THUNDERBIRD MINERAL SANDS PROJECT

LICENCE AMENDMENT SUPPORTING INFORMATION

February 2026

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THUNDERBIRD MINERAL SANDS PROJECT

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Appendix B : OPTSF Stage 3a Downstream Raise DDR (REC 2025)
Appendix C : Stakeholder Engagement Register
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1. Introduction

1.1 Purpose

This report provides the supporting information for the Licence Amendment Application (LAA) submitted by Thunderbird Mineral Sands (the Licensee) for proposed amendments to its existing Part V Operating Licence L9335/2022/1

1.2 Overview

The Thunderbird Mineral Sands Project (the Project) is located on the Dampier Peninsula within the West Kimberley region of Western Australia, approximately 75 km west southwest of Derby and 95 km northeast of Broome. The Project includes heavy mineral sand mining above and below the water table, dewatering within the Broome Sandstone Aquifer, onsite mineral processing and transport of mineral products to the Port of Broome.

Thunderbird Mineral Sands is currently operating the Thunderbird Project in accordance with Environmental License L9335/2022/1 (the Licence) granted by the Department of Water and Environmental Regulation (DWER) on 14 December 2022 and expiring on 13 December 2037.

Current deposition of tailings occurs to the Thunderbird Out of Pit TSF, however remaining capacity is not sufficient accommodate anticipated tailing generated from future processing of mineral sands with capacity expected to be reached within the next seven months. Thunderbird intend to dispose of tailings within an In-Pit TSF (IPTSF). The IPTSF refers to the overall in-pit tailings cells developed through progressive cell constructions, expanding in parallel with mining activities to meet LoM requirements. Cell 1 represents the first of the in-pit cells to receive tailings, marking the transition of tailings storage from the Out-of-Pit TSF (OPTSF) to In-Pit storage.

Information to support the Licence amendment to deposit tailings into the Thunderbird pit is provided in this document . Mining Proposal REG ID: 500426 for the In-Pit TSF was submitted to DMPE and Approvals Statement AS236099 was granted by DMPE on 18 November 2025.

Information presented in this document aims to assist DWER in assessing the adequacy of proposed pollution prevention and control measures to ensure adverse environmental impacts are prevented or minimised to levels where appropriate environmental standards can be complied with.

1.3 Structure of Submission

This application is structured into four sections as follows:

- Section 1 provides an introduction to Thunderbird Operations and the existing Licence Conditions, including background details and the purpose of the application. No changes to location or tenure will occur as a result of the proposed updates and therefore no changes to these sections have been made.
- Section 2 addresses the requirements of Attachment 2 of the application form and includes updates to premises maps that are relevant to the application.

- Section 3 addresses the requirements of Attachment 3B of the application form and summarises the proposed activities, including key characteristics, design specifications and timeline for proposed activities.
- Section 4 addresses the requirements of Attachment 5 of the application form and provides a list of key stakeholders for Thunderbird.
- Section 5 addresses the requirements of Attachment 6A of the application form, describing pollution control measures as they apply to discharges to land, water, air and noise emissions to reduce adverse environmental impacts.
- Section 6 addresses the requirements of Attachment 7 of the application form, there are no changes to siting or location for the proposed updates to the licence.
- Section 7 addresses the requirements of Attachment 9 of the application form and includes the additional information requirements for applications under Part V Division 3 of the Environmental Protection Act 1986 (EP Act) in the form of the relevant Category checklist for Tailings Storage Facilities.
- Section 8 addresses the requirements of Attachment 10 of the application form and outlines the fee calculation from the proposed changes.

1.4 Prescribed Premises and Categories

The Thunderbird Mineral Sands Project has been assessed as a Prescribed Premises, as defined by Schedule 1 of the *Environmental Protection Regulations 1987*. The Licensee currently holds L9335/2022/1 granted in March 2023 under Part V of the EP Act for the Thunderbird Operations Prescribed Premises, which includes the categories and design capacities outlined in Table 1.

The Prescribed Premises is located on mining tenement M04/459 as well as miscellaneous tenements L04/82, L04/83, L04/84, L04/85 and L04/86 granted under the Mining Act 1978 (Attachment 2: Premises Maps, Figure 1).

The Licence amendment proposes no changes to the existing prescribed premise boundary and no changes to the approved design capacity of any of the prescribed premise categories.

Table 1: Prescribed Premise Categories

Category No.	Category Description	Approved Design Capacity	Infrastructure	Proposed Change
8	Mineral sands mining or processing	25,000,000 tpa	Processing Plant, TSF and SSP	Processing Plant, Out of Pit TSF and SSP and InPit TSF
54	Sewage facility	WWTP1: 100 m^3/day WWTP2: 17.5 m^3/day	WWTP 1 and 2	No Change
89	Putrescible landfill site	1,100 tpa	Landfill	No Change

1.5 Tenure

The proposed amendments will be located within the current premise boundary Attachment 2: Premises Maps, Figure 1. No changes to tenure are proposed.

1.6 Licensee Information

The proponent and key contact details are shown in Table 2.

Table 2: Proponent and Key Contact Details

Proponent	
Name	Thunderbird Operations Pty Ltd
Address	264 Port Drive, Minyirr WA 6725
ABN/ACN	11 611 351 743
Key Contact	
Name	[redacted]
Company	Thunderbird Mineral Sands Project
Position	[redacted]
Address	264 Port Drive, Minyirr WA 6725
Phone	[redacted]
Email	[redacted]

2. Attachment 2: Premises Maps

The Prescribed Premise Boundary is shown in Figure 1.

The layout of the Project and location of the In-Pit TSF is shown in Figure 2.

496,000 504,000 512,000

N

8,072,000 8,064,000 8,056,000 8,048,000

496,000 504,000 512,000

Scale: 1: 100,000
Original Size: A3
Grid: GDA2020 / MGA zone 51
(EPSG:7851)
0 2 4 km

Legend

- Project Tenements
- Prescribed Premises Boundary

Figure 1

Prescribed Premises Boundary

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W:\Shiffolt Resources\Approvals\Environmental Licence\NF Amendment 2025\Drilling Project Amendment 28052025.qgz 28/05/2025 L1_PrescribedBoundary

492,000 496,000 500,000

8,076,000 8,072,000 8,068,000 8,064,000 8,060,000

N

In-Pit TSF

Mineral Deposit Area

Plant

Accomodation Village

Out of Pit TSF

Borefield

Cell 1A Tailings Extent

Cell 1A

Cell 1A Interim Embankment Crest

Main Embankment Cell 1A Crest

Seepage Collection Sump (1A)

Seepage Collection Drain (1A)

Seepage Collection Sump (1A)

Cell 1B Tailings Extent

Main Embankment Cell 1B

Seepage Tranfer Pipes (1A)

Seepage Collection Sump (1B)

Cell 1B

Seepage Transfer Pipes (1B)

Seepage Collection Drain (1B)

Cell 1B Extension Bund

Seepage Collection Sump (1B)

492,000 496,000 500,000

Scale: 1: 50,000
Original Size: A3
Grid: GDA2020 / MGA zone 51 (EPSG:7851)
0 1 2 km

Legend

- Project Tenements
- Prescribed Premises Boundary
- Site Layout (Current and Approved)
- Seepage Collection Drain
- Seepage Tranfer Pipes
- Embankment Cell
- Cell Tailings Extent
- ExistingTracks
- Seepage Collection Sump

Figure 2

Site layout and In-Pit TSF Location

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3. Attachment 3B: Proposed Activities

3.1 Proposed Activities Overview

Thunderbird Operations currently hold Licence L9335/2022/1 which was most recently amended on 14 May 2024 and is valid until 13 December 2037. The Licence covers Category 8 Mineral Sands Mining or Processing up to 25,000,000 tonnes per annual period (tpa), Category 54 Sewage facility up to 100 m^3 (WWTP1) and 17.5m^3 (WWTP2) per day, and Category 89 Putrescible landfill site up to 1,100 tpa.

Thunderbird Operations are requesting the following amendments to L9335/2022/1:

- Category 8: Addition of In Pit Tailings Storage Facility as a discharge point for tailings .
- Category 8: Amendments to the design and operation of the existing Out of Pit Tailings Storage Facility.

No changes are required to Category 54 or Category 89.

3.2 Key Characteristics of the Project

Details of the Project Key Characteristics and changes in them from the current Licence are provided in Table 3. Detailed information on each aspect is provided in the following sections.

Table 3: Project Key Characteristics

Characteristic	Description	Change From Current Approval
Proponent	Thunderbird Operations Pty Ltd	No change
Life of Project	40+ years	No change
Project Operational Time	24 hours per day, 7 days per week,365 days per year	No Change
In Pit Tailings Storage Facility (IPTSF)		
Type	In-Pit (Cell 1A, 1B)	New infrastructure to be added to the Licence
Footprint	199.5 ha	
Embankment Height	RL 110 m - RL 114 m	
Storage Capacity	Cell 1A: 8.79 Mt Cell 1 B: 18.58 Mt	
Tailings Density	Delivered at approximately 48.5% solids (by weight) = 1.6 t/m^3	
Tailings Deposition Method	Spigots - sub aerial/sub aqueously.	
Water Management System	Water is returned to processing operations for re-use	
Out of Pit Tailings Storage Facility		
Type	Engineered above ground	No Change
Footprint	116.1 ha	Change
Height	14.1 m (at 2 years)	Change
Storage Capacity	17.81 Mt	Change
Tailings Density	Delivered at approximately 50% solids (by weight). Setting to a stored density of 1.75 t/m^3	Change
Tailings Deposition Method	Spigots, cyclic tailings deposition up and down a central deposition embankment, and along perimeter.	Change -Modifications to allow for both central deposition and perimeter deposition options.
Water Management System	Internal lined TSF sump. Water is pumped directly from the sump to the Process Plant.	No change

3.3 Category 8: In-Pit Tailings Storage Facility (IPTSF)

Thunderbird engaged Resource Engineering Consultants (REC) to prepare the detailed design for the IPTSF, with Cell 1 developed in accordance with the *Code of Practice for Tailings Storage Facilities in Western Australia* (DMP, 2013) and the *ANCOLD Guidelines on Tailings Dam Planning, Design,*

Construction, Operation and Closure (ANCOLD, 2019). The Detailed Design Report (DDR) for Cell 1 is provided in Appendix A.

Key information for the IPTSF Cells is summarised in Table 4.

Table 4: IPTSF Activity Details

Activity Type	In Pit TSF	
Mine Activity Reference	IPTSF	
Area per tenement (ha)	M04/459 = 199.5*	
Design Description	Design: In Pit (Cell 1 A & B) Max Embankment Height: RL 110.0 – 114.0 m Storage Volume = Cell 1A = 8.79 Mt, Cell 1B = 18.58 Mt Discharge Method: Spigots - sub aerial/sub aqueously	
Material Characteristics	Fibrous Minerals	☐ Yes ☒ No
	Radioactive Material	☐ Yes ☒ No
	Materials capable of generating acid and/or metalliferous drainage, including neutral drainage and saline drainage.	☐ Yes ☒ No
	Dispersive and/or erosive material that is capable of compromising the structure and stability of the activity.	☐ Yes ☒ No

**As In-Pit cells sit within the mine void they do not add to overall land disturbance.*

3.3.1 Materials Characterisation

MBS Environmental (MBS 2016) was previously commissioned by KMS to determine the potential for acid and metalliferous drainage (AMD), and neutral or saline drainage from the process waste streams. Six composite samples were tested by MBS. The findings from the laboratory testing indicated that the tailings derived from materials mined from above the groundwater table, in the oxidised zone contain no known Potentially Acid Forming (PAF) material above the groundwater table.

Based on the test results, MBS in the residues waste report concluded that:

- Overall, results indicate that the project tailings will be NAF and barren with essentially no capacity for acid generation or acid neutralisation. Predicted concentrations of soluble salts, metals and metalloids in any seepage are expected to be extremely low.
- Low overall (in relation to waste volumes) levels of calcium sulfate and calcium carbonate will gradually be mobilised by leaching from the 'gypsum' residue; however, seepage water quality will mostly reflect process groundwater quality as drawn from local aquifers.
- Although various residues are geochemically enriched in thorium, uranium, lead and selenium, these elements were not found to be mobile, even under artificially applied acidic conditions.

- All process waste streams are thus considered environmentally benign for the project but will have a tendency towards dispersive behaviour – however, this will be managed on site by use of flocculants in process water if required.

Based on the results of the leachate tests, decant bleed water generated from the tailings is also expected to be geochemically benign, with a composition similar to site groundwater.

As operations commenced in 2023, additional geochemical testing for the tailings was undertaken in 2024 to verify the previous the tailings characterisation. Composite samples from each process waste stream were collected and sent for or geochemical testing. This included acid base accounting, elemental composition, ASLP water leachate, ASLP acid leachate and mineralogy.

Results were consistent with the MBS 2016 assessment. Overall, the rest results show that the tailings are barren with effectively no capacity for acid generation or neutralisation. This supports the understanding of the tailings stream previously established by MBS Environmental.

Physical and geochemical characteristics of the tailings and slurry liquor will remain unchanged from that discharged to the existing Out of pit TSF.

3.3.2 TSF Design

Tailings are to be delivered as a slurry at 48.5% solids by mass with the slurry discharged sub-aerially into mined out pit voids.

As the tailings fill the constructed IPTSF cell within the mine void, mining continues and construction of the next IPTSF cell commences. Once the tailings reach the final targeted height in the active cell, the discharge spigots and associated pipe work will be relocated to the newly constructed IPTSF cell to continue deposition.

Design criteria for In-pit TSF Cell 1A and 1B are contained in Table 5.

Table 5: IPTSF Cell1 Design Criteria

Design Parameter	Design Input
Storage Capacity	Cell 1A= 8.79 Mt
	Cell 1B = 18.58 Mt
Storage Life	Cell 1A = 12 Months
	Cell 1B =27 Months
Slurry Solids Concentration	48.5 %
Tailings In-situ Density	1.6 t/m^3
Embankment Crest Elevation	Cell 1A: RL 114.0 m
	Cell 1B: 110.0-114.0 m
Embankment Crest Width	22.8 m
Design Storm Event	1:100 AEP 72-hour event

IPTSF Cell 1 consists of sub-cells 1A and 1B, with Cell 1A proposed to commence deposition, while the construction of Cell 1B progresses in parallel with mining activities. Cell 1A will comprise the construction of a perimeter embankment to a minimum crest elevation of RL 114.0 m and an interim embankment elevation to RL 107.0 m.

The structural portion of the embankments will be constructed primarily out of mine waste (Zone A material (overburden) and Zone B material (oversize)). Embankments will have a typical crest width of 22.8 m and an upstream and downstream batter slope of 1V:2H. The interim embankment for Cell 1A and the Southeastern embankment for Cell 1B have a downstream batter slope of 1V:2.5H. Figure 3 and Figure 4 presents the typical cross-sections of the embankments. Figure 4 presents the alternative embankment section where overburden may be utilised, noting the extent and impact of overburden to be utilised will be assessed per case basis.

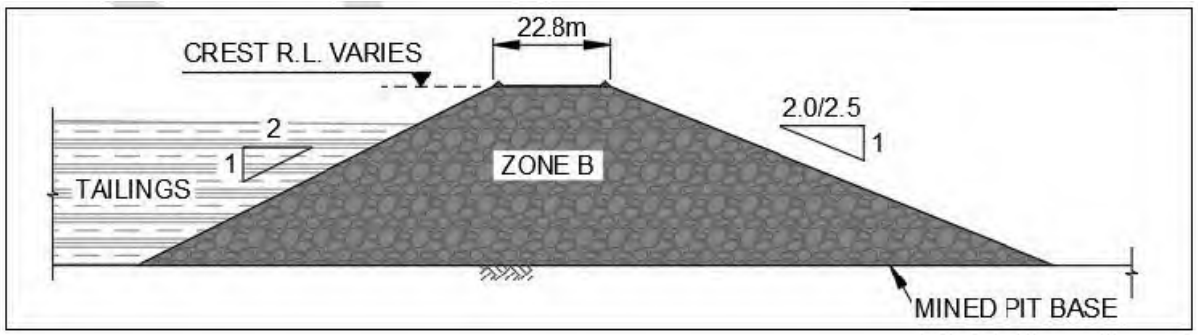

Figure 3: Typical Embankment Cross-section of IPTSF Cell 1

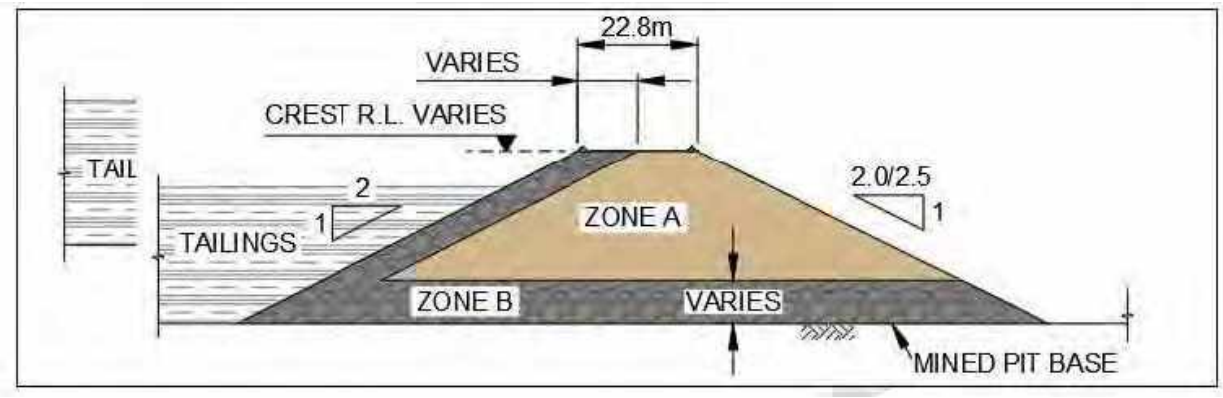

Figure 4: Alternative Embankment Cross Section

Zone A overburden material is to be sourced from mining activities. The overburden typically consists of a combination of Pindan sand/gravels and Melligo cobbles and boulders. Zone A material is to be used as structural fill overlying the blanket drain and serves as the overall fill of the embankment. Zone A material has a permeability coefficient of $1x10^{-7}$ m/s, hence its use as structural fill as opposed to drainage media.

Zone B oversize material is sourced from the oversized reject materials obtained from the DMU in the pits. Zone B material is to be used as the drainage fill forming the blanket drain and upstream drainage face. Zone B serves to remove supernatant water ponding against the embankment, promote drainage for deposited tailings, and intercept the phreatic table from penetrating the

embankment. Zone B material is typically a combination of weathered sandstone infilled with fine to medium grained sand. Zone B material has a permeability coefficient of 0.0003 m/s, hence its selection as appropriate drainage media.

3.3.3 Hazard Rating

The IPTSF has been designed in accordance with the *Code of Practice for Tailings Storage Facilities in Western Australia* issued by DEMIRS and conforms to the DMIRS 2015 *Guidelines on the Preparation of a Design Report for TSFs* and the Australian National Committee on Large Dams (ANCOLD 2019) *Guidelines on Tailing Dam Planning, Design, Construction, Operation and Closure*.

For risk assessment purposes, the TSF has been assigned by REC (2025) a 'High', Category 1 hazard rating according to the DMIRS Code of Practice (DMP 2013) as determined by REC (2025) based on the following:

- Loss of life or injury is possible.
- Potential human exposure is limited, and temporary adverse health effects are possible.
- Temporary loss of assets is possible, and economic repairs can be made.
- Loss of TSF storage capacity is possible and repair is practicable.
- Limited or no potential for damage to the natural environment.
- Limited or no potential for adverse effects on flora and fauna.
- Limited or no potential for damage of items heritage or historical significance.
- Category 1 storage as the final height of the embankment is greater than 5 m.

The ANCOLD consequence category based on the above considerations (medium damage and a population at risk of greater than 10) was determined by REC to be 'High C'. Medium damage is characterised by:

- Population at risk >10 to 100.
- Loss of infrastructure $10 M – $100 M.
- Significant impacts to business.
- Impact area 1 km^2 or less.
- Impact duration less than one year.
- Damage limited to items of low conservation value, remediation possible.

3.3.3.1 In Pit TSF Operations

A TSF Operating Manual has been developed for the In-Pit TSF in accordance with the DEMIRS guidelines to address departmental requirements for the management and closure of the TSF (Department of Mines and Petroleum 2015). The principal objective of the In-Pit TSF Operating Manual is to provide a documented operating procedure to assist in the safe and efficient storage

of tailings and water management for the facility. The manual sets out how the facility should be operated in a way that is in line with the assumptions and principles adopted by the designer of the facility.

The Operating Manual will be updated regularly, in particular when design or operational changes occur.

3.3.4 Tailings Delivery and Deposition

Tailings slurry will be deposited sub-aerially or sub-aqueously within the facility, primarily from the pit boundaries towards the northwest and at selected retaining embankments, via a series of open-ended spigots operated in a cyclical sequence to promote uniform beach development and controlled deposition.

The slurry will be delivered from the process plant through a HDPE pipeline contained within a bunded trench at an approximate solids concentration of 48.5% by mass, feeding into a perimeter distribution system aligned with the designated deposition points. Instrumentation will be installed to monitor the condition of the pipelines and to detect leakage to initiate automatic shutdown of the pipeline.

Deposition locations may be adjusted as required under the guidance of the Engineer of Record (EoR) to respond to operational conditions, geotechnical performance, or environmental considerations.

3.3.5 Water Management

Water recovery will be achieved through collection of operational seepage across the retaining embankment. Seepage flows have been delineated into two regions as shown in Figure 5 and Figure 6 for Cell 1A and Cell 1B respectively. For both cells, seepage from Region A is transferred to Region B through seepage transfer pipes, ultimately reporting to a seepage collection sump typically situated at the lowest pit base elevation.

A pumping system comprising a primary and secondary pump, each capable of abstracting 900 m^3 per hour will be required at the seepage collection sumps. A secondary pump will remain on standby or be relocated to support water recovery as needed. Seepage rates may be variable during the commissioning stages of the facility. As such, the secondary pump may be relocated to facilitate water recovery within the facility (typically along construction ramps).

Figure 5: IPTSF Cell 1A Seepage Regions

Figure 6: IPTSF Cell 1B Seepage Regions

3.3.6 Monitoring

Five pre-existing groundwater monitoring bores (Figure 7) surrounding the facility will be used to monitor groundwater level and quality. Groundwater monitoring around the facility will be undertaken quarterly throughout the life of the project.

A series of Vibrating Wire Piezometers (VWPs) and survey monuments will be installed to assess embankment conditions. The data records from VWPs will provide timely information on changes in water level within the embankment and will be used for assessing the operational performance of the facility. Future trigger levels may be incorporated to allow for 'real-time' responses pending phreatic conditions within the embankment

Settlement pins will be installed at intervals along the embankment crest. Weekly survey data collected from monuments shall provide deformation / settlement trends of the facility to inform embankment integrity. Future trigger levels may also be incorporated for elevated responses depending on deformation magnitude.

492,000
495,000
498,000
8,076,000
8,073,000
8,070,000
8,067,000
8,064,000
N
THAC427
TMB02
THAC252
THAC243
THAC357

Scale: 1: 35,000
Original Size: A3
Grid: GDA2020 / MGA zone 51
(EPSG:7851)
0 0.75 1.5 km

Legend

- Monitoring Bores
- Site Layout (Current and Approved)
- Project Tenements
- Prescribed Premises Boundary

Figure 7

Monitoring Bore Locations

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3.4 Category 8: Out of Pit Tailings Storage Facility

3.4.1 Current Approved TSF (Stage 1, 2 and 3)

The existing above-ground Tailings Storage Facility (TSF) consists of an oval-shaped impoundment enclosed by perimeter embankments that are raised progressively as tailings deposition advances. Thickened tailings are discharged from a mobile deposition point that moves along a central causeway, forming a "whaleback" profile. Although the design anticipated that the predominantly sandy tailings and in-line flocculation would promote rapid drainage and create a steep beach profile, this outcome has not been achieved, requiring operational adjustments.

The embankments reach a maximum height of approximately 14 m and are constructed using a combination of in-situ clayey sand and tailings material. Emergency spillways are lined with a 1.35–1.5 mm HDPE geomembrane to prevent erosion. Ground improvement works were undertaken using high-energy impact rolling; however, investigations identified a potential risk of liquefaction in foundation materials under safety evaluation earthquake (SEE) loading conditions at about 4 m below ground level, prompting further review.

3.4.2 Changes to Design (Stage 3A)

Thunderbird engaged Resource Engineering Consultants Pty Ltd (REC) to design the Stage 3A downstream raise of the TSF this included design changes from the previous stages of TSF construction to address the identified geotechnical concerns (Appendix B).

The Stage 3A embankment design consists of a downstream slope with a gradient of 1V:2H, an upstream slope with a gradient of 1V:2.75H, and a 5 m wide embankment crest. The upstream slope has been altered slightly from the original design which featured a slope of 1V:2.5H. Each subsequent embankment raise has been designed to utilise downstream raising techniques. The facility remains compliant with safety requirements under operating base earthquake (OBE) loading conditions.

A typical cross section of the perimeter embankment is provided in Figure 8.

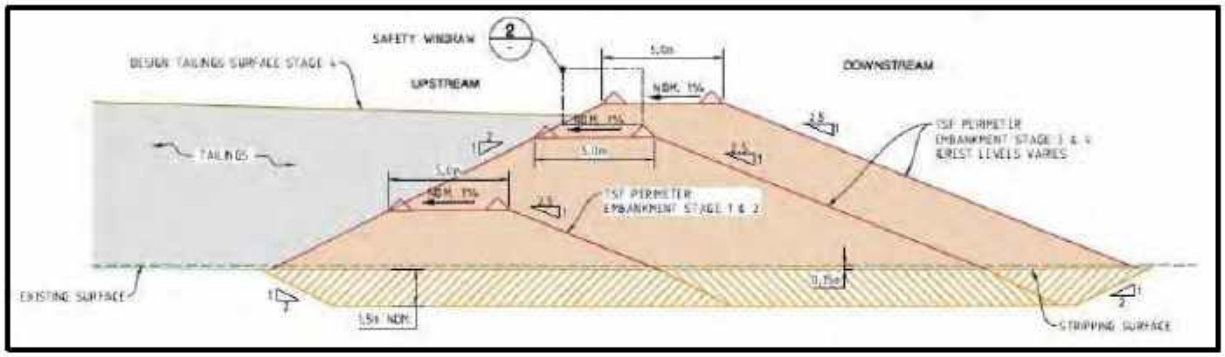

Figure 8: Cross-Section of the TSF Embankment

The deposition causeway provides access for cyclic deposition. The causeway has a width of 13 m and batter slopes of 1V:1.5H. A typical cross section of the causeway is provided in Figure 9.

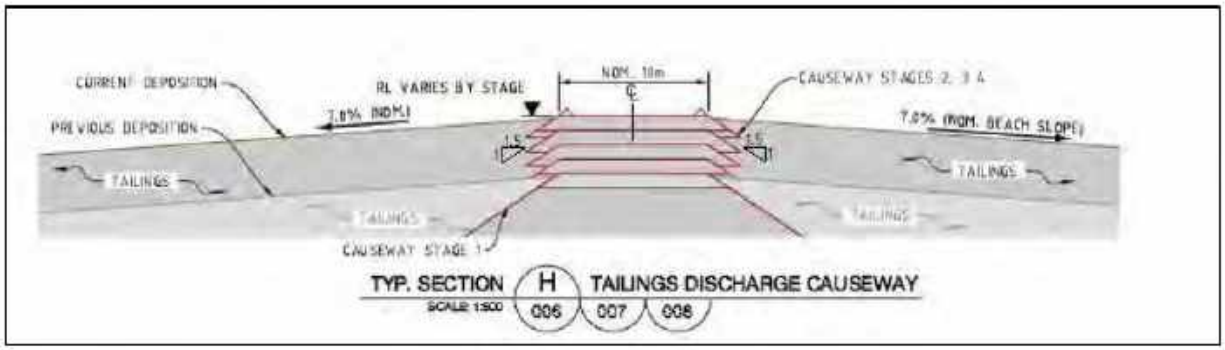

Figure 9: Cross-Section of the Tailings Storage Facility Causeway

3.4.2.1 Internal Retaining Embankment/Rock Ring

As part of the Stage 3 embankment rise, the emergency spillway invert was initially planned to be raised to RL 106 m. However, an internal retaining embankment – originally intended as a decant rock ring – was incorporated into the Stage 3 design to isolate the decant area (Figure 10). This modification will eliminate the need to raise the decant pocket and its associated liner and concrete works. The internal retaining embankment is planned to be centreline raised as part of the Stage 3A raise. The rock ring has since been repurposed as an internal retaining embankment, where the oversize/scats material will serve as an underdrainage blanket, overlaid with compacted tailings.

Runoff from the tailings stack flows over and through this internal retaining embankment to an HDPE lined sump (1.35 – 1.5 mm) constructed inside the TSF at the lowest point. The sump is lined to minimise seepage and contains a floating pump intake with skid mounted pump system that returns the TSF water to the plant for re-use in ore processing. This design helps to further reduce water losses to seepage and evaporation, with the rock ring improving water quality and return recovery rates.

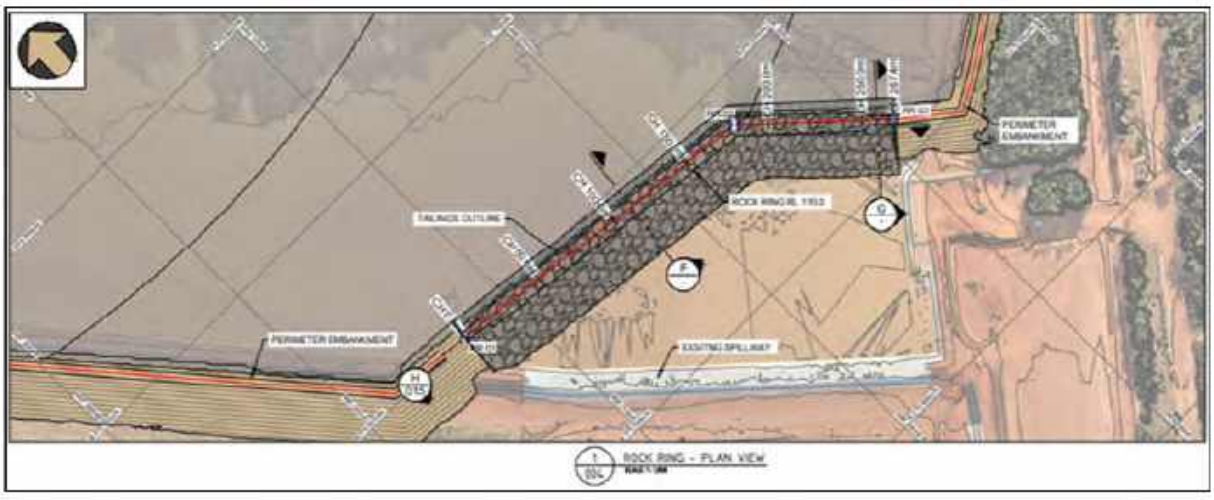

Figure 10: Internal Retaining Embankment/Rock Ring - Plan View

3.4.2.2 Seepage Management

Combined with evaporative drying, the anticipated steep tailings beaches, rapid release of bleed water and rapid consolidation of tailings are expected to efficiently remove water from the tailings,

such that the potential for tailings leachate seepage is minimised. The newly constructed internal embankment / rock ring aids in the settlement of tails outside of the lined impound, providing a recovery point from an internal decant pond within the TSF impoundment. Bleed water from the deposited tailings and incidental rainwater is continuously transferred via a pumping system from an HDPE geomembrane lined initial sump at the TSF lowest point to the Process Plant.

3.5 Proposed Changes to L9335/2022/1

The proposed activities which trigger the need to amend the Licence include the addition of the InPit TSF and modifications to the Out of Pit TSF staged embankment designs.

To allow for the proposed activities the following amendments to the Licence are required:

- Category 5: Processing or beneficiation or metallic or non-metallic ore - No changes to the approved design capacity threshold are required by this Licence amendment. Changes to infrastructure requirements to support Category 5 activities are required and include:
  - Addition of deposition of tailings to the In-Pit TSF.
  - Modifications to the Out of Pit TSF design (Stage 3A).

3.5.1 Category 5: Site Infrastructure Requirements

Condition 1 of Licence L9335/2022/1 states "*the licence holder must ensure that the site infrastructure and equipment listed in Table 1 and located at the corresponding infrastructure location is maintained and operated in accordance with the corresponding operational requirement set out in Table 1.*"

The locations specified in Table 1 of the Licence are summarised in Table 6 and shown in Attachment 2: Premises Maps, Figure 2.

Table 6: Summary of Infrastructure and Equipment Requirements as per Table 1 in L9335/2022/1

Site Infrastructure and Equipment	Operational Requirement
Active mine pit	• Base of mine pit to go no deeper than 75m AHD • Water trucks containing water sufficient to be used for dust suppression available as required. • Diversion bunds are to be used to divert surface water flows around active mine areas. • Drainage from the mine excavation must be directed into holding sumps and used for dust suppression or ore processing
TSF	• Perimeter embankment crest (RL m AHD) – Stage 1: 104.0 m – 108.5 m – Stage 2: 104.0 m – 113.0 m – Stage 3: 107.0 m – 116.0 m – Stage 4: 107.0 m – 119.1 m • Maintain a minimum freeboard of 500 mm. • Cyclic tailings deposition up and down the central deposition embankment. • Water from the tailings and surface runoff from the TSF directed to the HDPE lined decant sump. • Water from the decant sump pumped back to the process water ponds via the thickener for reuse. • Perimeter diversion drain to divert rainfall and runoff around the TSF.

**Proposed amendments to the licence wording are highlighted in bold.*

In addition to tailings being deposited to the Out of Pit TSF (Table 6), future tailings are also required to be discharged to the InPit TSF. The proposed amendment required for the licence is the addition of the In-Pit TSF as a tailings discharge option as outlined in Table 7.

Table 7: Proposed Changes to Infrastructure and Equipment Requirements as per Table 1 in L9335/2022/1

Site Infrastructure and Equipment	Operational Requirement
Active Mine Pit	Base of mine pit to go no deeper than 50.8 m AHD
In-Pit TSF	Cell 1A & Cell 1B • Maintain a minimum freeboard of 500 mm. • Sub aerial cyclic deposition • Water from tailings directed to seepage collection sump Water from seepage collection sump pumped back to processing operations for re-use
Out of Pit TSF	Perimeter embankment crest (RL m AHD) – Stage 1: 104.0 m – 108.5 m – Stage 2: 104.0 m – 113.0 m – Stage 3: 107.0 m – 116.0 m – Stage 3a: 111.0 m - 119.3 m • Cyclic tailings deposition up and down the central deposition embankment and perimeter deposition.

3.5.2 Timeline for Proposed Activities

The schedule for the proposed activities required for the Project are outlined in Table 8.

Table 8: Key Dates - IPTSF

Activity	Indicative Commencement Date	Indicative Completion Date
In-Pit TSF Cell 1 A	June 2026	June 2027
In-Pit TSF Cell 1 B	July 2027	September 2029
Out of Pit TSF	NA	July 2026

3.6 Site Plan

There are no changes to the general location of infrastructure. The prescribed premises is shown in Attachment 2: Premises Maps, Figure 1.

4. Stakeholders

Thunderbird aims to build strong stakeholder, social and community support for the Project and to create and maintain a positive foundation for project development, thereby assisting with approvals, project development, land access, construction and Project operations.

This is achieved through development and implementation of stakeholder communication and consultation strategies which ensure that stakeholders are informed and engaged positively about the Project.

A Stakeholder Consultation Register has been developed to record consultation activities undertaken with all stakeholder groups and individuals. This is provided in Appendix C.

5. Attachment 6A: Emissions and Discharges

The Thunderbird Mineral Sands Project has the potential to create emissions and discharges to the environment that may impact the health of site personnel and the environment. Emissions to air and from noise and odour, and discharges to land and surface water, and to groundwater are discussed in the following sections.

5.1 Emissions to Air and Noise

5.1.1 Sources

There are no significant air or noise emissions sources in the vicinity of the Project and due to the remote location, the receptors of air emission related impacts associated with the proposed Project will only be the employees of the Project and resident fauna.

Stage 3A Out of Pit TSF design will not result in any additional emissions to air. Minor noise emissions may result from pumps and generators, however these will be significantly lower than noise emissions from mining equipment operating in the adjacent pits.

5.1.2 Potential Impacts

The potential impacts from noise, gaseous emissions, dust, and particulates as a result of project implementation are:

- Decrease in human and fauna health due to increased localised noise volumes.
- Relocation of fauna from their natural habitats.
- Reduced amenity within and outside of the Project.

5.1.3 Control Measures

Noise and air emissions at Thunderbird, are managed in accordance with industry best standards, which include the following controls:

- Regular inspection and maintenance of pumps and generators to ensure integrity and optimal operation efficiency.

No additional controls are proposed.

5.1.4 Predicted Residual Environmental Risk

Noise and air emissions from the Project are not considered significant and are unlikely to impact the surrounding environment or other sensitive receptors. Noise and air emissions from the proposed activities will be in line with noise levels and air emissions from current operational activities. Therefore, the proposed control and management measures are considered sufficient to achieve a low residual risk of significant impact.

5.2 Emissions to Land and Surface Water

5.2.1 Sources

Stage 3A Out of Pit TSF design will not result in any additional emissions. This risk has previously been assessed by DWER (Licence Amendment Date: 14 May 2024).

The sources of discharges to land and surface water for the In-Pit TSF may potentially originate from:

- A breach of freeboard on the TSF resulting in loss of tails to the environment.
- Water overtopping confining embankments in extreme weather events.
- Spillage, leakage or seepage of tailings and tailings return water from the TSF pipelines.
- Spillage, leakage or seepage of water from TSF underdrainage/dewatering pipelines.

5.2.2 Potential Impacts

Sources of discharge from Project infrastructure operations have the potential to:

- Cause deposition of sediment in the surrounding environment from uncontrolled runoff during operational activities.
- Reduce the surface water catchment size and alter drainage patterns (Out of pit TSF).
- Contaminate surface water and land due to spillages or leaks of tailings and return water.

5.2.3 Control Measures

Management measures that will be implemented to minimise the potential impacts from the In-Pit TSF and associated infrastructure include:

5.2.3.1 In-Pit TSF

- Sufficient freeboard will be maintained in the TSF to allow capture of rainfall from a 1% AEP 72-hour event.
- An In-Pit TSF Operations Manual has been developed to provide direction on the appropriate operation and monitoring of the TSF including daily inspections.
- Operation of the tailings disposal system and performance of the TSF will be monitored on a regular basis.

5.2.3.2 Pipelines

- Tailings pipelines will be contained in earthen bunds with sumps located at low points along the pipeline routes to ensure leaks or spillages are contained within bunded areas.
- Pipelines will incorporate isolation valves at appropriate intervals and periodic visual inspections will be undertaken.
- Tailings and return water pipelines will be fitted with flow meters and leak detection sensors.

5.2.4 Predicted Residual Environmental Risk

Given the reasonably remote location of the Project and the 7 km separation from the nearest sensitive receptor (Fraser River), the proposed mitigation and management measures are sufficient to achieve a low risk of significant impact to local land and surface water quality.

There are no other major developments taking place surrounding the Project, hence there will be no cumulative impacts on inland water quality.

5.3 Discharges to Groundwater

5.3.1 Sources

Modification to Out of Pit TSF design will not result in any additional emissions to groundwater. This risk has previously been assessed by DWER (Licence Amendment Date: 14 May 2024).

Implementation of In-Pit TSF activities has the potential to impact groundwater through spillage, leakage and seepage of tailings and tailings return water from the In-Pit TSF pipelines.

5.3.2 Potential Impacts

In-Pit TSF operations have the potential to:

- Result in localised groundwater mounding adjacent to the In-Pit TSF.
- Contaminate groundwater in areas adjacent to the pit.

5.3.3 Control Measures

- The approved Groundwater Operation Strategy will be implemented to monitor groundwater quality and groundwater levels in accordance with water abstraction licence GWL201977(2) under the *Rights in Water and Irrigation Act 1914*.
- Tailings and return water pipelines will be fitted with flow meters to record tailings and return water volumes.
- Groundwater in the vicinity of the In-Pit TSF will be monitored for water quality and level.
- The In-pit TSF will be constructed in accordance with the approved design to maximise water recovery.

5.3.4 Predicted Residual Environmental Risk

Groundwater is greater than RL 70m AHD in the vicinity of the Pit area. Tailings are known to be inert and benign. Impacts to groundwater associated with operation of the In-Pit TSF and tailings/return pipelines are not expected to be significant after implementing the control measures as described in Section 5.3.3.

5.4 Radiation Emissions

Naturally occurring radioactive materials (NORM) contain the elements thorium and uranium which are associated with heavy minerals, and in particular with monazite. As demonstrated in the mine residues characterisation assessments (MBS 2016 and 2024), the uranium and thorium in monazite

is tightly bound and unavailable environmentally but is still subject to radioactive decay and emissions proportional to the concentration of monazite. Ore, waste and product materials generated by the mining and processing of heavy mineral sands has the potential to impact human health by exposure to radiation.

A Radiation Management Plan (RMP) has been prepared and implemented for the Project. The proposed changes to the Out of Pit TSF and In-Pit TSF will not result in changes to radiation risks.

5.4.1 Sources

Potential exposures and exposure routes to radiation from mining include:

- Radiation exposure affecting the health of mine workers — by inhalation of dust containing radionuclides, inhalation of radon, external gamma irradiation.
- Radiation exposure affecting the health of members of the public.

Potential exposures for mine workers were estimated based on:

- Exposure to external gamma irradiation by general proximity to the NORM.
- Inhalation of dust containing radionuclides (and hence exposure to otherwise short-lived alpha particles).
- Inhalation of radon gas and radon decay products.

Radon is a gas that may accumulate in areas with reduced ventilation based on the concentration of uranium and the rate of air exchange. Potential exposures for mine workers by these exposure routes were estimated and compared to occupational exposure limit of 20 mSv/year (Regulation 16.18 *Mines Safety and Inspection Regulations 1995*). Results are shown in Table 9.

Table 9: Summary of Estimated Mine Workers Radiation Exposure

Exposure Pathway	Calculated Dose	Guideline Value	Percentage Guideline
	(mSv/year)		
External Gamma	0.34	20	1.7%
Dust Inhalation	0.11	20	0.55%
Radon Inhalation	1.7	20	8.5%
Total Exposure	**2.15**	**20**	**10.75%**

5.4.2 Potential Impacts

Potential exposures for members of the public may occur by means of external gamma irradiation (if within sufficiently close proximity to the products or waste material) or by inhalation of radionuclides within the dust. The guideline for exposure assessment to the public is 1 mSv/year (as opposed to 20 mSv/year for radiation workers) (ARPANSA 2002). Radiation waste management and rehabilitation post mining will ensure surface and environmental radiation levels are within environmental

screening (10 µGy/h) or determined background levels such that radiation exposure is incidental only and less than 1 mSv/year.

5.4.3 Predicted Resdiual Environmental Risk

Radon inhalation is not considered significant due to its rapid decay. As the only potential residence adjacent to the Prescribed Premise boundary is the Mt Jowlaenga pastoral homestead some 8 km away and the site access road is approximately 30 km from the Great Northern Highway, potential for gamma radiation exposure to the public in the vicinity of the Minesite is considered extremely low.

The predicted dose to mine workers was conservatively estimated to be 2.15 mSv/year, which is well below the dose rate limit for workers of 20 mSv/year. The predicted dose to a member of the public was considered to be negligible and below assessable levels.

The proposed changes to the Out of Pit TSF design and use of In-Pit TSF will not result in any significant changes to radiation emissions or exposure compared to the approved operations.

6. Attachment 7: Siting and Location

The Prescribed Premises is located on the Dampier Peninsula within the West Kimberley region of Western Australia approximately 75 km west southwest of Derby and 95 km northeast of Broome.

No changes to siting and location are proposed for this Licence amendment. No significant changes to the existing environment are apparent since the current Licence was issued.

6.1 Environmental Receptors

The sensitive receptors identified for the Thunderbird Mineral Sands Project, which have the potential to be impacted by activities are outlined in Table 10 and shown in Figure 11.

Table 10: Environmental Sensitive Receptors and Distance from Prescribed Premises

Environmental Receptor	Relevance to Prescribed Premises
Environmentally Sensitive Areas	No ESAs within or near the Prescribed Premises boundary.
Public Drinking Water Source Area	The Prescribed Premises is not located within a PDWSA.
Surface Water	No significant named watercourses intersect the Prescribed Premises boundary. The Fraser River is located approximately 7 km north of the Prescribed Premises.
Groundwater	Broome Sandstone Aquifer. The water table elevation over the area ranges from about 72 mAHD (Australian Height Datum) in the south to about 75 mAHD at its northern edge, with groundwater in the Broome Sandstone Aquifer flowing to the south.
Threatened and Priority Ecological Communities	No TECs or PECs are within the Prescribed Premises boundary. Three Priority 1 and five Priority 3 PECs, as listed by DBCA (2016b DBCA Reference 01-0816EC) occur within 50 km of the project.
Threatened / Priority flora	No Threatened flora species are located within the Prescribed Premises boundary.
Threatened / Priority fauna	Three conservation significant fauna species were recorded at the Project. These were the Greater Bilby, Short-tailed Mouse and the Rainbow Bee-eater. The Project will impact upon the Greater Bilby habitat. Evidence of the Priority 1 species Dampierland Peninsula Goanna (*Varanus sparnus*) was found during fauna surveys. This species was not found within the Prescribed Premise Boundary. Management of impacts on fauna of significance were addressed as part of conditions of MS 1080. A Terrestrial Fauna Management Plan has been developed to address impacts on both the Greater Bilby and the Dampierland Goanna — approved by EPA and DAWE on 07/11/18 and 20/11/18 respectively.

Environmental Receptor	Relevance to Prescribed Premises
Aboriginal and other Heritage Sites	One Registered Aboriginal Site is located within the Project (Mt Jowlaenga, site ID 37263). No Other Heritage Places are located within the Project. The nearest other Heritage Place is the Nillibubbica Well about 2 km from the intersection of the Site Access Road and Great Northern Highway, well away from any possible effect of the Project. A Thunderbird Project Co-existence Agreement includes an agreed Heritage buffer within M04/459 which excludes TOPL access over the mine life. A Section 18 approval granted for Registered Aboriginal Site 37263 over M04/459 provides Thunderbird access to its mine lease.
Other	The northern part of the Project is located within the Mt Jowlaenga Pastoral Station and the southern part (Site Access Road) is located within the Yeeda Pastoral Station (Figure 11). Both pastoral stations are owned by Yeeda Australian Rangeland Meat Pty Ltd and produce beef products.

500,000
510,000
520,000
8,080,000
8,070,000
8,060,000
8,050,000
N

Scale: 1: 120,000
Original Size: A3
Grid: GDA2020 / MGA zone 51
(EPSG:7851)
0 2 4 km

Legend

- Project Tenements
- Prescribed Premises Boundary
- Site Layout (Current and Approved)

Pastoral Lease Boundaries
- MT JOWLAENGA
- YEEDA

Figure 11

Environmental Receptors

MBS ENVIRONMENTAL

W:\Sheffield Resources\Approvals\Environmental Licence\NP 1SP Amendment 2025\GIS\Mining Project Amendment 16082025.qgz 08/09/2025 L11 Environmental Receptors

6.2 Climate

The climate at the Project is classified as 'grassland, hot (winter drought)' under the modified Köppen climate classification of Australia (Stern et al. 2000). It has summer dominant rainfall, with hot, humid summer temperatures (BoM 2022).

Most rainfall occurs during the wet season between November and April. Potential evapotranspiration is very high, averaging 1,980 mm/year, and varies moderately across seasons. Evapotranspiration generally remains higher than rainfall even in the wet season, resulting in water-limited conditions for vegetation (CSIRO 2009).

Monthly maximum and minimum temperatures and mean humidity are shown in Chart 1. Maximum temperatures are generally between 33 and 45°C, with minimum temperatures rarely dropping below 15°C during the dry season. Average humidity is around 40% in the dry season and approaches 80% in the wet season.

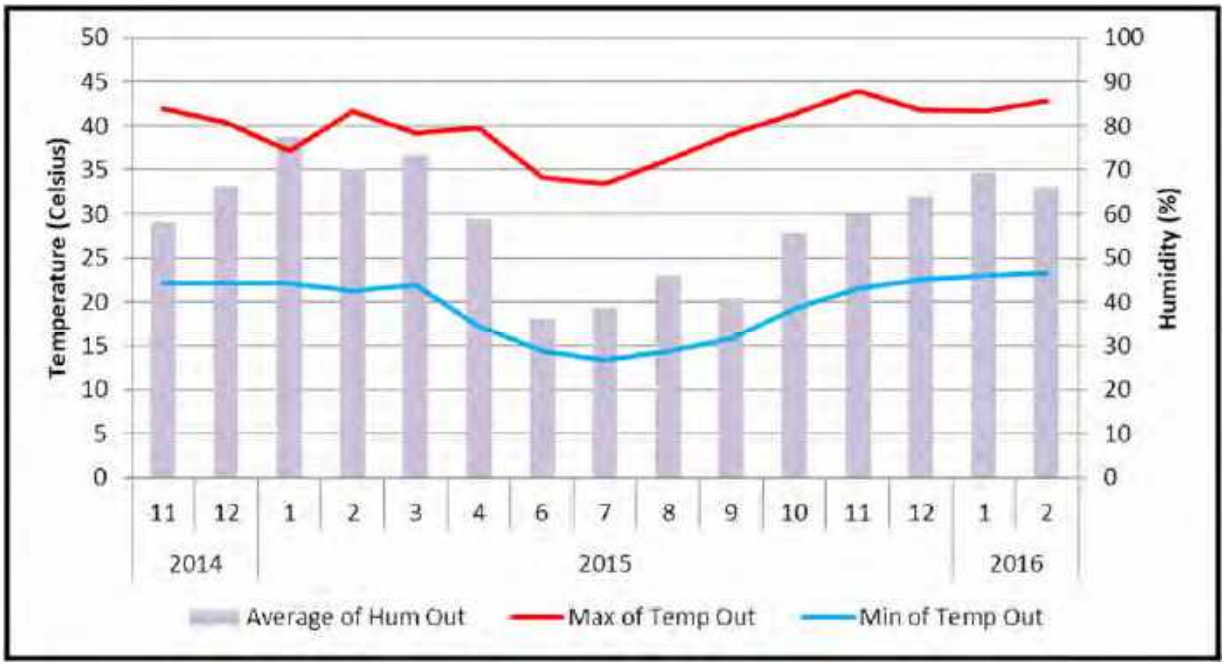

Chart 1: Temperature and humidity at Thunderbird

6.2.1 Rainfall

Spatially extrapolated rainfall data is available for the Project location from the SILO Data Drill data set (Queensland Government 2016). This data is calculated by extrapolation from all available Bureau of Meteorology (BoM) data including the closest BoM sites (Thunderbird, Mt Jowlaenga, Country Downs, Beagle Bay, Yeeda, and Derby Aero) to give a continuous estimated record for a specific location. Comparison with local stations shows that the data closely matches Mt Jowlaenga rainfall records (when available) and is similar to Country Downs and other nearby stations at other times.

Monthly rainfall statistics for the Project based on the Data Drill dataset from 1889 – 2018 are shown in Table 11 and Chart 2, with annual figures based on a rainfall year from September to August. Mean annual rainfall is 694 mm, however, is very variable with a lowest annual rainfall of 153 mm

and highest of 1,503 mm. Median annual rainfall is 675 mm. Median monthly rainfall is 1.2 mm or less during the dry season from May to October. Very low or no rainfall may occur in some months.

Table 11: Rainfall Statistics the Project (mm) 1889–2018

Values	Rainfall (mm)												
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Annual
Mean	1.0	4.2	17.9	95.7	198.9	182.5	126.9	29.2	23.3	14.6	6.4	3.8	703.1
Highest	48.5	53.9	229.1	668.5	1031.8	556.9	535.1	261.7	308.4	159.4	157.6	56.1	1,608.0
Decile 9	1.1	13.7	43.4	203.5	375.9	342.7	284.4	72.3	80.3	53.1	19.2	6.0	1,025.7
Median	0.0	0.3	8.7	66.4	165.5	164.7	94.4	11.8	0.9	0.1	0.0	1.2	675.2
Decile 1	0.0	0.0	0.3	11.1	54.9	48.2	27.7	0.0	0.0	0.0	0.0	0.6	406.0
Lowest	0.0	0.0	0.0	1.1	21.0	12.7	1.8	0.0	0.0	0.0	0.0	0.5	152.6

(Source: Data Drill)

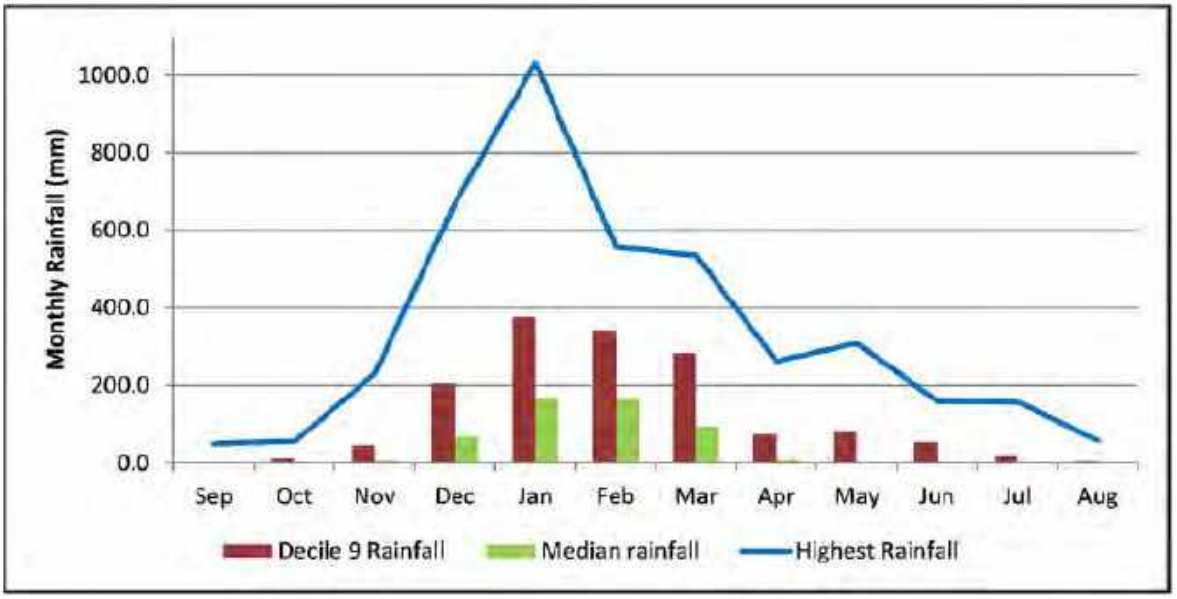

Chart 2: Monthly Rainfall Statistics at Thunderbird

6.2.2 Extreme Rainfall Events and Tropical Cyclones

Across the Kimberley region widespread rainfall event total volumes in excess of 100 mm are commonly associated with tropical lows and cyclones. Such rainfalls can occur well to the east of the cyclone due to moisture-laden northwesterly monsoon winds. Rainfall is not directly related to the intensity of the cyclone and some of the largest flood events have been associated with tropical lows below cyclone intensity.

Although rainfall associated with tropical cyclones is a likely contributor to flooding at the Project, cyclone risk with respect to wind is much lower than for Broome and coastal Pilbara towns due to fewer cyclones, including severe cyclones, impacting on the area. On average, for the northwest coast as a whole, approximately five cyclones occur each year, two of which cross the coast with one rated

as severe (BoM 2022a). When taken in isolation, the risk of a cyclone occurring at any particular location inland from the coast is much lower.

The cyclone season officially runs between November and April, although cyclones only rarely occur in November and have been observed as late as May. The highest risk of category 4 or 5 cyclones is late in the season during March and April. The impact of early cyclones on flooding is also likely to be lessened due to dry catchment conditions.

6.3 Bioregion and Topography

The Project is located on the Dampier Peninsula in the western part of the Kimberley region, in the Dampierland bioregion and Pindanland subregion, as defined by the Interim Biogeographic Regionalisation of Australia (IBRA) classification system (Graham 2001). The Pindanland subregion (5,198,904 ha) is described as a fine-textured sand-sheet with subdued dunes, comprised of the sandplains of the Dampier Peninsula and western part of Dampierland, including the Fitzroy River paleodelta. The climate is semi-arid and vegetation is primarily described as pindan. Broad-scale vegetation mapping of the Pindanland subregion describes the following components:

- Mangroves around coastal areas.
- Coastal dune communities.
- Ephemeral herblands and/or grasslands with scattered low trees.
- Mixed species tussock grasslands or sedgelands.
- Various eucalypt and melaleuca woodlands.

Topography at the Project is relatively subdued, with elevations ranging between 89 and 119 mRL AHD (Australian Height Datum), with an average elevation of approximately 110 mRL AHD. Rocky hills associated with the Reeves Land System occur as outcrops of shallow dipping Cretaceous sediments cover approximately 20% of the Project.

The deposit area experiences relatively even change in elevation along its length, from 130 m in the north to 95 m in the south. The Site Access Road crosses an area that is relatively low lying between two outcroppings and then continues to undulate gently until reaching the Great Northern Highway.

6.4 Geology

6.4.1 Regional Geology

The Project is located in the west Kimberley on the Dampier Peninsula, located within the Fitzroy Trough in the north of the Phanerozoic Canning Basin, an intracratonic basin covering 640,000 km^2 with a dominant onshore area of 530,000 km^2.

The Fitzroy Trough is bounded by the Beagle Bay Fault in the north and the Fenton Fault in the south which are near-vertical normal faults (Searle 2012). The faults extend through the Triassic and older sediments. The faults' prevalence in younger sediments is unknown. The major fold within the Trough is the Baskerville Anticline, in the centre of the Dampier Peninsula. The anticline strikes east-

west and plunges to the west. Strata on the southern limb dip gently to the southwest and strata on the northern limb dip gently to the northwest.

The main geological units of interest in the Dampier Peninsula are the Broome Sandstone and the Mowanjum Sand. The Broome Sandstone is mainly concealed at the surface by the younger units; however, it does outcrop at some locations across the Peninsula, mostly along the shoreline. Outcrops of various facies of the Broome sandstone have been mapped near the Project.

6.4.2 Local Geology

6.4.2.1 Mowanjum Sand

The Mowanjum Sand (Searle 2012) occurs at the surface or beneath a veneer of other superficial units within the Dampier Peninsula. It is a widespread sheet deposit of Quaternary age and unconformably overlies a weathered contact on the Broome Sandstone. It is overlain itself by thin, younger deposits in places. Various other unconsolidated deposits of sand, limestone, silt, clay, gravel, and conglomerate occur along beaches, and tidal flats, and are associated with the dunes. The unit consists of red-brown, fine-grained (very fine to medium) silty sand (colloquially termed 'pindan') and is generally between 8 and 14 m thick (maximum 29 m) in the holes drilled by Wright (2013) near the Broome townsite. At the Project it is typically 6 –12 m thick and unsaturated.

6.4.2.2 Emeriau Sandstone

The Emeriau Sandstone consists of fine- to coarse-grained, poorly sorted sandstone and conglomerate. It is of Late Cretaceous age and is only present in the northwest of the Dampier Peninsula, about 60 km northwest of the Project. It overlies the Broome Sandstone.

6.4.2.3 Broome Sandstone

The Broome Sandstone is present over the west and central part of the Dampier Peninsula, except where it has been eroded away towards the east and over the nose of the Baskerville anticline. To the west, the Broome Sandstone extends offshore beneath the Indian Ocean.

The unit description here follows Towner and Gibson's (1980) usage and includes the basal transitional unit known as the Jowlaenga Formation. The sediments of the Broome Sandstone and basal Jowlaenga Formation are of Early Cretaceous age. They are overlain by superficial units comprising shoreline, aeolian, and alluvial deposits; mainly the Mowanjum sand ('pindan sand'). The contact with the Mowanjum sand is weathered and is frequently difficult to recognise in drill cuttings. The Broome Sandstone is underlain by the Jarlemai Siltstone, which is of Late Jurassic to Early Cretaceous age and has a maximum onshore recorded thickness of 388 m (DMIRS 2016).

Broome Sandstone (Upper)

The Broome Sandstone consists of weakly cemented, fine- to coarse-grained quartzose sandstone, with minor beds of siltstone and claystone, thin coal seams, and minor pebble conglomerate (Laws 1991). Vogwill (2003) reports that these lithologies are contained within four subfacies, three upper deltaic facies ('Broome sandstone 1–3') and a lower fluvial subfacies ('Broome sandstone 4') in the southwest of the Peninsula. The fluvial facies comprise mainly coarse grained sand and granule-sized

particles with minor siltstone and claystone, while the upper deltaic facies is mainly medium- to coarse-grained sand with abundant silt. The Broome Sandstone is characterised in geophysical logs by low gamma radiation and high resistivity where the formation is saturated by fresh groundwater. Gamma radiation signatures have higher intensity where there are intercalated siltstone and claystone beds. Gamma radiation signatures have lower intensity where pebble conglomerate beds are present.

Heavy Mineral Sands

At the Project, the lower part of the Broome Sandstone comprises high grades of fine-grained heavy mineral sands (HMS) containing valuable heavy minerals ilmenite, zircon, leucoxene and rutile. Mineralisation is in a thick, broad, anticlinal, sheet-like body striking northwest. The HMS section of the Broome Sandstone at the deposit is relatively thick (35 – 55 m). The HMS lithology of the Broome sandstone is comparably finer grained to that of the upper section of the Broome Sandstone. The areal extent, width, grade, geological continuity and grain size of the Thunderbird deposit are interpreted to indicate an offshore sub-wave base depositional environment.

Basal Transitional Unit

The Broome Sandstone basal transitional unit (also referred as the Jowlaenga Formation) is very similar lithologically to the upper part of the Broome Sandstone although it contains more silts and clays. It can be difficult to differentiate in drill cuttings; however, the transition is recognisable in geophysical logs by a progressive increase in gamma-intensity and a decrease of resistivity with depth. Resource exploration drilling data show an increased concentration of very fine-grained sediment (slime) in the basal transitional unit.

The transitional unit has been interpreted as generally 15 – 30 m thick (Rockwater 2016), in general agreement with the maximum recorded thickness of 40 m for the Jowlaenga Formation in Geoscience Australia's online geological database.

6.4.2.4 Jarlemai Siltstone

The Jarlemai Siltstone is a shallow marine deposit of early Cretaceous to late Jurassic age that is unconformably overlain by the Jowlaenga Formation (Gibson 1983). The formation is up to 218 m thick (in the bore Fraser River 1) and has an average thickness of about 100 m in the Dampier Peninsula.

The formation is primarily a mudstone, consisting of silty claystone, sandy and fossiliferous siltstone, and clayey sandstone. The siltstone and claystone are micaceous and pyritic. They are generally medium to dark grey, brownish grey, and light brown, but can be oxidised dark red-brown, purple, and yellow. Sands are light grey, coarse- to medium-grained, loose to friable, sub-rounded to rounded. Shell fragments, including pelecypods, brachiopods and foraminifera are common, and the formation is calcareous through the middle portion.

Structure contours on the top of the Jarlemai Siltstone indicate an asymmetric east-west trending anticline that probably developed over the pre-existing Baskerville anticline (Laws 1991). Some erosion may also have occurred, particularly south of the Project, but the overall structure is an anticline-like feature.

6.5 Hydrology and Hydrogeology

6.5.1 Surface Water

The Project is located on sandy soils with low runoff generation and there are no defined watercourses within the main mine development areas. There are no year-round surface water bodies within the Project area: the nearest surface water body is the large wetland near the Mt Jowleanga homestead, outside the Project envelope. The nearest ephemeral pools are approximately 25 km downstream on Fraser River South.

6.5.1.1 Regional Catchments

The Project is within the National Catchments Boundaries Level 2 Cape Leveque Coast River Region of the Level 1 Tanami-Timor Sea Coast Division (Stein et al. 2011). The Cape Leveque Coast River Region consists of several river systems draining to the coast and extending approximately 100 km inland. All catchments of the Project area drain east to King Sound.

The Project lies within the catchments of Fraser River, Fraser River South and Little Logue River (Figure 12). Whilst Fraser River enters King Sound from the west, Little Logue River discharges via Logue River to King Sound at Jarrananga Plain immediately adjacent to the Fitzroy River. The adjacent Fitzroy River Basin is a much larger river basin extending approximately 500 km inland and representing the primary surface water inflow to King Sound.

6.5.1.2 Local Catchments

Local catchments are shown in Figure 13. The catchments of the In Pit TSF and Out of Pit TSF have small rocky hills at their heads and are very small at less than 3 km^2. Defined watercourse channels do not extend far past the base of the hills, but wet ground conditions further down the catchment have been observed following intense rainfall events.

The southern portion of the mineral deposit area has a larger catchment of 108 km^2 extending 17 km upstream referred to as the Deposit South Catchment. There is no distinct watercourse channel associated with the drainage line, but there is a broad valley approximately 450 m wide exhibiting variation in vegetation associated with surface water or shallow groundwater.

The Project area includes catchments of four named rivers shown in Figure 12. These comprise:

- Fraser River (total catchment area 1,529 km^2).
- Fraser River South (total catchment area 1,024 km^2).
- Little Logue River (total catchment area 323 km^2).
- Logue River (total catchment area 1,056 km^2).

The majority of the Project is within the Fraser River South catchment. The Logue and Little Logue River catchments are crossed by the site access road and do not contain any other Project infrastructure.

6.5.1.3 Surface Water Quality

No surface water quality monitoring data is available for the Project area or elsewhere on the Dampier Peninsula. Given the lack of industry and other sources of potential contamination, surface runoff is expected to be of good quality suitable for livestock and agricultural use.

All watercourses remain dry during the dry season. Some salinity records are available from the Fitzroy River, where wet season river flows representing surface runoff quality are typically less than 250 mg/L and often less than 100 mg/L (Lindsay and Commander 2005).

The nearest water quality information available on the Statewide River Water Quality Assessment dataset (DoW 2016) is for the Isdell River (Site 804001), 266 km east of the Project area, which had a median total dissolved solids concentration of 106 mg/L and median pH of 7.97 for the period 2005 to 2007.

480,000
510,000
540,000
8,130,000
8,100,000
8,070,000
8,040,000
8,010,000
N

Legend
Project Tenements
Prescribed Premises Boundary
Site Layout (Current and Approved)
State Road
Exiting Tracks
Regional Catchments
Fraser River
Fraser River South
Little Logue River
Logue River
Regional Drainage Direction
Drainage Lines

Scale: 1: 350,000
Original Size: A3
Grid: GDA2020 / MGA zone 51
(EPSG:7851)
0 5 10 km

Figure 12

Regional Catchment Boundaries

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W:\Shared Resources\Approvals\Environmental Licence\ML 100 Amendment 2025\GIS\Mining Project Amendment_Base2025.aprx 10/12/2025 LG Regional Catchments

480,000
510,000
540,000
8,130,000
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8,070,000
8,040,000
8,010,000
N

Legend
- Project Tenements
- Prescribed Premises Boundary
- Site Layout (Current and Approved)
- State Road
- ExistingTracks
- Local Catchments
- Local Drainage Direction
- Drainage Lines

Scale: 1: 350,000
Original Size: A3
Grid: GDA2020 / MGA zone 51
(EPSG:7851)
0 5 10 km

Figure 13

Local Catchment Boundaries

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6.5.2 Groundwater

The Broome Sandstone Aquifer is hosted in the Broome Sandstone and the saturated parts of the overlying Emeriau sandstone and Mowanjum sand, which are generally in hydraulic continuity. It is a major unconfined to semi-confined aquifer that supplies groundwater to the Broome townsite, rural subdivisions, horticultural areas and pastoral properties. The Jarlemai siltstone underlies the Broome Sandstone Aquifer and acts as a major aquiclude between it and the Alexander Formation (part of the Wallal Aquifer) below.

Groundwater levels in the Broome Sandstone Aquifer range from about 75 m AHD near the centre of the Dampier Peninsula to about 0 – 1 m AHD at the coast (Figure 14). In the northern and eastern parts of the study area there are regions with sparse groundwater monitoring data, with data most concentrated in the Broome townsite region. The contours (Figure 14) imply that regional groundwater flow is towards the coast under an average hydraulic gradient of 0.00085 (0.85 m/km).

Variations in groundwater levels in monitoring bores for the Broome townsite, although within close proximity to production bores, appear to closely correspond to variations in rainfall. Groundwater levels vary by about 3 m in response to inter-decadal variations in rainfall. This is evident when comparing the cumulative rainfall variation with groundwater levels. The groundwater level trends closely match the trends in cumulative-deviation-from-mean annual rainfall, with an apparent lag of two to three years as observed in other studies (CSIRO 2009; Rockwater 2013, 2014).

Monitoring of groundwater levels across the deposit area has occurred for a number of years. Water levels are variable across the project and have fluctuated in response to climatic conditions and seasons.

The Broome Sandstone Aquifer is recharged mainly by the direct percolation of rainfall, which falls mostly during summer (Rockwater 2016). Coastal dunes north of Broome are a significant local source of groundwater recharge to the Broome Sandstone Aquifer, which is apparent from the groundwater flow pattern and chemistry (Laws 1991). Recharge rates of 4 – 5% of rainfall were estimated from chloride ratios and flow net interpretations (Laws 1987). This corresponds to groundwater recharge rates of 22 – 52 mm from an average annual rainfall of 780 mm/year.

Minor seasonal surface water ponding areas may occur locally in the overlying Pindan sand. The salinity of groundwater in the Broome Sandstone Aquifer is low but increases near the coastline and Roebuck Plains. Groundwater salinity values of 110 – 200 mg/L were obtained from the aquifer test boreholes (Pennington Scott 2014). Sampling of additional bores drilled in the Project area in 2017 returned groundwater conductivity ranging from 124 – 370 µs/cm (Rockwater, 2018).

Groundwater in the Broome Sandstone Aquifer is predominantly of sodium-chloride type, with elevated levels of bicarbonate in some areas (Laws 1991). Silica levels are high, with reported values of 14.7 – 119 mg/L. Nitrate levels are frequently over 40 mg/L, probably as a result of nitrate fixation by native acacias and termite activity

492,000
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8,064,000
N
Broome Sandstone
Jarlemail Siltstone
74
72
70
68
66
Scale: 1: 50,000
Original Size: A3
Grid: GDA2020 / MGA zone 51
(EPSG:7851)
0 1 2 km
Legend
Project Tenements
Prescribed Premises Boundary
Site Layout (Current and Approved)
Catchment Divide
Existing Tracks
Interpreted Broome Aquifer Groundwater Level (mAHD)
(Rockwater June 2016)
Figure 14
Thunderbird Interpreted Groundwater Levels (2016)
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7. Attachment 9: Category Specific Checklist

7.1 TSF Category Checklist

Additional information is now required under Part V of the EP Act through the completion of IR-F28 Application Form annex: Category checklist (tailings storage facility), (TSF Checklist, DWER 2023). A copy of the checklist is provided in Appendix D

7.2 Conceptual Site Model

Stage 3A Out of Pit design does not result in changes to the conceptual site model outlining the potential Source-Pathway-Receptor pathways provided and previously been assessed by DWER (Licence Amendment Date: 14 May 2024) and as such, the Out of Pit TSF has not been addressed in this section.

The conceptual site model outlining the potential Source-Pathway-Receptor pathways has been prepared in accordance with the requirements of the TSF Checklist for the In-Pit TSF and is provided in Table 12.

Table 12: Conceptual Site Model

Source/Activities	Potential Emissions, Pollutants or Contaminants of Concern	Potential Pathway	Potential Receptors	Potential Impacts	Proposed Controls and Contingencies
Return water and tailings pipelines	Pipeline leakage or failure	Surface water and land	The Project is located on sandy soils with low runoff generation and there are no defined watercourses within the main mine development areas. There are no year-round surface water bodies within the Project area, the nearest surface water body is the large wetland near the Mt Jowleanga homestead outside the Prescribed Premise boundary. The nearest ephemeral pools are approximately 25 km downstream on Fraser River South.	Localised reduction in surface water quality Localised surface disturbance/ contamination	Tailings pipelines are contained in earthen bunds with sumps located at low points along the pipeline routes to ensure leaks or spillages are contained within bunded areas. Pipelines incorporate isolation valves at appropriate intervals and periodic visual inspections are undertaken. Tailings and return water pipelines are fitted with flow meters and leak detection sensors.
In-Pit Tailings Storage Facility	Overtopping due to insufficient freeboard capacity	Surface water and land		Localised reduction in surface water quality	Sufficient freeboard is maintained in the TSF to allow capture of rainfall from a 1% AEP 72-hour event. An In-Pit TSF Operations Manual has been developed to provide direction on the appropriate operation and monitoring of the In-Pit TSF including daily inspections
In-Pit Tailings Storage Facility	Seepage from the In-Pit TSF to groundwater	Seepage/infiltration to Groundwater		Localised changes to groundwater quality and levels	Groundwater levels and groundwater quality are monitored at five monitor bores surrounding the Pit. Groundwater monitoring around the facility will be undertaken quarterly throughout the life of the project. The supernatant pond on the In-Pit TSF is likely to remain small during operations, and internal water recovery within the facility is expected to be ineffective, water recovery has therefore been designed to be managed

Source/Activities	Potential Emissions, Pollutants or Contaminants of Concern	Potential Pathway	Potential Receptors	Potential Impacts	Proposed Controls and Contingencies
					predominantly externally, through the collection of operational seepage. Water recovery is achieved through the collection of operational seepage across the retaining embankments. Seepage flows have been delineated into two regions as for Cell 1A and Cell 1B respectively. For both cells, seepage from Region A is transferred to Region B through seepage transfer pipes, ultimately reporting to a seepage collection sump situated at the lowest pit base elevation. A pumping system comprising a primary and secondary pump is to be located at seepage collection sumps. A secondary pump will remain on standby or relocated to support water recovery as needed. Seepage rates may be variable during the commissioning stages of the facility. As such, the secondary pump may be relocated to facilitate water recovery within the facility (typically along construction ramps). Groundwater levels and groundwater quality are monitored routinely at five monitor bores surrounding the Pit.

7.3 TSF Checklist Attachment 3: Premise Map and Site Layout Plan

Attachment 3 of the TSF Checklist requires provision of a Premise Map and Site Layout Plan as shown in Figure 15.

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N

THAC427
TMB02
In-Pit TSF
THAC252
THAC243
THAC357

Cell 1A Tailings Extent
Cell 1A
Cell 1A Interim Embankment Crest
Seepage Collection Sump (1A)
Main Embankment Cell 1A Crest
Seepage Collection Drain (1A)
Seepage Collection Sump (1A)
Cell 1B Tailings Extent
Main Embankment Cell 1B
Seepage Tranfer Pipes (1A)
Seepage Collection Sump (1B)
Cell 1B
Seepage Transfer Pipes (1B)
Seepage Collection Drain (1B)
Cell 1B Extension Bund
Seepage Collection Sump (1B)

492,000 496,000 500,000

Scale: 1: 50,000
Original Size: A3
Grid: GDA2020 / MGA zone 51 (EPSG:7851)
0 1 2 km

Legend

- Project Tenements
- Prescribed Premises Boundary
- Site Layout (Current and Approved)
- Seepage Collection Sump
- Seepage Collection Drain
- Seepage Tranfer Pipes
- Embankment Cell
- Cell Tailings Extent
- Monitoring Bores

Figure 15
TSF Checklist - Attachment 3: Premise Map & Site Layout Plan

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8. Attachment 10: Proposed Fee Calculation

The fee calculation associated with amendment of L9335/2022/1 for the proposed activities described within this document equated to $6,120 and is outlined in Table 13.

Amendment Application Fee Calculator (effective as of 1 July 2022)	Instrument No. / Fee Multiplier	L9335/2022/1
Categories	**Units**	**Fee**
8 - Mineral sands mining or processing: More than 5,000,000 tonnes per year.	450	6,120
	Fee Payable	**$6,120**

Note: Amendment fee is determined by the category with the largest fee units

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APPENDIX A

APPENDIX A:

IN-PIT TAILINGS STORAGE FACILITY (CELL 1) DDR (REC 2025)

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REPORT REF	P24-77-PR-13/DDR	17 DECEMBER 2025

IPTSF Cell 1
Detailed Design Report
Kimberley Mineral Sands
Thunderbird Mineral Sands Project

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Resource Engineering Consultants Pty Ltd

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Trading as REC

ABN: 66 626 931 753

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Report

Title:	IPTSF Cell 1 Detailed Design Report
File:	P24-77-PR-13/DDR [redacted]
Client:	Kimberley Mineral Sands Pty Ltd [redacted]
Synopsis:	This document presents the Detailed Design Report (DDR) for Cell 1 of the in-pit tailings storage facility at the Kimberley Mineral Sands' Thunderbird Mineral Sands Project (TMSP).

Revision

Date	Revision	Purpose	Author(s)
29 OCT 2025	REV A	ISSUED FOR EARLY REVIEW AND COMMENT	MH; GL; SS; SH
05 NOV 2025	REV B	ISSUED FOR REVIEW AND COMMENT	MH; GL; SS; SH
05 DEC 2025	REV C	ISSUED FOR REVIEW AND COMMENT	MH; GL; SS; SH
17 DEC 2025	REV 0	ISSUED FOR USE	MH; GL; SS; SH
Recipients are responsible for eliminating all superseded documents in their possession			

Distribution

Date	Revision	Approved	Recipient(s)	No of Copies
29 OCT 2025	REV A	MH	KIMBERLEY MINERAL SANDS	1. PDF
05 NOV 2025	REV B	MH	KIMBERLEY MINERAL SANDS	1. PDF
05 DEC 2025	REV C	MH	KIMBERLEY MINERAL SANDS	1. PDF
17 DEC 2025	REV 0	MH	KIMBERLEY MINERAL SANDS	1. PDF
Recipients are responsible for eliminating all superseded documents in their possession				

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Executive Summary

Kimberley Mineral Sands Pty Ltd (KMS) is expanding the tailings storage capacity at the Thunderbird Mineral Sands Project (TMSP), located approximately 100 km northeast of Broome in Western Australia. This expansion marks the transition of tailings deposition from the existing Out-of-Pit Tailings Storage Facility (OPTSF) to the In-pit Tailings Storage Facility (IPTSF). The storage capacities of Cell 1, which comprises sub-cells 1A and 1B, are summarised below:

Parameter	Value
Design In-situ Tailings Dry Density	1.60 t/m³
Average Throughput (FY27 to FY30)	8.02 Mtpa
Cell 1A Tailings Storage Capacity	8.79 Mt / 5.50 Mm³
Cell 1A Storage Life	July 2026 to end-June 2027 (12 months)
Cell 1B Tailings Storage Capacity	18.58 Mt / 11.61 Mm³
Cell 1B Storage Life	July 2027 to end-September 2029 (27 months)
Notes: The storage capacity and operating life are based on design estimates and will depend on performance achieved during operation. Earlier transition from Cell 1A to Cell 1B may be required if performance is lower than expected. Conversely, performance exceeding design expectations may allow the facility to operate for a longer period than estimated.	

This document provides the design details for IPTSF Cell 1 which has been designed in alignment with currently recognised tailings-related guidelines for TSF development. Given the nature of an in-pit storage facility, it is anticipated that the runout from a hypothetical dam break will not exceed the confinement of the pit. Based on discussions with KMS, the highest number of persons at any given moment within the pit is anticipated to be between 10 – 100. As such, a Population at Risk (PAR) of 10 – 100 has been adopted for the assignment of dam consequence classification. This supports the facilities' classification as per the following standards/guidelines:

- DMPE: Category 1
- ANCOLD: High C

The design of Cell 1 consists of sub-cells 1A and 1B. Cell 1A will receive tailings from July 2026 to end-June 2027, which allows for continued DMU progression and the construction of the Cell 1B perimeter embankments. Once the Cell 1B embankments are completed, Cell 1A and Cell 1B will be combined to form a single tailings storage area. Water recovery is intended to take place either externally through the form of collected seepage or internally (directly) from the supernatant pond (given appropriate pond size). The perimeter embankments have a typical upstream batter of 1V:2H, and a downstream batter of 1V:2H or 1V:2.5H, depending on the section. The typical embankment will be constructed primarily using DMU oversize, with overburden considered as an alternative material subject to REC acceptance.

The Operating Manual attached in Appendix B is aimed at providing guidance to the operating and monitoring requirements of the facility. The typical operating conditions consist of tailings delivered as a slurry at a target 48.5% solids by mass with the slurry discharged sub-aerially or sub-aqueously from the prescribed spigotting locations. The spigots will be operated in a rotating manner to promote the formation of uniform tailings beaches and maintain the supernatant ponds intended locations.

Geotechnical stability assessments have been undertaken in consideration of static and post-seismic conditions to assess the factor of safety (FoS) of the proposed embankment structure as per ANCOLD recommendations. Seven embankment sections were assessed, and FoS requirements for static and post-seismic conditions meet the minimum ANCOLD requirements.

The facility will be monitored through a combination of vibrating wire piezometers (VWPs) and settlement pins installed along the embankment crest. Additionally, monthly aerial surveys shall be taken to facilitate tailings density reconciliation and water balance calibrations (bathymetric surveys may be required depending on supernatant pond size).

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Terminology and Abbreviations

The following terminology and abbreviations have been used in this document:

AEP	Annual exceedance probability
ANCOLD	Australian National Committee on Large Dams
DDR	Detailed Design Report
DMPE	Department of Mines Petroleum and Exploration
EoR	Engineer of Record
GPS	Global Positioning System
GSI	Geotechnical Site Investigation
HDPE	High-Density Polyethylene
KMS	Kimberley Mineral Sands
IFD	Intensity Frequency Duration
IPTSF	In-pit Tailings Storage Facility
LGIRS	Department of Local Government Industry Regulation and Safety
LoM	Life of Mine
m/a	Metres per annum
m^3/d	Cubic meters per day
Mm^3	Million cubic meters
Mt	Million tonnes
Mt/a	Million tons per annum
NAF	Non-acid forming
OM	Operating Manual
OPTSF	Out-of-Pit Tailings Storage Facility
PAF	Potentially Acid Forming
PMP	Probable Maximum Precipitation
RL	Reduced level
t/a	Tonnes per annum
t/d	Tonnes per day
t/m^3	Tonnes per cubic metre
TMSP	Thunderbird Mineral Sands Project
SMDD	Standard Maximum Dry Density

1. TSF Proposal Summary

1.1 Introduction

Resource Engineering Consultants Pty Ltd (REC) has been engaged by Kimberley Mineral Sands Pty Ltd (KMS) to prepare the Detailed Design Report (DDR) for Cell 1 (consisting of sub-cells Cell 1A and Cell 1B) of the In-pit Tailings Storage Facility (IPTSF) at the Thunderbird Mineral Sands Project (TMSP) site, located approximately 100 km Northeast of Broome in Western Australia.

The IPTSF refers to the overall in-pit tailings cells developed through progressive cell constructions, expanding in parallel with mining activities to meet LoM requirements. Cell 1 represents the first of the in-pit cells to receive tailings, marking the transition of tailings storage from the Out-of-Pit TSF (OPTSF) to in-pit storage. The location of the project site along with the IPTSF Cell 1 location is presented in Figure 1.

Figure 1: Project Locality

As noted previously, Cell 1 consists of two sub-cells, Cell 1A and Cell 1B. This configuration enables concurrent deposition and continued DMU advancement, as Cell 1A enables initial use of the pit void for tailings storage while the Cell 1B perimeter embankment continues to be constructed. Cell 1A incorporates an Internal Weir that functions as a temporary retaining structure during the construction of the Cell 1B embankments. Once the Cell 1B embankments are completed, the storage volumes of the two sub-cells become shared, allowing supernatant water and tailings to spill over the Internal Weir. Figure 5 and Figure 6 presents the general configurations of Cells 1A and 1B respectively.

This DDR documents the engineering design of IPTSF Cell 1 to a maximum constructed embankment crest elevation between RL 111.0 m and RL 114.0 m. The design provides approximately 8.79 Mt of storage capacity for Cell 1A and 18.58 Mt for Cell 1B, supporting tailings deposition until end-September 2029.

The scope of the design documented in this report is limited to civil engineering / earthworks components and excludes mechanical and electrical design elements. To enable this report to be considered as a ‘stand-alone’ document and remove the need for repeated cross-referencing to existing reports / memorandums and excessive appendices, several sections have been copied verbatim (or very close to).

1.2 Purpose and Scope

This DDR outlines the basis of design for IPTSF Cell 1 at the TMSP, upon which the design assessments and operation requirements are based. The purpose of this document is to present the overall objectives of IPTSF Cell 1 and summarise the guidelines and legislations, tailings properties, design philosophy, design criteria and other relevant information for the design requirements. All matters related to the design, construction, and operations of the IPTSF Cell 1 at the TMSP will be prepared in accordance with the most recent and applicable design codes and regulations.

As the scope of this document is to provide comprehensive design documentation, the contents within this document are to be considered the definitive design document of the TMSP IPTSF Cell 1. Preceding design documentation submitted to KMS, and their associated assessments and designs pertaining to IPTSF Cell 1, are superseded by the contents of this document.

2. TSF Design Considerations

2.1 Concurrent Mining and Deposition

2.1.1 Mining Progression and Tailings Storage

The IPTSF cell configurations is based on the concurrent progression of mining activities, in-pit cell construction, and tailings deposition. As mining advances and voids are created, these void spaces are sequentially developed into ITPSF cells, compartmentalised by engineered embankments to facilitate concurrent deposition and mining operations. Accordingly, each cell is to be configured to provide sufficient tailings storage capacity to enable the development of subsequent cells, while maintaining adequate clearance from ongoing mining activities.

2.1.2 Historical Mining Schedules and IPTSF Designs

The mining schedule has undergone several revisions and optimisations to accommodate the transition to in-pit tailings storage. Historical revisions of the DMU schedule and previously planned in-pit deposition timeframes have been altered due to the limitations surrounding available mine void space to be utilised for tailing storage. This is further detailed in the Q3 2024 EoR Report (document ref. P24-77-PR-02/2024Q3), whereby due to the available void space for subsequent IPTSF cells, sub-optimal embankment placement will result in a cascading reduction in tailings storage capacity, eventuating at a 'break point' where in-pit deposition will no longer be possible.

Two IPTSF Cell 1 DDRs have been developed under different design considerations, scopes, and limitations. These are detailed in the 2024 IPTSF Cell 1 DDR (document ref. P24-77-PR-01/DDR) and 2025 IPTSF Cell 1 DDR (document ref. P24-77-PR-09/DDR). The shortcomings of the 2024 IPTSF Cell 1 design and the accommodating DMU schedule were highlighted in the Q3 2024 EoR Report (document ref. P24-77-PR-02/2024Q3) and the Q4 2024 EoR Report (document ref. P24-77-PR-02/2024Q4) respectively.

The 2025 IPTSF Cell 1 DDR considered a revised DMU schedule for sustainable in-pit deposition. However, this schedule was again revised due to financial considerations. REC notes that both the 2024 and 2025 designs are currently invalid and not in alignment with the current design objectives and limitations. REC notes a key change in the design criteria for the ITPSF – while the initial two IPTSF Cell 1 designs focused on maximising tailings storage capacity, the scope has since been revised to also accommodate oversize and overburden (partial) material generated from DMU operations. This shift in scope has prompted significant changes to both the mining schedule and consequently the ITPSF configuration. Through a collaborative effort between KMS, REC, and Entech Pty Ltd (Entech), a high-level path forward for integrated waste and tailings storage within the ITPSF has been developed.

2.1.3 Current Mining Schedule and Tailings Production

The revised mining schedule, including both sequence and progression is presented in Figure 2. REC notes that based on discussions with KMS in early October 2025, Block 21 is no longer planned to be mined at this stage. Additionally, the mining sequence for Blocks 16 to 27 has been revised. Overall, the resequencing of mining progress for the aforementioned blocks should not have a significant impact on the development of Cell 1A and 1B. However, the presence of Block 21 will reduce the overall tailings storage capacity for Cell 1B.

IPTSF Cell 1A and 1B occupy up to Blocks 15 and 27 respectively. Based on discussions with KMS, it is understood that a clearance of approximately 600 m must be maintained between construction and mining activities.

Figure 2: Revised Mining Schedule

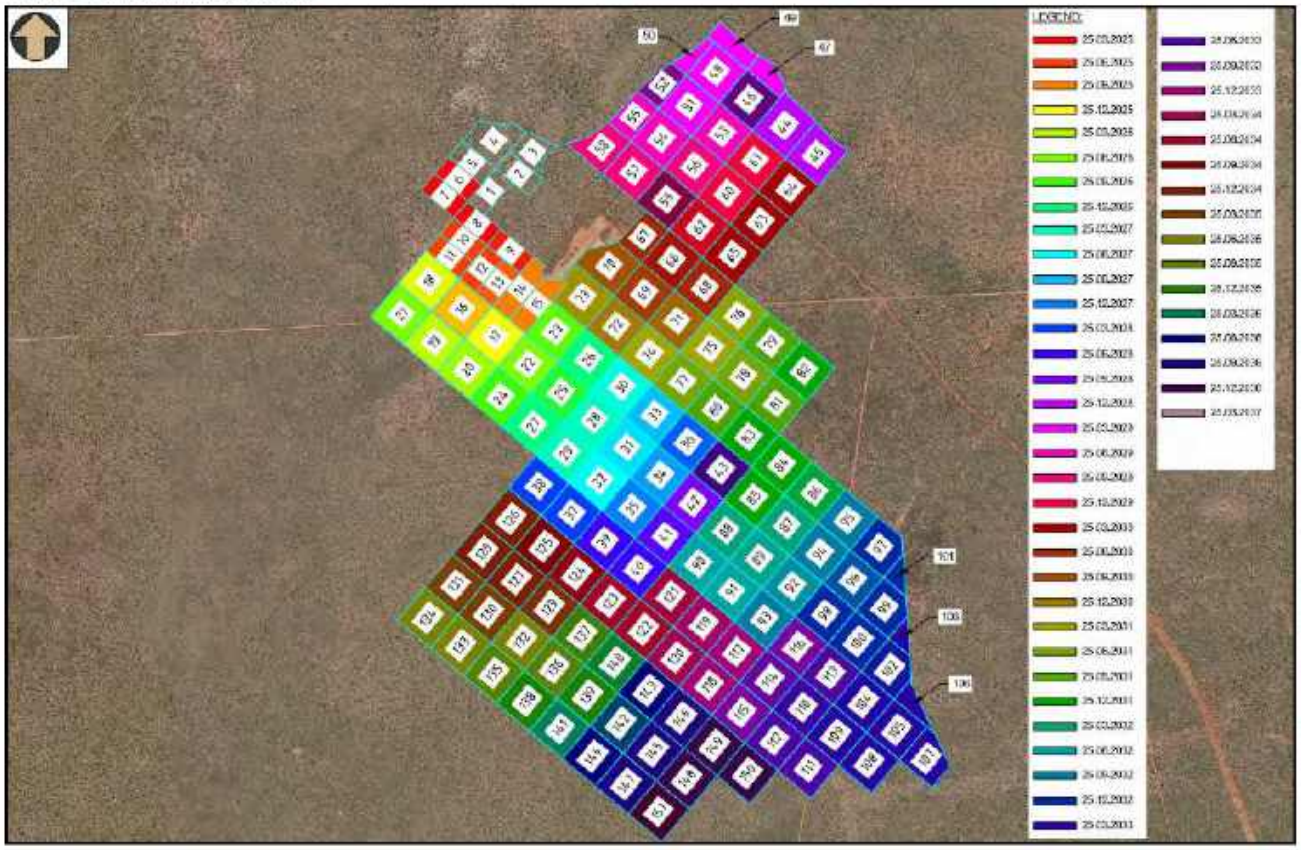
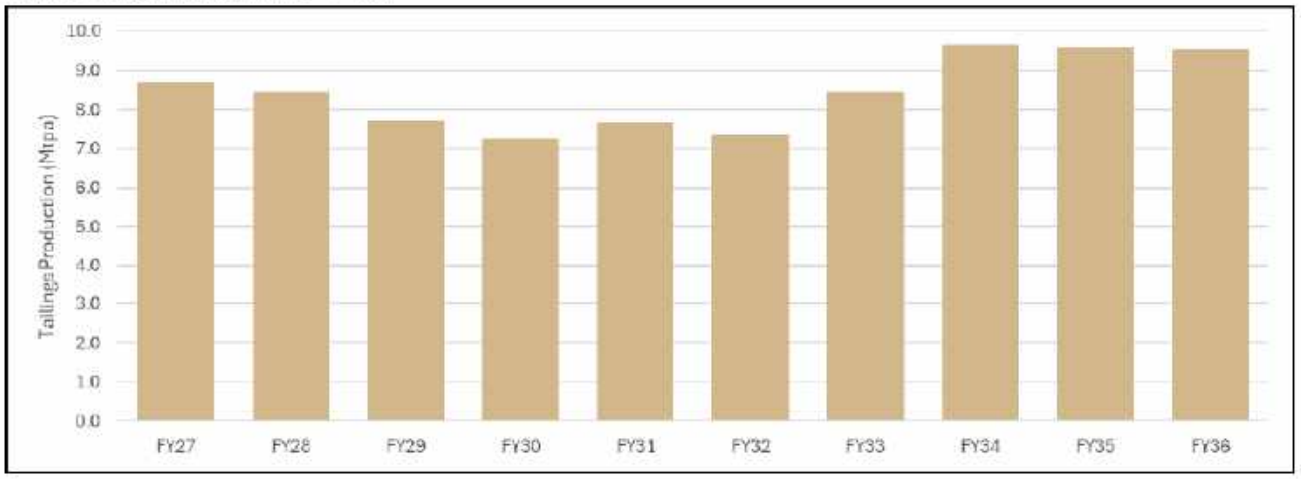


Table 1 and Figure 3 presents the anticipated tailings production between FY27 to FY36 based on the metallurgy model provided by KMS (15 July 2025), which is understood to be reflective of the above mining schedule. Given the in-pit deposition commencement in July 2026, IPTSF Cell 1A has been designed to provide approximately 8.79 Mt of tailings storage capacity, allowing for operation until end-June 2027. This is followed by the extension of Cell 1B, designed to provide approximately an additional 18.58 Mt of tailings storage capacity, allowing for operating up until end-September 2029 (including approximately 0.61 Mt of contingency storage). REC notes that the projected tailings throughout are correlated to mining progression.

Table 1: Tailings Production (FY27 - FY36)

Financial Year	Tailings Production (Mt)
FY27	8.68
FY28	8.46
FY29	7.70
FY30	7.25
FY31	7.65
FY32	7.35
FY33	8.47
FY34	9.64
FY35	9.61
FY36	9.55

Figure 3: Tailings Production (FY27 - FY36)



2.2 Tenure and Site Conditions

2.2.1 Topography

The topography surrounding the pit is generally comparatively low relief with a gentle 0.4% slope lowering towards the Southeast. IPTSF Cell 1 is to be constructed in the pit voids resulting from mining activities. The 2-year pit depth is expected to range from approximately 20 m to 50 m with an estimated pit floor slope of 1.5% – 2.0% lowering towards the Southeast. The pit depth within IPTSF Cell 1 TSF footprint is expected to range from 20 m – 40 m.

2.2.2 Climate

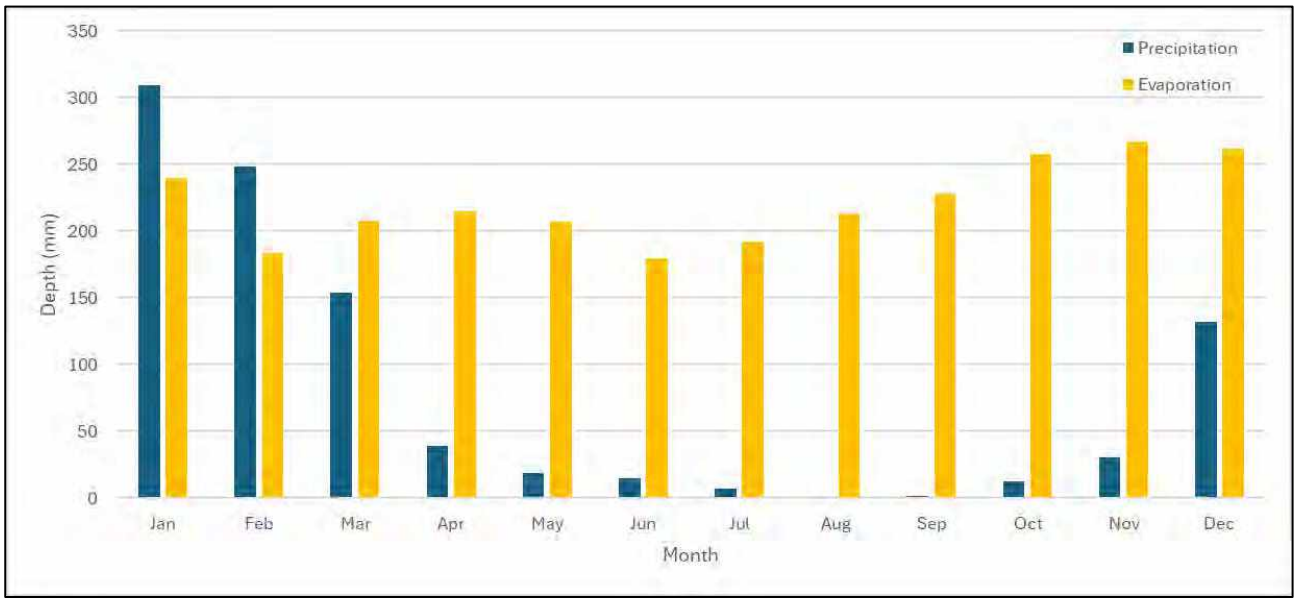
The climate of Broome (100 km Southwest of the project site) is characterised by oppressive and overcast wet seasons and humid, windy and mostly clear dry seasons, wet season typically lasts from mid-December to mid-March. The project location is hot year-round, the temperature varies from 15°C to 34°C and rarely below 10°C and above 37°C.

Climate data has been extracted for the site from the Bureau of Meteorology (BoM). The monthly precipitation data was sourced from Country Downs, located approximately 45 km Northwest of the project site. The average rainfall data is collected over 44 years starting 1970 until 2023 (9 years unrecorded in between). The average monthly evaporation data was extracted from the pan evaporation map average from 1975 to 2005. The average monthly climate data is summarised in Table 2 and presented in Figure 4.

Table 2: Average Monthly Rainfall and Evaporation

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Mean Rainfall (mm)	309.4	249.1	154.2	39.1	19.4	15.0	7.3	1.3	1.8	12.6	30.9	132.4	972.5
Mean Evap. (mm)	239.9	183.8	208.3	215.2	207.4	180.0	192.7	213.8	228.3	257.9	267.4	262.2	2656.8

Figure 4: Average Monthly Rainfall and Evaporation



2.2.3 Regional Geology

The project site is situated within the Canning Basin developed as an intracratonic sag between the West and North Australian Cratons during the Early Paleozoic. The bulk of the sedimentary succession is Ordovician to Middle Triassic, mostly composed of continental to marine carbonate and clastic sedimentary facies, including widespread Upper Ordovician to Silurian evaporitic deposits. Upper Cambrian sections may be present in depocentres but remain unconfirmed by drilling.

Overlying Jurassic to Cenozoic sedimentary deposits are thin, especially inland from the coast, but thicken markedly offshore towards the Roebuck Basin. The main phases of significant tectonism producing much of the present structural configuration in the basin developed during: (DMPE n.d.)

- Possible Cambrian to Silurian extension and rapid subsidence.
- Early Devonian compression and erosion (Prices Creek Movement).
- Middle Devonian to early Carboniferous extension and subsidence.
- Middle Carboniferous compression (Meda Transpression).
- Late Carboniferous to early Triassic subsidence.
- Middle Triassic to Middle Jurassic uplift and erosion (Fitzroy Transpression)..

Apart from faulting, these events did not greatly deform strata within the basin, making them difficult to differentiate at a local scale. Younger strata are relatively thin, flat lying and only weakly indurated as subsequent structural events, such as the late phases of the breakup of Gondwana, barely affected the basin (DMPE n.d.).

The basin contains a series of mostly west-Northwesterly striking sub-basins. These tectonic divisions apply chiefly to the succession pre-dating the Meda Transpression; overlying strata show considerably less deformation. The main divisions are: (DMPE n.d.)

- Fitzroy Trough and Gregory Sub-basin, representing a Devonian–Triassic northern depocentre containing a Phanerozoic succession estimated at up to 15 km thick. Strata older than the Devonian may be present but have not been penetrated by drilling.
- Kidson and Willara Sub-basins, representing an Ordovician–Devonian southern depocentre, which is up to 5 km thick overlain by a thin Permo-Carboniferous and Mesozoic succession.
- Broome and Crossland Platforms, a central basement high containing an extensive Ordovician–Devonian succession overlain by thin Permo-Carboniferous sections.

- Areas flanking the margins of the basin are designated as structural 'shelves', where pre-Permian strata either abut, thin or pinch out. A series of minor grabens and platforms contiguous with the Anketell Shelf fringe the southwestern margin of the basin and grade westwards into a similar shelf along the northern edge of the West Australian Craton; however, identification of these features relies on limited data.

2.2.4 Hydrology

2.2.4.1 Runoff and Catchment

The runoff for IPTSF Cell 1 is primarily generated from its direct catchment, with minor contributions from the upstream catchment located to the North of the cell. Diversion bunds are to be constructed along the Northwest of IPTSF Cell 1 to reduce the upstream runoff. A runoff coefficient of 1.0 has been conservatively assumed for rainfall falling across all catchment areas as recommended by ANCOLD. Table 3 summarises the estimated catchment areas for Cell 1A and 1B.

Table 3: Cell 1A and Cell 1B Catchment Areas

Cell	Direct Catchment (m^2)	Upstream Catchment (m^2)
Cell 1A	401,700	19,300
Cell 1B	778,700	19,300

2.2.4.2 Design Storm Events

Design rainfall depths for the project site were obtained from the Bureau of Meteorology (BoM) 2016 Rainfall Intensity-Frequency-Duration (IFD) data system for the project site. Table 4 summarises the IFD data.

Table 4: Rare Design Rainfall Depths

Event Duration	Rainfall Depth (mm) for Annual Exceedance Probability (1 in x AEP)						
	1 in 20	1 in 50	1 in 100	1 in 200	1 in 500	1 in 1,000	1 in 2,000
3-hour	121	142	156	178	212	240	270
6-hour	155	185	209	237	283	320	361
12-hour	202	249	288	326	388	440	496
24-hour	268	337	396	450	536	607	685
48-hour	353	445	522	605	727	829	940
72-hour	405	506	589	679	807	911	1,020

2.2.4.3 Probable Maximum Precipitation (Generalised Short-Duration Method)

The Probable Maximum Precipitation (PMP) and the associated Probable Maximum Flood (PMF) were estimated using the Generalised Short-Duration Method (GSDM). The PMP represents the maximum amount of precipitation theoretically possible for a given location and duration, under the most severe meteorological conditions. Table 5 summarises the key parameters of the estimation method, Table 6 summarises the temporal distribution of the PMP.

Table 5: GSDM PMP Estimation Summary

Parameter	Value
Area (km²)	0.29
Duration (hours)	6.0
Terrain Type	Smooth
Moisture Adjustment Factor	1.13
Elevation Adjustment Factor	1.00
Point PMP Depth (mm)	1,000
Area PMP Depth (mm)	970

Table 6: PMP Temporal Distribution

% of Time	5	10	15	20	25	30	35	40	45	50	Depth (mm)
	39	97	175	243	310	38	446	504	572	621	
	55	60	65	70	75	80	85	90	95	100	
	679	728	776	825	863	892	922	941	960	970	

2.2.5 Seismicity

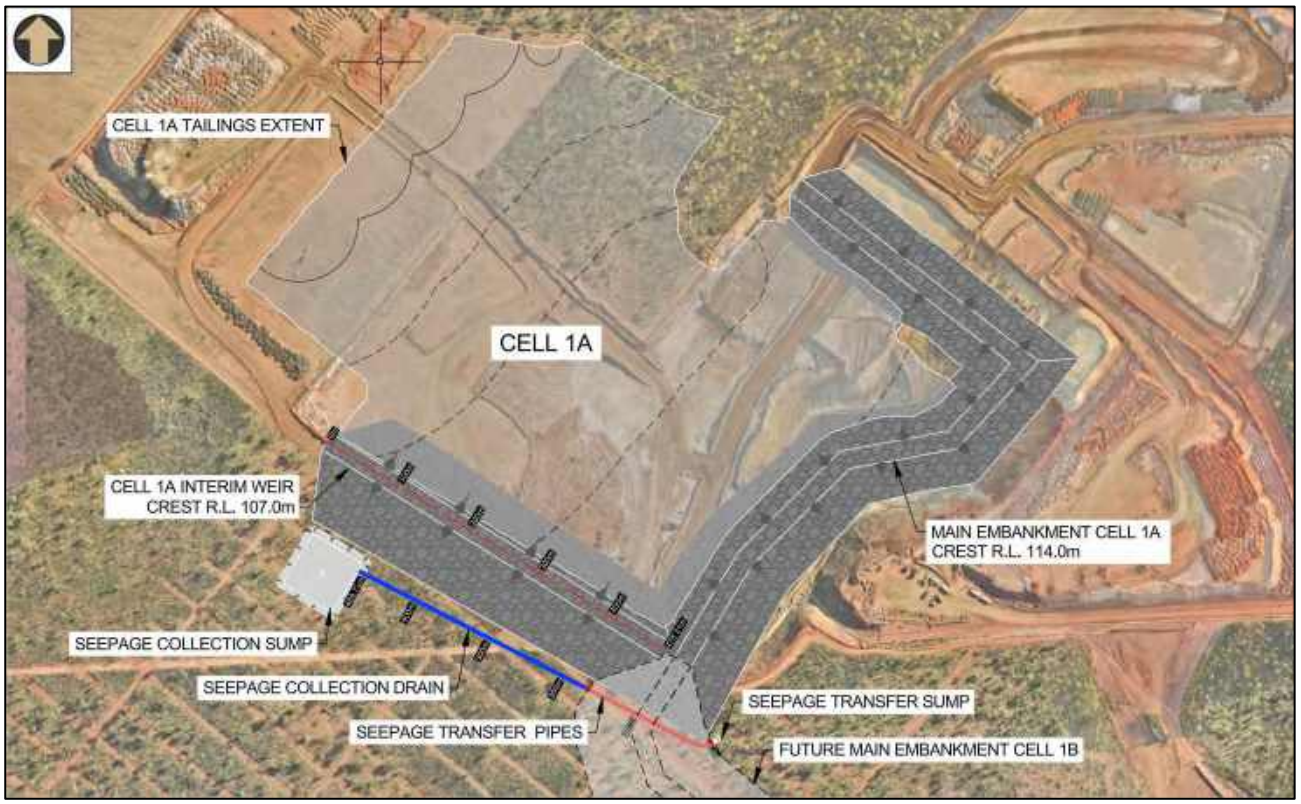
Based on the 2023 National Seismic Hazard Assessment (NSHA) for Australia, the project location Peak Ground Acceleration (PGA) for the 1:475 and 1:2,475 Annual Exceedance Probability (AEP) is between 0.04g – 0.05 g and 0.12 – 0.16 g respectively.

2.3 Retaining Structure

2.3.1 Embankment Configuration

IPTSF Cell 1 consists of sub-cells 1A and 1B, with Cell 1A planned to commence deposition in July 2026, while construction of Cell 1B progresses in parallel with mining activities. Cell 1A will comprise the construction of a perimeter embankment to a minimum crest elevation of RL 114.0 m and an Internal Weir embankment elevation to RL 107.0 m. Figure 5 presents the embankment configuration of Cell 1A.

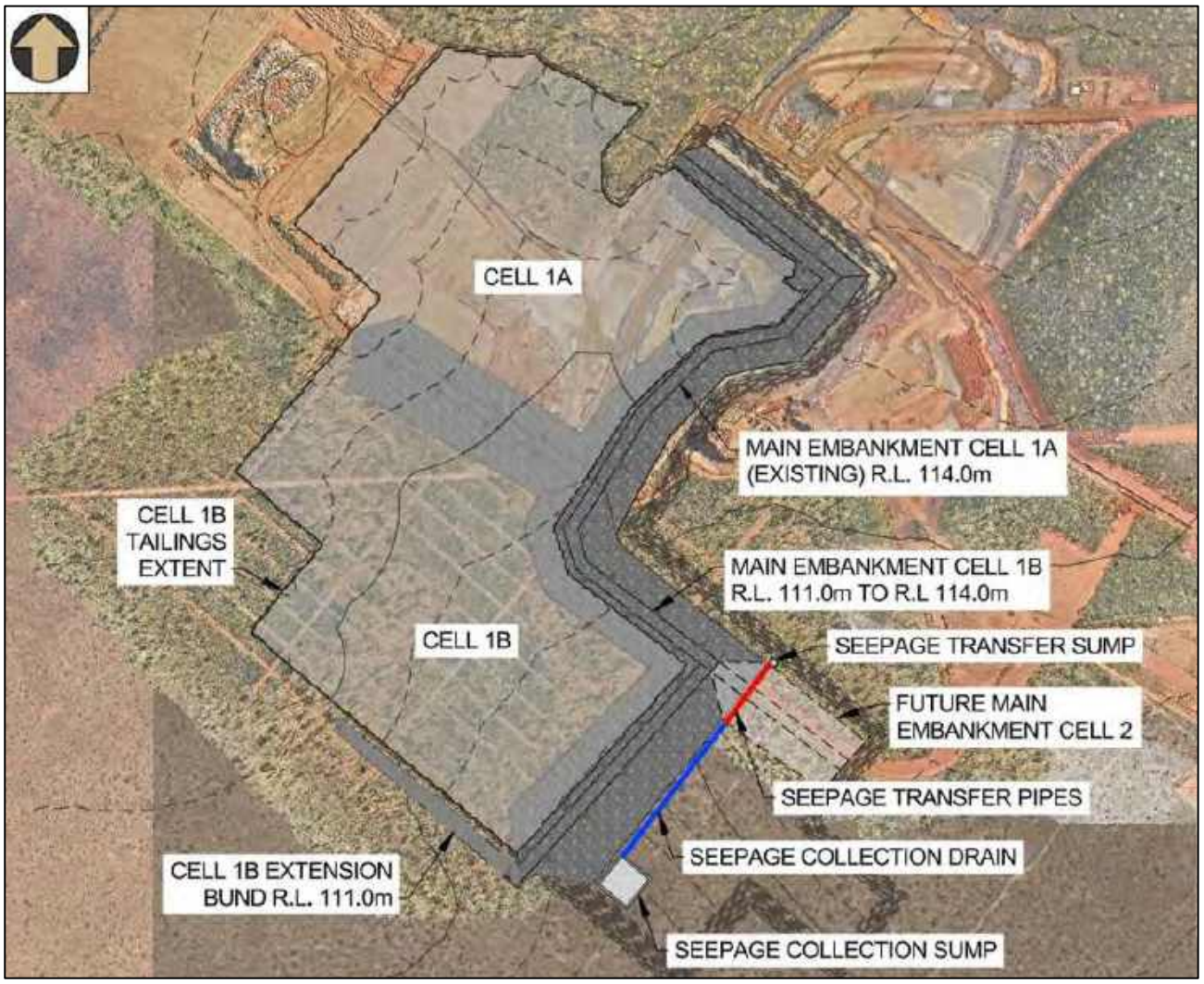
Figure 5: IPTSF Cell 1A Configuration



The Internal Weir functions as a temporary retaining structure, separating the active deposition area from ongoing mining operations. Towards the end of Cell 1A's operational life, and following the completion of Cell 1B construction, tailings are intended to overtop the Internal Weir, thereby initiating deposition within Cell 1B.

Cell 1B will comprise the construction of the remainder of the perimeter embankment to a crest elevation of between RL 111.0 m and RL 114.0 m. Figure 6 presents the embankment configuration of Cell 1B.

Figure 6: IPTSF Cell 1B Configuration



The embankments have a typical crest width of 22.8 m and an upstream and downstream batter slope of 1V:2H. The Internal Weir for Cell 1A and the Southeastern embankment for Cell 1B have a downstream batter slope of 1V:2.5H. Figure 7 and Figure 8 presents the typical cross-sections of the embankments. Figure 8 presents the alternative embankment section where overburden may be utilised, the extent and impact of overburden to be utilised will be assessed per case basis.

Figure 7: Typical Embankment Cross-section of IPTSF Cell 1

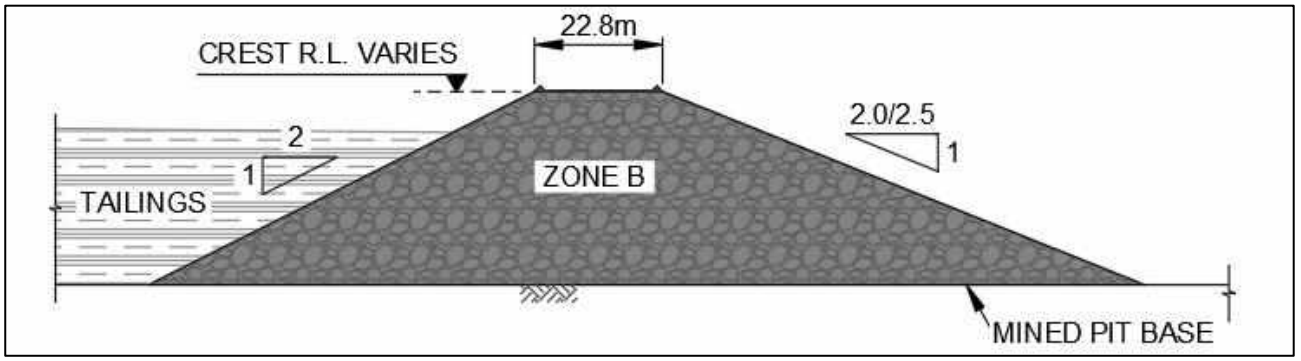
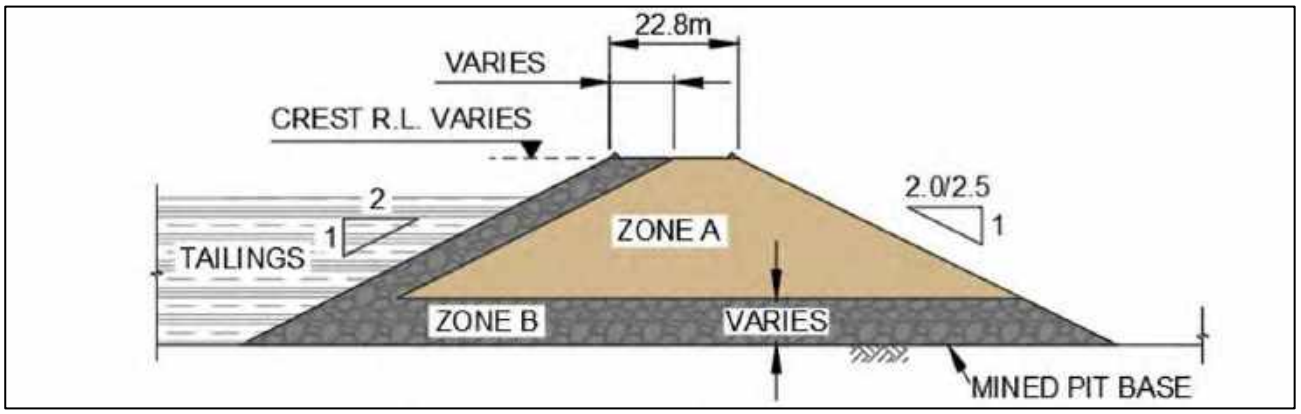


Figure 8: Alternative Embankment Section of IPTSF Cell 1



2.3.2 Zone A – Overburden

Zone A – overburden material is to be sourced from mining activities. The overburden typically consists of a combination of Pindan sand/gravels and Melligo cobbles and boulders. Zone A material can potentially be used as the structural fill of the embankment (in place of Zone B, which is to be utilised when available).

It is to be noted that based on the updated DMU schedule provided by KMS, it is anticipated that sufficient Zone B (Oversize) material will be generated via mining activities for the construction of the embankment and that Zone A material is unlikely to be utilised. However, as a contingency, Zone A material is available to be used as embankment bulk fill if the need arises. Design assessments pertaining to the use of Zone A have not been undertaken as part of this report, all necessary design assessments will be undertaken prior to the utilisation of Zone A material to determine its suitability for the given situation. Figure 9 and Figure 10 presents the typical overburden material observed on site.

Figure 9: Typical Overburden Observed On-site (1 of 2)

Figure 10: Typical Overburden Observed On-site (2 of 2)

2.3.3 Zone B – Oversize

Zone B – oversize material is sourced from the oversized reject materials obtained from the DMU. Zone B oversize material is to be used as the primary bulk fill of the embankment given its observed free-draining properties. Zone B material is typically a combination of weathered sandstone infilled with fine to medium grained sand. It is understood that the oversize has a lower bound angle of repose (loosest state) of approximately 37°. Figure 11 presents the typical oversize material observed on site.

Figure 11: Typical Oversize Observed On-site

2.3.4 Construction Material Strength Parameters

To support the stability analysis of the embankment, a strength correlation has been developed as a function of the effective normal stress (σ'_N). This correlation adopts the most conservative values from the studies of Leps (1970) and Woodward-Clyde (1995), and the generalised empirical correlation for peak friction angle presented by Duncan (2014), minus one standard deviation (Duncan), as shown below:

$$\phi_{peak}(\sigma'_N) = \min\left(\phi_{Leps\&WC}(\sigma'_N), \phi_{Duncan}(\sigma'_N)\right) - \sigma_{Duncan}$$

Based on the visual appearance of the stockpiled construction material, REC considers the usage of the formula presented above to be suitable for both Zone A and Zone B. REC notes that the formula presented by Duncan incorporates relative density for the assessment of the peak friction angle. A minimum relative density of 50% has been adopted to be achieved through construction for both Zone A and Zone B. The relative density of 50% corresponds to a dry density of approximately 1.95 t/m^3 based on the following:

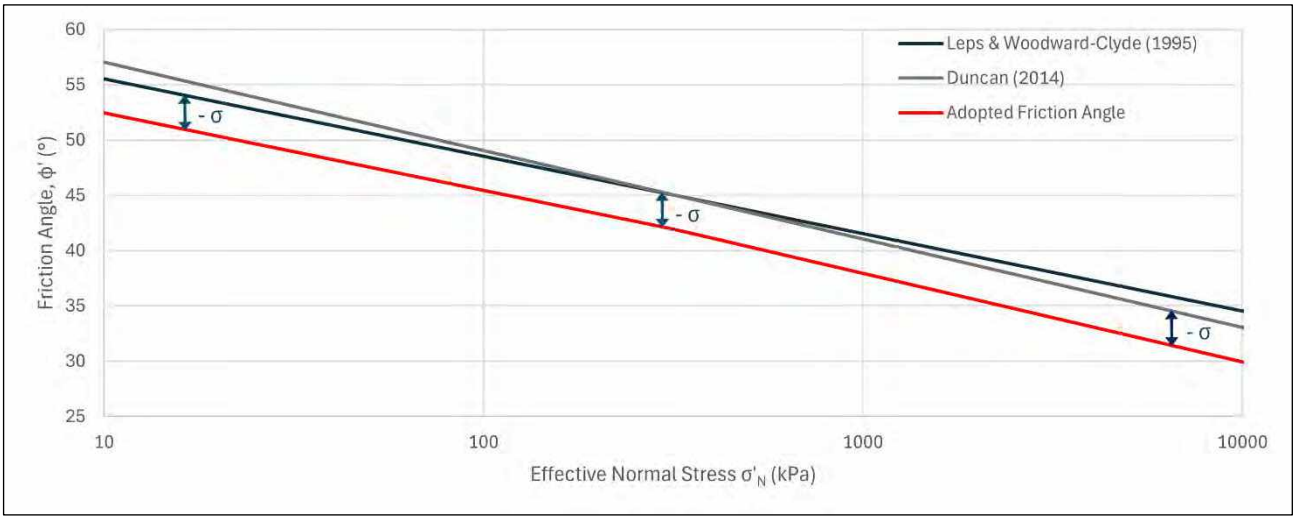
- Assumed specific gravity of 2.75.
- Loose density of 1,650 kg/m^3 (detailed in Section 3.4) – e_{max} of 0.67
- Assumed maximum density of 2,400 kg/m^3 – e_{min} of 0.15
- 50% relative density – e of 0.41

Table 7 presents the variation in friction angle as a function of effective normal stress (σ'_N) for both methodologies and the adopted friction angle, and Figure 12 presents the adopted friction angle.

Table 7: Friction Angle Function

σ'_N/P_a	ϕ' (Leps & Woodward-Clyde 1995)	ϕ' (Duncan 2014)	Minimum ϕ' - σ_{Duncan} (Adopted)
0.01	62.50	65.00	59.40
0.1	55.50	57.00	52.40
1	48.50	49.00	45.40
2	46.39	46.59	43.29
3	45.16	45.18	42.06
4	44.29	44.18	41.08
5	43.61	43.41	40.31
6	43.05	42.77	39.67
7	42.58	42.24	39.14
8	42.18	41.78	38.68
9	41.82	41.37	38.27
10	41.50	41.00	37.90
15	40.27	39.59	36.49
20	39.39	38.59	35.49

Figure 12: Adopted Friction Angle Function



2.3.5 Construction Material Hydraulic Parameters

The field trial of falling head tests on the Zone B material was inconclusive, as no measurable water head could be maintained during testing. This observation suggests that the material is highly permeable and exhibits free-draining behaviour. Photographs documenting the field trials are presented in Figure 13 and Figure 14.

Figure 13: Water Failing to Accumulate During Oversize Field Trial (1 of 2)

Figure 14: Water Failing to Accumulate During Oversize Field Trial (2 of 2)

The permeability of the compacted material was estimated using the established Hazen (1892) empirical correlation, which relates the hydraulic conductivity (K) to the square of the D_{10} particle size. The Hazen correlation is typically expressed as:

$$K = CD_{10}^2$$

Where K is the hydraulic conductivity in metres per second, D_{10} is in millimetres, and C is an empirical coefficient (typically between 0.007 to 0.014). Based on the oversize PSD test work undertaken by KMS (summarised in Section 3.4), the 10% passing particle size (D_{10}) was interpolated to be approximately 0.3 mm. Given that the embankment material consists of sub-angular, compacted oversize fragments with a relatively low void ratio ($e \leq 0.4$, see Section 2.3.4), a lower bound coefficient of 0.005 has been adopted. This results in an estimated permeability of 4.5×10^{-4} m/s for the oversize material. However, in consideration of material variability and to remain conservative given the water recovery philosophy of the facility, a permeability of 2.0×10^{-4} m/s has been adopted.

3. Sub-surface Geotechnical Conditions

3.1 General

Based on the geotechnical documentation available to REC, it is understood that the following Geotechnical Site Investigations (GSI) have previously been undertaken:

- 2014 ATCW GSI (ATCW 2014) – Project site GSI.
- 2021 PGMG GSI (PGMG 2021) – Trial pit window mapping (dry season and wet season).
- 2024 KMS Test Work (KMS 2024) – Oversize test work.

A summary of the geotechnical investigation conducted and data available to REC relevant to the IPTSF is provided in the following sections.

3.2 2014 Project Site GSI (ATCW 2014)

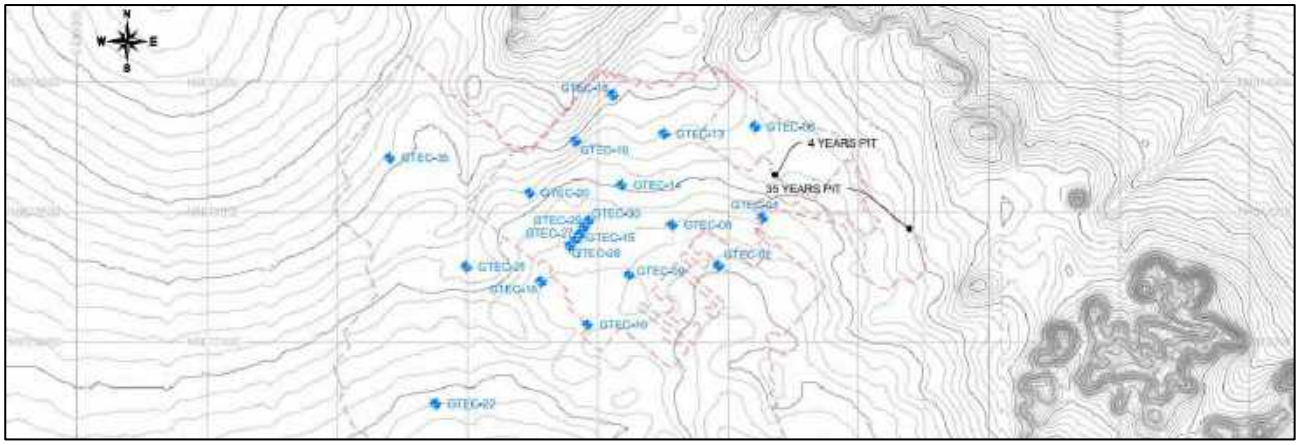
3.2.1 General

A GSI was undertaken by ATC Williams (ATCW) in 2014 across various locations within the project site. The scope of work for the investigation is as follows:

- 20 sonic core boreholes advanced to a depth between 21 m to 69 m.
- Standard penetration testing (SPT) undertaken at 3 m and 6 m intervals in selected boreholes.
- Push tube sample collections at selected depths.
- In-situ permeability testing in selected boreholes.
- Laboratory testing of soil and rock core samples.

Figure 15 presents the GSI locations. GTEC19 and GTEC20 are the only boreholes near the IPTSF Cell 1 footprint. For the purpose of summarising geotechnical data in support of the design of IPTSF Cell 1, only detailed findings from GTEC19 and GTEC20 will be summarised.

Figure 15: 2014 GSI Locations



3.2.2 Standard Penetration Testing

Standard Penetration Tests (SPT) were conducted in 15 of the 20 boreholes throughout the depth of the proposed pit shell. In total, 111 tests were performed. Full test penetration occurred at only 14 tests (13%), with N values between 9 and 50 being recorded (medium dense to dense sand). Refusal during seating (first 150 mm) occurred in 43 % of the tests and partial penetration with refusal occurred at the remaining test locations (N> 50). These results confirm the very dense nature of the extremely weathered rock mass /residual sand deposits. Table 8 summarises the SPT results for GTEC19 and GTEC 20.

Table 8: 2014 GSI SPT Summary

Borehole	Depth (m)	SPT Blow Count 'N'		
		150 mm	300 mm	450 mm
GTEC19	6.0	50 @ 120 mm	-	-
	12.0	50 @ 115 mm	-	-
	21.0	50 @ 130 mm	-	-
	30.0	5	15 @ 75 mm	-
	36.0	30	10 @ 30 mm	-
GTEC20	6.0	5	9	16 @ 60 mm
	12.0	25	30 @ 70 mm	-
	18.0	10	3	26
	31.5	35 @ 150 mm	-	-
	39.0	50 @ 80 mm	-	-

3.2.3 Triaxial Shear Strength Testing

Assessment of effective shear strength of saturated, undisturbed soil samples obtained by U63 tube sampling in selected boreholes was undertaken alongside bulk and dry density measurements. Table 9 summarises the triaxial test results for GTEC19 and GTEC20.

Table 9: 2014 GSI Triaxial Test Results

Tube ID	USCS	Wet Density (t/m^3)	Dry Density (t/m^3)	c' (kPa)	Φ (°)
GTEC19 27.0-27.3 m	SM	1.91	1.72	14.5	37.0
GTEC20 37.0-37.5 m	SC	2.15	1.84	12.2	37.1
GTEC20 43.5-44.0 m	SP	1.99	1.68	-	-

3.2.4 Point Load and Uniaxial Compressive Strength

The results of point load tests (field and laboratory tests) and uniaxial compressive strength tests on samples of indurated, intact sandstone and ironstone layers for GTEC19 and GTEC20 are summarised in Table 10.

Table 10: 2014 GSI Rock Strength Result Summary

Test ID	Rock Type	Weathering	Is50 (MPa)		UCS (MPa)	Strength
			D	A		
GTEC19 (3.1 m)	Sandstone (Melligo)	MW	-	2.20	-	High
GTEC19 (8.4 m)	Sandstone	HW/MW	-	0.82	-	Medium
GTEC19 (11.2 – 11.27 m)	Ironstone	MW	-	5.04	-	Very High
GTEC19 (15.5 – 15.70 m)	Sandstone	MW/SW	-	-	53.50	Very High
GTEC19 (17.8 m)	Sandstone	MW	-	3.30	-	Very High
GTEC19 (31.6 m)	Ironstone	MW	-	2.40	-	High
GTEC20 (6.26-6.31 m)	Sandstone (Melligo)	MW/SW	-	1.84	-	High
GTEC20 (6.53-6.5 m)	Sandstone (Melligo)	ME/SW	-	1.55	-	High
GTEC20 (6.75 m)	Sandstone (Melligo)	EW/HW	-	2.8	-	High
GTEC20 (7.37 – 7.43m)	Sandstone (Melligo)	HW	-	1.68	-	High
GTEC20 (17.0 m)	Sandstone	HW/MW	-	0.39	-	Medium
GTEC20 (17.15 – 17.21 m)	Sandstone	HW/MW	-	0.48	-	Medium
GTEC20 (17.3 – 17.32 m)	Ironstone	HW/MW	-	5.40	-	Very High
GTEC20 (18.73 – 18.77 m)	Ironstone	HW/MW	-	3.29	-	Very High
GTEC20 (38.7 – 38.73 m)	Ironstone	MW	-	3.85	-	Very High
GTEC20 (38.9 – 38.93 m)	Ironstone	MW	-	1.19	-	High
GTEC20 (48.6 – 48.64 m)	Sandstone	HW	-	0.15	-	Low
GTEC20 (48.72 – 47.76 m)	Sandstone	HW	-	0.14	-	Low

3.3 2021 Trial Pit Window Mapping (PGMG 2021)

3.3.1 General

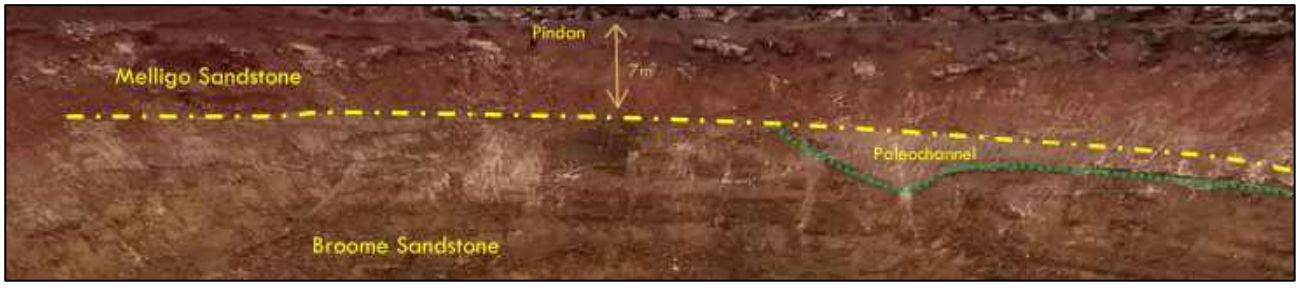
PGM Geotechnical Pty Ltd undertook window mapping as part of the pit trial for the in-pit mining (PGM Geotechnical 2021a & 2021b). The trial pit is located at approximate coordinates 495,700 m E 8,073,430 m S and was excavated over a period of two months in late 2020 and the window mapping was undertaken between RL 112 m to RL 92.5 m. Figure 16 presents the trial pit.

Figure 16: 2020 Trial Pit Aerial Imagery (PGM 2021b)

3.3.2 Trial Pit Findings

The surface was covered with shallow alluvial red-brown Pindan Soils to a depth of 1 – 2 m below surface, which overly completely weathered Melligo Sandstone which has been weathered to a soil-like consistency with remnant fresh to slightly weathered Melligo Sandstone boulders embedded in the Matrix as illustrated in Figure 17. There was an area with more residual Melligo sandstone in the northern side of the trial pit.

Figure 17: Interface of Broome and Melligo Sandstone in Trial Pit



The exposed Broome Sandstone approximately 5 – 20 m below the surface of the trial pit, is a sequence of shallow dipping (0-15 degrees), very weak (1-5 MPa) to weak (5-25 MPa) sandstones, with medium-strong to strong interbedded ironstone bands and nodules which typically define the interface of successive sandstone units as illustrated in Figure 18. A series of 4 sandstone units nominally 5 m thick was mapped in the upper 20 m of the trial pit as indicated in Figure 18, with apparent sandstone units spaced at approximately 7 – 11 m.

Figure 18: Interpreted Sandstone Units in South East of Trial Pit

The strength and condition of the Broome Sandstone observed in the upper 20 m of the trial pit were not physically consistent with the sonic borehole GTEC19. It is speculated that the vibrations from sonic coring method appears to have destroyed the fabric of the very weak to weak sandstone resulting in the core on the whole being reduced to sand, resulting in any extremely weak or soil like layers which would control overall slope stability being obscured.

The geotechnical mapping indicated that the Broome Sandstone could effectively be separated into a sequence of layered horizontal to sub-horizontal units with differing similar strength, and rock mass properties. This is illustrated schematically in Figure 18 and shown in detail in Figure 19. The Broome Sandstone also contained numerous completely weathered inclusions up to several metres in size that also crossed the stratigraphic boundaries but did not have an impact on the structural stability of the slopes. One such inclusion is shown in the centre of Figure 19. The potential origin of these inclusions is not conclusive, with some appearing to reflect in-situ weathering or alteration of former boulders or cobbles in the sandstone matrix, however the origin of the large irregular inclusions as illustrated in Figure 19 is not currently understood.

Figure 19: Sandstone Units in Ramp of Trial Pit

3.4 2024 Oversize Test Work (KMS 2024)

3.4.1 General

The oversize waste generated by the DMU was assessed across various tests, undertaken by the KMS geology department (KMS memo title – Oversize Test Work). The tests include:

- Amount of oversize generated by the DMU over a period of 10 days, testing for both variability in the percentage of fines and also the quantification of the ZrO_2 and TiO_2 percentage of the oversize fines.
- Assessment of mining factors associated with the movement of the oversize from the DMU floor across two different test periods.
- Assessment of the different sizing fractions within the oversize.
- Assessment of density and swell factor.

Geotechnical findings that are relevant to the design of the IPTSF have been summarised below. It is to be noted that "fines" within Section 3.4 refers to DMU oversize with a nominal particle size smaller than 12.5 mm (passing the 12.5 mm DMU screens), this is considerably different from the geotechnical definition of "fines" at 75 µm.

3.4.2 Oversize Particle Size Distribution

The percentage of fines contained within the oversize samples is variable in nature. The percentage of fines (< 12.5 mm) within the oversize averaged 16.3% across the testing period. The range of fines percentage was between 0.63% - 49.03% across the 41 samples. Table 11 summarises the test results across the testing period.

Table 11: Oversize Particles Size Summary (KMS 2024)

Sample Category	Net Total Weight (kg)	Net Oversize Weight (kg)	Net Fines (<12.5 mm) Weight (%)	Oversize (> 12.5 mm) Percentage (%)	Fines (< 12.5 mm) Percentage (%)
Larger Samples	21.30	17.14	4.16	80.5	19.5
Day 1 Average	4.73	3.75	0.98	79.4	20.6
Day 2 Average	4.22	3.61	0.61	85.5	14.5
Day 3 Average	2.90	2.60	0.30	89.5	10.5
Day 4 Average	3.55	2.95	0.60	83.2	16.8
Day 5 Average	3.48	3.12	0.36	89.6	10.4
Day 6 Average	3.81	3.16	0.65	83.0	17.0
Day 7 Average	2.46	2.26	0.19	92.2	7.8
Day 8 Average	5.53	4.63	0.91	83.6	16.4
Day 9 Average	5.71	4.22	1.49	73.9	26.1
Test Work Average	5.33	4.39	0.94	83.7	16.3

The 27 fines (< 12.5 mm) samples were submitted to the onsite laboratory and further screened at 425 µm and 38 µm. Table 12 summarises the test fines screening results. It is to be noted that 3 of the 27 samples (inferred as the day 1 – 3 samples) were presented with a sample ID not matching that of the fines (< 12.5 mm) screening.

Table 12: Oversize Fines (< 12.5 mm) Distribution (KMS 2024)

Sample Category	Fines (< 12.5 mm) Particles Passing (%)	
	425 µm	38 µm
Day 1 – 3 Average	57.4	9.3
Day 4 Average	62.5	5.4
Day 5 Average	77.1	3.7
Day 6 Average	73.2	1.9
Day 7 Average	84.0	2.9
Day 8 Average	69.7	2.1
Day 9 Average	65.7	3.0
Test Work Average	69.9	4.1

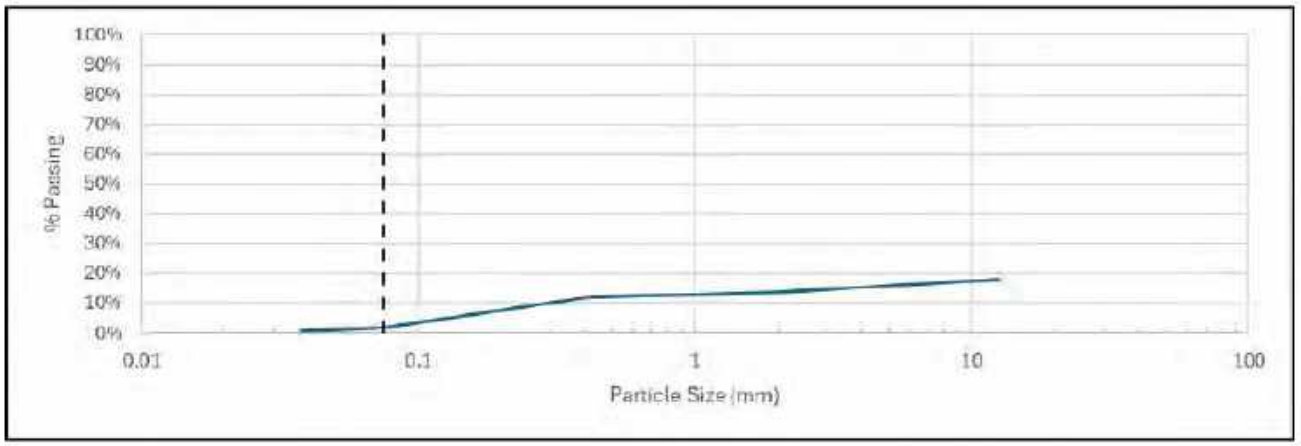
Additional particle size distribution (PSD) test work was undertaken to quantify the grade distribution of the fines (<12.5 mm) portion of the oversize. Six samples were screened at 12.5mm, 2 mm, 425 µm, and 38 µm. Table 13 summarises the additional PSD testing for the fines (< 12.5 mm) portion of the oversize.

Table 13: Additional Oversize PSD Test Results for Fines (< 12.5 mm) (KMS 2024)

Test ID	Particles Passing (%)				
	12.5 mm	2 mm	425 µm	75 µm [Notes]	38 µm
A	23.7	18.6	16.8	2.7	0.7
B	10.6	9.4	8.8	1.4	0.3
C	24.3	17.5	15.3	2.4	0.6
D	13.3	10.5	9.4	1.5	0.4
E	21.7	15.3	13.4	1.9	0.4
F	12.4	9.4	8.6	1.2	0.3
Average	17.7	13.5	12.1	1.8	0.5
Notes: 75 µm passing is linearly interpolated based on 425 µm and 38 µm passing.					

Based on the data available, the DMU oversize consists of on average 16.3% – 17.7% DMU fines (< 12.5 mm) and 1.4% geotechnical fines (< 75 µm). Figure 20 presents the average PSD of the fines portion of the DMU oversize.

Figure 20: DMU Oversize Fines (< 12.5 mm) PSD



3.4.3 Oversize Density

Two tests were carried out to estimate the loose density of the placed oversize material. It should be noted that the truck weighmeters were reported to be uncalibrated, and as such, the recorded data may be subject to some degree of inaccuracy. The outcomes for both tests are summarised below:

- Test 1: A total of 32 truckloads of oversize material were weighted, paddock dumped, and surveyed. The surveyed volume was reported to be 1,600 m^3 with a total recorded oversize mass of 2,468 t, equating to an approximate loose density of 1.58 t/m^3.
- Test 2: Conducted on a large scale, involving 203 truckloads of oversize material. The surveyed volume was reported to be 10,095 m^3 with a total recorded mass of 16,751 t, corresponding to an approximate loose density of 1.67 t/m^3.

4. Tailings Properties

4.1 Geotechnical Characterisation

4.1.1 2024 Preliminary Tailings Test Work

4.1.1.1 General

Preliminary tailings testing has been undertaken for tailings with a solids concentration of 15%, 20%, and 25%. The test work undertaken is as follows:

- Particle size distribution.
- Atterberg limits.
- One-dimensional consolidation.
- Settlement (undrained and double drained).
- Air drying.

The sample details are summarised in Table 14. The test certificates are attached in Appendix E.

Table 14: Preliminary Tailings Testing Samples Summary

Sample ID	Solids Content (% w/w)
S1	15
S2	20
S3	20
S4	25

4.1.1.2 Index Testing Results

The preliminary tailings test work indicates that the tailings have a fines content ranging from 36% to 56% with an average of 45% and typically with less than 1% of particles larger than 0.425 mm. Additionally, the tailings have a liquid limit between 18.6% to 26.3% and a plastic index of 7.3% to 10.4%. Table 15 summarises the index results of the tailings samples, Figure 21 and Figure 22 presents the PSD curves and the Atterberg limit chart.

Table 15: Tailings Index Test Result Summary

Parameter	S1	S2	S3	S4
% finer than 75 µm	56.0	40.1	48.9	36.3
% finer than 2 µm	36.7	22.0	30.2	21.1
Liquid Limit (%)	22.95	18.65	25.51	26.27
Plastic Limit (%)	15.63	9..86	15.13	18.59
Plasticity Index (%)	7.32	8.79	10.38	7.68

Figure 21: Tailings PSD Curve

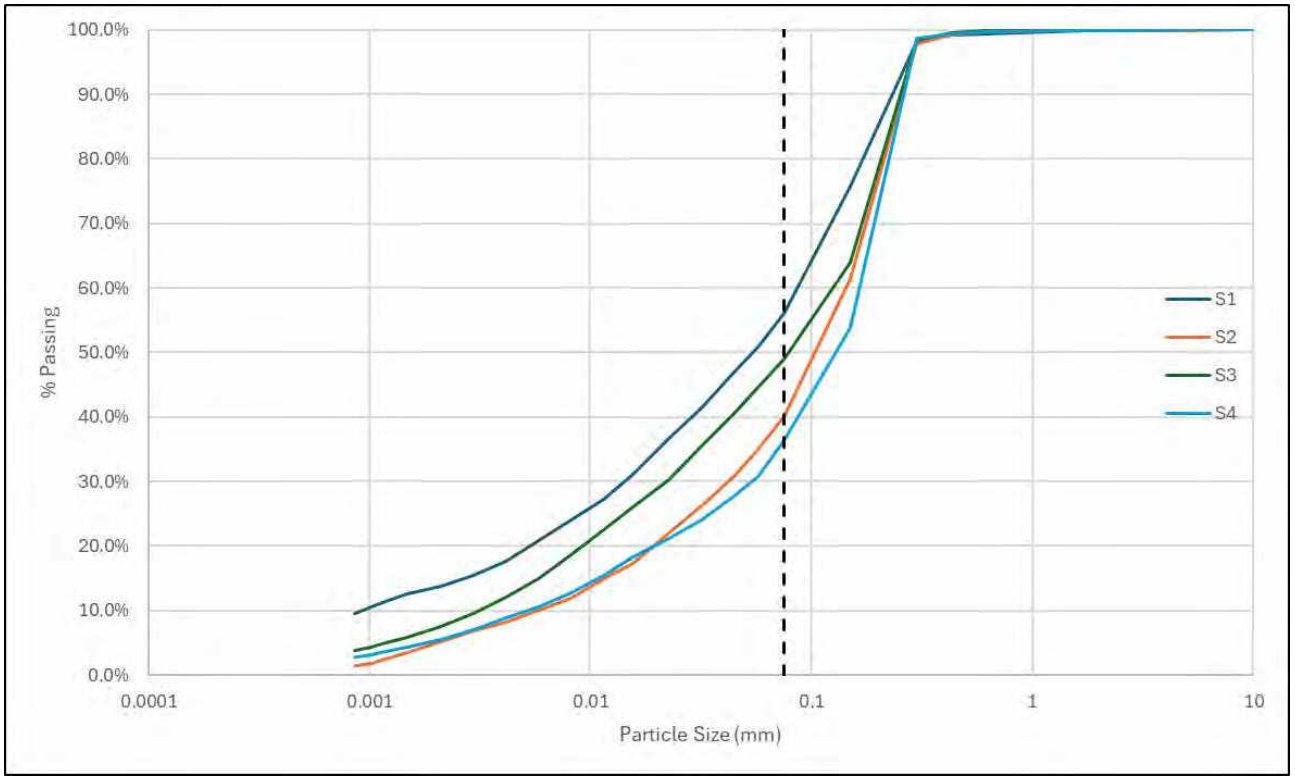
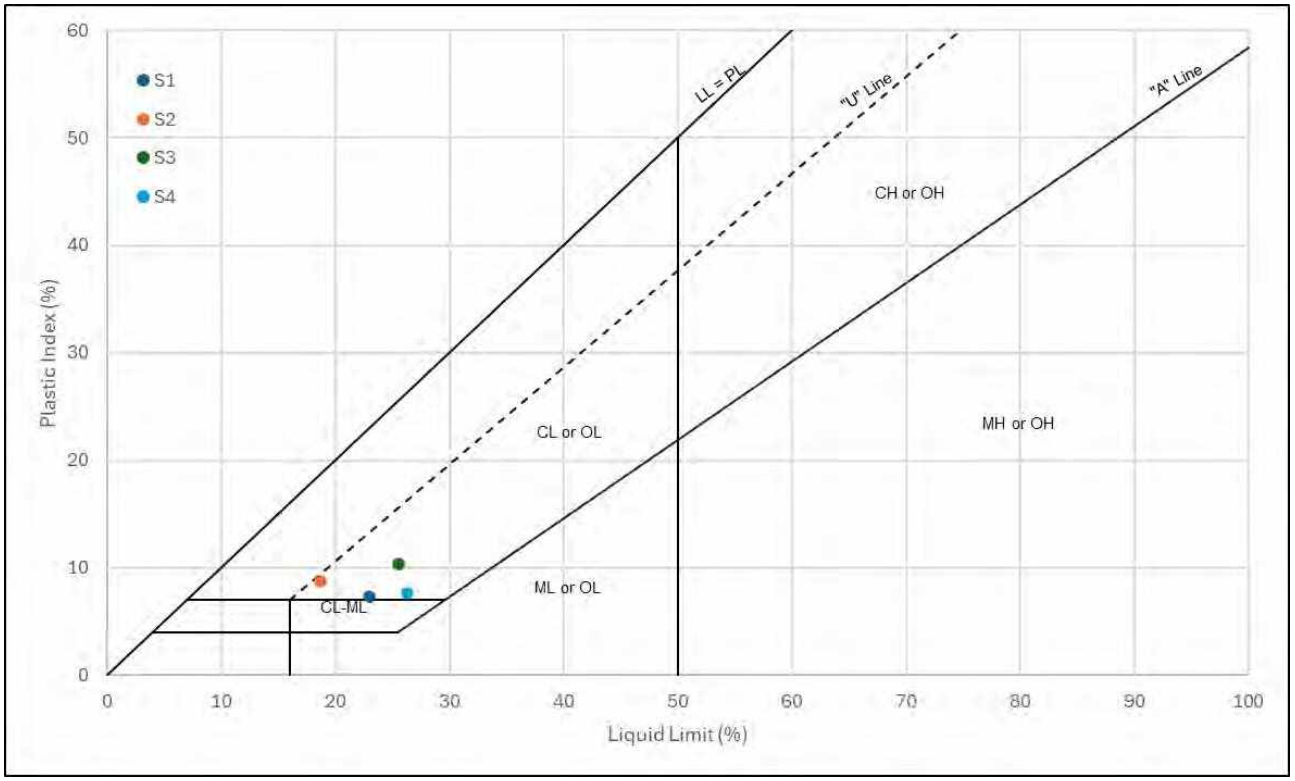


Figure 22: Tailings Atterberg Limits



4.1.1.3 One-dimensional Consolidation

Table 16 summarises the outcome of the one-dimensional consolidation. The full testing range from 12.5 kPa to 1600 kPa along with unload measurements are presented in Appendix E.

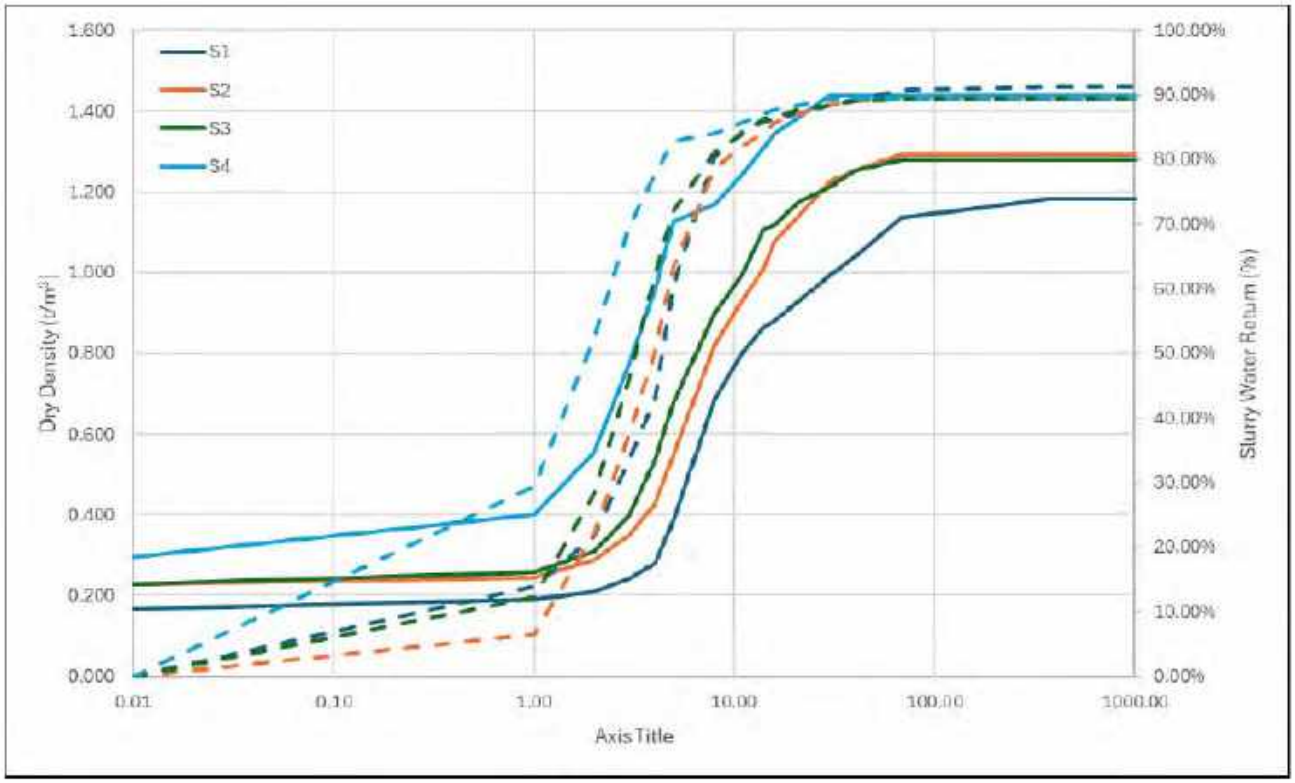
Table 16: One-dimension Consolidation Test Result Summary

Sample	Stage	K (m/s)	Void Ratio (e_f)	Vertical Strain (%)
S1	Stage 3 @ 50 kPa	2.6×10^{-9}	0.733	25.26
	Stage 5 @ 200 kPa	1.3×10^{-9}	0.656	28.60
S2	Stage 3 @ 50 kPa	1.8×10^{-9}	0.481	9.74
	Stage 5 @ 200 kPa	5.0×10^{-10}	0.407	14.25
S3	Stage 3 @ 50 kPa	1.4×10^{-9}	0.499	15.23
	Stage 5 @ 200 kPa	3.6×10^{-10}	0.425	19.42
S4	Stage 3 @ 50 kPa	1.3×10^{-9}	0.458	6.36
	Stage 5 @ 200 kPa	5.9×10^{-10}	0.425	8.46

4.1.1.4 Settlement

Figure 23 presents the outcomes of the settlement testing for undrained conditions, the solid lines indicate the dry density, and the dashed lines indicate the percentage of surface slurry water. Appendix E details the settlement results for the double-drained condition.

Figure 23: Undrained Settlement Test Results



4.1.1.5 Air Drying

Table 17 summarises the air drying density results. Appendix E details the air drying results.

Table 17: Air Drying Results Summary

Time (minutes)	Dry Density (t/m³)			
	S1	S2	S3	S4
100	0.18	0.24	0.24	0.30
1,000	0.23	0.29	0.28	0.42
5,000	0.40	0.52	0.48	0.76
10,000	0.72	0.94	0.96	1.14

4.1.2 2024 Additional Tailings Test Work

4.1.2.1 General

Additional tailings testing has been undertaken on tailings samples with a solids concentration of 55%. The test work undertaken is as follows:

- Particle size distribution.
- Atterberg limits.
- One-dimensional consolidation (Bucket Sample 2 only).
- Settlement (undrained and double drained) (Bucket Sample 2 only).
- Air drying (Bucket Sample 2 only).

The sample details are summarised in Table 18. The test certificates are attached in Appendix E.

Table 18: Representative Tailings Test Samples Summary

Sample ID	Comments
Bucket Sample 1	Excludes 2 – 12 mm, non-representative of IPTSF tailings.
Bucket Sample 2	Includes 2 – 12 mm, representative of IPTSF tailings.

4.1.2.2 Material Index

The additional tailings test work of the representative sample (Bucket Sample 2) indicates that the tailings to be deposited in the IPTSF will have a fines content of approximately 17.4% with 23.0% of particles larger than 425 µm. Additionally, the tailings have a liquid limit of 23.2% and a plastic index of 8.9%. Table 19 summarises the index results of the tailings samples.

Table 19: Tailings Index Test Result Summary

Parameter	Bucket Sample 1	Bucket Sample 2
% finer than 425 µm	94.1	77.0
% finer than 75 µm	21.6	17.4
% finer than 2 µm	11.5	8.3
Liquid Limit (%)	23.8	23.2
Plastic Limit (%)	13.9	12.5
Plasticity Index (%)	8.0	8.9
Specific Gravity	2.65	2.79

4.1.2.3 One-dimensional Consolidation

Table 20 summarises the outcome of the one-dimensional consolidation for the representative sample. The full testing range from 12.5 kPa to 1600 kPa along with unload measurements are presented in Appendix E.

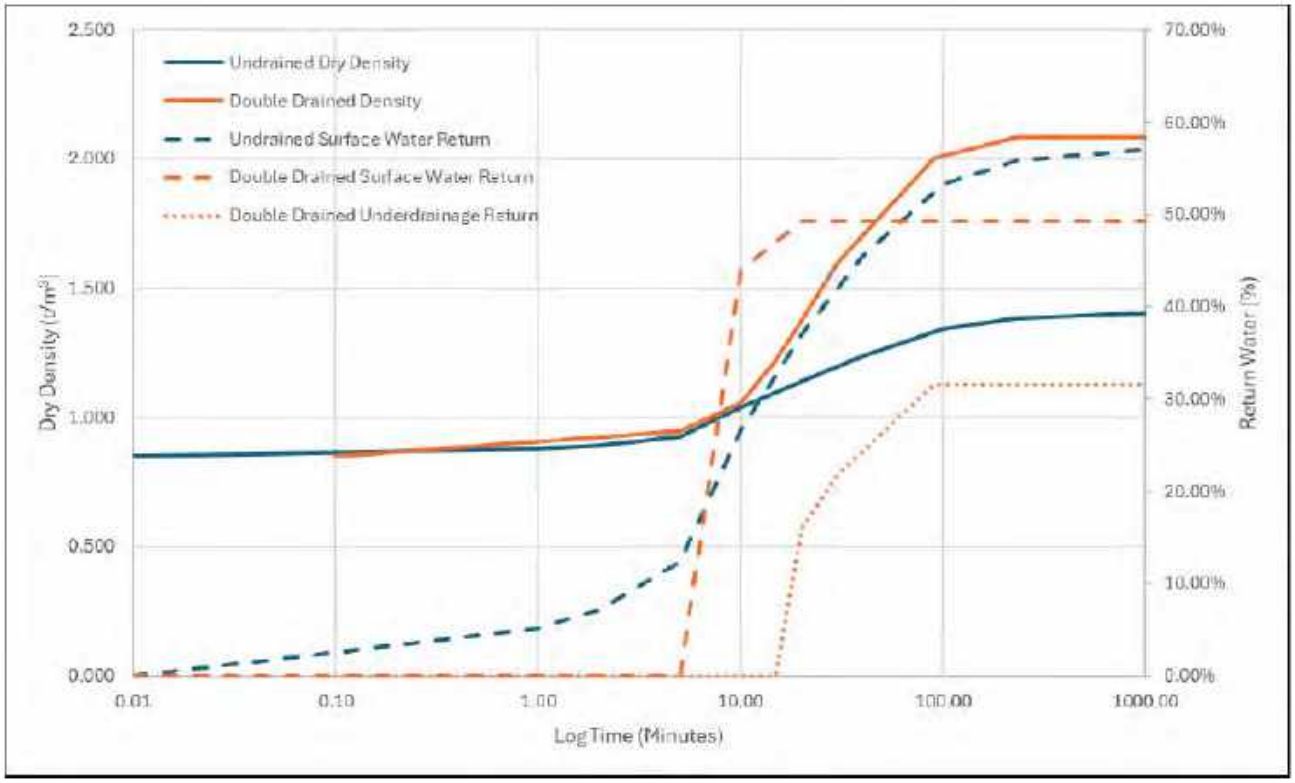
Table 20: One-dimension Consolidation Test Result Summary

Sample	Stage	K (m/s)	Void Ratio (e_f)	Vertical Strain (%)
Bucket Sample 2	Stage 3 @ 50 kPa	3.7×10^{-8}	0.325	4.68
	Stage 5 @ 200 kPa	1.7×10^{-9}	0.284	7.67
	Stage 8 @ 1600 kPa	9.8×10^{-11}	0.209	13.08

4.1.2.4 Settlement

Figure 24 presents the outcomes of the settlement testing for the undrained and double drained condition, the solid lines indicate the dry density, and the dashed lines indicate the percentage of slurry water return.

Figure 24: Undrained Settlement Test Results



4.1.2.5 Air Drying

Table 21 summarises the air drying density results. Appendix E details the air drying results.

Table 21: Air Drying Results Summary

Time (minutes)	Dry Density (t/m³)
100	0.85
1,000	1.00
5,000	1.49
9,000	1.54

4.2 Geochemical Characterisation

4.2.1 Initial Tailings Characterisation (MBS 2016)

MBS Environmental was previously commissioned by KMS to determine the potential for acid and metalliferous drainage (AMD), and neutral or saline drainage from the process waste streams. Six composite samples were tested by MBS, the following quantitative laboratory testing were undertaken:

- Total sulfur
- Water soluble sulfate
- Sulfur and Acid Base Accounting (ABA)

The findings from the laboratory testing indicated that the tailings derived from materials mined from above the groundwater table, in the oxidised zone contain no known Potentially Acid Forming (PAF) material above the groundwater table. Based on the test results, MBS in the residues waste report concluded that:

"Overall, results indicate that the project tailings will be NAF and barren with essentially no capacity for acid generation or acid neutralisation. Predicted concentrations of soluble salts, metals and metalloids in any seepage are expected to be extremely low. Low overall (in relation to waste volumes) levels of calcium sulfate and calcium carbonate will gradually be mobilised by leaching from the 'gypsum' residue; however, seepage water quality will mostly reflect process groundwater quality as drawn from local aquifers.

Although various residues are geochemically enriched in thorium, uranium, lead and selenium, these elements were not found to be mobile, even under artificially applied acidic conditions. All process waste streams are thus considered environmentally benign for the project but will have a tendency towards dispersive behaviour – however, this will be managed on site by use of flocculants in process water."

Based on the results of the leachate tests, decant bleed water generated from the tailings is also expected to be geochemically benign, with a composition similar to site groundwater.

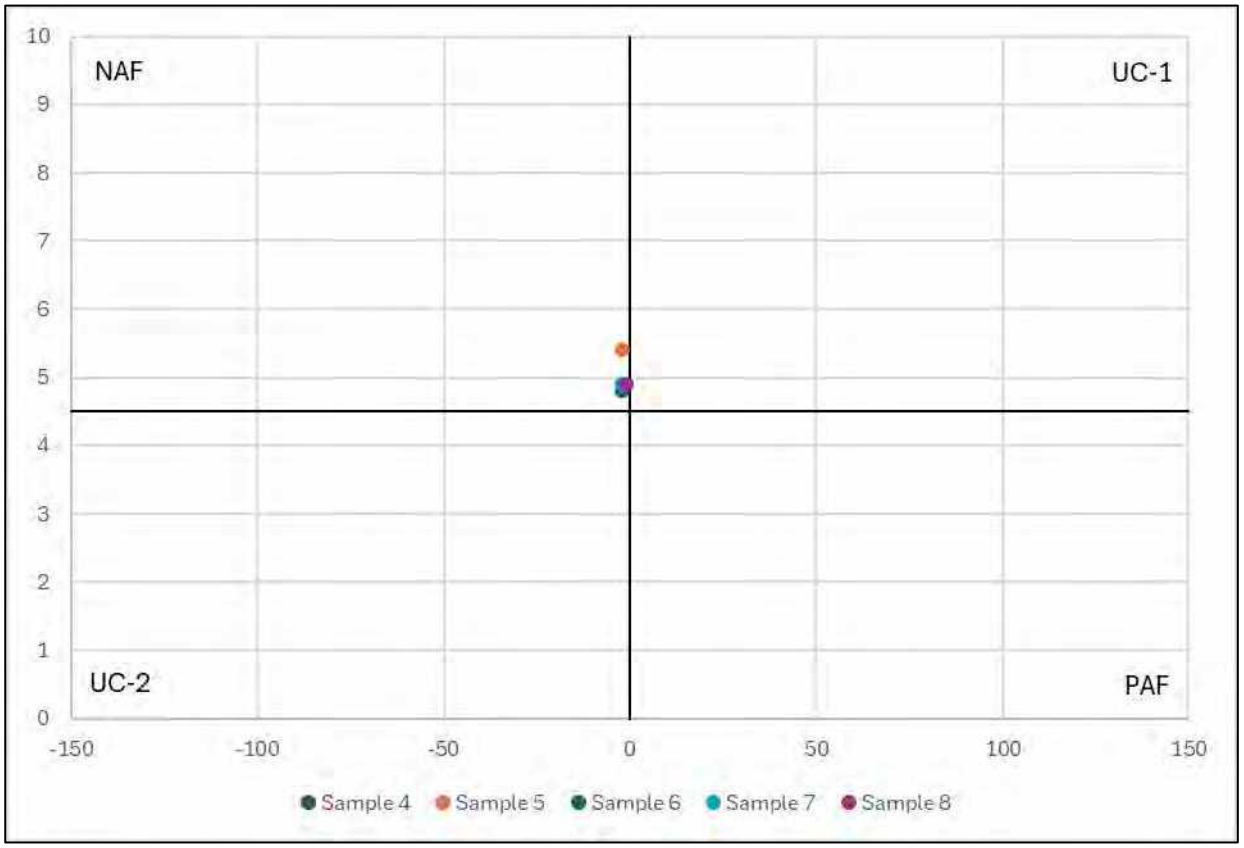
4.2.2 2024 Tailings Characterisation

Additional geochemical testing for the tailings was undertaken to support the tailings characterisation. A total of 16 samples were tested for various properties. The test certificates are attached in Appendix E. Notably, the net acid generation (NAG) and the net acid producing potential (NAPP) were assessed for the following components of the representative tailings stream:

- Sample 4 – MUP Oversize (>12 mm)
- Sample 5 – WCP Oversize (<12 – >2 mm)
- Sample 6 – WCP Sand Reject
- Sample 7 – WCP Tails (Slimes)
- Sample 8 – CUP Tailings

Overall, the rest results suggest that the tailings are barren with effectively no capacity for acid generation or neutralisation, which supports the understanding of the tailings stream previously established by MBS Environmental. Figure 25 presents the acid-base accounting for the tailings samples.

Figure 25: 2024 Tailings Acid-base Accounting



5. IPTSF Cell 1 Design

5.1 Standards and Guidelines

The IPTSF have been designed in general alignment with the following regulatory standards and design guidelines:

- ANCOLD, *Guidelines of Tailings Dams, Planning, Design, Construction, Operation and Closure*, 2019.
- DMP (now known as DMPE), *Code of Practice – Tailings Storage Facilities in Western Australia*, 2013.
- DMP (now known as DMPE), *Guide to the Preparation of a Design Report for Tailings Storage Facilities (TSFs)*, 2015.

5.2 Basis of Design

5.2.1 Additional Considerations

- Perimeter embankments are to be designed for full containment of tailings solids during its operational and post-closure life.
- No “ore pillars” are to form part of the perimeter embankments where mining occurs in the “near future”.
- Oversized materials are to be fully utilised to the extent practicable.
- The IPTSF is to allow for access to the pit for concurrent mining activities to continue.
- Deposited tailings are to remain below the natural ground elevation.
- Neither the TSF footprint, nor related infrastructure such as pipelines, access roads, ramps, pump infrastructures, etc. will encroach outside tenement boundaries. This will apply to the operational, as well as the potential future closure footprint.

5.2.2 Design Criteria

The design criteria for IPTSF Cell 1 are summarised in Table 22.

Table 22: IPTSF Cell 1 Design Criteria

Design Parameter	Design Input	Reference
Consequence Category		
ANCOLD	High C	ANCOLD (2019)
DMP	Category 1	DMP (2015)
Tailings Production and Capacity		
Tailings Throughput Rate	Varies	KMS, detailed in Section 2.1.3
Storage Capacity	Cell 1A: 8.79 Mt Cell 1B: 18.58 Mt	REC, detailed in Section 5.4.3
Storage Life	Cell 1A: 12 months Cell 1B: 27 months	REC, detailed in Section 5.4.3
Tailings Properties		
Slurry Solids Concentration	48.5%	KMS, typical
Specific Gravity	2.75	REC, typical
Average In-situ Dry Density	1.6 t/m^3	REC, detailed in Section 5.4.1
Beach Slope	0.9% - 2.2%	REC, detailed in Section 5.4.2
Geochemistry	Benign	MBS (2016), Section 4.2
Stability of External Slopes		
Factors of Safety (FoS)	Static: 1.5 Post-seismic: 1.0 – 1.2	ANCOLD (2019)
Operating Base Earthquake (OBE)	1:475 AEP	ANCOLD (2019)
Safety Evaluation Earthquake (SEE)	1:2,000 AEP	ANCOLD (2019)
Post-Closure Earthquake	MCE	ANCOLD (2019)
Hydrology		
Total Catchment Area	Cell 1A: 421,000 m^2 Cell 1B: 798,000 m^2	REC, detailed in Section 2.2.4.1
Design Storm Event	589 mm (1:100 AEP, 72-hour event)	ANCOLD (2019)
Construction Material		
Material Source	Mine waste (oversize & overburden)	KMS
Geochemistry	Benign	REC, assumed
Geometry		
Embankment Crest Elevation	Cell 1A Perimeter Embankment: RL 114.0 m Cell 1A Internal Weir: RL 107.0 m Cell 1B Perimeter Embankment: RL 111.0 – 114.0 m	REC
Embankment Crest Width	22.8 m	KMS
Minimum Windrow Height	The higher between 0.6 m and ½ trafficking wheel diameter	KMS
Embankment Slope Gradient	Upstream: 1V:2H Downstream: 1V:2H and 1V:2.5H	REC

5.3 TSF Classification

5.3.1 ANCOLD Classification

5.3.1.1 General

Two Consequence Categories are to be assessed as part of the TSF design. These are the Dam Failure Consequence Category and the Environmental Spill Consequence Category. These are used to determine various design and operational requirements including the design of spillways and flood storage requirements.

5.3.1.2 Dam Failure Severity Level

In accordance with ANCOLD (2019) Guidelines, seven (7) damage type categories need to be assessed to determine the severity level/impact (Minor, Medium, Major and Catastrophic) of a potential facility failure or spill. In accordance with the Dam Severity Level impact assessment (ANCOLD 2019, Table 1), IPTSF Cell 1 at TMSP is classified as 'Medium' severity, as presented in Table 23 (grey), due to the impact of dam failure on business importance.

Table 23: ANCOLD Dam Severity Level Rating System

Damage Type	Minor	Medium	Major	Catastrophic
Infrastructure (dam, houses, commerce, farms, community)	<$10M	$10M-$100M	$100M-$1B	>$1B
Business Importance	Some restrictions	Significant impacts	Severe to crippling	Business dissolution, bankruptcy
Public health	<100 people affected	100-1000 people affected	<1000 people affected for more than one month	>10,000 people affected for over one year
Social dislocation	<100 person or <20 business months	100-1000 person months or 20-2000 business months	>1000 person months or >200 business months	>10,000 person months or numerous business failures
Impact Area	<1 km^2	< 5km^2	< 20km^2	> 20km^2
Impact Duration	< 1 (wet) year	< 5 years	< 20 years	> 20 years
Impact on natural environment	Damage limited to items of low conservation value (e.g. degraded or cleared land, ephemeral streams, non-endangered flora and fauna). Remediation possible.	Significant effects on rural land and local flora & fauna. Limited effects on: A. Item(s) of local & state natural heritage. B. Native flora and fauna within forestry, aquatic and conservation reserves, or recognised habitat corridors, wetlands or fish breeding areas	Extensive rural effects. Significant effects on river system and areas A & B. Limited effects on: C. Item(s) of National or World natural heritage. D. Native flora and fauna within national parks, recognised wilderness areas, RAMSAR wetlands and nationally protected aquatic reserves. Remediation difficult.	Extensively affects areas A & B. Significantly affects areas C & D. Remediation involves significantly altered ecosystems.

5.3.1.3 Dam Failure Consequence Category

The dam failure consequence category is adapted from the severity level assessment of damage and loss, combined with the Population at Risk (PAR).

While no Dam Break Assessments (DBA) has been undertaken, given the in-pit nature of the facility, it is anticipated that the runout from a hypothetical dam break will not exceed the confinement of the pit. Based on discussion with KMS, the highest

number of persons at any given moment within the pit is anticipated to be between 10 – 100. As such, a dam failure severity level of 'Major' and a PAR between 10 – 100 has been adopted, the ANCOLD guidelines recommend the adoption of a 'High C' Dam Failure Consequence Category rating, as presented in Table 24 (grey).

Table 24: ANCOLD Consequence Category

Population at Risk (PAR)	Severity of Damage or Loss			
	Minor	Medium	Major	Catastrophic
<1	Very Low	Low	Significant	High C
>1 to 10	Significant (Note 2)	Significant (Note 2)	High C	High B
>10 to 100	High C	High C	High B	High A
>100 to 1000	Note 1	High B	High A	Extreme
>1000		Note 1	Extreme	Extreme

Notes:

1 – With a PAR in excess of 100, it is unlikely Damage will be minor. Similarly, with a PAR in excess of 1,000 it is unlikely Damage will be classified as Medium.

2 – Change to "High C" where there is the potential of one or more lives being lost. The potential for loss of life is determined by the characteristics of the flood area, particularly the depth and velocity of flow.

5.3.1.4 Environmental Spill Consequence Category

The Environmental Spill Consequence Category is assessed by considering the effect of spilling dam water to the downstream environment (typically through the dam spillway during a flood event). The aerial extent of the spill impact will be significantly smaller than the area that would be affected in the event of a dam failure. The effect of spilling water into the environment from the TSF is primarily driven by the geochemistry of the tailings solids and the supernatant pond.

Geochemical characterisation undertaken by MBS and REC indicates that the tailings and slurry are geochemically benign with no potential for acid generation or neutralisation. In the event of extreme weather, any water discharged from the TSF would be subject to significant dilution, both directly and through additional flooding of the downstream environment. A theoretical spill from IPTSF Cell 1 would also be contained within the pit. On this basis, the potential environmental impact of spills from the TSF is considered to be 'Minor'.

The PAR assigned to a dam spill from the TSF is < 1. For the combined Dam Spill Consequence Category, the TSF has been assessed as "Very Low" for the Environmental Spill Consequence Category at this stage of the design.

5.3.2 DMPE Classification

The facility has been assessed in accordance with the DMPE (previously known as DMP / DEMIRS) hazard rating system (DMP 2013, Table 1). The assessment concluded that a 'High' hazard rating be assigned to the facility, as demonstrated in Table 25 (grey). The facility has also been assessed in accordance with the DMP Code of Practice (DMP 2013, Table 2), with maximum embankment heights of '< 5.0 m'. As such, the facility is classified as a 'Category 1' facility, as demonstrated in Table 26 (grey).

Table 25: DMP CoP Hazard Rating System

Type of Impact or Damage	Hazard Rating		
	High	Medium	Low
	Extent or Severity of Impact or Damage		
Loss of human life or personal injury	Loss of life or injury is possible	Loss of life or injury is possible although not expected	No potential for loss of life or injury
Adverse human health due to direct physical impact or contamination of the environment	Long-term human exposure is possible, and permanent or prolonged adverse health effects are expected	The potential for human exposure is limited, and temporary adverse health effects are possible	No potential for human exposure
Loss of assets due to direct physical impact or contamination of the environment	Loss of numerous livestock is possible	Loss of some livestock is possible	Limited or no potential for loss of livestock
	Permanent loss of assets (e.g. commercial, industrial, agricultural and pastoral assets, public utilities and infrastructure, mine infrastructure) is possible and no economic repairs can be made	Temporary loss of assets is possible and economic repairs can be made	Limited or no potential for destruction or loss of assets
	Loss of TSF storage capacity is possible and repair is not practicable	Loss of TSF storage capacity is possible and repair is practicable	Insignificant loss of TSF storage capacity is possible
Damage to items of environmental, heritage or historical value due to direct physical impact or contamination of the environment	Permanent or prolonged damage to the natural environment (including soil, and surface and ground water resources) is possible	Temporary damage to the natural environment is possible	Limited or no potential for damage to the natural environment
	Permanent or prolonged adverse effects on flora and fauna are possible	Temporary adverse effects on flora and fauna are possible	Limited or no potential for adverse effects on flora and fauna
	Permanent damage or loss of items of heritage or historical value is possible	Temporary damage of items of heritage or historical value is possible	Limited or no potential for damage of items of heritage or historical

Table 26: DMP CoP Category Rating System

Maximum Embankment or Structure Height (m)	Hazard Rating		
	High	Medium	Low
> 15.0	Category 1	Category 1	Category 1
5.0 – 15.0	Category 1	Category 2	Category 2
< 5.0	Category 1	Category 2	Category 3

Notes:

Cross-valley TSFs or those that block or significantly impede flow in natural drainage paths should be treated as Category 1 TSFs, regardless of the embankment height.

In-pit TSFs are categorised assuming an embankment height of less than 5 m. In-pit TSFs extended by constructing a perimeter embankment are categorised based on the embankment height.

For thickened discharge facilities and "dry" stacked tailings, the maximum stack height is used in lieu of embankment height.

Integrated landforms should be classified according to the height of the retained tailings.

5.4 Tailings Storage Capacity

5.4.1 Tailings In-situ Density Reconciliation

A series of tailings density reconciliations of the OPTSF was conducted throughout REC's engagement as EoR to estimate the volume of tailings stored within the facility and validate the in-situ density of the stored material. Table 27 details a summary of reconciliation data based on survey data provided between February 2024 to April 2025.

It should be noted that there are some inconsistencies in the reconciled volumes and in-situ density obtained for the May 2024 period. The cause of these discrepancies is uncertain; however, it may be attributed to the quality of survey data and / or its manipulation.

Overall, a general stored tailings dry density between 1.6 t/m³ to 1.8 t/m³ is considered reflective of the tailings stored in the OPTSF. However, it is worthwhile noting that drainage conditions for the OTPSF and the IPTSF are different, and thus consolidation characteristics shall differ. As such, a lower-bound density of 1.6 t/m³ has been conservatively adopted for the design of the IPTSF, this is subject to further reconciliations and validation during the operation of the facility.

Table 27: OPTSF Reconciliation Data

Survey Date	Tailings Deposited (t)	Measured Volume (m³)	Inferred In-situ Dry Density (t/m³)
03/02/2024	767,327	452,163	1.68
14/04/2024	1,510,216	913,055	1.65
11/05/2024	1,975,297	1,314,152	1.50
24/05/2024	2,231,159	1,180,227	1.89
24/10/2024	4,891,482	2,673,832	1.83
24/11/2024	5,328,946	2,927,523	1.82
12/02/2025	6,912,589	3,744,091 Note A	1.85
29/04/2025	8,336,497	4,747,165 Note B	1.76
23/06/2025	9,578,938	5,416,096 Note C	1.77
31/08/2025	11,054,693	6,223,960 Note D	1.78

Notes: A – Tailings used as a construction material as of 25 Jan 2025, an additional 30,000 m³ has been added to account for this.
B – An additional 118,000 m³ added to account for tailings borrowed as a construction material.
C – An additional 121,050 m³ added to account for tailings borrowed as a construction material.
D – An additional 275,900 m³ added to account for tailings borrowed as a construction material.

5.4.2 Tailings Beach Slope

A series of beach slope assessments was undertaken during 2025 Q1 – Q3 of the operation of the OPTSF. Figure 26 presents the assessed tailings beach slopes and Table 28 summarises the adopted beach slope. REC notes that while the adopted tailings beach slope is based on the performance of the operation of the OPTSF, the deposition methodology and tailings characteristics remain consistent, thus deviation from OPTSF performance is anticipated to be minor.

Figure 26: Tailings Beach Slope (2025 Q1 – Q3)

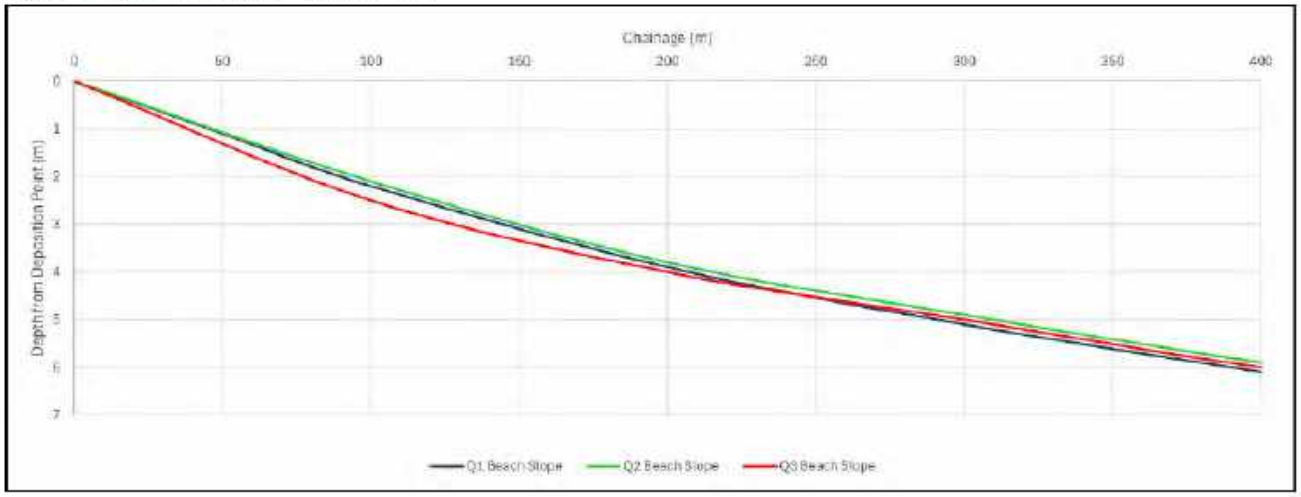


Table 28: Adopted Tailings Beach Slopes

Distance from Deposition Point (m)	Beach Slope (%)
0 – 100	2.2
100 – 200	1.7
200 – 300	1.1
300 – 400	1.0
400 +	0.9

5.4.3 IPTSF Cell 1 Tailings Storage Capacity

5.4.3.1 IPTSF Cell 1A Capacity

IPTSF Cell 1A is estimated to be able to accommodate approximately 8.79 Mt of tailings (5.50 Mm^3 at the adopted tailings dry density of 1.6 t/m^3). Based on its corresponding storage life between July 2026 to end-June 2027, the average tailings throughput for Cell 1A is estimated to be approximately 8.70 Mtpa.

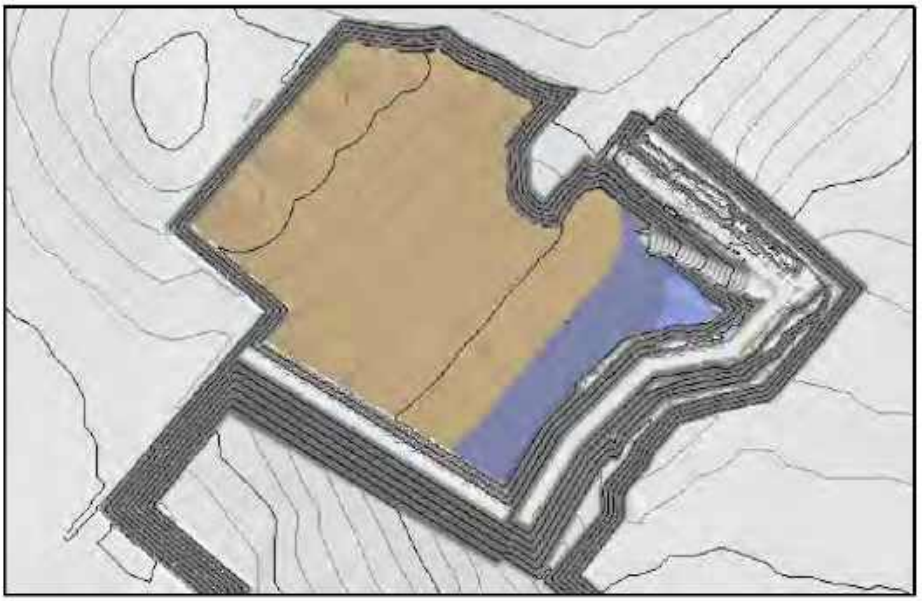
5.4.3.2 IPTSF Cell 1B Capacity

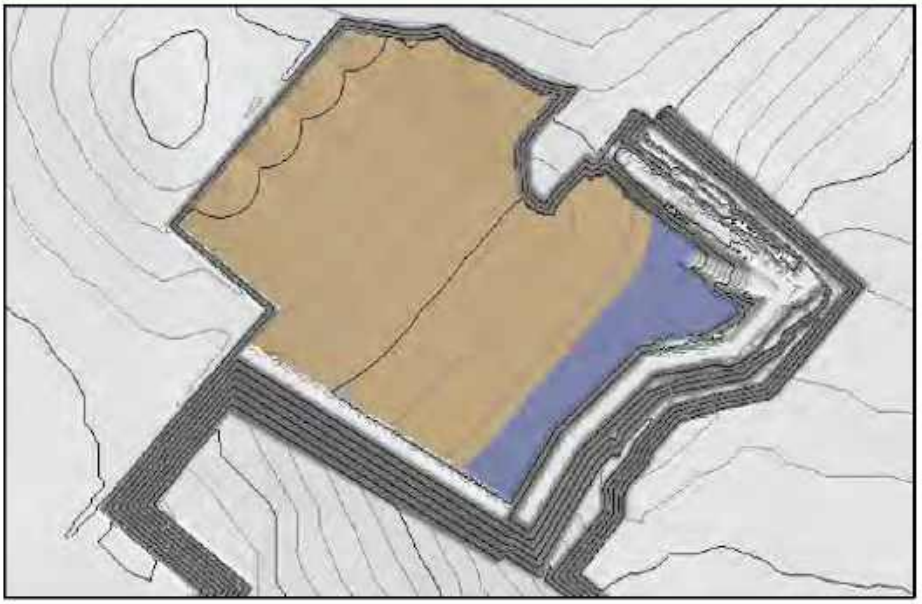
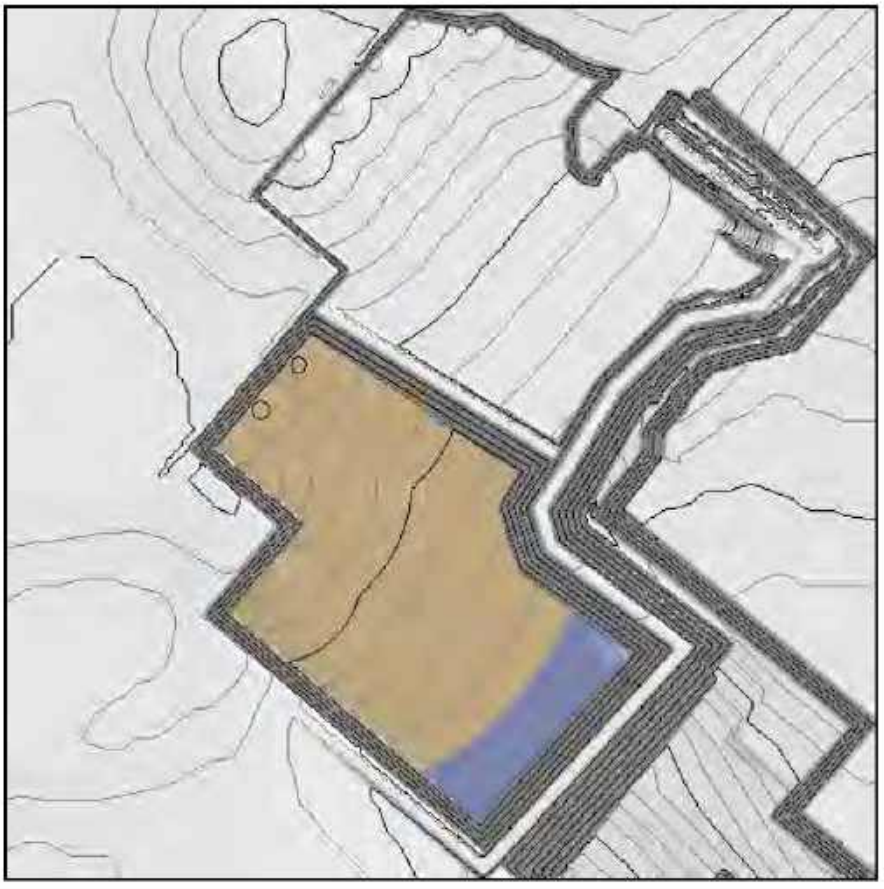
IPTSF Cell 1A is estimated to be able to accommodate approximately an additional 18.58 Mt of tailings (11.61 Mm^3 at the adopted tailings dry density of 1.6 t/m^3). Based on its corresponding storage life between July 2027 to end-September 2029, the average tailings throughput for Cell 1B is estimated to be approximately 8.03 Mtpa. It is to be noted that an allowance of approximately 1.19 Mm^3 has been made for the dumping of waste material at the base of the cell, up to an approximate height of 5 m across the basin of Cell 1B. The storage of mine waste and tailings may be further interchanged in consultation with REC.

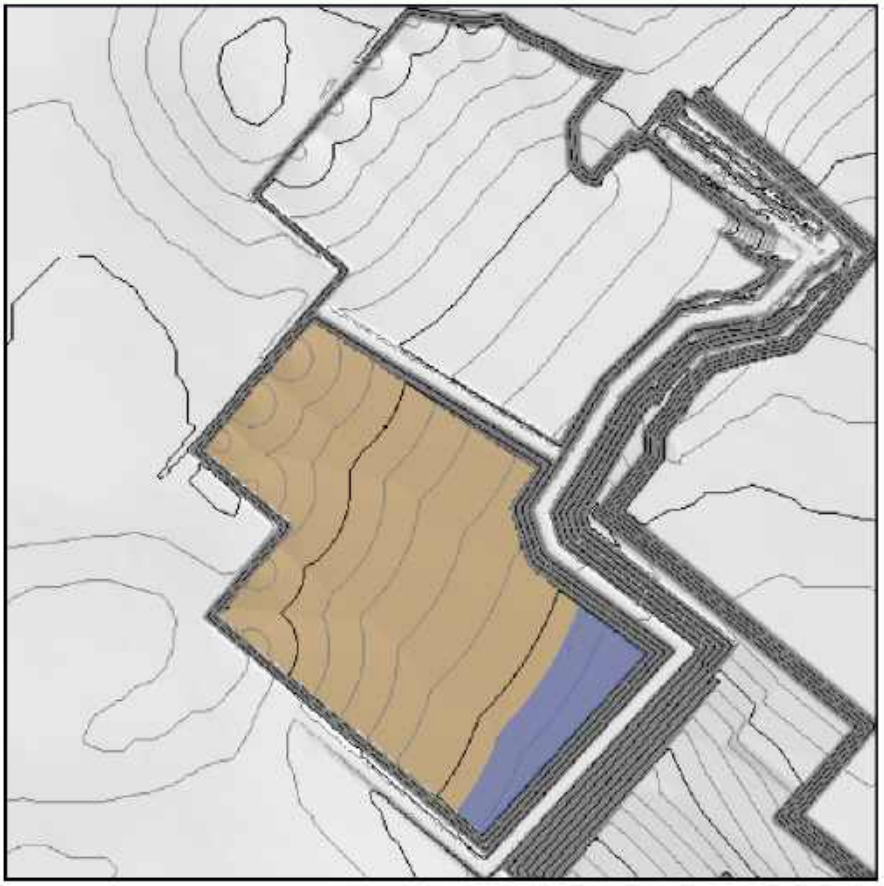
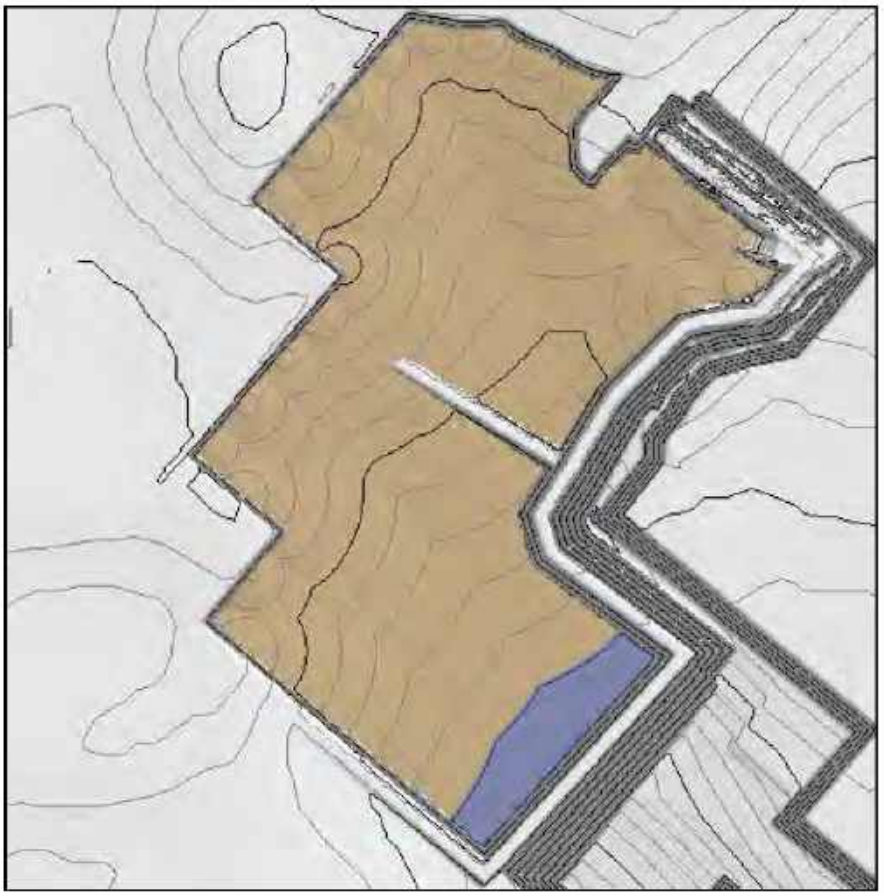
5.4.4 Deposition Timeframes

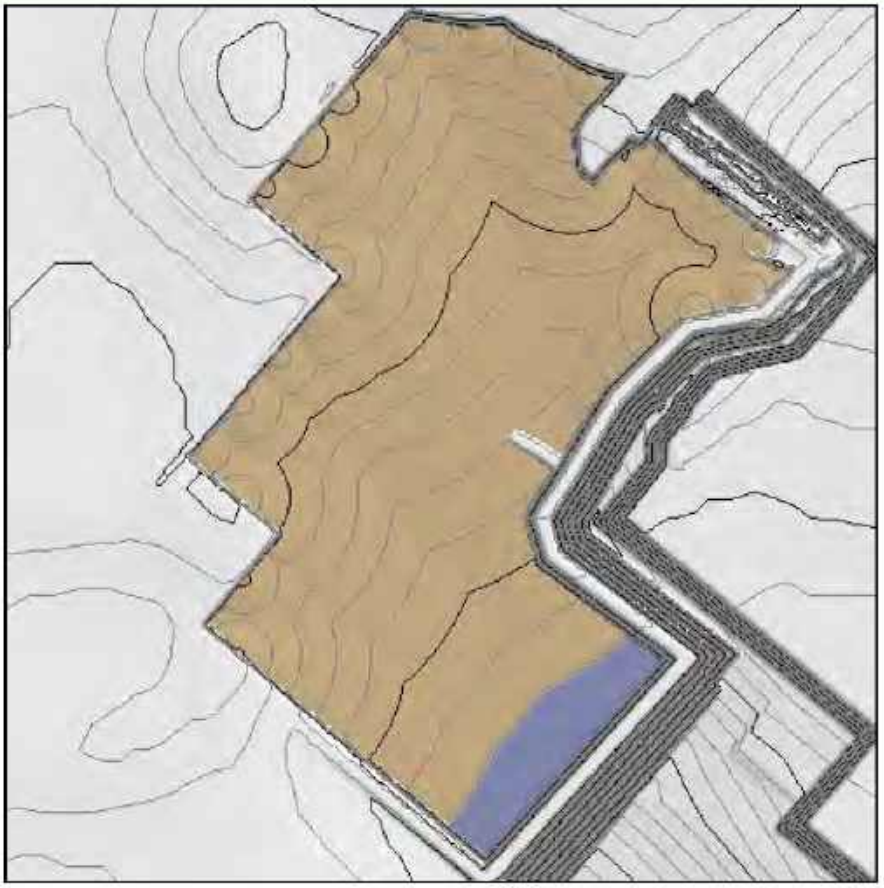
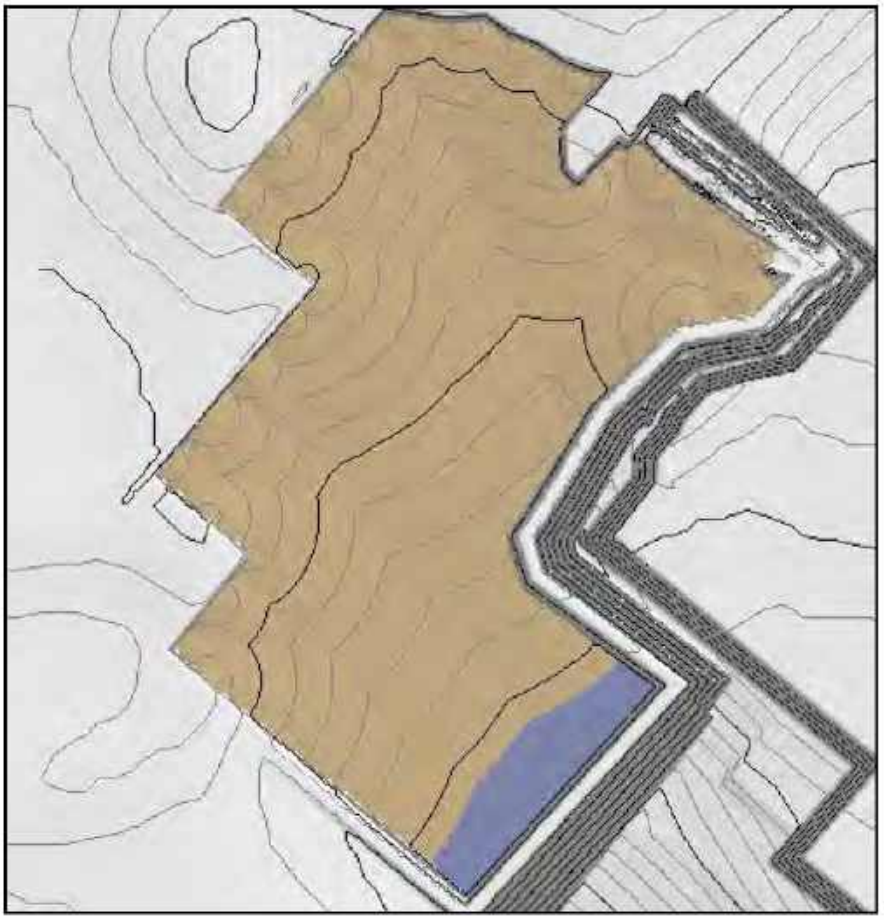
The deposition timeframes throughout the operation of IPTSF Cell 1 have been summarised in Table 29. REC notes that the timeframes provided indicate the end of the referenced period.

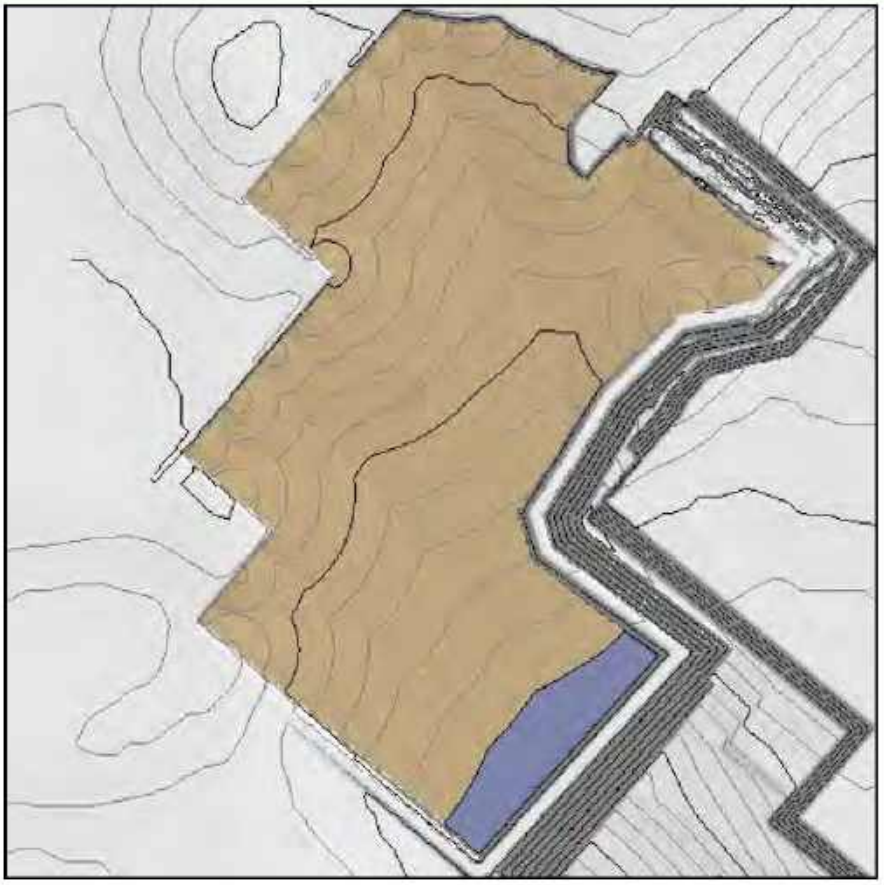
Table 29: Deposition Timeframes

Timeframe	Snapshot
December 2026 4.35 Mt Incremental Tailings 4.35 Mt Cumulative Tailings	

Timeframe	Snapshot
June 2027 4.33 Mt Incremental Tailings 8.70 Mt Cumulative Tailings	
December 2027 4.24 Mt Incremental Tailings 12.92 Mt Cumulative Tailings	

Timeframe	Snapshot
June 2028 4.21 Mt Incremental Tailings 17.14 Mt Cumulative Tailings	
December 2028 4.36 Mt Incremental Tailings 21.49 Mt Cumulative Tailings	

Timeframe	Snapshot
June 2029 3.34 Mt Incremental Tailings 24.84 Mt Cumulative Tailings	
September 2029 1.93 Mt Incremental Tailings 26.76 Mt Cumulative Tailings	

Timeframe	Snapshot
Maximum Design Storage 0.61 Mt Incremental Tailings 27.37 Mt Cumulative Tailings	

5.5 Liquefaction Potential

5.5.1 Deposited Tailings

The embankment does not rely on the strength of the tailings for overall embankment stability. Therefore, the liquefaction potential of the tailings was not assessed as part of the design. However, as part of the post-seismic conditions in stability modelling, an assumption has been made that the tailings will liquefy and an assumed liquefied strength for the tailings has been incorporated in the modelling.

5.5.2 Retaining Structure

The IPTSF Cell 1 embankments will be constructed using traffic-compacted, oversized mine waste and overburden material. The embankments are not planned to undergo any subsequent raises, and given the observed free-draining nature of the construction material, the embankment is expected to behave under drained conditions, with minimal potential for the development of excess pore water pressures. Accordingly, the structure is not considered susceptible to liquefaction under seismic loading.

5.5.3 Foundation Material

The pit floor, situated approximately 20 – 40 m below ground level, is expected to be in an overconsolidated state as a result of historical stresses. Overconsolidated soils typically exhibit dilative behaviour, leading to higher undrained shear strengths and a reduced susceptibility to flow liquefaction under seismic loading (Robertson, 2018). While matric suction effects may contribute to additional strength in unsaturated zones, dependent on the phreatic surface position. Based on these considerations, the foundation material is considered to be resistant to liquefaction under seismic loading.

5.6 Modelling and Design Assessments

5.6.1 Freeboard Assessment

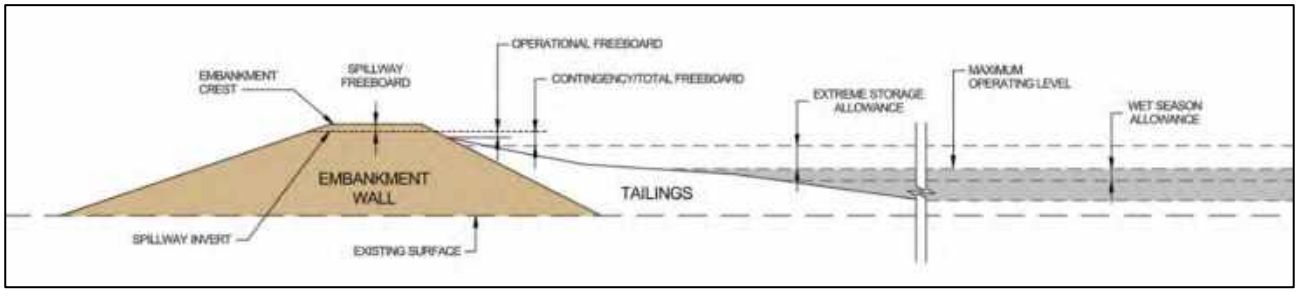
5.6.1.1 General

Various definitions of freeboard are provided across the adopted design standards and guidelines. While these freeboards may be named differently, several are functionally equivalent, leading to overlap and potential complexities in application and interpretation. Collectively, these various freeboards have been consolidated into the freeboard definitions below for implementation in IPTSF Cell 1:

- Freeboard:
  - The vertical distance between the embankment crest and the reference.
- Operational Freeboard:
  - Freeboard between the tailings level and the adjacent embankment crest.
  - Operational freeboard is the underlying freeboard that governs the available supernatant pond capacity.
- Spillway Freeboard (where applicable):
  - Freeboard between the embankment crest and the spillway invert.
  - For typical paddock perimeter discharge facilities, this should coincide with the lowest elevation along the perimeter embankment.
  - Flood spill depth is the depth of water flow over the spillway for the design flood event.
- Contingency Storage Allowance:
  - Additional storage allowance above the design storm event.
  - Typically provided in standards or guidelines in the form of a vertical distance rather than volume.
- Extreme Storage Allowance:
  - Based on the design storm inflow – function of the catchment area, runoff coefficient, and the design storm event depth.
  - Not to be encroached upon during normal operating conditions.
  - Freeboard subject to the depth-volume relationship atop the tailings surface.
- Wet Season Storage Allowance:
  - Allowance for the storage of water, which may conservatively be required to be stored on the tailings dam through a combination of excess wet season rainfall runoff from the facility catchment and processing water which cannot be extracted from the dam.
  - Freeboard subject to the depth-volume relationship atop the tailings surface.

The aforementioned freeboard components are shown graphically in Figure 27.

Figure 27: TSF Freeboard Definition



A summary of the individual freeboard requirements based on DMPE and ANCOLD Guidelines is presented in Table 30. The most conservative freeboard elements adopted for design are highlighted in grey. REC notes that the ITPSF Cell 1 design does not feature a spillway, thus the spillway freeboard component is not applicable.

Table 30: Freeboard Requirements

Parameter	ANCOLD	DMPE
Facility Classification	High C	Category 1
Contingency Storage Allowance		
Total / Additional Freeboard	0.5 m	0.5 m
Extreme Storage Allowance		
Design Storm Event (1:X-year AEP, X-hour event)	1:100 AEP, 72-hr	1:100 AEP, 72-hr
Wet Season Storage Allowance		
Wet Season Design Storage Allowance (1:X-year AEP) Runoff	1:100 AEP	NA

5.6.1.2 Operational Freeboard

DMPE requires a minimum operational freeboard of 300 mm for facilities with a supernatant pond located away from the perimeter embankment, and 500 mm for facilities where the pond is located against the perimeter embankment. REC notes that the intended deposition philosophy for ITPSF Cells 1A and 1B is for the supernatant pond to be located against the perimeter embankment throughout each cell's operating life. As such, an operational freeboard of 500 mm has been adopted.

5.6.1.3 Total / Contingency Freeboard

In accordance with DMPE requirements, for TSFs with a supernatant pond located away from the perimeter embankment, a total freeboard of 0.5 m is to be adopted. For a 'High C' consequence category facility, ANCOLD requires an additional 0.5 m freeboard above the design storm event storage. The total freeboard and contingency freeboard are considered to be synonymous.

5.6.1.4 Extreme Storage Allowance

Based on the IFD data detailed in Section 2.2.4.1, the design storm event of 1:100 AEP 72-hour event sourced from BoM is 589 mm. The extreme storage allowance breakdown is summarised in Table 31.

Table 31: Extreme Storage Allowance Summary

Parameter	Cell 1A		Cell 1B	
	Direct Catchment	Upstream Catchment	Direct Catchment	Upstream Catchment
Runoff Coefficient	1.0	1.0	1.0	1.0
Catchment Area	401,700 m²	19,300 m²	778,700	19,300
Design Storm Depth (1:100 AEP, 72-hr event)	589 mm		589 mm	
Design Storm Inflow	247,970 m³		470,000 m³	

5.6.1.5 Wet Season Storage Allowance

Based on the TSF design philosophy, the removal of water is to be controlled to maintain the freeboard limit and the criterion assessed as part of the probabilistic (Water Balance Model) WBM. As such, water abstraction infrastructure is intended to be operated such that the size of the TSF supernatant pond is always confined around the decant infrastructure. Water is not intended to accumulate on the TSF throughout the wet season. Additionally, the ANCOLD recommendation of assuming no water recovery takes place throughout the wet season is considered to be ill-applied for tailings dams, where water recovery is required to maintain processing operations.

However, in keeping with the concept of the wet season allowance recommended by ANCOLD, the abstraction criterion for the facility has been defined to accommodate the removal of TSF water to maintain a less than 1% chance of encroaching the contingency storage allowance based on the probabilistic WBM estimates (reflective of the 1:100 AEP wet season allowance recommended by ANCOLD). These abstraction requirements shall be met on an operational level to remove the need for a physical wet season freeboard.

5.6.1.6 Freeboard Limits

In accordance with the adopted classifications of the guidelines, the design storm rainfall volumes for the facility and the maximum operating pond level were assessed. REC notes that the stormwater storage capacity is dependent upon the development of the beach slope achieved throughout the facility's operation and reconciliations will likely be required towards the end of the storage life of the facility. Table 32 and Figure 28 presents the freeboard limits for IPTSF Cell 1A, Table 33 and Figure 29 presents the freeboard limits for IPTSF Cell 1B.

Table 32: IPTSF Cell 1A Freeboard Limits

Parameter	Inc. Freeboard (m)	Elevation (RL m)	Storage Capacity (m³)
Embankment Crest	–	107.00	542,240
Contingency Storage Allowance			
DMPE / ANCOLD Contingency Freeboard	0.50	106.50	465,680
Extreme Storage Allowance			
Design Storm Event (1:100 AEP, 72-hour event)	1.46	105.04	217,720
Operating Limits			
Maximum Operating Pond Limit	1.96	105.04	217,720

Figure 28: IPTSF Cell 1A Top-down Storage Curve

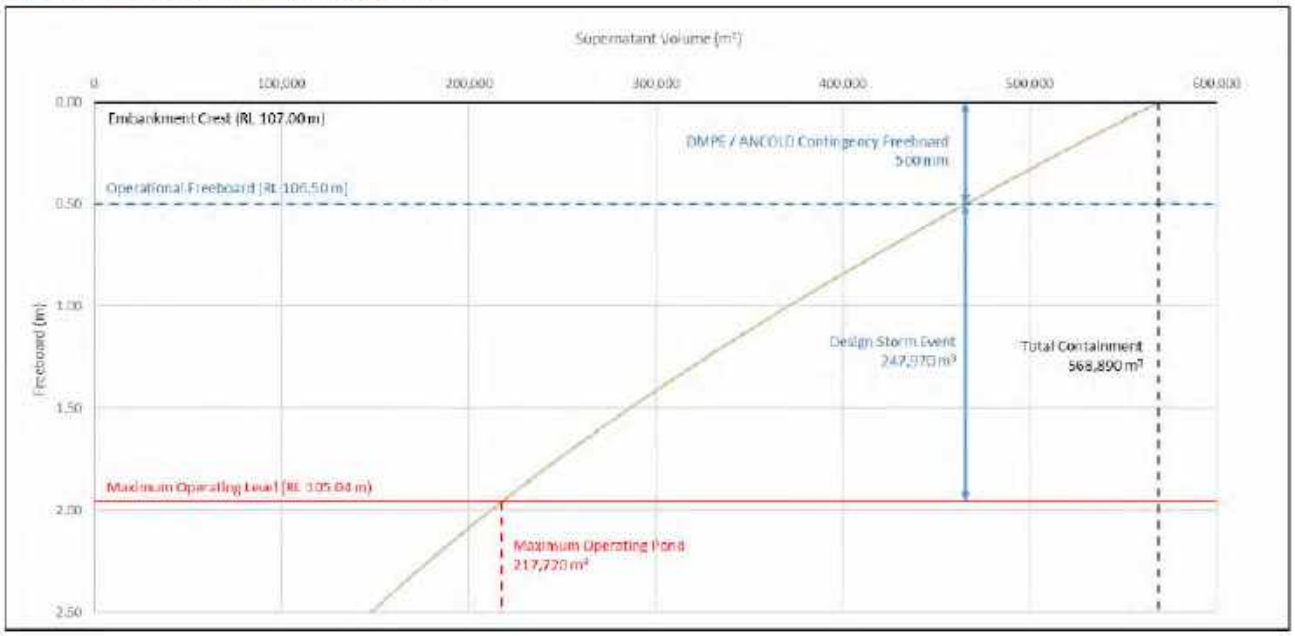
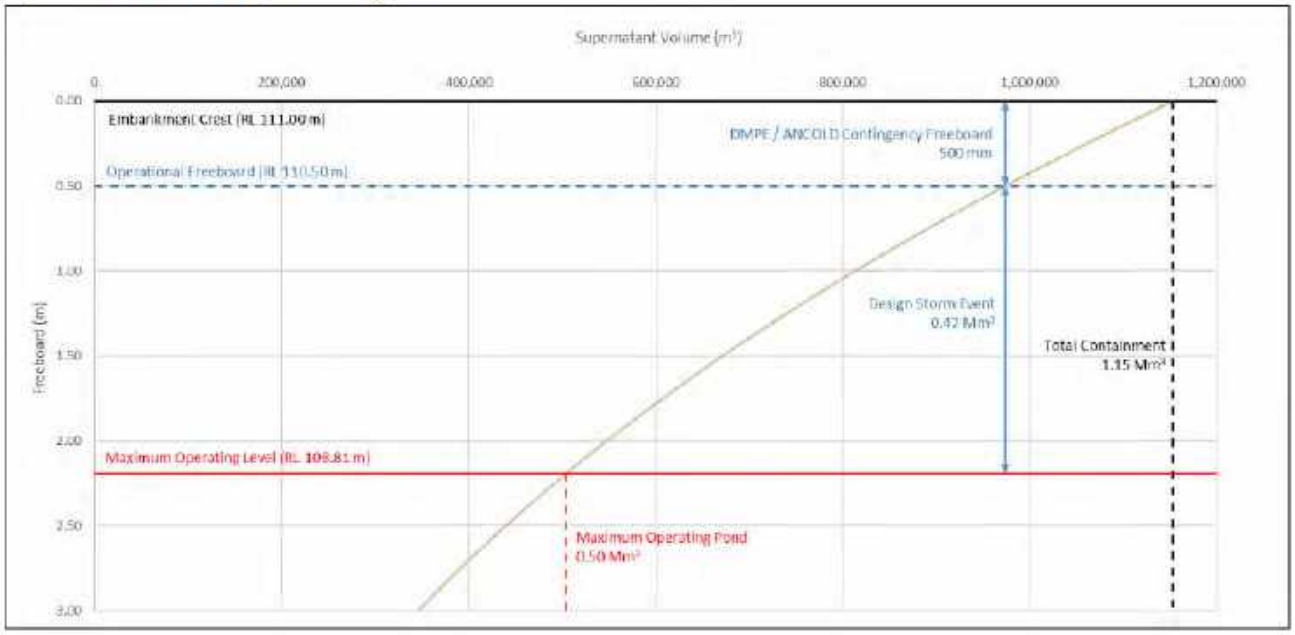


Table 33: IPTSF Cell 1B Freeboard Limits

Parameter	Inc. Freeboard (m)	Elevation (RL m)	Storage Capacity (m^3)
Embankment Crest	–	111.00	1,181,260
Contingency Storage Allowance			
DMPE / ANCOLD Total Freeboard	0.50	110.50	974,310
Extreme Storage Allowance			
Design Storm Event (1:100 AEP, 72-hour event)	1.69	108.81	504,290
Operating Limits			
Maximum Operating Pond Limit	2.19	108.81	504,290

Figure 29: IPTSF Cell 1B Top-down Storage Curve



5.6.2 Water Balance Model

5.6.2.1 Approach

An Excel-based probabilistic WBM was developed by REC in alignment with best practices for risk-based decision making, particularly given the highly variable precipitation at the project site. The probabilistic model incorporates typical operational inflows and outflows as an average, with precipitation inputs treated probabilistically and assessed using the Monte Carlo method.

The Monte Carlo method is a statistical simulation technique used to approximate the probability of different outcomes when there is inherent uncertainty in input variables. Rather than relying on a single deterministic value, the Monte Carlo method:

- Randomly samples input variables (i.e. monthly precipitation) from defined probability distributions.
- Runs thousands of simulations (iterations), each time using a different combination of sampled inputs.
- Aggregates the results to build a probability profile of outcomes (i.e. pond volumes, exceedance probabilities, etc.).

The WBM has been developed to assess the following probabilistically:

- Supernatant pond volume.
- Operational seepage through the embankment.
- Water recovery.

5.6.2.2 Input Parameters and Assumptions

5.6.2.2.1 Probabilistic Monthly Precipitation

Precipitation data from 1941 – 2024 was sourced from BoM for Broome, upon which the Cornish-Fisher expansion was applied to the log-transformed rainfall data. For most months, the bottom and top 5 percentiles were excluded from analysis. However, for January to March, which historically experience extreme rainfall conditions, the 1st to 99th percentile rainfall distribution was considered. Figure 30 to Figure 41 present the probabilistic density of the historical monthly precipitation and the adopted probabilistic curve. Figure 42 presents the adopted precipitation percentiles for each month.

Figure 30: January Rainfall Cornish-Fisher Expansion

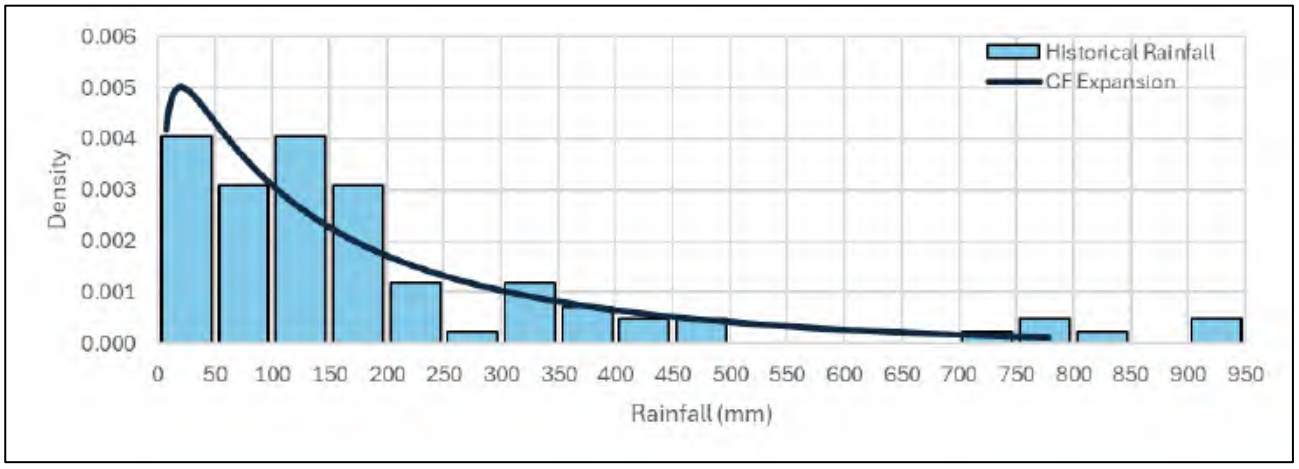


Figure 31: February Rainfall Cornish-Fisher Expansion

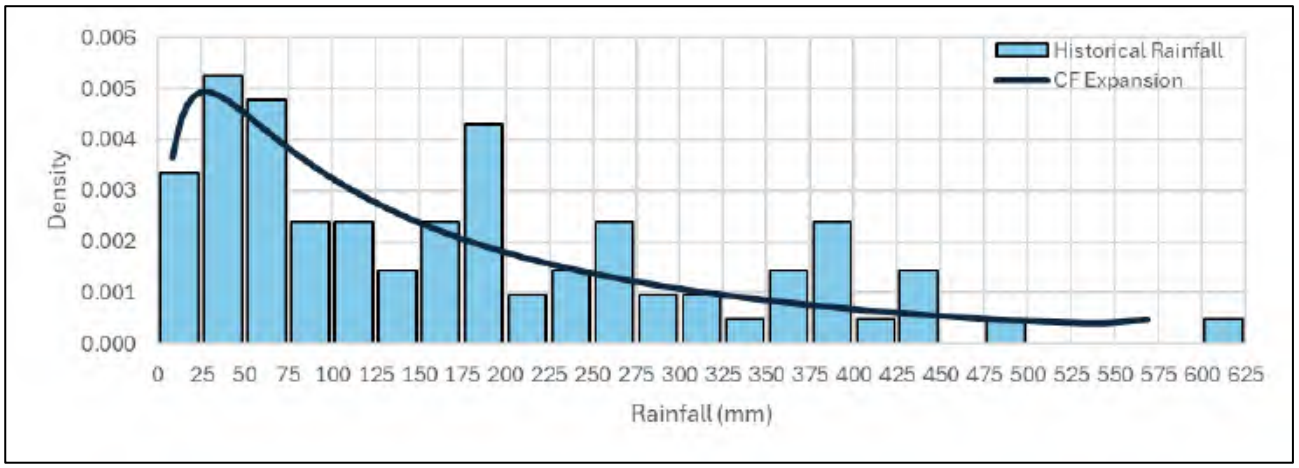


Figure 32: March Rainfall Cornish-Fisher Expansion

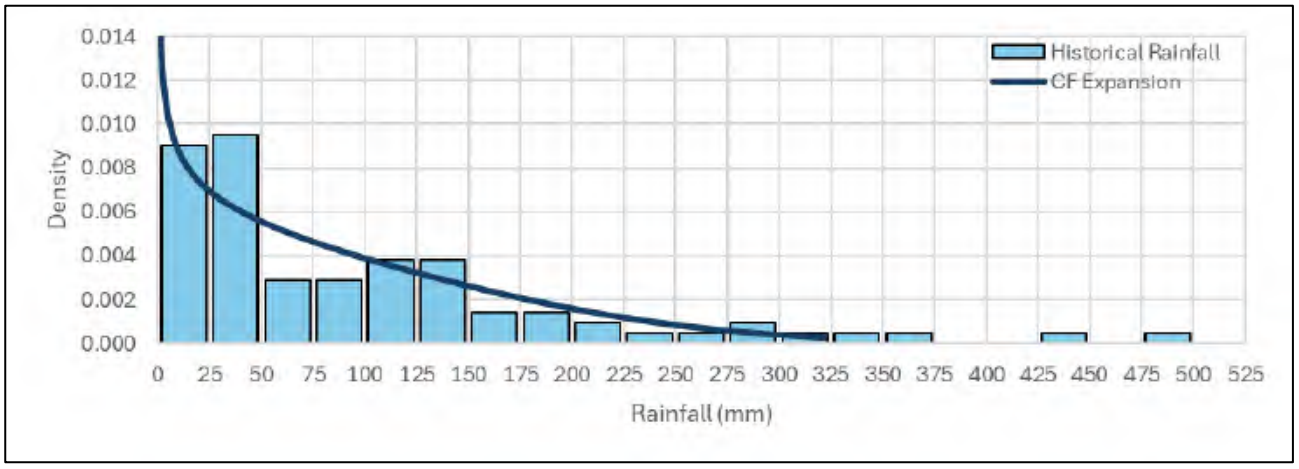


Figure 33: April Rainfall Cornish-Fisher Expansion

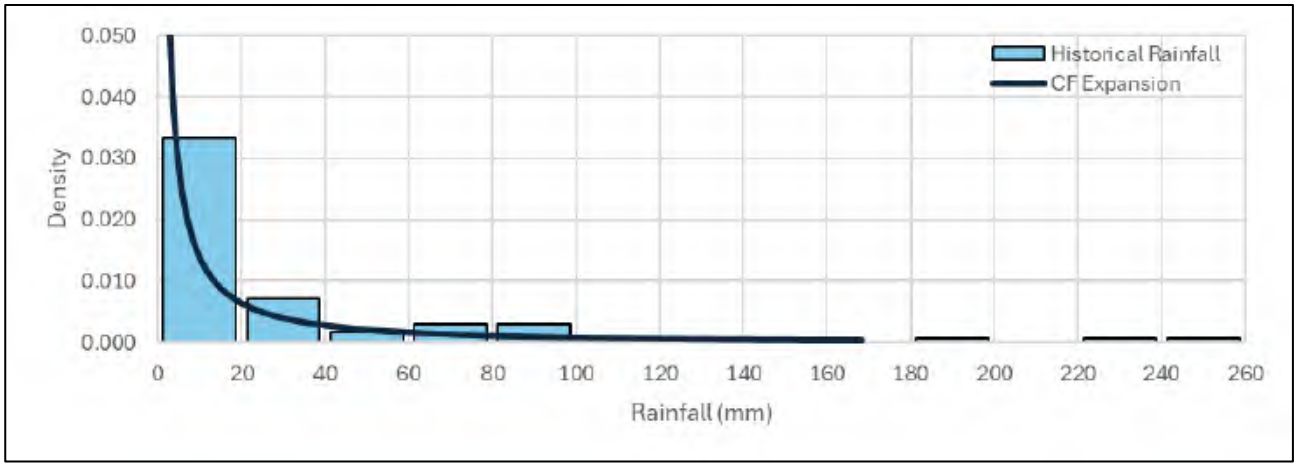


Figure 34: May Rainfall Cornish-Fisher Expansion

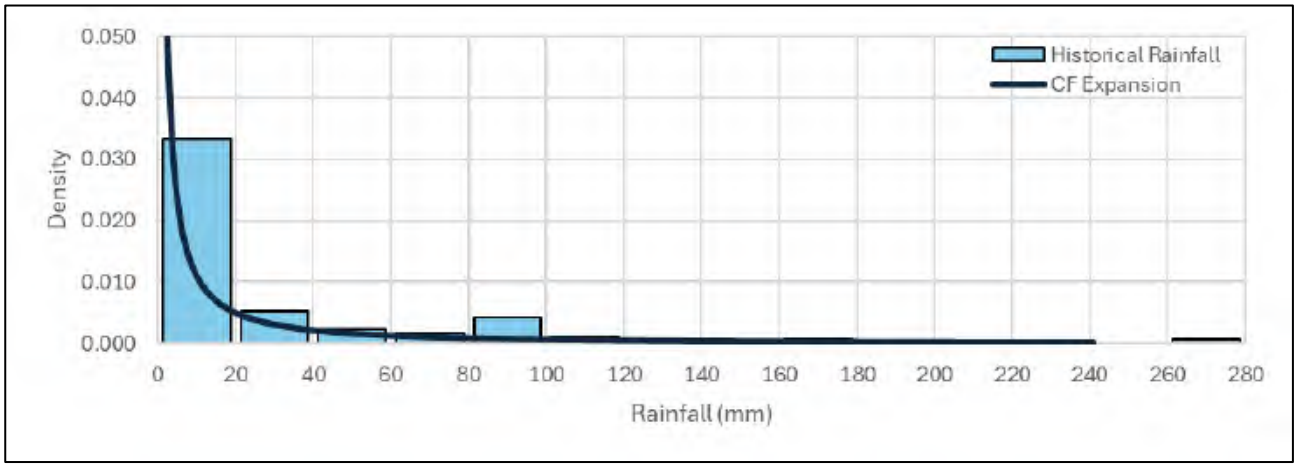


Figure 35: June Rainfall Cornish-Fisher Expansion

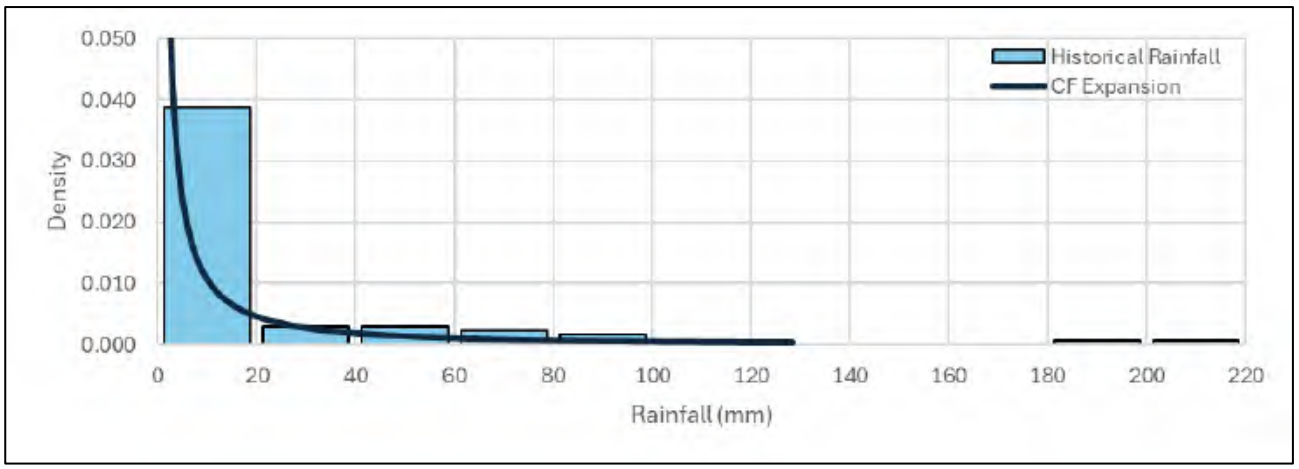


Figure 36: July Rainfall Cornish-Fisher Expansion

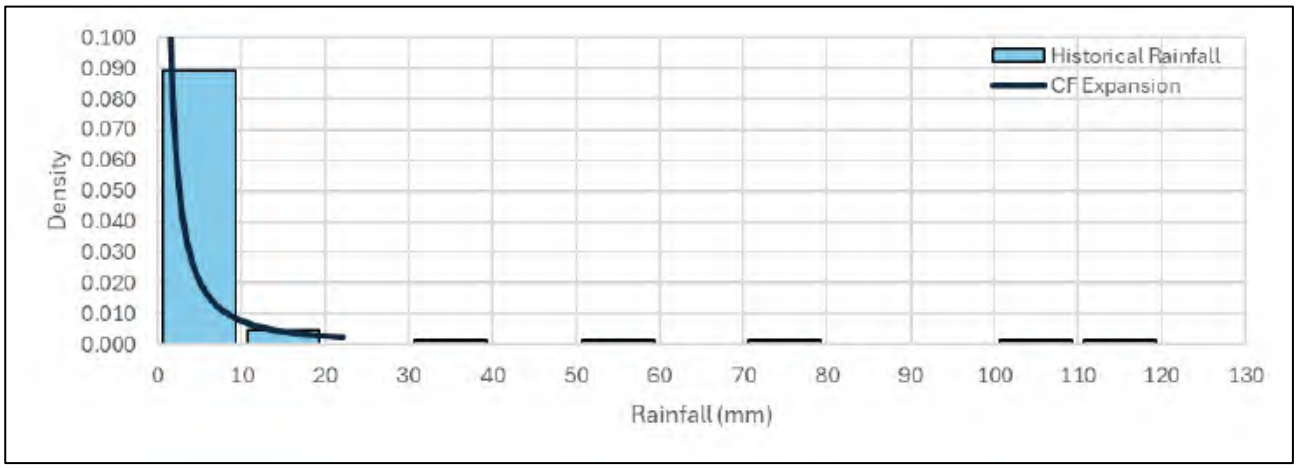


Figure 37: August Rainfall Cornish-Fisher Expansion

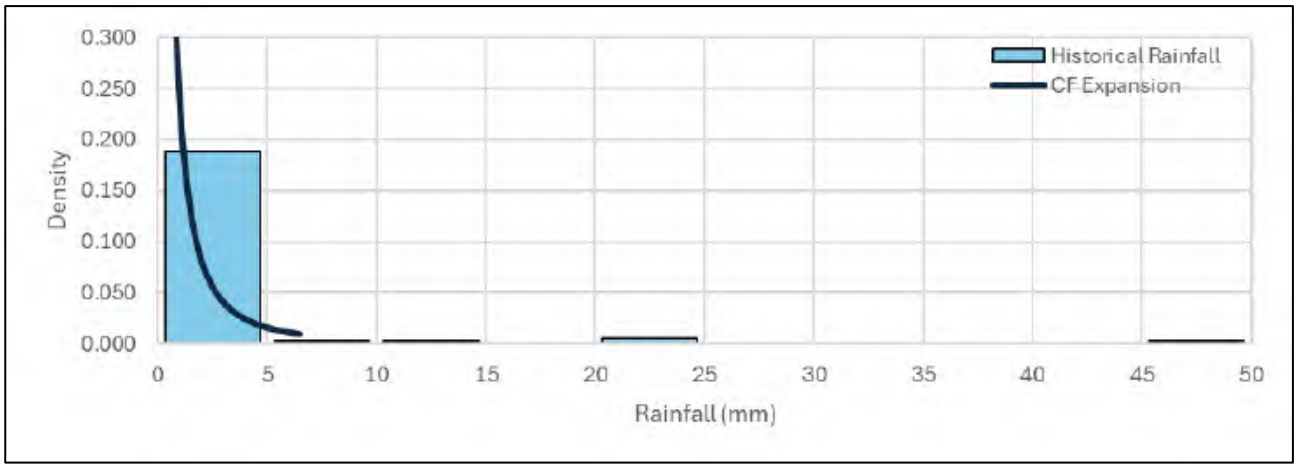


Figure 38: September Rainfall Cornish-Fisher Expansion

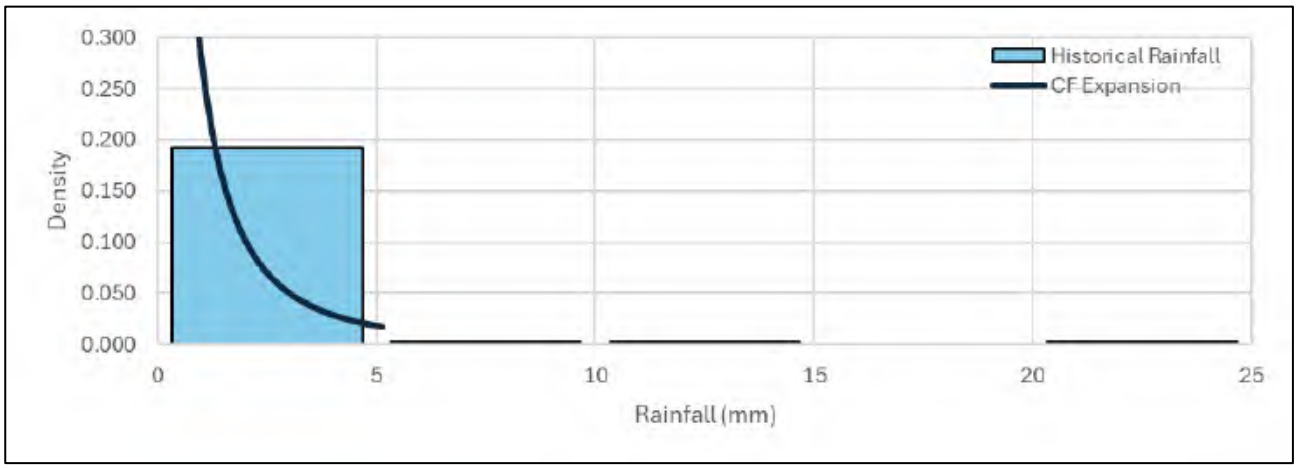


Figure 39: October Rainfall Cornish-Fisher Expansion

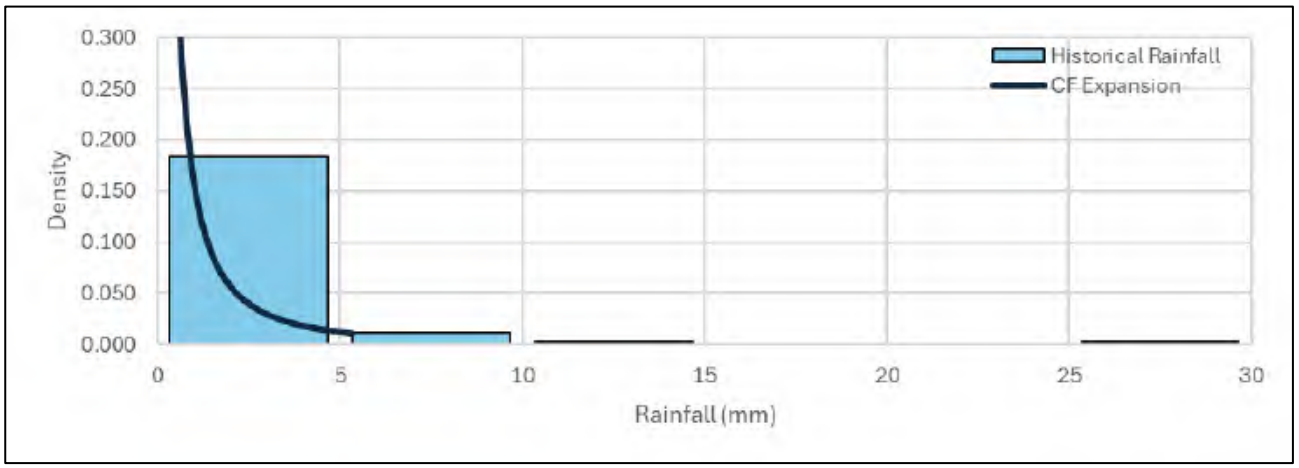


Figure 40: November Rainfall Cornish-Fisher Expansion

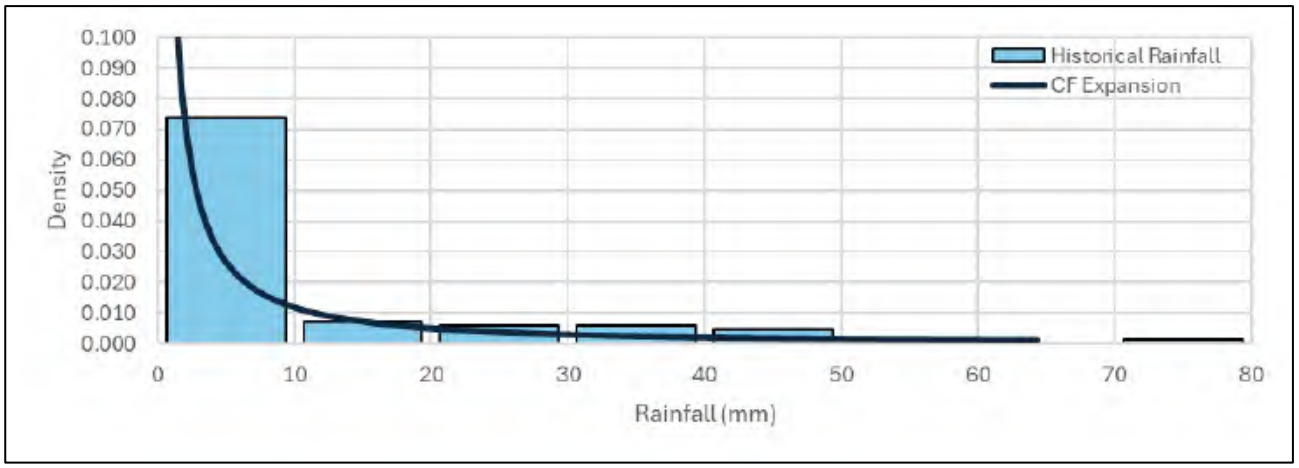


Figure 41: December Rainfall Cornish-Fisher Expansion

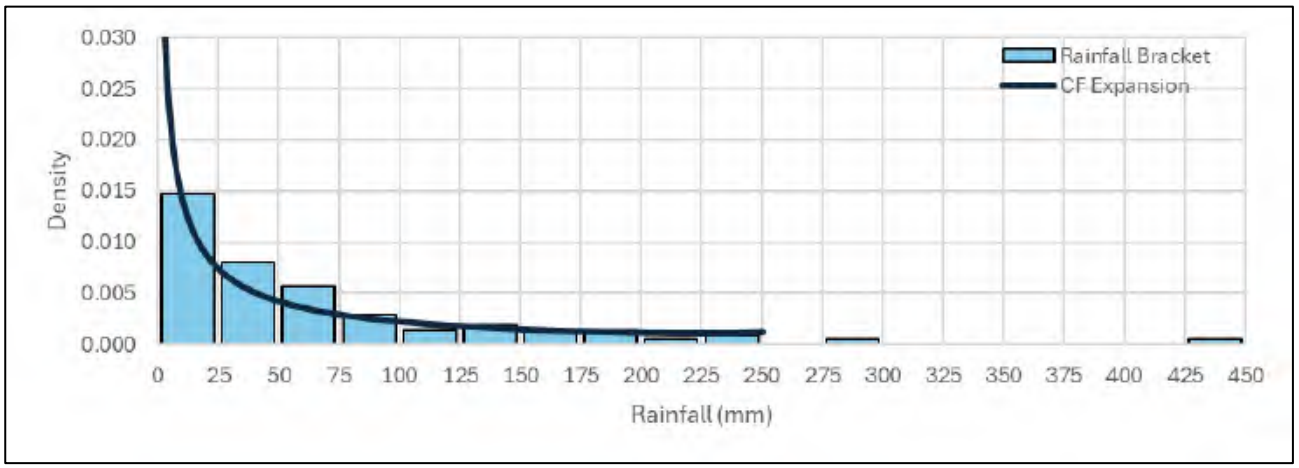
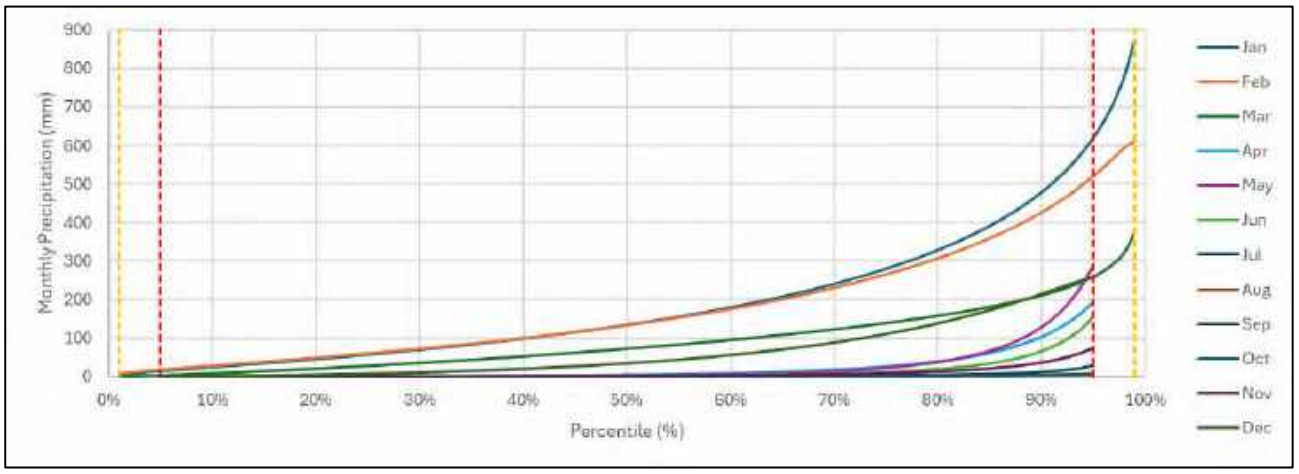


Figure 42: Adopted Monthly Precipitation Percentiles



5.6.2.2.2 Adopted Parameters

Table 34 summarises the input parameters of the water balance model. Additionally, the following assumptions have been adopted in the model:

- Seepage assessment outcome for typical conditions is representative throughout the operation of the facility.
- The upper bound seepage rate for Cells 1A and 1B assumes Cell 1A's seepage for typical conditions (Cell 1B's upper bound seepage unlikely to be achieved, as a smaller pond corresponds to lesser seepage).
- No pond is possible (pond size of zero).

Table 34: Water Balance Input Parameters

Parameter		Value	Source
General			
Cell Commissioning		Cell 1A: July 2026 Cell 1B: July 2027	REC, detailed in Section 2.1.3
Monte Carlo Iterations		1,000	REC, adopted
Inflow			
Runoff Coefficient		1.0	REC, assumption
Total Catchment Area		Cell 1A: 421,000 m² Cell 1B: 798,000 m²	REC, detailed in Section 2.2.4.1
Slurry Density		48.5%	KMS, typical
Tailings Throughput		Varies	KMS, detailed in Section 2.1.3
Outflow			
Tailings Specific Gravity		2.75	REC, typical
Initial In-situ Tailings Dry Density		1.0 t/m³	REC, assumption
In-situ Tailings Dry Density Change		+0.1 t/m³/month	REC, assumption
Maximum In-situ Tailings Dry Density		1.6 t/m³	REC, detailed in Section 5.4.1
Seepage (Upper Bound)		26,149 m³/day	REC, detailed in Section 5.6.3
Pan Factor		Pond: 0.70 Wet beach: 0.40 Dry Beach: 0.15	REC, assumption
Evaporation Area	Cell 1A	Total beach: 311,900 m² Pond: 20,000 m² Wet beach: 10% of beach area	REC, assumption
	Cell 1B	Total beach: 768,850 m² Pond: 20,000 m² Wet beach: 10% of beach area	REC, assumption

5.6.2.3 Water Balance Outcome

Based on the 99th percentile supernatant pond volume estimated by the WBM model, the supernatant pond within IPTSF Cells 1A and 1B is not expected to exceed the provided contingency allowance throughout operations. This aligns with the ANCOLD 1:100 AEP wet season allowance (detailed in Section 5.6.1.5). Additionally, it is to be noted that the facility does not abstract water internally, but rather externally in the form of collected operational seepage (detailed in Section 5.7).

The 50th percentile operational seepage outcomes indicate an average of 0.60 Mm^3 of water per month will be available for recovery, equivalent to approximately 73% slurry water recovery. Figure 43 presents the assessed probabilistic pond size and seepage. Figure 44 presents the storage balance throughout the operation of IPTSF Cell 1A & 1B.

Figure 43: Probabilistic Pond Size and Seepage

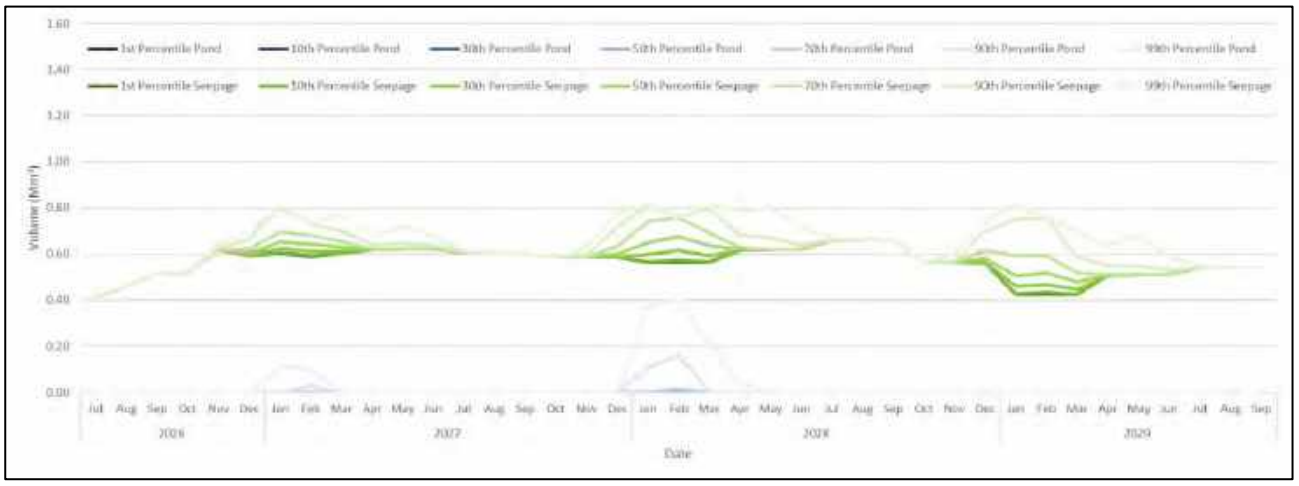
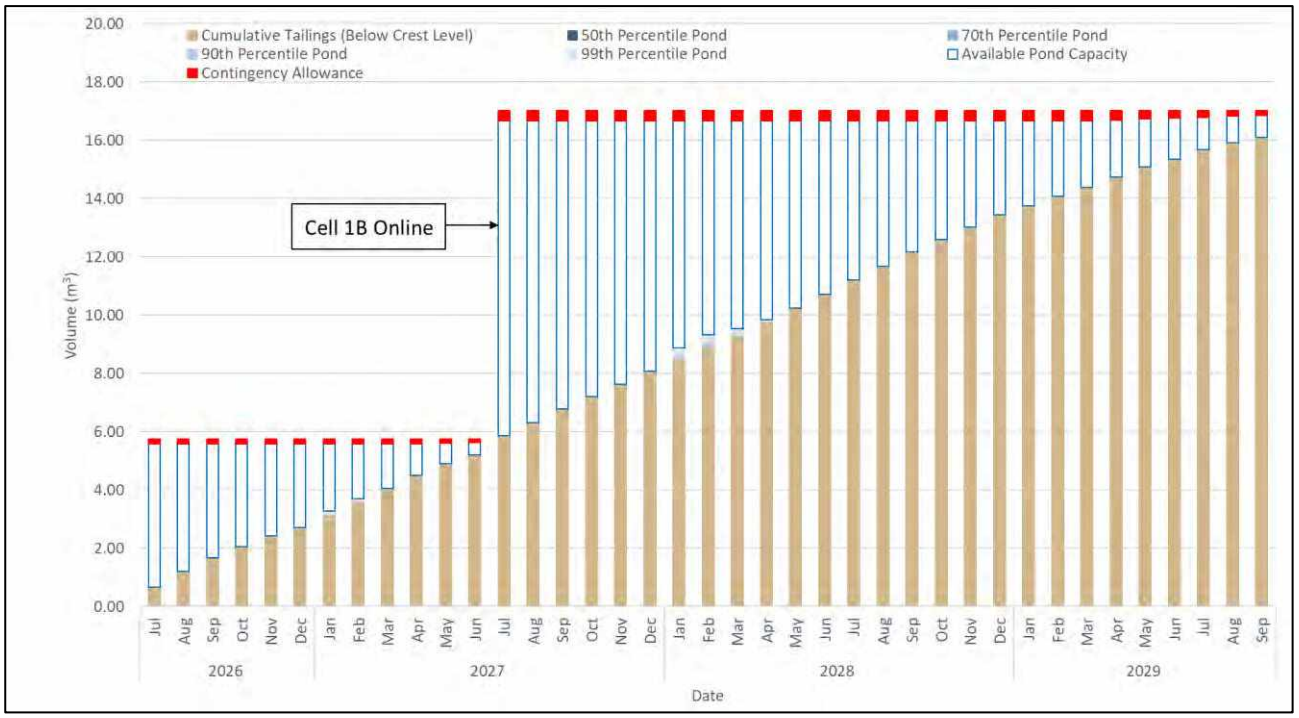


Figure 44: IPTSF Cell 1A & 1B Volumetric Storage Balance



5.6.3 Seepage Assessment

5.6.3.1 Approach

The seepage assessment was undertaken using the finite element modelling software Slide2. Steady-state seepage assessments were undertaken for selected embankment sections for Cell 1A and 1B. The purpose of the seepage assessment is to estimate the seepage through the embankment under typical operating conditions, and to assess the phreatic profile under critical conditions for subsequent stability analysis. The approach used to achieve this comprised the following:

- Selection of representative sections for several embankment sections.
- Applying the discharge section across the embankment to estimate seepage.

5.6.3.2 Model Section

Four sections were selected for assessment at Cell 1A, and three sections at Cell 1B, as listed below, and shown in Figure 45.

- Cell 1A operations:

- Section A is located at the northern portion of the east embankment. This location corresponds to the lowest elevation within the cell.
- Section B is located at the southern terminus of the east embankment. This cross-section exhibits a considerably lower internal elevation, an elevated pond level, and a relatively tall embankment structure.
- Section C is located at the eastern portion of the south embankment. This segment features a substantial embankment height with the direct influence of the pond.
- Section D is located at the eastern terminus of the south embankment. This cross-section represents the maximum internal embankment elevation required for the facility. Due to current operational conditions, no pond level is present at the crest of this section.

- Cell 1B operations:
  - Section E is located adjacent to section B but reflects the operational conditions specific to Cell 1B.
  - Section F is located at the eastern terminus of the north embankment.
  - Section G is located at the southern portion of the east embankment. This location corresponds to the lowest elevation within the cell and incorporates a considerably high embankment.

Figure 45: Seepage Modelling Section Locations (Cell 1A Operations)

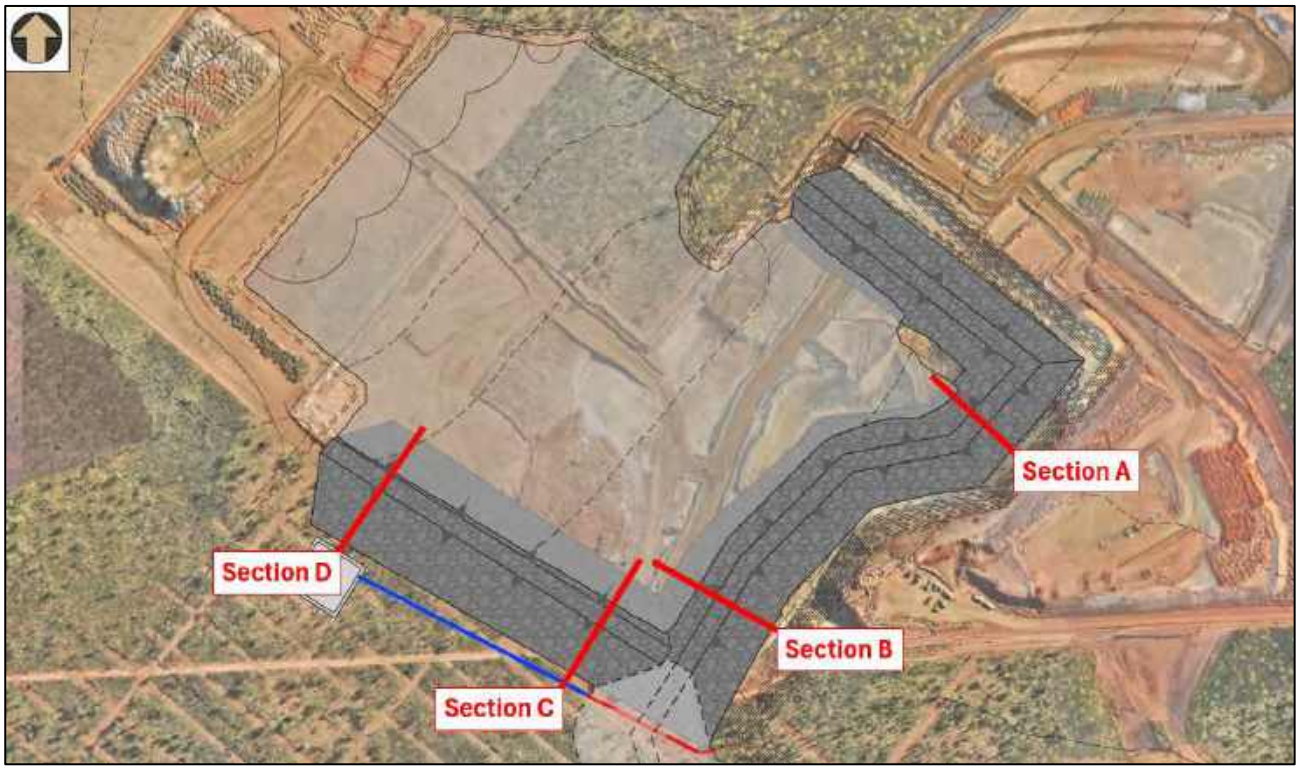


Figure 46: Seepage Modelling Section Locations (Cell 1B Operations)

5.6.3.3 Material Hydraulic Parameters and Assumptions

Two conditions in relation to the supernatant pond have been modelled for assessment:

- 'Typical' operating conditions: supernatant pond is operating at the Maximum Operating Limit (detailed in Section 5.6.1).
- Critical condition: maximum possible pond level (equal to lowest embankment crest level).

Table 35 summarises the hydraulic parameters adopted for the seepage modelling.

Table 35: Material Parameters Adopted for Seepage Assessment

Material	Hydraulic Conductivity, k (m/s)	Anisotropy k_h/k_v
Tailings	1.00×10^{-7}	1.0
Zone B	2.00×10^{-4}	1.0
Foundation	1.00×10^{-8}	1.0

5.6.3.4 Seepage Results

Based on the seepage assessment, assuming steady state operation at the Maximum Operating Level, the total assessed seepage rate is approximately 26,149 m^3/day for Cell 1A and 50,615 m^3/day for Cell 1B. It should be noted that steady-state conditions at the Maximum Operating Level are unlikely, as the seepage rates often exceed the operational inflows (i.e. pond is often smaller than the Maximum Operating Level, and thus lesser seepage).

Table 36 summarises the maximum seepage rates assuming steady state with the supernatant pond at the Maximum Operating Limit. The outcomes of the seepage assessment for critical conditions (maximum pond) have been applied in the stability analysis and presented in Appendix C.

Table 36: Maximum Operating Condition Seepage Rates

Cell Operation	Section	Assessed Section Seepage Rate ($m^3/d/m$)	Representative Embankment Section Length (m)	Representative Embankment Seepage Rate (m^3/d)
Cell 1A	A	15.08	270	4,072
	B	32.65	270	8,816
	C	47.86	220	10,529
	D	12.42	220	2,732
Cell 1B	E	37.81	220	8,318
	F	49.91	330	16,470
	G	75.96	340	25,826

5.6.4 Stability Assessment

5.6.4.1 Approach

Geotechnical stability assessments have been undertaken to assess the FoS of the proposed embankment configuration for the facility. The approach adopted to assess slope stability as part of this report comprised the following:

- The FoS of the perimeter slopes were estimated through limit-equilibrium calculations. The Morgenstern-Price calculation method was adopted to assess non-circular failure modes.
- The stability of the perimeter slopes was checked under static loading conditions and post-seismic conditions.
- The phreatic profile adopted for the stability assessment is based on the seepage assessment for critical conditions (maximum pond).

5.6.4.2 Model Section

The sections adopted for the stability assessment are identical to the sections adopted for the seepage assessment.

5.6.4.3 Material Strength Parameters and Assumptions

The material parameters adopted in the stability modelling are summarised in Table 37.

Conditions adopted in the stability modelling are summarised below:

- Materials will maintain drained conditions due to free-draining material characteristics.
- The phreatic table is based on seepage assessment outcomes for critical conditions.
- Foundation and retaining structure do not liquefy (detailed in Section 5.4.4).
- Tailings are assumed to liquefy under post-seismic conditions with a shear strength ratio of 0.05.
- Non-liquefiable materials adopt a 20% reduction in strength in post-seismic conditions.

Table 37: Material Parameters Adopted for Stability Modelling

Material	Bulk Density (kN/m³)	Static				Post-seismic			
		Effective		Total		Effective		Total	
		ϕ' (°)	C' (kPa)	S_u (kPa)	$S_{u,min}$ (kPa)	ϕ' (°)	C' (kPa)	S_u (kPa)	$S_{u,min}$ (kPa)
Tailings	17.5	25.0	0	-	-	-	-	$0.05\sigma_v$	-
Zone B	18.5	Friction angle function (Section 2.3.3)							
Foundation	20.0	37.0	100	-	-	29.6	80	-	-

5.6.4.4 Stability Results

The stability model output figures are provided in Appendix D. The estimated slope stability Factors of Safety (FoS) of the assessed section for each of the analysis cases are summarised in Table 38.

Table 38: Stability Results Summary

Condition	Cell Operation	Section	Required FoS	Assessed FoS
Static	Cell 1A	A	1.50	2.01
		B		1.72
		C		1.75
		D		1.68
	Cell 1B	E		1.58
		F		1.51
		G		1.50
Post-seismic	Cell 1A	A	1.00	1.43
		B		1.25
		C		1.27
		D		1.21
	Cell 1B	E		1.14
		F		1.09
		G		1.08

Based on the stability assessment, IPTSF Cell 1A & 1B embankments meet the recommended minimum FoS as per ANCOLD guidelines.

5.7 Seepage and Water Recovery

5.7.1 Water Recovery Philosophy

Seepage through the embankments is anticipated to be substantial under steady-state typical operating conditions (supernatant pond at Maximum Operating Level). The seepage assessment outcomes indicate that an upper bound of approximately 26,150 m^3 of water will be discharged through the embankment each day for Cell 1A, and 50,615 m^3 per day for Cell 1B. The probabilistic Water Balance Model (WBM) outcomes indicate that this upper bound is rarely reached, and consequently, the typical pond level during operations is expected to remain below the Maximum Operating Limit, and seepage will be limited by typical inflows during operating conditions.

Given that the supernatant pond is likely to remain small during operations, and internal water recovery within the facility is expected to be ineffective, water recovery has therefore been designed to be managed predominantly externally, through the collection of operational seepage.

5.7.2 Cell 1A Seepage and Water Recovery

The expected seepage during Cell 1A operations is designed to be collected via seepage collection drains and pipes. The seepage outflow is segmented into the two regions presented in Figure 47.

Figure 47: IPTSF Cell 1A Seepage Regions

During the operation of Cell 1A, the two seepage regions are separated by the construction of the Cell 1B perimeter embankment. To allow for the transfer of collected seepage from Region A to Region B, seepage transfer pipes are required to be constructed beneath the Cell 1B embankment. Based on the outcomes of the seepage assessment, up to 9,900 m^3 of seepage water may be discharged across Region A per day (upper-bound seepage rates). To accommodate this, two seepage transfer pipes of 300 mm diameter (internal) at a minimum of 1.5% grading are required.

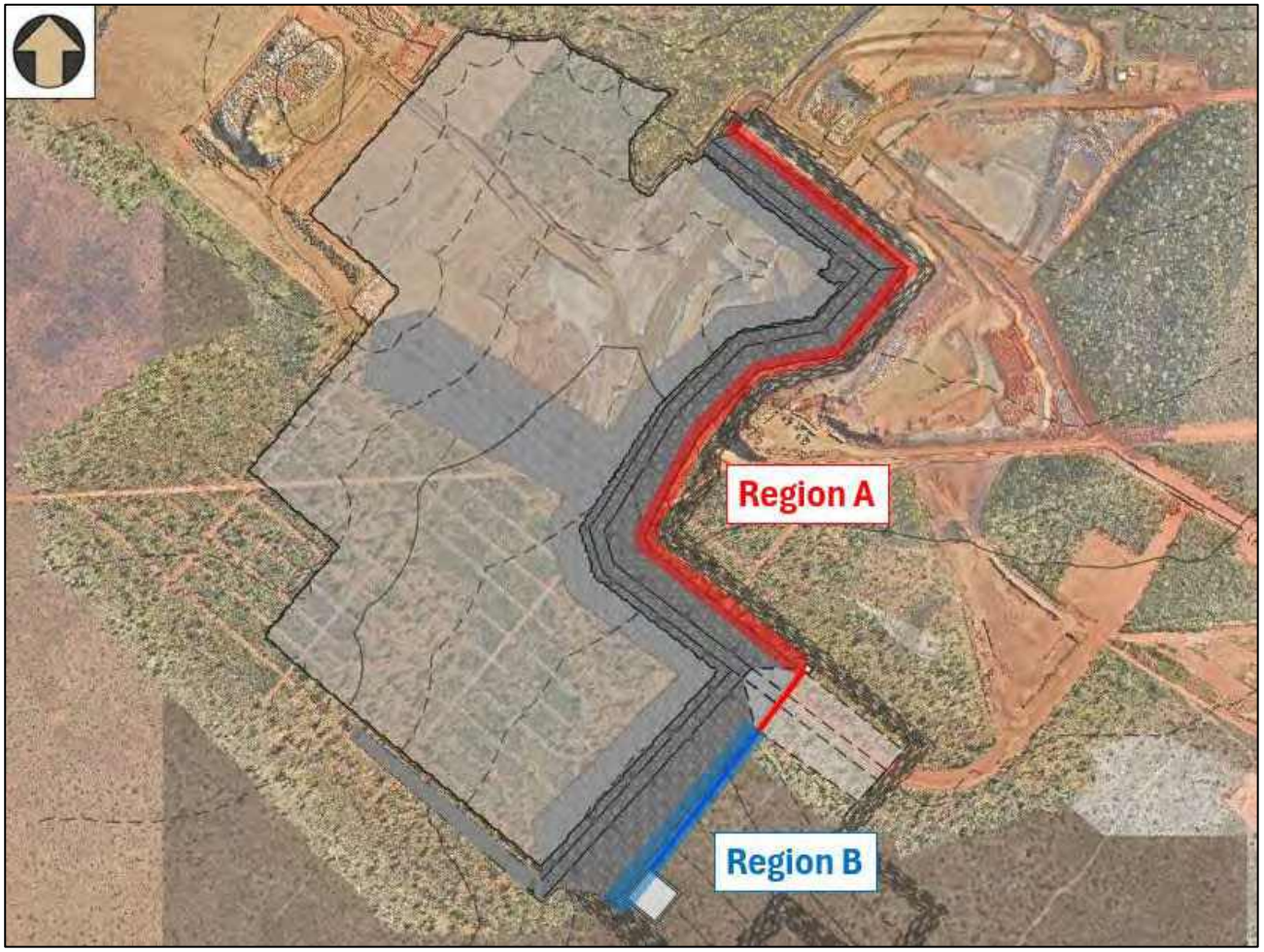
All collected seepage will be directed to the seepage collection sump, where water recovery will be undertaken. The sump is recommended to have base dimensions of 70 m by 70 m and a depth of 4 m, providing approximately 20,100 m^3 of storage, equivalent to approximately one day of operational seepage (the probabilistic WBM indicates that the seepage realistically achievable during typical operation amounts to approximately 19,800 m^3 per day). A pumping system comprising a primary and secondary pump, each capable of abstracting 900 m^3 per hour is required. The secondary pump should remain on standby or be relocated to support water recovery as needed.

Prior to the commencement of Cell 1B operations, the seepage transfer pipes must be securely plugged at both ends to prevent any tailings transfer through the pipes during operation. The plugs must adequately prevent water or tailings backflow throughout Cell 1B operation. It is to be noted that during Cell 1B operations, the Cell 1A seepage collection infrastructure downstream of the Internal Weir is intended to be buried by Cell 1B tailings depositions; this will have no impact on the intended operation on the subsequent stage of the facility.

5.7.3 Cell 1B Seepage and Water Recovery

Similar to Cell 1A operations, the expected seepage during Cell 1B operations is designed to be collected via seepage collection drains and pipes. The seepage outflow is segmented into the two regions presented in Figure 48.

Figure 48: IPTSF Cell 1B Seepage Regions



During the operation of Cell 1B, the two seepage regions will be separated by the construction of a future cell, and similar to Cell 1A, seepage transfer pipes will be required below the embankment. Based on the outcomes of the seepage assessment, up to 24,800 m^3 of water may be discharged across Region A per day (upper-bound seepage rates). To accommodate this, five seepage transfer pipes of 300 mm diameter (internal) at a minimum 1.5% grading are required.

Similar to cell 1A, all collected seepage will be directed to the seepage collection sump, where water recovery will be undertaken. The sump is recommended to have dimensions base of 70 m by 70 m and a depth of 4 m, providing approximately 20,100 m^3 of storage, equivalent to approximately one day of operational seepage (the probabilistic WBM indicates that the seepage realistically achievable during typical operation amounts to approximately 19,800 m^3 per day). A pumping system comprising a primary and secondary pump, each capable of abstracting 900 m^3 per hour is required. The secondary pump should remain on standby or be relocated to support water recovery as needed.

5.7.4 Commissioning Stages

Seepage rates are likely lower during the commissioning stages of the cells, this is mostly attributed to embankment saturation and a lower pressure head driving seepage. During the commissioning phase of each cell, the secondary pump should be placed within the facility (along existing construction ramps) to enable water recovery internally.

5.7.5 Design Deviation

It should be noted that while the oversize material has been observed to be free draining with an adopted permeability of 2 x 10^{-4} m/s, no conclusive field permeability trials have been completed. If seepage rates during facility operations are found to be significantly lower than the assessment estimates (resulting in accumulation of the supernatant pond), it is recommended that the secondary pump be relocated to the construction ramp at the Northern perimeter embankment of Cell 1A to enable internal water recovery within the cell.

6. Operational Requirements

6.1 Operating Manual

An Operating Manual (OP) has been compiled as part of the detailed design and is attached in Appendix B. This section of the report (Section 6) must be read in conjunction with the OM.

The principal objective of the OM is to provide a documented operating procedure to assist in the safe and efficient storage of tailings and water management for the facility. The manual should set out how the facility should be operated in a way that is in line with the assumptions and principles adopted by the designer of the facility.

Operating manuals are to be updated regularly, in particular when design or operational changes occur.

6.2 Tailings Deposition Management

Tailings slurry will be deposited sub-aerially or sub-aqueously within the facility, primarily from the pit boundaries towards the Northwest and at selected retaining embankments, via a series of open-ended spigots operated in a cyclical sequence to promote uniform beach development and controlled deposition. The slurry will be delivered from the process plant through a HDPE pipeline at an approximate solids concentration of 48.5% by mass, feeding into a perimeter distribution system aligned with the designated deposition points.

Deposition locations may be adjusted as required under the guidance of the Engineer of Record (EoR) to respond to operational conditions, geotechnical performance, or environmental considerations.

6.3 Seepage and Water Recovery

Water recovery is achieved through the collection of operational seepage across the retaining embankment. Seepage flows have been delineated into two regions as shown in Figure 47 and Figure 48 for Cell 1A and Cell 1B respectively. For both cells, seepage from Region A is transferred to Region B through seepage transfer pipes, ultimately reporting to a seepage collection sump typically situated at the lowest pit base elevation.

A pumping system comprising a primary and secondary pump, each capable of abstracting 900 m^3 per hour is required at the seepage collection sumps. The secondary pump should remain on standby or be relocated to support water recovery as needed. Seepage rates may be variable during the commissioning stages of the facility. As such, the secondary pump may be relocated to facilitate water recovery within the facility (typically along construction ramps).

6.4 Monitoring and Surveillance

6.4.1 Monitoring

A program of monitoring and surveillance has been implemented as part of the REC EoR Framework to evaluate the performance of the facility with respect to the original design expectations. The data obtained will:

- Form the basis of annual surveillance and quarterly performance reviews.
- Be used to assess and integrate required maintenance programs.

Some of the key monitoring items will include the following:

- Routine reconciliation of tailings discharge tonnage and solids concentration.
- Routine monitoring of tailings beach head and beach toe level.
- Routine monitoring of pond water levels and process plant return water rates.
- Routine monitoring of seepage collection sump water levels.
- Quarterly evaluation of tailings dry density.
- Quarterly monitoring of groundwater quality.

- Ad hoc assessment of seepage collection sump (recovery water) quality.

The existing groundwater monitoring bores around the facility will be used to monitor groundwater levels and quality. These bores will be monitored prior to the commencement of deposition of tailings into the IPTSF to provide baseline data for the project and then quarterly throughout the life of the project.

The tailings are considered geochemically benign, with no effective potential for acid generation or neutralisation, and no significant changes to groundwater quality are expected. If monitoring results indicate adverse impacts, a risk assessment shall be undertaken by a qualified specialist, and dewatering bores may be installed where required to mitigate potential impacts.

6.4.2 Surveillance

6.4.2.1 General

Routine inspection of the facility will be carried out to check whether the design strategy is being implemented and to identify any maintenance requirements or any circumstances associated with facility performance that need further attention. TMSP will carry out regular inspections of the facility and its appurtenant features.

The operating manual will provide procedures and protocols for inspection requirements in accordance with the facility consequence category. Observations made during the inspections will be recorded and appropriately reported. Any incidents that occur will be reported in accordance with the operating licence conditions and statutory regulations. As per ANCOLD guidelines, the inspection type and frequency for a 'High C' facility have been summarised in Table 39.

Table 39: Inspection Type and Frequency

Type of Inspection	Frequency	Personnel	Purpose
Comprehensive	After the first year of operation, then every 2 years	Dams engineer and specialist (where relevant)	The identification of deficiencies by a thorough onsite inspection; by evaluating data; and by applying current criteria and prevailing knowledge. Equipment should be test operated to identify deficiencies.
Intermediate	Annual	Dams engineer	The identification of deficiencies by visual examination of the dam and review of surveillance data against prevailing knowledge. Equipment is not necessarily operated.
Routine	Daily to 3 times a week	Operations personnel	The identification and reporting of deficiencies by field and operating personnel as part of their duties at the dam.
Special	As required	Dams engineer and specialist	The examination of a particular feature of a dam for some special reason (e.g. after earthquakes, heavy floods, rapid draw down).
Emergency	As required	Dams engineer	The examination of a particular feature of a dam which has been identified as having a possible deficiency or which has been subject to abnormal conditions.

6.4.2.2 Routine Inspections

These focus on operational issues related to the facility. The recommended frequency of inspection is two times per production shift, a minimum of three times per week. Key inspection items that should be covered are (further detailed in the OM):

- Tailings and return water pipeline.
- Tailings discharge point management.
- Decant pond location.
- Integrity of the embankment (inspection and deformation monitoring).
- Seepage condition (clear or cloudy).
- Seepage collection infrastructure conditions (seepage transfer sump, seepage collection pipes, seepage collection drain, and seepage collection sump).
- Aerial surveys (a minimum of once per month).

6.4.2.3 Intermediate Inspections

These focus on issues that may develop over time and may impact on the safety of the facility or environment. The recommended items that should be generally covered are:

- Detailed inspection of embankments and all appurtenant structures.
- Tailings characteristics.
- Tailings beach development.
- Decant pond level and location.
- Decant and return water system operation.
- Tailings and return water pipelines.
- Surveillance of all monitoring installations.

6.4.2.4 Comprehensive Inspection

These will be undertaken by qualified geotechnical engineers and focus on the identification of deficiencies by visual examination of the embankments and all appurtenant structures, as well as a review of all surveillance and monitoring data. These reviews are required to be carried out at a minimum once every two years as per ANCOLD requirements (or after the first year of operations).

It is recommended that an Independent Senior Technical Reviewer (ISTR), reporting to the Accountable Executive (AE), be retained to review planning, design, construction, operation, water and mass balance, maintenance, monitoring, performance, and risk management at appropriate intervals throughout all phases of the tailings facility lifecycle. This approach aligns with industry best practices.

6.4.3 Instrumentation

6.4.3.1 General

A series of Vibrating Wire Piezometers (VWPs) and survey monuments shall be installed to assess embankment conditions. The general monitoring network provides coverage as follows:

- VWPs: Placed along the upstream toe and at the base of the embankment. Data records from the VWPs will provide information on changes in water level within the embankment and will be used for assessing the operational performance of the facility. Future trigger levels may be incorporated to allow for ‘real-time’ responses pending phreatic conditions within the embankment.
- Settlement pins: Installed at intervals along the embankment crest. Weekly survey data collected from monuments shall provide deformation / settlement trends of the facility to inform embankment integrity. Future trigger levels may also be incorporated for elevated responses depending on deformation magnitude.

6.4.3.2 Settlement Pin

A total of 22 settlement pins is proposed to be installed across the perimeter embankment crest near the upstream crest edge. Weekly surveys of the settlement pin are to be undertaken and provided to REC for review. Table 40 summarises the proposed settlement pin locations.

Table 40: Proposed Settlement Pin Locations

Settlement Pin ID	Location	Easting (m E)	Northing (m N)
SP-01	Cell 1A Perimeter Embankment	495,789.19	8,073,801.65
SP-02		495,868.44	8,073,740.66
SP-03		495,947.69	8,073,679.67
SP-04		495,932.07	8,073,610.87
SP-05		495,847.97	8,073,566.71
SP-06		495,755.47	8,073,537.35
SP-07		495,684.46	8,073,466.95
SP-08		495,622.51	8,073,389.39
SP-09		495,570.81	8,073,304.21
SP-10	Cell 1B Perimeter Embankment	495,550.63	8,073,272.26
SP-11		495,527.46	8,073,184.47
SP-12		495,588.06	8,073,110.73
SP-13		495,667.88	8,073,050.49
SP-14		495,747.70	8,072,990.25
SP-15		495,702.43	8,072,918.35
SP-16		495,635.13	8,072,844.39
SP-17		495,567.82	8,072,770.43
SP-18		495,500.52	8,072,696.47
SP-19	Cell 1A Internal Weir	495,244.98	8,073,519.49
SP-20		495,330.03	8,073,466.90
SP-21		495,415.09	8,073,414.31
SP-22		495,500.14	8,073,361.72

6.4.3.3 Vibrating Wire Piezometer

A total of 6 VWPs are proposed to be installed across the perimeter embankment, to a depth of approximately 0.5 m above the mined pit floor. The VWPs readings will be recorded in 'real-time' to the Geoscience Data Management System (GDMS), REC's in-house cloud monitoring system. Table 41 summarises the proposed VWP locations.

Table 41: Proposed VWP Locations

VWP ID	Location	Easting (m E)	Northing (m N)	Elevation (RL m)
VWP-01	Cell 1A Perimeter Embankment	495,922.28	8,073,599.64	93.92
VWP-02		495,640.34	8,073,417.81	86.83
VWP-03	Cell 1B Perimeter Embankment	495,390.18	8,073,429.12	81.67
VWP-04		495,230.61	8,073,527.76	78.96
VWP-05	Cell 1A Internal Weir	495,623.05	8,073,084.95	82.70
VWP-06		495,519.00	8,072,716.04	74.29

6.5 Emergency Response Plan

6.5.1 Overview

The facility has been designed to limit danger to life and property and to minimise impacts on the surrounding environment. Regardless of the possible level of risk associated with tailings management, a contingency plan is required to address any eventuality that might arise. The following emergency response plan has been developed to be implemented to reduce the potential for unacceptable risk and consequential damage.

It is well known that water is the most common element relating to the majority of facility failures. For this reason, the operators of facilities are encouraged to carefully manage water on or near the facilities. The supernatant water pond in the facility should be kept to a minimum practical level. The pond should be located around the design location. Following heavy rainfall events, excess water stored in the facility should be removed as early as possible.

6.5.2 Pipeline Breakage and Spillage

Transfer through the affected pipeline is to cease until repairs and investigation (if required) are completed. KMS to manage as per internal spill procedures.

6.5.3 Embankment Deformation

Should a visual inspection reveal local embankment cracking, significant erosion, sloughing and/or settlement, the following actions should be carried out by a qualified engineer if possible:

- Immediately contact:
    - Responsible Tailings Facility Engineer (RTFE)
    - Design engineer / Engineer of Record
- The short-term risk will be immediately assessed between the RTFE and the EoR, and appropriate measures adopted to address the problem.
- Cease tailings deposition immediately if recommended by RTFE or the EoR.
- Short-term remediation designs will immediately be implemented, while longer-term solutions and actions are developed.
- The longer-term actions, once implemented, will be monitored to limit risk.

6.5.4 Critical Embankment Failure

In the event that a large-scale embankment failure occurs, the following course of action should be followed:

- Immediately contact:
    - Responsible Tailings Facility Engineer (RTFE)
    - Emergency services
    - Design engineers / Engineer or Record
- Draw down free water on the facility if safe to do so.
- Assess the likelihood of tailings release or freeboard reduction – if either is considered likely, undertake appropriate measures under the advice of the design engineers.
- Assess short-term remedial actions – possibly buttress the outer embankment with rocks while longer-term solutions are developed.
- Cease tailings deposition until the situation has been rectified.
- Clean up tailings, if released from the facility.

6.5.5 Reportable Incidents

In Western Australia, reportable incidents are governed by the Work Health and Safety (Mines) Regulation 2022 under the Work Health and Safety Act 2020 (WHS Act). The below incidents must be reported to the appropriate regulatory bodies.

Fatalities and serious injuries:

- Death of a worker or other person on the mining site.
- Serious injuries or illnesses, including:
    - Amputation of a body part.
    - Serious head or eye injury.
    - Spinal injuries.
    - Serious burns.
    - Loss of bodily function.
    - Any injury requiring immediate hospital treatment.

Dangerous incidents (near misses):

- Uncontrolled escape, spillage, or leakage of substances.
- Uncontrolled explosion or fire.
- Unplanned collapse of ground, tunnels, or mine workings.
- Failure of ground support systems (e.g., rockfall, stope failure).
- Failure of plant or structure (e.g., tailings dam, heavy machinery).
- Uncontrolled inrush of water, mud, or gas.
- Electrical incidents, including contact with live wires or serious arc flash incidents.
- Airborne contaminants exceeding safe exposure limits.
- Vehicle or equipment collisions leading to a hazardous situation.

Specific mining hazards:

- Geotechnical failures (e.g., slope failures, pit wall collapses).
- Seismic events affecting operations.
- Explosives-related incidents (e.g., misfires, premature detonation).
- Unexpected interactions with hazardous materials.
- Loss of mine communication systems or emergency response capability.

Occupational health exposures:

- Exceedance of exposure limits for silica dust, asbestos, diesel particulates, or other hazardous substances.
- Overexposure to radiation or noise.
- Failure of a ventilation system leading to unsafe atmospheric conditions.

Environmental incidents:

- Uncontrolled tailings or hazardous waste discharge.
- Significant contamination of land, water, or air.
- Failure of containment structures (e.g., TSF breach).

In the event that an incident occurs, the KMS Environmental Department and the Mine Operator must be informed immediately. After contacting the KMS Environmental Department, the applicable reporting form should be completed describing the nature of the incident, and submitted to the following regulatory bodies as soon as practical:

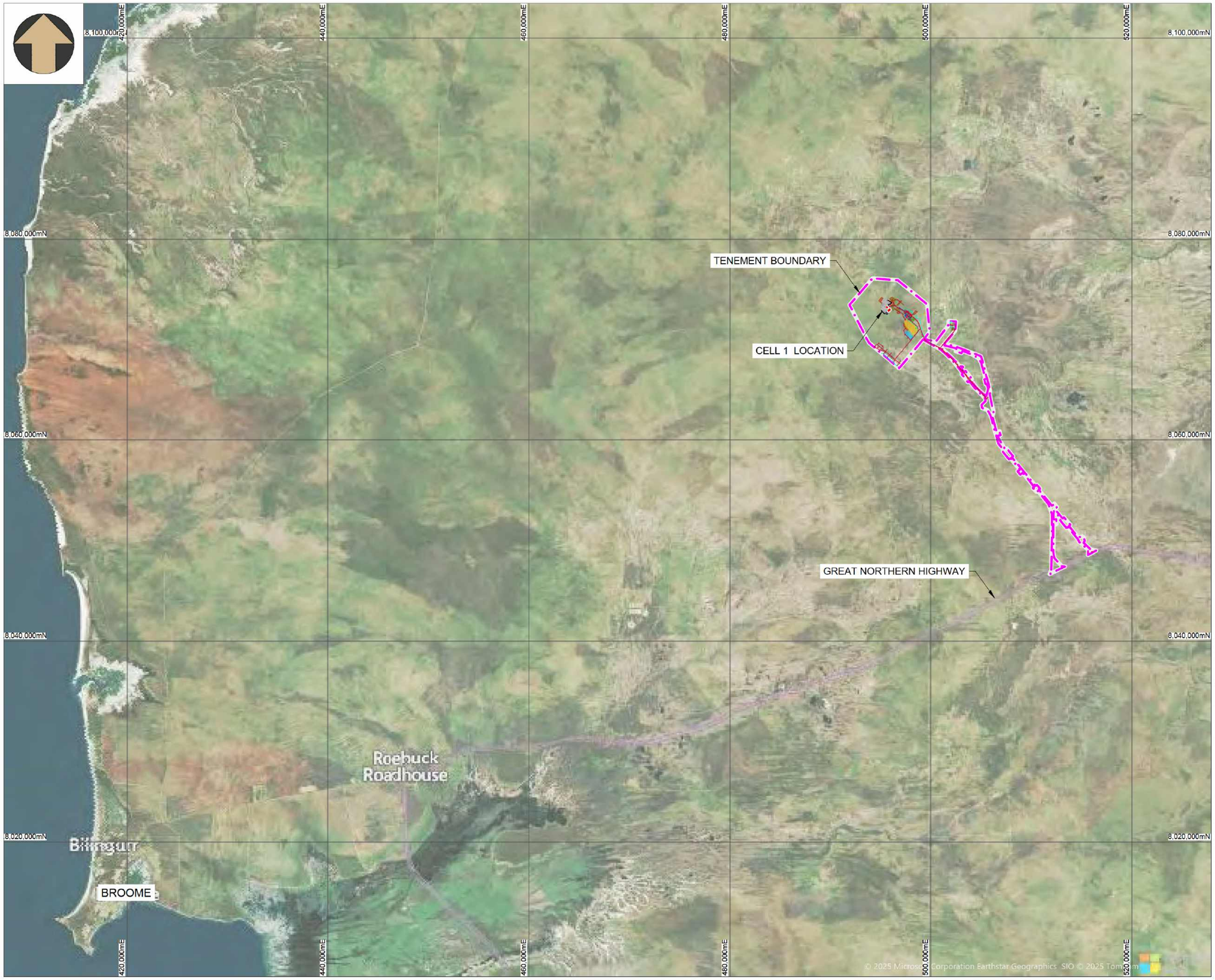
- LGIRS (previously known as DMP / DEMIRS) – WorkSafe WA (Mines Safety)
    - Serious incidents are to be reported immediately (via phone or online portal)
    - Written report required within 2 days for fatalities or serious incidents.
- DWER – for environmental incidents
- Emergency Services (000) – if immediate public safety is at risk.

