GEOTECHNICAL INVESTIGATION REPORT FOR THE DESIGN AND CONSTRUCTION OF RETHUSENG SPECIAL SCHOOL, MAMEHLABE, BLOUBERG LOCAL MUNICIPALITY, CAPRICORN DISTRICT, LIMPOPO PROVINCE.

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Location : Mamehlabe, Capricorn District, Limpopo Province

Date : 28 August 2025

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Report Date:	**28 August 2025**	
Project Reference	**Rethusheng Primary School**	
Managing Director	**SACNASP No**	**Signature**
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Overview

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LIST OF ABBREVIATIONS AND DEFINITIONS

TP: Test Pit (An excavation unit intended for profiling and sampling
DCP: Dynamic Cone Penetrometer – The test involves dropping of an 8kg weight on an anvil through a drop height of 575mm. This causes a 20mm diameter cone of 60-degree vertex angle, attached to a rod to penetrate the soil.
CBR: California Bearing Ratio
AASHTO: American Association of State Highway and Transportation Officials
Collapsible soil: A soil that exhibits sudden or rapid settlement when subjected to a combination of applied lot and an increase in moisture content.
Compressible soil: A soil that exhibits gradual settlement as its volume decreases when subjected to an applied load
Expansive Soil: A fine-grained soil whose clay mineralogy causes it to experience volumetric changes due to alternate wetting and drying cycles.
Foundation Indicator: A verification test for assessing basic characteristics of disturbed samples
Soil Profile: A record of the vertical succession of the different soil horizons as they occur at a particular location.
Soil Profile: A record of the vertical succession of the different soil horizons as they occur at a particular location.
Below Ground Level (bgl): means the vertical depth measured downward from the existing ground surface at the point of interest to a feature or horizon (e.g., soil layer, groundwater, footing).

Executive Summary

Mobu Geo Services (Pty) Ltd was commissioned by Muteo Consulting (Pty) Ltd on behalf of Limpopo Department of Public Works, Roads and Infrastructure to undertake a geotechnical investigation to support the design and construction of Rethuseng Special School in Mamehlabe, Blouberg Local Municipality, Capricorn District, Limpopo Province. The objective of the investigation was to characterise the subsurface conditions and to develop engineering parameters for design and construction.

Fieldwork was carried out on the 2nd of August 2025. The investigation comprised excavation of eight (8) test pits advanced to depths of approximately 1.05 m below ground level, supplemented with Dynamic Cone Penetrometer (DCP) testing conducted adjacent to each test pit. Representative samples were submitted to a civil engineering materials laboratory for classification testing, moisture–density relationships (Modified AASHTO), and California Bearing Ratio (CBR) testing.

The site is mantled by transported soils overlying residual granite. The residual granite is underlain by weathered granite bedrock at shallow depth. The transported horizons comprise silty sandy gravel and gravelly silty sand, whereas the residual profile is predominantly granitic gravelly sand to sandy gravel.

The transported soils generally classify as G8 quality material according to COLTO specifications and are not suitable for use as engineered fill. The residual soils derived from granite bedrock classify predominantly as G5–G6 and are suitable for use as an engineered fill, provided they are placed and compacted in accordance with specification.

DCP testing was conducted to depths of approximately 0.23m to 0.755m below ground level, and the results indicate lower inferred bearing capacity within the transported horizon, typically in the range of approximately 90 kPa to150 kPa, with values increasing to greater than 200kPa within the residual and weathered bedrock profile.

No seepage was observed in the test pits at the time of investigation. The presence of ferricrete nodules, however, suggests that perched water may occur on a seasonal basis. The design should therefore include positive surface drainage to prevent water ingress adjacent to structures.

In terms of NHBRC guidance, the site is zoned as Site Class R–C, where “R” reflects areas controlled by shallow bedrock and “C” reflects areas underlain by compressible and potentially collapsable soils. Normal

strip foundations are recommended. Where footings are founded directly on bedrock, an indicative allowable bearing capacity of approximately 500 kPa is appropriate, and where foundations are placed on engineered fill over residual soils, an indicative allowable bearing capacity of approximately 200 kPa is appropriate when compacted using G5 quality material. These values are subject to confirmation at founding level during construction.

Excavation conditions are generally soft to depths of approximately 1.05 m below ground level. Deeper excavation is feasible using suitable mechanized plant.

Earthworks should follow SANS 1200 principles. The contractor should strip vegetation and topsoil, proof-roll the formation, undercut soft or yielding zones, and replace them with approved selected material. Fill should be placed in layers not exceeding 150 mm and compacted to the specified Modified AASHTO density with appropriate moisture control. Routine density and moisture testing should be carried out, and founding inspections should be documented by a competent person.

The site is suitable for the proposed school development, provided the drainage, earthworks, and foundation controls described above are implemented and founding levels and layerworks are verified during construction.

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1. INTRODUCTION

1.1 Terms of Reference

Mobu Geo Services (Pty) Ltd was commissioned by Muteo Consulting (Pty) Ltd on behalf of Limpopo Department of Public Works, Roads and Infrastructure to conduct a geotechnical investigation for the design and construction of Rethuseng Special School at Mamehlabe Village, under the Blouberg Local Municipality in the Limpopo Province of South Africa.

The study provides a review of available geological, geotechnical and topographic data of the site and surrounds. This information was used to assess and determine the regional geological and geotechnical conditions, initial site risks and likely geotechnical constraints for the proposed development.

The basic objective of this geotechnical investigation was to assess the soil and rock profile below the site and evaluate the subsurface conditions. All these activities aim to give well- informed engineering parameters for input into design for the proposed development.

1.2 Objectives

The objectives of this geotechnical investigation were to:

- Determine the geological origin of the material on site and engineering properties of different materials layers on site to provide foundation solutions.
- Comment upon perched and/or permanent water table if encountered within the limits of investigation.
- Assess the suitability of the near surface soils for use as backfill, bedding and/or pavement materials.
- Comment upon the excavatability of the near surface soils and any geotechnical constraints that may impact upon the design and construction of the proposed development (problematic soils, etc.)
- Provide foundation recommendations for the proposed development.

1.3 Report Provisions

This report is specifically suitable for design purposes of structures for the proposed special school. It is meant solely for use in the above manner. Any form of development, outside the boundaries of the investigated area as per the attached site layout plan, is not covered by this report.

1.4 Information Sources

The following were studied to obtain information about the site:

- *1:250 000 scale geological map sheet 2328 PIETERSBURG. published by the CGS*
- *Satellite images and site layout plans where available*
- *Available literature*

1.5 Scope of Work

The scope of the work involved:

- Desktop analysis of the relevant available information
- Site investigations:
  - Excavation of test pits and evaluation of the ground profile
  - Sampling on key horizons
  - DCP Testing
- Collection of representative samples and execution of laboratory testing
- Interpretation of site information and laboratory test results
- Preparation of an interpretive geotechnical report

2. SITE DESCRIPTION

2.1 Location

The site is located in Mamehlabe in Ga-Matlala under the Blouberg Local Municipality within the Capricorn District Municipality of Limpopo Province. The site is situated within centre coordinates 23°33'15.49"S 28°57'28.96"E. Access to the site is gained via the Juno Road. The reader is referred to **Figure 1** for locality map.

2.2 Land Use

The site is currently vacant and classified as a greenfield area. It is predominantly covered with natural vegetation, including trees and dense shrubbery. **Plate 1** shows the condition of the site.

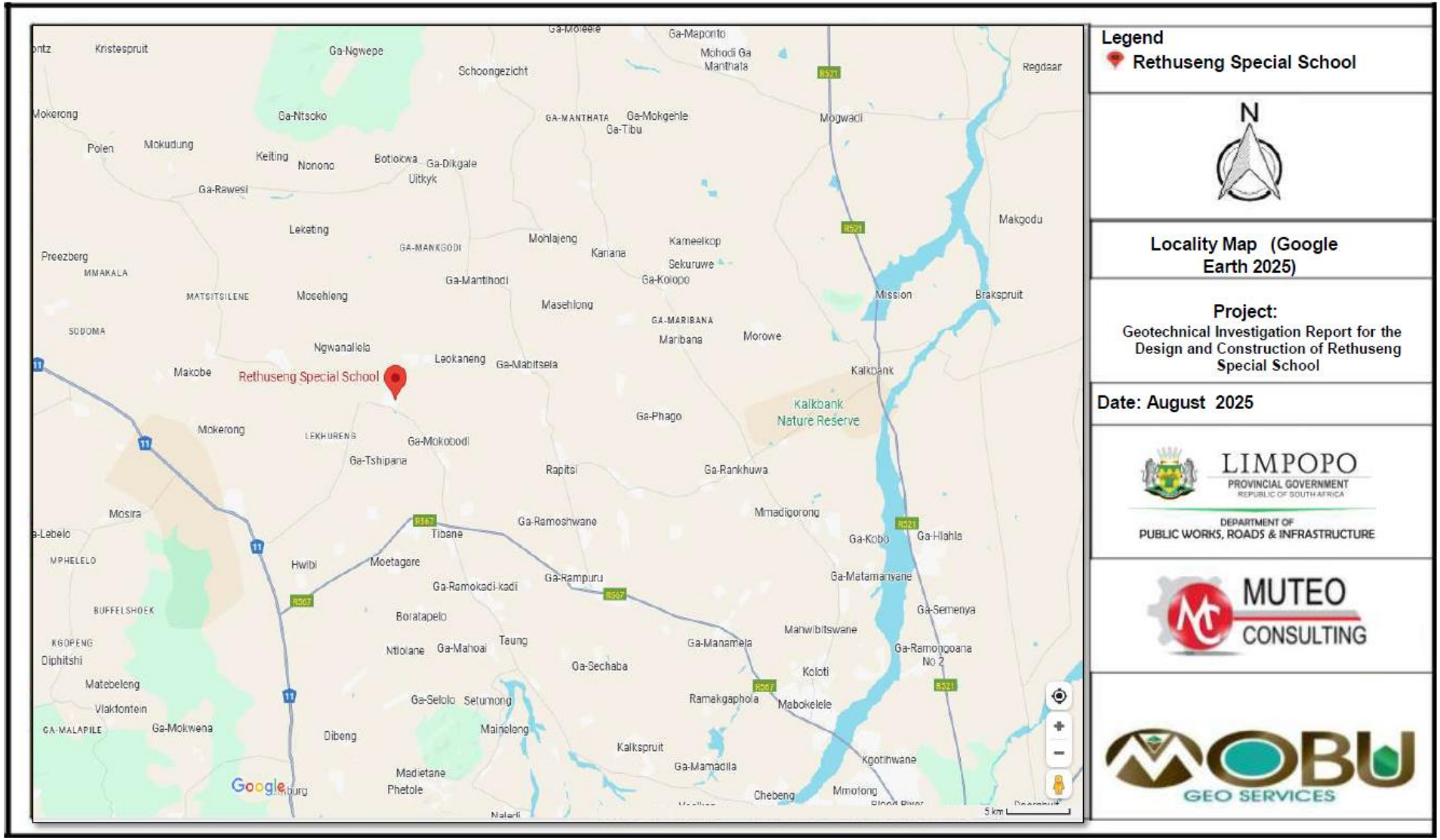


Figure 1: Locality of the site

Plate 1: Condition of the site

2.3 Topography

The test-pit elevations indicate a gently sloping site, with levels ranging from 1060m above mean sea level (northeast) to 1049m above mean sea level (southwest), giving a total relief of approximately 11m across the footprint. Surface runoff, particularly during periods of heavy or prolonged rainfall is anticipated to be in the form of sheetwash towards the south-southwest.

2.4 Climate

Mamehlabe experiences a warm semi-arid climate. Summers (November to February) are hot and humid, with average daytime highs of 30°C to 34°C and frequent afternoon thunderstorms delivering most of the annual rainfall (around 450–600mm). Winters (June to August) are dry and mild, with pleasant daytime temperatures of 22°C to 26°C and cool nights that can drop to lows of between 5°C and 8 °C.

The climatic regime plays a fundamental role in the development of the soil profile and the weathering of rocks. Weinert (1964) demonstrated that chemical decomposition is the predominant mode of rock weathering in areas where the climatic "N-value" is less than 5. In areas where the climatic N-value is between 5 and 10, disintegration is the predominant form of weathering, although some chemical decomposition of the primary rock minerals still takes place. Where the climatic N-value is greater than 10, secondary minerals do not develop to an appreciable extent, and all weathering takes place by mechanical disintegration of the rock.

Weinert's climatic N-value for the area is less than 5. This implies that chemical decomposition is the predominant form of weathering.

2.5 Ground Subsidence

Subsidence occurs in areas with large underground cavities typically resulting from large scale shallow to very shallow mining and from dolomite/limestone dissolution. It may also appear where thick deposits of unconsolidated material exist. From the desktop studies and results of the site investigation, there are no signs of previous subsidence and no underground mining activities occurring around the site.

2.6 Sinkhole Formation

Similar to subsidence, sinkhole formation occurs in areas with very large to extremely large underground cavities resulting from poorly designed shallow underground activities. Dissolution of dolomites or limestones over millions of years, may lead to cavity formations which later manifest as sinkholes. The available 1:250 000 2328 PIETERSBURG geological map shows that the site is not underlain by dolomite bedrock. The probability of sinkholes development is remote.

2.7 Seismic Hazard

Seismic activity can be defined by type, frequency and size of earthquakes that happen over a period in certain areas. In South Africa, areas of seismic activity are determined from the seismic hazard map and hazard zones. Based on seismic hazard maps**,** the Peak Ground Acceleration (PGA) value in this area is estimated to be 0.10g, indicating a low probability of significant ground shaking is predicted for the site and surrounding areas.

2.8 Landslide and Mudslides

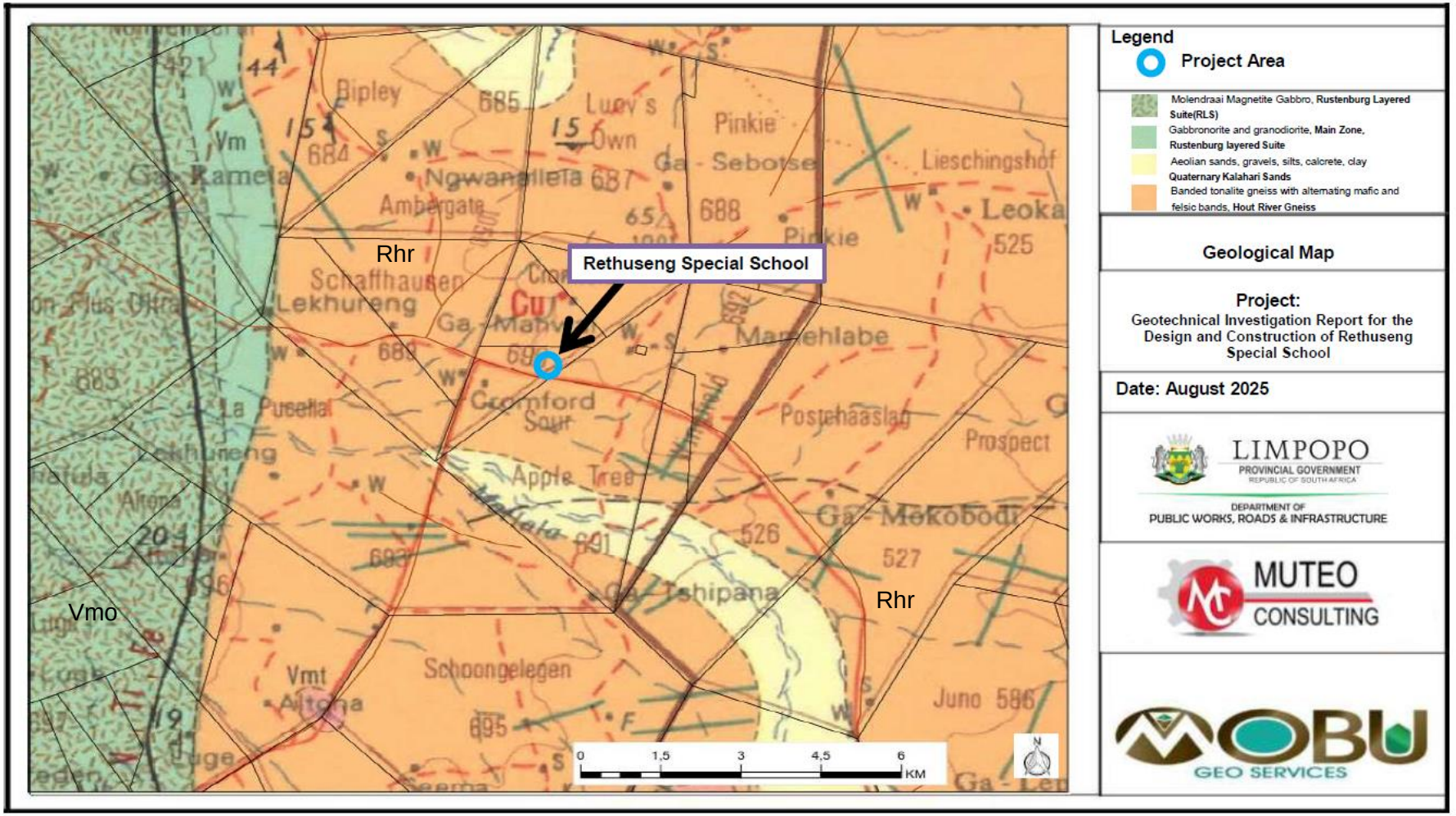
The probability of landslides and mudslides occurring within this area is remote. This is primarily due to the low relief of the area.

2.9 Rockfalls and Rockslides

The probability of the occurrence of rockfalls and rockslides is low due to the low relief and shallow gradient.

2.10 Regional Geology

A review of the 1:250 000 Geological Map **2328 PIETERSBERG** indicates that the site is underlain by lithologies of the Hout River Gneiss (Rhr) comprising leucocratic migmatite and gneiss, grey and pink hornblende-biotite gneiss, grey biotite gneiss, minor muscovite-bearing granite, pegmatite and gneiss. An extract of the geological map is shown in **Figure 2.**



[Vm] Moiwndraai Magnetite Gabrro, **Rustenburg Layered Suite (RLS)**
Aeolian sands, gravels, silts, calcrete, clay **Quaternary Kalahari Sands**
[Rhr] Leucocratic migmatite and gneiss, grey and pink hornblende-biotite gneiss, grey biotite gneiss, minor muscovite-bearing granite, pegmatite and gneiss, **Hout River Gneiss**

Figure 2: An extract of the geological map 2328 Pietersburg

3. METHOD OF INVESTIGATION

3.1 Desktop Studies

At the initial stage of the investigation, all available information on the proposed site and its surroundings was gathered and analyzed to develop a preliminary understanding of its geotechnical conditions. This process involved a walkover survey and a review of relevant geological, topographic, geotechnical, and geohydrological reports and maps.

