the Murchison Province of the Yilgarn Craton. The Archaean basement is dominantly volcanic and intrusive mafic and felsic rocks and their sheared equivalents, which have been metamorphosed to the mid-amphibolite facies. Metasedimentary rocks are rare and consist of thin, discontinuous, interflow ferruginous cherts. The basement of the mine area consists of volcanic sequences.

6.1.2 Local Geology

The local geology was identified from the observation of the face of the open pits during the site reconnaissance carried out by CMW in February and March 2022, summarised in the CMW (2022) memorandum.

The regolith consists of thin surficial sandy soils with increasing fines (silt, clay) and lateritic gravel contents with depth, overlying slightly to moderately cemented (hardpan) which further down became cemented by iron oxides (Ferricrete). Saprolite underlying the surficial layers and above the bedrock displayed an upper zone with shades of pale brown to brown layer with red and yellow hues, overlying a lower zone that was white and grey in colour. Both saprolite zones exhibited little indication of texture degradation. The two saprolite zones are referred to as the ‘upper saprolite’ and ‘lower saprolite’, respectively.

The soil layers including the gravelly soil were present at all of the pits albeit with different thicknesses, which typically ranged between 1 m to 2 m above the hardpan. The underlying Ferricrete was typically up to 3 m thick. The saprolite extended to depths between 20 m to 40 m.

6.2 Subsurface Profiles

6.2.1 1st Campaign

The ground conditions encountered and inferred from the first geotechnical investigation campaign of the IWL site were considered to be generally consistent with the published geology for the area and can be generalised and split according to the following subsurface sequences:

Silty SAND (SM)	fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; trace gravel fine to coarse, subrounded to rounded, pale grey/grey; Colluvial.
Or	
Gravelly Silty SAND to Gravelly SAND (SM)	fine to coarse grained, poorly graded, subangular to subrounded, red-brown; silt non-plastic; gravel fine to coarse, subrounded to rounded; slightly cemented; Colluvial.
Overlying	
FERRICRETE	retrieved as Silty SAND with Gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented.
Overlying	
GRANITE (Saprolite)	recovered as Sandy SILT; silt non-plastic to low plasticity, white; sand fine to coarse, well graded, subangular to subrounded.

Organic materials in the form of roots and rootlets were encountered within the Silty SAND and Gravelly Silty SAND layers, from the surface to between 0.2 metres below ground level (mbgl) and 0.4 mbgl.

The distribution of subsurface conditions encountered is presented in Table 2.

Table 2: Summary of Encountered Soil/Rock Stratigraphy (1st Geotechnical Investigation Campaign)

Description	Depths Encountered (mbgl [1])			Averaged Thickness (m)
	Top	Bottom		
		Min	Max	
Silty SAND (Colluvial)	0	0.1	0.5	0.4
Gravelly Silty SAND to Gravelly SAND (Colluvial)	0	0.1	1.1	0.7
FERRICRETE	0.1 - 1.1 [3]	2.0 [3]	9.0 [3]	3.6 [3]
GRANITE (Saprolite)	1.0 [2]	-	14.9 [3]	-

1) Meters below ground level.
2) Excluding outcrops, subcrops and floaters.
3) Maximum depth of investigation in boreholes.

In addition to the stratigraphy shown in Table 2, there were also clusters of the following types of soil and rock encountered or identified during the geotechnical investigation:

- Sandy SILT (ML) – low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded; trace clay nodules; with organic material (roots); Colluvial.
- Clayey SAND (SC) – fine to coarse grained, poorly graded, subangular to subrounded, red-brown; clay low plasticity; with gravel fine, subrounded to rounded; Colluvial.
- SAND (SP) – fine to coarse grained, poorly graded, subrounded, red-brown; with silt non-plastic; trace gravel fine to coarse, subrounded to rounded.
- GRAVEL (GP) – fine to coarse, rounded to subrounded, red-brown-patchy pale grey/mottled dark grey-pale green; with sand fine to coarse grained, subrounded to subangular, well graded, red-brown; with silt/clay low plasticity; Alluvial.
- GRANITE – outcrops, subcrops and floaters identified in the locations marked on the Geotechnical Investigation Plan (Figure 2).

The presence of the localised subsurface conditions is summarised in Table 3.

Table 3: Summary of Localised Soil/Rock Stratigraphy

Description	Test Locs	Depths Encountered (mbgl [1])			Comments
		Top	Bottom		
			Min	Max	
Sandy SILT (Colluvial)	TP32-34, TP39-41, TP47 and TP49	0	0.3	0.7	Under a Silty SAND layer in TP20-22 and TP48; Overall, the clusters of this material were encountered in the centre and on the southwest of the proposed TSF1 location, with a lesser presence to the southeast and to (i.e. outside the TSF footprint) the south-southwest.
	TP20-22 and TP48	0.3 - 0.5	0.6	0.9	
Clayey SAND (Colluvial)	HA25, HA26, TP37 and TP38	0	0.4		Encountered on the east and southeast of the proposed TSF1 location.
SAND (Colluvial)	TP12, TP13 and HA25	0	0.7		Encountered on the northeast and east of the proposed TSF1 location.
GRAVEL (Alluvial)	TP42, TP43 and TP44	0.15	1.3		Encountered on the south and to the southeast of the proposed TSF1 location.
GRANITE, outcrops/subcrops/floaters	TP22 [2] and as marked in Figure 2	0.5 [2]	0.9 [2]		Within the Sandy SILT layer in TP22; Overall, these were identified on the east and to the south-southwest of the proposed TSF1 location, with a lesser presence on the southeast and south

1) Meters below ground level.
2) Floaters, and depths in TP22 only.

6.2.2 2nd Campaign

The ground conditions encountered and inferred from the second geotechnical investigation campaign of the IWL site were generally consistent with the findings from the first campaign. A minor difference was noted as follow:

- Gravelly Silty SAND (SM) to Sandy GRAVEL (GP) form the majority of the underlying soil unit to the surface Silty SAND (SM) layer. These are generally fine to coarse grained sand and fine to coarse gravel, with silt or clay of low to no plasticity.
- Presence of a Sandy GRAVEL (GP) layer in lieu of the above layer of Gravelly Silty SAND (SM) to Sandy GRAVEL (GP). The properties are as per Section 6.2.1 of this report.

The distribution of subsurface conditions encountered is presented in Table 4.

Table 4: Summary of Encountered Soil/Rock Stratigraphy (2nd Geotechnical Investigation Campaign)

Description	Depths Encountered (mbgl [1])			Averaged Thickness (m)
	Top	Bottom		
		Min	Max	
Silty SAND (Colluvial)	0	0.1	0.9	0.4
Gravelly Silty SAND to Sandy GRAVEL (Colluvial)	0	0.4	1.2	0.5
Sandy GRAVEL (Alluvial)	0.2	0.5	1.0	0.5
FERRICRETE	0.25 – 1.5 [3]	2.5 [3]	5.6 [3]	3.3 [3]
GRANITE (Saprolite)	0.5 [2]	-	15.1 [3]	-

1) Meters below ground level.
2) Subcrops in TP51 and TP52.
3) Maximum depth of investigation in boreholes.

Organic materials in the form of roots and rootlets were encountered within the Colluvial layers, from the surface to between 0.2 metres below ground level (mbgl) and 0.8 mbgl.

Granite encountered in testpits TP51 and TP52 were identified as sub-crops.

In addition to the stratigraphy shown in Table 4, there were also clusters of the following types of soil encountered during the second geotechnical investigation:

- Clayey SAND (SC) – at between 0.55 m and 1.2 m deep in testpit TP58. Properties as per Section 6.2.1 of this report.
- Sandy CLAY (SC) – within the upper 0.25 m in hand auger HA59 and 0.35 m in testpit TP64. Its properties included low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, angular to subangular; Colluvial.

6.3 Groundwater

Groundwater was not encountered within any of the test pits and boreholes during both investigations.

6.4 In-situ Permeability

RC boreholes were drilled by Topdrill to facilitate in-situ falling head permeability tests by CMW, and mineral sterilisation by CMM, during the first geotechnical investigation campaign. In the second geotechnical investigation campaign, AC boreholes were drilled by Prospect Drilling for the purpose of the investigation only.

The stratigraphy at these locations was logged by CMW based on spoils recovered from the cone splitter (RC) and discharge pipe (AC) of the drilling rigs.

During the first geotechnical investigation campaign, the 18 in-situ permeability tests undertaken in the RC-drilled boreholes, over six locations, were measured using a groundwater dipmeter over a duration of up to 2 days. The same applied to the 9 in-situ permeability tests undertaken at the three AC-drilled boreholes during the second geotechnical investigation campaign.

Water was added to the 10 m and 15 m deep boreholes after these were stabilised near the surface with a PVC collar, and the drop in level within each borehole was recorded. No collar was installed to the 1 m deep boreholes as the intent was to specifically measure the permeability of the near-surface materials.

A minimum of one set of measurements was made in each of the 27 boreholes. The results were recorded along with the depth of boreholes including the changes in dimensions due to partial collapses of the wall after water was added in, if any. The records were then used to estimate the soil permeabilities based on the Hvorslev method.

The results of the in-situ permeability tests in each borehole at the six locations are summarised in Table 5:

Table 5: Permeability Tests Summary			
Location	**Hydraulic Conductivity, k (m/s)**		
	Depth ~1 m	**Depth ~10 m**	**Depth ~15 m**
1st Geotechnical Investigation Campaign			
BH01	8.4×10^{-6}	9.2×10^{-8}	4.8×10^{-8}
BH02	1.2×10^{-6}	3.5×10^{-8}	2.0×10^{-8}
BH03	1.6×10^{-5}	1.9×10^{-7}	1.0×10^{-7}
BH04	9.5×10^{-6}	5.2×10^{-8}	1.6×10^{-8}
BH05	2.1×10^{-5}	7.3×10^{-8}	9.4×10^{-8}
BH06	2.3×10^{-6}	8.4×10^{-8}	3.1×10^{-8}
2nd Geotechnical Investigation Campaign			
BH07	5.4×10^{-6}	1.2×10^{-7}	3.1×10^{-8}
BH08	1.4×10^{-5}	1.4×10^{-7}	5.8×10^{-8}
BH09	2.3×10^{-6}	1.4×10^{-7}	8.4×10^{-8}

Traces of the in-situ permeability tests plus graphical output are presented in Appendix D. Discussion of the testing is made in Section 7.

6.5 Laboratory Test Results

Tables 6 and 7 summarises the laboratory test results of the samples obtained from the test pits during the first and second geotechnical investigation campaigns, respectively.

Table 6: Summary of Soil Classification Test Results (1st Geotechnical Investigation Campaign)

TP No. & RL (m AHD)	Depths (mbgl)	Particle Size Distribution				k (m/s)	Atterberg Limits				SMDD			ECN	Multi-Stage CU Triaxial		
		Gravel (%)	Sand (%)	Silt (%)	Clay (%)		LL (%)	PL (%)	PI (%)	LS (%)	OMC (%)	SMDD (t/m^3)	ρ_b (t/m^3)		c' (kPa)	ϕ' (^{0})	c_v (cm^2/s)
TP07 RL 341.66	0.25 – 0.9	44	44	5	7	3.49e-8	NO	NP	NP	1	11.5	2.02	2.81	5	23	35	0.292
TP10 RL 343.65	0.7 – 1.35	22	58	13	7	8.15e-8	NO	NP	NP	1.5	13.5	1.81	2.77	4	43	29	0.107
TP19 RL 346.49	0.4 – 0.8	2	56	42		-	30	16	14	7	-	-	-	-	-	-	-
TP21 RL 350.77	0.8 – 1.1	0	39	61		-	57	28	29	13	-	-	-	4	-	-	-
TP34 RL 352.52	0.5 – 0.85	3	52	45		-	35	19	16	8	-	-	-	3	-	-	-
TP41 RL 359.16	0.3 – 0.6	6	51	43		-	-	-	-	-	-	-	-	-	-	-	-
TP43 RL 363.70	0.5 – 1.0	80	14	6		-	-	-	-	-	-	-	-	-	-	-	-
TP44 RL 368.33	0 – 0.2	20	64	16		-	NO	NP	NP	1	-	-	-	-	-	-	-

Gravel, sand, silt and clay percentages are by weight, ρ_b = apparent (bulk) density, LL = liquid limit, PL = plasticity limit, PI = plasticity index, LS = linear shrinkage, NO = Not obtainable, NP = Non-Plastic, MC = Natural Moisture Content, OMC = Optimum Moisture Content, SMDD = Standard Maximum Dry Density, ECN = Emerson Class Number, c' = cohesion, φ' = angle of shear resistance, cv = coefficient of consolidation, k = coefficient of permeability.

Table 7: Summary of Soil Classification Test Results (2nd Geotechnical Investigation Campaign)

TP No. & RL (m AHD)	Depths (mbgl)	Particle Size Distribution				k (m/s)	Atterberg Limits				SMDD			ECN	Multi-Stage CU Triaxial		
		Gravel (%)	Sand (%)	Silt (%)	Clay (%)		LL (%)	PL (%)	PI (%)	LS (%)	OMC (%)	SMDD (t/m^3)	ρ_b (t/m^3)		c' (kPa)	ϕ' (^{0})	c_v (cm^2/s)
TP55 RL 329.6	0 – 0.15	11	74	15		-	20	16	4	1.0	-	-	-	-	-	-	-
TP58 RL 333.5	0.2 – 0.5	0	83	17		-	NO	NP	NP	0.0	-	-	-	-	-	-	-
TP58 RL 333.5	0.8 – 1.2	2	75	23		-	25	19	6	3.0	-	-	-	-	-	-	-
TP58 RL 333.5	1.2 – 1.35	18	67	13	2	5.48e-9	NO	NP	NP	1.0	11.0	1.89	2.76	4	-	-	-
TP61 RL 337.2	0 – 0.3	0	84	7	9	5.21e-8	NO	NP	NP	0.0	9.0	2.03	2.68	5	-	-	-
TP63 RL 333.0	0.5 – 0.8	65	23	12		-	25	16	9	4.0	-	-	-	-	-	-	-
TP64 RL 336.4	0 – 0.3	12	47	11	30	1.39e-9	26	16	10	5.0	12.0	1.91	2.76	5	-	-	-

Gravel, sand, silt and clay percentages are by weight, ρ_b = apparent (bulk) density, LL = liquid limit, PL = plasticity limit, PI = plasticity index, LS = linear shrinkage, NO = Not obtainable, NP = Non-Plastic, MC = Natural Moisture Content, OMC = Optimum Moisture Content, SMDD = Standard Maximum Dry Density, ECN = Emerson Class Number, c' = cohesion, φ' = angle of shear resistance, cv = coefficient of consolidation, k = coefficient of permeability.

6.6 Materials Assessment

6.6.1 Silty SAND and Gravelly Silty SAND to Gravelly SAND

The Silty SAND and Gravelly Silty SAND to Gravelly SAND materials were identified by samples from TP07_0.25-0.9 m and TP44_0-0.2 m of the first geotechnical investigation, and from TP55_0-0.15 m, TP58_0.2-0.5 m and TP61_0-0.3 m of the second geotechnical investigation.

The materials have non-plastic fines with a nominal 0-1% linear shrinkage. Using standard compactive effort in accordance with AS1289.5.1.1, sample TP07_0.25-0.9 m recorded a maximum dry density of 2.02 t/m^3 achieved with an optimum moisture content (OMC) of 11.5%. Remoulding of the sample to 95% of the standard maximum dry density (SMDD), it recorded a permeability coefficient (k) is 3.5 x 10^{-8} m/s which is considered as 'very low' permeability (Terzaghi et al 1996) and is typical of the soil groups 'SM-SC'. Similar parameters were derived from the sample of TP61_0-0.3 m where a maximum dry density of 2.03 t/m^3 was achieved with an OMC of 9%, and at 95% of SMDD the permeability k is 5.21 x 10^{-8} m/s.

Both of the samples TP07_0.25-0.9 m and TP61_0-0.3 m has an Emerson Class Number (ECN) 5 which indicates that while the materials are non-dispersive, the remoulding and breaking down of it can result in dispersive behaviour. Remoulding at near OMC for earthworks is not expected to increase the potential for dispersive behaviour. It should also be noted that low salinity water was utilised for the ECN tests and actual dispersion would be subject to in-situ salinity.

Consolidated Undrained (CU) triaxial tests on the materials (TP07_0.25-0.9 m) provided effective strength parameters with cohesion c' of 23 kPa, angle of shear resistance ϕ' of 35^0 and coefficient of consolidation c_v of 0.292 cm^2/s or 921 m^2/yr.

6.6.2 Ferricrete

The Ferricrete materials when broken down to Silty SAND with Gravel were noted to have non-plastic fines with a nominal 1% linear shrinkage. These materials were best represented by the samples TP10_0.7-1.35 m of the first geotechnical investigation, and TP58_1.2-1.35 m of the second geotechnical investigation.

The SMDD results on sample TP10_0.7-1.35 m was a maximum dry density of 1.81 t/m^3 at an OMC of 13.5%. Remoulding of the sample to 95% of SMDD, provided a permeability result, 'k' of 8.25 x 10^{-8} m/s. The permeability coefficient is considered as 'very low' (Terzaghi et al 1996) and is typical of the soil group 'SM'.

Similar parameters were derived from the sample TP58_1.2-1.35 m where a maximum dry density of 1.89 t/m3 was achieved with an OMC of 11%, however, at 95% of SMDD the permeability k is marginally lower at 5.48 x 10^{-9} m/s.

Both of the samples TP10_0.7-1.35 m and TP58_1.2-1.35 m has an ECN 4 which indicates that in addition to the materials being non-dispersive, the presence of calcium carbonate and calcium sulphate is noted. These chemicals promote the lowering of soil acidity and reduction of thick cation layers around fines particles that are associated with dispersion issues with soil.

CU triaxial tests on the materials (sample TP10_0.7-1.35 m) provided effective strength parameters with c' of 43 kPa, ϕ' of 29^0 and c_v of 0.107 cm^2/s or 338 m^2/yr.

6.6.3 Sandy CLAY to Clayey SAND

The Sandy CLAY materials encountered during the first geotechnical investigation (samples TP19_0.4-0.8 m, TP21_0.8-1.1 m, TP34_0.5-0.85 m and TP41_0.3-0.6 m) were found to have generally low to medium plasticity, with one location being of high plasticity (TP21 at 0.8-1.1 mbgl).

The linear shrinkages were between 7% to 13%. These soils have been assessed as adequate for TSF embankment construction.

The Sandy CLAY to Clayey SAND materials encountered during the second geotechnical investigation (samples TP58_0.8-1.2 m and TP64_0-0.3 m) were similar in nature having generally low plasticity with linear shrinkages of between 3% to 5%.

The ECN of the Sandy CLAY materials from the first geotechnical investigation ranged from 3 to 4, indicating slightly dispersive to non-dispersive materials. Where encountered in TP34 and TP40-41, these materials were found from at least 0.3 mbgl, thus reducing the potential for erosion. The saline environment of the area would further reduce the likelihood for erosion. It is noted however that typically materials with ECN 3 or less are not to be used on the surface of a basin.

The ECN of the Sandy CLAY to Clayey SAND materials from the second geotechnical investigation was 5 thus would be considered as non-dispersive except when remoulded or earthworked.

6.6.4 Gravel

During the first geotechnical investigation, the Gravel (with silt/clay of low plasticity) encountered was alluvial in nature and situated in ephemeral gullies, surface runoff is mainly as shallow sheet flows, with no incised creek channel. The composition included some fines and trace sand. Tactile assessment indicated the fines content being low plasticity or non-plastic.

The Gravel layers encountered during the second geotechnical investigation were slightly different in nature, in that these were encountered beneath the overlying Silty SAND or Sandy CLAY layers. Test results indicated some contents of sand and low plasticity clay, which are consistent with the stratum at which the Gravel layers were found.

7 DISCUSSIONS

The second geotechnical investigation was carried out on the areas of the revised TSF1 location not covered by the first geotechnical investigation. The revised TSF1 location is approximately 400 m to the north-northwest of its original location.

The purpose of the relocation is to avoid the rock outcrops, requiring the ‘clay blanket’ as discussed in Section 7.1 of this report. Additionally, further heritage monitoring after the first geotechnical investigation revealed several locations with heritage value thus necessitating the relocation.

Based on the results of the second geotechnical investigation, it is considered that the near surface ground conditions, including the underlying granite (saprolite) layer, at the revised TSF1 location were similar to the original location. The additional information from the in-situ and laboratory tests have been taken into account in deriving the geotechnical design parameters to be used in the TSF1 design, summarised in Section 7.3 of this report.

7.1 Geotechnical Design Parameters

For the purposes of geotechnical design calculations, the strength/stiffness parameters have been interpreted for the generalised soil/rock units encountered at the proposed TSF1 location, based on the results of the geotechnical investigation and the subsequent laboratory test results, published literature on similar soils, empirical correlations and case histories. Table 6 provides the design parameters for bulk density, elastic density, Poisson's ratio, shear modulus, small-strain shear modulus and the coefficients of at rest, active and passive earth pressures.

Table 4: Summary of Recommended Soil / Rock Strength / Stiffness Parameters

Description	ρ (kN/m^3)	S_u (kPa)	Φ' (degrees)	c' (kPa)	E (MPa)	ν	G (MPa)	G_0 (MPa)	K_0	No wall friction	
										K_a	K_p
Silty SAND (SM)	20	-	35	5	50	0.3	20	100	0.43	0.27	3.7
Gravelly Silty SAND to Gravelly SAND (SM)	20	-	38	0	80	0.25	35	200	0.38	0.24	4.2
FERRICRETE	18	300	30	40	400	0.2	170	1,500	0.50	0.33	3.0
GRANITE (Saprolite)	23	400	40	5	750	0.2	320	3,000	0.36	0.22	4.5

Notes:

- Refer to Section 4.2 for the definition of soil unit levels,
- ρ = unit weight, S_u = Undrained Shear Strength, Ø' = Effective Angle of Friction, c' = cohesion, E = elastic modulus, ν = Poisons Ratio, G = shear modulus, G_o = small strain shear modulus, K_0 = coefficient of earth pressure at rest, K_a = coefficient of active earth pressure, K_p = coefficient of passive earth pressure.

8 CLOSURE

The findings contained within this report are the result of limited discrete investigations conducted in accordance with normal practices and standards. To the best of our knowledge, they represent a reasonable interpretation of the general condition of the site. Under no circumstances, can it be considered that these findings represent the actual state of the ground conditions away from our investigation locations.

If the ground conditions encountered during construction are significantly different from those described in this report and on which the conclusions and recommendations were based, then we must be notified immediately.

This report has been prepared for use by Capricorn Metals Ltd (CMM) in relation to the proposed TSF1 design at the Mt Gibson Gold Project, WA project in accordance with generally accepted consulting practice. No other warranty, expressed or implied, is made as to the professional advice included in this report. Use of this report by parties other than CMM and their respective consultants and contractors is at their risk as it may not contain sufficient information for any other purposes.

For and on behalf of
CMW Geosciences Pty Ltd

Prasudi Atmajaya

Geotechnical Engineer

Christopher Hogg

Principal Tailings Engineer

Distribution: 1 copy to Capricorn Metals Ltd (electronic)
Original held by CMW Geosciences Pty Ltd

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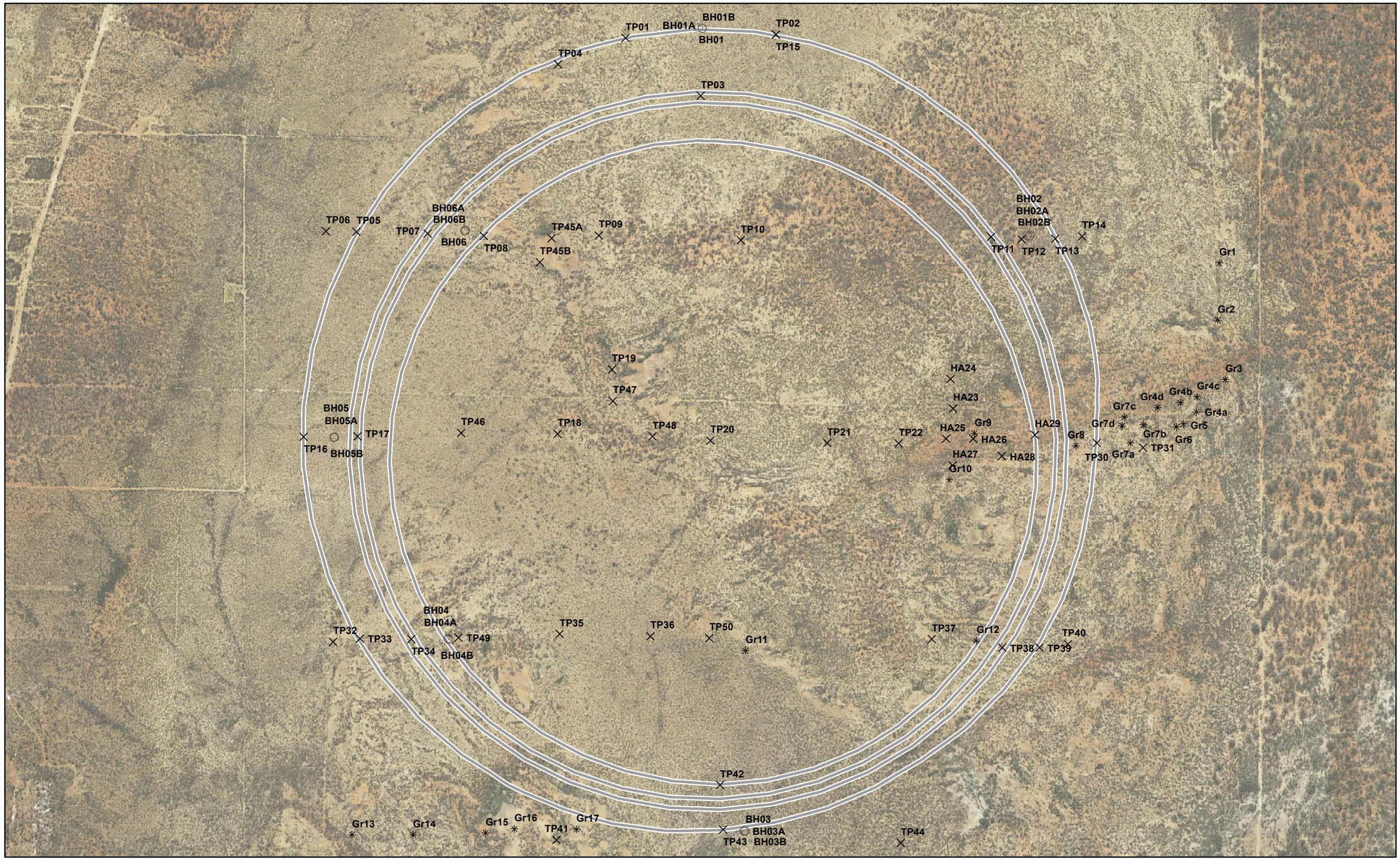
Figures



CMW Test Location

- ○ Borehole
- ✳ Rock Outcrop
- × Hand Auger
- × Test Pit

NOTES

1. Aerial photography sourced from Landgate SLIP.

0 35 70 140 210 280 350
Meters

Coordinate System: GDA 1994 MGA Zone 50Transverse Mercator

N

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		COMPILED: NR	PROJECT: PER2022-0011
PROJECT: MT GIBSON GOLD MINE TSF DESIGN		CHECKED: PA	FIGURE: 01
		REVISION: A	SCALE: 1:7,000
TITLE: TSF Aerial		DATE: 10/11/2022	SHEET: A3 L

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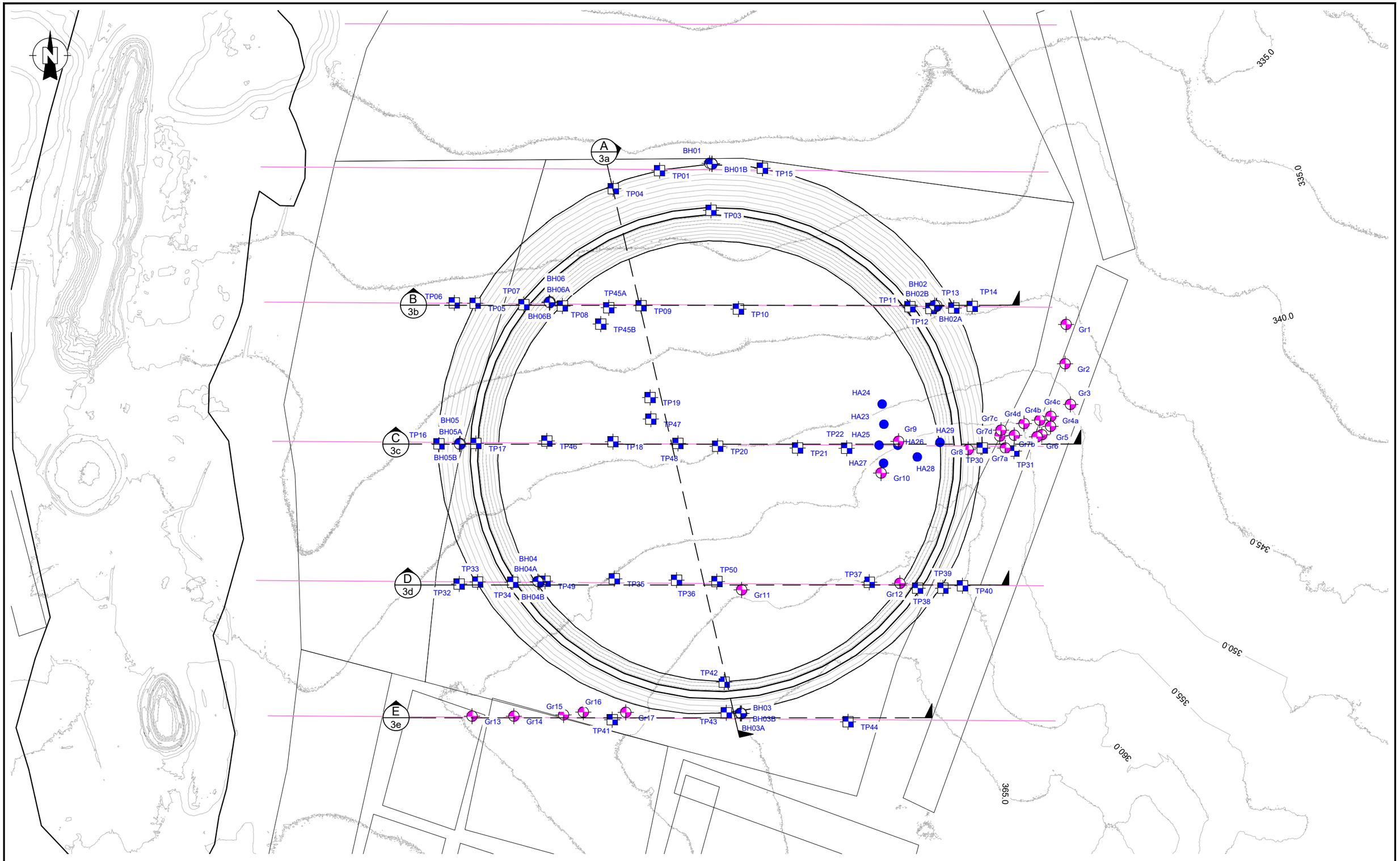

LEGEND:

- BH01 BOREHOLE LOCATION
- HA01 HAND AUGER LOCATION
- TP01 TEST PIT LOCATION
- GR1 ROCK OUTCROP
- SOUTH STERILISATION LINES

1:10 000

0 100 200 300 400 500 m

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		DRAWN: DE	PROJECT: PER2022-0011
PROJECT: MT GIBSON GOLD PROJECT (MGGP) TSF1 DESIGN		CHECKED: PA	FIGURE: 02A
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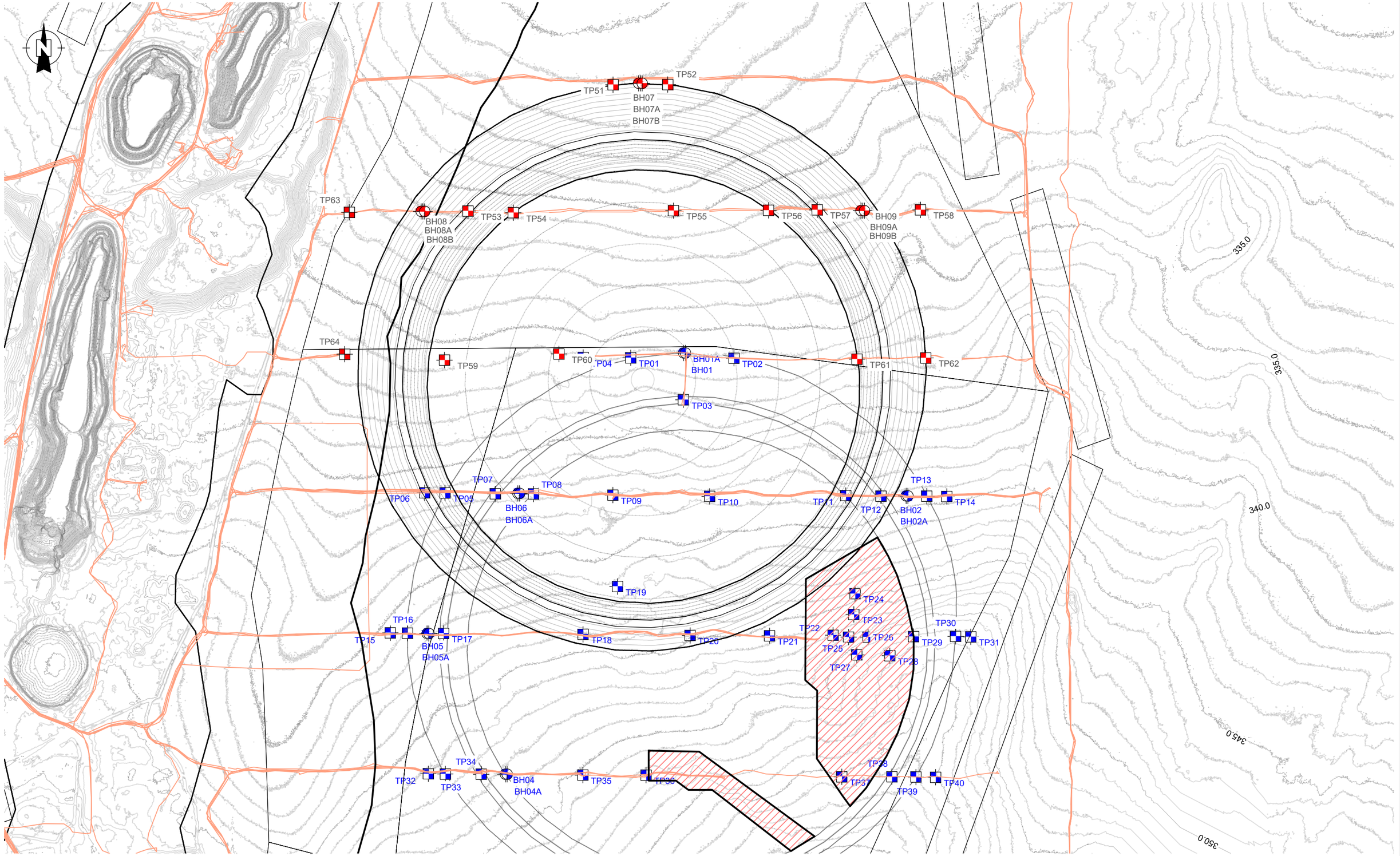

LEGEND:

- BH01 BOREHOLE LOCATION
- TP01 TEST PIT LOCATION
- SOUTH STERILISATION LINES
- BH01 BOREHOLE LOCATION (PREVIOUS INVESTIGATION)
- TP01 TEST PIT LOCATION (PREVIOUS INVESTIGATION)

1:10 000 0 100 200 300 400 500 m

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		DRAWN: DE	PROJECT: PER2022-0011
PROJECT: MT GIBSON GOLD MINE TSF DESIGN		CHECKED: PA	FIGURE: 02B
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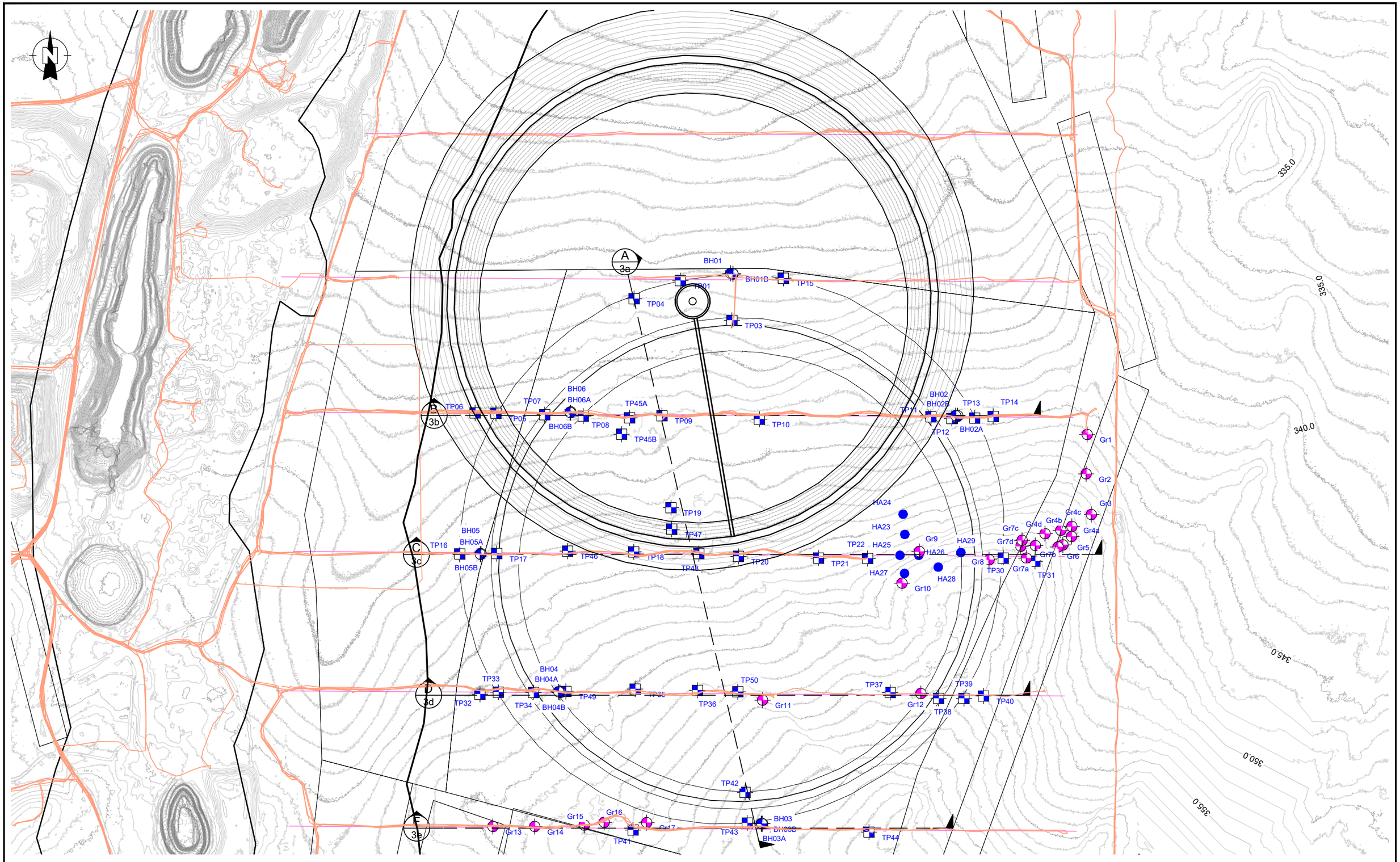

LEGEND:

- BH01 BOREHOLE LOCATION
- HA01 HAND AUGER LOCATION
- TP01 TEST PIT LOCATION
- GR1 ROCK OUTCROP
- SOUTH STERILISATION LINES

1:10 000

0 100 200 300 400 500 m

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		DRAWN: DE	PROJECT: PER2022-0011
PROJECT: MT GIBSON GOLD PROJECT (MGGP) TSF1 DESIGN		CHECKED: PA	FIGURE: 02C
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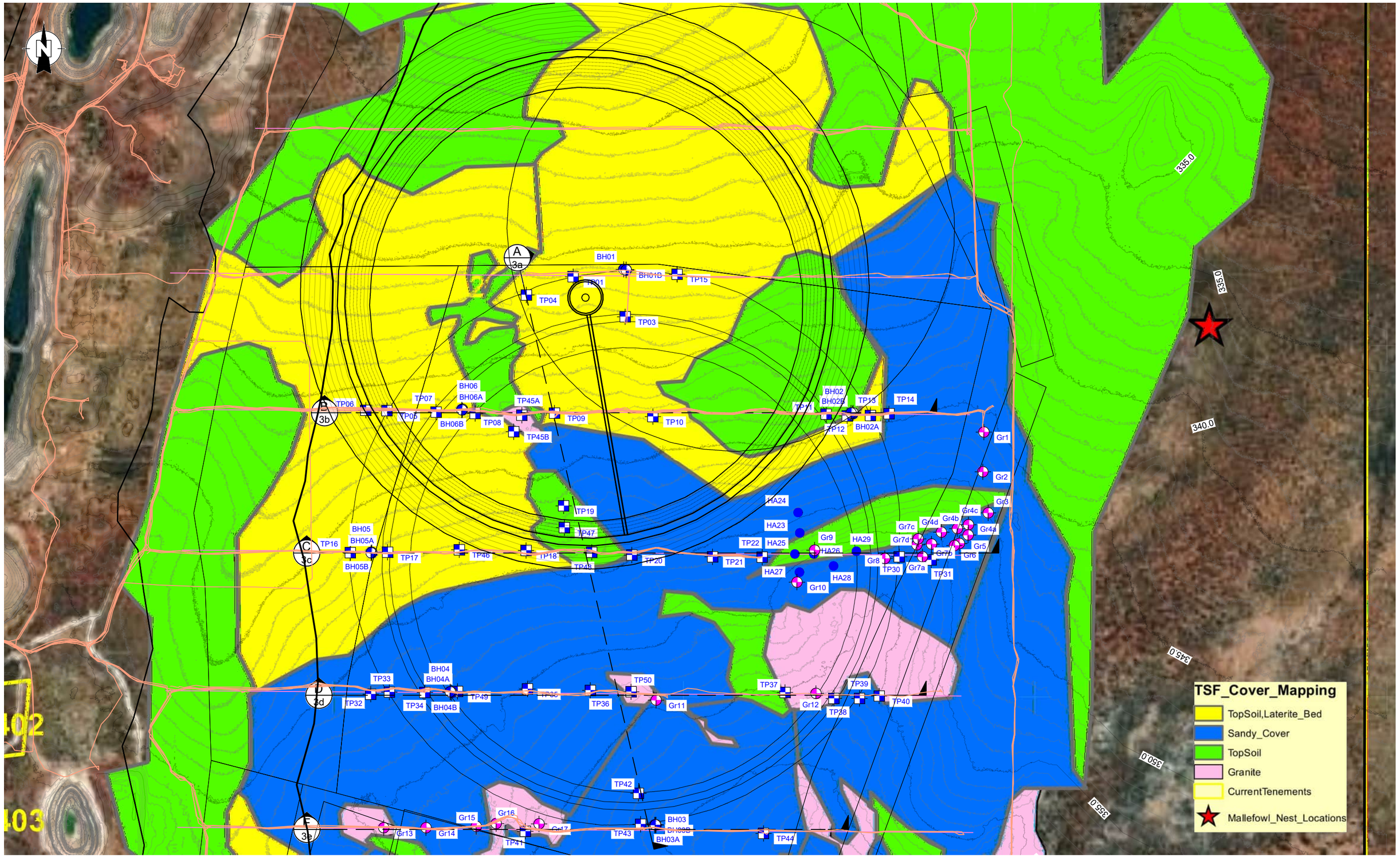

LEGEND:

- BH01 BOREHOLE LOCATION
- HA01 HAND AUGER LOCATION
- TP01 TEST PIT LOCATION
- GR1 ROCK OUTCROP
- SOUTH STERILISATION LINES

1:10 000

0 100 200 300 400 500 m

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		DRAWN: DE	PROJECT: PER2022-0011
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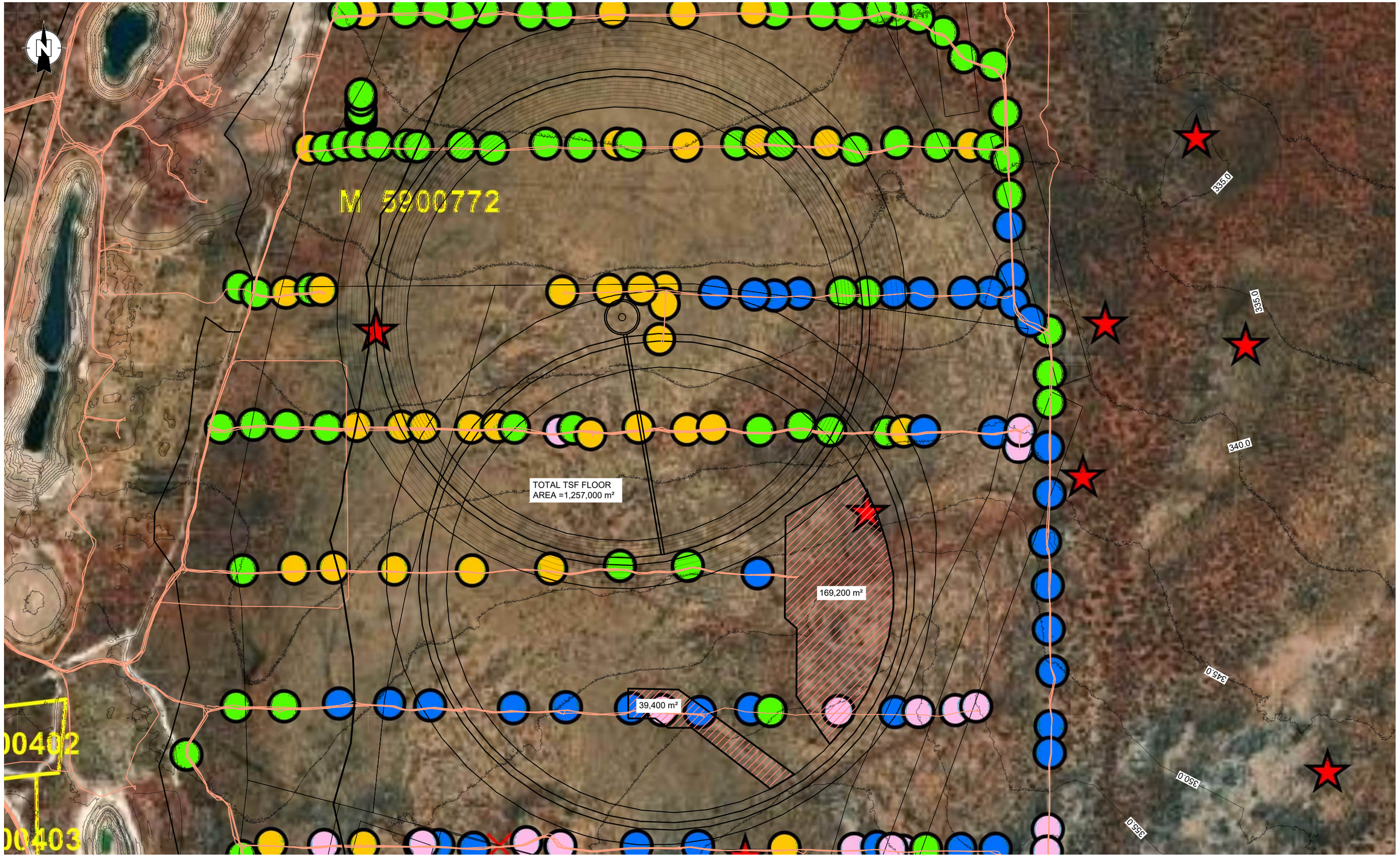

LEGEND:

AREAS WITH ROCK OUTCROPS AND SUBCROPS REQUIRING CLAYEY MINE WASTE OVERLAY

1:10 000

0 100 200 300 400 500 m

CMW Geosciences

CLIENT: **CAPRICORN METALS LTD**		DRAWN: DE	PROJECT: PER2022-0011
PROJECT: **MT GIBSON GOLD PROJECT (MGGP) TSF1 DESIGN**		CHECKED: PA	FIGURE: 02E
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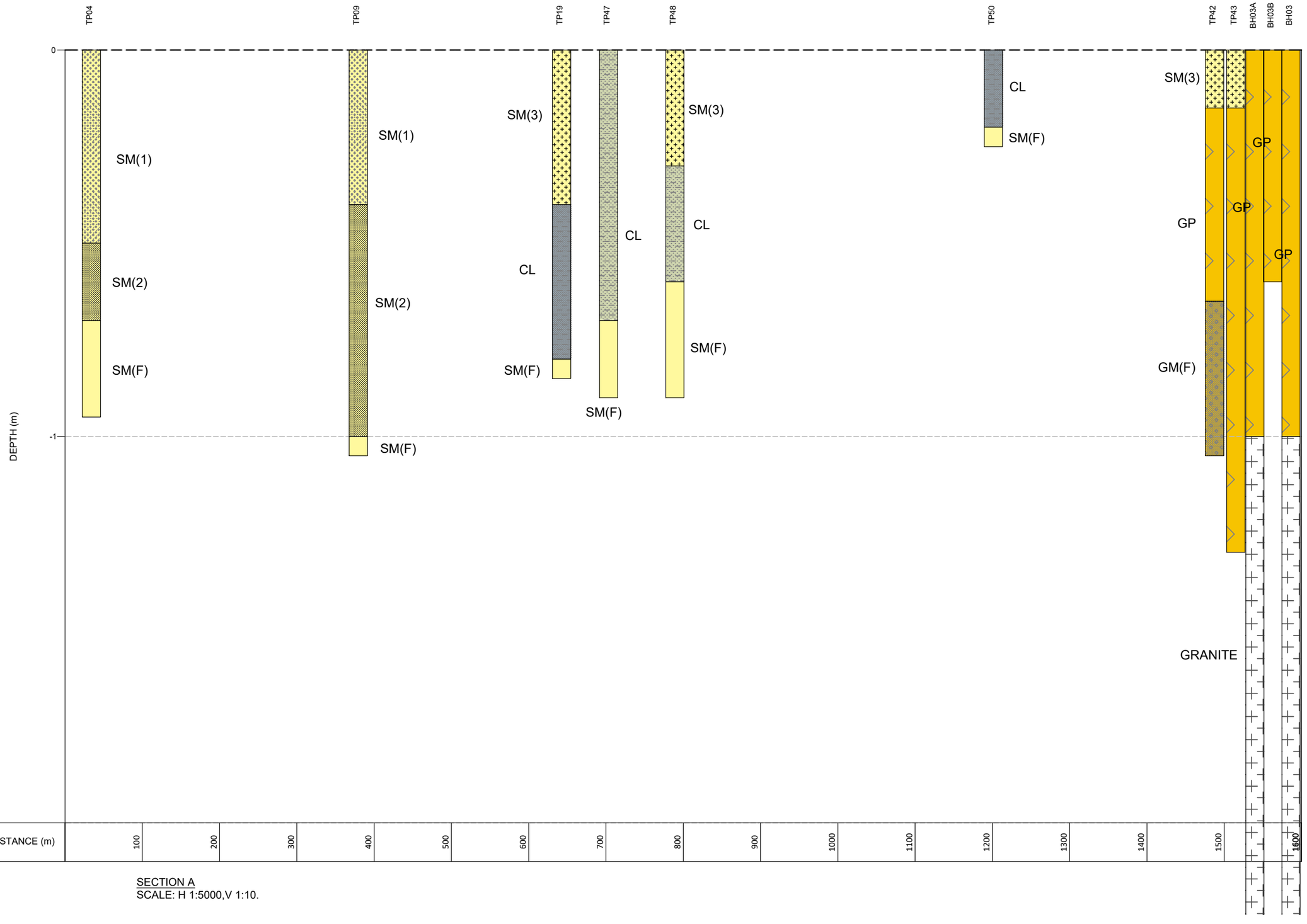

SECTION A
SCALE: H 1:5000,V 1:10.

LEGEND:

SM(1)	GRAVELLY SAND	CL	SANDY CLAY
SM(2)	GRAVELLY SILTY SAND	GP	GRAVEL
SM(3)	SILTY SAND	SP	SAND
SM(F)	FERRICRETE retrieved as SILTY SAND with Gravel	SC	CLAYEY SAND
		ML	SANDY SILT
GM(F)	FERRICRETE retrieved as SANDY GRAVEL	CI	SANDY CLAY

1:5000 0 50 100 150 200 250 m

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		DRAWN: DE	PROJECT: PER2022-0011
PROJECT: MT GIBSON GOLD PROJECT (MGGP) TSF1 DESIGN		CHECKED: PA	FIGURE: 03a
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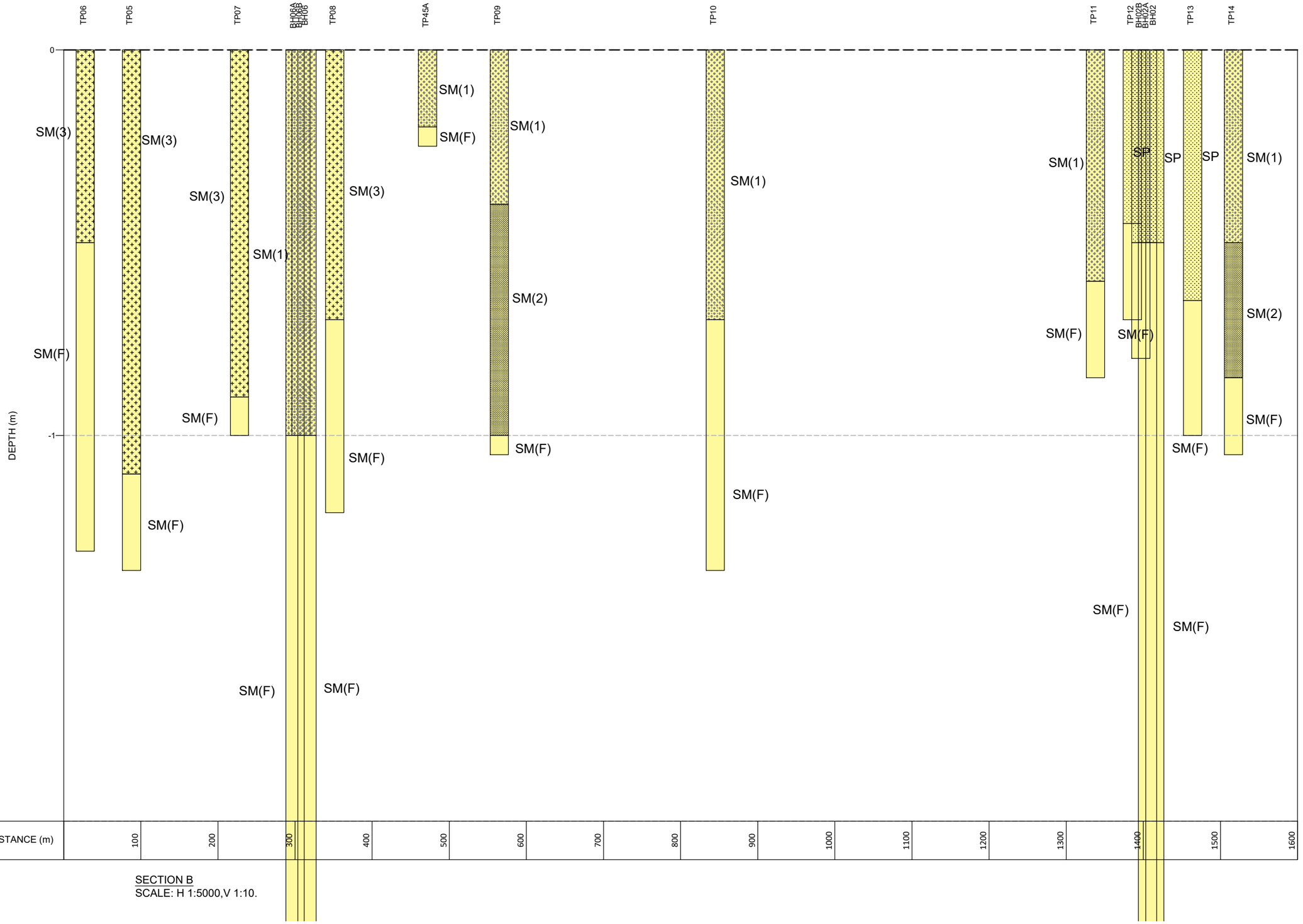

SECTION B
SCALE: H 1:5000,V 1:10.

LEGEND:

SM(1)	GRAVELLY SAND	CL	SANDY CLAY
SM(2)	GRAVELLY SILTY SAND	GP	GRAVEL
SM(3)	SILTY SAND	SP	SAND
SM(F)	FERRICRETE retrieved as SILTY SAND with Gravel	SC	CLAYEY SAND
GM(F)	FERRICRETE retrieved as SANDY GRAVEL	ML	SANDY SILT
		CI	SANDY CLAY

1:5000 0 50 100 150 200 250 m

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		DRAWN: DE	PROJECT: PER2022-0011
PROJECT: MT GIBSON GOLD PROJECT (MGGP) TSF1 DESIGN		CHECKED: PA	FIGURE: 03b
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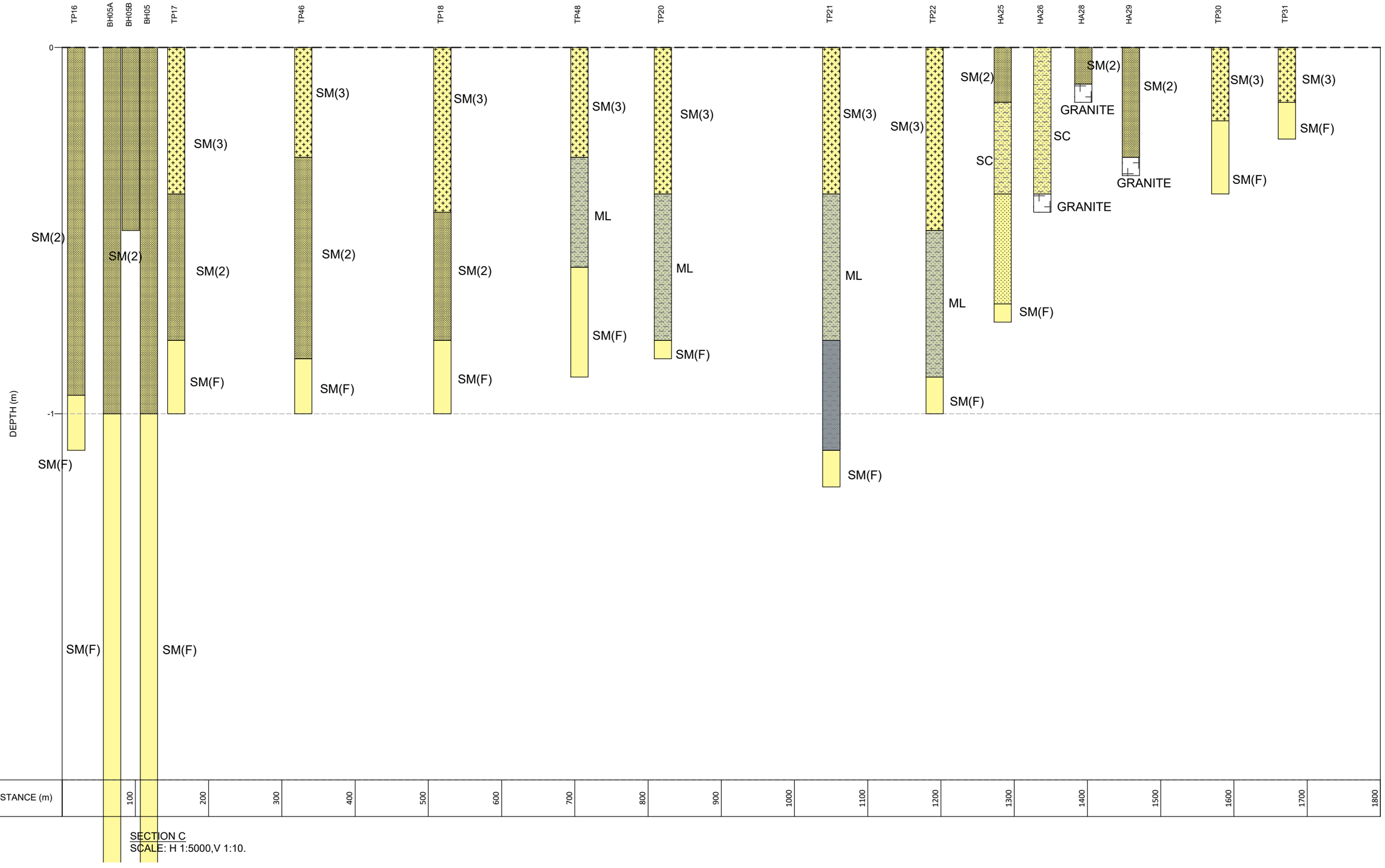

SECTION C
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SM(2)	GRAVELLY SILTY SAND	GP	GRAVEL
SM(3)	SILTY SAND	SP	SAND
SM(F)	FERRICRETE retrieved as SILTY SAND with Gravel	SC	CLAYEY SAND
		ML	SANDY SILT
GM(F)	FERRICRETE retrieved as SANDY GRAVEL	CI	SANDY CLAY

1:5000 0 50 100 150 200 250 m

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		DRAWN: DE	PROJECT: PER2022-0011
PROJECT: MT GIBSON GOLD PROJECT (MGGP) TSF1 DESIGN		CHECKED: PA	FIGURE: 03c
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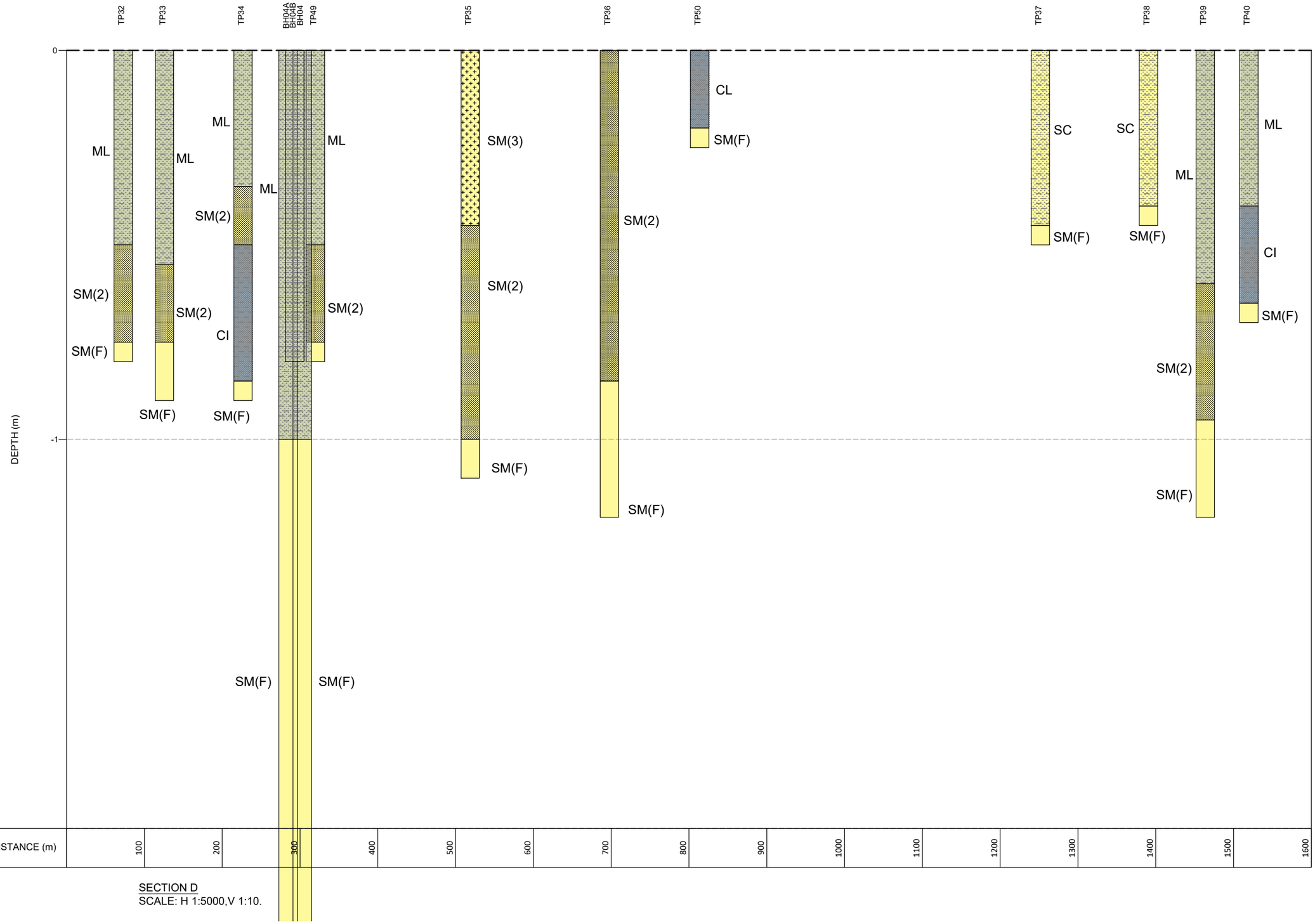

SECTION D
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SM(2)	GRAVELLY SILTY SAND	GP	GRAVEL
SM(3)	SILTY SAND	SP	SAND
SM(F)	FERRICRETE retrieved as SILTY SAND with Gravel	SC	CLAYEY SAND
GM(F)	FERRICRETE retrieved as SANDY GRAVEL	ML	SANDY SILT
		CI	SANDY CLAY

1:5000 0 50 100 150 200 250 m

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		DRAWN: DE	PROJECT: PER2022-0011
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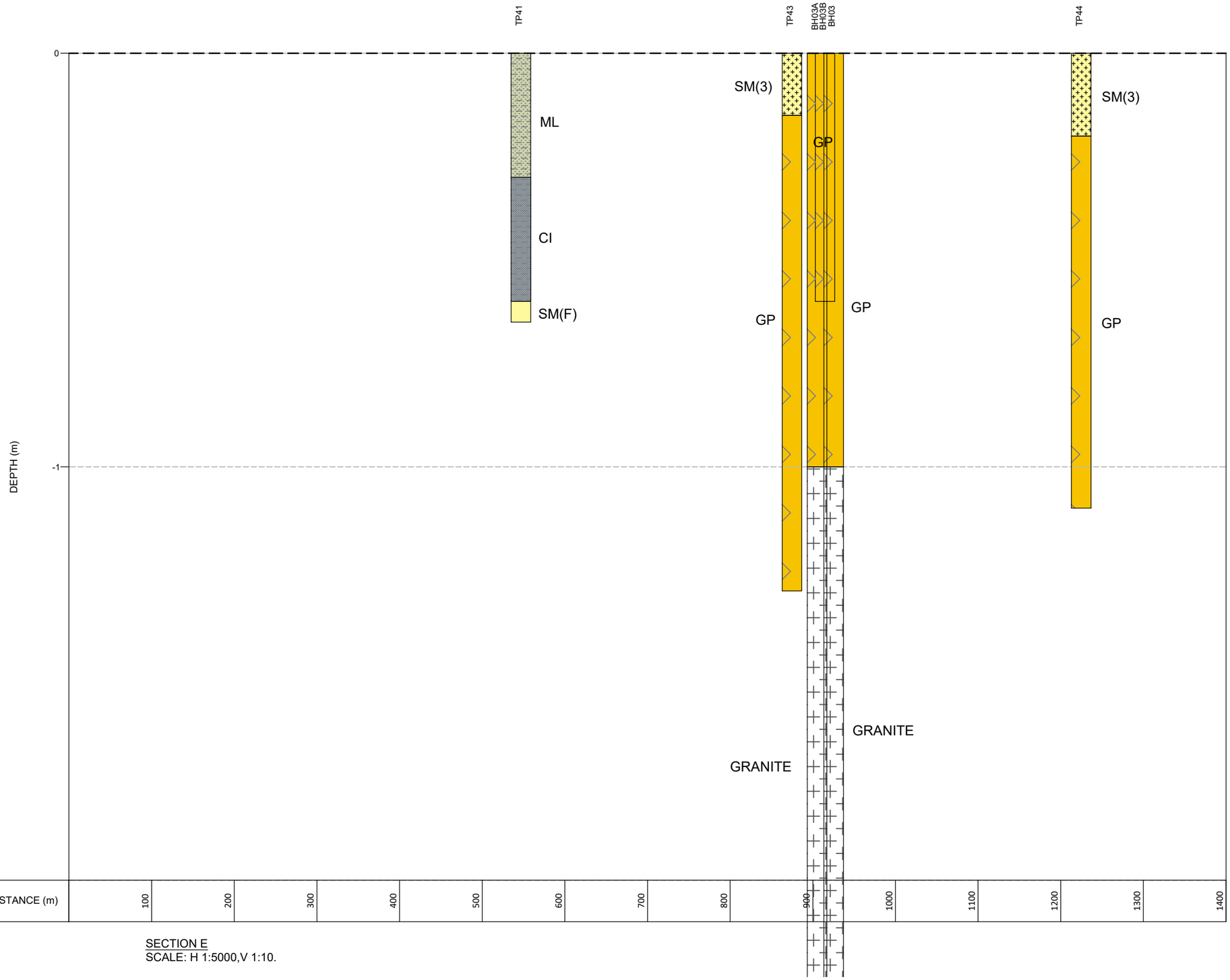

SECTION E
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LEGEND:

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SM(2)	GRAVELLY SILTY SAND	GP	GRAVEL
SM(3)	SILTY SAND	SP	SAND
SM(F)	FERRICRETE retrieved as SILTY SAND with Gravel	SC	CLAYEY SAND
		ML	SANDY SILT
GM(F)	FERRICRETE retrieved as SANDY GRAVEL	CI	SANDY CLAY

1:5000 0 50 100 150 200 250 m

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		DRAWN: DE	PROJECT: PER2022-0011
PROJECT: MT GIBSON GOLD PROJECT (MGGP) TSF1 DESIGN		CHECKED: PA	FIGURE: 03e
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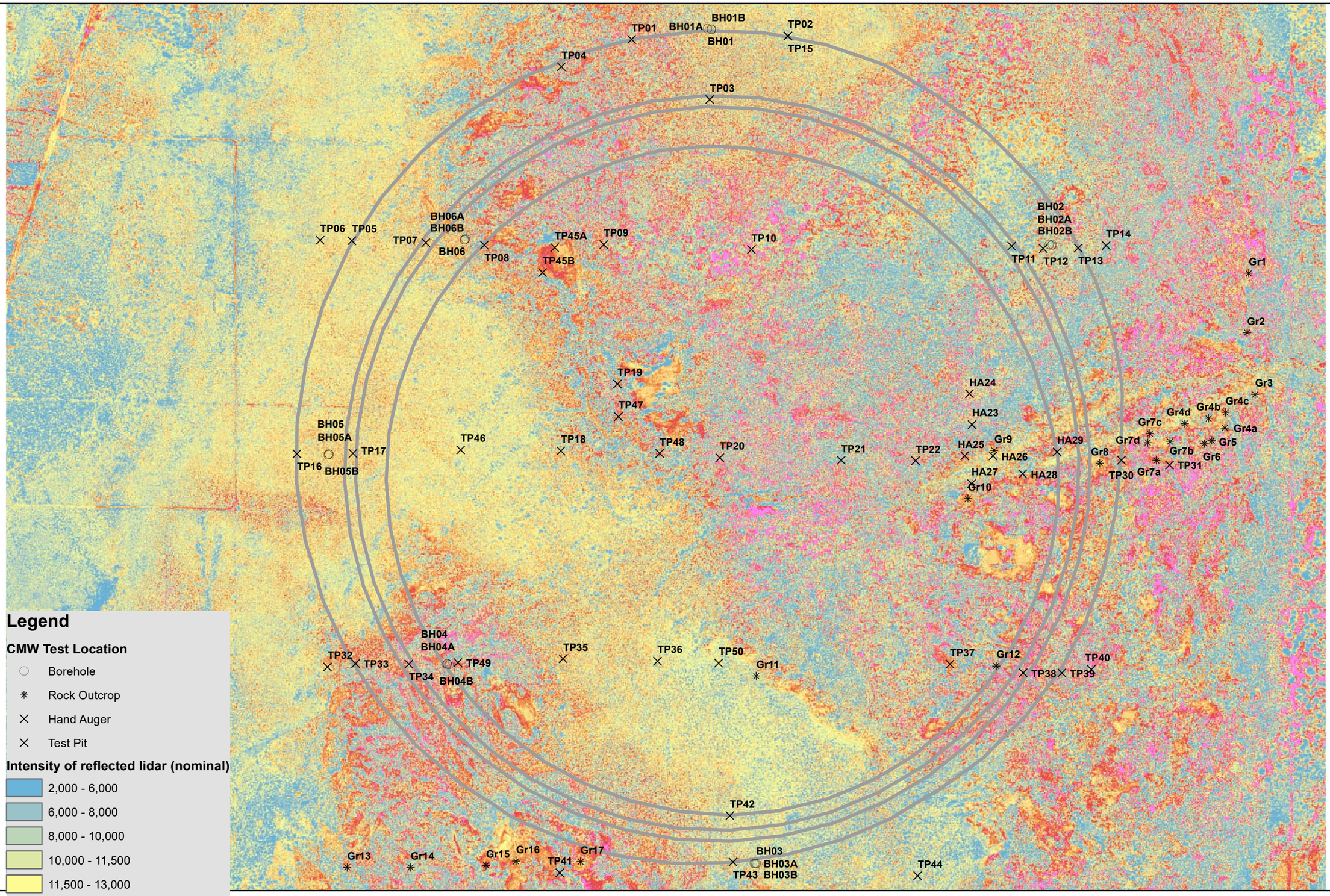

Legend

CMW Test Location

- Borehole
- Rock Outcrop
- Hand Auger
- Test Pit

Intensity of reflected lidar (nominal)

- 2,000 - 6,000
- 6,000 - 8,000
- 8,000 - 10,000
- 10,000 - 11,500
- 11,500 - 13,000
- 13,000 - 14,500
- 14,500 - 16,000
- 16,000 - 17,500
- 17,500 - 25,000

NOTES

1. Aerial photography sourced from Landgate SLIP.

0 35 70 140 210 280 350
Meters

Coordinate System: GDA 1994 MGA Zone 50Transverse Mercator

N

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		COMPILED: NR	PROJECT: PER2022-0011
PROJECT: MT GIBSON GOLD MINE TSF DESIGN		CHECKED: PA	FIGURE: 04
		REVISION: A	SCALE: 1:7,000
TITLE: TSF AREA - LIDAR INTENSITY		DATE: 10/11/2022	SHEET: A3 L

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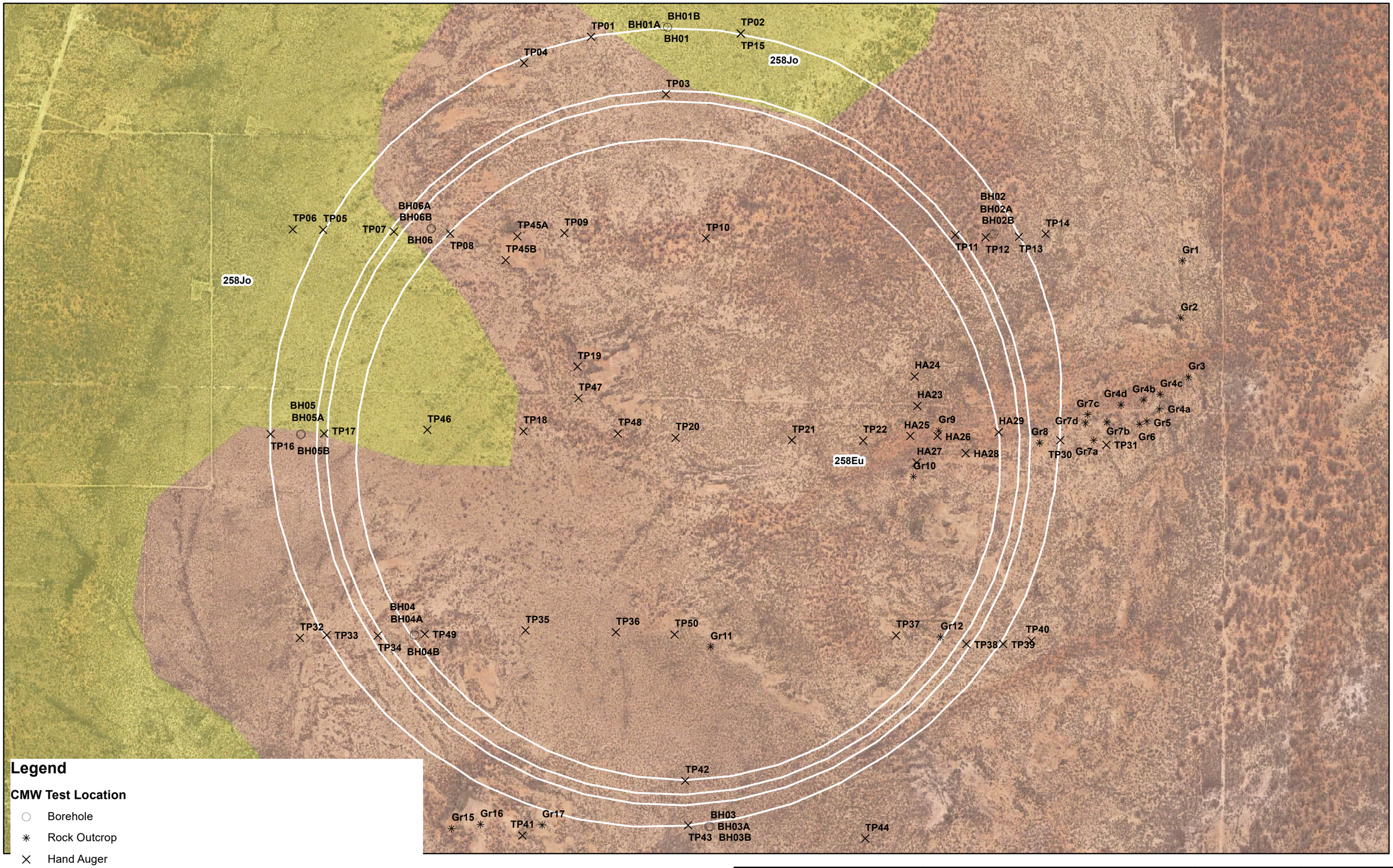

Legend

CMW Test Location

- Borehole
- Rock Outcrop
- Hand Auger
- Test Pit

Soil Landscape Mapping - Best_Available (DPIRD_027)

- 258Eu - Euchre system: Low granite breakaways with alluvial plains and sandy tracts.
- 258Jo - Joseph system - Undulating yellow sandplain.

NOTES

1. Aerial photography sourced from Landgate SLIP.
2. Soil classification data sourced from the Department of Primary Industries and Regional Development

0 35 70 140 210 280 350 Meters

Coordinate System: GDA 1994 MGA Zone 50Transverse Mercator

N

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		COMPILED: NR	PROJECT: PER2022-0011
PROJECT: MT GIBSON GOLD MINE TSF DESIGN		CHECKED: PA	FIGURE: 05
		REVISION: A	SCALE: 1:7,000
TITLE: TSF AREA - LANDSCAPE MAP (DPIRD)		DATE: 14/11/2022	SHEET: A3 L

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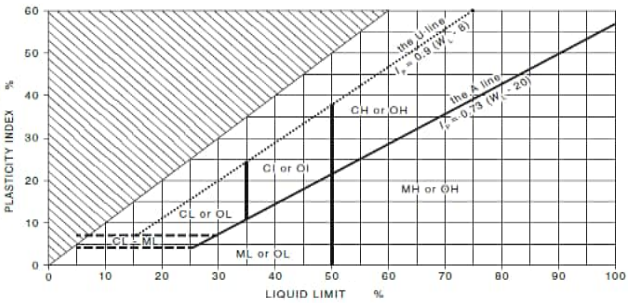
Appendix A
Explanatory Notes

Explanatory Notes – Soil Description

GRAVEL	Gravelly SAND	Sandy CLAY	FILL
SILTY GRAVEL	SILTY SAND	SILT	TOPSOIL
CLAYEY GRAVEL	CLAYEY SAND	Gravelly SILT	COBBLES & BOULDERS
Sandy GRAVEL	CLAY	Sandy SILT	CONCRETE
SAND	Gravelly CLAY	PEAT	NO CORE

GP	Poorly Graded Gravel	ML	Low Plasticity Silt
GW	Well Graded Gravel	MH	High Plasticity Silt
GM	Silty Gravel	CL	Low Plasticity Clay
GC	Clayey Gravel	CI	Medium Plasticity Clay
SP	Poorly Graded Sand	CH	High Plasticity Clay
SW	Well Graded Sand	OL	Organic Soils (LP)
SM	Silty Sand	OH	Organic Soils (HP)
SC	Clayey Sand	PT	Peat
	Fill		Cobbles & Boulders

Soil colours based on BGS Internal report IR/05/123 "A Revised scheme for coding unlithified deposits", 2006.



WATER	
Groundwater (Strike)	Groundwater (rise)

CLASSIFICATION AND INFERRED STRATIGRAPHY

Particle Size		
Major Division	Sub Division	Particle Size
Boulders		> 200 mm
Cobbles		63 to 200 mm
Gravel	Coarse	19 to 63 mm
	Medium	6.7 to 19 mm
	Fine	2.36 to 6.7 mm
Sand	Coarse	0.6 to 2.36 mm
	Medium	0.21 to 0.6 mm
	Fine	0.075 to 0.21 mm
Silt		0.002 to 0.075 mm
Clay		< 0.002 mm

SECONDARY/MINOR COMPONENTS	
TERMS FOR SANDS/GRAVELS (Less than 35% Particles < 0.075mm)	**TERMS FOR CLAYS/SILTS** (More than 35% Particles < 0.075mm)
trace… sand/gravel = <15% clay/silt = <5%	**trace…** sand/gravel = <15%
with… sand/gravel = >15%, <30% clay/silt = >5%, <12%	**with…** sand/gravel = >15%, <30%
Sandy… / Gravelly… >30%	**Sandy… / Gravelly…** >30%
Clayey… / Silty … >12%	

MOISTURE CONDITION (Cohesionless Soils)

Symbol	Term	Description
D	Dry	Looks and feels dry. Cohesionless and free-running.
M	Moist	No free water on remoulding. Soil feels cool, darkened in colour. Soil tends to cohere.
W	Wet	Free water on remoulding. Soil feels cool, darkened in colour. Soil tends to cohere.

MOISTURE CONDITION (Cohesive Soils)

Symbol	Term	Description
<PL	Dry	Looks and feels dry. Hard and friable or powdery, well dry of the plastic limit
≈PL	Moist	Soil feels cool, darkened in colour. Soil can be moulded. Near plastic limit.
>PL	Wet	Soils feels cool, darkened in colour. Usually weakened and free water forms when remoulding. Wet of plastic limit.

DENSITY (Cohesionless Soils)

Sym.	Term	Density Index (%)	SPT 'N'
VL	Very Loose	Less than 15	0 to 4
L	Loose	15 to 35	4 to 10
MD	Medium Dense	35 to 65	10 to 30
D	Dense	65 to 85	30 to 50
VD	Very Dense	Above 85	Above 50

STIFFNESS (Cohesive Soils)

Sym.	Term	Undrained Shear Strength
VS	Very Soft	0 to 12 kPa
S	Soft	12 to 25 kPa
F	Firm	25 to 50 kPa
St	Stiff	50 to 100 kPa
VSt	Very Stiff	100 to 200 kPa

SAMPLING AND LABORATORY / INSITU TESTING RESULTS

B	Bulk Disturbed Sample	U	Undisturbed Push-in Sample	CBR	California Bearing Ratio
BLK	Block Sample	W	Water Sample	UCS	Unconfined Compressive Strength
C	Core Sample	LL	Liquid Limit	PLI	Point Load Index
ES	Environmental Soil Sample	PI	Plasticity Index	N	SPT-N Value
P	Piston Sample	LS	Linear Shrinkage		

DRILLING/EXCAVATION METHOD

AC	Air Core	HA	Hand Auger	RC	Rotary Cored
ADH	Hollow Auger Drilling	HQ	Rotary Core 63.5mm	RO	Rotary Open Hole
AD/V	Auger with V-Bit	HQ3	Rotary Core 61.1mm	SPT	Standard Penetration Test
AD/T	Auger with TC-Bit	PQ3	Rotary Drill 83mm	TP	Test Pit
DPP	Direct Push Probe	PT	Push Tube	W	Wash Bore

Explanatory Notes – Rock Description

MUDSTONE

SILTSTONE

SANDSTONE

LIMESTONE

CHALK

BRECCIA

CONGLOMERATE

IGNEOUS

METAMORPHIC

GYPSUM

SHALE

PYROCLASTIC

ROCK MATERIAL STRENGTH				
Symbol	**Term**	**Uniaxial Compressive Strength - UCS (MPa)**	**Point Load Index - $I_{s(50)}$ (MPa) - GUIDE ONLY**	**Field Guide**
EL	Extremely Low	Less than 0.6	Less than 0.03	Easily remoulded by hand to a material with soil properties (logged as soil).
VL	Very Low	0.6 to 2	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 3 cm thick can be broken by finger pressure.
L	Low	2 to 6	0.1 to 0.3	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150 mm long 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
M	Medium	6 to 20	0.3 to 1	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
H	High	20 to 60	1 to 3	A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
VH	Very High	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
EH	Extremely High	More than 200	More than 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

WEATHERING CLASSIFICATION		
Symbol	**Term**	**Definition**
RS	Residual Soil	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
XW	Extremely weathered rock	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.
HW (or DW)	Highly Weathered	Rock strength usually changed by weathering. The rock may be highly discoloured. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
MW (or DW)	Moderately Weathered	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognizable, but shows little or no change of strength from fresh rock.
SW	Slightly weathered rock	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
FR	Fresh rock	Rock shows no sign of decomposition or staining.

CEMENTATION CLASSIFICATION		
Symbol	**Term**	**Definition**
Uc	Uncemented	Clean grains, exhibiting soil properties.
VWc	Very weakly cemented	Marginal soil-rock strengths, collapsing feel under light finger pressure, cement seen on some washed grains.
Wc	Weakly Cemented	Collapsing feel under light soil pressure, breaks down to individual grains or with some grains cemented together, cement seen on many washed grains.
MWk	Moderately Weakly Cemented	Cement on nearly all grains, breaks down to lumps and some individual grains under finger pressure, can crush to individual grains under knife blade.
Mo	Moderately Cemented	Cement on most grains, can break fragments off by hand and crush to small lumps under knife blade.
We	Well Cemented	Practically all grains cemented together, cannot break fragments off by hand, dull sound under hammer.
VWe	Very Well Cemented	Most Primary Pores filled with cement, requires firm blow with hammer to break off fragments, rings when struck

ROCK CORE RECOVERY		
Symbol	**Term**	**Definition**
TCR	Total Core Recovery (%)	The ratio of total length of core recovered to length of core run drilled, expressed as a percentage.
SCR	Solid Core Recovery (%)	The ratio of the total length of solid cylindrical pieces of core recovered to length of core run drilled, expressed as a percentage.
RQD	Rock Quality Designation (%)	The ratio of the total length of solid cylindrical pieces of core over 100mm in length recovered to length of core run drilled, expressed as a percentage.

Explanatory Notes – Defect Description

Defect Type			
ABBREVIATION	**TERM**	**DEFINITION**	**DIAGRAM**
PT	**Parting**	A surface or crack across which the soil has little or no tensile strength. Parallel or sub parallel to layering (eg bedding). May be open or closed.	
JT	**Joint**	A surface or crack across which the soil has little or no tensile strength but which is not parallel or sub parallel to layering. May be open or closed.	
SS	**Sheared Surface**	A near planar, curved or undulating surface which is usually smooth, polished or slickensided and which shows evidence of shear displacement.	
SZ	**Sheared Zone**	Zone of rock material with roughly parallel near planar, curved or undulating boundaries cut by closely spaced joints, sheared surfaces or other defects. Some of the defects are usually curved and intersect to divide the mass into lenticular or wedge-shaped blocks.	
CS	**Crushed Zone / Seam**	Seam of soil material with roughly parallel almost planar boundaries, composed of disoriented, usually angular fragments of the host rock material which may be more weathered than the host rock. The seam has soil properties.	
SM	**Seam**	Seam of soil material usually with distinct roughly parallel boundaries formed by the migration of soil into an open cavity or joint, infilled seams less than 1 mm thick may be described as a veneer or coating on a joint surface.	

Surface Roughness		
ABBREVIATION	**TERM**	**Description**
VR	**Very Rough**	Many large irregularities generally > 1 mm
RO	**Rough**	Many small irregularities generally > 1 mm
SM	**Smooth**	Few or no surface irregularities
PO	**Polished**	Shiny smooth surface
SI	**Slickensided/Striated**	Grooved/striated surface, usually polished

Orientation	
ABBREVIATION	**TERM**
SH	**Sub Vertical**
SV	**Sub Horizontal**
10°	**Angle from horizontal**

Surface Shape		
ABBREVIATION	**TERM**	**Description**
PL	**Planar**	Does not vary in orientation
CU	**Curved**	gradual change in orientation
UN	**Undulating**	wavy surface
ST	**Stepped**	one or more well defined steps
IR	**Irregular**	many sharp changes in orientation

Aperture	
ABBREVIATION	**TERM**
DIS	**Discontinuous**
CL	**Closed**
5mm	**Measured width between joint surfaces**

Coatings		
ABBREVIATION	**TERM**	**Description**
CN	**Clean**	No visible coating
SN	**Stained**	No coating but surface discoloured
VN	**Veneer**	visible coating too thin to measure
CT	**Coating**	visible coating up to 1mm thick
IF	**Infilled**	Over 1mm thick of soil present

Block Shape	
Term	**Description**
Blocky	Roughly equidimensional blocks.
Tabular	thickness of blocks much less than length or width.
Columnar	lengths much greater than other dimensions
Irregular	Irregular discontinuities without arrangement into distinct sets,

Appendix B
Test Pit Logs

TEST PIT LOG - TP01

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 22/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517685m N.6709198m (MGA Zone 50J)
Elevation: 336.33 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	Depth	Type & Results							
						SM: GRAVELLY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; gravel fine to coarse, subrounded to rounded; with silt non-plastic; with organic material (roots) (Colluvium)		MD	
						... from 0.25m to 0.35m, less to no organic material			
	0.4 - 0.8	Bulk Sample	336.0			SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, rounded; slightly cemented (Colluvium)	D to M	D to VD	
			335.5			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
			335.4	1		Test pit terminated at 0.95 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP02

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 22/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517981m N.6709205m (MGA Zone 50J)
Elevation: 336.09 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, rounded; slightly cemented (Colluvium) *... from 0.25m to 1.05m, less to no organic material*	D to M	MD to D	
			335.0	1		SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
			334.8			Test pit terminated at 1.25 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP03

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 22/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517833m N.6709084m (MGA Zone 50J)
Elevation: 338.18 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	Depth	Type & Results							
	0.8 - 1.0	Bulk Sample	337.4			SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, rounded; slightly cemented (Colluvium) *... from 0.20m to 0.75m, less to no organic material*	D to M	MD to D	
				1		SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
			337.1			Test pit terminated at 1.05 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP04

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 22/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517552m N.6709146m (MGA Zone 50J)
Elevation: 337.04 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: GRAVELLY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; gravel fine to coarse, subrounded to rounded; with silt non-plastic; with organic material (roots) (Colluvium) *... from 0.20m to 0.50m, less to no organic material*	D to M	MD	
			336.5			SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, subrounded to rounded (Colluvium)		D to VD	
			336.3			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
			336.1	1		Test pit terminated at 0.95 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP05

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 21/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517155m N.6708817m (MGA Zone 50J)
Elevation: 341.32 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; with gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium) *... from 0.25m to 1.10m, less to no organic material*	D to M	MD to D	
			340.2	1		SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, pale grey-red-patchy pale blue; silt non-plastic; gravel fine to coarse, subangular to subrounded; with cobbles; cemented; friable (Duricrust)	D	VD	
			340.0			Test pit terminated at 1.35 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP06

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 21/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517095m N.6708818m (MGA Zone 50J)
Elevation: 341.13 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; trace gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium)			
						... from 0.25m to 0.50m, less to no organic material	D to M	MD to D	
	0.5 - 1.3	Bulk Sample	340.6			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, pale grey-red-patchy pale blue; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)			
				1			D	VD	
			339.8			Test pit terminated at 1.30 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP07

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 21/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517295m N.6708813m (MGA Zone 50J)
Elevation: 341.66 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	0.2 - 0.9	Bulk Sample for PSD +Hydrometer, Atterberg Limits, Falling Head Permeability, Emerson Class, MDD-OMC Determination, and Triaxial Tests see Appendix C				SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; trace gravel fine to coarse, subrounded to rounded, pale grey/grey; trace organic material (roots) (Colluvium) *... from 0.20m to 0.90m, less to no organic material*	D to M	MD to D	
			340.8			SM: FERRICRETE: retrieved as SILTY SAND trace gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, pale grey-red-patchy pale blue; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
			340.7	1		Test pit terminated at 1.00 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP08

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 21/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517406m N.6708809m (MGA Zone 50J)
Elevation: 341.91 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; trace gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium) *... from 0.30m to 0.70m, less to no organic material*	D to M	MD to D	
			341.2			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
			340.7	1		Test pit terminated at 1.20 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP09

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 22/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517632m N.6708810m (MGA Zone 50J)
Elevation: 343.06 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: GRAVELLY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; gravel fine to coarse, subrounded to rounded; with silt non-plastic; with organic material (roots) (Colluvium)		MD	
						... from 0.25m to 0.40m, less to no organic material			
			342.7			SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, subrounded to rounded (Colluvium)	D to M	D to VD	
			342.1 342.0	1		SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
						Test pit terminated at 1.05 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP10

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 22/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517912m N.6708800m (MGA Zone 50J)
Elevation: 343.65 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: GRAVELLY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; gravel fine to coarse, subrounded to rounded; with silt non-plastic (Colluvium) *... from 0.15m to 0.70m, less to no organic material*	D to M	MD to D	
	0.7 - 1.4	Bulk Sample for PSD +Hydrometer, Atterberg Limits, Falling Head Permeability, Emerson Class, MDD-OMC Determination, and Triaxial Tests see Appendix C	343.0	1		SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
			342.3	2		Test pit terminated at 1.35 m			

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP11

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 22/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518405m N.6708807m (MGA Zone 50J)
Elevation: 344.05 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: GRAVELLY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; gravel fine to coarse, subrounded to rounded; with silt non-plastic (Colluvium)	D to M	MD to D	
						... from 0.15m to 0.60m, less to no organic material	M		
			343.4			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
			343.2			Test pit terminated at 0.85 m			
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP12

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 22/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518465m N.6708802m (MGA Zone 50J)
Elevation: 344.44 m (GDA94)

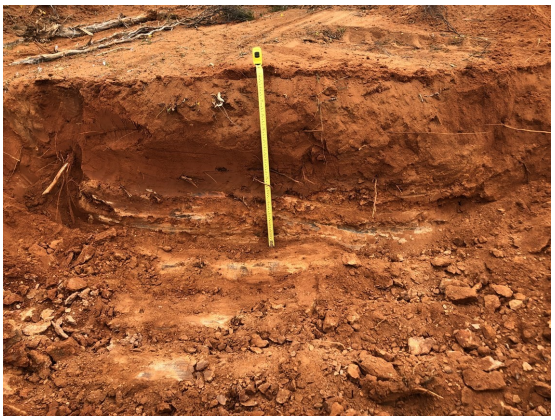
Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SP: SAND: fine to coarse grained, poorly graded, subrounded, red-brown; with silt non-plastic; trace gravel fine to coarse, subrounded to rounded (Colluvium)	D to M		
						... from 0.20m to 0.45m, less to no organic material	M	MD	
			344.0			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
			343.7			Test pit terminated at 0.70 m			
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered



TEST PIT LOG - TP13

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 22/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518531m N.6708803m (MGA Zone 50J)
Elevation: 344.59 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	0.2 - 0.6	Bulk Sample				SP: SAND: fine to coarse grained, poorly graded, subrounded, red-brown; with silt non-plastic; trace gravel fine to coarse, subrounded to rounded (Colluvium)	D to M		
						... from 0.25m to 0.65m, less to no organic material	M	MD	
			343.9			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
			343.6	1		Test pit terminated at 1.00 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP14

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 22/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518584m N.6708808m (MGA Zone 50J)
Elevation: 344.5 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: GRAVELLY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; gravel fine to coarse, subrounded to rounded; with silt non-plastic; with organic material (roots) (Colluvium) *... from 0.25m to 0.50m, less to no organic material*	D to M	MD	
			344.0			SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, subrounded to rounded (Colluvium)		D to VD	
			343.6			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
			343.4	1		Test pit terminated at 1.05 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP15

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517981m N.6709205m (MGA Zone 50J)
Elevation: 336.09 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, rounded; slightly cemented (Colluvium) *... from 0.20m to 0.80m, less to no organic material*	D to M	MD to D	
			335.3			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
			335.2	1		Test pit terminated at 0.90 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP16

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517051m N.6708413m (MGA Zone 50J)
Elevation: 346.12 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, rounded; slightly cemented (Colluvium) *... from 0.25m to 0.95m, less to no organic material* *... from 0.70m to 0.95m, cemented*	D to M	MD to D	
			345.2 345.0	1		SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust) Test pit terminated at 1.10 m	D	VD	
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP17

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517157m N.6708414m (MGA Zone 50J)
Elevation: 347.27 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	Depth	Type & Results							
	0.4 - 0.8	Bulk Sample	346.9			SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; trace gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium) *... from 0.20m to 0.40m, less to no organic material*	D to M	MD	
						SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, rounded; slightly cemented (Colluvium) *... from 0.70m to 0.95m, cemented*		MD to D	
			346.5			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
			346.3	1		Test pit terminated at 1.00 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP18

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517551m N.6708419m (MGA Zone 50J)
Elevation: 349 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; trace gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium) *... from 0.20m to 0.45m, less to no organic material*	D to M	MD	
			348.6			SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, rounded; slightly cemented (Colluvium)		MD to D	
			348.2			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
			348.0	1		Test pit terminated at 1.00 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP19

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517658m N.6708546m (MGA Zone 50J)
Elevation: 346.49 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; trace gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium) *... from 0.20m to 0.40m, less to no organic material*	D to M	MD	
	0.4 - 0.8	Bulk Sample for PSD, and Atterberg Limits see Appendix C	346.1			CL: SANDY CLAY: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded (Colluvium)	<PL	St	
			345.7 345.6			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
				1		Test pit terminated at 0.85 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP20

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517852m N.6708406m (MGA Zone 50J)
Elevation: 349.96 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; trace gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium) *... from 0.20m to 0.40m, less to no organic material*	D to M	L to MD	
			349.6			ML: SANDY SILT: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded; trace clay nodules; with organic material (roots) (Colluvium)	<PL	F to St	
			349.2 349.1			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; slightly calcareous; friable (Duricrust) Test pit terminated at 0.85 m	D	VD	
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP21

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518082m N.6708401m (MGA Zone 50J)
Elevation: 350.77 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; trace gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium) *... from 0.25m to 0.40m, less to no organic material*	D to M	L to MD	
			350.4			ML: SANDY SILT: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded; trace clay nodules; with organic material (roots) (Colluvium)	<PL	F to St	
	0.8 - 1.1	Bulk Sample for PSD, Atterberg Limits, and Emerson Class see Appendix C	350.0	1		CH: SANDY CLAY: high plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded (Colluvium)		VSt	
			349.7 349.6			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; slightly calcareous; friable (Duricrust) Test pit terminated at 1.20 m	D	VD	
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP22

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518223m N.6708400m (MGA Zone 50J)
Elevation: 351.87 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; trace gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium) *... from 0.30m to 0.50m, less to no organic material*	D to M	L to MD	
			351.4			ML: SANDY SILT: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded; trace clay nodules; trace boulders (granite floaters); with organic material (roots) (Colluvium)	<PL	F to St	
			351.0			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; slightly calcareous; friable (Duricrust)	D	VD	
			350.9	1		Test pit terminated at 1.00 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - HA23

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518330m N.6708469m (MGA Zone 50J)
Elevation: 351.3 m (GDA94)

Plant: Hand Auger
Contractor: CMW Geosciences Pty Ltd

Dimensions : 0.10m x 0.10m

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	Depth	Type & Results							
			351.1			SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; trace gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium)	D to M	L	
						CL: SANDY CLAY: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded (Colluvium)	<PL	St to VSt	
	0.8 - 1.0	Bulk Sample	350.5			SM: FERRICRETE: inferred SILTY SAND with gravel; cemented (Duricrust)	D	VD	
			350.3	1		Test pit terminated at 1.00 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - HA24

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518325m N.6708527m (MGA Zone 50J)
Elevation: 349.47 m (GDA94)

Plant: Hand Auger
Contractor: CMW Geosciences Pty Ltd

Dimensions : 0.10m x 0.10m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description (Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components)	Moisture Condition	Consistency/ Relative Density	Structure & other observations
			349.3			SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; trace gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium)	D to M	L	
						CL: SANDY CLAY: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded (Colluvium)	<PL	St to VSt	
	0.6 - 0.8	Bulk Sample	348.9			SM: FERRICRETE: inferred SILTY SAND with gravel; cemented (Duricrust)	D	VD	
			348.6			Test pit terminated at 0.85 m			
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - HA25

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 22/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518316m N.6708409m (MGA Zone 50J)
Elevation: 353.09 m (GDA94)

Plant: Hand Auger
Contractor: CMW Geosciences Pty Ltd

Dimensions : 0.10m x 0.10m

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	Depth	Type & Results							
	0.2 - 0.4	Bulk Sample	352.9			SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, subrounded to rounded (Colluvium)	D to M	L	
						SC: CLAYEY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; clay low plasticity; with gravel fine to coarse, subrounded to rounded (Colluvium)		MD to D	
	0.4 - 0.7	Bulk Sample	352.7			SP: SAND: fine to coarse grained, poorly graded, subangular to subrounded, pale brown; trace silt non-plastic; trace gravel fine, subrounded to rounded, red-brown (Colluvium)		MD	
			352.4			SM: FERRICRETE: inferred SILTY SAND with gravel; cemented (Duricrust)	D	VD	
			352.3	1		Test pit terminated at 0.75 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - HA26

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 22/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518370m N.6708409m (MGA Zone 50J)
Elevation: 354.68 m (GDA94)

Plant: Hand Auger
Contractor: CMW Geosciences Pty Ltd

Dimensions : 0.10m x 0.10m

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	Depth	Type & Results							
	0.0 - 0.4	Bulk Sample				SC: CLAYEY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; clay low plasticity; with gravel fine to coarse, subrounded to rounded (Colluvium)	D to M	MD	
			354.3			GRANITE: inferred outcrops (Even-grained Granite)	D		
			354.2			Test pit terminated at 0.45 m			
				1					
				2					

Termination Reason: Refusal on granite outcrops

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - HA27

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518329m N.6708357m (MGA Zone 50J)
Elevation: 355.8 m (GDA94)

Plant: Hand Auger
Contractor: CMW Geosciences Pty Ltd

Dimensions : 0.10m x 0.10m

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	Depth	Type & Results							
	0.0 - 0.0	Bulk Sample	355.7			SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; trace gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium)	D to M	L	
			355.6			GRANITE: inferred outcrops (Even-grained Granite)	D		
				1		Test pit terminated at 0.15 m			
				2					

Termination Reason: Refusal on granite outcrops

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - HA28

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 22/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518426m N.6708375m (MGA Zone 50J)
Elevation: 357.18 m (GDA94)

Plant: Hand Auger
Contractor: CMW Geosciences Pty Ltd

Dimensions : 0.10m x 0.10m

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	Depth	Type & Results							
	0.0 - 0.1	Bulk Sample	357.1			SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, subrounded to rounded (Colluvium)	D to M	L	
			357.0			GRANITE: inferred outcrops (Even-grained Granite)	D		
						Test pit terminated at 0.15 m			
				1					
				2					

Termination Reason: Refusal on granite outcrops

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - HA29

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 22/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518491m N.6708417m (MGA Zone 50J)
Elevation: 356.47 m (GDA94)

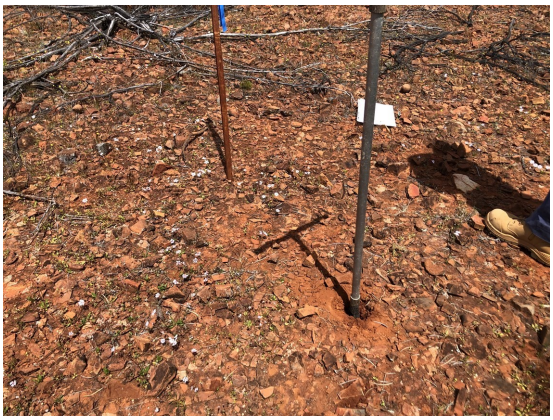
Plant: Hand Auger
Contractor: CMW Geosciences Pty Ltd

Dimensions : 0.10m x 0.10m

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	Depth	Type & Results							
	0.0 - 0.3	Bulk Sample				SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, subrounded to rounded (Colluvium)	D to M	L	
			356.2			GRANITE: inferred outcrops (Even-grained Granite)	D		
			356.1			Test pit terminated at 0.35 m			
				1					
				2					

Termination Reason: Refusal on granite outcrops

Remarks: Test pit backfilled; No DCP; Groundwater not encountered



TEST PIT LOG - TP30

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 22/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518613m N.6708401m (MGA Zone 50J)
Elevation: 357.66 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	Depth	Type & Results							
			357.5			SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; trace gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium)	D to M	MD	
			357.3			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
						Test pit terminated at 0.40 m			
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP31

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 22/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518704m N.6708392m (MGA Zone 50J)
Elevation: 356.41 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	Depth	Type & Results							
			356.3			SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; trace gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium)	D to M	MD	
			356.2			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
						Test pit terminated at 0.25 m			
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP32

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517109m N.6708010m (MGA Zone 50J)
Elevation: 351.2 m (GDA94)