7. References

1. ANCOLD (2019). Guidelines of Tailings Dams, Planning, Design, Construction, Operation and Closure. ISBN: 978-0-9808192-4-3.
2. ATCW (2014). *Geotechnical Investigation Report*. Consultant's report (unpublished). Kimberley Mineral Sands, Thunderbird Mineral Sands Project.
3. Duncan et al. (2014). Soil Strength and Slope Stability (Second Edition). ISBN: 978-1-118-65165-0.
4. DMP (now DMPE) (2013). Code of Practice – Tailings Storage Facilities in Western Australia. ISBN 978-1-922149-02-2
5. DMP (now DMPE) (2015). Guide to the Preparation of a Design Report for Tailings Storage Facilities (TSFs).
6. DMPE (n.d.). *Canning Basin*. www.dmp.wa.gov.au/Petroleum/Canning-Basin-10989.aspx
7. MBS Environmental (2016). *Thunderbird Mineral Sands Project – Mine Residues Characterisation*. Consultant's report (unpublished). Kimberley Mineral Sands, Thunderbird Mineral Sands Project.
8. PGMG (2021a). *Thunderbird Trial Pit – Geotechnical Inspection Report*. Consultant's report (unpublished). Kimberley Mineral Sands, Thunderbird Mineral Sands Project.
9. PGMG (2021b). *Thunderbird Trial Pit – Post Wet Season Geotechnical Inspection Report*. Consultant's report (unpublished). Kimberley Mineral Sands, Thunderbird Mineral Sands Project.

Appendix A

Design Drawings

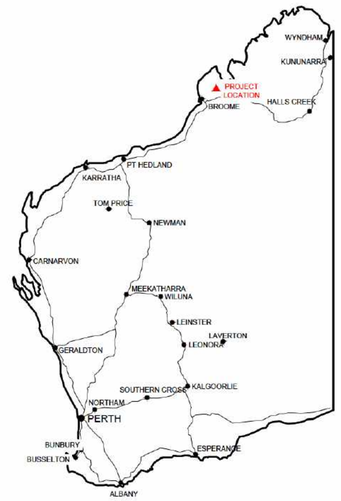


NOTES:

1. ALL DIMENSIONS IN METRES U.N.O.
2. SURVEY SUPPLIED BY: KIMBERLEY MINERAL SANDS (JUNE, 2024).
3. PROJECTION: MGA94 ZONE 51, AHD(m).
4. DESIGN LEVELS SHOWN ARE TO FINISHED SURFACE LEVELS U.N.O. OTHERWISE.
5. DIMENSIONS NOT TO BE SCALED FROM DRAWINGS.
6. EXISTING UNDERGROUND SERVICES ARE NOT SHOWN ON THIS DRAWING U.N.O. THE CONTRACTOR SHALL CONTACT THE RELEVANT AUTHORITIES TO DETERMINE THE PRESENCE OF UNDERGROUND SERVICES PRIOR TO COMMENCEMENT OF ANY WORKS.
7. ALL RELEVANT WORKING PERMITS SHALL BE ACQUIRED PRIOR TO COMMENCEMENT OF ANY WORKS.
8. ALL CONSTRUCTION WORKS SHALL BE EXECUTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE EARTHWORKS SPECIFICATION.

DRAWING INDEX

TITLE	REV.	NUMBER
SITE LAYOUT & DRAWING INDEX	B	P24-77-PR13-001
SITE LAYOUT	B	P24-77-PR13-002
SITE GENERAL ARRANGEMENT	B	P24-77-PR13-003
EXCAVATION SCHEDULE PLAN	A	P24-77-PR13-004
GENERAL ARRANGEMENT - CELL 1A	B	P24-77-PR13-005
GENERAL ARRANGEMENT - CELLS 1A &1B	B	P24-77-PR13-006
SETTING OUT PLAN - CELL 1A	B	P24-77-PR13-007
SETTING OUT PLAN - CELL 1B	B	P24-77-PR13-008
SPIGOT & PIPELINE PLAN - CELL 1A	B	P24-77-PR13-009
SPIGOT & PIPELINE PLAN - CELLS 1A & CELL 1B	B	P24-77-PR13-010
MONITORING INSTRUMENTATION LAYOUT	A	P24-77-PR13-011
CELL 1A EMBANKMENT LONG. SECTIONS	B	P24-77-PR13-012
CELL 1B EMBANKMENT LONG. SECTIONS	A	P24-77-PR13-013
SEEPAGE DRAINS LONG. SECTIONS	B	P24-77-PR13-014
TYPICAL SECTIONS & DETAILS - SHT 1	B	P24-77-PR13-030
TYPICAL SECTIONS & DETAILS - SHT 2	B	P24-77-PR13-031
TYPICAL SECTIONS & DETAILS - SHT 3	B	P24-77-PR13-032
TYPICAL SECTIONS & DETAILS - SHT 4	B	P24-77-PR13-033
TYPICAL SPIGOT SECTIONS & DETAILS	A	P24-77-PR13-041



GEOGRAPHICAL LOCATION
NOT TO SCALE

SITE LOCATION
SCALE 1:200,000

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SCALE 1 : 200,000 (m)

DRAFT

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
B	05.12.2025	ISSUED FOR CLIENT REVIEW	OT	GL	GL				
A	04.11.2025	ISSUED FOR CLIENT REVIEW	OT	GL	GL			P24-77-PR02-002	SITE LAYOUT

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	O.THANT	24.10.2025	
DESIGNED:	G.LI	24.10.2025	
CHECKED:	G.LI	04.11.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

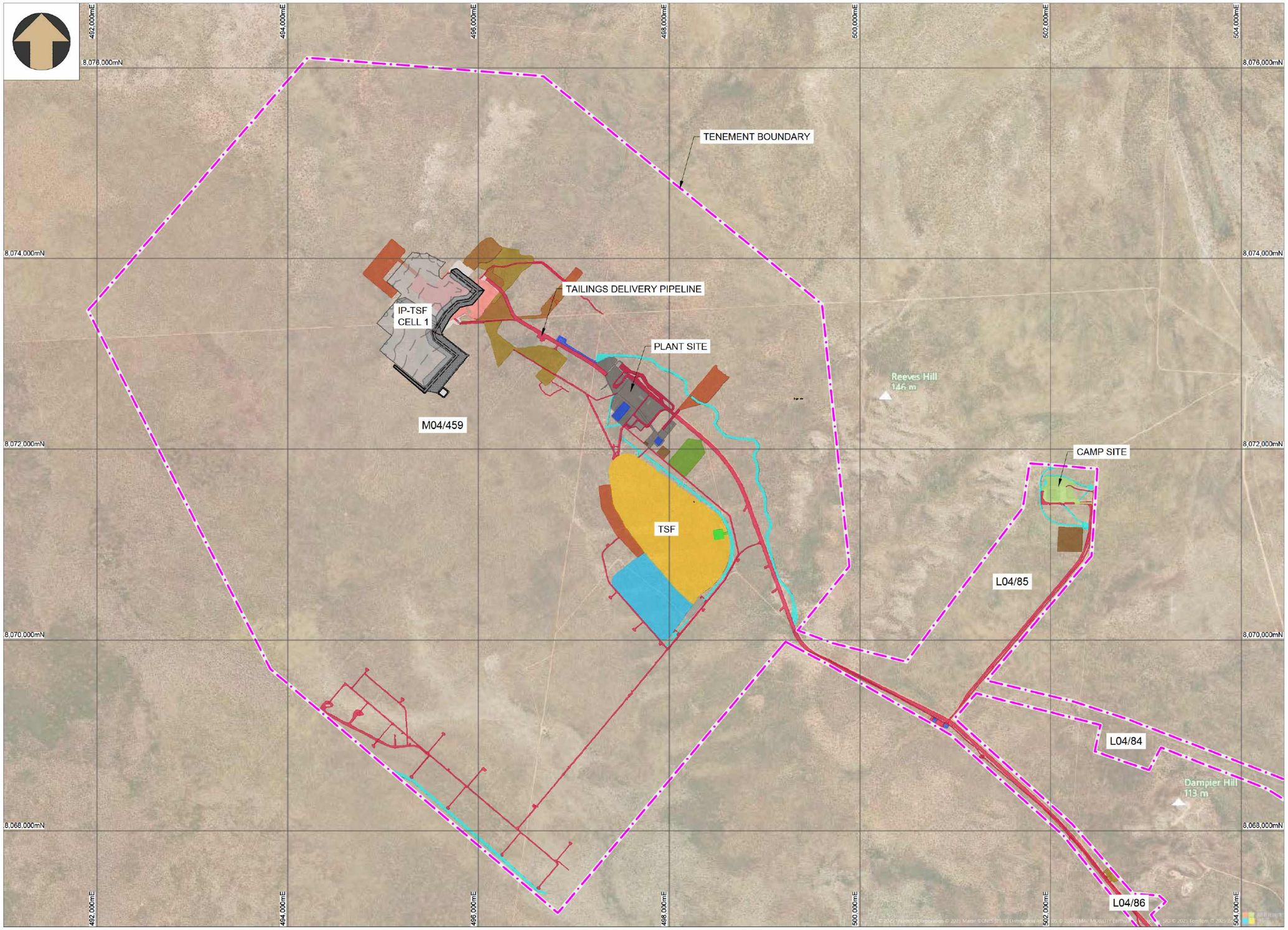
TITLE
KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
IN-PIT TSF - CELL 1
SITE LAYOUT & DRAWING INDEX

SCALE: 1:200,000 (A1)

DRAWING No.: P24-77-PR13-001

REV: B

A1 Border v2.0



LEGEND:

- ACCESS ROAD
- BORROW PIT
- CAMP SITE
- DAM
- DIVERSION CHANNEL
- MINERAL DEPOSIT AREA
- MINE SERVICES AREA
- PIT
- PLANT SITE
- SEPTIC AREA
- STORMWATER STORAGE POND
- TOPSOIL STOCKPILE
- TAILINGS STORAGE FACILITY
- VEGETATION STOCKPILE
- WASTE DUMP

NOTES:

1. REFER TO DRAWING P24-77-PR13-001 FOR GENERAL NOTES.

DRAFT

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REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
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A	04.11.2025	ISSUED FOR CLIENT REVIEW	OT	GL	GL			P24-77-PR13-001	SITE LAYOUT & DRAWING INDEX

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DRAWN:	O.THANT	24.10.2025	
DESIGNED:	G.LI	24.10.2025	
CHECKED:	G.LI	04.11.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
IN-PIT TSF - CELL 1
SITE LAYOUT

SCALE: 1:20,000 (A1)

DRAWING No.: P24-77-PR13-002

REV: A

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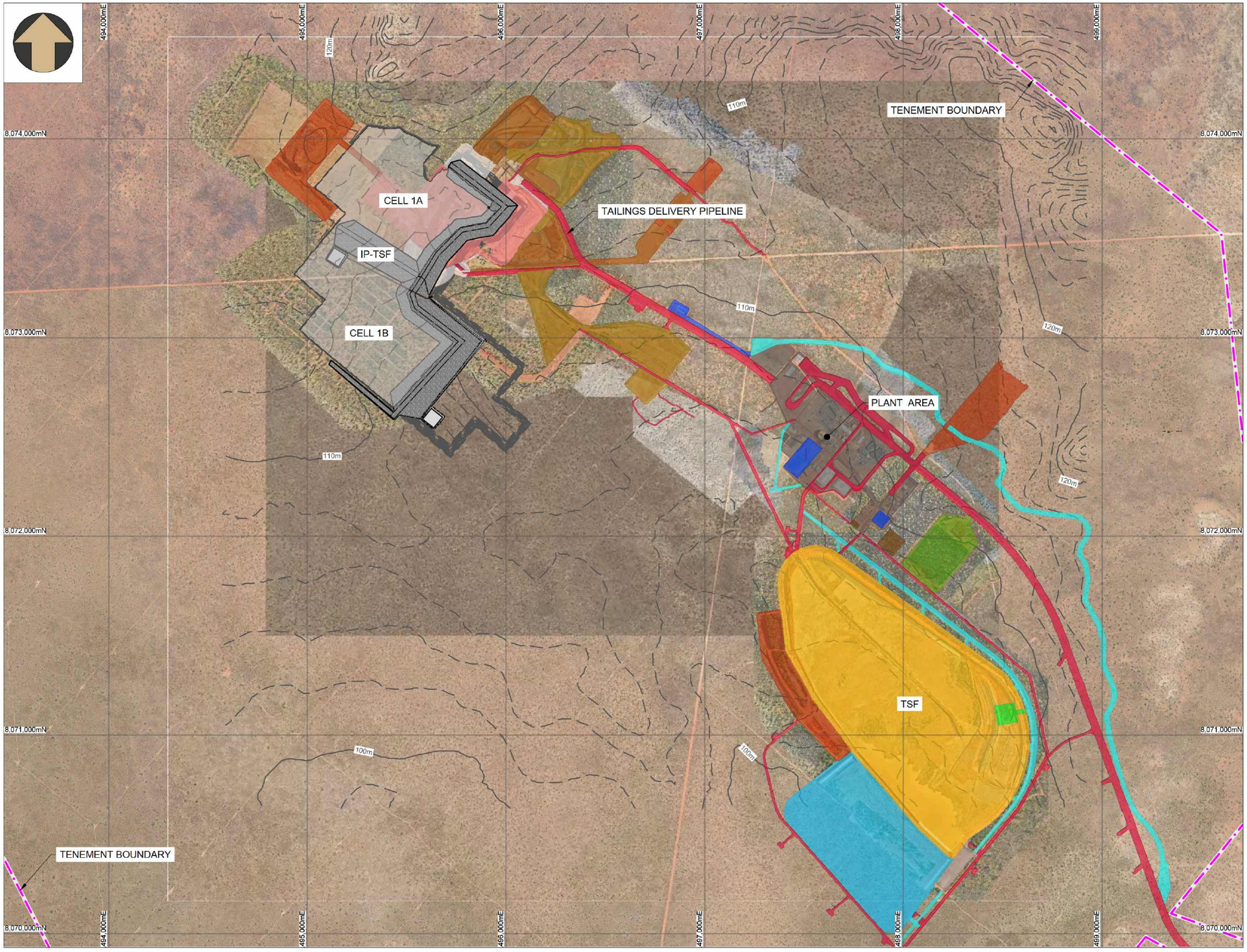

LEGEND:

- ACCESS ROAD
- BORROW PIT
- CAMP SITE
- DAM
- DIVERSION CHANNEL
- MINERAL DEPOSIT AREA
- MINE SERVICES AREA
- PIT
- PLANT SITE
- SEPTIC AREA
- STORMWATER STORAGE POND
- TOPSOIL STOCKPILE
- TAILINGS STORAGE FACILITY
- VEGETATION STOCKPILE
- WASTE DUMP

NOTES:

1. REFER TO DRAWING P24-77-PR13-001 FOR GENERAL NOTES.

LEGEND:

ZONE A: OVERBURDEN MATERIAL

ZONE B: OVERSIZE MATERIAL

DRAFT

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SCALE 1 : 10,000 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
B	05.12.2025	ISSUED FOR CLIENT REVIEW	AZ	GL	GL				
A	04.11.2025	ISSUED FOR CLIENT REVIEW	OT	GL	GL			P24-77-PR13-002	SITE LAYOUT

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DRAWN:	O.THANT	20.10.2025	
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APPROVED:			
ORIGIN:			
CLIENT:			

TITLE

KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
IN-PIT TSF - CELL 1
SITE GENERAL ARRANGEMENT

SCALE: 1 : 10,000 (A1)

DRAWING No.: P24-77-PR13-003

REV: B

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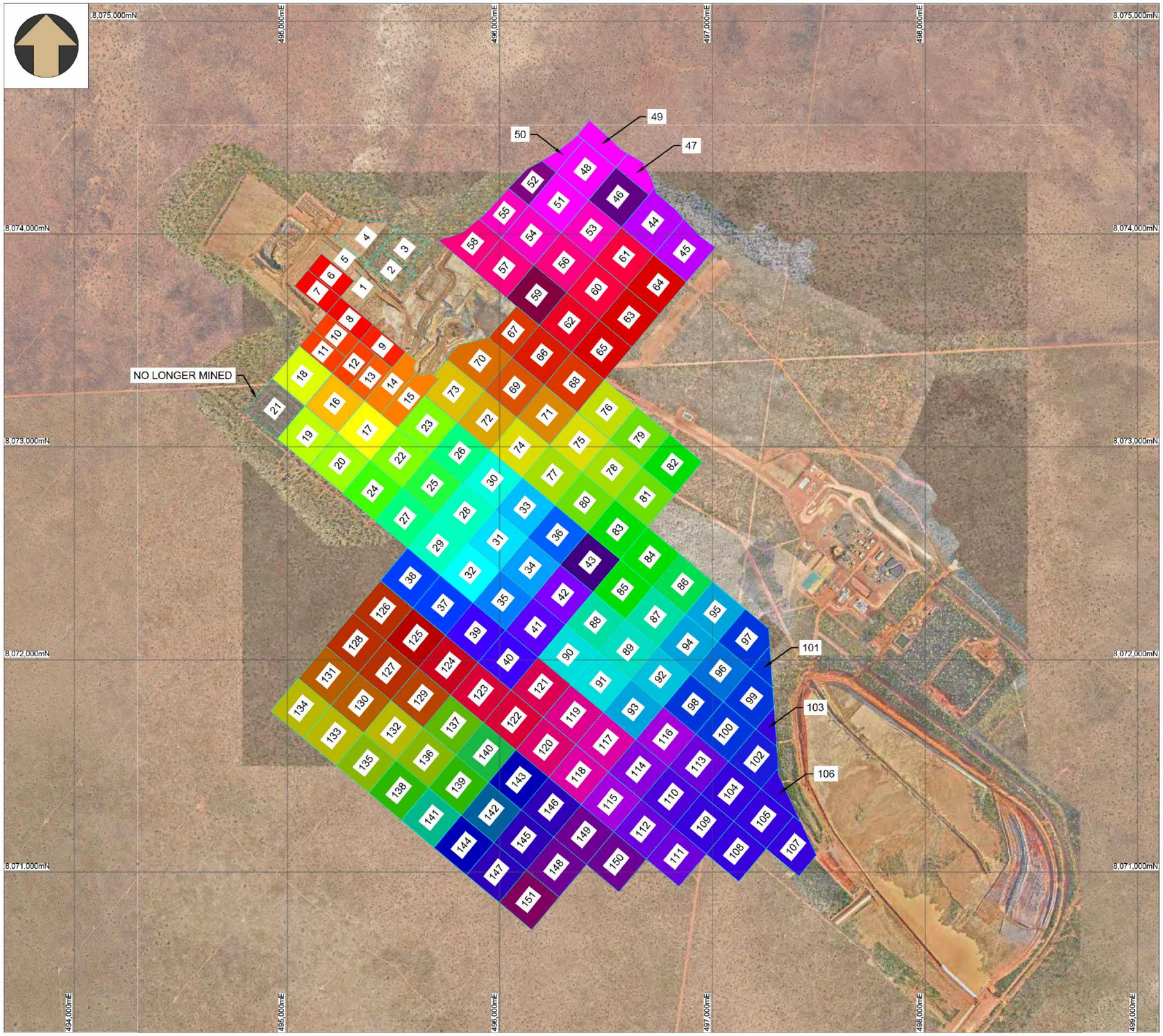

NOTES:

1. FOR GENERAL NOTES REFER TO DRG. P24-77-PR13-001.

LEGEND:

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- 25.09.2025
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- 25.03.2026 (18,19,20)
- 25.06.2026 (20,21,22,23)
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- 25.12.2026 (25,26,27)
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DRAFT

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A	04.11.2025	ISSUED FOR CLIENT REVIEW	OT	GL	GL			P24-77-PR13-002	SITE LAYOUT

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APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
IN-PIT TSF - CELL 1
EXCAVATION SCHEDULE PLAN

SCALE: 1:10,000 (A1)

DRAWING No.: P24-77-PR13-004

REV: A

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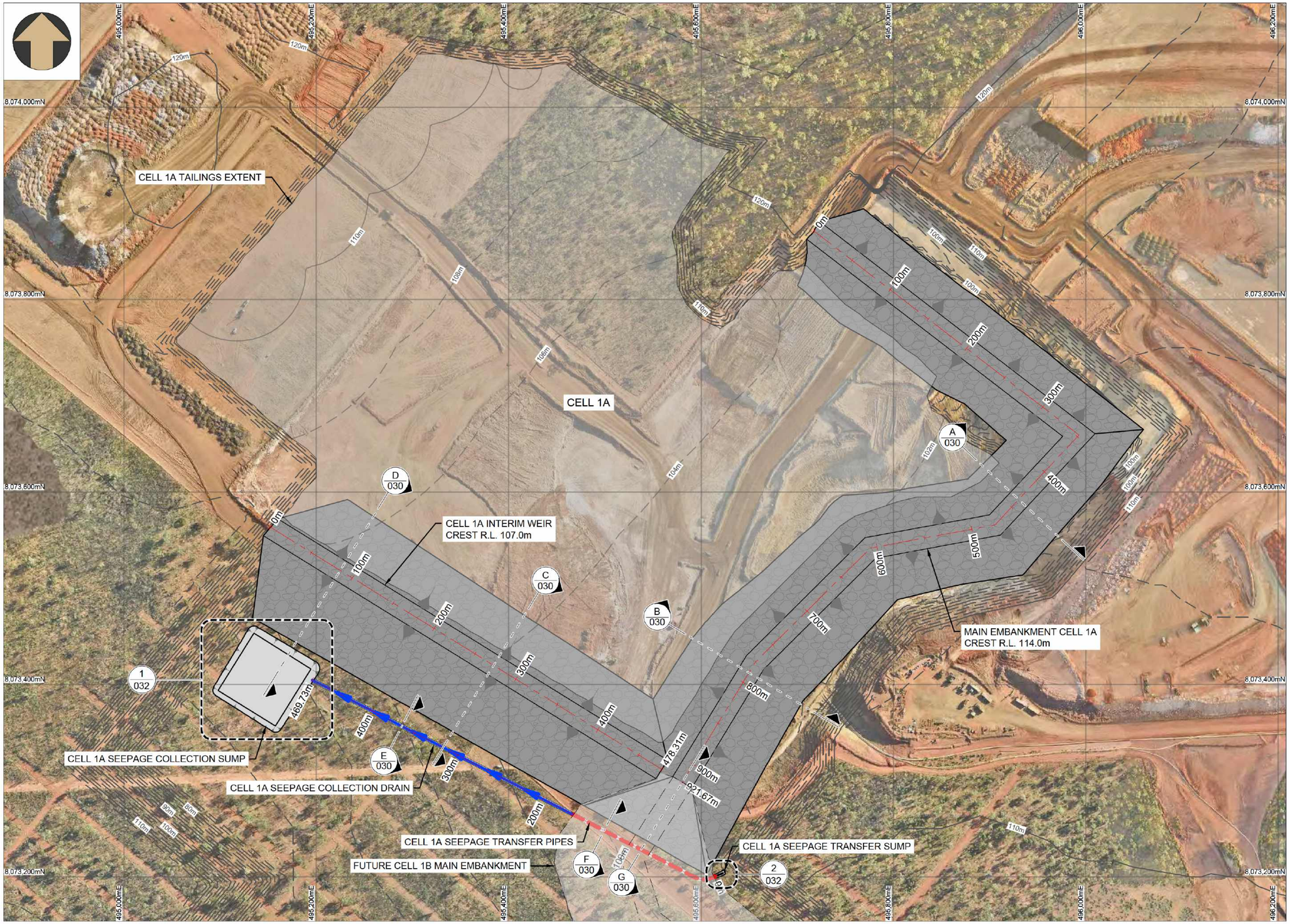

NOTES:

1. REFER TO DRAWING P24-77-PR13-001 FOR GENERAL NOTES.

LEGEND:

TRANSFER PIPES

CHANNEL

LEGEND: ZONE A: OVERBURDEN MATERIAL ZONE B: OVERSIZE MATERIAL

DRAFT

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SCALE 1 : 2,000 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT
B	05.12.2025	ISSUED FOR CLIENT REVIEW	OT	GL	GL		
A	04.11.2025	ISSUED FOR CLIENT REVIEW	OT	GL	GL		

DRG. NO.	REFERENCE DRAWING
P24-77-PR02-032	TYPICAL SECTIONS & DETAILS - SHT 3
P24-77-PR02-030	TYPICAL SECTIONS & DETAILS - SHT 1
P24-77-PR02-014	SEEPAGE DRAINS LONG.SECTIONS
P24-77-PR02-012	CELL 1A EMBANKMENT LONG. SECTIONS
P24-77-PR02-003	SITE GENERAL ARRANGEMENT

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	O.THANT	21.10.2025	
DESIGNED:	G.LI	17.10.2025	
CHECKED:	G.LI	04.11.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
IN-PIT TSF - CELL 2
GENERAL ARRANGEMENT - CELL 1A

SCALE 1:2,000 (A1)

DRAWING No. P24-77-PR13-005 REV B

A1 Border v2.0

NOTES:

1. REFER TO DRAWING P24-77-PR13-001 FOR GENERAL NOTES.

LEGEND:

TRANSFER PIPES

CHANNEL

CELL 1A

MAIN EMBANKMENT CELL 1A (EXISTING) R.L. 114.0m

MAIN EMBANKMENT CELL 1B
R.L. 111.0m TO R.L 114.0m

CELL 1B TAILINGS EXTENT

CELL 1B

CELL 1B SEEPAGE TRANSFER SUMP

FUTURE EMBANKMENT

CELL 1B SEEPAGE TRANSFER PIPES

CELL 1B SEEPAGE COLLECTION DRAIN

CELL 1B EXTENSION BUND R.L. 111.0m

CELL 1B SEEPAGE COLLECTION SUMP

LEGEND:

ZONE A: OVERBURDEN MATERIAL

ZONE B: OVERSIZE MATERIAL

DRAFT

0 40 100 200
SCALE 1 : 4,000 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
								P24-77-PR13-033	TYPICAL SECTIONS & DETAILS - SHT 4
								P24-77-PR13-031	TYPICAL SECTIONS & DETAILS - SHT 2
								P24-77-PR13-014	SEEPAGE DRAIN LONG. SECTIONS
B	05.12.2025	ISSUED FOR CLIENT REVIEW	AZ	GL	GL			P24-77-PR13-013	CELL 1B EMBANKMENT LONG. SECTIONS
A	04.11.2025	ISSUED FOR CLIENT REVIEW	OT	GL	GL			P24-77-PR13-003	SITE GENERAL ARRANGEMENT

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	O.THANT	20.10.2025	
DESIGNED:	G.LI	17.10.2025	
CHECKED:	G.LI	04.11.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

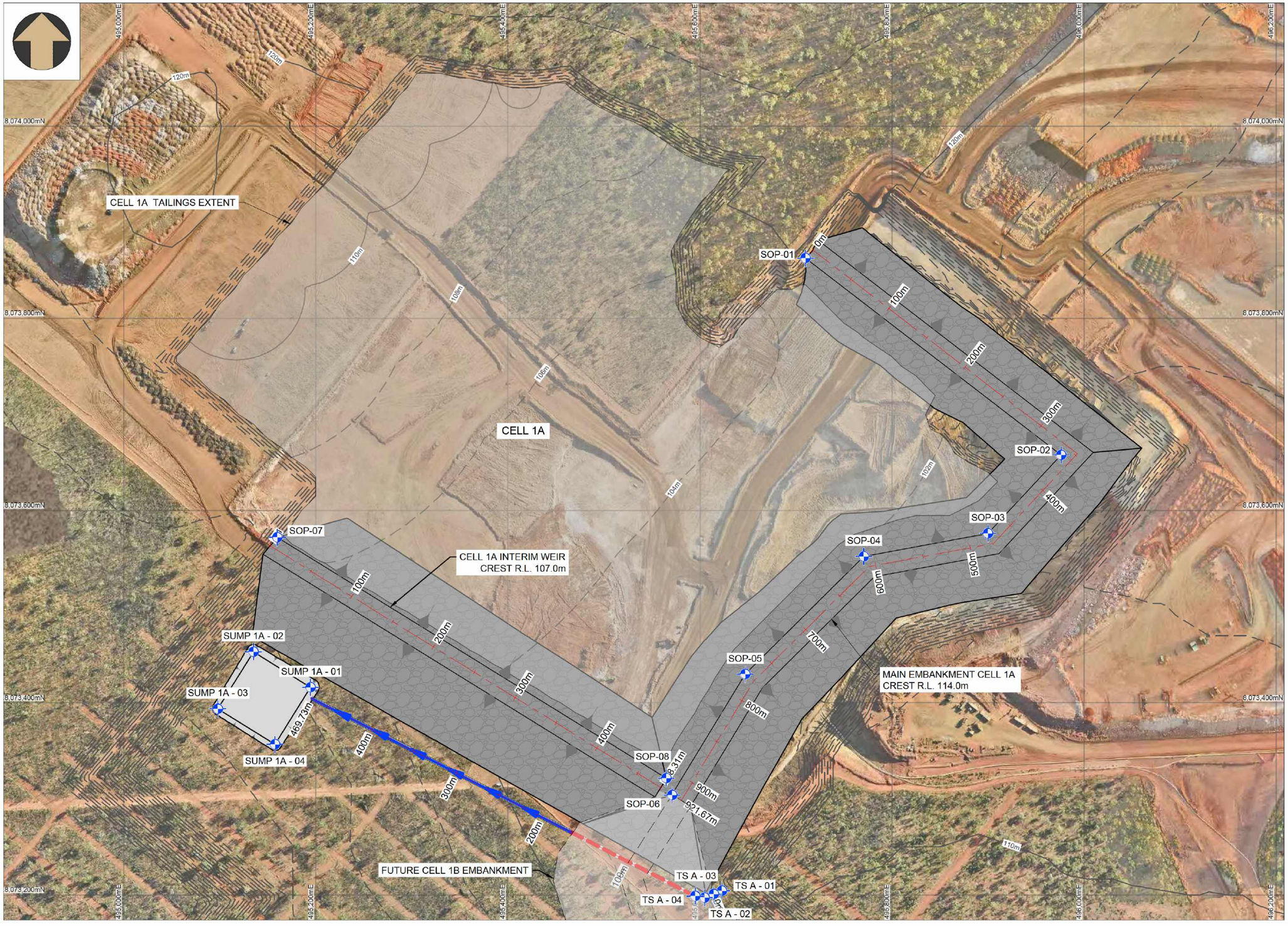
TITLE: KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
IN-PIT TSF - CELL 1
GENERAL ARRANGEMENT - CELLS 1A & 1B

SCALE: 1:4,000 (A1)

DRAWING No.: P24-77-PR13-006

REV: B

A1 Border v2.0



NOTES:

1. REFER TO DRAWING P24-77-PR13-001 FOR GENERAL NOTES.

LEGEND:

SETTING OUT POINT

MAIN EMBANKMENT SETTING OUT POINTS

I.D.	EASTING	NORTHING	R.L. (m)
SOP-01	495,709.9	8,073,862.6	114.0
SOP-02	495,976.0	8,073,657.9	114.0
SOP-03	495,899.8	8,073,576.3	114.0
SOP-04	495,770.6	8,073,552.4	114.0
SOP-05	495,647.1	8,073,429.9	114.0
SOP-06	495,571.0	8,073,304.1	114.0

INTERIM WEIR SETTING OUT POINTS

I.D.	EASTING	NORTHING	R.L. (m)
SOP-07	495,160.0	8,073,572.1	107.0
SOP-08	495,564.9	8,073,321.7	107.0

CELL 1A SUMP SETTING OUT POINTS

I.D.	EASTING	NORTHING	R.L. (m)
SUMP 1A - 01	495,194.4	8,073,416.2	70.6
SUMP 1A - 02	495,135.0	8,073,453.2	70.6
SUMP 1A - 03	495,098.0	8,073,393.7	70.6
SUMP 1A - 04	495,157.5	8,073,356.7	70.6

TRANSFER SUMP 1A SETTING OUT POINTS

I.D.	EASTING	NORTHING	R.L. (m)
TS A - 01	495,622.7	8,073,204.5	83.5
TS A - 02	495,614.5	8,073,200.9	83.3
TS A - 03	495,604.7	8,073,197.2	85.2
TS A - 04	495,595.0	8,073,198.9	85.2

LEGEND: ZONE A: OVERBURDEN MATERIAL — ZONE B: OVERSIZE MATERIAL

DRAFT

0 20 50 100
SCALE 1 : 2,000 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
B	05.12.2025	ISSUED FOR CLIENT REVIEW	OT	GL	GL				
A	04.11.2025	ISSUED FOR CLIENT REVIEW	OT	GL	GL			P24-77-PR13-003	SITE GENERAL ARRANGEMENT

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CLIENT: KIMBERLEY MINERAL SANDS — THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	O.THANT	20.10.2025	
DESIGNED:	G.LI	17.10.2025	
CHECKED:	G.LI	04.11.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

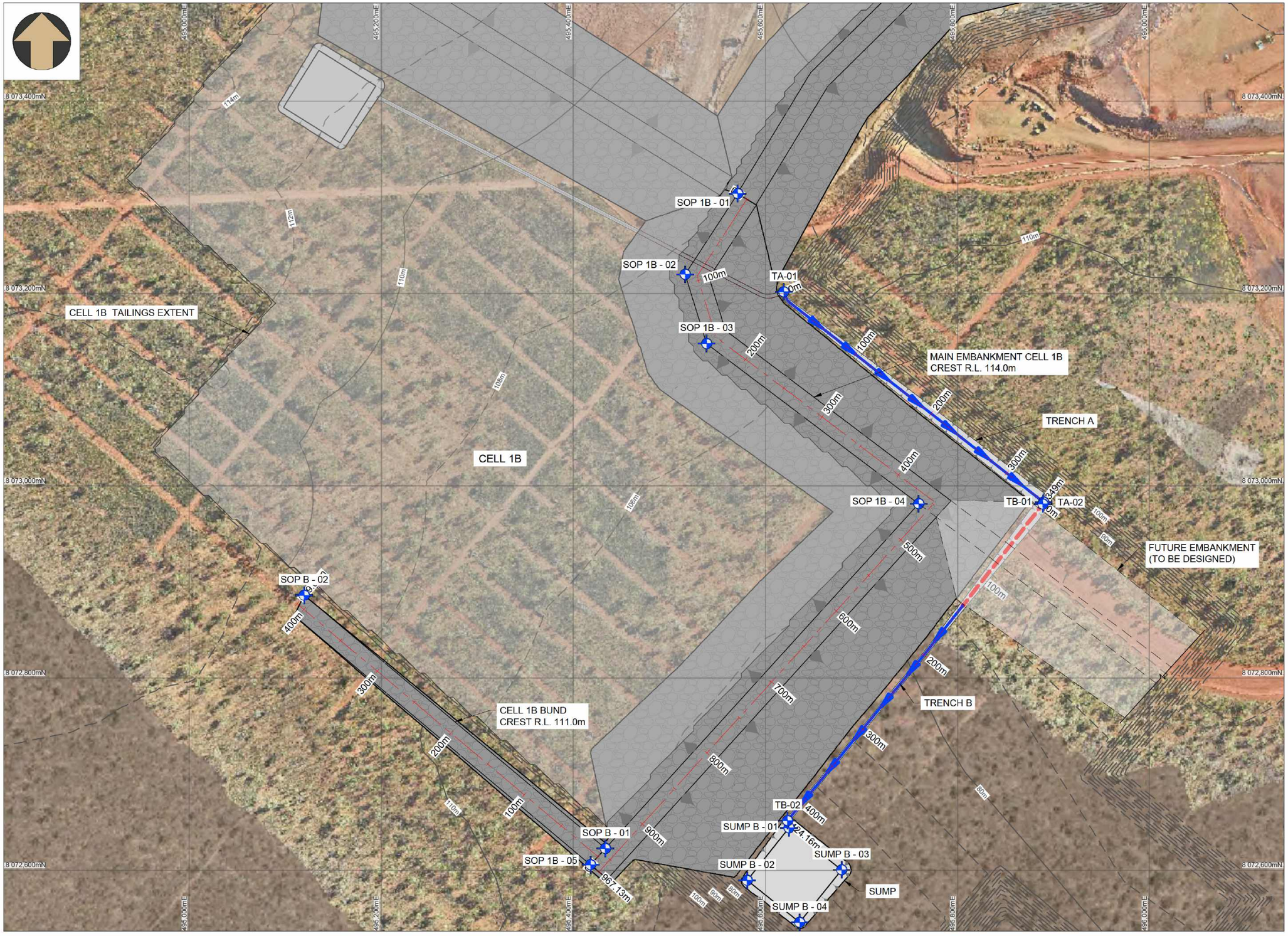
TITLE
KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
IN-PIT TSF - CELL 1
SETTING OUT PLAN - CELL 1A

SCALE: 1 : 2,000 (A1)

DRAWING No.: P24-77-PR13-007

REV: B

A1 Border v2.0



NOTES:

1. REFER TO DRAWING P24-77-PR13-001 FOR GENERAL NOTES.

LEGEND:

SETTING OUT POINTS

CELL 1B MAIN EMB. SETTING OUT POINTS

I.D.	EASTING	NORTHING	R.L. (m)
SOP 1B - 01	495,571.04	8,073,304.08	114.00
SOP 1B - 02	495,516.43	8,073,220.03	114.00
SOP 1B - 03	495,538.79	8,073,147.91	113.40
SOP 1B - 04	495,759.65	8,072,981.23	111.40
SOP 1B - 05	495,417.85	8,072,605.63	111.00

EXTENSION BUND SETTING OUT POINTS

I.D.	EASTING	NORTHING	R.L. (m)
SOP B - 01	495,433.21	8,072,622.51	111.00
SOP B - 02	495,119.64	8,072,885.95	111.00

TRENCH A SETTING OUT POINTS

I.D.	EASTING	NORTHING	R.L. (m)
TA-01	495,619.04	8,073,201.79	83.38
TA-02	495,889.70	8,072,962.83	82.68

TRENCH B SETTING OUT POINTS

I.D.	EASTING	NORTHING	R.L. (m)
TB-01	495,888.86	8,072,980.95	82.68
TB-02	495,622.94	8,072,651.54	73.55

CELL 1B SUMP SETTING OUT POINTS

I.D.	EASTING	NORTHING	R.L. (m)
SUMP B - 01	495,624.54	8,072,644.05	68.45
SUMP B - 02	495,580.88	8,072,589.33	68.45
SUMP B - 03	495,679.26	8,072,600.40	68.45
SUMP B - 04	495,635.60	8,072,545.68	68.45

LEGEND: ZONE A: OVERBURDEN MATERIAL — ZONE B: OVERSIZE MATERIAL

DRAFT

0 20 50 100
SCALE 1 : 2,000 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
B	05.12.2025	ISSUED FOR CLIENT REVIEW	AZ	GL	GL				
A	04.11.2025	ISSUED FOR CLIENT REVIEW	OT	GL	GL			P24-77-PR13-003	SITE GENERAL ARRANGEMENT

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CLIENT: KIMBERLEY MINERAL SANDS — THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	O.THANT	20.10.2025	
DESIGNED:	G.LI	17.10.2025	
CHECKED:	G.LI	04.11.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

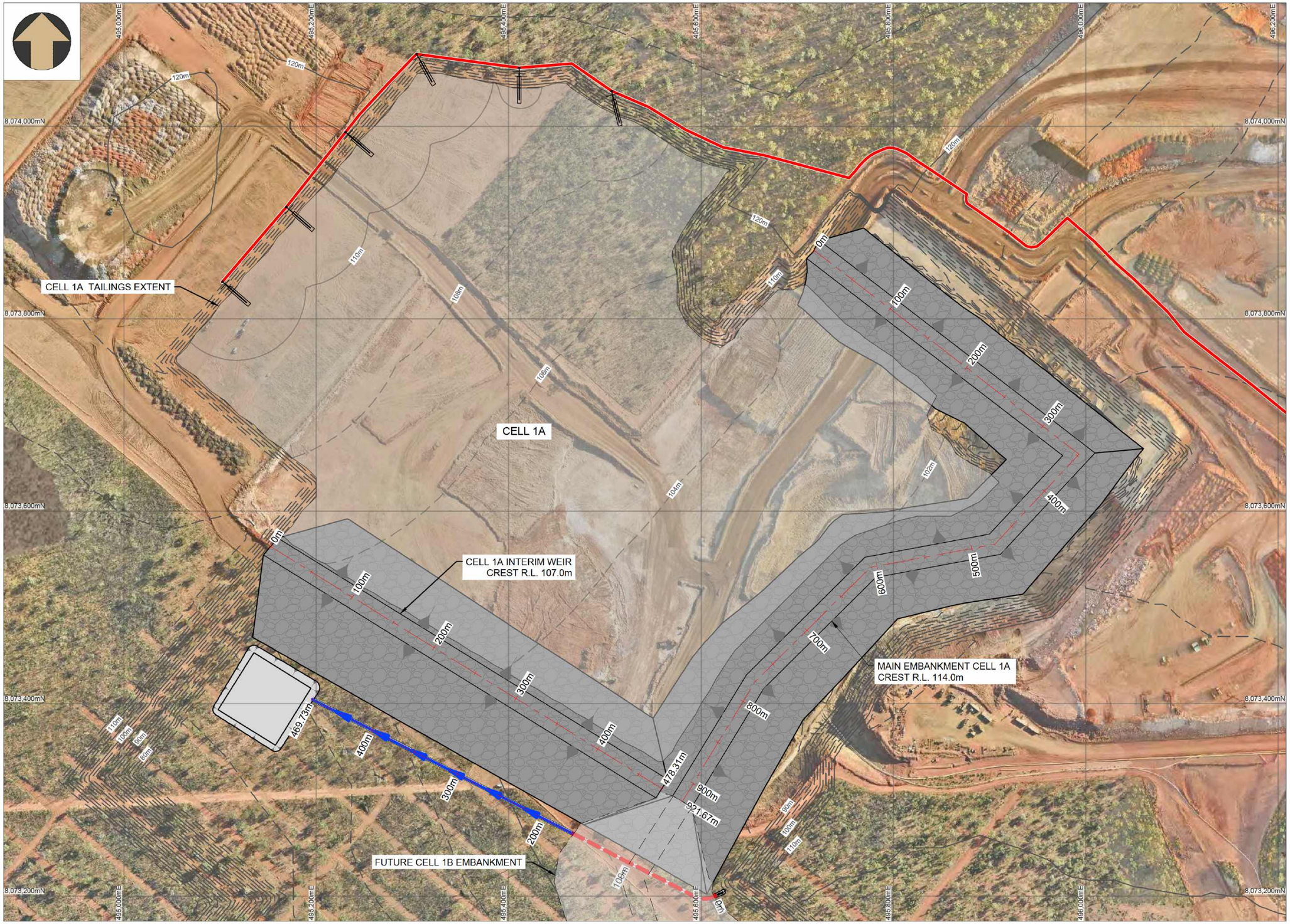
TITLE
KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
IN-PIT TSF - CELL 1
SETTING OUT POINTS - CELL 1B

SCALE: 1 : 2,000 (A1)

DRAWING No.: P24-77-PR13-008

REV: B

A1 Border v2.0



NOTES:

1. REFER TO DRAWING P24-77-PR13-001 FOR GENERAL NOTES.

LEGEND:

SPIGOT LOCATION

TAILINGS PIPELINE

LEGEND:

ZONE A: OVERBURDEN MATERIAL

ZONE B: OVERSIZE MATERIAL

DRAFT

0 20 50 100

SCALE 1 : 2,000 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
B	05.12.2025	ISSUED FOR CLIENT REVIEW	OT	GL	GL				
A	04.11.2025	ISSUED FOR CLIENT REVIEW	AZ	GL	GL			P24-77-PR13-003	SITE GENERAL ARRANGEMENT

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	A.ZDUNIC	22.10.2025	
DESIGNED:	G.LI	17.10.2025	
CHECKED:	G.LI	04.11.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE

KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
IN-PIT TSF - CELL 1A
SPIGOT & PIPELINE PLAN - CELL 1A

SCALE: 1:2,000 (A1)

DRAWING No.: P24-77-PR13-009

REV: B

A1 Border v2.0

NOTES:

1. REFER TO DRAWING P24-77-PR13-001 FOR GENERAL NOTES.

LEGEND:

SPIGOT LOCATION

TAILINGS PIPELINE

LEGEND: ZONE A: OVERBURDEN MATERIAL ZONE B: OVERSIZE MATERIAL

DRAFT

0 40 100 200
SCALE 1 : 4,000 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
B	05.12.2025	ISSUED FOR CLIENT REVIEW	AZ	GL	GL				
A	04.11.2025	ISSUED FOR CLIENT REVIEW	AZ	GL	GL			P24-77-PR13-003	SITE GENERAL ARRANGEMENT

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	A.ZDUNIC	22.10.2025	
DESIGNED:	G.LI	17.10.2025	
CHECKED:	G.LI	04.11.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

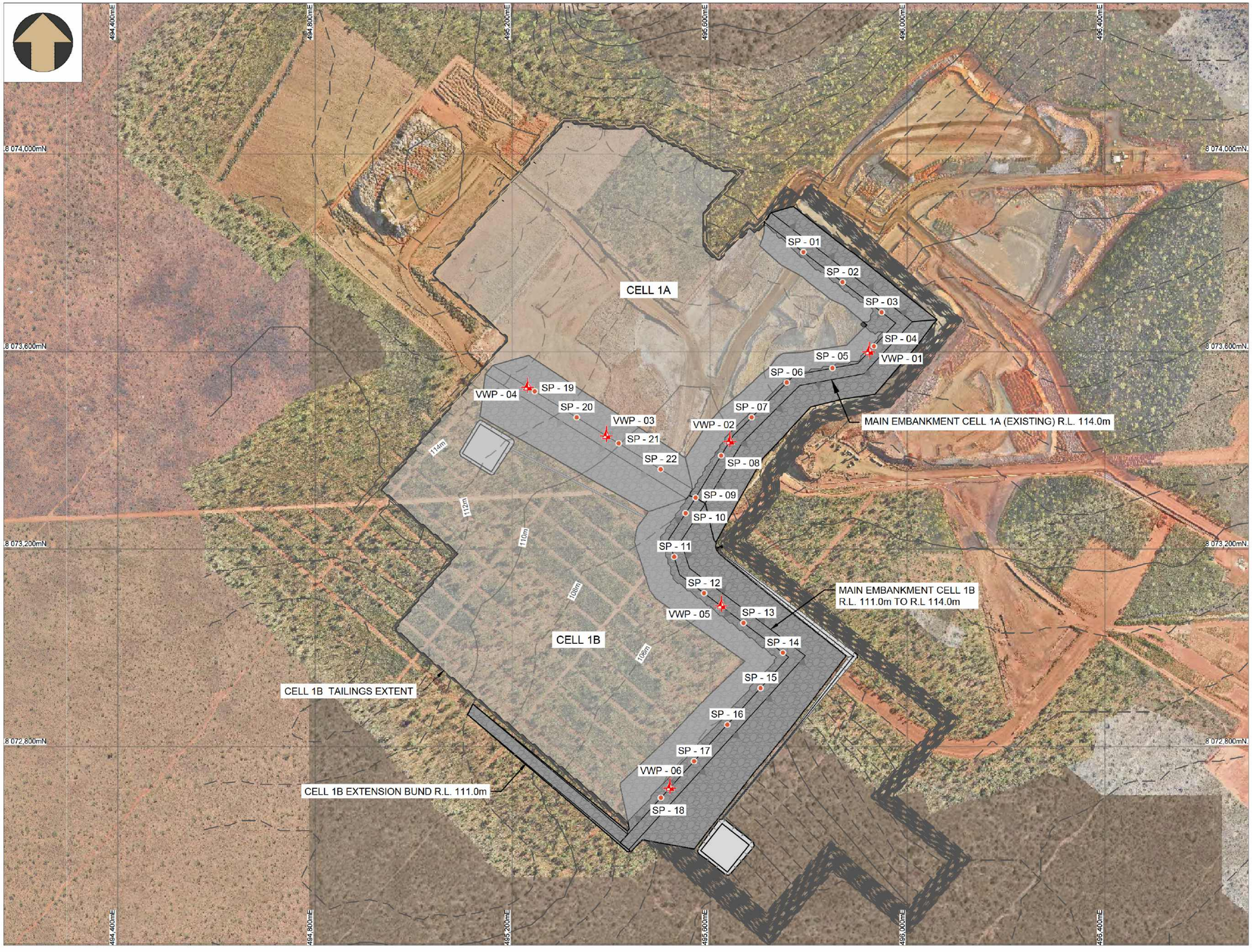
TITLE
KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
IN-PIT TSF - CELL 1
SPIGOT & PIPELINE PLAN - CELLS 1A & 1B

SCALE: 1:4,000 (A1)

DRAWING No.: P24-77-PR13-010

REV: B

A1 Border v2.0



NOTES:

1. REFER TO DRAWING P24-77-PR13-001 FOR GENERAL NOTES.

LEGEND:

PROPOSED SETTLEMENT PINS

PROPOSED VWPs

PROPOSED SETTLEMENT PINS LOCATIONS

POINT I.D.	EASTING	NORTHING	R.L. (m)
SP - 01	495,789.19	8,073,801.65	114.0
SP - 02	495,868.44	8,073,740.66	114.0
SP - 03	495,947.69	8,073,679.67	114.0
SP - 04	495,932.07	8,073,610.87	114.0
SP - 05	495,847.97	8,073,566.71	114.0
SP - 06	495,755.47	8,073,537.35	114.0
SP - 07	495,684.46	8,073,466.95	114.0
SP - 08	495,622.51	8,073,389.39	114.0
SP - 09	495,570.81	8,073,304.21	114.0
SP - 10	495,550.63	8,073,272.66	114.0
SP - 11	495,527.46	8,073,184.47	113.7
SP - 12	495,588.06	8,073,110.73	113.0
SP - 13	495,667.88	8,073,050.49	112.2
SP - 14	495,747.70	8,072,990.25	111.5
SP - 15	495,702.43	8,072,918.35	111.3
SP - 16	495,635.13	8,072,844.39	111.2
SP - 17	495,567.82	8,072,770.43	111.2
SP - 18	495,500.52	8,072,696.47	111.1
SP - 19	495,244.98	8,073,519.49	107.0
SP - 20	495,330.03	8,073,466.90	107.0
SP - 21	495,415.09	8,073,414.31	107.0
SP - 22	495,500.14	8,073,361.72	107.0

PROPOSED VWPs LOCATIONS

POINT I.D.	EASTING	NORTHING	R.L. (m)
VWP - 01	495,922.28	8,073,599.64	93.92
VWP - 02	495,840.34	8,073,417.81	86.83
VWP - 03	495,390.18	8,073,429.12	81.67
VWP - 04	495,230.61	8,073,527.76	78.96
VWP - 05	495,623.05	8,073,084.95	82.70
VWP - 06	495,519.00	8,072,716.04	74.29

LEGEND: ZONE A: OVERBURDEN MATERIAL ZONE B: OVERSIZE MATERIAL

DRAFT

0 40 100 200
SCALE 1 : 4,000 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT
A	05.12.2025	ISSUED FOR CLIENT REVIEW	OT	GL	GL		

DRG. NO.	REFERENCE DRAWING
P24-77-PR13-031	TYPICAL SECTIONS & DETAILS - SHT 2
P24-77-PR13-003	SITE GENERAL ARRANGEMENT

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	O.THANT	05.12.2025	
DESIGNED:	G.LI	17.10.2025	
CHECKED:	G.LI	05.12.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

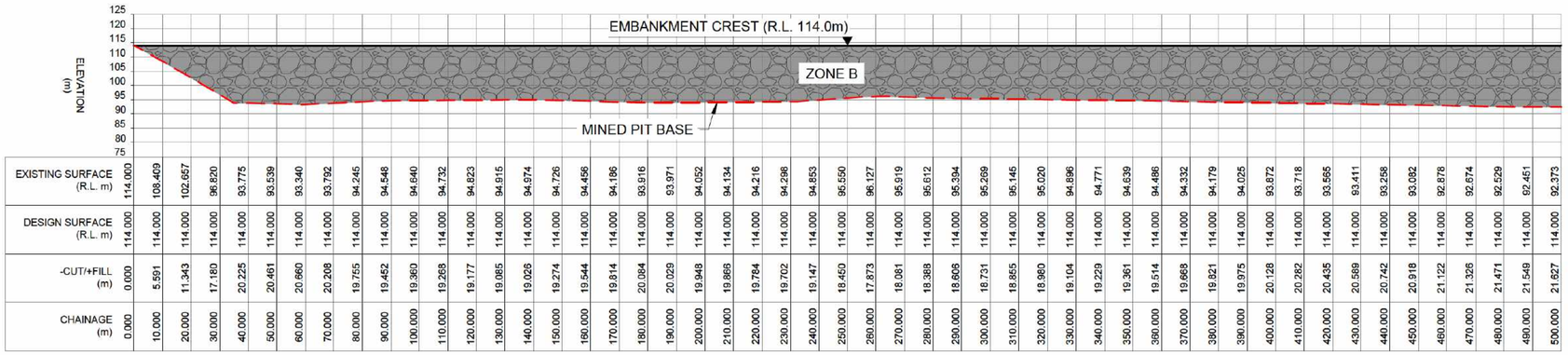
TITLE
KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
IN-PIT TSF - CELL 1
MONITORING INSTRUMENTATION LAYOUT

SCALE 1:4,000 (A1)

DRAWING No. P24-77-PR13-011

REV A

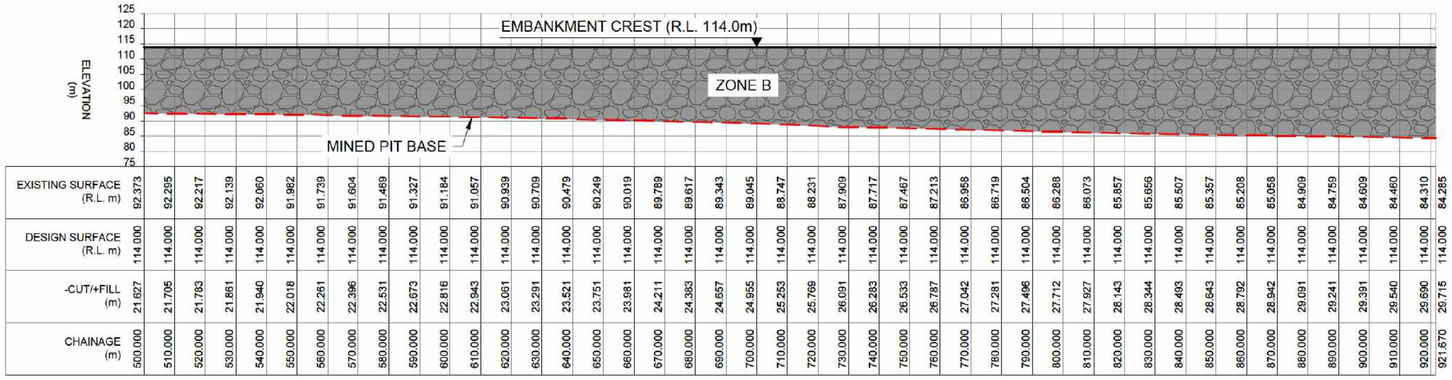
A1 Border v2.0



CHAINAGE (m)	EXISTING SURFACE (R.L. m)	DESIGN SURFACE (R.L. m)	-CUT/+FILL (m)
0.000	114.000	114.000	0.000
10.000	108.409	114.000	5.591
20.000	102.657	114.000	11.343
30.000	96.820	114.000	17.180
40.000	93.775	114.000	20.225
50.000	93.539	114.000	20.461
60.000	93.340	114.000	20.660
70.000	93.792	114.000	20.208
80.000	94.245	114.000	19.755
90.000	94.548	114.000	19.452
100.000	94.640	114.000	19.360
110.000	94.732	114.000	19.268
120.000	94.823	114.000	19.177
130.000	94.915	114.000	19.085
140.000	94.974	114.000	19.026
150.000	94.726	114.000	19.274
160.000	94.456	114.000	19.544
170.000	94.186	114.000	19.814
180.000	93.916	114.000	20.084
190.000	93.971	114.000	20.029
200.000	94.052	114.000	19.948
210.000	94.134	114.000	19.866
220.000	94.216	114.000	19.784
230.000	94.298	114.000	19.702
240.000	94.853	114.000	19.147
250.000	95.550	114.000	18.450
260.000	96.127	114.000	17.873
270.000	95.919	114.000	18.081
280.000	95.612	114.000	18.388
290.000	95.394	114.000	18.606
300.000	95.269	114.000	18.731
310.000	95.145	114.000	18.855
320.000	95.020	114.000	18.980
330.000	94.896	114.000	19.104
340.000	94.771	114.000	19.229
350.000	94.639	114.000	19.361
360.000	94.486	114.000	19.514
370.000	94.332	114.000	19.668
380.000	94.179	114.000	19.821
390.000	94.025	114.000	19.975
400.000	93.872	114.000	20.128
410.000	93.718	114.000	20.282
420.000	93.565	114.000	20.435
430.000	93.411	114.000	20.589
440.000	93.258	114.000	20.742
450.000	93.082	114.000	20.918
460.000	92.878	114.000	21.122
470.000	92.674	114.000	21.326
480.000	92.529	114.000	21.471
490.000	92.451	114.000	21.549
500.000	92.373	114.000	21.627

CELL 1A MAIN EMBANKMENT LONGITUDINAL SECTION - CH. 0.0 TO 500.0m

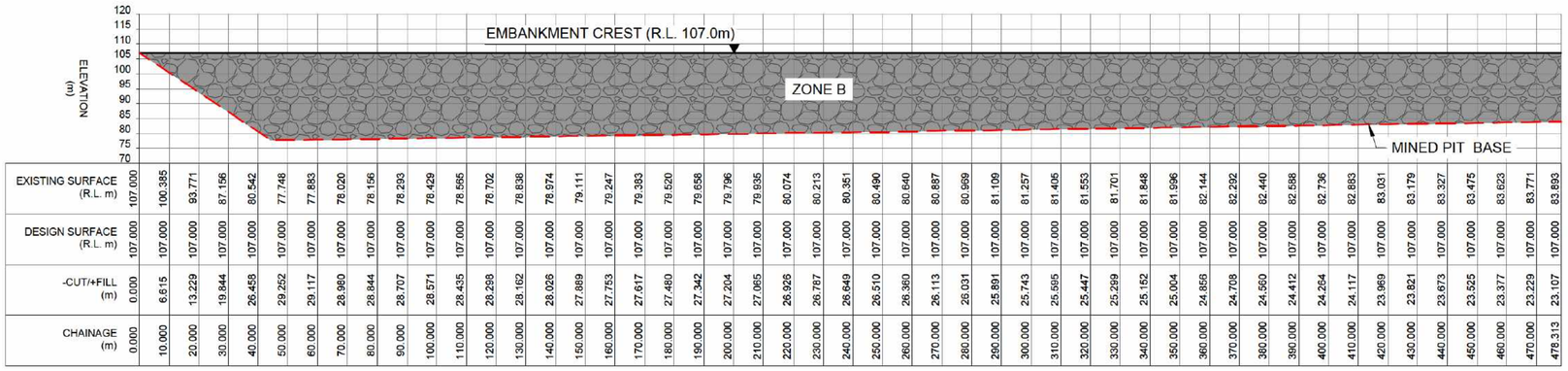
1:1,000



CHAINAGE (m)	EXISTING SURFACE (R.L. m)	DESIGN SURFACE (R.L. m)	-CUT/+FILL (m)
500.000	92.373	114.000	21.627
510.000	92.295	114.000	21.705
520.000	92.217	114.000	21.783
530.000	92.139	114.000	21.861
540.000	92.060	114.000	21.940
550.000	91.982	114.000	22.018
560.000	91.739	114.000	22.261
570.000	91.604	114.000	22.396
580.000	91.469	114.000	22.531
590.000	91.327	114.000	22.673
600.000	91.184	114.000	22.816
610.000	91.057	114.000	22.943
620.000	90.939	114.000	23.061
630.000	90.709	114.000	23.291
640.000	90.479	114.000	23.521
650.000	90.249	114.000	23.751
660.000	90.019	114.000	23.981
670.000	89.789	114.000	24.211
680.000	89.617	114.000	24.383
690.000	89.343	114.000	24.657
700.000	89.045	114.000	24.955
710.000	88.747	114.000	25.253
720.000	88.231	114.000	25.769
730.000	87.969	114.000	26.031
740.000	87.717	114.000	26.283
750.000	87.467	114.000	26.533
760.000	87.213	114.000	26.787
770.000	86.958	114.000	27.042
780.000	86.719	114.000	27.281
790.000	86.504	114.000	27.496
800.000	86.288	114.000	27.712
810.000	86.073	114.000	27.927
820.000	85.857	114.000	28.143
830.000	85.656	114.000	28.344
840.000	85.507	114.000	28.493
850.000	85.357	114.000	28.643
860.000	85.208	114.000	28.792
870.000	85.058	114.000	28.942
880.000	84.909	114.000	29.091
890.000	84.759	114.000	29.241
900.000	84.609	114.000	29.391
910.000	84.460	114.000	29.540
920.000	84.310	114.000	29.690
921.670	84.285	114.000	29.715

CELL 1A MAIN EMBANKMENT LONGITUDINAL SECTION - CH. 500.0 TO 921.67m

1:1,000



CHAINAGE (m)	EXISTING SURFACE (R.L. m)	DESIGN SURFACE (R.L. m)	-CUT/+FILL (m)
0.000	107.000	107.000	0.000
10.000	100.385	107.000	6.615
20.000	93.771	107.000	13.229
30.000	87.156	107.000	19.844
40.000	80.542	107.000	26.458
50.000	77.748	107.000	29.252
60.000	77.883	107.000	29.117
70.000	78.020	107.000	28.980
80.000	78.156	107.000	28.844
90.000	78.293	107.000	28.707
100.000	78.429	107.000	28.571
110.000	78.565	107.000	28.435
120.000	78.702	107.000	28.298
130.000	78.838	107.000	28.162
140.000	78.974	107.000	28.026
150.000	79.111	107.000	27.889
160.000	79.247	107.000	27.753
170.000	79.383	107.000	27.617
180.000	79.520	107.000	27.480
190.000	79.658	107.000	27.342
200.000	79.796	107.000	27.204
210.000	79.935	107.000	27.065
220.000	80.074	107.000	26.926
230.000	80.213	107.000	26.787
240.000	80.351	107.000	26.649
250.000	80.490	107.000	26.510
260.000	80.640	107.000	26.360
270.000	80.887	107.000	26.113
280.000	80.969	107.000	26.031
290.000	81.109	107.000	25.891
300.000	81.257	107.000	25.743
310.000	81.405	107.000	25.595
320.000	81.553	107.000	25.447
330.000	81.701	107.000	25.299
340.000	81.848	107.000	25.152
350.000	81.996	107.000	25.004
360.000	82.144	107.000	24.856
370.000	82.292	107.000	24.708
380.000	82.440	107.000	24.560
390.000	82.588	107.000	24.412
400.000	82.736	107.000	24.264
410.000	82.883	107.000	24.117
420.000	83.031	107.000	23.969
430.000	83.179	107.000	23.821
440.000	83.327	107.000	23.673
450.000	83.475	107.000	23.525
460.000	83.623	107.000	23.377
470.000	83.771	107.000	23.229
478.313	83.893	107.000	23.107

CELL 1A INTERIM WEIR LONGITUDINAL SECTION - CH. 0 TO 478.31m

1:1,000

LEGEND:

DESIGN PROFILE

EXISTING GROUND SURFACE

NOTES:

1. REFER TO DRAWING P24-77-PR13-001 FOR GENERAL NOTES.

LEGEND: ZONE A: OVERBURDEN MATERIAL ZONE B: OVERSIZE MATERIAL

DRAFT

0 10 25 50

SCALE 1 : 1,000 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
B	05.12.2025	ISSUED FOR CLIENT REVIEW	OT	GL	GL				
A	04.11.2025	ISSUED FOR CLIENT REVIEW	OT	GL	GL			P24-77-PR13-005	GENERAL ARRANGEMENT - CELL 1A

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	O.THANT	21.10.2025	
DESIGNED:	G.LI	08.10.2025	
CHECKED:	G.LI	04.11.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE

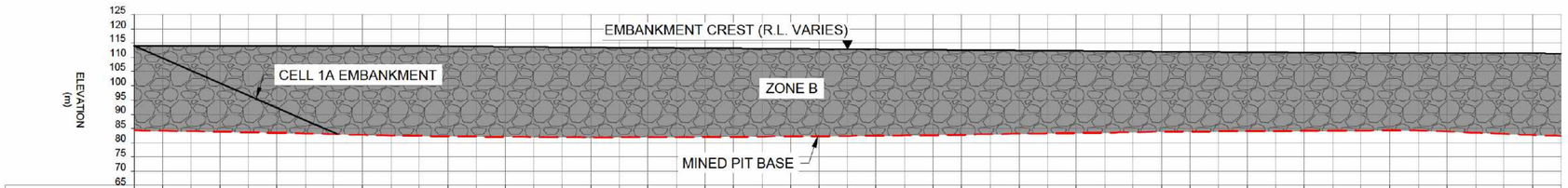
KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
IN-PIT TSF - CELL 1
CELL 1A EMBANKMENT LONG. SECTIONS

SCALE: AS SHOWN (A1)

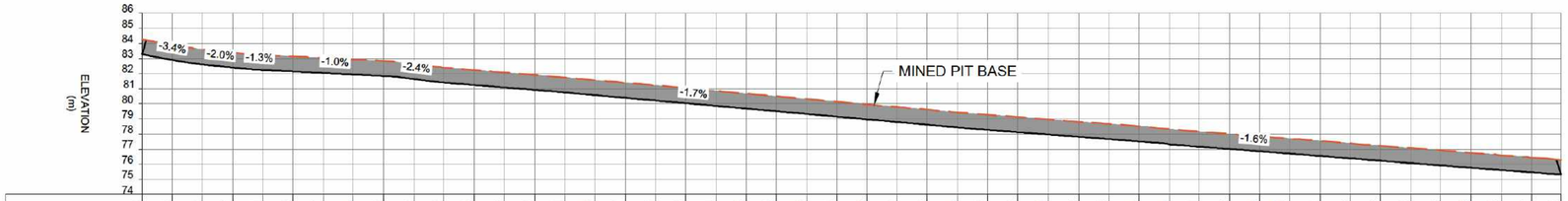
DRAWING No.: P24-77-PR13-012

REV: B

A1Border v2.0


EMBANKMENT CREST (R.L. VARIES)
CELL 1A EMBANKMENT
ZONE B
MINED PIT BASE
ELEVATION (m)

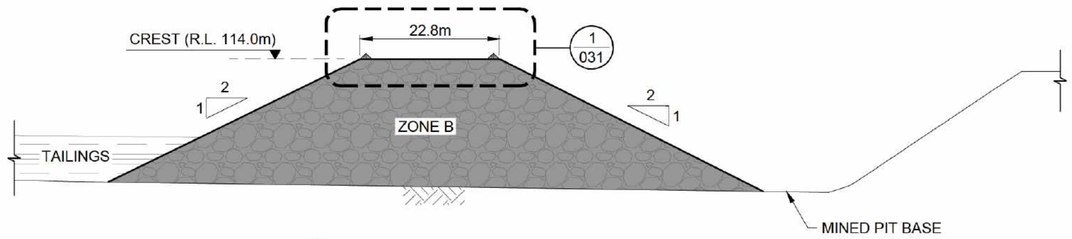
| | | |


ELEVATION (m)
-3.4%
-2.0%
-1.3%
-1.0%
-2.4%
-1.7%
-1.6%
MINED PIT BASE

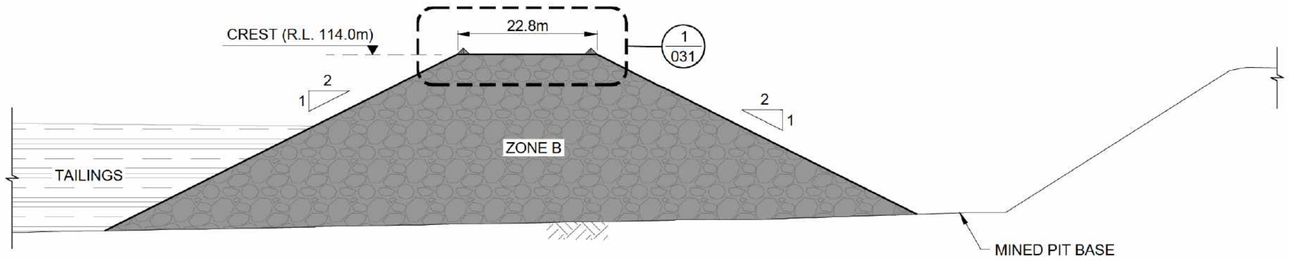
| | | |

NOTES:

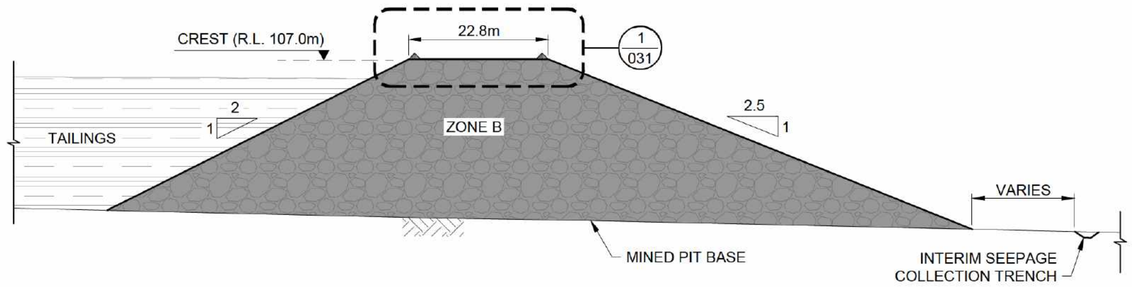
1. REFER TO DRAWING P24-77-PR13-001 FOR GENERAL NOTES.



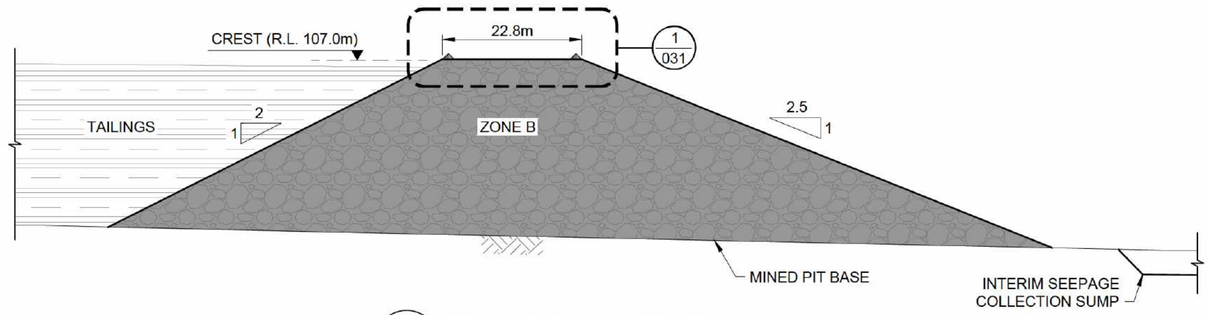
A 004 MAIN EMBANKMENT - CELL 1A
SCALE 1:500



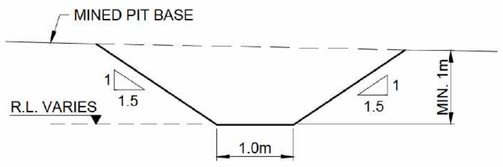
B 004 MAIN EMBANKMENT - CELL 1A
SCALE 1:500



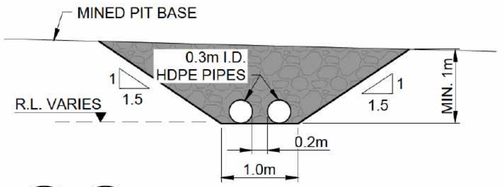
C 004 INTERIM WEIR - CELL 1A
SCALE 1:500



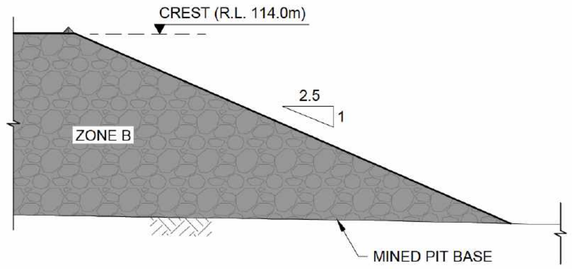
D 004 INTERIM WEIR - CELL 1A
SCALE 1:500



E 004 E 005 SEEPAGE COLLECTION DRAIN
SCALE 1:40



F 004 F 005 SEEPAGE TRANSFER PIPES
SCALE 1:40



G 004 MAIN EMBANKMENT - CELL 1A
SCALE 1:500

0 0.4 1.0 2.0
SCALE 1 : 40 (m)

0 4 10 20
SCALE 1 : 500 (m)

LEGEND: ZONE A: OVERBURDEN MATERIAL ZONE B: OVERSIZE MATERIAL

DRAFT

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT
B	05.12.2025	ISSUED FOR CLIENT REVIEW	OT	GL	GL		
A	04.11.2025	ISSUED FOR CLIENT REVIEW	AZ	GL	GL		

DRG. NO.	REFERENCE DRAWING
P24-77-PR13-031	TYPICAL SECTIONS & DETAILS - SHT 2
P24-77-PR13-006	GENERAL ARRANGEMENT - CELL 1A & CELL 1B
P24-77-PR13-005	GENERAL ARRANGEMENT - CELL 1A

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	A.ZDUNIC	21.10.2025	
DESIGNED:	G.LI	17.10.2025	
CHECKED:	G.LI	04.11.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
IN-PIT TSF - CELL 1
TYPICAL SECTIONS & DETAILS - SHT 1

SCALE: AS SHOWN (A1)

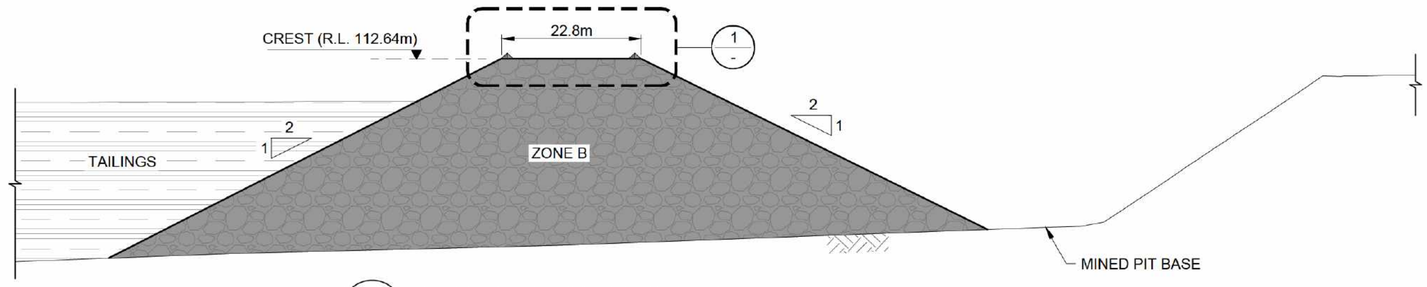
DRAWING No. P24-77-PR13-030

REV B

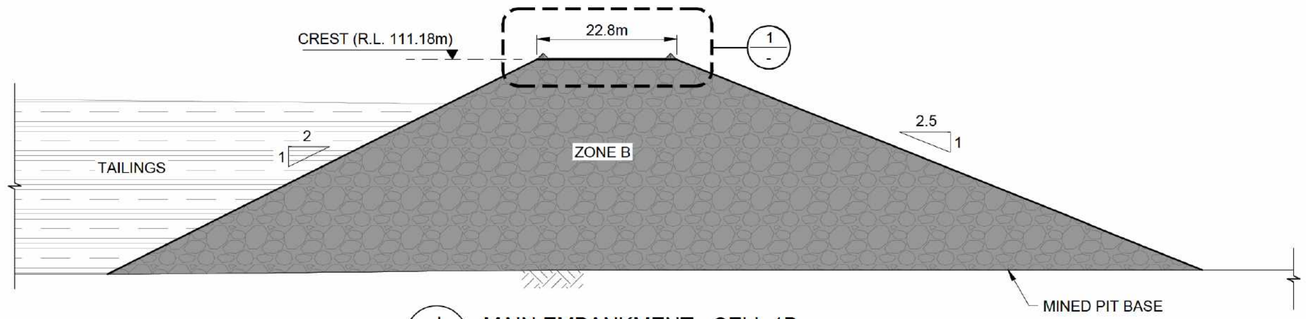
A1 Border v2.0

NOTES:

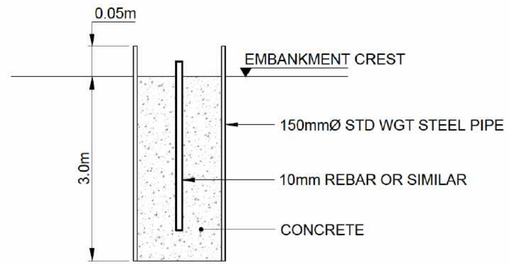
1. REFER TO DRAWING P24-77-PR13-001 FOR GENERAL NOTES.



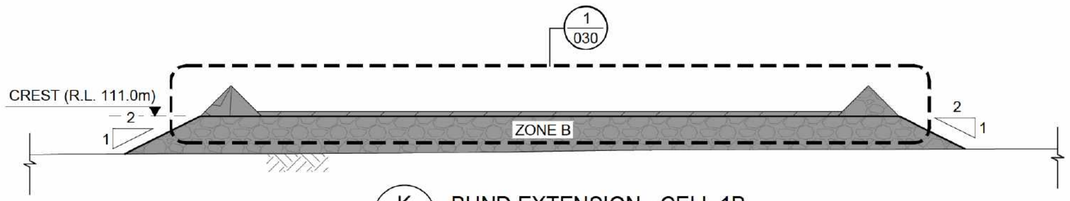
H 005 MAIN EMBANKMENT - CELL 1B
SCALE 1:500



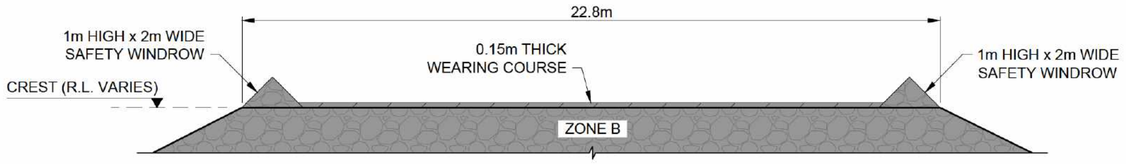
J 005 MAIN EMBANKMENT - CELL 1B
SCALE 1:500



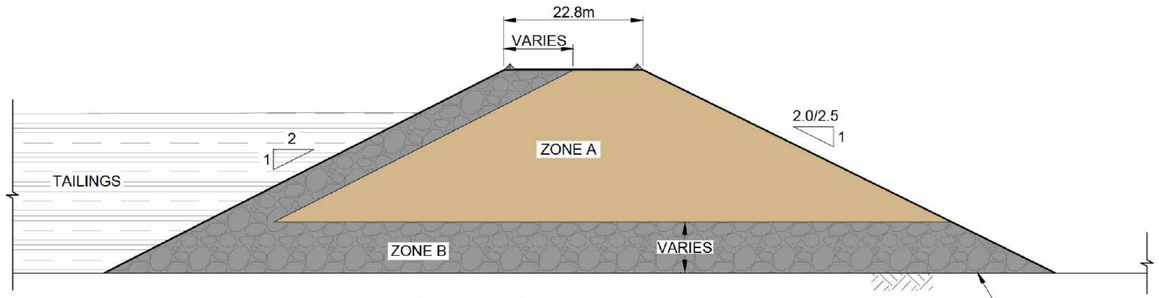
TYP. SETTLEMENT PIN
SCALE 1:5



K 005 BUND EXTENSION - CELL 1B
SCALE 1:100



1 - 1 030 TYP. EMB. CREST
SCALE 1:100



ALTERNATIVE EMBANKMENT ZONING - CELLS 1A & 1B
SCALE 1:500

LEGEND: ZONE A: OVERBURDEN MATERIAL ZONE B: OVERSIZE MATERIAL

DRAFT

SCALE 1 : 100 (m) (0 1 2.5 5)

SCALE 1 : 500 (m) (0 4 10 20)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
B	05.12.2025	ISSUED FOR CLIENT REVIEW	AZ	GL	GL			P24-77-PR13-030	TYPICAL SECTIONS & DETAILS - SHT 1
A	04.11.2025	ISSUED FOR CLIENT REVIEW	AZ	GL	GL			P24-77-PR13-006	GENERAL ARRANGEMENT - CELLS 1A & 1B

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	A.ZDUNIC	21.10.2025	
DESIGNED:	G.LI	17.10.2025	
CHECKED:	G.LI	04.11.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
IN-PIT TSF - CELL 1
TYPICAL SECTIONS & DETAILS - SHT 2

SCALE: AS SHOWN (A1)

DRAWING No.: P24-77-PR13-031

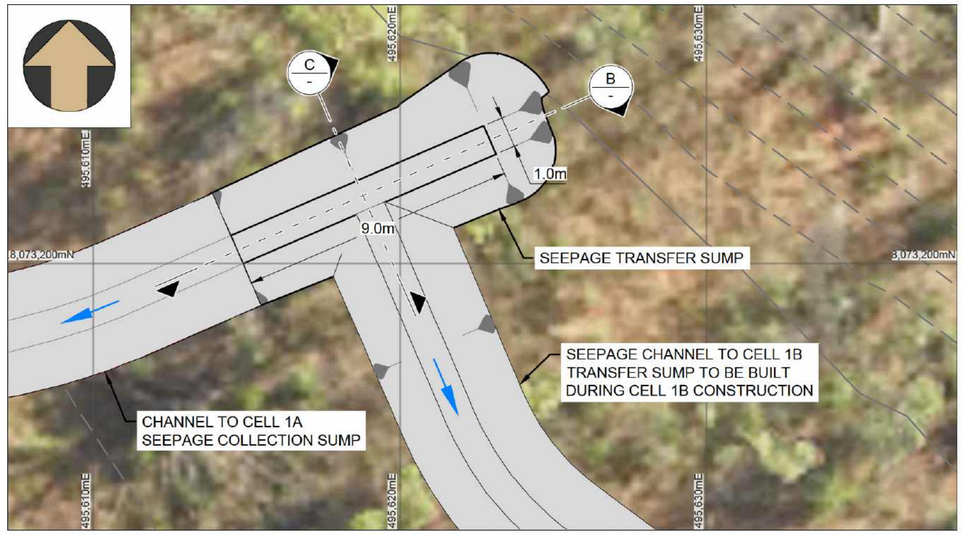
REV: B

A1 Border v2.0

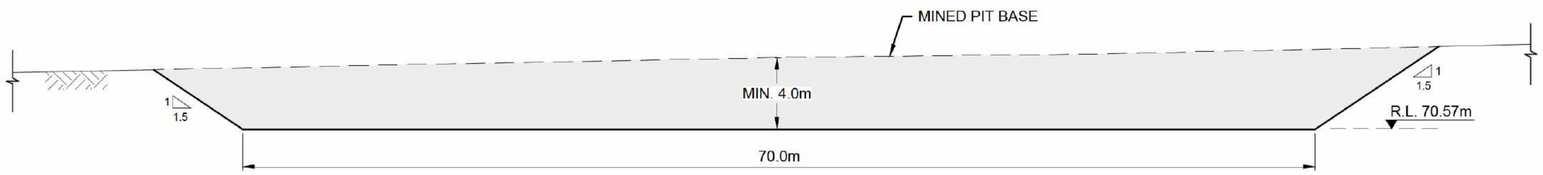
NOTES:

1. REFER TO DRAWING P24-77-PR13-001 FOR GENERAL NOTES.

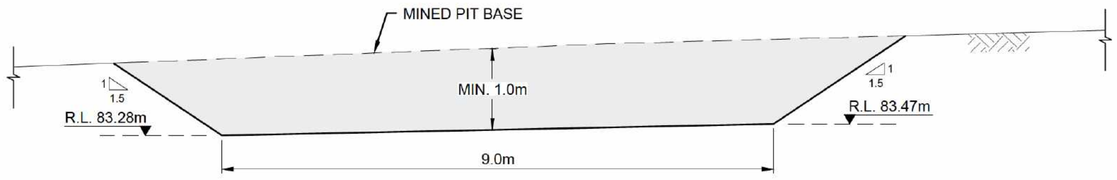
1 / 005 CELL 1A SEEPAGE COLLECTION SUMP
1:500



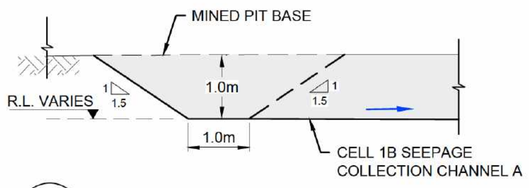
2 / 005 CELL 1A SEEPAGE TRANSFER SUMP
1:100



A / - CELL 1A SEEPAGE COLLECTION SUMP
1:200



B / - CELL 1A SEEPAGE TRANSFER SUMP
1:50



C / - CELL 1A SEEPAGE TRANSFER SUMP
1:50

LEGEND: ZONE A: OVERBURDEN MATERIAL ZONE B: OVERSIZE MATERIAL

DRAFT

0 0.4 1.0 2.0
SCALE 1 : 50 (m)

0 1 2.5 5
SCALE 1 : 100 (m)

0 2 5 10
SCALE 1 : 200 (m)

0 4 10 20
SCALE 1 : 500 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
B	05.12.2025	ISSUED FOR CLIENT REVIEW	AZ	GL	GL				
A	04.11.2025	ISSUED FOR CLIENT REVIEW	OT	GL	GL			P24-77-PR13-005	GENERAL ARRANGEMENT - CELL 1A

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	O.THANT	20.10.2025	
DESIGNED:	G.LI	17.10.2025	
CHECKED:	G.LI	04.11.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

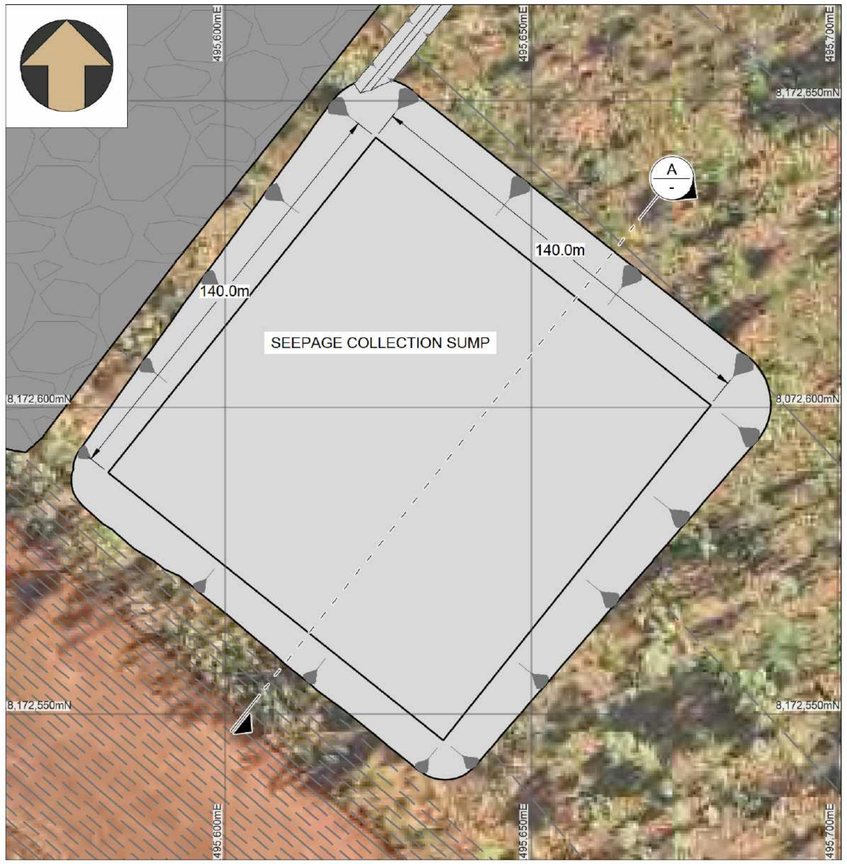
TITLE
KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
IN-PIT TSF - CELL 1
TYPICAL SECTIONS & DETAILS - SHT 3

SCALE: AS SHOWN (A1)

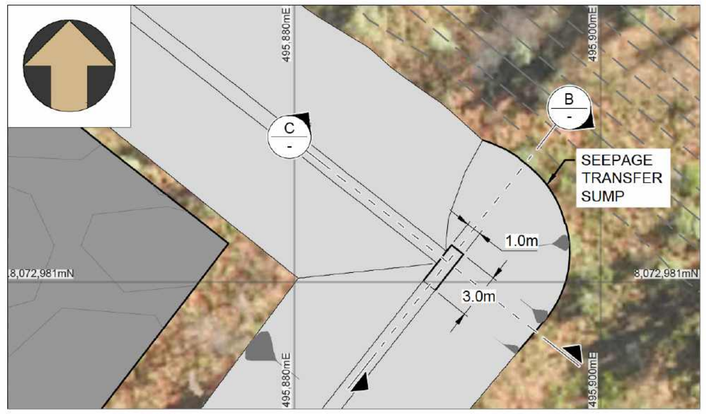
DRAWING No.: P24-77-PR13-032

REV: B

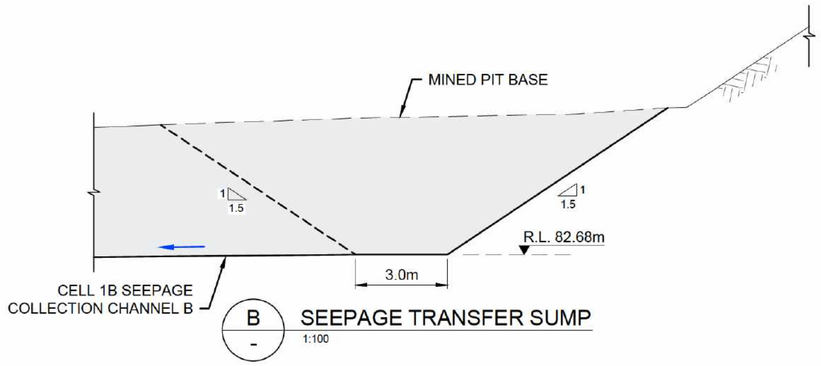
A1 Border v2.0



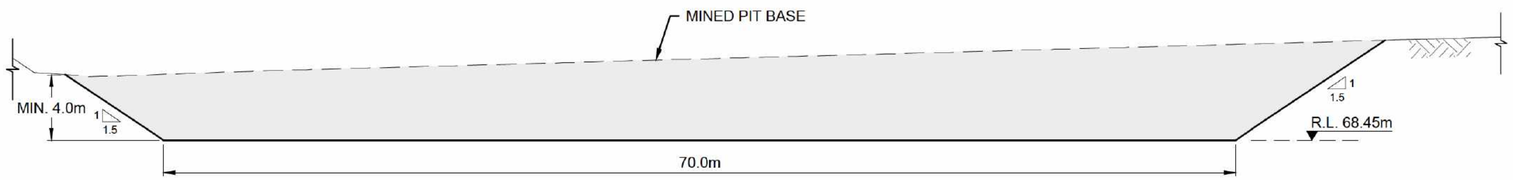
4 / 006 CELL 1B SEEPAGE COLLECTION SUMP
1:500



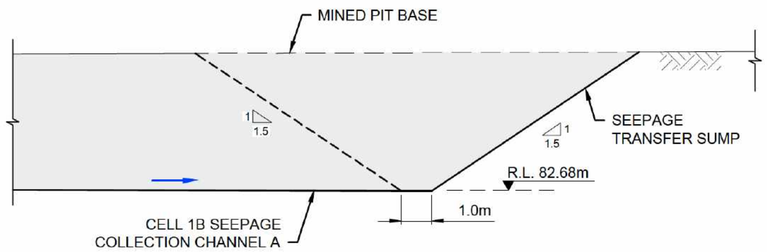
3 / 006 CELL 1B SEEPAGE TRANSFER SUMP
1:200



B / - SEEPAGE TRANSFER SUMP
1:100



A / - SEEPAGE COLLECTION SUMP
1:200



C / - SEEPAGE TRANSFER SUMP
1:100

NOTES:

1. REFER TO DRAWING P24-77-PR13-001 FOR GENERAL NOTES.

0 1 2.5 5
SCALE 1 : 100 (m)

0 2 5 10
SCALE 1 : 200 (m)

0 4 10 20
SCALE 1 : 500 (m)

LEGEND: ZONE A: OVERBURDEN MATERIAL ZONE B: OVERSIZE MATERIAL

DRAFT

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
B	05.12.2025	ISSUED FOR CLIENT REIVEW	AZ	GL	GL				
A	04.11.2025	ISSUED FOR CLIENT REVIEW	OT	GL	GL			P24-77-PR13-006	GENERAL ARRANGEMENT - CELLS 1A & 1B

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	O.THANT	20.10.2025	
DESIGNED:	G.LI	17.10.2025	
CHECKED:	G.LI	04.11.2025	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE: KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
IN-PIT TSF - CELL 1
TYPICAL SECTIONS & DETAILS - SHT 4

SCALE: AS SHOWN (A1)

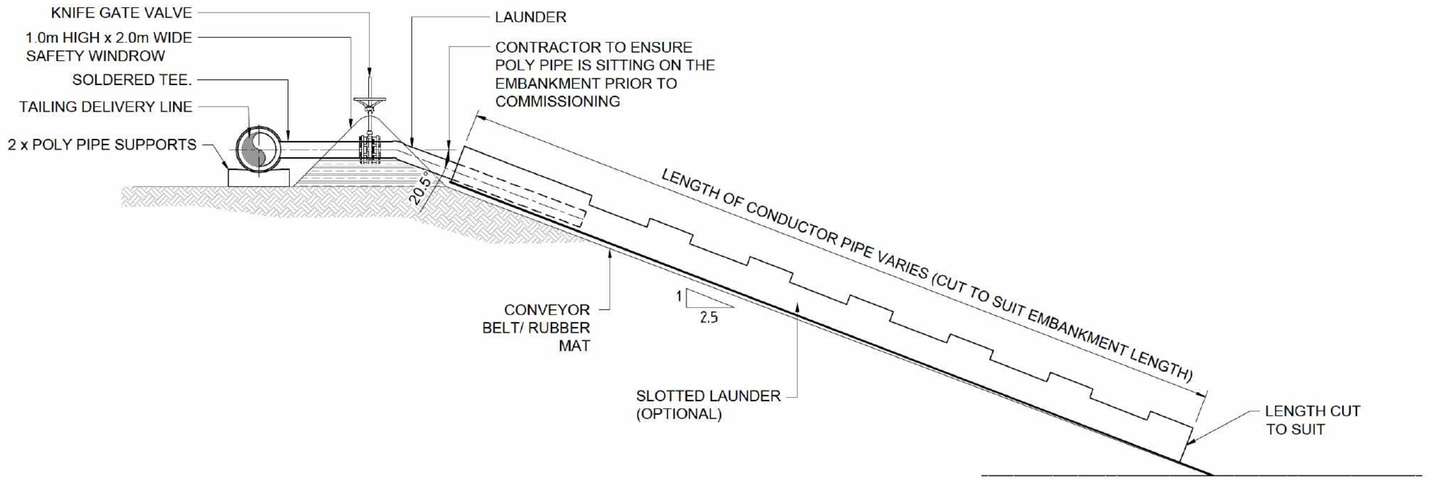
DRAWING No.: P24-77-PR13-033

REV: B

A1 Border v2.0

NOTES:

1. REFER TO DRAWING P24-77-PR13-001 FOR GENERAL NOTES.



TYPICAL SPIGOT SECTION
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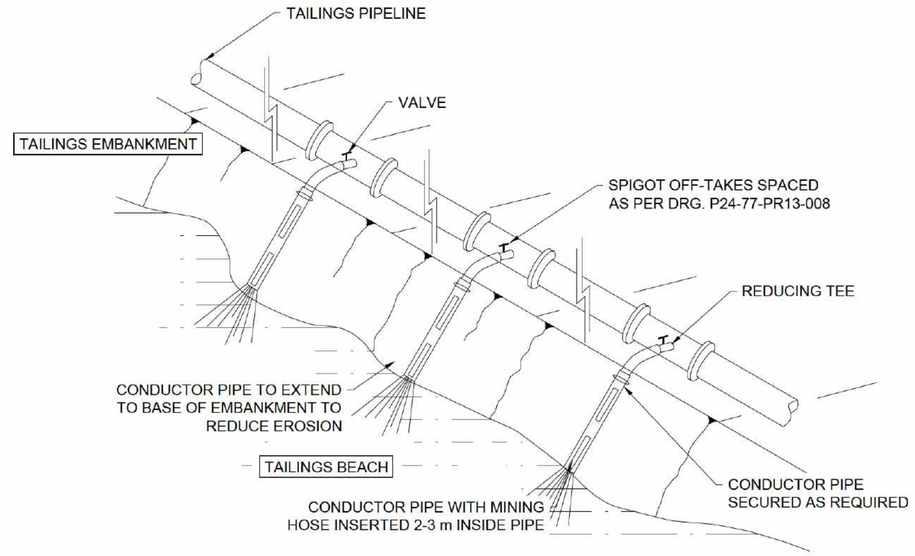

PROPOSED SPIGOT ARRANGEMENT ISOMETRIC
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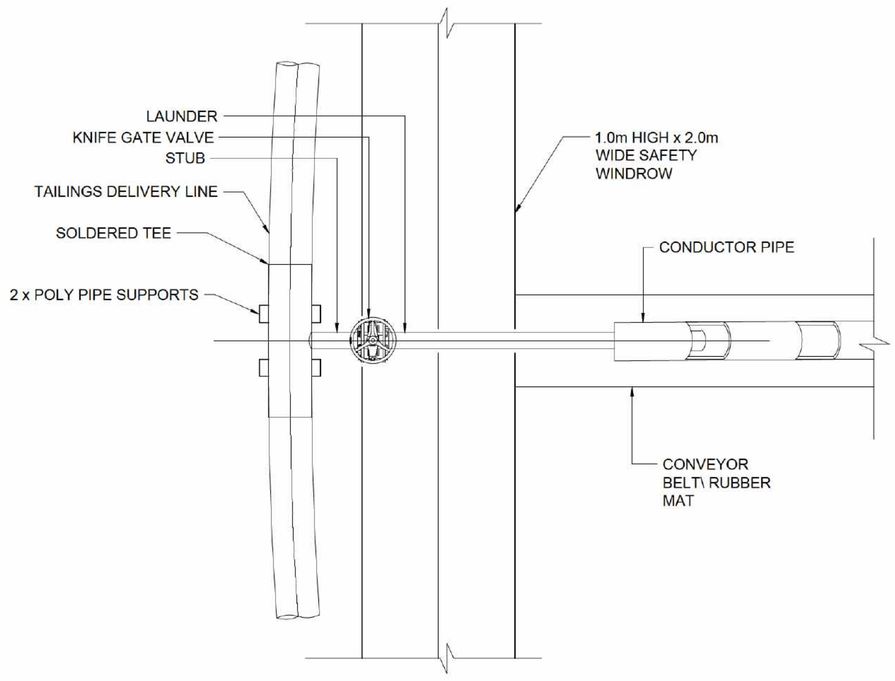

SPIGOT ARRANGEMENT PLAN
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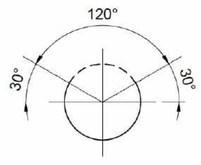

TYPICAL SPIGOT SECTION
N.T.S

DRAFT

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT
A	04.11.2025	ISSUED FOR CLIENT REVIEW	AZ	GL	GL		

DRG. NO.	REFERENCE DRAWING
P24-77-PR13-010	SPIGOT & PIPELINE PLAN - CELLS 1A & 1B
P24-77-PR13-009	SPIGOT & PIPELINE PLAN - CELL 1A

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TITLE
KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
IN-PIT TSF - CELL 1
TYPICAL SPIGOT SECTIONS & DETAILS

SCALE: AS SHOWN (A1)

DRAWING No.: **P24-77-PR13-041**

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Appendix B

Operating Manual

REPORT REF	P24-77-PR-13/OM	17 DECEMBER 2025

In-pit Tailings Storage Facility Cell 1 Operating Manual
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Report

Title:	In-pit Tailings Storage Facility Operating Manual
File:	P24-77-PR-13/OM
Author(s):	Mitch Hanger; George Li, Sebastian Hernandez
Client:	Kimberley Mineral Sands Pty Ltd
Contact:	Terry Tye
Synopsis:	This document presents the Operating Manual for Cell 1 of the in-pit tailings storage facility at the Kimberley Mineral Sands' Thunderbird Mineral Sands Project (TMSP).

Revision

Date	Revision	Purpose	Author
29 OCT 2025	REV A	ISSUED FOR REVIEW AND COMMENT	MH; GL; SH
05 DEC 2025	REV B	ISSUED FOR REVIEW AND COMMENT	MH; GL; SH
17 DEC 2025	REV 0	ISSUED FOR USE	MH; GL; SH
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Appendix B: Regulatory License and Lease Conditions
Appendix C: Operating Manual Forms for Process Plant Staff
Appendix D: Operational Templates

Terminology and Abbreviations

The following terminology and abbreviations have been used in this document:

AEP	Annual exceedance probability
ANCOLD	Australian National Committee on Large Dams
DDR	Detailed Design Report
DMPE	Department of Mines Petroleum and Exploration
EoR	Engineer of Record
GPS	Global Positioning System
GSI	Geotechnical Site Investigation
HDPE	High-Density Polyethylene
KMS	Kimberley Mineral Sands
IFD	Intensity Frequency Duration
IPTSF	In-pit Tailings Storage Facility
LGIRS	Department of Local Government Industry Regulation and Safety
LoM	Life of Mine
m/a	Metres per annum
m^3/d	Cubic meters per day
Mm^3	Million cubic meters
Mt	Million tonnes
Mt/a	Million tons per annum
NAF	Non-acid forming
OM	Operating Manual
OPTSF	Out of Pit Tailings Storage Facility
PAF	Potentially Acid Forming
PMP	Probable Maximum Precipitation
RL	Reduced level
t/a	Tonnes per annum
t/d	Tonnes per day
t/m^3	Tonnes per cubic metre
TMSP	Thunderbird Mineral Sands Project
SMDD	Standard Maximum Dry Density

1. Introduction

1.1 General

Resource Engineering Consultants Pty Ltd (REC) has been engaged by Kimberley Mineral Sands Pty Ltd (KMS) to prepare the Detailed Design Report (DDR) for Cell 1 (consisting of sub-cells Cell 1A and Cell 1B) of the In-pit Tailings Storage Facility (IPTSF) at the Thunderbird Mineral Sands Project (TMSP) site, located approximately 100 km Northeast of Broome in Western Australia. As part of the DDR, this Operating Manual (OM) has been developed for use by the Operators at the TMSP. The general arrangement for IPTSF Cell 1A and Cell 1B is presented in Figure 1 and Figure 2 respectively.

Figure 1: ITPSF Cell 1A General Arrangement

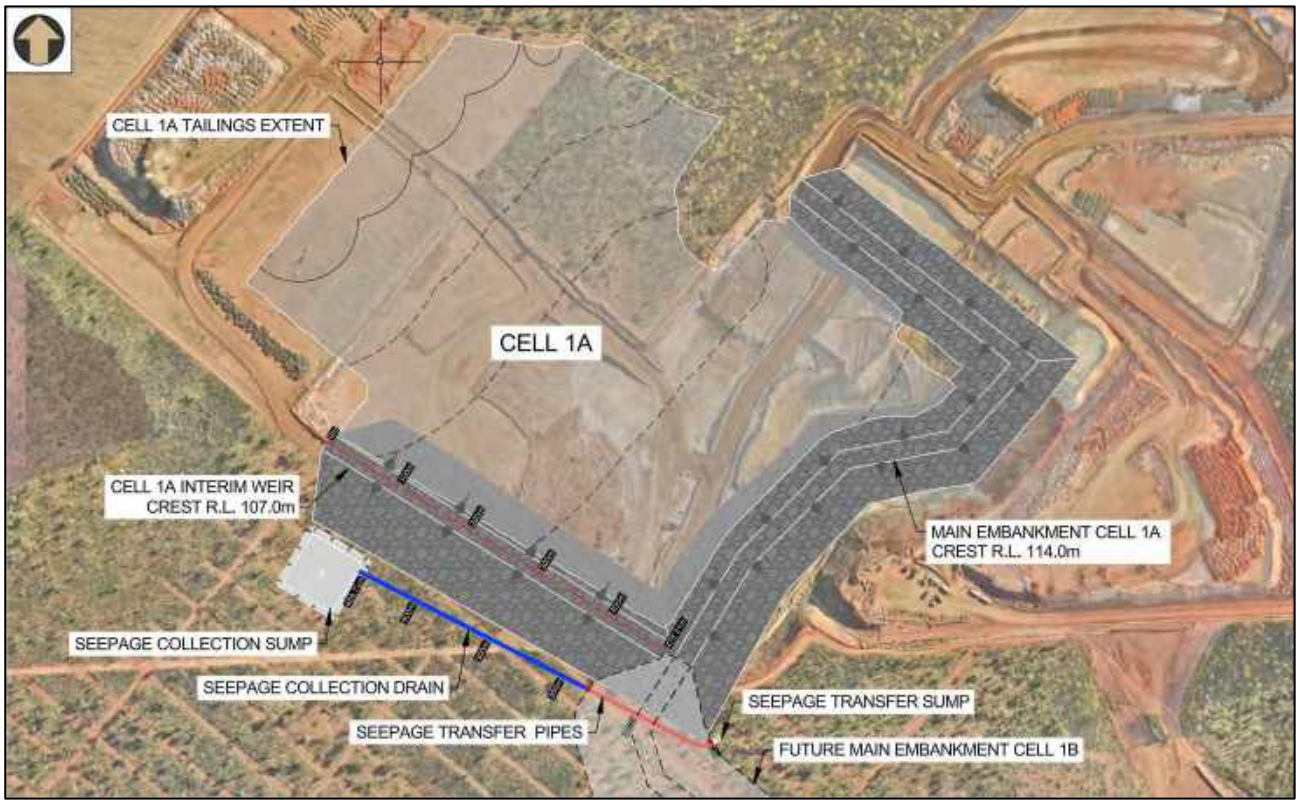
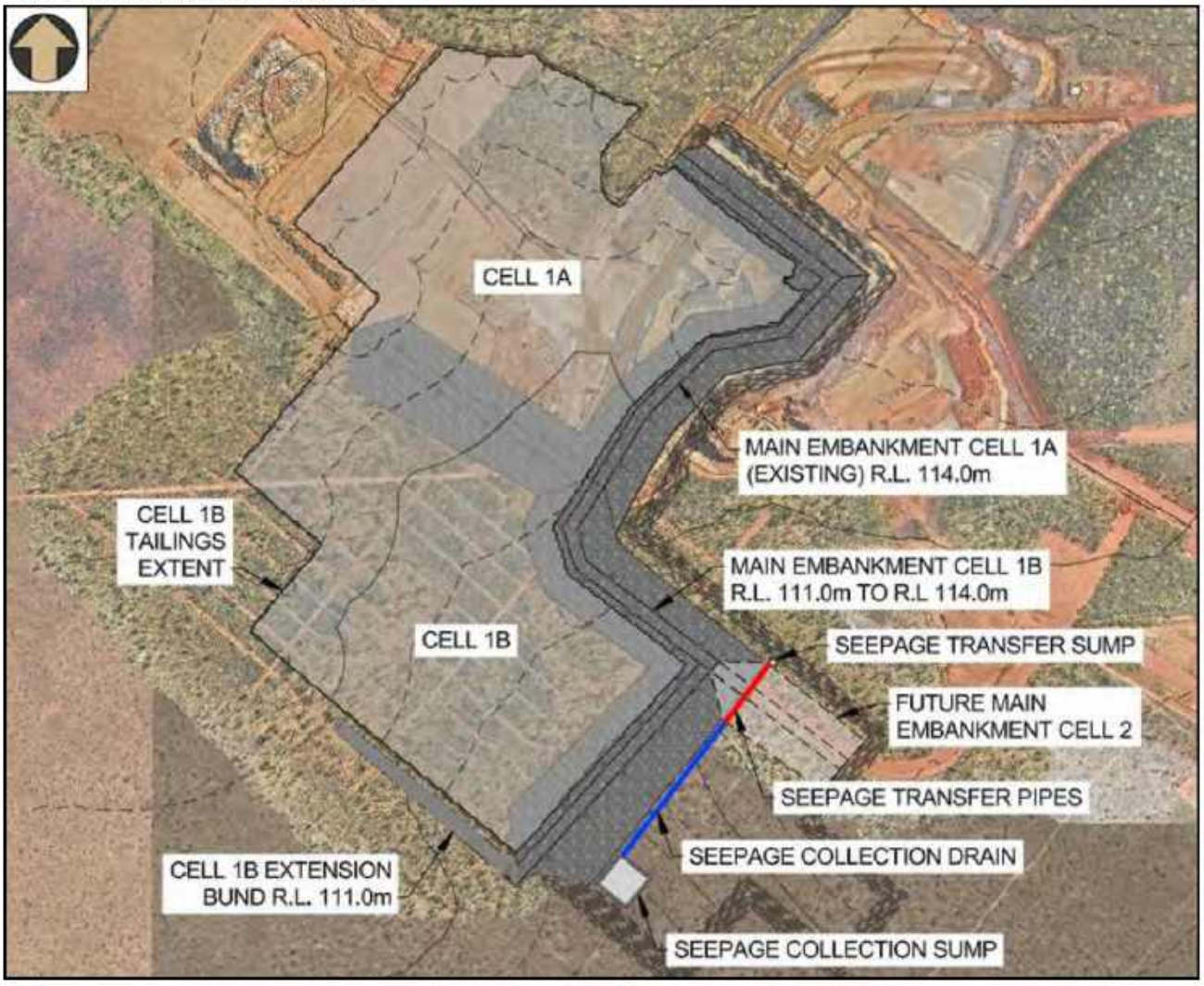


Figure 2: ITPSF Cell 1B General Arrangement



The design of IPTSF Cell 1 assumes an average tailings density of 1.6 t/m^3, which will provide approximately 17.1 Mm^3 of storage capacity for 27.4 Mt of tailings. Table 1 summarises the tailings storage capacity.

Table 1: IPTSF Cell 1 Tailings Storage Capacity Summary

Parameter	Cell 1A	Cell 1B
Assumed In-situ Tailings Density (t/m^3)	1.6	1.6
Tailings Throughput (Mtpa)	8.7	8.03
Tailings Storage Capacity (Mt)	8.79	18.58
Tailings Storage Capacity (Mm^3)	5.5	11.61
Estimated Storage Life	12 months	27 months

1.2 Scope of Operating Manual

This OM details the requirements for personnel who have the responsibility for the day-to-day operation and maintenance of the IPTSF Cell 1A and Cell 1B.

The objectives of the day-to-day management of the facility are as follows:

- Ensuring the facility and all associated infrastructure are operated, maintained and monitored to achieve the design objectives.

- Ensuring the TSF is operated in accordance with the design parameters that have been provided by the Owner for use in the design of the TSF. Where changes in the parameters are proposed, the process plant management must advise the designers so that the impact of the changes can be fully assessed.
- Ensuring the facility is operated such that the supernatant pond is located at its designed location.

This document also sets out the requirements for operating the facility, including aspects covering:

- Pump rate requirements from the seepage collection sump.
- Pump placement and water recovery considerations during commissioning phases.
- Deposition locations and tailings beach development.
- The routine daily inspections and monitoring.
- The objectives of the daily inspection and monitoring programme.

1.3 Operator Training

All Operators of the IPTSF Cell 1 and associated components, and Contractors working on the facility must complete the requisite training and competency testing and be aware of the emergency procedures prior to being allowed to work on the facility and associated components.

The Responsible Tailings Facility Engineer (RTFE), Processing Superintendent, and Mining Superintendent are responsible for ensuring that training, competency testing, and emergency awareness for Operators and Contractors are completed, and that Operators and Contractors are trained in the management of the facility.

Personnel inspecting the facility should be advised of the regulatory requirements for the facility as part of their induction and training. Copies of the regulatory Licence and or Lease Conditions relevant to the TSF are attached to this document in Appendix B. The RTFE must insert these documents into Appendix B of this Operations Manual and ensure that, whenever the regulatory conditions are changed (renewed, amended, or updated), the documents are updated, the staff are advised of the changes, and the training confirmation records are updated accordingly.

1.4 Guidelines, Codes of Practice and Standards

The following Guidelines, Codes of Practice and Standards are relevant to the operation of the facility:

- Australian National Committee on Large Dams (ANCOLD): "*Guidelines on the Consequence Categories for Dams*", 2012.
- Australian National Committee on Large Dams (ANCOLD): "*Guidelines on Tailings Dams Planning, Design, Construction, Operation and Closure*", 2019.
- DMP (now LGIRS), *Code of Practice – Tailings Storage Facilities in Western Australia*, 2013.

2. Facility Design and Operational Basis

2.1 Design Basis and Operational Compliance

In accordance with ANCOLD and LGIRS, a consequence classification rating of 'High C' and "Category 1' has been adopted for the design of IPTSF Cell 1, respectively. Construction work must be undertaken in accordance with drawings and earthwork specifications.

The facility is designed to accommodate tailings slurry deposited sub-aerially or sub-aqueously, primarily from the pit boundaries towards the Northwest and at selected retaining embankments, via a series of open-ended spigots operated in a cyclical sequence to promote uniform beach development and controlled deposition. The slurry will be delivered from the process plant through a HDPE pipeline at an approximate solids concentration of 48.5% by mass, feeding into a perimeter distribution system aligned with the designated deposition points.

The OM for the facility outlines the procedures for the safe management and control of operations. The provision of the OM must be strictly followed by the Owner, and the facility must be constructed and operated in full compliance with both the OM and the design. REC shall not be liable in any respect whatsoever for any damage to or failure in the operations of the tailings and water storage facilities resulting from the failure of the Owner, its servants or agents to comply with the provisions of the design and OM for the facility.

The appendices referred to in this document comprise the following and are to be attached to this document by the Owner:

- Appendix A: Emergency Assembly Points (**OWNER TO ATTACH**)
- Appendix B: Regulatory License and Lease Conditions (**OWNER TO ATTACH**)
- Appendix C: Operating Manual Forms for Process Plant Staff (**OWNER TO ATTACH**)
- Appendix D: Operational Templates (OMPPS1, OMPPS2, and OMPPS3)

2.2 Deposition Strategy and Operating Philosophy

The tailings deposition regime is designed to promote safe and controlled operation of IPTSF Cell 1 in alignment with its design. The primary objective is to minimise the size of the supernatant pond and promote drying and consolidation of deposited tailings, while ensuring the pond remains located within the designated perimeter embankment to facilitate decant recovery through the form of operational seepage.

To achieve this, the following operational principles apply:

- **Optimised storage:** Tailings will be deposited only at the designated locations for Cell 1A and Cell 1B's operation to allow for maximum utilisation of storage space while ensuring sufficient water storage requirements.
- **Controlled beaching and water management:** Deposition will be managed to maintain the supernatant pond within the designated area. Tailings discharge will be sequenced to achieve uniform beach slopes, maximise in-situ density, and enhance water recovery for reuse in the process plant.
- **Discharge method:** Tailings, delivered as a slurry, may be discharged sub-aerially (onto exposed surfaces) or sub-aqueously (into standing water), depending on pond levels and operational requirements at the time of discharge. Discharge may occur through multiple spigot outlets to promote even beach development and layering of the deposited tailings.
- **Pond and tailings freeboard compliance:** The supernatant pond level must remain below the Maximum Operating Limit (MOL) at all times. A minimum operational freeboard (tailings freeboard) of 500 mm is to be maintained at all times.

As deposition progresses, spigot locations and operating sequences may be adjusted to maintain optimal beach development and maximise the use of available storage volume. If operational changes are required (such as modifications to the deposition sequence, freeboard criteria, or water management approach), these must be assessed by the Engineer or Record (EoR), and where applicable, relevant regulatory authorities shall be notified prior to implementing material changes.

Near the end of the facility's life, the deposition philosophy may need to be revised to align with closure and decommissioning objectives. Updated deposition and water management procedures shall be developed and implemented as part of a decommissioning plan if required.

2.3 Supporting and Related Documents

This document is to be used in conjunction with the following related documents:

- IPTSF Cell 1 Detailed Design Report (document ref. P24-77-PR-13/DDR) and its attached appendices.

The forms which are relevant to this Operations Manual are provided in Appendix D and comprise the following templates:

- Daily Inspection Log Sheet (OMPPS1);
- Operations Personnel Contact Details (OMPPS2); and
- Training Confirmation Record (OMPPS3).

The content of these templates is intended to serve as a reasonable minimum for monitoring the facility's performance. The templates' content can be modified by site management, if required, to meet any additional site-specific requirements.

A plan showing the location of the Assembly Points in the event of an emergency is to be prepared by the RTFE. This plan should be designated and inserted behind the cover page and attached as Appendix A.

3. Operating Methodology

3.1 Background to Tailings Deposition

The method of tailings deposition into the facility is one of the major factors in achieving or exceeding the design requirements. The method of tailings deposition influences:

- In-situ densities within the stored tailings;
- Seepage magnitude and location; and
- Water return for reuse in the process plant.

It is essential to acquire a detailed understanding of the components of the tailings system to understand tailings deposition. The tailings system components include:

- Tailings pipeline from the process plant to the facility, including the associated valves in this pipeline which direct tailings to the various distribution points;
- Spigot operation and the spigotting (tailings deposition) process; and
- Flushing procedures for the tailings pipeline(s) and spigots.

3.2 Deposition Management

3.2.1 Tailings Pipeline

For TMSP, tailings are transported from the process plant to the TSF via a large-diameter HDPE pipe to the embankments, where they are to be discharged. Instrumentation is to be installed to monitor pipeline condition, detect leaks, and initiate automatic pipeline shutdown. An access track should be located along the pipeline to facilitate pipeline inspections and maintenance.

3.2.2 Spigotting Process

Tailings are deposited sub-aerially/sub-aqueously depending on the slurry water level within the facility at the time of discharge. The designed deposition locations for IPTSF Cell 1A and Cell 1B are detailed in the Design Drawings, attached in Appendix A of the IPTSF Cell 1 DDR

The deposition locations are primarily from the pit boundaries towards the Northwest and at selected retaining embankments, via a series of open-ended spigots operated in a cyclical sequence to promote uniform beach development and controlled deposition. Deposition at locations outside of design can be undertaken where necessary under the guidance of the EoR.

Care should be taken to ensure that the tailings are not discharged so as to damage the earthworks or allow tailings slurry flow to erode the perimeter embankment. Conductor may be utilised to ensure the tailings are deposited at the base of the facility. However, if open-ended spigotting is utilised, trials should be undertaken to observe any erosion and damage that occurs, upon which the designer or a qualified engineer is consulted on the suitability of open-ended spigotting.

Upon completion of the deposition on each spigot and after the changeover to the alternative spigot, the inoperative tailings line should be flushed with water until it is clean.

3.3 Freeboard Management

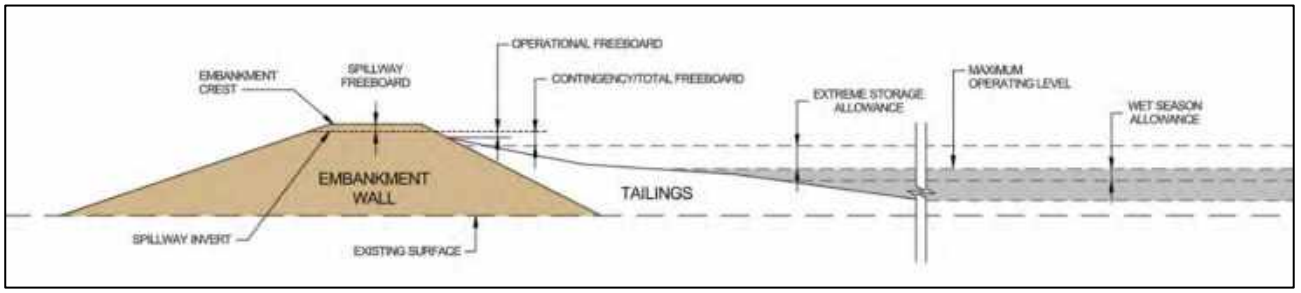
3.3.1 Definitions

Various definitions of freeboard are provided across the adopted design standards and guidelines. While these freeboards may be named differently, several are functionally equivalent, leading to overlap and potential complexities in application and interpretation. Collectively, these various freeboards have been consolidated into the freeboard definitions below for implementation in IPTSF Cell 1:

- Freeboard:
  - The vertical distance between the embankment crest and the reference.
- Operational Freeboard:
  - Freeboard between the tailings level and the adjacent embankment crest.
  - Operational freeboard is the underlying freeboard that governs the available supernatant pond capacity.
- Spillway Freeboard (where applicable):
  - Freeboard between the embankment crest and the spillway invert.
  - For typical paddock perimeter discharge facilities, this should coincide with the lowest elevation along the perimeter embankment.
  - Flood spill depth is the depth of water flow over the spillway for the design flood event.
- Contingency Storage Allowance:
  - Additional storage allowance above the design storm event.
  - Typically provided in standards or guidelines in the form of a vertical distance rather than volume.
- Extreme Storage Allowance:
  - Based on the design storm inflow – function of the catchment area, runoff coefficient, and the design storm event depth.
  - Not to be encroached upon during normal operating conditions.
  - Freeboard subject to the depth-volume relationship atop the tailings surface.
- Wet Season Storage Allowance:
  - Allowance for the storage of water, which may conservatively be required to be stored on the tailings dam through a combination of excess wet season rainfall runoff from the facility catchment and processing water which cannot be extracted from the dam.
  - Freeboard subject to the depth-volume relationship atop the tailings surface.

The aforementioned freeboard components are shown graphically in Figure 3.

Figure 3: TSF Freeboard Definition



The height from the embankment crest at any stage of IPTSF Cell 1A and Cell 1B operation to the tailings solids and supernatant pond retained in the facility will vary. It must be understood that the Maximum Operating Limit must always be maintained under regular operation. Should water levels rise above the Maximum Operating Level, additional pumps should be engaged to abstract

water from the facility until the levels are reduced to an acceptable level. Additionally, an Operating Freeboard of 500 mm is to be maintained at all times.

3.3.2 Freeboard Requirements

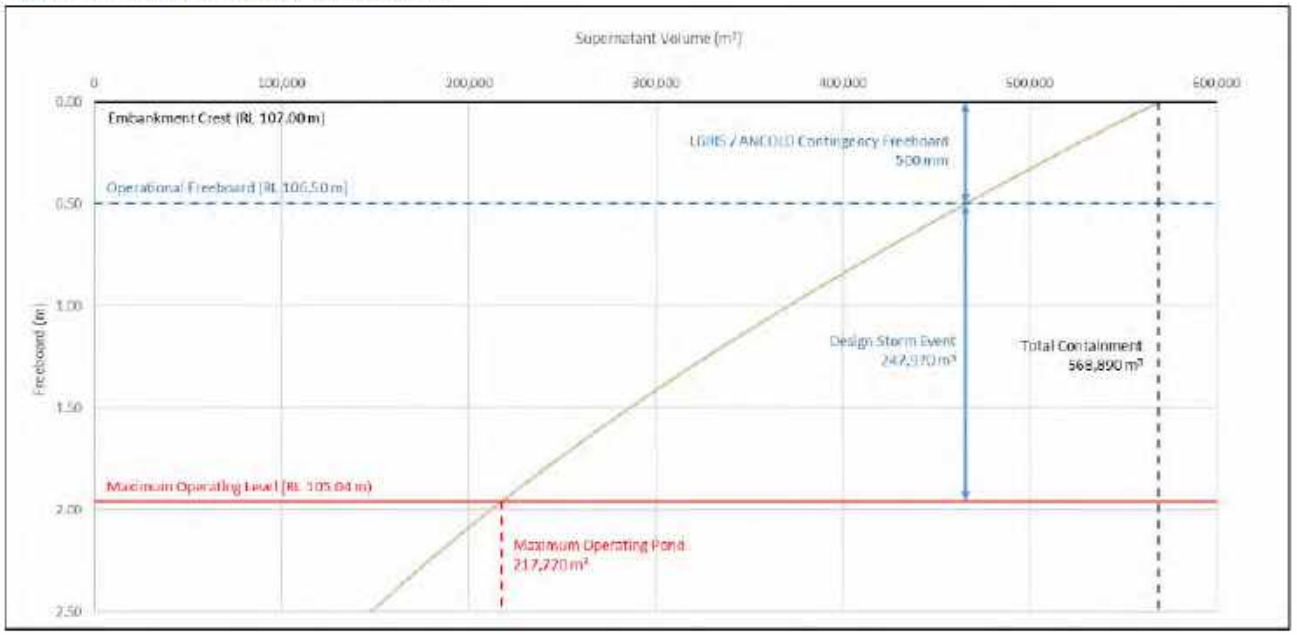
3.3.2.1 IPTSF Cell 1A Freeboard

In accordance with the adopted classifications of the guidelines, the design storm rainfall volumes for the facility and the maximum operating pond level were assessed. REC notes that the stormwater storage capacity is dependent upon the development of the beach slope achieved throughout the facility's operation and reconciliations will likely be required towards the end of the storage life of the facility. Table 2 and Figure 4 presents the freeboard limits for IPTSF Cell 1A.

Table 2: IPTSF Cell 1A Freeboard Limits

Parameter	Inc. Freeboard (m)	Elevation (RL m)	Storage Capacity (m³)
Embankment Crest	–	107.00	542,240
Contingency Storage Allowance			
LGIRS / ANCOLD Contingency Freeboard	0.50	106.50	465,680
Extreme Storage Allowance			
Design Storm Event (1:100 AEP, 72-hour event)	1.46	105.04	217,720
Operating Limits			
Maximum Operating Pond Limit	1.96	105.04	217,720

Figure 4: IPTSF Cell 1A Top-down Storage Curve



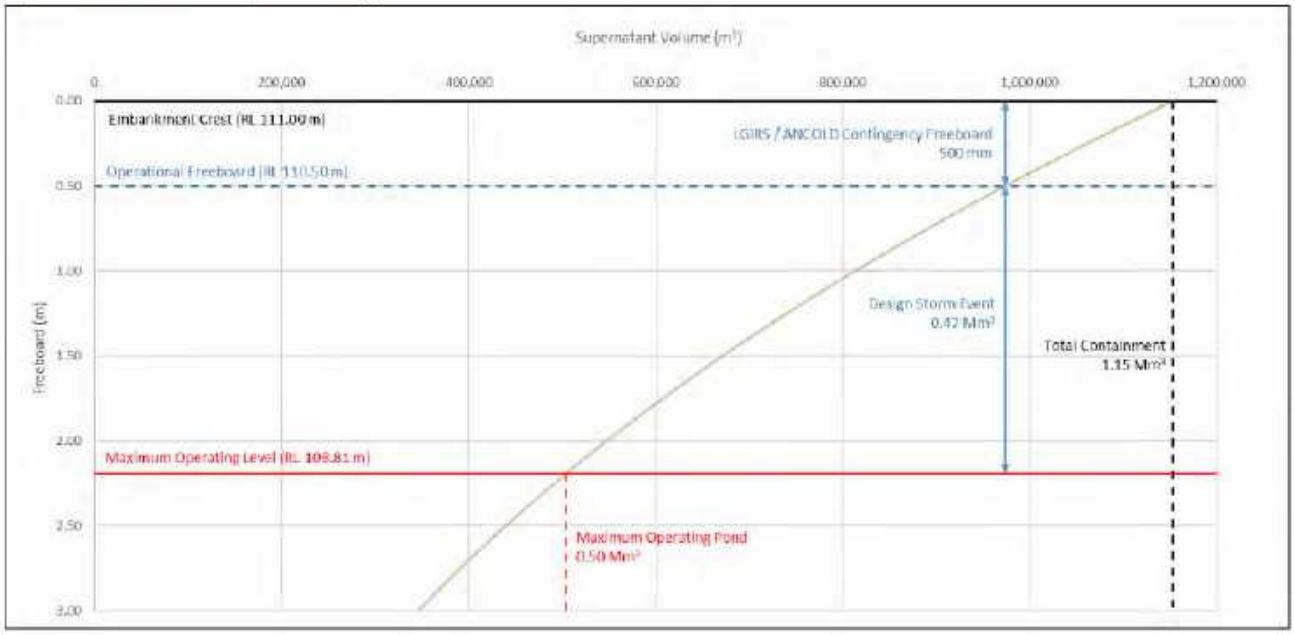
3.3.2.2 IPTSF Cell 1B Freeboard

Table 3 and Figure 5 presents the freeboard limits for IPTSF Cell 1B.

Table 3: IPTSF Cell 1B Freeboard Limits

Parameter	Inc. Freeboard (m)	Elevation (RL m)	Storage Capacity (m³)
Embankment Crest	–	111.00	1,181,260
Contingency Storage Allowance			
LGIRS / ANCOLD Total Freeboard	0.50	110.50	974,310
Extreme Storage Allowance			
Design Storm Event (1:100 AEP, 72-hour event)	1.69	108.81	504,290
Operating Limits			
Maximum Operating Pond Limit	2.19	108.81	504,290

Figure 5: IPTSF Cell 1B Top-down Storage Curve



3.4 Seepage and Water Recovery

3.4.1 Water Recovery Philosophy

Seepage through the embankments is anticipated to be substantial under steady-state typical operating conditions (supernatant pond at Maximum Operating Level). The seepage assessment outcomes indicate that an upper bound of approximately 26,150 m³ of water will be discharged through the embankment each day for Cell 1A, and 50,615 m³ per day for Cell 1B. The probabilistic Water Balance Model (WBM) outcomes indicate that this upper bound is rarely reached, and consequently, the typical pond level during operations is expected to remain below the Maximum Operating Limit, and seepage will be limited by typical inflows during operating conditions.

Given that the supernatant pond is likely to remain small during operations, and internal water recovery within the facility is expected to be ineffective, water recovery has therefore been designed to be managed predominantly externally, through the collection of operational seepage.

3.4.2 Cell 1A Seepage and Water Recovery

The expected seepage during Cell 1A operations is designed to be collected via seepage collection drains and pipes. The seepage outflow is segmented into the two regions presented in Figure 6.

Figure 6: IPTSF Cell 1A Seepage Regions

Seepage from Region A to Region B is connected via the seepage transfer sump and the seepage transfer pipes, located below the Cell 1B embankment. The operational seepage will ultimately collect at the seepage collection sump located at the pit base towards the Southeast corner of the facility, where water recovery will be undertaken. The probabilistic WBM indicates that the seepage realistically achievable during typical operation amounts to approximately 19,800 m^3 per day.

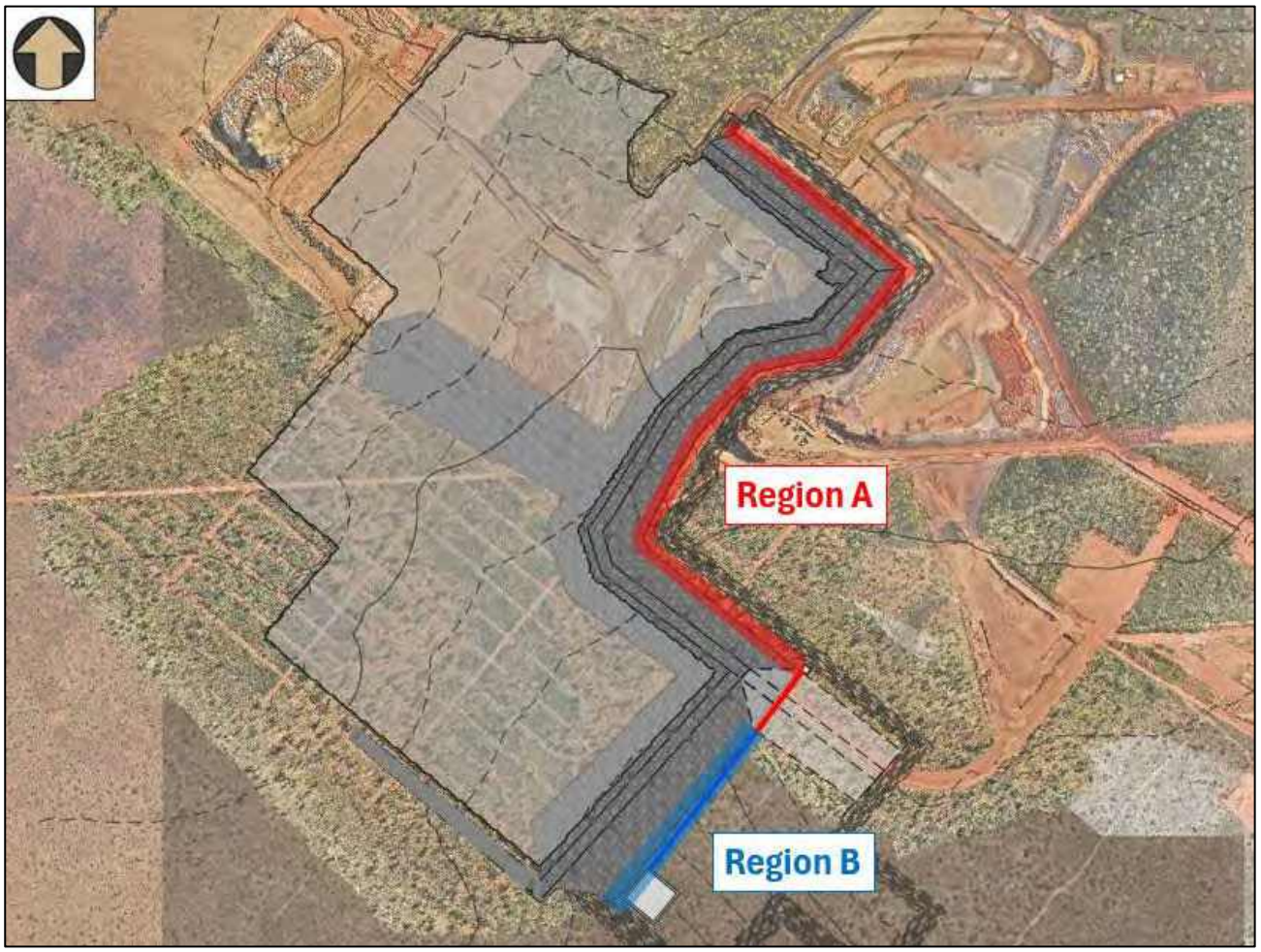
To manage the water recovery in the seepage collection sump, a pumping system comprising a primary and secondary pump, each capable of abstracting 900 m^3 per hour is required (based on a targeted run-time of 22 hours per day). The secondary pump should remain on standby or be relocated to support water recovery as needed.

Prior to the commencement of Cell 1B operations, the seepage transfer pipes must be securely plugged at both ends to prevent any tailings transfer through the pipes during operation. The plugs must adequately prevent water or tailings backflow throughout Cell 1B operation. It is to be noted that during Cell 1B operations, the Cell 1A seepage collection infrastructure downstream of the Internal Weir is intended to be buried by Cell 1B tailings depositions; this will have no impact on the intended operation on the subsequent stage of the facility.

3.4.3 Cell 1B Seepage and Water Recovery

Similar to Cell 1A operations, the expected seepage during Cell 1B operations is designed to be collected via seepage collection drains and pipes. The seepage outflow is segmented into the two regions presented in Figure 7.

Figure 7: IPTSF Cell 1B Seepage Regions



The seepage collection and water recovery for Cell 1B are similar to those of Cell 1A. Seepage from Region A to Region B is connected via the seepage transfer sump and the seepage transfer pipes, located below the Cell 2 embankment (to be designed). The operational seepage will ultimately collect at the seepage collection sump located at the pit of the base towards the South of the facility. The probabilistic WBM indicates that the seepage realistically achievable during typical operation amounts to approximately 19,800 m^3 per day.

To manage the water recovery in the seepage collection sump, a pumping system comprising a primary and secondary pump, each capable of abstracting 900 m^3 per hour is required (based on a targeted run-time of 22 hours per day). The secondary pump should remain on standby or be relocated to support water recovery as needed.

Prior to the commencement of Cell 2 operations, the seepage transfer pipes must be securely plugged at both ends to prevent any tailings transfer through the pipes during operation. The plugs must adequately prevent water or tailings backflow throughout Cell 2 operation.

4. Monitoring and Surveillance

4.1 Monitoring

A program of monitoring and surveillance has been implemented as part of the REC EoR Framework to evaluate the performance of the facility with respect to the original design expectations. The data obtained will:

- Form the basis of annual surveillance and quarterly performance reviews.
- Be used to assess and integrate required maintenance programs.

Some of the key monitoring items will include the following:

- Routine reconciliation of tailings discharge tonnage and solids concentration.
- Routine monitoring of tailings beach head and beach toe level.
- Routine monitoring of pond water levels and process plant return water rates.
- Routine monitoring of seepage collection sump water levels.
- Quarterly evaluation of tailings dry density.
- Quarterly monitoring of groundwater quality.
- Ad hoc assessment of seepage collection sump (recovery water) quality.

The existing groundwater monitoring bores around the facility will be used to monitor groundwater levels and quality. These bores will be monitored prior to the commencement of deposition of tailings into the IPTSF to provide baseline data for the project and then quarterly throughout the life of the project.

The tailings are considered geochemically benign, with no effective potential for acid generation or neutralisation, and no significant changes to groundwater quality are expected. If monitoring results indicate adverse impacts, a risk assessment shall be undertaken by a qualified specialist, and dewatering bores may be installed where required to mitigate potential impacts.

4.2 Surveillance

4.2.1 Inspection Requirements

Routine inspection of the facility will be carried out to check whether the design strategy is being implemented and to identify any maintenance requirements or any circumstances associated with facility performance that need further attention. TMSP will carry out regular inspections of the facility and its appurtenant features.

The operating manual will provide procedures and protocols for inspection requirements in accordance with the facility consequence category. Observations made during the inspections will be appropriately filed and reported. Any incidents that occur will be reported in accordance with the operating licence conditions and statutory regulations. As per ANCOLD guidelines, the inspection type and frequency for a ‘High C’ facility have been summarised in Table 4.

Table 4: Inspection Type and Frequency

Type of Inspection	Frequency	Personnel	Purpose
Comprehensive	After the first year of operation, then every 2 years	Dams engineer and specialist (where relevant)	The identification of deficiencies by a thorough onsite inspection; by evaluating data; and by applying current criteria and prevailing knowledge. Equipment should be test operated to identify deficiencies.
Intermediate	Annual	Dams engineer	The identification of deficiencies by visual examination of the dam and review of surveillance data against prevailing knowledge. Equipment is not necessarily operated.
Routine	Daily to 3 times a week	Operations personnel	The identification and reporting of deficiencies by field and operating personnel as part of their duties at the dam.
Special	As required	Dams engineer and specialist	The examination of a particular feature of a dam for some special reason (e.g. after earthquakes, heavy floods, rapid draw down).
Emergency	As required	Dams engineer	The examination of a particular feature of a dam which has been identified as having a possible deficiency or which has been subject to abnormal conditions.

4.2.2 Routine Inspections

A minimum of three (3) inspections must be carried out throughout the week. However, it is recommended that two (2) inspections be conducted during each shift (day and night) for a total of four (4) inspections per day. Inspections must be executed by trained staff, namely the RTFE on each shift or by a designated trained operator.

The date and time of each inspection are to be recorded in an Inspection Logbook, which may be maintained digitally or in hard copy, and signed by the person allocated to undertake the inspection for that shift to confirm that all requirements have been met. Inspection records (including photography taken during the inspection) are to be retained on-site and made available to the Engineer of Record (EoR) upon request. Routine inspections for the facility must cover the following aspects (refer to OMPPS1 in Appendix D):

- Deposition infrastructure:
    - Tailings and return water pipeline
    - Return water pumps
    - Spigots and valves
- Deposition point management
- Supernatant pond location and size
- Seepage condition (clear or cloudy)
- Seepage collection infrastructure
    - Water recovery pumps
    - Seepage transfer sump
    - Seepage transfer pipes
    - Seepage collection drain
    - Seepage collection sump
- Integrity of the embankment (inspection and deformation monitoring)
- Aerial surveys (a minimum of once per month)

Any leaks or failures of the tailings pipeline, deterioration of the integrity of the embankment, or abnormally high water levels in the facility must be immediately reported to the following personnel as appropriate:

- Issues with potential impacts to embankment integrity:
    - RTFE
    - Design Engineer / EoR

- Mining Superintendent
- Processing Superintendent

- Issues with potential impacts to the environment:
  - RTFE
  - Environmental Superintendent

4.2.3 Tailings and Return Water Pipeline

Tailings pipelines are sensitive to temperature fluctuations, which cause the material to expand and contract. Repeated thermal movement can place stress on joints, welds, and connections, potentially leading to leaks or, in extreme cases, pipeline failure. Although it is understood that instrumentation has been installed to detect potential leaks, the pipelines must be inspected at least once per shift. Any abnormalities must be reported immediately to the RTFE, Environmental Superintendent, Processing Superintendent, and Maintenance Superintendent.

4.2.4 Supernatant Pond

The pond's position and size must be inspected at least once per shift. Any abnormalities must be reported immediately to the RTFE and the Design Engineer / EoR. Should the supernatant pond exceed the Maximum Operating Limit during regular operation, full abstraction is to be engaged until the supernatant pond aligns with the Maximum Operating Limit.

4.2.5 Retaining Embankments

As part of each TSF inspection, the containment embankments, including berms and batter slopes, must be visually assessed. The presence of any cracking (new or developing), or other features such as embankment erosion or scour (caused by tailings deposition or rainfall runoff) or any other noticeable changes to the physical state of the embankment since the previous inspection must be entered into the Inspection Logbook and immediately reported to the following personnel:

- RTFE
- Design Engineer / EoR
- Mining Superintendent
- Processing Superintendent

4.2.6 Instrumentation

4.2.6.1 General

A series of Vibrating Wire Piezometers (VWPs) and survey monuments shall be installed to assess embankment conditions. The general monitoring network provides coverage as follows:

- VWPs: Placed along the upstream toe and at the base of the embankment. Data records from the VWPs will provide information on changes in water level within the embankment and will be used for assessing the operational performance of the facility. Future trigger levels may be incorporated to allow for ‘real-time’ responses pending phreatic conditions within the embankment.
- Settlement pins: Installed at intervals along the embankment crest. Weekly survey data collected from monuments shall provide deformation / settlement trends of the facility to inform embankment integrity. Future trigger levels may also be incorporated for elevated responses depending on deformation magnitude.

4.2.6.2 Settlement Pin

A total of 22 settlement pins is proposed to be installed across the perimeter embankment crest near the upstream crest edge. Weekly surveys of the settlement pin are to be undertaken and provided to REC for review. Table 5 summarises the proposed settlement pin locations.

Table 5: Proposed Settlement Pin Locations

Settlement Pin ID	Location	Easting (m E)	Northing (m N)
SP-01	Cell 1A Perimeter Embankment	495,789.19	8,073,801.65
SP-02		495,868.44	8,073,740.66
SP-03		495,947.69	8,073,679.67
SP-04		495,932.07	8,073,610.87
SP-05		495,847.97	8,073,566.71
SP-06		495,755.47	8,073,537.35
SP-07		495,684.46	8,073,466.95
SP-08		495,622.51	8,073,389.39
SP-09		495,570.81	8,073,304.21
SP-10	Cell 1B Perimeter Embankment	495,550.63	8,073,272.26
SP-11		495,527.46	8,073,184.47
SP-12		495,588.06	8,073,110.73
SP-13		495,667.88	8,073,050.49
SP-14		495,747.70	8,072,990.25
SP-15		495,702.43	8,072,918.35
SP-16		495,635.13	8,072,844.39
SP-17		495,567.82	8,072,770.43
SP-18		495,500.52	8,072,696.47
SP-19	Cell 1A Internal Weir	495,244.98	8,073,519.49
SP-20		495,330.03	8,073,466.90
SP-21		495,415.09	8,073,414.31
SP-22		495,500.14	8,073,361.72

4.2.6.3 Vibrating Wire Piezometer

A total of 6 VWPs are proposed to be installed across the perimeter embankment, to a depth of approximately 0.5 m above the mined pit floor. The VWPs readings will be recorded in 'real-time' to the Geoscience Data Management System (GDMS), REC's in-house cloud monitoring system. Table 6 summarises the proposed VWP locations.

Table 6: Proposed VWP Locations

VWP ID	Location	Easting (m E)	Northing (m N)	Elevation (RL m)
VWP-01	Cell 1A Perimeter Embankment	495,922.28	8,073,599.64	93.92
VWP-02		495,640.34	8,073,417.81	86.83
VWP-03	Cell 1B Perimeter Embankment	495,390.18	8,073,429.12	81.67
VWP-04		495,230.61	8,073,527.76	78.96
VWP-05	Cell 1A Internal Weir	495,623.05	8,073,084.95	82.70
VWP-06		495,519.00	8,072,716.04	74.29

5. Emergency Action Plan

5.1 Overview

The facility has been designed to limit danger to life and property and to minimise impacts on the surrounding environment. Regardless of the possible level of risk associated with tailings management, a contingency plan is required to address any eventuality that might arise. The following emergency response plan has been developed to be implemented to reduce the potential for unacceptable risk and consequential damage.

It is well known that water is the most common element relating to the majority of facility failures. For this reason, facility operators are encouraged to manage water on or near their facilities carefully. The supernatant water pond in the facility should be kept to a minimum practical level. The pond should be located around the design location. Following heavy rainfall, excess water stored in the facility should be removed as soon as possible.

5.2 Response Actions

In the event of an emergency, the site Emergency Response Team (ERT) must be notified and advised of its nature immediately to enable the appropriate emergency action plan to be implemented. At the time of the emergency, the General Manager 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 on the form (OMPPS2) appended to this document. This form must be reviewed at least quarterly and updated immediately upon personnel leaving or joining the operation.
- All mine-based personnel listed in OMPPS2 are immediately contacted and advised of the nature of the emergency, and any assistance required is requested.

All personnel working in the vicinity of the emergency are expected to be present at the muster points and to be aware of other assembly points around the TSF and the relevant reporting procedures. Emergency assembly points are shown in Appendix A of this document.

5.3 Pipeline Breakage and Spillage

In the event of pipeline failure, the automated tailings line shutdown should be initiated. Should the automated shutdown fail, the Process Superintendent 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 the facility. Transfer through the affected pipeline is to cease until repairs and investigation (if required) are completed.

5.4 Embankment Deformation

Should a visual inspection reveal local embankment cracking, significant erosion, sloughing and/or settlement, the following actions should be carried out by a qualified engineer if possible:

- Immediately contact:
    - RTFE
    - Design Engineer / EoR
    - Mining Superintendent
    - Processing Superintendent
- The short-term risk will be immediately assessed between the RTFE and the EoR, and appropriate measures adopted to address the problem.
- Cease tailings deposition immediately if recommended by RTFE or the EoR.
- Short-term remediation designs will immediately be implemented, while longer-term solutions and actions are developed.

- The longer-term actions, once implemented, will be monitored to limit risk.

5.5 Critical Embankment Failure

The embankments have been designed with an adequate factor of safety against failure under critical static and seismic load conditions, in accordance with applied guidelines and design standards.

The probability of embankment failure during normal operations is very low, given that:

- The embankment construction has been or should have been carried out in accordance with the design; and
- The implementation of the operating methodology, along with the monitoring and surveillance requirements (Sections 3 and 4), including routine inspections and maintenance practices, are adhered to in accordance with the provisions set out in the OM.

However, in the unlikely event of embankment failure, the flow of tailings from the storage will be controlled by the degree of saturation of the tailings at the time of failure

Action to control a small-scale embankment failure and limit environmental damage would include:

- Assessing the requirement to shut down the process plant, or reduce process plant throughput;
- Diversion of tailings deposition to areas not affected by the small-scale embankment failure;
- Construction of bunds by earthmoving equipment to divert and contain the tailings;
- Contacting the Design Engineer / EoR for technical assistance (specialist engagement may be required at the recommendation of the Design Engineer / EoR);
- Deployment of pumps to recover tailings water as appropriate and return it either to the facility 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 or without a specialist, depending on the scale of the failure, prior to the commencement of any repairs;
- Undertaking remedial and repair work of the damaged embankment or affected area;
- Clean up of tailings as soon as practicable after embankment repairs have been completed and the storage is considered in a safe condition;
- Preparing an incident report, detailing all factors prior to the incident and the situation after clean-up. The report should identify the causes of the problem and outline the actions to be taken to prevent a similar occurrence. This report should detail the ongoing monitoring programme to fully assess the impact of the incident, and
- Advising all appropriate government departments as necessary of the incident, reviewing the conditions of the operating licence and lease conditions to ensure that the timing of reports and content of reports meet the regulatory requirements.

Action to control a large-scale embankment failure and to limit environmental damage would include:

- Shut down of the process 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 the TSF 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 embankment 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 the causes of the problem and outline the actions to be taken to prevent a similar occurrence. This report should detail the ongoing monitoring programme to fully assess the impact of the incident;
- Advising all appropriate regulatory authorities as necessary of the incident; and
- Reviewing conditions of any licence or lease conditions in respect to the timing of advising the regulatory authorities and the contents of that notification (reporting criteria).

It must be reiterated that the safe operation of the facility relies on the implementation of operational methodology that comprises tailings deposition, decant operations, and routine inspections and maintenance, to minimise the potential for a catastrophic event such as embankment failure.

5.6 Water Recovery Pump

The water recovery pump is to be operated at all times. The pump is only switched off:

- In the event of an emergency, where necessary.
- When future cell construction interferes with the operations of the pump.
- Primary pump breakdown, switch-over to secondary pump.
- Relocation of pumps.

Alternative pumping equipment and pump locations may be required during periods of pump maintenance or when embankment construction work impacts the operation of the pump. The supernatant water level is to be recorded and reviewed at least once a day during pump shutdown. More frequent inspections may be prescribed by the Design Engineer / EoR or any other parties of concern.

6. Incident Reporting

In Western Australia, reportable incidents are governed by the Work Health and Safety (Mines) Regulation 2022 under the Work Health and Safety Act 2020 (WHS Act). The below incidents must be reported to the appropriate regulatory bodies.

Fatalities and serious injuries:

- Death of a worker or other person on the mining site.
- Serious injuries or illnesses, including:
    - Amputation of a body part.
    - Serious head or eye injury.
    - Spinal injuries.
    - Serious burns.
    - Loss of bodily function.
    - Any injury requiring immediate hospital treatment.

Dangerous incidents (near misses):

- Uncontrolled escape, spillage, or leakage of substances.
- Uncontrolled explosion or fire.
- Unplanned collapse of ground, tunnels, or mine workings.
- Failure of ground support systems (e.g., rockfall, stope failure).
- Failure of plant or structure (e.g., tailings dam, heavy machinery).
- Uncontrolled inrush of water, mud, or gas.
- Electrical incidents, including contact with live wires or serious arc flash incidents.
- Airborne contaminants exceeding safe exposure limits.
- Vehicle or equipment collisions leading to a hazardous situation.

Specific mining hazards:

- Geotechnical failures (e.g., slope failures, pit wall collapses).
- Seismic events affecting operations.
- Explosives-related incidents (e.g., misfires, premature detonation).
- Unexpected interactions with hazardous materials.
- Loss of mine communication systems or emergency response capability.

Occupational health exposures:

- Exceedance of exposure limits for silica dust, asbestos, diesel particulates, or other hazardous substances.
- Overexposure to radiation or noise.
- Failure of a ventilation system leading to unsafe atmospheric conditions.

Environmental incidents:

- Uncontrolled tailings or hazardous waste discharge.
- Significant contamination of land, water, or air.
- Failure of containment structures (e.g., TSF breach).

In the event that an incident occurs, the KMS Environmental Department and the Mine Operator must be informed immediately. After contacting the KMS Environmental Department, the applicable reporting form should be completed describing the nature of the incident, and submitted to the following regulatory bodies as soon as practical:

- LGIRS (previously known as DMP / DEMIRS) – WorkSafe WA (Mines Safety)
    - Serious incidents are to be reported immediately (via phone or online portal)
    - Written report required within 2 days for fatalities or serious incidents.
- DWER – for environmental incidents
- Emergency Services (000) – if immediate public safety is at risk.

Appendix A

Emergency Assembly Points

Appendix B

Regulatory License and Lease Conditions

Appendix C

Operating Manual Forms for Process Plant Staff

Appendix D

Operational Templates

DOCUMENT:	IPTSF CELL 1 DAILY INSPECTION SHEET			Document Control	
				Document Name:	IPTSF CELL 1 Daily Inspection Sheet
SITE:	THUNDERBIRD OPERATIONS PTY LTD			Date of Issue:	29-Oct-25
				Revision:	C
Date:		Time:		Inspection by:	
Shift Supervisor:		TSF/Cell Number:		Verified by:	

Item	CRITERIA	YES/NO/NA		PHOTOGRAPH/DETAIL		COMMENTS
		DAY SHIFT	NIGHT SHIFT			
1	**Access Roads / Ramps**					
1.01	Are they in good condition?			Photograph No:		
1.02	Is dust being degenerated when trafficked?			Photograph No:		
1.03	Is there any visable erosion? If yes, is it new or existing?			Photograph No:		
1.04	Has the existing erosion increased in size? Is Remediation required?			Photograph No:		
1.05	Are the access road / ramp safety bunds at 0.6 m height along its entire length?			Photograph No:		
2	**Embankment**					
2.01	Any distress, cracking or deformation observed in the embankment?			Photograph No:		
2.02	If yes, is it new ?			Photograph No:		
2.03	Has the existing cracking/deformation increased in size?			Photograph No:		
2.04	Any erosion observed in the embankment?			Photograph No:		
2.05	If yes, is it new ?			Photograph No:		
2.06	Has the existing erosion increased in size ?			Photograph No:		
2.07	Any rock fall observed from embankment?			Photograph No:		
2.08	If yes, is it new ?			Photograph No:		
2.09	Are the embankment safety bunds at 0.6 m height along its entire length?			Photograph No:		
2.10	Any water ponding underneath tailings distribution lines?			Photograph No:		
2.11	Any staining or discolouration of soil/rock present on the embankment and slopes?			Photograph No:		
2.12	Any abnormal seepage (focused, cloudy, staining)?			Photograph No:		
2.13	If yes, is it new ?			Photograph No:		
2.14	Is the height of the deposited tailings less than 500 mm from the pit crest at any location?			Photograph No:		
2.15	Any construction activities at the pit crest?			Photograph No:		
2.16	Any tailings spillages?			Photograph No:		
3	**Supernatant Pond**					
3.01	Is the water pond positioned around the designated pond area?			Photograph No:		
3.02	Is the water pond level within the Maximum Operating Limit?			Photograph No:		
3.03	What is the approximate average pond depth (if identifiable)?			Photograph No:		
3.04	What is the approximate pond size?			Photograph No:		
3.05	What is the approximate pond surface coverage (% of tailings beach)?			Photograph No:		
3.06	Is the water in the decant pond clear?			Photograph No:		
4	**Seepage Collection Infrastructure**					
4.01	Is the seepage transfer sump blocked / filled with sediments?			Photograph No:		
4.02	Are the seepage transfer pipes blocked / filled with sediments?			Photograph No:		
4.03	Is the seepage collection drain blocked / filled with sediments?			Photograph No:		
4.04	Is the seepage collection sump filled with sediments?			Photograph No:		
4.05	Are the primary and secondary pumps in operable conditions?			Photograph No:		
4.06	Are there any outstanding maintenance repair issues?			Photograph No:		
4.07	Can the primary and secondary pumps be accessed?			Photograph No:		
4.08	Can the secondary pump be relocated on demand if required?			Photograph No:		
5	**Tailings and Return Water Lines**					
5.01	Any tailings spillages along pipe lines?			Photograph No:		
5.02	Are the tailings and water return lines intact and free of cracks?			Photograph No:		
5.03	Any scouring around the tailings and return lines?			Photograph No:		

5.04	Are the tailings and water return lines leaking?			Photograph No:		
5.05	Are there outstanding maintainence repair issues?			Photograph No:		
6	**Tailings Discharge**					
6.01	Identify spigots in operation.			Spigot Numbers:		
6.02	Is the number of spigots operating and the location of the spigots as planned?			Photograph No:		
6.03	Is the spigotting effective in keeping the water around the decant pond?			Photograph No:		
6.04	Do any of the spigots leak or need repair?			Photograph No:		
7	**Monitoring**					
7.01	Are all IPTSF monitoring instrumentation in working condition?			Photograph No:		
7.02	Are there any abnormal deformations recorded by the settlement pins?			Photograph No:		
8	**Fauna and Flora**					
8.01	Any fauna deaths?			Photograph No:		
8.02	Any new distress to surrounding flora (if identifiable)?			Photograph No:		
8.03	Any vegetation requiring removal due to potential growth size?			Photograph No:		

Additional Comments

This section shall include any other signs of concern that have not been included in the above list.

TSF PERSONNEL CONTACT DETAILS (OMPPS2)

NOTE: This sheet must be updated quarterly as a minimum. This sheet must be updated immediately following personnel leaving or starting on site and shall include all personnel listed below, and associated with the TSF.

PROJECT:		**DATE:**	
LOCATION:			

PERSONNEL	POSITION	CONTACT DETAILS (WORK PHONE, MOBILE PHONE, HOME PHONE)
	General Manager	
	Process Plant Manager / Superintendent	
	Mill Foreman	
	Maintenance Manager / Superintendent	
	Mine Manager / Superintendent	
	Environmental Manager / Superintendent	
	Security Manager / Superintendent	
	Emergency Response Team	
	Emergency Response Team	
	Emergency Response Team	
	Emergency Response Team	
	Emergency Response Team	
	Emergency Response Team	
	Emergency Response Team	
	Emergency Response Team	
	Emergency Response Team	
	Operator	
	Operator	
	Operator	
	Operator	
	Operator	
	Operator	
	Operator	
	Operator	

TSF PERSONNEL TRAINING REGISTER (OMPPS3)

All Operators of the TSF and associated components and Contractors working on the TSF must complete requisite training, competency testing and be aware of the emergency procedures prior to being allowed to work on the TSF.

PROJECT:		**DATE:**	
LOCATION:			

PERSONNEL	POSITION	TRAINING COMPLETED	COMPETENCY TESTING
	General Manager		
	Process Plant Manager / Superintendent		
	Mill Foreman		
	Maintenance Manager / Superintendent		
	Mine Manager / Superintendent		
	Environmental Manager / Superintendent		
	Security Manager / Superintendent		
	Emergency Response Team		
	Emergency Response Team		
	Emergency Response Team		
	Emergency Response Team		
	Emergency Response Team		
	Emergency Response Team		
	Emergency Response Team		
	Emergency Response Team		
	Emergency Response Team		
	Operator		
	Operator		
	Operator		
	Operator		
	Operator		
	Operator		
	Operator		
	Operator		
	Operator		

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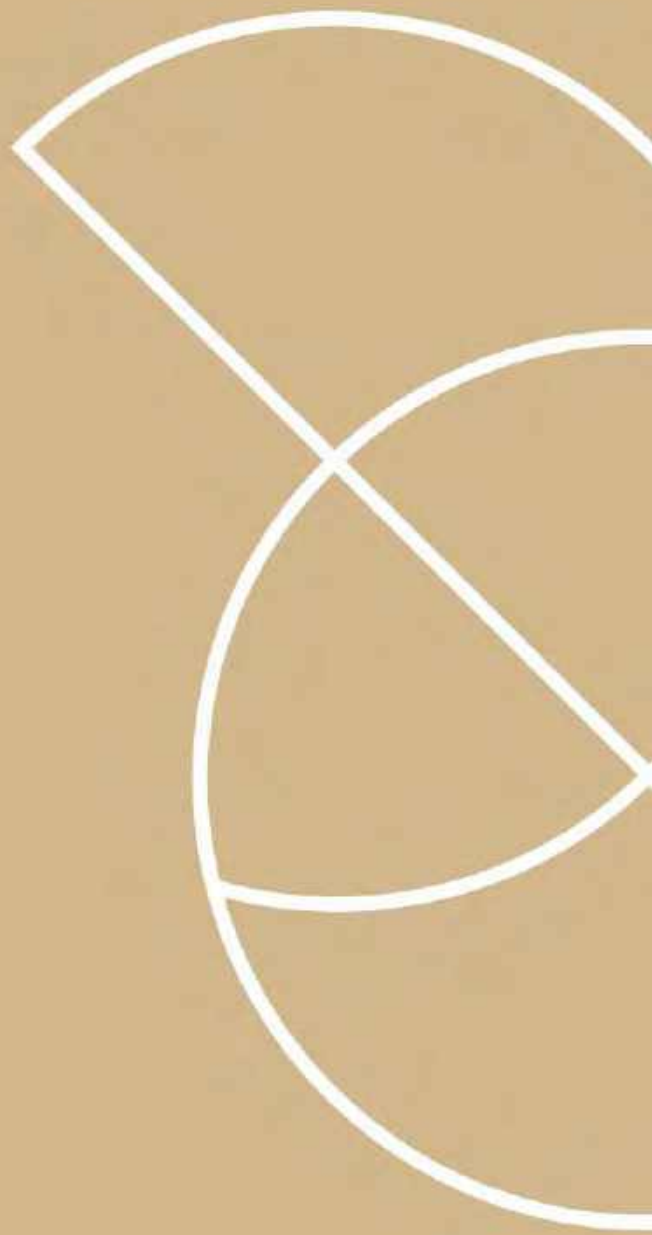
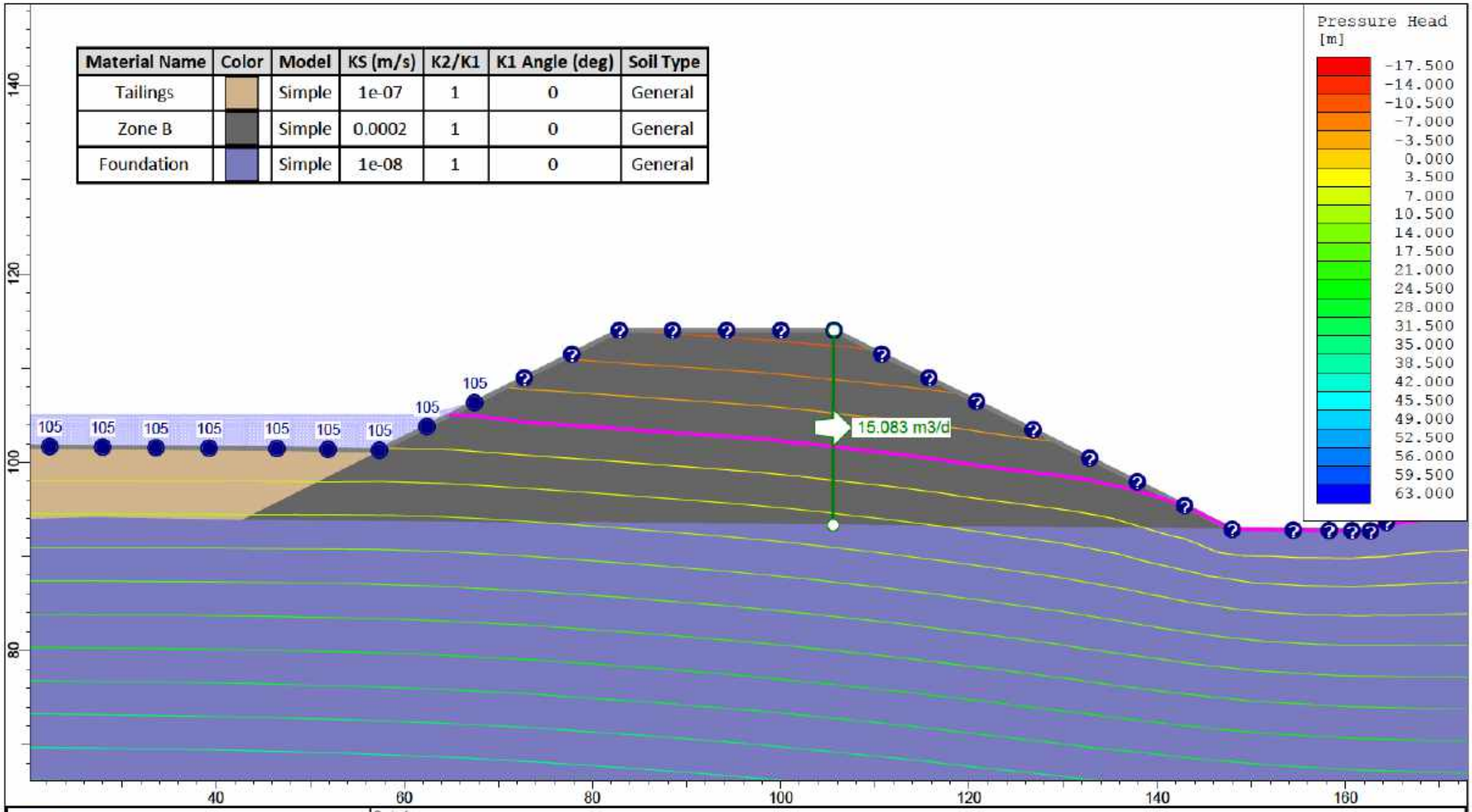
ACN: 626 931 753



Appendix C

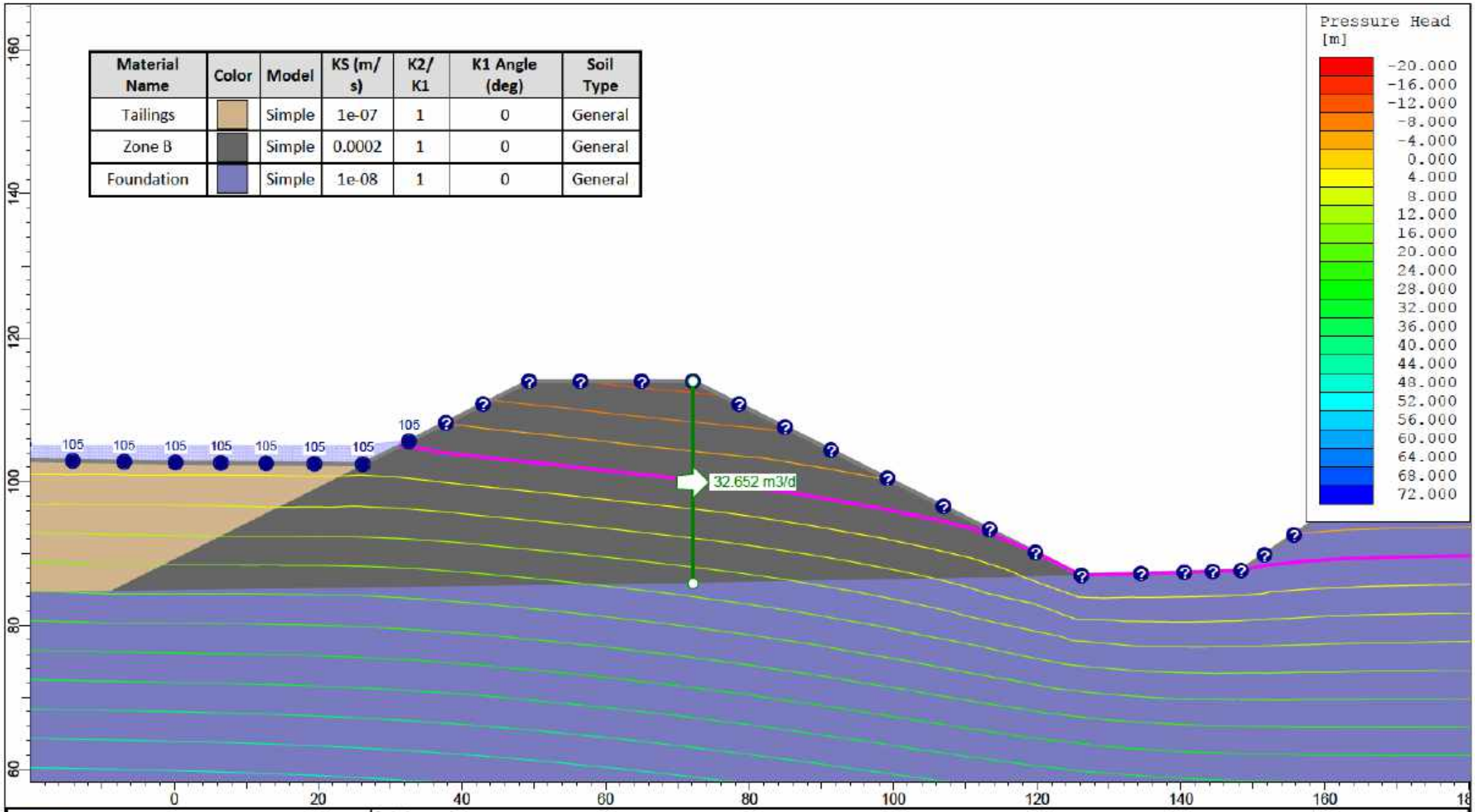
Seepage Modelling

Material Name	Color	Model	KS (m/s)	K2/K1	K1 Angle (deg)	Soil Type
Tailings		Simple	1e-07	1	0	General
Zone B		Simple	0.0002	1	0	General
Foundation		Simple	1e-08	1	0	General



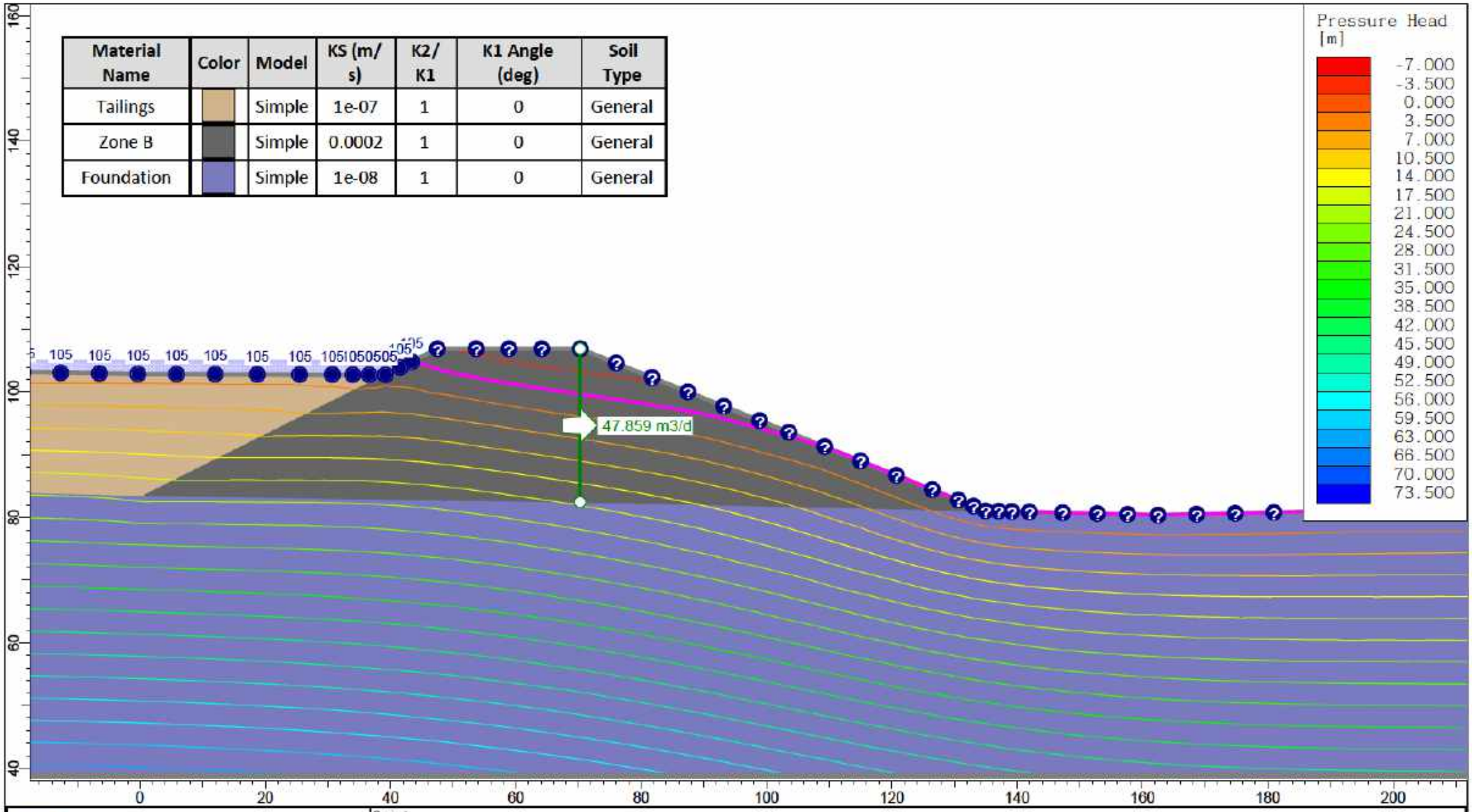
rec	Project: IPTSF Cell 1 DDR		
SLIDEINTERPRET 9.040	Date: 29/10/2025		Scenario: Section A - Operational Condition
	Designer: SH	Reviewer: GL	Company: REC

Material Name	Color	Model	KS (m/s)	K2/K1	K1 Angle (deg)	Soil Type
Tailings		Simple	1e-07	1	0	General
Zone B		Simple	0.0002	1	0	General
Foundation		Simple	1e-08	1	0	General



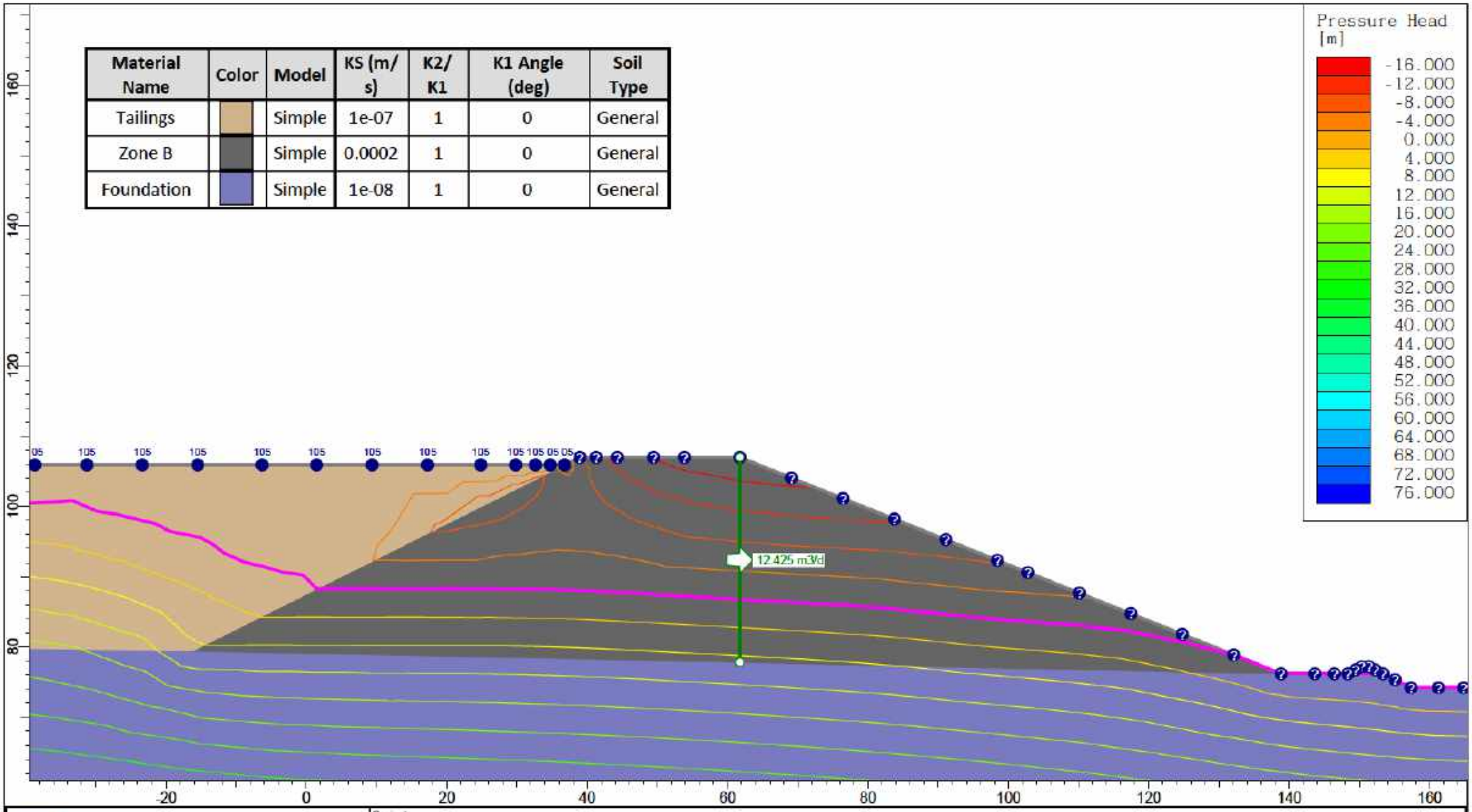
rec	Project: IPTSF Cell 1 DDR		
SLIDEINTERPRET 9.040	Date: 29/10/2025		Scenario: Section B - Operational Condition
	Designer: SH	Reviewer: GL	Company: REC

Material Name	Color	Model	KS (m/s)	K2/K1	K1 Angle (deg)	Soil Type
Tailings		Simple	1e-07	1	0	General
Zone B		Simple	0.0002	1	0	General
Foundation		Simple	1e-08	1	0	General



rec	Project: IPTSF Cell 1 DDR		
SLIDEINTERPRET 9.040	Date: 29/10/2025		Scenario: Section C - Operational Condition
	Designer: SH	Reviewer: GL	Company: REC

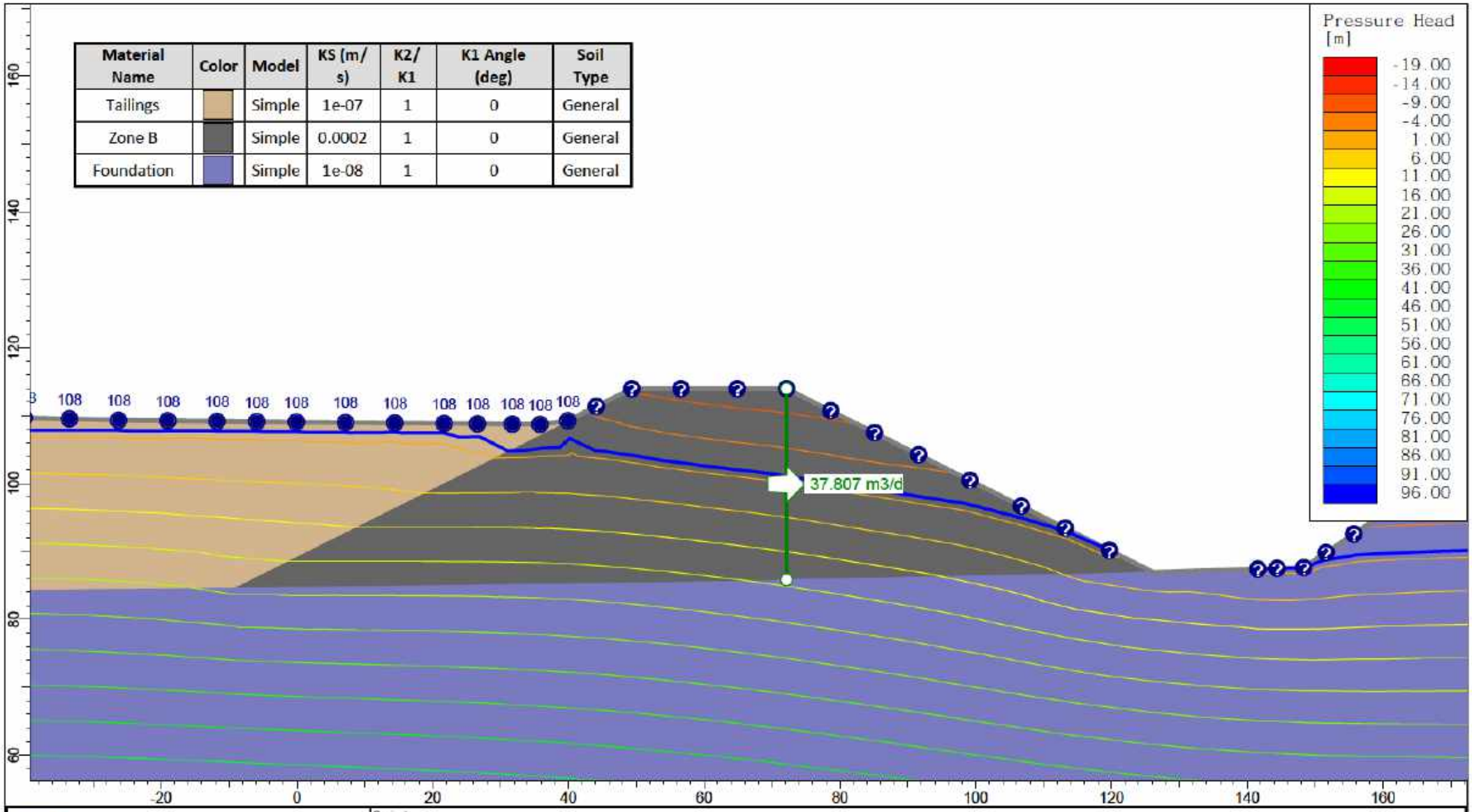
Material Name	Color	Model	KS (m/s)	K2/K1	K1 Angle (deg)	Soil Type
Tailings		Simple	1e-07	1	0	General
Zone B		Simple	0.0002	1	0	General
Foundation		Simple	1e-08	1	0	General



SLIDEINTERPRET 9.040

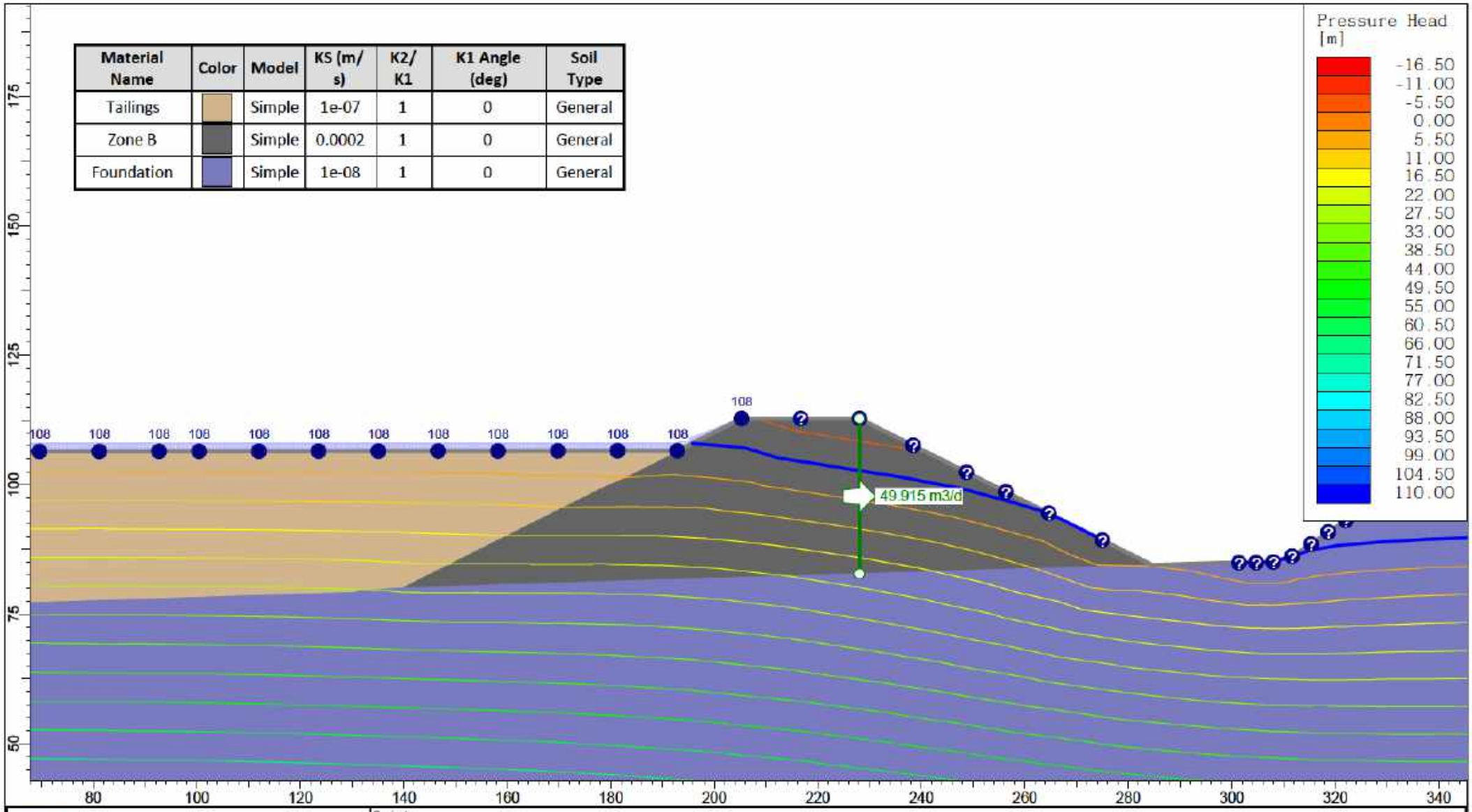
Project: IPTSF Cell 1 DDR		
Date: 29/10/2025		Scenario: Section D - Operational Condition
Designer: SH	Reviewer: GL	Company: REC

Material Name	Color	Model	KS (m/s)	K2/K1	K1 Angle (deg)	Soil Type
Tailings		Simple	1e-07	1	0	General
Zone B		Simple	0.0002	1	0	General
Foundation		Simple	1e-08	1	0	General



rec	Project: IPTSF Cell 1 DDR		
SLIDEINTERPRET 9.040	Date: 29/10/2025		Scenario: Section E - Operational Condition
	Designer: SH	Reviewer: GL	Company: REC

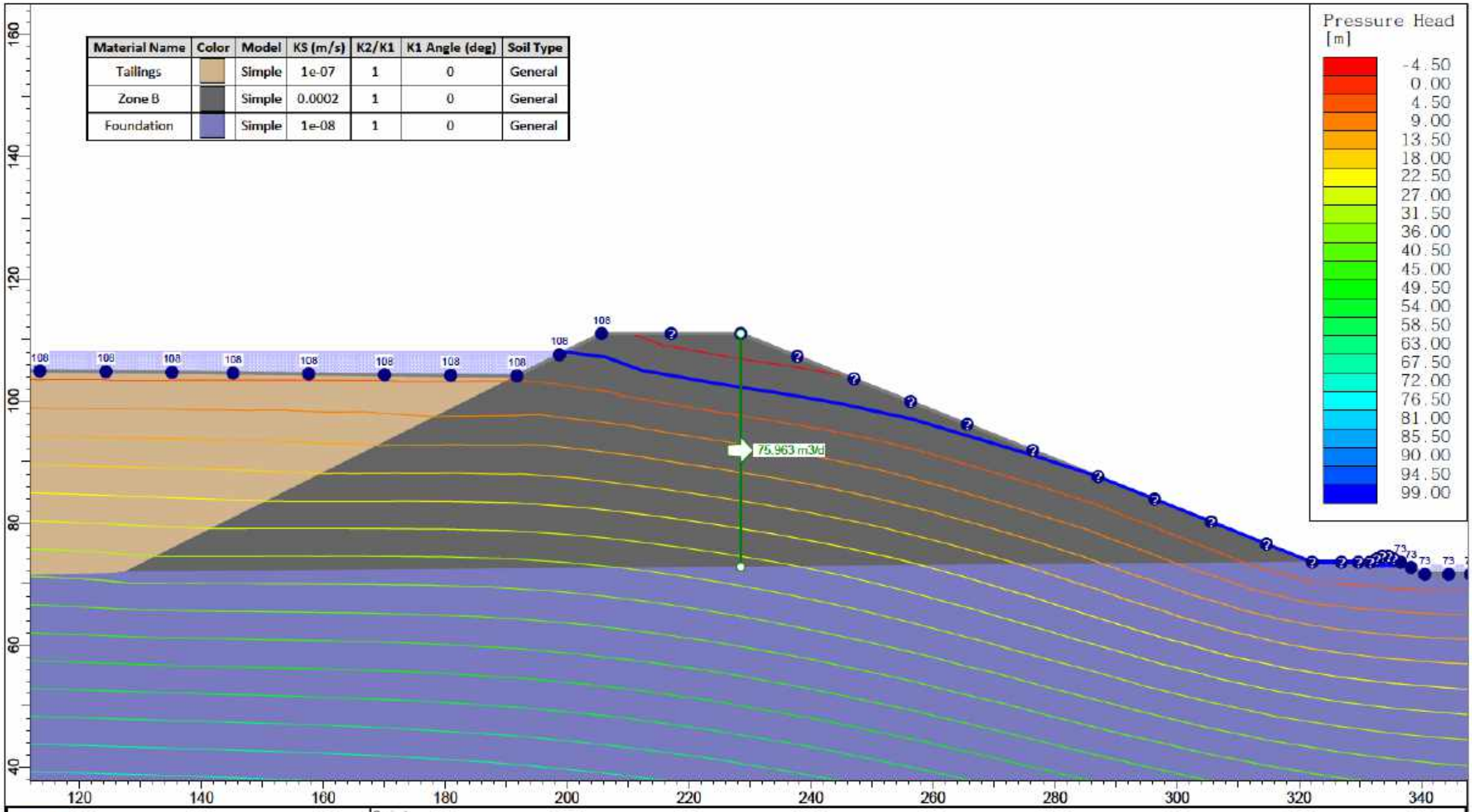
Material Name	Color	Model	KS (m/s)	K2/K1	K1 Angle (deg)	Soil Type
Tailings		Simple	1e-07	1	0	General
Zone B		Simple	0.0002	1	0	General
Foundation		Simple	1e-08	1	0	General



rec	Project: IPTSF Cell 1 DDR		
	Date: 29/10/2025		Scenario: Section F - Operational Condition
	Designer: SH	Reviewer: GL	Company: REC

SLIDEINTERPRET 9.040

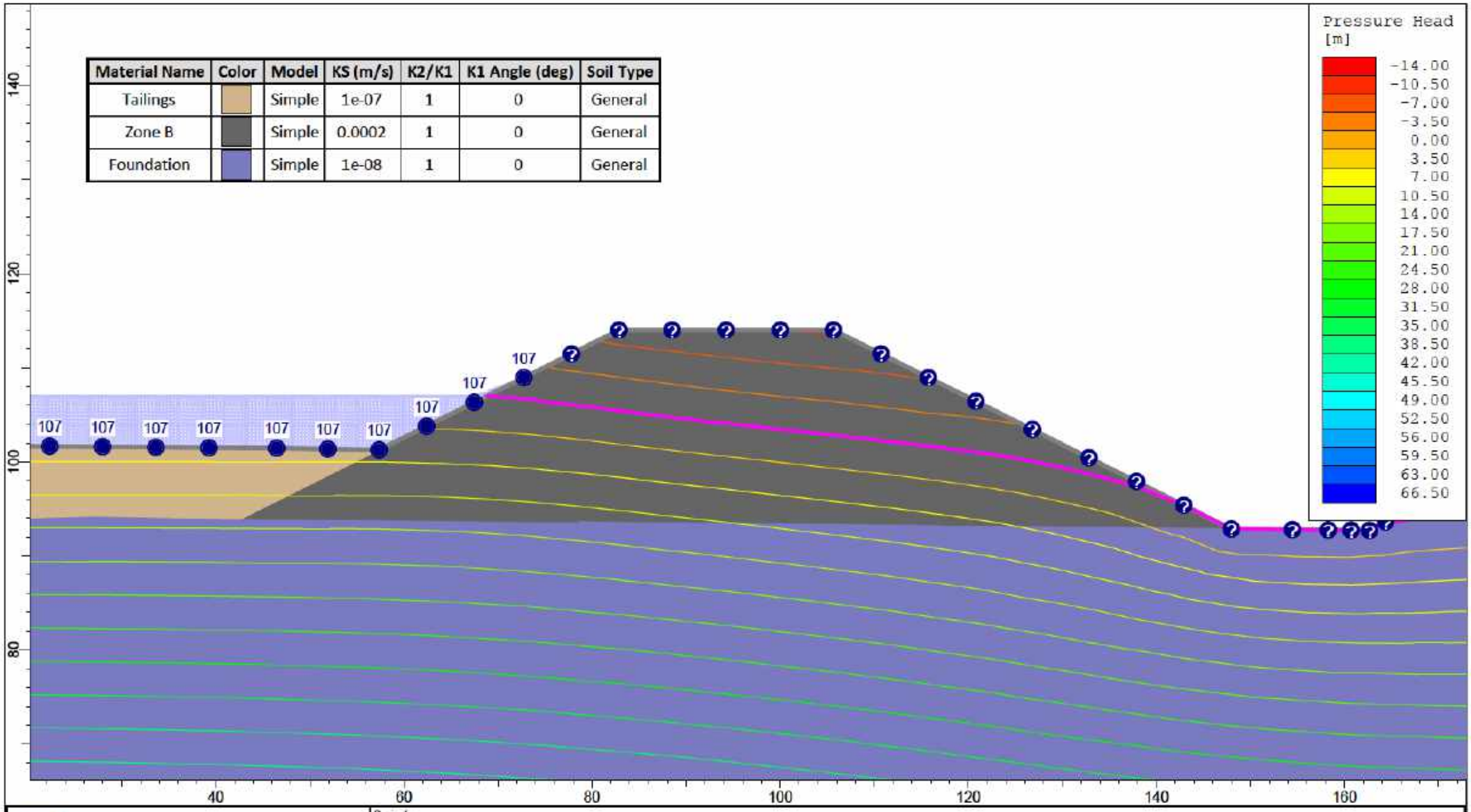
Material Name	Color	Model	KS (m/s)	K2/K1	K1 Angle (deg)	Soil Type
Tailings		Simple	1e-07	1	0	General
Zone B		Simple	0.0002	1	0	General
Foundation		Simple	1e-08	1	0	General



rec	Project: IPTSF Cell 1 DDR		
	Date: 29/10/2025		Scenario: Section G - Operational Condition
	Designer: SH	Reviewer: GL	Company: REC

SLIDEINTERPRET 9.040

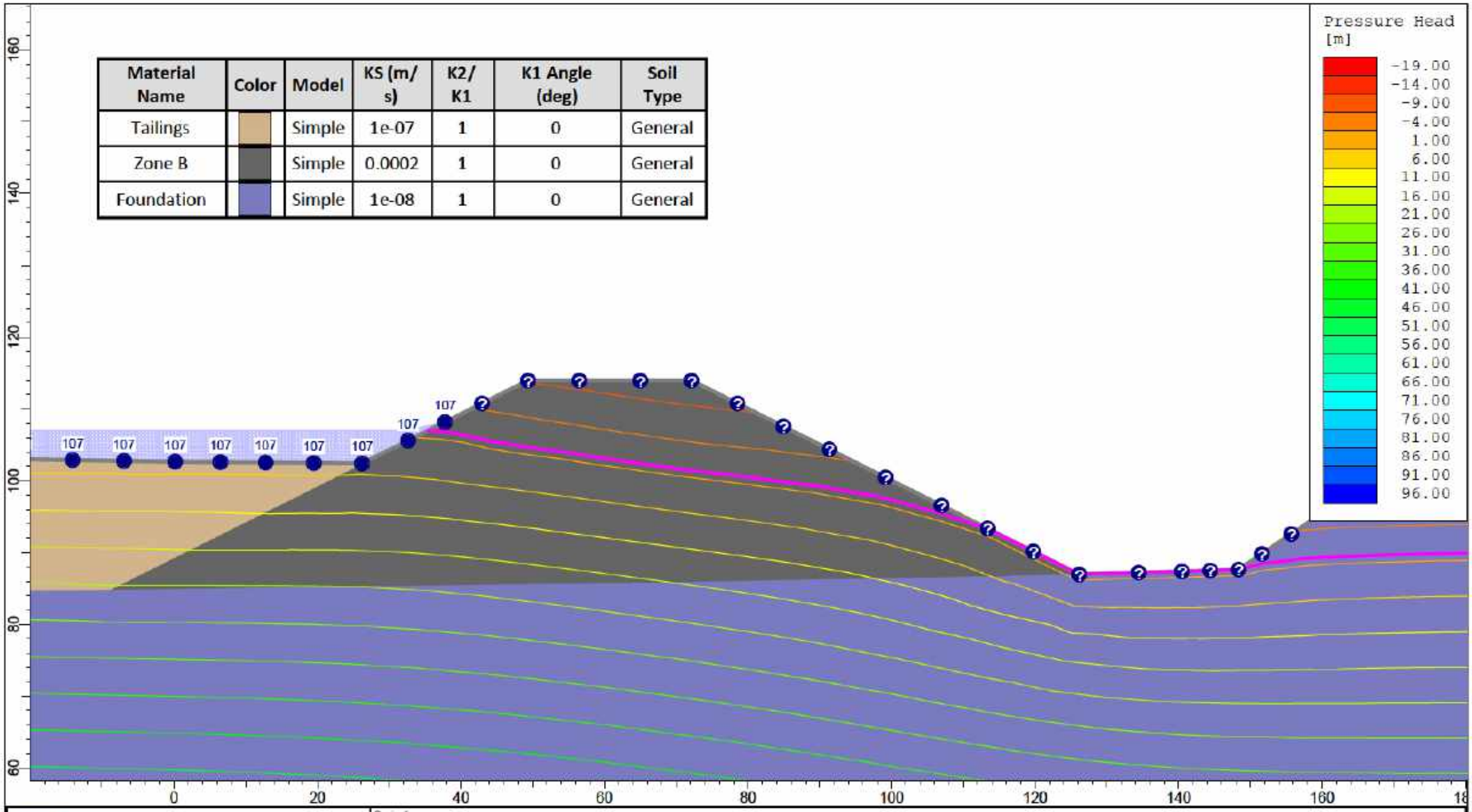
Material Name	Color	Model	KS (m/s)	K2/K1	K1 Angle (deg)	Soil Type
Tailings		Simple	1e-07	1	0	General
Zone B		Simple	0.0002	1	0	General
Foundation		Simple	1e-08	1	0	General



Project	IPTSF Cell 1 DDR		
Date	29/10/2025	Scenario	Section A - Critical Condition
Designer	SH	Reviewer	GL
Company	REC		

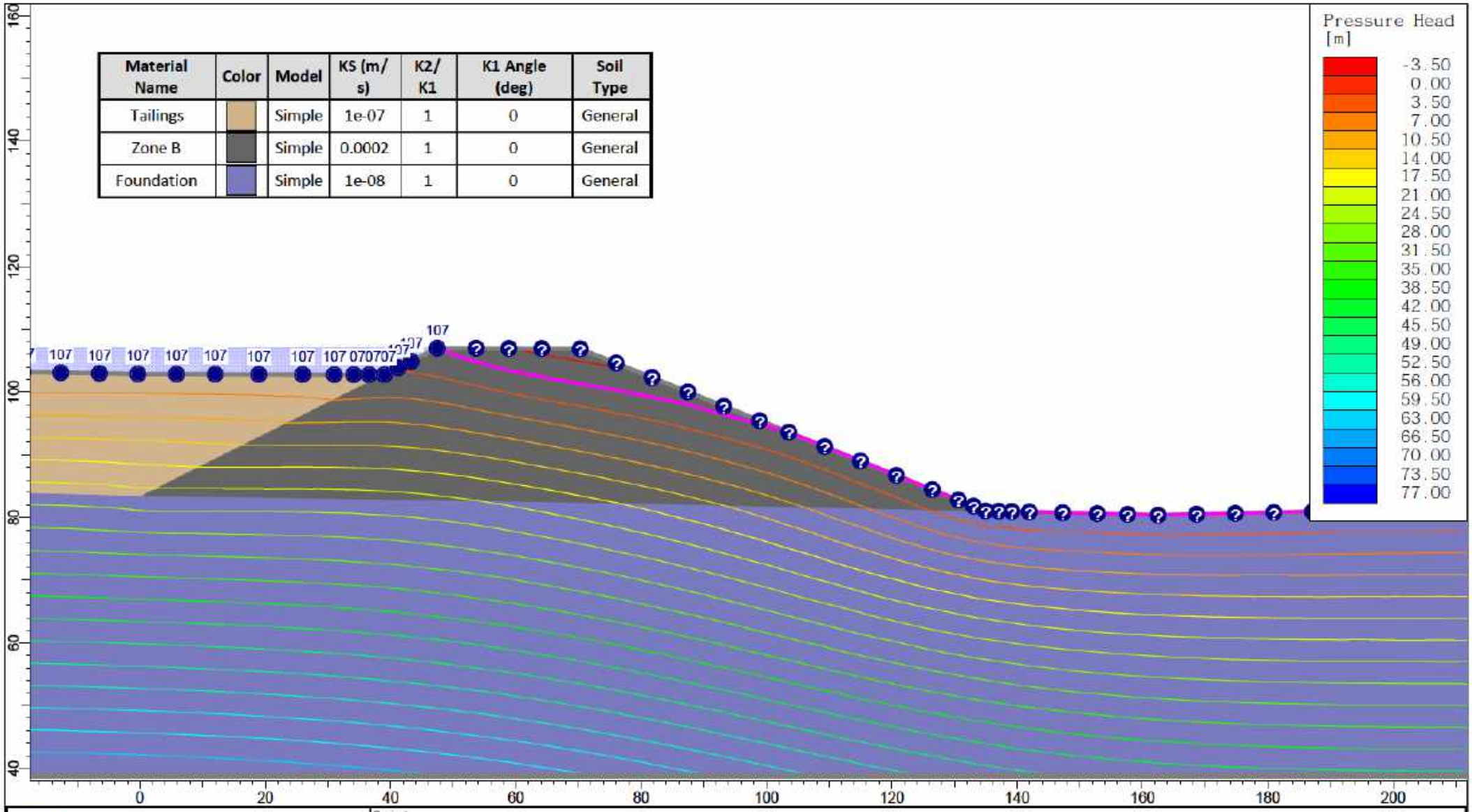
SLIDEINTERPRET 9.040

Material Name	Color	Model	KS (m/s)	K2/K1	K1 Angle (deg)	Soil Type
Tailings		Simple	1e-07	1	0	General
Zone B		Simple	0.0002	1	0	General
Foundation		Simple	1e-08	1	0	General



rec	Project: IPTSF Cell 1 DDR		
SLIDEINTERPRET 9.040	Date: 29/10/2025		Scenario: Section B - Critical Condition
	Designer: SH	Reviewer: GL	Company: REC

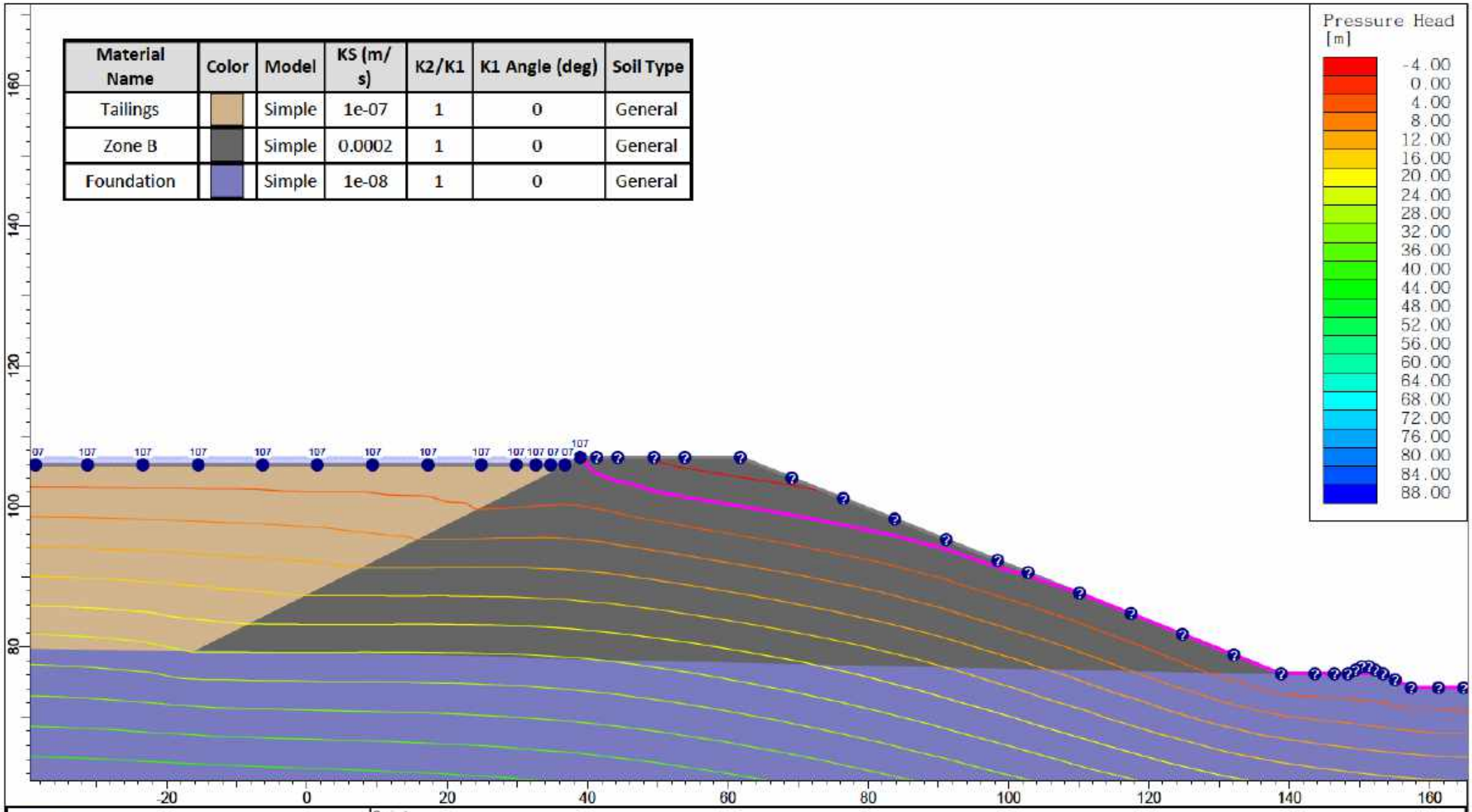
Material Name	Color	Model	KS (m/s)	K2/K1	K1 Angle (deg)	Soil Type
Tailings		Simple	1e-07	1	0	General
Zone B		Simple	0.0002	1	0	General
Foundation		Simple	1e-08	1	0	General



Project: IPTSF Cell 1 DDR		
Date: 29/10/2025		Scenario: Section C - Critical Condition
Designer: SH	Reviewer: GL	Company: REC

SLIDEINTERPRET 9.040

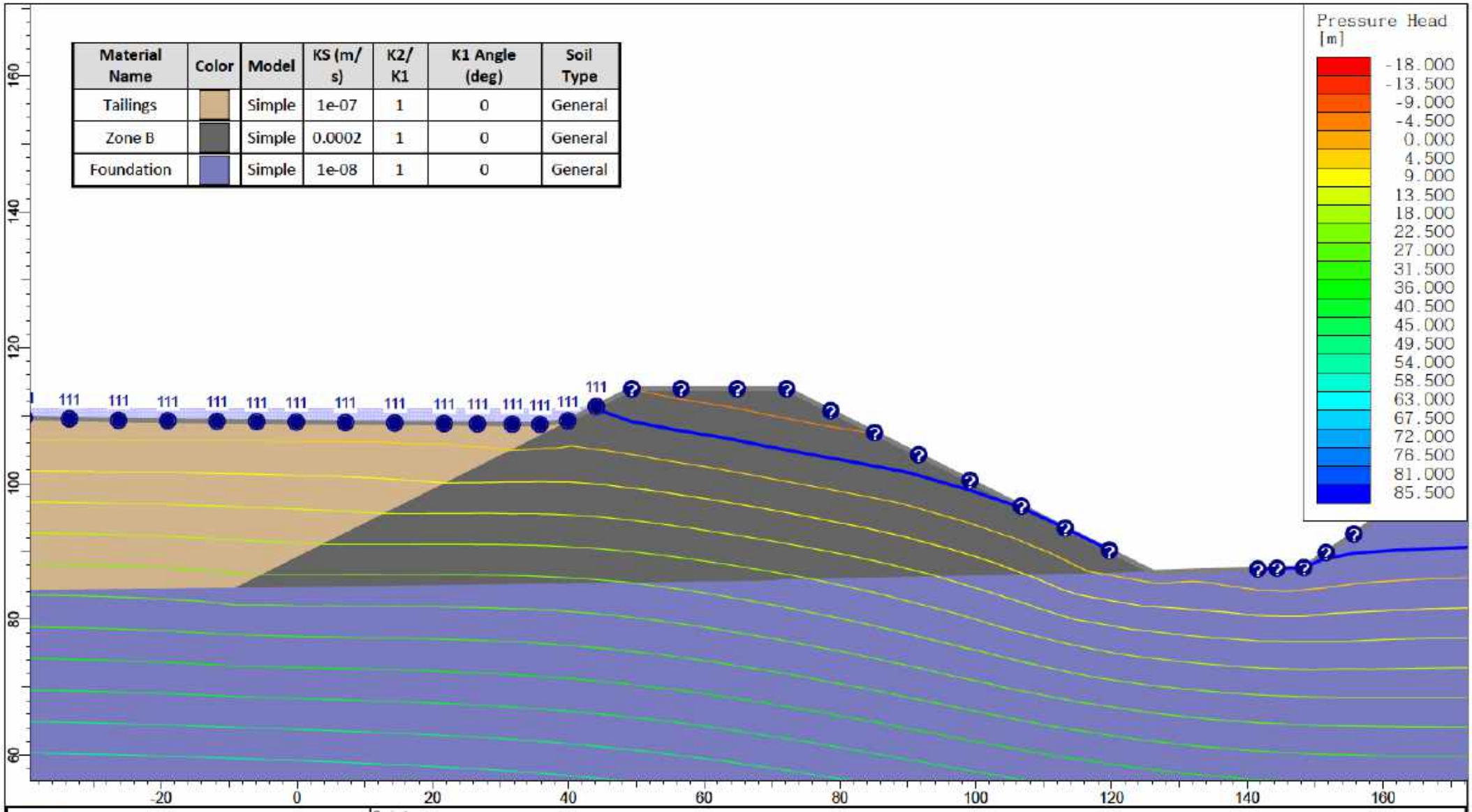
Material Name	Color	Model	KS (m/s)	K2/K1	K1 Angle (deg)	Soil Type
Tailings		Simple	1e-07	1	0	General
Zone B		Simple	0.0002	1	0	General
Foundation		Simple	1e-08	1	0	General



rec	Project: IPTSF Cell 1 DDR		
	Date: 29/10/2025		Scenario: Section D - Critical Condition
	Designer: SH	Reviewer: GL	Company: REC

SLIDEINTERPRET 9.040

Material Name	Color	Model	KS (m/s)	K2/K1	K1 Angle (deg)	Soil Type
Tailings		Simple	1e-07	1	0	General
Zone B		Simple	0.0002	1	0	General
Foundation		Simple	1e-08	1	0	General

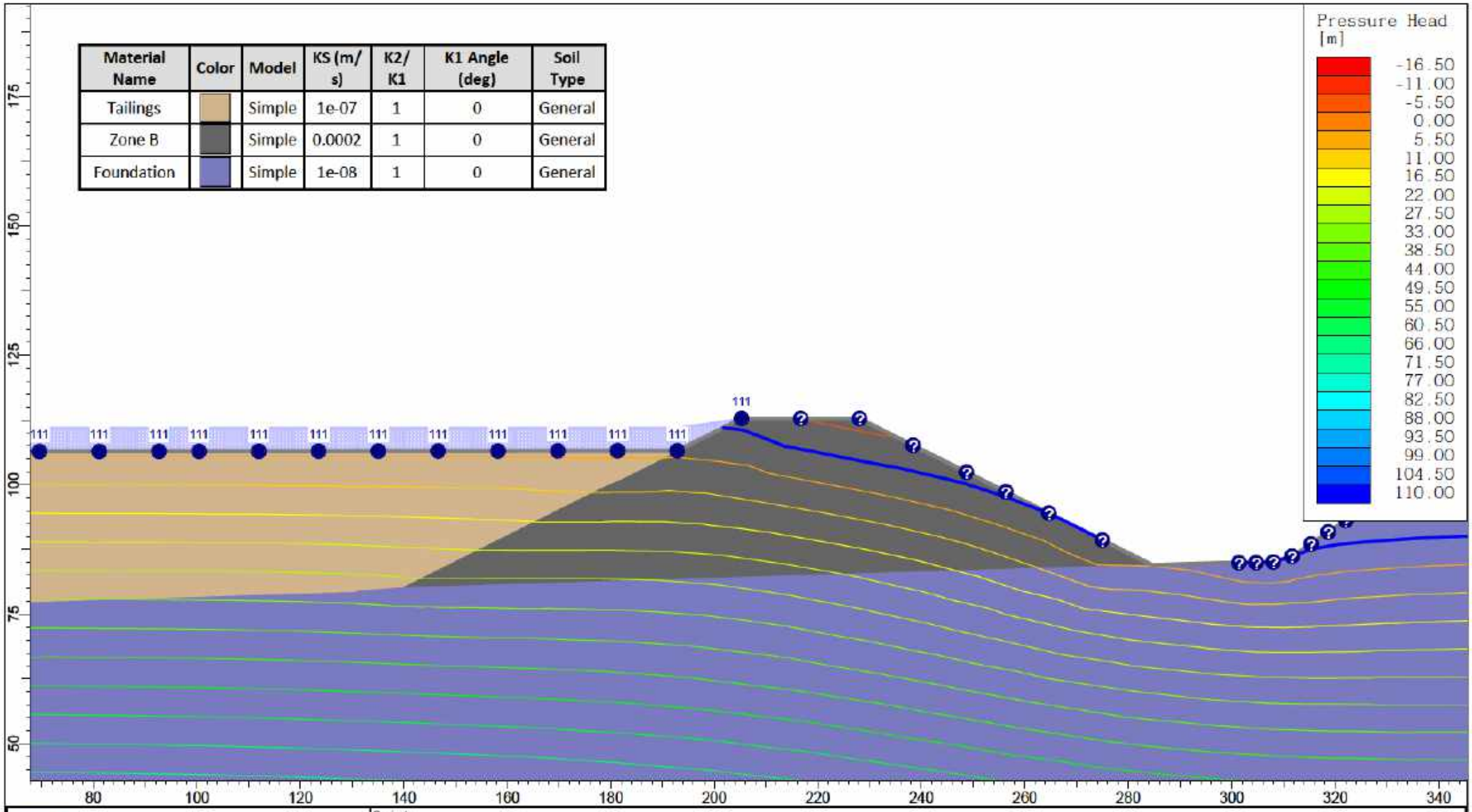


rec

SLIDEINTERPRET 9.040

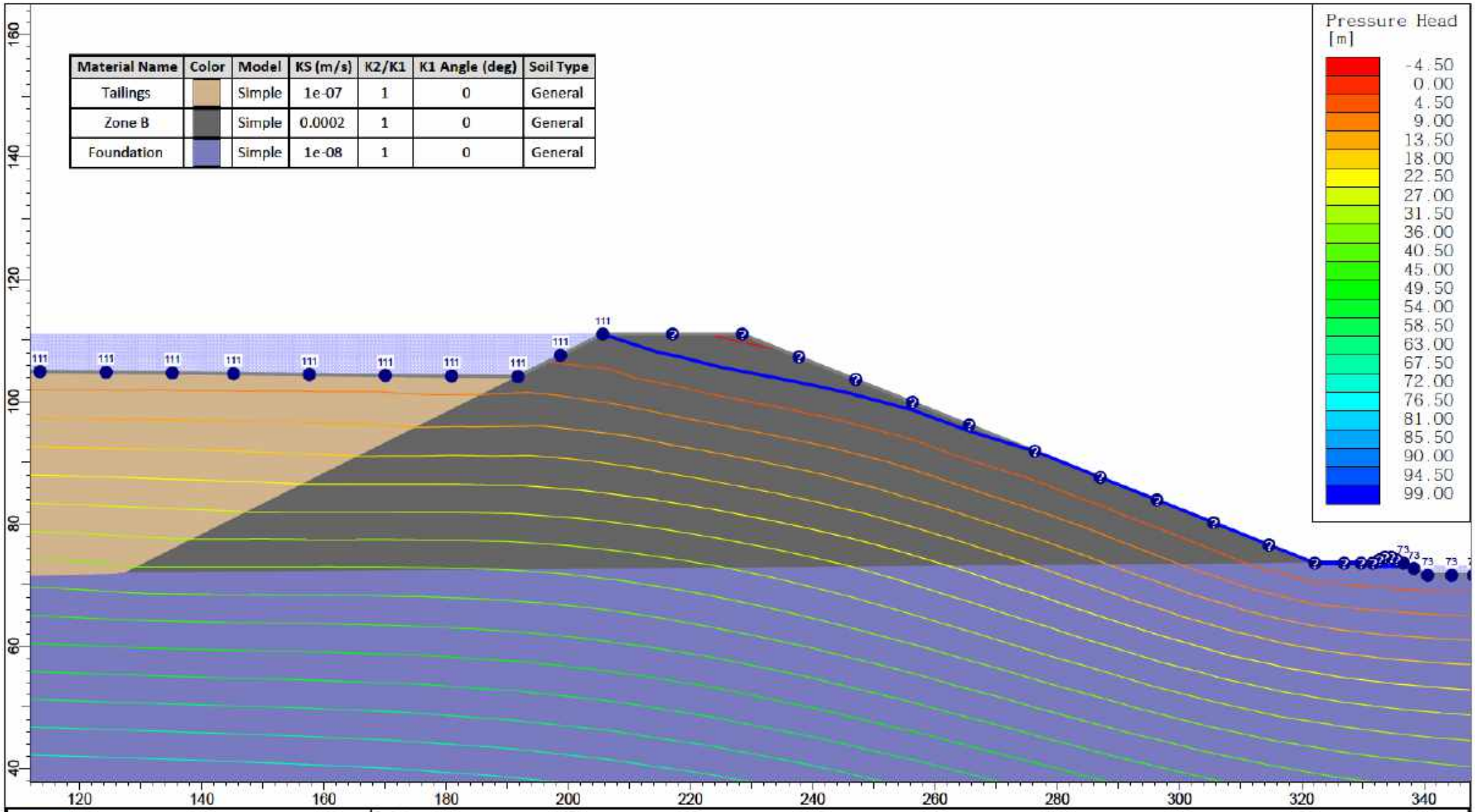
Project: IPTSF Cell 1 DDR		
Date: 29/10/2025		Scenario: Section E - Critical Condition
Designer: SH	Reviewer: GL	Company: REC

Material Name	Color	Model	KS (m/s)	K2/K1	K1 Angle (deg)	Soil Type
Tailings		Simple	1e-07	1	0	General
Zone B		Simple	0.0002	1	0	General
Foundation		Simple	1e-08	1	0	General



rec	Project: IPTSF Cell 1 DDR		
	Date: 29/10/2025		Scenario: Section F - Critical Condition
	Designer: SH	Reviewer: GL	Company: REC

SLIDEINTERPRET 9.040

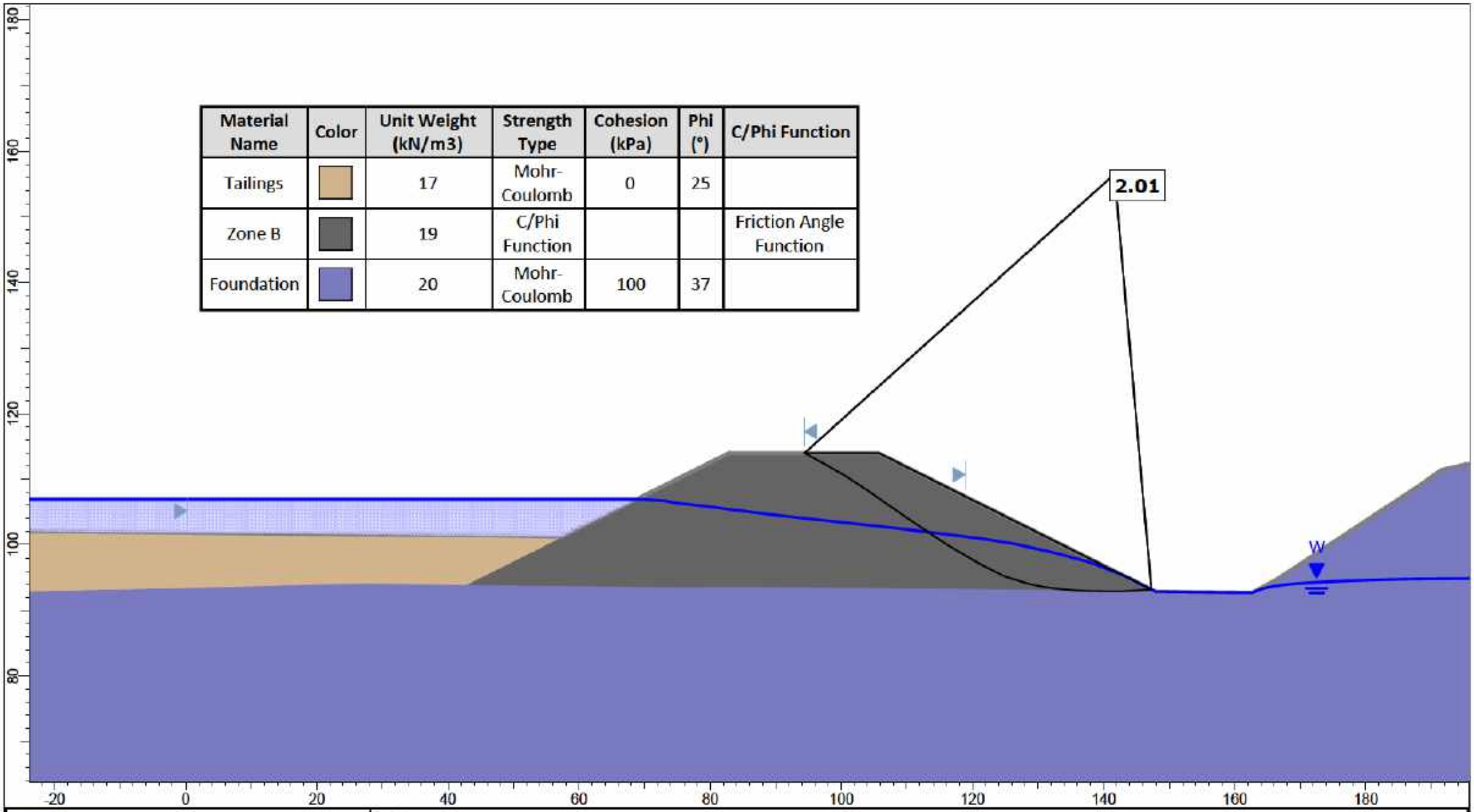


rec	Project: IPTSF Cell 1 DDR		
SLIDEINTERPRET 9.040	Date: 29/10/2025		Scenario: Section G - Critical Condition
	Designer: SH	Reviewer: GL	Company: REC

Appendix D

Stability Modelling

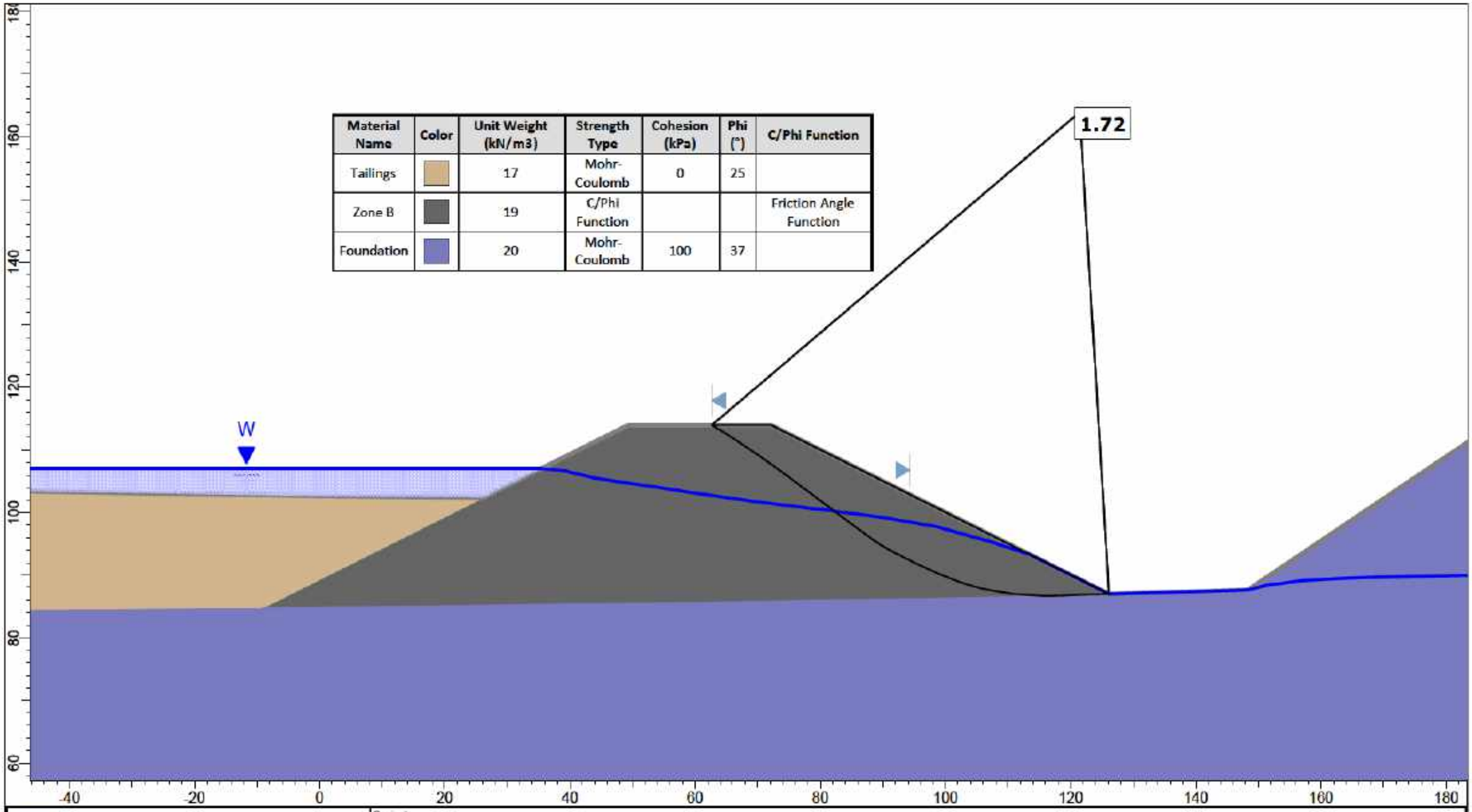
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	C/Phi Function
Tailings		17	Mohr-Coulomb	0	25	
Zone B		19	C/Phi Function			Friction Angle Function
Foundation		20	Mohr-Coulomb	100	37	



SLIDEINTERPRET 9.040

Project: IPTSF Cell 1 DDR			
Date: 29/10/2025		Scenario: Section A	
Designer: SH	Reviewer: GL	Company: REC	

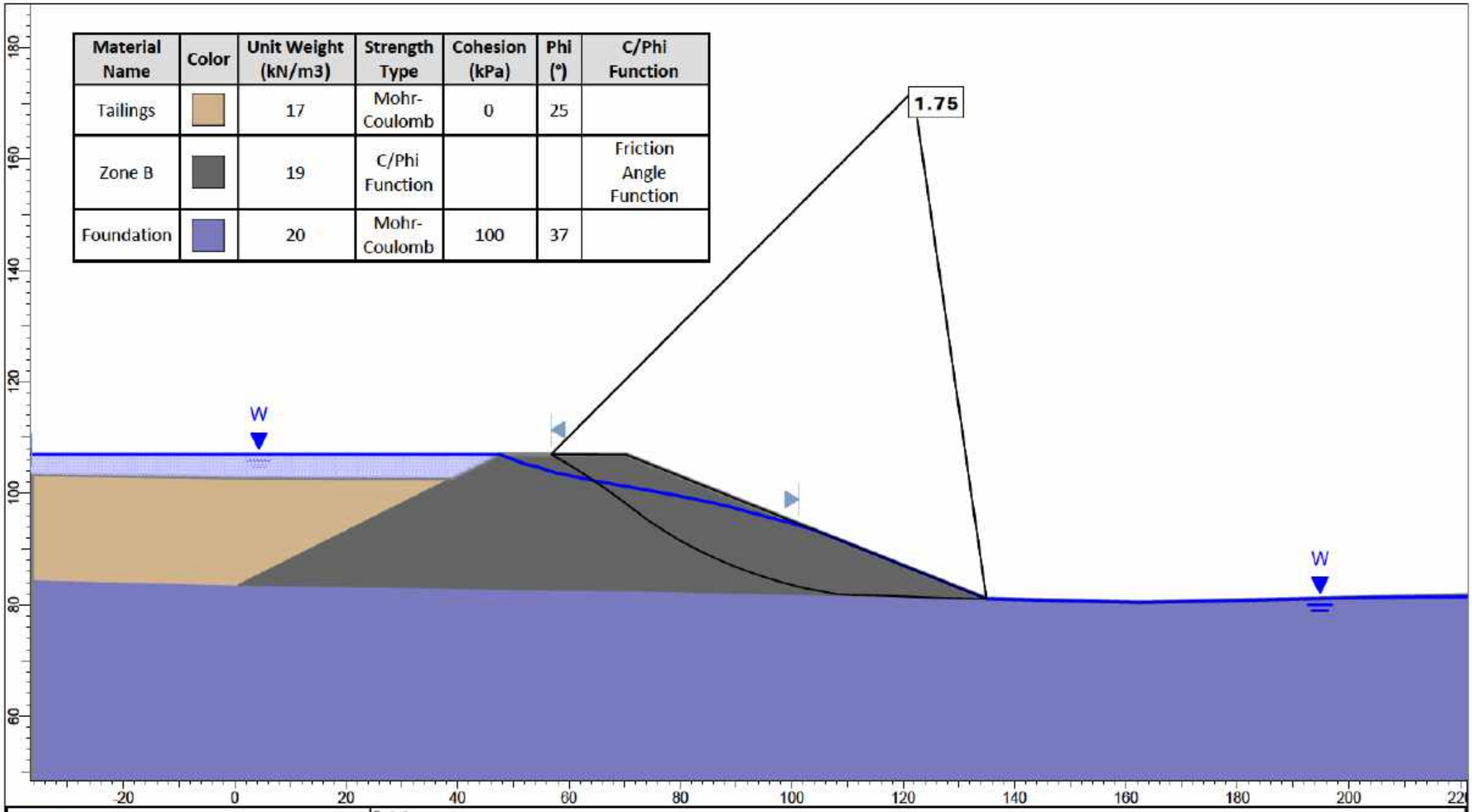
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	C/Phi Function
Tailings		17	Mohr-Coulomb	0	25	
Zone B		19	C/Phi Function			Friction Angle Function
Foundation		20	Mohr-Coulomb	100	37	



Project: IPTSF Cell 1 DDR			
Date: 29/10/2025		Scenario: Section B	
Designer: SH	Reviewer: GL	Company: REC	

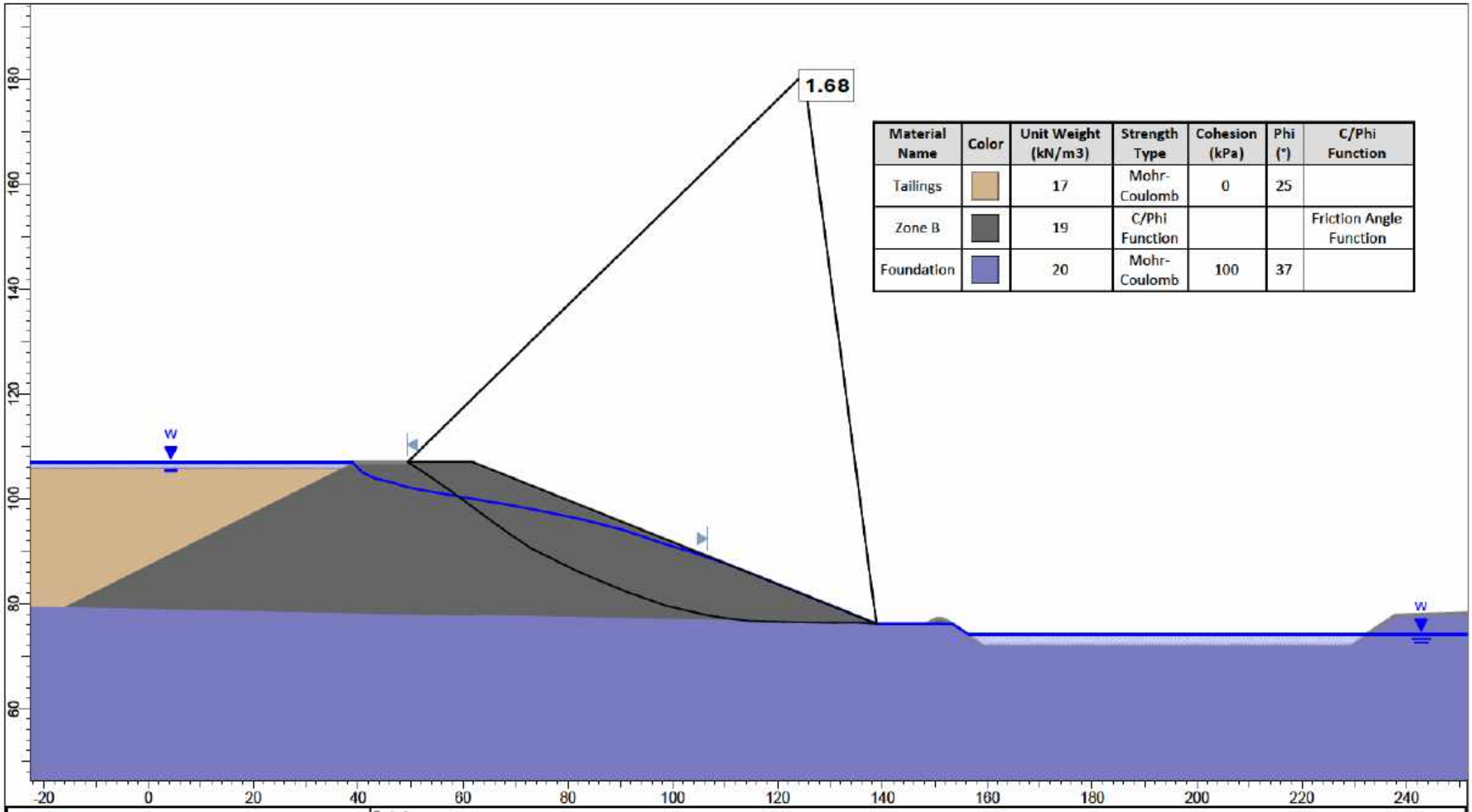
SLIDEINTERPRET 9.040

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	C/Phi Function
Tailings		17	Mohr-Coulomb	0	25	
Zone B		19	C/Phi Function			Friction Angle Function
Foundation		20	Mohr-Coulomb	100	37	



Project	IPTSF Cell 1 DDR		
Date	29/10/2025	Scenario	Section C
Designer	SH	Reviewer	GL
Company	REC		

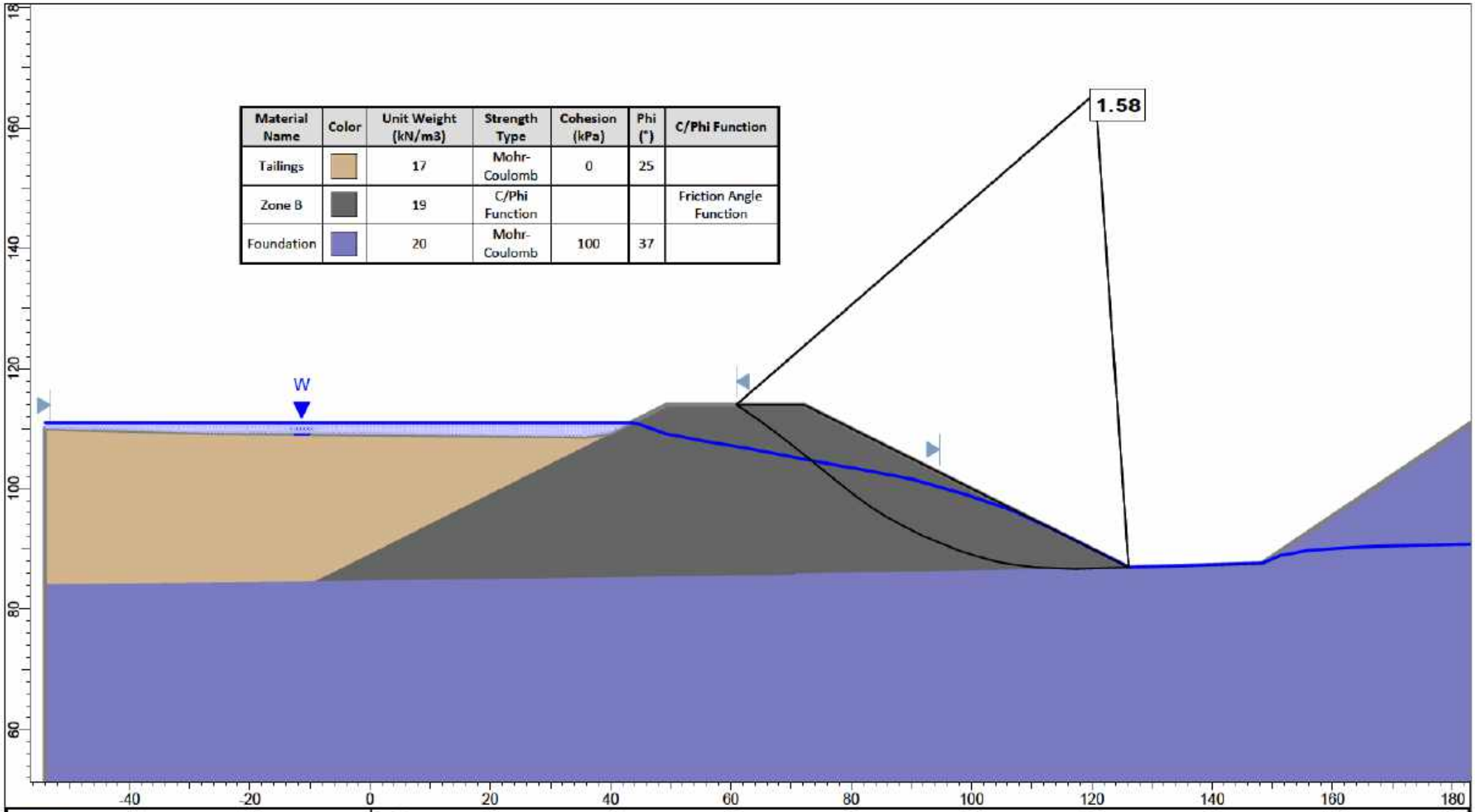
SLIDE INTERPRET 9.040



rec	Project: IPTSF Cell 1 DDR		
	Date: 29/10/2025		Scenario: Section D
	Designer: SH	Reviewer: GL	Company: REC

SLIDEINTERPRET 9.040

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	C/Phi Function
Tailings		17	Mohr-Coulomb	0	25	
Zone B		19	C/Phi Function			Friction Angle Function
Foundation		20	Mohr-Coulomb	100	37	

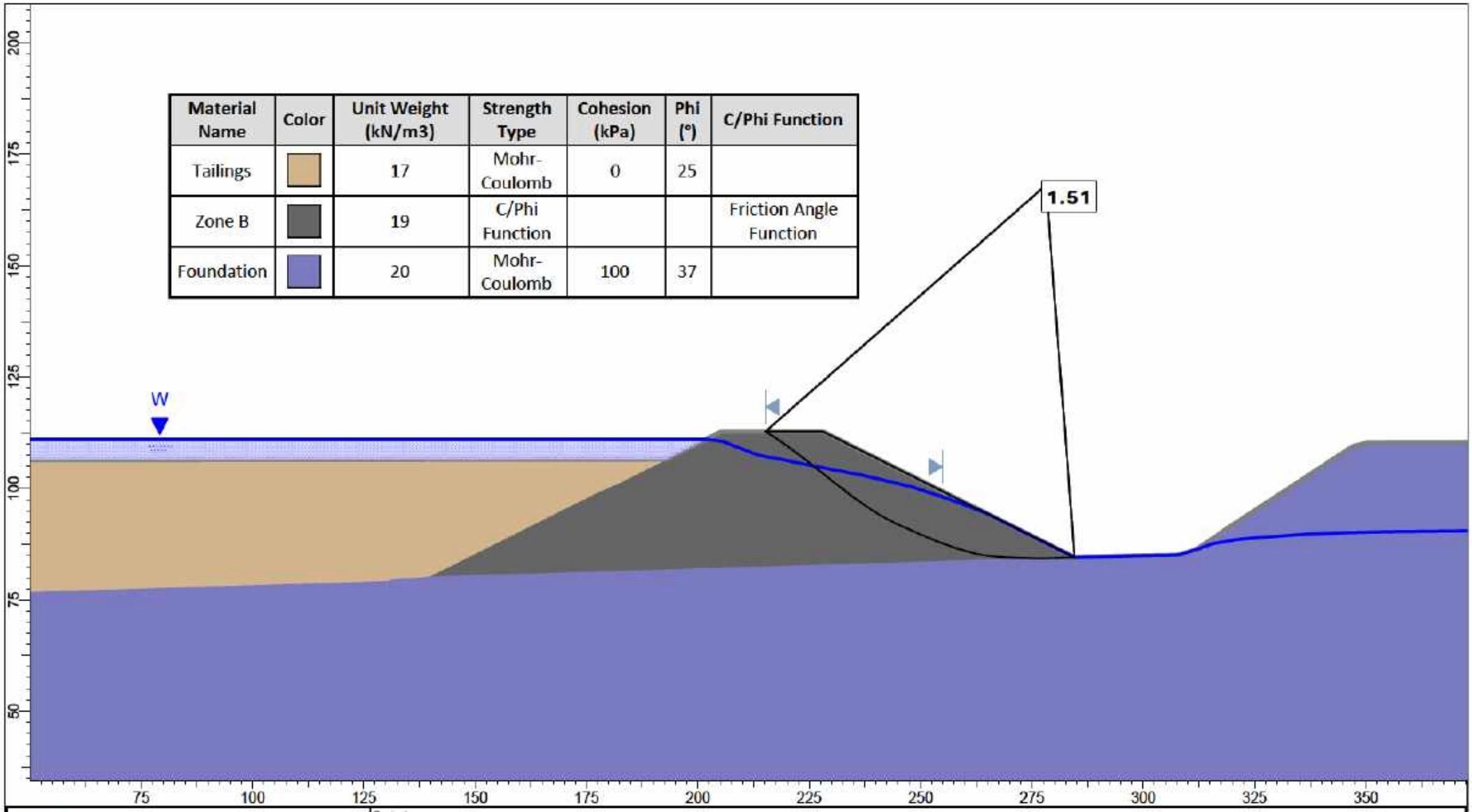


rec

SLIDEINTERPRET 9.040

Project: IPTSF Cell 1 DDR			
Date: 29/10/2025		Scenario: Section E	
Designer: SH	Reviewer: GL	Company: REC	

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	C/Phi Function
Tailings		17	Mohr-Coulomb	0	25	
Zone B		19	C/Phi Function			Friction Angle Function
Foundation		20	Mohr-Coulomb	100	37	

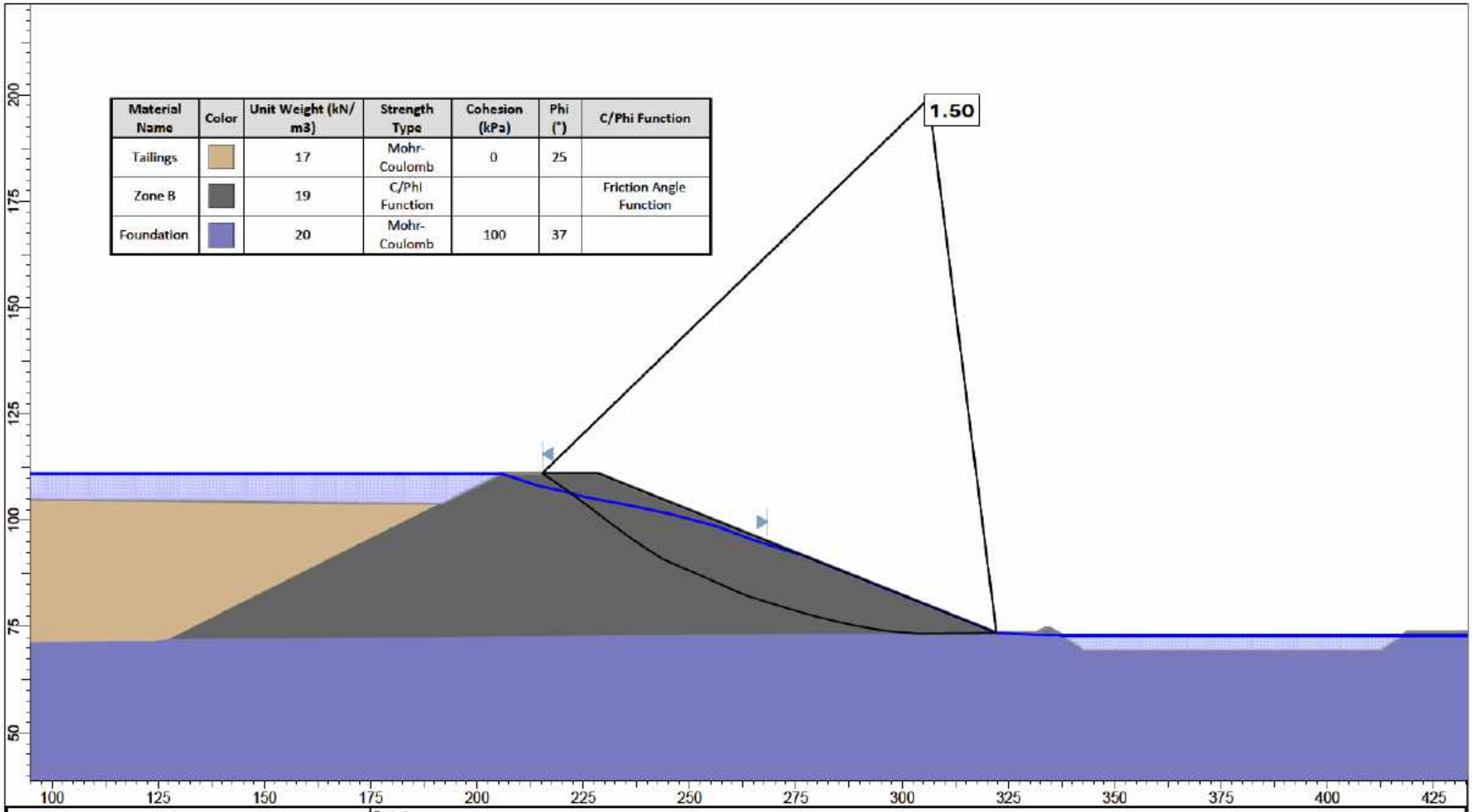


rec

SLIDEINTERPRET 9.040

Project: IPTSF Cell 1 DDR		
Date: 29/10/2025		Scenario: Section F
Designer: SH	Reviewer: GL	Company: REC

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	C/Phi Function
Tailings		17	Mohr-Coulomb	0	25	
Zone B		19	C/Phi Function			Friction Angle Function
Foundation		20	Mohr-Coulomb	100	37	

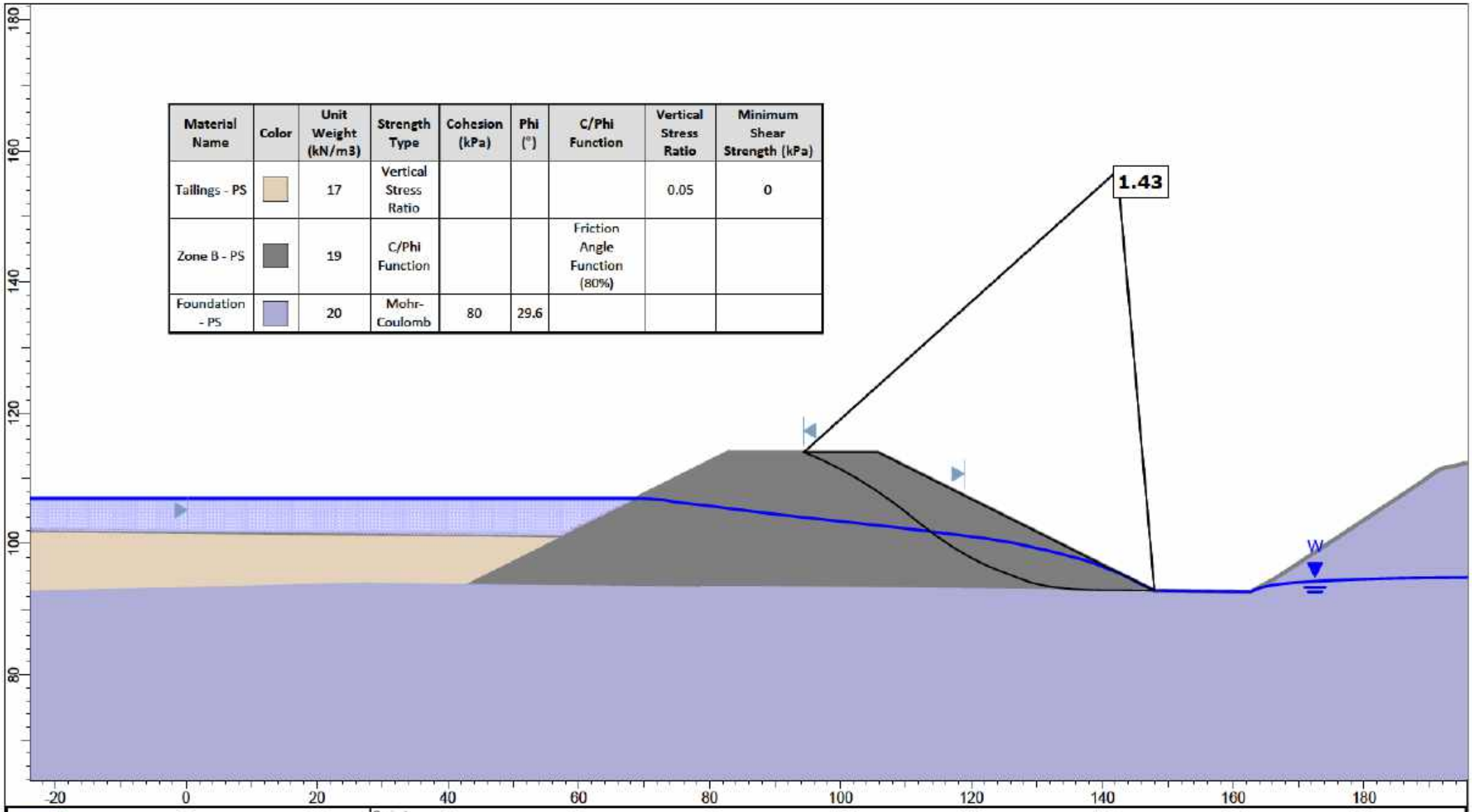


rec

SLIDEINTERPRET 9.040

Project: IPTSF Cell 1 DDR		
Date: 29/10/2025		Scenario: Section G
Designer: SH	Reviewer: GL	Company: REC

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	C/Phi Function	Vertical Stress Ratio	Minimum Shear Strength (kPa)
Tailings - PS		17	Vertical Stress Ratio				0.05	0
Zone B - PS		19	C/Phi Function			Friction Angle Function (80%)		
Foundation - PS		20	Mohr-Coulomb	80	29.6			

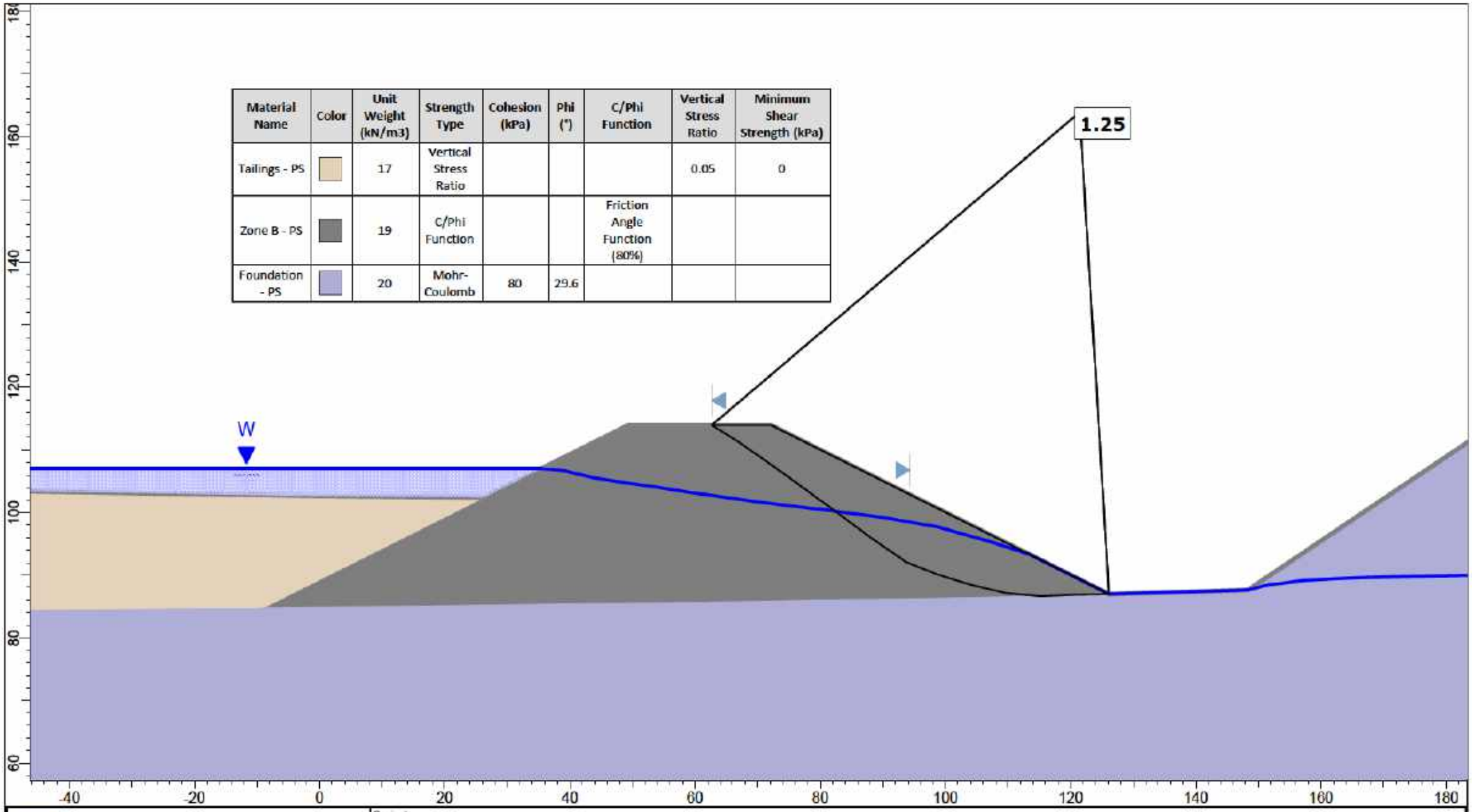


rec

SLIDEINTERPRET 9.040

Project: IPTSF Cell 1 DDR			
Date: 29/10/2025		Scenario: Section A - PS	
Designer: SH	Reviewer: GL	Company: REC	

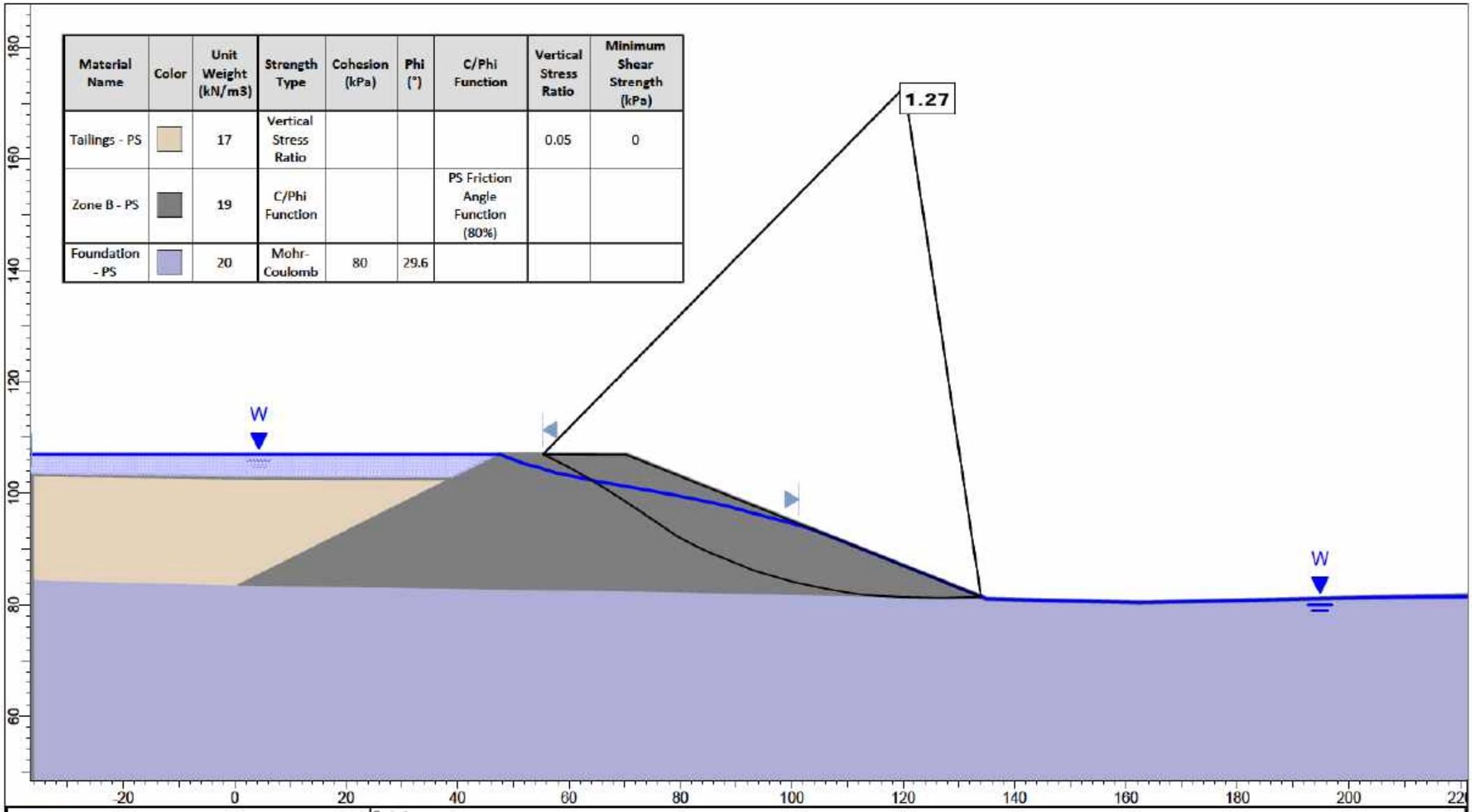
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	C/Phi Function	Vertical Stress Ratio	Minimum Shear Strength (kPa)
Tailings - PS		17	Vertical Stress Ratio				0.05	0
Zone B - PS		19	C/Phi Function			Friction Angle Function (80%)		
Foundation - PS		20	Mohr-Coulomb	80	29.6			



SLIDEINTERPRET 9.040

Project: IPTSF Cell 1 DDR			
Date: 29/10/2025		Scenario: Section B - PS	
Designer: SH	Reviewer: GL	Company: REC	

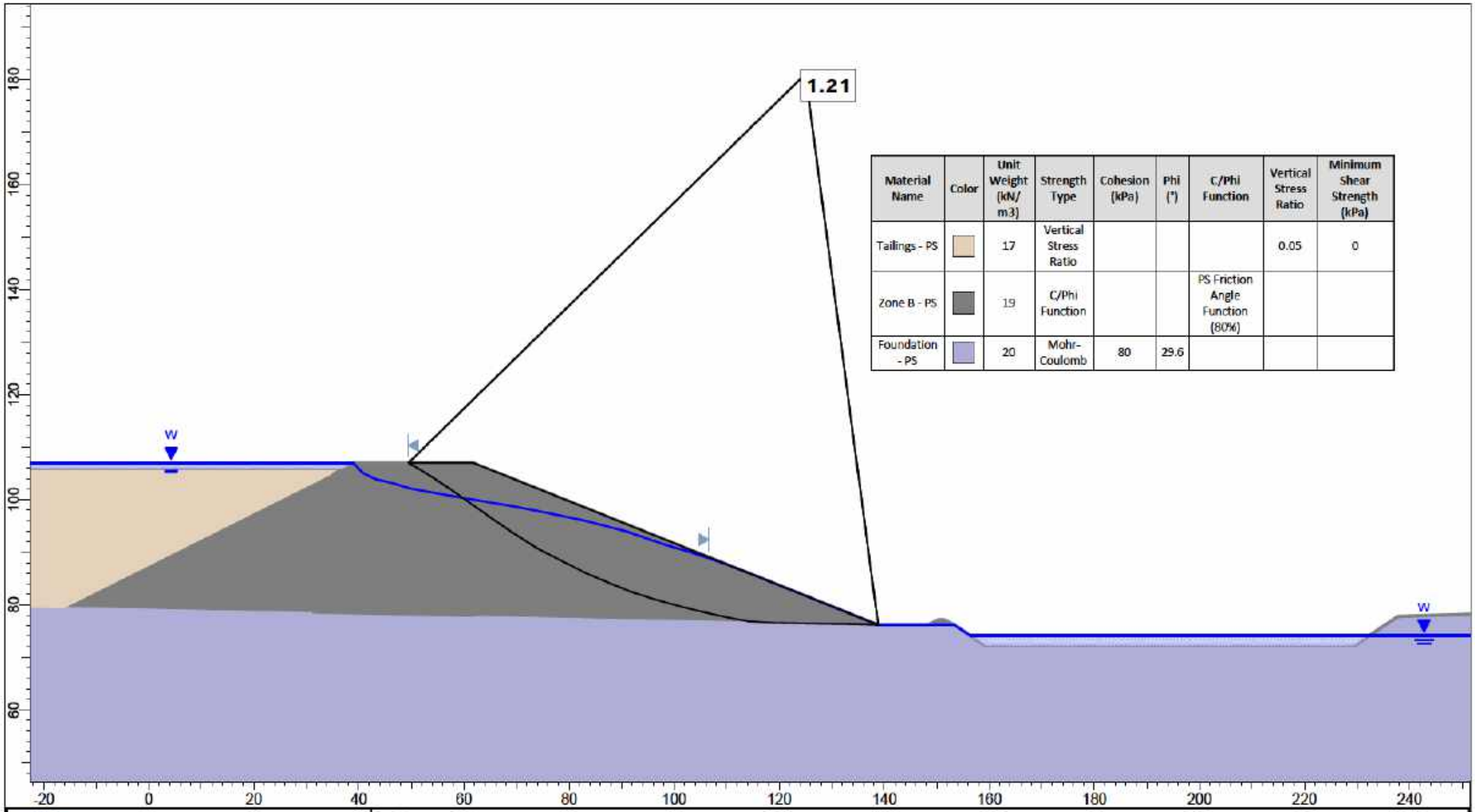
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	C/Phi Function	Vertical Stress Ratio	Minimum Shear Strength (kPa)
Tailings - PS		17	Vertical Stress Ratio				0.05	0
Zone B - PS		19	C/Phi Function			PS Friction Angle Function (80%)		
Foundation - PS		20	Mohr-Coulomb	80	29.6			



rec

SLIDEINTERPRET 9.040

Project: IPTSF Cell 1 DDR			
Date: 29/10/2025		Scenario: Section C - PS	
Designer: SH	Reviewer: GL	Company: REC	



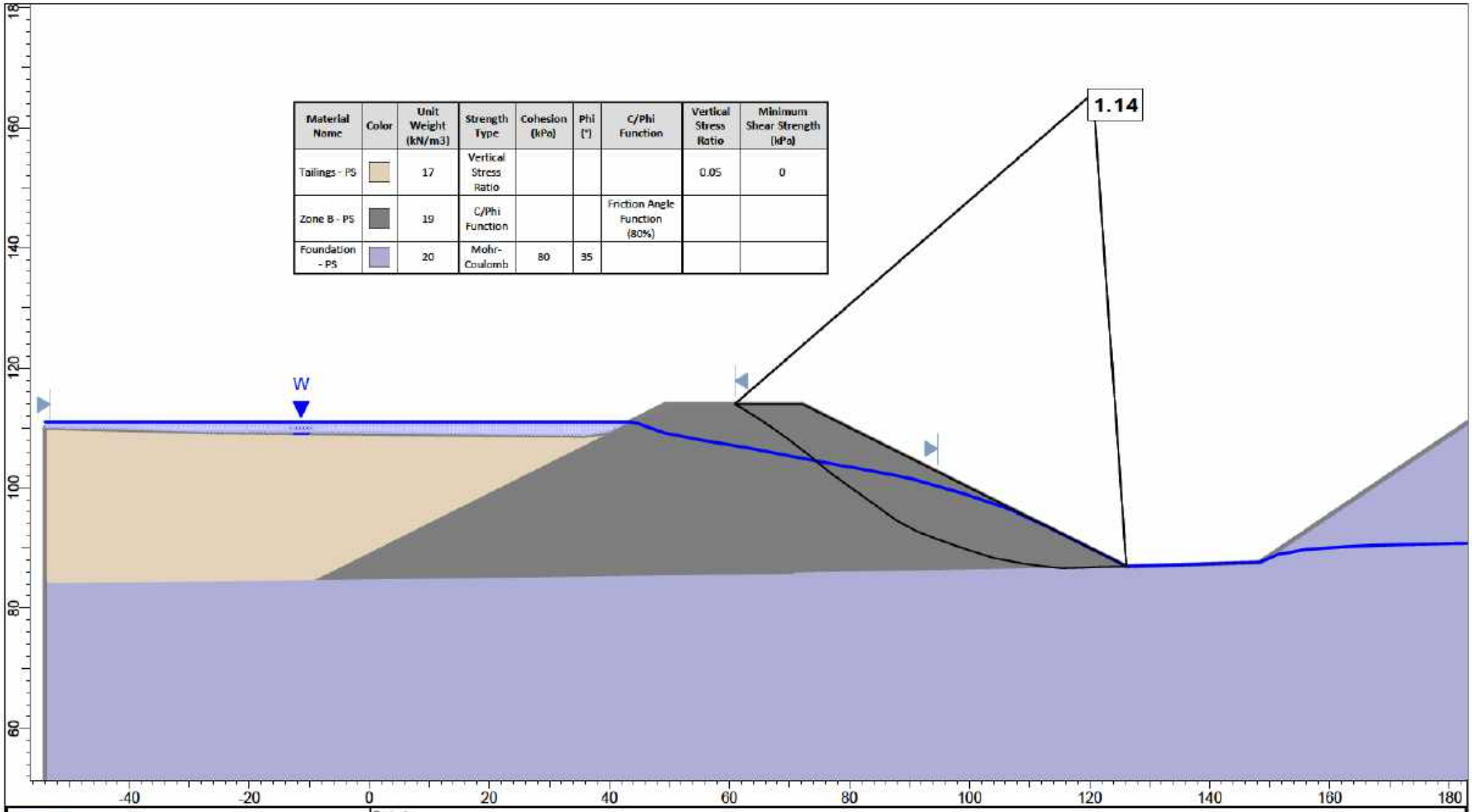
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	C/Phi Function	Vertical Stress Ratio	Minimum Shear Strength (kPa)
Tailings - PS		17	Vertical Stress Ratio				0.05	0
Zone B - PS		19	C/Phi Function			PS Friction Angle Function (80%)		
Foundation - PS		20	Mohr-Coulomb	80	29.6			

rec

SLIDEINTERPRET 9.040

Project	IPTSF Cell 1 DDR		
Date	29/10/2025	Scenario	Section D - PS
Designer	SH	Reviewer	GL
Company	REC		

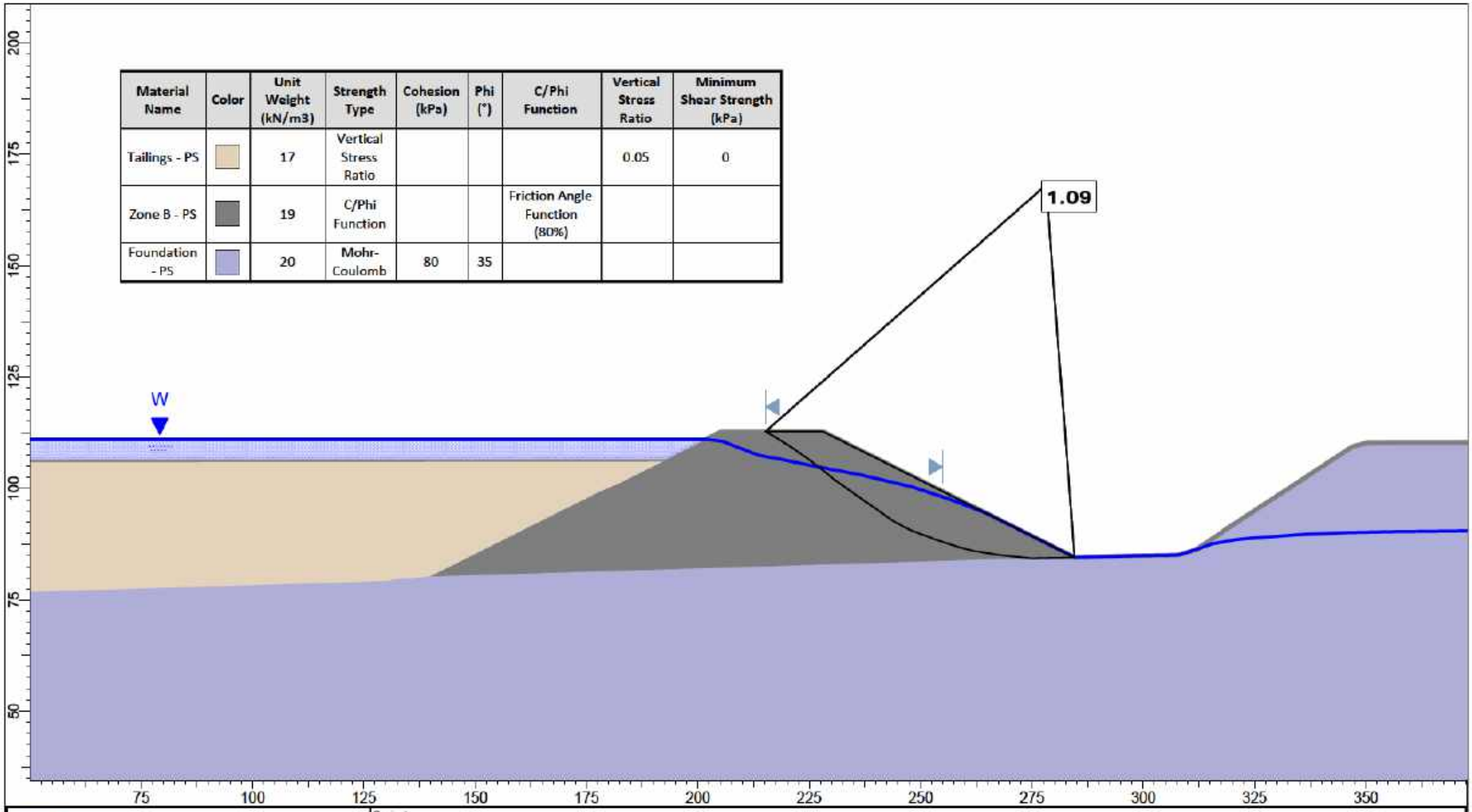
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	C/Phi Function	Vertical Stress Ratio	Minimum Shear Strength (kPa)
Tailings - PS		17	Vertical Stress Ratio				0.05	0
Zone B - PS		19	C/Phi Function			Friction Angle Function (80%)		
Foundation - PS		20	Mohr-Coulomb	80	35			



Project: IPTSF Cell 1 DDR			
Date: 29/10/2025		Scenario: Section E - PS	
Designer: SH	Reviewer: GL	Company: REC	

SLIDEINTERPRET 9.040

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	C/Phi Function	Vertical Stress Ratio	Minimum Shear Strength (kPa)
Tailings - PS		17	Vertical Stress Ratio				0.05	0
Zone B - PS		19	C/Phi Function			Friction Angle Function (80%)		
Foundation - PS		20	Mohr-Coulomb	80	35			

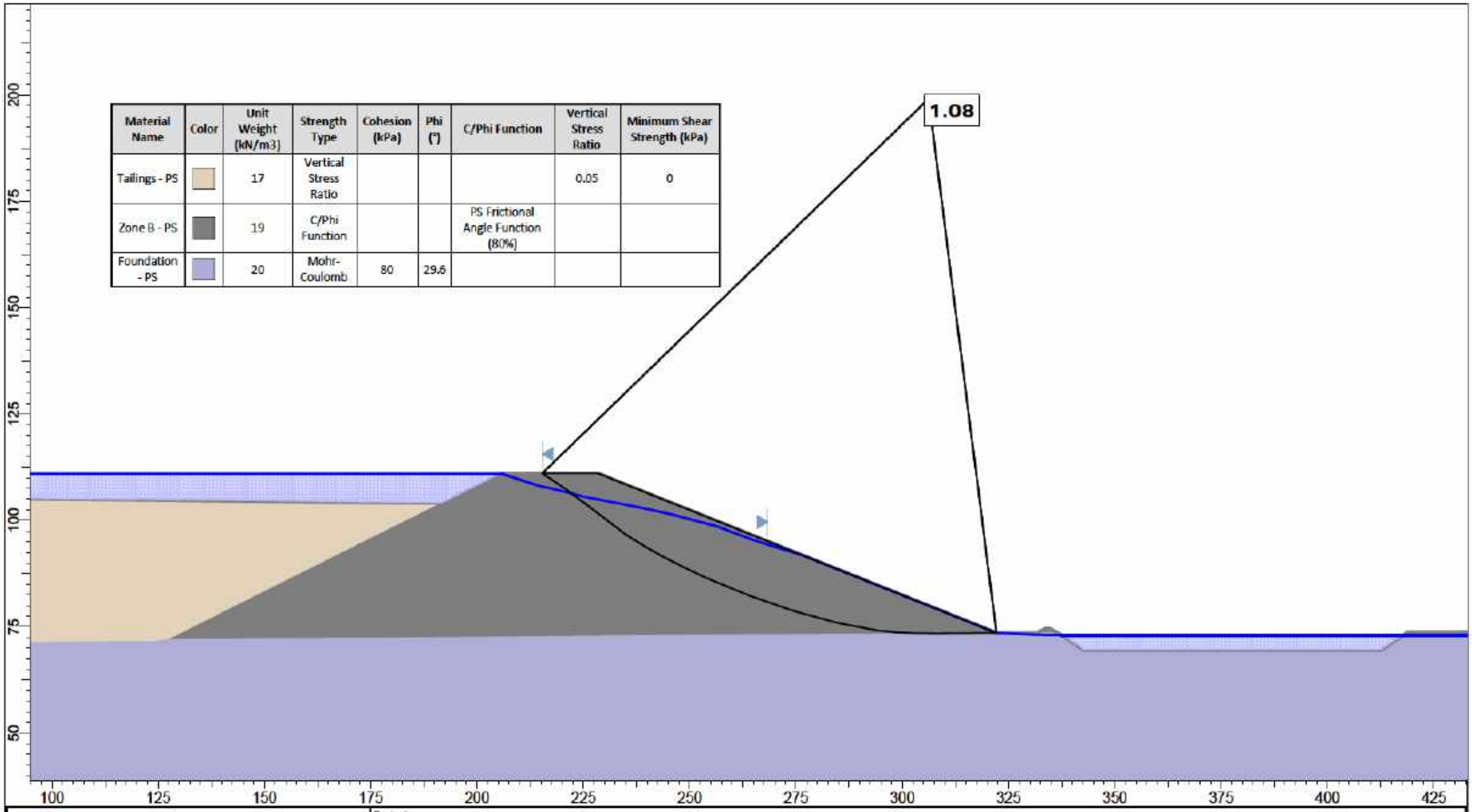


rec

SLIDEINTERPRET 9.040

Project: IPTSF Cell 1 DDR		
Date: 29/10/2025		Scenario: Section F - PS
Designer: SH	Reviewer: GL	Company: REC

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	C/Phi Function	Vertical Stress Ratio	Minimum Shear Strength (kPa)
Tailings - PS		17	Vertical Stress Ratio				0.05	0
Zone B - PS		19	C/Phi Function			PS Frictional Angle Function (80%)		
Foundation - PS		20	Mohr-Coulomb	80	29.6			



rec

SLIDEINTERPRET 9.040

Project: IPTSF Cell 1 DDR		
Date: 29/10/2025		Scenario: Section G - PS
Designer: SH	Reviewer: GL	Company: REC

Appendix E

Laboratory Test Certificates

Perth
16 Gympie Way, Willetton
WA 6155
Ph: (08) 9418 8742

[redacted]

E-Precision Laboratory

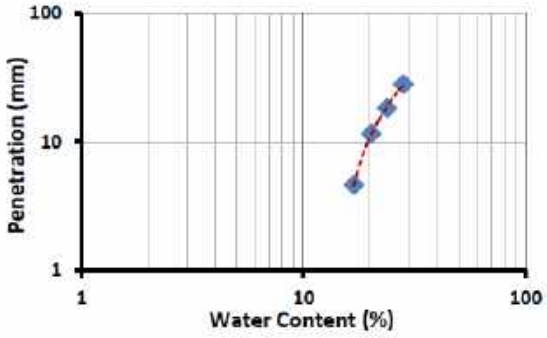
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

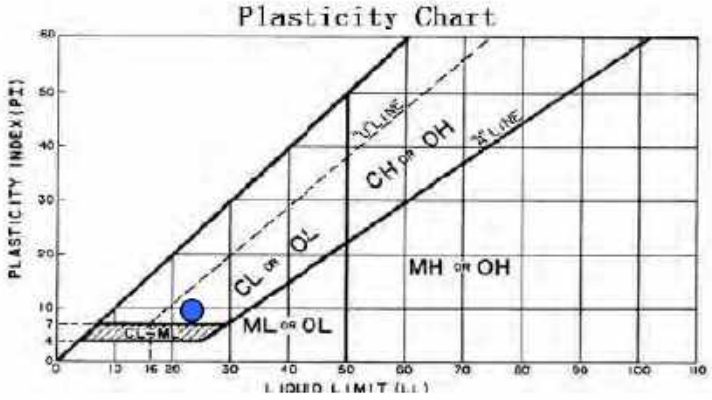
Client:	Kimberley Sands	**Date Tested:**	25/04/2024
Project:	Tails Testing 2024	Lab:	EPLAB
Sample No:	S1	**Job Number:**	KSANDS
Lab ID:	S1_ATT		
Depth (m):	-	**Room Temperature at Test:**	20°C
Tested by:	George	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	22.95
Plastic Limit (%):	15.63
Plasticity Index (%):	7.32
Liquidity Index (%):	-
Shrinkage Limit (%):	13.91
Linear Shrinkage(%):	3.67

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatur [redacted]

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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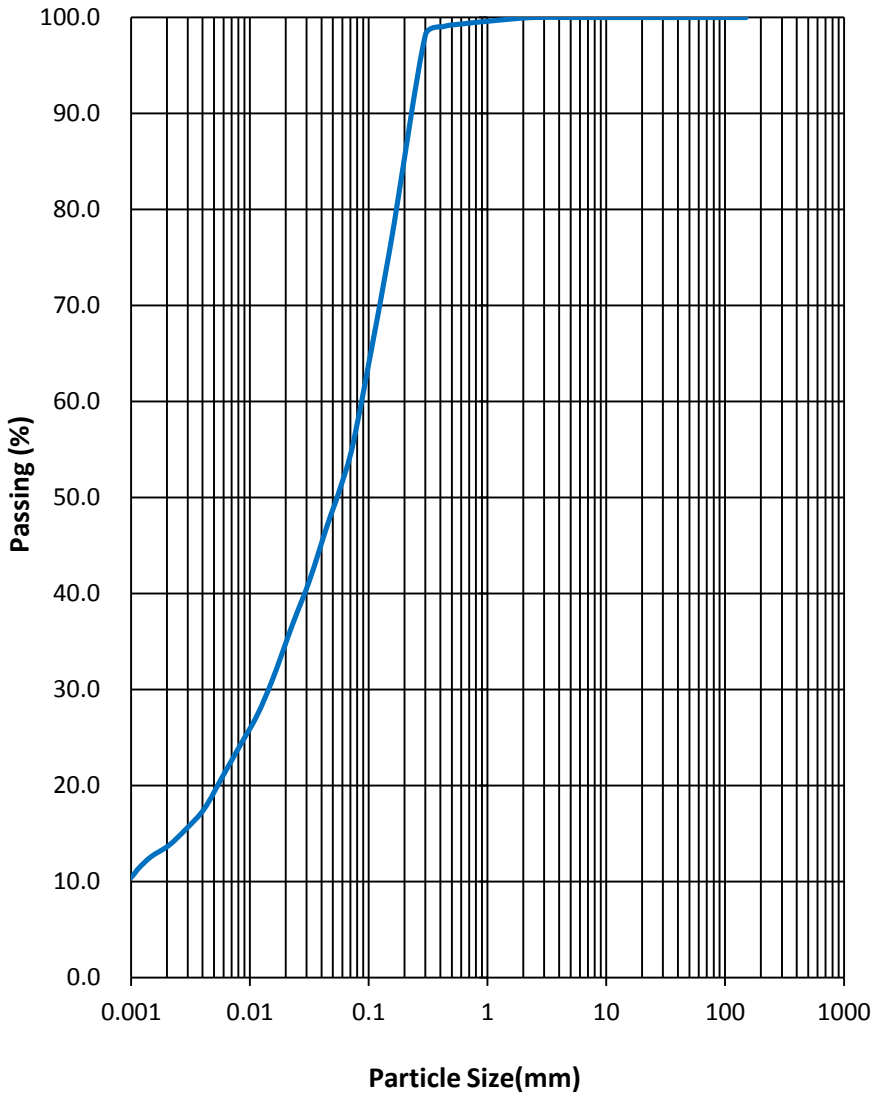
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	Kimberley Sands	Date Tested:	20/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S1	Depth (m):	-
Lab ID:	S1_PSDH	Room Temperature at Test:	19°C
Tested by:	George	2.36mm Particle Density (t/m³):	2.824
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	100.0
2.36	100.0
1.18	99.7
0.6	99.3
0.425	99.1
0.3	98.2
0.15	75.8
0.075	56.0
0.05701	50.8
0.04451	47.0
0.03185	41.4
0.02274	36.7
0.01559	31.1
0.01148	27.3
0.00818	24.1
0.00582	20.8
0.00414	17.6
0.00294	15.5
0.00209	13.8
0.00148	12.6
0.00117	11.4
0.00102	10.5
0.00086	9.6

PSD Graph



Notes: *Oven dried @ 60deg*
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature: [redacted]