3.2 Excavation of Test pits

Fieldwork was conducted on the 2nd of August 2025 and comprised excavation of eight (8) test pits to a maximum depth of approximately 1.05m using manual excavation. The exposed soil horizons in each of the pit were identified and described comprehensively applying the MCCSSO technique as advocated by Jennings et al (1973). The acronym: MCCSSO – stands for Moisture, Colour, Consistency, Structure, Soil Type, and Origin. The test pits were designated TP01 to TP08 and is shown on the layout drawing, **Figure 3**. The test pit coordinates, and depth of excavation are provided in **Table 1** below.

Table 1: Summary of test pit location and final depths

Test Pit ID.	Handheld GPS Coordinates		Elevation (amsl)	Final Depth (m)	Comments
	Easting	Southing			
TP01	28°57'32.15"E	23°33'23.50"S	1049	1.05	Refusal
TP02	28°57'34.30"E	23°33'09.6"S	1060	0.50	Refusal
TP03	28°57'25.40"E	23°33'08.15"S	1058	0.70	Refusal
TP04	28°57'22.90"E	23°33'22.70"S	1050	0.65	Refusal
TP05	28°57'29.20"E	23°33'19.70"S	1052	0.60	Refusal
TP06	28°57'21.20"E	23°33'15.70"S	1055	0.65	Refusal
TP07	28°57'32.60"E	23°33'18.90"S	1054	0.95	Refusal
TP08	28°57'29.10"E	23°33'10.55"S	1059	0.60	Refusal

3.3 Dynamic Penetrometer Testing

DCP tests were carried out adjacent to the test pits to determine the consistency (in-situ density) of the in-situ soils. The DCP test is conducted by driving a 60° disposable steel cone, 20mm diameter, into the ground by an 8kg hammer falling through 575mm. The penetration resistance is expressed as penetration rate (mm) for every 10 consecutive blows. The test is used as a guide in compaction control. The DCP coordinates and depth of penetration are provided in **Table 2** below.

Table 2: Summary of DCP location and penetration depths

DCP ID.	Handheld GPS Coordinates		Final Depth (m)	Comments
	Easting	Southing		
DCP1	28°57'32.15"E	23°33'23.50"S	0.755	Refusal
DCP2	28°57'34.30"E	23°33'09.60"S	0.180	Refusal
DCP3	28°57'25.40"E	23°33'08.15"S	0.335	Refusal
DCP4	28°57'22.90"E	23°33'22.70"S	0.265	Refusal
DCP5	28°57'29.20"E	23°33'19.70"S	0.230	Refusal
DCP6	28°57'21.20"E	23°33'15.70"S	0.385	Refusal
DCP7	28°57'32.60"E	23°33'18.90"S	0.635	Refusal
DCP8	28°57'29.10"E	23°33'10.55"S	0.375	Refusal

3.4 Laboratory Testing

Five (5) disturbed soil samples were recovered from selected test pits for further analysis. The following tests were undertaken by Roadlab, a Civil Engineering Materials Laboratory, in order to assess the geotechnical properties of the founding soil strata and their suitability for use as backfill materials during construction:

- **Foundation Indicator Tests** - used to establish the soil type, its potential for heave.
- **Moisture Density Relation & CBR** – used to determine the compaction characteristics of the soil.

4. SITE INVESTIGATION

The test pit profiles reveal that the site is masked by a transported soil underlain by residual granite and weathered bedrock. The test pit profiles are summarized in **Table 3** with the detailed soil profiles attached as **Appendix A. Plate 2** shows the soil horizons encountered.

Table 3: Summary of test pit soil profiles

Test Pit ID	Summary of Layers (m)				
	Transported		Residual Granite		Weathered Bedrock GRANITE
	Silty Sandy GRAVEL	Gravelly Silty SAND	Gravelly SAND	Sandy GRAVEL	
TP01	–	0.00 – 0.75	0.75 – 1.05	–	
TP02	–	–	–	–	0 – 0.50
TP03	0.40 – 0.70	–	–	–	0.40 – 0.70
TP04	0.00 – 0.30	–	–	0.30 – 0.65	–
TP05	–	0 – 0.25	–	0.25 – 0.60	–
TP06	0 – 0.50	–	–	0.50 – 0.65	–
TP07	–	0 – 0.75	–	0.75 – 0.95	–
TP08	0 – 0.45	–		–	0.45 – 0.60

The soil profiles are briefly described below;

Transported

- Silty Sandy GRAVEL

Dry, light brown, medium dense, intact, qaurtzitic silty sandy gravel with roots - Transported.

- Gravelly Silty SAND

Dry, dark brown, loose, intact, gravelly silty sand - Transported.

Residual Granite

- Gravelly SAND

Dry, light reddish brown speckled black, dense, intact, quartzitic gravelly sand with ferricrete nodules - Residual.

- Sandy GRAVEL

Dry, light reddish brown speckled black, dense, intact, quartzitic sandy gravel - Residual.

Weathered Bedrock Granite

Light reddish brown speckled black, moderately weathered, medium grained, fractured, soft - Granite.

TP01	TP03	TP05	TP07
			
			

Plate 2: Typical soil horizons encountered on site

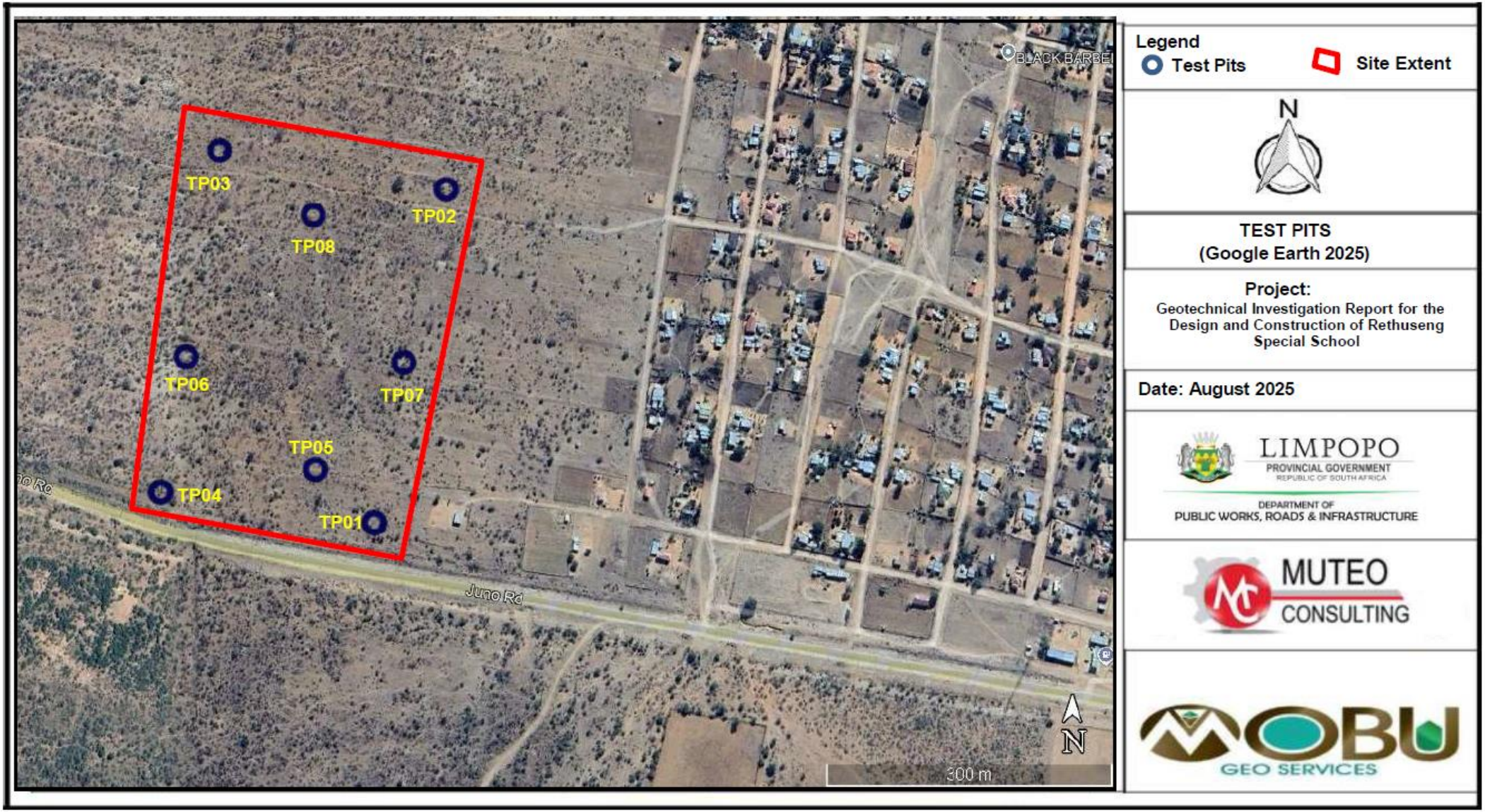


Figure 3: Test Pits Layout Map

5. GEOTECHNICAL EVALUATION

5.1 Engineering & Material Characteristics

Five (5) disturbed soil samples, considered to be representative of the material on site, were subjected to foundation indicator testing and Mod CBR (as per SANS 3001 test methods). The laboratory testing was conducted by Roadlab, a Civil Engineering Materials Testing Soil Laboratory. The results are summarized in **Table 4.**

Laboratory test results are presented in **Appendix B**.

Table 4: Summary of laboratory test results

TEST PIT		TP01	TP02	TP04	TP05	TP07
Depth (m)		0.75 – 1.05	0 – 0.50	0.30 – 0.65	0.25 – 0.60	0 – 0.75
% Passing 0.425mm		34	17	27	20	52
% Gravel		41.0	73.0	54.0	63.0	9.0
% Sand		51.5	25.0	42.8	30.6	80.4
% Silt		3.8	1.0	1.6	1.2	6.0
% Clay		3.7	1.0	1.6	1.2	4.6
GM (Grading Modulus)		1.90	2.50	2.20	2.40	1.40
USCS		SC	GW-GC	SC	GW-GC	SC
Atterberg limits						
LL		-	-	-	-	-
PI		NP	NP	SP	SP	SP
Linear Shrinkage		0.0	0.0	1.0	1.5	1.5
Moisture/Density Relationship						
MDD (kg/m^3)		2160	2155	2246	2139	2015
OMC (%)		7.3	5.3	6.3	8.2	9.2
Compaction						
CBR	@ 100% MDD	73	63	169	76	59
	@ 95% MDD	34	44	72	49	18
	@ 93% MDD	25	38	51	41	11
COLTO		G6	G6	G5	G5	G8
TRH 14		G6	G6	G5	G5	G10
H.R.B.		A-1-b (0)	A-1-a (0)	A-1-a (0)	A-1-a (0)	A-2-4 (0)

5.2 Discussion of Laboratory Results

5.2.1 Transported

The transported material classifies as **Silty Clayey SAND**.

The clayey SAND (SC) is classifying as low plastic in terms of Plasticity Index. The moisture/density tests result yielded a maximum dry density of 2015kg/m^3 Modified AASHTO compaction effort at an optimum moisture content of 9.2%. The CBR results are 11 at a compaction density of 93% and 18 at a compaction density of 95% Modified AASHTO compaction effort, respectively. The grading modulus is 1.40. This material classifies as G8 quality material according to COLTO and G10 according to TRH 14 specifications. Based on the AASHTO classification, this material falls within the A-2 group which rates as "excellent to good" for use as a subgrade. This material is considered not suitable for use as an engineered fill.

5.2.2 Residual Granite

The residual material classifies as **Silty Gravelly SAND** and **Sandy GRAVEL**.

Silty Gravelly SAND

The silty gravelly SAND is classifying as Non-plastic to slightly plastic in terms of Plasticity Index. The moisture/density tests result yielded a maximum dry density of 2160kg/m^3 and 2246kg/m^3 Modified AASHTO compaction effort at an optimum moisture content of 7.3% and 6.3%, respectively. The CBR results are ranging between 25 and 51 at a compaction density of 93% and between 34 and 72 at a compaction density of 95% Modified AASHTO compaction effort, respectively. The grading modulus is ranging between 1.90 and 2.20. This material classifies as G5/G6 quality material according to COLTO and G5/G6 according to TRH 14 specifications. Based on the AASHTO classification, this material falls within the A-1 group which rates as "excellent to good" for use as a subgrade. This material is considered suitable for use as an engineered fill.

Sandy GRAVEL.

The sandy gravel exhibits very low plasticity in terms of Plasticity Index. The moisture/density tests result yielded a maximum dry density of 2139kg/m^3 Modified AASHTO compaction effort at an optimum moisture content of 8.2%. The CBR results are 41 at a compaction density of 93% and 49 at a compaction density of 95% Modified AASHTO compaction effort, respectively. The grading modulus is 2.40. This material classifies as G5 quality material according to both COLTO and TRH 14 specifications. Based on the AASHTO classification, this material falls within the A-1 group which rates as "excellent to good" for use as a subgrade. This material is considered suitable for use as an engineered fill.

5.2.3 Weathered Granite Bedrock

The weathered granite bedrock classifies as Sandy GRAVEL.

This material is non-plastic. The moisture/density tests result yielded a maximum dry density of 2155kg/m3 Modified AASHTO compaction effort at an optimum moisture content of 5.3%. The CBR results are 38 at a compaction density of 93% and 44 at a compaction density of 95% Modified AASHTO compaction effort, respectively. The grading modulus is 2.5. This material classifies as G6 quality material according to both COLTO and TRH 14 specifications. Based on the AASHTO classification, this material falls within the A-1 group which rates as "excellent to good" for use as a subgrade. This material is considered suitable for use as an engineered fill.

5.3 Dynamic Cone Penetrometer (DCP) Tests

A total of eight (8) DCP tests were carried out to depths ranging between 0.23m and 0.755m below existing ground level. The DCP tests were conducted adjacent the test pits to determine the in-situ soil consistency and California Bearing Ratio (CBR). A plot of the DCP results is provided in **Appendix C,** whereas a summary of DCP data and associated typical material properties is given in **Table 5**.

Table 5: Summary of DCP results

DCP ID	Notes
DCP1	The DCP encountered refusal at 0.755m (bgl) penetrating through the transported soil and marginally into the underlying residual soil. The estimated bearing capacity ranges between 82kPa and 152kPa within the transported soils, and >200kPa on the within the residual soils.
DCP2	The DCP encountered refusal at 0.180m (bgl) within the weathered granite bedrock. The estimated bearing capacity ranges between 152kPa and >200kPa on the weathered bedrock.
DCP3	The DCP encountered refusal at 0.335m (bgl) penetrating through the transported soil. The estimated bearing capacity ranges from 123kPa on the upper transported soil, increasing to >200kPa toward the base of the horizon.
DCP4	The DCP encountered refusal at 0.265m (bgl) penetrating through the transported soil. The estimated bearing capacity ranges from 123kPa on the upper transported soil, increasing to >200kPa toward the base of the horizon.
DCP5	The DCP encountered refusal at 0.230m (bgl) penetrating through the transported soil. The estimated bearing capacity ranges from 98kPa on the upper transported soil, increasing to >200kPa toward the base of the horizon.
DCP6	The DCP encountered refusal at 0.385m (bgl) penetrating through the transported soil. The estimated bearing capacity ranges between 105kPa and >200kPa within the horizon.
DCP7	The DCP encountered refusal at 0.635m (bgl) penetrating through the transported soil. The estimated bearing capacity ranges between 92kPa and >200kPa within the horizon.
DCP8	The DCP encountered refusal at 0.375m (bgl) penetrating through the transported soil. The estimated bearing capacity ranges between 113kPa and >200kPa within the horizon.

5.4 Groundwater

No groundwater seepage was intersected in any of the excavated test pits. However, ferricrete nodules was noted within the residual granite which indicates that a seasonally fluctuating groundwater with perched groundwater conditions is anticipated especially during or after the wet season.

It is advised that precautionary measures be implemented to counteract any potential groundwater activity. Groundwater activity is anticipated to be elevated after periods of rainfall.

5.5 Geotechnical Assessment

The purpose of this section is to evaluate the likely geotechnical properties of the project area against the typical geotechnical constrains for development as identified by Partridge et al (1993). Only those constrains identified as likely to affect development are evaluated in more detail below. A summary of site conditions compared to typical geotechnical constrains for development is shown in **Table 6** below:

Table 6: Geotechnical classification for the site (Partridge et al. 1993).

CONSTRAINT		Most Favourable (1)	Intermediate (2)	Least Favourable (3)
A	Collapsible Soil	Any collapsible horizon or consecutive horizons totalling a depth of less than 750mm in thickness.	Any collapsible horizon or consecutive horizons with a depth of more than 750 mm in thickness.	A least favourable* situation for this constraint does not occur.
B	Seepage	Permanent or perched water table more than 1,5m below ground surface	Permanent or perched water table less than 1,5m below ground surface.	Swamps and marshes
C	Active Soil	Low soil-heave potential predicted*	Moderate soil heave potential predicted.	High soil heave potential predicted
D	Highly Compressible	Low soil compressibility expected *	Moderate soil compressibility expected	High soil compressibility expected
E	Erodibility of soil	Low	Intermediate	High
F	Difficulty of excavation to 1.5m depth	Scattered or occasional boulders less than 10% of the total volume	Rock or hardpan pedocretes between 10 and 40% of the total volume	Rock or hardpan pedocretes more than 40% of the total volume.
G	Undermined ground – Not undermined	Undermining at a depth greater than 100m below surface	Old undermined areas to a depth of 100m below surface where stope closure has ceased	Mining within less than 100m of surface or where extraction mining total has taken place.
H	Instability in areas of soluble rock Not underlain by dolomite	Possibly unstable	Probably unstable	Known sinkholes and dolines

CONSTRAINT		Most Favourable (1)	Intermediate (2)	Least Favourable (3)
I	Steep slopes	Between 2 and 6 degrees (all regions)	Slopes between 6 and 18 degrees and less than 2 degrees (Natal and Western Cape). Slopes between 6 and 12 degrees and less than 2 degrees	More than 18 degrees (Natal and Western Cape) More than 12 degrees (all other regions)
J	Areas of unstable natural slope	Low risk	Intermediate risk	High risk (especially in areas subject to seismic activity)
K	Areas subject to seismic activity	10% probability of an event less than 100 cm/s² within 50 years	Mining-induced seismic activity more than 100cm/s²	Natural seismic activity more than 100 cm/s²
L	Areas subject to flooding	A "most favourable" situation for this constraint does not occur.	Areas adjacent to a known drainage channel or floodplain with slope less than 1%	Areas within a known drainage channel or floodplain.

6. RECOMMENDATIONS

The site is generally underlain by a blanket of compressible and potentially collapsible transported and residual soils, which is underlain by weathered bedrock occurring locally at shallow depth.

6.1

6.2 Geotechnical Zonation

In terms of the NHBRC guidelines, the site can be classified as Site Class R - C. The estimated total settlement for site Class C is less than 5mm. Site Class R denoted area underlain by shallow bedrock. In this instance, it represents the weathered bedrock encountered below the site. **Table 7** shows the residential site class designations.

