PHASE 1 NEAR SURFACE GEOTECHNICAL INVESTIGATION FOR THE PROPOSED TOWNSHIP ESTABLISHMENT TO BE SITUATED ON PORTION 4, 5, 13, 22 AND THE REMAINDER OF PORTION 12 ON THE FARM OF GEMBOKSPRUIT 229 JR, MPUMALANGA PROVINCE OF SOUTH AFRICA

Report Prepared for:	Report Prepared by:
Nkanivo Development Consultants Unit 79, Block 5, Lombardy Business Park 66 Graham Road Pretoria, 0084 P.O Box 11948 Silver Lakes 0054 Tell: +27 (0) 12 807 7445 Cell: +27 (0) 83 277 7347 info@nkanivo.co.za www.nkanivo.co.za Contact Person: Samuel Chauke (Managing Director)	**Zwandazwashu Consulting (Pty) Ltd** Unit 01A Stanford Park 817 16th Road Randjespark Midrand 1685 Cell: 079 0812369 / 067 706 9904 Email: admin@zwandazwashu.co.za Website: www.zwandazwashu.co.za Prepared & Compiled by: Neduvhuledza Nduvho (Cand.Sci.Nat) Reviewed by: Mavhetha Lavhelesani (GSSA Member) (Pr.Sci.Nat)

REV	DATE	PREPARED BY		REVIEWED BY		STATUS
00	28/04/2021	N. Neduvhuledza (Cand.Sci.Nat)		L Mavhetha (Pr.Sci.Nat)		Final Geotech Report

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

AASHTO : American Association of State Highway and Transportation Officials

ARS : Acceleration Response Spectra

DCP : Dynamic Cone Penetrometer

DSI : Dolomite Stability Investigation

CBR : Californian Bearing Ratio

M : Meter

MDD : Maximum Dry Density

MBGL : Meters Below Ground Level

NHBRC : The National Home Builders Registration Council

OMC : Optimum Moisture Content

CL : Clay

TP : Trial Pit

TLB : Tractor Loader Backhoe

SANS : South African National Standards

SANAS : South African National Accreditation System

SACNASP : South African Council Natural Scientific Professions

USC : Unified Soil Classification

EXECUTIVE SUMMARY

Zwandazwashu Consulting (Pty) Ltd was appointed by Nkanivo Development Consultants to conduct phase 1 near surface geotechnical investigation for the proposed township establishment on portion 4, 5, 13, 22 and the remainder of portion 12 of the farm Gemsbokspruit 22 JR, on behalf of Thembisile Hani Local Municipality of the Nkangala District Municipality in Mpumalanga Province of South Africa. The general Geographical Positioning System (GPS) coordinates for proposed development are 28°54'17"E 25°24'10"S at an average elevation of 1333 meters above sea level.

Twenty Five (25) Test pits were positioned using a hand held GPS and the position of the test pits is shown on figure 3. The method of investigation was based on a near surface investigation, to a maximum depth of 2.8 m below existing ground level using fly wheel TLB (Tractor-Loader-Backhoe) in order to obtain information on the subsurface soil; each pit was marked, photographed and profiled by a field engineering geologist in accordance with the current standard procedures proposed by Brink and Bruin (2002). The test pit photographs are presented in Appendix A of this report.

The field work indicated a general homogeneity of the subsurface soils comprising moist, light brown, intact, dense, and Sandy gravel. Representative disturbed subsoil samples were retrieved from the inspection pits during the investigation and were taken to a SANAS Accredited laboratory for testing. These tests aid in assessing the behaviour of soils due to moisture changes particularly below foundations. The following tests were conducted on soil samples taken during the field work phase by a suitable SANAS accredited soils laboratory (RoadLab, Germiston, JHB, and Gauteng Province)

A review of the test pit data indicates that the site is generally underlained by sandy gravel and granite bedrock. The laboratory tests indicated that material underlying the site exhibits low potential expansiveness. The development potential has been broadly classified in terms of a Geotechnical Sub-Area 1 based on field observations/investigation (geological, hydrogeological, and geomorphological), and laboratory soil testing of soil samples. From the above discussion the site is classified into main soil area namely compressible and potential collapsible soils: According to COLTO the soil samples were classified as G6, G7 and G8. **The foundation design options as per SANS10400 H- NHBRC soil symbol is "R/C". The recommended Foundation types in accordance with** SANS 10400H- ***Modified normal / Reinforced Deep Strip Foundation.***I it is recommended that all foundations be inspected by a competent person prior to placing any concrete, regular checks on the quality and compaction of the backfill.