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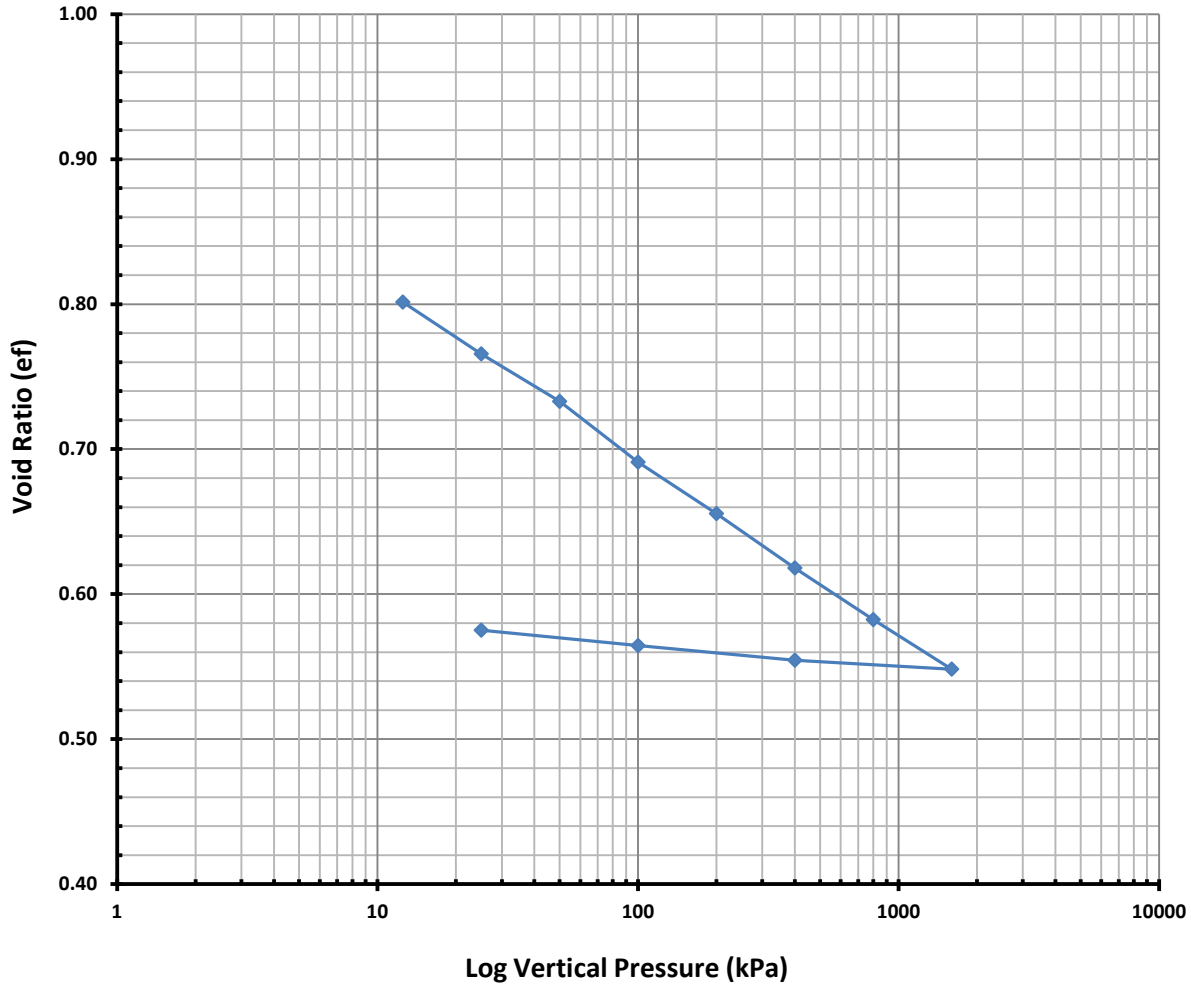
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°c

Tested by:	Phil	Initial Moisture (%):	41.01	Test Condition:	Undrained
Height (mm):	38.87	Final Moisture Content (%):	20.42	Sample Condition:	Saturated
Diameter (mm):	61.80	Bulk Density (t/m³):	2.10	Particle Density (t/m³):	2.824
Direction:	Vertical	Dry Density (t/m³):	1.49	Initial Void Ratio (e_i):	0.895

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



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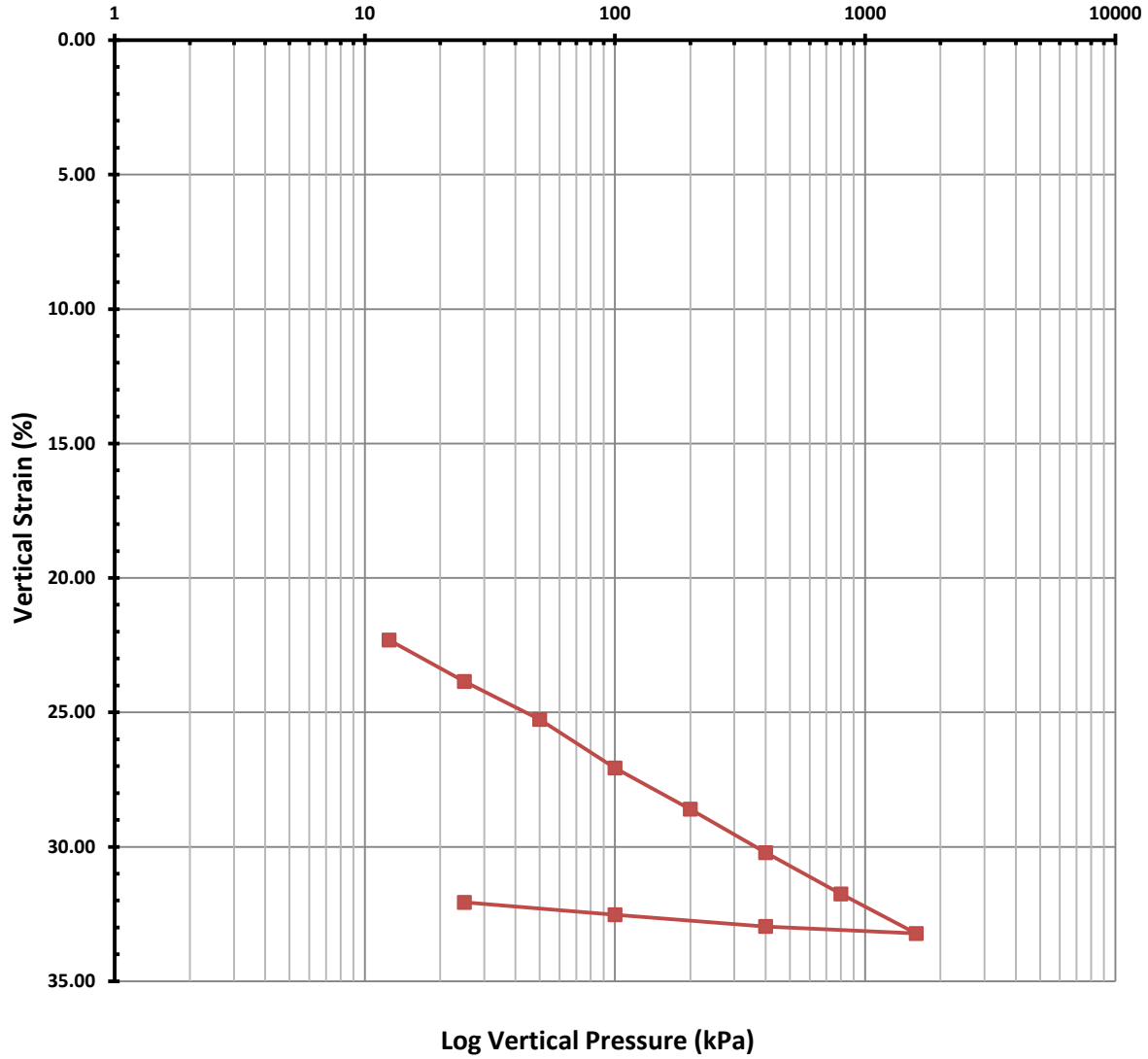
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_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:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_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	8.672	13.452	-	1.78E-02	7.5E-08		0.801	22.31
Stage 2 @ 25kPa	9.271	11.528	-	1.59E-03	5.7E-09		0.766	23.85
Stage 3 @ 50kPa	9.820	11.076	-	7.42E-04	2.6E-09		0.733	25.26
Stage 4 @ 100kPa	10.522	21.087	-	4.83E-04	3.2E-09		0.691	27.07
Stage 5 @ 200kPa	11.117	20.223	-	2.10E-04	1.3E-09		0.656	28.60
Stage 6 @ 400kPa	11.746	19.257	-	1.13E-04	6.8E-10		0.618	30.22
Stage 7 @ 800kPa	12.343	18.367	-	5.50E-05	3.1E-10		0.582	31.75
Stage 8 @ 1600kPa	12.915	11.719	-	2.70E-05	9.8E-11		0.548	33.23
Unload @ 400kPa	12.812							
Unload @ 100kPa	12.643							
Unload @ 25kPa	12.465							

** 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): [redacted]

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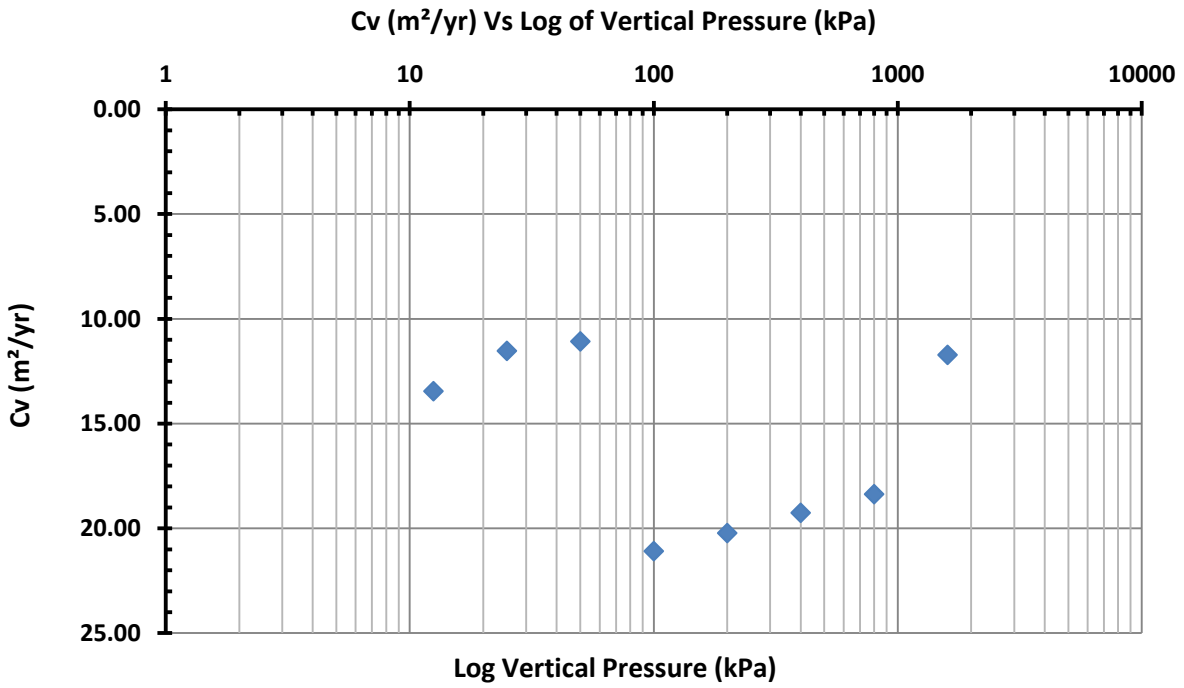
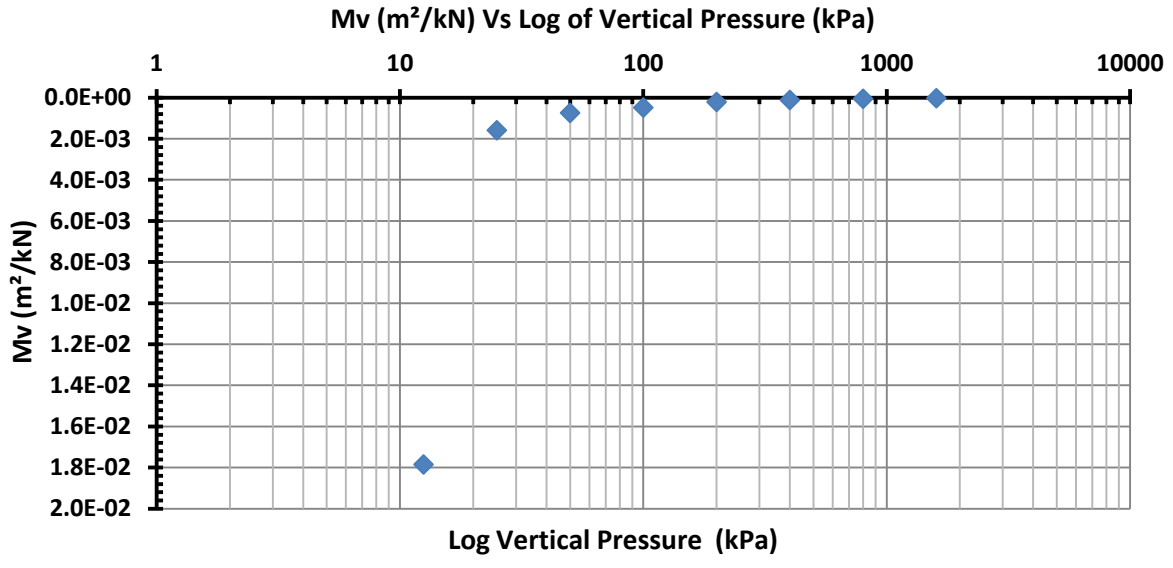
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_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:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

TEST RESULTS PLEASE SEE PAGES BELOW

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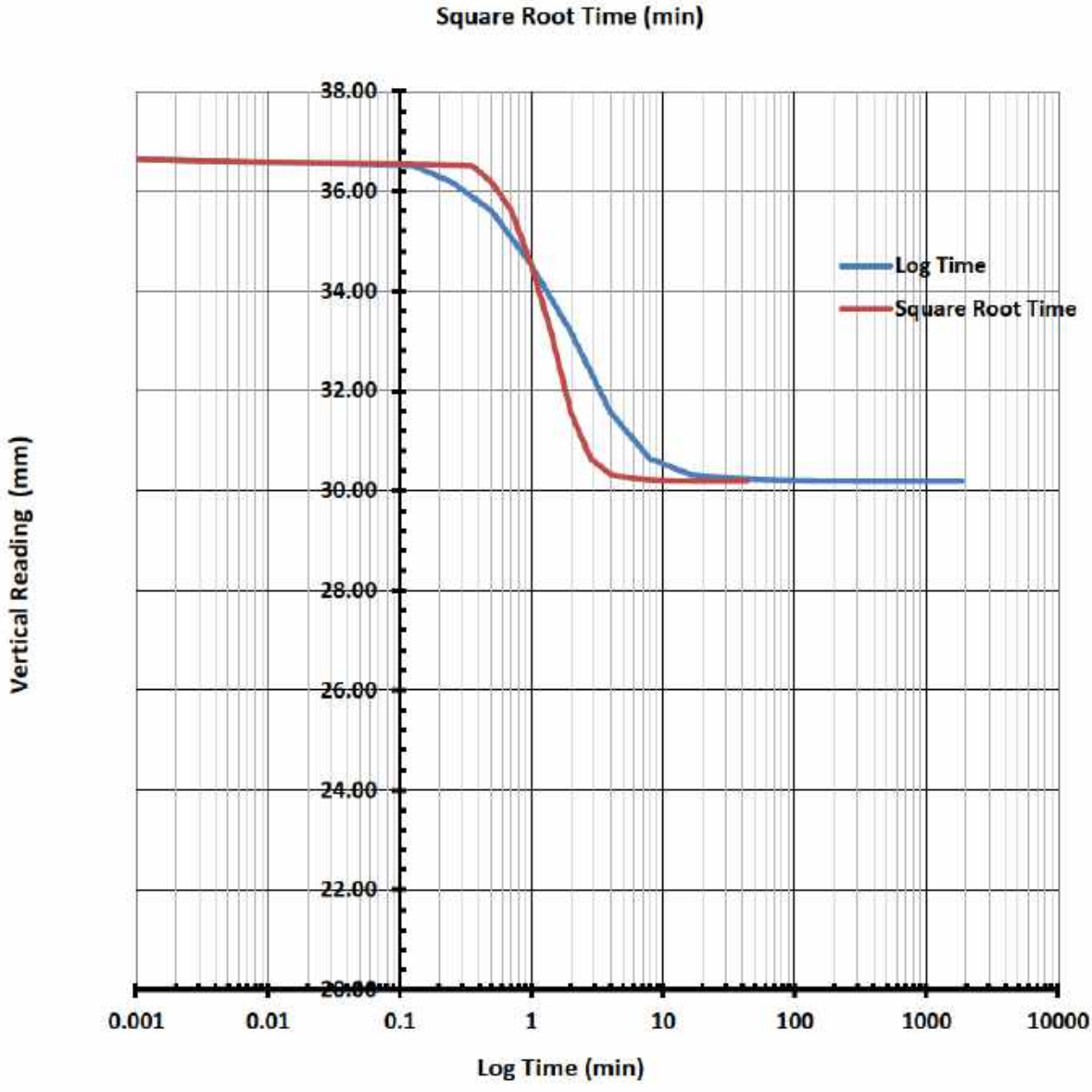
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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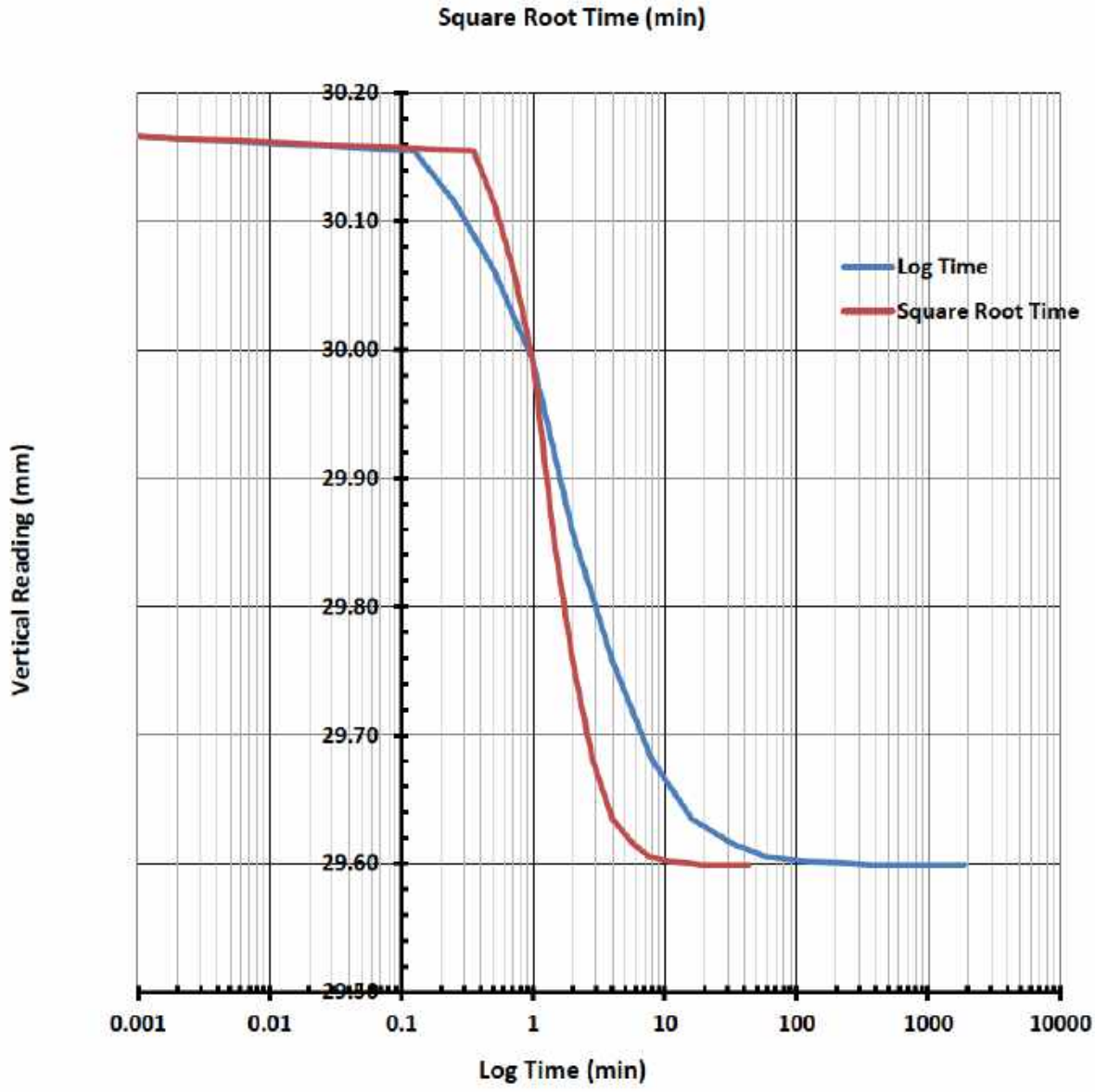
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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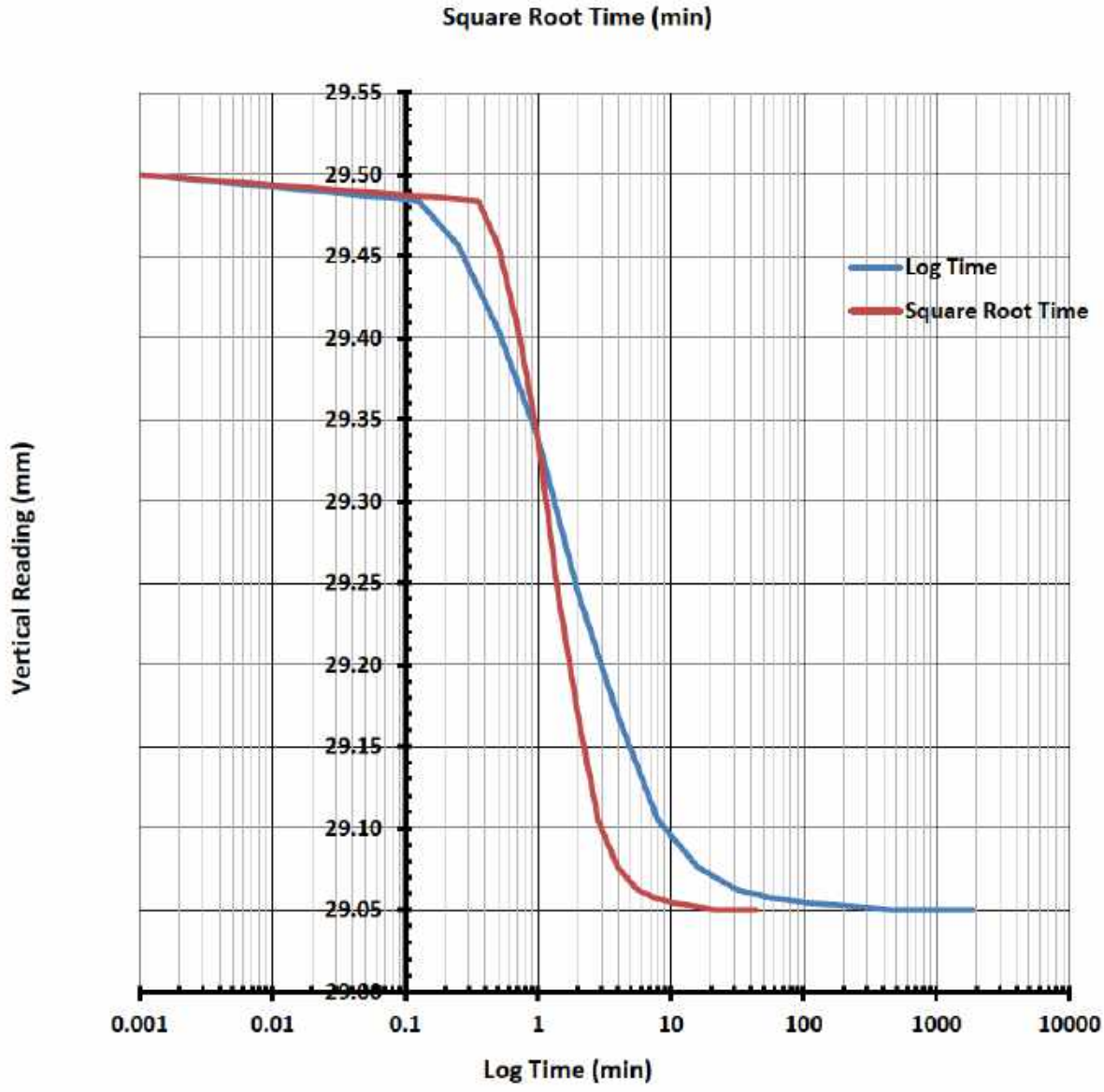
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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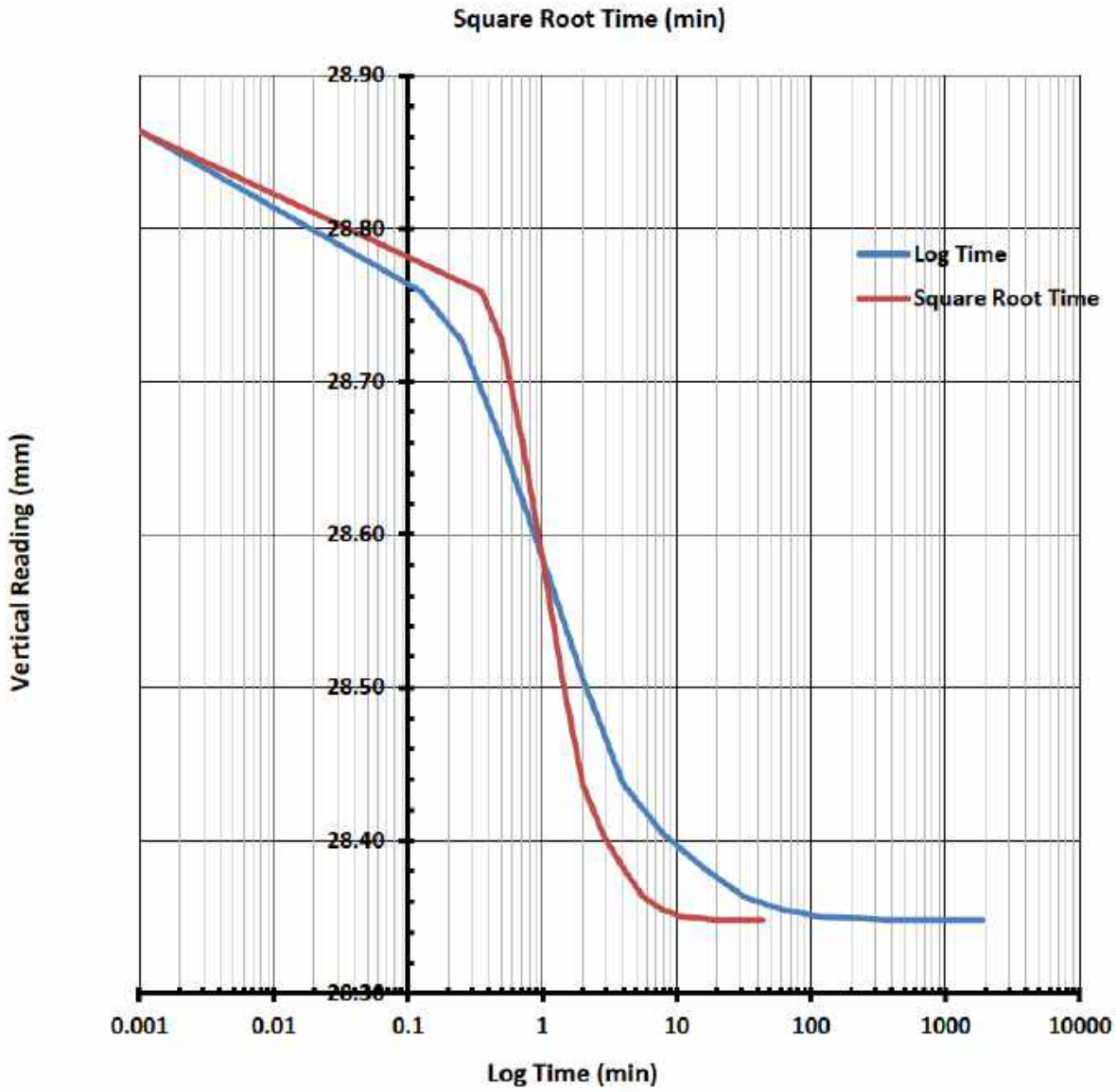
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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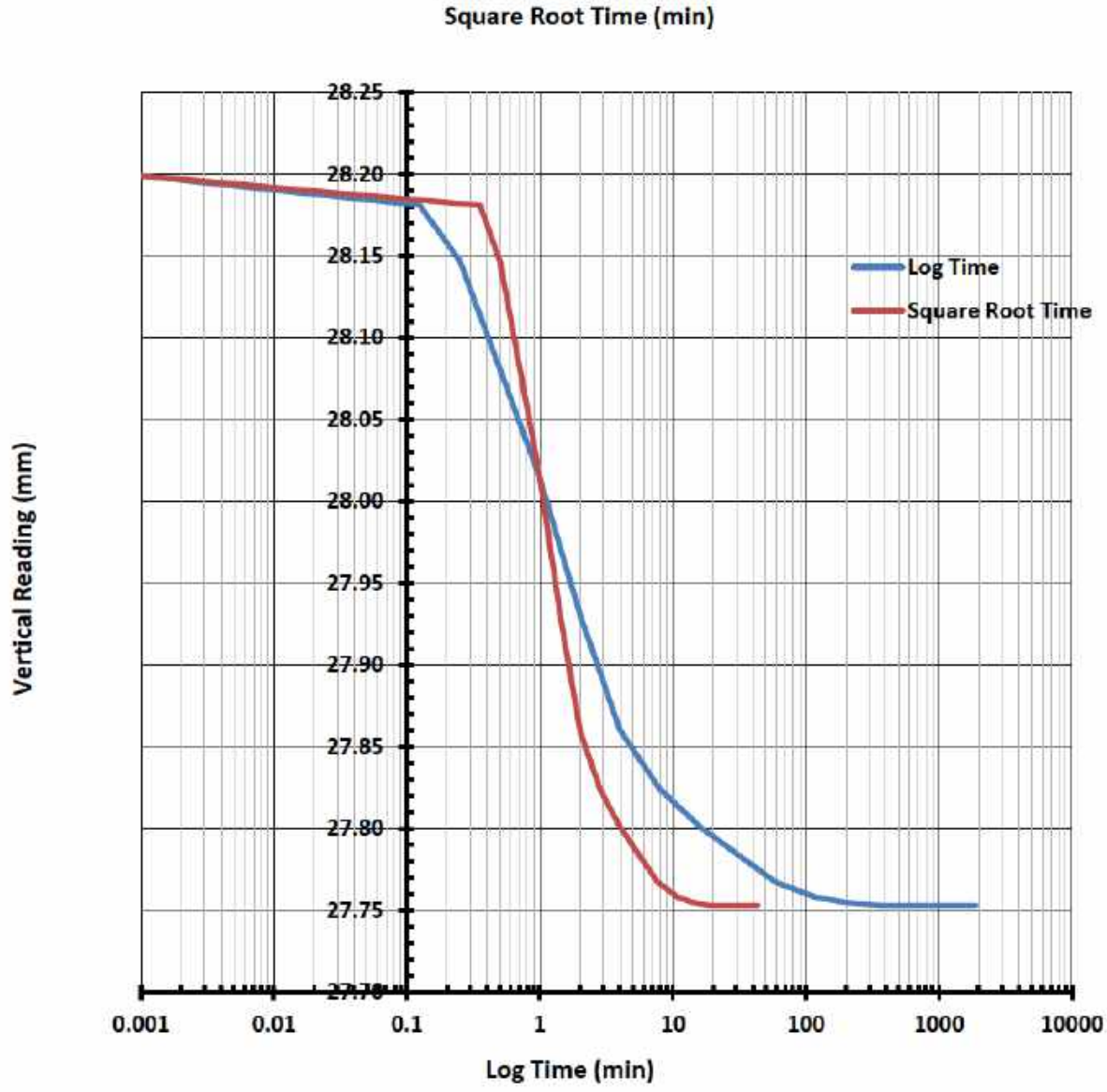
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa



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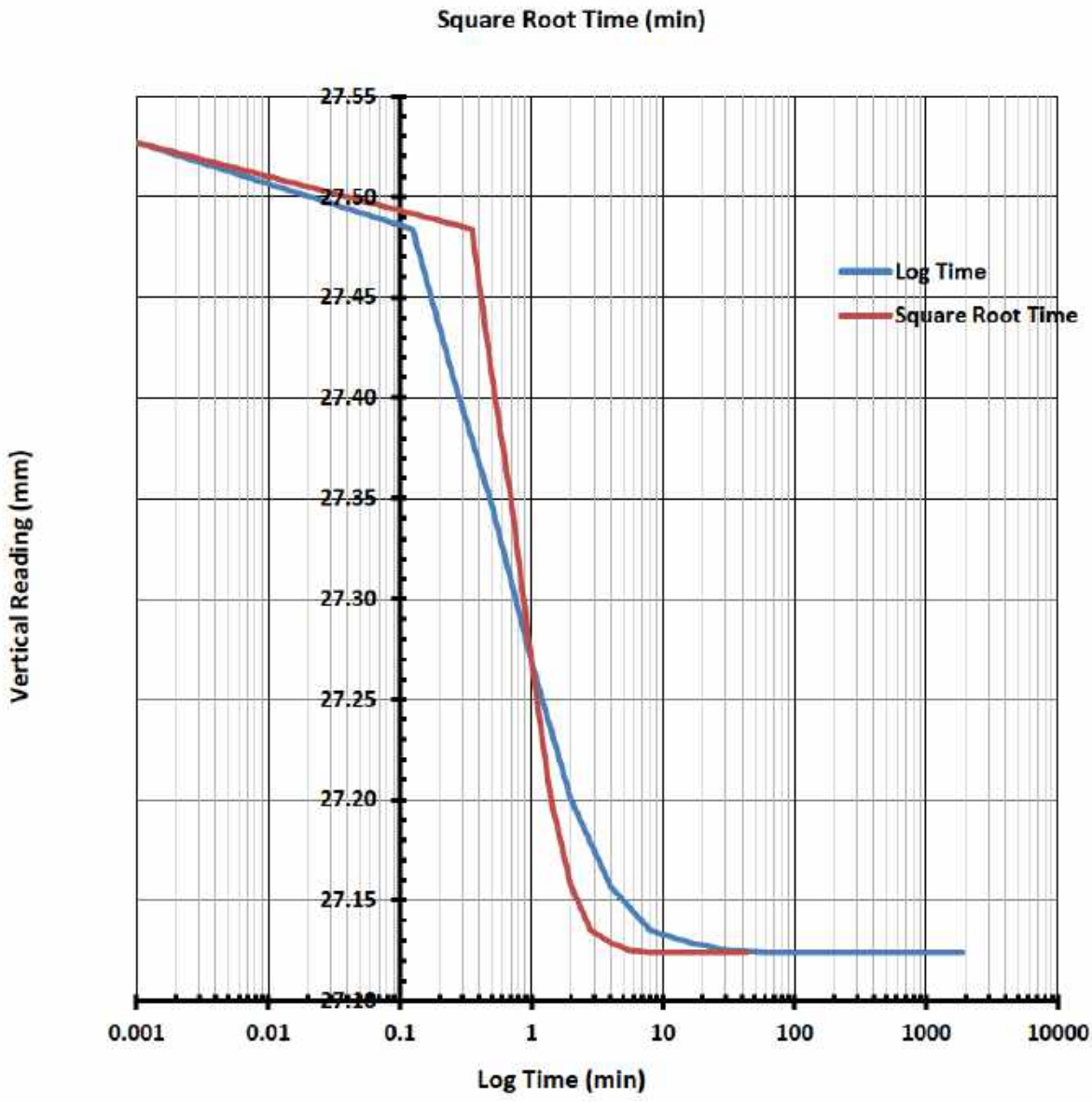
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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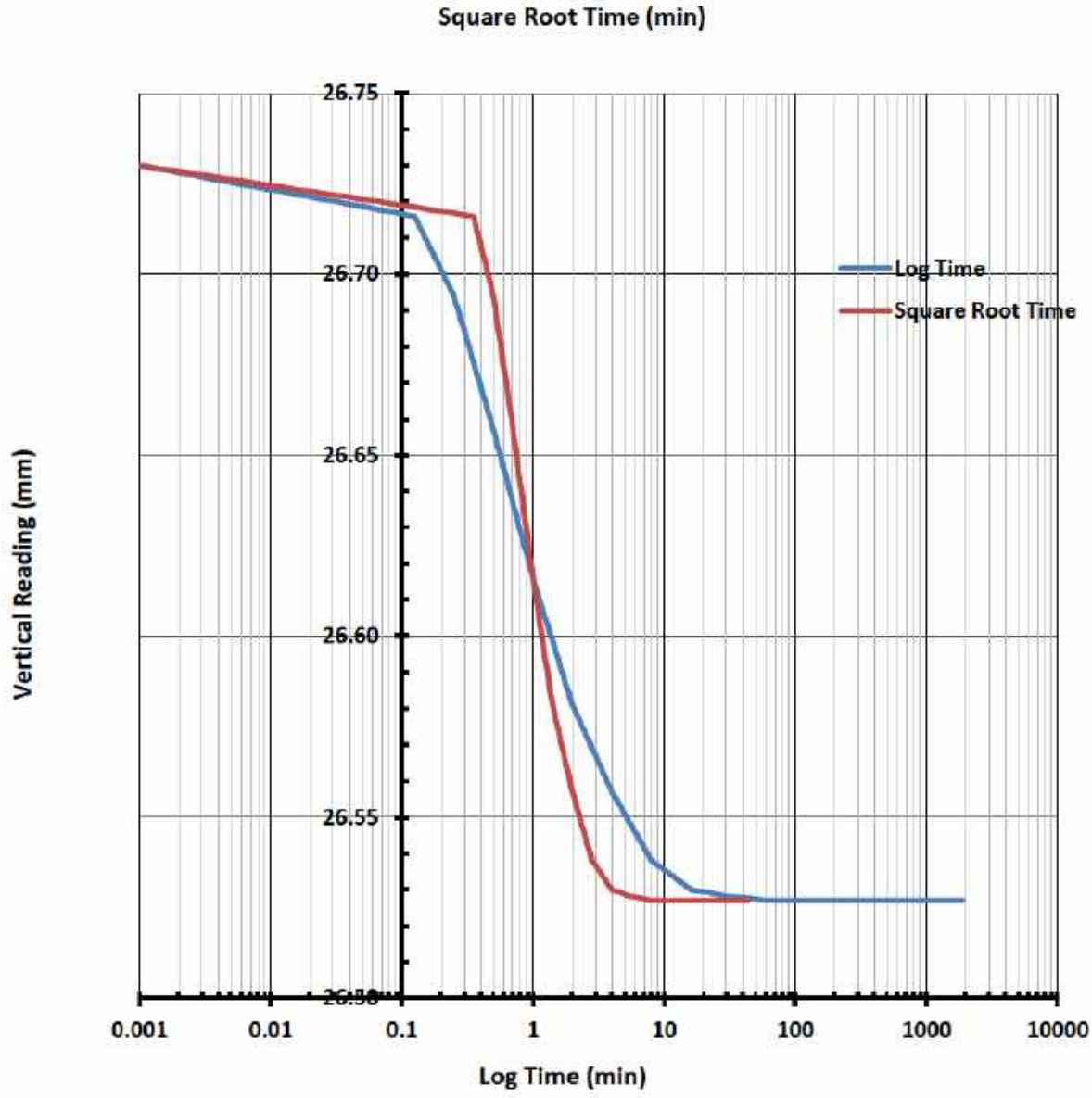
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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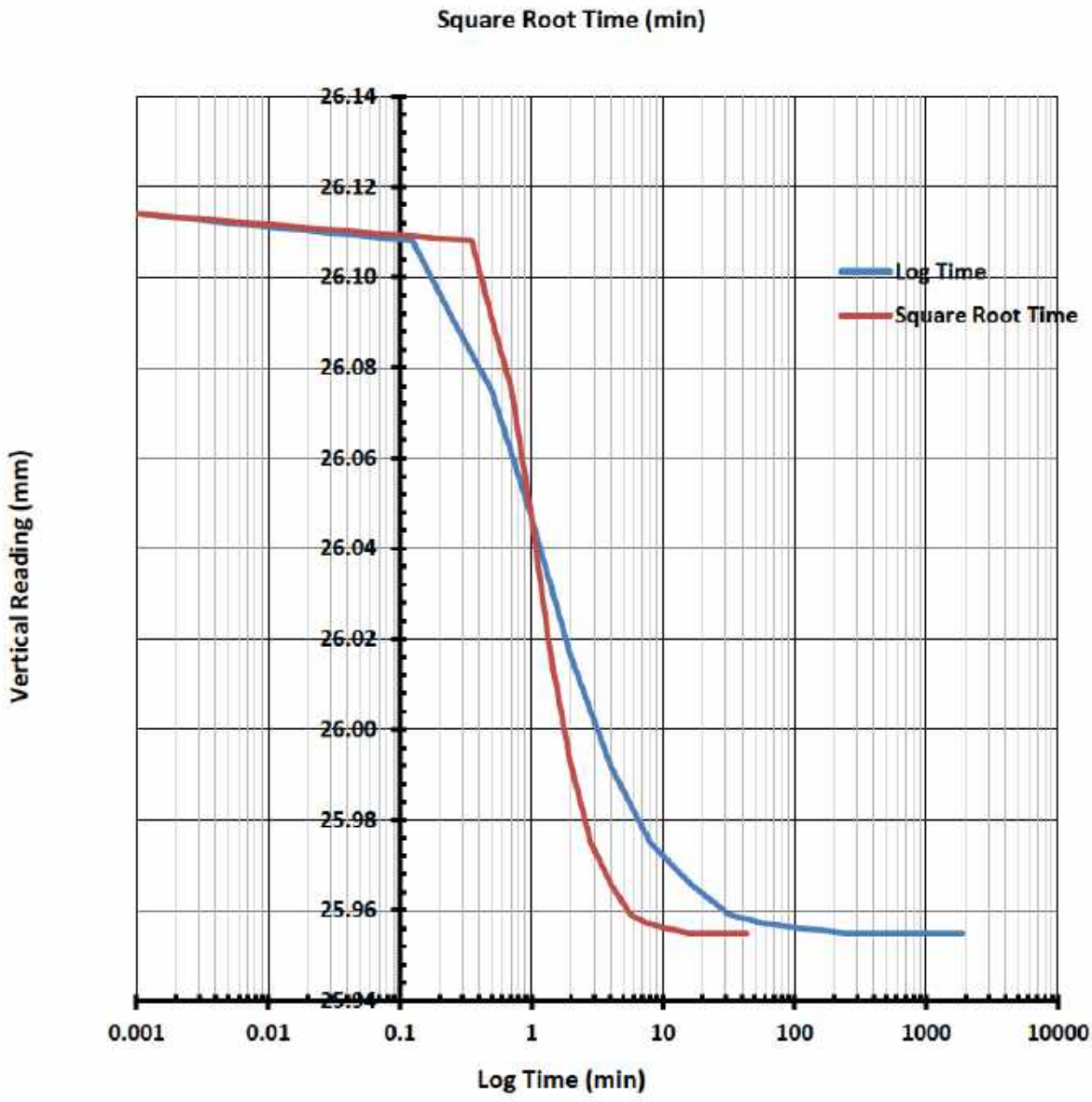
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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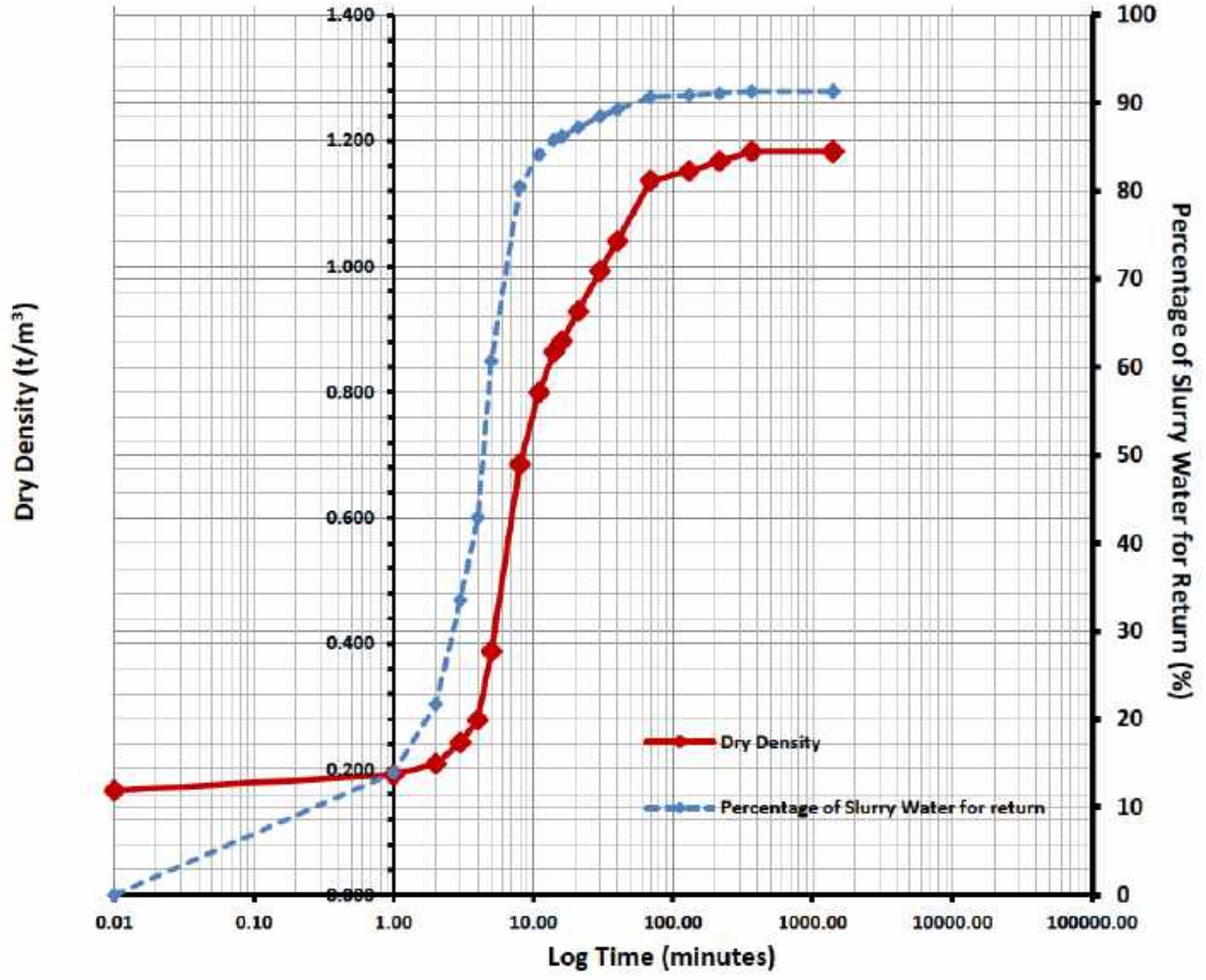
SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S1		
Lab ID:	S1_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil	**Initial Dry Density (t/m³):** 0.166
Type of Test: Settlement Testing	**Particle Density (t/m³):** 2.824
Sample Preparation: 15% Solids	**Initial Bulk Density (t/m³):** 1.107

Undrained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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SETTLEMENT TESTING TAILINGS

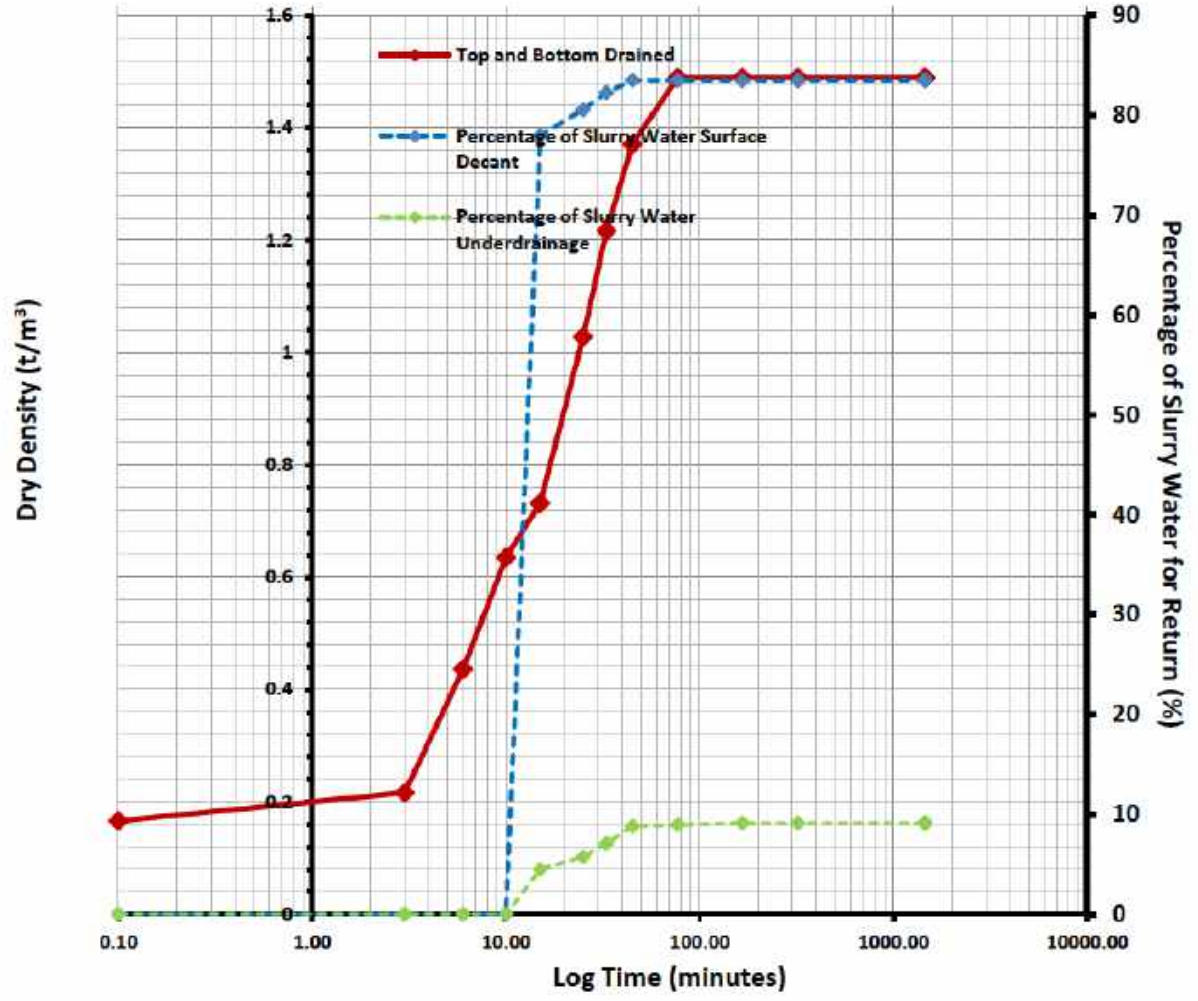
METHOD: IN-HOUSE METHOD

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S1		
Lab ID:	S1_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 15% Solids

Initial Dry Density (t/m³): 0.166
Particle Density (t/m³): 2.824
Initial Bulk Density (t/m³): 1.107

Top and Bottom Drained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

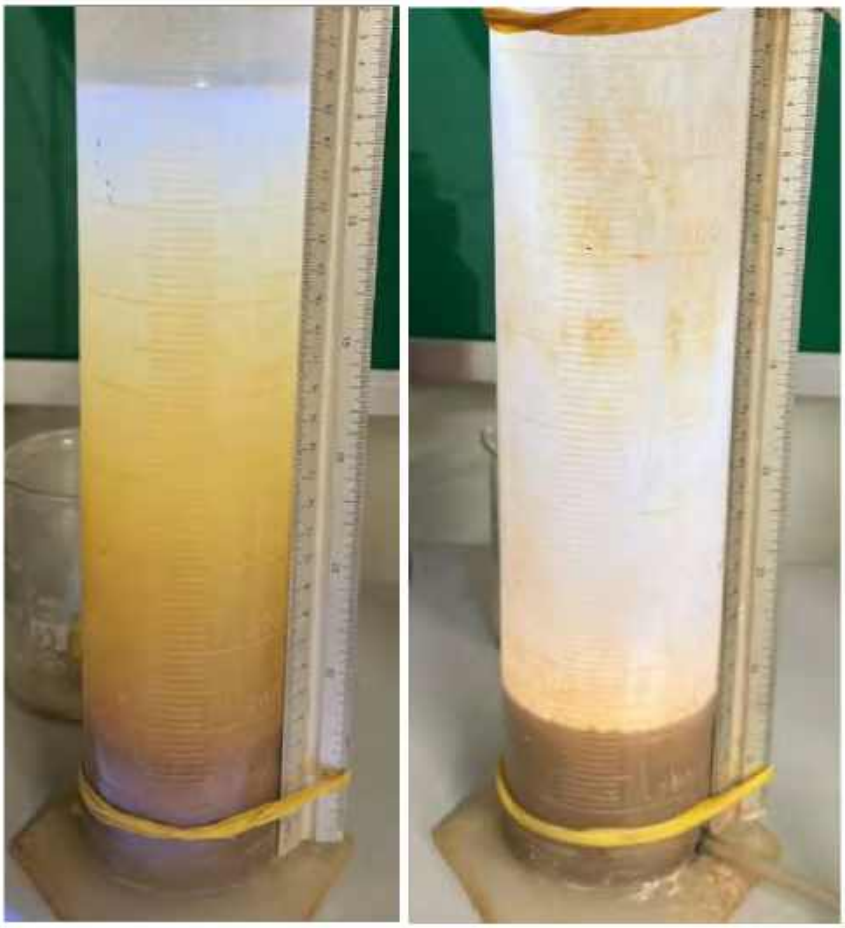
Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S1		
Lab ID:	S1_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 15% 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): [redacted]

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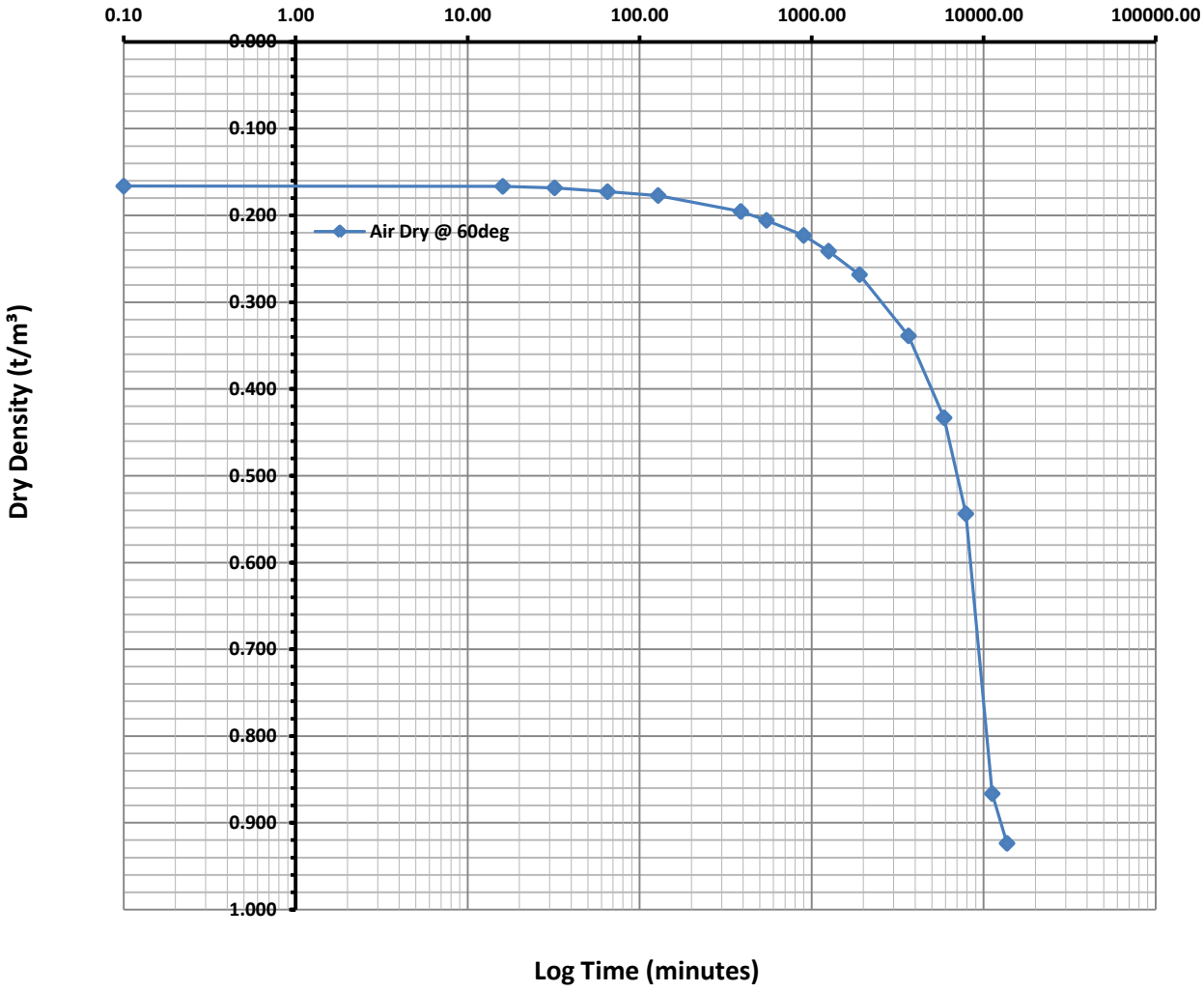
AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S1		
Lab ID:	S1_AIR_DRY	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Air Dry Testing
Sample Preparation: 15% Solids
Initial Bulk Density (t/m³): 1.109
Particle Density (t/m³): 2.824
Moisture Content Initial (%): 567.333

Dry Density (t/m³) Vs Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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E-Precision Laboratory

AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S1		
Lab ID:	S1_AIR_DRY	Room Temperature at Test:	19°

Photo of Samples after Testing

Oven dried @ 60deg

Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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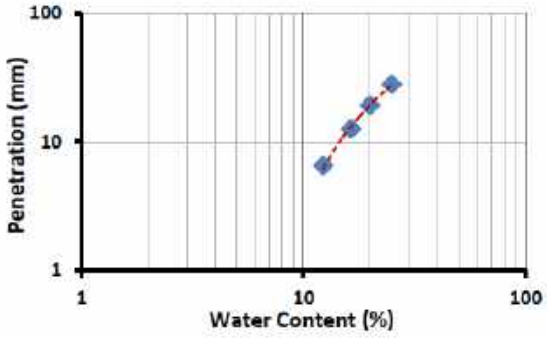
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

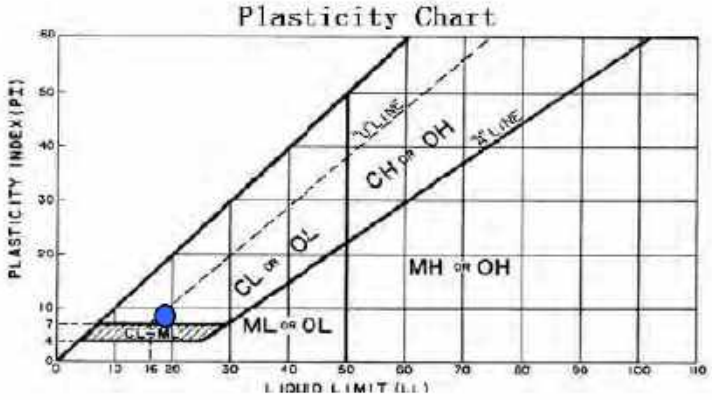
Client:	Kimberley Sands	**Date Tested:**	25/04/2024
Project:	Tails Testing 2024	Lab:	EPLAB
Sample No:	S2	**Job Number:**	KSANDS
Lab ID:	S2_ATT		
Depth (m):	-	**Room Temperature at Test:**	20°C
Tested by:	George	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	18.65
Plastic Limit (%):	9.86
Plasticity Index (%):	8.79
Liquidity Index (%):	-
Shrinkage Limit (%):	8.77
Linear Shrinkage(%):	4.15

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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

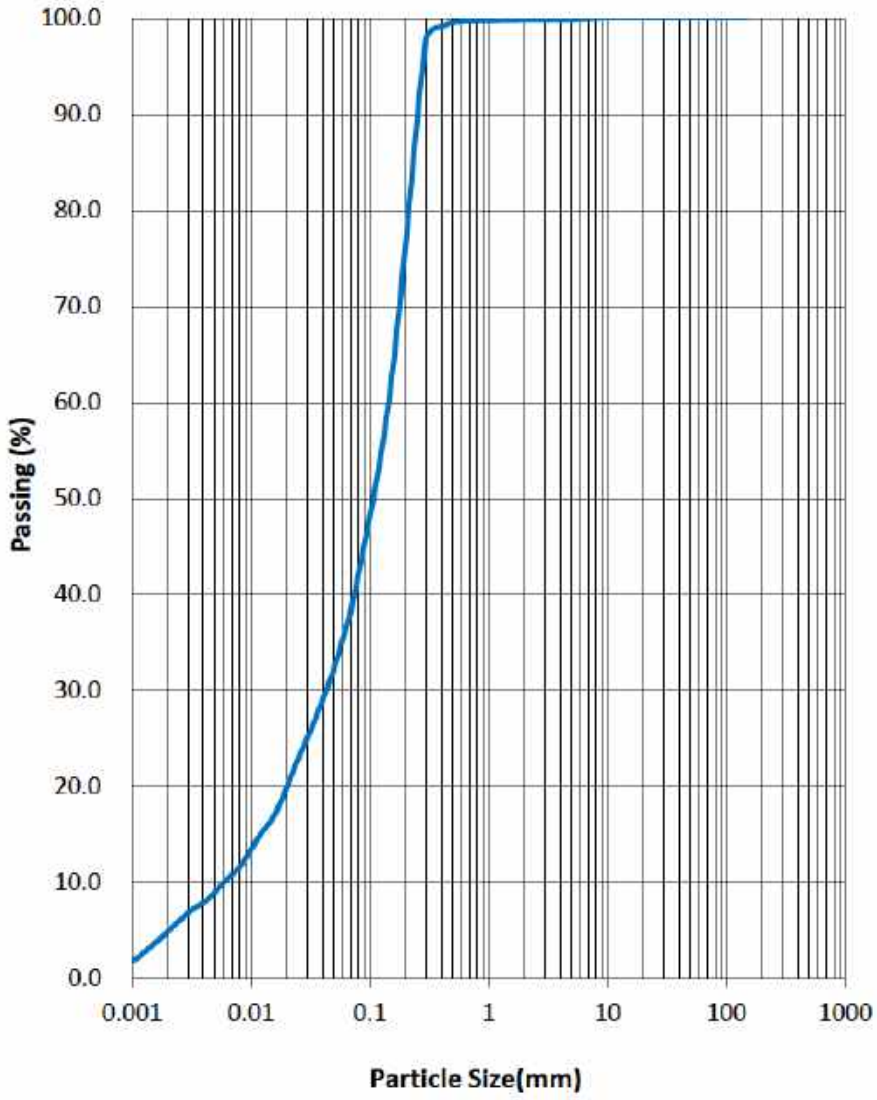
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	Kimberley Sands	Date Tested:	20/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S2	Depth (m):	-
Lab ID:	S2_PSDH	Room Temperature at Test:	19°C
Tested by:	George	2.36mm Particle Density (t/m³):	2.753
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	99.8
2.36	99.8
1.18	99.8
0.6	99.7
0.425	99.2
0.3	97.9
0.15	61.4
0.075	40.1
0.05837	35.0
0.04577	30.8
0.03280	26.2
0.02348	22.0
0.01615	17.2
0.01188	14.9
0.00847	11.9
0.00601	10.0
0.00427	8.1
0.00303	6.9
0.00215	5.2
0.00153	3.5
0.00121	2.5
0.00106	1.8
0.00089	1.4

PSD Graph



Notes: *Oven dried @ 60deg*

Stored and Tested the Sample as received

Samples supplied by the Client

Authorized Signature [redacted]

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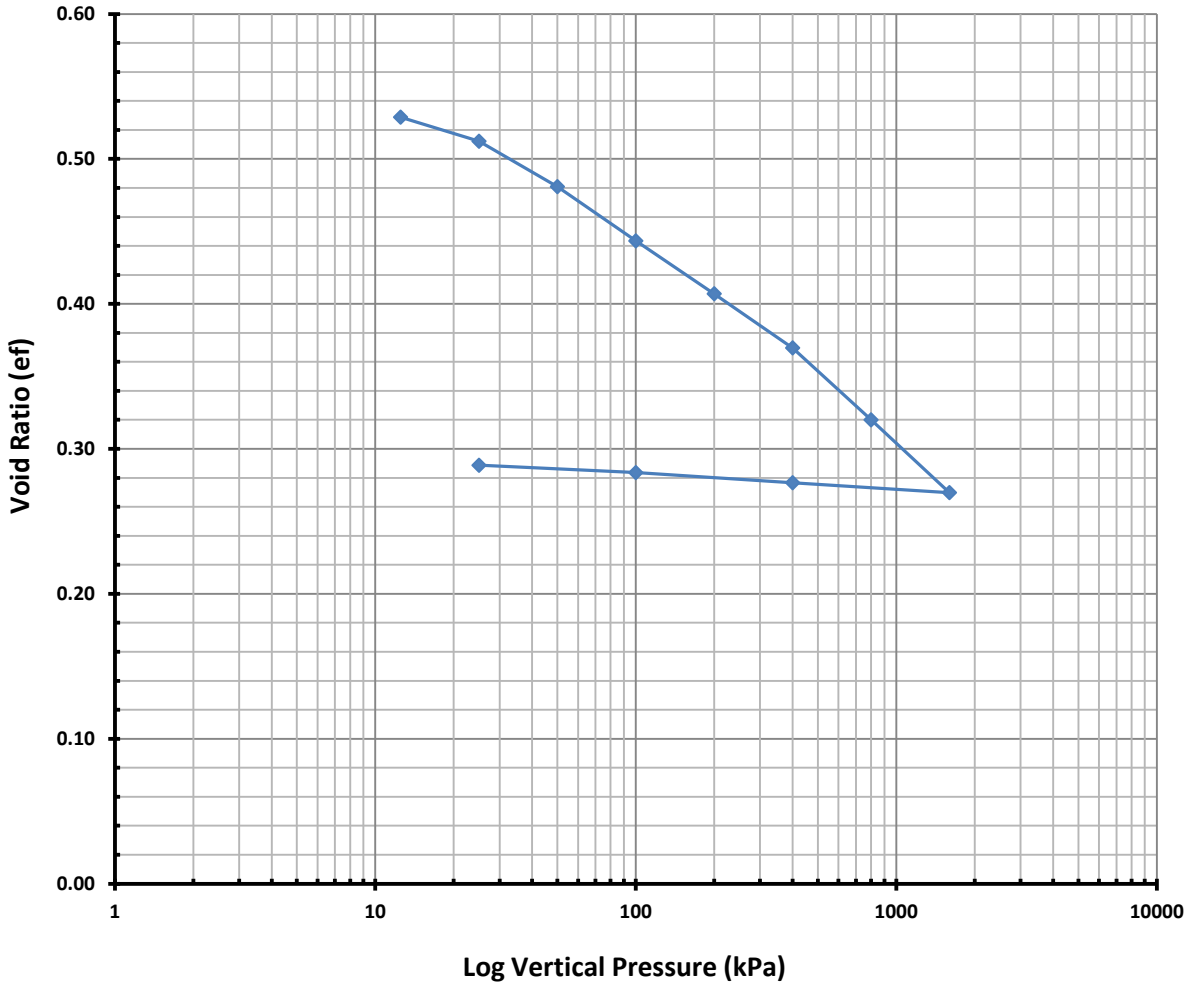
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°c

Tested by:	Phil	Initial Moisture (%):	32.43	Test Condition:	Undrained
Height (mm):	25.63	Final Moisture Content (%):	19.38	Sample Condition:	Saturated
Diameter (mm):	61.80	Bulk Density (t/m³):	2.32	Particle Density (t/m³):	2.753
Direction:	Vertical	Dry Density (t/m³):	1.75	Initial Void Ratio (e_i):	0.575

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



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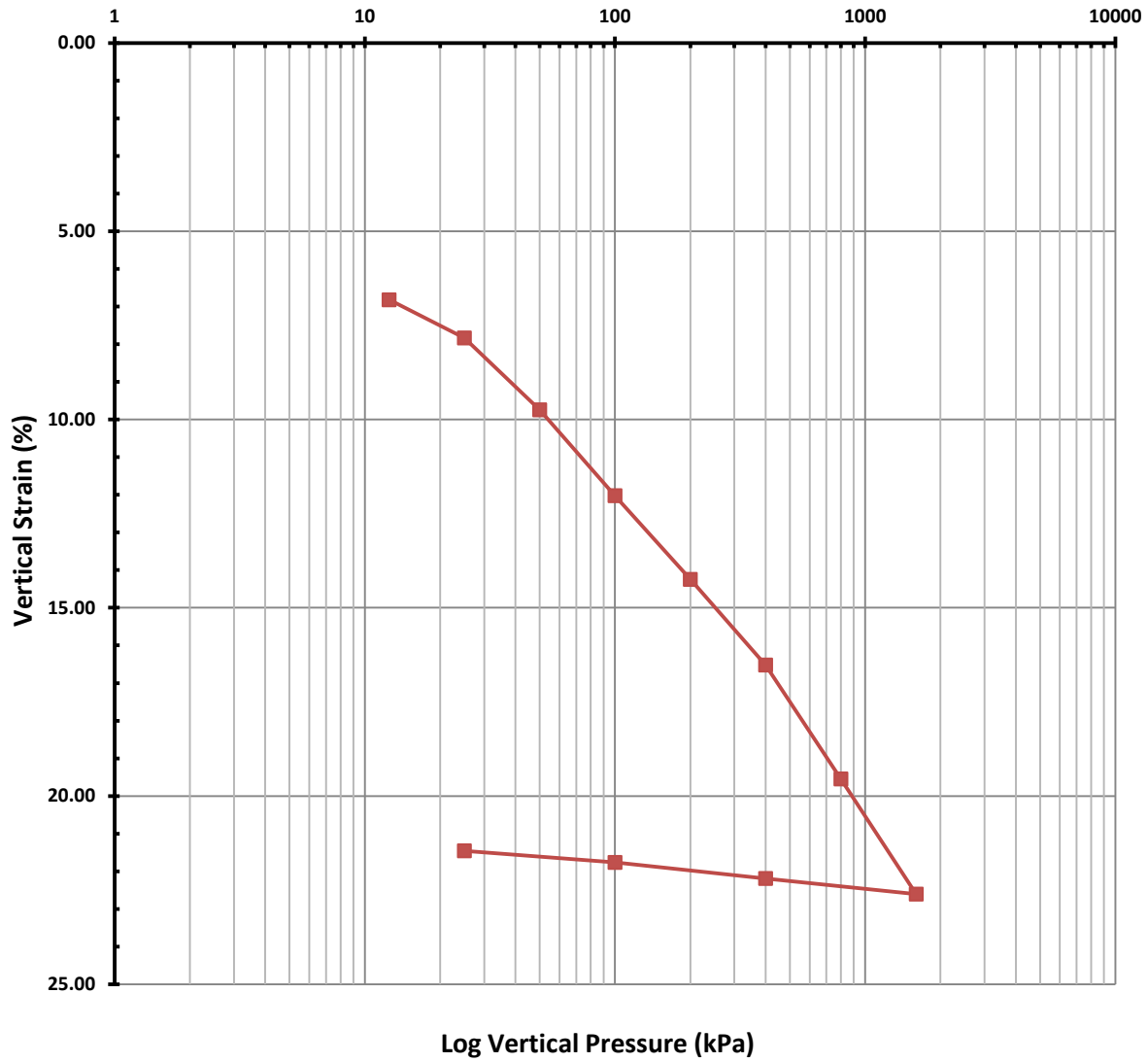
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_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:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_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	1.748	5.127	-	5.46E-03	8.7E-09		0.529	6.82
Stage 2 @ 25kPa	2.008	14.549	-	8.70E-04	3.9E-09		0.512	7.83
Stage 3 @ 50kPa	2.497	6.993	-	8.29E-04	1.8E-09		0.481	9.74
Stage 4 @ 100kPa	3.081	4.458	-	5.05E-04	7.0E-10		0.443	12.02
Stage 5 @ 200kPa	3.651	6.317	-	2.53E-04	5.0E-10		0.407	14.25
Stage 6 @ 400kPa	4.234	11.957	-	1.33E-04	4.9E-10		0.370	16.52
Stage 7 @ 800kPa	5.010	5.597	-	9.06E-05	1.6E-10		0.320	19.55
Stage 8 @ 1600kPa	5.794	3.454	-	4.75E-05	5.1E-11		0.270	22.61
Unload @ 400kPa	5.688							
Unload @ 100kPa	5.578							
Unload @ 25kPa	5.499							

** 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) [redacted]

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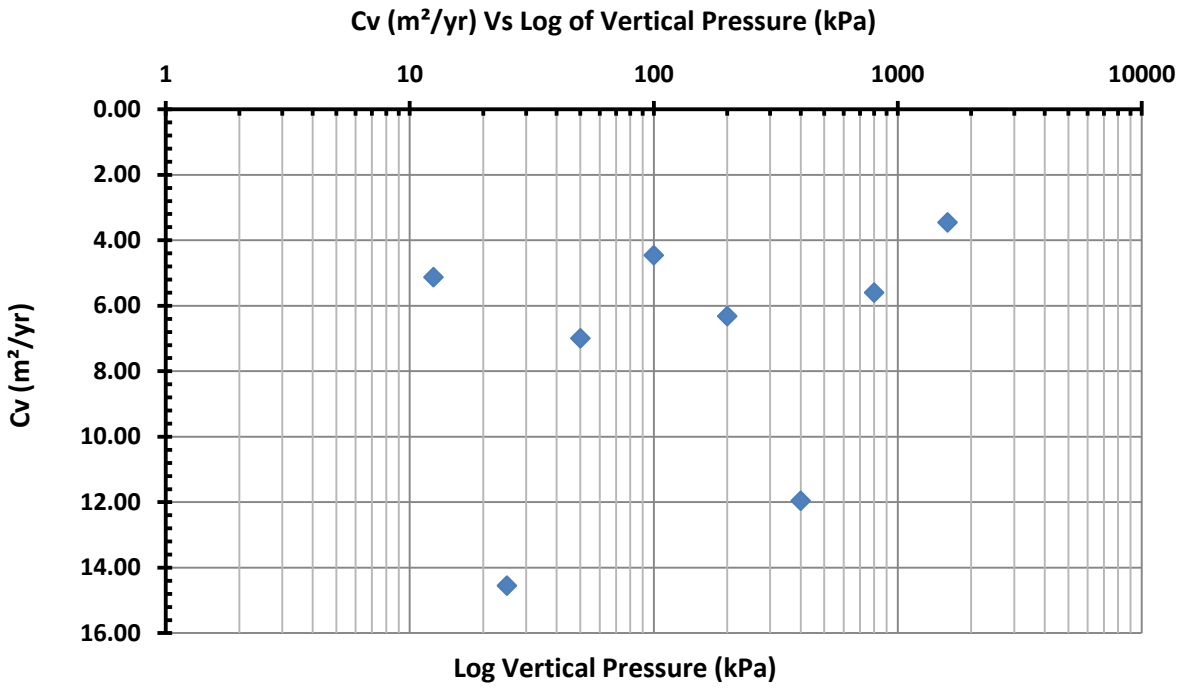
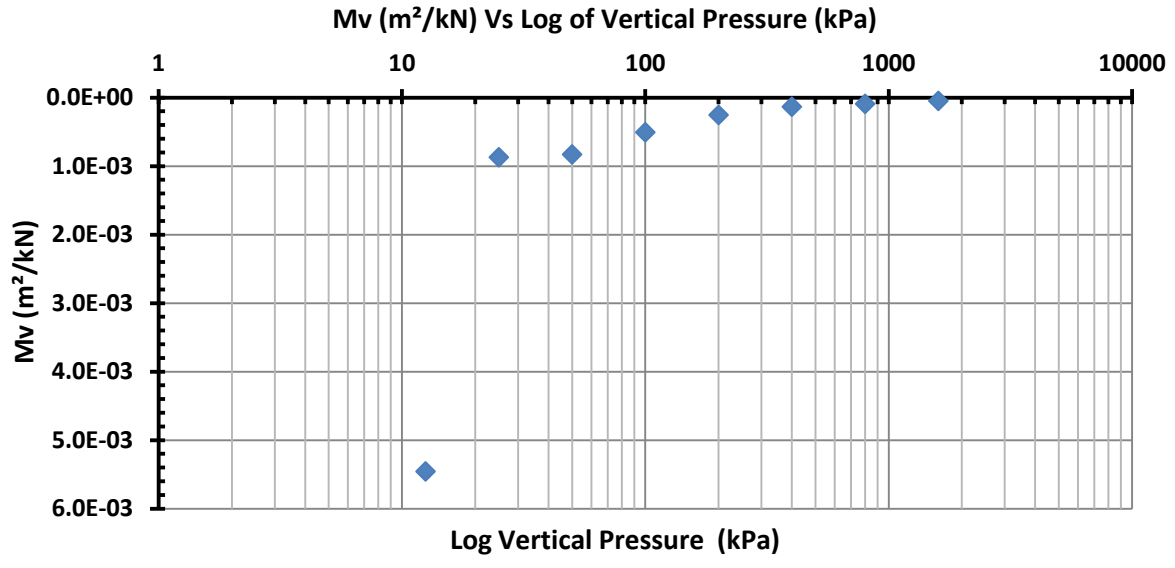
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_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:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

TEST RESULTS PLEASE SEE PAGES BELOW

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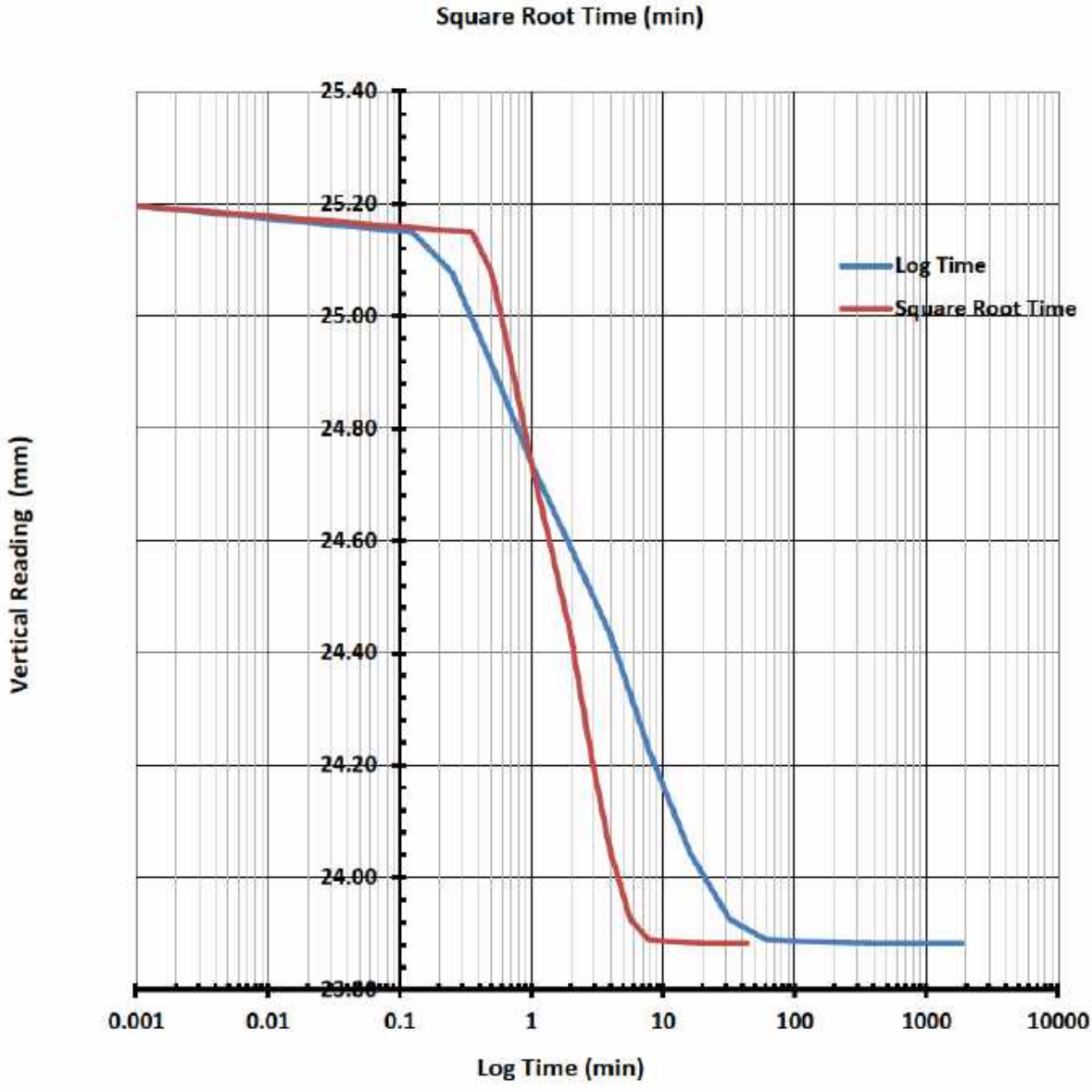
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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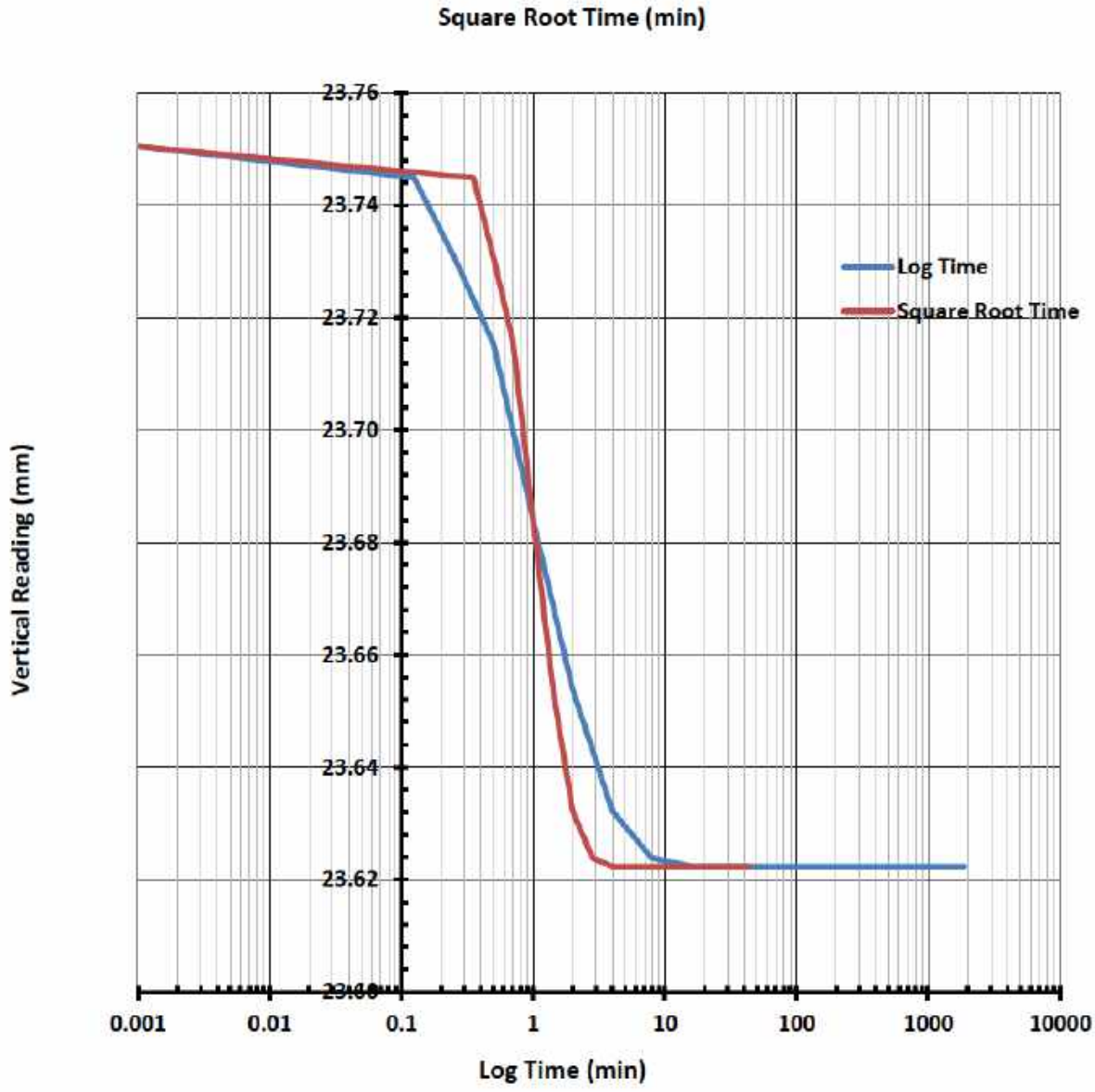
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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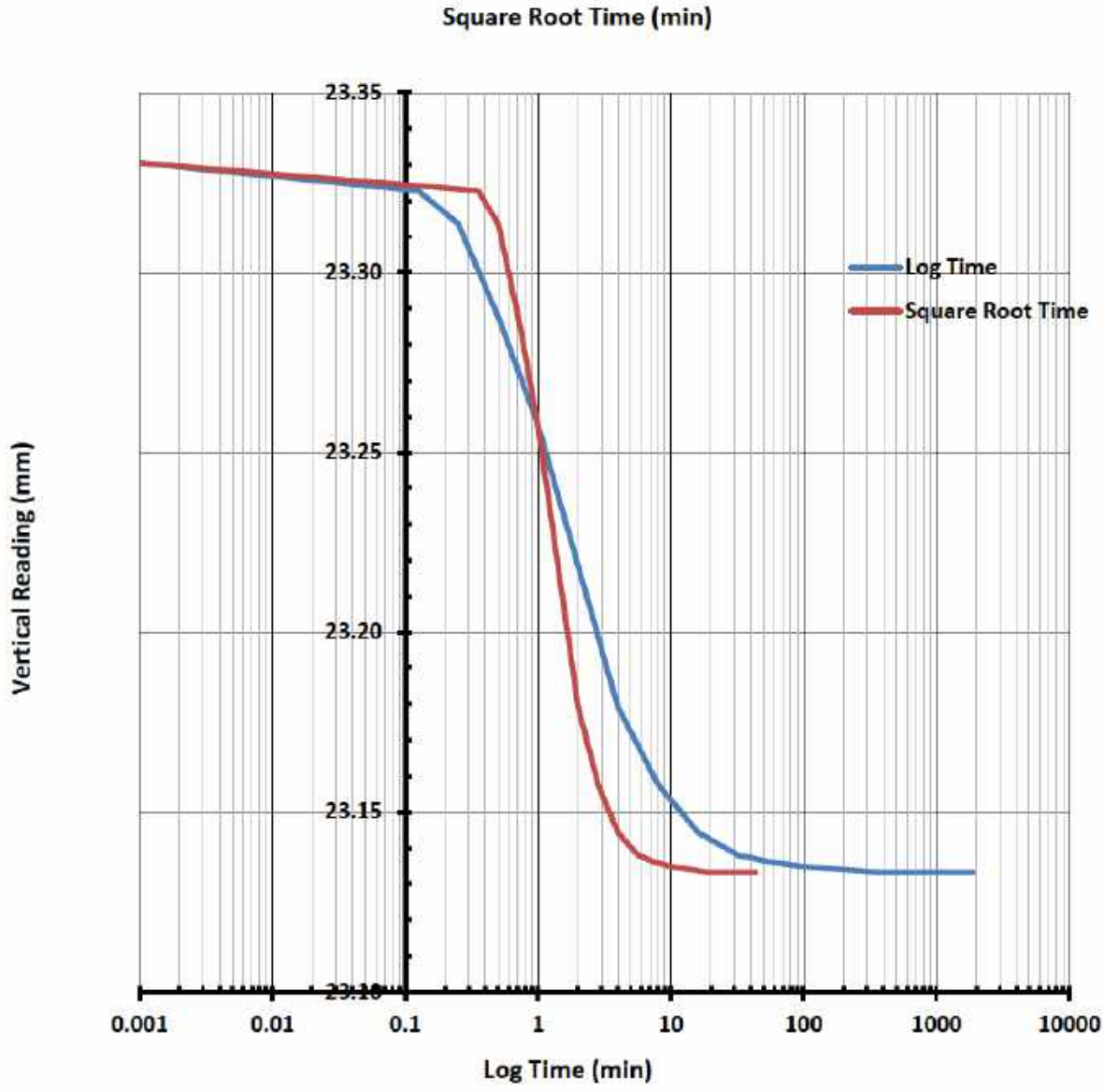
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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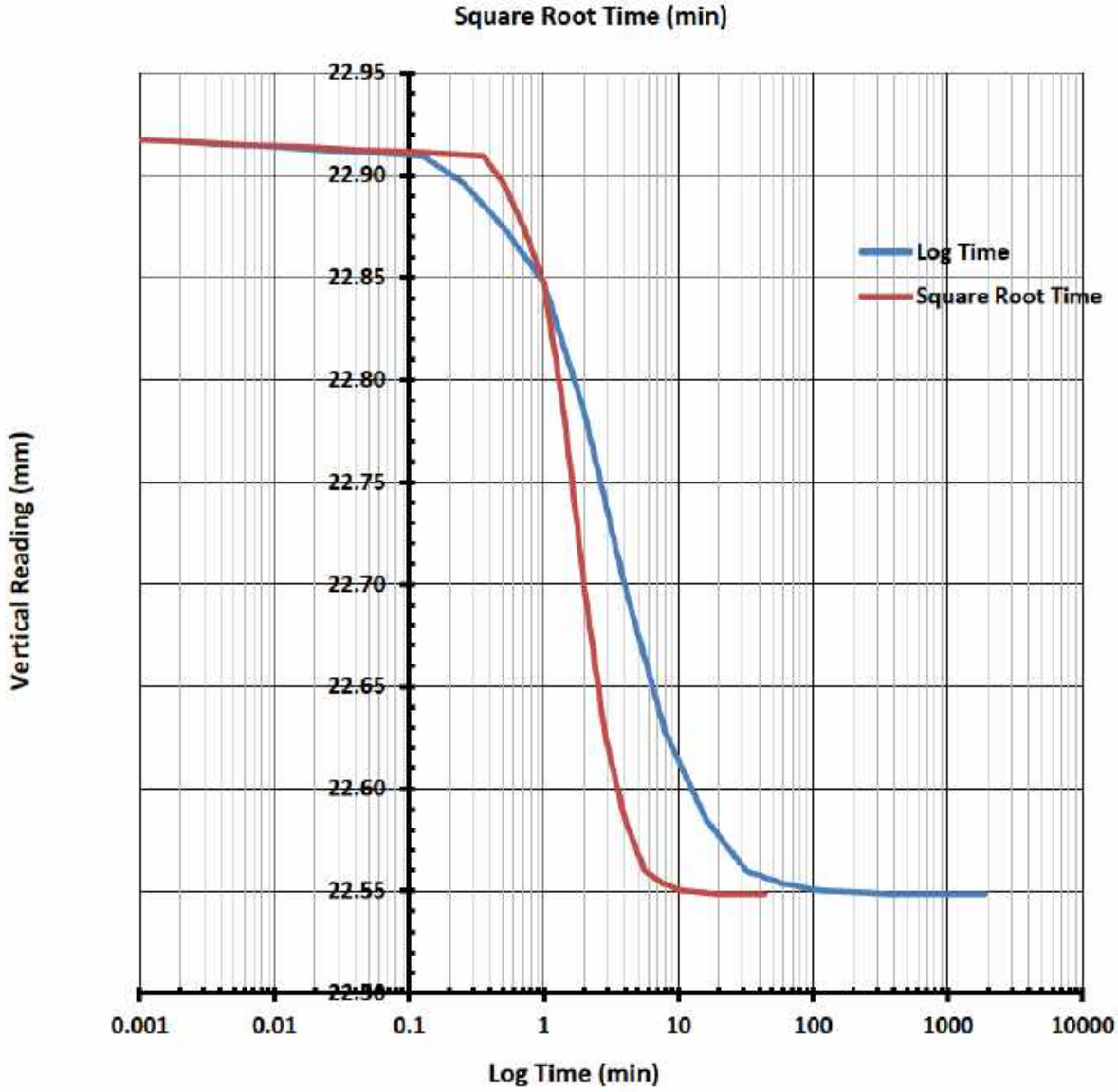
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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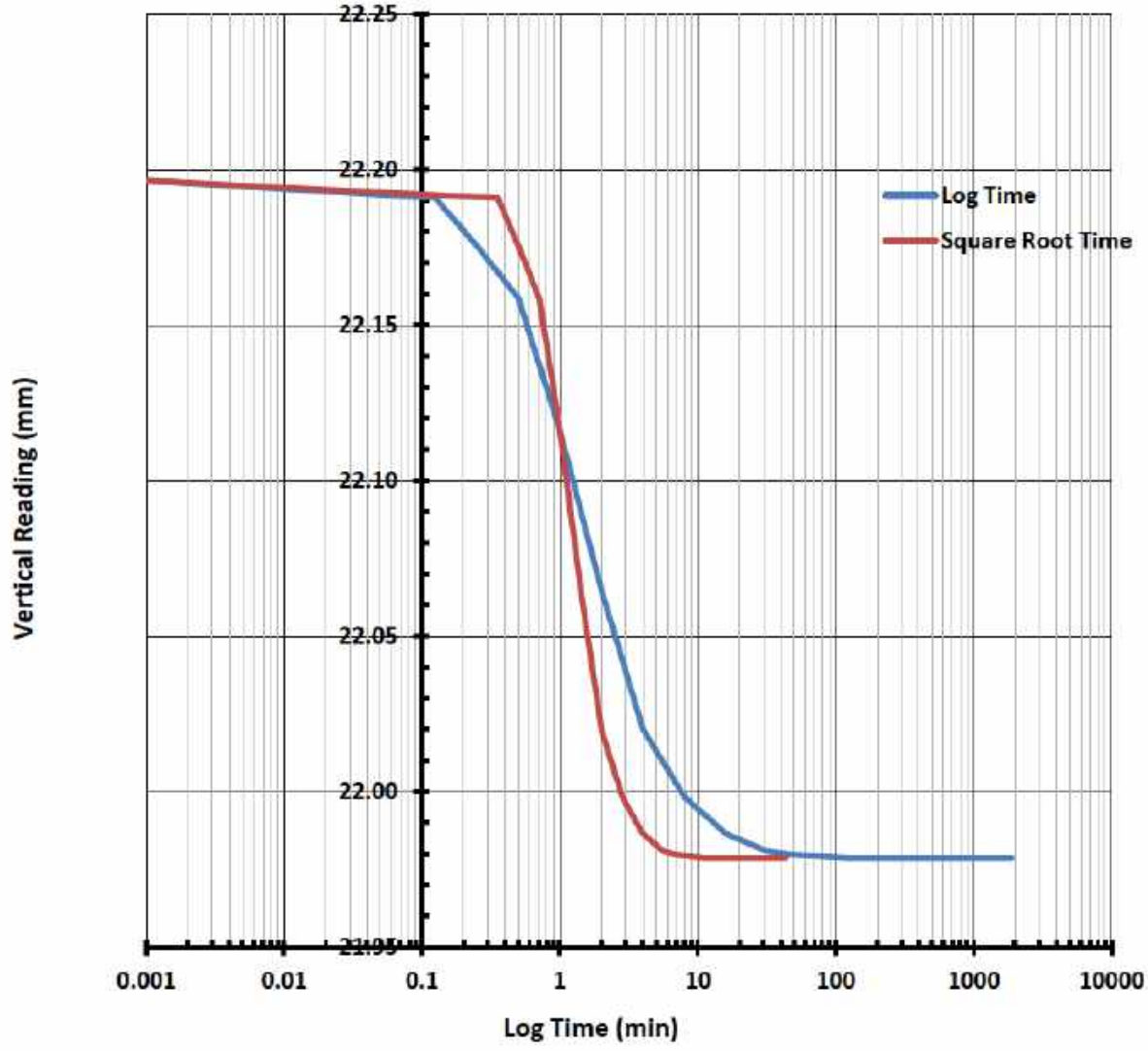
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa

Square Root Time (min)



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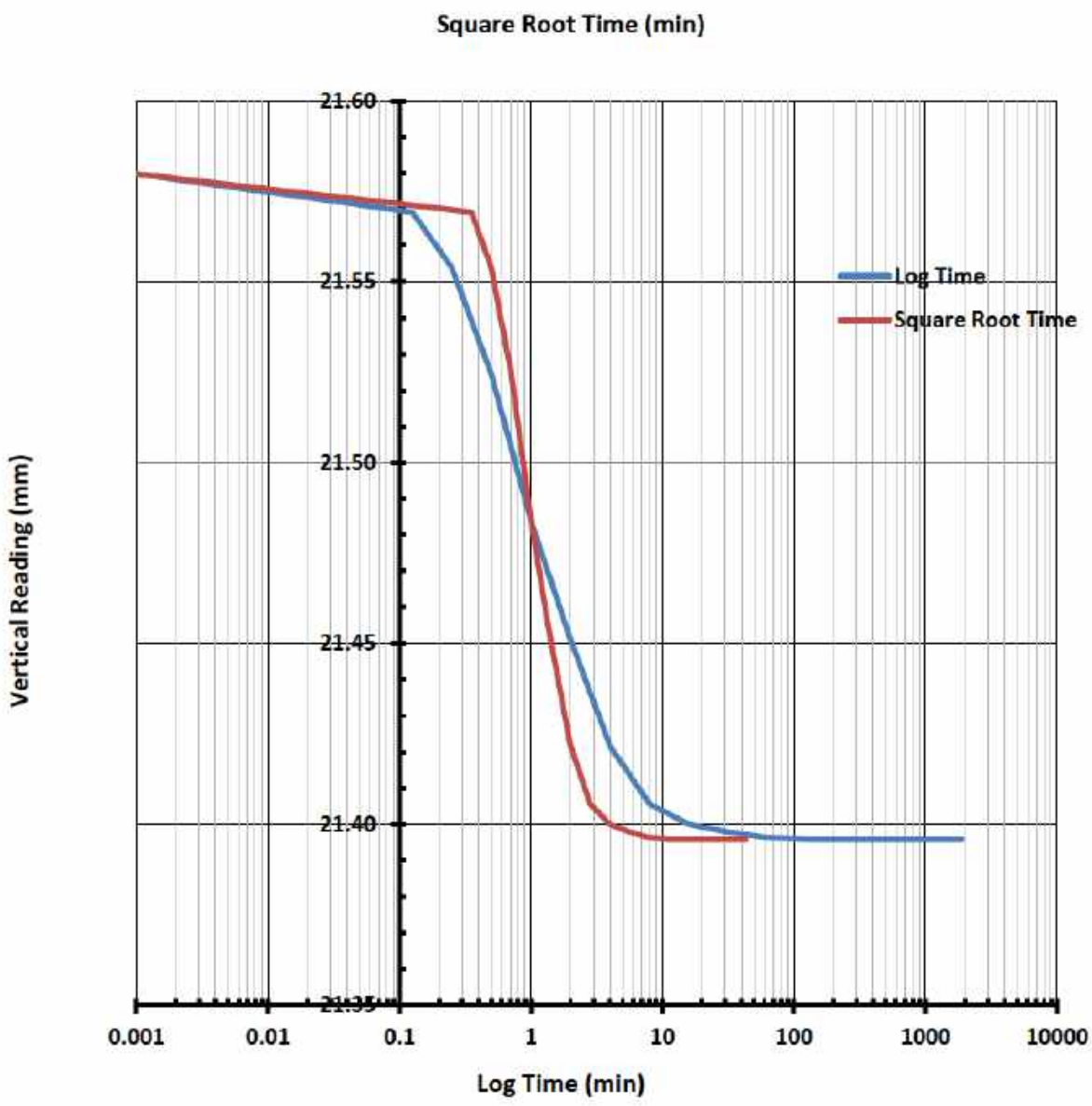
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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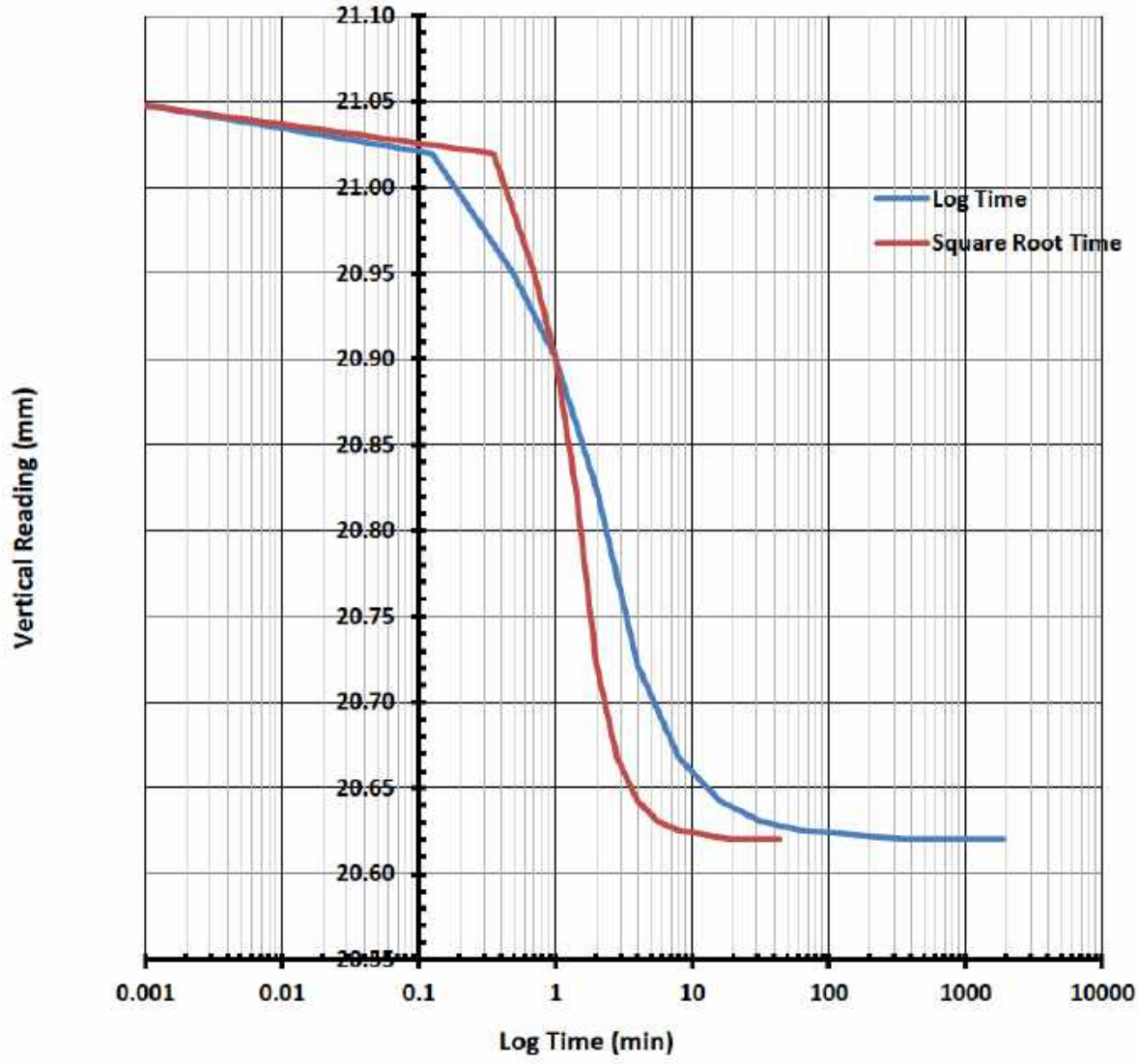
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa

Square Root Time (min)



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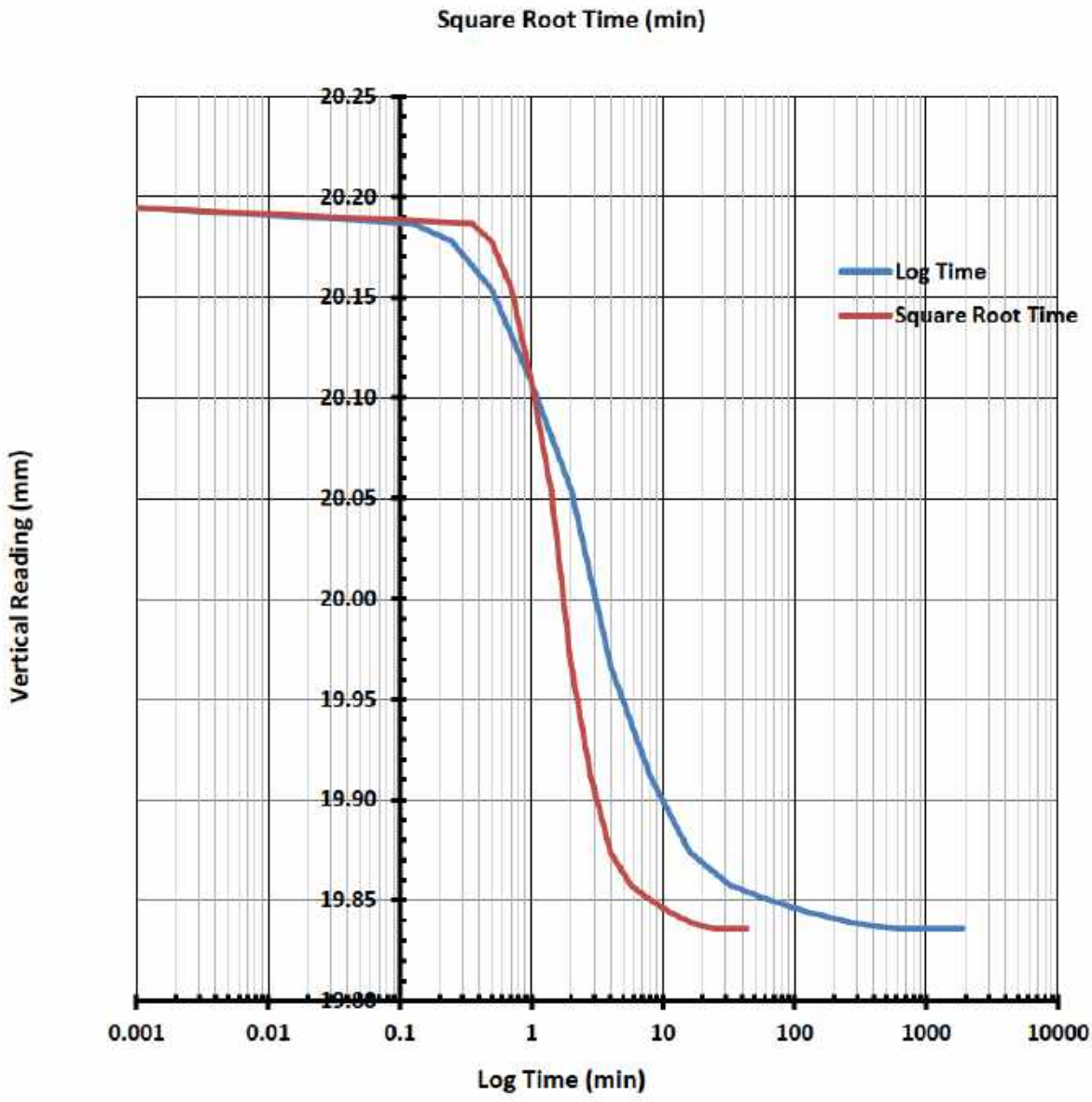
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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SETTLEMENT TESTING TAILINGS

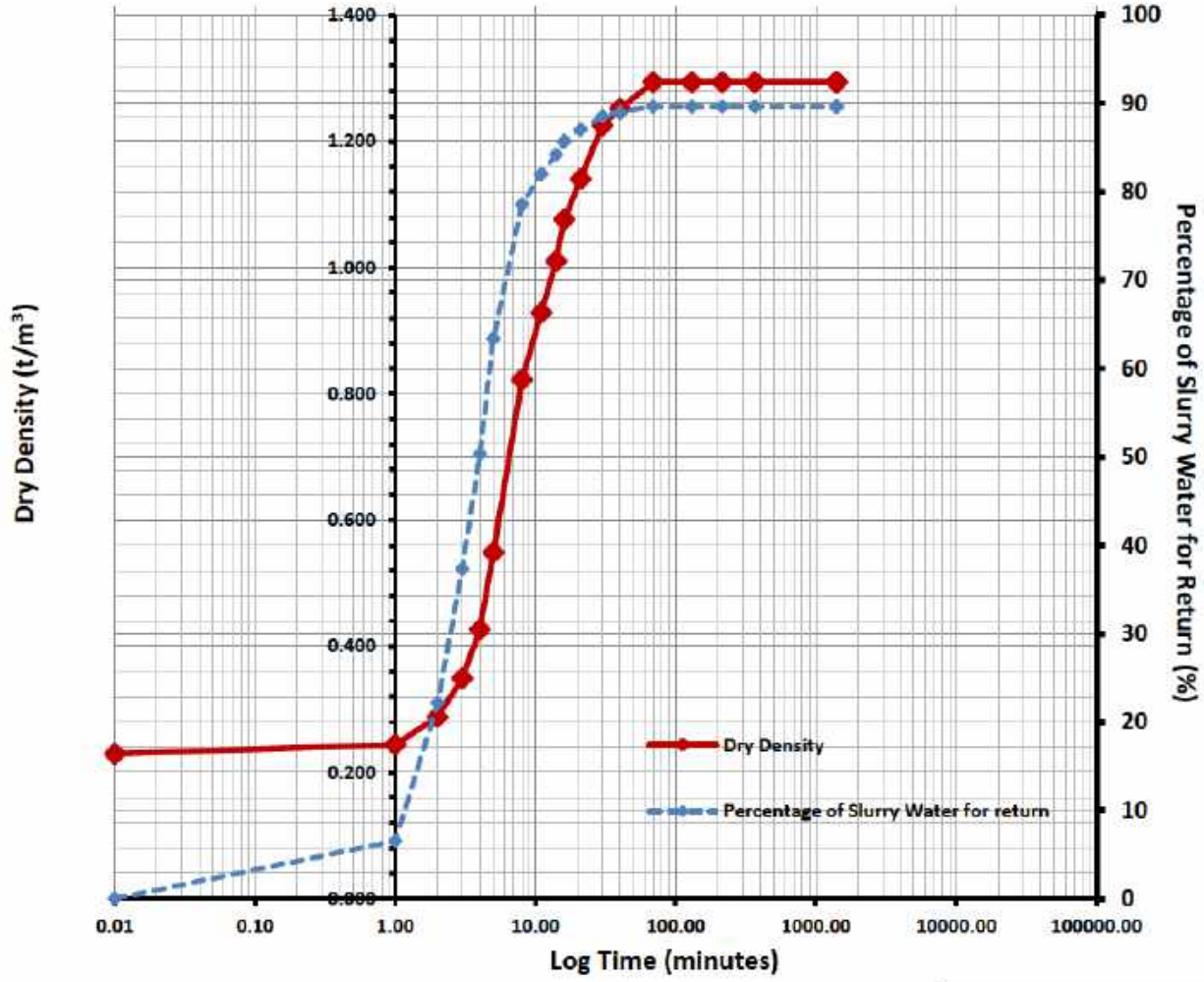
METHOD: IN-HOUSE METHOD

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S2		
Lab ID:	S2_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 20% Solids

Initial Dry Density (t/m³): 0.229
Particle Density (t/m³): 2.753
Initial Bulk Density (t/m³): 1.147

Undrained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

[redacted]

Authorised Signature (Geotechnical Engineer):

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SETTLEMENT TESTING TAILINGS

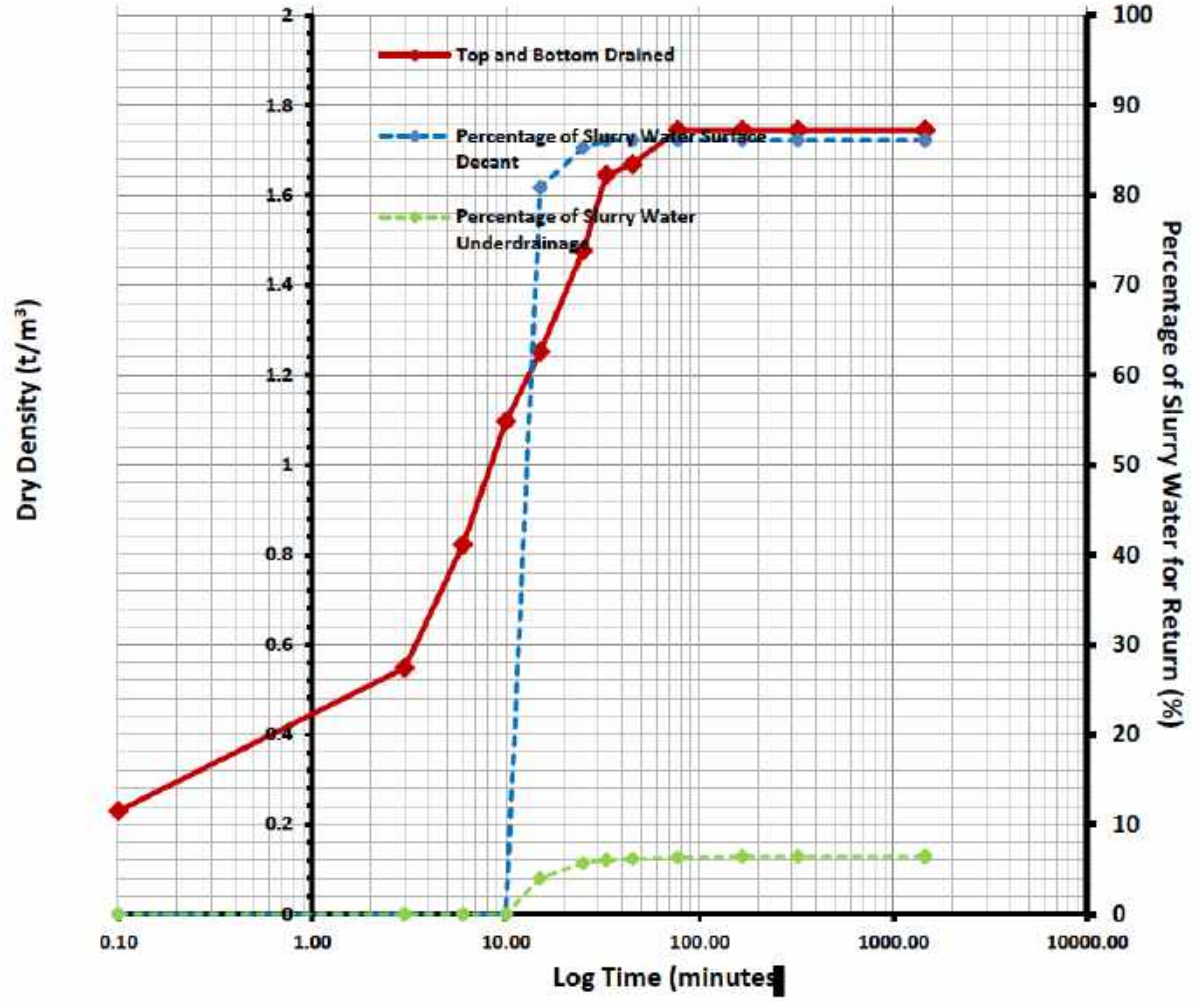
METHOD: IN-HOUSE METHOD

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S2		
Lab ID:	S2_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 20% Solids

Initial Dry Density (t/m³): 0.229
Particle Density (t/m³): 2.753
Initial Bulk Density (t/m³): 1.147

Top and Bottom Drained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S2		
Lab ID:	S2_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 20% 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): [redacted]

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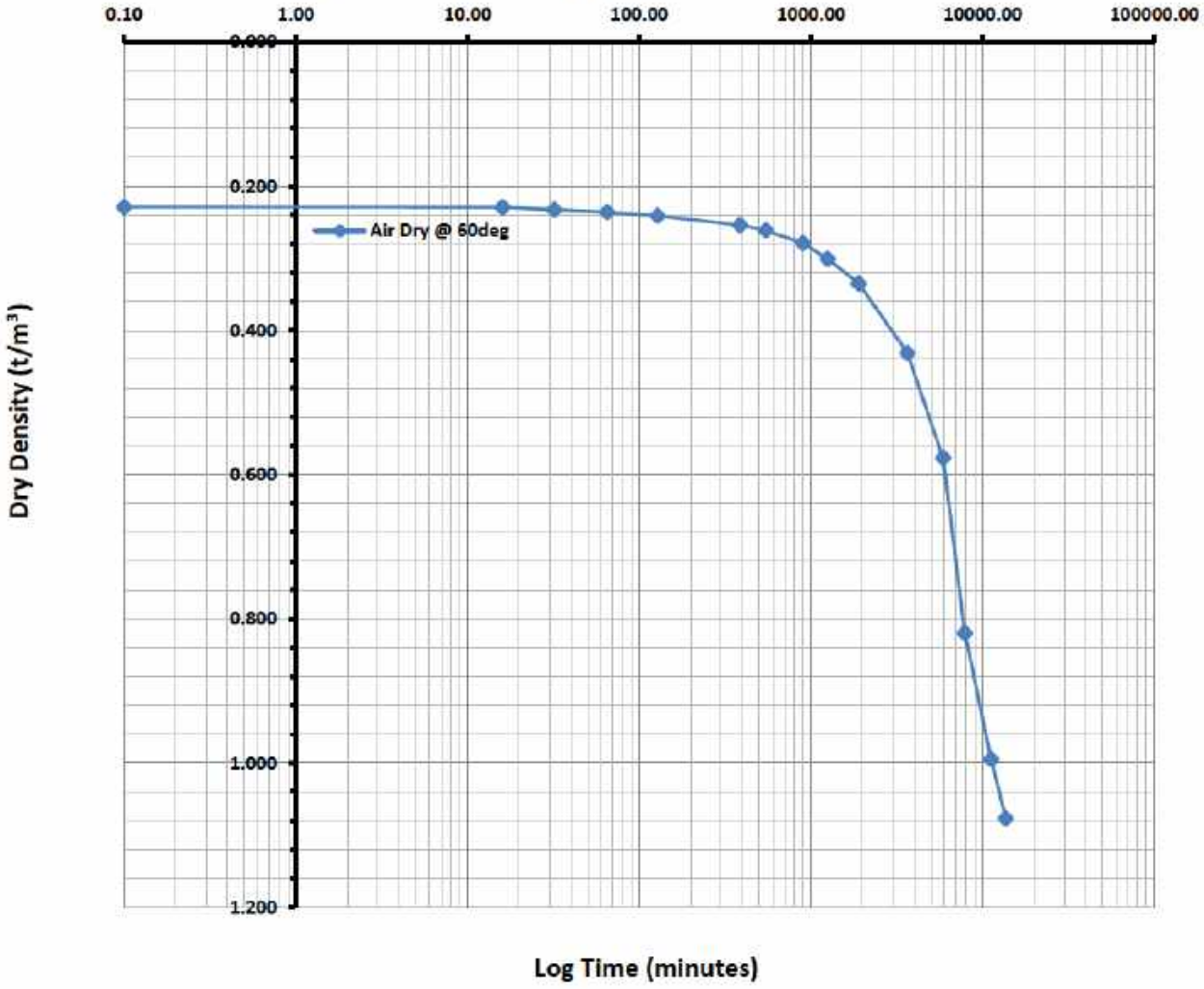
AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S2		
Lab ID:	S21_AIR_DRY	Room Temperature at Test:	19°

Tested by:	Phil	**Initial Bulk Density (t/m³):**	1.147
Type of Test:	Air Dry Testing	**Particle Density (t/m³):**	2.753
Sample Preparation:	20% Solids	**Moisture Content Initial (%):**	400.668

Dry Density (t/m³) Vs Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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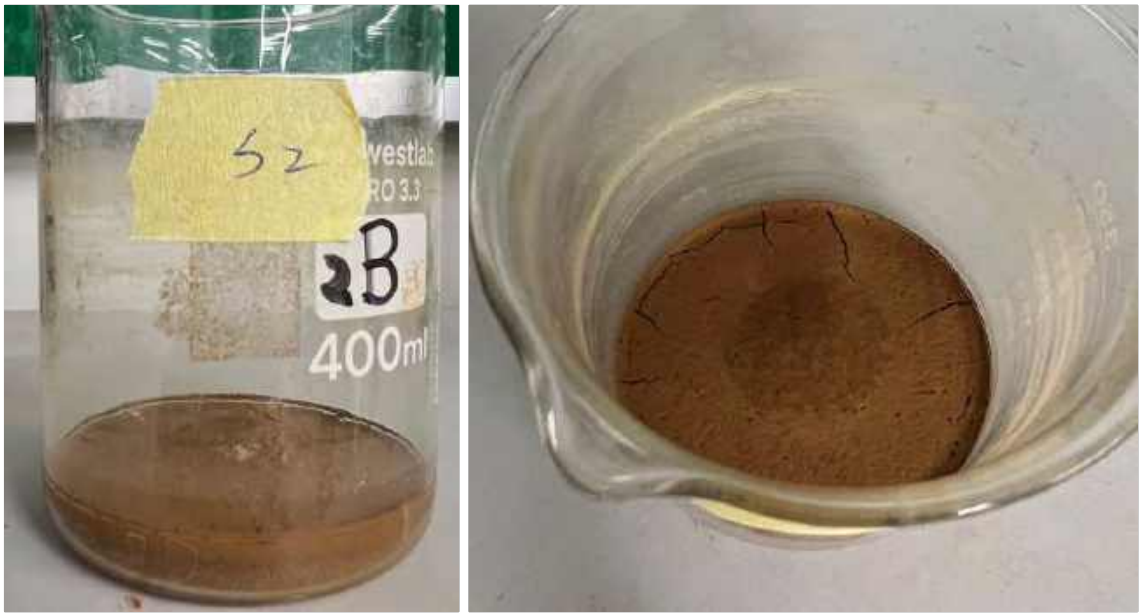
E-Precision Laboratory

AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S2		
Lab ID:	S21_AIR_DRY	Room Temperature at Test:	19°

Photo of Samples after Testing



Oven dried @ 60deg

Comments:

Authorised Signature (Geotechnical Engin [redacted]

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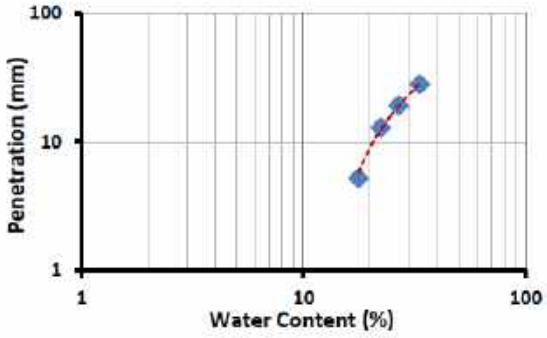
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

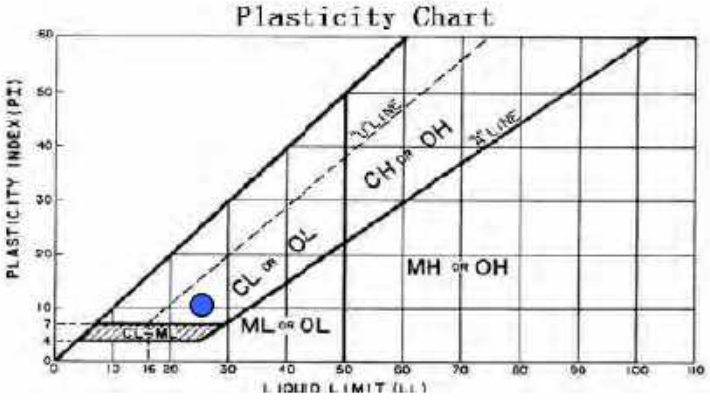
Client:	Kimberley Sands	**Date Tested:**	25/04/2024
Project:	Tails Testing 2024	Lab:	EPLAB
Sample No:	S3	**Job Number:**	KSANDS
Lab ID:	S3_ATT		
Depth (m):	-	**Room Temperature at Test:**	20°C
Tested by:	George	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	25.51
Plastic Limit (%):	15.13
Plasticity Index (%):	10.38
Liquidity Index (%):	-
Shrinkage Limit (%):	12.92
Linear Shrinkage(%):	5.15

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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

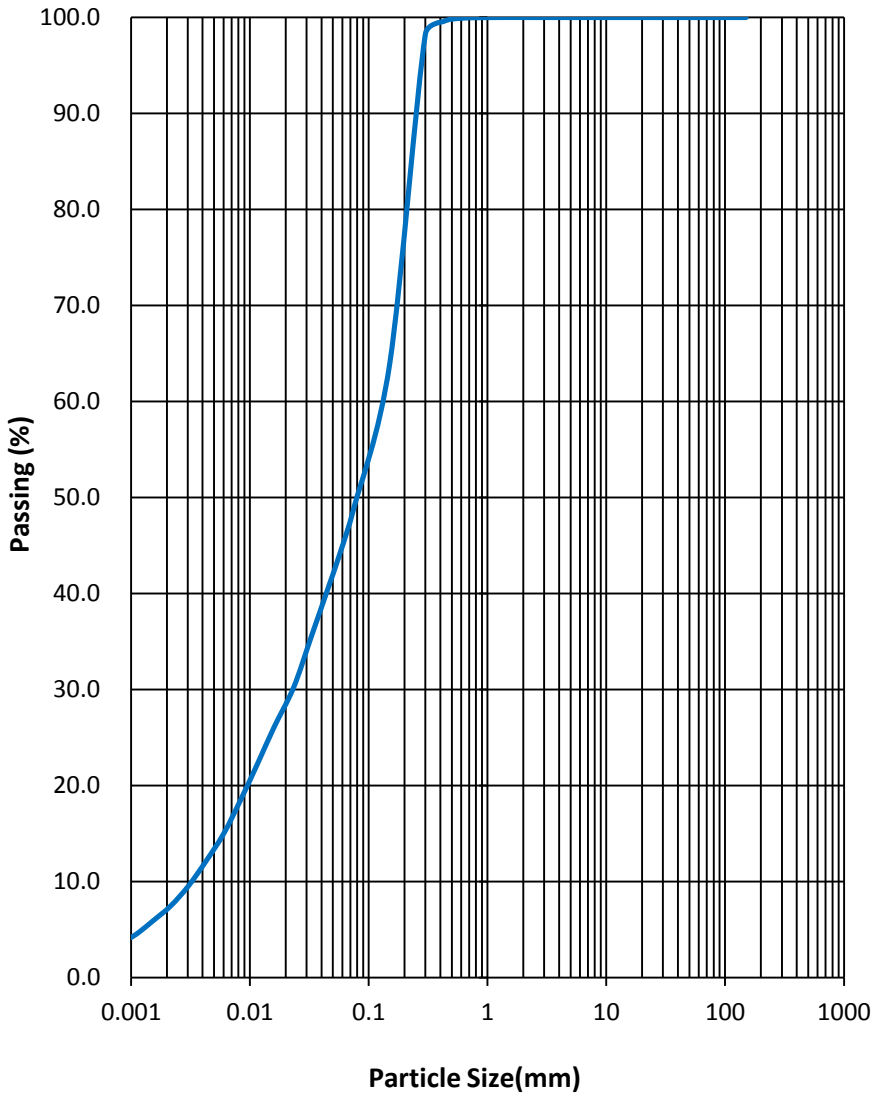
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	Kimberley Sands	Date Tested:	20/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S3	Depth (m):	-
Lab ID:	S3_PSDH	Room Temperature at Test:	19°C
Tested by:	George	2.36mm Particle Density (t/m³):	2.743
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	100.0
2.36	100.0
1.18	100.0
0.6	99.9
0.425	99.6
0.3	98.3
0.15	63.9
0.075	48.9
0.05835	44.5
0.04562	40.6
0.03266	35.4
0.02337	30.2
0.01600	26.1
0.01179	22.5
0.00842	18.6
0.00600	15.0
0.00427	12.1
0.00303	9.5
0.00215	7.5
0.00153	5.9
0.00121	4.9
0.00105	4.3
0.00089	3.8

PSD Graph



Notes: *Oven dried @ 60deg*
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature: [redacted]

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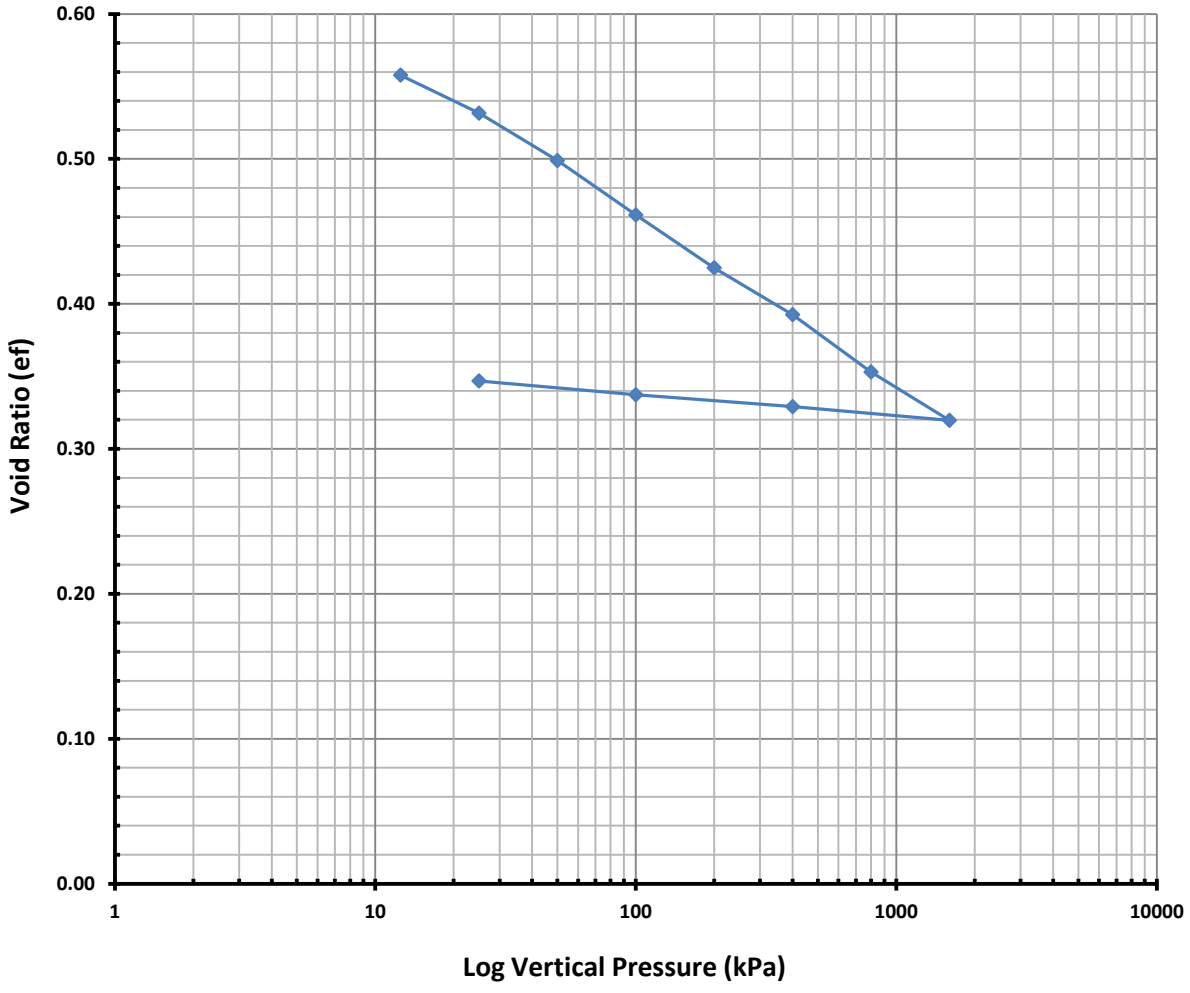
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°c

Tested by:	Phil	Initial Moisture (%):	28.95	Test Condition:	Undrained
Height (mm):	32.88	Final Moisture Content (%):	23.53	Sample Condition:	Saturated
Diameter (mm):	61.80	Bulk Density (t/m³):	2.18	Particle Density (t/m³):	2.743
Direction:	Vertical	Dry Density (t/m³):	1.69	Initial Void Ratio (e_i):	0.623

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



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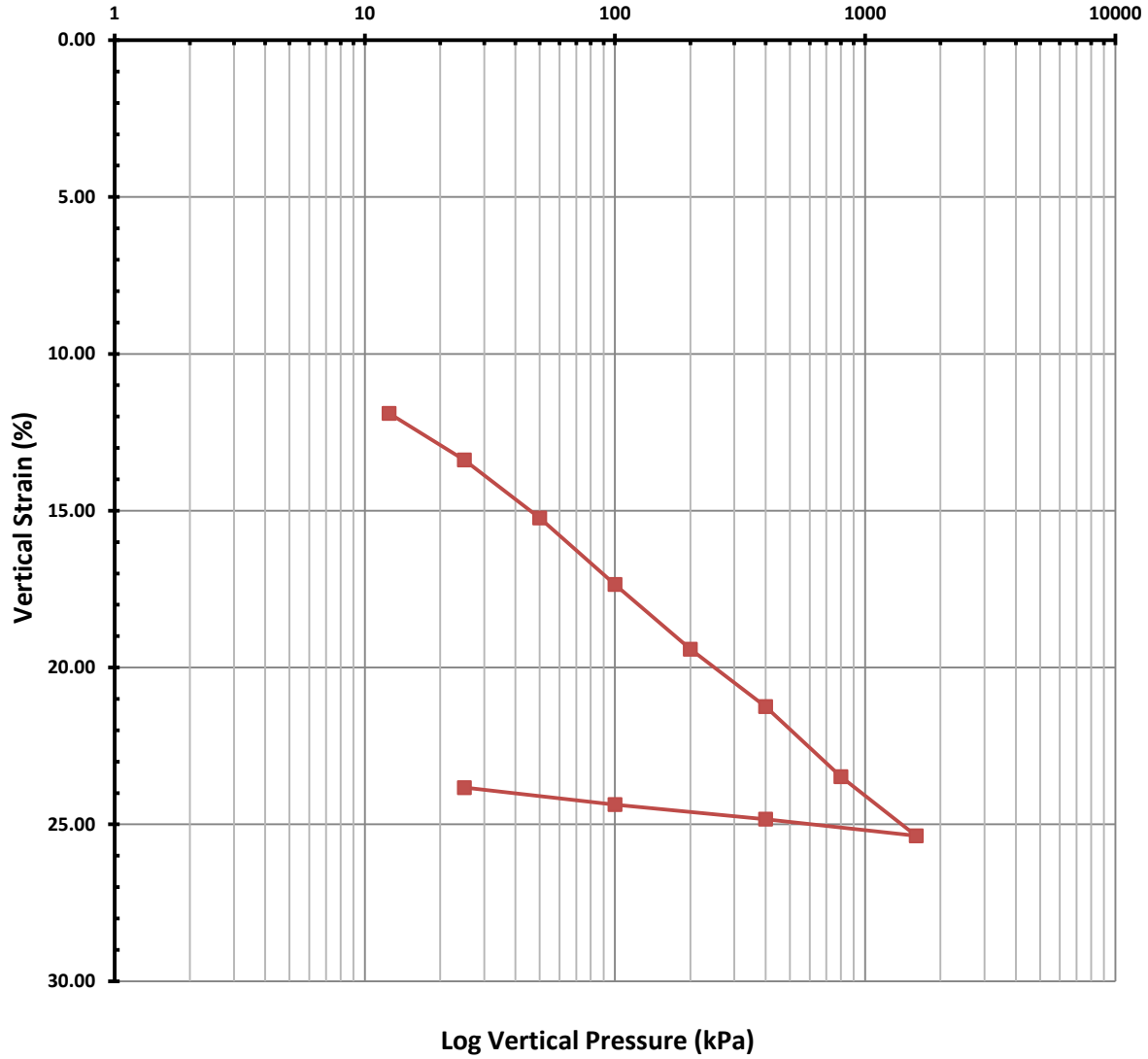
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_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:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_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	3.912	4.502	-	9.52E-03	1.3E-08		0.558	11.90
Stage 2 @ 25kPa	4.400	7.059	-	1.35E-03	3.0E-09		0.532	13.38
Stage 3 @ 50kPa	5.008	5.117	-	8.54E-04	1.4E-09		0.499	15.23
Stage 4 @ 100kPa	5.705	4.859	-	5.00E-04	7.6E-10		0.461	17.35
Stage 5 @ 200kPa	6.384	4.621	-	2.50E-04	3.6E-10		0.425	19.42
Stage 6 @ 400kPa	6.985	5.855	-	1.13E-04	2.1E-10		0.393	21.24
Stage 7 @ 800kPa	7.720	5.521	-	7.10E-05	1.2E-10		0.353	23.48
Stage 8 @ 1600kPa	8.340	5.254	-	3.08E-05	5.0E-11		0.320	25.36
Unload @ 400kPa	8.165							
Unload @ 100kPa	8.012							
Unload @ 25kPa	7.835							

** 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): [redacted]

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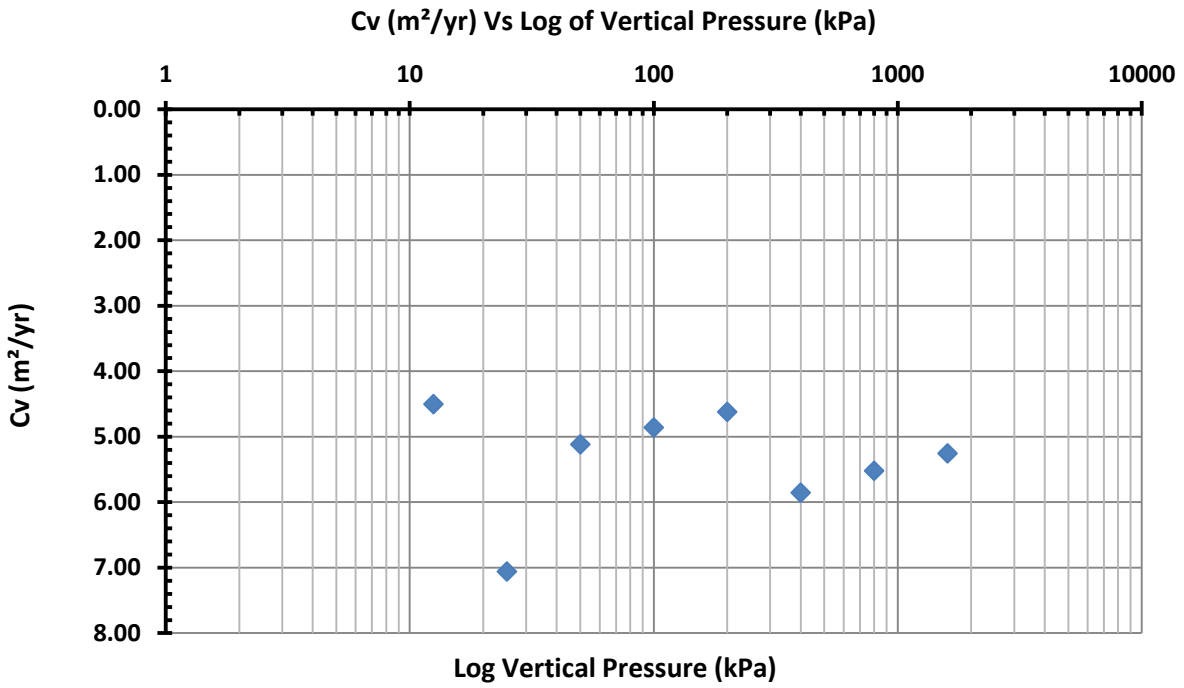
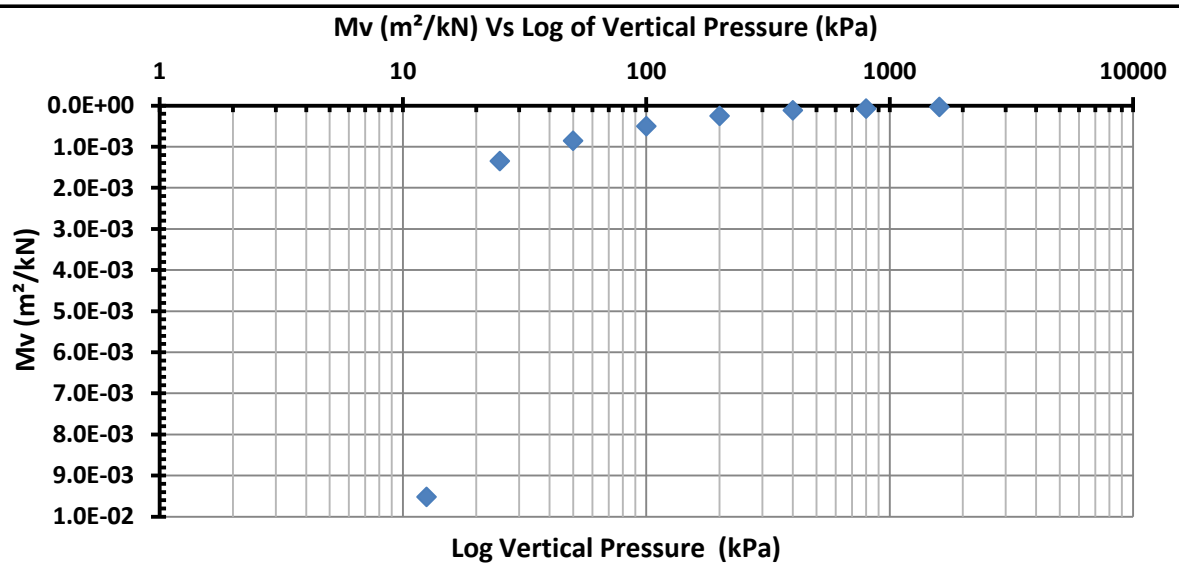
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_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:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

TEST RESULTS PLEASE SEE PAGES BELOW

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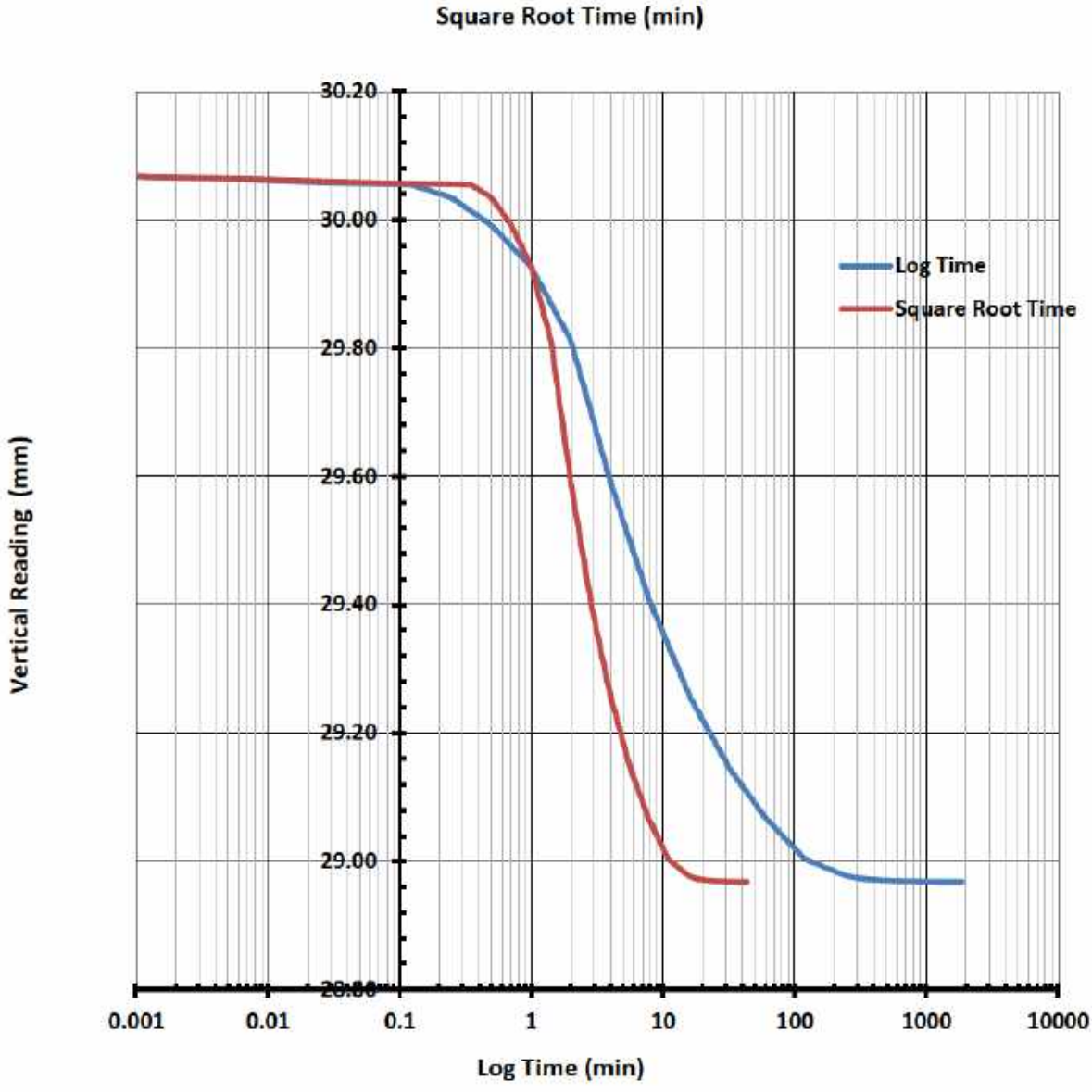
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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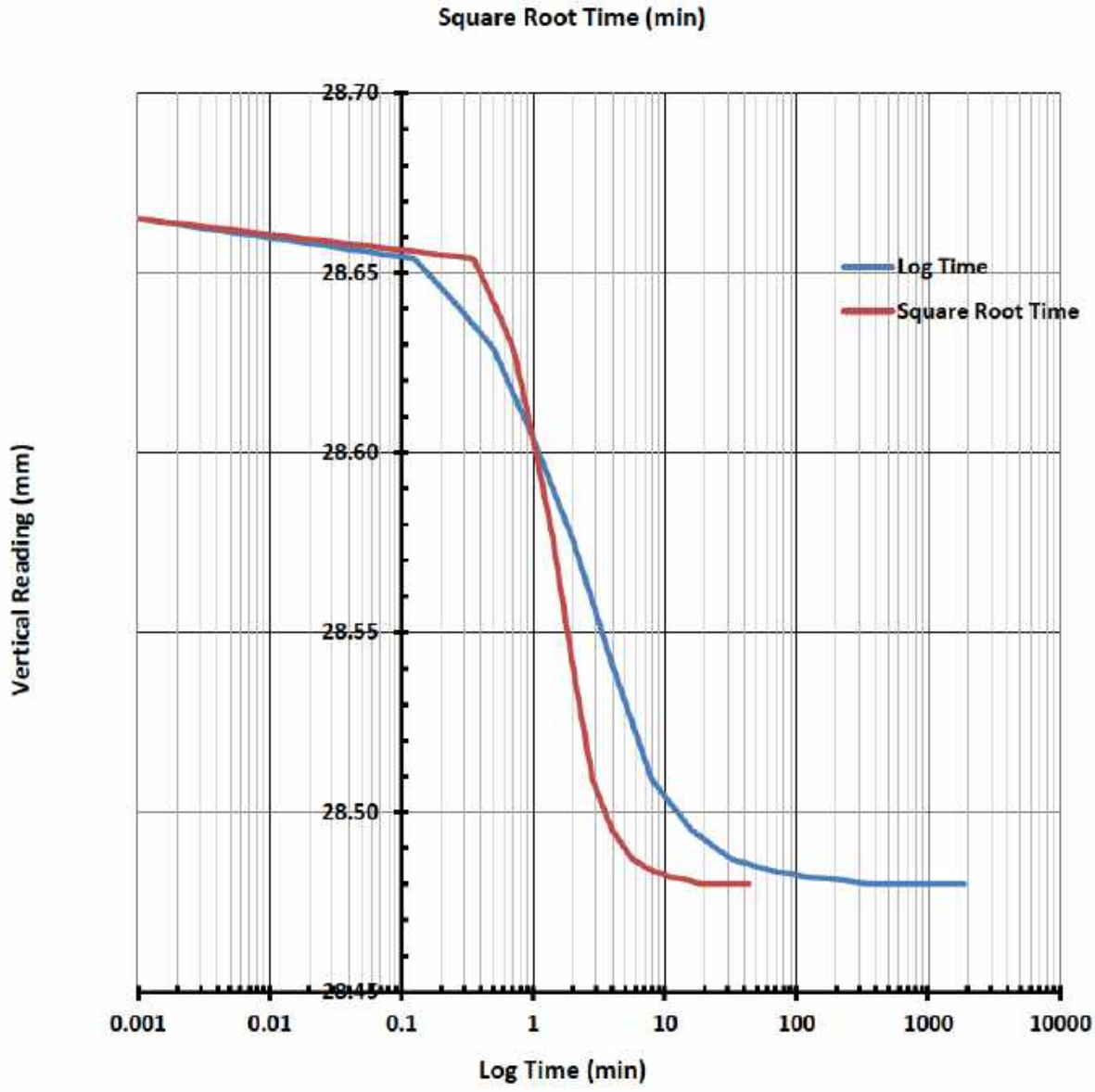
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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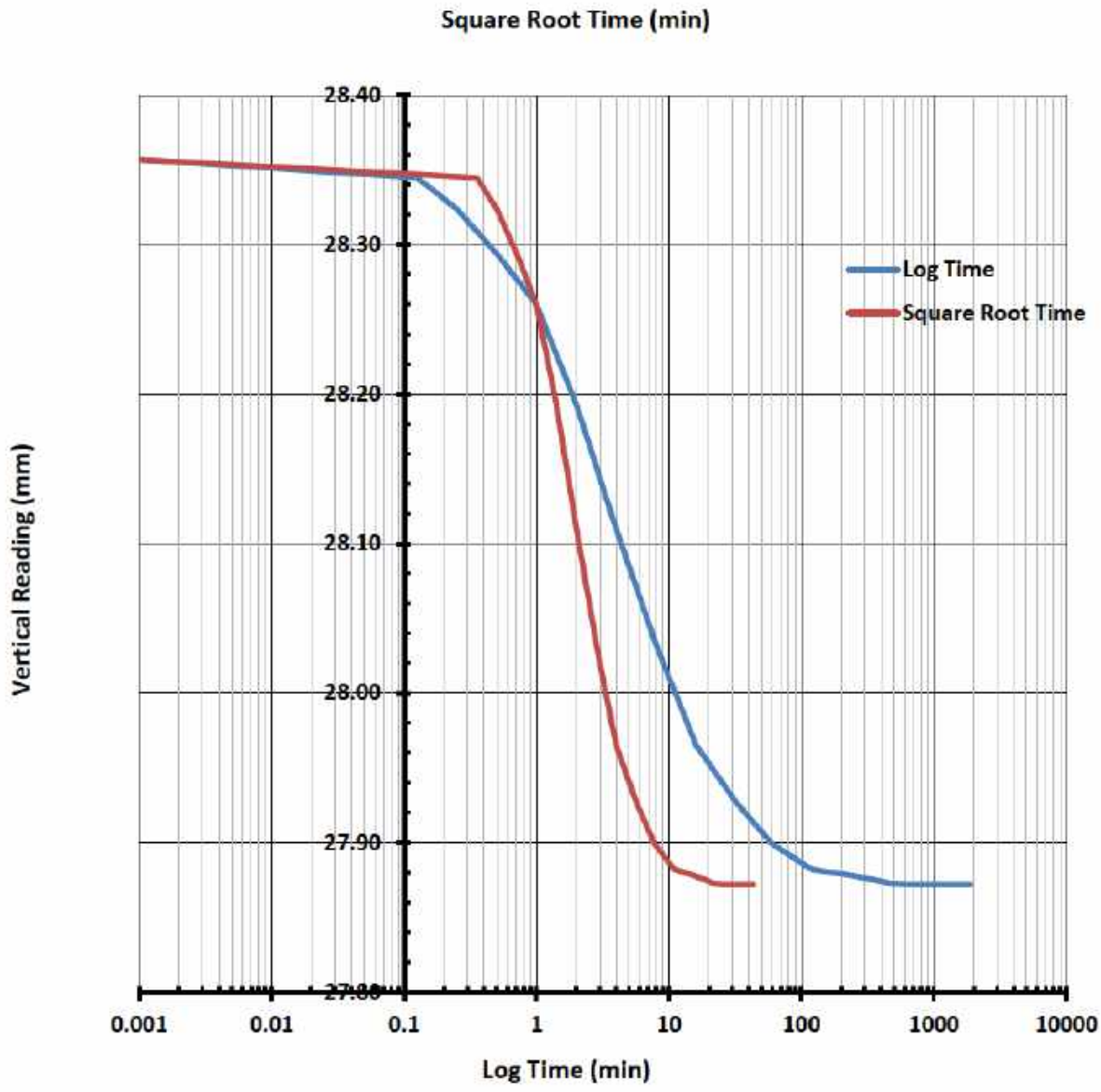
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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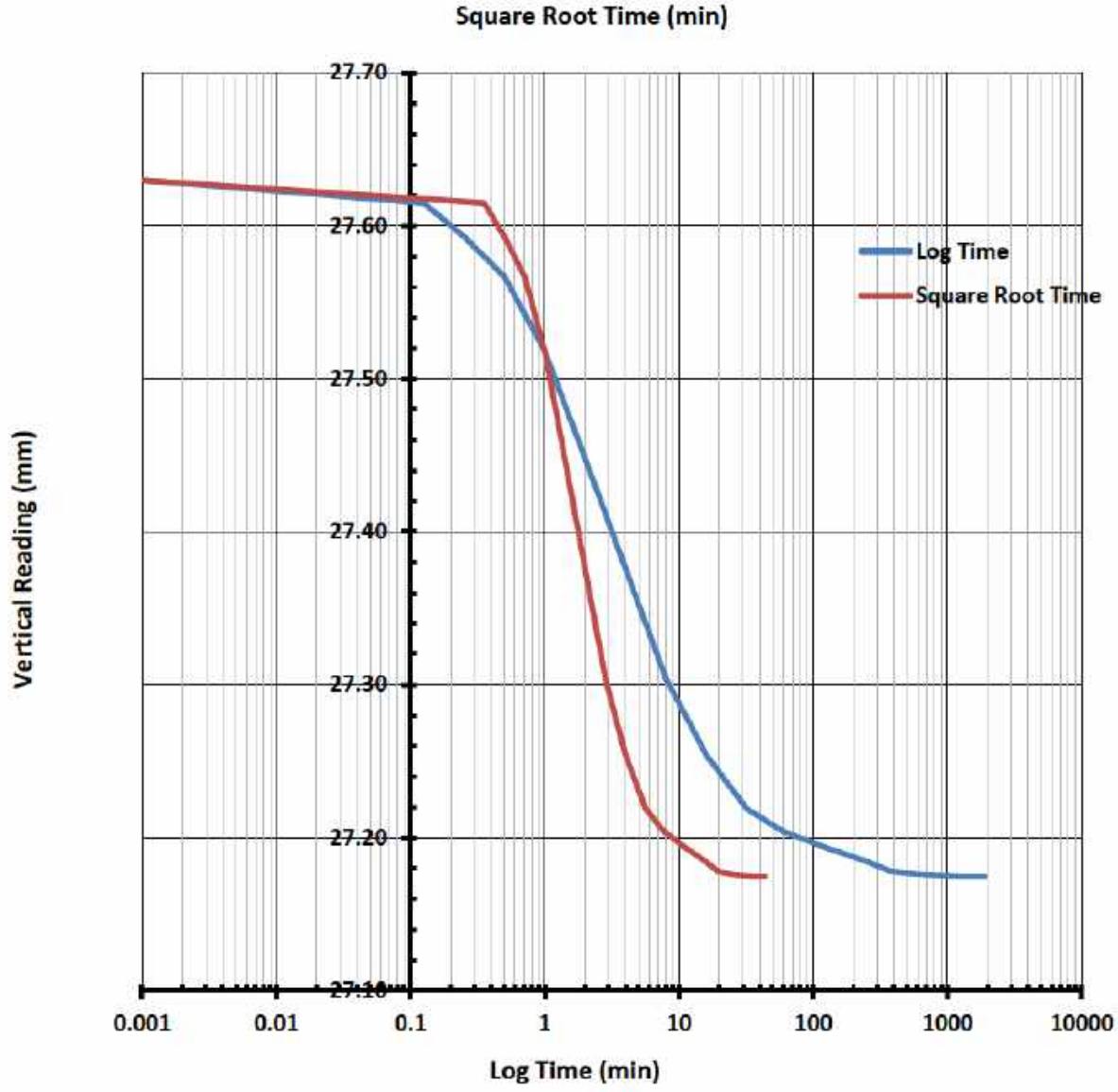
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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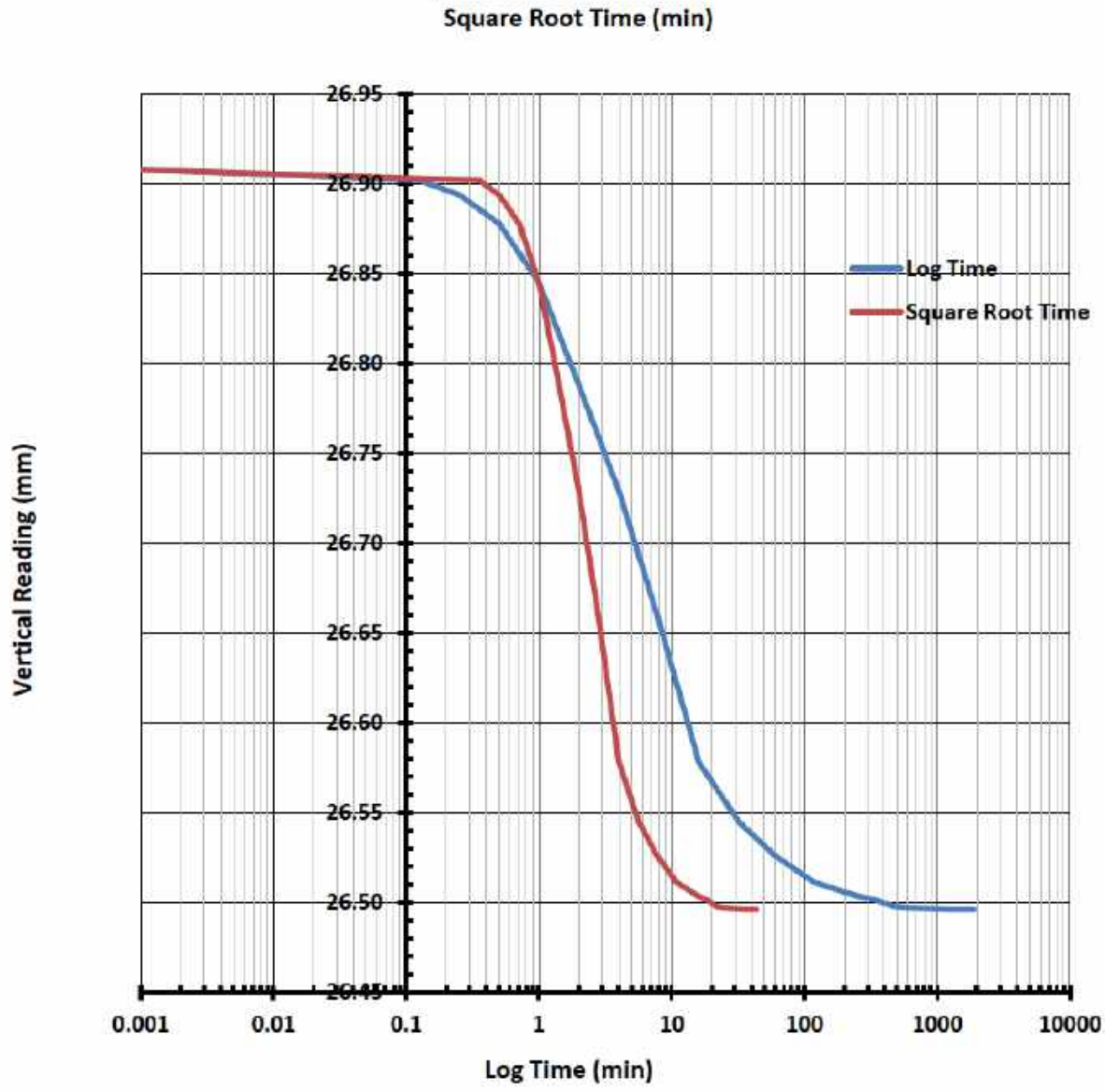
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa



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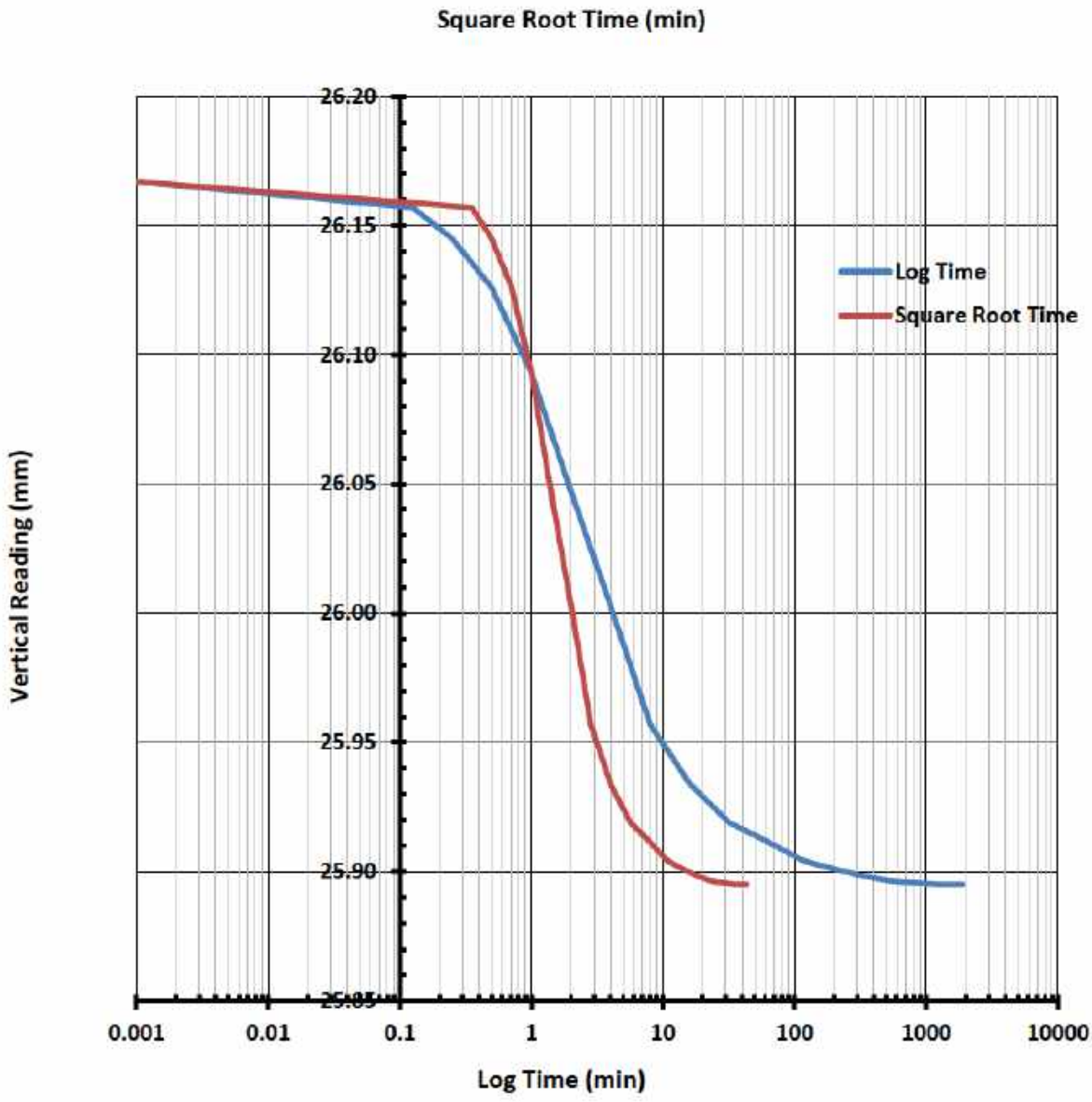
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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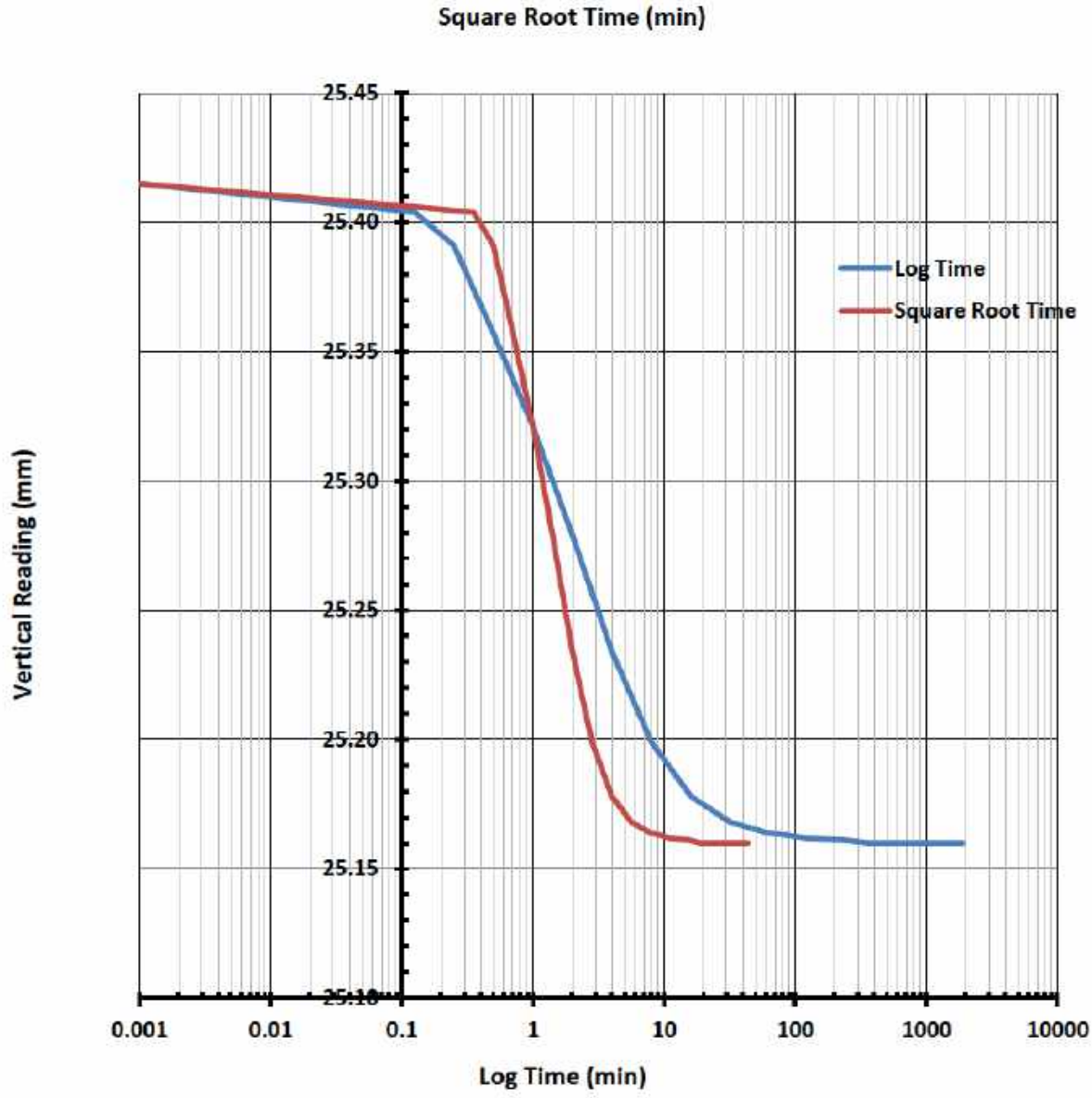
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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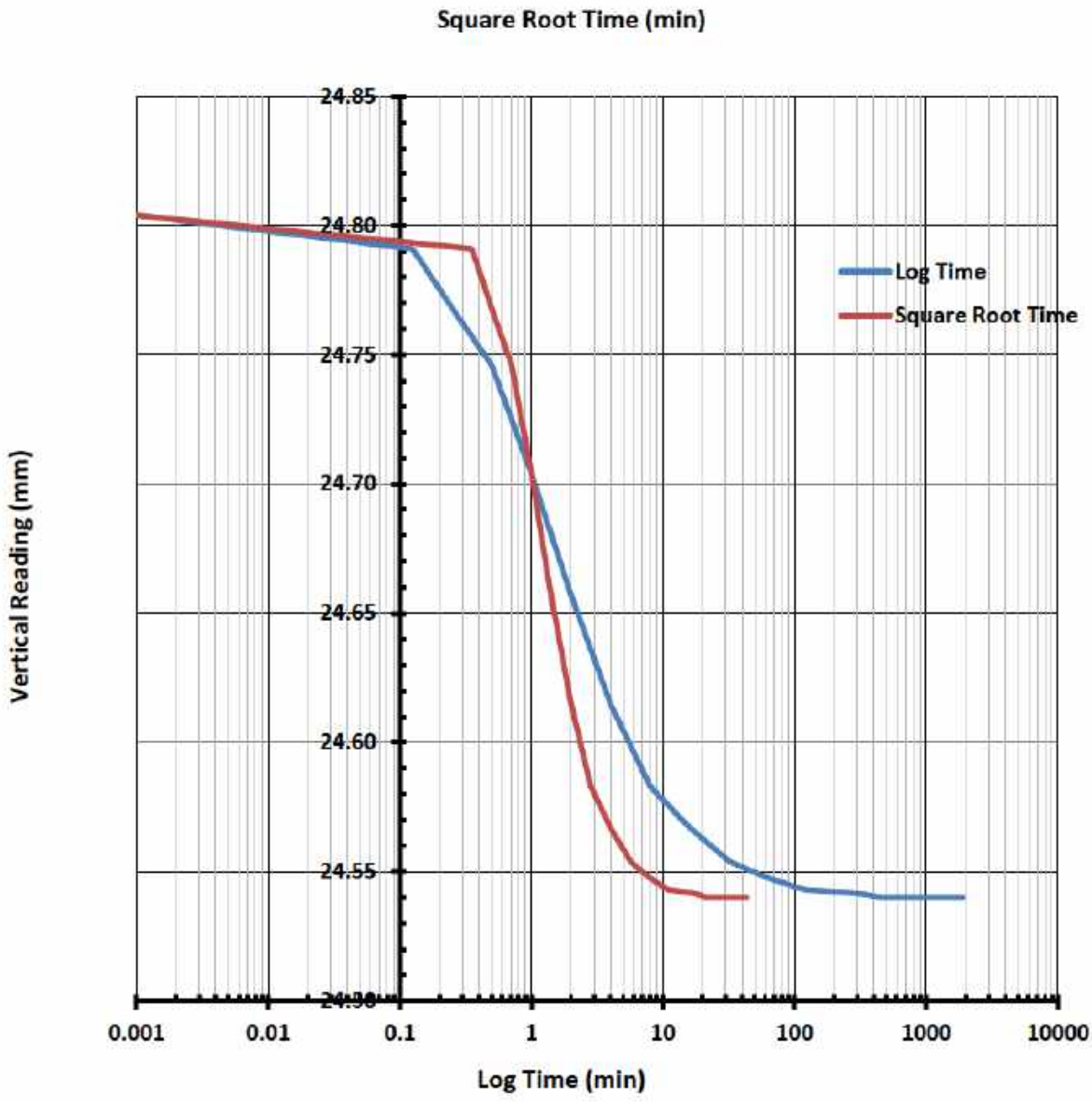
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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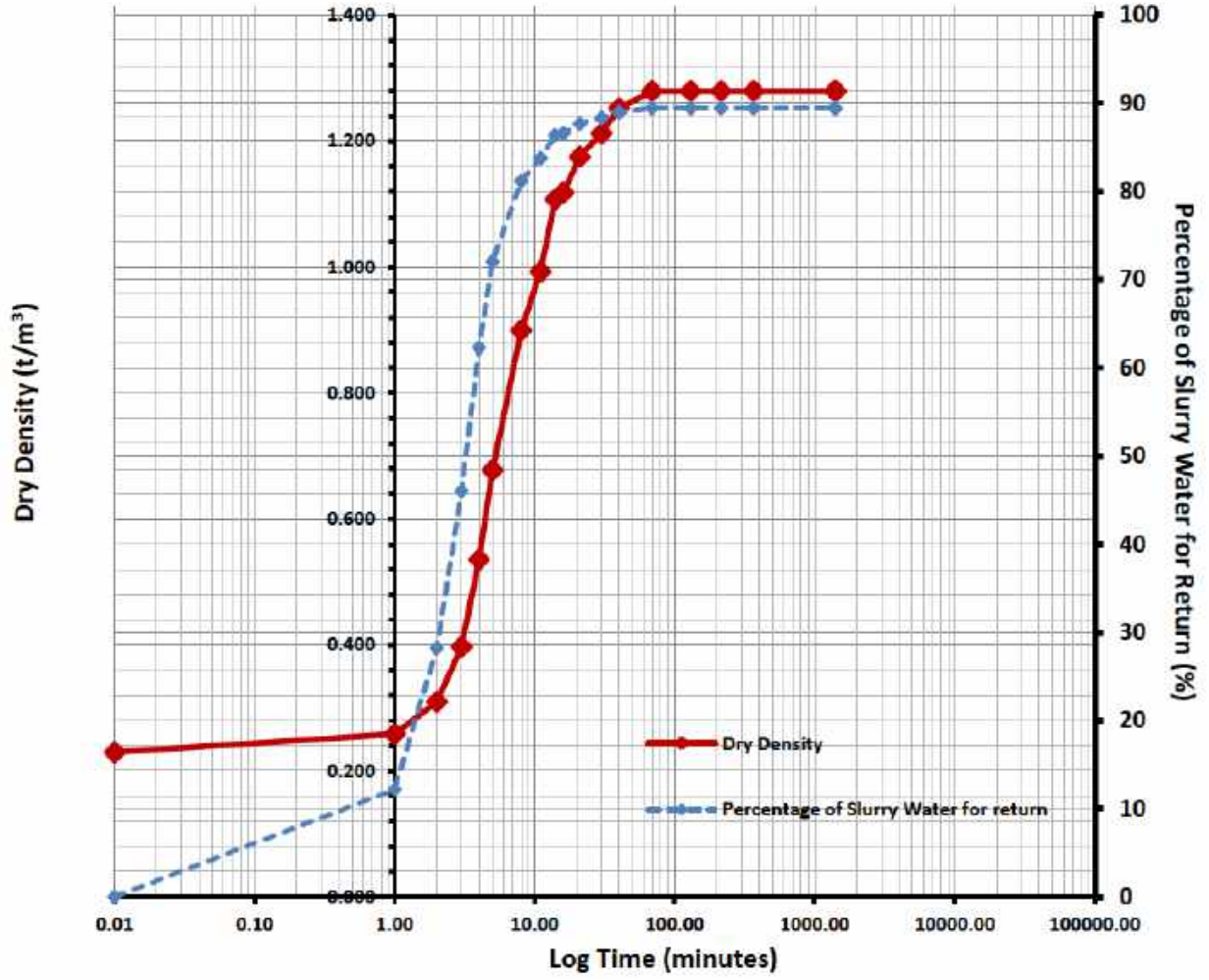
SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S3		
Lab ID:	S3_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil	**Initial Dry Density (t/m³):** 0.229
Type of Test: Settlement Testing	**Particle Density (t/m³):** 2.743
Sample Preparation: 20% Solids	**Initial Bulk Density (t/m³):** 1.147

Undrained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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SETTLEMENT TESTING TAILINGS

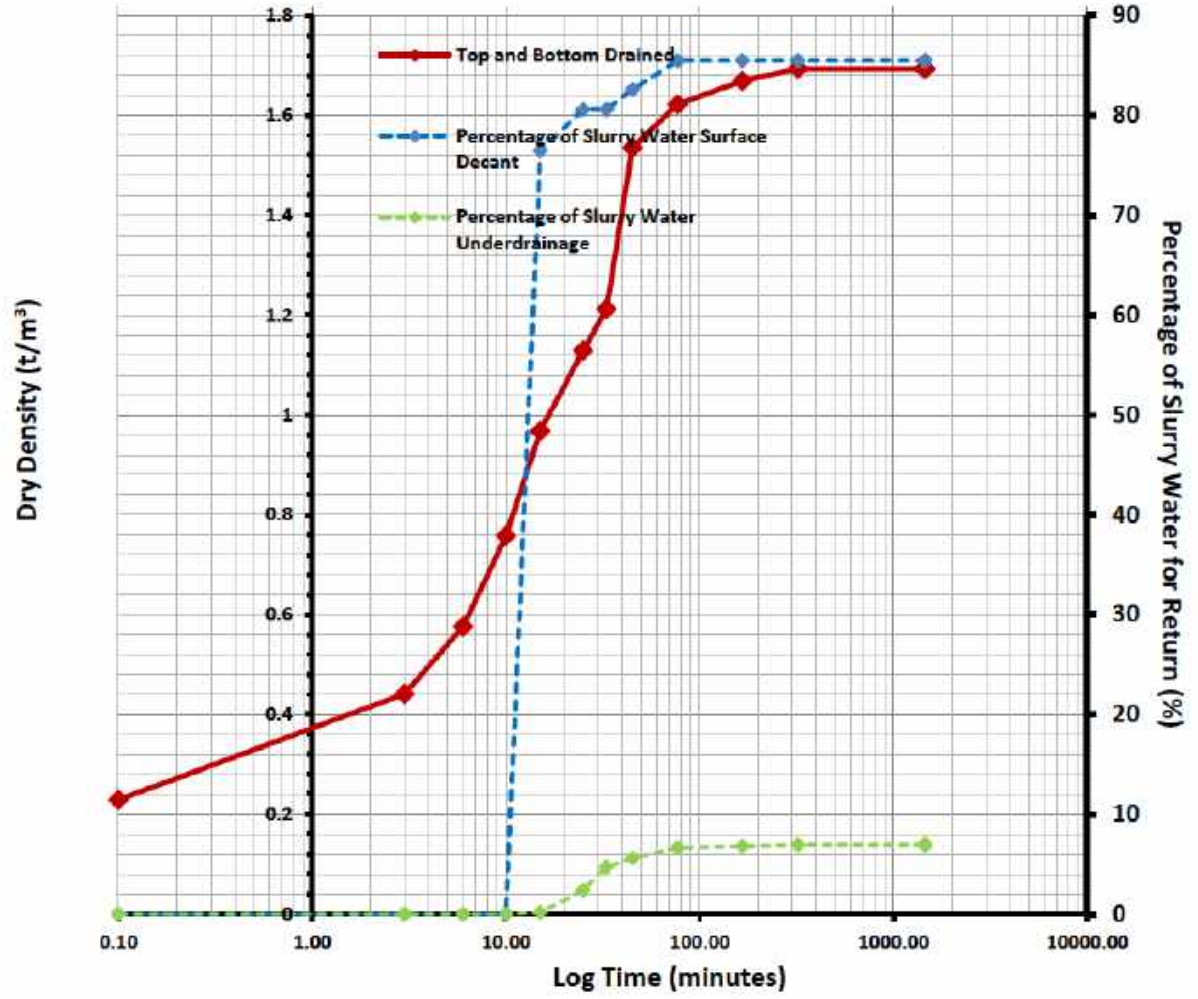
METHOD: IN-HOUSE METHOD

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S3		
Lab ID:	S3_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 20% Solids

Initial Dry Density (t/m³): 0.229
Particle Density (t/m³): 2.743
Initial Bulk Density (t/m³): 1.147

Top and Bottom Drained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

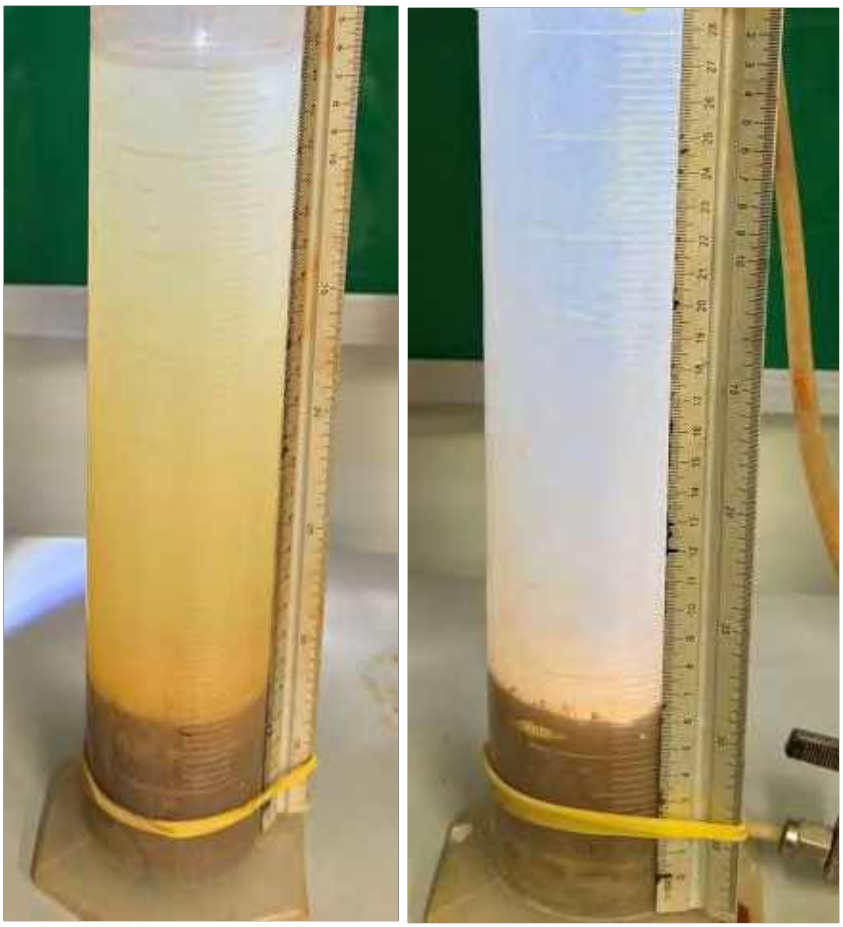
Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S3		
Lab ID:	S3_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 20% 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): [redacted]

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E-Precision Laboratory

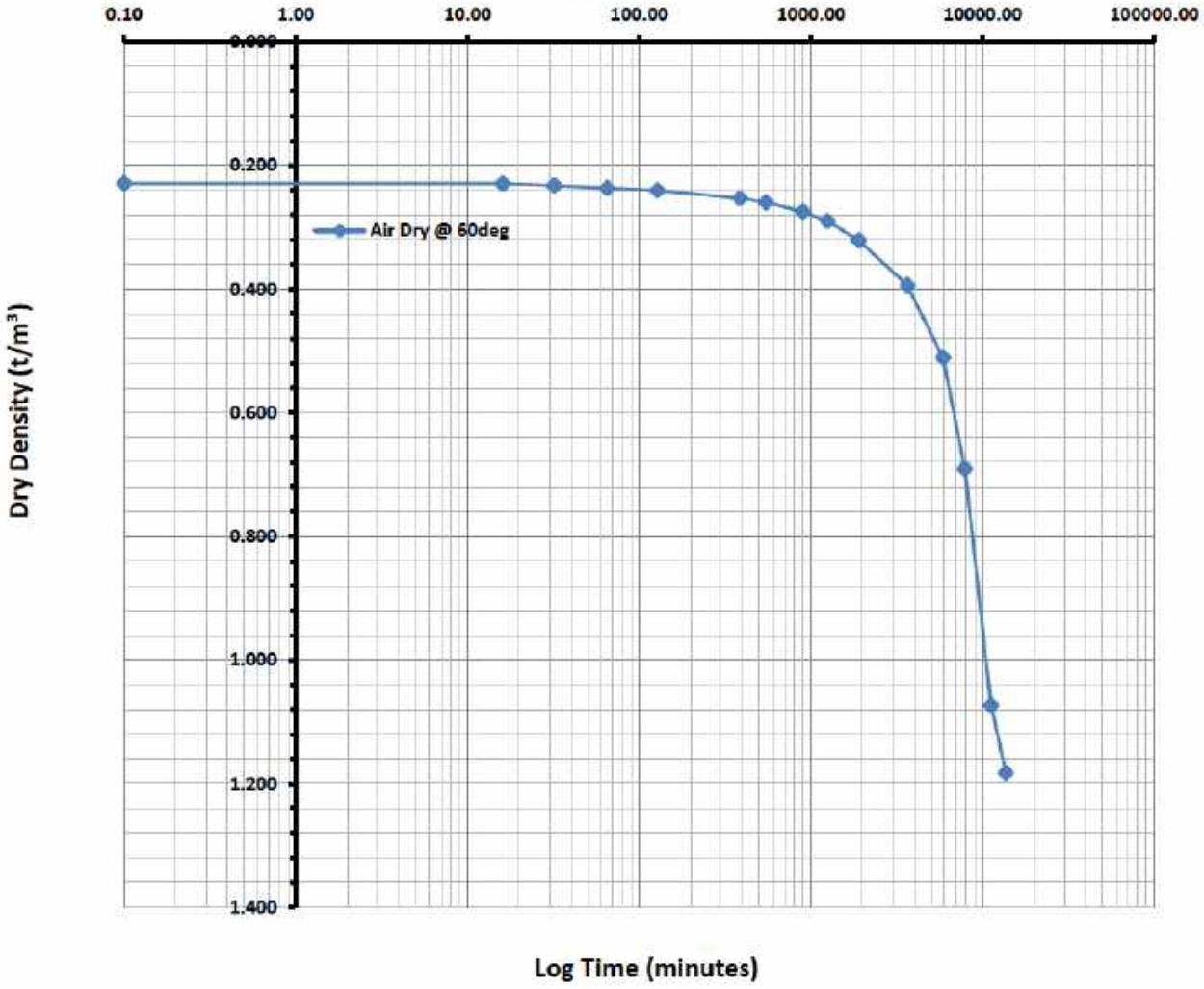
AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S3		
Lab ID:	S3_AIR_DRY	Room Temperature at Test:	19°

Tested by:	Phil	**Initial Bulk Density (t/m³):**	1.144
Type of Test:	Air Dry Testing	**Particle Density (t/m³):**	2.743
Sample Preparation:	20% Solids	**Moisture Content Initial (%):**	399.830

Dry Density (t/m³) Vs Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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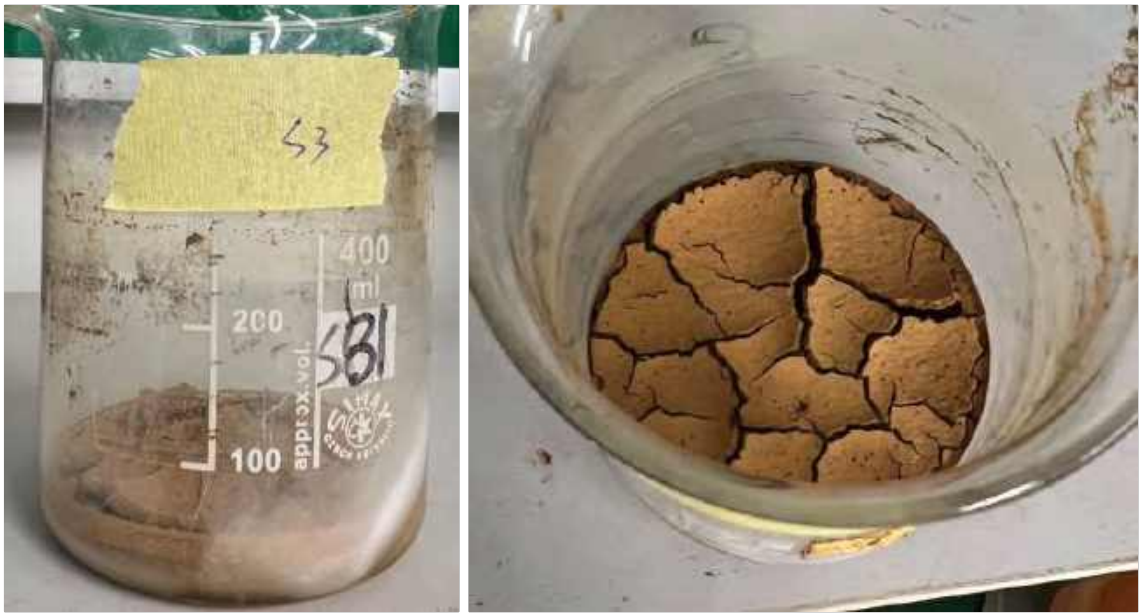
E-Precision Laboratory

AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S3		
Lab ID:	S3_AIR_DRY	Room Temperature at Test:	19°

Photo of Samples after Testing



Oven dried @ 60deg

Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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E-Precision Laboratory

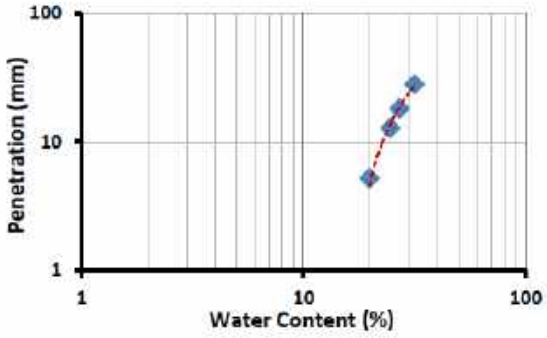
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

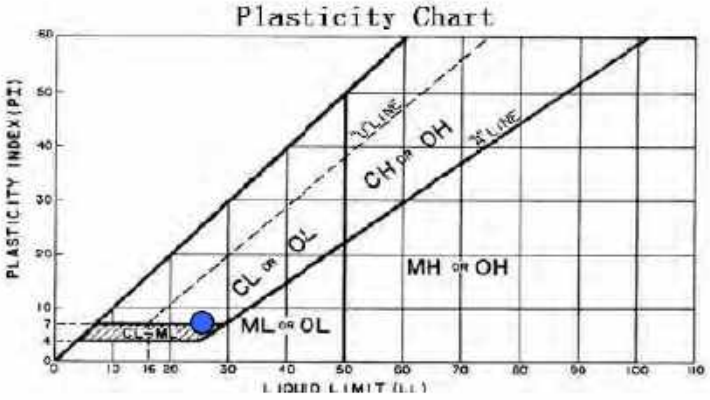
Client:	Kimberley Sands	**Date Tested:**	25/04/2024
Project:	Tails Testing 2024	Lab:	EPLAB
Sample No:	S4	**Job Number:**	KSANDS
Lab ID:	S4_ATT		
Depth (m):	-	**Room Temperature at Test:**	20°C
Tested by:	George	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	26.27
Plastic Limit (%):	18.59
Plasticity Index (%):	7.68
Liquidity Index (%):	-
Shrinkage Limit (%):	16.38
Linear Shrinkage(%):	3.49

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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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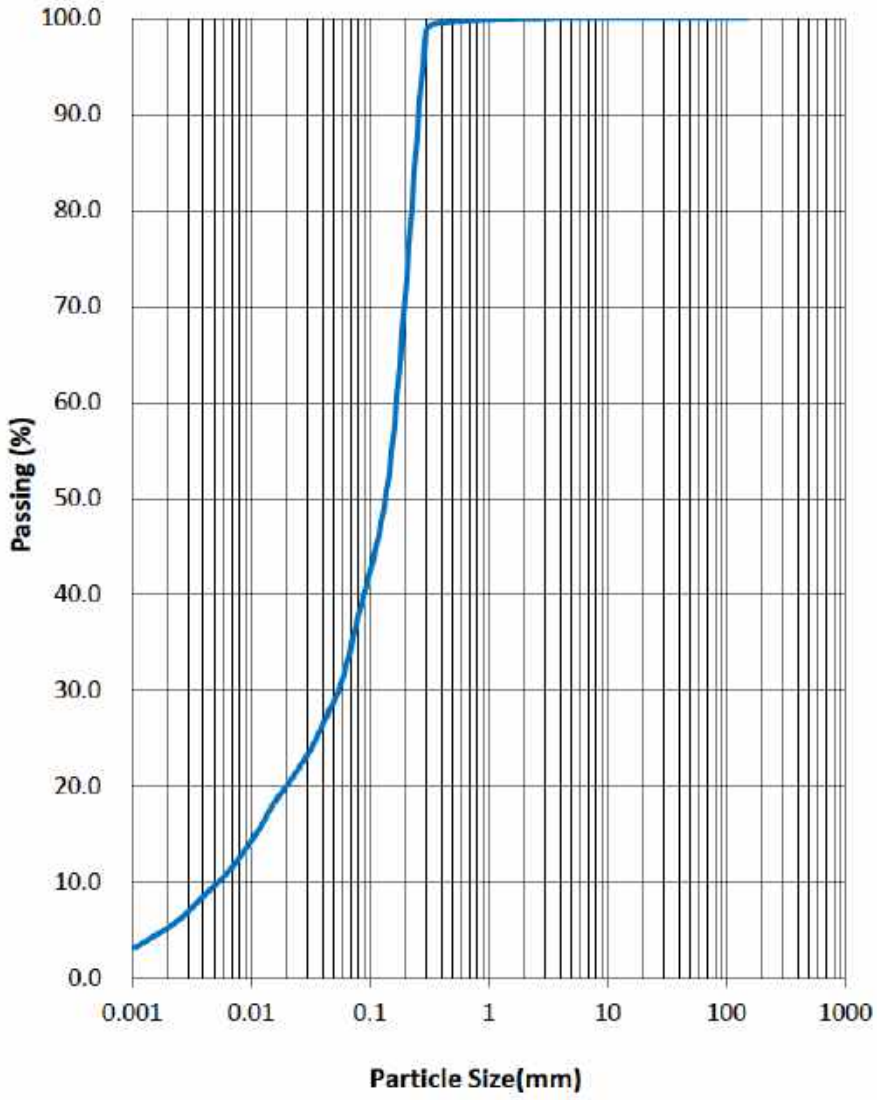
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	Kimberley Sands	Date Tested:	20/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S4	Depth (m):	-
Lab ID:	S4_PSDH	Room Temperature at Test:	19°C
Tested by:	George	2.36mm Particle Density (t/m³):	2.798
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	100.0
2.36	99.9
1.18	99.9
0.6	99.7
0.425	99.4
0.3	98.6
0.15	53.8
0.075	36.3
0.05778	30.8
0.04520	27.8
0.03235	24.0
0.02309	21.1
0.01580	18.3
0.01165	15.5
0.00831	12.8
0.00591	10.6
0.00420	8.9
0.00299	7.0
0.00212	5.4
0.00150	4.3
0.00119	3.6
0.00104	3.2
0.00088	2.8

PSD Graph



Notes: *Oven dried @ 60deg*

Stored and Tested the Sample as received

Samples supplied by the Client

Authorized Signature: [redacted]

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E-Precision Laboratory

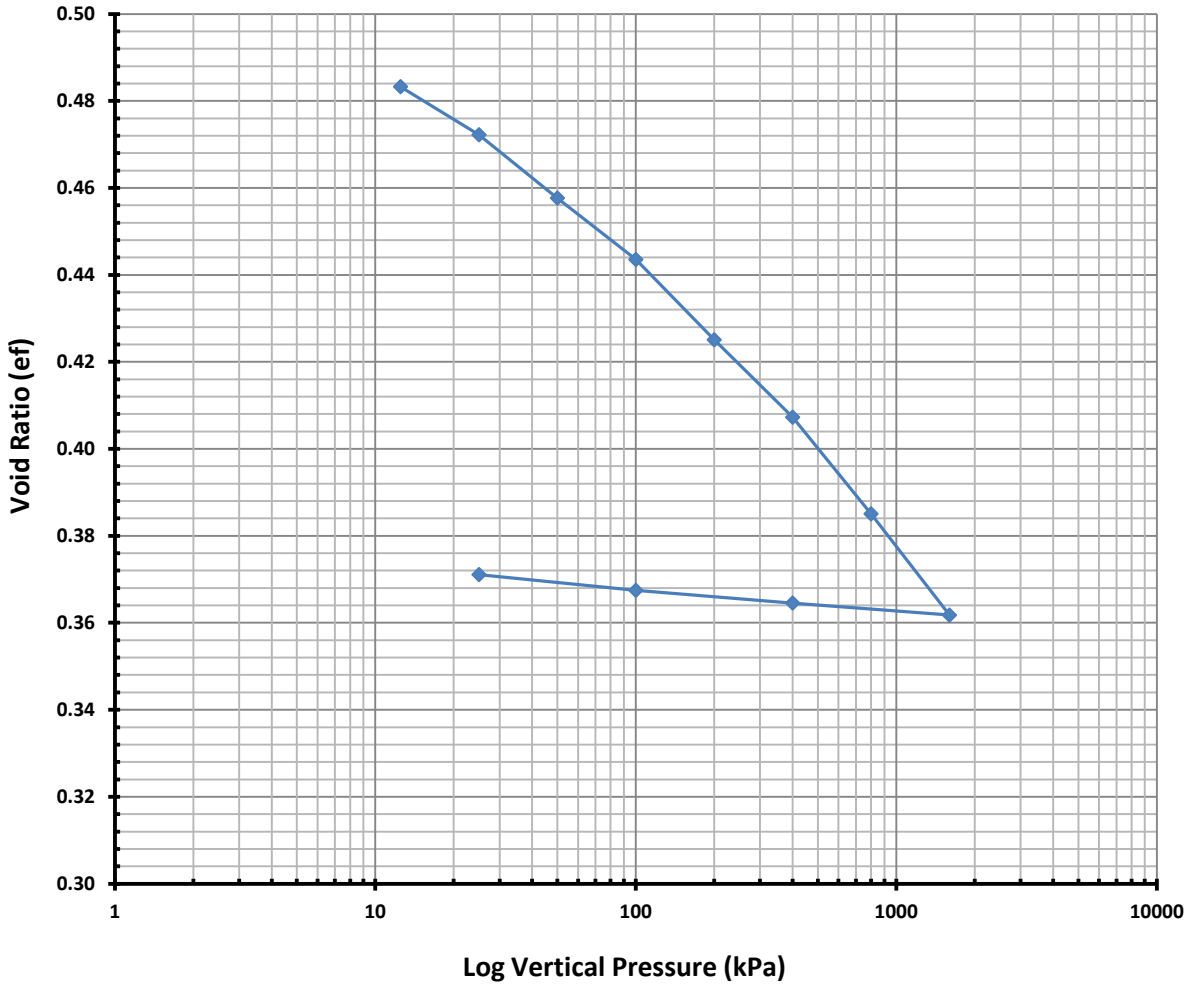
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°c

Tested by:	Phil	Initial Moisture (%):	31.54	Test Condition:	Undrained
Height (mm):	36.91	Final Moisture Content (%):	25.13	Sample Condition:	Saturated
Diameter (mm):	61.80	Bulk Density (t/m³):	2.43	Particle Density (t/m³):	2.798
Direction:	Vertical	Dry Density (t/m³):	1.85	Initial Void Ratio (e_i):	0.515

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



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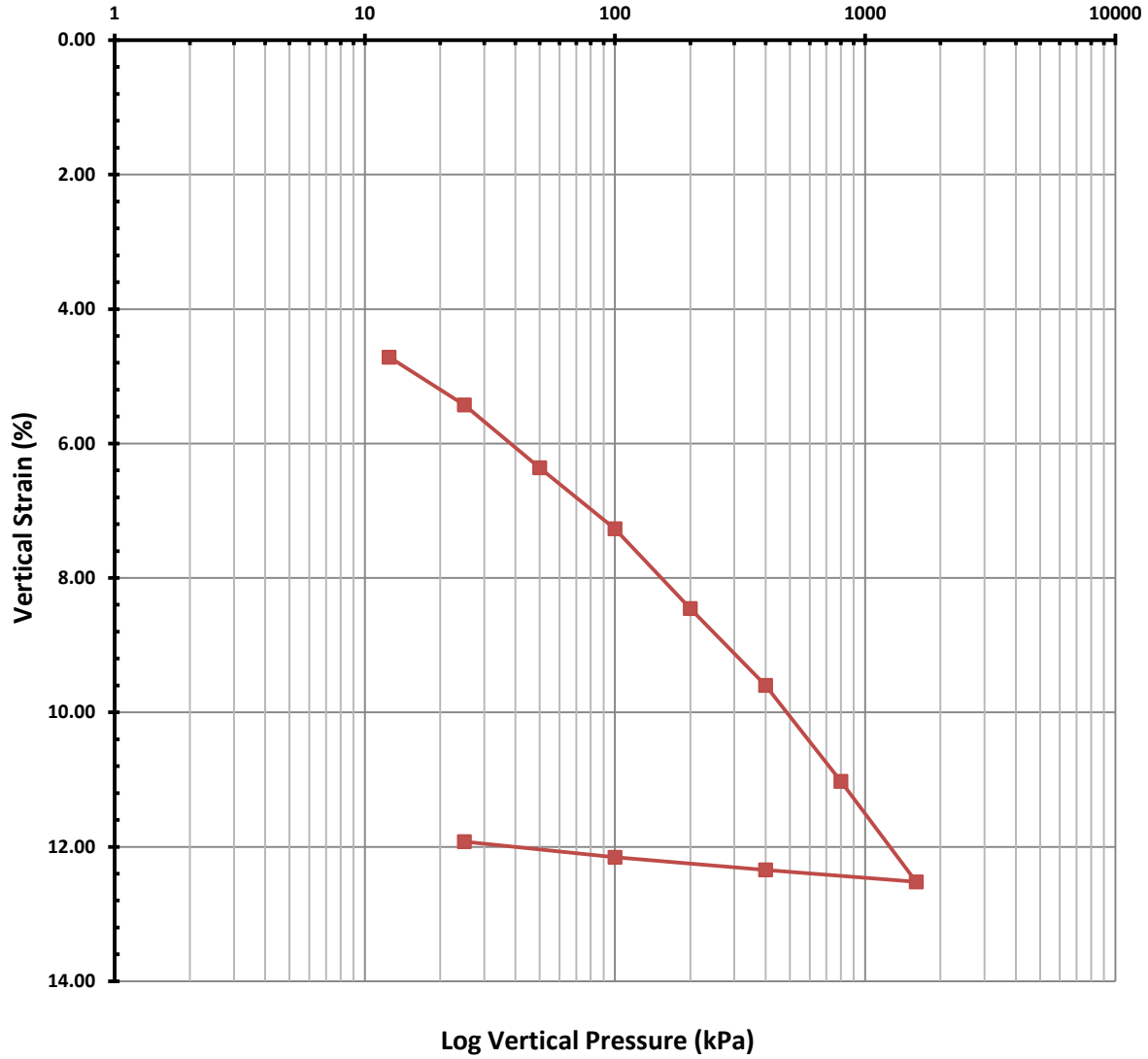
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_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:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_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	1.741	8.160	-	3.77E-03	9.6E-09		0.483	4.72
Stage 2 @ 25kPa	2.003	10.592	-	5.96E-04	2.0E-09		0.472	5.43
Stage 3 @ 50kPa	2.348	10.393	-	3.95E-04	1.3E-09		0.458	6.36
Stage 4 @ 100kPa	2.683	10.191	-	1.94E-04	6.1E-10		0.444	7.27
Stage 5 @ 200kPa	3.121	14.881	-	1.28E-04	5.9E-10		0.425	8.46
Stage 6 @ 400kPa	3.543	29.017	-	6.24E-05	5.6E-10		0.407	9.60
Stage 7 @ 800kPa	4.070	14.071	-	3.95E-05	1.7E-10		0.385	11.03
Stage 8 @ 1600kPa	4.622	13.605	-	2.10E-05	8.9E-11		0.362	12.52
Unload @ 400kPa	4.556							
Unload @ 100kPa	4.487							
Unload @ 25kPa	4.401							

** 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): [redacted]

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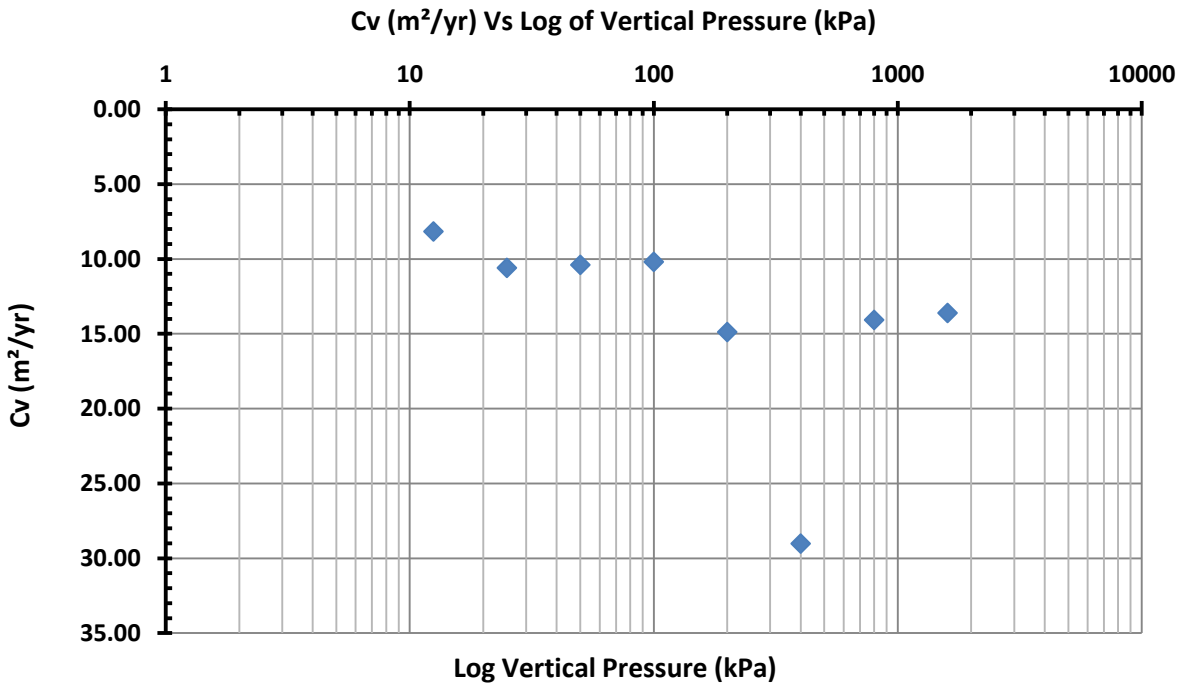
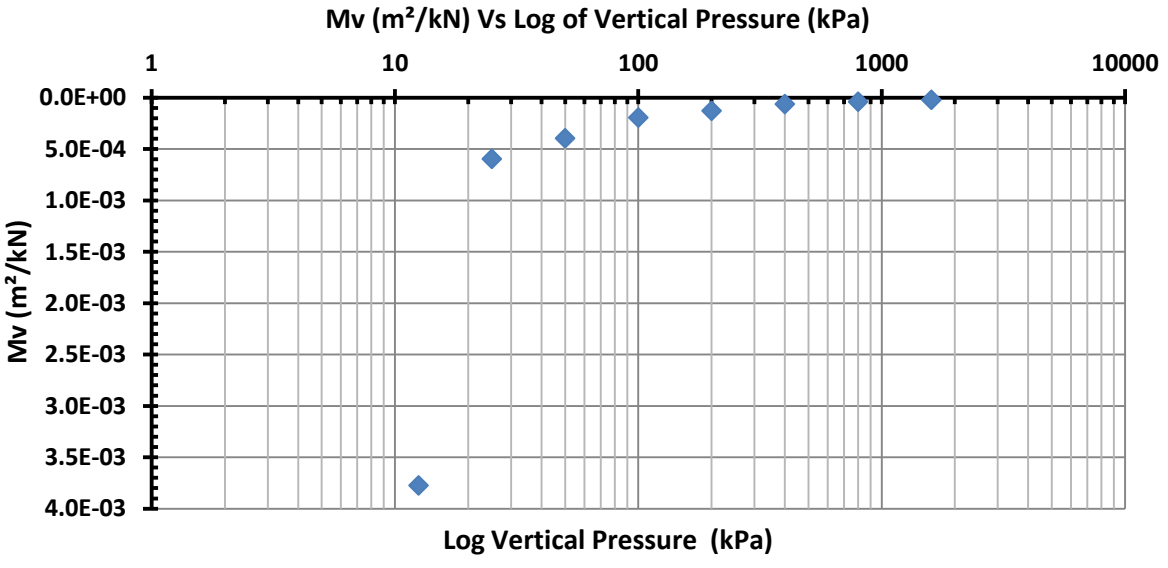
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_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:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

TEST RESULTS PLEASE SEE PAGES BELOW

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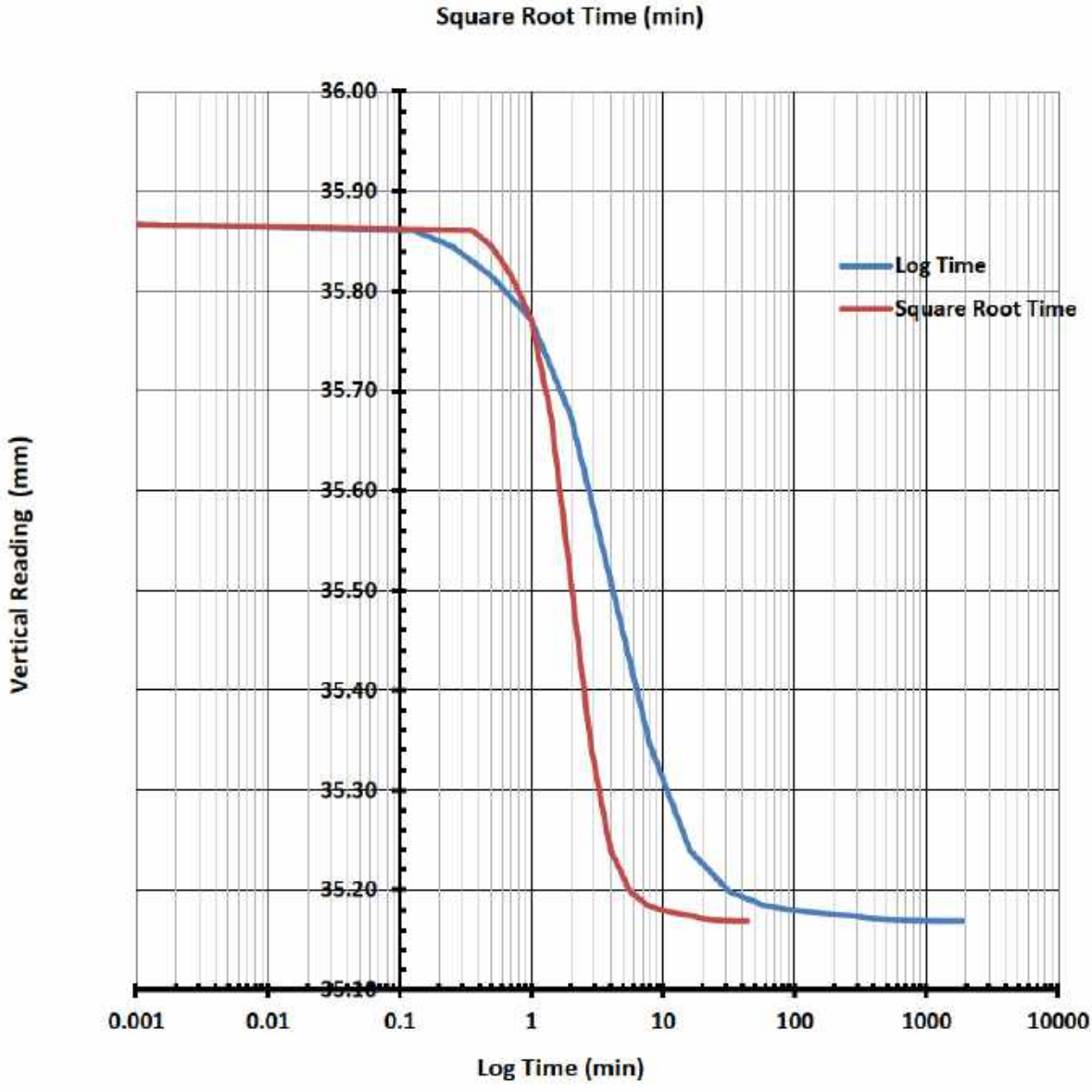
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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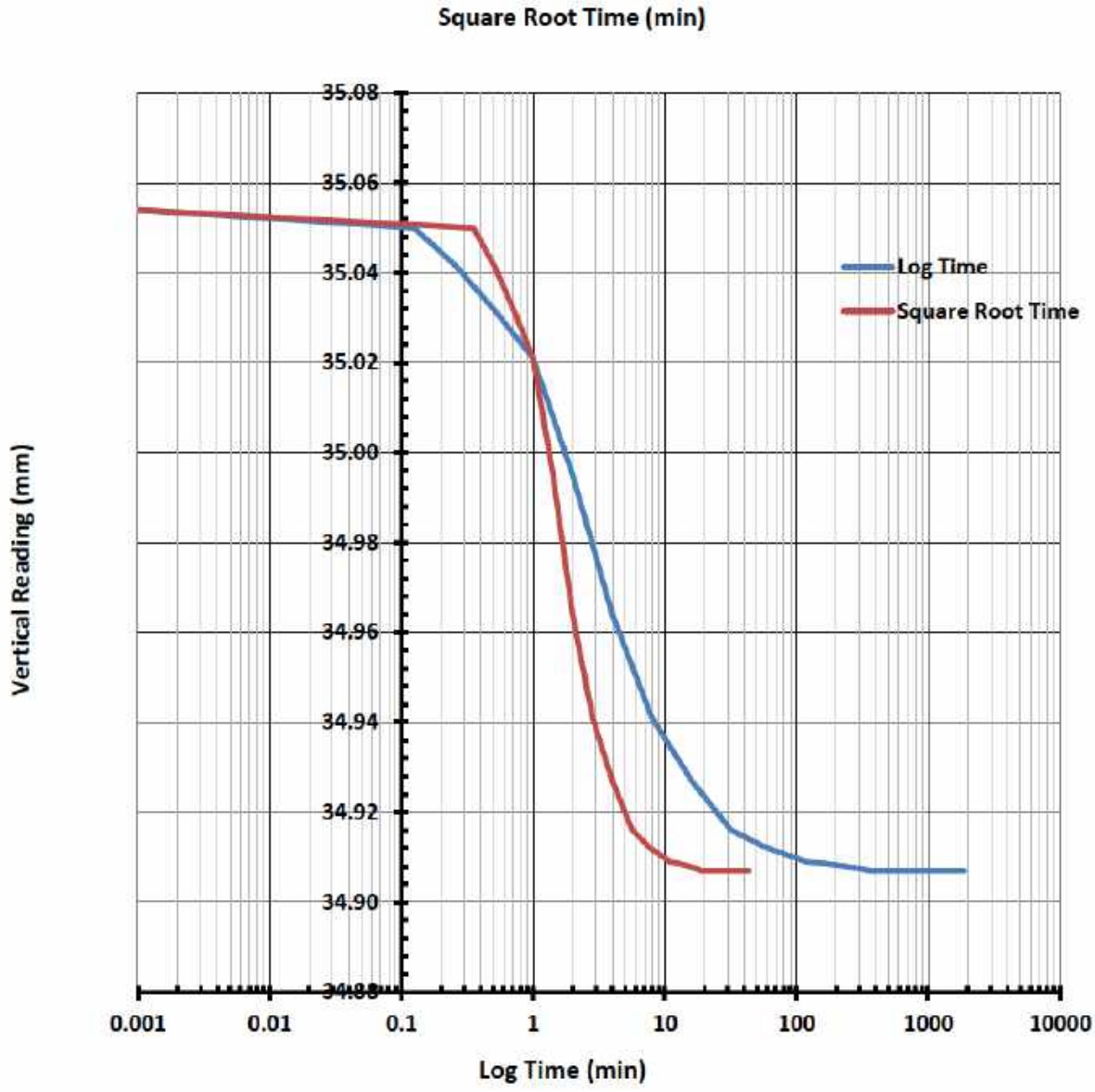
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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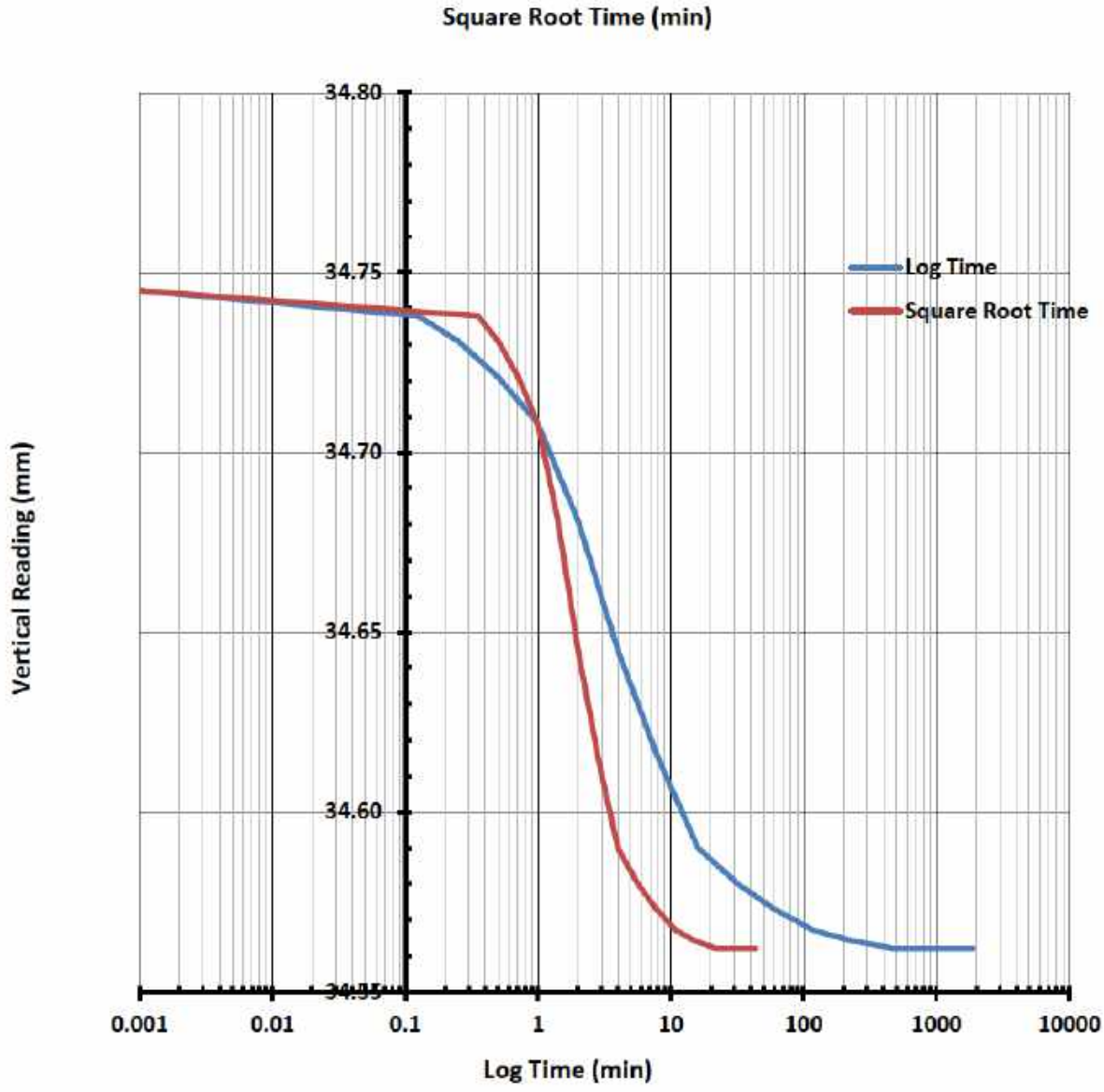
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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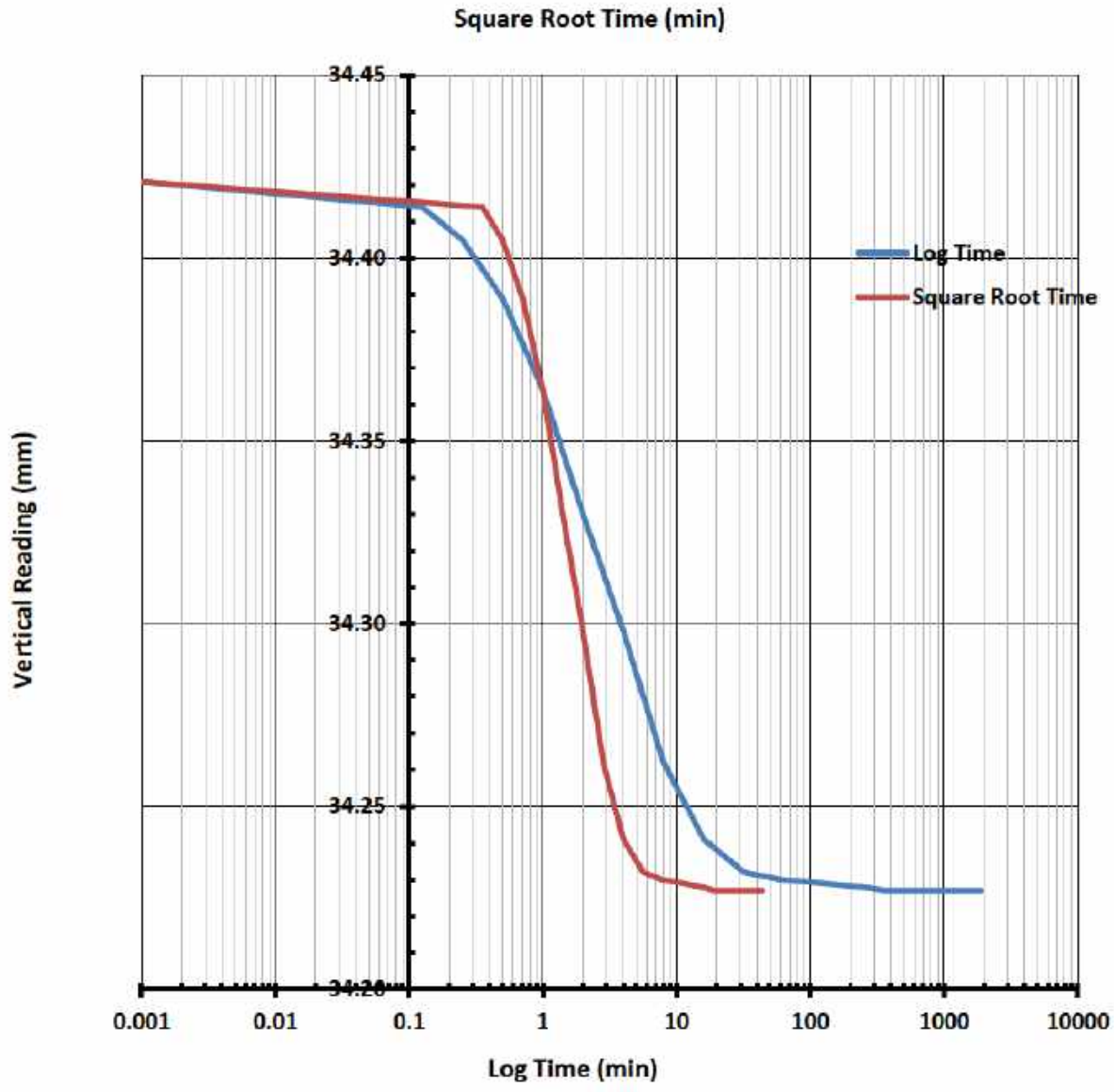
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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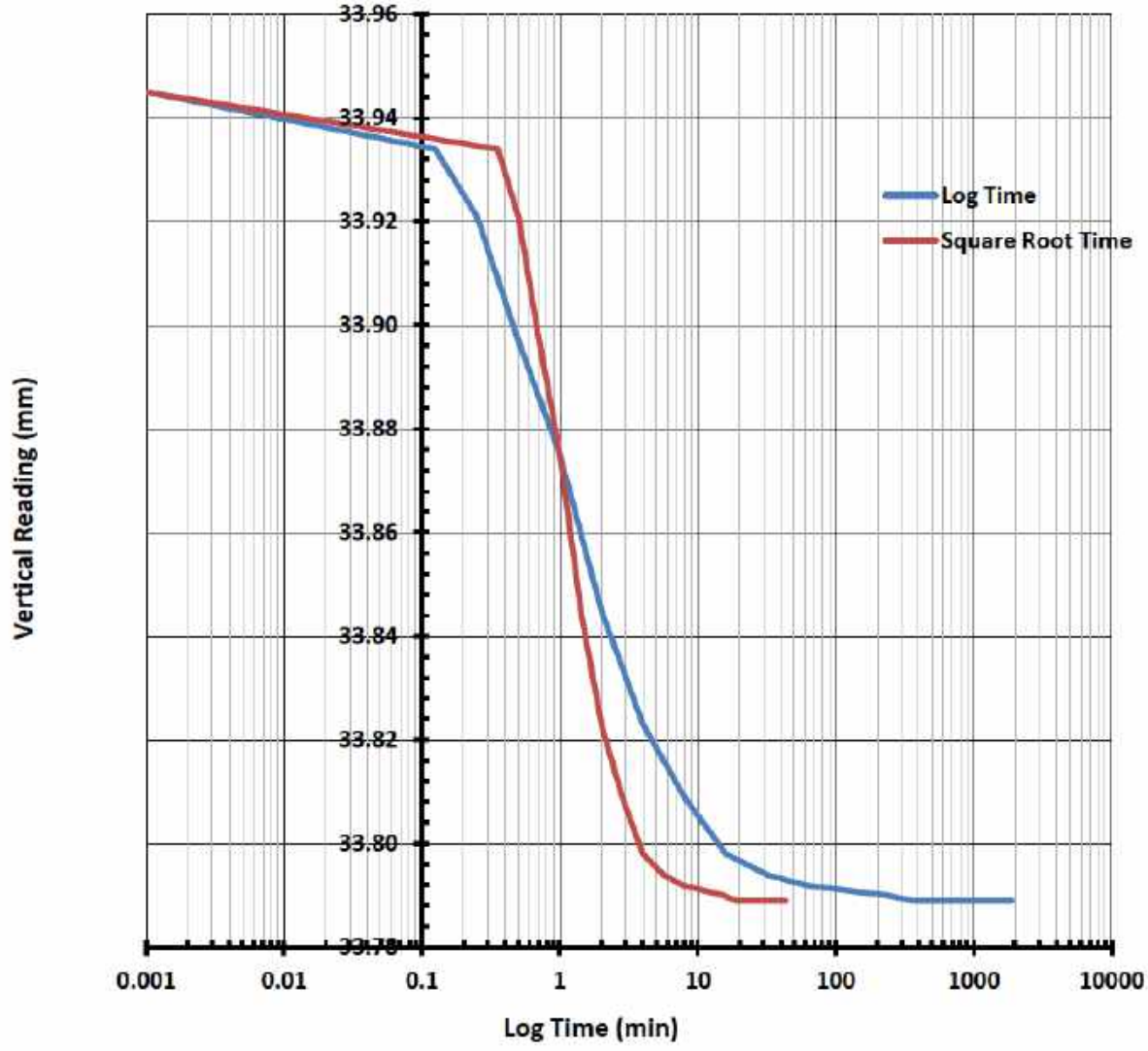
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa



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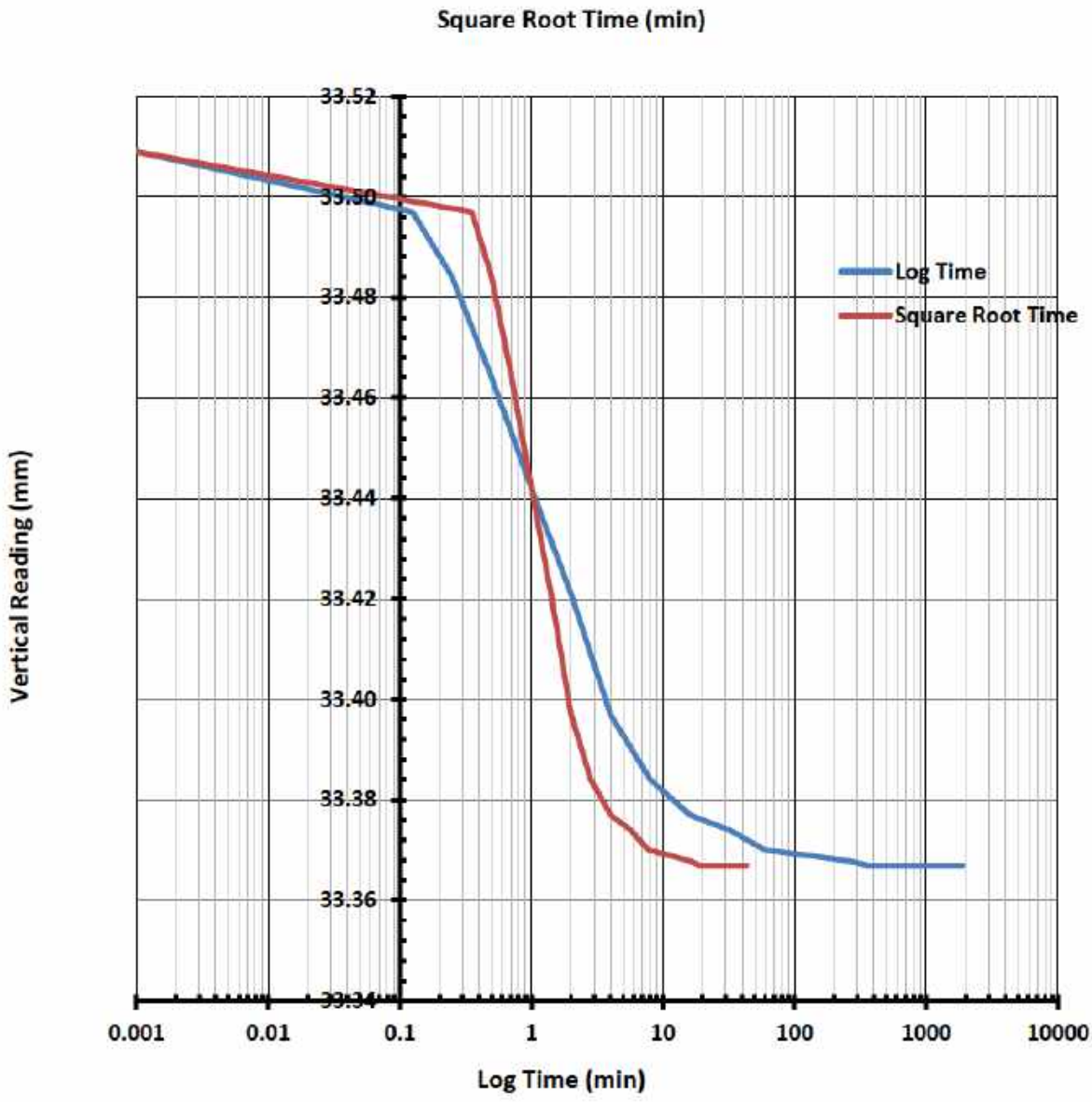
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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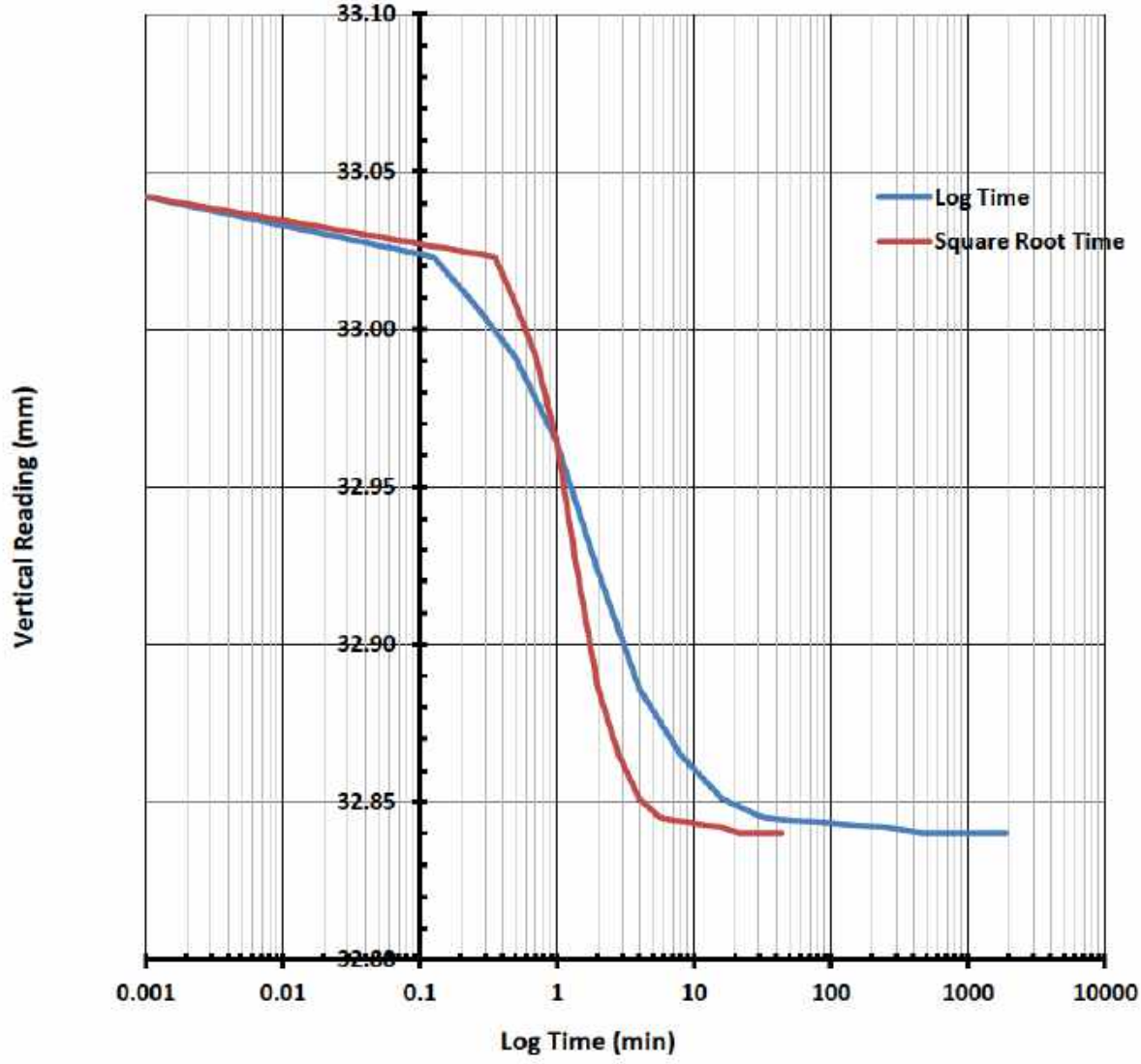
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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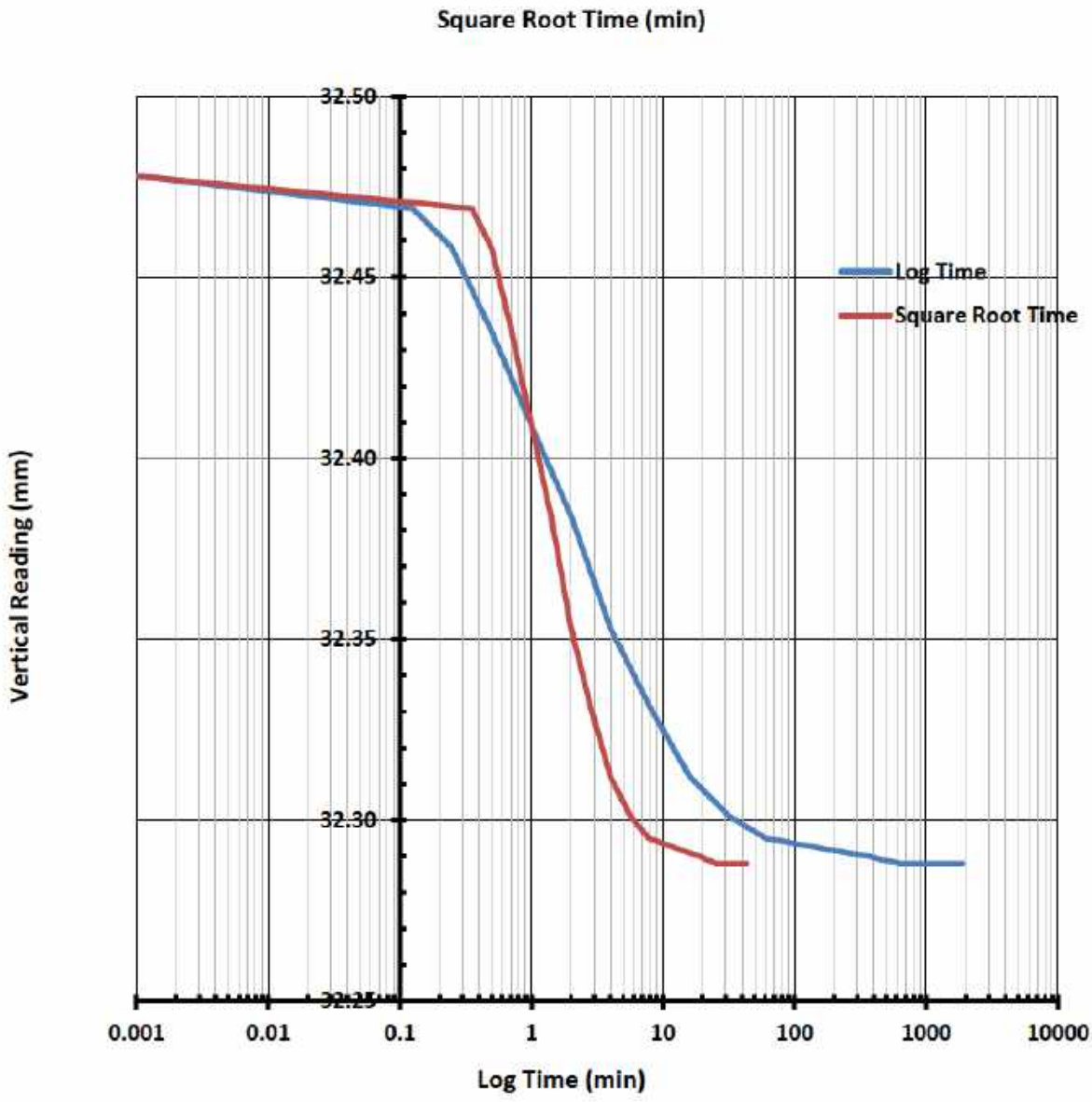
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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SETTLEMENT TESTING TAILINGS

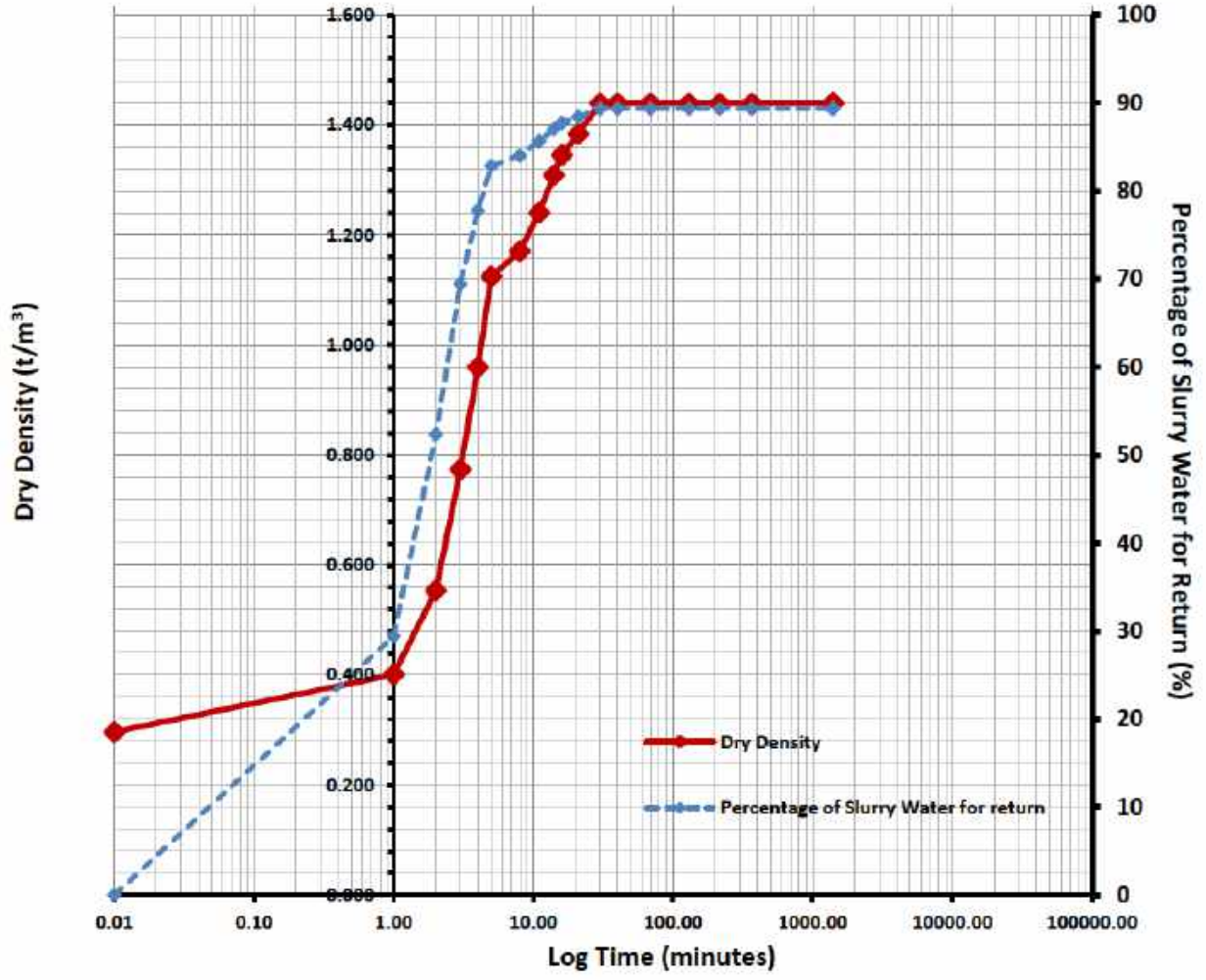
METHOD: IN-HOUSE METHOD

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S4		
Lab ID:	S4_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 25% Solids

Initial Dry Density (t/m³): 0.296
Particle Density (t/m³): 2.798
Initial Bulk Density (t/m³): 1.147

Undrained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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SETTLEMENT TESTING TAILINGS

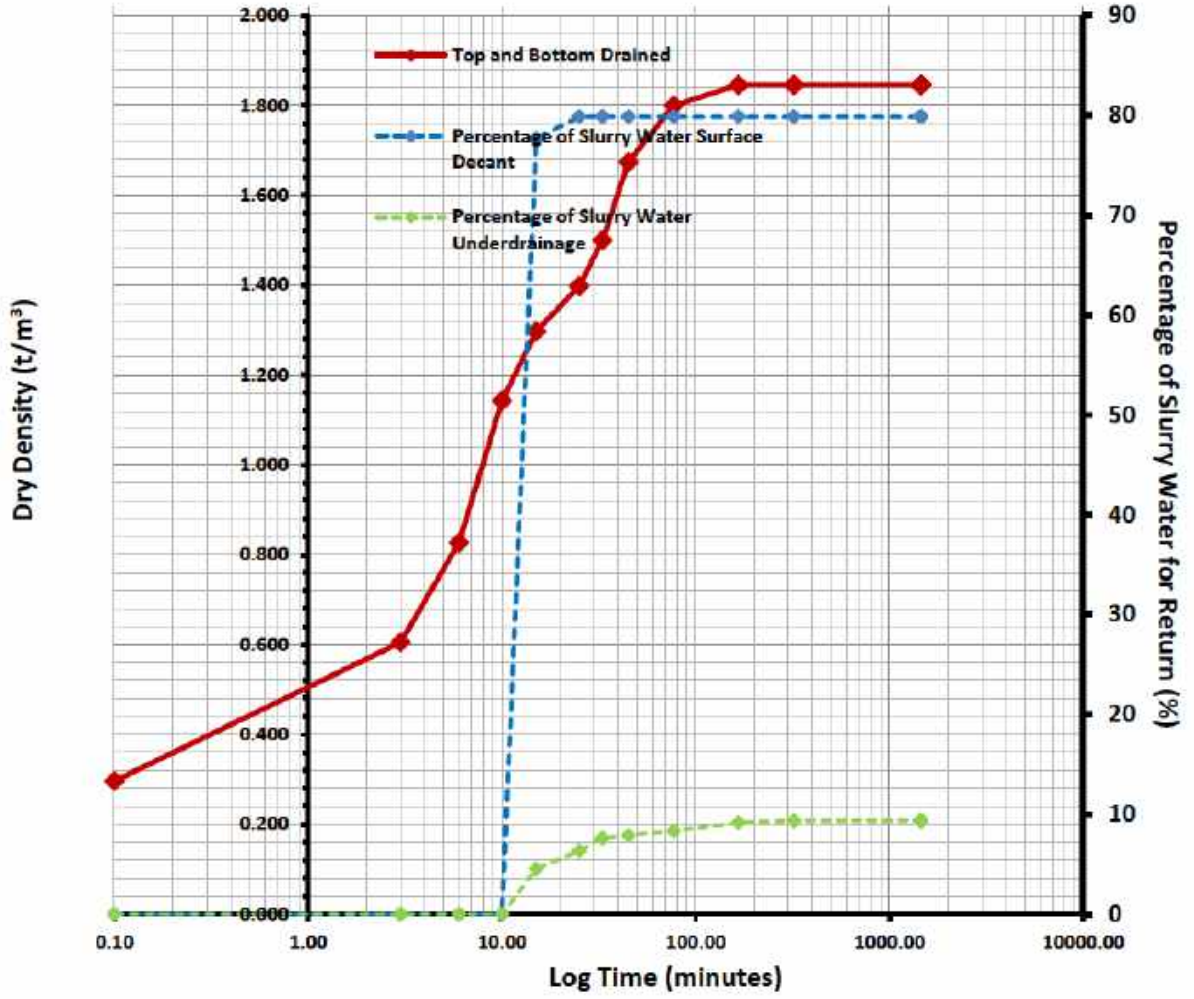
METHOD: IN-HOUSE METHOD

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S4		
Lab ID:	S4_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 25% Solids

Initial Dry Density (t/m³): 0.296
Particle Density (t/m³): 2.798
Initial Bulk Density (t/m³): 1.147

Top and Bottom Drained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

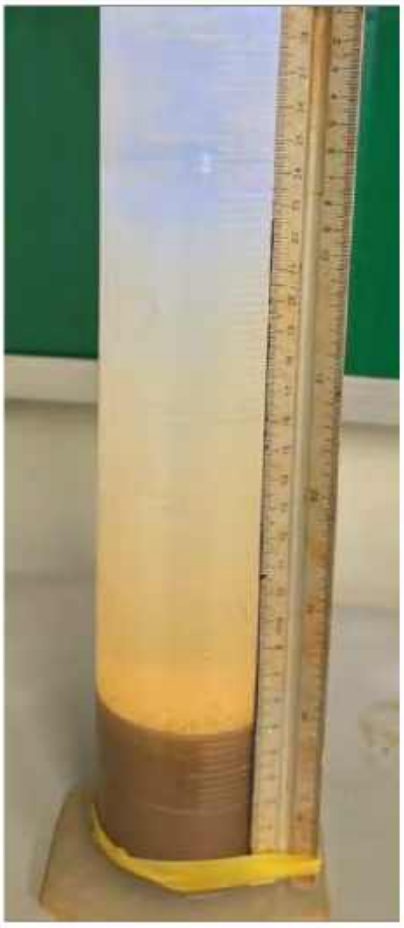
Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S4		
Lab ID:	S4_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 25% Solids

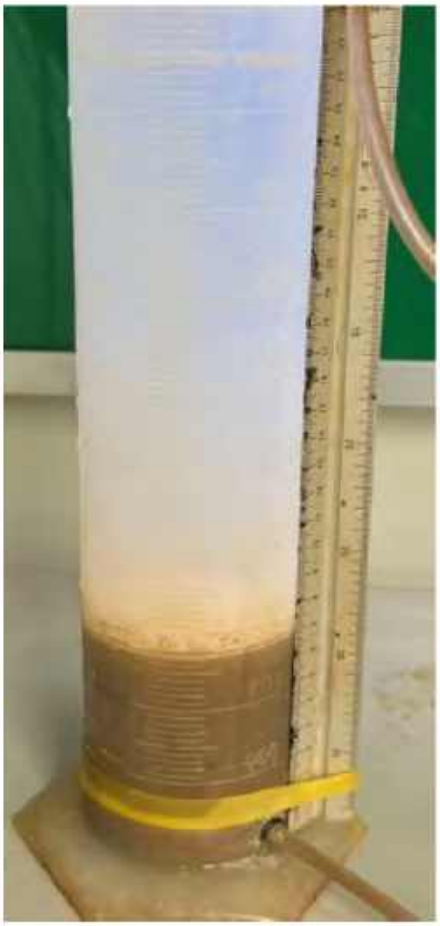
Initial Dry Density (t/m³): -
Particle Density (t/m³): -
Initial Bulk Density (t/m3): -

Photo of Test Setup

Undrained



Drained



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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E-Precision Laboratory

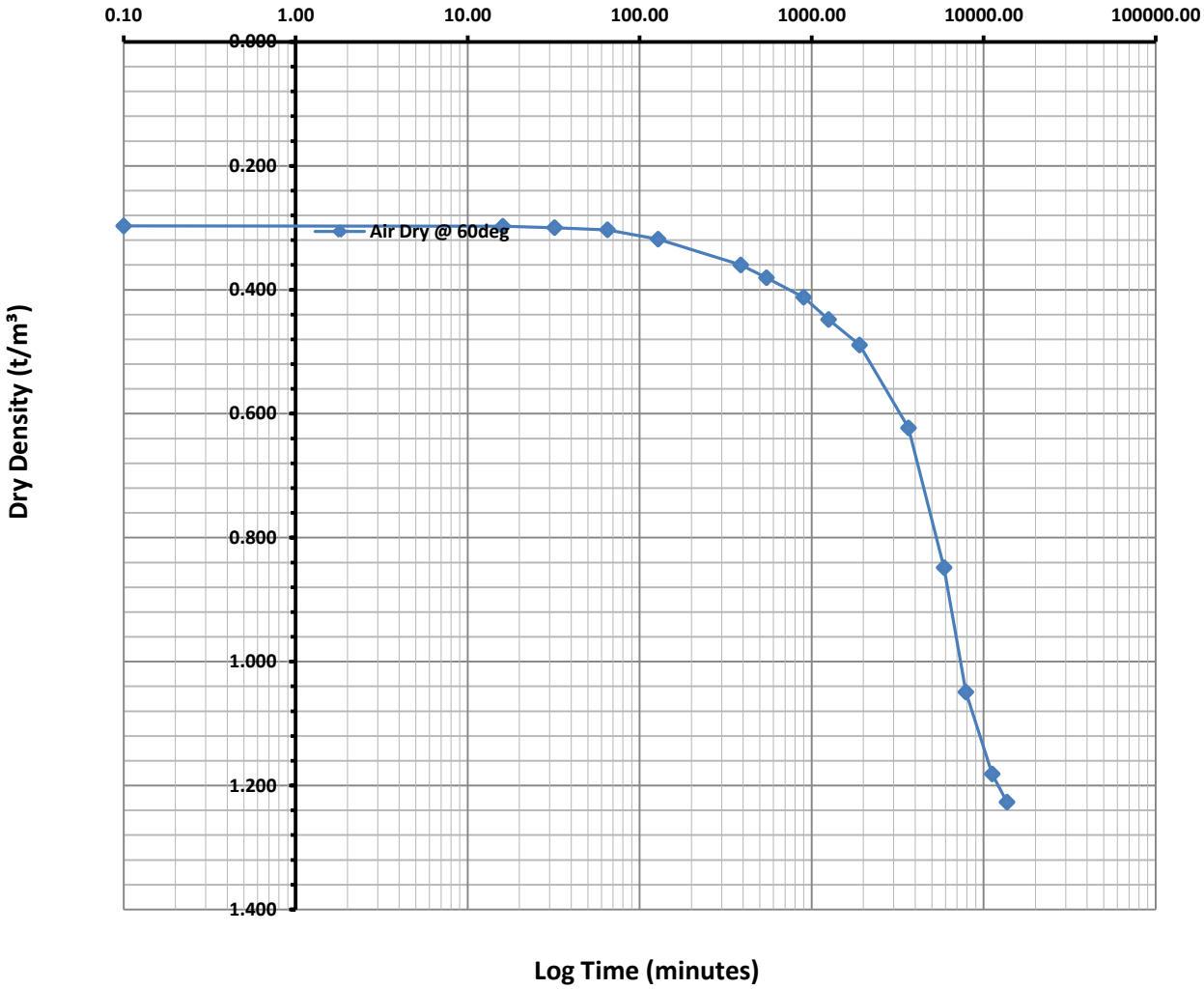
AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S4		
Lab ID:	S4_AIR_DRY	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Air Dry Testing
Sample Preparation: 25% Solids
Initial Bulk Density (t/m³): 1.188
Particle Density (t/m³): 2.798
Moisture Content Initial (%): 300.000

Dry Density (t/m³) Vs Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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E-Precision Laboratory

AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S4		
Lab ID:	S4_AIR_DRY	Room Temperature at Test:	19°

Photo of Samples after Testing

Oven dried @ 60deg

Comments:

Authorised Signature (Geotechnical Engineer) [redacted]

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MINERALS
TEST REPORT

CLIENT

KIMBERLEY MINERAL SANDS

JOB INFORMATION

JOB CODE	: 2303.0/2417910
NO. SAMPLES	: 16
NO. ELEMENTS	: 91
CLIENT ORDER NO.	: 4500003077 (Job 1 of 1)
SAMPLE SUBMISSION NO.	:
PROJECT	: GEOCHEM TESTING FOR TOPL TAILING M
SAMPLE TYPE	: Various
DATE RECEIVED	: 30/09/2024
DATE TESTED	: 11/10/2024 - 30/10/2024
DATE REPORTED	: 01/11/2024
DATE PRINTED	: 01/11/2024

REPORT NOTES

[redacted]

This report relates specifically to the sample(s) tested that were drawn and/or provided by the client or their nominated third party to Intertek. The reported result(s) provide no warranty or verification on the sample(s) representing any specific goods and/or shipment. This report was prepared solely for the use of the client named in this report. Intertek accepts no responsibility for any loss, damage or liability suffered by a third party as a result of any reliance upon or use of this report. The results provided are not intended for commercial settlement purposes.
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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 figures beyond the least significant digit have significance.

For more information on the uncertainty on individual reported values, please contact the laboratory.

MEASUREMENT OF UNCERTAINTY

Measurement of uncertainty estimates are available for most tests upon request.

SAMPLE STORAGE

All solid samples (assay pulps, bulk pulps and residues) will be stored for 60 days without charge. Following this samples will be stored at a daily rate until clients written advice regarding return, collection or disposal is received. If storage information is not supplied on the submission, or arranged with the laboratory in writing the default will be to store the samples with the applicable charges. Storage is charged at $4.00 per m3 per day, expenses related to the return or disposal of samples will also be charged. Current disposal costs including packaging in a Class2 waste disposal facility is charged at $175.00 per m3.

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.

LEGEND	X	= Less than Detection Limit		NA	= Not Analysed
	SNR	= Sample Not Received		UA	= Unable to Assay
	LNR	= Lab Not Received		>	= Value beyond Limit of Method
	DTF	= Result still to come		+	= Extra Sample Received Not Listed
	I/S	= Insufficient Sample for Analysis			

UNITS	ppm for Solid Samples	= mg/Kg
	ppb for Solid Samples	= µg/Kg
	ppm for Liquid Samples	= mg/L
	ppb for Liquid Samples	= µg/L

ELEMENTS	Ag	Al	Al2O3	ANC	As	B
UNITS	ug/l	mg/l	%	kgH2SO4/t	ug/l	mg/l
DETECTION LIMIT	0.01	0.01	0.01	1	0.1	0.01
DIGEST	ASLP/	ASLP/	FB6/	ANCx/	ASLP/	ASLP/
ANALYTICAL FINISH	MS	OE	OE	VOL	MS	OE
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	X	X	0.76		0.3	X
0002 Non-Magnetic Concentrate - Zircon	X	X	1.62		X	X
0003 Paramagnetic Concentrate	X	0.01	3.10		0.2	0.05
0004 MUP Oversize (>12mm)	X	X	4.02	2	X	0.02
0005 WCP Oversize (<12 - >2mm)	X	X	5.35	2	X	0.02
0006 WCP Sand Reject	X	X	1.52	1	X	0.01
0007 WCP Tails (Slimes)	X	X	22.13	2	0.2	0.01
0008 CUP Tailing	X	X	2.72	1	0.1	0.01
0009 MUP Oversize (>12 mm) pH 2.9	0.01	0.93			X	X
0010 WCP Oversize (<12 > 2mm) pH 2.9	0.04	1.60			X	0.01
0011 WCP Sand Rejects pH 2.9	0.08	0.39			X	X
0012 WCP Tails (slimes) pH 2.9	0.05	0.37			X	0.01
0013 CUP Tailings pH 2.9	X	0.47			X	X
0014 Magnetic Concentrate 1M HCl	X	1.45			0.5	X
0015 Non-magnetic concentrate 1M HCl	X	1.57			0.4	X
0016 Para-magnetic concentrate 1M HCl	X	2.27			0.5	X
CHECKS						
0001 MUP Oversize (>12mm)	X	X	4.04		X	X
0002 MUP Oversize (>12mm)				2		
STANDARDS						
0001 CCV-1-B-500		0.01				X
0002 ICP-AM-MISA6		99.91				100.07
0003 CRM-TMDW-500	2.02				85.8	
0004 GWS-6						
0005 ANC-6				97		
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699			1.23			
0010 OREAS 20a			14.93			
BLANKS						
0001 Control Blank	X	X	X		X	X
0002 Control Blank				0		

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ELEMENTS	Ba	Ba	Be	Be	Bi	C
UNITS	ppm	ug/l	ppm	ug/l	ug/l	%
DETECTION LIMIT	0.5	0.05	0.5	0.1	0.005	0.01
DIGEST	FB6/	ASLP/	FB6/	ASLP/	ASLP/	
ANALYTICAL FINISH	MS	MS	MS	MS	MS	/CSA
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	69.1	X	0.9	X	X	
0002 Non-Magnetic Concentrate - Zircon	48.3	0.44	4.8	X	X	
0003 Paramagnetic Concentrate	85.8	X	2.0	X	X	
0004 MUP Oversize (>12mm)	34.1	0.69	1.0	X	X	0.02
0005 WCP Oversize (<12 - >2mm)	53.7	1.74	2.4	X	X	0.04
0006 WCP Sand Reject	43.6	X	X	X	X	X
0007 WCP Tails (Slimes)	75.5	0.19	2.4	X	X	0.05
0008 CUP Tailing	48.9	0.06	1.0	X	X	0.01
0009 MUP Oversize (>12 mm) pH 2.9		32.26		0.5	0.006	
0010 WCP Oversize (<12 > 2mm) pH 2.9		123.57		2.8	0.008	
0011 WCP Sand Rejects pH 2.9		12.40		0.2	X	
0012 WCP Tails (slimes) pH 2.9		107.18		1.4	X	
0013 CUP Tailings pH 2.9		33.00		0.3	X	
0014 Magnetic Concentrate 1M HCl		70.56		0.9	0.342	
0015 Non-magnetic concentrate 1M HCl		73.93		1.5	0.151	
0016 Para-magnetic concentrate 1M HCl		210.37		1.5	0.372	
CHECKS						
0001 MUP Oversize (>12mm)	35.7	0.61	3.1	X	X	
0002 MUP Oversize (>12mm)						0.02
STANDARDS						
0001 CCV-1-B-500						
0002 ICP-AM-MISA6						
0003 CRM-TMDW-500		51.55		21.8	10.497	
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						1.14
0009 AMIS0699	54.6		1.3			
0010 OREAS 20a	1068.1		2.8			
BLANKS						
0001 Control Blank	0.7	X	X	X	X	
0002 Control Blank						X

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ELEMENTS	CO3	Ca	CaO	Cd	Ce	Ce
UNITS	mgCaCO3/L	mg/l	%	ug/l	ppm	ug/l
DETECTION LIMIT	1	0.01	0.01	0.02	0.5	0.002
DIGEST	ASLP/	ASLP/	FB6/	ASLP/	FB6/	ASLP/
ANALYTICAL FINISH	VOL	OE	OE	MS	MS	MS
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	X	X	0.01	X	1048.4	X
0002 Non-Magnetic Concentrate - Zircon	X	0.04	0.06	X	3079.5	0.003
0003 Paramagnetic Concentrate	X	0.03	0.07	X	6008.3	0.002
0004 MUP Oversize (>12mm)	X	0.01	X	X	257.5	X
0005 WCP Oversize (<12 - >2mm)	X	0.06	0.02	X	287.0	X
0006 WCP Sand Reject	X	0.02	0.01	X	1086.3	X
0007 WCP Tails (Slimes)	X	0.02	X	X	694.1	X
0008 CUP Tailing	X	0.03	0.03	X	2532.6	0.017
0009 MUP Oversize (>12 mm) pH 2.9		0.09		0.02		87.580
0010 WCP Oversize (<12 > 2mm) pH 2.9		1.27		X		30.844
0011 WCP Sand Rejects pH 2.9		0.11		X		17.319
0012 WCP Tails (slimes) pH 2.9		0.71		X		20.749
0013 CUP Tailings pH 2.9		0.10		X		49.091
0014 Magnetic Concentrate 1M HCl		0.17		0.08		480.970
0015 Non-magnetic concentrate 1M HCl		0.39		0.07		1002.721
0016 Para-magnetic concentrate 1M HCl		0.65		0.06		1384.885
CHECKS						
0001 MUP Oversize (>12mm)	X	X	X	X	247.8	X
0002 MUP Oversize (>12mm)						
STANDARDS						
0001 CCV-1-B-500		X				
0002 ICP-AM-MISA6		98.81				
0003 CRM-TMDW-500				10.74		X
0004 GWS-6	X					
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699			0.02		39.7	
0010 OREAS 20a			3.57		77.3	
BLANKS						
0001 Control Blank	X	X	X	X	0.6	X
0002 Control Blank						

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JOB NO : 2303.0/2417910
CLIENT REF : 4500003077

ELEMENTS	Cl	Co		CoolourChange	Cr	Cr
UNITS	mg/L	ppm	ug/l	NONE	ppm	ug/l
DETECTION LIMIT	2	0.5	0.1	0	20	10
DIGEST	ASLP/	FB6/	ASLP/	ANCx/	FB6/	ASLP/
ANALYTICAL FINISH	COL	MS	MS	QUAL	OE	MS
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	X	38.7	X		391	X
0002 Non-Magnetic Concentrate - Zircon	X	7.1	X		154	X
0003 Paramagnetic Concentrate	X	21.4	X		396	X
0004 MUP Oversize (>12mm)	X	12.8	X	No	161	X
0005 WCP Oversize (<12 - >2mm)	X	13.0	X	No	304	X
0006 WCP Sand Reject	X	5.7	X	No	106	X
0007 WCP Tails (Slimes)	3	12.6	X	No	335	X
0008 CUP Tailing	X	8.3	X	No	173	X
0009 MUP Oversize (>12 mm) pH 2.9			0.4			X
0010 WCP Oversize (<12 > 2mm) pH 2.9			1.4			12
0011 WCP Sand Rejects pH 2.9			X			X
0012 WCP Tails (slimes) pH 2.9			0.4			X
0013 CUP Tailings pH 2.9			0.1			X
0014 Magnetic Concentrate 1M HCl			0.4			13
0015 Non-magnetic concentrate 1M HCl			0.3			X
0016 Para-magnetic concentrate 1M HCl			0.9			X
CHECKS						
0001 MUP Oversize (>12mm)	X	14.1	X		162	X
0002 MUP Oversize (>12mm)				No		
STANDARDS						
0001 CCV-1-B-500						
0002 ICP-AM-MISA6						
0003 CRM-TMDW-500			25.3			21
0004 GWS-6	38					
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699		1.1			X	
0010 OREAS 20a		13.7			88	
BLANKS						
0001 Control Blank	X	X	X		X	X
0002 Control Blank						

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ELEMENTS	Cs	Cs	Cu	Dy	EC	EC
UNITS	ppm	ug/l	ug/l	ppm	uS/cm	uS/cm
DETECTION LIMIT	0.1	0.001	1	0.1	10	10
DIGEST	FB6/	ASLP/	ASLP/	FB6/	ASLP/	Ws5/
ANALYTICAL FINISH	MS	MS	MS	MS	MTR	MTR
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	0.2	X	X	75.7	X	
0002 Non-Magnetic Concentrate - Zircon	X	X	X	259.3	X	
0003 Paramagnetic Concentrate	0.1	X	X	211.5	X	
0004 MUP Oversize (>12mm)	0.2	X	X	15.6	X	13
0005 WCP Oversize (<12 - >2mm)	0.5	X	X	16.2	X	12
0006 WCP Sand Reject	X	X	X	36.1	X	17
0007 WCP Tails (Slimes)	0.2	X	X	16.2	15	70
0008 CUP Tailing	0.1	X	X	73.5	X	16
0009 MUP Oversize (>12 mm) pH 2.9		X	X			
0010 WCP Oversize (<12 > 2mm) pH 2.9		X	4			
0011 WCP Sand Rejects pH 2.9		X	X			
0012 WCP Tails (slimes) pH 2.9		X	X			
0013 CUP Tailings pH 2.9		X	X			
0014 Magnetic Concentrate 1M HCl		X	1			
0015 Non-magnetic concentrate 1M HCl		X	X			
0016 Para-magnetic concentrate 1M HCl		X	2			
CHECKS						
0001 MUP Oversize (>12mm)	0.1	X	X	14.6	X	
0002 MUP Oversize (>12mm)						14
STANDARDS						
0001 CCV-1-B-500						
0002 ICP-AM-MISA6						
0003 CRM-TMDW-500		X	20			
0004 GWS-6					307	
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						319
0008 OREAS 279						
0009 AMIS0699	X			92.5		
0010 OREAS 20a	12.7			5.2		
BLANKS						
0001 Control Blank	X	X	X	X	X	
0002 Control Blank						X

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ELEMENTS	Er	Eu	F	Fe	Fe2O3	Final-pH
UNITS	ppm	ppm	mg/L	mg/l	%	NONE
DETECTION LIMIT	0.1	0.1	0.1	0.01	0.01	0.1
DIGEST	FB6/	FB6/	ASLP/	ASLP/	FB6/	ANCx/
ANALYTICAL FINISH	MS	MS	SIE	OE	OE	MTR
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	52.7	4.5	X	X	48.69	
0002 Non-Magnetic Concentrate - Zircon	197.8	27.0	0.1	X	8.98	
0003 Paramagnetic Concentrate	110.0	24.6	0.1	X	31.30	
0004 MUP Oversize (>12mm)	9.8	1.8	X	X	16.90	1.6
0005 WCP Oversize (<12 - >2mm)	9.3	1.8	X	X	30.49	1.5
0006 WCP Sand Reject	17.9	4.4	X	X	8.19	1.9
0007 WCP Tails (Slimes)	10.4	2.5	X	X	20.42	1.4
0008 CUP Tailing	33.3	9.1	X	X	12.39	1.5
0009 MUP Oversize (>12 mm) pH 2.9				0.25		
0010 WCP Oversize (<12 > 2mm) pH 2.9				0.59		
0011 WCP Sand Rejects pH 2.9				0.11		
0012 WCP Tails (slimes) pH 2.9				0.05		
0013 CUP Tailings pH 2.9				0.14		
0014 Magnetic Concentrate 1M HCl				7.47		
0015 Non-magnetic concentrate 1M HCl				3.74		
0016 Para-magnetic concentrate 1M HCl				8.31		
CHECKS						
0001 MUP Oversize (>12mm)	10.2	1.9	X	X	17.00	
0002 MUP Oversize (>12mm)						1.6
STANDARDS						
0001 CCV-1-B-500				X		
0002 ICP-AM-MISA6				99.82		
0003 CRM-TMDW-500						
0004 GWS-6			0.6			
0005 ANC-6						1.5
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699	123.6	4.1			0.10	
0010 OREAS 20a	3.0	1.5			5.40	
BLANKS						
0001 Control Blank	X	X	X	X	X	
0002 Control Blank						1.4

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ELEMENTS	Fizz-Rate	Ga	Ga	Gd	Ge	HCO3
UNITS	NONE	ppm	ug/l	ppm	ug/l	mgCaCO3/L
DETECTION LIMIT	1	0.5	0.02	0.1	0.1	2
DIGEST	ANCx/	FB6/	ASLP/	FB6/	ASLP/	ASLP/
ANALYTICAL FINISH	QUAL	MS	MS	MS	MS	VOL
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite		15.1	X	62.5	X	3
0002 Non-Magnetic Concentrate - Zircon		6.0	X	223.1	X	3
0003 Paramagnetic Concentrate		17.1	X	298.3	X	3
0004 MUP Oversize (>12mm)	X	7.3	X	16.2	X	3
0005 WCP Oversize (<12 - >2mm)	X	12.7	X	16.3	X	3
0006 WCP Sand Reject	X	4.5	X	52.4	X	3
0007 WCP Tails (Slimes)	X	30.2	X	22.4	X	3
0008 CUP Tailing	X	8.7	X	113.6	X	3
0009 MUP Oversize (>12 mm) pH 2.9			0.21		X	
0010 WCP Oversize (<12 > 2mm) pH 2.9			0.17		X	
0011 WCP Sand Rejects pH 2.9			0.10		X	
0012 WCP Tails (slimes) pH 2.9			0.07		X	
0013 CUP Tailings pH 2.9			0.17		X	
0014 Magnetic Concentrate 1M HCl			2.87		0.1	
0015 Non-magnetic concentrate 1M HCl			2.29		0.1	
0016 Para-magnetic concentrate 1M HCl			4.51		X	
CHECKS						
0001 MUP Oversize (>12mm)		7.2	X	14.8	X	3
0002 MUP Oversize (>12mm)	X					
STANDARDS						
0001 CCV-1-B-500						
0002 ICP-AM-MISA6						
0003 CRM-TMDW-500			X		X	
0004 GWS-6						101
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699		1.4		32.2		
0010 OREAS 20a		17.7		5.3		
BLANKS						
0001 Control Blank		X	X	X	X	3
0002 Control Blank						

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ELEMENTS	Hf	Hf	Hg	Ho	K	K2O
UNITS	ppm	ug/l	ug/l	ppm	mg/l	%
DETECTION LIMIT	0.1	0.005	0.1	0.1	0.1	0.01
DIGEST	FB6/	ASLP/	ASLP/	FB6/	ASLP/	FB6/
ANALYTICAL FINISH	MS	MS	MS	MS	OE	OE
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	172.1	X	X	16.6	0.2	X
0002 Non-Magnetic Concentrate - Zircon	5707.1	X	X	57.0	X	X
0003 Paramagnetic Concentrate	1186.3	X	X	37.7	0.2	X
0004 MUP Oversize (>12mm)	121.4	X	X	3.1	X	X
0005 WCP Oversize (<12 - >2mm)	139.4	X	X	3.1	X	0.04
0006 WCP Sand Reject	136.0	X	X	6.3	X	0.01
0007 WCP Tails (Slimes)	132.9	X	X	3.1	0.3	0.13
0008 CUP Tailing	245.1	X	X	12.3	0.1	X
0009 MUP Oversize (>12 mm) pH 2.9		X	X		0.1	
0010 WCP Oversize (<12 > 2mm) pH 2.9		X	X		0.4	
0011 WCP Sand Rejects pH 2.9		0.011	X		0.1	
0012 WCP Tails (slimes) pH 2.9		X	X		0.9	
0013 CUP Tailings pH 2.9		X	X		0.1	
0014 Magnetic Concentrate 1M HCl		3.020	X		X	
0015 Non-magnetic concentrate 1M HCl		21.069	X		X	
0016 Para-magnetic concentrate 1M HCl		4.686	X		X	
CHECKS						
0001 MUP Oversize (>12mm)	118.6	X	X	3.1	X	0.02
0002 MUP Oversize (>12mm)						
STANDARDS						
0001 CCV-1-B-500					X	
0002 ICP-AM-MISA6					99.8	
0003 CRM-TMDW-500		X	X			
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699	1.00%			28.7		X
0010 OREAS 20a	13.7			1.0		3.78
BLANKS						
0001 Control Blank	X	X	X	X	0.1	X
0002 Control Blank						

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ELEMENTS	La	La	Li	Lu	Mg	MgO
UNITS	ppm	ug/l	ug/l	ppm	mg/l	%
DETECTION LIMIT	0.2	0.002	0.05	0.1	0.01	0.01
DIGEST	FB6/	ASLP/	ASLP/	FB6/	ASLP/	FB6/
ANALYTICAL FINISH	MS	MS	MS	MS	OE	OE
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	467.2	X	0.11	8.0	0.01	0.18
0002 Non-Magnetic Concentrate - Zircon	1348.7	0.003	0.08	54.1	0.06	0.15
0003 Paramagnetic Concentrate	2874.2	X	0.07	19.8	0.01	0.28
0004 MUP Oversize (>12mm)	115.1	X	0.29	2.1	0.05	0.06
0005 WCP Oversize (<12 - >2mm)	139.6	X	0.66	1.9	0.06	0.07
0006 WCP Sand Reject	511.6	X	0.38	3.0	0.01	0.05
0007 WCP Tails (Slimes)	335.7	X	0.21	1.9	0.03	0.07
0008 CUP Tailing	1226.2	0.003	0.10	5.5	0.04	0.16
0009 MUP Oversize (>12 mm) pH 2.9		55.794	0.50		0.76	
0010 WCP Oversize (<12 > 2mm) pH 2.9		33.607	1.25		1.27	
0011 WCP Sand Rejects pH 2.9		10.115	0.65		0.26	
0012 WCP Tails (slimes) pH 2.9		15.991	0.61		3.61	
0013 CUP Tailings pH 2.9		32.764	0.11		0.22	
0014 Magnetic Concentrate 1M HCl		282.818	0.75		0.22	
0015 Non-magnetic concentrate 1M HCl		547.144	0.71		0.20	
0016 Para-magnetic concentrate 1M HCl		785.086	0.88		0.57	
CHECKS						
0001 MUP Oversize (>12mm)	109.9	X	0.37	1.9	0.03	0.06
0002 MUP Oversize (>12mm)						
STANDARDS						
0001 CCV-1-B-500					X	
0002 ICP-AM-MISA6					99.26	
0003 CRM-TMDW-500		0.080	20.07			
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699	6.4			47.0		X
0010 OREAS 20a	38.6			0.3		2.37
BLANKS						
0001 Control Blank	X	X	X	X	X	X
0002 Control Blank						

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ELEMENTS	Mn	MnO	Mo	Mo	MPA	Na
UNITS	ug/l	%	ppm	ug/l	kgH2SO4/t	mg/l
DETECTION LIMIT	0.1	0.01	1	0.05	1	0.1
DIGEST	ASLP/	FB6/	FB6/	ASLP/		ASLP/
ANALYTICAL FINISH	MS	OE	MS	MS	/CALC	OE
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	X	0.94	7	X		1.0
0002 Non-Magnetic Concentrate - Zircon	X	0.15	5	X		0.4
0003 Paramagnetic Concentrate	X	0.45	5	0.17		0.6
0004 MUP Oversize (>12mm)	0.5	0.12	2	X	X	0.5
0005 WCP Oversize (<12 - >2mm)	X	0.13	2	X	X	0.6
0006 WCP Sand Reject	X	0.09	1	X	X	0.7
0007 WCP Tails (Slimes)	X	0.09	2	X	X	2.5
0008 CUP Tailing	X	0.15	2	X	X	0.7
0009 MUP Oversize (>12 mm) pH 2.9	9.7			X		0.7
0010 WCP Oversize (<12 > 2mm) pH 2.9	17.7			X		0.9
0011 WCP Sand Rejects pH 2.9	3.5			X		0.7
0012 WCP Tails (slimes) pH 2.9	17.8			X		3.2
0013 CUP Tailings pH 2.9	6.1			X		0.8
0014 Magnetic Concentrate 1M HCl	21.1			0.41		1.1
0015 Non-magnetic concentrate 1M HCl	17.1			X		0.5
0016 Para-magnetic concentrate 1M HCl	32.8			X		0.8
CHECKS						
0001 MUP Oversize (>12mm)	X	0.12	2	X		0.5
0002 MUP Oversize (>12mm)					X	
STANDARDS						
0001 CCV-1-B-500						819.7
0002 ICP-AM-MISA6						99.9
0003 CRM-TMDW-500	42.8			100.44		
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279					39	
0009 AMIS0699		X	3			
0010 OREAS 20a		0.07	4			
BLANKS						
0001 Control Blank	X	X	X	X		X
0002 Control Blank					X	

The results provided are not intended for commercial settlement purposes

ELEMENTS	Na2O	NAG	NAGpH	NAG(4.5)	NAPP	Nb
UNITS	%	kgH2SO4/t	NONE	kgH2SO4/t	kgH2SO4/t	ppm
DETECTION LIMIT	0.01	1	0.1	1	1	0.1
DIGEST	FB6/	NAGx/	NAGx/	NAGx/		FB6/
ANALYTICAL FINISH	OE	VOL	MTR	VOL	/CALC	MS
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	0.02					568.0
0002 Non-Magnetic Concentrate - Zircon	0.04					468.7
0003 Paramagnetic Concentrate	0.07					469.0
0004 MUP Oversize (>12mm)	X	5	4.8	0	-2	72.9
0005 WCP Oversize (<12 - >2mm)	X	1	5.4	0	-2	69.1
0006 WCP Sand Reject	0.02	6	4.9	0	-1	82.6
0007 WCP Tails (Slimes)	0.01	5	4.9	0	-2	62.1
0008 CUP Tailing	0.04	5	4.9	0	-1	178.3
0009 MUP Oversize (>12 mm) pH 2.9						
0010 WCP Oversize (<12 > 2mm) pH 2.9						
0011 WCP Sand Rejects pH 2.9						
0012 WCP Tails (slimes) pH 2.9						
0013 CUP Tailings pH 2.9						
0014 Magnetic Concentrate 1M HCl						
0015 Non-magnetic concentrate 1M HCl						
0016 Para-magnetic concentrate 1M HCl						
CHECKS						
0001 MUP Oversize (>12mm)	X					74.2
0002 MUP Oversize (>12mm)		5	4.8	0	-2	
STANDARDS						
0001 CCV-1-B-500						
0002 ICP-AM-MISA6						
0003 CRM-TMDW-500						
0004 GWS-6						
0005 ANC-6						
0006 NAG-6		95	2.4	13		
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699	X					7.5
0010 OREAS 20a	2.62					18.6
BLANKS						
0001 Control Blank	X					0.1
0002 Control Blank		10	4.7	0	0	

The results provided are not intended for commercial settlement purposes

ELEMENTS	Nb	Nd	Ni	OH	P	P2O5
UNITS	ug/l	ppm	ug/l	mgCaCO3/L	mg/l	%
DETECTION LIMIT	0.05	0.1	1	1	0.05	0.01
DIGEST	ASLP/	FB6/	ASLP/	ASLP/	ASLP/	FB6/
ANALYTICAL FINISH	MS	MS	MS	VOL	OE	OE
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	X	378.3	X	X	X	0.17
0002 Non-Magnetic Concentrate - Zircon	X	1108.5	X	X	X	0.63
0003 Paramagnetic Concentrate	X	2259.7	X	X	X	0.93
0004 MUP Oversize (>12mm)	X	85.7	X	X	X	0.12
0005 WCP Oversize (<12 - >2mm)	X	104.2	X	X	X	0.12
0006 WCP Sand Reject	X	397.7	X	X	X	0.18
0007 WCP Tails (Slimes)	X	176.3	X	X	X	0.23
0008 CUP Tailing	X	937.8	X	X	X	0.39
0009 MUP Oversize (>12 mm) pH 2.9	X		2		X	
0010 WCP Oversize (<12 > 2mm) pH 2.9	X		2		X	
0011 WCP Sand Rejects pH 2.9	X		1		X	
0012 WCP Tails (slimes) pH 2.9	X		5		X	
0013 CUP Tailings pH 2.9	X		1		X	
0014 Magnetic Concentrate 1M HCl	0.18		4		X	
0015 Non-magnetic concentrate 1M HCl	0.10		X		0.09	
0016 Para-magnetic concentrate 1M HCl	0.15		2		0.18	
CHECKS						
0001 MUP Oversize (>12mm)	X	84.9	X	X	X	0.10
0002 MUP Oversize (>12mm)						
STANDARDS						
0001 CCV-1-B-500					X	
0002 ICP-AM-MISA6					100.27	
0003 CRM-TMDW-500	X		60			
0004 GWS-6				X		
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699		18.8				0.09
0010 OREAS 20a		32.7				0.24
BLANKS						
0001 Control Blank	X	0.1	X	X	X	X
0002 Control Blank						

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ELEMENTS	Pb	pH	pH	pH Drop	Pr	Rb
UNITS	ug/l	NONE	NONE	NONE	ppm	ppm
DETECTION LIMIT	0.5	0.1	0.1	0.1	0.1	0.1
DIGEST	ASLP/	ASLP/	Ws5/	ANCx/	FB6/	FB6/
ANALYTICAL FINISH	MS	MTR	MTR	MTR	MS	MS
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	X	6.1			105.5	0.4
0002 Non-Magnetic Concentrate - Zircon	X	6.2			299.6	0.6
0003 Paramagnetic Concentrate	X	6.2			632.5	1.5
0004 MUP Oversize (>12mm)	0.6	5.7	5.7	4.7	25.1	1.8
0005 WCP Oversize (<12 - >2mm)	X	6.1	5.5	4.8	30.2	4.6
0006 WCP Sand Reject	X	6.3	6.5	4.5	114.7	1.5
0007 WCP Tails (Slimes)	X	6.0	6.0	4.9	57.1	7.2
0008 CUP Tailing	X	6.2	6.2	4.7	263.9	1.4
0009 MUP Oversize (>12 mm) pH 2.9	2.8					
0010 WCP Oversize (<12 > 2mm) pH 2.9	4.5					
0011 WCP Sand Rejects pH 2.9	1.6					
0012 WCP Tails (slimes) pH 2.9	1.1					
0013 CUP Tailings pH 2.9	1.9					
0014 Magnetic Concentrate 1M HCl	170.8					
0015 Non-magnetic concentrate 1M HCl	75.2					
0016 Para-magnetic concentrate 1M HCl	217.1					
CHECKS						
0001 MUP Oversize (>12mm)	X	5.4			24.2	2.1
0002 MUP Oversize (>12mm)			5.7	4.8		
STANDARDS						
0001 CCV-1-B-500						
0002 ICP-AM-MISA6						
0003 CRM-TMDW-500	42.4					
0004 GWS-6		9.1				
0005 ANC-6						
0006 NAG-6						
0007 GWS-6			9.1			
0008 OREAS 279						
0009 AMIS0699					3.4	0.5
0010 OREAS 20a					9.0	203.8
BLANKS						
0001 Control Blank	X	5.9			X	X
0002 Control Blank			6.3			

The results provided are not intended for commercial settlement purposes

ELEMENTS	Rb	S	S	SO4	Sb	Sb
UNITS	ug/l	%	mg/l	ppm	ppm	ug/l
DETECTION LIMIT	0.02	0.01	0.1	0.3	0.5	0.01
DIGEST	ASLP/		ASLP/	ASLP/	FB6/	ASLP/
ANALYTICAL FINISH	MS	/CSA	OE	OE	MS	MS
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	0.25		0.2	0.6	2.1	0.01
0002 Non-Magnetic Concentrate - Zircon	0.18		0.1	0.4	3.5	X
0003 Paramagnetic Concentrate	0.19		0.1	0.4	2.3	X
0004 MUP Oversize (>12mm)	0.11	X	0.2	0.5	0.6	X
0005 WCP Oversize (<12 - >2mm)	0.36	X	X	X	0.9	0.01
0006 WCP Sand Reject	0.17	X	0.1	0.4	0.7	X
0007 WCP Tails (Slimes)	0.26	X	0.7	2.0	0.8	0.01
0008 CUP Tailing	0.14	X	0.1	0.4	1.2	0.02
0009 MUP Oversize (>12 mm) pH 2.9	0.48		X	X		X
0010 WCP Oversize (<12 > 2mm) pH 2.9	2.08		X	X		X
0011 WCP Sand Rejects pH 2.9	0.42		X	X		X
0012 WCP Tails (slimes) pH 2.9	1.56		X	X		0.01
0013 CUP Tailings pH 2.9	0.37		X	X		0.17
0014 Magnetic Concentrate 1M HCl	0.55		0.1	0.4		0.71
0015 Non-magnetic concentrate 1M HCl	0.44		0.1	0.3		0.40
0016 Para-magnetic concentrate 1M HCl	2.20		0.1	0.4		0.26
CHECKS						
0001 MUP Oversize (>12mm)	0.11		0.2	0.5	0.5	0.02
0002 MUP Oversize (>12mm)		X				
STANDARDS						
0001 CCV-1-B-500			500.7	1499.9		
0002 ICP-AM-MISA6			0.3	1.0		
0003 CRM-TMDW-500	10.27					10.77
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279		1.27				
0009 AMIS0699					X	
0010 OREAS 20a					0.6	
BLANKS						
0001 Control Blank	X		X	X	X	0.01
0002 Control Blank		X				

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ELEMENTS	Sc	Sc	Se	SiO2	Sm	Sn
UNITS	ppm	mg/l	ug/l	%	ppm	ppm
DETECTION LIMIT	10	0.01	0.5	0.01	0.1	1
DIGEST	FB6/	ASLP/	ASLP/	FB6/	FB6/	FB6/
ANALYTICAL FINISH	OE	OE	MS	OE	MS	MS
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	55	X	X	3.67	71.5	25
0002 Non-Magnetic Concentrate - Zircon	355	X	X	30.32	240.3	84
0003 Paramagnetic Concentrate	129	X	X	26.07	390.9	46
0004 MUP Oversize (>12mm)	18	X	X	69.22	17.4	10
0005 WCP Oversize (<12 - >2mm)	18	X	X	52.63	18.3	5
0006 WCP Sand Reject	21	X	X	82.34	69.0	7
0007 WCP Tails (Slimes)	22	X	X	41.93	28.1	8
0008 CUP Tailing	29	X	X	69.45	153.8	14
0009 MUP Oversize (>12 mm) pH 2.9		X	X			
0010 WCP Oversize (<12 > 2mm) pH 2.9		X	X			
0011 WCP Sand Rejects pH 2.9		X	X			
0012 WCP Tails (slimes) pH 2.9		X	X			
0013 CUP Tailings pH 2.9		X	X			
0014 Magnetic Concentrate 1M HCl		X	0.6			
0015 Non-magnetic concentrate 1M HCl		0.03	0.6			
0016 Para-magnetic concentrate 1M HCl		0.01	0.5			
CHECKS						
0001 MUP Oversize (>12mm)	19	X	X	69.72	15.4	5
0002 MUP Oversize (>12mm)						
STANDARDS						
0001 CCV-1-B-500		X				
0002 ICP-AM-MISA6		X				
0003 CRM-TMDW-500			11.7			
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699	173			31.82	12.7	1
0010 OREAS 20a	12			63.53	6.1	4
BLANKS						
0001 Control Blank	X	X	X	X	X	X
0002 Control Blank						

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ELEMENTS	Sn	Sr	Sr	Ta	Ta	Tb
UNITS	ug/l	ppm	ug/l	ppm	ug/l	ppm
DETECTION LIMIT	0.1	0.2	0.02	0.1	0.001	0.1
DIGEST	ASLP/	FB6/	ASLP/	FB6/	ASLP/	FB6/
ANALYTICAL FINISH	MS	MS	MS	MS	MS	MS
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	X	8.3	0.09	39.0	X	11.0
0002 Non-Magnetic Concentrate - Zircon	X	44.8	0.60	41.4	X	38.1
0003 Paramagnetic Concentrate	X	26.5	0.04	43.0	X	39.1
0004 MUP Oversize (>12mm)	X	12.4	0.28	6.0	X	2.5
0005 WCP Oversize (<12 - >2mm)	X	21.1	1.55	5.6	X	2.5
0006 WCP Sand Reject	X	10.2	0.02	7.4	X	6.7
0007 WCP Tails (Slimes)	X	35.9	0.25	5.3	X	3.2
0008 CUP Tailing	X	22.3	0.22	15.6	X	14.7
0009 MUP Oversize (>12 mm) pH 2.9	X		4.28		X	
0010 WCP Oversize (<12 > 2mm) pH 2.9	X		38.36		X	
0011 WCP Sand Rejects pH 2.9	X		2.95		0.002	
0012 WCP Tails (slimes) pH 2.9	X		32.35		X	
0013 CUP Tailings pH 2.9	X		4.65		X	
0014 Magnetic Concentrate 1M HCl	1.9		6.86		0.005	
0015 Non-magnetic concentrate 1M HCl	1.0		17.39		0.005	
0016 Para-magnetic concentrate 1M HCl	1.5		32.31		0.004	
CHECKS						
0001 MUP Oversize (>12mm)	X	13.3	0.10	5.6	X	2.4
0002 MUP Oversize (>12mm)						
STANDARDS						
0001 CCV-1-B-500						
0002 ICP-AM-MISA6						
0003 CRM-TMDW-500	X		266.40		0.013	
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699		3.1		2.3		9.4
0010 OREAS 20a		281.3		1.5		0.9
BLANKS						
0001 Control Blank	X	X	X	X	X	X
0002 Control Blank						

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ELEMENTS	Te	Th	Th	Ti	TiO2	Tl
UNITS	ug/l	ppm	ug/l	mg/l	%	ug/l
DETECTION LIMIT	0.1	0.1	0.005	0.01	0.01	0.01
DIGEST	ASLP/	FB6/	ASLP/	ASLP/	FB6/	ASLP/
ANALYTICAL FINISH	MS	MS	MS	OE	OE	MS
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	X	347.1	X	X	40.80	X
0002 Non-Magnetic Concentrate - Zircon	X	1035.4	X	X	19.06	X
0003 Paramagnetic Concentrate	X	1617.3	0.009	X	25.92	X
0004 MUP Oversize (>12mm)	X	87.0	X	X	5.00	X
0005 WCP Oversize (<12 - >2mm)	X	118.5	X	X	4.55	X
0006 WCP Sand Reject	X	286.1	X	X	4.95	X
0007 WCP Tails (Slimes)	X	197.0	X	X	3.43	X
0008 CUP Tailing	X	646.4	0.008	X	9.09	X
0009 MUP Oversize (>12 mm) pH 2.9	X		1.894	X		X
0010 WCP Oversize (<12 > 2mm) pH 2.9	X		2.897	X		0.01
0011 WCP Sand Rejects pH 2.9	X		0.678	X		X
0012 WCP Tails (slimes) pH 2.9	X		0.201	X		X
0013 CUP Tailings pH 2.9	X		1.904	X		X
0014 Magnetic Concentrate 1M HCl	X		678.195	0.50		0.01
0015 Non-magnetic concentrate 1M HCl	X		596.522	0.23		0.01
0016 Para-magnetic concentrate 1M HCl	X		1025.823	0.42		0.01
CHECKS						
0001 MUP Oversize (>12mm)	X	84.9	X	X	5.02	X
0002 MUP Oversize (>12mm)						
STANDARDS						
0001 CCV-1-B-500				X		
0002 ICP-AM-MISA6				X		
0003 CRM-TMDW-500	3.0		X			10.63
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699		128.6			0.18	
0010 OREAS 20a		20.5			0.84	
BLANKS						
0001 Control Blank	X	X	X	X	X	X
0002 Control Blank						

The results provided are not intended for commercial settlement purposes

ELEMENTS	Tm	TotAlk	U	U	V	V
UNITS	ppm	mgCaCO3/L	ppm	ug/l	ppm	mg/l
DETECTION LIMIT	0.1	5	0.1	0.005	10	0.01
DIGEST	FB6/		FB6/	ASLP/	FB6/	ASLP/
ANALYTICAL FINISH	MS	/CALC	MS	MS	OE	OE
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	7.6	X	30.7	X	940	X
0002 Non-Magnetic Concentrate - Zircon	35.5	X	290.4	0.005	393	X
0003 Paramagnetic Concentrate	16.8	X	150.5	X	795	X
0004 MUP Oversize (>12mm)	1.4	X	10.7	X	461	X
0005 WCP Oversize (<12 - >2mm)	1.4	X	13.5	X	802	X
0006 WCP Sand Reject	2.8	X	26.1	X	209	X
0007 WCP Tails (Slimes)	1.5	X	15.2	X	910	X
0008 CUP Tailing	4.5	X	51.5	X	291	X
0009 MUP Oversize (>12 mm) pH 2.9				3.360		X
0010 WCP Oversize (<12 > 2mm) pH 2.9				5.235		X
0011 WCP Sand Rejects pH 2.9				1.133		X
0012 WCP Tails (slimes) pH 2.9				8.800		X
0013 CUP Tailings pH 2.9				3.492		X
0014 Magnetic Concentrate 1M HCl				11.130		1.78
0015 Non-magnetic concentrate 1M HCl				58.766		0.54
0016 Para-magnetic concentrate 1M HCl				27.169		2.29
CHECKS						
0001 MUP Oversize (>12mm)	1.6		10.4	X	458	X
0002 MUP Oversize (>12mm)						
STANDARDS						
0001 CCV-1-B-500						X
0002 ICP-AM-MISA6						99.04
0003 CRM-TMDW-500				10.689		
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699	25.9		283.9		X	
0010 OREAS 20a	0.3		6.4		109	
BLANKS						
0001 Control Blank	X		X	X	X	X
0002 Control Blank						

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ELEMENTS	W	W	WTTOT	Y	Y	Yb
UNITS	ppm	ug/l	g	ppm	ug/l	ppm
DETECTION LIMIT	1	0.02	0.01	0.5	0.005	0.1
DIGEST	FB6/	ASLP/		FB6/	ASLP/	FB6/
ANALYTICAL FINISH	MS	MS	WT01	MS	MS	MS
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	9	X	209.80	501.3	X	53.4
0002 Non-Magnetic Concentrate - Zircon	54	X	221.70	1545.7	X	295.8
0003 Paramagnetic Concentrate	27	X	220.90	1057.3	X	121.3
0004 MUP Oversize (>12mm)	5	X		82.9	X	12.2
0005 WCP Oversize (<12 - >2mm)	6	X	1593.70	89.6	X	13.1
0006 WCP Sand Reject	9	X	225.80	172.6	X	18.5
0007 WCP Tails (Slimes)	5	X	174.10	86.4	X	11.1
0008 CUP Tailing	10	X	190.70	341.7	X	34.7
0009 MUP Oversize (>12 mm) pH 2.9		X			8.378	
0010 WCP Oversize (<12 > 2mm) pH 2.9		X			5.363	
0011 WCP Sand Rejects pH 2.9		X			1.884	
0012 WCP Tails (slimes) pH 2.9		X			2.828	
0013 CUP Tailings pH 2.9		0.25			5.799	
0014 Magnetic Concentrate 1M HCl		X			29.852	
0015 Non-magnetic concentrate 1M HCl		X			128.398	
0016 Para-magnetic concentrate 1M HCl		X			80.908	
CHECKS						
0001 MUP Oversize (>12mm)	4	X		85.4	0.045	11.9
0002 MUP Oversize (>12mm)						
STANDARDS						
0001 CCV-1-B-500						
0002 ICP-AM-MISA6						
0003 CRM-TMDW-500		X			X	
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699	1			898.0		227.4
0010 OREAS 20a	4			28.2		3.4
BLANKS						
0001 Control Blank	X	X		X	X	0.2
0002 Control Blank						

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ELEMENTS	Zn	Zr
UNITS	ug/l	ppm
DETECTION LIMIT	10	1
DIGEST	ASLP/	FB6/
ANALYTICAL FINISH	MS	MS
SAMPLE NUMBERS		
0001 Magnetic Concentrate - Ilmenite	X	7022
0002 Non-Magnetic Concentrate - Zircon	X	23.92%
0003 Paramagnetic Concentrate	X	5.08%
0004 MUP Oversize (>12mm)	X	5256
0005 WCP Oversize (<12 - >2mm)	X	5951
0006 WCP Sand Reject	X	5932
0007 WCP Tails (Slimes)	X	5280
0008 CUP Tailing	X	1.10%
0009 MUP Oversize (>12 mm) pH 2.9	11	
0010 WCP Oversize (<12 > 2mm) pH 2.9	12	
0011 WCP Sand Rejects pH 2.9	X	
0012 WCP Tails (slimes) pH 2.9	32	
0013 CUP Tailings pH 2.9	12	
0014 Magnetic Concentrate 1M HCl	12	
0015 Non-magnetic concentrate 1M HCl	X	
0016 Para-magnetic concentrate 1M HCl	12	

CHECKS		
0001 MUP Oversize (>12mm)	X	5380
0002 MUP Oversize (>12mm)		

STANDARDS		
0001 CCV-1-B-500		
0002 ICP-AM-MISA6		
0003 CRM-TMDW-500	75	
0004 GWS-6		
0005 ANC-6		
0006 NAG-6		
0007 GWS-6		
0008 OREAS 279		
0009 AMIS0699		46.80%
0010 OREAS 20a		487

BLANKS		
0001 Control Blank	X	1
0002 Control Blank		

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METHOD CODE DESCRIPTION

Method Code Date Tested Package	Analysing Laboratory NATA Laboratory Accreditation	NATA Scope of Accreditation
/CALC **23/10/24 12:53**	Intertek Genalysis Perth **3244 3237** No digestion or other pre-treatment undertaken. Results Determined by calculation from other reported data.	*
/CALC **23/10/24 12:53** **ASLP/VOL09**	Intertek Genalysis Perth **3244 3237** No digestion or other pre-treatment undertaken. Results Determined by calculation from other reported data.	*
/CSA **30/10/24 13:52** **ARD01**	Intertek Genalysis Perth **3244 3237** Induction Furnace Analysed by Infrared Spectrometry	**ENV_W061(Per), MPL_W161(Adl)**
ANCx/MTR **18/10/24 07:26** **ARD01**	Intertek Genalysis Perth **3244 3237** Acid Neutralizing Capacity Digestion Procedure. Analysed with Electronic Meter Measurement	**ENV_W035**
ANCx/QUAL **18/10/24 07:26** **ARD01**	Intertek Genalysis Perth **3244 3237** Acid Neutralizing Capacity Digestion Procedure. Analysed by Qualitative Inspection	**ENV_W035**
ANCx/VOL **18/10/24 07:26** **ARD01**	Intertek Genalysis Perth **3244 3237** Acid Neutralizing Capacity Digestion Procedure. Analysed by Volumetric Technique.	**ENV_W035**
ASLP/COL **30/10/24 13:52** **ASLP/COL01**	Intertek Genalysis Perth **3244 3237** AS4439.3-1997: Australian Standard Leachates Protocol for Wastes, Sediments & Contaminated Soils. Analysed by UV-Visible Spectrometry.	**ENV_W037**
ASLP/MS **30/10/24 13:54** **ASLP/MS**	Intertek Genalysis Perth **3244 3237** AS4439.3-1997: Australian Standard Leachates Protocol for Wastes, Sediments & Contaminated Soils. Analysed by Inductively Coupled Plasma Mass Spectrometry.	**ENV_W037, MS_IM_001**

METHOD CODE DESCRIPTION

Method Code Date Tested Package	Analysing Laboratory NATA Laboratory Accreditation	NATA Scope of Accreditation
ASLP/MTR **30/10/24 13:52** **ASLP/MTR**	Intertek Genalysis Perth **3244 3237** AS4439.3-1997: Australian Standard Leachates Protocol for Wastes, Sediments & Contaminated Soils. Analysed with Electronic Meter Measurement	**ENV_W037**
ASLP/OE **30/10/24 12:35**	Intertek Genalysis Perth **3244 3237** AS4439.3-1997: Australian Standard Leachates Protocol for Wastes, Sediments & Contaminated Soils. Analysed by Inductively Coupled Plasma Optical (Atomic) Emission Spectrometry.	**ENV_W037, ICP_IM_001**
ASLP/OE **30/10/24 12:35** **ASLP/OE**	Intertek Genalysis Perth **3244 3237** AS4439.3-1997: Australian Standard Leachates Protocol for Wastes, Sediments & Contaminated Soils. Analysed by Inductively Coupled Plasma Optical (Atomic) Emission Spectrometry.	**ENV_W037, ICP_IM_001**
ASLP/SIE **24/10/24 10:42** **ASLP/SIE01**	Intertek Genalysis Perth **3244 3237** AS4439.3-1997: Australian Standard Leachates Protocol for Wastes, Sediments & Contaminated Soils. Analysed by Specific Ion Electrode.	**ENV_W037**
ASLP/VOL **30/10/24 13:52** **ASLP/VOL09**	Intertek Genalysis Perth **3244 3237** AS4439.3-1997: Australian Standard Leachates Protocol for Wastes, Sediments & Contaminated Soils. Analysed by Volumetric Technique.	**ENV_W037**
FB6/MS **18/10/24 11:24** **FB6/OM45**	Intertek Genalysis Perth **3244 3237** Lithium metaborate/tetraborate fusion Analysed by Inductively Coupled Plasma Mass Spectrometry.	**MPL_W057, MS_IM_001[Per], *[Adl]**
FB6/OE **18/10/24 11:24** **FB6/OM45**	Intertek Genalysis Perth **3244 3237** Lithium metaborate/tetraborate fusion Analysed by Inductively Coupled Plasma Optical (Atomic) Emission Spectrometry.	**MPL_W057, ICP_IM_001[Per], *[Adl]**
NAGx/MTR **17/10/24 19:06** **ARD01**	Intertek Genalysis Perth **3244 3237** Net Acid Generation Extraction of samples with H2O2 Analysed with Electronic Meter Measurement	**ENV_W036**

METHOD CODE DESCRIPTION

Method Code Date Tested Package	Analysing Laboratory NATA Laboratory Accreditation	NATA Scope of Accreditation
NAGx/VOL	Intertek Genalysis Perth	**ENV_W036**
17/10/24 19:06	**3244 3237**	
ARD01	Net Acid Generation Extraction of samples with H2O2 Analysed by Volumetric Technique.	
Ws5/MTR	Intertek Genalysis Perth	*
30/10/24 13:52	**3244 3237**	
ARD01	Water Extraction using a sample:water ratio of 1:5. Analysed with Electronic Meter Measurement	
WT01	Intertek Genalysis Perth	*
11/10/24 08:49	**3244 3237**	
WT01	Reporting weights of samples	

* Denotes not on Scope of Accreditation

Appendix F

Earthworks Specification

REPORT REF	P24-77-PR-09/ES	29 OCTOBER 2025

In-pit Tailings Storage Facility Earthworks Specification Kimberley Mineral Sands Thunderbird Mineral Sands Project

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Report

Title:	In-pit Tailings Storage Facility Earthworks Specification
File:	P24-77-PR-09/ES
[redacted]	
Client:	Kimberley Mineral Sands Pty Ltd
[redacted]	
Synopsis:	This document presents the Earthworks Specification for the In-pit Tailings Storage Facility at the Kimberley Mineral Sands Thunderbird Mineral Sands Project in Western Australia.