Table 7: Residential Site Class Designations (NHBRC HBM, Part 1, Section 2, Table 1)

TYPICAL FOUNDING MATERIAL	CHARACTER OF FOUNDING MATERIAL	EXPECTED RANGE OF TOTAL SOIL MOVEMENTS (mm)	ASSUMED DIFFERENTIAL MOVEMENT (% OF TOTAL)	SITE CLASS
Rock (excluding mud rocks which may exhibit swelling to some depth	**STABLE**	**NEGLIGIBLE**	**-**	**R**
Fine grained soils with moderate to very high plasticity (clays, silty clays, clayey silts and sandy clays)	EXPANSIVE SOILS	<7,5 7,5-15 15 - 30 >30	50% 50% 50% 50%	H H1 H2 H3
Silty sands, sands, sandy and gravely soils	**COMPRESSIBLE AND POTENTIALLY COLLAPSIBLE SOILS**	**<5 5-10 >10**	**75% 75% 75%**	**C C1 C2**
Fine grained soils (clayey silts and clayey sands of low plasticity), sands, sandy and gravely soils	COMPRESSIBLE SOILS	<10 10-20 >20	50% 50% 50%	S S1 S2
Contaminated soils, Controlled fill, Dolomitic areas, Landslip, Landfill, Marshy areas Mine waste fill, mining subsidence Reclaimed areas, Uncontrolled fill, Very soft silts/silty clays	**VARIABLE**	**VARIABLE**		**P**

6.3 Foundation

Strip foundations are recommended for the development, and the followings guidelines are applicable:

- The strip foundations shall have a minimum width of 600mm and be founded on the bedrock.
- Excavate the transported and residual soils onto the bedrock.
- The base of the excavation is to be cleaned, and a 100mm concrete blinding to be placed.
- Strip foundations, 600mm wide should be constructed adopting an allowable bearing pressure of 500kPa on the bedrock.
- In areas where the bedrock is deeper than 0.6m, rip and recompact activity should be exercised i.e. excavate through to the bedrock, recompact from the bedrock to a depth of 0.6m using excavated materials in layers not exceeding 150mm. Foundations can be placed on the engineered fill adopting an allowable bearing capacity of 200kPa.

Table 8: Foundation design, procedures, and precautionary measures for single-storey structures on consolidation/collapse-prone horizons

SITE CLASS	ESTIMATED TOTAL SETTLEMENT (mm)	CONSTRUCTION TYPE	FOUNDATION DESIGN AND BUILDING PROCEDURES (Expected damage limited to Category 1)
C	< 5	Normal	▪ Normal construction (strip footing or slab-on-the-ground) foundations ▪ Good site drainage.
C1	5-10	Modified normal	▪ Reinforced strip footings. ▪ Articulation joints at some internal and all external doors. ▪ Light reinforcement in masonry. ▪ Site drainage an service/plumbing precautions ▪ Foundations pressure not to exceed 50 kPa.
		Compaction of insitu soils below individual footings	▪ Remove insitu material below foundations to a depth and width of 1,5 times the foundation width or to a competent horizon and replace with material compacted to 93% MOD AASHTO density at –1% to +2% of optimum moisture content. ▪ Normal construction with light reinforcement in masonry.
		Deep strip foundations	▪ Normal construction with drainage precautions. ▪ Founding on a competent horizon below the problem horizon.
		Soil raft	▪ Remove insitu material to 1,0 m beyond perimeter of the building to a depth of 1,5 times the widest foundation or to a competent horizon and replace with material compacted to 93% MOD AASHTO density at –1% to +2% of optimum moisture content. ▪ Normal construction with lightly reinforced strip footings and light reinforcement in masonry.
C2	> 10	Stiffened strip footings, stiffened or cellular raft	▪ Stiffened strip footings or stiffened or cellular raft with lightly reinforced or articulated masonry. ▪ Bearing pressure not to exceed 50 kPa. ▪ Fabric reinforcement in floor slabs. ▪ Site drainage and service/plumbing precautions.
		Deep strip foundations compaction of insitu soils below individual footings	▪ As for C1 but with fabric reinforcement in floor slabs.
		Piled or pier foundations	▪ As for C1.
		Soil raft	▪ Reinforced concrete ground beams or solid slabs on piled pier foundations. ▪ Ground slabs with fabric reinforcement. ▪ Good site drainage. ▪ As for C1.

6.4 Surface Beds

It is recommended that the subgrade beneath surface beds or floor slabs be ripped to a minimum depth of 300mm and recompacted to 93% Mod AASHTO density using the G6/G7 quality material based on COLTO specifications. It is recommended that an approved damp proof membrane be used beneath the floor slabs.

6.5 Excavation Classification

Based on the test pit data, the site is classified as suitable for soft excavation to a depth of approximately 1.05 m below the existing ground level, in accordance with the SANS 1200DA classification. This assessment is based on the use of similar equipment to that employed during the investigation (i.e., manual excavation using picks and shovels). Excavation to greater depths is considered feasible with the use of mechanized equipment with higher excavation capacity.

Table 9: Excavatability Classification

CLASSIFICATION	DESCRIPTION
Restricted excavation	
Soft	Material which can be efficient removed by a back-acting excavator of fly wheel power >0,10 kW for each mm of tined bucket width.
Intermediate	Material which can be removed by a back-acting excavator having a fly wheel power > 0,10kW for each mm of tined-bucket width or with the use of pneumatic tools before removal by a machine capable of removing soft material.
Hard Rock	Material that cannot be removed without blasting or wedging and splitting.
Non-restricted excavation	
Soft	Material which can be efficiently removed or loaded, without prior ripping, by any of the following plant: a bulldozer or a track type front end loader having an approximate mass of 22 tonne and a fly wheel power of 145 kW. a tractor-scraper unit having an approximate mass of 28 tonne and fly wheel power of 245 kW, pushed during loading by a bulldozer equivalent to that described above.
Intermediate	Material which can be efficiently ripped by a bulldozer having an approximate mass of 35 tonne and a fly wheel power of 220 kW.
Hard Rock	Material that cannot be efficiently ripped by a bulldozer having an approximate mass of 35 tonne and a fly wheel power of 220 kW.
Boulder class A	Material containing more than 40% by volume of boulders of size between 0,03 m^3 and 20m^3, in a matrix of soft material or smaller boulders.
Boulder class B	Material containing 40% or less by volume of boulders of size between 0,03 m^3 and 20m^3, in a matrix of soft material or smaller boulders.

6.6 Surface Drainage and Groundwater Management

The most important factor in the stable development of the site is the control and removal of both surface and groundwater from the site. Hardened areas, such as roof areas, paved surfaces and parking lots contribute to the surface runoff. The following is therefore recommended:

- Stormwater should be collected and piped preferably off site. If this is not feasible, all stormwaters should be led well down slope of all structures and building terraces to discharge in a carefully controlled fashion by means of surface spreaders/headwalls to Engineer's detail.
- Profiling of the ground should be implemented for the minimization of water ingress into the soil around the foundations; and

- A concrete splash apron should be constructed around the perimeter of the buildings. This will prevent ingress of surface water close to the foundations, thereby affecting the moisture content of the founding soils.
- All stormwaters should be led to discharge in a controlled manner away from the site.

6.7 Construction Materials

The residual granite soils encountered on site generally classifies as G5/G6 quality material according to COLTO specifications. This material is considered suitable for use as engineered fill.

The transported soils encountered on site classifies as G8 quality material according to COLTO specifications. This material is not considered suitable for use as engineered fill. This material was encountered from surface to an approximate depth of 0.75m bgl.

6.8 Earthworks

Earthwork activities will need to be carried out strictly in accordance with the current SANS 1200 guidelines to ensure safe working procedures and maintain stability of the site.

Placement of fill layers should be undertaken in layers not exceeding 150mm thick. When placed loose and compacted using suitable compaction plant to achieve 93% of Modified AASHTO maximum dry density.

If natural ground slopes are steeper than 9 degrees, the fill must be benched into the slope.

Terraces should be graded to direct water away from the fill edges, and small earth bunds should be constructed along the crests of fills, to prevent overtopping and erosion of fill embankment slopes.

Acceptance and process density control testing of placed fill material should be undertaken at regular intervals during fill construction as part of process and acceptance quality assurance monitoring.

Cut and fill slopes in soils should be formed to batters not exceeding 26° and to a height not greater than 2 metres where retaining walls are not provided.

Engineered fill slopes should be over constructed and thereafter trimmed back to the required position.

All excavations must be inspected daily by a competent person and records must be kept. It remains the responsibility of the Contractor/Developer to comply with the current requirements of the Occupational Health and Safety Act.

6.9 Construction Monitoring

It is recommended that all excavations and foundations be inspected by a competent person prior to placing any concrete and regular checks on the quality and compaction of the backfill to the terraces should be made. A construction design report compiled by the competent person must be submitted to all relevant authorities.

6.10 Additional Investigation

No additional investigations are considered necessary for the assessment of near surface soils for the proposed construction of the student residence.

6.11 General

All test pits were loosely backfilled upon completion of the fieldwork. Possibility of localised settlement occurring below structures due to the consolidation settlement of this loose backfill, it is recommended that each test hole be identified and adequately backfilled in 150mm layers, to at least 90% Mod AASHTO.

7. CONCLUSION

This report contains the results of the geotechnical investigation carried out for the construction of Rethuseng Special School in Mamehlabe, Blouberg Local Municipality, Capricorn District, Limpopo Province.

The site is underlain by transported soils overlying residual granite, with weathered granite bedrock occurring locally at shallow depth. Transported horizons comprise silty sandy gravel / gravelly silty sand, while the residual profile is predominantly quartzitic gravelly sand to sandy gravel.

The transported soils generally classify as G8 according to COLTO specifications and are not suitable as engineered fill, whereas the residual granite soils classify as G5–G6 and are suitable for engineered fill. Where transported soils predominate, imported selected material will be required to achieve consistent layerworks quality.

Stormwater should be collected and either piped off-site or led to controlled discharge points well downslope of structures; provide profiling to falls and concrete splash aprons to prevent ingress adjacent to foundations.

Soft excavation conditions (SANS 1200DA) are anticipated to depths of approximately 1.05 m below existing ground level; deeper excavation is feasible using mechanised plant of higher capacity.

Dynamic Cone Penetrometer (DCP) tests to depths of 0.23 – 0.755 m bgl indicate lower bearing capacity within the transported horizon (approximately 90–150 kPa, increasing with depth) and >200 kPa within the residual/bedrock profile.

In terms of the NHBRC guidelines, the site is classified Site Class R–C (R = shallow bedrock; C = compressible and potentially collapsible soils). Normal strip foundations are recommended: found on bedrock (typical allowable bearing approximately 500 kPa), or on engineered fill where bedrock is deeper than approximately 0.6 m (typical allowable bearing approximately 200 kPa), subject to founding inspection.

8. REFERENCES & BIBLIOGRAPHY

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9. APPENDICES

Appendix A:

Soil Profiles

Appendix B:

Laboratory Test Results

Appendix C:

Dynamic Cone Penetrometer Results

APPENDIX A:

Soil Profiles

PROJECT NUMBER LDPWRI-PROF/16003/A	**HOLE NUMBER** TP01	**Y-COORDINATES** 23°33'23.50"S
PROJECT NAME RETHUSHENG SPECIAL SCH(	**DATE DRILLED** 02/08/2025	**X-COORDINATES** 28°57'32.15"E
CLIENT MUTEO CONSULTING	**COMPANY** MOBU GEO SERVICES	**SURFACE ELEVATION** 1.048
ADDRESS MAMEHLABE, LIMPOPO PROVINCE	**MACHINE** HAND TOOLS	**LOGGED BY** C KUBAYI
	TOTAL DEPTH 1.05	**CHECKED BY** R RAMABOEA

Depth (m)	Samples	Graphic Log	Material Description
0			0.0
			Dry, dark brown, loose, intact, gravelly silty sand - Transported.
0.75	CBR		0.75
			Dry, light reddish brown speckled black, dense, intact, quartzitic sandy gravel with ferricrete nodules- Residual.
1.05			1.05
			Refusal at 1.05.
			Sample CBR at 0.75--1.05.
			No groundwater seepage encountered.

PROJECT NUMBER LDPWRI-PROF/16003/A
PROJECT NAME RETHUSHENG SPECIAL SCH(
CLIENT MUTEO CONSULTING
ADDRESS MAMEHLABE, LIMPOPO PROVINCE

HOLE NUMBER TP02
DATE DRILLED 02/08/2025
COMPANY MOBU GEO SERVICES
MACHINE HAND TOOLS
TOTAL DEPTH 0.50

Y-COORDINATES 23°33'9.60"S
X-COORDINATES 28°57'34.30"E
SURFACE ELEVATION 1.059
LOGGED BY C KUBAYI
CHECKED BY R RAMABOEA

Depth (m)	Samples	Graphic Log	Material Description
0			0.0
			Light reddish brown speckled black, moderately weathered, medium grained, fractured, soft - Granite.
0.5			0.50
			Refusal at 0.50.
			Not Sampled.
			No groundwater seepage encountered.

PROJECT NUMBER LDPWRI-PROF/16003/A
PROJECT NAME RETHUSHENG SPECIAL SCH(
CLIENT MUTEO CONSULTING
ADDRESS MAMEHLABE, LIMPOPO PROVINCE

HOLE NUMBER TP03
DATE DRILLED 02/08/2025
COMPANY MOBU GEO SERVICES
MACHINE HAND TOOLS
TOTAL DEPTH 0.70

Y-COORDINATES 23°33'80.15"S
X-COORDINATES 28°57'25.40"E
SURFACE ELEVATION 1.057
LOGGED BY C KUBAYI
CHECKED BY R RAMABOEA

Depth (m)	Samples	Graphic Log	Material Description
0			0.0
			Dry, light brown, medium dense, intact, quartzitic silty sandy gravel with roots - Transported.
0.4			0.40
			Creamish white speckled reddish brown, moderately weathered, medium grained, fractured, soft - Granite.
0.7			0.70
			Refusal at 0.70.
			Not Sampled.
			No groundwater seepage encountered.

PROJECT NUMBER LDPWRI-PROF/16003/A
PROJECT NAME RETHUSHENG SPECIAL SCH(
CLIENT MUTEO CONSULTING
ADDRESS MAMEHLABE, LIMPOPO PROVINCE

HOLE NUMBER TP04
DATE DRILLED 02/08/2025
COMPANY MOBU GEO SERVICES
MACHINE HAND TOOLS
TOTAL DEPTH 0.65

Y-COORDINATES 23°33'22.70"S
X-COORDINATES 28°57'22.90"E
SURFACE ELEVATION 1.049
LOGGED BY C KUBAYI
CHECKED BY R RAMABOEA

Depth (m)	Samples	Graphic Log	Material Description
0			0.0
			Dry, light brown, medium dense, intact, quartzitic silty sandy gravel with roots - Transported.
0.3	CBR		0.30
			Dry, light reddish brown speckled yellow, dense, intact, quartzitic sandy gravel - Residual.
0.65			0.65
			Refusal at 0.65.
			Sample CBR at 0.30--0.65.
			No groundwater seepage encountered.

PROJECT NUMBER LDPWRI-PROF/16003/A
PROJECT NAME RETHUSHENG SPECIAL SCH(
CLIENT MUTEO CONSULTING
ADDRESS MAMEHLABE, LIMPOPO PROVINCE

HOLE NUMBER TP05
DATE DRILLED 02/08/2025
COMPANY MOBU GEO SERVICES
MACHINE HAND TOOLS
TOTAL DEPTH 0.60

Y-COORDINATES 23°33'19.70"S
X-COORDINATES 28°57'29.20"E
SURFACE ELEVATION 1.051
LOGGED BY C KUBAYI
CHECKED BY R RAMABOEA

Depth (m)	Samples	Graphic Log	Material Description
0			0.0
			Dry, dark brown, loose, intact, gravelly silty sand - Transported.
0.25	CBR		0.25
			Dry, light reddish brown speckled yellow, dense, intact, quartzitic sandy gravel - Residual.
0.6			0.60
			Refusal at 0.60.
			Sample CBR at 0.25--0.60.
			No groundwater seepage encountered.

PROJECT NUMBER LDPWRI-PROF/16003/A
PROJECT NAME RETHUSHENG SPECIAL SCH(
CLIENT MUTEO CONSULTING
ADDRESS MAMEHLABE, LIMPOPO PROVINCE

HOLE NUMBER TP06
DATE DRILLED 02/08/2025
COMPANY MOBU GEO SERVICES
MACHINE HAND TOOLS
TOTAL DEPTH 0.65

Y-COORDINATES 23°33'15.70"S
X-COORDINATES 28°57'21.20"E
SURFACE ELEVATION 1.054
LOGGED BY C KUBAYI
CHECKED BY R RAMABOEA

Depth (m)	Samples	Graphic Log	Material Description
0			0.0
			Dry, dark brown, medium dense, intact, quartzitic silty sandy gravel - Transported.
0.5			0.50
			Dry, light reddish brown speckled black, dense, intact, quartzitic sandy gravel with ferricrete nodules- Residual.
0.65			0.65
			Refusal at 0.65.
			Not Sampled.
			No groundwater seepage encountered.

PROJECT NUMBER LDPWRI-PROF/16003/A
PROJECT NAME RETHUSHENG SPECIAL SCH(
CLIENT MUTEO CONSULTING
ADDRESS MAMEHLABE, LIMPOPO PROVINCE

HOLE NUMBER TP07
DATE DRILLED 02/08/2025
COMPANY MOBU GEO SERVICES
MACHINE HAND TOOLS
TOTAL DEPTH 0.95

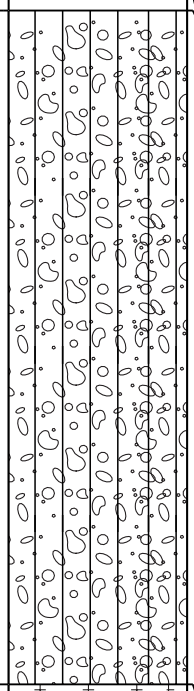
Y-COORDINATES 23°33'18.90"S
X-COORDINATES 28°57'32.60"E
SURFACE ELEVATION 1.053
LOGGED BY C KUBAYI
CHECKED BY R RAMABOEA

Depth (m)	Samples	Graphic Log	Material Description
0	CBR		0.0
			Dry, dark brown, medium dense, intact, quartzitic silty sandy gravel - Transported.
0.75			0.75
			Dry, light red brown speckled black, dense, intact, quartzitic sandy gravel with ferricrete nodules - Residual.
0.95			0.95
			Refusal at 0.95.
			Sample CBR at 0.00--0.75.
			No groundwater seepage encountered.