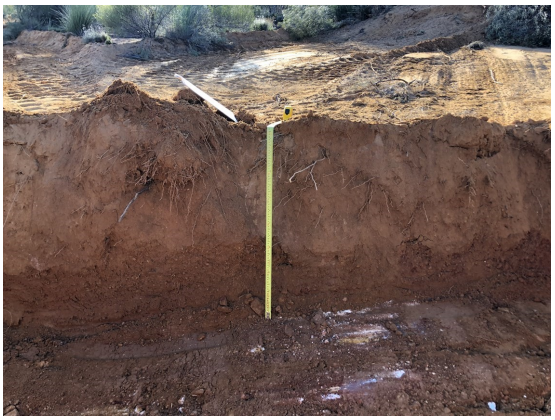
Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	Depth	Type & Results							
						ML: SANDY SILT: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded; trace clay nodules; with organic material (roots) (Colluvium) *... from 0.20m to 0.50m, less to no organic material*	<PL	S to F	
			350.7			SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, rounded; slightly cemented (Colluvium)	D	MD to D	
			350.4					VD	
			350.4	1		SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; slightly calcareous; friable (Duricrust) Test pit terminated at 0.80 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered



TEST PIT LOG - TP33

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517162m N.6708016m (MGA Zone 50J)
Elevation: 351.45 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						ML: SANDY SILT: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded; trace clay nodules; with organic material (roots) (Colluvium) *... from 0.15m to 0.55m, less to no organic material*	<PL	S to F	
			350.9			SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, rounded; slightly cemented (Colluvium)	D	MD to D	
			350.7			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; slightly calcareous; friable (Duricrust)		VD	
			350.6			Test pit terminated at 0.90 m			
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP34

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517263m N.6708015m (MGA Zone 50J)
Elevation: 352.52 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						ML: SANDY SILT: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded; trace clay nodules; with organic material (roots) (Colluvium) *... from 0.25m to 0.35m, less to no organic material*	<PL	S to F	
			352.2			SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, rounded; slightly cemented (Colluvium)	D	MD to D	
	0.5 - 0.8	Bulk Sample for PSD, Atterberg Limits, and Emerson Class see Appendix C	352.0			CI: SANDY CLAY: low plasticity, pale grey-patchy brown-mottled red-orange; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded (Colluvium)	<PL	VSt	
			351.7 351.6			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; slightly calcareous; friable (Duricrust)	D	VD	
				1		Test pit terminated at 0.90 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP35

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517555m N.6708025m (MGA Zone 50J)
Elevation: 355.18 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	Depth	Type & Results							
						SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; trace gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium)		MD	
						... from 0.25m to 0.45m, less to no organic material			
	0.4 - 1.0	Bulk Sample	354.7			SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, subrounded to rounded (Colluvium)	D to M	MD to D	
			354.2	1		SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; slightly calcareous; friable (Duricrust)	D	VD	
			354.1			Test pit terminated at 1.10 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP36

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517734m N.6708021m (MGA Zone 50J)
Elevation: 357.26 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, subrounded to rounded; with organic material (roots) (Colluvium) *... from 0.25m to 0.85m, less to no organic material*	D to M	MD to D	
			356.4	1		SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; slightly calcareous; friable (Duricrust)	D	VD	
			356.1			Test pit terminated at 1.20 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP37

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518288m N.6708015m (MGA Zone 50J)
Elevation: 360.02 m (GDA94)

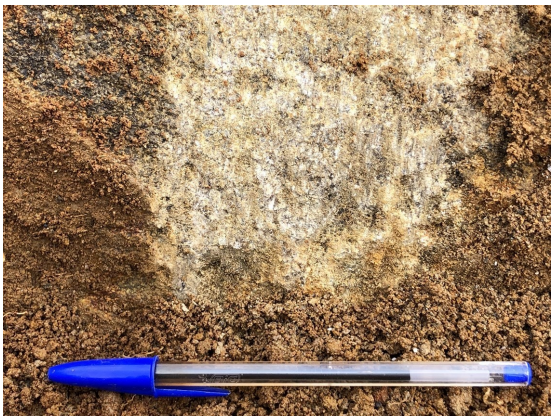
Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SC: CLAYEY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown; clay low plasticity; with gravel fine, subrounded to rounded; with organic material (roots) (Colluvium) *... from 0.15m to 0.45m, less to no organic material*	D to M	MD	
			359.6 359.5			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; slightly calcareous; friable (Duricrust) Test pit terminated at 0.50 m	D	VD	
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered



TEST PIT LOG - TP38

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518427m N.6707998m (MGA Zone 50J)
Elevation: 361.4 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SC: CLAYEY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown; clay low plasticity; with gravel fine, subrounded to rounded; with organic material (roots) (Colluvium)			
						... from 0.20m to 0.40m, less to no organic material	D to M	MD	
			361.0						
			361.0			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; slightly calcareous; friable (Duricrust)	D	VD	
						Test pit terminated at 0.45 m			
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP39

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518500m N.6707998m (MGA Zone 50J)
Elevation: 361.22 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						ML: SANDY SILT: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded; trace clay nodules; with organic material (roots) (Colluvium) *... from 0.25m to 0.60m, less to no organic material*	<PL	S to F	
			360.6			SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, rounded; slightly cemented (Colluvium)	D	MD to D	
	1.0 - 1.2	Bulk Sample	360.3	1		SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; slightly calcareous; friable (Duricrust)		VD	
			360.0			Test pit terminated at 1.20 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP40

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518556m N.6708005m (MGA Zone 50J)
Elevation: 360.11 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						ML: SANDY SILT: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded; trace clay nodules; with organic material (roots) (Colluvium)	<PL	S to F	
						... from 0.25m to 0.40m, less to no organic material			
			359.7			CI: SANDY CLAY: low plasticity, pale grey-patchy brown-mottled red-orange; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded; slightly cemented (Colluvium)		St to VSt	
			359.5 359.4			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; slightly calcareous; friable (Duricrust) Test pit terminated at 0.70 m	D	VD	
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP41

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517549m N.6707620m (MGA Zone 50J)
Elevation: 359.16 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						ML: SANDY SILT: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded; trace clay nodules; with organic material (roots) (Colluvium) *... from 0.15m to 0.30m, less to no organic material*		S to F	
	0.3 - 0.6	Bulk Sample for PSD see Appendix C	358.9			CI: SANDY CLAY: low plasticity, pale grey-patchy brown-mottled red-orange; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded (Colluvium)	<PL	St to VSt	
			358.6 358.5			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; slightly calcareous; friable (Duricrust) Test pit terminated at 0.65 m	D	VD	
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP42

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 25/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517871m N.6707728m (MGA Zone 50J)
Elevation: 362.8 m (GDA94)

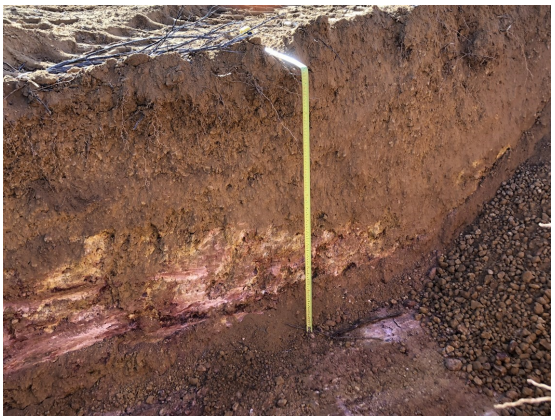
Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
			362.6			SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; with gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium)		L	
						GP: GRAVEL: fine to coarse, rounded to subrounded, red-brown-pale grey/ mottled dark grey-pale green; with sand fine to coarse grained, subrounded to subangular, well graded, red-brown; with silt/clay low plasticity (Alluvium)	D to M	VD	
			362.2			GM: FERRICRETE: retrieved as SANDY GRAVEL; fine to coarse, subangular, red-pale brown-patchy grey-pale green; sand fine to coarse grained, well graded, subangular to subrounded; with silt non-plastic; trace cobbles (Duricrust)	D		
			361.8	1		Test pit terminated at 1.05 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered



TEST PIT LOG - TP43

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 25/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517877m N.6707640m (MGA Zone 50J)
Elevation: 363.7 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	0.5 - 1.0	Bulk Sample for PSD see Appendix C	363.6			SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; with gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium)		L	
						GP: GRAVEL: fine to coarse, rounded to subrounded, red-brown-patchy pale grey/mottled dark grey-pale green; with sand fine to coarse grained, subrounded to subangular, well graded, red-brown; with silt/clay low plasticity (Alluvium)	D to M	VD	
				1		*... from 0.70m to 1.30m, cemented*			
			362.4			Test pit terminated at 1.30 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP44

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 25/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518227m N.6707614m (MGA Zone 50J)
Elevation: 368.33 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	0.0 - 0.2	Bulk Sample for PSD, and Atterberg Limits see Appendix C	368.1			SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; with gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium)		L	
						GP: GRAVEL: fine to coarse, rounded to subrounded, red-brown-patchy pale grey/mottled dark grey-pale green; with sand fine to coarse grained, subrounded to subangular, well graded, red-brown; with silt/clay low plasticity (Alluvium)	D to M	VD	
						... from 0.90m to 1.10m, cemented			
				1					
			367.2			Test pit terminated at 1.10 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP45A

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 21/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517539m N.6708804m (MGA Zone 50J)
Elevation: 342.51 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: GRAVELLY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; gravel fine to coarse, subrounded to rounded; with silt non-plastic (Colluvium)	D to M	MD	
			342.3						
			342.3			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust) Test pit terminated at 0.25 m	D	VD	
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP45B

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 21/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517516m N.6708757m (MGA Zone 50J)
Elevation: 342.99 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description (Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components)	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	0.0 - 0.3	Bulk Sample				SM: GRAVELLY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; gravel fine to coarse, subrounded to rounded; with silt non-plastic (Colluvium)	D to M	MD	
			342.7 342.6			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
						Test pit terminated at 0.35 m			
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP46

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517361m N.6708421m (MGA Zone 50J)
Elevation: 348.28 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; trace gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium)		MD	
						... from 0.20m to 0.30m, less to no organic material			
			348.0			SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, rounded; slightly cemented (Colluvium)	D to M	MD to D	
						... from 0.70m to 0.85m, cemented			
			347.4			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
			347.3	1		Test pit terminated at 1.00 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP47

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517660m N.6708484m (MGA Zone 50J)
Elevation: 347.33 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						ML: SANDY SILT: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded; trace clay nodules; with organic material (roots) (Colluvium) *... from 0.20m to 0.70m, less to no organic material*	<PL	F to St	
			346.6			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
			346.4			Test pit terminated at 0.90 m			
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP48

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517738m N.6708414m (MGA Zone 50J)
Elevation: 348.91 m (GDA94)

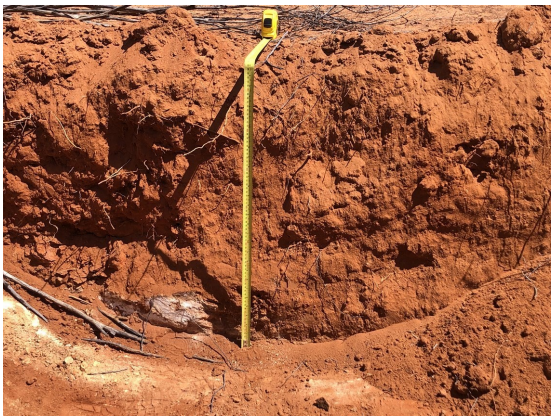
Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, brown-mottled red-pale yellow; silt non-plastic; trace gravel fine to coarse, subrounded to rounded, pale grey/grey; with organic material (roots) (Colluvium) *... from 0.20m to 0.30m, less to no organic material*	D to M	L to MD	
			348.6			ML: SANDY SILT: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded; trace clay nodules; with organic material (roots) (Colluvium)	<PL	F to St	
			348.3			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)	D	VD	
			348.0			Test pit terminated at 0.90 m			
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered



TEST PIT LOG - TP49

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517356m N.6708018m (MGA Zone 50J)
Elevation: 353.4 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						ML: SANDY SILT: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded; trace clay nodules; with organic material (roots) (Colluvium) *... from 0.20m to 0.50m, less to no organic material*	<PL	S to F	
			352.9			SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, rounded; slightly cemented (Colluvium)	D	MD to D	
			352.6					VD	
			352.6			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; slightly calcareous; friable (Duricrust) Test pit terminated at 0.80 m			
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP50

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 23/09/2022

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517850m N.6708017m (MGA Zone 50J)
Elevation: 357.66 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	0.0 - 0.2	Bulk Sample				CL: SANDY CLAY: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; with gravel fine, subrounded to rounded (Colluvium)	<PL	S to F	
			357.5 357.4			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; slightly calcareous; friable (Duricrust) Test pit terminated at 0.25 m	D	VD	
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP51

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 27/01/2023

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517636m N.6709979m (MGA Zone 50J)
Elevation: 325.8 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown; silt non-plastic; gravel fine to coarse, angular to subrounded, red-brown-dark grey; trace organic material (roots) (Colluvium) *... from 0.10m to 0.45m, gravel subrounded to rounded, red-pale yellow-dark grey*	D	MD to D	
			325.4			GRANITE: inferred subcrops (Even-grained Granite)		VD	
			325.3			Test pit terminated at 0.50 m			
				1					
				2					

Termination Reason: Refusal on granite subcrops

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP52

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 27/01/2023

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517792m N.6709980m (MGA Zone 50J)
Elevation: 325.8 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown; silt non-plastic; gravel fine to coarse, angular to subrounded, red-brown-dark grey; trace organic material (roots) (Colluvium) *... from 0.10m to 0.50m, gravel subrounded to rounded, red-pale yellow-dark grey*	D	MD to D	
			325.3			GRANITE: inferred subcrops (Even-grained Granite)		VD	
			325.2			Test pit terminated at 0.55 m			
				1					
				2					

Termination Reason: Refusal on granite subcrops

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - HA53

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 27/01/2023

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517222m N.6709620m (MGA Zone 50J)
Elevation: 331.01 m (GDA94)

Plant: Hand Auger
Contractor: CMW Geosciences Pty Ltd

Dimensions : 0.10m x 0.10m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
			330.9			SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown/mottled pale yellow; silt low plasticity ; trace gravel fine, angular to subangular; trace organic material (roots) (Colluvium)		L	
						GP: SANDY GRAVEL: fine to coarse, angular to subrounded, red-pale yellow/ mottled dark grey; sand fine to coarse grained, poorly graded, subangular to subrounded, red-brown; with clay low plasticity (Alluvium)	D	MD to D	
			330.5 330.4			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, red-pale yellow/patchy pale brown/mottled dark blue-black; silt non-plastic; gravel fine to coarse, subangular to subrounded; cemented; friable (Duricrust)		VD	
						Test pit terminated at 0.60 m			
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - HA54

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 27/01/2023

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517352m N.6709615m (MGA Zone 50J)
Elevation: 330.8 m (GDA94)

Plant: Hand Auger
Contractor: CMW Geosciences Pty Ltd

Dimensions : 0.10m x 0.10m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
			330.6			SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown/mottled pale yellow; silt low plasticity ; trace gravel fine, angular to subangular; trace organic material (roots) (Colluvium)	D	L	
						GP: SANDY GRAVEL: fine to coarse, angular to subrounded, red-pale yellow/ mottled dark grey; sand fine to coarse grained, poorly graded, subangular to subrounded, red-brown; with clay low plasticity (Alluvium)		MD to D	
			330.2			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, red-pale yellow/patchy pale brown/mottled dark blue-black; silt non-plastic; gravel fine to coarse, subangular to subrounded; cemented; friable (Duricrust)		VD	
			330.2			Test pit terminated at 0.65 m			
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP55

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 27/01/2023

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517808m N.6709621m (MGA Zone 50J)
Elevation: 329.6 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description (Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components)	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	0.0 - 0.2	Bulk Sample for PSD, and Atterberg Limits see Appendix C	329.4			SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown/mottled pale yellow; silt low plasticity ; trace gravel fine, angular to subangular; trace organic material (roots) (Colluvium)	D	L	
						GP: GRAVEL: fine to coarse, angular to subrounded, red-pale yellow/mottled dark grey; with sand fine to coarse grained, poorly graded, subangular to subrounded, red-brown; with clay low plasticity (Alluvium)		MD to D	
			329.2			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, red-pale yellow/patchy pale brown/mottled dark blue-black; silt non-plastic; gravel fine to coarse, subangular to subrounded; cemented; friable (Duricrust)		VD	
			329.0			Test pit terminated at 0.60 m			
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP56

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 27/01/2023

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518079m N.6709621m (MGA Zone 50J)
Elevation: 331.3 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SC: SANDY CLAY: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, angular to subangular; trace organic material (roots) (Colluvium)	<PL	S to F	
			331.1			GP: GRAVEL: fine to coarse, angular to subrounded, red-pale yellow/mottled dark grey; with sand fine to coarse grained, poorly graded, subangular to subrounded, red-brown; with clay low plasticity (Alluvium)	D	VD	
			330.5 330.4			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, red-pale yellow/patchy pale brown/mottled dark blue-black; silt non-plastic; gravel fine to coarse, subangular to subrounded; cemented; friable (Duricrust)			
				1		Test pit terminated at 0.85 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP57

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 27/01/2023

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518218m N.6709623m (MGA Zone 50J)
Elevation: 331.34 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown; silt non-plastic; trace organic material (roots) (Colluvium)		MD to D	
			331.1			GP: GRAVEL: fine to coarse, subrounded to rounded, red/patchy pale yellow-dark grey; with sand fine to coarse grained, poorly graded, subangular to subrounded, red-brown; with clay low plasticity (Alluvium)	D	VD	
			330.6 330.5			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, red-pale yellow/patchy pale brown/mottled dark blue-black; silt non-plastic; gravel fine to coarse, subangular to subrounded; cemented; friable (Duricrust) Test pit terminated at 0.80 m			
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP58

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 27/01/2023

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518512m N.6709623m (MGA Zone 50J)
Elevation: 333.5 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	0.2 - 0.5	Bulk Sample for PSD, and Atterberg Limits see Appendix C				SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown; silt non-plastic; trace organic material (roots) (Colluvium)		L-MD	
			333.0			SC: CLAYEY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown; clay low plasticity; trace gravel fine, subrounded to rounded, red-brown/mottled dark blue-black; cemented (Colluvium)	D		
	0.8 - 1.2	Bulk Sample for PSD, and Atterberg Limits see Appendix C		1				MD to D	
	1.2 - 1.4	Bulk Sample for PSD +Hydrometer, Atterberg Limits, Falling Head Permeability, Emerson Class, and MDD-OMC Determination see Appendix C	332.3			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, pale yellow/patchy pale red-pale brown/mottled dark blue-black; silt non-plastic; gravel fine to coarse, subangular to subrounded; trace cobbles; cemented; friable (Duricrust)		VD	
			332.2			Test pit terminated at 1.35 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - HA59

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 27/01/2023

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517155m N.6709195m (MGA Zone 50J)
Elevation: 335.6 m (GDA94)

Plant: Hand Auger
Contractor: CMW Geosciences Pty Ltd

Dimensions : 0.10m x 0.10m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						CL: SANDY CLAY: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, angular to subangular; trace organic material (roots) (Colluvium)	<PL	S to F	
			335.4			SM: FERRICRETE: retrieved as GRAVELLY SILTY SAND; sand fine to coarse grained, poorly graded, subangular to subrounded, red-pale yellow-white; silt non-plastic; gravel fine to coarse, angular to subangular, pale yellow-dark grey; trace cobbles; cemented; friable (Duricrust)	D	VD	
			335.2			Test pit terminated at 0.30 m			
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - HA60

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 27/01/2023

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.517481m N.6709212m (MGA Zone 50J)
Elevation: 336.03 m (GDA94)

Plant: Hand Auger
Contractor: CMW Geosciences Pty Ltd

Dimensions : 0.10m x 0.10m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown/mottled pale grey; silt low plasticity ; trace gravel fine, angular to subangular; trace organic material (roots) (Colluvium)		S to F	
			335.5 335.4			SM: FERRICRETE: retrieved as GRAVELLY SILTY SAND; sand fine to coarse grained, poorly graded, subangular to subrounded, red-pale yellow-white; silt non-plastic; gravel fine to coarse, angular to subangular, pale yellow-dark grey; trace cobbles; cemented; friable (Duricrust)	D	VD	
						Test pit terminated at 0.60 m			
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP61

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 27/01/2023

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518331m N.6709197m (MGA Zone 50J)
Elevation: 337.2 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	0.0 - 0.3	Bulk Sample for PSD +Hydrometer, Atterberg Limits, Falling Head Permeability, Emerson Class, and MDD-OMC Determination see Appendix C				SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown; silt non-plastic; trace gravel fine, subangular to subrounded, red-brown/mottled dark grey; trace organic material (roots) (Colluvium)	D	MD to D D to VD	
			336.4			SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, red-pale yellow/patchy pale brown/mottled dark blue-black; silt non-plastic; gravel fine to coarse, angular to subrounded; cemented; friable (Duricrust)		VD	
			336.2	1		Test pit terminated at 1.05 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP62

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 27/01/2023

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.518527m N.6709201m (MGA Zone 50J)
Elevation: 338.7 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
						SM: SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown; silt non-plastic; trace gravel fine, subangular to subrounded, red-brown/mottled dark grey; trace organic material (roots) (Colluvium)		L	
						... from 0.45m to 0.85m, less to no organic material		MD to D	
			337.8			SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-pale yellow; silt non-plastic; gravel fine to coarse, subangular to subrounded, red-pale yellow/mottled dark grey (Colluvium)	D	D to VD	
			337.5 337.4	1		SM: FERRICRETE: retrieved as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, red-pale yellow/patchy pale brown/mottled dark blue-black; silt non-plastic; gravel fine to coarse, subangular to subrounded; cemented; friable (Duricrust)		VD	
				2		Test pit terminated at 1.25 m			

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

TEST PIT LOG - TP63

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 27/01/2023

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.516913m N.6709611m (MGA Zone 50J)
Elevation: 333 m (GDA94)

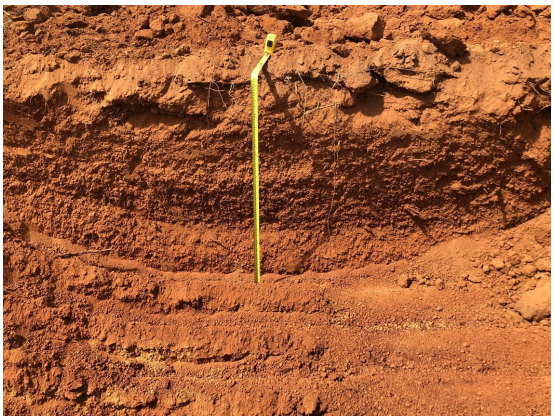
Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	Depth	Type & Results							
	0.5 - 0.8	Bulk Sample for PSD, and Atterberg Limits see Appendix C	332.8			SC: SANDY CLAY: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, angular to subangular; trace organic material (roots) (Colluvium)	<PL	S to F	
						GP: GRAVEL: fine to coarse, subrounded to rounded, red/patchy pale yellow-dark grey; with sand fine to coarse grained, poorly graded, subangular to subrounded, red-brown; with clay low plasticity (Alluvium)	D	VD	
			332.0						
			332.0	1		SM: FERRICRETE: retrieved as GRAVELLY SILTY SAND; sand fine to coarse grained, poorly graded, subangular to subrounded, red-pale yellow-white; silt non-plastic; gravel fine to coarse, angular to subangular, pale yellow-dark grey; trace cobbles; cemented; friable (Duricrust)			
						Test pit terminated at 1.00 m			
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered



TEST PIT LOG - TP64

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project: PER2022-0011
Date: 27/01/2023

CMW Geosciences

Logged by: P. Atmajaya
Checked by:C. Hogg

Position: E.516877m N.6709214m (MGA Zone 50J)
Elevation: 336.4 m (GDA94)

Plant: Doosan DX225LC
Contractor: Lambron Contracting

Dimensions : 1.35m x 4.00m

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	Depth	Type & Results							
	0.0 - 0.3	Bulk Sample for PSD +Hydrometer, Atterberg Limits, Falling Head Permeability, Emerson Class, and MDD-OMC Determination see Appendix C	336.0			SC: SANDY CLAY: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, angular to subangular; trace organic material (roots) (Colluvium)	<PL	S to F	
						SM: FERRICRETE: retrieved as GRAVELLY SILTY SAND; sand fine to coarse grained, poorly graded, subangular to subrounded, red-pale yellow-white; silt non-plastic; gravel fine to coarse, angular to subangular, pale yellow-dark grey; trace cobbles; cemented; friable (Duricrust)	D	VD	
			335.8			Test pit terminated at 0.60 m			
				1					
				2					

Termination Reason: Refusal on cemented layer

Remarks: Test pit backfilled; No DCP; Groundwater not encountered

Appendix C
Borehole Logs

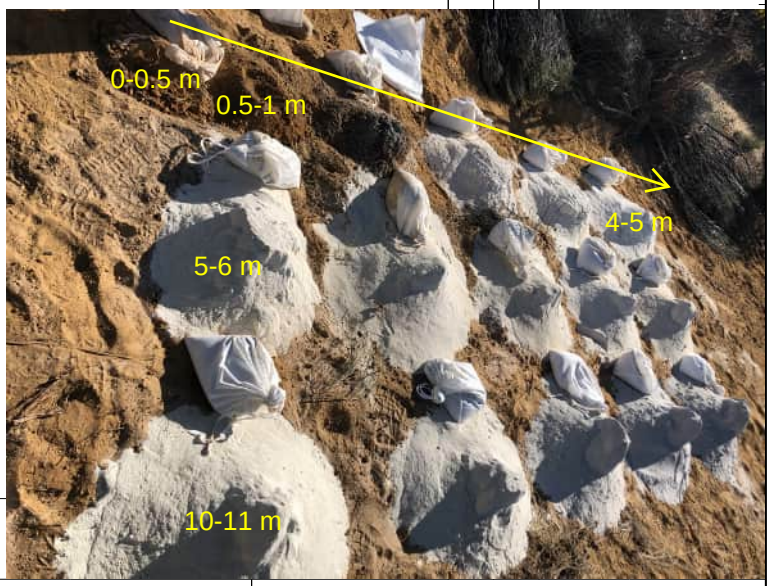
BOREHOLE LOG - BH01

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/09/2022

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517829m N.6709219m (MGA Zone 50J) | Hole Diameter: 146mm | Plant used: Rig 24 - Schramm Airdrill
Checked by: C. Hogg | Elevation: 336 m (AHD) | Angle from horizontal: 90° | Contractor: Topdrill

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
335.5			SM: GRAVELLY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; gravel fine to coarse, subrounded to rounded; with silt non-plastic (Colluvium)			
335.0	1		SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to (inferred) coarse, subrounded to rounded (Colluvium)			
			SM: FERRICRETE: recovered as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to (inferred) coarse, subangular to subrounded (Duricrust)			
334.0	2		GRANITE: recovered as SANDY SILT; silt non-plastic to low plasticity, white; sand fine to coarse, well graded, subangular to subrounded; trace gravel, fine, angular, white-mottled orange-pale yellow-dark grey (Even-grained Granite)			
	3					
	4					
	5					
	6		*... from 6.00m to 11.00m, white-pale yellow-mottled orange*			
	7					
	8					
	9					
	10					
	11		*... from 11.00m to 14.50m, white-pale grey-patchy pale yellow-mottled orange*			
	12					
	13					
	14					
321.5			Borehole terminated at 14.50 m			
	15					



DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

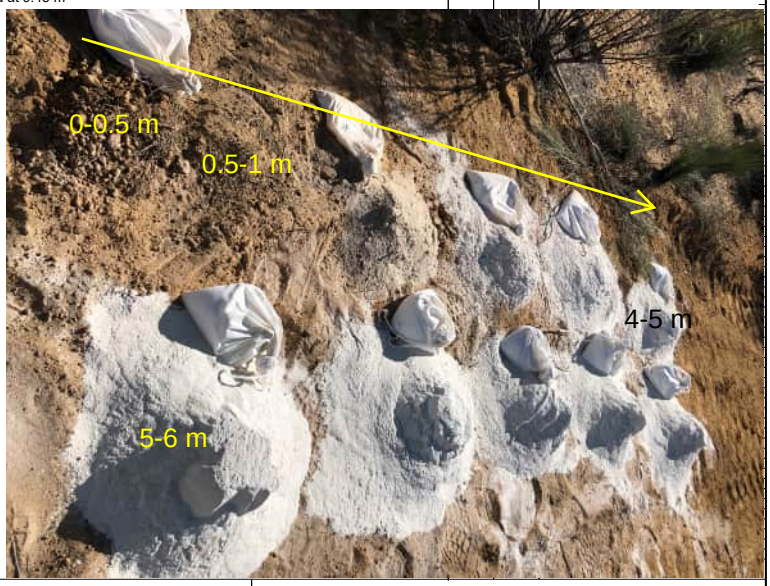
BOREHOLE LOG - BH01A

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/09/2022

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517836m N.6709218m (MGA Zone 50J) | Hole Diameter: 146mm | Plant used: Rig 24 - Schramm Airdrill
Checked by: C. Hogg | Elevation: 336 m (AHD) | Angle from horizontal: 90° | Contractor: Topdrill

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
335.5			SM: GRAVELLY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; gravel fine to coarse, subrounded to rounded; with silt non-plastic (Colluvium)			
335.0	1		SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to (inferred) coarse, subrounded to rounded (Colluvium)			
			SM: FERRICRETE: recovered as SILTY SAND trace gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to (inferred) coarse, subangular to subrounded (Duricrust)			
334.0	2		GRANITE: recovered as SANDY SILT; silt non-plastic to low plasticity, white; sand fine to coarse, well graded, subangular to subrounded; trace gravel, fine, angular, white-mottled orange-pale yellow-dark grey (Even-grained Granite)			
	3					
	4					
	5					
	6		*... from 6.00m to 9.45m, white-pale yellow-mottled orange*			
	7					
	8					
	9					
326.5			Borehole terminated at 9.45 m			
5	10					
	11					
	12					
	13					
	14					
	15					



DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

BOREHOLE LOG - BH01B

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/09/2022

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517836m N.6709217m (MGA Zone 50J) | Hole Diameter: 146mm | Plant used: Rig 24 - Schramm Airdrill
Checked by: C. Hogg | Elevation: 336 m (AHD) | Angle from horizontal: 90° | Contractor: Topdrill

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
335.5	0		SM: GRAVELLY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; gravel fine to coarse, subrounded to rounded; with silt non-plastic (Colluvium)			
335.4	0.1		SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to (inferred) coarse, subrounded to rounded (Colluvium)			
	0.6		Borehole terminated at 0.60 m			

DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

BOREHOLE LOG - BH02

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/09/2022

CMW Geosciences

Logged by: P. Atmajaya | Position: E.518482m N.6708810m (MGA Zone 50J) | Hole Diameter: 146mm | Plant used: Rig 24 - Schramm Airdrill
Checked by: C. Hogg | Elevation: 344.36 m (AHD) | Angle from horizontal: 90° | Contractor: Topdrill

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
343.8	0		SP: SAND: fine to coarse grained, poorly graded, subrounded, red-brown; with silt non-plastic; trace gravel fine to coarse, subrounded to rounded (Colluvium)			
	1		SM: FERRICRETE: recovered as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to (inferred) coarse, subangular to subrounded (Duricrust) *... from 1.00m to 2.00m, pale brown-pale red-mottled orange*			
	2		*... from 2.00m to 3.50m, pale brown-mottled red-orange*			
	3					
340.8	4		GRANITE: recovered as SANDY SILT; silt non-plastic to low plasticity, white; sand fine to coarse, well graded, subangular to subrounded; trace gravel, fine, angular, white-patchy dark grey-mottled orange-pale yellow (Even-grained Granite)			
	5					
	6					
	7					
	8					
	9					
	10					
	11					
	12					
	13					
	14					
329.9	15		Borehole terminated at 14.45 m			

DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth
Remarks: Falling Head Permeability Test

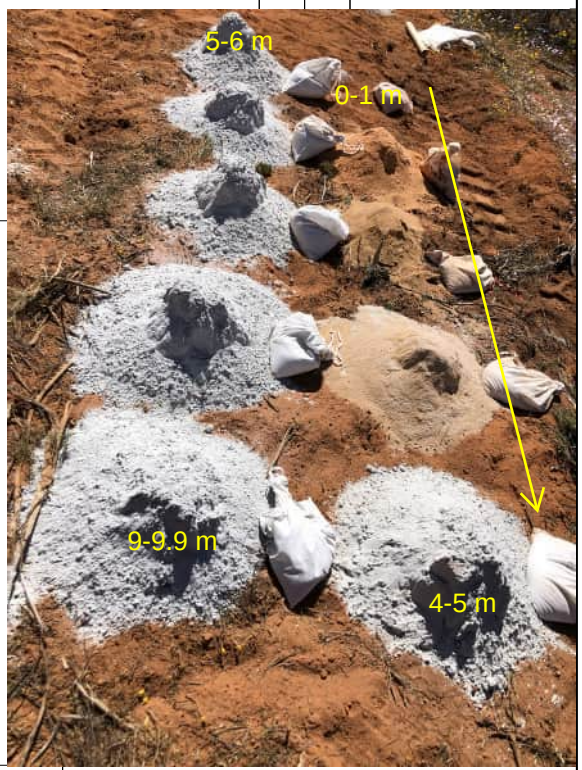
BOREHOLE LOG - BH02A

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/09/2022

CMW Geosciences

Logged by: P. Atmajaya | Position: E.518480m N.6708808m (MGA Zone 50J) | Hole Diameter: 146mm | Plant used: Rig 24 - Schramm Airdrill
Checked by: C. Hogg | Elevation: 344.41 m (AHD) | Angle from horizontal: 90° | Contractor: Topdrill

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
343.9	0		SP: SAND: fine to coarse grained, poorly graded, subrounded, red-brown; with silt non-plastic; trace gravel fine to coarse, subrounded to rounded (Colluvium)			
	1		SM: FERRICRETE: recovered as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to (inferred) coarse, subangular to subrounded (Duricrust) *... from 1.00m to 2.00m, pale brown-pale red-mottled orange*			
	2		*... from 2.00m to 3.50m, pale brown-mottled red-orange*			
	3					
340.9	4		GRANITE: recovered as SANDY SILT; silt non-plastic to low plasticity, white; sand fine to coarse, well graded, subangular to subrounded; trace gravel, fine, angular, white-patchy dark grey-mottled orange-pale yellow (Even-grained Granite)			
	5					
	6					
	7					
	8					
	9					
334.5	10		Borehole terminated at 9.90 m			
	11					
	12					
	13					
	14					
	15					



DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

BOREHOLE LOG - BH02B

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/09/2022

CMW Geosciences

Logged by: P. Atmajaya | Position: E.518476m N.6708810m (MGA Zone 50J) | Hole Diameter: 146mm | Plant used: Rig 24 - Schramm Airdrill
Checked by: C. Hogg | Elevation: 344.35 m (AHD) | Angle from horizontal: 90° | Contractor: Topdrill

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
343.8	0		SP: SAND: fine to coarse grained, poorly graded, subrounded, red-brown; with silt non-plastic; trace gravel fine to coarse, subrounded to rounded (Colluvium)			
343.5	1		SM: FERRICRETE: recovered as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to (inferred) coarse, subangular to subrounded (Duricrust)			
			Borehole terminated at 0.80 m			

DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

BOREHOLE LOG - BH03

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/09/2022

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517921m N.6707638m (MGA Zone 50J) | Hole Diameter: 146mm | Plant used: Rig 24 - Schramm Airdrill
Checked by: C. Hogg | Elevation: 364.4 m (AHD) | Angle from horizontal: 90° | Contractor: Topdrill

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
363.4	0		GP: GRAVEL: fine to coarse, rounded to subrounded, red-brown-patchy pale grey/mottled dark grey-pale green; with sand fine to coarse grained, subrounded to subangular, well graded, red-brown; with silt/clay low plasticity (Alluvium)			
	1		GRANITE: recovered as SANDY SILT; silt non-plastic to low plasticity, white; sand fine to coarse, well graded, subangular to subrounded; trace gravel, fine, angular, white-patchy dark grey-mottled orange-pale yellow (Even-grained Granite)			
	3		*... from 3.00m to 3.50m, pale brown-pale red-mottled orange*			
	14		*... from 14.00m to 14.45m, pale grey-pale yellow-mottled orange*			
349.9	14.45		Borehole terminated at 14.45 m			

DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth
Remarks: Falling Head Permeability Test

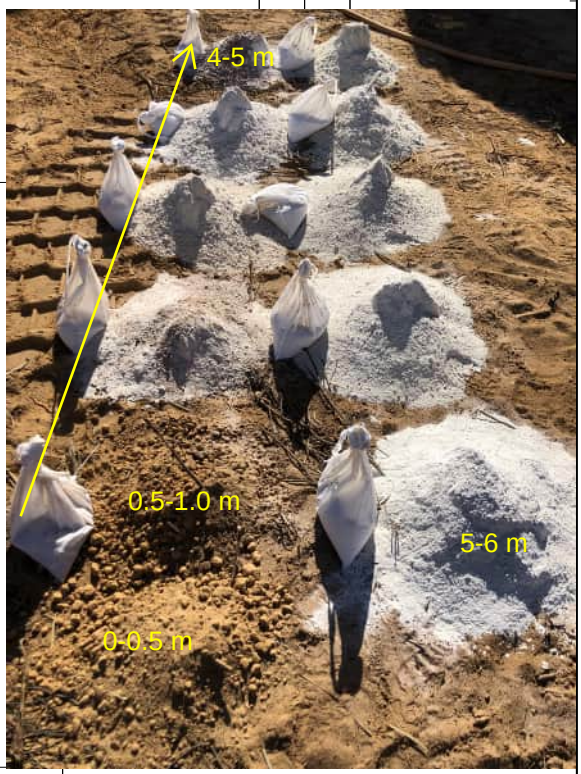
BOREHOLE LOG - BH03A

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/09/2022

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517919m N.6707638m (MGA Zone 50J) | Hole Diameter: 146mm | Plant used: Rig 24 - Schramm Airdrill
Checked by: C. Hogg | Elevation: 364.36 m (AHD) | Angle from horizontal: 90° | Contractor: Topdrill

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
363.3	0		GP: GRAVEL: fine to coarse, rounded to subrounded, red-brown-patchy pale grey/mottled dark grey-pale green; with sand fine to coarse grained, subrounded to subangular, well graded, red-brown; with silt/clay low plasticity (Alluvium)			
	1		GRANITE: recovered as SANDY SILT; silt non-plastic to low plasticity, white; sand fine to coarse, well graded, subangular to subrounded; trace gravel, fine, angular, white-patchy dark grey-mottled orange-pale yellow (Even-grained Granite)			
	4		*... from 4.00m to 4.50m, pale brown-pale red-mottled orange*			
354.86	9		Borehole terminated at 9.50 m			



DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

BOREHOLE LOG - BH03B

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/09/2022

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517917m N.6707638m (MGA Zone 50J) | Hole Diameter: 146mm | Plant used: Rig 24 - Schramm Airdrill
Checked by: C. Hogg | Elevation: 364.32 m (AHD) | Angle from horizontal: 90° | Contractor: Topdrill

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
363.7	0		GP: GRAVEL: fine to coarse, rounded to subrounded, red-brown-patchy pale grey/mottled dark grey-pale green; with sand fine to coarse grained, subrounded to subangular, well graded, red-brown; with silt/clay low plasticity (Alluvium)			
			Borehole terminated at 0.60 m			

DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

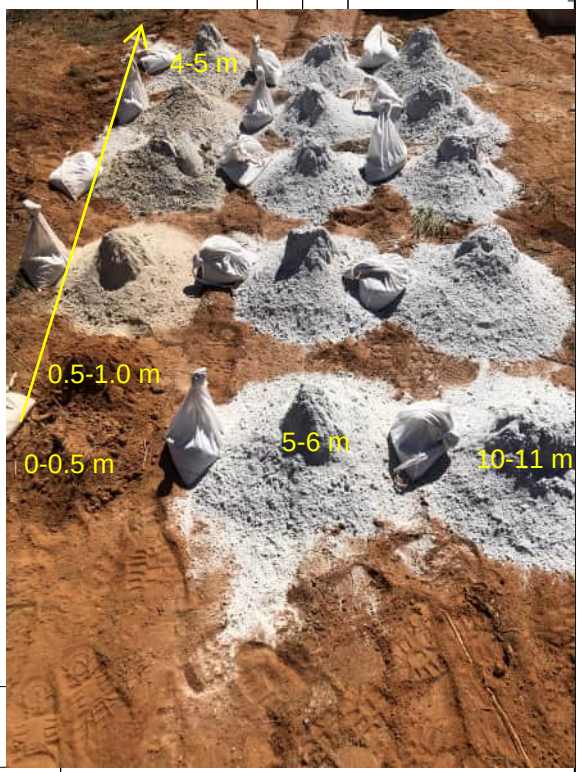
BOREHOLE LOG - BH04

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/09/2022

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517339m N.6708015m (MGA Zone 50J) | Hole Diameter: 146mm | Plant used: Rig 24 - Schramm Airdrill
Checked by: C. Hogg | Elevation: 353.32 m (AHD) | Angle from horizontal: 90° | Contractor: Topdrill

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
352.3	0		ML: SANDY SILT: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded; trace clay nodules (Colluvium)			
	1		SM: FERRICRETE: recovered as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to (inferred) coarse, subangular to subrounded (Duricrust)			
	2					
	3					
349.3	4					
	5					
	6					
	7		*... from 7.00m to 14.50m, pale grey-white-mottled orange-pale yellow*			
	8					
	9					
	10					
	11					
	12					
	13					
	14					
338.8	15		Borehole terminated at 14.50 m			



DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth
Remarks: Falling Head Permeability Test

This report must be read in conjunction with accompanying notes and abbreviations.

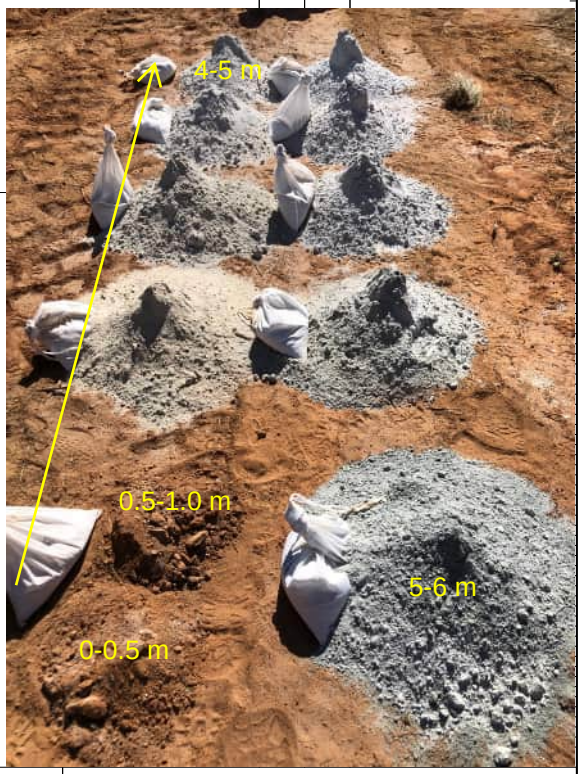
BOREHOLE LOG - BH04A

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/09/2022

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517336m N.6708016m (MGA Zone 50J) | Hole Diameter: 146mm | Plant used: Rig 24 - Schramm Airdrill
Checked by: C. Hogg | Elevation: 353.27 m (AHD) | Angle from horizontal: 90° | Contractor: Topdrill

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
			ML: SANDY SILT: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded; trace clay nodules (Colluvium)			
352.2	1		SM: FERRICRETE: recovered as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to (inferred) coarse, subangular to subrounded (Duricrust)			
	2					
350.2	3		GRANITE: recovered as SANDY SILT; silt non-plastic to low plasticity, white; sand fine to coarse, well graded, subangular to subrounded; trace gravel, fine, angular, white-patchy dark grey-mottled orange-pale yellow (Even-grained Granite)			
	4					
	5		*... from 5.00m to 6.00m, with gravel, fine to (inferred) coarse, dark grey-mottled blue*			
	6					
	7					
	8					
	9					
343.6			Borehole terminated at 9.60 m			
	10					
	11					
	12					
	13					
	14					
	15					



DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

BOREHOLE LOG - BH04B

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/09/2022

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517335m N.6708017m (MGA Zone 50J) | Hole Diameter: 146mm | Plant used: Rig 24 - Schramm Airdrill
Checked by: C. Hogg | Elevation: 353.22 m (AHD) | Angle from horizontal: 90° | Contractor: Topdrill

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
352.4	0		ML: SANDY SILT: low plasticity, red-brown; sand fine to coarse grained, poorly graded, subangular to subrounded; trace gravel fine, subrounded to rounded; trace clay nodules (Colluvium)			
	0.80		Borehole terminated at 0.80 m			

DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth
Remarks: Falling Head Permeability Test

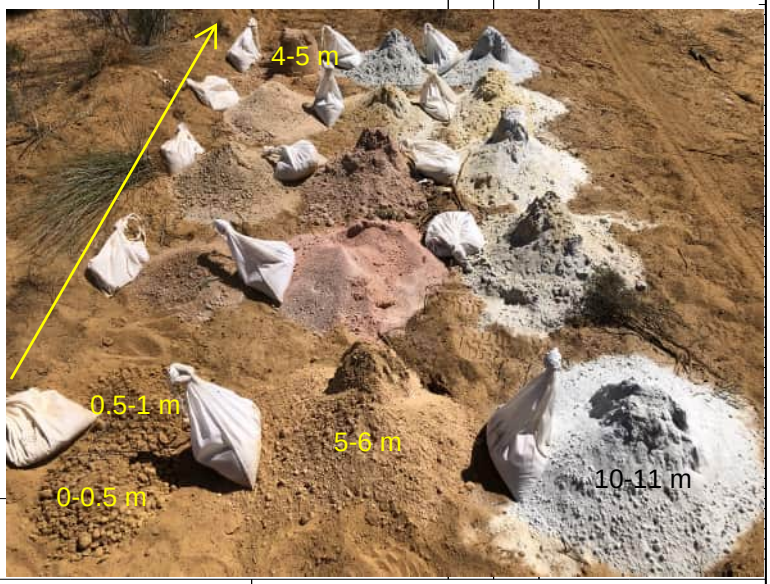
BOREHOLE LOG - BH05

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/09/2022

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517112m N.6708413m (MGA Zone 50J) | Hole Diameter: 146mm | Plant used: Rig 24 - Schramm Airdrill
Checked by: C. Hogg | Elevation: 346.94 m (AHD) | Angle from horizontal: 90° | Contractor: Topdrill

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
			SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, rounded; slightly cemented (Colluvium)			
345.9	1		SM: FERRICRETE: recovered as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-mottled red-orange; silt non-plastic; gravel fine to (inferred) coarse, subangular to subrounded (Duricrust)			
	2		*... from 2.00m to 4.00m, with gravel, pale brown*			
	3					
	4		*... from 4.00m to 6.00m, pale brown-red*			
	5					
	6		*... from 6.00m to 8.50m, pale red-pale grey*			
	7					
	8					
338.4	9		GRANITE: recovered as SANDY SILT; silt non-plastic to low plasticity, white; sand fine to coarse, well graded, subangular to subrounded; trace gravel, fine, angular, white-patchy dark grey-mottled orange-pale yellow (Even-grained Granite)			
	10					
	11					
	12					
	13					
	14					
332.4			Borehole terminated at 14.50 m			
	15					



DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

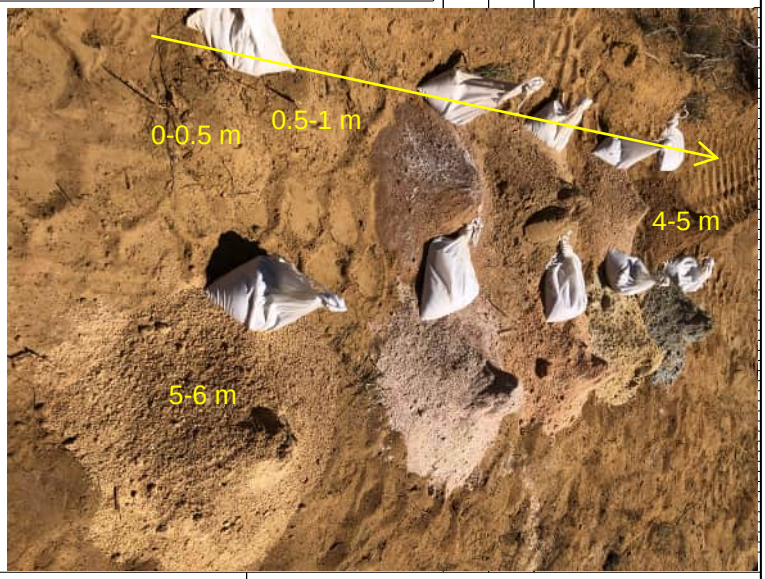
BOREHOLE LOG - BH05A

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/09/2022

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517111m N.6708414m (MGA Zone 50J) | Hole Diameter: 146mm | Plant used: Rig 24 - Schramm Airdrill
Checked by: C. Hogg | Elevation: 346.92 m (AHD) | Angle from horizontal: 90° | Contractor: Topdrill

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
345.9	0		SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, rounded; slightly cemented (Colluvium)			
	1		SM: FERRICRETE: recovered as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-grey-pale red-mottled orange; silt non-plastic; gravel fine to (inferred) coarse, subangular to subrounded (Duricrust)			
	2					
	3					
	4					
	5					
	6					
	7					
	8					
337.9	9		GRANITE: recovered as SANDY SILT; silt non-plastic to low plasticity, white-pale grey; sand fine to coarse, well graded, subangular to subrounded; trace gravel, fine, angular, white-patchy dark grey-mottled orange-pale yellow (Even-grained Granite)			
337.4			Borehole terminated at 9.45 m			
	10					
	11					
	12					
	13					
	14					
	15					



DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

BOREHOLE LOG - BH05B

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/09/2022

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517110m N.6708412m (MGA Zone 50J) | Hole Diameter: 146mm | Plant used: Rig 24 - Schramm Airdrill
Checked by: C. Hogg | Elevation: 346.91 m (AHD) | Angle from horizontal: 90° | Contractor: Topdrill

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
346.4	0		SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, red-brown-mottled pale yellow; silt non-plastic; gravel fine to coarse, rounded; slightly cemented (Colluvium)			
			Borehole terminated at 0.50 m			

DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth
Remarks: Falling Head Permeability Test

This report must be read in conjunction with accompanying notes and abbreviations.

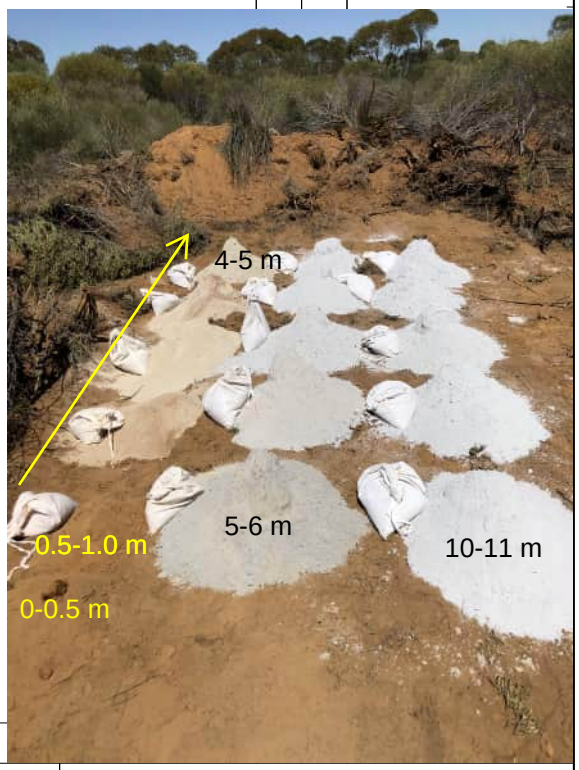
BOREHOLE LOG - BH06

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/09/2022

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517370m N.6708821m (MGA Zone 50J) | Hole Diameter: 146mm | Plant used: Rig 24 - Schramm Airdrill
Checked by: C. Hogg | Elevation: 341.62 m (AHD) | Angle from horizontal: 90° | Contractor: Topdrill

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
			SM: GRAVELLY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; gravel fine to coarse, subrounded to rounded; with silt non-plastic (Colluvium)			
340.6	1		SM: FERRICRETE: recovered as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, pale brown-pale red-mottled orange; silt non-plastic; gravel fine to (inferred) coarse, subangular to subrounded (Duricrust)			
	2		*... from 2.00m to 3.00m, pale brown-mottled red-orange*			
	3					
	4		*... from 4.00m to 5.00m, pale brown-mottled red-orange*			
336.6	5		GRANITE: recovered as SANDY SILT; silt non-plastic to low plasticity, white; sand fine to coarse, well graded, subangular to subrounded; trace gravel, fine, angular, white-patchy dark grey-mottled orange-pale yellow (Even-grained Granite)			
	6					
	7		*... from 7.00m to 14.90m, white-pale grey-patchy pale yellow-mottled orange*			
	8					
	9					
	10					
	11					
	12					
	13					
	14					
326.7	15		Borehole terminated at 14.90 m			



DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

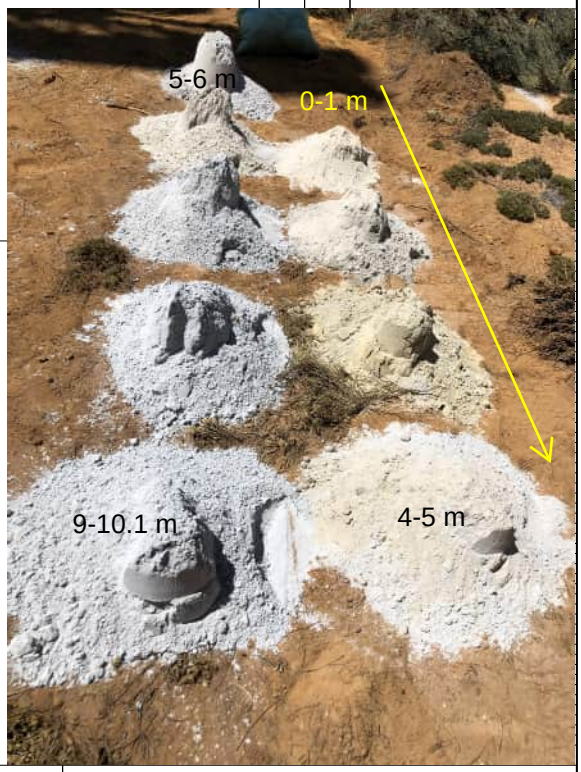
BOREHOLE LOG - BH06A

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/09/2022

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517369m N.6708819m (MGA Zone 50J) | Hole Diameter: 146mm | Plant used: Rig 24 - Schramm Airdrill
Checked by: C. Hogg | Elevation: 341.59 m (AHD) | Angle from horizontal: 90° | Contractor: Topdrill

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
			SM: GRAVELLY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; gravel fine to coarse, subrounded to rounded; with silt non-plastic (Colluvium)			
340.5	1		SM: FERRICRETE: recovered as SILTY SAND with gravel; sand fine to coarse grained, poorly graded, subangular to subrounded, white-patchy grey-mottled red-orange; silt non-plastic; gravel fine to (inferred) coarse, subangular to subrounded (Duricrust)			
	2					
	3		*... from 3.00m to 4.00m, pale brown-mottled red-orange*			
337.5	4		GRANITE: recovered as SANDY SILT; silt non-plastic to low plasticity, white; sand fine to coarse, well graded, subangular to subrounded; trace gravel, fine, angular, white-patchy dark grey-mottled orange-pale yellow (Even-grained Granite)			
	5					
	6					
	7		*... from 7.00m to 10.10m, white-pale grey-patchy pale yellow-mottled orange*			
	8					
	9					
331.4	10		Borehole terminated at 10.10 m			
	11					
	12					
	13					
	14					
	15					



DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

BOREHOLE LOG - BH06B

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/09/2022

Logged by: P. Atmajaya | Position: E.517368m N.6708819m (MGA Zone 50J) | Hole Diameter: 146mm | Plant used: Rig 24 - Schramm Airdrill
Checked by: C. Hogg | Elevation: 341.59 m (AHD) | Angle from horizontal: 90° | Contractor: Topdrill

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
340.6	1		SM: GRAVELLY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; gravel fine to coarse, subrounded to rounded; with silt non-plastic (Colluvium)			
			Borehole terminated at 1.00 m			

DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

This report must be read in conjunction with accompanying notes and abbreviations.

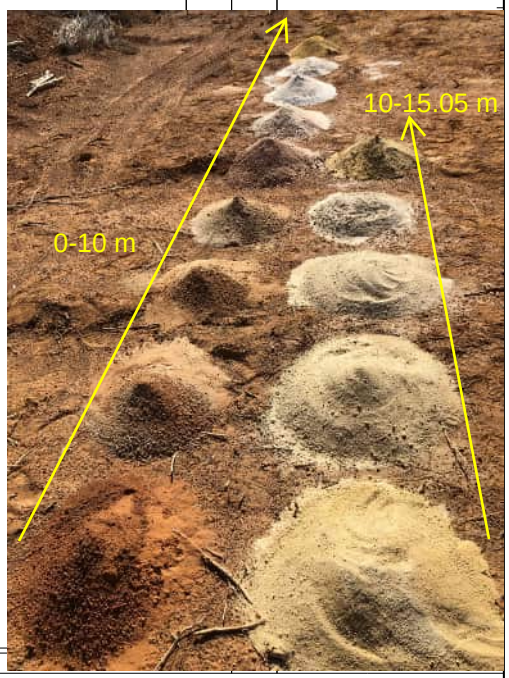
BOREHOLE LOG - BH07

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 25/01/2023

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517714m N.6709983m (MGA Zone 50J) | Hole Diameter: 135mm | Plant used: AC003 Rig - Schramm Airdrill
Checked by: C. Hogg | Elevation: 325.8 m (AHD) | Angle from horizontal: 90° | Contractor: Prospect Drilling

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
325.3			SM: SILTY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; silt non-plastic; with gravel fine, angular to subangular (Colluvium)			
324.8	1		SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, dark red-brown; silt non-plastic to low plasticity; gravel fine to coarse, angular to subangular; cemented (Colluvium)			
			SM: FERRICRETE: recovered as GRAVELLY SILTY SAND; sand fine to coarse grained, poorly graded, subangular to subrounded, pale brown-pale red-patchy pale grey; silt non-plastic to low plasticity; gravel fine to (inferred) coarse, subangular to subrounded, mottled dark grey (Duricrust)			
	2					
	3					
			... from 3.50m to 4.00m, becoming SILTY GRAVELLY SAND			
	4		*... from 4.00m to 4.50m, red-pale brown*			
321.3			GRANITE: recovered as SILTY SAND; sand fine to coarse, well graded, subangular to subrounded, white-mottled pale red-orange; silt non-plastic; trace gravel, fine to medium, angular, white-mottled pale grey-dark grey (Even-grained Granite)			
	5		*... from 5.50m to 8.00m, becoming SANDY SILT; silt low to medium plasticity*			
	6		*... from 6.00m to 8.00m, white*			
	7					
317.8	8		GRANITE: recovered as CLAYEY SAND; sand fine to coarse, poorly graded, subangular, pale yellow-pale brown-mottled pale grey; clay low plasticity; trace gravel, fine to medium, angular, white-mottled pale grey (Even-grained Granite)			
	9		*... from 9.00m to 13.00m, clay low to medium plasticity*			
	10					
	11					
	12					
	13		*... from 13.00m to 15.05m, clay high plasticity*			
	14					
	15		Borehole terminated at 15.05 m			



DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

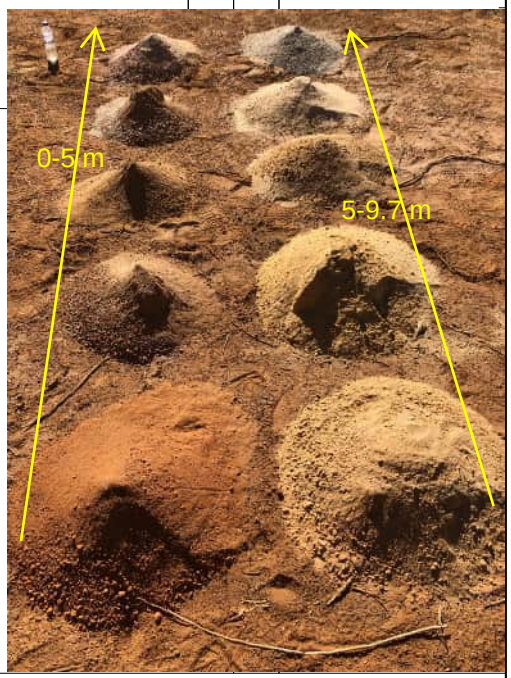
BOREHOLE LOG - BH07A

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 25/01/2023

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517709m N.6709983m (MGA Zone 50J) | Hole Diameter: 135mm | Plant used: AC003 Rig - Schramm Airdrill
Checked by: C. Hogg | Elevation: 325.8 m (AHD) | Angle from horizontal: 90° | Contractor: Prospect Drilling

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
325.3	0		SM: SILTY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; silt non-plastic; with gravel fine, angular to subangular (Colluvium)			
324.8	0.5		SM: GRAVELLY SILTY SAND: fine to coarse grained, poorly graded, subangular to subrounded, dark red-brown; silt non-plastic to low plasticity; gravel fine to coarse, angular to subangular; cemented (Colluvium)			
	1		SM: FERRICRETE: recovered as GRAVELLY SILTY SAND; sand fine to coarse grained, poorly graded, subangular to subrounded, pale brown-pale red-patchy pale grey; silt non-plastic to low plasticity; gravel fine to (inferred) coarse, subangular to subrounded, mottled dark grey (Duricrust)			
	2					
	3					
	4					
321.3	4.5		GRANITE: recovered as GRAVELLY SAND with clay; sand fine to coarse, poorly graded, subangular, pale yellow-pale brown-mottled pale grey; gravel, fine to medium, angular, white-mottled pale grey; clay low plasticity (Even-grained Granite)			
	5					
	6		*... from 6.00m to 7.00m, trace clay*			
	7					
317.80	8					
	9					
	9.7		Borehole terminated at 9.70 m			
	10					
	11					
	12					
	13					
	14					
	15					



DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

BOREHOLE LOG - BH07B

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 25/01/2023

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517719m N.6709983m (MGA Zone 50J) | Hole Diameter: 135mm | Plant used: AC003 Rig - Schramm Airdrill
Checked by: C. Hogg | Elevation: 325.8 m (AHD) | Angle from horizontal: 90° | Contractor: Prospect Drilling

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
325.3	0		SM: SILTY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; silt non-plastic; with gravel fine, angular to subangular (Colluvium)			
324.8	1		SM: FERRICRETE: recovered as GRAVELLY SILTY SAND; sand fine to coarse grained, poorly graded, subangular to subrounded, pale brown-pale red-patchy pale grey; silt non-plastic to low plasticity; gravel fine to (inferred) coarse, subangular to subrounded, mottled dark grey (Duricrust) Borehole terminated at 0.75 m			

DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

This report must be read in conjunction with accompanying notes and abbreviations.

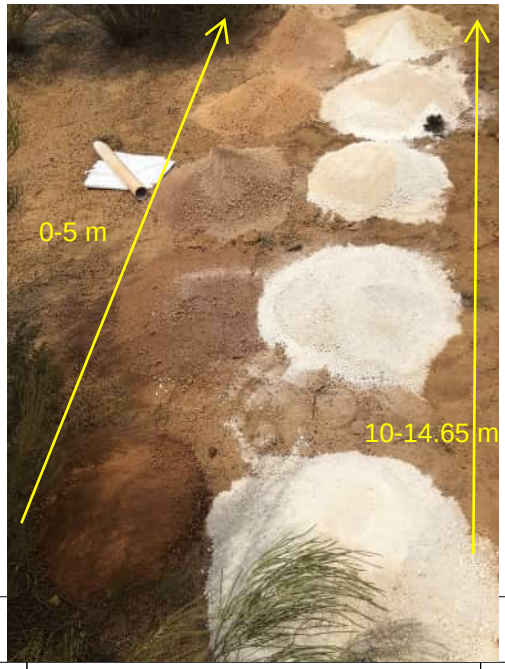
BOREHOLE LOG - BH08

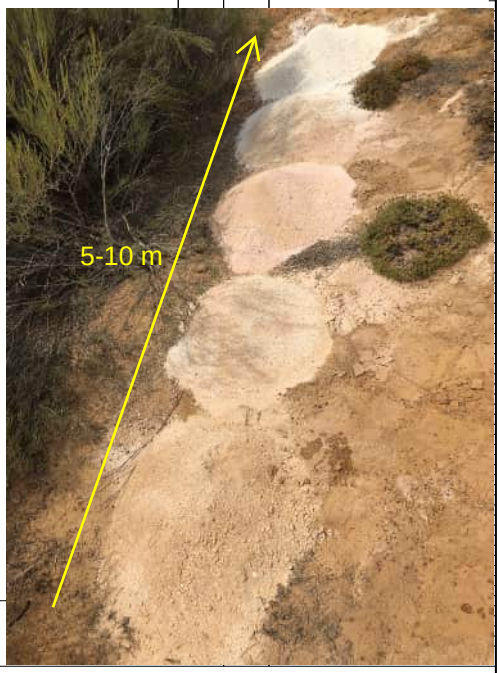
Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/01/2023

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517094m N.6709618m (MGA Zone 50J) | Hole Diameter: 135mm | Plant used: AC003 Rig - Schramm Airdrill
Checked by: C. Hogg | Elevation: 331.32 m (AHD) | Angle from horizontal: 90° | Contractor: Prospect Drilling

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
330.8	0		SM: SILTY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; silt non-plastic; trace gravel fine, angular to subrounded, dark grey (Colluvium)			
	1		SM: FERRICRETE: recovered as GRAVELLY SILTY SAND; sand fine to coarse grained, moderately graded, angular to subrounded, red-brown; silt non-plastic to low plasticity; gravel fine to (inferred) coarse, angular to subrounded, dark red-dark grey (Duricrust)			
	2					
	3		*... from 3.00m to 5.50m, pale brown-pale red-patchy pale yellow-pale grey*			
	4					
	5					
325.8	6		GRANITE: recovered as CLAYEY SAND with gravel; sand fine to coarse, well graded, subangular to subrounded, white-mottled pale red; clay low to medium plasticity; gravel fine to (inferred) coarse, angular to subrounded, white-mottled pale red-dark grey (Even-grained Granite)			
	7		*... from 6.50m to 8.50m, white-pale red*			
	8					
	9					
	10					
	11					
	12					
	13		*... from 13.50m to 14.50m, white-patchy pale brown-mottled orange*			
	14					
316.7	15		Borehole terminated at 14.65 m			





DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

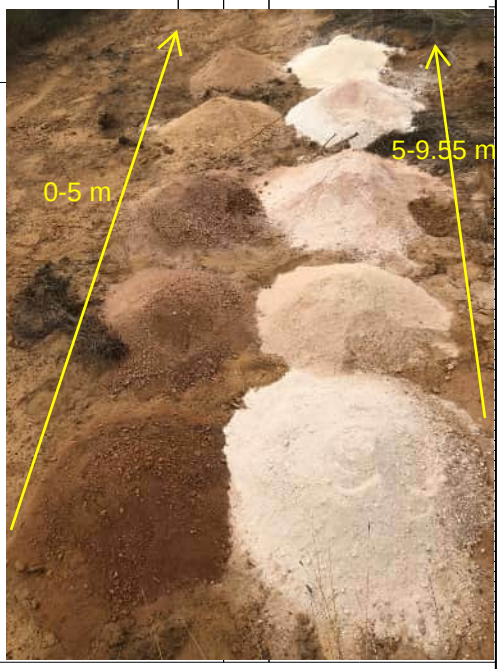
BOREHOLE LOG - BH08A

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/01/2023

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517089m N.6709618m (MGA Zone 50J) | Hole Diameter: 135mm | Plant used: AC003 Rig - Schramm Airdrill
Checked by: C. Hogg | Elevation: 331.31 m (AHD) | Angle from horizontal: 90° | Contractor: Prospect Drilling

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
330.8	0		SM: SILTY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; silt non-plastic; trace gravel fine, angular to subrounded, dark grey (Colluvium)			
	1		SM: FERRICRETE: recovered as GRAVELLY SILTY SAND; sand fine to coarse grained, moderately graded, angular to subrounded, red-brown; silt non-plastic to low plasticity; gravel fine to (inferred) coarse, angular to subrounded, dark red-dark grey (Duricrust)			
	2					
	3		*... from 3.00m to 5.00m, pale brown-pale red-patchy pale yellow-pale grey*			
	4					
326.3	5		GRANITE: recovered as CLAYEY SAND with gravel; sand fine to coarse, well graded, subangular to subrounded, white-mottled pale red; clay low to medium plasticity; gravel fine to (inferred) coarse, angular to subrounded, white-mottled pale red-dark grey (Even-grained Granite)			
	6		*... from 6.00m to 8.50m, white-pale red*			
	7					
	8					
	9					
321.8	10		Borehole terminated at 9.55 m			
	11					
	12					
	13					
	14					
	15					



DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

BOREHOLE LOG - BH08B

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/01/2023

CMW Geosciences

Logged by: P. Atmajaya | Position: E.517099m N.6709618m (MGA Zone 50J) | Hole Diameter: 135mm | Plant used: AC003 Rig - Schramm Airdrill
Checked by: C. Hogg | Elevation: 331.23 m (AHD) | Angle from horizontal: 90° | Contractor: Prospect Drilling

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
330.7	0		SM: SILTY SAND: fine to coarse grained, poorly graded, subrounded, red-brown; silt non-plastic; trace gravel fine, angular to subrounded, dark grey (Colluvium)			
330.2	1		SM: FERRICRETE: recovered as GRAVELLY SILTY SAND; sand fine to coarse grained, moderately graded, angular to subrounded, red-brown; silt non-plastic to low plasticity; gravel fine to (inferred) coarse, angular to subrounded, dark red-dark grey (Duricrust)			
			Borehole terminated at 1.00 m			

DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

This report must be read in conjunction with accompanying notes and abbreviations.

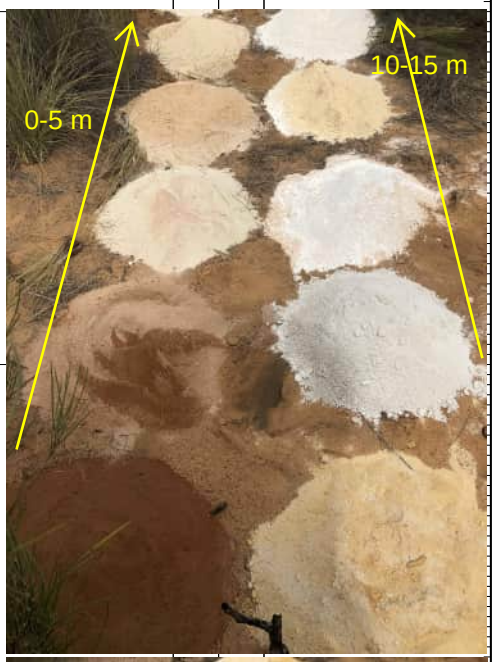
BOREHOLE LOG - BH09

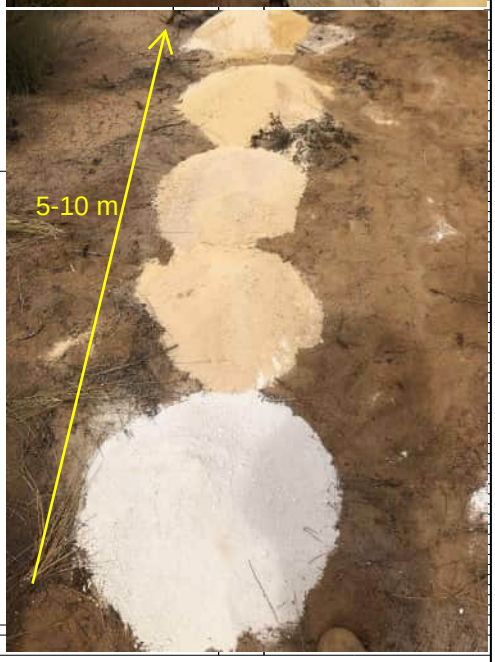
Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/01/2023

CMW Geosciences

Logged by: P. Atmajaya | Position: E.518347m N.6709621m (MGA Zone 50J) | Hole Diameter: 135mm | Plant used: AC003 Rig - Schramm Airdrill
Checked by: C. Hogg | Elevation: 331.5 m (AHD) | Angle from horizontal: 90° | Contractor: Prospect Drilling

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
	0		SM: GRAVELLY SAND: fine to coarse grained, poorly graded, angular to subangular, red-brown; gravel fine to coarse, angular to subangular; with silt non-plastic (Colluvium)			
330.0	1		SM: FERRICRETE: recovered as GRAVELLY SILTY SAND; sand fine to coarse grained, poorly graded, angular to subrounded, pale red-pale brown; silt non-plastic to low plasticity; gravel fine to (inferred) coarse, angular to subrounded, dark red-pale grey (Duricrust)			
329.0	2		GRANITE: recovered as CLAYEY SAND; sand fine to coarse, well graded, subangular to subrounded, whitepatchy pale red; clay low to medium plasticity; trace gravel, fine to (inferred) coarse, subangular to subrounded, white-patchy pale brown-mottled dark grey (Even-grained Granite) *... from 3.50m to 4.00m, white-pale brown-mottled pale red*			
325.5	3		GRANITE: recovered as CLAYEY SAND; sand fine to coarse, poorly graded, subangular, pale yellow-pale brown-mottled pale grey; clay low plasticity; trace gravel, fine to medium, angular, white-mottled pale grey (Even-grained Granite)			
321.0	4		GRANITE: recovered as CLAYEY SAND; sand fine to coarse, well graded, subangular to subrounded, white; clay medium plasticity; trace gravel, fine to (inferred) coarse, subangular to subrounded, white-patchy pale brown-mottled dark grey (Even-grained Granite) *... from 13.50m to 14.00m, white-patchy pale red-mottled pale brown* *... from 14.00m to 15.00m, white-pale brown* ~~Borehole terminated at 15.00 m~~			





DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth
Remarks: Falling Head Permeability Test

BOREHOLE LOG - BH09A

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/01/2023

CMW Geosciences

Logged by: P. Atmajaya | Position: E.518342m N.6709621m (MGA Zone 50J) | Hole Diameter: 135mm | Plant used: AC003 Rig - Schramm Airdrill
Checked by: C. Hogg | Elevation: 331.5 m (AHD) | Angle from horizontal: 90° | Contractor: Prospect Drilling

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
331.0	0		SM: GRAVELLY SAND: fine to coarse grained, poorly graded, angular to subangular, red-brown; gravel fine to coarse, angular to subangular; with silt non-plastic (Colluvium)			
	1		SM: FERRICRETE: recovered as GRAVELLY SILTY SAND; sand fine to coarse grained, poorly graded, angular to subrounded, pale red-pale brown; silt non-plastic to low plasticity; gravel fine to (inferred) coarse, angular to subrounded, dark red-pale grey (Duricrust)			
	2					
329.0	3		GRANITE: recovered as CLAYEY SAND; sand fine to coarse, well graded, subangular to subrounded, white-mottled pale red; clay low to medium plasticity; trace gravel, fine to (inferred) coarse, subangular to subrounded, white-patchy pale brown-mottled dark grey (Even-grained Granite) *... from 3.00m to 8.00m, white; clay medium plasticity*			
	4					
	5					
	6					
	7					
323.5	8					
	9					
	10		Borehole terminated at 9.85 m			
	11					
	12					
	13					
	14					
	15					

DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

This report must be read in conjunction with accompanying notes and abbreviations.

BOREHOLE LOG - BH09B

Client: Capricorn Metals
Project: TSF1 Design
Location: Mt Gibson
Project ID: PER2022-0011
Date: 26/01/2023

CMW Geosciences

Logged by: P. Atmajaya | Position: E.518352m N.6709621m (MGA Zone 50J) | Hole Diameter: 135mm | Plant used: AC003 Rig - Schramm Airdrill
Checked by: C. Hogg | Elevation: 331.5 m (AHD) | Angle from horizontal: 90° | Contractor: Prospect Drilling

RL (m)	Depth (m)	Graphic Log	Material Description Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	Structure & other observations
330.4	1		SM: GRAVELLY SAND: fine to coarse grained, poorly graded, angular to subangular, red-brown; gravel fine to coarse, angular to subangular; with silt non-plastic (Colluvium)			
			Borehole terminated at 1.10 m			

DCP/PSP Equipment Ref.: | In Situ Vane Equipment Ref.: | Pocket Penetrometer Equipment Ref.:

Termination Reason: Target Depth

Remarks: Falling Head Permeability Test

Appendix D
Permeability Test Results

CMW Geosciences	CLIENT:	Capricorn Metals Ltd	DESIGNER: PA
	PROJECT:	TSF1 Mt Gibson Gold Project (MGGP), WA	CHECKED: CH BH NO.: BH01 (MGA Zone 51J, 0517829 m E, 6709219 m N, RL347 m)
	TITLE:	Falling Head Permeability Test	DATE: 26-28 September 2022 PROJECT: PER2022-0011

Specifications - Open-Ended Tube

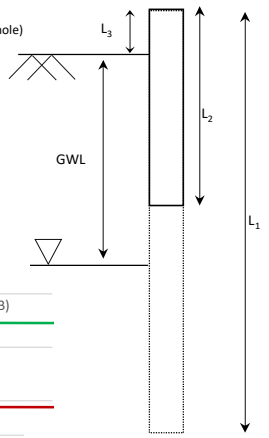
Length L_1 of Tests 1, 2, 3:		Diameter (mm):	Non-Perm L2 (m):	Above Gnd L3 (m):
14.55 m	Test 1:	146	1.20	0.05
9.45 m	Test 2:	146	1.02	0
0.60 m	Test 3:	146	0	0

Ground Conditions

GWL: 70 m BGL (Blank = Bottom of hole)

Permeability Anisotropy m: 1 $m = \sqrt{k_h/k_v}$

Bottom of Test Hole: 14.50 m BGL (Test 1)
9.45 m BGL (Test 2)
0.60 m BGL (Test 3)

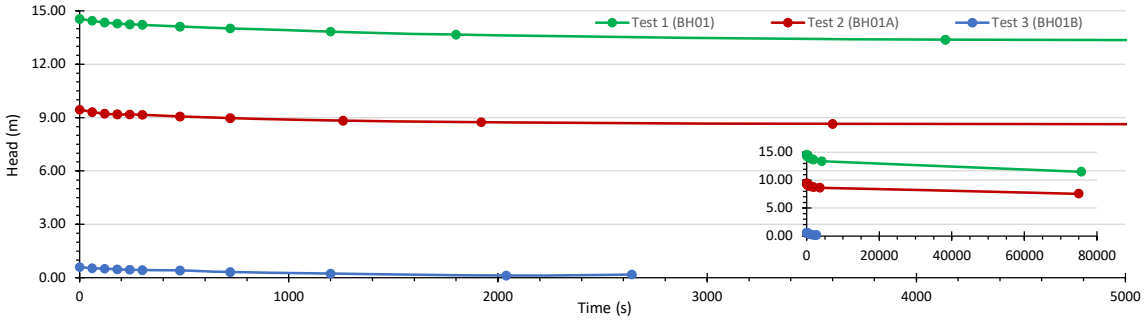


Hydraulic Conductivity (k)

Hvorslev: Hvorslev (1951) *Time Lag and Soil Permeability in Ground-Water Observations* , Fig 18, p49

$$k = \frac{d^2 \ln\left(\frac{mL}{d} + \sqrt{\left(\frac{mL}{d}\right)^2 + 1}\right)}{8L(t_2 - t_1)} \ln\frac{H_1}{H_2} =$$

2.83E-06 ms^{-1} = 2.45E-01 m/day



Data	Time	Tape Avg	Head	Perm. Length	Hvorslev 'k'	Average 'k'
Test No.	(s)	(m)	(m)	(m)	Case G (ms^{-1})	ms^{-1}
Test 1 (BH01)	0	0.00	14.55			4.82E-08
	60	0.10	14.45	13.35	1.19E-07	
	120	0.20	14.35	13.35	1.20E-07	
	180	0.26	14.29	13.35	7.26E-08	
	240	0.30	14.25	13.35	4.86E-08	
	300	0.33	14.22	13.35	3.65E-08	
	480	0.43	14.12	13.35	4.08E-08	
	720	0.53	14.02	13.35	3.08E-08	
	1200	0.71	13.84	13.35	2.80E-08	
	1800	0.88	13.67	13.35	2.14E-08	
	4140	1.17	13.38	13.35	9.53E-09	
	75660	3.04	11.51	12.45	2.32E-09	
Test 2 (BH01A)	0	0.00	9.45			9.18E-08
	60	0.14	9.32	8.43	3.60E-07	
	120	0.23	9.22	8.43	2.56E-07	
	180	0.26	9.19	8.43	8.15E-08	
	240	0.28	9.18	8.43	4.09E-08	
	300	0.29	9.16	8.43	4.09E-08	
	480	0.38	9.07	8.43	8.23E-08	
	720	0.48	8.97	8.43	6.93E-08	
	1260	0.62	8.83	8.43	4.37E-08	
	1920	0.70	8.75	8.43	2.07E-08	
	3600	0.81	8.65	8.43	1.08E-08	
	74940	1.88	7.57	8.11	2.88E-09	
Test 3 (BH01B)	0	0.00	0.60			8.36E-06
	60	0.07	0.54	0.57	1.85E-05	
	120	0.10	0.51	0.52	9.77E-06	
	180	0.12	0.48	0.49	8.84E-06	
	240	0.15	0.45	0.47	1.16E-05	
	300	0.17	0.43	0.44	8.36E-06	
	480	0.19	0.41	0.42	2.99E-06	
	720	0.28	0.32	0.37	1.24E-05	
	1200	0.37	0.23	0.28	9.27E-06	
	2040	0.48	0.12	0.18	1.20E-05	
	2640	0.43	0.18	0.15	-1.01E-05	
	73860	DRY				

STRATIGRAPHIC LOG, REF. BH01

- Silty/Clayey SAND, lateritic (COLLUVIUM)
- FERRICRETE, retrieved as silty/clayey sandy GRAVEL
- SAPROLITE

EOH @ 14.5m

CMW Geosciences	CLIENT:	Capricorn Metals Ltd	DESIGNER: PA
	PROJECT:	TSF1 Mt Gibson Gold Project (MGGP), WA	CHECKED: CH
			BH NO.: BH02 (MGA Zone 51J, 0518482 m E, 6708810 m N, RL354 m)
	TITLE:	Falling Head Permeability Test	DATE: 26-28 September 2022
			PROJECT: PER2022-0011

Specifications - Open-Ended Tube

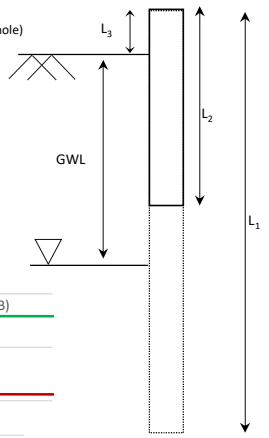
Length L_1 of Tests 1, 2, 3:		Diameter (mm):	Non-Perm L2 (m):	Above Gnd L3 (m):
14.45 m	Test 1:	146	0.63	0
10.03 m	Test 2:	146	0.67	0.13
0.80 m	Test 3:	146	0	0

Ground Conditions

GWL: 70 m BGL (Blank = Bottom of hole)

Permeability Anisotropy m: 1 $m = \sqrt{k_h / k_v}$

Bottom of Test Hole: 14.45 m BGL (Test 1)
9.90 m BGL (Test 2)
0.80 m BGL (Test 3)

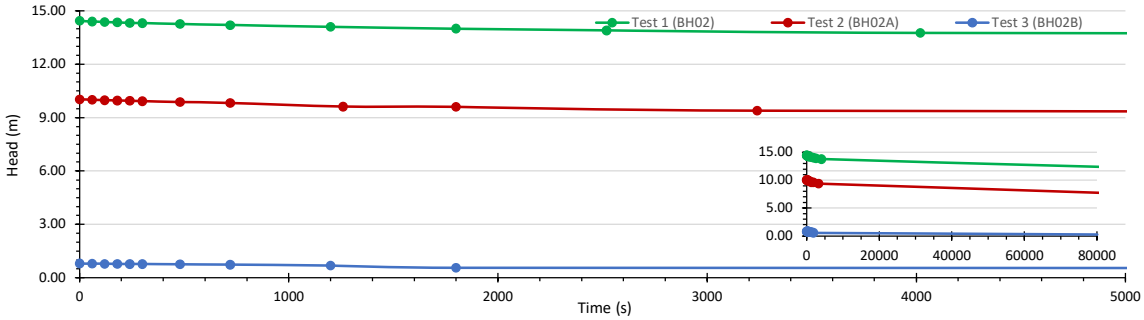


Hydraulic Conductivity (k)

Hvorslev: Hvorslev (1951) *Time Lag and Soil Permeability in Ground-Water Observations* , Fig 18, p49

$$k = \frac{d^2 \ln\left(\frac{mL}{d} + \sqrt{\left(\frac{mL}{d}\right)^2 + 1}\right)}{8L(t_2 - t_1)} \ln\frac{H_1}{H_2} =$$

4.03E-07 ms^{-1} = 3.48E-02 m/day



Data	Time	Tape Avg	Head	Perm. Length	Hvorslev 'k'	Average 'k'
Test No.	(s)	(m)	(m)	(m)	Case G (ms^{-1})	ms^{-1}
Test 1 (BH02)	0	0.00	14.45			2.00E-08
	60	0.05	14.41	13.82	5.26E-08	
	120	0.07	14.38	13.82	2.93E-08	
	180	0.10	14.36	13.82	2.93E-08	
	240	0.12	14.33	13.82	2.94E-08	
	300	0.14	14.32	13.82	1.76E-08	
	480	0.18	14.27	13.82	1.77E-08	
	720	0.25	14.21	13.82	1.92E-08	
	1200	0.35	14.11	13.82	1.49E-08	
	1800	0.45	14.01	13.82	1.20E-08	
	2520	0.55	13.91	13.82	1.01E-08	
	4020	0.69	13.77	13.82	6.82E-09	
	82380	2.10	12.35	13.06	1.47E-09	
Test 2 (BH02A)	0	0.00	10.03			3.48E-08
	60	0.03	10.01	9.36	5.75E-08	
	120	0.05	9.99	9.36	4.61E-08	
	180	0.07	9.97	9.36	4.62E-08	
	240	0.09	9.95	9.36	4.63E-08	
	300	0.10	9.93	9.36	3.48E-08	
	480	0.15	9.89	9.36	3.49E-08	
	720	0.21	9.83	9.36	3.51E-08	
	1260	0.41	9.63	9.36	5.26E-08	
	1800	0.43	9.61	9.36	5.32E-09	
	3240	0.63	9.40	9.36	2.07E-08	
	81600	2.29	7.74	8.57	3.67E-09	
Test 3 (BH02B)	0	0.00	0.80			1.15E-06
	60	0.01	0.79	0.80	1.68E-06	
	120	0.02	0.79	0.79	8.55E-07	
	180	0.02	0.78	0.78	8.63E-07	
	240	0.03	0.78	0.78	8.72E-07	
	300	0.03	0.77	0.77	8.81E-07	
	480	0.05	0.76	0.76	8.99E-07	
	720	0.07	0.73	0.74	1.17E-06	
	1200	0.11	0.69	0.71	1.01E-06	
	1800	0.24	0.56	0.63	3.20E-06	
	80100	0.52	0.29	0.42	9.71E-08	

STRATIGRAPHIC LOG, REF. BH02

Silty/Clayey SAND, lateritic (COLLUVIUM)

FERRICRETE, retrieved as silty/clayey sandy GRAVEL

SAPROLITE

EOH @ 14.45m

CMW Geosciences	CLIENT:	Capricorn Metals Ltd	DESIGNER: PA
	PROJECT:	TSF1 Mt Gibson Gold Project (MGGP), WA	CHECKED: CH
			BH NO.: BH03 (MGA Zone 51J, 0517921 m E, 6707638 m N, RL370 m)
	TITLE:	Falling Head Permeability Test	DATE: 26-28 September 2022
			PROJECT: PER2022-0011

Specifications - Open-Ended Tube

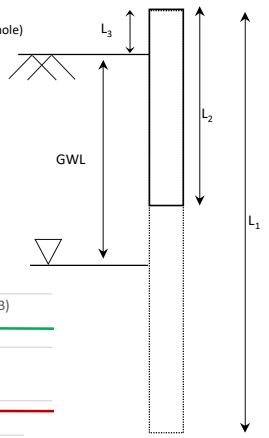
Length L_1 of Tests 1, 2, 3:		Diameter (mm):	Non-Perm L2 (m):	Above Gnd L3 (m):
14.60 m	Test 1:	146	1.30	0.15
9.60 m	Test 2:	146	1.45	0.1
0.60 m	Test 3:	146	0	0

Ground Conditions

GWL: 70 m BGL (Blank = Bottom of hole)

Permeability Anisotropy m: 1 $m = \sqrt{k_h / k_v}$

Bottom of Test Hole: 14.45 m BGL (Test 1)
9.50 m BGL (Test 2)
0.60 m BGL (Test 3)

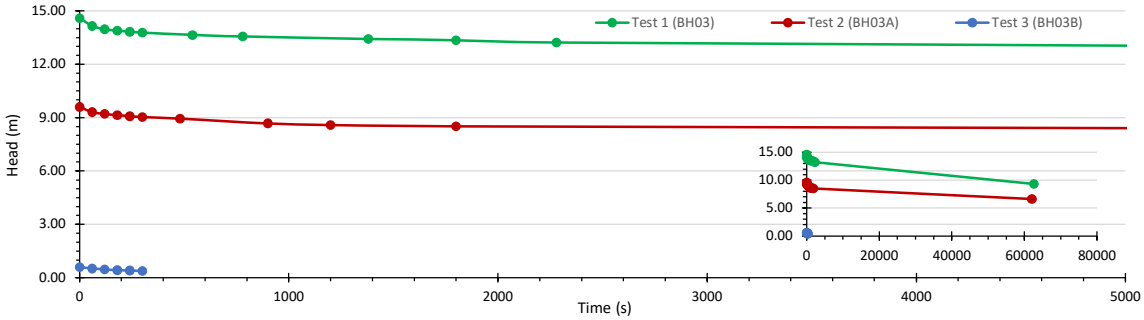


Hydraulic Conductivity (k)

Hvorslev: Hvorslev (1951) *Time Lag and Soil Permeability in Ground-Water Observations* , Fig 18, p49

$$k = \frac{d^2 \ln\left(\frac{mL}{d} + \sqrt{\left(\frac{mL}{d}\right)^2 + 1}\right)}{8L(t_2 - t_1)} \ln\frac{H_1}{H_2} =$$

5.48E-06 ms^{-1} = 4.73E-01 m/day



Data	Time	Tape Avg	Head	Perm. Length	Hvorslev 'k'	Average 'k'
Test No.	(s)	(m)	(m)	(m)	Case G (ms^{-1})	ms^{-1}
Test 1 (BH03)	0	0.00	14.60			1.03E-07
	60	0.44	14.16	13.30	5.32E-07	
	120	0.63	13.97	13.30	2.35E-07	
	180	0.71	13.90	13.30	9.36E-08	
	240	0.77	13.83	13.30	8.15E-08	
	300	0.82	13.78	13.30	6.29E-08	
	540	0.95	13.65	13.30	4.12E-08	
	780	1.04	13.56	13.30	2.87E-08	
	1380	1.17	13.43	13.30	1.67E-08	
	1800	1.25	13.35	13.30	1.48E-08	
	2280	1.37	13.23	13.29	1.96E-08	
	62580	5.28	9.32	11.28	6.92E-09	
Test 2 (BH03A)	0	0.00	9.60			1.85E-07
	60	0.29	9.31	8.15	7.88E-07	
	120	0.39	9.21	8.15	2.77E-07	
	180	0.46	9.15	8.15	1.82E-07	
	240	0.52	9.08	8.15	1.83E-07	
	300	0.57	9.03	8.15	1.42E-07	
	480	0.66	8.95	8.15	8.10E-08	
	900	0.93	8.68	8.15	1.12E-07	
	1200	1.01	8.59	8.15	5.06E-08	
	1800	1.09	8.51	8.15	2.40E-08	
	62040	2.99	6.61	7.56	6.86E-09	
Test 3 (BH03B)	0	0.00	0.60			1.61E-05
	60	0.08	0.52	0.56	2.33E-05	
	120	0.13	0.47	0.50	1.76E-05	
	180	0.17	0.43	0.45	1.62E-05	
	240	0.19	0.41	0.42	8.96E-06	
	300	0.22	0.38	0.40	1.47E-05	
	480	DRY				

STRATIGRAPHIC LOG, REF. BH03

Silty/Clayey SAND, lateritic (COLLUVIUM)

SAPROLITE

EOH @ 14.45m

CMW Geosciences	CLIENT:	Capricorn Metals Ltd	DESIGNER: PA
	PROJECT:	TSF1 Mt Gibson Gold Project (MGGP), WA	CHECKED: CH BH NO.: BH04 (MGA Zone 51J, 0517339 m E, 6708015 m N, RL351 m)
	TITLE:	Falling Head Permeability Test	DATE: 26-28 September 2022 PROJECT: PER2022-0011

Specifications - Open-Ended Tube

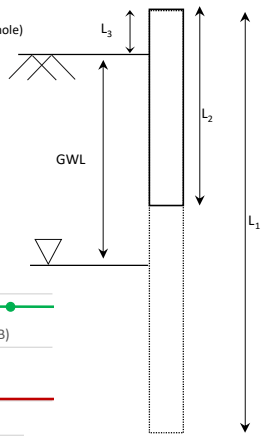
Length L_1 of Tests 1, 2, 3:		Diameter (mm):	Non-Perm L2 (m):	Above Gnd L3 (m):
14.50 m	Test 1:	146	0.90	0
9.60 m	Test 2:	146	0.62	0
0.80 m	Test 3:	146	0	0

Ground Conditions

GWL: 70 m BGL (Blank = Bottom of hole)

Permeability Anisotropy m: 1 $m = \sqrt{k_h/k_v}$

Bottom of Test Hole: 14.50 m BGL (Test 1)
9.60 m BGL (Test 2)
0.80 m BGL (Test 3)

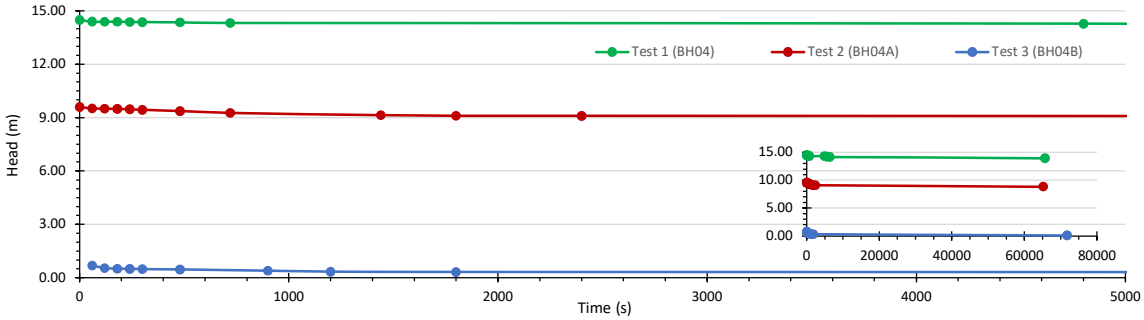


Hydraulic Conductivity (k)

Hvorslev: Hvorslev (1951) *Time Lag and Soil Permeability in Ground-Water Observations*, Fig 18, p49

$$k = \frac{d^2 \ln\left(\frac{mL}{d} + \sqrt{\left(\frac{mL}{d}\right)^2 + 1}\right)}{8L(t_2 - t_1)} \ln\frac{H_1}{H_2} =$$

3.16E-06 ms^{-1} = 2.73E-01 m/day



Data	Time	Tape Avg	Head	Perm. Length	Hvorslev 'k'	Average 'k'
Test No.	(s)	(m)	(m)	(m)	Case G (ms^{-1})	ms^{-1}
Test 1 (BH04)	0	0.00	14.50			1.61E-08
	60	0.10	14.40	13.60	1.18E-07	
	120	0.11	14.40	13.60	5.93E-09	
	180	0.11	14.39	13.60	5.93E-09	
	240	0.12	14.38	13.60	1.19E-08	
	300	0.13	14.38	13.60	5.94E-09	
	480	0.15	14.36	13.60	7.92E-09	
	720	0.18	14.33	13.60	8.93E-09	
	4800	0.22	14.29	13.60	7.02E-10	
	5460	0.28	14.22	13.60	7.08E-09	
	6300	0.34	14.17	13.60	4.72E-09	
	65640	0.58	13.93	13.60	2.95E-10	
Test 2 (BH04A)	0	0.00	9.60			5.17E-08
	60	0.08	9.52	8.98	1.99E-07	
	120	0.10	9.51	8.98	3.75E-08	
	180	0.11	9.50	8.98	2.51E-08	
	240	0.13	9.48	8.98	5.02E-08	
	300	0.16	9.44	8.98	8.81E-08	
	480	0.23	9.37	8.98	5.90E-08	
	720	0.33	9.27	8.98	6.38E-08	
	1440	0.46	9.14	8.98	2.80E-08	
	1800	0.49	9.11	8.98	1.30E-08	
	2400	0.51	9.10	8.98	3.92E-09	
	65160	0.78	8.83	8.96	6.87E-10	
Test 3 (BH04B)	0	0.00	0.80			9.40E-06
	60	0.23	0.57	0.69	4.94E-05	
	120	0.28	0.52	0.55	1.52E-05	
	180	0.30	0.51	0.51	4.99E-06	
	240	0.31	0.50	0.50	3.45E-06	
	300	0.32	0.48	0.49	5.38E-06	
	480	0.36	0.44	0.46	5.22E-06	
	900	0.45	0.35	0.40	6.33E-06	
	1200	0.47	0.33	0.34	2.43E-06	
	1800	0.49	0.31	0.32	1.32E-06	
	71700	0.71	0.09	0.20	2.64E-07	

STRATIGRAPHIC LOG, REF. BH04

Silty/Clayey SAND, lateritic (COLLUVIUM)

FERRICRETE, retrieved as silty/clayey sandy GRAVEL

SAPROLITE

EOH @ 14.5m

CLIENT:	Capricorn Metals Ltd	DESIGNER:	PA
PROJECT:	TSF1 Mt Gibson Gold Project (MGGP), WA	CHECKED:	CH
		BH NO.:	BH05 (MGA Zone 51J, 0517112 m E, 6708413 m N, RL352 m)
TITLE:	Falling Head Permeability Test	DATE:	26-28 September 2022
		PROJECT:	PER2022-0011

Specifications - Open-Ended Tube

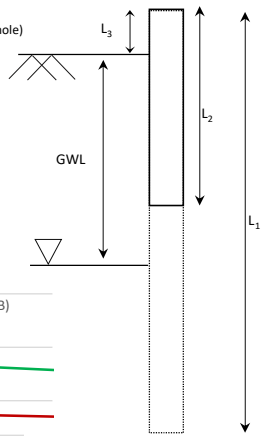
Length L_1 of Tests 1, 2, 3:		Diameter (mm):	Non-Perm L2 (m):	Above Gnd L3 (m):
14.50 m	Test 1:	146	1.04	0
9.45 m	Test 2:	146	0.9	0
0.50 m	Test 3:	146	0	0

Ground Conditions

GWL: 70 m BGL (Blank = Bottom of hole)

Permeability Anisotropy m: 1 $m = \sqrt{k_h / k_v}$

Bottom of Test Hole: 14.50 m BGL (Test 1)
9.45 m BGL (Test 2)
0.50 m BGL (Test 3)

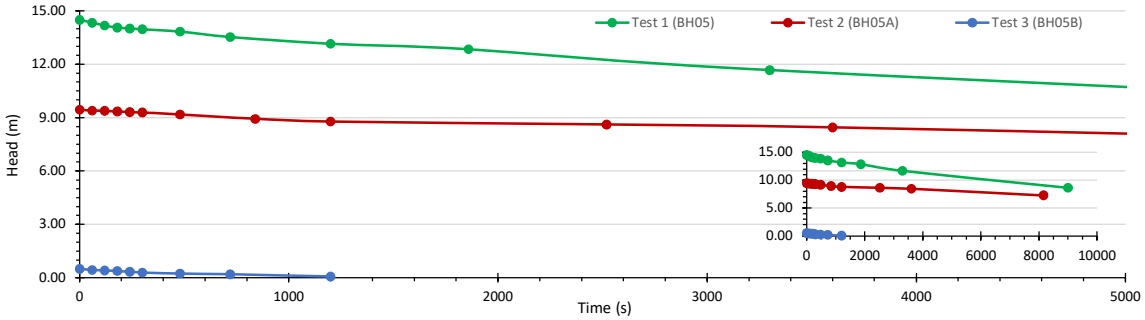


Hydraulic Conductivity (k)

Hvorslev: Hvorslev (1951) *Time Lag and Soil Permeability in Ground-Water Observations* , Fig 18, p49

$$k = \frac{d^2 \ln\left(\frac{mL}{d} + \sqrt{\left(\frac{mL}{d}\right)^2 + 1}\right)}{8L(t_2 - t_1)} \ln\frac{H_1}{H_2} =$$

7.04E-06 ms^{-1} = 6.09E-01 m/day



Data	Time	Tape Avg	Head	Perm. Length	Hvorslev 'k'	Average 'k'
Test No.	(s)	(m)	(m)	(m)	Case G (ms^{-1})	ms^{-1}
Test 1 (BH05)	0	0.00	14.50			9.40E-08
	60	0.16	14.34	13.46	1.91E-07	
	120	0.32	14.18	13.46	1.93E-07	
	180	0.44	14.07	13.46	1.40E-07	
	240	0.49	14.01	13.46	6.74E-08	
	300	0.53	13.97	13.46	4.92E-08	
	480	0.66	13.84	13.46	5.36E-08	
	720	0.97	13.54	13.46	9.59E-08	
	1200	1.35	13.16	13.35	6.17E-08	
	1860	1.65	12.85	13.00	3.77E-08	
	3300	2.83	11.67	12.26	7.45E-08	
	9000	5.89	8.61	10.14	6.92E-08	
Test 2 (BH05A)	0	0.00	9.45			7.29E-08
	60	0.05	9.40	8.55	1.31E-07	
	120	0.07	9.38	8.55	5.27E-08	
	180	0.10	9.35	8.55	7.93E-08	
	240	0.14	9.32	8.55	9.28E-08	
	300	0.16	9.29	8.55	6.65E-08	
	480	0.27	9.18	8.55	9.82E-08	
	840	0.52	8.94	8.55	1.12E-07	
	1200	0.67	8.79	8.55	6.98E-08	
	2520	0.84	8.61	8.55	2.26E-08	
	3600	1.00	8.46	8.53	2.50E-08	
	8160	2.18	7.27	7.86	5.25E-08	
Test 3 (BH05B)	0	0.00	0.50			2.10E-05
	60	0.06	0.44	0.47	2.28E-05	
	120	0.09	0.41	0.43	1.32E-05	
	180	0.12	0.38	0.40	1.47E-05	
	240	0.17	0.34	0.36	2.55E-05	
	300	0.21	0.30	0.32	2.71E-05	
	480	0.27	0.24	0.27	1.72E-05	
	720	0.31	0.19	0.21	1.30E-05	
	1200	0.43	0.07	0.13	3.42E-05	
	1500	DRY				

STRATIGRAPHIC LOG, REF. BH05

Silty/Clayey SAND, lateritic (COLLUVIUM)

FERRICRETE, retrieved as silty/clayey sandy GRAVEL

SAPROLITE

EOH @ 14.5m

CMW Geosciences	CLIENT:	Capricorn Metals Ltd	DESIGNER: PA
	PROJECT:	TSF1 Mt Gibson Gold Project (MGGP), WA	CHECKED: CH BH NO.: BH06 (MGA Zone 51J, 0517370 m E, 6708821 m N, RL347 m)
	TITLE:	Falling Head Permeability Test	DATE: 26-28 September 2022 PROJECT: PER2022-0011

Specifications - Open-Ended Tube

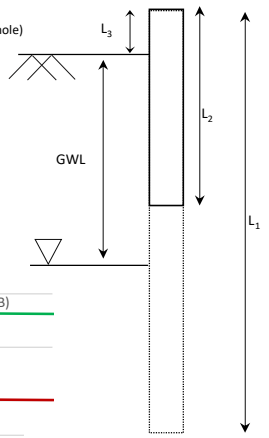
Length L_1 of Tests 1, 2, 3:		Diameter (mm):	Non-Perm L2 (m):	Above Gnd L3 (m):
14.90 m	Test 1:	146	1.20	0
10.10 m	Test 2:	146	0.95	0
1.00 m	Test 3:	146	0	0

Ground Conditions

GWL: 70 m BGL (Blank = Bottom of hole)

Permeability Anisotropy m: 1 $m = \sqrt{k_h / k_v}$

Bottom of Test Hole: 14.90 m BGL (Test 1)
10.10 m BGL (Test 2)
1.00 m BGL (Test 3)

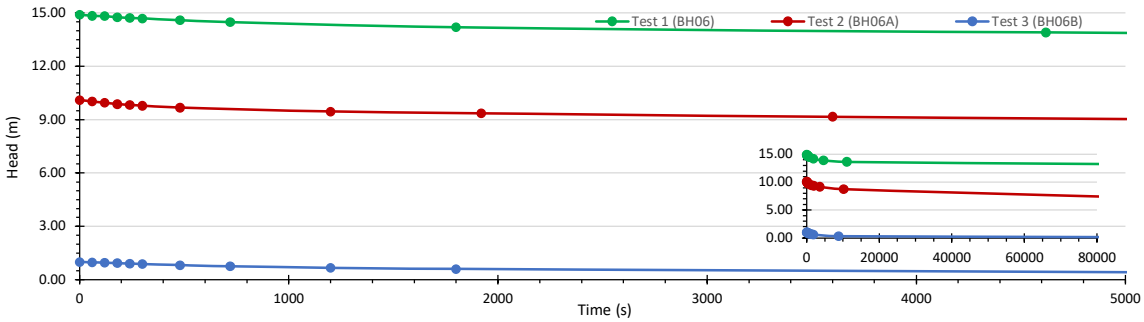


Hydraulic Conductivity (k)

Hvorslev: Hvorslev (1951) *Time Lag and Soil Permeability in Ground-Water Observations*, Fig 18, p49

$$k = \frac{d^2 \ln\left(\frac{mL}{d} + \sqrt{\left(\frac{mL}{d}\right)^2 + 1}\right)}{8L(t_2 - t_1)} \ln\frac{H_1}{H_2} =$$