Revision

Date	Revision	Purpose	[redacted]
28 FEB 2025	DRAFT	ISSUED FOR REVIEW AND COMMENT	
4 MAR 2025	REV A	ISSUED FOR REVIEW AND COMMENT	
15 SEP 2025	REV 0	ISSUED FOR USE	
29 OCT 2025	REV 1	ISSUED FOR USE	
Recipients are responsible for eliminating all superseded documents in their possession			

Distribution

Date	Revision	Approved	Recipient(s)	[redacted]
28 FEB 2025	DRAFT	MH	KIMBERLEY MINERAL SANDS	
4 MAR 2025	REV A	MH	KIMBERLEY MINERAL SANDS	
15 SEP 2025	REV 0	MH	KIMBERLEY MINERAL SANDS	
29 OCT 2025	REV 1	MH	KIMBERLEY MINERAL SANDS	
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Terminology and Abbreviations

The following terminology and abbreviations have been used in this document:

AS	Australian Standard
ASTM	American Society for Testing and Materials
BoQ	Bill of Quantities
CMS	Construction Methodology Statement
CQA	Construction Quality Assurance
HDPE	High-Density Polyethylene
IFC	Issued for Construction
IPTSF	In-pit Tailings Storage Facility
KMS	Kimberley Mineral Sands
NATA	National Association of Testing Authorities
OMC	Optimum Moisture Content
REC	Resource Engineering Consultants
RL	Reduced Level
SMDD	Standard Maximum Dry Density
t/m³	Tonnes per cubic metre
TMSP	Thunderbird Mineral Sands Project

The following soil classification terminology has been used in this document:

G	Gravel
S	Sand
M	Silt
C	Clay
O	Organic
W	Well Graded
P	Poorly Graded
L	Low Plasticity
I	Medium Plasticity
H	High Plasticity

1. Introduction

1.1 General

This Earthworks Specification prescribes the requirements for the earthworks construction to achieve the site-finished grades indicated on the Design Drawings for the In-pit Tailings Storage Facility (IPTSF) at the Thunderbird Mineral Sands Project (TMSP), located approximately 100 km Northeast of Broome in Western Australia. Also prescribed are the requirements the removal, replacement and disposal of unsuitable materials, the disposal of surplus materials, and the furnishing, placement and compaction of embankment fill materials.

This Earthworks Specification comprises the technical aspects of the civil works requirement to complete the Works, the Contractor shall coordinate work prescribed by this document with other related works to be performed. Any discrepancies between this specification, the Drawings and the Bill of Quantities are to be queried before work commencement.

1.2 Definitions

Table 1 presents the definitions used in this document.

Table 1: Definitions

Term / Name	Definition
Company / KMS	Kimberley Mineral Sands Pty Ltd or an authorised representative (Company Representative).
Company Representative	Appointed representative of the Company responsible for overseeing the Contract(s) between the Company and the Contractor(s).
Contractor(s)	Party awarded the Contact to complete the Works described in this Specification.
Designer	Resource Engineering Consultants Pty Ltd (REC).
Drawings	Detailed IFC Design Drawings issued by the Company to the Contractor.
Hold Points	An identified point in the construction sequence where the Contractor(s) must halt work and provide required information to the Superintendent. The Contractor(s) must not resume work until the Hold Point is released, in writing, by the Superintendent.
Inspection Point	An identified point in the construction sequence where the Contactor(s) is required to provide written notification in advance of commencing work on identified items in order to allow the opportunity for the Superintendent to directly inspect the work, the notification must be provided when indicated and in no case less than 24 hours in advance of commencing the work.
Optimum Moisture Content (OMC)	The moisture content at which the Standard Maximum Dry Density is achieved.
Quality Assurance Inspector (QAI)	An independent third-party entity engaged by the Company to undertake CQA audits of the Works. The CQA audits are to be undertaken in accordance with the Level 2 inspection as per AS3798-2007. The QAI shall be engaged by the Company and maintain a part-time (fortnightly visits) presence on site for the duration of the Works and shall be independent of the Contractor.
Earthworks Specification / Specification	This document and all documents relevant in fulfilling the requirements outlined in this document.
Site	The location of the TMSP IPTSF.
Standard Maximum Dry Density (SMDD)	The maximum dry density achieved as per AS 1289.5.1.1 when testing a sample of material representative of that to be compacted in the field.
Work / Works	The activities specified within this document as the responsibility of the Contractor(s).

1.3 References

1.3.1 General

The publications listed below form part of this Specification. Each publication shall be the latest revision and addendum in effect on the date this Specification is issued for construction unless noted otherwise. Except as modified by the requirements specified

herein or the details of the Drawings, work included in this Specification shall conform to the applicable provisions of these publications.

1.3.2 Statutory Regulations

The statutory authorities having jurisdiction over the mine site and the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) and the Department of Water and Environmental Regulation (DWER).

The design and manufacture of all equipment shall comply with all relevant government acts, by-laws, and regulations, both state and federal, including but not limited to:

- *Occupational Safety and Health Act*, 1984
- *Occupational Safety and Health Regulations*, 1988
- *Mines Safety and Inspection Act*, 1994
- *Mines Safety and Inspection Regulations*, 1995

1.3.3 Applicable Codes / Standards

The works shall be carried out to comply with the latest revision of the Drawings, Codes and Standards specified or to the appropriate Australian Standards, or to other recognised International Standards approved by the Company or the Engineer where there is no comparable Australian Standard.

The applicable Australian Standards relevant to the work covered by this Specification include but are not limited to:

- AS 1181 – Method of measure of civil engineering works and associated building works
- AS 1289 – Methods of testing soils for engineering purposes
- AS 1470 – Health and safety at work – principles and practices
- AS 1726 – Geotechnical site investigations
- AS 2124 – General conditions of contract
- AS 3798 - Guidelines on earthworks for commercial and residential developments

2. Surveying of Works

2.1 General

a) All testing and survey of the Site during the construction phase must be performed in accordance with this Specification.

b) The Contractor must be solely responsible for the setting out of all the Works.

c) The Contractor must provide a baseline survey pick up of the existing (pre-works) surfaces to the Company Representative for review and approval prior to commencement of the Works **(Hold Point)**.

d) The Contractor must be responsible for all survey requirements to perform the Works. This must be carried out by a full-time on-site suitability qualified surveyor supplied by the Contractor and approved by the Company Representative.

e) The Contractor must set-out the Works and receive Company Representative approval prior to the Works commencing **(Hold Point)**.

f) The Contractor must provide accurate survey data of all material test locations within the Works.

g) The Contractor must maintain survey of the earthworks and other infrastructure construction throughout the Works including all interfaces between various material types to ensure that the Works are undertaken in accordance with the Construction Drawings and produce accurate as-constructed records.

h) The Contractor must maintain survey of the material within approved borrow area to manage borrow material volumes.

2.2 Setting-out Survey Control

a) At the discretion of the Company Representative, an electronic digital terrain model (DTM) of the design will be issued to the Contractor(s) for setting out purposes and to verify the quantities forming the Contract. The DTM as issued is to be agreed by the Contractor(s), after which the agreed DTM will form the basis of the verification of the progress payments and the final payment. Any discrepancies found in the DTM by the Contractor(s) are to be reported to the Company Representative prior to execution of the Contract.

b) All survey shall be carried out in the Geocentric Datum of Australia 1994 (GDA94) system.

c) Survey benchmarks will be provided by the Company. Only these benchmarks are to be used by the Contractor(s) for the setting out of the Works under the Contract. Prior to the setting out of the Works, the Contractor(s) shall verify the survey control points and notify the Company Representative if discrepancies exist between the coordinates provided and those surveyed.

d) The Contractor(s) may have to establish additional stations to adequately and efficiently set out and monitor the Works. The establishment of additional control points shall be completed to a standard consistent with the rest of the site and general surveying best practice. During or at the completion of the Works, the Company Representative may request the additional control point information from the Contractor(s). At the end of the Works, the temporary survey control points are to be removed, excluding those as required by the Company Representative to remain.

e) The Contractor(s) shall be responsible for setting out and staking all Work, including baselines and levels, using the survey benchmarks established by the Company Representative. Survey measurement of the completed Works shall be required to support progress payment claims, and shall be submitted to the Company Representative for verification.

f) The Contractor(s) shall undertake monthly verification of survey reference beacons.

2.3 Earthwork Tolerances

a) Dimensions shall not be less nor the slopes steeper than those specified. Dimensional tolerances shall be the following, unless specifically otherwise noted:

- Embankment lift level tolerance: -0.3 m to +0.3 m
- Embankment crest finishing level tolerance: 0 m to +1 m.
- Horizontal tolerance ±1 m

- Gradient tolerance:
  - Cross-fall gradient ±0.5%
  - Batter gradients: 1V:2.5H = 40% ±3%, 1V:2H = 50% ±3.5%.

b) The Contractor shall provide and have available at all times during the Contract working hours the necessary staff and equipment to ensure accurate setting out of the Works is maintained continuously throughout construction. Should any errors in setting out of the Works occur, such errors shall be corrected in a timely manner, and any necessary adjustments to previously placed fill materials shall be carried out to the satisfaction of the Company Representative at no additional cost to the Company.

3. Materials

3.1 General

The Contractor(s) shall ensure that the materials supplied/sourced meet the requirements of this Specification and shall demonstrate compliance to the satisfaction of the Company Representative.

3.2 Borrow Areas

a) Fill materials shall be sourced from dedicated borrow areas supplied by the Company and approved by the Company Representative.

b) All the Contractor borrow areas nominated under the Contract shall be cleared, grubbed, and stripped by the Contractor at commencement of the Works (where applicable).

c) The Contractor shall take all necessary steps to ensure that fill from borrow areas does not contaminate topsoil stockpiles (where applicable). Should it become necessary to relocate an existing topsoil stockpile, the Company Representative shall be notified and approval granted prior to relocation of the topsoil stockpile.

d) Boulders or large rocks (non-conforming to the grading requirements of Zone A and Zone B Material) encountered within borrow pit areas should not be used in the Works unless otherwise directed by the Company Representative. Boulders and large rocks may be required to be removed from borrow pit areas and stockpiled at the request of the Company Representative. Surveyed volume of boulders or large rocks to be provided to the Company on a monthly basis.

e) Locations of any additional ramps or access roads required to access borrow areas or stockpiles shall be determined by the Contractor and approved by the Company Representative.

f) The Contractor shall avoid the creation of temporary slopes in borrow areas and stockpiles that may be unstable. All trafficking slopes within the borrow areas and stockpiles shall be at 10H:1V grades (where applicable).

g) The Contractor shall maintain all borrow areas for the duration of the Works, including the implementation of measures necessary to control dust, stormwater, and groundwater inflow (where applicable).

h) The Contractor shall maintain all borrow pit access roads and haul circuits for the duration of the works. The Contractor shall provide the Company Representative with weekly updates to the site Traffic Management Plan, including modifications to borrow pit access roads (where applicable).

i) Where required, the Contractor shall establish lighting required for night shift activities, including within borrow pit locations.

3.3 Unsuitable Materials

a) The Company Representative may instruct the Contractor to remove unsuitable material from the Works and stockpile in an area approved by the Company Representative.

b) Unsuitable material includes but is not limited to:

   i) vegetation and materials resulting from clearing, grubbing, and stripping activities and all perishable matter

   ii) organic soils

   iii) soft ground

   iv) soils and materials subject to chemical change, due to oxidation or due to attack by any potential aggressive fluids and gases or that, by virtue of their chemical composition, may have a deleterious effect on structures or components forming part of the permanent work

   v) soils containing debris or other contaminants deemed unsuitable by the Company Representative.

c) Fill materials used in the Works shall not contain any unsuitable material.

3.4 Zone A – Overburden Material

Zone A – overburden material shall be won from the excavation Works within the nominated pit area as approved by the Company Representative. Zone A material shall be loaded, hauled, and placed for the direct construction of the IPTSF. Excess Zone A material shall be loaded, hauled, and placed at a stockpile appointed by the Company Representative. Zone A material may also be sourced from existing stockpiles of materials at the direction of the Company Representative.

Zone A material shall be free of unsuitable material, including topsoil, organic material and any other root matter or deleterious materials (as specified in Section 3.3).

Zone A material particles shall not exceed a nominal diameter of 500 mm unless otherwise approved by the Company Representative in writing.

Zone A may serve as a substitute for Zone B material at the approval of the Company Representative in consultation with the Designer.

3.5 Zone B – Oversize Material

Zone B – oversize material shall be won from the excavation Works within the nominated pit area as approved by the Company Representative. Zone B material shall be loaded, hauled, and placed for the direct construction of the IPTSF, excess Zone B material shall be loaded, hauled, washed, and placed at a stockpile appointed by the Company Representative. Zone B material may also be sourced from existing stockpiles of materials at the direction of the Company Representative.

Zone B material shall be free of unsuitable material, including topsoil, organic material and any other root matter or deleterious materials (as specified in Section 3.3).

Zone B material particles shall not exceed a nominal diameter of 500 mm unless otherwise approved by the Company Representative in writing.

At the approval of the Company Representative in consultation with the Designer, Zone A material is able to be substituted with Zone B material. The scale and proportion of the substituted sections are to be documented by the Contractor in the form of chainage and lifts.

3.6 Safety Bunds

All safety bunds shall be constructed and maintained as necessary on the crest of embankments and access ramps by the Contractor during construction at the expense of the Contractor. The Contractor shall form safety bunds using Zone A or Zone B material along the crest margin to the lines and levels indicated on the Drawings and in-line with TMSP standards.

The safety bunds shall be constructed with a minimum height of the greater of 600 mm or 50% of the diameter of the largest tyre of the equipment trafficking the applicable region, or higher as required to satisfy the Company's safety procedures for the Contractor's machinery operating at the applicable region. Temporary side slopes shall not be steeper in any location than 1V:1H.

4. Preliminary Works

4.1 General

a) The Contractor(s) shall construct, maintain, and rehabilitate, at its own expense any temporary access roads (including roads to and from borrow pit areas), haul roads, ramps or the like required for construction purposes (where applicable).

b) The Contractor(s) shall provide, maintain, and operate, at its own expense, any temporary drainage and/or pumping facilities required to dispose of water in order to keep the excavations dry and stable during the construction phase. Any reworking of materials affected by the lack of the above controls shall be at the Contractor's expense. Disposal of the water removed from the excavations will take place at the discretion of the Company Representative.

c) All excavations shall be to the lines and grades shown on the Drawings or to the satisfaction of the Company Representative. The Contractor(s) shall not excavate beyond the lines and grades shown on the Drawings without prior written approval of the Company Representative. After an excavation has been completed to the lines and grades as specified, the Contractor(s) shall notify the Company Representative giving a reasonable notice period, who will inspect the work. No excavation shall be backfilled or covered in any way until the Contractor(s) has obtained the written approval of the Company Representative. The Contractor(s) shall, at his own expense, uncover any excavation that has been covered without the prior inspection and approval of the Company Representative.

d) The Contractor(s) shall not damage any trees and flora adjacent to the area of the Works or as nominated by the Company Representative and in accordance with the Company's internal policies and procedures.

4.2 Clearing and Grubbing

a) Any clearing and stripping that the Contractor(s) elects to perform for its own purposes, such as for construction of temporary haul roads, equipment yard etc., shall be subject to the approval of the Company Representative and shall be performed at the Contractor's own expense (where applicable). At the end of the Contract, all such areas shall be reinstated and rehabilitated by the Contractor(s), at its own expense, to meet the Company's requirements and environmental obligations and to the satisfaction of the Company Representative.

b) Subsequent Works shall not commence until approval has been given by the Company Representative.

4.3 Embankment Base Preparation

a) It is anticipated that the embankment subgrade is sufficiently consolidated and competent due to pre-mined overburden loading. As such it is not expected that additional subgrade preparation is required to be undertaken. However, should soft ground or non-competent ground be encountered, note the location and extent of the non-competent ground and submit in the form of a TQ to the Company Representative and Designer for way forward.

5. Earthworks

5.1 Excavations

5.1.1 General

a) All excavations shall be to the minimum lines and grades shown on the Drawings or to the satisfaction of the Company Representative.

b) Excavation Works shall not commence in any zone prior to inspection and approval of the Contractor's survey markers in that zone by the Company Representative.

c) Care shall be undertaken to not damage existing buried infrastructure.

d) During the progress of the Work, the Company Representative may find it necessary or desirable to revise the lines and grades of any part of the excavations due to unfavourable soil conditions exposed by the excavations, or for any other reason. If such revision requires additional excavation to be made after the excavation of such part has already been completed to the lines and grades shown on the Drawings, additional excavation shall be carried out as specified herein. The cost of any revisions shall be deemed as a variation to the contract. This will include removal of rock and filling of resultant voids.

e) All necessary precautions shall be taken to preserve the material below and beyond the lines of all excavations in the soundest possible condition. Any damage done to the Work including the loosening of material or excavation beyond the required lines and grades, or the caving in of material near to the edge of an excavation, which is performed by the Contractor(s), shall be repaired by the Contractor(s). If such excavation should, in the opinion of the Company Representative, require backfilling, such backfilling shall be done to the satisfaction of the Company Representative with material similar to the fill to be placed against the excavated surface in accordance with this Specification, at the Contractor's expense.

f) Excavations shall include all operations necessary to excavate, irrespective of type and subsurface conditions including the selection of material as specified or otherwise directed, to dispose of all surplus excavated materials not required for embankment construction, to shape formation, drains and batters, all as specified herein or as otherwise to the satisfaction of the Company Representative.

5.1.2 Stability of Excavations

a) The sides of all excavations steeper than the angle of repose of the material shall be benched, battered or adequately supported by bracing or shoring, as necessary, to ensure against slides, cave-ins or danger to persons or structures. The cost of all bracing, shoring or treatment to excavations shall be included in the tendered amount for excavation. All slips of unstable masses of materials outside the limits of excavations and specified cut batters shall be rectified by the Contractor(s) at his expense.

b) Shoring and trench protection shall be constructed in accordance with the relevant statutory safety regulations. Where required or directed by the Company Representative, the Contractor(s) shall use benching techniques to ensure the stability of bulk excavations. Benches shall be sloped inwards and the inside edge of the bench shall be adequately drained.

5.1.3 Disposal of Excavated Materials

a) All suitable material from excavations to be used in the Work under the Contract shall be separated from unsuitable material and placed in the final position where it will be used, or else stockpiled separately in a place and manner that is acceptable to the Company Representative, until required.

b) The Contractor(s) shall dispose of all material that has to be excavated but is unsuitable for construction purpose in stockpiles at locations to the satisfaction of the Company Representative. The Contractor(s) shall spread in layers and traffic compact such material to the maximum extent practicable using this method by routing the haulage traffic over the area. All such disposal areas shall be kept neat and tidy.

c) Waste stockpiles shall be levelled, trimmed, and shaped to regular lines and grades to prevent the occurrence of ponding or concentrations of surface water runoff. Berms and drains shall be constructed by the Contractor(s) to direct surface water runoff to available natural drainage courses.

5.1.4 Classification of Excavated Material

a) "Common excavation" must include all overburden, shattered rock and other material which can be removed by any of the following methods:

- By hand.
- By scraper.
- By excavator, with competent operator, with an operating weight not less than 30 tonne and a rock bucket not less than 1 m^3 in capacity, at a rate of more than 40 BCM (Bank Cubic Metres) per hour.
- By track-type tractor, with competent operator, equivalent to a Caterpillar D9N in mass and power, ripping and bulldozing at a rate of more than 100 BCM per hour.
- "Hard rock excavation" must include all materials which cannot be removed by the methods described above for "Common excavation" and which normally require drilling and blasting.

b) If the Contractor considers that hard rock has been encountered during excavation, the Contractor must notify the Company Representative and await instructions before proceeding further with the excavation (**Hold Point**). In the event of a dispute as to the classification of a material, the decision of the Company Representative will be final.

c) If hard rock excavation is required as determined by the Company Representative, the Contractor must complete the excavation as agreed with the Company Representative, at a rate for hard rock excavation nominated in the Contract or at cost plus arrangement and operator hourly rate.

5.1.5 Excavation and Handling of Zone A and Zone B Material

a) Excavation of Zone A and Zone B Material from the borrow pit or stockpiles shall not commence prior to inspection and approval by the Company Representative.

b) The Contractor shall excavate Zone A and Zone B Material as directed by the Company Representative. The batter slopes of the borrow area and all stockpiles shall be maintained to the satisfaction of the Company Representative.

5.1.6 Embankment Subgrade Preparation

a) It is anticipated that the embankment subgrade is sufficiently consolidated and competent due to pre-mined overburden loading. As such it is not expected that additional subgrade preparation is required to be undertaken. However, should soft ground or non-competent ground be encountered, note the location and extent of the non-competent ground and submit in the form of a TQ to the Company Representative and Designer for way forward.

5.1.7 Soft Ground

a) Soft Ground shall not be removed without the written instruction of the Company Representative.

b) Soft Ground shall be removed within the limits specified by the Company Representative using appropriate equipment as agreed with the Company Representative beforehand.

c) Soft Ground shall be disposed of at a location nominated by the Company Representative.

d) The Soft Ground stockpile area shall be protected from erosion by suitable sloping and windrowing during construction, to the dimensions designated by the Company Representative.

e) Material designated "Soft Ground" will be replaced with Zone B Material and compacted in accordance with the requirements of this CMS.

5.2 Embankment and Decant Causeway Construction

5.2.1 Safety Berms and Bunds

a) All safety berms and bunds shall be constructed and maintained as necessary along the crest of the embankments by the Contractor(s) during construction, at the expense of the Contractor(s).

b) The safety berms and bunds will be constructed with Zone A or Zone B Material to a minimum height of higher between 0.6 m, as shown on the Drawings. Side slopes shall not be steeper than 1:1 (V:H). The height of safety bunds shall also be at least 50% of the diameter of the largest tyre of the equipment using access road (either during construction or the final intended user).

5.2.2 Placement of Zone A Material

a) Zone A Material shall be sourced as outlined in Section 3.4, Section 5.1.5 of this Specification. Fill shall not be sourced from locations that have not been approved by the Company Representative. It is the Contractor's responsibility to verify the material suitability as per this Specification.

b) Zone A Material shall be used as a substitute of Zone B material at discretion of the Company Representative.

c) Fill shall be placed in maximum 2.0 m loose lift thickness layers for the construction of the perimeter embankments to the lines and levels shown on the Drawings.

d) The fill material shall be traffic compacted.

e) Over-filling and trimming back the upstream and downstream faces to competent compacted material, to the satisfaction of the Company Representative, shall be included in the cost.

f) Compaction shall be as uniform as practicable over the entire fill layer surface and compaction equipment shall travel in a direction parallel to the embankment or road axis, except near existing slopes or other obstacles.

g) Any loose or oversized material that is trimmed from the embankment or collects at the base of the embankment shall be removed to a Company Representative approved dump site.

h) The fill shall not be significantly different in gradation from the surrounding material of the same zone.

i) Any material placed that does not meet the specified requirements or has been rejected by the Company Representative shall be removed and replaced with suitable material at no additional cost to the Company.

5.2.3 Placement of Zone B Material

a) Zone B Material shall be sourced as outlined in Section 3.5, Section 5.1.5 of this Specification. Fill shall not be sourced from locations that have not been approved by the Company Representative. It is the Contractor's responsibility to verify the material suitability as per this Specification.

b) Zone B Material shall be used for the construction of the upstream drainage face, blanket drain, upstream toe drain, and finger drains as outlined in IFC drawings.

c) Fill shall be placed in maximum 2.0 m loose lift thickness layers for the construction of the perimeter embankments to the lines and levels shown on the Drawings.

d) The fill material shall be traffic compacted.

e) Over-filling and trimming back the upstream and downstream faces to competent compacted material, to the satisfaction of the Company Representative, shall be included in the cost.

f) Compaction shall be as uniform as practicable over the entire fill layer surface and compaction equipment shall travel in a direction parallel to the embankment or road axis, except near existing slopes or other obstacles.

g) Any loose or oversized material that is trimmed from the embankment or collected at the base of the embankment shall be removed to a Company Representative approved dump site.

h) The fill shall be free from lenses, pockets or layers of material that are significantly different in gradation from the surrounding material of the same zone. Placed material that does not meet the specified gradation requirements shall be removed or otherwise reworked to produce material that does meet the Specification requirements.

i) The fill shall not be significantly different in gradation from the surrounding material of the same zone.

j) Any material placed that does not meet the specified requirements or has been rejected by the Company Representative shall be removed, and replaced with suitable material at no additional cost to the Company.

5.2.4 Construction of Access Ramps

a) Access ramps and roads to the pit area shall be undertaken by the Contractor and formed simultaneously with the construction of the Zone A and Zone B Material as appropriate, or as directed by the Company Representative. Access ramps shall not be steeper than 10:1 (H:V) and shall not have batter slopes steeper than 2:1 (H:V). Locations of access ramps are to be confirmed by the Company Representative on site.

5.2.5 Drying of Wet Material

a) If at any time the Company Representative considers the material is too wet, compaction operations may be ordered to cease until the material has dried out sufficiently.

b) Disc plough or deep ripping methods may be an effective measure to reduce the moisture content of wet material.

c) When drying is necessary, it shall be carried out to allow the full depth of the layer to dry uniformly.

d) Drying and re-compaction shall be carried out under favourable weather conditions.

e) Re-compaction is only to be carried out once the material is considered to be suitable by the Company Representative. Mixing and blending may be required.

6. Compaction Method and Testing

6.1 Compaction Requirements

The general compaction requirements for fill materials are shown in Table 2.

Table 2: General Compaction Requirements

Zone	Maximum Uncompacted Layer Thickness (mm)	Recommended Moisture Content Range	Minimum Compacted Dry Density (relative to SMDD)
Zone A	2.0 m	CMS	CMS
Zone B	2.0 m	CMS	CMS

a) A construction method shall be developed for the project during the first week of activities. The required drying time or addition of moisture to the borrow material will be identified and *in situ* density tests performed to identify the required number of compaction passes to achieve the compaction criteria.

b) The Contractor shall prepare a Construction Methodology Statement (CMS) for the placement of the Zone A Material. Preparation of the CMS shall constitute a **Hold Point**. No placement of material shall occur until the Company Representative has approved the CMS in writing. The Contractor shall allow three days for review of the CMS. The CMS shall be applicable for all construction, unless a significant change in borrow material quality is observed by the Contractor or the Company Representative, in which case a new compaction trial and CMS shall be prepared by the Contractor.

c) The Contractor shall prepare a Construction Methodology Statement (CMS) for the placement of Zone B Material. Preparation of the CMS shall constitute a **Hold Point**. No placement of material shall occur until the Company Representative has approved the CMS in writing. The Contractor shall allow three days for review of the CMS. The Contractor shall allow three days for review of the CMS. The CMS shall be applicable for all construction, unless a significant change in borrow material quality is observed by the Contractor or the Company Representative, in which case a new compaction trial and CMS shall be prepared by the Contractor.

d) The recommended water content range for Zone A and Zone B (as outlined by the CMS) is the range the Contractor should endeavour to achieve, to attain a minimum of the target densities. The Company Representative may require the Contractor to dry or moisture condition material within the recommended water content range.

e) Traffic compaction shall be as uniform as practicable over the entire lift surface and compaction equipment shall travel in a direction parallel to the embankment or road axis except near the abutments and other obstacles.

f) Methods of carrying out the fill placement and moisture conditioning shall be subject to approval by the Company Representative. Equipment suitability, method of working, rate of progress and quality of work shall be demonstrated during the initial stages of the work. In the event that the work performance is unsatisfactory, the Contractor shall immediately implement such changes as are required to ensure the proper completion of the work in accordance with the specification.

g) The Contractor shall provide survey pick up to the Company Representative after the completion of each lift.

h) The Contractor shall provide, and have available at all times during normal working hours, the necessary staff and equipment to ensure that proper and correct setting out of the Works is continually maintained during construction. Should any errors in setting out of the Works occur, such errors shall be corrected and any necessary adjustments to previously placed fill materials shall be made, to the satisfaction of the Company Representative, prior to further placement of fill materials. The cost of any corrective actions shall be borne by the Contractor.

6.2 Quality Control Testing

a) Visual inspections and photographs shall be carried out by the Contractor or as organised by the Company as agreed with the Company in the Service Agreement, in accordance with the CMS approved by the Company Representative and the Designer.

b) Survey pick-ups are to be undertaken at the centre, upstream, and downstream crest, at a minimum of one per lift and one per 100 m of placed material length.

c) Visual inspections and photographs shall be taken by the Contractor or entity approved by the Company per material placed as follows:

Table 3: Quality Control Requirements

Material Type	Maximum Uncompacted Layer
Zone A Material	Per every 2,500 m³ of loose material placed, with a minimum of one per each day of Works.
Zone B Material	Per every 2,500 m³ of loose material placed, with a minimum of one per each day of Works.

d) The Company Representative may, at his discretion, request that the Contractor undertake additional inspections and photographs to provide the Company Representative sufficient assurance that the Specification is being satisfied. The Company Representative may nominate the location of such inspections and photographs.

e) Inspections and photographs shall be taken within 24 hours of completion of compaction of the layer to be tested.

f) In the event that the visual inspection and/or photograph indicates that a section of the layer appears to have failed to meet the compaction requirements, as set out in Section 6.1, the material shall be re-compacted, as directed by the Company Representative, prior to re-inspection.

g) If a reworked section appears to have failed to meet the compaction requirements, the material shall continue to be reworked by the Contractor, to the satisfaction of the Company Representative, and re-inspected until the section meets the satisfaction of the Company Representative.

h) The Contractor shall provide the Company Representative with the photograph undertaken during the inspection, with details of the layer number and GPS coordinates prior to placement of a subsequent layer. No subsequent layer shall be placed until the preceding layer has met the compaction standards outlined in Section 6.1, to the satisfaction of the Company Representative (**Hold Point**).

i) The Contractor shall progressively submit to the Company Representative (and the QAI) inspection photographs, as the work is completed.

6.3 Quality Control Procedure and Documentation

6.3.1 General

a) The Contractor must maintain an effective and adequately documented system of Quality Management, planned, and developed, in conjunction with other supplier's functions, necessary to satisfy the Contractor requirements. This requirement must be met by the establishment and implementation of procedures that ensure that all technical standards are entirely achieved in the construction of the permanent work under the Contract.

b) The Contractor must, as a minimum, meet the requirements of:

- Standards Australia AS/NZS ISO 9001:2008 Quality Systems – Requirements, and associated document HB90.3-2000 The Construction Industry – Guide to ISO 9001:2000, and
- Standards Australia AS/ANZ ISO 9000.2:1998 Quality System Guidelines – Guide to AS/NZS ISO 9001, AS/NZS ISO 9002 and AS/NZS ISO 9003 for Construction.

The Contractor shall provide the Company Representative with evidence of meeting the above requirements prior to commencement of the Works (**Hold Point**).

c) Notwithstanding any statements to the contrary in the Contractor's Quality System, no part of the Quality System shall be used to pre-empt, preclude or otherwise negate the requirements of any part of the Contractor Documents. Quality System elements shall be used as an aid to achieving compliance with the Contractor Documents and documenting such compliance, and in no way shall they relieve the Contractor of responsibility to comply with the Contractor Documents.

d) The Contractor must present a list of Suppliers and Sub-Contractors undertaking any parts of the Works as part of the final submission. The Contractor must not use any other suppliers and/or subcontractors for the Works without prior written permission from the Company Representative.

6.3.2 Quality Management Plan

a) The Contractor must produce a Quality Management Plan (QMP), based upon the guidelines detailed in Standards Australia AS/NZS ISO 9004:2011, and should as a minimum address the following:

- The quality objectives to be attained for the Contractor
- The specific allocation of responsibilities and authority during the different phases of the Contract
- The specific procedures, methods, and work instructions to be applied during the course of the Contract
- Control and distribution of Quality Records
- A method for managing changes, exceptions, and modifications in the QMP as the Contractor proceeds
- Production of record documents at the completion of the Contract
- Other measures necessary to meet the objectives of the Contract.

b) The Contractor must appoint a representative, who shall have responsibility for implementing the QMP for the Works.

- Specific Quality System requirements including, but not limited to, the following:
- Inspection and Test Plans (ITPs)
- Manufacturing Data Records (MDRs)
- Sub-contracting of Works
- Final Inspection and Release
- Submission of Documentation
- Quality Control Records
- Access to Documentation and Works
- Non-conformance/Corrective Action
- Relevant attachments including MDR List of Contents, Certificate of Completion for Fabricated Items, List of Material Certificates and Test Reports, and ITP pro-forma.

The Contractor shall provide the Company Representative with evidence of meeting the above requirements prior to the commencement of the works (**Hold Point**).

7. Inspection and Supervision

7.1 General

a) The Contractor shall provide adequate supervision of the Works at all times and have a representative who is authorised to act on behalf of the Contractor present.

b) The Company Representative and QAI may inspect the Works at any time to check for compliance with the Specifications.

7.2 Hold Points

Hold Points shall apply whereby the Contractor shall submit relevant information to the Company Representative for approval prior to commencing with the next stage in the sub-area. The Contractor shall provide the Company Representative a minimum of 48 hours' notice, prior to request for approval. The Contractor shall not proceed beyond the Hold Point prior to receiving written approval from the Company Representative.

If the Contractor proceeds to construct beyond the designated Hold Point without the Company Representative's inspection and or without the Company Representative's approval then the Company Representative may direct the Contractor to uncover and remediate the Works to the Hold Point, at the Contractor's expense.

The Contractor shall be deemed to have allowed for all time delays and costs associated with the Hold Points during the Works.

The Hold Points include, but are not limited to, the following.

a) Company Representative's approval of the verified site survey and construction survey control system, which shall be provided to the Company by the Contractor at least two weeks prior to construction commencement.

b) Setting out approval for the establishment of all on-site facilities before commencing the clear and grub Works.

c) Company Representative's inspection and approval of cleared and grubbed areas in accordance with the Drawings.

d) The Contractor shall provide the Company Representative with evidence of meeting the quality control procedures and documentation prior to commencement of the works.

e) Company Representative's approval of setting out of the borrow area excavation.

f) Company Representative's inspection and approval of the perimeter embankment foundation, prior to the placement of fill material.

g) Company Representative's inspection and approval of the embankment box cut and key trench, prior to the placement of fill material.

h) Company Representative's approval of the Construction Methodology Statement describing the agreed compaction method, inclusive of inspection of the compaction trials and discussions on the results and testing.

i) Company Representative's approval of the Construction Methodology Statement describing the placement of Material B, inclusive of discussions on the results and testing.

j) Company Representative's approval of the embankment construction to the slope, grades and height as specified in the Drawings.

k) Company Representative's inspection and approval of decant access causeways foundation, prior to placement of fill material on these areas.

l) Company Representative's inspection, during embankment construction, of all compaction results before approving placement of the next layer at that location.

m) Company Representative's approval of final survey of all Works before final payment is approved.

n) All other Hold Points defined in this Specification or as directed by the Company Representative.

7.3 Inspection and Test Plans

a) Inspection and Test Plans (ITPs) must be submitted, as part of the QMP to the Company Representative.

b) An ITP must apply to, and be initiated for, each Lot of the work under the Contract. For the purposes of this Section, a Lot is defined as a section, element, or complete component of the work under the Contract commensurate with a required conformance decision and must be designated by the Contractor's Quality Assurance Representative unless otherwise modified by the Company Representative. All lots must be chosen such that the Works included shall have been completed concurrently and, in the Company Representative's opinion, using similar materials and construction methods. In no case shall a lot contain a quantity of work that is in excess of that finished in a single shift.

c) ITPs must as a minimum, include:

- The work process sequences and their associated inspection and test points.
- The allocation of responsibilities for carrying out the inspection and testing.
- The required frequency on inspection and testing and the criteria for acceptance.
- The methods of testing to be used.
- Provision for identification of the work Lot to which the ITP applies.
- Verification of completion of various inspections/tests by the Contractor.
- Inspection approval (Hold Points) by the Company Representative at specified construction phases in accordance with this specification.
- Product identification and traceability of materials for which test certificates are required.

d) Where the content of the Contractor's ITPs is in conflict with the requirements of the Specification, the requirements of the Specification must prevail, unless the Company Representative specifically varies the requirements of the Specification in writing.

e) Work must not commence on any Lot to which an ITP applies until the specific provisions and procedures of the ITP are approved and signed by the Company Representative.

f) The inspections specified in this Specification must be carried out jointly by the Company Representative and the Contractor, in addition to other random inspections by the Company Representative from time to time as is deemed necessary. These specific inspections should be included in the Contractor's Inspection and Test Plans.

If the Contractor discovers material or work, which is not in accordance with the Specification, the Contractor must promptly initiate the non-conformance procedures required by the QMP.

7.4 Non-conforming Work

a) In the event that a Lot, or any part thereof, does not conform to the requirements of the QMP, the Contractor must promptly initiate a Non-Conformance Report (NCR) in accordance with the QMP. In addition, the Company Representative may initiate a NCR for non-conforming work.

b) The Contractor must notify the Company Representative of all non-conformances within 24 hours of the non-conformance being detected. If the Contractor proposes a disposition, with respect to any non-conforming work under the Contract or with regard to materials, which differs from the requirements of the specification, such a disposition must be submitted in writing to the Company Representative. Work must not proceed on the Lot to which the non-conformance refers until such time that the Company Representative has approved the disposition or an amended disposition, as the case may be, in writing.

c) If appropriate for the particular non-conformance in question, the Contractor must issue a Corrective Action Report (CAR) or similar in accordance with the QMP.

7.5 Technical Query

a) Directions and instructions set out in this Specification shall be deemed to have been given to the Contractor by the Company and accepted by the Contractor.

b) Any direction or clarification sought by the Contractor shall be made in writing in the form of a Technical Query (TQ).

c) The Company may provide verbal clarification but shall be followed-up in writing within five (5) working days of the clarification provided or TQ received.

d) The Designer may be sought to provide direction or clarification in response to the Contractor's TQ. The response to a TQ shall be executed as an addendum to this Specification.

8. Project Close Out

8.1 Commissioning

a) The Contractor shall provide a working commissioning manager for all commissioning activities with relevant experience. This person shall be nominated on the project organisational chart.

b) A formal documented inspection of the Works shall be performed by a group consisting of Contractor(s), the commissioning manager, and the Company Representative to identify punch list items in Categories 1, 2 or 3.

c) Punch list items shall be classified to confirm whether they are within the agreed Scope of Works and to establish their priority. The priorities are:

- Category 1 – Any item that constitutes a safety, equipment, or operational hazard or that will impede operations.
- Category 2 – Any remaining incomplete item that require ongoing construction activity. Non-completion of these items shall not present hazards to equipment or Personnel.
- Category 3 – Items outside the scope of the Contract, which are handled in accordance with Contract scope change procedures. Scope change items will be implemented in such a manner as to minimise the impact on operations.

d) The Contractor shall rectify all defects and non-conformances during the construction phase and prior to demobilisation.

e) Defects and non-conformances shall be rectified in a timely manner so that there will be no interruption to the mine production/operation and limited effects on the construction schedule.

f) The Contractor shall supply all information necessary for others to produce ‘As-constructed Drawings’, inclusive of red-line mark ups and electronic as-constructed data with lines and levels in DXF format.

g) The Contractor shall submit Manufacturing Data Records (MDR) to the Company Representative, in “hard” copy and “electronic” copy.

h) The Contractor shall provide as-constructed survey data on an ongoing basis during and upon completion of the Works in both “hard” copy and “electronic” copy (DXF format) within two weeks of the completion of the Works.

i) The Contractor shall submit all documentation outlined in the Contract Schedules.

j) Documentation deliverables for all Contractor supplied items shall include the following information:

- Item Description.
- Manufacturer.
- Serial Number (if applicable).
- Additional Description.
- Drawing Number & Owner.
- Colloquial Name.
- Supplier.
- Calibration Limits.
- Operating Range.
- Contractor Part No.
- Manufacturer Part No.
- Make/Model.
- Design Life.
- Specifications.

8.2 Demobilisation

a) The Contractor shall remove and transport from Site all temporary, construction facilities and equipment, and restore the Site including rehabilitation of temporarily cleared areas to the satisfaction of the Company Representative on Completion of the Works.

b) The Contractor shall supply an accurate demobilisation schedule to the Company prior to commencement of demobilisation and shall give 24 hours' notice if this schedule changes.

Appendix A

IFC Drawings

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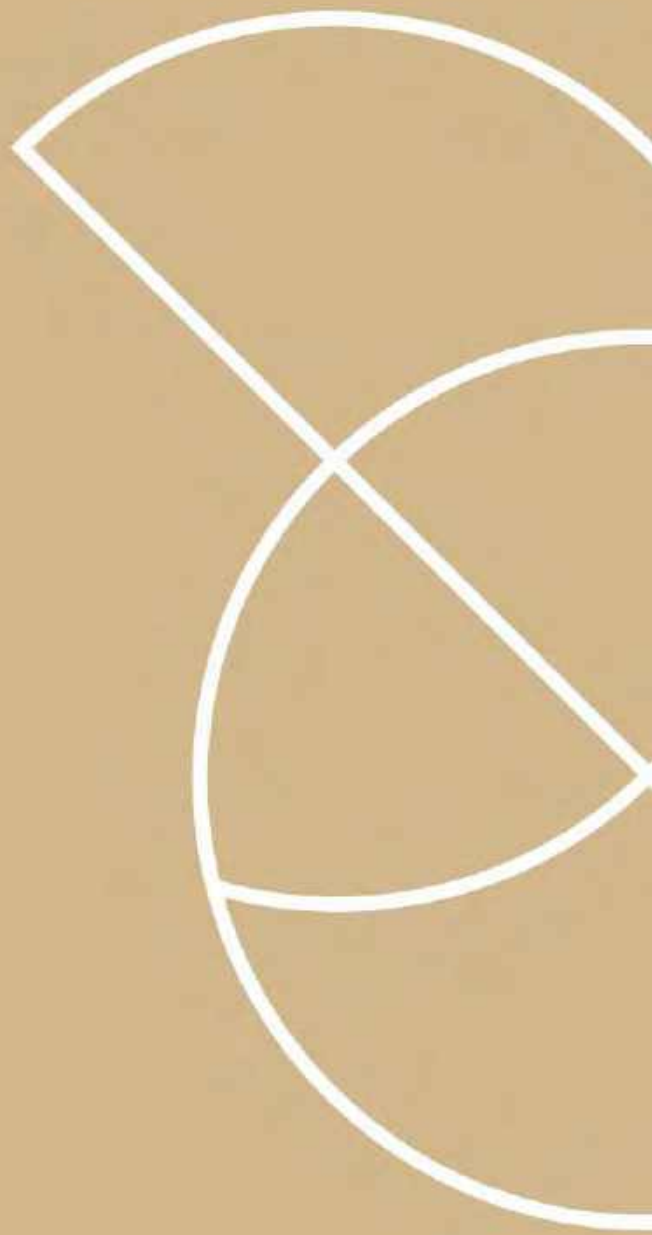

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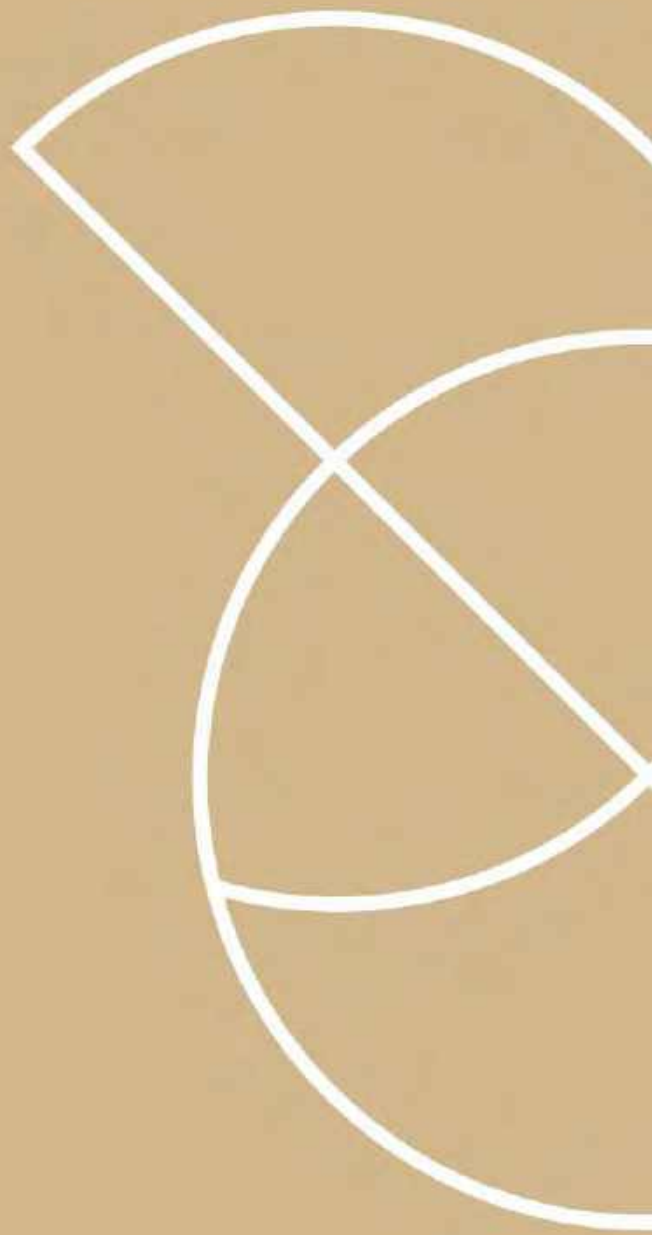

APPENDIX B

APPENDIX B:
OPTSF STAGE 3A DOWNSTREAM RAISE DDR (REC 2025)

MBS ENVIRONMENTAL

REPORT REF	P24-77-PR-06/DDR	12 SEPTEMBER 2025

OPTSF Stage 3A Downstream Raise Detailed Design Report Kimberley Mineral Sands Thunderbird Mineral Sands Project

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Report

Title:	Stage 3A OPTSF Downstream Raise Detailed Design Report
File:	P24-77-PR-06/DDR
[redacted]	
Client:	Kimberley Mineral Sands Pty Ltd
[redacted]	
Synopsis:	This document presents the Detailed Design Report (DDR) for the Stage 3A ODTSF downstream raise at the Kimberley Mineral Sands Pty Ltd Thunderbird Mineral Sands Project.

Revision

Date	Revision	Purpose	[redacted]
18 MAR 2025	DRAFT	ISSUED FOR REVIEW AND COMMENT	
26 MAR 2025	REV A	ISSUED FOR REVIEW AND COMMENT	
17 APR 2025	REV 0	ISSUED FOR USE	
12 SEP 2025	REV 1	ADDRESSED CLIENT FEEDBACK	
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Date	Revision	[redacted]	Recipient(s)	No of Copies
18 MAR 2025	DRAFT		KIMBERLEY MINERAL SANDS	1. PDF
26 MAR 2025	REV A		KIMBERLEY MINERAL SANDS	1. PDF
17 APR 2025	REV 0		KIMBERLEY MINERAL SANDS	1. PDF
12 SEP 2025	REV 1		KIMBERLEY MINERAL SANDS	1. PDF
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Executive Summary

Kimberley Mineral Sands Pty Ltd (KMS) is expanding its tailings storage capacity for the above-ground Out of Pit Tailings Storage Facility (OPTSF) at the Thunderbird Mineral Sands Project (Thunderbird), located approximately 100 km Northeast of Broome in Western Australia. The expansion is to provide additional tailings capacity until in-pit tailings deposition at the In-pit Tailings Storage Facility (IPTSF) is readied, the table below summarises the Stage 3A OPTSF capacity details:

Parameter	Value
Assumed In-situ Tailings Density (t/m³)	1.75
Tailings Storage Capacity (Mt)	7.62
Tailings Storage Capacity (Mm³)	4.35
Average Anticipated Throughput (Mtpa)	10
Estimated Storage Life (months)	9.1
Estimated End of Storage Life	End of June 2026

This document presents the design details for the Stage 3A OPTSF which has been designed in general alignment with currently recognised tailings-related guidelines for TSF development. Based on discussions with KMS, the design is to align with the 1085 tph DMU schedule as it is considered to be more closely aligned with current operations. Established dam break modelling undertaken by ATCW was utilised for a semi-quantitative population and risk (PAR) estimate based on engineering judgement considering inundation zones and site infrastructure locations. It is recommended that KMS review the PAR estimates and raise suggestions as appropriate. The PAR has been adopted to be approximately 10 – 100. This supports its classification as per the following standards/guidelines:

- DEMIRS: Category 1
- ANCOLD: High C

The typical embankment is to be constructed out of either the deposited tailings or pindan sands as per previous construction works. The design includes a downstream raise to the perimeter embankments and a centreline raise to the internal retaining embankment (formerly referred to as the rock ring) constructed as part of the Stage 3 embankment raise to isolate the decant area, removing the need to raise the decant area and associated concrete works. The downstream raised perimeter embankment has a typical downstream and upstream slope of 1V:2H and 1V:2.75H respectively, with a height ranging from approximately 6.7 – 13.9 m and a crest width of 5 m. The internal retaining embankment has a typical upstream slope of 1V:2H and 1V:3H respectively, and a crest width of 7 m.

The Operating Manual attached in Appendix B is aimed at providing guidance on the operation, maintenance, and monitoring requirements for the facility. The typical operating conditions for OPTSF consist of tailings delivered as a slurry at 45% solids by mass with the slurry discharged sub-aerially or sub-aqueous from the central causeway. The spigots will be operated in a rotating fashion to promote the formation of uniform tailings beaches and maintain the supernatant ponds near the decant embankment.

Geotechnical stability assessments have been undertaken in consideration of static and post-seismic conditions to assess the factor of safety (FoS) of the proposed embankment structure as per ANCOLD recommendations. Five embankment sections were assessed, to which static FoS requirements were satisfied. However, due to the liquefaction potential of the foundation pindan, the post-seismic FoS are below ANCOLD requirements. The post-seismic instability risk has also been highlighted for the existing embankment in the 2024 Annual Audit, this is detailed in Section 2.4.

The facility will be monitored using a combination of Vibrating Wire Piezometers (VWP's), settlement pins, and monthly aerial surveys. These monitoring measures will provide data on the TSF's integrity, performance, and tailings beach development, throughout the life of the facility. Instrumentation installation details are to be provided in a later revision of this document. The instrumentation installed is to serve as key components towards a Trigger Action Response Plan (TARP) that may be developed as part of a future scope.

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Appendix I: 2025 CPTu GSI Test Certificates

Appendix J: 2025 Tailings Test Certificates

Terminology and Abbreviations

The following terminology and abbreviations have been used in this document:

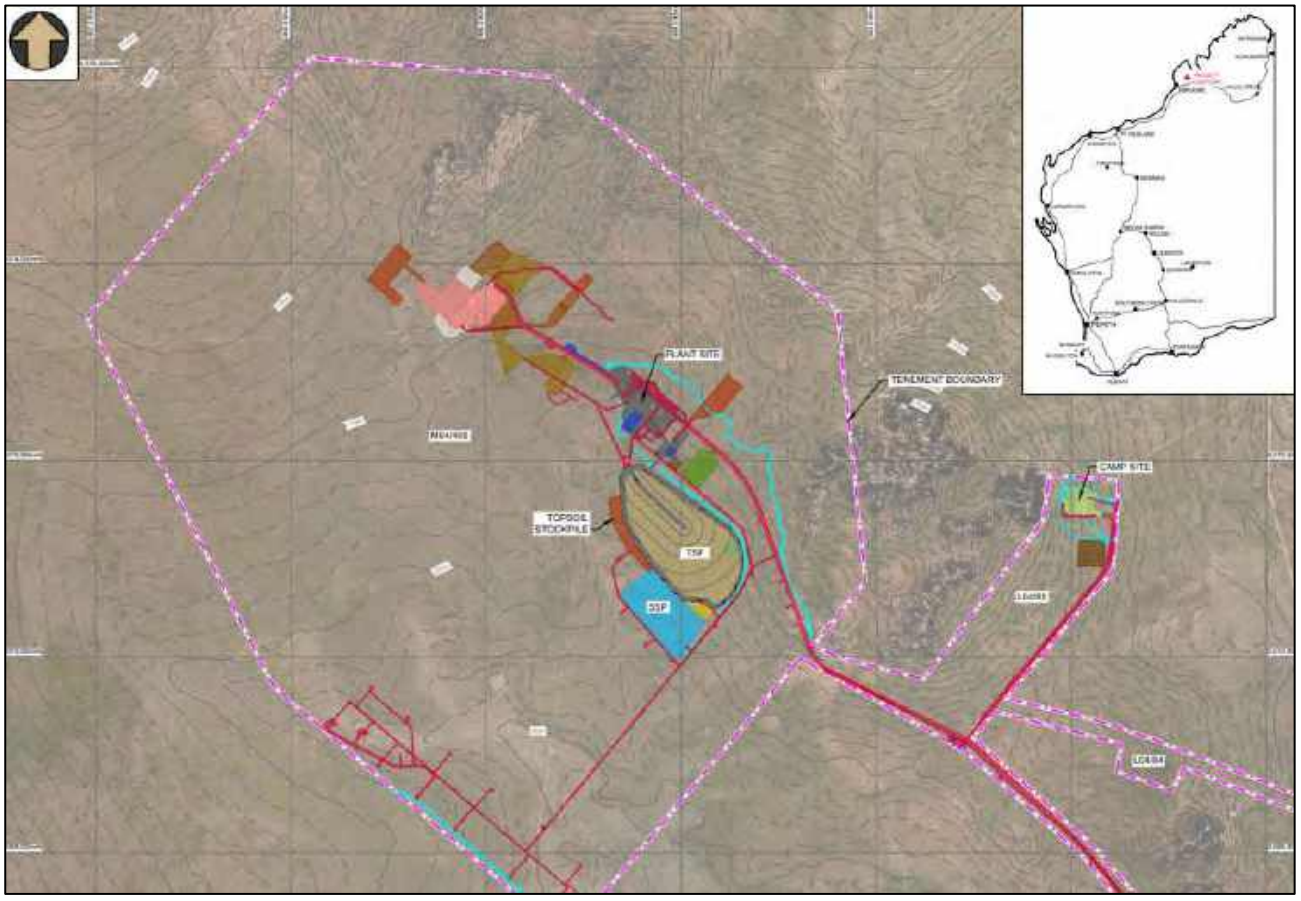
AEP	Annual exceedance probability
ANCOLD	Australian National Committee on Large Dams
DDR	Detailed Design Report
EoR	Engineer of Record
GPS	Global Positioning System
GSI	Geotechnical Site Investigation
HDPE	High-Density Polyethylene
KMS	Kimberley Mineral Sands
IFD	Intensity Frequency Duration
LoM	Life of Mine
m/a	Metres per annum
m3/d	Cubic meters per day
Mm3	Million cubic meters
Mt	Million tonnes
Mt/a	Million tons per annum
NAF	Non-acid forming
OM	Operating Manual
OTPSF	Out of Pit Tailings Storage Facility
PAF	Potentially Acid Forming
PMP	Probable Maximum Precipitation
RL	Reduced level
t/a	Tonnes per annum
t/d	Tonnes per day
t/m³	Tonnes per cubic metre
TOPL	Thunderbird Operations Pty Ltd
SMDD	Standard Maximum Dry Density
IPTSF	In-pit Tailings Storage Facility

1. TSF Proposal Summary

1.1 Introduction

Resource Engineering Consultants Pty Ltd (REC) has been engaged by Kimberley Mineral Sands Pty Ltd (KMS) to prepare the Detailed Design Report (DDR) for the Stage 3A Out of Pit Tailings Storage Facility (OPTSF) at the Thunderbird Mineral Sands Project (Thunderbird), located approximately 100 km Northeast of Broome in Western Australia. The location of the project site along with the Stage 3A OPTSF arrangement is presented in Figure 1.

Figure 1: Stage 3A OPTSF Locality



This DDR documents the engineering design of the Stage 3A downstream raise of the OPTSF to a crest elevation of RL 119.2 m to RL 109.3 m. The design of the Stage 3A downstream raise is to accommodate an additional 4 months of tailings throughput on top of the Stage 3 OPTSF capacity.

The scope of the design documented in this report is limited to civil/earthworks components and excludes mechanical and electrical design elements. To enable this report to be considered as a 'stand-alone' document and remove the need for repeated cross-referencing to existing reports and excessive appendices, several sections have been copied verbatim (or very close to) from previous reports.

1.2 Purpose and Scope

This DDR outlines the basis of design for the Stage 3A downstream raise of the Thunderbird OPTSF, upon which the design assessments and operation requirements are based. It is to be noted that the Stage 3A OPTSF raise features fundamental design philosophy changes from the previous stages.

The purpose of this document is to present the overall objectives of the OPTSF and summarise the guidelines and legislations, tailings properties, design philosophy, design criteria and other relevant information forming the design basis. All matters related

to the design, construction and operation of the OPTSF at Thunderbird will be prepared in accordance with the most recent and applicable design codes and regulations.

As the scope of this document is to provide comprehensive design documentation, the contents within this document are to be considered as the definitive design document of the Stage 3A OPTSF. Preceding design documentation submitted to KMS, and their associated assessments and designs pertaining to the Stage 3A OPTSF, if in conflict with the information presented in this document, are superseded by the contents of this document.

2. OPTSF Design Considerations

2.1 Background

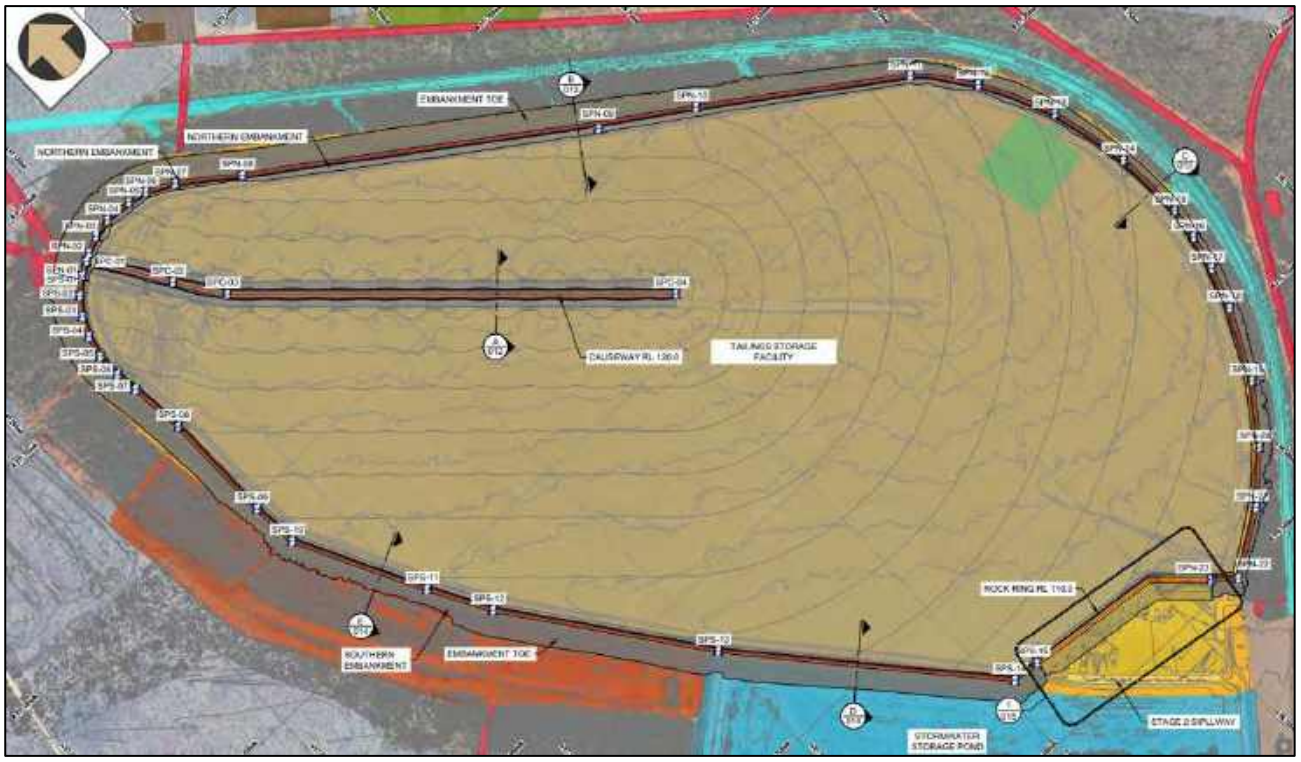
2.1.1 General

Thunderbird currently operates an above-ground OPTSF, referred to also as the “Initial TSF”. OPTSF Stages 1 – 4 were designed by ATC Williams (ATCW) and are currently operating at Stage 2. The purpose of the OPTSF was to provide tailings storage during the early stages of mine development prior to the progressive in-pit disposal of tailings within the mining voids.

At the OPTSF, tailings are deposited from an elevated central causeway, along which the deposition point will change in a cyclic manner. The tailings are thickened to promote a steeper beach development thus improving the tailings storage capacity relative to the perimeter embankment crest elevation.

The designed position of the causeway results in supernatant water ponding towards the South perimeter embankment corner towards the decant sump, where it is then pumped back to the Process Plant through the decant infrastructures. In the event of a design storm, the OPTSF emergency spillway is expected to be engaged, and the design storm inflow will spill into the neighbouring Stormwater Storage Pond (SSP). The SSP contains a basin along the Southwest embankment which is fully lined with high-density polyethylene (HDPE) with concrete platforms for pumping equipment. Figure 2 presents the plan view of the Stage 3A.

Figure 2: Stage 3A OPTSF Overview



It is understood that at the end of the OPTSF operating life, tailings will be stored in-pit utilising the mine voids developed during mining. The design storage capacity of the OPTSF was estimated to be 19 Mt by ATCW, however due to various issues identified by REC during its engagement as the Engineer of Record (EoR), this will not be achievable. The 2024 Q2 EoR report (document No. P24-77-PR-02/2024Q2) and 2024 Audit (document No. P24-77-PR-07/AUDIT) details the issues and accomodating design deviations.

2.1.2 ATCW Design Philosophy

It is understood that the design philosophy upon which the OPTSF is based consists of the co-disposal of two tailings streams (sand and slimes) with flocculants along the elevated central causeway in a cyclic manner. The aim of this is to accelerate the consolidation process of the deposited tailings and allow for improved water return after initial deposition.

The construction of the central causeway and the perimeter embankment is intended to be continuous throughout the TSF's operation. The central causeway is to be raised approximately 2 m – 5 m at each stage, the perimeter embankment is to be raised as required to accommodate the design tailings beach slope of 3% – 7% and the storage requirement of 6.3 Mtpa.

The supernatant water is stored at the Southern embankment corner (decant sump) adjacent to the neighbouring SSP, where it is pumped to the processing plant under normal operating conditions or spilled into the SSP through the emergency spillway in a controlled manner. The key objectives for the management of water at the TSF and the SSP are to minimise the volume of water required to be stored in the TSF, maintain contingency water in the SSP (3 Mm^3), and maintain a suitable flood storage capacity in the TSF and SSP. Figure 3 presents the configuration of the OPTSF and the SSP.

Figure 3: Configuration of OPTSF and SSP

2.1.3 Operational Arrangement

2.1.3.1 Transportation Pipelines and Tailings Disposal Skid

Tailings are produced in two streams at the Process Plant, comprising sands and slimes. The two tailings streams are combined in the Co-disposal Hopper at the Process Plant prior to being pumped to the OPTSF via the Tailings Transportation Pipeline. The tailings stream is understood to comprise a relative proportion of sand and slimes of 79% and 21% respectively.

To facilitate the separation of solids from water, and subsequently assist with steepening beach slopes, consolidation and water recovery, a polymer flocculant is added to the tailings pipeline discharge point (pipe head flocculation). The polymer flocculants are prepared and dosed at the Flocculant Plant, located within the Process Plant complex.

The Tailings Transportation Pipeline extends from the Process Plant and is connected to the Tailings Disposal Skid located downstream of the northern embankment of the TSF. The Flocculant Line, and a separate Dilution Water Line (to facilitate flocculant dilution and line flushing) are also connected to the Tailings Disposal Skid (Disposal Skid-1). The purpose of Disposal Skid-1 is to switch the discharge of tailings, flocculant and dilution water between the two different arms, which correspond to the north and south tailings lines, extending across the northern and southern sides of the Central Causeway respectively.

Additionally, the Disposal Skid-1 provides also allows for the emergency distribution of tailings (no flocculant or dilution water) to two additional arms, which correspond to the emergency north and south tailings lines, extending across the northern and southern Perimeter Embankments respectively.

The general arrangement of the Tailings Transportation Pipeline and Disposal Skid-1 are detailed in Figure 4 and Figure 5 respectively.

Figure 4: Tailings Transportation Pipeline Configuration (ATCW 2023)

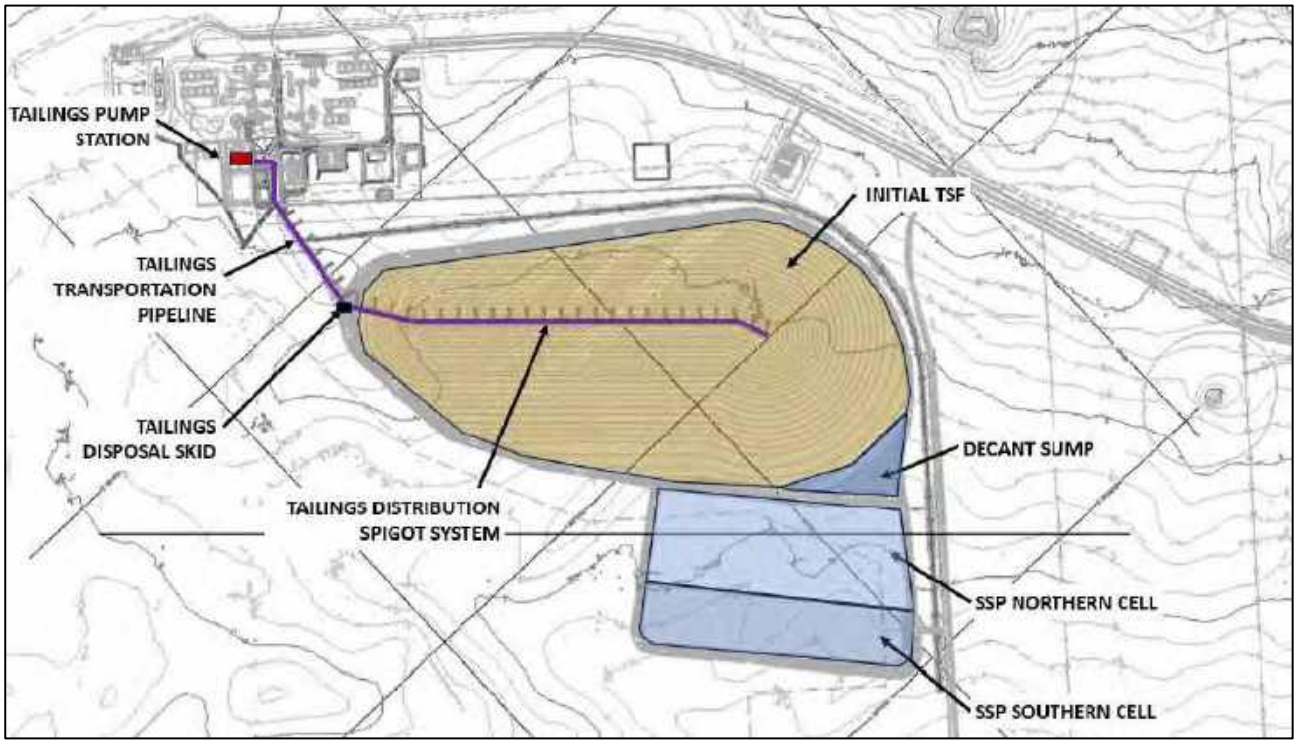
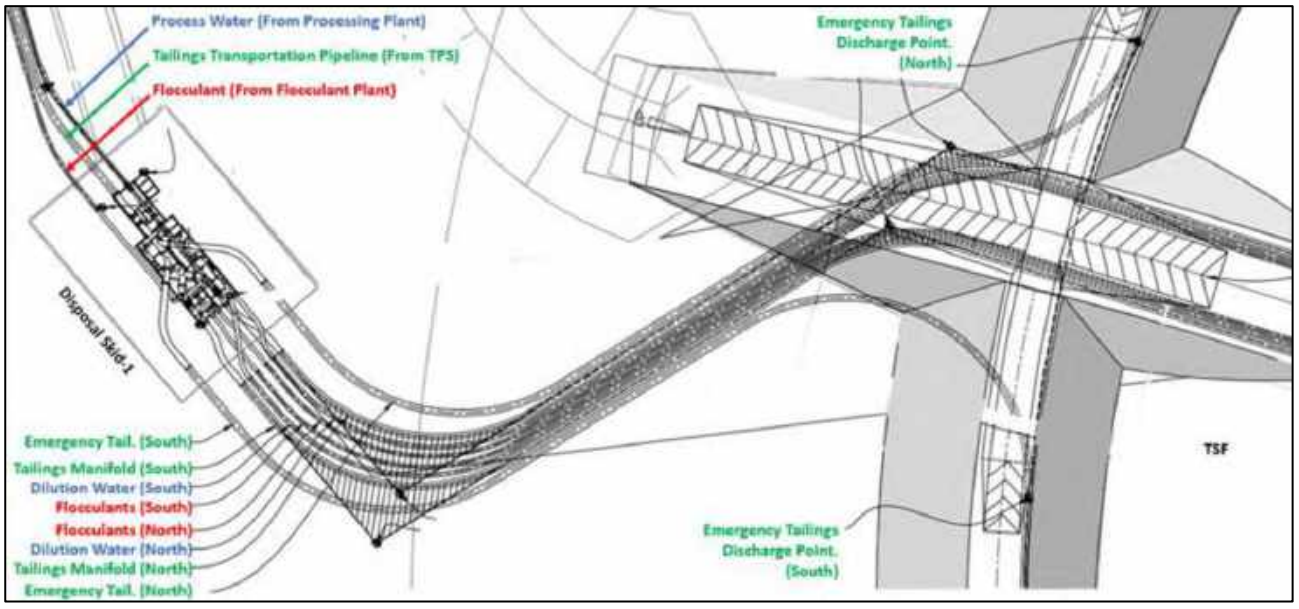


Figure 5: Disposal Skid-1 (ATCW 2023)



2.1.3.2 Tailings Distribution Spigot System

The Tailings Distribution Spigot System extends across the Central Causeway from Disposal Skid-1 and comprises two manifolds, the north and south lines which each run tailings, flocculant and dilution water.

Pipe head flocculation is undertaken on the separate lines via the use of inline mixers, known as Disposal Skid-2 and Disposal Skid-3 situated across the Central Causeway. This is undertaken via:

- Disposal Skid-2:
  - Facilitates the mixing of flocculant with dilution water.
  - Comprises an injection point to dose diluted flocculants to the tailings pipeline.
  - Flocculant line ceases beyond.
- Disposal Skid-3:
  - Comprises and injection point to dose diluted flocculants (from Disposal Skid—2) to the tailings pipeline.
  - Diluted flocculant line ceases beyond.

Both Disposal Skid-2 and Disposal Skid-3 are moved sequentially along the Central Causeway arrangement as the tailings discharge sequence progresses, consistently arranged to service flocculant dosing within the final six (6) discharge points along the actively discharging line.

It is understood that these separate skids (Skid-2 and Skid-3) were implemented to facilitating flocculant mixing whilst reducing the likelihood of flocculant shearing as part of tailings transportation prior to discharge.

2.2 Tenure and Site Conditions

2.2.1 Topography

The topography of the Thunderbird Mineral Sands Project area is characterized by a flat to gently undulating landscape, typical of the Canning Basin in Western Australia's Kimberley region. The terrain exhibits low-relief features with subtle rises and depressions, reflecting its sedimentary origins. Dominated by pindan soils, the surface consists primarily of red sandy deposits, which are a defining characteristic of the region. These soils are interspersed with sparse vegetation, including savannah woodlands, shrubland, and native grasses, with occasional small trees such as acacias and eucalypts.

2.2.2 Climate

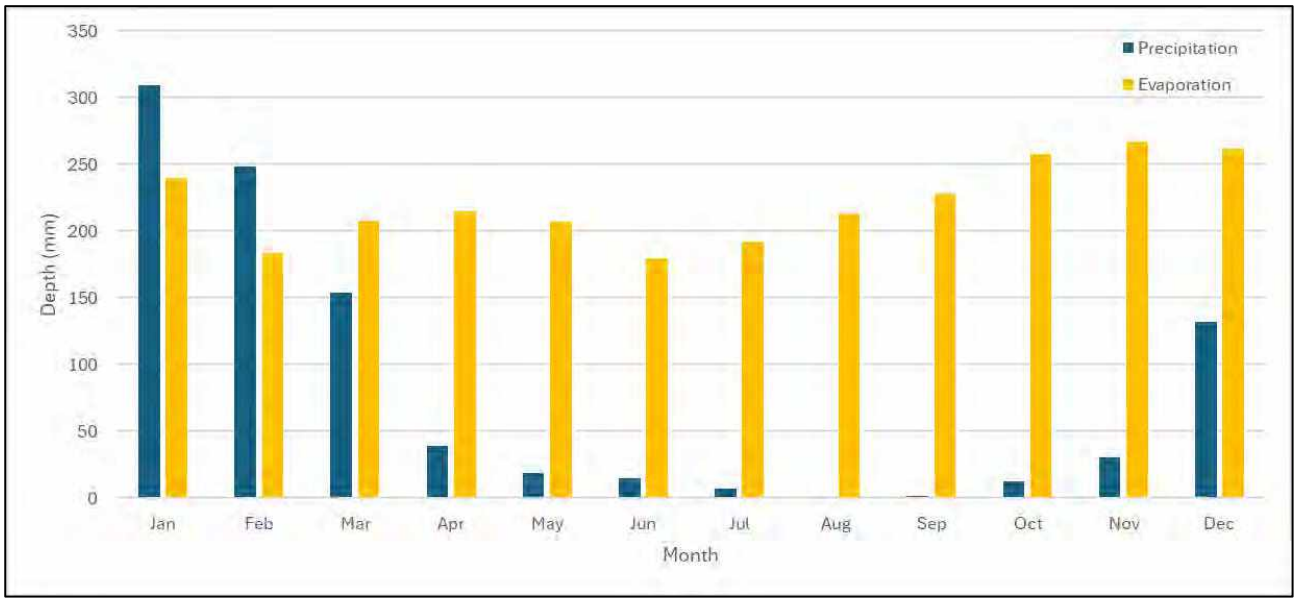
The climate of Broome (100 km Southwest of the project site) is characterised by oppressive and overcast wet seasons and humid, windy and mostly clear dry seasons, wet season typically lasts from mid-December to mid-March. The project location is hot year-round, the temperature varies from 15°C to 34°C and rarely below 10°C and above 37°C.

Climate data has been extracted for the site from the Bureau of Meteorology (BoM). The monthly precipitation data was sourced from Country Downs, located approximately 45 km Northwest of the project site. The average rainfall data is collected over 44 years starting 1970 until 2023 (9 years unrecorded in between). The average monthly evaporation data was extracted from the pan evaporation map average from 1975 to 2005. The average monthly climate data is summarised in Table 1 and presented in Figure 6.

Table 1: Average Monthly Rainfall and Evaporation

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Mean Rainfall (mm)	309.4	249.1	154.2	39.1	19.4	15.0	7.3	1.3	1.8	12.6	30.9	132.4	972.5
Mean Evap. (mm)	239.9	183.8	208.3	215.2	207.4	180.0	192.7	213.6	228.3	257.9	267.4	262.2	2656.8

Figure 6: Average Monthly Rainfall and Evaporation

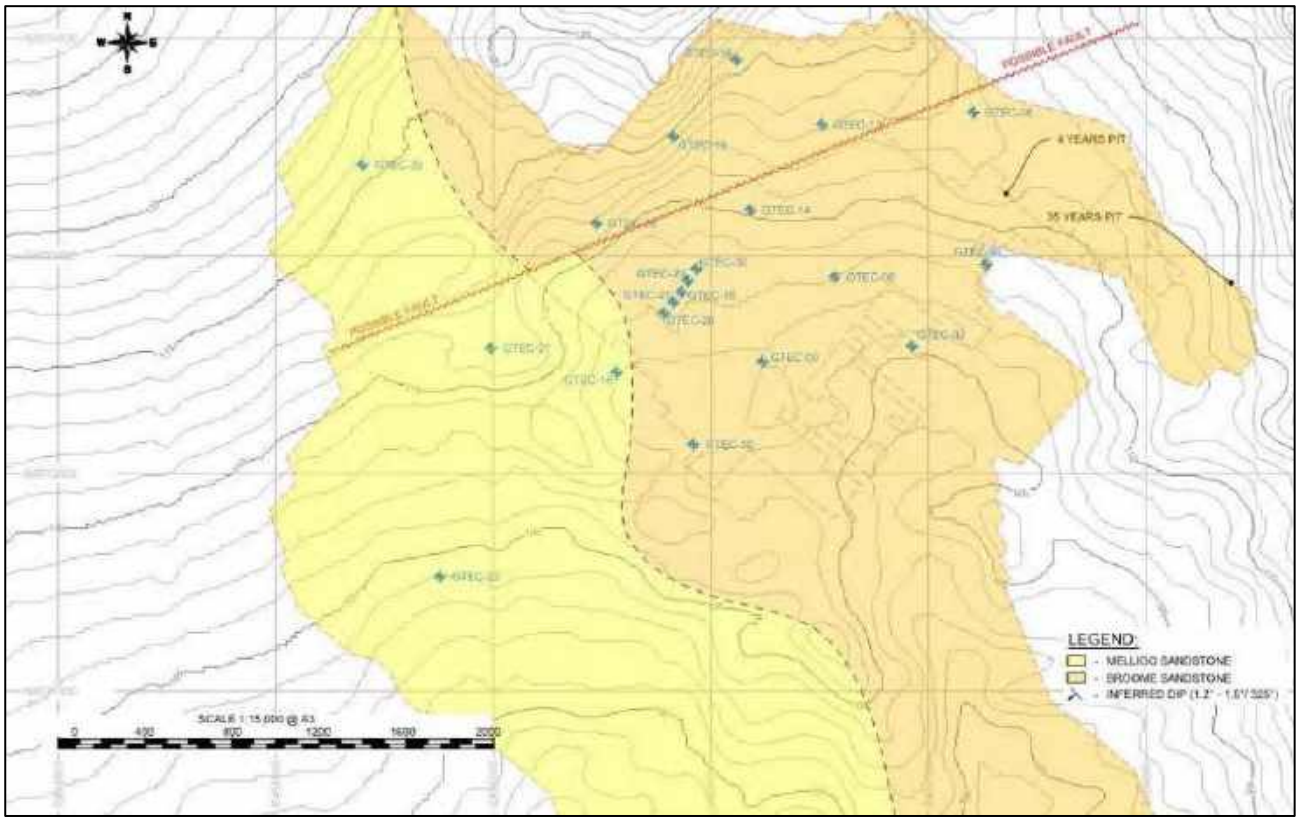


2.2.3 Geology (ATCW 2022)

Published geological information indicates the project site to be underlain by the Melligo and Broome Sandstones of early Cretaceous age (@130 Ma). The Broome sandstone was deposited in a tidal, shallow marine environment and overlain unconformably by the Melligo sandstone beach deposits as the Cretaceous Sea regressed. The upper part of the Broome Sandstone represents a deltaic or transitional facies within which heavy mineral shoreline deposits developed. Exploration drilling undertaken previously indicated that the Broome sandstone is predominantly highly to extremely weathered, with the composition of very dense sand for the most part. The presence of thin ironstone bands, representing the leaching of iron oxides at former phreatic surfaces, was also observed at variable depths and lateral persistence. These ironstone bands typically occur at depths greater than 10 mbgl.

A simplified map representing the solid geology is presented in Figure 7. Recent superficial deposits across the project area comprise red-brown, fine and medium, silty/clayey sand of aeolian (wind-blown) origin, known regionally as “Pindan”. Geotechnical investigations undertaken at the site indicated that the Pindan sand is anticipated to occur in the upper 1.0 m to 4.5 m of the soil profile in the vicinity of the initial TSF. The fine content of the Pindan is typically between 20% and 35%, increasing with depth. The material transitions to a basal red sandy clay in places or directly overlies the highly weathered sandstone, occasionally with an upper interface of yellow sandy clay. Localised clayey gravel horizons were intersected at the base of the Pindan in the elevated northern part of the site. A laterised caprock zone up to 1.5 m thick at the interface of the Pindan and the weathered sandstone was also locally intersected at the northern end of the site.

Figure 7: Simplified Solid Geology (ATCW 2022)



2.2.4 Hydrology and Hydrogeology

2.2.4.1 Hydrogeology (ATCW 2022)

The project site is located above the Broome aquifer, which is a regional, unconfined aquifer extending across a large portion of the Dampier Peninsula and hosted in the Broome Sandstone. Figure 8 shows the site located on the palaeochannel map published by Geoscience Australia (GA), National Water Commission in 2012, which shows the interpreted distribution of palaeochannel in arid and semi-arid parts of Western Australia (WA), South Australia (SA) and Northern Territory (NT). This map is generally referred to as the “WASANT” palaeochannel map. The coloured areas are the palaeochannel and it appears that the site is not located within any of the identified palaeochannel.

Shortly after the 2017/2018 wet season, at the time of the geotechnical investigation, perched groundwater (seepage) was encountered in the majority of test pits excavated in the central and southern areas of the TSF site at depths between 1.7 m and 3.7 m bgl.

Figure 8: WASANT Palaeochannel Map Extract (ATCW 2022)

2.2.4.2 Runoff and Catchment

The total catchment area for the Stage 3A OPTSF and the SSP is limited to within the embankment without an external catchment area. The total catchment area for the Stage 3A OPTSF and the SSP is approximately 1,004,000 m^2 and 366,000 m^2 respectively. A runoff coefficient of 1.0 has been conservatively assumed for rainfall falling across the OPTSF and SSP catchment, including tailings beach, supernatant pond, embankment crests, and SSP basin.

2.2.4.3 Design Storm Events

Design rainfall depths for the project site was obtained from the Bureau of Meteorology (BoM) 2016 Rainfall Intensity-Frequency-Duration (IFD) data system for the project site. Table 2 summarises the IFD data.

Table 2: Rare Design Rainfall Depths

Event Duration	Rainfall Depth (mm) for Annual Exceedance Probability (1 in x AEP)						
	1 in 20	1 in 50	1 in 100	1 in 200	1 in 500	1 in 1,000	1 in 2,000
3-hour	121	142	156	178	212	240	270
6-hour	155	185	209	237	283	320	361
12-hour	202	249	288	326	388	440	496
24-hour	268	337	396	450	536	607	685
48-hour	353	445	522	605	727	829	940
72-hour	405	506	589	679	807	911	1,020

2.2.4.4 Probable Maximum Precipitation (Generalised Short-Duration Method)

The Probable Maximum Precipitation (PMP) and the associated Probable Maximum Flood (PMF) were estimated using the Generalised Short-Duration Method (GSDM). The PMP represents the maximum amount of precipitation theoretically possible for a given location and duration, under the most severe meteorological conditions. Table 3 summarises the key parameters of the estimation method, Table 4 summarises the temporal distribution of the PMP.

Table 3: GSDM PMP Estimation Summary

Parameter	Value
Area (km²)	0.29
Duration (hours)	6.0
Terrain Type	Smooth
Moisture Adjustment Factor	1.13
Elevation Adjustment Factor	1.00
Point PMP Depth (mm)	1,000
Area PMP Depth (mm)	970

Table 4: PMP Temporal Distribution

% of Time	5	10	15	20	25	30	35	40	45	50	Depth (mm)
	39	97	175	243	310	38	446	504	572	621	
	55	60	65	70	75	80	85	90	95	100	
	679	728	776	825	863	892	922	941	960	970	

2.2.5 Seismicity

In the absence of any site-specific Probability Seismic Hazard Assessment (PSHA) information, the 2023 National Seismic Hazard Assessment (NSHA) was adopted to derive the design of seismic events. In accordance with ANCOLD, two seismic events are to be considered under normal operating conditions, termed the Operating Basis Earthquake (OBE) and the Safey Evaluation Earthquake (SEE). The level of ground motion produced by an OBE event should cause only minor and acceptable damage, whereas the SEE is the maximum level of ground motion for which the embankment is capable of withstanding without critical containment failure. Table 5 summarises the earthquake loading adopted for a facility with an ANCOLD consequence rating of 'High C'.

Table 5: Earthquake Loading

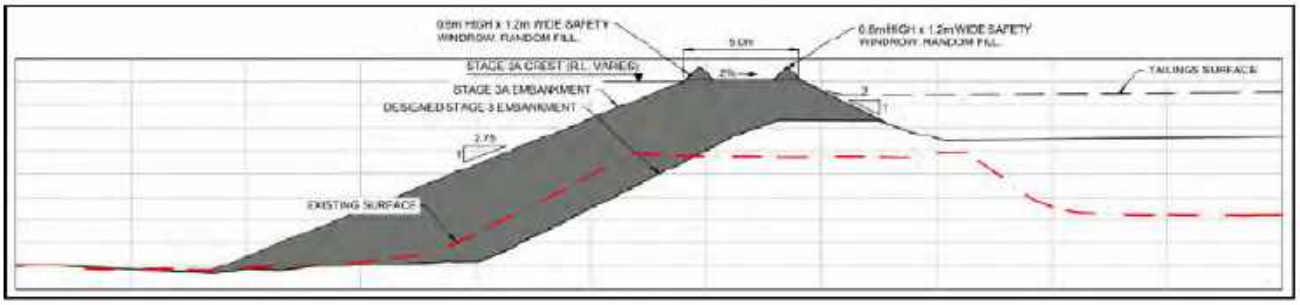
Earthquake Event	Annual Exceedance Probability (1:x AEP)	Magnitude (g)
OBE	1:475	0.05
SEE	1:2,000	0.14

2.3 Retaining Structure

2.3.1 Perimeter Embankment

The Stage 3A OPTSF consists of an upstream slope with a gradient of 1V:2H, a downstream slope with a gradient of 1V:2.75H, and a 5 m wide embankment crest. The central causeway consists of batter slopes with a gradient of 1V:1.5H and a causeway width of 13 m. The OPTSF perimeter embankment is approximately 4.0 km in length with a central causeway approximately 1.3 km in length. Figure 9 presents the typical OPTSF embankment cross-section.

Figure 9: Typical Stage 3A OPTSF Embankment Cross-section



The height of the embankment varies along its length, the typical embankment heights at Stage 3A are summarised in Table 6.

Table 6: Typical Stage 2 OPTSF Embankment Height

Structure	Height (m)
Northern Embankment	~ 14.1
Southern Embankment	~ 6.5
Northwestern Embankment	~ 10.1 – 14.1
Southeastern Embankment	~ 6.5 – 14.1

The established emergency spillway to the SSP, features a width of 200 m at an invert elevation of RL 103 m and side batters of 4H:1V. The emergency spillway invert was initially intended to be raised to RL 106 m as part of the Stage 3 embankment raise, however, at the request of KMS, an internal retaining embankment was featured as part of the Stage 3 design drawings to isolate the decant area, removing the need to raise the decant area and associated concrete works. This internal retaining embankment is to be raised as part of the Stage 3A raise.

2.3.2 Internal Retaining Embankment (Rock Ring)

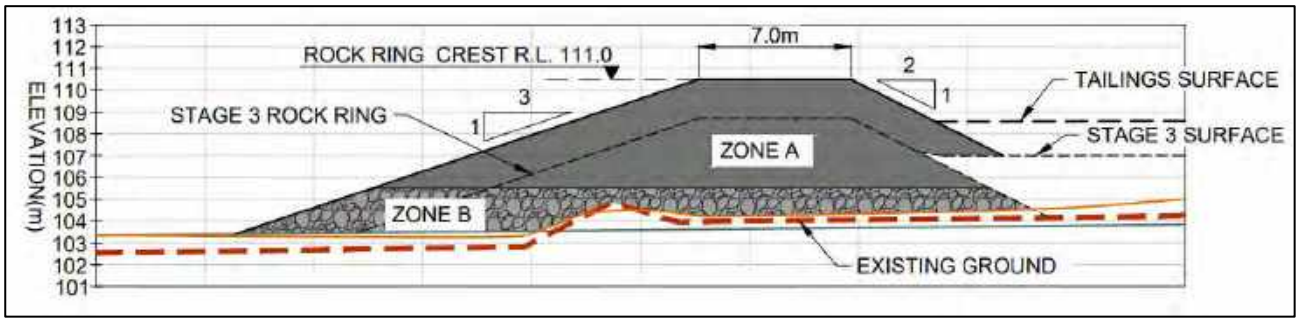
As part of the Stage 3 embankment raise, the emergency spillway invert was initially planned to be raised to RL 106 m. However, at the request of KMS and in consultation with the EoR, an internal retaining embankment – originally intended as a decant rock ring – was incorporated into the Stage 3 design to isolate the decant area. This modification eliminated the need to raise the decant pocket and its associated liner and concrete works. The internal retaining embankment is now scheduled to be centreline raised as part of the Stage 3A raise.

The internal retaining embankment was initially designed as a rock ring to allow supernatant water to filter through and be recovered in the decant pocket. However, concerns were raised regarding:

- The filtering capacities of the available material (scats and oversize material).
- Identified post-seismic stability issues (detailed in the 2024 Audit, document ref. P24-77-PR-07/AUDIT).

The above concerns were considered to impact the feasibility of the rock ring in achieving its original design intent. As such, the rock ring has been repurposed as an internal retaining embankment, where the placed oversize/scats material will serve as an underdrainage blanket, overlaid with compacted tailings. Figure 10 presents the typical section of the internal retaining embankment.

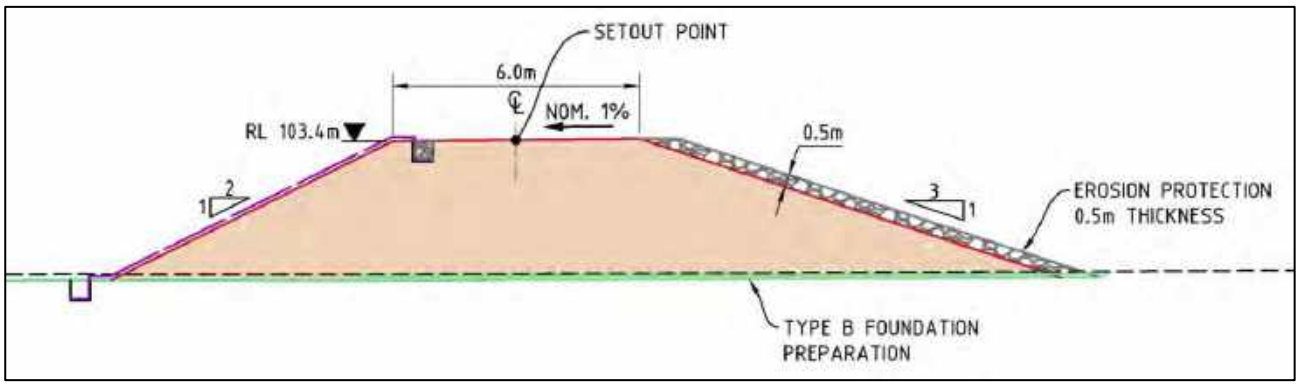
Figure 10: Typical Internal Retaining Embankment Cross-section



2.3.3 Stormwater Storage Pond

The established SSP perimeter embankment consists of an upstream slope with a gradient of 1V:2H, a downstream slope with a gradient of 1V:2.5H (altered from 1V:3H during Stage 1 construction), and a 6.0 m wide embankment crest. The upstream slopes of the embankment are fully HDPE lined and the downstream slopes are overlayed with 0.5 m thick erosion protection material. The SSP perimeter embankment is approximately 1.8 km in length and is approximately ~ 3.7 m in height. Figure 11 presents the typical SSP embankment cross-section.

Figure 11: Typical SSP Embankment Cross-section (ATCW 2022)



The SSP consists of a fully HDPE-lined internal sump (known as the SSP Southern Cell) adjacent to the Southwestern SSP embankment with an approximate average depth and width of 0.65 m and 160 m respectively. Figure 12 and Figure 13 present the sump configuration and the typical cross-section of the sump respectively.

Figure 12: SSP Sump Configuration (ATCW 2022)

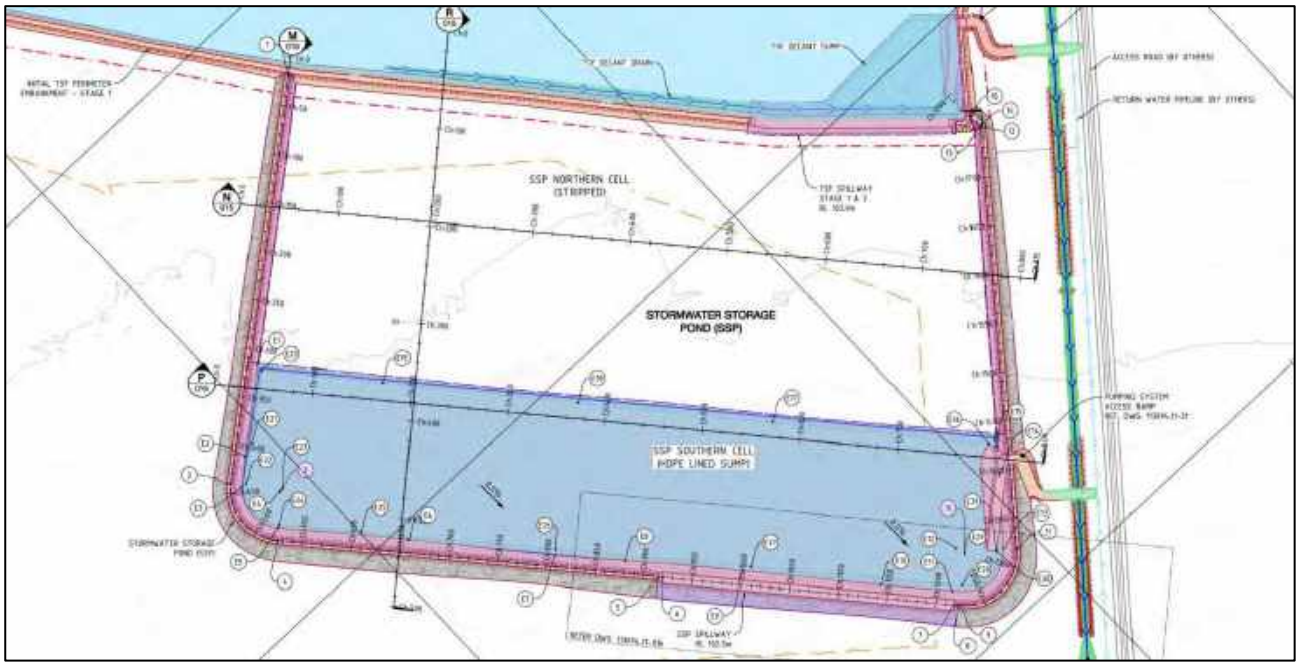
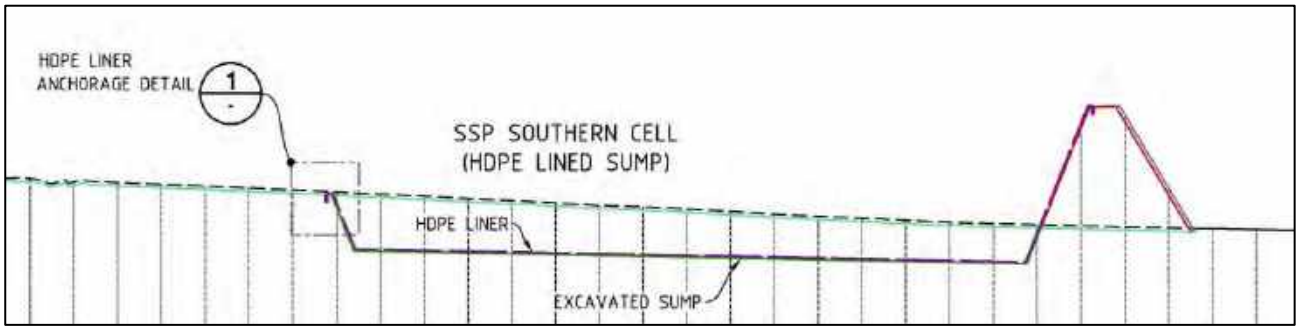


Figure 13: Typical SSP Sump Cross-section (ATCW 2022)



An emergency spillway has been constructed to allow for environmental discharge, featuring a width of 300 m at an invert elevation of RL 102.5 m and side batters of 4H:1V.

2.3.4 Zone A Material (Embankment Fill and Causeway Fill)

Zone A – Embankment Fill and Causeway Fill material is to be sourced from within the OPTSF. The embankment fill is to consist of the deposited tailings material compacted to 95% Standard Maximum Dry Density (SMDD). The typical tailings particle size distribution (PSD) and Atterberg limits are detailed in Section 4.

2.3.5 Zone B Material (Granular Fill)

Zone 2 – Granular Fill material is to be sourced from mining activities. Initially, the scats (2 – 12 mm) material was initially observed to be suitable as a filter material for the rock ring, however after placement during the Stage 3 raise it appeared to contain an increased amount of fines that was not observed when it was stockpiled. Figure 14 presents the scats as observed in the stockpile and Figure 15 presents the placed scats as observed. Oversize material sourced from mining activities was proposed as an alternative for the rock ring construction. Oversize material is presented in Figure 16.

Figure 14: Observed Stockpile Scats (2 - 12 mm) Material

Figure 15: Observed Placed Scats (2 - 12 mm) Material

Figure 16: Oversize Drainage Channel Material

2.4 Post-seismic Stability Concerns

2.4.1 Stability Review

As part of the 2024 OPTSF Audit, a stability review was undertaken considering the historical and newly gathered GSI data (2025 CPTu GSI, detailed in Section 0). Throughout the review, prominent liquefaction risks have been consistently identified for the pindan foundation.

The initial stability analyses undertaken by ATCW for Stage 1 of the OPTSF accounted for the liquefied pindan foundation. In the ATCW Stage 1 post-seismic stability modelling, a vertical shear stress ratio (σ'v/Su) of 0.07 was adopted for the liquefied pindan foundation. However, REC's review of the stability modelling identified deficiencies, thus two models were selected for reassessment (only global failures considered), these are:

- Northern embankment (Figure F11 and F14)
- Decant pocket (Figure F23 and F26)

The model was reconstructed by estimating the elevation and distance of key geometric nodes presented in the figures. Based on the information from these figures, the recreated model aimed to replicate material parameters, slope limits, the approximate phreatic level, embankment geometry, and material boundaries. Given the characteristics of the assessed failure slope, it is likely that stability was evaluated using a circular failure mechanism (not conservative).

A large discrepancy has been identified between the FoS reported by ATCW and the assessed FoS from the recreated model. REC notes that not all information regarding the stability model can be gathered from the figures available, it is recommended that the original stability model developed by ATCW be made available for detailed review. Table 7 summarises the reconstructed model's FoS and the ATCW reported FoS. Figure 17 and Figure 18 presents the stability modelling undertaken by ATCW, Figure 19 and Figure 20 presents the stability modelling of the recreated model. Note that some material parameters have been updated since the assessment undertaken for the 2024 Audit.

Figure 17: ATCW 2022 Stability Model - Figure F23 (Drained)

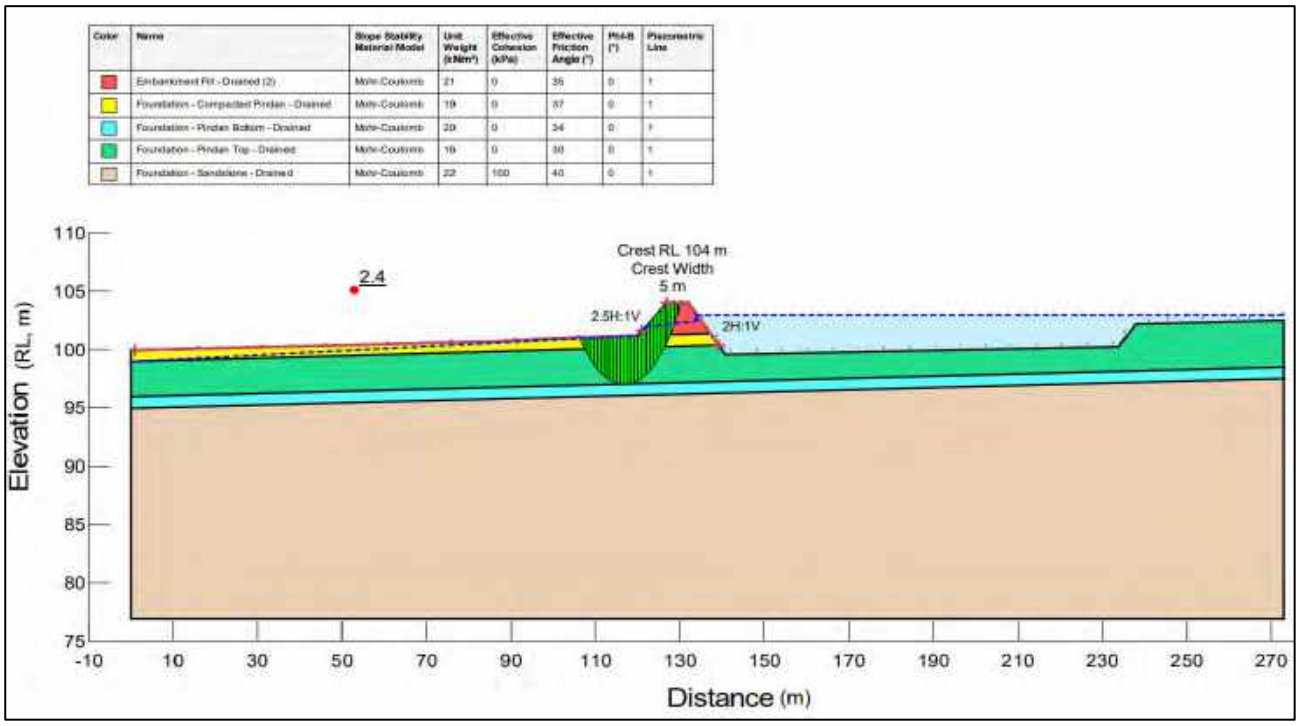


Figure 18: ATCW 2022 Stability Model - Figure F26 (Post-seismic)

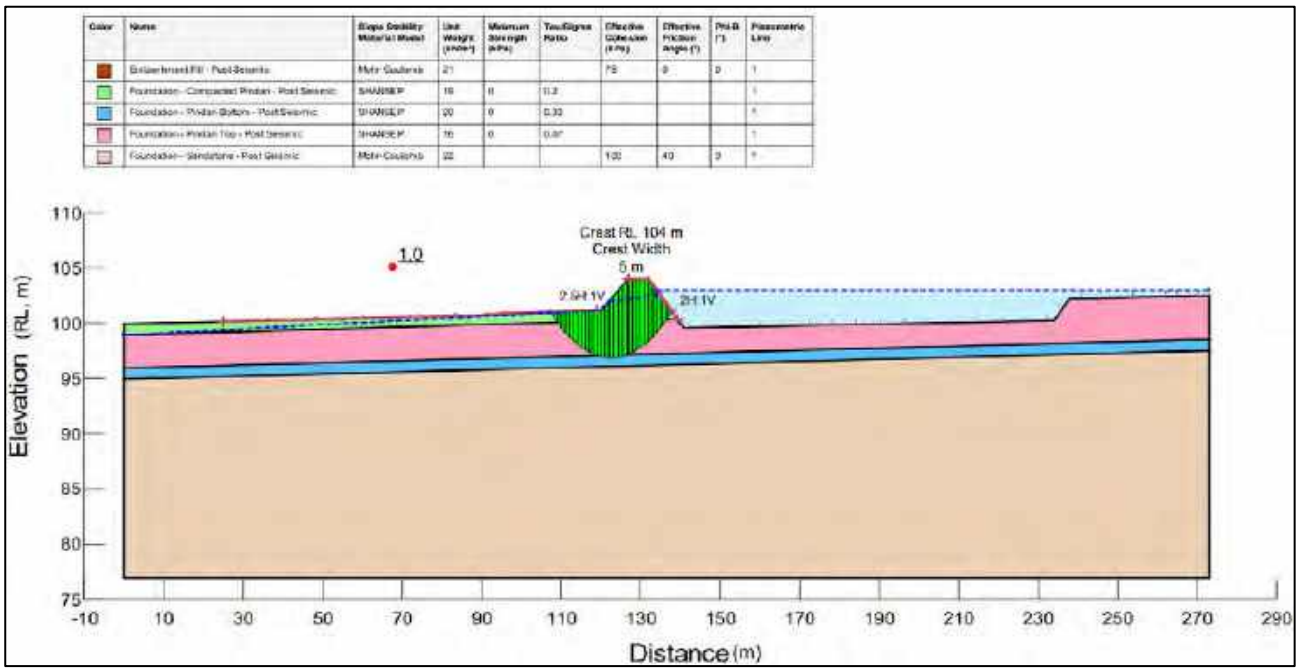


Figure 19: Recreated Stability Model – Drained

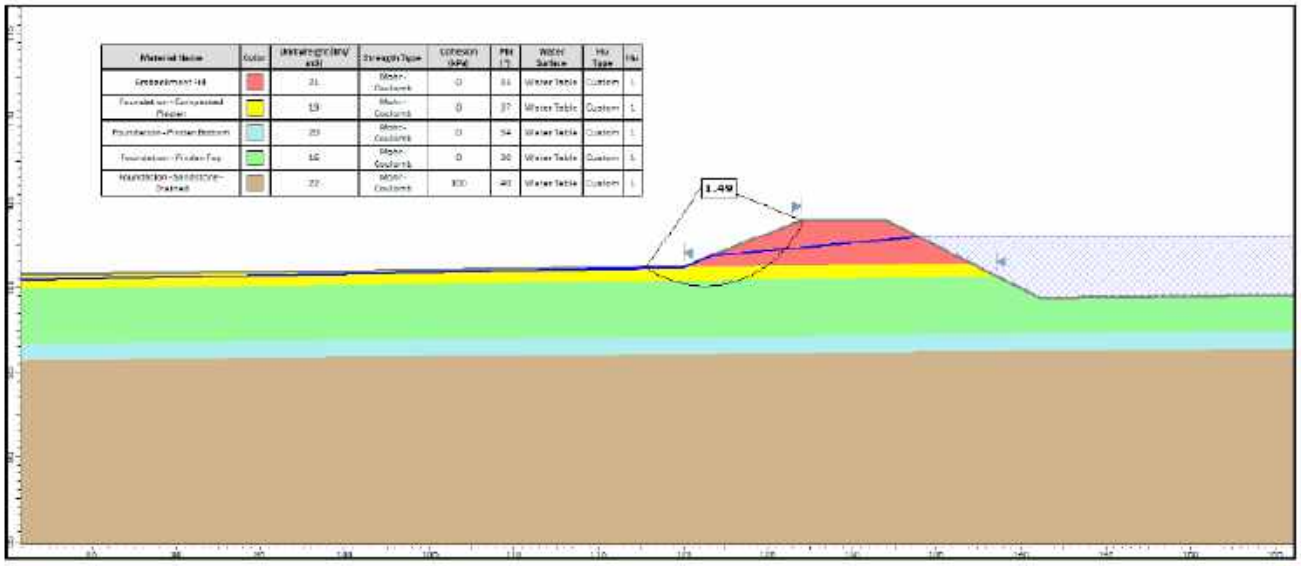


Figure 20: ATCW Stability Model – Post-seismic

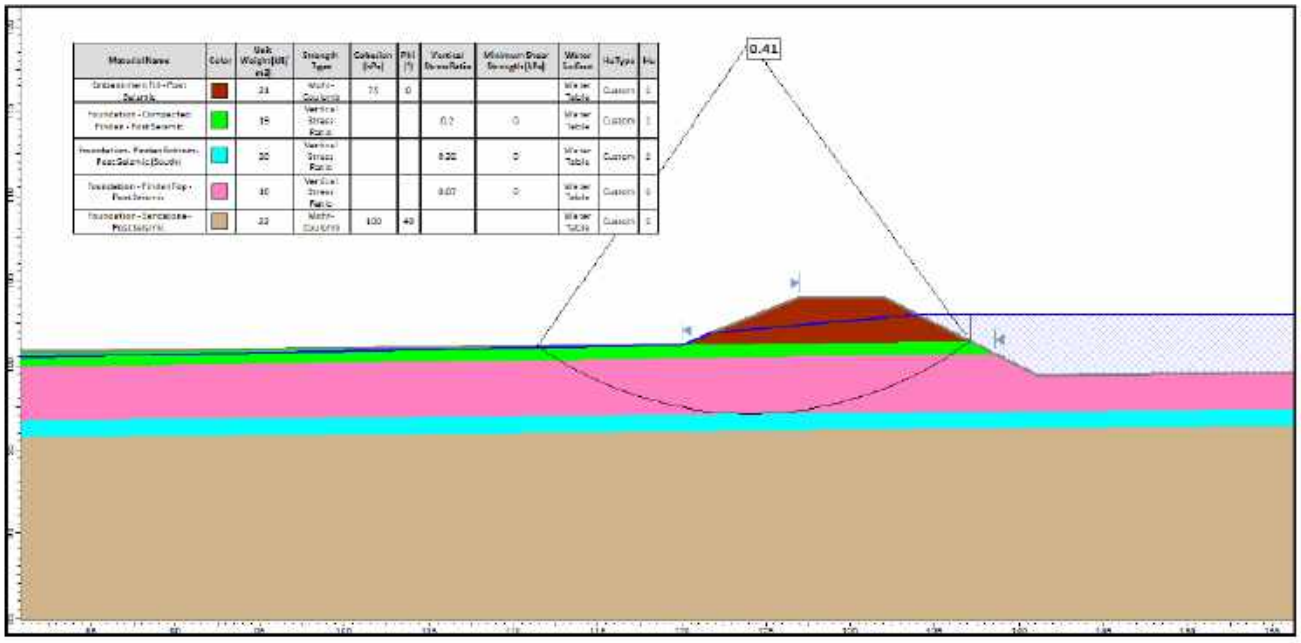


Table 7: Stability Modelling Comparison Summary

Section	Model	Condition	Factor of Safety	Minimum Required Factor of Safety
Northern Embankment	ATCW Stability Model	Post-seismic	2.8	1.0 – 1.2
	Reconstructed Model	Post-seismic	1.99	1.0 – 1.2
Decant Pocket	ATCW Stability Model	Drained	2.4	1.5
		Post-seismic	1.0	1.0 – 1.2
	Reconstructed Model	Drained	1.49	1.5
		Post-seismic	0.41	1.0 – 1.2

2.4.2 Implications for Design

The 2024 OPTSF Audit review concluded that **the facility has been at risk of post-seismic instability throughout its operation**. Best practice suggests remediation measures involving extensive earthworks such as foundational replacement (where feasible) and secondary retaining embankments to contain a potential spill. However, these issues cannot be feasibly addressed within the design of a single raise of the facility without suspension of operation and significant company and stakeholder strain.

As such, KMS proposes the continued operation of the OPTSF for Stage 3A (estimated to provide tailings capacity until July 2026). As the EoR, REC has considered the following in support of the continued operation of the OPTSF and the Stage 3A raise:

- The facility has been assessed to be at risk of instability only under post-seismic conditions.
- Facility has achieve high settled tailings dry-density of >1.8 t/m^3 (detailed in Section 5.4.1), NDMs undertaken as part of the Stage 3 QA testing indicate that the SMDD for tailings material is approximately 1.95 t/m^3 (approximately 92% SMDD) – i.e. deposited tailings have low entrained water, and failure is more likely to result in deformation and slumping rather than runouts (across the majority of the perimeter embankments).
- The facility does not retain a significant amount of water outside of the decant pocket, dam breaks resulting in water runout can only occur at the following locations:
    - OPTSF emergency spillway, spilling into the SSP.
    - Decant pocket – along the concrete access pad, embankment height of approximately 1.5 m and not raised as part of Stage 3A.
- Operating requirements to maximise water abstraction.
- Tailings are geochemically benign (detailed in Section 4.1.3).
- Additional monitoring instruments to be installed and a trigger system to be developed based on sensitivity analysis.
- Facility to be dewatered and closed after Stage 3A. Long-term risk profile to be evaluated and mitigated through monitoring and engineering measures.

REC considers the above factors important in providing a more pragmatic perspective in assessing the facility's risk profile, taking into account the failure condition (post-seismic) and its consequences (unlikely runout and chemically benign tailings). KMS is to consider the potential risks involved with the continued operation of the Stage 3A OPTSF in its deviation from best practices and ANCOLD design requirements.

3. Sub-surface Geotechnical Properties

3.1 Historical GSIs

It is understood that three Geotechnical Site Investigations (GSIs) have been undertaken for the TOPL project, these are:

- 2014 – ATCW geotechnical investigation for pit slope stability analyses and material excitability (document ref. 133094.01R01), mostly irrelevant to design of the OPTSF.
- 2016 – HATCH geotechnical investigation for infrastructure to support the BFS (document ref. H351137-0000-229-230-0001), document not available to REC.
- 2018 – ATCW geotechnical investigation for initial TSF (document ref. 113094.06R02)
- 2025 – REC cone penetration testing with pore pressure measurement (CPTu) geotechnical site investigation.

2018 ATCW GSI presents findings relevant to the Stage 3A raise of the OPTSF and will be summarised in the following sections, along with the general stratigraphy for the OPTSF area.

3.2 General Stratigraphy

The general stratigraphy for the OPTSF is summarised in Table 8.

Table 8: General OPTSF Site Stratigraphy

Soil Type	Description
Topsoil	The site features a red-brown, silty sand or sandy silt topsoil layer with roots, ranging from 0.10 to 0.20 m thick.
Pindan (Clayey Sand)	Pindan deposits were found below the topsoil layer across the site, extending to depths of 3.0 – 3.5 m. These red-brown clayey/silty sands contain low-plasticity clay fines (25 – 30%), with an increasing clay fines content through the layer. SPT results indicate the Pindan soils below 1.5 m are generally loose to medium dense, while 2018 DCP tests classified the upper Pindan layer as loose. The lower 2018 DCP values, compared to 2016 dry-season results, reflect seasonal softening due to rainfall and inundation. These lower-bound seasonal values are deemed suitable for design, considering the soils may become partially to fully saturated during tailings deposition.
Sandy Clays	Below the clayey sand Pindan layer, sandy clay materials were identified in lower elevation areas (below the 103 m AHD contour) of the TSF and SSP impoundments. These consisted of a 1 – 2 m thick red-brown sandy clay layer, with 35 – 40% clay fines, likely reworked Pindan or less winnowed original deposits. Beneath this, a yellow sandy clay layer, typically less than 1 m thick and located at or below the water table, may represent residual weathered sandstone or leached red-brown sandy clay.
Clayey Gravels	Gravelly soils, including clayey and sandy gravel, were found in the elevated north and west areas of the OPTSF site, between depths of 1.0 – 3.0 m, with a typical thickness of less than 1 m. These materials are likely of colluvial origin.
Laterite	A variable layer of laterite was identified in boreholes and test pits at the north end of the OPTSF site, at depths of 1.15 – 4.35 m and typically less than 1.5 m thick where fully penetrated. The moderately cemented red-brown laterite showed small voids, likely from unconsolidated sand or silt washed out during drilling. In one borehole, a 2 m thick layer of poorly consolidated clayey gravel with laterite banding was encountered at 3.2 m depth, inferred as a transition to underlying sandstone due to poor core recovery.
Sandstone / Siltstone	Highly weathered sandstone with minor siltstone layers was encountered beneath the superficial materials in most boreholes. The fine- to medium-grained sandstone was brown to red-brown, with low to medium strength, while the siltstone layers were medium to high strength. Conglomeratic sandstone layers (< 0.5 m thick) were identified in six boreholes. Core jointing was predominantly horizontal or sub-horizontal along bedding planes and laminations, with fractures spaced 60 – 200 mm apart, mostly clean, tight, or open with no infill.

3.3 2018 ATCW GSI

3.3.1 General

The ATCW GSI took place between April and May 2018, the work comprised the following scope:

- 61 test pits to depths of 1.2 – 4.0 m.
- 12 HQ boreholes to a maximum depth of 10.5 m.
- 12 in-situ permeability tests in selected boreholes consisting of:

- 3 Lugeon downhole packer tests.
- 9 falling head permeability tests.

Table 9 and Figure 21 presents the locations of the boreholes.

Table 9: 2018 ATCW GSI Borehole Locations

Borehole ID	Easting (m E)	Northing (m N)	Surface Elevation (RL m)	Depth (m)
BH01 TSF	497,337	8,072,004	104.0	10.0
BH02 TSF	497,427	8,071,861	105.2	10.0
BH03 TSF	497,754	8,071,834	106.6	10.0
BH04 TSF	497,411	8,071,522	104.9	10.0
BH05 TSF	497,746	8,071,511	103.7	5.0
BH06 TSF	498,054	8,071,601	105.4	10.0
BH07 TSF	498,448	8,071,310	106.2	7.5
BH08 TSF	497,981	8,071,237	103.2	7.5
BH09 TSF	497,620	8,071,077	101.8	10.5
BH10 TSF	497,390	8,070,587	98.1	5.0
BH11 TSF	498,176	8,070,461	101.1	5.0
BH12 TSF	497,936	8,070,021	97.7	5.0

Figure 21: 2018 GSI Borehole Locations

3.3.2 Index Testing

Table 10 presents the index test results of the Pindan samples gathered from boreholes and test pits. The upper 3 m of material are generally found to be silty sand / sandy silt with a typical fines content of 28% and low plasticity.

Table 10: Index Test Results

Location ID	Depth Range (m)	Compaction Density		Particle Size Distribution (%)			Atterberg Limits			
		SMDD (t/m³)	MMDD (t/m³)	Gravel	Sand	Fines	LL	PL	PI	LS
BH02 TSF	0.80 – 1.20	-	-	0	75	25	26	16	10	1.5
BH02 TSF	0.95 – 1.00	-	-	0	75	25	23	15	8	0.5
BH04 TSF	2.50 – 3.00	-	-	0	75	25	23	14	9	1.5
BH09 TSF	2.50 – 3.00	-	-	0	70	30	24	18	6	2.0
TP05 TSF	1.00 – 2.00	1.895	-	0	75	25	23	15	8	0.5
TP10 TSF	3.00 – 3.50	2.009	-	48	40	12	24	17	7	0.5
TP19 TSF	1.00 – 2.00	-	-	0	72	28	22	13	9	2.5
TP21 TSF	2.00 – 3.00	-	1.981	0	64	36	27	11	16	4.0
TP22 TSF	1.00 – 2.00	2.008	-	0	68	32	25	15	10	2.5
TP22 TSF	2.00 – 2.80	1.924	-	0	66	34	25	15	10	2.0
TP28 TSF	0.00 – 1.00	1.887	-	0	74	26	21	14	7	1.0
TP33 TSF	2.00 – 3.00	-	-	0	58	42	27	12	15	6.5
TP36 TSF	1.00 – 2.00	1.834	-	0	79	21	22	16	6	0.0
TP47 TSF	2.00 – 3.00	1.867	-	0	61	39	24	11	13	2.0
TP48 TSF	0.00 – 1.00	1.862	-	0	72	28	21	13	7	1.0
TP52 TSF	2.00 – 3.00	-	-	3	66	31	25	12	13	3.0
TP57 TSF	1.00 – 2.00	1.879	-	0	75	25	23	16	7	0.5
TP59 TSF	1.00 – 2.00	1.924	-	1	63	36	25	12	12	5.0

3.3.3 Dispersion Testing

Eight surficial samples (< 3 m depth) were tested for dispersive characteristics, these are summarised in Table 11. The Pindan material was noted to be non-dispersive, but is considered to be erodible due to its particle size distribution.

Table 11: Emerson Class and Pinhole Dispersion Test Results

Location ID	Depth Range (m)	Emerson Class	Pinhole Dispersion	Remoulded Dry Density (t/m³)	Moisture Content (%)	Rate of Flow (ml/s)
BH02 TSF	0.80 – 1.20	5	-	-	-	-
TP05 TSF	1.00 – 2.00	6	ND1	1.479	21.5	0
TP10 TSF	3.00 – 3.50	6	ND1	1.379	23.4	0
TP19 TSF	1.00 – 2.00	5	-	-	-	-
TP28 TSF	0.00 – 1.00	5	ND1	1.354	19.9	0
TP36 TSF	1.00 – 2.00	6	ND1	1.398	24.5	0
TP47 TSF	2.00 – 3.00	6	-	-	-	-
TP57 TSF	1.00 – 2.00	6	-	-	-	-

3.3.4 Permeability Testing

Table 12 summarises the outcome of the in-situ permeability. ATCW suggested that the Pindan material with < 30% fines have an approximate permeability of 2.0 x 10^{-5} m/s, increasing to 1.5 x 10^{-6} m/s with materials with > 30% fines. Additional laboratory falling head testing indicated that the permeability of Pindan material with < 30% fines (recompacted to 95% SMDD) was between 1.3 x 10^{-8} m/s and 3.5 x 10^{-7} m/s, two samples at 36% and 39% were tested to have a permeability of 1.9 x 10^{-9} m/s and 9.0 x 10^{-8} m/s respectively.

Table 12: 2018 ATCW GSI In-situ Permeability Test Results

Borehole ID	Depth Range (m)	Test Type	Permeability, k (m/s)	Stratum
BH01 TSF	7.00 – 10.00	Lugeon Packer	3.0 x 10^{-7}	Sandstone
BH02 TSF	2.60 – 3.50	Falling Head	2.6 x 10^{-5}	Pindan / Laterite
BH02 TSF	3.50 – 4.50	Lugeon Packer	2.0 x 10^{-5}	Laterite
BH03 TSF	7.50 – 10.00	Falling Head	1.5 x 10^{-6}	Sandstone
BH04 TSF	2.20 – 3.00	Falling Head	2.0 x 10^{-5}	Pindan
BH04 TSF	7.50 – 10.00	Falling Head	2.4 x 10^{-6}	Sandstone
BH05 TSF	1.50 – 3.00	Falling Head	1.5 x 10^{-5}	Pindan / Alluvium
BH06 TSF	6.00 – 10.00	Falling Head	2.1 x 10^{-6}	Sandstone
BH09 TSF	7.00 – 10.50	Lugeon Packer	6.0 x 10^{-6}	Sandstone
BH10 TSF	1.50 – 3.00	Falling Head	2.8 x 10^{-6}	Pindan
BH11 TSF	1.00 – 3.00	Falling Head	1.5 x 10^{-6}	Pindan
BH12 TSF	1.00 – 3.00	Falling Head	1.3 x 10^{-6}	Pindan

3.3.5 Triaxial Testing

Two consolidated undrained triaxial (CUTX) tests were undertaken for the surficial Pindan material, Table 13 summarises the test results. The pore pressure at failure, u'_f, for both tests was negligible.

Additionally, it is to be noted that based on the Nuclear Densitometry (NDM) undertaken for the Stage 3 construction, it is inferred that the average SMDD for the Pindan material is approximately 1.95 – 2.00 t/m^3.

Table 13: Triaxial Testing Results

Location ID	Depth Range (m)	Dry Density (t/m^3)	Effective Friction Angle, σ' (Degrees)	Cohesion, C' (kPa)
BH04 TSF	2.50 – 3.00	1.88	32.6	16.2
BH09 TSF	2.50 – 3.00	1.79	33.4	8.8

3.3.6 Standard Penetration Testing

Standard Penetration Tests (SPTs) were undertaken as part of the 2018 ATCW GSI, Table 14 summarises the SPT results.

Table 14: 2018 ATCW GSI SPT Summary

Location ID	Depth Range (m)	SPT N-value			
		0 – 150 mm	150 – 300 mm	300 – 450 mm	N_m
BH01 TSF	1.50 – 1.95	20	20	Refusal*	20
BH02 TSF	1.50 – 1.95	1	1	1	2
BH03 TSF	1.50 – 1.95	2	3	4	7
BH04 TSF	1.50 – 1.95	1	1	2	3
	3.00 – 3.45	1	1	2	3
	4.50 – 4.95	10	20*	30	30
BH05 TSF	1.50 – 1.95	1	1	1	2
	3.00 – 3.45	0	0	2	2
	4.50 – 4.95	4	8	6*	8
BH06 TSF	1.50 – 1.95	2	2	3	5
BH07 TSF	1.50 – 1.95	1	1	0	1
	3.00 – 3.45	0	1	1	2
	4.50 – 4.95	10	5	4	9
BH08 TSF	1.50 – 1.95	0	1	1	2
	3.00 – 3.45	0	1	1	2
	4.50 – 4.95	5	11	9	20
BH09 TSF	1.50 – 1.95	0	1	1	2
	2.50 – 3.00	1	2	2	4
	4.50 – 4.95	3	3	6	9
BH10 TSF	1.50 – 1.95	1	2	2	4
	3.00 – 3.45	1	2	2	4
	4.50 – 4.95	2	2	2	4
BH11 TSF	1.50 – 1.95	0	1	1	2
	3.00 – 3.45	1	1	2	3
	4.50 – 4.95	3	3	5	8
BH12 TSF	1.50 – 1.95	0	1	1	2
	3.00 – 3.45	0	0	1	1
	4.50 – 4.95	2	4	6	10

Notes: * - SPT results presented in drill logs are unclear / ambiguous, values are assumed based on interpretation of formatting.

3.4 2025 REC CPTu GSI

3.4.1 Background

As detailed in the Q4 2024 Engineer of Record (EoR) Report, as part of the Stage 3A detailed design works, REC has undertaken an assessment of liquefaction potential using SPT results collected during the 2018 ATCW GSI. Foundation materials up to approximately 4 m below ground surface level were identified to be at potential risk of liquefaction under SEE loading conditions. These findings are consistent with earlier ATCW assessments, which employed an alternative method, intended as a screening evaluation for liquefaction potential. This alignment strongly suggests that the foundation is prone to liquefaction and thus poses a major stability risk.

REC recommended further GSIs to be undertaken to assess the in-situ condition of the foundation beneath the existing embankments across the perimeter of the OPTSF to assess the following:

- The effectiveness of dynamic compaction undertaken during early stages of embankment construction.
- The depth of liquefaction potential of the in-situ embankment,

3.4.2 General

The REC CPTu GSI took place between late January to February 2025, the work comprised the following scope:

- 12 CPTus undertaken across 10 locations.
- Dissipation tests where positive pore water pressure was encountered as select depths.
- 4 undisturbed sampling (UDS) at select depths.

Table 15 and Figure 22 presents the locations of the CPTus.

Table 15: Details of CPTu Locations

CPTu ID	Easting (m E)	Northing (m N)	Elevation (RL m)	Termination Depth (m)
CPTu01 / CPTu01A	497,562	8,071,908	112.5	9.38
CPTu02	498,202	8,071,486	110.4	8.58
CPTu03	498,545	8,071,209	110.4	6.34
CPTu04	498,558	8,071,216	107.5	3.54
CPTu05	498,613	8,070,923	109.4	8.64
CPTu06	498,626	8,070,923	107.2	6.00
CPTu07	498,352	8,070,516	105.1	8.04
CPTu08 / CPTu08A	498,067	8,070,572	104.1	7.88
CPTu09	497,903	8,070,760	105.4	9.50
CPTu10	497,712	8,070,981	106.2	8.78

Figure 22: 2025 REC CPTu GSI Locations

3.4.3 Foundation Conditions

Table 16 summarises the inferred elevation of the phreatic level, contractive regions, and competent layer at the CPTu test locations. Contractive regions are identified based on a consistent state parameter estimations (ψ) lower than -0.05.

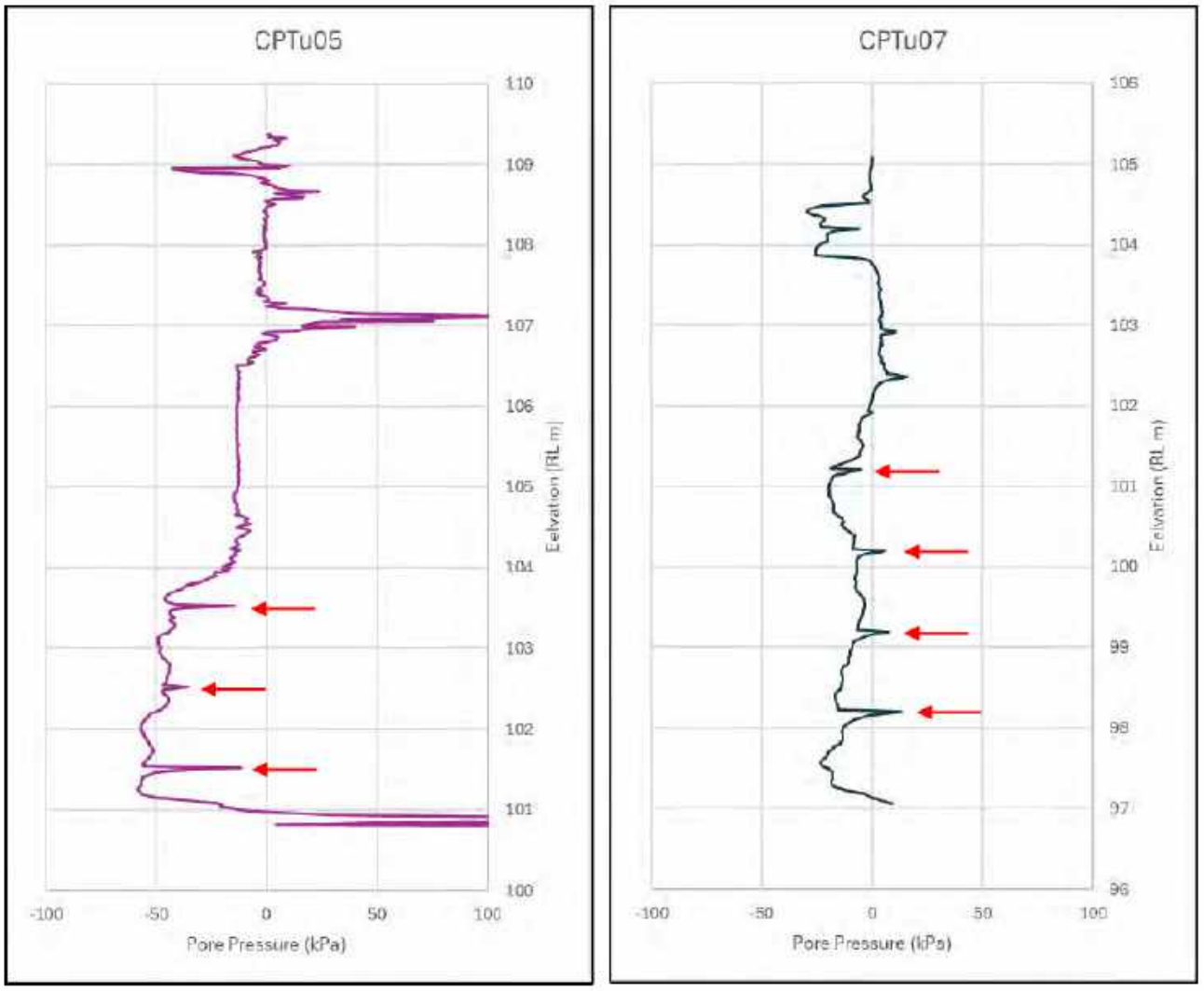
Table 16: Inferred Stratigraphy

CPTu ID	Inferred Phreatic Elevation (RL m)	Inferred Contractive Region (RL m)	Inferred Competent Layer Elevation (RL m)
CPTu 01A	103.3 Note A	103.3 – 104.0	103.3
CPTu 02	106.0 Note A	102.4 – 102.9 104.3 – 104.7	101.8
CPTu 03	107.2 Note A	Not consistently encountered	104.1
CPTu 04	106.5 Note A	Not consistently encountered	104.0
CPTu 05	105.5 Note A	101.3 – 106.0	100.8
CPTu 06	104.6 Note A	101.7 – 106.2	101.2
CPTu 07	101.6 Note A	97.1 – 102.0	97.1
CPTu 08A	101.4	Not consistently encountered	96.2
CPTu 09	101.5 Note A	97.0 – 98.7 99.6 – 100.6	95.9
CPTu 10	102.2	97.0 – 101.2	97.0
Notes: A – Water level derived manually via dipping and should be used as a guide only.			

The general pore pressure recordings are zero or sub-zero across the majority of the embankment footprint. However, this could be due to localised dilatancy that arises from initial soil particle displacement during probing. Behaviour matching rapid dissipation can be observed on CPTu 05 and CPTu 07 presented in Figure 23. This behaviour takes form in 1 m increments when CPTu

probing pauses as the operator loads the next rod. As such, the phreatic table should be considered per manual dipping measurements and dissipation tests.

Figure 23: Typical Pore Pressure Reading



3.4.4 State Parameter

The state parameter of the foundation material was evaluated using the normalized clean sand equivalent ($Q_{tn,cs}$) to infer the in-situ conditions and dilatancy of the material. Periodic spikes in the state parameter have been observed at specific locations (CPTu05 and CPTu06), which may be attributed to similar factors as the pore water pressure spikes discussed in the previous section. As such, these spikes are considered representative of the in-situ foundation conditions.

Based on the state parameters assessed, it is inferred that the foundation is liquefiable for up to between 2.5 – 5.0 m depth across the embankment footprint, with the highest liquefiable depths at the location of CPTu05, 06, 07, and 10 located on the Eastern to the Southern region of the OPTSF near the internal retaining embankment.

Figure 24 to Figure 26 presents the assessed state parameter of the CPTu profiles and the corresponding inferred liquefiable zones.

Figure 24: 2025 REC CPTu GSI State Parameter (CPTu01A, 02, 03, and 04)

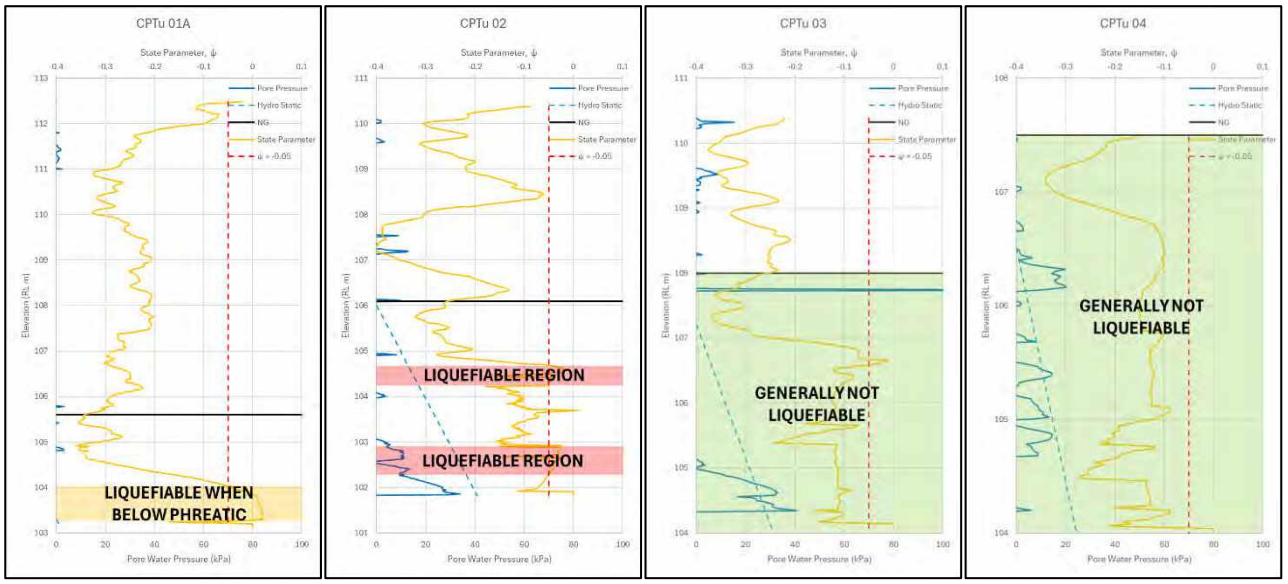


Figure 25: 2025 REC CPTu GSI State Parameter (CPTu05, 06, 07, and 08A)

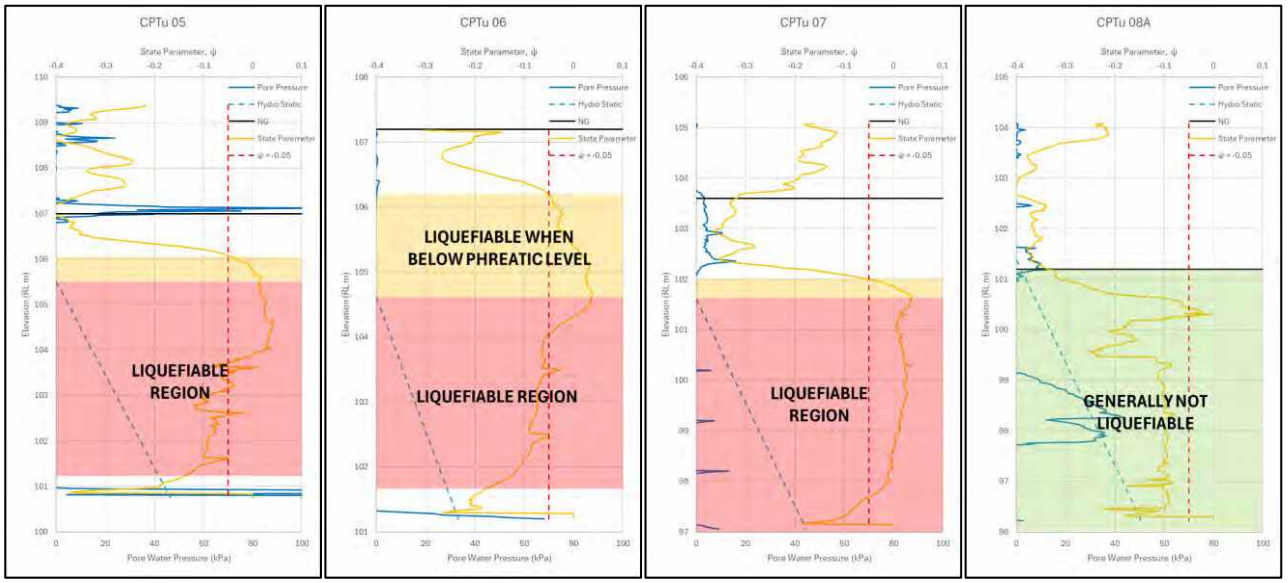
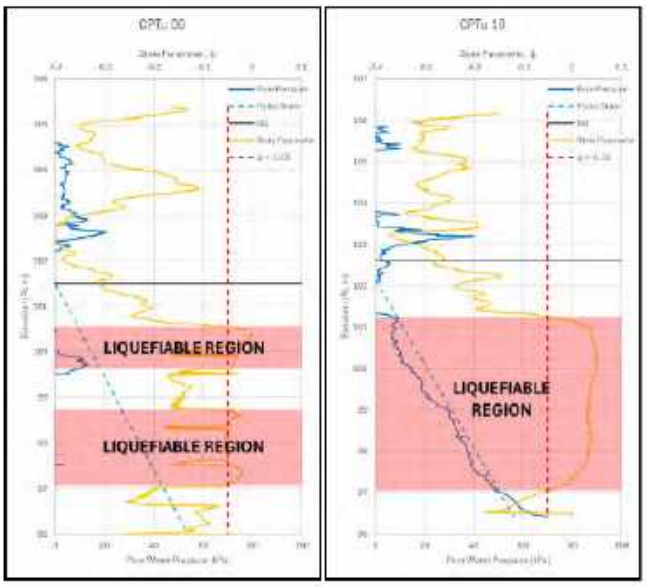


Figure 26: 2025 REC CPTu GSI State Parameter (CPTu09 and 10)



3.4.5 Laboratory Testing

3.4.5.1 General

Four undisturbed samples were gathered at selected locations as part of the CPTu GSI. The following laboratory testing was undertaken on the samples:

- PSD with hydrometer
- Atterberg limits
- Multi-stage consolidated undrained triaxial tests (CUTX)

Table 17 summarises the details of the collected samples. Test certificate are attached in Appendix I.

Table 17: 2025 REC CPTu GSI UDS Summary

Sample ID	Depth Range (m)	Approximate Depth Range Below NG (m)
CPTu03 Note A	5.0 – 5.5	2.6 – 3.1
CPTu04	2.5 – 3.0	2.5 – 3.0
CPTu06	3.0 – 3.5	3.0 – 3.5
CPTu10 Note A	5.5 – 6.0	2.0 – 2.5
Notes: A – CPTu undertaken on perimeter embankment, understood to have undergone impact rolling.		

3.4.5.2 Index Testing

Based on the laboratory testing of CPTu samples from various depths, the subsurface materials can be characterised as relatively consistent silty sands with some clay content. The samples show liquid limits ranging from 21.5% to 24.3%, with plasticity indices of 6.5 to 9.3, indicating low to medium plasticity. Particle densities are fairly uniform across all samples (2.49-2.56 t/m³).

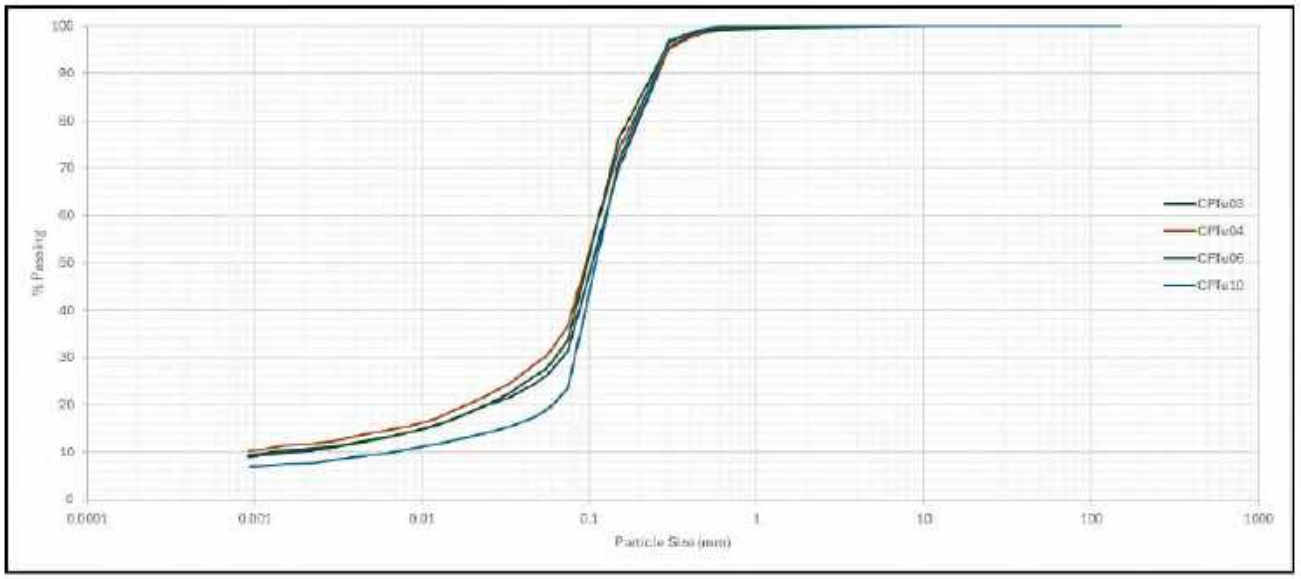
Grain size analyses indicate that the materials contain significant fine fractions, with 23.5 – 36.7% passing the 0.075mm sieve. The CPTu04 sample contains the highest percentage of fines at 36.7%, while the CPTu10 sample contains the lowest at 23.5%. Moisture contents generally range from 13% to 20% across all samples, with shrinkage limits between 11.4% and 14.3%. These characteristics suggest moderately compacted, fine-grained soils with some variability in composition but overall consistent geotechnical properties throughout the investigated locations.

Table 18 summarises the material index of the tested samples. Figure 27 presents the PSD of the samples.

Table 18: 2025 REC GSI Material Index Summary

Sample ID	Depth Below NG (m)	Liquid Limit (%)	Plastic Limit (%)	Linear Shrinkage (%)	% Passing 0.075 mm	Specific Gravity (2.36 mm Particle)
CPTu03	2.6 – 3.1	21.5	15.1	3.1	31.4	2.55
CPTu04	2.5 – 3.0	24.3	15.0	4.8	36.7	2.55
CPTu06	3.0 – 3.5	23.8	16.1	3.8	33.6	2.56
CPTu10	2.0 – 2.5	21.6	12.9	4.5	23.5	2.49

Figure 27: 2025 REC GSI PSD Results



3.4.5.3 Consolidated Undrained Triaxial Testing

Three-stage consolidated undrained triaxial (CUTX) tests were conducted on the selected samples. It is generally inferred that the foundation has a friction angle between ranges of 35 – 38 degrees, CPTu04 indicated behaviours more aligned with clay, aligning with the fact that CPTu04 sample has higher fines content compared to the other samples.

It is understood that impact rolling was undertaken as part of the foundation preparation, thus resulting in higher strength parameters compared to those outlined in Section 3.3.5. Table 19 summarises the outcomes of the CUTX and the inferred strength parameters.

Table 19: 2025 REC GSI CUTX Results

Sample ID	Stage	Principal Stresses (kPa)				Inferred Parameters	
		σ_3	σ'_1	σ'_3	u'_f	φ' (°)	c' (kPa)
CPTu03	1	136	241	56	80	35.5	9.1
	2	206	297	66	140		
	3	289	368	89	200		
CPTu04	1	119	234	39	80	28.2	37.8
	2	208	318	68	140		
	3	289	373	89	200		
CPTu06	1	134	248	54	80	37.3	8.0
	2	216	349	76	140		
	3	340	602	140	200		
CPTu10	1	132	255	52	80	38.1	10.0
	2	243	490	103	140		
	3	341	627	141	200		

3.5 Foundation Parameters

Based on the review of historical foundation geotechnical data, the foundation stratigraphy can be generalised to a surficial pindan material, increasing in fines content with depth, particularly below 1.5 m. The Pindan material overlays the extremely weathered sandstone of low to medium strength at variable depth. The general stratigraphy and its inferred parameters are summarised below:

- Compacted pindan foundation (0 m – 2 m)
  - Bulk density, ρ = 20 kN/m^3
  - Friction angle, ϕ' = 34.0°
  - Permeability, k = 1.0 x 10^{-9} m/s
- Uncompacted pindan foundation (0 m – 4 m):
  - Bulk density, ρ = 18.5 kN/m^3
  - Friction angle, ϕ' = 32.5°
  - Undrained shear strength ratio, S_u/σ'_v = 0.40
  - Permeability, k = 8.0 x 10^{-5} m/s
- Extremely weathered sandstone (> 4 m)
  - Bulk density, ρ = 22 kN/m^3
  - Friction angle, ϕ' = 40.0°
  - Cohesion, C' = 55 kPa
  - Permeability, k = 6.0 x 10^{-6} m/s

4. Tailings Properties

4.1 Tailings Geotechnical Characteristics

4.1.1 2017 Tailings Laboratory Testing

4.1.1.1 General

Preliminary tailings testing was conducted on composite tailings with a solids concentration of 45%, 39%, and 47%. The test work undertaken is as follows:

- Index testing.
    - Specific Gravity
    - Particle size distribution
    - Hydrometer
    - Atterberg limits
- Slurry consolidometer tests.
- undrained settling test.
- Shrinkage Testing (Air drying).
- Drying Columns.
- Strength testing.
    - Direct simple shear (DSS) tests.
    - Isotopically consolidated undrained (CIU) triaxial tests.

The sample details are summarised in Table 20.

Table 20: Preliminary Tailings Testing Samples Summary

Sample ID	Sand and slimes ratio per sample type		Solids Content (% w/w)
	% Sand by Mass	% Slimes by Mass	
Sand	100	0	92*
Slimes	0	100	31-33*
Primary Composite	76	24	45
Upper Composite	66	34	39
Lower Composite	81	19	47
Notes: * as received			

4.1.1.2 Material Index

The preliminary tailings test work (composite samples) indicates that the tailings have a fines content ranging from 26% to 39% with an average of 32%. Additionally, the tailings have a liquid limit between 14.0% to 15.0% and a plastic index of 1.0% to 6.0%. Table 21 summarises the index results of the tailings samples, Figure 28 and Figure 29 presents the PSD curves and the Atterberg limit chart.

Table 21: Tailings Index Test Result Summary

Parameter	Sand	Slimes	Primary Composite	Upper Composite	Lower Composite
% finer than 75 µm	9.0	98.0	31.0	39.0	26.0
% finer than 2 µm	-	38.0	11.0	15.0	10.0
Liquid Limit (%)	-	34.0	14.0	15.0	14.0
Plastic Limit (%)	-	21.0	8.0	13.0	13.0
Plasticity Index (%)	-	13.0	6.0	2.0	1.0
Specific Gravity	2.68	3.06	2.77*	2.81*	2.75*
Notes: * values estimated by weighted averaging of Sand and Slimes results					

Figure 28: Tailings PSD Curve

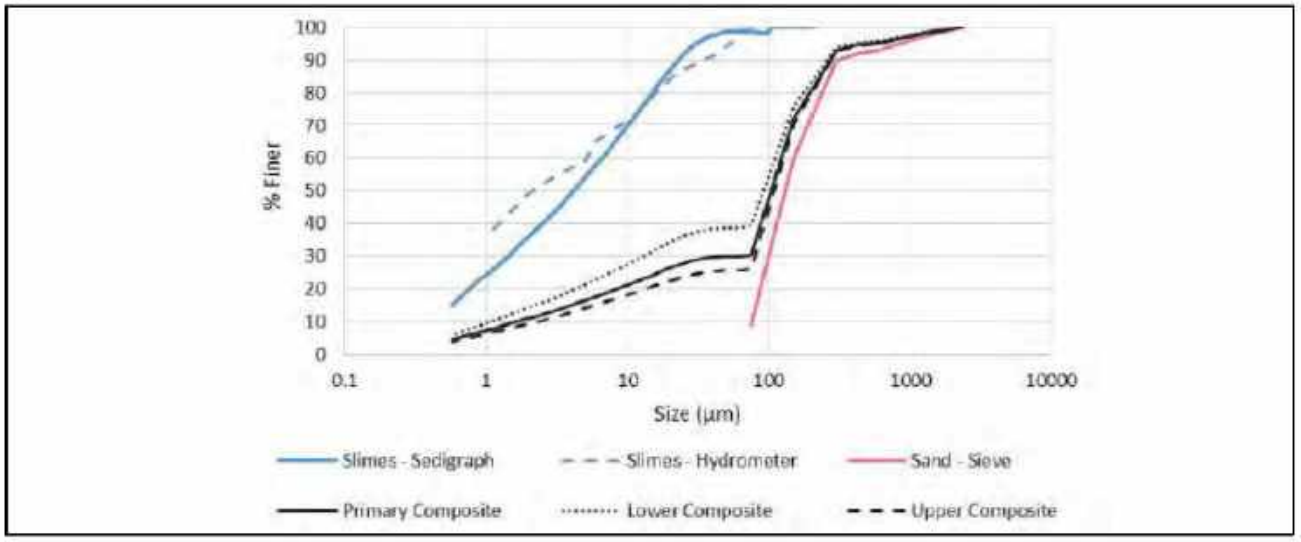
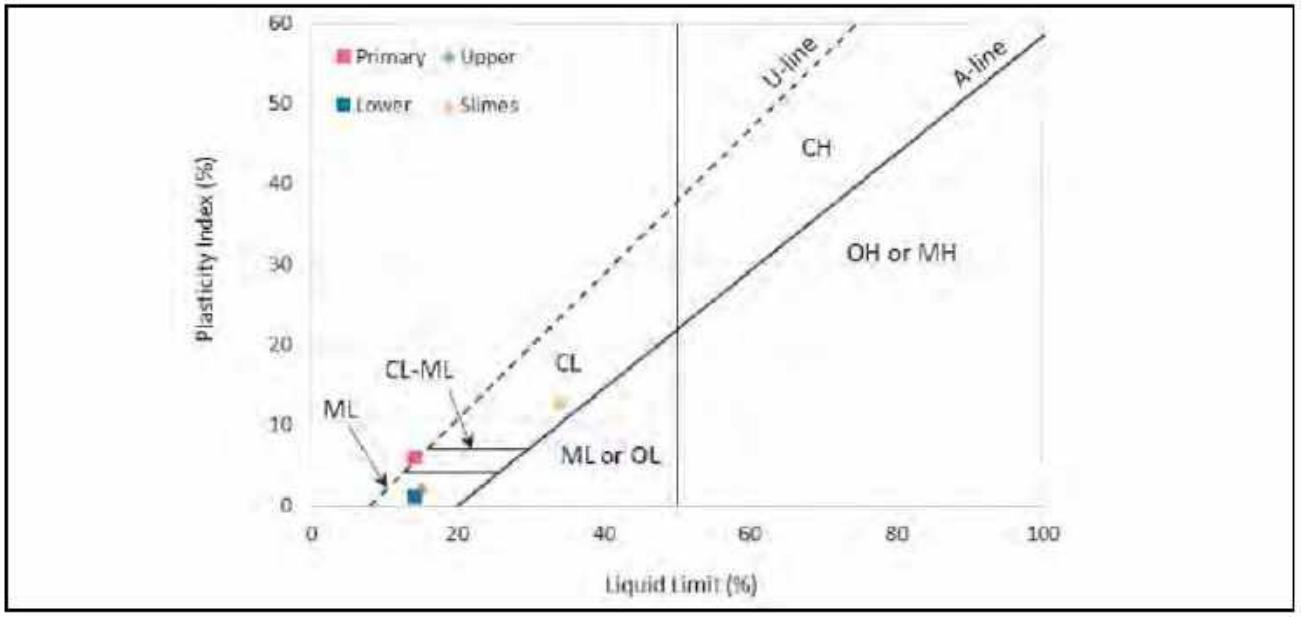


Figure 29: Tailings Atterberg Limits



4.1.1.3 Rate of Consolidation and Hydraulic Conductivity

The rate of consolidation and hydraulic conductivity estimates obtained from slurry consolidometer testing are shown in Figure 30 and Figure 31.

Figure 30: Coefficient of Consolidation Versus Vertical Effective Stress

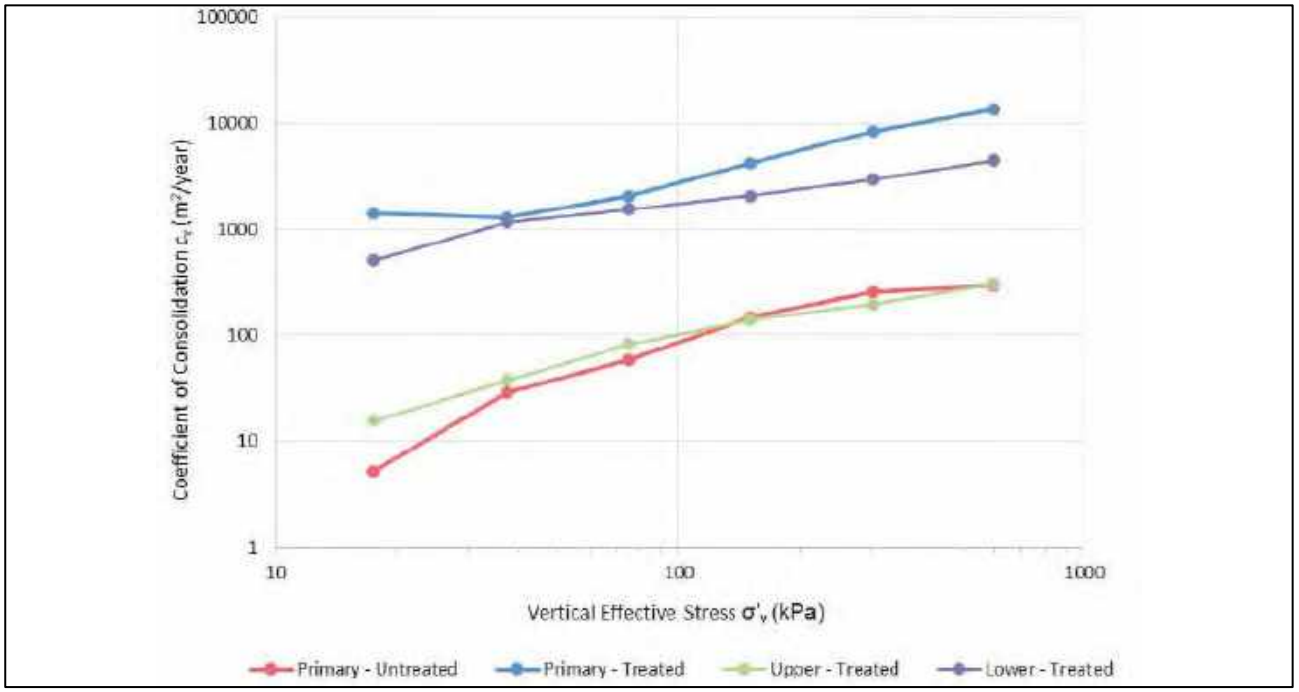
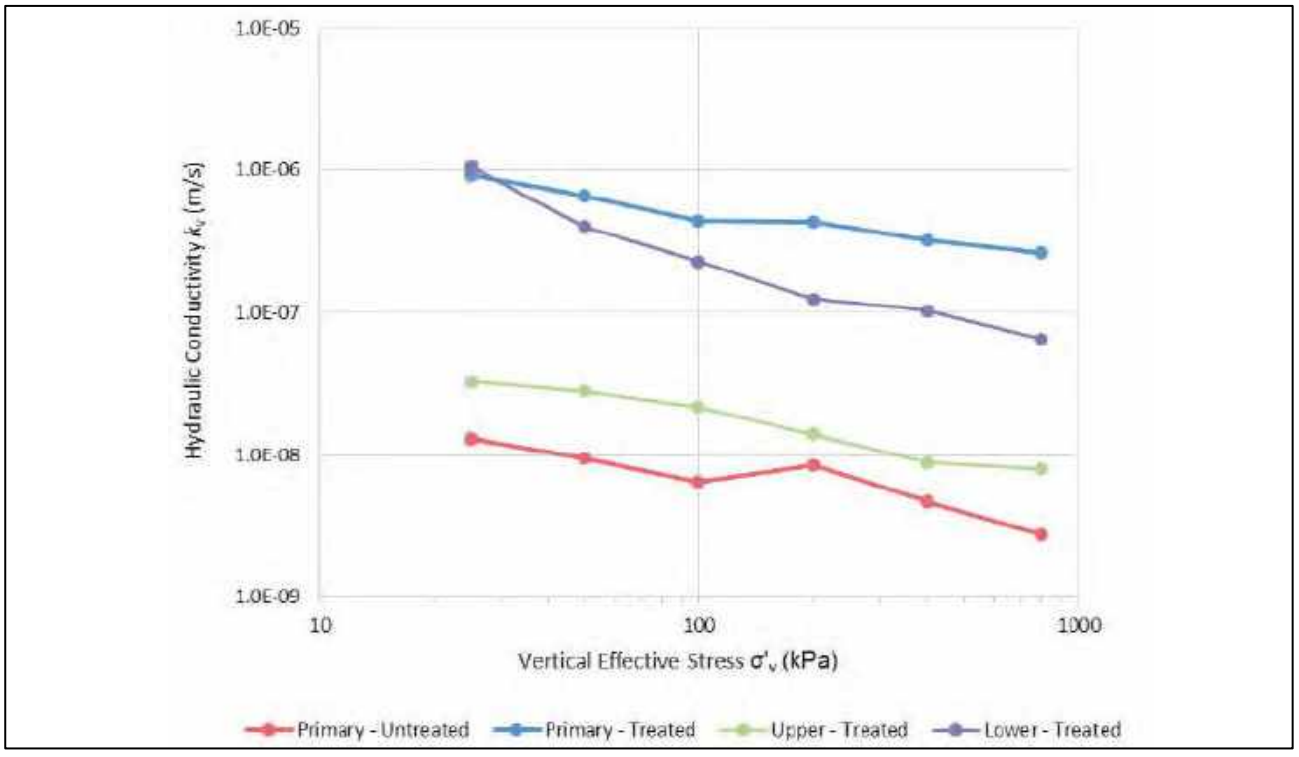


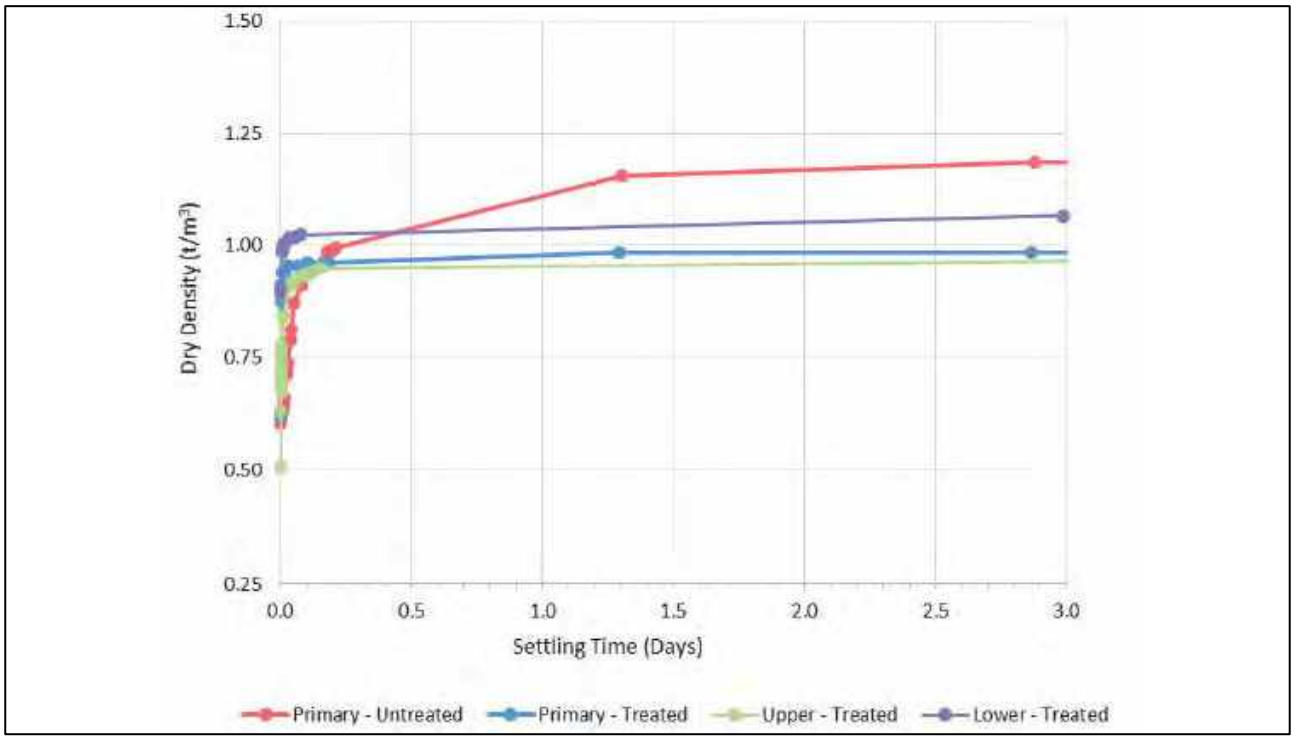
Figure 31: Hydraulic Conductivity Versus Vertical Effective Stress



4.1.1.4 Settling Tests

Figure 32 presents the outcomes of the settlement testing for the undrained condition, the solid lines indicate the dry density.

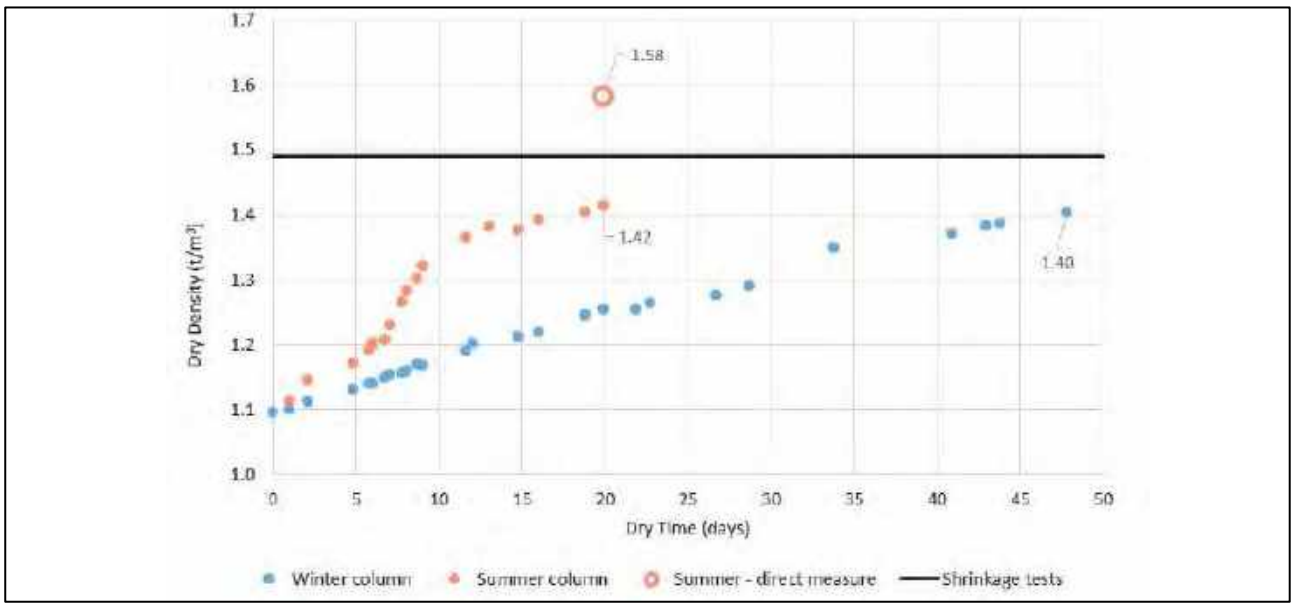
Figure 32: Undrained Settlement Test Results



4.1.1.5 Air Drying (Shrinkage Testing)

Figure 33 shows the correlation between dry density and dry time for the shrinkage tests.

Figure 33: Dry Density Versus Time



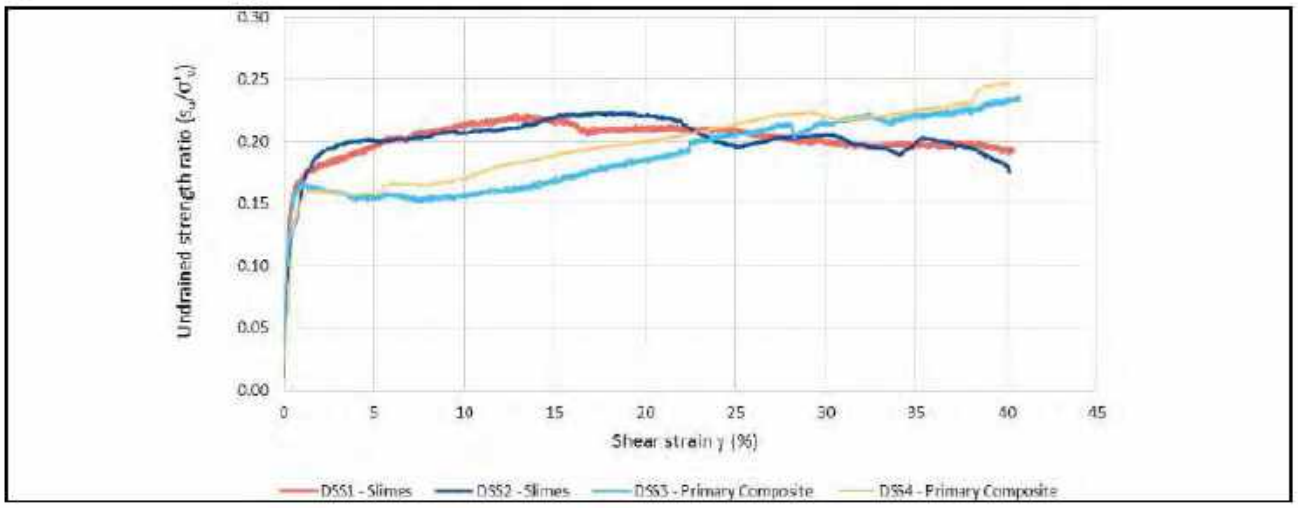
4.1.1.6 DSS Tests

The results of the DSS tests are summarized in Table 22, and the normalized undrained strength versus strain is presented in Figure 34.

Table 22: DSS Test Result Summary

Test Number	Material Type	Consolidated Vertical Effective Stress ∑'v	Max. Undrained Strength Ratio
1	Slimes	100	0.23
2	Slimes	200	0.23
3	Primary Composite	100	0.24
4	Primary Composite	200	0.25

Figure 34: Undrained Strength Ratio Versus Shear strain



4.1.1.7 Triaxial Tests

The results of the test consolidation stresses and effective friction are presented in Table 23 and Table 24. Additionally, the stress paths for each set of tests are summarized in Figure 35 and Figure 36.

Table 23: Primary Composite Test Results

Test Number	Preparation Type	Consolidated p' (kPa)	Peak Effective Frictional Strength			
			p' (kPa)	q (kPa)	M_{tc}	ϕ' (deg)
1	From Column	100	72.4	99.7	1.38	34.1
3	Moist tamped	200	18.6	20.1	1.08	27.2
4	Moist tamped	400	51.3	59.7	1.16	29.2
				Average	1.21	30.2

Figure 35: Primary Composite Tests – Cambridge plot

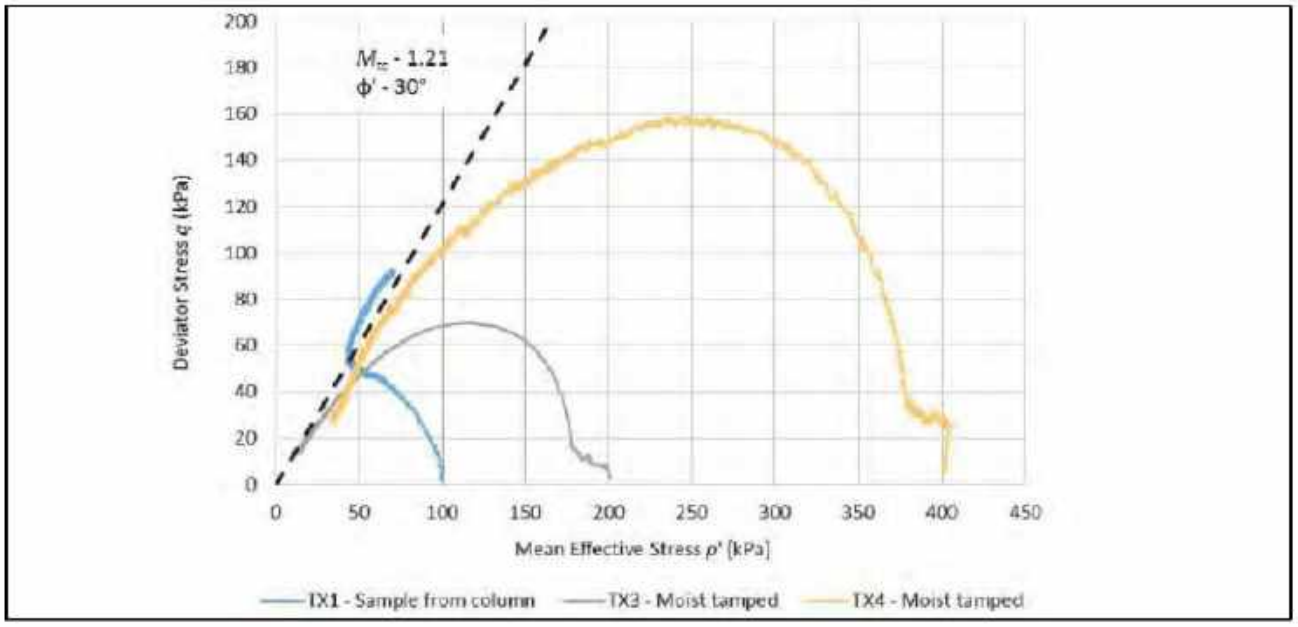
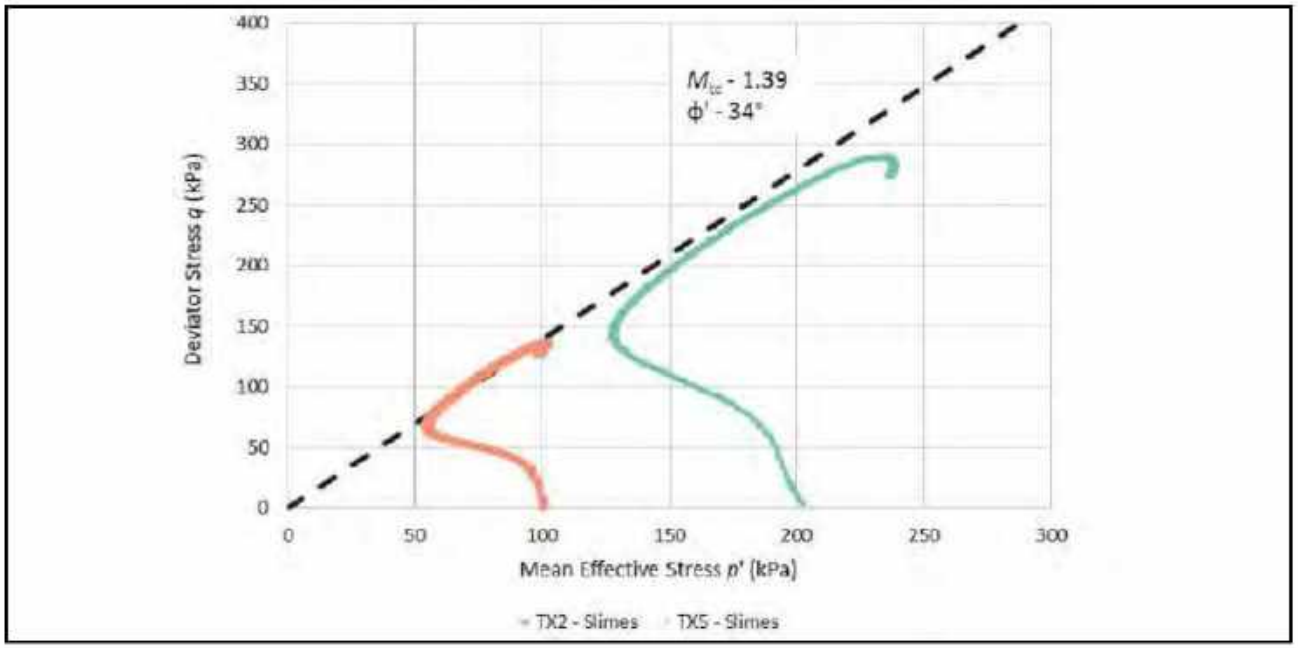


Table 24: Slimes test results

Test Number	Preparation Type	Consolidated p' (kPa)	Peak Effective Frictional Strength			
			p' (kPa)	q (kPa)	M_{tc}	ϕ' (deg)
2	From Column	100	75.6	110.4	1.46	36.0
5	From Column	200	174.0	230.0	1.32	32.8
				Average	1.39	34.4

Figure 36: Slimes tests – Cambridge plot



4.1.2 2018 Tailings Laboratory Testing

4.1.2.1 General

Preliminary tailings testing has been undertaken for tailings with a solid concentration of 47.3%. The test work undertaken is as follows:

- pH and conductivity.
- Particle density.
- Plasticity and shrinkage (Atterberg) limits.
- Particle size distribution (PSD).
- Moisture content.
- Drained tray settling test.
- Shear Strength.

The sample details are summarised in Table 25.

Table 25: Preliminary Tailings Testing Samples Summary

Sample ID	Sample Number	Solids Content (% w/w)
Sand Material	32617	Unsaturated
Slimes Material – Sample 1	32717	34.7
Decant Water Slimes Sample 1	32817	-
Slimes Material – Sample 2	00118	-
Combined sand and slimes sample (79% sand / 21% slimes)	32917	-
Notes: * as received		

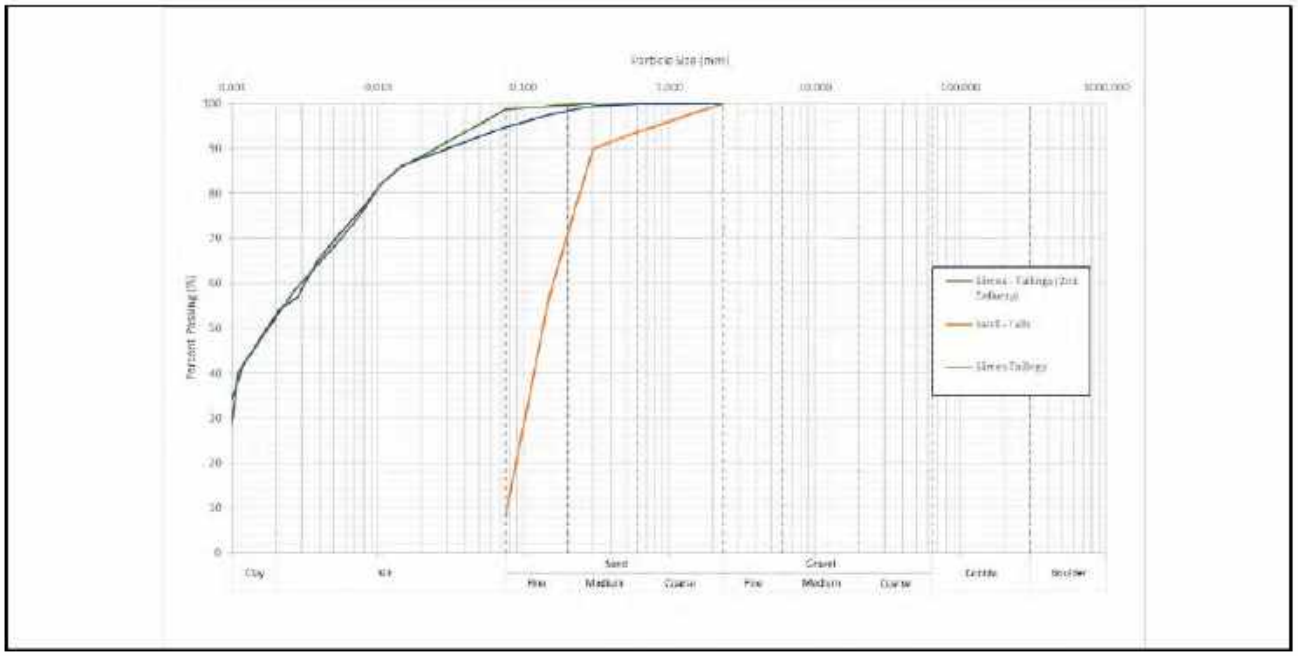
4.1.2.2 Material Index

The preliminary tailings test work indicates that the tailings have a fines content ranging from 8.2% to 98.6% with an average of 67.2%. Additionally, the tailings have a liquid limit between 44.0% and a plastic index of 19.0%. Table 26 summarises the material characterisation of the tailings samples and Figure 37 presents the PSD curves.

Table 26: Material Characterisation Summary

Parameter	Sand Material	Slimes Material – Sample 1	Decant Water Slimes Sample 1	Slimes Material – Sample 2	Combined sand and slimes sample (79% sand / 21% slimes)
% finer than 75 µm	8.2 (9)	94.8 (98)	-	98.6	-
% finer than 2 µm	-	53 (38)	-	53	-
Liquid Limit (%)	-	44 (34)	-	-	-
Plastic Limit (%)	-	25 (21)	-	-	-
Plasticity Index (%)	-	19 (13)	-	-	-
Moisture Content (as received), %	5.8	-	-	-	-
pH	-	6.5	7.3	-	-
Particle Density	2.76 (2.68)	3.06 (3.06)	-	3.08	2.76[1]
Notes: [1]Calculated on proportional weighted average.					

Figure 37: Tailings PSD Curve



4.1.2.3 Drained Tray Settling Test

Table 27 provides a summary of the data obtained from the drained tray settling tests. Graphical representations of the data are shown in Figure 38 and Figure 39.

Table 27: Drained tray settling test results

Property	Suction 5 kPa Test 1	Suction 10 kPa Test 1	Suction 5 kPa Test 2
Initial Solids Concentration (%w/w) including flocculant dilution water	54.00	54.00	54.00
Final Solids Concentration (%w/w)	76.85	75.56	76.06
Final Dry Density (t/m³)	1.52	1.47	1.49
Bleed Water (m³/tonne of initial solids)	0.55	0.52	0.53

Figure 38: Height versus Time

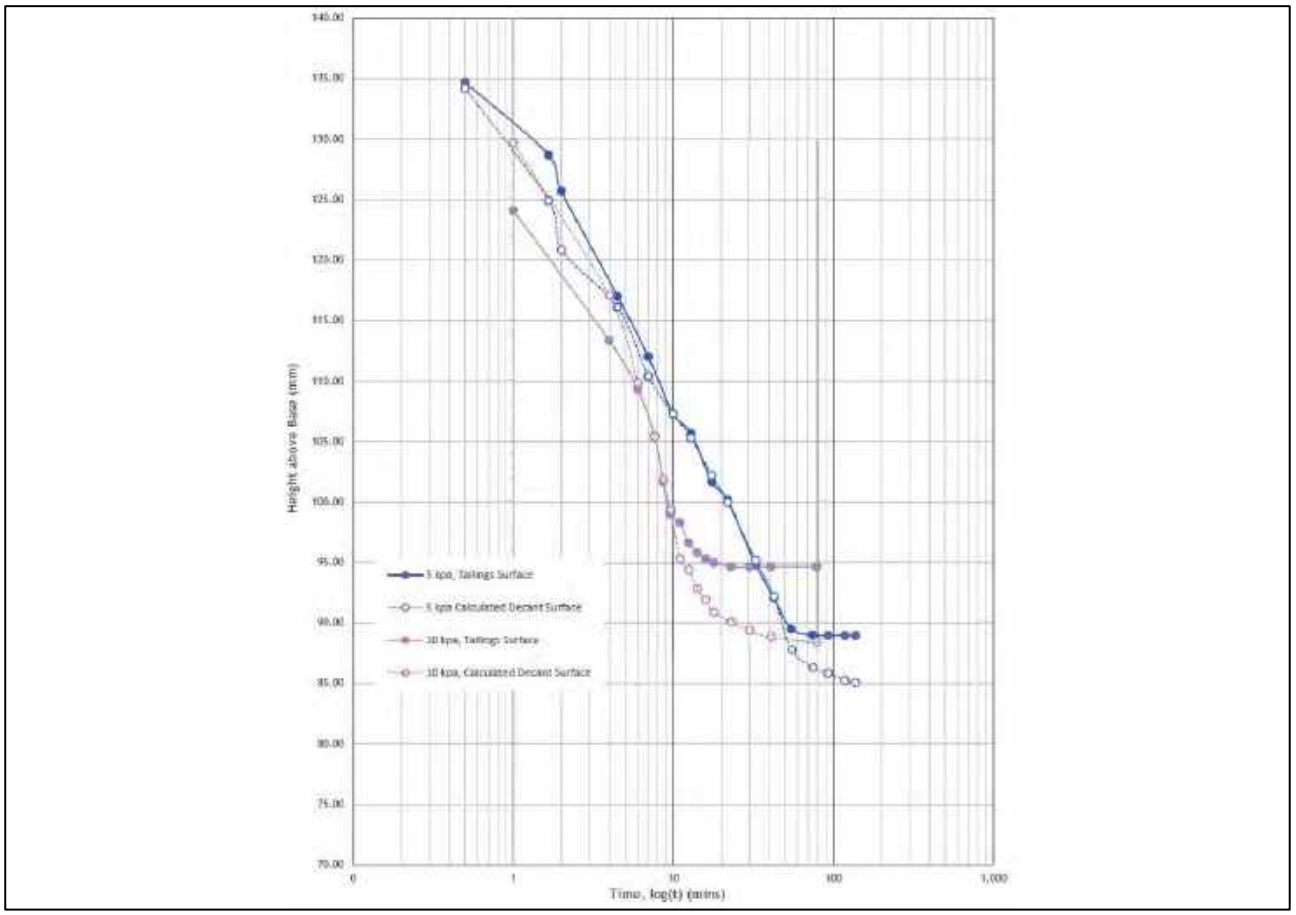
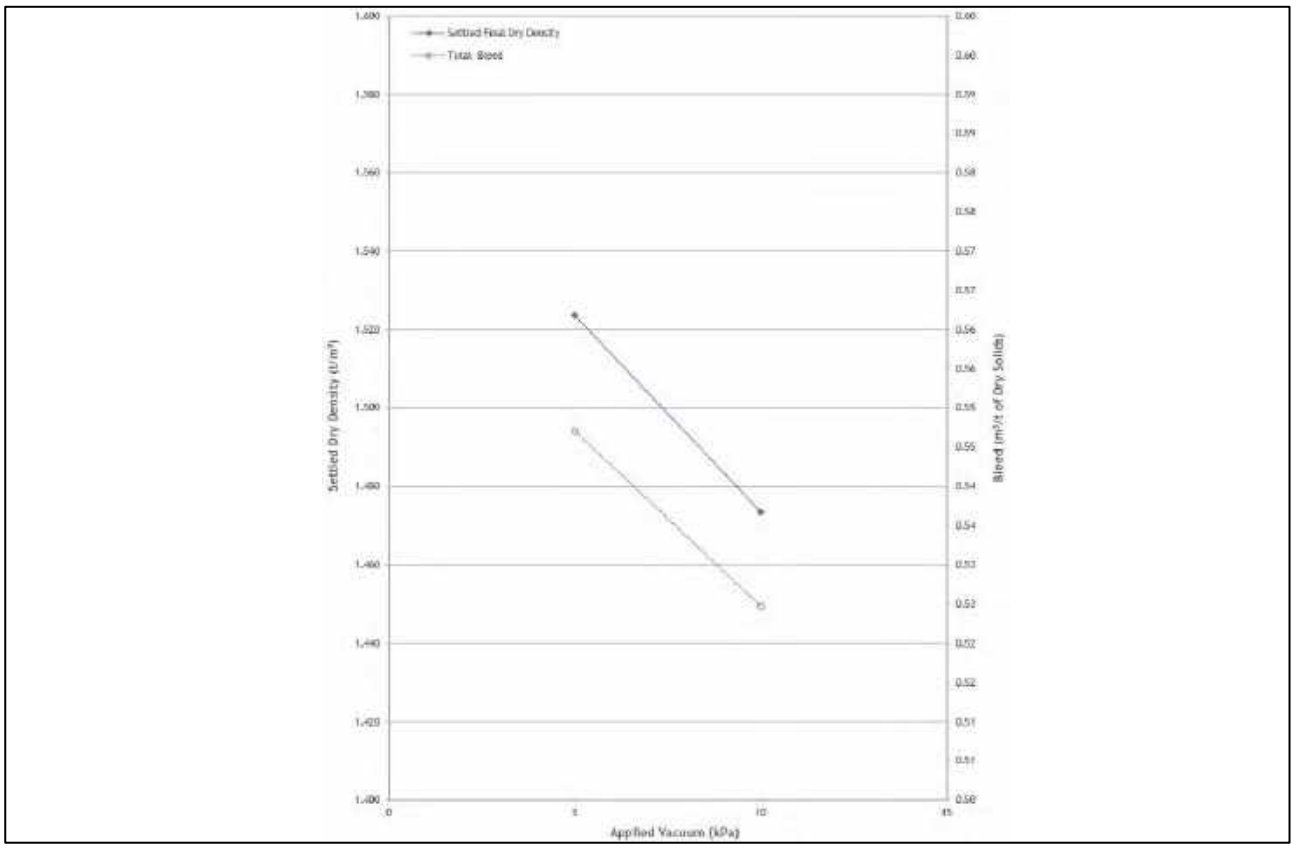


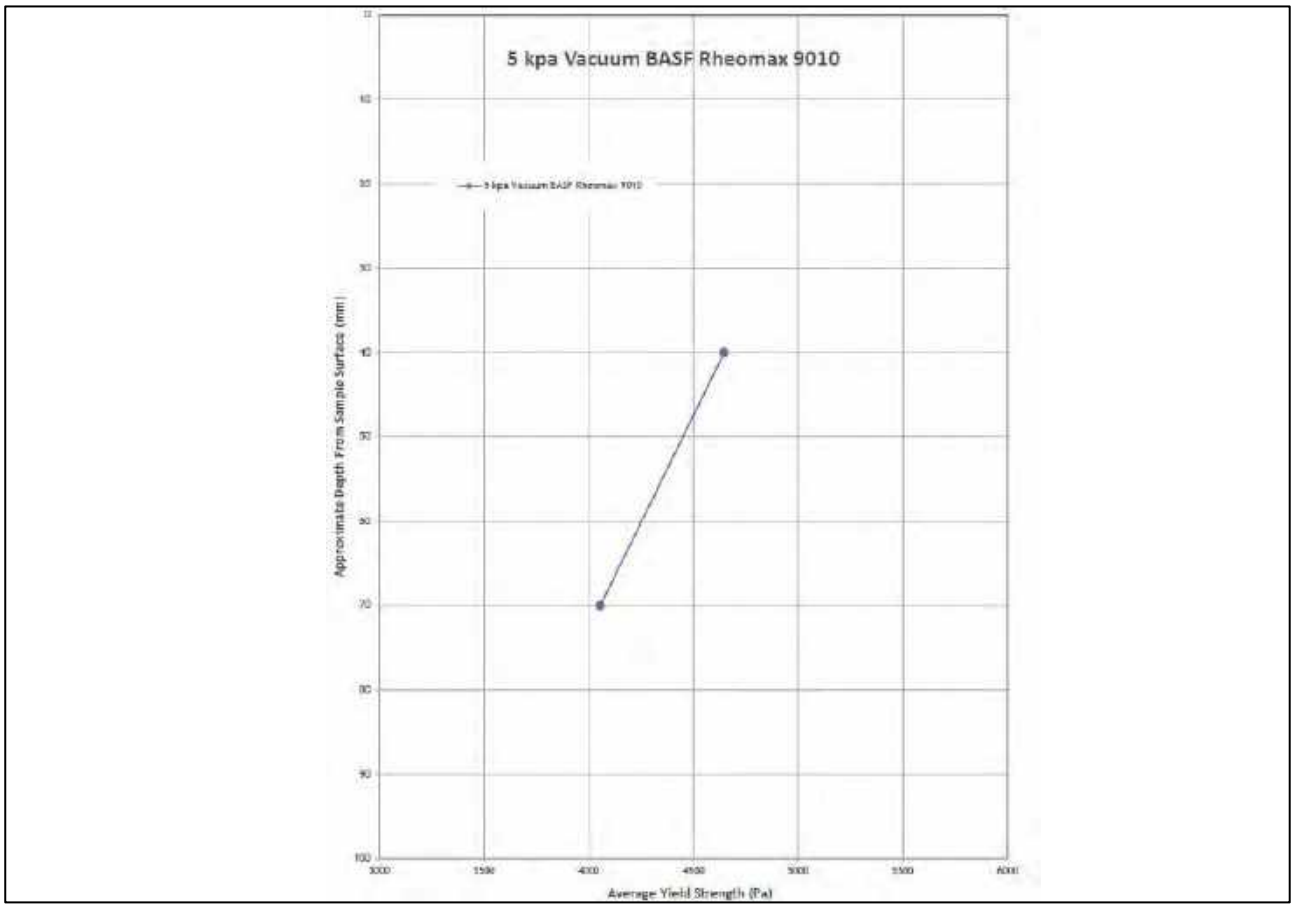
Figure 39: Density Versus Vacuum



4.1.2.4 Shear Strength

A further drained tray test (Test 2) was conducted with an applied suction of 5 kPa to measure the post-test shear strength. A shear vane test indicated a peak shear strength of 4,646 Pa at the middle of the sample and 4,055 Pa near its base. The recorded shear strength versus depth is shown in Figure 40.

Figure 40: Shear Strength Versus Depth



4.1.3 2025 Tailings Laboratory Testing

4.1.3.1 General

During Q1 2025, the construction material of the perimeter embankment transitioned from Pindan sand to deposited tailings. Initial observations suggested that the tailings would exhibit properties similar to those of Pindan sand. Sampling laboratory testing was undertaken in support of the transition of the construction material. The test work undertaken is summarised below:

- Particle size distribution with hydrometer analysis (6 samples)
- Emerson class tests (3 samples)
- Standard compaction tests (3 samples)
- Falling head permeability tests (3 samples)
- Three-stage consolidated undrained triaxial strength testing (3 samples)

Figure 41 presents the general locations where the samples were gathered, Table 28 summarises the details of the samples. Test certificates are attached in Appendix J.

Figure 41: 2025 Tailings Sample Locations

Table 28: 2024 Tailings Test Sample Summary

Sample ID	Location	Approximate Distance from Spiggot (m)
L1S1	Location 1	25
L1S2		
L2S1	Location 2	75
L2S2		
L3S1	Location 3	115
L3S2		

4.1.3.2 Material Index

Based on the laboratory test reports, the tailings samples show relatively consistent material index properties across the three locations. The particle size distribution (PSD) data indicates predominantly sandy materials with varying fines content, typically containing 15-35% passing the 0.075mm sieve, classifying them primarily as silty sands.

The samples from Location 1 (closest to the tailings deposition point) through to Location 3 (furthest from deposition) show subtle variations that align with typical tailings beach segregation. The Atterberg limits testing suggests low to medium plasticity characteristics with liquid limits ranging from approximately 21 – 25%, plastic limits between 12 – 16%, and plasticity indices of 6 – 12%, with all samples exhibiting similar linear shrinkage values of 3 – 6%.

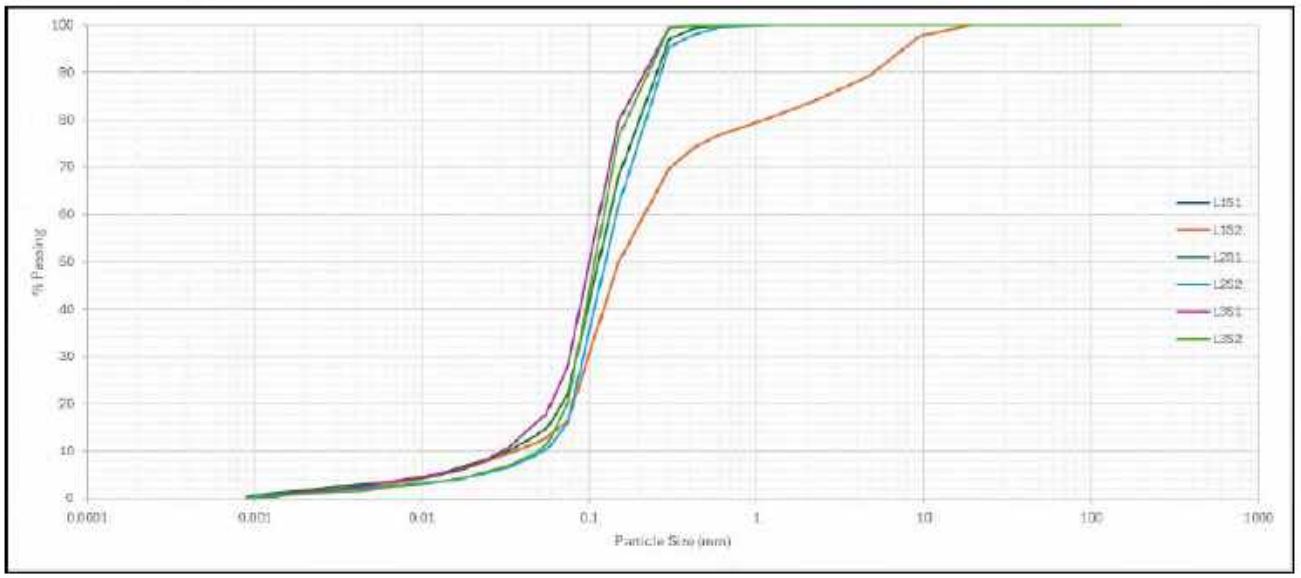
Emerson Class testing performed on tailings samples L1S1, L2S1, and L3S1 yielded consistent Class 5 results across all locations. An Emerson Class of 5 indicates that these materials are slightly dispersive, exhibiting minimal slaking when immersed in water but showing some dispersion of clay particles.

Table 29 summarises the material index of the tested samples. Figure 42 presents the PSD of the samples.

Table 29: 2025 Tailings Test Material Index Summary

Sample ID	Liquid Limit (%)	Plastic Limit (%)	Linear Shrinkage (%)	% Passing 0.075 mm	Specific Gravity	Emerson Class	Standard Maximum Dry Density (t/m³)
L1S1	23.2	14.6	4.1	16.4	2.78	5	1.80
L1S2	23.9	13.9	5.0	20.7	2.59	-	-
L2S1	24.3	12.4	5.6	22.1	2.68	5	1.75
L2S2	24.6	15.0	4.8	16.1	2.64	-	-
L3S1	23.7	13.3	5.2	28.0	2.75	5	1.70
L3S2	23.1	14.2	4.6	20.1	2.65	-	-

Figure 42: 2025 Tailings Test PSD



4.1.3.3 Falling Head Permeability

The falling head permeability tests were conducted on remoulded samples L1S1, L2S1, and L3S1, each compacted to 95% SMDD. Results revealed a trend of decreasing permeability with distance from the tailings deposition point. The sample nearest to the deposition point (L1S1) exhibited the highest permeability at 1.67 x 10^{-8} m/s, followed by the intermediate location sample (L2S1) at 8.2 x 10^{-7} m/s, while the furthest location (L3S1) showed the lowest value at 6.4 x 10^{-7} m/s. This pattern indicates a gradual fining of material away from the discharge point, consistent with typical tailings beach segregation processes, where coarser particles settle closer to the deposition point. Table 30 summarises the falling head permeability test results.

Table 30: 2025 Tailings Test Falling Head Permeability Results

Sample ID	Initial Moisture Content (%)	Initial Dry Density (t/m³	Permeability K_{20} (m/s)
L1S1	15.05	1.71	1.67×10^{-8}
L2S1	16.19	1.65	8.23×10^{-7}
L3S1	19.22	1.62	6.39×10^{-7}

4.1.3.4 Consolidated Undrained Triaxial Tests

Three-stage consolidated undrained triaxial (CUTX) tests was conducted on remoulded samples L1S1, L2S1, and L3S1, each compacted to 95% SMDD. Results revealed a trend of decreasing strength with distance from the tailings deposition point. Table 31 summarises the outcomes of the CUTX and the inferred strength parameters.

Table 31: 2025 Tailings Test CUTX Results

Sample ID	Stage	Principal Stresses (kPa)				Inferred Parameters	
		σ_3	σ'_1	σ'_3	u'_f	φ' (°)	c' (kPa)
L1S1	1	40	231	19	21	46.5	22.4
	2	80	295	29	51		
	3	120	432	51	69		
L2S1	1	40	165	22	18	37.2	19.8
	2	80	238	37	43		
	3	120	333	63	57		
L3S1	1	40	107	16	24	36.1	11.5
	2	80	225	46	34		
	3	120	273	59	61		

4.1.3.5 Tailings Construction Material Parameters

It is understood that the Stage 3A perimeter embankment is to be constructed from compacted tailings. The method of construction will likely result in a blend of tailings material between the causeway (deposition point) and up to the perimeter embankment. It is recommended that the most conservative material parameters (L3S1) be adopted to accommodate the risk of non-blended borrowing. The compacted tailings parameters to be adopted for the design of the Stage 3A OPTSF embankment are summarised in Table 32.

Table 32: Adopted Tailings Parameters

Parameter	Value
Hydraulic Conductivity (m/s)	5×10^{-7}
Unit Weight (kN/m³)	17.5
Friction Angle (°)	36
Cohesion (kPa)	0 Note A
Notes: A – It can be unconservative to adopt cohesion as the long-term strength of soils is typically governed by the friction angle alone.	

4.2 Tailings Geochemical Characteristics

4.2.1 Initial Tailings Characterisation (MBS 2016)

As detailed in the OPTSF design report by ATCW (document ref. 113094.11 R01 Rev 1). MBS Environmental was previously commissioned by KMS to determine the potential for acid and metalliferous drainage (AMD), and neutral or saline drainage from the process waste streams. Six composite samples were tested by MBS, the following quantitative laboratory testing were undertaken:

- Total sulfur
- Water soluble sulfate
- Sulfur and Acid Base Accounting (ABA)

The findings from the laboratory testing indicated that the tailings derived from materials mined from above the groundwater table, in the oxidised zone contain no known Potentially Acid Forming (PAF) material above the groundwater table. Based on the test results, MBS in the residues waste report concluded that:

"Overall, results indicate that the project tailings will be NAF and barren with essentially no capacity for acid generation or acid neutralisation. Predicted concentrations of soluble salts, metals and metalloids in any seepage are expected to be extremely low.

Low overall (in relation to waste volumes) levels of calcium sulfate and calcium carbonate will gradually be mobilised by leaching from the 'gypsum' residue; however, seepage water quality will mostly reflect process groundwater quality as drawn from local aquifers.

Although various residues are geochemically enriched in thorium, uranium, lead and selenium, these elements were not found to be mobile, even under artificially applied acidic conditions. All process waste streams are thus considered environmentally benign for the project but will have a tendency towards dispersive behaviour – however, this will be managed on site by use of flocculants in process water."

Based on the results of the leachate tests, decant bleed water generated from the tailings is also expected to be geochemically benign, with a composition similar to site groundwater.

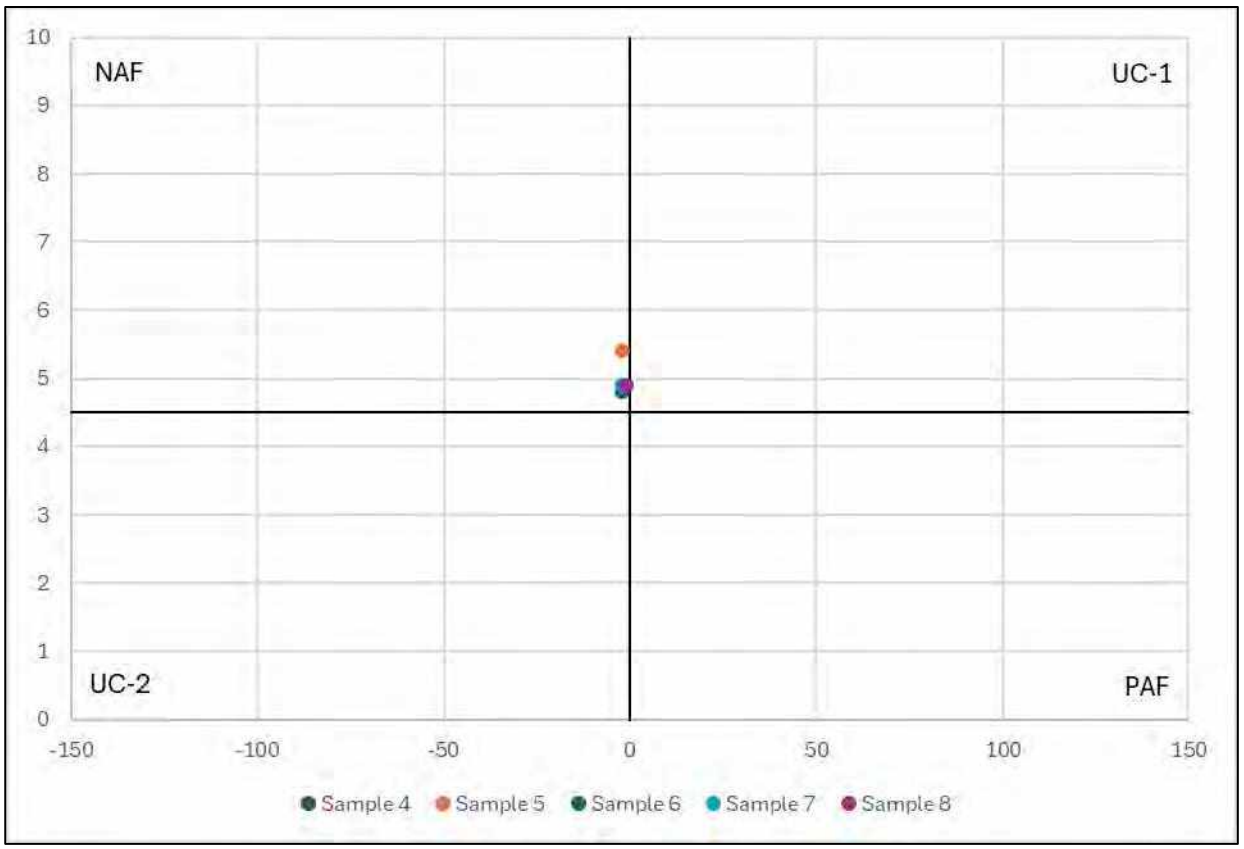
4.2.2 2024 Tailings Characterisation

Additional geochemical testing for the tailings was undertaken to support the tailings characterisation. A total of 16 samples were tested for various properties, these are detailed in Appendix F. Notably, the net acid generation (NAG) and the net acid producing potential (NAPP) were assessed for the following components of the representative tailings stream:

- Sample 4 – MUP Oversize (>12 mm)
- Sample 5 – WCP Oversize (<12 - >2mm)
- Sample 6 – WCP Sand Reject
- Sample 7 – WCP Tails (Slimes)
- Sample 8 – CUP Tailings

Overall, the rest results suggest that the tailings are barren with effectively no capacity for acid generation or neutralisation, this supports the understanding of the tailings stream previously established by MBS Environmental. Figure 43 presents the acid-base accounting for the tailings samples.

Figure 43: 2024 Tailings Acid-base Accounting



5. Stage 3A OPTSF Design

5.1 Standards and Guidelines

The Stage 3A OPTSF have been designed in general alignment with the following standards/guidelines:

- ANCOLD, *Guidelines of Tailings Dams, Planning, Design, Construction, Operation and Closure*, 2019.
- DMP (now DEMIRS), *Code of Practice – Tailings Storage Facilities in Western Australia*, 2013.
- DMP (now DEMIRS), *Guide to the Preparation of a Design Report for Tailings Storage Facilities (TSFs)*, 2015.

5.2 Basis of Design

5.2.1 Additional Considerations

In addition to the information detailed in Section 2, additional design considerations are listed below:

- Perimeter embankments are to be designed for full containment of tailings solids during its operational and post-closure life.
- To the extent practicable, the OPTSF has been designed so that surface water in contact with deposited tailings will be contained within the OPTSF and SSP boundaries.
- Neither the TSF footprint nor related infrastructure such as pipelines, toe drains, access roads, ramps, pump stations, etc. will encroach outside tenement boundaries. This will apply to the operational, as well as the potential future closure footprint.
- Internal retaining embankment to be raised centreline.
- The embankment is constructed over liquefiable soil.
- A minimum amount of water is to be stored in the facility to limit the post-seismic risk profile.

5.2.2 Design Criteria

The design criteria for the Thunderbird OPTSF are summarised in Table 33.

Table 33: Thunderbird Stage 3A OPTSF Design Criteria

Design Parameter	Design Input	Reference
Consequence Category		
DEMIRS	Category 1	DEMIRS (2013)
ANCOLD	High C	ANCOLD (2019)
Tailings Properties		
Average Tailings Throughput	10 Mtpa	KMS, anticipated
Slurry Solids Concentration	45%	KMS, typical
Specific Gravity	2.8	REC, assumed
Average In-situ Dry Density	1.75 t/m³	REC, detailed in Section 5.4.1
Beach Slope	1.0% - 2.2%	REC, detailed in Section 0
Geochemistry	Benign	REC, detailed in Section 4.1.3
Stability of External Slopes		
Factors of Safety (FoS)	Static: 1.5 Post-seismic: Section 2.4.2	ANCOLD (2019)
Operating Base Earthquake (OBE)	1:475	ANCOLD (2019)
Safety Evaluation Earthquake (SEE)	1:2,000	ANCOLD (2019)
Post Closure Earthquake	MCE	ANCOLD (2019)
Hydrology		
Catchment Area	OPTSF: 1,004,000 m² SSP: 366,000 m²	REC, detailed in Section 2.2.4.2
Design Storm Event	1:100 AEP, 72-hr event	ANCOLD (2019)
Construction Material		
Material Source	Embankment fill: deposited tailings Granular fill: oversize mine waste	KMS
Geochemistry	Benign	REC, detailed in Section 4.1.3
Geometry		
Embankment Crest Elevation	Varies, RL 111.0 m to RL 116.0 m	REC
Embankment Crest Width	5 m	REC
Minimum Windrows Height	The greater between 0.6 m and ½ of the largest trafficking wheel diameter.	REC
Typical Embankment Slope Gradient	Upstream: 1V:2H Downstream: 1V:2.5H	REC

5.3 OPTSF Classification

5.3.1 Population at Risk

Based on the runout pathing and other information summarised as part of the ATCW DDR (document ref. 113094.11-R01) the Population at Risk (PAR) was estimated based on engineering judgement by identifying the number of buildings or other places of occupation within the failure impact zone.

The PAR was estimated based on a formula relating the expected occupancy and assumed exposure time within the area, as shown in the equation below:

$$PAR = Occupancy \times \frac{Exposure\ Time\ (hours)}{24} \times \frac{Frequency\ (days)}{365}$$

Impacted Area	Occupancy	Duration (hours per day)	Frequency (days per year)	Exposure (per year)
Site Entry / Exit Road (limited to where runout intercepts road)	100	0.1	365	0.42
Operation Personnel	4	12	365	2.00
Construction Personnel	30	12	120	4.93
Personnel Downstream Inspection (routine, ad hoc, etc.)	1	4	365	0.167
Personnel Inspection Downstream (Monthly)	2	4	12	0.011
Personnel Inspection Downstream (Quarterly)	3	5	4	0.007
Personnel Inspection Downstream (Annually)	3	5	1	0.002
			PAR Estimate	7.53

In the absence of computational fluid dynamic dam break simulations and runout regions, the PAR should be conservatively adopted as between 10 – 100. This is aligned with the PAR range previously adopted by ATCW.

5.3.2 DEMIRS Classification

The facility has been assessed in accordance with the DMP CoP (DMP 2013, Table 1). The assessment concluded that a 'Medium' hazard rating be assigned to the facility, as demonstrated in Table 34 (grey). The facility has also been assessed in accordance with the DMP Code of Practice (DMP 2013, Table 2), with maximum embankment heights of '5.0 – 15.0 m'. As such, the facility is classified as a 'Category 1' facility, as demonstrated in Table 35 (grey).

Table 34: DMP CoP Hazard Rating System

Type of Impact or Damage	Hazard Rating		
	High	Medium	Low
	Extent or Severity of Impact or Damage		
Loss of human life or personal injury	Loss of life or injury is possible	Loss of life or injury is possible although not expected	No potential for loss of life or injury
Adverse human health due to direct physical impact or contamination of the environment	Long-term human exposure is possible, and permanent or prolonged adverse health effects are expected	The potential for human exposure is limited, and temporary adverse health effects are possible	No potential for human exposure
Loss of assets due to direct physical impact or contamination of the environment	Loss of numerous livestock is possible	Loss of some livestock is possible	Limited or no potential for loss of livestock
	Permanent loss of assets (e.g. commercial, industrial, agricultural and pastoral assets, public utilities and infrastructure, mine infrastructure) is possible and no economic repairs can be made	Temporary loss of assets is possible and economic repairs can be made	Limited or no potential for destruction or loss of assets
	Loss of TSF storage capacity is possible and repair is not practicable	Loss of TSF storage capacity is possible and repair is practicable	Insignificant loss of TSF storage capacity is possible
Damage to items of environmental, heritage or historical value due to direct physical impact or contamination of the environment	Permanent or prolonged damage to the natural environment (including soil, and surface and ground water resources) is possible	Temporary damage to the natural environment is possible	Limited or no potential for damage to the natural environment
	Permanent or prolonged adverse effects on flora and fauna are possible	Temporary adverse effects on flora and fauna are possible	Limited or no potential for adverse effects on flora and fauna
	Permanent damage or loss of items of heritage or historical value is possible	Temporary damage of items of heritage or historical value is possible	Limited or no potential for damage of items of heritage or historical

Table 35: DMP CoP Category Rating System

Maximum Embankment or Structure Height (m)	Hazard Rating		
	High	Medium	Low
> 15.0	Category 1	Category 1	Category 1
5.0 - 15.0	Category 1	Category 2	Category 2
< 5.0	Category 1	Category 2	Category 3

5.3.3 ANCOLD Classification

5.3.3.1 General

Two Consequence Categories are to be assessed as part of the OPTSF design. These are the Dam Failure Consequence Category and the Environmental Spill Consequence Category. These are used to determine various design and operational requirements including the design of spillways and flood storage requirements.

5.3.3.2 Dam Failure Severity Level

In accordance with ANCOLD (2019) Guidelines, seven (7) damage type categories need to be assessed to determine the severity level/impact (Minor, Medium, Major and Catastrophic) of a potential facility failure or spill. In accordance with the Dam Severity

Level impact assessment (ANCOLD 2019, Table 1), The OPTSF at TOPL is classified as 'Medium' severity, as presented in Table 36 (grey), due to the impact of dam failure on business importance.

Table 36: ANCOLD Dam Severity Level Rating System

Damage Type	Minor	Medium	Major	Catastrophic
Infrastructure (dam, houses, commerce, farms, community)	<$10M	$10M-$100M	$100M-$1B	>$1B
Business Importance	Some restrictions	Significant impacts	Severe to crippling	Business dissolution, bankruptcy
Public health	<100 people affected	100-1000 people affected	<1000 people affected for more than one month	>10,000 people affected for over one year
Social dislocation	<100 person or <20 business months	100-1000 person months or 20-2000 business months	>1000 person months or >200 business months	>10,000 person months or numerous business failures
Impact Area	<1 km²	< 5km²	< 20km²	> 20km²
Impact Duration	< 1 (wet) year	< 5 years	< 20 years	> 20 years
Impact on natural environment	Damage limited to items of low conservation value (e.g. degraded or cleared land, ephemeral streams, non-endangered flora and fauna). Remediation possible.	Significant effects on rural land and local flora & fauna. Limited effects on: A. Item(s) of local & state natural heritage. B. Native flora and fauna within forestry, aquatic and conservation reserves, or recognised habitat corridors, wetlands or fish breeding areas	Extensive rural effects. Significant effects on river system and areas A & B. Limited effects on: C. Item(s) of National or World natural heritage. D. Native flora and fauna within national parks, recognised wilderness areas, RAMSAR wetlands and nationally protected aquatic reserves. Remediation difficult.	Extensively affects areas A & B. Significantly affects areas C & D. Remediation involves significantly altered ecosystems.

5.3.3.3 Dam Failure Consequence Category

The dam failure consequence category is adapted from the severity level assessment of damage and loss, combined with the Population at Risk (PAR).

Based on the semi-quantitative assessment of PAR detailed in Section 5.3.1, the highest amount of persons at any given moment within the pit is anticipated to be between 10 – 100. As such, a dam failure severity level of 'Medium' and a PAR between 10 – 100 has been adopted, the ANCOLD guidelines recommend the adoption of a 'High C' Dam Failure Consequence Category rating, as presented in Table 37 (grey).

Table 37: ANCOLD Dam Severity Level Rating System

Population at Risk (PAR)	Severity of Damage or Loss			
	Minor	Medium	Major	Catastrophic
<1	Very Low	Low	Significant	High C
>1 to 10	Significant (Note 2)	Significant (Note 2)	High C	High B
>10 to 100	High C	High C	High B	High A
>100 to 1000	Note 1	High B	High A	Extreme
>1000		Note 1	Extreme	Extreme

Notes:

1 – With a PAR in excess of 100, it is unlikely Damage will be minor. Similarly, with a PAR in excess of 1,000 it is unlikely Damage will be classified as Medium.

2 – Change to "High C" where there is the potential of one or more lives being lost. The potential for loss of life is determined by the characteristics of the flood area, particularly the depth and velocity of flow.

5.3.3.4 Environmental Spill Consequence Category

The Environmental Spill Consequence Category is assessed by considering the effect of spilling dam water to the downstream environment (typically through the dam spillway during a flood event). The aerial extent of the spill impact will be significantly smaller than the area that would be affected in the event of a dam failure. The effect of spilling water into the environment from the TSF is primarily driven by the geochemistry of the tailings solids and the supernatant pond.

Water spilled from the TSF under extreme weather events will be significantly diluted, and further diluted again given the downstream environment of the dam is also likely to be flooded. Additionally, given that a run out dam break is unlikely (Section 2.4.2) and the geochemistry of the tailings is benign, a theoretical spill from the OPTSF is unlikely to leave any significant impacts on the natural environment. Thus the consequence category for environmental spills is considered to be 'Minor'.

5.4 Storage Capacity

5.4.1 Tailings In-situ Reconciliation

A series of tailings density reconciliations of the OPTSF was conducted to estimate the volume of tailings stored within the facility and validate the in-situ density of stored tailings materials. Table 38 details a summary of reconciliation data based on survey data provided between February 2024 to Feburary 2025. It should be noted that there are some inconsistencies in the reconciled volumes and in-situ density obtained for the May 2024 periods. The cause of these discrepancies is uncertain, however, it may be attributed to the quality of survey data and/or its manipulation (note that the supernatant pond was relatively large during this period). As such, a stored in-situ tailings dry density of 1.75 t/m^3 has been adopted for the Stage 3A design.

Table 38: TSF Reconciliation Data

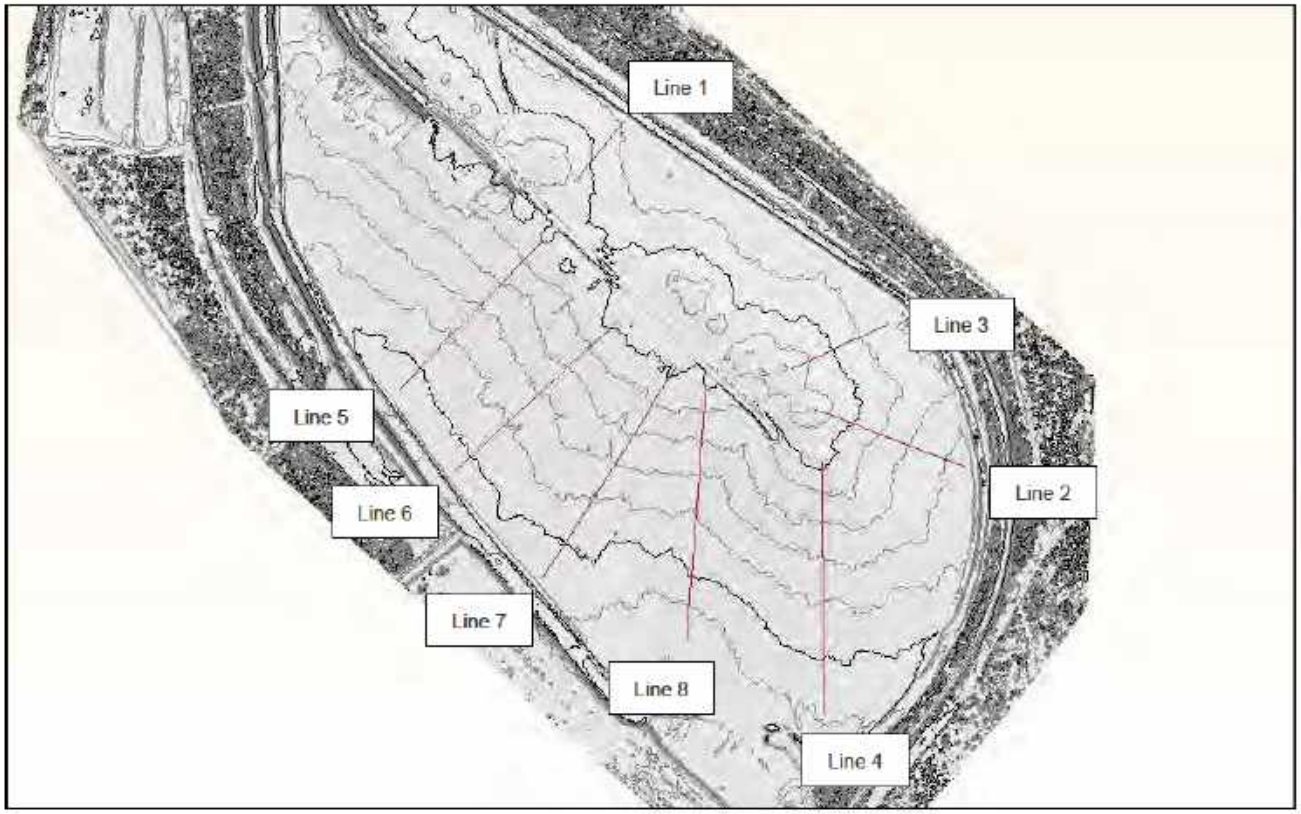
Survey Date	Tailings Deposited (t)	Measured Volume (m^3)	Inferred In-situ Dry Density (t/m^3)
03/02/2024	767,327	452,163	1.68
14/04/2024	1,510,216	913,055	1.65
11/05/2024	1,975,297	1,314,152	1.50
24/05/2024	2,231,159	1,180,227	1.89
24/10/2024	4,891,482	2,673,832	1.83
24/11/2024	5,328,946	2,927,523	1.82
12/02/2025	6,912,589	3,744,091 Note A	1.85

Notes: A – Tailings used as a construction material as of 25 Jan 2025, an additional 30,000 m^3 has been added to account for this.

5.4.2 Tailings Beach Development

A beach slope assessment was undertaken based on the 12 Feb 2025 survey data for the OPTSF. A series of eight lines were drawn, spaced across the Northern and Southern tailings beach from the central causeway at existing discharge locations as detailed in Figure 44.

Figure 44: Assessed Beach Slope



The assessed beach slope profiles are presented in Figure 45 and the adopted beach slope profile is summarised in Table 39.

Figure 45: Beach Slope Profile

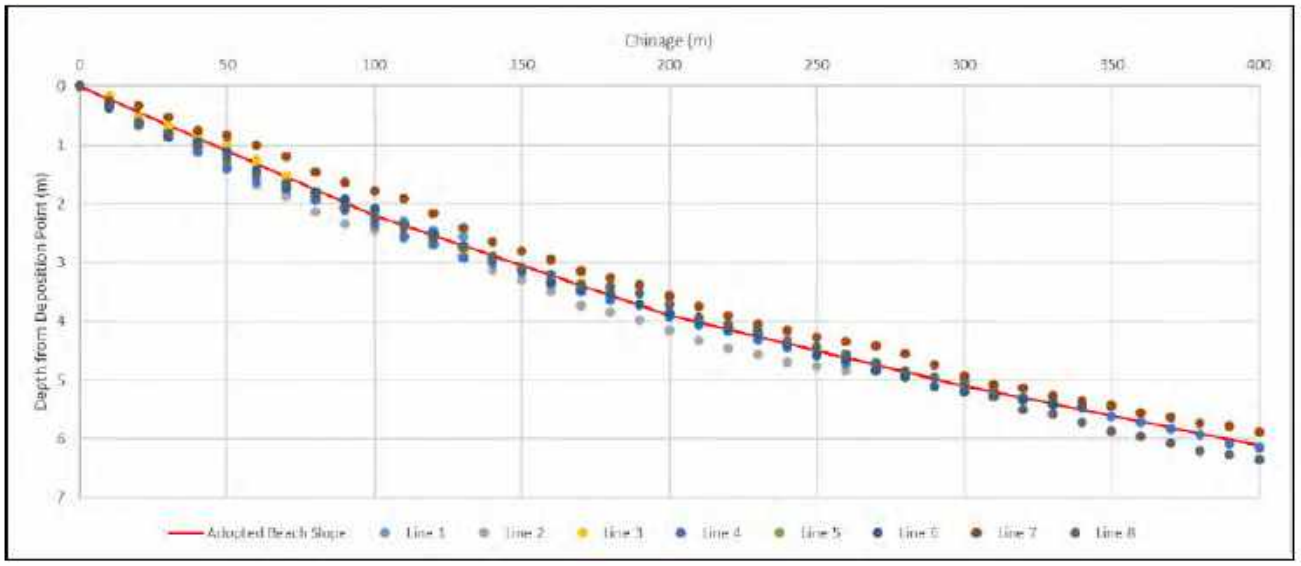


Table 39: Adopted Beach Slope

Distance from Deposition Point (m)	Beach Slope (%)
0 – 100	2.2
100 – 200	1.7
200 – 300	1.2
300 +	1.0

The historically adopted beach slope was undertaken based on survey data from the 11 May 2024. A series of five (5) cross sections were drawn, spaced across the southern storage area from the central causeway at existing tailings discharge locations as detailed in Figure 46. Figure 47 and Table 40 presents the adopted tailings beach profiles, the idealised beach slope was considered to be representative of operating conditions.

Figure 46: Extracted Beach Locations

Figure 47: Beach Slope Assessment

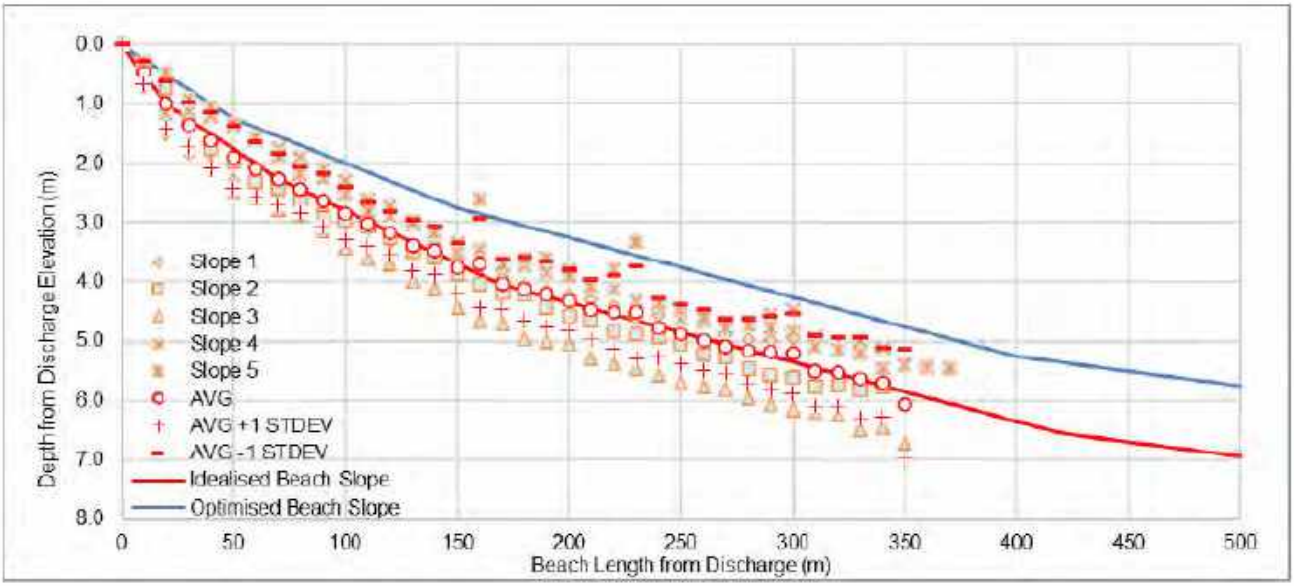
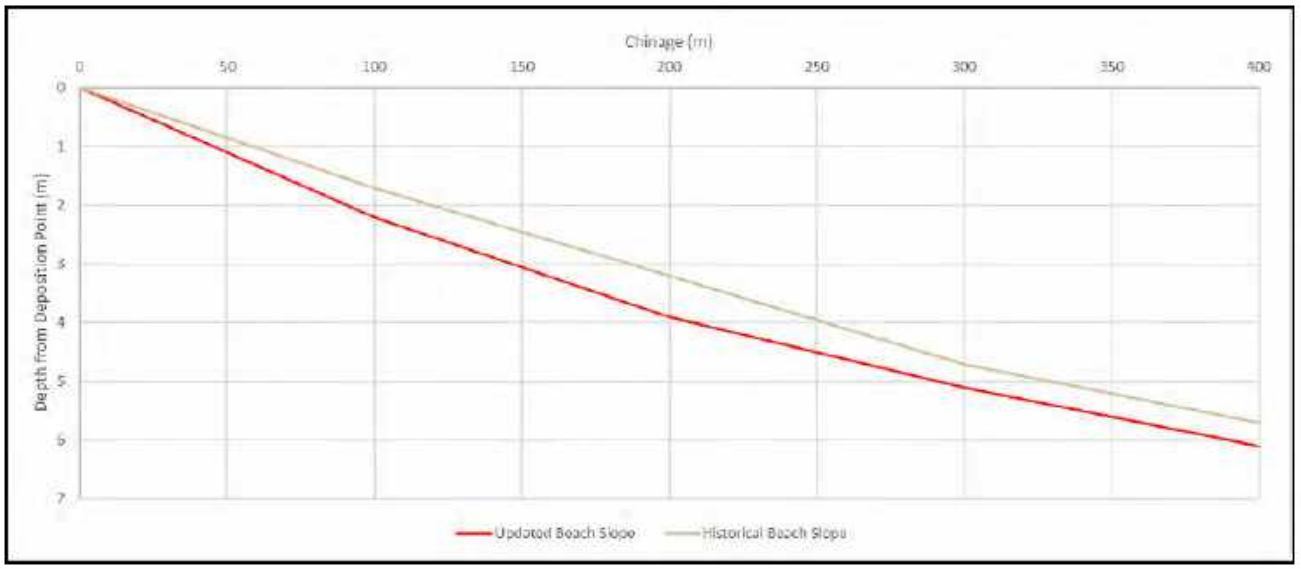


Table 40: Beach Slope Summary

Beach Slope Configuration	Incremental Distance (m) for Increment #					Beach Slope (%) for Increment #				
	1	2	3	4	5	1	2	3	4	5
Idealised Beach Slope	20	50	100	250	∞	5.0	2.5	1.8	1.0	0.5
Optimised Beach Slope	50	100	250	∞	-	2.5	1.5	1.0	0.5	-

Figure 48 presents a comparison of the historically adopted beach slope and the updated beach slope. Overall, the updated beach slope is slightly steeper than the historical beach slope between 0 – 200 m from the deposition point. However, much of this difference is reconciled from 200+ m onwards. At a distance of 300 m the vertical difference between the updated and historical beach slopes is approximately 0.4 m.

Figure 48: Beach Slope Comparison



5.4.3 Stage 3A OPTSF Maximum Capacity

The OPTSF Stage 3A is required to store approximately 9 months of throughput in addition to the Stage 3 capacity, up until June 2026. Table 41 summarises the storage capacity of Stage 3A OPTSF. It is to be noted that the storage capacity for Stage 3A accounts for the borrowed tailings for the construction of the perimeter embankment and central causeway.

Table 41: OPTSF Stage 3A Tailings Storage Capacity Summary

Parameter	Value
Assumed In-situ Tailings Density (t/m^3)	1.75
Tailings Storage Capacity (Mt)	7.62
Tailings Storage Capacity (Mm^3)	4.35
Average Anticipated Throughput (Mtpa)	10
Estimated Storage Life (months)	9.1
Estimated End of Storage Life	End of June 2026

5.5 Modelling and Design Assessments

5.5.1 Freeboard Assessment

The typical freeboard levels to be maintained by a TSF consist of a list of requirements stipulated by a combination of design guidelines. These requirements comprise the following distinct elements, shown graphically in Figure 49.

Spillway Freeboard:

- Freeboard is the available freeboard above the spillway flood depth; and
- Flood spill depth is the depth of water flow over the spillway for the design flood event.

Contingency Storage Allowance:

- Operational freeboard is the height difference between the tailings beach and the embankment crest/spillway invert level;
- Beach freeboard is the level difference between the tailings beach and the decant water level plus allowance for an extreme storm event;
- Total freeboard is the sum of the operational freeboard and beach freeboard plus allowance for an extreme storm event;
- Additional freeboard is the allowance for further freeboard above the Extreme storage allowance; and
- Wave freeboard is the allowance for wave runup above the Extreme storage allowance.

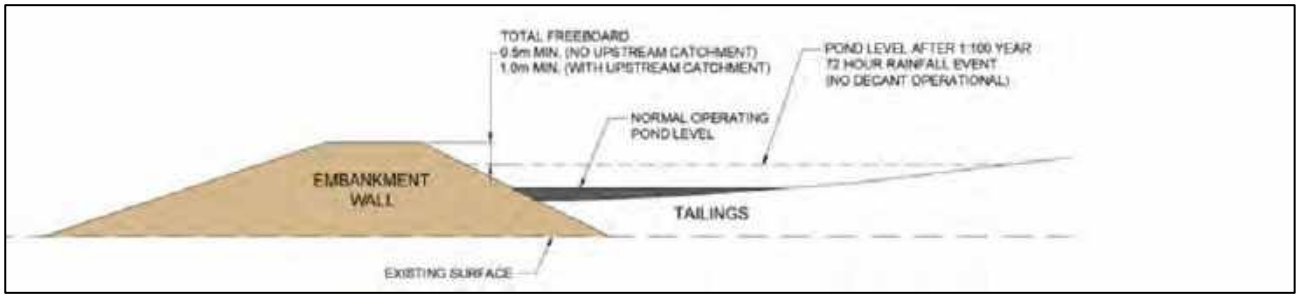
Extreme Storage Allowance:

- Allowance for the storage of an design/extreme storm event to prevent spill from the dam.

Wet Season Storage Allowance:

- Allowance for the storage of water which may conservatively be required to be stored on the tailings dam through a combination of excess wet season rainfall runoff from the facility catchment and processing water which cannot be extracted from the dam.

Figure 49: Freeboard Definition (DEMIRS 2019)



In the case of the OPTSF, the design philosophy set by ATCW does not consider stormwater storage in the facility to be necessary (stored instead at the SSP), the freeboard limit is governed by the total freeboard. In accordance with DEMIRS requirements for a facility with a supernatant pond against the embankment and no upstream catchment area, a total freeboard of 0.7 m and 0.5 m has been adopted for the perimeter embankment and internal retaining embankment respectively.

5.5.2 Liquefaction Assessment

5.5.2.1 Tailings

The perimeter embankments of the OPTSF will be raised using the downstream construction method. As a result, the downstream raises of the embankment do not rely on the strength of the tailings for overall embankment stability. Therefore, the liquefaction potential of the tailings was not assessed as part of the design. However, as part of the post-seismic conditions in stability modelling, an assumption has been made that the tailings will liquefy and a liquefied strength for the tailings has been incorporated in the modelling.

5.5.2.2 Retaining Structure

The structural fill for the OPTSF embankment will consist of 95% SMDD compacted pindan / tailings material, which is expected to exhibit dilative behaviour. In saturated dilative soils, the tendency to expand during under shear stress causes a reduction in pore water pressure under undrained conditions. This reduction increases the effective stress, enhancing shear strength and reducing the risk of liquefaction. At large strains, the shear strength in undrained loading is often equal to or greater than that in drained loading (Robertson 2018). As such, the material is considered to be strain hardening when saturated and is considered to be more conservative to adopt drained material parameters. As such, the material is considered to be liquefaction resistant, and a 20% reduction in strength due to cyclic loading will be applied.

5.5.2.3 Foundation

5.5.2.3.1 SPT Assessment

The embankment foundation was assessed for liquefaction based on the methodology outlined by Yond and Idriss (2001). The methodology assesses the liquefaction potential of the material based on the material's Cyclic Resistance Ratio (CRR) via SPT results and the expected Cyclic Stress Ratio (CSR). CSR and CRR were calculated from the equations presented below:

$$CSR = 0.65 \times \frac{\alpha_{max}}{g} \times \frac{\sigma_{total}}{\sigma_{effective}} r_d$$

$$CRR = \left(\frac{1}{34 - (N_1)_{60}} + \frac{(N_1)_{60}}{135} + \frac{50}{[10(N_1)_{60} + 45]^2} - \frac{1}{200} \right) \times MSF$$

Where:

CRR = Cyclic Resistance Ratio

CSR = Cyclic Stress Ratio

α_{max} = Peak horizontal acceleration under SEE earthquake loading

g = Gravitational acceleration (9.81 m/s^2)

σ_{total} = Total vertical stress

$\sigma_{effective}$ = Effective vertical stress

r_d = Stress Reduction Coefficient; and

$(N_1)_{60}$ = Normalized SPT blow counts

MSF = Magnitude scaling factor

These equations are valid for $(N_1)_{60} < 30$. For $(N_1)_{60} \geq 30$, clean granular soils are considered too dense to liquefy and can be classed as non-liquefiable. The overburden correction factor (C_N) used to assess the $(N_1)_{60}$ was estimated based on the method suggested by Liao and Whitman (1986) and Kayen et al. (1992) and the most conservative factor was adopted. Additionally, the assessment adopts the following parameters and assumptions:

- Phreatic table is 2.5 m below the natural ground level.
- Future overburden of 4 m.
- Future phreatic table is 1.0 m below the natural ground level.
- Fines content of 25% adopted based on index test results.
- Sandstones are typically not susceptible to liquefaction.
- Assumed MSF of 1.0.
- Adopted SEE α_{max} of 0.14 g.

Table 42 summarises the outcomes of the liquefaction assessment.

Table 42: SPT Liquefaction Assessment Summary

Location ID	Depth Range (m)	Normalised SPT N-values $(N_1)_{60}$	FoS Against Liquefaction
BH01 TSF	1.50 – 1.95	29	3.9
BH02 TSF	1.50 – 1.95	7	0.8
BH03 TSF	1.50 – 1.95	13	1.3
BH04 TSF	1.50 – 1.95	8	0.9
	3.00 – 3.45	8	0.7
	4.50 – 4.95	39	Classified as non-liquefiable
BH05 TSF	1.50 – 1.95	7	0.8
	3.00 – 3.45	7	0.6
	4.50 – 4.95	13	1.0
BH06 TSF	1.50 – 1.95	11	1.1
BH07 TSF	1.50 – 1.95	6	0.7
	3.00 – 3.45	7	0.6
	4.50 – 4.95	15	1.1
BH08 TSF	1.50 – 1.95	7	0.8
	3.00 – 3.45	7	0.6
	4.50 – 4.95	27	2.4
BH09 TSF	1.50 – 1.95	7	0.8
	2.50 – 3.00	9	0.8
	4.50 – 4.95	15	1.1
BH10 TSF	1.50 – 1.95	9	1.0
	3.00 – 3.45	9	0.8
	4.50 – 4.95	9	0.7
BH11 TSF	1.50 – 1.95	7	0.8
	3.00 – 3.45	8	0.7
	4.50 – 4.95	13	1.0
BH12 TSF	1.50 – 1.95	7	0.8
	3.00 – 3.45	6	0.6
	4.50 – 4.95	16	1.2

Based on the SPT liquefaction assessment, it is inferred that the upper layer (up to 3.5 m depth) of Pindan foundation is generally considered to be susceptible to liquefiable under SEE earthquake loads. This is somewhat consistent with ATCW's liquefaction assessment with the Chinese and 2003 Seed et al. method, based on the fines content and Atterberg limits of the Pindan layer.

It is to be noted that for liquefaction to occur, a combination of adverse factors comprising saturation, low in-situ stress, and the application of cyclic (or rapid) loading of sufficient magnitude is required to overcome the material's inherent resistance to such loading.

5.5.2.3.2 State Parameter Assessment

Based on the state parameter assessed from the 2025 CPTu data, it is inferred that the foundation is contractive between 3.5 – 5 m below ground level. This aligns with the established understanding of the liquefaction potential of the foundation. It is understood that dynamic compaction was undertaken during the early stages of the facility's construction, this appears to have had a varying degree of effectiveness in compacting the foundation to a depth of 1 – 2 m as presented in Figure 24 to Figure 26. However, areas surrounding the decant pocket / internal retaining embankment have a foundation that is contractive up to 5 m depth. Contractive soil is typically considered vulnerable to liquefaction when saturated due to excess pore water pressure build-up during shearing. The stratigraphy adopted in stability analysis sections is based on the most applicable CPTu profile.

5.5.3 Seepage Assessment

5.5.3.1 Approach

The seepage assessment was undertaken using the finite element modelling software Slide2. Steady-state seepage assessments were undertaken for the Stage 3A OPTSF, the approach used to assess seepage comprised the following:

- Select sections representative of selected embankment sections.
- Apply constant head based on the internal retaining embankment.

The purpose of the seepage assessment is to estimate the phreatic profile for stability assessment. Given that the supernatant pond is not anticipated to be maintained along the perimeter embankment for extended periods (steady-state conditions unlikely to be established), a constant phreatic table has been assumed for perimeter embankments based on the inferred phreatic table from the 2025 CPTu GSI.

5.5.3.2 Material Hydraulic Parameters and Assumptions

The parameters adopted are based on the GSI data available to REC. It has been conservatively assumed that typical operations will result in the supernatant pond operating at the spillway invert level. Table 43 summarises the hydraulic parameters adopted for the seepage modelling.

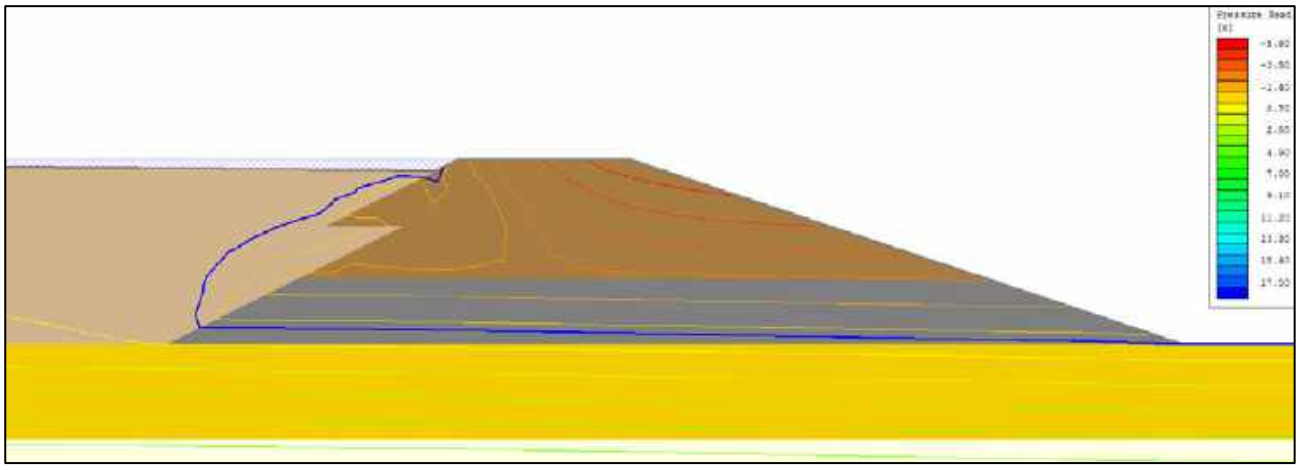
Table 43: Material Parameters Adopted for Seepage Assessment

Material	Hydraulic Conductivity, k (m/s)	Anisotropy k_h/k_v
Tailings	1.0×10^{-7}	1.0
Embankment Fill (Pindan)	1.0×10^{-9}	1.0
Embankment Fill (Compacted Tailings)	5.0×10^{-7}	1.0
Granular Fill	1.0×10^{-4}	1.0
Sandstone	6.0×10^{-6}	1.0

5.5.3.3 Seepage Assessment Results

Figure 50 presents the outcomes of the assessed phreatic table across the internal dividing embankment. The seepage modelling is attached in Appendix C.

Figure 50: Internal Retaining Embankment Seepage Assessment Outcome



5.5.4 Stability Assessment

5.5.4.1 Approach

Geotechnical stability assessments have been undertaken to assess the FoS of the proposed embankment configuration for the facility. The approach adopted to assess slope stability as part of this report comprised of the following:

- The FoS of the perimeter slopes were estimated through limit-equilibrium calculations, using effective strength parameters and/or undrained strength parameters, depending on load condition. The Morgenstern-Price calculation method was adopted to assess non-circular failure modes.
- The stability of the perimeter slopes was checked under static loading conditions and post-seismic.
- The phreatic profile adopted for the stability assessment is based on the outcomes of the seepage assessment.

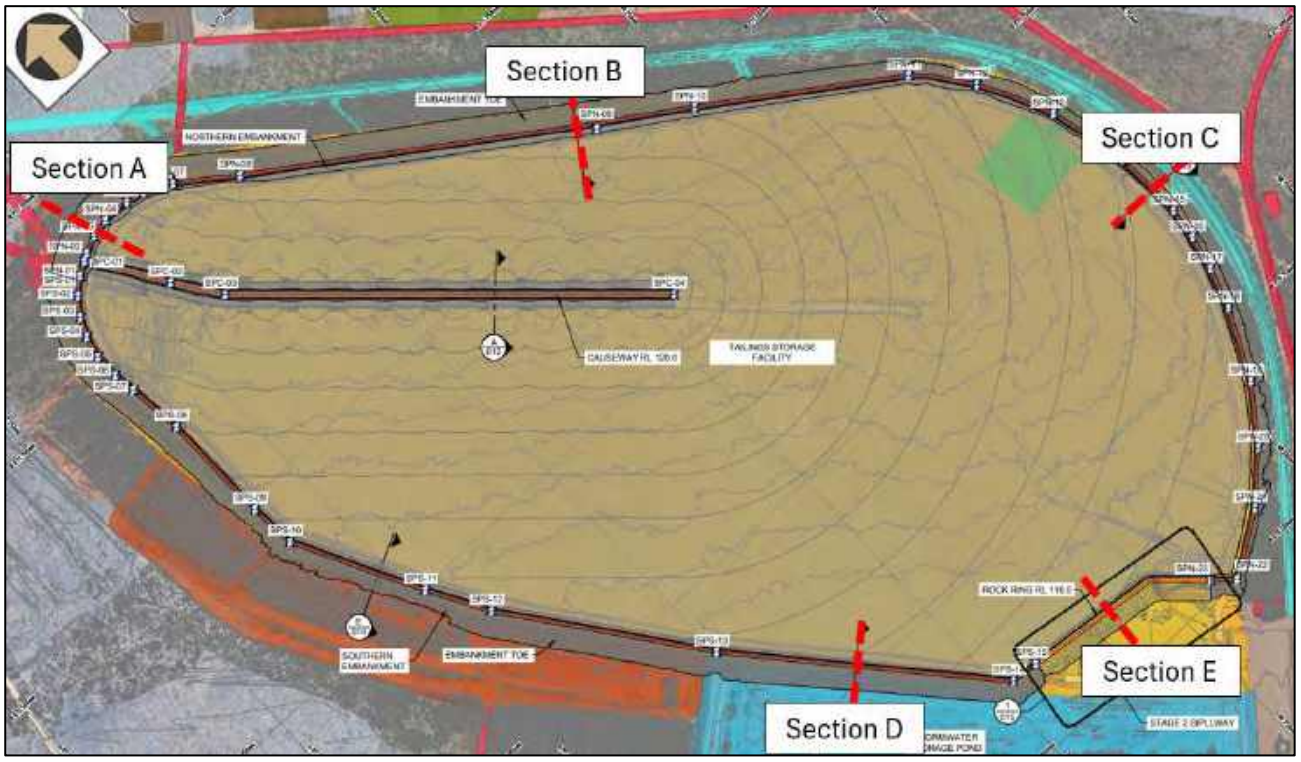
5.5.4.2 Model Section

Five sections were selected for assessment:

- Section A: Causeway Adjacent Embankment
- Section B: North Embankment
- Section C: East Embankment
- Section D: SSP Dividing Embankment
- Section E: Internal Retaining Embankment

Figure 51 presents the approximate locations of the above sections.

Figure 51: Stability Section Locations



5.5.4.3 Material Strength Parameters and Assumptions

The material parameters adopted in the stability modelling are based on the geotechnical data available to REC, this is summarised in Table 44.

Conditions adopted in the stability modelling are summarised below:

- The phreatic table across the perimeter embankment is assumed to be constant and is based on the inferred phreatic table from the 2025 CPTu GSI.
- The phreatic table across the internal dividing embankment is based on seepage assessment outcomes.
- Retaining structure does not liquefy and adopts effective strength parameters (detailed in Section 5.5.2.2).
- Tailings are assumed to be saturated and liquefy under post-seismic conditions with a shear strength ratio of 0.05.
- Saturated uncompacted pindan foundation liquefy under post-seismic conditions with a shear strength ratio of 0.07.
- Non-liquefiable materials adopt a 20% reduction in strength in post-seismic conditions.

Table 44: Material Parameters Adopted for Stability Modelling

Material	Bulk Density (kN/m³)	Static				Post-seismic			
		Effective		Total		Effective		Total	
		ϕ' (°)	C' (kPa)	S_u (kPa)	$S_{u,min}$ (kPa)	ϕ' (°)	C' (kPa)	S_u (kPa)	$S_{u,min}$ (kPa)
Tailings	17.5	-	-	$0.25\sigma'_v$	0	-	-	$0.05\sigma_v$	0
Embankment Fill (Pindan)	20.0	34.0	0	-	-	27.2	0	-	-
Embankment Fill (Compacted Tailings)	17.5	36.0	0	-	-	28.8	0	-	-
Uncompacted Pindan	18.5	32.5	0	$0.40\sigma'_v$	0	26.0	0	$0.07\sigma'_v$	0
Granular Fill	20.0	37.0	0	-	-	29.6	0	-	-
Sandstone	22.0	40.0	55.0	-	-	32.0	44.0	-	-

5.5.4.4 Stability Assessment Results

The stability model output figure is provided in Appendix D. The estimated slope stability Factors of Safety (FoS) of the selected embankment section for each of the assessed cases are summarised in Table 45.

Table 45: Stability Results Summary

Condition	Section	Required FoS	Assessed FoS
Static	A	1.50	2.22
	B		1.61
	C		1.87
	D		1.56
	E		1.66
Post-seismic	A	1.00	1.66
	B		< 1.00
	C		< 1.00
	D		< 1.00
	E		< 1.00

5.5.5 Water Balance Model

5.5.5.1 Approach

The water balance model for the Stage 3A OPTSF was prepared using an Excel spreadsheet and considers typical inflows and outflows during operation on a monthly basis. Given the established configuration of the facility, the SSP and the OPTSF have been considered to be one system. Water inflows to the facility system consist of incidental rainfall and slurry water from the plant. Water outflows consist of evaporation from the supernatant pond and running beaches, seepage, and retention of water within tailings.

5.5.5.2 Input Parameters and Assumptions

Table 46 summarises the input parameters of the water balance model.

Table 46: Water Balance Input Parameters

Parameter	Value	Source
General		
Facility Commissioning	September 2025	KMS
Facility Maximum Capacity	June 2026	KMS
Inflow		
OPTSF		
Runoff Coefficient	1.0	REC, assumption
Total Catchment Area	1,004,000 m²	REC, detailed in Section 2.2.4.2
Slurry Density	45%	KMS
Tailings Throughput	10 Mtpa	KMS
SSP		
Runoff Coefficient	1.0	REC, assumption
Total Catchment Area	366,000 m²	REC, detailed in Section 2.2.4.2
Outflow		
OPTSF		
Tailings Specific Gravity	2.80	REC, assumption
In-situ Dry Density	1.75 t/m³	REC, detailed in 5.4.1
Total Evaporation Area	955,600 m²	REC, estimation
Pan Factor	Pond: 0.67 Wet beach: 0.30 Dry Beach: 0.10	REC, assumption
Evaporation Area	Pond: 8% of beach area Wet beach: 10% of beach area Dry beach: 82% of beach area	REC, assumption
Plant Return	72% of slurry water	KMS, operation average
Lateral Seepage	1% of total OPTSF inflow	REC, assumption
SSP		
Total Evaporation Area	326,000 m²	REC, estimation
Pan Factor	Pond: 0.67 Dry area: 0.10	REC, assumption
Evaporation Area	Pond: 36% of basin area Dry area: 64% of basin	REC, estimation
Plant Return	97,245 m³ per month	KMS

5.5.5.3 Water Balance Summary

The water balance model indicates that throughout the operation of Stage 3A OPTSF, to maintain water neutrality for the Stage 3A operating period, additional water abstraction from either the OPTSF or the SSP is required as below:

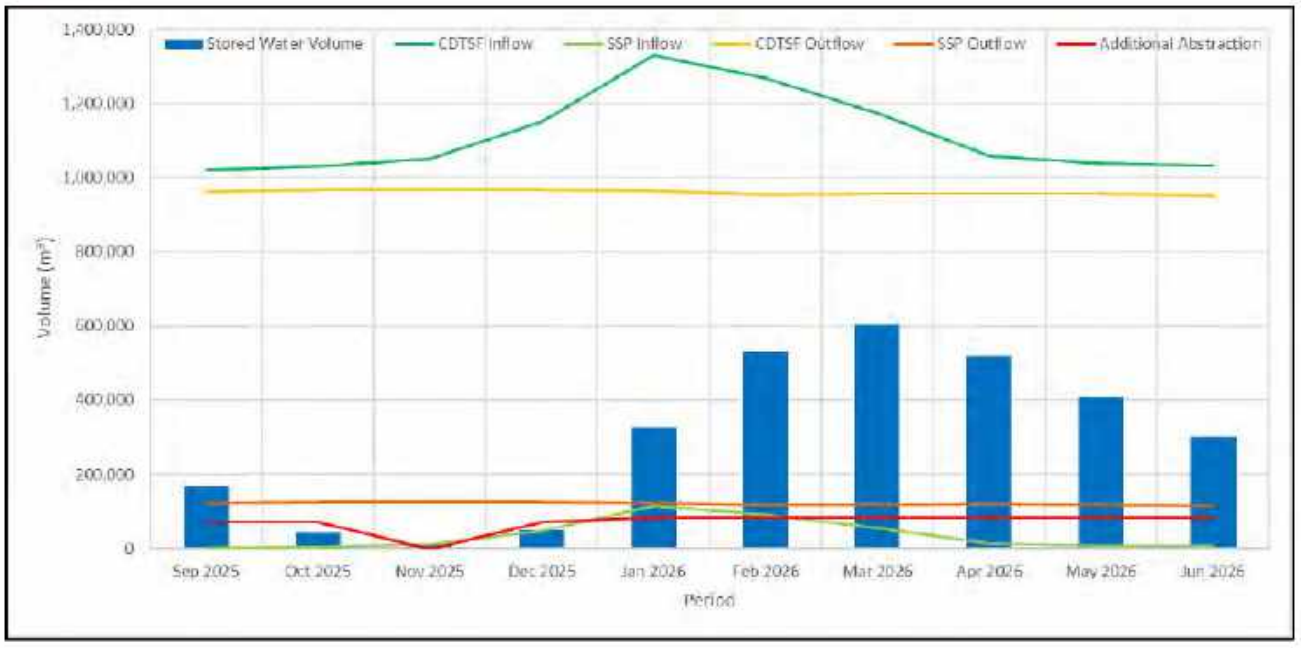
- 70,625 m³ per month across months Sep, Oct, and Dec 2025.
- 82,460 m³ per month for Jan, Feb, Mar, Apr, May, Jun 2026.

Table 47 and Figure 52 present a summary of the water balance. The detailed water balance model is attached in Appendix E.

Table 47: Water Balance Model Outcome Summary

Period	OPTSF Inflow (m^3)	SSP Inflow (m^3)	OPTSF Outflow (m^3)	SSP Outflow (m^3)	Additional Abstraction (m^3)	Stored Water Volume (m^3)
Sep 2025	1,020,326	659	960,594	121,442	70,500	168,449
Oct 2025	1,031,169	4,612	966,178	124,885	70,500	42,667
Nov 2025	1,049,542	11,309	966,994	125,283	0	11,241
Dec 2025	1,151,448	48,458	967,206	124,775	70,500	48,666
Jan 2026	1,329,156	113,240	963,160	121,114	82,460	324,329
Feb 2026	1,268,615	91,171	953,677	115,532	82,460	532,445
Mar 2026	1,173,335	56,437	956,601	117,970	82,460	605,187
Apr 2026	1,057,775	14,311	956,537	118,656	82,460	519,619
May 2026	1,037,996	7,100	955,105	117,880	82,460	409,270
Jun 2026	1,033,579	5,490	950,725	115,154	82,460	299,999

Figure 52: Water Balance Model Outcome Summary



5.6 Internal Retaining Embankment

The internal retaining embankment is to be fitted with filter pipes i.e. pipes capped with geotextile on the elevated end. The decant pipes are to provide sufficient capacity to accommodate the peak PMP inflow, assuming no temporary storage capacity is available. The PMP estimation is detailed in Section 2.2.4.4.

Peak flows for the OPTSF catchment were derived using the Rational Method. The Rational Method expresses a relationship between rainfall intensity and catchment area as independent variables and the peak flood discharge resulting from the rainfall as the dependent variable. The peak flows derived from the Rational Method are calculated from:

$$Q_Y = kC_Y I_{t_c Y} A$$

Where:

Q_Y = Peak Flow Rate (m^3/s)

k = Conversion factor, k = 0.278 when A is in km^2

C_Y = Run-off Coefficient (dimensionless)

I_{tcY} = Average Rainfall Intensity at Time of Concentration (mm/hr)

A = Catchment Area (km^2)

The quantification of the peak discharge is measured through the time of concentration (t_c), the time required for runoff to travel from the hydraulically most distant point in the watershed to the outlet. The hydraulically most distant point is the point with the longest travel time to the watershed outlet, and not necessarily the point with the longest flow distance to the outlet. The derivation of the time of concentration is based on the Bransby-Williams formula, as follows:

$$t_c = \frac{FL}{A^{0.1} S_e^{0.2}}$$

Where:

t_c = Time of Concentration (hrs)

F = A conversion factor. F = 58.5 when A is in km^2

L = Length of mainstream (km) from the outlet to the catchment divide

A = Area of catchment (km^2)

S_e = Equal area slope (m/km) (V:H)

The peak design flow for the PMP event is estimated to be approximately 0.05 m^3/s. The pipes required to accommodate the PMP flow are assumed to:

- Have a minimum longitudinal grading of 1%.
- Mannings coefficient of 0.02.
- Maximum capacity is limited to a flow comprising ¾ diameter from the bottom.
- Maximum capacity is further limited to 10% to account for geotextile restriction.

Based on the aforementioned assumptions, a minimum of 10 pipes with an inner diameter of 300 mm are to be installed at consistent intervals across the internal retaining embankment, 300 mm below the embankment crest. It is also recommended to install additional decant pipes at 1 m vertical increments at the Southern end of the internal retaining embankment to allow for water transfer as supernatant water accumulates.

6. Operational Requirements

6.1 Operating Manual

An Operating Manual (OP) has been compiled as part of the detailed design and is attached in Appendix B. This section of the report (Section 6) must be read in conjunction with the OM.

The principal objective of the OM is to provide a documented operating procedure to assist in the safe and efficient storage of tailings and water management for the facility. The manual should set out how the facility should be operated in a way that is in line with the assumptions and principles adopted by the designer of the facility.

Operating manuals are to be updated regularly, particularly when design or operational changes occur.

6.2 Tailings Deposition Management

The facility is designed to accommodate tailings slurry being deposited sub-aerially from an elevated central causeway via spigot outlets that are sequentially opened in a cyclical manner around the facility. Perimeter deposition can be undertaken where necessary, under the guidance of REC. Tailings slurry will be transported to the facility via an HDPE pipeline that extends from the process plant to the facility. While typically tailings are to be deposited from the central causeway, perimeter discharge of tailings may be required to appropriately manage the supernatant pond. As such, tailings discharge from the perimeter embankment is permitted under the guidance of the EoR.

Tailings will be deposited through open-ended spigots. Tailings slurry would be delivered to the facility with a solids concentration of approximately 45% by mass. Tailings are to be deposited in thin lifts and beaching towards the rock ring.

6.3 Supernatant Water Management

The supernatant water within the decant pocket is to be managed as such where the emergency spillway reporting to the SSP is not engaged under normal operating conditions. Should the supernatant pond level within the decant pocket come within 300 mm freeboard of the spillway invert, pumps should engaged to transfer water from the decant pocket into the SSP.

Following rare rainfall events, pumps should be expected to be engaged to assist water abstraction and return the supernatant pond within the decant pocket return to a minimum of 300 mm freeboard to the spillway invert.

6.4 Monitoring and Surveillance

6.4.1 Monitoring

A program of monitoring and surveillance will be implemented to evaluate the performance of the facility with respect to the original design expectations. The data obtained will:

- Form the basis of annual surveillance, and
- Be used to assess and integrate required maintenance programs.

Some of the key monitoring items will include the following:

- Routine reconciliation of tailings discharge tonnage and solids concentration.
- Routine monitoring of tailings beach head and beach toe level.
- Routine monitoring of pond water levels and process plant return water rates.
- Routine assessment of collection sump water quality.
- Quarterly field evaluation of tailings density reconciliation.

Groundwater monitoring around the facility will be undertaken quarterly throughout the life of the project. Where groundwater monitoring indicates adverse impacts, a risk assessment will be conducted by a qualified specialist and dewatering bores may be installed to mitigate impacts, where required.

The data records from Vibrating Wire Piezometers (VWPs) and settlement pins to be installed around the facility will provide timely information on changes in water level within or beneath the embankments and deformation across the embankment as well as allow for monitoring of deformation. VWPs and settlement pins will be monitored, and the phreatic surface compared to future trigger levels to assess whether remedial measures are required for the facility to maintain stability.

6.4.2 Surveillance

6.4.2.1 General

Routine inspection of the facility will be carried out to check whether the design strategy is being implemented and to identify any maintenance requirements or any circumstances associated with facility performance that need further attention. TOPL will carry out regular inspections of the facility and its appurtenant features.

The operating manual will provide procedures and protocols for inspection requirements in accordance with the facility consequence category. Observations made during the inspections will be recorded and appropriately reported. Any incidents that occur will be reported in accordance with the operating licence conditions and statutory regulations. As per ANCOLD guidelines, the inspection type and frequency for a 'High C' facility have been summarised in Table 48.

Table 48: Inspection Type and Frequency

Type of Inspection	Frequency	Personnel	Purpose
Comprehensive	After the first year of operation, then every 2 years	Dams engineer and specialist (where relevant)	The identification of deficiencies by a thorough onsite inspection; by evaluating data; and by applying current criteria and prevailing knowledge. Equipment should be test operated to identify deficiencies.
Intermediate	Annual	Dams engineer	The identification of deficiencies by visual examination of the dam and review of surveillance data against prevailing knowledge. Equipment is not necessarily operated.
Routine	Daily to 3 times a week	Operations personnel	The identification and reporting of deficiencies by field and operating personnel as part of their duties at the dam.
Special	As required	Dams engineer and specialist	The examination of a particular feature of a dam for some special reason (e.g. after earthquakes, heavy floods, rapid draw down).
Emergency	As required	Dams engineer	The examination of a particular feature of a dam which has been identified as having a possible deficiency or which has been subject to abnormal conditions.

6.4.2.2 Routine Inspections

These focus on operational issues to do with the facility. The recommended frequency of inspection is two times per production shift. Items that should be generally covered are:

- Tailings and return water pipeline.
- Tailings discharge point management.
- Decant pond location.
- Decant and return water system operation.
- Seepage.
- Integrity of the embankment.

6.4.2.3 Intermediate Inspections

These focus on issues that may develop over time and may impact on the safety of the facility or environment. The recommended items that should be generally covered are:

- Detailed inspection of embankments and all appurtenant structures.
- Tailings characteristics.
- Tailings beach development.

- Decant pond level and location.
- Decant and return water system operation.
- Tailings and return water pipelines.
- Surveillance of all monitoring installations.

6.4.2.4 Comprehensive Inspection

These will be undertaken by qualified geotechnical engineers and focus on the identification of deficiencies by visual examination of the embankments and all appurtenant structures, as well as a review of all surveillance and monitoring data. These reviews are required to be carried out one year after the beginning of the facility's operation and at minimum once every two years after as per ANCOLD requirements.

6.4.3 Instrumentation

Six (6) Vibrating Wire Piezometers (VWPs) were installed at TSF during the construction of Stage 3 within the perimeter embankment to facilitate real-time monitoring of embankment and foundation pore pressures at critical embankment areas. Figure 53 presents the installed VWPs, with new instruments marked in green, installed within the perimeter embankment. The TSF VWP install locations and depths are presented in Table 49. VWP data began transmitting on 4 March 2025, it is noted that the VWPs are desaturated at the time of preparing this report, indicating no phreatic table has formed above the natural ground at most of the monitored locations.