PROJECT NUMBER LDPWRI-PROF/16003/A
PROJECT NAME RETHUSHENG SPECIAL SCH(
CLIENT MUTEO CONSULTING
ADDRESS MAMEHLABE, LIMPOPO PROVINCE

HOLE NUMBER TP08
DATE DRILLED 02/08/2025
COMPANY MOBU GEO SERVICES
MACHINE HAND TOOLS
TOTAL DEPTH 0.60

Y-COORDINATES 23°33'10.55"S
X-COORDINATES 28°57'29.10"E
SURFACE ELEVATION 1.058
LOGGED BY C KUBAYI
CHECKED BY R RAMABOEA

Depth (m)	Samples	Graphic Log	Material Description
0	CBR		0.0 Dry, light brown, medium dense, intact, quartzitic silty sandy gravel with roots - Transported.
0.45			0.45 Creamish white speckled reddish brown, moderately weathered, medium grained, fractured, soft - Granite.
0.6			0.60 Refusal at 0.60. Sample CBR at 0.00--0.45. No groundwater seepage encountered.

APPENDIX B:

Laboratory Test Results

ROADLAB NORTH
Plot 4 Dalmada, POLOKWANE, 0699
PO Box 30, Thornhill Plaza, 0882
Tel: 015 263 6016 Fax: -
Email: sibusiso@roadlabnorth.net
Web: www.roadlab.co.za

Job Request No.: RN 9298 A
MOBU GEO SERVICES
076 965 2360
ramaboear@mobugeoservices.co.za

Client Ref.No.: -

Date Reported : 2025-08-12

Project : RETHUSHENG SPECIAL SCHOOL

Attention : Ruth

UNTREATED MATERIAL CLASSIFICATION SANS 3001: GR 1; GR 10; GR 30; GR 40

SAMPLE INFORMATION AND PROPERTIES

SAMPLE NO.		S/16050			
HOLE NO./ Km / CHAINAGE		TP 01			
ROAD NO./ NAME Line 1 ROAD NO./ NAME Line 2		Rethusheng S. School -			
LAYER TESTED/SAMPLED		750 - 1050			
SAMPLE DEPTH		-			
DATE SAMPLED		2025-08-02			
COLOUR OF SAMPLE		Dark Reddish Brown			
TYPE OF SAMPLE		Silty Gravelly Sand			

SIEVE ANALYSIS - % PASSING SIEVES *(SANS 3001-GR1:2010, SANS 3001-GR2:2010)

SIEVE ANALYSIS (GR 1) % PASSING	100.0 mm				
	75.0 mm				
	63.0 mm				
	50.0 mm				
	37.5 mm	100			
	28.0 mm	99			
	20.0 mm	98			
	14.0 mm	98			
	5.0 mm	79			
	2.0 mm	59			
	0.425 mm	34			
	0.075 mm	13			
GM %		1,9			

ATTERBERG LIMITS ANALYSIS - *(SANS 3001-GR10:2010)

ATTERBERG LIMITS (%) SANS GR10,GR11	LIQUID LIMIT				
	PLASTICITY INDEX	NP			
	LINEAR SHRINKAGE	0,0			
CLASSIFICATION	H.R.B.	A-1-b(0)			
	COLTO	G6			
	TRH 14	G6			

CALIFORNIA BEARING RATIO - *(SANS 3001-GR30:2010, SANS 3001-GR40:2010)

SANS GR30 MAX. DRY DENSITY	OMC %	7,3			
	MDD (kg/m³)	2160			
	COMP MC %	7,4			
SWELL % @	MOD | NRB | PRO	0,07 | 0,13 | 0,26			
C.B.R. SANS GR40	100 %	73			
	98 %	54			
	97 %	47			
	95 %	34			
	93 %	25			
	90 %	16			

STABILISER IN LAB	Neat			
TEST TYPE	CBR			
SAMPLING METHOD	TMH 5			
WEATHER WHEN SAMPLED	Unknown			

Deviation from Test Method : -
Remarks and Notes : -

Opinions and interpretations are not included in our scope of works.
The samples were subjected to analysis according to (SANS)(TMH5)(DOT)(ASTM).
The test results reported relate to the samples tested.
Further use of the above information is not the responsibility or liability of Roadlab.
Document may only be reproduced of published in their full context.
Report compiled by : Hlokwe Tebatso

S Mahlangu / I Mahloko
Manager

Prog.ver 10.7 (2019/11/07)

ROADLAB NORTH
Plot 4 Dalmada, POLOKWANE, 0699
PO Box 30, Thornhill Plaza, 0882
Tel: 015 263 6016 Fax: -
Email: sibusiso@roadlabnorth.net
Web: www.roadlab.co.za

Job Request No.: RN 9298 A
MOBU GEO SERVICES
076 965 2360
ramaboear@mobugeoservices.co.za

Client Ref.No.: -

Date Reported : 2025-08-12

Project : RETHUSHENG SPECIAL SCHOOL

Attention : Ruth

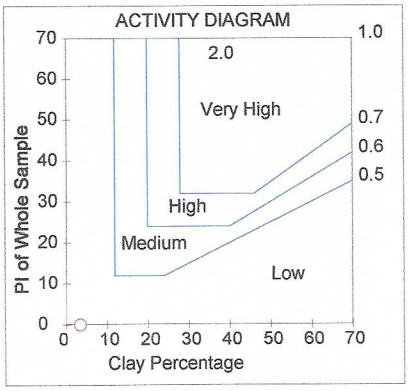
HYDROMETER ANALYSIS SANS 3001: GR 1; GR 10; ASTM D422

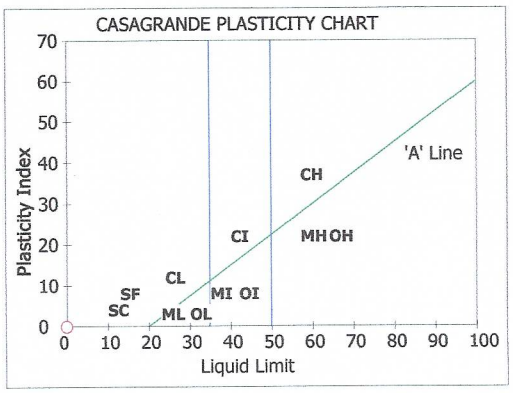
Sample No.	: S/16050
Position	: TP 01
Layer Type	: 750 - 1050
Sample Colour	: Dark Reddish Brown
Sample Type	: Silty Gravelly Sand

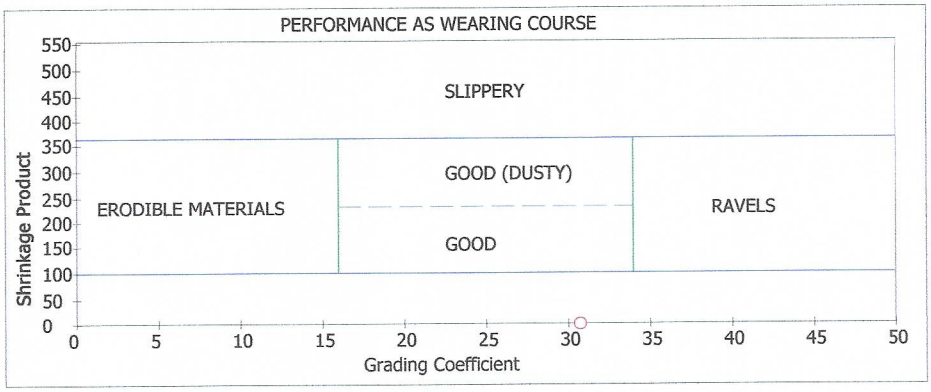
Sieve Size(mm)	% Passing
100.0	100
75.00	100
63.00	100
50.00	100
37.50	100
28.00	98
20.00	98
14.00	98
5.000	79
2.000	59
0.425	34
0.250	26
0.150	19
0.075	13
0.060	7,5
0.050	7,3
0.020	6,6
0.005	5,4
0.002	3,7

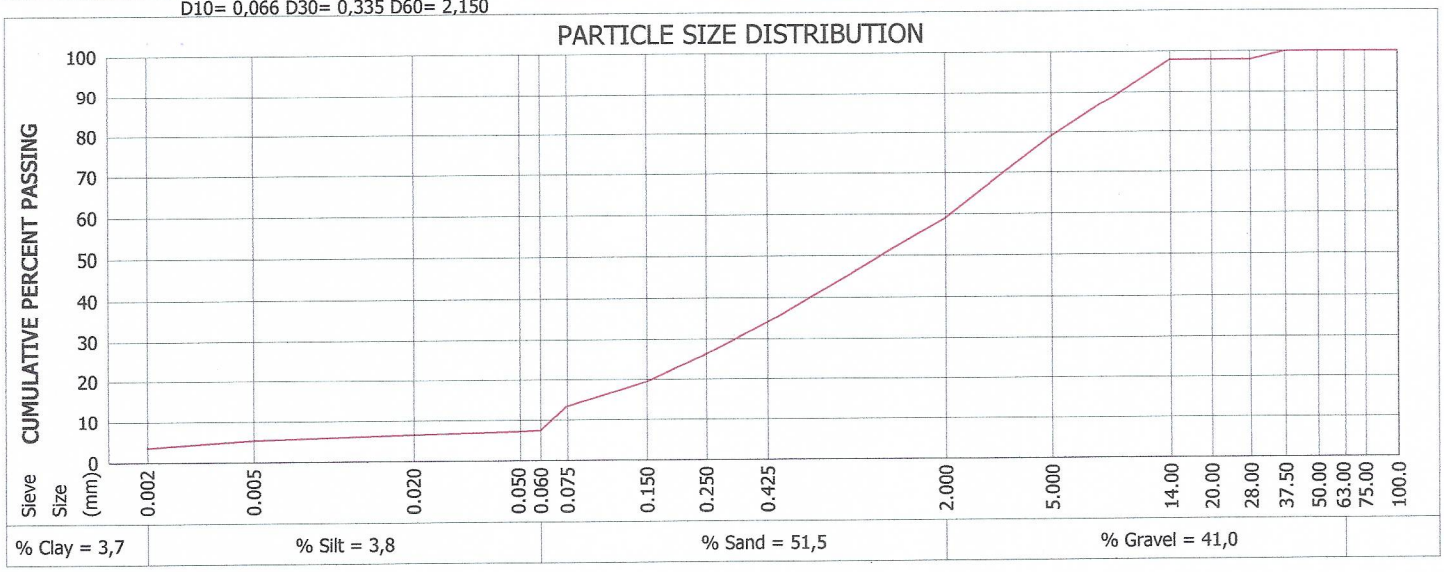
Soil Mortar	2.000 - 0.425	43
	0.425 - 0.250	13
	0.250 - 0.150	12
	0.150 - 0.075	11
	< 0.075	22
Effective Size		0,066
Uniformity Coefficient		32,6
Curvature Coefficient		0,8
Oversize Index		0,0
Shrinkage Product		0,0
Grading Coefficient		30,8
Grading Modulus		1,90
Atterberg Limits	Liquid Limit	
	Plasticity Index	NP
	Linear Shrinkage	0,0
	PI < 0.075	8
Unified Soil Classification		SC
US Highway Classification		A-1-b(0)

D10= 0,066 D30= 0,335 D60= 2,150









% Clay = 3,7	% Silt = 3,8	% Sand = 51,5	% Gravel = 41,0

Deviation from Test Method : -
Remarks and Notes : -

Opinions and interpretations are not included in our scope of works.
The samples were subjected to analysis according to (SANS)(TMH5)(DOT)(ASTM).
The test results reported relate to the samples tested.
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Report compiled by : Hlokwe Tebatso

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Job Request No.: RN 9298 B
Client Ref.No.: -
Date Reported : 2025-08-12

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Project : RETHUSHENG SPECIAL SCHOOL

Attention : Ruth

UNTREATED MATERIAL CLASSIFICATION SANS 3001: GR 1; GR 10; GR 30; GR 40

SAMPLE INFORMATION AND PROPERTIES

SAMPLE NO.		S/16051			
HOLE NO./ Km / CHAINAGE		TP 02			
ROAD NO./ NAME Line 1 ROAD NO./ NAME Line 2		Rethusheng S. School -			
LAYER TESTED/SAMPLED		0 - 500			
SAMPLE DEPTH		-			
DATE SAMPLED		2025-08-02			
COLOUR OF SAMPLE		Light Yellowish Oran			
TYPE OF SAMPLE		Sandy Gravel			

SIEVE ANALYSIS - % PASSING SIEVES *(SANS 3001-GR1:2010, SANS 3001-GR2:2010)

SIEVE ANALYSIS (GR 1) % PASSING	100.0 mm				
	75.0 mm				
	63.0 mm	100			
	50.0 mm	94			
	37.5 mm	88			
	28.0 mm	83			
	20.0 mm	74			
	14.0 mm	65			
	5.0 mm	38			
	2.0 mm	27			
	0.425 mm	17			
	0.075 mm	6			
GM %		2,5			

ATTERBERG LIMITS ANALYSIS - *(SANS 3001-GR10:2010)

ATTERBERG LIMITS (%) SANS GR10,GR11	LIQUID LIMIT				
	PLASTICITY INDEX	NP			
	LINEAR SHRINKAGE	0,0			
CLASSIFICATION	H.R.B.	A-1-a(0)			
	COLTO	G6			
	TRH 14	G6			

CALIFORNIA BEARING RATIO - *(SANS 3001-GR30:2010, SANS 3001-GR40:2010)

SANS GR30 MAX. DRY DENSITY	OMC %	5,3			
	MDD (kg/m³)	2155			
	COMP MC %	5,4			
SWELL % @	MOD | NRB | PRO	0,07 | 0,14 | 0,20			
C.B.R. SANS GR40	100 %	63			
	98 %	55			
	97 %	51			
	95 %	44			
	93 %	38			
	90 %	30			

STABILISER IN LAB		Neat			
TEST TYPE		CBR			
SAMPLING METHOD		TMH 5			
WEATHER WHEN SAMPLED		Unknown			

Deviation from Test Method : -
Remarks and Notes : -

Opinions and interpretations are not included in our scope of works.
The samples were subjected to analysis according to (SANS)(TMH5)(DOT)(ASTM).
The test results reported relate to the samples tested.
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Report compiled by : Hlokwe Tebatso

S Mahlangu / I Mahloko
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Client Ref.No.: -

Date Reported : 2025-08-12

Project : RETHUSHENG SPECIAL SCHOOL

Attention : Ruth

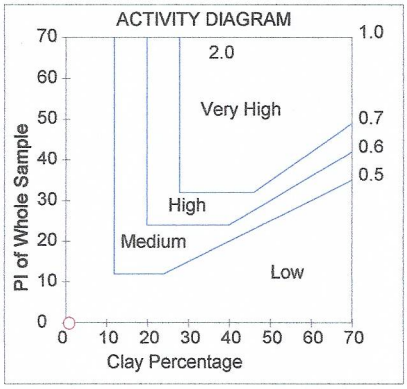
HYDROMETER ANALYSIS SANS 3001: GR 1; GR 10; ASTM D422

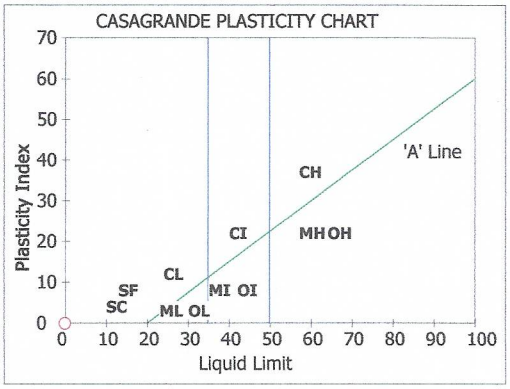
Sample No.	: S/16051
Position	: TP 02
Layer Type	: 0 - 500
Sample Colour	: Light Yellowish Oran
Sample Type	: Sandy Gravel

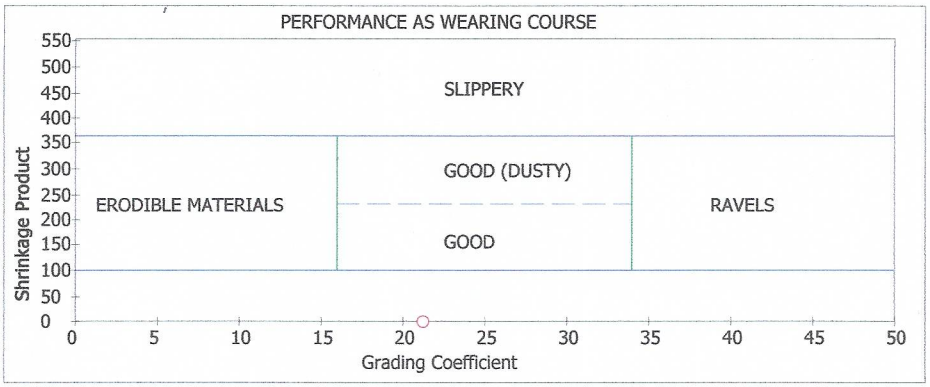
Sieve Size(mm)	% Passing
100.0	100
75.00	100
63.00	100
50.00	94
37.50	88
28.00	83
20.00	74
14.00	65
5.000	38
2.000	27
0.425	17
0.250	13
0.150	9,6
0.075	6,3
0.060	2,0
0.050	1,9
0.020	1,6
0.005	1,0
0.002	1,0

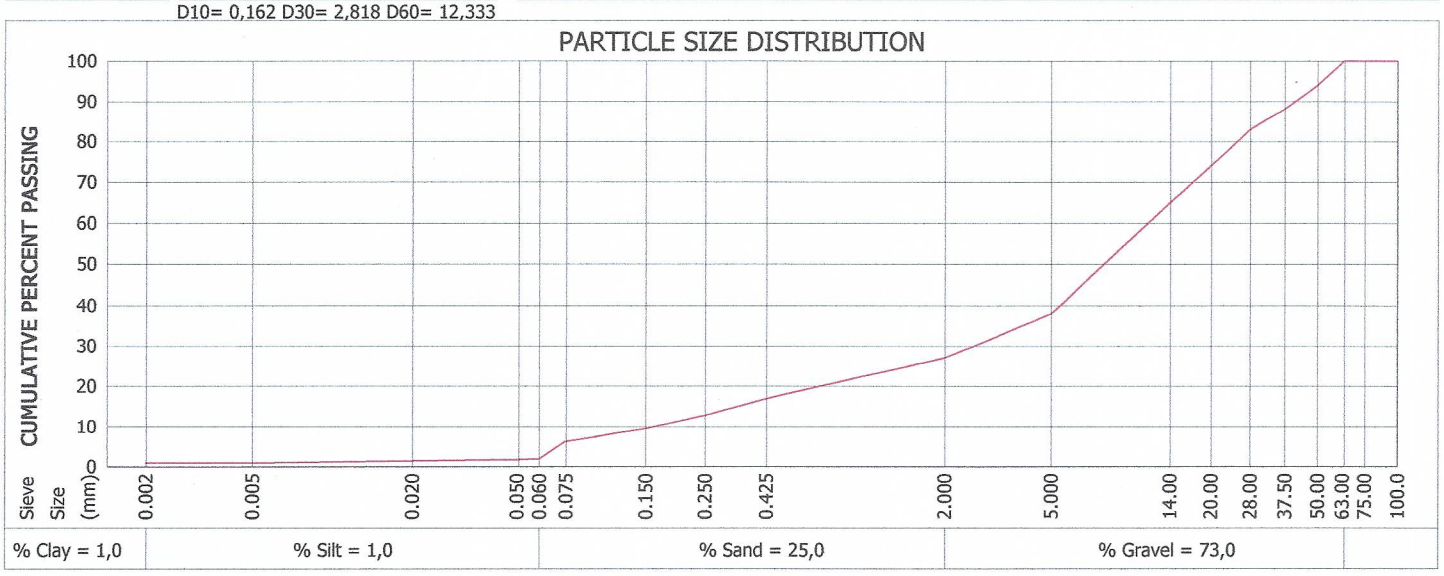
Soil Mortar	2.000 - 0.425	38
	0.425 - 0.250	15
	0.250 - 0.150	12
	0.150 - 0.075	13
	< 0.075	22
Effective Size		0,162
Uniformity Coefficient		76,1
Curvature Coefficient		4,0
Oversize Index		6,0
Shrinkage Product		0,0
Grading Coefficient		21,3
Grading Modulus		2,50
Atterberg Limits	Liquid Limit	
	Plasticity Index	NP
	Linear Shrinkage	0,0
	PI < 0.075	5
Unified Soil Classification		GW-GC
US Highway Classification		A-1-a(0)