8.14E-07 ms^{-1} = 7.04E-02 m/day



Data	Time	Tape Avg	Head	Perm. Length	Hvorslev 'k'	Average 'k'
Test No.	(s)	(m)	(m)	(m)	Case G (ms^{-1})	ms^{-1}
Test 1 (BH06)	0	0.00	14.90			3.09E-08
	60	0.06	14.84	13.70	6.85E-08	
	120	0.08	14.82	13.70	2.29E-08	
	180	0.14	14.76	13.70	6.88E-08	
	240	0.18	14.72	13.70	4.60E-08	
	300	0.21	14.69	13.70	3.46E-08	
	480	0.31	14.60	13.70	3.67E-08	
	720	0.42	14.49	13.70	3.21E-08	
	1800	0.71	14.20	13.70	1.91E-08	
	4620	1.00	13.90	13.70	7.58E-09	
	11040	1.27	13.64	13.70	3.05E-09	
	88080	1.70	13.20	13.42	4.36E-10	
Test 2 (BH06A)	0	0.00	10.10			8.44E-08
	60	0.08	10.03	9.15	1.75E-07	
	120	0.15	9.95	9.15	1.76E-07	
	180	0.23	9.88	9.15	1.77E-07	
	240	0.27	9.83	9.15	1.07E-07	
	300	0.32	9.79	9.15	1.08E-07	
	480	0.43	9.68	9.15	8.84E-08	
	1200	0.65	9.46	9.15	4.49E-08	
	1920	0.74	9.36	9.15	1.97E-08	
	3600	0.94	9.17	9.15	1.76E-08	
	10140	1.38	8.72	8.94	1.09E-08	
	87180	2.76	7.34	8.03	3.49E-09	
Test 3 (BH06B)	0	0.00	1.00			2.33E-06
	60	0.03	0.98	0.99	2.97E-06	
	120	0.04	0.96	0.97	1.84E-06	
	180	0.07	0.94	0.95	3.18E-06	
	240	0.09	0.91	0.92	3.32E-06	
	300	0.12	0.89	0.90	3.47E-06	
	480	0.18	0.82	0.85	3.27E-06	
	720	0.25	0.76	0.79	2.78E-06	
	1200	0.33	0.67	0.71	2.13E-06	
	1800	0.40	0.61	0.64	1.55E-06	
	8760	0.68	0.32	0.46	9.86E-07	
	86220	0.84	0.17	0.24	1.20E-07	

STRATIGRAPHIC LOG, REF. BH06

Silty/Clayey SAND, lateritic (COLLUVIUM)

FERRICRETE, retrieved as silty/clayey sandy GRAVEL

SAPROLITE

EOH @ 14.9m

CMW Geosciences	CLIENT:	Capricorn Metals Ltd	DESIGNER: PA
	PROJECT:	TSF1 Mt Gibson Gold Project (MGGP), WA	CHECKED: CH
	TITLE:	Falling Head Permeability Test	BH NO.: BH07 (MGA Zone 50J, 0517706 m E, 6709997 m N, RL331 m) DATE: 26-27 January 2023 PROJECT: PER2022-0011

Specifications - Open-Ended Tube

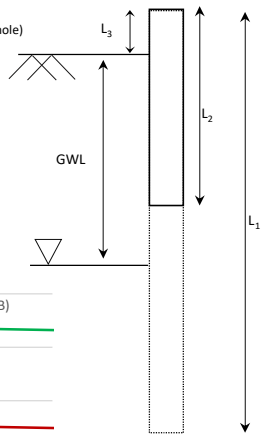
Length L_1 of Tests 1, 2, 3:		Diameter (mm):	Non-Perm L2 (m):	Above Gnd L3 (m):
15.05 m	Test 1:	135	0.75	0
9.70 m	Test 2:	135	0.5	0
0.75 m	Test 3:	135	0	0

Ground Conditions

GWL: 70 m BGL (Blank = Bottom of hole)

Permeability Anisotropy m: 1 $m = \sqrt{k_h / k_v}$

Bottom of Test Hole: 15.05 m BGL (Test 1)
9.70 m BGL (Test 2)
0.75 m BGL (Test 3)

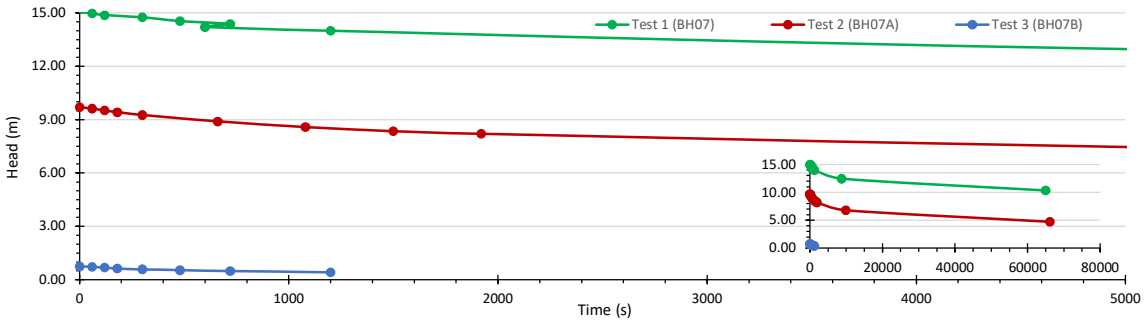


Hydraulic Conductivity (k)

Hvorslev: Hvorslev (1951) *Time Lag and Soil Permeability in Ground-Water Observations* , Fig 18, p49

$$k = \frac{d^2 \ln\left(\frac{mL}{d} + \sqrt{\left(\frac{mL}{d}\right)^2 + 1}\right)}{8L(t_2 - t_1)} \ln\frac{H_1}{H_2} =$$

1.85E-06 ms^{-1} = 1.60E-01 m/day



Data	Time	Tape Avg	Head	Perm. Length	Hvorslev 'k'	Average 'k'
Test No.	(s)	(m)	(m)	(m)	Case G (ms^{-1})	ms^{-1}
Test 1 (BH07)	0	0.00	15.05			3.10E-08
	60	0.08	14.97	14.30	7.58E-08	
	120	0.18	14.87	14.30	9.53E-08	
	300	0.29	14.76	14.30	3.52E-08	
	480	0.51	14.54	14.30	7.12E-08	
	720	0.68	14.37	14.30	4.18E-08	
	600	0.84	14.21	14.29	-7.97E-08	
	1200	1.05	14.00	14.11	2.14E-08	
	8700	2.60	12.45	13.23	1.42E-08	
	64920	4.70	10.35	11.40	3.37E-09	
Test 2 (BH07A)	0	0.00	9.70			1.20E-07
	60	0.08	9.62	9.20	1.68E-07	
	120	0.18	9.52	9.20	2.12E-07	
	180	0.28	9.42	9.20	2.14E-07	
	300	0.44	9.26	9.20	1.74E-07	
	660	0.80	8.90	9.08	1.35E-07	
	1080	1.11	8.59	8.75	1.07E-07	
	1500	1.35	8.35	8.47	8.77E-08	
	1920	1.50	8.20	8.28	5.71E-08	
	9900	2.90	6.80	7.50	3.36E-08	
	66120	4.98	4.73	5.76	1.14E-08	
Test 3 (BH07B)	0	0.00	0.75			5.39E-06
	60	0.03	0.72	0.74	5.05E-06	
	120	0.07	0.69	0.70	6.33E-06	
	180	0.12	0.64	0.66	9.99E-06	
	300	0.17	0.59	0.61	5.65E-06	
	480	0.22	0.54	0.56	4.30E-06	
	720	0.26	0.49	0.51	3.33E-06	
	1200	0.33	0.42	0.46	3.10E-06	
	3300	DRY				

STRATIGRAPHIC LOG, REF. BH05

Gravelly Silty SAND, lateritic (COLLUVIUM)

FERRICRETE, retrieved as gravelly silty/clayey SAND

SAPROLITE

EOH @ 15.05m

CMW Geosciences	CLIENT:	Capricorn Metals Ltd	DESIGNER: PA
	PROJECT:	TSF1 Mt Gibson Gold Project (MGGP), WA	CHECKED: CH
			BH NO.: BH08 (MGA Zone 50J, 0517442 m E, 6709619 m N, RL339 m)
	TITLE:	Falling Head Permeability Test	DATE: 26-27 January 2023
			PROJECT: PER2022-0011

Specifications - Open-Ended Tube

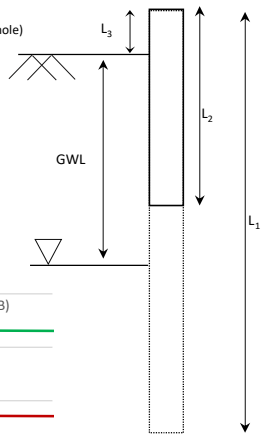
Length L_1 of Tests 1, 2, 3:		Diameter (mm):	Non-Perm L2 (m):	Above Gnd L3 (m):
14.65 m	Test 1:	135	0.50	0
9.55 m	Test 2:	135	0.55	0
0.40 m	Test 3:	135	0	0

Ground Conditions

GWL: 70 m BGL (Blank = Bottom of hole)

Permeability Anisotropy m: 1 $m = \sqrt{k_h / k_v}$

Bottom of Test Hole: 14.65 m BGL (Test 1)
9.55 m BGL (Test 2)
0.40 m BGL (Test 3)

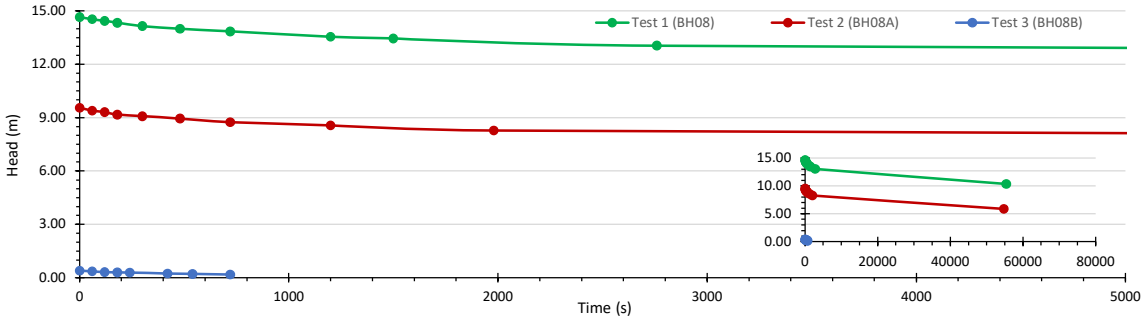


Hydraulic Conductivity (k)

Hvorslev: Hvorslev (1951) *Time Lag and Soil Permeability in Ground-Water Observations* , Fig 18, p49

$$k = \frac{d^2 \ln\left(\frac{mL}{d} + \sqrt{\left(\frac{mL}{d}\right)^2 + 1}\right)}{8L(t_2 - t_1)} \ln\frac{H_1}{H_2} =$$

4.75E-06 ms^{-1} = 4.10E-01 m/day



Data	Time	Tape Avg	Head	Perm. Length	Hvorslev 'k'	Average 'k'
Test No.	(s)	(m)	(m)	(m)	Case G (ms^{-1})	ms^{-1}
Test 1 (BH08)	0	0.00	14.65			5.81E-08
	60	0.11	14.54	14.15	1.08E-07	
	120	0.21	14.44	14.15	9.90E-08	
	180	0.31	14.34	14.15	9.97E-08	
	300	0.50	14.15	14.15	9.57E-08	
	480	0.65	14.00	14.08	5.12E-08	
	720	0.80	13.85	13.93	3.91E-08	
	1200	1.10	13.55	13.70	4.03E-08	
	1500	1.20	13.45	13.50	2.21E-08	
	2760	1.60	13.05	13.25	2.18E-08	
	55380	4.30	10.35	11.70	4.42E-09	
Test 2 (BH08A)	0	0.00	9.55			1.42E-07
	60	0.15	9.40	9.00	3.27E-07	
	120	0.24	9.31	9.00	1.99E-07	
	180	0.38	9.17	9.00	3.13E-07	
	300	0.47	9.08	9.00	1.02E-07	
	480	0.60	8.95	9.00	9.92E-08	
	720	0.80	8.75	8.85	1.18E-07	
	1200	0.98	8.57	8.66	5.53E-08	
	1980	1.27	8.28	8.43	5.76E-08	
	54720	3.68	5.87	7.08	9.77E-09	
Test 3 (BH08B)	0	0.00	0.40			1.40E-05
	60	0.04	0.36	0.38	1.85E-05	
	120	0.08	0.32	0.34	2.18E-05	
	180	0.10	0.30	0.31	1.24E-05	
	240	0.11	0.29	0.30	6.65E-06	
	420	0.16	0.24	0.27	1.29E-05	
	540	0.19	0.21	0.23	1.45E-05	
	720	0.22	0.18	0.20	1.16E-05	
	1200	DRY				

STRATIGRAPHIC LOG, REF. BH05

Gravelly Silty SAND, lateritic (COLLUVIUM)

FERRICRETE, retrieved as gravelly silty/clayey SAND

SAPROLITE

EOH @ 14.65m

CLIENT:	Capricorn Metals Ltd	DESIGNER:	PA
PROJECT:	TSF1 Mt Gibson Gold Project (MGGP), WA	CHECKED:	CH
		BH NO.:	BH09 (MGA Zone 50J, 0518346 m E, 6709624 m N, RL342 m)
TITLE:	Falling Head Permeability Test	DATE:	26-27 January 2023
		PROJECT:	PER2022-0011

Specifications - Open-Ended Tube

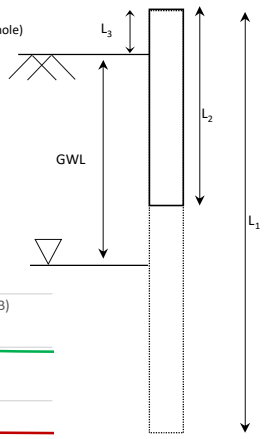
Length L_1 of Tests 1, 2, 3:		Diameter (mm):	Non-Perm L2 (m):	Above Gnd L3 (m):
15.00 m	Test 1:	135	0.55	0
9.85 m	Test 2:	135	0.75	0
1.10 m	Test 3:	135	0	0

Ground Conditions

GWL: 70 m BGL (Blank = Bottom of hole)

Permeability Anisotropy m: 1 $m = \sqrt{k_h / k_v}$

Bottom of Test Hole: 15.00 m BGL (Test 1)
9.85 m BGL (Test 2)
1.10 m BGL (Test 3)

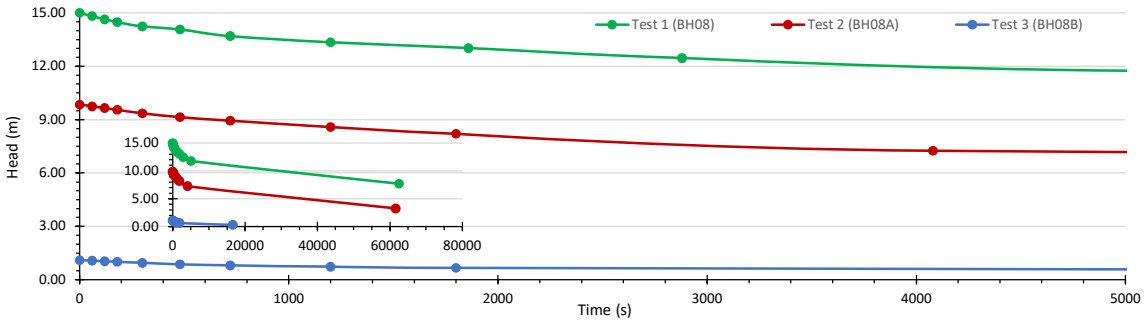


Hydraulic Conductivity (k)

Hvorslev: Hvorslev (1951) *Time Lag and Soil Permeability in Ground-Water Observations* , Fig 18, p49

$$k = \frac{d^2 \ln\left(\frac{mL}{d} + \sqrt{\left(\frac{mL}{d}\right)^2 + 1}\right)}{8L(t_2 - t_1)} \ln\frac{H_1}{H_2} =$$

8.26E-07 ms^{-1} = 7.13E-02 m/day



Data	Time	Tape Avg	Head	Perm. Length	Hvorslev 'k'	Average 'k'
Test No.	(s)	(m)	(m)	(m)	Case G (ms^{-1})	ms^{-1}
Test 1 (BH08)	0	0.00	15.00			8.44E-08
	60	0.18	14.82	14.45	1.70E-07	
	120	0.36	14.64	14.45	1.72E-07	
	180	0.52	14.48	14.45	1.55E-07	
	300	0.76	14.24	14.36	1.18E-07	
	480	0.93	14.07	14.16	5.74E-08	
	720	1.30	13.70	13.89	9.70E-08	
	1200	1.65	13.35	13.53	4.81E-08	
	1860	1.98	13.02	13.19	3.46E-08	
	2880	2.53	12.47	12.75	3.96E-08	
	5040	3.25	11.75	12.11	2.69E-08	
	62520	7.32	7.68	9.72	8.62E-09	
Test 2 (BH08A)	0	0.00	9.85			1.42E-07
	60	0.10	9.75	9.10	2.09E-07	
	120	0.20	9.65	9.10	2.11E-07	
	180	0.30	9.55	9.10	2.13E-07	
	300	0.49	9.36	9.10	2.06E-07	
	480	0.71	9.14	9.10	1.62E-07	
	720	0.91	8.94	9.04	1.14E-07	
	1200	1.26	8.59	8.77	1.05E-07	
	1800	1.65	8.20	8.40	1.01E-07	
	4080	2.60	7.25	7.73	7.55E-08	
	61560	6.60	3.25	5.25	2.64E-08	
Test 3 (BH08B)	0	0.00	1.10			2.25E-06
	60	0.03	1.07	1.09	2.69E-06	
	120	0.06	1.04	1.06	2.82E-06	
	180	0.09	1.01	1.03	2.95E-06	
	300	0.15	0.95	0.98	3.18E-06	
	480	0.23	0.87	0.91	3.19E-06	
	720	0.30	0.81	0.84	2.22E-06	
	1200	0.37	0.73	0.77	1.47E-06	
	1800	0.44	0.67	0.70	1.19E-06	
	16560	0.81	0.29	0.48	5.30E-07	

STRATIGRAPHIC LOG, REF. BH05

Gravelly Silty SAND, lateritic (COLLUVIUM)

FERRICRETE, retrieved as gravelly silty/clayey SAND

SAPROLITE

EOH @ 15m

Appendix E
Laboratory Test Results

WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.6.1 & ψ AS 1289. 3.6.3

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14990_1_PSDHY
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14990
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP07 0.25-0.9m	*Date Tested:*	12/10-17/10/22

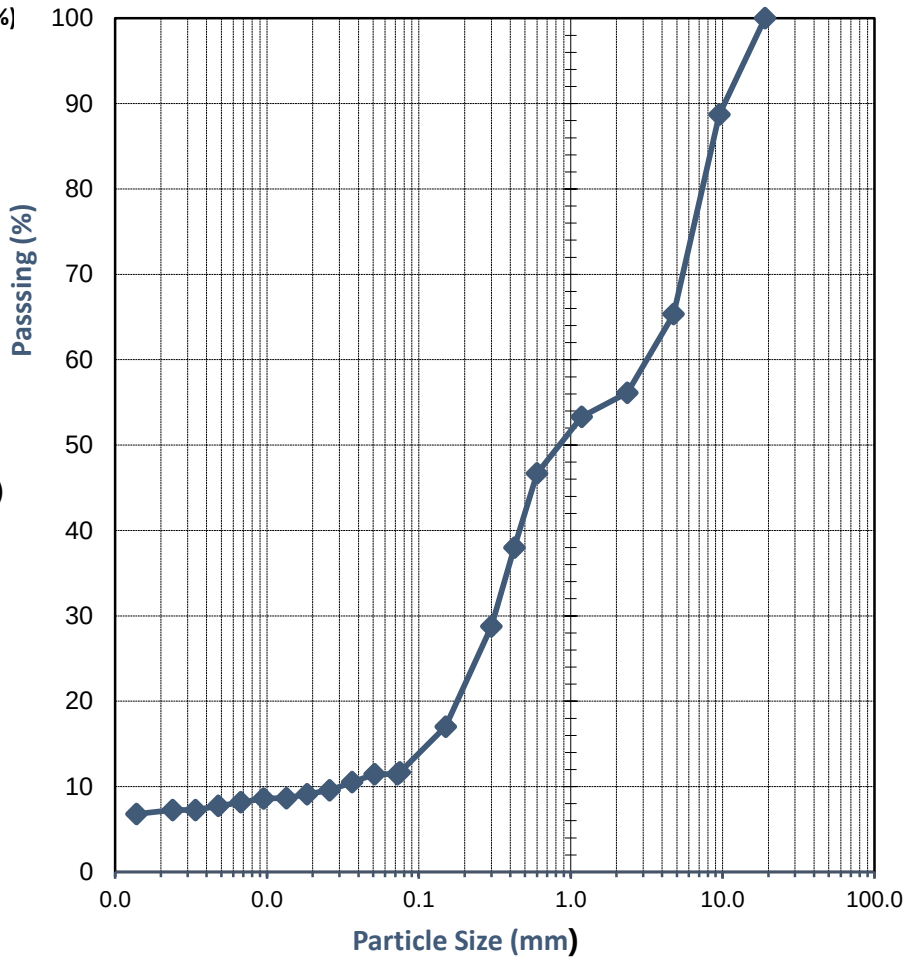
TEST RESULTS - Particle Size Distribution of Soil & Hydrometer Analysis

Sampling Method: **Sampled by Client, Tested as Received**

Sieve Size (mm)	Percent Passing (%)
75.0	
37.5	
19.0	100
9.5	89
4.75	65
2.36	56
1.18	53
0.600	47
0.425	38
0.300	29
0.150	17
0.075	12

Particle Diameter (mm ψ	Percent Finer (%)
0.0722	11
0.0510	11
0.0363	11
0.0258	10
0.0134	9
0.0095	9
0.0067	8
0.0048	8
0.0034	7
0.0024	7
0.0014	7

ψ AS 1289.3.5.1 -2.36mm Particle Density
2.81 g/cm3



Comments: ψ- AS 1289.3.5.1 & ψ AS 1289.3.6.3 - NATA Accreditation does not cover the performance of this service.

Approved Signatory:

Name: Cody O'Neill
Date: 19/October/2022

Accreditation No. 20599
Accredited for compliance with ISO/IEC 17025 - Testing

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.6.1 & ψ AS 1289. 3.6.3

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14991_1_PSDHY
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14991
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP10 0.7-1.35m	*Date Tested:*	12/10-17/10/22

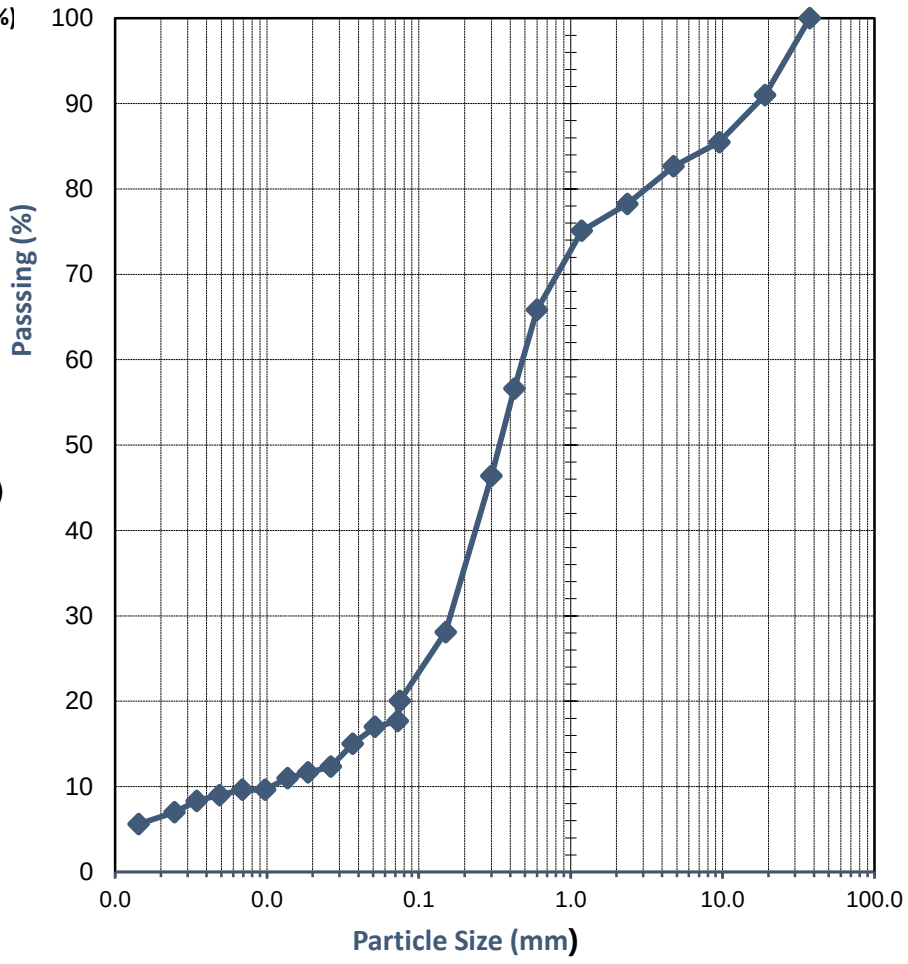
TEST RESULTS - Particle Size Distribution of Soil & Hydrometer Analysis

Sampling Method: **Sampled by Client, Tested as Received**

Sieve Size (mm)	Percent Passing (%)
75.0	
37.5	100
19.0	91
9.5	85
4.75	83
2.36	78
1.18	75
0.600	66
0.425	57
0.300	46
0.150	28
0.075	20

Particle Diameter (mm ψ	Percent Finer (%)
0.0724	18
0.0514	17
0.0367	15
0.0262	12
0.0136	11
0.0097	10
0.0069	10
0.0049	9
0.0034	8
0.0025	7
0.0014	6

ψ AS 1289.3.5.1 -2.36mm Particle Density
2.77 g/cm3



Comments: ψ- AS 1289.3.5.1 & ψ AS 1289.3.6.3 - NATA Accreditation does not cover the performance of this service.

Approved Signatory:

Name: Cody O'Neill
Date: 19/October/2022

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

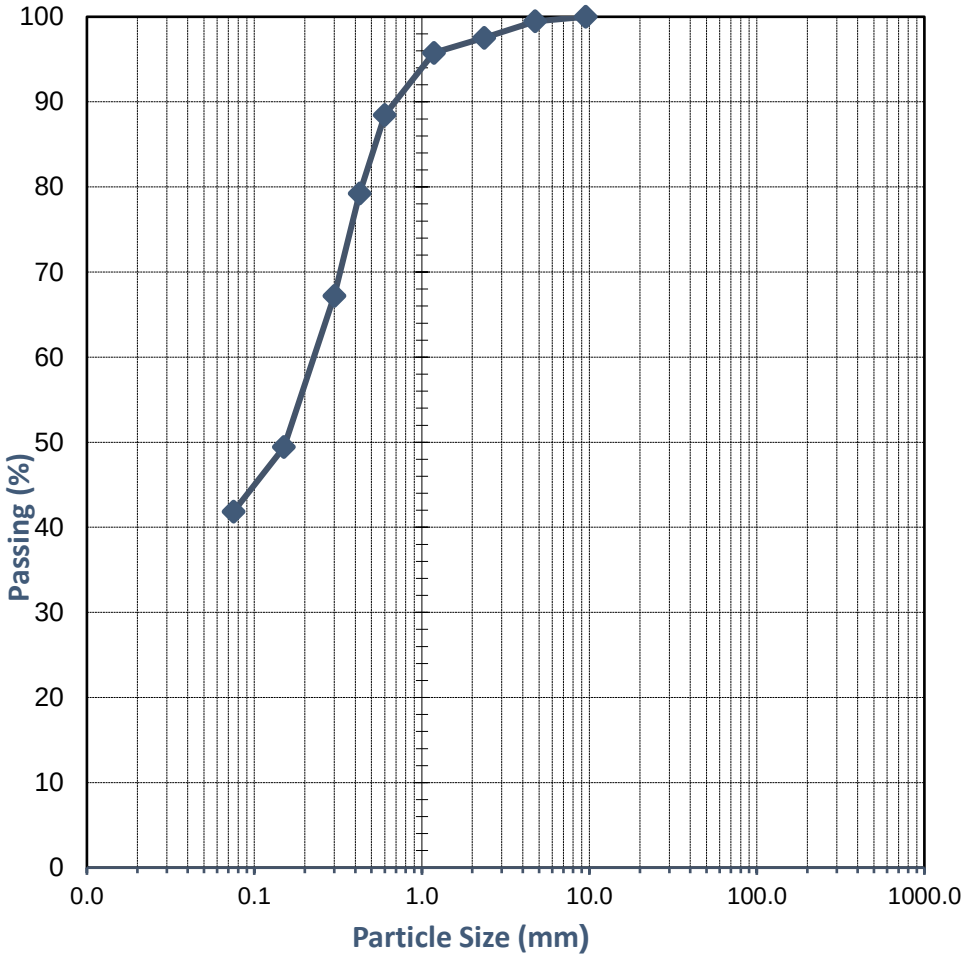
TEST REPORT - AS 1289.3.6.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14992_1_PSD
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14992
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP19 0.4-0.8m	*Date Tested:*	12/10 - 13/10/2022

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	100
4.75	99
2.36	98
1.18	96
0.600	88
0.425	79
0.300	67
0.150	49
0.075	42



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 13/October/2022

Accreditation No. 20599
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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

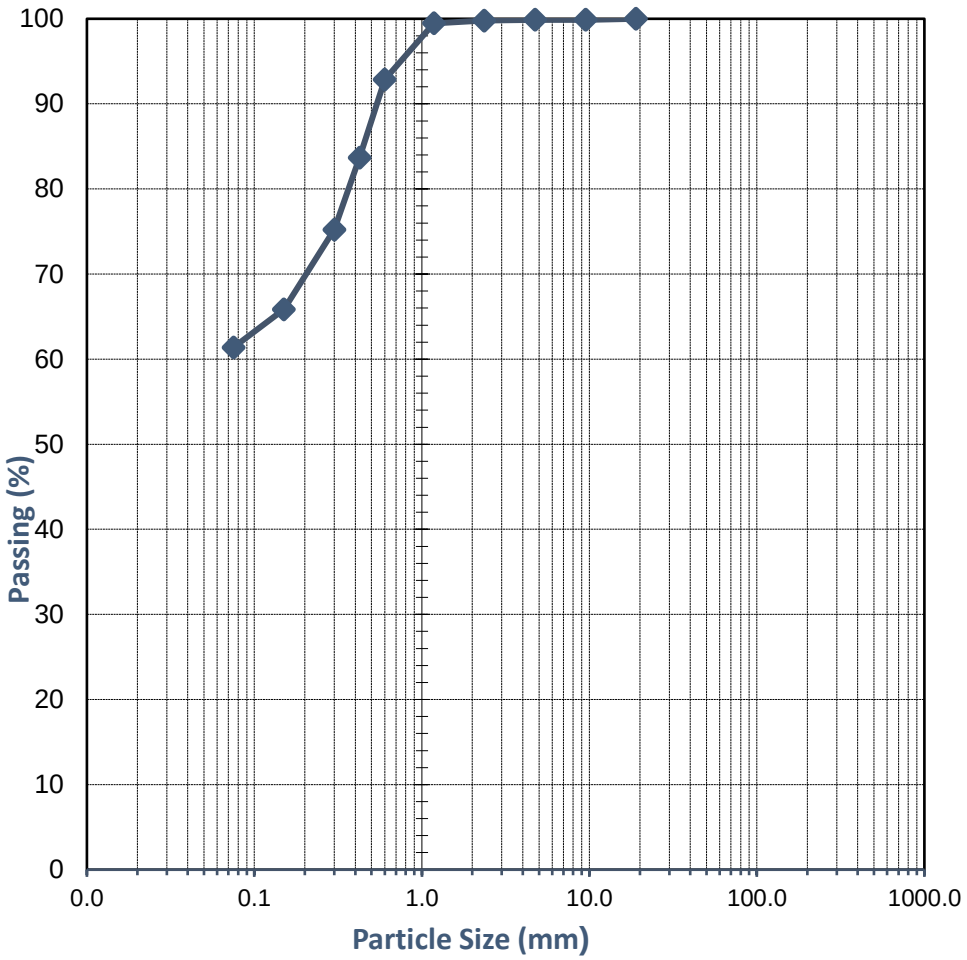
TEST REPORT - AS 1289.3.6.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14993_1_PSD
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14993
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP21 0.8-1.1m	*Date Tested:*	12/10 - 13/10/2022

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	100
9.5	100
4.75	100
2.36	100
1.18	99
0.600	93
0.425	84
0.300	75
0.150	66
0.075	61



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 13/October/2022

Accreditation No. 20599
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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

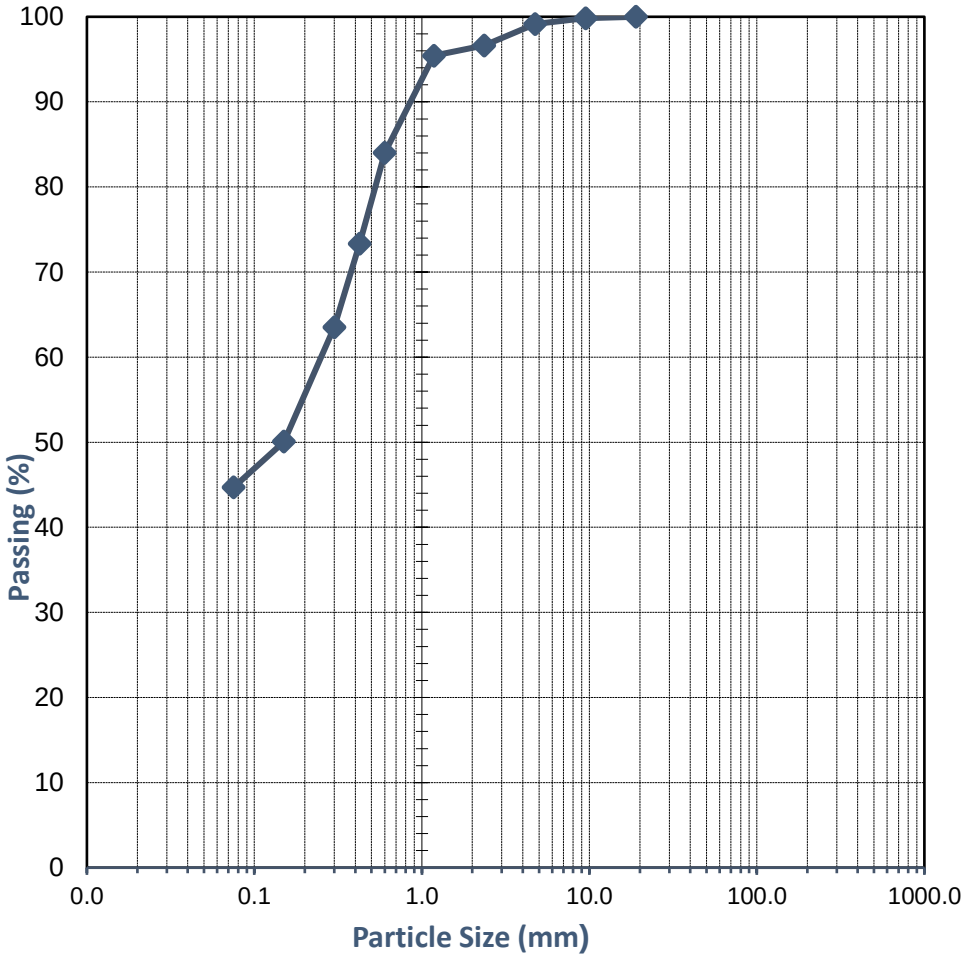
TEST REPORT - AS 1289.3.6.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14994_1_PSD
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14994
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP34 0.5-0.85m	*Date Tested:*	12/10 - 13/10/2022

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	100
9.5	100
4.75	99
2.36	97
1.18	95
0.600	84
0.425	73
0.300	64
0.150	50
0.075	45



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 13/October/2022

Accreditation No. 20599
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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

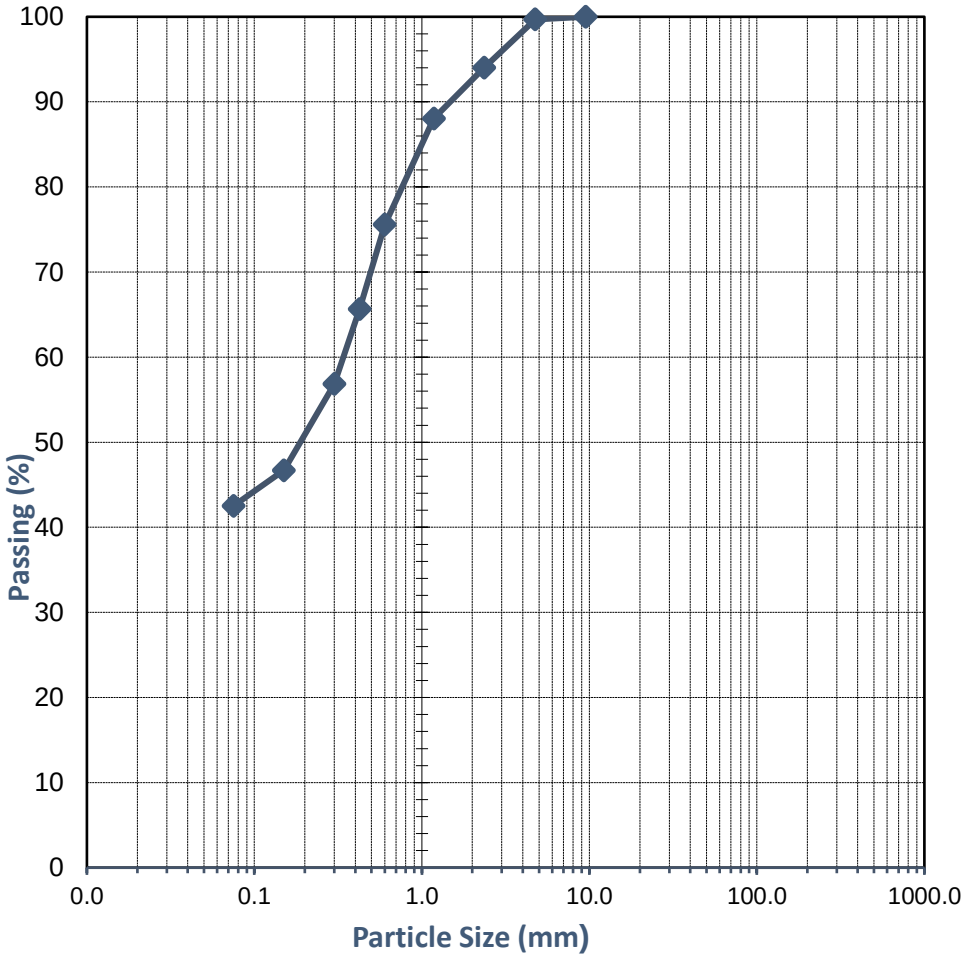
TEST REPORT - AS 1289.3.6.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14995_1_PSD
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14995
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP41 0.3-0.6m	*Date Tested:*	12/10 - 13/10/2022

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	100
4.75	100
2.36	94
1.18	88
0.600	76
0.425	66
0.300	57
0.150	47
0.075	43



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 13/October/2022

Accreditation No. 20599
Accredited for compliance with ISO/IEC 17025 - Testing

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

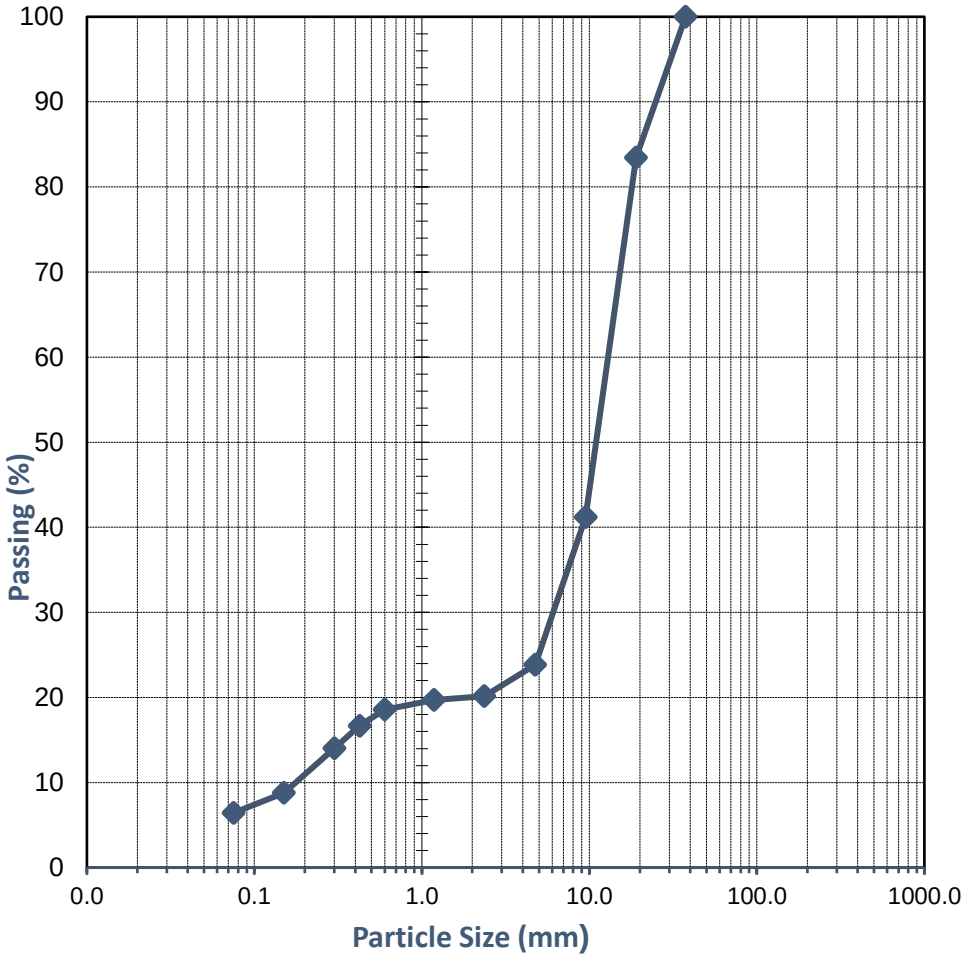
TEST REPORT - AS 1289.3.6.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14996_1_PSD
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14996
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP43 0.5-1m	*Date Tested:*	12/10 - 13/10/2022

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	100
19.0	83
9.5	41
4.75	24
2.36	20
1.18	20
0.600	19
0.425	17
0.300	14
0.150	9
0.075	6



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 13/October/2022

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

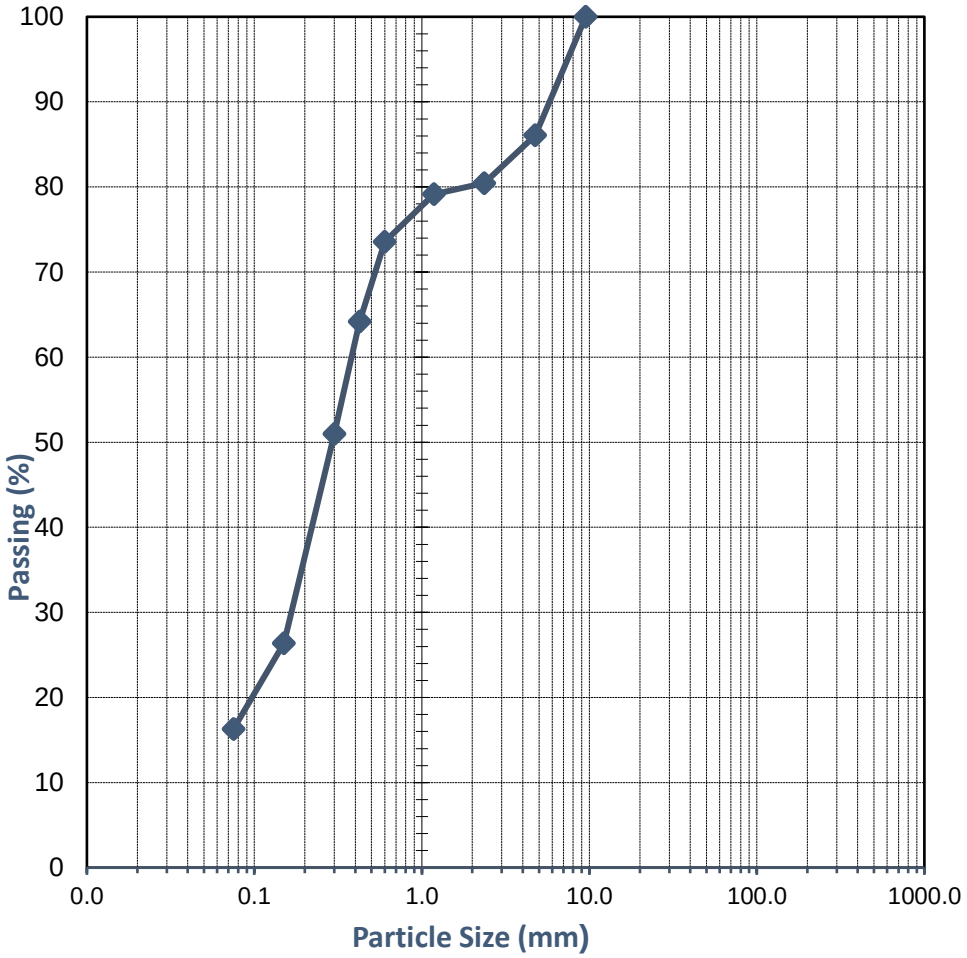
TEST REPORT - AS 1289.3.6.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14997_1_PSD
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14997
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP44 0-0.2m	*Date Tested:*	12/10 - 13/10/2022

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	100
4.75	86
2.36	80
1.18	79
0.600	74
0.425	64
0.300	51
0.150	26
0.075	16



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 13/October/2022

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14990_1_PI
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14990
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP07 0.25-0.9m	*Date Tested:*	13-10-2022

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50^{o}C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**Not Obtainable**
AS 1289.3.2.1	**Plastic Limit (%)**	**Non-Plastic**
AS 1289.3.3.1	**Plasticity Index (%)**	**Non-Plastic**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**1.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**125**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 14-October-2022

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TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14991_1_PI
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14991
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP10 0.7-1.35m	*Date Tested:*	13-10-2022

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50^{o}C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**Not Obtainable**
AS 1289.3.2.1	**Plastic Limit (%)**	**Non-Plastic**
AS 1289.3.3.1	**Plasticity Index (%)**	**Non-Plastic**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**1.5**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 14-October-2022

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14992_1_PI
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14992
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP19 0.4-0.8m	*Date Tested:*	13-10-2022

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50^{o}C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**30**
AS 1289.3.2.1	**Plastic Limit (%)**	**16**
AS 1289.3.3.1	**Plasticity Index (%)**	**14**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**7.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**Curled**

Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 14-October-2022

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14993_1_PI
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14993
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP21 0.8-1.1m	*Date Tested:*	13-10-2022

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50^{o}C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**57**
AS 1289.3.2.1	**Plastic Limit (%)**	**28**
AS 1289.3.3.1	**Plasticity Index (%)**	**29**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**13.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**Cracked, Curled**

Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 14-October-2022

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TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14994_1_PI
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14994
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP34 0.5-0.85m	*Date Tested:*	13-10-2022

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50^{o}C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**35**
AS 1289.3.2.1	**Plastic Limit (%)**	**19**
AS 1289.3.3.1	**Plasticity Index (%)**	**16**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**8.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**Cracked, Curled**

Comments:

Approved Signatory: Coneill

Name: Cody O'Neill

Date: 14-October-2022

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TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14997_1_PI
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14997
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP44 0-0.2m	*Date Tested:*	13-10-2022

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50^{o}C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**Not Obtainable**
AS 1289.3.2.1	**Plastic Limit (%)**	**Non-Plastic**
AS 1289.3.3.1	**Plasticity Index (%)**	**Non-Plastic**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**1.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 14-October-2022

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.5.1.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14990_1_SMDD
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14990
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP07 0.25-0.9m	*Date Tested:*	12/10/2022

TEST RESULTS - Standard Maximum Dry Density

Sampling Method: Sampled by Client, Tested as Received

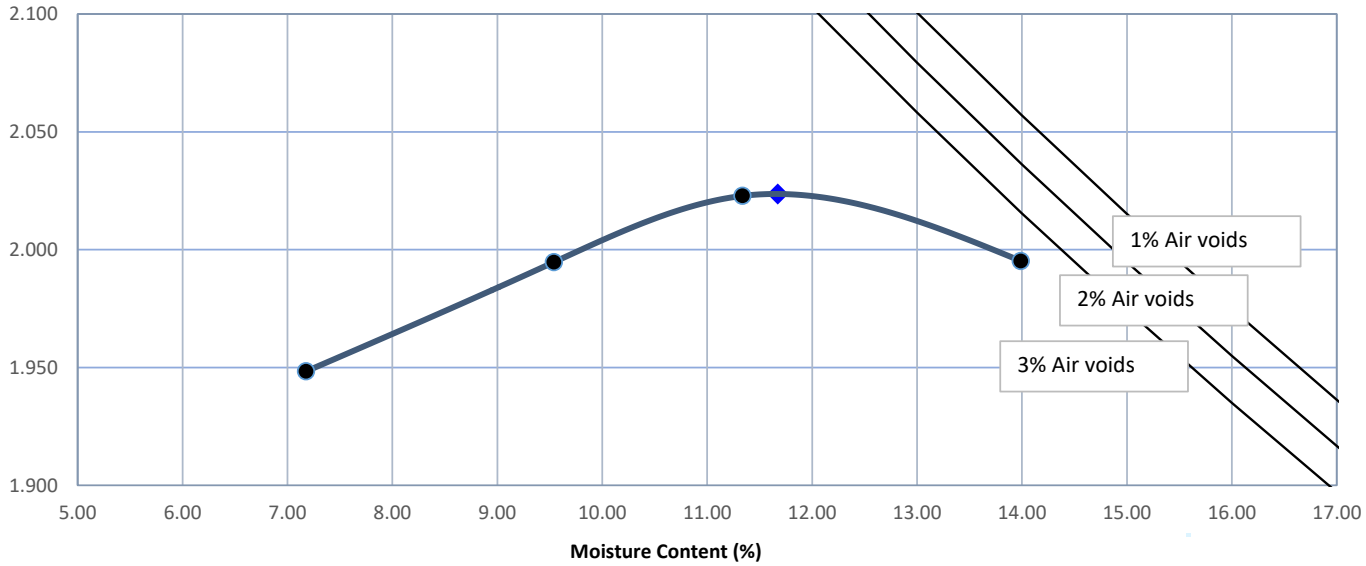
Sample Curing Time: 2 hrs

Method used to Determine Liquid Limit: Visual / Tactile Assessment by Competent Technician

Material + 19.0mm (%): 0 **Material + 37.5mm (%)** -

Moisture Content (%)	**7.2**	**9.5**	**11.3**	**14.0**	
Dry Density (t/m³)	**1.948**	**1.995**	**2.023**	**1.995**	

Dry Density (t/m³)



Standard Maximum Dry Density (t/m³) **2.02**

Optimum Moisture Content (%) **11.5**

Comments: ***The above air void lines are derived from a calculated apparent particle density of 2.93 t/m³***

Approved Signatory:

Name: Cody O'Neill

Date: 13/October/2022

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.5.1.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14991_1_SMDD
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14991
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP10 0.7-1.35m	*Date Tested:*	12/10/2022

TEST RESULTS - Standard Maximum Dry Density

Sampling Method: Sampled by Client, Tested as Received

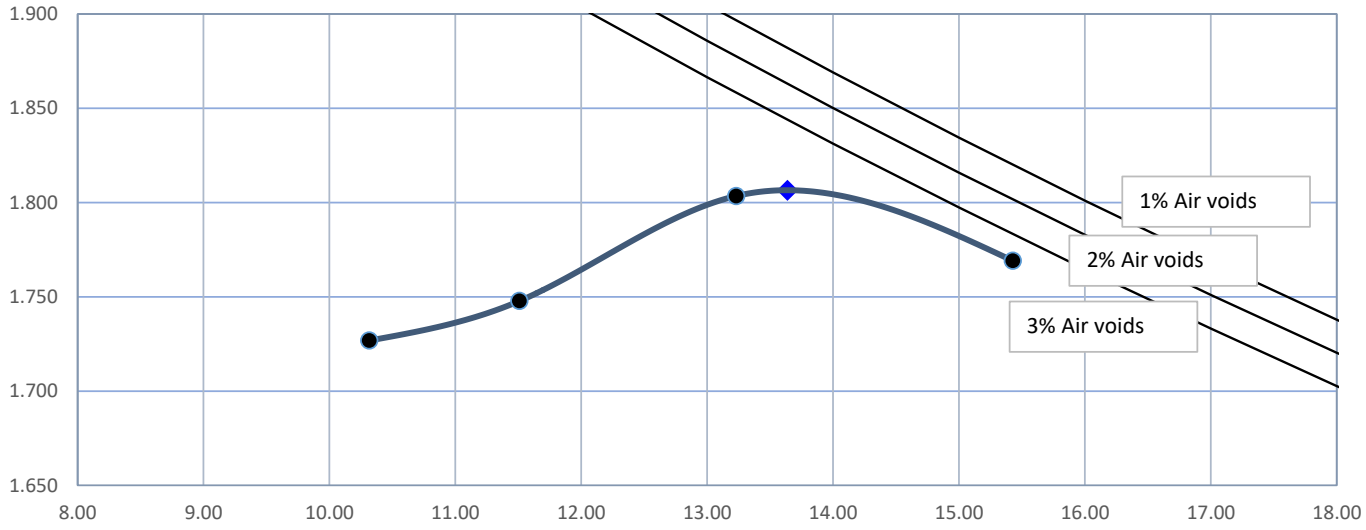
Sample Curing Time: 2 HRS

Method used to Determine Liquid Limit: Visual / Tactile Assessment by Competent Technician

Material + 19.0mm (%): 1 **Material + 37.5mm (%)** -

Moisture Content (%)	**10.3**	**11.5**	**13.2**	**15.4**	
Dry Density (t/m³)	**1.727**	**1.748**	**1.803**	**1.769**	

Dry Density (t/m³)



Standard Maximum Dry Density (t/m³) **1.81**

Optimum Moisture Content (%) **13.5**

Comments: *The above air void lines are derived from a calculated apparent particle density of 2.566 t/m³*

Approved Signatory:

Name: Cody O'Neill

Date: 13/October/2022

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - ψ AS 1289.3.5.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14990_1_PD
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14990
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP07 0.25-0.9m	*Date Tested:*	13/10/2022

TEST RESULTS - SOIL PARTICLE DENSITY -FINE

Sampling Method: **Sampled by Client, Tested as Received**

SOIL APPARENT PARTICLE DENSITY g/cm^3	**2.81**

***Comments:* ψ - NATA Accreditation does not cover the performance of this service.**

Approved Signatory:

Name: Cody O'Neill

Date: 14/10/2022

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - ψ AS 1289.3.5.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14991_1_PD
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14991
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP10 0.7-1.35m	*Date Tested:*	13/10/2022

TEST RESULTS - SOIL PARTICLE DENSITY -FINE

Sampling Method: **Sampled by Client, Tested as Received**

SOIL APPARENT PARTICLE DENSITY g/cm^3	**2.77**

***Comments:* ψ - NATA Accreditation does not cover the performance of this service.**

Approved Signatory:

Name: Cody O'Neill

Date: 14/10/2022

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.8.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14990_1_ECN
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14990
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP07 0.25-0.9m	*Date Tested:*	12/10/2022

TEST RESULTS - Emerson Class Number

Sampling Method:	**Sampled by Client, Tested as Received**
Source of Material:	**Not Specified**
Soil Description:	**Silty Sand with Gravel**
Water Used:	**Distilled**

EMERSON CLASS NUMBER	**5**

Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 13/October/2022

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.8.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14991_1_ECN
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14991
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP10 0.7-1.35m	*Date Tested:*	12/10/2022

TEST RESULTS - Emerson Class Number

Sampling Method:	**Sampled by Client, Tested as Received**
Source of Material:	**Not Specified**
Soil Description:	**Silty Sand with Gravel**
Water Used:	**Distilled**

EMERSON CLASS NUMBER

4

Comments: Calcite present in sample.

Approved Signatory:

Name: Cody O'Neill

Date: 13/October/2022

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.8.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14993_1_ECN
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14993
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP21 0.8-1.1m	*Date Tested:*	12/10/2022

TEST RESULTS - Emerson Class Number

Sampling Method:	**Sampled by Client, Tested as Received**
Source of Material:	**Not Specified**
Soil Description:	**Silty Clay**
Water Used:	**Distilled**

EMERSON CLASS NUMBER

4

Comments: Calcite and Gypsum present in sample.

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 13/October/2022

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.8.1

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14994_1_ECN
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14994
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification:	TP34 0.5-0.85m	*Date Tested:*	12/10/2022

TEST RESULTS - Emerson Class Number

Sampling Method:	**Sampled by Client, Tested as Received**
Source of Material:	**Not Specified**
Soil Description:	**Silty Sand with Gravel**
Water Used:	**Distilled**

EMERSON CLASS NUMBER	**3**

Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 13/October/2022

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WESTERN GEOTECHNICAL & Laboratory Services

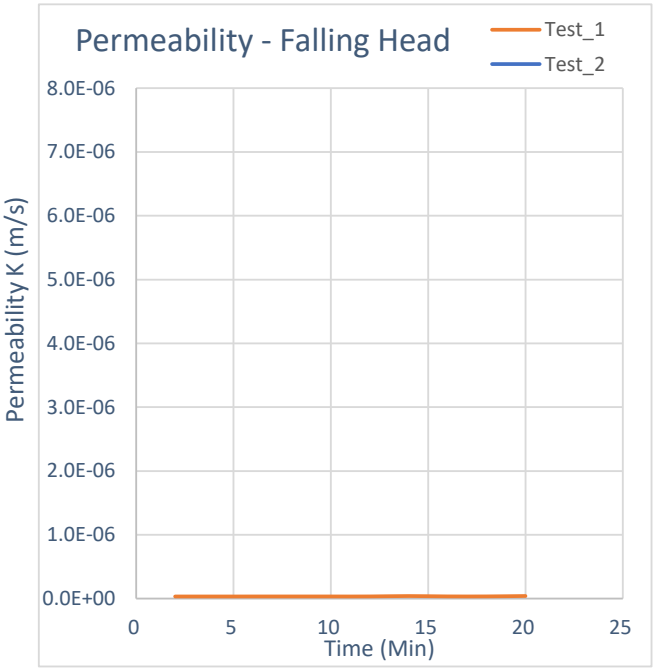
SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT AS 1289.6.7.2

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14990-1_1_FHPERM
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14990-1
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification	TP07 0.25-0.9m	*Date Tested:*	18/10 - 21/10/22

TEST RESULTS - FALLING HEAD PERMEABILITY

Sampling Method: Sampled by Client, Tested as Received



Compaction Details	
Compaction Method	AS1289.5.1.1
Hammer Type	Standard
% Retained of 19.0mm	0.2
Maximum Dry Density (t/m^3)	2.024
Optimum Moisture (%)	11.7
Target Dry Density Ratio	95
Target Moisture Ratio	100

Specimen Conditions at Compaction	
Laboratory Density Ratio (%)	94.6
Laboratory Moisture Ratio (%)	104.0
Surcharge (kPa)	3

Coefficient of Permeability K_{20} (m/s) 3.49E-08

Comments:

Approved Signatory:

Name: Brooke Elliott

Date: 24-October-2022

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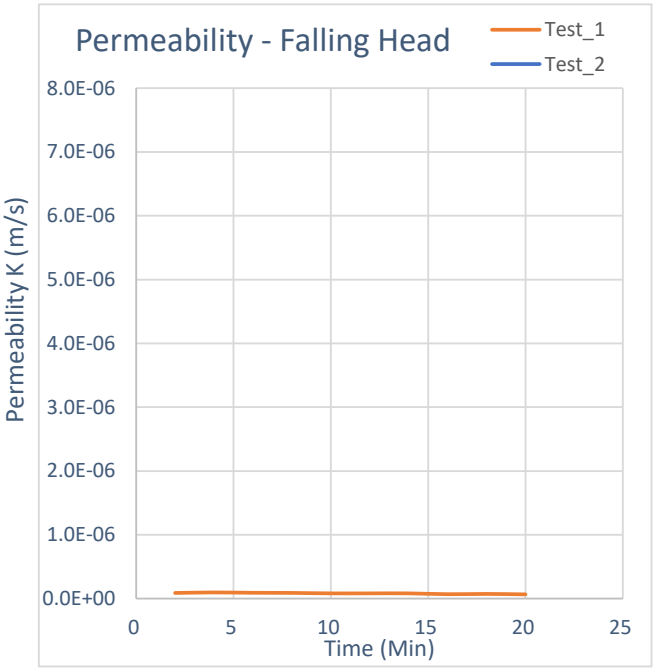
SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT AS 1289.6.7.2

Client:	CMW Geosciences	*Ticket No.*	S7579
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.14991_1_FHPERM
Project:	Mt Gibson TSF - Site Investigation	*Sample No.*	WG22.14991
Location:	Not Specified	*Date Sampled:*	Not Specified
Sample Identification	TP10 0.7-1.35m	*Date Tested:*	12/10-19/10/22

TEST RESULTS - FALLING HEAD PERMEABILITY

Sampling Method: Sampled by Client, Tested as Received



Compaction Details	
Compaction Method	AS1289.5.1.1
Hammer Type	Standard
% Retained of 19.0mm	0.8
Maximum Dry Density (t/m^3)	1.807
Optimum Moisture (%)	13.6
Target Dry Density Ratio	95
Target Moisture Ratio	100

Specimen Conditions at Compaction	
Laboratory Density Ratio (%)	94.5
Laboratory Moisture Ratio (%)	104.6
Surcharge (kPa)	3

Coefficient of Permeability K_{20} (m/s) 8.15E-08

Comments:

Approved Signatory: Coneill

Name: Cody O'Neill

Date: 24-October-2022

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Perth
16 Gympie Way, Willetton
WA 6155
Ph: (08) 9418 8742
E-mail: Phillip.li@eprecisionlab.com

E-Precision Laboratory

MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

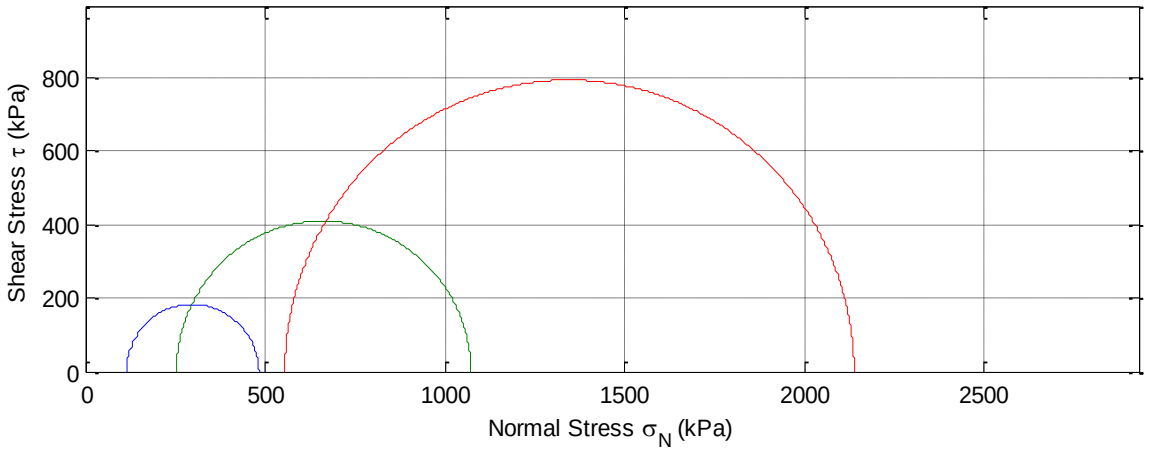
Method: AS1289.6.4.2 2.1.1

Client:	Western Geotechnical Lab Services	Date Tested:	15/10/2022
Project:	Mt Gibson TSF - Site Investigation	EP Lab Job Number:	WGEO
Sample No:	TP07	Lab:	EPLab
Sample ID:	WG22_14490_CU3	Report Date:	24/10/2022
Depth (m):	0.25 - 0.90	Room Temperature at Test:	~ 18°c

Tested by:	Phil Li	Initial Moisture (%):	11.63	Strain Rate (mm/min):	0.007
Height (mm):	125.13	Final Moisture (%):	18.54	Skempton's (B):	0.99
Diameter (mm):	61.80	Bulk Density (t/m³):	2.15	Geology:	-
L/D Ratio:	2.02	Dry Density (t/m³):	1.92	Particle Density (t/m^3):	-

Failure Criteria used: Peak Principle Stress Ratio

Mohr Circle Diagram



Interpretations conducted using Matlab

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	2.04	14.17	47.89
Angle of Shear Resistance Φ' (Degrees) :	37.60	35.37	33.82

Accredited for compliance with ISO/IEC 17025-TESTING

NATA: 19078

Authorised Signatory (Geotechnical Engineer):

NATA ACCREDITATION NO: 19078

Integrity Precision Innovation

Perth
16 Gympie Way, Willetton
WA 6155
Ph: (08) 9418 8742
E-mail: Phillip.li@eprecisionlab.com

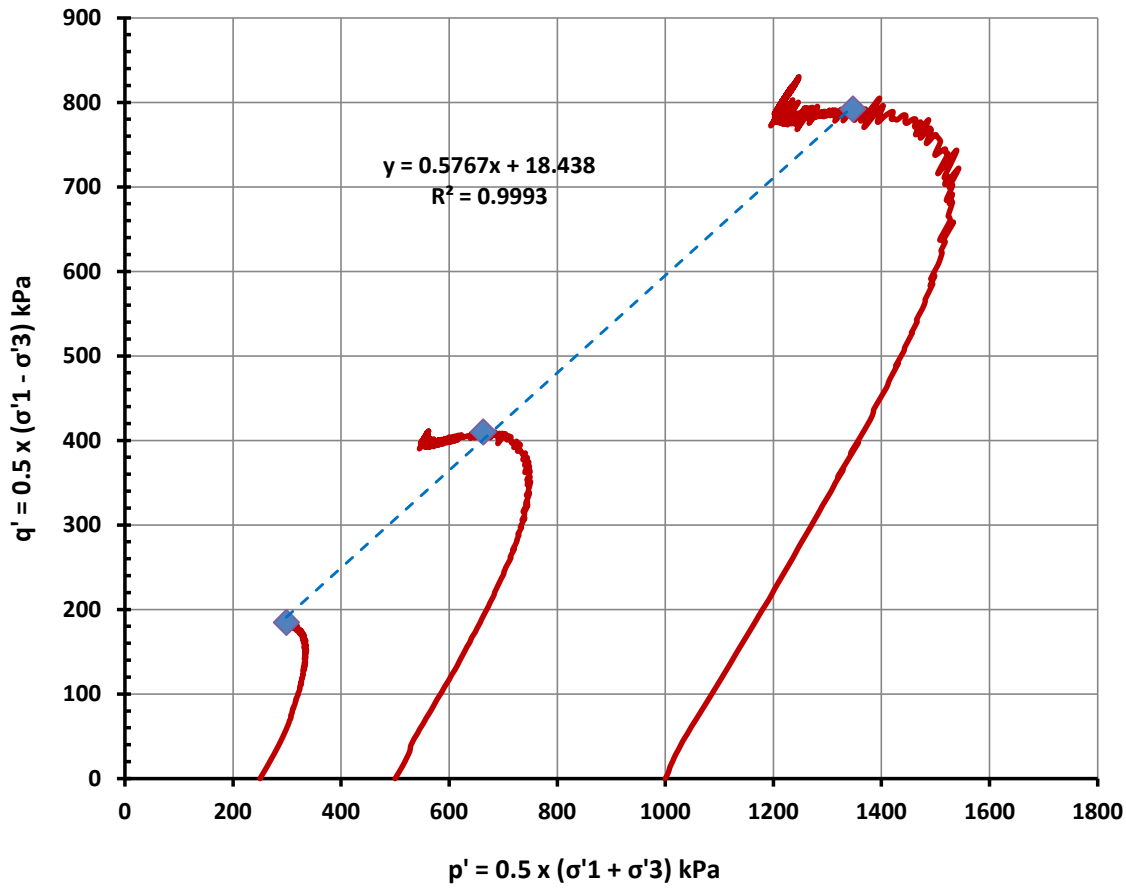
E-Precision Laboratory

MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 2.1.1

Client:	Western Geotechnical Lab Services	Date Tested:	15/10/2022
Project:	Mt Gibson TSF - Site Investigation	EP Lab Job Number:	WGEO
Sample No:	TP07	Lab:	EPLab
Sample ID:	WG22_14490_CU3		
Depth (m):	0.25 - 0.90	Room Temperature at Test:	~ 18°C

MIT Effective Stress Path (q' vs p' diagram)



MIT Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	**22.64**
Angle of Shear Resistance Φ' (Deg) :	**35.45**

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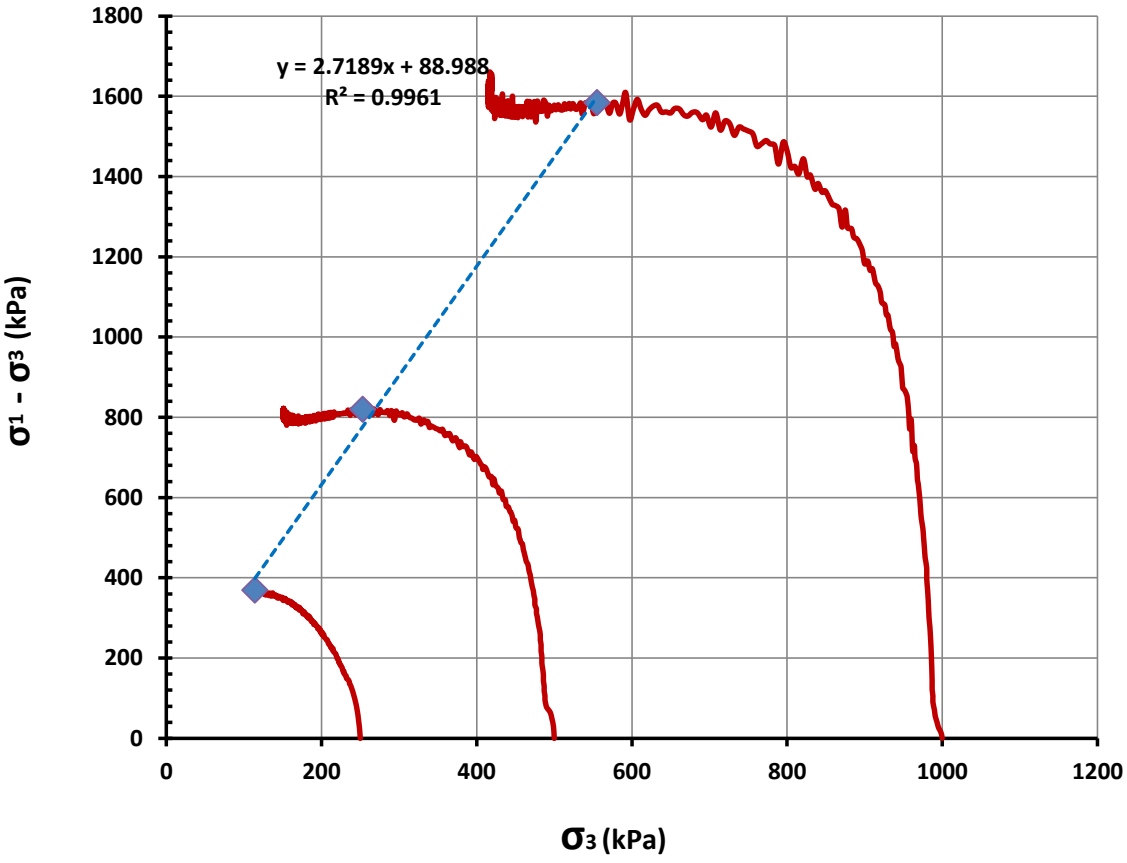
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 2.1.1

Client:	Western Geotechnical Lab Services	Date Tested:	15/10/2022
Project:	Mt Gibson TSF - Site Investigation	EP Lab Job Number:	WGEO
Sample No:	TP07	Lab:	EPLab
Sample ID:	WG22_14490_CU3		
Depth (m):	0.25 - 0.90	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Modified Mohr Coulomb Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	**23.07**
Angle of Shear Resistance Φ' (Deg) :	**35.19**

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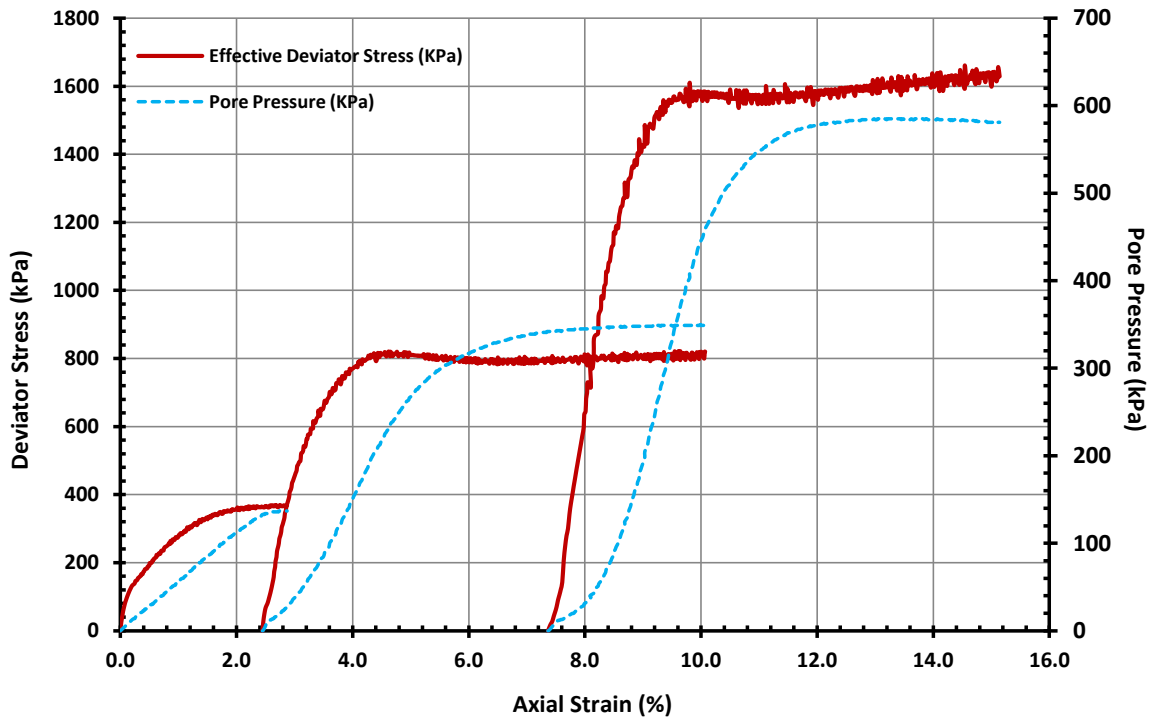
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 2.1.1

Client:	Western Geotechnical Lab Services	Date Tested:	15/10/2022
Project:	Mt Gibson TSF - Site Investigation	EP Lab Job Number:	WGEO
Sample No:	TP07	Lab:	EPLab
Sample ID:	WG22_14490_CU3		
Depth (m):	0.25 - 0.90	Room Temperature at Test:	~ 18°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'0	U'f	Principal Effective Stresses			σ'1 - σ'3	Strain (%)
				σ'1	σ'3	σ'1 / σ'3		
1	250	0	136	483	114	4.24	369	2.66
2	500	0	247	1073	253	4.24	820	4.76
3	1000	0	445	2139	555	3.85	1584	9.99

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E-Precision Laboratory

MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 2.1.1

Client:	Western Geotechnical Lab Services	Date Tested:	15/10/2022
Project:	Mt Gibson TSF - Site Investigation	EP Lab Job Number:	WGEO
Sample No:	TP07	Lab:	EPLab
Sample ID:	WG22_14490_CU3		
Depth (m):	0.25 - 0.90	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: TP07 **Depth (m):** 0.25 - 0.90
Lab ID: WG22_14490_CU3 **Date Tested:** 15/10/2022

Failure Mode: Bulging Failure

Notes: **Sample remolded to 95% MDD @ OMC**
Stored and Tested the Sample as received
Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):**

NATA ACCREDITATION NO: 19078

The results of tests performed apply only to the specific sample at time of test unless otherwise clearly stated. Reference should be made to E-Precision Laboratory's "Standard Terms and Conditions" E-Precision Laboratory ABN 431 559 578 87

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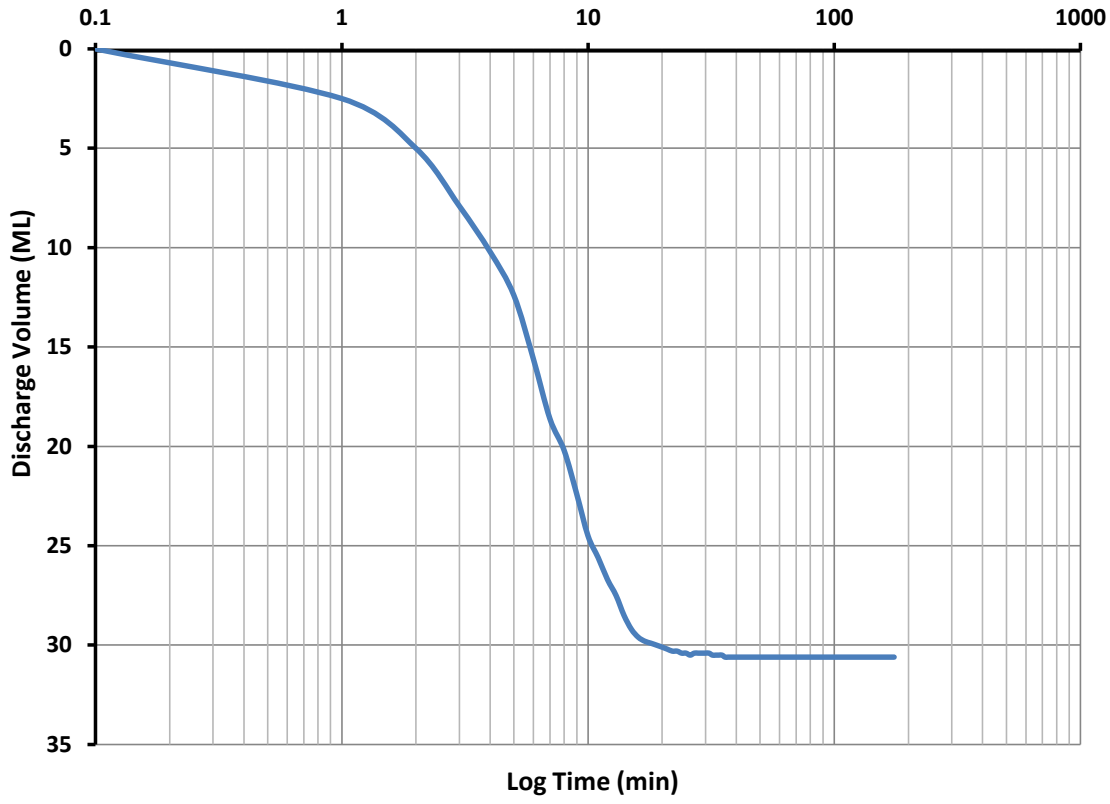
E-Precision Laboratory

MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 2.1.1

Client:	Western Geotechnical Lab Services	Date Tested:	15/10/2022
Project:	Mt Gibson TSF - Site Investigation	EP Lab Job Number:	WGEO
Sample No:	TP07	Lab:	EPLab
Sample ID:	WG22_14490_CU3		
Depth (m):	0.25 - 0.90	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.292 based on t_{90}

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

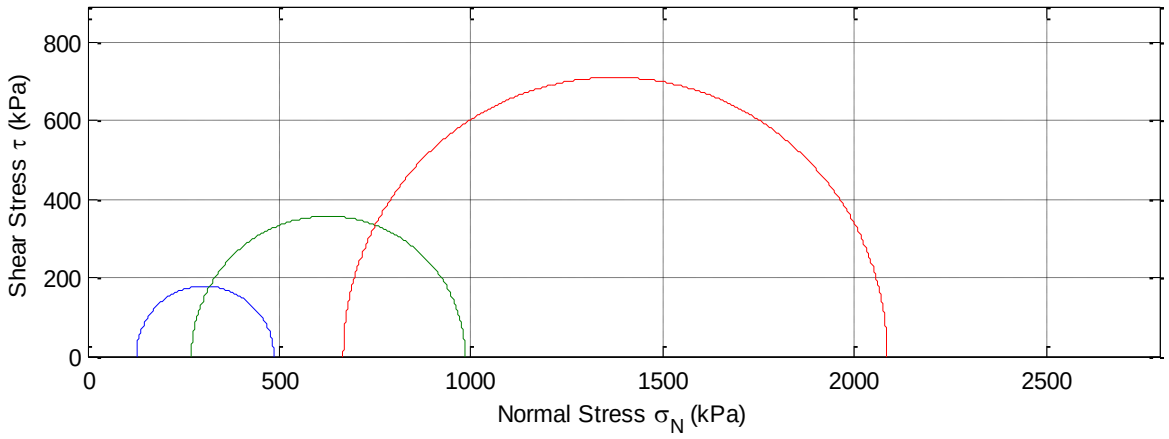
Method: AS1289.6.4.2 2.1.1

Client:	Western Geotechnical Lab Services	Date Tested:	15/10/2022
Project:	Mt Gibson TSF - Site Investigation	EP Lab Job Number:	WGEO
Sample No:	TP10	Lab:	EPLab
Sample ID:	WG22_14491_CU3	Report Date:	24/10/2022
Depth (m):	0.70 - 1.35	Room Temperature at Test:	~ 18°c

Tested by:	Phil Li	Initial Moisture (%):	13.49	Strain Rate (mm/min):	0.007
Height (mm):	124.78	Final Moisture (%):	20.92	Skempton's (B):	1
Diameter (mm):	61.80	Bulk Density (t/m³):	1.95	Geology:	-
L/D Ratio:	2.02	Dry Density (t/m³):	1.72	Particle Density (t/m^3):	-

Failure Criteria used: Peak Principle Stress Ratio

Mohr Circle Diagram



Interpretations conducted using Matlab

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	12.33	31.87	69.43
Angle of Shear Resistance Φ' (Degrees) :	33.42	29.68	27.92

Accredited for compliance with ISO/IEC 17025-TESTING
NATA: 19078

Authorised Signatory (Geotechnical Engineer):

NATA ACCREDITATION NO: 19078

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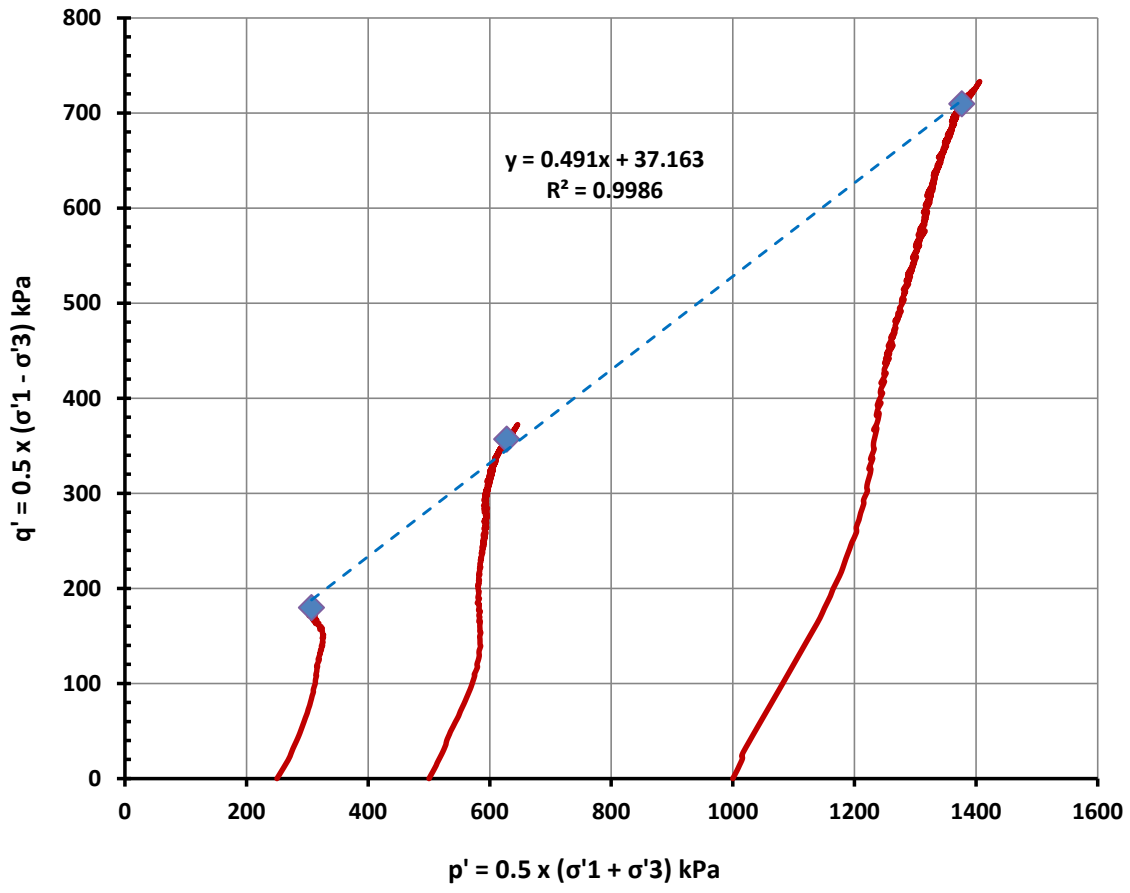
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 2.1.1

Client:	Western Geotechnical Lab Services	Date Tested:	15/10/2022
Project:	Mt Gibson TSF - Site Investigation	EP Lab Job Number:	WGEO
Sample No:	TP10	Lab:	EPLab
Sample ID:	WG22_14491_CU3		
Depth (m):	0.70 - 1.35	Room Temperature at Test:	~ 18°C

MIT Effective Stress Path (q' vs p' diagram)



MIT Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : 42.63

Angle of Shear Resistance Φ' (Deg) : 29.34

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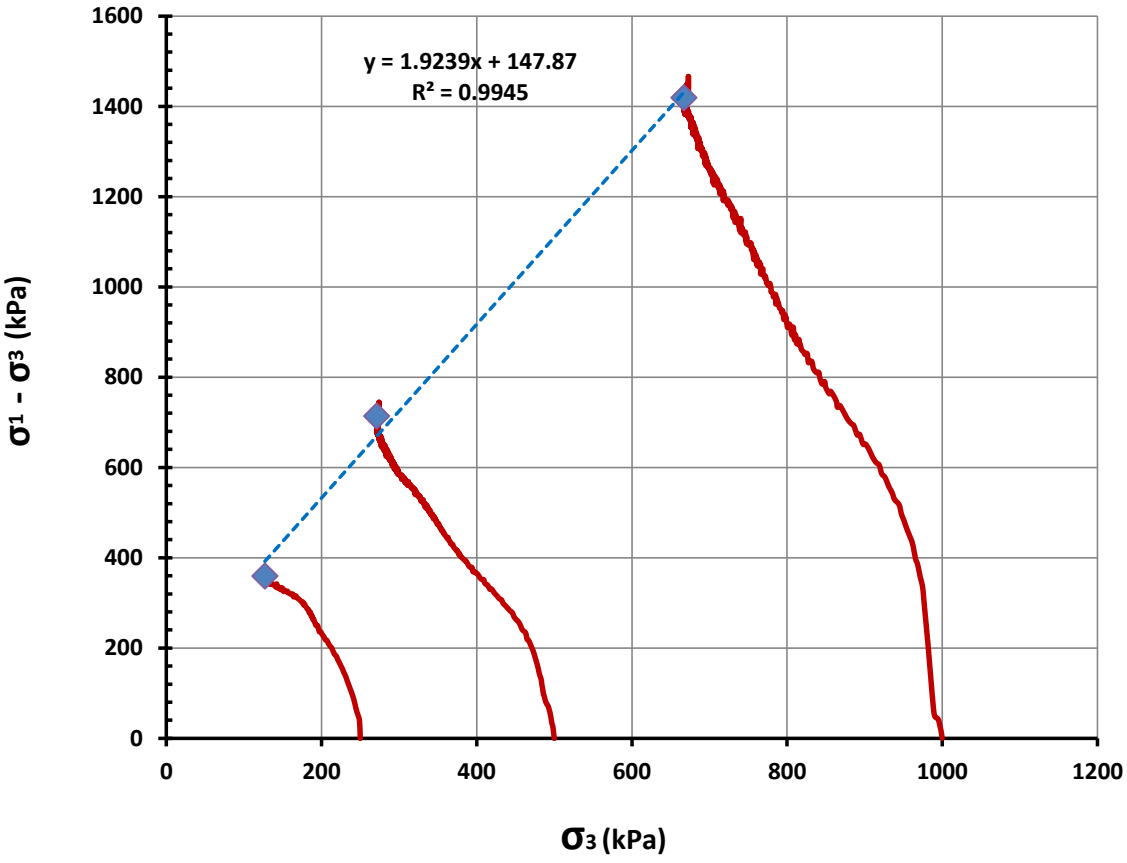
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 2.1.1

Client:	Western Geotechnical Lab Services	Date Tested:	15/10/2022
Project:	Mt Gibson TSF - Site Investigation	EP Lab Job Number:	WGEO
Sample No:	TP10	Lab:	EPLab
Sample ID:	WG22_14491_CU3		
Depth (m):	0.70 - 1.35	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Modified Mohr Coulomb Path - Using Stress Path Tangency Method

Cohesion C' (kPa) :	**43.27**
Angle of Shear Resistance Φ' (Deg) :	**29.33**

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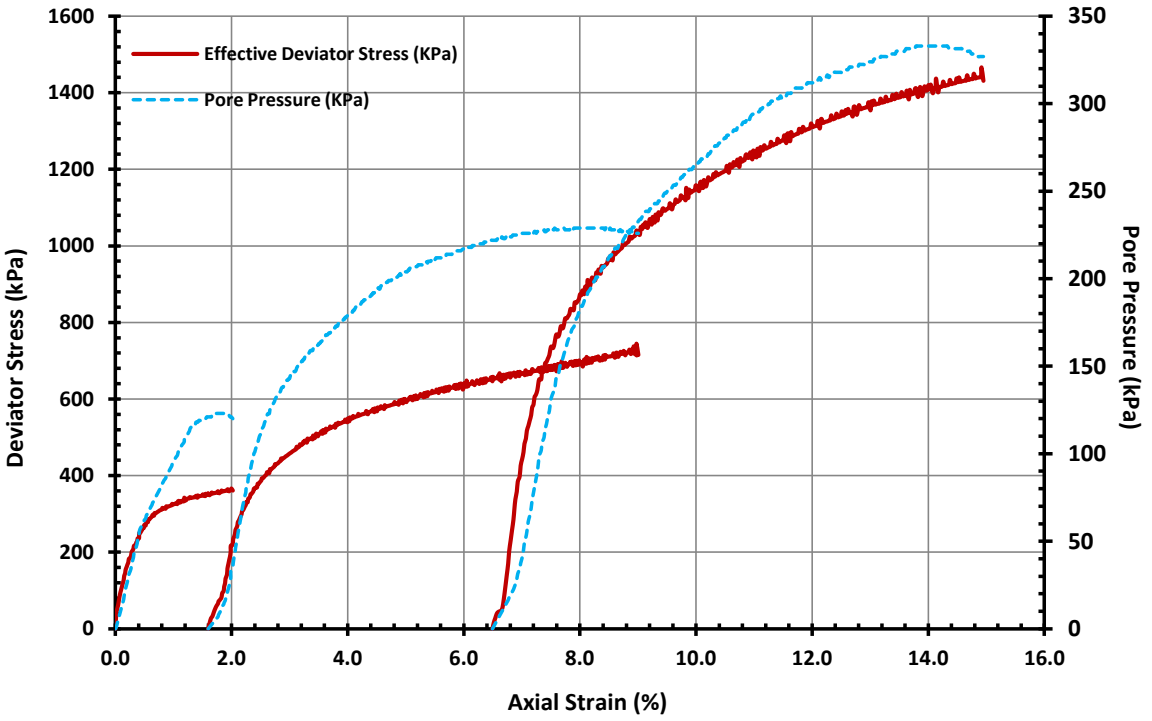
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 2.1.1

Client:	Western Geotechnical Lab Services	Date Tested:	15/10/2022
Project:	Mt Gibson TSF - Site Investigation	EP Lab Job Number:	WGEO
Sample No:	TP10	Lab:	EPLab
Sample ID:	WG22_14491_CU3		
Depth (m):	0.70 - 1.35	Room Temperature at Test:	~ 18°C

Deviator Stress Vs Strain Diagram



SHEAR STAGE DATA AND STRESS MEASUREMENTS (kPa)

Shear Stage	Confining Pressure	U'_0	U'_f	Principal Effective Stresses			$\sigma'_1 - \sigma'_3$	Strain (%)
				σ'_1	σ'_3	σ'_1 / σ'_3		
1	250	0	123	486	127	3.83	359	1.88
2	500	0	229	985	271	3.63	714	8.40
3	1000	0	333	2086	667	3.13	1419	14.30

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MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 2.1.1

Client:	Western Geotechnical Lab Services	Date Tested:	15/10/2022
Project:	Mt Gibson TSF - Site Investigation	EP Lab Job Number:	WGEO
Sample No:	TP10	Lab:	EPLab
Sample ID:	WG22_14491_CU3		
Depth (m):	0.70 - 1.35	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: TP10 **Depth (m):** 0.70 - 1.35
Lab ID: WG22_14491_CU3 **Date Tested:** 15/10/2022

Failure Mode: Bulging Failure

Notes: **Sample remolded to 95% MDD @ OMC**
Stored and Tested the Sample as received
Samples supplied by the Client

NATA: 19078

Authorised Signatory (Geotechnical Engineer):

NATA
ACCREDITATION NO: 19078

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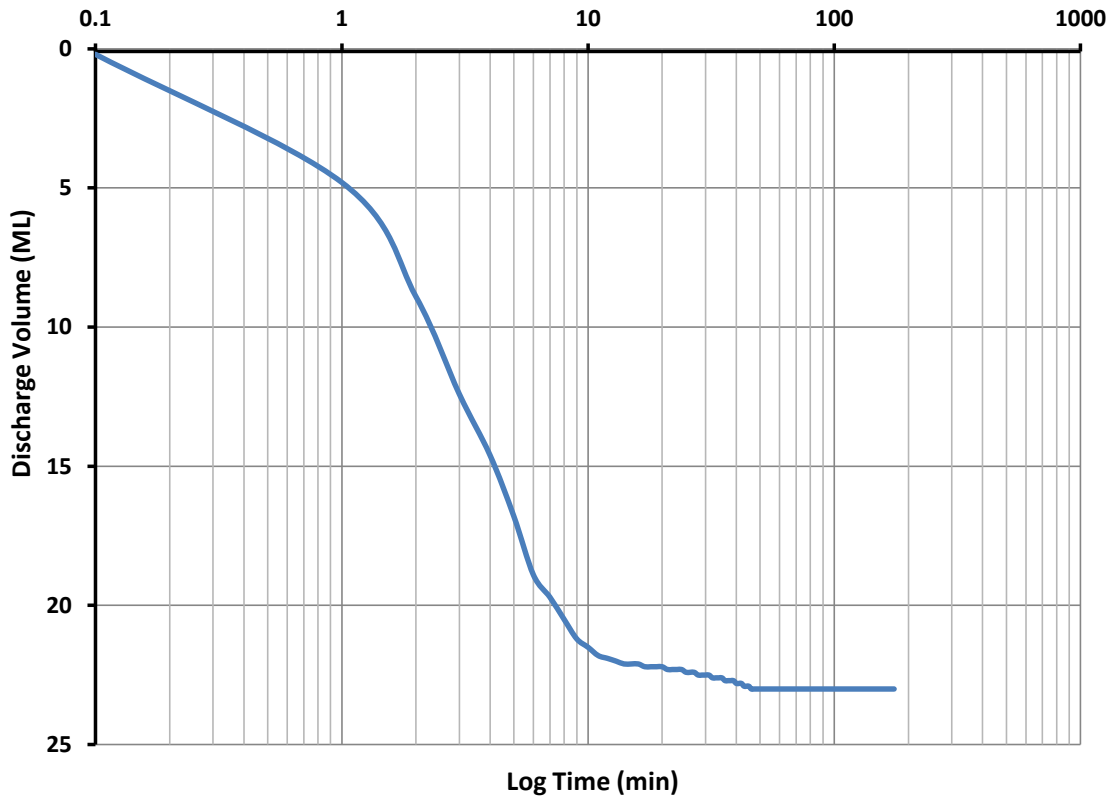
MULTI-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 2.1.1

Client:	Western Geotechnical Lab Services	Date Tested:	15/10/2022
Project:	Mt Gibson TSF - Site Investigation	EP Lab Job Number:	WGEO
Sample No:	TP10	Lab:	EPLab
Sample ID:	WG22_14491_CU3		
Depth (m):	0.70 - 1.35	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.107 based on t_{90}

WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

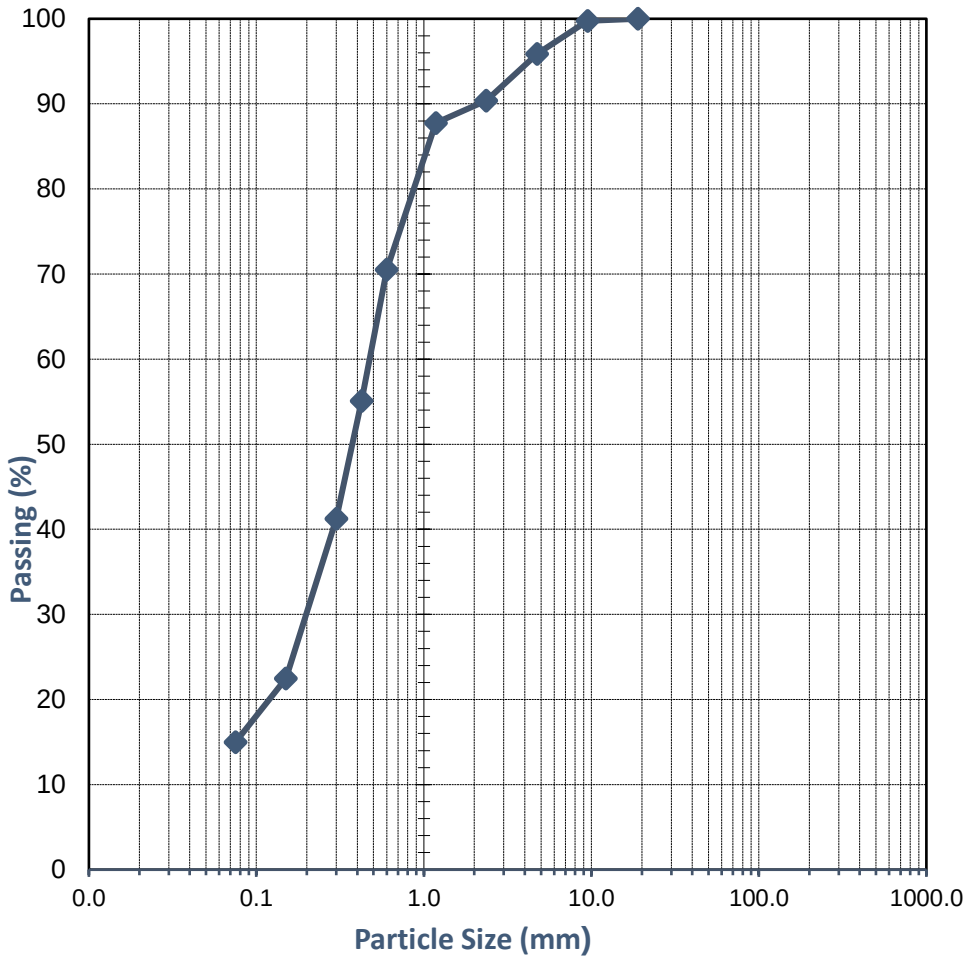
TEST REPORT - AS 1289.3.6.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2136_1_PSD
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2136
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP55 (0-0.15)m	*Date Tested:*	07/02 - 08/02/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	100
9.5	100
4.75	96
2.36	90
1.18	88
0.600	71
0.425	55
0.300	41
0.150	22
0.075	15



Comments:

Approved Signatory:

Name: Natasha Bielawski

Date: 08/February/2023

NATA WORLD RECOGNISED ACCREDITATION

Accreditation No. 20599
Accredited for compliance with ISO/IEC 17025 - Testing

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

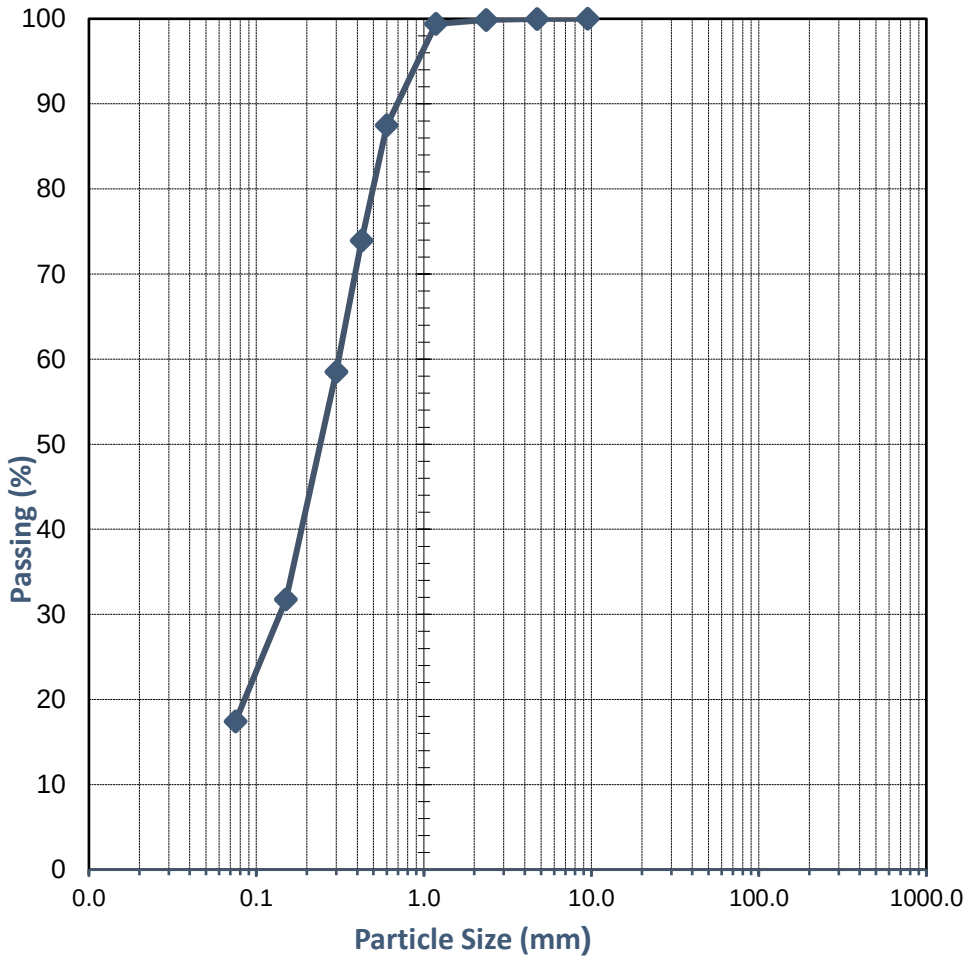
TEST REPORT - AS 1289.3.6.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2137_1_PSD
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2137
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP58 (0.2-0.5)m	*Date Tested:*	7/02 - 8/02/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	100
4.75	100
2.36	100
1.18	99
0.600	87
0.425	74
0.300	59
0.150	32
0.075	17



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 09-February-2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

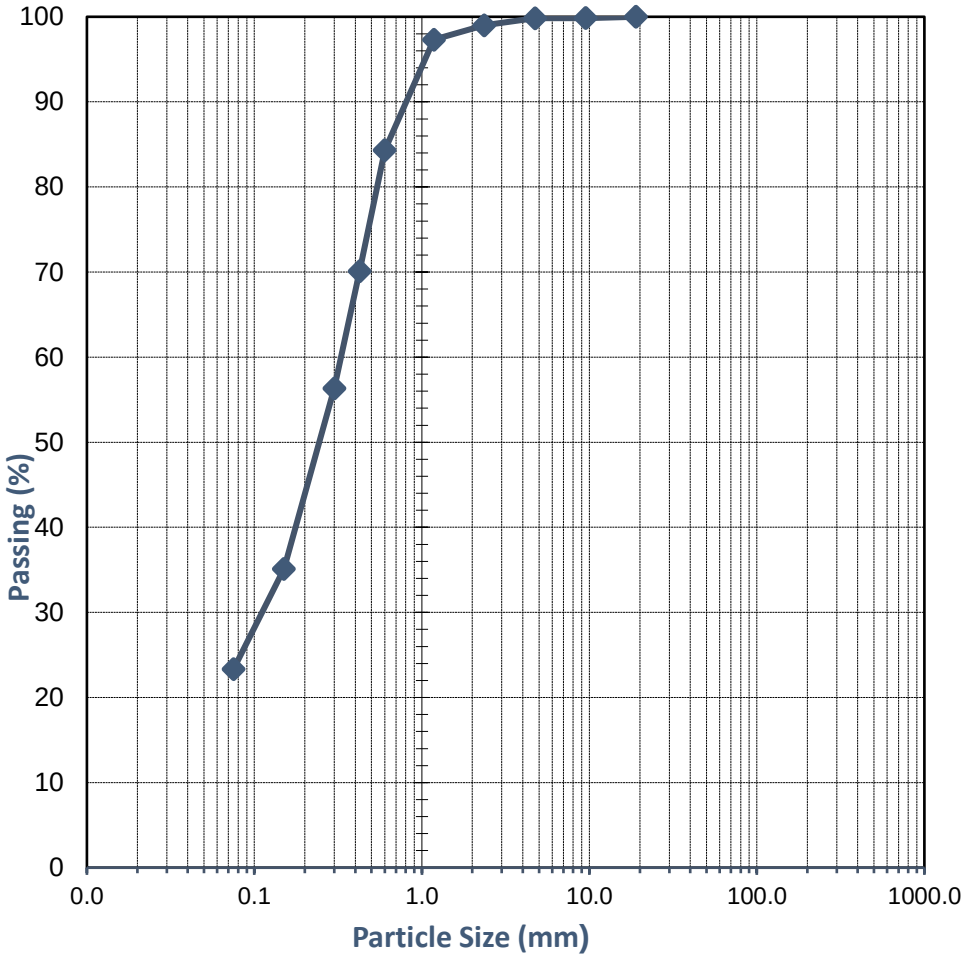
TEST REPORT - AS 1289.3.6.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2138_1_PSD
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2138
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP58 (0.8-1.2)m	*Date Tested:*	7/02 - 8/02/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	100
9.5	100
4.75	100
2.36	99
1.18	97
0.600	84
0.425	70
0.300	56
0.150	35
0.075	23



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 09-February-2023

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TEST REPORT - AS 1289.3.6.1 & ψ AS 1289. 3.6.3

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2139_1_PSDHY
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2139
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP58 (1.2-1.35)m	*Date Tested:*	7/2 - 10/2/23

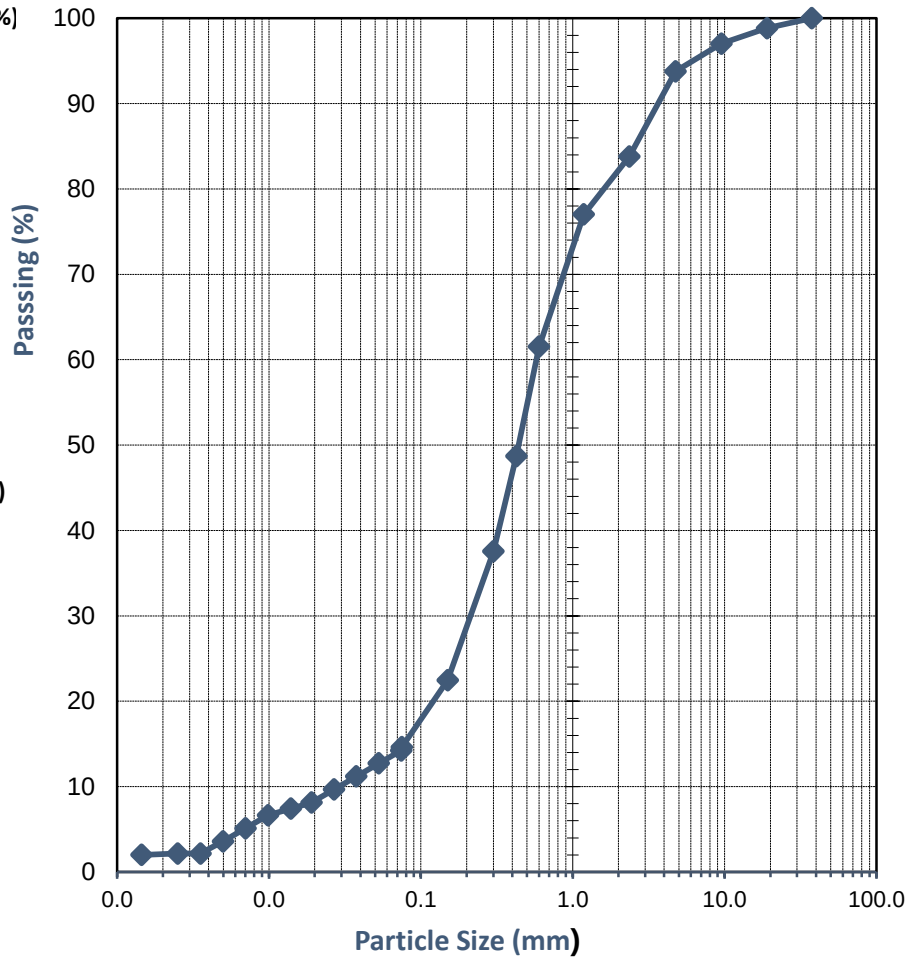
TEST RESULTS - Particle Size Distribution of Soil & Hydrometer Analysis

Sampling Method: **Sampled by Client, Tested as Received**

Sieve Size (mm)	Percent Passing (%)
75.0	
37.5	100
19.0	99
9.5	97
4.75	94
2.36	84
1.18	77
0.600	62
0.425	49
0.300	38
0.150	22
0.075	15

Particle Diameter (mm ψ	Percent Finer (%)
0.0742	14
0.0528	13
0.0376	11
0.0267	10
0.0139	7
0.0099	7
0.0070	5
0.0050	4
0.0035	2
0.0025	2
0.0014	2

ψ AS 1289.3.5.1 -2.36mm Particle Density
2.76 g/cm3



Comments: ψ- AS 1289.3.5.1 & ψ AS 1289.3.6.3 - NATA Accreditation does not cover the performance of this service.