Figure 53: OPTSF VWP Layout

Table 49: TSF VWP Locations

VWP ID	Easting (m E)	Northing (m N)	Install Depth (m)	Install Elevation (RL m)	NG Elevation (RL m)	Status
VWP 01	498,545	8,071,209	3.0	107.4	108.0	Offline
VWP 02	498,613	8,070,923	3.0	106.4	107.0	Offline
VWP 03	498,352	8,070,516	3.0	102.1	103.6	Online
VWP 04	498,067	8,070,572	2.8	101.3	101.2	Online
VWP 05	497,903	8,070,760	3.4	102.0	101.5	Online
VWP 06	497,712	8,070,981	4.0	102.2	102.6	Online
Note: natural ground elevation derived from pre-construction surveys.						

6.5 Emergency Response Plan

6.5.1 Overview

The facility has been designed to limit danger to life and property and to minimise impacts on the surrounding environment. Regardless of the possible level of risk associated with tailings management, a contingency plan is required to address any eventuality that might arise. The following emergency response plan has been developed to be implemented to reduce the potential for unacceptable risk and consequential damage.

It is well known that water is the most common element relating to the majority of facility failures. For this reason, the operators of facilities are encouraged to carefully manage water on or near the facilities. The supernatant water pond in the facility should be kept to a minimum practical level. The pond should be located around the design location. Following heavy rainfall events, excess water stored in the facility should be removed as early as possible.

6.5.2 Pipeline Breakage and Spillage

Transfer through the affected pipeline is to cease until repairs and investigation (if required) are completed. KMS to manage as per internal spill procedures and report to relevant regulatory bodies as required.

6.5.3 Embankment Deformation

Should a visual inspection reveal local embankment cracking, erosion, sloughing and/or settlement, the following actions should be carried out, preferably by a qualified engineer:

- The short-term risk will be immediately assessed, and appropriate measures adopted to address the problem.
- Short-term remediation designs will immediately be implemented, while longer-term solutions and actions are developed.
- Cease tailings deposition until the situation in the facility has been rectified.
- The longer-term actions, once implemented, will be monitored to limit risk.

6.5.4 Critical Embankment Failure

In the event that a large-scale embankment failure occurs, the following course of action should be followed:

- Immediately contact Operations Superintendent.
- Immediately contact emergency services and the design engineers.
- Draw free water on TSF down immediately.
- Assess the likelihood of tailings release or freeboard reduction – if either is considered likely, undertake appropriate measures under the advice of the design engineers.

- Assess short-term remedial actions – possibly buttress the outer embankment with rocks while longer-term solutions are developed.
- Cease tailings deposition until the situation has been rectified.
- Clean up tailings, if released from the facility.

6.5.5 Reportable Incidents

In Western Australia, reportable incidents are governed by the Work Health and Safety (Mines) Regulation 2022 under the Work Health and Safety Act 2020 (WHS Act). The below incidents must be reported to the appropriate regulatory bodies.

Fatalities and serious injuries:

- Death of a worker or other person on the mining site.
- Serious injuries or illnesses, including:
    - Amputation of a body part.
    - Serious head or eye injury.
    - Spinal injuries.
    - Serious burns.
    - Loss of bodily function.
    - Any injury requiring immediate hospital treatment.

Dangerous incidents (near misses):

- Uncontrolled escape, spillage, or leakage of substances.
- Uncontrolled explosion or fire.
- Unplanned collapse of ground, tunnels, or mine workings.
- Failure of ground support systems (e.g., rockfall, stope failure).
- Failure of plant or structure (e.g., tailings dam, heavy machinery).
- Uncontrolled inrush of water, mud, or gas.
- Electrical incidents, including contact with live wires or serious arc flash incidents.
- Airborne contaminants exceeding safe exposure limits.
- Vehicle or equipment collisions leading to a hazardous situation.

Specific mining hazards:

- Geotechnical failures (e.g., slope failures, pit wall collapses).
- Seismic events affecting operations.
- Explosives-related incidents (e.g., misfires, premature detonation).
- Unexpected interactions with hazardous materials.
- Loss of mine communication systems or emergency response capability.

Occupational health exposures:

- Exceedance of exposure limits for silica dust, asbestos, diesel particulates, or other hazardous substances.
- Overexposure to radiation or noise.
- Failure of a ventilation system leading to unsafe atmospheric conditions.

Environmental incidents:

- Uncontrolled tailings or hazardous waste discharge.

- Significant contamination of land, water, or air.
- Failure of containment structures (e.g., TSF breach).

In the event that an incident occurs, the KMS Environmental Department and the Mine Operator must be informed immediately. After contacting the KMS Environmental Department, the applicable reporting form should be completed describing the nature of the incident, and submitted to the following regulatory bodies as soon as practical:

- DEMIRS – WorkSafe Mines Safety Branch
    - Serious incidents are to be reported immediately (via phone or online portal)
    - Written report required within 2 days for fatalities or serious incidents.
- DWER – for environmental incidents
- Emergency Services (000) – if immediate public safety is at risk.

7. References

1. ATCW (2014). *Geotechnical Investigation Report*. Consultant's report (unpublished).
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Appendix A

Design Drawings

NOTES:

1. ALL DIMENSIONS IN METRES U.N.O.
2. SURVEY SUPPLIED BY: KIMBERLEY MINERAL SANDS (NOVEMBER, 2024).
3. PROJECTION: MGA94 ZONE 51, AHD(m).
4. DESIGN LEVELS SHOWN ARE TO FINISHED SURFACE LEVELS U.N.O. OTHERWISE.
5. DIMENSIONS NOT TO BE SCALED FROM DRAWINGS.
6. EXISTING UNDERGROUND SERVICES ARE NOT SHOWN ON THIS DRAWING U.N.O. THE CONTRACTOR SHALL CONTACT THE RELEVANT AUTHORITIES TO DETERMINE THE PRESENCE OF UNDERGROUND SERVICES PRIOR TO COMMENCEMENT OF ANY WORKS.
7. ALL RELEVANT WORKING PERMITS SHALL BE ACQUIRED PRIOR TO COMMENCEMENT OF ANY WORKS.
8. ALL CONSTRUCTION WORKS SHALL BE EXECUTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE EARTHWORKS SPECIFICATION.

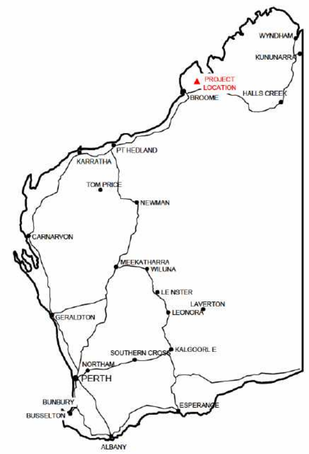
DRAWING INDEX

TITLE	REV.	NUMBER
SITE LAYOUT & DRAWING INDEX	0	P24-77-PR06-001
SITE GENERAL ARRANGEMENT	0	P24-77-PR06-002
GENERAL ARRANGEMENT - STAGE 3A	0	P24-77-PR06-003
SETTING OUT PLAN	0	P24-77-PR06-004
EMBANKMENT LONG. SECTIONS 1 OF 3	0	P24-77-PR06-005
EMBANKMENT LONG. SECTIONS 2 OF 3	0	P24-77-PR06-006
EMBANKMENT LONG. SECTIONS 3 OF 3	0	P24-77-PR06-007
EMBANKMENT CROSS SECTIONS 1 OF 4	0	P24-77-PR06-008
EMBANKMENT CROSS SECTIONS 2 OF 4	0	P24-77-PR06-009
EMBANKMENT CROSS SECTIONS 3 OF 4	0	P24-77-PR06-010
EMBANKMENT CROSS SECTIONS 4 OF 4	0	P24-77-PR06-011
CAUSEWAY CROSS SECTIONS	0	P24-77-PR06-012
EMBANKMENT SECTIONS 1 OF 2	0	P24-77-PR06-013
EMBANKMENT SECTIONS 2 OF 2	0	P24-77-PR06-014
INTERNAL RETAINING EMB. PLAN VIEW AND DETAILS	0	P24-77-PR06-015
ROCK RING - CROSS SECTIONS	0	P24-77-PR06-016

SITE LOCATION
SCALE 1:200,000

0 2,000 5,000 10,000
SCALE 1 : 200,000 (m)

ISSUED FOR CONSTRUCTION



GEOGRAPHICAL LOCATION
NOT TO SCALE

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
0	16.04.2025	ISSUED FOR CONSTRUCTION	AS	GL	JB				

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CLIENT
KIMBERLEY MINERAL SANDS
THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	A. SANTANA	02.12.2024	
DESIGNED:	G. LI	02.12.2024	
CHECKED:	J. BLAKE	02.12.2024	
APPROVED:			
ORIGIN:			
CLIENT:			

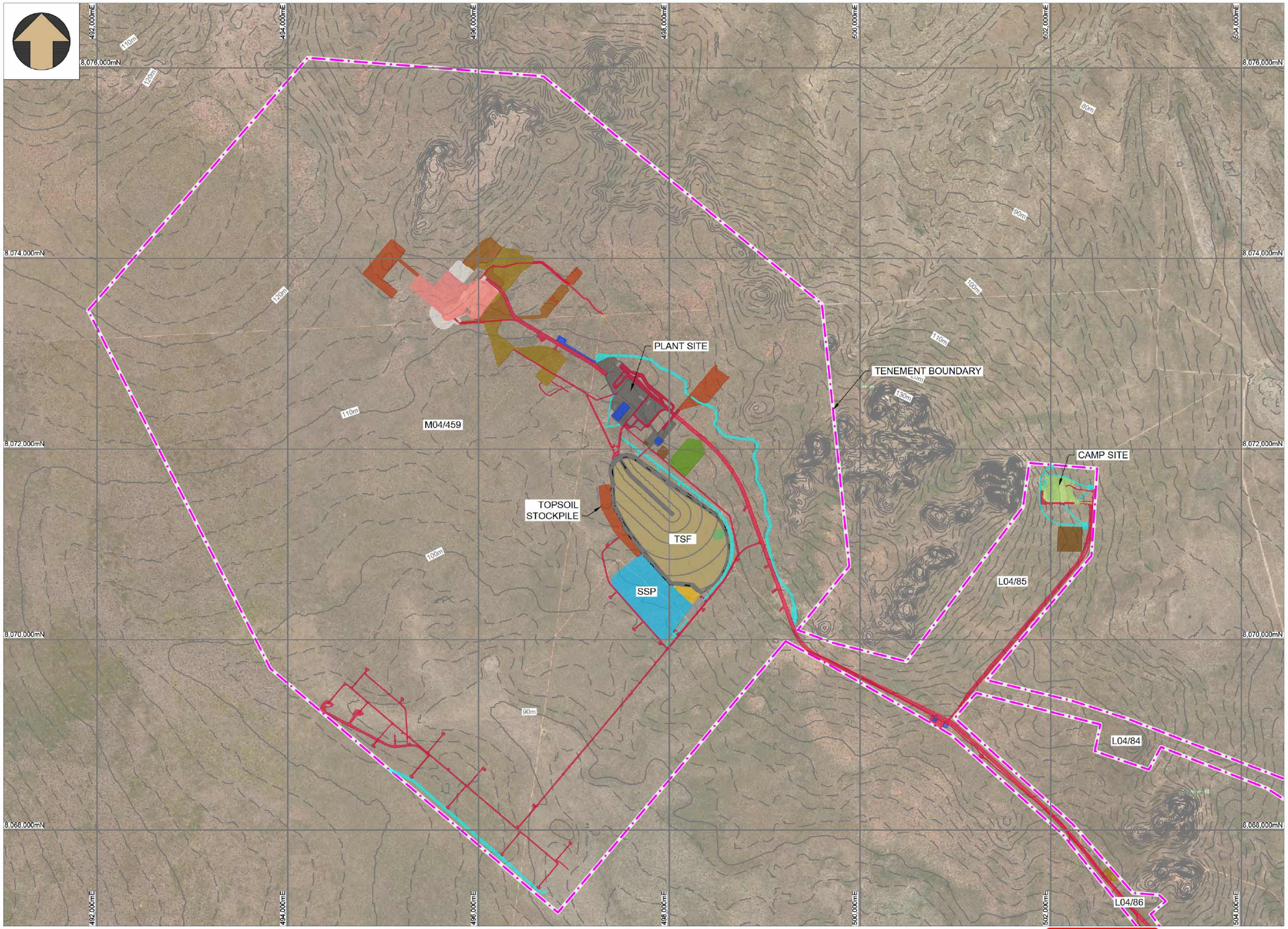
TITLE
KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
TAILINGS STORAGE FACILITY - STAGE 3A
SITE LOCATION AND DRAWING INDEX

SCALE
1 : 5,000
(A1)

DRAWING No.
P24-77-PR06-001

REV
0

A1 Border v2.0



LEGEND:

- TENEMENT BOUNDARY
- ACCESS ROAD
- BORROW PIT
- CAMP SITE
- DAM
- DIVERSION CHANNEL
- MINERAL DEPOSIT AREA
- MINE SERVICES AREA
- PIT
- PLANT SITE
- SEPTIC AREA
- STORMWATER STORAGE POND
- TOPSOIL STOCKPILE
- TAILINGS STORAGE FACILITY
- VEGETATION STOCKPILE
- WASTE DUMP

NOTES:

1. REFER TO DRAWING P24-77-PR06-001 FOR GENERAL NOTES.

ISSUED FOR CONSTRUCTION

0 200 500 1000
SCALE 1 : 20,000 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
0	16.04.2025	ISSUED FOR CONSTRUCTION	AS	GL	JB				

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APPROVED:			
ORIGIN:			
CLIENT:			

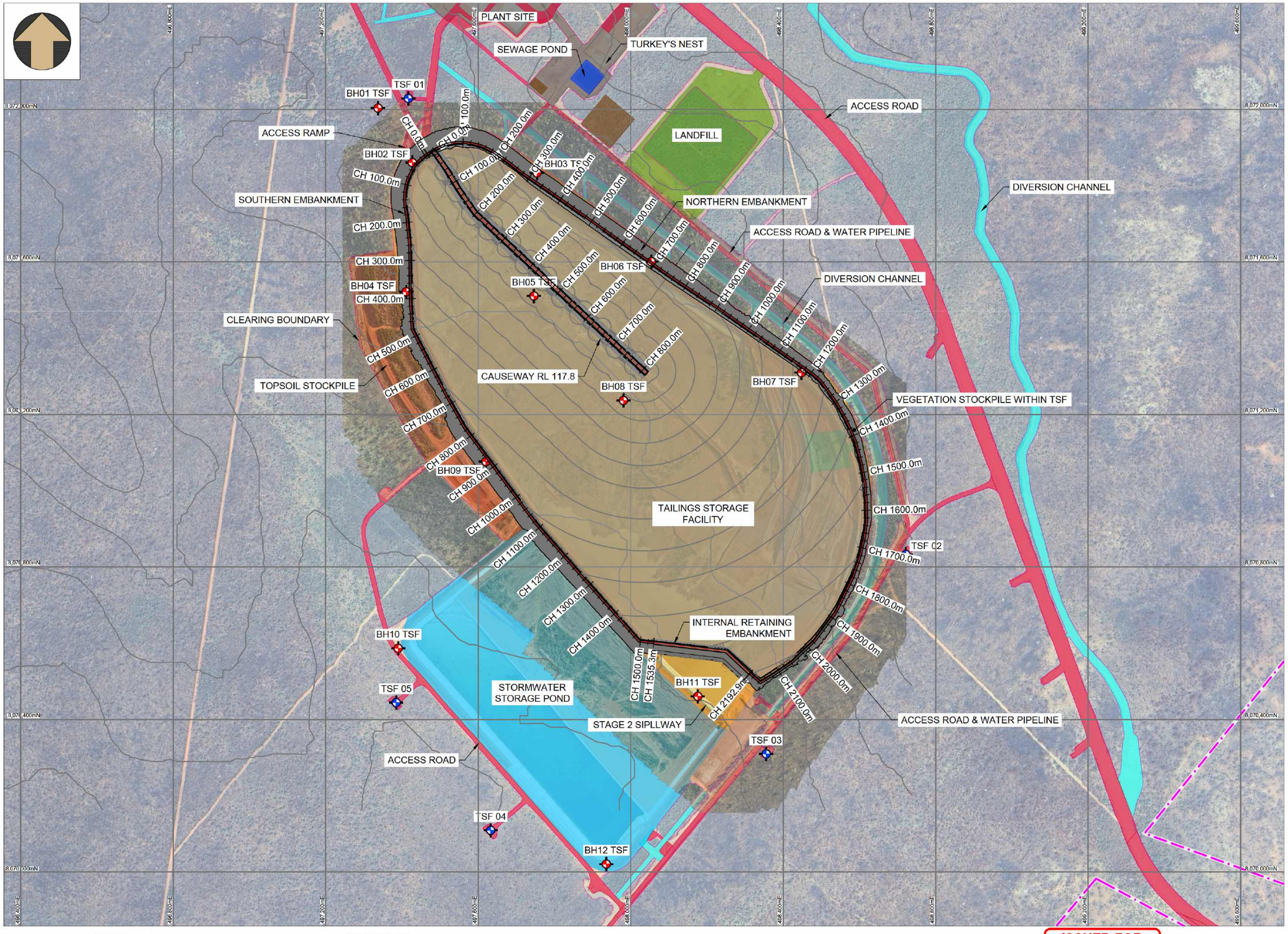
TITLE
KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
TAILINGS STORAGE FACILITY - STAGE 3A
SITE GENERAL ARRANGEMENT

SCALE
1 : 5,000
(A1)

DRAWING No.
P24-77-PR06-002

REV
0

A1 Border v2.0



LEGEND:

- TENEMENT BOUNDARY
- ACCESS ROAD
- DAM
- DIVERSION CHANNEL
- MINE SERVICES AREA
- PLANT SITE
- SEPTIC AREA
- STORMWATER STORAGE POND
- TOPSOIL STOCKPILE
- TAILINGS STORAGE FACILITY
- VEGETATION STOCKPILE
- EXISTING MONITORING BORE

NOTES:

1. REFER TO DRAWING P24-77-PR06-001 FOR GENERAL NOTES.

MONITORING BORE LOCATION

POINT I.D.	EASTING	NORTHING	R.L. (m)
TSF 01	497,416.5	8,072,029.2	104.5
TSF 02	498,721.6	8,070,833.3	108.2
TSF 03	498,355.4	8,070,310.1	101.8
TSF 04	497,632.5	8,070,109.6	97.5
TSF 05	497,384.7	8,070,444.7	97.5
TSF 06	497,359.2	8,070,997.8	101.4

MONITORING BORE LOCATION

POINT I.D.	EASTING	NORTHING	R.L. (m)
BH01 TSF	497,337.0	8,072,004.0	104.6
BH02 TSF	497,427.0	8,071,861.0	105.5
BH03 TSF	497,754.0	8,071,834.0	107.0
BH04 TSF	497,411.0	8,071,522.0	105.5
BH05 TSF	497,746.0	8,071,511.0	104.2
BH06 TSF	498,054.0	8,071,601.0	106.2
BH07 TSF	498,448.0	8,071,310.0	107.1
BH08 TSF	497,981.0	8,071,237.0	103.8
BH09 TSF	497,620.0	8,071,077.0	102.4
BH10 TSF	497,390.0	8,070,587.0	98.8
BH11 TSF	498,176.0	8,070,461.0	102.1
BH12 TSF	497,936.0	8,070,021.0	0.0

LEGEND: ZONE B: TAILINGS (CAUSEWAY) — ZONE B: OVESIZED MATERIAL

ISSUED FOR CONSTRUCTION

0 50 125 250
SCALE 1 : 5,000 (m)

(A1)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
0	16.04.2025	ISSUED FOR CONSTRUCTION	AS	GL	JB				

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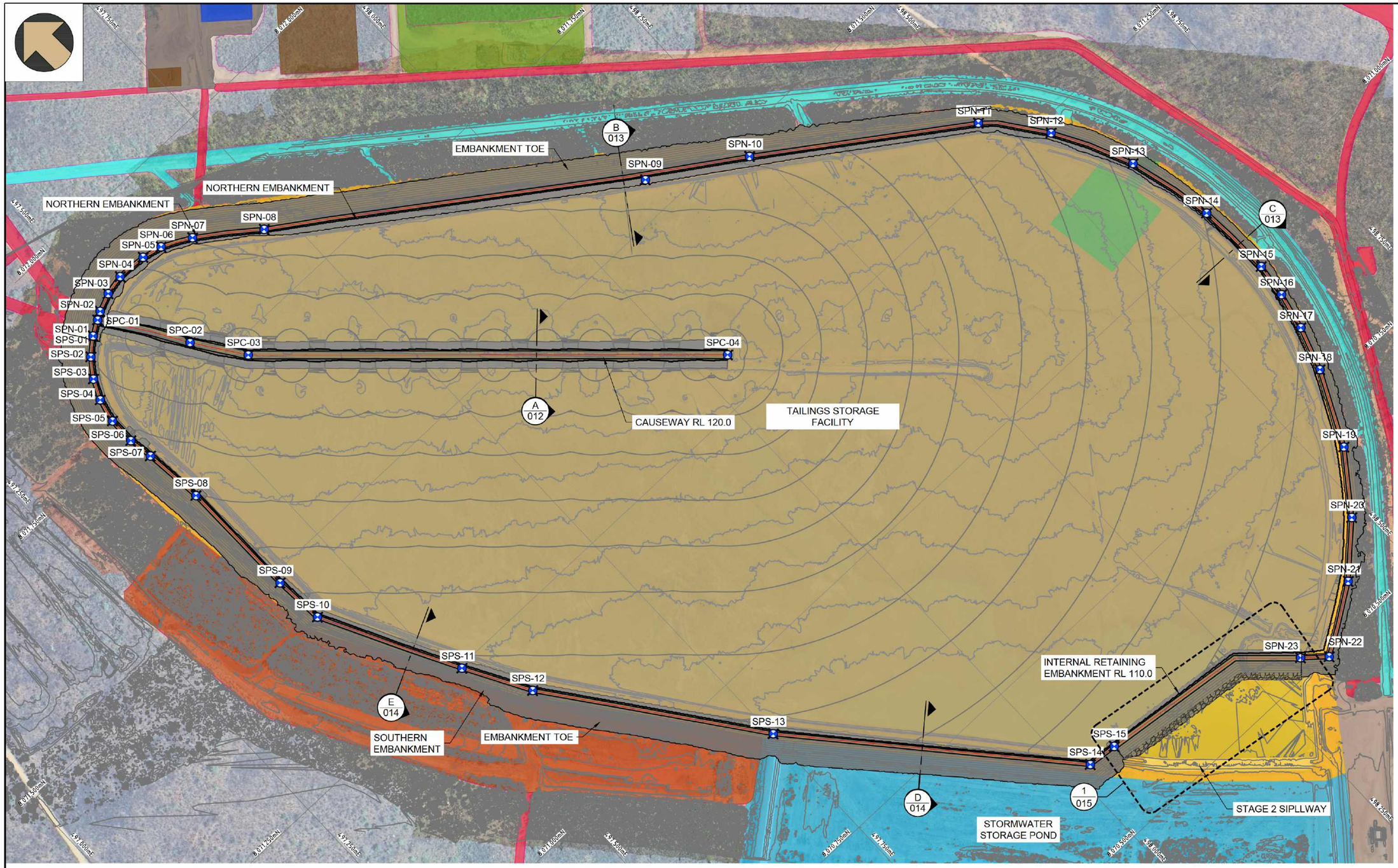
	BY	DATE	INIT.
DRAWN:	[redacted]	02.12.2024	
DESIGNED:	G. LI	02.12.2024	
CHECKED:	[redacted]	02.12.2024	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE

KIMBERLEY MINERAL SANDS THUNDERBIRD MINERAL SANDS TAILINGS STORAGE FACILITY - GENERAL ARRANGEMENT



NOTES:

1. REFER TO DRAWING P24-77-PR06-001 FOR GENERAL NOTES.

NORTH EMBANKMENT			
POINT I.D.	EASTING	NORTHING	R.L. (m)
SPN-01	497,464.0	8,071,881.9	119.1
SPN-02	497,492.2	8,071,898.8	119.3
SPN-03	497,515.2	8,071,908.3	119.3
SPN-04	497,541.3	8,071,913.8	119.2
SPN-05	497,579.8	8,071,911.8	118.7
SPN-06	497,605.8	8,071,905.8	118.4
SPN-07	497,643.3	8,071,886.8	117.9
SPN-08	497,717.7	8,071,831.8	117.3
SPN-09	498,118.3	8,071,543.8	116.1
SPN-10	498,236.3	8,071,474.3	115.9
SPN-11	498,479.8	8,071,304.8	113.4
SPN-12	498,539.4	8,071,231.8	112.6
SPN-13	498,589.2	8,071,131.3	111.8
SPN-14	498,614.7	8,071,020.3	111.0
SPN-15	498,619.0	8,070,922.3	110.5
SPN-16	498,613.2	8,070,878.3	110.3
SPN-17	498,602.3	8,070,830.3	110.0
SPN-18	498,583.5	8,070,774.3	109.8
SPN-19	498,538.0	8,070,680.8	109.4
SPN-20	498,483.6	8,070,607.8	109.1
SPN-21	498,424.2	8,070,551.3	108.9
SPN-22	498,340.4	8,070,497.2	108.7
SPN-23	498,312.6	8,070,521.3	0.0

SOUTH EMBANKMENT			
POINT I.D.	EASTING	NORTHING	R.L. (m)
SPS-01	497,464.0	8,071,881.9	119.1
SPS-02	497,443.5	8,071,864.3	119.0
SPS-03	497,426.6	8,071,841.3	118.8
SPS-04	497,414.6	8,071,815.8	118.5
SPS-05	497,407.6	8,071,785.3	118.2
SPS-06	497,407.5	8,071,750.8	117.9
SPS-07	497,412.4	8,071,719.3	117.6
SPS-08	497,420.3	8,071,642.3	116.8
SPS-09	497,422.5	8,071,486.8	115.3
SPS-10	497,427.6	8,071,421.8	114.7
SPS-11	497,518.0	8,071,247.3	113.9
SPS-12	497,564.8	8,071,164.3	113.5
SPS-13	497,752.1	8,070,912.8	112.8
SPS-14	498,022.1	8,070,605.8	110.3
SPS-15	498,060.3	8,070,601.8	110.2

CAUSEWAY			
POINT I.D.	EASTING	NORTHING	R.L. (m)
SPC-01	497,482.2	8,071,892.8	119.3
SPC-02	497,549.0	8,071,790.8	120.0
SPC-03	497,592.6	8,071,728.0	120.0
SPC-04	498,041.8	8,071,307.7	0.0

LEGEND: ZONE A: TAILINGS (95 % SMDD) ZONE C: OVERSIZED MATERIAL

ISSUED FOR CONSTRUCTION

0 25 62.5 125
SCALE 1 : 2,500 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
0	16.04.2025	ISSUED FOR CONSTRUCTION	AS	GL	JB				

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	A. SANTANA	02.12.2024	
DESIGNED:	G. LI	02.12.2024	
CHECKED:	J. BLAKE	02.12.2024	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
KIMBERLEY MINERAL SANDS THUNDERBIRD MINERAL SANDS PROJECT TAILINGS STORAGE FACILITY - STAGE 3A SETTING OUT PLAN

SCALE 1 : 5,000 (A1)

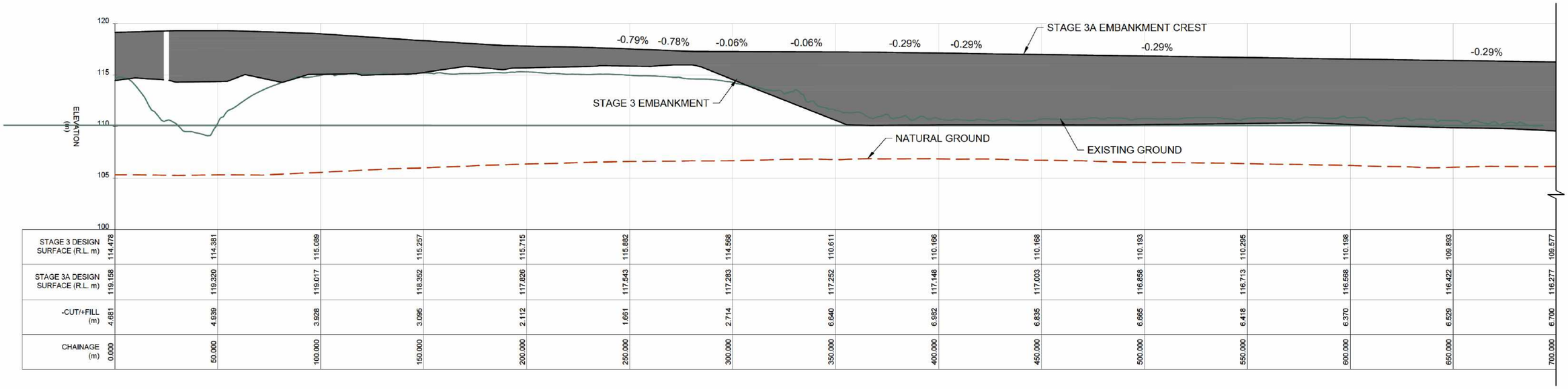
DRAWING No. P24-77-PR06-004

REV 0

A1 Border v2.0

NOTES:

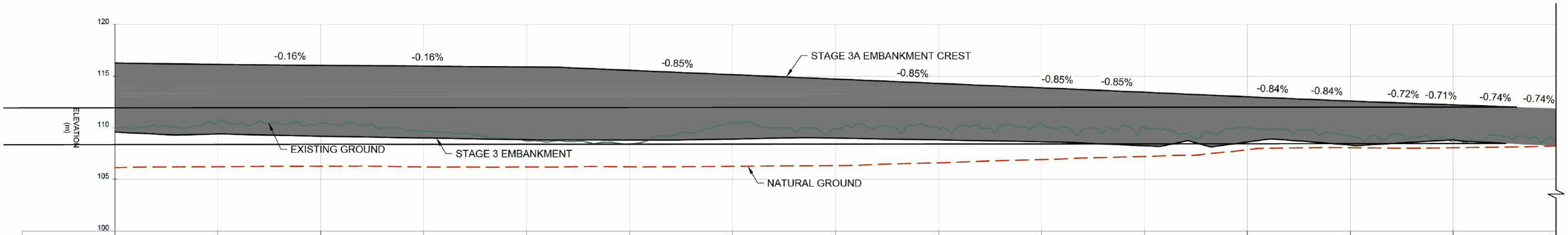
1. REFER TO DRAWING P24-77-PR06-001 FOR GENERAL NOTES.



STAGE 3 DESIGN SURFACE (R.L. m)	114.478	114.381	115.089	115.257	115.715	115.882	114.568	110.611	110.166	110.168	110.193	110.295	110.198	109.893	109.577
STAGE 3A DESIGN SURFACE (R.L. m)	119.158	119.320	119.017	118.352	117.826	117.543	117.283	117.252	117.148	117.003	116.658	116.713	116.568	116.422	116.277
-CUT/+FILL (m)	4.681	4.939	3.928	3.096	2.112	1.661	2.714	6.640	6.982	6.835	6.665	6.418	6.370	6.529	6.700
CHAINAGE (m)	0.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000	400.000	450.000	500.000	550.000	600.000	650.000	700.000

TAILINGS STORAGE FACILITY - NORTHERN EMBANKMENT LONGITUDINAL SECTION - CH. 0.0 TO 700.0m

H 1:1,000
V 1:200



STAGE 3 DESIGN SURFACE (R.L. m)	109.577	109.398	109.166	109.007	108.836	108.606	108.906	108.994	108.816	108.638	108.253	108.615	108.331	108.824	108.236
STAGE 3A DESIGN SURFACE (R.L. m)	116.277	116.134	116.054	115.975	115.895	115.567	115.144	114.720	114.295	113.871	113.448	113.005	112.585	112.226	111.859
-CUT/+FILL (m)	6.700	6.736	6.888	6.968	7.059	6.761	6.237	5.725	5.479	5.233	5.195	4.391	4.254	3.402	3.623
CHAINAGE (m)	700.000	750.000	800.000	850.000	900.000	950.000	1000.000	1050.000	1100.000	1150.000	1200.000	1250.000	1300.000	1350.000	1400.000

TAILINGS STORAGE FACILITY - NORTHERN EMBANKMENT LONGITUDINAL SECTION - CH. 700.0 TO 1,400.0m

H 1:1,000
V 1:200

LEGEND: ZONE A: TAILINGS (95 % SMDD) — DESIGNED EMBANKMENT — EXISTING GROUND — NATURAL GROUND

ISSUED FOR CONSTRUCTION

0 2 5 10
SCALE 1 : 200 (m)

0 10 25 50
SCALE 1 : 1,000 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT
0	16.04.2025	ISSUED FOR CONSTRUCTION	AS	GL	JB		

DRG. NO.	REFERENCE DRAWING

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	A. SANTANA	02.12.2024	
DESIGNED:	G. LI	02.12.2024	
CHECKED:	J. BLAKE	02.12.2024	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
TAILINGS STORAGE FACILITY - STAGE 3A EMBANKMENT LONG. SECTION 1 OF 3

SCALE: AS SHOWN (A1)

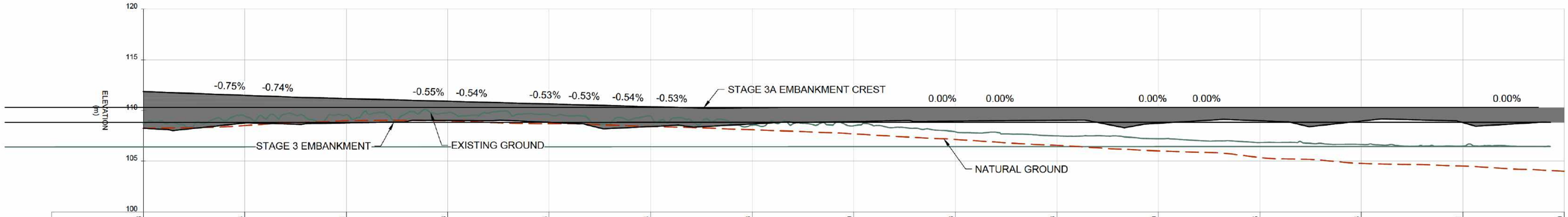
DRAWING No.: P24-77-PR06-005

REV: 0

A1 Border v2.0

NOTES:

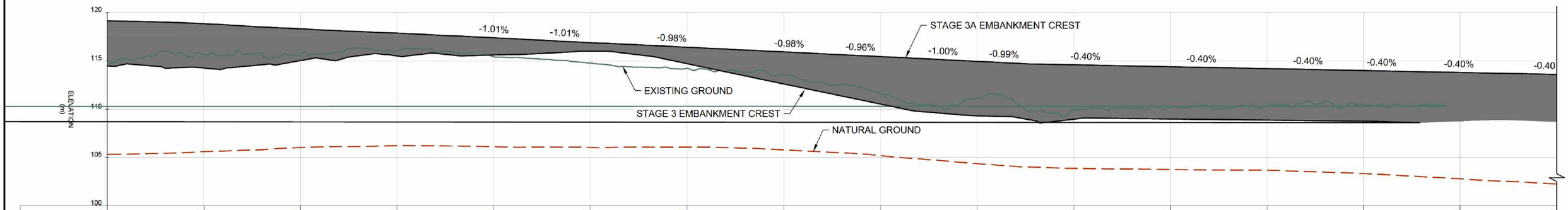
1. REFER TO DRAWING P24-77-PR06-001 FOR GENERAL NOTES.



| | | |

NOTES:

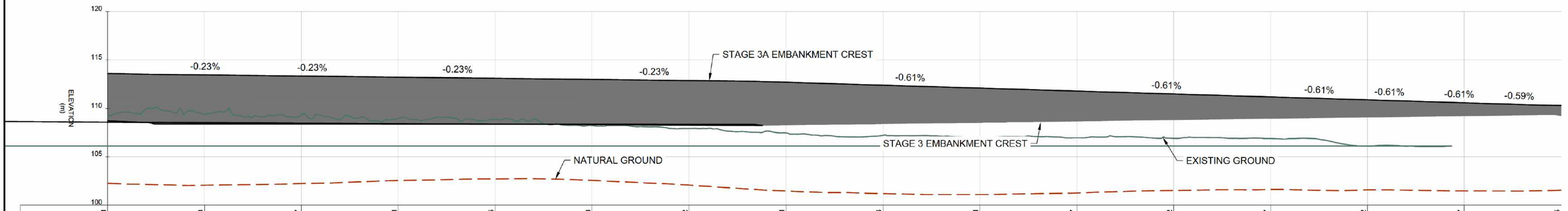
1. REFER TO DRAWING P24-77-PR06-001 FOR GENERAL NOTES.



STAGE 3 DESIGN SURFACE (R.L. m)	114.476	114.247	115.027	115.498	115.607	116.000	114.704	112.606	110.527	109.303	108.953	108.975	108.863	108.751	108.757	108.691
STAGE 3A DESIGN SURFACE (R.L. m)	119.143	118.845	118.313	117.862	117.388	116.861	116.413	115.925	115.440	114.947	114.592	114.394	114.195	113.996	113.797	113.699
-CUT/+FILL (m)	4.667	4.598	3.287	2.364	1.781	0.861	1.710	3.320	4.913	5.644	5.639	5.418	5.332	5.245	5.040	4.908
CHAINAGE (m)	0.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000	400.000	450.000	500.000	550.000	600.000	650.000	700.000	750.000

TAILINGS STORAGE FACILITY - SOUTHERN EMBANKMENT LONGITUDINAL SECTION - CH. 0.0 TO 750.0m

H 1:1,000
V 1:200



STAGE 3 DESIGN SURFACE (R.L. m)	108.691	108.373	108.367	108.361	108.365	108.348	108.342	108.251	108.386	108.521	108.657	108.792	108.927	109.062	109.197	109.215
STAGE 3A DESIGN SURFACE (R.L. m)	113.599	113.451	113.335	113.218	113.101	112.985	112.868	112.692	112.389	112.086	111.782	111.479	111.175	110.875	110.571	110.295
-CUT/+FILL (m)	4.908	5.078	4.967	4.857	4.747	4.636	4.526	4.441	4.003	3.564	3.126	2.687	2.249	1.813	1.374	1.080
CHAINAGE (m)	750.000	800.000	850.000	900.000	950.000	1000.000	1050.000	1100.000	1150.000	1200.000	1250.000	1300.000	1350.000	1400.000	1450.000	1500.000

TAILINGS STORAGE FACILITY - SOUTHERN EMBANKMENT LONGITUDINAL SECTION - CH. 750.0 TO 1,500.0m

H 1:1,000
V 1:200

LEGEND: ZONE A : TAILINGS (95% SMDD) — DESIGNED EMBANKMENT — — — EXISTING GROUND — — — NATURAL GROUND

ISSUED FOR CONSTRUCTION

0 2 5 10
SCALE 1 : 200 (m)

0 10 25 50
SCALE 1 : 1,000 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
0	16.04.2025	ISSUED FOR CONSTRUCTION	AS	GL	JB				

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	A. SANTANA	02.12.2024	
DESIGNED:	G. LI	02.12.2024	
CHECKED:	J. BLAKE	02.12.2024	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE: **KIMBERLEY MINERAL SANDS THUNDERBIRD MINERAL SANDS PROJECT TAILINGS STORAGE FACILITY - STAGE 3A EMBANKMENT LONG. SECTION 3 OF 3**

SCALE: AS SHOWN (A1)

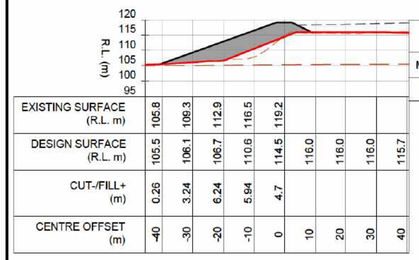
DRAWING No.: P24-77-PR06-007

REV: 0

A1 Border v2.0

NOTES:

1. REFER TO DRAWING P24-77-PR06-001 FOR GENERAL NOTES.

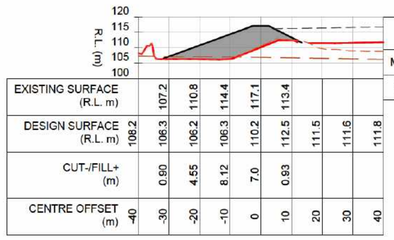


EXISTING SURFACE (R.L. m)	105.8	106.3	106.9	112.9	116.5	116.5	119.2				
DESIGN SURFACE (R.L. m)	105.5	106.1	106.7	106.7	110.6	114.5	116.0	116.0	116.0	116.0	115.7
CUT-/FILL+ (m)	0.26	3.24	6.24	6.24	5.94	4.7					
CENTRE OFFSET (m)	-40	-30	-20	-20	-10	0	10	20	30	40	

EARTHWORKS AT CH 0.0m

MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	202.84	0.00	0.00

CH 0.0m

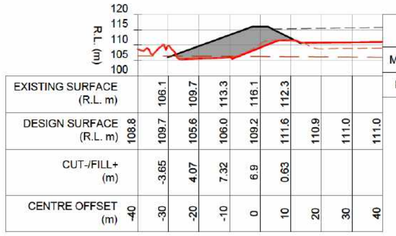


EXISTING SURFACE (R.L. m)	107.2	110.8	114.4	117.1	113.4			
DESIGN SURFACE (R.L. m)	106.2	106.3	106.2	106.3	110.2	112.5	111.5	111.6	111.8
CUT-/FILL+ (m)	0.90	4.55	8.12	7.0	0.93				
CENTRE OFFSET (m)	-40	-30	-20	-10	0	10	20	30	40

EARTHWORKS AT CH 400.0m

MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	212.50	16,332.61	66,428.29

CH 400.0m

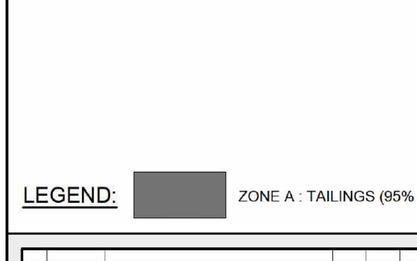


EXISTING SURFACE (R.L. m)	106.1	109.7	113.3	116.1	112.3			
DESIGN SURFACE (R.L. m)	109.7	105.6	106.0	109.2	111.6	110.9	111.0	111.0
CUT-/FILL+ (m)	-3.65	4.07	7.32	6.9	0.63			
CENTRE OFFSET (m)	-40	-30	-20	-10	0	10	20	30	40

EARTHWORKS AT CH 800.0m

MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	193.90	19,824.69	148,057.20

CH 800.0m

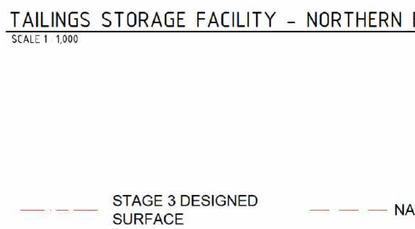


EXISTING SURFACE (R.L. m)	105.6	109.2	112.8	116.4	119.0	115.0			
DESIGN SURFACE (R.L. m)	105.0	105.2	107.1	111.1	115.1	114.6	113.3	113.3	113.5
CUT-/FILL+ (m)	0.64	3.97	5.74	5.36	3.9	0.39			
CENTRE OFFSET (m)	-40	-30	-20	-10	0	10	20	30	40

EARTHWORKS AT CH 100.0m

MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	199.54	21,902.21	21,902.21

CH 100.0m



EXISTING SURFACE (R.L. m)	108.9	110.5	114.1	116.9	113.1			
DESIGN SURFACE (R.L. m)	105.6	105.8	106.3	110.2	112.5	111.3	111.4	111.5
CUT-/FILL+ (m)	1.30	4.67	7.83	6.7	0.58			
CENTRE OFFSET (m)	-40	-30	-20	-10	0	10	20	30	40

EARTHWORKS AT CH 500.0m

MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	207.83	21,016.56	87,444.86

CH 500.0m

EXISTING SURFACE (R.L. m)		109.5	113.2	115.9	112.1			
DESIGN SURFACE (R.L. m)	110.0	105.6	105.9	108.8	111.4	110.4	110.5	110.5
CUT-/FILL+ (m)		3.95	7.29	7.1	0.74			
CENTRE OFFSET (m)	-40	-30	-20	-10	0	10	20	30	40

EARTHWORKS AT CH 900.0m

MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	191.97	19,293.76	167,350.96

CH 900.0m

EXISTING SURFACE (R.L. m)	107.8	111.4	115.1	117.8				
DESIGN SURFACE (R.L. m)	106.0	107.7	111.7	115.7	113.9	112.3	112.4	112.5
CUT-/FILL+ (m)	1.86	3.73	3.37	2.1				
CENTRE OFFSET (m)	-40	-30	-20	-10	0	10	20	30	40

EARTHWORKS AT CH 200.0m

MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	112.22	16,907.54	38,809.74

CH 200.0m

EXISTING SURFACE (R.L. m)	106.6	110.2	113.9	116.6	112.8			
DESIGN SURFACE (R.L. m)	105.6	105.7	106.2	110.2	112.2	111.2	111.3	111.4
CUT-/FILL+ (m)	1.02	4.56	7.67	6.4	0.64			
CENTRE OFFSET (m)	-40	-30	-20	-10	0	10	20	30	40

EARTHWORKS AT CH 600.0m

MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	202.24	20,503.68	107,948.54

CH 600.0m

EXISTING SURFACE (R.L. m)		108.8	112.4	115.1	111.4			
DESIGN SURFACE (R.L. m)	110.2	105.6	107.3	108.9	111.1	109.7	109.8	109.9
CUT-/FILL+ (m)		3.22	5.17	6.2	0.28			
CENTRE OFFSET (m)	-40	-30	-20	-10	0	10	20	30	40

EARTHWORKS AT CH 1000.0m

MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	158.40	17,545.77	184,896.72

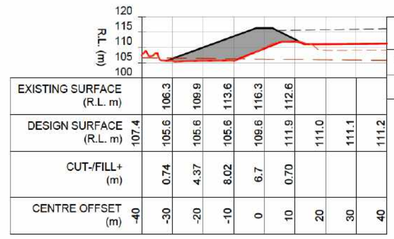
CH 1000.0m

EXISTING SURFACE (R.L. m)	107.2	110.9	114.5	117.3	113.5			
DESIGN SURFACE (R.L. m)	106.4	105.7	110.6	114.6	113.2	111.8	111.9	112.1
CUT-/FILL+ (m)	0.85	4.22	3.90	2.7	0.29			
CENTRE OFFSET (m)	-40	-30	-20	-10	0	10	20	30	40

EARTHWORKS AT CH 300.0m

MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	113.49	11,285.93	50,095.67

CH 300.0m

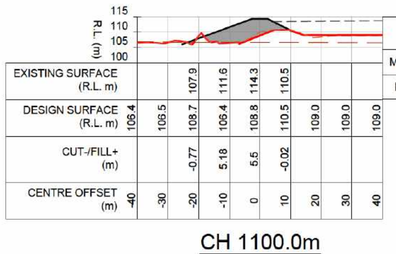


EXISTING SURFACE (R.L. m)	106.3	109.9	113.6	116.3	112.6			
DESIGN SURFACE (R.L. m)	107.4	105.6	105.6	105.6	109.6	111.9	111.0	111.1	111.2
CUT-/FILL+ (m)	0.74	4.37	8.02	6.7	0.70				
CENTRE OFFSET (m)	-40	-30	-20	-10	0	10	20	30	40

EARTHWORKS AT CH 700.0m

MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	203.44	20,283.98	128,232.51

CH 700.0m



EXISTING SURFACE (R.L. m)		107.9	111.6	114.3	110.5			
DESIGN SURFACE (R.L. m)	105.5	108.7	105.4	108.8	110.5	109.0	109.0	109.0
CUT-/FILL+ (m)		-0.77	5.18	5.5	-0.02			
CENTRE OFFSET (m)	-40	-30	-20	-10	0	10	20	30	40

EARTHWORKS AT CH 1100.0m

MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	117.30	13,785.29	198,682.01

CH 1100.0m

TAILINGS STORAGE FACILITY - NORTHERN EMBANKMENT CROSS SECTIONS - CH. 0.0 TO 1,100.0m

SCALE 1 1,000

LEGEND: ZONE A : TAILINGS (95% SMDD) — STAGE 3A DESIGNED EMBANKMENT — STAGE 3 DESIGNED SURFACE — NATURAL GROUND - - - - - TAILINGS SURFACE

ISSUED FOR CONSTRUCTION

0 10 25 50
SCALE 1 : 1,000 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
0	16.04.2025	ISSUED FOR CONSTRUCTION	AS	GL	JB				

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	A. SANTANA	02.12.2024	
DESIGNED:	G. LI	02.12.2024	
CHECKED:	J. BLAKE	02.12.2024	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE: **KIMBERLEY MINERAL SANDS THUNDERBIRD MINERAL SANDS PROJECT TAILINGS STORAGE FACILITY - STAGE 3A EMBANKMENT CROSS SECTIONS 1 OF 4**

SCALE: AS SHOWN (A1)

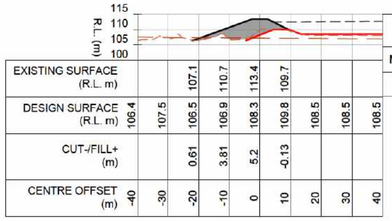
DRAWING No.: P24-77-PR06-008

REV: 0

A1 Border v2.0

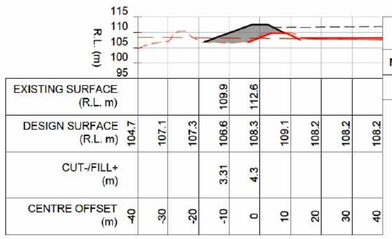
NOTES:

1. REFER TO DRAWING P24-77-PR06-001 FOR GENERAL NOTES.



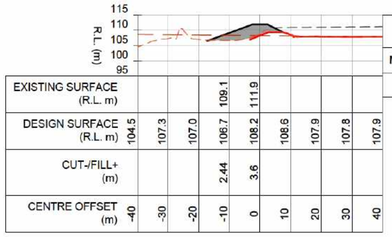
EARTHWORKS AT CH 1200.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	93.12	10,521.03	209,203.04

CH 1200.0m



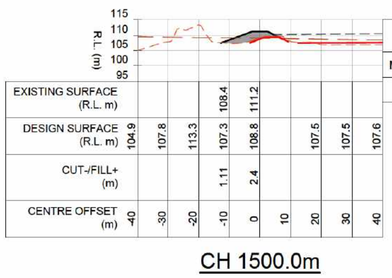
EARTHWORKS AT CH 1300.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	76.74	8,616.87	217,819.91

CH 1300.0m



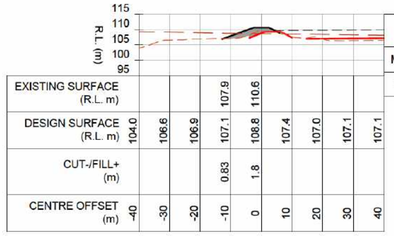
EARTHWORKS AT CH 1400.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	58.99	6,849.38	224,669.29

CH 1400.0m



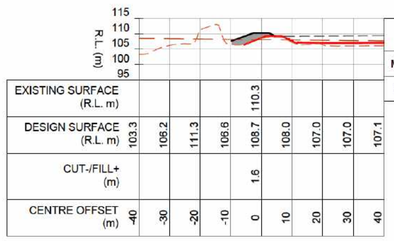
EARTHWORKS AT CH 1500.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	34.82	4,731.03	229,400.32

CH 1500.0m



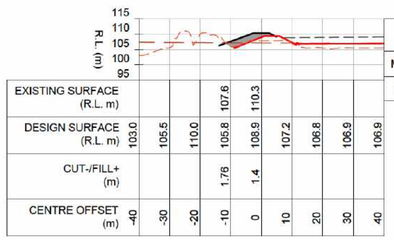
EARTHWORKS AT CH 1600.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	25.81	3,046.32	232,446.64

CH 1600.0m



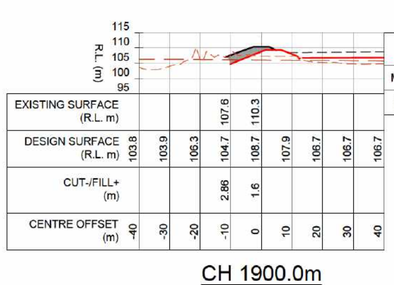
EARTHWORKS AT CH 1700.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	25.59	2,591.56	235,038.20

CH 1700.0m



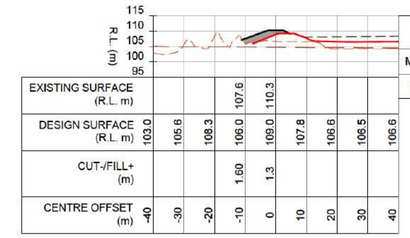
EARTHWORKS AT CH 1800.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	27.80	2,694.70	237,732.90

CH 1800.0m



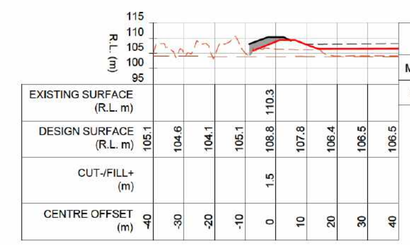
EARTHWORKS AT CH 1900.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	31.39	2,985.03	240,717.93

CH 1900.0m



EARTHWORKS AT CH 2000.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	26.32	2,907.55	243,625.48

CH 2000.0m



EARTHWORKS AT CH 2100.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	25.58	2,612.51	246,237.99

CH 2100.0m

TAILINGS STORAGE FACILITY - NORTHERN EMBANKMENT CROSS SECTIONS - CH. 1,200 TO 2,100.0m

SCALE 1 : 1,000

LEGEND: ZONE A : TAILINGS (95% SMDD) — STAGE 3A DESIGNED EMBANKMENT — STAGE 3 DESIGNED SURFACE — NATURAL GROUND — TAILINGS SURFACE

ISSUED FOR CONSTRUCTION

0 10 25 50
SCALE 1 : 1,000 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
0	16.04.2025	ISSUED FOR CONSTRUCTION	AS	GL	JB				

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	A. SANTANA	02.12.2024	
DESIGNED:	G. LI	02.12.2024	
CHECKED:	J. BLAKE	02.12.2024	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE: **KIMBERLEY MINERAL SANDS THUNDERBIRD MINERAL SANDS PROJECT TAILINGS STORAGE FACILITY - STAGE 3A EMBANKMENT CROSS SECTIONS 2 OF 4**

SCALE: AS SHOWN (A1)

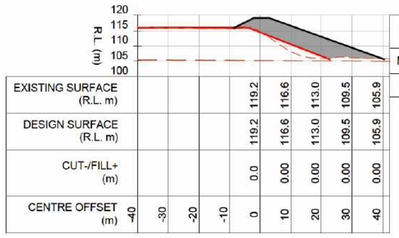
DRAWING No.: P24-77-PR06-009

REV: 0

A1 Border v2.0

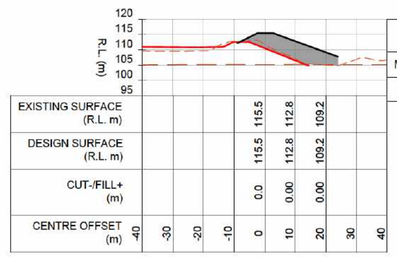
NOTES:

1. REFER TO DRAWING P24-77-PR06-001 FOR GENERAL NOTES.



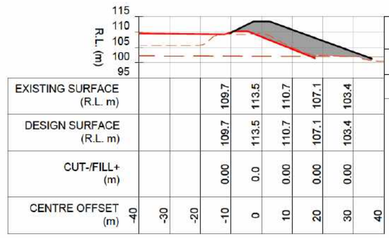
EARTHWORKS AT CH 0.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	204.74	0.00	0.00

CH 0.0m



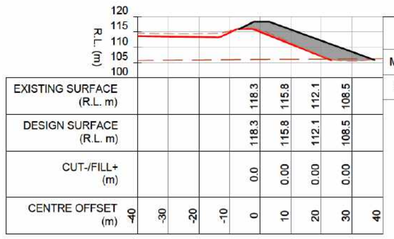
EARTHWORKS AT CH 400.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	150.23	11,920.60	54,943.06

CH 400.0m



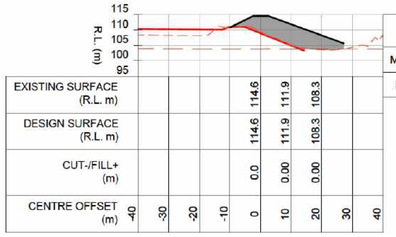
EARTHWORKS AT CH 800.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	183.26	17,119.10	123,962.07

CH 800.0m



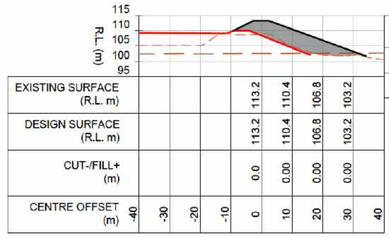
EARTHWORKS AT CH 100.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	160.23	20,315.08	20,315.08

CH 100.0m



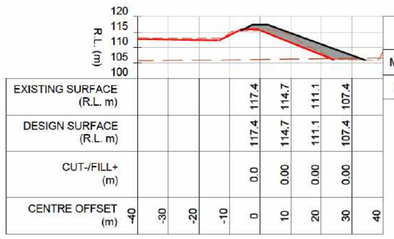
EARTHWORKS AT CH 500.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	179.53	17,210.76	72,153.82

CH 500.0m



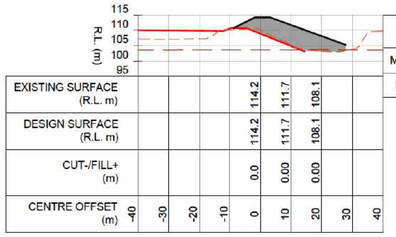
EARTHWORKS AT CH 900.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	171.86	17,756.05	141,718.12

CH 900.0m



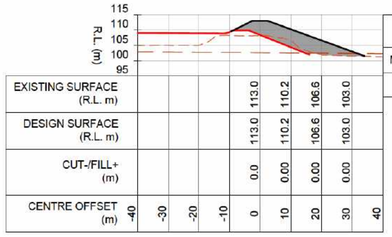
EARTHWORKS AT CH 200.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	97.79	13,523.91	33,838.99

CH 200.0m



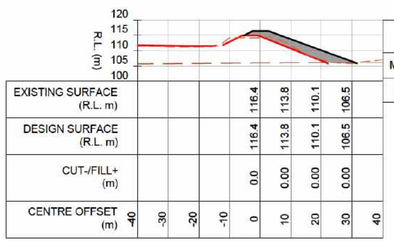
EARTHWORKS AT CH 600.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	179.21	17,936.55	90,090.37

CH 600.0m



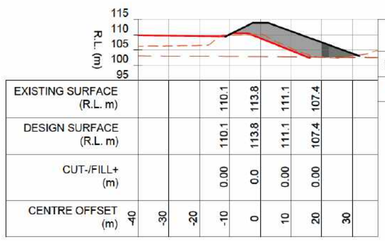
EARTHWORKS AT CH 1000.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	167.19	16,952.69	158,670.82

CH 1000.0m



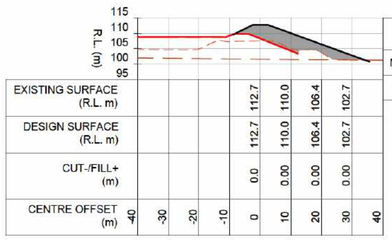
EARTHWORKS AT CH 300.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	88.18	9,183.47	43,022.47

CH 300.0m



EARTHWORKS AT CH 700.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	154.71	16,752.60	106,842.97

CH 700.0m



EARTHWORKS AT CH 1100.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	143.19	15,660.09	174,330.90

CH 1100.0m

TAILINGS STORAGE FACILITY - SOUTHERN EMBANKMENT CROSS SECTIONS - CH. 0.0 TO 1,100.0m

SCALE 1 : 1,000

LEGEND: ZONE A : TAILINGS (95% SMDD) — STAGE 3A DESIGNED EMBANKMENT — STAGE 3 DESIGNED SURFACE — NATURAL GROUND — TAILINGS SURFACE

ISSUED FOR CONSTRUCTION

0 10 25 50
SCALE 1 : 1,000 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
0	16.04.2025	ISSUED FOR CONSTRUCTION	AS	GL	JB				

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	A. SANTANA	02.12.2024	
DESIGNED:	G. LI	02.12.2024	
CHECKED:	J. BLAKE	02.12.2024	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE: **KIMBERLEY MINERAL SANDS THUNDERBIRD MINERAL SANDS PROJECT TAILINGS STORAGE FACILITY - STAGE 3A EMBANKMENT CROSS SECTIONS 3 OF 4**

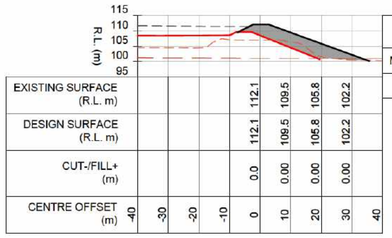
SCALE: **AS SHOWN** (A1)

DRAWING No.: **P24-77-PR06-010** REV: **0**

A1 Border v2.0

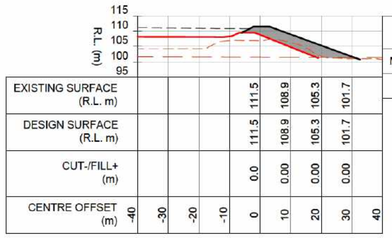
NOTES:

1. REFER TO DRAWING P24-77-PR06-001 FOR GENERAL NOTES.



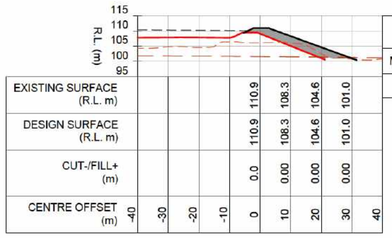
EARTHWORKS AT CH 1200.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	145.95	14,457.00	188,800.30

CH 1200.0m



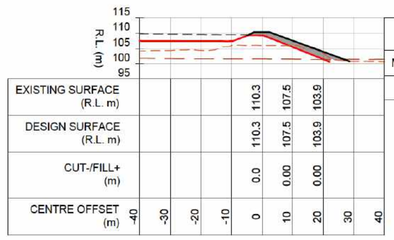
EARTHWORKS AT CH 1300.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	112.71	12,932.99	201,733.29

CH 1300.0m



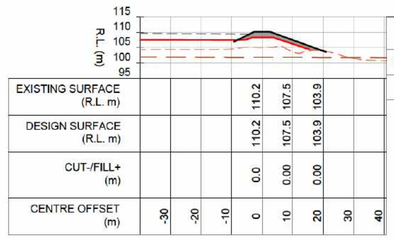
EARTHWORKS AT CH 1400.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	86.45	9,957.98	211,691.27

CH 1400.0m



EARTHWORKS AT CH 1500.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	55.88	7,772.32	219,463.59

CH 1500.0m



EARTHWORKS AT CH 1535.3m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	35.52	1,812.50	221,076.09

CH 1535.3m

TAILINGS STORAGE FACILITY - SOUTHERN EMBANKMENT CROSS SECTIONS - CH. 1,200.0 TO 1,535.3m

SCALE 1 : 1,000

LEGEND: ZONE A : TAILINGS (95% SMDD) — STAGE 3A DESIGNED EMBANKMENT — STAGE 3 DESIGNED SURFACE — NATURAL GROUND — TAILINGS SURFACE

ISSUED FOR CONSTRUCTION

0 10 25 50
SCALE 1 : 1,000 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
0	16.04.2025	ISSUED FOR CONSTRUCTION	AS	GL	JB				

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	A. SANTANA	02.12.2024	
DESIGNED:	G. LI	02.12.2024	
CHECKED:	J. BLAKE	02.12.2024	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE: **KIMBERLEY MINERAL SANDS THUNDERBIRD MINERAL SANDS PROJECT TAILINGS STORAGE FACILITY - STAGE 3A EMBANKMENT CROSS SECTIONS 4 OF 4**

SCALE: AS SHOWN (A1)

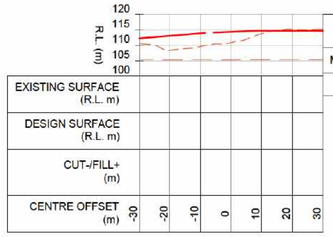
DRAWING No.: P24-77-PR06-011

REV: 0

A1 Border v2.0

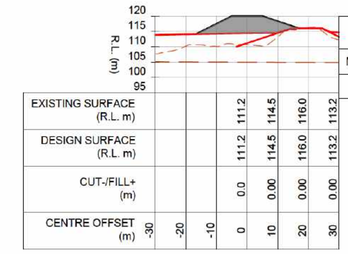
NOTES:

1. REFER TO DRAWING P24-77-PR06-001 FOR GENERAL NOTES.



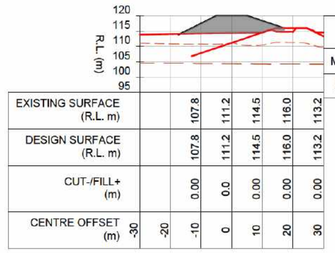
EARTHWORKS AT CH 0.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	0.00	0.00	0.00

CH 0.0m



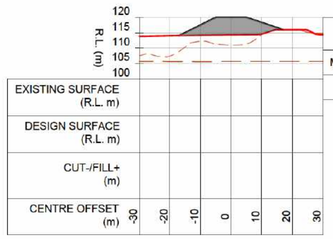
EARTHWORKS AT CH 300.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	123.72	11,890.81	30,140.47

CH 300.0m



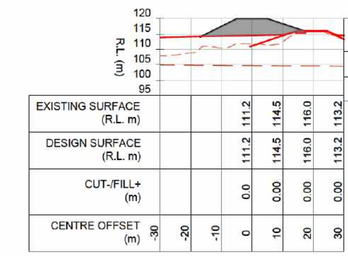
EARTHWORKS AT CH 600.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	128.93	12,507.34	66,978.03

CH 600.0m



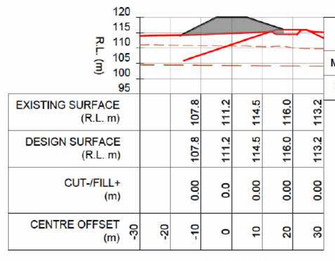
EARTHWORKS AT CH 100.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	125.43	6,271.03	6,271.03

CH 100.0m



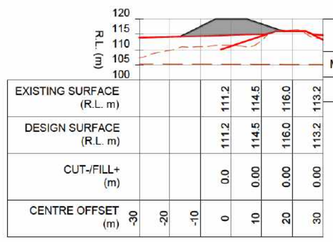
EARTHWORKS AT CH 400.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	120.83	12,227.78	42,368.26

CH 400.0m



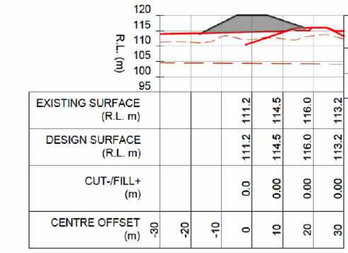
EARTHWORKS AT CH 700.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	117.86	12,339.37	79,317.40

CH 700.0m



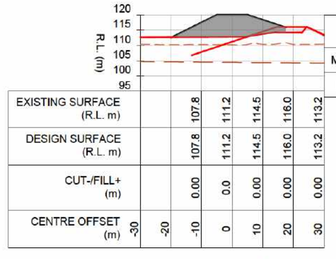
EARTHWORKS AT CH 200.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	114.09	11,978.64	18,249.67

CH 200.0m



EARTHWORKS AT CH 500.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	121.22	12,102.43	54,470.68

CH 500.0m

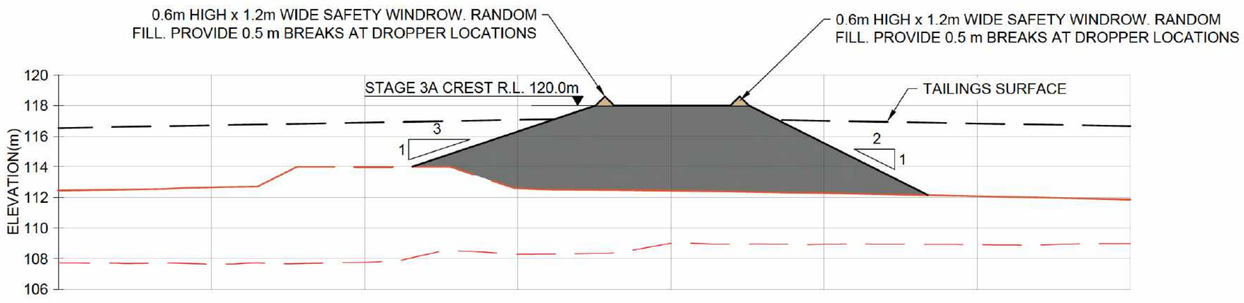


EARTHWORKS AT CH 800.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
EARTHWORKS	175.48	14,666.97	93,984.37

CH 800.0m

TAILINGS STORAGE FACILITY - SOUTHERN EMBANKMENT CROSS SECTIONS - CH. 1,200.0 TO 1,535.3m

SCALE 1 : 1,000



EARTHWORKS VOLUME TABLE			
CHAINAGE	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
CH 0.0m	0.00	0.00	0.00
CH 100.0m	125.43	6,271.03	6,271.03
CH 200.0m	114.09	11,978.64	18,249.67
CH 300.0m	123.72	11,890.81	30,140.47
CH 400.0m	120.83	12,227.78	42,368.26
CH 500.0m	121.22	12,102.43	54,470.68
CH 600.0m	128.93	12,507.34	66,978.03
CH 700.0m	117.86	12,339.37	79,317.40
CH 800.0m	175.48	14,666.97	93,984.37
CH 813.6m	0.00	1,192.98	95,177.36

LEGEND: ZONE A : TAILINGS (95% SMDD) — STAGE 3A DESIGNED CAUSEWAY — STAGE 3 DESIGNED SURFACE — NATURAL GROUND — TAILINGS SURFACE

ISSUED FOR CONSTRUCTION

0 10 25 50
SCALE 1 : 1,000 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
0	16.04.2025	ISSUED FOR CONSTRUCTION	AS	GL	JB				

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	A. SANTANA	02.12.2024	
DESIGNED:	G. LI	02.12.2024	
CHECKED:	J. BLAKE	02.12.2024	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE: KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
TAILINGS STORAGE FACILITY - STAGE 3A
CAUSEWAY CROSS SECTIONS AND DETAILS

SCALE: AS SHOWN (A1)

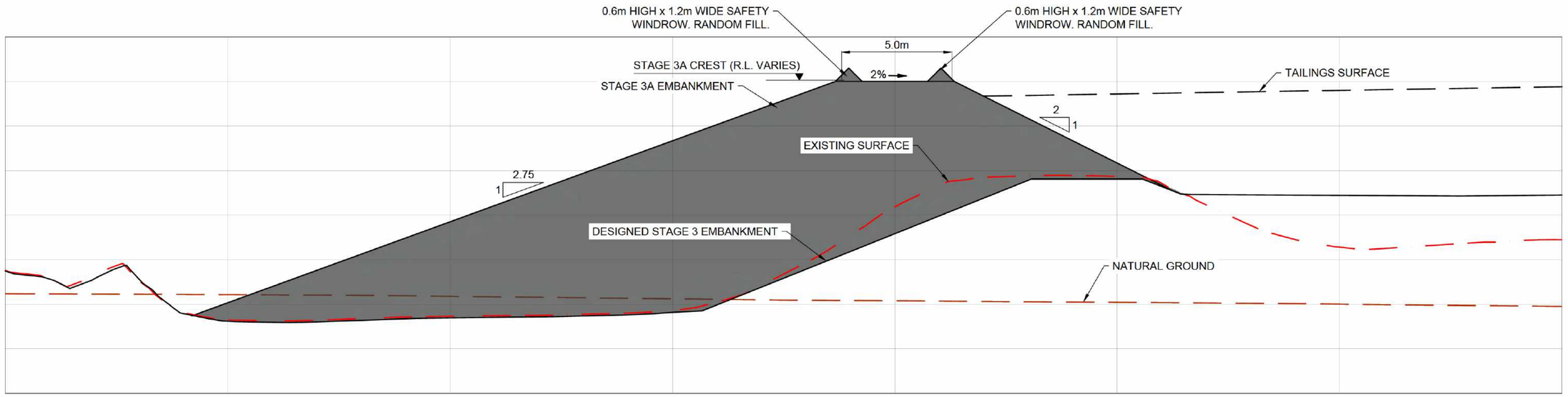
DRAWING No.: P24-77-PR06-012

REV: 0

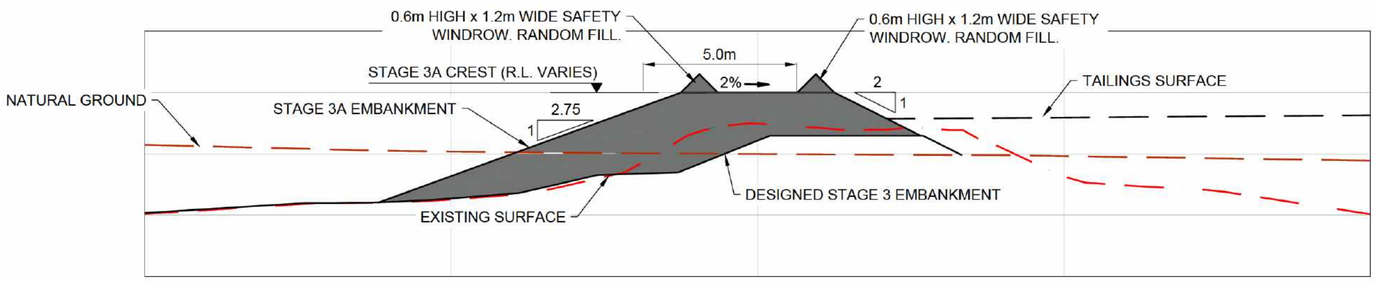
A1 Border v2.0

NOTES:

1. REFER TO DRAWING P24-77-PR06-001 FOR GENERAL NOTES.



B 04 STAGE 3A EMBANKMENT - CROSS SECTION
SCALE: 1: 100



C 04 STAGE 3A EMBANKMENT - CROSS SECTION
SCALE: 1: 100

LEGEND: ZONE A: TAILINGS (95 % SMDD) — DESIGNED EMBANKMENT — EXISTING GROUND — NATURAL GROUND

ISSUED FOR CONSTRUCTION

0 1 2.5 5
SCALE 1 : 100 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
0	16.04.2025	ISSUED FOR CONSTRUCTION	AS	GL	JB				

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	A. SANTANA	02.12.2024	
DESIGNED:	G. LI	02.12.2024	
CHECKED:	J. BLAKE	02.12.2024	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
KIMBERLEY MINERAL SANDS THUNDERBIRD MINERAL SANDS PROJECT TAILINGS STORAGE FACILITY - STAGE 3A EMBANKMENT SECTIONS 1 OF 2

SCALE: AS SHOWN (A1)

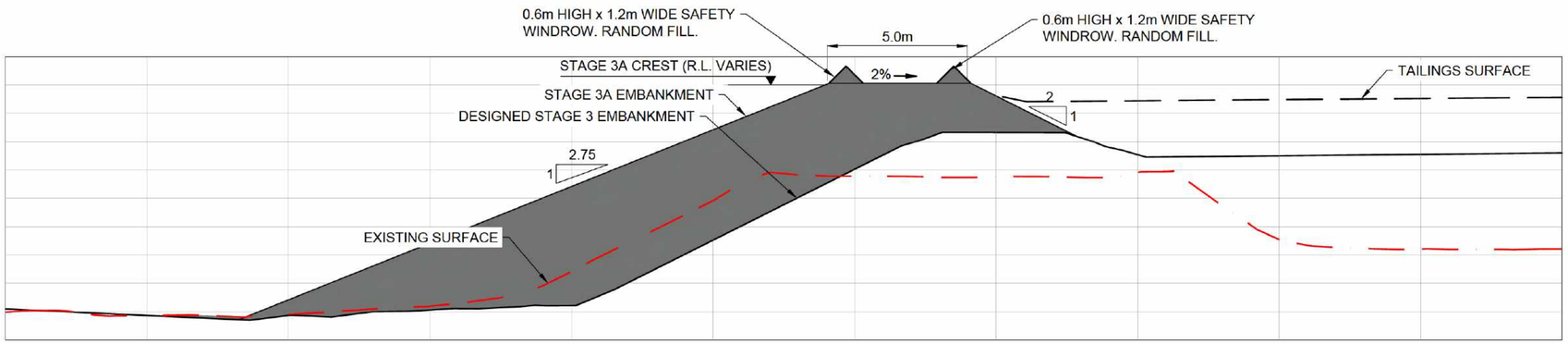
DRAWING No.: P24-77-PR06-013

REV: 0

A1 Border v2.0

NOTES:

1. REFER TO DRAWING P24-77-PR06-001 FOR GENERAL NOTES.



D 04 STAGE 3A EMBANKMENT - CROSS SECTION
SCALE: 1: 100

E 04 STAGE 3A EMBANKMENT - CROSS SECTION
SCALE: 1: 100

LEGEND: ZONE A: TAILINGS (95 % SMDD) — DESIGNED EMBANKMENT — EXISTING GROUND — NATURAL GROUND

ISSUED FOR CONSTRUCTION

0 1 2.5 5
SCALE 1 : 100 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
0	16.04.2025	ISSUED FOR CONSTRUCTION	AS	GL	JB				

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

	BY	DATE	INIT.
DRAWN:	A. SANTANA	02.12.2024	
DESIGNED:	G. LI	02.12.2024	
CHECKED:	J. BLAKE	02.12.2024	
APPROVED:			
ORIGIN:			
CLIENT:			

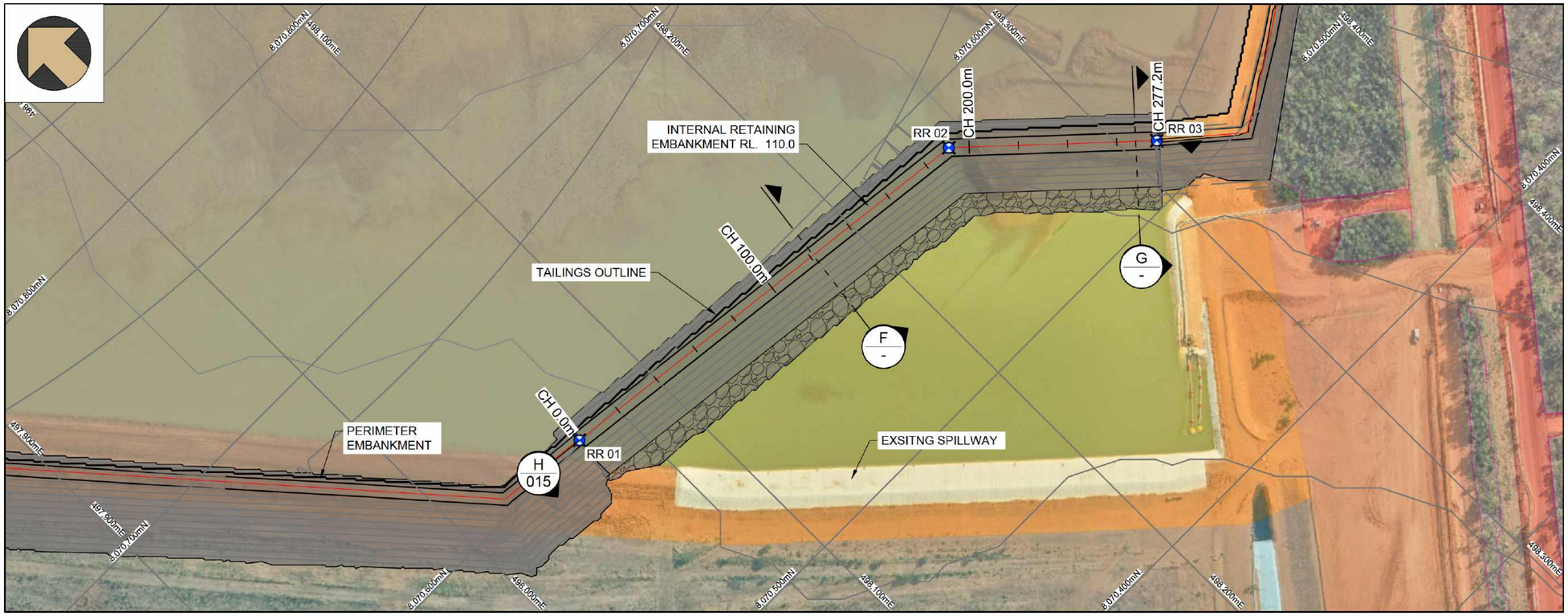
TITLE
KIMBERLEY MINERAL SANDS THUNDERBIRD MINERAL SANDS PROJECT TAILINGS STORAGE FACILITY - STAGE 3A EMBANKMENT SECTIONS 2 OF 2

SCALE: AS SHOWN (A1)

DRAWING No.: P24-77-PR06-014

REV: 0

A1 Border v2.0



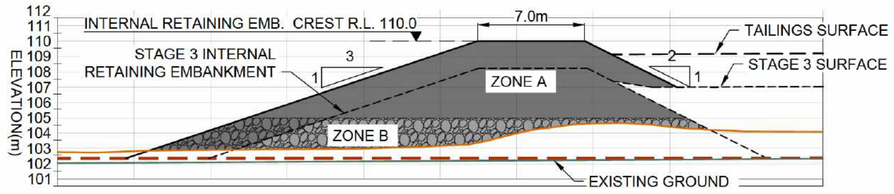
1/004 INTERNAL RETAINING EMBANKMENT - PLAN VIEW
SCALE: 1 : 1,000

NOTES:

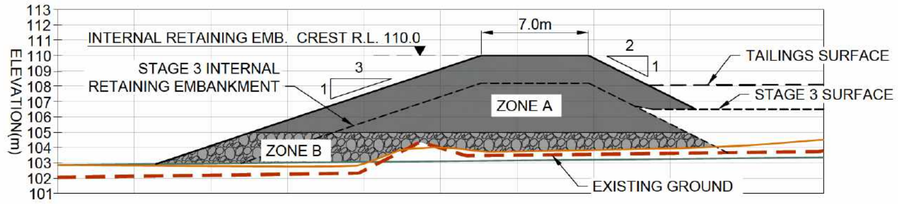
1. REFER TO DRAWING P24-77-PR02-001 FOR GENERAL NOTES.

INTERNAL RETAINING EMBANKMENT SETTING OUT POINTS

POINT I.D.	EASTING	NORTHING	R.L. (m)
RR 01	498,060.3	8,070,601.3	110.0
RR 02	498,250.5	8,070,578.8	110.0
RR 03	498,312.2	8,070,520.9	110.0



F/- INTERNAL RETAINING EMBANKMENT- TYPICAL SECTION
SCALE: 1: 200



G/- INTERNAL RETAINING EMBANKMENT - TYPICAL SECTION
SCALE: 1: 200

LEGEND: ZONE A: TAILINGS (95 % SMDD) ZONE C: OVESIZED MATERIAL

ISSUED FOR CONSTRUCTION

0 4 10 20
SCALE 1 : 500 (m)

0 1 2.5 5
SCALE 1 : 100 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT
0	16.04.2025	ISSUED FOR CONSTRUCTION	AS	GL	JB		

DRG. NO.	REFERENCE DRAWING

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CLIENT: KIMBERLEY MINERAL SANDS THUNDERBIRD OPERATIONS PTY LTD

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DESIGNED:	G. LI	02.12.2024	
CHECKED:	J. BLAKE	02.12.2024	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE: KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
TAILINGS STORAGE FACILITY - STAGE 3A
INTERNAL RETEAINING EMB. PLAN VIEW

SCALE: 1 : 5,000 (A1)

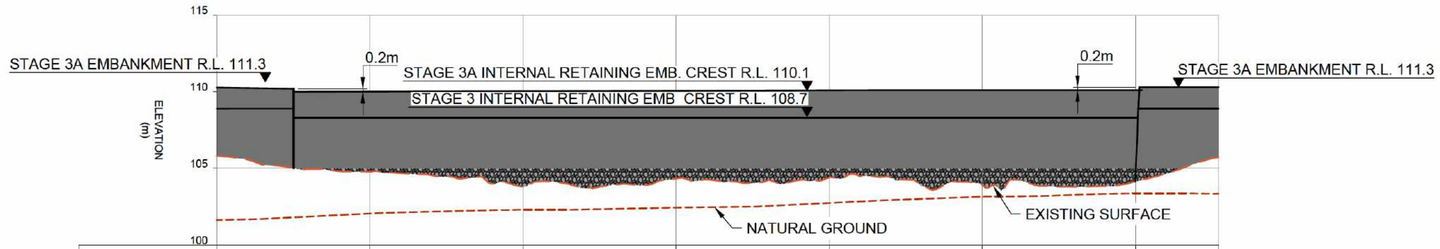
DRAWING No.: P24-77-PR06-015

REV: 0

A1 Border v2.0

NOTES:

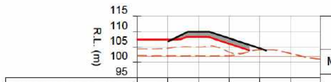
1. REFER TO DRAWING P24-77-PR02-001 FOR GENERAL NOTES.



EXISTING SURFACE (R.L. m)	101.625	102.050	102.300	102.433	102.740	103.146	103.396	103.350
DESIGN SURFACE (R.L. m)	101.625	102.050	102.300	102.433	102.740	103.146	103.396	103.350
-CUT/+FILL (m)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CHAINAGE (m)	0.000	50.000	100.000	150.000	200.000	250.000	300.000	327.228

TAILINGS STORAGE FACILITY - INTERNAL RETAINING EMBANKMENT - LONG. SECTION

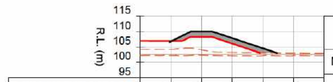
H 1:1,000
V 1:500



EARTHWORKS AT CH 0.4m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ROCK RING	40.93	0.00	0.00

EXISTING SURFACE (R.L. m)	107.4	107.4	108.3	106.1			
DESIGN SURFACE (R.L. m)			110.0	107.9	104.6		
CUT-/FILL+ (m)			1.7	1.8			
CENTRE OFFSET (m)	-20	-10	0	10	20	30	

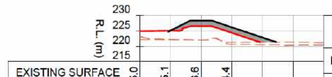
CH 0.4m



EARTHWORKS AT CH 150.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ROCK RING	53.24	2,542.58	7,359.83

EXISTING SURFACE (R.L. m)	107.0	107.0	108.3	106.1			
DESIGN SURFACE (R.L. m)		106.8	110.1	107.9	104.6		
CUT-/FILL+ (m)		-0.2	1.8	1.8			
CENTRE OFFSET (m)	-20	-10	0	10	20	30	40

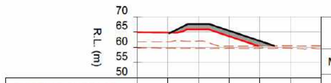
CH 150.0m



EARTHWORKS AT CH 250.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ROCK RING	53.80	2,675.18	12,696.38

EXISTING SURFACE (R.L. m)	225.0	225.1	226.6	224.4			
DESIGN SURFACE (R.L. m)		225.1	228.4	226.2	222.9		
CUT-/FILL+ (m)		0.1	1.8	1.8			
CENTRE OFFSET (m)	-20	-10	0	10	20	30	40

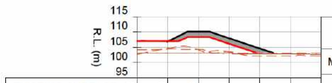
CH 250.0m



EARTHWORKS AT CH 50.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ROCK RING	52.05	2,304.45	2,304.45

EXISTING SURFACE (R.L. m)	64.8	64.8	65.8	63.6			
DESIGN SURFACE (R.L. m)			67.5	65.4	62.0		
CUT-/FILL+ (m)			1.7	1.8			
CENTRE OFFSET (m)	-20	-10	0	10	20	30	40

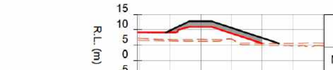
CH 50.0m



EARTHWORKS AT CH 200.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ROCK RING	53.21	2,661.37	10,021.20

EXISTING SURFACE (R.L. m)	107.0	107.0	108.3	106.1			
DESIGN SURFACE (R.L. m)		106.8	110.1	107.9	104.6		
CUT-/FILL+ (m)		-0.1	1.8	1.8			
CENTRE OFFSET (m)	-20	-10	0	10	20	30	40

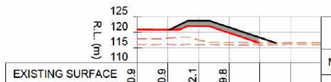
CH 200.0m



EARTHWORKS AT CH 275.8m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ROCK RING	51.54	1,357.07	14,053.45

EXISTING SURFACE (R.L. m)	9.2	9.2	11.0	8.9	5.6		
DESIGN SURFACE (R.L. m)		9.8	12.8	10.7	7.4		
CUT-/FILL+ (m)		0.6	1.8	1.8	1.8		
CENTRE OFFSET (m)	-20	-10	0	10	20	30	40

CH 275.8m



EARTHWORKS AT CH 100.0m			
MATERIAL NAME	AREA (m²)	VOLUME (m³)	CUMULATIVE VOLUME (m³)
ROCK RING	48.46	2,512.80	4,817.25

EXISTING SURFACE (R.L. m)	120.9	120.9	122.1	119.8			
DESIGN SURFACE (R.L. m)			123.8	121.7	118.3		
CUT-/FILL+ (m)			1.8	1.8			
CENTRE OFFSET (m)	-20	-10	0	10	20	30	40

CH 100.0m

H 014 TAILINGS STORAGE FACILITY - INTERNAL RETAINING EMBANKMENT - CROSS SECTIONS

H 1:1,000

LEGEND: ZONE A: TAILINGS (95 % SMDD)

ZONE C: OVESIZED MATERIAL

ISSUED FOR CONSTRUCTION

0 4 10 20
SCALE 1 : 500 (m)

0 1 2.5 5
SCALE 1 : 100 (m)

REV	DATE	AMENDMENTS	DRN	DSN	CKD	APP	CLT	DRG. NO.	REFERENCE DRAWING
0	16.04.2025	ISSUED FOR CONSTRUCTION	AS	GL	JB				

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	BY	DATE	INIT.
DRAWN:	A. SANTANA	02.12.2024	
DESIGNED:	G. LI	02.12.2024	
CHECKED:	J. BLAKE	02.12.2024	
APPROVED:			
ORIGIN:			
CLIENT:			

TITLE
KIMBERLEY MINERAL SANDS
THUNDERBIRD MINERAL SANDS PROJECT
TAILINGS STORAGE FACILITY - STAGE 3A
INTERNAL RETAINING EMB. CROSS SECTION

SCALE: AS SHOWN (A1)

DRAWING No.: B24-77-PR06-016

REV: 0

A1 Border v2.0

Appendix B

Operating Manual

REPORT REF	P24-77-PR-06/OM	12 SEPTEMBER 2025

Out of Pit TSF Stage 3A Operating Manual Kimberley Mineral Sands Thunderbird Operations Pty Ltd

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Report

Title:	Stage 3A OPTSF Downstream Raise Operating Manual
File:	P24-77-PR-06/OM
Author(s):	Mitch Hanger; Joshua Blake, George Li, Janith Ranaweera
Client:	Kimberley Mineral Sands Pty Ltd
Contact:	Terry Tye
Synopsis:	This document presents the Operating Manual for Stage 3A OPTSF Downstream Raise at the Kimberley Mineral Sands' Thunderbird Operation Pty Ltd (TOPL).

Revision

Date	Revision	Purpose	Author
26 MAR 2025	DRAFT	ISSUED FOR REVIEW AND COMMENT	MH; JB; GL; JR
17 APR 2025	REV 0	ISSUED FOR USE	MH; JB; GL; JR
12 SEP 2025	REV 1	ADDRESSED CLIENT FEEDBACK	MH; JB; GL; JR
Recipients are responsible for eliminating all superseded documents in their possession			

Distribution

Date	Revision	Approved	Recipient(s)	No of Copies
26 MAR 2025	DRAFT	MH	KIMBERLEY MINERAL SANDS	1. PDF
17 APR 2025	REV 0	MH	KIMBERLEY MINERAL SANDS	1. PDF
12 SEP 2025	REV 1	MH	KIMBERLEY MINERAL SANDS	1. PDF
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Appendix B: Regulatory License and Lease Conditions
Appendix C: Operating Manual Forms for Process Plant Staff
Appendix D: Operational Templates

Terminology and Abbreviations

The following terminology and abbreviations have been used in this document:

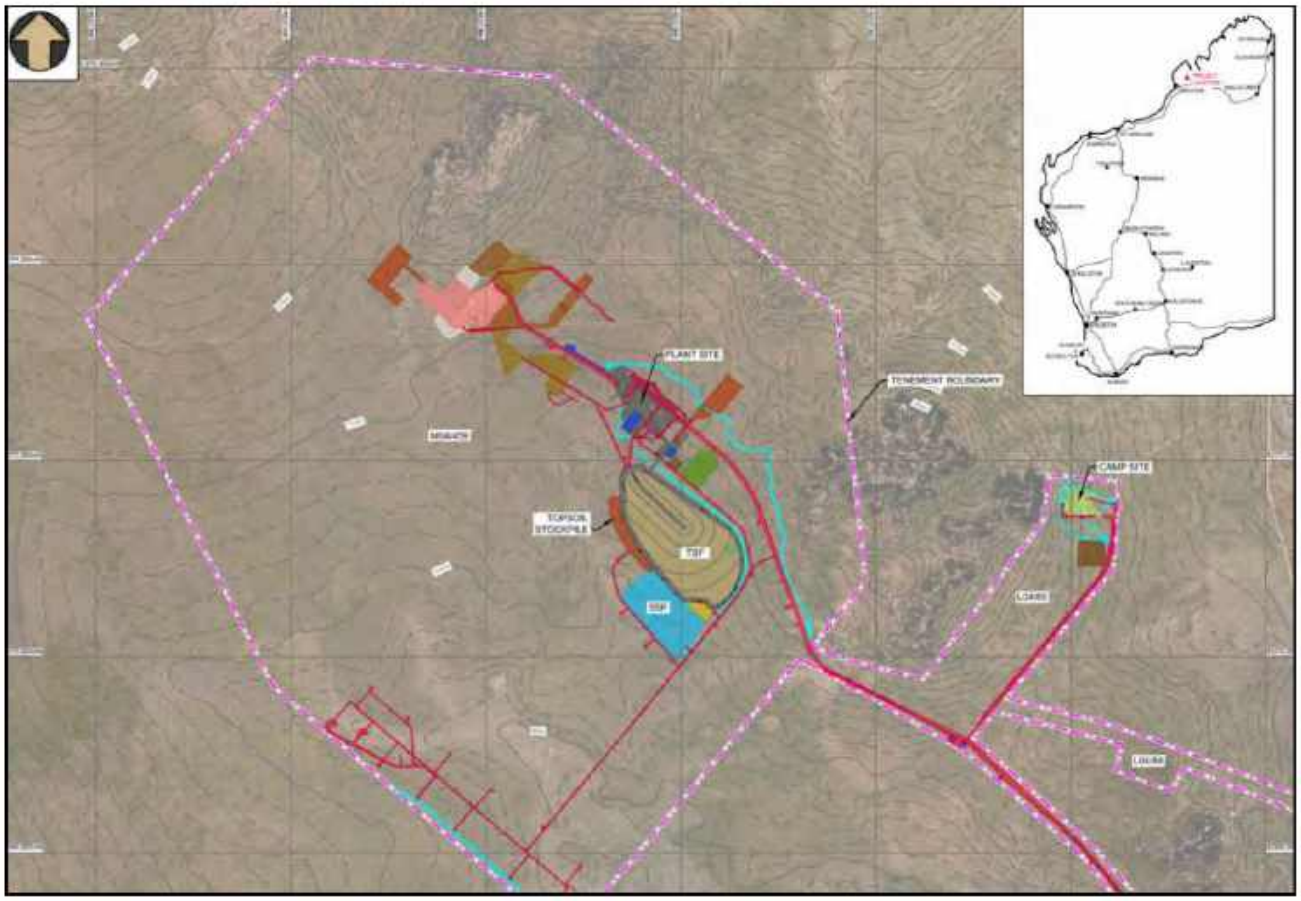
AEP	Annual exceedance probability
ANCOLD	Australian National Committee on Large Dams
DDR	Detailed Design Report
EoR	Engineer of Record
GPS	Global Positioning System
GSI	Geotechnical Site Investigation
HDPE	High-Density Polyethylene
KMS	Kimberley Mineral Sands
IFD	Intensity Frequency Duration
LoM	Life of Mine
m/a	Metres per annum
m3/d	Cubic meters per day
Mm3	Million cubic meters
Mt	Million tonnes
Mt/a	Million tons per annum
NAF	Non-acid forming
OM	Operating Manual
PAF	Potentially Acid Forming
PMP	Probable Maximum Precipitation
RL	Reduced level
t/a	Tonnes per annum
t/d	Tonnes per day
t/m³	Tonnes per cubic metre
TOPL	Thunderbird Operations Pty Ltd
SMDD	Standard Maximum Dry Density
OPTSF	Out of Pit Tailings Storage Facility

1. TSF Proposal Summary

1.1 Introduction

Resource Engineering Consultants Pty Ltd (REC) has been engaged by Kimberley Mineral Sands Pty Ltd (KMS) to prepare the Detailed Design Report (DDR) for Stage 3A of the Out of Pit Tailings Storage Facility (OPTSF) at the Thunderbird Operations Pty Ltd (TOPL) site, located approximately 100 km Northeast of Broome in Western Australia. As part of the DDR, an Operating Manual (OM) has been developed to guide the operators in operating the facility. The location of the project site along with the Stage 3A OPTSF is presented in Figure 1.

Figure 1: OPTSF Stage 3A Arrangement



The design of OPTSF Stage 3A assumes an average tailings density of 1.75 t/m^3 which will provide approximately 4.35 Mm^3 of storage capacity for 7.62 Mt of tailings, providing capacity till the end of June 2026 (assuming 1085 tph DMU schedule). Table 1 summarises the tailings storage capacity.

Table 1: OPTSF Stage 3A Tailings Storage Capacity Summary

Parameter	Value
Assumed In-situ Tailings Density (t/m^3)	1.75
Tailings Storage Capacity (Mt)	7.62
Tailings Storage Capacity (Mm^3)	4.35
Average Anticipated Throughput (Mtpa)	10
Estimated Storage Life (months)	9.1
Estimated End of Storage Life	End of June 2026

In accordance with ANCOLD and DEMIRS, a consequence classification rating of 'High C' and "Category 1' has been adopted for the design of the TSF, respectively. Construction work must be undertaken in accordance with drawings and earthwork specifications. Furthermore, the operation of these facilities must be executed in accordance with the intent of the design and this OM. Any interpreted discrepancies in operation methodology should be reported to the Designers for further guidance.

The facility is designed to accommodate tailings slurry deposited sub-aerially primarily from the central causeway. Tailings slurry will be transported to the facility via an HDPE pipeline that extends from the process plant to the facility. Tailings will be deposited through open-ended spigots. Tailings slurry would be delivered to the facility with a solids concentration of approximately 45% by mass. Conveyor belt mats or similar are to be used as localised embankment liners for erosion protection along where tailings are deposited.

Given the high variability of central discharge facilities, changes in deposition location and methodology may be required at times to appropriately manage the beach slope development and supernatant pond location. Alterations to the deposition location and methodology can be made where necessary under the guidance of REC.

The OPTSF is not intended for water storage and thus must have a minimal supernatant pond at all times. The design of the facility aims to transfer water from the OPTSF to the decant pocket via filter pipes embedded in the Internal Retaining Embankment. As per DEMIRS requirements, a minimum 0.5 m tailings freeboard must be maintained at all times within the facility.

The OM for the facility describes the operating procedures recommended for the safe management and control of the facility. The provisions of the OM must be strictly adhered to by the Owner and the facility must be constructed and operated strictly in accordance with the provisions of the OM and in accordance with the design. REC shall not be liable in any respect whatsoever for any damage to or failure in the operations of the tailings and water storages resulting from the failure of the Owner, its servants or agents to comply with the provisions of the design and OM for the facility.

The appendices referred to in this document comprise the following and are to be attached to this document by the Owner:

- Appendix A: Emergency Assembly Points (**OWNER TO ATTACH**)
- Appendix B: Regulatory License and Lease Conditions (**OWNER TO ATTACH**)
- Appendix C: Operating Manual Forms for Process Plant Staff (**OWNER TO ATTACH**)

1.2 Scope of Operating Manual

The Operating Manual ('this document') details the requirements for personnel who have the responsibility for the day-to-day operation and maintenance of the OPTSF Stage 3A.

The objectives of the day-to-day management of the facility are:

- Ensuring the facility and all associated infrastructure are operated, maintained and monitored to achieve the design objectives;
- Ensuring the OPTSF is operated in accordance with the design parameters that have been provided by the Owner for use in the design of the OPTSF. 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; and
- Ensuring the facility is operated and maintained to remove water ponding against the upstream embankment.

This document also sets out the requirements for operating the facility including aspects comprising:

- Pump rate requirements from decant recovery;
- Pump rate requirements from seepage collection sump.
- Tailings placement/deposition;
- The routine daily inspections and monitoring; and
- The objectives of the daily inspection and monitoring programme.

1.3 Operator Training

All operators of the OPTSF Stage 3A and associated components and Contractors working on the facility must complete the requisite training and competency testing, and be aware of the emergency procedures prior to being allowed to work on the facility and associated components.

The Site Manager is responsible for ensuring that the training, competency testing, and emergency awareness of operators and Contractors is completed and must be trained in the management of the facility.

Personnel inspecting the facility should be advised of the regulatory requirements for the facility as part of their induction and training. Copies of the regulatory Licence and or Lease Conditions relevant to the TSF are attached to this document in Appendix B. The Site Manager and Process Plant Foreman must insert these documents in Appendix B of this Operations Manual and must ensure that each time the regulatory conditions are changed (renewed, amended or updated) the documents are changed, and the staff are advised of the changes and the training confirmation records updated accordingly.

1.4 Guidelines, Codes of Practice and Standards

The following Guidelines, Codes of Practice and Standards are relevant to the operation of the TSF:

- Australian National Committee on Large Dams (ANCOLD): "*Guidelines on the Consequence Categories for Dams*", 2012; and
- Australian National Committee on Large Dams (ANCOLD): "*Guidelines on Tailings Dams Planning, Design, Construction, Operation and Closure*", 2019;
- DMP (now DEMIRS), *Code of Practice – Tailings Storage Facilities in Western Australia*, 2013.

2. Summary of Operating Procedures

2.1 General

The following considerations have been incorporated into the operation of Stage 3A OPTSF.

- To optimise tailings storage capacity and reduce the risks associated with embankment stability and seepage, the tailings beach shall develop in such a way that the supernatant water is retained against the Internal Retaining Embankment of the Stage 3A OPTSF.
- Tailings in the form of a slurry will typically be discharged subaerially (discharge exposed to air) from the central causeway. However, given the high variability of central discharge facilities, changes in deposition location and methodology may be required at times to appropriately manage the beach slope development and supernatant pond location. Alterations to the deposition location and methodology can be made where necessary under the guidance of REC

The deposition regime is aimed at minimising the supernatant pond over the surface of the tailings beach to promote the drying of the tailings and maintain the supernatant pond around the drainage perimeter embankments.

Depending on the decommissioning plan adopted for the facility, it may be necessary to alter the deposition philosophy near the end of the facility's life. Appropriate procedures shall be developed if changes to deposition or freeboard criteria are required. If necessary, appropriate government authorities shall be advised of any changes, especially to freeboard criteria. As tailings deposition progresses, there may be a requirement for the deposition locations to be moved in order to maximise the utilisation of the tailings storage area.

Tailings discharge or spigotting is to be carried out such that the supernatant pond is always maintained around the Internal Retaining Embankment towards the south of the facility, adjacent to the decant pocket. The supernatant pond is to be minimised at all times.

2.2 Related Documents

This document is to be used in conjunction with the following related documents:

- OPTSF Stage 3A Detailed Design Report (document ref. P24-77-PR-06/DDR)

The forms which are relevant to this Operations Manual are provided in Appendix D and comprise the following templates:

- Daily Inspection Log Sheet (OMPPS1);
- Operations Personnel Contact Details (OMPPS2); and
- Training Confirmation Record (OMPPS3).

The content of these templates is to consider the reasonable minimum to be used to monitor the performance of the TSF. The content of the templates can be modified by the site management, if required, to meet any additional site-specific requirements.

A plan showing the location of the Assembly Points in the event of an emergency is to be prepared by the Process Plant Foreman. This plan should be designated and inserted behind the cover page and attached as Appendix A.

2.3 Freeboard Requirement

The typical freeboard levels to be maintained by a TSF consist of a list of requirements stipulated by a combination of design guidelines. These requirements comprise the following distinct elements, shown graphically in Figure 2.

Spillway Freeboard:

- Freeboard is the available freeboard above the spillway flood depth; and
- Flood spill depth is the depth of water flow over the spillway for the design flood event.

Contingency Storage Allowance:

- Operational freeboard is the height difference between the tailings beach and the embankment crest/spillway invert level;
- Beach freeboard is the level difference between the tailings beach and the decant water level plus allowance for an extreme storm event;
- Total freeboard is the sum of the operational freeboard and beach freeboard plus allowance for an extreme storm event;
- Additional freeboard is the allowance for further freeboard above the Extreme storage allowance; and
- Wave freeboard is the allowance for wave runup above the Extreme storage allowance.

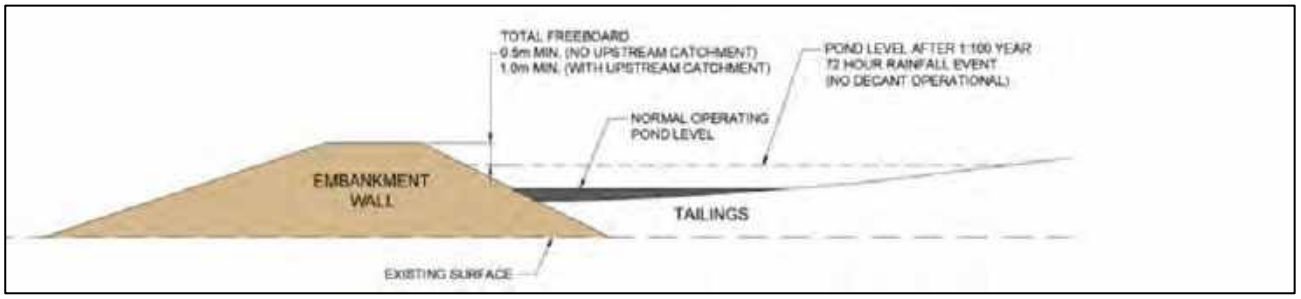
Extreme Storage Allowance:

- Allowance for the storage of an design/extreme storm event to prevent spill from the dam.

Wet Season Storage Allowance:

- Allowance for the storage of water which may conservatively be required to be stored on the tailings dam through a combination of excess wet season rainfall runoff from the facility catchment and processing water which cannot be extracted from the dam.

Figure 2: Freeboard Definition (DEMIRS 2019)



In the case of the OPTSF, the design philosophy set by ATCW does not consider stormwater storage in the facility to be necessary (stored instead at the SSP), the freeboard limit is governed by the total freeboard. In accordance with DEMIRS requirements for a facility with a supernatant pond against the embankment and no upstream catchment area, a total freeboard of 0.7 m and 0.5 m has been adopted for the perimeter embankment and internal retaining embankment respectively.

2.4 Freeboard Management

The height from the embankment crest at any stage of the Stage 3A OPTSF operation to the tailings solids and supernatant pond retained in the OPTSF will vary. At the completion of construction, the computed freeboard height (vertical distance from the embankment crest to the tailings solids and supernatant pond) is to be reviewed. It must be understood that the Total Freeboard to tailings must be maintained at all times under normal operation. Should the Total Freeboard be encroached on, it is to be reported, and adjustments to the tailings deposition or potential minor embankment lifts under the guidance of REC may be required.

Frequent inspections (multiple times per day) should be made of the:

- Central causeway
- Tailings lines;
- Water return lines;
- Discharge points;
- The position of the supernatant ponds in relation to the perimeter embankments;
- The perimeter embankment; and
- Monitoring instrumentations.

The embankments and causeway should be inspected at a minimum once per day. If seepage is observed (wet patches) along the perimeter embankment slope, particular attention should be paid to the embankments in the vicinity. Only by regular inspection and appropriate remedial action can the performance of the water return be optimised, and operational risks lowered.

Operation, safety and environmental aspects should be periodically reviewed during an inspection by a suitably experienced and qualified engineer. This inspection should be done at least every year in the form of an annual audit, this may also be partially covered under quarterly Engineer of Record (EoR) reports.

3. Operating Methodology

3.1 Background to Tailings Deposition

The method of deposition of tailings into the facility is one of the major controlling factors in achieving or exceeding the design requirements. The method of tailings deposition influences:

- In-situ dry densities within the stored tailings; and
- Water return for reuse in the process plant.

It is essential that a detailed understanding of the various components of the tailings system is acquired to understand the tailings deposition. The tailings system components include:

- Tailings pipeline from the process plant to the facility including the associated valves in this pipeline which direct tailings to the various distribution points;
- Spigot operation and the spigotting (tailings deposition) process; and
- Flushing procedures for the tailings pipeline(s) and spigots.

3.2 Operating Philosophy

In continuance of the established design and operating philosophy, the Stage 3A CDSTF will continue to operate under central deposition with supernatant water stored within the decant pocket. However, with the addition of the Internal Retaining Embankment, the OPTSF will maintain a small supernatant pond as the water inflows from deposition or precipitation is filtered through to the decant pocket through the embedded decant pipes in the Internal Retaining Embankment. The filtered supernatant water is then recovered from the decant pocket for processing or other project site uses.

The existing emergency spillway reporting to the SSP may be engaged during infrequent storm events. However, under normal operating conditions, the spillway should not be engaged. Excess water in the decant pocket should be transferred to the SSP via pumping.

3.3 Tailings Pipeline

For TMSP, tailings are transported from the process plant to the OPTSF central causeway through a large-diameter HDPE pipe, where they are discharged. It is understood that instrumentation has been installed to monitor the condition of the pipelines that can detect leakage and initial automatic shutdown of the pipeline. An access track should be located along the pipeline to facilitate pipeline inspections and maintenance.

3.4 Spigotting Process

Tailings are typically deposited sub-aerially depending on the slurry water level within the TSF at the time of discharge. The designed deposition locations for OPTSF Stage 3A are along OPTSF central causeway. Deposition from spigots is to be cycled to promote drying and desiccation. Deposition at locations outside of the design can be undertaken where necessary under the guidance of REC.

The design and operation of the pumping and piping system will dictate the number of spigots that can be opened at any one time. Ideally, tailings deposition should be from multiple spigot points. Care should be taken to ensure that the tailings are not discharged so as to damage the earthworks or allow tailings slurry flow to erode the perimeter embankment. As such, deposition from a single-point discharge is not recommended.

At the completion of the deposition on each spigot and following the changeover to the alternative spigot, the inoperative tailings line should be flushed with water until it is clean.

3.5 Water Recovery and Abstraction Requirements

Pumps are to be installed at the decant pocket to recover water back to the processing plant for reuse. Given the operational philosophy of the OPTSF, the OPTSF and the SSP are considered to be a singular water storage system. Based on the static water balance detailed in the DDR, additional water abstraction (on top of typical outflows) is required as such:

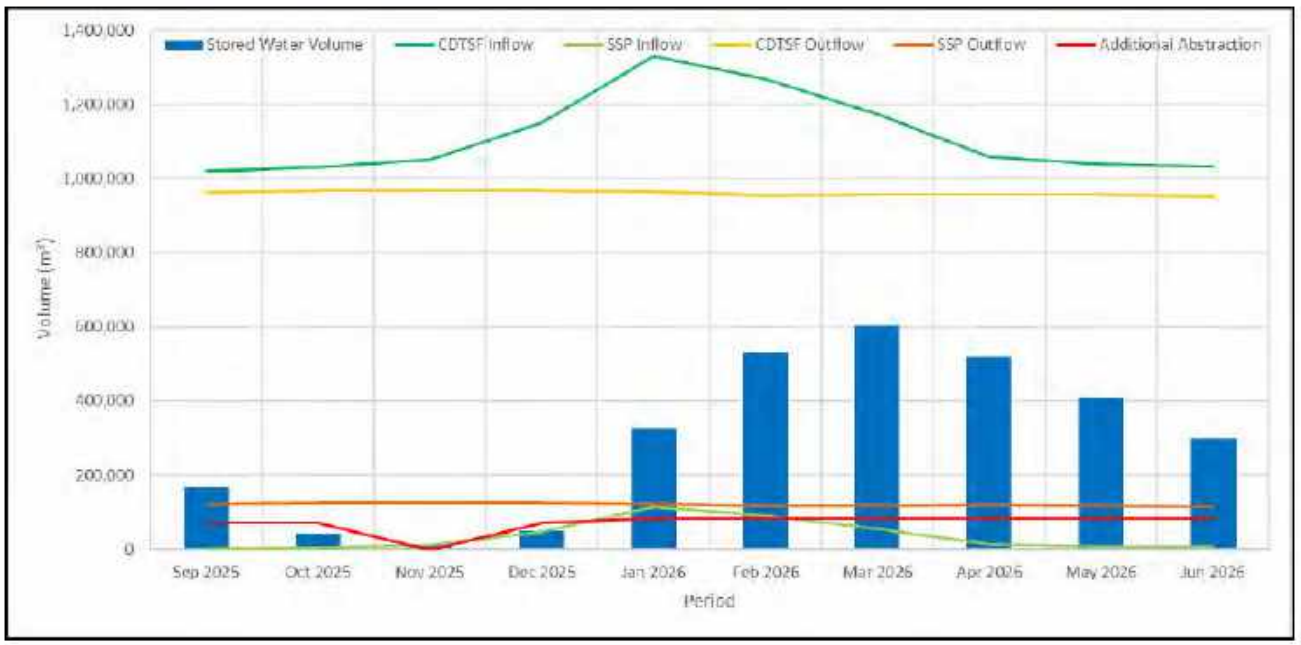
- 70,625 m^3 per month across months Sep, Oct, and Dec 2025.
- 82,460 m^3 per month for Jan, Feb, Mar, Apr, May, Jun 2026.

The typical inflows and outflows to the OPTSF and SSP are presented in Table 2 and Figure 3. It is recommended that the Operators review the water balance model attached in the DDR to confirm the adopted inflows and outflows. Abstraction is to prioritise the decant pocket.

Table 2: Water Balance Model Outcome Summary

Period	OPTSF Inflow (m^3)	SSP Inflow (m^3)	OPTSF Outflow (m^3)	SSP Outflow (m^3)	Additional Abstraction (m^3)	Stored Water Volume (m^3)
Sep 2025	1,020,326	659	960,594	121,442	70,500	168,449
Oct 2025	1,031,169	4,612	966,178	124,885	70,500	42,667
Nov 2025	1,049,542	11,309	966,994	125,283	0	11,241
Dec 2025	1,151,448	48,458	967,206	124,775	70,500	48,666
Jan 2026	1,329,156	113,240	963,160	121,114	82,460	324,329
Feb 2026	1,268,615	91,171	953,677	115,532	82,460	532,445
Mar 2026	1,173,335	56,437	956,601	117,970	82,460	605,187
Apr 2026	1,057,775	14,311	956,537	118,656	82,460	519,619
May 2026	1,037,996	7,100	955,105	117,880	82,460	409,270
Jun 2026	1,033,579	5,490	950,725	115,154	82,460	299,999

Figure 3: Water Balance Model Outcome Summary



3.6 Seepage Management

Minimal amounts of seepage through the perimeter embankment are anticipated during the operation, some amounts of seepage may occur near the decant pocket. Should seepage around the perimeter embankment be observed, it is to be reported.

3.7 Inspections

3.7.1 General

A minimum of three (3) inspections must be carried out throughout the week, however it is recommended that two (2) inspections are carried out during each shift (day shift and night shift) for a total of four (4) inspections per day. Inspections must be executed by a designated trained operator. The date and time of each inspection are to be entered into the Process Plant Foreman's logbook and are to be signed by the person allocated to undertake the inspection on that shift to ensure the requirements have been undertaken. The daily inspections for the TSF where applicable must cover the following (see OMPPS 1):

- The central causeway
- The pipelines (tailings delivery line and water return line) to and from the tailings storage facility;
- Leak detection;
- Pumps;
- Spigots and valves;
- Spigotting and deposition;
- Location and size of the supernatant water pond;
- The embankment crest, upstream and downstream face;
- The general integrity of the embankment i.e. any new cracking, any new seepage;
- Any changes to existing cracking or seepage; and
- Seepage collection drains and sumps.

Any leaks or failures of the tailings pipeline, deterioration of the integrity of the embankment and causeway, or abnormally high water levels in the facility must be immediately reported to the following personnel or project equivalents, as appropriate, and an incident report completed:

- Site Manager; and
- Process Plant Foreman.

3.7.2 Tailings and Return Water System

The tailings lines, particularly on the causeway of the OPTSF, are sensitive to temperature and the expansion and contraction of this line can cause leaks and in extreme situations, failure of the pipeline. While it is understood that instrumentation has been installed to detect potential leakage, the pipelines must be inspected at least once per shift. Any abnormalities must be immediately reported immediately to the maintenance and process plant personnel.

3.7.3 Supernatant Pond

The position and size of the pond must be inspected at least once per shift. Any abnormalities must be immediately reported immediately to the maintenance and process plant personnel. The decant pocket must also be inspected to ensure that the water levels in the decant pocket are reasonably below the OPTSF emergency spillway. High water levels encroaching up to the spillway invert, must be reported. Should the emergency spillway indicate signs of engagement during the inspection, it must be noted and reported on.

3.7.4 Retaining Embankments

As part of each inspection of the OPTSF perimeter and internal retaining embankments, including the batters and crest, must be visually assessed. The presence of any new cracking or other features such as seepage, embankment erosion or scour (caused by tailings deposition or rainfall runoff) or any other obvious changes to the physical state of the embankment since the previous inspection must be entered into the Process Plant Foreman's logbook and immediately reported to the following personnel:

- Site Manager;
- Process Plant Foreman; and
- Design Consultant.

3.8 Monitoring and Surveillance

3.8.1 Monitoring

A program of monitoring and surveillance will be implemented to evaluate the performance of the facility with respect to the original design expectations. The data obtained will:

- Form the basis of annual surveillance, and
- Be used to assess and integrate required maintenance programs.

Some of the key monitoring items will include the following:

- Routine reconciliation of tailings discharge tonnage and solids concentration.
- Routine monitoring of tailings beach head and beach toe level.
- Routine monitoring of pond water levels and process plant return water rates.
- Routine assessment of collection sump water quality.
- Quarterly field evaluation of tailings density reconciliation.

Groundwater monitoring around the facility will be undertaken quarterly throughout the life of the project. While the geochemistry of the tailings is considered to be benign and NAF and no significant changes to groundwater quality are expected, where groundwater monitoring indicates adverse impacts, a risk assessment will be conducted by a qualified specialist and dewatering bores may be installed to mitigate impacts, where required.

Vibrating wire piezometers and settlement pins are to be used to monitor the facility, installation details are to be provided at a later revision of this document. The data records from Vibrating Wire Piezometers (VWPs) and settlement pins installed around the facility will provide timely information on changes in water level within or beneath the embankments and deformation across the embankment. VWPs and settlement pins will be monitored, and the phreatic surface compared to future trigger levels to be established shall be used to assess whether remedial measures are required for the facility to maintain stability.

3.8.2 Surveillance

3.8.2.1 General

Routine inspection of the facility will be carried out to check whether the design strategy is being implemented and to identify any maintenance requirements or any circumstances associated with facility performance that need further attention. TOPL will carry out regular inspections of the facility and its appurtenant features.

The operating manual will provide procedures and protocols for inspection requirements in accordance with the facility consequence category. Observations made during the inspections will be recorded and appropriately reported. Any incidents that occur will be reported in accordance with the operating licence conditions and statutory regulations. As per ANCOLD guidelines, the inspection type and frequency for a ‘High C’ facility have been summarised in Table 3.

Table 3: Inspection Type and Frequency

Type of Inspection	Frequency	Personnel	Purpose
Comprehensive	After the first year of operation, then every 2 years	Dams engineer and specialist (where relevant)	The identification of deficiencies by a thorough onsite inspection; by evaluating data; and by applying current criteria and prevailing knowledge. Equipment should be test operated to identify deficiencies.
Intermediate	Annual	Dams engineer	The identification of deficiencies by visual examination of the dam and review of surveillance data against prevailing knowledge. Equipment is not necessarily operated.
Routine	Daily to 3 times a week	Operations personnel	The identification and reporting of deficiencies by field and operating personnel as part of their duties at the dam.
Special	As required	Dams engineer and specialist	The examination of a particular feature of a dam for some special reason (e.g. after earthquakes, heavy floods, rapid draw down).
Emergency	As required	Dams engineer	The examination of a particular feature of a dam which has been identified as having a possible deficiency or which has been subject to abnormal conditions.

3.8.2.2 Routine Inspections

These focus on operational issues to do with the facility. The recommended frequency of inspection is two times per production shift, a minimum of three times per week. Items that should be covered are:

- Tailings and return water pipeline.
- Tailings discharge point management.
- Decant pond location.
- Decant and return water system operation.
- Seepage (visual wet spots).
- Integrity of the embankment (deformation monitoring).
- Integrity of the causeway (deformation monitoring).
- Aerial surveys (a minimum of once per month).

3.8.2.3 Intermediate Inspections

These focus on issues that may develop over time and may impact on the safety of the facility or environment. The recommended items that should be generally covered are:

- Detailed inspection of embankments and all appurtenant structures.
- Detailed inspection of causeway.
- Tailings characteristics.
- Tailings beach development.
- Decant pond level and location.
- Decant and return water system operation.
- Tailings and return water pipelines.
- Surveillance of all monitoring installations.

3.8.2.4 Comprehensive Inspection

These will be undertaken by qualified geotechnical engineers and focus on the identification of deficiencies by visual examination of the embankments and all appurtenant structures, as well as a review of all surveillance and monitoring data. These reviews are required to be carried out at minimum once every two years as per ANCOLD requirements.

3.8.3 Instrumentation

3.8.3.1 Vibrating Wire Piezometers

Six (6) Vibrating Wire Piezometers (VWPs) were installed at TSF during the construction of Stage 3 within the perimeter embankment to facilitate real-time monitoring of embankment and foundation pore pressures at critical embankment areas. Figure 4 presents the installed VWPs, with new instruments marked in green, installed within the perimeter embankment. The TSF VWP install locations and depths are presented in Table 4. VWP data began transmitting on 4 March 2025, it is noted that five of the VWPs are offline at the time of preparing this document, which is suspected to be disconnected/damaged due to the Stage 3 construction works. All VWPs (prior to becoming offline) are recording negative pore water pressures, indicating desaturation and that no phreatic surface has formed above the natural ground at the monitored locations.

Figure 4: OPTSF VWP Layout

Table 4: TSF VWP Locations

VWP ID	Easting (m E)	Northing (m N)	Install Depth (m)	Install Elevation (RL m)	NG Elevation (RL m)	Status
VWP 01	498,545	8,071,209	3.0	107.4	108.0	Offline
VWP 02	498,613	8,070,923	3.0	106.4	107.0	Offline
VWP 03	498,352	8,070,516	3.0	102.1	103.6	Offline
VWP 04	498,067	8,070,572	2.8	101.3	101.2	Offline
VWP 05	497,903	8,070,760	3.4	102.0	101.5	Online
VWP 06	497,712	8,070,981	4.0	102.2	102.6	Offline
Note: natural ground elevation derived from pre-construction surveys.						

3.8.3.2 Monitoring Bores

The OPTSF monitoring bores were constructed in November 2022 to provide baseline water quality, groundwater elevations and ongoing monitoring for the mine's operational lifespan. There are six monitoring bores installed around the OPTSF and the SSP.

The monitoring bore locations are presented in Figure 5 and detailed in Table 5.

Figure 5: Monitoring Borehole Locations

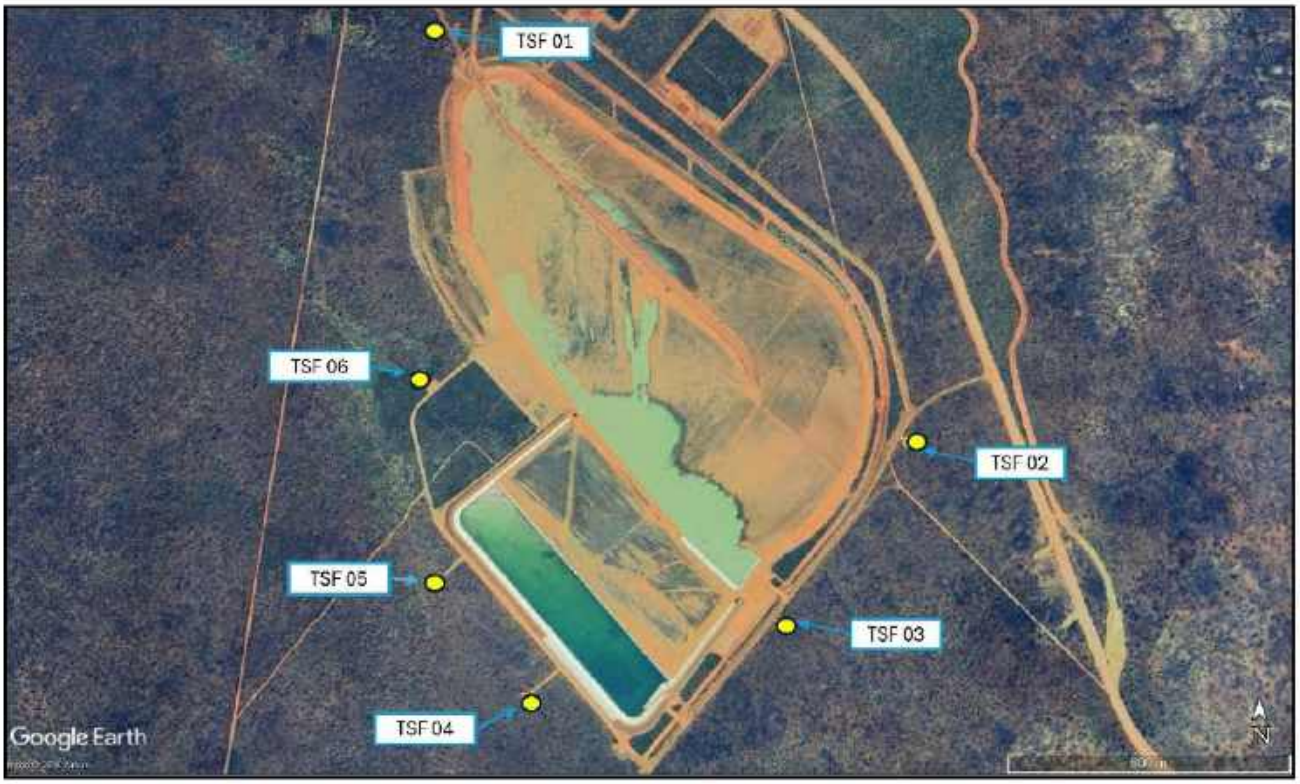


Table 5: Monitoring Borehole Details

Borehole No.	Coordinates		RL (Ground Level)	Drilled Depth	Constructed Depth	Screened Interval (Below Ground Level)
	Easting (m)	Northing (m)	(m)	(m)	(m)	(m)
TSF 01	497,416.50	8,072,029.17	104.54	45.0	42.2	36.0 – 42.0
TSF 02	498,721.65	8,070,833.29	108.18	42.0	40.8	34.6 – 40.6
TSF 03	498,355.38	8,070,310.10	101.82	45.0	42.2	36.0 – 42.0
TSF 04	497,632.52	8,070,109.64	97.53	45.0	44.5	38.3 – 44.3
TSF 05	497,384.71	8,070,444.69	97.5	45.0	43.0	36.8 – 42.8
TSF 06	497,359.21	8,070,997.78	101.45	42.0	41.6	35.4 – 41.4

The DWER license (L9335/2022/1) outlines 26 mandatory parameters that must be recorded quarterly for ambient environmental quality monitoring, these parameters as summarised in Table 6. While the license does not specify limits for these parameters, it requires baseline ambient environmental conditions to be established.

Table 6: Ambient Environmental Quality Monitoring Parameters

Parameter	Unit	Method
SWL Notes 1 and 2	mbgl	AS/NZS 5667.1 AS/NZS 5667.11
pH Note 1	pH Units	
Electrical Conductivity @ 25 C Note 1	µS/cm	
Redox Potential Note 1	mV	
Total Dissolved Solids Note 1	mg/L	
Bicarbonate		
Calcium		
Chloride		
Magnesium		
Potassium		
Sodium		
Sulfate		
Total Dissolved Solids		
Aluminium		
Arsenic		
Cadmium		
Chromium (Total Cr and CrVI)		
Cobalt		
Copper		
Iron		
Mercury		
Nickel		
Selenium		
Thallium		
Uranium		
Zinc		
Notes: 1 – In-field non-NATA accredited analysis permitted. 2 – SWL to be determined prior to the collection of other samples.		

The Baseline water quality parameter test results prior to the commencement of tailings deposition has been summarised in Table 7 for reference.

Table 7: Baseline Water Quality Parameters (Before Tailings Deposition, Sampled date – 15/09/2023)

Analyte Name	Units	BH No.					
		TSF01	TSF02	TSF03	TSF04	TSF05	TSF06
pH**	pH Units	5.8	7	7	6.3	6.7	6.5
Conductivity @ 25 C	µS/cm	120	140	160	240	280	280
Total Alkalinity as CaCO3	mg/L	6	11	14	24	26	28
Carbonate Alkalinity as CO3	mg/L	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as HCO3	mg/L	8	13	17	30	32	34
Sulfate, SO4	mg/L	5	<1	1	3	2	4
Chloride, Cl	mg/L	27	30	35	57	69	66
Calcium, Ca	mg/L	2.3	1	2.3	3.7	3.7	2.4
Magnesium, Mg	mg/L	2.4	2.6	3.3	4	7.1	4.8
Sodium, Na	mg/L	14	19	22	32	36	38
Potassium, K	mg/L	0.4	0.5	1	2.4	1.4	1.5
Total Hardness by Calculation	mg CaCO3/L	16	13	19	26	38	26
Total Dissolved Solids Dried at 175-185°C	mg/L	100	130	150	220	210	240
Ammonia Nitrogen, NH_3 as N	mg/L	<0.05	<0.05	<0.05	<0.05	0.07	<0.05
Nitrite Nitrogen, NO_2 as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Filterable Reactive Phosphorus as P	mg/L	0.004	<0.002	0.005	0.011	0.013	0.029
Reactive Silica, SiO_2	mg/L	48	69	71	97	68	100
Aluminium	µg/L	9	<5	<5	<5	<5	<5
Arsenic	µg/L	<1	<1	<1	<1	<1	<1
Cadmium	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	µg/L	<1	<1	<1	<1	<1	<1
Chromium	µg/L	<1	<1	<1	<1	<1	<1
Copper	µg/L	2	<1	<1	<1	<1	<1
Iron	µg/L	<5	<5	130	6	<5	<5
Manganese	µg/L	11	14	69	26	10	75
Molybdenum	µg/L	<1	<1	<1	<1	<1	<1
Nickel	µg/L	2	2	1	<1	<1	<1
Lead	µg/L	<1	<1	<1	<1	<1	<1
Selenium	µg/L	<1	<1	<1	<1	<1	<1
Antimony	µg/L	<1	<1	<1	<1	<1	<1
Zinc	µg/L	<5	<5	<5	<5	<5	<5
Uranium	µg/L	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Mercury	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005

4. Emergency Action Plan

4.1 Overview

The facility has been designed to limit danger to life and property and to minimise impacts on the surrounding environment. Regardless of the possible level of risk associated with tailings management, a contingency plan is required to address any eventuality that might arise. The following emergency response plan has been developed to be implemented to reduce the potential for unacceptable risk and consequential damage.

It is well known that water is the most common element relating to the majority of facility failures. For this reason, the operators of facilities are encouraged to carefully manage water on or near the facilities. The supernatant water pond in the facility should be kept to a minimum practical level. The pond should be located around the design location. Following heavy rainfall events, excess water stored in the facility should be removed as early as possible.

4.2 Response Actions

In the event of an emergency, the site emergency response team must immediately be notified and advised of the nature of the emergency to enable the appropriate emergency action plan to be implemented. The site emergency response plan contains the details presented in the following Sections such that response activities are coordinated with operations personnel.

At the time of the emergency, the General Manager or Site Senior Executive 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 on form (OMPPS2) appended to this document. 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 OMPPS2 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 the TSF and the relevant reporting procedures. Emergency assembly points are shown in Appendix A of this document.

4.3 Embankment Failure

The embankments have been designed with an adequate factor of safety against failure under normal operating (static) conditions. However, deformations and slumping are expected under seismic load conditions. This is further detailed in the 2024 Annual Report and the Stage 3A DDR. As such, post-seismic conditions of the embankment

Under normal operations, the probability of embankment failure during normal operations is very low, given that:

- The embankment construction has been or should have been carried out in accordance with the design; and
- The implementation of the tailings operation methodology (Section 3), including the routine inspections and maintenance practices are adhered to as set out in the Operations Manual

However, in the unlikely event of embankment failure, the flow of tailings from the storage will be controlled by the degree of saturation of the tailings at the time of failure

Action to control a small-scale embankment failure and limit environmental damage would include:

- Assessing the requirement to shut down the process plant, or reduce process plant throughput;
- Diversion of tailings deposition to areas not affected by the small-scale embankment failure;
- Construction of bunds by earthmoving equipment to divert and contain the tailings;
- Contacting a suitably qualified geotechnical organisation for technical assistance;

- Deployment of pumps to recover tailings water as appropriate and return it either to the TSF 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 or without a specialist, depending on the scale of the failure, prior to the commencement of any repairs;
- Undertaking remedial and repair work of the damaged embankment or affected area;
- Clean up of tailings as soon as practicable after embankment repairs have been completed and the storage is considered in a safe condition;
- Preparing an incident report, detailing all factors prior to the incident and the situation after clean-up. The report should identify the causes of the problem and what actions will be taken to prevent a similar occurrence. This report should detail the ongoing monitoring programme to fully assess the impact of the incident; and
- Advising all appropriate government departments as necessary of the incident, review the conditions of operating licence and lease conditions to ensure that the timing of reports and content of reports meets the regulatory requirements.

Action to control a large-scale embankment failure and to limit environmental damage would include:

- Shut down of the process 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 the TSF 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 embankment 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 programme to fully assess the impact of the incident;
- Advising all appropriate regulatory authorities as necessary of the incident; and
- Reviewing conditions of any licence 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 the TSF relies upon the implementation of operational procedures which comprise tailings deposition, central causeway operation and routine inspections and maintenance, as set out in the Operations Manual to minimise the potential for a catastrophic event such as a failed embankment.

4.4 Tailings Lines and Return Water Lines

In the event of pipeline failure, the automated tailings line shutdown should be initiated. Should the automated shutdown fail, the Process Plant Superintendent 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 the TSF.

4.5 Decant Pump

The decant pump is to be operated at all times. The pump is only switched off:

- In the event of an emergency where necessary.

- When future cell construction interferes with the operations of the pump.

Alternative pumping equipment and pump locations may be required during periods of pump maintenance or when embankment construction work is undertaken. The supernatant water level is to be recorded and reviewed at a minimum of once a day during pump shut down, more frequent inspection may be prescribed by the Designers or any other parties of concern.

5. Incident Reporting

In Western Australia, reportable incidents are governed by the Work Health and Safety (Mines) Regulation 2022 under the Work Health and Safety Act 2020 (WHS Act). The below incidents must be reported to the appropriate regulatory bodies.

Fatalities and serious injuries:

- Death of a worker or other person on the mining site.
- Serious injuries or illnesses, including:
    - Amputation of a body part.
    - Serious head or eye injury.
    - Spinal injuries.
    - Serious burns.
    - Loss of bodily function.
    - Any injury requiring immediate hospital treatment.

Dangerous incidents (near misses):

- Uncontrolled escape, spillage, or leakage of substances.
- Uncontrolled explosion or fire.
- Unplanned collapse of ground, tunnels, or mine workings.
- Failure of ground support systems (e.g., rockfall, stope failure).
- Failure of plant or structure (e.g., tailings dam, heavy machinery).
- Uncontrolled inrush of water, mud, or gas.
- Electrical incidents, including contact with live wires or serious arc flash incidents.
- Airborne contaminants exceeding safe exposure limits.
- Vehicle or equipment collisions leading to a hazardous situation.

Specific mining hazards:

- Geotechnical failures (e.g., slope failures, pit wall collapses).
- Seismic events affecting operations.
- Explosives-related incidents (e.g., misfires, premature detonation).
- Unexpected interactions with hazardous materials.
- Loss of mine communication systems or emergency response capability.

Occupational health exposures:

- Exceedance of exposure limits for silica dust, asbestos, diesel particulates, or other hazardous substances.
- Overexposure to radiation or noise.
- Failure of a ventilation system leading to unsafe atmospheric conditions.

Environmental incidents:

- Uncontrolled tailings or hazardous waste discharge.
- Significant contamination of land, water, or air.
- Failure of containment structures (e.g., TSF breach).

In the event that an incident occurs, the KMS Environmental Department and the Mine Operator must be informed immediately. After contacting the KMS Environmental Department, the applicable reporting form should be completed describing the nature of the incident, and submitted to the following regulatory bodies as soon as practical:

- DEMIRS – WorkSafe Mines Safety Branch
    - Serious incidents are to be reported immediately (via phone or online portal)
    - Written report required within 2 days for fatalities or serious incidents.
- DWER – for environmental incidents
- Emergency Services (000) – if immediate public safety is at risk.

Appendix A

Emergency Assembly Points

Appendix B

Regulatory License and Lease Conditions

Appendix C

Operating Manual Forms for Process Plant Staff

Appendix D

Operational Templates

DOCUMENT:	OPTSF DAILY INSPECTION SHEET			Document Control	
				Document Name:	OPTSF Daily Inspection Sheet
SITE:	THUNDERBIRD OPERATIONS PTY LTD			Date of Issue:	12-Sep-25
				Revision:	B
Date:		Time:		Inspection by:	
Shift Supervisor:		TSF/Cell Number:		Verified by:	

Item	Criteria	Yes/No/NA		Photograph/Detail		Comments
		DAY SHIFT	NIGHT SHIFT			
1	Access Roads / Ramps					
1.01	Are they in good condition?			Photograph No:		
1.02	Is dust being degenerated when trafficked?			Photograph No:		
1.03	Is there any visable erosion? If yes, is it new or existing?			Photograph No:		
1.04	Has the existing erosion increased in size? Is Remediation required?			Photograph No:		
1.05	Are the access road / ramp safety bunds at 0.6 m height along its entire length?			Photograph No:		
2	OPTSF Perimeter Embankment					
2.01	Any distress, cracking or deformation observed in the embankment?			Photograph No:		
2.02	If yes, is it new ?			Photograph No:		
2.03	Has the existing cracking/deformation increased in size?			Photograph No:		
2.04	Any erosion observed in the embankment?			Photograph No:		
2.05	If yes, is it new ?			Photograph No:		
2.06	Has the existing erosion increased in size ?			Photograph No:		
2.07	Are the embankment safety bunds at 0.6 m height along its entire length?			Photograph No:		
2.08	Any water ponding along the perimeter embankment?			Photograph No:		
2.09	Any water ponding underneath tailings distribution lines?			Photograph No:		
2.10	Any staining or discolouration of soil/rock present on the embankment and slopes?			Photograph No:		
2.11	Any staining or discolouration of soil present outside the CDTSF perimeter?			Photograph No:		
2.12	Any seepage / wet areas present on the embankment and slopes?			Photograph No:		
2.13	Any seepage / wet areas present outside the CDTSF perimeter?			Photograph No:		
2.14	If seepage is identified, is it flowing rapidly? If so is it clear?			Photograph No:		
2.15	Is the height of the deposited tailings less than 500 mm from the perimeter embankment crest at any location?			Photograph No:		
2.16	Any construction activities?			Photograph No:		
3	Internal Retaining Embankment					
3.01	Any distress, cracking or deformation observed in the embankment?			Photograph No:		
3.02	If yes, is it new ?			Photograph No:		
3.03	Has the existing cracking/deformation increased in size?			Photograph No:		
3.04	Any erosion observed in the embankment?			Photograph No:		
3.05	If yes, is it new ?			Photograph No:		
3.06	Has the existing erosion increased in size ?			Photograph No:		
3.07	Are the embankment safety bunds at 0.6 m height along its entire length?			Photograph No:		
3.08	Are the supernatant water ponding along the internal retaining embankment?			Photograph No:		
4	Decant Pocket					
4.01	Is the water pond positioned around the designated pumping area?			Photograph No:		
4.02	What is the approximate pond maximum depth (m)?			Photograph No:		
4.03	Is the water freeboard less than 1 m to the emergency spillway invert?			Photograph No:		
4.04	Is the spillway in good condition? Any signs of significant erosion ?			Photograph No:		
4.05	Can the decant system efficiently handle and discharge any storm runoff in addition to the supernatant water?			Photograph No:		
4.06	Is the water in the decant pond clear?			Photograph No:		
4.07	Can the decant pump be accessed / manoeuvred?			Photograph No:		
4.08	Decant pump operating and in good condition?			Photograph No:		
5	SSP Perimeter Embankment					
5.01	Any distress, cracking or deformation observed in the embankment?			Photograph No:		

5.02	If yes, is it new ?			Photograph No:		
5.03	Has the existing cracking/deformation increased in size?			Photograph No:		
5.04	Any erosion observed in the embankment?			Photograph No:		
5.05	If yes, is it new ?			Photograph No:		
5.06	Has the existing erosion increased in size ?			Photograph No:		
5.07	Any water ponding outside of the lined basin?			Photograph No:		
5.08	Any water ponding underneath tailings distribution lines?			Photograph No:		
5.09	Any staining or discolouration of soil/rock present on the embankment and slopes?			Photograph No:		
5.10	Any staining or discolouration of soil present outside the SSP perimeter?			Photograph No:		
5.11	Any seepage / wet areas present on the embankment and slopes?			Photograph No:		
5.12	Any seepage / wet areas present outside the SSP perimeter?			Photograph No:		
5.13	If seepage is identified, is it flowing rapidly? If so is it clear?			Photograph No:		
5.14	Any construction activities?			Photograph No:		
6	**Tailings and Return Water Lines**					
6.01	Any tailings spillages along pipe lines?			Photograph No:		
6.02	Are the tailings and water return lines intact and free of cracks?			Photograph No:		
6.03	Any scouring around the tailings and return lines?			Photograph No:		
6.04	Are the tailings and water return lines leaking?			Photograph No:		
6.05	Are there outstanding maintainence repair issues?			Photograph No:		
6.06	Are the seepage collection drains and sump in good condition?			Photograph No:		
6.07	Are the seepage collection pumps operating and in good condition?			Photograph No:		
7	**Tailings Discharge**					
7.01	Identify spigots in operation.			Spigot Numbers:		
7.02	Is the number of spigots operating and the location of the spigots as planned?			Photograph No:		
7.03	How long have the current spigots been operating?			Photograph No:		
7.04	Is the spigotting effective in keeping the water around the decant pond?			Photograph No:		
7.05	Do any of the spigots leak or need repair?			Photograph No:		
8	**Seepage**					
8.01	Any abnormal seepage? If so, where?			Photograph No:		
8.02	Existing seepage (including seepage collection channel) any change in flow?			Photograph No:		
8.03	Have the water quality measurements for known seepage areas been taken and recorded at the required frequency?			Photograph No:		
9	**Monitoring**					
9.01	Are all CDTSF monitoring instrumentation in working condition?			Photograph No:		
9.02	Have groundwater quality sampling and testing been undertaken in accordance with site/license requirements?			Photograph No:		
9.03	When was the last aerial survey undertaken? Is it more than a month ago?			Photograph No:		
10	**Climatic Data**					
10.01	Any significant rainfall events?			Photograph No:		
10.02	Has the daily rainfall been entered into the appropriate databases?			Photograph No:		
10.03	Has the daily evaporation been entered into the appropriate databases?			Photograph No:		
10.04	Has the daily temperature been entered into the appropriate databases?			Photograph No:		
11	**Fauna**					
11.01	Any deaths?			Photograph No:		
12	**Flora**					
12.01	Any new distress to surronding flora?			Photograph No:		
12.02	Any vegetation requiring removal due to potential growth size?			Photograph No:		

Additional Comments

TSF PERSONNEL CONTACT DETAILS (OMPPS2)

NOTE: This sheet must be updated quarterly as a minimum. This sheet must be updated immediately following personnel leaving or starting on site and shall include all personnel listed below, and associated with the TSF.

PROJECT:		**DATE:**	
LOCATION:			

PERSONNEL	POSITION	CONTACT DETAILS (WORK PHONE, MOBILE PHONE, HOME PHONE)
	General Manager	
	Process Plant Manager / Superintendent	
	Mill Foreman	
	Maintenance Manager / Superintendent	
	Mine Manager / Superintendent	
	Environmental Manager / Superintendent	
	Security Manager / Superintendent	
	Emergency Response Team	
	Emergency Response Team	
	Emergency Response Team	
	Emergency Response Team	
	Emergency Response Team	
	Emergency Response Team	
	Emergency Response Team	
	Emergency Response Team	
	Emergency Response Team	
	Operator	
	Operator	
	Operator	
	Operator	
	Operator	
	Operator	
	Operator	
	Operator	

TSF PERSONNEL TRAINING REGISTER (OMPPS3)

All Operators of the TSF and associated components and Contractors working on the TSF must complete requisite training, competency testing and be aware of the emergency procedures prior to being allowed to work on the TSF.

PROJECT:		**DATE:**	
LOCATION:			

PERSONNEL	POSITION	TRAINING COMPLETED	COMPETENCY TESTING
	General Manager		
	Process Plant Manager / Superintendent		
	Mill Foreman		
	Maintenance Manager / Superintendent		
	Mine Manager / Superintendent		
	Environmental Manager / Superintendent		
	Security Manager / Superintendent		
	Emergency Response Team		
	Emergency Response Team		
	Emergency Response Team		
	Emergency Response Team		
	Emergency Response Team		
	Emergency Response Team		
	Emergency Response Team		
	Emergency Response Team		
	Emergency Response Team		
	Operator		
	Operator		
	Operator		
	Operator		
	Operator		
	Operator		
	Operator		
	Operator		
	Operator		

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CONTACT DETAILS

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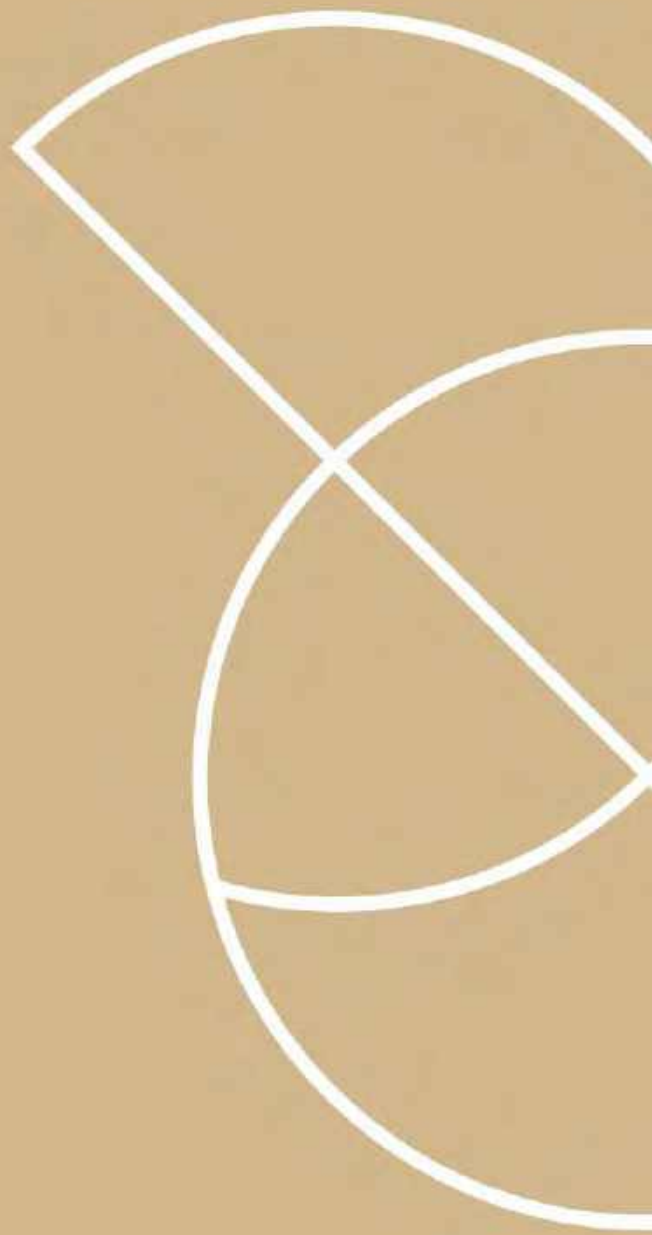
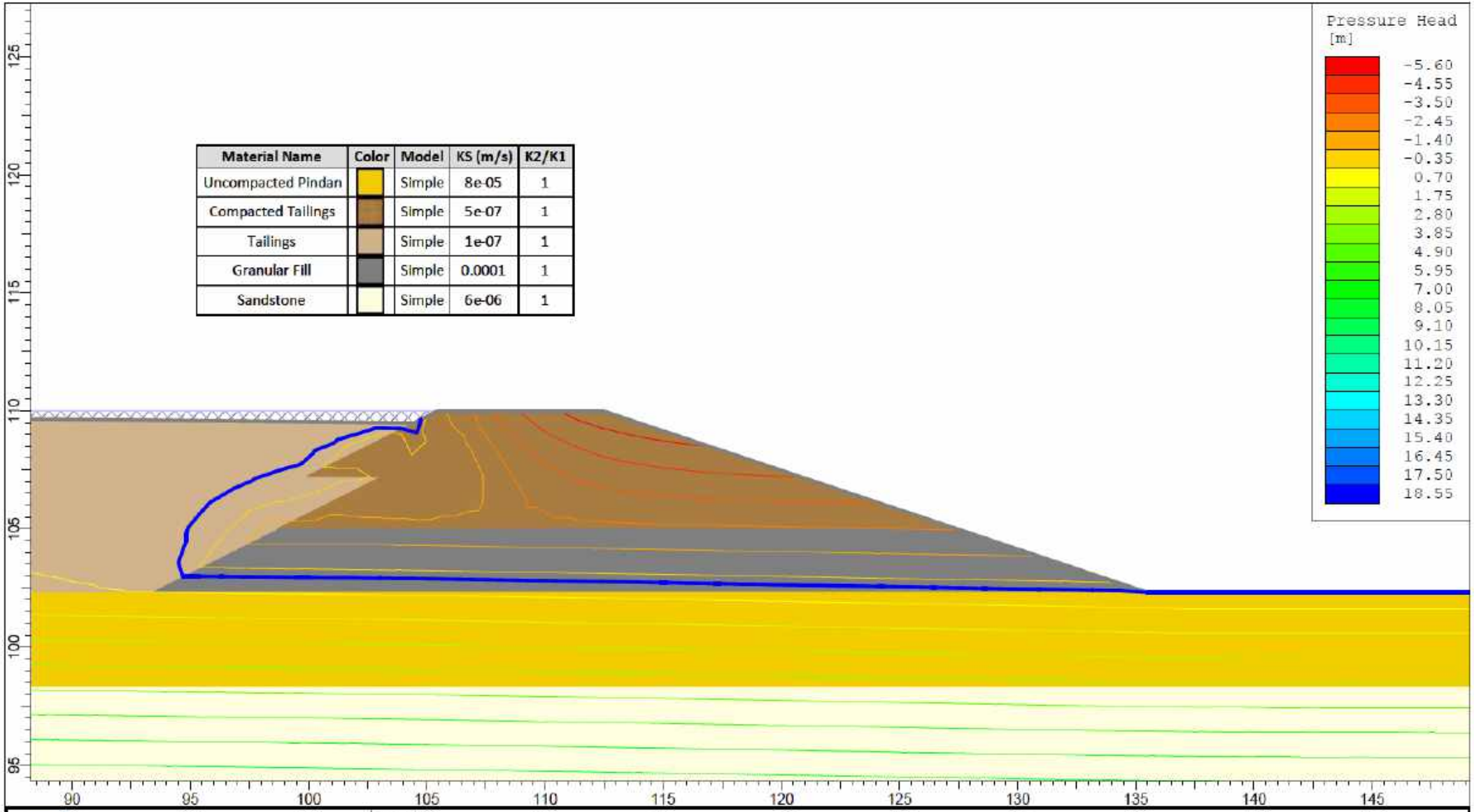
E: info@rec.com.au

Resource Engineering Consultants Pty Ltd
ACN: 626 931 753



Appendix C

Seepage Modelling



Project	OPTSF Stage 3A		
Date	17/04/2025	Scenario	Section E
Author	GL	Company	REC

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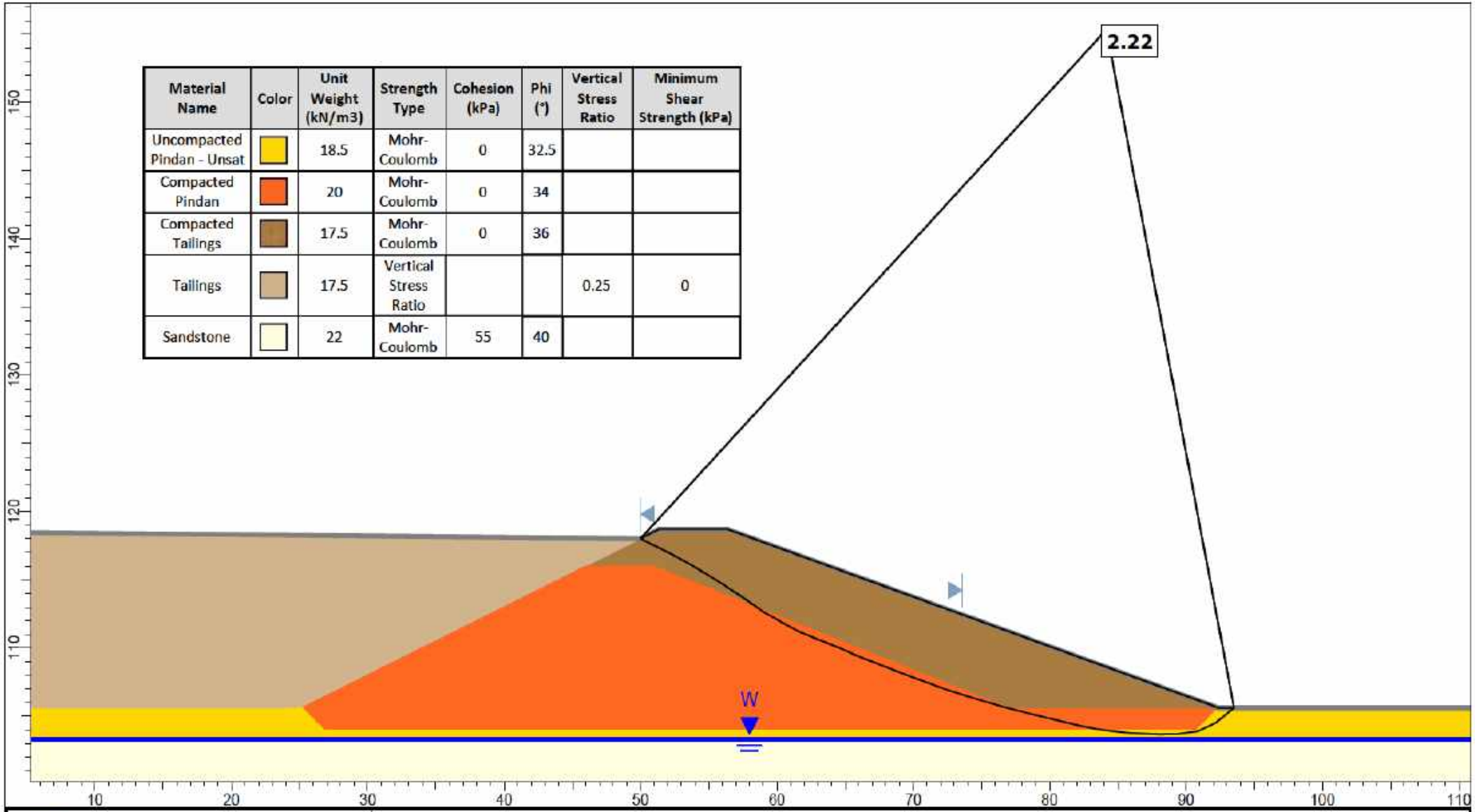
Appendix D

Stability Modelling

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Vertical Stress Ratio	Minimum Shear Strength (kPa)
Uncompacted Pindan - Unsat		18.5	Mohr-Coulomb	0	32.5		
Compacted Pindan		20	Mohr-Coulomb	0	34		
Compacted Tailings		17.5	Mohr-Coulomb	0	36		
Tailings		17.5	Vertical Stress Ratio			0.25	0
Sandstone		22	Mohr-Coulomb	55	40		



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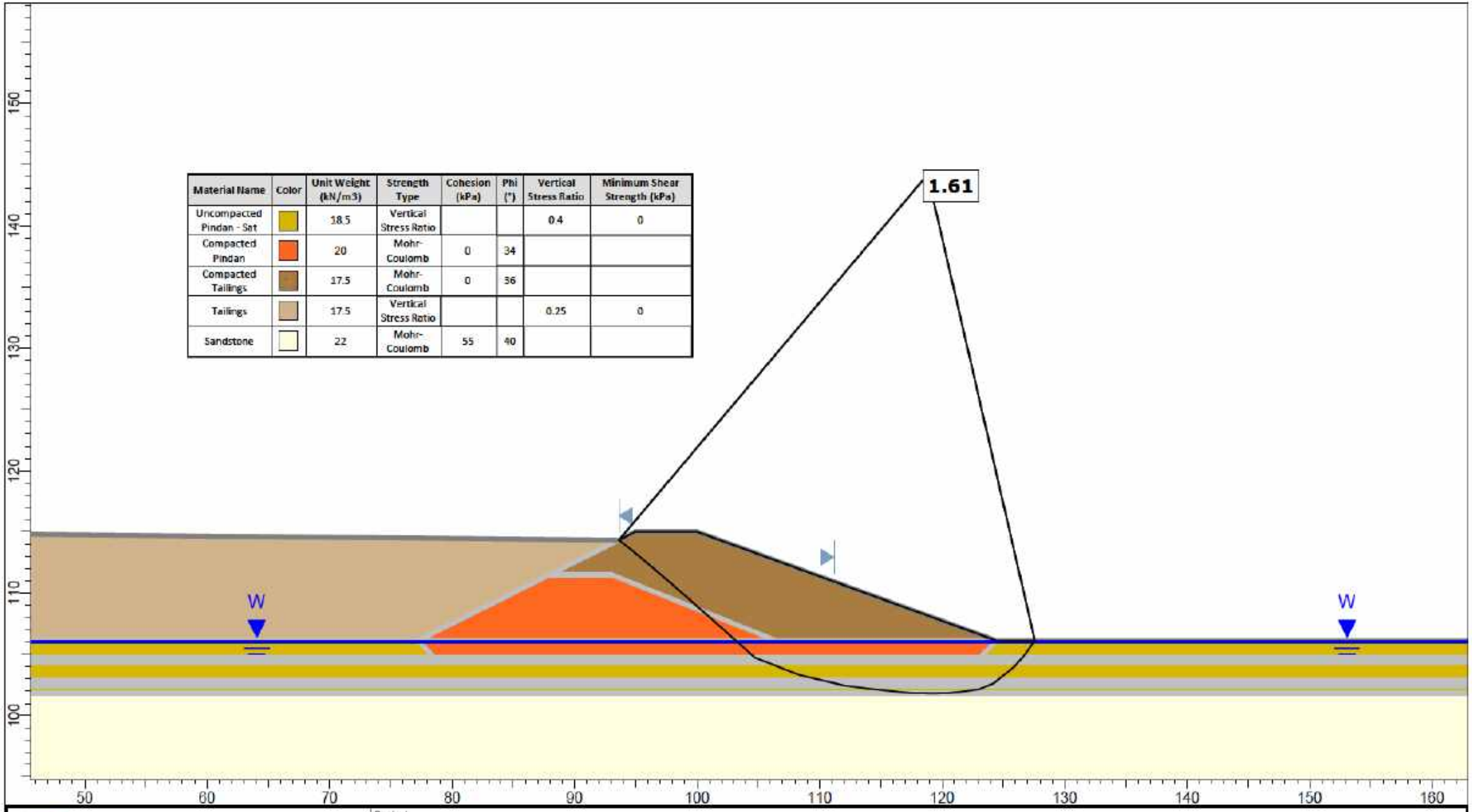
Project	OPTSF Stage 3A		
Date	17/04/2025	Scenario	Section A
Author	GL	Company	REC

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Vertical Stress Ratio	Minimum Shear Strength (kPa)
Uncompacted Pindan - Sat		18.5	Vertical Stress Ratio			0.4	0
Compacted Pindan		20	Mohr-Coulomb	0	34		
Compacted Tailings		17.5	Mohr-Coulomb	0	36		
Tailings		17.5	Vertical Stress Ratio			0.25	0
Sandstone		22	Mohr-Coulomb	55	40		



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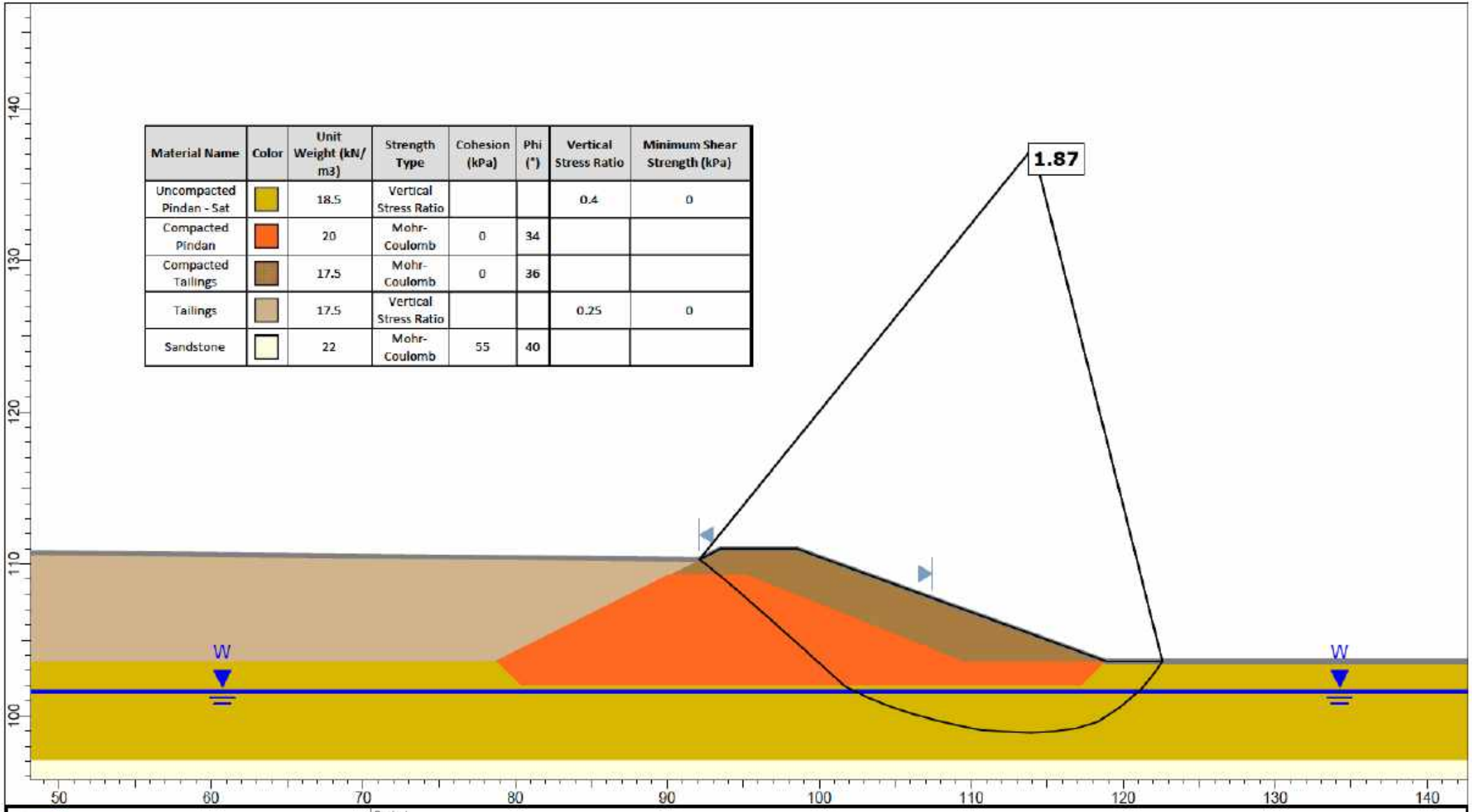
Project	OPTSF Stage 3A		
Date	17/04/2025	Scenario	Section B
Author	GL	Company	REC

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Vertical Stress Ratio	Minimum Shear Strength (kPa)
Uncompacted Pindan - Sat		18.5	Vertical Stress Ratio			0.4	0
Compacted Pindan		20	Mohr-Coulomb	0	34		
Compacted Tailings		17.5	Mohr-Coulomb	0	36		
Tailings		17.5	Vertical Stress Ratio			0.25	0
Sandstone		22	Mohr-Coulomb	55	40		



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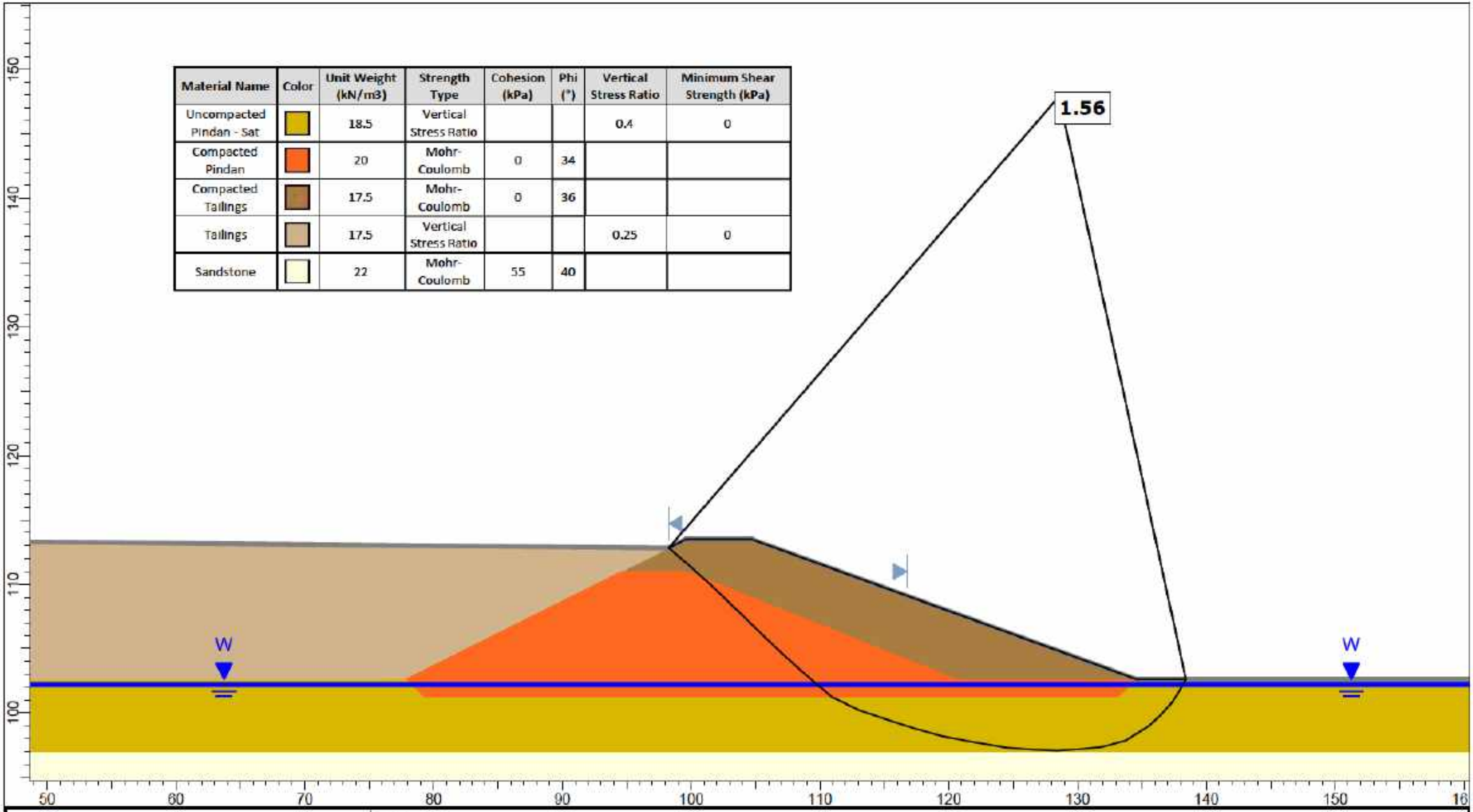
Project	OPTSF Stage 3A		
Date	17/04/2025	Scenario	Section C
Author	GL	Company	REC

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Vertical Stress Ratio	Minimum Shear Strength (kPa)
Uncompacted Pindan - Sat		18.5	Vertical Stress Ratio			0.4	0
Compacted Pindan		20	Mohr-Coulomb	0	34		
Compacted Tailings		17.5	Mohr-Coulomb	0	36		
Tailings		17.5	Vertical Stress Ratio			0.25	0
Sandstone		22	Mohr-Coulomb	55	40		



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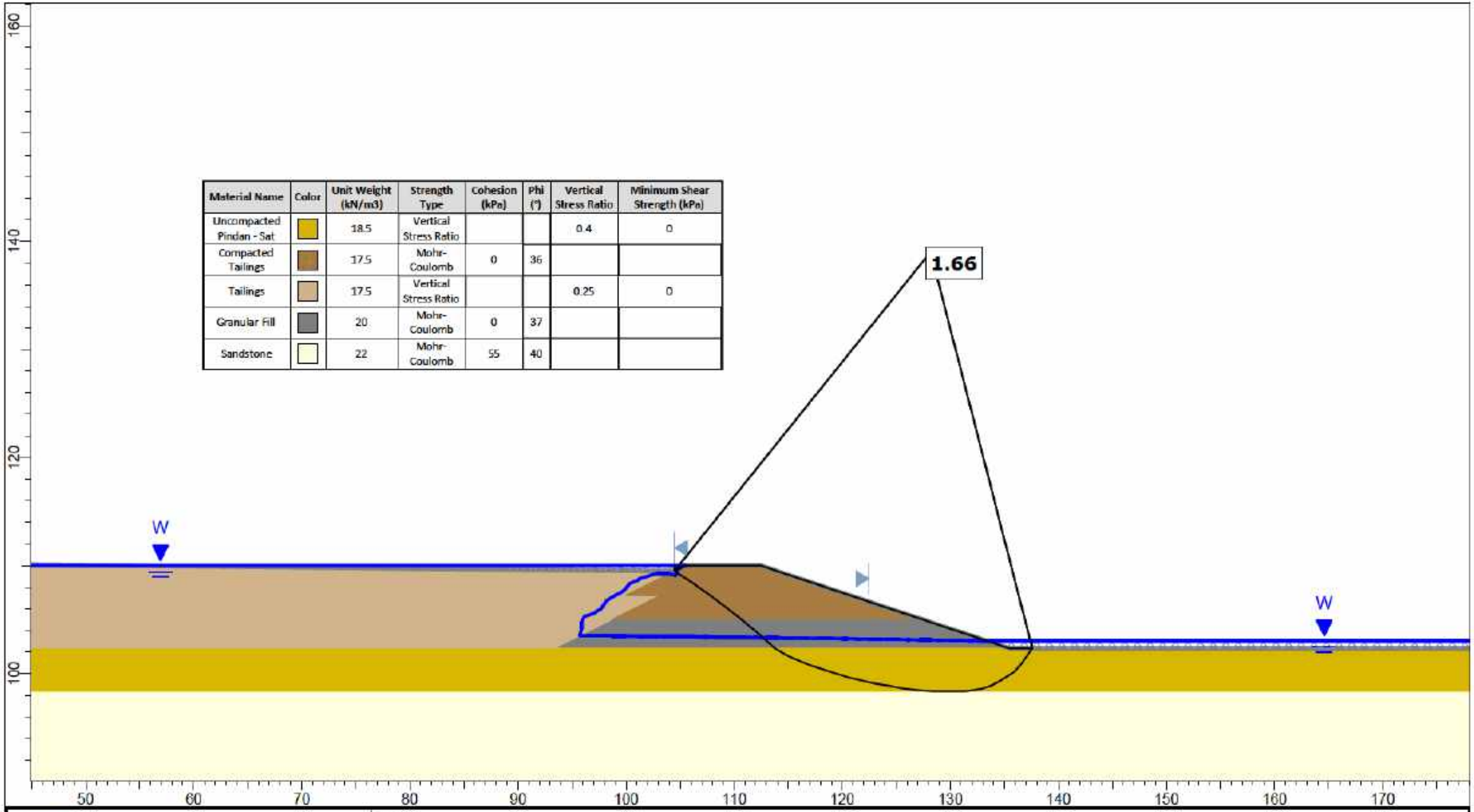
Project	OPTSF Stage 3A		
Date	17/04/2025	Scenario	Section D
Author	GL	Company	REC

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Vertical Stress Ratio	Minimum Shear Strength (kPa)
Uncompacted Pindan - Sat		18.5	Vertical Stress Ratio			0.4	0
Compacted Tailings		17.5	Mohr-Coulomb	0	36		
Tailings		17.5	Vertical Stress Ratio			0.25	0
Granular Fill		20	Mohr-Coulomb	0	37		
Sandstone		22	Mohr-Coulomb	55	40		



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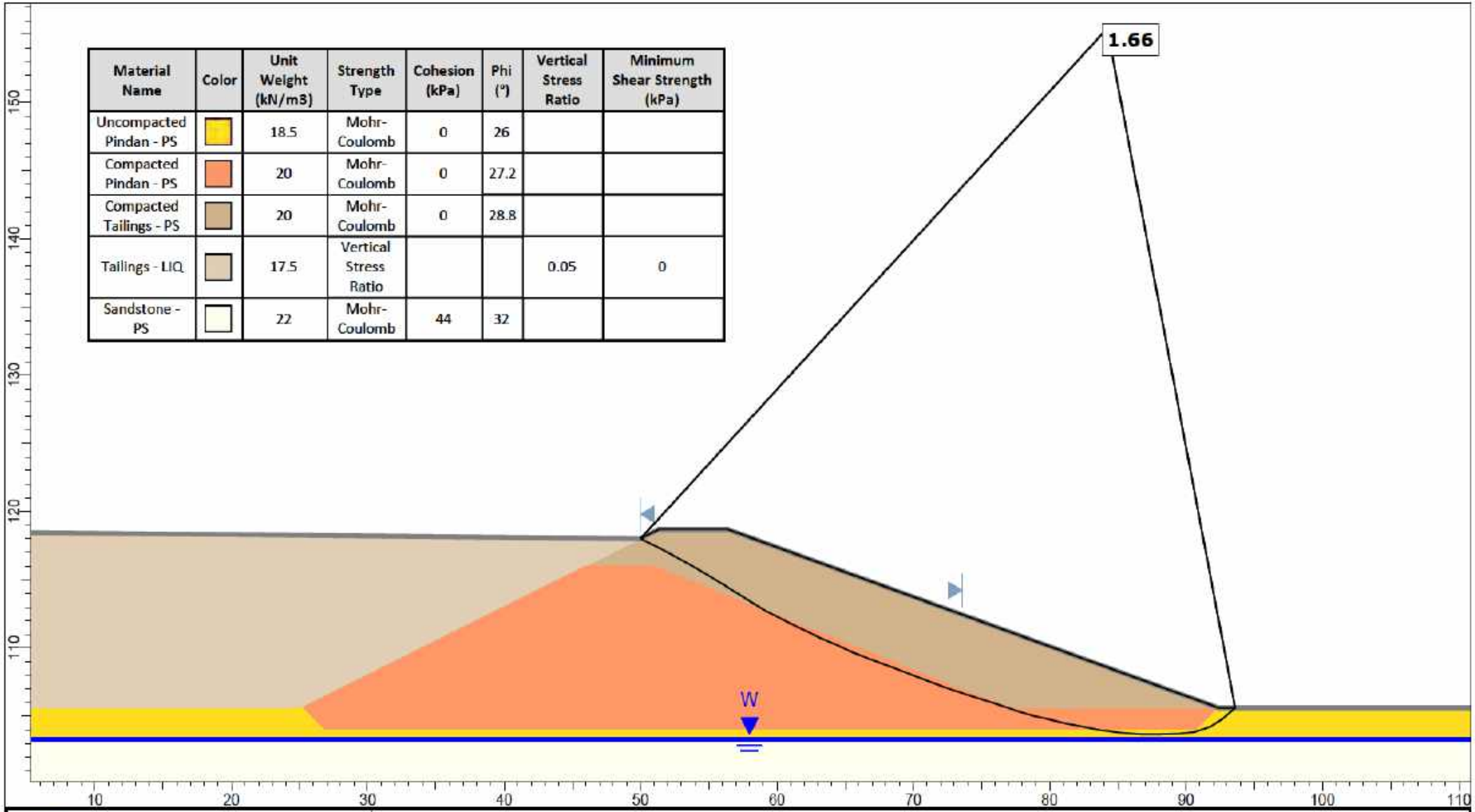
Project	OPTSF Stage 3A		
Date	17/04/2025	Scenario	Section E
Author	GL	Company	REC

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Vertical Stress Ratio	Minimum Shear Strength (kPa)
Uncompacted Pindan - PS		18.5	Mohr-Coulomb	0	26		
Compacted Pindan - PS		20	Mohr-Coulomb	0	27.2		
Compacted Tailings - PS		20	Mohr-Coulomb	0	28.8		
Tailings - LIQ		17.5	Vertical Stress Ratio			0.05	0
Sandstone - PS		22	Mohr-Coulomb	44	32		



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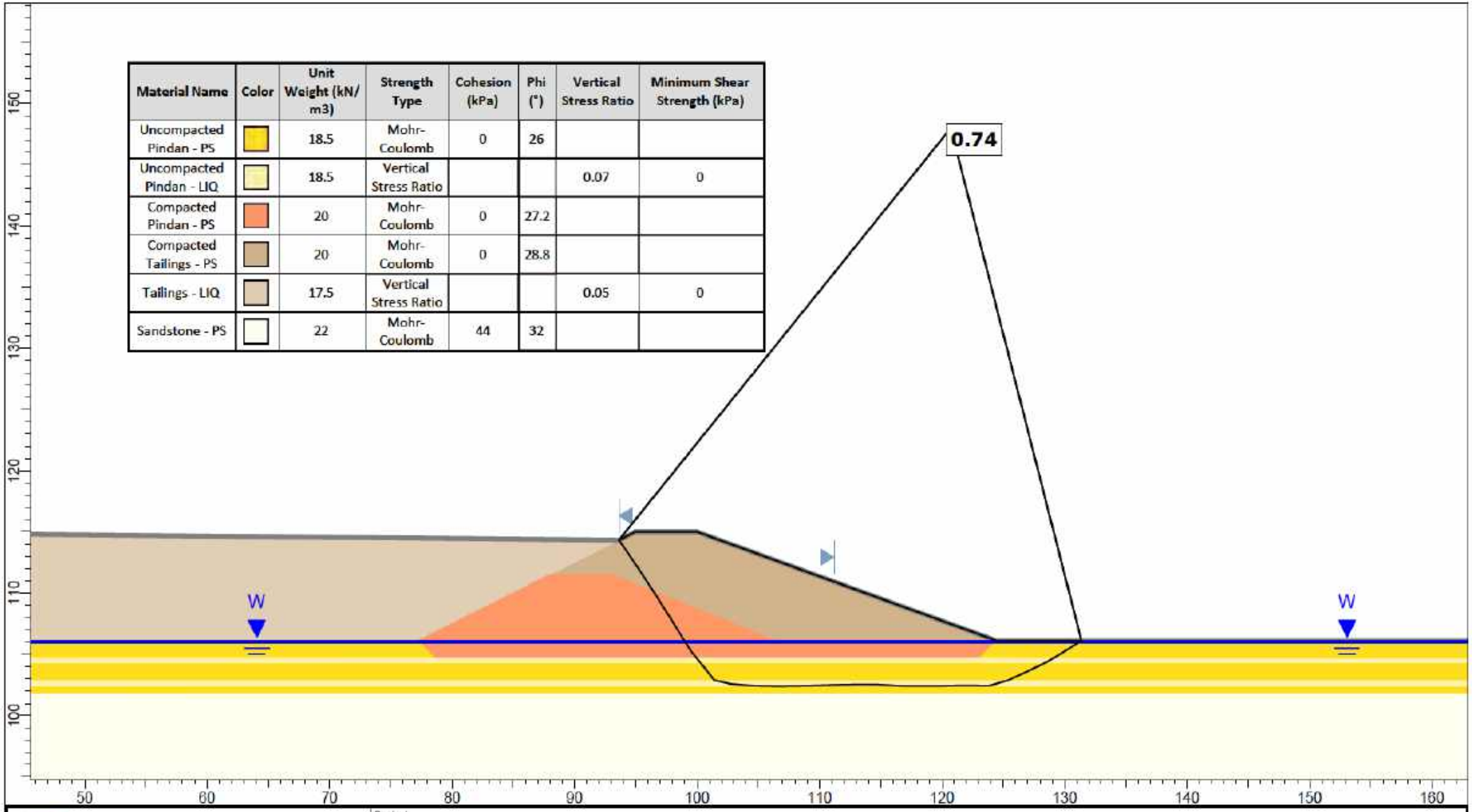
Project	OPTSF Stage 3A	
Date	17/04/2025	Scenario: Section A - PS
Author	GL	Company: REC

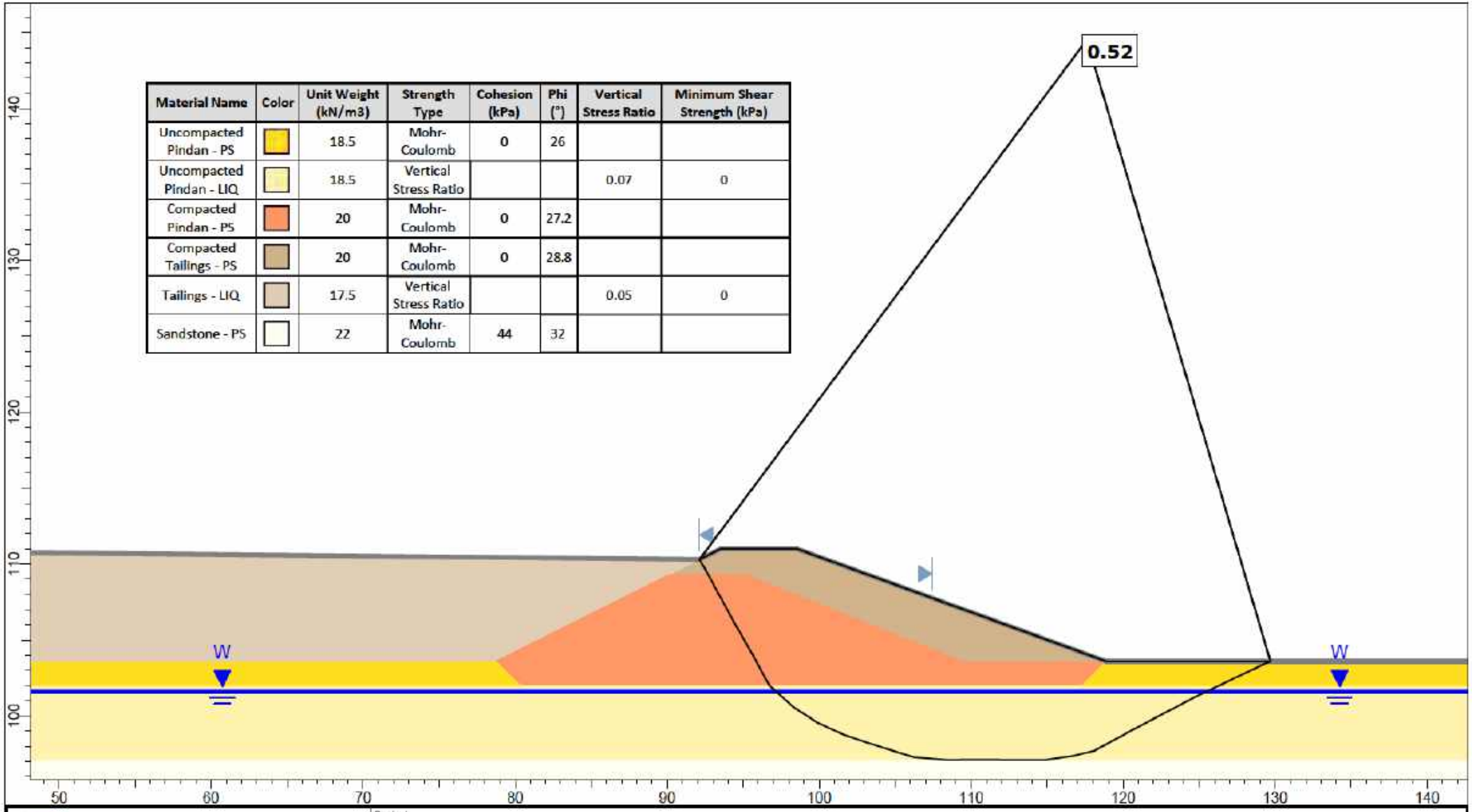
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Vertical Stress Ratio	Minimum Shear Strength (kPa)
Uncompacted Pindan - PS		18.5	Mohr-Coulomb	0	26		
Uncompacted Pindan - LIQ		18.5	Vertical Stress Ratio			0.07	0
Compacted Pindan - PS		20	Mohr-Coulomb	0	27.2		
Compacted Tailings - PS		20	Mohr-Coulomb	0	28.8		
Tailings - LIQ		17.5	Vertical Stress Ratio			0.05	0
Sandstone - PS		22	Mohr-Coulomb	44	32		



Project	OPTSF Stage 3A		
Date	17/04/2025	Scenario	Section B - PS
Author	GL	Company	REC

SLIDEINTERPRET 9.036

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Vertical Stress Ratio	Minimum Shear Strength (kPa)
Uncompacted Pindan - PS		18.5	Mohr-Coulomb	0	26		
Uncompacted Pindan - LIQ		18.5	Vertical Stress Ratio			0.07	0
Compacted Pindan - PS		20	Mohr-Coulomb	0	27.2		
Compacted Tailings - PS		20	Mohr-Coulomb	0	28.8		
Tailings - LIQ		17.5	Vertical Stress Ratio			0.05	0
Sandstone - PS		22	Mohr-Coulomb	44	32		



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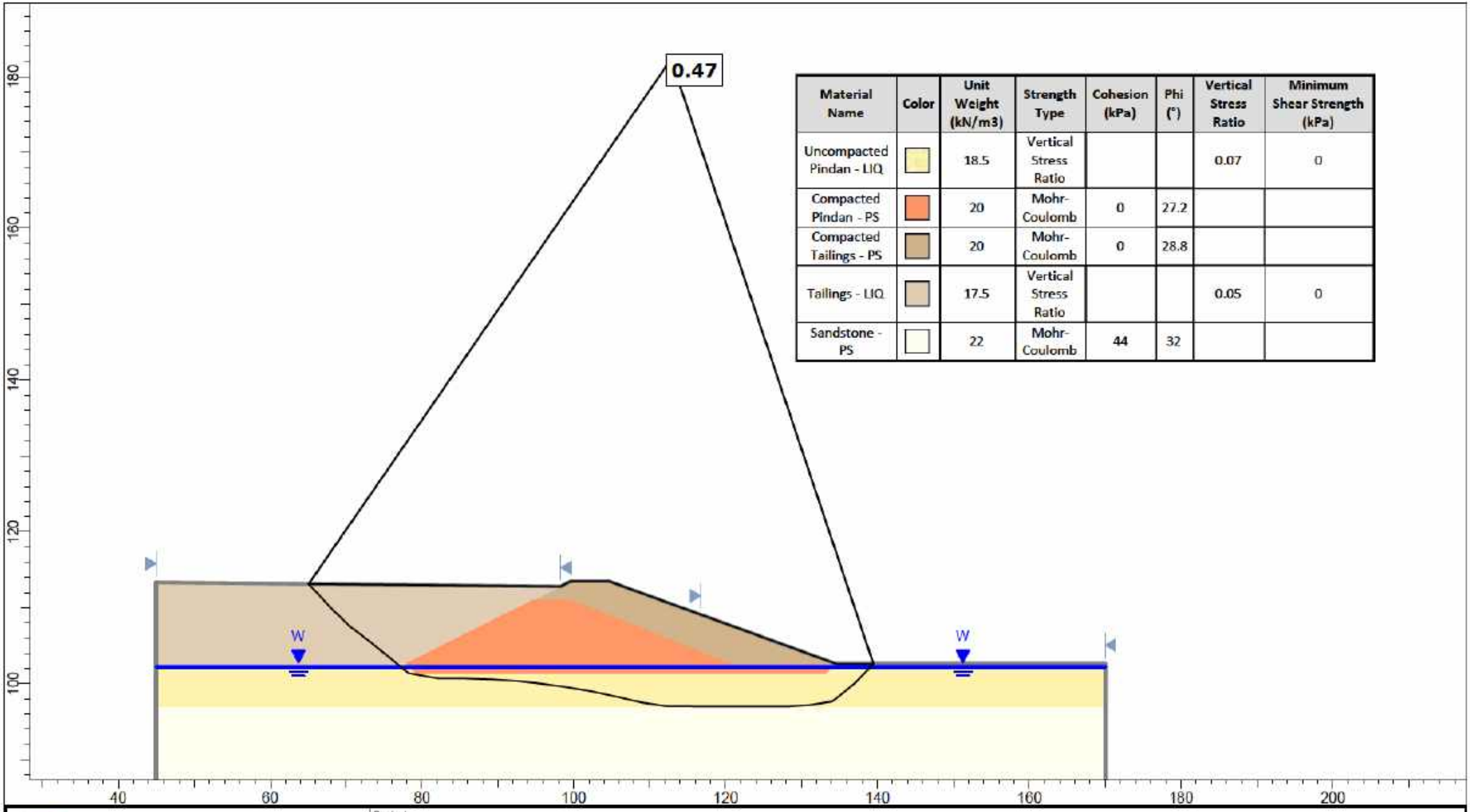
Project	OPTSF Stage 3A		
Date	17/04/2025	Scenario	Section C - PS
Author	GL	Company	REC



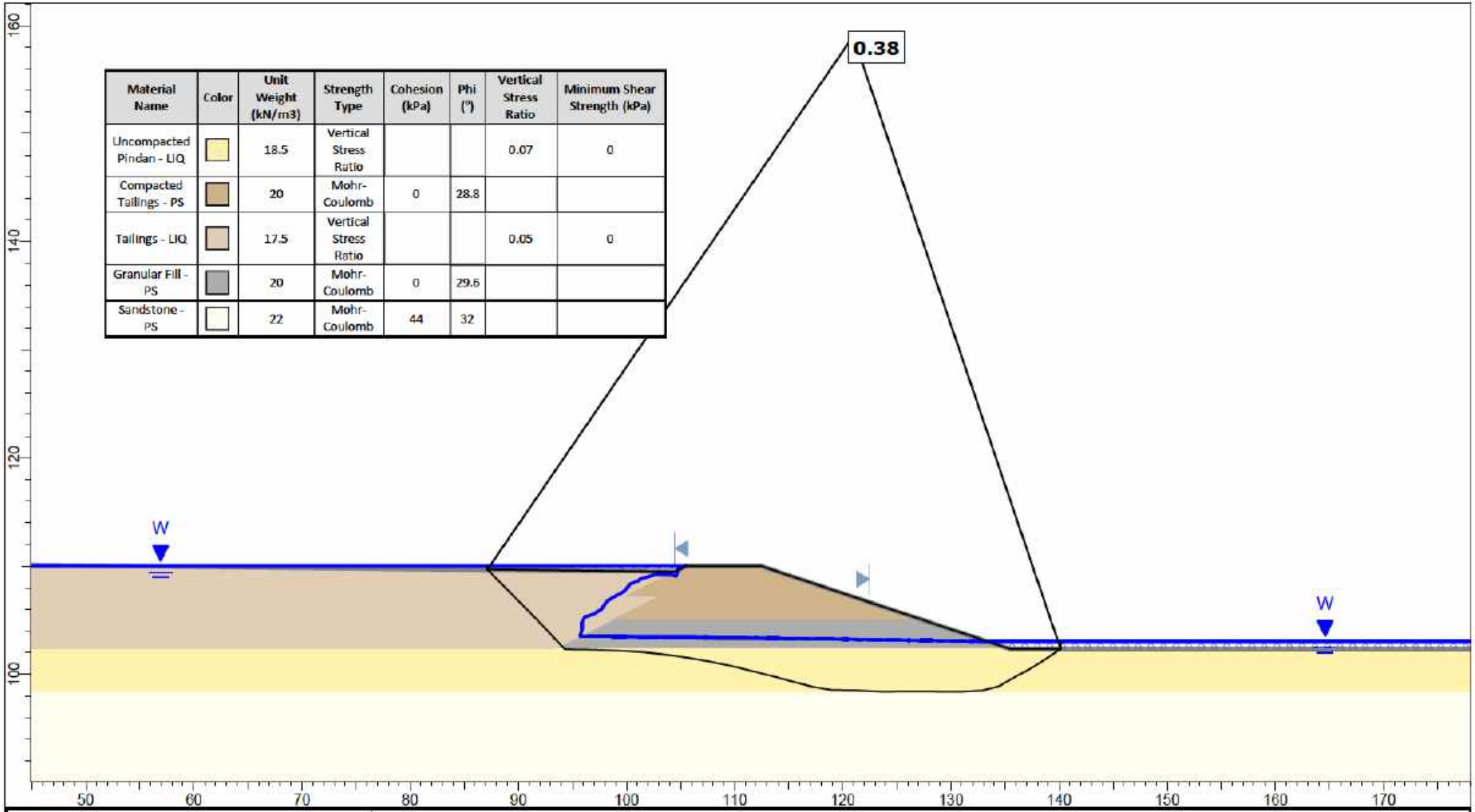
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Vertical Stress Ratio	Minimum Shear Strength (kPa)
Uncompacted Pindan - LIQ		18.5	Vertical Stress Ratio			0.07	0
Compacted Pindan - PS		20	Mohr-Coulomb	0	27.2		
Compacted Tailings - PS		20	Mohr-Coulomb	0	28.8		
Tailings - LIQ		17.5	Vertical Stress Ratio			0.05	0
Sandstone - PS		22	Mohr-Coulomb	44	32		

rec

SLIDEINTERPRET 9.036

Project	OPTSF Stage 3A		
Date	17/04/2025	*Scenario*	Section D - PS
Author	GL	*Company*	REC

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Vertical Stress Ratio	Minimum Shear Strength (kPa)
Uncompacted Pindan - LIQ		18.5	Vertical Stress Ratio			0.07	0
Compacted Tailings - PS		20	Mohr-Coulomb	0	28.8		
Tailings - LIQ		17.5	Vertical Stress Ratio			0.05	0
Granular Fill - PS		20	Mohr-Coulomb	0	29.6		
Sandstone - PS		22	Mohr-Coulomb	44	32		



rec

SLIDEINTERPRET 9.036

Project	OPTSF Stage 3A
Date	17/04/2025
Scenario	Section E - PS
Author	GL
Company	REC

Appendix E

Water Balance Model

TSF	Stage 3A OPTSF											
OPERATIONAL STAGE	1085 tph DMU Schedule - 2025											
MONTH	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DAYS IN MONTH	31	28	31	30	31	30	31	31	30	31	30	31

RAINFALL													
Monthly Rainfall (mm)			-	-	-	-	-	-	-	-	2	13	31	132
CDTSF													
Catchment Area (m^2)			-	-	-	-	-	-	-	-	1,004,000	1,004,000	1,004,000	1,004,000
Rainfall Inflow Volume (m^3/month)	Run-off Coefficient	1.0	-	-	-	-	-	-	-	-	1,907	12,850	31,024	132,930
SSP													
Catchment Area (m^2)			-	-	-	-	-	-	-	-	366,000	366,000	366,000	366,000
Rainfall Inflow Volume (m^3/month)	Run-off Coefficient	1.0	-	-	-	-	-	-	-	-	659	4,612	11,309	48,459
DEPOSITION													
Production Rate (t/month)	Yearly Throughput (Mtpa)	10	-	-	-	-	-	-	-	-	833,333	833,333	833,333	833,333
Slurry Density (%)			-	-	-	-	-	-	-	-	45.0%	45.0%	45.0%	45.0%
Volume of Tailings Solids into TSF (m^3)			-	-	-	-	-	-	-	-	297,619	297,619	297,619	297,619
Volume of Slurry Water into TSF (m^3/month)			-	-	-	-	-	-	-	-	1,018,519	1,018,519	1,018,519	1,018,519
CDTSF INFLOW (m^3/month)			-	-	-	-	-	-	-	-	**1,020,326**	**1,031,169**	**1,049,542**	**1,151,448**
SSP INFLOW (m^3/month)			-	-	-	-	-	-	-	-	**659**	**4,612**	**11,309**	**48,458**
TOTAL INFLOW (m^3/month)			-	-	-	-	-	-	-	-	**1,020,985**	**1,035,781**	**1,060,852**	**1,199,907**
EVAPORATION													
Monthly Evaporation (mm)			-	-	-	-	-	-	-	-	343	278	282	277
CDTSF													
Supernatant Pond Area (m^2)	% of Total Evaporation Area	8%	-	-	-	-	-	-	-	-	78,448	78,448	78,448	78,448
Wet Beach Area (m^2)	% of Total Evaporation Area	10%	-	-	-	-	-	-	-	-	95,560	95,560	95,560	95,560
Dry Beach Area (m^2)	% of Total Evaporation Area	82%	-	-	-	-	-	-	-	-	783,592	783,592	783,592	783,592
Evaporation from Supernatant Pond (m^3)	Pond Pan Factor (Assumption)	0.67	-	-	-	-	-	-	-	-	12,457	14,229	14,434	14,173
Evaporation from Wet Beach (m^3)	Wet Beach Factor (Assumption)	0.30	-	-	-	-	-	-	-	-	5,972	7,954	8,079	7,932
Evaporation from Dry Beach (m^3)	Dry Beach Factor (Assumption)	0.10	-	-	-	-	-	-	-	-	10,057	21,788	22,082	21,682
Total TSF Evaporation Outflow (m^3/month)			-	-	-	-	-	-	-	-	38,480	43,901	44,594	43,787
SSP													
Pond Area (m^2)	% of Total Evaporation Area	36%	-	-	-	-	-	-	-	-	117,360	117,360	117,360	117,360
Dry Area (m^2)	% of Total Evaporation Area	64%	-	-	-	-	-	-	-	-	208,640	208,640	208,640	208,640
Evaporation from Pond (m^3)	Pond Pan Factor (Assumption)	0.67	-	-	-	-	-	-	-	-	19,123	21,844	22,158	21,757
Evaporation from Dry Area (m^3)	Dry Beach Factor (Assumption)	0.10	-	-	-	-	-	-	-	-	5,074	5,796	5,879	5,773
Total SSP Evaporation Outflow (m^3/month)			-	-	-	-	-	-	-	-	24,197	27,640	28,038	27,530
RETENTION													
In-situ Dry Density (t/m^3)	Specific Gravity (SG)	2.8	-	-	-	-	-	-	-	-	1.75	1.75	1.75	1.75
Volume Retained in Tailings (%/month)			-	-	-	-	-	-	-	-	21.43%	21.43%	21.43%	21.43%
Volume Retained in Tailings (m^3/month)			-	-	-	-	-	-	-	-	178,571	178,571	178,571	178,571
ABSTRACTION													
CDTSF													
Water Recovered From TSF (m^3)			-	-	-	-	-	-	-	-	733,333	733,333	733,333	733,333
Water Recovery (%)			-	-	-	-	-	-	-	-	72%	72%	72%	72%
Average Pump Rate (m^3/hour)	Hours of Operation per Day	22	-	-	-	-	-	-	-	-	1,111	1,075	1,111	1,075
SSP													
Water Recovered From TSF (m^3)			-	-	-	-	-	-	-	-	97,245	97,245	97,245	97,245
Average Pump Rate (m^3/hour)	Hours of Operation per Day	22	-	-	-	-	-	-	-	-	147	143	147	143
SEEPAGE													
CDTSF Lateral Seepage (m^3)	% of Total CDTSF Inflow	1%	-	-	-	-	-	-	-	-	10,203	10,312	10,495	11,514
CDTSF OUTFLOW (m^3/month)			-	-	-	-	-	-	-	-	**968,594**	**968,178**	**968,934**	**967,206**
SSP OUTFLOW (m^3/month)			-	-	-	-	-	-	-	-	**121,442**	**124,885**	**125,283**	**124,776**
TOTAL OUTFLOW (m^3/month)			-	-	-	-	-	-	-	-	**1,082,036**	**1,091,062**	**1,092,277**	**1,091,982**
CHANGE IN WATER VOLUME (m^3)			-	-	-	-	-	-	-	-	-61,051	-55,282	-31,426	107,926
CUMULATIVE WATER DIFFERENCE (m^3)			-	-	-	-	-	-	-	-	**238,549**	**183,667**	**152,241**	**260,166**
ADDITIONAL ABSTRACTION TO MAINTAIN WATER NEUTRALITY (m^3/month)			-	-	-	-	-	-	-	-	**70,500**	**70,500**	**0**	**70,000**
STORED WATER VOLUME (m^3)			-	-	-	-	-	-	-	-	**168,449**	**42,667**	**11,241**	**48,068**

TSF	Stage 3A OPTSF											
OPERATIONAL STAGE	1085 tph DMU Schedule - 2026											
MONTH	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DAYS IN MONTH	31	28	31	30	31	30	31	31	30	31	30	31
RAINFALL												
Monthly Rainfall (mm)		309	249	154	39	19	10	-	-	-	-	-	-
CDTSF												
Catchment Area (m^2)		1,004,000	1,004,000	1,004,000	1,004,000	1,004,001	1,004,002	-	-	-	-	-	-
Rainfall Inflow Volume (m^3/month)	Run-off Coefficient 1.0	310,636	250,096	154,617	39,256	19,478	15,080	-	-	-	-	-	-
SSP												
Catchment Area (m^2)		366,000	366,000	366,000	366,000	366,001	366,002	-	-	-	-	-	-
Rainfall Inflow Volume (m^3/month)	Run-off Coefficient 1.0	113,240	91,171	56,437	14,311	7,100	5,490	-	-	-	-	-	-
DEPOSITION												
Production Rate (t/month)	Yearly Throughput (Mtpa) 10	833,333	833,333	833,333	833,333	833,333	833,333	-	-	-	-	-	-
Slurry Density (%)		45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	-	-	-	-	-	-
Volume of Tailings Solids into TSF (m^3)		297,619	297,619	297,619	297,619	297,619	297,619	-	-	-	-	-	-
Volume of Slurry Water into TSF (m^3/month)		1,018,519	1,018,519	1,018,519	1,018,519	1,018,519	1,018,519	-	-	-	-	-	-
CDTSF INFLOW (m^3/month)		1,329,156	1,268,615	1,173,335	1,057,775	1,037,998	1,033,579	-	-	-	-	-	-
SSP INFLOW (m^3/month)		113,240	91,171	56,437	14,311	7,100	5,490	-	-	-	-	-	-
TOTAL INFLOW (m^3/month)		1,442,397	1,359,786	1,229,773	1,072,086	1,045,097	1,039,069	-	-	-	-	-	-
EVAPORATION												
Monthly Evaporation (mm)		240	184	208	215	207	180	-	-	-	-	-	-
CDTSF												
Supernatant Pond Area (m^2)	% of Total Evaporation Area 8%	76,448	76,448	76,448	76,448	76,448	76,448	-	-	-	-	-	-
Wet Beach Area (m^2)	% of Total Evaporation Area 10%	95,560	95,560	95,560	95,560	95,560	95,560	-	-	-	-	-	-
Dry Beach Area (m^2)	% of Total Evaporation Area 82%	783,592	783,592	783,592	783,592	783,592	783,592	-	-	-	-	-	-
Evaporation from Supernatant Pond (m^3)	Pond Pan Factor (Assumption) 0.67	12,288	9,414	10,669	11,023	10,623	9,220	-	-	-	-	-	-
Evaporation from Wet Beach (m^3)	Wet Beach Factor (Assumption) 0.30	5,877	5,209	5,972	6,169	5,946	5,160	-	-	-	-	-	-
Evaporation from Dry Beach (m^3)	Dry Beach Factor (Assumption) 0.10	16,798	14,402	16,322	16,863	16,252	14,105	-	-	-	-	-	-
Total TSF Evaporation Outflow (m^3/month)		37,964	29,026	32,963	34,055	32,821	28,485	-	-	-	-	-	-
SSP												
Pond Area (m^2)	% of Total Evaporation Area 36%	117,360	117,360	117,360	117,360	117,360	117,360	-	-	-	-	-	-
Dry Area (m^2)	% of Total Evaporation Area 64%	208,640	208,640	208,640	208,640	208,640	208,640	-	-	-	-	-	-
Evaporation from Pond (m^3)	Pond Pan Factor (Assumption) 0.67	18,864	14,462	16,379	16,921	16,308	14,154	-	-	-	-	-	-
Evaporation from Dry Area (m^3)	Dry Beach Factor (Assumption) 0.10	5,005	3,835	4,340	4,490	4,327	3,756	-	-	-	-	-	-
Total SSP Evaporation Outflow (m^3/month)		23,869	18,297	20,725	21,411	20,635	17,909	-	-	-	-	-	-
RETENTION												
In-situ Dry Density (t/m^3)	Specific Gravity (SG) 2.8	1.75	1.75	1.75	1.75	1.75	1.75	-	-	-	-	-	-
Volume Retained in Tailings (%/month)		21.43%	21.43%	21.43%	21.43%	21.43%	21.43%	-	-	-	-	-	-
Volume Retained in Tailings (m^3/month)		178,571	178,571	178,571	178,571	178,571	178,571	-	-	-	-	-	-
ABSTRACTION												
CDTSF												
Water Recovered From TSF (m^3)		733,333	733,333	733,333	733,333	733,333	733,333	-	-	-	-	-	-
Water Recovery (%)		72%	72%	72%	72%	72%	72%	-	-	-	-	-	-
Average Pump Rate (m^3/hour)	Hours of Operation per Day 22	1,075	1,190	1,075	1,111	1,075	1,111	-	-	-	-	-	-
SSP												
Water Recovered From TSF (m^3)		97,245	97,245	97,245	97,245	97,245	97,245	-	-	-	-	-	-
Average Pump Rate (m^3/hour)	Hours of Operation per Day 22	143	158	143	147	143	147	-	-	-	-	-	-
SEEPAGE												
CDTSF Lateral Seepage (m^3)	% of Total CDTSF Inflow 1%	13,292	12,686	11,733	10,578	10,380	10,336	-	-	-	-	-	-
CDTSF OUTFLOW (m^3/month)		963,160	953,677	956,601	956,537	955,165	950,725	-	-	-	-	-	-
SSP OUTFLOW (m^3/month)		121,114	115,532	117,970	118,656	117,880	115,154	-	-	-	-	-	-
TOTAL OUTFLOW (m^3/month)		1,084,274	1,069,209	1,074,571	1,075,194	1,073,045	1,065,879	-	-	-	-	-	-
CHANGE IN WATER VOLUME (m^3)		358,123	290,577	155,202	-3,108	-27,949	-26,811	-	-	-	-	-	-
CUMULATIVE WATER DIFFERENCE (m^3)		618,283	908,865	1,064,067	1,060,959	1,033,070	1,006,259	-	-	-	-	-	-
ADDITIONAL MONTHLY ABSTRACTION TO MAINTAIN WATER NEUTRALITY (m^3)		82,460	82,460	82,460	82,460	82,460	82,460	-	-	-	-	-	-
STORED WATER VOLUME (m^3)		324,329	532,445	685,187	519,619	409,270	299,999	-	-	-	-	-	-

Appendix F

2024 Tailings Test Certificates

Perth
16 Gympie Way, Willetton
WA 6155
Ph: (08) 9418 8742
[redacted]

E-Precision Laboratory

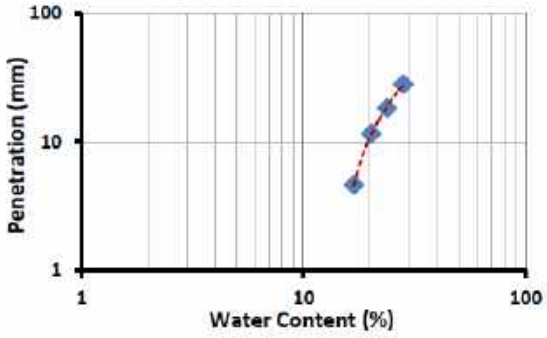
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

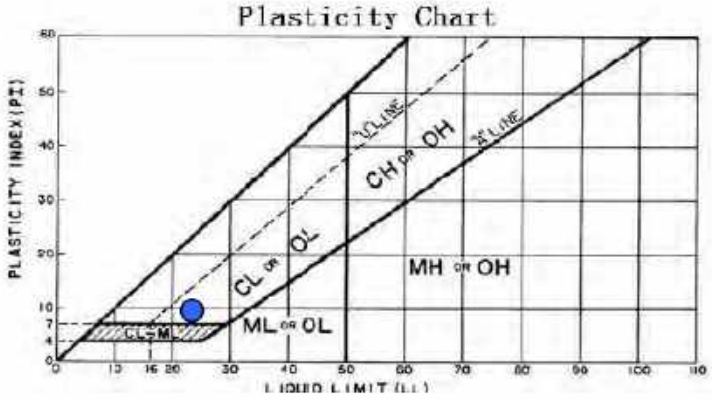
Client:	Kimberley Sands	**Date Tested:**	25/04/2024
Project:	Tails Testing 2024	Lab:	EPLAB
Sample No:	S1	**Job Number:**	KSANDS
Lab ID:	S1_ATT		
Depth (m):	-	**Room Temperature at Test:**	20°C
Tested by:	George	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	22.95
Plastic Limit (%):	15.63
Plasticity Index (%):	7.32
Liquidity Index (%):	-
Shrinkage Limit (%):	13.91
Linear Shrinkage(%):	3.67

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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

Integrity Precision Innovation

Perth
16 Gympie Way, Willetton
WA 6155
Ph: (08) 9418 8742
[redacted]

E-Precision Laboratory

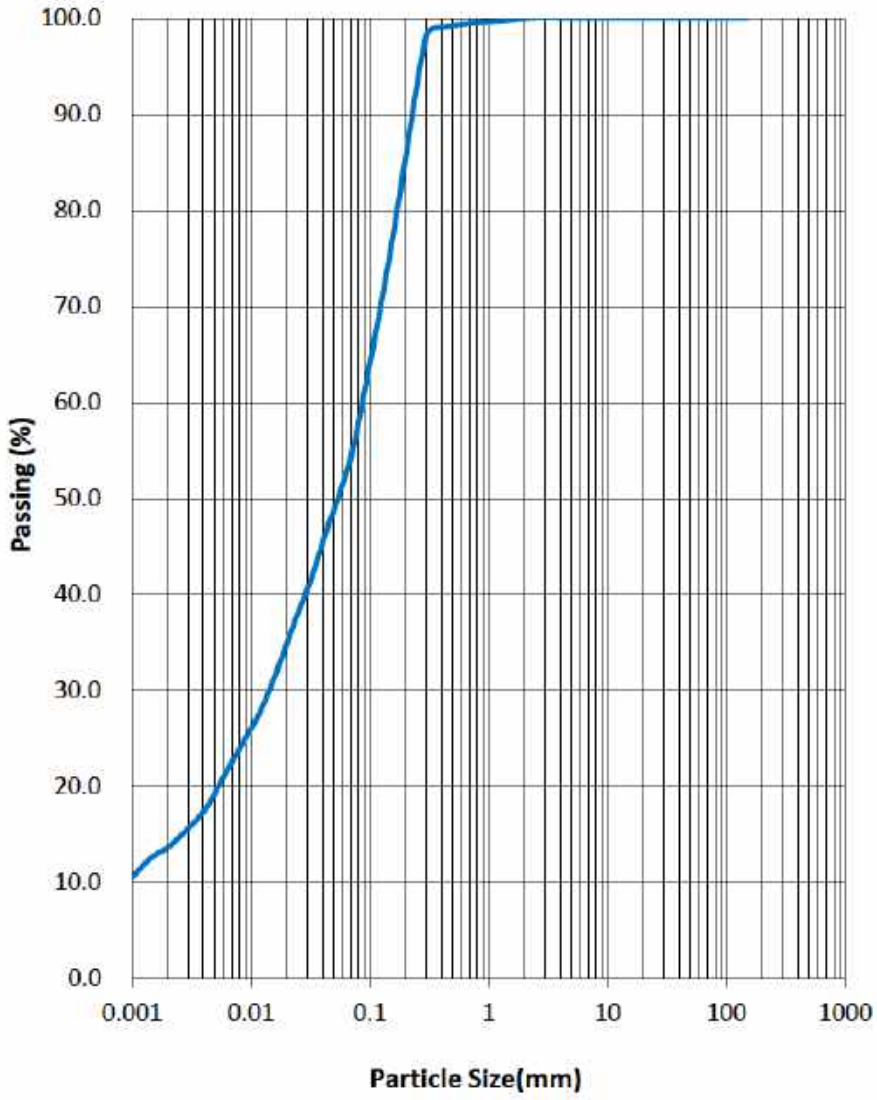
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	Kimberley Sands	Date Tested:	20/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S1	Depth (m):	-
Lab ID:	S1_PSDH	Room Temperature at Test:	19°C
Tested by:	George	2.36mm Particle Density (t/m³):	2.824
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	100.0
2.36	100.0
1.18	99.7
0.6	99.3
0.425	99.1
0.3	98.2
0.15	75.8
0.075	56.0
0.05701	50.8
0.04451	47.0
0.03185	41.4
0.02274	36.7
0.01559	31.1
0.01148	27.3
0.00818	24.1
0.00582	20.8
0.00414	17.6
0.00294	15.5
0.00209	13.8
0.00148	12.6
0.00117	11.4
0.00102	10.5
0.00086	9.6

PSD Graph



Notes: *Oven dried @ 60deg*

Stored and Tested the Sample as received

Samples supplied by the Client

Authorized Signature: [redacted]

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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[redacted]

E-Precision Laboratory

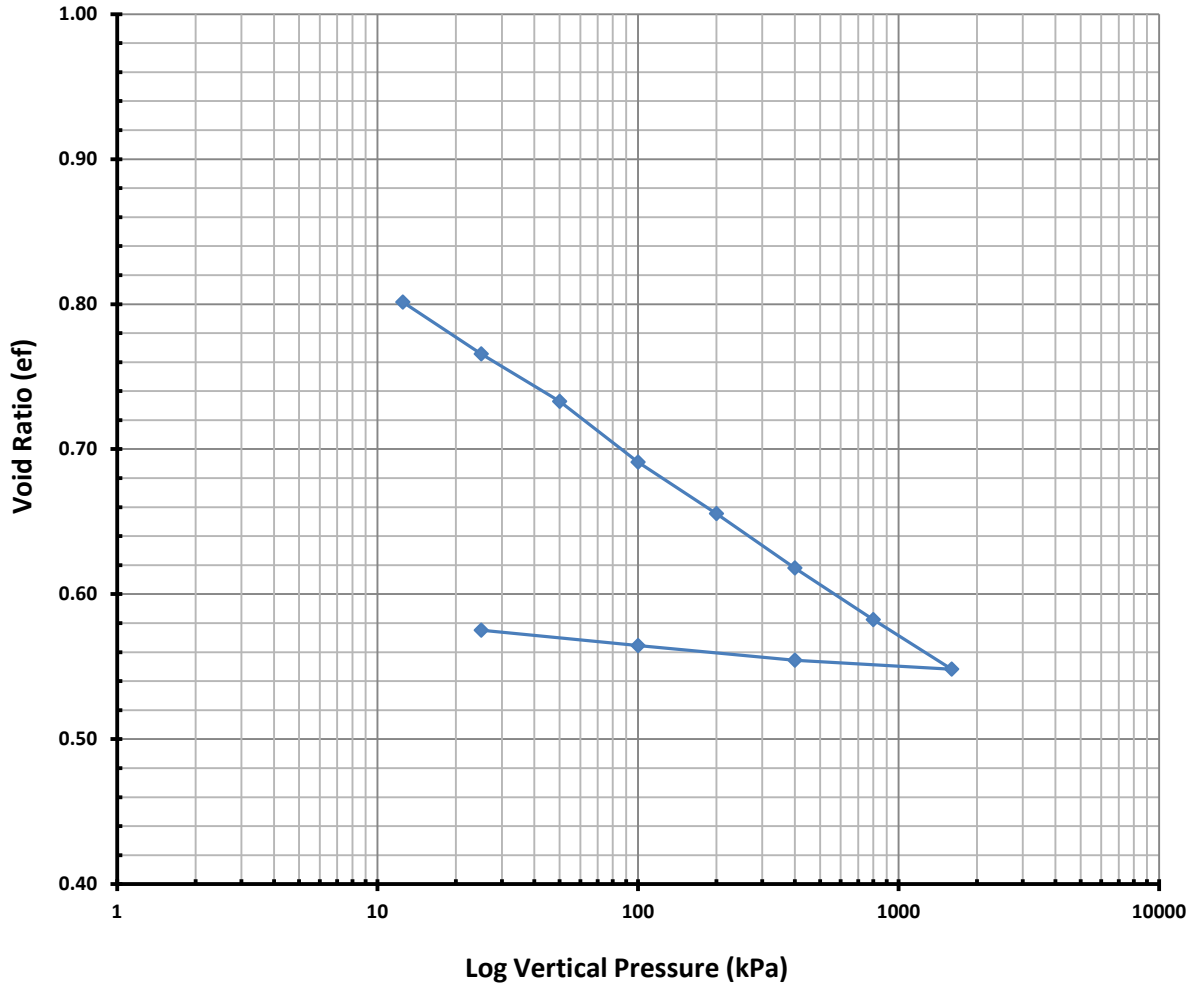
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°c

Tested by:	Phil	Initial Moisture (%):	41.01	Test Condition:	Undrained
Height (mm):	38.87	Final Moisture Content (%):	20.42	Sample Condition:	Saturated
Diameter (mm):	61.80	Bulk Density (t/m³):	2.10	Particle Density (t/m³):	2.824
Direction:	Vertical	Dry Density (t/m³):	1.49	Initial Void Ratio (e_i):	0.895

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



Integrity Precision Innovation

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[redacted]

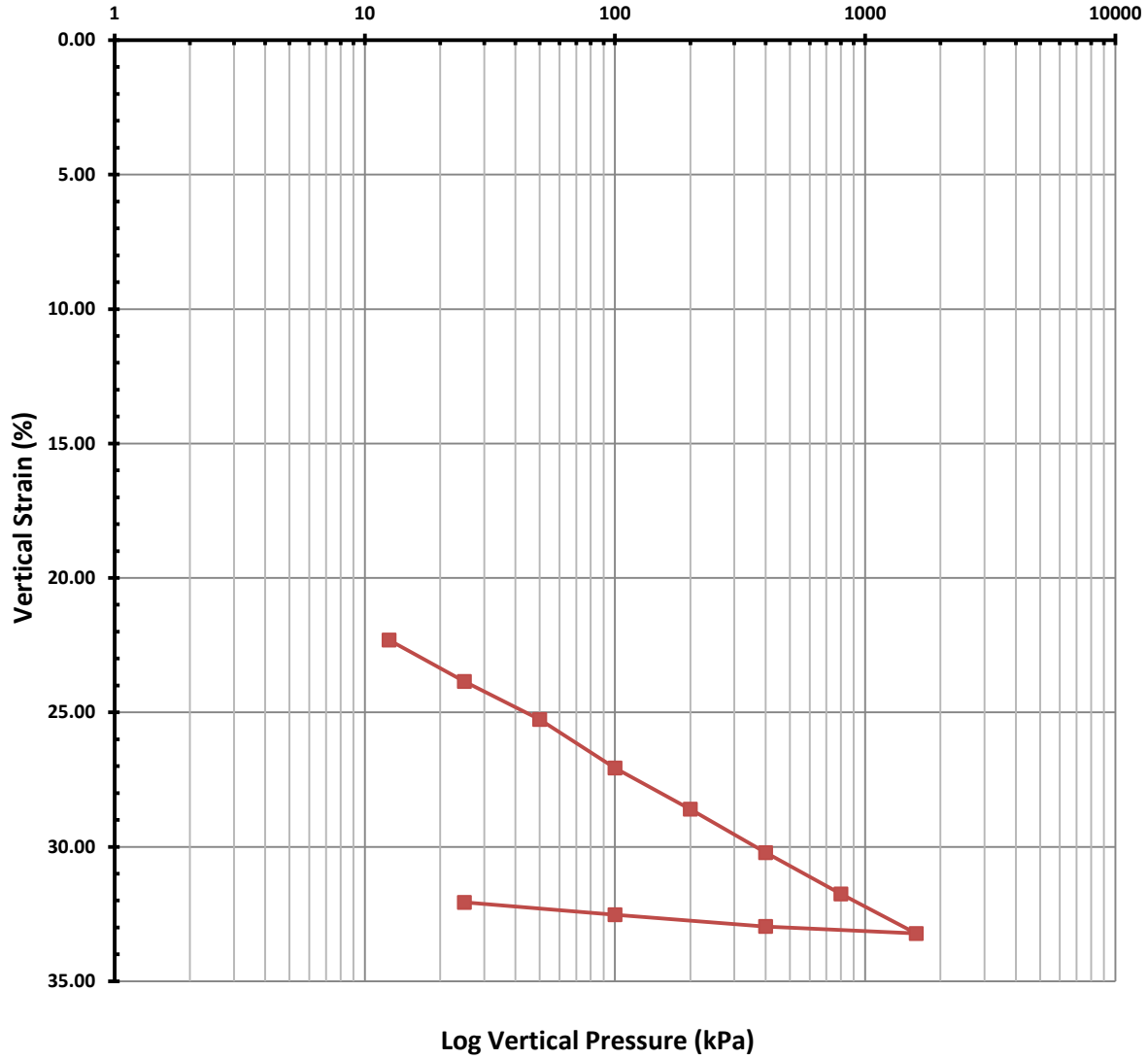
E-Precision Laboratory

CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°c

Vertical Strain (%) Vs Log of Vertical Pressure (kPa)



Integrity Precision Innovation

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[redacted]

E-Precision Laboratory

CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_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	8.672	13.452	-	1.78E-02	7.5E-08		0.801	22.31
Stage 2 @ 25kPa	9.271	11.528	-	1.59E-03	5.7E-09		0.766	23.85
Stage 3 @ 50kPa	9.820	11.076	-	7.42E-04	2.6E-09		0.733	25.26
Stage 4 @ 100kPa	10.522	21.087	-	4.83E-04	3.2E-09		0.691	27.07
Stage 5 @ 200kPa	11.117	20.223	-	2.10E-04	1.3E-09		0.656	28.60
Stage 6 @ 400kPa	11.746	19.257	-	1.13E-04	6.8E-10		0.618	30.22
Stage 7 @ 800kPa	12.343	18.367	-	5.50E-05	3.1E-10		0.582	31.75
Stage 8 @ 1600kPa	12.915	11.719	-	2.70E-05	9.8E-11		0.548	33.23
Unload @ 400kPa	12.812							
Unload @ 100kPa	12.643							
Unload @ 25kPa	12.465							

** 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): [redacted]

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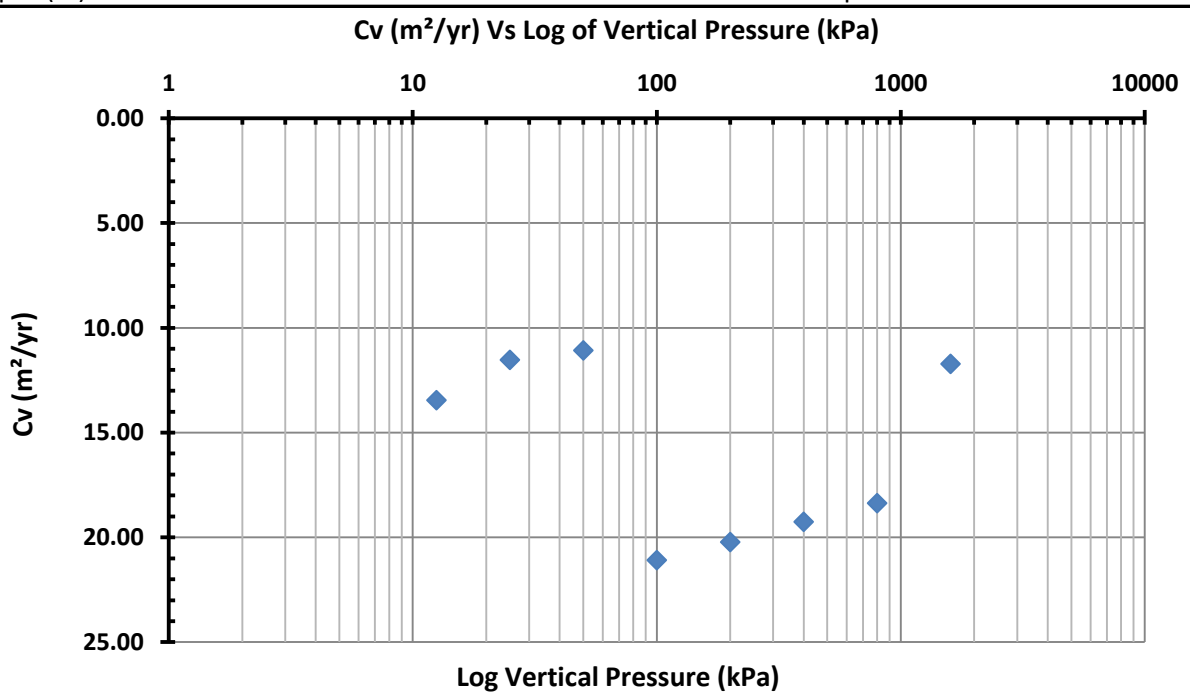
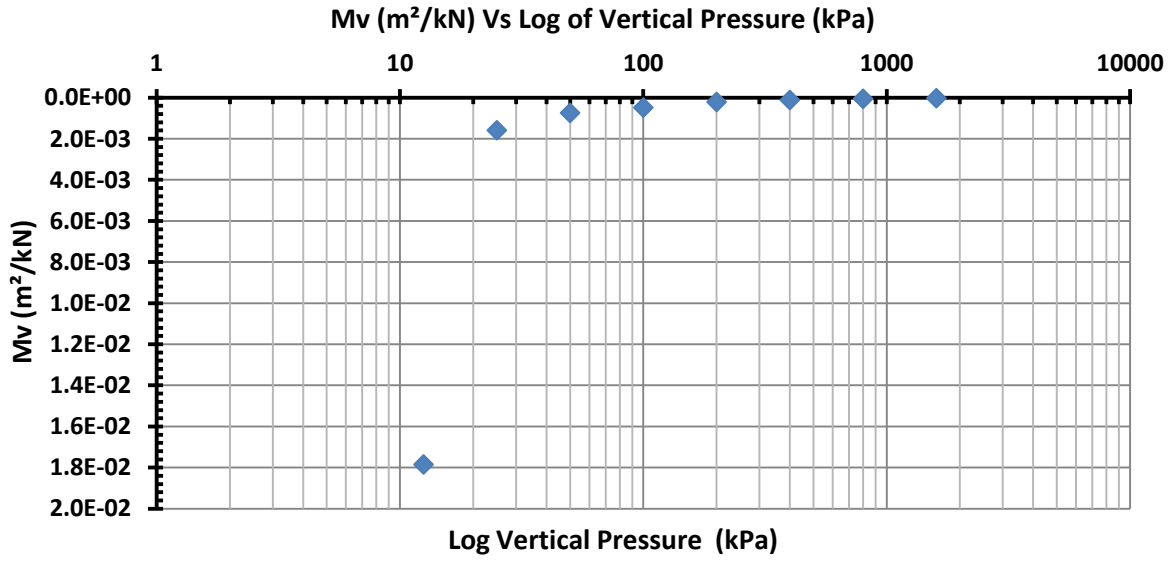
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_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:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

TEST RESULTS PLEASE SEE PAGES BELOW

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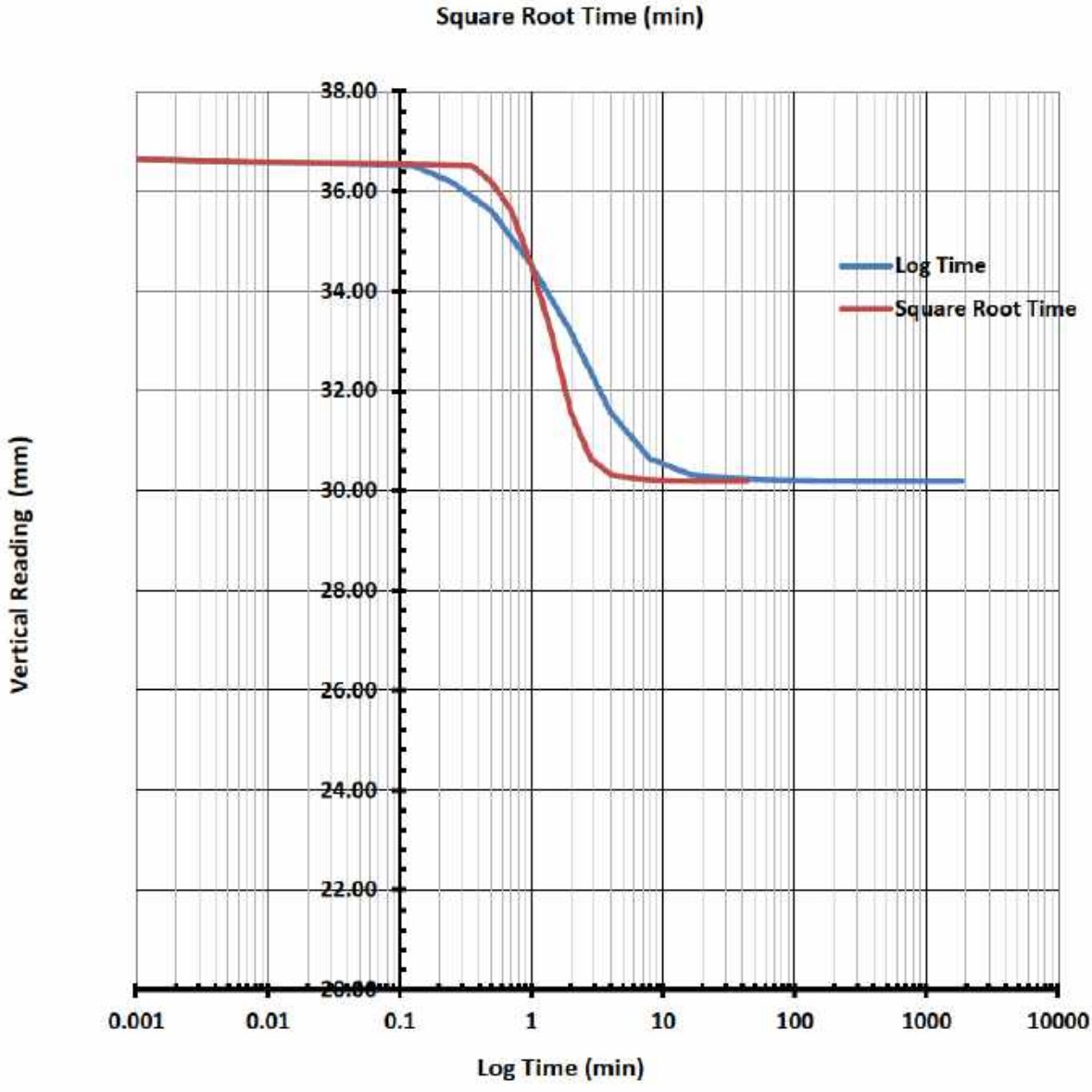
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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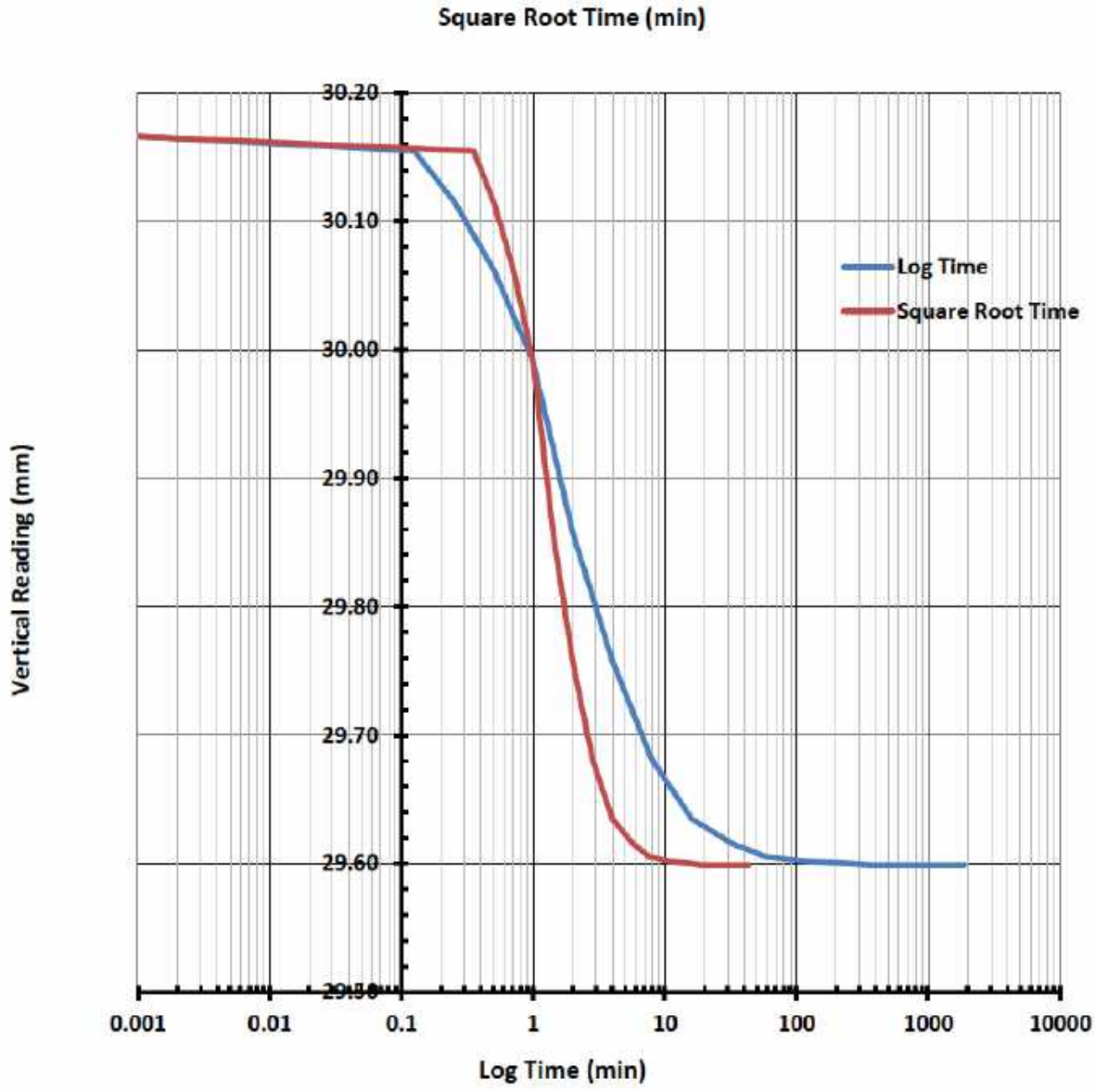
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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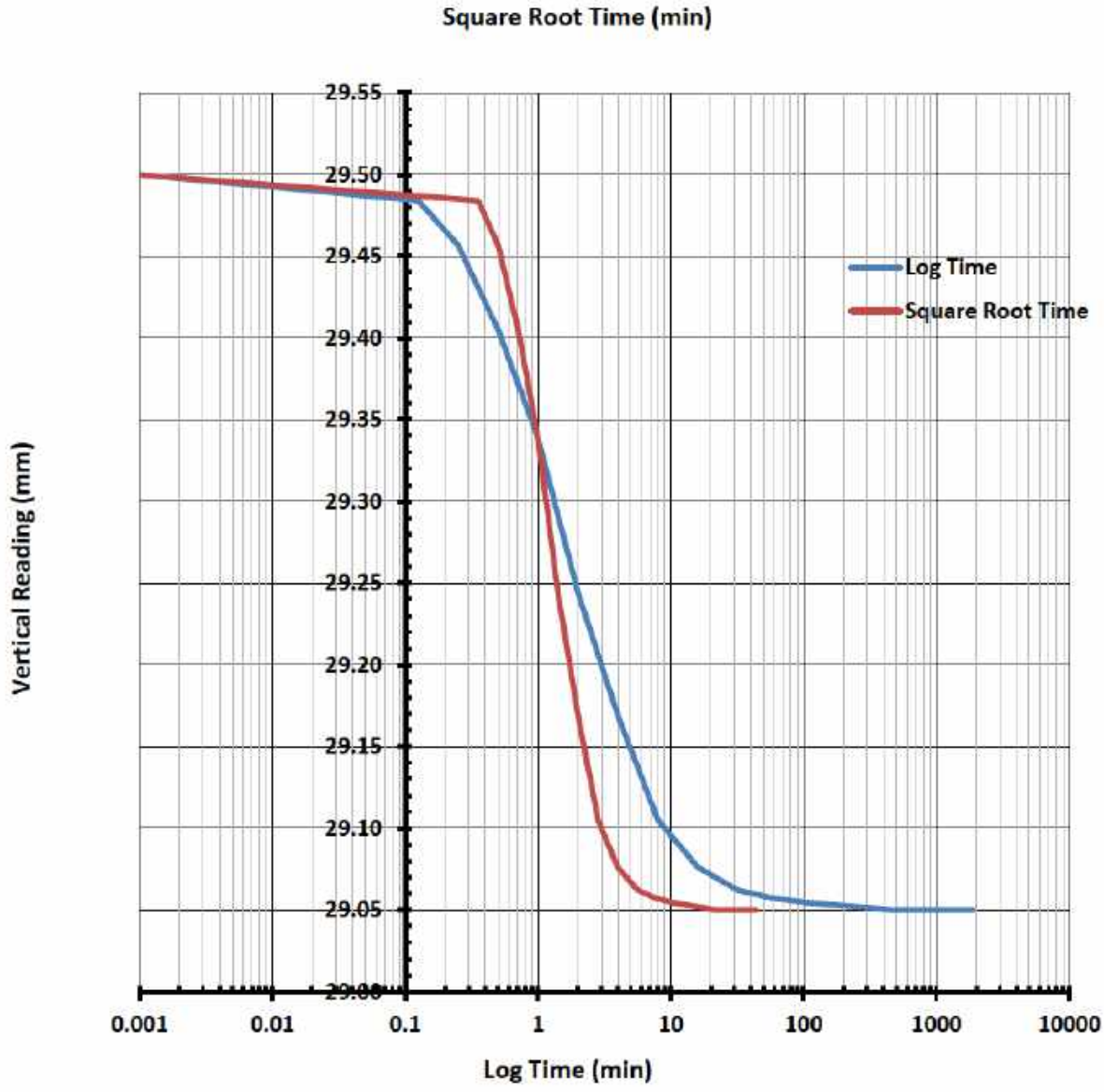
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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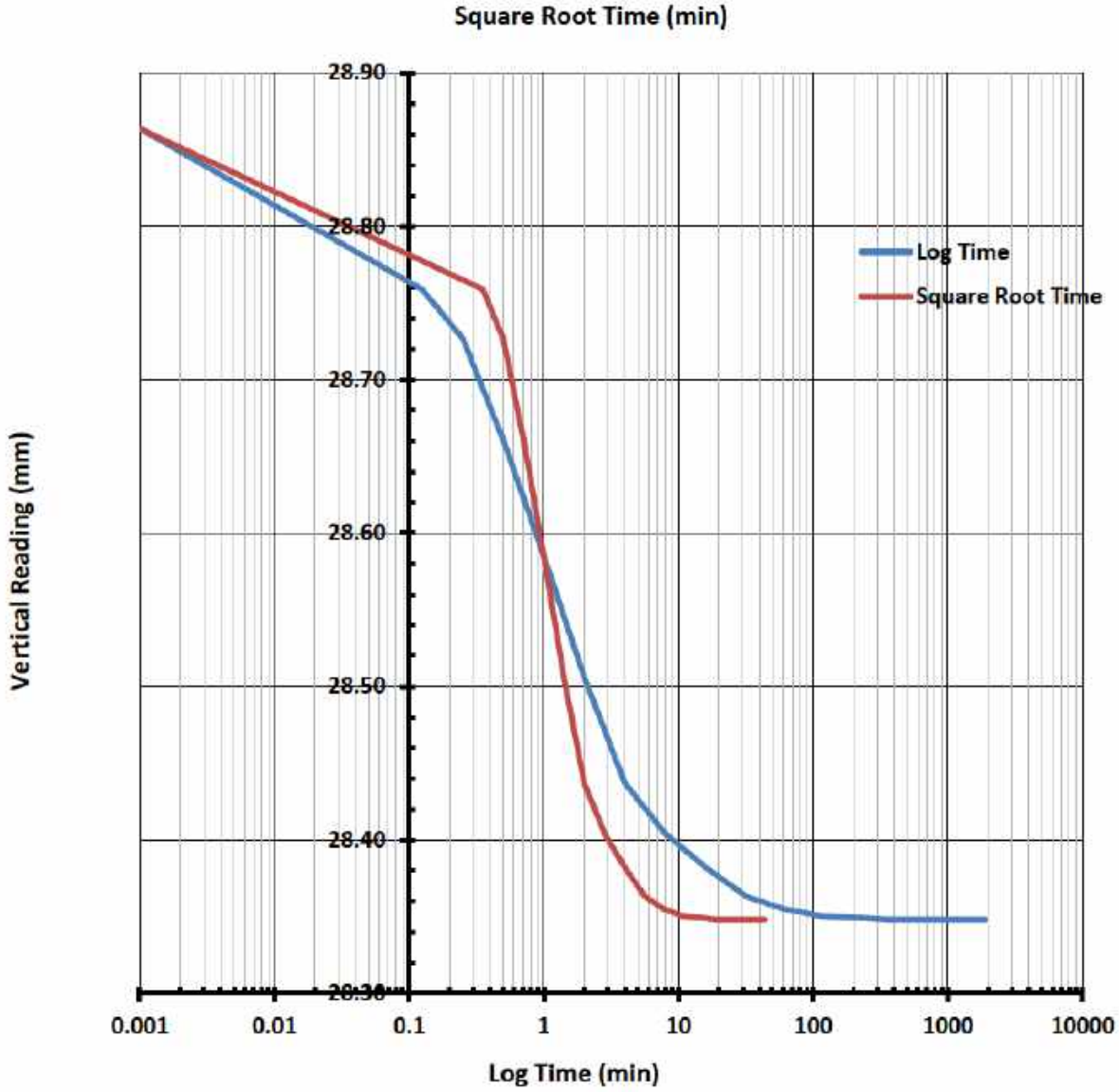
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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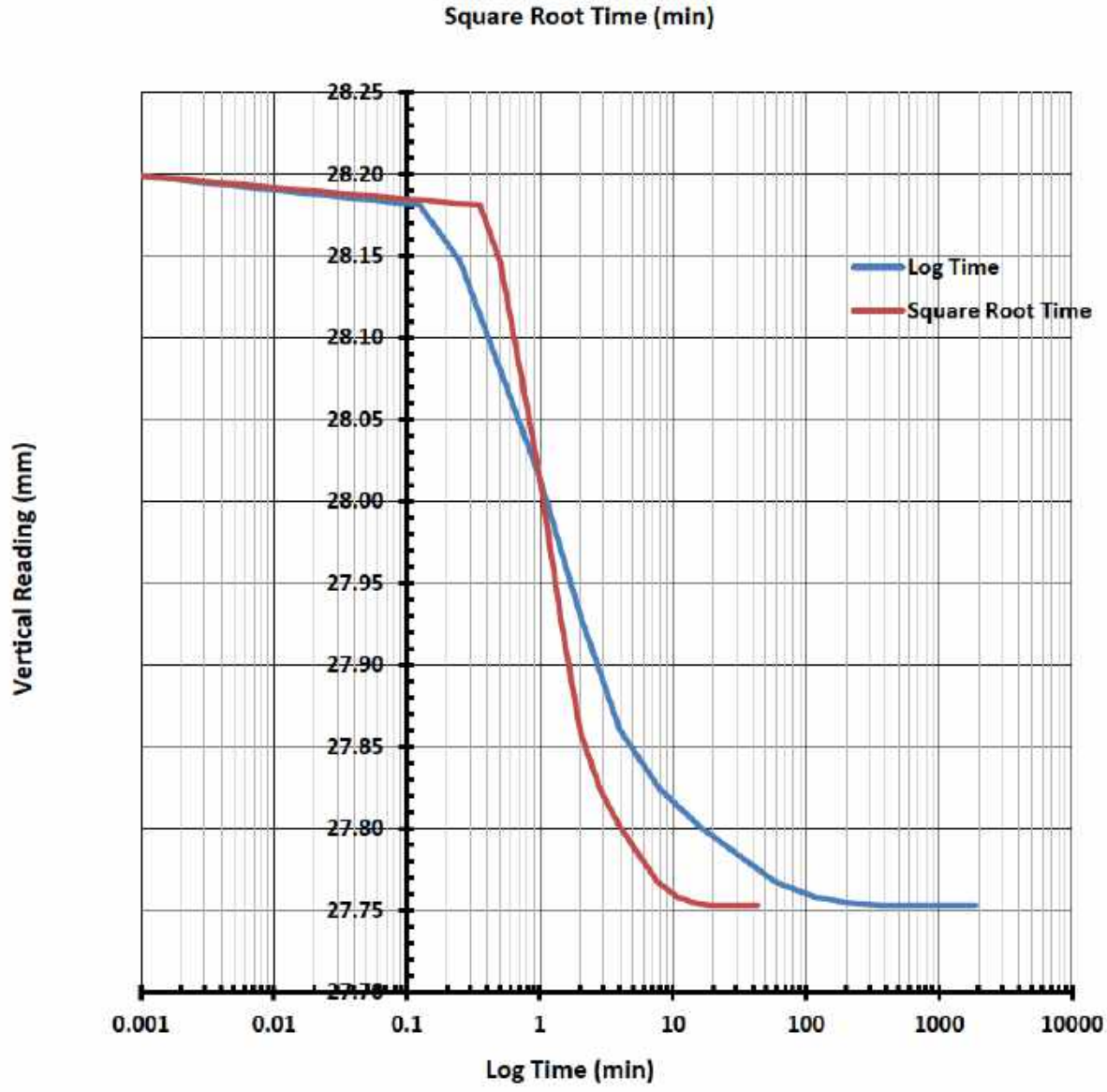
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa



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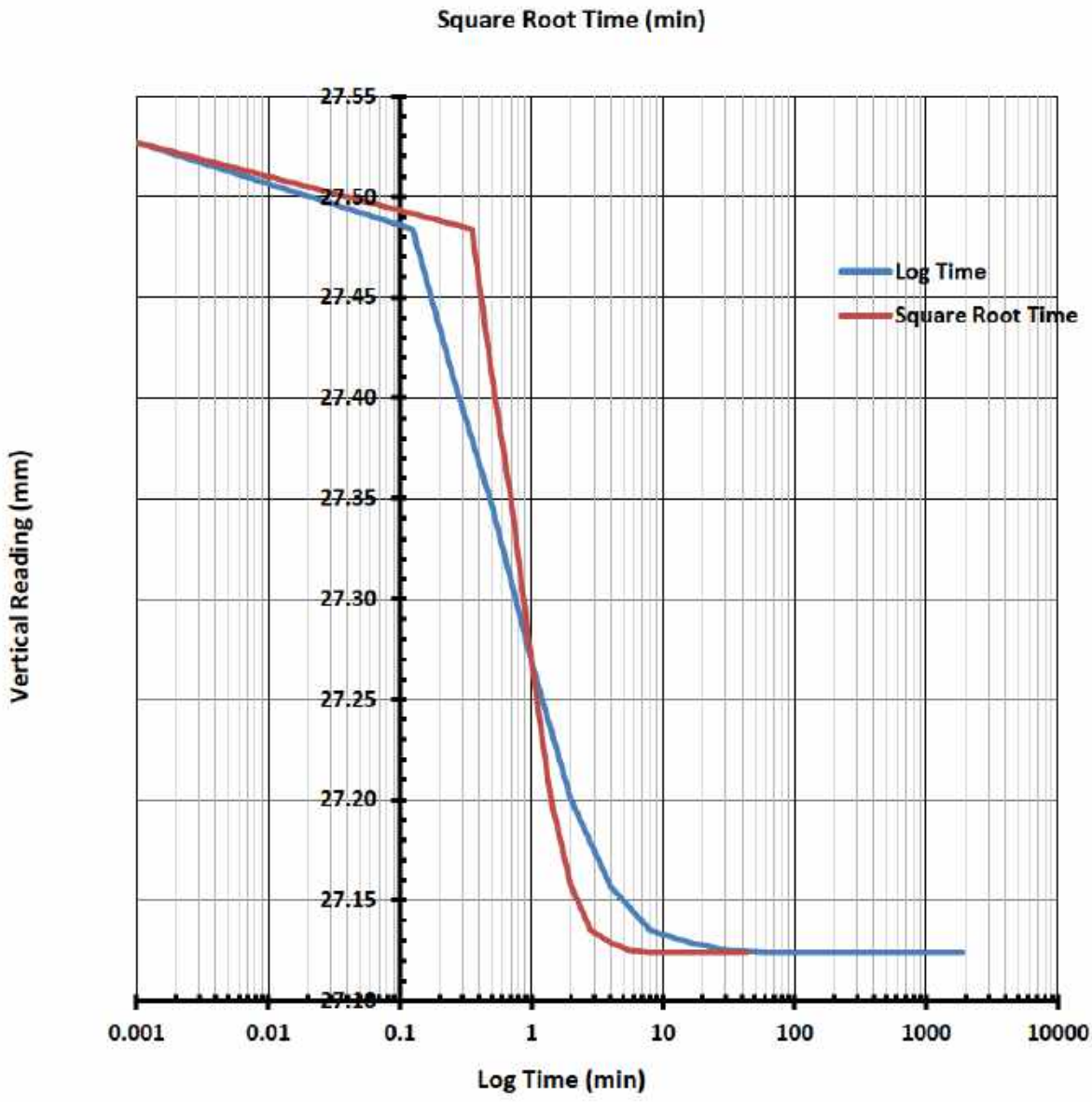
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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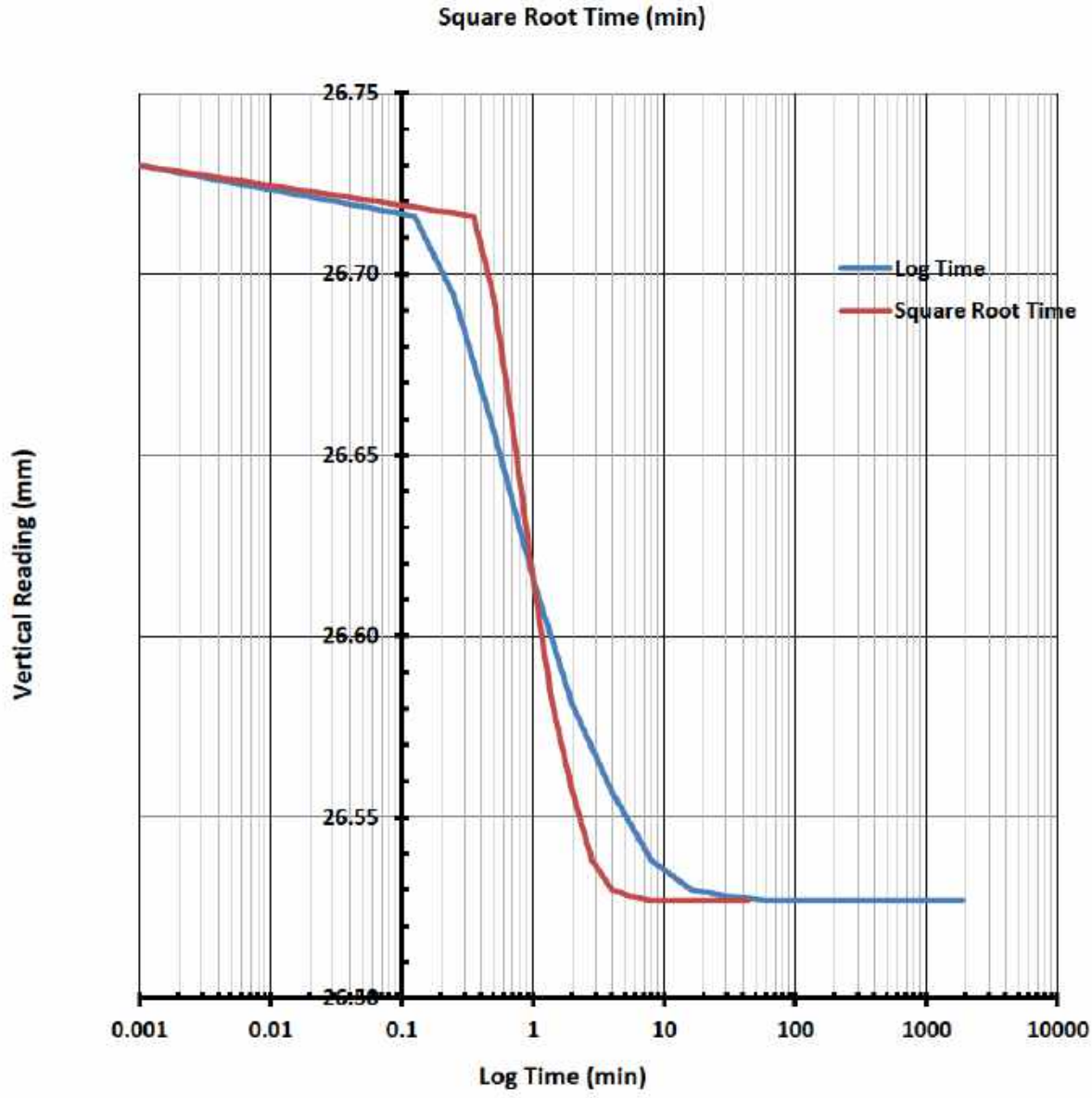
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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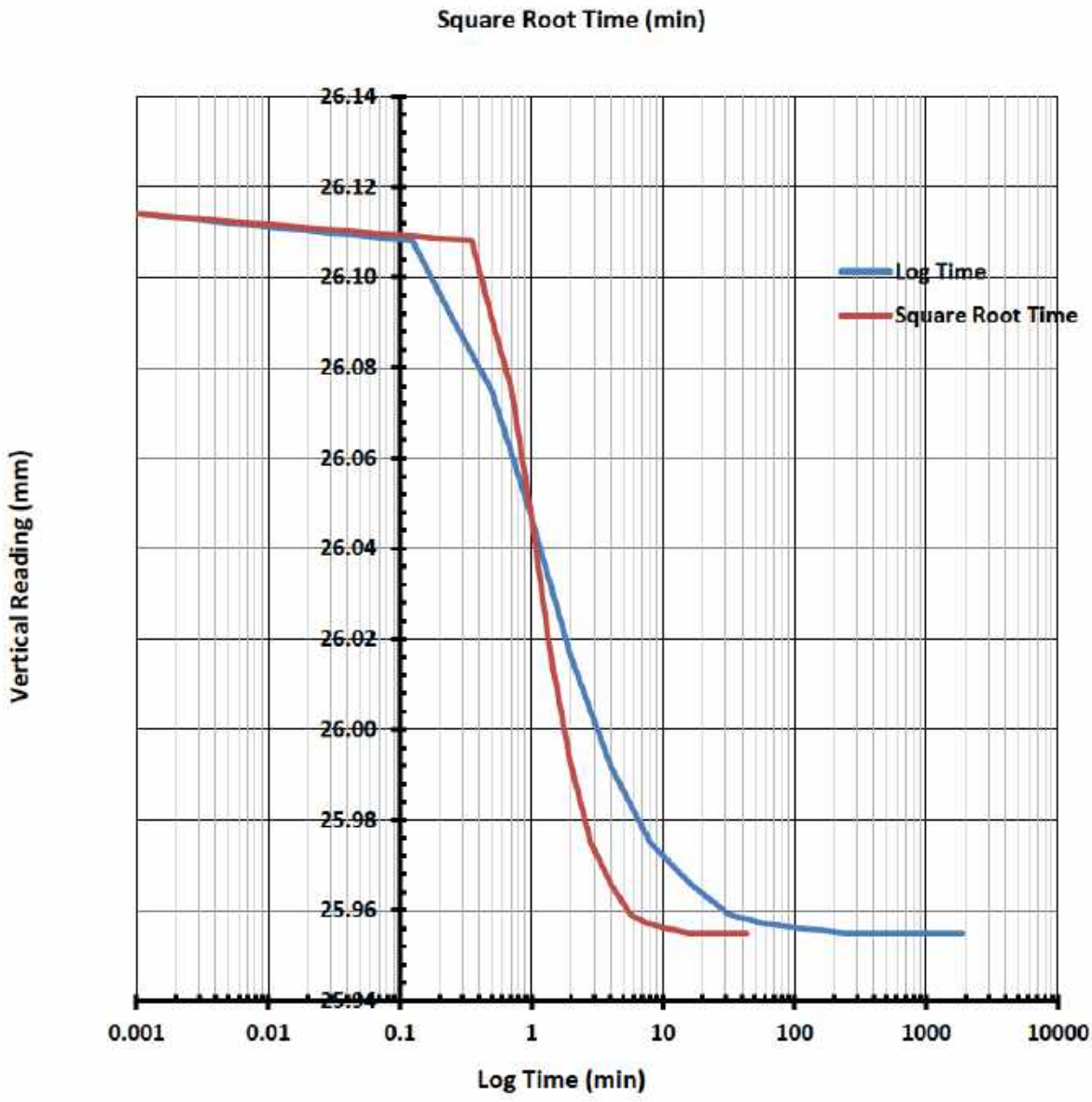
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S1		
Lab ID:	S1_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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SETTLEMENT TESTING TAILINGS

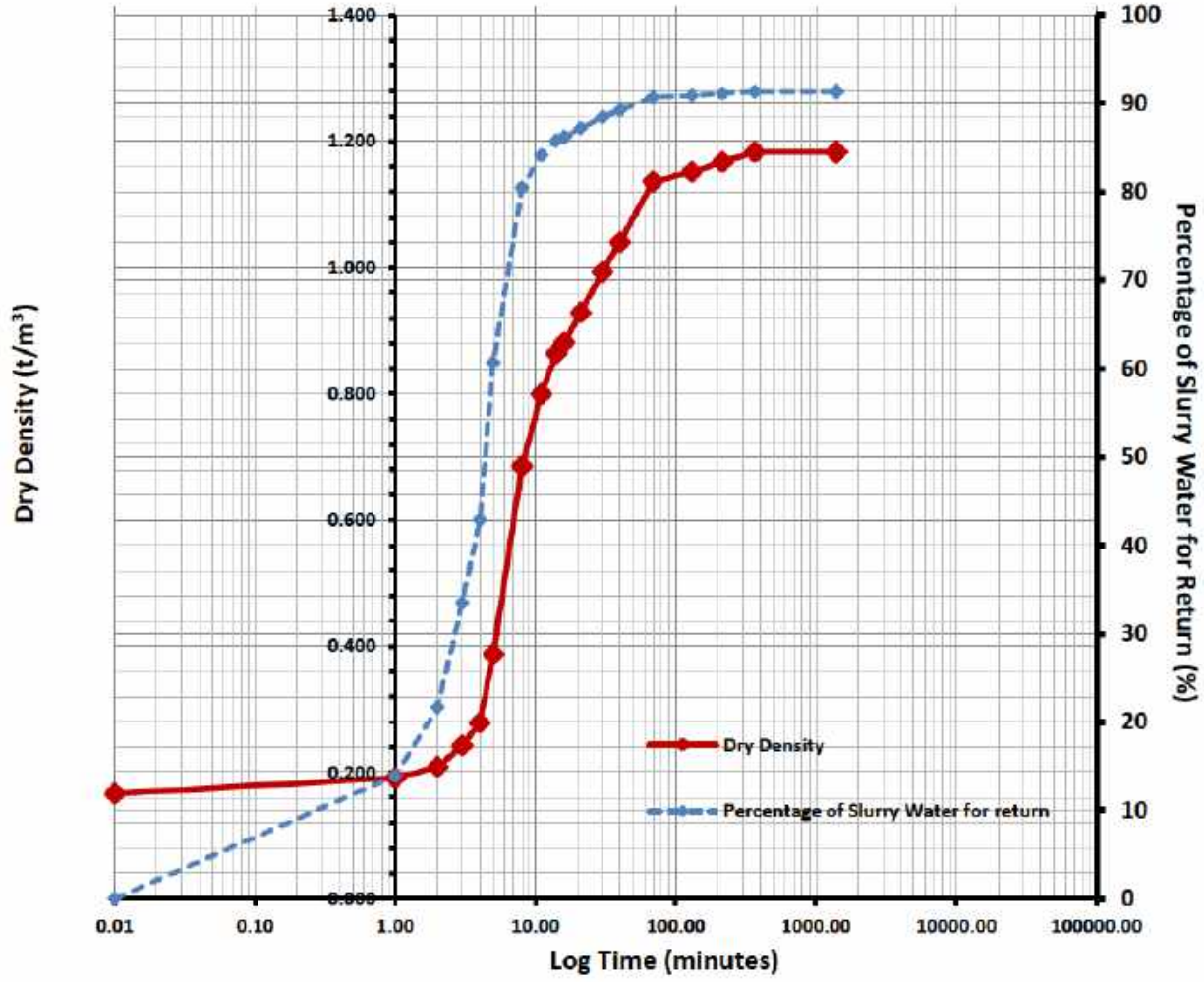
METHOD: IN-HOUSE METHOD

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S1		
Lab ID:	S1_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 15% Solids

Initial Dry Density (t/m³): 0.166
Particle Density (t/m³): 2.824
Initial Bulk Density (t/m³): 1.107

Undrained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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SETTLEMENT TESTING TAILINGS

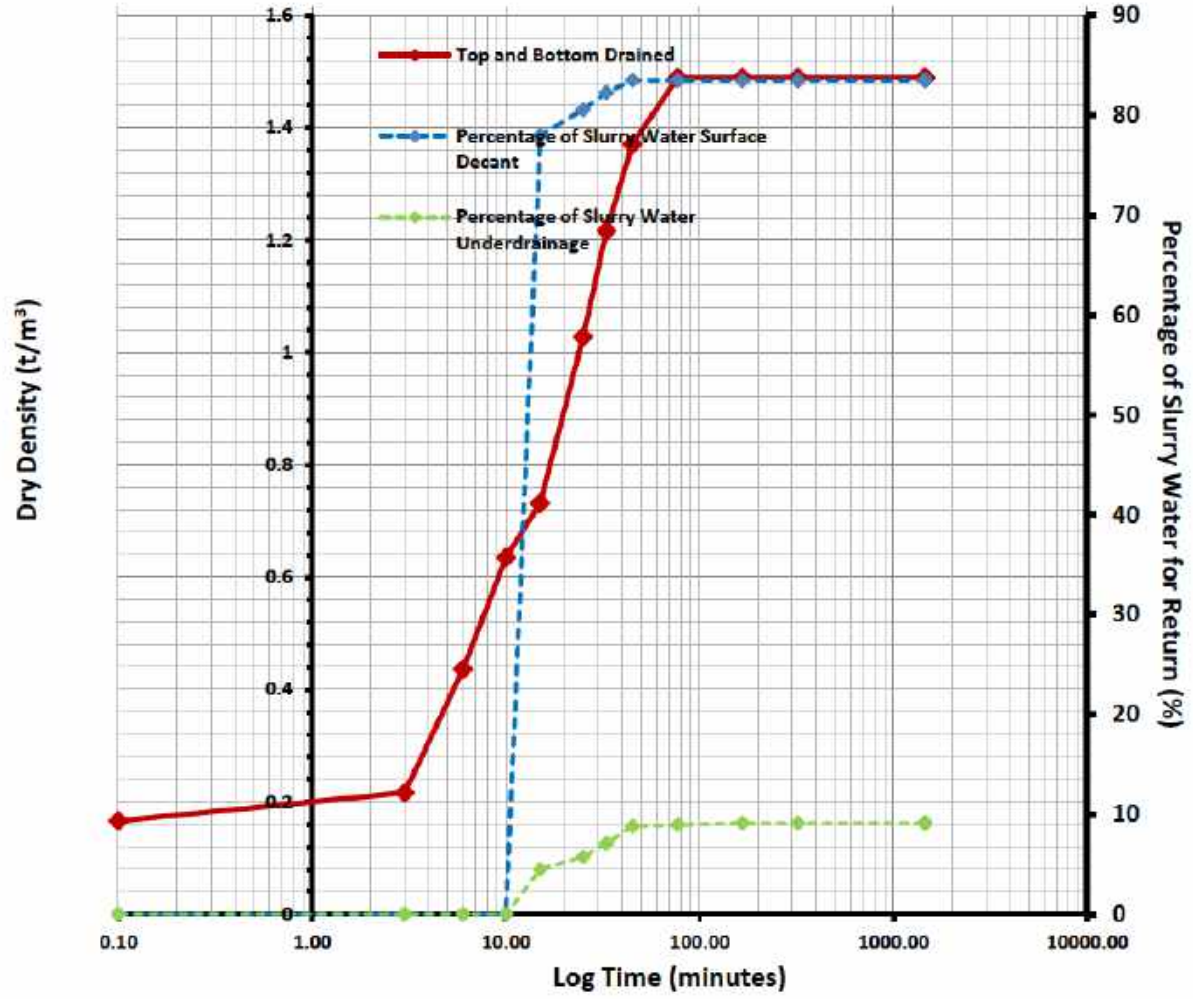
METHOD: IN-HOUSE METHOD

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S1		
Lab ID:	S1_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 15% Solids

Initial Dry Density (t/m³): 0.166
Particle Density (t/m³): 2.824
Initial Bulk Density (t/m³): 1.107

Top and Bottom Drained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

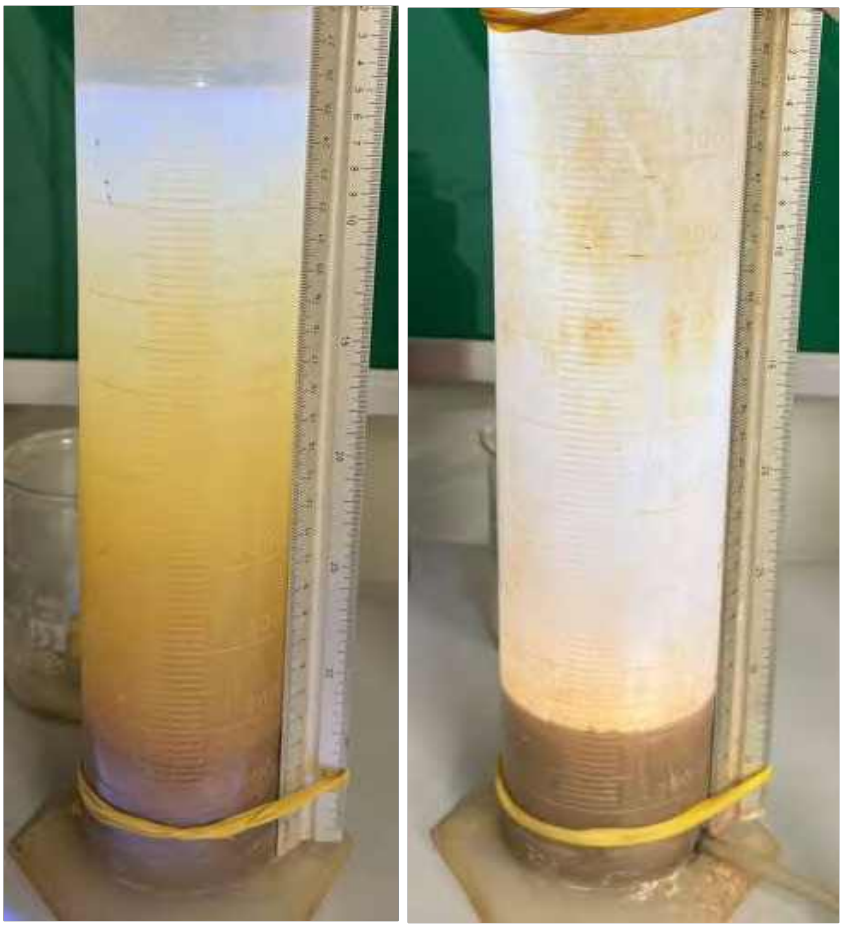
Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S1		
Lab ID:	S1_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 15% 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): [redacted]

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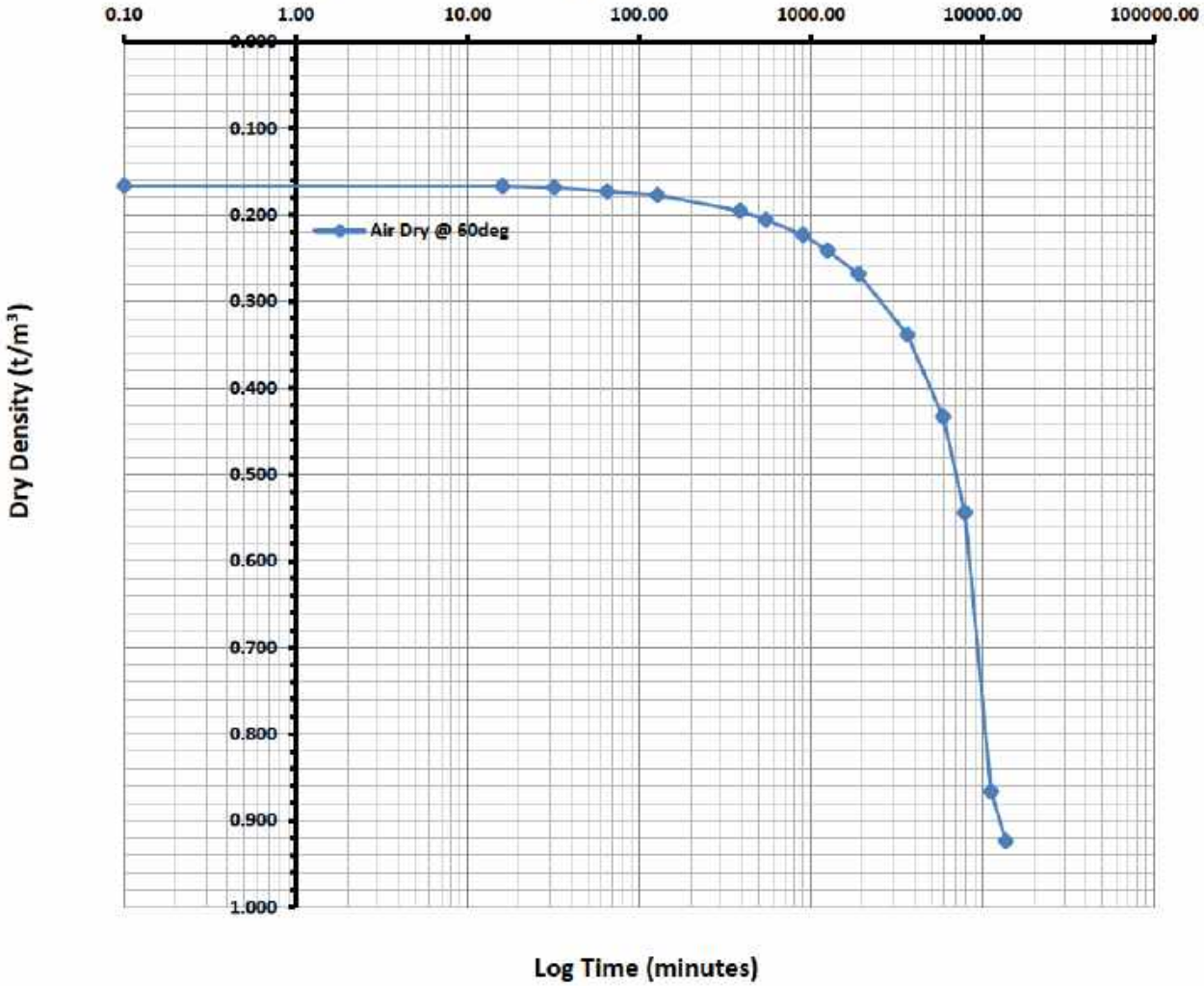
AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S1		
Lab ID:	S1_AIR_DRY	Room Temperature at Test:	19°

Tested by:	Phil	**Initial Bulk Density (t/m³):**	1.109
Type of Test:	Air Dry Testing	**Particle Density (t/m³):**	2.824
Sample Preparation:	15% Solids	**Moisture Content Initial (%):**	567.333

Dry Density (t/m³) Vs Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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E-Precision Laboratory

AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S1		
Lab ID:	S1_AIR_DRY	Room Temperature at Test:	19°

Photo of Samples after Testing

Oven dried @ 60deg

Comments:

Authorised Signature (Geotechnical Engineer) [redacted]

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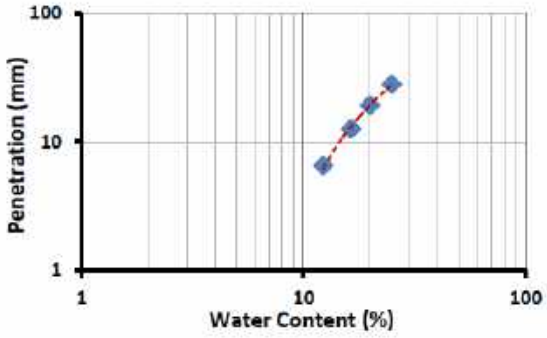
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

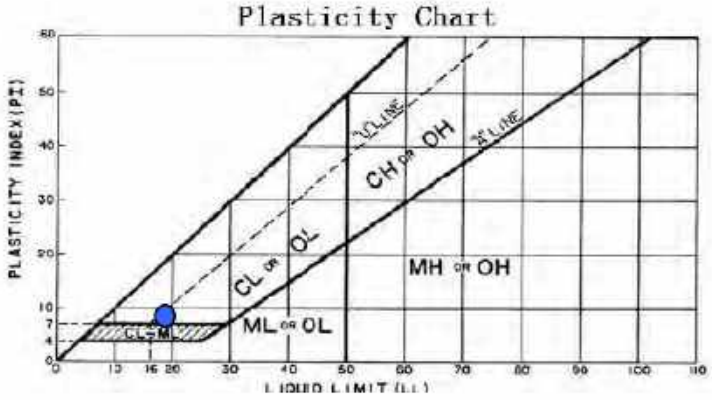
Client:	Kimberley Sands	**Date Tested:**	25/04/2024
Project:	Tails Testing 2024	Lab:	EPLAB
Sample No:	S2	**Job Number:**	KSANDS
Lab ID:	S2_ATT		
Depth (m):	-	**Room Temperature at Test:**	20°C
Tested by:	George	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	18.65
Plastic Limit (%):	9.86
Plasticity Index (%):	8.79
Liquidity Index (%):	-
Shrinkage Limit (%):	8.77
Linear Shrinkage(%):	4.15

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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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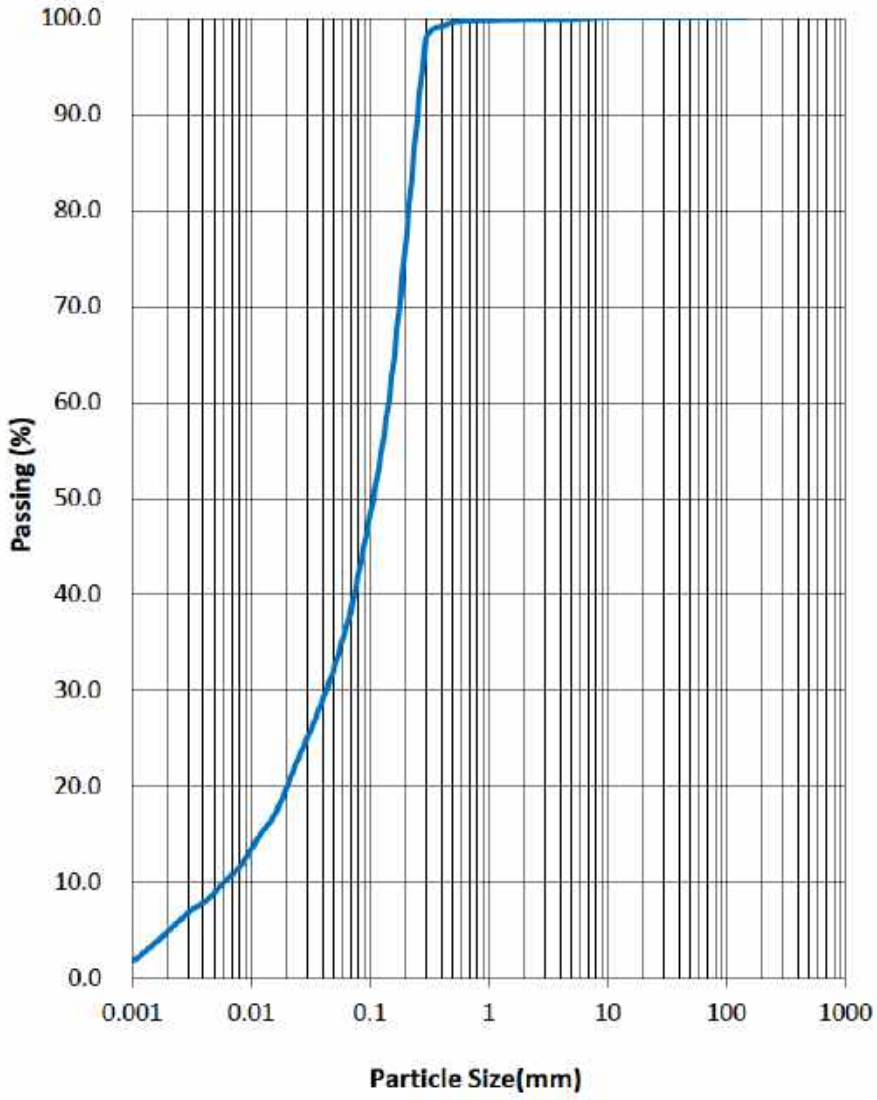
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	Kimberley Sands	Date Tested:	20/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S2	Depth (m):	-
Lab ID:	S2_PSDH	Room Temperature at Test:	19°C
Tested by:	George	2.36mm Particle Density (t/m³):	2.753
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	99.8
2.36	99.8
1.18	99.8
0.6	99.7
0.425	99.2
0.3	97.9
0.15	61.4
0.075	40.1
0.05837	35.0
0.04577	30.8
0.03280	26.2
0.02348	22.0
0.01615	17.2
0.01188	14.9
0.00847	11.9
0.00601	10.0
0.00427	8.1
0.00303	6.9
0.00215	5.2
0.00153	3.5
0.00121	2.5
0.00106	1.8
0.00089	1.4

PSD Graph



Notes: *Oven dried @ 60deg*
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature: [redacted]

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E-Precision Laboratory

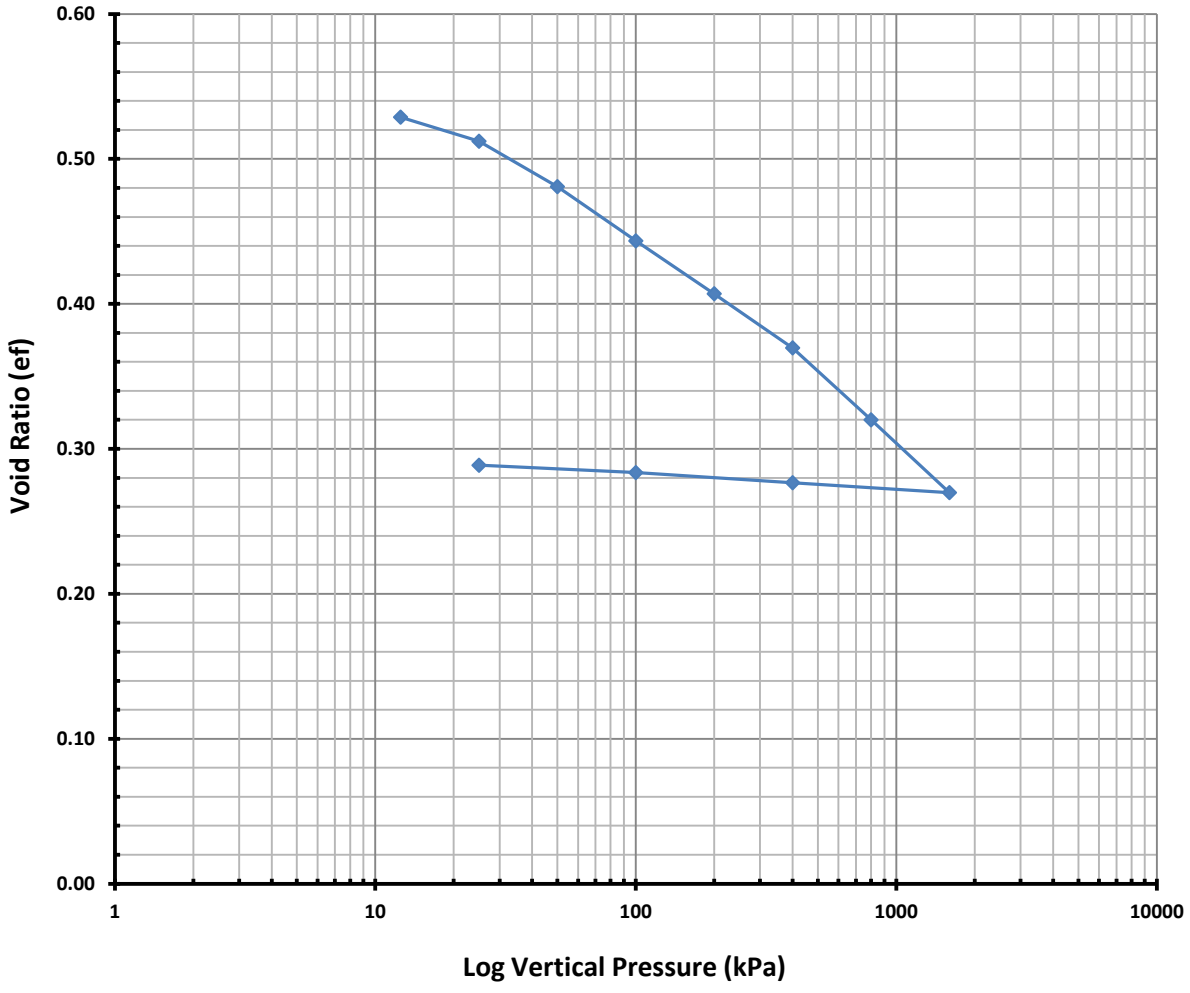
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°c

Tested by:	Phil	Initial Moisture (%):	32.43	Test Condition:	Undrained
Height (mm):	25.63	Final Moisture Content (%):	19.38	Sample Condition:	Saturated
Diameter (mm):	61.80	Bulk Density (t/m³):	2.32	Particle Density (t/m³):	2.753
Direction:	Vertical	Dry Density (t/m³):	1.75	Initial Void Ratio (e_i):	0.575