D10= 0,162 D30= 2,818 D60= 12,333









% Clay = 1,0	% Silt = 1,0	% Sand = 25,0	% Gravel = 73,0

Deviation from Test Method : -
Remarks and Notes : -

Opinions and interpretations are not included in our scope of works.
The samples were subjected to analysis according to (SANS)(TMH5)(DOT)(ASTM).
The test results reported relate to the samples tested.
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S Mahlangu / T Mahloko
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Client Ref.No.: -

Date Reported : 2025-08-12

Project : RETHUSHENG SPECIAL SCHOOL

Attention : Ruth

UNTREATED MATERIAL CLASSIFICATION SANS 3001: GR 1; GR 10; GR 30; GR 40

SAMPLE INFORMATION AND PROPERTIES

SAMPLE NO.	S/16052			
HOLE NO./ Km / CHAINAGE	TP 04			
ROAD NO./ NAME Line 1 ROAD NO./ NAME Line 2	Rethusheng S. School -			
LAYER TESTED/SAMPLED	300 - 650			
SAMPLE DEPTH	-			
DATE SAMPLED	2025-08-02			
COLOUR OF SAMPLE	Light Brown			
TYPE OF SAMPLE	Sillty Gravelly Sand			

SIEVE ANALYSIS - % PASSING SIEVES *(SANS 3001-GR1:2010, SANS 3001-GR2:2010)

SIEVE ANALYSIS (GR 1) % PASSING	100.0 mm				
	75.0 mm				
	63.0 mm				
	50.0 mm				
	37.5 mm	100			
	28.0 mm	98			
	20.0 mm	92			
	14.0 mm	86			
	5.0 mm	60			
	2.0 mm	46			
	0.425 mm	27			
	0.075 mm	11			
GM %		2,2			

ATTERBERG LIMITS ANALYSIS - *(SANS 3001-GR10:2010)

ATTERBERG LIMITS (%) SANS GR10,GR11	LIQUID LIMIT				
	PLASTICITY INDEX	SP			
	LINEAR SHRINKAGE	1,0			
CLASSIFICATION	H.R.B.	A-1-a(0)			
	COLTO	G5			
	TRH 14	G5			

CALIFORNIA BEARING RATIO - *(SANS 3001-GR30:2010, SANS 3001-GR40:2010)

SANS GR30 MAX. DRY DENSITY	OMC %	6,3			
	MDD (kg/m³)	2246			
	COMP MC %	6,5			
SWELL % @	MOD | NRB | PRO	0,10 | 0,20 | 0,24			
C.B.R. SANS GR40	100 %	169			
	98 %	120			
	97 %	101			
	95 %	72			
	93 %	51			
	90 %	30			

STABILISER IN LAB	Neat			
TEST TYPE	CBR			
SAMPLING METHOD	TMH 5			
WEATHER WHEN SAMPLED	Unknown			

Deviation from Test Method : -
Remarks and Notes : -

Opinions and interpretations are not included in our scope of works.
The samples were subjected to analysis according to (SANS)(TMH5)(DOT)(ASTM).
The test results reported relate to the samples tested.
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Report compiled by : Hlokwe Tebatso

S Mahlangu / I Mahloko
Manager

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Date Reported : 2025-08-12

Project : RETHUSHENG SPECIAL SCHOOL

Attention : Ruth

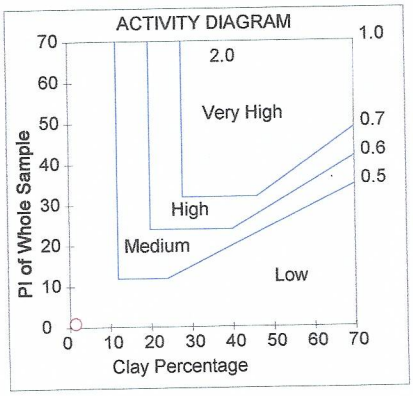
HYDROMETER ANALYSIS SANS 3001: GR 1; GR 10; ASTM D422

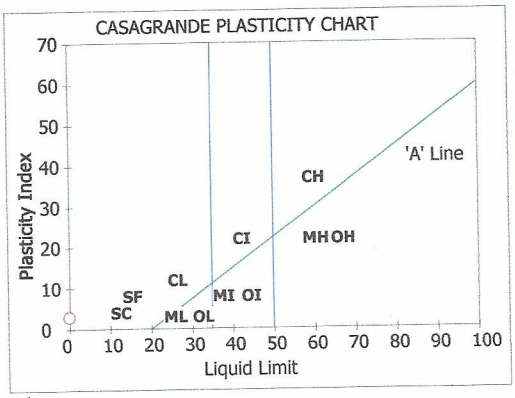
Sample No.	: S/16052
Position	: TP 04
Layer Type	: 300 - 650
Sample Colour	: Light Brown
Sample Type	: Silty Gravelly Sand

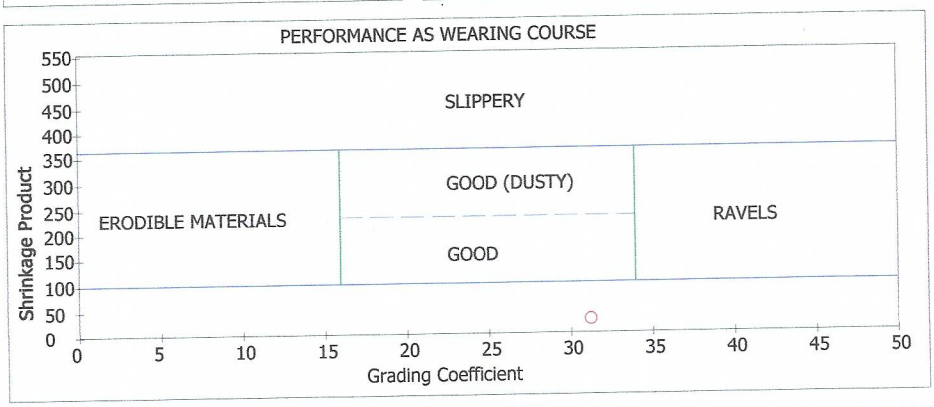
Sieve Size(mm)	% Passing
100.0	100
75.00	100
63.00	100
50.00	100
37.50	100
28.00	98
20.00	92
14.00	86
5.000	60
2.000	46
0.425	27
0.250	21
0.150	16
0.075	11
0.060	3,2
0.050	3,1
0.020	2,5
0.005	1,6
0.002	1,6

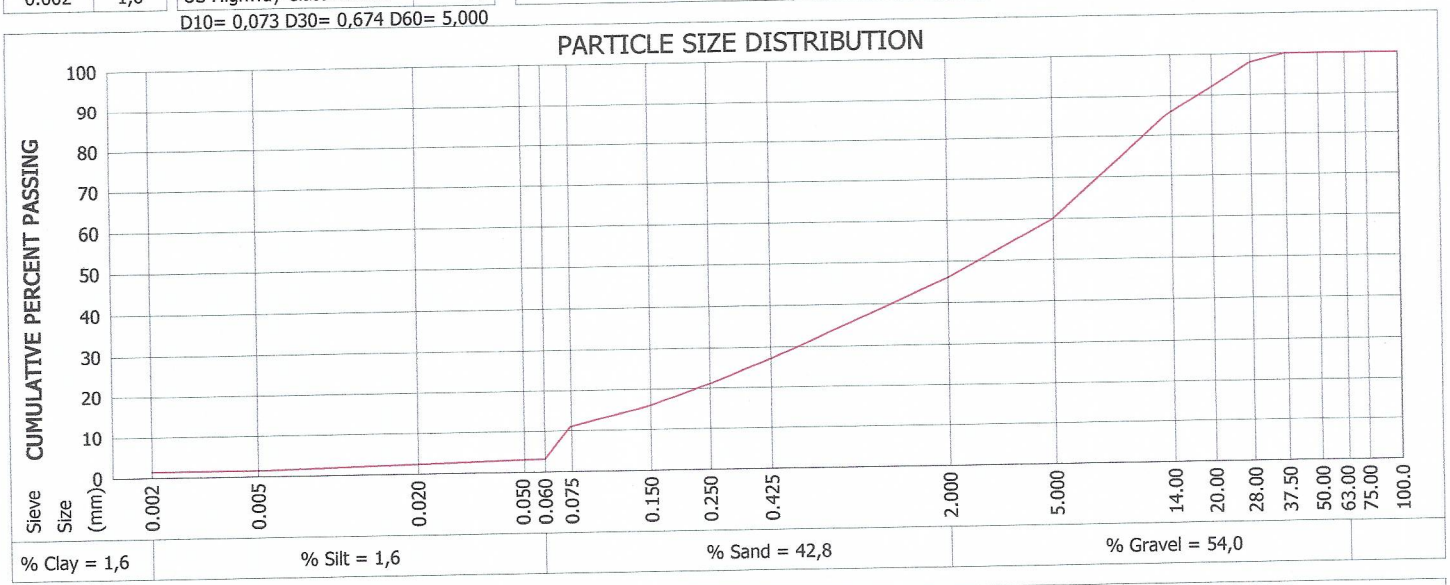
Soil Mortar	2.000 - 0.425	41
	0.425 - 0.250	13
	0.250 - 0.150	11
	0.150 - 0.075	11
	< 0.075	24
Effective Size		0,073
Uniformity Coefficient		68,5
Curvature Coefficient		1,2
Oversize Index		0,0
Shrinkage Product		27,0
Grading Coefficient		31,2
Grading Modulus		2,20
Atterberg Limits	Liquid Limit	
	Plasticity Index	SP
	Linear Shrinkage	1,0
	PI < 0.075	9
Unified Soil Classification		SW-SC
US Highway Classification		A-1-a(0)

D10= 0,073 D30= 0,674 D60= 5,000









% Clay = 1,6	% Silt = 1,6	% Sand = 42,8	% Gravel = 54,0

Deviation from Test Method : -
Remarks and Notes : -

Opinions and interpretations are not included in our scope of works.
The samples were subjected to analysis according to (SANS)(TMH5)(DOT)(ASTM).
The test results reported relate to the samples tested.
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Report compiled by : Hlokwe Tebatso

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Client Ref.No.: -

Date Reported : 2025-08-12

Project : RETHUSHENG SPECIAL SCHOOL

Attention : Ruth

UNTREATED MATERIAL CLASSIFICATION SANS 3001: GR 1; GR 10; GR 30; GR 40

SAMPLE INFORMATION AND PROPERTIES

SAMPLE NO.	S/16053			
HOLE NO./ Km / CHAINAGE	TP 05			
ROAD NO./ NAME Line 1 ROAD NO./ NAME Line 2	Rethusheng S. School -			
LAYER TESTED/SAMPLED	250 - 600			
SAMPLE DEPTH	-			
DATE SAMPLED	2025-08-02			
COLOUR OF SAMPLE	Dark Brown			
TYPE OF SAMPLE	Sandy Gravel			

SIEVE ANALYSIS - % PASSING SIEVES *(SANS 3001-GR1:2010, SANS 3001-GR2:2010)

SIEVE ANALYSIS (GR 1) % PASSING	100.0 mm				
	75.0 mm	100			
	63.0 mm	96			
	50.0 mm	93			
	37.5 mm	90			
	28.0 mm	87			
	20.0 mm	79			
	14.0 mm	70			
	5.0 mm	44			
	2.0 mm	33			
	0.425 mm	20			
	0.075 mm	7			
GM %		2,4			

ATTERBERG LIMITS ANALYSIS - *(SANS 3001-GR10:2010)

ATTERBERG LIMITS (%) SANS GR10,GR11	LIQUID LIMIT				
	PLASTICITY INDEX	SP			
	LINEAR SHRINKAGE	1,5			
CLASSIFICATION	H.R.B.	A-1-a(0)			
	COLTO	G5			
	TRH 14	G5			

CALIFORNIA BEARING RATIO - *(SANS 3001-GR30:2010, SANS 3001-GR40:2010)

SANS GR30 MAX. DRY DENSITY	OMC %	8,2			
	MDD (kg/m³)	2139			
	COMP MC %	8,4			
SWELL % @	MOD | NRB | PRO	0,09 | 0,17 | 0,28			
C.B.R. SANS GR40	100 %	76			
	98 %	64			
	97 %	59			
	95 %	49			
	93 %	41			
	90 %	32			

STABILISER IN LAB	Neat			
TEST TYPE	CBR			
SAMPLING METHOD	TMH 5			
WEATHER WHEN SAMPLED	Unknown			

Deviation from Test Method : -
Remarks and Notes : -

Report compiled by : Hlokwe Tebatso

S Mahlangu / I Mahloko
Manager

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Client Ref.No.: -

Date Reported : 2025-08-12

Project : RETHUSHENG SPECIAL SCHOOL

Attention : Ruth

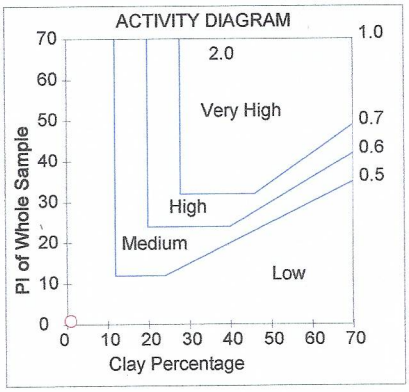
HYDROMETER ANALYSIS SANS 3001: GR 1; GR 10; ASTM D422

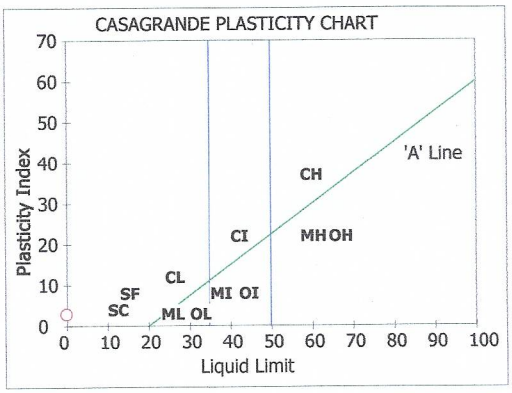
Sample No.	: S/16053
Position	: TP 05
Layer Type	: 250 - 600
Sample Colour	: Dark Brown
Sample Type	: Sandy Gravel

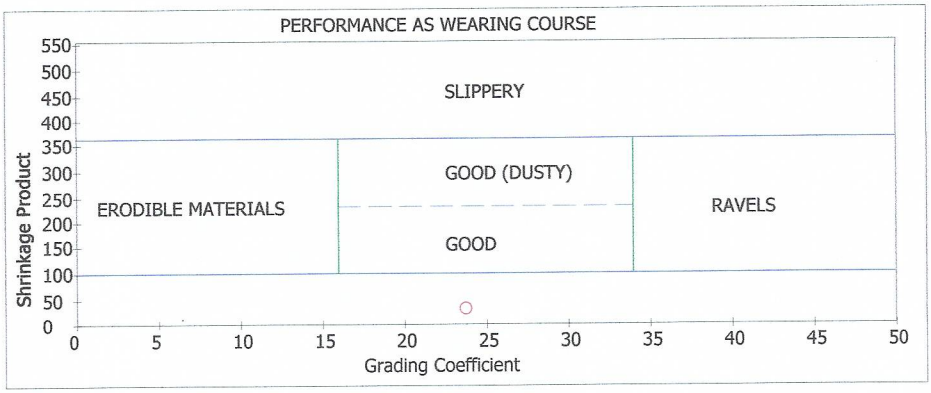
Sieve Size(mm)	% Passing
100.0	100
75.00	100
63.00	96
50.00	93
37.50	90
28.00	87
20.00	79
14.00	70
5.000	44
2.000	33
0.425	20
0.250	15
0.150	11
0.075	6,9
0.060	2,4
0.050	2,3
0.020	1,9
0.005	1,2
0.002	1,2

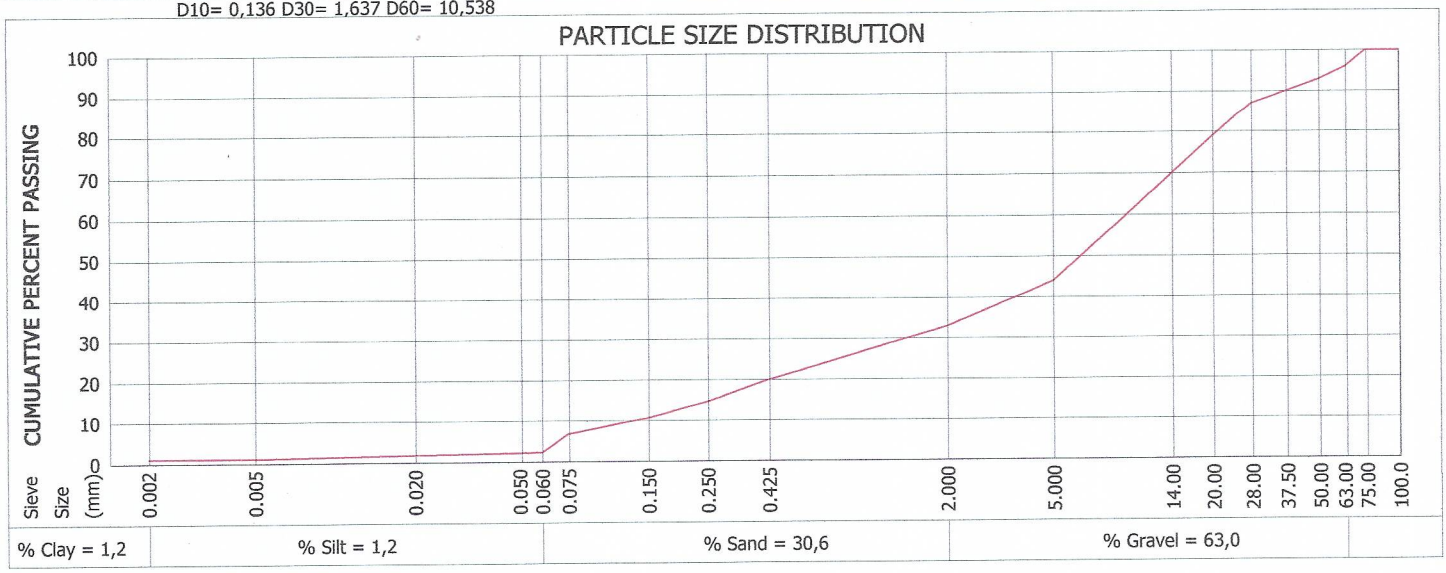
Soil Mortar	2.000 - 0.425	40
	0.425 - 0.250	16
	0.250 - 0.150	12
	0.150 - 0.075	11
	< 0.075	21
Effective Size		0,136
Uniformity Coefficient		77,5
Curvature Coefficient		1,9
Oversize Index		3,0
Shrinkage Product		30,0
Grading Coefficient		23,8
Grading Modulus		2,40
Atterberg Limits	Liquid Limit	
	Plasticity Index	SP
	Linear Shrinkage	1,5
	PI < 0.075	9
Unified Soil Classification		GW-GC
US Highway Classification		A-1-a(0)