Approved Signatory:

Name: Cody O'Neill
Date: 10/February/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.6.1 & ψ AS 1289. 3.6.3

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2140_1_PSDHY
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2140
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP61 (0-0.3)m	*Date Tested:*	7/2 - 10/2/23

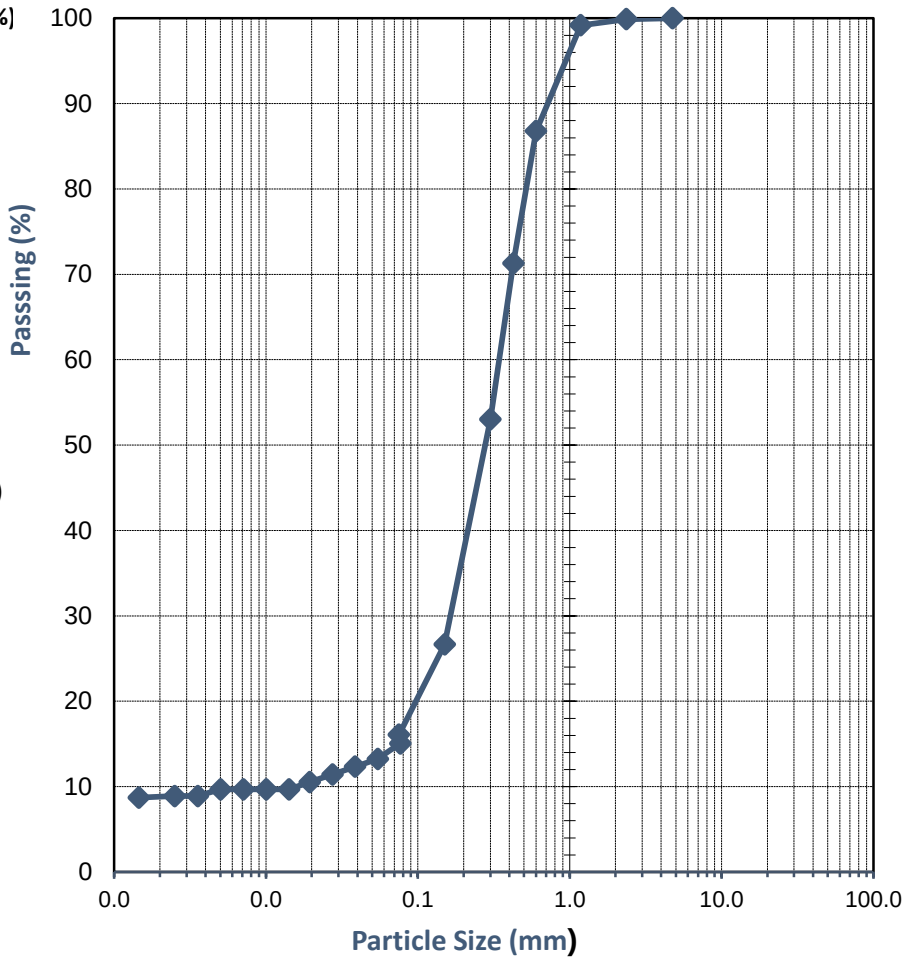
TEST RESULTS - Particle Size Distribution of Soil & Hydrometer Analysis

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing (%)
75.0	
37.5	
19.0	
9.5	
4.75	100
2.36	100
1.18	99
0.600	87
0.425	71
0.300	53
0.150	27
0.075	16

Particle Diameter (mm ψ	Percent Finer (%)
0.0764	15
0.0544	13
0.0386	12
0.0274	11
0.0142	10
0.0100	10
0.0071	10
0.0050	10
0.0035	9
0.0025	9
0.0015	9

ψ AS 1289.3.5.1 -2.36mm Particle Density
2.68 g/cm3



Comments: ψ- AS 1289.3.5.1 & ψ AS 1289.3.6.3 - NATA Accreditation does not cover the performance of this service.

Approved Signatory:

Name: Cody O'Neill
Date: 10/February/2023

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

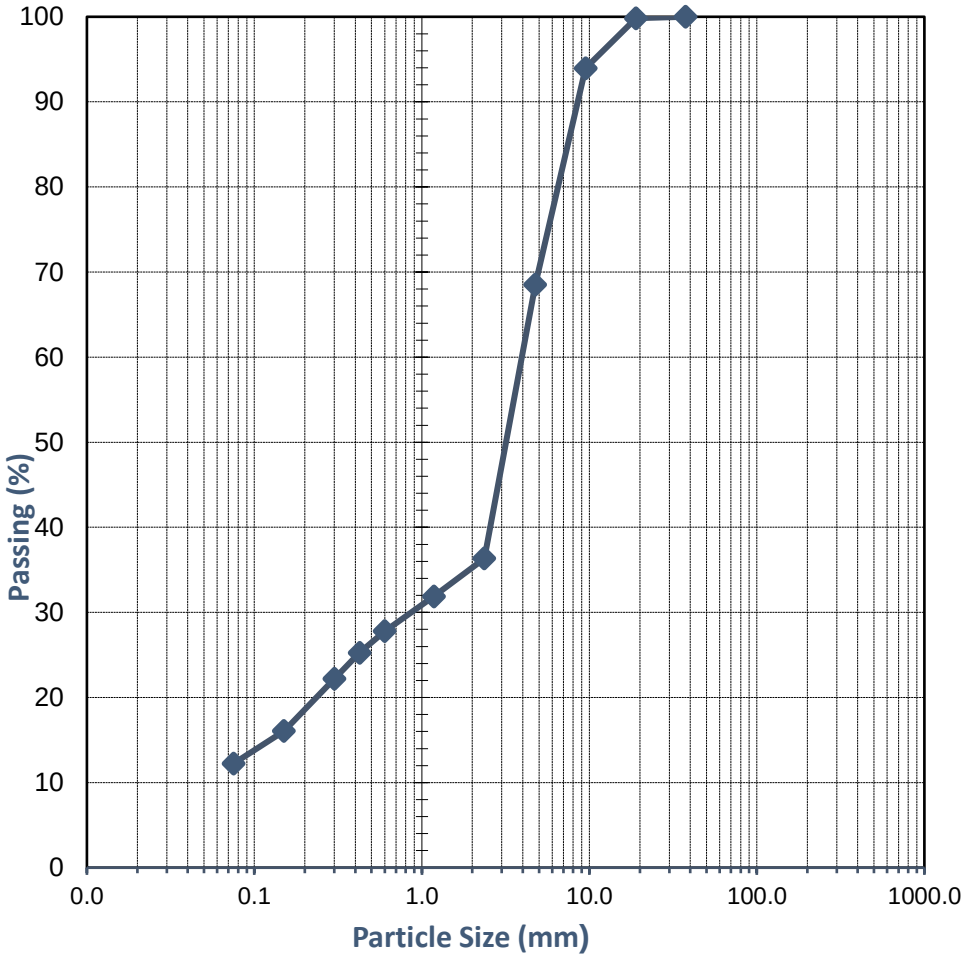
TEST REPORT - AS 1289.3.6.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2141_1_PSD
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2141
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP63 (0.5-0.8)	*Date Tested:*	7/02 - 8/02/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	100
19.0	100
9.5	94
4.75	69
2.36	36
1.18	32
0.600	28
0.425	25
0.300	22
0.150	16
0.075	12



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 09-February-2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.6.1 & ψ AS 1289. 3.6.3

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2142_1_PSDHY
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2142
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP64 (0-0.3)m	*Date Tested:*	7/2 - 10/2/23

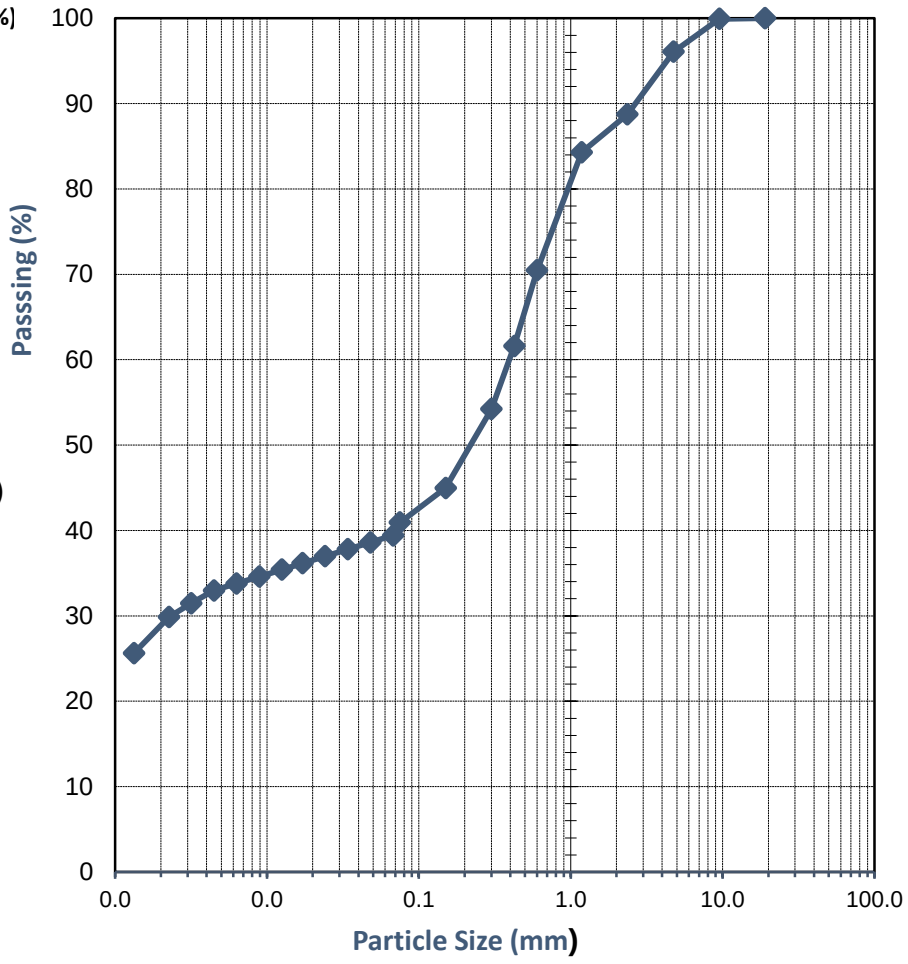
TEST RESULTS - Particle Size Distribution of Soil & Hydrometer Analysis

Sampling Method: **Sampled by Client, Tested as Received**

Sieve Size (mm)	Percent Passing (%)
75.0	
37.5	
19.0	100
9.5	100
4.75	96
2.36	89
1.18	84
0.600	70
0.425	62
0.300	54
0.150	45
0.075	41

Particle Diameter (mm ψ	Percent Finer (%)
0.0676	39
0.0479	39
0.0340	38
0.0241	37
0.0125	35
0.0089	35
0.0063	34
0.0045	33
0.0032	31
0.0023	30
0.0013	26

ψ AS 1289.3.5.1 -2.36mm Particle Density
2.76 g/cm3



Comments: ψ- AS 1289.3.5.1 & ψ AS 1289.3.6.3 - NATA Accreditation does not cover the performance of this service.

Approved Signatory:

Name: Cody O'Neill
Date: 10/February/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.2, 3.2.1, 3.3.1 & 3.4.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2136_1_PI
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2136
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP55 (0-0.15)m	*Date Tested:*	8/02/2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.2	**Liquid Limit (%)**	**20**
AS 1289.3.2.1	**Plastic Limit (%)**	**16**
AS 1289.3.3.1	**Plasticity Index (%)**	**4**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**1.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen**	**-**

Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 09/February/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2137_1_PI
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2137
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP58 (0.2-0.5)m	*Date Tested:*	9-02-2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**Not Obtainable**
AS 1289.3.2.1	**Plastic Limit (%)**	**Non-Plastic**
AS 1289.3.3.1	**Plasticity Index (%)**	**Non-Plastic**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**0.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Natasha Bielawski

Date: 10-February-2023

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TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2138_1_PI
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2138
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP58 (0.8-1.2)m	*Date Tested:*	9-02-2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**25**
AS 1289.3.2.1	**Plastic Limit (%)**	**19**
AS 1289.3.3.1	**Plasticity Index (%)**	**6**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**3.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**Curled**

Comments:

Approved Signatory:

Name: Natasha Bielawski

Date: 10-February-2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2139_1_PI
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2139
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP58 (1.2-1.35)m	*Date Tested:*	9-02-2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**Not Obtainable**
AS 1289.3.2.1	**Plastic Limit (%)**	**Non-Plastic**
AS 1289.3.3.1	**Plasticity Index (%)**	**Non-Plastic**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**1.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Natasha Bielawski

Date: 10-February-2023

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TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2140_1_PI
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2140
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP61 (0-0.3)m	*Date Tested:*	9-02-2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**Not Obtainable**
AS 1289.3.2.1	**Plastic Limit (%)**	**Non-Plastic**
AS 1289.3.3.1	**Plasticity Index (%)**	**Non-Plastic**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**0.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Natasha Bielawski

Date: 10-February-2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2141_1_PI
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2141
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP63 (0.5-0.8)	*Date Tested:*	9-02-2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**25**
AS 1289.3.2.1	**Plastic Limit (%)**	**16**
AS 1289.3.3.1	**Plasticity Index (%)**	**9**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**4.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**Cracked, Curled**

Comments:

Approved Signatory:

Name: Natasha Bielawski

Date: 10-February-2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2142_1_PI
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2142
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP64 (0-0.3)m	*Date Tested:*	9-02-2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**26**
AS 1289.3.2.1	**Plastic Limit (%)**	**16**
AS 1289.3.3.1	**Plasticity Index (%)**	**10**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**5.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**Cracked**

Comments:

Approved Signatory:

Name: Natasha Bielawski

Date: 10-February-2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.8.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2139_1_ECN
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2139
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP58 (1.2-1.35)m	*Date Tested:*	9-02-2023

TEST RESULTS - Emerson Class Number

Sampling Method:	**Sampled by Client, Tested as Received**
Source of Material:	**Not Specified**
Soil Description:	**Silty Sand, trace gravel**
Water Used:	**Distilled**

EMERSON CLASS NUMBER	**4**

Comments:

Approved Signatory:

Name: Brooke Elliott

Date: 13-February-2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.8.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2140_1_ECN
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2140
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP61 (0-0.3)m	*Date Tested:*	9-02-2023

TEST RESULTS - Emerson Class Number

Sampling Method:	**Sampled by Client, Tested as Received**
Source of Material:	**Not Specified**
Soil Description:	**Silty sand**
Water Used:	**Distilled**

EMERSON CLASS NUMBER	**5**

Comments:

Approved Signatory:

Name: Brooke Elliott

Date: 13-February-2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.8.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2142_1_ECN
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2142
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP64 (0-0.3)m	*Date Tested:*	9-02-2023

TEST RESULTS - Emerson Class Number

Sampling Method:	**Sampled by Client, Tested as Received**
Source of Material:	**Not Specified**
Soil Description:	**Clayey Sand with Gravel**
Water Used:	**Distilled**

EMERSON CLASS NUMBER	**5**

Comments:

Approved Signatory:

Name: Brooke Elliott

Date: 13-February-2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - ψ AS 1289.3.5.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2139_1_PD
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2139
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP58 (1.2-1.35)m	*Date Tested:*	8/02/2023

TEST RESULTS - SOIL PARTICLE DENSITY -FINE

Sampling Method: **Sampled by Client, Tested as Received**

SOIL APPARENT PARTICLE DENSITY g/cm^3	**2.76**

***Comments:* ψ - NATA Accreditation does not cover the performance of this service.**

Approved Signatory:

Name: Cody O'Neill

Date: 9/02/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - ψ AS 1289.3.5.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2140_1_PD
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2140
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP61 (0-0.3)m	*Date Tested:*	8/02/2023

TEST RESULTS - SOIL PARTICLE DENSITY -FINE

Sampling Method: **Sampled by Client, Tested as Received**

SOIL APPARENT PARTICLE DENSITY g/cm^3	**2.68**

***Comments:* ψ - NATA Accreditation does not cover the performance of this service.**

Approved Signatory:

Name: Cody O'Neill

Date: 9/02/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - ψ AS 1289.3.5.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2142_1_PD
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2142
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP64 (0-0.3)m	*Date Tested:*	8-02-2023

TEST RESULTS - SOIL PARTICLE DENSITY -FINE

Sampling Method: **Sampled by Client, Tested as Received**

SOIL APPARENT PARTICLE DENSITY g/cm^3	**2.76**

Comments: *ψ - NATA Accreditation does not cover the performance of this service.*

Approved Signatory:

Name: Cody O'Neill

Date: 09-02-23

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.5.1.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2139_1_SMDD
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2139
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP58 (1.2-1.35)m	*Date Tested:*	7-02-2023

TEST RESULTS - Standard Maximum Dry Density

Sampling Method: Sampled by Client, Tested as Received

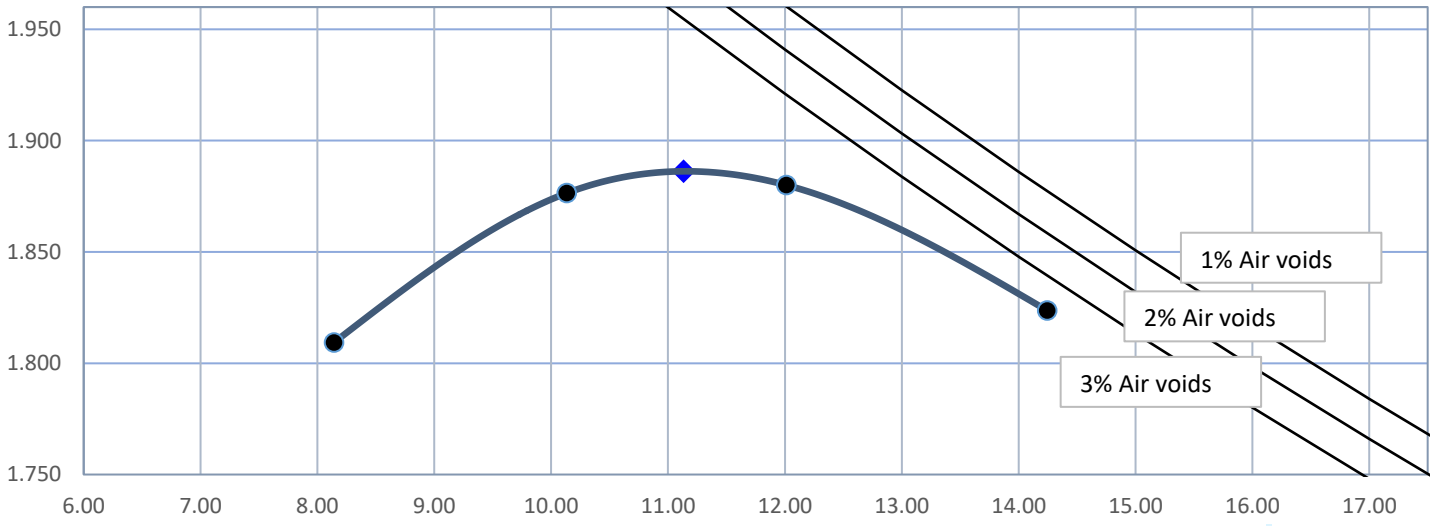
Sample Curing Time (Hours): 2

Method used to Determine Liquid Limit: Visual / Tactile Assessment by Competent Technician

Material + 19.0mm (%): 0 **Material + 37.5mm (%)** -

Moisture Content (%)	8.1	10.1	12.0	14.2	
Dry Density (t/m³)	1.809	1.876	1.880	1.824	

Dry Density (t/m³)



Standard Maximum Dry Density (t/m³) **1.89**

Optimum Moisture Content (%) **11.0**

Comments: *The above air void lines are derived from a calculated apparent particle density of 2.598 t/m³*

Approved Signatory:

Name: Madhav Basnet

Date: 08-February-2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.5.1.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2140_1_SMDD
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2140
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP61 (0-0.3)m	*Date Tested:*	7-02-2023

TEST RESULTS - Standard Maximum Dry Density

Sampling Method: Sampled by Client, Tested as Received

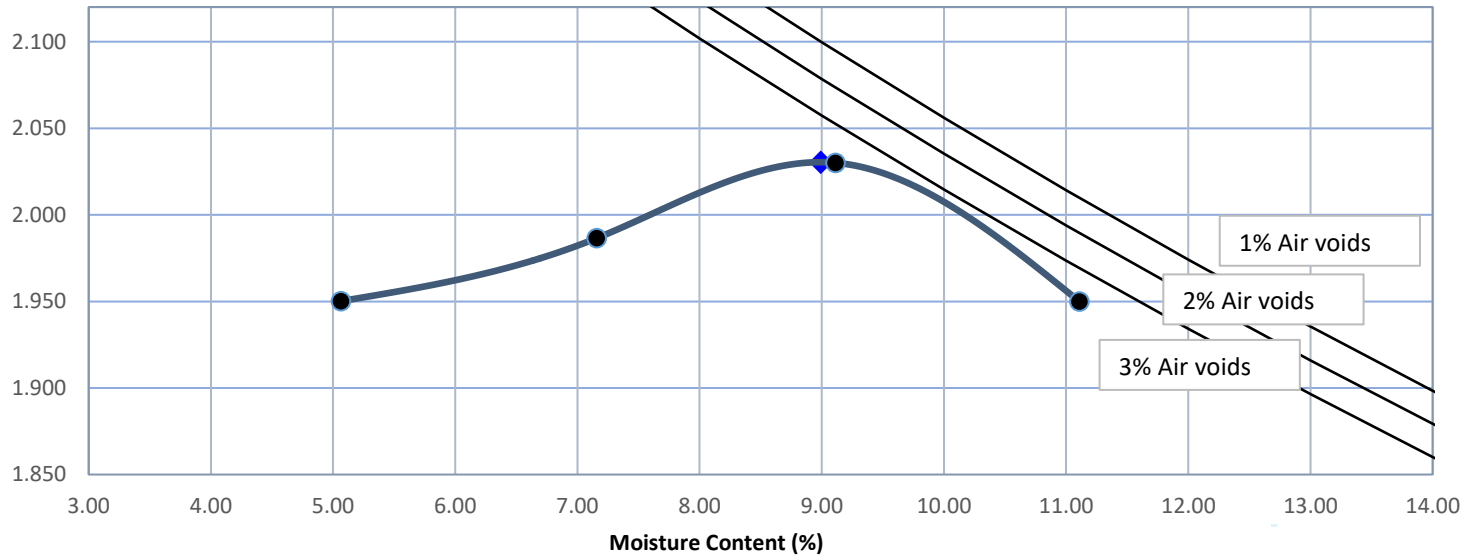
Sample Curing Time (Hours): 2

Method used to Determine Liquid Limit: Visual / Tactile Assessment by Competent Technician

Material + 19.0mm (%): 0 **Material + 37.5mm (%)** -

Moisture Content (%)	5.1	7.2	9.1	11.1	
Dry Density (t/m³)	1.950	1.987	2.030	1.950	

Dry Density (t/m³)



Standard Maximum Dry Density (t/m³) **2.03**

Optimum Moisture Content (%) **9.0**

Comments: *The above air void lines are derived from a calculated apparent particle density of 2.621 t/m³*

Approved Signatory:

Name: Madhav Basnet

Date: 08-February-2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.5.1.1

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2142_1_SMDD
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2142
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	TP64 (0-0.3)m	*Date Tested:*	7-02-2023

TEST RESULTS - Standard Maximum Dry Density

Sampling Method: Sampled by Client, Tested as Received

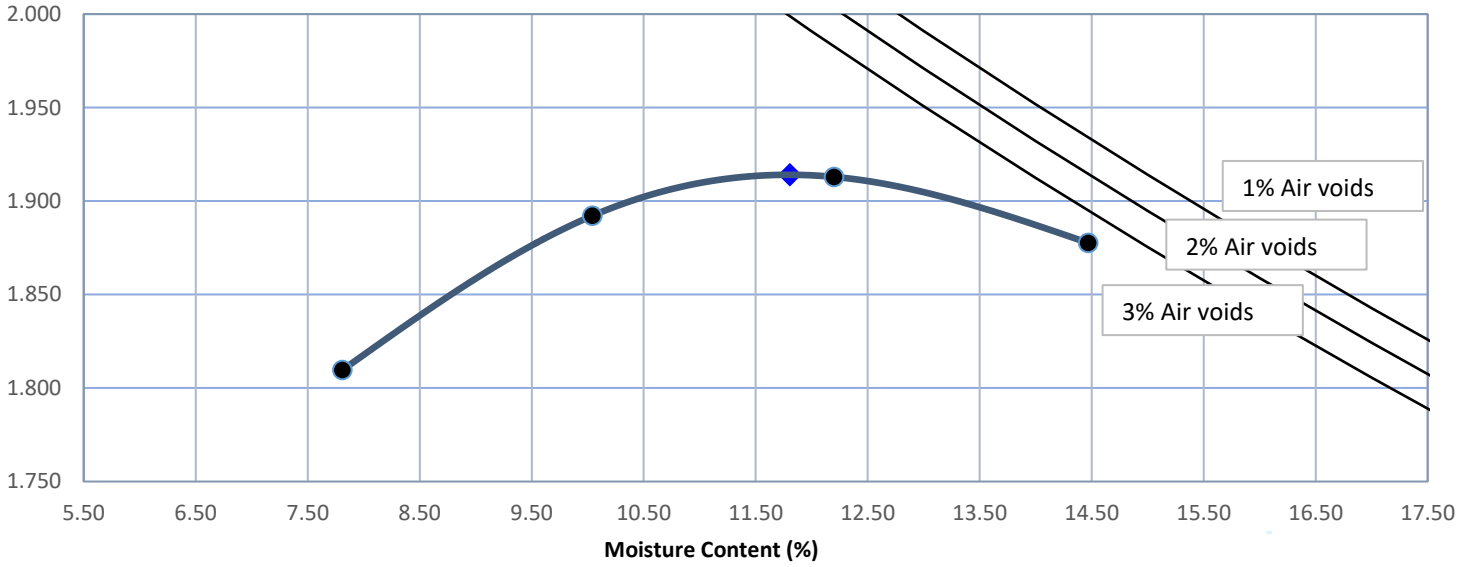
Sample Curing Time (Hours): 2

Method used to Determine Liquid Limit: Visual / Tactile Assessment by Competent Technician

Material + 19.0mm (%): 0 **Material + 37.5mm (%)** -

Moisture Content (%)	**7.8**	**10.0**	**12.2**	**14.5**	
Dry Density (t/m³)	**1.810**	**1.892**	**1.913**	**1.878**	

Dry Density (t/m³)



Standard Maximum Dry Density (t/m³) **1.91**

Optimum Moisture Content (%) **12.0**

Comments: *The above air void lines are derived from a calculated apparent particle density of 2.723 t/m³*

Approved Signatory:

Name: Madhav Basnet

Date: 08-February-2023

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WESTERN GEOTECHNICAL & Laboratory Services

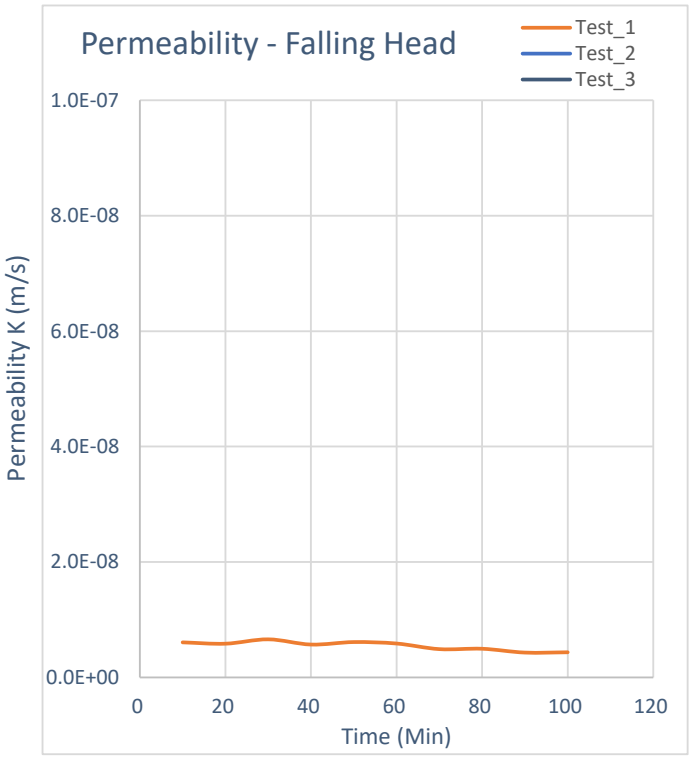
SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT AS 1289.6.7.2

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2139_1_FHPERM
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2139
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification	TP58 (1.2-1.35)m	*Date Tested:*	7/2 - 16/2/23

TEST RESULTS - FALLING HEAD PERMEABILITY

Sampling Method: Sampled by Client, Tested as Received



Compaction Details	
Compaction Method	AS1289.5.1.1
Hammer Type	Standard
% Retained of 19.0mm	0
Maximum Dry Density (t/m^3)	1.886
Optimum Moisture (%)	11.1
Target Dry Density Ratio	95
Target Moisture Ratio	100

Specimen Conditions at Compaction	
Laboratory Density Ratio (%)	95.3
Laboratory Moisture Ratio (%)	98.8
Surcharge (kPa)	3

Coefficient of Permeability K_{20} (m/s) 5.48E-09

Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 17/February/2023

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WESTERN GEOTECHNICAL & Laboratory Services

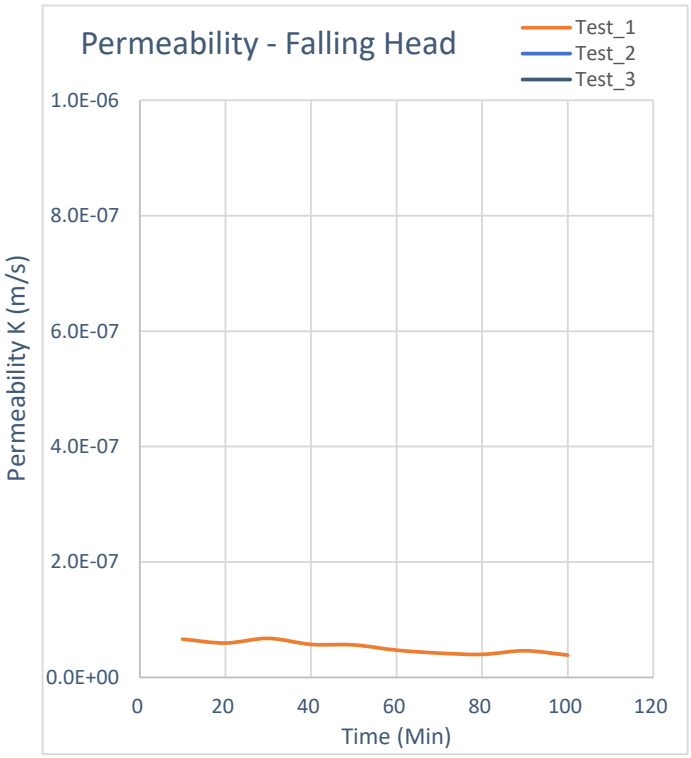
SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT AS 1289.6.7.2

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2140_1_FHPERM
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2140
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification	TP61 (0-0.3)m	*Date Tested:*	7/2 - 16/2/23

TEST RESULTS - FALLING HEAD PERMEABILITY

Sampling Method: Sampled by Client, Tested as Received



Compaction Details	
Compaction Method	AS1289.5.1.1
Hammer Type	Standard
% Retained of 19.0mm	0
Maximum Dry Density (t/m^3)	2.03
Optimum Moisture (%)	9
Target Dry Density Ratio	95
Target Moisture Ratio	100

Specimen Conditions at Compaction	
Laboratory Density Ratio (%)	95.0
Laboratory Moisture Ratio (%)	99.7
Surcharge (kPa)	3

Coefficient of Permeability K_{20} (m/s) 5.21E-08

Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 17/February/2023

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WESTERN GEOTECHNICAL & Laboratory Services

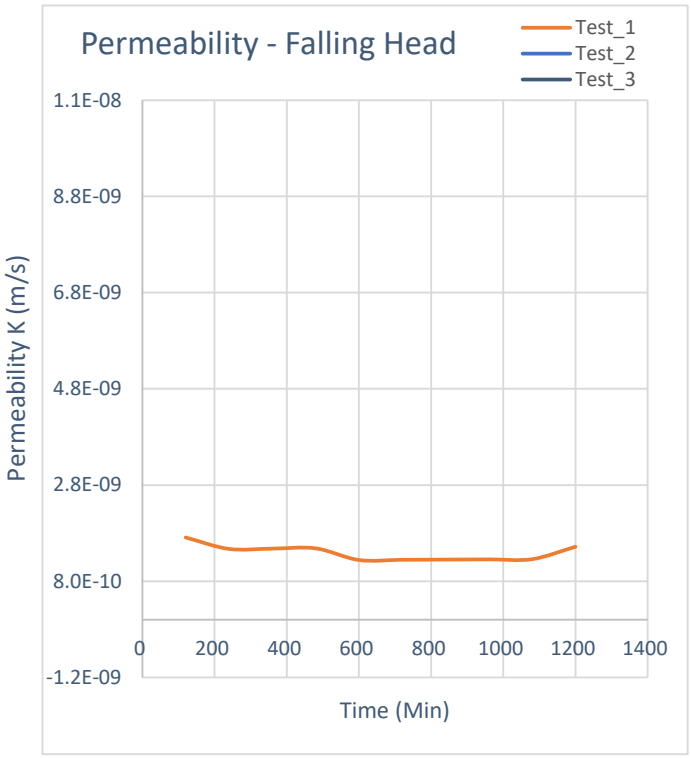
SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT AS 1289.6.7.2

Client:	CMW Geosciences	*Ticket No.*	S8584
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG23.2142_1_FHPERM
Project:	Mt Gibson TSF - Site Investigation 2	*Sample No.*	WG23.2142
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification	TP64 (0-0.3)m	*Date Tested:*	7/2 - 16/2/23

TEST RESULTS - FALLING HEAD PERMEABILITY

Sampling Method: Sampled by Client, Tested as Received



Compaction Details	
Compaction Method	AS1289.5.1.1
Hammer Type	Standard
% Retained of 19.0mm	0.3
Maximum Dry Density (t/m^3)	1.914
Optimum Moisture (%)	11.8
Target Dry Density Ratio	95
Target Moisture Ratio	100

Specimen Conditions at Compaction	
Laboratory Density Ratio (%)	95.1
Laboratory Moisture Ratio (%)	100.3
Surcharge (kPa)	3

Coefficient of Permeability K_{20} (m/s) **1.39E-09**

Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 17/February/2023

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Appendix E – Tailings Testwork

WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.6.1 & ψ AS 1289. 3.6.3

Client:	CMW Geosciences	*Ticket No.*	S8118
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.18037_1_PSDHY
Project:	Mt Gibson TSF - Tailings Testwork	*Sample No.*	WG22.18037
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	Orion Oxide	*Date Tested:*	6/1-11/1/23

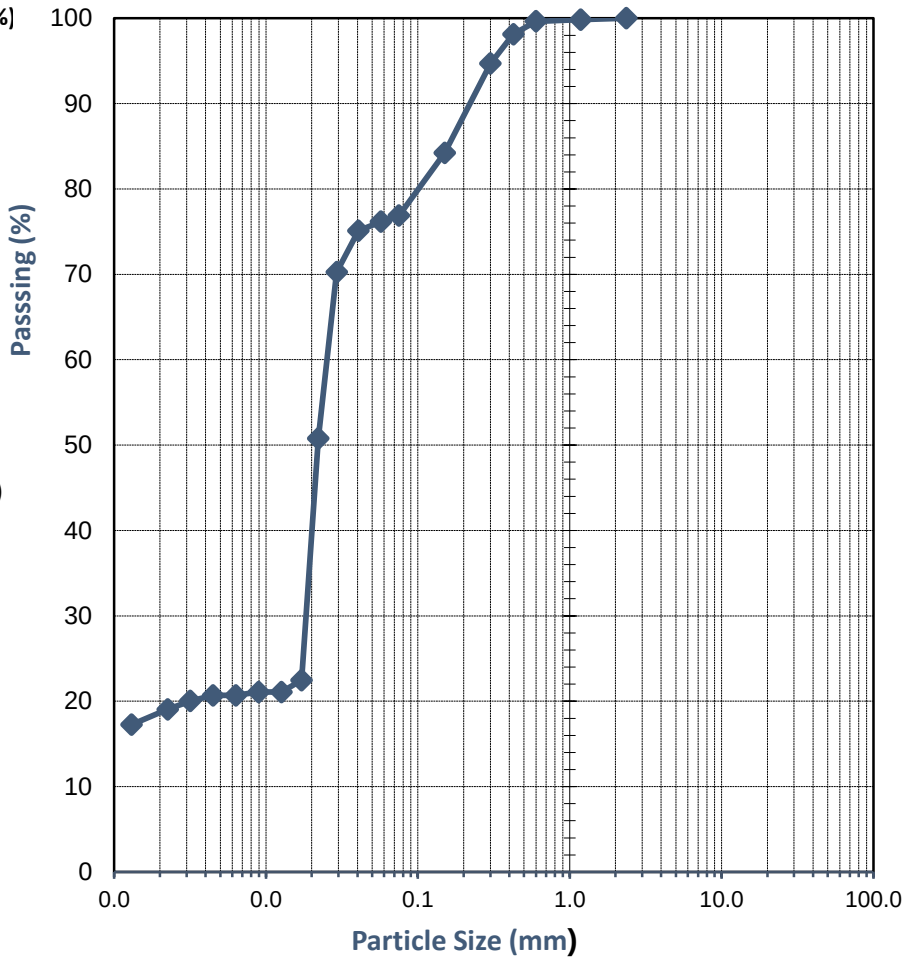
TEST RESULTS - Particle Size Distribution of Soil & Hydrometer Analysis

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing (%)
75.0	
37.5	
19.0	
9.5	
4.75	
2.36	100
1.18	100
0.600	100
0.425	98
0.300	95
0.150	84
0.075	77

Particle Diameter (mm	ψ	Percent Finer (%)
0.0571		76
0.0406		75
0.0292		70
0.0221		51
0.0126		21
0.0089		21
0.0063		21
0.0045		21
0.0032		20
0.0023		19
0.0013		17

ψ AS 1289.3.5.1 -2.36mm Particle Density
2.83 g/cm3



Comments: ψ- AS 1289.3.5.1 & ψ AS 1289.3.6.3 - NATA Accreditation does not cover the performance of this service.

Approved Signatory:

Name: Cody O'Neill
Date: 11/January/2023

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.6.1 & ψ AS 1289. 3.6.3

Client:	CMW Geosciences	*Ticket No.*	S8118
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.18036_1_PSDHY
Project:	Mt Gibson TSF - Tailings Testwork	*Sample No.*	WG22.18036
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	Orion Fresh	*Date Tested:*	6/1-11/1/23

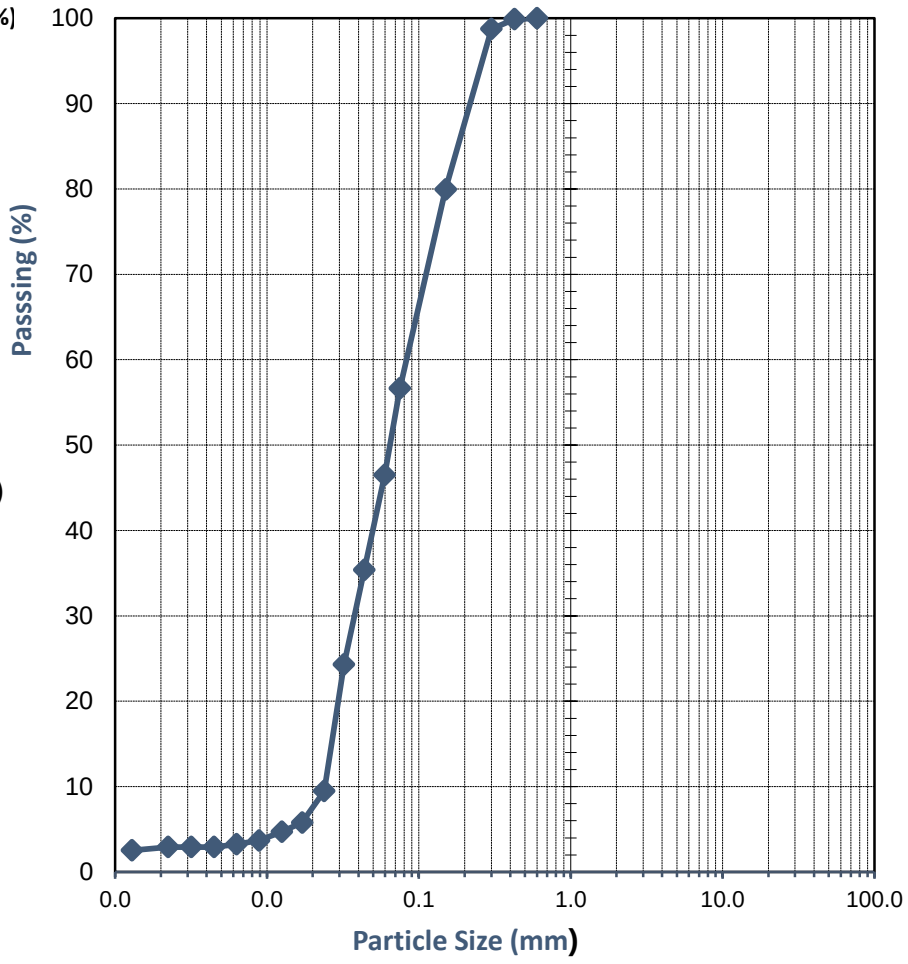
TEST RESULTS - Particle Size Distribution of Soil & Hydrometer Analysis

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing (%)
75.0	
37.5	
19.0	
9.5	
4.75	
2.36	
1.18	
0.600	100
0.425	100
0.300	99
0.150	80
0.075	57

Particle Diameter (mm ψ	Percent Finer (%)
0.0595	46
0.0437	35
0.0321	24
0.0238	9
0.0125	5
0.0089	4
0.0063	3
0.0045	3
0.0032	3
0.0022	3
0.0013	3

ψ AS 1289.3.5.1 -2.36mm Particle Density
3.04 g/cm3



Comments: ψ- AS 1289.3.5.1 & ψ AS 1289.3.6.3 - NATA Accreditation does not cover the performance of this service.

Approved Signatory:

Name: Cody O'Neill
Date: 11/January/2023

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	CMW Geosciences	*Ticket No.*	S8118
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.18037_1_PI
Project:	Mt Gibson TSF - Tailings Testwork	*Sample No.*	WG22.18037
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	Orion Oxide	*Date Tested:*	9-01-2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**41**
AS 1289.3.2.1	**Plastic Limit (%)**	**23**
AS 1289.3.3.1	**Plasticity Index (%)**	**18**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**9.5**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Brooke Elliott

Date: 10-January-2023

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	CMW Geosciences	*Ticket No.*	S8118
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.18036_1_PI
Project:	Mt Gibson TSF - Tailings Testwork	*Sample No.*	WG22.18036
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	Orion Fresh	*Date Tested:*	9/01/2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**Not Obtainable**
AS 1289.3.2.1	**Plastic Limit (%)**	**Non-Plastic**
AS 1289.3.3.1	**Plasticity Index (%)**	**Non-Plastic**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**0.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 11/January/2023

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - ψ AS 1289.3.5.1

Client:	CMW Geosciences	*Ticket No.*	S8118
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.18037_1_PD
Project:	Mt Gibson TSF - Tailings Testwork	*Sample No.*	WG22.18037
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	Orion Oxide	*Date Tested:*	6/01/2023

TEST RESULTS - SOIL PARTICLE DENSITY -FINE

Sampling Method: **Sampled by Client, Tested as Received**

SOIL APPARENT PARTICLE DENSITY g/cm^3	**2.83**

***Comments:* ψ - NATA Accreditation does not cover the performance of this service.**

Approved Signatory:

Name: Cody O'Neill

Date: 10/01/2023

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - ψ AS 1289.3.5.1

Client:	CMW Geosciences	*Ticket No.*	S8118
Client Address:	Suite 1, Level 3/29 Flynn Street, Wembley WA	*Report No.*	WG22.18036_1_PD
Project:	Mt Gibson TSF - Tailings Testwork	*Sample No.*	WG22.18036
Location:	Mt Gibson	*Date Sampled:*	Not Specified
Sample Identification:	Orion Fresh	*Date Tested:*	6/01/2023

TEST RESULTS - SOIL PARTICLE DENSITY -FINE

Sampling Method: **Sampled by Client, Tested as Received**

SOIL APPARENT PARTICLE DENSITY g/cm^3	**3.04**

***Comments:* ψ - NATA Accreditation does not cover the performance of this service.**

Approved Signatory:

Name: Cody O'Neill

Date: 10/01/2023

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E-mail: Phillip.li@eprecisionlab.com

E-Precision Laboratory

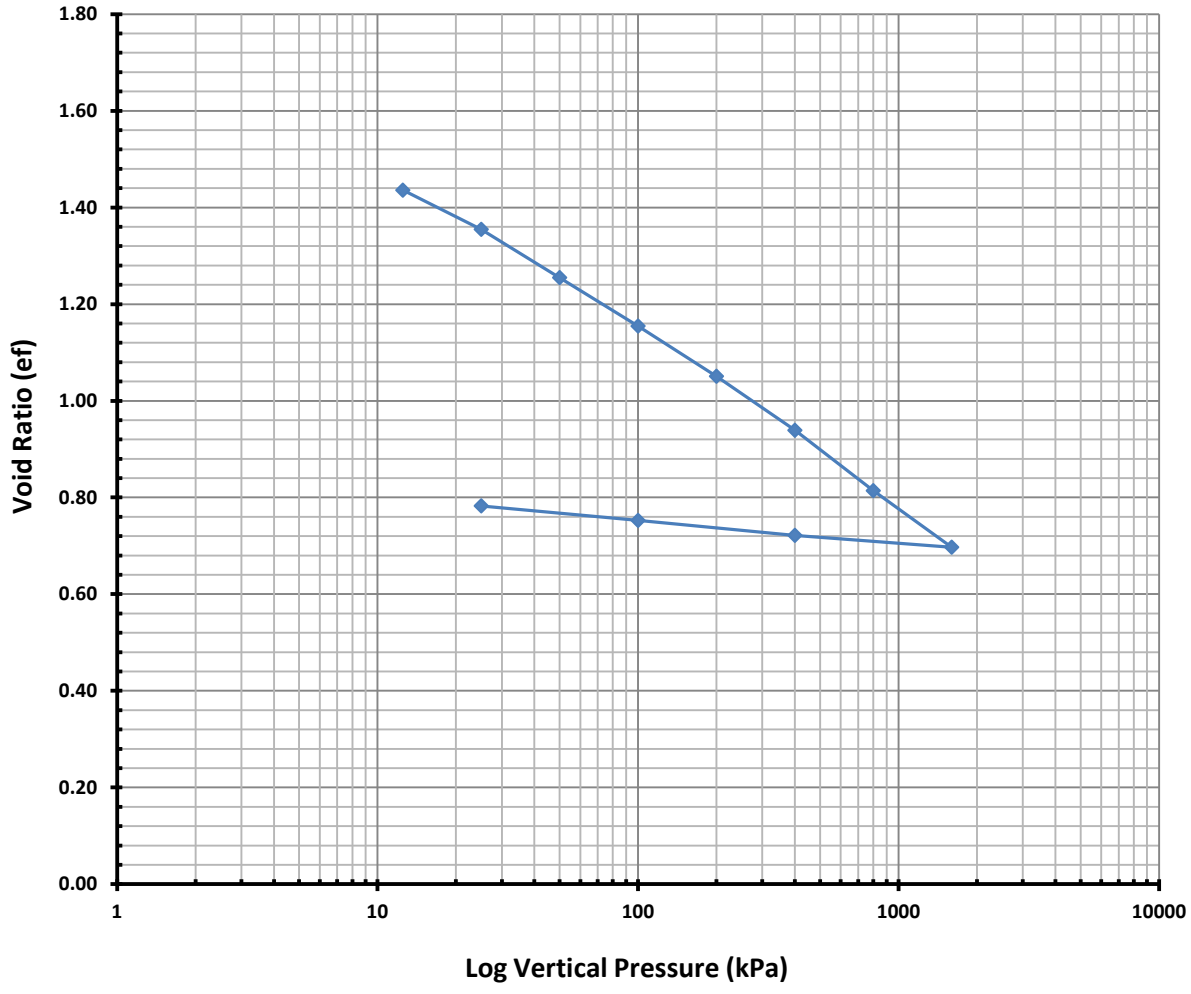
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Oxide - OOMC		
Lab ID:	OOMC_42.7%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°c

Tested by:	Phil	Initial Moisture (%):	59.44	Test Condition:	Undrained
Height (mm):	37.65	Final Moisture Content (%):	56.31	Sample Condition:	Saturated
Diameter (mm):	61.80	Bulk Density (t/m³):	1.65	Particle Density (t/m³):	2.704
Direction:	Vertical	Dry Density (t/m³):	1.03	Initial Void Ratio (e_i):	1.618

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



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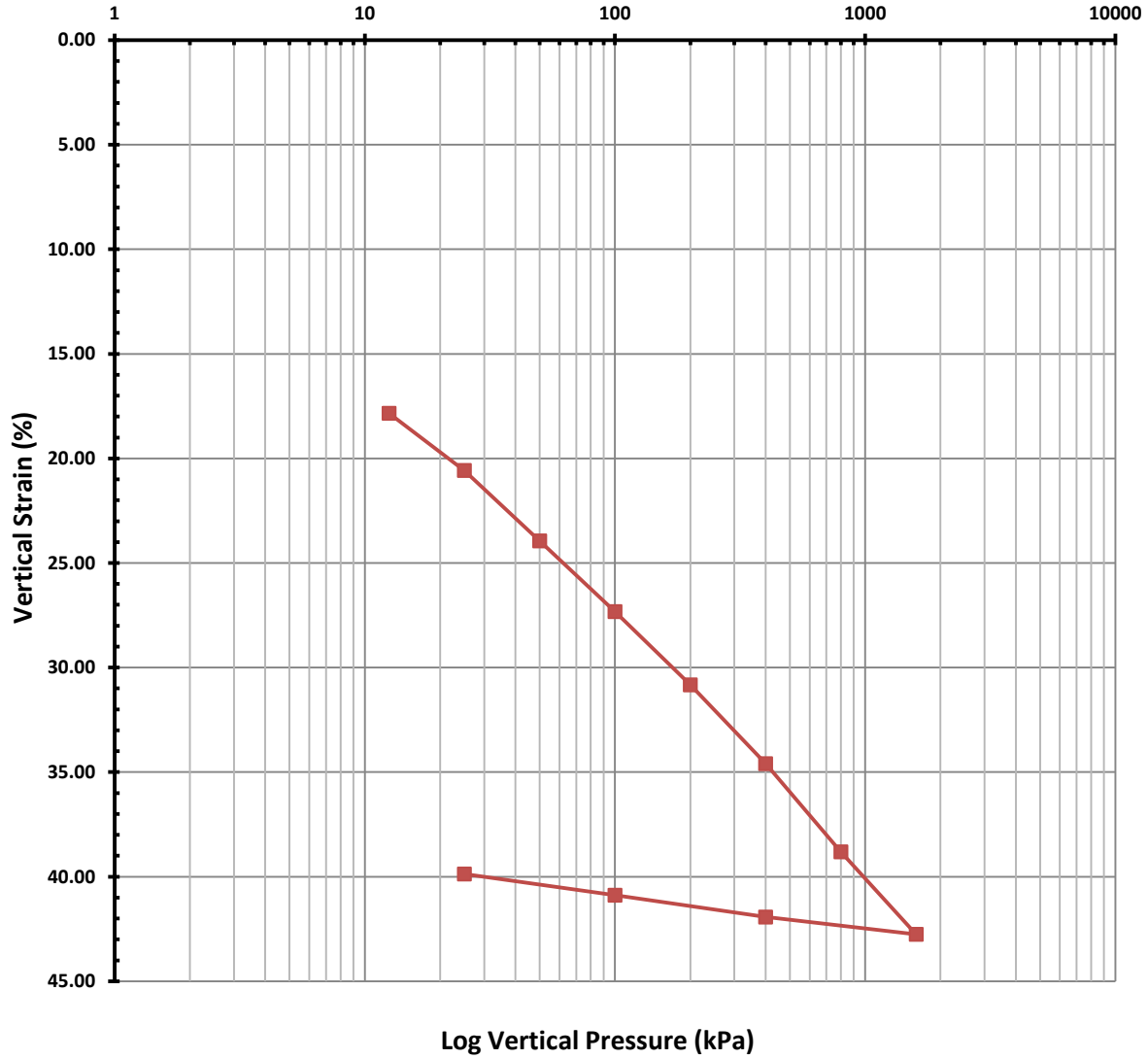
E-Precision Laboratory

CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Oxide - OOMC		
Lab ID:	OOMC_42.7%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°c

Vertical Strain (%) Vs Log of Vertical Pressure (kPa)



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Oxide - OOMC		
Lab ID:	OOMC_42.7%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Test Results

*

Stages	Vert Disp (mm)	Cv (m^2/yr)		Compressibility Mv (m^2/kN)	K (m/s)		Void Ratio (e_f)	Vertical Strain (%)
		*t_{50}	t_{90}					
Stage 1 @ 12.5kPa	6.718	5.889	-	1.43E-02	2.6E-08		1.436	17.84
Stage 2 @ 25kPa	7.747	4.762	-	2.66E-03	3.9E-09		1.355	20.58
Stage 3 @ 50kPa	9.015	3.677	-	1.70E-03	1.9E-09		1.255	23.94
Stage 4 @ 100kPa	10.288	3.373	-	8.89E-04	9.3E-10		1.155	27.33
Stage 5 @ 200kPa	11.607	3.050	-	4.82E-04	4.6E-10		1.051	30.83
Stage 6 @ 400kPa	13.026	2.679	-	2.72E-04	2.3E-10		0.939	34.60
Stage 7 @ 800kPa	14.613	2.436	-	1.61E-04	1.2E-10		0.814	38.81
Stage 8 @ 1600kPa	16.098	2.090	-	8.06E-05	5.2E-11		0.697	42.76
Unload @ 400kPa	15.787							
Unload @ 100kPa	15.394							
Unload @ 25kPa	15.012							

** Values interpreted via lab only*

Comments: **Samples collected from Drained Settlement Testing**
Cv values to be interpreted via Engineer

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer):

The results of tests performed apply only to the specific sample at time of test unless otherwise clearly stated. Reference should be made to E-Precision Laboratory's "Standard Terms and Conditions" E-Precision Laboratory ABN 431 559 578 87

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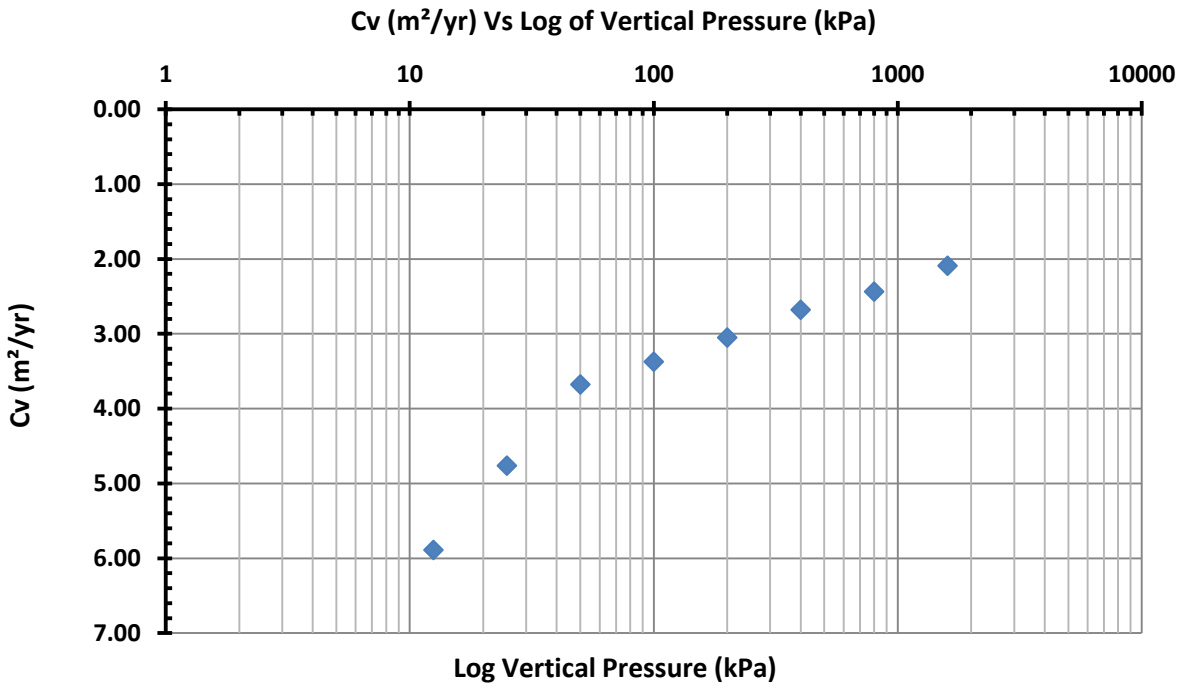
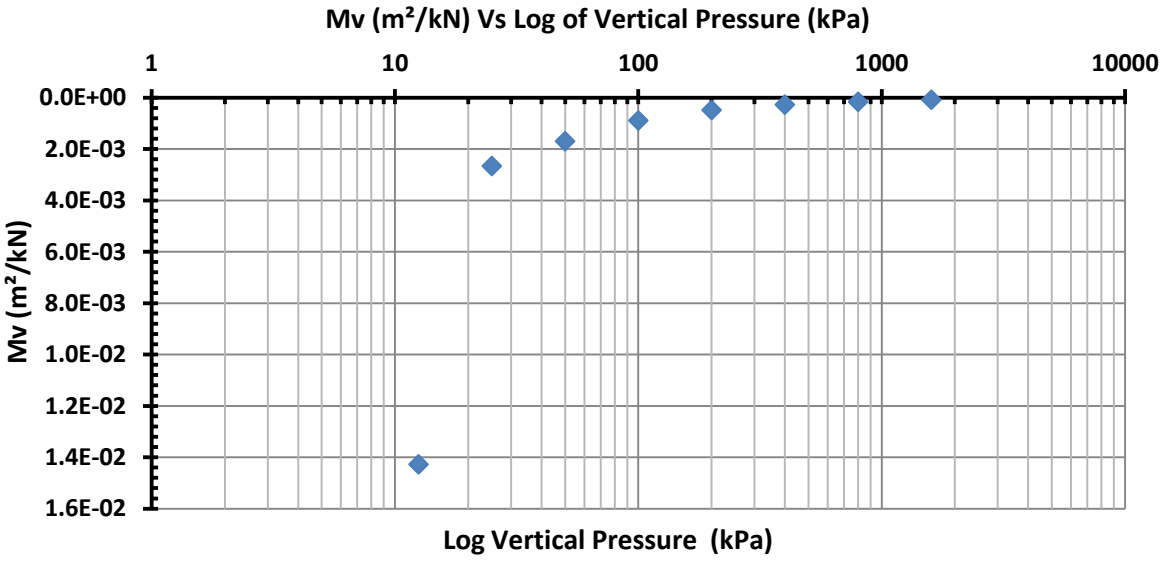
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Oxide - OOMC		
Lab ID:	OOMC_42.7%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C



* Plot based on Log (time) data



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Oxide - OOMC		
Lab ID:	OOMC_42.7%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

TEST RESULTS PLEASE SEE PAGES BELOW

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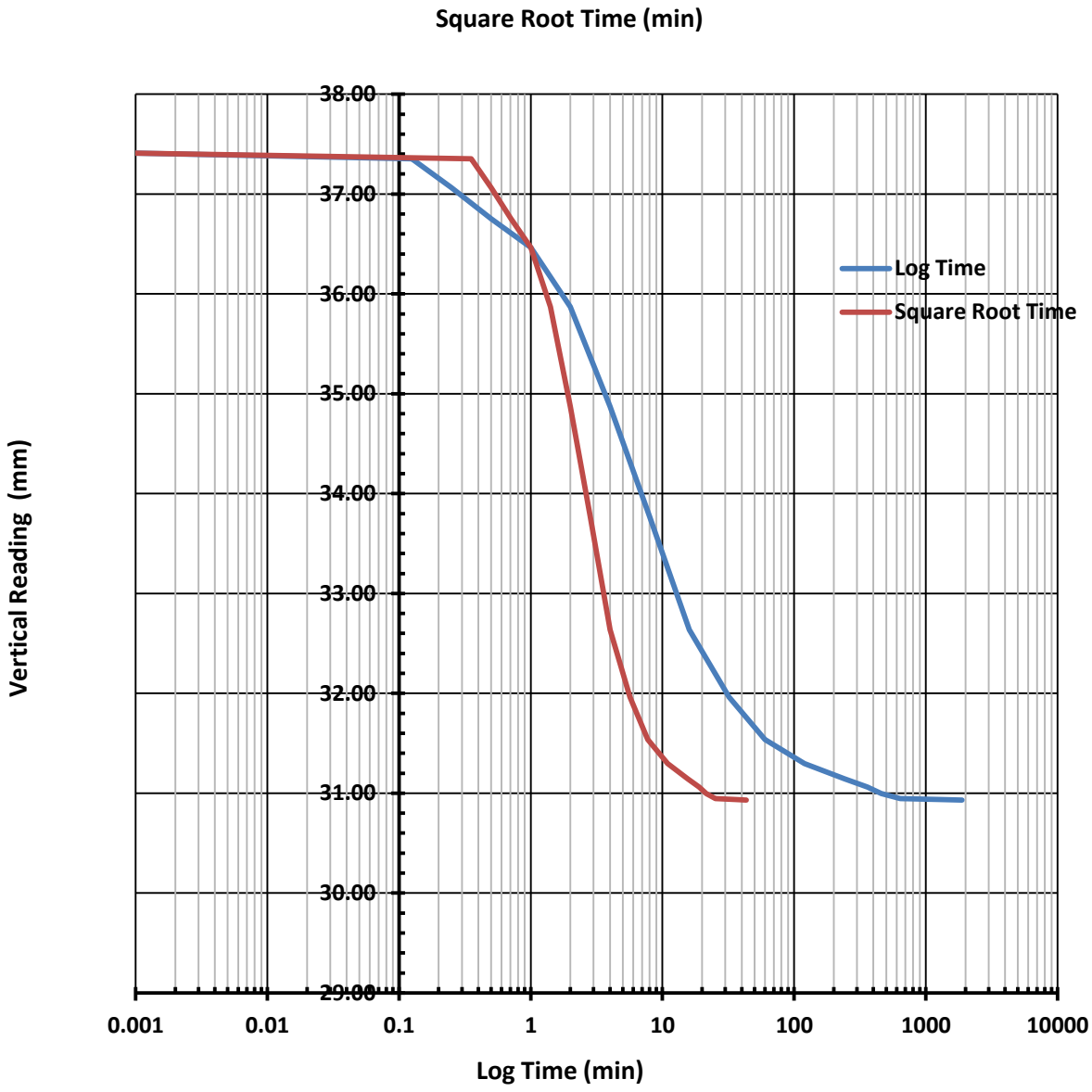
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Oxide - OOMC		
Lab ID:	OOMC_42.7%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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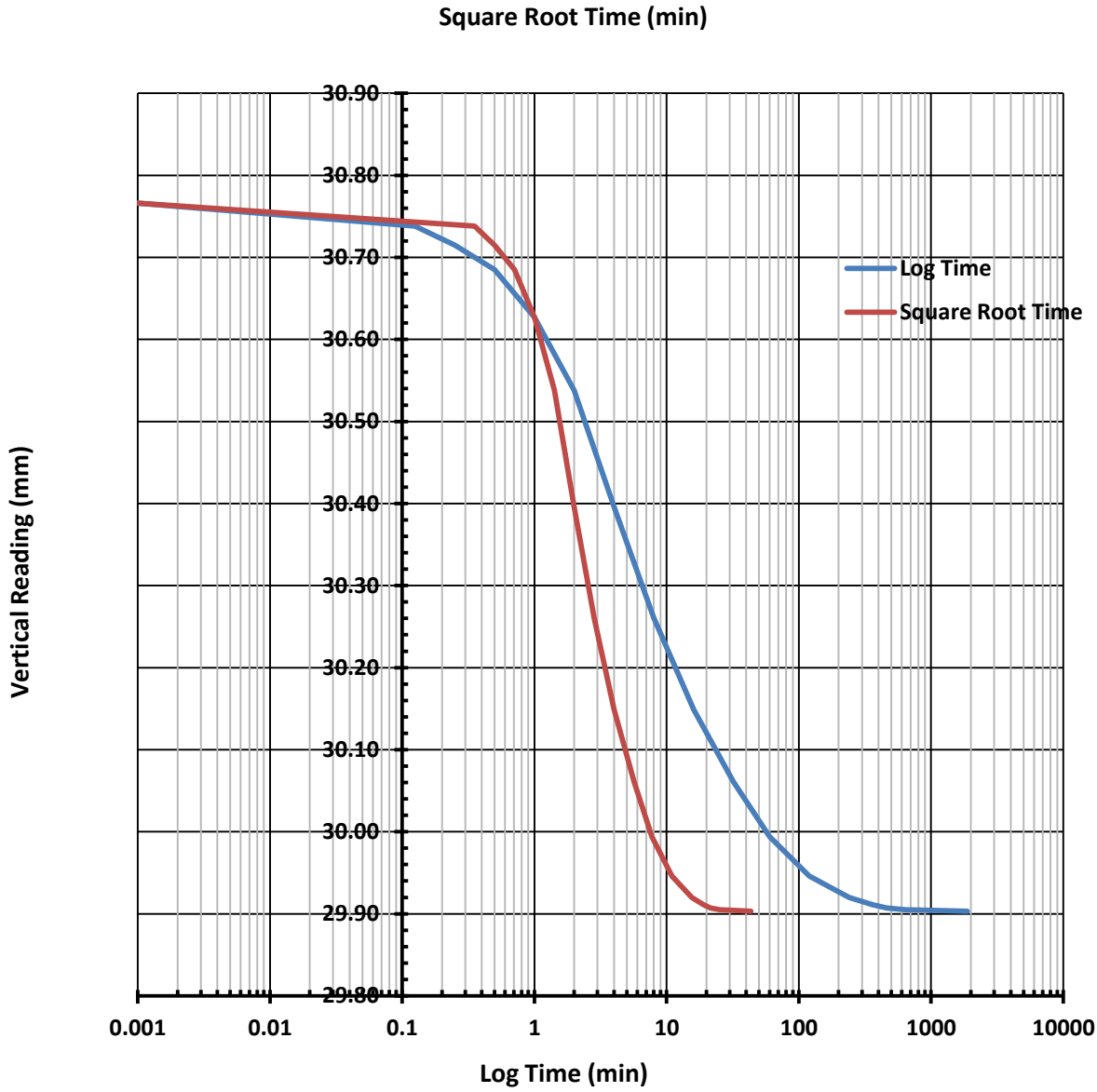
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Oxide - OOMC		
Lab ID:	OOMC_42.7%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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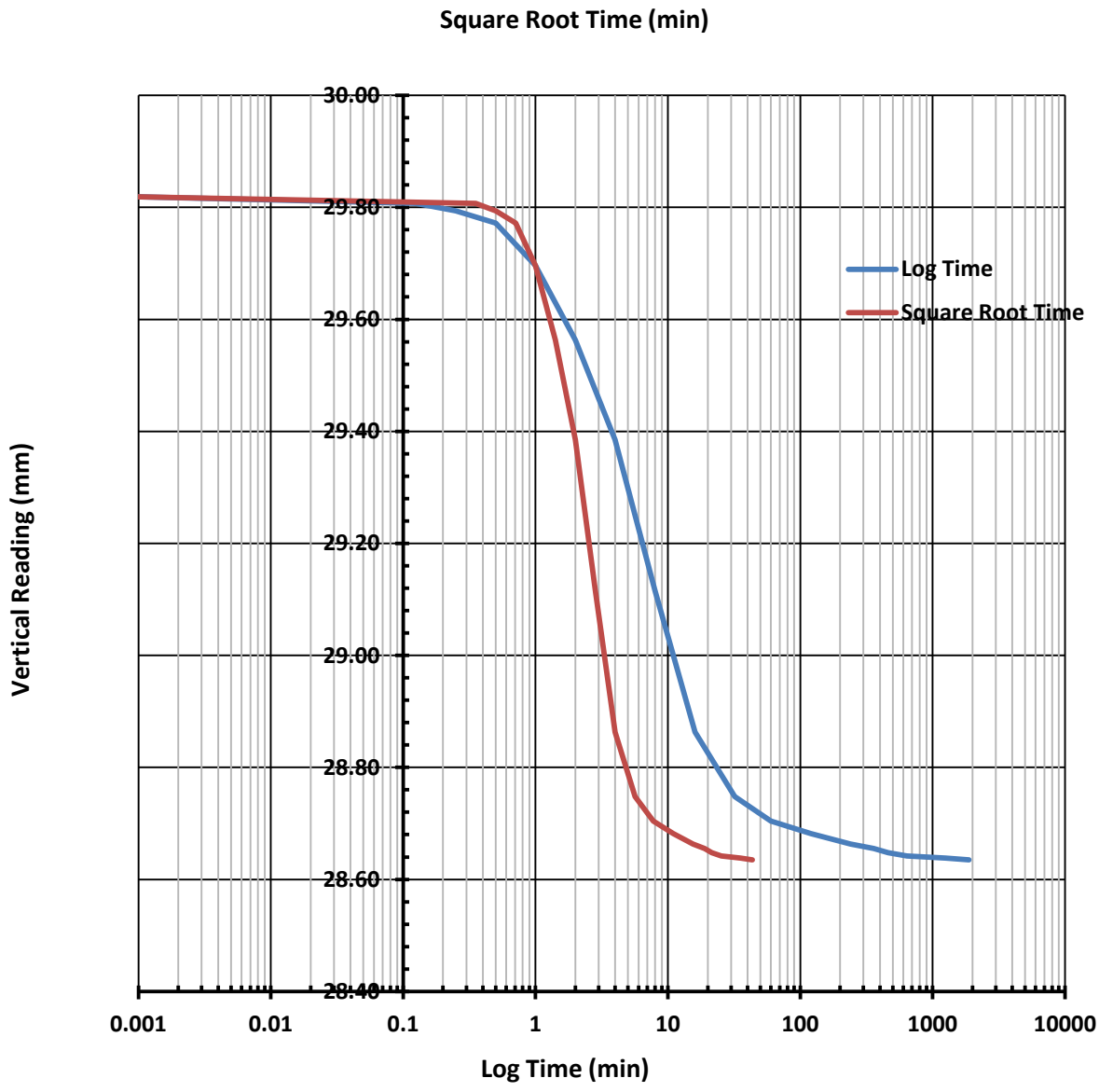
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Oxide - OOMC		
Lab ID:	OOMC_42.7%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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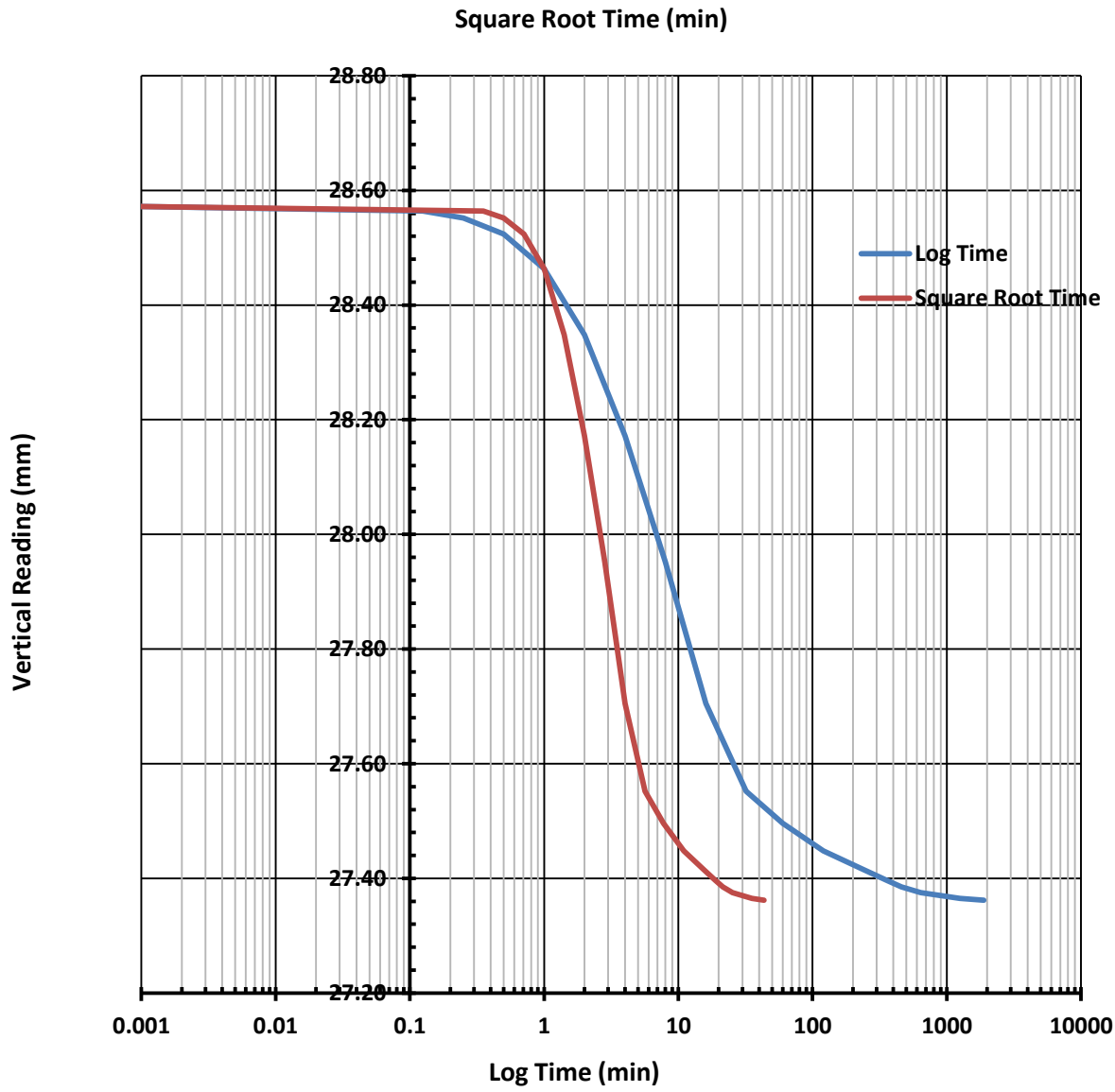
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Oxide - OOMC		
Lab ID:	OOMC_42.7%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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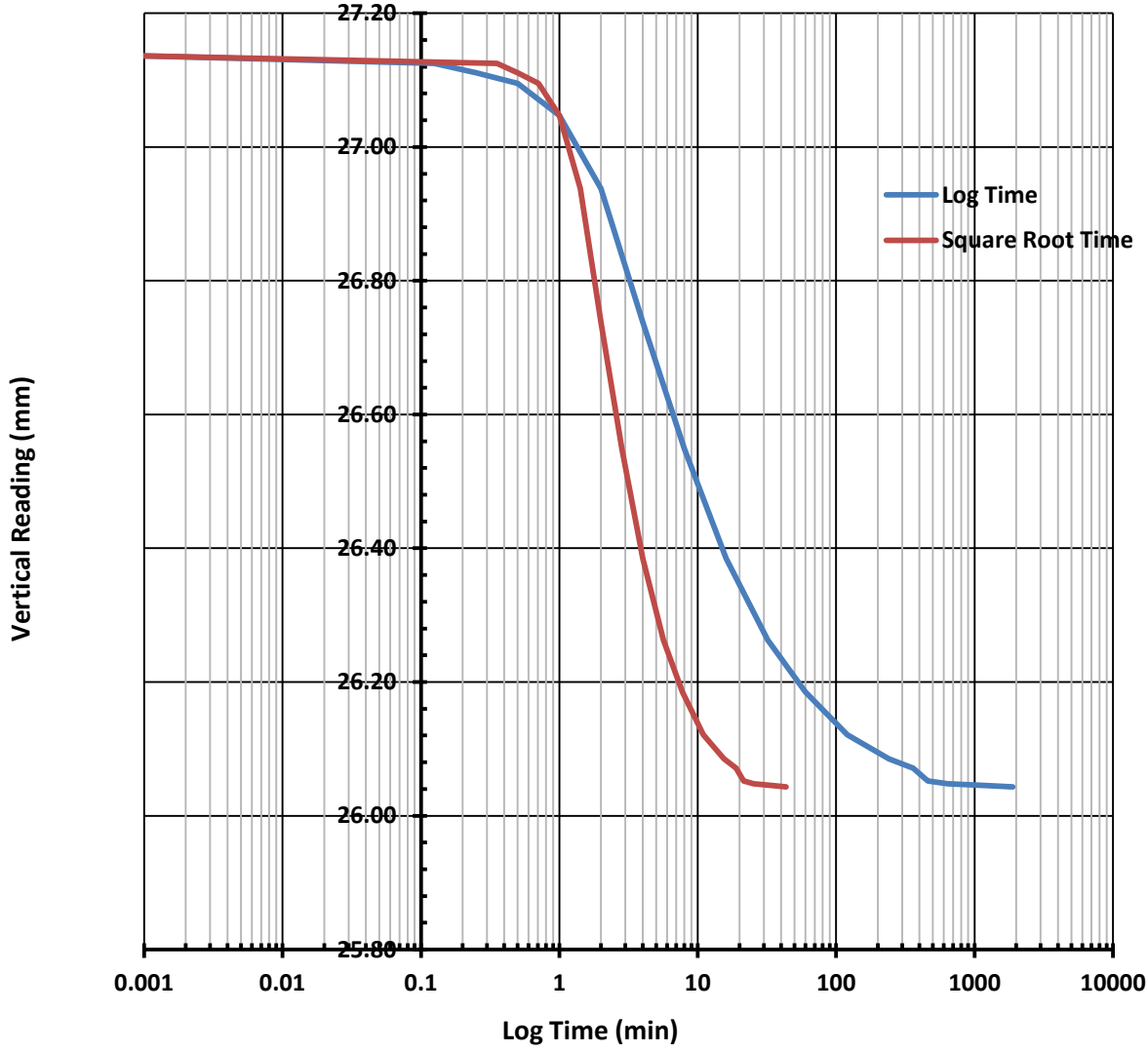
E-Precision Laboratory

CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Oxide - OOMC		
Lab ID:	OOMC_42.7%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa



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CONSOLIDATION - ONE DIMENSION

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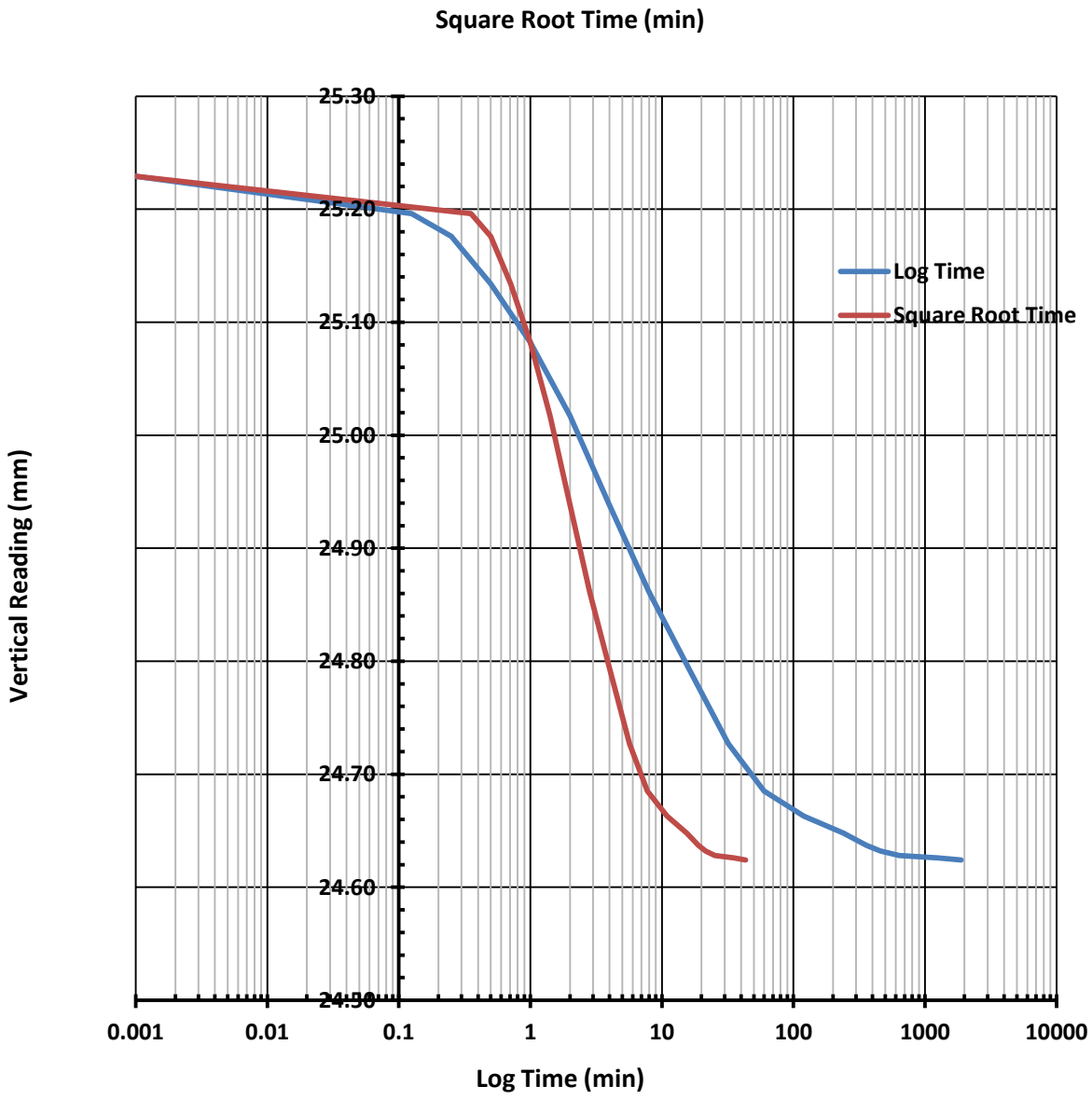
Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Oxide - OOMC		
Lab ID:	OOMC_42.7%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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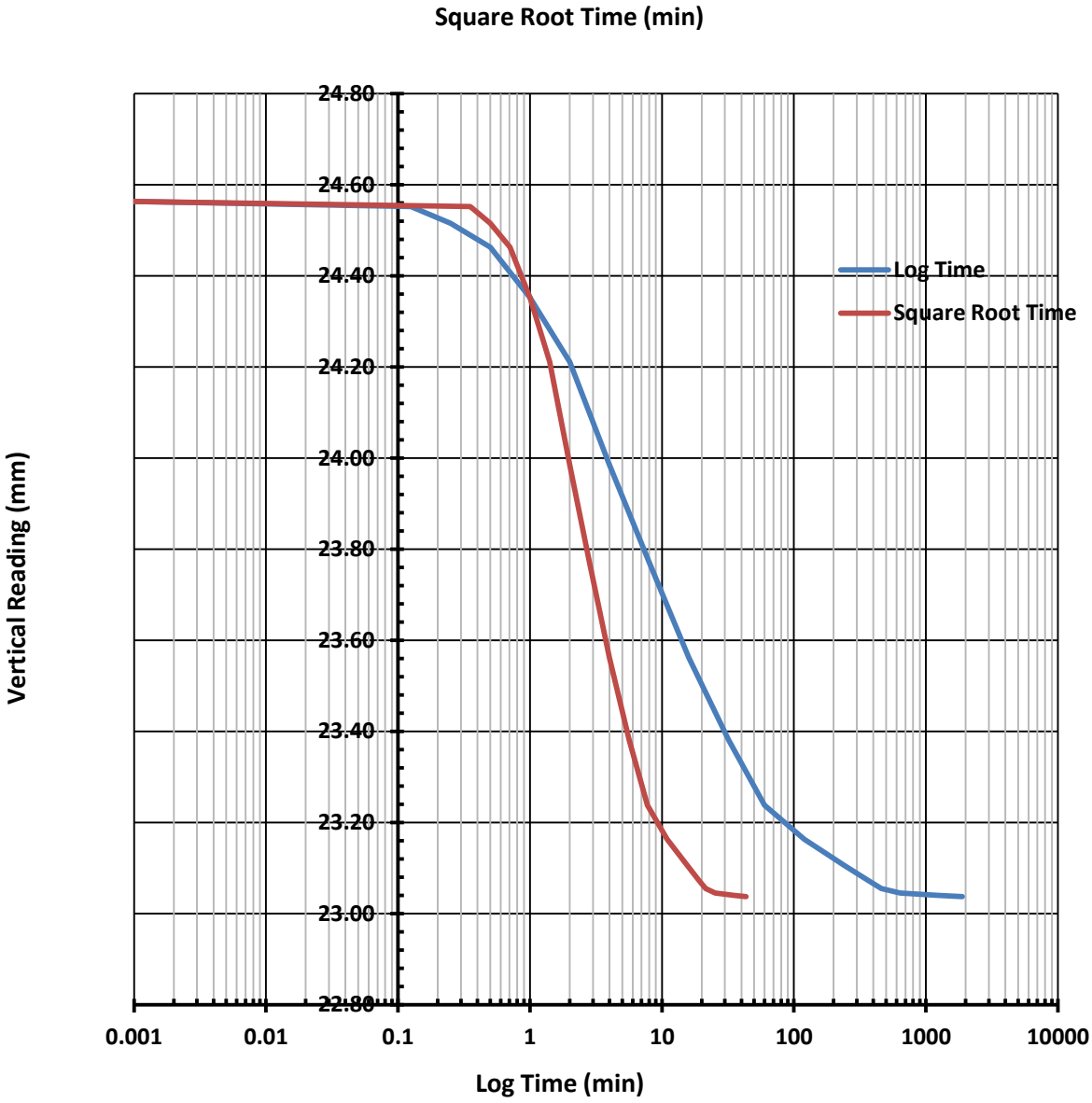
Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Oxide - OOMC		
Lab ID:	OOMC_42.7%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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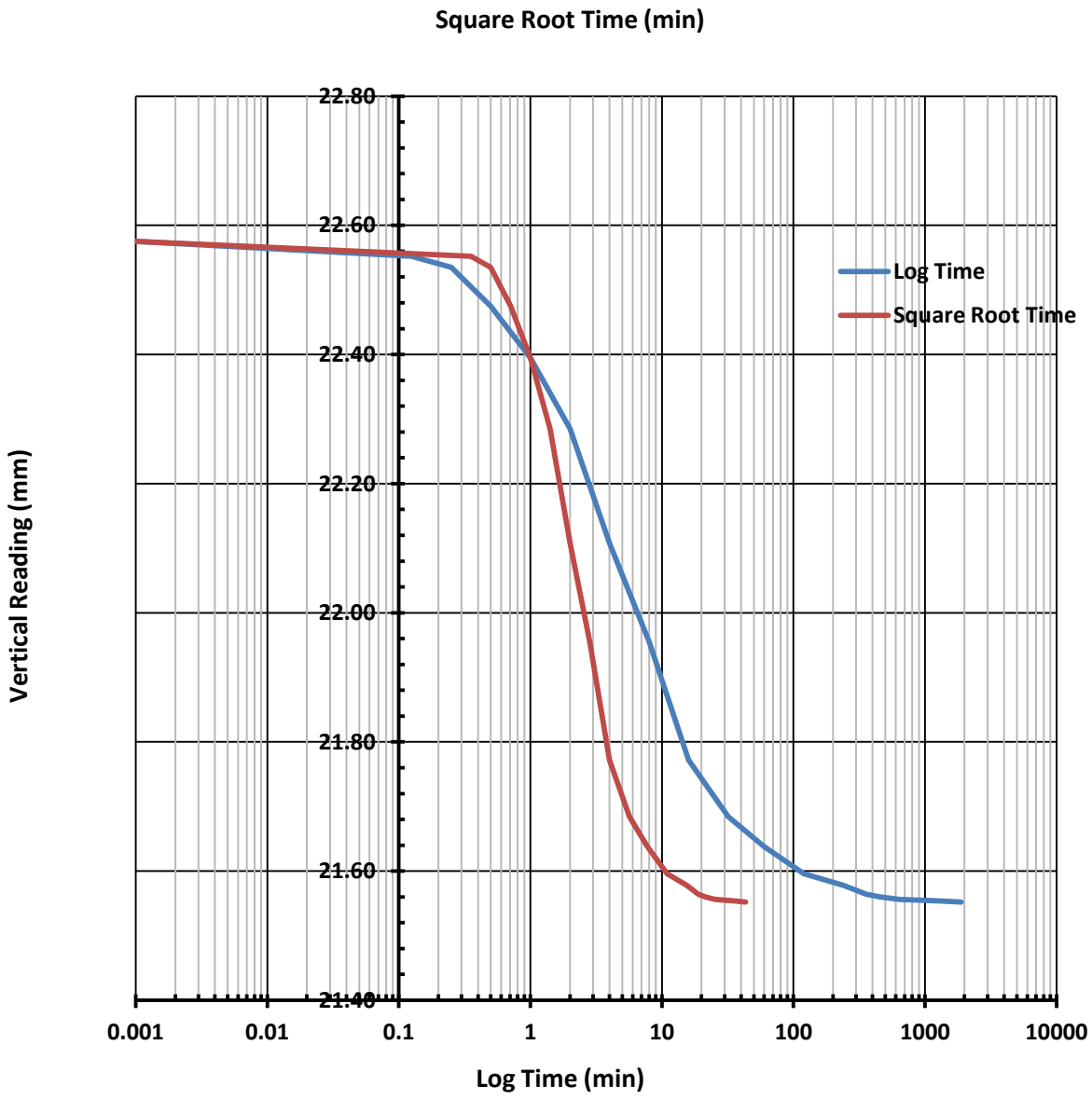
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Oxide - OOMC		
Lab ID:	OOMC_42.7%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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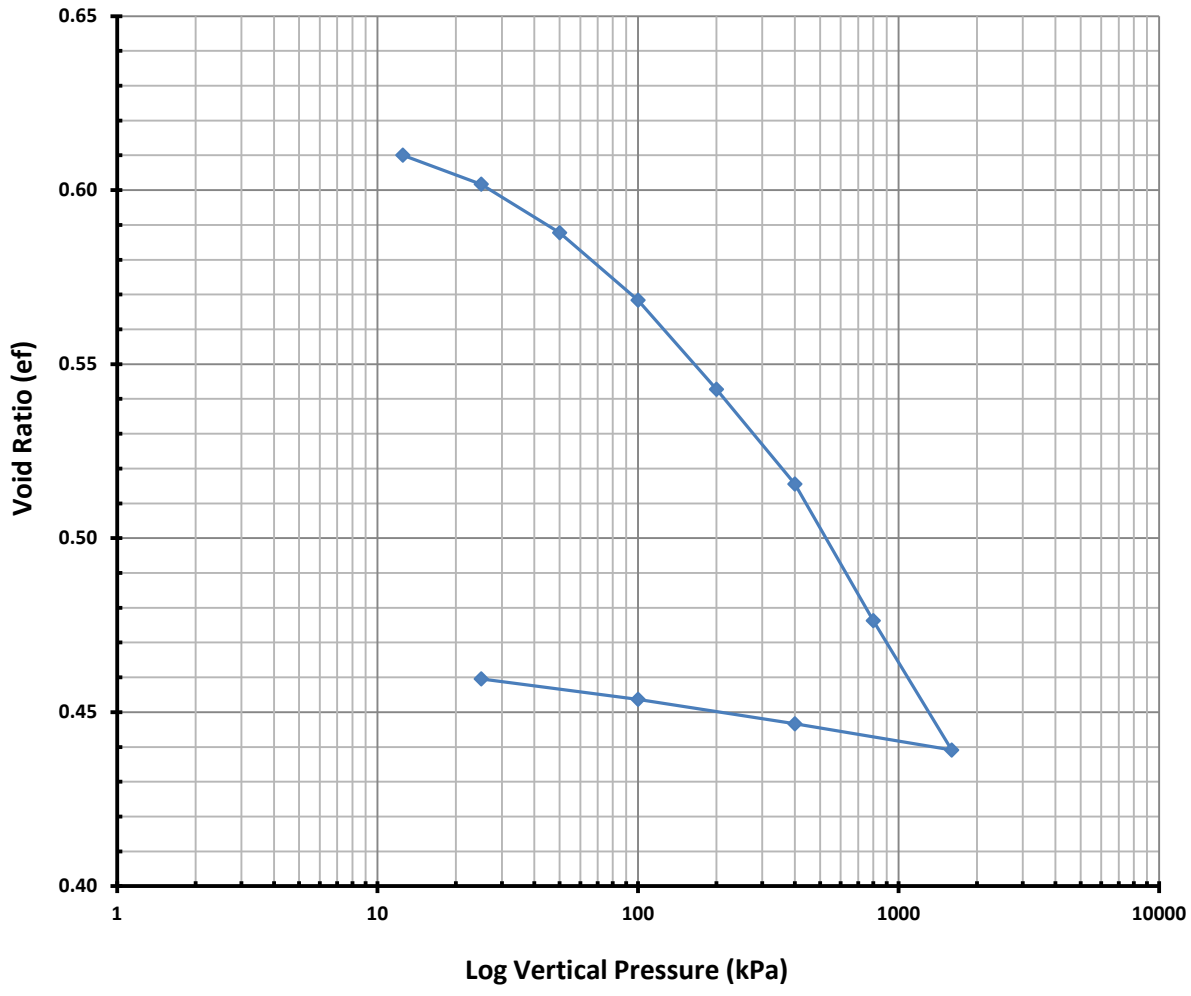
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Fresh - OFMC		
Lab ID:	OFMC_63%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°c

Tested by:	Phil	Initial Moisture (%):	22.47	Test Condition:	Undrained
Height (mm):	38.94	Final Moisture Content (%):	30.77	Sample Condition:	Saturated
Diameter (mm):	61.80	Bulk Density (t/m³):	2.20	Particle Density (t/m³):	2.916
Direction:	Vertical	Dry Density (t/m³):	1.80	Initial Void Ratio (e_i):	0.623

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



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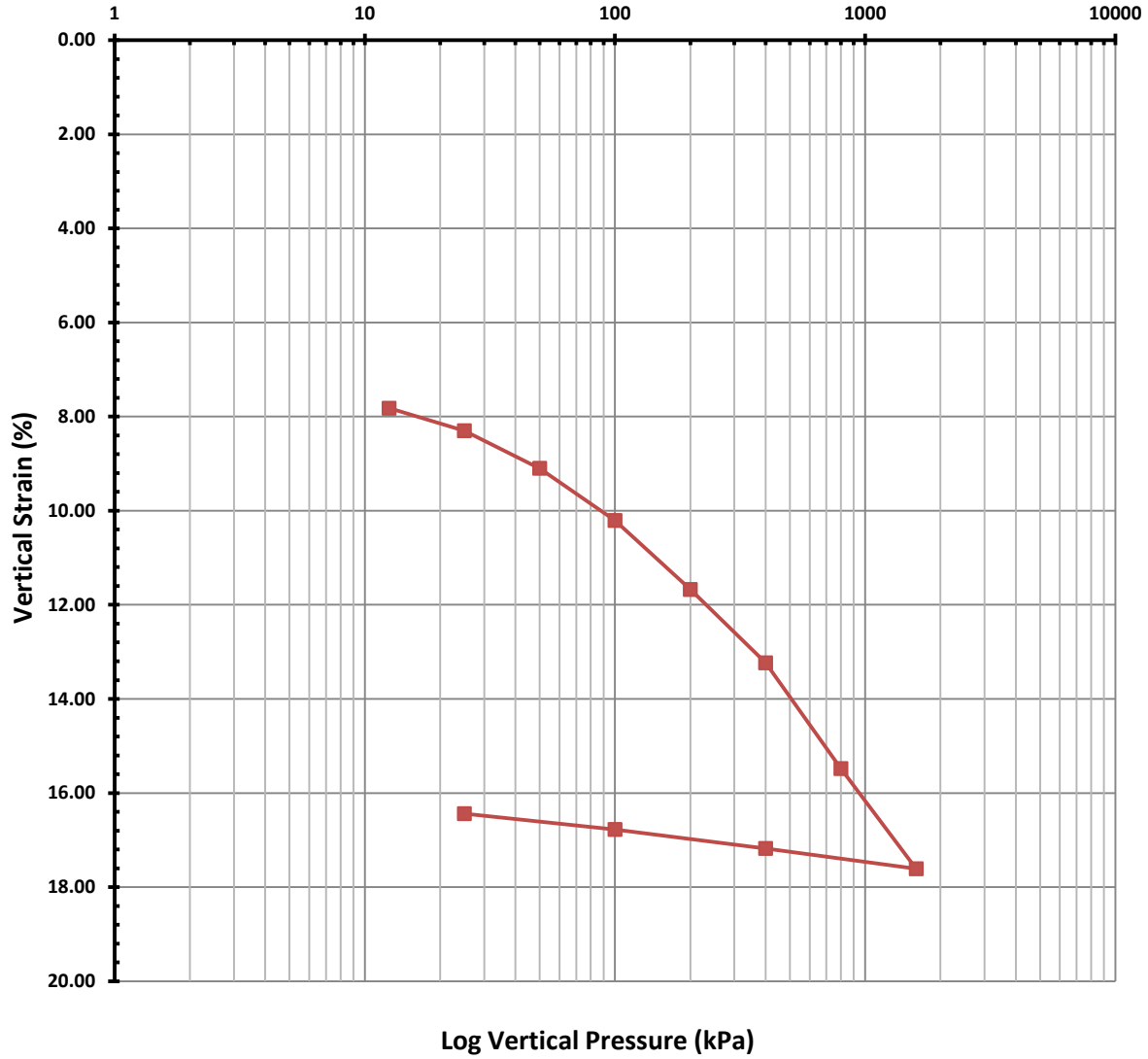
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Fresh - OFMC		
Lab ID:	OFMC_63%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°c

Vertical Strain (%) Vs Log of Vertical Pressure (kPa)



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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Fresh - OFMC		
Lab ID:	OFMC_63%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Test Results

*

Stages	Vert Disp (mm)	Cv (m^2/yr)		Compressibility Mv (m^2/kN)	K (m/s)		Void Ratio (e_f)	Vertical Strain (%)
		*t_{50}	t_{90}					
Stage 1 @ 12.5kPa	3.046	8.504	-	6.26E-03	1.7E-08		0.610	7.82
Stage 2 @ 25kPa	3.232	8.316	-	4.15E-04	1.1E-09		0.602	8.30
Stage 3 @ 50kPa	3.543	8.198	-	3.48E-04	8.9E-10		0.588	9.10
Stage 4 @ 100kPa	3.975	7.979	-	2.44E-04	6.1E-10		0.568	10.21
Stage 5 @ 200kPa	4.546	7.730	-	1.63E-04	3.9E-10		0.543	11.67
Stage 6 @ 400kPa	5.153	7.467	-	8.82E-05	2.0E-10		0.516	13.23
Stage 7 @ 800kPa	6.028	7.104	-	6.47E-05	1.4E-10		0.476	15.48
Stage 8 @ 1600kPa	6.857	6.762	-	3.15E-05	6.6E-11		0.439	17.61
Unload @ 400kPa	6.689							
Unload @ 100kPa	6.532							
Unload @ 25kPa	6.401							

** Values interpreted via lab only*

Comments: **Samples collected from Drained Settlement Testing**
Cv values to be interpreted via Engineer

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer):