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



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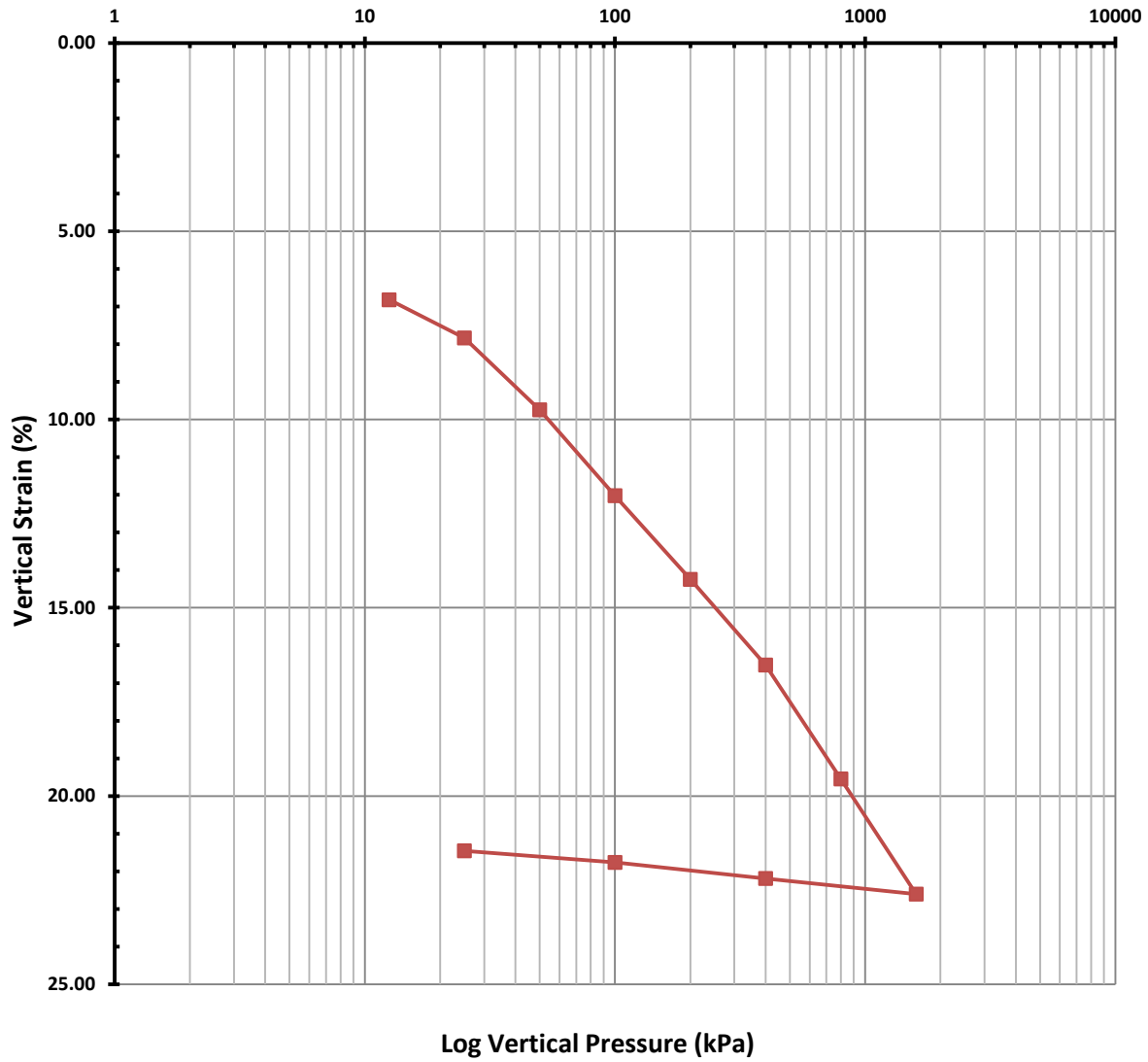
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_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:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_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	1.748	5.127	-	5.46E-03	8.7E-09		0.529	6.82
Stage 2 @ 25kPa	2.008	14.549	-	8.70E-04	3.9E-09		0.512	7.83
Stage 3 @ 50kPa	2.497	6.993	-	8.29E-04	1.8E-09		0.481	9.74
Stage 4 @ 100kPa	3.081	4.458	-	5.05E-04	7.0E-10		0.443	12.02
Stage 5 @ 200kPa	3.651	6.317	-	2.53E-04	5.0E-10		0.407	14.25
Stage 6 @ 400kPa	4.234	11.957	-	1.33E-04	4.9E-10		0.370	16.52
Stage 7 @ 800kPa	5.010	5.597	-	9.06E-05	1.6E-10		0.320	19.55
Stage 8 @ 1600kPa	5.794	3.454	-	4.75E-05	5.1E-11		0.270	22.61
Unload @ 400kPa	5.688							
Unload @ 100kPa	5.578							
Unload @ 25kPa	5.499							

** 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): [redacted]

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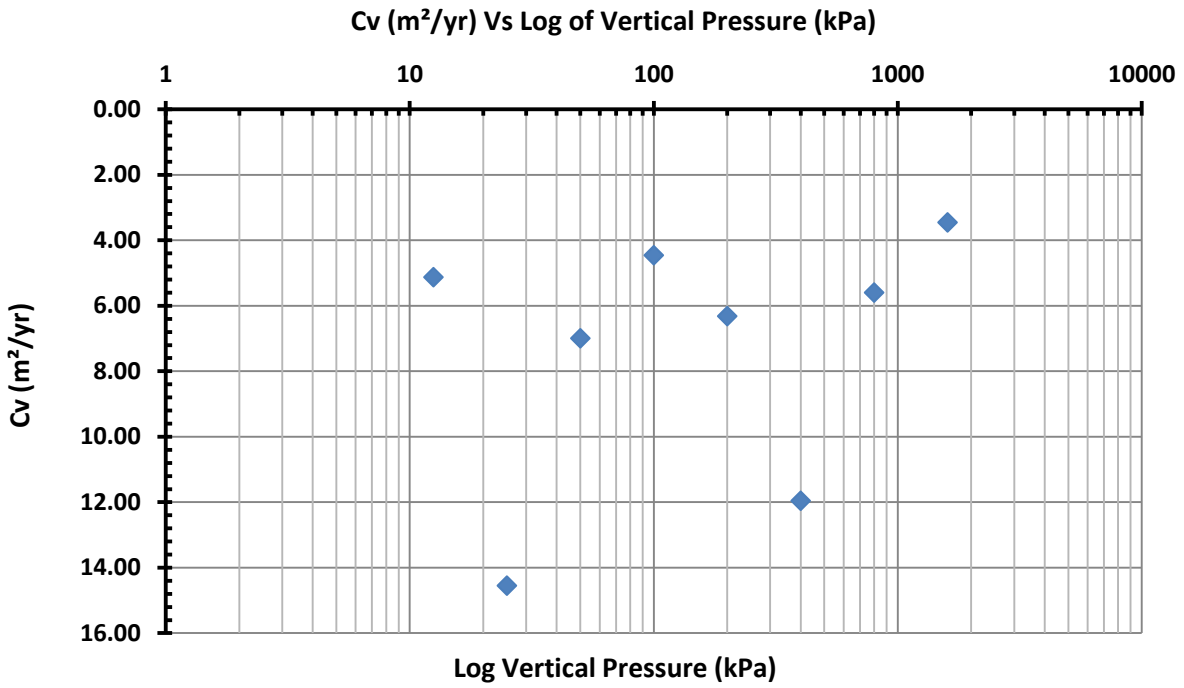
E-Precision Laboratory

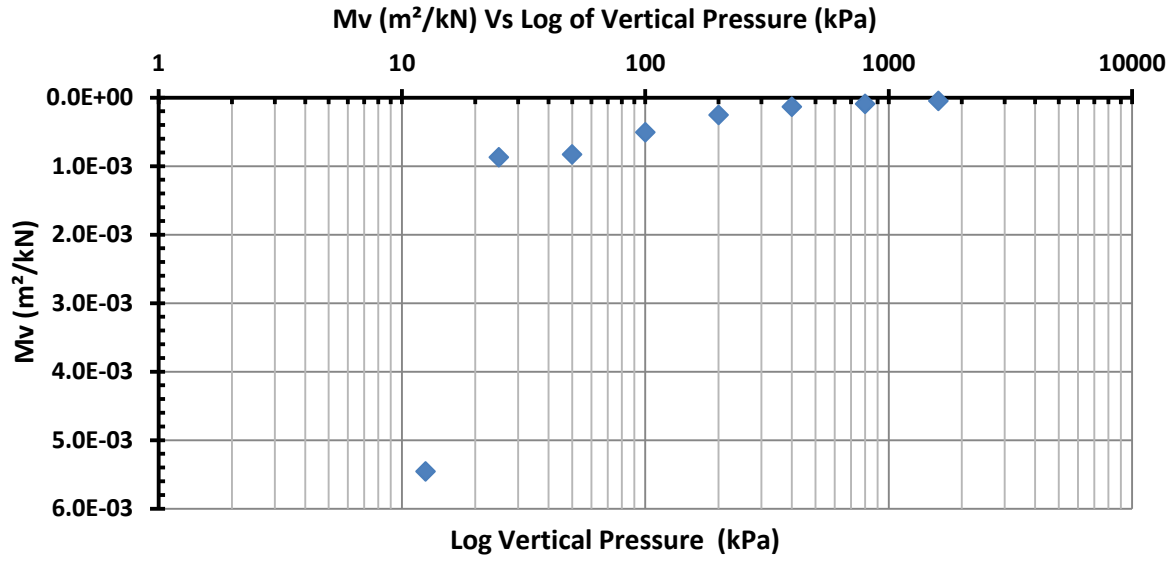
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_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:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

TEST RESULTS PLEASE SEE PAGES BELOW

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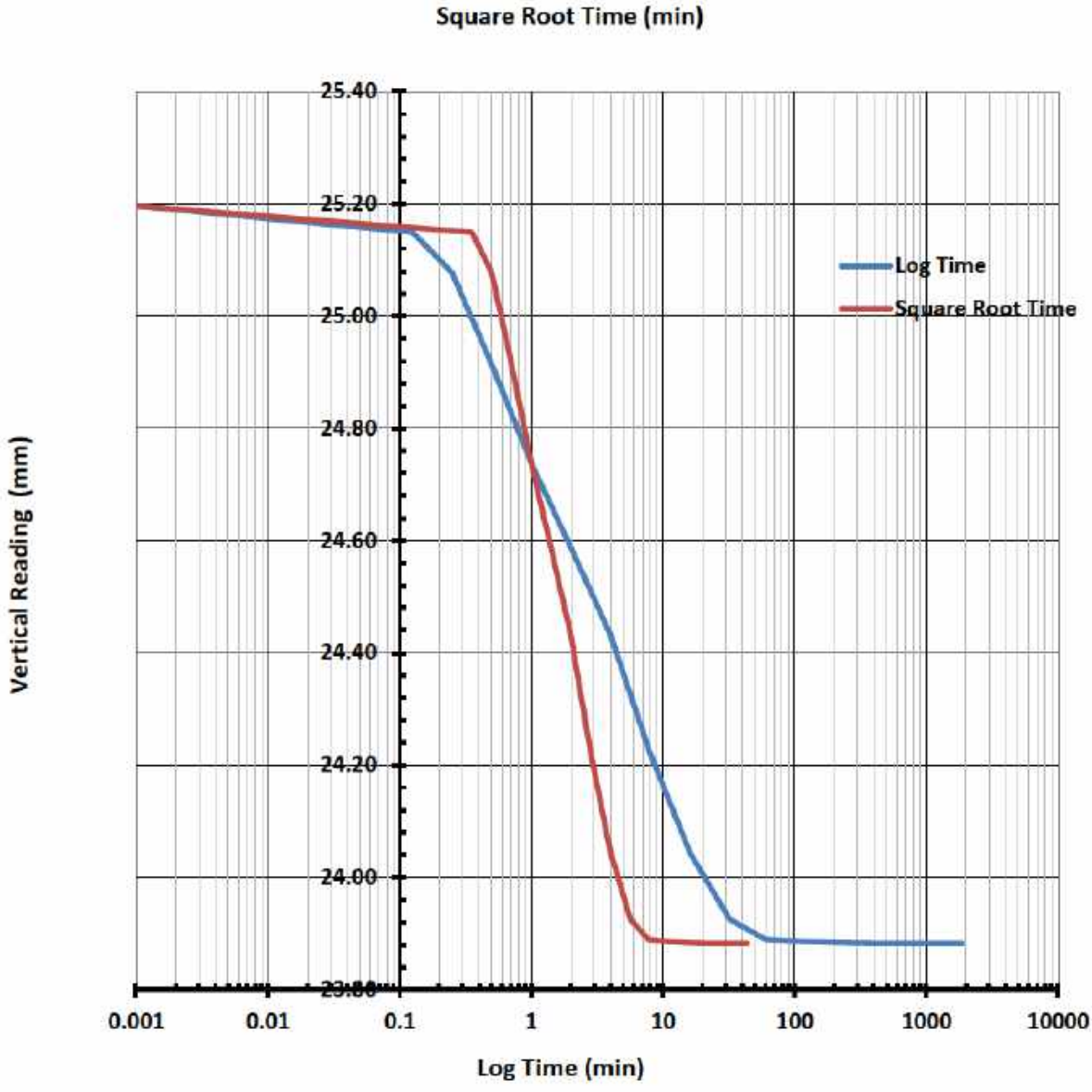
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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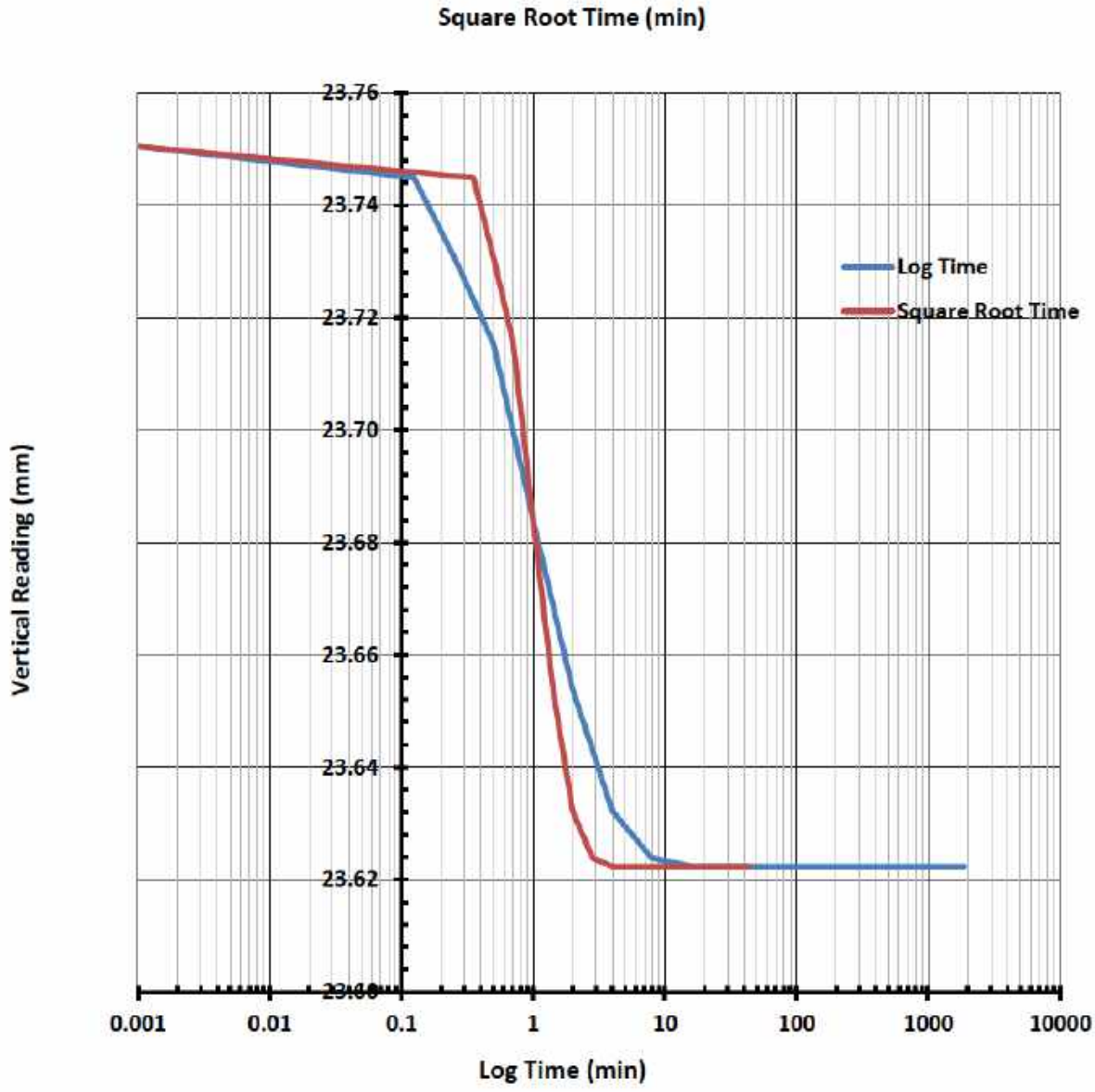
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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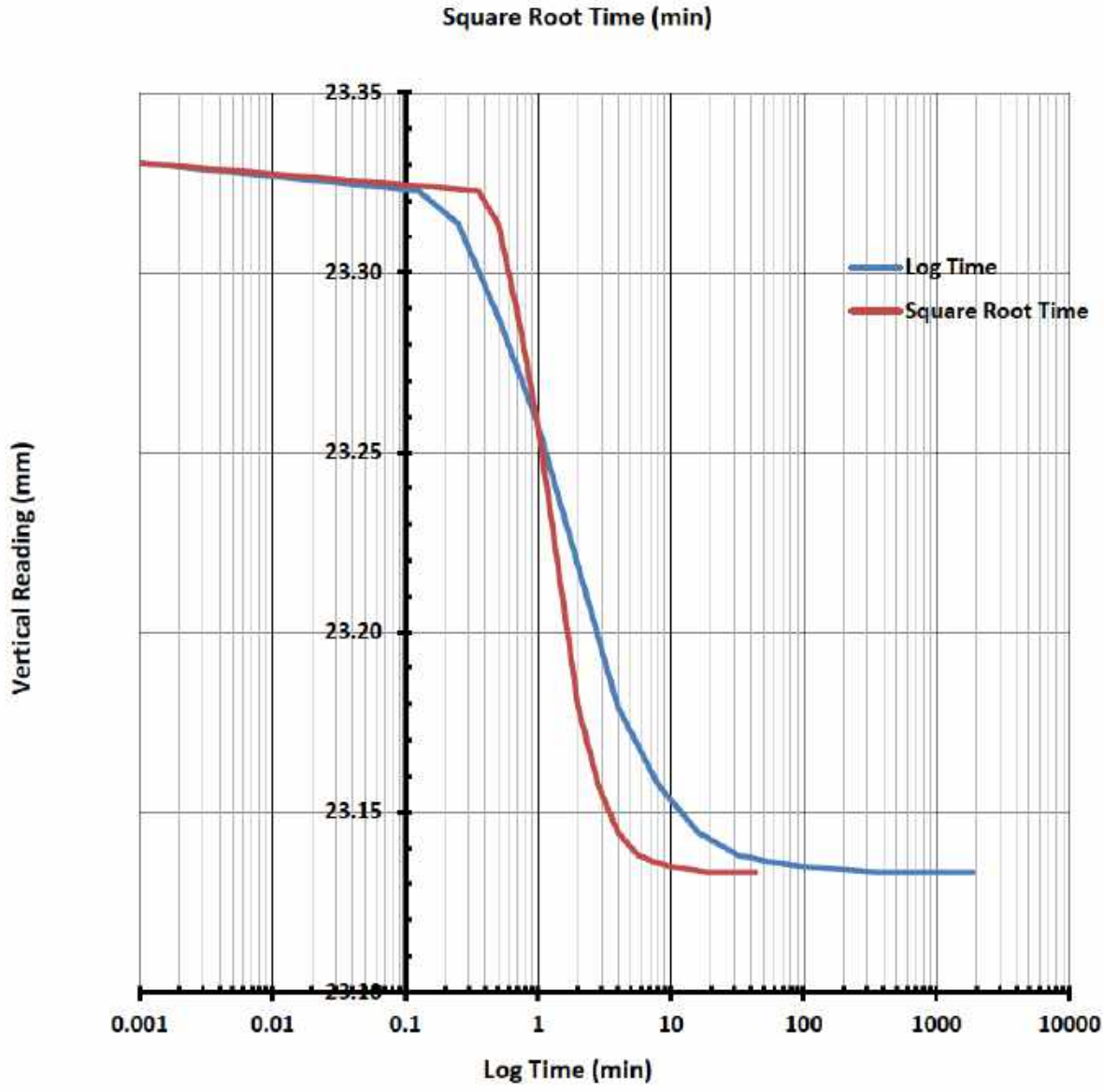
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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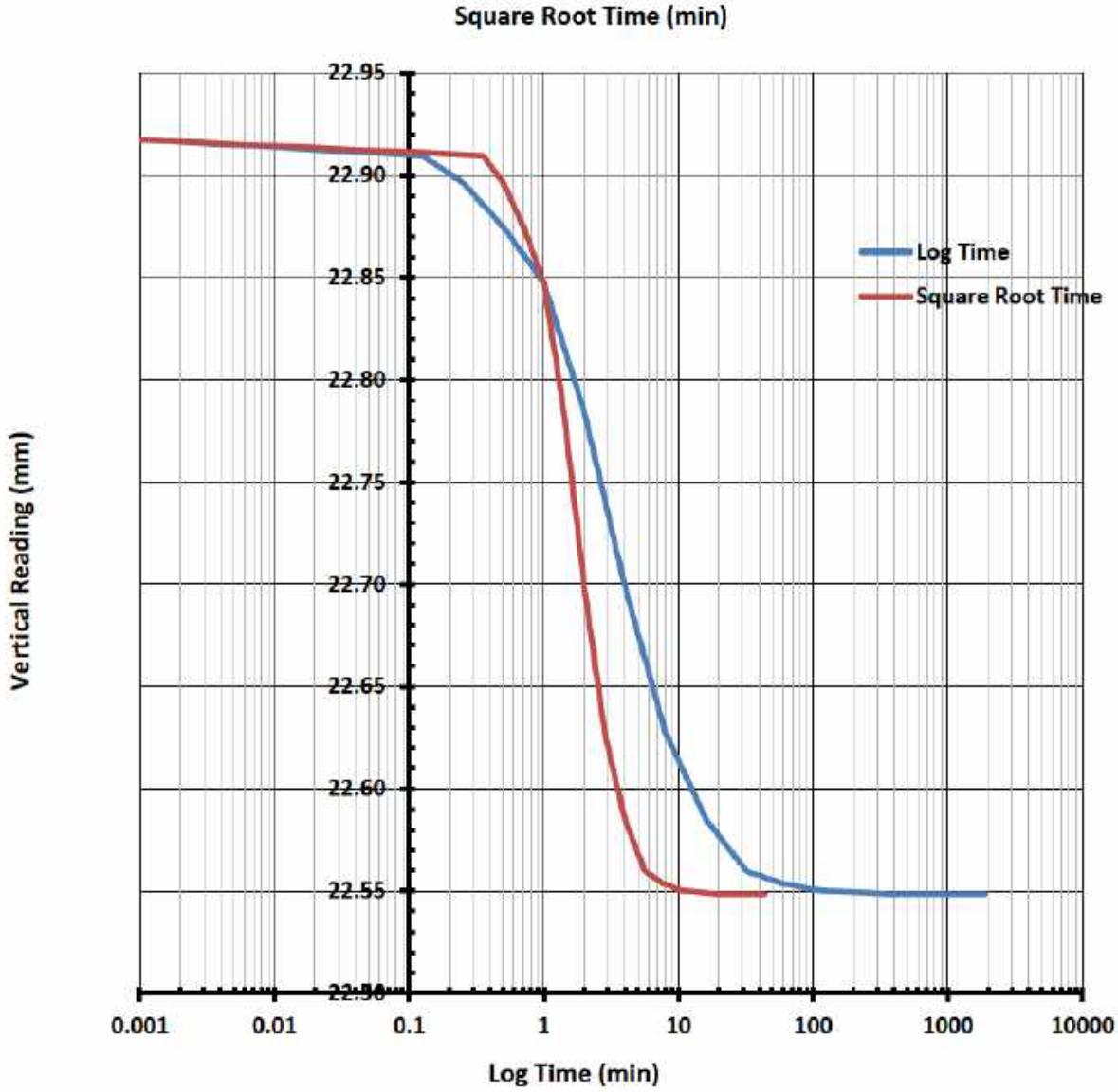
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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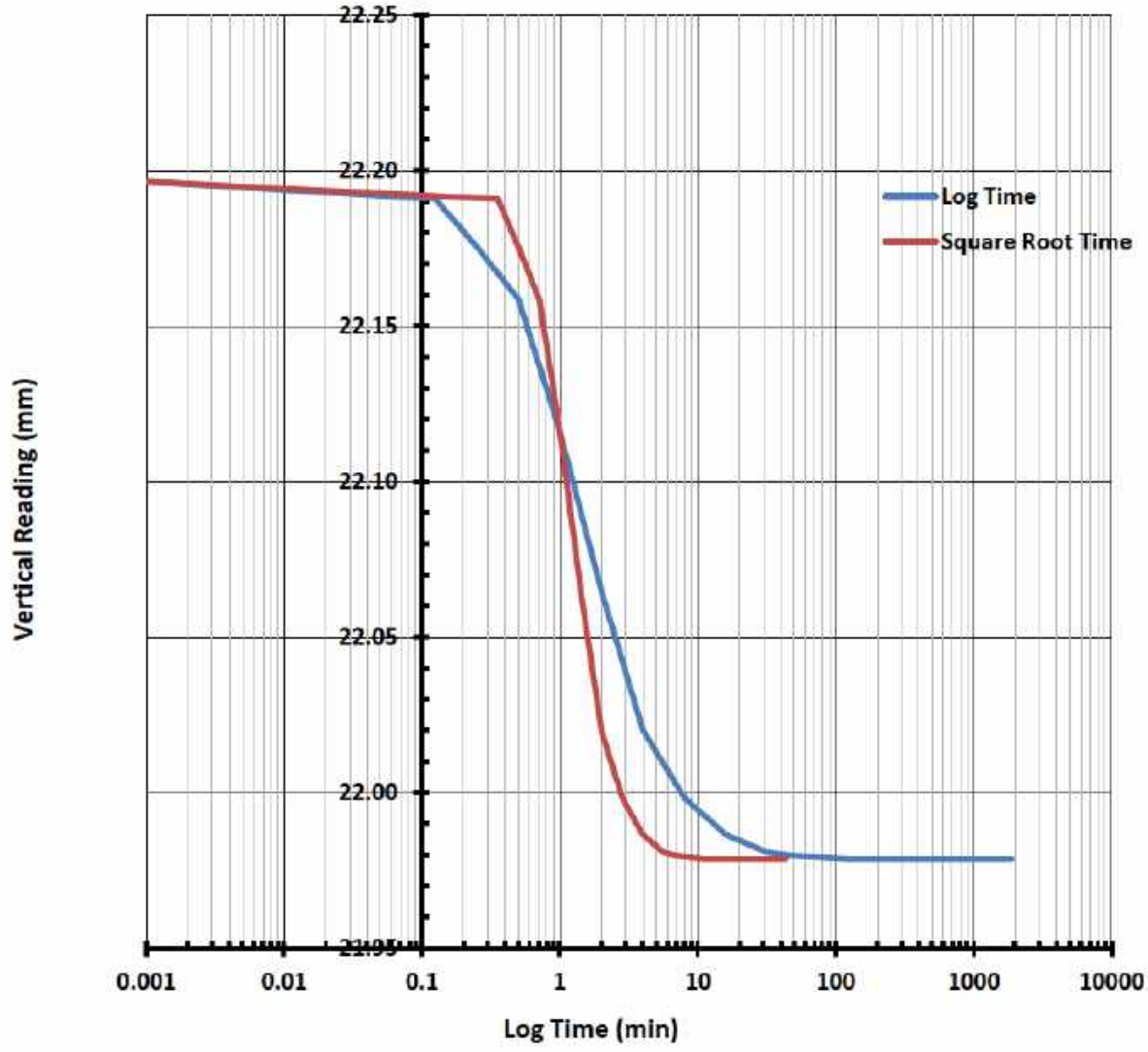
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa

Square Root Time (min)



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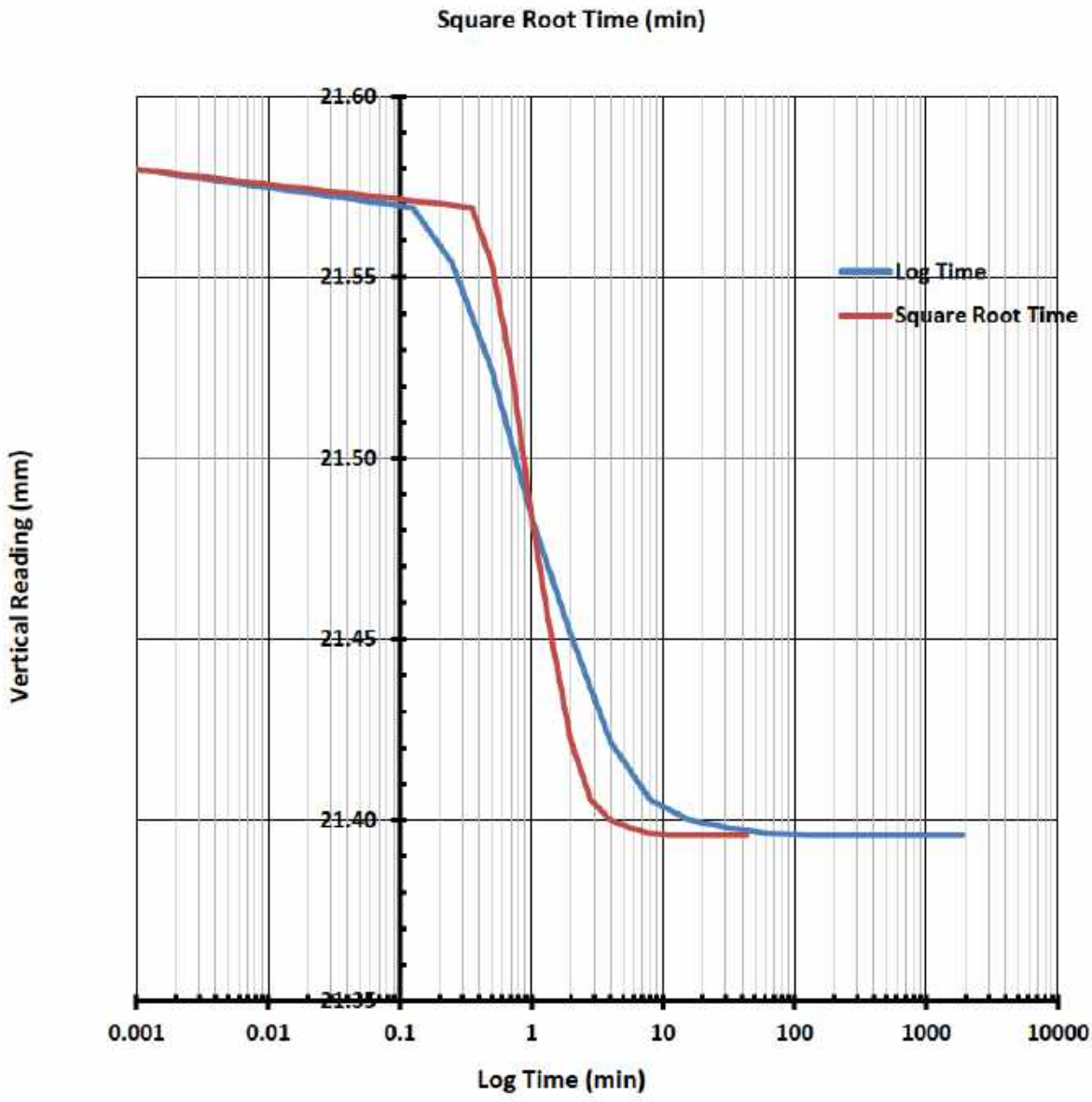
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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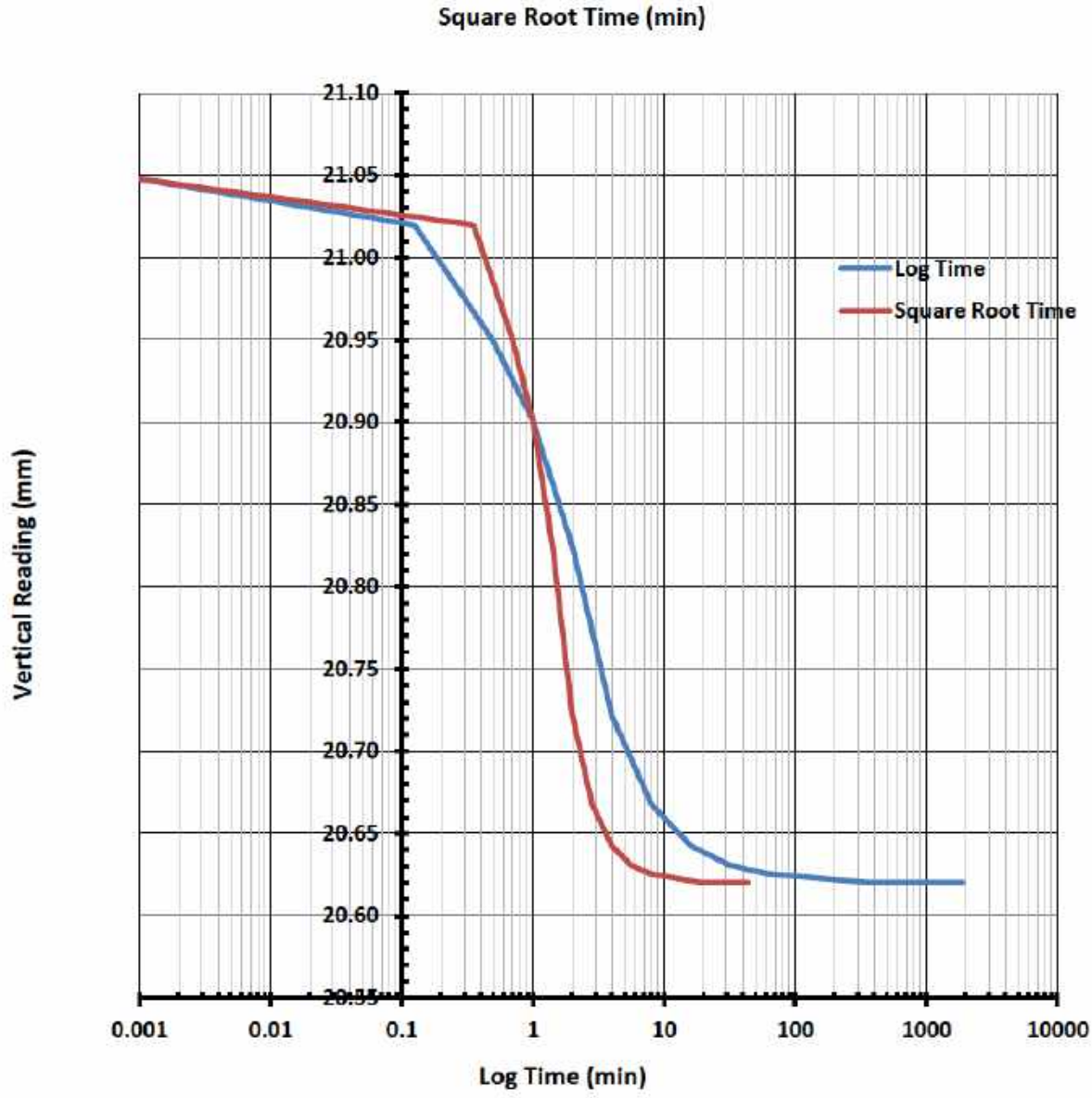
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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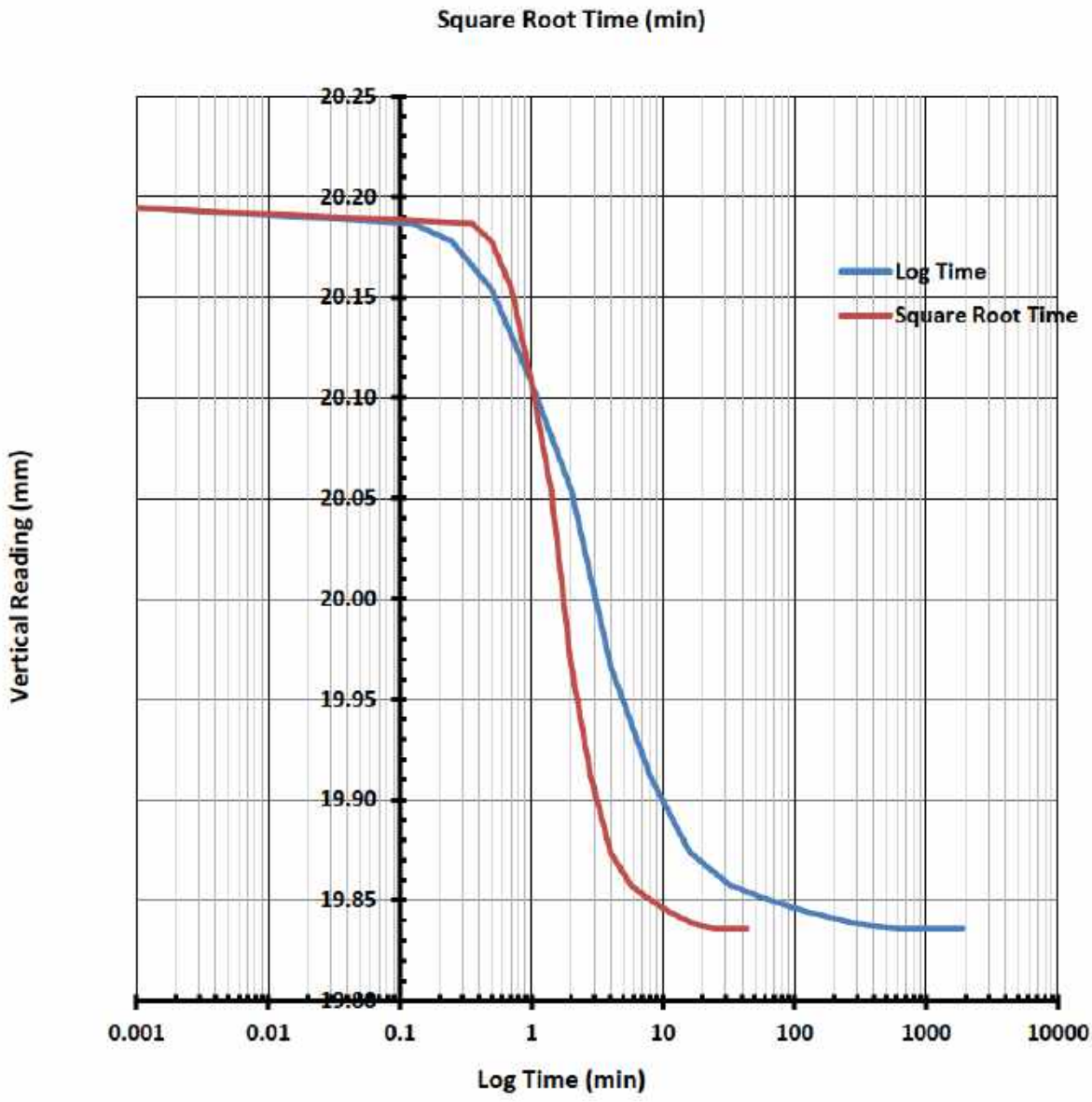
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S2		
Lab ID:	S2_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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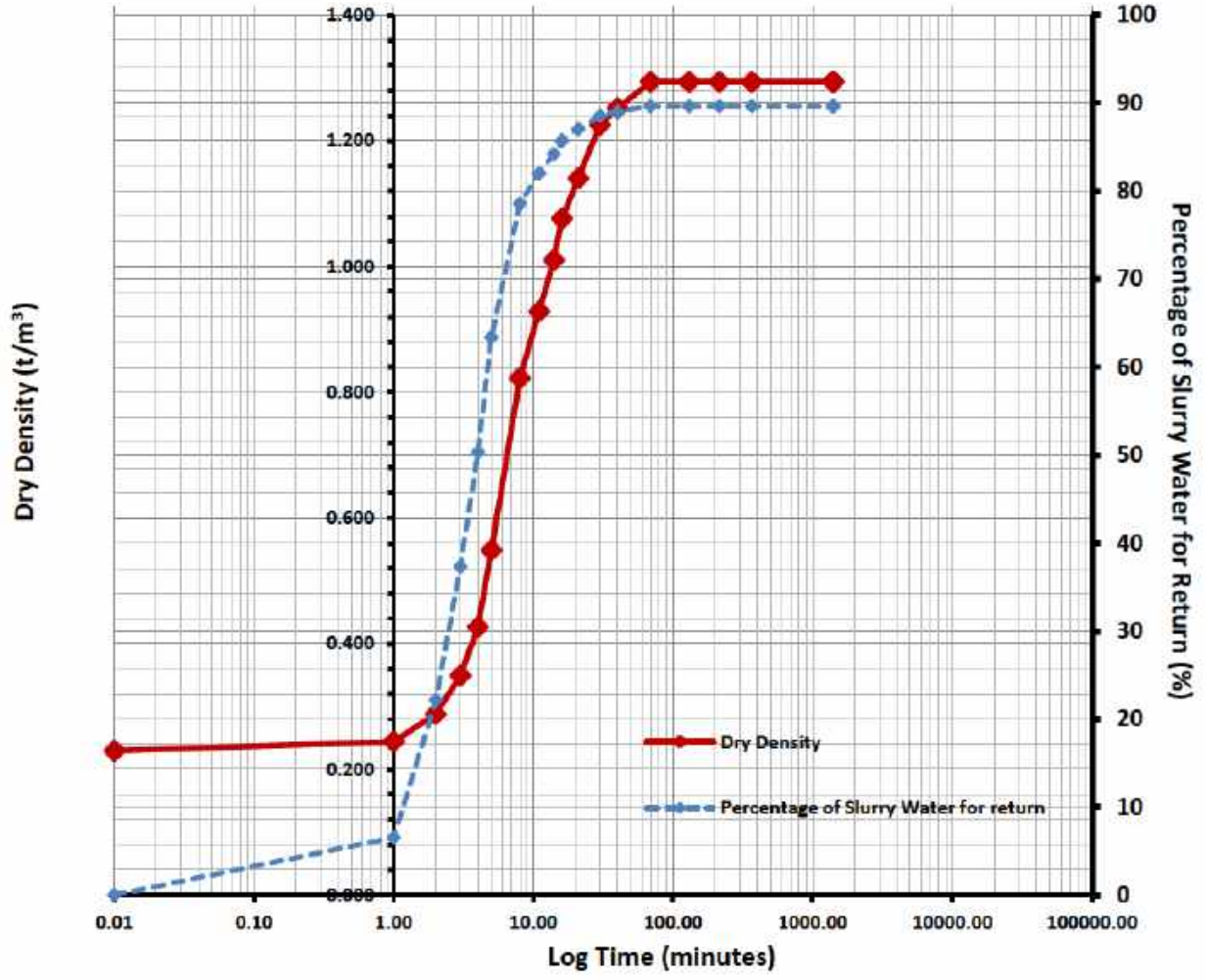
SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S2		
Lab ID:	S2_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil	**Initial Dry Density (t/m³):** 0.229
Type of Test: Settlement Testing	**Particle Density (t/m³):** 2.753
Sample Preparation: 20% Solids	**Initial Bulk Density (t/m³):** 1.147

Undrained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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SETTLEMENT TESTING TAILINGS

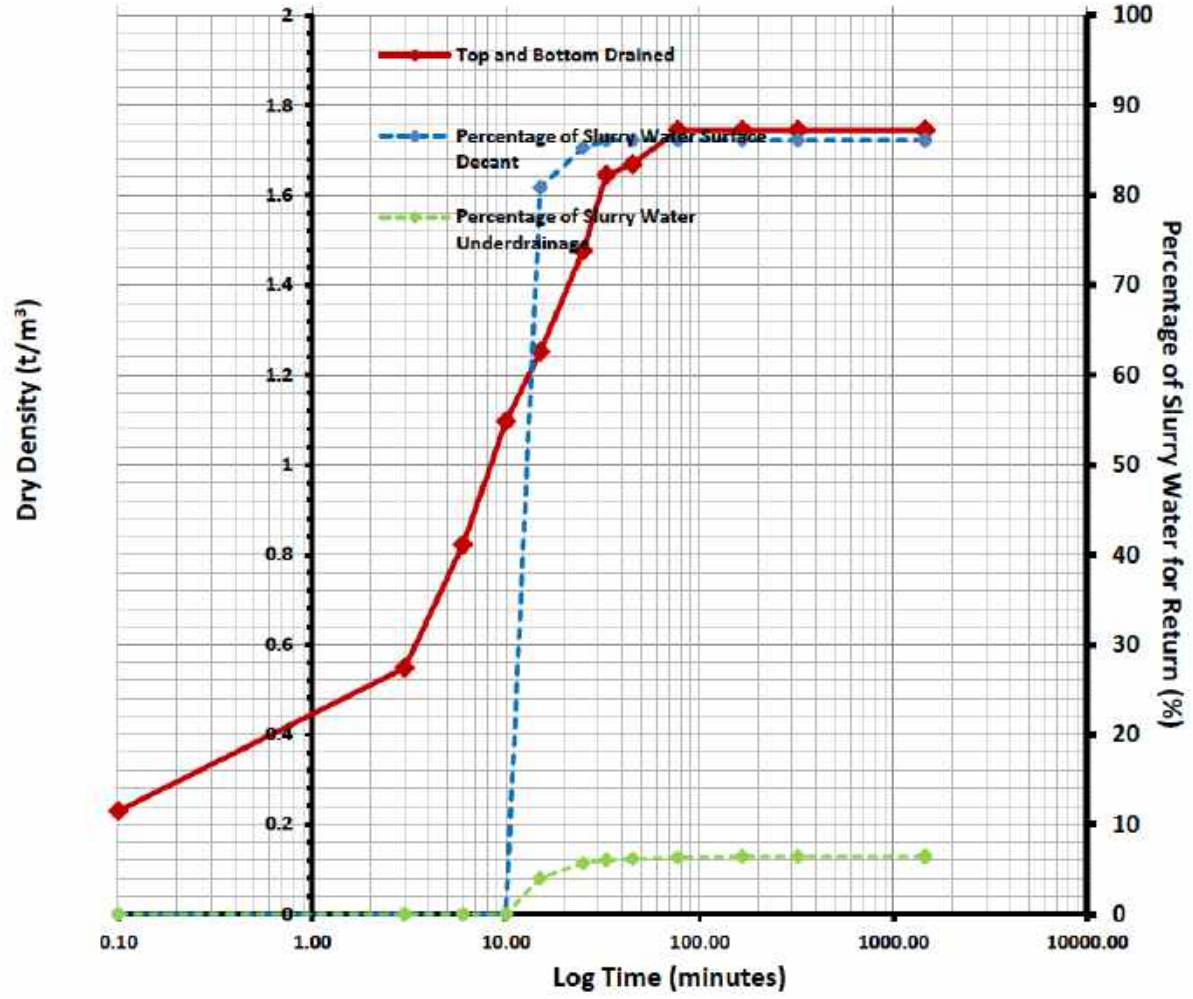
METHOD: IN-HOUSE METHOD

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S2		
Lab ID:	S2_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 20% Solids

Initial Dry Density (t/m³): 0.229
Particle Density (t/m³): 2.753
Initial Bulk Density (t/m³): 1.147

Top and Bottom Drained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S2		
Lab ID:	S2_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 20% 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): [redacted]

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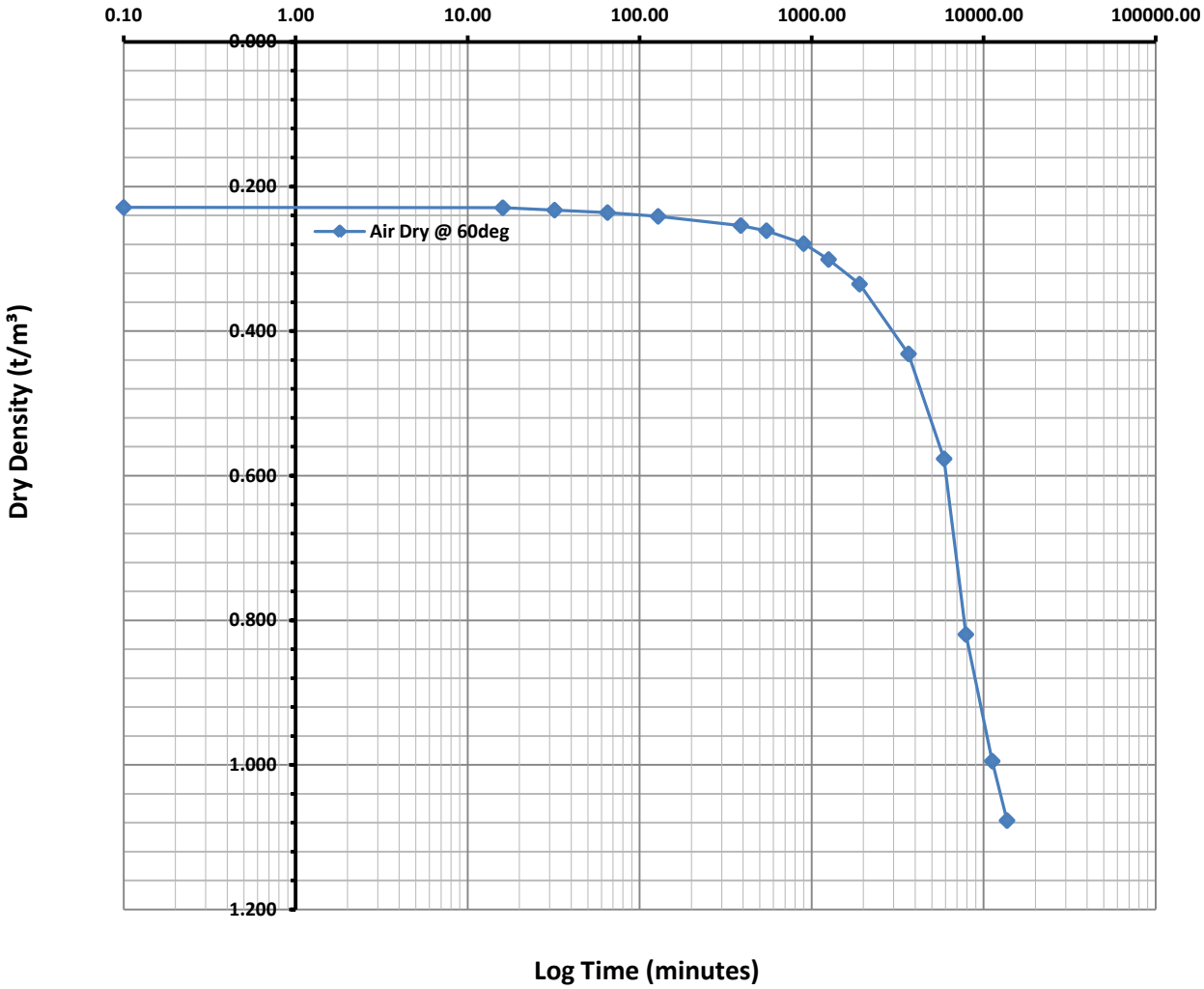
AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S2		
Lab ID:	S21_AIR_DRY	Room Temperature at Test:	19°

Tested by:	Phil	**Initial Bulk Density (t/m³):**	1.147
Type of Test:	Air Dry Testing	**Particle Density (t/m³):**	2.753
Sample Preparation:	20% Solids	**Moisture Content Initial (%):**	400.668

Dry Density (t/m³) Vs Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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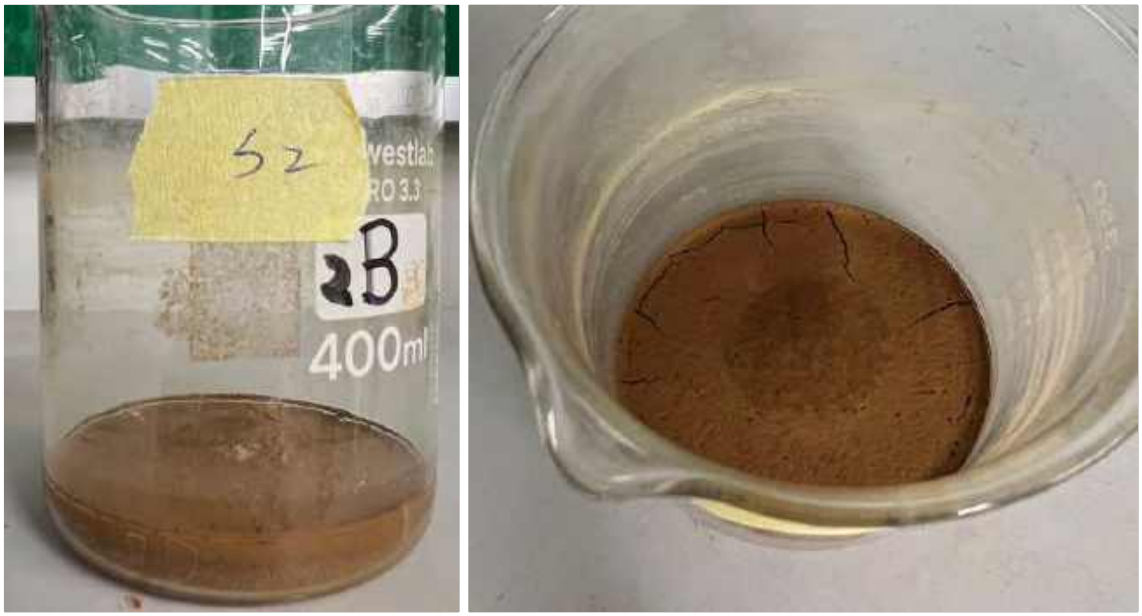
E-Precision Laboratory

AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S2		
Lab ID:	S21_AIR_DRY	Room Temperature at Test:	19°

Photo of Samples after Testing



Oven dried @ 60deg

Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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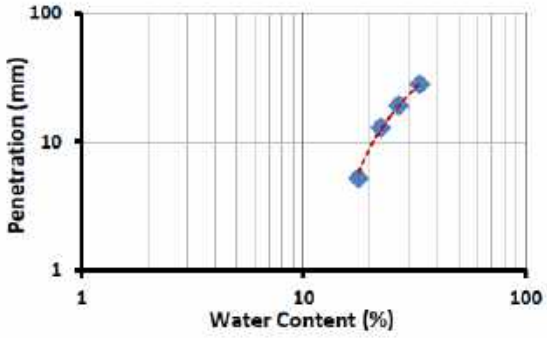
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

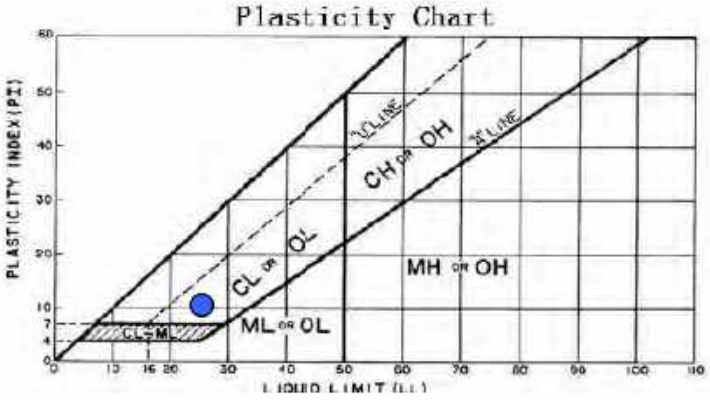
Client:	Kimberley Sands	**Date Tested:**	25/04/2024
Project:	Tails Testing 2024	Lab:	EPLAB
Sample No:	S3	**Job Number:**	KSANDS
Lab ID:	S3_ATT		
Depth (m):	-	**Room Temperature at Test:**	20°C
Tested by:	George	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	25.51
Plastic Limit (%):	15.13
Plasticity Index (%):	10.38
Liquidity Index (%):	-
Shrinkage Limit (%):	12.92
Linear Shrinkage(%):	5.15

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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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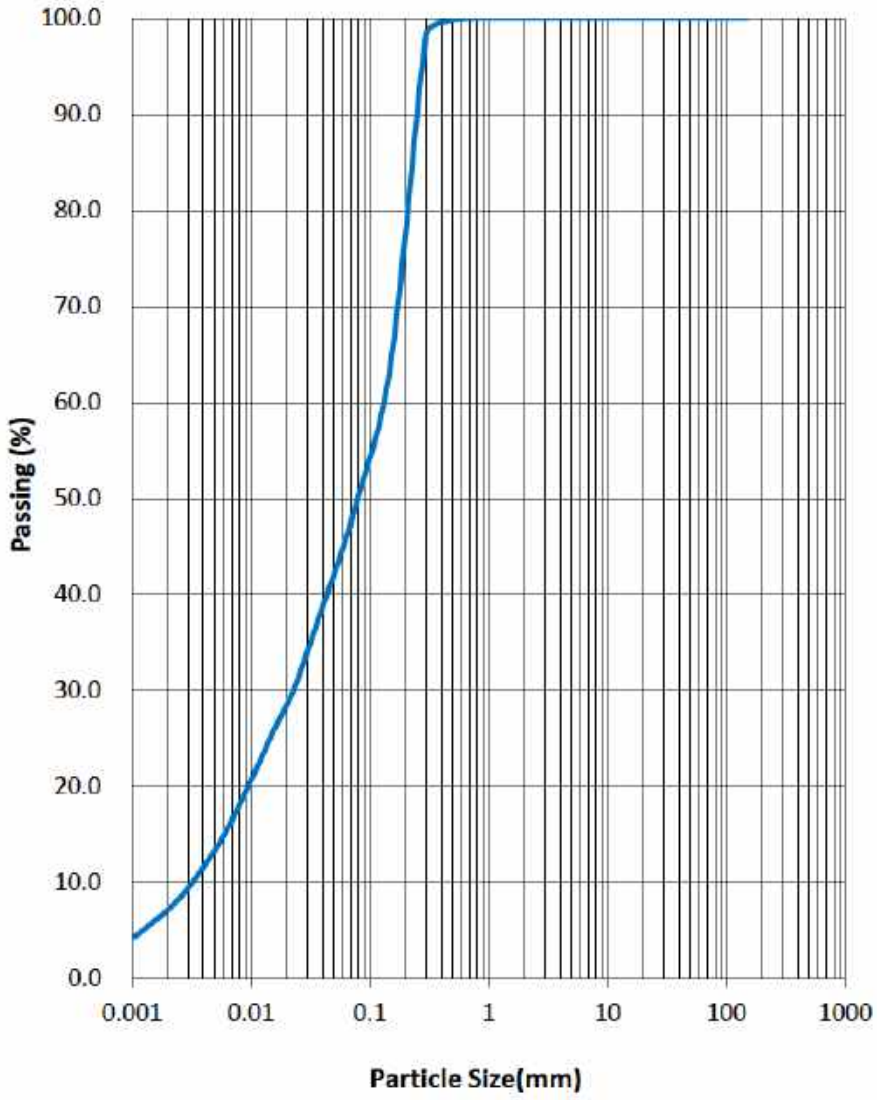
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	Kimberley Sands	Date Tested:	20/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S3	Depth (m):	-
Lab ID:	S3_PSDH	Room Temperature at Test:	19°C
Tested by:	George	2.36mm Particle Density (t/m³):	2.743
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	100.0
2.36	100.0
1.18	100.0
0.6	99.9
0.425	99.6
0.3	98.3
0.15	63.9
0.075	48.9
0.05835	44.5
0.04562	40.6
0.03266	35.4
0.02337	30.2
0.01600	26.1
0.01179	22.5
0.00842	18.6
0.00600	15.0
0.00427	12.1
0.00303	9.5
0.00215	7.5
0.00153	5.9
0.00121	4.9
0.00105	4.3
0.00089	3.8

PSD Graph



Notes: *Oven dried @ 60deg*

Stored and Tested the Sample as received

Samples supplied by the Client

Authorized Signature: [redacted]

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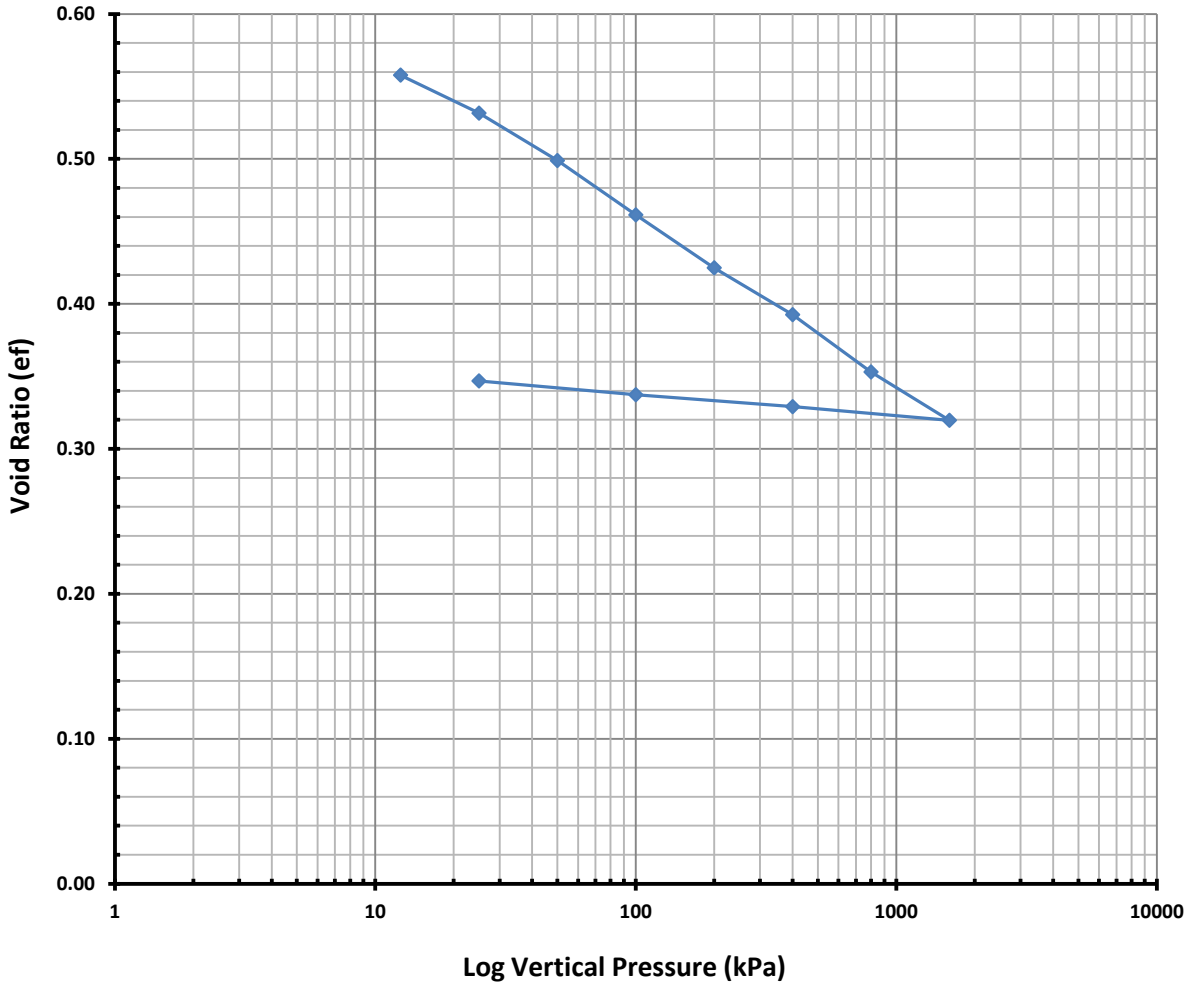
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°c

Tested by:	Phil	Initial Moisture (%):	28.95	Test Condition:	Undrained
Height (mm):	32.88	Final Moisture Content (%):	23.53	Sample Condition:	Saturated
Diameter (mm):	61.80	Bulk Density (t/m³):	2.18	Particle Density (t/m³):	2.743
Direction:	Vertical	Dry Density (t/m³):	1.69	Initial Void Ratio (e_i):	0.623

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



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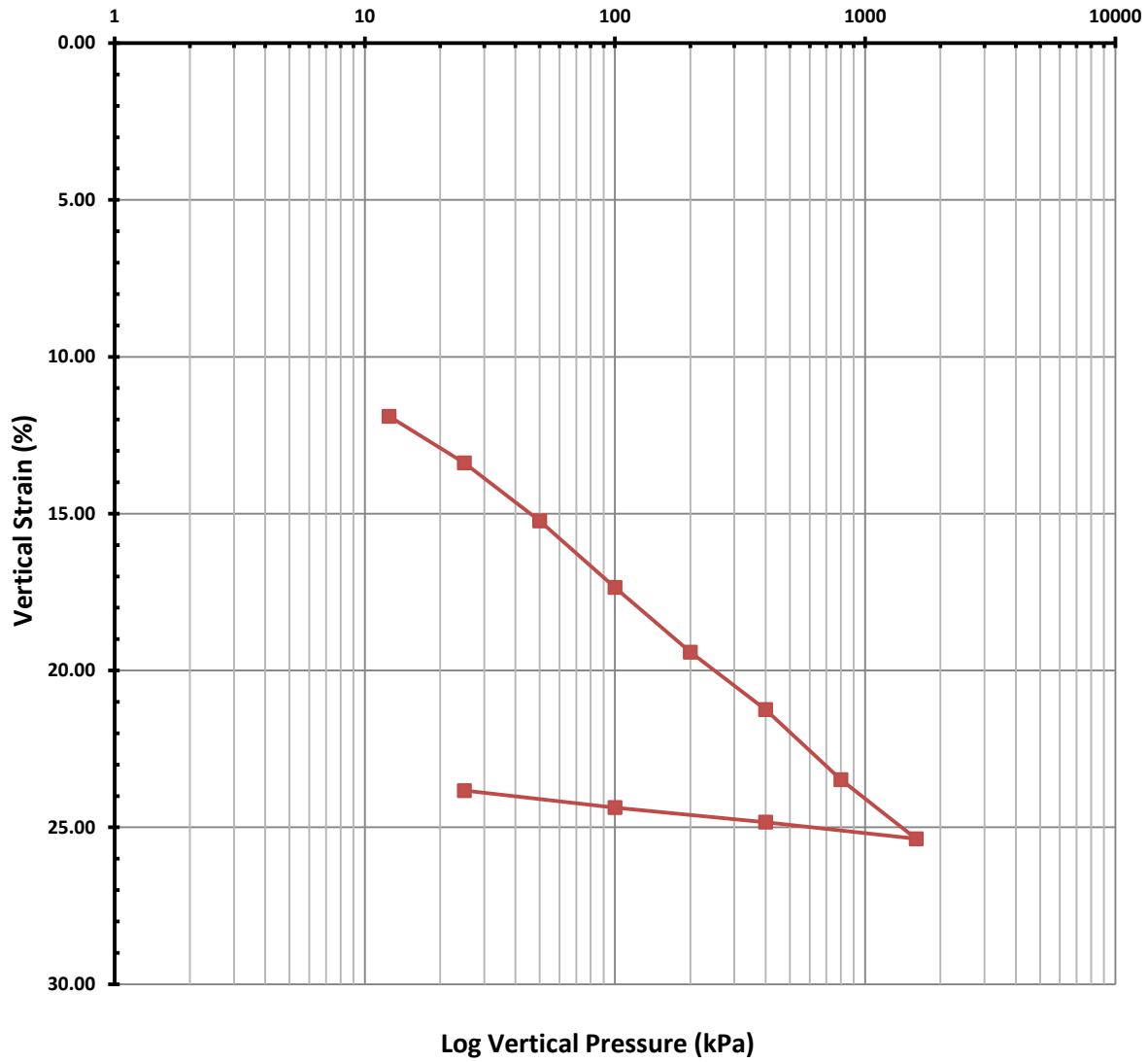
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_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:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_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	3.912	4.502	-	9.52E-03	1.3E-08		0.558	11.90
Stage 2 @ 25kPa	4.400	7.059	-	1.35E-03	3.0E-09		0.532	13.38
Stage 3 @ 50kPa	5.008	5.117	-	8.54E-04	1.4E-09		0.499	15.23
Stage 4 @ 100kPa	5.705	4.859	-	5.00E-04	7.6E-10		0.461	17.35
Stage 5 @ 200kPa	6.384	4.621	-	2.50E-04	3.6E-10		0.425	19.42
Stage 6 @ 400kPa	6.985	5.855	-	1.13E-04	2.1E-10		0.393	21.24
Stage 7 @ 800kPa	7.720	5.521	-	7.10E-05	1.2E-10		0.353	23.48
Stage 8 @ 1600kPa	8.340	5.254	-	3.08E-05	5.0E-11		0.320	25.36
Unload @ 400kPa	8.165							
Unload @ 100kPa	8.012							
Unload @ 25kPa	7.835							

** 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): [redacted]

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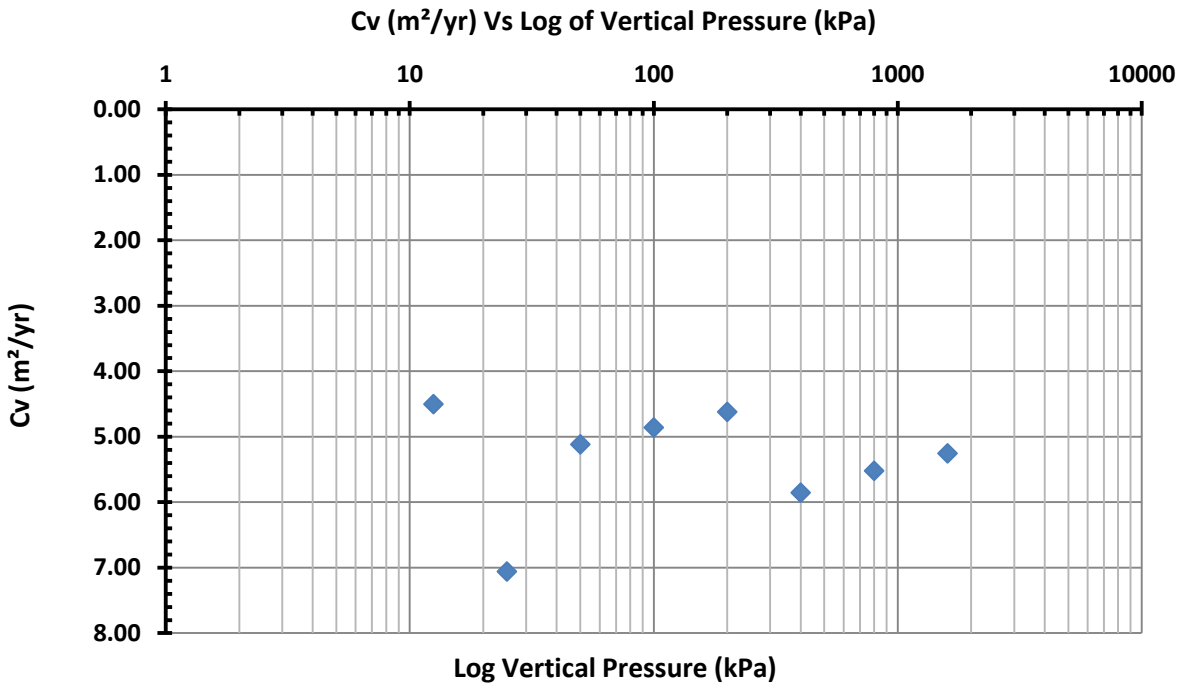
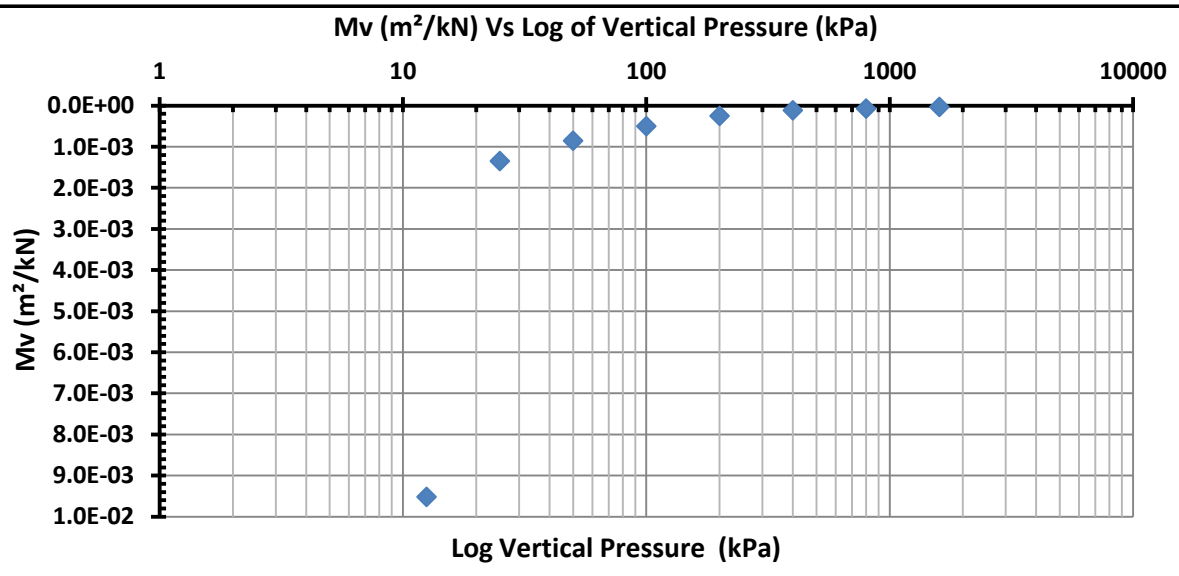
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_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:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

TEST RESULTS PLEASE SEE PAGES BELOW

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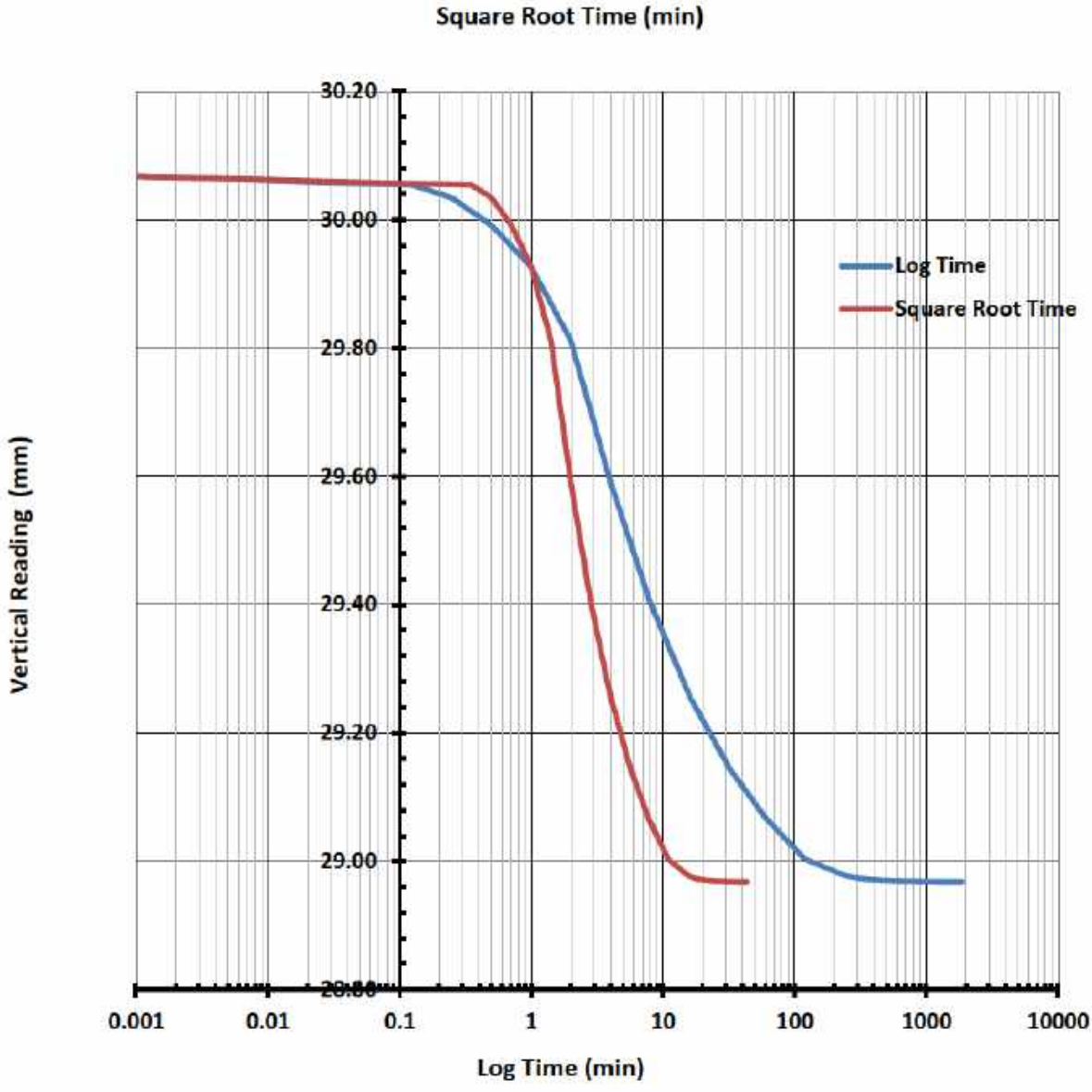
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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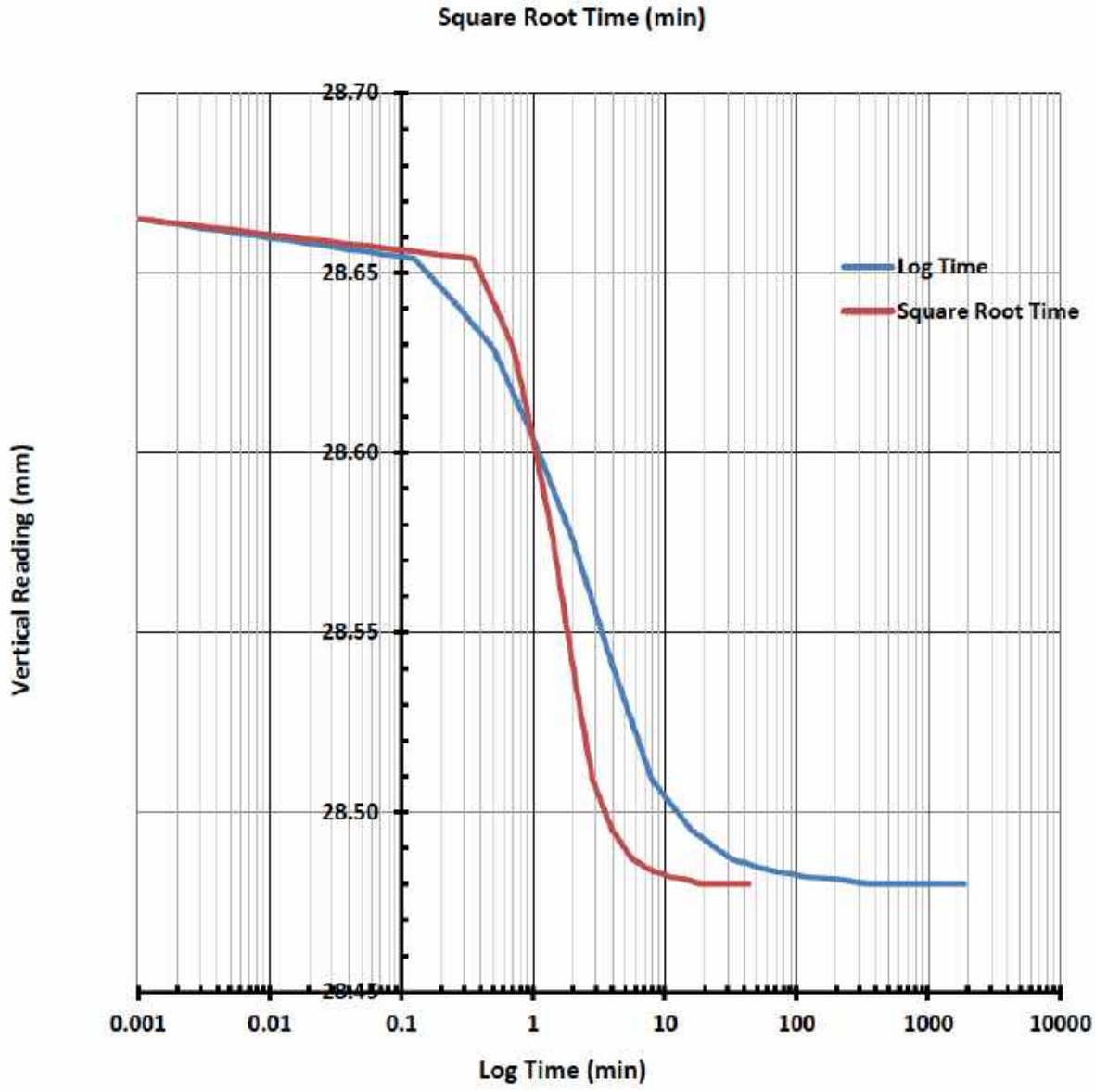
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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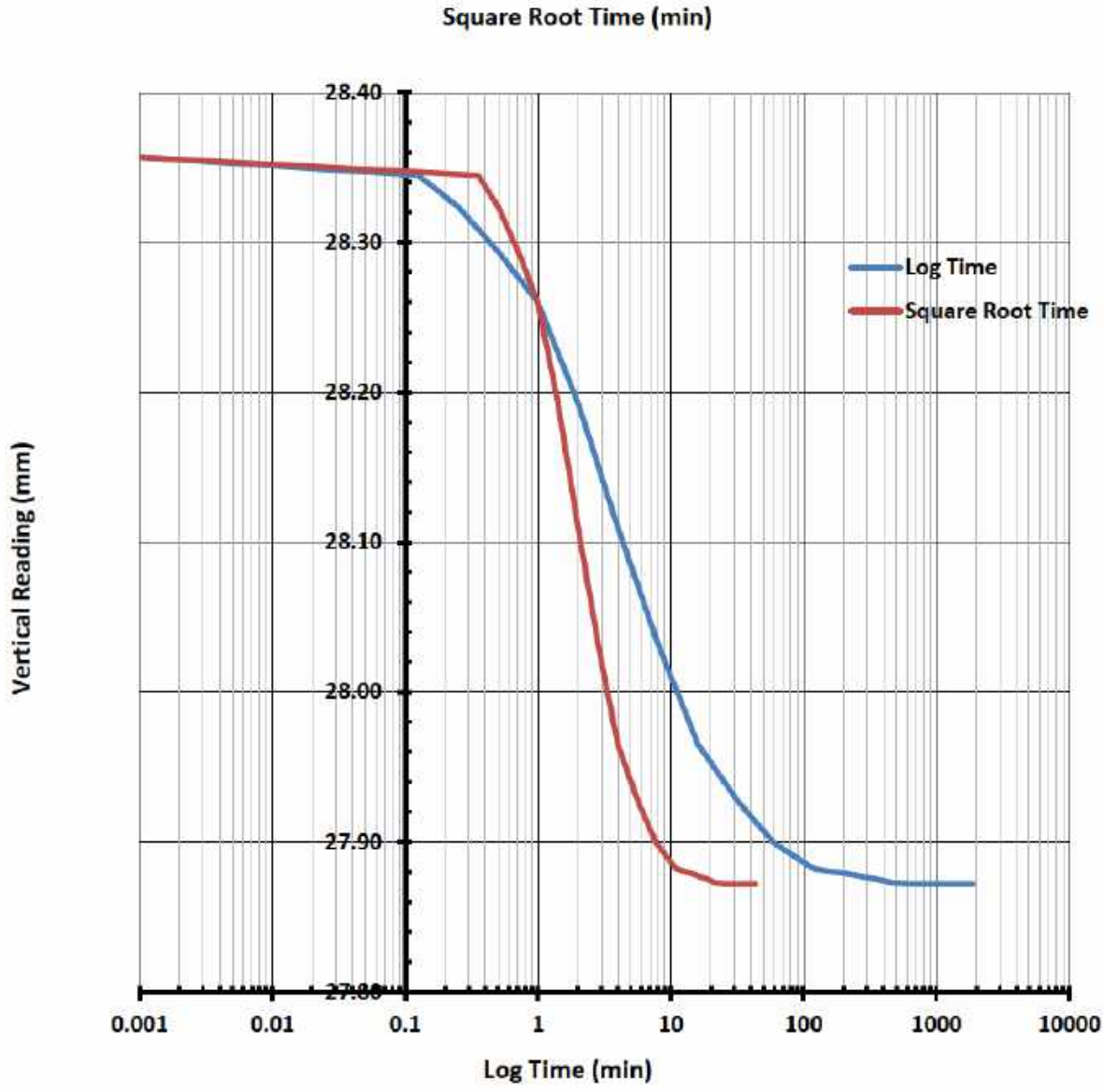
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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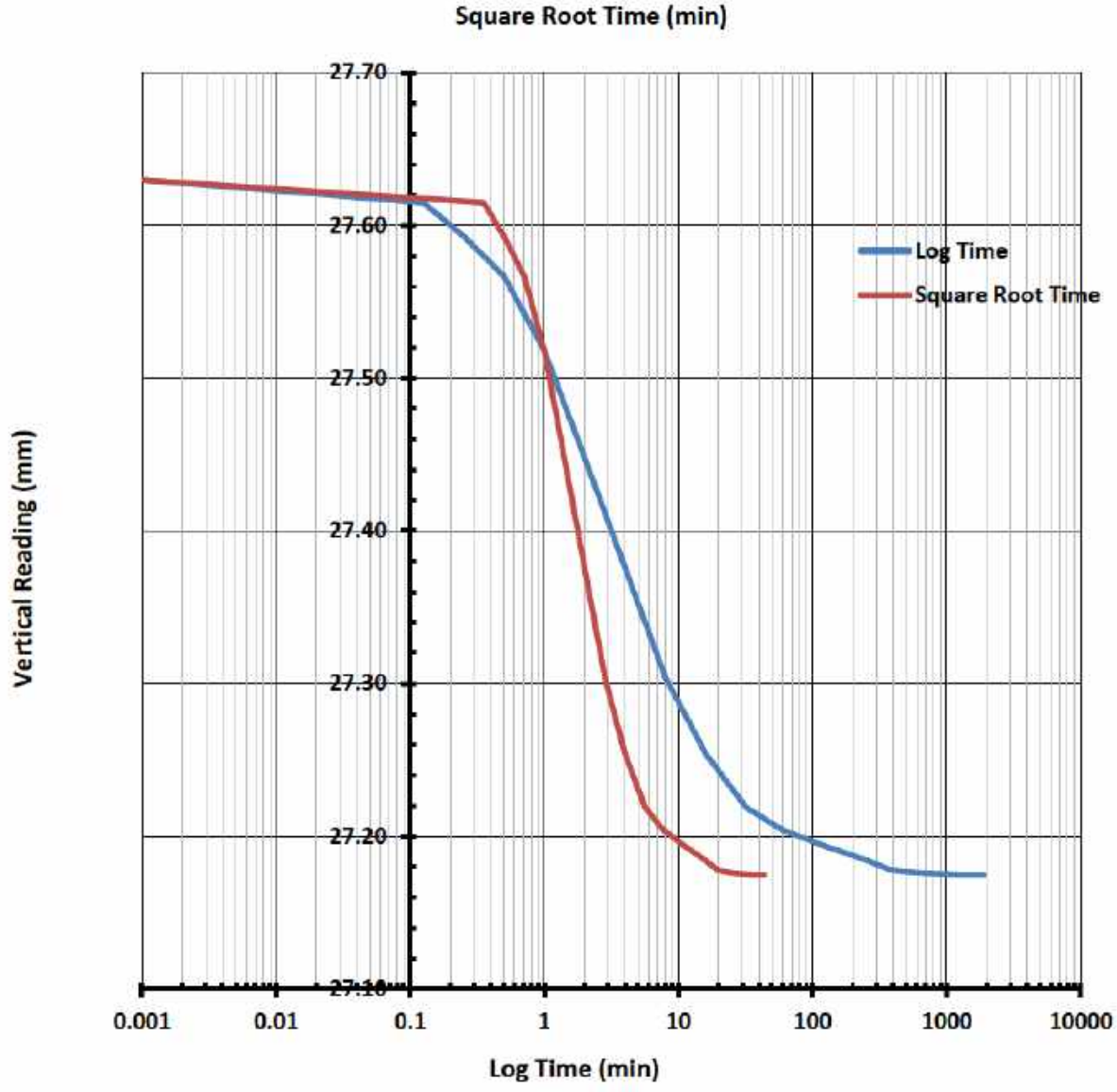
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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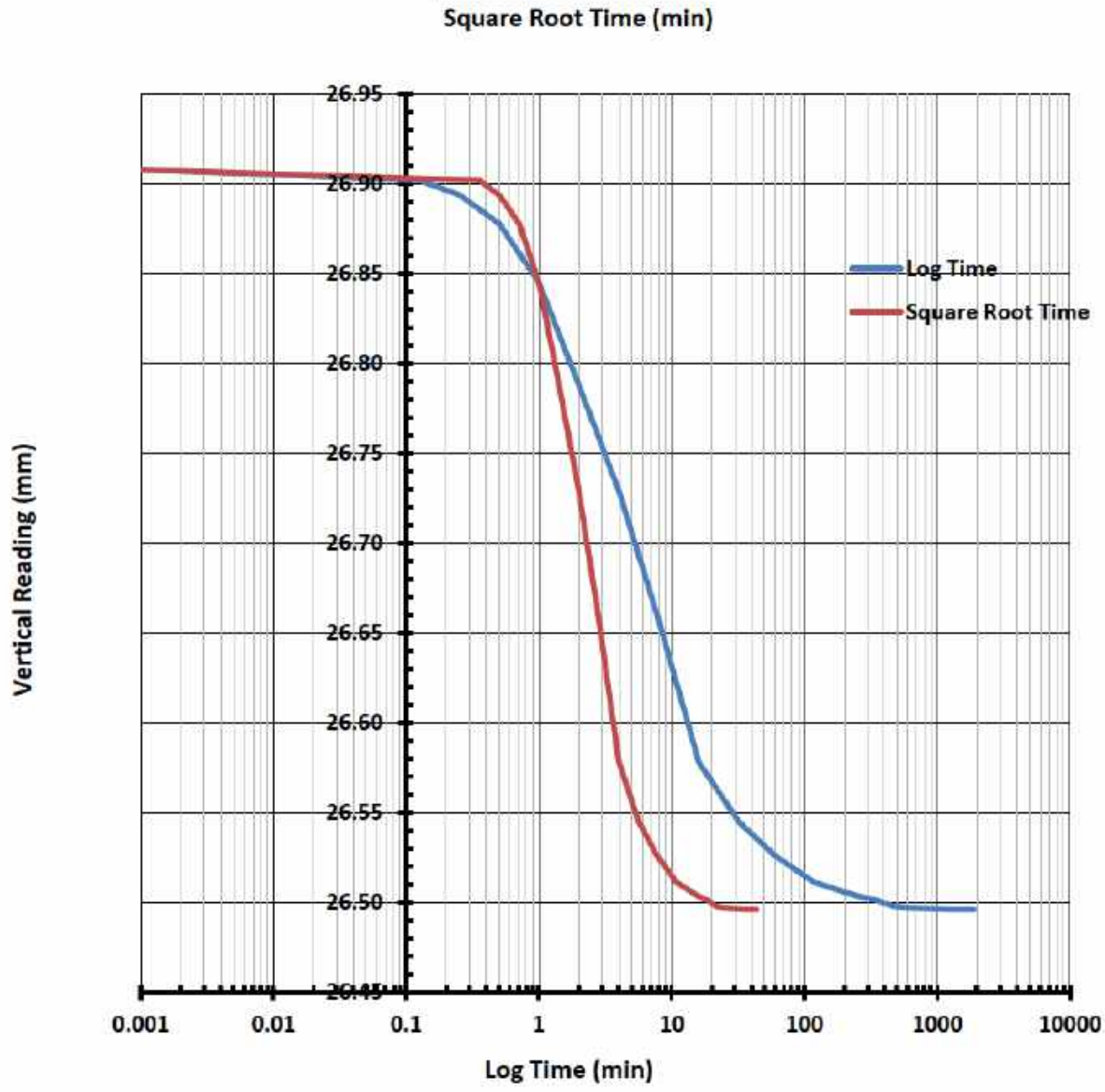
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa



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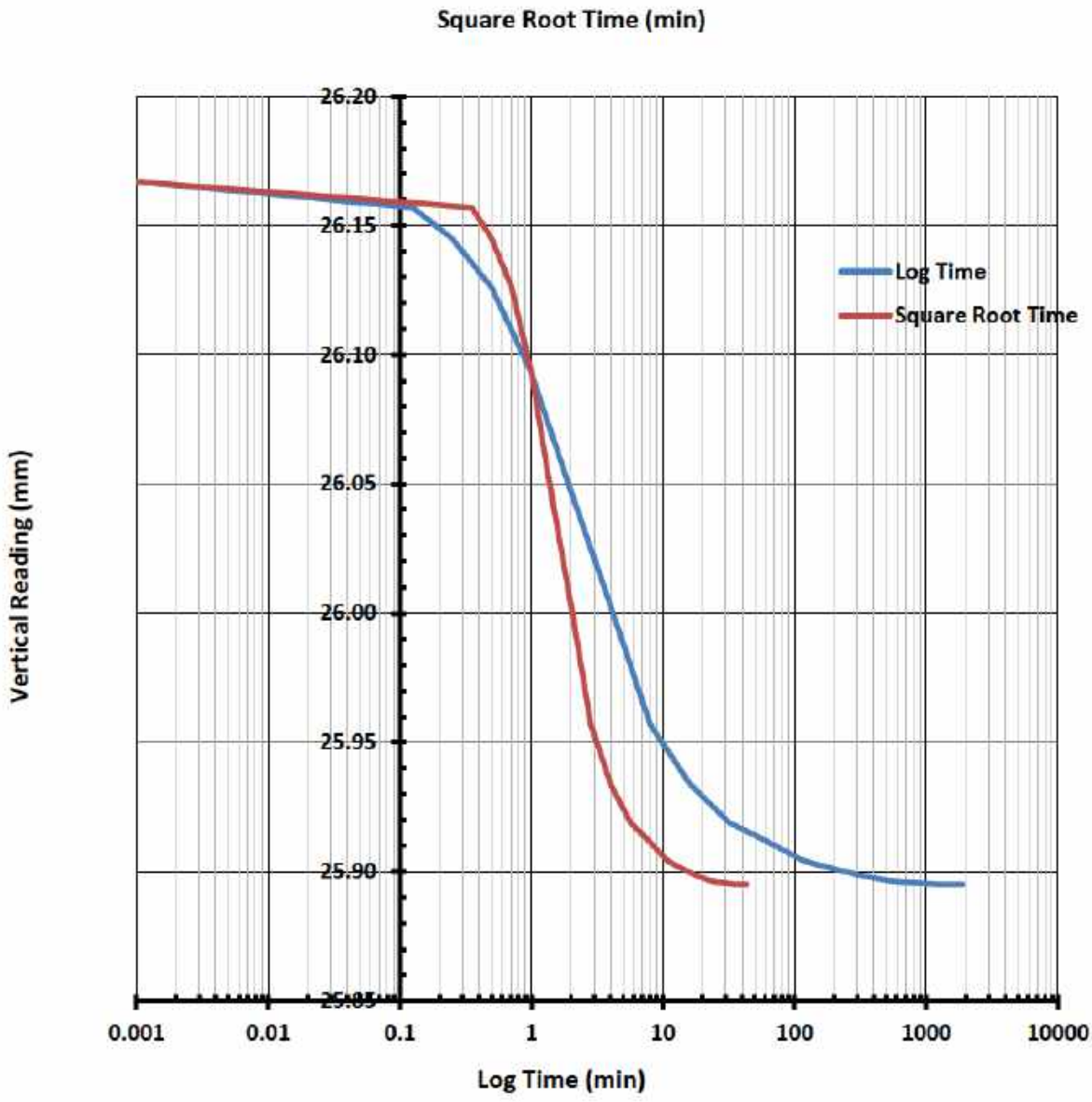
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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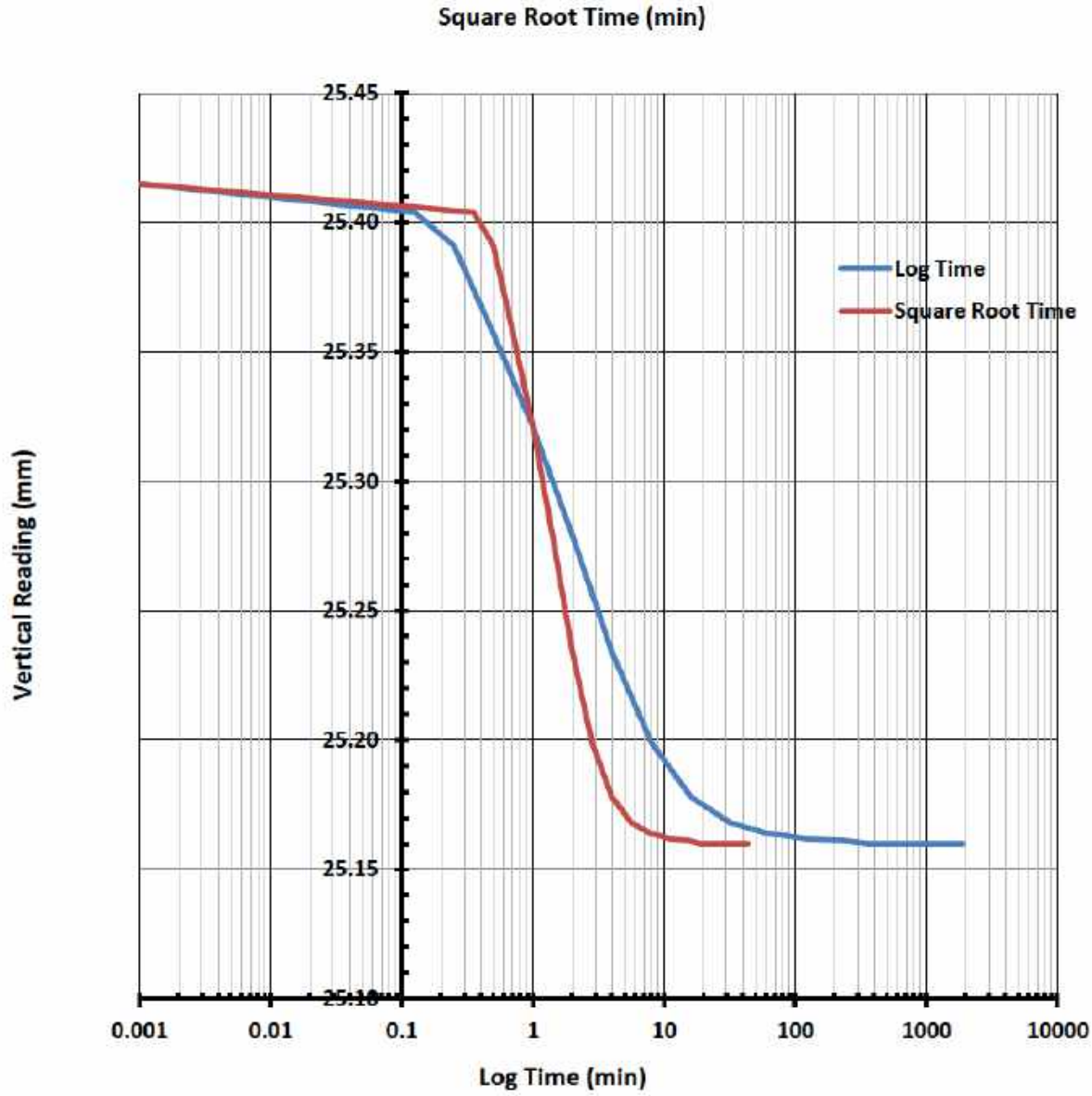
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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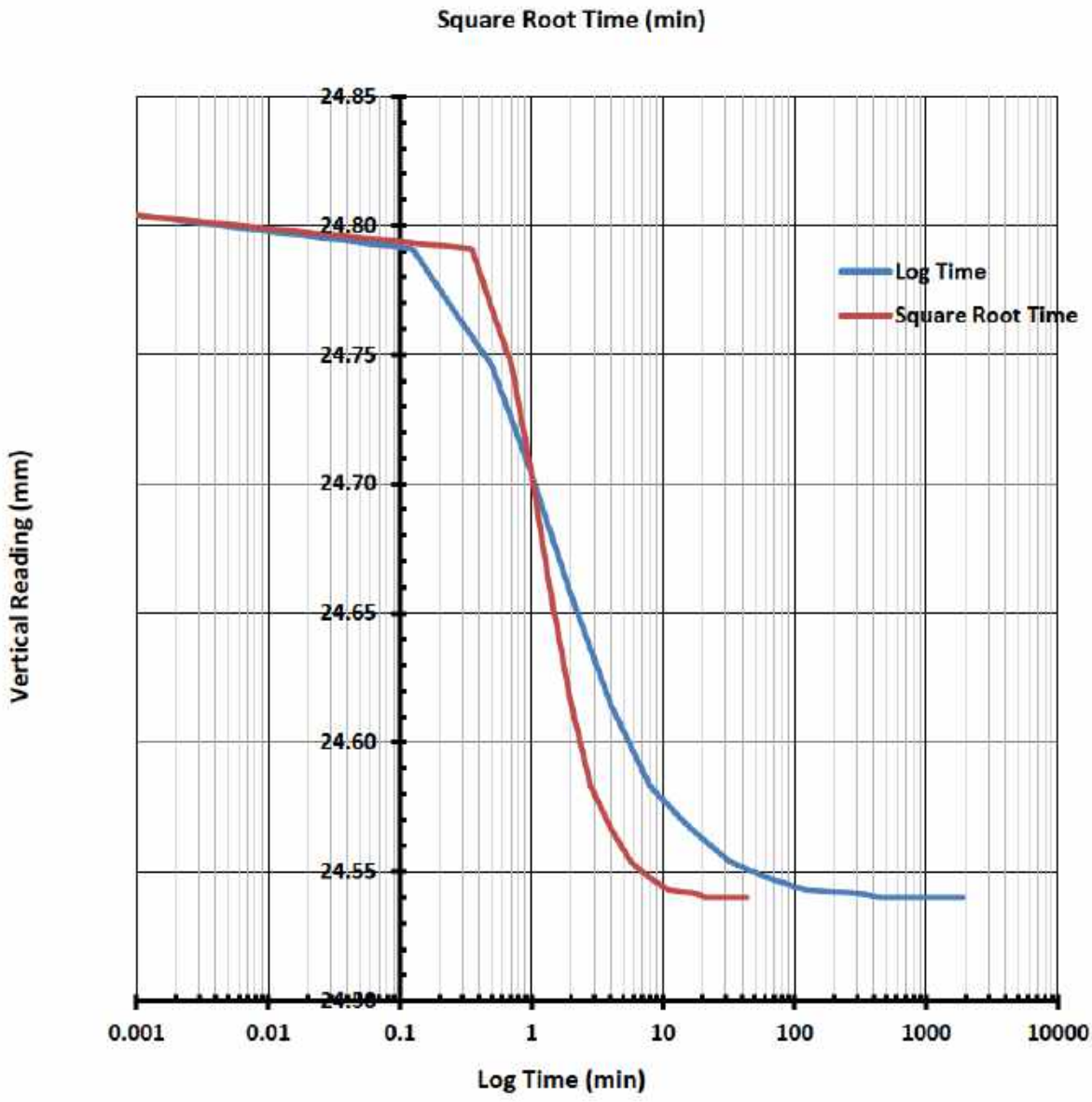
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S3		
Lab ID:	S3_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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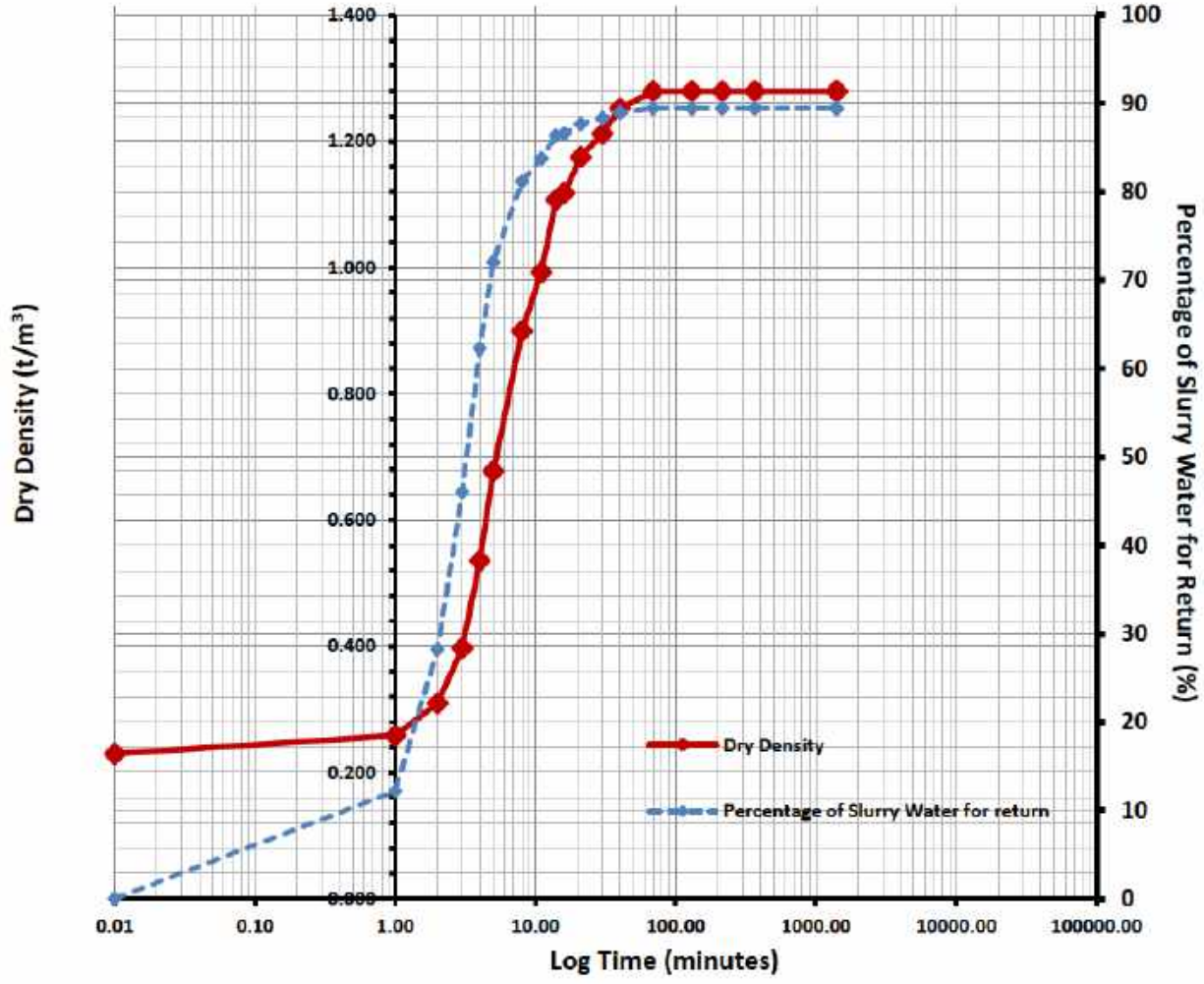
SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S3		
Lab ID:	S3_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil	**Initial Dry Density (t/m³):** 0.229
Type of Test: Settlement Testing	**Particle Density (t/m³):** 2.743
Sample Preparation: 20% Solids	**Initial Bulk Density (t/m³):** 1.147

Undrained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

[redacted]

Authorised Signature (Geotechnical Engineer):

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SETTLEMENT TESTING TAILINGS

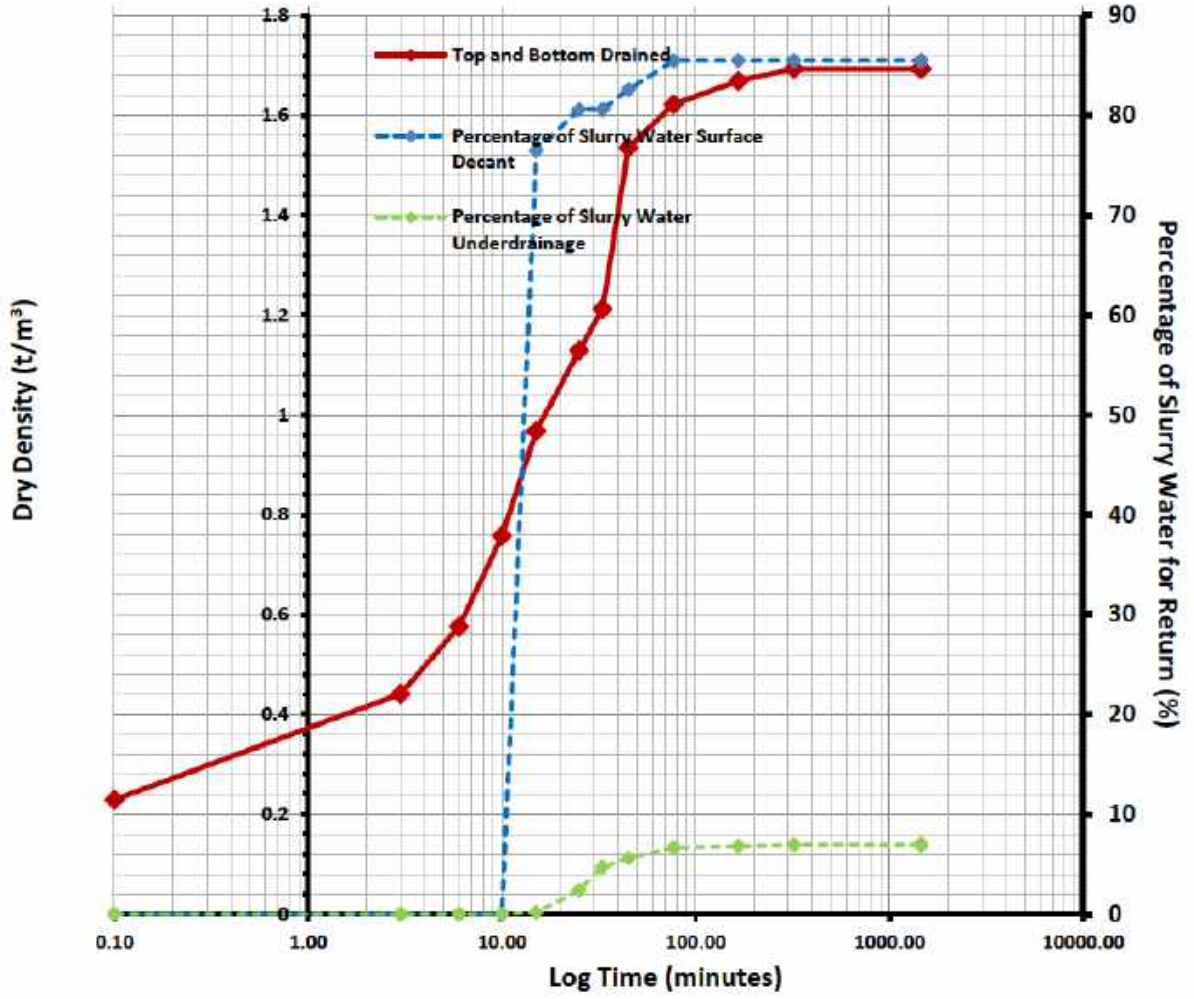
METHOD: IN-HOUSE METHOD

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S3		
Lab ID:	S3_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 20% Solids

Initial Dry Density (t/m³): 0.229
Particle Density (t/m³): 2.743
Initial Bulk Density (t/m³): 1.147

Top and Bottom Drained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

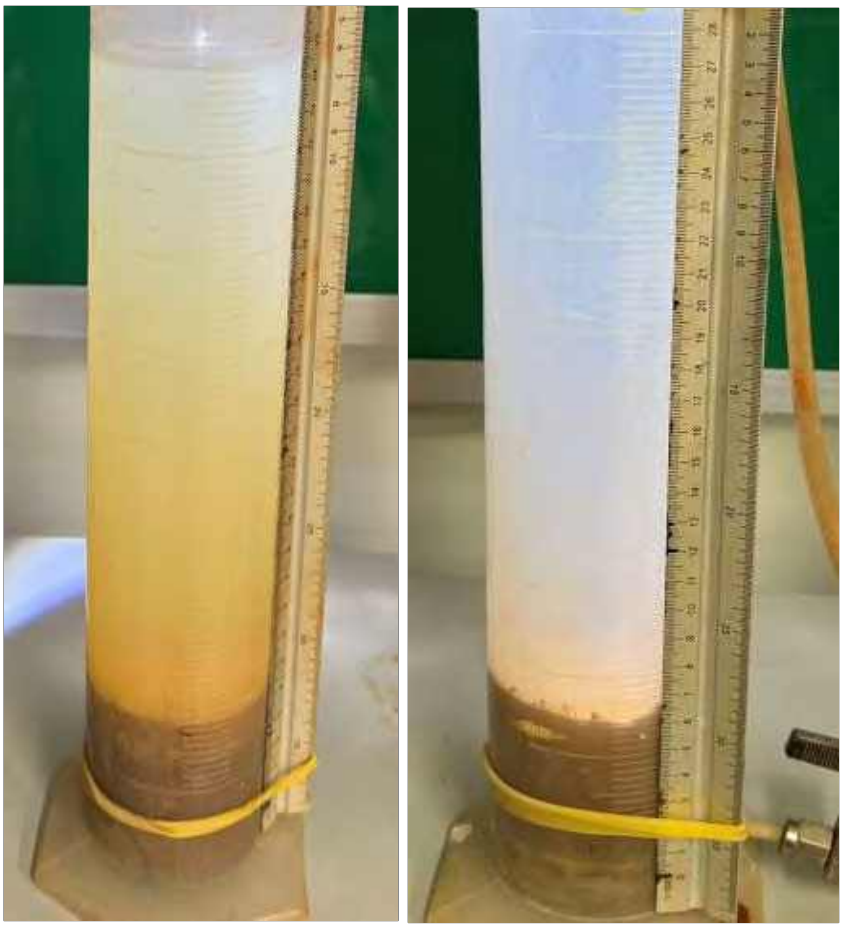
Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S3		
Lab ID:	S3_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 20% 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): [redacted]

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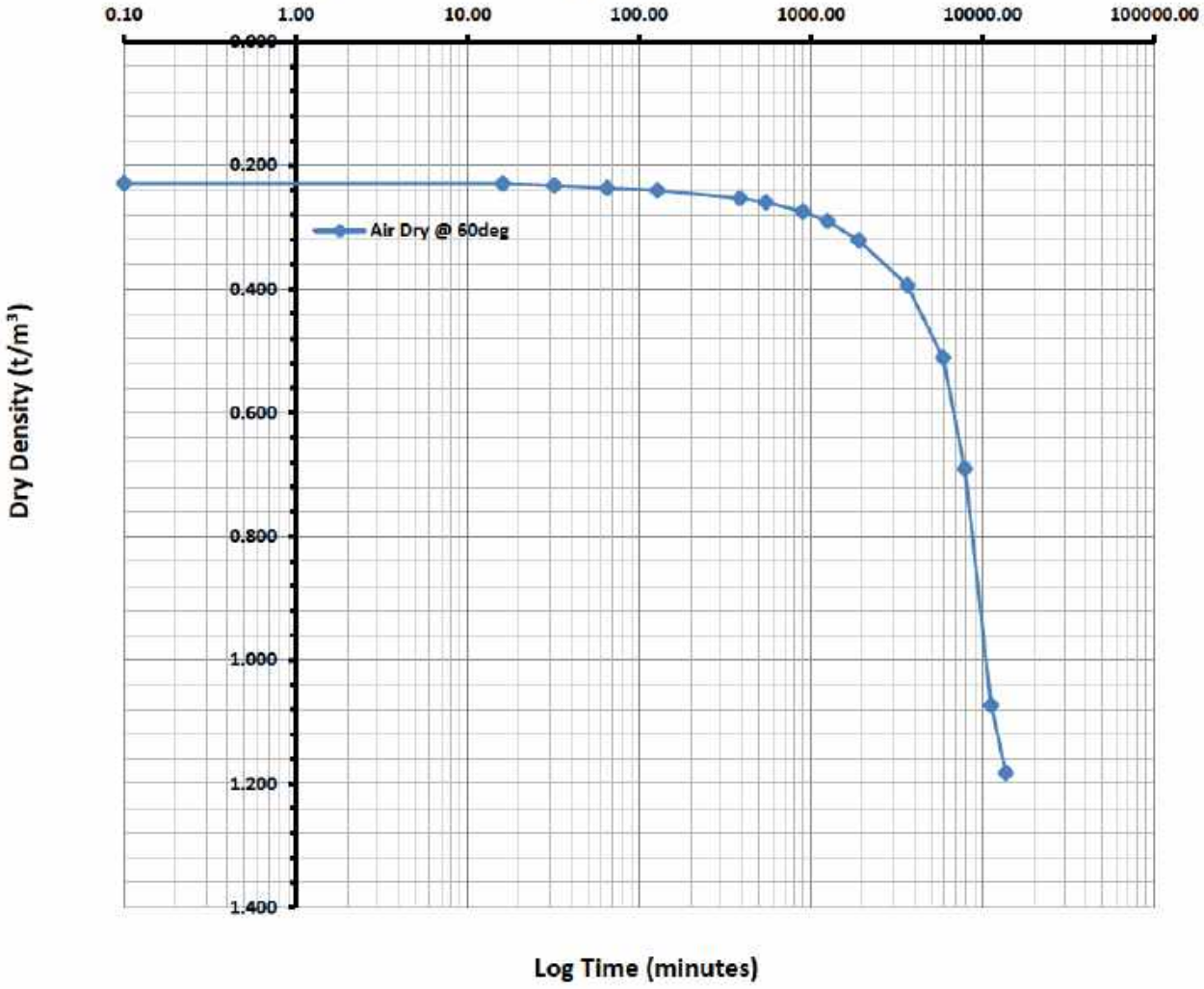
AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S3		
Lab ID:	S3_AIR_DRY	Room Temperature at Test:	19°

Tested by:	Phil	**Initial Bulk Density (t/m³):**	1.144
Type of Test:	Air Dry Testing	**Particle Density (t/m³):**	2.743
Sample Preparation:	20% Solids	**Moisture Content Initial (%):**	399.830

Dry Density (t/m³) Vs Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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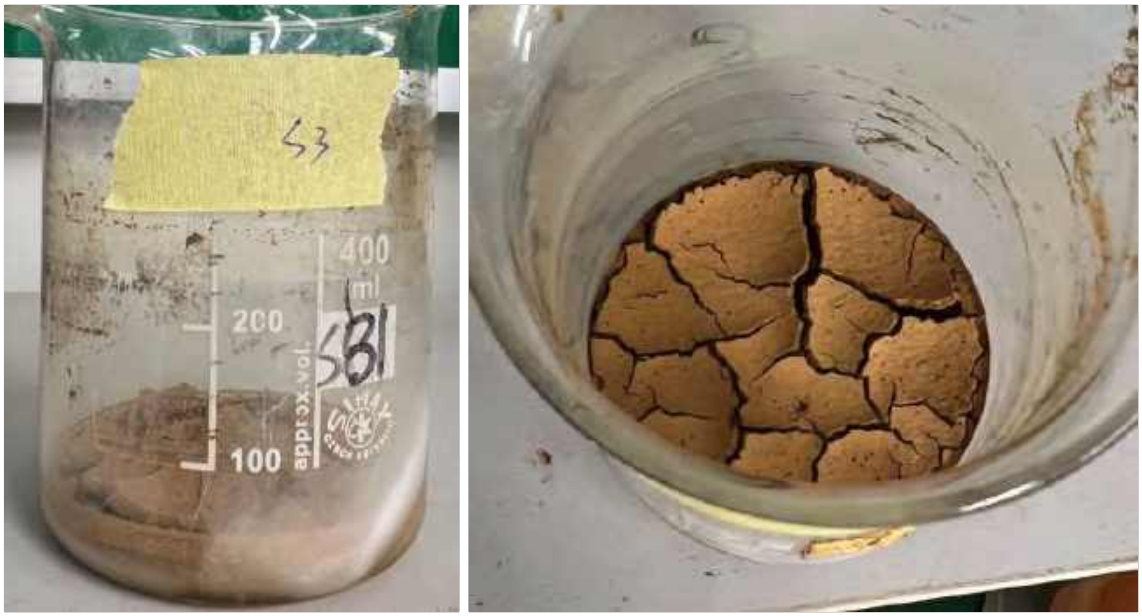
E-Precision Laboratory

AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S3		
Lab ID:	S3_AIR_DRY	Room Temperature at Test:	19°

Photo of Samples after Testing



Oven dried @ 60deg

Comments:

Authorised Signature (Geotechnical Engineer [redacted]

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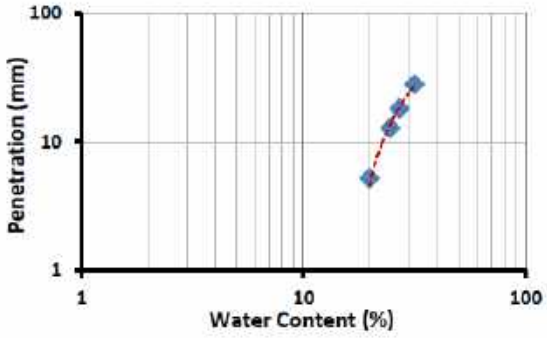
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

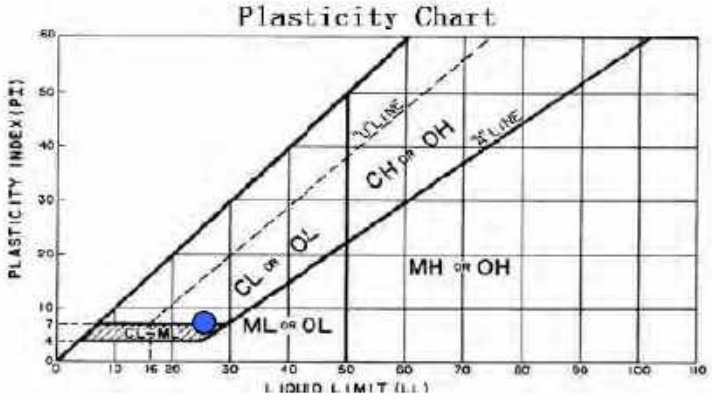
Client:	Kimberley Sands	**Date Tested:**	25/04/2024
Project:	Tails Testing 2024	Lab:	EPLAB
Sample No:	S4	**Job Number:**	KSANDS
Lab ID:	S4_ATT		
Depth (m):	-	**Room Temperature at Test:**	20°C
Tested by:	George	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	26.27
Plastic Limit (%):	18.59
Plasticity Index (%):	7.68
Liquidity Index (%):	-
Shrinkage Limit (%):	16.38
Linear Shrinkage(%):	3.49

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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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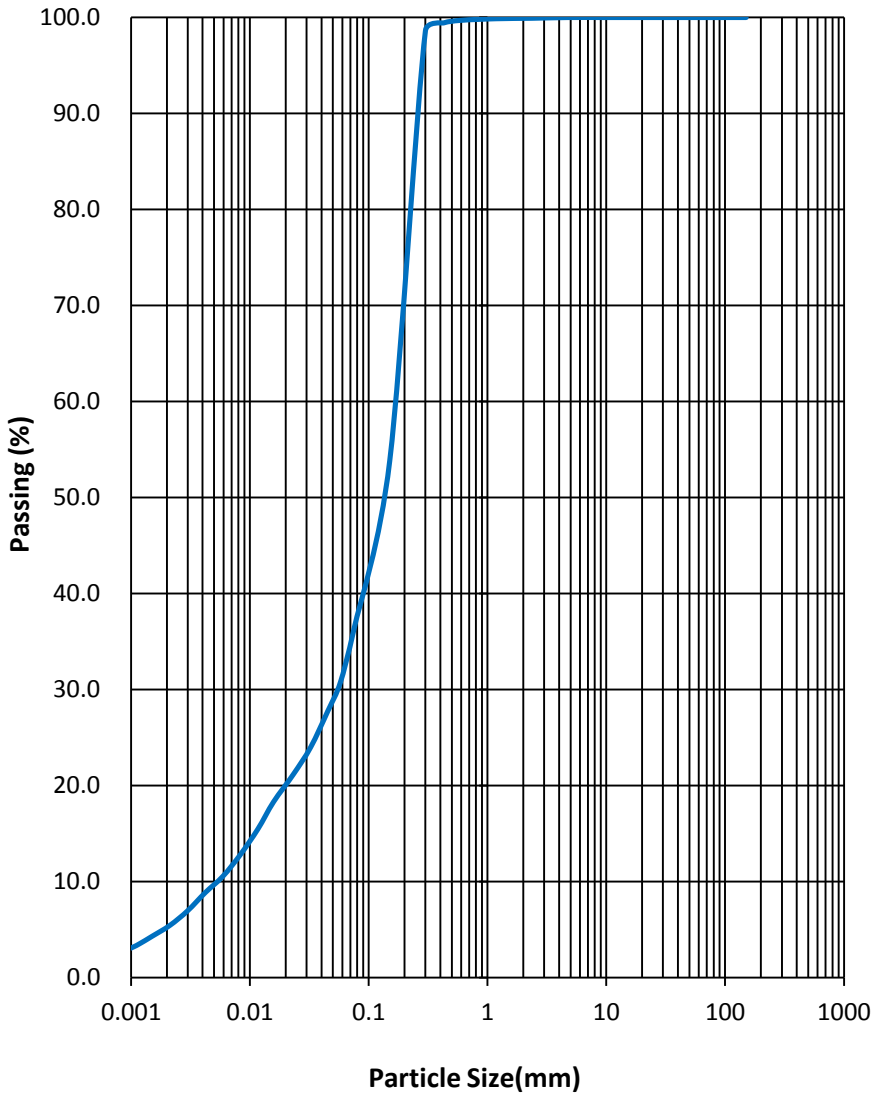
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3 3.5.1

Client:	Kimberley Sands	Date Tested:	20/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S4	Depth (m):	-
Lab ID:	S4_PSDH	Room Temperature at Test:	19°C
Tested by:	George	2.36mm Particle Density (t/m³):	2.798
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	100.0
2.36	99.9
1.18	99.9
0.6	99.7
0.425	99.4
0.3	98.6
0.15	53.8
0.075	36.3
0.05778	30.8
0.04520	27.8
0.03235	24.0
0.02309	21.1
0.01580	18.3
0.01165	15.5
0.00831	12.8
0.00591	10.6
0.00420	8.9
0.00299	7.0
0.00212	5.4
0.00150	4.3
0.00119	3.6
0.00104	3.2
0.00088	2.8

PSD Graph



Notes: *Oven dried @ 60deg*
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature: [redacted]

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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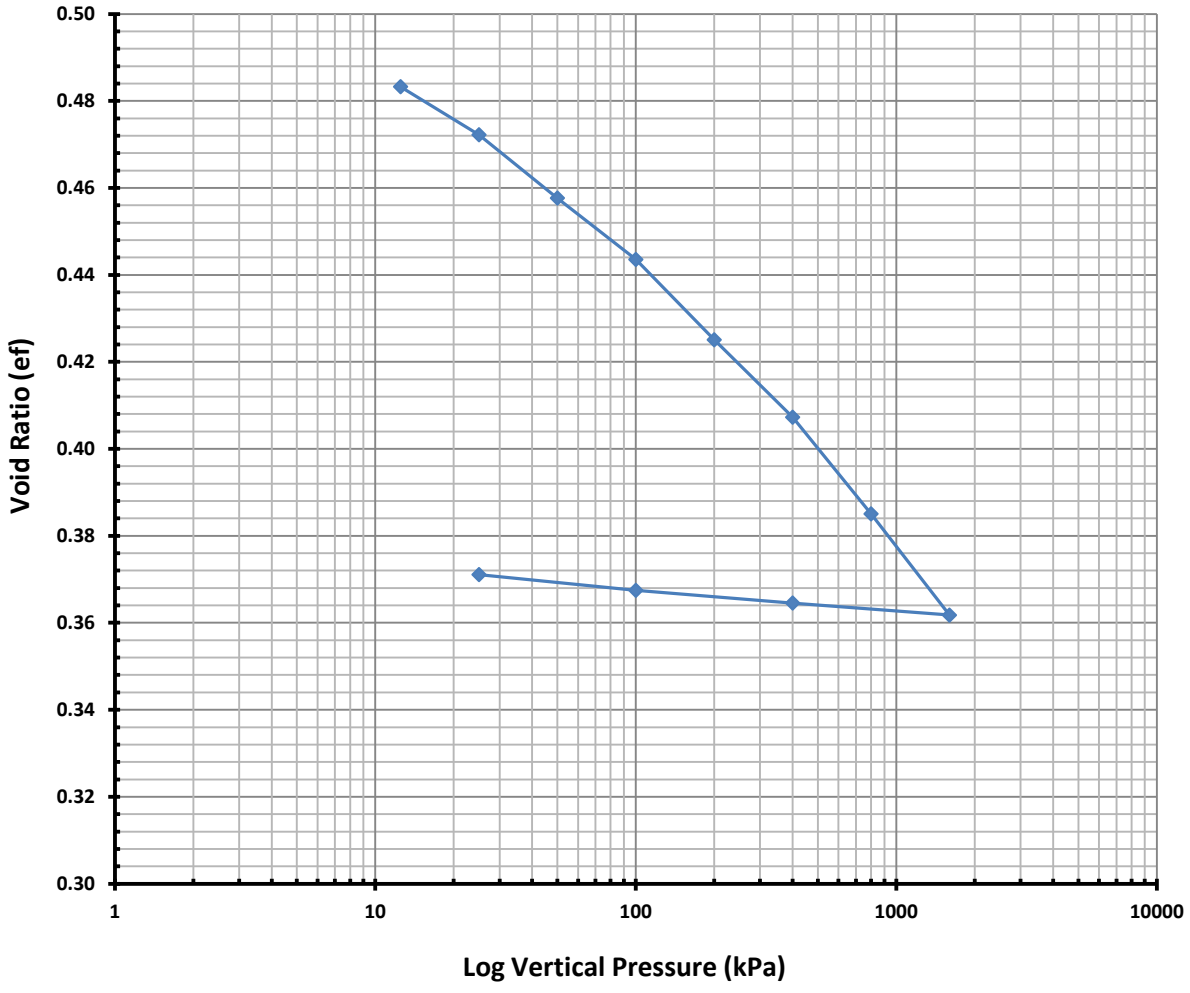
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°c

Tested by:	Phil	Initial Moisture (%):	31.54	Test Condition:	Undrained
Height (mm):	36.91	Final Moisture Content (%):	25.13	Sample Condition:	Saturated
Diameter (mm):	61.80	Bulk Density (t/m³):	2.43	Particle Density (t/m³):	2.798
Direction:	Vertical	Dry Density (t/m³):	1.85	Initial Void Ratio (e_i):	0.515

Void Ratio (e_f) Vs Log of Vertical Pressure (kPa)



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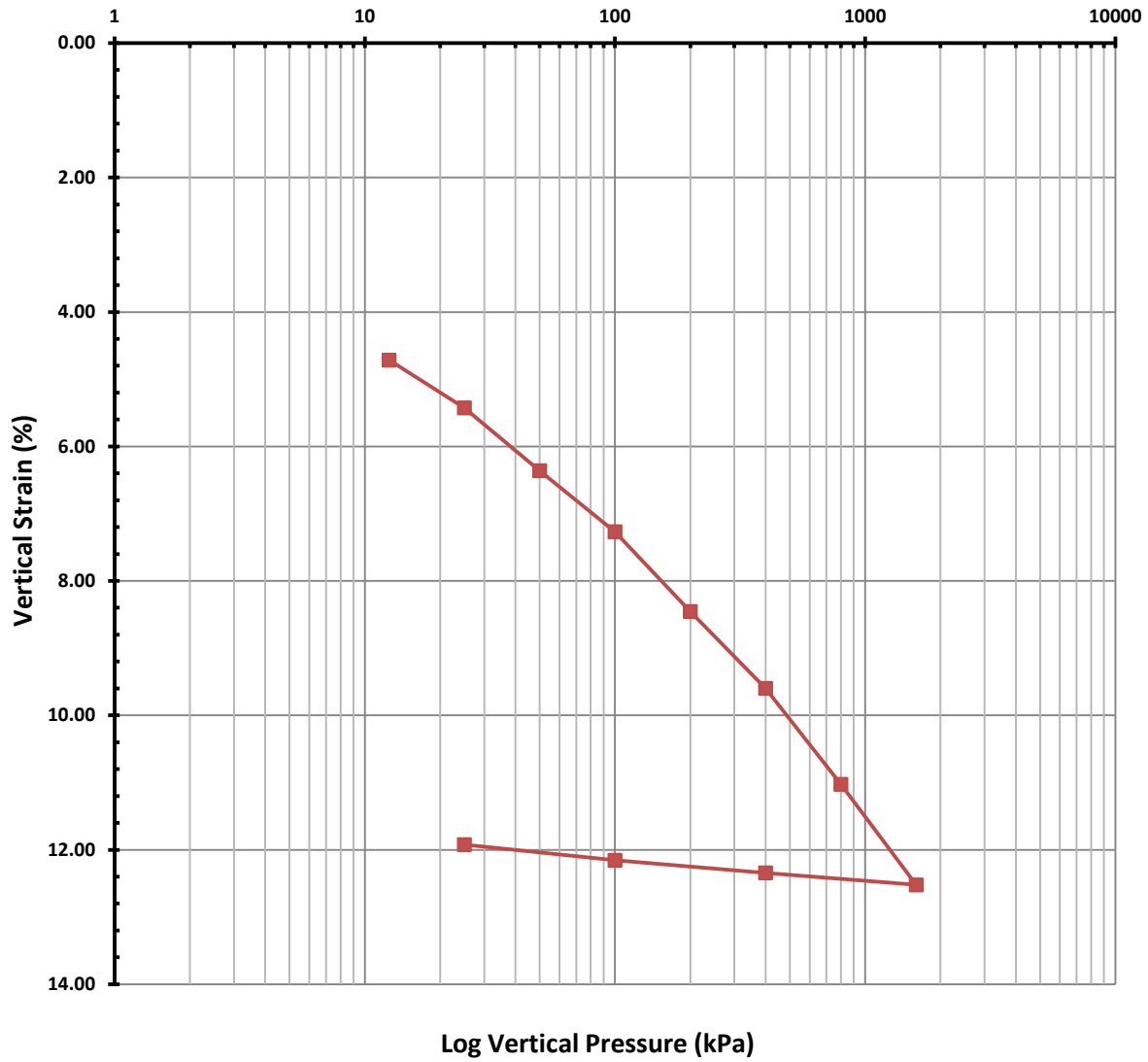
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_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:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_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	1.741	8.160	-	3.77E-03	9.6E-09		0.483	4.72
Stage 2 @ 25kPa	2.003	10.592	-	5.96E-04	2.0E-09		0.472	5.43
Stage 3 @ 50kPa	2.348	10.393	-	3.95E-04	1.3E-09		0.458	6.36
Stage 4 @ 100kPa	2.683	10.191	-	1.94E-04	6.1E-10		0.444	7.27
Stage 5 @ 200kPa	3.121	14.881	-	1.28E-04	5.9E-10		0.425	8.46
Stage 6 @ 400kPa	3.543	29.017	-	6.24E-05	5.6E-10		0.407	9.60
Stage 7 @ 800kPa	4.070	14.071	-	3.95E-05	1.7E-10		0.385	11.03
Stage 8 @ 1600kPa	4.622	13.605	-	2.10E-05	8.9E-11		0.362	12.52
Unload @ 400kPa	4.556							
Unload @ 100kPa	4.487							
Unload @ 25kPa	4.401							

** 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): [redacted]

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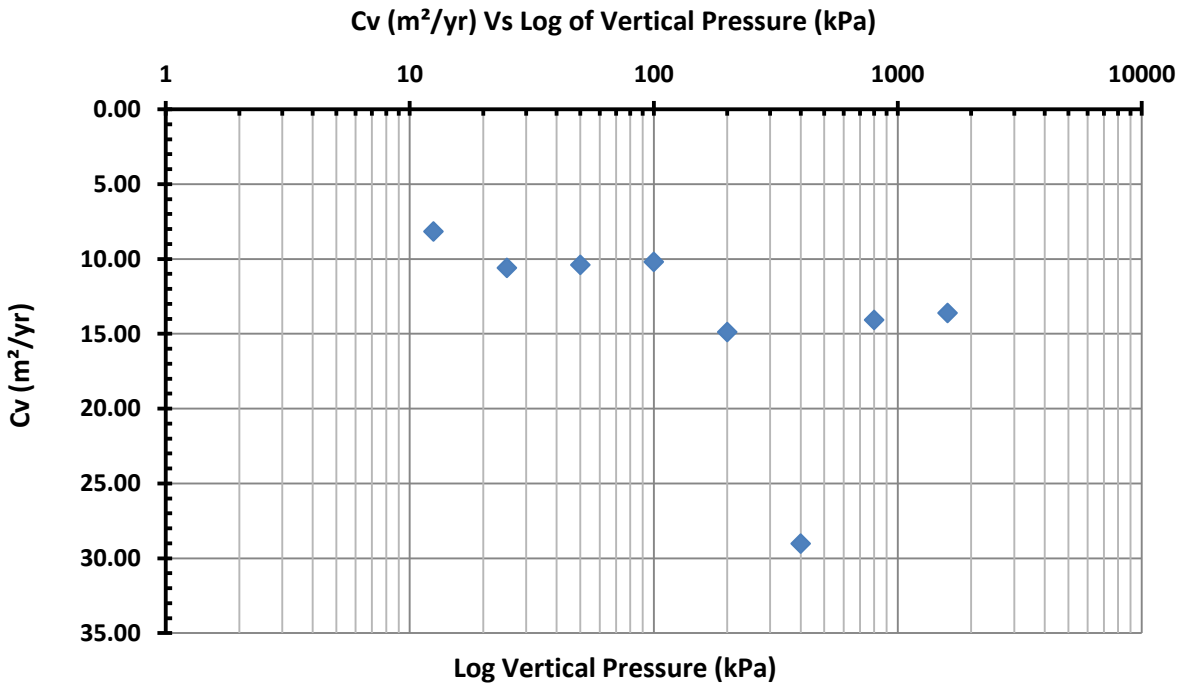
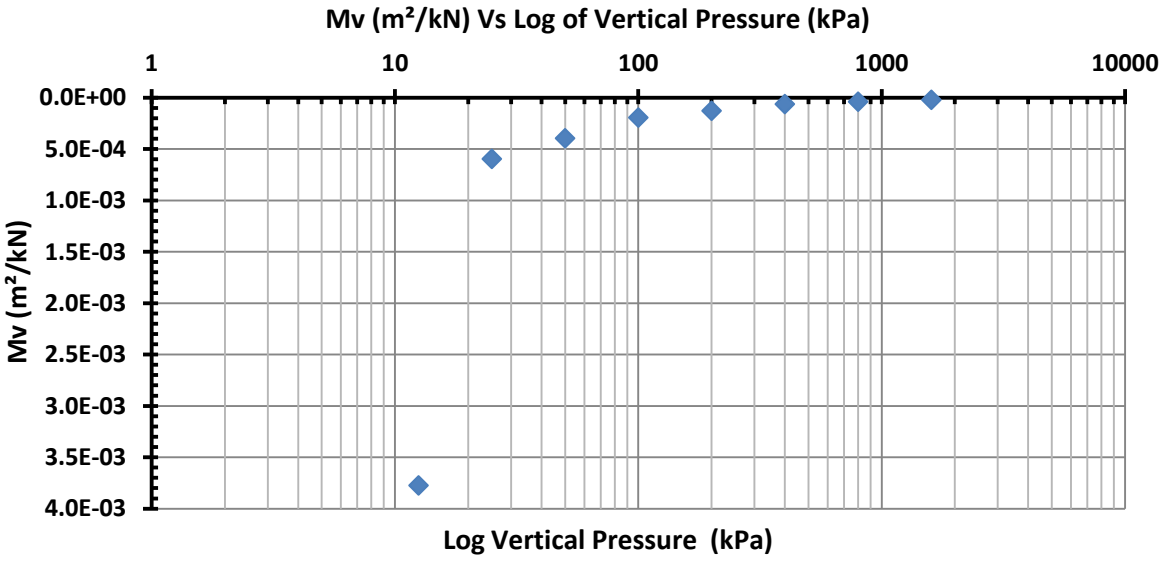
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C



* Plot based on Log (time) data



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WA 6155
Ph: (08) 9418 8742
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CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

TEST RESULTS PLEASE SEE PAGES BELOW

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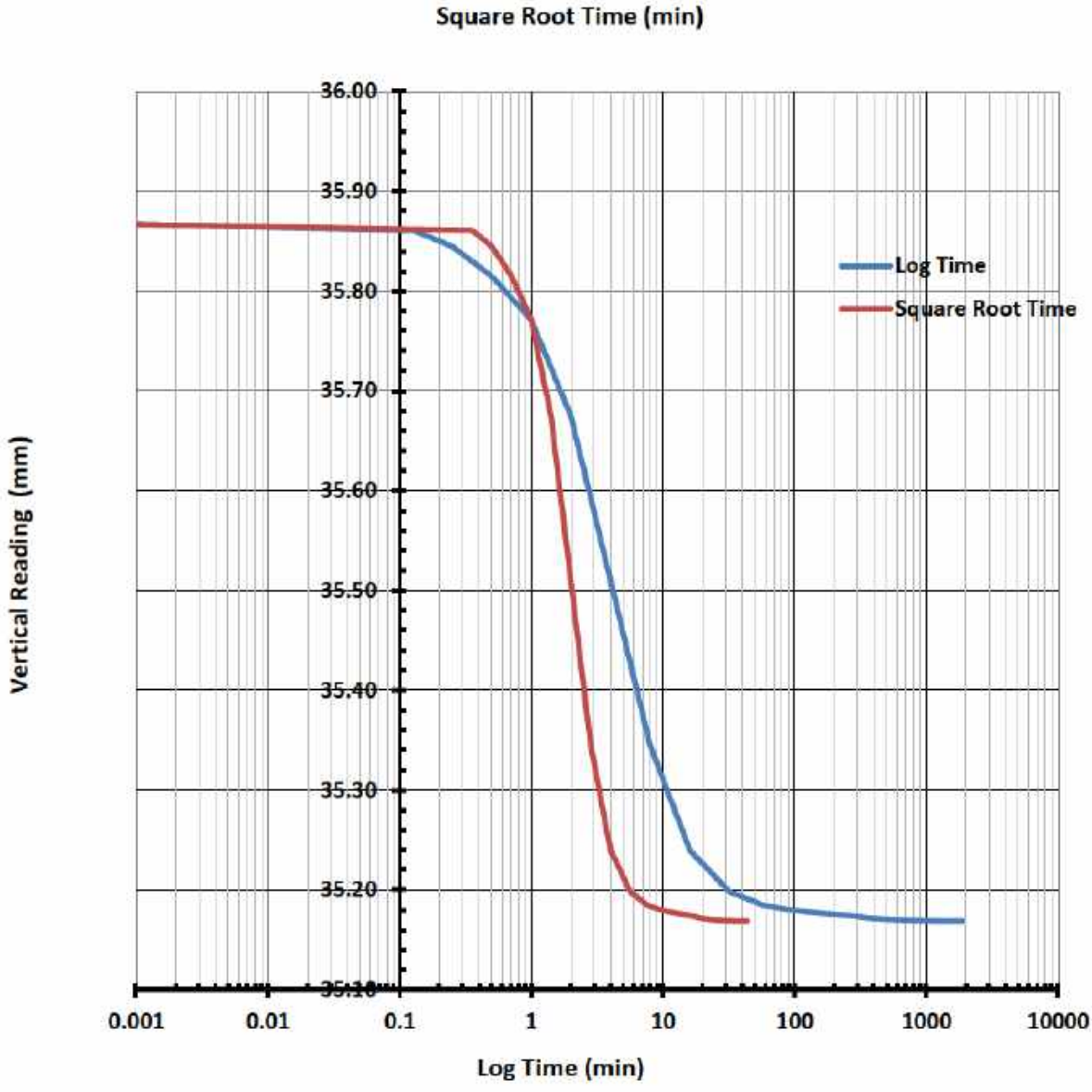
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 1 @ 12.5kPa



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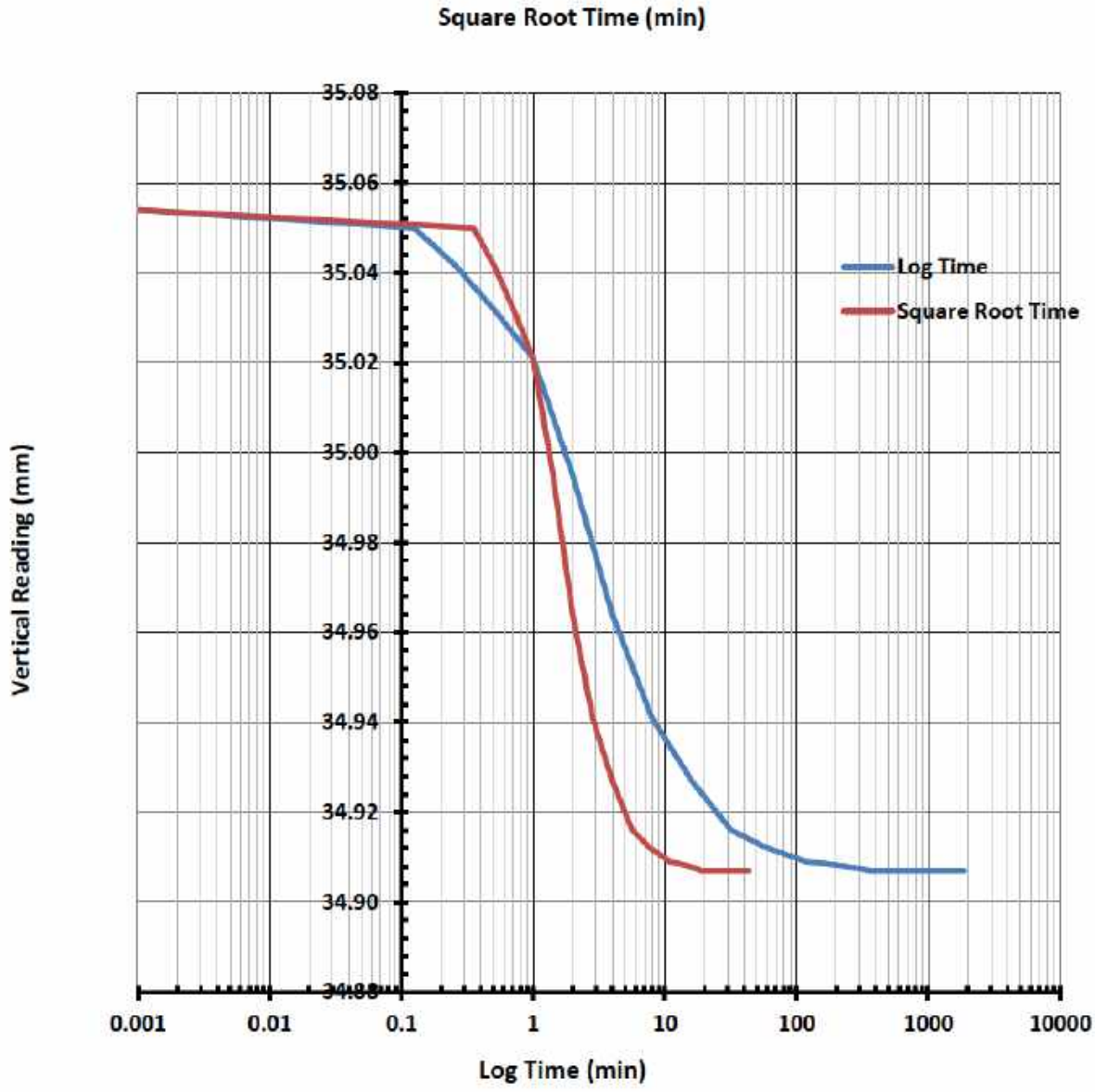
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 2 @ 25kPa



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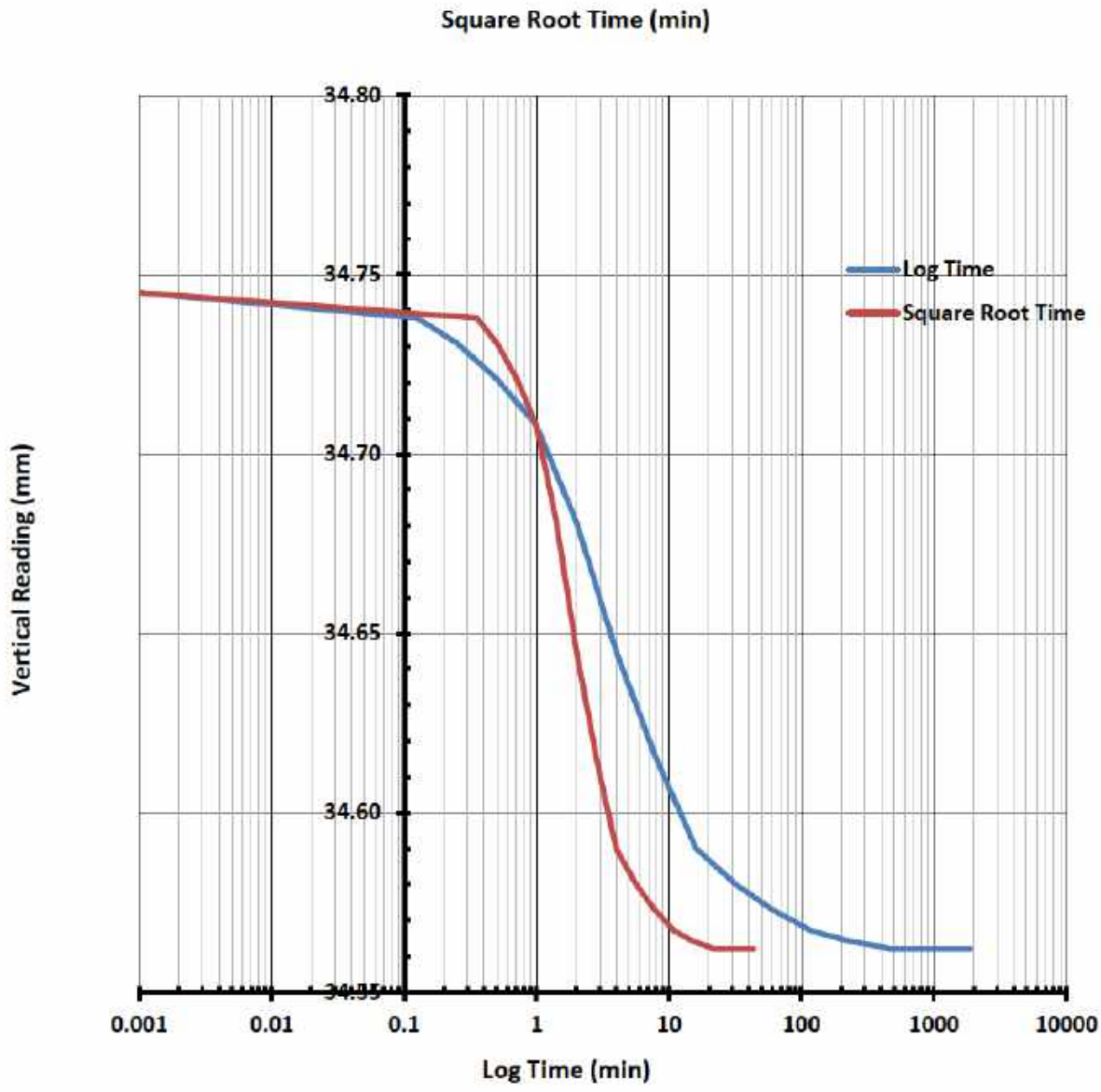
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 3 @ 50kPa



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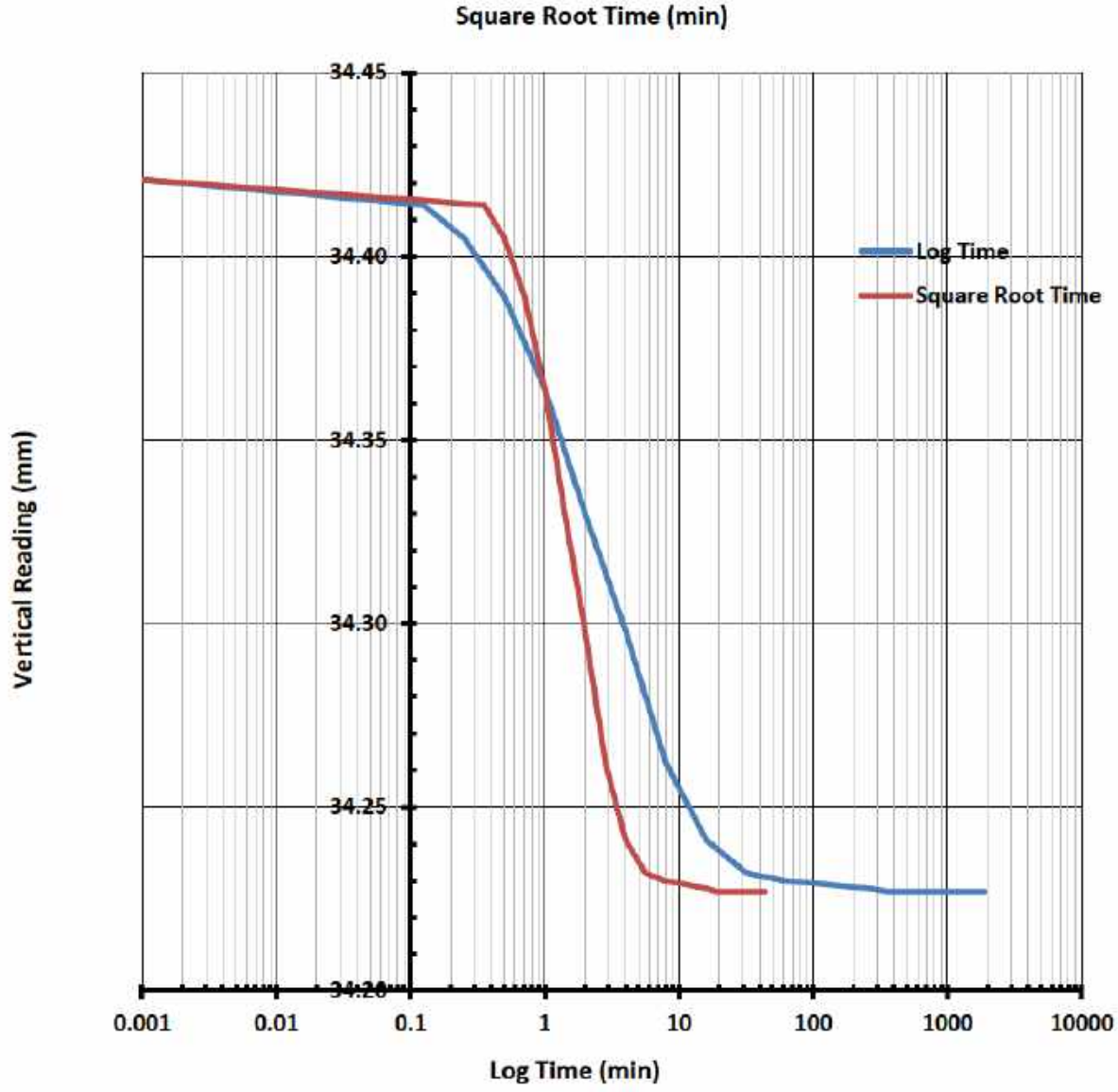
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 4 @ 100kPa



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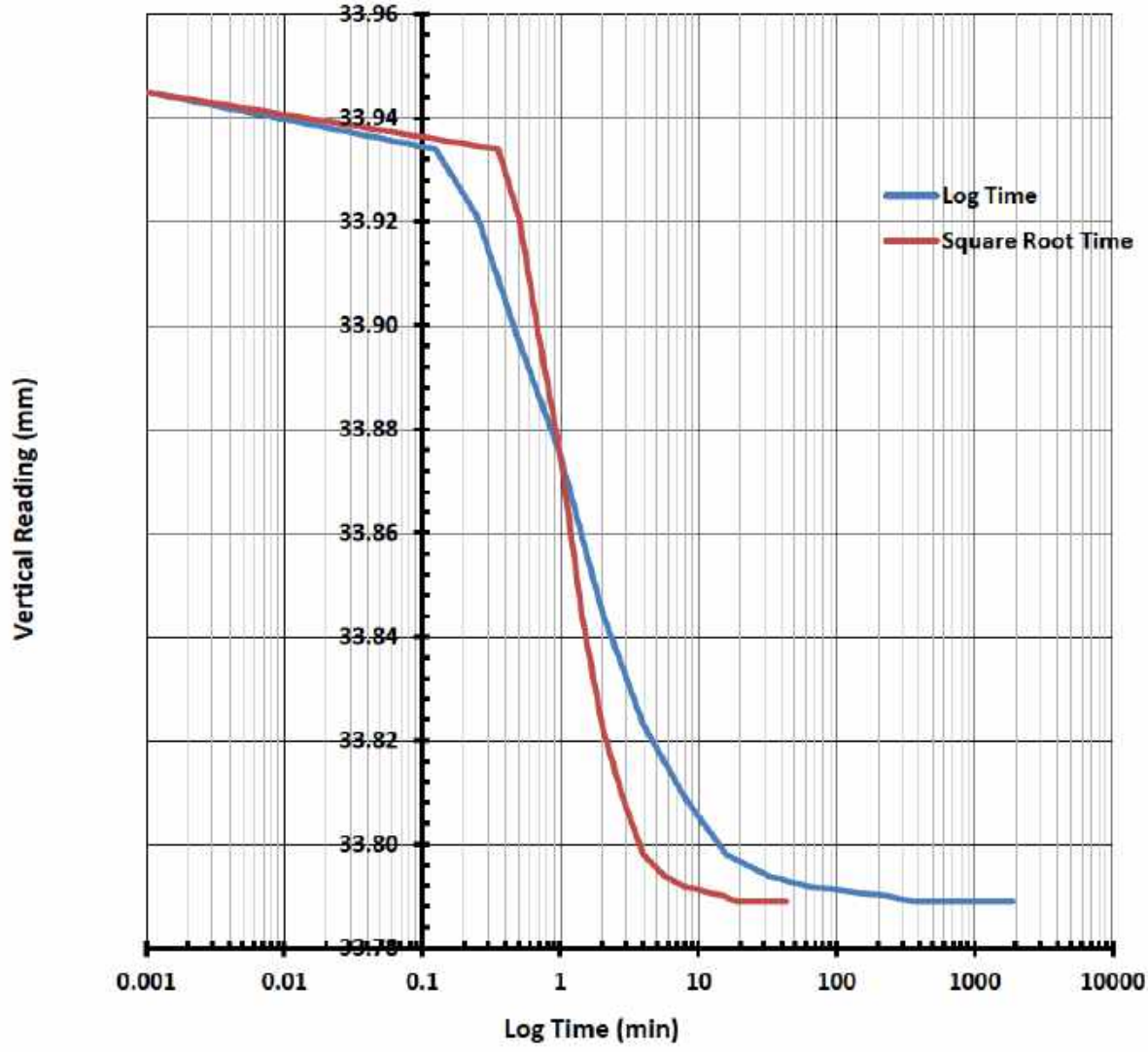
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 5 @ 200kPa



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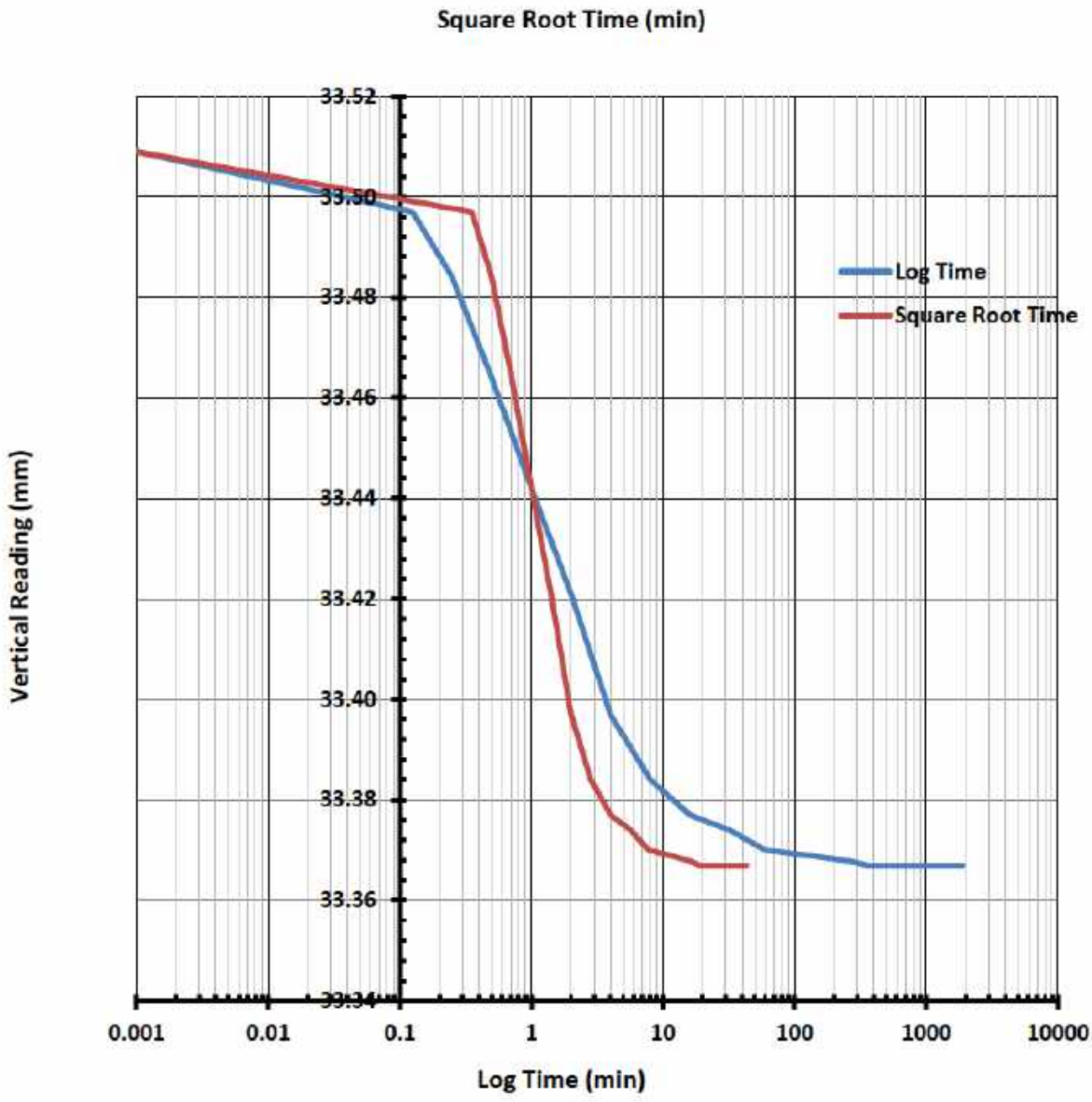
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 6 @ 400kPa



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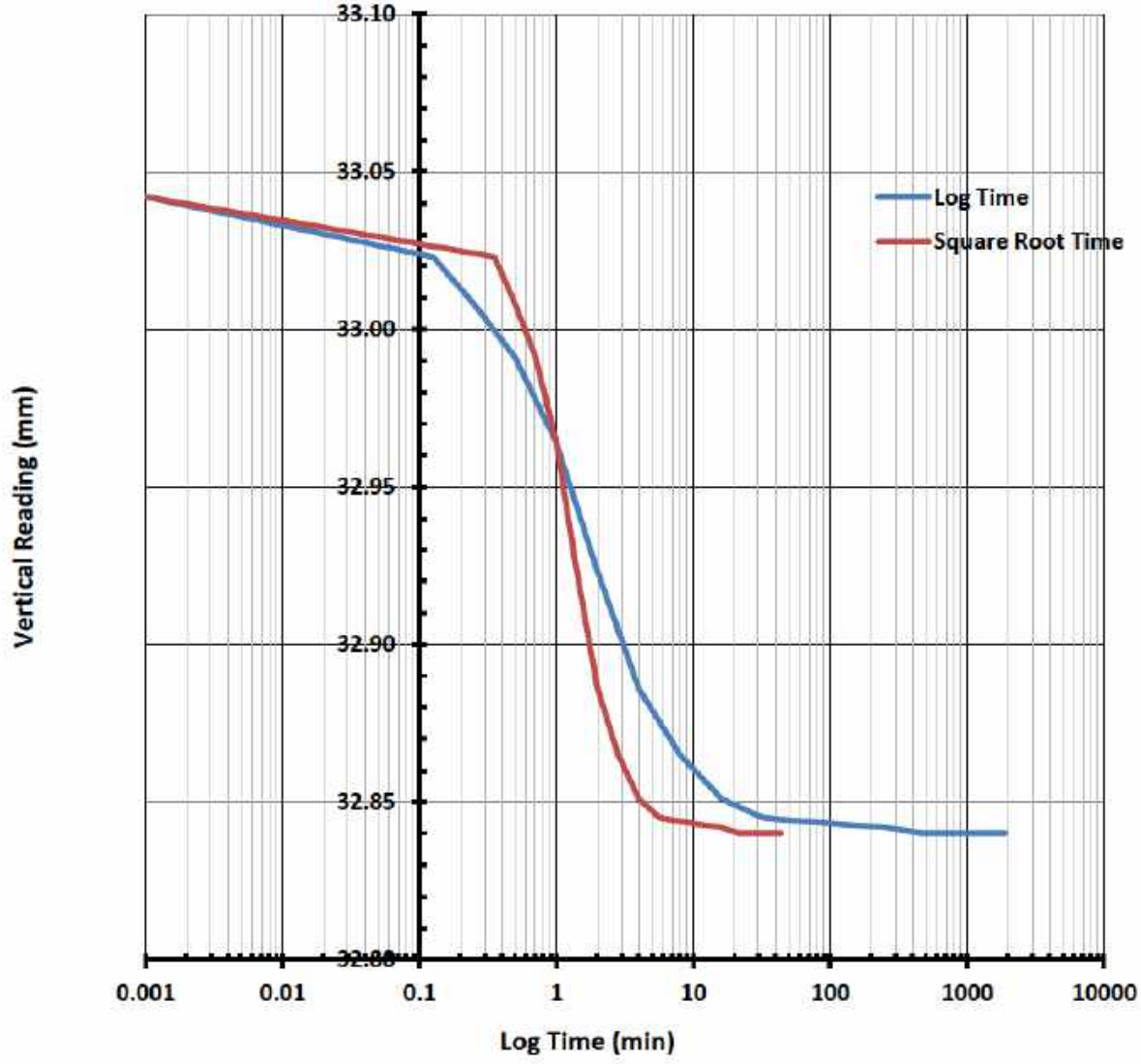
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 7 @ 800kPa



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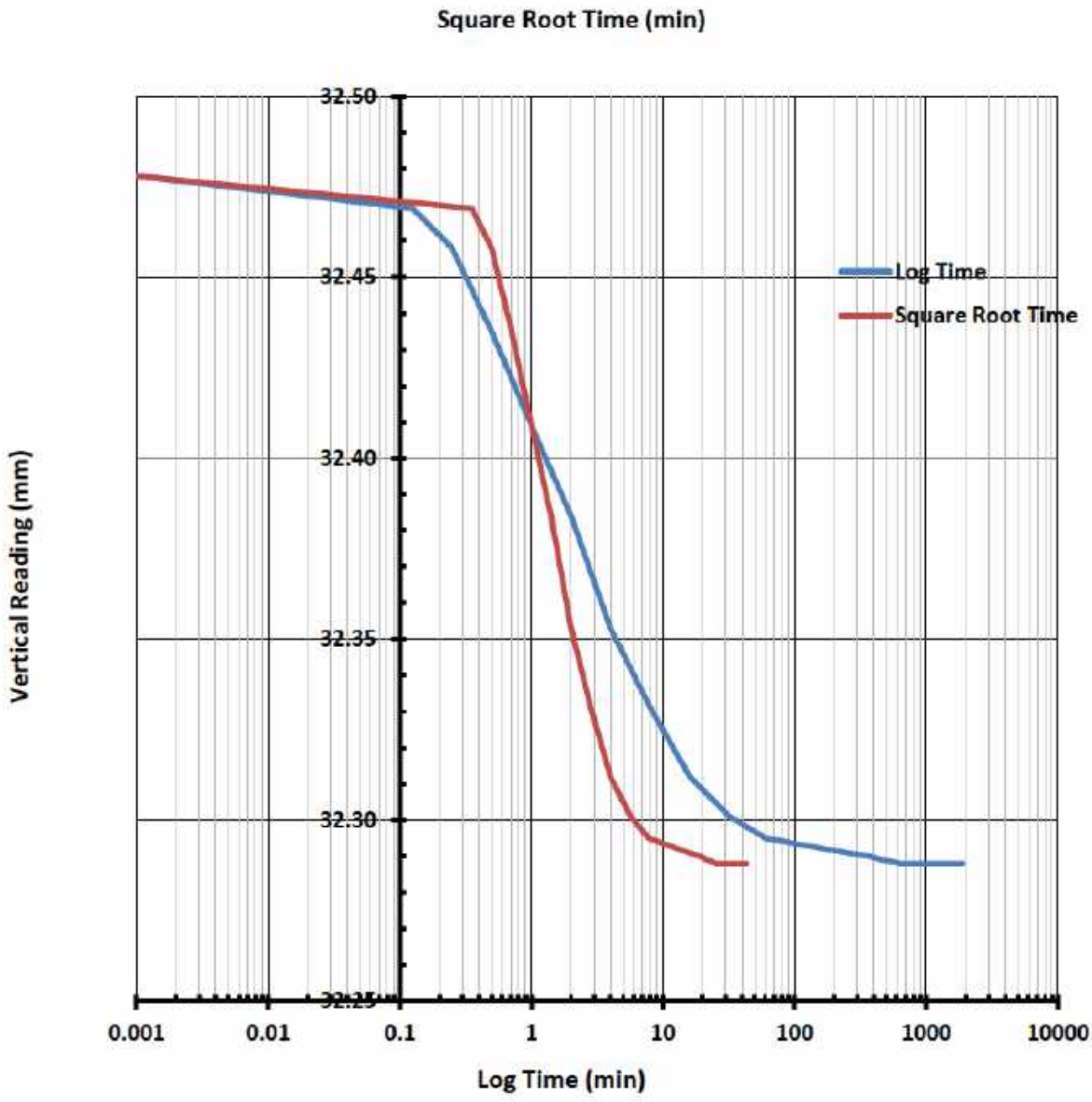
CONSOLIDATION - ONE DIMENSION

Method: AS1289 6.6.1 / Inhouse Method

Client:	Kimberley Sands	Date Tested:	22/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample ID:	S4		
Lab ID:	S4_OED	Lab:	EPLab
Depth (m):	-	Room Temperature at Test:	~ 19°C

Stage 8 @ 1600kPa



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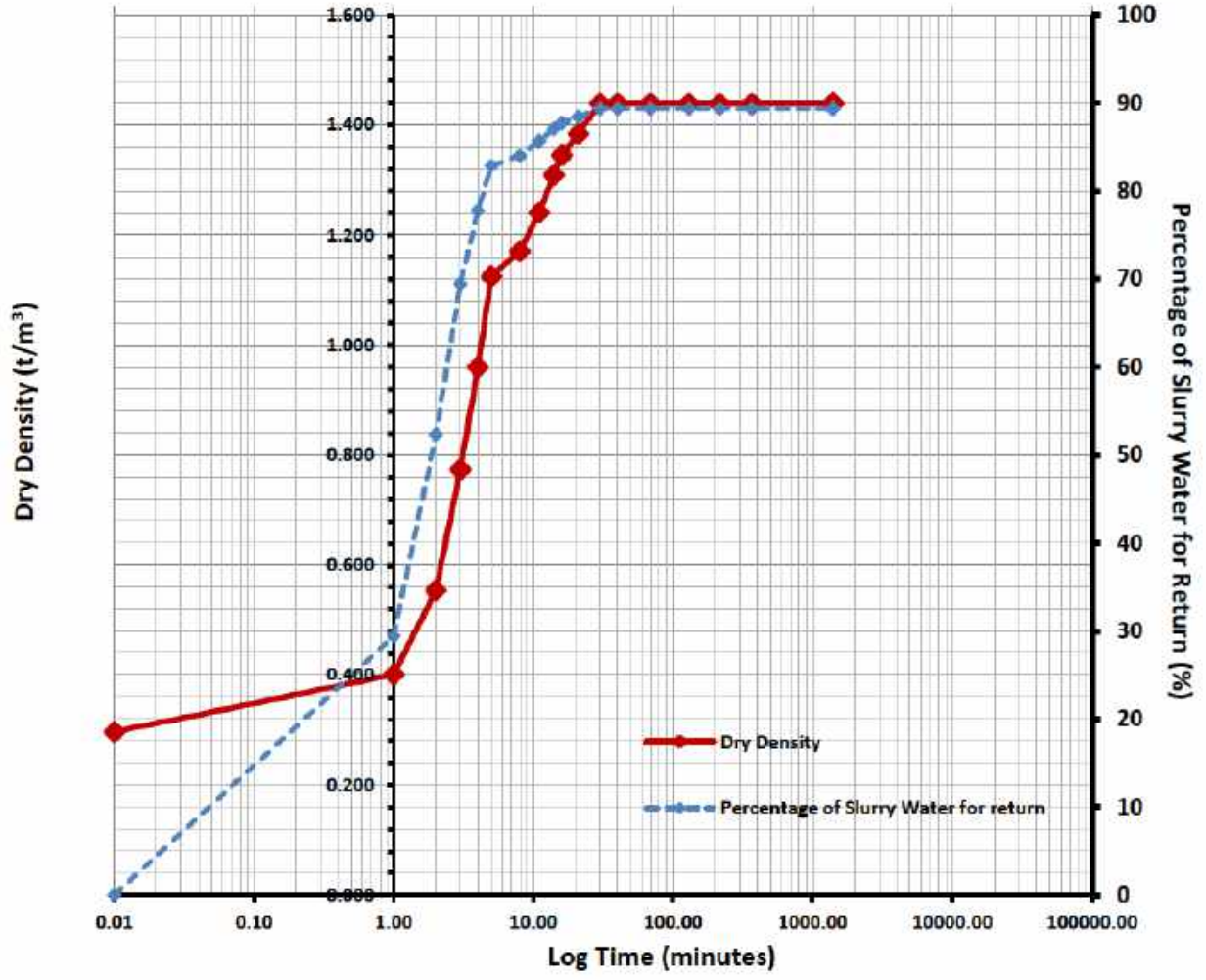
SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S4		
Lab ID:	S4_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil	**Initial Dry Density (t/m³):** 0.296
Type of Test: Settlement Testing	**Particle Density (t/m³):** 2.798
Sample Preparation: 25% Solids	**Initial Bulk Density (t/m³):** 1.147

Undrained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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

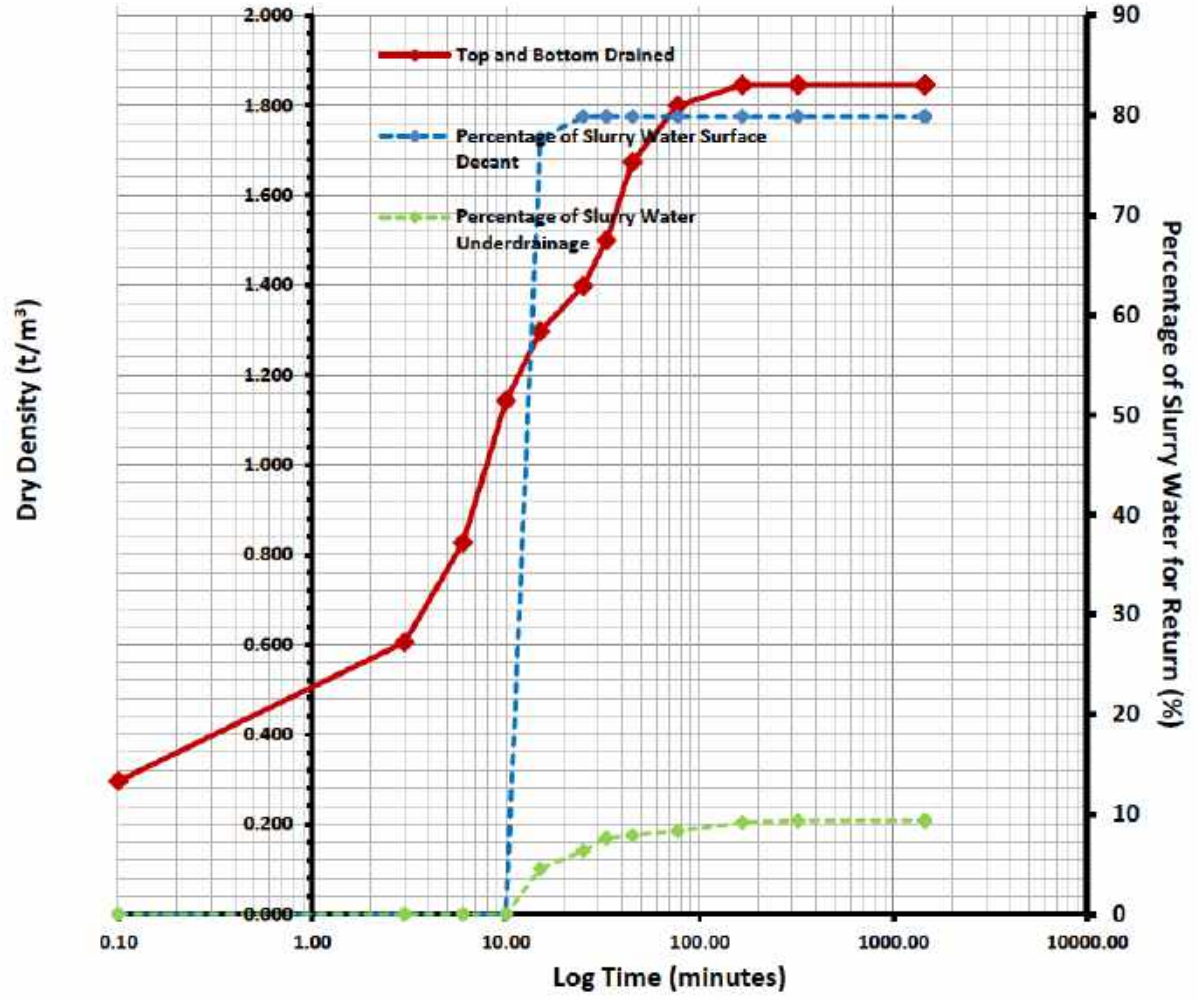
METHOD: IN-HOUSE METHOD

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S4		
Lab ID:	S4_SETTLEMENT	Room Temperature at Test:	19°

Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 25% Solids

Initial Dry Density (t/m³): 0.296
Particle Density (t/m³): 2.798
Initial Bulk Density (t/m³): 1.147

Top and Bottom Drained Dry Density (t/m³) Vs Log Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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SETTLEMENT TESTING TAILINGS

METHOD: IN-HOUSE METHOD

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tailings 2024	EP Lab Job Number:	KSANDS
Sample No:	S4		
Lab ID:	S4_SETTLEMENT	Room Temperature at Test:	19°

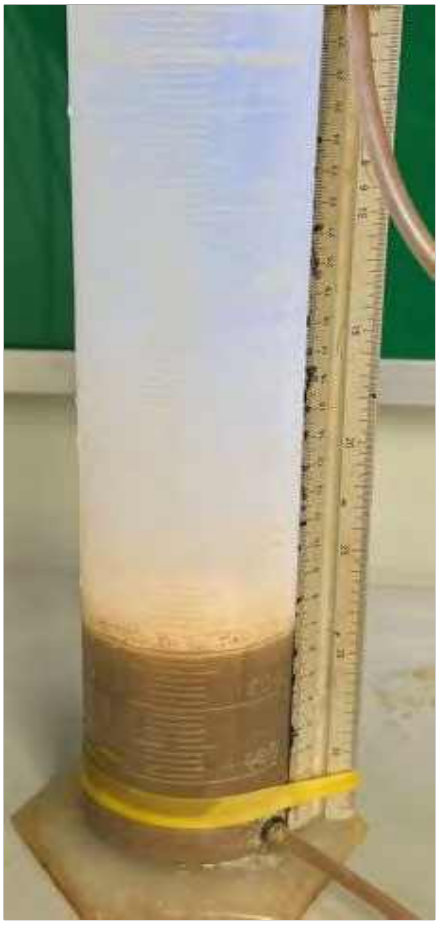
Tested by: Phil
Type of Test: Settlement Testing
Sample Preparation: 25% Solids

Initial Dry Density (t/m³): -
Particle Density (t/m³): -
Initial Bulk Density (t/m3): -

Photo of Test Setup

Undrained

Drained



Comments:

[redacted]

Authorised Signature (Geotechnical Engineer):

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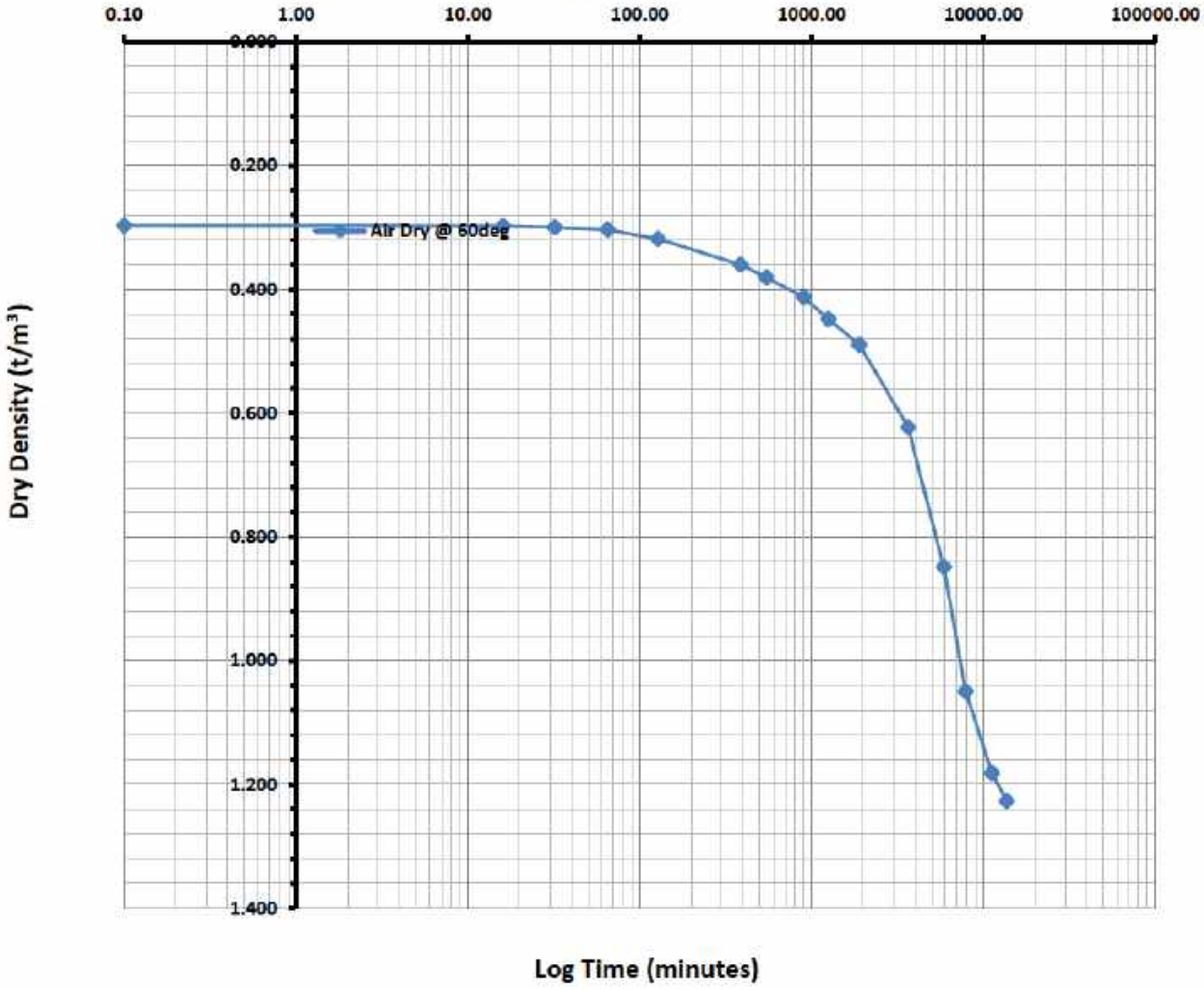
AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S4		
Lab ID:	S4_AIR_DRY	Room Temperature at Test:	19°

Tested by:	Phil	**Initial Bulk Density (t/m³):**	1.188
Type of Test:	Air Dry Testing	**Particle Density (t/m³):**	2.798
Sample Preparation:	25% Solids	**Moisture Content Initial (%):**	300.000

Dry Density (t/m³) Vs Time (minutes)



Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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WA 6155

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E-Precision Laboratory

AIR DRYING SETTLING TEST

METHOD: Supplied by Client SRC-WF-100 / SRC-RF-100

Client:	Kimberley Sands	Date Tested:	15/04/2024
Project:	Tails Testing 2024	EP Lab Job Number:	KSANDS
Sample No:	S4		
Lab ID:	S4_AIR_DRY	Room Temperature at Test:	19°

Photo of Samples after Testing

Oven dried @ 60deg

Comments:

Authorised Signature (Geotechnical Engineer): [redacted]

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

Integrity Precision Innovation

MINERALS
TEST REPORT

CLIENT

KIMBERLEY MINERAL SANDS

JOB INFORMATION

JOB CODE	: 2303.0/2417910
NO. SAMPLES	: 16
NO. ELEMENTS	: 91
CLIENT ORDER NO.	: 4500003077 (Job 1 of 1)
SAMPLE SUBMISSION NO.	:
PROJECT	: GEOCHEM TESTING FOR TOPL TAILING M
SAMPLE TYPE	: Various
DATE RECEIVED	: 30/09/2024
DATE TESTED	: 11/10/2024 - 30/10/2024
DATE REPORTED	: 01/11/2024
DATE PRINTED	: 01/11/2024

REPORT NOTES

[redacted]

This report relates specifically to the sample(s) tested that were drawn and/or provided by the client or their nominated third party to Intertek. The reported result(s) provide no warranty or verification on the sample(s) representing any specific goods and/or shipment. This report was prepared solely for the use of the client named in this report. Intertek accepts no responsibility for any loss, damage or liability suffered by a third party as a result of any reliance upon or use of this report. The results provided are not intended for commercial settlement purposes.
Except where explicitly agreed in writing, all work and services performed by Intertek is subject to our standard Terms and Conditions which can be obtained at our website: intertek.com/terms/
In nominating Intertek for this work, you hereby undertake that the performance of such work will not constitute a breach of, or cause Intertek to be in breach of, any applicable sanctions or other legislation.

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 figures beyond the least significant digit have significance.

For more information on the uncertainty on individual reported values, please contact the laboratory.

MEASUREMENT OF UNCERTAINTY

Measurement of uncertainty estimates are available for most tests upon request.

SAMPLE STORAGE

All solid samples (assay pulps, bulk pulps and residues) will be stored for 60 days without charge. Following this samples will be stored at a daily rate until clients written advice regarding return, collection or disposal is received. If storage information is not supplied on the submission, or arranged with the laboratory in writing the default will be to store the samples with the applicable charges. Storage is charged at $4.00 per m3 per day, expenses related to the return or disposal of samples will also be charged. Current disposal costs including packaging in a Class2 waste disposal facility is charged at $175.00 per m3.

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.

LEGEND	X	= Less than Detection Limit		NA	= Not Analysed
	SNR	= Sample Not Received		UA	= Unable to Assay
	LNR	= Lab Not Received		>	= Value beyond Limit of Method
	DTF	= Result still to come		+	= Extra Sample Received Not Listed
	I/S	= Insufficient Sample for Analysis			

UNITS	ppm for Solid Samples	= mg/Kg
	ppb for Solid Samples	= µg/Kg
	ppm for Liquid Samples	= mg/L
	ppb for Liquid Samples	= µg/L

ELEMENTS	Ag	Al	Al2O3	ANC	As	B
UNITS	ug/l	mg/l	%	kgH2SO4/t	ug/l	mg/l
DETECTION LIMIT	0.01	0.01	0.01	1	0.1	0.01
DIGEST	ASLP/	ASLP/	FB6/	ANCx/	ASLP/	ASLP/
ANALYTICAL FINISH	MS	OE	OE	VOL	MS	OE
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	X	X	0.76		0.3	X
0002 Non-Magnetic Concentrate - Zircon	X	X	1.62		X	X
0003 Paramagnetic Concentrate	X	0.01	3.10		0.2	0.05
0004 MUP Oversize (>12mm)	X	X	4.02	2	X	0.02
0005 WCP Oversize (<12 - >2mm)	X	X	5.35	2	X	0.02
0006 WCP Sand Reject	X	X	1.52	1	X	0.01
0007 WCP Tails (Slimes)	X	X	22.13	2	0.2	0.01
0008 CUP Tailing	X	X	2.72	1	0.1	0.01
0009 MUP Oversize (>12 mm) pH 2.9	0.01	0.93			X	X
0010 WCP Oversize (<12 > 2mm) pH 2.9	0.04	1.60			X	0.01
0011 WCP Sand Rejects pH 2.9	0.08	0.39			X	X
0012 WCP Tails (slimes) pH 2.9	0.05	0.37			X	0.01
0013 CUP Tailings pH 2.9	X	0.47			X	X
0014 Magnetic Concentrate 1M HCl	X	1.45			0.5	X
0015 Non-magnetic concentrate 1M HCl	X	1.57			0.4	X
0016 Para-magnetic concentrate 1M HCl	X	2.27			0.5	X
CHECKS						
0001 MUP Oversize (>12mm)	X	X	4.04		X	X
0002 MUP Oversize (>12mm)				2		
STANDARDS						
0001 CCV-1-B-500		0.01				X
0002 ICP-AM-MISA6		99.91				100.07
0003 CRM-TMDW-500	2.02				85.8	
0004 GWS-6						
0005 ANC-6				97		
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699			1.23			
0010 OREAS 20a			14.93			
BLANKS						
0001 Control Blank	X	X	X		X	X
0002 Control Blank				0		

The results provided are not intended for commercial settlement purposes

ELEMENTS	Ba	Ba	Be	Be	Bi	C
UNITS	ppm	ug/l	ppm	ug/l	ug/l	%
DETECTION LIMIT	0.5	0.05	0.5	0.1	0.005	0.01
DIGEST	FB6/	ASLP/	FB6/	ASLP/	ASLP/	
ANALYTICAL FINISH	MS	MS	MS	MS	MS	/CSA
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	69.1	X	0.9	X	X	
0002 Non-Magnetic Concentrate - Zircon	48.3	0.44	4.8	X	X	
0003 Paramagnetic Concentrate	85.8	X	2.0	X	X	
0004 MUP Oversize (>12mm)	34.1	0.69	1.0	X	X	0.02
0005 WCP Oversize (<12 - >2mm)	53.7	1.74	2.4	X	X	0.04
0006 WCP Sand Reject	43.6	X	X	X	X	X
0007 WCP Tails (Slimes)	75.5	0.19	2.4	X	X	0.05
0008 CUP Tailing	48.9	0.06	1.0	X	X	0.01
0009 MUP Oversize (>12 mm) pH 2.9		32.26		0.5	0.006	
0010 WCP Oversize (<12 > 2mm) pH 2.9		123.57		2.8	0.008	
0011 WCP Sand Rejects pH 2.9		12.40		0.2	X	
0012 WCP Tails (slimes) pH 2.9		107.18		1.4	X	
0013 CUP Tailings pH 2.9		33.00		0.3	X	
0014 Magnetic Concentrate 1M HCl		70.56		0.9	0.342	
0015 Non-magnetic concentrate 1M HCl		73.93		1.5	0.151	
0016 Para-magnetic concentrate 1M HCl		210.37		1.5	0.372	
CHECKS						
0001 MUP Oversize (>12mm)	35.7	0.61	3.1	X	X	
0002 MUP Oversize (>12mm)						0.02
STANDARDS						
0001 CCV-1-B-500						
0002 ICP-AM-MISA6						
0003 CRM-TMDW-500		51.55		21.8	10.497	
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						1.14
0009 AMIS0699	54.6		1.3			
0010 OREAS 20a	1068.1		2.8			
BLANKS						
0001 Control Blank	0.7	X	X	X	X	
0002 Control Blank						X

The results provided are not intended for commercial settlement purposes

ELEMENTS	CO3	Ca	CaO	Cd	Ce	Ce
UNITS	mgCaCO3/L	mg/l	%	ug/l	ppm	ug/l
DETECTION LIMIT	1	0.01	0.01	0.02	0.5	0.002
DIGEST	ASLP/	ASLP/	FB6/	ASLP/	FB6/	ASLP/
ANALYTICAL FINISH	VOL	OE	OE	MS	MS	MS
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	X	X	0.01	X	1048.4	X
0002 Non-Magnetic Concentrate - Zircon	X	0.04	0.06	X	3079.5	0.003
0003 Paramagnetic Concentrate	X	0.03	0.07	X	6008.3	0.002
0004 MUP Oversize (>12mm)	X	0.01	X	X	257.5	X
0005 WCP Oversize (<12 - >2mm)	X	0.06	0.02	X	287.0	X
0006 WCP Sand Reject	X	0.02	0.01	X	1086.3	X
0007 WCP Tails (Slimes)	X	0.02	X	X	694.1	X
0008 CUP Tailing	X	0.03	0.03	X	2532.6	0.017
0009 MUP Oversize (>12 mm) pH 2.9		0.09		0.02		87.580
0010 WCP Oversize (<12 > 2mm) pH 2.9		1.27		X		30.844
0011 WCP Sand Rejects pH 2.9		0.11		X		17.319
0012 WCP Tails (slimes) pH 2.9		0.71		X		20.749
0013 CUP Tailings pH 2.9		0.10		X		49.091
0014 Magnetic Concentrate 1M HCl		0.17		0.08		480.970
0015 Non-magnetic concentrate 1M HCl		0.39		0.07		1002.721
0016 Para-magnetic concentrate 1M HCl		0.65		0.06		1384.885
CHECKS						
0001 MUP Oversize (>12mm)	X	X	X	X	247.8	X
0002 MUP Oversize (>12mm)						
STANDARDS						
0001 CCV-1-B-500		X				
0002 ICP-AM-MISA6		98.81				
0003 CRM-TMDW-500				10.74		X
0004 GWS-6	X					
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699			0.02		39.7	
0010 OREAS 20a			3.57		77.3	
BLANKS						
0001 Control Blank	X	X	X	X	0.6	X
0002 Control Blank						

The results provided are not intended for commercial settlement purposes

JOB NO : 2303.0/2417910
CLIENT REF : 4500003077

ELEMENTS	Cl	Co		CoolourChange	Cr	Cr
UNITS	mg/L	ppm	ug/l	NONE	ppm	ug/l
DETECTION LIMIT	2	0.5	0.1	0	20	10
DIGEST	ASLP/	FB6/	ASLP/	ANCx/	FB6/	ASLP/
ANALYTICAL FINISH	COL	MS	MS	QUAL	OE	MS
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	X	38.7	X		391	X
0002 Non-Magnetic Concentrate - Zircon	X	7.1	X		154	X
0003 Paramagnetic Concentrate	X	21.4	X		396	X
0004 MUP Oversize (>12mm)	X	12.8	X	No	161	X
0005 WCP Oversize (<12 - >2mm)	X	13.0	X	No	304	X
0006 WCP Sand Reject	X	5.7	X	No	106	X
0007 WCP Tails (Slimes)	3	12.6	X	No	335	X
0008 CUP Tailing	X	8.3	X	No	173	X
0009 MUP Oversize (>12 mm) pH 2.9			0.4			X
0010 WCP Oversize (<12 > 2mm) pH 2.9			1.4			12
0011 WCP Sand Rejects pH 2.9			X			X
0012 WCP Tails (slimes) pH 2.9			0.4			X
0013 CUP Tailings pH 2.9			0.1			X
0014 Magnetic Concentrate 1M HCl			0.4			13
0015 Non-magnetic concentrate 1M HCl			0.3			X
0016 Para-magnetic concentrate 1M HCl			0.9			X
CHECKS						
0001 MUP Oversize (>12mm)	X	14.1	X		162	X
0002 MUP Oversize (>12mm)				No		
STANDARDS						
0001 CCV-1-B-500						
0002 ICP-AM-MISA6						
0003 CRM-TMDW-500			25.3			21
0004 GWS-6	38					
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699		1.1			X	
0010 OREAS 20a		13.7			88	
BLANKS						
0001 Control Blank	X	X	X		X	X
0002 Control Blank						

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ELEMENTS	Cs	Cs	Cu	Dy	EC	EC
UNITS	ppm	ug/l	ug/l	ppm	uS/cm	uS/cm
DETECTION LIMIT	0.1	0.001	1	0.1	10	10
DIGEST	FB6/	ASLP/	ASLP/	FB6/	ASLP/	Ws5/
ANALYTICAL FINISH	MS	MS	MS	MS	MTR	MTR
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	0.2	X	X	75.7	X	
0002 Non-Magnetic Concentrate - Zircon	X	X	X	259.3	X	
0003 Paramagnetic Concentrate	0.1	X	X	211.5	X	
0004 MUP Oversize (>12mm)	0.2	X	X	15.6	X	13
0005 WCP Oversize (<12 - >2mm)	0.5	X	X	16.2	X	12
0006 WCP Sand Reject	X	X	X	36.1	X	17
0007 WCP Tails (Slimes)	0.2	X	X	16.2	15	70
0008 CUP Tailing	0.1	X	X	73.5	X	16
0009 MUP Oversize (>12 mm) pH 2.9		X	X			
0010 WCP Oversize (<12 > 2mm) pH 2.9		X	4			
0011 WCP Sand Rejects pH 2.9		X	X			
0012 WCP Tails (slimes) pH 2.9		X	X			
0013 CUP Tailings pH 2.9		X	X			
0014 Magnetic Concentrate 1M HCl		X	1			
0015 Non-magnetic concentrate 1M HCl		X	X			
0016 Para-magnetic concentrate 1M HCl		X	2			
CHECKS						
0001 MUP Oversize (>12mm)	0.1	X	X	14.6	X	
0002 MUP Oversize (>12mm)						14
STANDARDS						
0001 CCV-1-B-500						
0002 ICP-AM-MISA6						
0003 CRM-TMDW-500		X	20			
0004 GWS-6					307	
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						319
0008 OREAS 279						
0009 AMIS0699	X			92.5		
0010 OREAS 20a	12.7			5.2		
BLANKS						
0001 Control Blank	X	X	X	X	X	
0002 Control Blank						X

The results provided are not intended for commercial settlement purposes

ELEMENTS	Er	Eu	F	Fe	Fe2O3	Final-pH
UNITS	ppm	ppm	mg/L	mg/l	%	NONE
DETECTION LIMIT	0.1	0.1	0.1	0.01	0.01	0.1
DIGEST	FB6/	FB6/	ASLP/	ASLP/	FB6/	ANCx/
ANALYTICAL FINISH	MS	MS	SIE	OE	OE	MTR
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	52.7	4.5	X	X	48.69	
0002 Non-Magnetic Concentrate - Zircon	197.8	27.0	0.1	X	8.98	
0003 Paramagnetic Concentrate	110.0	24.6	0.1	X	31.30	
0004 MUP Oversize (>12mm)	9.8	1.8	X	X	16.90	1.6
0005 WCP Oversize (<12 - >2mm)	9.3	1.8	X	X	30.49	1.5
0006 WCP Sand Reject	17.9	4.4	X	X	8.19	1.9
0007 WCP Tails (Slimes)	10.4	2.5	X	X	20.42	1.4
0008 CUP Tailing	33.3	9.1	X	X	12.39	1.5
0009 MUP Oversize (>12 mm) pH 2.9				0.25		
0010 WCP Oversize (<12 > 2mm) pH 2.9				0.59		
0011 WCP Sand Rejects pH 2.9				0.11		
0012 WCP Tails (slimes) pH 2.9				0.05		
0013 CUP Tailings pH 2.9				0.14		
0014 Magnetic Concentrate 1M HCl				7.47		
0015 Non-magnetic concentrate 1M HCl				3.74		
0016 Para-magnetic concentrate 1M HCl				8.31		
CHECKS						
0001 MUP Oversize (>12mm)	10.2	1.9	X	X	17.00	
0002 MUP Oversize (>12mm)						1.6
STANDARDS						
0001 CCV-1-B-500				X		
0002 ICP-AM-MISA6				99.82		
0003 CRM-TMDW-500						
0004 GWS-6			0.6			
0005 ANC-6						1.5
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699	123.6	4.1			0.10	
0010 OREAS 20a	3.0	1.5			5.40	
BLANKS						
0001 Control Blank	X	X	X	X	X	
0002 Control Blank						1.4

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ELEMENTS	Fizz-Rate	Ga	Ga	Gd	Ge	HCO3
UNITS	NONE	ppm	ug/l	ppm	ug/l	mgCaCO3/L
DETECTION LIMIT	1	0.5	0.02	0.1	0.1	2
DIGEST	ANCx/	FB6/	ASLP/	FB6/	ASLP/	ASLP/
ANALYTICAL FINISH	QUAL	MS	MS	MS	MS	VOL
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite		15.1	X	62.5	X	3
0002 Non-Magnetic Concentrate - Zircon		6.0	X	223.1	X	3
0003 Paramagnetic Concentrate		17.1	X	298.3	X	3
0004 MUP Oversize (>12mm)	X	7.3	X	16.2	X	3
0005 WCP Oversize (<12 - >2mm)	X	12.7	X	16.3	X	3
0006 WCP Sand Reject	X	4.5	X	52.4	X	3
0007 WCP Tails (Slimes)	X	30.2	X	22.4	X	3
0008 CUP Tailing	X	8.7	X	113.6	X	3
0009 MUP Oversize (>12 mm) pH 2.9			0.21		X	
0010 WCP Oversize (<12 > 2mm) pH 2.9			0.17		X	
0011 WCP Sand Rejects pH 2.9			0.10		X	
0012 WCP Tails (slimes) pH 2.9			0.07		X	
0013 CUP Tailings pH 2.9			0.17		X	
0014 Magnetic Concentrate 1M HCl			2.87		0.1	
0015 Non-magnetic concentrate 1M HCl			2.29		0.1	
0016 Para-magnetic concentrate 1M HCl			4.51		X	
CHECKS						
0001 MUP Oversize (>12mm)		7.2	X	14.8	X	3
0002 MUP Oversize (>12mm)	X					
STANDARDS						
0001 CCV-1-B-500						
0002 ICP-AM-MISA6						
0003 CRM-TMDW-500			X		X	
0004 GWS-6						101
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699		1.4		32.2		
0010 OREAS 20a		17.7		5.3		
BLANKS						
0001 Control Blank		X	X	X	X	3
0002 Control Blank						

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ELEMENTS	Hf	Hf	Hg	Ho	K	K2O
UNITS	ppm	ug/l	ug/l	ppm	mg/l	%
DETECTION LIMIT	0.1	0.005	0.1	0.1	0.1	0.01
DIGEST	FB6/	ASLP/	ASLP/	FB6/	ASLP/	FB6/
ANALYTICAL FINISH	MS	MS	MS	MS	OE	OE
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	172.1	X	X	16.6	0.2	X
0002 Non-Magnetic Concentrate - Zircon	5707.1	X	X	57.0	X	X
0003 Paramagnetic Concentrate	1186.3	X	X	37.7	0.2	X
0004 MUP Oversize (>12mm)	121.4	X	X	3.1	X	X
0005 WCP Oversize (<12 - >2mm)	139.4	X	X	3.1	X	0.04
0006 WCP Sand Reject	136.0	X	X	6.3	X	0.01
0007 WCP Tails (Slimes)	132.9	X	X	3.1	0.3	0.13
0008 CUP Tailing	245.1	X	X	12.3	0.1	X
0009 MUP Oversize (>12 mm) pH 2.9		X	X		0.1	
0010 WCP Oversize (<12 > 2mm) pH 2.9		X	X		0.4	
0011 WCP Sand Rejects pH 2.9		0.011	X		0.1	
0012 WCP Tails (slimes) pH 2.9		X	X		0.9	
0013 CUP Tailings pH 2.9		X	X		0.1	
0014 Magnetic Concentrate 1M HCl		3.020	X		X	
0015 Non-magnetic concentrate 1M HCl		21.069	X		X	
0016 Para-magnetic concentrate 1M HCl		4.686	X		X	
CHECKS						
0001 MUP Oversize (>12mm)	118.6	X	X	3.1	X	0.02
0002 MUP Oversize (>12mm)						
STANDARDS						
0001 CCV-1-B-500					X	
0002 ICP-AM-MISA6					99.8	
0003 CRM-TMDW-500		X	X			
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699	1.00%			28.7		X
0010 OREAS 20a	13.7			1.0		3.78
BLANKS						
0001 Control Blank	X	X	X	X	0.1	X
0002 Control Blank						

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ELEMENTS	La	La	Li	Lu	Mg	MgO
UNITS	ppm	ug/l	ug/l	ppm	mg/l	%
DETECTION LIMIT	0.2	0.002	0.05	0.1	0.01	0.01
DIGEST	FB6/	ASLP/	ASLP/	FB6/	ASLP/	FB6/
ANALYTICAL FINISH	MS	MS	MS	MS	OE	OE
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	467.2	X	0.11	8.0	0.01	0.18
0002 Non-Magnetic Concentrate - Zircon	1348.7	0.003	0.08	54.1	0.06	0.15
0003 Paramagnetic Concentrate	2874.2	X	0.07	19.8	0.01	0.28
0004 MUP Oversize (>12mm)	115.1	X	0.29	2.1	0.05	0.06
0005 WCP Oversize (<12 - >2mm)	139.6	X	0.66	1.9	0.06	0.07
0006 WCP Sand Reject	511.6	X	0.38	3.0	0.01	0.05
0007 WCP Tails (Slimes)	335.7	X	0.21	1.9	0.03	0.07
0008 CUP Tailing	1226.2	0.003	0.10	5.5	0.04	0.16
0009 MUP Oversize (>12 mm) pH 2.9		55.794	0.50		0.76	
0010 WCP Oversize (<12 > 2mm) pH 2.9		33.607	1.25		1.27	
0011 WCP Sand Rejects pH 2.9		10.115	0.65		0.26	
0012 WCP Tails (slimes) pH 2.9		15.991	0.61		3.61	
0013 CUP Tailings pH 2.9		32.764	0.11		0.22	
0014 Magnetic Concentrate 1M HCl		282.818	0.75		0.22	
0015 Non-magnetic concentrate 1M HCl		547.144	0.71		0.20	
0016 Para-magnetic concentrate 1M HCl		785.086	0.88		0.57	
CHECKS						
0001 MUP Oversize (>12mm)	109.9	X	0.37	1.9	0.03	0.06
0002 MUP Oversize (>12mm)						
STANDARDS						
0001 CCV-1-B-500					X	
0002 ICP-AM-MISA6					99.26	
0003 CRM-TMDW-500		0.080	20.07			
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699	6.4			47.0		X
0010 OREAS 20a	38.6			0.3		2.37
BLANKS						
0001 Control Blank	X	X	X	X	X	X
0002 Control Blank						

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ELEMENTS	Mn	MnO	Mo	Mo	MPA	Na
UNITS	ug/l	%	ppm	ug/l	kgH2SO4/t	mg/l
DETECTION LIMIT	0.1	0.01	1	0.05	1	0.1
DIGEST	ASLP/	FB6/	FB6/	ASLP/		ASLP/
ANALYTICAL FINISH	MS	OE	MS	MS	/CALC	OE
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	X	0.94	7	X		1.0
0002 Non-Magnetic Concentrate - Zircon	X	0.15	5	X		0.4
0003 Paramagnetic Concentrate	X	0.45	5	0.17		0.6
0004 MUP Oversize (>12mm)	0.5	0.12	2	X	X	0.5
0005 WCP Oversize (<12 - >2mm)	X	0.13	2	X	X	0.6
0006 WCP Sand Reject	X	0.09	1	X	X	0.7
0007 WCP Tails (Slimes)	X	0.09	2	X	X	2.5
0008 CUP Tailing	X	0.15	2	X	X	0.7
0009 MUP Oversize (>12 mm) pH 2.9	9.7			X		0.7
0010 WCP Oversize (<12 > 2mm) pH 2.9	17.7			X		0.9
0011 WCP Sand Rejects pH 2.9	3.5			X		0.7
0012 WCP Tails (slimes) pH 2.9	17.8			X		3.2
0013 CUP Tailings pH 2.9	6.1			X		0.8
0014 Magnetic Concentrate 1M HCl	21.1			0.41		1.1
0015 Non-magnetic concentrate 1M HCl	17.1			X		0.5
0016 Para-magnetic concentrate 1M HCl	32.8			X		0.8
CHECKS						
0001 MUP Oversize (>12mm)	X	0.12	2	X		0.5
0002 MUP Oversize (>12mm)					X	
STANDARDS						
0001 CCV-1-B-500						819.7
0002 ICP-AM-MISA6						99.9
0003 CRM-TMDW-500	42.8			100.44		
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279					39	
0009 AMIS0699		X	3			
0010 OREAS 20a		0.07	4			
BLANKS						
0001 Control Blank	X	X	X	X		X
0002 Control Blank					X	

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ELEMENTS	Na2O	NAG	NAGpH	NAG(4.5)	NAPP	Nb
UNITS	%	kgH2SO4/t	NONE	kgH2SO4/t	kgH2SO4/t	ppm
DETECTION LIMIT	0.01	1	0.1	1	1	0.1
DIGEST	FB6/	NAGx/	NAGx/	NAGx/		FB6/
ANALYTICAL FINISH	OE	VOL	MTR	VOL	/CALC	MS
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	0.02					568.0
0002 Non-Magnetic Concentrate - Zircon	0.04					468.7
0003 Paramagnetic Concentrate	0.07					469.0
0004 MUP Oversize (>12mm)	X	5	4.8	0	-2	72.9
0005 WCP Oversize (<12 - >2mm)	X	1	5.4	0	-2	69.1
0006 WCP Sand Reject	0.02	6	4.9	0	-1	82.6
0007 WCP Tails (Slimes)	0.01	5	4.9	0	-2	62.1
0008 CUP Tailing	0.04	5	4.9	0	-1	178.3
0009 MUP Oversize (>12 mm) pH 2.9						
0010 WCP Oversize (<12 > 2mm) pH 2.9						
0011 WCP Sand Rejects pH 2.9						
0012 WCP Tails (slimes) pH 2.9						
0013 CUP Tailings pH 2.9						
0014 Magnetic Concentrate 1M HCl						
0015 Non-magnetic concentrate 1M HCl						
0016 Para-magnetic concentrate 1M HCl						
CHECKS						
0001 MUP Oversize (>12mm)	X					74.2
0002 MUP Oversize (>12mm)		5	4.8	0	-2	
STANDARDS						
0001 CCV-1-B-500						
0002 ICP-AM-MISA6						
0003 CRM-TMDW-500						
0004 GWS-6						
0005 ANC-6						
0006 NAG-6		95	2.4	13		
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699	X					7.5
0010 OREAS 20a	2.62					18.6
BLANKS						
0001 Control Blank	X					0.1
0002 Control Blank		10	4.7	0	0	

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ELEMENTS	Nb	Nd	Ni	OH	P	P2O5
UNITS	ug/l	ppm	ug/l	mgCaCO3/L	mg/l	%
DETECTION LIMIT	0.05	0.1	1	1	0.05	0.01
DIGEST	ASLP/	FB6/	ASLP/	ASLP/	ASLP/	FB6/
ANALYTICAL FINISH	MS	MS	MS	VOL	OE	OE
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	X	378.3	X	X	X	0.17
0002 Non-Magnetic Concentrate - Zircon	X	1108.5	X	X	X	0.63
0003 Paramagnetic Concentrate	X	2259.7	X	X	X	0.93
0004 MUP Oversize (>12mm)	X	85.7	X	X	X	0.12
0005 WCP Oversize (<12 - >2mm)	X	104.2	X	X	X	0.12
0006 WCP Sand Reject	X	397.7	X	X	X	0.18
0007 WCP Tails (Slimes)	X	176.3	X	X	X	0.23
0008 CUP Tailing	X	937.8	X	X	X	0.39
0009 MUP Oversize (>12 mm) pH 2.9	X		2		X	
0010 WCP Oversize (<12 > 2mm) pH 2.9	X		2		X	
0011 WCP Sand Rejects pH 2.9	X		1		X	
0012 WCP Tails (slimes) pH 2.9	X		5		X	
0013 CUP Tailings pH 2.9	X		1		X	
0014 Magnetic Concentrate 1M HCl	0.18		4		X	
0015 Non-magnetic concentrate 1M HCl	0.10		X		0.09	
0016 Para-magnetic concentrate 1M HCl	0.15		2		0.18	
CHECKS						
0001 MUP Oversize (>12mm)	X	84.9	X	X	X	0.10
0002 MUP Oversize (>12mm)						
STANDARDS						
0001 CCV-1-B-500					X	
0002 ICP-AM-MISA6					100.27	
0003 CRM-TMDW-500	X		60			
0004 GWS-6				X		
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699		18.8				0.09
0010 OREAS 20a		32.7				0.24
BLANKS						
0001 Control Blank	X	0.1	X	X	X	X
0002 Control Blank						

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ELEMENTS	Pb	pH	pH	pH Drop	Pr	Rb
UNITS	ug/l	NONE	NONE	NONE	ppm	ppm
DETECTION LIMIT	0.5	0.1	0.1	0.1	0.1	0.1
DIGEST	ASLP/	ASLP/	Ws5/	ANCx/	FB6/	FB6/
ANALYTICAL FINISH	MS	MTR	MTR	MTR	MS	MS
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	X	6.1			105.5	0.4
0002 Non-Magnetic Concentrate - Zircon	X	6.2			299.6	0.6
0003 Paramagnetic Concentrate	X	6.2			632.5	1.5
0004 MUP Oversize (>12mm)	0.6	5.7	5.7	4.7	25.1	1.8
0005 WCP Oversize (<12 - >2mm)	X	6.1	5.5	4.8	30.2	4.6
0006 WCP Sand Reject	X	6.3	6.5	4.5	114.7	1.5
0007 WCP Tails (Slimes)	X	6.0	6.0	4.9	57.1	7.2
0008 CUP Tailing	X	6.2	6.2	4.7	263.9	1.4
0009 MUP Oversize (>12 mm) pH 2.9	2.8					
0010 WCP Oversize (<12 > 2mm) pH 2.9	4.5					
0011 WCP Sand Rejects pH 2.9	1.6					
0012 WCP Tails (slimes) pH 2.9	1.1					
0013 CUP Tailings pH 2.9	1.9					
0014 Magnetic Concentrate 1M HCl	170.8					
0015 Non-magnetic concentrate 1M HCl	75.2					
0016 Para-magnetic concentrate 1M HCl	217.1					
CHECKS						
0001 MUP Oversize (>12mm)	X	5.4			24.2	2.1
0002 MUP Oversize (>12mm)			5.7	4.8		
STANDARDS						
0001 CCV-1-B-500						
0002 ICP-AM-MISA6						
0003 CRM-TMDW-500	42.4					
0004 GWS-6		9.1				
0005 ANC-6						
0006 NAG-6						
0007 GWS-6			9.1			
0008 OREAS 279						
0009 AMIS0699					3.4	0.5
0010 OREAS 20a					9.0	203.8
BLANKS						
0001 Control Blank	X	5.9			X	X
0002 Control Blank			6.3			

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ELEMENTS	Rb	S	S	SO4	Sb	Sb
UNITS	ug/l	%	mg/l	ppm	ppm	ug/l
DETECTION LIMIT	0.02	0.01	0.1	0.3	0.5	0.01
DIGEST	ASLP/		ASLP/	ASLP/	FB6/	ASLP/
ANALYTICAL FINISH	MS	/CSA	OE	OE	MS	MS
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	0.25		0.2	0.6	2.1	0.01
0002 Non-Magnetic Concentrate - Zircon	0.18		0.1	0.4	3.5	X
0003 Paramagnetic Concentrate	0.19		0.1	0.4	2.3	X
0004 MUP Oversize (>12mm)	0.11	X	0.2	0.5	0.6	X
0005 WCP Oversize (<12 - >2mm)	0.36	X	X	X	0.9	0.01
0006 WCP Sand Reject	0.17	X	0.1	0.4	0.7	X
0007 WCP Tails (Slimes)	0.26	X	0.7	2.0	0.8	0.01
0008 CUP Tailing	0.14	X	0.1	0.4	1.2	0.02
0009 MUP Oversize (>12 mm) pH 2.9	0.48		X	X		X
0010 WCP Oversize (<12 > 2mm) pH 2.9	2.08		X	X		X
0011 WCP Sand Rejects pH 2.9	0.42		X	X		X
0012 WCP Tails (slimes) pH 2.9	1.56		X	X		0.01
0013 CUP Tailings pH 2.9	0.37		X	X		0.17
0014 Magnetic Concentrate 1M HCl	0.55		0.1	0.4		0.71
0015 Non-magnetic concentrate 1M HCl	0.44		0.1	0.3		0.40
0016 Para-magnetic concentrate 1M HCl	2.20		0.1	0.4		0.26
CHECKS						
0001 MUP Oversize (>12mm)	0.11		0.2	0.5	0.5	0.02
0002 MUP Oversize (>12mm)		X				
STANDARDS						
0001 CCV-1-B-500			500.7	1499.9		
0002 ICP-AM-MISA6			0.3	1.0		
0003 CRM-TMDW-500	10.27					10.77
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279		1.27				
0009 AMIS0699					X	
0010 OREAS 20a					0.6	
BLANKS						
0001 Control Blank	X		X	X	X	0.01
0002 Control Blank		X				

The results provided are not intended for commercial settlement purposes

ELEMENTS	Sc	Sc	Se	SiO2	Sm	Sn
UNITS	ppm	mg/l	ug/l	%	ppm	ppm
DETECTION LIMIT	10	0.01	0.5	0.01	0.1	1
DIGEST	FB6/	ASLP/	ASLP/	FB6/	FB6/	FB6/
ANALYTICAL FINISH	OE	OE	MS	OE	MS	MS
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	55	X	X	3.67	71.5	25
0002 Non-Magnetic Concentrate - Zircon	355	X	X	30.32	240.3	84
0003 Paramagnetic Concentrate	129	X	X	26.07	390.9	46
0004 MUP Oversize (>12mm)	18	X	X	69.22	17.4	10
0005 WCP Oversize (<12 - >2mm)	18	X	X	52.63	18.3	5
0006 WCP Sand Reject	21	X	X	82.34	69.0	7
0007 WCP Tails (Slimes)	22	X	X	41.93	28.1	8
0008 CUP Tailing	29	X	X	69.45	153.8	14
0009 MUP Oversize (>12 mm) pH 2.9		X	X			
0010 WCP Oversize (<12 > 2mm) pH 2.9		X	X			
0011 WCP Sand Rejects pH 2.9		X	X			
0012 WCP Tails (slimes) pH 2.9		X	X			
0013 CUP Tailings pH 2.9		X	X			
0014 Magnetic Concentrate 1M HCl		X	0.6			
0015 Non-magnetic concentrate 1M HCl		0.03	0.6			
0016 Para-magnetic concentrate 1M HCl		0.01	0.5			
CHECKS						
0001 MUP Oversize (>12mm)	19	X	X	69.72	15.4	5
0002 MUP Oversize (>12mm)						
STANDARDS						
0001 CCV-1-B-500		X				
0002 ICP-AM-MISA6		X				
0003 CRM-TMDW-500			11.7			
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699	173			31.82	12.7	1
0010 OREAS 20a	12			63.53	6.1	4
BLANKS						
0001 Control Blank	X	X	X	X	X	X
0002 Control Blank						

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ELEMENTS	Sn	Sr	Sr	Ta	Ta	Tb
UNITS	ug/l	ppm	ug/l	ppm	ug/l	ppm
DETECTION LIMIT	0.1	0.2	0.02	0.1	0.001	0.1
DIGEST	ASLP/	FB6/	ASLP/	FB6/	ASLP/	FB6/
ANALYTICAL FINISH	MS	MS	MS	MS	MS	MS
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	X	8.3	0.09	39.0	X	11.0
0002 Non-Magnetic Concentrate - Zircon	X	44.8	0.60	41.4	X	38.1
0003 Paramagnetic Concentrate	X	26.5	0.04	43.0	X	39.1
0004 MUP Oversize (>12mm)	X	12.4	0.28	6.0	X	2.5
0005 WCP Oversize (<12 - >2mm)	X	21.1	1.55	5.6	X	2.5
0006 WCP Sand Reject	X	10.2	0.02	7.4	X	6.7
0007 WCP Tails (Slimes)	X	35.9	0.25	5.3	X	3.2
0008 CUP Tailing	X	22.3	0.22	15.6	X	14.7
0009 MUP Oversize (>12 mm) pH 2.9	X		4.28		X	
0010 WCP Oversize (<12 > 2mm) pH 2.9	X		38.36		X	
0011 WCP Sand Rejects pH 2.9	X		2.95		0.002	
0012 WCP Tails (slimes) pH 2.9	X		32.35		X	
0013 CUP Tailings pH 2.9	X		4.65		X	
0014 Magnetic Concentrate 1M HCl	1.9		6.86		0.005	
0015 Non-magnetic concentrate 1M HCl	1.0		17.39		0.005	
0016 Para-magnetic concentrate 1M HCl	1.5		32.31		0.004	
CHECKS						
0001 MUP Oversize (>12mm)	X	13.3	0.10	5.6	X	2.4
0002 MUP Oversize (>12mm)						
STANDARDS						
0001 CCV-1-B-500						
0002 ICP-AM-MISA6						
0003 CRM-TMDW-500	X		266.40		0.013	
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699		3.1		2.3		9.4
0010 OREAS 20a		281.3		1.5		0.9
BLANKS						
0001 Control Blank	X	X	X	X	X	X
0002 Control Blank						

The results provided are not intended for commercial settlement purposes

ELEMENTS	Te	Th	Th	Ti	TiO2	Tl
UNITS	ug/l	ppm	ug/l	mg/l	%	ug/l
DETECTION LIMIT	0.1	0.1	0.005	0.01	0.01	0.01
DIGEST	ASLP/	FB6/	ASLP/	ASLP/	FB6/	ASLP/
ANALYTICAL FINISH	MS	MS	MS	OE	OE	MS
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	X	347.1	X	X	40.80	X
0002 Non-Magnetic Concentrate - Zircon	X	1035.4	X	X	19.06	X
0003 Paramagnetic Concentrate	X	1617.3	0.009	X	25.92	X
0004 MUP Oversize (>12mm)	X	87.0	X	X	5.00	X
0005 WCP Oversize (<12 - >2mm)	X	118.5	X	X	4.55	X
0006 WCP Sand Reject	X	286.1	X	X	4.95	X
0007 WCP Tails (Slimes)	X	197.0	X	X	3.43	X
0008 CUP Tailing	X	646.4	0.008	X	9.09	X
0009 MUP Oversize (>12 mm) pH 2.9	X		1.894	X		X
0010 WCP Oversize (<12 > 2mm) pH 2.9	X		2.897	X		0.01
0011 WCP Sand Rejects pH 2.9	X		0.678	X		X
0012 WCP Tails (slimes) pH 2.9	X		0.201	X		X
0013 CUP Tailings pH 2.9	X		1.904	X		X
0014 Magnetic Concentrate 1M HCl	X		678.195	0.50		0.01
0015 Non-magnetic concentrate 1M HCl	X		596.522	0.23		0.01
0016 Para-magnetic concentrate 1M HCl	X		1025.823	0.42		0.01
CHECKS						
0001 MUP Oversize (>12mm)	X	84.9	X	X	5.02	X
0002 MUP Oversize (>12mm)						
STANDARDS						
0001 CCV-1-B-500				X		
0002 ICP-AM-MISA6				X		
0003 CRM-TMDW-500	3.0		X			10.63
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699		128.6			0.18	
0010 OREAS 20a		20.5			0.84	
BLANKS						
0001 Control Blank	X	X	X	X	X	X
0002 Control Blank						

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ELEMENTS	Tm	TotAlk	U	U	V	V
UNITS	ppm	mgCaCO3/L	ppm	ug/l	ppm	mg/l
DETECTION LIMIT	0.1	5	0.1	0.005	10	0.01
DIGEST	FB6/		FB6/	ASLP/	FB6/	ASLP/
ANALYTICAL FINISH	MS	/CALC	MS	MS	OE	OE
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	7.6	X	30.7	X	940	X
0002 Non-Magnetic Concentrate - Zircon	35.5	X	290.4	0.005	393	X
0003 Paramagnetic Concentrate	16.8	X	150.5	X	795	X
0004 MUP Oversize (>12mm)	1.4	X	10.7	X	461	X
0005 WCP Oversize (<12 - >2mm)	1.4	X	13.5	X	802	X
0006 WCP Sand Reject	2.8	X	26.1	X	209	X
0007 WCP Tails (Slimes)	1.5	X	15.2	X	910	X
0008 CUP Tailing	4.5	X	51.5	X	291	X
0009 MUP Oversize (>12 mm) pH 2.9				3.360		X
0010 WCP Oversize (<12 > 2mm) pH 2.9				5.235		X
0011 WCP Sand Rejects pH 2.9				1.133		X
0012 WCP Tails (slimes) pH 2.9				8.800		X
0013 CUP Tailings pH 2.9				3.492		X
0014 Magnetic Concentrate 1M HCl				11.130		1.78
0015 Non-magnetic concentrate 1M HCl				58.766		0.54
0016 Para-magnetic concentrate 1M HCl				27.169		2.29
CHECKS						
0001 MUP Oversize (>12mm)	1.6		10.4	X	458	X
0002 MUP Oversize (>12mm)						
STANDARDS						
0001 CCV-1-B-500						X
0002 ICP-AM-MISA6						99.04
0003 CRM-TMDW-500				10.689		
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699	25.9		283.9		X	
0010 OREAS 20a	0.3		6.4		109	
BLANKS						
0001 Control Blank	X		X	X	X	X
0002 Control Blank						

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ELEMENTS	W	W	WTTOT	Y	Y	Yb
UNITS	ppm	ug/l	g	ppm	ug/l	ppm
DETECTION LIMIT	1	0.02	0.01	0.5	0.005	0.1
DIGEST	FB6/	ASLP/		FB6/	ASLP/	FB6/
ANALYTICAL FINISH	MS	MS	WT01	MS	MS	MS
SAMPLE NUMBERS						
0001 Magnetic Concentrate - Ilmenite	9	X	209.80	501.3	X	53.4
0002 Non-Magnetic Concentrate - Zircon	54	X	221.70	1545.7	X	295.8
0003 Paramagnetic Concentrate	27	X	220.90	1057.3	X	121.3
0004 MUP Oversize (>12mm)	5	X		82.9	X	12.2
0005 WCP Oversize (<12 - >2mm)	6	X	1593.70	89.6	X	13.1
0006 WCP Sand Reject	9	X	225.80	172.6	X	18.5
0007 WCP Tails (Slimes)	5	X	174.10	86.4	X	11.1
0008 CUP Tailing	10	X	190.70	341.7	X	34.7
0009 MUP Oversize (>12 mm) pH 2.9		X			8.378	
0010 WCP Oversize (<12 > 2mm) pH 2.9		X			5.363	
0011 WCP Sand Rejects pH 2.9		X			1.884	
0012 WCP Tails (slimes) pH 2.9		X			2.828	
0013 CUP Tailings pH 2.9		0.25			5.799	
0014 Magnetic Concentrate 1M HCl		X			29.852	
0015 Non-magnetic concentrate 1M HCl		X			128.398	
0016 Para-magnetic concentrate 1M HCl		X			80.908	
CHECKS						
0001 MUP Oversize (>12mm)	4	X		85.4	0.045	11.9
0002 MUP Oversize (>12mm)						
STANDARDS						
0001 CCV-1-B-500						
0002 ICP-AM-MISA6						
0003 CRM-TMDW-500		X			X	
0004 GWS-6						
0005 ANC-6						
0006 NAG-6						
0007 GWS-6						
0008 OREAS 279						
0009 AMIS0699	1			898.0		227.4
0010 OREAS 20a	4			28.2		3.4
BLANKS						
0001 Control Blank	X	X		X	X	0.2
0002 Control Blank						

The results provided are not intended for commercial settlement purposes

ELEMENTS	Zn	Zr
UNITS	ug/l	ppm
DETECTION LIMIT	10	1
DIGEST	ASLP/	FB6/
ANALYTICAL FINISH	MS	MS
SAMPLE NUMBERS		
0001 Magnetic Concentrate - Ilmenite	X	7022
0002 Non-Magnetic Concentrate - Zircon	X	23.92%
0003 Paramagnetic Concentrate	X	5.08%
0004 MUP Oversize (>12mm)	X	5256
0005 WCP Oversize (<12 - >2mm)	X	5951
0006 WCP Sand Reject	X	5932
0007 WCP Tails (Slimes)	X	5280
0008 CUP Tailing	X	1.10%
0009 MUP Oversize (>12 mm) pH 2.9	11	
0010 WCP Oversize (<12 > 2mm) pH 2.9	12	
0011 WCP Sand Rejects pH 2.9	X	
0012 WCP Tails (slimes) pH 2.9	32	
0013 CUP Tailings pH 2.9	12	
0014 Magnetic Concentrate 1M HCl	12	
0015 Non-magnetic concentrate 1M HCl	X	
0016 Para-magnetic concentrate 1M HCl	12	

CHECKS		
0001 MUP Oversize (>12mm)	X	5380
0002 MUP Oversize (>12mm)		

STANDARDS		
0001 CCV-1-B-500		
0002 ICP-AM-MISA6		
0003 CRM-TMDW-500	75	
0004 GWS-6		
0005 ANC-6		
0006 NAG-6		
0007 GWS-6		
0008 OREAS 279		
0009 AMIS0699		46.80%
0010 OREAS 20a		487

BLANKS		
0001 Control Blank	X	1
0002 Control Blank		

The results provided are not intended for commercial settlement purposes

METHOD CODE DESCRIPTION

Method Code Date Tested Package	Analysing Laboratory NATA Laboratory Accreditation	NATA Scope of Accreditation
/CALC **23/10/24 12:53**	Intertek Genalysis Perth **3244 3237** No digestion or other pre-treatment undertaken. Results Determined by calculation from other reported data.	*
/CALC **23/10/24 12:53** **ASLP/VOL09**	Intertek Genalysis Perth **3244 3237** No digestion or other pre-treatment undertaken. Results Determined by calculation from other reported data.	*
/CSA **30/10/24 13:52** **ARD01**	Intertek Genalysis Perth **3244 3237** Induction Furnace Analysed by Infrared Spectrometry	**ENV_W061(Per), MPL_W161(Adl)**
ANCx/MTR **18/10/24 07:26** **ARD01**	Intertek Genalysis Perth **3244 3237** Acid Neutralizing Capacity Digestion Procedure. Analysed with Electronic Meter Measurement	**ENV_W035**
ANCx/QUAL **18/10/24 07:26** **ARD01**	Intertek Genalysis Perth **3244 3237** Acid Neutralizing Capacity Digestion Procedure. Analysed by Qualitative Inspection	**ENV_W035**
ANCx/VOL **18/10/24 07:26** **ARD01**	Intertek Genalysis Perth **3244 3237** Acid Neutralizing Capacity Digestion Procedure. Analysed by Volumetric Technique.	**ENV_W035**
ASLP/COL **30/10/24 13:52** **ASLP/COL01**	Intertek Genalysis Perth **3244 3237** AS4439.3-1997: Australian Standard Leachates Protocol for Wastes, Sediments & Contaminated Soils. Analysed by UV-Visible Spectrometry.	**ENV_W037**
ASLP/MS **30/10/24 13:54** **ASLP/MS**	Intertek Genalysis Perth **3244 3237** AS4439.3-1997: Australian Standard Leachates Protocol for Wastes, Sediments & Contaminated Soils. Analysed by Inductively Coupled Plasma Mass Spectrometry.	**ENV_W037, MS_IM_001**

METHOD CODE DESCRIPTION

Method Code Date Tested Package	Analysing Laboratory NATA Laboratory Accreditation	NATA Scope of Accreditation
ASLP/MTR **30/10/24 13:52** **ASLP/MTR**	Intertek Genalysis Perth **3244 3237** AS4439.3-1997: Australian Standard Leachates Protocol for Wastes, Sediments & Contaminated Soils. Analysed with Electronic Meter Measurement	**ENV_W037**
ASLP/OE **30/10/24 12:35**	Intertek Genalysis Perth **3244 3237** AS4439.3-1997: Australian Standard Leachates Protocol for Wastes, Sediments & Contaminated Soils. Analysed by Inductively Coupled Plasma Optical (Atomic) Emission Spectrometry.	**ENV_W037, ICP_IM_001**
ASLP/OE **30/10/24 12:35** **ASLP/OE**	Intertek Genalysis Perth **3244 3237** AS4439.3-1997: Australian Standard Leachates Protocol for Wastes, Sediments & Contaminated Soils. Analysed by Inductively Coupled Plasma Optical (Atomic) Emission Spectrometry.	**ENV_W037, ICP_IM_001**
ASLP/SIE **24/10/24 10:42** **ASLP/SIE01**	Intertek Genalysis Perth **3244 3237** AS4439.3-1997: Australian Standard Leachates Protocol for Wastes, Sediments & Contaminated Soils. Analysed by Specific Ion Electrode.	**ENV_W037**
ASLP/VOL **30/10/24 13:52** **ASLP/VOL09**	Intertek Genalysis Perth **3244 3237** AS4439.3-1997: Australian Standard Leachates Protocol for Wastes, Sediments & Contaminated Soils. Analysed by Volumetric Technique.	**ENV_W037**
FB6/MS **18/10/24 11:24** **FB6/OM45**	Intertek Genalysis Perth **3244 3237** Lithium metaborate/tetraborate fusion Analysed by Inductively Coupled Plasma Mass Spectrometry.	**MPL_W057, MS_IM_001[Per], *[Adl]**
FB6/OE **18/10/24 11:24** **FB6/OM45**	Intertek Genalysis Perth **3244 3237** Lithium metaborate/tetraborate fusion Analysed by Inductively Coupled Plasma Optical (Atomic) Emission Spectrometry.	**MPL_W057, ICP_IM_001[Per], *[Adl]**
NAGx/MTR **17/10/24 19:06** **ARD01**	Intertek Genalysis Perth **3244 3237** Net Acid Generation Extraction of samples with H2O2 Analysed with Electronic Meter Measurement	**ENV_W036**

METHOD CODE DESCRIPTION

Method Code Date Tested Package	Analysing Laboratory NATA Laboratory Accreditation	NATA Scope of Accreditation
NAGx/VOL	Intertek Genalysis Perth	**ENV_W036**
17/10/24 19:06	**3244 3237**	
ARD01	Net Acid Generation Extraction of samples with H2O2 Analysed by Volumetric Technique.	
Ws5/MTR	Intertek Genalysis Perth	*
30/10/24 13:52	**3244 3237**	
ARD01	Water Extraction using a sample:water ratio of 1:5. Analysed with Electronic Meter Measurement	
WT01	Intertek Genalysis Perth	*
11/10/24 08:49	**3244 3237**	
WT01	Reporting weights of samples	

* Denotes not on Scope of Accreditation

Appendix G

Earthworks Specification

REPORT REF	P24-77-PR-01/ES	12 SEPTEMBER 2025

Stage 3A Out of Pit TSF Earthworks Specification Kimberley Mineral Sands Thunderbird Operations Pty Ltd

CLIENT DETAILS

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Report

Title:	Stage 3A Out of Pit TSF Earthworks Specification
File:	P24-77-PR-06/ES
[redacted]	
Client:	Kimberley Mineral Sands Pty Ltd
[redacted]	
Synopsis:	This document presents the Earthworks Specification for the Stage 3A Out of Pit Tailings Storage Facility at the Kimberley Mineral Sands Thunderbird Operations Pty Ltd in Western Australia.

Revision

Date	Revision	Purpose	[redacted]
07 FEB 2025	DRAFT	ISSUED FOR REVIEW AND COMMENT	
26 MAR 2025	REV A	ISSUED FOR REVIEW AND COMMENT	
23 JUN 2025	REV 0	ISSUED FOR USE	
12 SEP 2025	REV 1	ADDRESSED CLIENT FEEDBACK	
Recipients are responsible for eliminating all superseded documents in their possession			

Distribution

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Terminology and Abbreviations

The following terminology and abbreviations have been used in this document:

AS	Australian Standard
ASTM	American Society for Testing and Materials
BoQ	Bill of Quantities
OPTSF	Out of Pit Tailings Storage Facility
CQA	Construction Quality Assurance
HDPE	High-Density Polyethylene
IFC	Issued for Construction
KMS	Kimberley Mineral Sands
NATA	National Association of Testing Authorities
OMC	Optimum Moisture Content
REC	Resource Engineering Consultants
RL	Reduced Level
MDD	Maximum Dry Density
PSP	Perth sand penetrometer
QAF	Quality Assurance Framework
SMDD	Standard Maximum Dry Density
t/m³	Tonnes per cubic metre
TOPL	Thunderbird Operations Pty Ltd

The following soil classification terminology has been used in this document:

G	Gravel
S	Sand
M	Silt
C	Clay
O	Organic
W	Well Graded
P	Poorly Graded
L	Low Plasticity
I	Medium Plasticity
H	High Plasticity

1. Introduction

1.1 General

This Earthworks Specification prescribes the requirements for the earthworks construction to achieve the site-finished grades indicated on the Design Drawings for the Stage 3A Raise of the Out of Pit Tailings Storage Facility (OPTSF) at the Thunderbird Operations Pty Ltd (TOPL), located approximately 100 km Northeast of Broome in Western Australia. 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 materials.

This Earthworks Specification comprises the technical aspects of the civil works requirement to complete the Works. The Contractor shall coordinate work prescribed by this document with other related works to be performed. Any discrepancies between this specification, the Drawings and the Bill of Quantities are to be queried before work commencement.

1.2 Definitions

Table 1 presents the definitions used in this document.

Table 1: Definitions

Term / Name	Definition
Company / KMS	Kimberley Mineral Sands Pty Ltd or an authorised representative (Company Representative).
Company Representative	Appointed representative of the Company responsible for overseeing the Contract(s) between the Company and the Contractor(s).
Contractor(s)	Party awarded the Contract to complete the Works described in this Specification.
Designer	Resource Engineering Consultants Pty Ltd (REC).
Drawings	Detailed IFC Design Drawings issued by the Company to the Contractor.
Hold Points	An identified point in the construction sequence where the Contractor(s) must halt work and provide required information to the Superintendent. The Contractor(s) must not resume work until the Hold Point is released, in writing, by the Superintendent.
Inspection Point	An identified point in the construction sequence where the Contactor(s) is required to provide written notification in advance of commencing work on identified items in order to allow the opportunity for the Superintendent to directly inspect the work; the notification must be provided when indicated and in no case less than 24 hours in advance of commencing the work.
Optimum Moisture Content (OMC)	The moisture content at which the Maximum Dry Density is achieved. As determined with AS1289.5.1.1 and AS 1289.5.2.1.
Quality Assurance Framework (QAF)	Construction QA Framework to be adhered to by the Designer, Company, and the QAI for the Stage 3A construction works.
Quality Assurance Inspector (QAI)	An independent third-party entity engaged by the Company to undertake CQA audits of the Works. The CQA audits are to be undertaken in accordance with the Level 2 inspection as per AS3798-2007. The QAI shall be engaged by the Company for the duration of the Works and shall be independent of the Contractor.
Earthworks Specification / Specification	This document and all documents relevant to fulfilling the requirements outlined in this document.
Site	Thunderbird Mineral Sands Project (TMSP) Centrally Discharged Tailings Storage Facility (OPTSF).
Maximum Dry Density (MDD)	The maximum dry density achieved as per AS 1289.5.2.1 and AS 1289.5.4.1 when testing a sample of material representative of that to be compacted in the field.
Work / Works	The activities specified within this document as the responsibility of the Contractor(s).

1.3 References

1.3.1 General

The publications listed below form part of this Specification. Each publication shall be the latest revision and addendum in effect on the date this Specification is issued for construction unless noted otherwise. Except as modified by the requirements specified herein or the details of the Drawings, work included in this Specification shall conform to the applicable provisions of these publications.

1.3.2 Statutory Regulations

The statutory authorities having jurisdiction over the mine site are the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) and the Department of Water and Environmental Regulation (DWER).

The design and manufacture of all equipment shall comply with all relevant government acts, by-laws, and regulations, both state and federal, including but not limited to:

- *Occupational Safety and Health Act*, 1984
- *Occupational Safety and Health Regulations*, 1988
- *Mines Safety and Inspection Act*, 1994
- *Work Health and Safety (Mines) Regulations*, 2022

1.3.3 Applicable Codes / Standards

The works shall be carried out to comply with the latest revision of the Drawings, Codes and Standards specified or to the appropriate Australian Standards, or to other recognised International Standards approved by the Company or the Designer where there is no comparable Australian Standard.

The applicable Australian Standards relevant to the work covered by this Specification include but are not limited to:

- AS 1181 – Method of measure of civil engineering works and associated building works
- AS 1289 – Methods of testing soils for engineering purposes
- AS 1470 – Health and safety at work – principles and practices
- AS 1726 – Geotechnical site investigations
- AS 2124 – General conditions of contract
- AS 3798 – Guidelines on earthworks for commercial and residential developments

2. Surveying of Works

2.1 General

a) All testing and survey of the Site during the construction phase must be performed in accordance with this Specification.

b) The Contractor must be solely responsible for the setting out of all the Works.

c) The Contractor must provide a baseline survey pick up of the existing (pre-works) surfaces to the Company Representative for review and approval prior to commencement of the Works **(Hold Point)**.

d) The Contractor must be responsible for all survey requirements to perform the Works. This must be carried out by a full-time on-site suitability qualified surveyor supplied by the Contractor and approved by the Company Representative.

e) The Contractor must set-out the Works and receive Company Representative approval prior to the Works commencing **(Hold Point)**.

f) The Contractor must provide accurate survey data of all material test locations within the Works.

g) The Contractor must submit a survey pick-up of the constructed works with each Preliminary Progress Payment Certificate (PPPC) for review by the Company Representative.

h) The Contractor must maintain survey of the earthworks and other infrastructure construction throughout the Works including all interfaces between various material types to ensure that the Works are undertaken in accordance with the Construction Drawings and produce accurate as-constructed records.

i) The Contractor must maintain survey of the material within approved borrow pits to manage borrow pit material volumes.

2.2 Setting-out Survey Control

a) At the discretion of the Company Representative, an electronic digital terrain model (DTM) of the design will be issued to the Contractor(s) for setting out purposes and to verify the quantities forming the Contract. The DTM as issued is to be agreed by the Contractor(s), after which the agreed DTM will form the basis of the verification of the progress payments and the final payment. Any discrepancies found in the DTM by the Contractor(s) are to be reported to the Company Representative prior to execution of the Contract.

b) All survey shall be carried out in the Geocentric Datum of Australia 1994 (GDA94) system.

c) Survey benchmarks will be provided by the Company. Only these benchmarks are to be used by the Contractor(s) for the setting out of the Works under the Contract. Prior to the setting out of the Works, the Contractor(s) shall verify the survey control points and notify the Company Representative if discrepancies exist between the coordinates provided and those surveyed.

d) The Contractor(s) may have to establish additional stations to adequately and efficiently set out and monitor the Works. The establishment of additional control points shall be completed to a standard consistent with the rest of the site and general surveying best practice. During, or at the completion of, the Works, the Company Representative may request the additional control point information from the Contractor(s). At the end of the Works, the temporary survey control points are to be removed, excluding those as required by the Company Representative to remain.

e) The Contractor(s) shall be responsible for setting out and staking all Work, including baselines and levels, using the survey benchmarks established by the Company Representative. Survey measurement of the completed Works shall be required to support progress payment claims, and shall be submitted to the Company Representative for verification.

f) The Contractor(s) shall undertake monthly verification of survey reference beacons.

2.3 Earthwork Tolerances

a) Dimensions shall not be less nor the slopes steeper than those specified. Dimensional tolerances shall be the following, unless specifically otherwise noted:

- Embankment lift level tolerance: -0.1 m to 0 m

- Embankment crest finishing level tolerance: 0 m to +0.1 m.
- Horizontal tolerance ±0.3 m
- Gradient tolerance:
  - Cross-fall gradient ±0.5%
  - Batter gradients: 1V:3H = 33% ±2%, 1V:2H = 50% ±3.5%.

b) The Contractor shall provide and have available at all times during the Contract working hours the necessary staff and equipment to ensure accurate setting out of the Works is maintained continuously throughout construction. Should any errors in setting out of the Works occur, such errors shall be corrected in a timely manner and any necessary adjustments to previously placed fill materials shall be carried out to the satisfaction of the Company Representative at no additional cost to the Company.

3. Materials

3.1 General

The Contractor(s) shall ensure that the materials supplied/sourced meet the requirements of this Specification and shall demonstrate compliance to the satisfaction of the Company Representative.

3.2 Borrow Areas

a) Fill materials shall be sourced from dedicated borrow areas supplied by the Company and approved by the Company Representative. Fill material sourced from the mining pit may be stockpiled by the Company at the Southern Occurrence.

b) All the Contractor borrow areas nominated under the Contract shall be cleared, grubbed, and stripped by the Contractor at the commencement of the Works (where applicable). Should it become necessary to relocate an existing stockpile, the Company Representative shall be notified and pre-relocation **(Hold Point)** and post-relocation surveys **(Hold Point)** are to be undertaken by the Company.

c) The Contractor shall take all necessary steps to ensure that fill from borrow areas does not contaminate topsoil stockpiles (where applicable). Should it become necessary to relocate an existing topsoil stockpile, the Company Representative shall be notified and approval granted prior to relocation of the topsoil stockpile.

d) Boulders or large rocks (non-conforming to the grading requirements of Zone C Material) encountered within borrow pit areas should not be used in the Works unless otherwise directed by the Company Representative. Boulders and large rocks may be required to be removed from borrow pit areas and stockpiled, at the request of the Company Representative. Surveyed volume of boulders or large rocks to be provided to the Company on a monthly basis (per m^3 to be provided in attached Bill of Quantities).

e) Locations of any additional ramps or access roads required to access borrow areas or stockpiles shall be determined by the Contractor and approved by the Company Representative.

f) The Contractor shall avoid the creation of temporary slopes in borrow areas and stockpiles that may be unstable. All trafficking slopes within the borrow areas and stockpiles shall be at 10H:1V grades.

g) The Contractor shall maintain all borrow areas for the duration of the Works, including the implementation of measures necessary to control dust, stormwater, and groundwater inflow (where applicable).

h) The Contractor shall maintain all borrow pit access roads and haul circuits for the duration of the works. The Contractor shall provide the Company Representative with weekly updates to the site Traffic Management Plan (where applicable).

i) Where required, the Contractor shall establish lighting required for night shift activities, including within borrow pit locations.

3.3 Unsuitable Materials

a) The Company Representative may instruct the Contractor to remove unsuitable material from the Works and stockpile in an area approved by the Company Representative.

b) Unsuitable material includes but is not limited to:

   i) vegetation and materials resulting from clearing, grubbing, and stripping activities and all perishable matter

   ii) organic soils

   iii) soft ground

   iv) soils and materials subject to chemical change, due to oxidation or due to attack by any potential aggressive fluids and gases or that, by virtue of their chemical composition, may have a deleterious effect on structures or components forming part of the permanent work

   v) soils containing debris or other contaminants deemed unsuitable by the Company Representative.

c) Fill materials used in the Works shall not contain any unsuitable material.

3.4 Zone A – Embankment Fill (Tailings Material)

Zone A – Embankment Fill shall be won from the tailings beach within the OPTSF. Borrow areas are to be nominated by the Contractor, and approved by the Company Representative, as required. Zone A material shall be loaded, hauled, and placed for the construction of the perimeter embankments of the OPTSF. Zone A material may also be sourced from existing stockpiles at the direction of the Company Representative.

Zone A material shall be free of unsuitable material, including topsoil, organic material and any other root matter or deleterious materials (as specified in Section 3.3).

Zone A Material shall conform to the gradation limit outlined in Table 2. Additionally, Zone A material is to have a plastic index of > 10, unless otherwise approved by the Company Representative in writing.

Where necessary, the Contractor shall moisture condition Material A to achieve the moisture contents outlined in the Specification.

Table 2: Zone A Gradation Limits

Particle Size (mm)	Passing (%)
19	100
4.75	95 – 100
0.15	30 – 80
0.075	> 20

3.5 Zone B – Causeway Fill (Tailings Material)

Zone B – Causeway Fill shall be won from the tailings beach within the OPTSF. Borrow areas are to be nominated by the Contractor, and approved by the Company Representative, as required. Zone B material shall be loaded, hauled, and placed for the construction of the causeway of the OPTSF.

Zone B material shall be free of unsuitable material, including topsoil, organic material and any other root matter or deleterious materials (as specified in Section 3.3).

3.6 Zone C – Rock Ring Fill (Oversize Mine Waste)

Zone C – oversize material shall be sourced from stockpiles approved by the Company Representative. Zone C material shall be loaded, hauled, and placed for the direct construction of the OPTSF.

Zone C material shall be free of unsuitable material, including topsoil, organic material and any other root matter or deleterious materials (as specified in Section 3.3).

Zone C material particles shall not exceed a nominal diameter of 500 mm unless otherwise approved by the Company Representative in writing.

3.7 Safety Bunds

All safety bunds shall be constructed and maintained as necessary on the crest of embankments and access ramps by the Contractor during construction at the expense of the Contractor. The Contractor shall form safety bunds using Zone A / Zone B along the crest margin to the lines and levels indicated on the Drawings and in-line with TOPL standards.

The safety bunds shall be constructed with a minimum height of the greater of 600 mm or 50% of the diameter of the largest tyre of the equipment trafficking the bunded region, or higher as required to satisfy the Company's safety procedures for the Contractor's machinery operating at the applicable region. Temporary side slopes shall not be steeper in any location than 1V:1H.

4. Preliminary Works

4.1 General

a) The Contractor(s) shall construct, maintain, and rehabilitate, at its own expense any temporary access roads (including roads to and from borrow pit areas), haul roads, ramps or the like required for construction purposes (where applicable).

b) All excavations shall be to the lines and grades shown on the Drawings or to the satisfaction of the Company Representative. The Contractor(s) shall not excavate beyond the lines and grades shown on the Drawings without prior written approval of the Company Representative. After an excavation has been completed to the lines and grades as specified, the Contractor(s) shall notify the Company Representative giving a reasonable notice period, who will inspect the work. No excavation shall be backfilled or covered in any way until the Contractor(s) has obtained the written approval of the Company Representative. The Contractor(s) shall, at his own expense, uncover any excavation that has been covered without the prior inspection and approval of the Company Representative.

c) The Contractor(s) shall not damage any trees and flora adjacent to the area of the Works or as nominated by the Company Representative and in accordance with the Company's internal policies and procedures.

4.2 Relocation of Existing Infrastructure

The Company will advise the Contractor if existing infrastructure must be removed or reallocated to facilitate completion of the Works. This may include reallocation of fencing to the East of the OPTSF (North of the SSP), VWP cables, or telemetry loggers. The reallocation of existing infrastructure will be directed by the Company Representative.

4.3 Clearing and Grubbing

a) Any clearing and stripping that the Contractor(s) elects to perform for its own purposes, such as for construction of temporary haul roads, equipment yard etc., shall be subject to the approval of the Company Representative and shall be performed at the Contractor's own expense (where applicable). At the end of the Contract, all such areas shall be reinstated and rehabilitated by the Contractor(s), at its own expense, to meet the Company's requirements and environmental obligations and to the satisfaction of the Company Representative.

b) Subsequent Works shall not commence until approval has been given by the Company Representative.

4.4 Embankment Base Preparation

a) The base of the embankment foundation shall be cleared of all unsuitable materials, including vegetable matter, debris, or any material that may cause foundation settlement.

b) Following the removal of topsoil and unsuitable materials within the proposed footprint, the foundation shall be dynamically compacted with eight (8) passes

c) Following the dynamic compaction, the foundation shall be ripped, moisture-conditioned, and readied for embankment tie-in.

d) Any unsuitable material (Section 3.3), not meeting any of the material specifications, shall be removed and disposed of at the location nominated by the Company Representative.

e) The foundation preparation and compaction results shall be inspected and approved by the Company Representative prior to the placement of Zone A material.

5. Earthworks

5.1 Excavations

5.1.1 General

a) All excavations shall be to the minimum lines and grades shown on the Drawings or to the satisfaction of the Company Representative.

b) Excavation Works shall not commence in any zone prior to inspection and approval of the Contractor's survey markers in that zone by the Company Representative **(Hold Point)**.

c) Care shall be undertaken to not damage existing piezometers and associated cabling and telemetry loggers installed within the existing OPTSF embankment. Existing location of piezometers and indicative location of piezometer cables have been presented on Drawings. Existing piezometer cables have been installed within conduits approximately 150 mm below the surface of the OPTSF crest. Telemetry loggers have been installed adjacent to the upstream windrow and VWP.

d) During the progress of the Work, the Company Representative in consultation with the Designer may find it necessary or desirable to revise the lines and grades of the Design. If such revision requires excavation to be made after the placement of material has already been completed to the lines and grades shown on the Drawings, excavation shall be carried out under the direction of the Company Representative. The cost of any revisions shall be deemed as a variation to the contract.

e) All necessary precautions shall be taken to preserve the material below and beyond the lines of all excavations in the soundest possible condition. Any damage done to the Work including the loosening of material or excavation beyond the required lines and grades, or the caving in of material near to the edge of an excavation, which is performed by the Contractor(s), shall be repaired by the Contractor(s). If such excavation should, in the opinion of the Company Representative, require backfilling, such backfilling shall be done to the satisfaction of the Company Representative with material similar to the fill to be placed against the excavated surface in accordance with this Specification, at the Contractor's expense.

5.1.2 Stability of Excavations

a) The sides of all excavations steeper than the angle of repose of the material shall be benched, battered or adequately supported by bracing or shoring, as necessary, to ensure against slides, cave-ins or danger to persons or structures. The cost of all bracing, shoring or treatment to excavations shall be included in the tendered amount for excavation. All slips of unstable masses of materials outside the limits of excavations and specified cut batters shall be rectified by the Contractor(s) at his expense.

b) Shoring and trench protection shall be constructed in accordance with the relevant statutory safety regulations. Where required or directed by the Company Representative, the Contractor(s) shall use benching techniques to ensure the stability of bulk excavations. Benches shall be sloped inwards and the inside edge of the bench shall be adequately drained.

5.1.3 Disposal of Excavated Materials

a) All suitable material from excavations to be used in the Work under the Contract shall be separated from unsuitable material and placed in the final position where it will be used, or else stockpiled separately in a place and manner that is acceptable to the Company Representative, until required.

b) The Contractor(s) shall dispose of all material that has to be excavated but is unsuitable for construction purpose at locations directed by the Company Representative.

5.1.4 Classification of Excavated Material

a) "Common excavation" must include all overburden, shattered rock and other material which can be removed by any of the following methods:

- o By hand.
- o By scraper.
- o By excavator, with competent operator, with an operating weight not less than 30 tonne and a rock bucket not less than 1 m^3 in capacity, at a rate of more than 40 BCM (Bank Cubic Metres) per hour.
- o By track-type tractor, with competent operator, equivalent to a Caterpillar D9N in mass and power, ripping and bulldozing at a rate of more than 100 BCM per hour.
- o "Hard rock excavation" must include all materials which cannot be removed by the methods described above for "Common excavation" and which normally require drilling and blasting.

5.1.5 Excavation and Handling of Zone A, Zone B, and Zone C Material

a) Excavation of Zone A, Zone B, and Zone C Material from the borrow pit or stockpiles shall not commence prior to inspection and approval by the Company Representative.

b) The Contractor shall excavate Zone A and Zone B Material as directed by the Company Representative. The batter slopes of the borrow area and all stockpiles shall be maintained to the satisfaction of the Company Representative.

c) The Contractor shall moisture condition the borrowed Zone A material, or stockpiled material as appropriate to achieve the requirements outlined by this Specification.

5.1.6 Embankment Subgrade Preparation

a) The exposed subgrade shall be scarified, moisture conditioned, and proof-rolled with a sheepfoot roller within the footprint of the embankment prior to the placement of the loose lift layers.

b) Any prepared areas that in the opinion of the Company Representative are considered unsuitable (including soft, wet, of unsuitable gradation, or unstable) or deflect excessively shall be removed or improved as appropriate.

c) The contractor shall not place overlying material until approval has been given by the Company Representative.

5.1.7 Soft Ground

a) Soft Ground shall not be removed without the written instruction of the Company Representative.

b) Soft Ground shall be removed within the limits specified by the Company Representative using appropriate equipment as agreed with the Company Representative beforehand.

c) Soft Ground shall be disposed of at a location nominated by the Company Representative.

d) The Soft Ground stockpile area shall be protected from erosion by suitable sloping and windrowing during construction, to the dimensions designated by the Company Representative.

e) Material designated "Soft Ground" will be replaced with Zone A Material, and be moisture conditioned and compacted in accordance with the requirements of this Specification.

5.2 Construction

5.2.1 General

a) Chainages are to be clearly marked along the perimeter embankment.

b) Grading shall be carried out using equipment equipped with machine control.

5.2.2 Safety Berms and Bunds

a) All safety berms and bunds shall be constructed and maintained as necessary along the crest of the embankments by the Contractor(s) during construction, at the expense of the Contractor(s).

b) The safety berms and bunds will be constructed with Zone A, Zone B, or Zone C Material to a minimum height of 600 mm. The height of safety bunds shall also be at least 50% of the diameter of the largest tyre of the equipment using access road (either during construction or the final intended user). Side slopes shall not be steeper than 1:1 (V:H).

5.2.3 Placement of Zone A Material

a) Zone A Material shall be sourced as outlined in Section 3.4, Section 5.1.5 of this Specification. Fill shall not be sourced from locations that have not been approved by the Company Representative. It is the Contractor's responsibility to verify the material suitability as per this Specification.

a) Fill shall be placed to form maximum 300 mm compacted lift thickness layers for the construction of the overall perimeter embankments and ramps to the lines and levels shown on the Drawings.

b) The fill material shall be compacted with a heavy (12-tonne minimum), sheepfoot or padfoot roller, which provides a kneading type of compaction.

c) Over-filling and trimming back the upstream and downstream faces to competent compacted material, to the satisfaction of the Company Representative, shall be included in the cost.

d) Compaction shall be as uniform as practicable over the entire fill layer surface and compaction equipment shall travel in a direction parallel to the embankment or road axis, except near existing slopes or other obstacles.

b) Any compacted fill material that has suffered a reduction in density due to precipitation or for any other reason, or that has cracked due to drying, shall be reworked or replaced to the full depth of damage prior to placing the next lift. If the surface is too dry or too smooth to bond properly with the next lift of material to be placed, the fill surface should be scarified to a minimum depth of 100 mm and water added as necessary.

c) Any loose or oversized material that is trimmed from the embankment or collects at the base of the embankment shall be moved to a Company Representative approved location.

d) The fill shall be free from lenses, pockets or layers of material that are significantly different in gradation from the surrounding material of the same zone. Placed material that does not meet the specified gradation requirements shall be removed or otherwise reworked to produce material that does meet the Specification requirements.

e) Any material placed that does not meet the specified requirements or has been rejected by the Company Representative shall be removed and replaced with suitable material at no additional cost to the Company.

f) The Contractor shall develop a method specification for the placement and compaction of Zone A Material well ahead of planned placement of the material. The layer thickness, addition of moisture, placement method, equipment specification, and number of passes required will be provided to the Company Representative **(Hold Point)**. Testing will be carried out to confirm that the method specification achieves the requirements of this Specification **(Hold Point)**.

5.2.4 Placement of Zone B Material

a) Zone B Material shall be sourced as outlined in Section 3.5, Section 5.1.5 of this Specification. Fill shall not be sourced from locations that have not been approved by the Company Representative.

b) Zone B shall be placed in maximum 500 mm loose lift thickness layers for the construction of the central causeway to the lines and levels shown on the Drawings.

c) Zone B material is to be traffic compacted at a minimum.

d) Compaction shall be as uniform as practicable over the entire fill layer surface and compaction equipment shall travel in a direction parallel to the embankment or road axis, except near existing slopes or other obstacle

e) The fill shall be free from lenses, pockets or layers of material that are significantly different in gradation from the surrounding material of the same zone. Placed material that does not meet the specified gradation requirements shall be removed or otherwise reworked to produce material that does meet the Specification requirements.

f) Any material placed that does not meet the specified requirements or has been rejected by the Company Representative shall be removed and replaced with suitable material at no additional cost to the Company.

g) The Contractor shall develop a method specification for the placement and compaction of Zone B Material well ahead of planned placement of the material.

5.2.5 Placement of Zone C Material

a) Zone C Material, conforming to the specifications detailed in Section 3.6, shall be sourced from stockpiles designated by the Company Representative.

b) Zone C Material shall be loaded, handled, and placed in a manner as to avoid segregation and mixing or contamination with other materials.

c) Zone C material shall be placed in maximum 500 mm loose lift thickness layers for the construction of the rock ring to the lines and levels shown on the Drawings.

d) Zone C material is to be traffic compacted at a minimum.

e) Settling is anticipated to occur as the placement of the Zone C material displaces underlying tailings material. Zone C material shall be placed until the rock ring is stabilised and settling no longer occurs (to the extent possible).

f) The Contractor shall develop a method specification for the placement and compaction of Zone C Material well ahead of planned placement of the material.

5.2.6 Construction of Access Ramps

a) Access ramps and roads to the pit area shall be undertaken by the Contractor and formed simultaneously with the construction of the Zone A and Zone B Material as appropriate, or as directed by the Company Representative. Access ramps shall not be steeper than 10:1 (H:V) and shall not have batter slopes steeper than 2.5:1 (H:V). Indicative locations of access ramps are to be confirmed by the Company Representative on site.

5.2.7 Drying of Wet Material

a) If at any time the Company Representative considers the material is too wet, compaction operations may be ordered to cease until the material has dried out sufficiently.

b) Disc plough or deep ripping methods may be an effective measure to reduce the moisture content of wet material.

c) When drying is necessary, it shall be carried out to allow the full depth of the layer to dry uniformly.

d) Drying and re-compaction shall be carried out under favourable weather conditions.

e) Re-compaction is only to be carried out once the material is considered to be suitable by the Company Representative. Mixing and blending may be required to allow for uniform moisture content throughout the borrow.

6. Compaction Method and Testing

6.1 Compaction Requirements

The general compaction requirements for fill materials are shown in Table 3.

Table 3: General Compaction Requirements

Zone	Maximum Layer Thickness (mm)	Recommended Moisture Content Range	Minimum Compacted Dry Density (Relative to MDD)
Zone A	300 mm Compacted	± 3% of OMC	95%
Zone B	500 mm Uncompacted	CMS	CMS
Zone C	500 mm Uncompacted	CMS	CMS

a) A construction method shall be developed for the project during the first week of activities. The required drying time or addition of moisture to the borrow material will be identified and *in situ* density tests performed to identify the required number of passes of the roller to achieve the compaction criteria.

b) The Contractor shall prepare a Construction Methodology Statement (CMS) for the placement and compaction of the Zone A Material to meet the minimum density requirements specified in Table 3. Preparation of the CMS shall constitute a **Hold Point**. No placement of material shall occur until the Company Representative has approved the CMS in writing. The Contractor shall allow three days for review of the CMS. The CMS shall be applicable for all construction, unless a significant change in borrow material quality is observed by the Contractor or the Company Representative, in which case a new compaction trial and CMS shall be prepared by the Contractor.

c) The Contractor shall prepare a Construction Methodology Statement (CMS) for the placement of the Zone B Material. Preparation of the CMS shall constitute a **Hold Point**. No placement of material shall occur until the Company Representative has approved the CMS in writing. The Contractor shall allow three days for review of the CMS. The CMS shall be applicable for all construction, unless a significant change in borrow material quality is observed by the Contractor or the Company Representative, in which case a new compaction trial and CMS shall be prepared by the Contractor.

d) The Contractor shall prepare a Construction Methodology Statement (CMS) for the placement of Zone C Material. Preparation of the CMS shall constitute a **Hold Point**. No placement of material shall occur until the Company Representative has approved the CMS in writing. The Contractor shall allow three days for review of the CMS. The Contractor shall allow three days for review of the CMS. The CMS shall be applicable for all construction, unless a significant change in borrow material quality is observed by the Contractor or the Company Representative, in which case a new compaction trial and CMS shall be prepared by the Contractor.

e) The recommended water content range for Zone A is the range the Contractor should endeavour to achieve, to attain a minimum of the target densities. The Company Representative may require the Contractor to dry or moisture condition material within the recommended water content range.

f) Traffic compaction (where applied) shall be as uniform as practicable over the entire lift surface and compaction equipment shall travel in a direction parallel to the embankment or road axis except near the abutments and other obstacles.

g) Methods of carrying out the fill placement and moisture conditioning shall be subject to approval by the Company Representative. Equipment suitability, method of working, rate of progress and quality of work shall be demonstrated during the initial stages of the work. In the event that the work performance is unsatisfactory, the Contractor shall immediately implement such changes as are required to ensure the proper completion of the work in accordance with the specification.

h) Testing of the Works will be carried out by the Contractor. It is the Contractor's responsibility to ensure that target minimum density ratios and target moisture contents are achieved and verified.

i) The Contractor shall provide verification to Company representative that the number of passes, lift thickness, and moisture content for portions of the construction completed meets the specification requirements set out in this document.

j) The Contractor shall provide, and have available at all times during normal working hours, the necessary staff and equipment to ensure that proper and correct setting out of the Works is continually maintained during construction. Should any errors in setting out of the Works occur, such errors shall be corrected and any necessary adjustments to previously placed fill materials shall be made, to the satisfaction of the Company Representative, prior to further placement of fill materials. The cost of any corrective actions shall be borne by the Contractor.

6.2 Construction Documentation and Reporting

a) The Contractor must maintain an effective and adequately documented system of construction records, detailing the date and location of material placement and compaction. This information is to be provided at the request of the Designer or Company Representative.

b) Weekly summaries are to be provided to the Designer and Company Representative detailing information such as but not limited to:

- Quantity of material placed/moved.
- Construction progress and forecast progress.
- Equipment utilisation, working hours, breakdowns, or maintenance issues.
- Weather impacts (construction materials, accessibility, etc.)
- Health and safety, incidents, and near misses.
- Upcoming activities and planning.
- General photos and site documentation.

c) The Company Representative may, at his discretion, request that the Contractor undertake inspections and photographs to provide to the Company Representative. The Company Representative may nominate the location of such inspections and photographs.

d) The Quality Assurance Framework (QAF), attached in Appendix C, must be adhered to by the Designer, Company / Company Representative, and the QAI.

6.3 Quality Control Testing

a) Compaction testing shall be carried out by the Company in accordance with the relevant test procedures detailed in AS AS 1289.5.2.1 (MDD) and AS 1289.5.8.1 (in-situ nuclear density testing).

b) Nuclear densitometer testing shall be conducted to a depth of no less than the fill layer thickness.

c) The NDMs shall be conducted in the presence of the QAI.

d) The Company shall arrange all the required testing to verify construction quality.

e) Results of Quality Control testing shall be provided to the Designer as soon as practical.

Table 4: Construction Quality Control Testing Summary

Description	Type of Testing	Testing Frequency
Foundation Preparation	Field Density (No compaction requirements, data to inform modelling)	Routine density compliance testing shall be undertaken using NDMs and PSPs at 2,500 m^2 intervals. The NDMs are to test up to 450 mm depth, accompanied by PSP testing to 2 m depth at approximately the same location.
Embankment Fill (Zone A)	Field Density (PSP) (Minimum blows to be calibrated and detailed in fortnightly construction summary reports)	Routine density compliance testing shall be undertaken with PSPs to achieve the highest testing frequency of the following: • One test per day • One test per lift • One test per 2,500 m^3 of material placed
	Field Density (NDM) (Minimum compaction of 95% MDD @ OMC ±3% at 300 mm compacted lifts)	Weekly density compliance testing shall be undertaken using NDMs with a testing frequency of two tests per week. A minimum of three PSP tests shall be undertaken adjacent to each NDM test location for fortnightly calibration.
	Classification Testing	PSD with Hydrometer testing shall be undertaken at a rate of one test per 5,000 m^3 of placed fill, or one test per day or one test per layer (if the material is consistent). The testing shall conform to AS 1289.3.6.1, 1289.3.5.1 and 1289.2.1.1)
		Atterberg Limits testing shall be undertaken at a rate of one test per 5,000 m^3 of placed fill, one test per day or one test per layer (if the material is consistent). The testing shall conform to AS 1289.2.1.1, 1289.3.1.1, 1289.3.1.2, 1289.3.2.1, 1289.3.3.1, and 1289.3.4.1)

7. Inspection and Supervision

7.1 General

a) The Contractor shall provide adequate supervision of the Works at all times and have a representative who is authorised to act on behalf of the Contractor present.

b) The Company Representative and QAI may inspect the Works at any time to check for compliance with the Specifications.

7.2 Hold Points

Hold Points shall apply whereby the Contractor shall submit relevant information to the Company Representative for approval prior to commencing with the next stage in the sub-area. The Contractor shall provide the Company Representative a minimum of 48 hours' notice, prior to request for approval. The Contractor shall not proceed beyond the Hold Point prior to receiving written approval from the Company Representative.

If the Contractor proceeds to construct beyond the designated Hold Point without the Company Representative's inspection and or without the Company Representative's approval then the Company Representative may direct the Contractor to uncover and remediate the Works to the Hold Point, at the Contractor's expense.

The Contractor shall be deemed to have allowed for all time delays and costs associated with the Hold Points during the Works.

The Hold Points include but are not limited to the following:

a) Company Representative's approval of the verified site survey and construction survey control system, which shall be provided to the Company by the Contractor at least two weeks prior to construction commencement.

b) Setting out approval for the establishment of all on-site facilities before commencing the clear and grub Works.

c) Company Representative's inspection and approval of cleared and grubbed areas in accordance with the Drawings.

d) Company Representative's approval of setting out of the borrow area excavation.

e) Company Representative's inspection and approval of the perimeter embankment foundation, prior to the placement of fill material.

f) Company Representative's approval of the Construction Methodology Statement (CMS) describing the agreed compaction method, inclusive of inspection of the compaction trials and discussions on the results and testing for Zone A, Zone B, and Zone C material.

g) Company Representative's approval of the embankment construction to the slope, grades and height as specified in the Drawings.

h) Company Representative's inspection and approval of decant access causeways foundation, prior to placement of fill material on these areas.

i) Company Representative's inspection, during embankment construction, of all compaction results before approving placement of the next layer at that location.

j) Company Representative's approval of final survey of all Works before final payment is approved.

k) All other Hold Points defined in this Specification or as directed by the Company Representative.

If the Contractor discovers material or work, which is not in accordance with the Specification, the Contractor must promptly initiate the non-conformance procedures.

7.3 Non-conforming Work

a) In the event that a Lot, or any part thereof, does not conform to the requirements of the specification, the Contractor must promptly initiate a Non-Conformance Report (NCR). In addition, the Company Representative / QAI may initiate an NCR for non-conforming work.

b) The classification and details included in the NCR shall, at a minimum, comply with the requirements set out in the QAF.

7.4 Technical Query

a) Directions and instructions set out in this Specification shall be deemed to have been given to the Contractor by the Company and accepted by the Contractor.

b) Any direction or clarification sought by the Contractor, Company Representative, and/or the QAI shall be made in writing in the form of a Technical Query (TQ).

c) The classification and details included in the TQ shall, at a minimum, comply with the requirements set out in the QAF.

8. Project Close Out

8.1 Commissioning

a) The Contractor shall provide a working commissioning manager for all commissioning activities with relevant experience. This person shall be nominated on the project organisational chart.

b) A formal documented inspection of the Works shall be performed by a group consisting of Contractor(s), the commissioning manager, and the Company Representative to identify punch list items in Categories 1, 2 or 3.

c) Punch list items shall be classified to confirm whether they are within the agreed Scope of Works and to establish their priority. The priorities are:

- Category 1 – Any item that constitutes a safety, equipment, or operational hazard or that will impede operations.
- Category 2 – Any remaining incomplete item that require ongoing construction activity. Non-completion of these items shall not present hazards to equipment or Personnel.
- Category 3 – Items outside the scope of the Contract, which are handled in accordance with Contract scope change procedures. Scope change items will be implemented in such a manner as to minimise the impact on operations.

d) The Contractor shall rectify all defects and non-conformances during the construction phase and prior to demobilisation.

e) Defects and non-conformances shall be rectified in a timely manner so that there will be no interruption to the mine production/operation and limited effects on the construction schedule.

f) The Contractor shall supply all information necessary for others to produce ‘As-constructed Drawings’, inclusive of red-line mark ups and electronic as-constructed data with lines and levels in DXF format.

g) The Contractor shall submit Manufacturing Data Records (MDR) to the Company Representative, in “hard” copy and “electronic” copy.

h) The Contractor shall provide as-constructed survey data on an ongoing basis during and upon completion of the Works in both “hard” copy and “electronic” copy (DXF format) within two weeks of the completion of the Works.

i) The Contractor shall submit all documentation outlined in the Contract Schedules.

j) Documentation deliverables for all Contractor supplied items shall include the following information:

- Item Description.
- Manufacturer.
- Serial Number (if applicable).
- Additional Description.
- Drawing Number & Owner.
- Colloquial Name.
- Supplier.
- Calibration Limits.
- Operating Range.
- Contractor Part No.
- Manufacturer Part No.
- Make/Model.
- Design Life.
- Specifications.

8.2 Demobilisation

a) The Contractor shall remove and transport from Site all temporary, construction facilities and equipment, and restore the Site including rehabilitation of temporarily cleared areas to the satisfaction of the Company Representative on Completion of the Works.

b) The Contractor shall supply an accurate demobilisation schedule to the Company prior to commencement of demobilisation and shall give 24 hours' notice if this schedule changes.

Appendix A

IFC Drawings

Appendix B

Bill of Quantities

Appendix C

Quality Assurance Framework

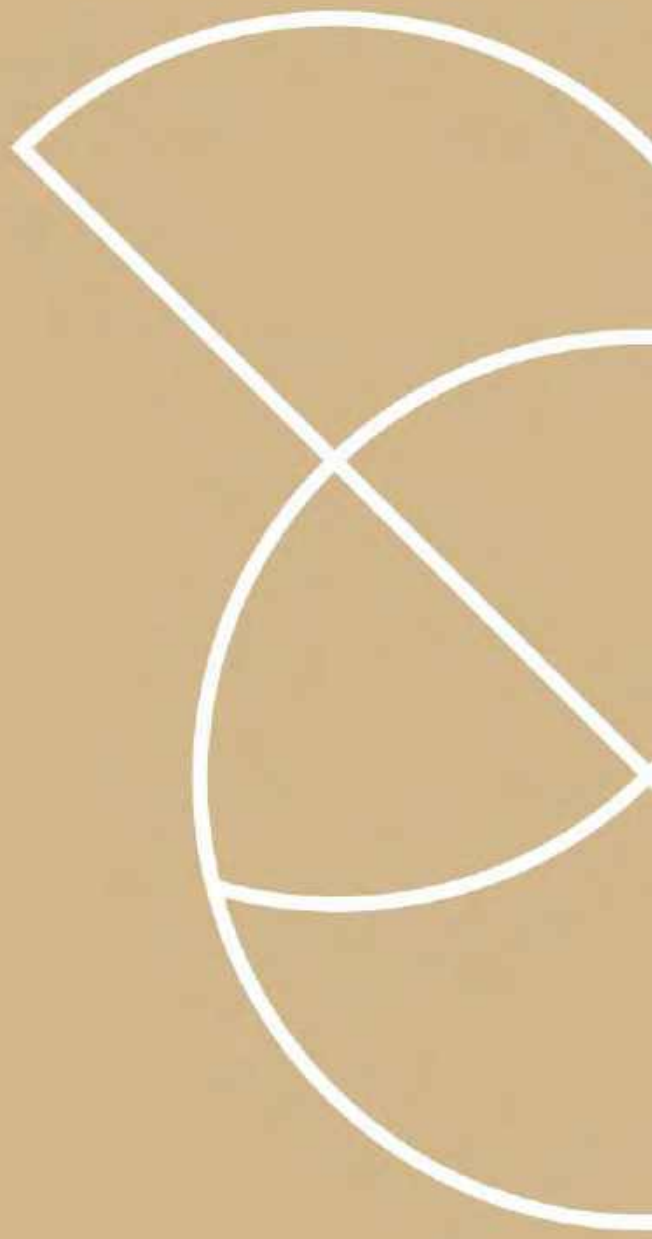
rec

Efficiency
Recalibrated.