D10= 0,136 D30= 1,637 D60= 10,538









% Clay = 1,2	% Silt = 1,2	% Sand = 30,6	% Gravel = 63,0

Deviation from Test Method : -
Remarks and Notes : -

Opinions and interpretations are not included in our scope of works.
The samples were subjected to analysis according to (SANS)(TMH5)(DOT)(ASTM).
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Date Reported : 2025-08-12

Project : RETHUSHENG SPECIAL SCHOOL

Attention : Ruth

UNTREATED MATERIAL CLASSIFICATION SANS 3001: GR 1; GR 10; GR 30; GR 40

SAMPLE INFORMATION AND PROPERTIES

SAMPLE NO.	S/16054				
HOLE NO./ Km / CHAINAGE	TP 07				
ROAD NO./ NAME Line 1 ROAD NO./ NAME Line 2	Rethusheng S. School -				
LAYER TESTED/SAMPLED	0 - 750				
SAMPLE DEPTH	-				
DATE SAMPLED	2025-08-02				
COLOUR OF SAMPLE	Light Brown				
TYPE OF SAMPLE	Silty Sand				

SIEVE ANALYSIS - % PASSING SIEVES *(SANS 3001-GR1:2010, SANS 3001-GR2:2010)

SIEVE ANALYSIS (GR 1) % PASSING	100.0 mm				
	75.0 mm				
	63.0 mm				
	50.0 mm				
	37.5 mm				
	28.0 mm				
	20.0 mm				
	14.0 mm	100			
	5.0 mm	99			
	2.0 mm	91			
	0.425 mm	52			
	0.075 mm	19			
GM %		1,4			

ATTERBERG LIMITS ANALYSIS - *(SANS 3001-GR10:2010)

ATTERBERG LIMITS (%) SANS GR10,GR11	LIQUID LIMIT				
	PLASTICITY INDEX	SP			
	LINEAR SHRINKAGE	1,5			
CLASSIFICATION	H.R.B.	A-2-4(0)			
	COLTO	G8			
	TRH 14	G10			

CALIFORNIA BEARING RATIO - *(SANS 3001-GR30:2010, SANS 3001-GR40:2010)

SANS GR30 MAX. DRY DENSITY	OMC %	9,2			
	MDD (kg/m³)	2015			
	COMP MC %	9,3			
SWELL % @	MOD | NRB | PRO	0,08 | 0,15 | 0,23			
C.B.R. SANS GR40	100 %	59			
	98 %	37			
	97 %	29			
	95 %	18			
	93 %	11			
	90 %	6			

STABILISER IN LAB	Neat			
TEST TYPE	CBR			
SAMPLING METHOD	TMH 5			
WEATHER WHEN SAMPLED	Unknown			

Deviation from Test Method : -
Remarks and Notes : -

Opinions and interpretations are not included in our scope of works.
The samples were subjected to analysis according to (SANS)(TMH5)(DOT)(ASTM).
The test results reported relate to the samples tested.
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Report compiled by : Hlokwe Tebatso

S Mahlangu / I Mahloko
Manager

Prog.ver 10.7 (2019/11/07)

ROADLAB NORTH
Plot 4 Dalmada, POLOKWANE, 0699
PO Box 30, Thornhill Plaza, 0882
Tel: 015 263 6016 Fax: -
Email: sibusiso@roadlabnorth.net
Web: www.roadlab.co.za

Job Request No.: RN 9298 E
MOBU GEO SERVICES
076 965 2360
ramaboear@mobugeoservices.co.za

Client Ref.No.: -

Date Reported : 2025-08-12

Project : RETHUSHENG SPECIAL SCHOOL

Attention : Ruth

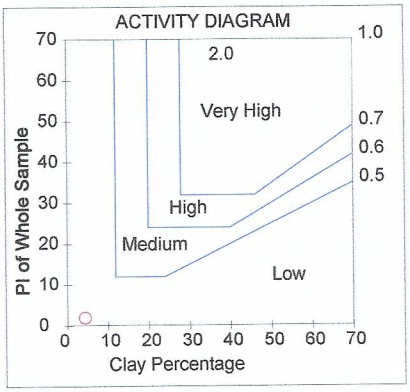
HYDROMETER ANALYSIS SANS 3001: GR 1; GR 10; ASTM D422

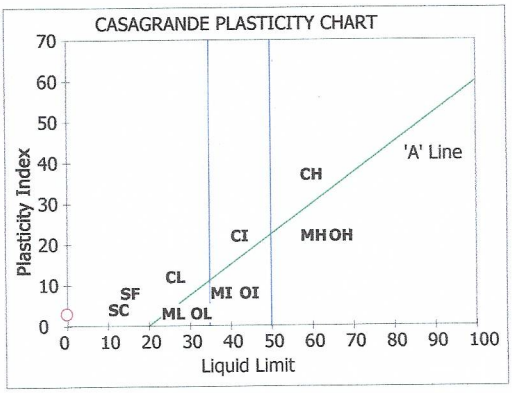
Sample No.	: S/16054
Position	: TP 07
Layer Type	: 0 - 750
Sample Colour	: Light Brown
Sample Type	: Silty Sand

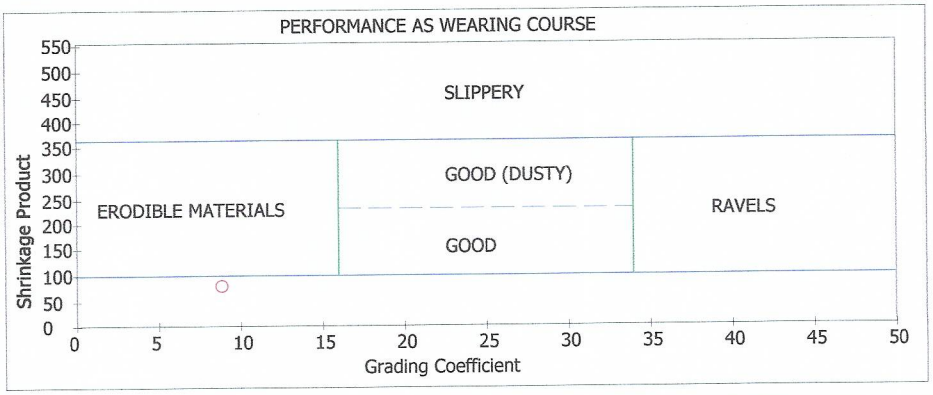
Sieve Size(mm)	% Passing
100.0	100
75.00	100
63.00	100
50.00	100
37.50	100
28.00	100
20.00	100
14.00	100
5.000	99
2.000	91
0.425	52
0.250	43
0.150	31
0.075	19
0.060	11
0.050	10
0.020	9,0
0.005	7,2
0.002	4,6

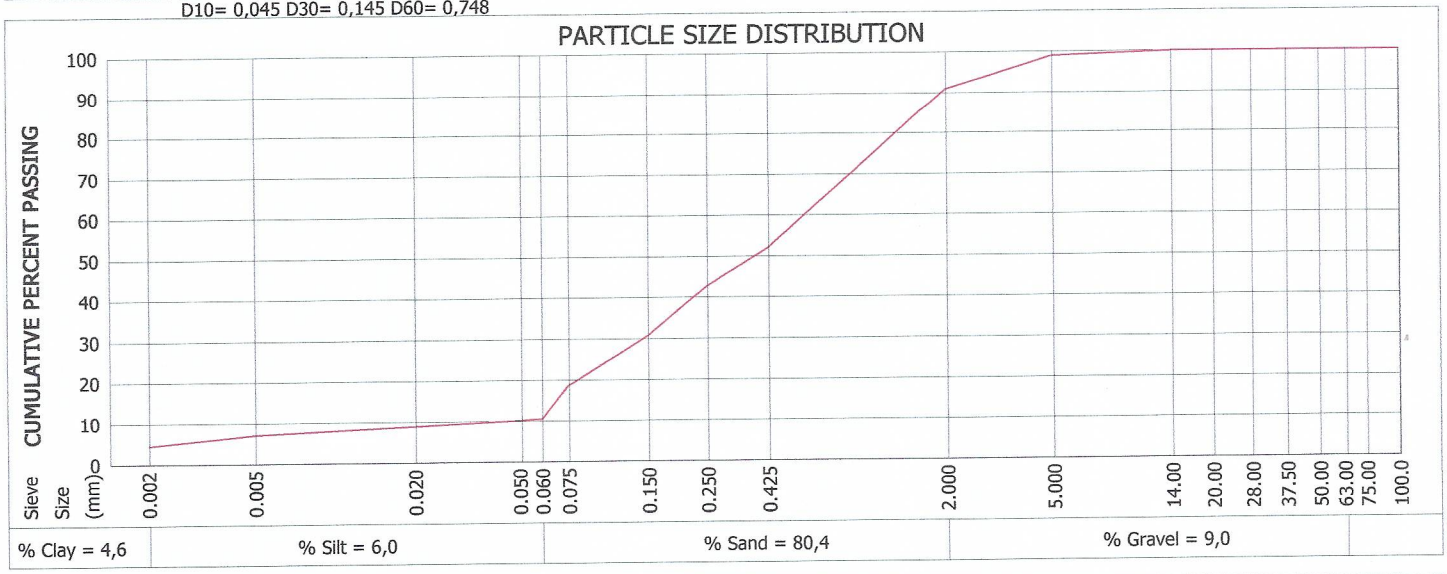
Soil Mortar	2.000 - 0.425	43
	0.425 - 0.250	10
	0.250 - 0.150	13
	0.150 - 0.075	13
	< 0.075	21
Effective Size		0,045
Uniformity Coefficient		16,6
Curvature Coefficient		0,6
Oversize Index		0,0
Shrinkage Product		78,0
Grading Coefficient		8,9
Grading Modulus		1,40
Atterberg Limits	Liquid Limit	
	Plasticity Index	SP
	Linear Shrinkage	1,5
	PI < 0.075	13
Unified Soil Classification		SC
US Highway Classification		A-2-4(0)

D10= 0,045 D30= 0,145 D60= 0,748









% Clay = 4,6	% Silt = 6,0	% Sand = 80,4	% Gravel = 9,0

Deviation from Test Method : -
Remarks and Notes : -

Opinions and interpretations are not included in our scope of works.
The samples were subjected to analysis according to (SANS)(TMH5)(DOT)(ASTM).
The test results reported relate to the samples tested.
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Report compiled by : Hlokwe Tebatso

S Mahlangu / I Mahloko
Manager

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APPENDIX C:

Dynamic Cone Penetrometer Results

Roadlab North (PTY) Ltd
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RN 9298 F **2025/08/12**

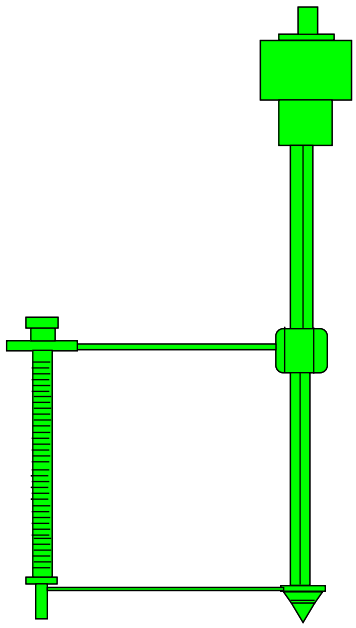
DYNAMIC CONE PENETRATION

AS REQUESTED BY

CLIENT : **MOBU GEO SERVICES**

ATTENTION: **Ruth Ramaboea**

CONTRACT: **RETHUSHENG SPECIAL SCHOOL**



Kind Regards

Mr. I Mahloko
Assistant Branch Manager

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Plot No. 4, Dalmada,
Polokwane, 700

CLIENT:	**MOBU GEO SERVICES**	**PROJECT DATE:**	**2025/08/02**
CONTRACT:	**RETHUSHENG SPECIAL SCHOOL**	**DATE:**	**2025/08/12**
		REFERENCE NO.:	**RN 9298 F**

DCP No. 1		**DCP No. 6**	
Area:	TP 1	Area:	TP 6
Penetration :	755mm	Penetration:	385mm
Removed:	0	Removed:	0
Refusal :	Y	Refusal:	Y
Position :	P1	Position:	P6
DCP No. 2		**DCP No. 7**	
Area:	TP 2	Area:	TP 7
Penetration :	180mm	Penetration:	635mm
Removed:	0	Removed:	0
Refusal :	Y	Refusal:	Y
Position :	P2	Position:	P7
DCP No. 3		**DCP No. 8**	
Area:	TP3	Area:	TP 8
Penetration :	335mm	Penetration:	375mm
Removed:	0	Removed:	0
Refusal :	Y	Refusal:	Y
Position :	P3	Position:	P8
DCP No. 4			
Area:	TP 4		
Penetration :	265mm		
Removed:	0		
Refusal :	Y		
Position :	P4		
DCP No. 5			
Area:	TP 5		
Penetration:	230mm		
Removed:	0		
Refusal:	Y		
Position:	P5		

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Req No: RN 9298 F **Order No:**

Estimate Bearing Ratio calculations based on a paper by Dr. Barry van Wyk

CLIENT: MOBU GEO SERVICES **DATE:** 2025/08/12

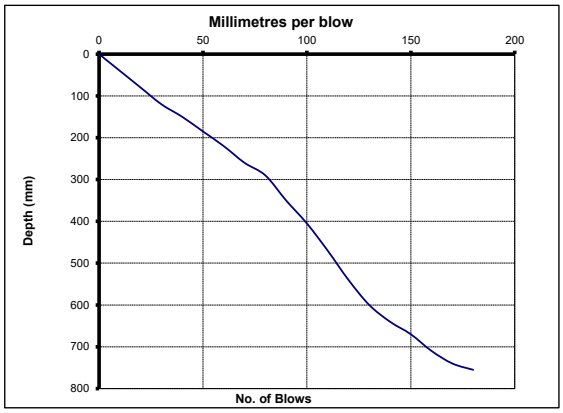
TEST REPORT:	RETHUSHENG SPECIAL SCHOOL	**JOB NUMBER:**	RN 9298 F
OPERATOR:	Client	**DATE TESTED:**	2025/08/02
TEST POSITION:	P1	**STARTING DEPTH:**	0mm
MATERIAL TYPE:	Gravel	**INSTRUMENT USED:**	1M DCP
CONSTRUCTION TYPE:	Structural	**NOTE:**	Refusal @ 755 mm

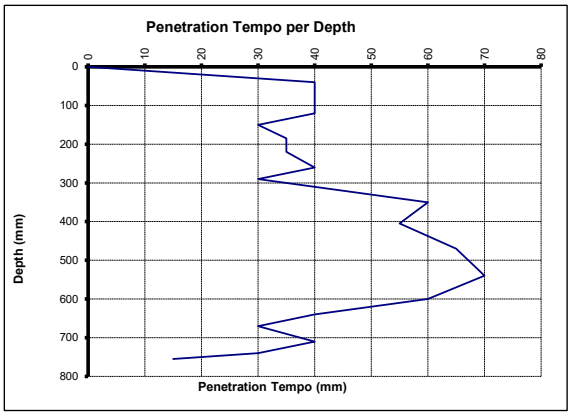
Number of Blows	Depth (mm)	Corrective Depth (mm)	Penetration Tempo	Structure Nr (dn) mm/blow	Consistency	Estimate Bearing Ratio (kPa)	In Situ CBR $410x(dn)^{-1.27}$	In Situ CBR (TMH 6)	In Situ UCS $2900x(dn)^{-1.09}$
0	70	0mm	0	0	0	0	0	0	0
10	110	40mm	40	8,0	Dense	123	29	31	301
20	150	80mm	40	8,0	Dense	123	29	31	301
30	190	120mm	40	8,0	Dense	123	29	31	301
40	220	150mm	30	6,0	Dense	152	42	44	411
50	255	185mm	35	7,0	Dense	136	35	36	348
60	290	220mm	35	7,0	Dense	136	35	36	348
70	330	260mm	40	8,0	Dense	123	29	31	301
80	360	290mm	30	6,0	Dense	152	42	44	411
90	420	350mm	60	12,0	Dense	92	17	18	193
100	475	405mm	55	11,0	Dense	98	20	20	212
110	540	470mm	65	13,0	Medium Dense	86	16	16	177
120	610	540mm	70	14,0	Medium Dense	82	14	15	163
130	670	600mm	60	12,0	Dense	92	17	18	193
140	710	640mm	40	8,0	Dense	123	29	31	301
150	740	670mm	30	6,0	Dense	152	42	44	411
160	780	710mm	40	8,0	Dense	123	29	31	301
170	810	740mm	30	6,0	Dense	152	42	44	411
180	825	755mm	15	3,0	Very Dense	>200	102	108	876