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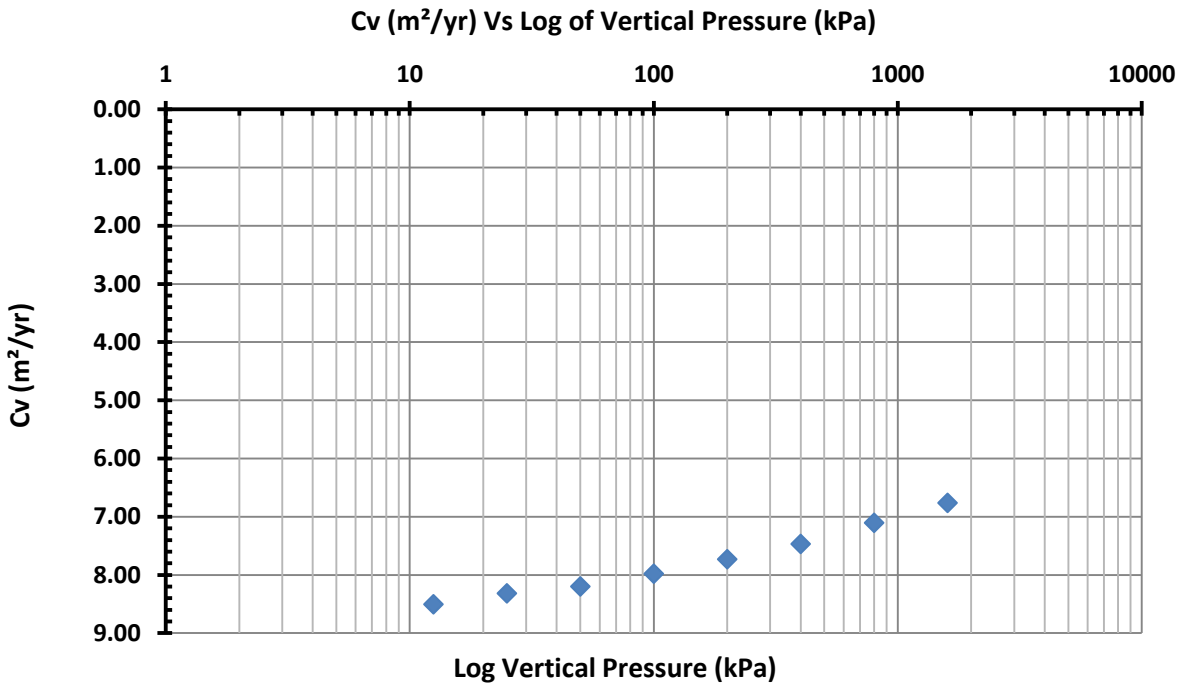
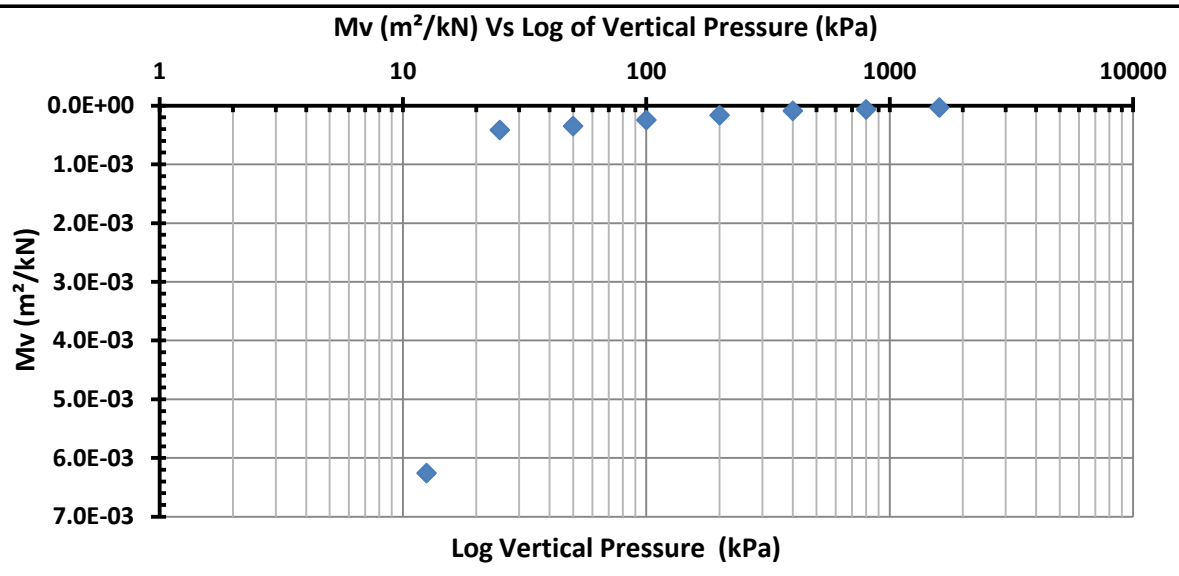
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Fresh - OFMC		
Lab ID:	OFMC_63%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C



* Plot based on Log (time) data



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Method: AS1289 6.6.1 / Inhouse Method

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Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Fresh - OFMC		
Lab ID:	OFMC_63%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

TEST RESULTS PLEASE SEE PAGES BELOW

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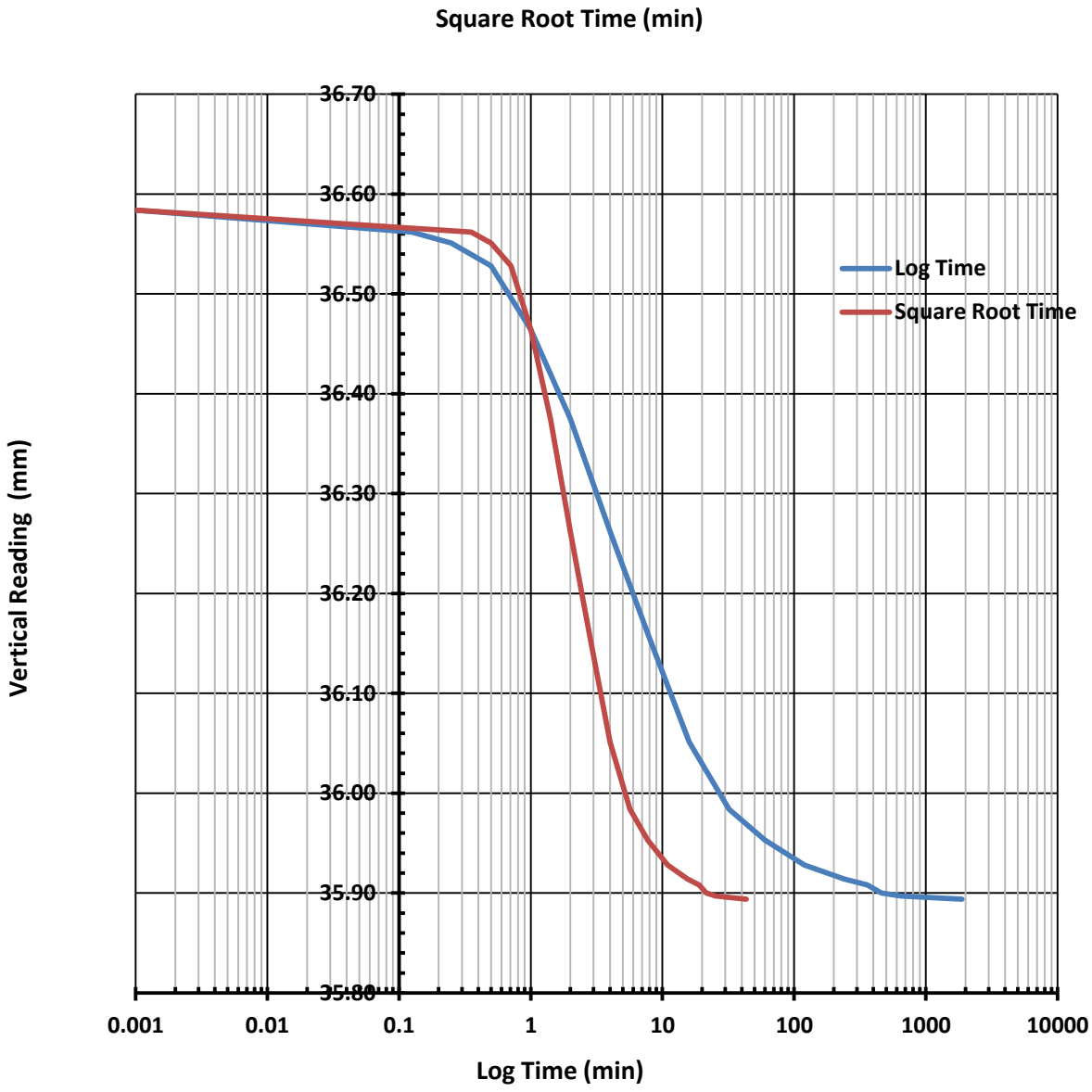
Method: AS1289 6.6.1 / Inhouse Method

Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Fresh - OFMC		
Lab ID:	OFMC_63%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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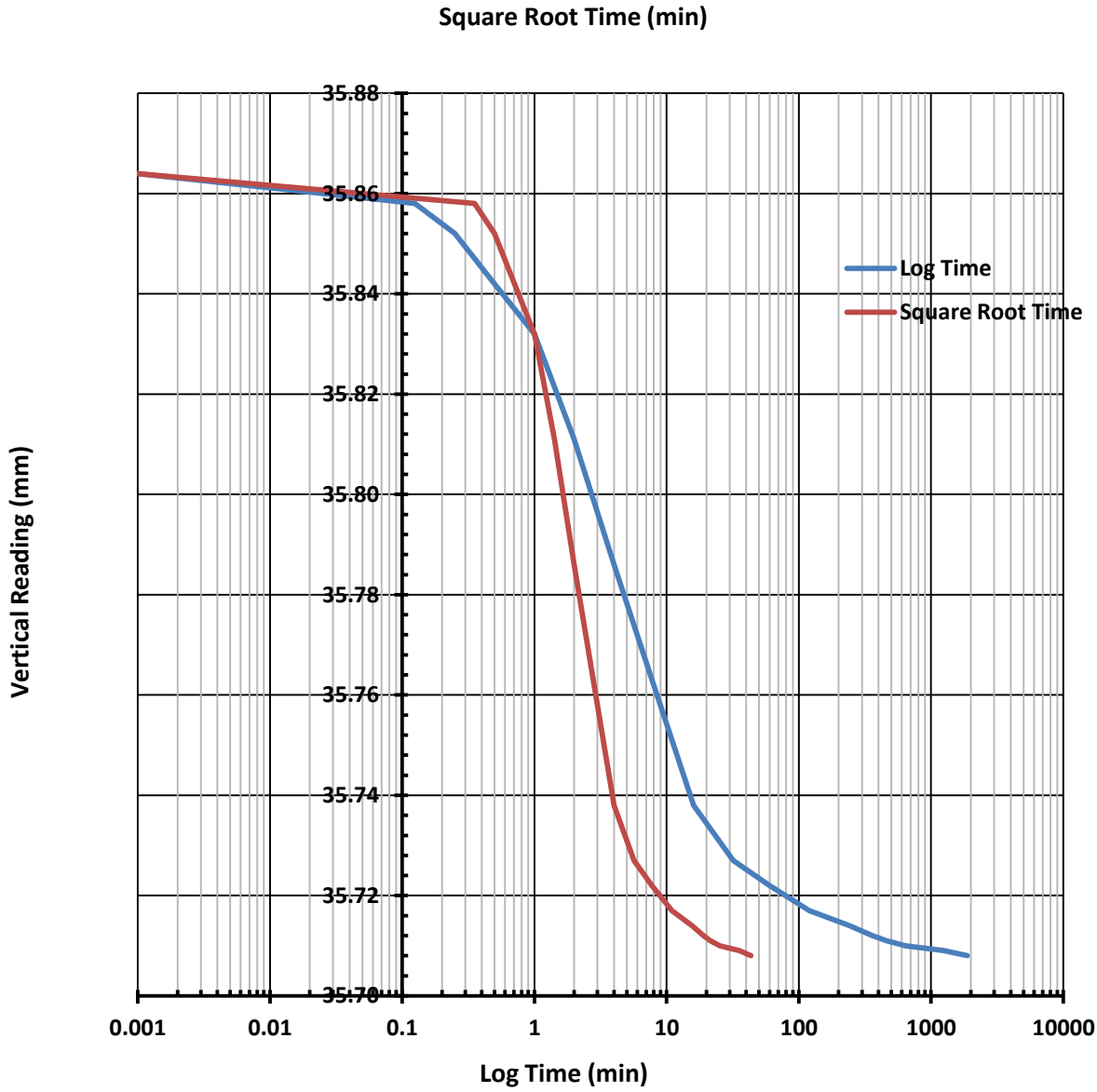
Method: AS1289 6.6.1 / Inhouse Method

Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Fresh - OFMC		
Lab ID:	OFMC_63%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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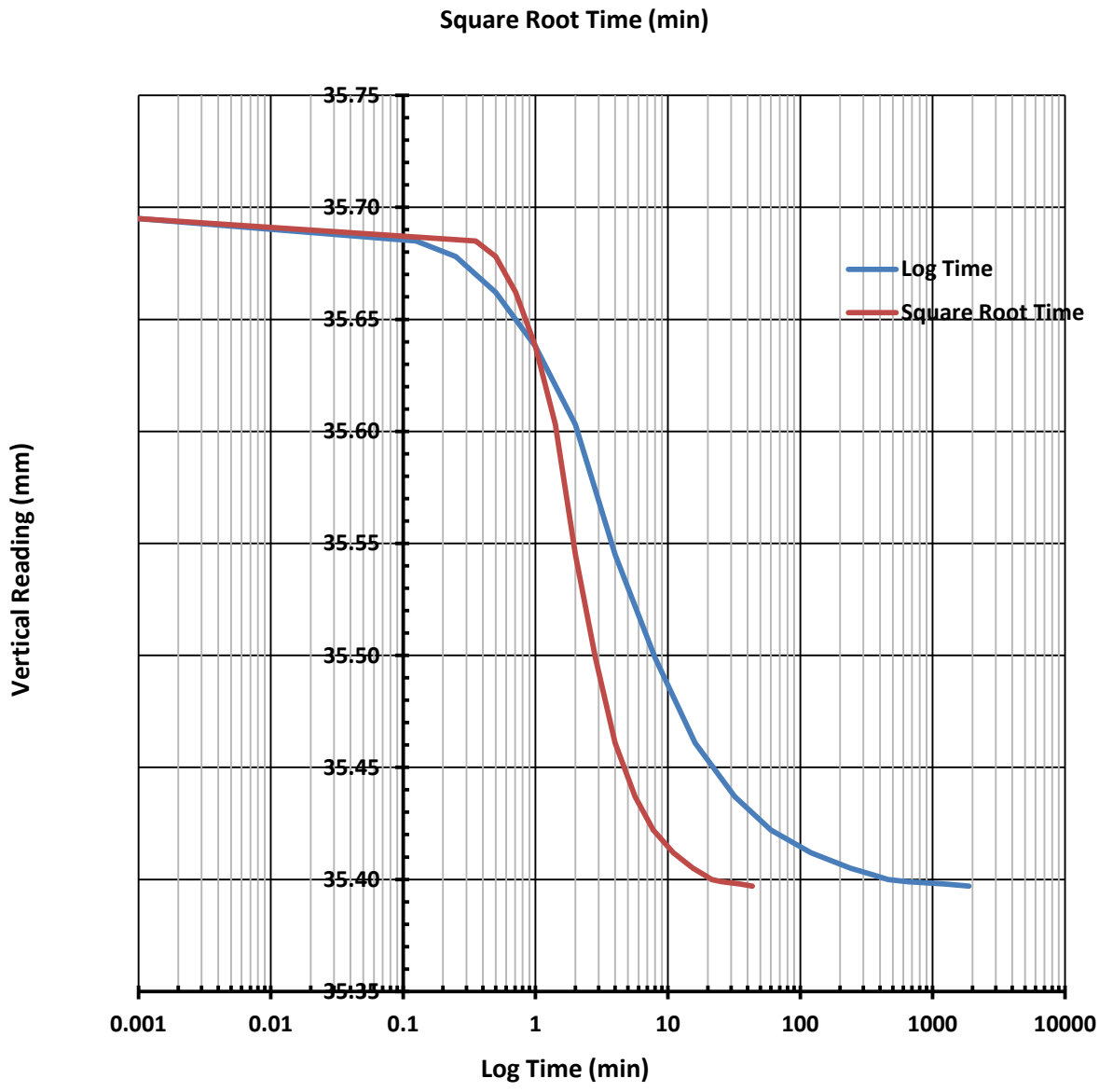
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Fresh - OFMC		
Lab ID:	OFMC_63%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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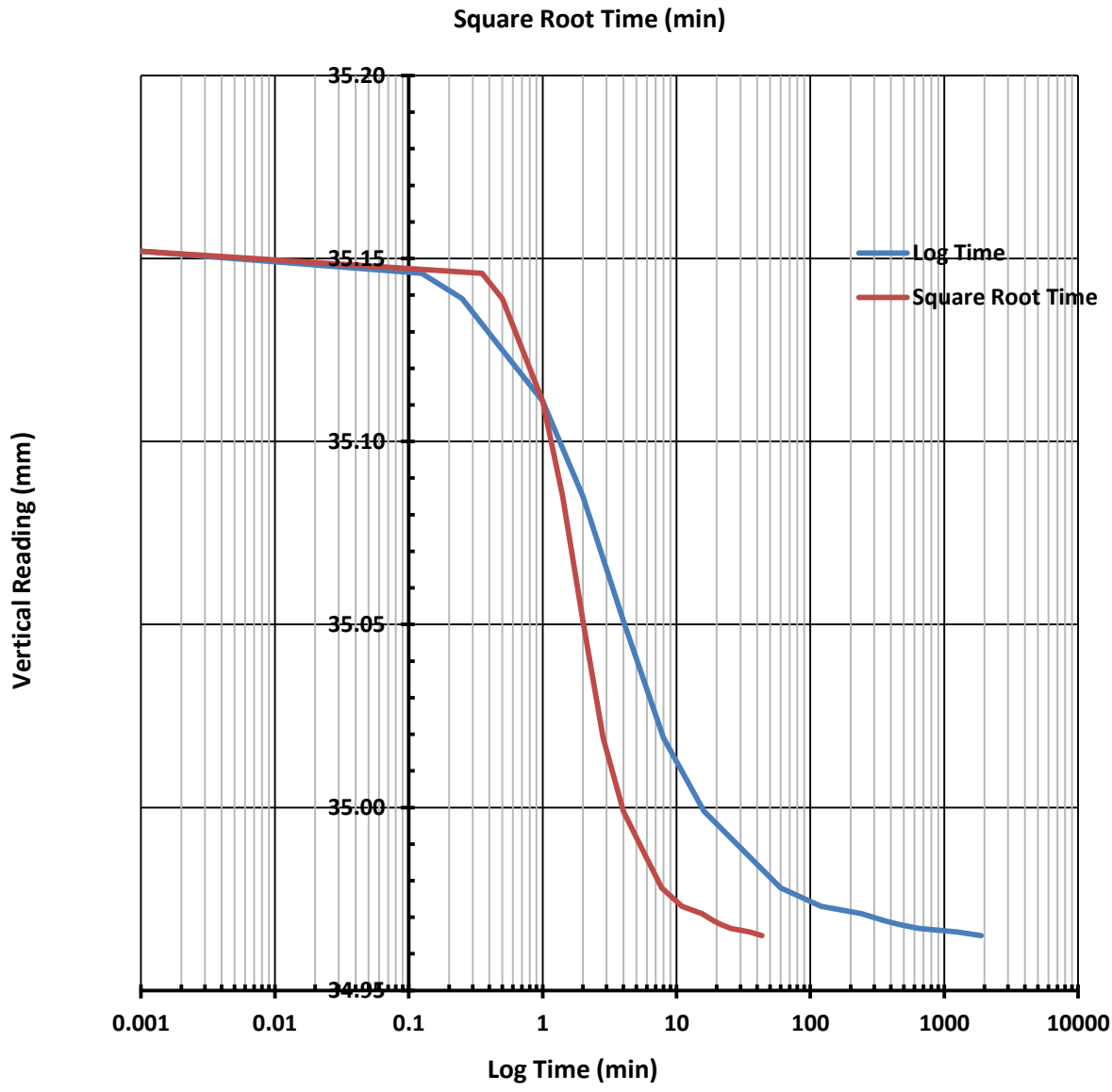
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Fresh - OFMC		
Lab ID:	OFMC_63%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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CONSOLIDATION - ONE DIMENSION

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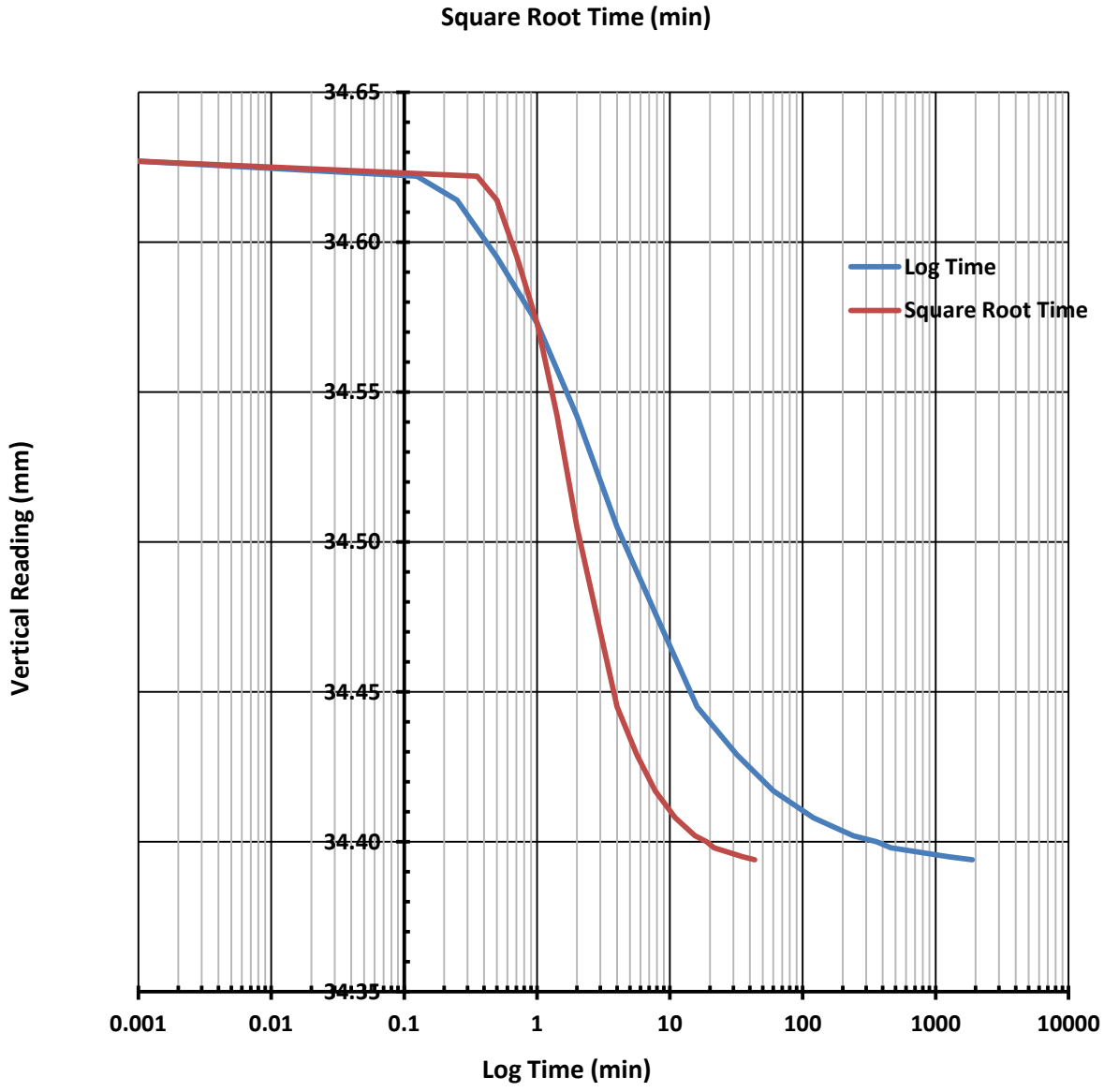
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Fresh - OFMC		
Lab ID:	OFMC_63%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa



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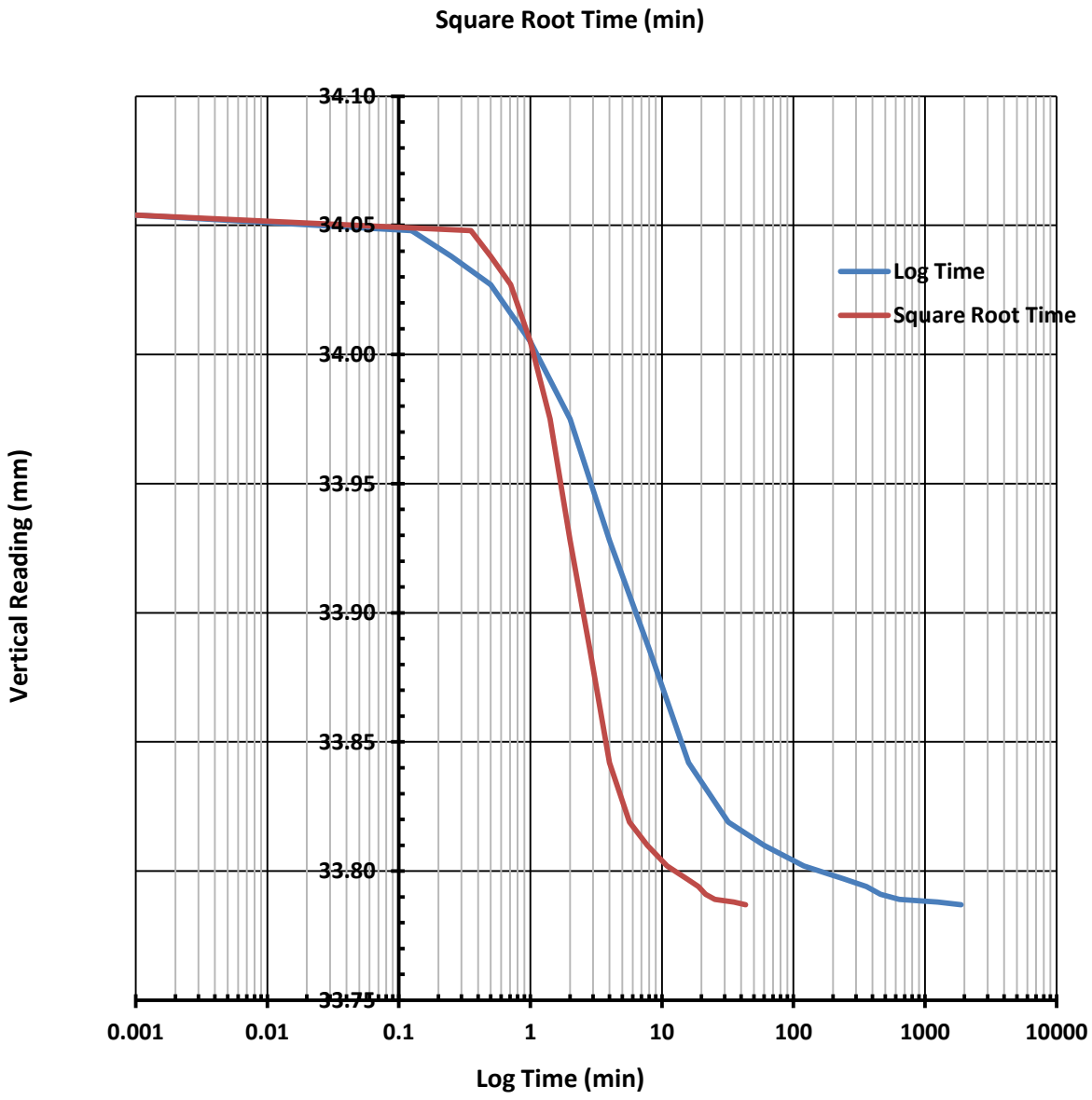
Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Fresh - OFMC		
Lab ID:	OFMC_63%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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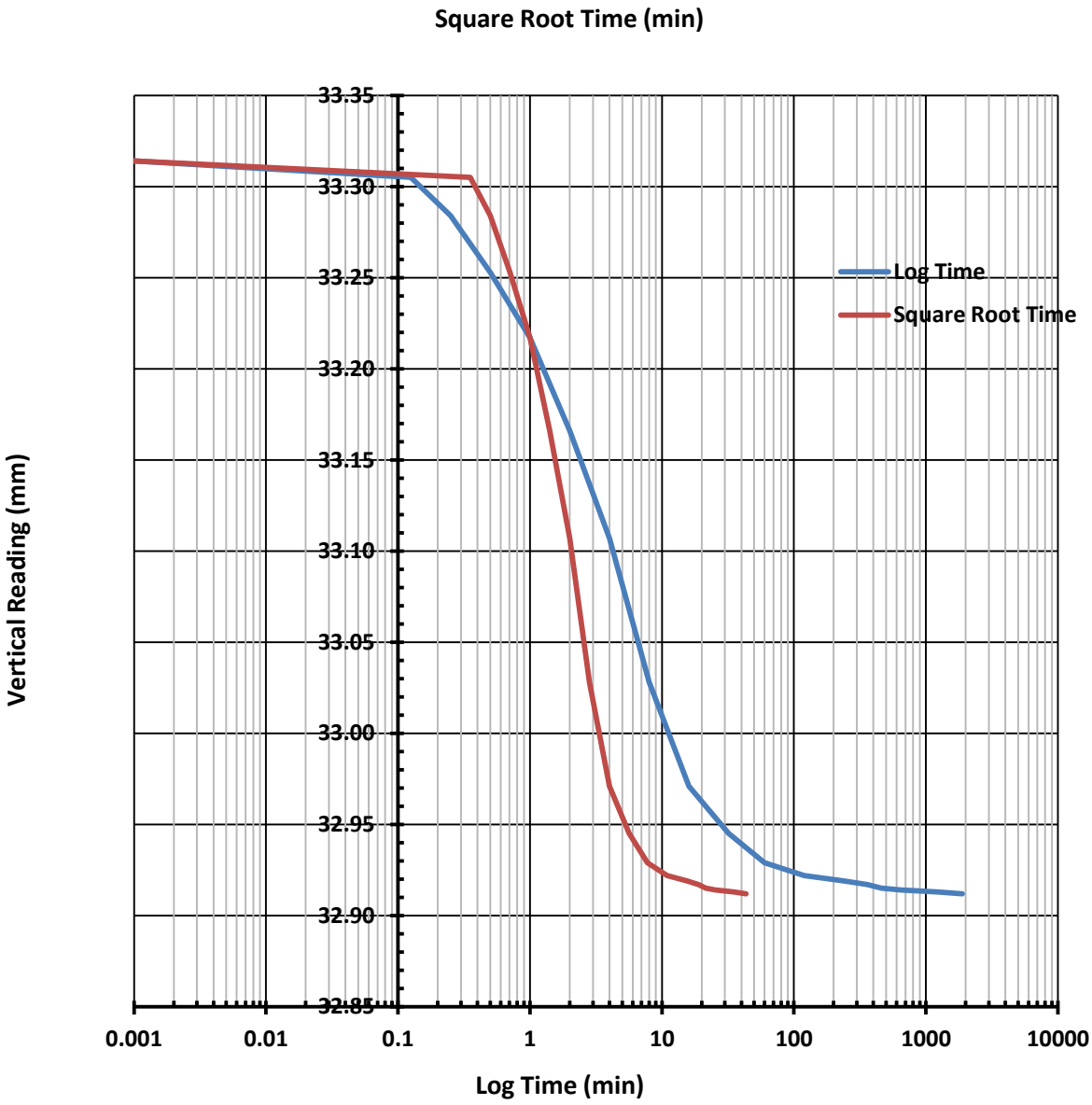
Client:	Western Geotechnical Lab Services	Date Tested:	11/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Fresh - OFMC		
Lab ID:	OFMC_63%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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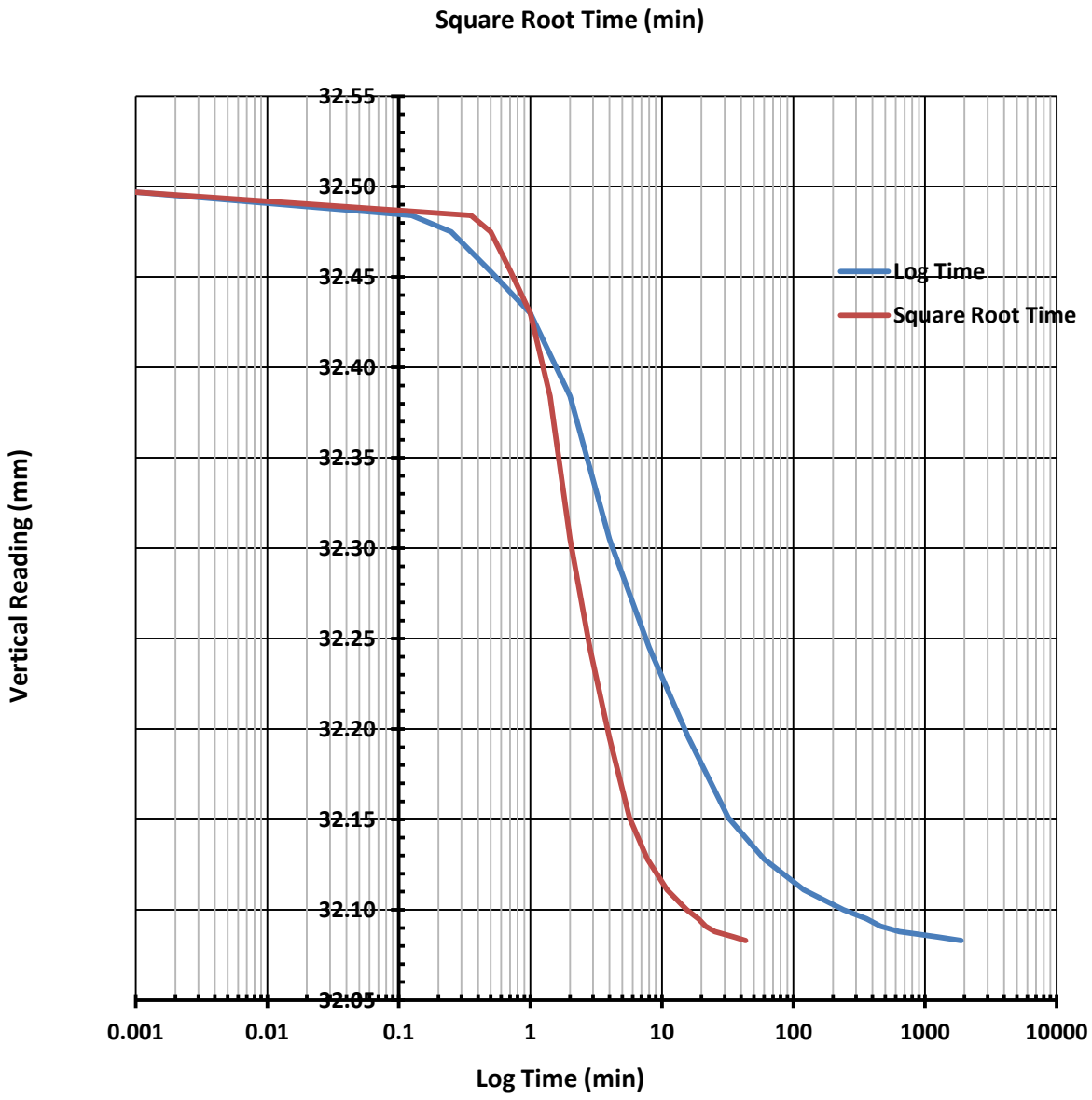
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample ID:	Orion Fresh - OFMC		
Lab ID:	OFMC_63%_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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E-Precision Laboratory

AIR DRYING SETTLING TEST

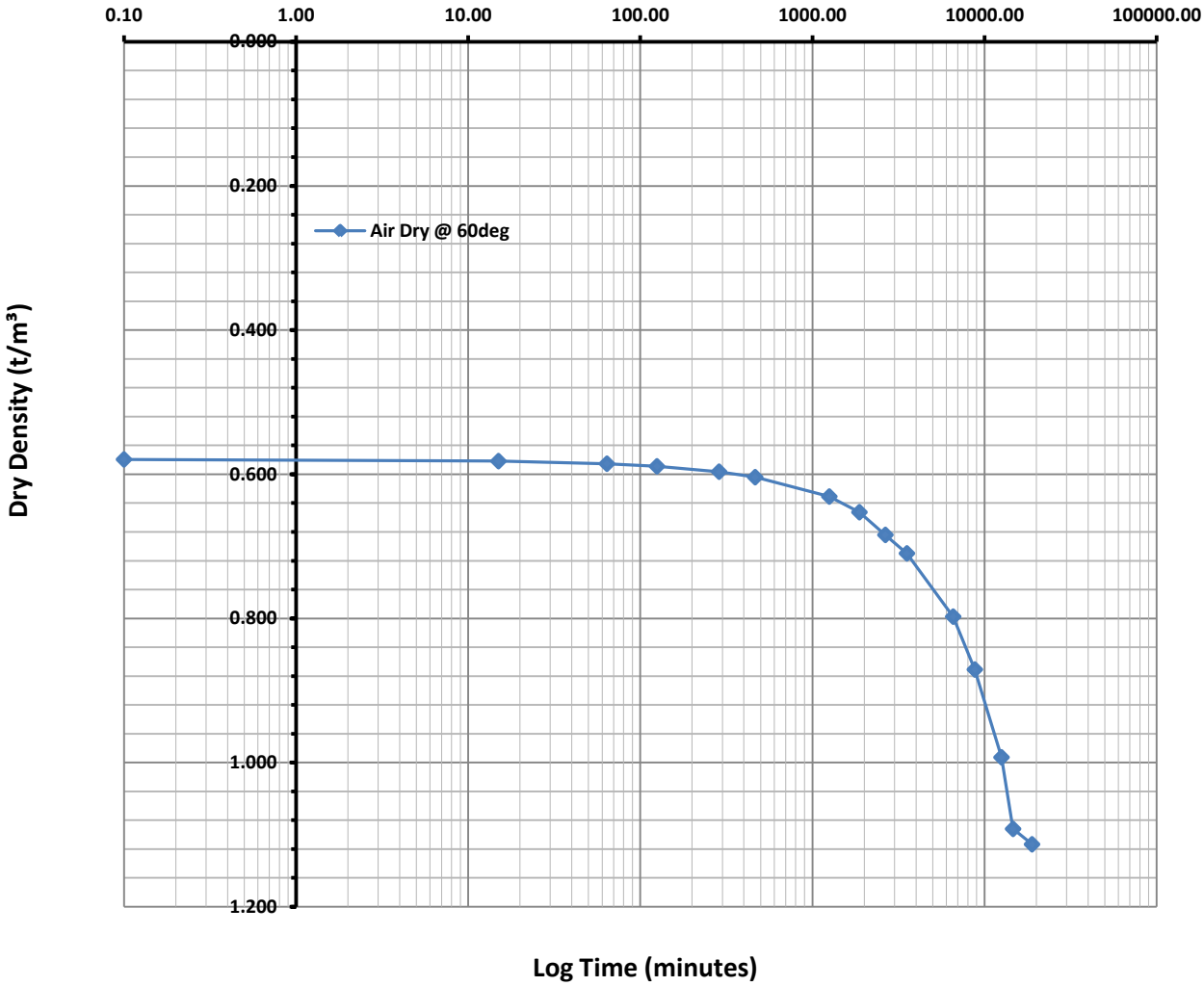
METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Western Geotechnical Lab Services	Date Tested:	2022/12/1
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample No:	Orion Oxide - OOMC		
Lab ID:	OOMC_42.7%_AIR_DRY	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Air Dry Testing
Sample Preparation: 42.7% Solids

Initial Bulk Density (t/m³): 1.358
Particle Density (t/m³): 2.704
Moisture Content Initial (%): 134.330

Dry Density (t/m³) Vs Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer):

The results of tests performed apply only to the specific sample at time of test unless otherwise clearly stated. Reference should be made to E-Precision Laboratory's "Standard Terms and Conditions" E-Precision Laboratory ABN 431 559 578 87

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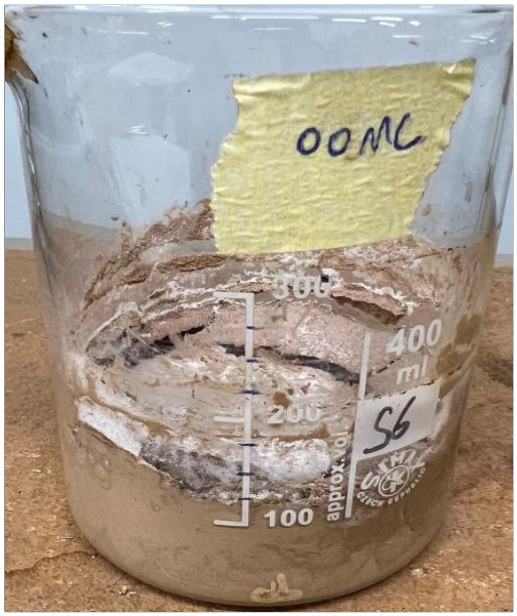
AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Western Geotechnical Lab Services	Date Tested:	2022/12/1
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample No:	Orion Oxide - OOMC		
Lab ID:	OOMC_42.7%_AIR_DRY	Room Temperature at Test:	19°

Tested by:	Phil	**Initial Bulk Density (t/m³):**	1.358
Type of Test:	Air Dry Testing	**Particle Density (t/m³):**	2.704
Sample Preparation:	42.7% Solids	**Moisture Content Initial (%):**	134.330

Photo of Samples after Testing



Oven dried @ 60deg

Comments:

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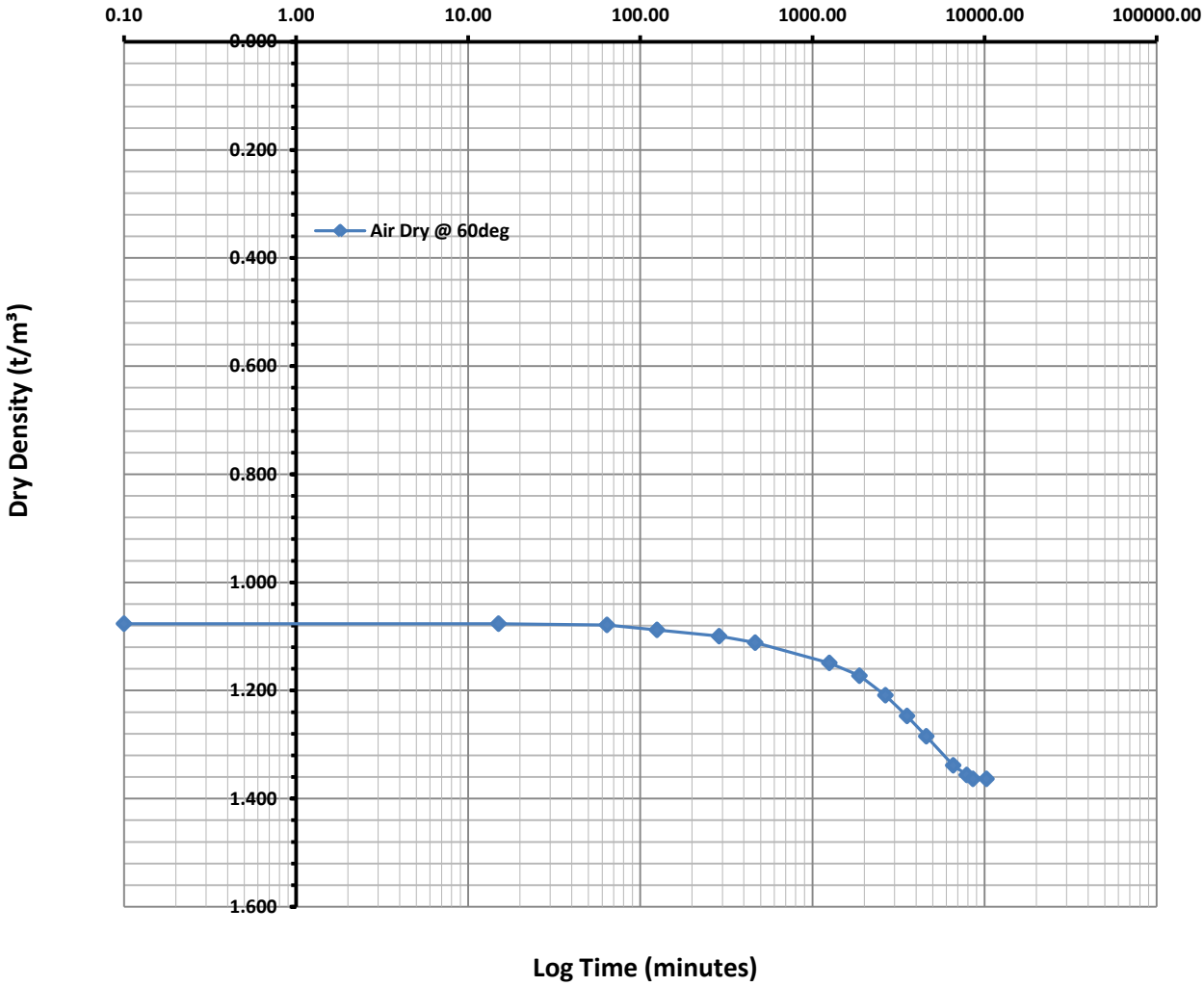
AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Western Geotechnical Lab Services	Date Tested:	01/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample No:	Orion Fresh - OFMC		
Lab ID:	OFMC_63%_AIR_DRY	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Air Dry Testing
Sample Preparation: 63% Solids
Initial Bulk Density (t/m³): 1.708
Particle Density (t/m³): 2.916
Moisture Content Initial (%): 58.723

Dry Density (t/m³) Vs Time (minutes)



Comments:

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AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Western Geotechnical Lab Services	Date Tested:	01/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample No:	Orion Fresh - OFMC		
Lab ID:	OFMC_63%_AIR_DRY	Room Temperature at Test:	19°

Tested by:	Phil	**Initial Bulk Density (t/m³):**	1.708
Type of Test:	Air Dry Testing	**Particle Density (t/m³):**	2.704
Sample Preparation:	42.7% Solids	**Moisture Content Initial (%):**	58.723

Photo of Samples after Testing

Oven dried @ 60deg

Comments:

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Integrity Precision Innovation

Perth
16 Gympie Way, Willetton
WA 6155
Ph: (08) 9418 8742
E-mail: Phillip.li@eprecisionlab.com

E-Precision Laboratory

SETTLEMENT TESTING TAILINGS

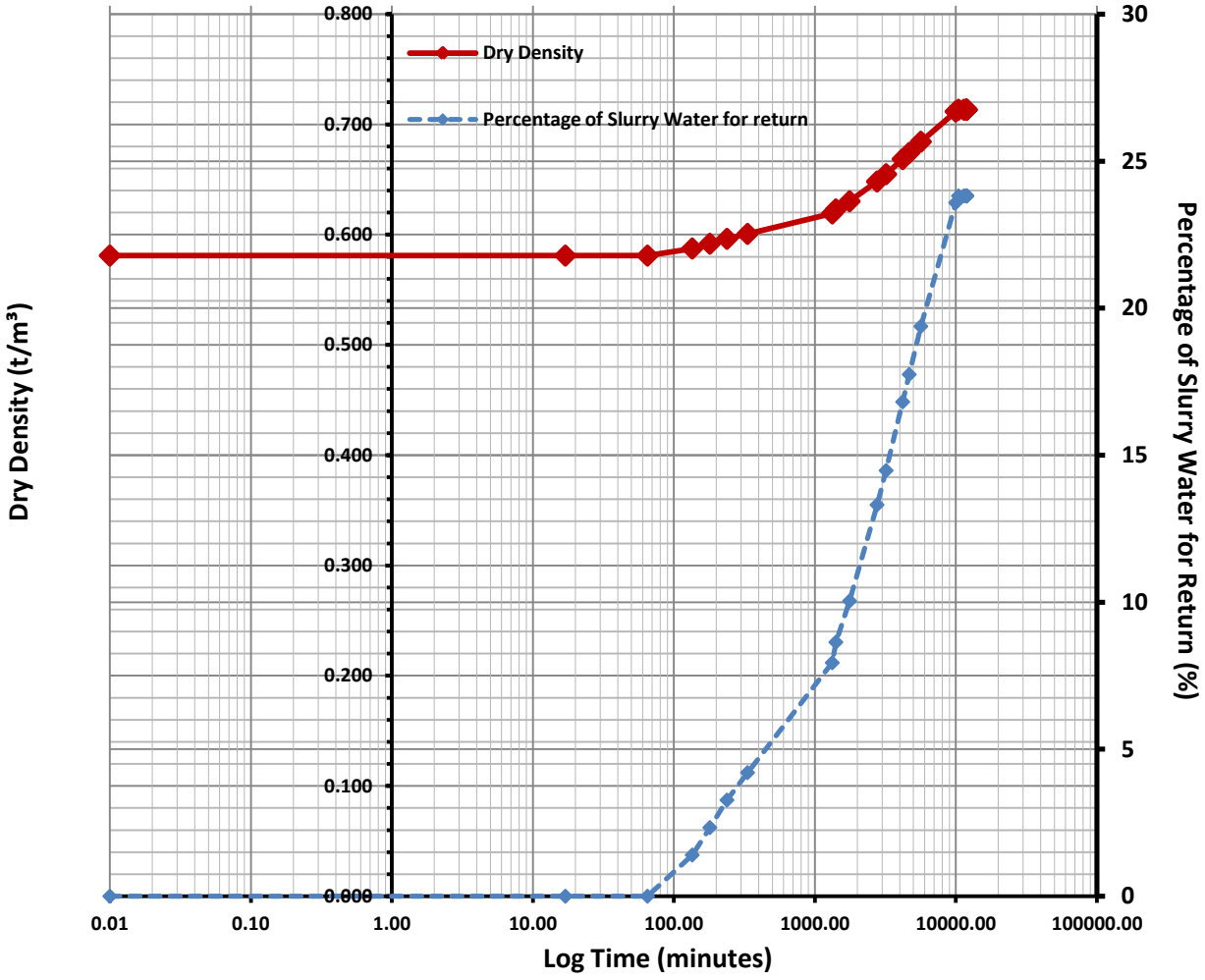
METHOD: IN-HOUSE METHOD

Client:	Western Geotechnical Lab Services	Date Tested:	01/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample No:	Orion Oxide - OOMC		
Lab ID:	OOMC_42.7%_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 42.7% Solids

Initial Dry Density (t/m³): 0.581
Particle Density (t/m³): 2.704
Initial Bulk Density (t/m³): 1.360

Undrained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer):

The results of tests performed apply only to the specific sample at time of test unless otherwise clearly stated. Reference should be made to E-Precision Laboratory's "Standard Terms and Conditions" E-Precision Laboratory ABN 431 559 578 87

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SETTLEMENT TESTING TAILINGS

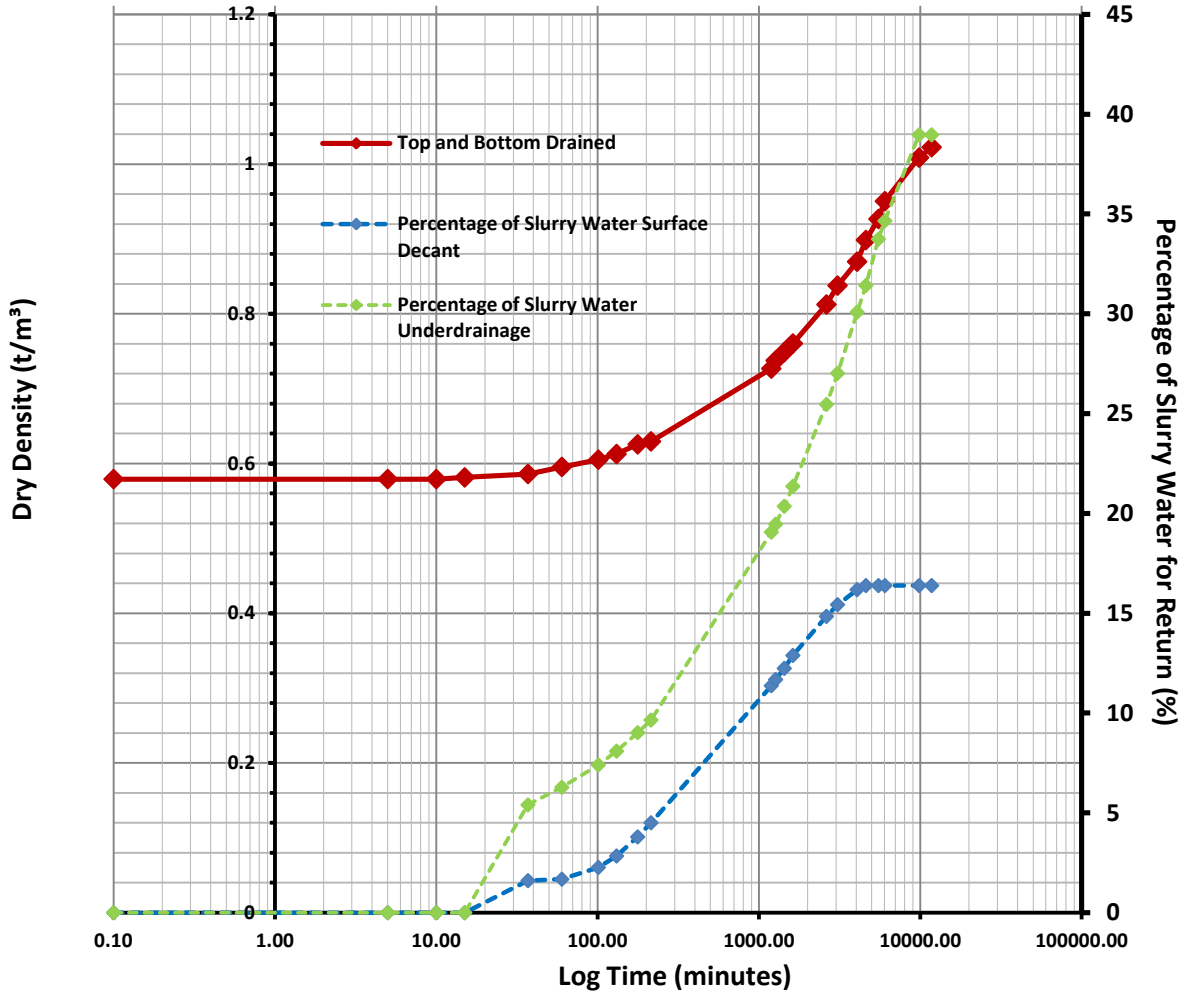
METHOD: IN-HOUSE METHOD

Client:	Western Geotechnical Lab Services	Date Tested:	01/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample No:	Orion Oxide - OOMC		
Lab ID:	OOMC_42.7%_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 42.7% Solids

Initial Dry Density (t/m³): 0.579
Particle Density (t/m³): 2.704
Initial Bulk Density (t/m³): 1.355

Top and Bottom Drained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer):

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METHOD: IN-HOUSE METHOD

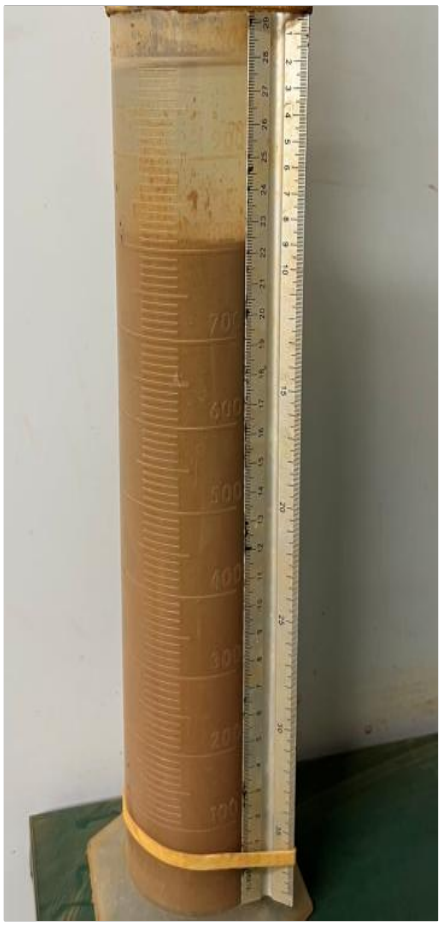
Client:	Western Geotechnical Lab Services	Date Tested:	01/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample No:	Orion Oxide - OOMC		
Lab ID:	OOMC_42.7%_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 42.7% Solids

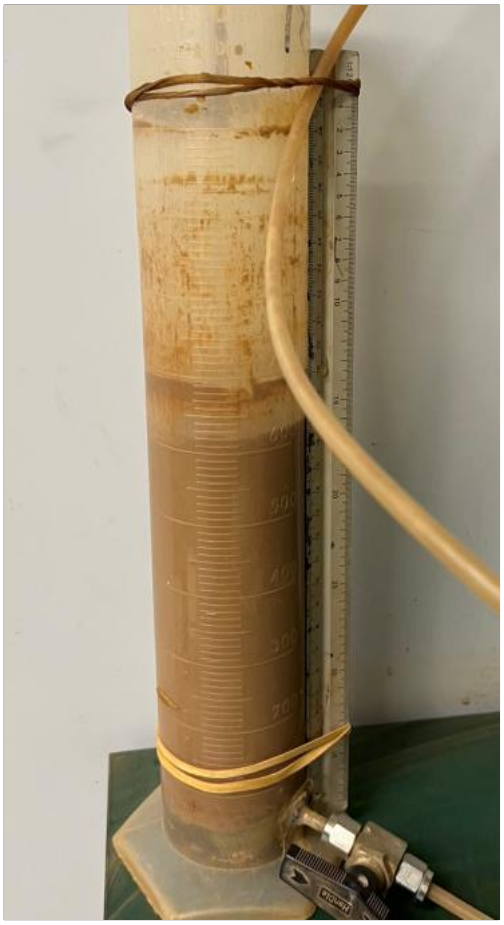
Initial Dry Density (t/m³): -
Particle Density (t/m³): -
Initial Bulk Density (t/m3): -

Photo of Test Setup

Undrained



Drained



Comments:

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SETTLEMENT TESTING TAILINGS

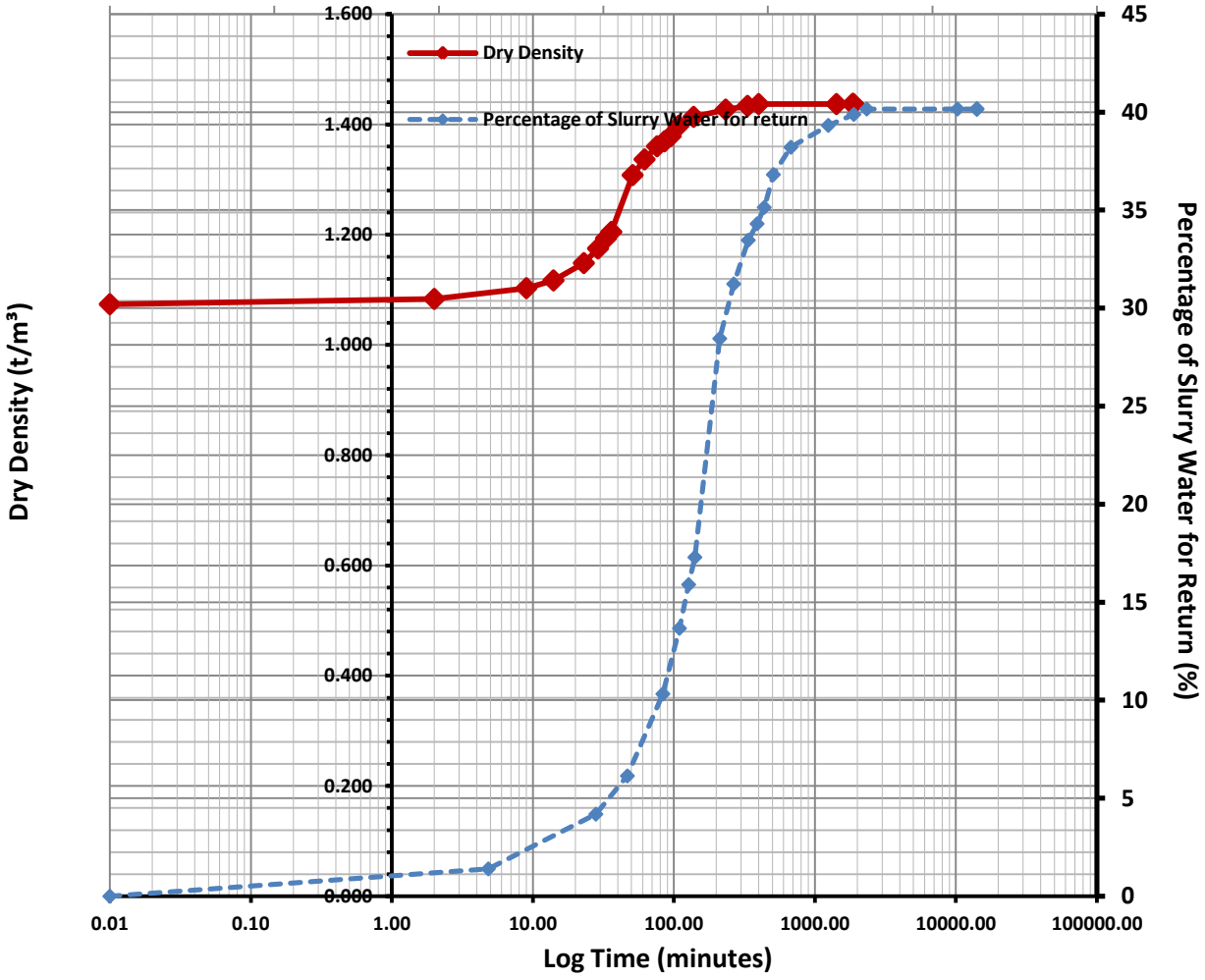
METHOD: IN-HOUSE METHOD

Client:	Western Geotechnical Lab Services	Date Tested:	01/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample No:	Orion Fresh - OFMC		
Lab ID:	OFMC_63%_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 63% Solids

Initial Dry Density (t/m³): 1.074
Particle Density (t/m³): 2.916
Initial Bulk Density (t/m³): 1.703

Undrained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

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SETTLEMENT TESTING TAILINGS

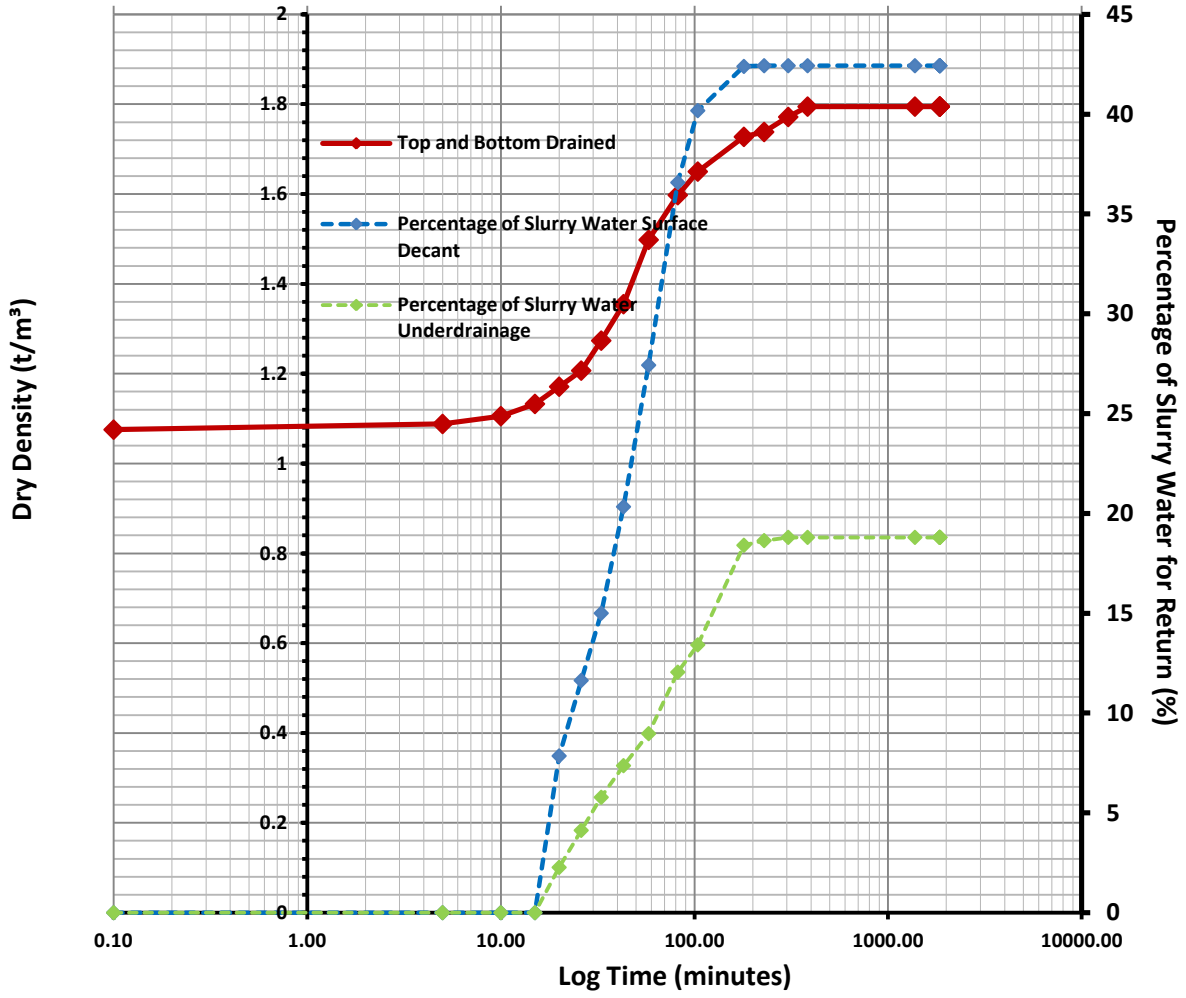
METHOD: IN-HOUSE METHOD

Client:	Western Geotechnical Lab Services	Date Tested:	01/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample No:	Orion Fresh - OFMC		
Lab ID:	OFMC_63%_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 63% Solids

Initial Dry Density (t/m³): 1.075
Particle Density (t/m³): 2.916
Initial Bulk Density (t/m³): 1.707

Top and Bottom Drained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

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SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

Client:	Western Geotechnical Lab Services	Date Tested:	01/12/2022
Project:	Mt Gibson TSF 2022	EP Lab Job Number:	WGEO
Sample No:	Orion Fresh - OFMC		
Lab ID:	OFMC_63%_SETTLEMENT	Room Temperature at Test:	19°

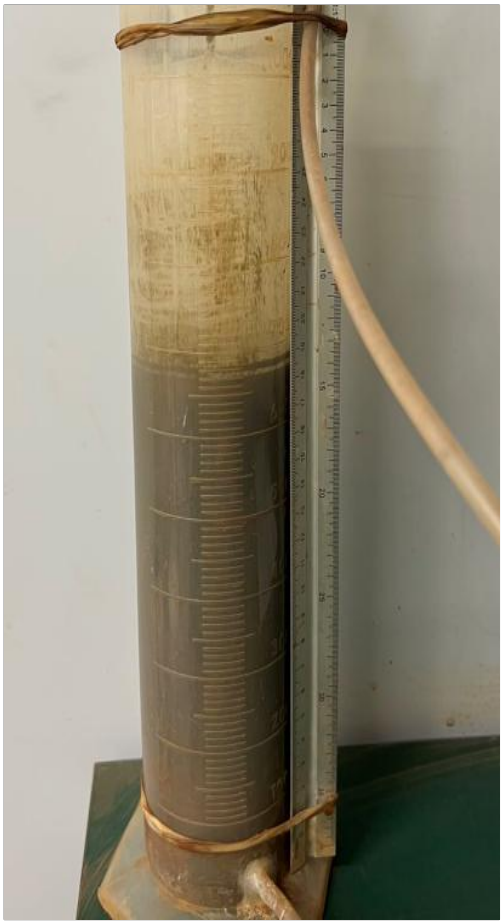
Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 63% Solids

Initial Dry Density (t/m³): -
Particle Density (t/m³): -
Initial Bulk Density (t/m3): -

Photo of Test Setup

Undrained

Drained



Comments:

Authorised Signature (Geotechnical Engineer):

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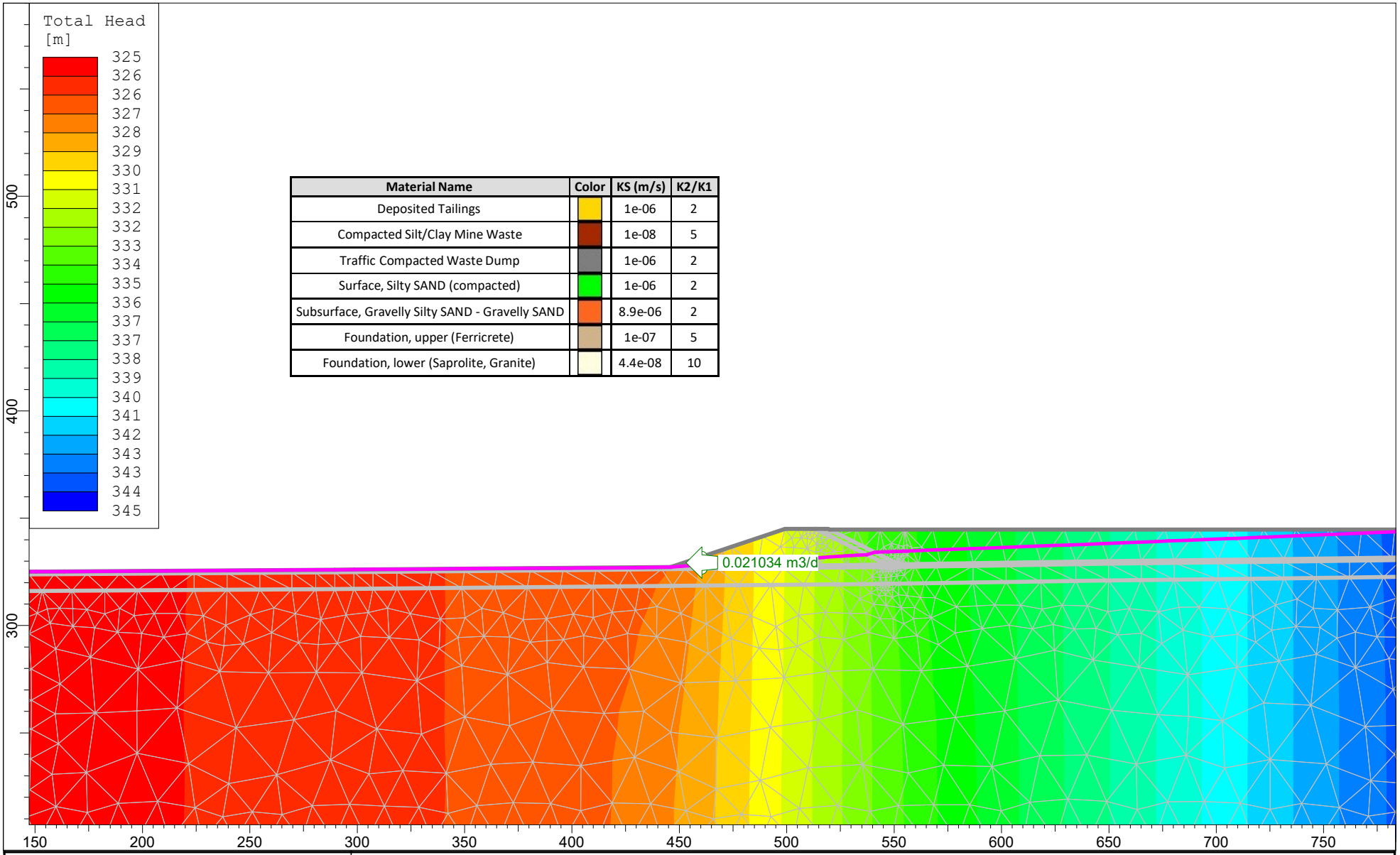
Appendix F – Seepage Analyses

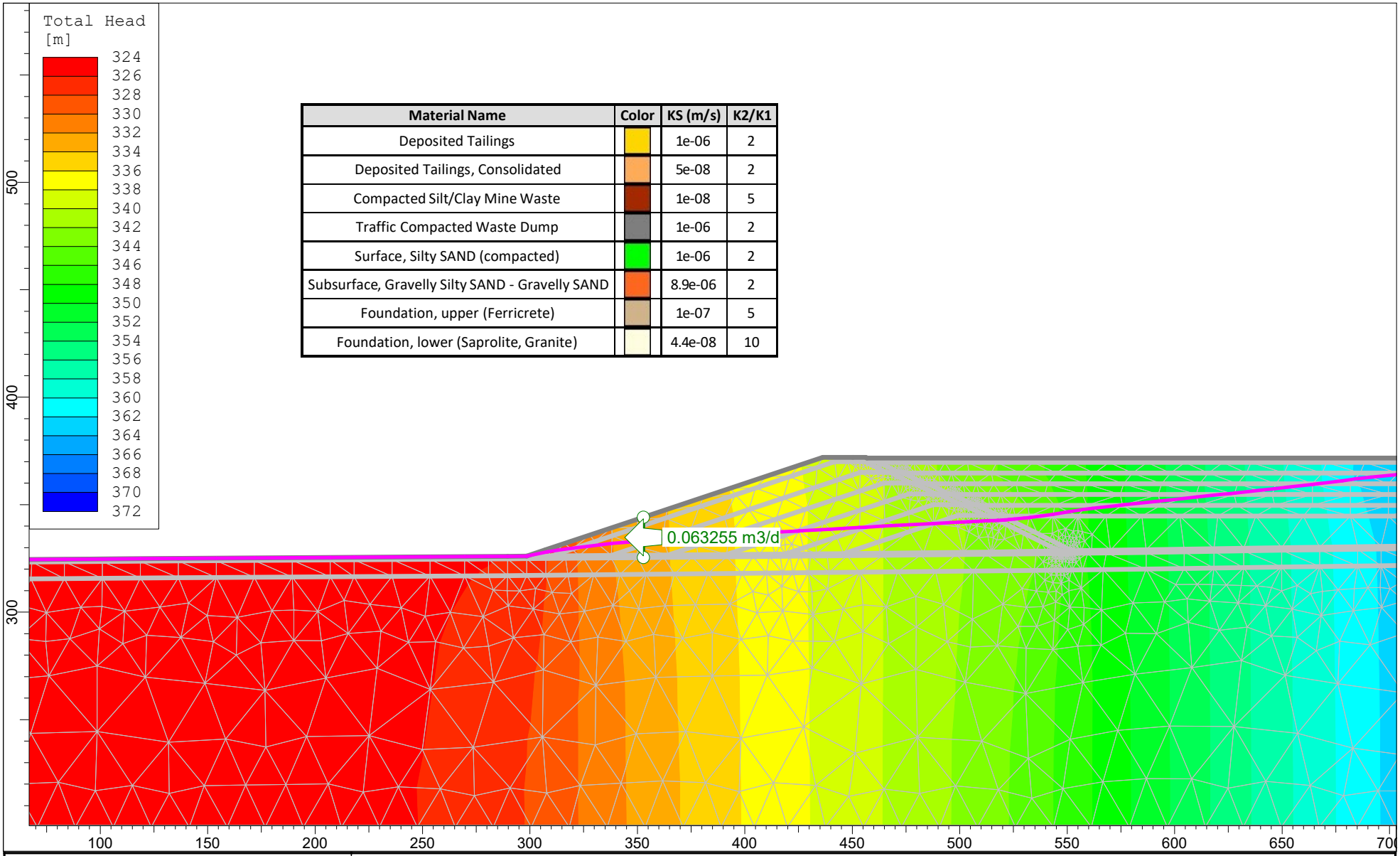


Material Name	Color	KS (m/s)	K2/K1
Deposited Tailings		1e-06	2
Compacted Silt/Clay Mine Waste		1e-08	5
Traffic Compacted Waste Dump		1e-06	2
Surface, Silty SAND (compacted)		1e-06	2
Subsurface, Gravelly Silty SAND - Gravelly SAND		8.9e-06	2
Foundation, upper (Ferricrete)		1e-07	5
Foundation, lower (Saprolite, Granite)		4.4e-08	10

rocscience

SLIDEINTERPRET 9.019

Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Seepage Analysis - Stage 1 RL 345.0 m, max. h = 19 m, pond at embankment		
Drawn By	PA	*Scale* 1:2500	*Company* CMW Geosciences Pty Ltd
Date	21/2/2023		*File Name* Mt Gibson TSF Seepage Analyses - Stage 1.slmd



Material Name	Color	KS (m/s)	K2/K1
Deposited Tailings		1e-06	2
Deposited Tailings, Consolidated		5e-08	2
Compacted Silt/Clay Mine Waste		1e-08	5
Traffic Compacted Waste Dump		1e-06	2
Surface, Silty SAND (compacted)		1e-06	2
Subsurface, Gravelly Silty SAND - Gravelly SAND		8.9e-06	2
Foundation, upper (Ferricrete)		1e-07	5
Foundation, lower (Saprolite, Granite)		4.4e-08	10

rocscience

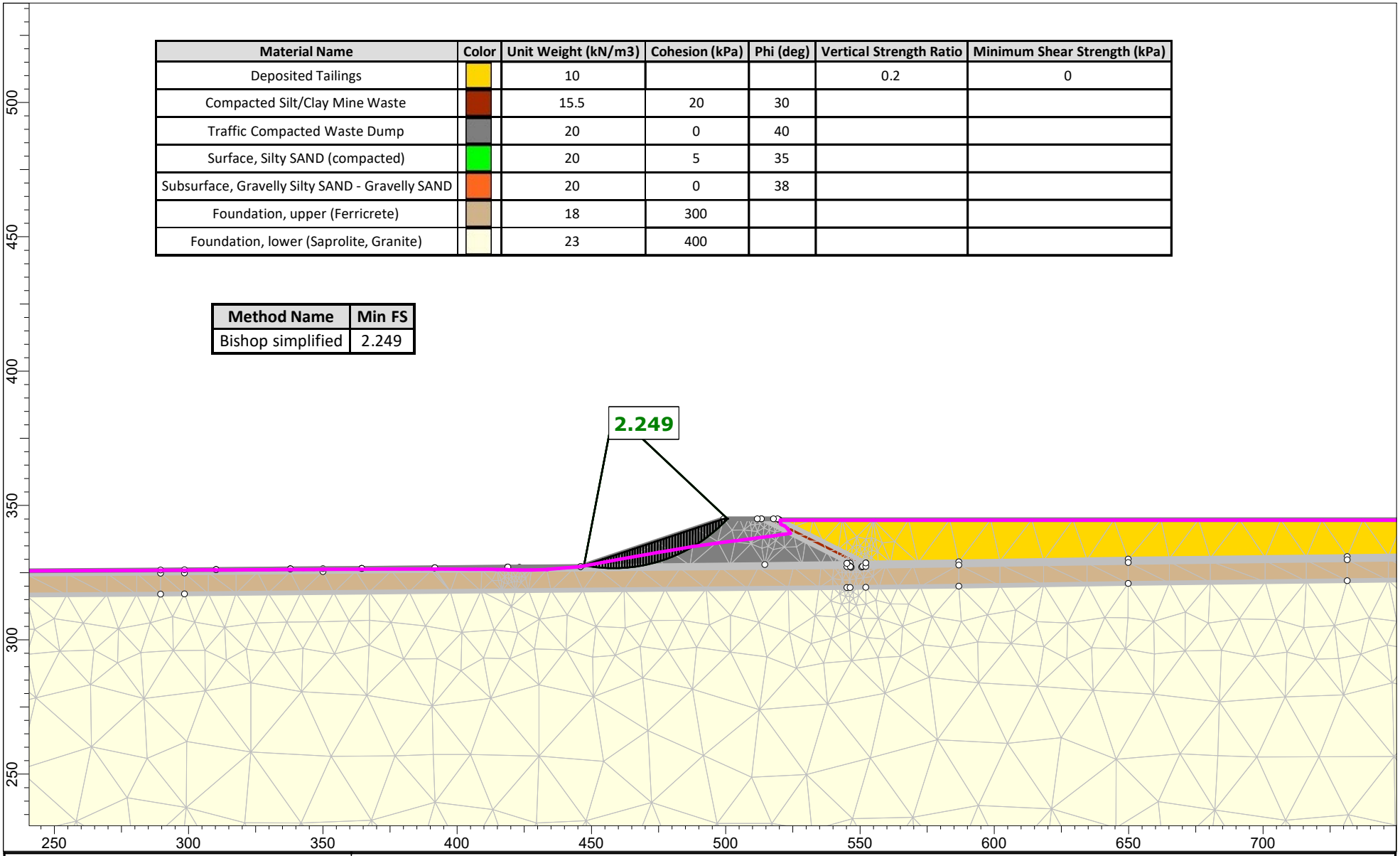
SLIDEINTERPRET 9.019

Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Seepage Analysis - Stage 7 RL 372.0 m, max. h = 46 m, pond at embankment		
Drawn By	PA	*Scale* 1:2500	*Company* CMW Geosciences Pty Ltd
Date	14/2/2023		*File Name* Mt Gibson TSF Seepage Analyses - Final Stage.slmd

Appendix G – Stability Analyses

Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)	Vertical Strength Ratio	Minimum Shear Strength (kPa)
Deposited Tailings		10			0.2	0
Compacted Silt/Clay Mine Waste		15.5	20	30		
Traffic Compacted Waste Dump		20	0	40		
Surface, Silty SAND (compacted)		20	5	35		
Subsurface, Gravelly Silty SAND - Gravelly SAND		20	0	38		
Foundation, upper (Ferricrete)		18	300			
Foundation, lower (Saprolite, Granite)		23	400			

Method Name	Min FS
Bishop simplified	2.249



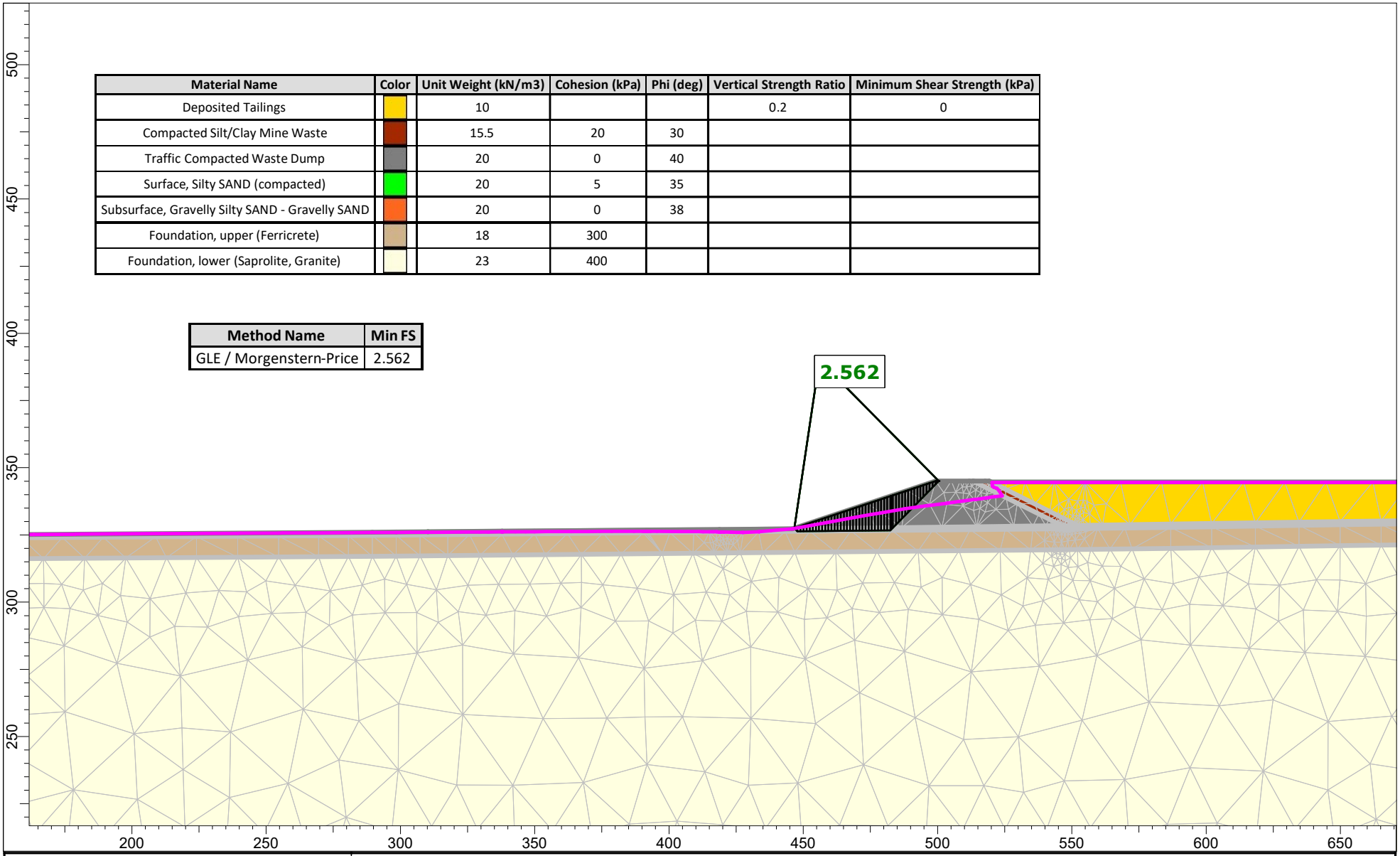
CMW Geosciences

SLIDEINTERPRET 9.019

Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 1 (D/S, Static) - Stage 1 RL 345.0 m, max. h = 19 m, worst-case phreatic loading		
Drawn By	PA	*Scale* 1:2000	*Company* CMW Geosciences Pty Ltd
Date	21/2/2023		*File Name* mt gibson tsf stability analyses - stage 1 - case 1.slmd

Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)	Vertical Strength Ratio	Minimum Shear Strength (kPa)
Deposited Tailings		10			0.2	0
Compacted Silt/Clay Mine Waste		15.5	20	30		
Traffic Compacted Waste Dump		20	0	40		
Surface, Silty SAND (compacted)		20	5	35		
Subsurface, Gravelly Silty SAND - Gravelly SAND		20	0	38		
Foundation, upper (Ferricrete)		18	300			
Foundation, lower (Saprolite, Granite)		23	400			

Method Name	Min FS
GLE / Morgenstern-Price	2.562



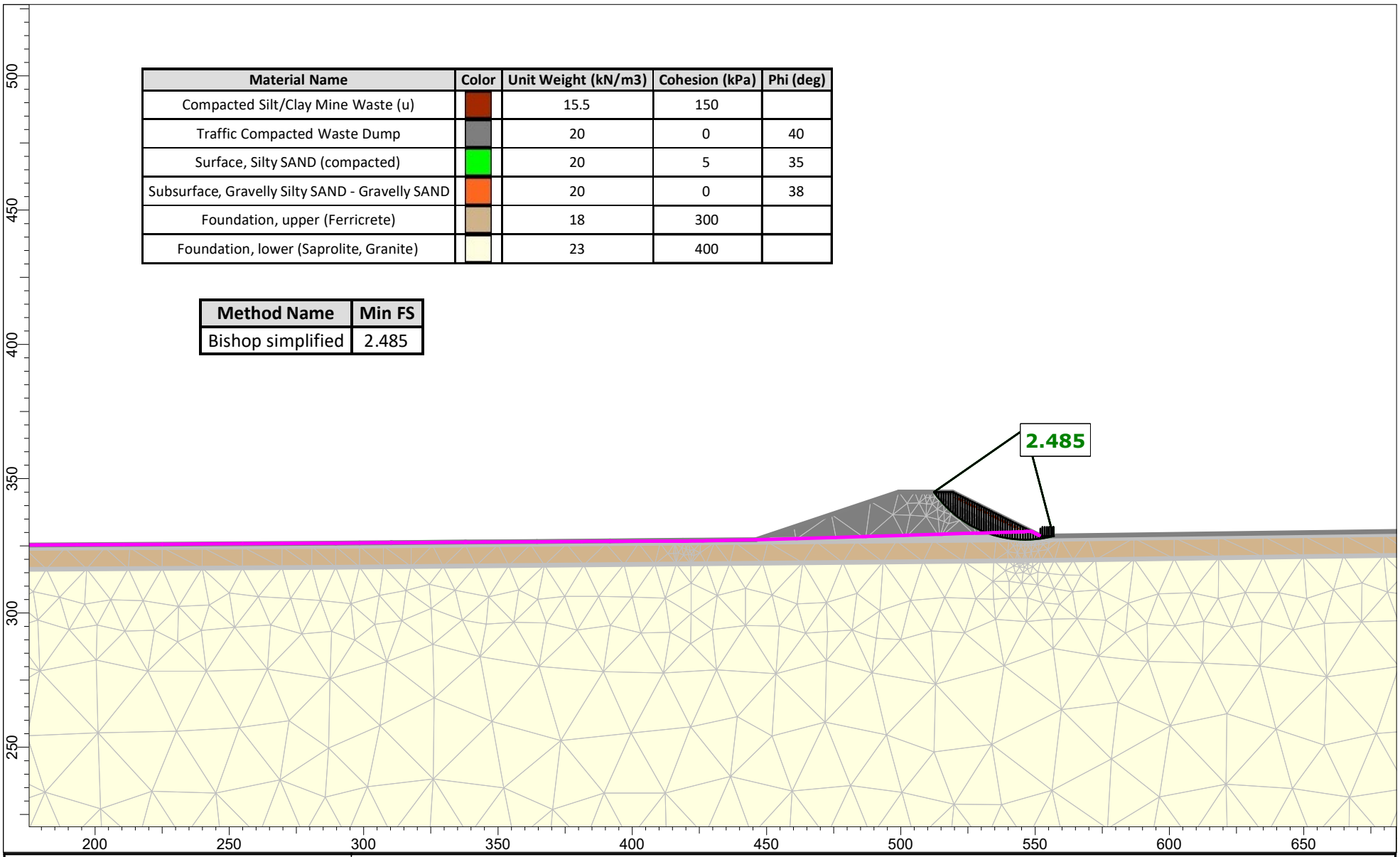
CMW Geosciences

SLIDEINTERPRET 9.019

Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 1 (D/S, Static, Wedge) - Stage 1 RL 345.0 m, max. h = 19 m, worst-case phreatic loading		
Drawn By	PA	*Scale* 1:2000	*Company* CMW Geosciences Pty Ltd
Date	21/2/2023		*File Name* mt gibson tsf stability analyses - stage 1 - case 1.slmd

Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)
Compacted Silt/Clay Mine Waste (u)		15.5	150	
Traffic Compacted Waste Dump		20	0	40
Surface, Silty SAND (compacted)		20	5	35
Subsurface, Gravelly Silty SAND - Gravelly SAND		20	0	38
Foundation, upper (Ferricrete)		18	300	
Foundation, lower (Saprolite, Granite)		23	400	

Method Name	Min FS
Bishop simplified	2.485



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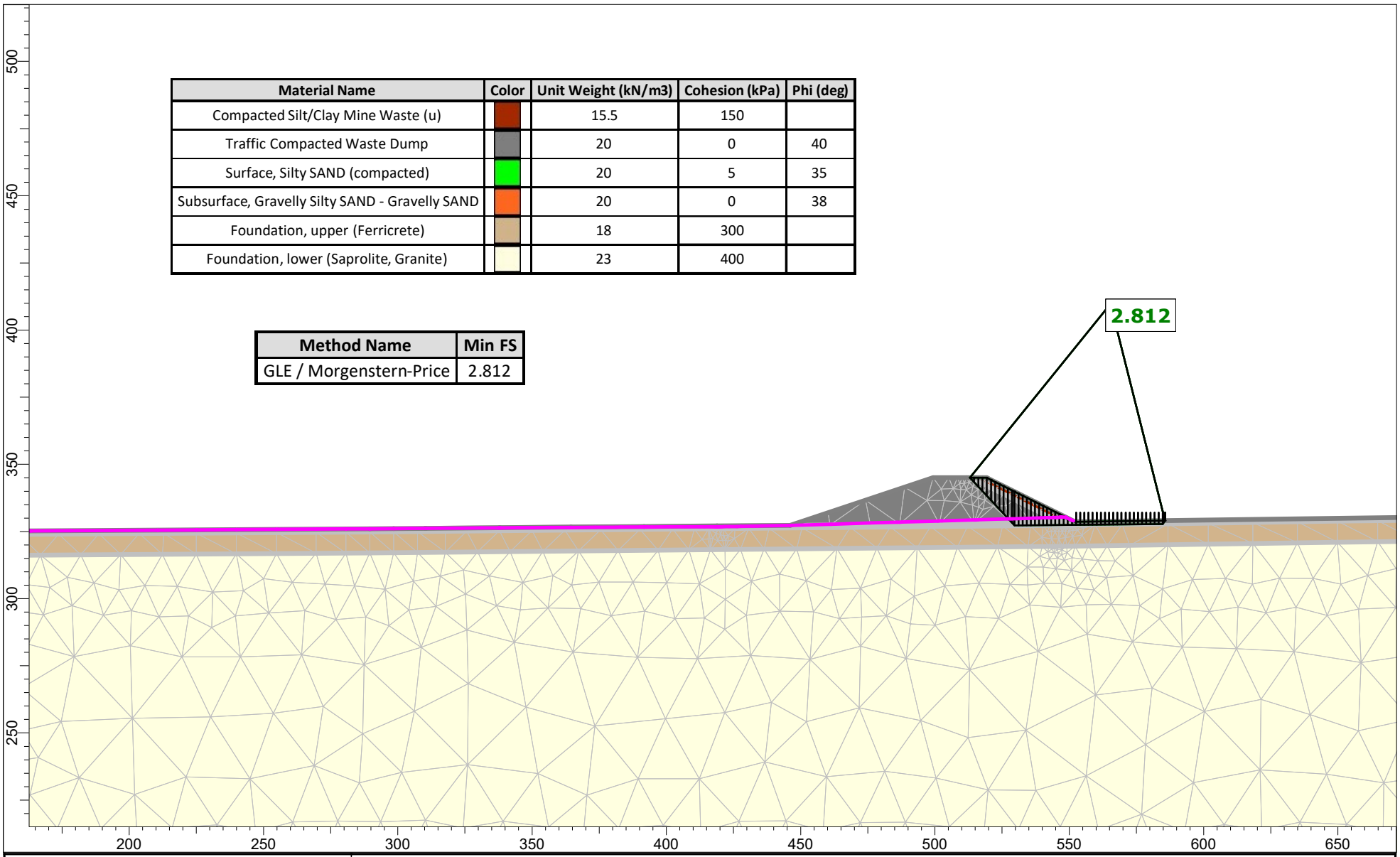
SLIDEINTERPRET 9.019

Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 2 (U/S, Static) - Stage 1 RL 345.0 m, max. h = 19 m, worst-case phreatic loading		
Drawn By	PA	*Scale* 1:2000	*Company* CMW Geosciences Pty Ltd
Date	21/2/2023		*File Name* Mt Gibson TSF Stability Analyses - Stage 1 - Case 2.slmd

Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)
Compacted Silt/Clay Mine Waste (u)		15.5	150	
Traffic Compacted Waste Dump		20	0	40
Surface, Silty SAND (compacted)		20	5	35
Subsurface, Gravelly Silty SAND - Gravelly SAND		20	0	38
Foundation, upper (Ferricrete)		18	300	
Foundation, lower (Saprolite, Granite)		23	400	

Method Name	Min FS
GLE / Morgenstern-Price	2.812



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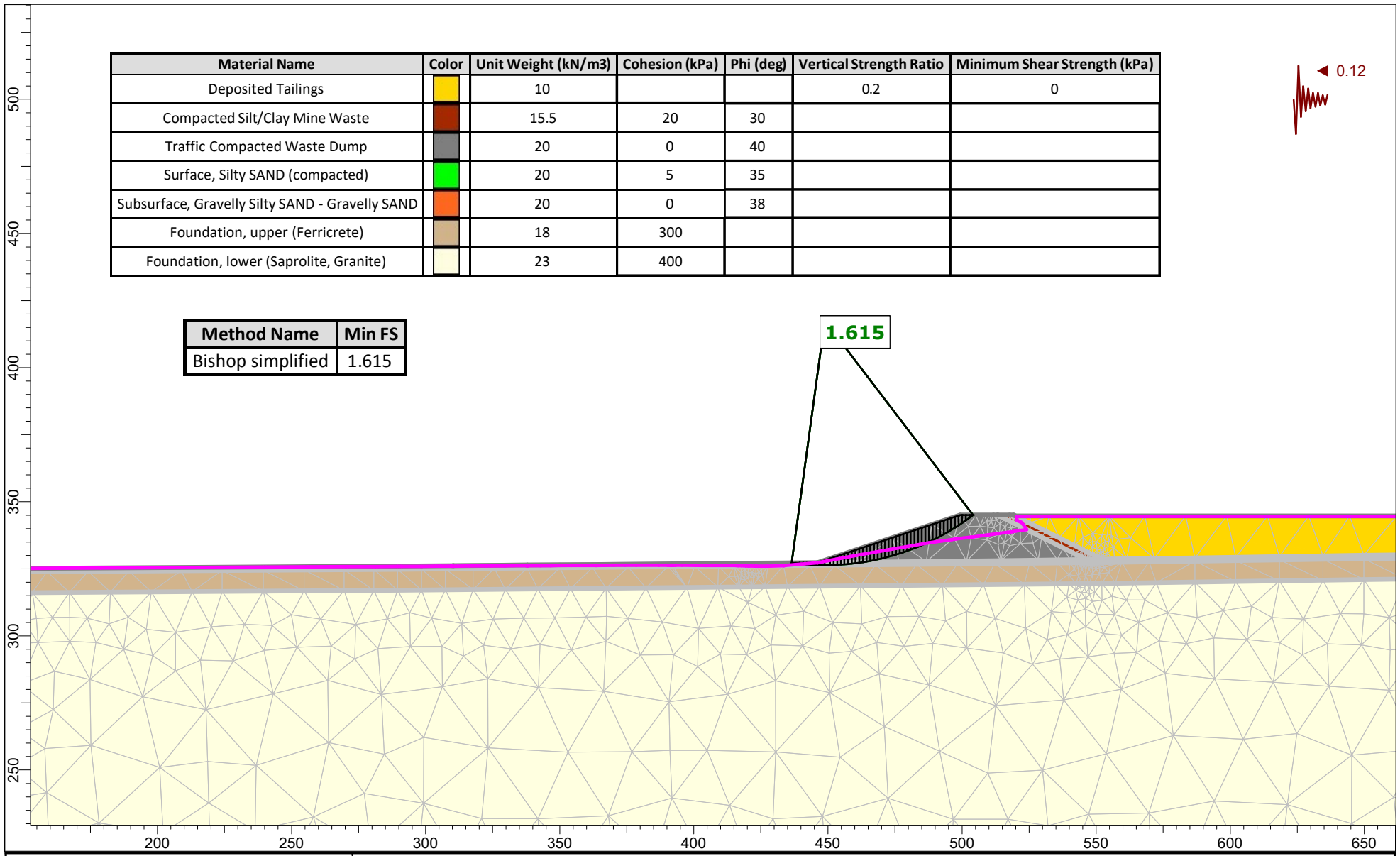
SLIDEINTERPRET 9.019

Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 2 (U/S, Static, Wedge) - Stage 1 RL 345.0 m, max. h = 19 m, worst-case phreatic loading		
Drawn By	PA	*Scale* 1:2000	*Company* CMW Geosciences Pty Ltd
Date	21/2/2023		*File Name* mt gibson tsf stability analyses - stage 1 - case 2.slmd

Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)	Vertical Strength Ratio	Minimum Shear Strength (kPa)
Deposited Tailings		10			0.2	0
Compacted Silt/Clay Mine Waste		15.5	20	30		
Traffic Compacted Waste Dump		20	0	40		
Surface, Silty SAND (compacted)		20	5	35		
Subsurface, Gravelly Silty SAND - Gravelly SAND		20	0	38		
Foundation, upper (Ferricrete)		18	300			
Foundation, lower (Saprolite, Granite)		23	400			

Method Name	Min FS
Bishop simplified	1.615



Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 3 (D/S, Pseudo-Static, OBE) - Stage 1 RL 345.0 m, max. h = 19 m, worst-case phreatic loading		
Drawn By	PA	Scale 1:2000	Company CMW Geosciences Pty Ltd
Date	21/2/2023		File Name Mt Gibson TSF Stability Analyses - Stage 1 - Case 3.slmd

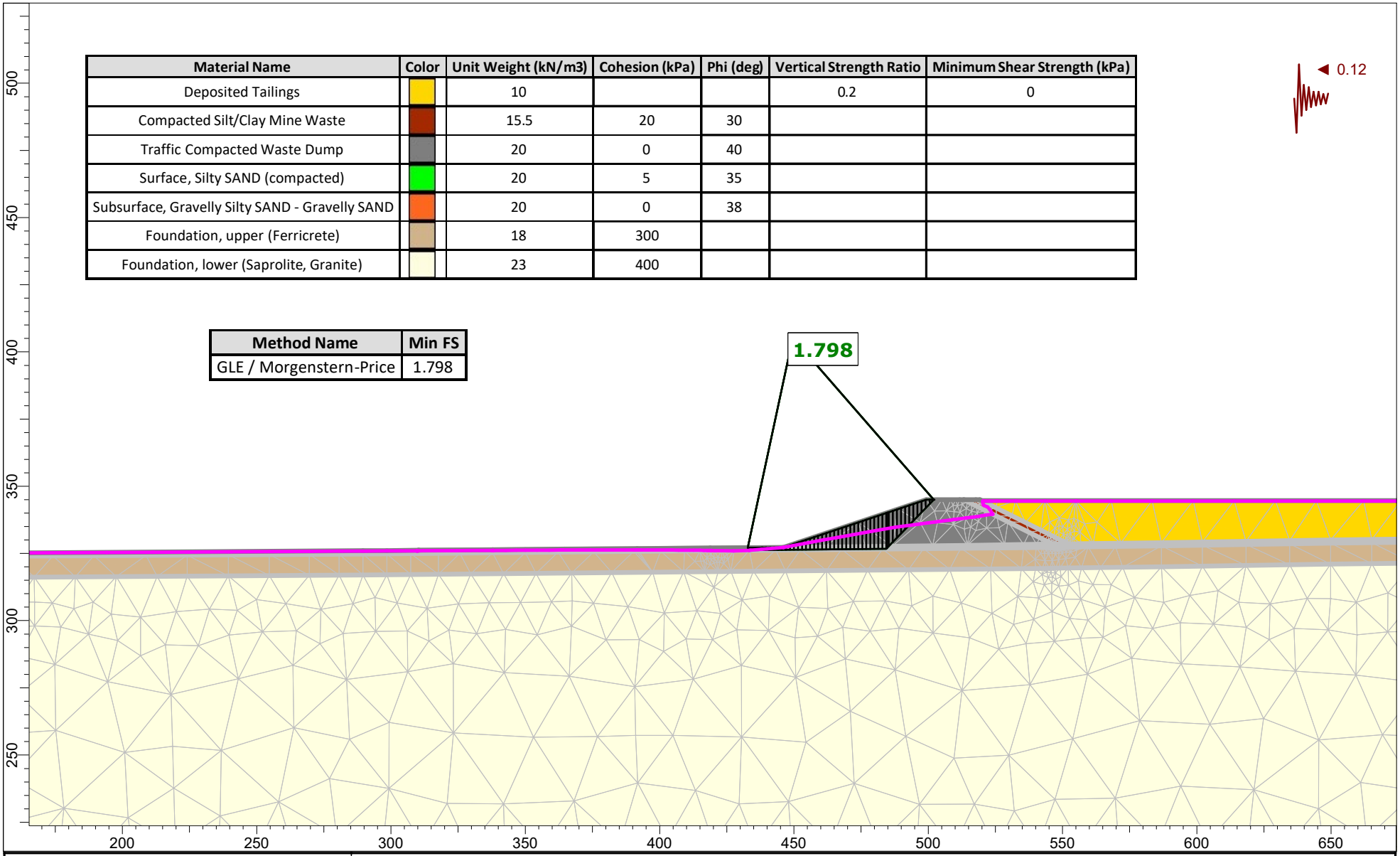
CMW Geosciences

SLIDEINTERPRET 9.019

Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)	Vertical Strength Ratio	Minimum Shear Strength (kPa)
Deposited Tailings		10			0.2	0
Compacted Silt/Clay Mine Waste		15.5	20	30		
Traffic Compacted Waste Dump		20	0	40		
Surface, Silty SAND (compacted)		20	5	35		
Subsurface, Gravelly Silty SAND - Gravelly SAND		20	0	38		
Foundation, upper (Ferricrete)		18	300			
Foundation, lower (Saprolite, Granite)		23	400			

◀ 0.12

Method Name	Min FS
GLE / Morgenstern-Price	1.798



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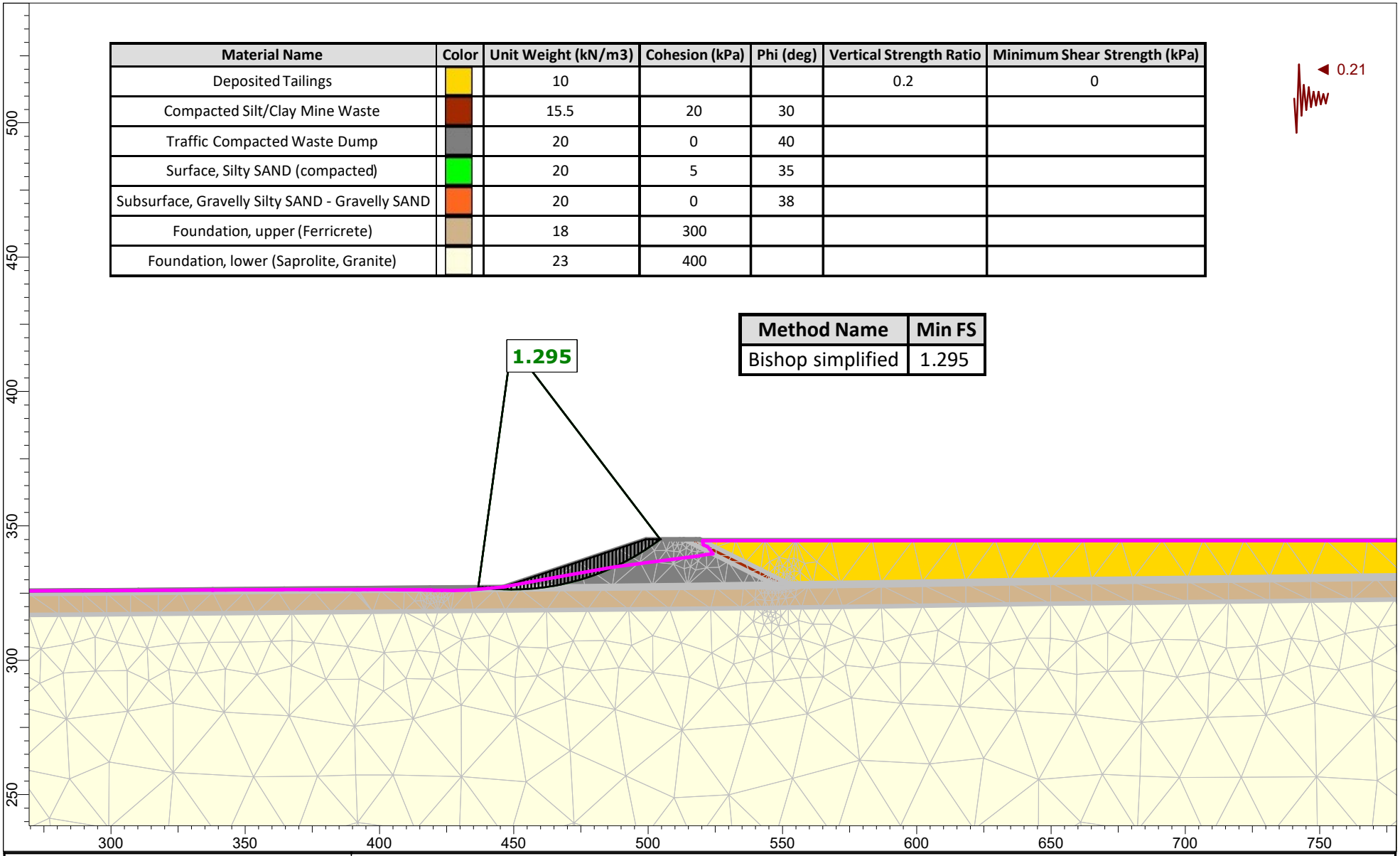
SLIDEINTERPRET 9.019

Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 3 (D/S, Pseudo-Static, OBE, Wedge) - Stage 1 RL 345.0 m, max. h = 19 m, worst-case phreatic loading		
Drawn By	PA	Scale 1:2000	Company CMW Geosciences Pty Ltd
Date	21/2/2023		File Name mt gibson tsf stability analyses - stage 1 - case 3.slmd

Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)	Vertical Strength Ratio	Minimum Shear Strength (kPa)
Deposited Tailings		10			0.2	0
Compacted Silt/Clay Mine Waste		15.5	20	30		
Traffic Compacted Waste Dump		20	0	40		
Surface, Silty SAND (compacted)		20	5	35		
Subsurface, Gravelly Silty SAND - Gravelly SAND		20	0	38		
Foundation, upper (Ferricrete)		18	300			
Foundation, lower (Saprolite, Granite)		23	400			

◀ 0.21

Method Name	Min FS
Bishop simplified	1.295



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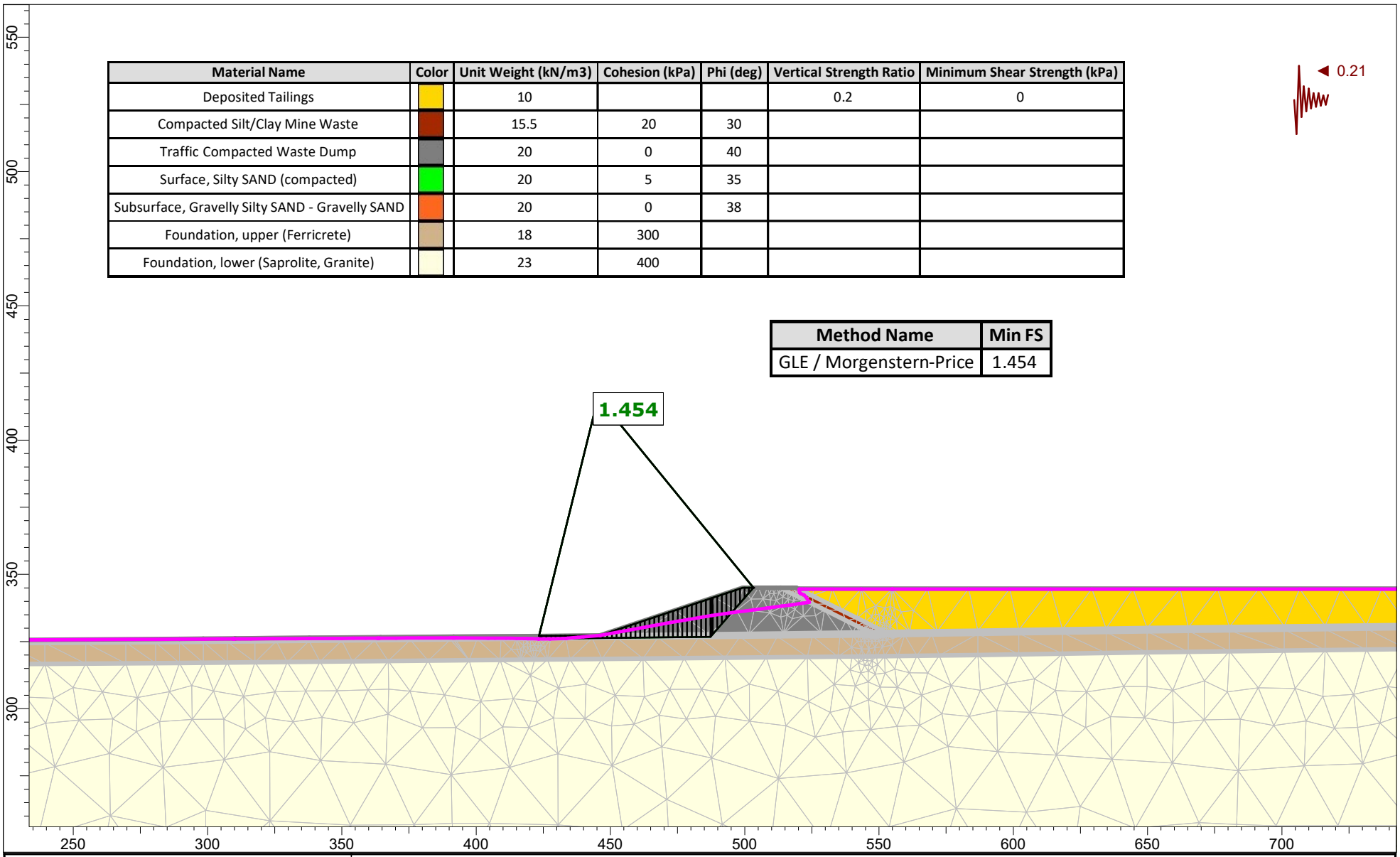
SLIDEINTERPRET 9.019

Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 4 (D/S, Pseudo-Static, SEE) - Stage 1 RL 345.0 m, max. h = 19 m, worst-case phreatic loading		
Drawn By	PA	Scale 1:2000	Company CMW Geosciences Pty Ltd
Date	21/2/2023		File Name Mt Gibson TSF Stability Analyses - Stage 1 - Case 4.slmd

Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)	Vertical Strength Ratio	Minimum Shear Strength (kPa)
Deposited Tailings		10			0.2	0
Compacted Silt/Clay Mine Waste		15.5	20	30		
Traffic Compacted Waste Dump		20	0	40		
Surface, Silty SAND (compacted)		20	5	35		
Subsurface, Gravelly Silty SAND - Gravelly SAND		20	0	38		
Foundation, upper (Ferricrete)		18	300			
Foundation, lower (Saprolite, Granite)		23	400			

◄ 0.21

Method Name	Min FS
GLE / Morgenstern-Price	1.454



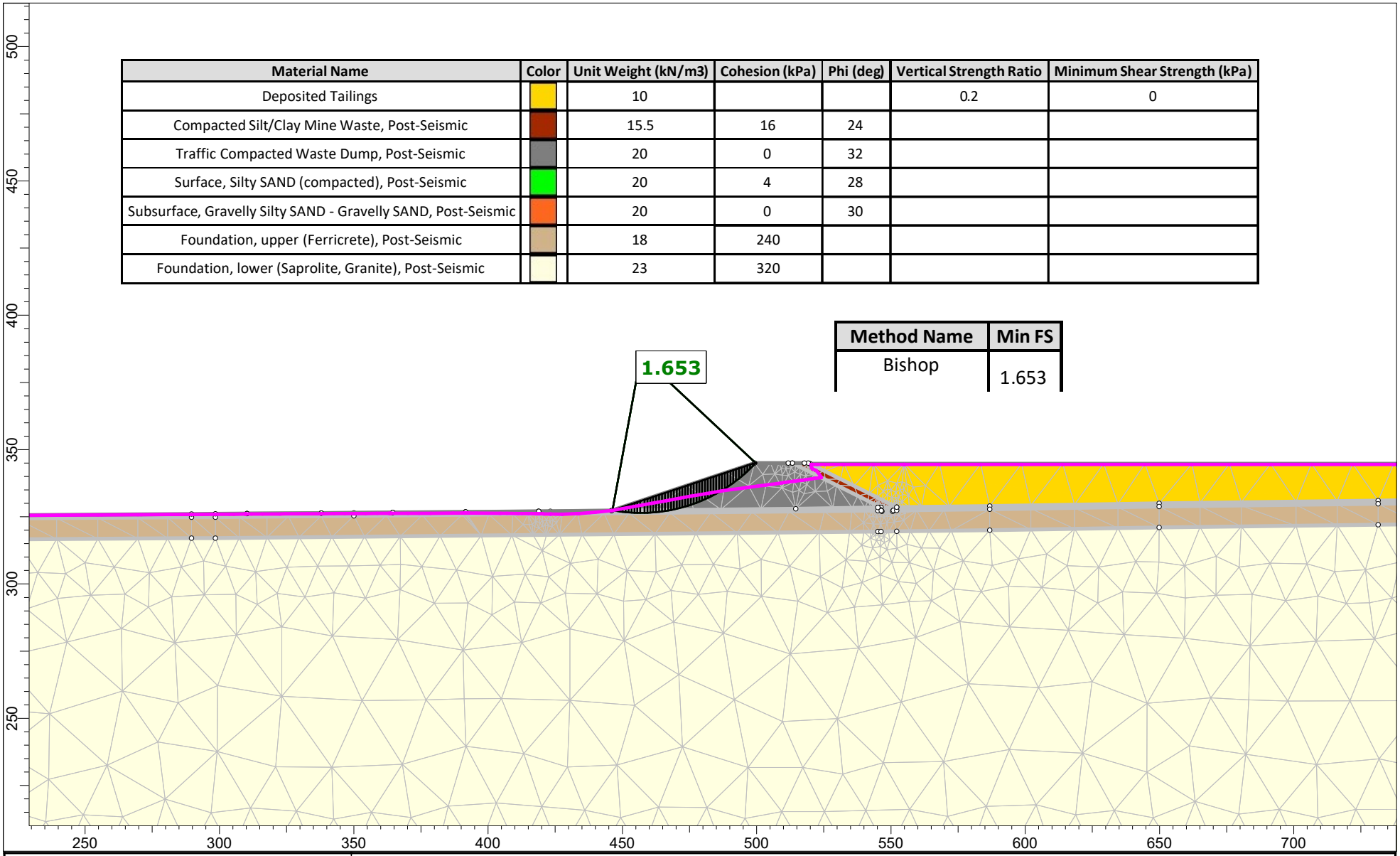
CMW Geosciences

SLIDEINTERPRET 9.019

Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 4 (D/S, Pseudo-Static, SEE, Wedge) - Stage 1 RL 345.0 m, max. h = 19 m, worst-case phreatic loading		
Drawn By	PA	Scale 1:2000	Company CMW Geosciences Pty Ltd
Date	21/2/2023		File Name mt gibson tsf stability analyses - stage 1 - case 4.slmd

Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)	Vertical Strength Ratio	Minimum Shear Strength (kPa)
Deposited Tailings		10			0.2	0
Compacted Silt/Clay Mine Waste, Post-Seismic		15.5	16	24		
Traffic Compacted Waste Dump, Post-Seismic		20	0	32		
Surface, Silty SAND (compacted), Post-Seismic		20	4	28		
Subsurface, Gravelly Silty SAND - Gravelly SAND, Post-Seismic		20	0	30		
Foundation, upper (Ferricrete), Post-Seismic		18	240			
Foundation, lower (Saprolite, Granite), Post-Seismic		23	320			

Method Name	Min FS
Bishop	1.653



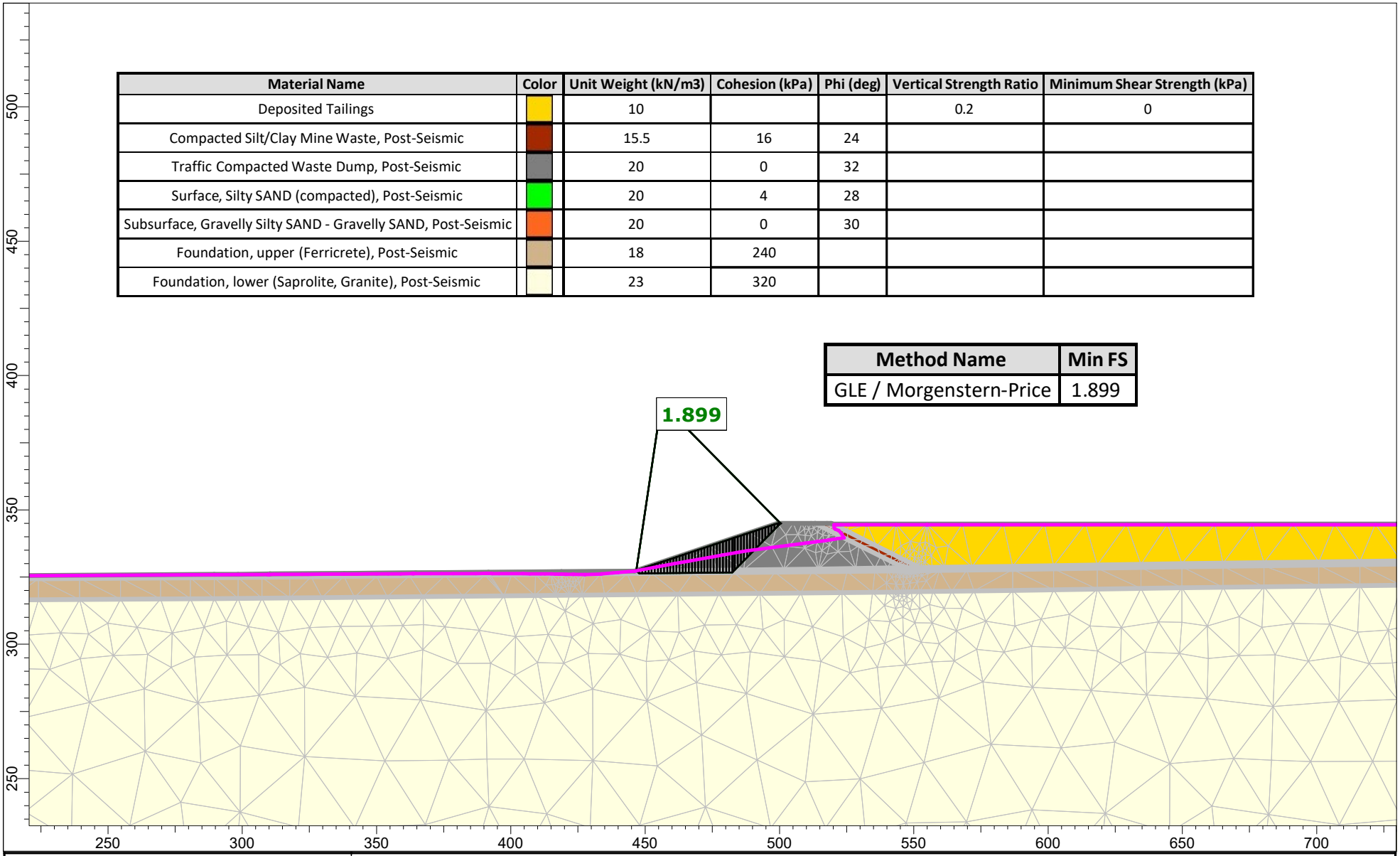
CMW Geosciences

SLIDEINTERPRET 9.019

Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 5 (D/S, Post-Seismic) - Stage 1 RL 345.0 m, max. h = 19 m, worst-case phreatic loading		
Drawn By	PA	*Scale* 1:2000	*Company* CMW Geosciences Pty Ltd
Date	21/2/2023		*File Name* Mt Gibson TSF Stability Analyses - Stage 1 - Case 5.slmd

Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)	Vertical Strength Ratio	Minimum Shear Strength (kPa)
Deposited Tailings		10			0.2	0
Compacted Silt/Clay Mine Waste, Post-Seismic		15.5	16	24		
Traffic Compacted Waste Dump, Post-Seismic		20	0	32		
Surface, Silty SAND (compacted), Post-Seismic		20	4	28		
Subsurface, Gravelly Silty SAND - Gravelly SAND, Post-Seismic		20	0	30		
Foundation, upper (Ferricrete), Post-Seismic		18	240			
Foundation, lower (Saprolite, Granite), Post-Seismic		23	320			

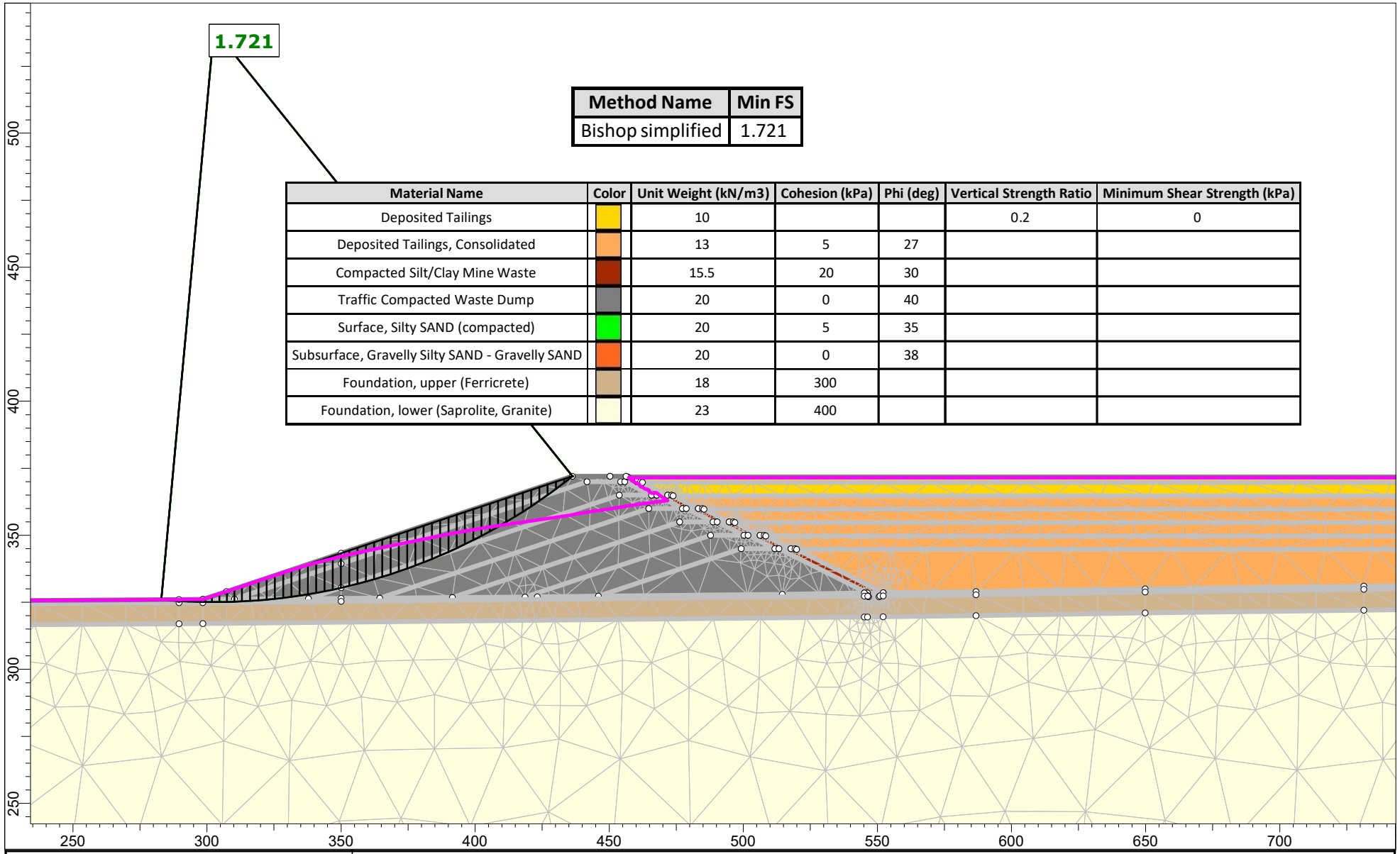
Method Name	Min FS
GLE / Morgenstern-Price	1.899



CMW Geosciences

SLIDEINTERPRET 9.019

Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 5 (D/S, Post-Seismic, Wedge) - Stage 1 RL 345.0 m, max. h = 19 m, worst-case phreatic loading		
Drawn By	PA	Scale 1:2000	Company CMW Geosciences Pty Ltd
Date	21/2/2023		File Name mt gibson tsf stability analyses - stage 1 - case 5.slmd



Method Name	Min FS
Bishop simplified	1.721

Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)	Vertical Strength Ratio	Minimum Shear Strength (kPa)
Deposited Tailings		10			0.2	0
Deposited Tailings, Consolidated		13	5	27		
Compacted Silt/Clay Mine Waste		15.5	20	30		
Traffic Compacted Waste Dump		20	0	40		
Surface, Silty SAND (compacted)		20	5	35		
Subsurface, Gravelly Silty SAND - Gravelly SAND		20	0	38		
Foundation, upper (Ferricrete)		18	300			
Foundation, lower (Saprolite, Granite)		23	400			

CMW Geosciences

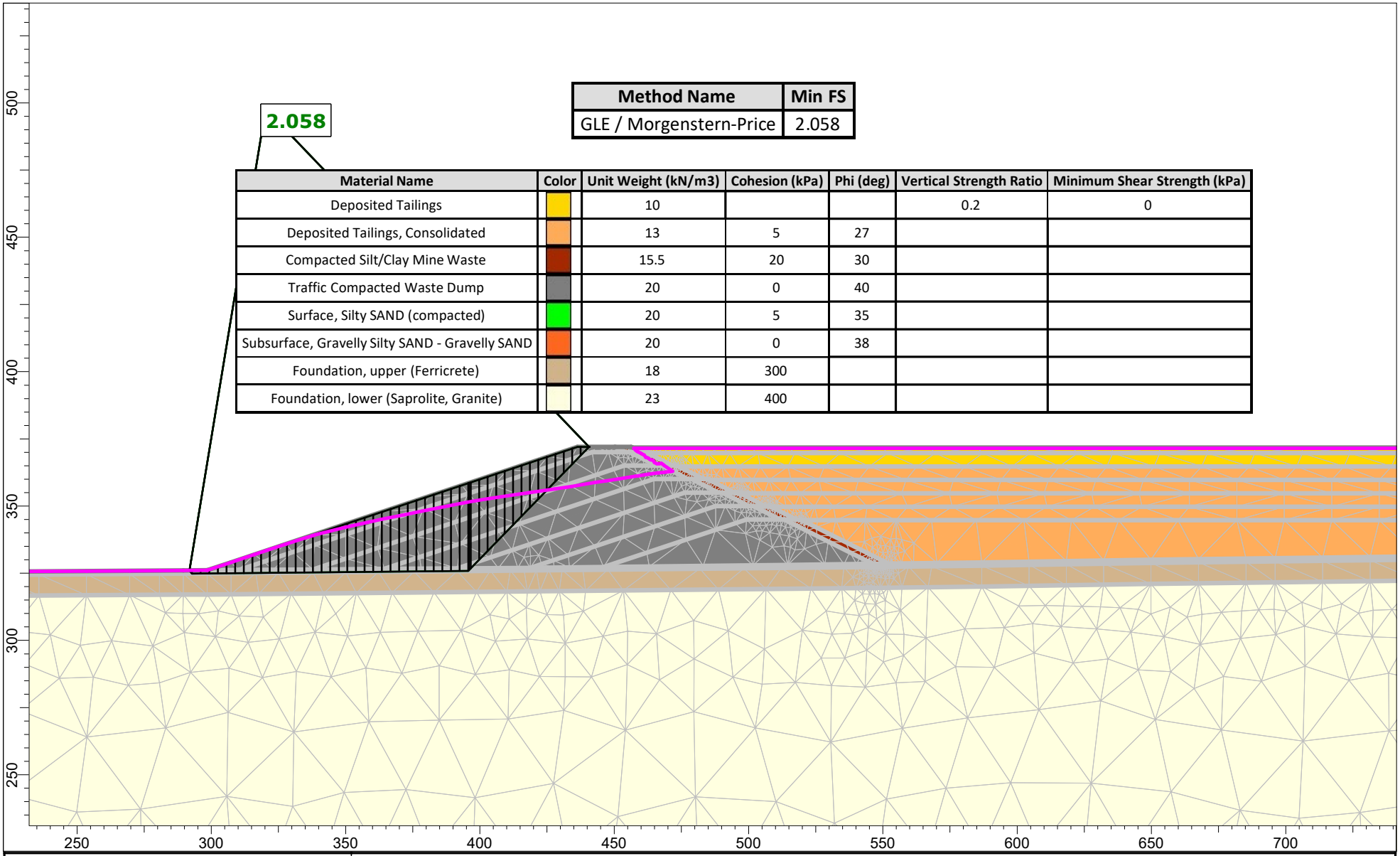
SLIDEINTERPRET 9.019

Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 1 (D/S, Static) - Stage 7 RL 372.0 m, max. h = 46 m, worst-case phreatic loading		
Drawn By	PA	*Scale* 1:2000	*Company* CMW Geosciences Pty Ltd
Date	14/2/2023		*File Name* mt gibson tsf stability analyses - final stage - case 1.slmd

Method Name	Min FS
GLE / Morgenstern-Price	2.058

2.058

Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)	Vertical Strength Ratio	Minimum Shear Strength (kPa)
Deposited Tailings		10			0.2	0
Deposited Tailings, Consolidated		13	5	27		
Compacted Silt/Clay Mine Waste		15.5	20	30		
Traffic Compacted Waste Dump		20	0	40		
Surface, Silty SAND (compacted)		20	5	35		
Subsurface, Gravelly Silty SAND - Gravelly SAND		20	0	38		
Foundation, upper (Ferricrete)		18	300			
Foundation, lower (Saprolite, Granite)		23	400			



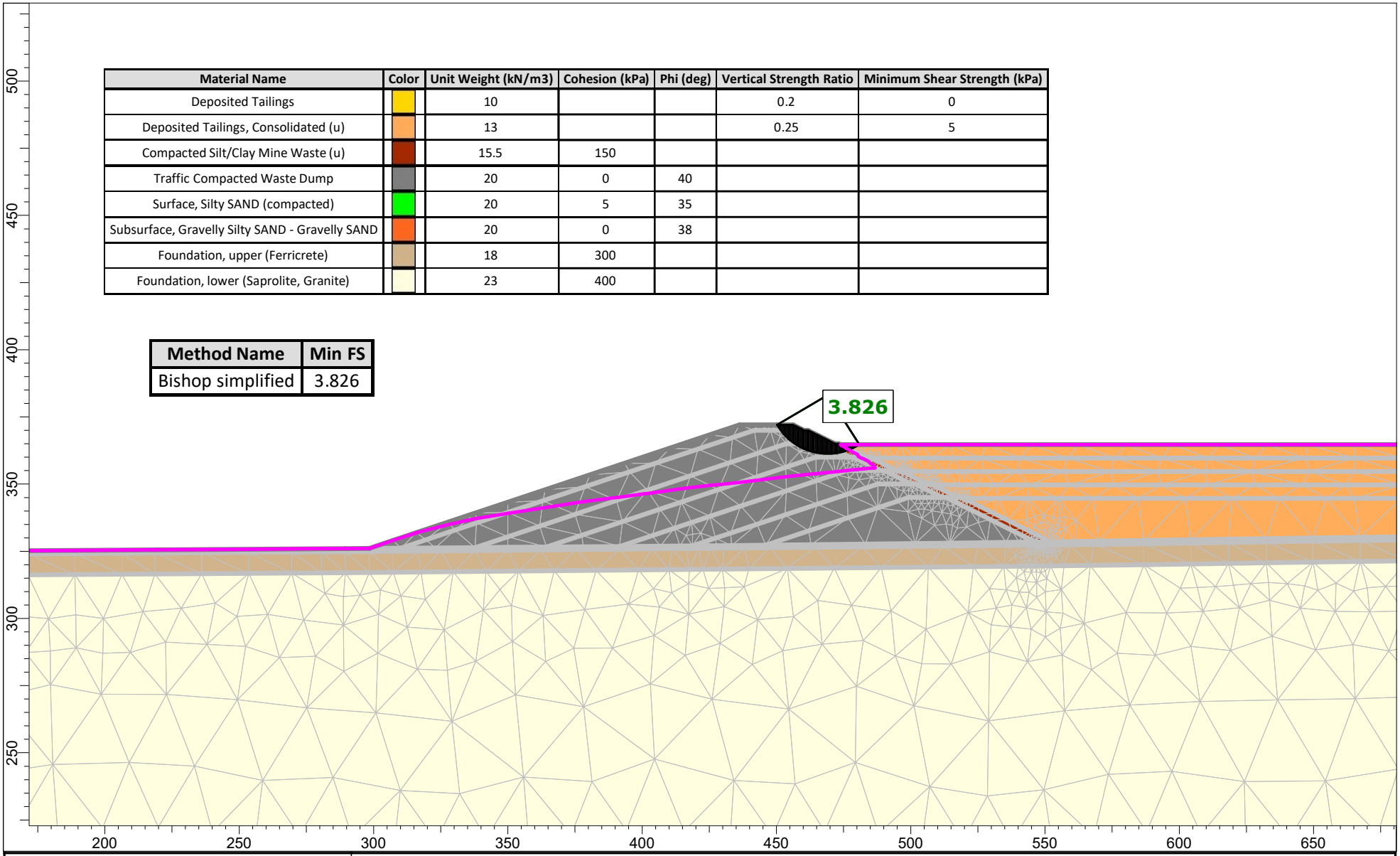
CMW Geosciences

SLIDEINTERPRET 9.019

Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 1 (D/S, Static, Wedge) - Stage 7 RL 372.0 m, max. h = 46 m, worst-case phreatic loading		
Drawn By	PA	*Scale* 1:2000	*Company* CMW Geosciences Pty Ltd
Date	14/2/2023		*File Name* Mt Gibson TSF Stability Analyses - Final Stage - Case 1.slmd

Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)	Vertical Strength Ratio	Minimum Shear Strength (kPa)
Deposited Tailings		10			0.2	0
Deposited Tailings, Consolidated (u)		13			0.25	5
Compacted Silt/Clay Mine Waste (u)		15.5	150			
Traffic Compacted Waste Dump		20	0	40		
Surface, Silty SAND (compacted)		20	5	35		
Subsurface, Gravelly Silty SAND - Gravelly SAND		20	0	38		
Foundation, upper (Ferricrete)		18	300			
Foundation, lower (Saprolite, Granite)		23	400			

Method Name	Min FS
Bishop simplified	3.826



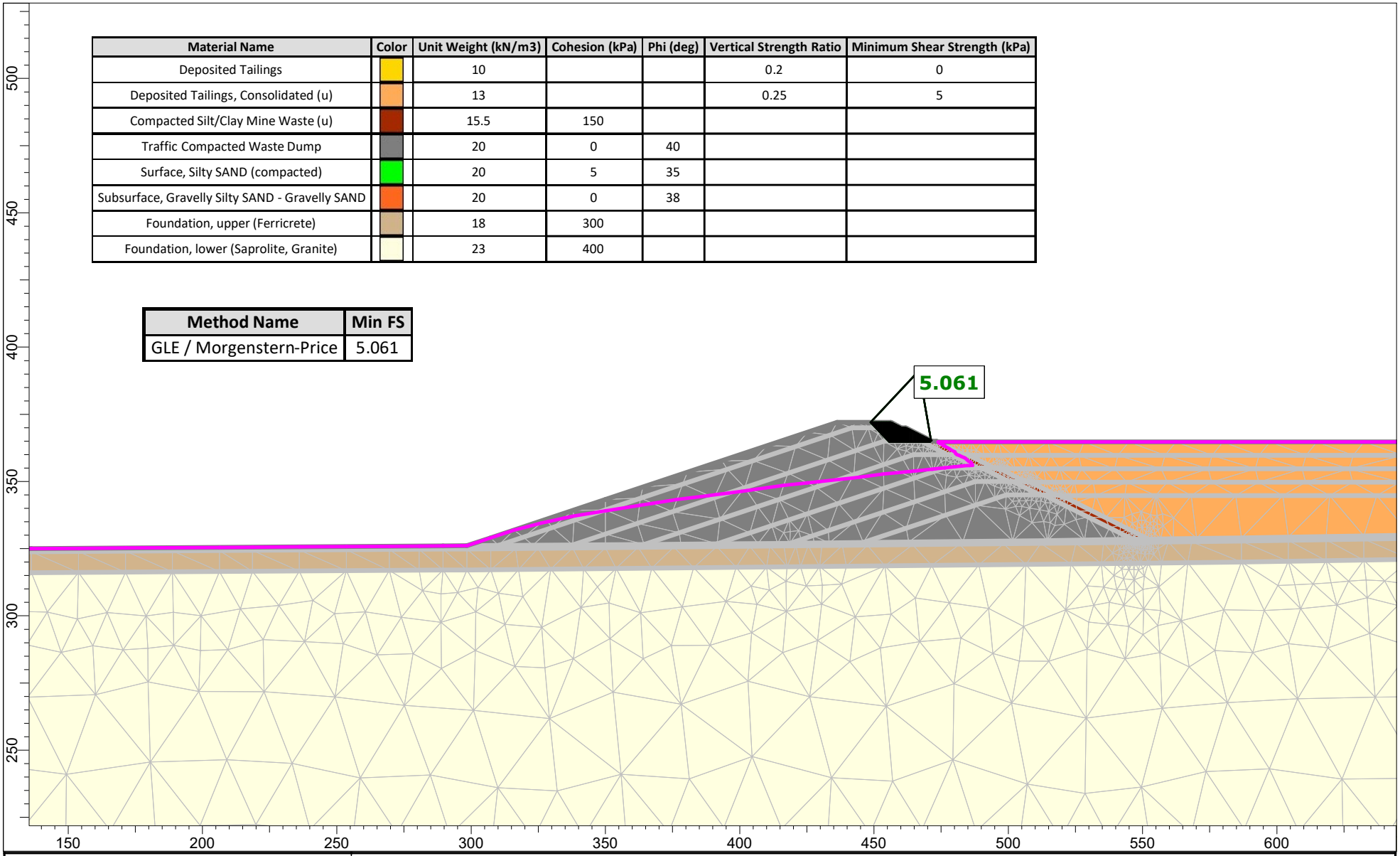
CMW Geosciences

SLIDEINTERPRET 9.019

Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 2 (U/S, Static) - Stage 7 RL 372.0 m, max. h = 46 m, worst-case phreatic loading		
Drawn By	PA	*Scale* 1:2000	*Company* CMW Geosciences Pty Ltd
Date	14/2/2023		*File Name* Mt Gibson TSF Stability Analyses - Final Stage - Case 2.slmd

Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)	Vertical Strength Ratio	Minimum Shear Strength (kPa)
Deposited Tailings		10			0.2	0
Deposited Tailings, Consolidated (u)		13			0.25	5
Compacted Silt/Clay Mine Waste (u)		15.5	150			
Traffic Compacted Waste Dump		20	0	40		
Surface, Silty SAND (compacted)		20	5	35		
Subsurface, Gravelly Silty SAND - Gravelly SAND		20	0	38		
Foundation, upper (Ferricrete)		18	300			
Foundation, lower (Saprolite, Granite)		23	400			

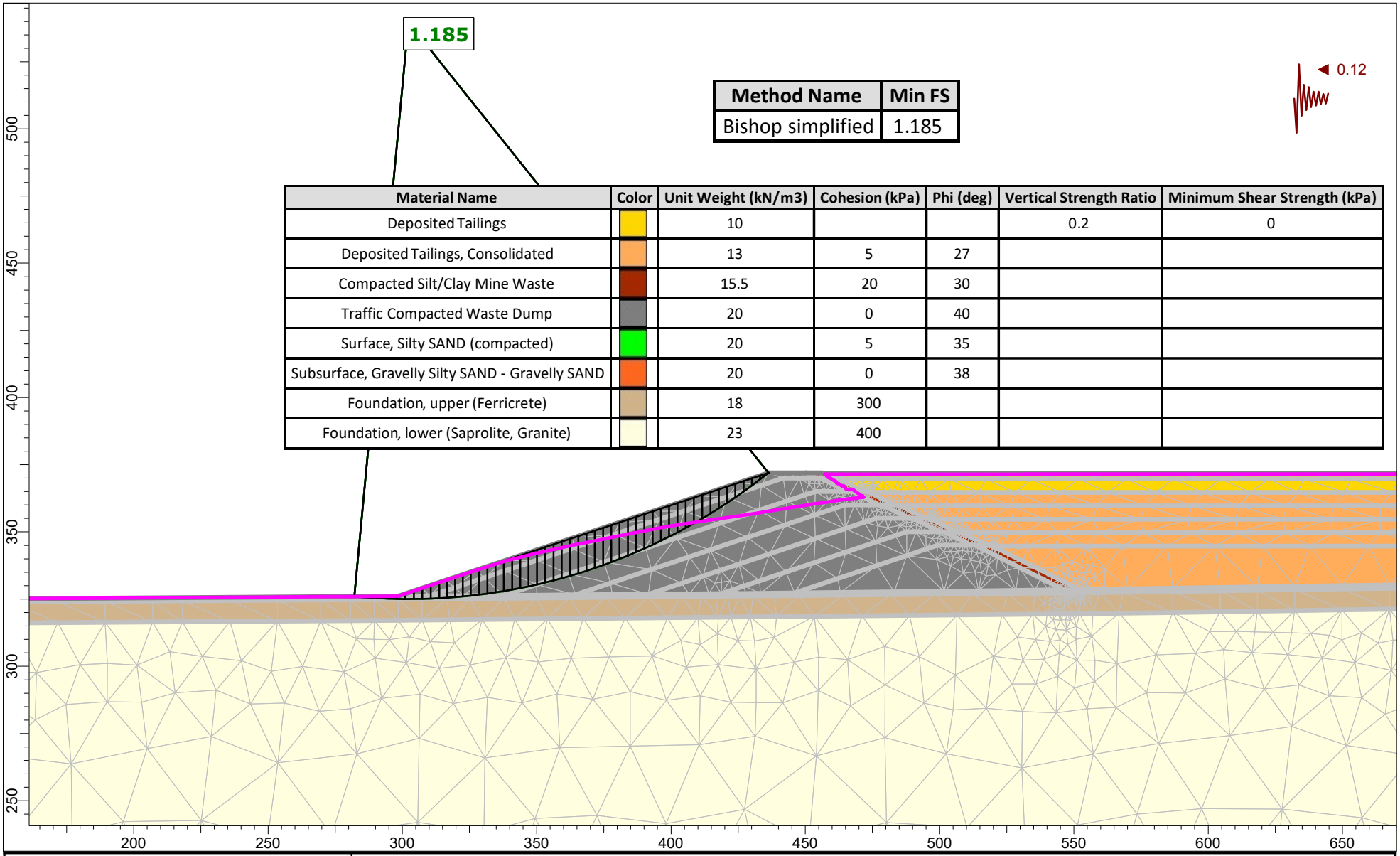
Method Name	Min FS
GLE / Morgenstern-Price	5.061



CMW Geosciences

SLIDEINTERPRET 9.019

Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 2 (U/S, Static, Wedge) - Stage 7 RL 372.0 m, max. h = 46 m, worst-case phreatic loading		
Drawn By	PA	*Scale* 1:2000	*Company* CMW Geosciences Pty Ltd
Date	14/2/2023		*File Name* mt gibson tsf stability analyses - final stage - case 2.slmd



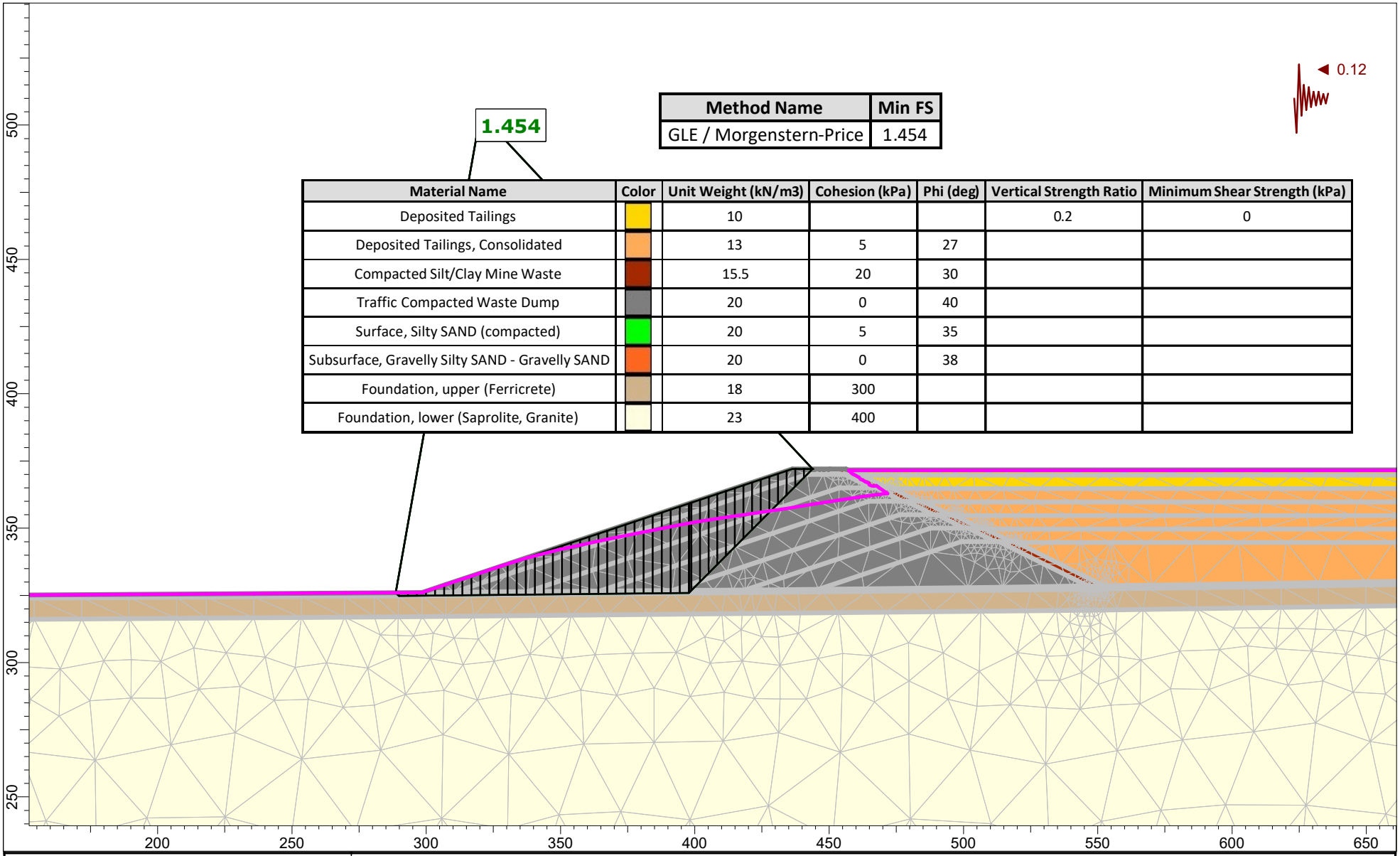
Method Name	Min FS
Bishop simplified	1.185

Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)	Vertical Strength Ratio	Minimum Shear Strength (kPa)
Deposited Tailings		10			0.2	0
Deposited Tailings, Consolidated		13	5	27		
Compacted Silt/Clay Mine Waste		15.5	20	30		
Traffic Compacted Waste Dump		20	0	40		
Surface, Silty SAND (compacted)		20	5	35		
Subsurface, Gravelly Silty SAND - Gravelly SAND		20	0	38		
Foundation, upper (Ferricrete)		18	300			
Foundation, lower (Saprolite, Granite)		23	400			

CMW Geosciences

SLIDEINTERPRET 9.019

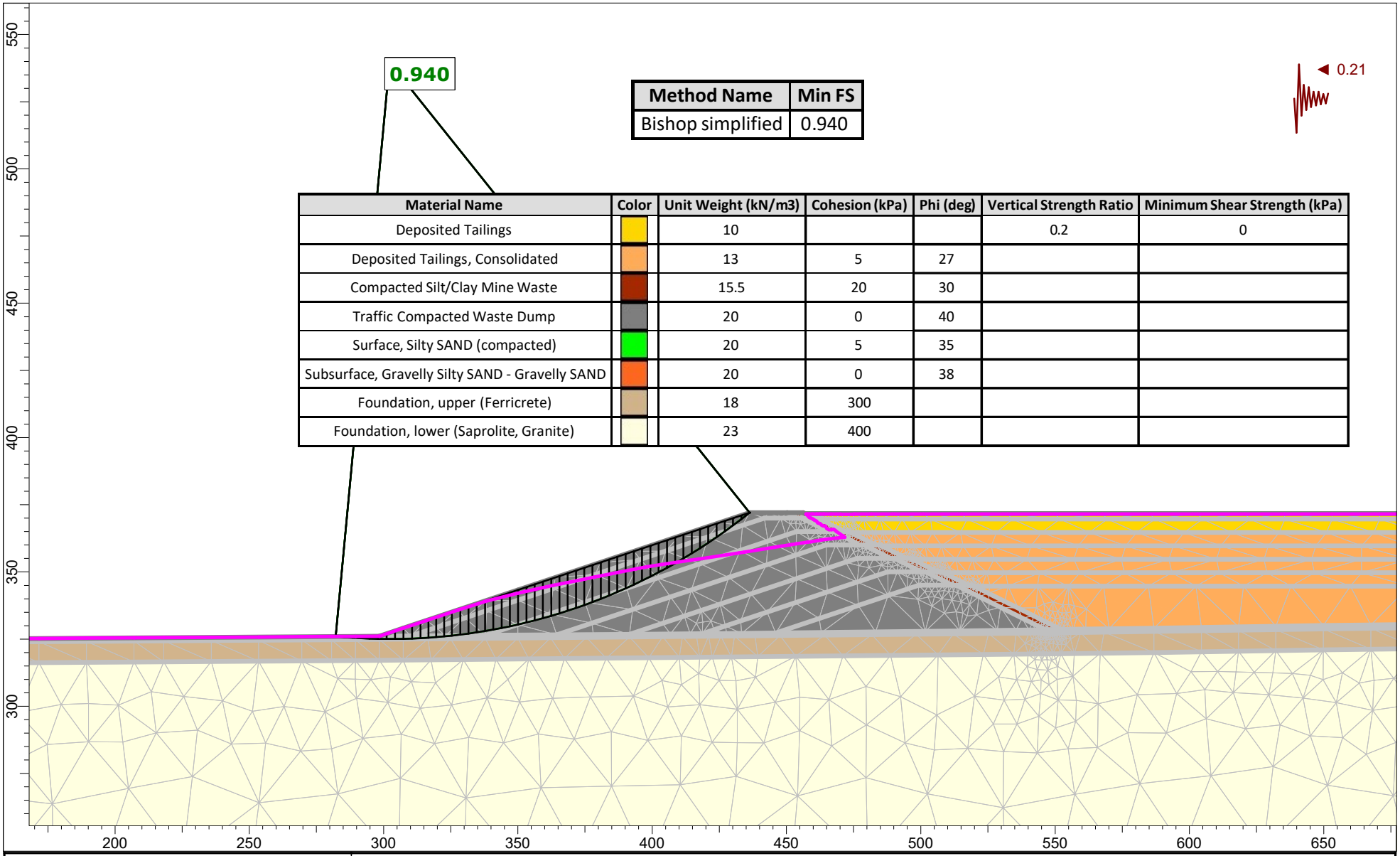
Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 3 (D/S, Pseudo-Static, OBE) - Stage 7 RL 372.0 m, max. h = 46 m, worst-case phreatic loading		
Drawn By	PA	*Scale* 1:2000	*Company* CMW Geosciences Pty Ltd
Date	14/2/2023		*File Name* Mt Gibson TSF Stability Analyses - Final Stage - Case 3.slmd



CMW Geosciences

SLIDEINTERPRET 9.019

Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 3 (D/S, Pseudo-Static, OBE, Wedge) - Stage 7 RL 372.0 m, max. h = 46 m, worst-case phreatic loading		
Drawn By	PA	*Scale* 1:2000	*Company* CMW Geosciences Pty Ltd
Date	14/2/2023		*File Name* mt gibson tsf stability analyses - final stage - case 3.slmd



CMW Geosciences

SLIDEINTERPRET 9.019

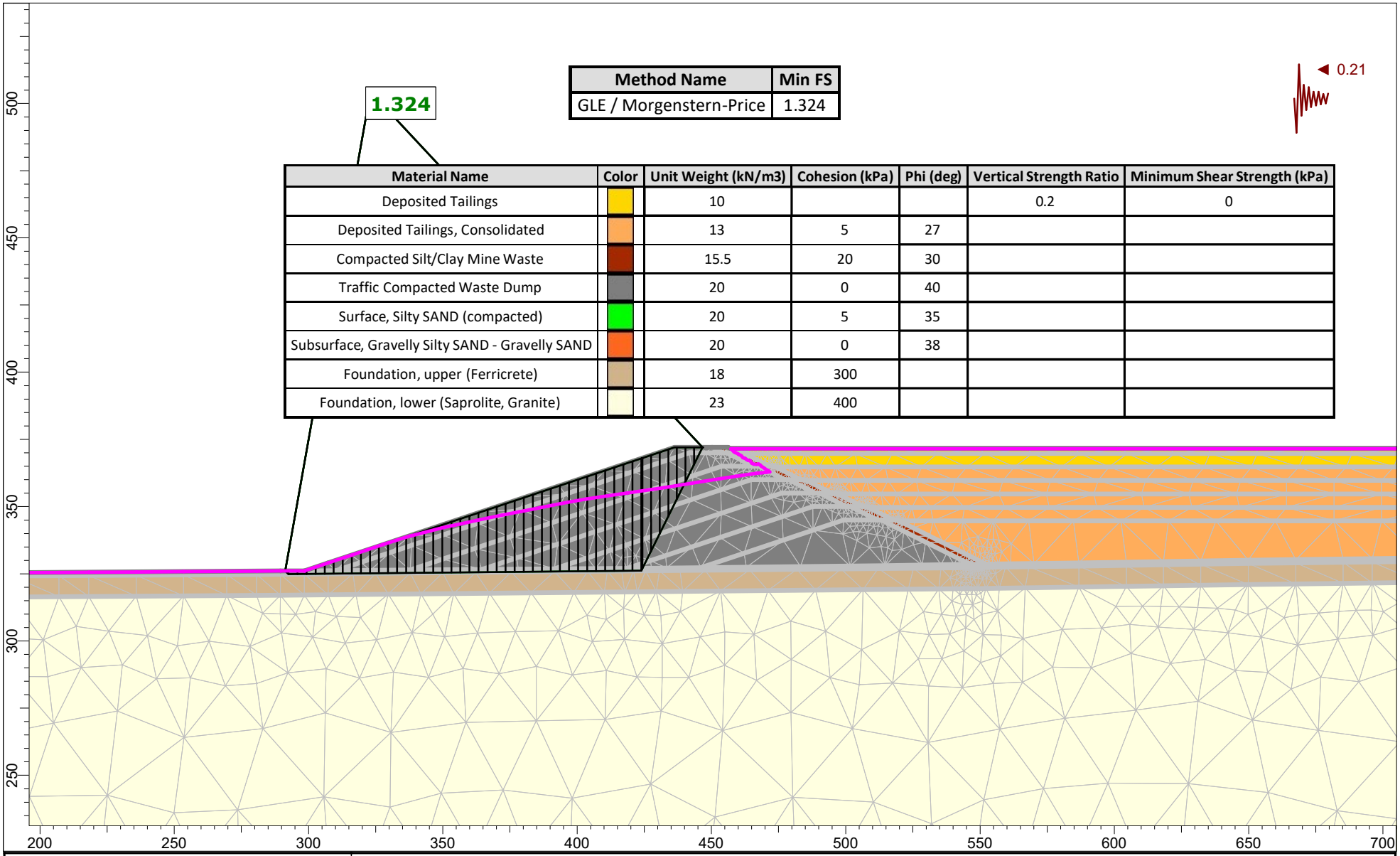
Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 4 (D/S, Pseudo-Static, SEE) - Stage 7 RL 372.0 m, max. h = 46 m, worst-case phreatic loading		
Drawn By PA	*Scale* 1:2000	*Company*	CMW Geosciences Pty Ltd
Date 14/2/2023		*File Name*	Mt Gibson TSF Stability Analyses - Final Stage - Case 4.slmd

Method Name	Min FS
GLE / Morgenstern-Price	1.324

1.324

◄ 0.21

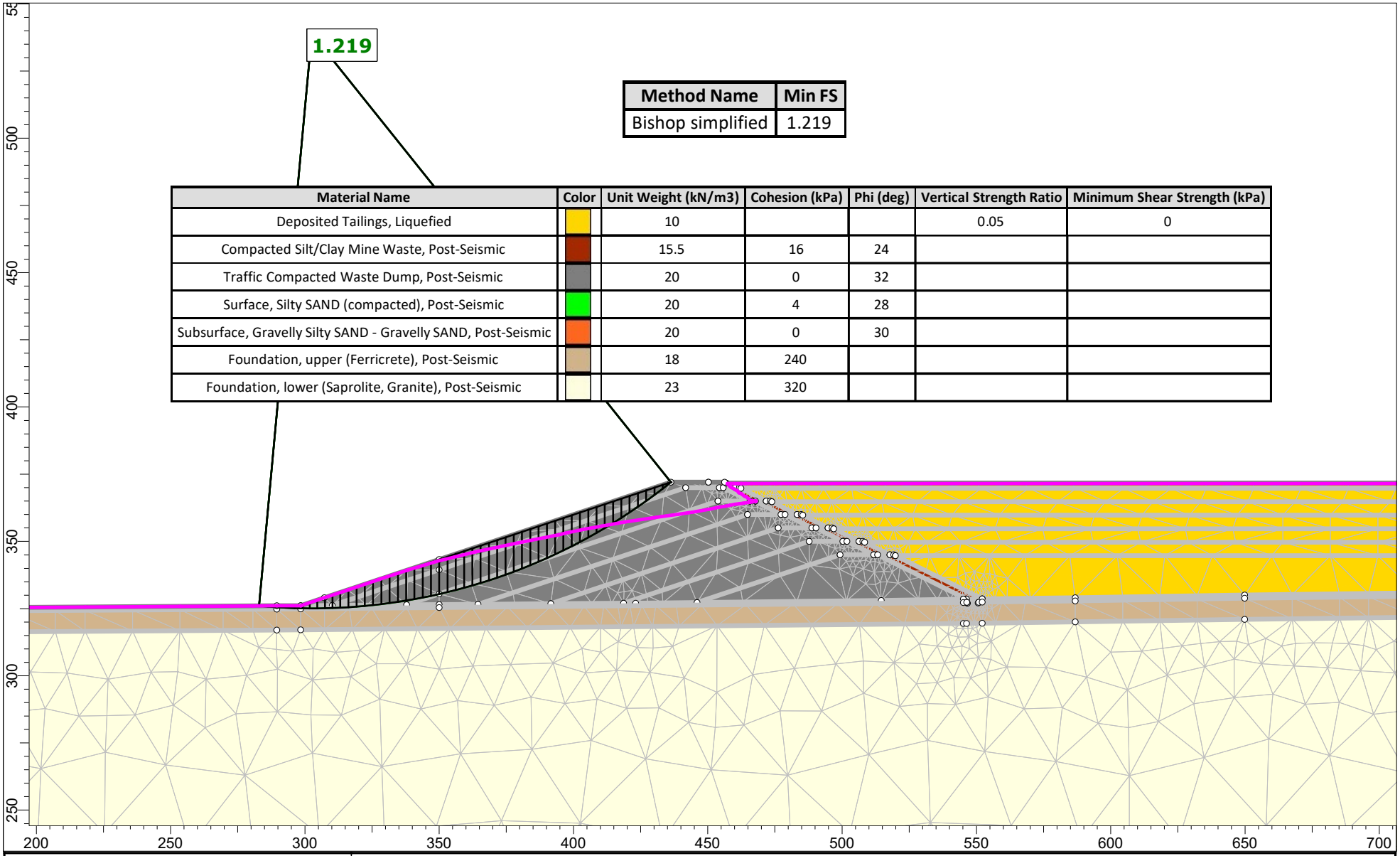
Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)	Vertical Strength Ratio	Minimum Shear Strength (kPa)
Deposited Tailings		10			0.2	0
Deposited Tailings, Consolidated		13	5	27		
Compacted Silt/Clay Mine Waste		15.5	20	30		
Traffic Compacted Waste Dump		20	0	40		
Surface, Silty SAND (compacted)		20	5	35		
Subsurface, Gravelly Silty SAND - Gravelly SAND		20	0	38		
Foundation, upper (Ferricrete)		18	300			
Foundation, lower (Saprolite, Granite)		23	400			



CMW Geosciences

SLIDEINTERPRET 9.019

Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 4 (D/S, Pseudo-Static, SEE, Wedge) - Stage 7 RL 372.0 m, max. h = 46 m, worst-case phreatic loading		
Drawn By	PA	Scale 1:2000	Company CMW Geosciences Pty Ltd
Date	14/2/2023		File Name mt gibson tsf stability analyses - final stage - case 4.slmd



CMW Geosciences

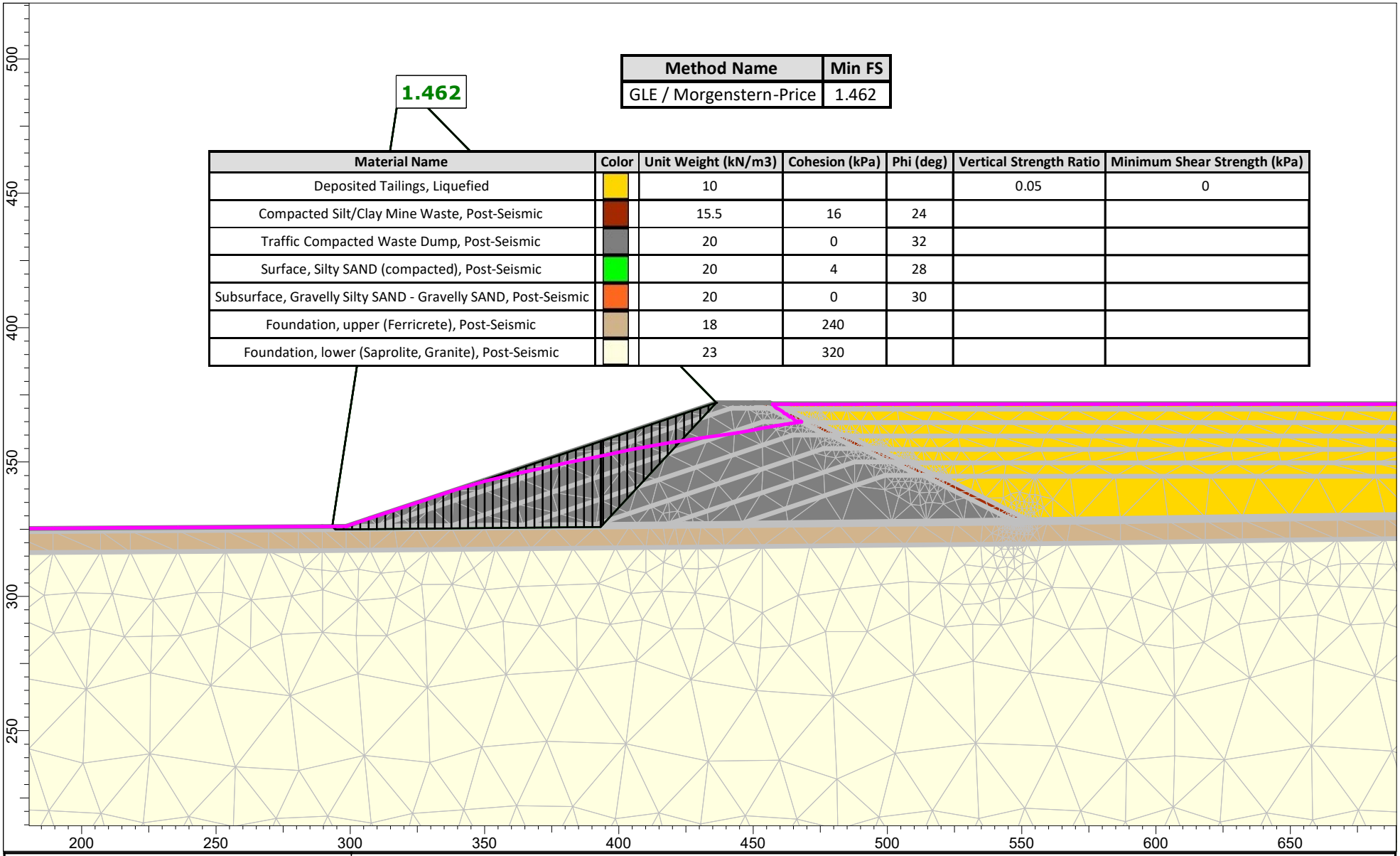
SLIDEINTERPRET 9.019

Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 5 (D/S, Post-Seismic) - Stage 7 RL 372.0 m, max. h = 46 m, worst-case phreatic loading		
Drawn By	PA	*Scale* 1:2000	*Company* CMW Geosciences Pty Ltd
Date	14/2/2023		*File Name* Mt Gibson TSF Stability Analyses - Final Stage - Case 5.slmd

Method Name	Min FS
GLE / Morgenstern-Price	1.462

1.462

Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)	Vertical Strength Ratio	Minimum Shear Strength (kPa)
Deposited Tailings, Liquefied		10			0.05	0
Compacted Silt/Clay Mine Waste, Post-Seismic		15.5	16	24		
Traffic Compacted Waste Dump, Post-Seismic		20	0	32		
Surface, Silty SAND (compacted), Post-Seismic		20	4	28		
Subsurface, Gravelly Silty SAND - Gravelly SAND, Post-Seismic		20	0	30		
Foundation, upper (Ferricrete), Post-Seismic		18	240			
Foundation, lower (Saprolite, Granite), Post-Seismic		23	320			



CMW Geosciences

SLIDEINTERPRET 9.019

Project	IWLTSF Mt Gibson Gold Project		
Analysis Description	Stability Analysis, Case 5 (D/S, Post-Seismic, Wedge) - Stage 7 RL 372.0 m, max. h = 46 m, worst-case phreatic loading		
Drawn By	PA	Scale 1:2000	Company CMW Geosciences Pty Ltd
Date	14/2/2023		File Name mt gibson tsf stability analyses - final stage - case 5.slmd

Appendix H – Deformation Estimate

Embankment Deformation

Swaisgood (1998)

SEF, % settle	0.052	PGA (g)	0.21
H, m	46	M	6.6
Crest Settlement, mm	23.8		

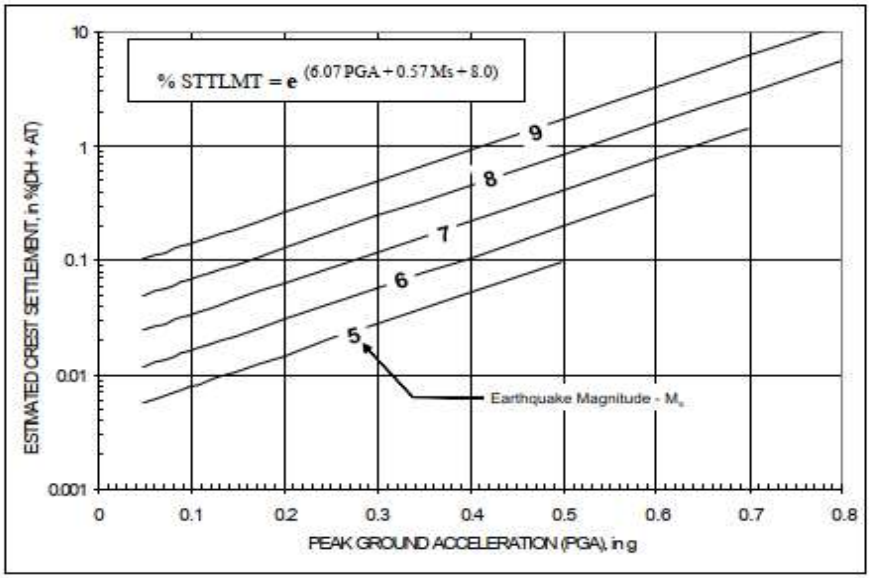


Figure 2. Chart for estimating crest settlement

4 RESULTS OF REGRESSION ANALYSES

The regression analyses also provided a mathematical relationship between the crest settlement and the two factors, PGA and M. This relationship can be expressed as:

$$\% \text{ Settlement} = e^{(6.07\,PGA + 0.57\,M - 8.00)} \qquad (1)$$

where % Settlement = the amount of settlement of the crest of the dam (in meters) divided by the height of the dam plus the thickness of the alluvium (in meters) times 100 (see. Fig 1); PGA = peak horizontal ground acceleration of the foundation rock (in g) recorded or estimated at the dam site; and M = earthquake magnitude (in surface-wave scale: M_S).

This relationship is illustrated in Figure 2.

Appendix I – Water Balance Analyses

PROJECT : TSF1 Mt Gibson Gold Project

CLIENT : Capricorn Metals Ltd

LOCATION : Mt Gibson, WA

SUBJECT : WATER BALANCE TOTAL TAILINGS STREAM CALENDAR YEAR - FINAL STAGE

Date	2-Mar-23
Job No	PER2022-0011
File	PER2022-0011AD
Subject	Water Balance
Revision	0

			Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
INFLOWS			Days per month	31	28.25	31	30	31	30	31	31	30	31	30	31	
RAINFALL																
Rainfall (mm)				25.7	28.5	32.6	25.5	39.3	36.9	39.2	35.9	21	11.5	20.3	14.1	**330.5**
Average Daily Rainfall (mm)				0.83	1.01	1.05	0.85	1.27	1.23	1.26	1.16	0.70	0.37	0.68	0.45	
Tailings Dam Storage Area (m2)				922,629	922,629	922,629	922,629	922,629	922,629	922,629	922,629	922,629	922,629	922,629	922,629	
Runoff Coefficient Tailings				0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	
Catchment Area above Storage (m2)				0	0	0	0	0	0	0	0	0	0	0	0	
Runoff Coefficient Catchment				0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	
Pool Area (m2)				177,205	177,205	177,205	177,205	177,205	177,205	177,205	177,205	177,205	177,205	177,205	177,205	
Running Beaches (m2)				63,438	63,438	63,438	63,438	63,438	63,438	63,438	63,438	63,438	63,438	63,438	63,438	
Rainfall Inflow Total Volume (m3/day)				425.7	518.0	539.9	436.4	650.9	631.5	649.3	594.6	359.4	190.5	347.4	233.5	
SLURRY WATER																
Tonnes per year	5,000,000															
Total tonnes per month				416,667	416,667	416,667	416,667	416,667	416,667	416,667	416,667	416,667	416,667	416,667	416,667	**5,000,000**
% Solids =	42.7			43	43	43	43	43	43	43	43	43	43	43	43	
Tailings Output Solids (tpd)				13,440.9	14,749.3	13,440.9	13,888.9	13,440.9	13,888.9	13,440.9	13,440.9	13,888.9	13,440.9	13,888.9	13,440.9	
Volume of Water (m3/day)				18,036.6	19,792.3	18,036.6	18,637.8	18,036.6	18,637.8	18,036.6	18,036.6	18,637.8	18,036.6	18,637.8	18,036.6	**6,709,602**
OTHER WATER INFLOWS																
Pit Dewatering (m3/day)				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other Water Inflow Total (m3/day)				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
TOTAL INFLOW (m3/day)				**18,462**	**20,310**	**18,577**	**19,074**	**18,687**	**19,269**	**18,686**	**18,631**	**18,997**	**18,227**	**18,985**	**18,270**	
TOTAL INFLOW (m3/month)				**572,329**	**573,766**	**575,872**	**572,226**	**579,312**	**578,079**	**579,260**	**577,566**	**569,916**	**565,038**	**569,556**	**566,373**	**6,879,293.03**

OUTFLOW-LOSSES FROM TAILINGS DAM			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
EVAPORATION (from pond and beaches)															
Evaporation Rate (mm)			477.0	420.0	367.0	239.0	157.0	99.0	103.0	133.0	171.0	281.0	347.0	449.0	**3,243**
Pan Factor			0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	
Monthly Dam Evaporation Rate (mm)			333.9	294.0	256.9	167.3	109.9	69.3	72.1	93.1	119.7	196.7	242.9	314.3	
Average Daily Evaporation Rate (mm)			10.77	10.41	8.29	5.58	3.55	2.31	2.33	3.00	3.99	6.35	8.10	10.14	
Pool Area & Running Beaches (m2)			240,643	240,643	240,643	240,643	240,643	240,643	240,643	240,643	240,643	240,643	240,643	240,643	
Daily Evaporation Loss/Outflow (m3/day)			2,592.0	2,504.4	1,994.2	1,342.0	853.1	555.9	559.7	722.7	960.2	1,526.9	1,948.4	2,439.8	
EVAPO-TRANSPIRATION (from drying tailings)															
Evapo-transpiration Rate (mm)			27.2	24.8	27.2	26.3	27.2	26.3	27.2	27.2	26.3	27.2	26.3	27.2	**320**
Evapo-transpiration Rate (Pan/3)			9.1	8.3	9.1	8.8	9.1	8.8	9.1	9.1	8.8	9.1	8.8	9.1	
Average Daily Evapo-transpiration Rate (mm)			0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	
Area Transpiring (m2)			721,930	721,930	721,930	721,930	721,930	721,930	721,930	721,930	721,930	721,930	721,930	721,930	
Daily transpiration Loss (m3/day)			210.8	210.8	210.8	210.8	210.8	210.8	210.8	210.8	210.8	210.8	210.8	210.8	
SEEPAGE															
Downstream Embankment (m3/day)			320.0	320.0	320.0	320.0	320.0	320.0	320.0	320.0	320.0	320.0	320.0	320.0	
Upstream Embankment (m3/day)			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Seepage Rate m/sec	1.00E-06														
Dam Floor (m3/day).			9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	
Total Seepage Outflow (m3/day)			329.6	329.6	329.6	329.6	329.6	329.6	329.6	329.6	329.6	329.6	329.6	329.6	
RETENTION															
Tailings Output (tpd)			13,440.9	14,749.3	13,440.9	13,888.9	13,440.9	13,888.9	13,440.9	13,440.9	13,888.9	13,440.9	13,888.9	13,440.9	
Calculated Ave. Insitu Dry Density (t/m^3) and MC	1.35	40.0%													
Volume Retained in Tailings (m3/day)			5,376.3	5,899.7	5,376.3	5,555.6	5,376.3	5,555.6	5,376.3	5,376.3	5,555.6	5,376.3	5,555.6	5,376.3	
TOTAL OUTFLOW-LOSSES FROM TAILINGS DAM			**8,508.7**	**8,944.5**	**7,911.0**	**7,437.9**	**6,769.9**	**6,651.8**	**6,476.4**	**6,639.5**	**7,056.1**	**7,443.7**	**8,044.4**	**8,356.6**	
BALANCE INFLOW-OUTFLOW/LOSSES (m3/day)			9,953.5	11,365.8	10,665.5	11,636.3	11,917.6	12,617.5	12,209.4	11,991.7	11,941.1	10,783.4	10,940.8	9,913.5	
BALANCE INFLOW-OUTFLOW/LOSSES (m3/month)			308,558.8	321,084.2	330,631.1	349,087.7	369,445.7	378,524.0	378,490.7	371,742.8	358,231.9	334,284.3	328,225.2	307,319.6	
RETURN WATER TO THE PLANT (if available)															
Total Water Return per month (balance of inflow -outflow for planning)			308,558.8	321,084.2	330,631.1	349,087.7	369,445.7	378,524.0	378,490.7	371,742.8	358,231.9	334,284.3	328,225.2	307,319.6	
Volume of Water (m3/day),estimated at			9,953.5	11,365.8	10,665.5	11,636.3	11,917.6	12,617.5	12,209.4	11,991.7	11,941.1	10,783.4	10,940.8	9,913.5	
Average water return			55%	57%	59%	62%	66%	68%	68%	66%	64%	60%	59%	55%	**62%**

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
Summary of Water Balance													
Water shortfall (make up water) or excess of requirements (m3/day)	**-8,083**	**-8,427**	**-7,371**	**-7,002**	**-6,119**	**-6,020**	**-5,827**	**-6,045**	**-6,697**	**-7,253**	**-7,697**	**-8,123**	
Total water in excess of requirements (m3/month)	**-250,575**	**-238,049**	**-228,502**	**-210,046**	**-189,688**	**-180,609**	**-180,643**	**-187,391**	**-200,902**	**-224,849**	**-230,908**	**-251,814**	**-2,573,976**
Total water in excess of requirements (m3/year) =	**-2,573,976**												

Appendix J – Dam Break Assessment

PROJECT	**: Mt Gibson Gold Project**
CLIENT	**: Capricorn Metals Ltd**
LOCATION	**: Near Paynes Find, WA**
SUBJECT	**: Dam Break Study, Worse Case**
Scenario:	**TSF Worst Case (PMP Rainy Day Failure Conditions)**

Date	22-Feb-23
Job No	PER2022-0011
Rev	0

BREACH CHARACTERISTICS	**Using Empirical Method**		**MacDonald and Langridge - Monopolis (1984)**
Input Parameters	**Value**	**Unit**	**Comments**
New Embankment Crest Level	372.0	mRL	From design
Approx. NGL	326.0	mRL	From design
Maximum Embankment Height (on Northern Side)	**46.0**	m	From design
Approximate Emb Length corresponding to Highest Section	500	m	assumed
Embankment Crest Width	20.0	m	From design
Upstream Embankment Slope	2.0	H to 1V	From design
Downstream Embankment Slope	3.0	H to 1V	From design
Embankment Cross Section Area	6,210.0	m^2	Embankment cross section area at highest section
Total Tailings Tonnes stored in TSF	56.84	Mt	Estimated total storage capacity
Dry Density	1.35	t/m³	From design
Bulk Density	1.50	t/m³	From design
Tailings Volume stored in TSF (V_T)	**42,100,000**	m³	Estimated total tailings volume
PMP Storm Volume over TSF Catchment	**1,407,600**	m³	*Rainy Day Failure Scenario - PMP storm event adopted 6 hrs 680 mm - Area - 2,070,000 m^2 (207 ha)*
Total Released Tailings Volume from the TSF (V_F)	**15,300,600**	m³	Allowed for released tailings ~ 33% of storage volume
	12,511	acre-feet	Converted from m^3 to acre-feet (1 acre-feet = 1233 m3)

Note: For conservative assessment, it was assumed that embankment breaches will be occurred through the whole embankment height. Tailings released from the embankment breaches were assumed to be liquefied.

Output Parameters - Breach Characteristics	**Value**	**Unit**	**Comments**
Breach Shape - Trapezoidal Side Slopes	**2**	**V to 1H**	Adopted approximate trapezoidal breach shape (T MacDonald and J Langridge - Monopolis, 1984)
Breach Height (H_o)	**46.0**	m	Adopted the bottom of the breach is at the base of the embankment
	150.8	feet	Converted from meter to feet
Breach Formation Factor (V_F x H_o)	**703,827,600**	m³ x m	Used this figure to predict the volume of embankment material removed during a breach
	1.9E+06	acre-ft x ft	Converted from m^3 x m to acre-feet x feet
Embankment Volume Eroded during Breach (V_M)	**1.9E+05**	yrd^3	Embankment volume removed during a breach (determined from **Figure 1**, T MacDonald and J Langridge - Monopolis, 1984)
	145,570	m³	Converted from cubic yard to cubic meter (1 cubic yard = 0.765 cubic meter)
Average Breach Width (W_{ave})	**23**	m	Calculated based on the removed embankment volume during a breach and embankment geometry
Base Breach Width (W_b)	**0**	m	Calculated based on the removed embankment volume during a breach and embankment geometry
Top Breach Width (W_t)	**46**	m	Calculated based on the removed embankment volume during a breach and embankment geometry
Breach Shape Area (A_F)	**1,078**	m^2	Breach shape area at highest embankment section
Equivalent Released Tailings Volume behind Breach Area	**1,421,156**	m³	Used this figure to estimate the equivalent tailings failed length behind breach area
Equivalent Tailings Failed Length behind Breach Area (x_o)	**1,320**	m	Calculated based on the released tailings volume (behind breach area) and breach shape
Adopted Breach Development Time (t_F)	**6.0**	hour	Determined from **Figure 2**, T MacDonald and J Langridge - Monopolis, 1984) 6.6 check
Released Tailings Run-out Flow (Q_F) - average flow	**708**	m^3/s	Calculated based on released tailings volume and breach development time
Peak Tailings Run-out Flow (Q_P)	**1,417**	m^3/s	Assuming a triangular hydrograph
Peak Tailings Run-out Flow (Q_P)	**5,103**	m^3/s	Based on Rico M, Beniti G, Diez-Herrero G 2008 Run-out distance (Dmax) 122 km

PROJECT	**: Mt Gibson Gold Project**	Date	22-Feb-23
CLIENT	**: Capricorn Metals Ltd**	Job No	PER2022-0011
LOCATION	**: Near Paynes Find, WA**	Rev	0
SUBJECT	**: DAM BREAK STUDY, SUNNY DAY**		
Scenario:	**TSF Sunny Day Conditions**		

BREACH CHARACTERISTICS	**Using Empirical Method**		**MacDonald and Langridge - Monopolis (1984)**
Input Parameters	**Value**	**Unit**	**Comments**
New Embankment Crest Level	372.0	mRL	From design
Approx. NGL	326.0	mRL	From design
Maximum Embankment Height (on Northern Side)	**46.0**	m	From design
Approximate Emb Length corresponding to Highest Section	500	m	assumed
Embankment Crest Width	20	m	From design
Upstream Embankment Slope	2	H to 1V	From design
Downstream Embankment Slope	3	H to 1V	From design
Embankment Cross Section Area	6,210.0	m^2	Embankment cross section area at highest section
Total Tailings Tonnes stored in TSF	56.84	Mt	Estimated total storage capacity
Dry Density	1.35	t/m^3	From design
Bulk Density	1.50	t/m^3	From design
Tailings Volume stored in TSF (V_T)	**42,100,000**	m^3	Estimated total tailings volume
PMP Storm Volume over TSF Catchment	**0**	m^3	*Rainy Day Failure Scenario - PMP storm event adopted 6 hrs 680 mm - Area - 2,070,000 m2 (207 ha)*
Total Released Tailings Volume from the TSF (V_F)	**13,893,000**	m^3	Allowed for released tailings ~ 67% of storage volume
	11,360	acre-feet	Converted from m^3 to acre-feet (1 acre-feet = 1233 m3)

Note: For conservative assessment, it was assumed that embankment breaches will be occurred through the whole embankment height. Tailings released from the embankment breaches were assumed to be liquefied.

Output Parameters - Breach Characteristics	**Value**	**Unit**	**Comments**
Breach Shape - Trapezoidal Side Slopes	**2**	**V to 1H**	Adopted approximate trapezoidal breach shape (T MacDonald and J Langridge - Monopolis, 1984)
Breach Height (H_o)	**46.0**	m	Adopted the bottom of the breach is at the base of the embankment
	150.8	feet	Converted from meter to feet
Breach Formation Factor (V_F x H_o)	**639,078,000**	m^3 x m	Used this figure to predict the volume of embankment material removed during a breach
	1.7E+06	acre-ft x ft	Converted from m^3 x m to acre-feet x feet
Embankment Volume Eroded during Breach (V_M)	**1.8E+05**	yrd^3	Embankment volume removed during a breach (determined from **Figure 1**, T MacDonald and J Langridge - Monopolis, 1984)
	134,700	m^3	Converted from cubic yard to cubic meter (1 cubic yard = 0.765 cubic meter)
Average Breach Width (W_{ave})	**22**	m	Calculated based on the removed embankment volume during a breach and embankment geometry
Base Breach Width (W_b)	**-1**	m	Calculated based on the removed embankment volume during a breach and embankment geometry
Top Breach Width (W_t)	**45**	m	Calculated based on the removed embankment volume during a breach and embankment geometry
Breach Shape Area (A_F)	**998**	m^2	Breach shape area at highest embankment section
Equivalent Released Tailings Volume behind Breach Area	**1,241,780**	m^3	Used this figure to estimate the equivalent tailings failed length behind breach area
Equivalent Tailings Failed Length behind Breach Area (x_o)	**1,240**	m	Calculated based on the released tailings volume (behind breach area) and breach shape
Adopted Breach Development Time (t_F)	**6.0**	hour	Determined from **Figure 2**, T MacDonald and J Langridge - Monopolis, 1984) 6.4 check
Released Tailings Run-out Flow (Q_F) - average flow	**643**	m^3/s	Calculated based on released tailings volume and breach development time
Peak Tailings Run-out Flow (Q_P)	**1,286**	m^3/s	Assuming a triangular hydrograph
Peak Tailings Run-out Flow (Q_P)	**4,900**	m^3/s	Based on Rico M, Beniti G, Diez-Herrero G 2008 Run-out distance (Dmax) 114 km

CMW Geosciences Pty Ltd, Chapman Morton Woodward	CLIENT: **Mt Gibson Gold Project**	DESIGNER:	PA
	PROJECT: **Capricorn Metals Ltd**	CHECKED:	CH
		REVISION:	0
	TITLE: **PRELIMINARY DAM BREAK ASSESSMENT-WORST CASE**	DATE:	22/02/2023
		PROJECT:	PER2022-0011

Step 1: Estimate runout volume following a dam overtopping, embankment stability or piping failure.

Total volume of tailings and water in the facility at the time of failure, V_T (m^3):	43,507,600	
Volume of tailings and water released at failure, V_F (m^3):	**17,728,701**	Eq. 7 Rico et. Al. 2007

$$V_F = 0.354 \times V_T^{1.008}$$

Assumptions:

The formula represents the maximum tailings volume that can be released in the most extreme situation in which pond volume was empouted folllowing the dam break.

The failure mechanism is from the base of the facility to the highest embankment level at RL1491m.

Step 2: Estimate preflow horizontal distance of failure volume.

Embankment height, h_0 (m):	46	
Embankment Length 1	500	
Estimated pre-flow horizontal distance, x_0 embankment 1(m):	1,320	Seddon K. D. 2010

Assumptions:

Failure occurs along full length of embankment. Failure at aech embankment is assessed.

Eneregy based linear method as per Seddon K.d> 2010

Zero grade.

$$H_o x_o = h\, x_f$$

$$\therefore h = (x_o / x_f) H_o$$

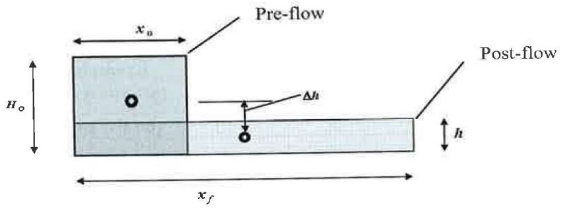


Figure 2 Simplified flow slide geometry

Step 3: Estimate runout distance following a dam overtopping, embankment stability or piping failure.

Bulk unit weight (kN/m^3):	15	
Undrained shear strength (kPa):	4	
Estimated post-flow horizontal distance of failure volume, x_f embankment 1 (m):	**3964**	Eqn. 6 Seddon K.D. 2010

$$x_f^2 + x_o x_f - 2\gamma x_o H_o^2 / s_u = 0$$

Runout distance, R_0 embankment 1 (m):	**2644**	Eqn. 7 Seddon K.D. 2010

$$Ro = x_f - x_o$$

CMW Geosciences Pty Ltd, Chapman Morton Woodward	CLIENT: **Mt Gibson Gold Project**	DESIGNER:	PA
	PROJECT: **Capricorn Metals Ltd**	CHECKED:	CH
		REVISION:	0
	TITLE: **PRELIMINARY DAM BREAK ASSESSMENT-WORST CASE**	DATE:	22/02/2023
		PROJECT:	PER2022-0011

Step 1: Estimate runout volume following a dam overtopping, embankment stability or piping failure.

Total volume of tailings and water in the facility at the time of failure, V_T (m^3):	43,507,600	
Volume of tailings and water released at failure, V_F (m^3):	**17,728,701**	Eq. 7 Rico et. Al. 2007

$$V_F = 0.354 \times V_T^{1.008}$$

Assumptions:

The formula represents the maximum tailings volume that can be released in the most extreme situation in which pond volume was empouted folllowing the dam break.

The failure mechanism is from the base of the facility to the highest embankment level at RL1491m.

Step 2: Estimate preflow horizontal distance of failure volume.

Embankment height, h_0 (m):	46	
Embankment Length 1	500	
Estimated pre-flow horizontal distance, x_0 embankment 1(m):	1,320	Seddon K. D. 2010

Assumptions:

Failure occurs along full length of embankment. Failure at aech embankment is assessed.

Eneregy based linear method as per Seddon K.d> 2010

Zero grade.

$$H_o x_o = h\, x_f$$

$$\therefore h = (x_o / x_f) H_o$$

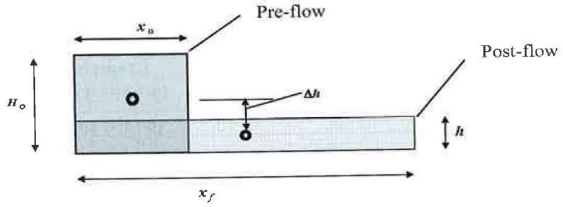


Figure 2 Simplified flow slide geometry

Step 3: Estimate runout distance following a dam overtopping, embankment stability or piping failure.

Bulk unit weight (kN/m^3):	15	
Undrained shear strength (kPa):	7	
Estimated post-flow horizontal distance of failure volume, x_f embankment 1 (m):	**2862**	Eqn. 6 Seddon K.D. 2010

$$x_f^2 + x_o x_f - 2\gamma x_o H_o^2 / s_u = 0$$

Runout distance, R_0 embankment 1 (m):	**1542**	Eqn. 7 Seddon K.D. 2010

$$Ro = x_f - x_o$$

Project: Mt Gibson Gold Project

Client: Capricorn Metals Ltd

Location: Near Paynes Find, WA

Job No.: PER2022-0011

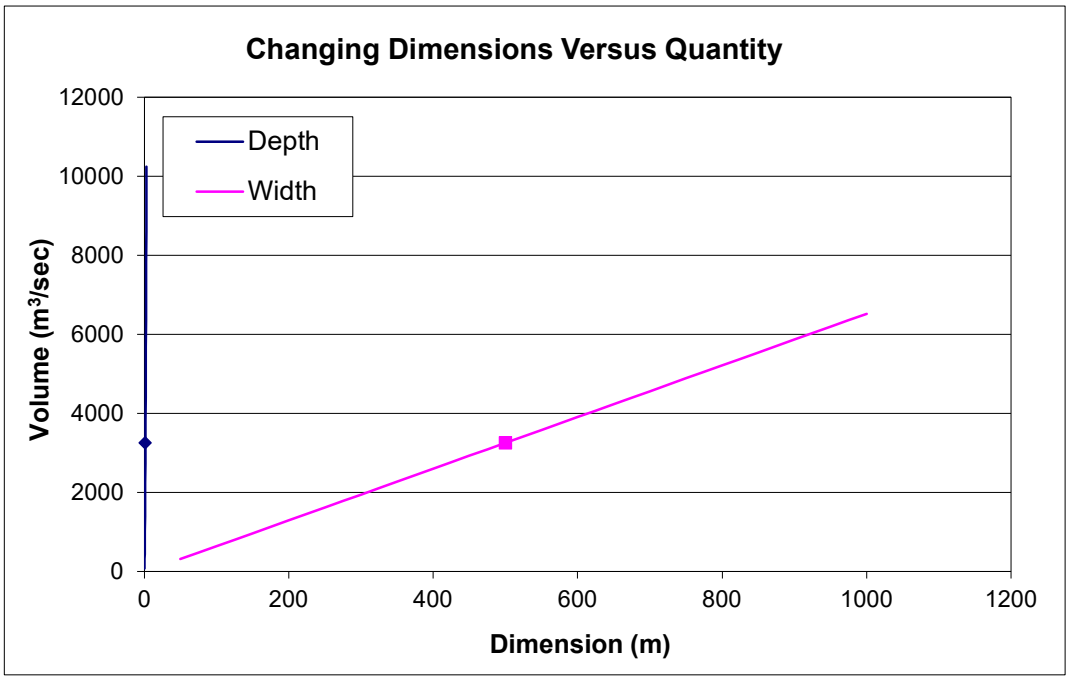
Dam Break Assessment

Input Data

Channel Width (w) =	500 m
Flow Depth (d) =	1.5 m
Side Slope (C) =	0.01 : 1
Channel Slope (s) =	0.01
Manning No. =	0.03

Output

Area (A) =	750.02 m
Perimeter =	503.00 m
Effective Radius (R) =	1.49 m
Quantity (Q) =	3254.37 m^3/s
Depth (d) =	1.50 m
Velocity (v) =	4.34 m/s



Appendix K – Geochemical Study

OROYA MINING LIMITED

MT GIBSON GOLD PROJECT

GEOCHEMICAL ASSESSMENT OF WASTE ROCKS AND TAILINGS

PE801-00024/5
April 2003

Geochemistry

Knight Piésold Pty Limited
A.B.N. 67 001 040 419
1 Ord Street
West Perth WA 6005
AUSTRALIA

24.25

Knight Piésold
CONSULTING

XSERV

Geological consulting & mineral exploration management

→ Derek Waterfield

from Dermot

With compliments

XServ Pty Ltd (109 685 403) as trustee for RFT (ABN 28 511 037 547)
Level 3, 640 Murray Street West Perth 6005 PO Box 1165 West Perth Western Australia 6872
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CONTENTS **PAGE**

1. INTRODUCTION 1
1.1 GENERAL 1
1.2 PROJECT OVERVIEW 1
1.3 GEOLOGICAL OVERVIEW 2
2. TAILING & WASTE ROCK GEOCHEMICAL CHARACTERISATION 3
2.1 INTRODUCTION 3
2.2 SAMPLE SELECTION CRITERIA 3
2.3 TESTWORK METHODS 5
2.3.1 Paste pH and Conductivity 5
2.3.2 Acid Base Accounting 5
2.3.3 Static Net Acid Generation 6
2.3.4 Multi-Element Analysis 7
2.3.5 Mineralogical Analysis 7
3. RESULTS OF WASTE ROCK GEOCHEMICAL CHARACTERISATION 8
3.1 WASTE ROCK ACID BASE ACCOUNTING 8
3.1.1 Paste pH and Conductivity 8
3.1.2 Sulphur Forms and Maximum Potential Acidity 9
3.1.3 Carbon Forms and Acid Neutralising Capacity 10
3.1.4 Acid Formation Potential 11
3.2 WASTE ROCK NET ACID GENERATION 13
3.3 WASTE ROCK MULTI-ELEMENT ANALYSIS 15
3.4 WASTE ROCK MINERALOGICAL RESULTS 17
4. RESULTS OF TAILINGS GEOCHEMICAL CHARACTERISATION 19
4.1 TAILINGS ACID BASE ACCOUNTING 19
4.1.1 Paste pH and Conductivity 19
4.1.2 Sulphur Forms and Maximum Potential Acidity 19
4.1.3 Carbon Forms and Acid Neutralising Capacity 20
4.1.4 Acid Formation Potential 20

CONTENTS PAGE

4.2 TAILINGS NET ACID GENERATION 21

4.3 TAILINGS MULTI-ELEMENT ANALYSIS 22

4.4 TAILINGS MINERALOGICAL RESULTS 24

5. IMPLICATIONS FOR WASTE DUMP DESIGN 25

5.1 GENERAL 25

5.2 CONSIDERATION FOR NEW WASTE DUMP DESIGN 25

5.3 CONSIDERATIONS FOR EXISTING WASTE DUMPS 26

5.4 CONSIDERATIONS FOR WASTE DUMP REHABILITATION 27

6. IMPLICATIONS FOR TAILINGS STORAGE REHABILITATION 28

6.1 GENERAL 28

6.2 CONSIDERATIONS FOR TAILINGS STORAGE TD1 AND ORION 4 REHABILIATION 28

6.3 CONSIDERATIONS FOR TAILINGS STORAGE TD2 REHABILIATION 29

7. CONCLUSIONS AND RECOMMENDATIONS 31

7.1 WASTE ROCK 31

7.2 TAILINGS 32

8. REFERENCES 33

APPENDIX A
Laboratory Results

1. INTRODUCTION

1.1 GENERAL

Oroya Mining Limited (Oroya) has undertaken a bankable feasibility study of the Mount Gibson Gold Project. Knight Piésold Pty Ltd (KP) have been appointed to conduct investigations of the waste rocks and tailings which will be mined, in order to characterise them and assess the potential for Acid Rock Drainage (ARD) or other potential environmental issues. Knight Piésold has also characterised the tailings stored in existing facilities at the site to allow future rehabilitation to be designed.

This report details the selection, collection and geochemical analysis of various rock and tailings samples. The results of the analysis are presented, interpreted and the key implications for engineering design are defined.

1.2 PROJECT OVERVIEW

The Mt Gibson Gold Project is located 280 km Northeast of Perth in Western Australia. The project is located within the Archaean greenstone belts of Western Australia, which host many other major gold deposits. The project area incorporates 80 square kilometres of mining leases.

Gold was first mined from the project area in 1986 and continued until 1998. The project contains 14 open pits which mined both oxide and primary ores to a maximum depth of 100 m and a single underground mine. The original project consisted of CIL processing and heap leaching, with over 16.5 Mt of ore being processed. The processing plant and associated infrastructure are still at the site along with the waste dumps, tailings storage facilities and heap leach pads.

Oroya plans to recommence mining within the project area concentrating initially on three main targets, Capricorn, Saratoga and Midway. The existing processing plant will be used to process the ore which will be mined by conventional open cut mining techniques. The project will have a throughput of 1 Mpa with a mine life of 5 years.

A resource estimation was undertaken by SRK as part of the pre feasibility study, the revised Mineral Resources for Saratoga, Midway and Capricorn, at a 1.0 g/t lower cut-off grade, being summarised in Table 1.1

Table 1.1: Summary of Mineral Resources at Saratoga, Midway and Capricorn

	Total (measure + indicated + inferred)		
	Tonnes (t)	Au (g/t)	Ounces (oz)
Saratoga	1,915,800	2.18	134,188
Midway	3,462,100	2.08	231,744
Capricorn	476,200	1.72	26,273
TOTAL	5,854,100	2.08	392,205

Sourced from Oroya announcement to ASX 24 January 2003. (Oroya, January 2003)

1.3 GEOLOGICAL OVERVIEW

The Mt Gibson Project is situated on the intersection of the Yalgoo-Singleton Greenstone Belt and the Mt Gibson-Meekatharra Fault System. These two regional-scale trends establish the basic tectonic framework of the ore mineralizing system and are the principal controls on gold mineralization.

The Mt Gibson - Meekatharra Fault may be traced for over 500 kms north through the Murchison Goldfield from its southernmost point at Mt Gibson. It is associated with numerous gold mining centres along its length, including Paynes Find, Mt Magnet, Cue, Tuckabianna and Meekatharra, from which a total of over 12 million ounces of gold has been produced.

The Mt Gibson mineralized system itself extends over an area of approximately 100 km^2 and is therefore comparable with other well-known large gold mineralized areas such as Western Australia's Wiluna and Kalgoorlie Mining Centres.

Primary gold mineralization on the main Mt Gibson Mine trend occurs as multiple high-grade, quartz or sulphide-rich lodes in specific structural sites within a major shear corridor up to 600 m wide, which forms part of the Mt Gibson - Meekatharra Fault.

While individual lode structures vary considerably in size and disposition, and the mining method required to extract ore would be governed by both the size and density of the lodes, available mining and drilling evidence indicates that the Mt Gibson mineralised trends have excellent potential for both large scale open pit and smaller higher grade underground mining operations (Oroya, 2003).

2. TAILING & WASTE ROCK GEOCHEMICAL CHARACTERISATION

2.1 INTRODUCTION

Waste rock samples from the Capricorn, Saratoga and Midway pits were obtained from RC drill chips produced as part of the resource estimation program. Five hundred (500) grams of each sample were bagged and sent to KP Perth, where they were split and distributed to the various testing laboratories. The samples were subjected to geochemical test work to characterise the waste rock in terms of acid formation potential, mineralogical composition and elemental enrichment. The geochemical test work was conducted by Genalysis Laboratory Services and the mineralogical analysis by Roger Townend and Associates. Detailed results of the test work are included in Appendix A of this report.

Samples of the tailings from the three existing tailings storage facilities at the site were also obtained. The tailings samples were obtained from approximately 1 m below the tailings surface. These samples were also subjected to geochemical test work to characterise them in terms of acid formation potential, mineralogical composition and elemental enrichment. The geochemical test work was conducted by Genalysis Laboratory Services and the mineralogical analysis by Roger Townend and Associates. Detailed results of the test work are included in Appendix A of this report.

2.2 SAMPLE SELECTION CRITERIA

The rock samples were selected to represent the predicted principal waste rock types, which will be produced from each pit as a result of the mining operations. A total of thirteen rock samples were obtained for testing.

The aim of the sample selection was to obtain samples which broadly represented the major lithological and weathering domains identified in the pit outlines. Table 2.1 gives the location of the samples and Table 2.2 shows their geological and weathering characteristics.

Table 2.1: Samples Locations

Sample ID	Borehole	Top Depth (m)	Bottom Depth (m)	Deposit
77662	N/A	~1m		TD1
77663	N/A	~1m		TD2
77664	N/A	~1m		Orion 4 in-pit
77665	CRC006	29	35	Capricorn
77666	CRC006	110	115	Capricorn
77667	CRC003	20	28	Capricorn
77668	CRC004	105	107	Capricorn
77669	YRC002	20	25	Midway
77670	YRC002	95	100	Midway
77671	YRC012	20	26	Midway
77672	YRC012	70	75	Midway
77673	SRC032	20	25	Saratoga
77674	SRC032	64	70	Saratoga
77675	SRC007	51	53	Saratoga
77676	SRC009	10	14	Saratoga
77677	SRC009	95	97	Saratoga

Table 2.2: Sample Characteristics

Sample ID	Lithological Domain	Weathering
77662	Tailings TD1	
77663	Tailings TD2	
77664	Tailings Orion 4 in-pit	
77665	Yellow orange clay	Fully oxidised
77666	Sericite-quartz-schist	Fresh
77667	Biotite sericite +/-quartz-schist	Fresh
77668	Biotite sericite +/-quartz-schist-chert	Fresh
77669	Grey orange clay	Fully oxidised
77670	Amphibolite	Fresh
77671	Yellow brown clay	Fully oxidised
77672	Amphibolite, foliated, pyrite/gossan	Fresh
77673	Mottled clay	Fully oxidised Fresh
77674	Amphibolite, foliated, pyrite/gossan	Fresh
77675	Grey clay pyrite	Fully oxidised
77676	White clay	Fully oxidised
77677	Amphibolite, Fresh	Fresh

2.3 TESTWORK METHODS

2.3.1 Paste pH and Conductivity

The paste pH is used to aid the assessment of whether the sample contains readily available acidity or alkalinity. The paste is made up by adding a small amount of water until a thin paste is formed, no water should pond and no dry solids should be left. Using a combination pH / EC electrode, pH and EC can then be measured

2.3.2 Acid Base Accounting

Acid base accounting assesses the sample's potential to form acid from oxidation of sulphides and the ability to neutralise acid by the dissolution of minerals, especially carbonates, contained in the sample.

The acid base accounting test work was conducted by Genalysis, Perth. All samples were crushed to a nominal 2 mm-particle size, then pulped to less than 75 µm particle size.

Total sulphur, total carbon and non-carbonate carbon was determined by LECO induction furnace, IR detection. Sulphate sulphur was determined by 10% Na_2CO_3

extraction, $BaSO_4$ precipitation. The test work methods used are based on the Modified ABA methodology defined in the MEND Acid Rock Drainage Prediction Manual (1991).

Acid Neutralising Capacity was determined by digestion in a standard solution of HCl, followed by back titration with NaOH to determine the amount of acid consumed. The technique used was based on Sobek *et al* (1978). The Net Acid Generation (NAG) test is used as a simple check on the overall ABA accounting.

The results of the ABA test work are used to calculate the Maximum Potential Acidity (MPA) which is a measure of the maximum amount of sulphuric acid which can be produced from the total oxidation of sulphides within the sample. The MPA is calculated by multiplying the sulphide content of the sample (Sulphide content = Total sulphur – Sulphate sulphur) by a factor of 30.6 to give the amount of sulphuric acid produced in kg per tonne of sample.

The Net Acid Producing Potential (NAPP) is the balance between the Maximum Potential Acidity and the Acid Neutralising Capacity. A negative NAPP indicates that there is an excess neutralising capacity and a positive NAPP indicates there is excess potential acidity.

2.3.3 Static Net Acid Generation

Static Net Acid Generation (NAG) test work is a direct measure of the sample's ability to produce acid through sulphide oxidation. The addition of hydrogen peroxide to samples causes rapid oxidation of the contained sulphides to produce sulphuric acid.

NAG test work was conducted by Genalysis, Perth. All samples were crushed to a nominal 2 mm-particle size then pulped to less than 75 µm particle size.

The procedure employed is based upon that for the Static NAG Test as described by Miller *et al* (1997). Fifteen percent hydrogen peroxide solution was adjusted to pH 4.5 before addition to the samples. The samples were then left to stand overnight at room temperature before pH measurement and titration to pH 7.0. The samples are then boiled for 2 to 3 hours and allowed to cool before being made back up to 250 ml. For those samples with a pH of <7.0, 1 mL of a 0.016 M CuCl is added (to decompose any residual H_2O_2) and the solution again boiled for approximately 30 minutes followed by cooling, a third pH measurement and titration to pH 7.0.

In interpretation of the NAG test work data it is important (for samples with both a sulphide sulphur concentration of less than 1% and ANC values of less than 10 kg H_2SO_4/tonne) to consider the pH after the overnight standing period. This represents the pH values under ambient conditions prior to the accelerated dissolution of the gangue minerals during the boiling stage (Graham Campbell, 2002).

2.3.4 Multi-Element Analysis

Multi-element analysis of the waste rock samples was conducted to assess the potential for metal leaching from the waste and to assess the possible negative environmental impact of dust produced during the waste dumping operation.

The multi-element analysis was conducted by Genalysis Laboratories in Perth. The rock samples were subjected to various digestion methods, defined in the laboratory test report in Appendix A. Analysis was by Inductively Coupled Plasma Mass Spectrometry or Inductively Coupled Plasma Optical Emission Spectrometry depending on the element being analysed and the detection limits required. Mercury was analysed by Cold Vapour Generation Atomic Adsorption Spectrometry and fluorine by Specific Ion Electrode.

The results displayed in Section 3 of this report are limited to those elements that showed enrichment when compared to the Geochemical Abundance Index (GAI). The GAI quantifies an assay result for a particular element in terms of average crustal abundance. The GAI is calculated from the following formula:

$$GAI = Log_2 (C_n / (1.5 \times B_n))$$

Where: C_n = measured concentration of element in sample

B_n = average crustal abundance (Bowen, 1979)

The GAI is expressed on a scale of 0 to 6, with 0 indicating the concentration of the element is less than or similar to average crustal abundance; a GAI of 3 corresponds to a 12 fold increase above the average crustal abundance; and so forth up to a GAI of 6 which represents a 96 fold increase or greater.

2.3.5 Mineralogical Analysis

Five pulp samples were subjected to mineralogical analysis to define the mineral composition of the waste rocks. The analysis concentrated on the sulphide minerals and major gangue mineral within the rock to aid in the interpretation of the ABA and multi-element Analysis.

The mineralogical analysis was conducted by Roger Townend and Associates in Perth.

3. RESULTS OF WASTE ROCK GEOCHEMICAL CHARACTERISATION

3.1 WASTE ROCK ACID BASE ACCOUNTING

3.1.1 Paste pH and Conductivity

The waste rock samples were found to have paste pH varying from 3.5 to 9.0. The lower paste pH results were generally associated with the fully oxidised material suggesting that the fully oxidised material contains acidity from prior acid generation.

Five of the samples had paste pH values above pH 7 suggesting the presence of reactive carbonate. Four of the five samples which had high paste pH values were fresh rock, suggesting that the reactive carbonate becomes depleted during the weathering process.

The electrical conductivity showed a distinct relationship to the pH and sulphate sulphur content of the samples. Those samples with a high electrical conductivity generally had a low pH and high sulphate sulphur content, suggesting that the sulphides in these samples have already been oxidised, producing latent acidity and sulphates.

The paste pH and conductivities are shown in Table 3.1.

Table 3.1: Paste pH and Conductivity

Sample	Lithology	Paste pH	Electrical Conductivity (mS/cm)
77665	Yellow orange clay	6.6	2.93
77666	Sericite-quartz-schist	9.0	2.40
77667	Biotite sericite quartz-schist	7.1	0.94
77668	Biotite sericite quartz-schist-chert	8.3	0.85
77669	Grey orange clay	4.4	3.81
77670	Amphibolite	8.0	4.92
77671	Yellow brown clay	3.5	4.80
77672	Amphibolite, foliated, pyrite/gossan	6.3	3.90
77673	Mottled clay	6.8	5.33
77674	Amphibolite, foliated, pyrite/gossan	6.7	4.80
77675	Grey clay pyrite	3.9	4.31
77676	White clay	7.2	1.60
77677	Amphibolite	4.0	5.80

3.1.2 Sulphur Forms and Maximum Potential Acidity

The samples had low to moderate total sulphur contents ranging from 0.005 to 2.9%, with the fully oxidised samples having lower total sulphur content than the fresh samples (with the exception of sample 77675, grey clay with pyrite which had a total sulphur content of 2.91%).

Fresh amphibolite samples from both Saratoga and Midway deposits had relatively high total sulphur contents ranging from 0.8 to 2.28% sulphur. The amphibolite contained only small amount of sulphate (less than 0.15%) with the remaining sulphur assumed to represent sulphide sulphur. This gave a sulphide content of 0.75 to 2.16% sulphide sulphur and a calculated maximum potential acidity (MPA) of between 23 and 66 kg H_2SO_4/tonne.

Fresh schist samples from the Capricorn deposit had a low total sulphur content not exceeding 0.087% total sulphur, the sulphate sulphur content of the schist was negligible giving sulphide sulphur contents of between 0.001 and 0.067% and a calculated MPA of 0 and 2.1 kg H_2SO_4/tonnes.

All the fully oxidised samples, with the exception of sample 77676 (grey clay with pyrite), had low total sulphur which was made up entirely of sulphate sulphur and therefore the MPA was 0 kg H_2SO_4/tonnes for these samples.

Sample 77675 (grey clay with pyrite) had a very high total sulphur content of 2.91% with only 0.25% of that being sulphate sulphur, this results in a calculated sulphide sulphur content of 2.66% and a MPA of 81.4 kg H_2SO_4/tonnes.

The results of the analysis are shown in Table 3.2.

Table 3.2: Sulphur forms and Maximum Potential Acidity Results

	Sample ID	Total Sulphur (%)	Sulphate Sulphur (%)	Calculated Sulphide Sulphur (%)	Calculated MPA (kg H_2SO_4/t)
77665	Yellow orange clay	0.032	0.07	0.0	0.0
77666	Sericite-quartz-schist	0.087	0.02	0.067	2.1
77667	Biotite sericite quartz-schist	0.010	0.02	0.0	0.0
77668	Biotite sericite quartz-schist-chert	0.005	0	0.005	0.2
77669	Grey orange clay	0.021	0.02	0.001	0.0
77670	Amphibolite	0.800	0.05	0.750	23.0
77671	Yellow brown clay	0.090	0.13	0.0	0.0
77672	Amphibolite, foliated, pyrite/gossan	1.860	0.12	1.740	53.2
77673	Mottled clay	0.029	0.04	0.0	0.0
77674	Amphibolite, foliated, pyrite/gossan	2.280	0.12	2.160	66.1
77675	Grey clay pyrite	2.910	0.25	2.660	81.4
77676	White clay	0.010	0	0.010	0.3
77677	Amphibolite	1.250	0.15	1.100	33.7

3.1.3 Carbon Forms and Acid Neutralising Capacity

Total carbon content of the samples ranged from 0.0 to 0.29%, however several of the samples contained significant non-carbonate carbon. The calculated "carbonate" carbon therefore ranged from 0 to 0.26% averaging 0.07%. Mineralogical analysis identified the carbonates to be calcite, which is considered readily soluble and reactive in circum-neutral conditions.