CONTACT DETAILS

Building B, The Garden Office Park
355 Scarborough Beach Road
Osborne Park WA 6017 Australia
T: +61 8 6110 4768
W: www.rec.com.au
E: info@rec.com.au

Resource Engineering Consultants Pty Ltd
ACN: 626 931 753

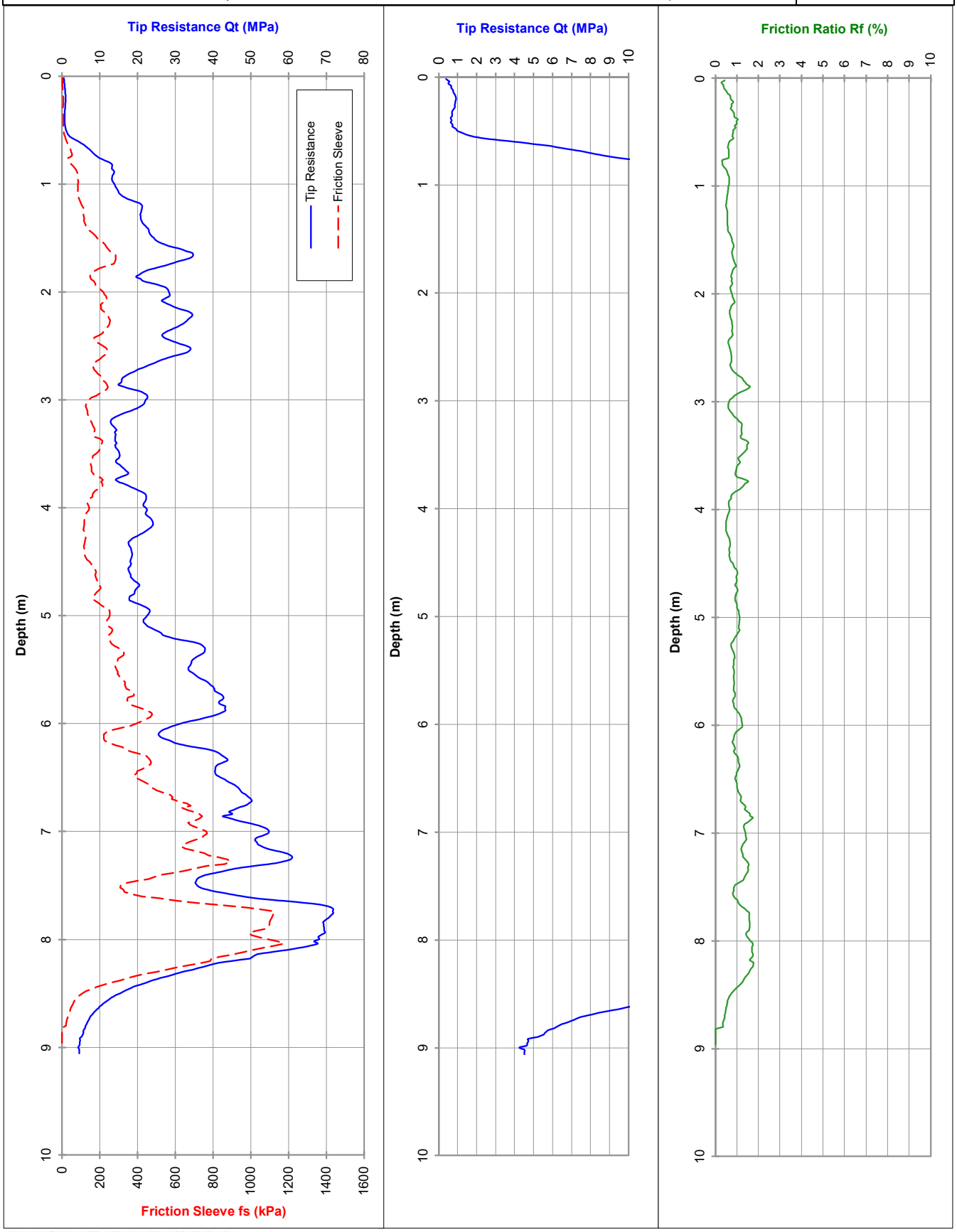


Appendix H

2025 CPTu Plots

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m): 113.08	**CPTU 01**
LOCATION: Thunderbird Mine, Broome	Co-ords: 497561.67mE, 8071907.63mN	30-Jan-25



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 9.0

Dummy probe to (m):

Refusal: Negative FS

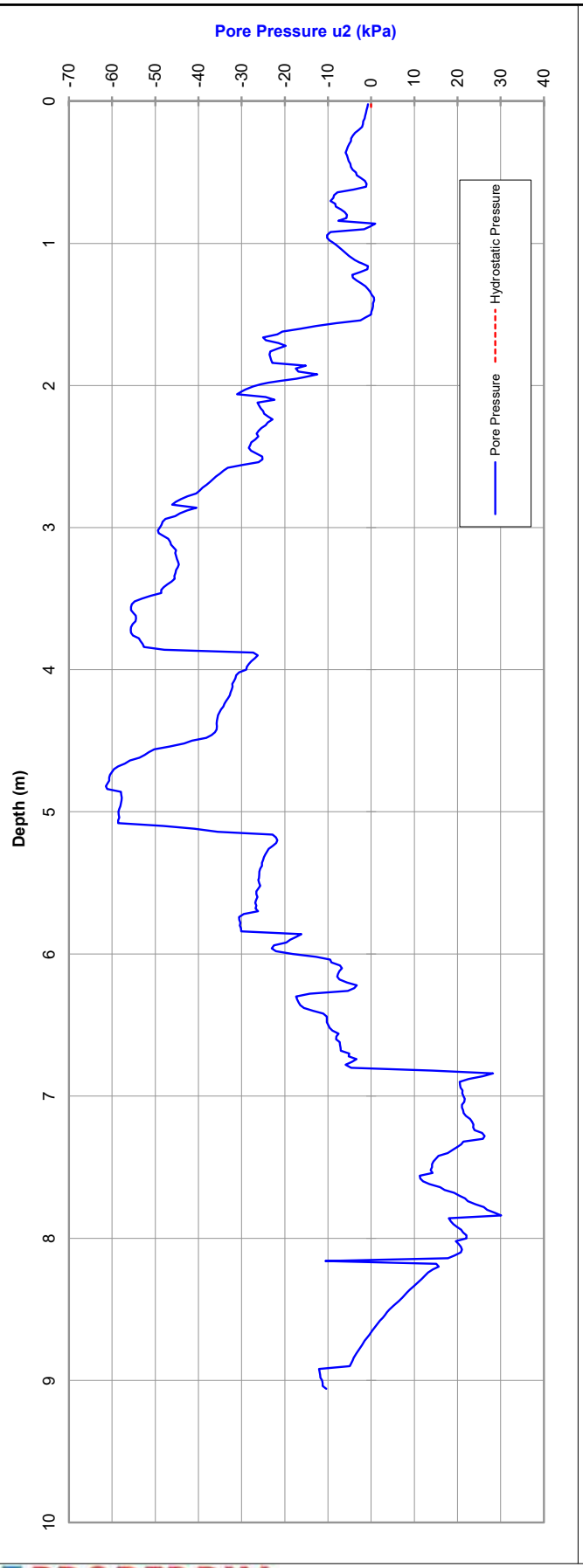
Cone I.D.: EC05

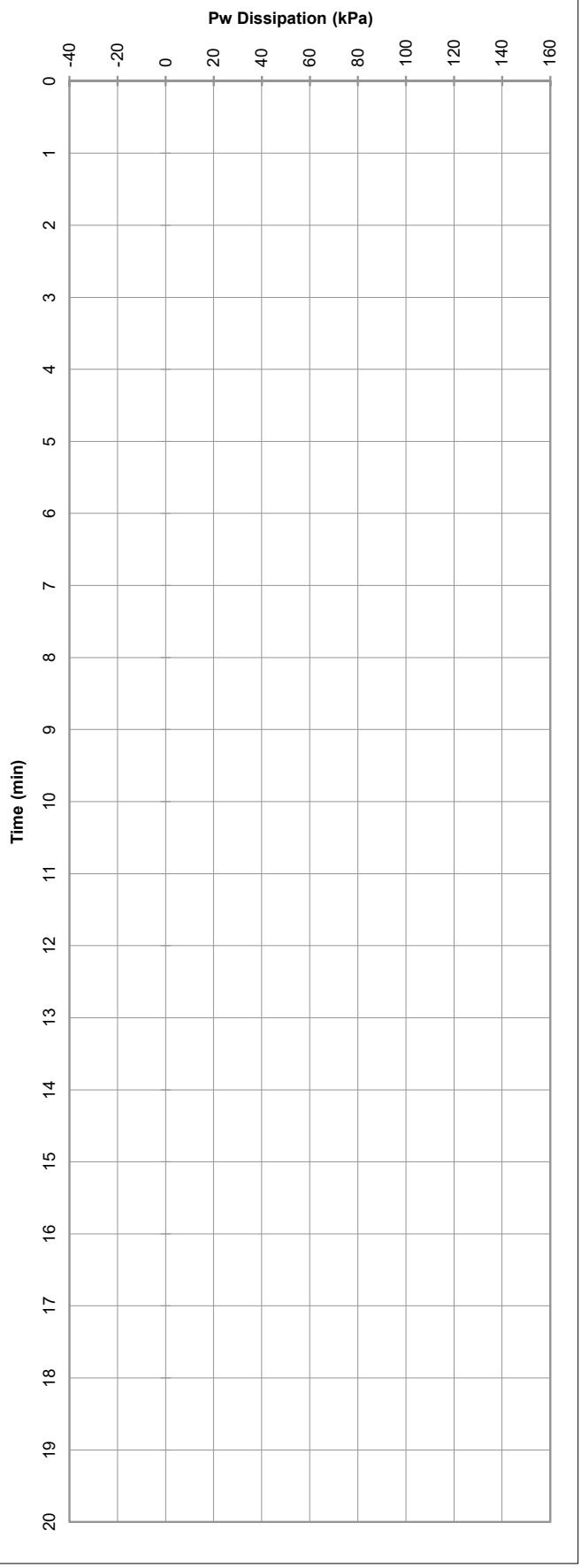
File: RE0010M3

Rig Type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m):	**CPTU 01**
LOCATION: Thunderbird Mine, Broome	Co-ords:	30-Jan-25





PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

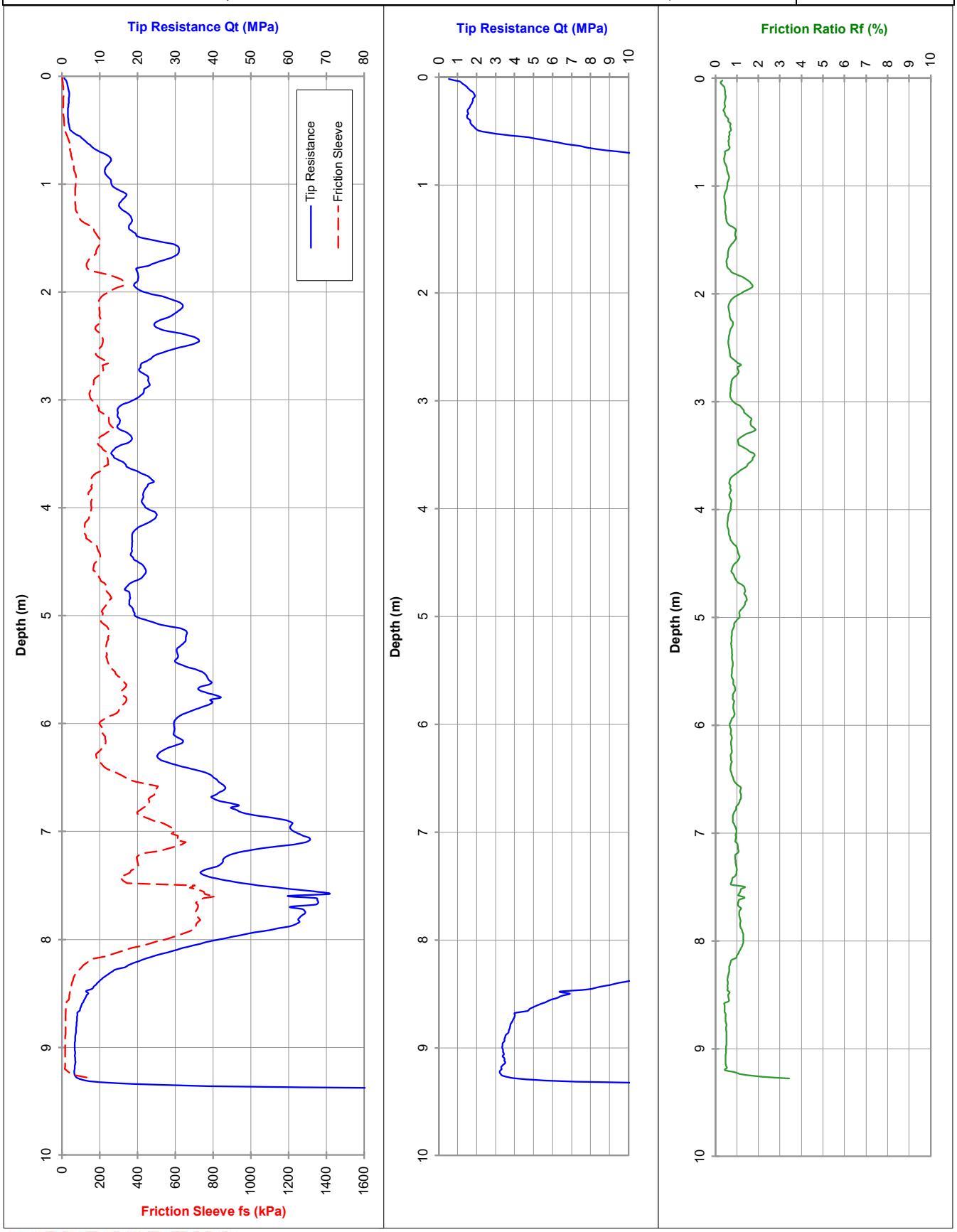
Approx. Water (m): Dry to 9.0

File: RE0010M3.txt

Rig type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m): 111.85	**CPTU 01A**
LOCATION: Thunderbird Mine, Broome	Co-ords: 497563.24mE, 8071907.99mN	31-Jan-25



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): 9.2

Dummy probe to (m):

Refusal: 85 MPa

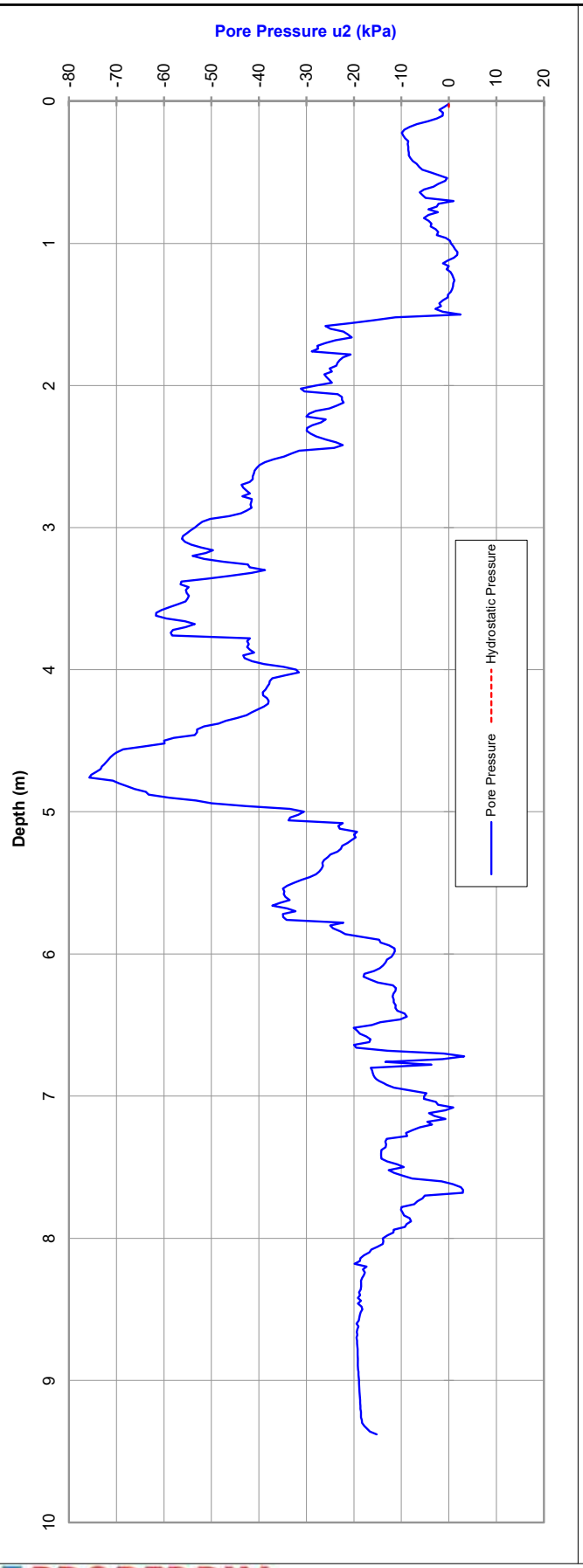
Cone I.D.: EC05

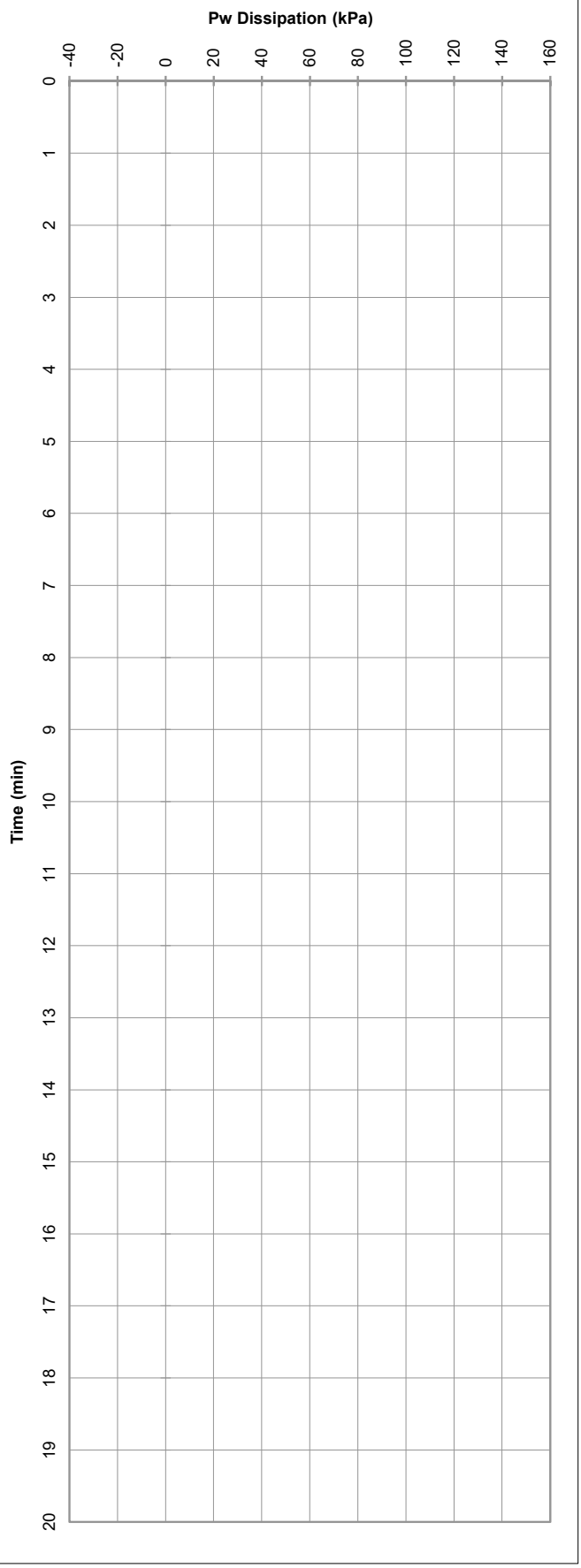
File: RE0011M3

Rig Type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m):	**CPTU 01A**
LOCATION: Thunderbird Mine, Broome	Co-ords:	31-Jan-25





PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

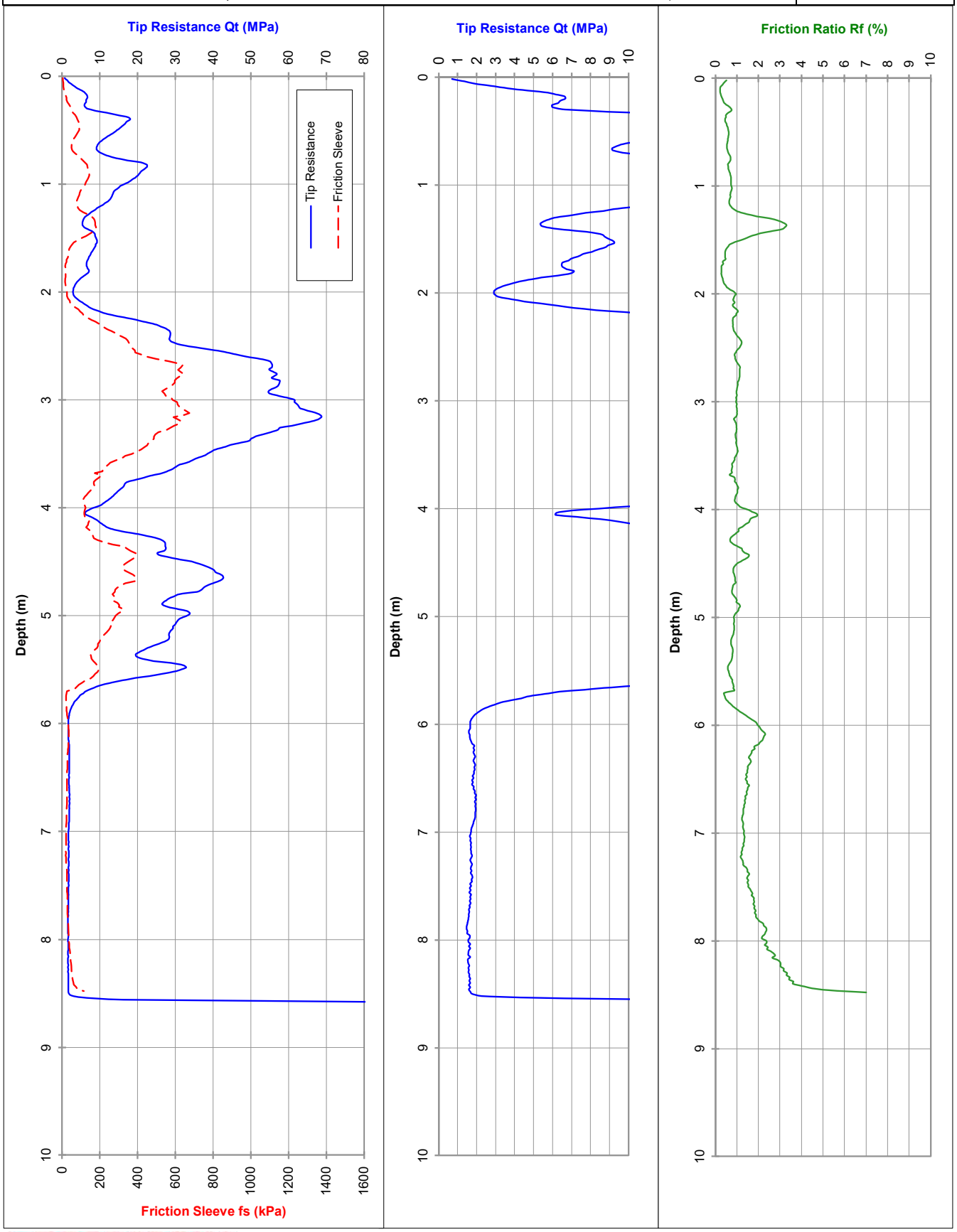
Approx. Water (m): 9.2

File: RE0011M3.txt

Rig type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m): 108.87	**CPTU 02**
LOCATION: Thunderbird Mine, Broome	Co-ords: 498202.09mE, 8071485.95mN	31-Jan-25



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): 4.4

Dummy probe to (m):

Refusal: 85 MPa

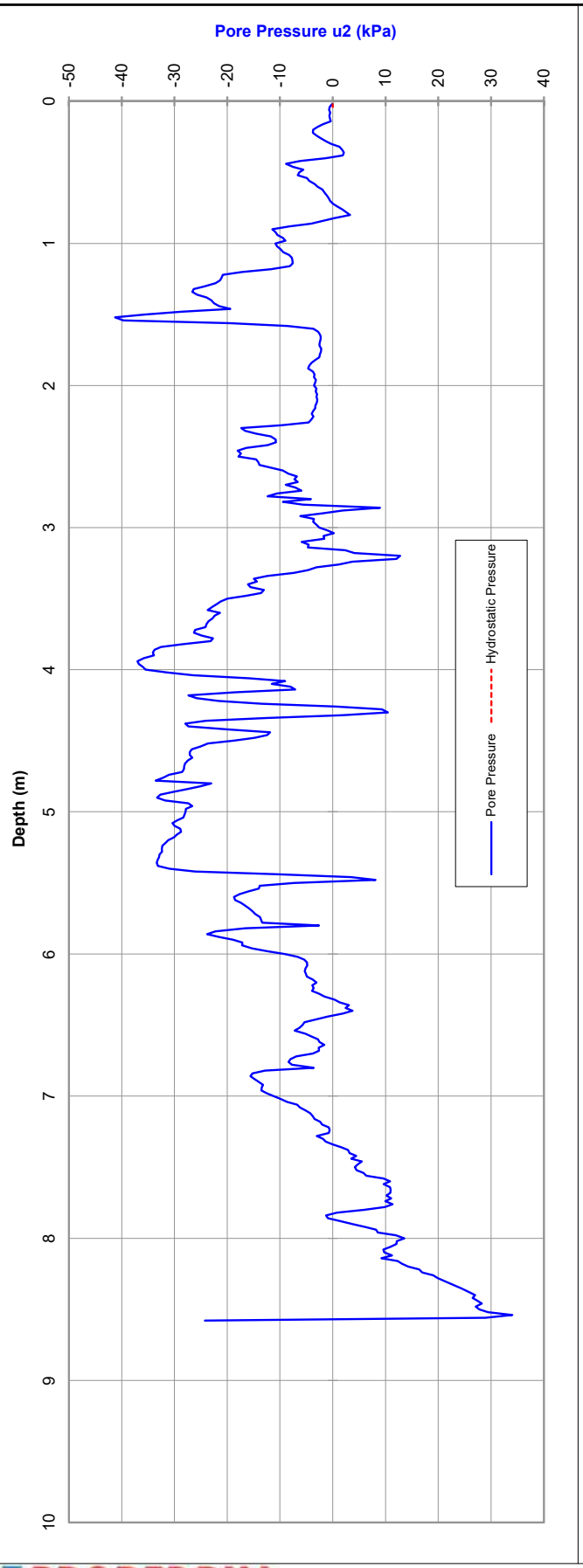
Cone I.D.: EC05

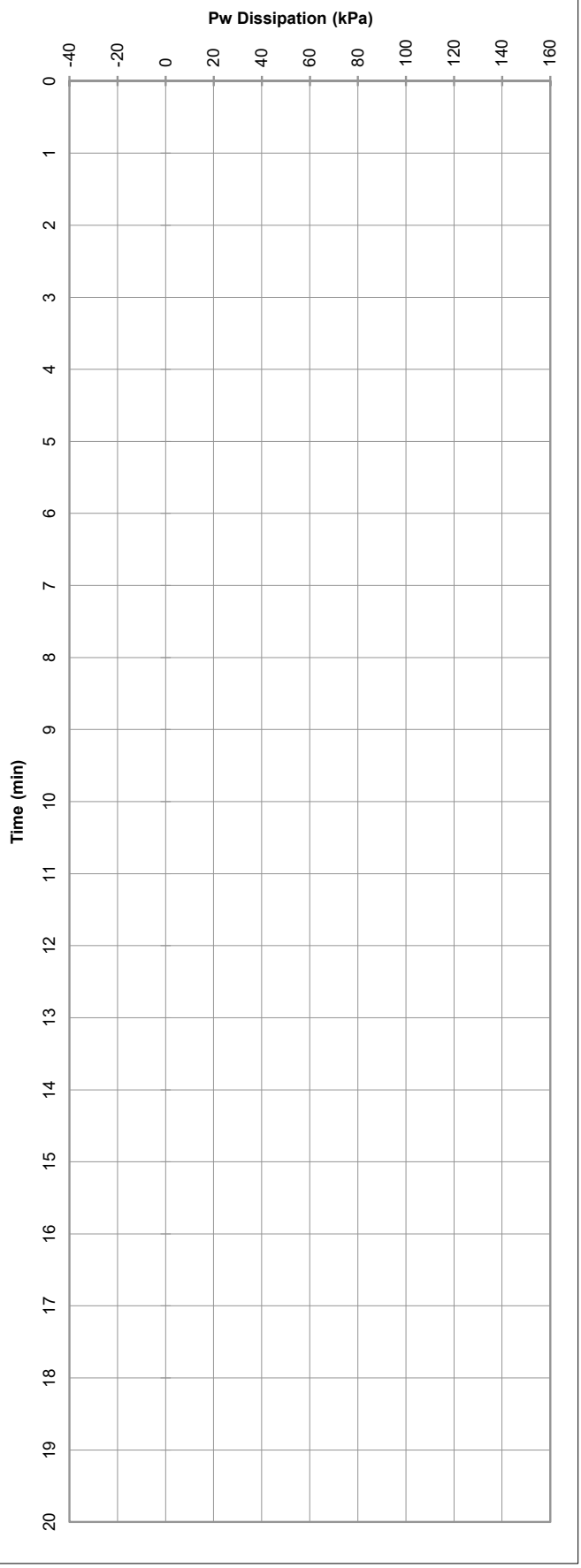
File: RE0012M3

Rig Type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m):	**CPTU 02**
LOCATION: Thunderbird Mine, Broome	Co-ords:	31-Jan-25





PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

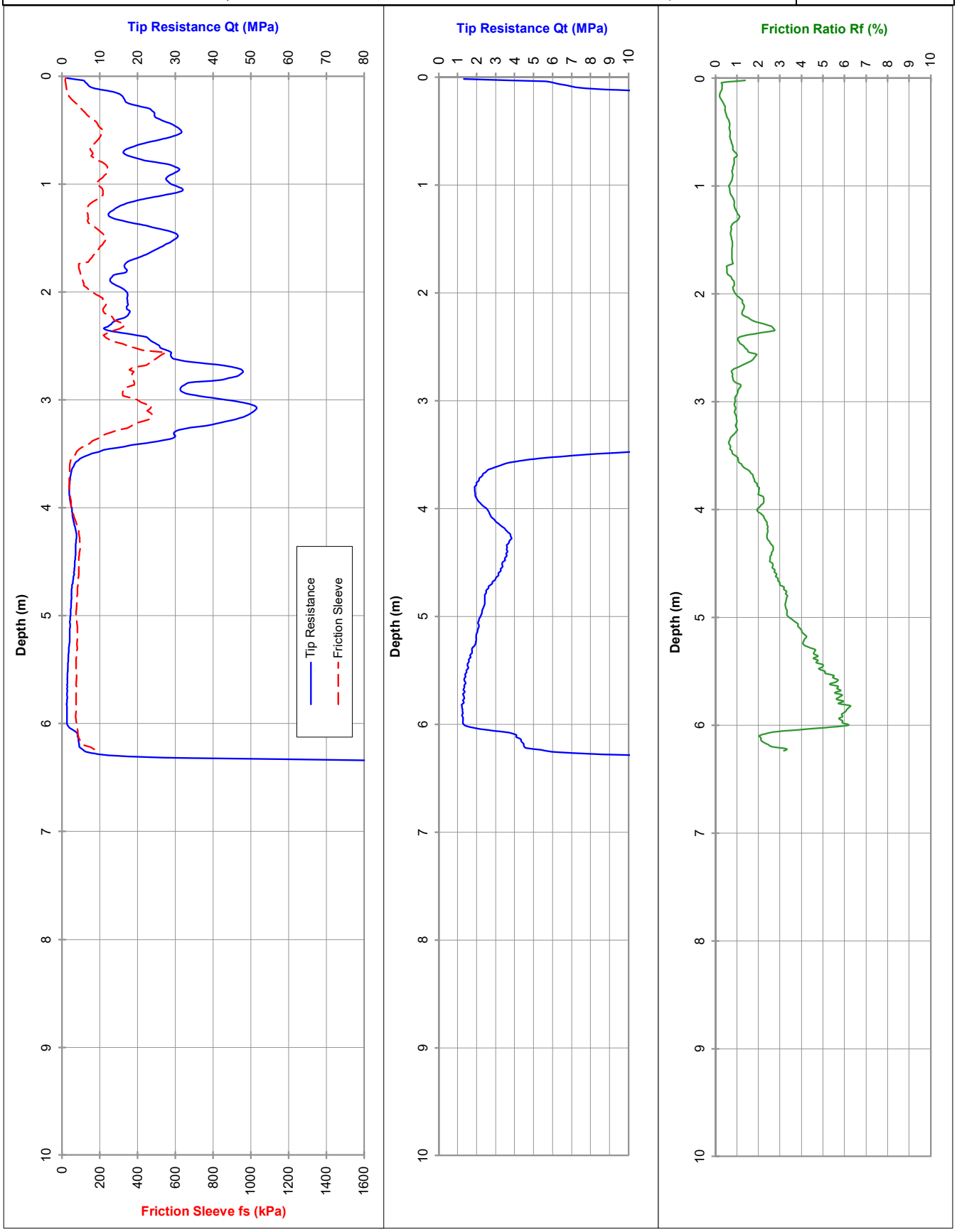
Approx. Water (m): 4.4

File: RE0012M3.txt

Rig type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m): 111.04	**CPTU 03**
LOCATION: Thunderbird Mine, Broome	Co-ords: 498545.58mE, 8071212.08mN	31-Jan-25



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): 3.2

0.5m Piston Sample at (m): 5.0 VWP Installed to (m): 3.0

Refusal: 80 MPa + Lateral Rod Support

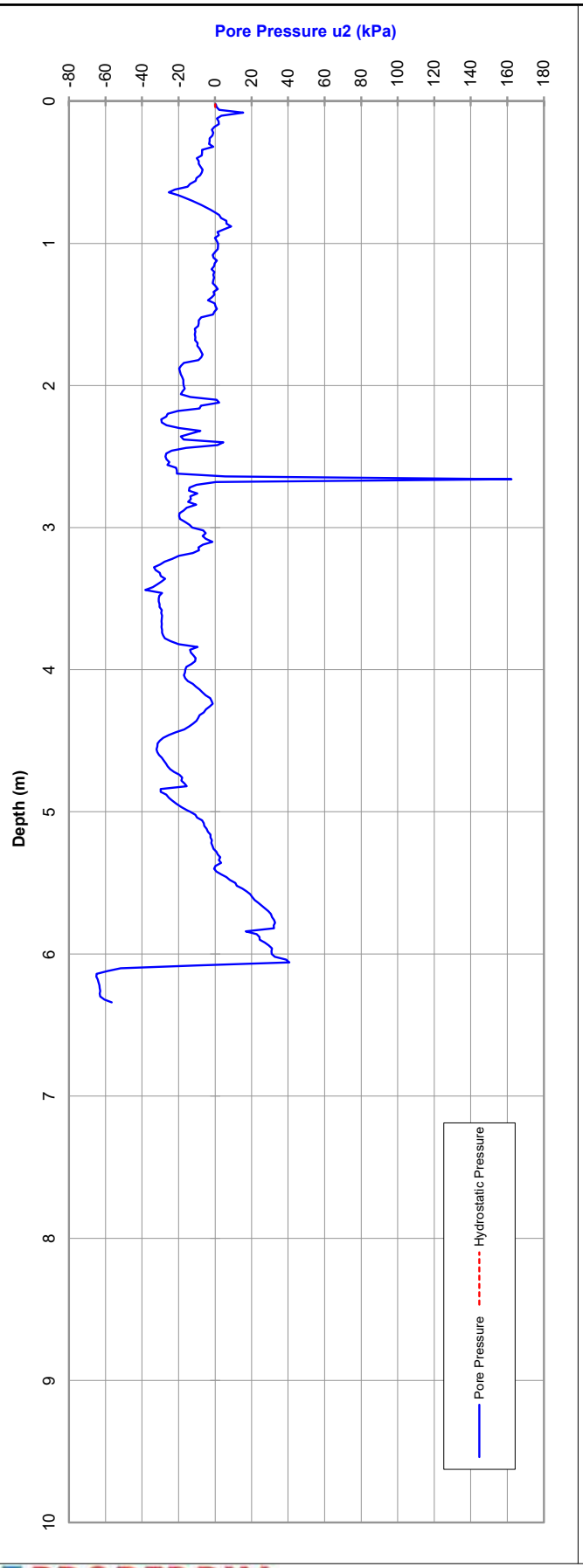
Cone I.D.: EC05

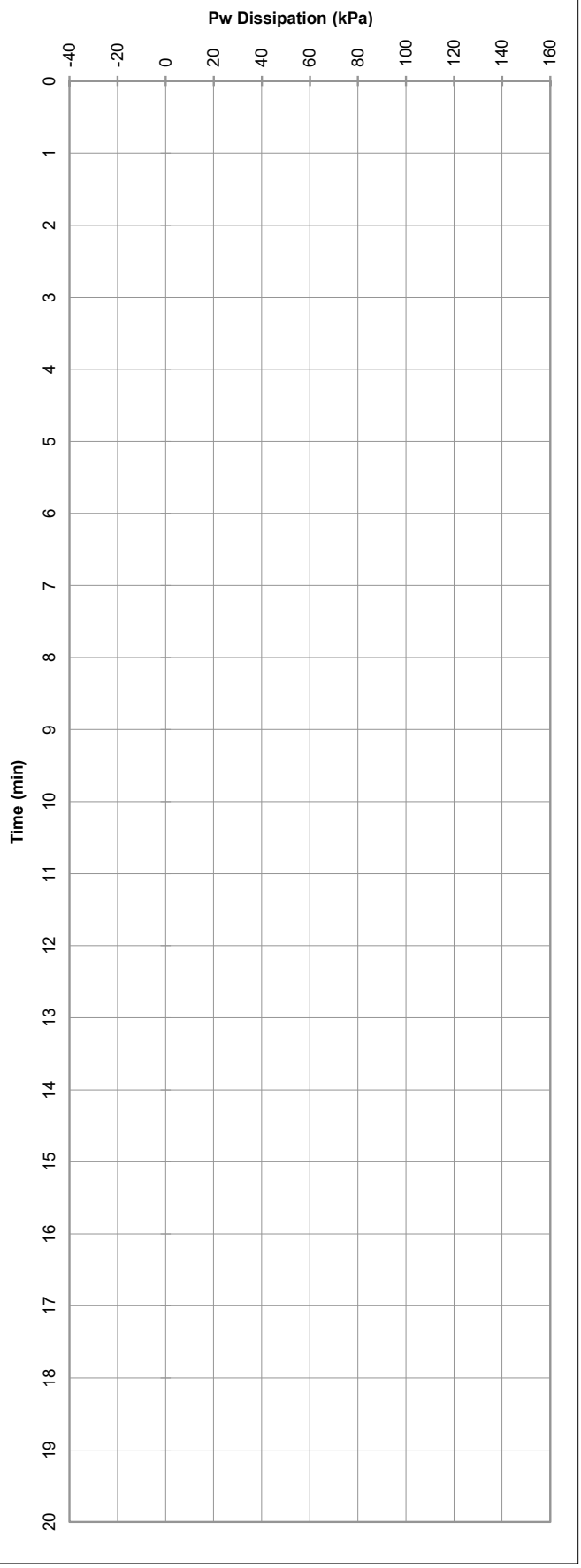
File: RE0013M3

Rig Type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m):	**CPTU 03**
LOCATION: Thunderbird Mine, Broome	Co-ords:	31-Jan-25





PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

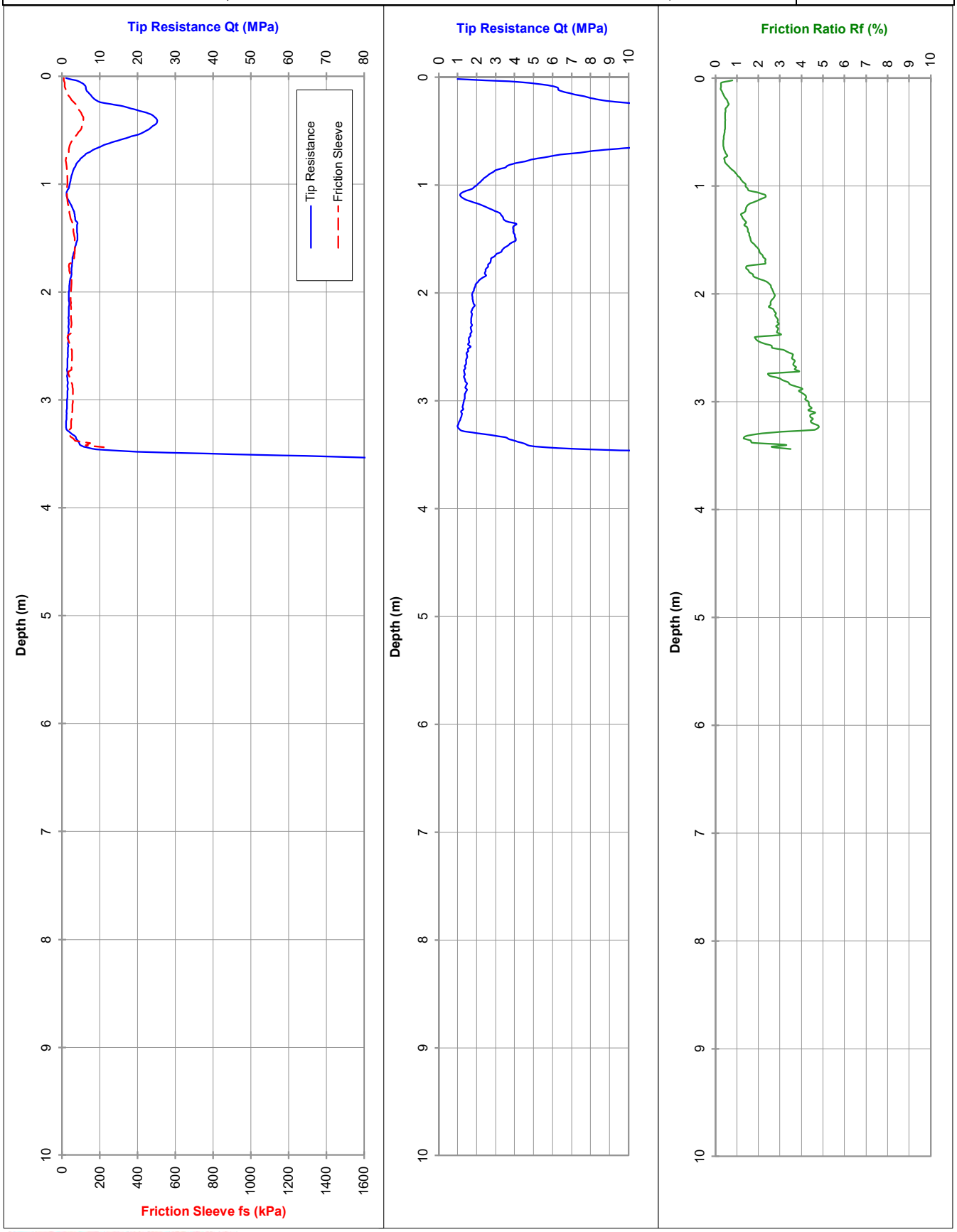
Approx. Water (m): 3.2

File: RE0013M3.txt

Rig type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m): 111.61	**CPTU 04**
LOCATION: Thunderbird Mine, Broome	Co-ords: 498557.82mE, 8071215.85mN	01-Feb-25



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): 1.0

0.5m Piston Sample at (m): 2.5

Refusal: 85 MPa

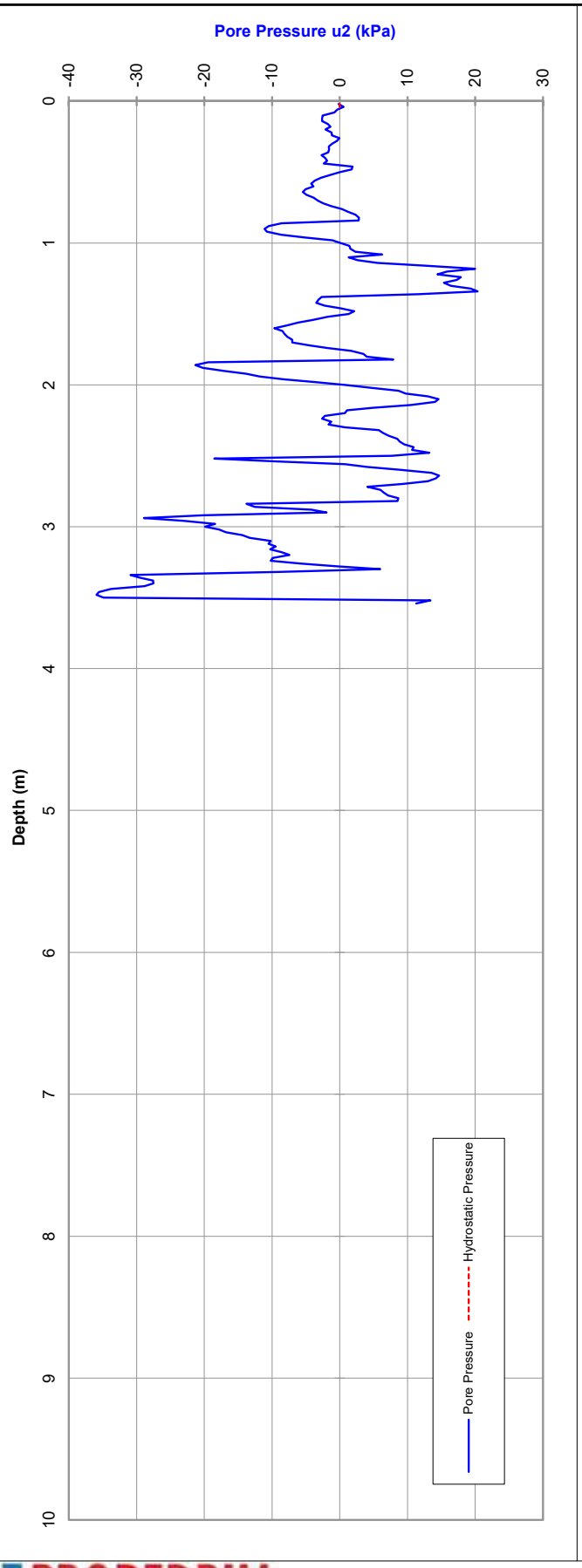
Cone I.D.: EC81GM

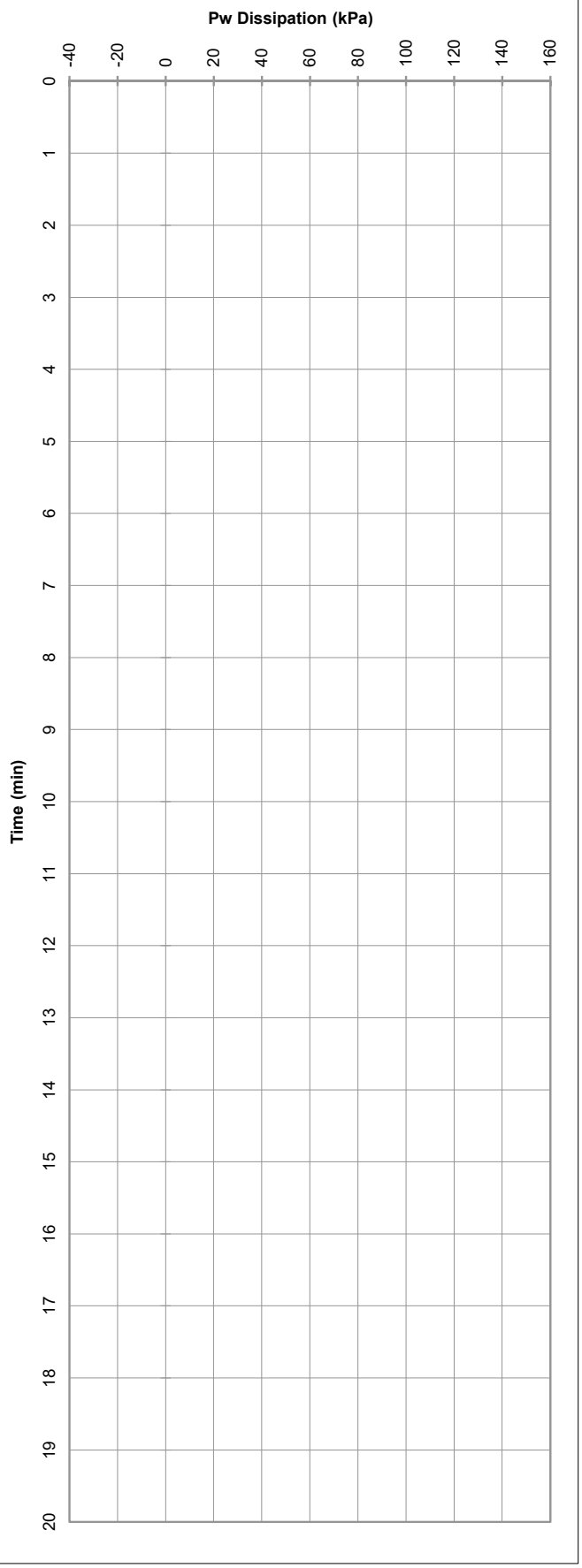
File: RE0017M3

Rig Type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m):	**CPTU 04**
LOCATION: Thunderbird Mine, Broome	Co-ords:	01-Feb-25





PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

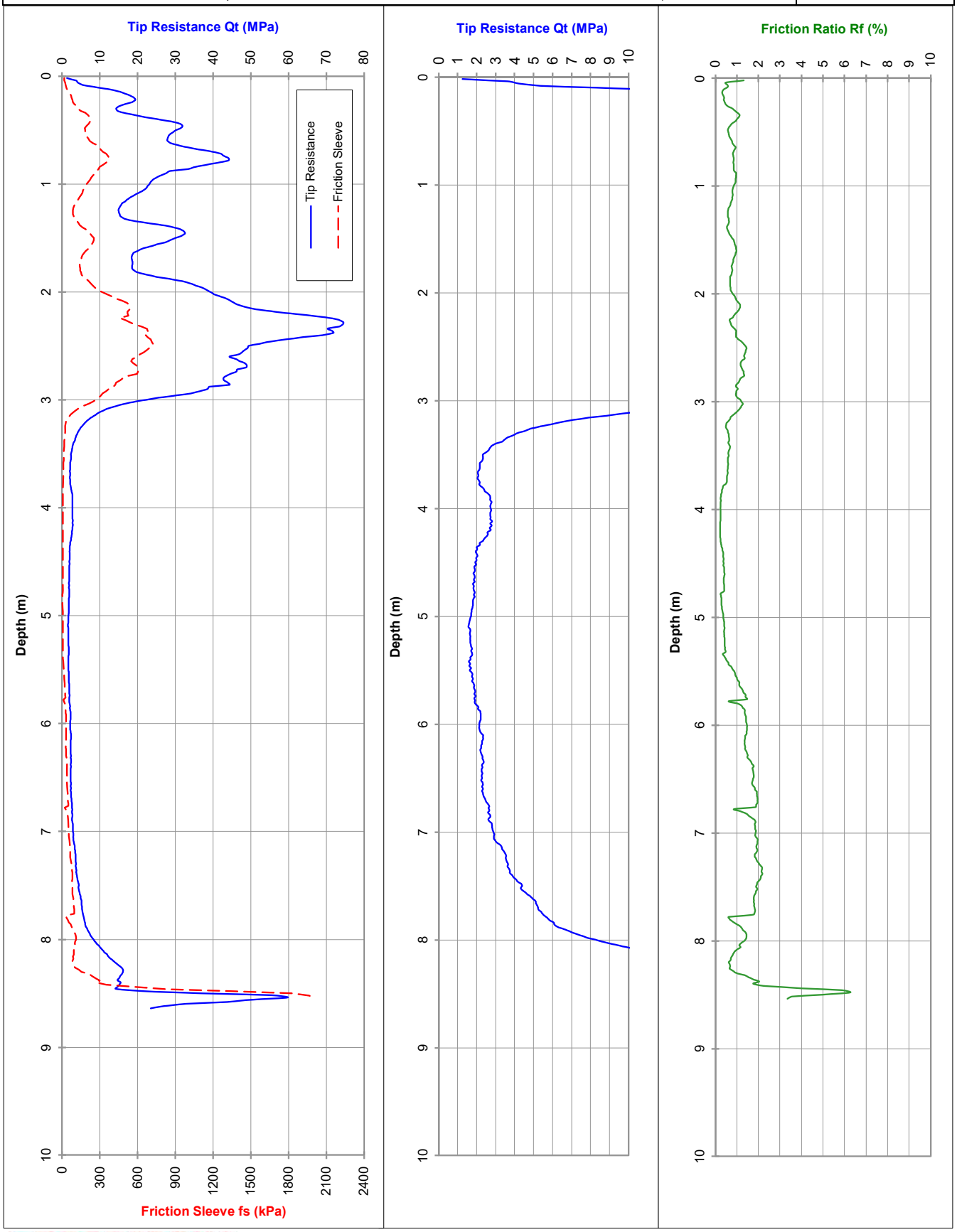
Approx. Water (m): 1

File: RE0017M3.txt

Rig type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m): 110.63	**CPTU 05**
LOCATION: Thunderbird Mine, Broome	Co-ords: 498616.1mE, 8070922.5mN	31-Jan-25



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): 3.9

VWP Installed to (m): 3.0

Refusal: PP Max

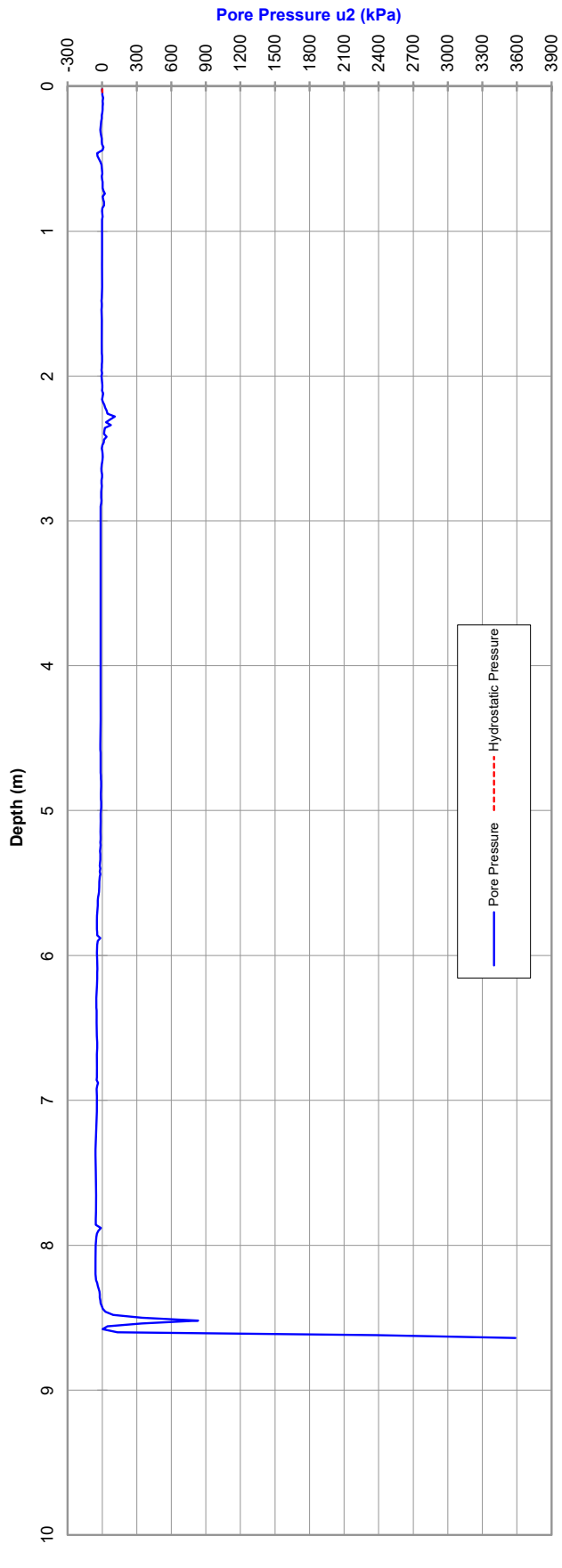
Cone I.D.: EC05

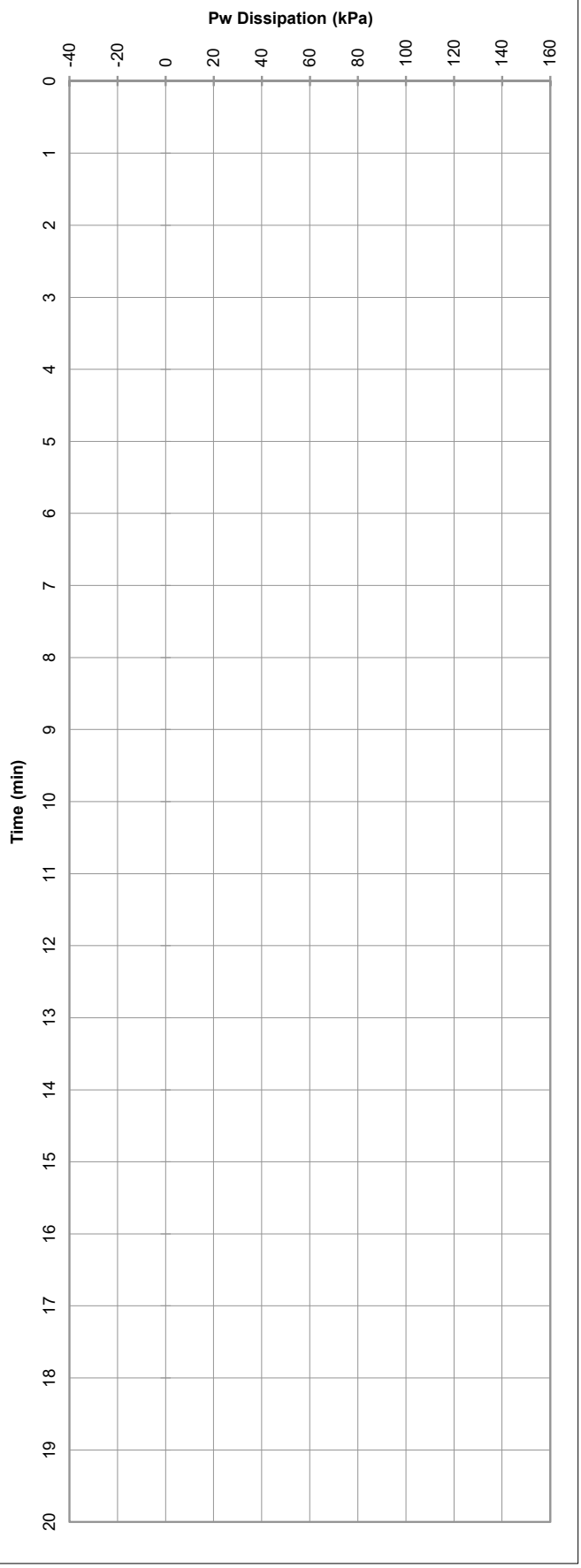
File: RE0014M3

Rig Type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m):	**CPTU 05**
LOCATION: Thunderbird Mine, Broome	Co-ords:	31-Jan-25





PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

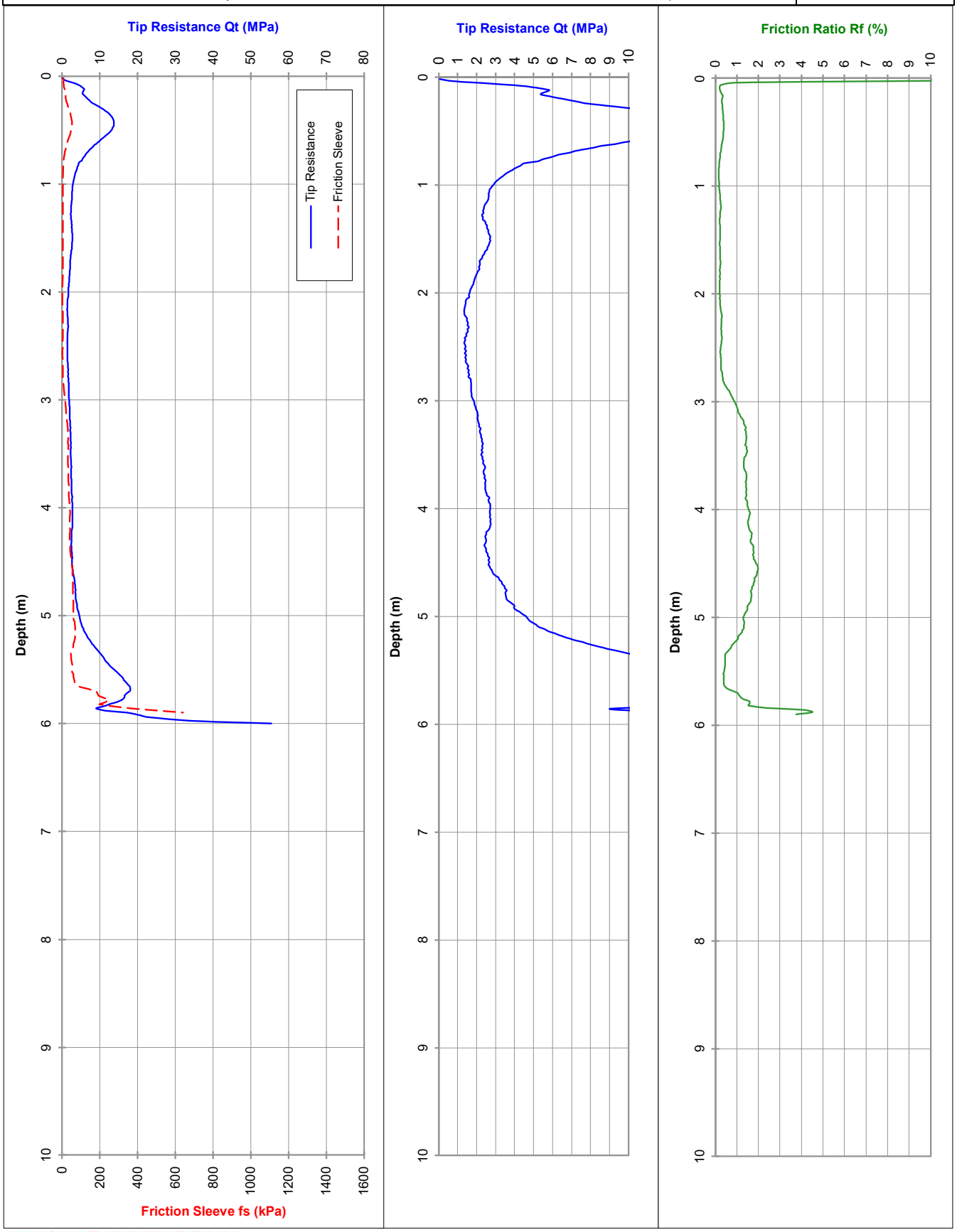
Approx. Water (m): 3.9

File: RE0014M3.txt

Rig type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m): 105.62	**CPTU 06**
LOCATION: Thunderbird Mine, Broome	Co-ords: 498626.03mE, 8070923.35mN	01-Feb-25



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): 2.6

0.5m Piston Sample at (m): 3.0

Refusal:

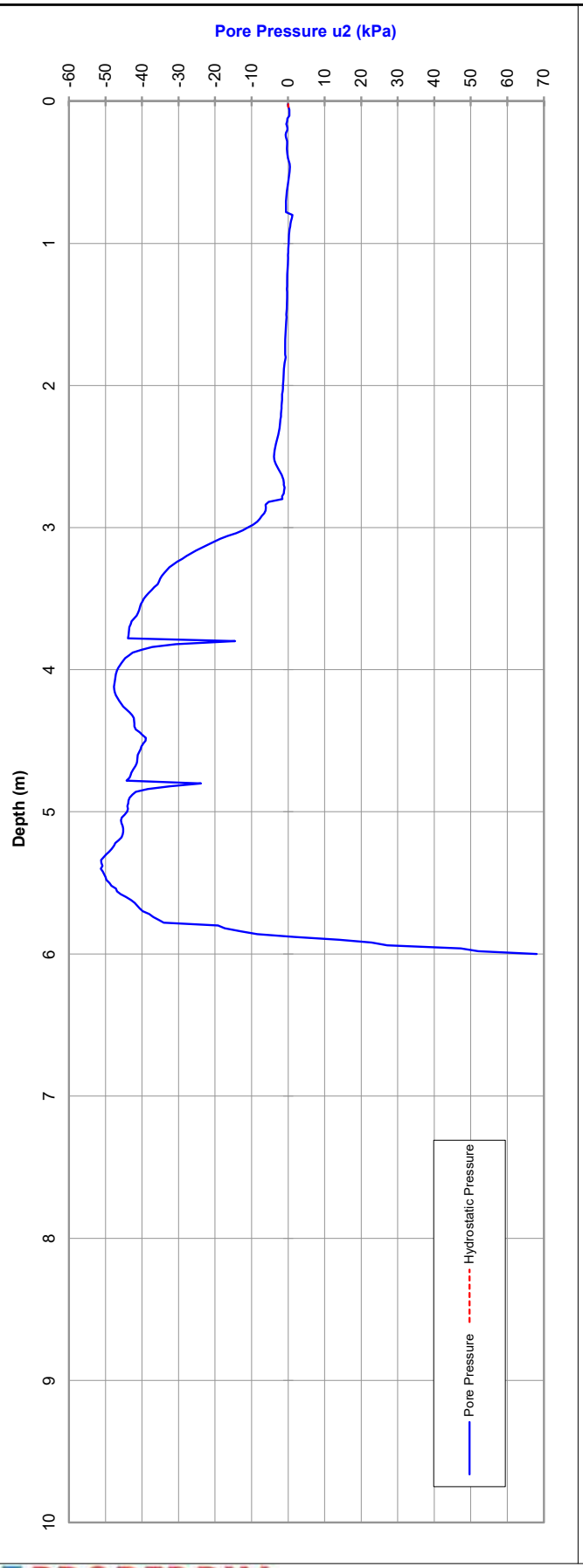
Cone I.D.: EC81GM

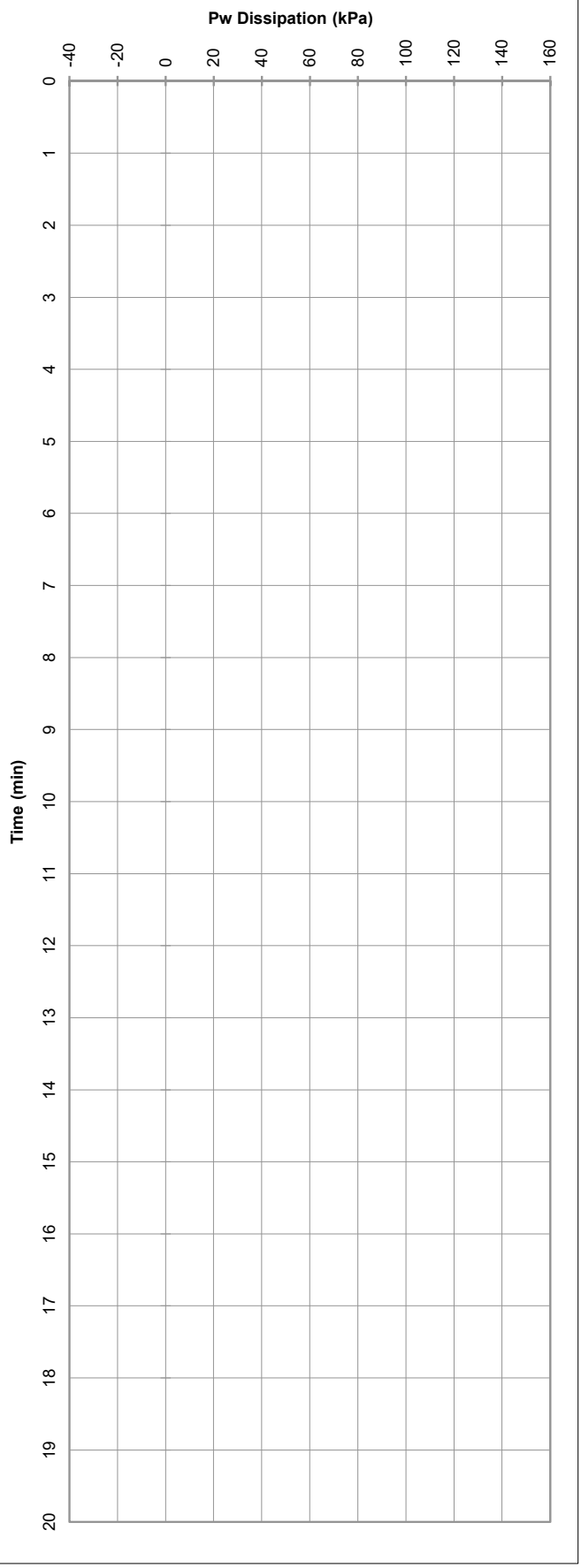
File: RE0016M3

Rig Type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m):	**CPTU 06**
LOCATION: Thunderbird Mine, Broome	Co-ords:	01-Feb-25





PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

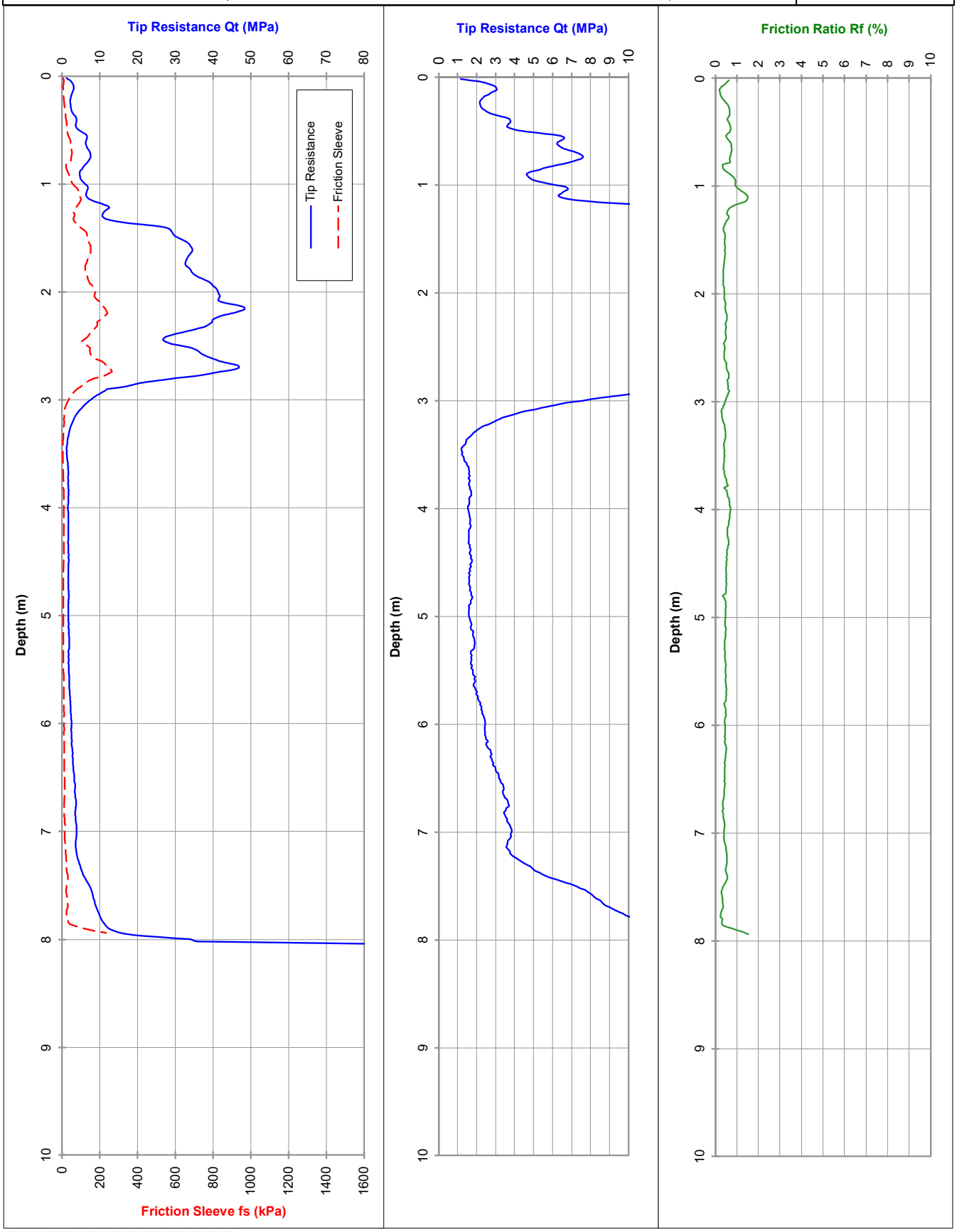
Approx. Water (m): 2.6

File: RE0016M3.txt

Rig type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m): 103.48	**CPTU 07**
LOCATION: Thunderbird Mine, Broome	Co-ords: 498352.89mE, 8070516.77mN	01-Feb-25



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): 3.5

VWP Installed to (m): 3.0

Refusal: 80 MPa

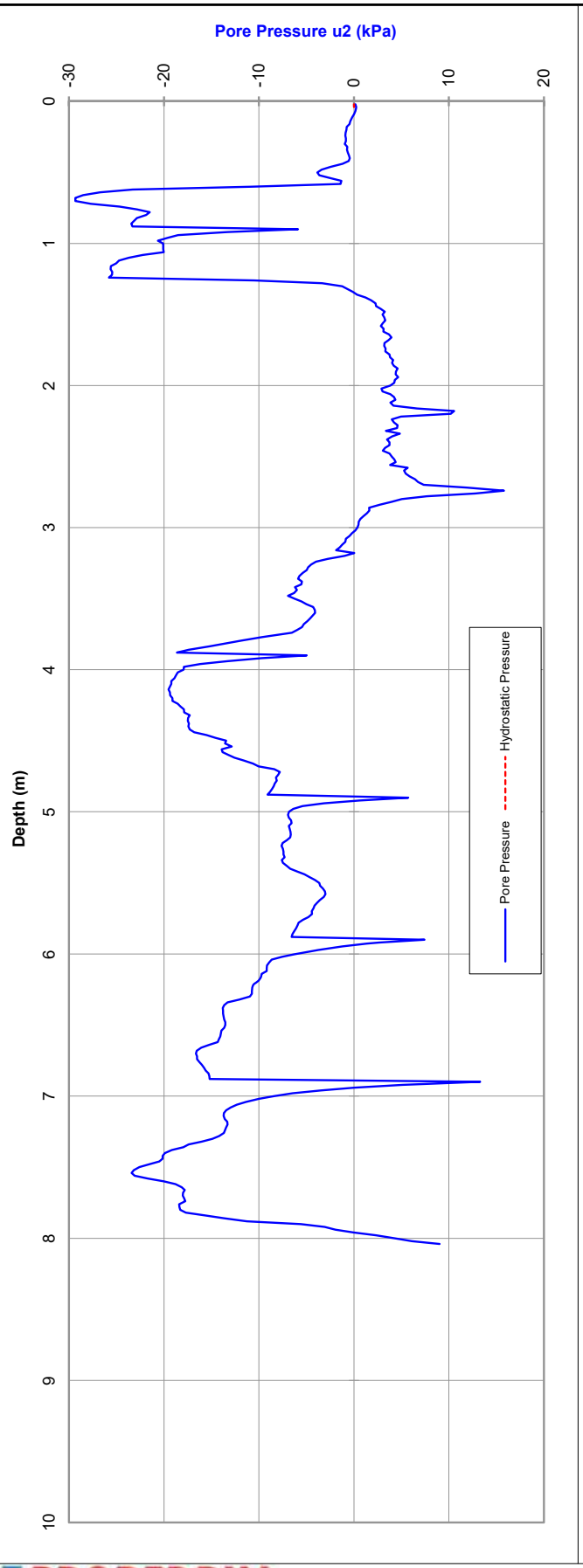
Cone I.D.: EC81GM

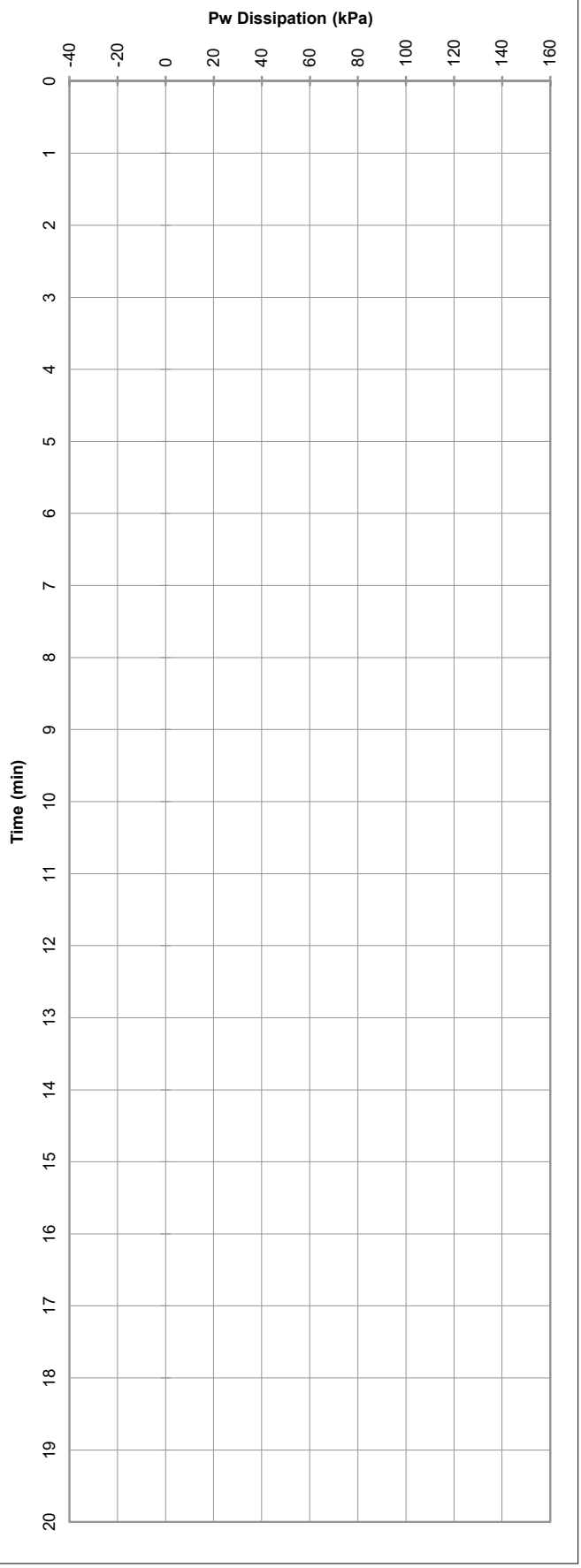
File: RE0015M3

Rig Type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m):	**CPTU 07**
LOCATION: Thunderbird Mine, Broome	Co-ords:	01-Feb-25





PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

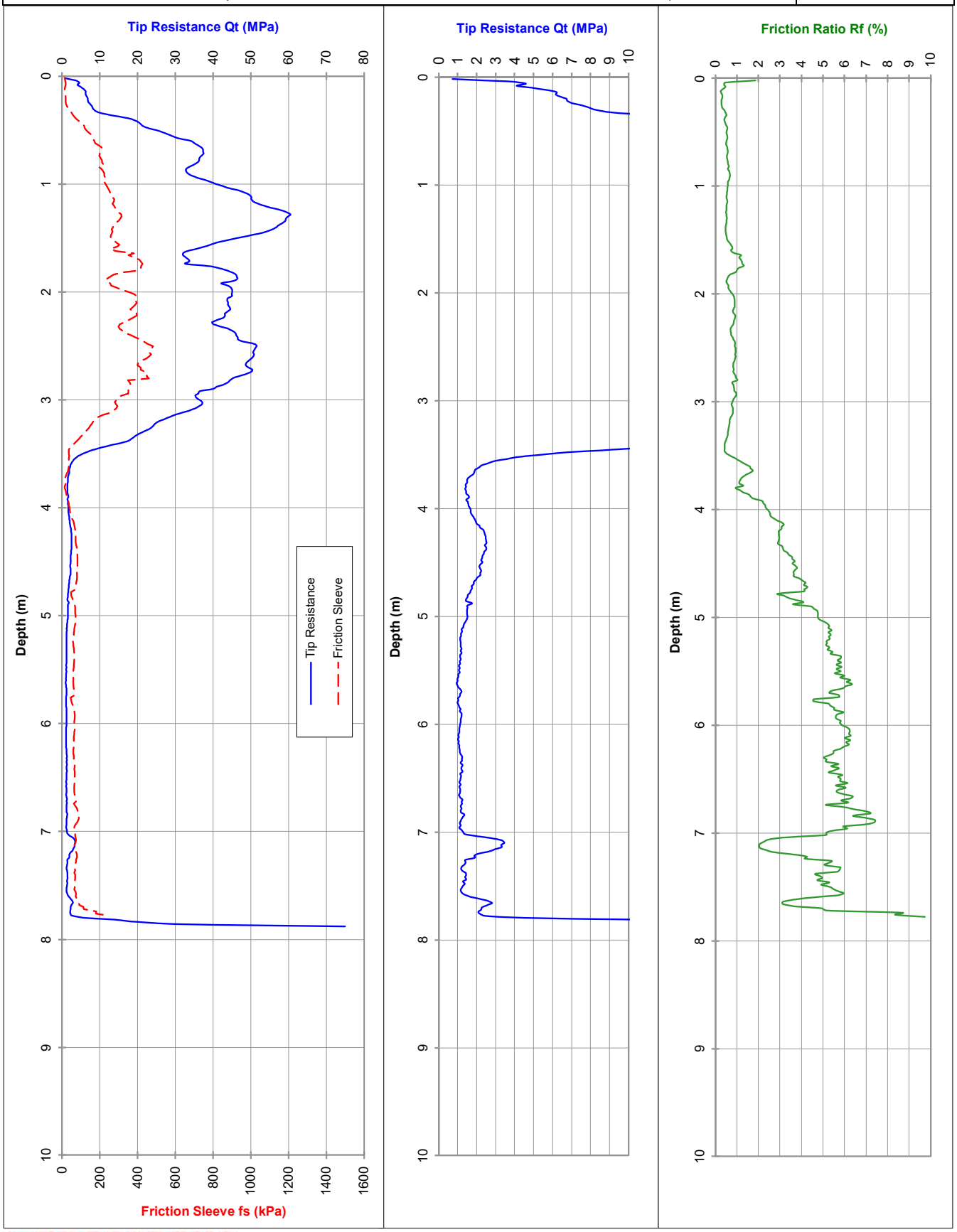
Approx. Water (m): 3.5

File: RE0015M3.txt

Rig type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m): 105.46	**CPTU 08A**
LOCATION: Thunderbird Mine, Broome	Co-ords: 498069.46mE, 8070572.76mN	02-Feb-25



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): 3.2

VWP Installed to (m): 2.8

Refusal: 75 MPa

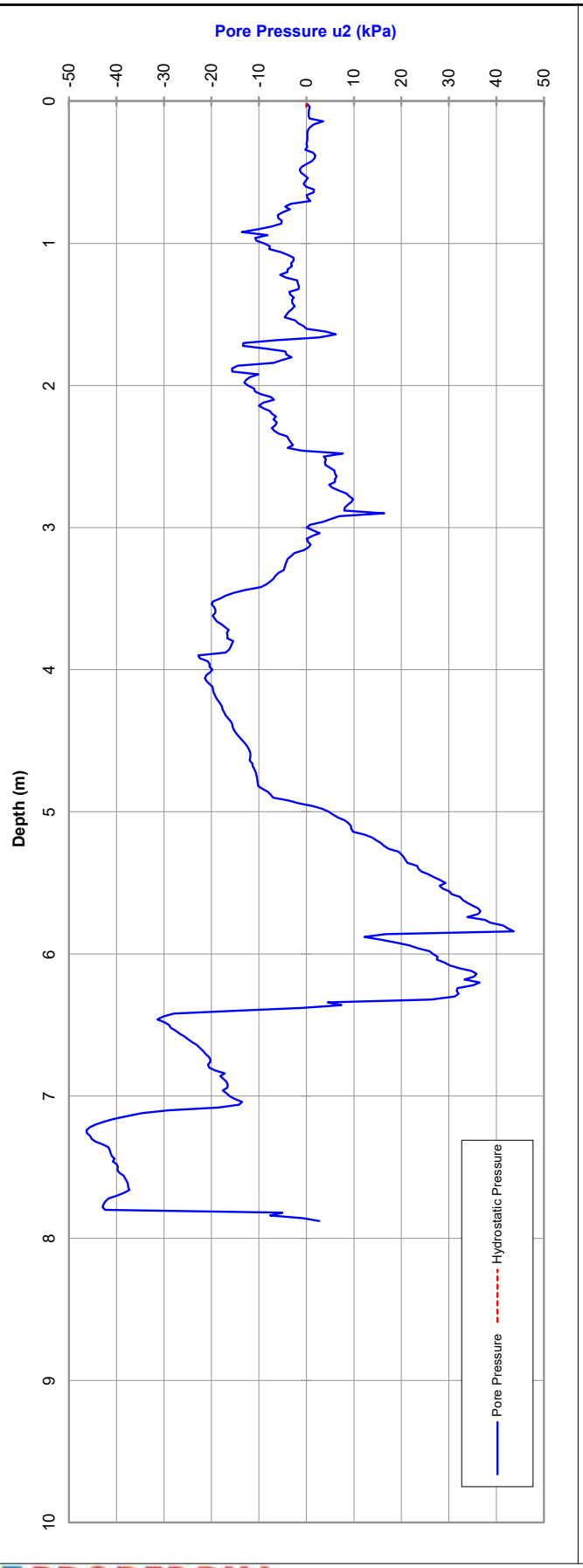
Cone I.D.: EC81GM

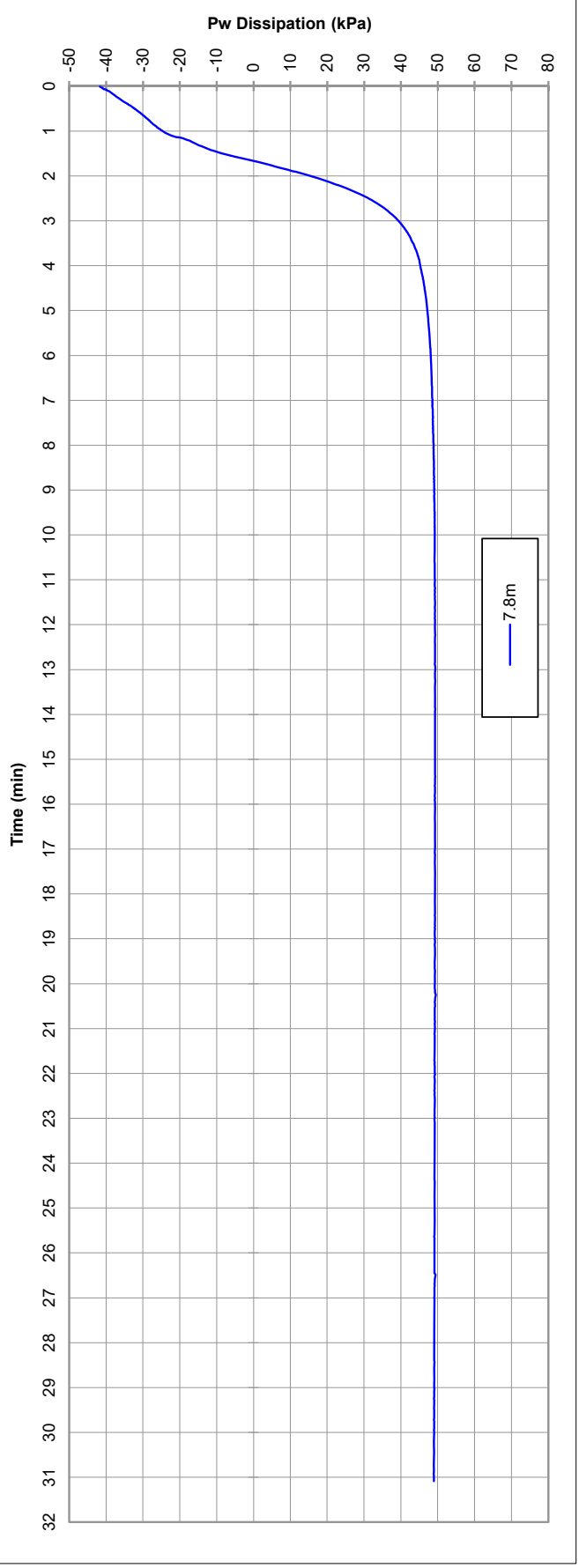
File: RE0021M3

Rig Type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m):	**CPTU 08A**
LOCATION: Thunderbird Mine, Broome	Co-ords:	02-Feb-25





PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

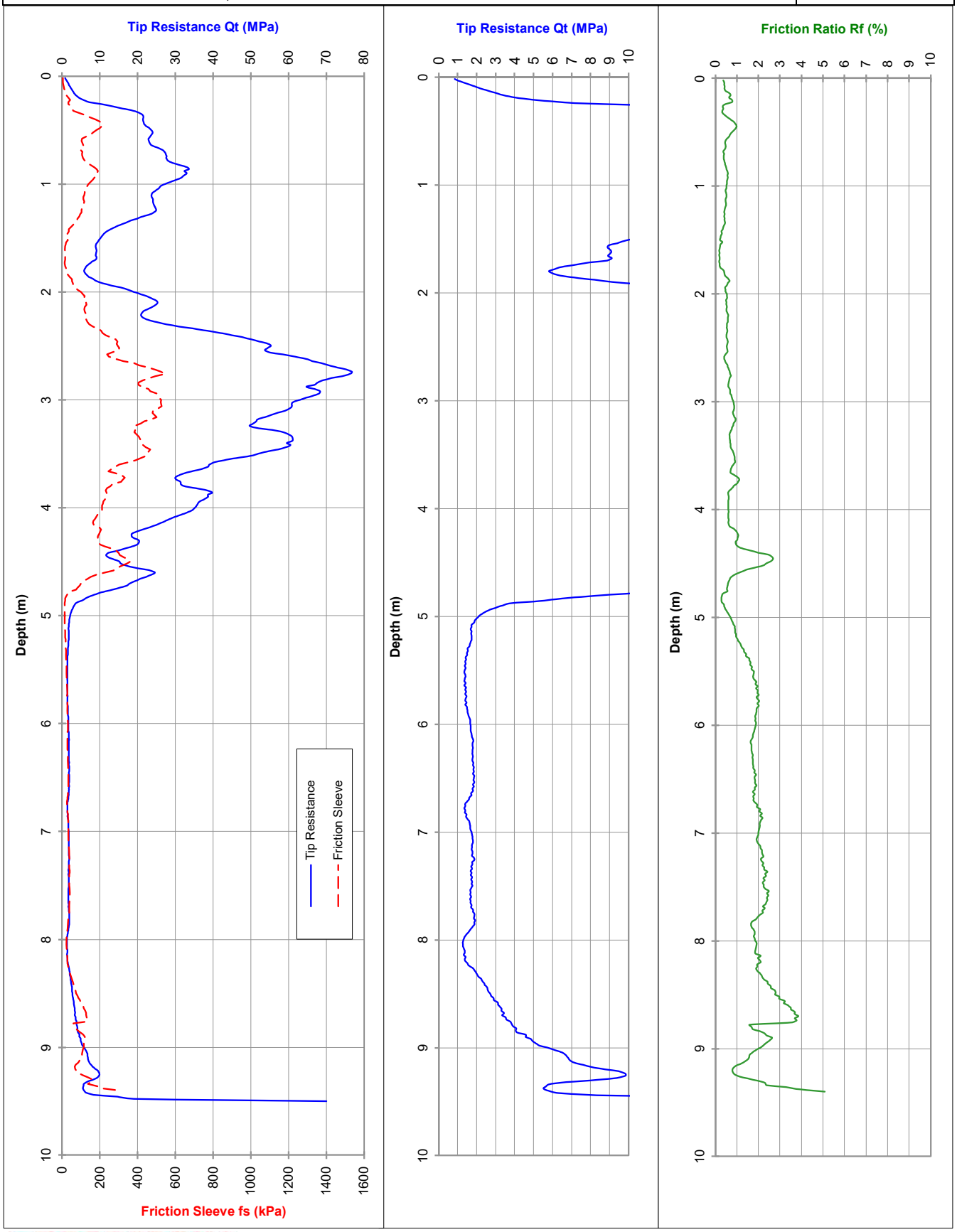
Approx. Water (m): 3.2

File: RE0021M3.txt

Rig type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m):	**CPTU 09**
LOCATION: Thunderbird Mine, Broome	Co-ords:	02-Feb-25



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): 3.9

VWP Installed to (m): 3.4

Refusal: 70 MPa

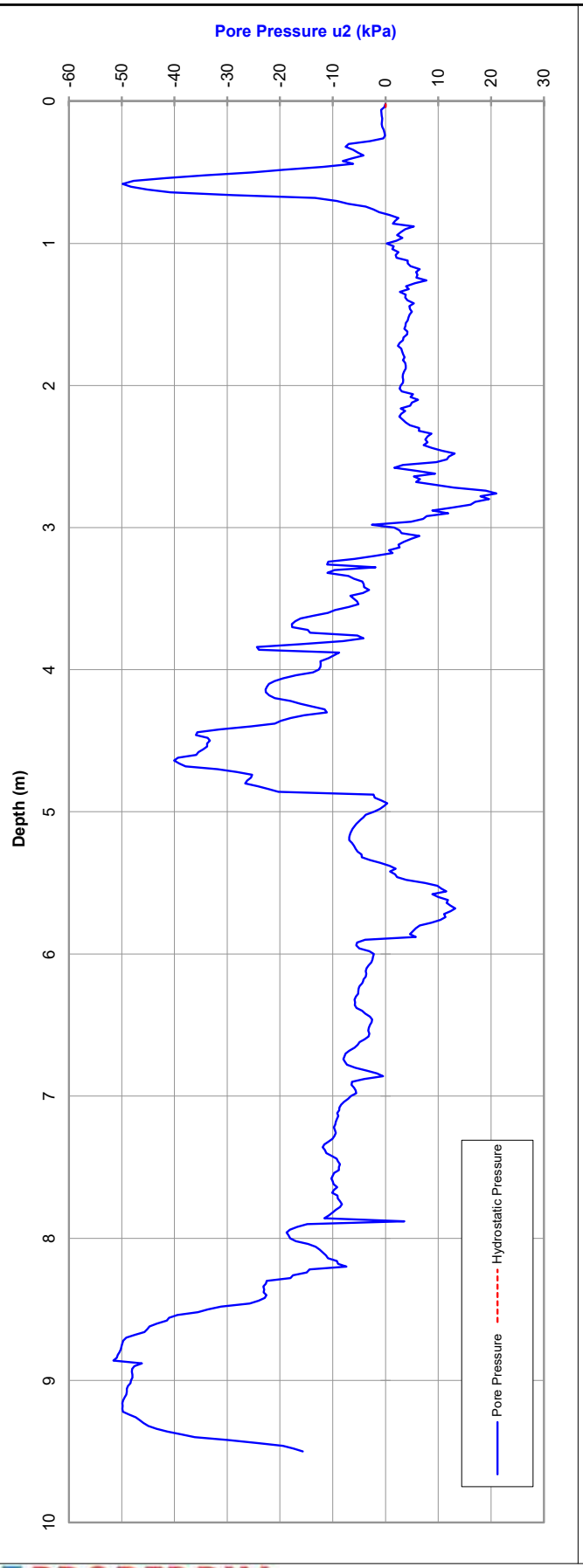
Cone I.D.: EC81GM

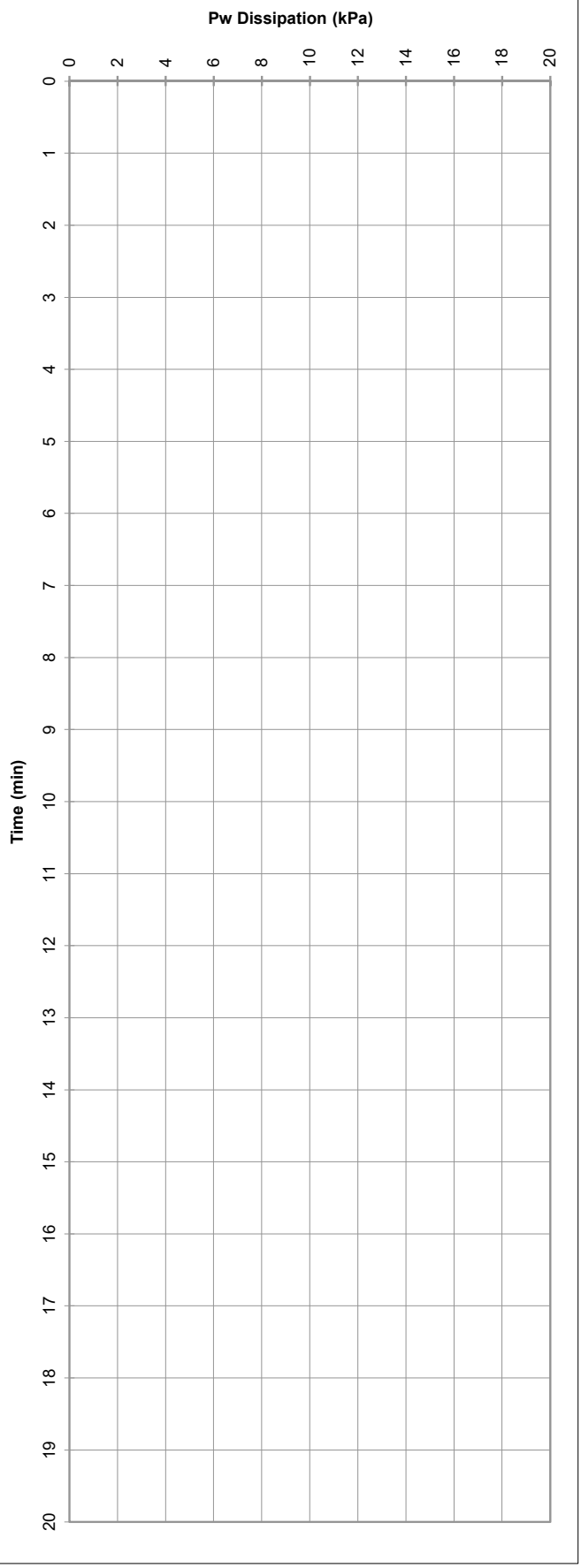
File: RE0019M3

Rig Type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m):	**CPTU 09**
LOCATION: Thunderbird Mine, Broome	Co-ords:	02-Feb-25





PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

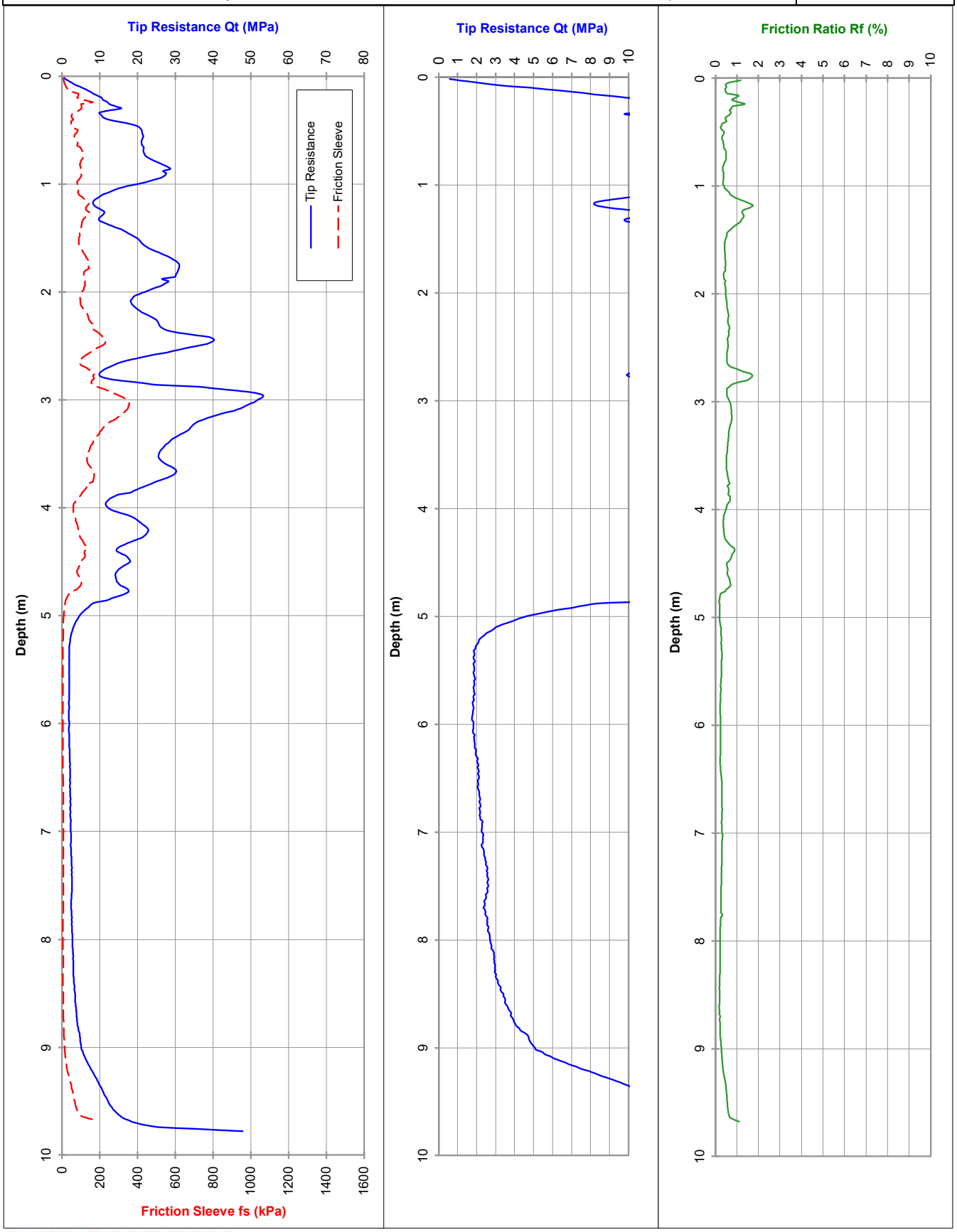
Approx. Water (m): 3.9

File: RE0019M3.txt

Rig type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m): 104.75	**CPTU 10**
LOCATION: Thunderbird Mine, Broome	Co-ords: 497718.35mE, 8070975.56mN	01-Feb-25



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 4.0

0.5m Piston Sample at (m): 5.5 VWP Installed to (m): 4.0

Refusal: Lateral Rod Support

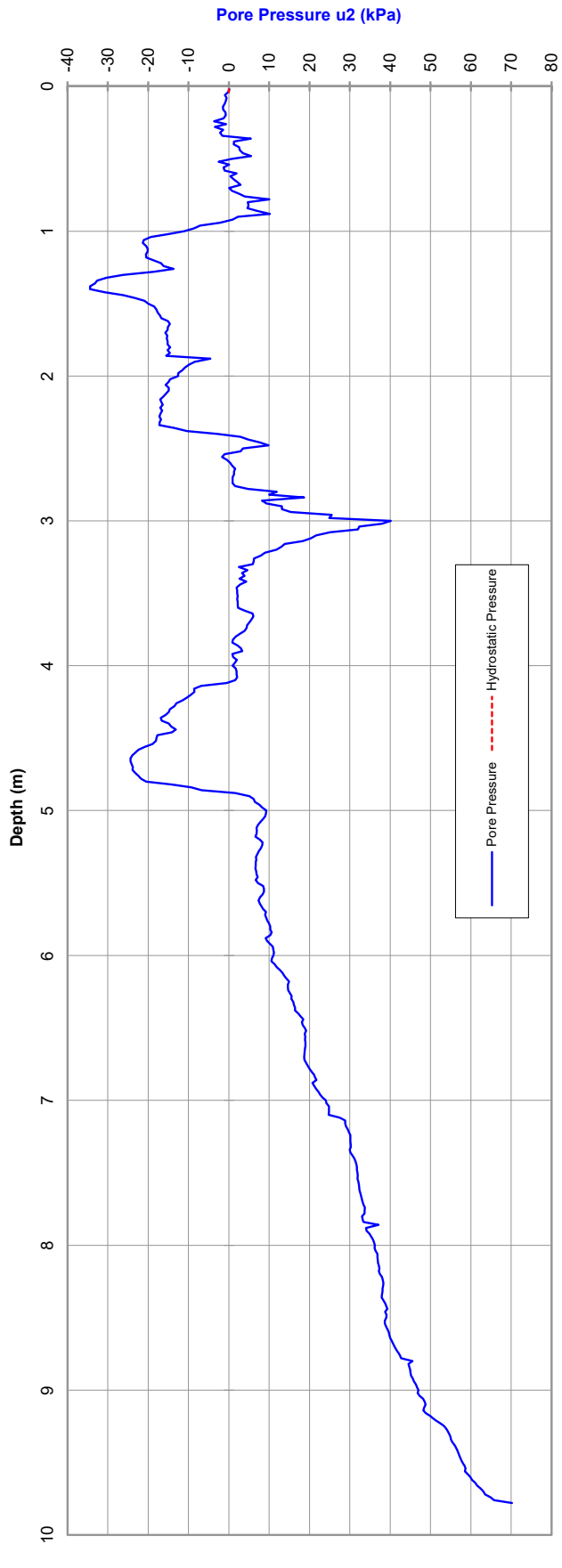
Cone I.D.: EC81GM

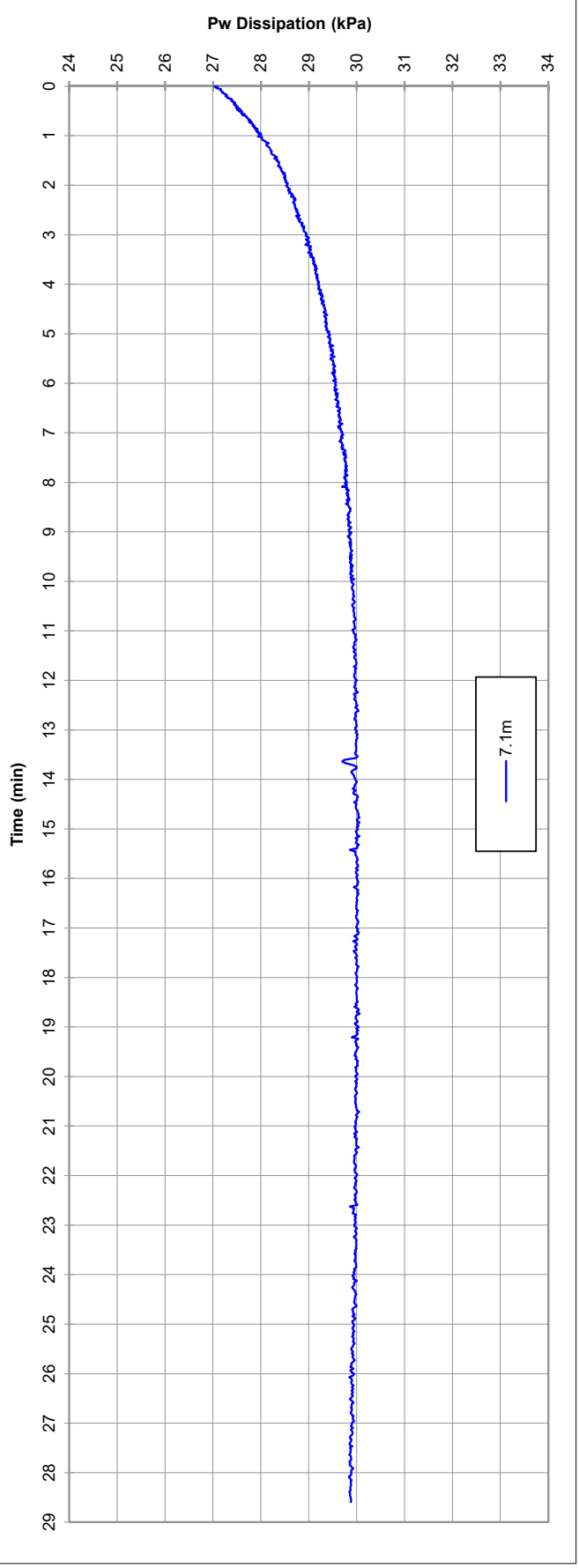
File: RE0018M3

Rig Type: 19t track (M3)

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: REC	Job No.: 2477-PR-08	Probe I.D
PROJECT: KMS CPT and VWP's	RL (m):	**CPTU 10**
LOCATION: Thunderbird Mine, Broome	Co-ords:	01-Feb-25





PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Please note: Hydrostatic Line is taken from the water level manually dipped by the CPT Operator following completion of the probe and, as such, should be used as a guide only.

Approx. Water (m): Dry to 4.0

File: RE0018M3.txt

Rig type: 19t track (M3)

Appendix I

2025 CPTu GSI Test Certificates

Perth
16 Gympie Way, Willetton
WA 6155
Ph: (08) 9418 8742
[redacted]

E-Precision Laboratory

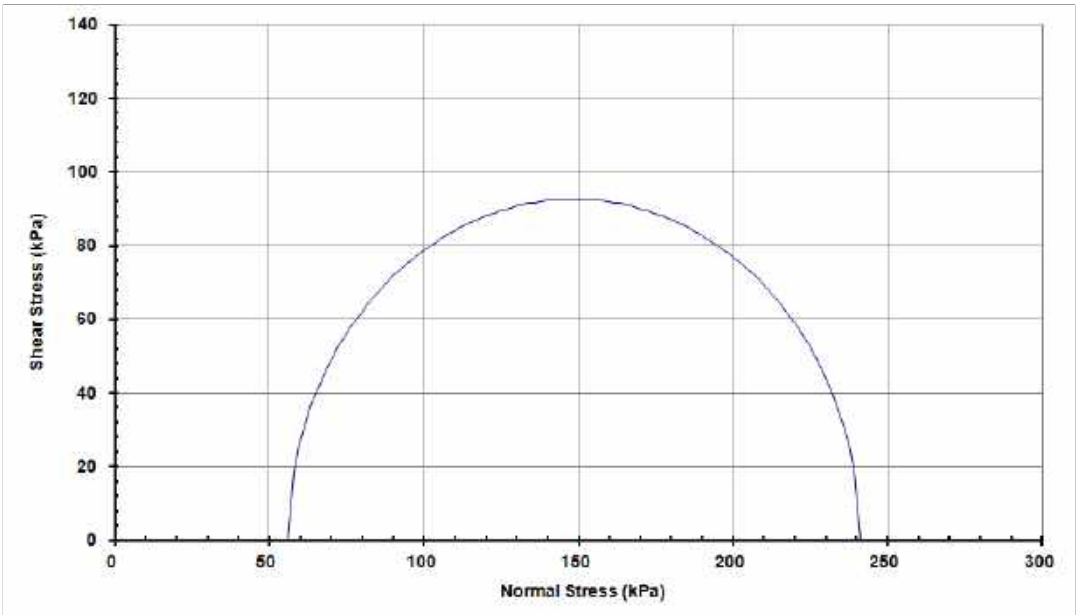
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu03	Lab:	EPLab
Sample ID:	CPTu03_A_CU1	Issue Date:	26/03/2025
Depth (m):	5.00 - 5.50	Room Temperature at Test:	~ 18°C

Tested by:	Phil Li	Initial Moisture (%):	15.07	Strain Rate (mm/min):	0.007
Height (mm):	122.12	Final Moisture (%):	13.83	Skempton's (B):	0.99
Diameter (mm):	55.25	Bulk Density (t/m³):	1.78	Initial Void Ratio (e_i):	-
L/D Ratio:	2.21	Dry Density (t/m³):	1.54	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

Accredited for compliance with ISO/IEC 17025-TESTING

NATA: 19078

Authorised Signatory (Geotechnical Engineer): [redacted]

Integrity Precision Innovation

Perth
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WA 6155
Ph: (08) 9418 8742

[redacted]

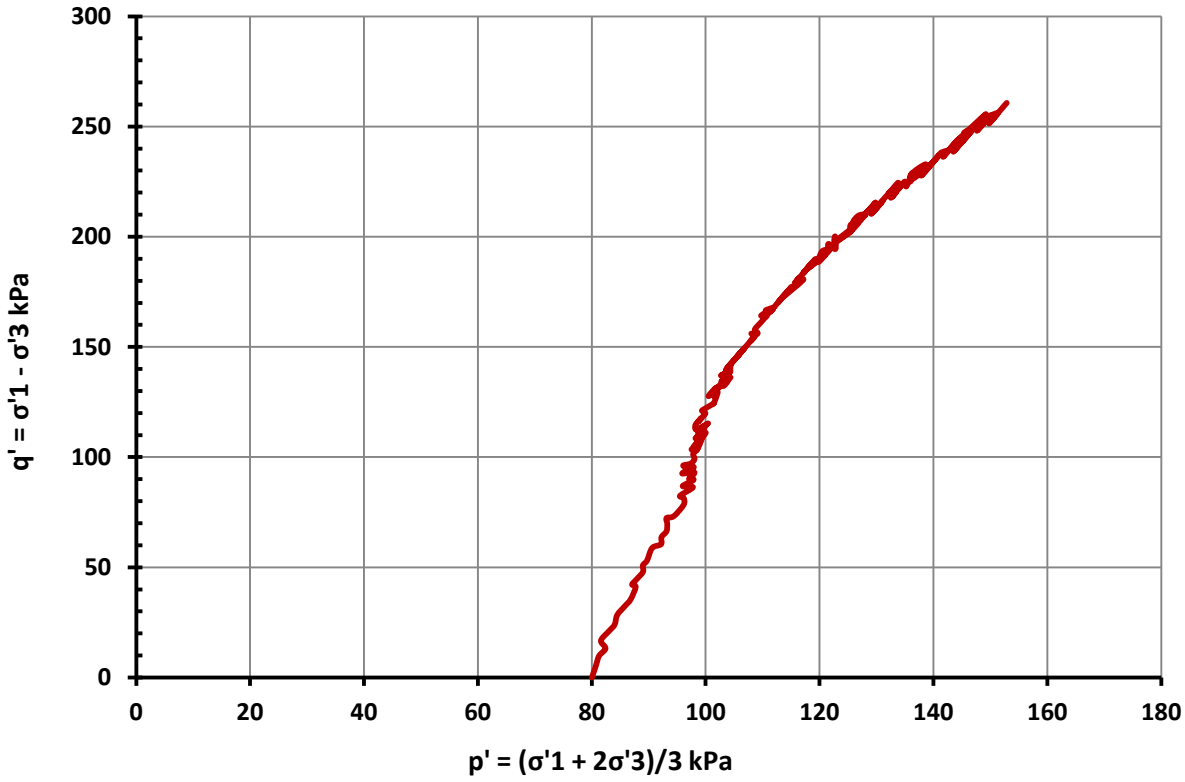
E-Precision Laboratory

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu03	Lab:	EPLab
Sample ID:	CPTu03_A_CU1		
Depth (m):	5.00 - 5.50	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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WA 6155
Ph: (08) 9418 8742

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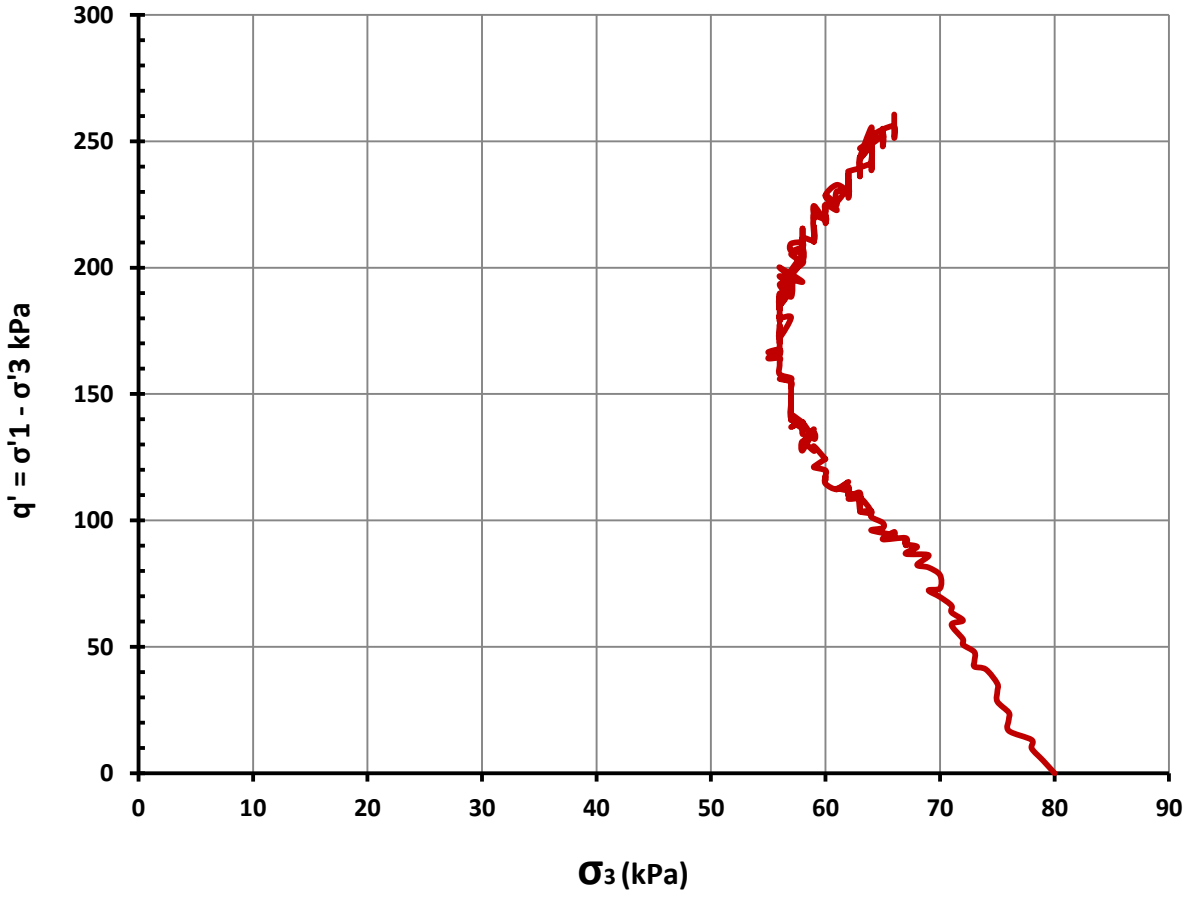
E-Precision Laboratory

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu03	Lab:	EPLab
Sample ID:	CPTu03_A_CU1		
Depth (m):	5.00 - 5.50	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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[redacted]

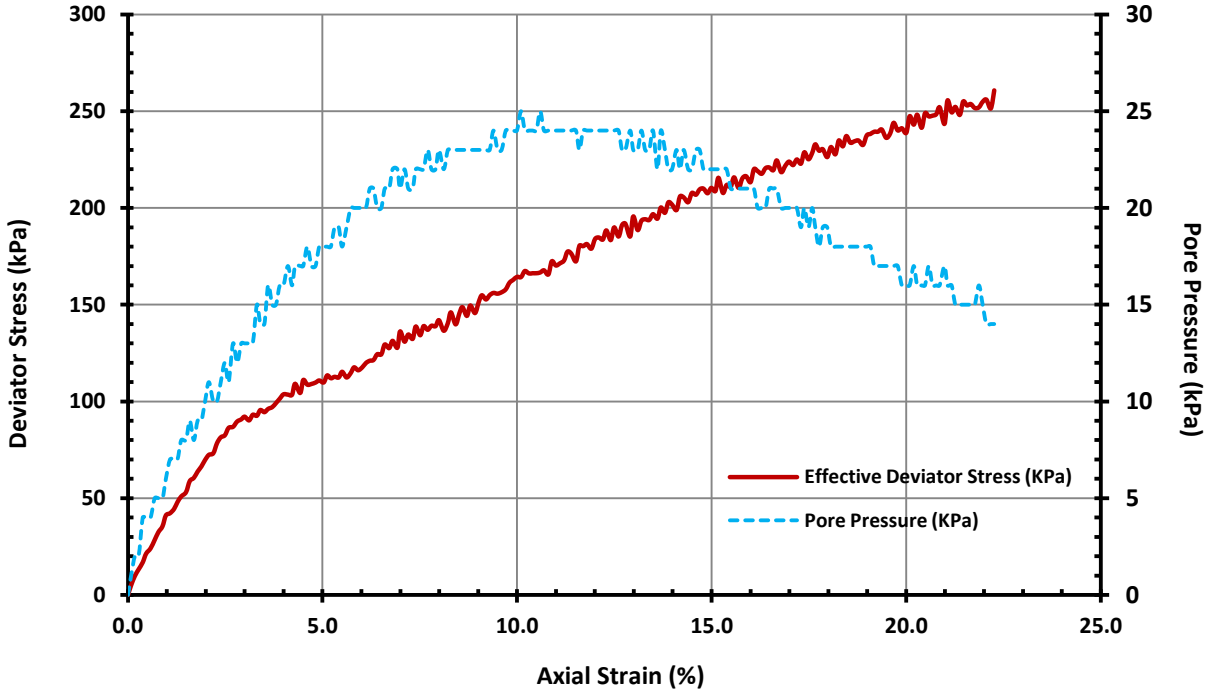
E-Precision Laboratory

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu03	Lab:	EPLab
Sample ID:	CPTu03_A_CU1		
Depth (m):	5.00 - 5.50	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	80	0	24	241	56	4.30	185	12.10

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E-Precision Laboratory

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu03	Lab:	EPLab
Sample ID:	CPTu03_A_CU1		
Depth (m):	5.00 - 5.50	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: CPTu03 **Depth (m):** 5.00 - 5.50
Lab ID: CPTu03_A_CU1 **Date Tested:** 26/03/2025

Failure Mode: **Bulging**

Notes: **Insitu sample from shelby Tube**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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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WA 6155

[redacted]

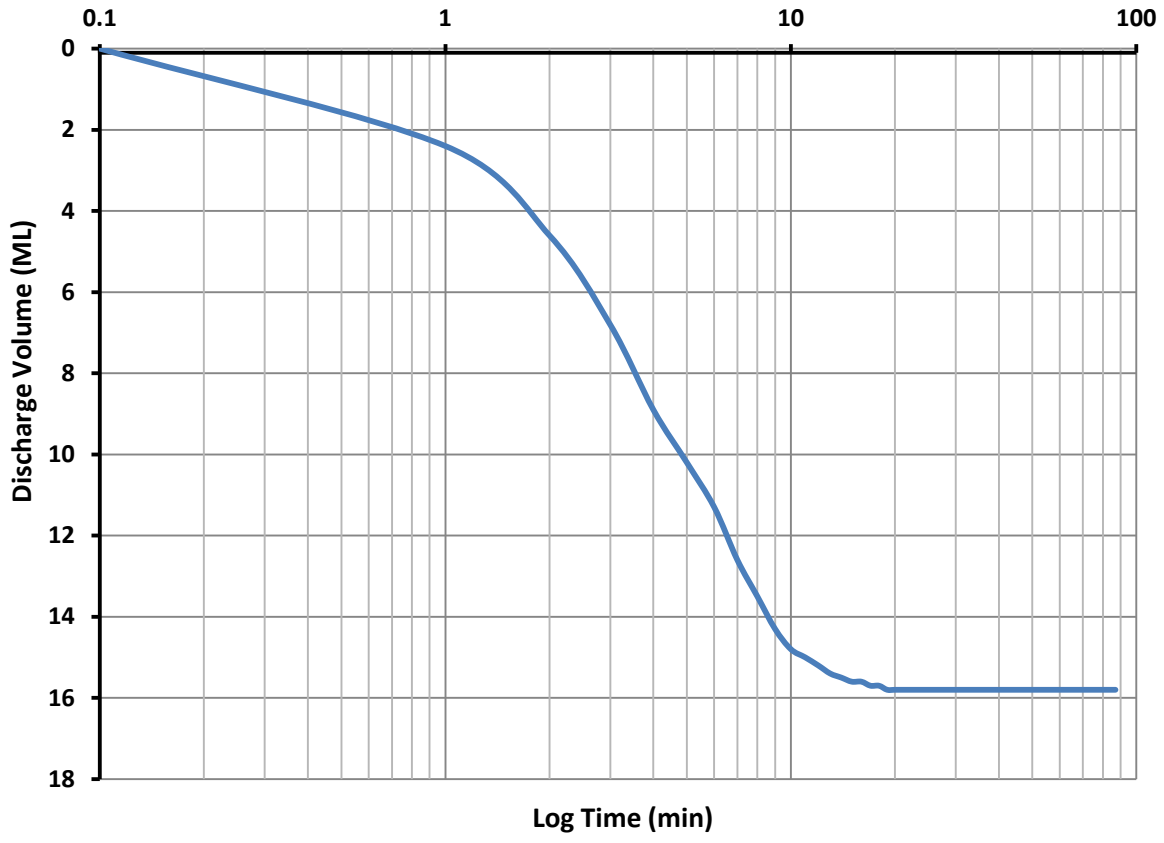
E-Precision Laboratory

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu03	Lab:	EPLab
Sample ID:	CPTu03_A_CU1		
Depth (m):	5.00 - 5.50	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.079 based on t_{90}

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[redacted]

E-Precision Laboratory

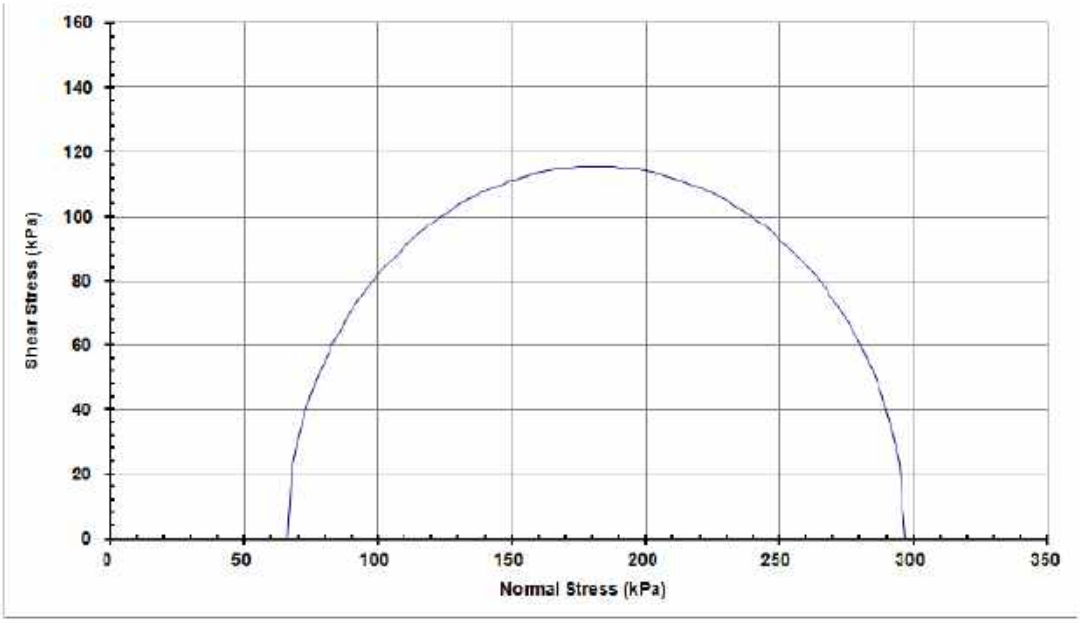
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu03	Lab:	EPLab
Sample ID:	CPTu03_B_CU1	Issue Date:	26/03/2025
Depth (m):	5.00 - 5.50	Room Temperature at Test:	~ 18°C

Tested by:	Phil Li	Initial Moisture (%):	18.46	Strain Rate (mm/min):	0.007
Height (mm):	104.72	Final Moisture (%):	19.20	Skempton's (B):	0.99
Diameter (mm):	53.65	Bulk Density (t/m³):	1.90	Initial Void Ratio (e_i):	-
L/D Ratio:	1.95	Dry Density (t/m³):	1.60	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

Accredited for compliance with ISO/IEC 17025-TESTING

NATA: 19078

Authorised Signatory (Geotechnical Engineer): [redacted]

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[redacted]

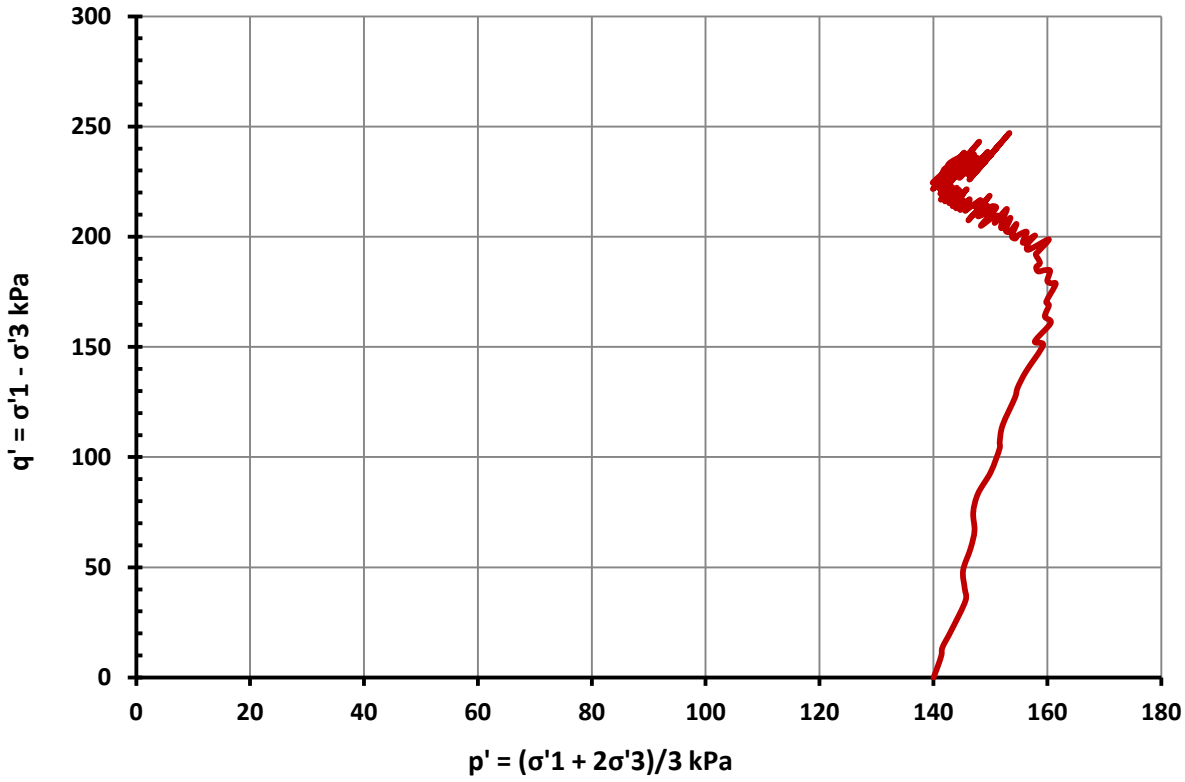
E-Precision Laboratory

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu03	Lab:	EPLab
Sample ID:	CPTu03_B_CU1		
Depth (m):	5.00 - 5.50	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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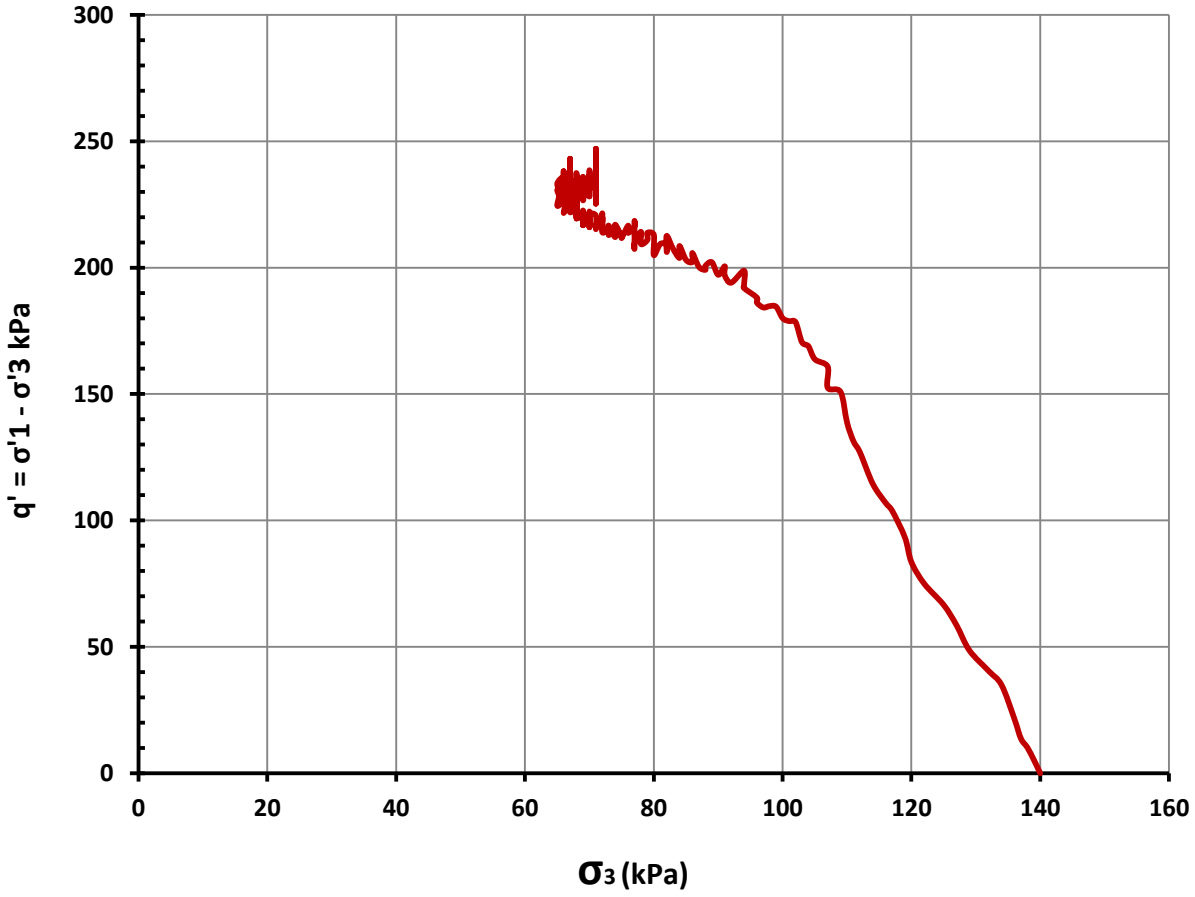
E-Precision Laboratory

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu03	Lab:	EPLab
Sample ID:	CPTu03_B_CU1		
Depth (m):	5.00 - 5.50	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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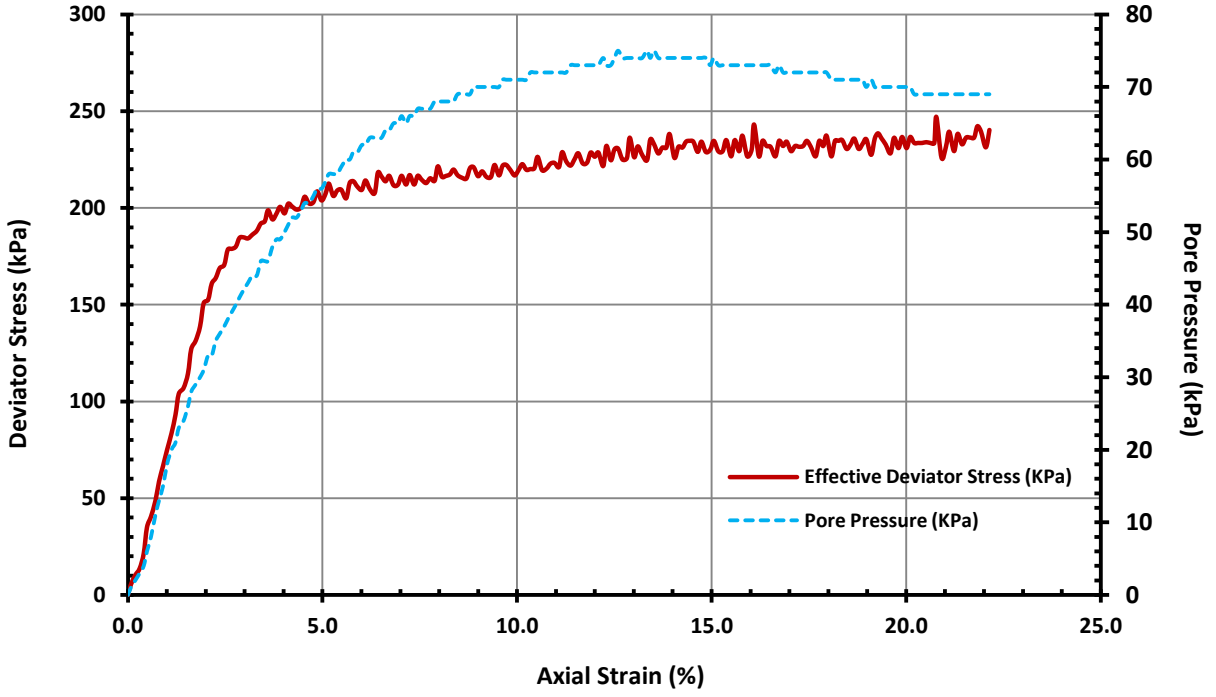
E-Precision Laboratory

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu03	Lab:	EPLab
Sample ID:	CPTu03_B_CU1		
Depth (m):	5.00 - 5.50	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	140	0	74	297	66	4.50	231	14.25

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WA 6155

[redacted]

E-Precision Laboratory

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu03	Lab:	EPLab
Sample ID:	CPTu03_B_CU1		
Depth (m):	5.00 - 5.50	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: CPTu03 **Depth (m):** 5.00 - 5.50

Lab ID: CPTu03_B_CU1 **Date Tested:** 26/03/2025

Failure Mode: **Bulging** °

Notes: **Insitu sample from shelby Tube**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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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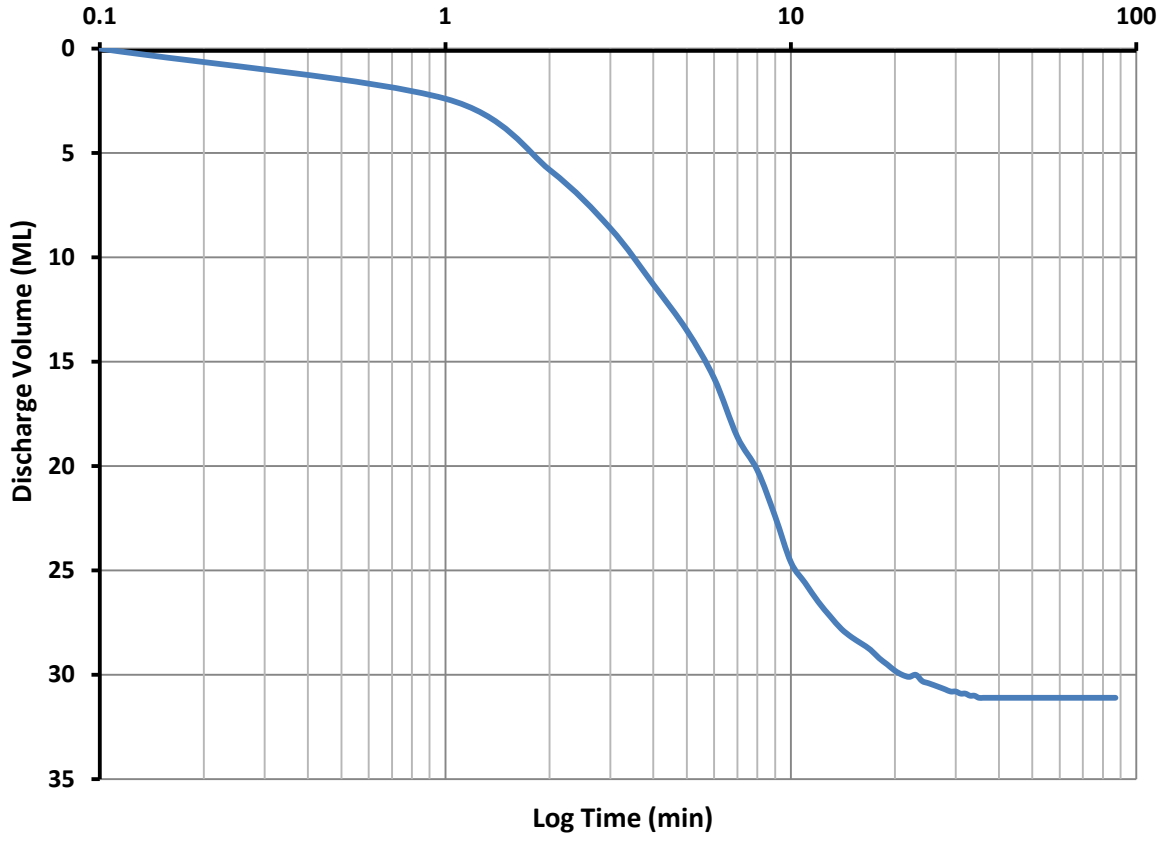
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu03	Lab:	EPLab
Sample ID:	CPTu03_B_CU1		
Depth (m):	5.00 - 5.50	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.043 based on t_{90}

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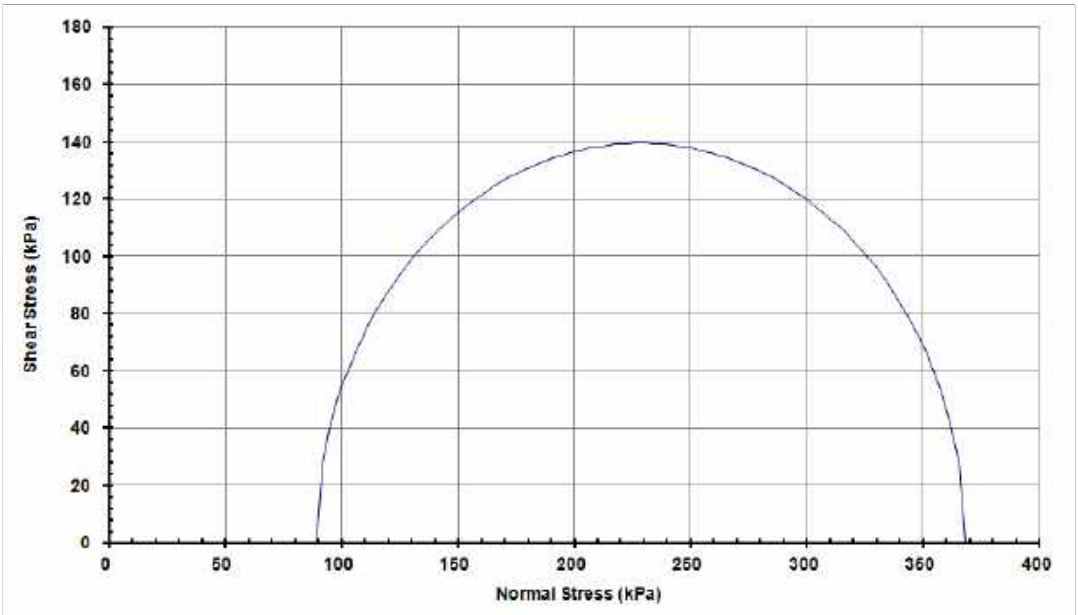
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu03	Lab:	EPLab
Sample ID:	CPTu03_C_CU1	Issue Date:	26/03/2025
Depth (m):	5.00 - 5.50	Room Temperature at Test:	~ 18°C

Tested by:	Phil Li	Initial Moisture (%):	20.50	Strain Rate (mm/min):	0.007
Height (mm):	106.99	Final Moisture (%):	16.26	Skempton's (B):	1
Diameter (mm):	54.32	Bulk Density (t/m³):	1.94	Initial Void Ratio (e_i):	-
L/D Ratio:	1.97	Dry Density (t/m³):	1.61	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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NATA: 19078

Authorised Signatory (Geotechnical Engineer): [redacted]

NATA

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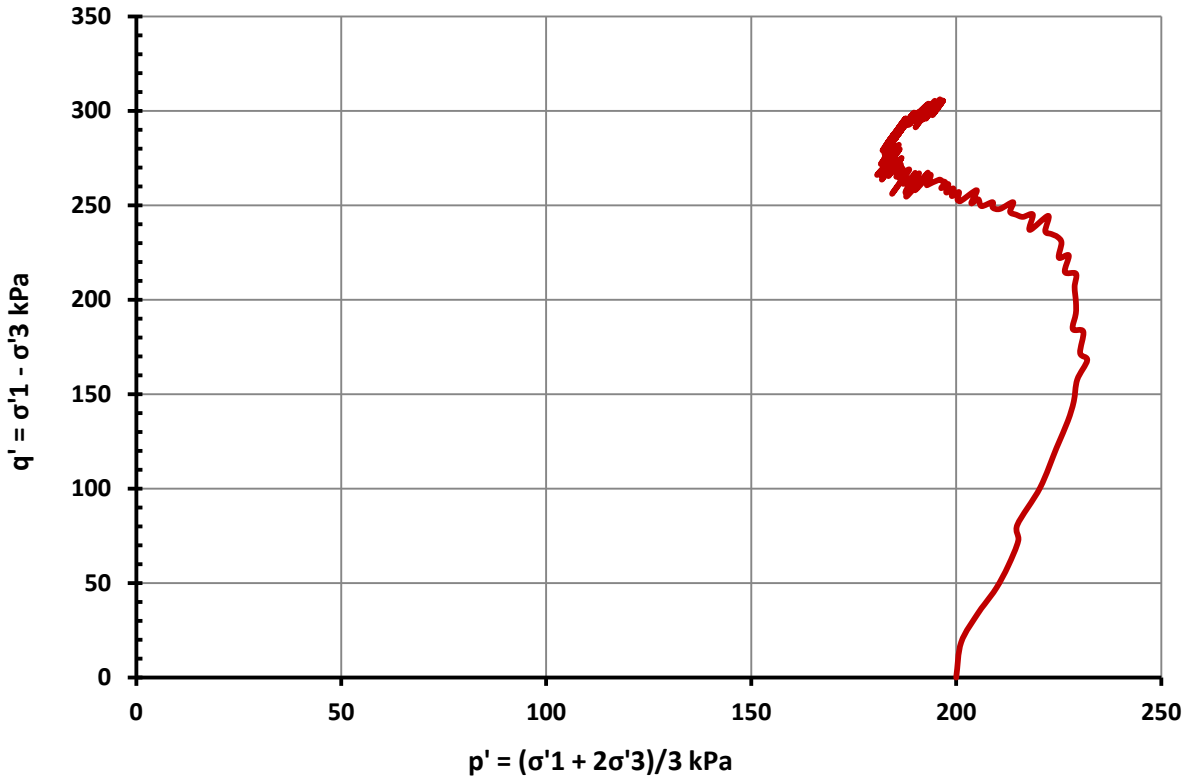
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu03	Lab:	EPLab
Sample ID:	CPTu03_C_CU1		
Depth (m):	5.00 - 5.50	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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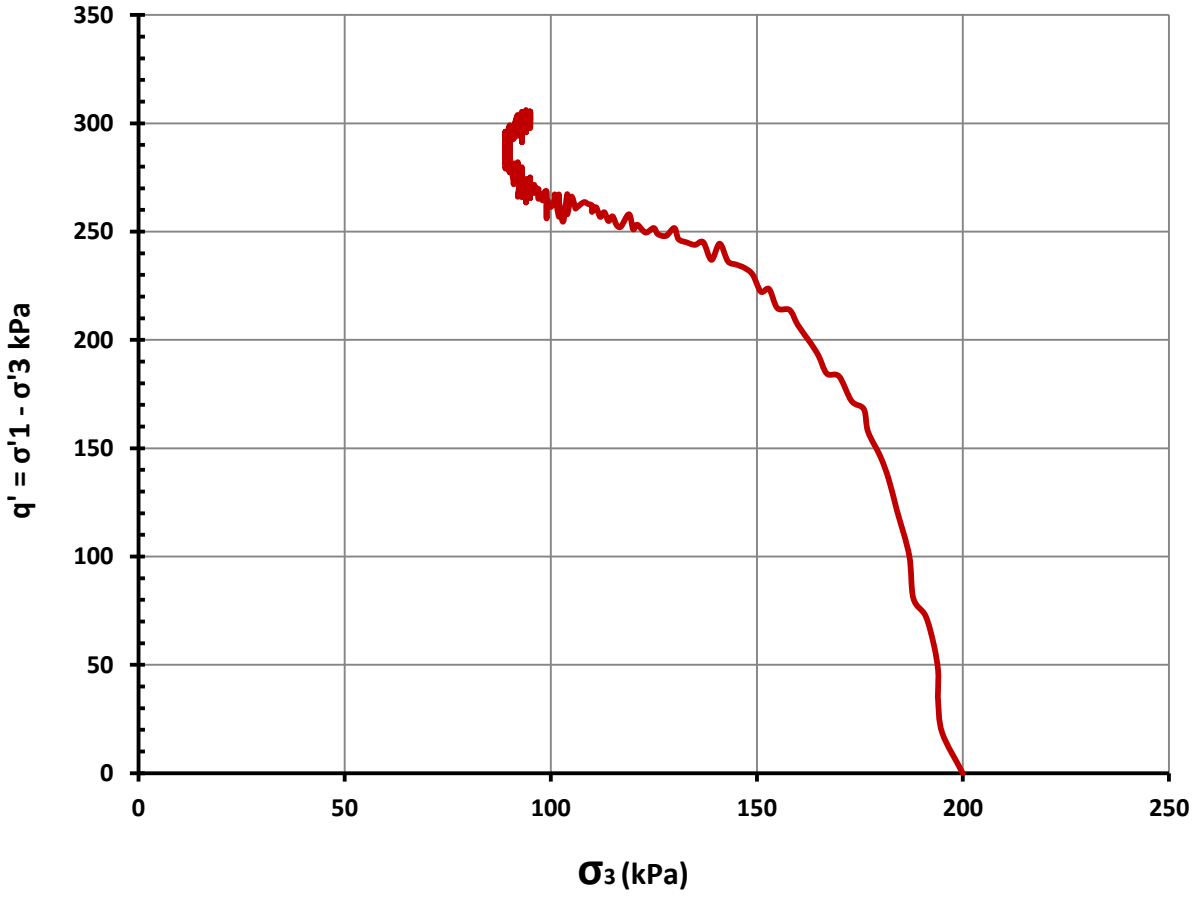
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu03	Lab:	EPLab
Sample ID:	CPTu03_C_CU1		
Depth (m):	5.00 - 5.50	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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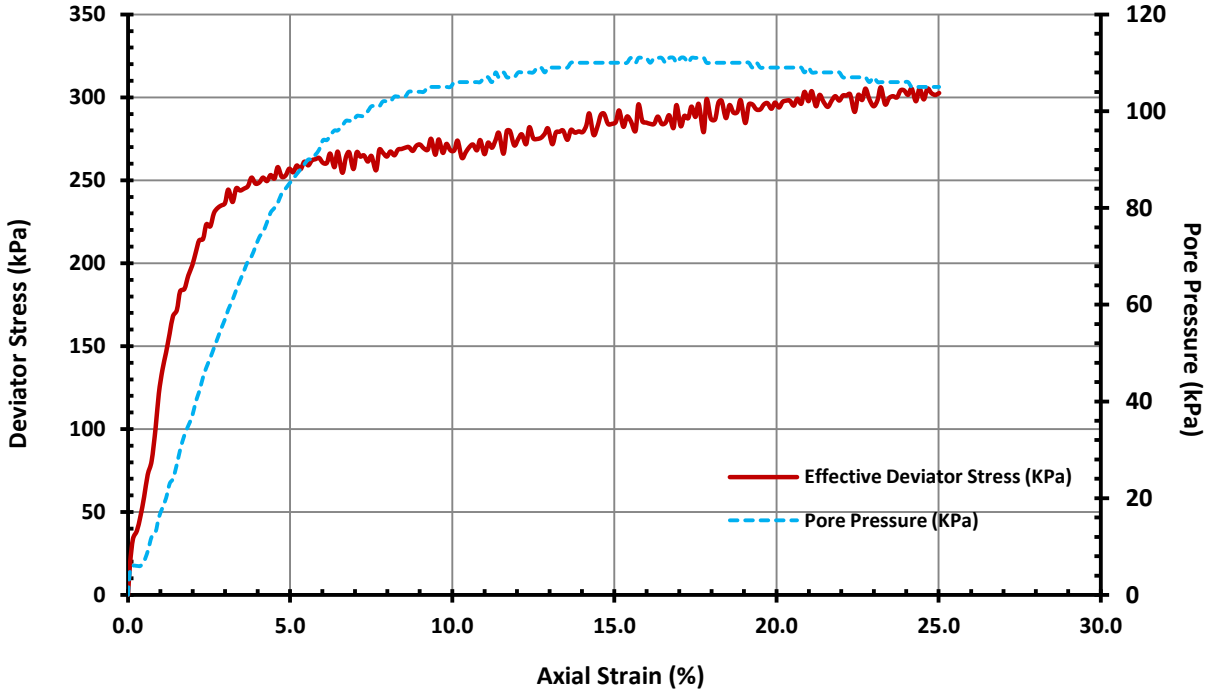
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu03	Lab:	EPLab
Sample ID:	CPTu03_C_CU1		
Depth (m):	5.00 - 5.50	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	200	0	111	368	89	4.13	279	17.75

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SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu03	Lab:	EPLab
Sample ID:	CPTu03_C_CU1		
Depth (m):	5.00 - 5.50	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: CPTu03 **Depth (m):** 5.00 - 5.50
Lab ID: CPTu03_C_CU1 **Date Tested:** 26/03/2025

Failure Mode: **Bulging** °

Notes: **Insitu sample from shelby Tube**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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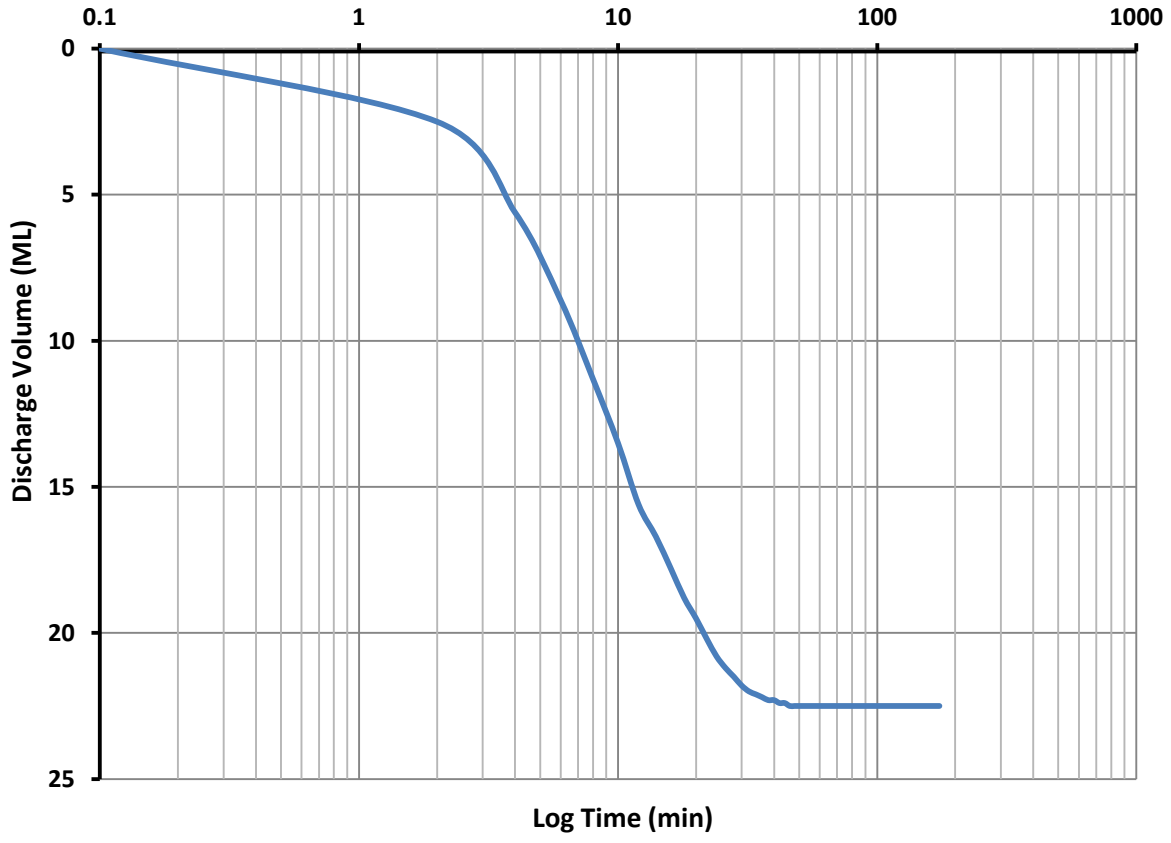
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu03	Lab:	EPLab
Sample ID:	CPTu03_C_CU1		
Depth (m):	5.00 - 5.50	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.029 based on t_{90}

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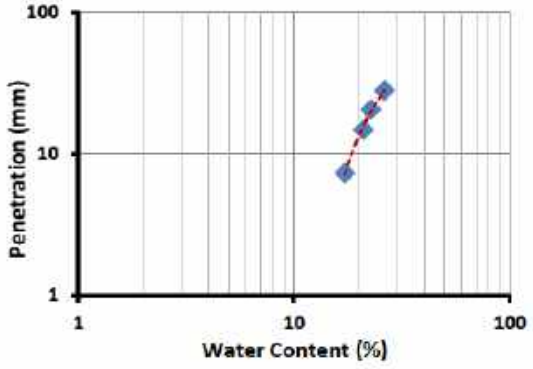
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

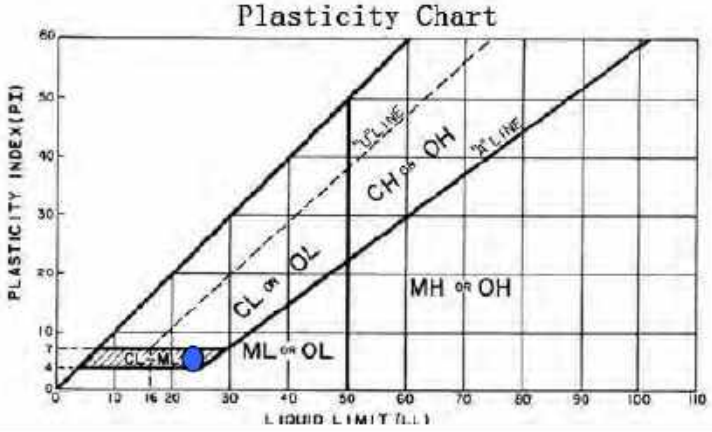
Client:	REC	Date Tested:	05/04/2025
Project:	KMS Testing 2025	Lab:	EPLAB
Sample No:	CPTu03	Job Number:	REC
Lab ID:	CPTu03_1_ATT		
Depth (m):	5.00 - 5.50	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	21.54
Plastic Limit (%):	15.08
Plasticity Index (%):	6.46
Liquidity Index (%):	-
Shrinkage Limit (%):	13.61
Linear Shrinkage(%):	3.06

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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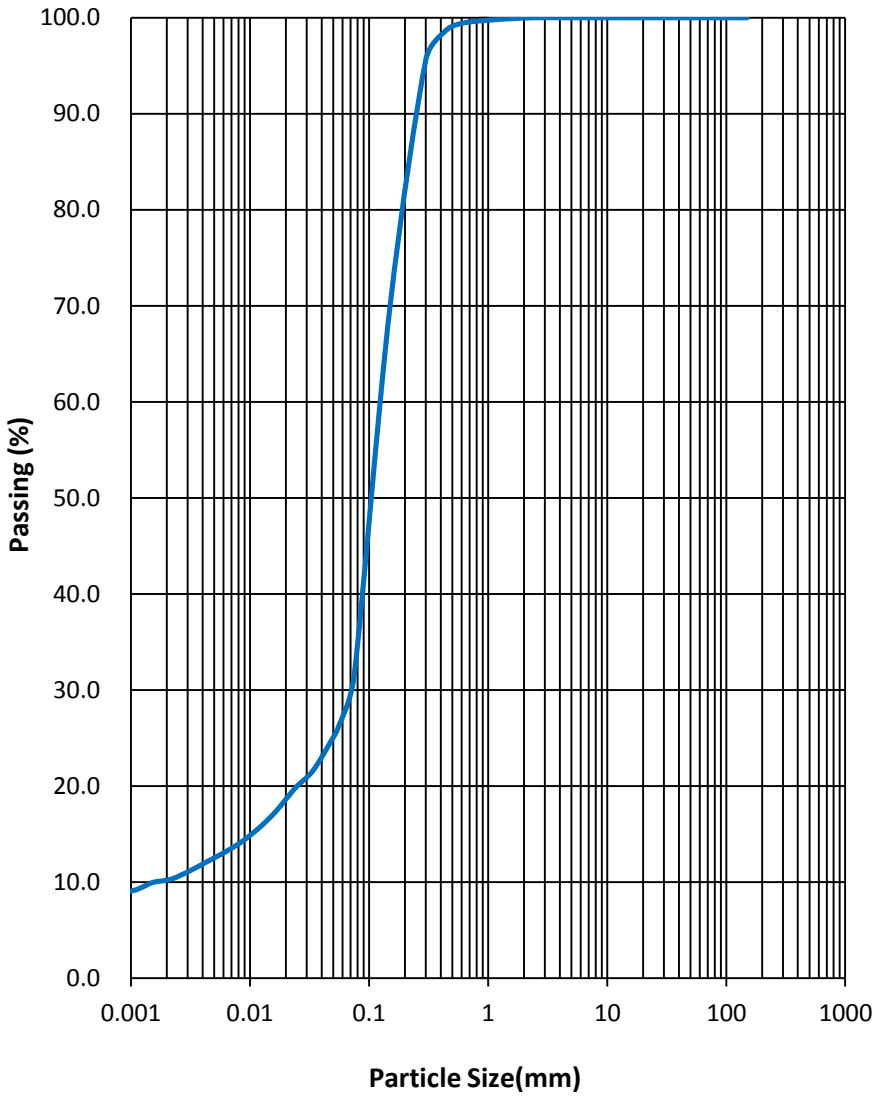
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3, 3.5.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu03	Depth (m):	5.00 - 5.50
Lab ID:	CPTu03_1_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.548
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	100.0
2.36	100.0
1.18	99.8
0.6	99.4
0.425	98.5
0.3	95.6
0.15	69.9
0.075	31.4
0.05607	26.3
0.04722	24.5
0.03376	21.6
0.02403	19.8
0.01644	17.3
0.01209	15.7
0.00860	14.2
0.00611	13.1
0.00433	12.1
0.00307	11.1
0.00218	10.3
0.00154	10.0
0.00126	9.5
0.00108	9.2
0.00092	9.0

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature [redacted]

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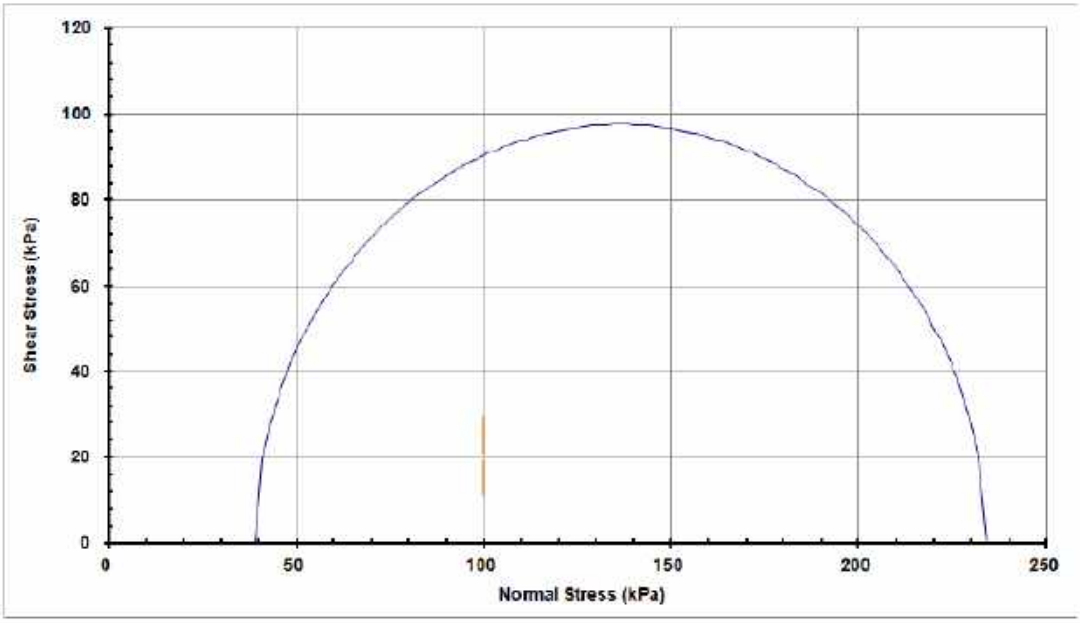
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu04	Lab:	EPLab
Sample ID:	CPTu04_A_CU1	Issue Date:	26/03/2025
Depth (m):	2.50 - 3.00	Room Temperature at Test:	~ 18°C

Tested by:	Phil Li	Initial Moisture (%):	19.90	Strain Rate (mm/min):	0.007
Height (mm):	106.06	Final Moisture (%):	17.60	Skempton's (B):	1
Diameter (mm):	54.63	Bulk Density (t/m³):	1.93	Initial Void Ratio (e_i):	-
L/D Ratio:	1.94	Dry Density (t/m³):	1.61	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

Accredited for compliance with ISO/IEC 17025-TESTING

NATA: 19078

Authorised Signatory (Geotechnical Engineer): [redacted]

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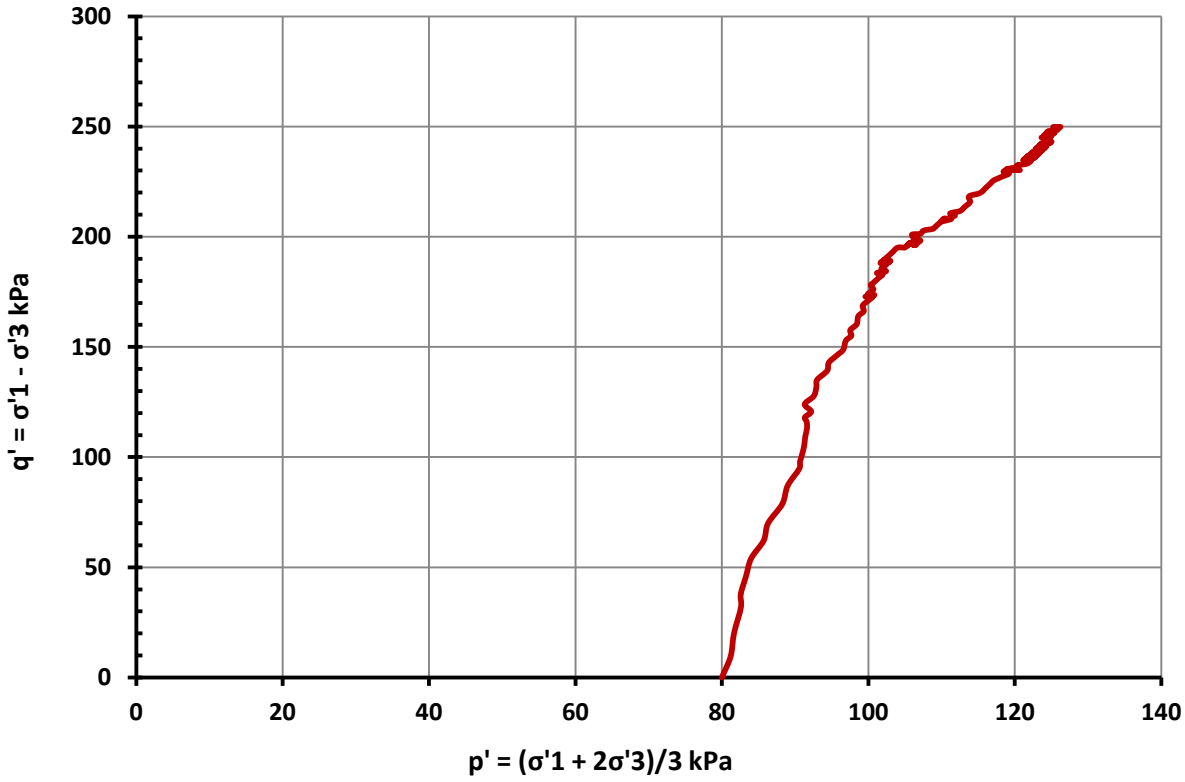
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu04	Lab:	EPLab
Sample ID:	CPTu04_A_CU1		
Depth (m):	2.50 - 3.00	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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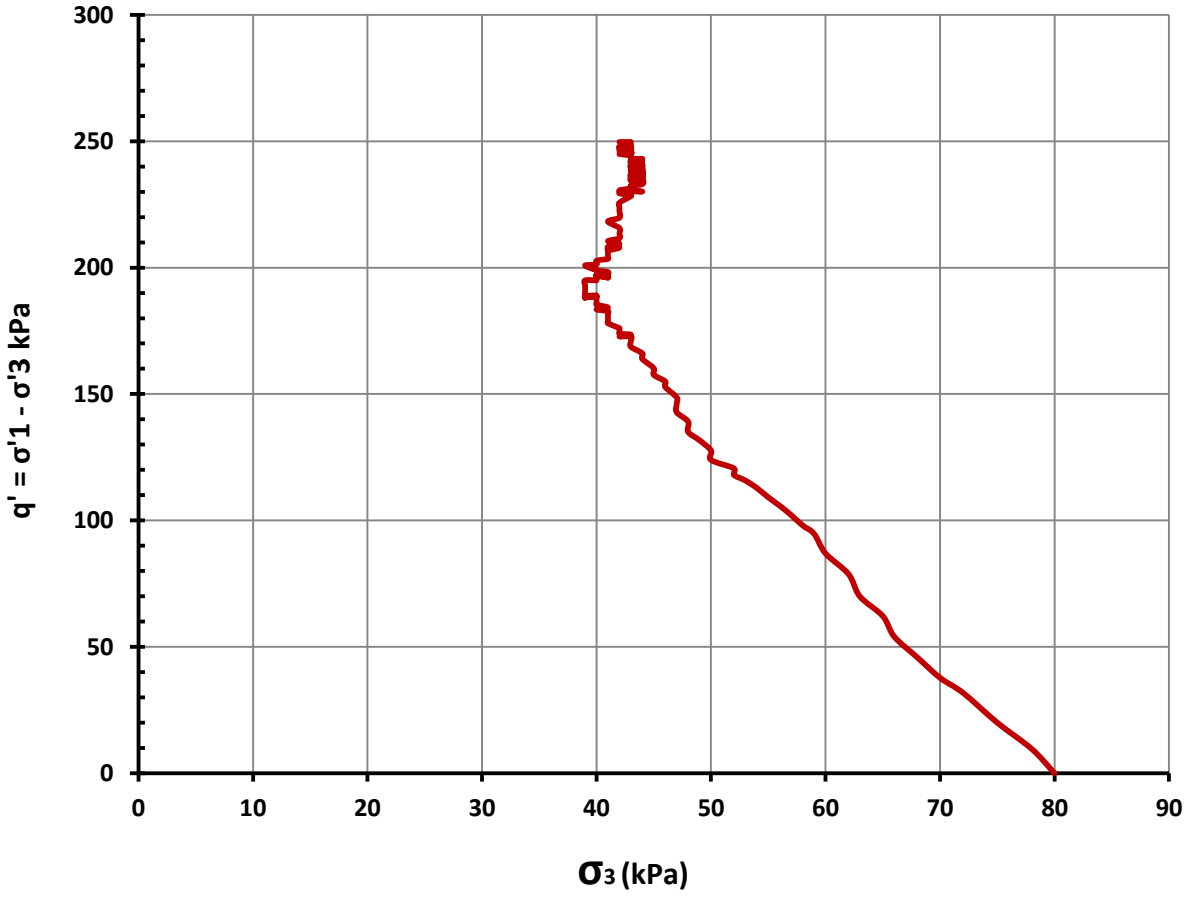
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu04	Lab:	EPLab
Sample ID:	CPTu04_A_CU1		
Depth (m):	2.50 - 3.00	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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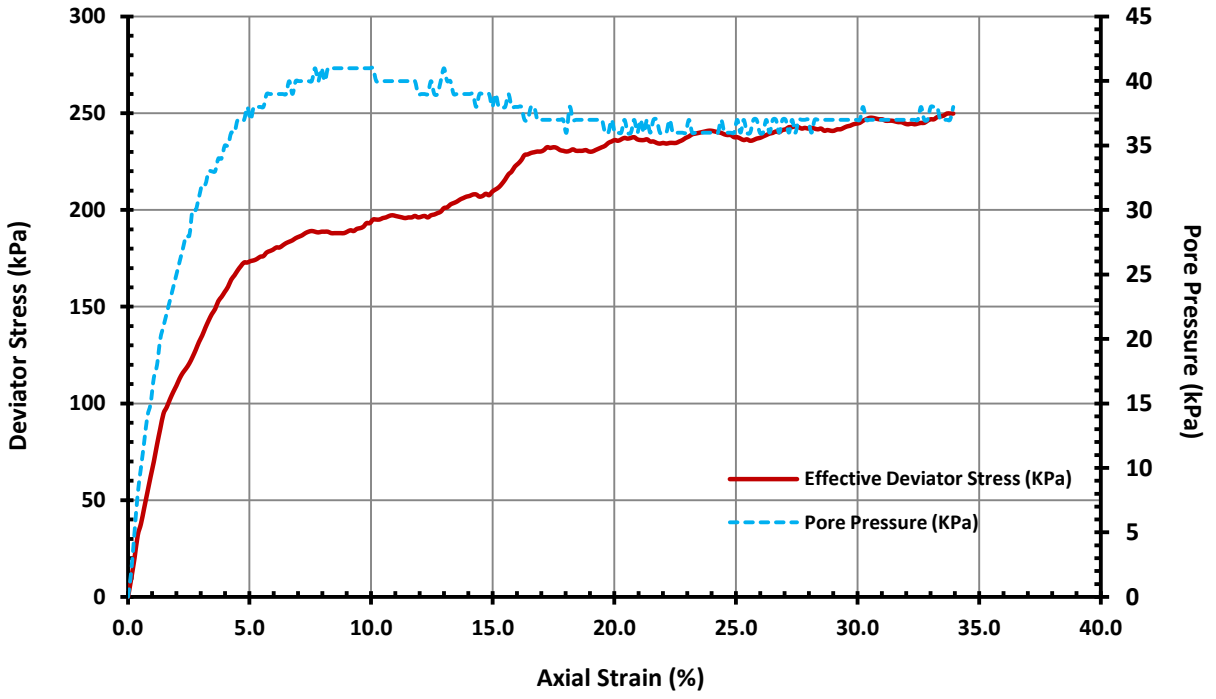
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu04	Lab:	EPLab
Sample ID:	CPTu04_A_CU1		
Depth (m):	2.50 - 3.00	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	80	0	41	234	39	6.00	195	10.08

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SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu04	Lab:	EPLab
Sample ID:	CPTu04_A_CU1		
Depth (m):	2.50 - 3.00	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: CPTu04 **Depth (m):** 2.50 - 3.00
Lab ID: CPTu04_A_CU1 **Date Tested:** 26/03/2025

Failure Mode: **Intact Shear** **32.5 °**

Notes: **Insitu sample from shelby Tube**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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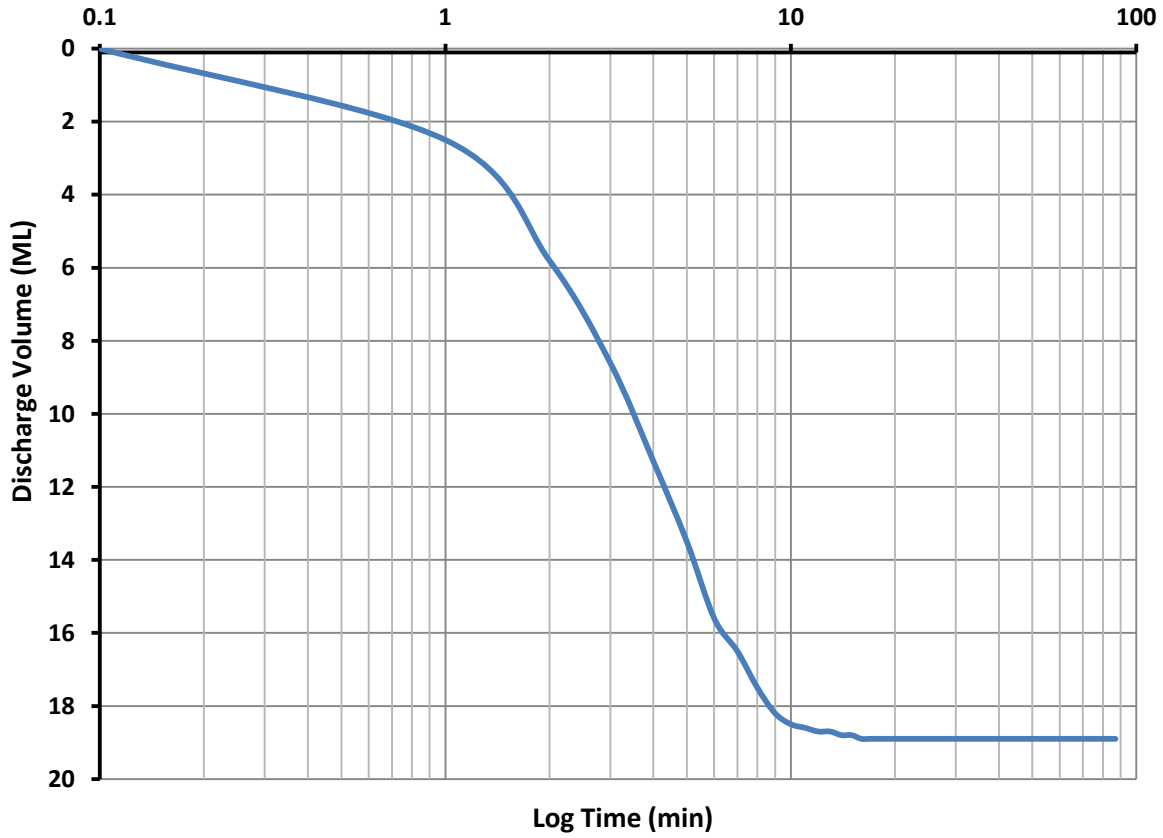
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu04	Lab:	EPLab
Sample ID:	CPTu04_A_CU1		
Depth (m):	2.50 - 3.00	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.075 based on t_{90}

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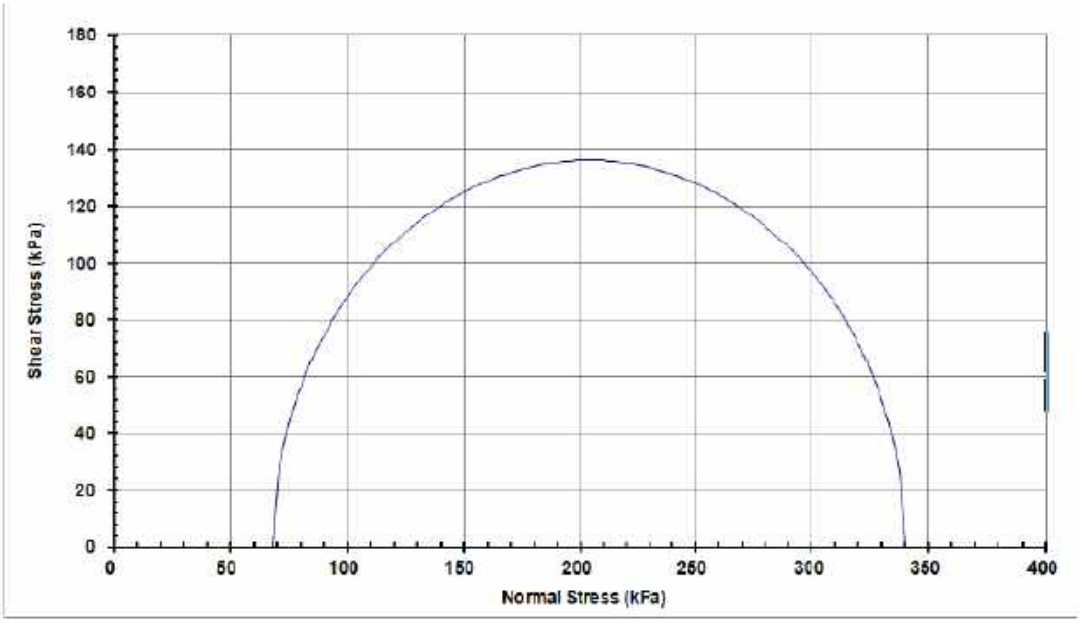
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu04	Lab:	EPLab
Sample ID:	CPTu04_B_CU1	Issue Date:	26/03/2025
Depth (m):	2.50 - 3.00	Room Temperature at Test:	~ 18°C

Tested by:	Phil Li	Initial Moisture (%):	18.55	Strain Rate (mm/min):	0.007
Height (mm):	111.06	Final Moisture (%):	17.20	Skempton's (B):	1
Diameter (mm):	56.45	Bulk Density (t/m³):	1.98	Initial Void Ratio (e_i):	-
L/D Ratio:	1.97	Dry Density (t/m³):	1.67	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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NATA: 19078

Authorised Signatory (Geotechnical Engineer): [redacted]

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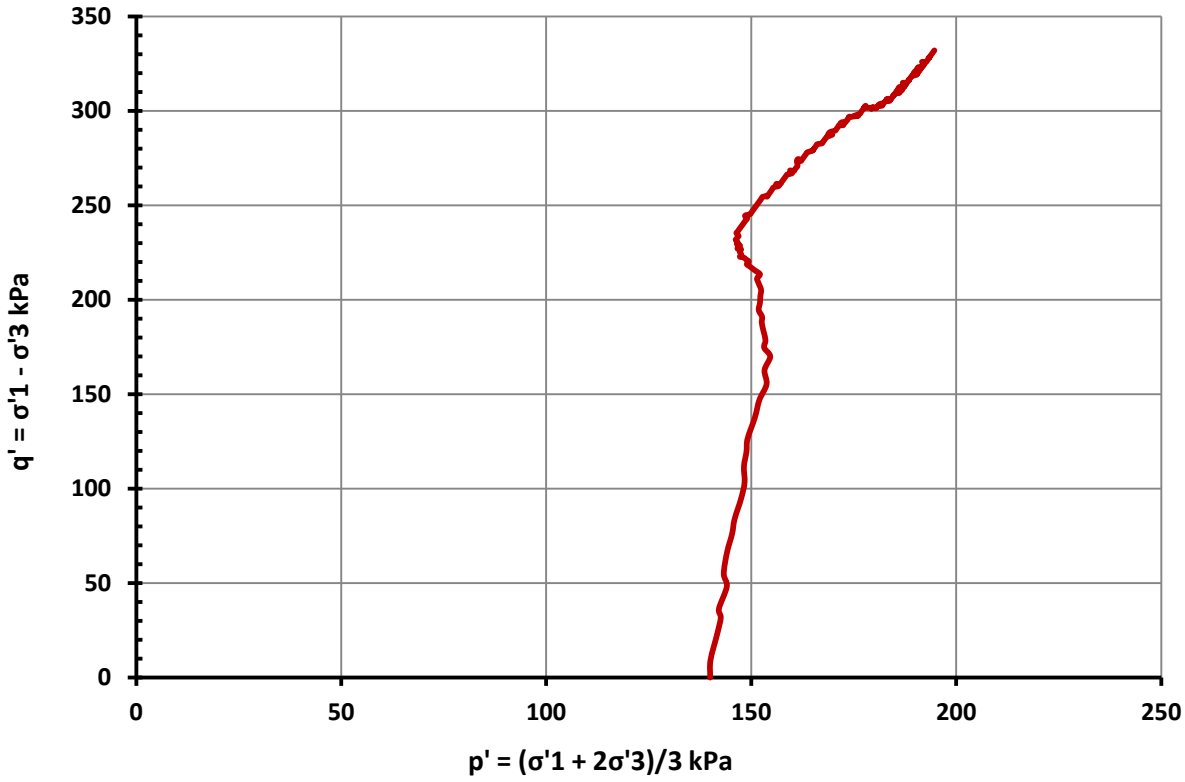
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu04	Lab:	EPLab
Sample ID:	CPTu04_B_CU1		
Depth (m):	2.50 - 3.00	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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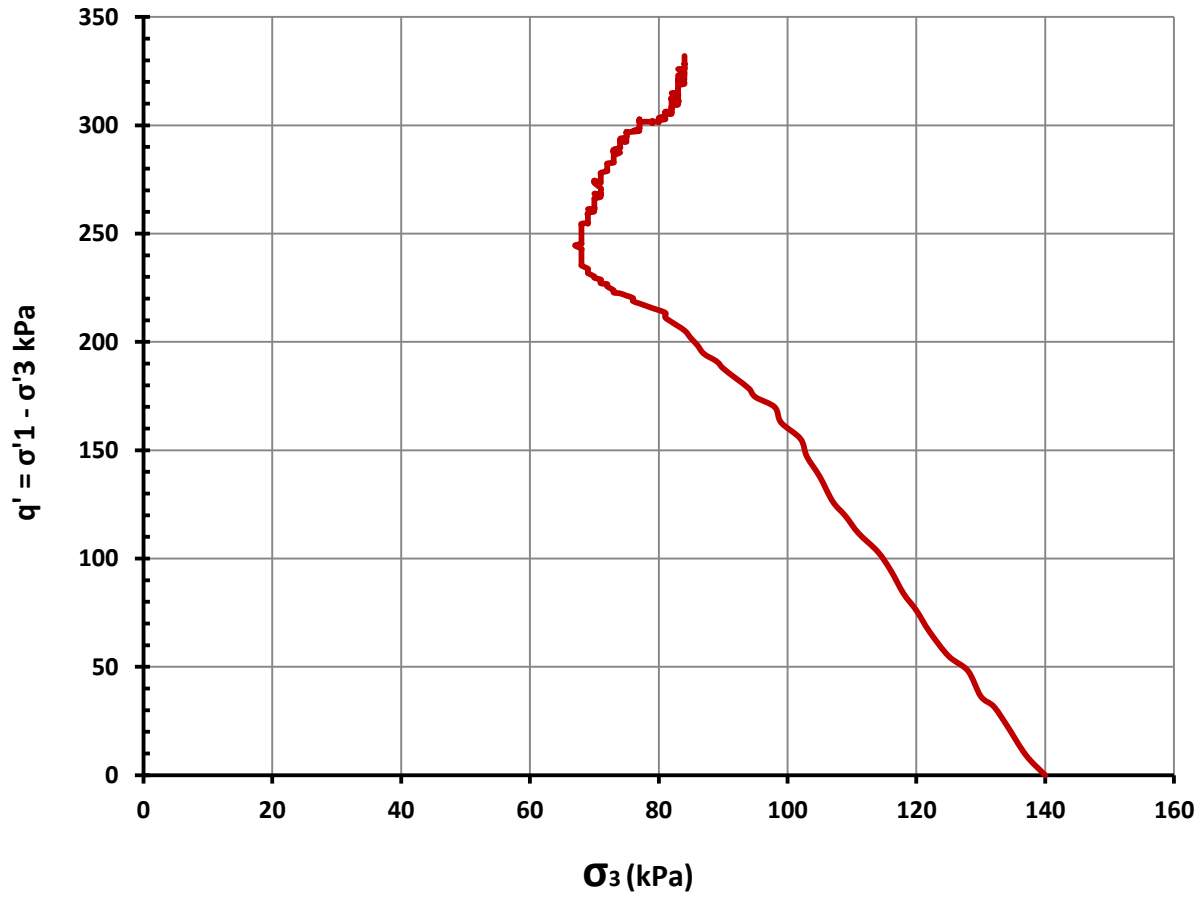
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu04	Lab:	EPLab
Sample ID:	CPTu04_B_CU1		
Depth (m):	2.50 - 3.00	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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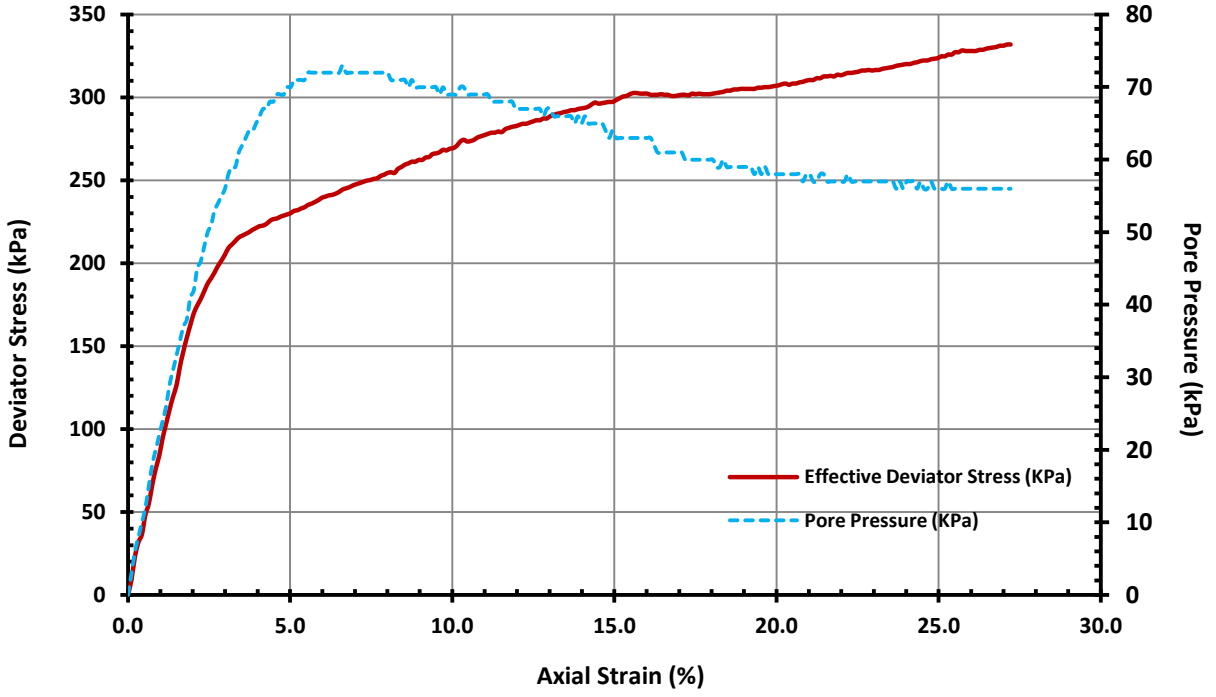
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu04	Lab:	EPLab
Sample ID:	CPTu04_B_CU1		
Depth (m):	2.50 - 3.00	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	140	0	72	318	68	4.68	250	7.47

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SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu04	Lab:	EPLab
Sample ID:	CPTu04_B_CU1		
Depth (m):	2.50 - 3.00	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: CPTu04 **Depth (m):** 2.50 - 3.00
Lab ID: CPTu04_B_CU1 **Date Tested:** 26/03/2025

Failure Mode: **Intact Shear** **34 °**

Notes: **Insitu sample from shelby Tube**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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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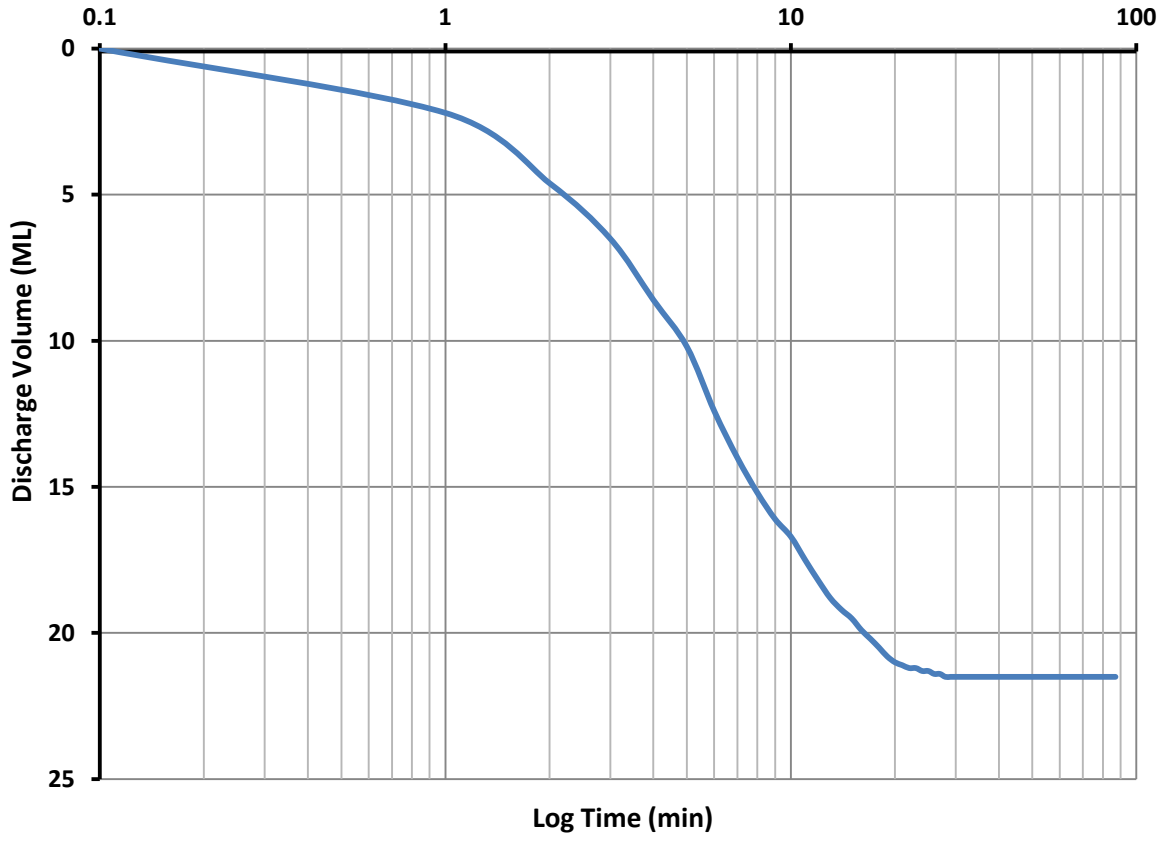
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu04	Lab:	EPLab
Sample ID:	CPTu04_B_CU1		
Depth (m):	2.50 - 3.00	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.060 based on t_{90}

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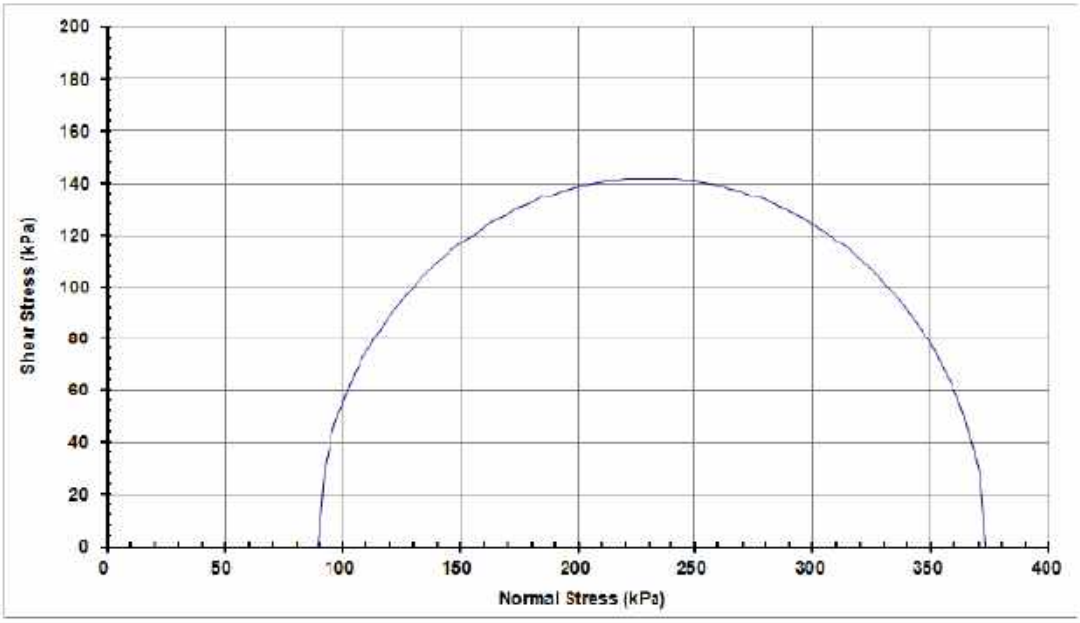
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu04	Lab:	EPLab
Sample ID:	CPTu04_C_CU1	Issue Date:	26/03/2025
Depth (m):	2.50 - 3.00	Room Temperature at Test:	~ 18°C

Tested by:	Phil Li	Initial Moisture (%):	16.71	Strain Rate (mm/min):	0.007
Height (mm):	101.68	Final Moisture (%):	17.16	Skempton's (B):	1
Diameter (mm):	54.98	Bulk Density (t/m³):	1.97	Initial Void Ratio (e_i):	-
L/D Ratio:	1.85	Dry Density (t/m³):	1.69	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

Accredited for compliance with ISO/IEC 17025-TESTING

NATA: 19078

Authorised Signatory (Geotechnical Engineer): [redacted]

NATA ACCREDITATION NO. 19078

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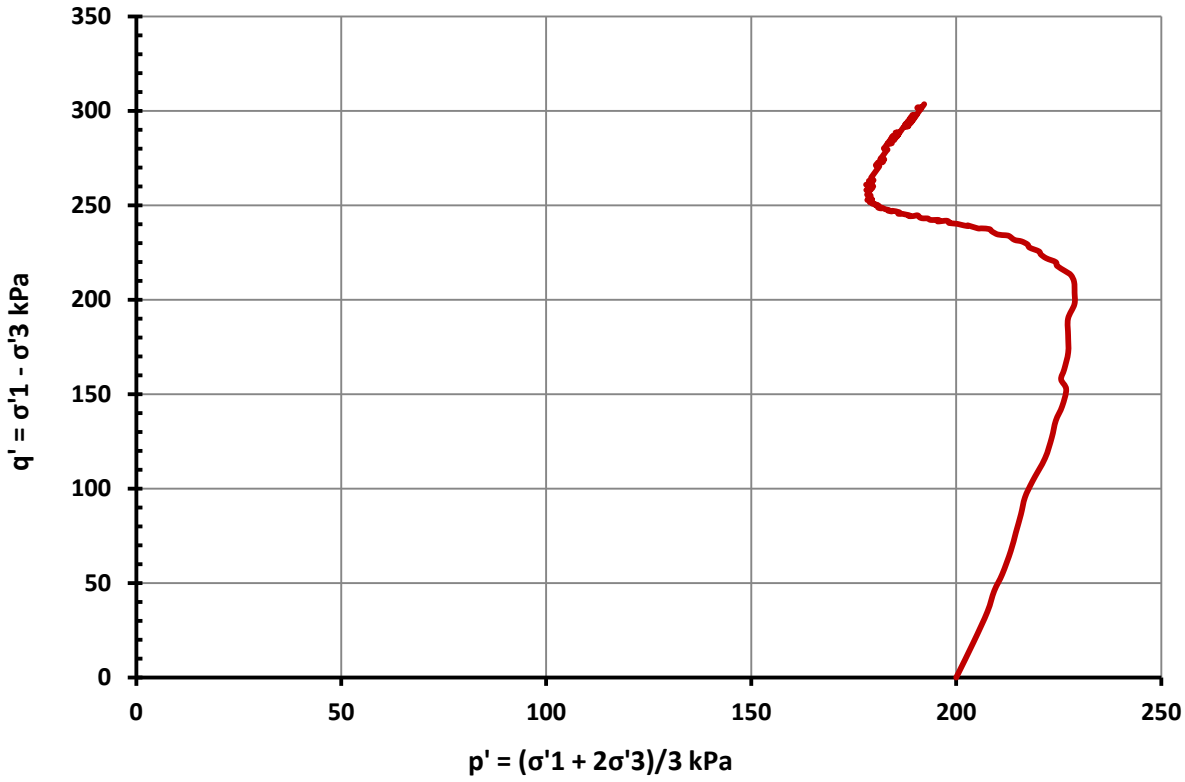
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu04	Lab:	EPLab
Sample ID:	CPTu04_C_CU1		
Depth (m):	2.50 - 3.00	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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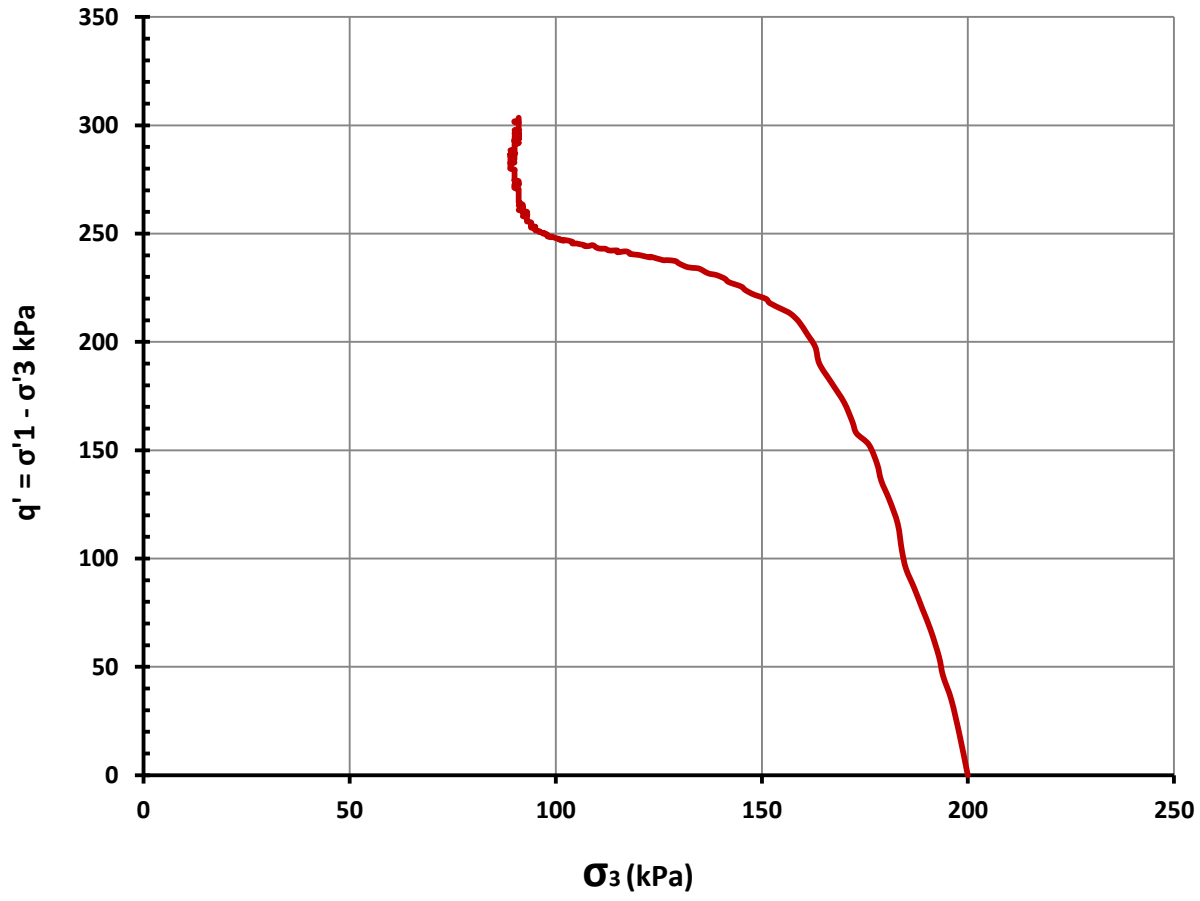
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu04	Lab:	EPLab
Sample ID:	CPTu04_C_CU1		
Depth (m):	2.50 - 3.00	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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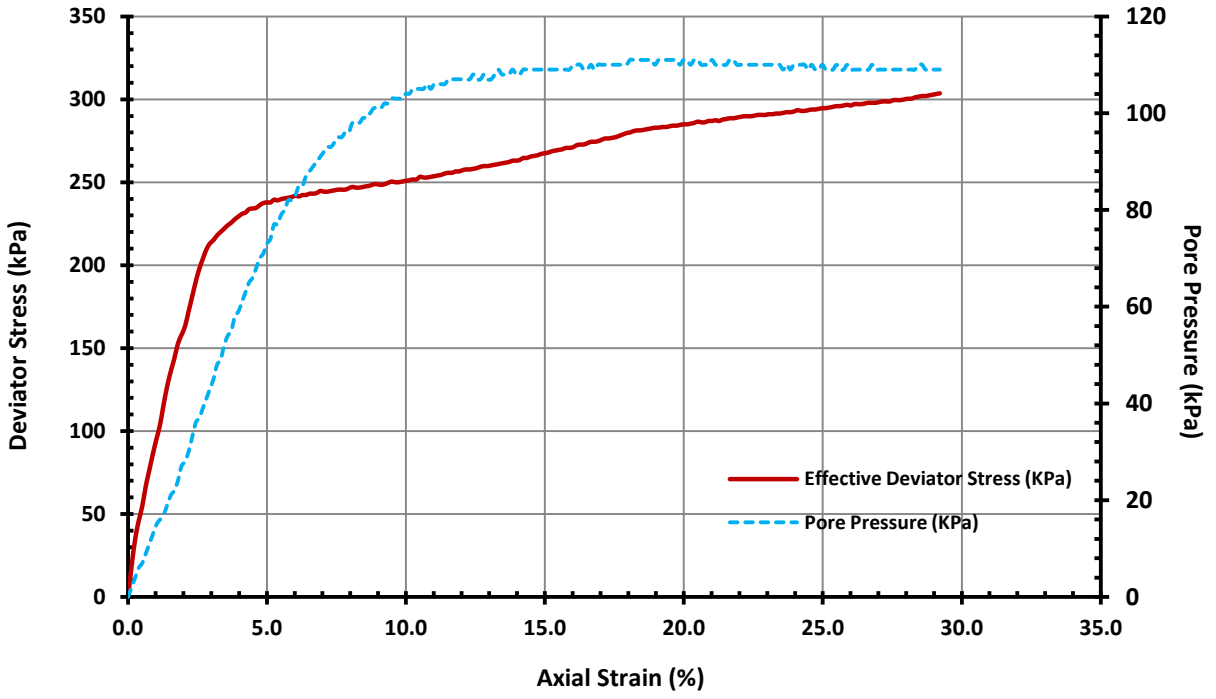
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu04	Lab:	EPLab
Sample ID:	CPTu04_C_CU1		
Depth (m):	2.50 - 3.00	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	200	0	111	373	89	4.19	284	19.73

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SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu04	Lab:	EPLab
Sample ID:	CPTu04_C_CU1		
Depth (m):	2.50 - 3.00	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: CPTu04 **Depth (m):** 2.50 - 3.00
Lab ID: CPTu04_C_CU1 **Date Tested:** 26/03/2025

Failure Mode: **Bulging** °

Notes: **Insitu sample from shelby Tube**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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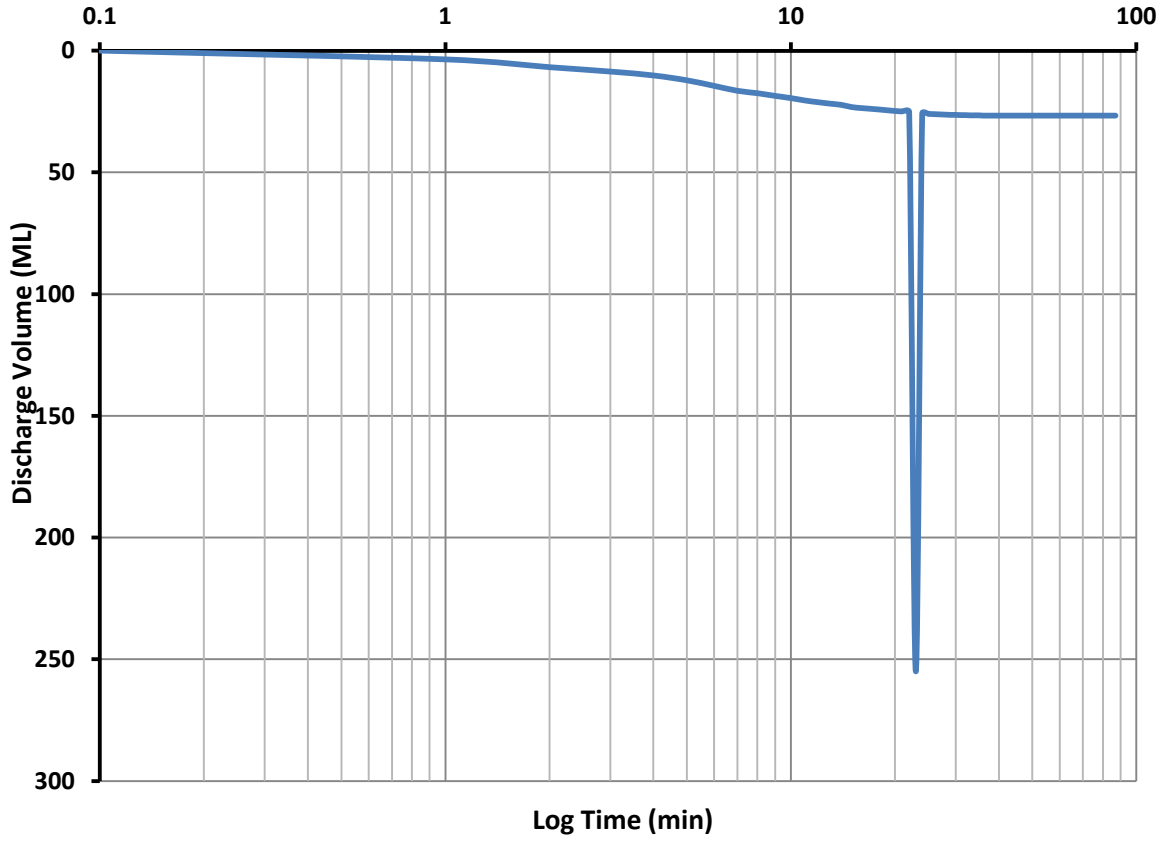
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	26/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu04	Lab:	EPLab
Sample ID:	CPTu04_C_CU1		
Depth (m):	2.50 - 3.00	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.050 based on t_{90}

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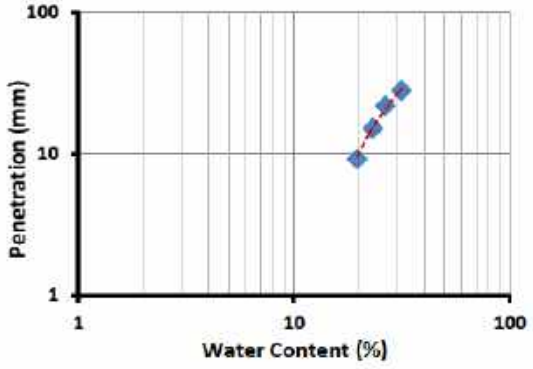
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

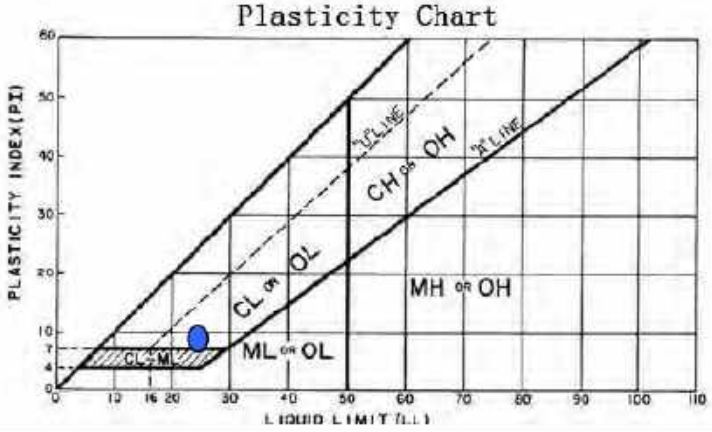
Client:	REC	Date Tested:	05/04/2025
Project:	KMS Testing 2025	Lab:	EPLAB
Sample No:	CPTu04	Job Number:	REC
Lab ID:	CPTu04_1_ATT		
Depth (m):	2.50 - 3.00	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	24.28
Plastic Limit (%):	14.95
Plasticity Index (%):	9.33
Liquidity Index (%):	-
Shrinkage Limit (%):	12.95
Linear Shrinkage(%):	4.84

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature [redacted]

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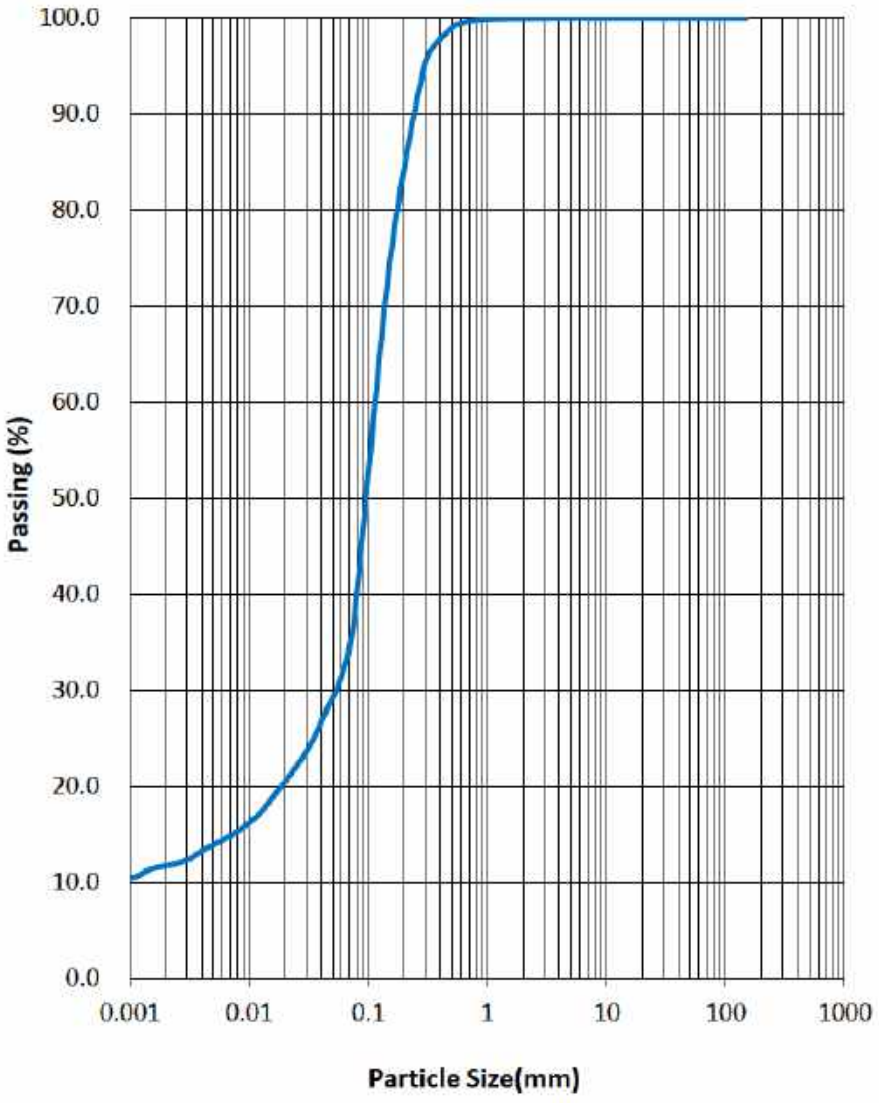
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3, 3.5.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu04	Depth (m):	2.50 - 3.00
Lab ID:	CPTu04_1_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.553
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	100.0
2.36	99.9
1.18	99.8
0.6	99.4
0.425	98.0
0.3	95.2
0.15	73.9
0.075	36.7
0.05594	30.4
0.04709	28.6
0.03373	24.6
0.02407	21.8
0.01646	19.2
0.01211	17.1
0.00860	15.6
0.00611	14.5
0.00433	13.5
0.00307	12.4
0.00218	11.8
0.00154	11.5
0.00126	10.9
0.00108	10.5
0.00092	10.3

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature: [redacted]

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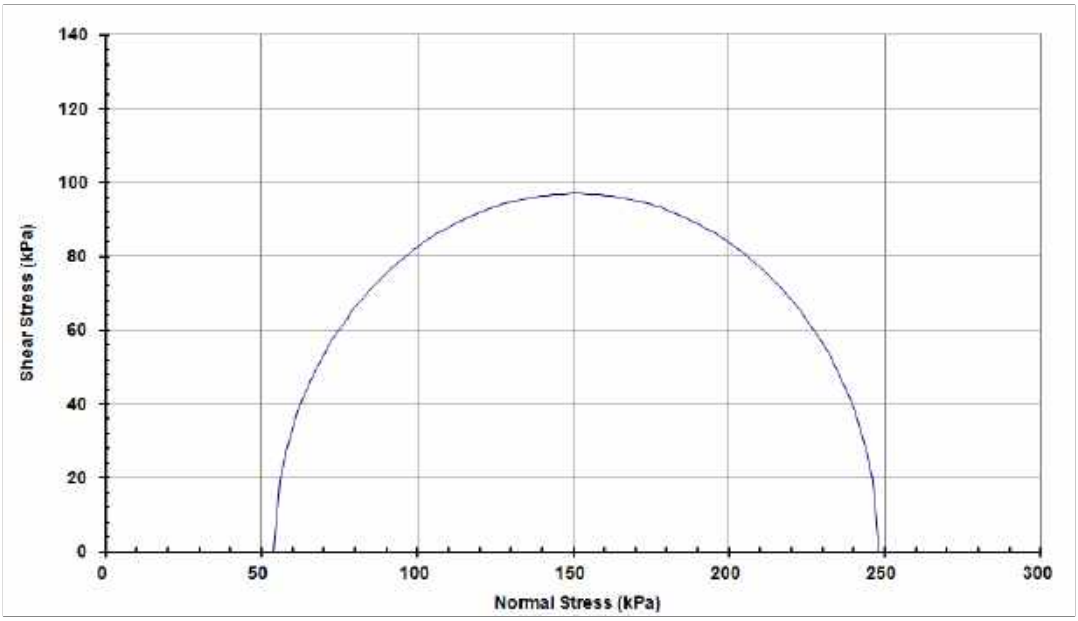
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu06	Lab:	EPLab
Sample ID:	CPTu06_A_CU1	Issue Date:	21/03/2025
Depth (m):	3.00 - 3.50	Room Temperature at Test:	~ 18°C

Tested by:	Phil Li	Initial Moisture (%):	13.06	Strain Rate (mm/min):	0.007
Height (mm):	120.30	Final Moisture (%):	15.85	Skempton's (B):	1
Diameter (mm):	61.32	Bulk Density (t/m³):	1.97	Initial Void Ratio (e_i):	-
L/D Ratio:	1.96	Dry Density (t/m³):	1.74	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

Accredited for compliance with ISO/IEC 17025-TESTING

NATA: 19078

[redacted]

Authorised Signatory (Geotechnical Engineer):

NATA

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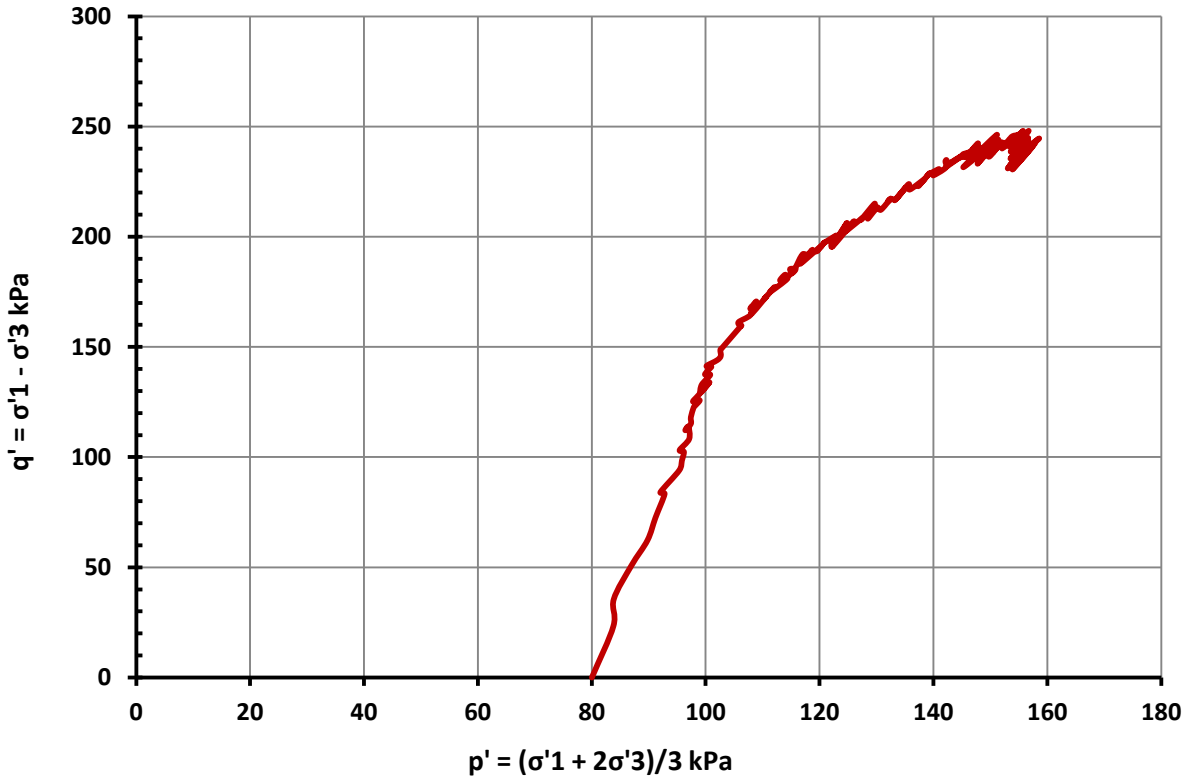
E-Precision Laboratory

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu06	Lab:	EPLab
Sample ID:	CPTu06_A_CU1		
Depth (m):	3.00 - 3.50	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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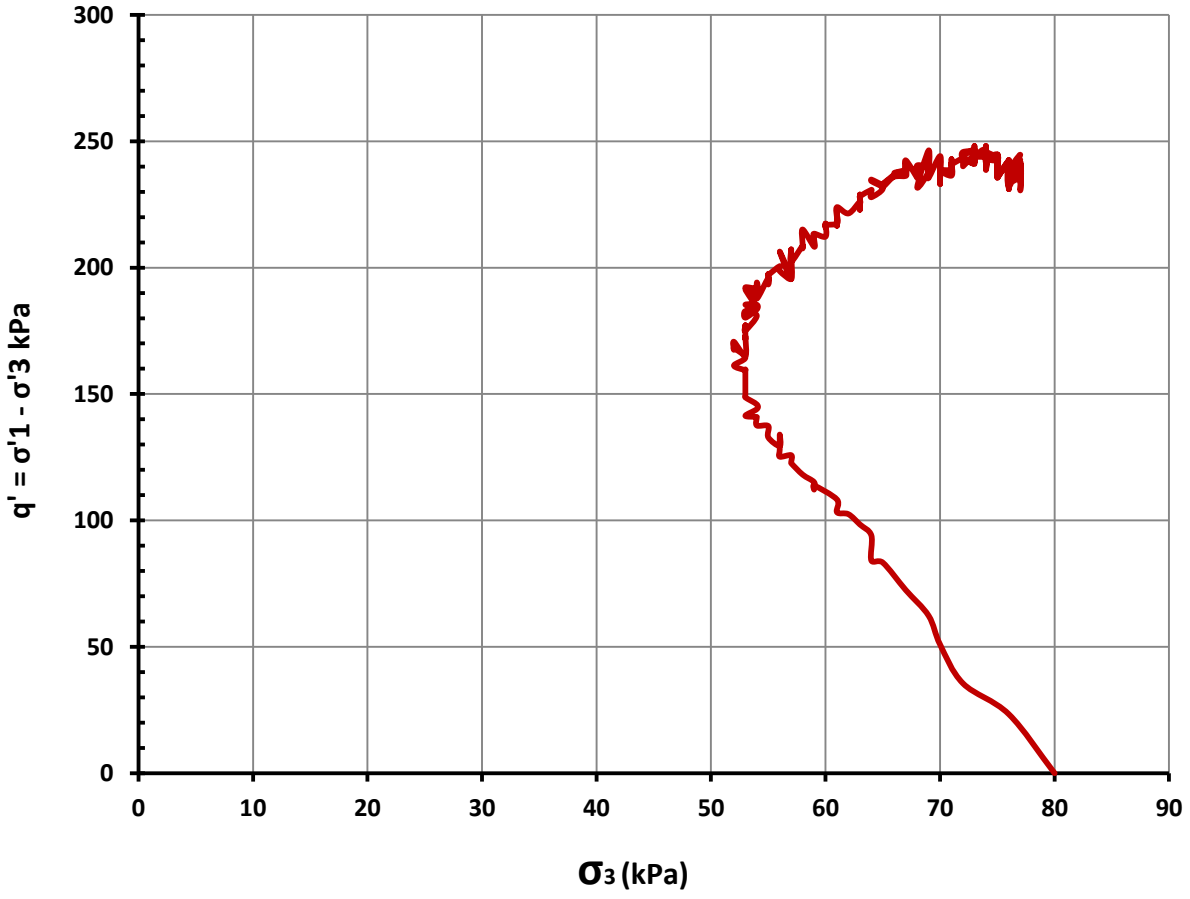
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu06	Lab:	EPLab
Sample ID:	CPTu06_A_CU1		
Depth (m):	3.00 - 3.50	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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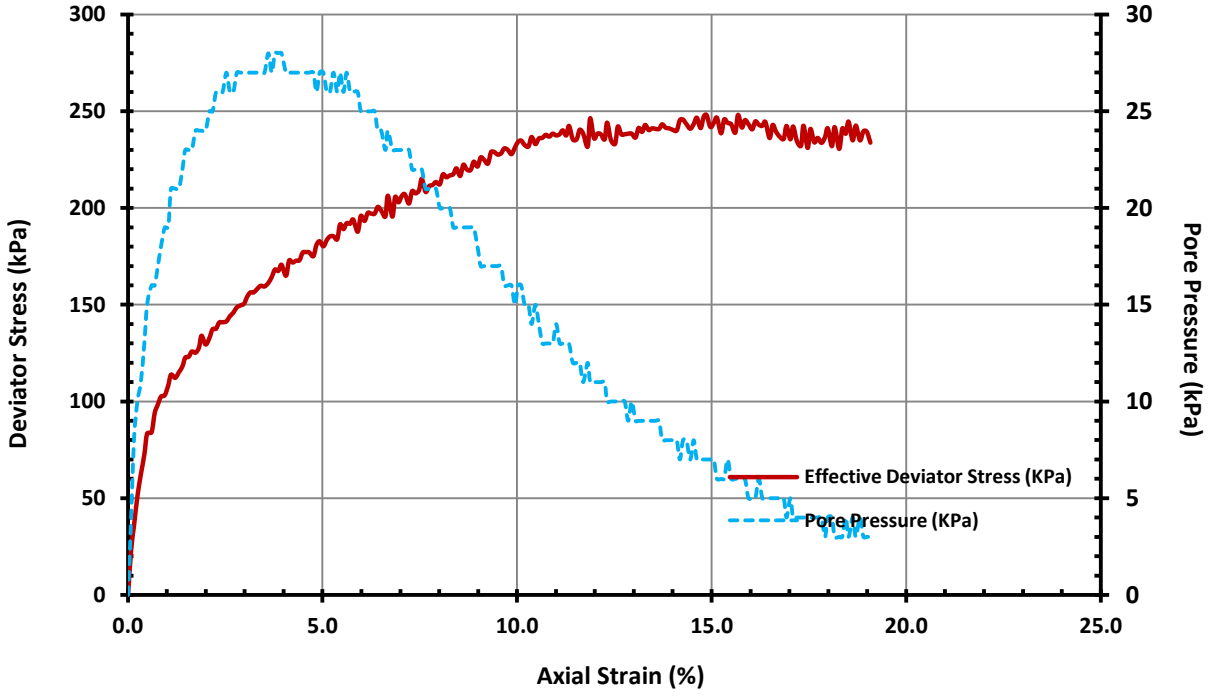
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu06	Lab:	EPLab
Sample ID:	CPTu06_A_CU1		
Depth (m):	3.00 - 3.50	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	80	0	26	248	54	4.59	194	5.79

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E-Precision Laboratory

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu06	Lab:	EPLab
Sample ID:	CPTu06_A_CU1		
Depth (m):	3.00 - 3.50	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: CPTu06 **Depth (m):** 3.00 - 3.50
Lab ID: CPTu06_A_CU1 **Date Tested:** 21/03/2025

Failure Mode: **Bulging**

Notes: **Insitu sample from shelby Tube**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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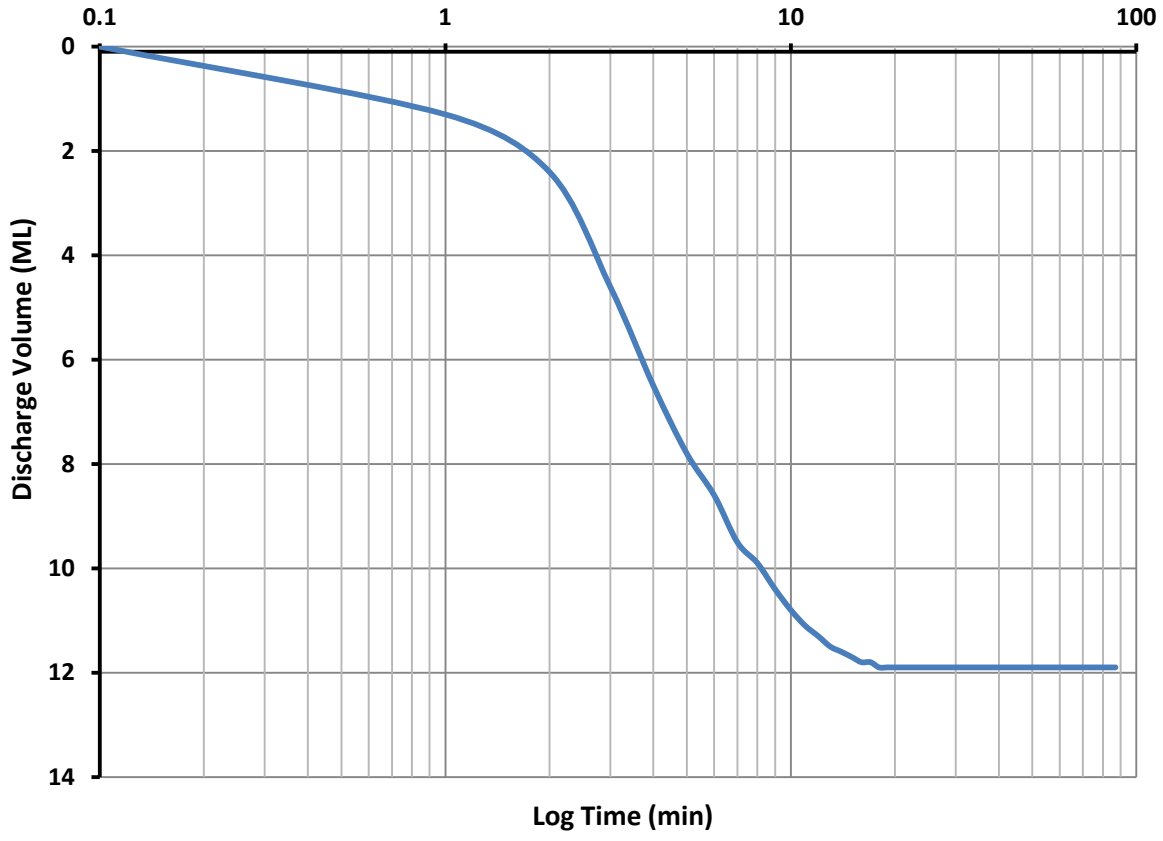
E-Precision Laboratory

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu06	Lab:	EPLab
Sample ID:	CPTu06_A_CU1		
Depth (m):	3.00 - 3.50	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.070 based on t_{90}

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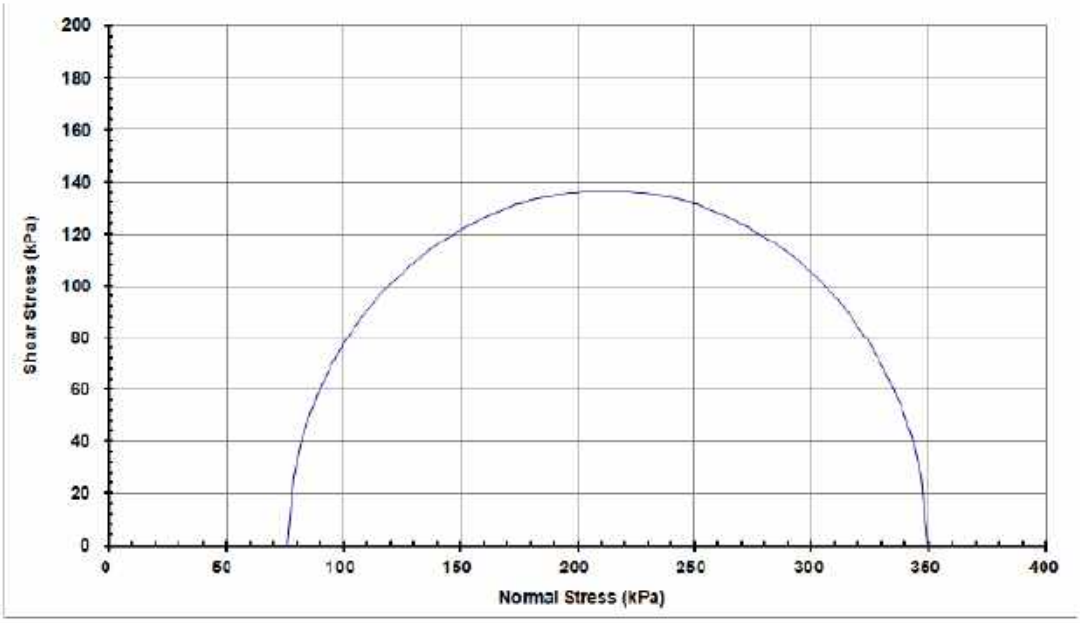
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu06	Lab:	EPLab
Sample ID:	CPTu06_B_CU1	Issue Date:	21/03/2025
Depth (m):	3.00 - 3.50	Room Temperature at Test:	~ 18°C

Tested by:	Phil Li	Initial Moisture (%):	16.88	Strain Rate (mm/min):	0.007
Height (mm):	122.36	Final Moisture (%):	16.07	Skempton's (B):	1
Diameter (mm):	60.54	Bulk Density (t/m³):	1.99	Initial Void Ratio (e_i):	-
L/D Ratio:	2.02	Dry Density (t/m³):	1.70	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

Accredited for compliance with ISO/IEC 17025-TESTING

NATA: 19078

Authorised Signatory (Geotechnic [redacted]

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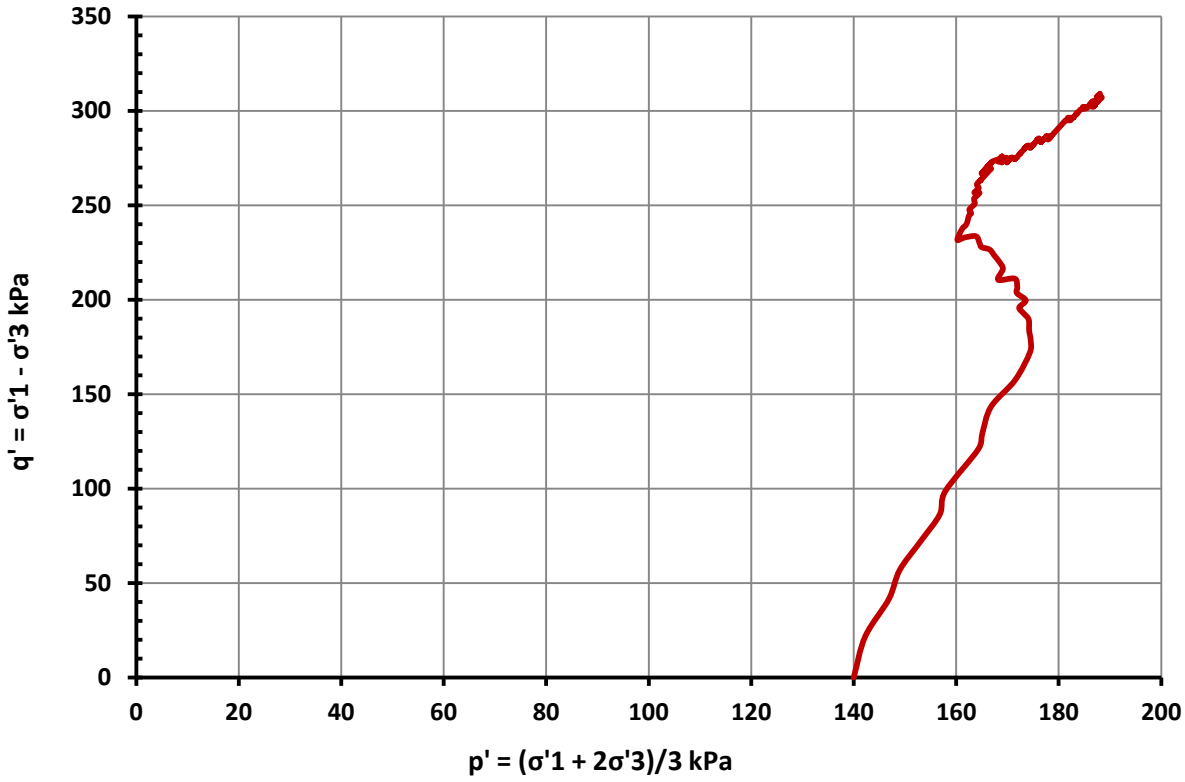
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu06	Lab:	EPLab
Sample ID:	CPTu06_B_CU1		
Depth (m):	3.00 - 3.50	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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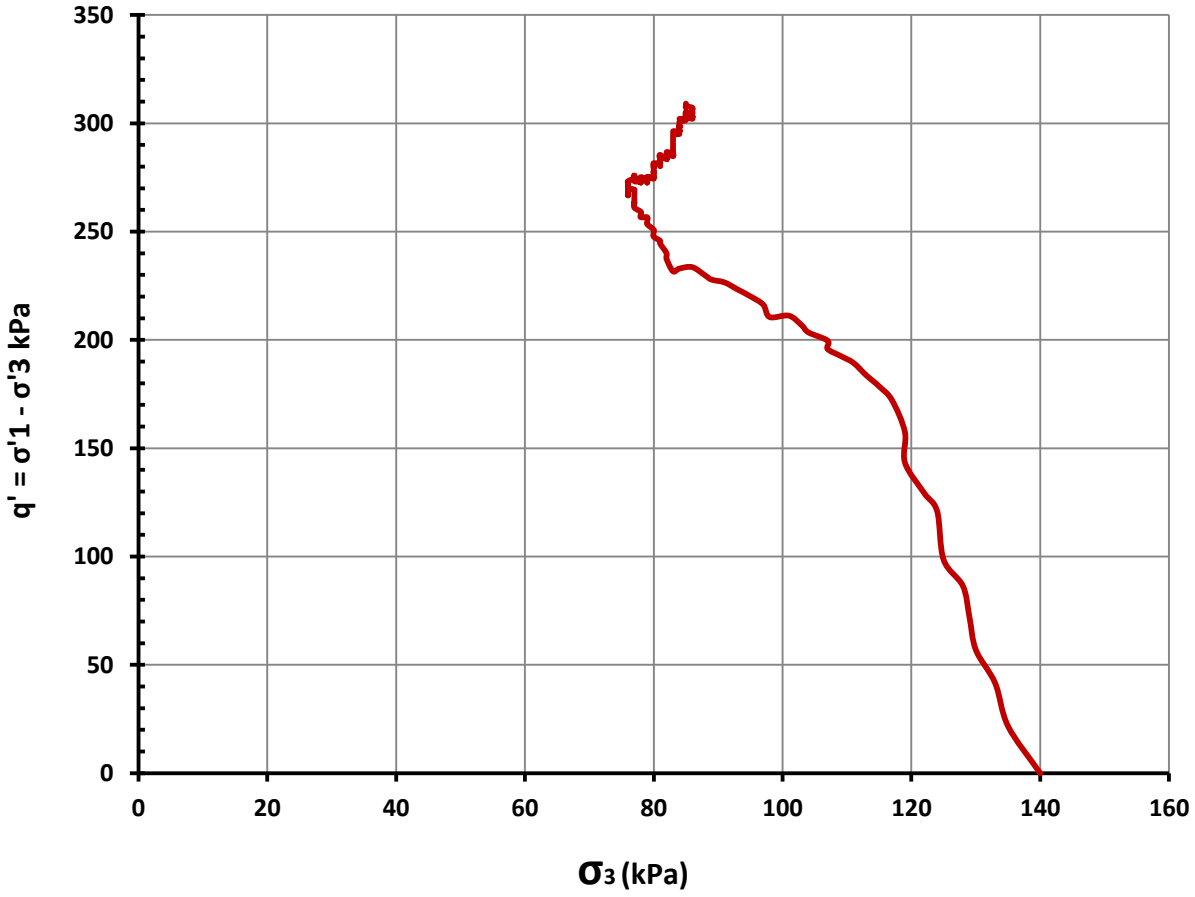
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu06	Lab:	EPLab
Sample ID:	CPTu06_B_CU1		
Depth (m):	3.00 - 3.50	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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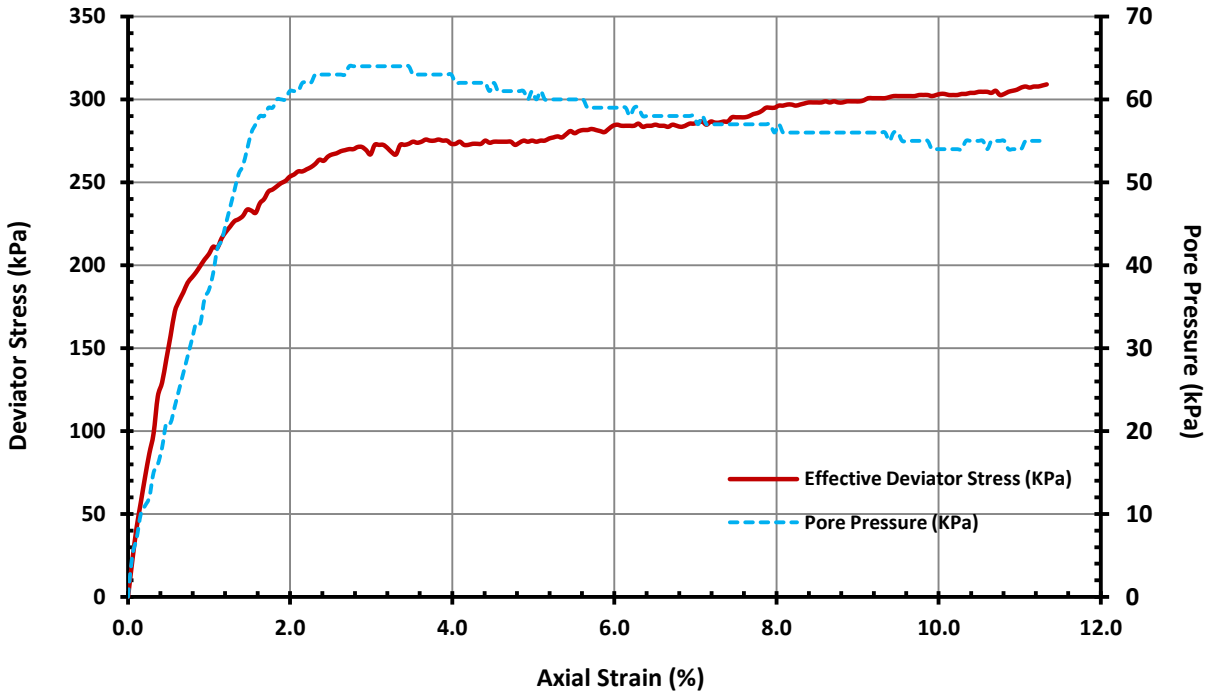
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu06	Lab:	EPLab
Sample ID:	CPTu06_B_CU1		
Depth (m):	3.00 - 3.50	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	140	0	64	349	76	4.60	273	3.46

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SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu06	Lab:	EPLab
Sample ID:	CPTu06_B_CU1		
Depth (m):	3.00 - 3.50	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: CPTu06 **Depth (m):** 3.00 - 3.50

Lab ID: CPTu06_B_CU1 **Date Tested:** 21/03/2025

Failure Mode: **Bulging**

Notes: **Insitu sample from shelby Tube**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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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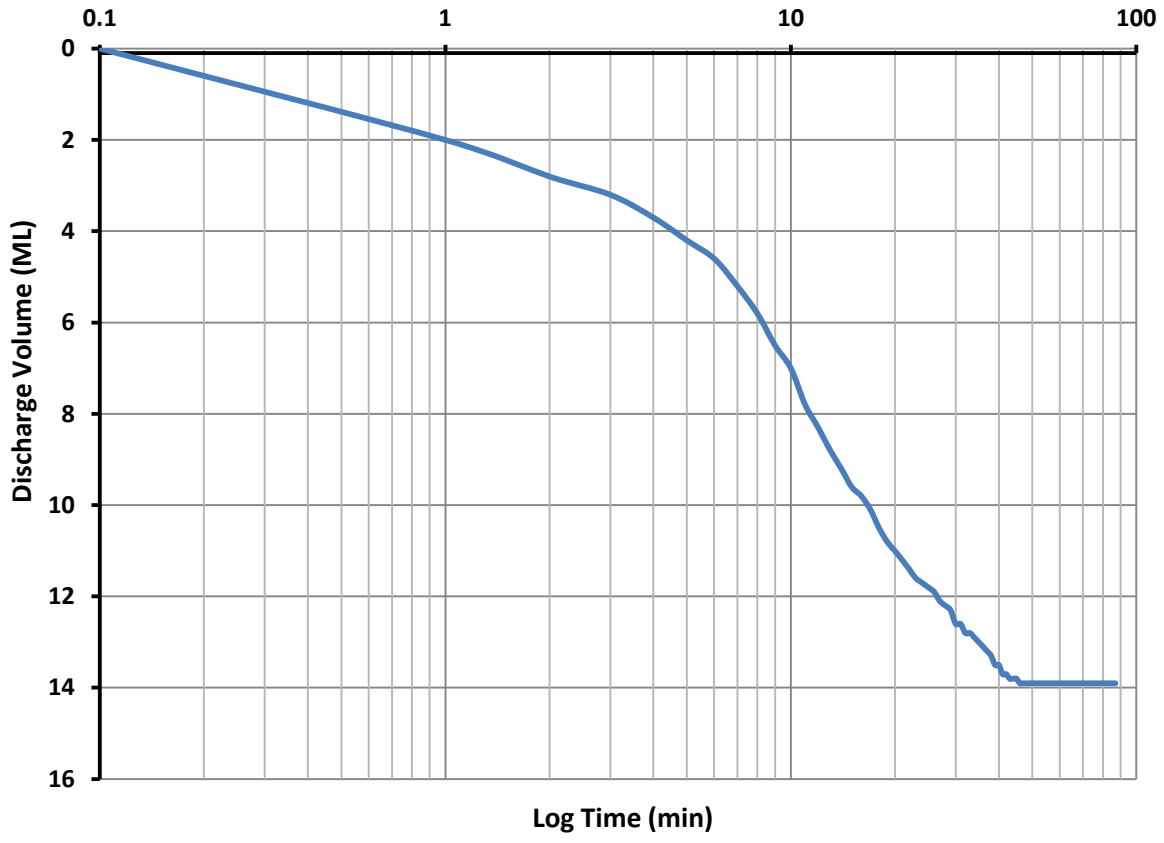
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu06	Lab:	EPLab
Sample ID:	CPTu06_B_CU1		
Depth (m):	3.00 - 3.50	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.040 based on t_{90}

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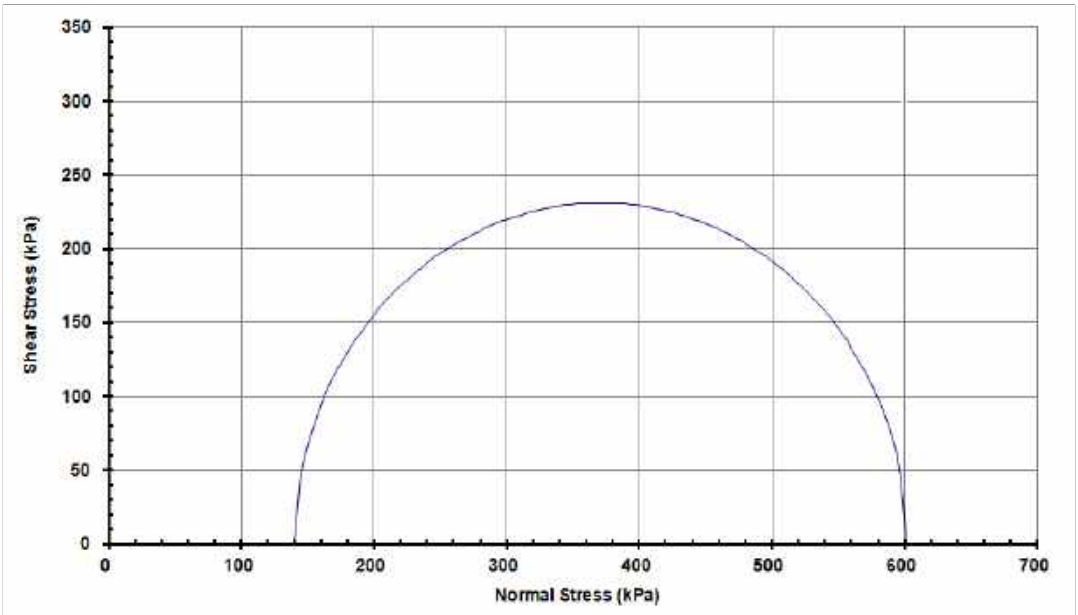
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu06	Lab:	EPLab
Sample ID:	CPTu06_C_CU1	Issue Date:	21/03/2025
Depth (m):	3.00 - 3.50	Room Temperature at Test:	~ 18°C

Tested by:	Phil Li	Initial Moisture (%):	14.04	Strain Rate (mm/min):	0.007
Height (mm):	121.63	Final Moisture (%):	13.33	Skempton's (B):	1
Diameter (mm):	60.92	Bulk Density (t/m³):	1.97	Initial Void Ratio (e_i):	-
L/D Ratio:	2.00	Dry Density (t/m³):	1.73	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

Accredited for compliance with ISO/IEC 17025-TESTING

NATA: 19078

Authorised Signatory (Geotech [redacted]

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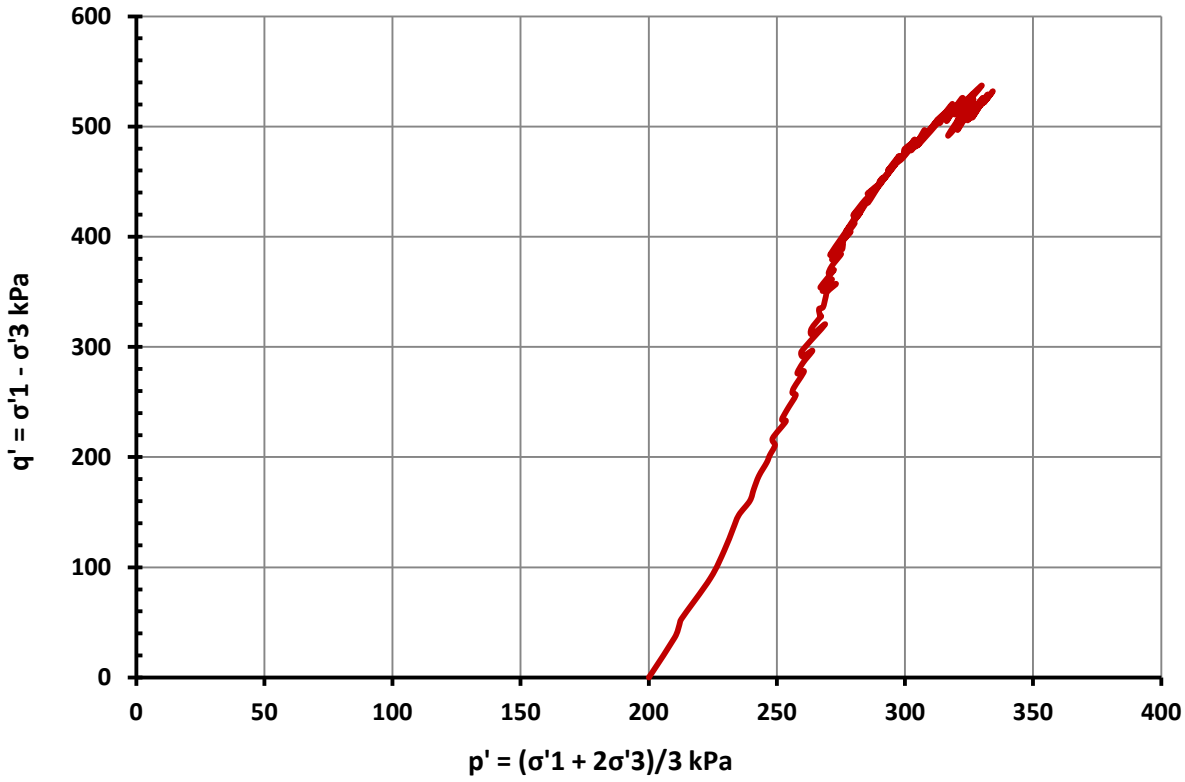
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu06	Lab:	EPLab
Sample ID:	CPTu06_C_CU1		
Depth (m):	3.00 - 3.50	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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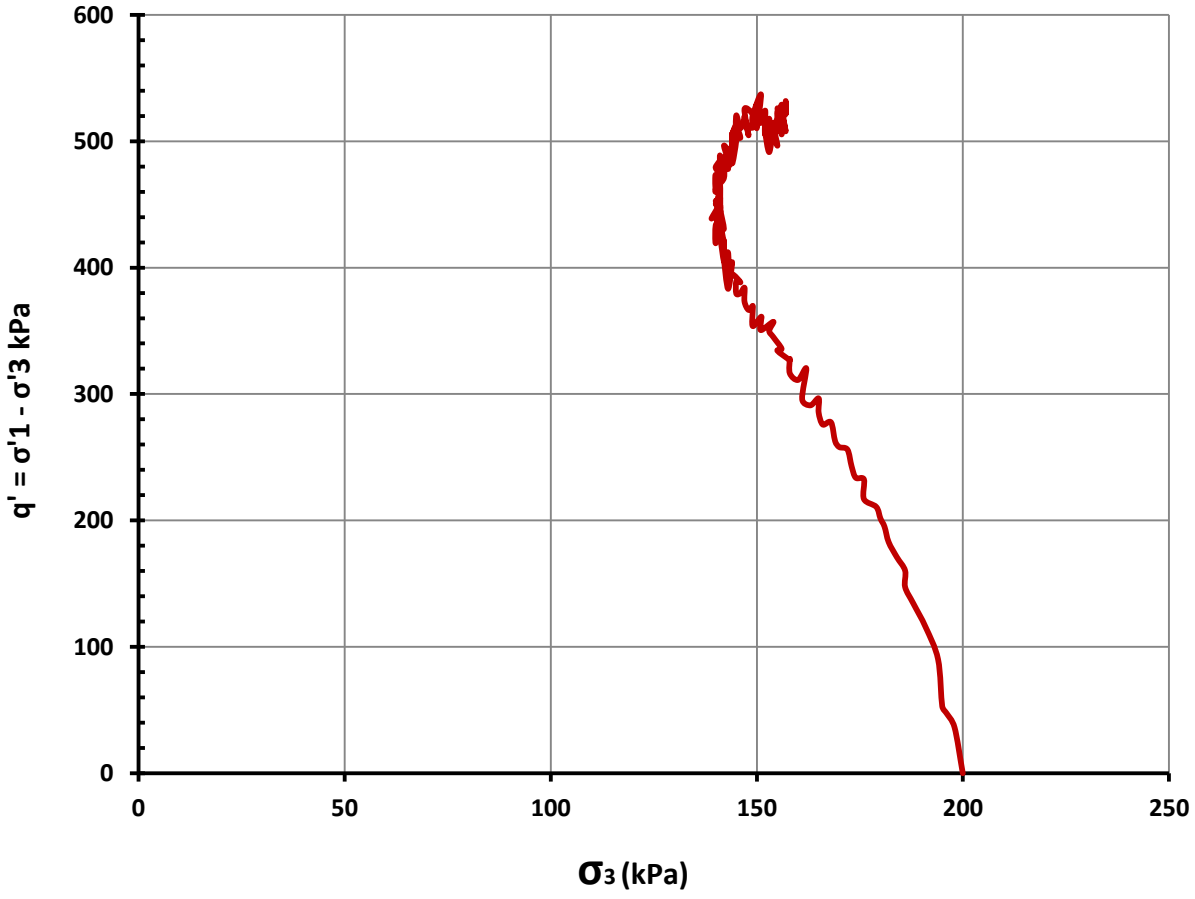
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu06	Lab:	EPLab
Sample ID:	CPTu06_C_CU1		
Depth (m):	3.00 - 3.50	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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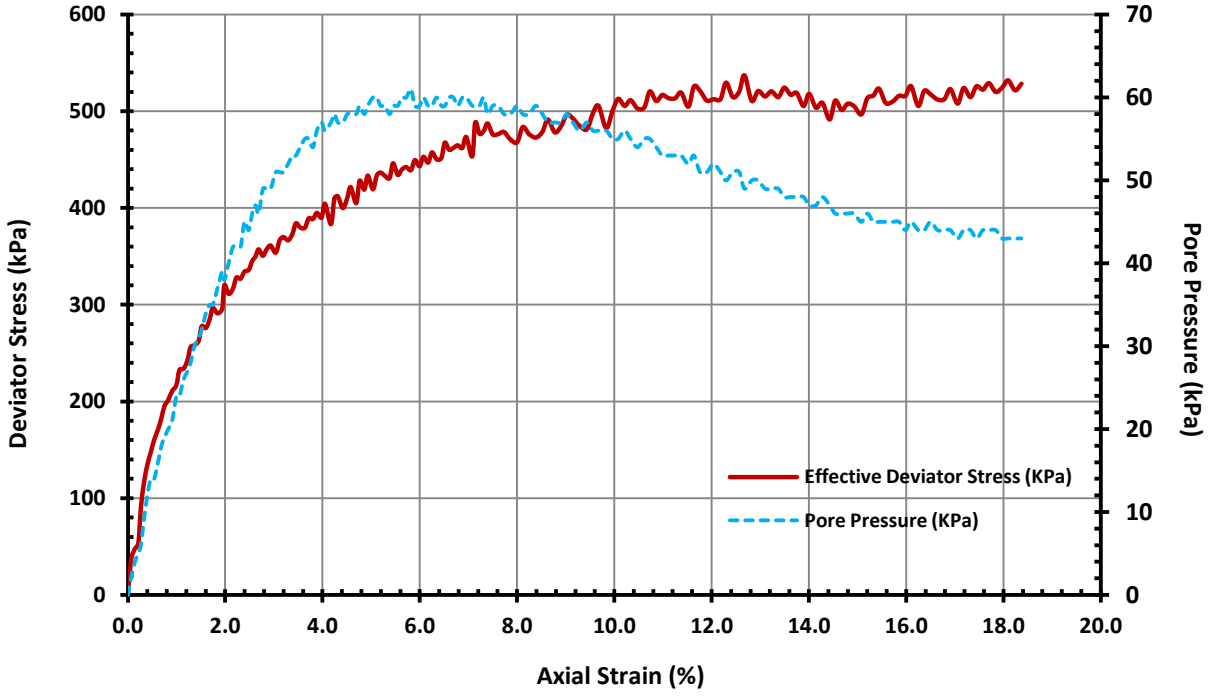
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu06	Lab:	EPLab
Sample ID:	CPTu06_C_CU1		
Depth (m):	3.00 - 3.50	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	200	0	60	602	140	4.30	462	6.69

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SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu06	Lab:	EPLab
Sample ID:	CPTu06_C_CU1		
Depth (m):	3.00 - 3.50	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: CPTu06 **Depth (m):** 3.00 - 3.50

Lab ID: CPTu06_C_CU1 **Date Tested:** 21/03/2025

Failure Mode: **Intact Shear** **35.9 °**

Notes: **Insitu sample from shelby Tube**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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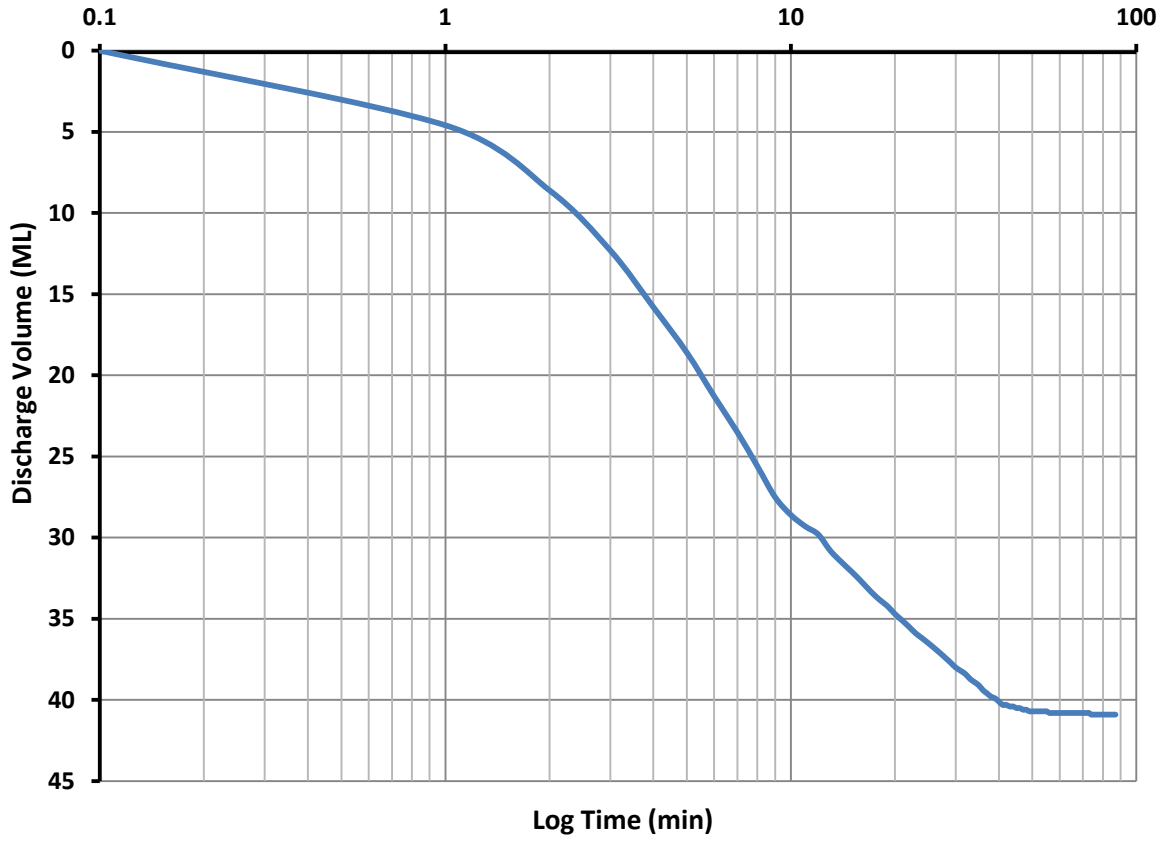
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu06	Lab:	EPLab
Sample ID:	CPTu06_C_CU1		
Depth (m):	3.00 - 3.50	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.031 based on t_{90}

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E-Precision Laboratory

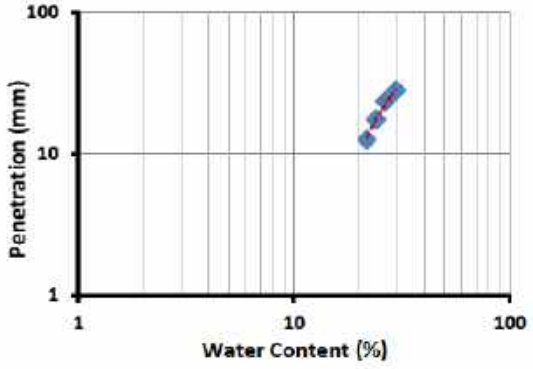
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

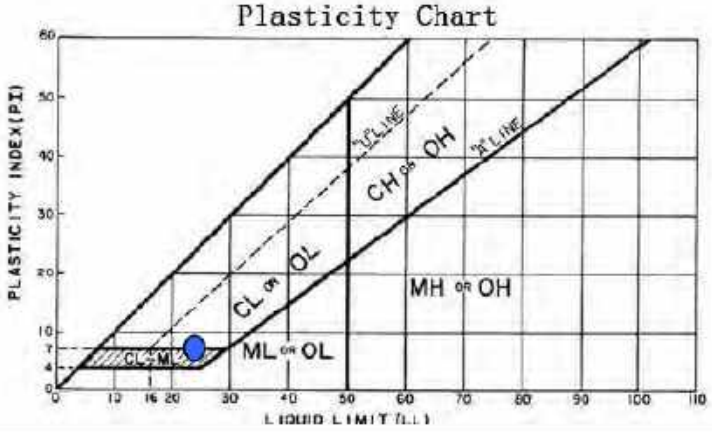
Client:	REC	Date Tested:	05/04/2025
Project:	KMS Testing 2025	Lab:	EPLAB
Sample No:	CPTu06	Job Number:	REC
Lab ID:	CPTu06_1_ATT		
Depth (m):	3.00 - 3.50	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	23.78
Plastic Limit (%):	16.13
Plasticity Index (%):	7.65
Liquidity Index (%):	-
Shrinkage Limit (%):	14.28
Linear Shrinkage(%):	3.75

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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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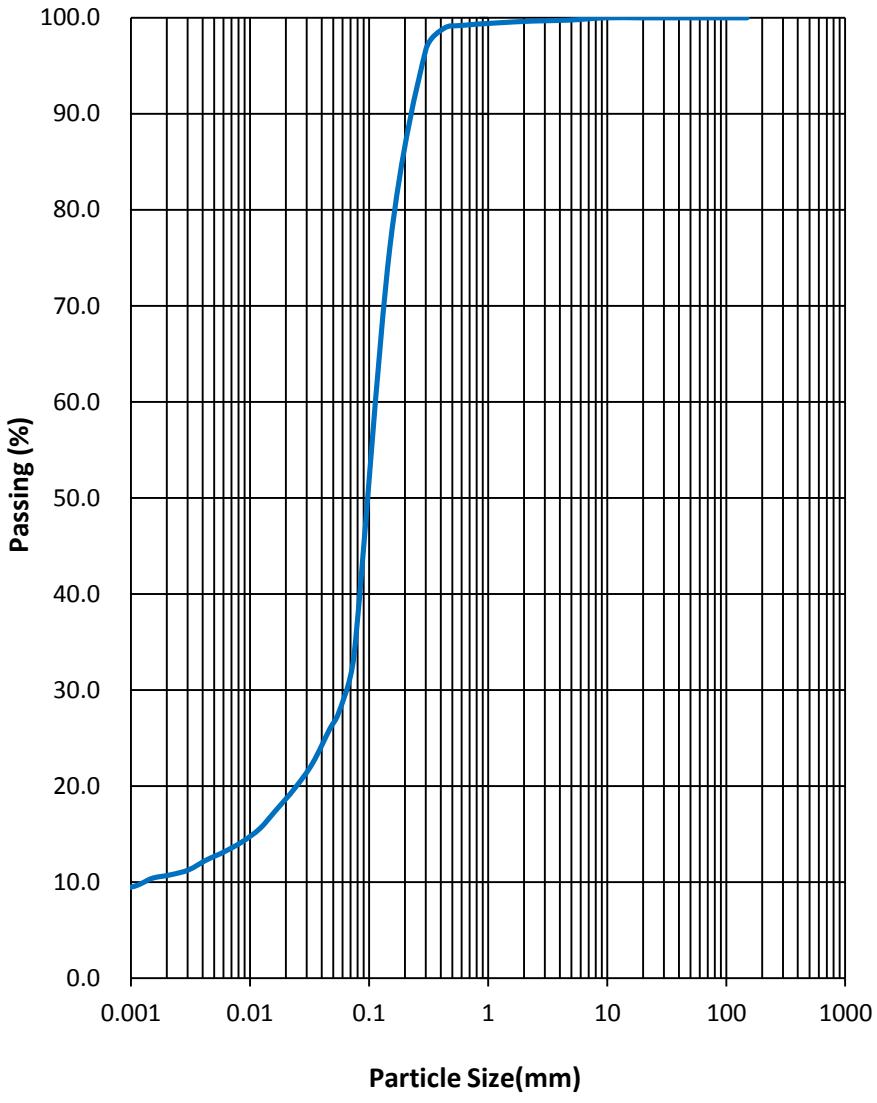
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3, 3.5.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu06	Depth (m):	3.00 - 3.50
Lab ID:	CPTu06_1_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.562
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	99.8
2.36	99.7
1.18	99.5
0.6	99.2
0.425	98.9
0.3	96.6
0.15	76.1
0.075	33.6
0.05578	27.7
0.04695	26.0
0.03363	22.4
0.02400	19.8
0.01641	17.4
0.01207	15.5
0.00858	14.2
0.00609	13.1
0.00432	12.3
0.00306	11.3
0.00217	10.8
0.00154	10.4
0.00125	9.9
0.00108	9.6
0.00092	9.4

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature [redacted]

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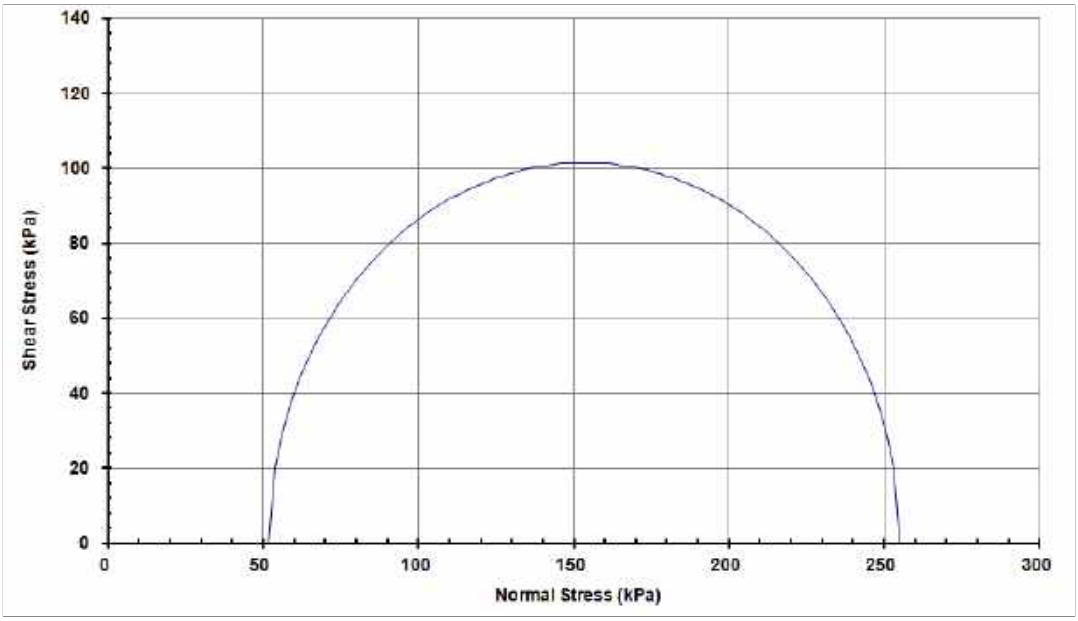
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	01/04/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu10	Lab:	EPLab
Sample ID:	CPTu10_A_CU1	Issue Date:	01/04/2025
Depth (m):	5.50 - 6.00	Room Temperature at Test:	~ 18°C

Tested by:	Phil Li	Initial Moisture (%):	15.52	Strain Rate (mm/min):	0.007
Height (mm):	121.35	Final Moisture (%):	16.67	Skempton's (B):	0.99
Diameter (mm):	55.21	Bulk Density (t/m³):	2.03	Initial Void Ratio (e_i):	-
L/D Ratio:	2.20	Dry Density (t/m³):	1.76	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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NATA: 19078

Authorised Signatory (Geotechnical Engineer): [redacted]

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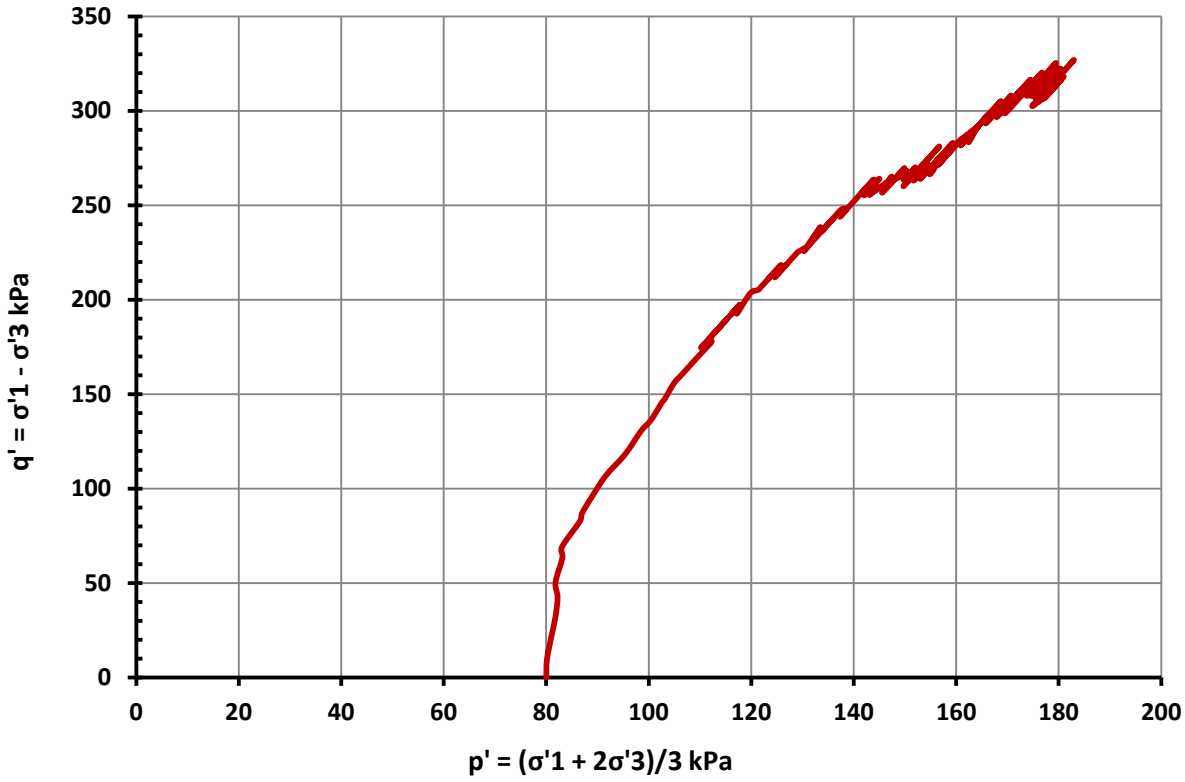
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	01/04/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu10	Lab:	EPLab
Sample ID:	CPTu10_A_CU1		
Depth (m):	5.50 - 6.00	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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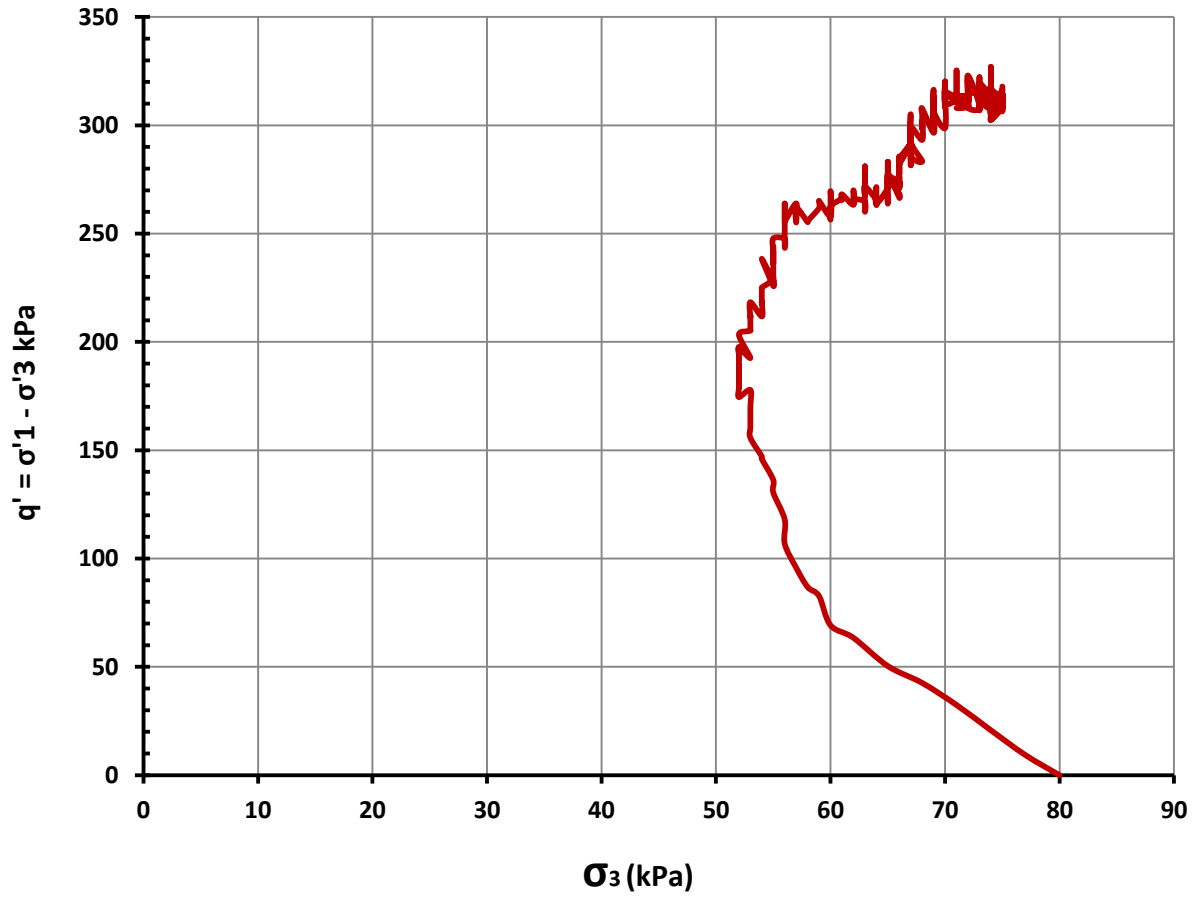
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	01/04/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu10	Lab:	EPLab
Sample ID:	CPTu10_A_CU1		
Depth (m):	5.50 - 6.00	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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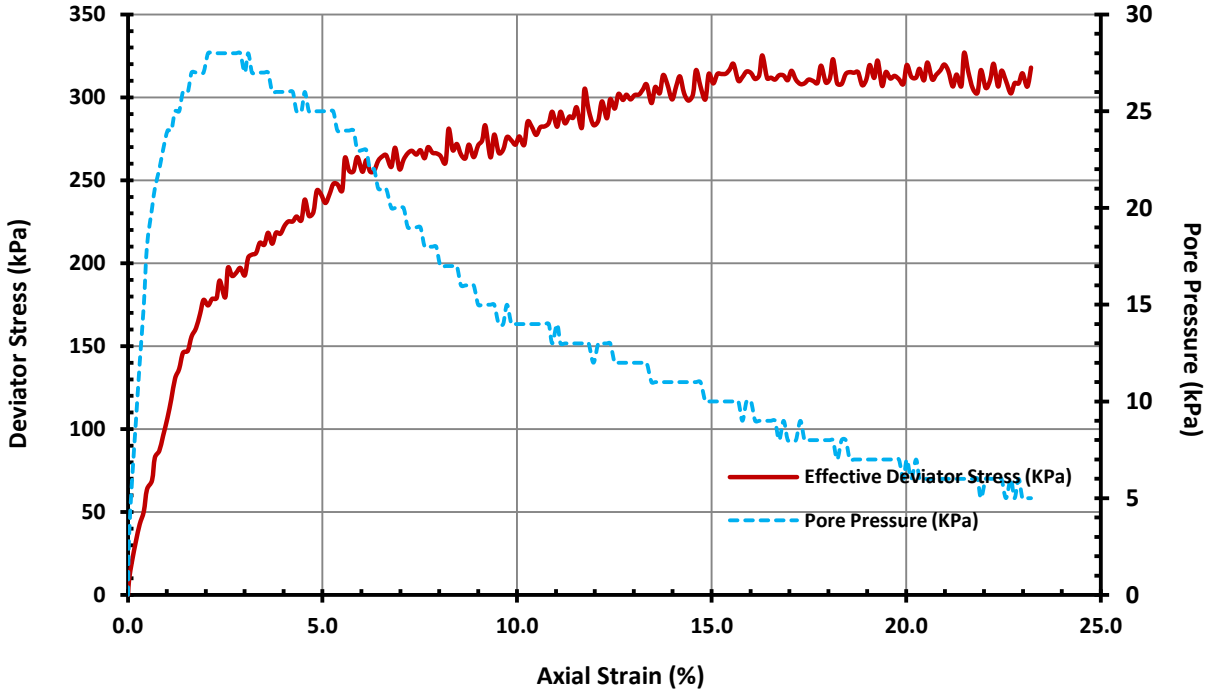
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	01/04/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu10	Lab:	EPLab
Sample ID:	CPTu10_A_CU1		
Depth (m):	5.50 - 6.00	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	80	0	28	255	52	4.91	203	3.09

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SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	01/04/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu10	Lab:	EPLab
Sample ID:	CPTu10_A_CU1		
Depth (m):	5.50 - 6.00	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: CPTu10 **Depth (m):** 5.50 - 6.00

Lab ID: CPTu10_A_CU1 **Date Tested:** 01/04/2025

Failure Mode: **Bulging** °

Notes: **Insitu sample from shelby Tube**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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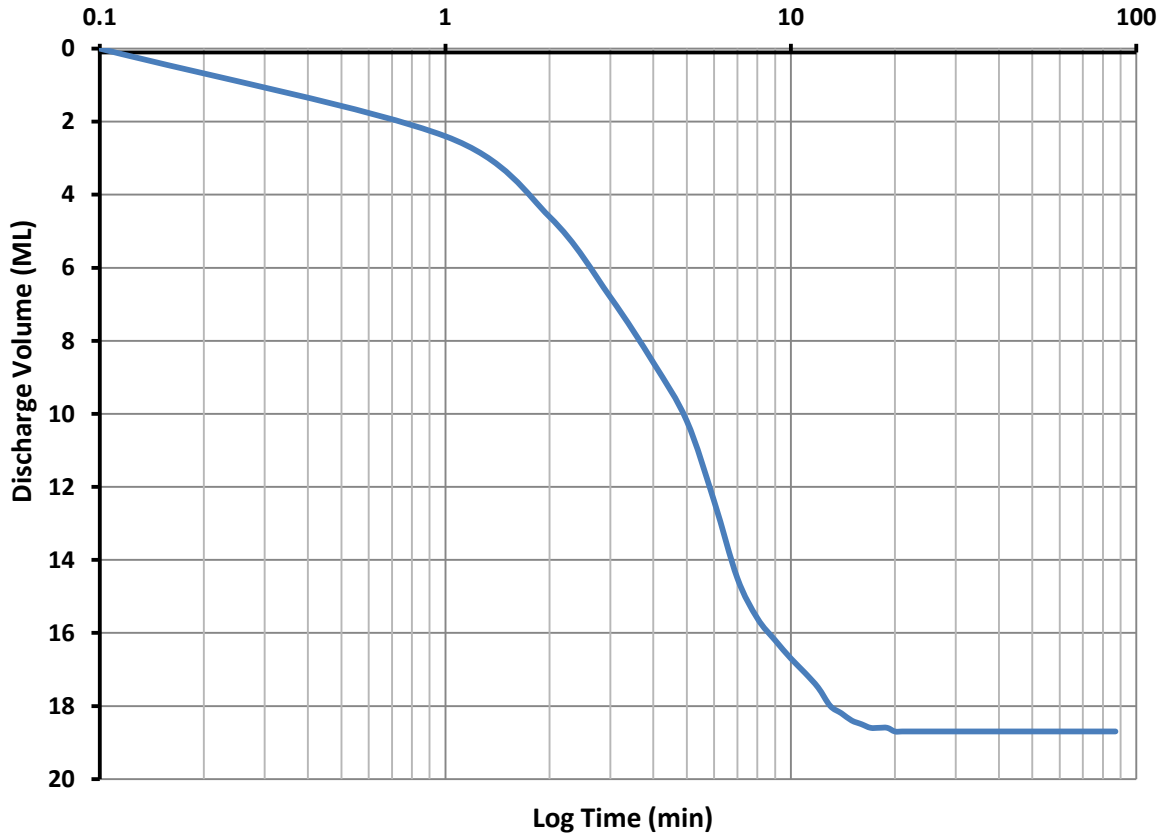
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	01/04/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu10	Lab:	EPLab
Sample ID:	CPTu10_A_CU1		
Depth (m):	5.50 - 6.00	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.312 based on t_{90}

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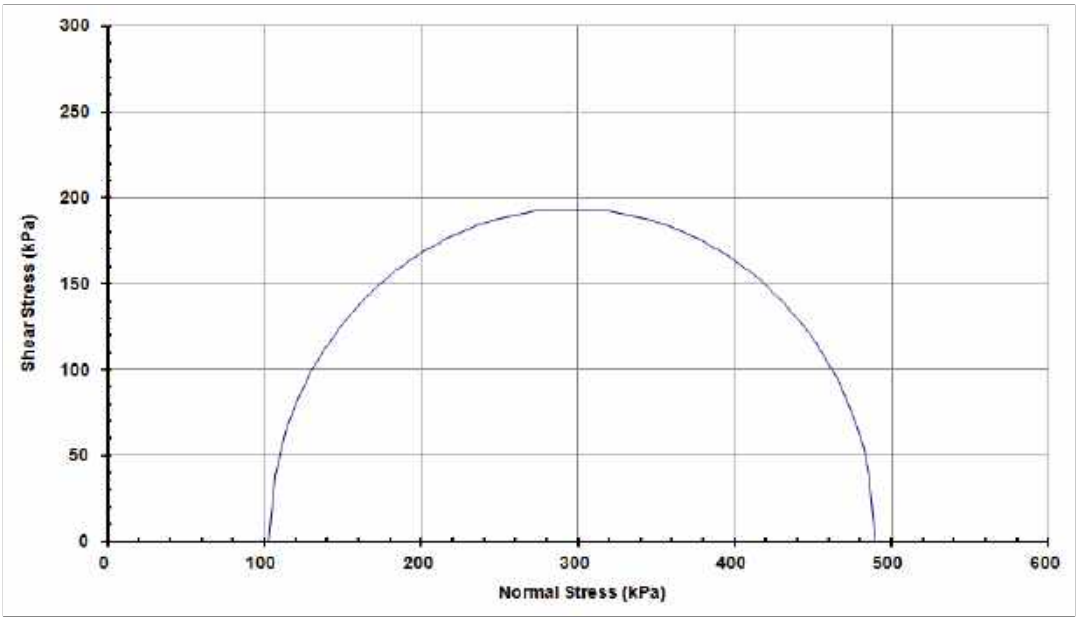
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC		Date Tested:	01/04/2025	
Project:	KMS Testing 2025		EP Lab Job Number:	REC	
Sample No:	CPTu10		Lab:	EPLab	
Sample ID:	CPTu10_B_CU1		Issue Date:	01/04/2025	
Depth (m):	5.50 - 6.00		Room Temperature at Test:	~ 18°C	

Tested by:	Phil Li	Initial Moisture (%):	15.79	Strain Rate (mm/min):	0.007
Height (mm):	113.90	Final Moisture (%):	18.06	Skempton's (B):	0.99
Diameter (mm):	52.23	Bulk Density (t/m³):	2.05	Initial Void Ratio (e_i):	-
L/D Ratio:	2.18	Dry Density (t/m³):	1.77	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

Accredited for compliance with ISO/IEC 17025-TESTING

NATA: 19078

[redacted]

Authorised Signatory (Geotechnical Engineer):