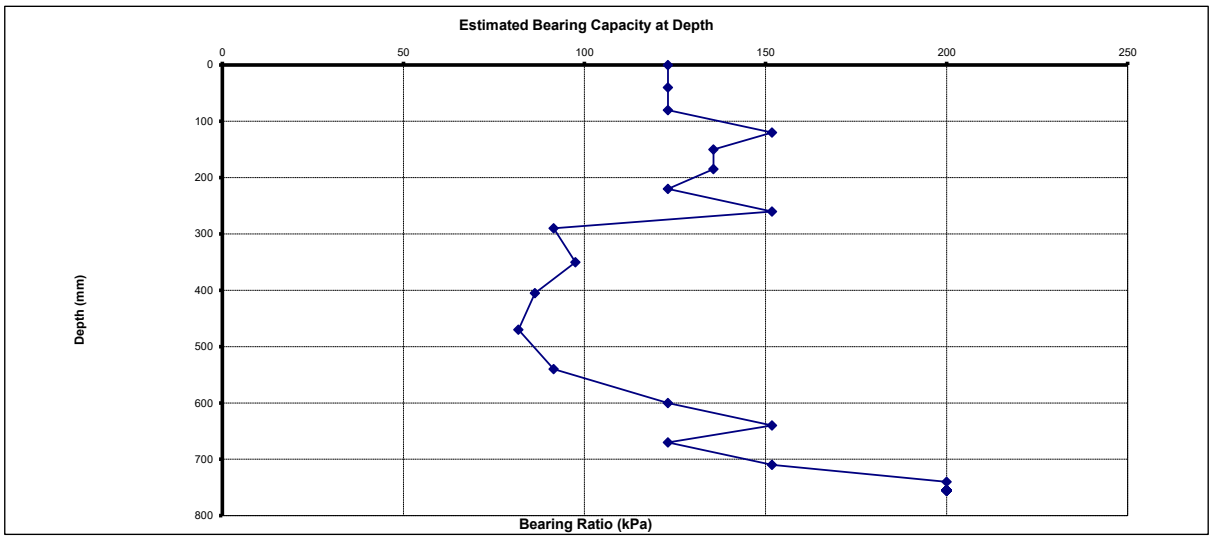
DCP GRAPHICAL REPRESENTATION

PROJECT: RETHUSHENG SPECIAL SCHOOL
CLIENT: MOBU GEO SERVICES
TEST POSITION: P1
MATERIAL TYPE: Gravel
CONSTRUCTION TYPE: Structural

DATE TESTED: 2025/08/02
OPERATOR: Client
STARTING DEPTH: 0mm
INSTRUMENT USED: 1M DCP
NOTE: Refusal @ 755 mm







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Req No: RN 9298 F **Order No:**

Estimate Bearing Ratio calculations based on a paper by Dr. Barry van Wyk

CLIENT: MOBU GEO SERVICES **DATE:** 2025/08/12

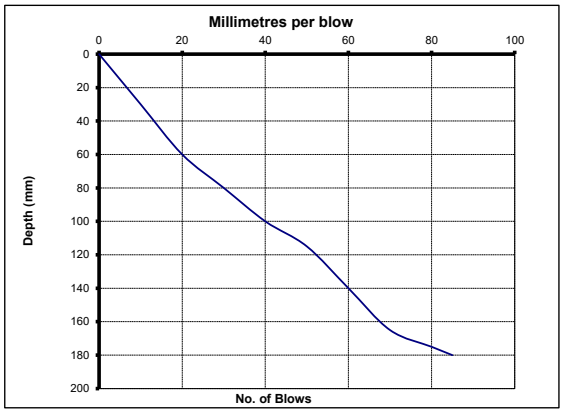
TEST REPORT:	RETHUSHENG SPECIAL SCHOOL	**JOB NUMBER:**	RN 9298 F
OPERATOR:	Client	**DATE TESTED:**	2025/08/02
TEST POSITION:	P2	**STARTING DEPTH:**	0mm
MATERIAL TYPE:	Gravel	**INSTRUMENT USED:**	1M DCP
CONSTRUCTION TYPE:	Structural	**NOTE:**	Refusal @ 180 mm

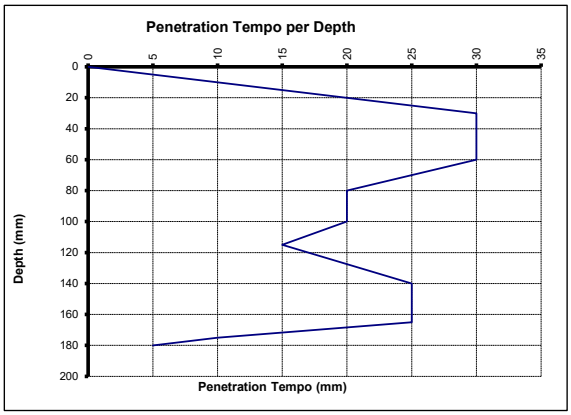
Number of Blows	Depth (mm)	Corrective Depth (mm)	Penetration Tempo	Structure Nr (dn) mm/blow	Consistency	Estimate Bearing Ratio (kPa)	In Situ CBR $410x(dn)^{-1.27}$	In Situ CBR (TMH 6)	In Situ UCS $2900x(dn)^{-1.09}$
0	60	0mm	0	0	0	0	0	0	0
10	90	30mm	30	6,0	Dense	152	42	44	411
20	120	60mm	30	6,0	Dense	152	42	44	411
30	140	80mm	20	4,0	Very Dense	200	70	75	640
40	160	100mm	20	4,0	Very Dense	200	70	75	640
50	175	115mm	15	3,0	Very Dense	>200	102	108	876
60	200	140mm	25	5,0	Very Dense	173	53	56	502
70	225	165mm	25	5,0	Very Dense	173	53	56	502
80	235	175mm	10	2,0	Very Dense	>200	170	>110	1362
85	240	180mm	5	1,0	Very Dense	>200	300	>110	2900

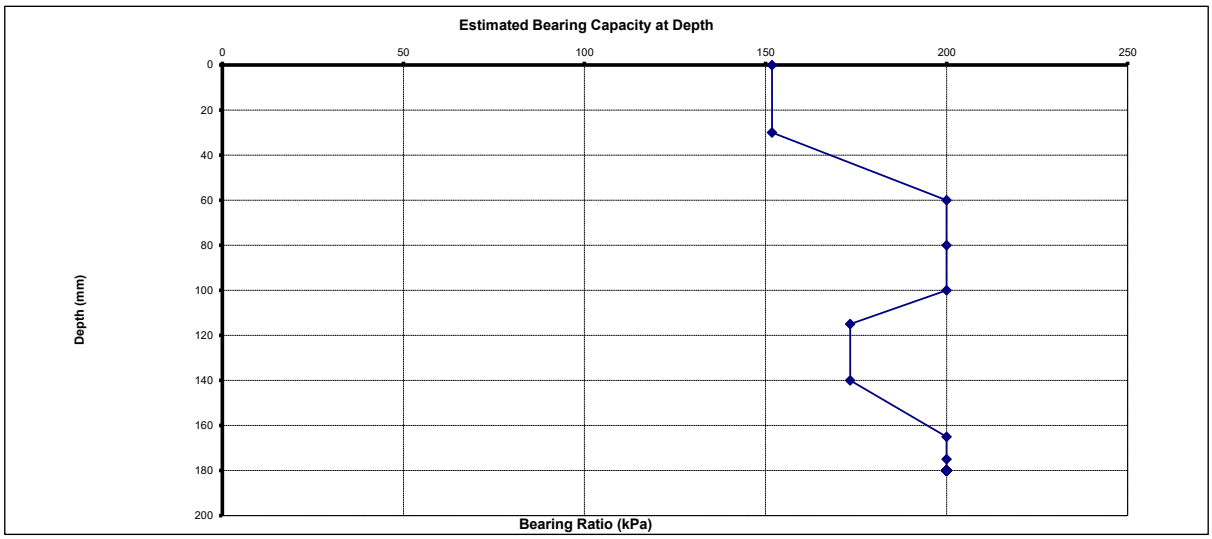
DCP GRAPHICAL REPRESENTATION

PROJECT: RETHUSHENG SPECIAL SCHOOL
CLIENT: MOBU GEO SERVICES
TEST POSITION: P2
MATERIAL TYPE: Gravel
CONSTRUCTION TYPE: Structural

DATE TESTED: 2025/08/02
OPERATOR: Client
STARTING DEPTH: 0mm
INSTRUMENT USED: 1M DCP
NOTE: Refusal @ 180 mm







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Req No: RN 9298 F **Order No:**

Estimate Bearing Ratio calculations based on a paper by Dr. Barry van Wyk

CLIENT: MOBU GEO SERVICES **DATE:** 2025/08/12

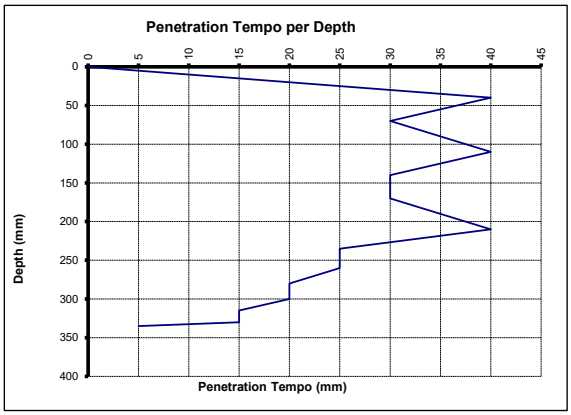
TEST REPORT:	RETHUSHENG SPECIAL SCHOOL	**JOB NUMBER:**	RN 9298 F
OPERATOR:	Client	**DATE TESTED:**	2025/08/02
TEST POSITION:	P3	**STARTING DEPTH:**	0mm
MATERIAL TYPE:	Gravel	**INSTRUMENT USED:**	1M DCP
CONSTRUCTION TYPE:	Structural	**NOTE:**	Refusal @ 335 mm

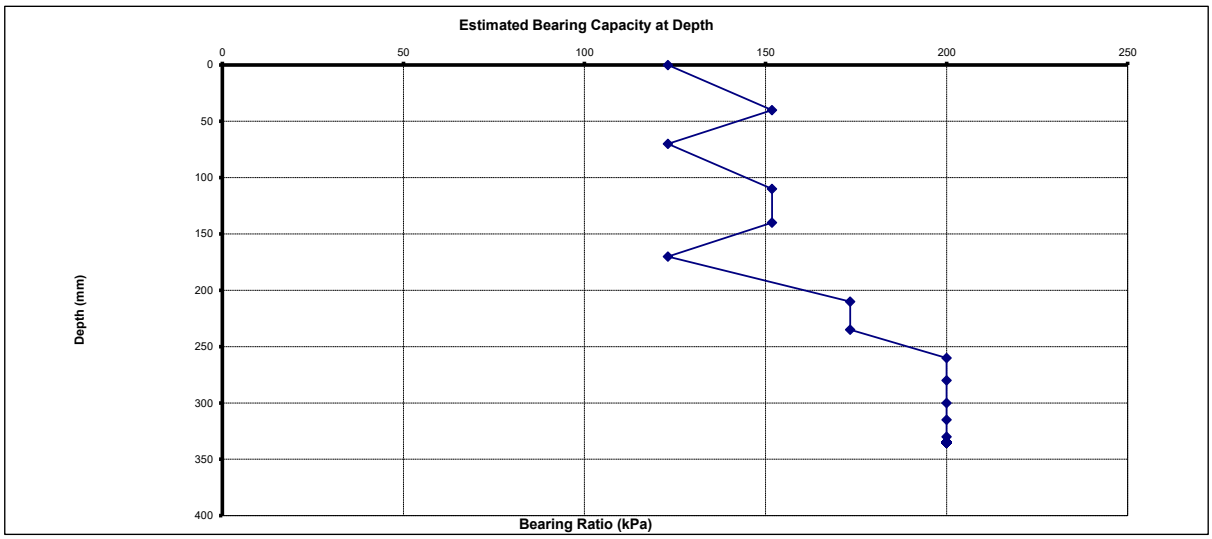
Number of Blows	Depth (mm)	Corrective Depth (mm)	Penetration Tempo	Structure Nr (dn) mm/blow	Consistency	Estimate Bearing Ratio (kPa)	In Situ CBR $410x(dn)^{-1.27}$	In Situ CBR (TMH 6)	In Situ UCS $2900x(dn)^{-1.09}$
0	80	0mm	0	0	0	0	0	0	0
10	120	40mm	40	8,0	Dense	123	29	31	301
20	150	70mm	30	6,0	Dense	152	42	44	411
30	190	110mm	40	8,0	Dense	123	29	31	301
40	220	140mm	30	6,0	Dense	152	42	44	411
50	250	170mm	30	6,0	Dense	152	42	44	411
60	290	210mm	40	8,0	Dense	123	29	31	301
70	315	235mm	25	5,0	Very Dense	173	53	56	502
80	340	260mm	25	5,0	Very Dense	173	53	56	502
90	360	280mm	20	4,0	Very Dense	200	70	75	640
100	380	300mm	20	4,0	Very Dense	200	70	75	640
110	395	315mm	15	3,0	Very Dense	>200	102	108	876
120	410	330mm	15	3,0	Very Dense	>200	102	108	876
125	415	335mm	5	1,0	Very Dense	>200	300	>110	2900

DCP GRAPHICAL REPRESENTATION

PROJECT: RETHUSHENG SPECIAL SCHOOL
CLIENT: MOBU GEO SERVICES
TEST POSITION: P3
MATERIAL TYPE: Gravel
CONSTRUCTION TYPE: Structural

DATE TESTED: 2025/08/02
OPERATOR: Client
STARTING DEPTH: 0mm
INSTRUMENT USED: 1M DCP
NOTE: Refusal @ 335 mm





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Req No: RN 9298 F **Order No:**

Estimate Bearing Ratio calculations based on a paper by Dr. Barry van Wyk

CLIENT: MOBU GEO SERVICES **DATE:** 2025/08/12

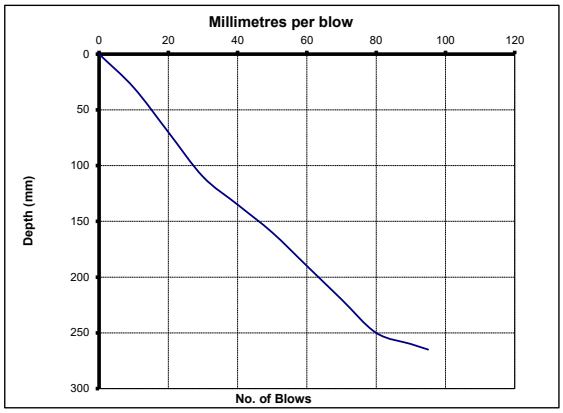
TEST REPORT:	RETHUSHENG SPECIAL SCHOOL	**JOB NUMBER:**	RN 9298 F
OPERATOR:	Client	**DATE TESTED:**	2025/08/02
TEST POSITION:	P4	**STARTING DEPTH:**	0mm
MATERIAL TYPE:	Gravel	**INSTRUMENT USED:**	1M DCP
CONSTRUCTION TYPE:	Structural	**NOTE:**	Refusal @ 265 mm

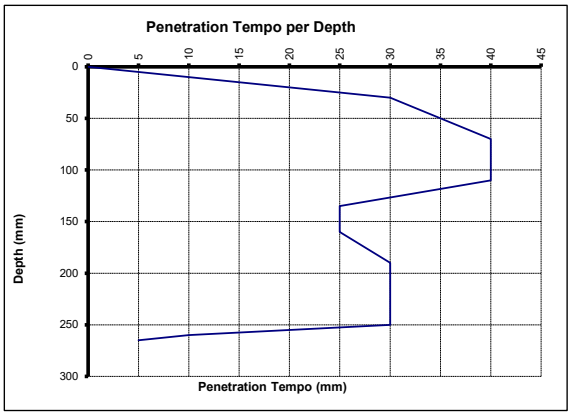
Number of Blows	Depth (mm)	Corrective Depth (mm)	Penetration Tempo	Structure Nr (dn) mm/blow	Consistency	Estimate Bearing Ratio (kPa)	In Situ CBR $410x(dn)^{-1.27}$	In Situ CBR (TMH 6)	In Situ UCS $2900x(dn)^{-1.09}$
0	60	0mm	0	0	0	0	0	0	0
10	90	30mm	30	6,0	Dense	152	42	44	411
20	130	70mm	40	8,0	Dense	123	29	31	301
30	170	110mm	40	8,0	Dense	123	29	31	301
40	195	135mm	25	5,0	Very Dense	173	53	56	502
50	220	160mm	25	5,0	Very Dense	173	53	56	502
60	250	190mm	30	6,0	Dense	152	42	44	411
70	280	220mm	30	6,0	Dense	152	42	44	411
80	310	250mm	30	6,0	Dense	152	42	44	411
90	320	260mm	10	2,0	Very Dense	>200	170	>110	1362
95	325	265mm	5	1,0	Very Dense	>200	300	>110	2900

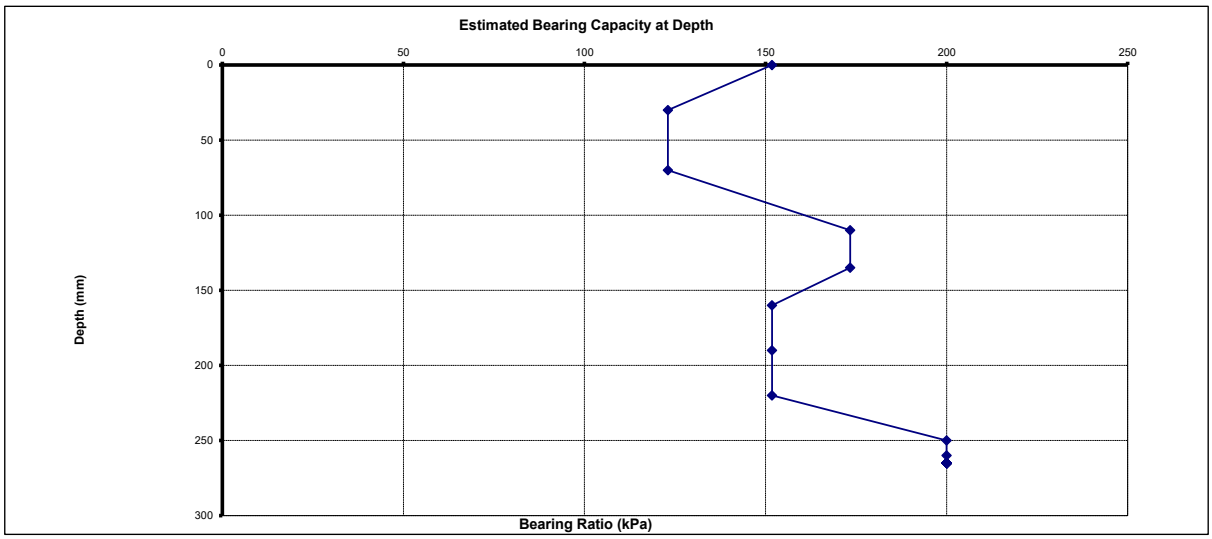
DCP GRAPHICAL REPRESENTATION

PROJECT: RETHUSHENG SPECIAL SCHOOL
CLIENT: MOBU GEO SERVICES
TEST POSITION: P4
MATERIAL TYPE: Gravel
CONSTRUCTION TYPE: Structural

DATE TESTED: 2025/08/02
OPERATOR: Client
STARTING DEPTH: 0mm
INSTRUMENT USED: 1M DCP
NOTE: Refusal @ 265 mm







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Req No: RN 9172 E **Order No:**