All samples had very low carbonate contents which has an impact on the classification of the materials, as discussed in more detail in Section 3.1.4 of this report.

The fresh rock generally had a higher carbonate content, average 0.11%, with the fully oxidised sample only having an average of 0.03% carbonate.

The Acid Neutralising Capacity of the samples was low and ranged from 0 to 16 kg H_2SO_4 per tonne averaging only 4.9 kg H_2SO_4 per tonne. The low ANC can be attributed to the limited buffering capacity of the silicate minerals and clays such as the

hornblende and kaolin. The results of the total carbon, non-carbonate carbon and ANC test work are presented in Table 3.3.

Table 3.3: Carbon forms and Acid Neutralising Capacity Results

	Sample ID	Total Carbon (%)	Non carbonate Carbon (%)	Calculated carbonate Carbon (%)	ANC (kg H2SO4 /t)
77665	Yellow orange clay	0.090	0.090	0.000	3.00
77666	Sericite-quartz-schist	0.130	0.060	0.070	12.00
77667	Biotite sericite quartz-schist	0.040	0.010	0.030	2.00
77668	Biotite sericite quartz-schist-chert	0.030	0.010	0.020	5.00
77669	Grey orange clay	0.010	0.010	0.000	0.00
77670	Amphibolite	0.150	0.040	0.110	11.00
77671	Yellow brown clay	0.040	0.010	0.030	0.00
77672	Amphibolite, foliated, pyrite/gossan	0.300	0.110	0.190	9.00
77673	Mottled clay	0.040	0.030	0.010	2.00
77674	Amphibolite, foliated, pyrite/gossan	0.290	0.030	0.260	7.00
77675	Grey clay pyrite	0.190	0.090	0.100	1.00
77676	White clay	0.120	0.100	0.020	3.00
77677	Amphibolite	0.080	0.010	0.070	9.00

3.1.4 Acid Formation Potential

The acid formation potential of the waste rock is calculated from the sulphide sulphur content, the Maximum Potential Acidity and the Acid Neutralising Capacity.

There are no universally agreed criteria that define whether a rock is Potentially Acid Forming (PAF) or Non-Acid Forming (NAF). The criteria defined below are consistent with the current industry standards generally employed in Western Australia.

NAF: Sulphide Sulphur <0.3%. For Sulphide Sulphur >0.3% both a negative NAPP value and an ANC/MPA ratio >2.0.

PAF: For Sulphide Sulphur >0.3% any positive NAPP value or a negative NAPP value with an ANC/MPA ratio <2.0.

However, these criteria are intended to be employed on samples with a significant acid neutralising capacity derived from carbonates. The samples collected from Mt Gibson are essentially devoid of carbonate and have very low ANC, it is therefore likely that the actual acid buffering capacity at circum neutral conditions will be limited resulting in acid generation from materials with even a very low sulphide content. Therefore, it is KP's opinion that the following criteria should be used to define whether a rock sample is Potentially Acid Forming (PAF) or Non-Acid Forming (NAF) unless further testing (kinetic) shows this to be too conservative. The criteria employed to define whether a rock is PAF or NAF are as follows:

NAF: Sulphide Sulphur $\leq$0.1%. For Sulphide Sulphur >0.1% both a negative NAPP value and an ANC/MPA ratio $\geq$2.0.

PAF: For Sulphide Sulphur $\geq$0.1% any positive NAPP value or a negative NAPP value with an ANC/MPA ratio $\leq$2.0.

The Acid Formation Potential of the samples is shown in Table 3.4.

Table 3.4: Acid Formation Potential Results

	Sample ID	Sulphide Sulphur (%)	NAPP (kg H_2SO_4/t)	ANC/MPA Ratio	Acid Formation Potential
77665	Yellow orange clay	0.001	-3	98.0	NAF
77666	Sericite-quartz-schist	0.067	-10	5.9	NAF
77667	Biotite sericite quartz-schist	0.001	-2	65.4	NAF
77668	Biotite sericite quartz-schist-chert	0.005	-5	32.7	NAF
77669	Grey orange clay	0.001	0	0.0	NAF
77670	Amphibolite	0.750	12	0.5	**PAF**
77671	Yellow brown clay	0.001	0	0.0	NAF
77672	Amphibolite, foliated, pyrite/gossan	1.740	44	0.2	**PAF**
77673	Mottled clay	0.001	-2	65.4	NAF
77674	Amphibolite, foliated, pyrite/gossan	2.160	59	0.1	**PAF**
77675	Grey clay pyrite	2.660	80	0.0	**PAF**
77676	White clay	0.010	-3	9.8	NAF
77677	Amphibolite	1.100	25	0.3	**PAF**

All the fully oxidised samples, with the exception of sample 77675 (grey clay with pyrite) are classified as non acid forming. Sample 77675 (grey clay with pyrite) had a very high sulphide sulphur content of 2.66% resulting in this sample being classified as Potentially acid forming.

Of the fresh rock, the amphibolite samples are all classified as potentially acid forming, therefore all fresh rock sample tested from the Midway and Saratoga deposits have been classified as PAF. The fresh schists from the Capricorn deposit were non acid forming.

3.2 WASTE ROCK NET ACID GENERATION

The net acid generation test gives some confirmation to the acid formation potential criteria selected. It also identifies if the sulphides and carbonates contained in the samples are readily available to produce or consume acid. The pH after standing overnight gives an indication of the relative reactivity of the sulphides and carbonates especially where the MPA and the ANC values are small. The results of the NAG test work are shown in Table 3.5.

Table 3.5: Net Acid Generation Test Results

	Sample ID	pH on standing overnight	pH after boiling for 2 - 3 hours	pH after CuCl addition	NAG (kg H_2SO_4/t)
77665	Yellow orange clay	5.8	6.3	6.1	0.5
77666	Sericite-quartz-schist	6.7	8.7	*	0.0
77667	Biotite sericite quartz-schist	5.6	5.9	5.5	0.5
77668	Biotite sericite quartz-schist-chert	5.8	6.1	6.2	1.5
77669	Grey orange clay	5.2	5.2	5.3	1.0
77670	Amphibolite	3.3	3.7	3.5	9.0
77671	Yellow brown clay	4.3	4.2	4.0	3.0
77672	Amphibolite, foliated, pyrite/gossan	3.1	3.2	3.1	20.5
77673	Mottled clay	5.6	6.5	6.2	0.5
77674	Amphibolite, foliated, pyrite/gossan	2.5	2.6	2.8	42.5
77675	Grey clay pyrite	2.4	2.4	2.5	62.5
77676	White clay	5.4	5.4	4.9	1.5
77677	Amphibolite	2.7	2.8	2.9	16.0

* No Copper addition required.

All samples exhibited a pH of below 7 after standing overnight, with the amphibolite and pyrite clay samples exhibiting pH of <3.5. This indicates that the rate of sulphide oxidation exceeds the rate of neutralisation by carbonates or other minerals under strongly oxidising condition.

Even upon boiling, only a single sample of schist had a pH above pH 7 indicating that the buffering capacity of the minerals which are available to neutralise the acidity is very limited.

All the samples which had been classified as PAF produced acid during the NAG test. The average net acid generation for the samples classified as PAF was 30 kg H_2SO_4/ tonne. The samples which had been classified as NAF produced an average of 1.1 kg H_2SO_4/tonne. These results suggest that the criteria selected for the classification are appropriate.

3.3 WASTE ROCK MULTI-ELEMENT ANALYSIS

The multi-element analysis showed the samples to have a relative high number of elemental enrichments. The results of the multi-element analysis and the geochemical abundance indices are shown in Table 3.6.

The samples of fresh schist from the Capricorn deposit have the lowest number of elemental enrichments, being only slightly enriched (GAI ≤3) in silver, boron, bismuth and copper. The oxidised clays from Capricorn are slightly enriched in silver, arsenic, boron, bismuth, chromium, copper, iron and antimony. The results of the multi element analysis and the corresponding geochemical abundance indices for all enriched elements are shown in Table 3.6, with complete multi-element results given in Appendix A.

The samples from Midway all had at least one element highly enriched (GAI >3). Sample 77669, fully oxidised grey orange clay, was the least enriched, of the samples tested, being highly enriched in antimony and slightly enriched in arsenic, boron, bismuth and insignificantly enriched in lead. The remaining clay sample and the two amphibolite samples from Midway were slightly to highly enriched in a range of elements as shown in Table 3.6.

The samples from Saratoga were all highly enriched with two or more elements, with all samples being highly enriched (GAI >3) in bismuth and slightly or highly enriched in silver, boron, and antimony. Both the fresh and fully oxidised samples showed a similar level of enrichments. The results are shown in Table 3.6

Assay Results		Element	Ag	As	B*	Bi	Cd	Co	Cr	Cu	Fe	Mo	Pb	Sb	Se	Sn	V	Zn
		Detection Limit	0.1	1	50	0.01	0.1	0.1	2	1	0.01	0.1	2	0.05	0.01	0.1	2	1
		Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
77665	Yellow orange clay, Fully oxidised	Capricorn	0.3	5	131	0.51	0.2	25.4	222	207	14.84	1.5	13	0.84	0.13	1.8	527	138
77666	Sericite-quartz-schist, Fresh	Capricorn	0.2	1	81	0.19	0.1	6.1	8	59	1.53	0.8	6	0.21	0.07	0.5	21	26
77667	Biotite sericite +/-quartz-schist, Fresh	Capricorn	0.2	1	148	0.59	0.1	4.3	24	137	4.92	0.6	9	0.22	0.10	0.5	60	20
77668	Biotite sericite +/-quartz-schist-chert, Fresh	Capricorn	0.1	1	50	0.08	0.1	3.3	12	23	1.33	0.4	5	0.16	0.03	0.5	22	26
77669	Grey orange clay, Fully oxidised	Midway	0.1	20	76	0.46	0.1	0.9	19	33	1.01	0.8	38	3.49	0.05	1.1	86	16
77670	Amphibolite, Fresh	Midway	1.3	23	175	0.81	0.6	45.9	216	95	9.83	1.1	26	3.57	0.21	1.5	386	129
77671	Yellow brown clay, Fully oxidised	Midway	0.1	33	182	3.42	0.1	9.7	170	366	9.80	2	96	6.06	0.47	4.2	640	123
77672	Amphibolite, foliated, pyrite/gossan, Fresh	Midway	1.0	12	50	1.93	0.5	57.6	260	132	8.56	1.5	40	1.34	0.33	1.7	282	142
77673	Mottled clay, Fully oxidised	Saratoga	0.9	6	50	1.27	0.3	4.9	246	217	2.55	0.9	40	4.35	0.20	2.6	565	30
77674	Amphibolite, foliated, pyrite/gossan, Fresh	Saratoga	1.3	3	50	6.06	0.5	56.1	32	255	9.97	0.5	26	1.12	0.49	1.5	252	131
77675	Grey clay pryite, Fully oxidised	Saratoga	1.3	3	50	2.86	3.5	84.0	32	449	5.17	1.8	43	3.84	0.42	2.5	597	420
77676	White clay, Fully oxidised	Saratoga	1.1	5	144	5.14	0.2	2.0	115	77	1.11	3.6	139	4.37	0.01	4.7	396	17
77677	Amphibolite, Fresh	Saratoga	0.7	18	50	1.59	0.7	26.3	5	141	7.05	1.8	29	3.56	0.29	1.5	121	121

Average Crustal Abundance	Element	Ag	As	B*	Bi	Cd	Co	Cr	Cu	Fe	Mo	Pb	Sb	Se	Sn	V	Zn
	Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
	Average Crustal Abundance	0.07	1.5	10	0.048	0.11	20	100	50	4.1	1.5	14	0.2	0.1	2.2	160	75

Geochemical Abundance Index (GAI).			Ag	As	B*	Bi	Cd	Co	Cr	Cu	Fe	Mo	Pb	Sb	Se	Sn	V	Zn
77665	Yellow orange clay, Fully oxidised	Capricorn	2	1	3	3	0	0	1	1	1	0	0	1	0	0	1	0
77666	Sericite-quartz-schist, Fresh	Capricorn	1	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0
77667	Biotite sericite +/-quartz-schist, Fresh	Capricorn	1	0	3	3	0	0	0	1	0	0	0	0	0	0	0	0
77668	Biotite sericite +/-quartz-schist-chert, Fresh	Capricorn	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
77669	Grey orange clay, Fully oxidised	Midway	0	3	2	3	0	0	0	0	0	0	1	[redacted]	0	0	0	0
77670	Amphibolite, Fresh	Midway	[redacted]	3	[redacted]	3	2	1	1	0	1	0	0	[redacted]	0	0	1	0
77671	Yellow brown clay, Fully oxidised	Midway	0	[redacted]	[redacted]	[redacted]	0	0	0	2	1	0	2	[redacted]	2	0	1	0
77672	Amphibolite, foliated, pyrite/gossan, Fresh	Midway	3	2	2	[redacted]	2	1	1	1	0	0	1	2	1	0	0	0
77673	Mottled clay, Fully oxidised	Saratoga	3	1	2	[redacted]	1	0	1	2	0	0	1	[redacted]	0	0	1	0
77674	Amphibolite, foliated, pyrite/gossan, Fresh	Saratoga	[redacted]	0	2	[redacted]	2	1	0	2	1	0	0	2	2	0	0	0
77675	Grey clay pryite, Fully oxidised	Saratoga	[redacted]	0	2	[redacted]	[redacted]	1	0	3	0	0	1	[redacted]	1	0	1	2
77676	White clay, Fully oxidised	Saratoga	3	1	3	[redacted]	0	0	0	0	0	1	3	[redacted]	0	1	1	0
77677	Amphibolite, Fresh	Saratoga	3	3	2	[redacted]	2	0	0	1	0	0	0	[redacted]	1	0	0	0

Notes:
Only elements with enrichments shown, complete assay results included in appendix A.
* Detection limit above average crustal abundance.

[redacted] = Slighty enriched GAI ≤3
[redacted] = Highly enriched GAI >3

3.4 WASTE ROCK MINERALOGICAL RESULTS

The results of the mineralogical analysis are summarised in Table 3.7, with the full results included in Appendix A. The fresh samples were found to be predominantly comprised of quartz, plagioclase and hornblende with accessory to trace amounts mica, clay and hydroxides. The fully oxidised samples were found to be composed predominantly of quartz and kaolin with accessory micas.

The quantities of sulphides identified correlate reasonable well with the sulphide contents calculated from the sulphur species analyses. The sulphide minerals identified were pyrite, pyrrhotite, chalcopyrite and marcasite, which are all considered reactive sulphides.

Carbonate (calcite) was only identified in a single sample, 77666 a sericite schist from Capricorn.

Deposit	Capricorn				Midway				Saratoga				
Sample	77665	77666	77667	77668	77669	77670	77671	77672	77673	77674	77675	77676	77677
Description	Clay (YO)	Sericite-quartz-schist, Fresh	Biotite sericite quartz-schist, Fresh	Biotite sericite quartz-schist-chert, Fresh	Clay (OG)	Amphibolite, Fresh	Clay (YB)	Amphibolite, foliated, pyrite, Fresh	Mottled clay	Amphibolite, foliated, pyrite, Fresh	Clay pryite	Clay (W)	Amphibolite Fresh
Pyrite		Trace				1%		2 - 3%		<1%	1%		2 - 3%
Pyrrhotite		Trace				1 - 2%		2 - 3%					
Chalcopyrite						<1%		<1%		Trace	<1%		<1%
Marcasite								<1%					<<1%
Carbonate		Trace											
Quartx	Minor	Major	Dominant	Dominant	Dominant	Accessory	Major	Minor	Major	Minor	Major	Major	Major
Ca Amphibole													
Mg Fe Amphibole										Major			
Plagioclase		Major		Minor		Major				Major	Major		Major
K Feldspar		Accessory		Accessory									
Bitotite		Accessory		Accessory		Accessory				Accessory	Accessory		Minor
Muscovite		Accessory	Accessory	Accessory	Accessory		Trace			Accessory			
Clinozoisite		Accessory				Accessory		Minor		Accessory	Accessory		Accessory
Mica												Accessory	
Hornblende						Dominant		Major		Minor	Minor		Minor
Chlorite		Accessory		Accessory			Trace			Accessory			Accessory
Kaolin	Dominant		Major	Accessory	Accessory		Dominant		Dominant		Minor	Dominant	
Goethite	Minor		2 - 3%	<1%	<1%		3 - 5%		<1%			<1%	
Ilmenite	1%					1 - 2%	1 - 2%			<1%	<1%		1 - 2%
Leucoxene												2 - 3%	
Rutile											<1%		
Haematite													
Magnetite						1 - 2%		<1%	1%				2 - 3%

Dominant = >50%, Major = 20-50%, Minor = 10-20%, Accessory = 1-10%, Trace =<1%

4. RESULTS OF TAILINGS GEOCHEMICAL CHARACTERISATION

4.1 TAILINGS ACID BASE ACCOUNTING

4.1.1 Paste pH and Conductivity

The samples of tailings were found to have circum neutral paste pH ranging from 7.1 to 7.5. The electrical conductivity of all three samples was high ranging 15.9 mS/cm in the tailings sample from TD1 to 36.2 mS/cm in the tailings sample from TD2.

The paste pH and conductivities are shown in Table 4.1.

Table 4.1: Paste pH and Conductivity

Sample	Location	Paste pH	Electrical Conductivity (mS/cm)
77662	Tailings Storage Facility 1 (TD1)	7.1	15.90
77663	Tailings Storage Facility 2 (TD2)	7.4	36.20
77664	Orion 4 in-pit tailings facility	7.5	25.40

4.1.2 Sulphur Forms and Maximum Potential Acidity

The tailings samples had moderate to high total sulphur contents of 2.3%, 0.95% and 0.78% for the tailings samples from TD1, TD2 and Orion 4 pit respectively. The tailings samples had moderate sulphate sulphur contents of 0.23%, 0.79% and 0.18% for the tailings samples from TD1, TD2 and Orion 4 pit respectively. Assuming the remaining sulphur was present as sulphide sulphur then the tailings samples had maximum potential acidities of 63, 4.8 and 18.4 Kg H_2SO_4/tonne for the tailings samples from TD1, TD2 and Orion 4 pit respectively

The results of the analysis are shown in Table 4.2.

Table 4.2: Sulphur forms and Maximum Potential Acidity Results

Sample	Location	Total Sulphur (%)	Sulphate Sulphur (%)	Calculated Sulphide Sulphur (%)	Calculated MPA (kg H2SO4/t)
77662	Tailings Storage Facility 1 (TD1)	2.290	0.23	2.060	63.0
77663	Tailings Storage Facility 2 (TD2)	0.948	0.79	0.158	4.8
77664	Orion 4 in-pit tailings facility	0.782	0.18	0.602	18.4

4.1.3 Carbon Forms and Acid Neutralising Capacity

Total carbon content of the tailings samples was low and ranged from 0.19 to 0.21%, however all of the samples contained significant non-carbonate carbon. The calculated "carbonate" carbon therefore ranged from 0.12 to 0.14%. The mineralogical analysis only identified carbonates (calcite) in sample 77662 from TD1.

The tailings samples had Acid Neutralising Capacities of 8, 16 and 13 kg H_2SO_4 per tonne for the tailings samples from TD1, TD2 and Orion 4 pit respectively. The low ANC can be attributed to the low carbonate content and the limited buffering capacity of the silicate minerals and clays. The results of the total carbon, non-carbonate carbon and ANC test work are presented in Table 4.3.

Table 4.3: Carbon forms and Acid Neutralising Capacity Results

Sample	Location	Total Carbon (%)	Non carbonate Carbon (%)	Calculated carbonate Carbon (%)	ANC (kg H_2SO_4/t)
77662	Tailings Storage Facility 1 (TD1)	0.190	0.060	0.130	8.00
77663	Tailings Storage Facility 2 (TD2)	0.210	0.070	0.140	16.00
77664	Orion 4 in-pit tailings facility	0.200	0.080	0.120	13.00

4.1.4 Acid Formation Potential

The acid formation potential of the tailings samples was calculated from the sulphide sulphur content, the Maximum Potential Acidity and the Acid Neutralising Capacity.

There are no universally agreed criteria that define whether a rock is Potentially Acid Forming (PAF) or Non-Acid Forming (NAF). The criteria defined below are consistent with the current industry standards generally employed in Western Australia.

NAF: Sulphide Sulphur <0.3%. For Sulphide Sulphur >0.3% both a negative NAPP value and an ANC/MPA ratio >2.0.

PAF: For Sulphide Sulphur >0.3% any positive NAPP value or a negative NAPP value with an ANC/MPA ratio <2.0.

The Acid Formation Potential of the samples is shown in Table 4.4.

Table 4.4: Acid Formation Potential Results

Sample	Location	Sulphide Sulphur (%)	NAPP (kg H_2SO_4/t)	ANC/MPA Ratio	Acid Formation Potential
77662	Tailings Storage Facility 1 (TD1)	2.060	55	0.1	PAF
77663	Tailings Storage Facility 2 (TD2)	0.158	-11	3.3	NAF
77664	Orion 4 in-pit tailings facility	0.602	5	0.7	PAF

The results indicate that the tailings sample from TD1 would be classified as PAF with a high capacity to form acid, the tailings sample from TD2 would be classified as NAF, with a low neutralising capacity and the tailings sample from Orion 4 in-pit facility would be classified and PAF with a low capacity to form acid.

4.2 TAILINGS NET ACID GENERATION

The net acid generation test gives some confirmation to the acid formation potential criteria selected. It also identifies if the sulphides and carbonates contained in the samples are readily available to produce or consume acid. The pH after standing overnight gives an indication of the relative reactivity of the sulphides and carbonates especially where the MPA and the ANC values are small. The results of the NAG test work are shown in Table 4.5.

Table 4.5: Net Acid Generation Test Results

Sample	Location	pH on standing overnight	pH after boiling for 2 - 3 hours	pH after CuCl addition	NAG (kg H_2SO_4/t)
77662	Tailings Storage Facility 1 (TD1)	2.7	2.8	2.8	37.5
77663	Tailings Storage Facility 2 (TD2)	7.0	7.5	*	0.0
77664	Orion 4 in-pit tailings facility	4.2	4.3	4.0	2.5

* No Copper addition required.

The sample from TD2 which was classified as NAF was at pH 7.0 after standing and increased to pH 7.5 after boiling and had no detectable net acid generation.

The sample from TD1 which was classified as PAF high capacity had a pH of 2.7 after standing overnight which only increased to pH 2.8 upon boiling suggesting minimal neutralising capacity even under extreme condition. This sample produced 37.5 kg H_2SO_4/tonne slightly less than predicted from the NAPP test results.

The sample from Orion 4 in-pit which was classified as PAF low capacity had a pH of 4.2 after standing overnight which only increased to pH 4.3 upon boiling, suggesting minimal neutralising capacity even under extreme condition. This sample produced 2.5 kg H_2SO_4/tonne slightly less than predicted from the NAPP test results.

These results suggest that the criteria selected for the classification are appropriate.

4.3 TAILINGS MULTI-ELEMENT ANALYSIS

The multi-element analysis showed the samples to have a relative high number of elemental enrichments. The results of the multi-element analysis and the geochemical abundance indices are shown in Table 4.6.

The sample from TD1 had the highest number of elemental enrichments with significant enrichment (GAI >3) in silver, arsenic, bismuth, cadmium, lead and antimony and slight enrichment (GAI ≤3) in boron, cobalt, copper, iron, selenium and zinc.

The sample from TD2 was significantly enriched in bismuth only but was slightly enriched in silver, arsenic, boron, cadmium, chromium, copper, iron, lead, antimony, selenium and zinc.

The sample from the Orion 4 in-pit storage facility was significantly enriched in arsenic and bismuth and slightly enriched in silver, boron, cadmium, chromium, copper, iron, lead, antimony, selenium, and zinc.

Assay Results		Element	Ag	As	B*	Bi	Cd	Co	Cr	Cu	Fe	Pb	Sb	Se	Zn
		Detection Limit	0.1	1	50	0.01	0.1	0.1	2	1	0.01	2	0.05	0.01	1
		Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm
77662	Tailings Storage TD1	Tailings	5.0	57	50	11.74	5.9	56.0	208	729	10.26	368	6.65	0.36	516
77663	Tailings Storage TD2	Tailings	0.7	20	50	4.35	1.8	37.8	298	335	9.17	111	2.87	0.45	234
77664	Orion 4 In-pit storage	Tailings	0.9	46	50	5.21	1.7	41.6	337	387	9.40	130	3.26	0.39	310

Average Crustal Abundance	Etement	Ag	As	B*	Bi	Cd	Co	Cr	Cu	Fe	Pb	Sb	Se	Zn
	Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg
	Abundance	0.07	1.5	10	0.048	0.11	20	100	50	4.1	14	0.2	0.1	75

Geochemical Abundance Index (GAI).		Element	Ag	As	B*	Bi	Cd	Co	Cr	Cu	Fe	Pb	Sb	Se	Zn
77662	Tailings Storage TD1	Tailings			2			1	0	3	1			1	2
77663	Tailings Storage TD2	Tailings	3	3	2		3	0	1	2	1	2	3	2	1
77664	Orion 4 In-pit storage	Tailings	3		2		3	0	1	2	1	3	3	1	1

Notes:

Only elements with enrichments shown, complete assay results included in appendix A.

* Detection limit above average crustal abundance.

= Slighty enriched GAI ≤3

= Highly enriched GAI >3

4.4 TAILINGS MINERALOGICAL RESULTS

The results of the mineralogical analysis are summarised in Table 4.7, with the full results included in Appendix A. The tailings samples were found to be predominantly comprised of quartz, calc amphibole with kaolin and chlorite.

The quantities of sulphides identified correlate reasonable well with the sulphide contents calculated from the sulphur species analyses. The only sulphide mineral identified was pyrite, which is considered a reactive sulphides.

Carbonate (calcite) was only identified in a the sample from TD1 in trace amounts.

Table 4.7: Tailings Mineralogical Results

	TD1 (77662)	TD2 (77663)	Orion 4 In-pit (77664)
Pyrite	1%	Trace	<1%
Carbonate	Trace		
Quartz	Major	Accessory	Major
Ca Amphibole	Minor	Minor	Accessory
Mg Fe Amphibole			Accessory
Plagioclase	Accessory		
Biotite	Accessory	Accessory	Accessory
Muscovite	Accessory	Accessory	Accessory
Clinozoisite	Accessory		Accessory
Chlorite	Minor		Major
Kaolin		Dominant	Accessory
Goethite	1%	<1%	<1%
Ilmenite	<1%		<1%
Haematite			<1%
Magnetite	<1%	<1%	

5. IMPLICATIONS FOR WASTE DUMP DESIGN

5.1 GENERAL

The waste rocks from the fresh zones of Midway and Saratoga have been classified as PAF and all contain significant elemental enrichments. The waste rocks from the fresh zones of Capricorn pit has been classified as NAF, however the waste rock is slightly enriched in a range of elements.

All the oxide material tested, with the exception of one sample, was found to be NAF, however the samples had a range of elemental enrichments and had moderate to high paste electrical conductivity, with most exhibiting low paste pH.

No testing of the overlying lateritic deposits has been conducted but for the purpose of this study and based on Knight Piésold's previous experience with laterite in Western Australia, they are assumed to be NAF with moderate salinity and circum neutral paste pH.

5.2 CONSIDERATION FOR NEW WASTE DUMP DESIGN

The main objective in the design of the waste dumps is to limit the environmental impacts caused by the formation of acid or the leaching of environmentally significant elements. To achieve this objective, the waste dumps will have to be engineered to control the flow of water into the dump limiting the potential pathway for acid and environmentally significant elements. The actual design of the waste dump is beyond the scope of work of this report however the following is intended to highlight the key issues to be considered in the design of the waste dumps.

Although the waste materials from Capricorn pit have been classified as NAF they are enriched in several environmentally significant elements. No test work has yet been conducted on the potential leachability of these elements and until such test work is conducted it should be conservatively assumed that there is the potential for these elements to be leached from the waste. Therefore, the design considerations outlined below are to be applied to all three deposits.

The semi-arid climate at the site will limit the effectiveness of an oxygen diffusion barrier as the low rainfall and high evaporation will result in the layer becoming unsaturated allowing oxygen diffusion. Therefore, the waste dumps should be designed to limit the inflow of water, preventing the formation of acid drainage or contaminated seepage. To prevent the inflow of water, the waste dumps should

incorporate a non acid generating low permeability zone to limit the inflow of water into the dump or a suitably thick cover layer with sufficient store and release capacity to prevent water percolating into the waste. The zone should be constructed to completely encapsulate any potentially acid generating material.

During operations it is not practical to have all the acid generating material completely encapsulated and therefore there is the potential for precipitation to come into the contact with the waste. All possible measures to limit the infiltration of water in to the waste should be adopted, these should include the following:

- Shaping the dumps to shed water.
- Construction of temporary covers over areas which are not being used for active dumping.
- Sumps and pumps should be used to remove water from areas which cannot be shaped to shed water.

The waste dumps should also be designed to allow for the collection of seepage from the base of the dump as this seepage has the potential to be highly contaminated. During operations this seepage should be actively collected and directed, where practicable, into the process water flow. Ongoing work should be conducted through the life of mine to estimate post closure water qualities and flows to allow a post closure treatment option to be devised.

Due to the high elemental enrichments in the waste, dust mitigation measures will be required during all waste handling and dumping operations. An allowance for dust control should be included in the operating costing.

It is recommended that regular testing of the waste is conducted throughout the life of the project to ensure that any changes in waste characteristics are detected and testing undertaken to determine that the new waste types are not significantly different from those reported here.

5.3 CONSIDERATIONS FOR EXISTING WASTE DUMPS

The existing waste dumps have been constructed as water harvesting structures and have been seeded with native species. The revegetation has generally been successful with good vegetation regrowth, however the flora is generally restricted to salt tolerant salt bush and blue bush.

Only the Deep South waste dump is showing evidence of acid formation, therefore this will need to be addressed to limit the potential environmental impacts related to the acidic seepage or if lease relinquishment is required.

There was no evidence of acid seepage occurring at any of the other waste dumps, during Knight Piésold's site inspection. This could be due to a number of factors however investigation into the existing dumps is beyond the scope of this report:

- The dumps may not contain acid forming material.
- The store and release potential (as evaporation) of the outer surface of the dumps may be sufficient to prevent precipitation penetrating the waste dumps.
- Seepage may be entering the groundwater and not be evident on surface.

It is therefore recommended that the groundwater and surface water around the existing waste dumps is monitored and that a remediation plan for Deep South is developed.

5.4 CONSIDERATIONS FOR WASTE DUMP REHABILITATION

The test work conducted on the waste rocks indicate that the saprolitic clays are non acid generating but have high salinity and low paste pH. These clays will therefore not be suitable for use as the outer facing of the waste dumps if revegetation of the waste dumps is proposed. Further testing of the overlying lateritic deposits is recommended to find a suitable growth medium in which to establish vegetation.

6. IMPLICATIONS FOR TAILINGS STORAGE REHABILITATION

6.1 GENERAL

The tailings samples from all existing storages at the site had circum neutral past pH but were highly saline. The tailings samples from both TD1 and the Orion 4 in-pit tailings storage facility were classified as potentially acid generating, with the tailings sample for TD2 classified as non acid forming. All three tailings samples had significant enrichments at least one element. No test work has yet been conducted on the potential leachability of these elements and until such test work is conducted, it should be conservatively assumed that there is the potential for these elements to be leached from the tailings. Therefore the rehabilitation design considerations outlined below are to be applied to all three tailings storage facilities.

Samples of the proposed tailings to be produced at the site are still undergoing geochemical characterisation by Graham Campbell and Associates and as such the tailings should be considered as potentially acid generating until this test work has been completed.

6.2 CONSIDERATIONS FOR TAILINGS STORAGE TD1 AND ORION 4 REHABILIATION

It is proposed to rehabilitate tailings storage TD1 and the Orion 4 in-pit tailings storage facility as part of future mining operations.

At present the majority of TD1 has been covered with an estimated 2 m of mine waste and has been shaped to be water harvesting. The tailings in TD1 have been shown to be potentially acid generating and therefore this cover configuration is considered only marginally suitable. To ensure the cover is suitable, further work would be required to estimate the store and release potential of the cover to ensure that precipitation is not percolating down into the tailings profile. Should testing indicate that the store and release potential of the cover is sufficient then the only additional work required would be to cover the remaining areas of the facility. If the additional testing indicates that the cover is unsuitable additional rehabilitation work would be required.

The Orion 4 in-pit tailings storage facility currently has not been rehabilitated and has limited ponded water on the surface. The ponded water on the facility should be removed as soon as practical to reduce the hydraulic head in the facility and to speed up the desiccation and consolidation of the tailings in the facility. When the facility has sufficient bearing capacity to support earthmoving equipment, rehabilitation should commence. Further work will be required to design a suitable cover system for the

facility which is beyond the scope of this report. However it is recommended that suitably qualified geotechnical consultants and rehabilitation experts are consulted as rehabilitation of in-pit facilities is more complex than most other rehabilitation projects.

6.3 CONSIDERATIONS FOR TAILINGS STORAGE TD2 REHABILIATION

It is proposed to recommence deposition into TD2 on recommencement of mining. Therefore the rehabilitation design should take into consideration the existing tailings in the facility and any future tailings to be produced.

The main objective in the rehabilitation design of the tailings storage facilities is to limit the environmental impacts caused by the formation of acid or the leaching of environmentally significant elements, and to form a stable non eroding landform. To achieve this objective the rehabilitation design will control the flow of water into the tailings bed, limiting the potential pathway for acid and environmentally significant elements. It will also promote the revegetation of the facility to stabilise the facing soils and prevent long term erosion.

The actual rehabilitation design of the tailings storage is beyond the scope of work of this report, however the following is intended to highlight the key issues to be considered in the rehabilitation design.

All tailings samples were found to be highly saline, therefore it is likely that future tailings will be highly saline, eliminating the possibility of direct revegetation of the tailings beach. A capillary break should be included in any rehabilitation design to prevent the upward migration of salts from the tailings bed into any capping layer.

To limit the potential for long term contaminated seepage, the top surface of the facility should be shaped to form water shedding surface or to have sufficient store and release capacity to prevent water percolating through the cover. If this is found to be impractical and water cannot be directed off the facilities, a low permeability cap will be required to prevent the ingress of water into the facilities. Detailed modelling of various cap designs and of the seepage through the cap will be required to ensure that any design prevents seepage of water into the tailings.

Seepage from the base of the facility should be removed and treated for as long as practical or until the flow has reduced to an acceptable level at which point all potential conduits for seepage, such as underdrainage outfalls and decant outfalls should be sealed.

The final surface of the facility should be covered in a non dispersive growth medium and seeded with native species. To increase the rehabilitation success, various growth mediums, ripping techniques and species should be trialled throughout the life of mine.

7. CONCLUSIONS AND RECOMMENDATIONS

The main conclusions and recommendation of the geochemical characterisation of the waste rock and tailings from the Mount Gibson Gold Project can be summarised as follows:

7.1 WASTE ROCK

Waste rock samples from three desposits, Capricorn, Saratoga and Midway, were tested for acid generating potential and multi-element analysis yielding the following results:

- All sample of fresh waste rock from Saratoga and Midway were found to be potentially acid generating, with sulphide sulphur contents of between 0.75% and 2.12% with low neutralising capacities of between 7 and 11 kg H_2SO_4.tonne. All waste rock samples from Saratoga and Midway were found to have a relatively high number of enrichments in environmentally significant elements.

- All samples of fresh waste rock from Capricorn deposit were found to be non acid generating, with sulphide sulphur contents of between 0 and 0.067% with acid neutralising capacities of between 2 and 12 kg H_2SO_4/tonne. All fresh waste rock samples were found to be slightly enriched in a range of environmentally significant elements.

- A single sample of oxide material (grey pyrite clay - Saratoga) was found to be potentially acid generating, all other samples of oxide material were classified as non acid forming. All samples of oxide material were found to be enriched in a range of environmentally significant elements.

- The paste pH and electrical conductivity results suggest that any seepage from the waste dumps is likely to be of poor quality.

- It is recommended that the potential metal leaching from waste is examined by way of water extraction testing of NAF waste and humidity cell or column leaching of PAF waste. Dust control measures should be implemented during waste handling operations to minimise the spread of dust containing elevated levels environmentally significant elements.

- The waste dumps are to be engineered to minimise infiltration of precipitation into the waste and seepage from the base of the waste dumps should be collected and treated.

- It is recommended that regular testing of the waste is conducted throughout the life of the project to ensure that any changes in waste characteristics are detected and testing undertaken to determine that the new waste types meet the required criteria.

- Consideration should be given to detailed waste movement scheduling and stockpiling to reduce any rehandling and limit environment impacts. It is recommended that the use of NAF waste rock from Capricorn as a cover material for PAF waste is examined.

7.2 TAILINGS

Three samples of tailings from the existing tailings storage facilities at the site, TD1, TD2 and Orion 4 in-pit storage facility, were subjected to geochemical testing yielding the following results:

- The tailings samples from TD1 and Orion 4 in-pit storage facility were classified as potentially acid forming. The sulphide sulphur contents were 2.06% and 0.6% for the samples from TD1 and Orion 4 respectively. The acid neutralising capacity was 8 and 13 kg H_2SO_4 per tonnes for the samples from TD1 and Orion 4 respectively.

- The tailings sample from Tailings Storage TD1 was further classified as potentially acid forming with a high capacity as a result of a net acid prodcucing potential of 55 kg H_2SO_4/tonne. The tailings sample from Orion 4 was further classified as potentially acid forming low capacity as a result of a net acid prodcucing potential of 5 kg H_2SO_4/tonne.

- The tailings samples from TD1 and Orion 4 were found to be enriched in a range of environmentally significant elements.

- The tailings sample from TD2 was found to be non acid forming however it was enriched in a range of environmentally significant elements.

- All tailings samples were found to be highly saline.

- The rehabilitation design of the tailings storage facilities should incorporate a capillary break and should include measures to reduce the inflitration of water into the tailings bed.

8. REFERENCES

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APPENDIX A

LABORATORY RESULTS

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Analytical Report

JOB INFORMATION

JOB CODE	: 752.0/0301210
No. of SAMPLES	: 16
No. of ELEMENTS	: 42
CLIENT O/N	: PE801-00024/3
SAMPLE SUBMISSION No.	:
PROJECT	:
STATE	: Various
DATE RECEIVED	: 14/03/2003
DATE COMPLETED	: 08/04/2003
DATE PRINTED	: 08/04/2003

LEGEND

'X'	= Less than Detection Limit
'N/R'	= Sample Not Received
'*'	= Result Checked
'( )'	= Result still to come
'I/S'	= Insufficient Sample for Analysis
'E6'	= Result X 1,000,000
'UA'	= Unable to Assay
'>'	= Value beyond Limit of Method

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SAMPLE DETAILS

DISCLAIMER

Genalysis Laboratory Services Pty Ltd wishes to make the following disclaimer pertaining to the accompanying analytical results.

Genalysis Laboratory Services Pty Ltd disclaims any liability, legal or otherwise, for any inferences implied from this report relating to either the origin of, or the sampling technique employed in the collection of, the submitted samples.

SIGNIFICANT FIGURES

It is common practice to report data derived from analytical instrumentation to a maximum of two or three significant figures. Some data reported herein may show more figures than this. The reporting of more than two or three figures in no way implies that the third, fourth and subsequent figures may be real or significant.

Genalysis Laboratory Services Pty Ltd accepts no responsibility whatsoever for any interpretation by any party of any data where more than two or three significant figures have been reported.

SAMPLE STORAGE DETAILS

GENERAL CONDITIONS

SAMPLE STORAGE OF SOLIDS

Bulk Residues and Pulps will be stored for 60 DAYS without charge. After this time all Bulk Residues and Pulps will be stored at a rate of $1.50 per cubic metre per day until your written advice regarding collection or disposal is received. Expenses related to the return or disposal of samples will be charged to you at cost. Current disposal cost is charged at $50.00 per cubic metre.

SAMPLE STORAGE OF SOLUTIONS

Samples received as liquids, waters or solutions will be held for 60 DAYS free of charge then disposed of, unless written advice for return or collection is received.

NOTES

1. Please Note

An extra sample numbered 77677 was received with this consignment and has been assayed with this job as per D. Martin and T. Rowles instructions.

The results reported below have been analysed using the dried and prepared material apart from the results for the pH and EC which have been determined on the sample as received. The moisture content of the sample have been reported as LOD.

The weight of sample used for the NAG determination has been reported as WT:/WGHT in the report. The volume of peroxide used was 250ml.

The three pH results reported are as follows:
pH W/METER : pH after standing overnight
pH X/METER : pH after boiling and re-voluming to 250ml
pH X2/METER : pH after addition of CuCl2 where required.

ANALYSIS

ELEMENTS	Ag	Al	As	B	Ba	Bi
UNITS	ppm	ppm	ppm	ppm	ppm	ppm
DETECTION	0.1	20	1	50	0.1	0.01
DIGEST	A/	A/	A/	D/	A/	A/
ANALYTICAL FINISH	MS	OES	MS	OES	MS	MS
SAMPLE NUMBERS						
0001 77662	5.0	7.36%	57	X	186.9	11.74
0002 77663	0.7	10.30%	20	X	242.2	4.35
0003 77664	0.9	9.55%	46	X	256.5	5.21
0004 77665	0.3	12.13%	5	131	60.2	0.51
0005 77666	0.2	8.13%	X	81	291.0	0.19
0006 77667	0.2	10.14%	X	148	284.2	0.59
0007 77668	X	7.27%	X	X	527.8	0.08
0008 77669	0.1	8.19%	20	76	282.1	0.46
0009 77670	1.3	7.79%	23	176	94.1	0.81
0010 77671	0.1	11.23%	33	182	61.1	3.42
0011 77672	1.0	7.53%	12	X	325.4	1.93
0012 77673	0.9	14.30%	6	X	72.5	1.27
0013 77674	1.3	7.89%	3	X	249.1	6.06
0014 77675	1.3	9.82%	3	X	162.5	2.86
0015 77676	1.1	13.69%	5	144	56.1	5.14
0016 77677	0.7	6.68%	18	X	276.3	1.59
CHECKS						
0001 77662	5.4	7.41%	57	X	182.5	10.19
STANDARDS						
0001 AE11						
0002 ASPAC-30						
0003 HgSTD						
0004 LECO2						
0005 PD-1						
0006 SO-2						
0007 SY-4	0.5	9.95%	X		326.7	0.02
0008 TKC2				858		
BLANKS						
0001 Control Blank	X	X	X	X	0.1	X

ANALYSIS

ELEMENTS	C	Ca	Cd	Co	Cr	Cu
UNITS	%	ppm	ppm	ppm	ppm	ppm
DETECTION	0.01	10	0.1	0.1	2	1
DIGEST		A/	A/	A/	A/	A/
ANALYTICAL FINISH	/LECO	OES	MS	MS	OES	OES
SAMPLE NUMBERS						
0001 77662	0.19	1.65%	5.9	56.0	208	729
0002 77663	0.21	2.27%	1.8	37.8	298	335
0003 77664	0.20	2.08%	1.7	41.6	337	387
0004 77665	0.09	1009	0.2	25.4	222	207
0005 77666	0.13	3.44%	X	6.1	8	59
0006 77667	0.04	412	X	4.3	24	137
0007 77668	0.03	4351	X	3.3	12	23
0008 77669	0.01	151	X	0.9	19	33
0009 77670	0.15	6.90%	0.6	45.9	216	95
0010 77671	0.04	381	0.1	9.7	170	366
0011 77672	0.30	5.21%	0.5	57.6	260	132
0012 77673	0.04	404	0.3	4.9	246	217
0013 77674	0.29	3.76%	0.5	56.1	32	255
0014 77675	0.19	8921	3.5	64.0	32	449
0015 77676	0.12	860	0.2	2.0	115	77
0016 77677	0.08	3.90%	0.7	26.3	5	141
CHECKS						
0001 77662	0.19	1.63%	6.4	57.6	223	724
STANDARDS						
0001 AE11						
0002 ASPAC-30						
0003 HgSTD						
0004 LECO2	4.37					
0005 PD-1						
0006 SO-2						
0007 SY-4		5.66%	0.9	3.8	5	9
0008 TKC2						
BLANKS						
0001 Control Blank	X	X	X	X	X	1

ANALYSIS

ELEMENTS	F	Fe	Hg	Mg	Mn	Mo
UNITS	ppm	%	ppm	ppm	ppm	ppm
DETECTION	50	0.01	0.01	20	1	0.1
DIGEST	DH/	D/	CM/	A/	A/	A/
ANALYTICAL FINISH	SIE	OES	CVAP	OES	OES	MS
SAMPLE NUMBERS						
0001 77662	283	10.26	0.02	2.43%	1278	1.1
0002 77663	315	9.17	0.01	2.06%	830	1.7
0003 77664	282	9.40	0.02	2.59%	1003	1.6
0004 77665	202	14.84	0.02	3232	347	1.5
0005 77666	173	1.53	0.01	8723	231	0.8
0006 77667	135	4.92	0.01	1456	42	0.6
0007 77668	142	1.33	0.03	4284	122	0.4
0008 77669	107	1.01	0.01	1636	56	0.8
0009 77670	316	9.83	0.01	3.78%	1605	1.1
0010 77671	194	9.80	0.01	1136	245	2.0
0011 77672	257	8.56	0.01	3.08%	1689	1.5
0012 77673	169	2.55	0.01	1037	322	0.9
0013 77674	289	9.97	0.01	4.24%	1719	0.6
0014 77675	303	5.17	0.01	7846	475	1.8
0015 77676	176	1.11	0.01	1157	724	3.6
0016 77677	318	7.05	0.01	1.50%	1716	1.8
CHECKS						
0001 77662	298	9.86	0.02	2.43%	1272	0.9
STANDARDS						
0001 AE11						
0002 ASPAC-30						
0003 HgSTD			0.26			
0004 LECO2						
0005 PD-1						
0006 SO-2	539					
0007 SY-4				3035	812	1.2
0008 TKC2		8.44				
BLANKS						
0001 Control Blank	X	X	X	X	X	X

ANALYSIS

ELEMENTS	P	Pb	S	S	Sb	Se
UNITS	ppm	ppm	ppm	%	ppm	ppm
DETECTION	20	2	10	0.005	0.05	0.01
DIGEST	A/	A/	A/		A/	BP/
ANALYTICAL FINISH	OES	MS	OES	/LECO	MS	MS
SAMPLE NUMBERS						
0001 77662	355	368	2.33%	2.290	6.65	0.36
0002 77663	373	111	9859	0.948	2.87	0.45
0003 77664	342	130	7633	0.782	3.26	0.39
0004 77665	900	13	320	0.032	0.84	0.13
0005 77666	246	6	865	0.087	0.21	0.07
0006 77667	154	9	88	0.010	0.22	0.10
0007 77668	245	5	107	0.005	0.16	0.03
0008 77669	96	38	209	0.021	3.49	0.05
0009 77670	741	26	8764	0.800	3.57	0.21
0010 77671	691	96	1146	0.090	6.06	0.47
0011 77672	374	40	1.88%	1.860	1.34	0.33
0012 77673	302	40	410	0.029	4.35	0.20
0013 77674	379	26	2.31%	2.280	1.12	0.49
0014 77675	384	43	2.89%	2.910	3.84	0.42
0015 77676	141	139	186	0.010	4.37	0.01
0016 77677	1318	29	1.27%	1.250	3.56	0.29
CHECKS						
0001 77662	330	317	2.26%	2.280	6.74	0.37
STANDARDS						
0001 AE11						0.58
0002 ASPAC-30						
0003 HgSTD						
0004 LECO2				2.370		
0005 PD-1						
0006 SO-2						
0007 SY-4	507	9	211		0.10	
0008 TKC2						
BLANKS						
0001 Control Blank	X	X	X	X	0.14	X

ANALYSIS

ELEMENTS	Sn	Sr	Th	Tl	ANC	EC
UNITS	ppm	ppm	ppm	ppm	kgH2SO4/t	mS/cm
DETECTION	0.1	0.05	0.01	0.02	1	0.01
DIGEST	A/	A/	A/	A/		W/
ANALYTICAL FINISH	MS	MS	MS	MS	/VOL	METER
SAMPLE NUMBERS						
0001 77662	1.8	27.77	2.29	0.47	8	15.90
0002 77663	2.5	97.84	4.56	0.35	16	36.20
0003 77664	1.8	51.95	4.25	0.41	13	25.40
0004 77665	1.8	10.78	2.98	0.05	3	2.93
0005 77666	0.5	146.77	1.85	0.20	12	2.40
0006 77667	0.5	5.50	1.60	0.10	2	0.94
0007 77668	0.5	140.92	1.32	0.17	5	0.85
0008 77669	1.1	9.01	7.30	0.21	0	3.81
0009 77670	1.5	86.92	1.70	0.23	11	4.92
0010 77671	4.2	28.87	3.13	0.14	0	4.80
0011 77672	1.7	33.05	1.38	0.48	9	3.90
0012 77673	2.6	12.10	3.93	0.08	2	5.33
0013 77674	1.5	53.99	1.50	0.40	7	4.80
0014 77675	2.5	29.53	4.89	0.58	1	4.31
0015 77676	4.7	9.09	7.08	0.20	3	1.60
0016 77677	1.5	57.71	7.10	0.46	9	5.80
CHECKS						
0001 77662	1.9	28.16	1.76	0.47	8	15.50
STANDARDS						
0001 AE11						
0002 ASPAC-30						
0003 HgSTD						
0004 LECO2						
0005 PD-1						
0006 SO-2						
0007 SY-4	7.0	971.11	0.98	0.26		
0008 TKC2						
BLANKS						
0001 Control Blank	0.2	X	X	X	0	X

ANALYSIS

ELEMENTS	LOD	NAG	S-SO4	TOC+C	WT	pH
UNITS	%	kgH2SO4/t	%	%	g	NONE
DETECTION	0.01	0.5	0.01	0.01	0.001	0.1
DIGEST			SO/	OrgC/		W/
ANALYTICAL FINISH	/GRAV	/VOL	OES	LECO	/WGHT	METER
SAMPLE NUMBERS						
0001 77662	25.89	37.5	0.23	0.06	0.990	7.1
0002 77663	43.50	0.0	0.79	0.07	2.470	7.4
0003 77664	36.72	2.5	0.18	0.06	2.460	7.5
0004 77665	1.67	0.5	0.07	0.09	2.490	6.6
0005 77666	1.44	0.0	0.02	0.06	2.490	9.0
0006 77667	0.40	0.5	0.02	0.01	2.500	7.1
0007 77668	0.09	1.5	X	0.01	2.460	8.3
0008 77669	0.31	1.0	0.02	0.01	2.520	4.4
0009 77670	0.11	9.0	0.05	0.04	2.480	8.0
0010 77671	0.72	3.0	0.13	0.01	2.490	3.5
0011 77672	1.73	20.5	0.12	0.11	2.530	6.3
0012 77673	2.79	0.5	0.04	0.03	2.490	6.8
0013 77674	0.93	42.5	0.12	0.03	0.950	6.7
0014 77675	13.07	62.5	0.25	0.09	1.030	3.9
0015 77676	6.80	1.5	X	0.10	2.530	7.2
0016 77677	0.37	16.0	0.15	0.01	2.510	4.0
CHECKS						
0001 77662		38.0	0.21	0.06	1.030	7.1
STANDARDS						
0001 AE11						
0002 ASPAC-30						4.7
0003 HgSTD						
0004 LECO2						
0005 PD-1			4.38			
0006 SO-2						
0007 SY-4						
0008 TKC2						
BLANKS						
0001 Control Blank		0.0	0.01	0.01		6.5

ANALYSIS

ELEMENTS	pH	pH	pH	U	V	Zn
UNITS	NONE	NONE	NONE	ppm	ppm	ppm
DETECTION	0.1	0.1	0.1	0.01	2	1
DIGEST	X/	X1/	X2/	A/	A/	A/
ANALYTICAL FINISH	METER	METER	METER	MS	OES	OES
SAMPLE NUMBERS						
0001 77662	2.7	2.8	2.8	0.75	292	516
0002 77663	7.0	7.5		1.19	321	234
0003 77664	4.2	4.3	4.0	1.22	294	310
0004 77665	5.8	6.3	6.1	1.26	527	138
0005 77666	6.7	8.7		0.72	21	26
0006 77667	5.6	5.9	5.5	0.99	60	20
0007 77668	5.8	6.1	6.2	0.52	22	26
0008 77669	5.2	5.2	5.3	0.84	86	16
0009 77670	3.3	3.7	3.5	0.56	386	129
0010 77671	4.3	4.2	4.0	1.35	640	123
0011 77672	3.1	3.2	3.1	0.42	282	142
0012 77673	5.6	6.5	6.2	1.61	565	30
0013 77674	2.6	2.8	2.8	0.43	252	131
0014 77675	2.4	2.4	2.5	1.38	597	420
0015 77676	5.4	5.4	4.9	3.18	396	17
0016 77677	2.7	2.8	2.9	1.98	121	121
CHECKS						
0001 77662	2.7	2.8	2.8	0.63	293	523
STANDARDS						
0001 AE11						
0002 ASPAC-30						
0003 HgSTD						
0004 LECO2						
0005 PD-1						
0006 SO-2						
0007 SY-4				0.57	6	97
0008 TKC2						
BLANKS						
0001 Control Blank	4.5	4.5	4.5	X	X	X

METHOD CODE DESCRIPTION

/VOL

No digestion or other pre-treatment undertaken. Analysed by Volumetric Technique.

A/MS

Multi-acid digest including Hydrofluoric, Nitric, Perchloric and Hydrochloric acids in Teflon Beakers. Analysed by Inductively Coupled Plasma Mass Spectrometry.

/GRAV

No digestion or other pre-treatment undertaken. Analysed by Gravimetric Technique

/LECO

No digestion or other pre-treatment undertaken. Analysed by LECO furnace.

/WGHT

No digestion or other pre-treatment undertaken. Weight determination using a Balance

A/OES

Multi-acid digest including Hydrofluoric, Nitric, Perchloric and Hydrochloric acids in Teflon Beakers. Analysed by Inductively Coupled Plasma Optical (Atomic) Emission Spectrometry.

BP/MS

Aqua-Regia digest followed by Precipitation and Concentration. Specific for Selenium. Analysed by Inductively Coupled Plasma Mass Spectrometry.

D/OES

Sodium peroxide fusion (Zirconium crucibles) and Hydrochloric acid to dissolve the melt. Analysed by Inductively Coupled Plasma Optical (Atomic) Emission Spectrometry.

DH/SIE

Alkaline fusion (Nickel crucible) specific for Fluorine. Analysed by Specific Ion Electrode.

SO/OES

Digestion to eliminate sulphides. Analysed by Inductively Coupled Plasma Optical (Atomic) Emission Spectrometry.

CM/CVAP

Low temperature Perchloric acid digest specific for Mercury. Analysed by Cold Vapour Generation Atomic Absorption Spectrometry.

W/METER

Water Extraction using a specific sample:water ratio. Analysed with Electronic Meter Measurement

X/METER

Client Specified Digestion or Extraction. Analysed with Electronic Meter Measurement

X1/METER

Special Digestion No1 specifically applicable to selected samples. Analysed with Electronic Meter Measurement

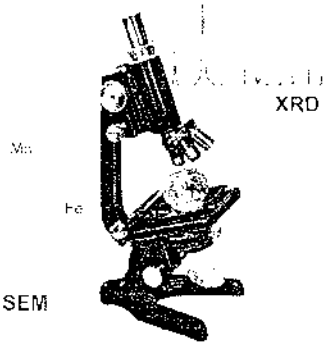
X2/METER

Special Digestion No2 specifically applicable to selected samples. Analysed with Electronic Meter Measurement

METHOD CODE DESCRIPTION

OrgC/LECO

Digestion to remove Carbonates. Analysed by LECO furnace.



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TIM ROWLES, 1-4-2003

KNIGHT PIESOLD PTY LTD,

1 ORD ST,

W PERTH

WA

OUR REF. 20643

YOUR REF. PE 801-00024/3

MINERAL ANALYSIS (XRD/PLM) OF 13 ROCK SAMPLES

AND 3 TAILING SAMPLES.

R TOWNEND

Correspondence to Box 3129, Malaga D.C. WA 6945
ACN 069 920 476 ABN 92 076 109 663

INTRODUCTION

Thirteen rocks and three tailing samples were submitted for mineral analysis with particular reference to carbonate and sulphides. The samples were analysed by XRD, polished section microscopy, and loose powder mounts, plus a little SEM.

RESULTS.

77662

QUARTZ	MAJOR
CHLORITE	MINOR
CA AMPHIBOLE	MINOR
BIOTITE	ACCESSORY
MUSCOVITE	ACCESSORY
CLINOZOISITE	ACCESSORY
PLAGIOCLASE	ACCESSORY
CARBONATE	TRACE
GOETHITE	1%
PYRITE	1% (20-100 microns)
MAGNETITE	<1%
ILMENITE	<1%

77663

KAOLIN	DOMINANT
CA AMPHIBOLE	MINOR
BIOTITE	ACCESSORY
MUSCOVITE	ACCESSORY
QUARTZ	ACCESSORY
GOETHITE	<1%
MAGNETITE	<1%
PYRITE	TRACE

77664

QUARTZ	MAJOR
CHLORITE	MAJOR
BIOTITE	ACCESSORY
MUSCOVITE	ACCESSORY
CA AMPHIBOLE	ACCESSORY
CLINOZOISITE	ACCESSORY
KAOLIN?	ACCESSORY
MG FE AMPHIBOLE	ACCESSORY
PYRITE	<1% (5-40 microns)
HEMATITE	<1%
GOETHITE	<1%
ILMENITE	<1%

77665

KAOLIN	DOMINANT
QUARTZ	MINOR
GOETHITE	MINOR
ILMENITE	1%

77666

QUARTZ	MAJOR
PLAGIOCLASE	MAJOR
MUSCOVITE	ACCESSORY
BIOTITE	ACCESSORY
CHLORITE	ACCESSORY
CLINOZOISITE	ACCESSORY
K FELDSPAR	ACCESSORY
CARBONATE (CALCITE)	TRACE
PYRITE	TRACE
PYRRHOTITE	TRACE

77667

QUARTZ	DOMINANT
KAOLIN	MAJOR
MUSCOVITE	ACCESSORY
GOETHITE	2-3%

77668

QUARTZ	DOMINANT
PLAGIOCLASE	MINOR
K FELDSPAR	ACCESSORY
BIOTITE	ACCESSORY
CHLORITE	ACCESSORY
MUSCOVITE	ACCESSORY
KAOLIN	ACCESSORY
GOETHITE	<1%

77669

QUARTZ	DOMINANT
KAOLIN	ACCESSORY
MUSCOVITE	ACCESSORY
GOETHITE	<1%

77670

HORNBLENDE	DOMINANT
PLAGIOCLASE	MAJOR
BIOTITE	ACCESSORY
CLINOZOISITE	ACCESSORY
QUARTZ	ACCESSORY
MAGNETITE	1-2%
ILMENITE	1-2%
PYRITE	1% (10-140 microns)
PYRRHOTITE	1-2% (20-100 microns)
CHALCOPYRITE	<1%

77671

KAOLIN	DOMINANT
QUARTZ	MAJOR
MUSCOVITE	TRACE
CHLORITE	TRACE
GOETHITE	3-5%
ALTERED ILMENITE	1-2%

77672

BIOTITE	MAJOR
HORNBLENDE	MAJOR
CLINOZOISITE	MINOR
QUARTZ	MIN OR
PYRRHOTITE	2-3% (5-120 microns)
PYRITE	2-3% (20-170 microns)
MARCASITE	<1%
CHALCOPYRITE	<1%
MAGNETITE	<1%

77673

KAOLIN	DOMINANT
QUARTZ	MAJOR
MAGNETITE	1%
GOETHITE	<1%

77674

MGFE AMPHIBOLE	MAJOR
PLAGIOCLASE	MAJOR
QUARTZ	MINOR
HORNBLENDE	MINOR
BIOTITE	ACCESSORY
CHLORITE	ACCESSORY
CLINOZOISITE	ACCESSORY
MUSCOVITE	ACCESSORY
PYRITE	<1% (25-120 microns)
ILMENITE	<1%
CHALCOPYRITE	TRACE

77675

QUARTZ	MAJOR
PLAGIOCLASE	MAJOR
KAOLIN	MINOR
HORNBLENDE	MINOR
BIOTITE	ACCESSORY
CLINOZOISITE	ACCESSORY
PYRITE	1% (20-120 microns)
ILMENITE	<1%
CHALCOPYRITE	<1%
RUTILE	<1%

77676

KAOLIN	DOMINANT
QUARTZ	MAJOR
MICA	ACCESSORY
LEUCOXENE	2-3%
GOETHITE	<1 %

77677

QUARTZ	MAJOR
PLAGIOCLASE	MAJOR
HORNBLENDE	MINOR
BIOTITE	MINOR
CLINOZOISITE	ACCESSORY
CHLORITE	ACCESSORY
PYRITE	2-3% (30-250 microns)
MARCASITE	< <1%
MAGNETITE	2-3%
ILMENITE	1-2%
CHALCOPYRITE	<1%

KEY. DOMINANT =>50%, MAJOR =20-50%, MINOR=10-20%, ACCESSORY =1-10%, TRACE =<1%

Appendix L – Scope of Works and Technical Specification Document

23 May 2023

TAILINGS STORAGE FACILITY NO. 1 (TSF1)
MT GIBSON GOLD PROJECT

SCOPE OF WORKS AND TECHNICAL SPECIFICATION DOCUMENT

Capricorn Metals Ltd

PER2022-0011AC Rev 2

PER2022-0011AE		
Date	Revision	Comments
27 February 2023	A	Internal Review
2 March 2023	0	Issued for inclusion in CMW design report ref. PER2022-0011AD Rev 0
19 March 2023	1	Issued after comments by CMM, for inclusion in CMW design report ref. PER2022-0011AD Rev 1
23 May 2023	2	Issued after further comments by CMM, for inclusion in CMW design report ref. PER2022-0011AD Rev 2

Table of Contents

TERMINOLOGY AND ABBREVIATIONS 1
1 INTRODUCTION 2
1.1 Design Drawings 2
1.2 Applicable Codes / Standards 3
1.3 Safety 3
1.4 Submittals 3
1.5 Site Conditions 4
1.6 Site Inspection 4
2 DESCRIPTION OF WORKS - SPECIFIC 4
2.1 General 4
2.2 Survey 4
2.3 Construction Tolerances 5
3 MATERIALS 6
3.1 General 6
3.2 Zone A – Silty/Clayey Mine Waste 7
3.3 Zone B – Waste Dump 7
3.4 Zone C – Traffic Compacted Silty/Clayey & Gravelly Silt/Clay Mine Waste 7
3.5 Zone D – Select Filter Rock 8
3.6 Zone E – Fine Filter Material 8
3.7 Zone F – Coarse Filter Material 8
3.8 Zone G – Base (Wearing) Course Material 9
3.9 Unsuitable Material 9
3.10 Geotextile 9
4 EXECUTION OF THE WORK 10
4.1 Examination 10
4.2 General 10
4.3 Site Preparation 10
4.3.1 Construction Layout 10
4.3.2 Clearing and Grubbing 11
4.3.3 Topsoil Stripping 11
4.3.4 Stockpiling 11
4.3.5 Haul Roads and Access 11
4.4 Foundation Preparation 11
4.5 Seepage Collection System 12
4.6 TSF Embankment Construction 13
4.6.1 Downstream Zone 13
4.6.2 Upstream Zone 13
4.7 Decant System 14
4.7.1 Temporary Decant Accessway 14
4.7.2 Decant Accessway 14
4.7.3 Rock Ring Wall 14
4.8 Supplementary Earthworks Requirements 14
4.9 Surface and Drainage 15
4.10 Maintenance 15
5 TESTING AND INSPECTION 15

5.1 Testing Firm/Facilities 15
5.2 Finishing Tolerances 15
5.3 Material Suitability 16
5.4 Compaction Testing 16
5.5 Testing Program 16
5.6 Additional Inspections 16
6 CLEAN UP 17
7 OWNER/PRINCIPAL SUPPLIED ITEMS 17
7.1 Survey 17
7.2 Materials 17
7.3 Water 17
8 MATERIALS 17
9 SUBSTITUTIONS 18
10 PERMITS, LICENCES AND APPROVALS 18

Appendix

Appendix A – Schedule of Quantities

Tables

Table 1 – Construction Tolerances

Table 2 – Properties of Zone A – Silty/Clayey Mine Waste

Table 3 – Properties of Zone B – Waste Dump

Table 4 – Properties of Zone C – Traffic Compacted Silty/Clayey & Gravelly Silt/Clay Mine Waste

Table 5 – Properties of Zone D – Select Filter Rock

Table 6 – Properties of Zone E – Fine Filter Material

Table 7 – Properties of Zone F – Coarse Filter Material

Table 8 – Properties of Zone G – Base (Wearing) Course Material

Table 9 – Geotextile Properties

Table 10 – Quality Control Tests

TERMINOLOGY AND ABBREVIATIONS

The following terminology and abbreviations are defined as stated, unless otherwise indicated:

AS	Australian Standard
ASTM	American Society for Testing and Materials
CMM	Capricorn Metals Ltd
Contractor	Appropriate individual, partnership, company or corporation contractually obligated to perform the work prescribed in this document and becomes contractually obligated to the Owner
Design Drawings	Detailed Design Drawings issued by the Owner to the Contractor
DMIRS	Department of Mines, Industry, Regulation and Safety (from 1 July 2017), previously referred to as Department of Mines and Petroleum (DMP)
DMIRSWA	Department of Mines, Industry, Regulation and Safety Western Australia, previously referred to as DMPWA
DWER	Department of Water and Environmental Regulation (from 1 July 2017), previously referred to as Department of Environment Regulation (DER)
Engineer	The Engineer (or designated Representative) appointed by the Owner who is responsible for evaluating the suitability of the materials involved in the work and for verifying the compliance of the work to the requirements of this SoW
Independent Testing and Inspection Firm	The company, partnership, or corporation retained to perform the inspections and tests, required to determine and verify compliance of the work with the requirements of this SoW
IWL	Integrated Waste Landform
MGGP	Mt Gibson Gold Project
NAF	Non-acid Forming
NATA	National Association of Testing Authorities
OMC	Optimum Moisture Content at which the SMDD is achieved
Owner/Principal	CMM
Project Superintendent	The designated Representative of the Owner/Principal appointed by the Owner/Principal who is responsible for the work on the project
QA/QC	Quality Assurance and Quality Control
RL	Reduced Level
SMDD	Standard Maximum Dry Density as per AS 1289.5.1.1 for testing of a representative material sample of that to be compacted in the field
SoW	Scope of Work and Technical Specification Document
t/m^3	Tonnes per cubic metre
TSF	Tailings Storage Facility
TSF1	Tailings Storage Facility No. 1

USCS	Unified Soil Classification System
Work / Works	The activities specified within this document as the responsibility for the Contractor

1 INTRODUCTION

This Scope of Work and Technical Specification Document (SoW) prescribes the requirements for the embankment construction works to achieve the site finished grades indicated on the Design Drawings for TSF1 at the MGGP.

The works mainly involve bulk earthworks to construct the engineered containment perimeter embankment and decant facilities for TSF1. All details presented herein are to be read in conjunction with the Design Drawings presented in the CMW design report referenced PER2022-0011AD Rev 2 dated 23 May 2023.

The SoW shall comprise the provision of all materials, construction plant, equipment, labour, supervision, tools, services, warehousing if required, testing equipment, and each and every item of expense necessary for the construction, acceptance testing and preparing of "as-built" drawings and documents for work shown in the drawings, materials schedules and specifications forming part of the construction of the TSF.

Also prescribed are the requirements for clearing and grubbing, the removal, replacement, and disposal of unsuitable materials, the disposal of surplus materials and the furnishing, placement and compaction of embankment fill material.

All works must be constructed complete and operational except as specifically excluded and must include all necessary auxiliary works, accessories and the incorporation of all miscellaneous material, minor parts and other such items, whether or not the items are specified, where it is clearly the intent of the design that they should be supplied or where they are obviously required and necessary to complete and commission the work.

The mining and processing teams should fully cooperate with each other and at all times coordinate activities to ensure TSF1 is constructed in accordance with the intent of the design in a timely manner and is ready to accept the tailings. The protection of all active and non-active pipework and instrumentation which is in place is paramount. The Mine Superintendent must be immediately notified of any damage to pipework or instrumentation no matter how minor.

The Contractor must liaise with the mining team, other contractors and the Owner/Principal to agree on a sequence for the works. The Contractor and other contractors must endeavour to complete the embankment in the sequence agreed. The Contractor must coordinate work prescribed by this document with other related works to be performed, such as relocation of tailings pipework.

1.1 Design Drawings

This SoW must be read in conjunction with the latest revisions of the following Design Drawings:

Title	**Project and Drawing Number**
TSF – Final Stage Plan	PER2022-0011-01
TSF – Stage 1 Plan	PER2022-0011-02
TSF – Final Stage Sections	PER2022-0011-03
TSF – Stage 1 Sections	PER2022-0011-04

Title	Project and Drawing Number
Pipeline and Spigot Details	PER2022-0011-05
Instrumentation and Underdrainage Plan	PER2022-0011-06
Instrumentation Details	PER2022-0011-07
Underdrainage Sections and Details	PER2022-0011-08
Inundation Plan	PER2022-0011-09

1.2 Applicable Codes / Standards

The works must be carried out to comply with the latest revision of the Design Drawings, Codes and Standards specified or to the appropriate Australian Standards or to other recognised International Standards approved by the Owner/Principal or the Engineer where there is no comparable Australian Standard.

The applicable Australian Standards for earthworks are as follows:

- AS 1289 - Methods of testing soils for engineering purposes;
- AS 1726 - Geotechnical site investigations; and
- AS 3798 - Guidelines on earthworks for commercial and residential developments.

Before making any change in any work under the Contract to comply with any revisions to the relevant codes and standards, the Contractor shall give to the Owner/Principal written notice specifying the reason therefore and requesting his direction thereon. The Principal shall decide whether a change is necessary and issue an order accordingly under the provisions of the General Conditions of Contract.

1.3 Safety

The Contractor must:

- Carry out the works in a safe manner and comply with all of Principal's procedures and guidelines.
- Conform to all relevant Acts or Statutes of Parliament, Regulations, By-Laws or Orders relating to the safety of persons and property on or about the site.

1.4 Submittals

All submittals must be delivered to the Owner/Principal. The following information must be submitted by the Contractor one month prior to the start of the work:

- A description of construction procedures/sequences together with;
- Proposed methods and construction details for any excavation where groundwater is expected to be encountered, to ensure that all excavations are kept dry during construction. Discharge/disposal of the dewatering system effluent must be coordinated with the temporary installations for stormwater management and dust control. Certified design calculations are required for all groundwater dewatering systems.

The following information must be submitted at the completion of the work:

- All field and laboratory test results and comments, which must be compiled in date order, for permanent project records.

1.5 Site Conditions

Geotechnical investigations to determine site conditions have been conducted and the test results from these investigations are, by this reference, made a part of this SoW. The geotechnical investigation report has been included as an appendix to the CMW design report referenced PER2022-0011AD Rev 2 dated 23 May 2023.

The information contained in the documents must not be construed as a guarantee of the depth, extent or character of materials, groundwater level and quality actually present.

1.6 Site Inspection

The Contractor must inspect the site and must allow for the following factors in the price:

- The nature and requirements of the work to be done.
- All conditions on and adjacent to the site.
- Access to the site.
- The types of soil and vegetation present on the site.
- The expected or known water table.
- The nearest sources of suitable construction material which comply with this SoW.
- The source of water for construction purposes.
- The Contractor is to manage saline water usage, hydrocarbon storage and dust suppression to the Owner/Principal's requirements.
- Prevailing climatic conditions for the site.

2 DESCRIPTION OF WORKS - SPECIFIC

The SoW includes, but is not necessarily limited to the following:

2.1 General

The work shall include:

- Attend a Site Induction of approximately five (5) hours duration before the commencement of works if they have not already attended one in the last six (6) months.
- Carry out all works indicated or implied in the Design Drawings or in the SoW.
- Supply all labour, plant and materials (except those indicated as being supplied by the Owner/Principal) necessary for the completion of the works.
- Maintain all works as required by the Contract documents and for the period stated therein.

All construction shall be to the minimum lines and grades shown on the Drawings or as required by the Owner/Principal's Representative as work progresses.

During the progress of the works, the Owner/Principal's Representative may find it necessary to revise the lines, levels and grades of any part of the works because of the conditions revealed by the works.

2.2 Survey

The Contractor must:

- Perform all ground surveys using conventional and agreed surveying techniques.
- Survey and setting out the works based on the datum points provided.

- Be responsible for the protection of all permanent and temporary beacons/benchmarks.
- Be wholly responsible for the setting out of his works in accordance with the terms of the SoW. Although the Owner/Principal's Representative will cause such setting out to be checked from time to time, such checking will not relieve the Contractor of full responsibility for the accuracy of such setting out.
- Carry out surveys prior to the commencement of the item of work and at the completion of the item of work.
- Carry out a post-construction survey by a licensed surveyor of the works to verify that the works were constructed within the specified tolerances and submit to the Owner/Principal's Representative.
- Submit his survey data and calculations to the Owner/Principal's Representative.
- Ensure initial and/or final surveys are undertaken and approved by the Owner's Representatives prior to the removal or placement of any material, especially where such action will destroy or cover the surface just surveyed. All survey checks or quantity measurements must be supplied to the Owner/Principal's Representative and suitable time must be given to the Owner/Principal's Representative to allow such calculations to be checked and approved prior to the works being covered or removed.

The Owner's Representative may undertake their own survey of any item, either in conjunction with the Contractor or separately.

The Contractor and Owner/Principal's Representative must agree on the results of measurement surveys that are carried out prior to any works being covered up or within seven (7) days of a survey being undertaken. Should an agreement not be reached, the difference must be documented such that the matter can be later decided without disruption to the construction programme.

2.3 Construction Tolerances

The embankment shall be constructed to the lines, grades, dimensions and details shown on the Design Drawings.

The embankment foundation footprint shall be surveyed following stripping, prior to the placement of any fill materials. Finished work shall comply with the tolerances set out in Table 1.

The maximum permissible horizontal deviation from the finished lines or zone boundaries shall be −0 m to +0.5 m. Vertical deviation shall be −0 m to +0.2 m, provided no abrupt changes in slope or level are present on any finished surface. Payment shall, however, be to the design lines, minimum requirements, excluding tolerances.

Table 1 - Construction Tolerances

Construction item	Tolerance item		Tolerance (1)
Perimeter embankment	Crest level		+200 mm, −0 mm
	Crest width		+500 mm, −0 mm
	Slopes (2)	Upstream	+ or -10% of specified
		Downstream	+ or −2% of specified
Decant accessway	Crest level		+200 mm, −0 mm
	Crest width		+500 mm, −0 mm
	Side slopes[2]		+ or −5% of specified

Notes:

1. *These shall mean that if a dimension is checked at a particular location, the work is acceptable provided that the dimension departs from that shown on the Drawings by no more than the amount shown above. They shall not be read to imply any basis for payment other than the design dimensions or levels are shown on the Design Drawings, upon which all quantities for payment purposes shall be calculated. The average dimension shall be not less than that shown on the Design Drawings.*
2. *Tolerances on slopes assume that slopes are specified in the format 1 vertical: X horizontal. The tolerance shall apply to X.*

Measurement for payment of all embankment fill materials shall be made for the compacted material, measured in place and only to the lines and grades required (excluding tolerances), measured in either metres (m), square metres (m^2) or cubic metres (m^3) as defined in the Schedule of Quantities. Measurement for payment shall be undertaken to AS1181 (1982). The Owner/Principal may inspect or check any setting out or measurements at any time and the Contractor shall allow for delays while any works are checked.

At the completion of the works, the Contractor shall provide detailed as-built details including hardcopy plan layout and survey information in electronic format as well as a concise summary of item volumes.

3 MATERIALS

3.1 General

Satisfactory materials must be free from large lumps or clods, refuse or other material that might prevent proper compaction. All materials must be approved for use by the Engineer prior to placement.

The material zones, as indicated on the Design Drawings, are as follows:

- Zone A, Silty/Clayey Mine Waste – this material must be used to construct the cut-off trench and the upstream (or inner) section of the TSF1 embankment, and as backfill for the seepage collection trenches and manholes.
- Zone B, Waste Dump – this material must be used to construct the downstream (or outer) section of the embankment.
- Zone C, Traffic Compacted Silty/Clayey and Gravelly Silt/Clay Mine Waste – this material must be used to construct the decant accessway.
- Zone D, Select Filter Rock – this material must be used to construct the decant structure including temporary decant.
- Zone E, Fine Filter Material – to be used as backfill for the seepage intersection trench, below the geotextile layer.
- Zone F, Coarse Filter Material – to be used as backfill for the seepage intersection trench, above the geotextile layer.
- Zone G, Base (Wearing) Course Material – this material must be used for sheeting the crests of the embankment and decant accessway.

Zones A, B and C materials will be internally sourced from the MGGP tenements.

3.2 Zone A – Silty/Clayey Mine Waste

Zone A – Silty/Clayey Mine Waste will be sourced from, primarily, the overburden soil and saprolite layers in the Orion 2/3 Pit. These must meet the requirements listed in Table 2.

Table 2: Properties of Zone A – Silty/Clayey Mine Waste

Item	Test Method	Requirement
Soil Classification (USCS)	AS 1726	CL / CI / CH / ML / MH
Particle Size Distribution	AS 1289	100% passing 150 mm, ≥19% passing 0.075 mm, <66% passing 0.075 mm
Plasticity Index	AS 1289	<30%
Liquid Limit	AS 1289	<60%
Permeability (k)	AS 1289	≤$1x10^{-8}$ m/s at 95% SMDD

Testing frequencies as per Section 5.5.

3.3 Zone B – Waste Dump

Zone B – Waste Dump will be internally sourced from the MGGP tenements and the open pits cut back operation, and must meet the requirements listed in Table 3.

Table 3: Properties of Zone B – Waste Dump

Item	Test Method	Requirement
Soil Classification (USCS)	AS 1726	GM / GC / SP / SM / SC / CL / CI / CH, cobbles, and boulders (<300 mm at upstream face)
Particle Size Distribution	AS 1289	100% passing 300 mm (at upstream face) 100% passing 600 mm (away from upstream face)

No testing is required for Zone B – Waste Dump as this material requires placement (traffic compaction) to achieve a mechanical interlock.

3.4 Zone C – Traffic Compacted Silty/Clayey & Gravelly Silt/Clay Mine Waste

Zone C – Traffic Compacted Silty/Clayey and Gravelly Mine Waste will be sourced from, primarily, the Orion 2/3 Waste Dump. These must meet the requirements listed in Table 4.

Table 4: Properties of Zone C – Traffic Compacted Silty/Clayey & Gravelly Mine Waste

Item	Test Method	Requirement
Soil Classification (USCS)	AS 1726	CL / CI / CH / ML / MH / GM / GC, with a trace of cobbles
Particle Size Distribution	AS 1289	100% passing 300 mm, ≥85% passing 60 mm, >12% passing 0.075 mm

3.5 Zone D – Select Filter Rock

Zone D – Select Filter Rock must meet the requirements listed in Table 5.

Table 5: Properties of Zone D – Select Filter Rock		
Item	**Test Method**	**Requirement**
Soil Classification (USCS)	AS 1726	GW including cobbles with a trace of boulders
Particle Size Distribution	AS 1289	100% passing 300 mm, >95% retained on 50 mm, <3% passing 0.075 mm

No testing is required for Zone D – Select Filter Rock as this material is to be traffic compacted as placed.

3.6 Zone E – Fine Filter Material

Zone E – Fine Filter Material must meet the requirements listed in Table 5.

Table 6: Properties of Zone E – Fine Filter Material		
Item	**Test Method**	**Requirement**
Soil Classification (USCS)	AS 1726	GP / GM (screened rock waste/ borrow pit gravels)
Particle Size Distribution	AS 1289	100% passing 37.5 mm, >95% retained on 4.75 mm, <3% passing 0.075 mm

No testing is required for Zone E – Fine Filter Material.

3.7 Zone F – Coarse Filter Material

Zone F – Coarse Filter Material must meet the requirements listed in Table 5.

Table 7: Properties of Zone F – Coarse Filter Material		
Item	**Test Method**	**Requirement**
Soil Classification (USCS)	AS 1726	GP with a trace of cobbles
Particle Size Distribution	AS 1289	100% passing 75 mm, >95% retained on 19 mm, <3% passing 0.075 mm

No testing is required for Zone F – Coarse Filter Material.

3.8 Zone G – Base (Wearing) Course Material

The Base (Wearing) Course Materials must be gravel sourced from MGGP operations and meet the requirements listed in Table 5.

Table 8: Properties of Zone G – Base (Wearing) Course Material

Item	Test Method	Requirement
Soil Classification (USCS)	AS1726	GW / GP / GM
Particle Size Distribution	AS1289	100% passing 37.5 mm, ≥60% retained on 4.75 mm, >4% to <20% fines (0.075 mm) – low plasticity/non-plastic

No testing is required for the Base Course Material.

3.9 Unsuitable Material

Materials that do not meet the requirements listed in Table 2 to Table 8, and soil having insufficient strength or stability to carry the loads that will be superimposed on the completed fill or embankment, without excessive settlement or loss of stability, must not be used in the constructed works. Material containing vegetable matter, muck refuse, large rocks, debris, or other materials that could cause the embankment fill not to compact and organic soils with USCS of Pt, OH, or OL are considered to be unsuitable material and must be removed from site.

3.10 Geotextile

The geotextile to be used is 'Bidim A34' or approved equivalent as shown on the Design Drawings.

Except where shown on the Design Drawings, individual sections of the geotextile, as supplied, shall not be less than 4.5 m wide without prefabrication and shall be of such dimensions and shape to result in the minimum on-site seam length.

The geotextile shall be chemically resistant to the material to be contained and suitable for service temperatures as well as the soils/groundwater conditions of the site. Material specifications supporting this confirmation shall be supplied on request.

Unless otherwise specified in the project documents, the physical properties of the Bidim A34 geotextile or approved equivalent shall meet the requirements listed in Table 9. The Contractor may submit physical properties for a different or alternative geotextile for review by the Owner/Principal.

The Contractor shall ensure the geotextile incorporated in the works is sufficient to protect the underlying material without damage to the geotextile.

Seam threads shall be of equal or better resistance to chemical and biological degradation than the geotextile fabric.

Table 9: Geotextile Properties			
Property	**Test Method**	**Units**	**Value**
Grab Tensile Strength	AS 3706.2	N	1,270
CBR Burst Strength	AS 3706.4	N	3,400
Wide Strip Tensile Strength	AS 3706.2	kN/m	18.5
Trapezoidal Tear Strength	AS 3706.3	N	440
Pore Size (095)	AS 3706.7	µm	75
Permittivity	AS 3706.9	s^{-1}	1.75

4 EXECUTION OF THE WORK

The SoW must include, but is not necessarily limited to the following:

4.1 Examination

Before starting work, the Contractor must thoroughly examine the site to ascertain conditions under which the work must be performed and the nature of the materials to be used in the construction. The Contractor must obtain all necessary site-specific permits prior to commencing work on site.

4.2 General

The Contractor must:

- Attend a specific site induction of approximately eight (8) hours duration before the commencement of works to ensure they fully understand the requirements of the design.
- Carry out all works indicated or implied in the Design Drawings or in the SoW.
- Supply all labour, plant and materials (except those indicated as being supplied by the Owner/Principal) necessary for the completion of the works.
- Maintain all works as required by the design documents and for the period stated therein.

All construction must be to the minimum lines and grades shown on the Design Drawings or as required by the Owner/Principal's Representative as work progresses.

During the progress of the works, the Owner/Principal's Representatives may find it necessary to revise the lines, levels and grades of any part of the works because of the conditions revealed by the works. Some delays may occur due to inspection and checking of any part of the works to determine grades.

4.3 Site Preparation

4.3.1 Construction Layout

The earthworks must be set out in accordance with the Design Drawings. The Contractor must examine the site and verify all existing levels and survey control points and the set-out points shown on the Design Drawings, before commencing the earthworks. The Contractor must be responsible for checking and agreeing with the correctness of all values of monuments, datum or benchmarks, prior to the commencement of work. The Engineer may find it necessary to revise the lines, levels and grades of any part of the works during progress, because of conditions revealed during construction.

The Contractor must confirm that there are no existing services in the area. If any services are noted, the Contractor must bring them to the notice of the Owner/Principal.

4.3.2 Clearing and Grubbing

The Contractor must remove trees, stumps, roots, rubbish and any debris and vegetation resting on or protruding through the ground surface from the designated areas as shown on the Design Drawings. Trees, stumps, roots and other vegetation must be removed to the bottom of their root zone. The cut materials from the clearing works may, with the permission of the Engineer, be placed on the outer, downstream batter slope of the TSF.

The area to be cleared must extend approximately 5 m past the downstream toe of the TSF embankment. All stripped vegetation should be pushed into heaps in locations as indicated by the Owner's Representative.

4.3.3 Topsoil Stripping

Strip topsoil from the TSF footprint to a minimum depth below the natural ground surface of 0.1 m. The depth of stripping may be increased as directed by the Owner/Principal's Representative.

The Contractor must avoid mixing topsoil with subsoil or other undesirable materials. The Contractor must place the removed topsoil in stockpiles to a maximum height of 2.0 m with side slopes of 1 (vertical) to 1.5 (horizontal) in areas nominated by the Owner/Principal.

4.3.4 Stockpiling

The Contractor must deposit material resulting from the clearing and grubbing operations in the disposal areas. The Contractor must cover with soil or burn if permitted by applicable regulations.

4.3.5 Haul Roads and Access

The Contractor must clear all vegetation, standing and fallen, from the agreed routes of all haul roads. The Contractor must push this vegetation into heaps in the locations as indicated by the Owner/Principal's Representative.

The Contractor must form up and lay the base course as necessary and do all things necessary to form and maintain the haul roads linking the mine waste dumps/borrow areas to the site and other haul roads necessary for the works and which are approved by the Owner/Principal's Representative.

The Contractor must keep all haul roads sprayed and wetted to totally prevent the generation of airborne dust during the course of road construction and usage.

4.4 Foundation Preparation

The work must include:

- The Contractor must remove unsuitable material as directed by the Engineer.
- Strip topsoil from the TSF footprint to the specified minimum depth of 0.1 m below the natural ground surface levels, and stockpile in nominated areas. The Contractor must remove soil only to such depth that the soil meets the definition of topsoil. Under no circumstance is the Contractor to rip or excavate rock unless directed by the Engineer.
- Tyne, moisture condition (to within –2% / +2% of OMC) and compact the TSF footprint (refer to Design Drawings) to a depth of 0.3 m (following topsoil stripping). The prepared surface of the embankment footprint should be compacted using a minimum of 6 passes of a 12 t vibratory roller.
- Prepare the foundation for the cut-off trench under the starter embankment as shown on the Design Drawings by excavating to indurated (Ferricrete) layer, depths of between 0.5 m and 1.5 m below the existing ground surface or as directed by the Owner/Principal's Representative. The depth shall be increased if loose sands or gravels are present in the excavation, so the base

of the excavation is in competent low permeability material or Ferricrete layer. Side batters shall have a minimum slope of 1 (vertical) to 1 (horizontal).

- Ripping may be necessary to construct the cut-off excavation. Blasting in the TSF area is not anticipated. No blasting or excavation into or through any competent layer shall be undertaken unless approval has been received from the Owner/Principal's Representative.
- All areas to receive fill shall be left in a clean and suitable condition to allow an uninterrupted placement of fill. No fill shall be placed in the cut-off trench until the base of all excavations has been inspected and approved by the Owner/Principal's Representative.
- Allow for keeping water from excavations by pumping, dewatering, or other suitable means, and adequately dispose of it clear of the works.
- The cut-off trench backfill shall comply with the following:
    - Moisture content at the time of placement is within -2% / +4% of the OMC as determined from laboratory test in accordance with AS1289.5.1.1 with moisture curing of materials as required during construction;
    - Each layer is compacted to achieve a density ratio greater than 95% of SMDD as determined from laboratory test AS 1289.5.1.1; and
    - Materials specifications as detailed in Section 3.2.
- At the decant area, a minimum of 0.5 m thick 'liner' constructed of clay/silt low permeability material, of the same specifications as detailed in Section 3.2, must be constructed on top of the prepared subgrade. The material shall be moisture conditioned to within the range of -2% / +2% of the OMC as determined in accordance with AS1289.5.1.1, and placed in homogenous layers not exceeding 0.3 m loose lift thickness. This shall then be compacted by a minimum of 6 passes of a 12 t vibratory roller or approved equivalent, to achieve a minimum of 95% dry density ratio in accordance with AS1289.5.1.1. Placement should be continuous and if a break in fill placement allows the exposed surface to dry, it should be lightly tyned, watered and compacted prior to fill placement recommencing.
- The 'liner' must extend to a minimum of 150 m radius measured from the centre of the rock ring decant.

4.5 Seepage Collection System

The seepage collection system comprises the following:

- Seepage intersection trenches parallel to the upstream crest of the embankment; flowing through a tee piece into
- Seepage collection trench; flowing into
- Seepage collection sump.

Pipeline gradients, excavation and backfill requirements, and materials requirements shall be as shown on the Design Drawings.

4.6 TSF Embankment Construction

4.6.1 Downstream Zone

Following completion of the foundation preparation, TSF1 embankment construction can commence. The downstream waste dump section of the embankment (Zone B) can be constructed using traditional waste dump techniques, including tipping from minor faces and paddock dumping (i.e. not dumping off a high face). The following points should however be noted:

- The mine waste within 20 m of the upstream zone shall be placed in ≤0.5 m nominal thick layers and trafficked by construction equipment across the full width of the layer. The maximum particle size in this zone should be a maximum of ≤1/3 the layer thickness.
- The upstream face of Zone B shall be 'smooth', free of projections i.e. large cobbles and boulders greater than 0.15 m in size and voided rock, in order to allow for placement of the upstream zone. Trimming of the waste dump face may be required.
- Preference should be made to placing large boulders and cobbles towards the downstream of Zone B.

4.6.2 Upstream Zone

Construct TSF1 embankment at the upstream zone using selected approved Zone A – Silty/Clayey Mine Waste material sourced from within MGGP. Suitable Zone A material will typically comprise of the materials from within the overburden and saprolite layers of the Orion 2/3 Pit, these include the gravelly CLAY with sand (overburden) material with USCS of 'CL', sandy SILT trace gravel (upper saprolite) material with USCS of 'ML', and non-plastic but low permeable (i.e. k ≤1x10^{-8} m/s) SILT with sand trace gravel (lower saprolite) material with USCS of 'ML'.

The upstream zone material must be free of organic matter and other deleterious material. It shall comply with the limits set in Sections 3.2.

Prior to construction, zones within the Orion 2/3 Pit must be identified that have potential for use in construction. In general, the Orion 2/3 Pit setting comprises of typically 1 m to 2 m of overburden layer, underlain by the Ferricrete layer that is up to 3 m thick, and the saprolite that extends to depths between 20 m to 40 m. The saprolite underlying the surficial layers and above the bedrock displayed an upper zone with shades of pale brown to brown layer with red and yellow hues, overlying a lower zone that was white and grey in colour.

All materials to be utilised in construction must be approved by the Engineer/Owner's Representative.

The Contractor shall:

- Adjust the moisture content of Zone A materials, which have been approved for use in the perimeter embankment construction. Moisture condition the borrow to within the range of -2% / +2% of the OMC as determined in accordance with AS1289.5.1.1. The borrow materials shall be cured to ensure the moisture is thoroughly mixed and evenly spread through all materials proposed for embankment construction.
- Place Zone A material in homogeneous horizontal layers not exceeding 0.3 m loose lift thickness. Each lift shall be compacted by a minimum of 6 passes of a 12 t vibratory roller or approved equivalent. Placement should be continuous. If a break in fill placement allows the exposed surface to dry, it should be lightly tyned, watered and compacted prior to fill placement recommencing. No oversize rock is to be placed into the embankment. Largest size should be 150 mm.
- Each of Zone A layer shall be compacted to achieve a density ratio greater than 95% of the SMDD as determined from laboratory test carried out in accordance with AS1289.5.1.1. The

actual number of passes of a 12 t vibratory roller or an approved equivalent to achieve a density greater than 95% SMDD shall be determined on site using roller trials.

4.7 Decant System

The decant system comprises a decant accessway and a rock-ring type decant structure. Refer to Design Drawings for details.

4.7.1 Temporary Decant Accessway

At the early stages of deposition, surface water will be recovered by temporary decants at two locations. The temporary decants must be formed using low filter rock wall as determined by the Owner/Principal.

4.7.2 Decant Accessway

The work shall include:

- Construct the decant accessway using traffic compacted silty/clayey and gravelly silt/clay mine waste (Zone C) sourced from the Orion 2/3 Waste Dump. Subject to appropriate material testing as determined by the Engineer, other sources approved by the Owner/Principal can also be used.
- Clayey/silty mine waste should be utilised near the embankment. Gravelly silt/clay mine waste with cobbles can only be used near the rock ring.
- The silty/clayey and gravelly mine waste (Zone C) should be placed in layers no greater than 1m thick and traffic-compacted by construction equipment across the full width of the layer.

4.7.3 Rock Ring Wall

Only well graded select filter rock material, 50 mm to 300 mm size with a low fines content (<3 % passing 75 µm) and free of oversize (100 % passing 300 mm) must be used to construct the rock-ring decant filter.

The decant rock-ring wall should be constructed in such a manner as to minimise segregation.

The Contractor shall:

- Complete the foundation preparation of the decant area i.e. compaction of an in situ foundation ‘liner’ to a depth of 0.5 m as per Section 4.4 of this SoW.
- Transport all materials to construct the decant.
- Transport select decant filter rock from the designated source and place around the decant. Selected rock shall comprise clean mine waste material, free of fines, sourced from a location nominated by the Owner/Principal.

4.8 Supplementary Earthworks Requirements

The Contractor must, in addition to the site and foundation preparations and TSF embankment and decant constructions, be required to make the following provisions:

- Form windrows, using rock/mine waste, of adequate height on both crest edges as the works proceed to comply with mine safety and operational guidelines, typically ≥0.5 m in heights or 1/2 wheel height of the largest vehicle. The windrows must be raised as the works proceed. Loose edge materials must be removed as the works proceed;
- Sheet and compact the crest of the perimeter embankment and the decant accessway with 0.1 m thick well graded gravel base (wearing) course material as per Section 3.8. The gravel shall

be sourced from nominated locations (pit areas/waste dump areas) by the Owner/Principal and from reclaimed gravel wear course materials if deemed suitable for reuse. Compaction is to achieve 98% of the SMDD as determined by AS 1289.5.1.1.

- Allow for keeping water from the works during construction by shaping finished surfaces with a fall to the storage;
- All materials must be stockpiled, transported and placed in such a manner as to minimise segregation;
- Carry out testing to comply with the SoW and QA/QC procedures.
- Ensure that placed material which fails to meet the minimum test requirements of compaction or moisture content is reworked (moisture content adjusted and/or recomputed) to meet the specified requirements. The Contractor must maintain an up-to-date Compaction Record Log in accordance with a spreadsheet example to be provided by the Owner/Principal;
- Construct and maintain haul road(s) between the ramp at the borrow areas and the works at TSF embankment;
- Construct and maintain access ramp(s) as required to enable the construction equipment to access the TSF embankment. The location(s) of these ramps must be approved by the Owner/Principal's Representative prior to commencement of these works. The ramps may be left in place at the discretion of the Owner/Principal.

4.9 Surface and Drainage

The Contractor must conduct fill operations in such a manner and sequence that proper drainage is maintained at all times in and around the work area. Promptly remove surface waters that become impounded. Remove and replace with satisfactory fill materials, or stabilise (by drying or approved mechanical or chemical amendment methods) materials that become loosened due to exposure to the elements.

4.10 Maintenance

The Contractor must maintain the final surfaces in a well-drained, dewatered and sufficiently moist condition to prevent shrinkage cracking and minimise dusting. The compacted surface must be smooth and generally free from roller marks, ruts, holes, depressions or protrusions.

5 TESTING AND INSPECTION

5.1 Testing Firm/Facilities

An Independent Testing and Inspection Firm will be retained by the Owner/Principal to perform field and laboratory testing and soil evaluations for control of construction activities and/or to verify compliance of the work with the requirements of this SoW. The performance or lack of performance of Quality Control tests and inspections must not be construed as granting relief from the requirements of this SoW or the other contract documents.

The Independent Testing and Inspection Firm must meet the technical criteria of NATA for agencies involved in soil and rock inspection and testing.

Any work failing to meet the criteria of the SoW must be rectified at the Contractor's expense.

5.2 Finishing Tolerances

Refer to Table 1 in Section 2.3.

5.3 Material Suitability

Prior to the placement of mine waste materials, field and laboratory testing must be performed by the Independent Testing and Inspection Firm to assess the suitability of the materials for construction. Materials must meet the requirements outlined in Section 3 of this document.

The Contractor must make provision for physical testing of the mine waste materials upon selection of their sources by the Owner/Principal. Test results must be made available to the Engineer for further comment.

Compaction criteria for the construction of TSF1 embankment must be established by performing compaction testing on representative samples in accordance with AS 1289.1.1 as appropriate to the materials.

5.4 Compaction Testing

Field density testing must be performed by the Independent Testing and Inspection Firm on the compacted embankment material to ensure the compaction criteria meets the requirements of this document. The preferred field density testing method is the Nuclear Density test method in accordance with AS 1289.5.8.1. The calibration curves must be checked and adjusted using either the sand cone method as described in AS 1289.5.3.1, or by an approved method by the Engineer.

The calibration checks of both the density and moisture of each gauge must be made at the beginning of the project, on each different type of material encountered, and at intervals as directed by the Engineer. The number of tests must be increased if visual inspection indicates non-uniform moisture content or variable compaction effort considered inadequate to achieve the specified dry density.

The Contractor must provide the survey data for the locations and RLs of the test sites.

5.5 Testing Program

The testing must follow the requirements of Table 10 as a minimum.

Table 10: Quality Control Tests

Property	Test Method	Minimum Testing Frequency	
		Sample from Pit	Placed Compacted Material
Moisture Content	AS 1289		1:750 m^3 (per layer)
Soil Classification	AS 1726	1:10,000 m^3	
Plasticity Index (PI)	AS 1289	1:10,000 m^3	
Particle Size Distribution (PSD)	AS 1289	1:10,000 m^3	
Field Density (FD) with 1x SMDD per 3 FD	AS 1289		1: 2,500 m^2 /layer or 1:750 m^3 (per layer)

At the embankment of TSF1, no testing will be required on Zone B – mechanically placed waste dump. The exception being the physical testing as per Section 5.3.

The TSF foundation preparation will be checked for compaction, using a testing frequency of 1 field density test per 2,500 m^2 per layer.

5.6 Additional Inspections

The Contractor must perform a random survey of the top surface of every layer to monitor fill progress.

6 CLEAN UP

Upon completion of the work, the Contractor must leave the project site clear of debris and surplus material resulting from the construction operations.

The Contractor must:

- Clean up all rubbish, remove all plant and supply materials, trim all banks neatly, spread all excavated material not specified to be removed from the site and leave the site in a clean and tidy condition.
- Topsoil and vegetable matter removed from the embankment footprint prior to embankment construction can be respread on the downstream face of the embankment (except the western embankment). Topsoil must be redeployed in a thickness similar to that removed from the embankment footprint.

7 OWNER/PRINCIPAL SUPPLIED ITEMS

7.1 Survey

The Owner/Principal will provide co-ordinates and levels of survey marks within the vicinity of the storage. The Contractor and their subcontractors must set out all lines and levels using the survey marks provided.

7.2 Materials

The Principal will supply mine waste for construction of the embankment from designated sources. The Contractor shall make their own arrangements for loading and hauling of materials.

7.3 Water

Water will be made available to the Contractor at no charge. Supply will be from a standpipe located at the plant site. Access to the standpipe will not be exclusive to the Contractor. The Contractor shall determine the type and suitability of the water supplies for use in this Contract.

The Contractor must make their own arrangements for loading and hauling of water.

8 MATERIALS

Where the Owner/Principal agrees to supply materials to the Contractor in the performance of the Contract then the following conditions will apply:

- The items shall be included in the Contractor's materials procurement schedules. The Contractor shall, upon arrival at site to commence work, check and ensure that Owner/Principal supplied materials are available and will not cause any delay to the Contractor's work progress.
- Items stored by the Owner/Principal, shall be removed from the Owner/Principal's store or storage area by the Contractor when required by him or when directed by the Owner's Representative (whichever is the sooner). However, no items shall be removed from the Owner/Principal's store or storage area by the Contractor without first obtaining authority from the Owner/Principal's Representative and the Contractor shall sign receipts or other documentation required acknowledging receipt of the Free Issue Materials.
- From the time the Owner/Principal supplied materials are removed from the Owner/Principal's store or storage area or are delivered to the site the Contractor shall be responsible for and shall keep safely and in good order all those Owner/Principal supplied materials including any returnable packing or containers.
- The Contractor shall account for all Owner/Principal supplied materials used and shall return to the Owner/Principal in good order and condition any Owner/Principal supplied materials

remaining unused on completion of the work. Subject to any insurance cover the Contractor shall be responsible for the cost of replacement or repair of any Owner/Principal supplied materials lost or damaged while he is responsible.

- The Contractor shall immediately notify the Owners Representative of any damaged to or loss of any of those Owner/Principal supplied materials at any time and shall as soon as possible specify the extent and circumstances of the damage or loss.

9 SUBSTITUTIONS

The Contractor shall:

- Not substitute any alternative to the equipment and materials included in the Works without the prior written consent of the Owner/Principal.
- Make diligent efforts to utilise the specified materials to be incorporated into the Works but where the Contractor considers there are commercial or other advantages to be derived by the Owner/Principal, the Contractor may submit a proposal for a substitute material for approval by the Owner/Principal prior to commencement of the work. Such proposal for substitution shall be in writing and state reasons for and (if applicable) advantages of the substitute material. The Owner/Principal shall determine whether the substitute material will be permitted and such determination shall be binding and conclusive upon the Contractor. Approval of a substitution will be given as a variation under of the General Conditions of Contract incorporating any adjustment to the Contract Sum.

10 PERMITS, LICENCES AND APPROVALS

Further to the General Conditions of Contract, the Owner/Principal will obtain the Department of Mines, Industry Regulation and Safety (DMIRS) and Department of Water and Environmental Regulation (DWER) approvals.

All other necessary permits, licenses and approvals shall be obtained by the Contractor.