NATA

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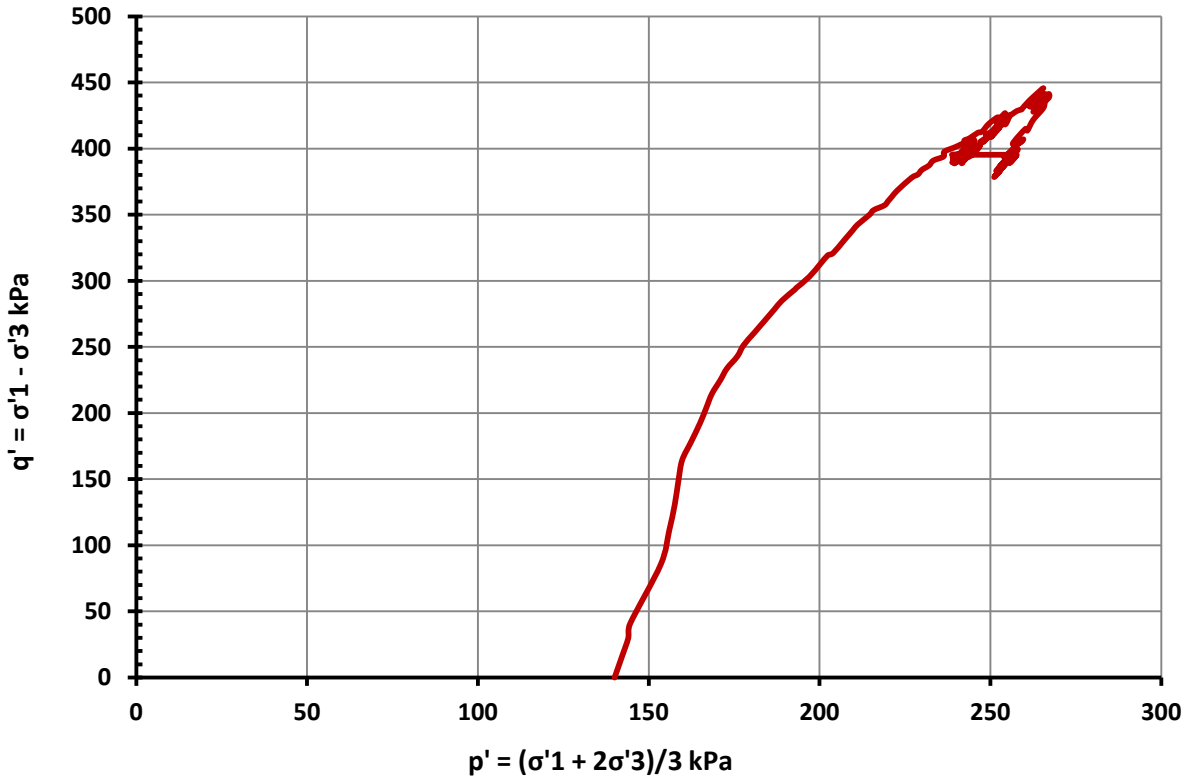
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	01/04/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu10	Lab:	EPLab
Sample ID:	CPTu10_B_CU1		
Depth (m):	5.50 - 6.00	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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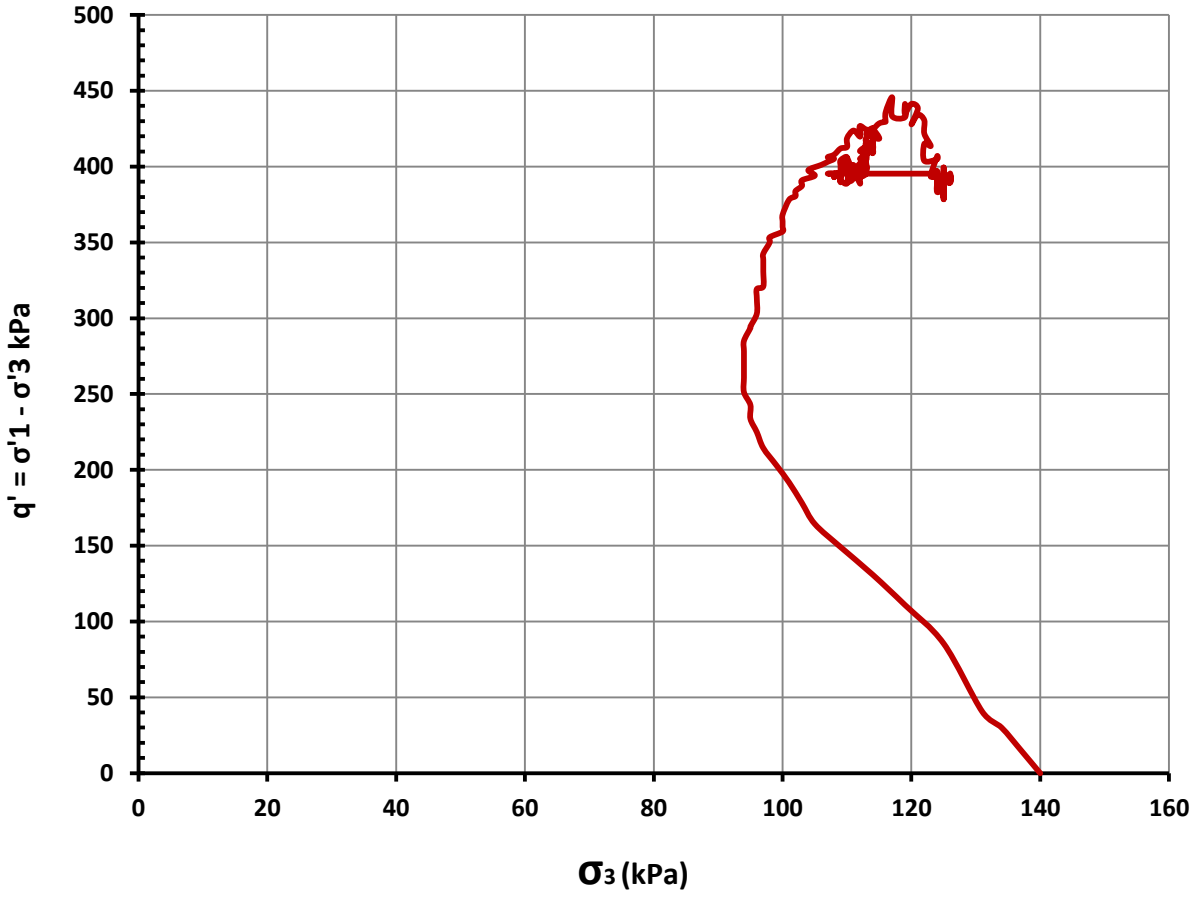
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	01/04/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu10	Lab:	EPLab
Sample ID:	CPTu10_B_CU1		
Depth (m):	5.50 - 6.00	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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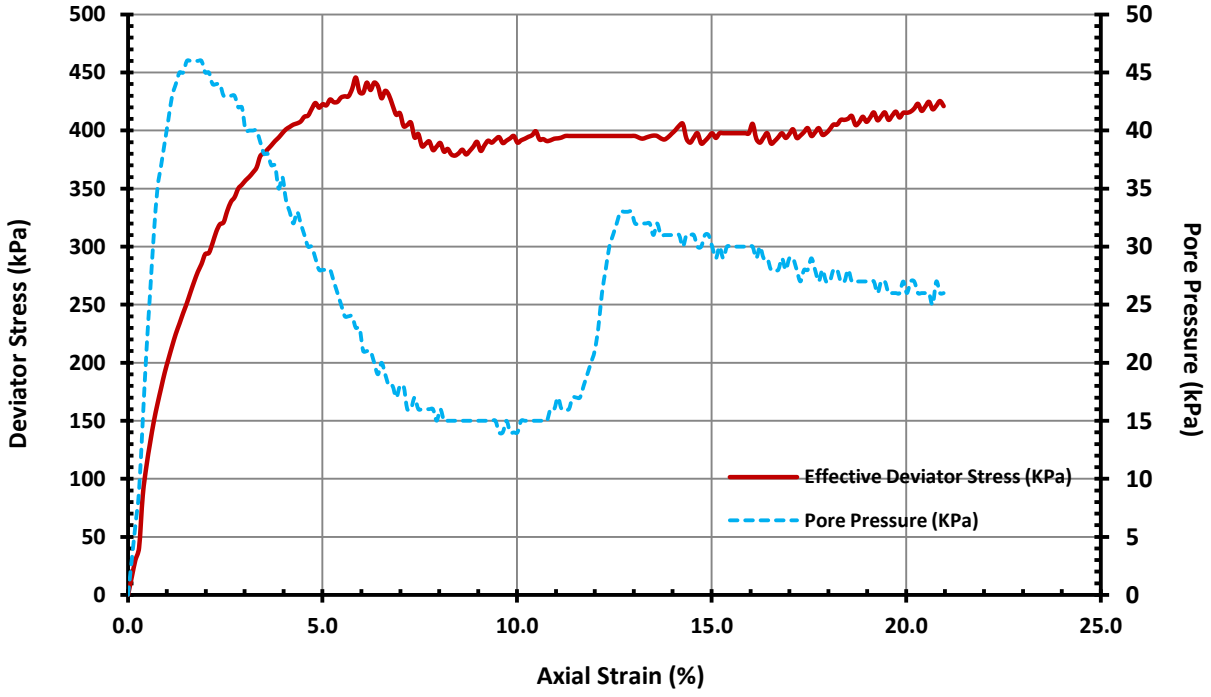
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	01/04/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu10	Lab:	EPLab
Sample ID:	CPTu10_B_CU1		
Depth (m):	5.50 - 6.00	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	140	0	37	490	103	4.76	387	3.68

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SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	01/04/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu10	Lab:	EPLab
Sample ID:	CPTu10_B_CU1		
Depth (m):	5.50 - 6.00	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: CPTu10 **Depth (m):** 5.50 - 6.00
Lab ID: CPTu10_B_CU1 **Date Tested:** 01/04/2025

Failure Mode: **Intact Shear** **29 °**

Notes: **Insitu sample from shelby Tube**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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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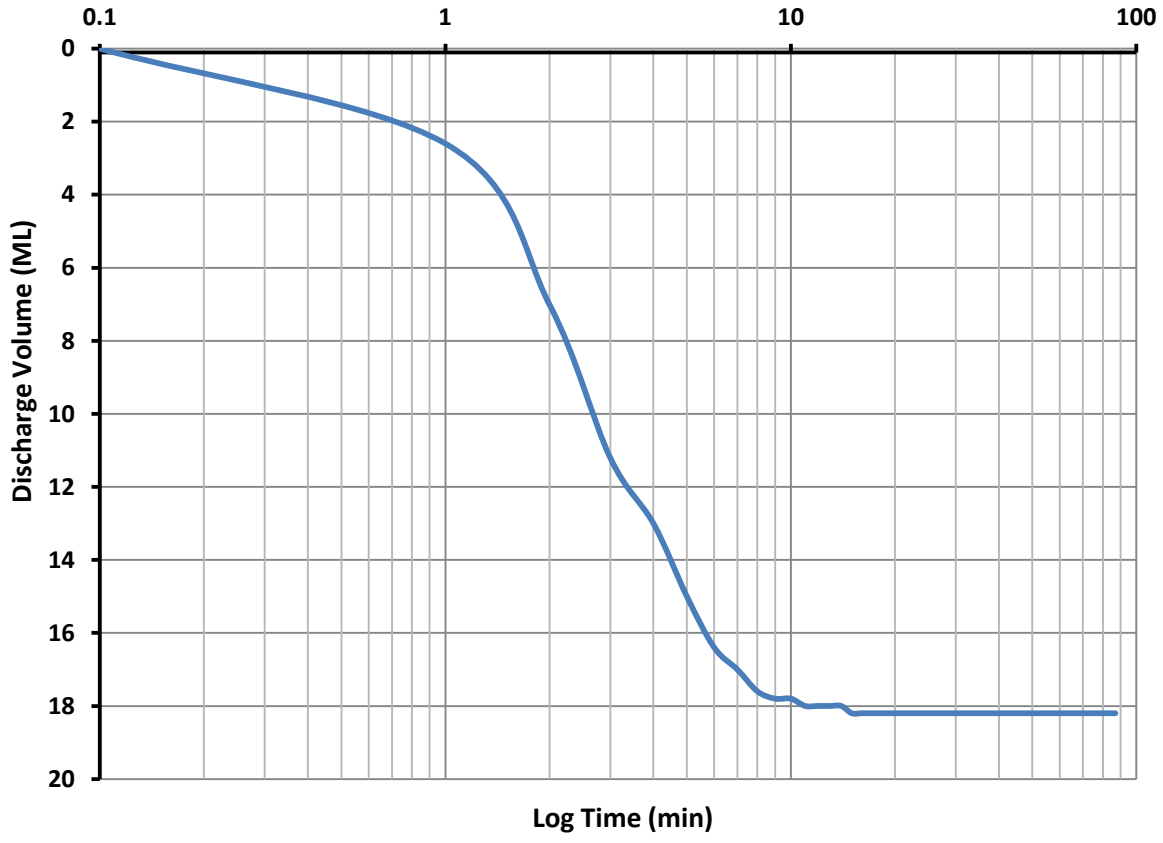
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	01/04/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu10	Lab:	EPLab
Sample ID:	CPTu10_B_CU1		
Depth (m):	5.50 - 6.00	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.107 based on t_{90}

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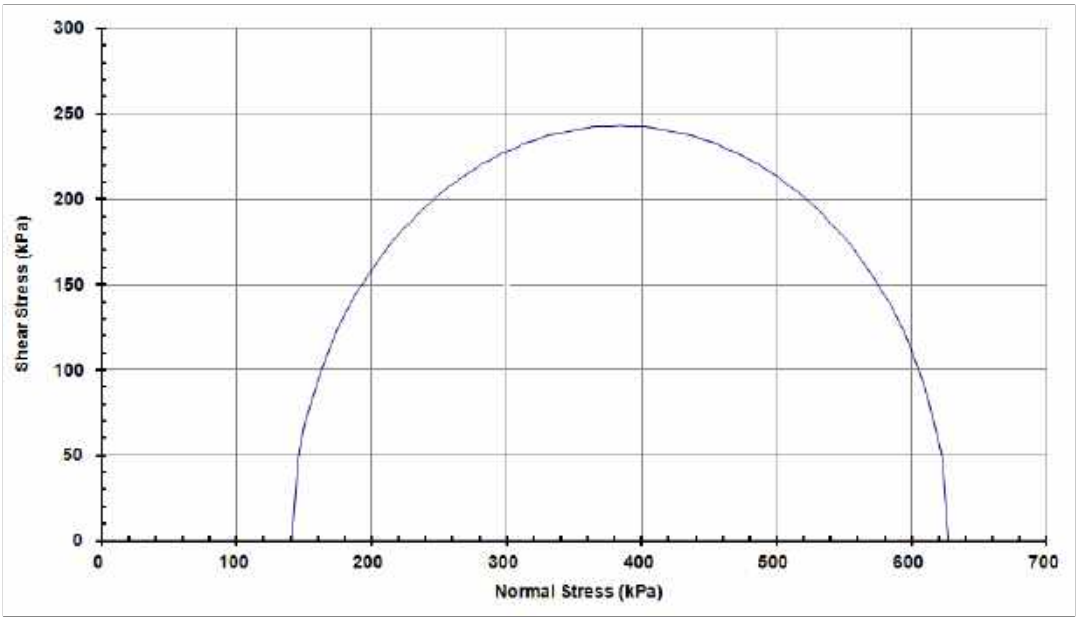
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	01/04/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu10	Lab:	EPLab
Sample ID:	CPTu10_C_CU1	Issue Date:	01/04/2025
Depth (m):	5.50 - 6.00	Room Temperature at Test:	~ 18°C

Tested by:	Phil Li	Initial Moisture (%):	16.99	Strain Rate (mm/min):	0.007
Height (mm):	103.54	Final Moisture (%):	16.26	Skempton's (B):	0.99
Diameter (mm):	54.38	Bulk Density (t/m³):	2.04	Initial Void Ratio (e_i):	-
L/D Ratio:	1.90	Dry Density (t/m³):	1.74	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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NATA: 19078

Authorised Signatory (Geotechnical Engineer): [redacted]

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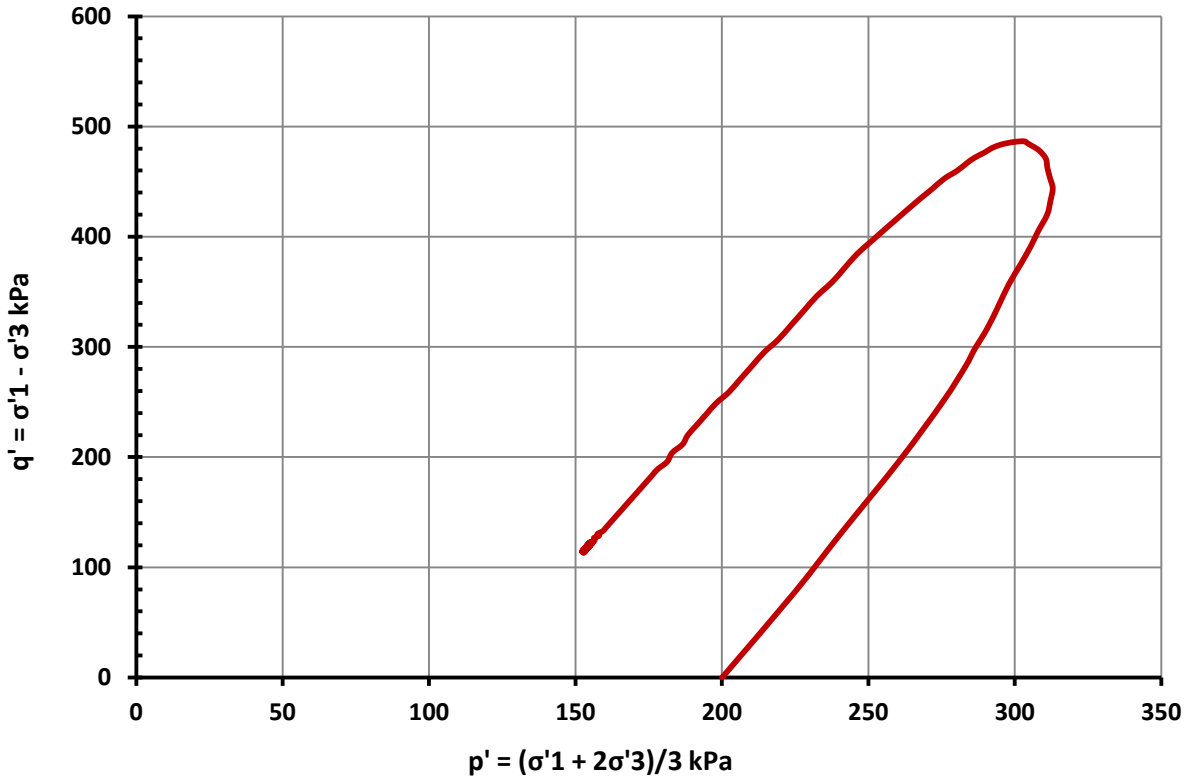
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	01/04/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu10	Lab:	EPLab
Sample ID:	CPTu10_C_CU1		
Depth (m):	5.50 - 6.00	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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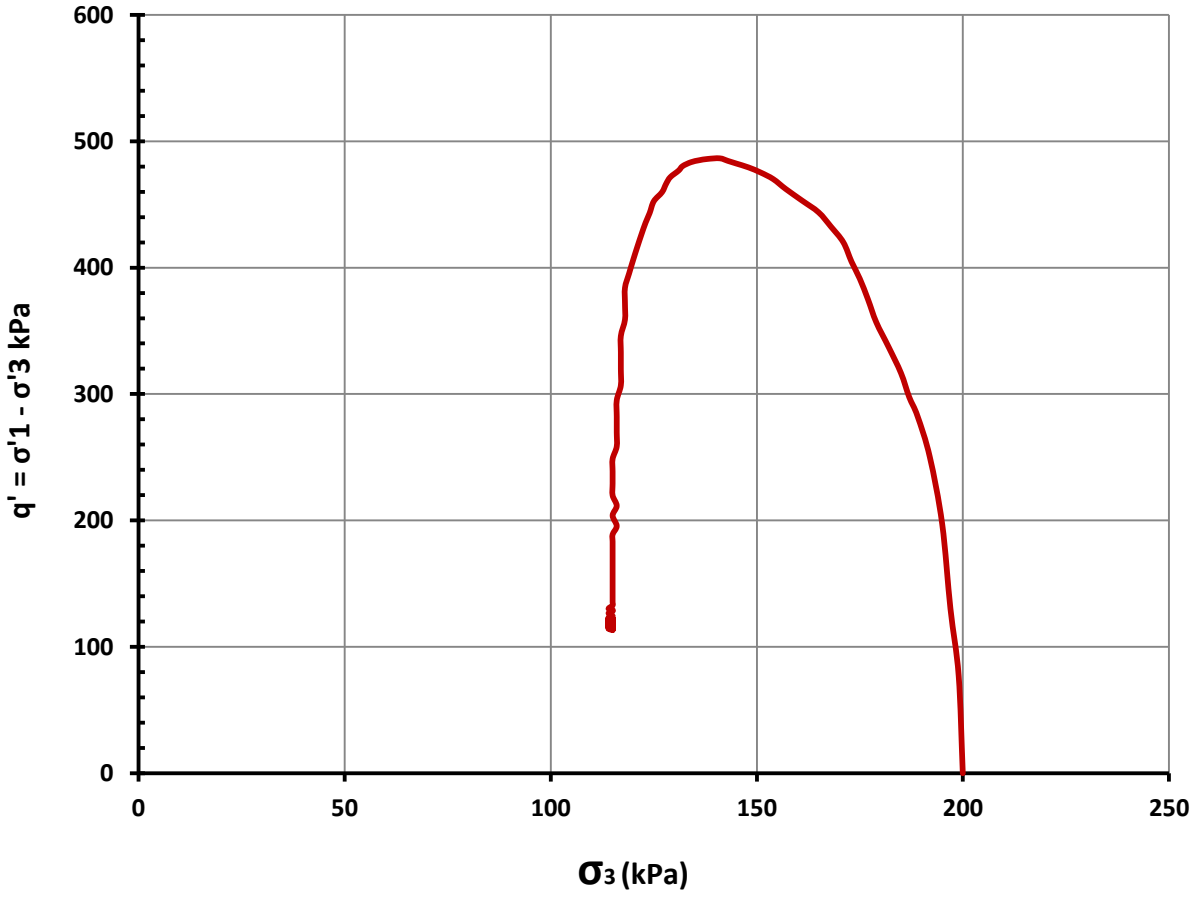
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	01/04/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu10	Lab:	EPLab
Sample ID:	CPTu10_C_CU1		
Depth (m):	5.50 - 6.00	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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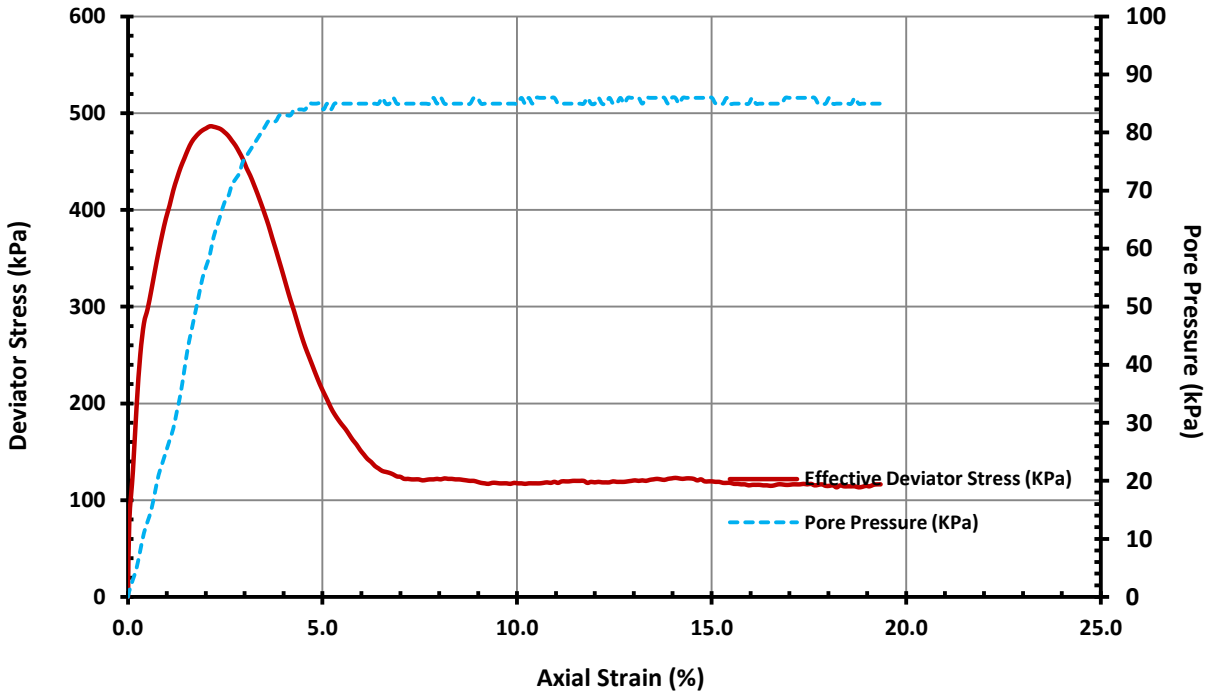
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	01/04/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu10	Lab:	EPLab
Sample ID:	CPTu10_C_CU1		
Depth (m):	5.50 - 6.00	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	200	0	59	627	141	4.45	486	2.10

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SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	01/04/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu10	Lab:	EPLab
Sample ID:	CPTu10_C_CU1		
Depth (m):	5.50 - 6.00	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: CPTu10 **Depth (m):** 5.50 - 6.00
Lab ID: CPTu10_C_CU1 **Date Tested:** 01/04/2025

Failure Mode: **Bulging**

Notes: **Insitu sample from shelby Tube**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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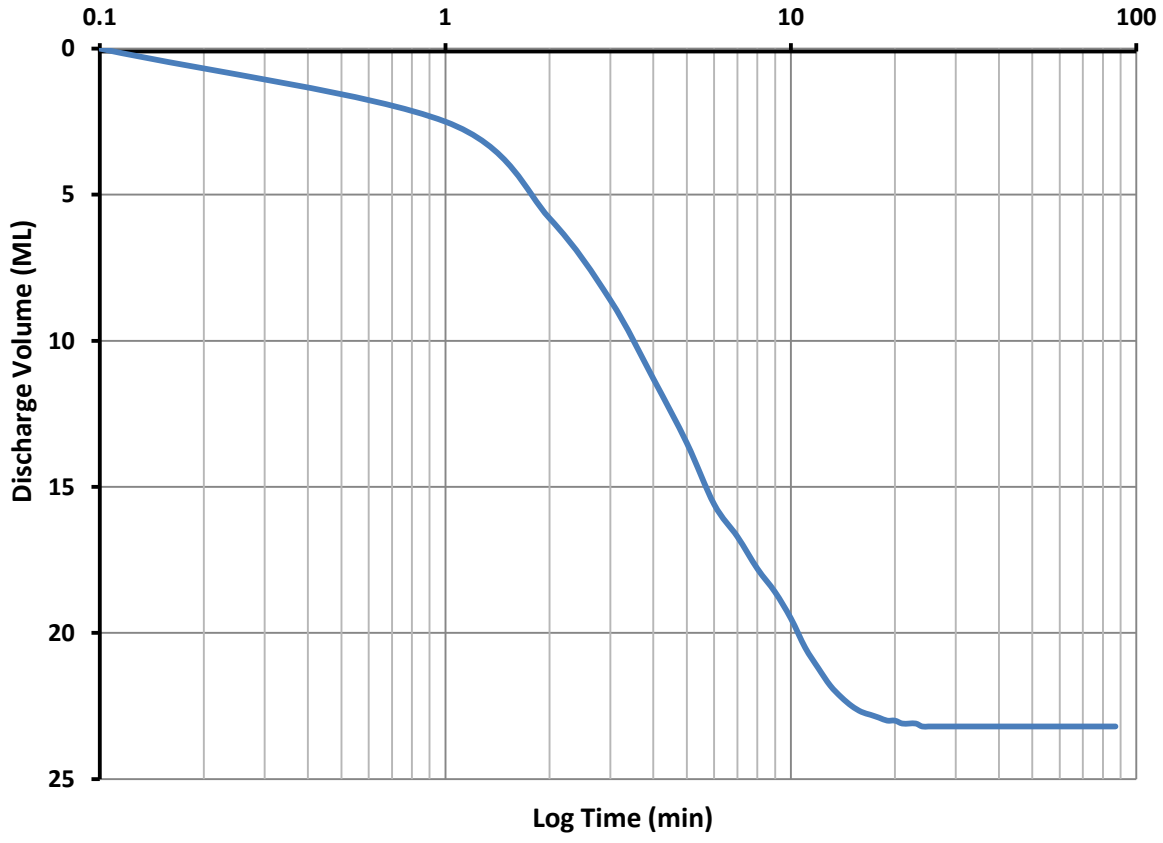
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	01/04/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu10	Lab:	EPLab
Sample ID:	CPTu10_C_CU1		
Depth (m):	5.50 - 6.00	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.052 based on t_{90}

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E-Precision Laboratory

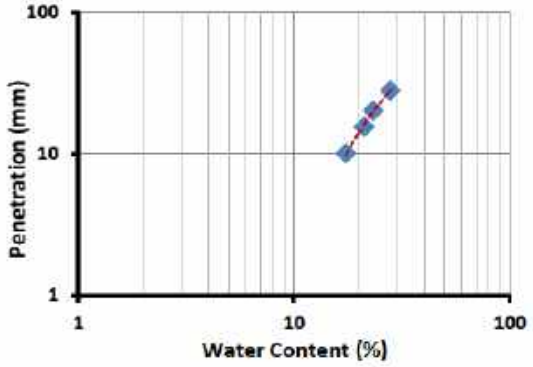
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

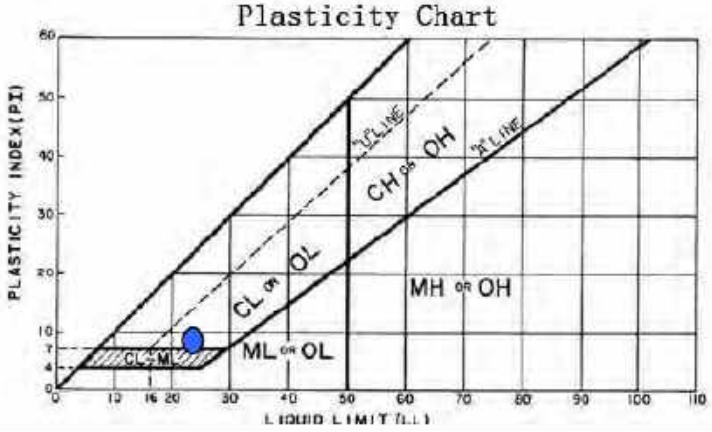
Client:	REC	Date Tested:	05/04/2025
Project:	KMS Testing 2025	Lab:	EPLAB
Sample No:	CPTu10	Job Number:	REC
Lab ID:	CPTu10_1_ATT		
Depth (m):	5.50 - 6.00	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	21.64
Plastic Limit (%):	12.91
Plasticity Index (%):	8.73
Liquidity Index (%):	-
Shrinkage Limit (%):	11.35
Linear Shrinkage(%):	4.51

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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

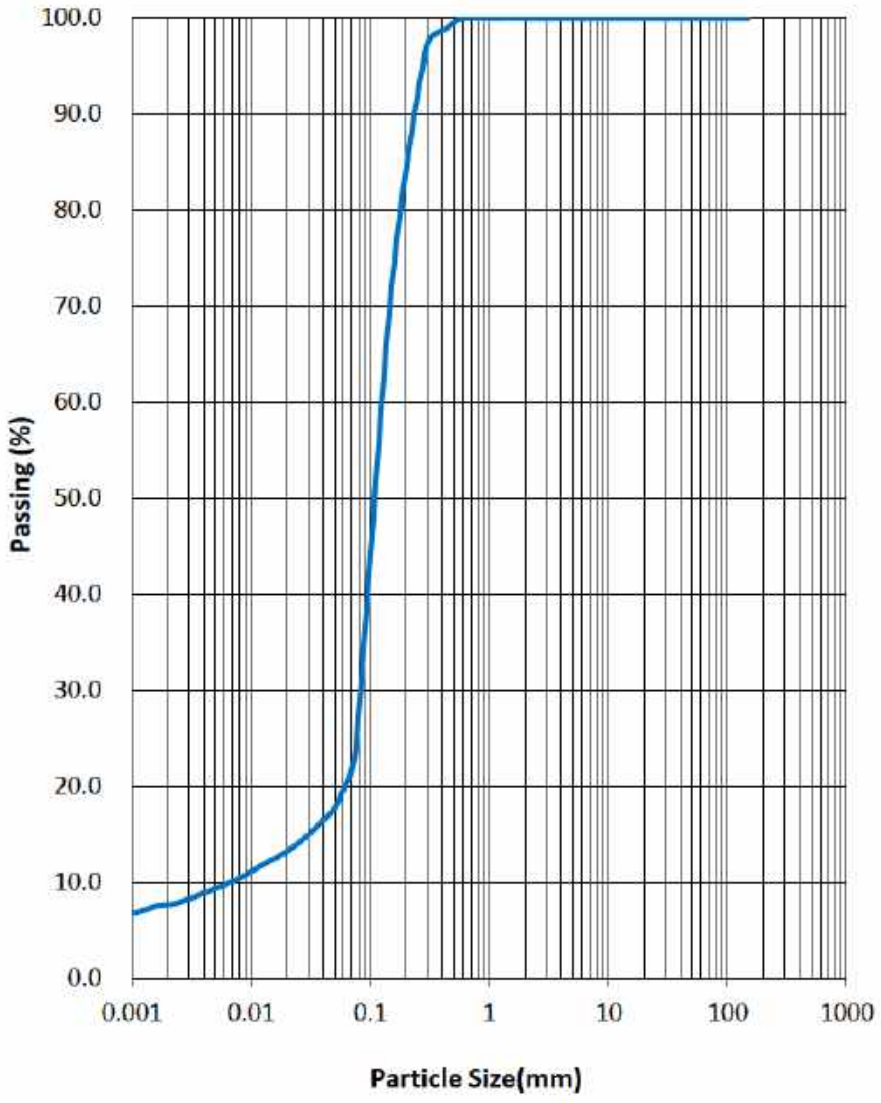
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3, 3.5.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	CPTu10	Depth (m):	5.50 - 6.00
Lab ID:	CPTu10_1_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.492
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	100.0
2.36	100.0
1.18	100.0
0.6	99.9
0.425	98.8
0.3	97.1
0.15	71.3
0.075	23.5
0.05728	19.2
0.04833	17.5
0.03449	15.6
0.02458	14.0
0.01678	12.7
0.01231	11.8
0.00876	10.7
0.00622	9.8
0.00441	9.1
0.00313	8.4
0.00222	7.7
0.00157	7.5
0.00128	7.1
0.00110	6.9
0.00094	6.8

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature: [redacted]

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

Appendix J

2025 Tailings Test Certificates

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EMERSON CLASS REPORT

Test Method: AS1289.3.8.1

Client:	REC	Date Tested:	03/04/2025
Project:	KMS Tails 2025	Lab:	EPLAB

Test Results

Sample ID	Class Number
L1S1	5
L2S1	5
L3S1	5

Notes: tested using process water @ 19deg

Samples tested as supplied by client

Samples supplied by the Client

Autho [redacted]

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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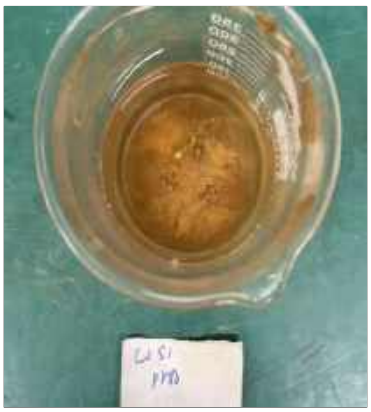
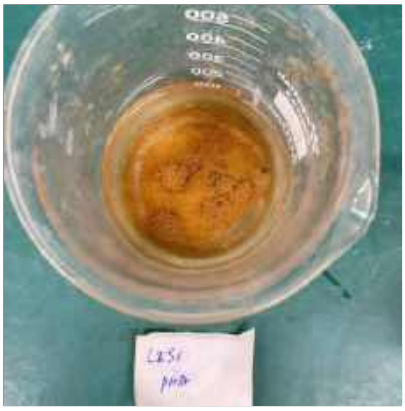
EMERSON CLASS REPORT

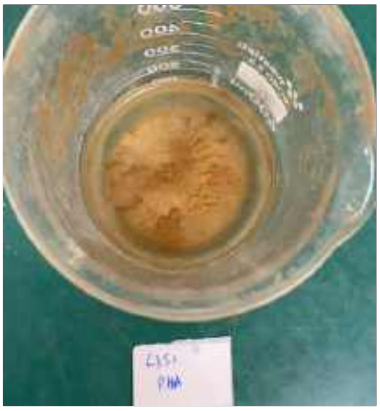
Test Method: AS1289.3.8.1

Client:	REC	Date Tested:	03/04/2025
Project:	KMS Tails 2025	Lab:	EPLAB

Photos







Notes: tested using Distilled water @ 19deg

Samples tested as supplied by client

Samples supplied by the Client

[redacted]

Authorised Signature:

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

FALLING HEAD PERMEABILITY TEST REPORT

Test Method: AS1289 6.7.2

Client:	REC	Date Tested:	18/03/2025
Project:	KMS Testing 2025	Date Reported:	01/04/2025
Lab:	EPLAB	EP Lab Job Number:	REC
Tested by:	Phil		
Checked by:	Phil		

Lab ID:	KMS_FH_01	KMS_FH_02	KMS_FH_03	
Client ID:	L1S1	L2S1	L3S1	
Sample ID:	-	-	-	
From Depth (m):	-	-	-	
To Depth (m):	-	-	-	
Sample Conditions:	Sample remolded to 95% MDD	Sample remolded to 95% MDD	Sample remolded to 95% MDD	
Surcharge Pressure (kPa):	25	25	25	
Initial Bulk Density (t/m³):	1.965	1.921	1.930	
Initial Moisture Content (%):	15.05	16.19	19.22	
Initial Dry Density (t/m³):	1.71	1.65	1.62	
Saturation (Skempton's B):	1.00	1.00	1.00	
K_{20} (m/s):	16.71×10^{-7}	8.23×10^{-7}	6.39×10^{-7}	

Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

[redacted]

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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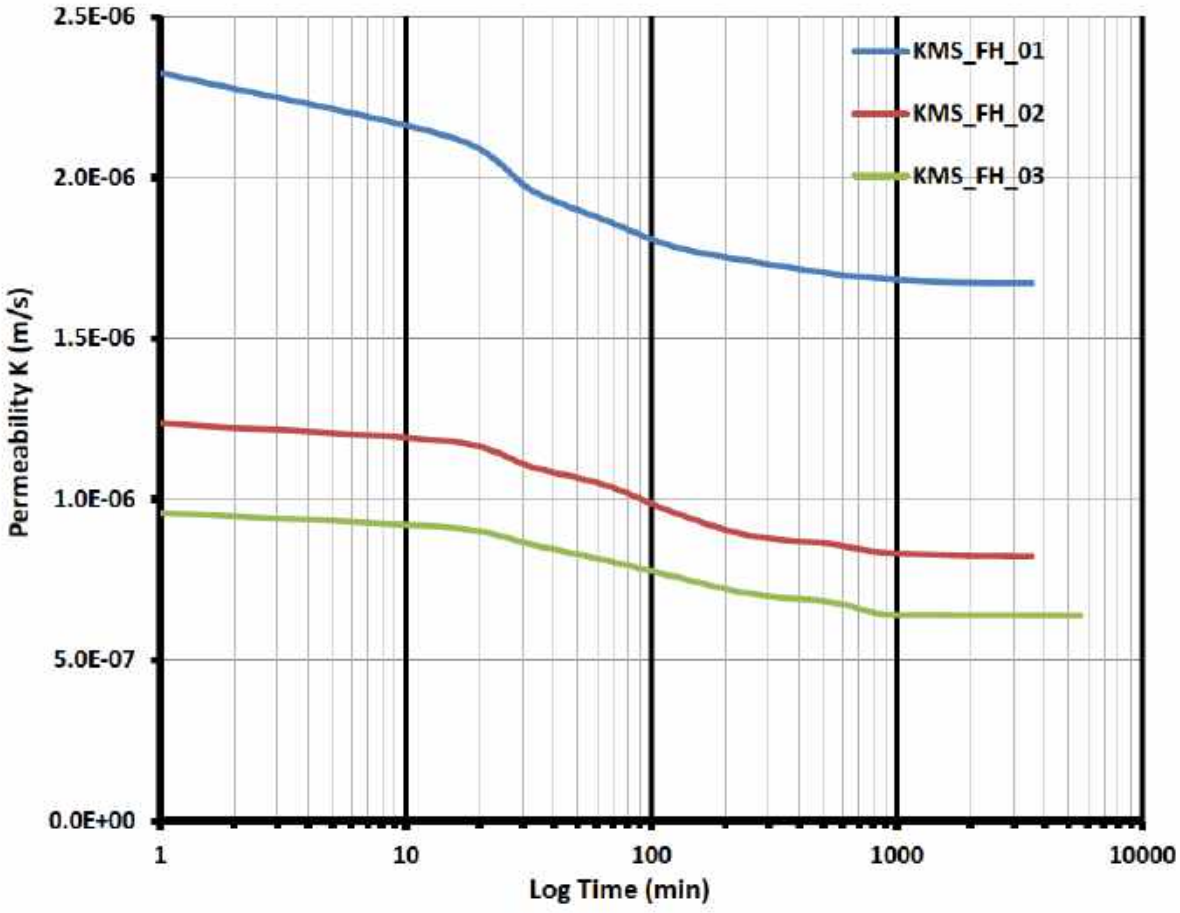
FALLING HEAD PERMEABILITY TEST REPORT

Test Method: AS1289 6.7.2

Client:	REC	Date Tested:	18/03/2025
Project:	KMS Testing 2025	Date Reported:	01/04/2025
Lab:	EPLAB	EP Lab Job Number:	REC



Notes:

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatory (Geotechnical Engineer): [redacted]

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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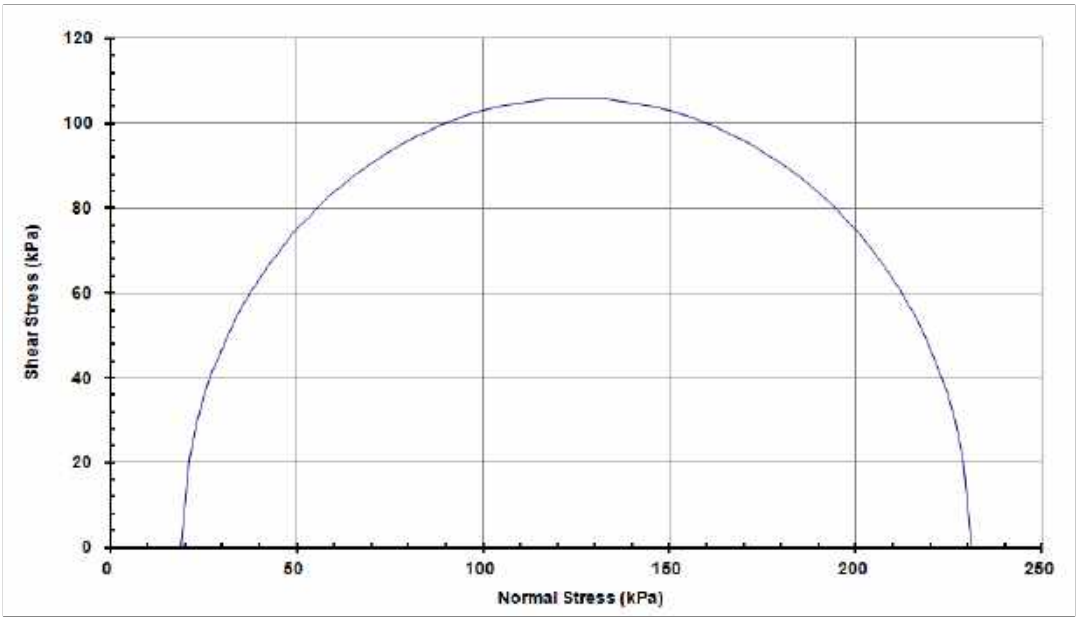
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC		Date Tested:	15/03/2025	
Project:	KMS Testing 2025		EP Lab Job Number:	REC	
Sample No:	L1S1		Lab:	EPLab	
Sample ID:	L1S1_A_CU1		Issue Date:	15/03/2025	
Depth (m):	-		Room Temperature at Test:	~ 18°C	

Tested by:	Phil Li	Initial Moisture (%):	15.11	Strain Rate (mm/min):	0.007
Height (mm):	125.32	Final Moisture (%):	17.24	Skempton's (B):	1
Diameter (mm):	62.02	Bulk Density (t/m³):	1.97	Initial Void Ratio (e_i):	-
L/D Ratio:	2.02	Dry Density (t/m³):	1.71	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

Accredited for compliance with ISO/IEC 17025-TESTING

NATA: 19078

[redacted]

Authorised Signatory (Geotechnical Engineer):

NATA

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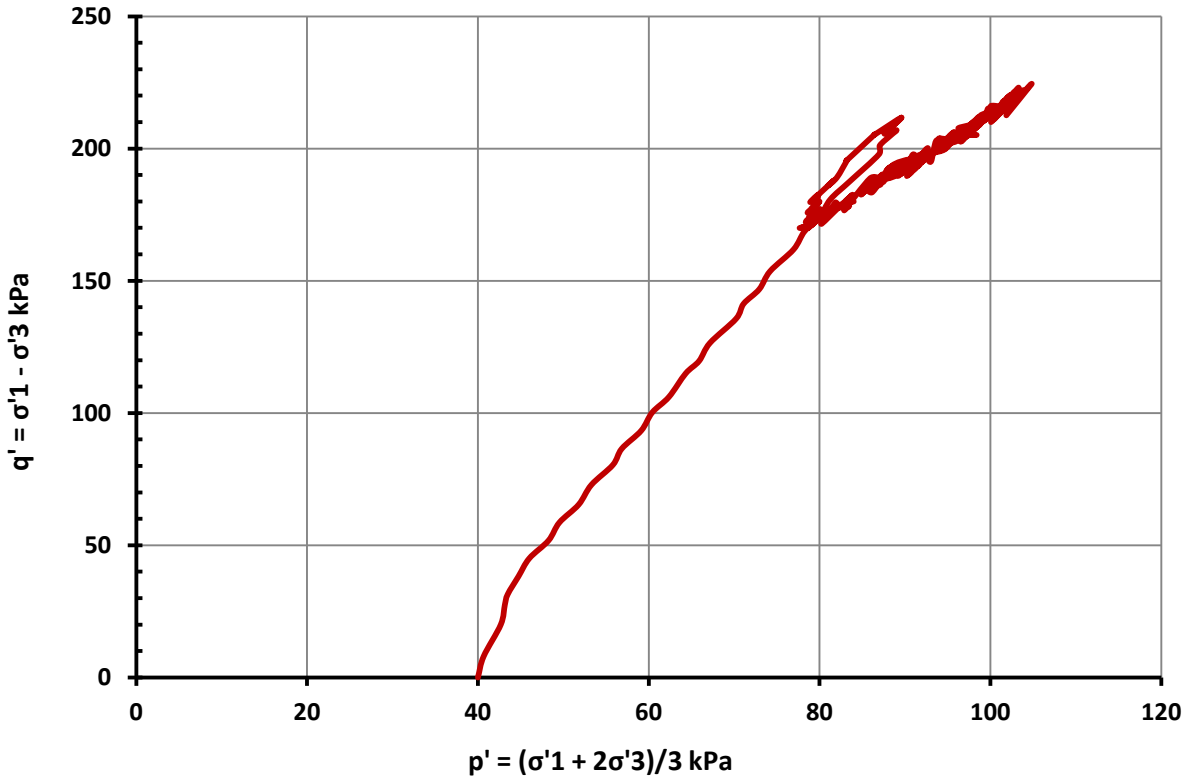
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L1S1	Lab:	EPLab
Sample ID:	L1S1_A_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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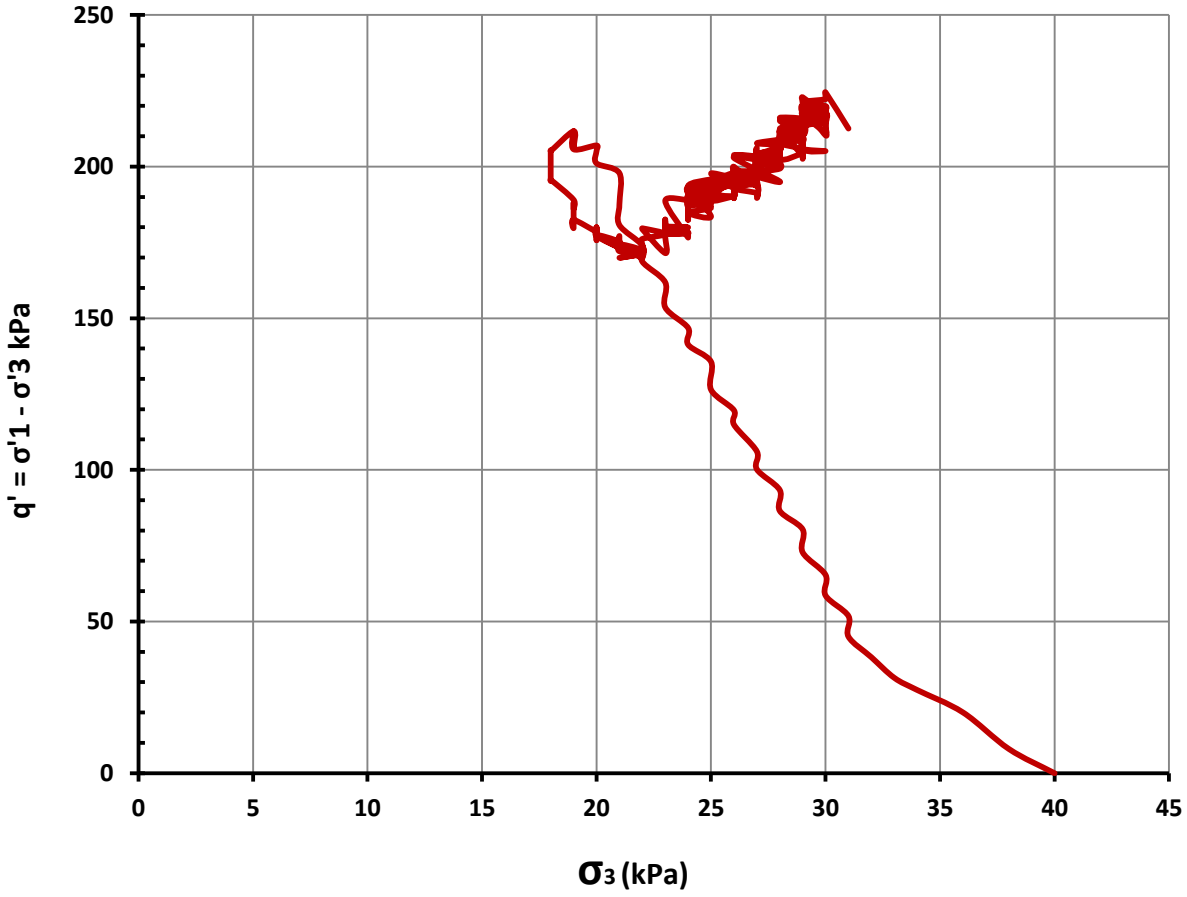
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L1S1	Lab:	EPLab
Sample ID:	L1S1_A_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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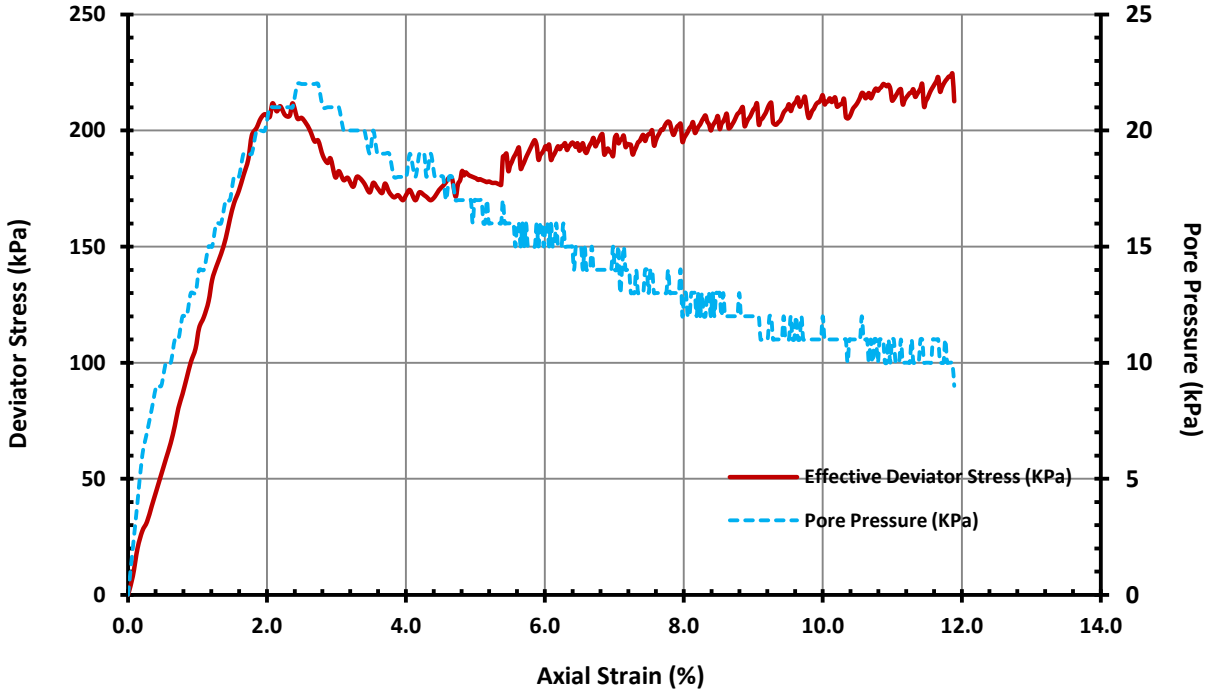
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L1S1	Lab:	EPLab
Sample ID:	L1S1_A_CU1		
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			$\sigma'_1 - \sigma'_3$	Strain (%)
				σ'_1	σ'_3	σ'_1 / σ'_3		
1	40	0	21	231	19	12.14	212	2.08

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SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L1S1	Lab:	EPLab
Sample ID:	L1S1_A_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: L1S1 **Depth (m):** -

Lab ID: L1S1_A_CU1 **Date Tested:** 15/03/2025

Failure Mode: **Bulging**

Notes: **Remolded to 95% MDD @ OMC**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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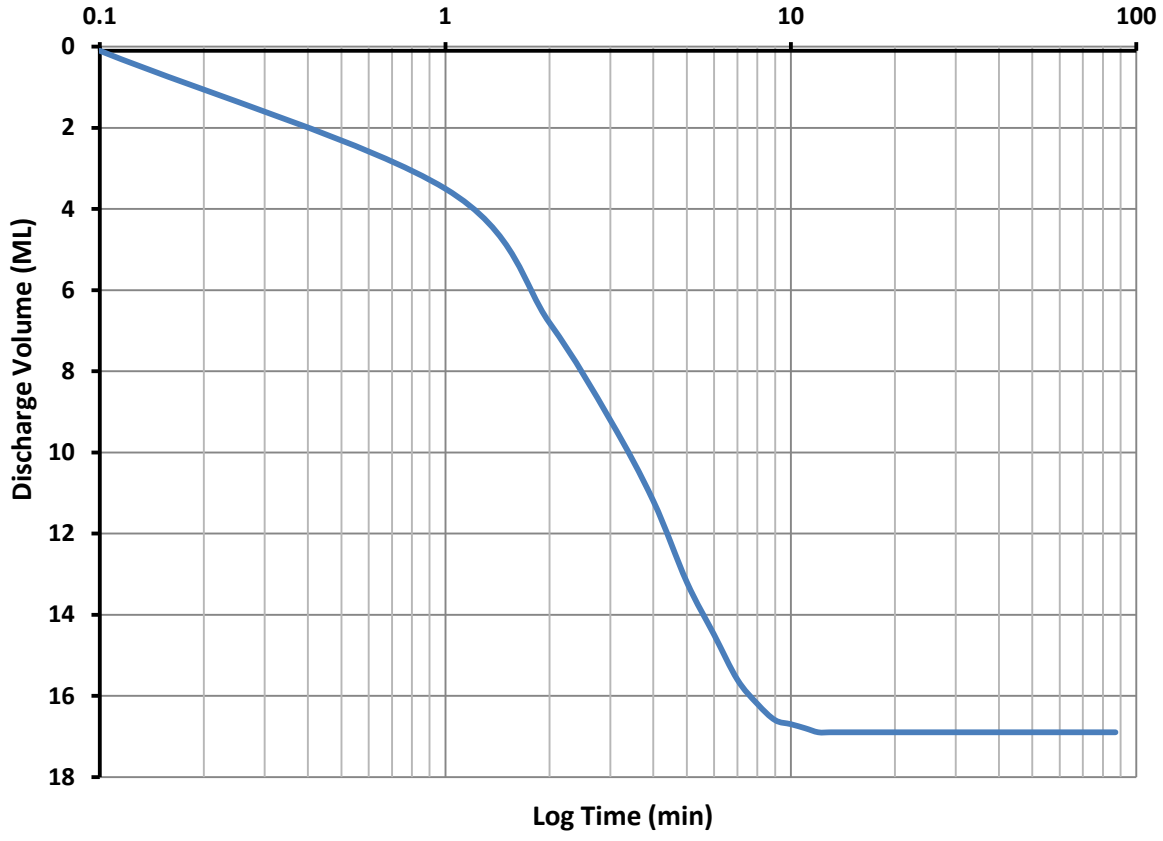
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L1S1	Lab:	EPLab
Sample ID:	L1S1_A_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.458 based on t_{90}

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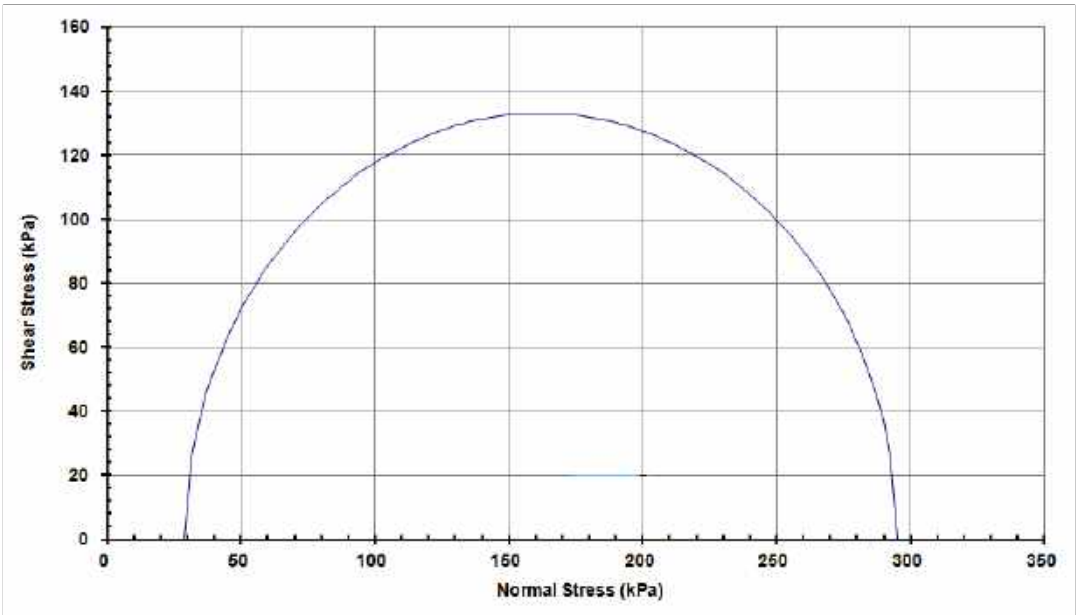
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L1S1	Lab:	EPLab
Sample ID:	L1S1_B_CU1	Issue Date:	15/03/2025
Depth (m):	-	Room Temperature at Test:	~ 18°C

Tested by:	Phil Li	Initial Moisture (%):	15.76	Strain Rate (mm/min):	0.007
Height (mm):	125.41	Final Moisture (%):	16.44	Skempton's (B):	1
Diameter (mm):	61.85	Bulk Density (t/m³):	1.98	Initial Void Ratio (e_i):	-
L/D Ratio:	2.03	Dry Density (t/m³):	1.71	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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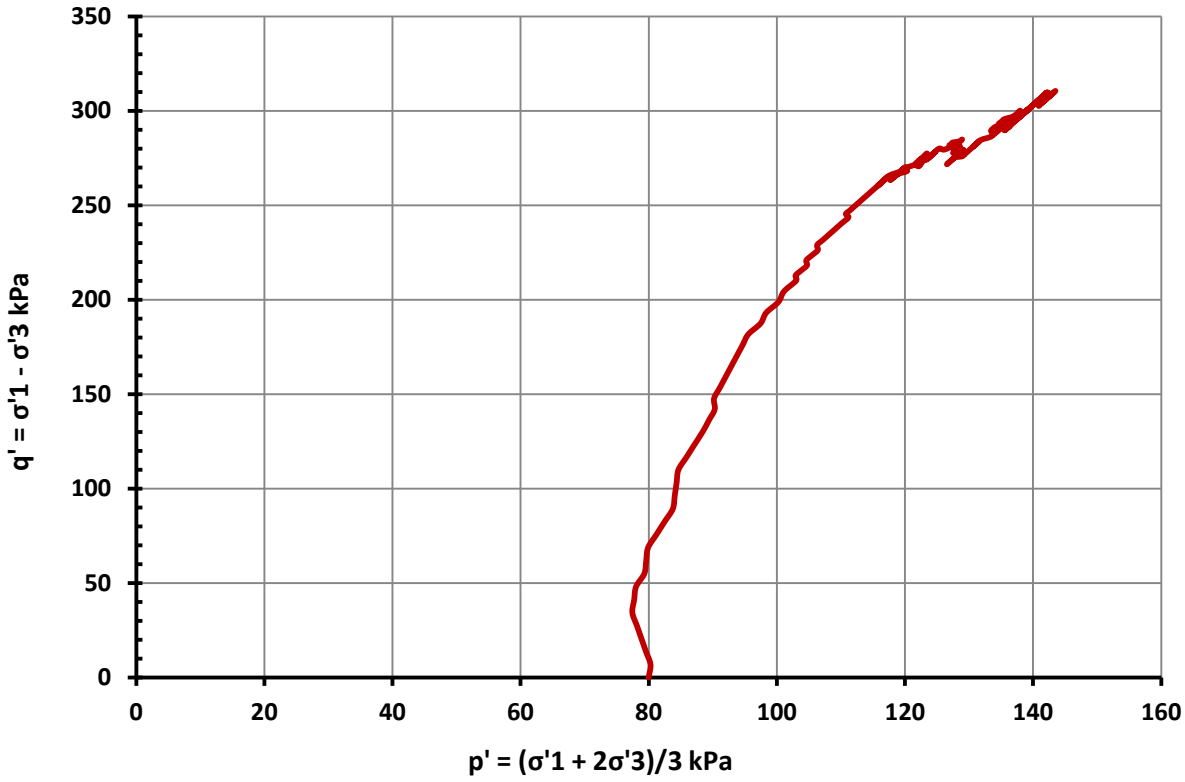
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L1S1	Lab:	EPLab
Sample ID:	L1S1_B_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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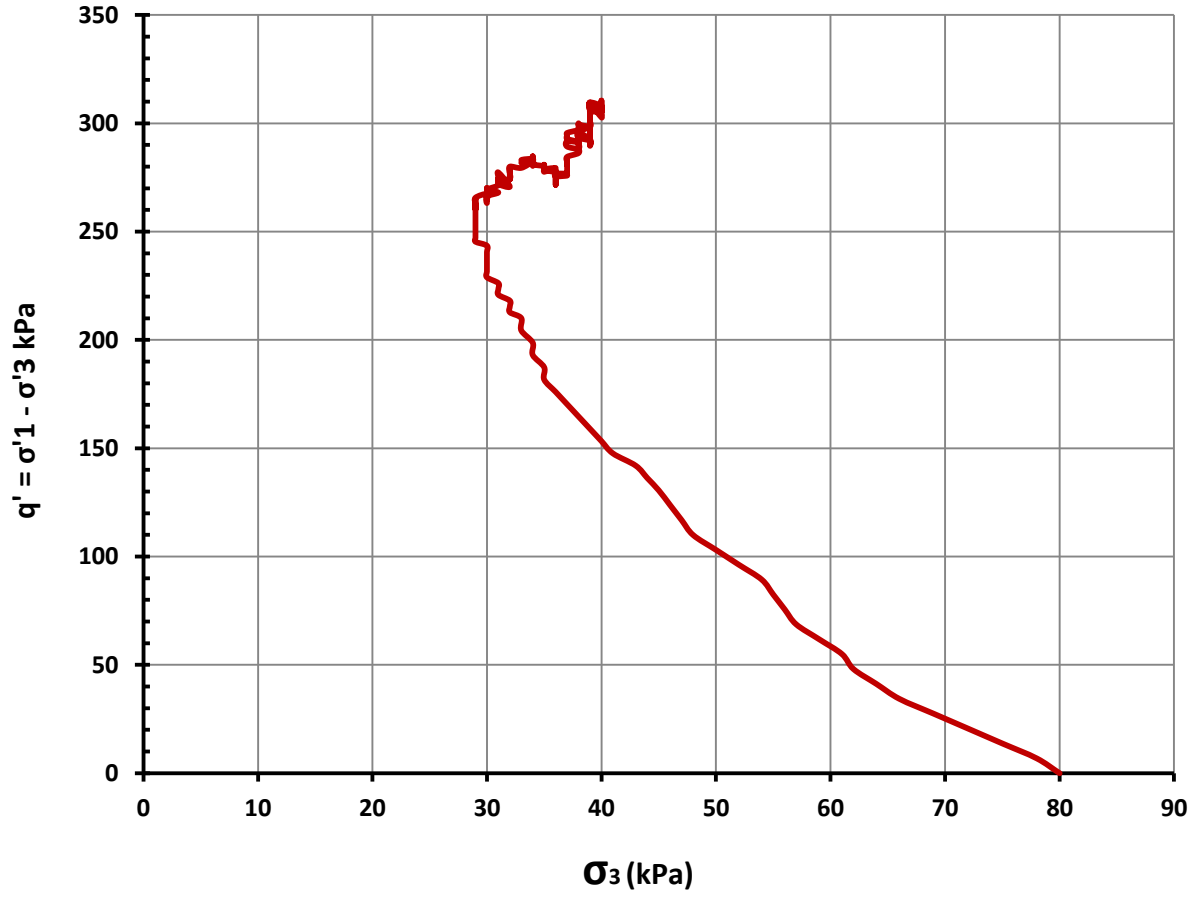
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L1S1	Lab:	EPLab
Sample ID:	L1S1_B_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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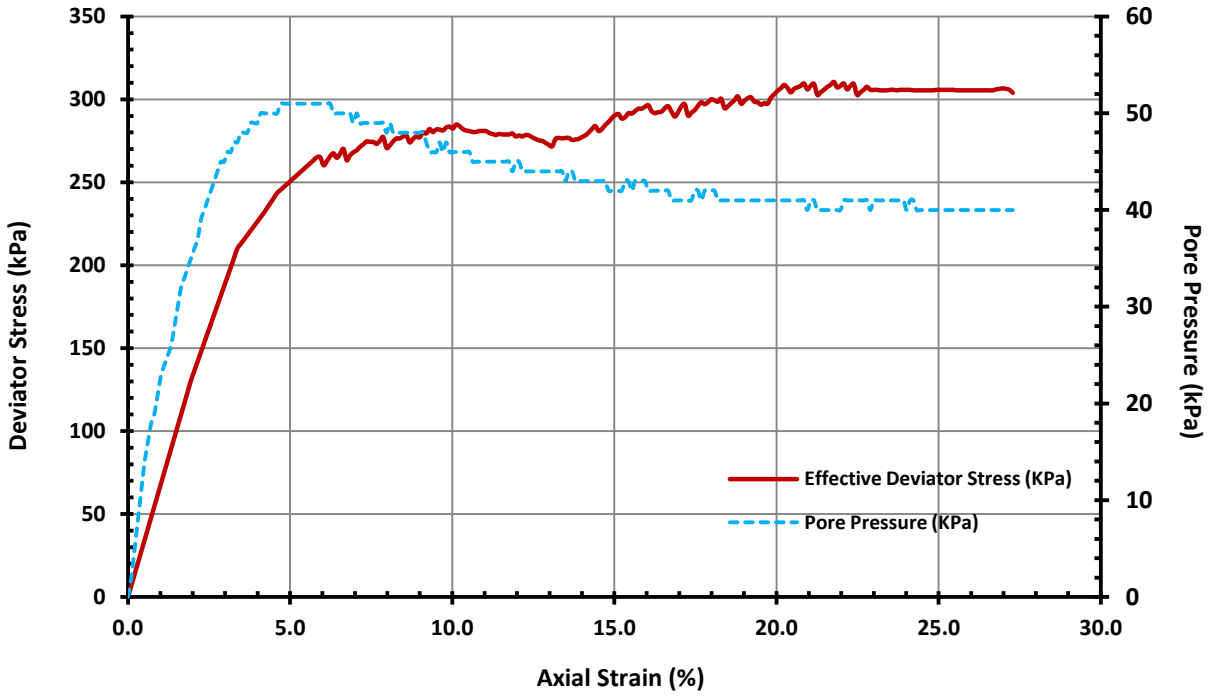
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L1S1	Lab:	EPLab
Sample ID:	L1S1_B_CU1		
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			$\sigma'_1 - \sigma'_3$	Strain (%)
				σ'_1	σ'_3	σ'_1 / σ'_3		
1	80	0	51	295	29	10.16	266	6.23

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SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L1S1	Lab:	EPLab
Sample ID:	L1S1_B_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID:	**L1S1**	**Depth (m):**	**-**
Lab ID:	**L1S1_B_CU1**	**Date Tested:**	**15/03/2025**

Failure Mode: **Bulging**

Notes: **Remolded to 95% MDD @ OMC**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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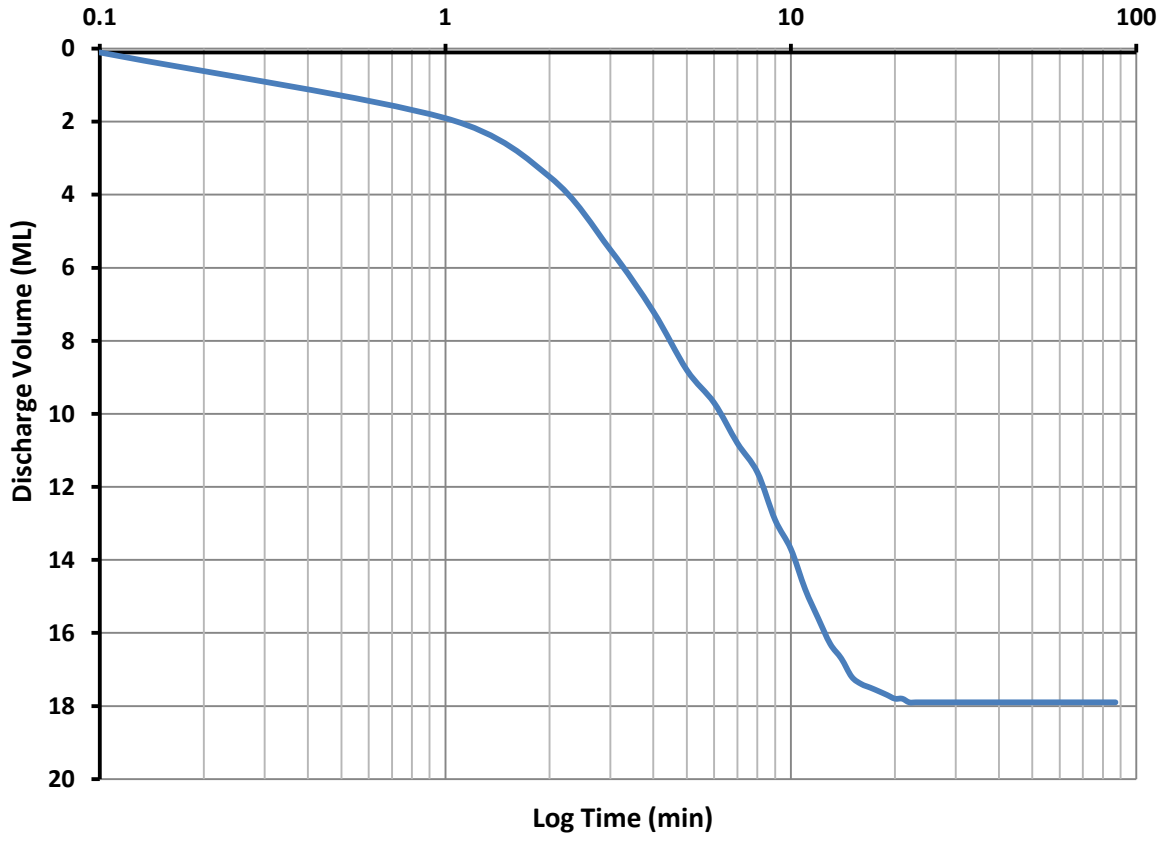
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L1S1	Lab:	EPLab
Sample ID:	L1S1_B_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.282 based on t_{90}

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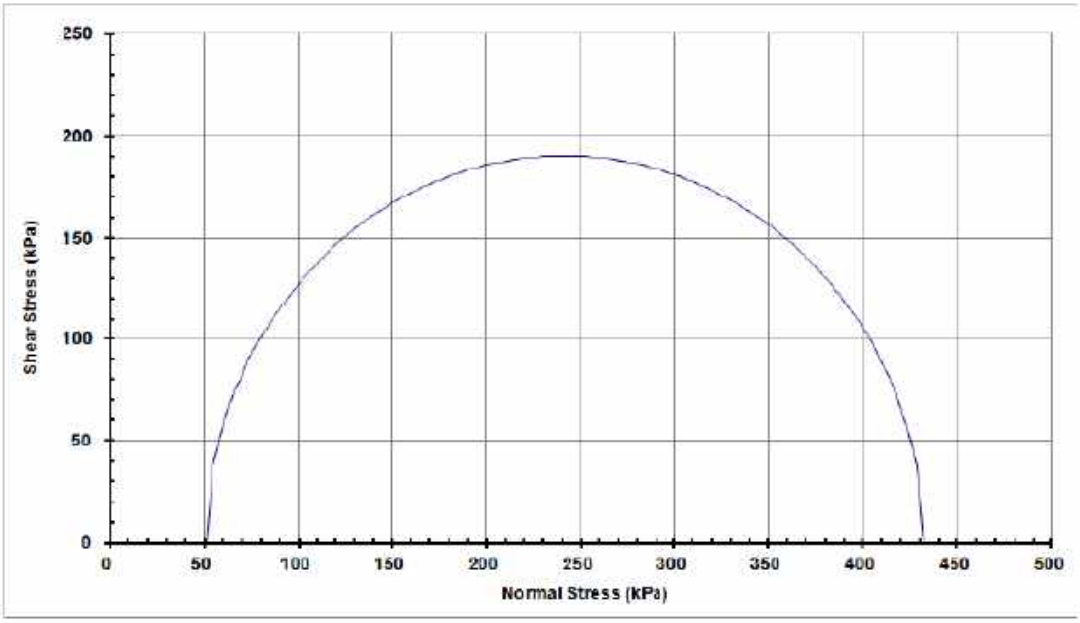
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L1S1	Lab:	EPLab
Sample ID:	L1S1_C_CU1	Issue Date:	15/03/2025
Depth (m):	-	Room Temperature at Test:	~ 18°C

Tested by:	Phil Li	Initial Moisture (%):	15.01	Strain Rate (mm/min):	0.007
Height (mm):	119.67	Final Moisture (%):	18.45	Skempton's (B):	1
Diameter (mm):	61.73	Bulk Density (t/m³):	1.97	Initial Void Ratio (e_i):	-
L/D Ratio:	1.94	Dry Density (t/m³):	1.71	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

Accredited for compliance with ISO/IEC 17025-TESTING

NATA: 19078

[redacted]

Authorised Signatory (Geotechnical Engineer):

NATA ACCREDITATION NO. 19078

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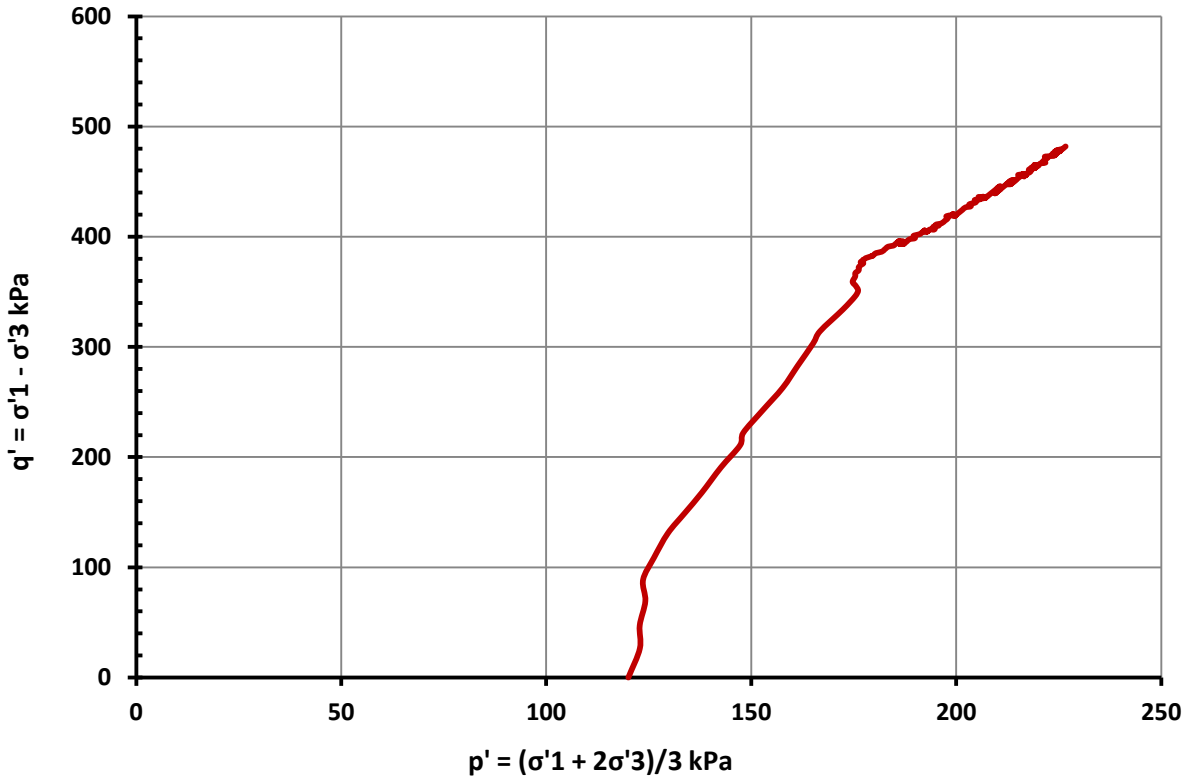
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L1S1	Lab:	EPLab
Sample ID:	L1S1_C_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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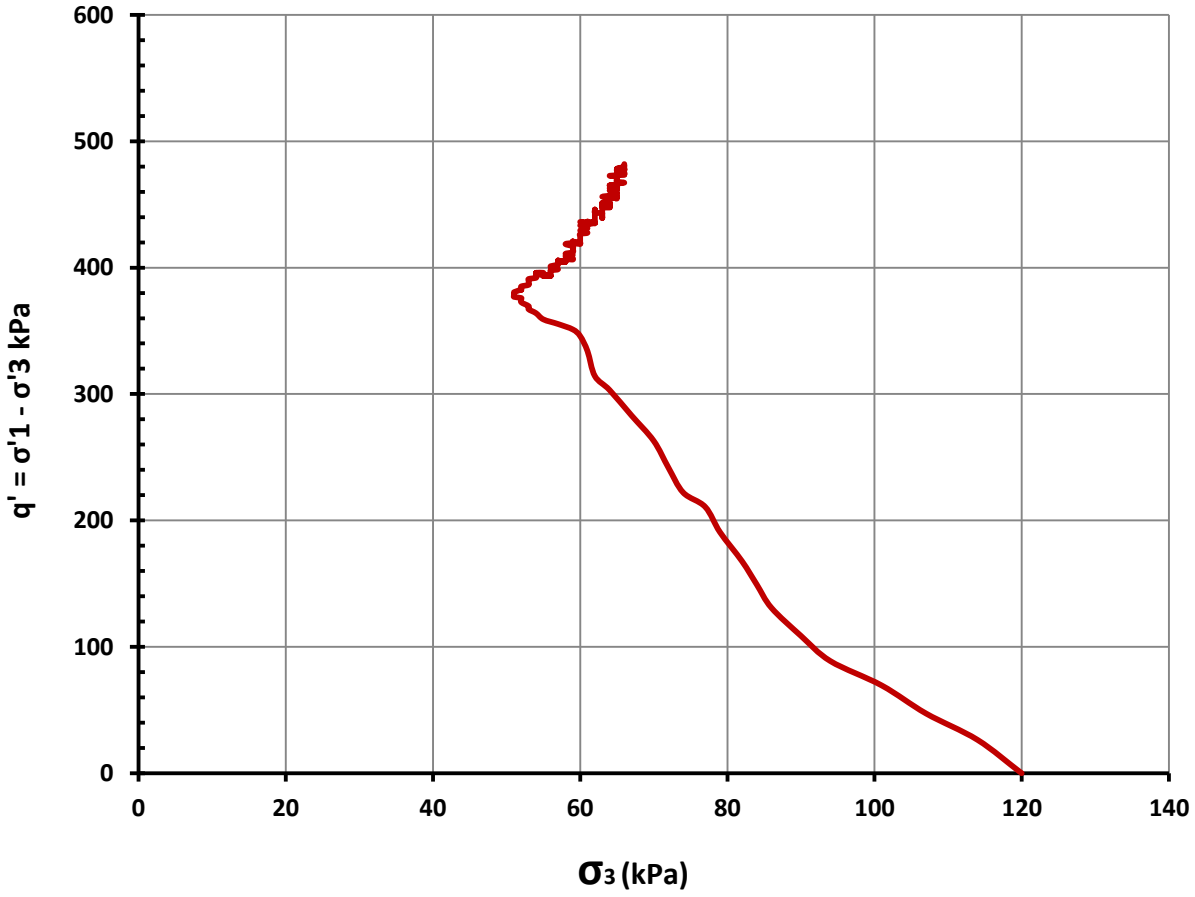
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L1S1	Lab:	EPLab
Sample ID:	L1S1_C_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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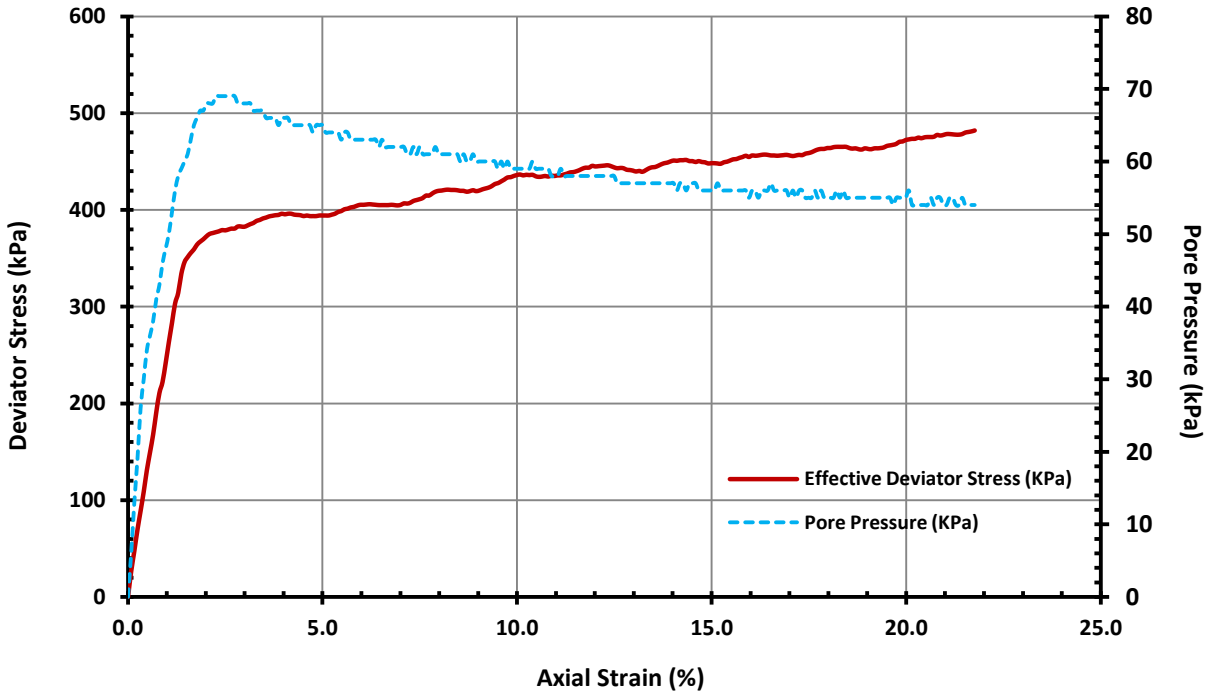
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L1S1	Lab:	EPLab
Sample ID:	L1S1_C_CU1		
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	120	0	69	432	51	8.46	381	2.74

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SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L1S1	Lab:	EPLab
Sample ID:	L1S1_C_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: L1S1 **Depth (m):** -

Lab ID: L1S1_C_CU1 **Date Tested:** 15/03/2025

Failure Mode: **Bulging**

Notes: **Remolded to 95% MDD @ OMC**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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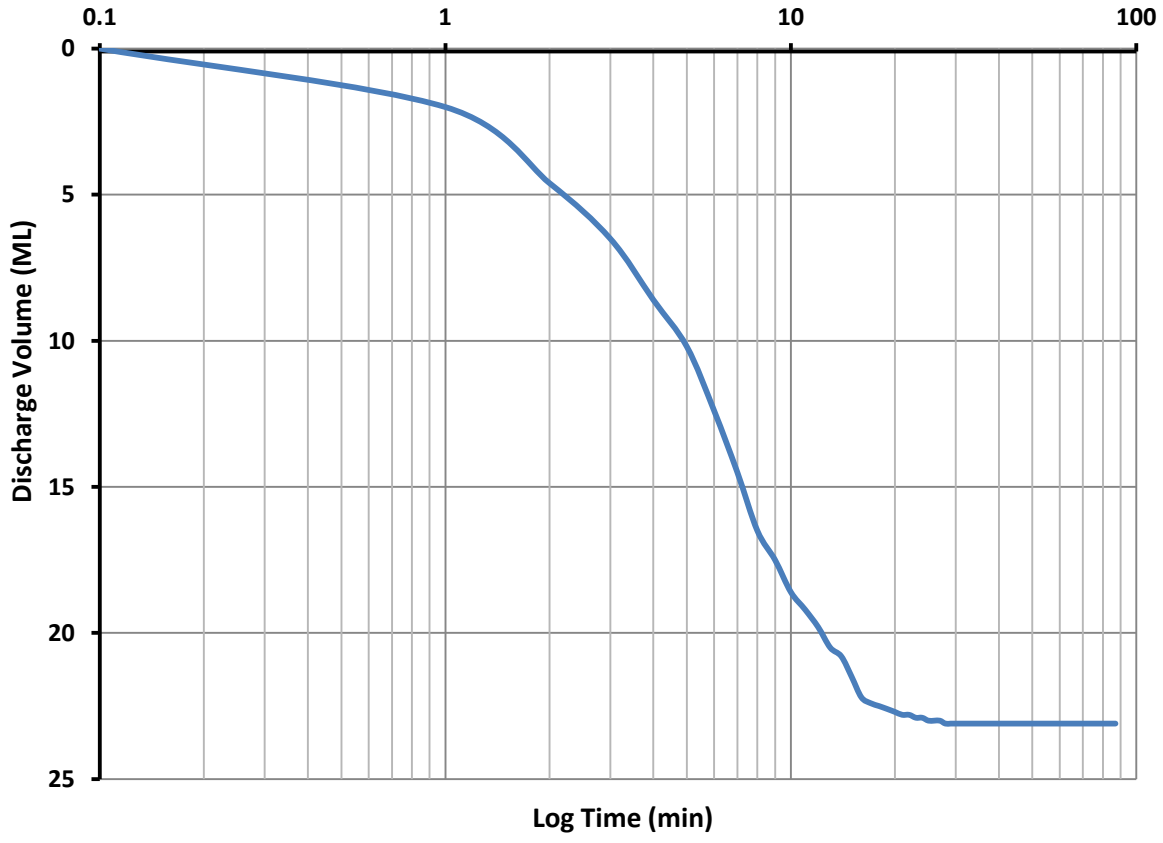
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L1S1	Lab:	EPLab
Sample ID:	L1S1_C_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.209 based on t_{90}

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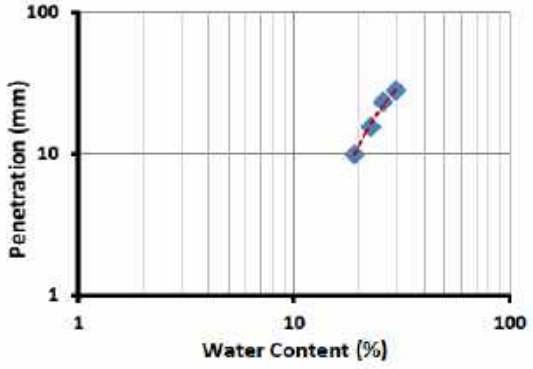
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

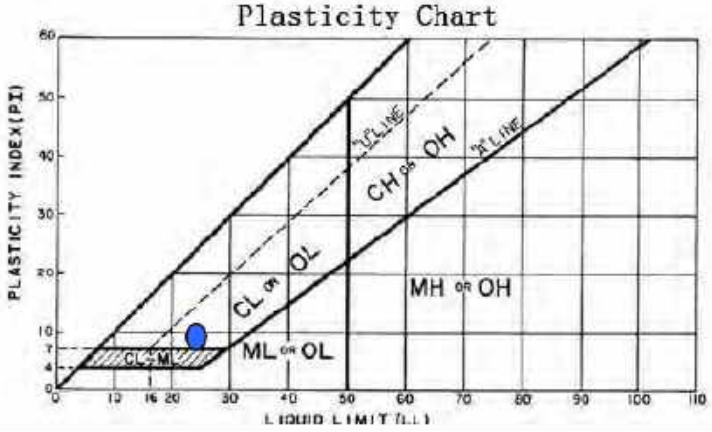
Client:	REC	Date Tested:	03/04/2025
Project:	KMS Testing 2025	Lab:	EPLAB
Sample No:	L1S1	Job Number:	REC
Lab ID:	L1S1_ATT		
Depth (m):	-	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	23.15
Plastic Limit (%):	14.64
Plasticity Index (%):	8.51
Liquidity Index (%):	-
Shrinkage Limit (%):	12.84
Linear Shrinkage(%):	4.13

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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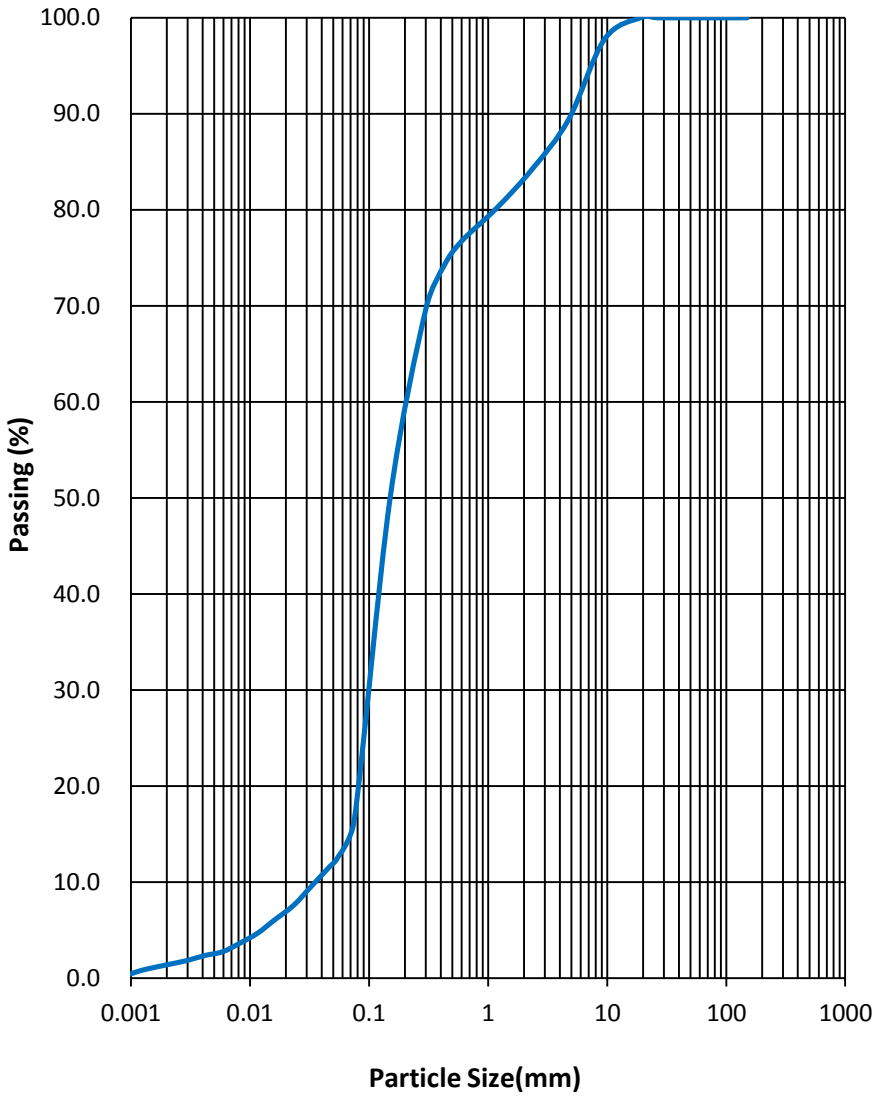
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3, 3.5.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L1S1	Depth (m):	-
Lab ID:	L1S1_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.776
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	97.8
4.75	89.4
2.36	84.3
1.18	80.2
0.6	76.8
0.425	74.1
0.3	69.7
0.15	49.9
0.075	16.4
0.05446	12.5
0.04578	11.5
0.03265	9.5
0.02325	7.6
0.01590	6.0
0.01167	4.7
0.00828	3.7
0.00588	2.7
0.00417	2.4
0.00295	1.8
0.00209	1.4
0.00148	1.0
0.00121	0.8
0.00104	0.5
0.00089	0.3

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature: [redacted]

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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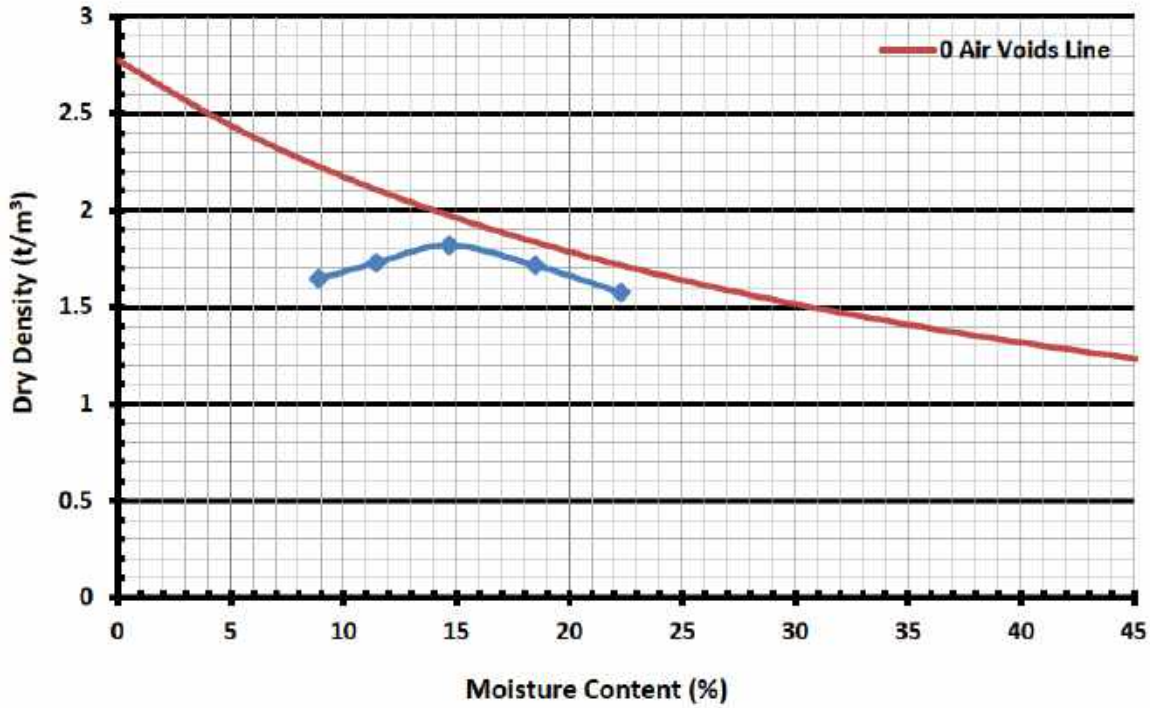
MOISTURE DENSITY RELATIONSHIP REPORT

Test Method: AS1289.5.1.1

Client:	REC	Date Tested:	12/03/2025
Project:	KMS Testing 2025	Lab:	EPLAB
Sample No:	L1S1	Job Number:	REC
Lab ID:	L1S1_SMDD		
Depth (m):	-	Room Temperature at Test:	20°C
Checked by:	Phil	Sample Description:	Tested in Mould A
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Results

Maximum Size (mm):	19.00	**Maximum Dry Density (t/m³):**	**1.800**
Oversize dry (%):	0.00	**Optimum Moisture Content (%):**	**15.00**



Notes: ** Particle density* *2.776 t/m³*

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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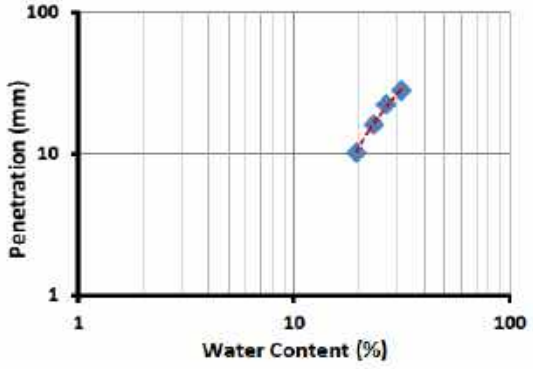
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

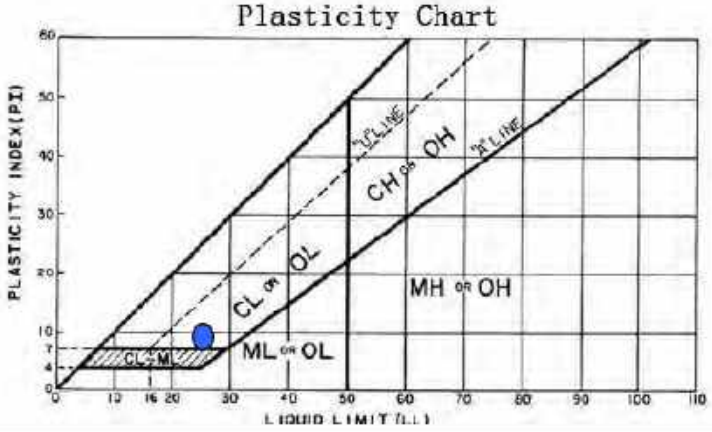
Client:	REC	Date Tested:	03/04/2025
Project:	KMS Testing 2025	Lab:	EPLAB
Sample No:	L1S2	Job Number:	REC
Lab ID:	L1S2_ATT		
Depth (m):	-	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	23.89
Plastic Limit (%):	13.92
Plasticity Index (%):	9.96
Liquidity Index (%):	-
Shrinkage Limit (%):	12.00
Linear Shrinkage(%):	4.98

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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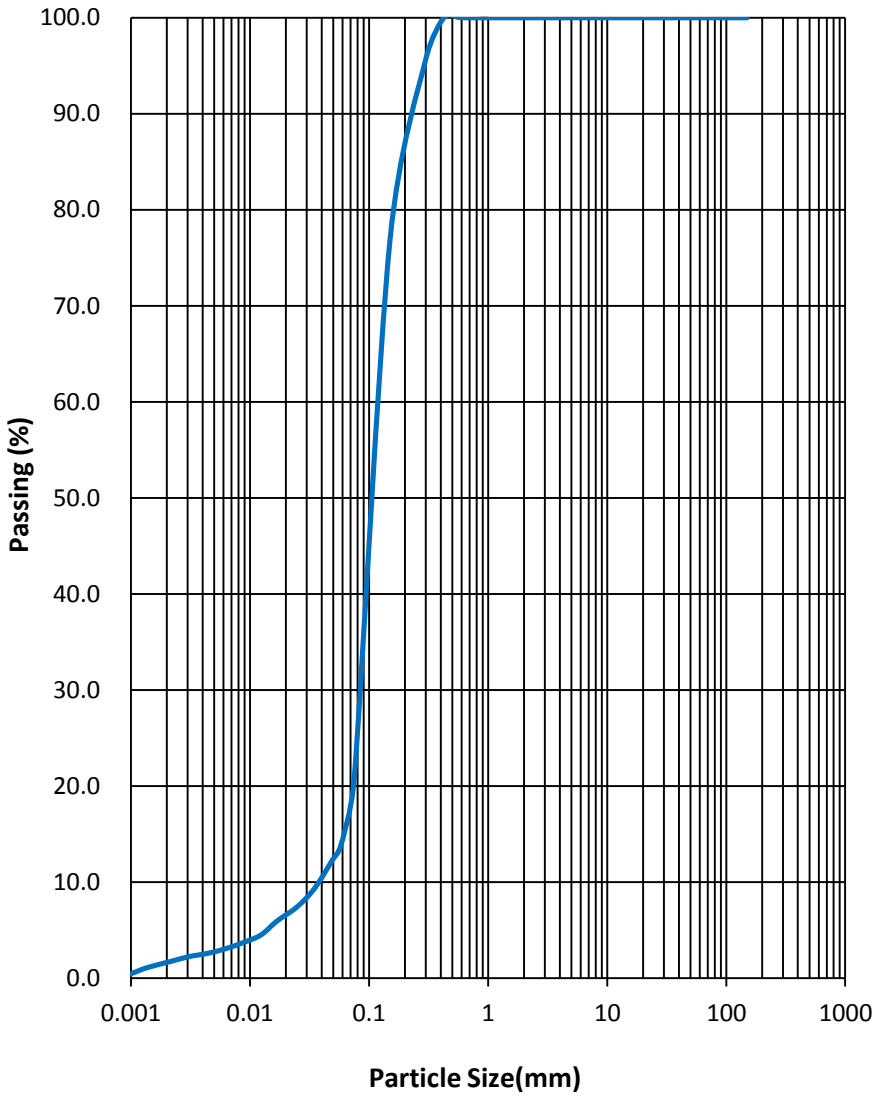
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3, 3.5.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L1S2	Depth (m):	-
Lab ID:	L1S2_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.589
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	100.0
2.36	100.0
1.18	100.0
0.6	100.0
0.425	100.0
0.3	95.7
0.15	76.9
0.075	20.7
0.05791	13.8
0.04873	12.2
0.03476	9.3
0.02472	7.4
0.01688	5.9
0.01239	4.5
0.00878	3.7
0.00622	3.1
0.00441	2.6
0.00312	2.2
0.00221	1.8
0.00157	1.3
0.00128	1.0
0.00110	0.6
0.00094	0.3

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature: [redacted]

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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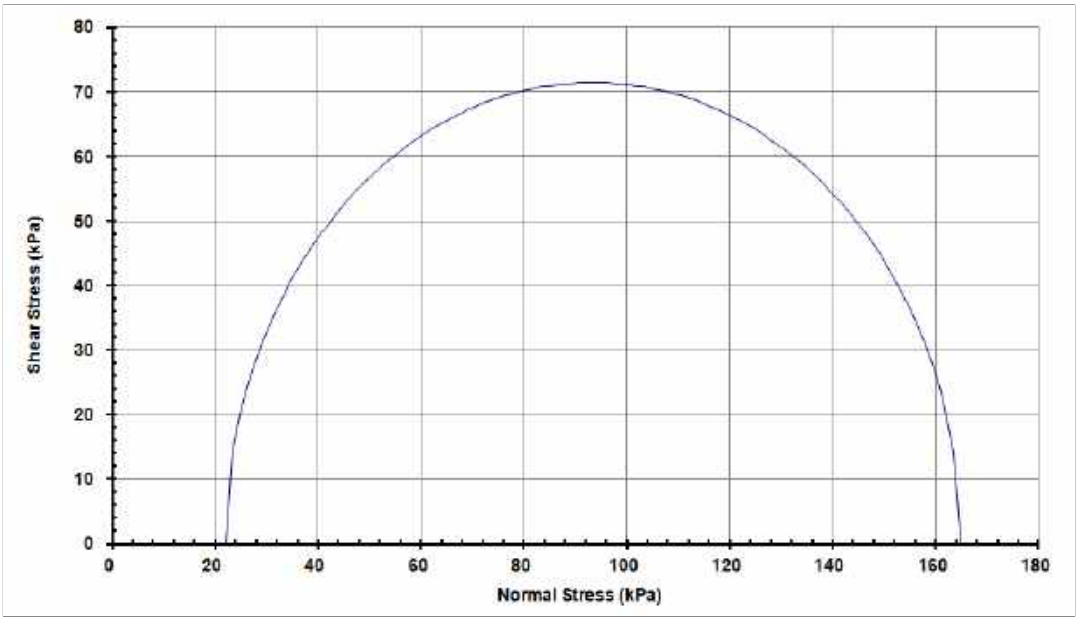
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S1	Lab:	EPLab
Sample ID:	L2S1_A_CU1	Issue Date:	15/03/2025
Depth (m):	-	Room Temperature at Test:	~ 18°C

Tested by:	Phil Li	Initial Moisture (%):	16.29	Strain Rate (mm/min):	0.007
Height (mm):	122.31	Final Moisture (%):	17.73	Skempton's (B):	1
Diameter (mm):	61.50	Bulk Density (t/m³):	1.93	Initial Void Ratio (e_i):	-
L/D Ratio:	1.99	Dry Density (t/m³):	1.66	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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Authorised Signatory (Geotechnical Engineer): [redacted]

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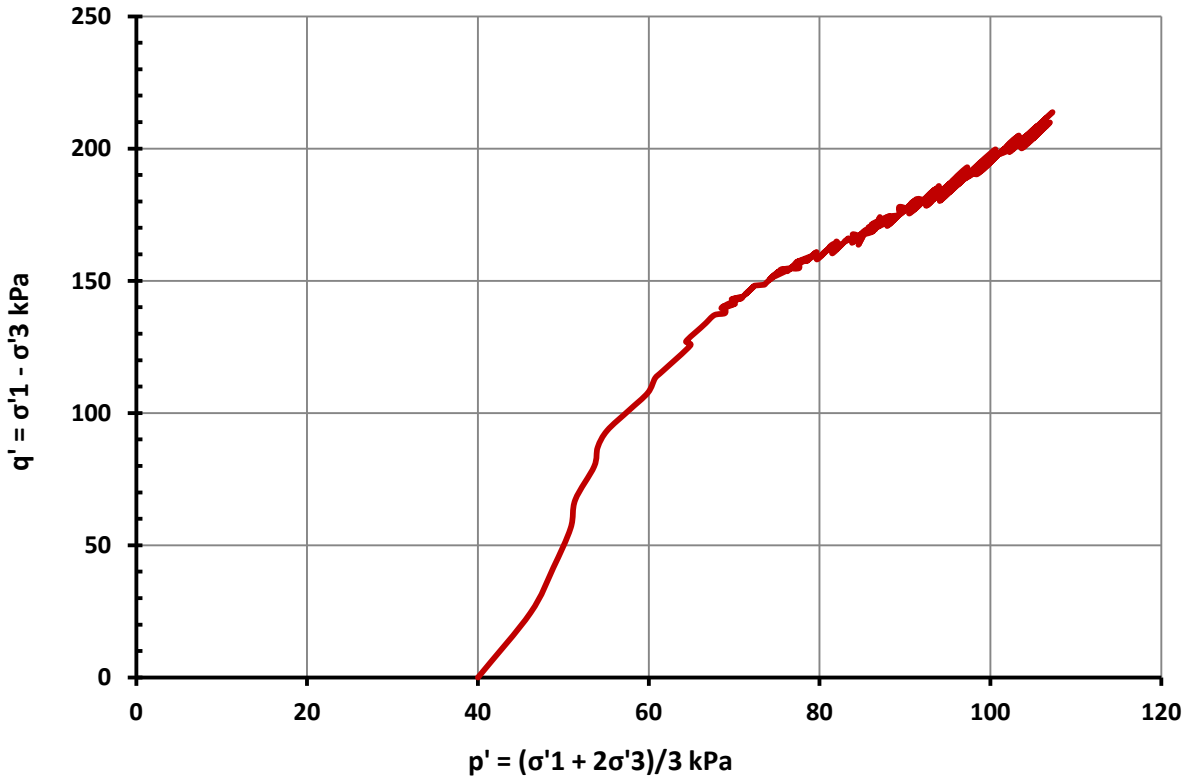
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S1	Lab:	EPLab
Sample ID:	L2S1_A_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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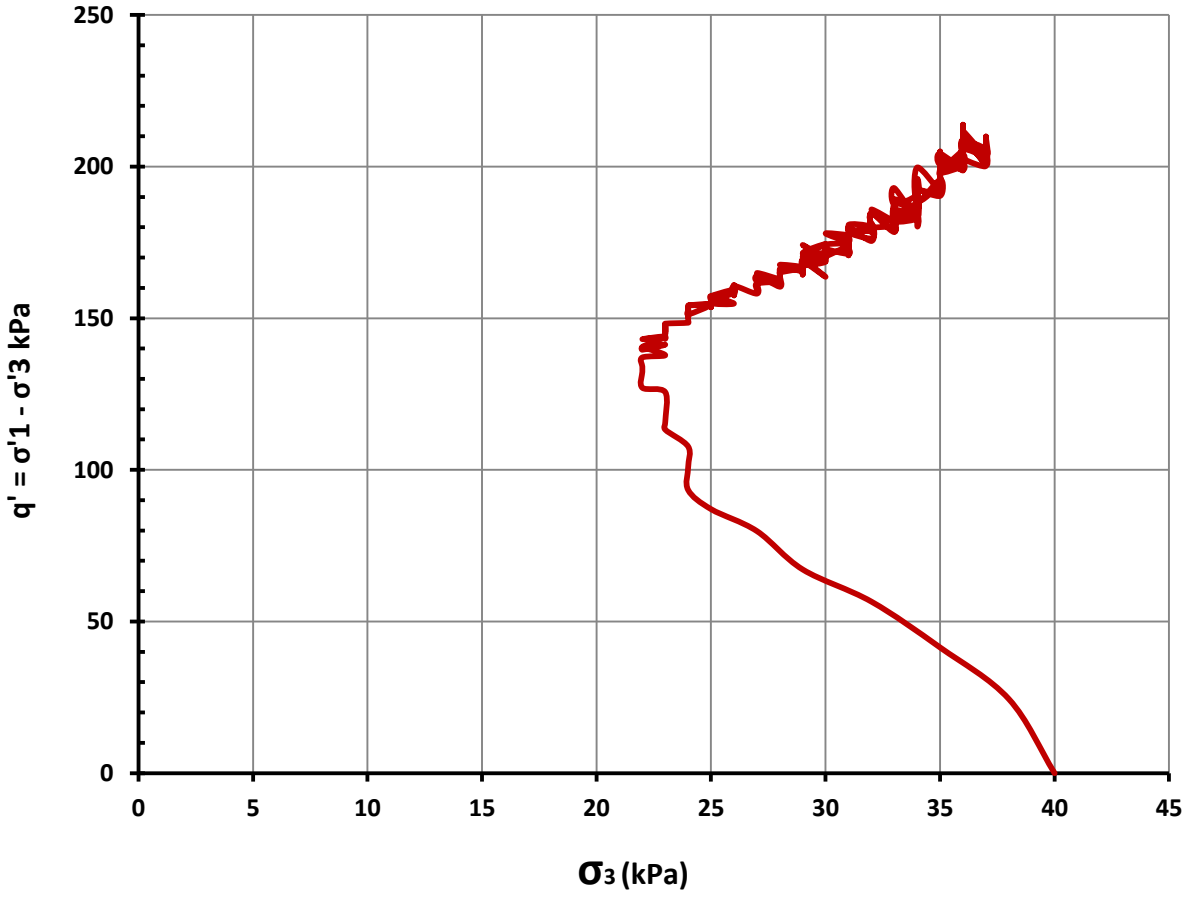
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S1	Lab:	EPLab
Sample ID:	L2S1_A_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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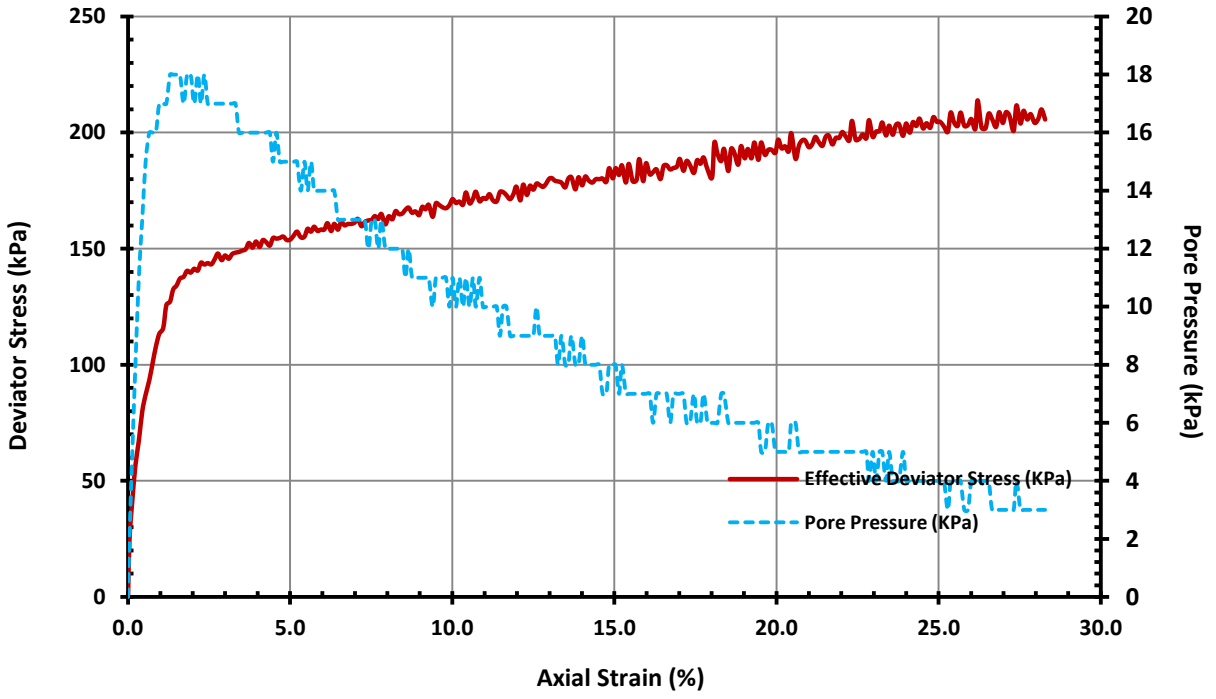
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S1	Lab:	EPLab
Sample ID:	L2S1_A_CU1		
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	40	0	18	165	22	7.51	143	2.35

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SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S1	Lab:	EPLab
Sample ID:	L2S1_A_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: L2S1 **Depth (m):** -
Lab ID: L2S1_A_CU1 **Date Tested:** 15/03/2025

Failure Mode: **Bulging**

Notes: **Remolded to 95% MDD @ OMC**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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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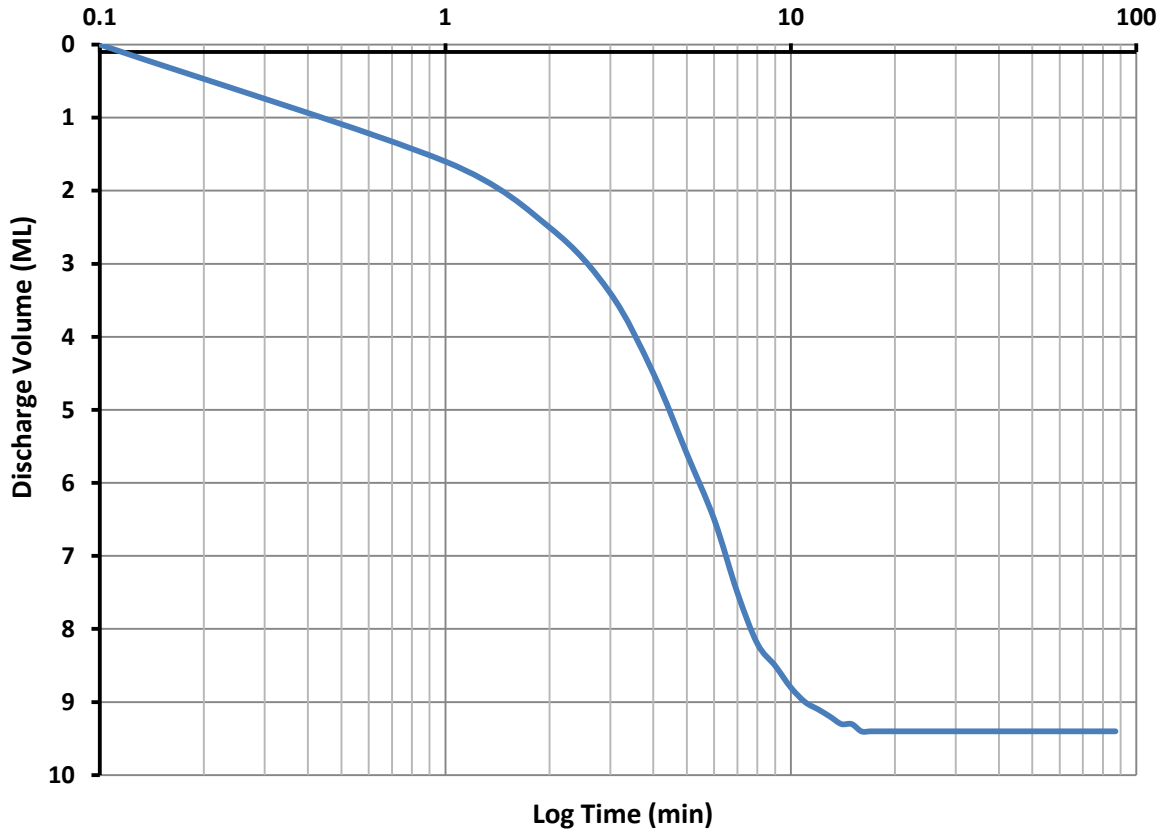
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S1	Lab:	EPLab
Sample ID:	L2S1_A_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.436 based on t_{90}

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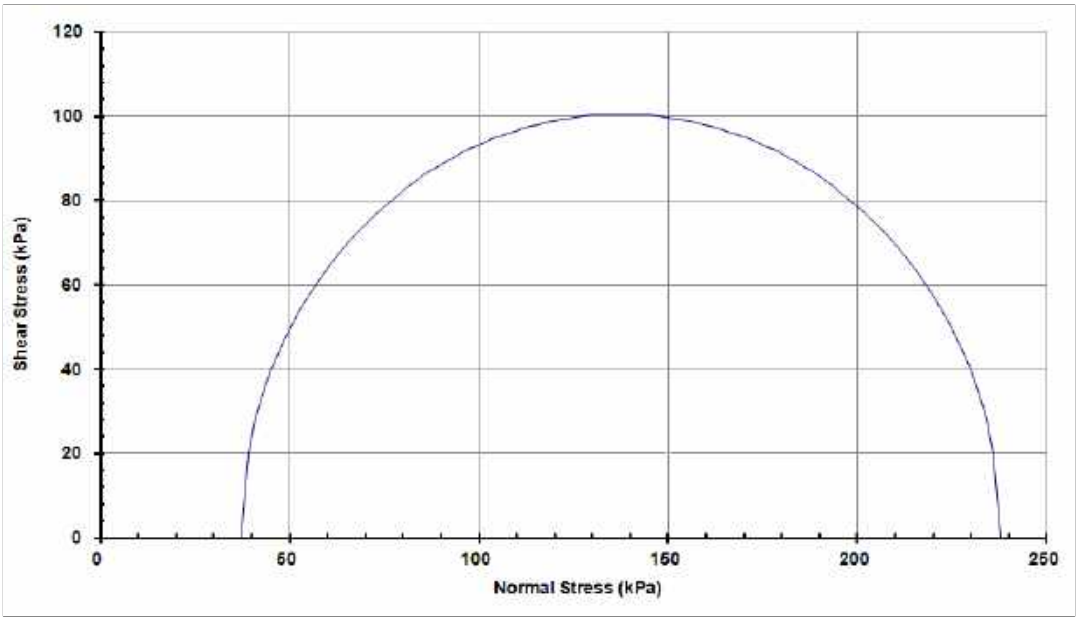
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S1	Lab:	EPLab
Sample ID:	L2S1_B_CU1	Issue Date:	15/03/2025
Depth (m):	-	Room Temperature at Test:	~ 18°C

Tested by:	Phil Li	Initial Moisture (%):	16.13	Strain Rate (mm/min):	0.007
Height (mm):	120.45	Final Moisture (%):	15.51	Skempton's (B):	1
Diameter (mm):	61.16	Bulk Density (t/m³):	1.94	Initial Void Ratio (e_i):	-
L/D Ratio:	1.97	Dry Density (t/m³):	1.67	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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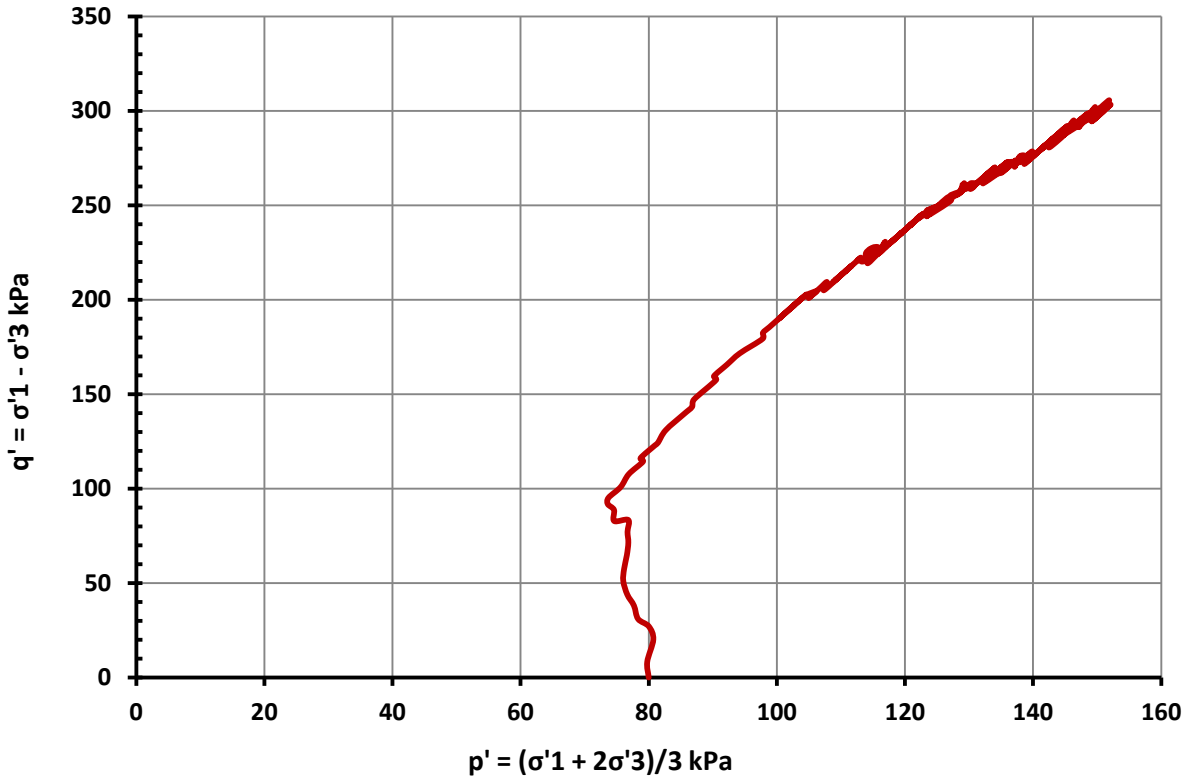
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S1	Lab:	EPLab
Sample ID:	L2S1_B_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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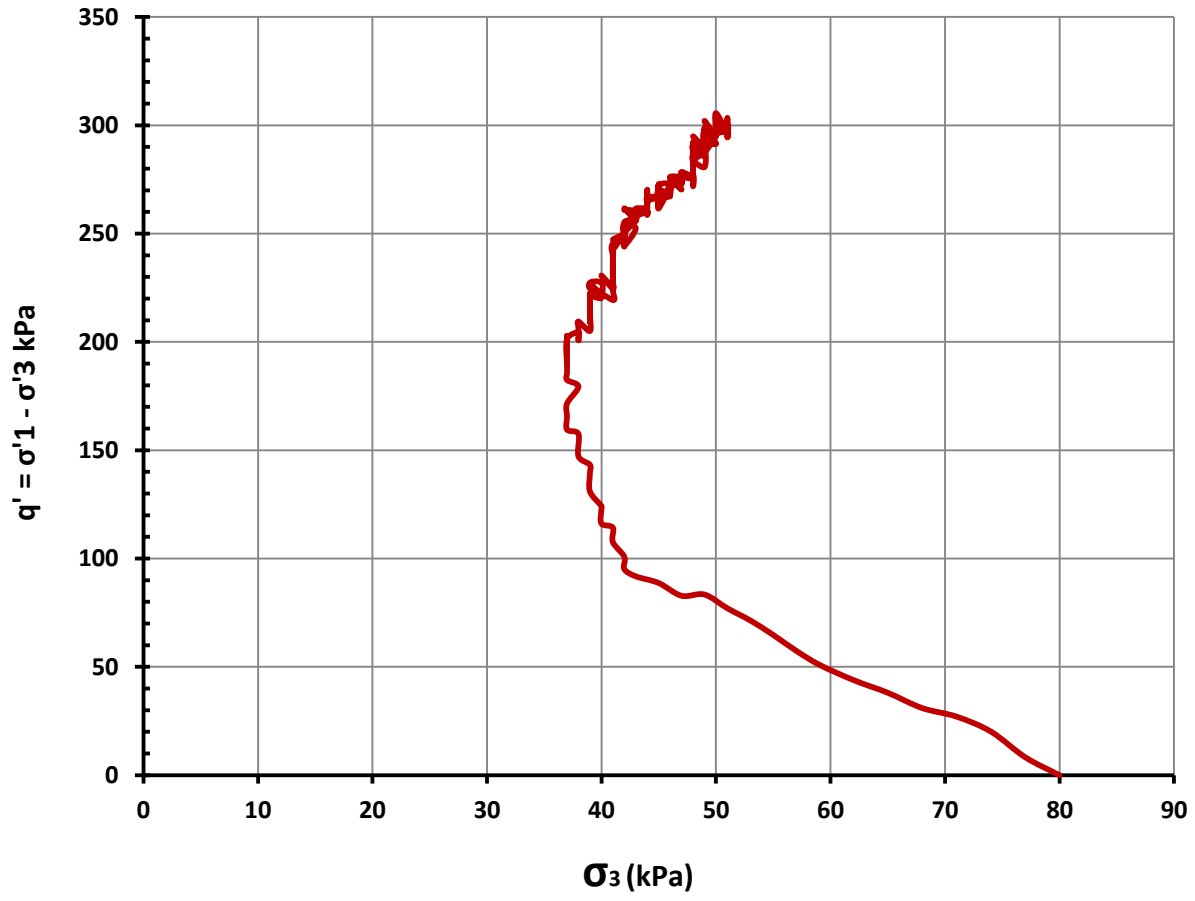
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S1	Lab:	EPLab
Sample ID:	L2S1_B_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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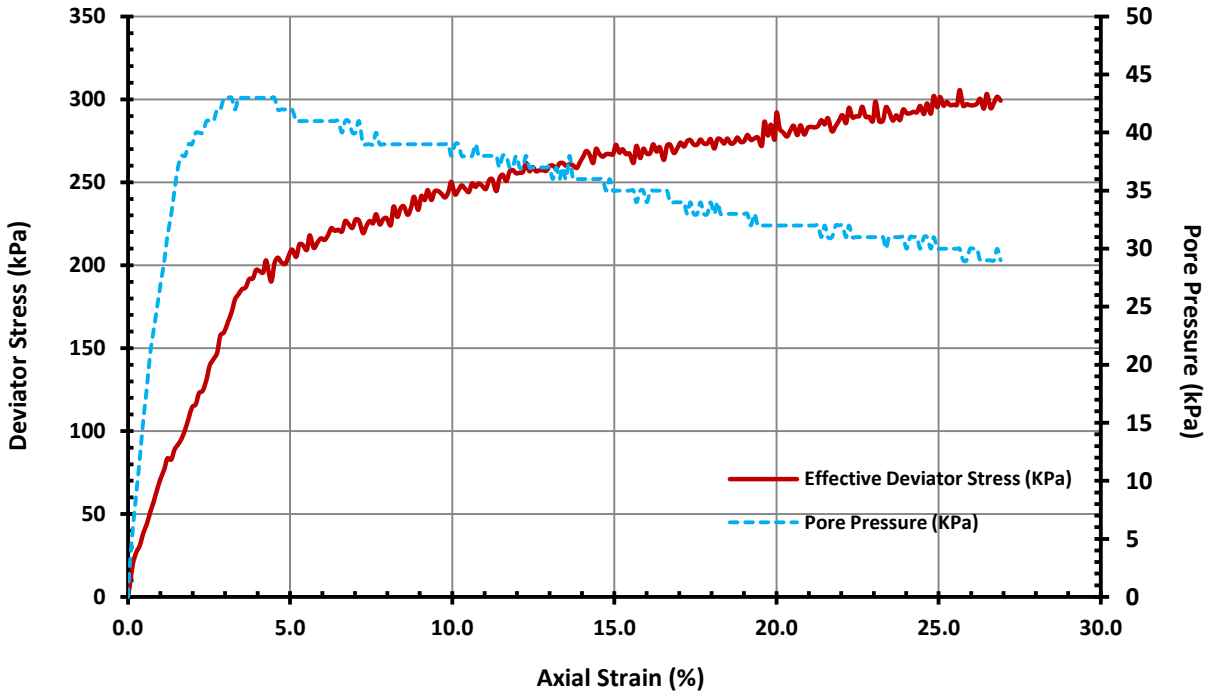
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S1	Lab:	EPLab
Sample ID:	L2S1_B_CU1		
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	80	0	43	238	37	6.44	201	4.52

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SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S1	Lab:	EPLab
Sample ID:	L2S1_B_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: L2S1 **Depth (m):** -
Lab ID: L2S1_B_CU1 **Date Tested:** 15/03/2025

Failure Mode: **Bulging**

Notes: **Remolded to 95% MDD @ OMC**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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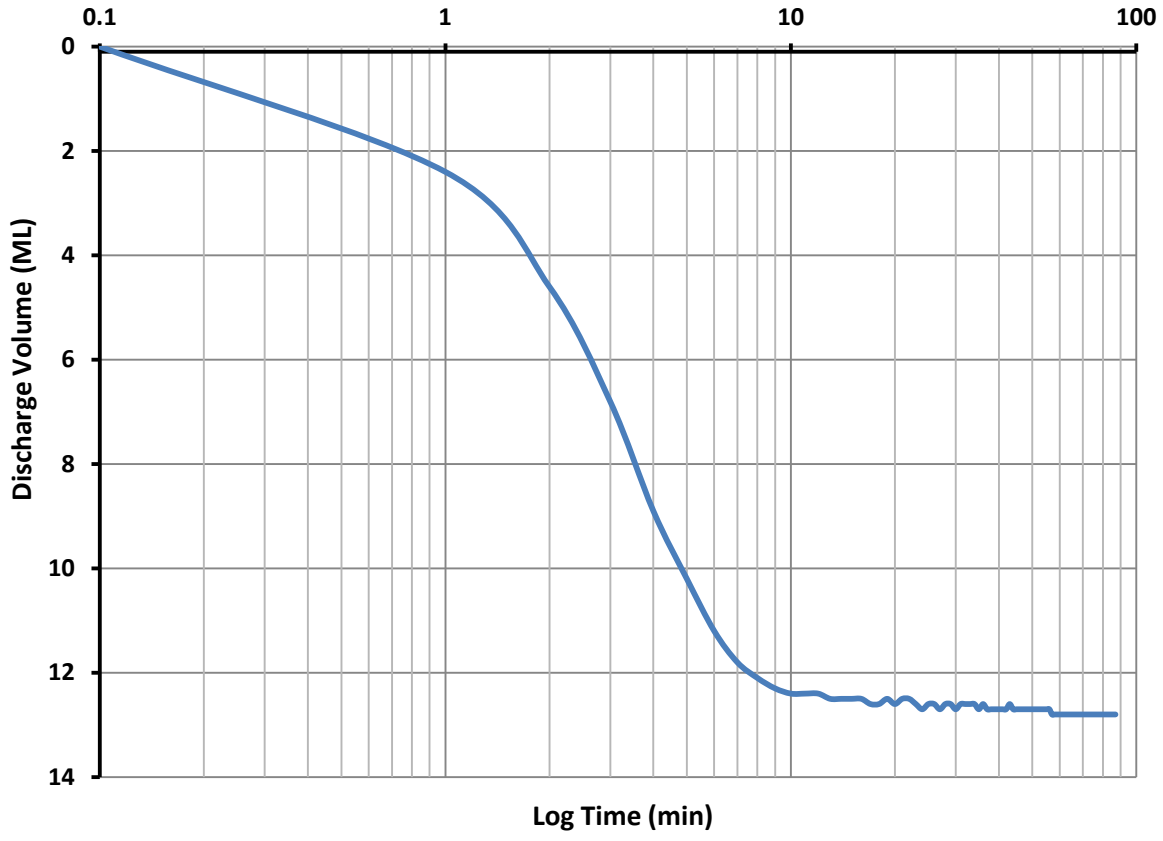
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S1	Lab:	EPLab
Sample ID:	L2S1_B_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.121 based on t_{90}

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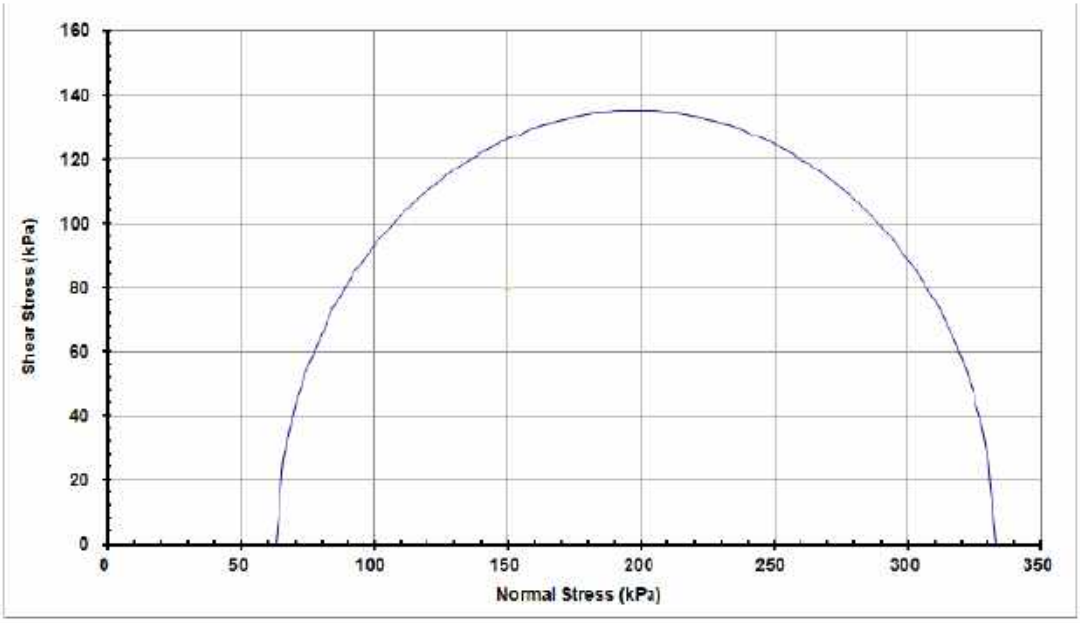
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S1	Lab:	EPLab
Sample ID:	L2S1_C_CU1	Issue Date:	15/03/2025
Depth (m):	-	Room Temperature at Test:	~ 18°C

Tested by:	Phil Li	Initial Moisture (%):	15.97	Strain Rate (mm/min):	0.007
Height (mm):	120.54	Final Moisture (%):	17.57	Skempton's (B):	1
Diameter (mm):	61.62	Bulk Density (t/m³):	1.92	Initial Void Ratio (e_i):	-
L/D Ratio:	1.96	Dry Density (t/m³):	1.66	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

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NATA: 19078 **Authorised Signatory (Geotechnical Engineer):**

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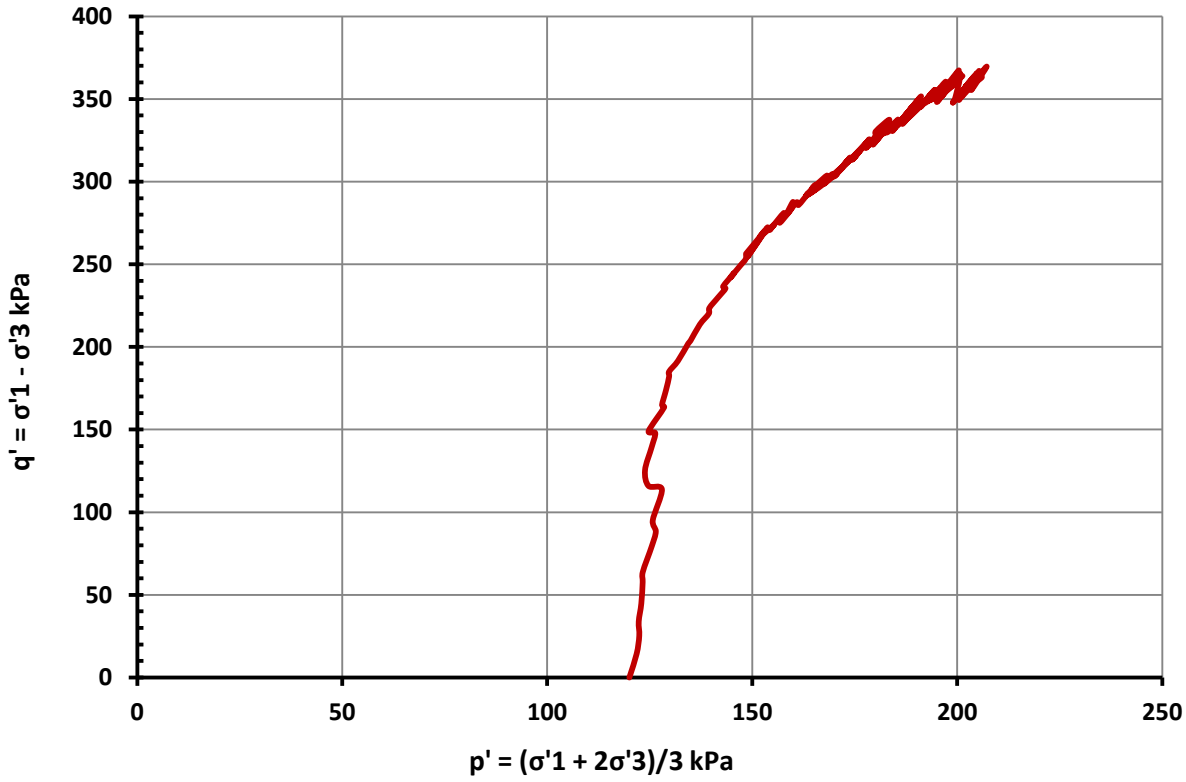
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S1	Lab:	EPLab
Sample ID:	L2S1_C_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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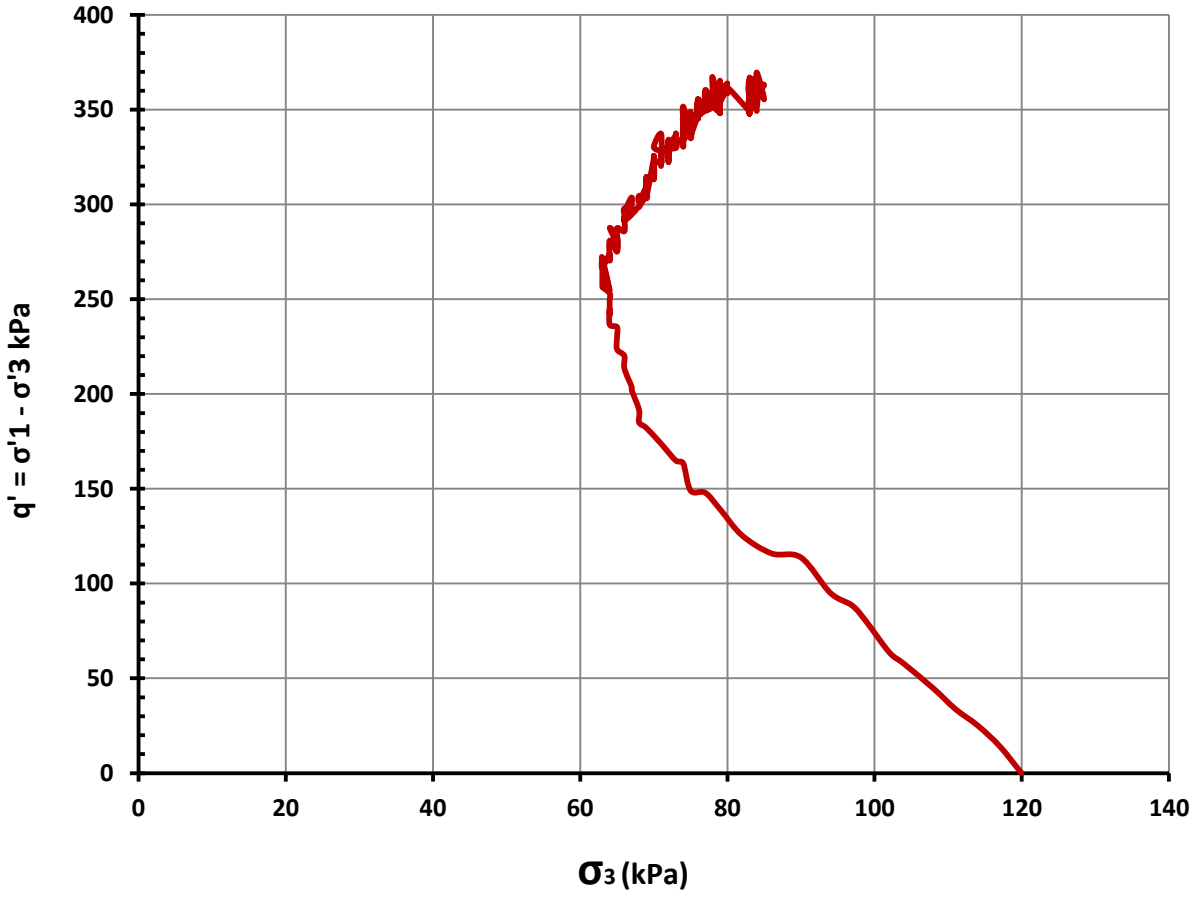
E-Precision Laboratory

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S1	Lab:	EPLab
Sample ID:	L2S1_C_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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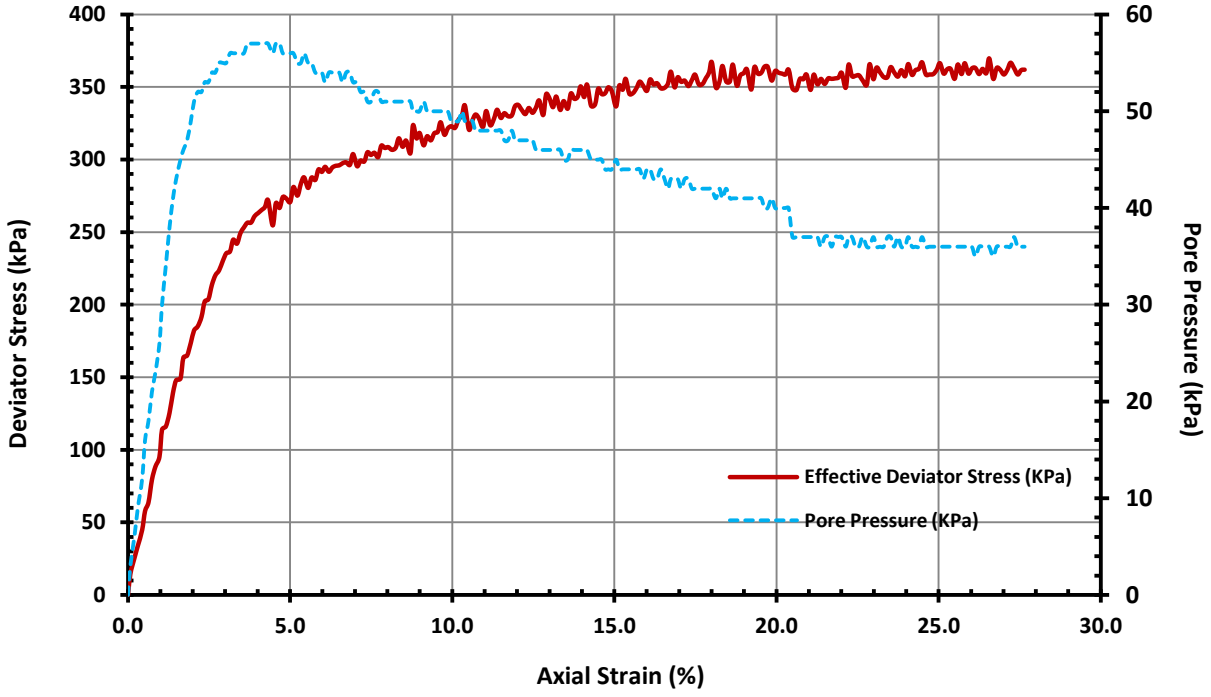
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S1	Lab:	EPLab
Sample ID:	L2S1_C_CU1		
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			$\sigma'_1 - \sigma'_3$	Strain (%)
				σ'_1	σ'_3	σ'_1 / σ'_3		
1	120	0	57	333	63	5.28	270	4.56

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SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S1	Lab:	EPLab
Sample ID:	L2S1_C_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: L2S1 **Depth (m):** -
Lab ID: L2S1_C_CU1 **Date Tested:** 15/03/2025

Failure Mode: **Bulging**

Notes: **Remolded to 95% MDD @ OMC**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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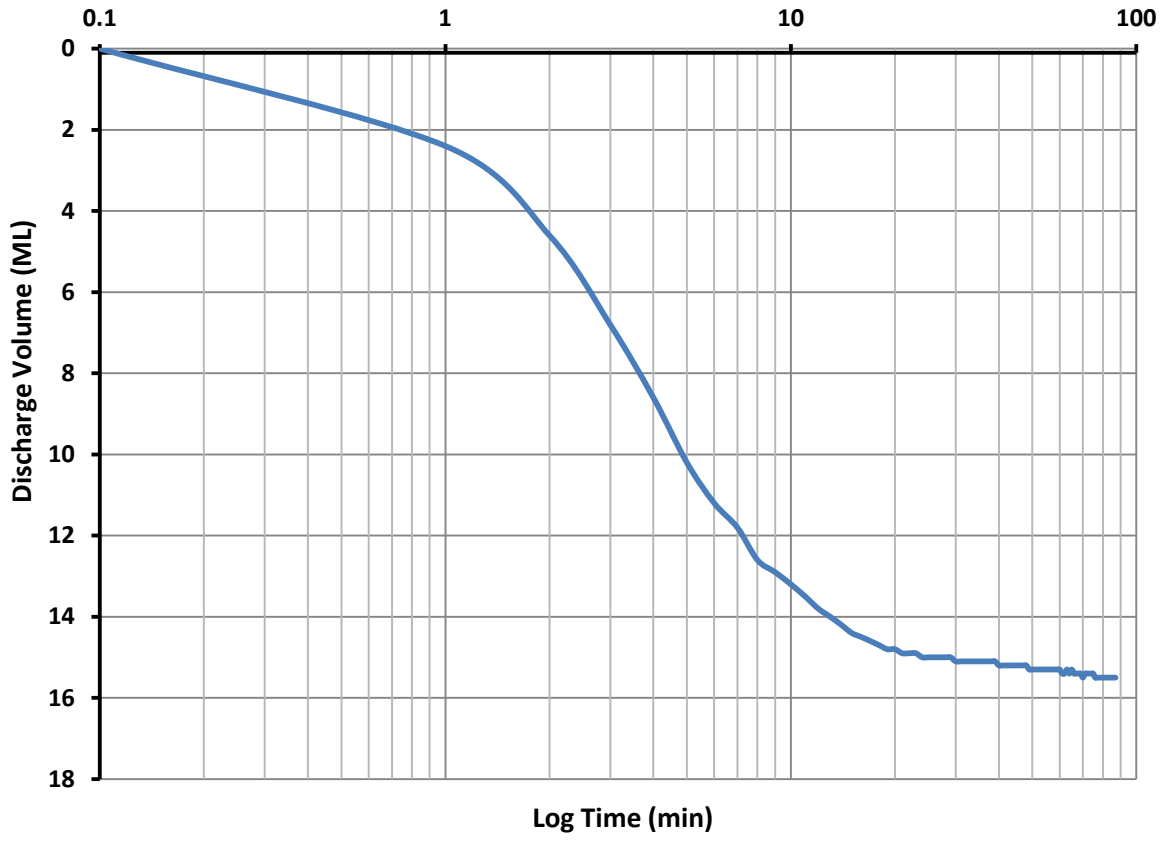
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S1	Lab:	EPLab
Sample ID:	L2S1_C_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.077 based on t_{90}

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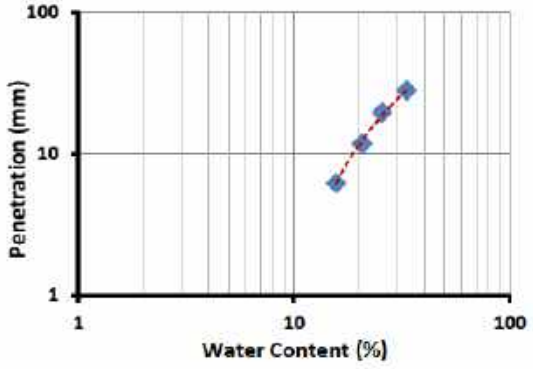
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

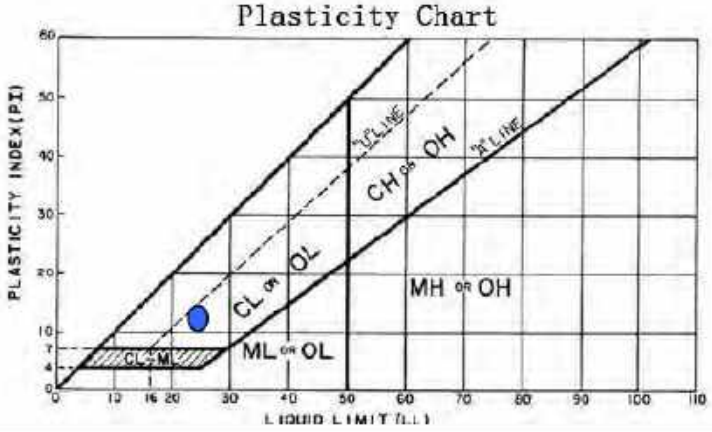
Client:	REC	Date Tested:	03/04/2025
Project:	KMS Testing 2025	Lab:	EPLAB
Sample No:	L2S1	Job Number:	REC
Lab ID:	L2S1_ATT		
Depth (m):	-	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	24.32
Plastic Limit (%):	12.41
Plasticity Index (%):	11.92
Liquidity Index (%):	-
Shrinkage Limit (%):	10.49
Linear Shrinkage(%):	5.55

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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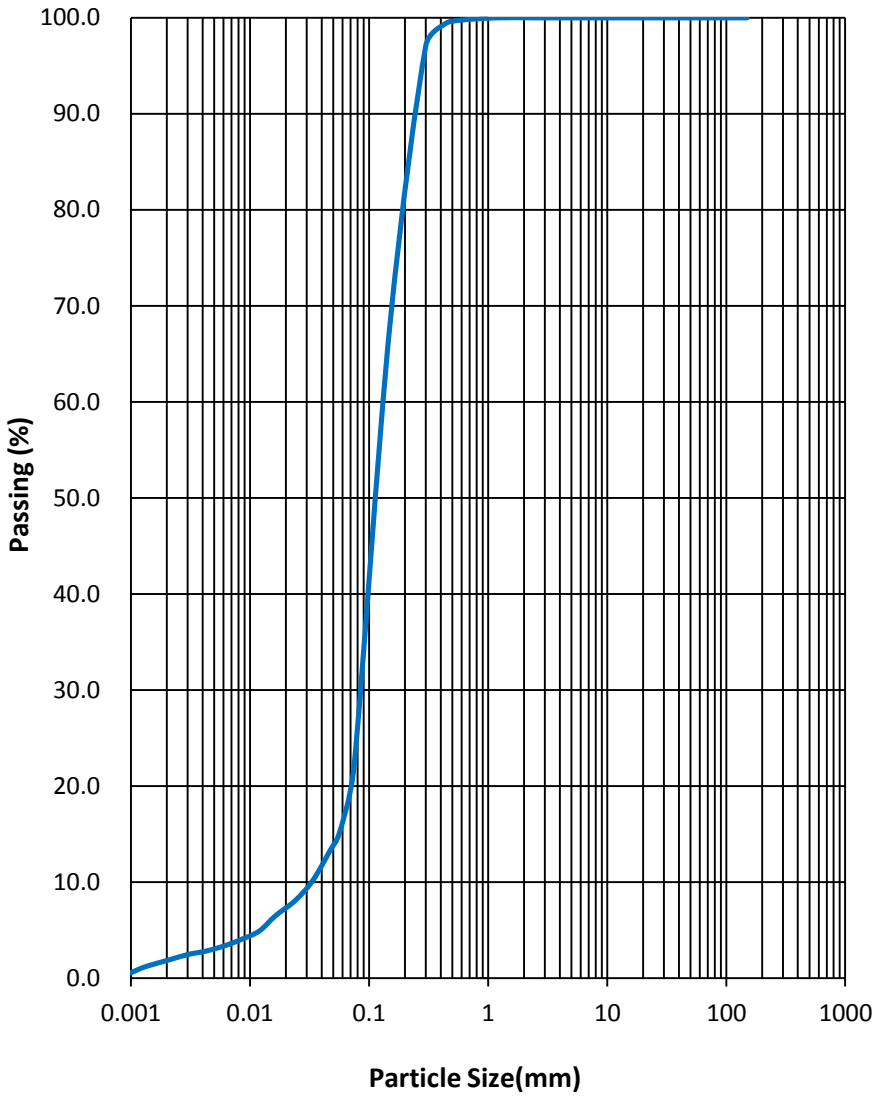
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3, 3.5.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S1	Depth (m):	-
Lab ID:	L2S1_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.678
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	100.0
2.36	100.0
1.18	100.0
0.6	99.8
0.425	99.3
0.3	97.1
0.15	68.0
0.075	22.1
0.05636	15.1
0.04742	13.3
0.03383	10.2
0.02405	8.1
0.01643	6.5
0.01205	4.9
0.00855	4.0
0.00606	3.3
0.00429	2.8
0.00304	2.5
0.00215	1.9
0.00152	1.4
0.00124	1.1
0.00107	0.7
0.00091	0.4

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature: [redacted]

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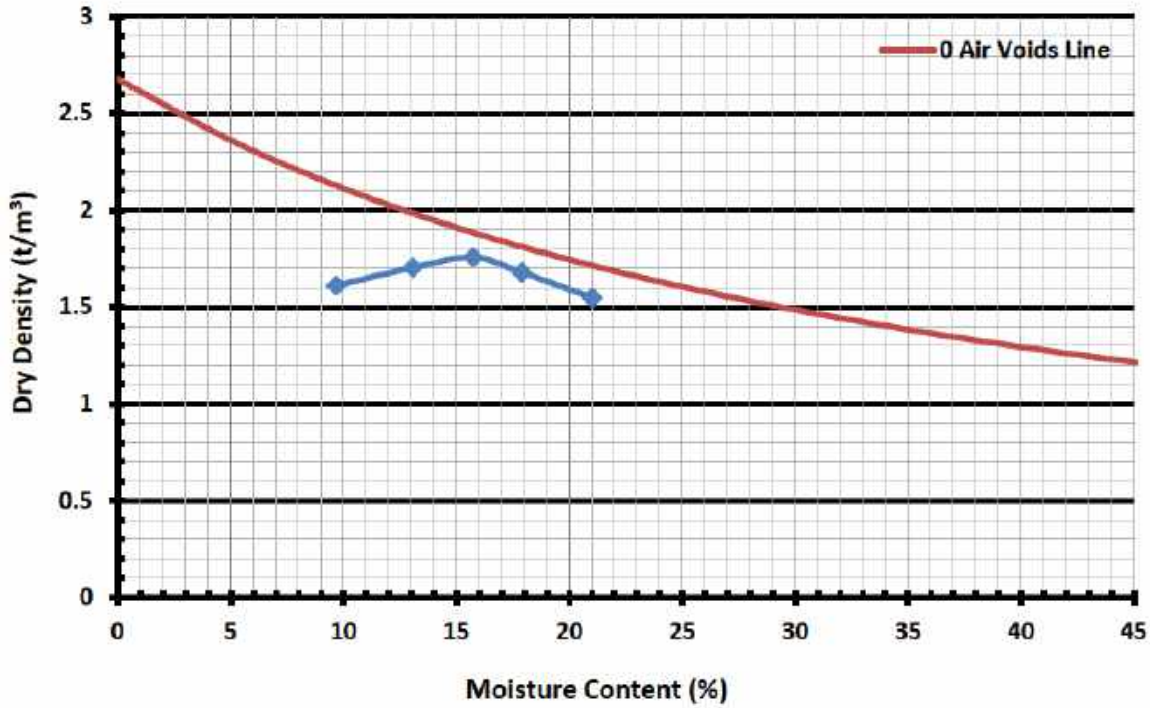
MOISTURE DENSITY RELATIONSHIP REPORT

Test Method: AS1289.5.1.1

Client:	REC	Date Tested:	12/03/2025
Project:	KMS Testing 2025	Lab:	EPLAB
Sample No:	L2S1	Job Number:	REC
Lab ID:	L2S1_SMDD		
Depth (m):	-	Room Temperature at Test:	20°C
Checked by:	Phil	Sample Description:	Tested in Mould A
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Results

Maximum Size (mm):	19.00	**Maximum Dry Density (t/m³):**	**1.750**
Oversize dry (%):	0.00	**Optimum Moisture Content (%):**	**16.00**



Notes: ** Particle density* *2.678 t/m³*

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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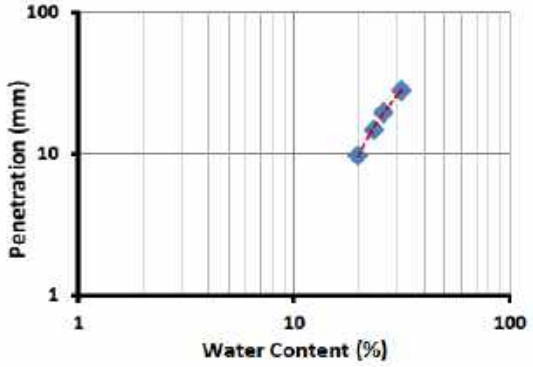
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

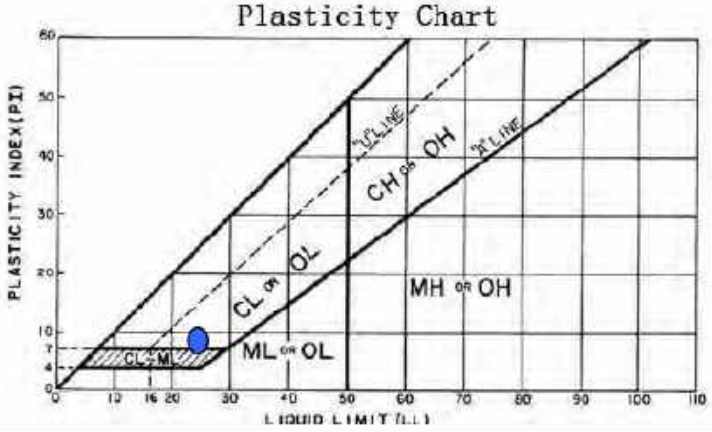
Client:	REC	Date Tested:	03/04/2025
Project:	KMS Testing 2025	Lab:	EPLAB
Sample No:	L2S2	Job Number:	REC
Lab ID:	L2S2_ATT		
Depth (m):	-	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	24.55
Plastic Limit (%):	15.04
Plasticity Index (%):	9.51
Liquidity Index (%):	-
Shrinkage Limit (%):	12.99
Linear Shrinkage(%):	4.82

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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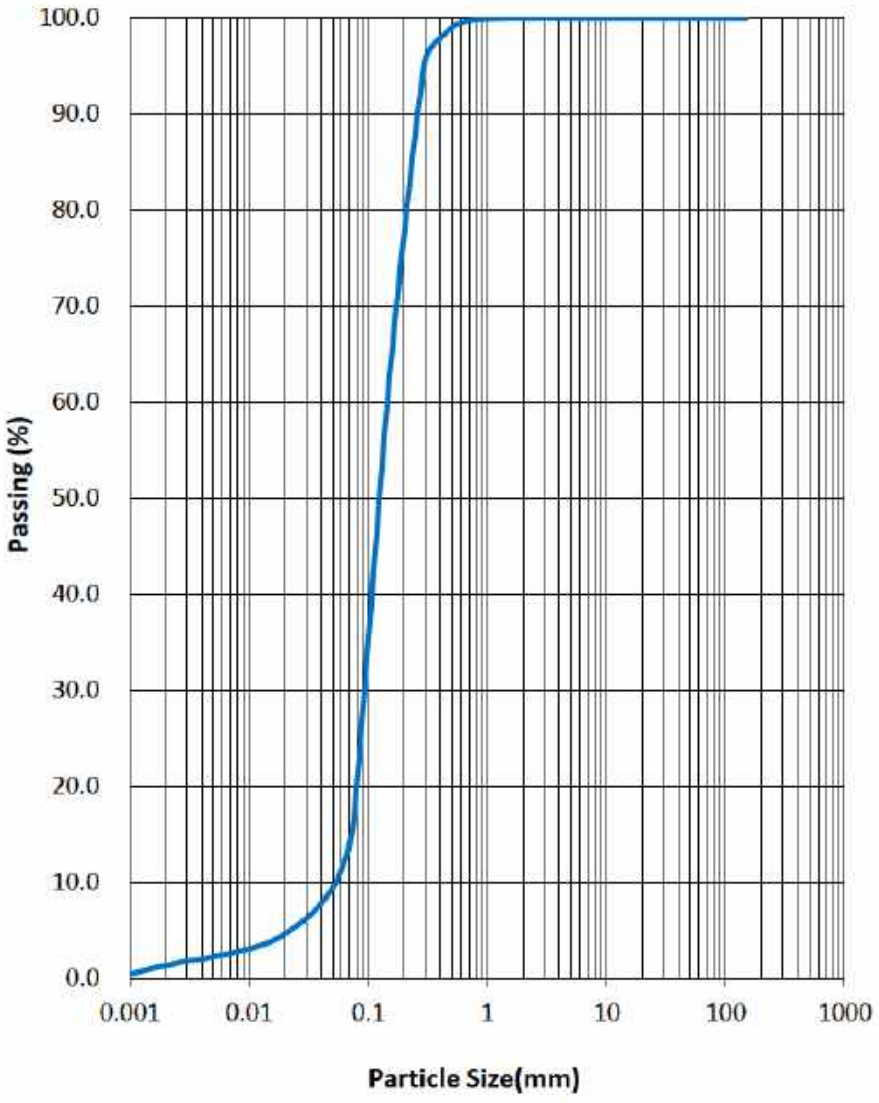
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3, 3.5.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L2S2	Depth (m):	-
Lab ID:	L2S2_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.642
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	100.0
2.36	100.0
1.18	100.0
0.6	99.5
0.425	98.1
0.3	95.4
0.15	62.0
0.075	16.1
0.05711	10.8
0.04810	9.1
0.03429	6.8
0.02437	5.4
0.01666	4.1
0.01220	3.4
0.00864	2.9
0.00612	2.5
0.00434	2.1
0.00307	1.8
0.00218	1.4
0.00154	1.1
0.00126	0.8
0.00108	0.5
0.00092	0.3

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature: [redacted]

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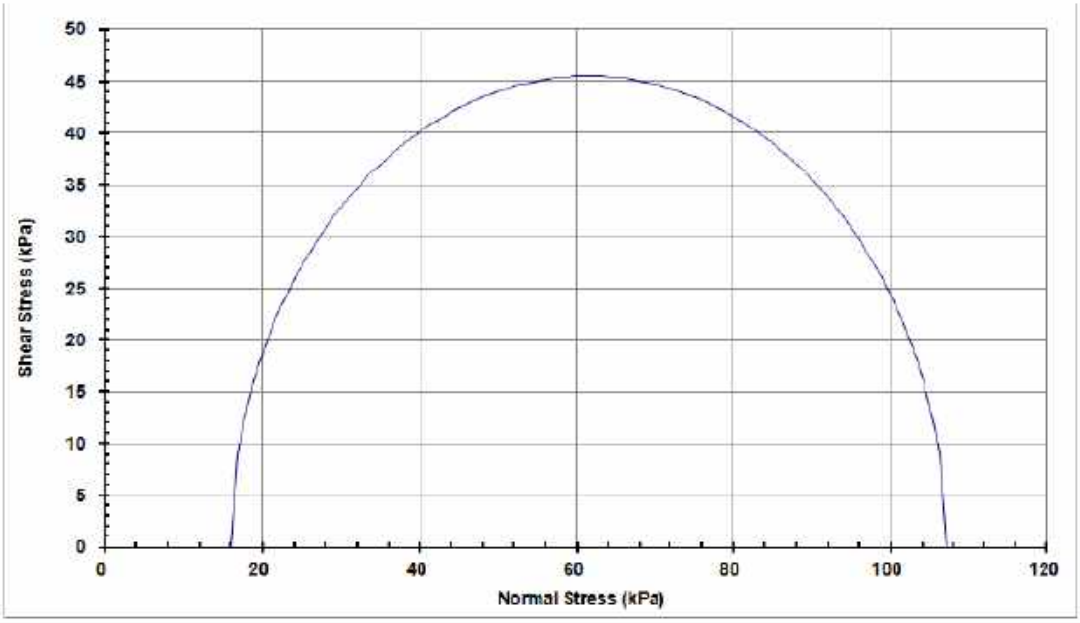
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S1	Lab:	EPLab
Sample ID:	L3S1_A_CU1	Issue Date:	15/03/2025
Depth (m):	-	Room Temperature at Test:	~ 18°C

Tested by:	Phil Li	Initial Moisture (%):	19.19	Strain Rate (mm/min):	0.007
Height (mm):	126.64	Final Moisture (%):	23.49	Skempton's (B):	1
Diameter (mm):	60.32	Bulk Density (t/m³):	1.93	Initial Void Ratio (e_i):	-
L/D Ratio:	2.10	Dry Density (t/m³):	1.62	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

Accredited for compliance with ISO/IEC 17025-TESTING

NATA: 19078

Authorised Signatory (Geotechnical Engineer): [redacted]

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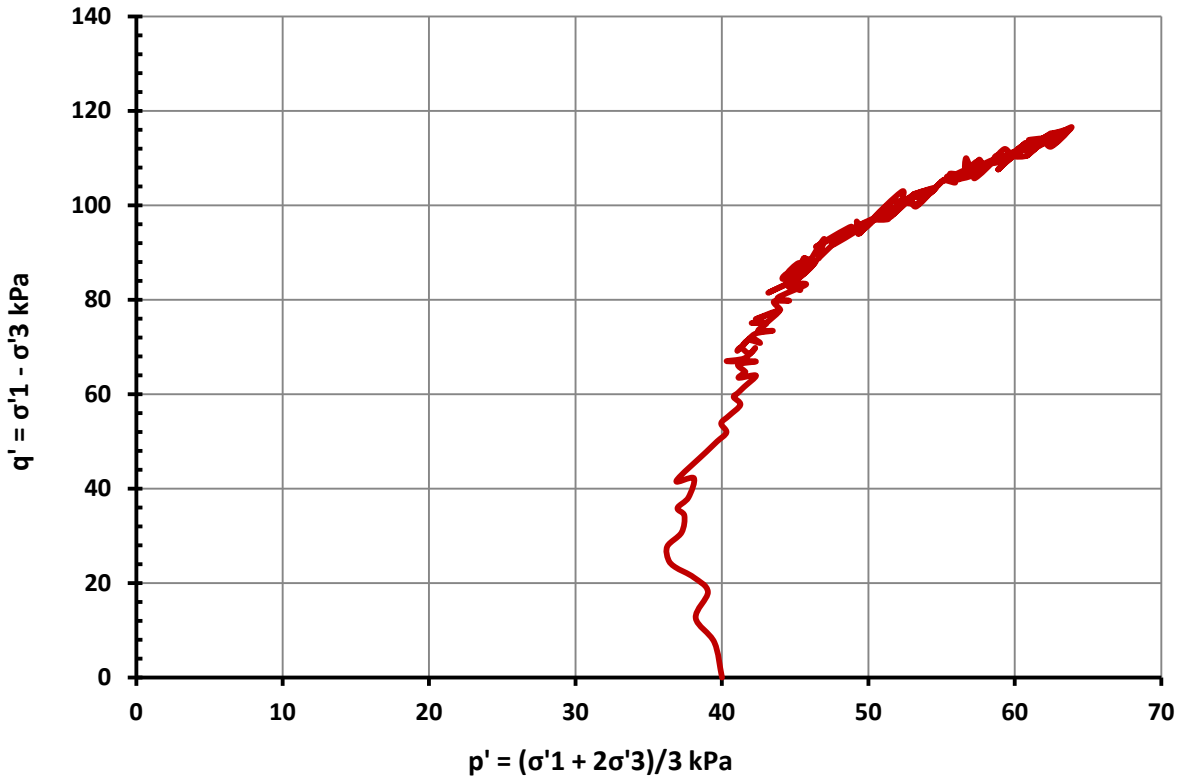
E-Precision Laboratory

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S1	Lab:	EPLab
Sample ID:	L3S1_A_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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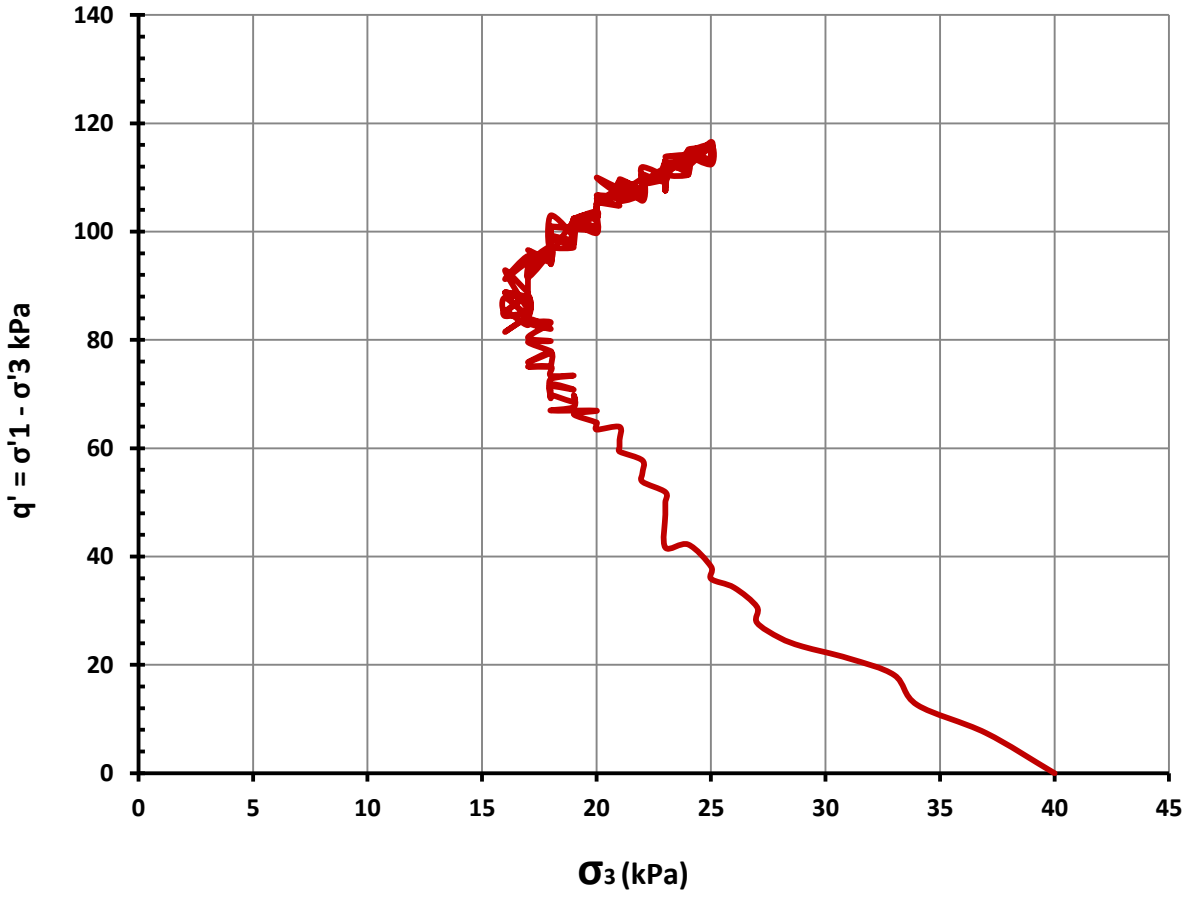
E-Precision Laboratory

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S1	Lab:	EPLab
Sample ID:	L3S1_A_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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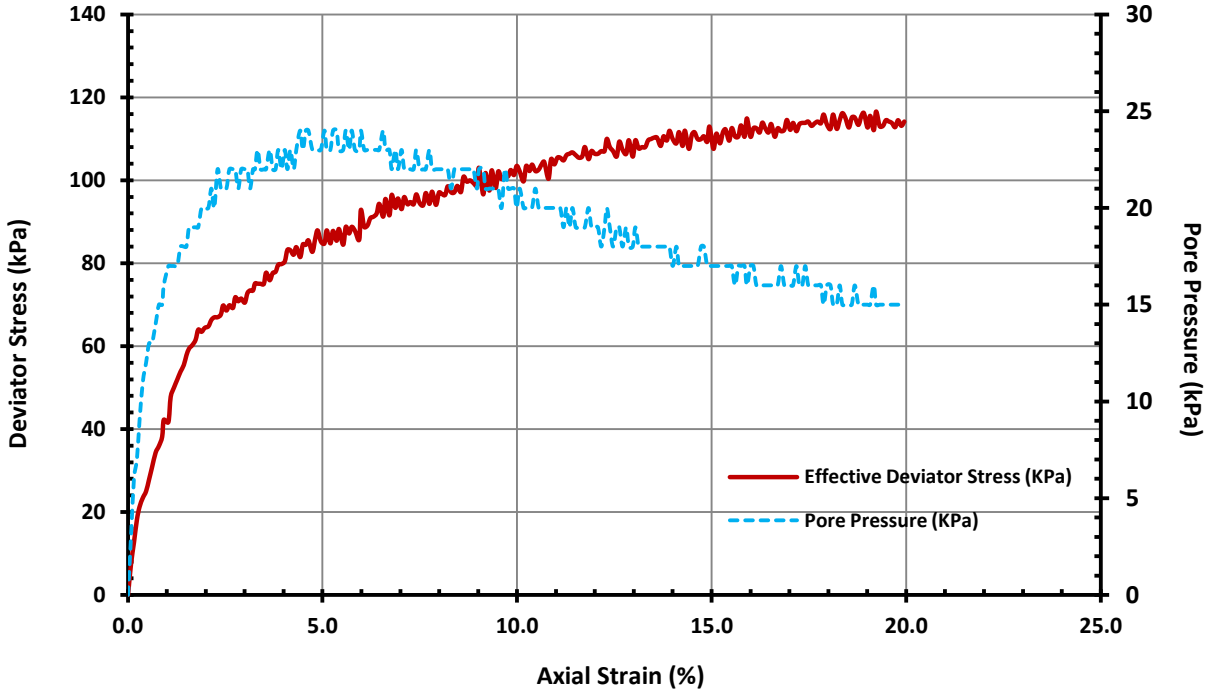
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S1	Lab:	EPLab
Sample ID:	L3S1_A_CU1		
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			$\sigma'_1 - \sigma'_3$	Strain (%)
				σ'_1	σ'_3	σ'_1 / σ'_3		
1	40	0	24	107	16	6.70	91	6.56

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E-Precision Laboratory

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S1	Lab:	EPLab
Sample ID:	L3S1_A_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: L3S1 **Depth (m):** -
Lab ID: L3S1_A_CU1 **Date Tested:** 15/03/2025

Failure Mode: **Bulging**

Notes: **Remolded to 95% MDD @ OMC**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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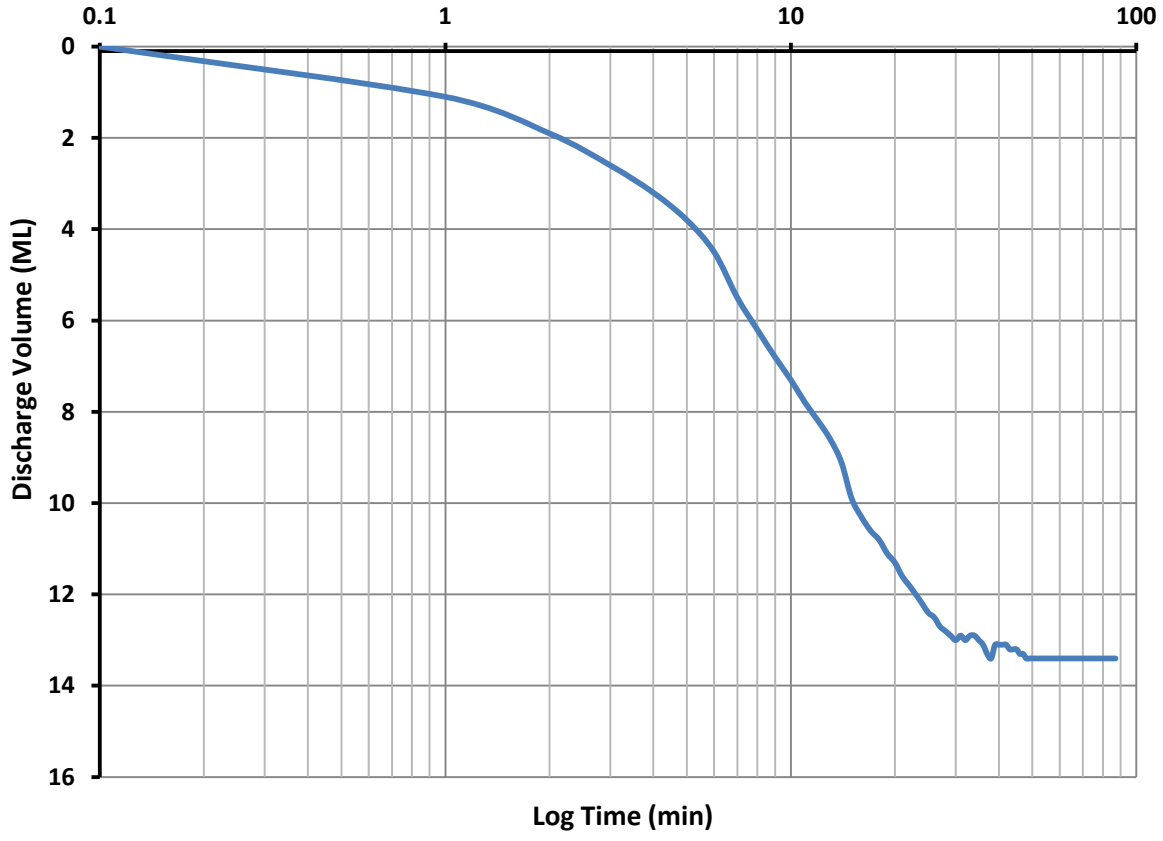
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S1	Lab:	EPLab
Sample ID:	L3S1_A_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.178 based on t_{90}

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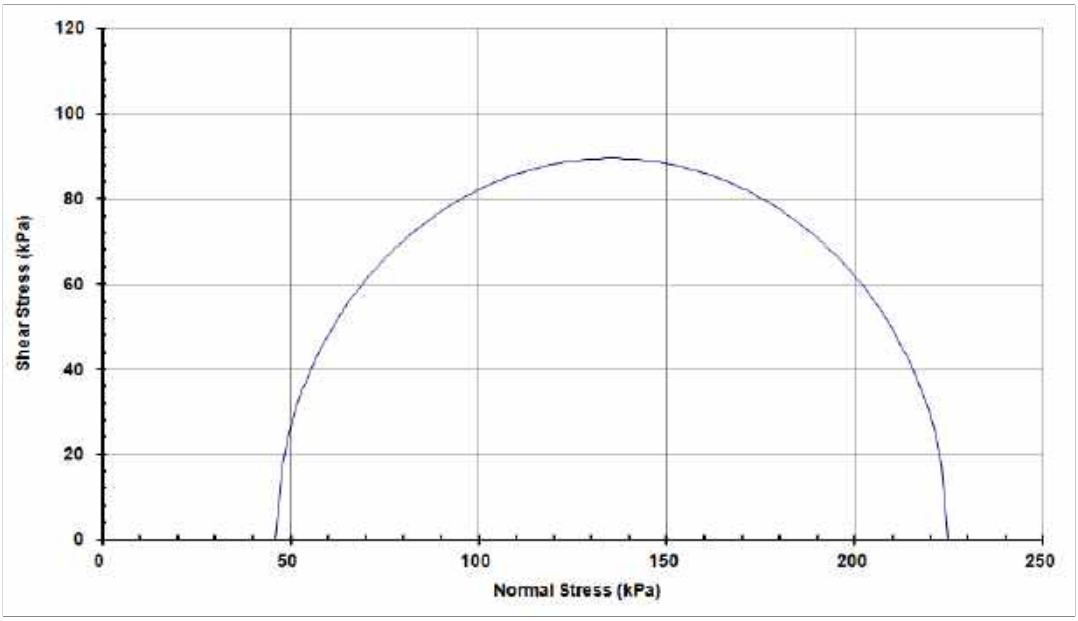
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S1	Lab:	EPLab
Sample ID:	L3S1_B_CU1	Issue Date:	15/03/2025
Depth (m):	-	Room Temperature at Test:	~ 18°C

Tested by:	Phil Li	Initial Moisture (%):	19.41	Strain Rate (mm/min):	0.007
Height (mm):	126.83	Final Moisture (%):	22.32	Skempton's (B):	1
Diameter (mm):	60.91	Bulk Density (t/m³):	1.93	Initial Void Ratio (e_i):	-
L/D Ratio:	2.08	Dry Density (t/m³):	1.62	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

Accredited for compliance with ISO/IEC 17025-TESTING

NATA: 19078

Authorised Signatory (Geotechr [redacted]

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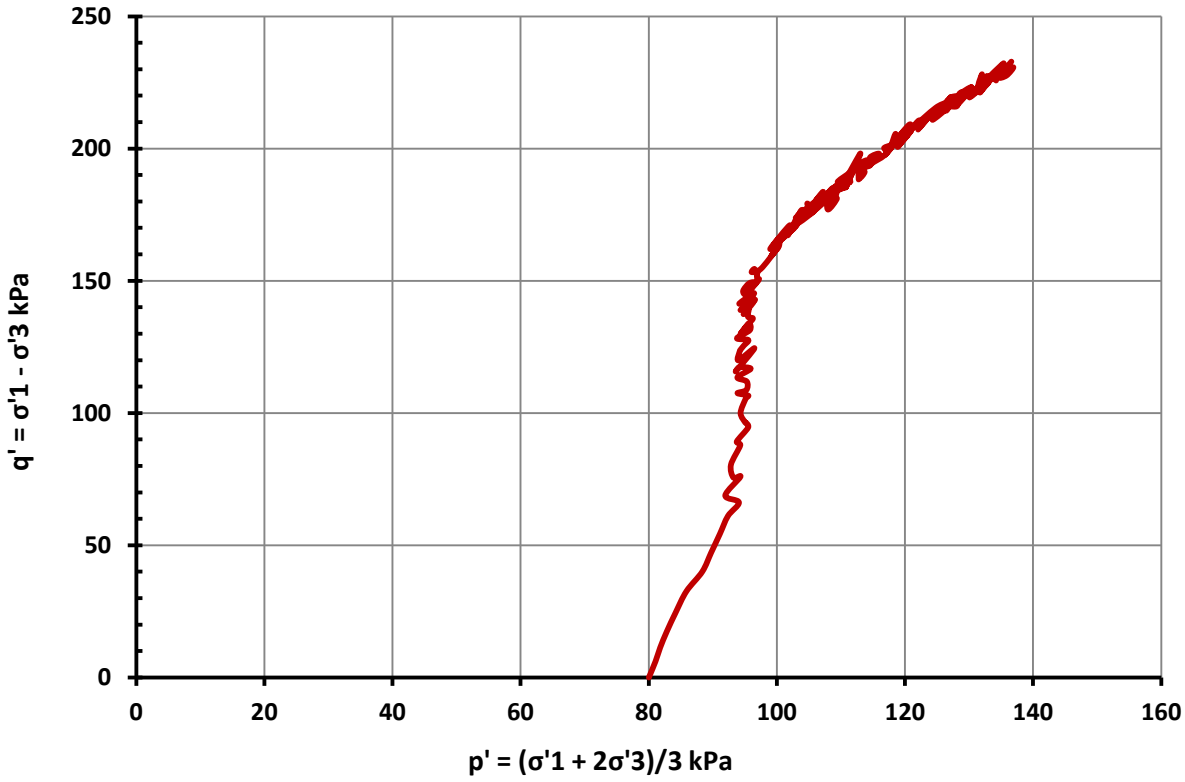
E-Precision Laboratory

SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S1	Lab:	EPLab
Sample ID:	L3S1_B_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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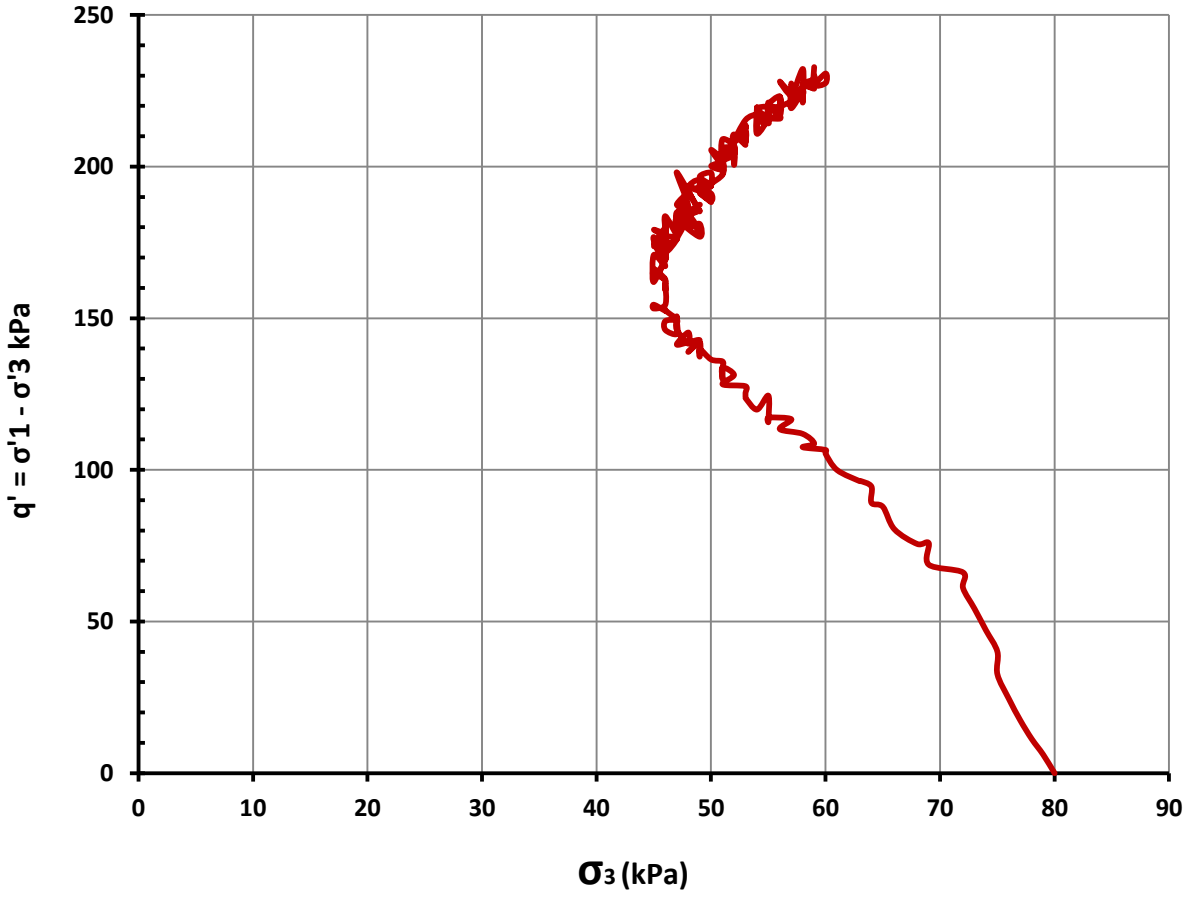
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S1	Lab:	EPLab
Sample ID:	L3S1_B_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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[redacted]

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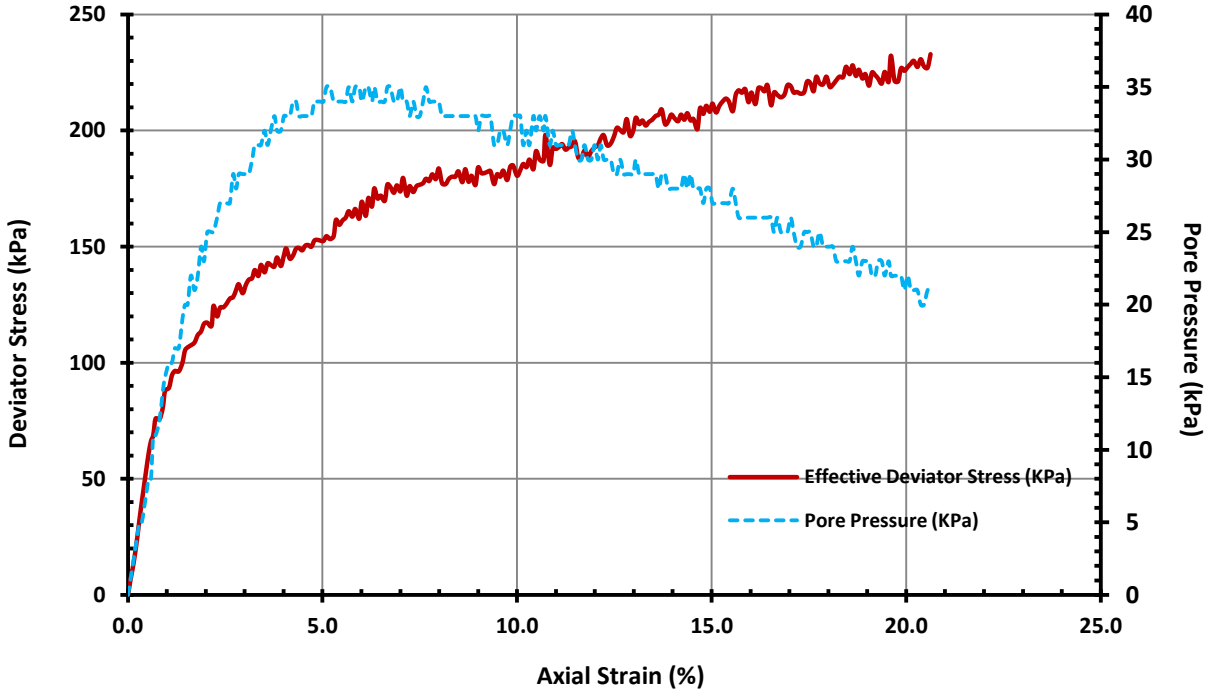
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S1	Lab:	EPLab
Sample ID:	L3S1_B_CU1		
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	80	0	34	225	46	4.89	179	7.91

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SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S1	Lab:	EPLab
Sample ID:	L3S1_B_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: L3S1 **Depth (m):** -
Lab ID: L3S1_B_CU1 **Date Tested:** 15/03/2025

Failure Mode: **Bulging**

Notes: **Remolded to 95% MDD @ OMC**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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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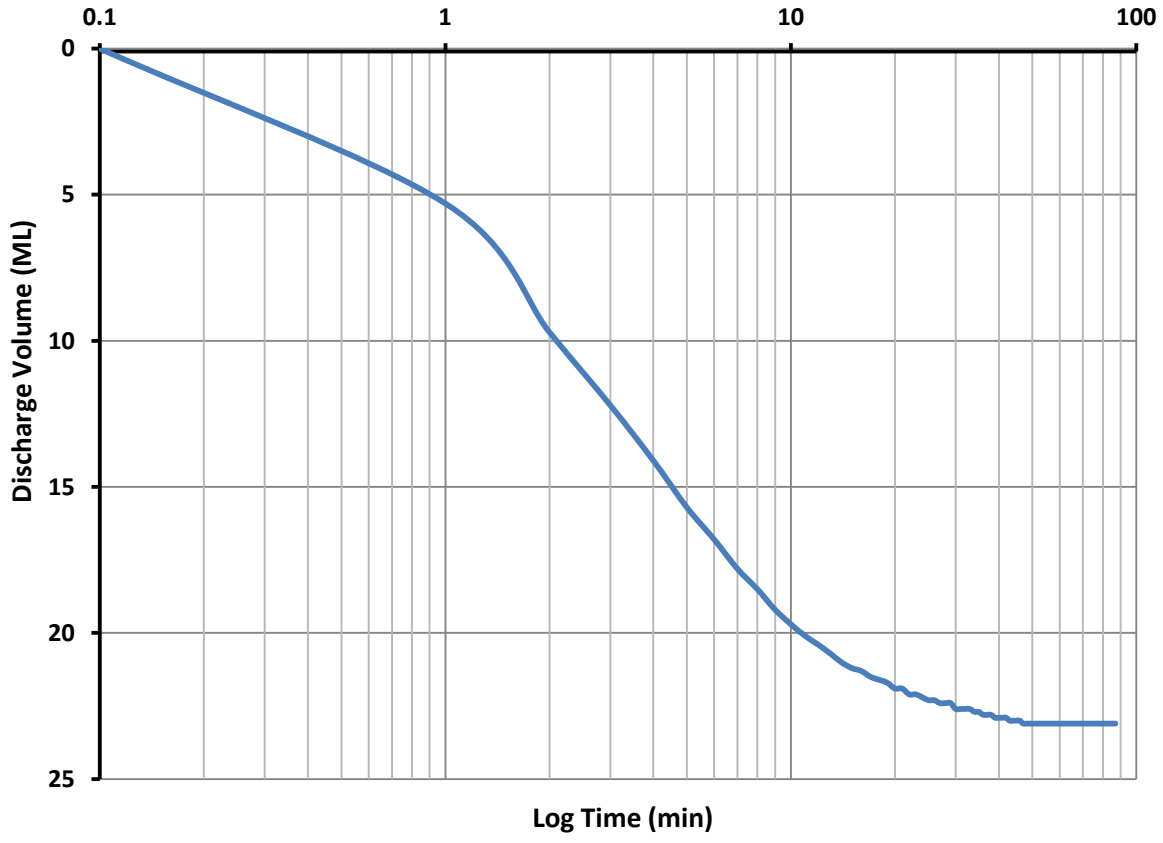
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S1	Lab:	EPLab
Sample ID:	L3S1_B_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.129 based on t_{90}

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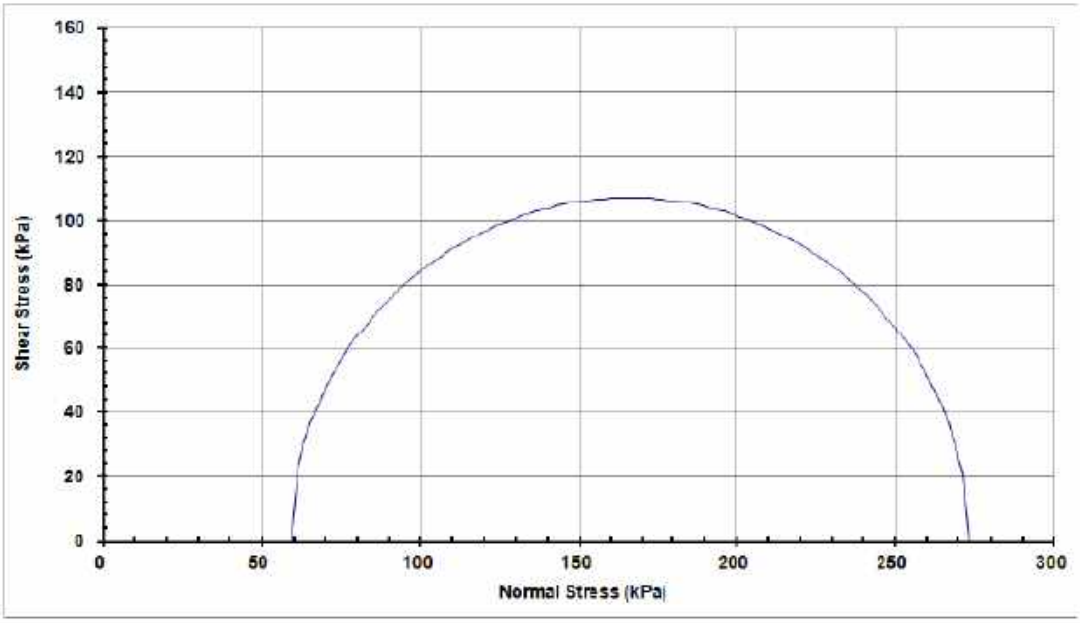
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S1	Lab:	EPLab
Sample ID:	L3S1_C_CU1	Issue Date:	15/03/2025
Depth (m):	-	Room Temperature at Test:	~ 18°C

Tested by:	Phil Li	Initial Moisture (%):	18.86	Strain Rate (mm/min):	0.007
Height (mm):	124.11	Final Moisture (%):	23.13	Skempton's (B):	1
Diameter (mm):	60.23	Bulk Density (t/m³):	1.92	Initial Void Ratio (e_i):	-
L/D Ratio:	2.06	Dry Density (t/m³):	1.62	Particle Density (t/m³):	-

Failure Criteria used: Max Principle Stress Ratio



Final Results as Measured after Testing

Final Dry Density (t/m³): -

Final Void Ratio (e_f): -

Interpretation from Mohr Circle:	Stage 1 & 2	Stage 1 & 3	Stage 2 & 3
Cohesion C' (kPa):	-	-	-
Angle of Shear Resistance Φ' (Degrees) :	-	-	-

Accredited for compliance with ISO/IEC 17025-TESTING

NATA: 19078

Authorised Signatory (Geotechnical Engineer): [redacted]

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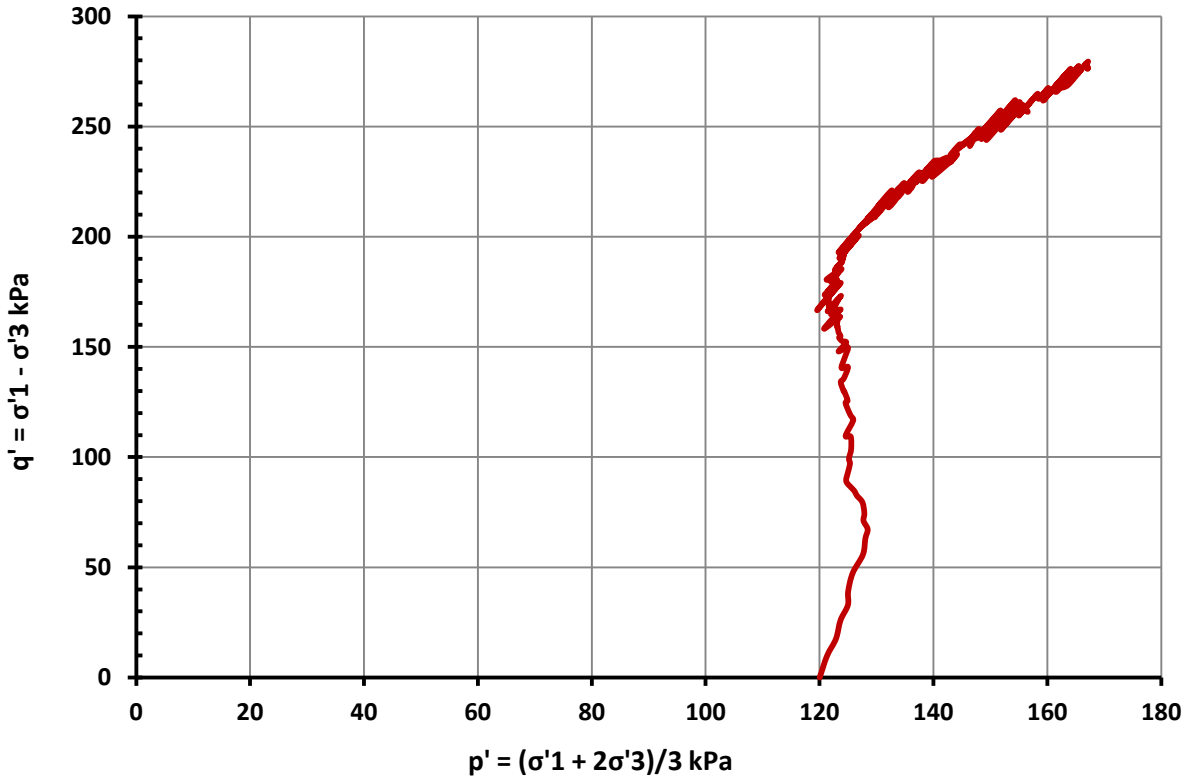
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S1	Lab:	EPLab
Sample ID:	L3S1_C_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Cambridge Stress Path (q' vs p' diagram)



Stress Path - Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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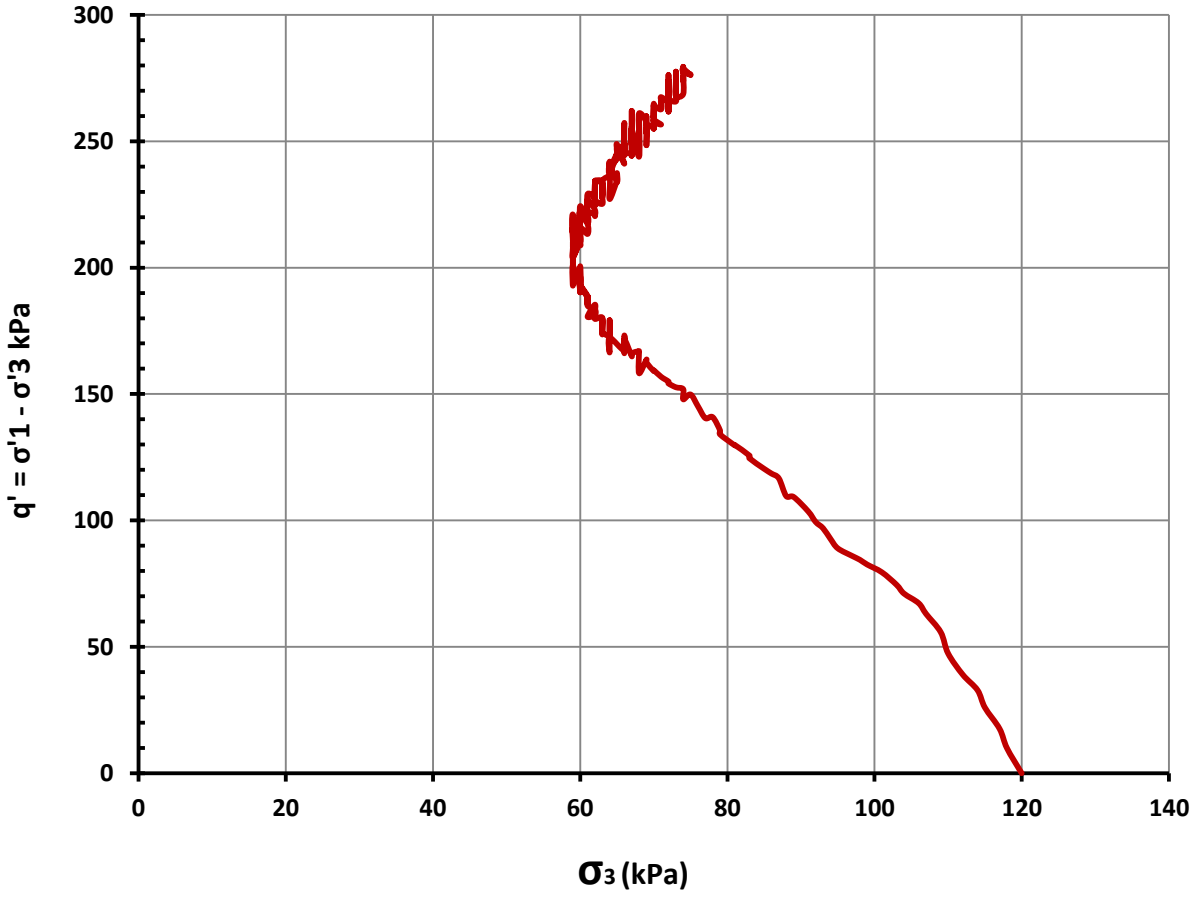
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S1	Lab:	EPLab
Sample ID:	L3S1_C_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Modified Mohr Coulomb Stress Path



Using Stress Path Tangency Method

Cohesion C' (kPa) : -

Angle of Shear Resistance Φ' (Deg) : -

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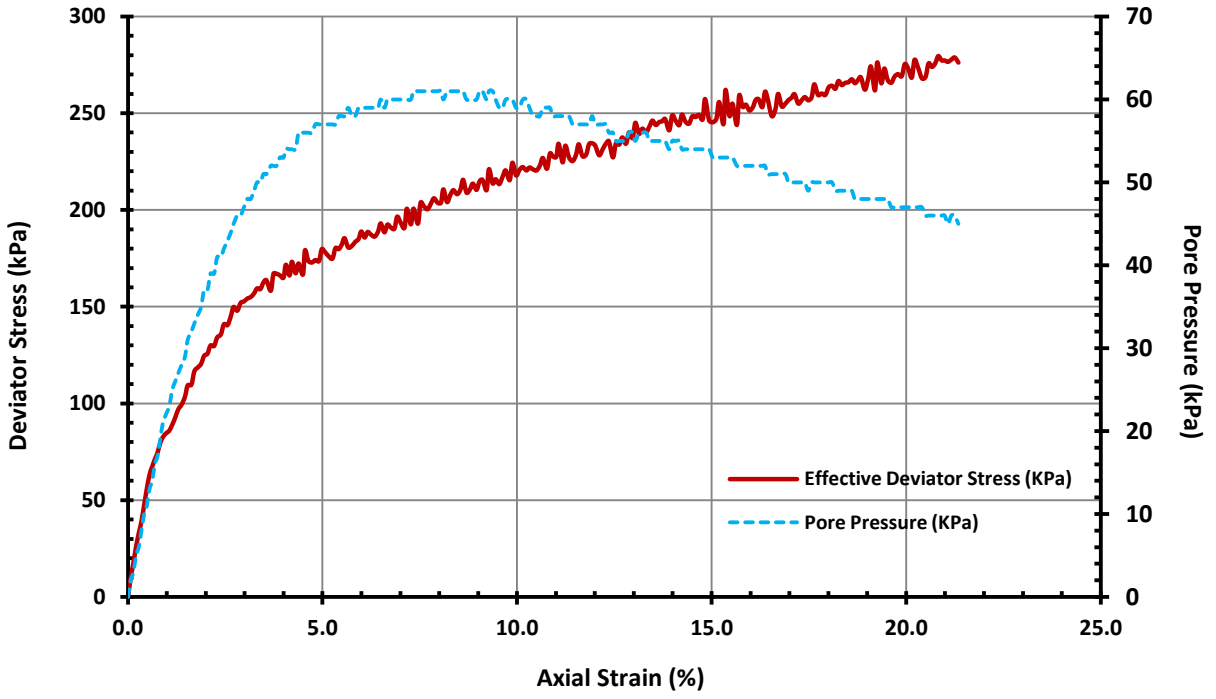
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S1	Lab:	EPLab
Sample ID:	L3S1_C_CU1		
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	120	0	61	273	59	4.62	214	9.37

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SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S1	Lab:	EPLab
Sample ID:	L3S1_C_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Photo After Test

Sample ID: L3S1 **Depth (m):** -
Lab ID: L3S1_C_CU1 **Date Tested:** 15/03/2025

Failure Mode: **Bulging**

Notes: **Remolded to 95% MDD @ OMC**

Stored and Tested the Sample as received

Samples supplied by the Client

NATA: 19078 **Authorised Signatory (Geotechnical Engineer):** [redacted]

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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[redacted]

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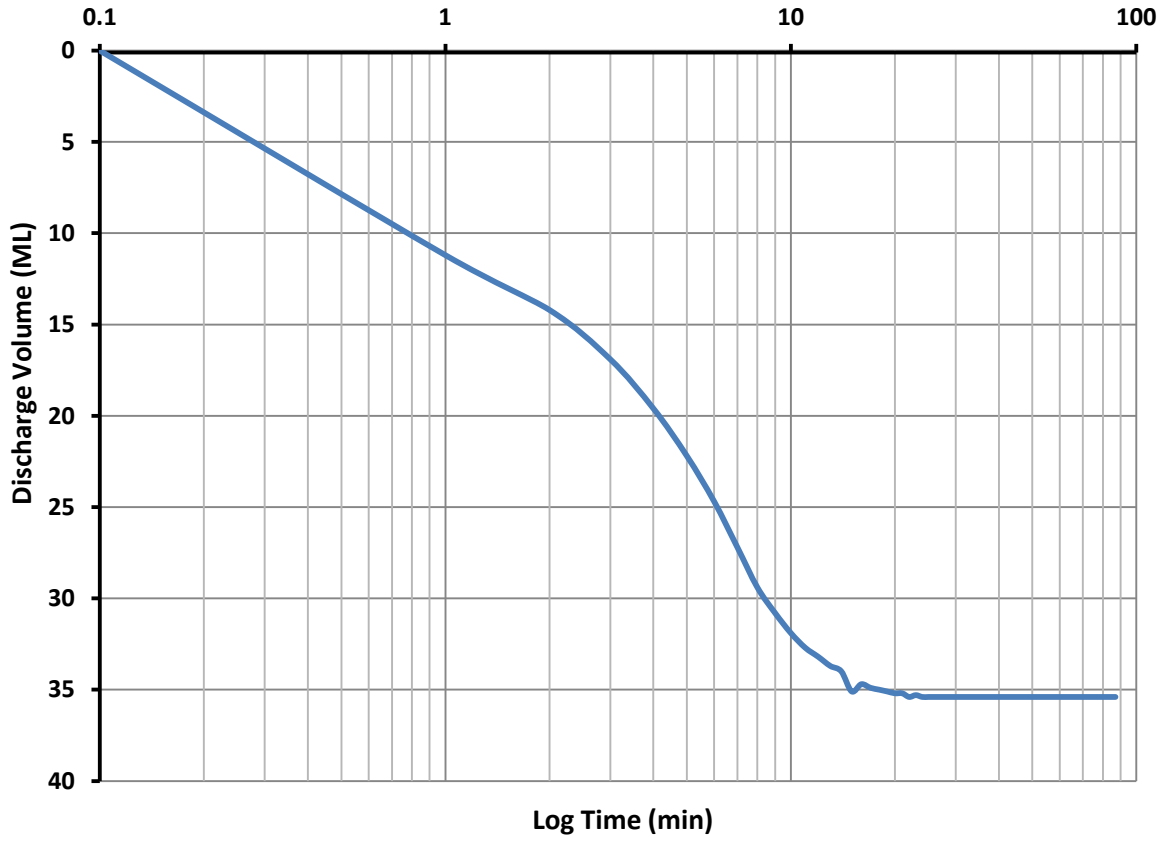
SINGLE-STAGE CONSOLIDATED UNDRAINED TRIAXIAL TEST

Method: AS1289.6.4.2 , 2.1.1

Client:	REC	Date Tested:	15/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S1	Lab:	EPLab
Sample ID:	L3S1_C_CU1		
Depth (m):	-	Room Temperature at Test:	~ 18°C

Discharge Volume (ML) Vs Log Time (min)



Cv (cm²/s): 0.075 based on t_{90}

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E-Precision Laboratory

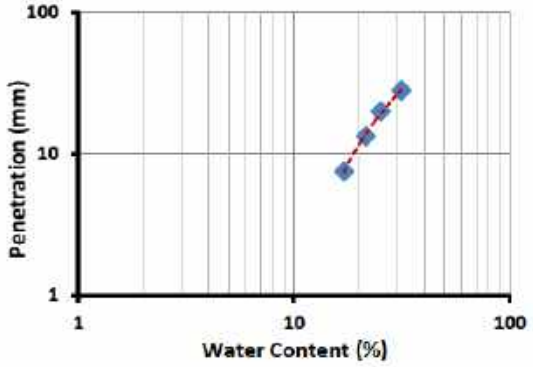
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

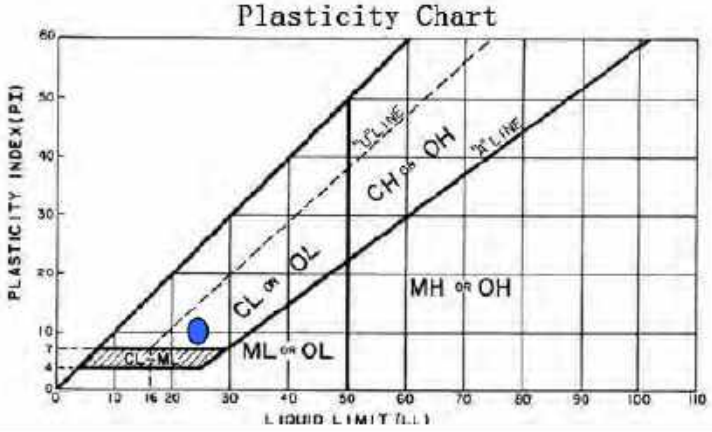
Client:	REC	Date Tested:	03/04/2025
Project:	KMS Testing 2025	Lab:	EPLAB
Sample No:	L3S1	Job Number:	REC
Lab ID:	L3S1_ATT		
Depth (m):	-	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	23.73
Plastic Limit (%):	13.34
Plasticity Index (%):	10.39
Liquidity Index (%):	-
Shrinkage Limit (%):	11.45
Linear Shrinkage(%):	5.19

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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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[redacted]

E-Precision Laboratory

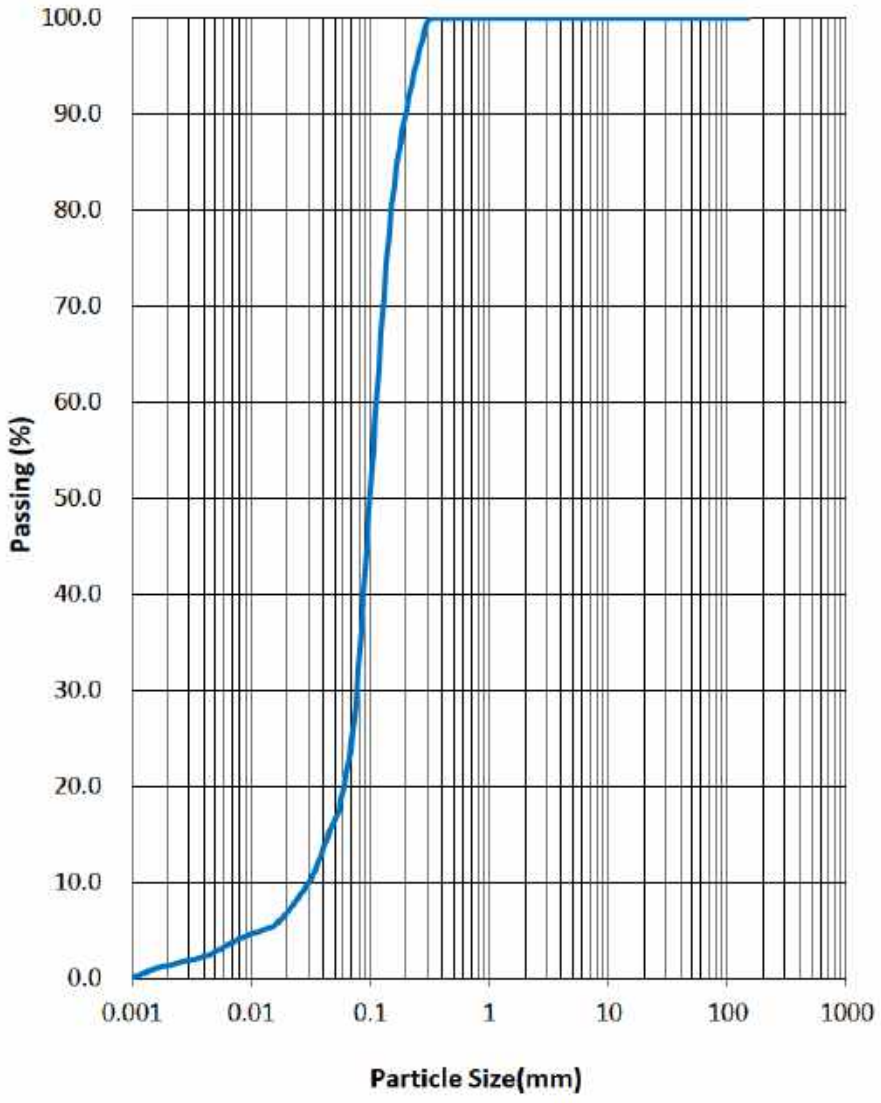
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3, 3.5.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S1	Depth (m):	-
Lab ID:	L3S1_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.752
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	100.0
2.36	100.0
1.18	100.0
0.6	100.0
0.425	99.9
0.3	99.5
0.15	79.7
0.075	28.0
0.05548	17.9
0.04664	15.6
0.03329	10.9
0.02367	8.0
0.01619	5.7
0.01184	5.0
0.00839	4.2
0.00595	3.3
0.00421	2.4
0.00298	1.9
0.00211	1.4
0.00150	0.9
0.00122	0.5
0.00105	0.2
0.00090	0.0

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature: [redacted]

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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WA 6155
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[redacted]

E-Precision Laboratory

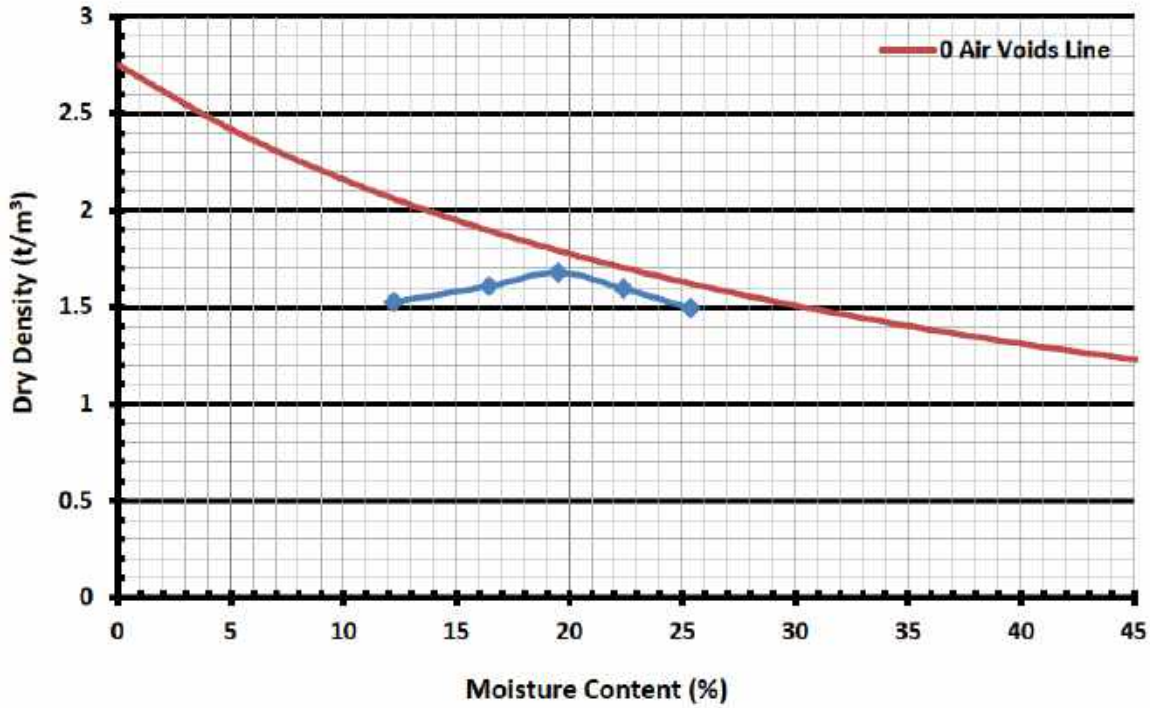
MOISTURE DENSITY RELATIONSHIP REPORT

Test Method: AS1289.5.1.1

Client:	REC	Date Tested:	12/03/2025
Project:	KMS Testing 2025	Lab:	EPLAB
Sample No:	L3S1	Job Number:	REC
Lab ID:	L3S1_SMDD		
Depth (m):	-	Room Temperature at Test:	20°C
Checked by:	Phil	Sample Description:	Tested in Mould A
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Results

Maximum Size (mm):	19.00	**Maximum Dry Density (t/m³):**	**1.700**
Oversize dry (%):	0.00	**Optimum Moisture Content (%):**	**19.00**



Notes: ** Particle density* *2.752 t/m³*

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signatur [redacted]

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

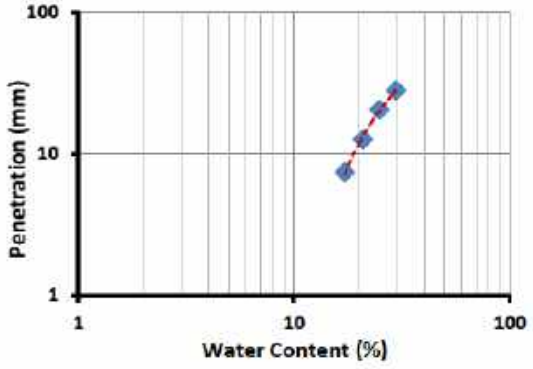
ATTERBERG LIMITS TEST REPORT

Test Method: AS1289.2.1.1 3.1.1 3.2.1 3.4.1

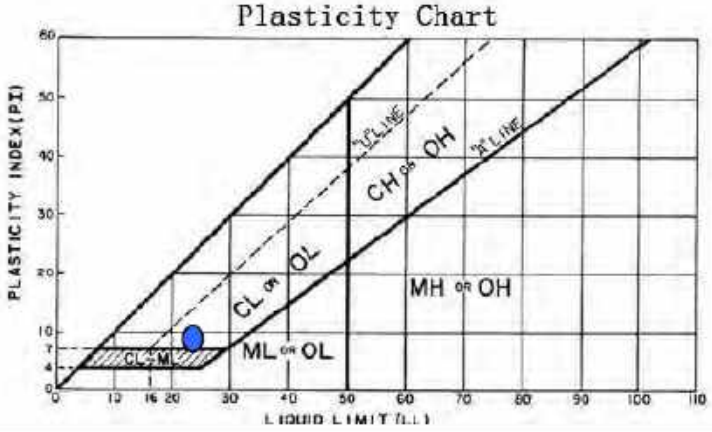
Client:	REC	Date Tested:	03/04/2025
Project:	KMS Testing 2025	Lab:	EPLAB
Sample No:	L3S2	Job Number:	REC
Lab ID:	L3S2_ATT		
Depth (m):	-	Room Temperature at Test:	18°C
Tested by:	Raymond	Sample Description:	-
Moisture Content (%):	-	Wet Density (t/m³):	-
		Dry Density (t/m³):	-

Liquid Limit (%):	23.10
Plastic Limit (%):	14.16
Plasticity Index (%):	8.94
Liquidity Index (%):	-
Shrinkage Limit (%):	12.36
Linear Shrinkage(%):	4.55

Results Chart



Plasticity Chart



Notes: The sample/s were tested oven dried, dry sieved and in a 125-250mm mould.

Stored and Tested the Sample as received

Samples supplied by the Client

Authorised Signature: [redacted]

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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[redacted]

E-Precision Laboratory

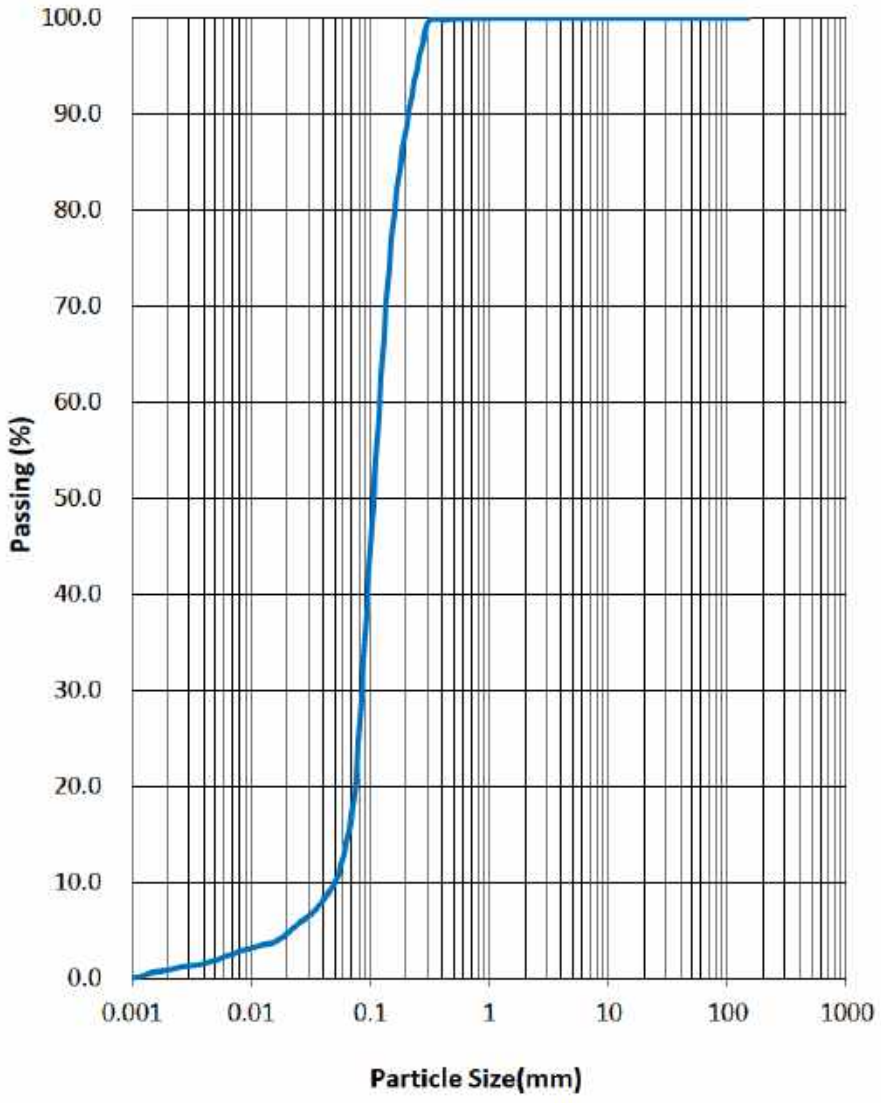
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.3, 3.5.1

Client:	REC	Date Tested:	21/03/2025
Project:	KMS Testing 2025	EP Lab Job Number:	REC
Sample No:	L3S2	Depth (m):	-
Lab ID:	L3S2_PSDH	Room Temperature at Test:	19°C
Tested by:	Raymond	2.36mm Particle Density (t/m³):	2.654
Checked by:	Phil	Moisture Content (%):	-

Sieve Size (mm)	Passing %
150	100.0
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
9.5	100.0
4.75	100.0
2.36	100.0
1.18	100.0
0.6	99.9
0.425	99.8
0.3	99.3
0.15	76.4
0.075	20.1
0.05721	11.9
0.04818	9.6
0.03431	7.1
0.02436	5.6
0.01666	4.0
0.01219	3.5
0.00863	3.0
0.00612	2.3
0.00434	1.6
0.00307	1.3
0.00217	1.0
0.00154	0.7
0.00125	0.3
0.00108	0.2
0.00092	0.0

PSD Graph



Notes:
Stored and Tested the Sample as received
Samples supplied by the Client

Authorized Signature: [redacted]

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CONTACT DETAILS

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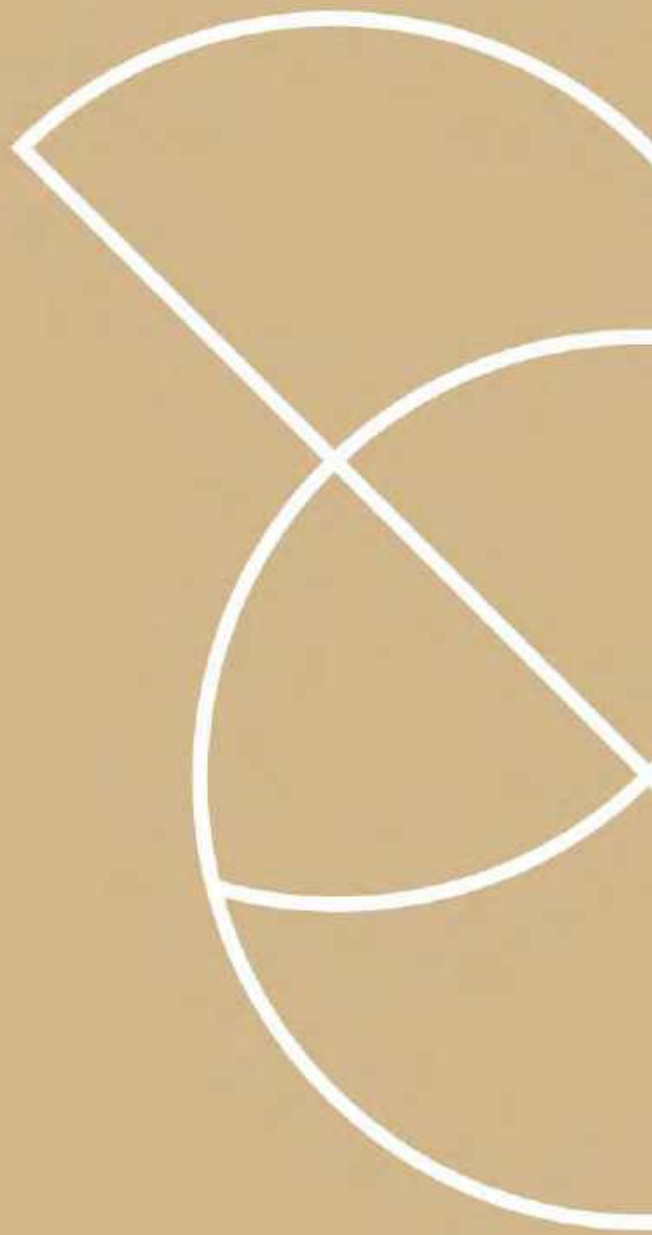
355 Scarborough Beach Road
Osborne Park WA 6017 Australia
T: +61 8 6110 4768
W: www.rec.com.au
E: info@rec.com.au

Resource Engineering Consultants Pty Ltd
ACN: 626 931 753



APPENDIX C:
STAKEHOLDER ENGAGEMENT REGISTER

MBS ENVIRONMENTAL

THUNDERBIRD KEY STAKEHOLDER REGISTER

Date	Key Stakeholders	Consultation Method	Key Feedback, Outcomes and/or Actions Comments/Issues	Proponent Response and/or Resolution
27/01/2023	No More Trucks - Keep Gubinge Rd Safe	Email	Stakeholder sent a letter including questions for KMS to answer in regards to trucking, noise and air quality, community consultation etc.	Ongoing engagement
23/02/2023	Shire of Broome	Briefing	KMS provided the Shire and Council of Broome project update. The update's focus was centred around the Port of Broome approval & timeline for community consultation. The update also provided information on Construction, local spend, recruitment, environment, and safety. The focus of the discussion centred around the trucking information and what that meant for the Broome Community.	Ongoing Engagement
23/02/2023	Bidan Community - Treasurer	Phone	Bidan members met with KMS to discuss: 1. Bidan Good Neighbour Agreement (Access to Country Procedure) 2. Economic Opportunity for Bidan with Containers for Change	Work together towards a final draft for the GNA
27/04/2023	Main Roads WA	Meeting	Discussion centred around a brief project update, KMS took the opportunity to clarify the following items 1. When was the road safety audit being undertaken? 2. What as the road audit being used for? 3. How long with the traffic counters be in place and when will the data be available? 4. PBS approval timeframe 5. Storage Location	Ongoing Engagement
11/05/2023	No More Trucks - Keep Gubinge Rd Safe	Phone	HW gave Jan an overall project update and specifically a detailed overview of the stakeholder engagement strategy being rolled out for TIA and TMP process, including stakeholders to be engaged, one on one interviews, focus groups, online survey, overview of different communication methods to be used to tell people about consultation, impact areas to be mapped. Also gave her information about proposed number of trucks, features of PBS 60m road trains, use of rotainers, and advised exact location of port storage area still being finalised but Campbell's looking at a number of different sites in the vicinity. Also discussed Main Roads' safety audit and current data collection process which will cover both dry and wet season.	Key points / concerns raised included number of trucks, size of trucks, road safety aspects (perception that road is unsafe in its current forms with current volumes), location of port storage. Fundamental issue is the cumulative effect on road safety and noise of our road transport on top of increased volumes of traffic in general.
20/05/2023	Bidan Aboriginal Community	Meeting	KMS explained Offset requirement in MS1080 and EPBC approvals and % split in spend as per Cwth offset policy. Mentioned project restrictions in regard to location. Discussed plans for initial research offset project involving better understanding feral cats populations on the Dampier Peninsula (DP) and possible cat baiting and fire mgt in future for on ground offset projects. Mentioned stakeholder engagement that has occurred to date, (including Cape Leveque Road offset and learnings from that) and ongoing engagement planned. Suggested DBCA partnering with Ranger groups such as Wallalakoo and Joombarn Buru. KMS was asked by Bidan prior to this session about the Bilby research centre who mentioned it was planned to be located next to the transitional village. KMS requested Bidan explain this concept to the group as concerns that there may be an expectation from unrelated historical discussions that the Bilby offset money would fund this idea. Bidan explained the concept and the previous discussions between Sheffield and Bidan and confirmed there was no agreements made. KMS confirmed with the group that Bilby offset funds would unlikely be approved (through the Commonwealth and State government) to be spent on a project such as this and is not related or to be confused with funding for the Bilby offset projects. Overall positive meeting.	Bidan suggested Nyul Nyul are consulted as they hold Bilby knowledge on the DP. Bidan asked if Nyul Nyul could approach KMS with a suggested project to request offset money. KMS will continue talking to NT groups and had developed set concepts around the initial project to ensure it has government support, capability and capacity in the region and would be successful. If anyone had proposed projects that fitted with these concepts they should approach KMS. - Bidan believe they could have had input into the regulatory Offset Strategy update. Requested a copy which KMS agreed to. KMS offered to work through Offset Strategy document with Bidan if they prefer. - KMS mentioned where the Bilby Offset information requesting feedback had been mentioned in KMS external facing information including community newsletters. Bidan claimed they are not receiving these. KMS will rectify.
23/05/2023	Dinosaur Coast Management Group	Correspondence	Stakeholder has concerns regarding increased truck movements along Gubinge Road and Port Drive whether these are the new 60m trucks or already permitted 53m trucks.	Ongoing Engagement
24/05/2023	Joombarn Buru Group	Meeting	Concerns raised around the mechanism to report on performance of co-existence agreement, JbAC happy with KMS performance in regards to employment and procurement, advised that KMS is going to receive a letter from the JB TO group.	Ongoing Engagement
25/05/2023	Walalakoo PBC	Meeting	Spoke to GM about advice relating to KMS renewing / applying for Misc tenements, we needed to improve the way we communicated. Wanted to establish a regular meeting with Chair and GM – ensure ongoing communications GM advised that there was a strong relationship, but the group was surprised recently about some tenements that had come through and this has put them offside a bit There are concerns from the group around lack of procurement opportunities	Establish ongoing communication with Walalakoo.
25/05/2023	JBAC Board	Meeting	Concerns raised over perceived lack of procurement and employment opportunities.	JBAC is going to write to KMS with the key concerns
13/06/2023	Kimberley Port Authority	Meeting	Discussed Part V approval process. KMS offered assistance in whatever way required to progress application. KPA has scoping meeting with DWER in the next week and will be able to provide more feedback after that. Approval process is minimum 60 days, potentially 90 days with current workload, plus possibility of an appeal. Items for discussion with DWER include impact of location of lay down areas (on or off port lands), and required stakeholder consultation as part of process. Discussed recent KMS community consultation, key emerging themes and the process used. Service licence agreement – should be signed by Board Mon 13 and then goes to Minister for approval. GTE reform coming in on 1 July will mean Treasurer also has to sign significant port transactions – uncertain whether it will get signed by new Minister before 1 July, however new Treasurer being previous Ports Minister and very aware of KPA activities should assist.	Ongoing engagement
5/03/2024	Kimberley Port Authority	Meeting;	KPA called meeting to discuss dust being generated from the OTS yard as a result of KMS activities. KMS outlined the controls in place - increase water cart, change the surface material and use a road sweeper when a vessel is in the Port. KPA were comfortable with the approach. KPA also advised that they will be talking to KMSB to try and limit operations out of E2 whilst weddings / functions were taking place at the hovercraft venue. KMS will discuss directly with KMSB in terms of the lost opportunity to utilise the E2.	A catch up will be scheduled by the KPA after the next vessel departs to have an assessment of the controls working.

THUNDERBIRD KEY STAKEHOLDER REGISTER

Date	Key Stakeholders	Consultation Method	Key Feedback, Outcomes and/or Actions Comments/Issues	Proponent Response and/or Resolution
3/04/2024	Kimberley Port Authority	Meeting;	General operational update	Action. Confirm on Monday 8/4 if KPA have received any feedback from the Amendment. Action. Advise KMS Marketing Manager of potential opportunity.
10/04/2024	Broome Chamber Commerce	Meeting;	Meeting to discuss a strategy to increase the capacity / capability of West Kimberley businesses to meet anticipated pipeline of work over the next five years - focus on safety, risk, financials etc.	Draft terms of reference developed to create a working group to develop and implement a strategy that will work with small businesses and proponents to prepare for anticipated pipeline of works.
10/04/2024	Hon Rosie Sahanna MLC Member for Mining & Pastoral	Meeting;	KMS provide an update on the Thunderbird project - employment and procurement outcomes. MLC advised that she has heard lots of positive feedback about the project, she has a few close relatives working at Thunderbird. MLC provided some high-level feedback around WA State Govt issues and the crime rates in the Kimberley WA State Govt preparing for WA State Election 8 March 2025, some nervousness in Govt around performance and mood of the broader community.	Schedule catch up for next quarter.
11/04/2024	AMEC	Teams Meeting;	Introduction to AMEC, membership benefits and events. We currently have one rep on the AMEC Safety Committee (Shaun), potential for others on Aboriginal Affairs, Legislation, Environment and Water if we want. Nick and Neil will be attending Growth Forum, opportunity to take them to Thunderbird if they would like.	Confirm primary contact going forward for KMS membership - currently Mitch.
1/05/2024	JbAC Chairperson	Phone;	Phoned Chair to advise that KMS has discovered a second stone artefact as part of a flora and fauna survey. Advised that the location has been secured and that we will be notifying the Minister and that we will cc. him into the notification to the Minister. JbAC requested if it was possible to undertake a site visit to view the artefact on Tuesday the 7th May	Arrange site visit to Thunderbird for the 7th May 2024.
7/05/2024	JbAC Chairperson	Site Trip;	KMS accompanied TOs to Thunderbird site to view the recently discovered stone artefact. The JbAC representatives spent a short time viewing the artefact and walking around the location. There were some questions around the reason for clearing and when the area would be accessed, we also viewed the map that was on hand around the site. At the end of the visit JbAC thanked KMS for facilitating the visit and advised that he would respond officially to KMS (Letter received Friday 10th May)	Respond to letter.
9/05/2024	Yeeda Station and DFES	Meeting;	Discussed fire management for Yeeda station and Thunderbird site. DFES will be undertaking "fire bombing" in the near future they will let us know when this will take place Yeeda have requested access to the bores in and around Thunderbird and sometime in the near future would like to undertake a muster in and around Mt Jowalenga.	Ongoing engagement
9/05/2024	Shire of Derby West Kimberley	Meeting;	Met with CEO & President to discuss Derby port lease status. Shire requested a meeting with COO and the Board representatives in the future. Council will send an invite.	Provide information on number of Derby employees and businesses utilised by KMS.
13/05/2024	Joombarn-buru Aboriginal Corporation Aboriginal Corporation	Meeting;	Meeting discussed - arrangements for KMS and JbAC Board to meet, upcoming ICC meeting, time to meet with KMS COO and KMS mine planning team to present to the JbAC Board. Also discussed the letter that the Chair has sent to KMS COO, advised that KMS has a different interpretation of the S18 Conditions. Also advised JBAC have not provided monitors when requested and we would like to have heritage monitors on-site and we have the heritage rangers that we used to have and KMS would like to reinstate these positions, JbACe was very open to this as an option and requested that we place this into the response to his letter.	Include heritage monitors and cultural heritage ranger positions as part of response to letter back to JbAC Send copy of previous IC minutes. Follow up with meeting requests for Board to Board meetings.
4/06/2024	Joombarn-buru Aboriginal Corporation Aboriginal Corporation	Meeting;	A follow up meeting between Chairs and opportunity for JbAC Chair and KMS COO. Broad conversation around heritage, mechanics of the TPCA. JbAC advised that he was surprised by the detail of the KMS response in regards to previous heritage works undertaken, he was asked where was the gap and JbAC advised that information had not been regularly communicated to the JbAC Board. Conversation around progressing TRADCO discussions and a specific JbAC business opportunity. Also agreed to meet board to board in August. Overall positive meeting.	Schedule time for Campbells representatives to meet with WB Arrange tour with JbAC Chair at Thunderbird to understand the mining process and logistics in more detail. Arrange the Board to Board meeting for August.
6/06/2024	Shire of Broome	Meeting;	Met with Director Development to provide an update on the Thunderbird Project and to check if the Shire of Broome had received any feedback about KMS. Shire advised that it had been very quiet from a community perspective. Councillor Jan Lewis has asked some questions in Council, about storage of rotainers during a cyclone, but not much else.	Would like to visit site
25/06/2024	Walalakoo Aboriginal Corporation - Board	Presentation;	Provided an overview of business performance to date including Aboriginal employment and procurement outcomes. Two slides relating to Jillian Ridge also presented to group.	Schedule meeting with GM and Chairperson to continue ongoing communications.
26/06/2024	Bidan Aboriginal Community	Meeting;	Discuss Sheffield / KMS Commitments: 1. Transitional Accommodation Village Advised community that it is not a priority for KMS given our maturity and focus on operations. 2. Seed Collection Waiting for feedback from Pilbara Development Commission, KMS is still very supportive 3. Containers for Change Community was seeking if there were other opportunities for recycling	Ongoing Engagement
10/07/2024	Walakaloo Aboriginal Corporation	Meeting;	Scheduled monthly engagements with WAC to progress WAC & KMS items and to re-build the relationship. • WAC are keen to progress a pre-employment program and will schedule a meeting likely next week or week after • WAC have engaged Economic Development Manager from KRED to assist with employment and economic development • The group will be tied up with the Warra and WAC evidence hearings from 15th – 30th of July in Derby and on-country • WAC are starting a junior ranger program for school aged kids (something we could support through PPE / uniforms etc) • Next year they will also be starting a female ranger program. • They are keen to explore synergy's between KMS and WAC rangers.	Ongoing Engagement

THUNDERBIRD KEY STAKEHOLDER REGISTER

Date	Key Stakeholders	Consultation Method	Key Feedback, Outcomes and/or Actions Comments/Issues	Proponent Response and/or Resolution
10/07/2024	Kimberley Ports Authority	Meeting;	1. KPA have a development approval process for the land, KMSB haven't engaged yet. 2. The lease for the 33 hectares doesn't commence until the end of construction of the marine side facility, we will need to calibrate this with what we are being advised 3. KMS has some outstanding HSE reports for the vessels outstanding 4. KPA are reviewing the Port Users Handbook, will likely incorporate a requirement to ensure that port users have appropriate stock levels (cattle, mineral sands, other) available at Port 5. Discussed dust issues and provided an overview of the work that KMS is undertaking at the OTS yard.	Ongoing Engagement
23/07/2024	Walalakoo Aboriginal Corporation	Meeting;	Discussion on proposed work-ready program in Derby early 2025. GM requested the conversation to expand further to other commitments in the Co-existence agreement.	Follow up meeting 13/08/2024.
14/08/2024	WA Main Roads Department	Meeting;	Discussed Port Drive West and the cross over. MRWA advised that the approval of the plans would be relatively straight forward. KMS asked if there was any WA MRD expectation to undertake community / stakeholder engagement, MRWA advised no. MRWA asked questions around E2, in particular if KMS views around a second access / changing the access. KMS advised that the proposed access presented challenges for the quads in terms of the swept path constraints and also visibility along the road when entering and existing the yard. MRWA also advised that as a condition of the quad permit he would be approaching KMS shortly about additional conditions.	Ongoing engagement
14/10/2024	AMEC	Phone; Briefing;	KMS briefed AMEC on the Minister's Decision regarding Aboriginal Heritage, outlining background, current situation and impact of the decision on current and future mining activities.	Ongoing Engagement
16/10/2024	WAC	Meeting;	WAC/KMS Monthly catch-up (postponed from initial meeting on 1 October 2024). Discussion on entry training program and Jillian Ridge.	CC to respond to WAC letter regarding training program.
17/10/2024	CME	Phone; Briefing;	KMS briefed CME on Minister's recent decision on Aboriginal Heritage. Discussion centred around the process leading up to decision, inc. survey process, site informants etc. Also discussed potential current and future impacts on mine.	Ongoing Engagement
13/11/2024	Broome Chamber of Commerce	Meeting;	Outlined current challenging operating conditions, including weakened Chinese market, reduced zircon prices.	Ongoing Engagement
14/11/2024	Shire of Broome	Phone;	Outlined current challenging operating conditions, including weakened Chinese market, reduced zircon prices. Advised of letter to suppliers and current financial situation impacting payments, and told him about business optimisation project with aim of increasing production and cutting costs. Shire advised a delegation from Shire are going to Canberra this weekend to meet EU Ambassador and others. He also suggested contacting Minerals Council who had recently brought a delegation from the EU to the north west, primarily looking at rare earths.	Ongoing Engagement
14/11/2024	Chamber of Minerals and Energy	Phone;	Spoke to Regional Manager to advise of current operating conditions and weakened market, business optimisation project. Also discussed EUS and potential markets / new zircon customers. CME offered assistance with anything required.	Ongoing Engagement
15/11/2024	Hon Neil Thomson MLC	Briefing; Phone;	Provided an update on Thunderbird and current challenging operating conditions.	Ongoing Engagement
3/12/2024	CME	Briefing; Phone;	Spoke to Regional Manager and then emailed one page update on organisational restructure. RM offered whatever support CME could give.	Ongoing Engagement
4/12/2024	Shire of Broome	Briefing; Phone;	Rang President to advise of organisational restructure. Followed up with email and one pager to President and key staff	Ongoing Engagement
4/12/2024	Shire of Derby	Briefing;	Emailed A/CEO one pager update on organisational restructure	Ongoing Engagement
4/12/2024	Derby Chamber of Commerce	Briefing; Phone;	Spoke to President to outline organisational restructure and waste mining changes. Emailed one pager subsequently.	Ongoing Engagement
5/12/2024	AMEC	Briefing; Phone;	Spoke to and then emailed CEO regarding operational restructure.	Ongoing Engagement
11/12/2024	Shire of Derby	Meeting;	Provided CEO with update on business including process for terminating lease which Council will need to agree to.	Provide CEO with two separate letters - one confirming insurance downgrade and the other confirming intent to terminate lease
11/12/2024	Derby Chamber	Meeting;	KMS update provided to President. Numerous projects in the pipeline in Derby, including a Curtin redevelopment timeline of 26/27 (includes runway resurfacing). Chamber will regroup in the New Year with more regular meetings. KMS talked about potential to expand the current Broome Chamber Steerco to include Derby projects pipeline.	Follow up Derby projects pipeline in the New Year.
23/01/2025	Walakaloo Aboriginal Corporation	Meeting;	Discussed the finalisation of the HPA to enable us to start discussing Jillian Ridge. Also advised that we would like to undertake further heritage surveys along the access road and in the Night Train tenements (EO4/2171) Requested an update on the HPA, WAC advised that the HPA was sent to KMS two weeks ago. WAC Chairperson advised that they would be writing to Sheffield and KMS Chairperson requesting a meeting to review the misc. agreement between WAC and KMS.	Check that HPA has been sent to KMS. Follow up WAC to provide documentation to action the royalty payments. Notify COO and KMS/Sheffield Chairpersons that a letter will be coming from WAC
28/01/2025	Minerals Council of Australia	Briefing;	Provided a brief overview of KMS operations	Likely a request to join the MCA
30/01/2025	Shire Derby West Kimberley	Phone;	Call to Peter to advise of conversations with SDWK CEO and that KMS will be sending a letter restating our position and requesting a meeting with the broader council. Peter reiterated that council had a job to represent the best interests of the Derby community and rate payers. Advised that the letter will also have the Deed of Acknowledgment attached signed by previous Shire President	Letter sent to Shire President and confirm council briefing on the 27th February 2025.
4/02/2025	Joombarn-buru Aboriginal Corporation Aboriginal Corporation	Meeting;	KMS Provided presentation - business update, procurement and employment outcomes to date. Overview of drill and blast including video of recent blast. No negative comments from JbAC members around the drill and blast.	Will revert to actions and minutes of meeting.
19/02/2025	DFES	Phone;	KMS advised DFES of gas supply situation due to GNH closure. DFES advised first trucks would be escorted through closed road today, including 3 empty EDL tankers from Sandfire to Hedland. Additional escorts will be made over next few days until the highway is able to open to the general public again.	Follow up with EDL / Main Roads
27/02/2025	Main Roads	Meeting;	Teams meeting to discuss recent media about Gubinge Road, speed review, update on Port Dr W design, waste materials on site. Mud and dust on road out of SB4 a concern for MRWA.	Look at mitigation on Port Drive out of SB4
28/02/2025	Kimberley Port Authority	Meeting;	Discussed the works approval for the Broome port, CEO advised that there still had been no feedback. KMS COO provided an overview of CY24 - tonnes shipped, cashflow and market challenges, reinforced our commitment to the port and to increase exports through the Port. KMS is negotiating permanent land options with KMSB and will need to increase the number of rotainers in the port precinct to ensure that we maintain tonnage throughput. KPA explained their capital works going forward and progress on FPOE, update on Shell and INPEX demobilizing and Jadestone commencing two year drill program.	Nil
8/04/2025	Joombarn-buru Aboriginal Corporation Aboriginal Corporation	Meeting;	Discussed details of the Revised Mine Proposal and Closure Plan	Ongoing engagement

THUNDERBIRD KEY STAKEHOLDER REGISTER

Date	Key Stakeholders	Consultation Method	Key Feedback, Outcomes and/or Actions Comments/Issues	Proponent Response and/or Resolution
9/07/2025	Department Mines, Petroleum and Exploration	Meeting;	CC & MG outlined KMS position waiting on approval of Mine Proposal and the potential impact of this on the mine. DMPE is experiencing delays as a result of the transition between departments and due to works to review need for security bond on site.	DMPE to provide update on Mining Proposal review & letter of intent to place a security bond on the site to allow KMS to respond
10/07/2025	Department of Water and Environmental Regulation	Meeting;	Discussed transition to In-pit tails and revision of Part V (EP Act) Licence	KMS to apply for licence amendment to accommodate transition to In-Pit Tails
19/08/2025	Joombarn-buru Aboriginal Corporation Aboriginal Corporation	Meeting;	Discussed details of the Revised Mine Proposal and Closure Plan and TSF incidents	Ongoing engagement
13/08/2025	Private Consultant	Meeting;	Discussed Rehab concepts and idea, as well as discussed Phil's availability to conduct flora surveys on site.	Phil on site August 25th-26th to conduct surveys. Will come back out at a later date for rehab advice.
27/08/2025	Kaynar	Meeting;	Discussed possibility of Kaynar conducting landform works for the prior rehabilitation areas north of the TSF	Kaynar to follow up with a quote and discuss with team
9/09/2025	Main Roads	Phone;	MRWA rang to clarify items relating to our road train permit, which have resulted from a Road wise meeting. Queries centred around speed limits and the permit itself.	Relevant information provided to Sandra by email, including information previously provided by Dave Serafini re the speed review. Also gave Sandra Sarah La Porta's contact details for any other queries regarding the PBS 60m road train permit.
15/10/2025	JBAC Directors	Meeting;	Positive meeting between JbAC directors and KMS Board Key items discussed: fire management plan, JbAC to have more input, further work around definition of JbAC business, work on the JbAC trust, Chair has requested that communications between JbAC and WAC should be shared (KMS is concerned with this approach and further explore the intent) potential for three way agreement. JbAC requested a focus on business opportunities for JbAC businesses	Follow up on bushfire management plan, communication between JbAC and WAC and using the business subcommittee to progress contracting opportunities.
15/10/2025	Broome Chamber of Commerce and Industry	Meeting;	Monthly BCCI Board meeting	Nil
22/10/2025	Joombarn Buru Aboriginal Corporation	Briefing;	KMS attended the JbAC AGM and provided an update on the last 12 months of Thunderbird operations. Presentation was well received.	Nil
28/10/2025	Main Roads WA	Meeting;	HW met Sandra to provide an update on preferred laydown option and ops in general. Sandra is A/Network Operations, and MRWA now has an Asset Manager, Anda, also in Broome. New Regional Manager is Rob Barnsley (replacing Gerry), and new Ops Manager is Richard Brown-Fleming (replacing Alan). Sandra explained MRWA generally only allow one entry/exit per industrial lot so may not be able to accommodate Toll design. She also said speed review team only come to Broome once a year and the 40km/h limit was not reviewed at the last visit. No knowledge of the increase in road maintenance contribution scheme or proposal to resurface area near Buru turn off.	Send meeting summary email so Sandra can take items to Rob and Richard at next meeting. Regular engagement to discuss progress and any complaints.
6/11/2025	Department Mines, Petroleum and Exploration	Meeting;	CC outlined KMS position with only 2 ha / 3 weeks of clearing left and the potential impact of this on the mine. DMPE is experiencing delays as a result of the transition to MCDP and wasn't forthcoming with anticipated approval dates or timelines - however undertook to review the RFI within a week of submission. A draft statement will then be provided to us for comment within 20 business days, if no changes then it will be issued directly thereafter.	Submit RFI ASAP.
6/11/2025	Chamber Minerals & Energy	Meeting;	Attended Land Access Committee meeting, which included a Departmental Update from Chris Shaw, DMPE - admitted many issues with MCDPs and Department was triaging applications.	NFA
12/11/2025	Department Mines, Petroleum and Exploration	Meeting;	Meeting to go through KMS response to Mine Proposal RFI and address requirements to transition to new MDCP format.	DMPE to issue Mine Proposal Approval
18/11/2025	Minister for Resources; Northern Australia	Meeting;	KMS met Minister's COS to provide a project update, economic contribution and to discuss context to Treasury application. Refer separate meeting note for detail	Engage directly with Fed Treasury Dept
3/12/2025	Critical Minerals Office	Meeting;	KMS outlined the project background, socio-economic benefits, market conditions, and debt restructuring to the CMO as background/context for the Treasury application, with a strong focus on local and Aboriginal jobs and procurement. CMO queries centred around KMS progress with reducing Chinese market exposure and looking at alternative markets.	Send through briefing note, keep updated on discussions and progress with debt restructure.
27/01/2026	JbAC	Meeting;	KMS gave JbAC a project update inc. debt restructure progress and refinancing, revised mine plan. JbAC Chair gave an overview of current business interests and potential interest in the Village tender.	Keep Wayne in the loop for upcoming tenders especially village services.

APPENDIX D:
TSF CATEGORY CHECKLIST

MBS ENVIRONMENTAL

Government of Western Australia
Department of Water and Environmental Regulation

Region Application form annex: Category checklist (tailings storage facilities)

Part V Division 3, *Environmental Protection Act 1986,*
Environmental Protection Regulations 1987

INSTRUCTIONS:

- This checklist outlines additional information requirements for applications under Part V Division 3 of the *Environmental Protection Act 1986* (EP Act) to:
  - construct and operate Tailing Storage Facilities (TSF), or
  - amend an instrument to change the conditions or characteristics related to an existing TSF (e.g. new TSFs or wall rises or lifts, or changes to delivery process or material characteristics).
- References to 'TSF' in this form include containment cells or dams and the retaining embankment, delivery system, water return system and ancillary structures required to support operations, including spillways and decant facilities.
- This checklist must be completed and submitted as an attachment to the main 'works approval, licence or amendment application form' (see Part 12 of that form). Notes included throughout this checklist must be read in conjunction with the instructions and requirements of the main application form.
- The application checklist must be completed with all relevant Application Supporting Information (ASI) attached. The 'ASI reference' column must clearly identify where in the supporting attachment(s) the relevant information has been provided or the relevant requirements have been met. Attachments containing ASI can be combined and submitted as one or more consolidated documents if desired, provided it is clear which section of the checklist the content relates to.
- If a checklist has been submitted and is incomplete the Chief Executive Officer (CEO) of the Department of Water and Environmental Regulation (the department) will decline or return the application (as applicable).
- The information requirements outlined in this checklist are not exhaustive. Applicants are advised to provide the ASI and environmental investigations as required to support the application and assessment process.

Completion matrix

The matrix below explains what sections are required to be completed for different types of TSF applications, as described in Schedule 1 Part 1 of the Environmental Protection Regulations 1987 (EP Regulations):

Category 5(c) – "Processing or beneficiation of metallic or non-metallic ore: premises on which - (c) tailings or residue from metallic or non-metallic ore are discharged into a containment cell or dam."

Key: • Form section must be completed and relevant supporting information provided. Δ To the extent required or (if amendment) changed. N/A Not applicable (information not required with application).	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Form section	New[1] above-ground or in-pit TSF (including valley TSF)	Wall raise/lift to existing TSF (in-pit or above-ground, including valley TSF)	Significant change to tailings delivery process (i.e. cyclone, thickener, etc) which will change the physical characteristics of tailings	Change to the tailings material characteristics (e.g. change in geochemical character, ore body, ore type, ore material character, etc) or the reprocessing of tailings
Part 1: Other approvals	Δ	Δ	Δ	Δ
Part 2: Conceptual Site Model	•	•	•	•
Part 3: Design overview	•	•	Δ	Δ
3.1 Design overview	•	•	Δ	Δ
3.2 Staging and storage capacity	•	•	Δ	N/A
3.3 Starter embankments and raises	•	N/A	N/A	N/A
Part 4: Construction overview	•	•	Δ	N/A
Part 5: Materials characterisation	•	N/A	Δ	•
Part 6: Seepage and water management	•	Δ	Δ	Δ
6.1 Hydrogeology	•	Δ	Δ	Δ
6.2 Stormwater management	•	Δ	Δ	Δ
6.3 TSF seepage and water management	•	•	Δ	Δ (if increase in risk)

Part 7: Other operational and management requirements	•	Δ	Δ	Δ
7.1 Dust	•	Δ	Δ	Δ
7.2 Tailings delivery and return water pipelines	•	•	Δ	N/A
Part 8: Monitoring and inspections	•	Δ (if change to layout)	Δ	Δ
8.1 Groundwater, surface water and seepage monitoring	•	Δ (if change to layout)	Δ	Δ
8.2 Dust monitoring	•	Δ	Δ	Δ
8.3 TSF inspections	•	Δ	Δ	N/A
Attachments	•	•	•	•
Att. 1 Drawings and figures (locality maps)	•	•	•	•
Att. 2 CSM table	•	•	•	•
Att. 3 Premises map and site layout	•	•	•	•
Att. 4 Design figures	•	•	•	•
Att. 5 Topography, geology and hydrogeological plans/maps	•	•	Δ	Δ
Att. 6 Layout of seepage management system	•	•	Δ	Δ
Att. 7 Stormwater or surface water management infrastructure	•	•	Δ	Δ
Att. 8 Layout of tailings delivery and return water pipelines	•	•	Δ	N/A
Att. 9 Monitoring locations map	•	Δ	Δ	Δ

Note 1: for Scenario 1, 'new' means:

- a new above-ground or in-pit TSF (i.e. whole facility)
- a new above-ground or in-pit storage cell to an existing licensed above-ground or in-pit TSF
- a change to the location, a change in the proposed liner or a change in the type of construction and staging of an approved TSF.

Part 1: Other approvals			
	Yes	**N/A**	**ASI reference**
1.1 State Agreement Act Is the premises subject to a State Agreement Act? If yes, provide a description of: • title of State Agreement Act. • relevant considerations within that State Agreement Act pertaining to the TSF and associated activities or infrastructure. • any consultation with the Department of Jobs, Tourism, Science and Innovation (DJTSI) about the TSF. • if the proposed/existing TSF is not on *Mining Act 1978* tenure, provide details of the proposed closure and rehabilitation aspects pertaining to the TSF (i.e. research, investigations, trials, progressive rehabilitation, early closure, closure outcomes and completion criteria). Refer to the Department of Mines, Industry Regulation and Safety (DMIRS) guidance on mine closure plans, particularly *How to prepare in accordance with the Statutory Guidelines*.	☐	☒	
1.2 *Mining Act 1978* approvals Provide a description of: • any consultation with DMIRS about the TSF. • status of the associated mining proposal (include registration ID if available) and mine closure plan.	☒	☐	Approvals Statement AS236099 issued for MP REG ID: 500426
1.3 Part IV Environmental Protection Act 1986 (EP Act) Provide a description of: • what has been referred and assessed in a Part IV referral. • all changes made to the TSF since Part IV referral or approval. • Part IV EP Act ministerial statement conditions pertaining to the existing TSF or proposed changes to the TSF.	☒	☐	Ministerial Statement MS 1080
1.4 *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Provide: • any consultation with the Department of Climate Change, Energy, Environment and Water about the TSF. • a description of any changes made to the TSF since submission or approval. • the EPBC approval number and copy of the TSF-related approval conditions.	☐	☒	EPBC 2016/7648 issued on 27/9/2018

Part 2: Conceptual Site Model			
	Yes	**N/A**	**ASI reference**
2.1 Conceptual Site Model (CSM) table Provide a site-specific conceptual site model (CSM)[2] that clearly identifies all potential Source-Pathway-Receptor (SPR) linkages for related environmental and public health receptors (refer to Section 2.3; Attachment 2 below). If this is for an existing facility that was previously approved under Part V Division 3 of the EP Act, only identify the changes to the model resulting from the proposed modification(s). The complexity of the CSM corresponds to the scale and complexity of the TSF activities and should be devised to assist in the TSF design process to identify appropriate design and operational measures as well as environmental monitoring requirements. A site-specific SPR assessment[3] for seepage must be undertaken as part of the CSM. Refer to Section 6.3 for seepage requirements. Note 2: Guidance on developing CSMs is provided in the department's Assessment and management of contaminated sites guidelines. Note 3: Assessment should be conducted as part of and be consistent with the requirements outlined in Part 9 of the main application form (potential emissions and discharges).	☒	☐	Please refer to Section 7 of the Environmental Licence (L9335/2022/1) Amendment Application - Supporting Documentation
Attachments			
2.2 Attachment 1: Locality map(s) An aerial photograph, map, and/or site plan of sufficient scale showing the proposed prescribed premises boundary and locality of the TSF and supporting infrastructure in respect to: • nearby sensitive receptors and surrounding land uses. • multiple maps at different scales can be provided.	☒	☐	Please refer to Section 2, Attachment 2, Figure 1 of the Environmental Licence (L9335/2022/1) Amendment Application - Supporting Documentation
2.3 Attachment 2: CSM table In accordance with Part 2.1 above, provide a site-specific CSM in table format. The CSM table should clearly summarise the identified SPR linkages for construction and operation. An example CSM table is provided in Appendix 1 to this form.	☒	☐	Please refer to Section 7 (Table 12) of the Environmental Licence (L9335/2022/1) Amendment Application - Supporting Documentation

Part 3: Other approvals

INSTRUCTIONS:

- This section requires applicants to provide a detailed overview of the design concept including all related infrastructure, such as seepage collection and management infrastructure.
- The proposed design should consider and acknowledge the interactions between all elements and take into consideration the environmental setting, adjacent current and future land uses, available materials and infrastructure, and materials characteristics of the tailings to be received.

	Yes	N/A	ASI reference
3.1 Design overview Provide details on the design overview (e.g. TSF footprint, cells and division embankments etc.). Specified design detail must be provided for each proposed cell of the TSF. If a change is being applied for a facility previously approved under Part V Division 3 of the EP Act (i.e. not a new facility) clearly define: • changes proposed • how they alter from the existing design and facility management measures.	☒	☐	Please refer to Section 3 of Environmental Licence (L9335/2022/1) Amendment Application - Supporting Documentation and Section 5 of In-Pit Tailings Storage Facility Cell 1 DDR attached as Appendix A.
3.2 Staging and storage capacity Provide details on proposed staging and storage capacity. As a minimum, include the: • expected crest elevation/pit depth, • tailings storage area (m^2), • tailings storage volume (m^3), • cumulative storage volume (m^3) for the starter embankment(s) and raise(s).	☒	☐	Please refer to Section 3 of the Environmental Licence (L9335/2022/1) Amendment - Supporting Documentation and Section 5.4 of In-pit Tailings Storage Facility Cell 1 DDR attached as Appendix A.
3.3 Starter embankments and raises Provide details on the proposed starter embankments and raises including: • general approach (upstream, centreline, downstream) • maximum height • materials properties, and availability.	☒	☐	Please refer to Section 3 of Environmental Licence (L9335/2022/1) Amendment - Supporting Documentation and In-pit Tailings Storage Facility Cell 1 DDR attached as Appendix A
Attachments			
3.4 Attachment 3: Premises map and site layout plan(s) A premises map and site layout plan(s) must be provided and include: • premises boundary and relevant tenure • TSF cell(s), proposed staged build (if required) and final landform • construction borrow source • seepage and groundwater monitoring bores	☒	☐	Please refer to Figure 1, 2 and Figure 7 of Environmental Licence (L9335/2022/1) Amendment Application - Supporting Documentation

Part 3: Other approvals			
• dewatering bores • roads (including haulage) and access tracks • topsoil stockpiles • pipelines, including connectivity (e.g. processing plant to the TSF) and scour pits if relevant • key environmental aspects or features (e.g. watercourses) • other key site infrastructure (i.e. pits, plant, accommodation village, administration offices, etc.) • topographical contours on and around the TSF • scale, north arrow, GPS coordinates and legend.			
3.5 Attachment 4: Design figures A series of design figures must be provided that include the following: • TSF layout depicting all TSF-related infrastructure (existing and proposed) including, but not limited to: - TSF cell(s) - embankments - supernatant pond(s) - stormwater infrastructure - tailings and water pipelines, including decant lines and pump locations, and related tanks and/or ponds - tailings discharge location(s) - seepage management and/or underdrainage design • clear highlighting/identifying of the proposed changes (if applicable) • schematic cross-sections of the TSF cell(s) and or embankments, including related geology.	☒	☐	Please refer to Section 3, Figures 2 - 6 and Figure 15 of Environmental Licence Amendment Application - Supporting Documentation and Appendix A of In-pit Tailings Storage Facility Cell 1 DDR attached as Appendix A.

Part 4: Construction overview			
INSTRUCTIONS: • This section requires applicants to provide a detailed overview of the proposed construction works including all related infrastructure that are proposed under this application to clarify the scope of assessment.			
	Yes	**N/A**	**ASI reference**
4.1 Scope of construction works Provide details of construction works including, but not limited to: • general site preparation works • infrastructure to be constructed • construction phases	☐	☒	Refer to Section 3 and Section 5 of Environmental Licence (L9335/2022/1) Amendment - Supporting Documentation and and Appendix F of In-pit Tailings Storage Facility Cell 1 DDR attached as Appendix A.

• timing of works – including all lifts being applied for, if applicable, (including all lifts proposed for within the next five years) • summary of management measures and controls to be adopted for key environmental factors including, but not limited to: - noise - dust - stormwater/surface water - erosion and sediment - hydrocarbon management (fuel, spills) Information must be consistent with the requirements outlined in Part 9 of the main application form (potential emissions and discharges).			

Part 5: Materials characterisation

INSTRUCTIONS:

- This section requires applicants to provide a detailed overview of the physical and geochemical characteristics of the tailings and embankment materials.
- Geochemical characteristics of representative material (i.e. tailings or other) should been defined, such that the geochemical risks are understood at least to a high level.
- A sampling program that sufficiently addresses the different type(s) of materials, such that their variability/heterogeneity is represented, should be conducted.
- Altered weathering zone(s) should be considered in the sampling program where applicable.
- Representative samples of tailings/process residues should be obtained from metallurgical test work conducted during the feasibility and development stages of the project.
- For existing sites, sampling should cover the full lateral and vertical extent from existing facilities/stockpiles, where possible.

	Yes	N/A	ASI reference
5.1 Materials characterisation Provide details on materials characterisation including, but not limited to: • where is each tailings type coming from? • any blending and ratios • number of samples taken relative to the volume/throughput • process chemicals used • water used, additional inputs to the system (any wastewater, decant recycled) • deposition methodology • physical details of each tailings type (i.e. material characterisation, wet/dry material, moisture content, dispersion characteristics, attenuation properties, modelled/actual consolidation) • geochemical performance of each tailings type (i.e. composition, contaminants of concern) • where a new tailings material (including new pits) is proposed, a comparison against existing tailings should be provided • acidic and/or metalliferous drainage (AMD), inclusive of:	☒	☐	Please refer to: Section 3.3.1 of Environmental Licence (L9335/2022/1) Amendment - Supporting Documentation and Section 4.2 of In-pit Tailings Storage Facility Cell 1 DDR attached as Appendix A.

Part 5: Materials characterisation			
- potential risk of AMD, neutral mine drainage (NMD), saline drainage, and acidic drainage of the tailings - metalliferous drainage (encompassing all metals and metalloids, regardless of whether the conditions are acidic) - naturally occurring radioactive material (NORM) and technologically enhanced naturally occurring radioactive materials (TENORM). • erosive, sodic and/or dispersive materials • fibrous minerals • leachability of contaminants with environmental significance from the tailings • water quality of tailings decant and seepage • continuity and variability of the geochemical characteristics of tailings • characteristics of embankment material.			

Part 6: Seepage and water management			
INSTRUCTIONS: • This section requires applicants to provide a detailed overview of seepage and water management. • Information must be provided on the proposed seepage management system including seepage recovery requirements. • The premises must be designed and constructed to ensure that stormwater is diverted away from the TSF (including individual cells). This may be achieved through the use of surface grade changes, bunding, interceptor drains, piping and other drainage systems. • Stormwater that has come into contact with the surface of the TSF (including embankments) must be collected and managed as decant in the decant management system.			
	Yes	**N/A**	**ASI reference**
6.1 Hydrogeology Provide a detailed overview on the following in relation to the TSF: • local geology • topography • geotechnical characteristics • hydrogeology including waterways and drainage plains • for in-pit TSFs, include known preferential and fracture pathways. Aerial overview and geological cross-section drawings must be provided.	☒	☐	Please refer to: Section 6.5 of Environmental Licence Amendment Application - Supporting Information
6.2 Stormwater management Provide details on the proposed stormwater management and controls for the TSF including, but not limited to: • diversion of stormwater away from the TSF using drainage features, bunds, interceptor drains or other drainage systems • details on clean stormwater holding ponds to be constructed (if required). Design specifications and an overview of construction works should also be provided.	☒	☐	Please refer to: Section 3 of Environmental Licence Amendment Application - Supporting Information

Part 6: Seepage and water management			
• details of any proposed controlled releases of clean stormwater into the environment and/or proposed reuse options on site • erosion and sediment control along drainage lines and discharge points. This includes stormwater flow control, vegetation, detention ponds, minimising land disturbance and other temporary and permanent erosion protection measures. Guidance on stormwater management can be found in the department's *Stormwater Management Manual for Western Australia*.			
6.3 TSF water and seepage management Provide details on seepage including, but not limited to: • where seepage is expected to occur (include a figure or map of plume modelling or estimated groundwater flow rates over time) • seepage rate and flow direction – including in-pit walls if applicable • estimated seepage migration timeframes in relation to receptors • seepage water quality and known contaminants of concern • consideration of existing seepage (including adjacent TSFs if applicable) as cumulative emissions in water balance calculations • seepage management measures. Has a seepage assessment been conducted for the works proposed under this application? A site-specific self-assessment[4] based on the SPR model and risk-rating matrix outlined in the department's *Guideline: Risk assessments* must be undertaken for seepage as part of the CSM: • The self-assessment should be conducted as part of and be consistent with the requirements outlined in Part 9 of the main application form (potential emissions and discharges). • The CSM must be completed as outlined in Part 2 of this form. • Proposed mitigation measures, triggers and timeframes, along with any residual risks must be clearly identified. • Self-assessment should include any SPR linkage of seepage to near-surface (i.e. land or soils), surface water and/or groundwater receptors. If the department's risk assessment (conducted as part of the assessment of this application) results in a residual risk the following further information may be required: - a time-dependent model including sensitivity of key parameters - relevant cross-sections of the pore pressure conditions for key time steps in the TSF's life. At a minimum this should include pre-mining conditions, year 1, mid-life, final year and post-operational drain-down - seepage management measures, including plan location, depth and expected efficiency.	☒	☐	Please refer to: Section 3 and Figures 2, 5 and 6 of Environmental Licence Amendment Application - Supporting Information and Section 5.6 and 5.7 of In-pit Tailings Storage Facility Cell 1 DDR attached as Appendix A.

Part 6: Seepage and water management			
It is recommended that the above information is provided with the application up-front if the self-assessment identifies a 'high' or 'extreme' risk to avoid delays in the application process[5]. Note 4: The risk assessment must be undertaken in accordance with the department's *Guideline: Risk assessments*. Note 5: Risk ratings are to be in accordance with the risk rating matrix outlined in the department's *Guideline: Risk assessments*. Provide details on the proposed TSF water management and controls including, but not limited to details of the: • proposed tailings delivery and decant/reclaim system • proposed cut-off trenches/toes and underdrainage system • operational water balance assessment, including approach, assumptions and estimates • operational freeboard assessment of storm storage capacity of the TSF (for each cell) at the proposed final height, relevant to its consequence category • proposed decant/reclaim system, including: - inlet/outlet locations - pumps and contingencies for failures - incidental rainfall collection on the TSF - pipelines, including location and specifications - access causeway construction - emergency spillway(s) - decant ponds (i.e. size, capacity, freeboard requirements, elevations, locations, etc). For existing sites previously approved under Part V Division 3 of the EP Act, provide information on existing water and seepage management. Include details such as updated water modelling. Data should be provided in Excel format to demonstrate trends over time.			
Attachments			
6.4 Attachment 5: Topography, geology and hydrogeological plan(s) An aerial overview and cross-section drawings of topographical, geological, and hydrogeological features related to the TSF, including existing monitoring bores and other monitoring instrumentation.	☐	☒	Please refer to: Figures 5,6,7,& 8 of Environmental Licence (L9335/2022/1) Amendment Application - Supporting Documentation and Tailings Storage Facility Cell 1 DDR attached as Appendix A.
6.5 Attachment 6: Layout of seepage management system Provide a layout plan of the proposed seepage management system that clearly depicts all associated infrastructure and equipment.	☐	☐	Please refer to Figures 3, 5 and Figure 6 of Environmental Licence

Part 6: Seepage and water management			
Multiple plans can be provided.			(L9335/2022/1) Amendment Application - Supporting Documentation and Appendix A of In-pit Tailings Storage Facility Cell 1 DDR attached as Appendix A.

Part 7: Seepage and water management			
INSTRUCTIONS: • This section outlines the operational management aspects of the TSF that must be addressed as part of an application. Focus should be given to the day-to-day activities undertaken at the TSF and the practices to be implemented to minimise environmental impacts.			
	Yes	**N/A**	**ASI reference**
7.1 Dust Provide details on the proposed dust mitigation measures to control dust emissions from the TSF. Where saline water is used for dust suppression, all reasonable measures must be taken to avoid detrimental impacts to surrounding environmental receptors. These measures must be documented in the application. 'Dust' includes dried tailings lift-off from the surface of the TSF.	☒	☐	Please refer to Section 5: Attachment 6A of Environmental Licence (L9335/2022/1) Amendment Application - Supporting Documentation
7.2 Tailings delivery and return water pipelines Provide details on the proposed tailings delivery and return water pipelines including, but not limited to: • locations • design specifications • connectivity (i.e. processing plant to TSF) • decant and reclaim system • supernatant ponds (location, size, etc). Provide details of the proposed management measures for tailings delivery and return water pipelines including, but not limited to: • trenches and diversion bunds • monitoring devices • flow meters • telemetry • leak detection/monitoring system • shut-off valves • inspections • deposition strategy • contingency measures in event of pipeline spills or ruptures.	☒	☐	Please refer to Section 3 of Environmental Licence (L9335/2022/1) Amendment Application - Supporting Documentation and Appendix A of In-pit Tailings Storage Facility Cell 1 DDR attached as Appendix A.

Part 7: Seepage and water management			
Attachments			
7.3 Attachment 8: Layout of tailings delivery and return water pipelines Design drawings and layout figure(s) of the proposed tailings delivery and return water pipeline infrastructure must be provided.	☒	☐	Please refer to Appendix A of In-pit Tailings Storage Facility Cell 1 DDR attached as Appendix A of Amendment Application - Supporting Documentation

Part 8: TSF monitoring and inspections

INSTRUCTIONS:

- This section requires applicants to provide an overview of the proposed monitoring and inspection components of the TSF.
- A comprehensive monitoring program should be developed to support the ongoing operation of the TSF. Aspects that should be included in the monitoring program (as a minimum) include seepage, surface water and groundwater, relevant to the risks identified.
- The operator must continually review the quality of data obtained and the positioning of monitoring points during the regular review of monitoring data.
- Typical monitoring aspects are outlined further below. Where an operator elects not to commit to certain monitoring programs, they must provide clear justification and rationale for this decision.

	Yes	N/A	ASI reference
8.1 Groundwater, surface water and seepage monitoring Provide details on the proposed groundwater and surface water monitoring program including, but not limited to: • groundwater, surface water, and seepage sampling/monitoring locations (including monitoring and recovery bores) • nearest stock bore(s) • nearest supply bore(s) • well construction specifications • sampling methodology • analysis suite • sampling frequency. For a new TSF, the operator should seek to demonstrate baseline groundwater and surface water conditions before construction works and to feed the results of this monitoring into the initial CSM development. The monitoring program should as a minimum seek to establish: • background groundwater quality, levels (in mAHD and mBGL), flow rates and flow directions • background surface water quality, levels, flow rates and flow directions • local aquifers, and groundwater flow direction and rates of each aquifer (if available) • a monitoring network that acts as an early indicator of seepage contamination in groundwater or surface water prior to offsite migration. For established TSFs, the operator should seek to demonstrate no changes from baseline conditions; and that any models/assumptions provided in original approval applications are sound. A Sampling and Analysis Quality Plan (SAQP) should be prepared to ensure that the data collected are representative and sufficient to address critical gaps and uncertainties identified in the CSM so that the information obtained provides a reliable basis for continually reviewing site operations and meeting compliance requirements of the operating licence.	☒	☐	Please refer to Section 3 and 6 of Environmental Licence (L9335/2022/1) Amendment Application - Supporting Documentation And Section 5.6 and 5.7 of In-pit Tailings Storage Facility Cell 1 DDR attached as Appendix A

Part 8: TSF monitoring and inspections			
For established TSFs please provide a summary/trend of the results of the data from the past five years and identify if there are any issues. Further guidance on developing a groundwater and surface water monitoring program, including the development of a SAQP, can be sourced from the department's Assessment and management of contaminated sites guideline and from Schedule B2 of the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (ASC NEPM).			
8.2 Dust monitoring Provide details on the proposed TSF dust monitoring including, but not limited to: • monitoring locations • monitoring methodology (i.e. visual, monitoring stations, DustTrak etc.) • monitoring frequency and duration • contingency measures.	☐	☒	Please refer to Section 6.1 of Environmental Licence (L9335/2022/1) Amendment Application - Supporting Documentation
8.3 TSF Inspections Provide details on the proposed TSF inspections including, but not limited to: • timing and frequency • erosion and sediment monitoring (including locations, methodology, frequency) • inspection locations and TSF components (i.e. drainage, freeboard, pipelines, vegetation etc).	☒	☐	Please refer to Section 3, of Environmental Licence (L9335/2022/1) Amendment Application - Supporting Documentation and Section 6 and Appendix B of In-pit Tailings Storage Facility Cell 1 DDR.
Attachments			
8.4 Attachment 9: Monitoring locations Provide layout figure(s) of the proposed monitoring locations (with GPS coordinates) including, but not limited to: • monitoring bore locations (including groundwater, seepage and recovery bores) • surface water monitoring locations • dust monitoring locations • vegetation monitoring locations.	☐	☒	Please refer to Figure 5, 6, 7 and Figure 15 of Environmental Licence (L9335/2022/1) Amendment Application - Supporting Documentation and Appendix A of In-pit Tailings Storage Facility Cell 1 DDR

APPENDIX 1: Example Conceptual Site Model (CSM) table:

Source / Activities	Potential emissions, pollutants, or contaminants of concern	Potential pathway	Potential receptors	Potential impacts	Proposed controls and contingencies
TSF-Cell 1 (deposition of tailings)	TSF-Cell 1 supernatant potentially containing concentrations of elements with environmental significance such as cyanide	Seepage/ infiltration	Underlying groundwater (20 mBGL)	Reduced groundwater quality	Groundwater monitoring, recovery bores, triggers and actions
			Groundwater and/or surface water users located at Green Town, 15 km	Health and amenity impacts	
		Groundwater mounding, seepage expression)	Surface water (specifically Blue Creek located 200 m south of the southern embankment of the TSF-Cell 1	Reduced surface water quality, and ecosystem disturbance	
Decant pipeline and/or tailings delivery pipeline failure	Decant water potentially containing concentrations of elements with environmental significance such as cyanide	Direct discharge Infiltration into soil or groundwater	Surface water (specifically Blue Creek located 200 m south of the southern embankment of the TSF-Cell 1	Reduced surface water quality and ecosystem disturbance	Telemetry, auto cut-offs, visual monitoring; clean-up response, reporting, spill containment measures
			General native vegetation. No Threatened Ecological Communities (TECs), Priority Ecological Communities (PECs) or threatened or priority flora were recorded within or near the proposed works area of the TSF	Reduced vegetation health, and potential loss of vegetation in some areas	Vegetation monitoring, siting of infrastructure
Stormwater	Sediment laden runoff. Potentially contaminated stormwater	Overland runoff	Surface water (specifically Blue Creek located 200 m south of the southern embankment of the TSF-Cell 1	Reduced surface water quality and ecosystem disturbance	Stormwater infrastructure, diversion drains, trenches, monitoring
			Native vegetation. No TECs, PECs or threatened or priority flora were recorded within or near the proposed works area of the TSF	Reduced vegetation health	Vegetation monitoring, flora surveys
Overtopping of TSF-Cell 1 due to insufficient freeboard capacity	Tailings potentially containing concentrations of cyanide	Unplanned direct discharge of tailings into the environment	Underlying groundwater (20 mBGL)	Reduced groundwater quality and impacts to downgradient groundwater users	Freeboard, water balance, water recovery measures
			Surface water (specifically Blue Creek located 200 m south of the southern embankment of the TSF-Cell 1	Reduced surface water quality, and ecosystem disturbance	
			Native vegetation. No TECs, PECs or threatened or priority flora were recorded within or near the proposed works area of the TSF	Reduced vegetation health, and potential loss of vegetation in some areas	
Dust (dried tailings) lift-off from the surface of the TSF-Cell 1, or embankments	Dust (dried tailings) potentially containing contaminants	Windblown dust transport through air then deposition	General native vegetation. No TECs, PECs or threatened or priority flora were recorded within or near the proposed works area of the TSF	Health/amenity impacts	Monitoring, triggers, dust suppression measures; modelling
		Air/wind dispersion	Residents located in proximity		