Estimate Bearing Ratio calculations based on a paper by Dr. Barry van Wyk

CLIENT: MOBU GEO SERVICES **DATE:** 2025/08/12

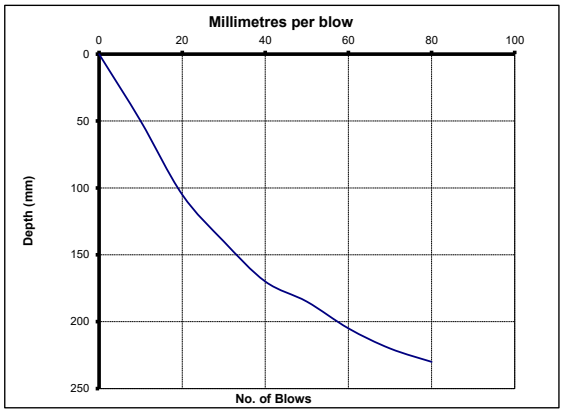
TEST REPORT:	RETHUSHENG SPECIAL SCHOOL	**JOB NUMBER:**	RN 9298 F
OPERATOR:	Client	**DATE TESTED:**	2025/08/02
TEST POSITION:	P5	**STARTING DEPTH:**	0mm
MATERIAL TYPE:	Gravel	**INSTRUMENT USED:**	1M DCP
CONSTRUCTION TYPE:	Structural	**NOTE:**	Refusal @ 230 mm

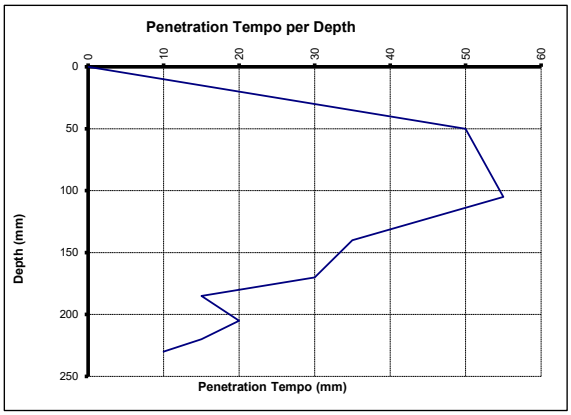
Number of Blows	Depth (mm)	Corrective Depth (mm)	Penetration Tempo	Structure Nr (dn) mm/blow	Consistency	Estimate Bearing Ratio (kPa)	In Situ CBR $410x(dn)^{-1.27}$	In Situ CBR (TMH 6)	In Situ UCS $2900x(dn)^{-1.09}$
0	70	0mm	0	0	0	0	0	0	0
10	120	50mm	50	10,0	Dense	105	22	23	236
20	175	105mm	55	11,0	Dense	98	20	20	212
30	210	140mm	35	7,0	Dense	136	35	36	348
40	240	170mm	30	6,0	Dense	152	42	44	411
50	255	185mm	15	3,0	Very Dense	>200	102	108	876
60	275	205mm	20	4,0	Very Dense	200	70	75	640
70	290	220mm	15	3,0	Very Dense	>200	102	108	876
80	300	230mm	10	2,0	Very Dense	>200	170	>110	1362

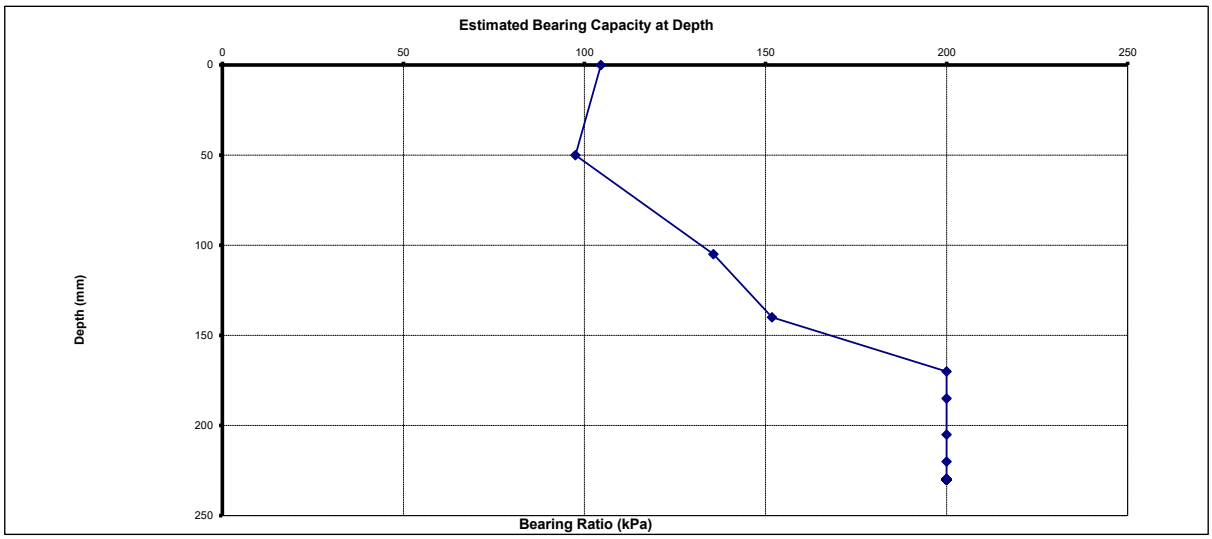
DCP GRAPHICAL REPRESENTATION

PROJECT: RETHUSHENG SPECIAL SCHOOL
CLIENT: MOBU GEO SERVICES
TEST POSITION: P5
MATERIAL TYPE: Gravel
CONSTRUCTION TYPE: Structural

DATE TESTED: 2025/08/02
OPERATOR: Client
STARTING DEPTH: 0mm
INSTRUMENT USED: 1M DCP
NOTE: Refusal @ 230 mm







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Req No: RN 9298 F **Order No:**

Estimate Bearing Ratio calculations based on a paper by Dr. Barry van Wyk

CLIENT: MOBU GEO SERVICES **DATE:** 2025/08/12

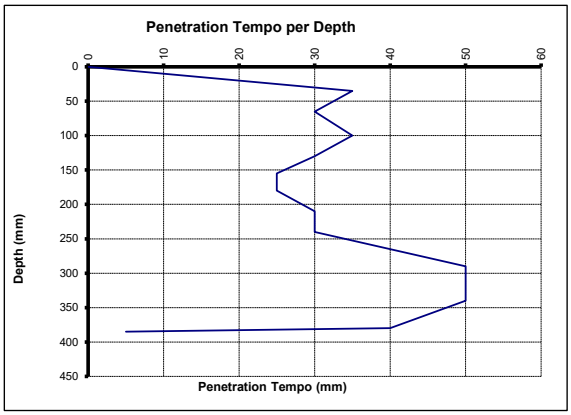
TEST REPORT:	RETHUSHENG SPECIAL SCHOOL	**JOB NUMBER:**	RN 9298 F
OPERATOR:	Client	**DATE TESTED:**	2025/08/02
TEST POSITION:	P6	**STARTING DEPTH:**	0mm
MATERIAL TYPE:	Gravel	**INSTRUMENT USED:**	1M DCP
CONSTRUCTION TYPE:	Structural	**NOTE:**	Refusal @ 385 mm

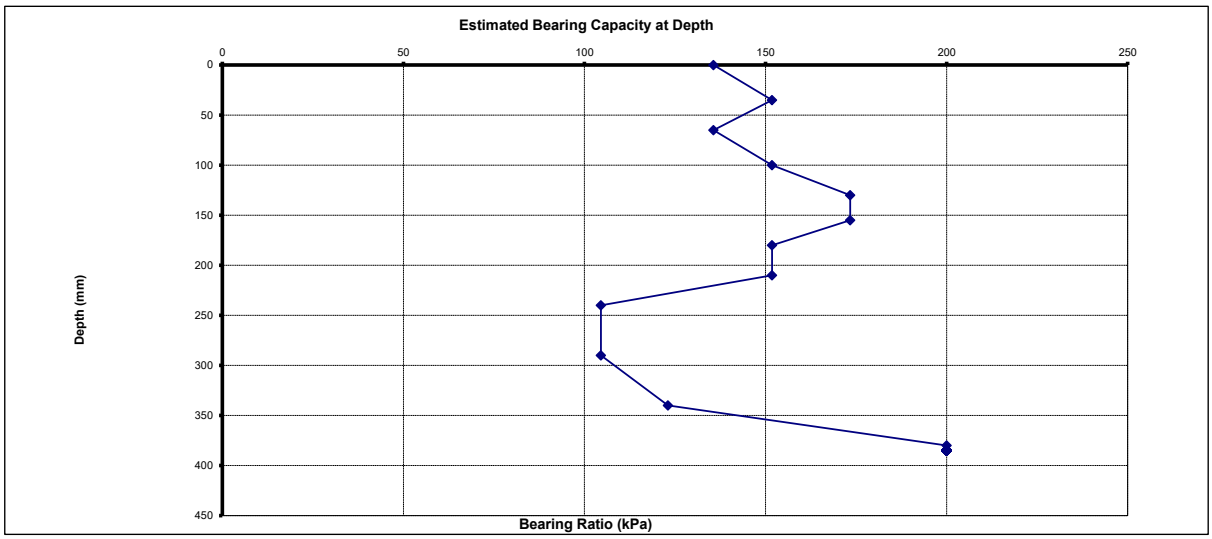
Number of Blows	Depth (mm)	Corrective Depth (mm)	Penetration Tempo	Structure Nr (dn) mm/blow	Consistency	Estimate Bearing Ratio (kPa)	In Situ CBR $410x(dn)^{-1.27}$	In Situ CBR (TMH 6)	In Situ UCS $2900x(dn)^{-1.09}$
0	80	0mm	0	0	0	0	0	0	0
10	115	35mm	35	7,0	Dense	136	35	36	348
20	145	65mm	30	6,0	Dense	152	42	44	411
30	180	100mm	35	7,0	Dense	136	35	36	348
40	210	130mm	30	6,0	Dense	152	42	44	411
50	235	155mm	25	5,0	Very Dense	173	53	56	502
60	260	180mm	25	5,0	Very Dense	173	53	56	502
70	290	210mm	30	6,0	Dense	152	42	44	411
80	320	240mm	30	6,0	Dense	152	42	44	411
90	370	290mm	50	10,0	Dense	105	22	23	236
100	420	340mm	50	10,0	Dense	105	22	23	236
110	460	380mm	40	8,0	Dense	123	29	31	301
115	465	385mm	5	1,0	Very Dense	>200	300	>110	2900

DCP GRAPHICAL REPRESENTATION

PROJECT: RETHUSHENG SPECIAL SCHOOL
CLIENT: MOBU GEO SERVICES
TEST POSITION: P6
MATERIAL TYPE: Gravel
CONSTRUCTION TYPE: Structural

DATE TESTED: 2025/08/02
OPERATOR: Client
STARTING DEPTH: 0mm
INSTRUMENT USED: 1M DCP
NOTE: Refusal @ 385 mm





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Req No: RN 9298 F **Order No:**

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CLIENT: MOBU GEO SERVICES **DATE:** 2025/08/12

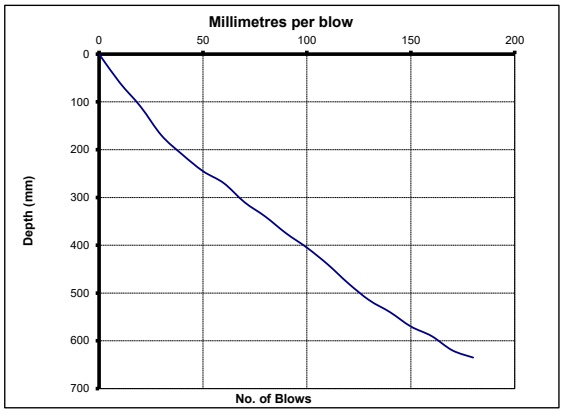
TEST REPORT:	RETHUSHENG SPECIAL SCHOOL	**JOB NUMBER:**	RN 9298 F
OPERATOR:	Client	**DATE TESTED:**	2025/08/02
TEST POSITION:	P7	**STARTING DEPTH:**	0mm
MATERIAL TYPE:	Gravel	**INSTRUMENT USED:**	1M DCP
CONSTRUCTION TYPE:	Structural	**NOTE:**	Refusal @ 635 mm

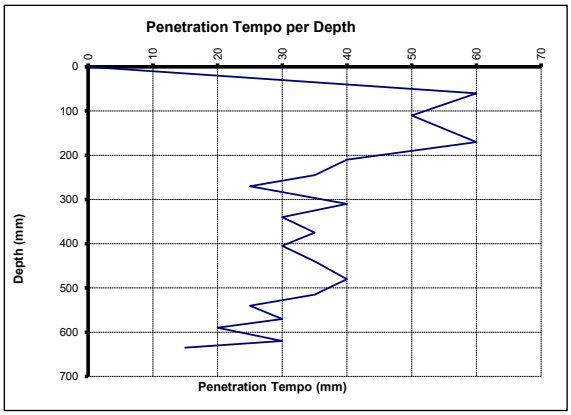
Number of Blows	Depth (mm)	Corrective Depth (mm)	Penetration Tempo	Structure Nr (dn) mm/blow	Consistency	Estimate Bearing Ratio (kPa)	In Situ CBR $410x(dn)^{-1.27}$	In Situ CBR (TMH 6)	In Situ UCS $2900x(dn)^{-1.09}$
0	80	0mm	0	0	0	0	0	0	0
10	140	60mm	60	12,0	Dense	92	17	18	193
20	190	110mm	50	10,0	Dense	105	22	23	236
30	250	170mm	60	12,0	Dense	92	17	18	193
40	290	210mm	40	8,0	Dense	123	29	31	301
50	325	245mm	35	7,0	Dense	136	35	36	348
60	350	270mm	25	5,0	Very Dense	173	53	56	502
70	390	310mm	40	8,0	Dense	123	29	31	301
80	420	340mm	30	6,0	Dense	152	42	44	411
90	455	375mm	35	7,0	Dense	136	35	36	348
100	485	405mm	30	6,0	Dense	152	42	44	411
110	520	440mm	35	7,0	Dense	136	35	36	348
120	560	480mm	40	8,0	Dense	123	29	31	301
130	595	515mm	35	7,0	Dense	136	35	36	348
140	620	540mm	25	5,0	Very Dense	173	53	56	502
150	650	570mm	30	6,0	Dense	152	42	44	411
160	670	590mm	20	4,0	Very Dense	200	70	75	640
170	700	620mm	30	6,0	Dense	152	42	44	411
180	715	635mm	15	3,0	Very Dense	>200	102	108	876

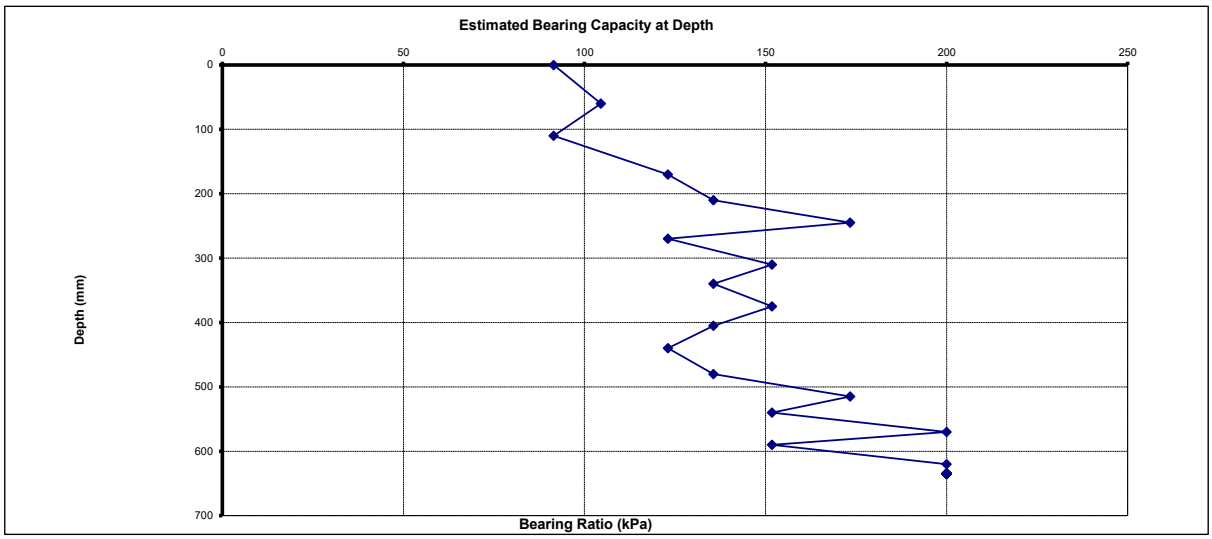
DCP GRAPHICAL REPRESENTATION

PROJECT: RETHUSHENG SPECIAL SCHOOL
CLIENT: MOBU GEO SERVICES
TEST POSITION: P7
MATERIAL TYPE: Gravel
CONSTRUCTION TYPE: Structural

DATE TESTED: 2025/08/02
OPERATOR: Client
STARTING DEPTH: 0mm
INSTRUMENT USED: 1M DCP
NOTE: Refusal @ 635 mm







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TEST REPORT:	RETHUSHENG SPECIAL SCHOOL	**JOB NUMBER:**	RN 9298 F
OPERATOR:	Client	**DATE TESTED:**	2025/08/02
TEST POSITION:	P8	**STARTING DEPTH:**	0mm
MATERIAL TYPE:	Gravel	**INSTRUMENT USED:**	1M DCP
CONSTRUCTION TYPE:	Structural	**NOTE:**	Refusal @ 375 mm

Number of Blows	Depth (mm)	Corrective Depth (mm)	Penetration Tempo	Structure Nr (dn) mm/blow	Consistency	Estimate Bearing Ratio (kPa)	In Situ CBR $410x(dn)^{-1.27}$	In Situ CBR (TMH 6)	In Situ UCS $2900x(dn)^{-1.09}$
0	70	0mm	0	0	0	0	0	0	0
10	115	45mm	45	9,0	Dense	113	25	26	264
20	150	80mm	35	7,0	Dense	136	35	36	348
30	190	120mm	40	8,0	Dense	123	29	31	301
40	230	160mm	40	8,0	Dense	123	29	31	301
50	270	200mm	40	8,0	Dense	123	29	31	301
60	310	240mm	40	8,0	Dense	123	29	31	301
70	330	260mm	20	4,0	Very Dense	200	70	75	640
80	365	295mm	35	7,0	Dense	136	35	36	348
90	390	320mm	25	5,0	Very Dense	173	53	56	502
100	415	345mm	25	5,0	Very Dense	173	53	56	502
110	440	370mm	25	5,0	Very Dense	173	53	56	502
115	445	375mm	5	1,0	Very Dense	>200	300	>110	2900

DCP GRAPHICAL REPRESENTATION

PROJECT: RETHUSHENG SPECIAL SCHOOL
CLIENT: MOBU GEO SERVICES
TEST POSITION: P8
MATERIAL TYPE: Gravel
CONSTRUCTION TYPE: Structural

DATE TESTED: 2025/08/02
OPERATOR: Client
STARTING DEPTH: 0mm
INSTRUMENT USED: 1M DCP
NOTE: Refusal @ 375 mm