Appendix A
Schedule of Quantities

Date	23-May-23
Job No	PER2022-0011
File	PER2022-0011AE
Subject	Quantities
Revision	2

PROJECT : **TAILINGS STORAGE FACILITY/INTEGRATED WASTE LANDFORM**

CLIENT : **CAPRICORN METALS LTD**

LOCATION : **MT GIBSON GOLD PROJECT**

Item	Description	Unit	Quantity	Rate	Amount
1.00	**Stage 1A (Starter) Embankment Construction, Crest RL340 m**				
	Preliminaries & Site Preparation				
1.01	Site establishment, including all preliminaries, insurances etc., mobilisation, demobilisation, borrow management, maintenance of existing tracks	Item	1		$ -
1.02	Site clearing including grubbing and stockpiling of vegetation from the TSF footprint area (extend approx. 5 m past the final downstream toe of embankments)	m^2	1,378,000	$ -	$ -
	Earthworks				
1.03	Strip topsoil (0.1 m thick) from TSF footprint area and stockpile separately from vegetation	m^3	130,000	$ -	$ -
1.04	Prepare perimeter embankment foundation	m^2	138,000	$ -	$ -
1.05	Moisture condition and compact TSF basin (to 0.3 m depth)	m^2	1,250,000		
1.06	Excavate cut-off trench beneath perimeter embankment (0.5-1.5 m deep, 4 m wide at base)	m^3	21,000	$ -	$ -
1.07	Backfill cut-off trench beneath perimeter embankment (0.5-1.5 m deep, 4 m wide at base) with roller compacted clayey materials	m^3	21,000	$ -	$ -
1.08	Borrow, transport, place and roller compact clayey materials to embankment	m^3	98,000	$ -	$ -
1.09	Borrow, transport, place and traffic compact mine waste to embankment	m^3	636,000	$ -	$ -
1.10	Borrow, transport, place and traffic compact mine waste to decant accessway	m^3	0	$ -	$ -
1.11	Sheet perimeter embankment crests with gravel (0.1 m thick over the crest width minus windrows).	m^3	4,600	$ -	$ -
2.00	**Decant Structure**				
2.01	Borrow, transport, place and roller compact clayey materials to decant area (min 150 m radius, 0.3 m thick) to form in-situ liner around the decant area	m^2	0	$ -	$ -
2.02	Place select filter rock to form Rock Ring Decant	m^3	0	$ -	$ -
3.00	**Underdrainage**				
3.01	Excavate seepage interception trenches	m^3	960	$ -	$ -
3.02	Excavate seepage collection trench	m^3	120	$ -	$ -
3.03	Excavate seepage collection sump	m^3	560	$ -	$ -
3.04	Supply and install slotted pipe wrapped in geotextile (Draincoil DN110 SN8 or equivalent)	m	1,600	$ -	$ -
3.05	Supply and install solid discharge/collection pipe (plus tee piece)	m	215	$ -	$ -
3.06	Backfill seepage intersection trenches with fine filter material	m^3	640	$ -	$ -
3.07	Geotextile Bidim A34 in seepage interception trenches	m^2	560	$ -	$ -
3.08	Backfill seepage intersection trenches with coarse aggregate	m^3	320	$ -	$ -
3.09	Backfill seepage collection trenches and manholes with compacted clayey/silty mine waste	m^3	120	$ -	$ -
	SUB-TOTAL				**$ -**

Date	23-May-23
Job No	PER2022-0011
File	PER2022-0011AE
Subject	Quantities
Revision	2

PROJECT : **TAILINGS STORAGE FACILITY/INTEGRATED WASTE LANDFORM**

CLIENT : **CAPRICORN METALS LTD**

LOCATION : **MT GIBSON GOLD PROJECT**

Item	Description	Unit	Quantity	Rate	Amount
3.00	**INSTRUMENTATION**				
3.01	Excavate trenches for VWPs	m	2,800	$ -	$ -
3.02	Lay VWP cables in trenches for future connection, 2-pair twisted 22 AWG to AS/NZS 1125/3808 (or similar), allow snaking	m	3,400	$ -	$ -
3.03	Trench backfill	m^3	450	$ -	$ -
3.04	Bentonite backfill	m^3	4	$ -	$ -
3.05	VWP, pressure = 350 kPa with frequency range = 2000 - 3500 Hz (or similar)	item	8	$ -	$ -
3.06	Terminal Box, incl. annual fee of approx. $500/yr (allow 5 yrs) for IP-VPN services	item	2	$ -	$ -
3.07	Monitoring bores, 34, 43, 59 and 49 m nom. depths	item	4	$ -	$ -
	SUB-TOTAL				**$ -**
3.0	**Ancillary Items**				
3.01	Airfares for Contractors / Superintendent personnel	No.			$ -
3.02	Accommodation and meals for Contractors	Person days			$ -
3.03	Fuel supplied by Principal	L			$ -
3.04	Construction monitoring costs (Superintendent and vehicle incl misc)	Item			$ -
3.05	QA/QC Geotechnical Testing	Days			by Client
3.06	Construction report and office support	Allow			by Client
	SUB-TOTAL				**$ -**
	No Contingency				**$ -**
	TOTAL COST-STAGE 1				**$ -**

Notes:

CMW Geosciences Pty Ltd
Chapman Morton Woodward

Date	23-May-23
Job No	PER2022-0011
File	PER2022-0011AE
Subject	Quantities
Revision	2

PROJECT : **TAILINGS STORAGE FACILITY/INTEGRATED WASTE LANDFORM**

CLIENT : **CAPRICORN METALS LTD**

LOCATION : **MT GIBSON GOLD PROJECT**

Item	Description	Unit	Quantity	Rate	Amount
1.00	**Stage 1B Embankment Construction, Crest RL345 m**				
	Preliminaries & Site Preparation				
1.01	Site establishment, including all preliminaries, insurances etc., mobilisation, demobilisation, borrow management, maintenance of existing tracks	Item	1		$ -
1.02	Site clearing including grubbing and stockpiling of vegetation from the TSF footprint area (extend approx. 5 m past the final downstream toe of embankments)	m^2	112,000	$ -	$ -
	Earthworks				
1.03	Strip topsoil (0.1 m thick) from TSF footprint area and stockpile separately from vegetation	m^3	20,000	$ -	$ -
1.04	Prepare perimeter embankment foundation	m^2	112,000	$ -	$ -
1.05	Moisture condition and compact TSF basin (to 0.3 m depth)	m^2	0		
1.06	Excavate cut-off trench beneath perimeter embankment (0.5-1.5 m deep, 4 m wide at base)	m^3	0	$ -	$ -
1.07	Backfill cut-off trench beneath perimeter embankment (0.5-1.5 m deep, 4 m wide at base) with roller compacted clayey materials	m^3	0	$ -	$ -
1.08	Borrow, transport, place and roller compact clayey materials to embankment	m^3	122,000	$ -	$ -
1.09	Borrow, transport, place and traffic compact mine waste to embankment	m^3	824,000	$ -	$ -
1.10	Borrow, transport, place and traffic compact mine waste to decant accessway	m^3	13,000	$ -	$ -
1.11	Sheet perimeter embankment and decant accessway crests with gravel (0.1 m thick over the crest width minus windrows).	m^3	8,850	$ -	$ -
2.00	**Decant Structure**				
2.01	Borrow, transport, place and roller compact clayey materials to decant area (min 150 m radius, 0.3 m thick) to form in-situ liner around the decant area	m^2	22,000	$ -	$ -
2.02	Place select filter rock to form Rock Ring Decant	m^3	6,500	$ -	$ -
	SUB-TOTAL				**$ -**
3.0	**Ancillary Items**				
3.01	Airfares for Contractors / Superintendent personnel	No.			$ -
3.02	Accommodation and meals for Contractors	Person days			$ -
3.03	Fuel supplied by Principal	L			$ -
3.04	Construction monitoring costs (Superintendent and vehicle incl misc)	Item			$ -
3.05	QA/QC Geotechnical Testing	Days			by Client
3.06	Construction report and office support	Allow			by Client
	SUB-TOTAL				**$ -**
	No Contingency				**$ -**
	TOTAL COST-STAGE 1				**$ -**

Notes:

Date	23-May-23
Job No	PER2022-0011
File	PER2022-0011AE
Subject	Quantities
Revision	2

PROJECT : **TAILINGS STORAGE FACILITY/INTEGRATED WASTE LANDFORM**

CLIENT : **CAPRICORN METALS LTD**

LOCATION : **MT GIBSON GOLD PROJECT**

Item	Description	Unit	Quantity	Rate	Amount
1.00	**Stage 2 Embankment Construction, Crest RL350 m**				
	Preliminaries & Site Preparation				
1.01	Site establishment, including all preliminaries, insurances etc., mobilisation, demobilisation, borrow management, maintenance of existing tracks	Item	1		$ -
1.02	Site clearing including grubbing and stockpiling of vegetation from the TSF footprint area (extend approx. 5 m past the final downstream toe of embankments)	m^2	112,000	$ -	$ -
	Earthworks				
1.03	Strip topsoil (0.1 m thick) from TSF footprint area and stockpile separately from vegetation	m^3	20,000	$ -	$ -
1.04	Prepare perimeter embankment foundation	m^2	112,000	$ -	$ -
1.05	Moisture condition and compact TSF basin (to 0.3 m depth)	m^2	0		
1.06	Excavate cut-off trench beneath perimeter embankment (0.5-1.5 m deep, 4 m wide at base)	m^3	0	$ -	$ -
1.07	Backfill cut-off trench beneath perimeter embankment (0.5-1.5 m deep, 4 m wide at base) with roller compacted clayey materials	m^3	0	$ -	$ -
1.08	Borrow, transport, place and roller compact clayey materials to embankment	m^3	123,000	$ -	$ -
1.09	Borrow, transport, place and traffic compact mine waste to embankment	m^3	1,430,000	$ -	$ -
1.10	Borrow, transport, place and traffic compact mine waste to decant accessway	m^3	63,000	$ -	$ -
1.11	Sheet perimeter embankment and decant accessway crests with gravel (0.1 m thick over the crest width minus windrows).	m^3	9,000	$ -	$ -
2.00	**Decant Structure**				
2.01	Borrow, transport, place and roller compact clayey materials to decant area (min 150 m radius, 0.3 m thick) to form in-situ liner around the decant area	m^2	0	$ -	$ -
2.02	Place select filter rock to form Rock Ring Decant	m^3	30,000	$ -	$ -
	SUB-TOTAL				**$ -**
3.0	**Ancillary Items**				
3.01	Airfares for Contractors / Superintendent personnel	No.			$ -
3.02	Accommodation and meals for Contractors	Person days			$ -
3.03	Fuel supplied by Principal	L			$ -
3.04	Construction monitoring costs (Superintendent and vehicle incl misc)	Item			$ -
3.05	QA/QC Geotechnical Testing	Days			by Client
3.06	Construction report and office support	Allow			by Client
	SUB-TOTAL				**$ -**
	No Contingency				**$ -**
	TOTAL COST-STAGE 1				**$ -**

Notes:

Date	23-May-23
Job No	PER2022-0011
File	PER2022-0011AE
Subject	Quantities
Revision	2

PROJECT : TAILINGS STORAGE FACILITY/INTEGRATED WASTE LANDFORM

CLIENT : CAPRICORN METALS LTD

LOCATION : MT GIBSON GOLD PROJECT

Item	Description	Unit	Quantity	Rate	Amount
1.00	**Stage 3 Embankment Construction, Crest RL355 m**				
	Preliminaries & Site Preparation				
1.01	Site establishment, including all preliminaries, insurances etc., mobilisation, demobilisation, borrow management, maintenance of existing tracks	Item	1		$ -
1.02	Site clearing including grubbing and stockpiling of vegetation from the TSF footprint area (extend approx. 5 m past the final downstream toe of embankments)	m^2	112,000	$ -	$ -
	Earthworks				
1.03	Strip topsoil (0.1 m thick) from TSF footprint area and stockpile separately from vegetation	m^3	20,000	$ -	$ -
1.04	Prepare perimeter embankment foundation	m^2	112,000	$ -	$ -
1.05	Moisture condition and compact TSF basin (to 0.3 m depth)	m^2	0		
1.06	Excavate cut-off trench beneath perimeter embankment (0.5-1.5 m deep, 4 m wide at base)	m^3	0	$ -	$ -
1.07	Backfill cut-off trench beneath perimeter embankment (0.5-1.5 m deep, 4 m wide at base) with roller compacted clayey materials	m^3	0	$ -	$ -
1.08	Borrow, transport, place and roller compact clayey materials to embankment	m^3	125,000	$ -	$ -
1.09	Borrow, transport, place and traffic compact mine waste to embankment	m^3	2,060,000	$ -	$ -
1.10	Borrow, transport, place and traffic compact mine waste to decant accessway	m^3	77,000	$ -	$ -
1.11	Sheet perimeter embankment and decant accessway crests with gravel (0.1 m thick over the crest width minus windrows).	m^3	9,150	$ -	$ -
2.00	**Decant Structure**				
2.01	Borrow, transport, place and roller compact clayey materials to decant area (min 150 m radius, 0.3 m thick) to form in-situ liner around the decant area	m^2	0	$ -	$ -
2.02	Place select filter rock to form Rock Ring Decant	m^3	38,000	$ -	$ -
	SUB-TOTAL				**$ -**
3.0	**Ancillary Items**				
3.01	Airfares for Contractors / Superintendent personnel	No.			$ -
3.02	Accommodation and meals for Contractors	Person days			$ -
3.03	Fuel supplied by Principal	L			$ -
3.04	Construction monitoring costs (Superintendent and vehicle incl misc)	Item			$ -
3.05	QA/QC Geotechnical Testing	Days			by Client
3.06	Construction report and office support	Allow			by Client
	SUB-TOTAL				**$ -**
	No Contingency				**$ -**
	TOTAL COST-STAGE 1				**$ -**

Notes:

Date	23-May-23
Job No	PER2022-0011
File	PER2022-0011AE
Subject	Quantities
Revision	2

PROJECT : **TAILINGS STORAGE FACILITY/INTEGRATED WASTE LANDFORM**

CLIENT : **CAPRICORN METALS LTD**

LOCATION : **MT GIBSON GOLD PROJECT**

Item	Description	Unit	Quantity	Rate	Amount
1.00	**Stage 4 Embankment Construction, Crest RL360 m**				
	Preliminaries & Site Preparation				
1.01	Site establishment, including all preliminaries, insurances etc., mobilisation, demobilisation, borrow management, maintenance of existing tracks	Item	1		$ -
1.02	Site clearing including grubbing and stockpiling of vegetation from the TSF footprint area (extend approx. 5 m past the final downstream toe of embankments)	m^2	112,000	$ -	$ -
	Earthworks				
1.03	Strip topsoil (0.1 m thick) from TSF footprint area and stockpile separately from vegetation	m^3	20,000	$ -	$ -
1.04	Prepare perimeter embankment foundation	m^2	112,000	$ -	$ -
1.05	Moisture condition and compact TSF basin (to 0.3 m depth)	m^2	0		
1.06	Excavate cut-off trench beneath perimeter embankment (0.5-1.5 m deep, 4 m wide at base)	m^3	0	$ -	$ -
1.07	Backfill cut-off trench beneath perimeter embankment (0.5-1.5 m deep, 4 m wide at base) with roller compacted clayey materials	m^3	0	$ -	$ -
1.08	Borrow, transport, place and roller compact clayey materials to embankment	m^3	127,000	$ -	$ -
1.09	Borrow, transport, place and traffic compact mine waste to embankment	m^3	2,700,000	$ -	$ -
1.10	Borrow, transport, place and traffic compact mine waste to decant accessway	m^3	78,000	$ -	$ -
1.11	Sheet perimeter embankment and decant accessway crests with gravel (0.1 m thick over the crest width minus windrows).	m^3	9,300	$ -	$ -
2.00	**Decant Structure**				
2.01	Borrow, transport, place and roller compact clayey materials to decant area (min 150 m radius, 0.3 m thick) to form in-situ liner around the decant area	m^2	0	$ -	$ -
2.02	Place select filter rock to form Rock Ring Decant	m^3	46,000	$ -	$ -
	SUB-TOTAL				**$ -**
3.0	**Ancillary Items**				
3.01	Airfares for Contractors / Superintendent personnel	No.			$ -
3.02	Accommodation and meals for Contractors	Person days			$ -
3.03	Fuel supplied by Principal	L			$ -
3.04	Construction monitoring costs (Superintendent and vehicle incl misc)	Item			$ -
3.05	QA/QC Geotechnical Testing	Days			by Client
3.06	Construction report and office support	Allow			by Client
	SUB-TOTAL				**$ -**
	No Contingency				**$ -**
	TOTAL COST-STAGE 1				**$ -**

Notes:

Date	23-May-23
Job No	PER2022-0011
File	PER2022-0011AE
Subject	Quantities
Revision	2

PROJECT : **TAILINGS STORAGE FACILITY/INTEGRATED WASTE LANDFORM**

CLIENT : **CAPRICORN METALS LTD**

LOCATION : **MT GIBSON GOLD PROJECT**

Item	Description	Unit	Quantity	Rate	Amount
1.00	**Stage 5 Embankment Construction, Crest RL365 m**				
	Preliminaries & Site Preparation				
1.01	Site establishment, including all preliminaries, insurances etc., mobilisation, demobilisation, borrow management, maintenance of existing tracks	Item	1		$ -
1.02	Site clearing including grubbing and stockpiling of vegetation from the TSF footprint area (extend approx. 5 m past the final downstream toe of embankments)	m^2	112,000	$ -	$ -
	Earthworks				
1.03	Strip topsoil (0.1 m thick) from TSF footprint area and stockpile separately from vegetation	m^3	20,000	$ -	$ -
1.04	Prepare perimeter embankment foundation	m^2	112,000	$ -	$ -
1.05	Moisture condition and compact TSF basin (to 0.3 m depth)	m^2	0		
1.06	Excavate cut-off trench beneath perimeter embankment (0.5-1.5 m deep, 4 m wide at base)	m^3	0	$ -	$ -
1.07	Backfill cut-off trench beneath perimeter embankment (0.5-1.5 m deep, 4 m wide at base) with roller compacted clayey materials	m^3	0	$ -	$ -
1.08	Borrow, transport, place and roller compact clayey materials to embankment	m^3	129,000	$ -	$ -
1.09	Borrow, transport, place and traffic compact mine waste to embankment	m^3	3,370,000	$ -	$ -
1.10	Borrow, transport, place and traffic compact mine waste to decant accessway	m^3	79,000	$ -	$ -
1.11	Sheet perimeter embankment and decant accessway crests with gravel (0.1 m thick over the crest width minus windrows).	m^3	9,500	$ -	$ -
2.00	**Decant Structure**				
2.01	Borrow, transport, place and roller compact clayey materials to decant area (min 150 m radius, 0.3 m thick) to form in-situ liner around the decant area	m^2	0	$ -	$ -
2.02	Place select filter rock to form Rock Ring Decant	m^3	54,000	$ -	$ -
	SUB-TOTAL				**$ -**
3.0	**Ancillary Items**				
3.01	Airfares for Contractors / Superintendent personnel	No.			$ -
3.02	Accommodation and meals for Contractors	Person days			$ -
3.03	Fuel supplied by Principal	L			$ -
3.04	Construction monitoring costs (Superintendent and vehicle incl misc)	Item			$ -
3.05	QA/QC Geotechnical Testing	Days			by Client
3.06	Construction report and office support	Allow			by Client
	SUB-TOTAL				**$ -**
	No Contingency				**$ -**
	TOTAL COST-STAGE 1				**$ -**

Notes:

Date	23-May-23
Job No	PER2022-0011
File	PER2022-0011AE
Subject	Quantities
Revision	2

PROJECT : **TAILINGS STORAGE FACILITY/INTEGRATED WASTE LANDFORM**

CLIENT : **CAPRICORN METALS LTD**

LOCATION : **MT GIBSON GOLD PROJECT**

Item	Description	Unit	Quantity	Rate	Amount
1.00	**Stage 6 Embankment Construction, Crest RL370 m**				
	Preliminaries & Site Preparation				
1.01	Site establishment, including all preliminaries, insurances etc., mobilisation, demobilisation, borrow management, maintenance of existing tracks	Item	1		$ -
1.02	Site clearing including grubbing and stockpiling of vegetation from the TSF footprint area (extend approx. 5 m past the final downstream toe of embankments)	m^2	112,000	$ -	$ -
	Earthworks				
1.03	Strip topsoil (0.1 m thick) from TSF footprint area and stockpile separately from vegetation	m^3	20,000	$ -	$ -
1.04	Prepare perimeter embankment foundation	m^2	112,000	$ -	$ -
1.05	Moisture condition and compact TSF basin (to 0.3 m depth)	m^2	0		
1.06	Excavate cut-off trench beneath perimeter embankment (0.5-1.5 m deep, 4 m wide at base)	m^3	0	$ -	$ -
1.07	Backfill cut-off trench beneath perimeter embankment (0.5-1.5 m deep, 4 m wide at base) with roller compacted clayey materials	m^3	0	$ -	$ -
1.08	Borrow, transport, place and roller compact clayey materials to embankment	m^3	131,000	$ -	$ -
1.09	Borrow, transport, place and traffic compact mine waste to embankment	m^3	4,060,000	$ -	$ -
1.10	Borrow, transport, place and traffic compact mine waste to decant accessway	m^3	81,000	$ -	$ -
1.11	Sheet perimeter embankment and decant accessway crests with gravel (0.1 m thick over the crest width minus windrows).	m^3	9,650	$ -	$ -
2.00	**Decant Structure**				
2.01	Borrow, transport, place and roller compact clayey materials to decant area (min 150 m radius, 0.3 m thick) to form in-situ liner around the decant area	m^2	0	$ -	$ -
2.02	Place select filter rock to form Rock Ring Decant	m^3	62,000	$ -	$ -
	SUB-TOTAL				**$ -**
3.0	**Ancillary Items**				
3.01	Airfares for Contractors / Superintendent personnel	No.			$ -
3.02	Accommodation and meals for Contractors	Person days			$ -
3.03	Fuel supplied by Principal	L			$ -
3.04	Construction monitoring costs (Superintendent and vehicle incl misc)	Item			$ -
3.05	QA/QC Geotechnical Testing	Days			by Client
3.06	Construction report and office support	Allow			by Client
	SUB-TOTAL				**$ -**
	No Contingency				**$ -**
	TOTAL COST-STAGE 1				**$ -**

Notes:

Date	23-May-23
Job No	PER2022-0011
File	PER2022-0011AE
Subject	Quantities
Revision	2

PROJECT : **TAILINGS STORAGE FACILITY/INTEGRATED WASTE LANDFORM**

CLIENT : **CAPRICORN METALS LTD**

LOCATION : **MT GIBSON GOLD PROJECT**

Item	Description	Unit	Quantity	Rate	Amount
1.00	**Stage 7 Embankment Construction, Crest RL372 m**				
	Preliminaries & Site Preparation				
1.01	Site establishment, including all preliminaries, insurances etc., mobilisation, demobilisation, borrow management, maintenance of existing tracks	Item	1		$ -
1.02	Site clearing including grubbing and stockpiling of vegetation from the TSF footprint area (extend approx. 5 m past the final downstream toe of embankments)	m^2	56,000	$ -	$ -
	Earthworks				
1.03	Strip topsoil (0.1 m thick) from TSF footprint area and stockpile separately from vegetation	m^3	10,000	$ -	$ -
1.04	Prepare perimeter embankment foundation	m^2	52,000	$ -	$ -
1.05	Moisture condition and compact TSF basin (to 0.3 m depth)	m^2	0		
1.06	Excavate cut-off trench beneath perimeter embankment (0.5-1.5 m deep, 4 m wide at base)	m^3	0	$ -	$ -
1.07	Backfill cut-off trench beneath perimeter embankment (0.5-1.5 m deep, 4 m wide at base) with roller compacted clayey materials	m^3	0	$ -	$ -
1.08	Borrow, transport, place and roller compact clayey materials to embankment	m^3	53,000	$ -	$ -
1.09	Borrow, transport, place and traffic compact mine waste to embankment	m^3	1,720,000	$ -	$ -
1.10	Borrow, transport, place and traffic compact mine waste to decant accessway	m^3	41,000	$ -	$ -
1.11	Sheet perimeter embankment and decant accessway crests with gravel (0.1 m thick over the crest width minus windrows).	m^3	9,700	$ -	$ -
2.00	**Decant Structure**				
2.01	Borrow, transport, place and roller compact clayey materials to decant area (min 150 m radius, 0.3 m thick) to form in-situ liner around the decant area	m^2	0	$ -	$ -
2.02	Place select filter rock to form Rock Ring Decant	m^3	26,000	$ -	$ -
	SUB-TOTAL				**$ -**
3.0	**Ancillary Items**				
3.01	Airfares for Contractors / Superintendent personnel	No.			$ -
3.02	Accommodation and meals for Contractors	Person days			$ -
3.03	Fuel supplied by Principal	L			$ -
3.04	Construction monitoring costs (Superintendent and vehicle incl misc)	Item			$ -
3.05	QA/QC Geotechnical Testing	Days			by Client
3.06	Construction report and office support	Allow			by Client
	SUB-TOTAL				**$ -**
	No Contingency				**$ -**
	TOTAL COST-STAGE 1				**$ -**

Notes:

Appendix M – Operations Manual

23 May 2023

TAILINGS STORAGE FACILITY NO. 1 (TSF1)

MT GIBSON GOLD PROJECT, WA

OPERATIONS MANUAL

Capricorn Metals Ltd

PER2022-0011AF Rev 2

Table of Contents

1 INTRODUCTION 1
1.1 Scope of the Operations Manual 1
1.2 Roles and Responsibilities 2
1.3 Training and Competency 3
1.4 Document Control 3
1.5 Managing Change Documents 3
1.5.1 Modifications to Design and/or Operation 3
1.5.2 Regulatory Changes 4
1.5.3 Ownership and Designation Changes 4
2 DESIGN CONCEPT 4
3 SUMMARY OF OPERATIONAL PROCEDURES 5
3.1 General 5
4 COMPONENTS OF TAILINGS STORAGE 6
4.1 Deposition of Tailings 6
4.1.1 Tailings Pipework 6
4.1.2 Deposition Process 6
4.1.3 Main Flushing 7
4.2 Return Water Operation 7
5 ROUTINE INSPECTIONS AND MAINTENANCE 7
5.1 Monthly Inspections 8
5.2 Annual Engineer's Inspection 8
5.3 Inspections 8
5.3.1 Tailings Lines 8
5.3.2 Return Water System 9
5.4 Embankment 9
6 MONITORING REQUIREMENTS 9
6.1 Process Plant 9
6.2 Embankment Monitoring 10
6.2.1 Vibrating Wire Piezometers 10
6.2.2 Monitoring Bores 10
6.3 Environmental Monitoring 10
6.3.1 Climatic Data 10
6.3.2 Water Quality 11
6.3.3 Storage Monitoring 11
7 EMERGENCY ACTION PLAN 11
7.1 Response Actions 12
7.2 Tailings Storage 12
7.3 Tailings Lines and Return Water Lines 13
7.4 Process Water Pond 13
8 INCIDENT REPORTING 13
9 DECOMMISSIONING AND REHABILITATION WORKS 14

10 CLOSURE 14

Figures

Figure 1 – TSF Final Stage Plan

Figure 2 – TSF Stage 1 Plan

Figure 3 – Freeboard Nomenclature

Figure 4 – Schematic Pipe Layout Plan

Appendices

Appendix A – Proformas

Appendix B – Trigger Action Response Plan (TARP)

Appendix C – Dam Safety Emergency Plan (DSEP)

Appendix D – Risk Register

1 INTRODUCTION

This manual is intended to be used by process plant staff who undertake daily inspections of the Tailings Storage Facility No. 1 (TSF1) tailings storage at the Mt Gibson Gold Project (MGGP), a gold mine located in the Mid West Region of WA, approximately 280 km northeast of Perth and 70 km southwest of Paynes Find. MGGP is owned by Capricorn Metals Ltd (CMM).

The purpose of this manual and the attached proformas is to document operational design procedures, describe the components of the TSF, outline inspection and monitoring protocols, and provide emergency action plan. These allow both shift and daily inspection records to be taken and recorded and, if required, reported to senior staff. The provisions of the Operations Manual must be strictly adhered to by the owner and the storage must be operated strictly in accordance with its provisions. CMW Geosciences Pty Ltd (CMW), the designer shall not be liable in any respect whatsoever for any damage to or failure in the operations of the tailings storages resulting from failure of the Owner, its servants or agents to comply with the provisions of this Operations Manual.

This document sets out details of the components of the storage facility which are influenced by the general day to day activities. Each of these components forms part of the overall operation of the storage facility and attention must be paid to each component to ensure the storage facility is operated to achieve the design objectives.

The components which are influenced by the general day to day activities include:

- Tailings deposition.
- Decant pump operation.
- Routine inspections and maintenance.

Site personnel involved with TSF1 should be trained in the requirements of this manual. Proforma PF4 should be signed by each person and training records retained on site. A risk register relating to TSF1 should be compiled using a workshop involving the operators and designers. The register should be updated as required and reviewed annually.

1.1 Scope of the Operations Manual

This document details the requirements for plant management and operators who have the responsibility for ensuring that:

- The containment embankment for TSF1 has been constructed to achieve the design objectives relevant to the operation of the facility.
- The TSF and all associated infrastructure is operated, maintained and monitored to achieve the design objectives.
- The facility is operated in accordance with the parameters that have been provided by CMW for use in the design of the TSF. Where changes in the parameters are proposed, the process plant management must advise the designers in order that the impact of the changes can be fully assessed.
- Additional storage requirements are planned, designed, budgeted for and constructed well in advance of the expected availability of the additional capacity.
- The annual engineering audit is completed.

1.2 Roles and Responsibilities

The individual responsibilities for TSF1 are detailed in Table 1.

Table 1 – Individual Responsibilities

Staff Designation	Operation	Maintenance	Surveillance & Reporting	Emergency Response	Reports to
Resident Manager (RM) / General Manager (GM)	√	√	√	√	Board / Company Directors
Process Plant Manager (PPM)	√	√	√	√	General Manager (GM)
Process Plant Supervisor (PPS) and Process Plant Operators (PPO)	√		√	√	PPM
Maintenance Supervisor (MS) electrical, instrumentation, pumping and piping		√		√	PPM
Mining Foreman (MF) mining activities and other earthworks				√	GM
Environmental Consultant (EC)			√		GM / PPM
Emergency Response Team (ERT)				√	GM
Design Consultant (DC)			√		GM / PPM

1.3 Training and Competency

The Process Plant Manager (PPM) has the responsibility for ensuring that the training and competency of all the personnel relevant to the day to day operation of TSF1 are completed.

The PPM will also ensure the various departments (Process Plant, Maintenance, Mining and Environmental) are each aware of their respective duties and roles and shall confirm that the training and competency of the relevant personnel within these departments have been completed.

The PPM also has the responsibility to ensure the training and competency of contractors is completed prior to work being undertaken on TSF1 or the associated infrastructure.

All personnel involved with TSF1 must be aware of visual indicators (leaking pipes, high solution levels, cracking, etc.) of the performance of TSF1.

1.4 Document Control

The PPM or his appointed designate has the responsibility for all document control for TSF1 including the Operating Manuals. The essential documents for TSF1 comprise the following:

- Design documents, including drawings.
- Operating Manual, including the associated records.
- Managing Change Documents.

1.5 Managing Change Documents

1.5.1 Modifications to Design and/or Operation

No changes shall be made to the design or operation of TSF1 without the written approval of the PPM, the GM and TSF designers where the proposed change to TSF1 materially affects the design or the operation of the facility.

Where design standards change, the designers should contact the PPM and the General Manager and advise of the changes required to bring either the design or operation of the facilities into line with current standards.

All approved changes to the design and/or operation of TSF1, no matter how minor, must be thoroughly documented and recorded in the master document control sheet for TSF1.

The procedures for making changes to the design and operation of TSF1 comprise:

- Submission of a written Request for Change to the PPM. The Request for Change Submission must outline the proposed change, the reason for the change, the expected impact (if any) of the change and the expected benefit (if any) of the change.
- Determination by the PPM if the proposed change has any impact, either positive or negative, and determine the value of the benefits of the proposed change.
- If the proposed change has no material effect on the design and/or operation of TSF1, the Request for Change Submission can be implemented and the relevant design and operational documents updated as required and the change noted in the master document.
- If the proposed change materially affects the design and/or operation of TSF1, the Request for Change Submission will be forwarded to the GM and DC with the comments of the PPM, for action as appropriate.

- Where the Request for Change Submission affects the design of TSF1, the DC will review the submission and make the necessary changes ensuring that any impacts not envisaged by the PPM are noted on the submission. The revised documents and the submission will be returned to the PPM. The revised documents will be appended to the OM document and the amendments noted on the document control sheet.
- Where the Request for Change Submission affects the operation of TSF1, the DC will review the submission and note the changes ensuring that any impacts not envisaged by the PPM are noted on the submission. The revised documents and the submission will be returned to the PPM. The revised documents will be appended to the OM document and the amendments noted on the document control sheet.
- Where the Request for Change Submission affects the operation of TSF1, the training and competency procedures will be reviewed to assess whether changes need to be made. Where changes are required, the relevant documents will be amended and the amendments noted on the document control sheets.

1.5.2 Regulatory Changes

Changes in the regulatory requirements will be passed to the PPM to be assessed, processed and documented using the same procedures as outlined in Section 1.5.1 above.

1.5.3 Ownership and Designation Changes

Changes in the ownership or changes to the organisational structure or designation hierarchy (Table 1) will be passed to the PPM, processed and documented using the same procedures as outlined in Section 1.5.1 above.

2 DESIGN CONCEPT

Details of the design are presented in the CMW (2023) report, '*Tailings Storage Facility No. 1 (TSF1) Mt Gibson Gold Project, WA, Design Report'*, referenced PER2022-0011AD Design Report Rev 2 dated 23/5/2023. TSF1 has been designed to store approx. 55 Mt of tailings over 11-years of storage life.

Based on the DMP Code of Practice (2013), the hazard rating for TSF1 has been assessed as 'Category 1 – Medium'. For the purposes of design, the ANCOLD (2019) consequence rating is 'High C' was adopted.

TSF1 will be located on Mining Leases M59/772. It has an approximate centre located at (MGA, Zone 50J) coordinates 6,709,150 m North and 517,700 m East.

TSF1 has been designed as a circular facility incorporated within a waste rock storage, producing what is known as an Integrated Waste Landform (IWL). It will be constructed within a clay/silt-lined perimeter embankment and raised utilising the downstream construction method. The clayey/silty (upstream) low permeability zone will have a minimum width of 6.0 m and roller compacted. The mine waste (downstream) zone will have a nominal width of 14.0 m and traffic compacted.

At Stage 1 construction, to crest RL 345.0 m AHD, the upstream zone of TSF1 will incorporate a cut-off trench 0.5 m to 1.5 m deep founded on a cemented Ferricrete layer in order to reduce seepage losses. Its footprint will have a diameter of approximately 1,360 m for a circumference of 4,270 m. Stage 2 to Stage 7 (Final) raises will each incorporate a 1.5 m offset (bench) from the upstream crest of the preceding construction. Stage 1 will be split into Stage 1A and Stage 1B. Stage 1A will be constructed prior to commissioning and Stage 1B in the early operations. Each construction raise will

be 5 m high except for Stage 7 where the raise will be 2 m high. The crest level at Stage 7 construction is RL 372.0 m AHD.

At Stage 7 construction, TSF1 will occupy a total footprint area of approximately 207 ha and a maximum embankment height of 46.0 m (final crest RL 372.0 m AHD). Its footprint will have a diameter of approximately 1,625 m for a circumference of 5,105 m.

Surface water will be removed from TSF1 by a decant pump located within a rock-ring decant at the centre of the TSF. At the early stages of deposition, surface water will be recovered by temporary decants at two locations. Return water will be pumped to the plant for reuse. The efficacy of the water return system is the key to achieving a high in-situ dry density within the tailings bed. The design also incorporates a seepage collection system under the embankment footprint.

The minimum capacity of the water recovery system should be not less than 940 tph including the additional capacity to recover water from design storm events.

3 SUMMARY OF OPERATIONAL PROCEDURES

3.1 General

The operational design of the facilities is aimed at:

- Provide 55 Mt of tailings storage. This will provide approximately 11-years of storage life at 5 Mtpa and tailings in-situ density of 1.35 t/m^3 (dry).
- Provide optimum removal of water from the facility and return to the plant for re-use in processing (i.e. an existing water treatment facility).
- Optimise tailings storage capacity by maximising tailings density (i.e. undertaking cyclic tailings deposition between groups of spigots).
- Reduce environmental impact (i.e. due to seepage).

The following operational considerations have been incorporated into the design:

- Tailings in the form of slurry will be discharged sub-aerially and cyclically into the facility in thin discrete layers, not exceeding 0.3 m thickness, in order to allow optimum density and strength gain by subjecting each layer to a drying cycle. Deposition will take place via multiple spigots from around the facility. Tailings deposition will be from the perimeter of the storage.
- Spigotting of tailings is to be carried out such that the supernatant pond is maintained within and around the rock-ring decant. The pond is to be maintained away from the perimeter embankment at all times.
- Water will be removed from the facility and pumped back to the process plant via a decant pump located in a centrally located rock-ring type decant structure.
- The tailings storage area will assume the form of a truncated prism with a depressed cone on the top surface. The facility will have the capacity to store a considerable volume of water during a storm event. The minimum total freeboard for TSF1 under normal operating conditions is 0.7 m which includes an allowance for the temporary storage of the 1:100 years or 1% average exceedance probability (AEP) storm event of 72-hour duration whilst maintaining the required minimum freeboard (refer Figure 2).
- Frequent inspections should be made of the tailings line, water return line, discharge points, water recovery system and the position of the supernatant pond in relation to the water recovery system.

- Only by regular inspection and appropriate remedial action can the performance of the water return system be optimised and operational problems be avoided.
- The operation, safety and environmental aspects should be periodically reviewed during an audit by a suitably experienced and qualified engineer. This audit should be done at least every year.
- On eventual decommissioning, the facility will remain as a permanent feature of the landscape and drain to an increasingly stable mass. The top surface and batters will be stabilised and rehabilitated as detailed in the design report.

4 COMPONENTS OF TAILINGS STORAGE

4.1 Deposition of Tailings

The method of deposition of tailings into storage is one of the major controlling factors in achieving:

- Higher in-situ densities in the tailings storage.
- Higher water returns.
- Maintaining embankment stability.

In order to understand the tailings deposition requirements, detailed knowledge of the components of the tailings system is required. These components include:

- Tailings pipe-work.
- Tailings deposition process.
- Ring main flushing.

4.1.1 Tailings Pipework

Tailings are transported from the process plant to TSF1 via an HDPE pipeline. At the TSF, the pipeline will split into two distribution lines to distribute the tailings around the active storage. One line distributes tailings to the northern section and one to the southern section.

The tailings distribution lines comprise welded HDPE pipe. The distribution lines have spigot offtakes located at nominally 60 m intervals on the embankment. The pipework is located adjacent to the upstream crest of the embankment and perimeter access road. Figure 3 shows a schematic pipe arrangement.

4.1.2 Deposition Process

Tailings should be deposited over the exposed beaches, at a low velocity from several spigot discharge points. Deposition should occur for a period of around two days from each group of spigots. Some experimentation will be required regarding the number of open spigots and the frequency of changing of spigots.

Each spigot comprises a mining hose fitted with a valve/scissor clamp to control flow through the spigot (or similar). Tailings should not be discharged so as to erode the perimeter containment embankment. During deposition, conductor pipes (slotted) should be utilised to ensure the tailings are deposited at the toe of the embankment.

4.1.3 Main Flushing

At the completion of the sequential deposition on each distribution main and following the change over to the alternative distribution main, the inoperative tailings line should be flushed with water (tails return water) until it is clean. The flushing operation will be supervised by the Shift Foreman.

4.2 Return Water Operation

Surface water will be removed from TSF1 by a decant pump located within a rock-ring type central decant structure. Return water will be pumped back to the process plant for reuse. The target average water return under normal operating conditions is approximately 62% of slurry water inflow. The minimum capacity of the water recovery system should not be less than 940 tph including the additional capacity to recover water from design storm events.

At the early stages of deposition, surface water will be recovered by temporary decants within the tailings storage basin. The locations (2 no.) of the temporary decant structures are shown on Drawing PER2022-0011-02. It should be noted that given the sloping nature of the ground, decant water will not enter the central decant for 2-3 months.

The location of the decant water pond will be controlled by the tailings discharge sequence employed. The process of tailings deposition is aimed at ensuring that the pond is positioned around the decant facilities and that the pond is maintained in that position. The pond is positioned by altering the location of deposition point around the perimeter of the storage, as appropriate.

The pond around the decant should be maintained at the smallest practical operational size (i.e. ideally within the rock-ring) to maximise water return to the plant to enable most of the free water to be recovered through the decant for recycling to the process plant.

The size of the pond will be largely governed by the efficiency of the decant system in removing water from the tailings storage. Other controlling factors will be:

- Evaporation from the surface of the pond;
- Variations to the input of tailings water (percentage solids);
- Rainfall events;
- Difference in permeability between the tailings and the underlying rock units; and
- The ratio of horizontal to vertical permeability of the tailings.

5 ROUTINE INSPECTIONS AND MAINTENANCE

The following routine inspection and maintenance procedures are to be carried out for the various components of the system. Reporting sheets (Proformas) are attached covering the following inspections:

- Monthly Inspection Log PF1
- Daily Inspection Log PF2
- Personnel Contact Details PF3
- Staff Confirmation Log PF4
- Assembly Points To be supplied by Capricorn Metals Ltd (CMM)

Routine inspections, as detailed below, are to be undertaken by an operator or shift supervisor, each shift on a daily basis. The date and time of each inspection are to be entered onto the inspection log

and is to be signed by the person allocated to undertake the inspection on that shift to ensure the requirements have been undertaken. Suggested proformas are attached to this operations manual.

The Shift Inspection Log Sheet is to be filled out on each shift, daily. The frequency of the routine inspection is to be increased if any untoward conditions are observed at any time. Copies of inspection logs should be retained on-site.

The inspections should cover:

- The pipelines (tailings delivery line and water return lines) to and from TSF1.
- Leak detection.
- Pumps.
- Valves.
- Spigotting and deposition.
- Location and size of the decant pond.
- Decant and return water pumps operation.
- Seepage recovery flows and pumps.
- Seepage from the embankment toe.
- The general integrity of the embankment i.e. any new cracking or new seepage (daily).
- Any changes to existing cracking or seepage.

5.1 Monthly Inspections

Monthly inspections of TSF1 should be carried out by process plant management, refer to PF1 in order to provide management oversight of the facility.

These inspections should assess the items listed in the proforma and note any changes which have occurred since the previous inspection.

5.2 Annual Engineer's Inspection

An audit by a qualified geotechnical engineer with experience in the design, operation and auditing of tailings storages should be carried out at least once every year.

5.3 Inspections

5.3.1 Tailings Lines

The tailings line is to be inspected a least once per shift. The date and time of each inspection are to be entered onto the inspection log.

All tailings lines will be bunded. The HDPE tailings lines are sensitive to temperature, and the expansion and contraction of this line can cause leaks, and in extreme situations, failure of the pipeline. Any leaks or failures of the tailings pipeline should be immediately reported to the following personnel or project equivalents and an incident report completed.

- Shift Foreman; or
- Mill Superintendent (Processing Manager).

5.3.2 Return Water System

The position and size of the pond in relation to TSF1 should be inspected at the same time as the tailings lines are inspected. Any abnormalities (i.e. lack of freeboard, pumps not operable) should be reported immediately to the following personnel or project equivalents:

- Shift Foreman; or
- Mill Superintendent (Processing Manager).

The return water lines to the plant from TSF1 should also be inspected at the same time as the tailings line. All return water lines will be bunded. Any leaks or failure of the water pipeline should be immediately reported to the following personnel or project equivalents:

- Shift Foreman; or
- Mill Superintendent (Processing Manager).

5.4 Embankment

Part of the general activities of the Shift Foreman, when visiting the storage facilities, shall be to inspect the embankment, including berms and batter slopes. The inspection shall note any cracking or new features, such as seepage, embankment erosion or scour (caused by tailings deposition or rainfall runoff) or any other obvious changes or problems.

6 MONITORING REQUIREMENTS

The following section details the monitoring requirements to ensure TSF1 is performing in accordance with the design parameters and the details presented in the detailed design report.

Monitoring results (e.g. water quality and water level) should be recorded on spreadsheets and plotted and graphed as soon as possible. The information should be reviewed after being entered and graphed to allow any changes to be identified and acted upon.

The plotting of recorded information allows trends to be determined. Where newly recorded information deviates (generally significantly) from a previously established trend the reading should be checked, the general area should be inspected and the information reported to plant management for consideration and action.

Copies of the current leased licence conditions (DWER or DMIRS) relevant to the tailings storage should be attached to this document to allow for easy reference. Each time the licence is renewed or updated all conditions should be checked for any changes, with appropriate confirmation they have been read and records have been updated and will be acted upon as considered appropriate.

6.1 Process Plant

In addition to the daily visual inspections of the water pond, spigots, water return pumps, tailings and return water pipelines the following information should be recorded at a minimum on a monthly basis:

- Ore treatment, measured in dry tonnes.
- Tailings slurry density, measured in percentage solids or slurry water volume.
- Water return from all sources from TSF1 to the process plant, measured in cubic metres or tonnes.

This information will be utilised to estimate a water balance as part of the annual review of TSF1.

6.2 Embankment Monitoring

The requirement for additional instrumentation (i.e. monitoring bores, piezometers) associated with TSF1 should be reviewed as part of the yearly audit.

6.2.1 Vibrating Wire Piezometers

Vibrating wire piezometers (VWP) are to be installed as part of the starter embankment construction. Allowance needs to be made for four (4) pairs, a total of eight (8) VWPs. VWPs will enable the phreatic surface within the TSF1 embankment to be monitored and stability analyses to be validated in the future.

VWPs are connected to data loggers downstream of the TSF. Under normal operating conditions, the data should be downloaded from the loggers at least monthly, but under some circumstances, more frequent readings are required as defined in the trigger action response plan (TARP) presented in Appendix B. The data should be downloaded to a spreadsheet and assessed by a geotechnical engineer.

Installation details and calibration of the VWPs should be provided following construction. For the VWP trigger levels, refer to the TARP. The VWP data should be reviewed as part of the annual audit by CMW or an independent 3rd Party.

6.2.2 Monitoring Bores

Four (4) monitoring bores (min.) should be installed around TSF1 to a maximum depth of 59 m as recommended in the CMW (2023) report.

It is recommended that as a minimum:

- Groundwater level readings are taken monthly, except in circumstances as defined by the TARP in Appendix B.
- Groundwater samples for laboratory analyses are taken quarterly, except for pH which is analysed on site.
- Analysis will be for Cu, Pb, Zn, As, Cd, Al, Fe, Ca, Mg, Na, K, HCO3, SiO2, SO4, Cl, NO3, Al2O3, B, Br, Sr, Mn, F, Ag, Ba, Be, Bi, CO3, Hg, Mo, Ni, P, Sb, Se, Si, Sn, U, W and Cr.
- Information collected from the monitoring bores be reviewed regularly and reported in an annual environmental review (AER) and annual TSF audit (every 3 years in DMIRS guidelines).

The trigger levels for the monitoring bores must be determined by an environmental consultant, and reflected in the attached TARP in Appendix B. The monitoring bores data should be reviewed as part of the annual audit by CMW or an independent 3rd Party.

6.3 Environmental Monitoring

6.3.1 Climatic Data

If climatic information is collected on-site or at a nearby BOM station, the following climatic data is to be collected daily or at the end of each month:

- Rainfall for the month.
- Evaporation for the month (if recorded on site or a nearby BOM station).

This information can be utilised in order to assist with determining a water balance for the annual review of TSF1.

6.3.2 Water Quality

Water quality monitoring (sampling and testing) is required from the following areas or sources:

- Monitoring bores located in and around TSF1.
- Seepage and any surface water located either downstream or upstream of TSF1.
- Slurry water discharged into the storage, decant water on the storage and water returned to the plant.

The frequency of the water quality monitoring is usually determined by the regulatory authorities with the details of the water quality requirements stipulated either on a licence or other approval documents issued by the regulatory authorities.

6.3.3 Storage Monitoring

Detailed mudline and water pond level surveys are to be carried out at least on an annual basis. This will enable the storage volume that has been used to be reconciled with the tailings tonnage deposited into the storage to establish an in-situ density of the tailings from comparison with the design in-situ density.

If any embankment construction is undertaken, as-built survey plans should be updated.

7 EMERGENCY ACTION PLAN

The Emergency Response Plan (ERP) or the Dam Safety Emergency Plan (DSEP) for MGGP (including the plant and TSF1) should be based on the results of the dam break analyses presented in the design report. The plan should be reviewed and updated as a minimum on a yearly basis. DESP and a risk register are presented in Appendix C and Appendix D, respectively.

The plan should include:

- Management responsibilities and emergency coordination.
- Muster points.
- Seeking specialist geotechnical advice.
- Emergency Plan Triggers (see TARP for further details), namely:
    - Freeboard less than design values.
    - Significant embankment distress.
    - Elevated piezometer and monitoring bore readings.
    - Imminent overtopping.
    - Damage following an earthquake or extreme rainfall event.

The emergency response should be managed by the Processing Manager. When the triggers above have been exceeded, personnel should be directed to the muster area, upslope of the TSF1 area, as appropriate. The designers should also be advised as required when geotechnical advice is required.

To enable the emergency action plan to be implemented and to allow a safe and timely response to be instigated, the attached documents (Personnel Contact Details, Assembly Points and Staff Confirmation Log) outline current information pertaining to assembly points and contact names. The sheets shall be reviewed at least six monthly or updated as required when new staff become responsible for activities in and around the facilities.

Contractors shall also be made familiar with the location of the assembly point and be made aware of their reporting responsibilities and to whom they shall report to.

The attached sheets should provide a list of relevant contact details of staff associated with the tailings storage, senior site responsible staff, safety officers and emergency services.

7.1 Response Actions

In the event of an emergency, the site ERT must immediately be notified and advised of the nature of the emergency to enable the appropriate emergency action plan to be implemented. The site ERP/DSEP contains the details presented in the following sections such that response activities are coordinated with operations personnel.

At the time of the emergency, the PPS or his designated (trained operator) representative is to ensure that:

- All personnel and contractors who were or are working in or around the location of the emergency are accounted for.
- Personnel contact details are provided. This form must be reviewed quarterly as a minimum and must be updated immediately in the event of personnel leaving or joining the operation.
- All mine based personnel listed in the responsibility hierarchy are immediately contacted and advised of the nature of the emergency and any assistance required is requested.

All personnel who are working in the vicinity of the emergency are expected to be present at the muster points and are expected to be aware of other assembly points around TSF1 and the relevant reporting procedures. Emergency assembly points to be determined prior to commissioning of the TSF.

7.2 Tailings Storage

TSF1 has an adequate factor of safety against failure under normal operating and seismic load conditions, appropriate for the location.

Normal operating conditions refer to the tailings surface and surface of the supernatant water pond being within the freeboard requirements.

The probability of the containment failure during normal operations is very low, given:

- TSF1 embankment has been designed with adequate factors of safety and construction has been monitored by the designer of the TSF; and
- The implementation of the tailings operation methodology, appropriate to the facility, including the routine inspections and maintenance practices is adhered to as set out in this document.

However, in the unlikely event of embankment failure, the flow of tailings from the storage will be controlled by the extent of the water pond and the degree of saturation of the tailings at the time of failure.

Action to control an embankment failure and to limit environmental damage would include:

- Shut down of the process plant;
- Evacuate areas that will likely be affected by the tailings breach (i.e. plant);
- Construction of bunds by earthmoving equipment to divert and contain the tailings;
- Contacting a suitably qualified geotechnical organisation for technical assistance;
- Advising the relevant regulatory authorities;

- Deployment of pumps to recover tailings water and returning it to TSF1 if structurally sound or to the plant water storage facilities if evaporation and or dilution is impractical;
- Undertaking a thorough inspection of the area with the assistance of a geotechnical specialist prior to the commencement of any repairs;
- Repairing the damaged embankment;
- Cleaning up of tailings as soon as practicable after the repairs have been completed;
- Preparing an incident report, detailing all factors prior to the incident and the situation after clean-up. The report should identify causes of the problem and what actions will be taken to prevent a similar occurrence. This report should detail the on-going monitoring program to fully assess the impact of the incident;
- Advising all appropriate regulatory authorities as necessary of the incident; and
- Reviewing conditions of any license or lease conditions in respect to the timing of advising the regulatory authorities and the contents of that notification (reporting criteria).

It must be stressed however, that the safe operation of TSF1 relies upon the implementation of operational procedures which comprise tailings deposition, decant operation and routine inspections and maintenance, as set out in this document to minimise the potential for a catastrophic event such as a failed embankment.

7.3 Tailings Lines and Return Water Lines

The tailings lines from the process plant to the tailings storage and the return water lines from the decant facilities to the process water dam are to be located inside bunded, pipes/open trenches to contain any spillage of materials resulting from leaks or burst pipes during operation. In the event of pipeline failure, the PPM is to be notified and the affected pipeline is to be shut down until repaired and the spilled materials collected and/or pumped, as appropriate, and deposited in TSF1.

7.4 Process Water Pond

The decant pump is operated manually and run at all times. The pump is only switched off:

- During plant shutdowns or maintenance periods; and
- When dirty water is pumped into the process water tank, or when embankment construction is scheduled in accordance with the design.

Alternative pumping equipment and pump locations may be required during periods of pump maintenance or when embankment construction work is being undertaken.

8 INCIDENT REPORTING

The undertaking of regular inspections and monitoring is aimed at identifying any problems prior to them causing a major impact on the operation or integrity of the structure. The inspections may result in the identification of an event that may require reporting to senior staff and in some cases to relevant government departments, i.e. new seepage as indicated by monitoring bores.

Typical reporting events include:

- Any fauna death on or near TSF1 (not road kill).

- Any uncontrolled release of tailings slurry or return water and the cause (pipe break, overtopping, pump malfunction, automatic switch malfunction, operator error, etc.).
- Impact from seepage (vegetation distress, soil contamination, water quality changes).
- Defects to the tailings storage facility covering such things as the embankment and return water system (i.e. pertaining to safety issues).
- Changes in water quality that exceed prescribed conditions of licence criteria.
- Increases in production tonnages.

It is recommended that prior to submitting an incident report to DWER or DMIRS that an assessment be undertaken to confirm the nature, type and impact of the incident by either senior site staff or an independent organisation. If an incident requires reporting to the DWER or DMIRS, as a minimum, an incident report form should be used as well as any other reporting requirements (refer to licences).

9 DECOMMISSIONING AND REHABILITATION WORKS

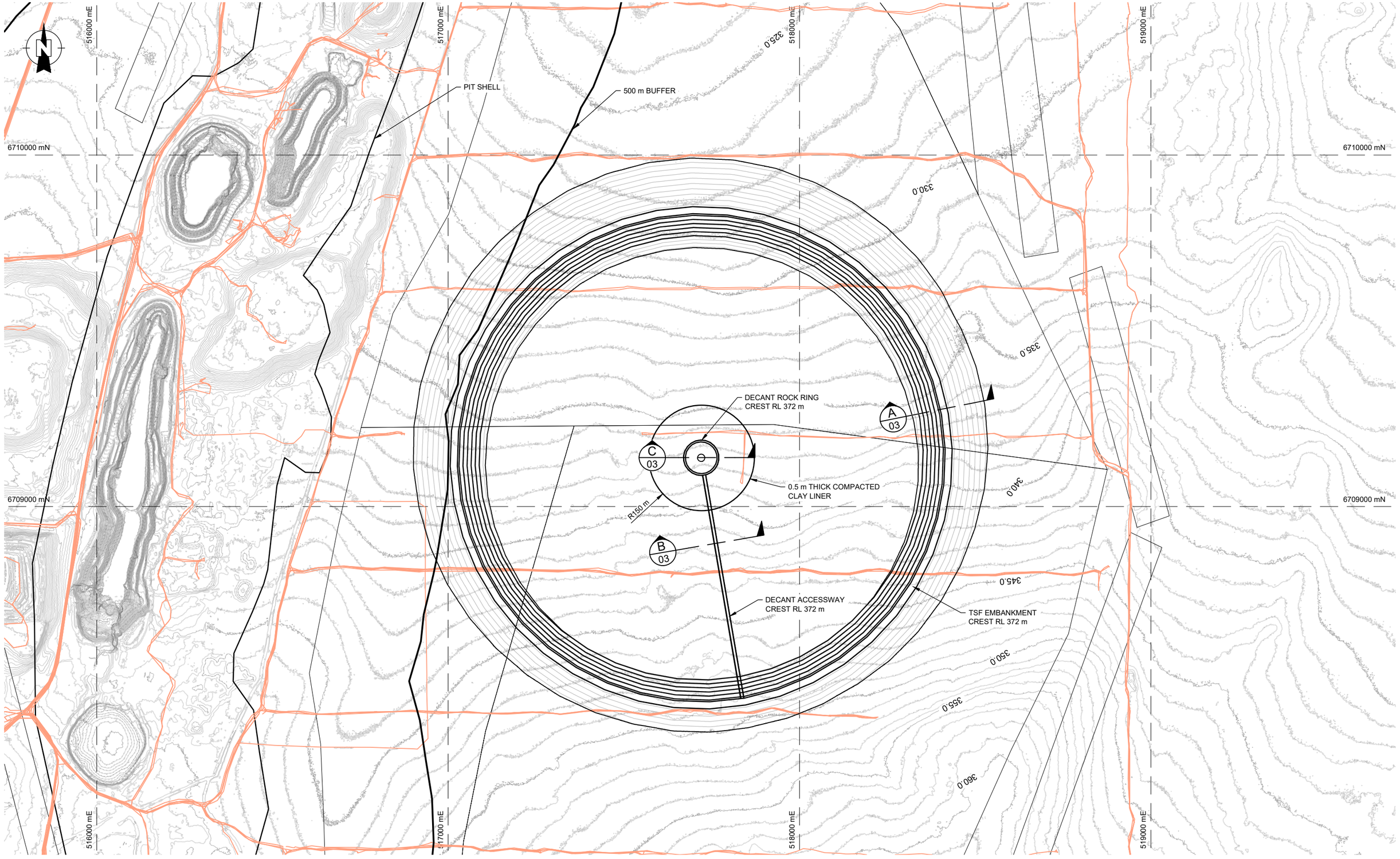
Refer to the CMW (2023) detailed design report for details of closure works associated with TSF1. Progressive rehabilitation works cannot be performed for the TSF during operations.

Rehabilitation closure criteria for TSF1 including observations specific to the tailings and consolidation will be developed and progressed as part of a Mine Closure Plan. Details of the criteria will be documented in the Mine Closure Plan (MCP) associated with the Mining Proposal.

10 CLOSURE

This Operations Manual is to be read in conjunction with the CMW (2023) design report. This Operating Manual contains copies of proforma log sheets and lists of information to be inspected and recorded on a daily, monthly or yearly basis.

Figures



LEGEND:

SOUTH STERILISATION LINES

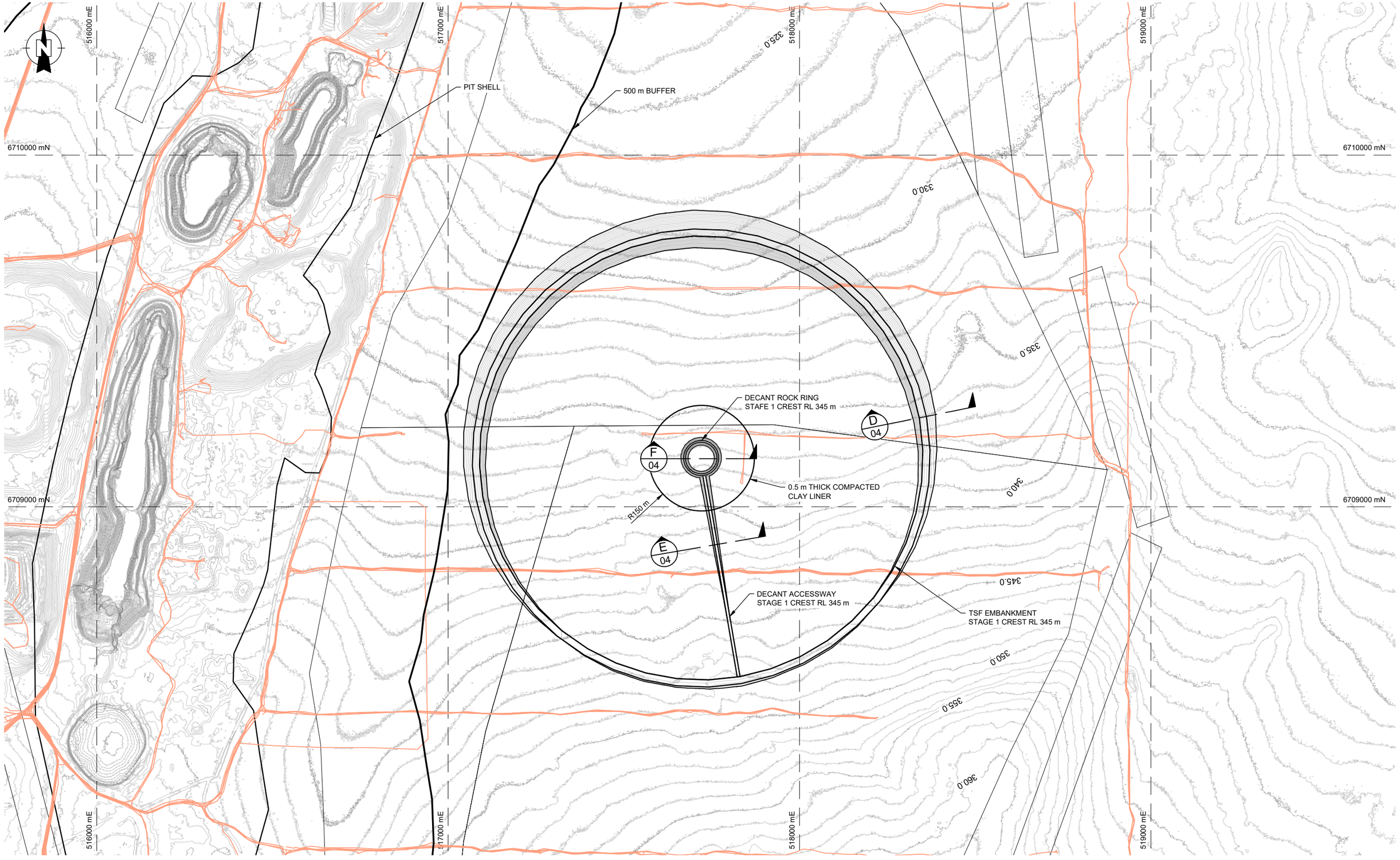
NOTES:

1. CONTOURS GENERATED FROM CLIENT SUPPLIED FILE: Lidar1m Contours
2. COORDINATE SYSTEM: MGA ZONE 50, GDA94

1:10 000 0 100 200 300 400 500 m

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		DRAWN: DE	PROJECT: PER2022-0011AF
PROJECT: MT GIBSON GOLD MINE TSF DESIGN		CHECKED: PA	DRAWING: 01
		REVISION: A	SCALE: 1:10,000
TITLE: TSF - FINAL STAGE PLAN		DATE: 02.03.23	SHEET: A3 L



LEGEND:

SOUTH STERILISATION LINES

NOTES:

1. CONTOURS GENERATED FROM CLIENT SUPPLIED FILE: Lidar1m Contours
2. COORDINATE SYSTEM: MGA ZONE 50, GDA94

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0 100 200 300 400 500 m

CMW Geosciences

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PROJECT: MT GIBSON GOLD MINE TSF DESIGN		CHECKED: PA	DRAWING: 02
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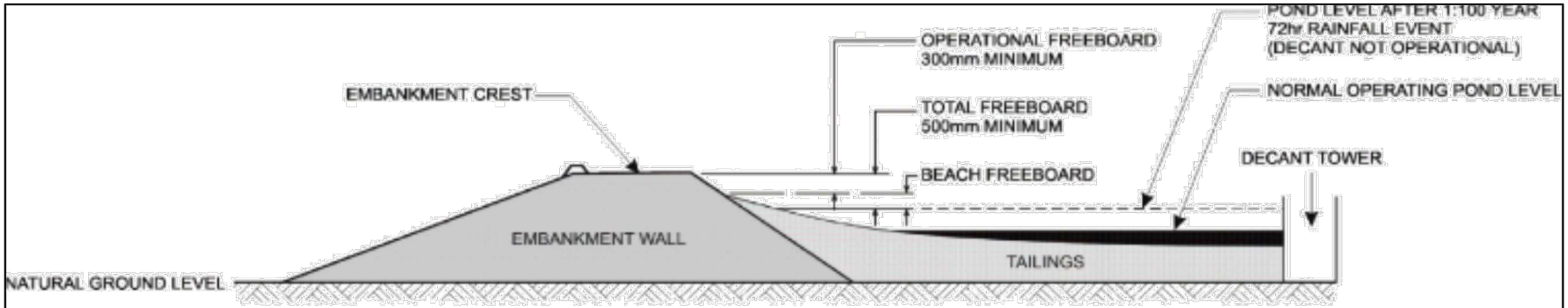
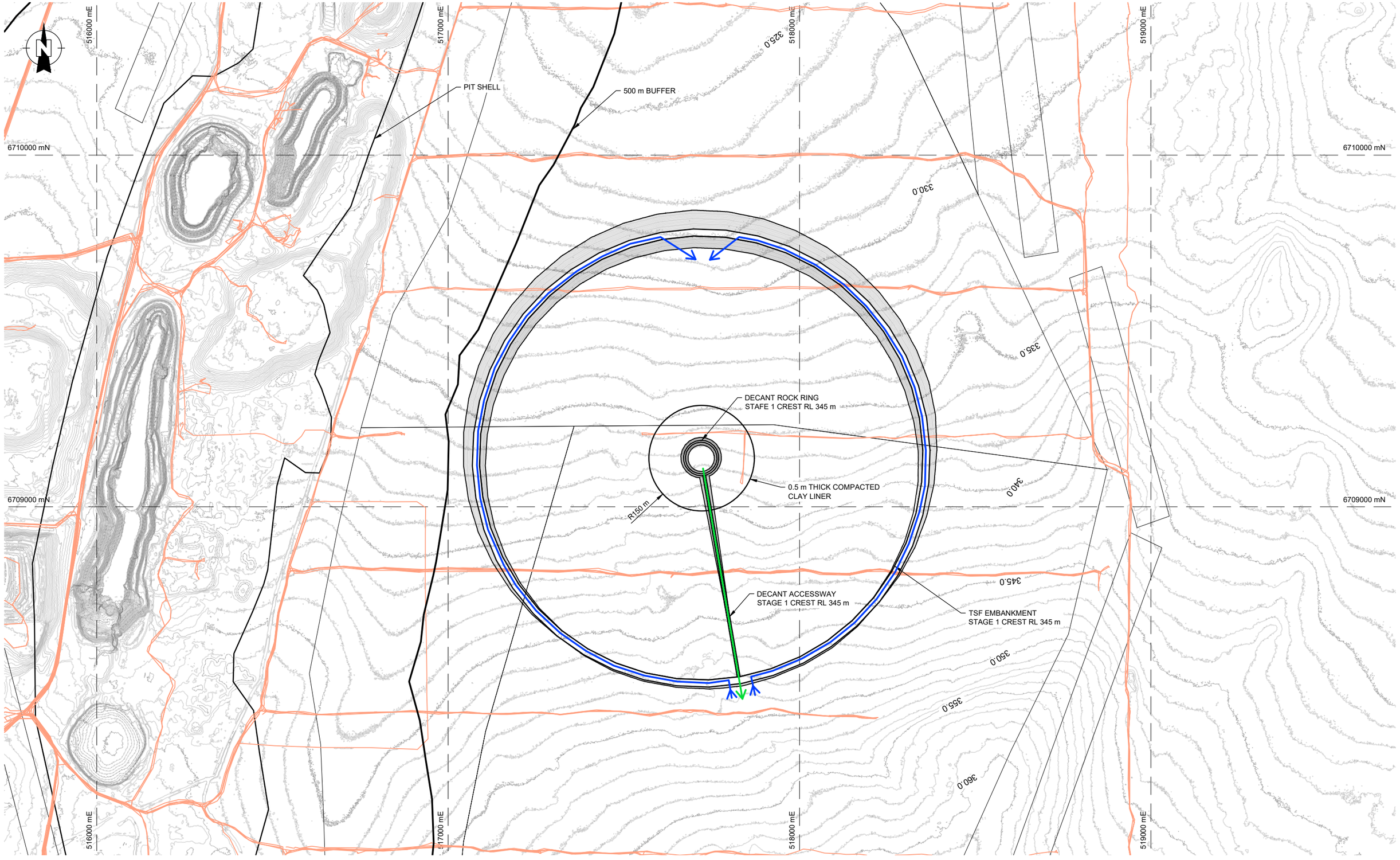
TITLE: TSF - STAGE 1 PLAN		DATE: 02.03.23	SHEET: A3 L



NOTE: FOR CASE WHERE POND IS NORMALLY LOCATED AWAY FROM ANY PERIMETER EMBANKMENTS

CMW Geosciences	CLIENT: **CAPRICORN METALS LTD**	DRAWN: DE	PROJECT: PER2022-0011AF
	PROJECT: **TSF1 MT GIBSON GOLD PROJECT, WA**	CHECKED: CH	FIGURE: 03
		REVISION: 0	SCALE: NTS
	TITLE: **FREEBOARD NOMENCLATURE**	DATE: 02.03.23	SHEET: A3 L



LEGEND:

- SOUTH STERILISATION LINES
- SLURRY LINES
- RETURN WATER LINES

NOTES:

1. CONTOURS GENERATED FROM CLIENT SUPPLIED FILE: Lidar1m Contours
2. COORDINATE SYSTEM: MGA ZONE 50, GDA94

1:10 000 — 0 100 200 300 400 500 m

CMW Geosciences

CLIENT: CAPRICORN METALS LTD		DRAWN: DE	PROJECT: PER2022-0011AF
PROJECT: MT GIBSON GOLD MINE TSF DESIGN		CHECKED: PA	DRAWING: 04
		REVISION: A	SCALE: 1:10,000
TITLE: SCHEMATIC PIPE LAYOUT PLAN		DATE: 07.03.23	SHEET: A3 L

Appendix A

Proformas

PROJECT	**: TAILINGS STORAGE FACILITY NO. 1 (TSF1)**	Date	2-Mar-23
		Job No	PER2022-0011
CLIENT	**: CAPRICORN METALS LTD**	File	PER2022-0011AF
		Subject	Inspections
LOCATION	**: MT GIBSON GOLD PROJECT**	Revision	0
SUBJECT	**: MONTHLY INSPECTION LOG AND MONITORING SHEET- PROCESS PLANT MANAGEMENT**	**PF1**	sheet 1 of 1

Date:	**Time:**	**Shift Number:**
Shift Supervisor:	**Inspection by:**	**Verified by:**
	Employee Number:	

Item	Description of Inspection Activity	Comments	Remedial Works	
			Start	Finish
1.0	**Embankments**			
	Is cracking, slumping or other distress present around the embankment crests and benches? If yes, is it new cracking or existing cracking? Has existing increased in extent?			
	Is the freeboard above the designated level? (Based on DMIRS criteria that is 0.7 m, operation freeboard (at embankment)			
	Is staining or discolouration present on any of the downstream batter slopes of the embankments?			
	Is water ponding at the downstream toe of any of the embankments?			
	Is there evidence of seepage or seepage water flow from the downstream toe of any of the embankments? If yes, is it new or existing seepage? Has existing increased in extent?			
2.0	**Tailings Deposition**			
	Is the distribution of the tailings on the beaches as required by the operations manual?			
3.0	**Decant System**			
	Is the supernatant water positioned around the decant facility?			
	Is the supernatant surface (within the storage) as planned, or is there excess water on the storage?			
	Can the decant system handle storm runoff in addition to the reclaim water efficiently?			
4.0	**Process Plant Information**			
	Ore processed for the month (tonnes)			
	Average tailings slurry density, measured in percentage solids			
	Water return from the tailings storage to the process plant (in tonnes and m3)			
	Compare the water return to the target of 62% of slurry water inflow (on an average annual basis). Any comments? Corrections required to operations?			
5.0	**Monitoring**			
	Have the water levels in the monitoring bores been measured and data entered to the appropriate sheet?			
	Has the water quality data from the monitoring bores been checked and data entered into the appropriate spreadsheet?			
	Has the VWP piezometer data been downloaded from the data loggers and uploaded to a spreadsheet?			
7.0	**Climatic Data**			
	Has the site rainfall been recorded entered daily into spreadsheet? monthly total?			
8.0	**Other Aspects**			
	Comments			

PROJECT	**: TAILINGS STORAGE FACILITY NO. 1 (TSF1)**	Date	2-Mar-23
		Job No	PER2022-0011
CLIENT	**: CAPRICORN METALS LTD**	File	PER2022-0011AF
		Subject	Inspections
LOCATION	**: MT GIBSON GOLD PROJECT**	Revision	0
SUBJECT	**: DAILY INSPECTION LOG SHEET**	**PF2**	sheet 1 of 1

Date:	**Time:**	**Shift Number:**
Shift Supervisor:	**Inspection by:**	**Verified by:**
	Employee Number:	

Item	**Criteria**	**Operating/Defective YES/NO**		**Comments**
		N/S	**D/S**	
Roadways	Condition		Y/N	
Downstream areas	Any seepage/wet areas		Y/N	
	Any spillages		Y/N	
Pipelines	Leaks?	Y/N	Y/N	
Decant	Pumps operating	Y/N	Y/N	
	Discharge water clarity	Y/N	Y/N	
Tailings discharge	Location, no. of spigots?	Y/N	Y/N	
Freeboard	Pond position		Y/N	
	Depth (estimate)		Y/N	
	Operational freeboard (at wall ≥1.0 m) (Estimate)		Y/N	
Embankments	Any distress? Any cracking? Any Slumping?		Y/N	
Fauna	Any deaths		Y/N	
Flora	Any new distress		Y/N	
Monitoring	Damage to instruments		Y/N	

NOTES :
Please provide any comments or notes relating to the tailings storage facility

PROJECT : **TAILINGS STORAGE FACILITY NO. 1 (TSF1)**

CLIENT : **CAPRICORN METALS LTD**

LOCATION : **MT GIBSON GOLD PROJECT**

SUBJECT : **PERSONNEL CONTACT DETAILS**

Date	2-Mar-23
Job No	PER2022-0011
File	PER2022-0011AF
Subject	Inspections
Revision	0

Name	Company	Responsibility	Contact Details

Last updated :

PROJECT	**: TAILINGS STORAGE FACILITY NO. 1 (TSF1)**	Date	2-Mar-23
		Job No	PER2022-0011
CLIENT	**: CAPRICORN METALS LTD**	File	PER2022-0011AF
		Subject	Inspections
LOCATION	**: MT GIBSON GOLD PROJECT**	Revision	0
SUBJECT	**: STAFF CONFIRMATION LOG SHEET**	**PF4**	sheet 1 of 1

As part of the requirements for the safe operation of the Tailings Storage Facility No. 1 (TSF1), all personnel involved with the daily or regular operation and inspection of the TSF as well as those who are responsible for the TSF, are required to sign this form as confirmation that you have attended and understood all safety and induction procedures. In particular that you are familiar with the prepared operations manual that has been prepared to in accordance with DMIRS guidelines.

NAME :

SIGNATURE :

DATE :

Appendix B

Trigger Action Response Plan (TARP)

TSF1 MT GIBSON GOLD PROJECT (MGGP) - TRIGGER ACTION RESPONSE PLAN (TARP)

Level	Embankment Deformation	Seepage	Seismic
0	<50 mm lateral or <25 mm settlement in a quarter	Embankment toe dry	Earthquake MM ≤5
1	50 to 100 mm lateral or 25-50 mm settlement in a quarter	Water seeping from embankment	Earthquake MM 6-8
2	> 100 mm lateral or >50 mm settlement in a quarter	Water flow from embankment	Earthquake MM ≥9

For reactions to above trigger events refer to the Dam Safety Emergency Plan (DSEP) for TSF1 MGGP

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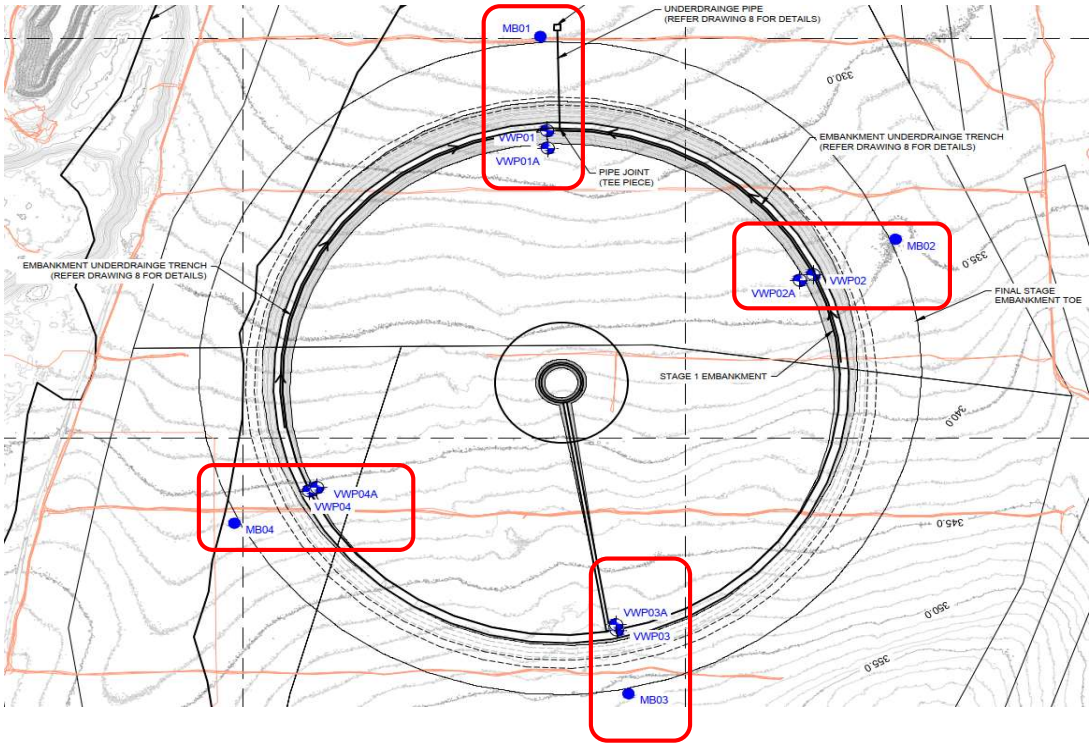
Hole Number	East (m)	North (m)	Embankment RL (m)	Instrument depth (mbgl)	RL at base (MB) / at piezometer (VWP) (mbgl)	Trigger Level RL (m)
MB01	517,679	6,710,003	326.0	34	292.0	... (*)
MB02	518,477	6,709,497	335.1	43	292.1	... (*)
MB03	517,872	6,708,362	350.8	59	291.8	... (*)
MB04	516,981	6,708,787	341.1	49	292.1	... (*)
VWP01	517,688	6,709,769	327.9	0.5	327.4	323.9
VWP01A	517,690	6,709,725	328.6	0.5	328.1	324.6
VWP02	518,290	6,709,409	333.7	0.5	333.2	329.7
VWP02A	518,260	6,709,395	333.8	0.5	333.3	329.8
VWP03	517,846	6,708,520	348.0	0.5	347.5	344.0
VWP03A	517,844	6,708,534	347.7	0.5	347.2	343.7
VWP04	517,149	6,708,868	340.4	0.5	339.9	336.4
VWP04A	517,168	6,708,877	340.3	0.5	339.8	336.3

* As determined by the Environmental Consultant



Appendix C

Dam Safety Emergency Plan (DSEP)

1 INTRODUCTION

This Dam Safety Emergency Plan (DSEP) applies to Tailings Storage Facility No. 1 (TSF1) at the Mt Gibson Gold Project (MGGP), a gold mine located in the Mid West Region of WA, approximately 280 km northeast of Perth and 70 km southwest of Paynes Find. MGGP is owned by Capricorn Metals Ltd (CMM).

This is a live document. This version is presented as part of the design of embankment construction on the facility, referenced PER2022-0011AD Design Report Rev 0 dated 2/3/2023 (CMW (2023) Design Report). The DSEP should be reviewed at least annually.

2 RESPONSIBILITIES

Operational responsibilities for the dam must be allocated to:

- Tailings deposition and decant operation: Process Plant Manager (PPM)/ Process Plant Supervisor (PPS)
- Routine inspections and monitoring: Process Plant Supervisor (PPS)
- Surveillance and safety reporting: CMW or an independent 3rd Party
- Routine maintenance: Maintenance Supervisor (MS)/ PPM

An emergency response would typically be initiated by the PPM, PPS or MS and the emergency coordinated by a delegated member/s of the Emergency Response Team (ERT).

3 EMERGENCY IDENTIFICATION, EVALUATION AND CLASSIFICATION

TSF1 has been designed with an adequate factor of safety against failure but unpredictable events due to nature or human intervention may compromise the integrity of the facility. For this reason, a matrix of response is required to be actioned should such an event occur. To assist with this several levels of alert have been provided where a different level of awareness and notification is required.

Emergency Action Plans

One alert level and two levels of action have been identified:

Level 1 **Alert Status – early indications**

Level 2 **Damage Apparent – possible impending failure**

Level 3 **Catastrophic – dam failure is or has occurred**

Procedures have been identified for each level of emergency in Figures C1, C2 and C3 (at the back of this document).

Reporting Procedures

3.2.1 Level 1 – Alert Status

Any unusual behaviour in the operation of the facility should always be evaluated. The following events fall into this category:

- New seepage is occurring from the embankment.
- New wet soft areas have developed on the embankment.

- Minor cracking on crest or batter slopes of the embankment.
- Movement readings indicate a significant increase in movement (refer TARP document).
- Lack of freeboard in TSF1 (i.e. operational freeboard ≥0.3 m).

If any of the above are observed, immediate action should be taken in accordance with the Level 1 Action Plan (Plate C1).

3.2.2 Level 2 – Damage Apparent

The advancement from a Level 1 to a Level 2 indicates the dam is suffering some distress, care should be taken not to be complacent in identifying a potential Level 2 event, since it is possible that a Level 2 situation can progress to a Level 3 in a short period of time where it would be impossible to prevent an incident.

In this category damage is already occurring, or has occurred, and there is potential for damage to a section of the dam to occur (partial dam weakening). The following are indicative of a Level 2 category:

- Sudden increase in the volume of seepage flow, erosion is noted.
- Flowing seepage water noted from upper sections of the embankment.
- Seepage water is cloudy or is discoloured, tailings observed in the water (indicating possible internal piping).
- Localised slumping is evident of the embankment crest or batter slopes.
- Sinkholes or other movements occur in deposited tailings.
- Discontinuity of alignment of dam crest or profile is noted in excess of 100mm.
- Collected rainfall is in danger of overtopping the dam, or significant overtopping of the dam is occurring from wave action and/or wind set up.

If any of the above take place immediate action is required in accordance with Level 2 Action Plan (Plate C2). The undertaking of any repair or remedial works shall only be initiated if it is SAFE to do so especially if heavy equipment is to be used. Keep clear unless absolutely necessary.

Restrict access to TSF1, notify downstream personnel, close potentially affected roads, advise government agencies and design consultant.

3.2.3 Level 3 – Embankment Failure or Break

This level of emergency is called for when one or more of the following has occurred, access to be limited:

- Embankment collapse.
- Breach of embankment is starting to occur, resulting in loss of tailings or floodwater.
- Overtopping and/or erosion of the embankment.
- Outflow of tailings and/or rain water.
- Mobilisation and outflow of tailings due to liquefaction by earthquake.

Actions must be taken immediately in accordance with Level 3 Action Plan (Plate C3) including advising downstream personnel, close roads, advise design consultants, government agencies. Appoint an Emergency Services Coordinator. Restrict access to the dam and priorities those who enter the area, set up road blocks to TSF1 area. Enter with extreme care and initiate hazard initiatives and management plan.

4 NOTIFICATION

As detailed above, notification of an emergency situation to relevant authorities and organisations is the responsibility of the PPM, PPS or MS. The contact details of all individuals and organisations are maintained in the site emergency management plan.

- PPM / PPS – CMM
- PPS – CMM
- Police, Fire and Ambulance. State Emergency Services
- Regional Inspector of Mines DMIRS, DWER Kalgoorlie
- CMW Geosciences Pty Ltd (Perth Office) or Dams Safety Adviser

5 ACCESS AND COMMUNICATIONS

Access to TSF1 is from the main access road which is located to the west of the facility.

MGGP operates an extensive two-way radio and an internal phone system.

6 INUNDATION MAP

The result from breach modelling indicates that the maximum (peak) run-out flow from a 'dam break' under 'worst-case' (Probable Maximum Precipitation, PMP) rainy day conditions will be approximately 1,417 to 5,103 m^3/s over 6 hours.

As drainage at TSF1 location is defined by sheetflow with no distinct drainage line, the flow in the project area is expected to flow to the north-northeast and into the Karpa Spring approximately 4 km away.

The flow was estimated to be approximately 500 m wide, with a maximum flow depth of approximately 1.5 m. Flow towards the site office and processing plant to the south of TSF1 is considered highly unlikely due to the higher elevations of these locations. It would however potentially flow into the adjacent pits, the closest being the Orion 2/3 Pit approximately 0.7 km away to the west.

The following consequences of a dam break are considered most likely to be:

- A dam break will unlikely inundate the plant or the camp, which are to be situated on higher grounds at >0.8 km, however, there is potential for loss of life due to the presence of the open pits to the west of TSF1, and infrastructure around the pits and TSF1.
- Loss of TSF storage capacity, and economic loss from permanent loss of assets including mine infrastructure, repairs of damaged sections of TSF1, damage to plant and local mine site roads.
- No public infrastructure is likely to be affected.
- Limited damage to natural environment including flora and fauna. Damage would reasonably be expected to be concentrated in the ephemeral streams.
- Some damage to items of heritage values

An Inundation Map is shown in the following Figure.

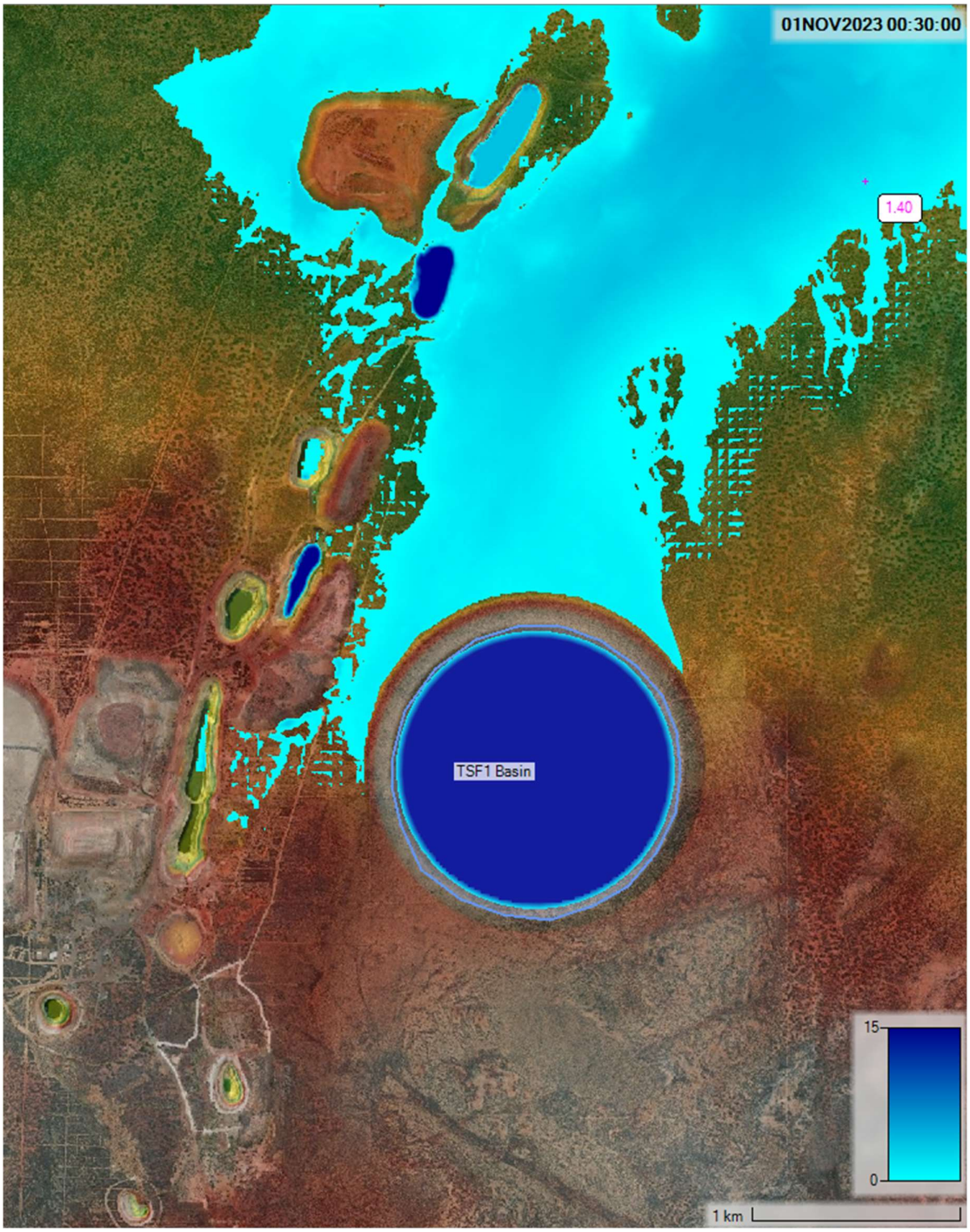


Figure: Inundation Plan
(ref: CMW (2023) Design Report, shown above is depth at 30 mins after a dam break)

7 PREVENTATIVE ACTIONS

Possible preventative actions for various trigger levels are provided in the table below.

Table: Preventative Actions

Trigger Level	Issue	Actions
1	• New seepage is occurring from the embankment	• Monitor decant pond level and extent on TSF1 • Reduce decant water pond, as appropriate • Monitor seepage for flow and turbidity
	• Minor cracking of embankment	• Monitor cracks for additional movement. Escalate to level 2 if movement continues.
	• Lack of freeboard	• Reduce decant water pond level
2	• Sudden increase in seepage, turbid seepage occurring from the embankment	• Monitor decant pond level and extent on TSF1 • Reduce decant water pond, as appropriate • Monitor seepage for flow and turbidity
	• Slumping of embankment (sinkholes etc)	• Buttress the embankment downstream of the slump. Escalate to level 3 if movement continues.
	• Imminent overtopping of embankment	• Reduce decant water pond level on facility. Escalate to Level 3 if pumps etc can't cope (i.e. level continues to rise) All of the above: notification of personnel from downstream (i.e. plant)
3	• Embankment collapsing • overtopping of embankment	• Evacuation of personnel from downstream of TSF1 and restrict access to TSF1

The following completes the DSEP:

- Dam Location and Description Summary
- Inundation Map

TSF1 – Dam Safety Plan – Summary Information

Location: Mt Gibson Gold Project

TSF1 approx. centre at 6,709,150 m N, 517,700 m E (MGA Zone 50J)

Description:

TSF1 has been designed as a circular facility incorporated within a waste rock storage, producing what is known as an Integrated Waste Landform (IWL). It will be constructed within a clay/silt-lined perimeter embankment and raised utilising the downstream construction method. The clayey/silty (upstream) low permeability zone will have a minimum width of 6.0 m and roller compacted. The mine waste (downstream) zone will have a nominal width of 14.0 m and traffic compacted.

At Stage 1 construction, to crest RL 345.0 m AHD, the upstream zone of TSF1 will incorporate a cut-off trench 1.5 m (nominal) deep founded on a cemented Ferricrete layer in order to reduce seepage losses. Its impoundment area will be approximately 129 ha, with a diameter of approximately 1,280 m for a circumference of 4,020 m. Stage 2 to Stage 7 (Final) raises will each incorporate a 1.5 m offset (bench) from the upstream crest of the preceding construction. Each construction raise will be 5 m high except for Stage 7 where the raise will be 2 m high. The crest level at Stage 7 construction is RL 372.0 m AHD.

At Stage 7 construction, TSF1 will occupy a total impoundment area of approximately 207 ha and a maximum embankment height of 46.0 m (final crest RL 372.0 m AHD). Its impoundment will have a diameter of approximately 1,625 m for a circumference of 5,105 m.

Surface water will be removed from TSF1 by a decant pump located within a rock-ring decant at the centre of the TSF. Return water will be pumped to the plant for reuse. The minimum capacity of the water recovery system should be not less than 940 tph including the additional capacity to recover water from design storm events.

Spillway: No spillway

Catchment Area: approx. 129 ha (Stage 1, Crest RL 345.0 m), 270 ha (Stage 7, Crest RL 372.0 m)

Consequence Category: High C

Alert Levels:

Level 1	Alert Status – early indications
Level 2	Damage Apparent – possible impending failure
Level 3	Catastrophic – dam failure is or has occurred

Notification Protocols: Refer to flowcharts at front of DSEP

Flood Plain Name: Not applicable

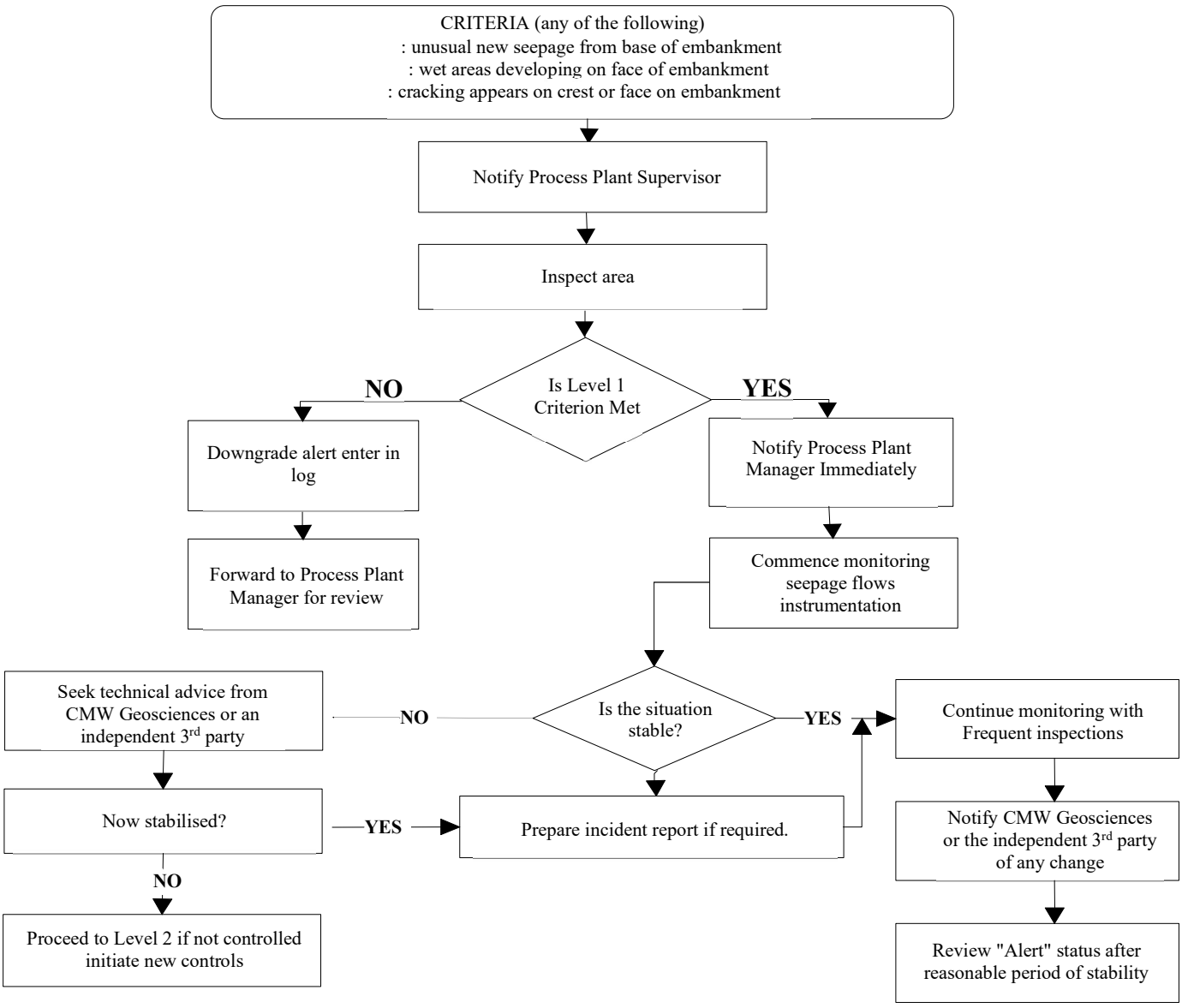
Consequences of Dam Failure:

The flow in the project area is expected to flow to the north-northeast and into the Karpa Spring approximately 4 km away.

Flow towards the site office and processing plant to the south of TSF1 is considered highly unlikely due to the higher elevations of these locations. It would however potentially flow into the adjacent pits, the closest being the Orion 2/3 Pit approximately 0.7 km away to the west.

LEVEL 1 - ACTION PLAN
"ALERT STATUS"

Process Plant Manager:	**04.. … …**
Process Plant Supervisor:	**04.. … …**
CMW Geosciences:	**(08) 6555 4920**

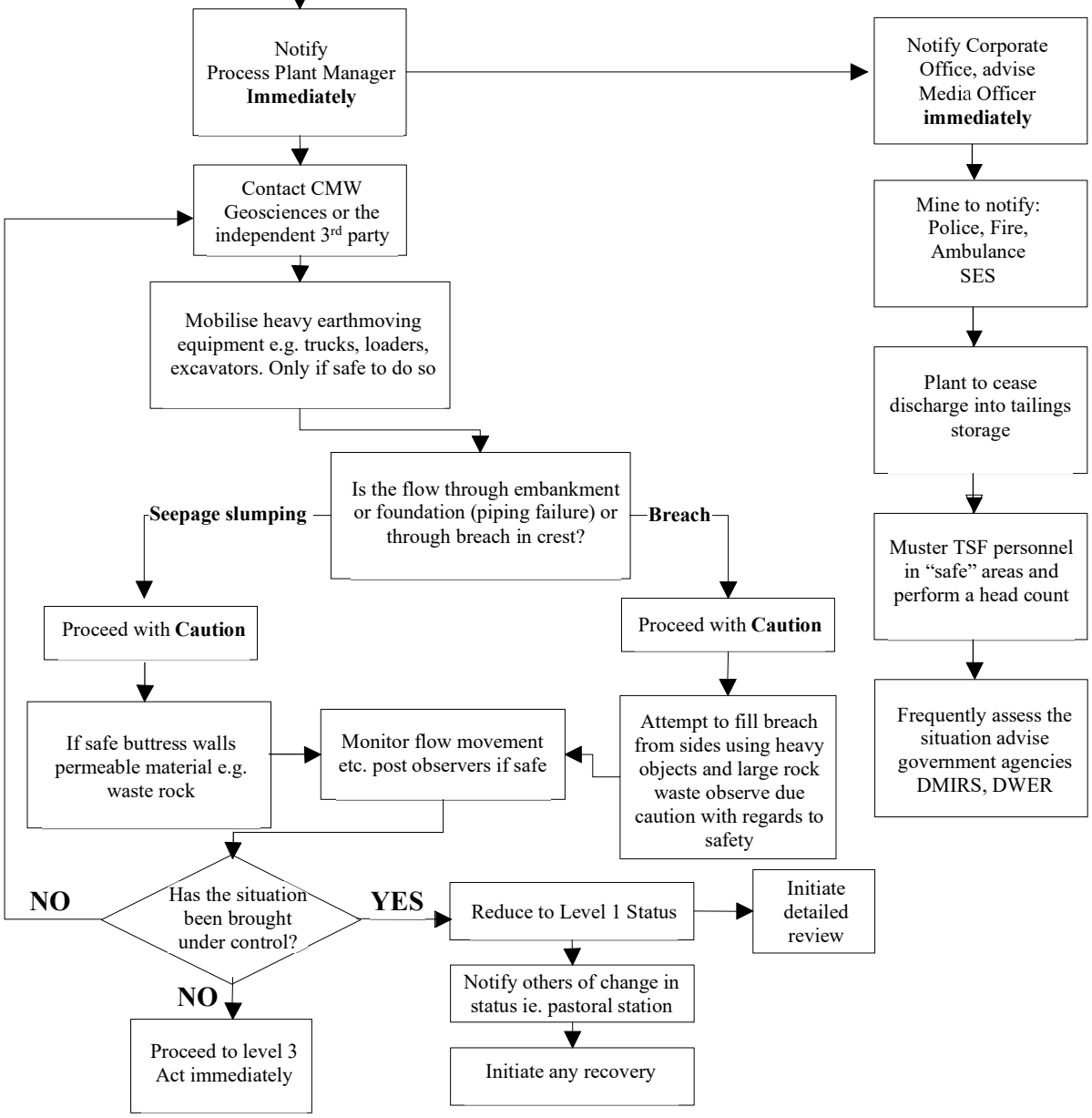


LEVEL 2 - ACTION PLAN
"DAMAGE APPARENT"

Process Plant Manager:	**04.. … …**
Process Plant Supervisor:	**04.. … …**
State Emergency Services (SES):	**(08) …. ….**
CMW Geosciences:	**(08) 6555 4920**

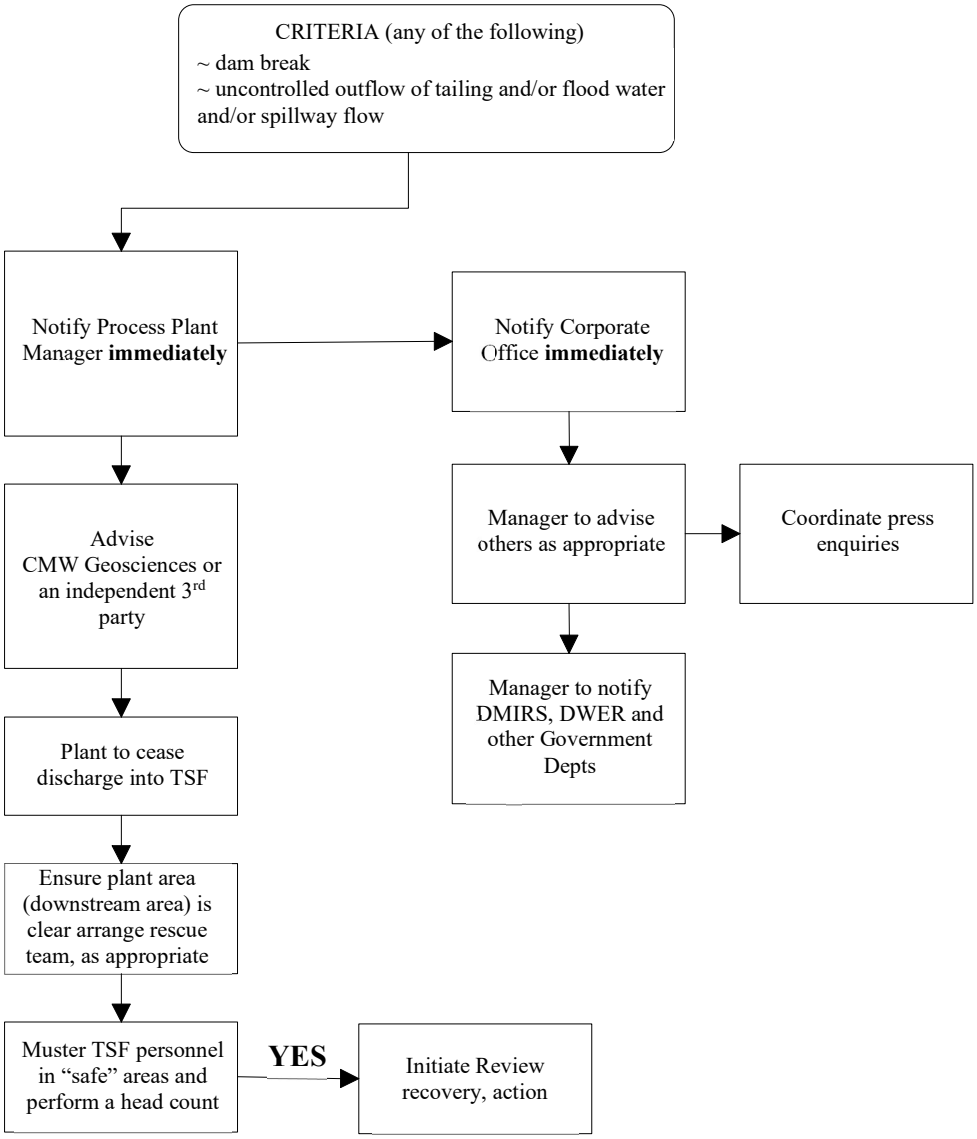
CRITERIA (any of the following)

: erosion hole formed water
: leakage >50 litres per second
: overtopping of dam imminent, or waves overtopping
: breach of dam imminent
: increasing seepage flow rate, turbid flows
: slumps on dam face
: discontinuity of dam alignment



LEVEL 3 - ACTION PLAN
"DAM FAILURE IS/HAS OCCURRED"

Process Plant Manager:	**04.. … …**
Process Plant Supervisor:	**04.. … …**
CMW Geosciences:	**(08) 6555 4920**



EMERGENCY CONTACT NUMBERS as at .. / .. / 2023

Capricorn Metals Ltd

Process Plant Manager
Currently: …
Mobile: 04.. … …
Email: …

Process Plant Supervisor
Currently: …
Mobile: 04.. … …
Email: …

Main Office
Phone number: (08) 9212 4600

Consultants

CMW Geosciences Pty Ltd
Tailings Principal: Mr Chris Hogg
Work: (08) 6555 4920
Mobile: 0499 311 109
E-mail: Chrish@cmwgeo.com

Review Consultant: *to be appointed, as appropriate*
Mobile: -

SES Emergency Line 132 500
Local SES 132 500

Mine Rescue -
Work phone: -
Mobile phone: -

DMIRS
Inspector: -
Phone Number: -

DWER
Inspector: -
Phone Number: -

Appendix D

Risk Register

Table - Risk assessment summary								
Risk identification		**Risk analysis (prior to management / control measures)**			**Risk management**	**Risk analysis (subsequent to management / control measures)**		
Risk	**Possible result**	**Consequence**	**Likelihood**	**Risk matrix rating**	**Management / control measures**	**Consequence**	**Likelihood**	**Risk matrix rating**
Tailings pump breakdown (at plant)	Spillage of slurry: Vegetation distress. Loss of production.	Moderate (3)	Possible (3)	Medium (9)	Use of standby pump. Use of automated systems for failure notification. Regular inspections and maintenance of pump.	Minor (2)	Unlikely (2)	Medium(4)
Tailings line leakage or rupture	Spillage of slurry: Vegetation distress. Loss of production.	Moderate (3)	Possible (3)	Medium (9)	Construction of bunded pipeline corridor. Use of leakage detection system. Regular inspection of TSF and pipeline.	Minor (2)	Unlikely (2)	Medium (4)
Seepage from the TSF	Rising groundwater levels leading to vegetation distress and seepage.	Major (4)	Possible (3)	High (12)	Minimise decant pond on TSF at all times. Installation/utilization of monitoring bores to measure groundwater levels and quality. Recovery of seepage water back to TSF/directly to the plant.	Moderate (3)	Unlikely (2)	Medium (6)
Decant pump breakdown	Increased size of decant pond size. Increased seepage.	Moderate (3)	Possible (3)	Medium (9)	Use of standby pump. Minimise decant pond on TSF at all times. Use of automated systems for failure notification. Regular inspections and maintenance of pump.	Minor (2)	Possible (3)	Medium (6)
Return water line leakage or rupture	Local seepage. Vegetation distress and seepage.	Moderate (3)	Possible (3)	Medium (9)	Construction of bunded pipeline corridor. Use of automated leakage detection system. Regular line inspection and maintenance.	Minor (2)	Unlikely (2)	Medium (4)
Rainfall event	TSF collapse or overtopping. TSF rupture-unconfined tailings. Contamination of soil and vegetation loss.	Severe (5)	Unlikely (2)	High (10)	Decant water pond is kept to a minimum. Allowance for 1:100 year AEP 72 hours storm event. Operational freeboard is kept to 300mm (minimum). Daily inspections.	Severe (5)	Rare (1)	High (5)

Risk identification		Risk analysis (prior to management / control measures)			Risk management	Risk analysis (subsequent to management / control measures)		
Risk	**Possible result**	**Consequence**	**Likelihood**	**Risk matrix rating**	**Management / control measures**	**Consequence**	**Likelihood**	**Risk matrix rating**
Rainfall Event	Downstream Embankment erosion.	Minor (2)	Possible (3)	Medium (6)	Checks for signs of erosion after rainfall events. Crest sloped inwards to shed water into the TSF. Embankment downstream slope covered with rock armour to protect from erosion if required.	Minor (2)	Unlikely (2)	Medium (4)
	Increase size of decant pond – Increase in seepage.	Moderate (3)	Possible (3)	Medium (9)	Minimise the size of the water pond. Undertake regular checks of pond and pumps to assess size and depth.	Moderate (3)	Unlikely (2)	Medium (6)
Water runoff	Downstream embankment erosion.	Minor (2)	Unlikely (2)	Medium (4)	Rock armour to decrease embankment wall erosion to staged embankments.	Slight (1)	Rare (1)	Low (1)
Wind	Dust generation. Tailings dust inhalation.	Moderate (3)	Likely (4)	High (12)	Rotate slurry spigots around TSF perimeter embankments. Rehabilitate when decommissioned. Salt crusting should lower dust risk.	Minor (2)	Unlikely (2)	Medium (4)
Earthquake	TSF rupture. Release of tailings. Loss of human life, fauna and/or vegetation. Loss of production.	Severe (5)	Unlikely (2)	High (10)	Adequate design, operate TSF as per design and using Tailings Management Plan. Implementation of Tailings Spill Management Plan. Independent annual audits of the TSF. Regular mill personnel inspections	Severe (5)	Rare (1)	High (5)