1. INTRODUCTION

Zwandazwashu Consulting (Pty) Ltd was appointed by Nkanivo Development Consultants to conduct phase 1 near surface geotechnical investigation for the proposed township establishment on portion 4, 5, 13, 22 and the remainder of portion 12 of the farm Gemsbokspruit 22 JR, on behalf of Thembisile Hani Local Municipality of the Nkangala District Municipality in Mpumalanga Province of South Africa.

2. SCOPE OF THE REPORT

This report evaluates the geotechnical characteristics associated with the underlying geology and any geotechnical constraints that might affect structural integrity of the subject property. However, it is also essential to Identify engineering properties' potential influence on the design, construction and operation of the intended infrastructures. It must be noted that there were no infrastructures erected on site during the course of the investigation, thus, the site is a Greenfield.

The main objective of the investigation was aimed at defining the founding materials and establishing broader geotechnical conditions and their suitability to the establishment of township.

The following are some of the objectives of the conducted geotechnical investigation:

- To provide an overview of the geology of the site
- To establish in broad terms, the nature and relevant engineering properties of the upper soil and rock strata underlying the site.
- To ascertain the soil chemistry including pH determination and electrical conductivity tests.
- Assess the groundwater level encountered below the site.
- To comment on suitable excavation procedures for the installation of services.
- To present general foundation recommendations for the proposed development.
- To comment on any other geotechnical aspects as these may affect the development.
- Potential geotechnical limiting factors by determining the behavior and suitability of soil/rocks and their effects on the intended development;
- Assess excavation conditions

- Determine the presence or occurrence of groundwater from the surface to a maximum depth of 3 meters.
- Classification of the site material according to the TRH14 classification system

The geotechnical investigation was carried out in accordance with SAIEG and GFSH-2 guidelines and all NHBRC Home Building Manuals. This report presents findings on the geotechnical properties and characteristics of the surficial soils underlying the site, the investigation methodology and discusses recommendations for earthworks, drainage, ease of excavation and foundations.

3. INFORMATION USED IN THIS STUDY

The geotechnical investigation commenced with a desktop study using the existing geotechnical databases and Maps

The following information was reviewed and consulted during the site investigation:

- Geological Map of the GSO: Scale 1: 100 000 Sheet – Geological series 2528BD
- Expansive Roadbed Treatment for Southern Africa: D J Weston (1980) 4th Int. Conf. on Expansive Soils, Vol. 1, Denver pp 339-360;
- National Home Builders Registration Council: Home Builders Manual 2015;
- Technical Recommendations for Highways – TRH14 Guidelines for Road Construction Materials by the National Institute for Transport and road research of the Council for Scientific and Industrial Research, (1985);
- SAICE's Guidelines for Urban Engineering Geological Investigations;
- Schwartz, K. (1985). Collapsible soils. The Civil Engineer in South Africa, July, p379-393 and;
- New, M., Lister, D., Hulme, M. and Makin, I., 2002: A high-resolution data set of surface climate over global land areas. Climate Research 21:1-25
- Site plans provided by the client
- South African Weather Service

4. SITE DESCRIPTION

4.1. Site Location

The general Geographical Positioning System (GPS) coordinates for proposed development are 28°54'17"E 25°24'10"S at an average elevation of 1333 meters above sea level. The site for the proposed township establishment is located approximately 8 km north of Kwagga mall via the R573 Moloto road and R544. Gembokspruit Village is approximately 103 kilometers North East of Pretoria. The area is administered by the Thembisile Hani Local Municipality, in Nkangala District Municipality, Mpumalanga Province, South Africa. There is presence of tar road with existing road signs. The proposed site has an approximately 96.13 hectares in extent, which is expected to yield approximately 766 stands.

The proposed site locality map is shown in Figure 1 below.

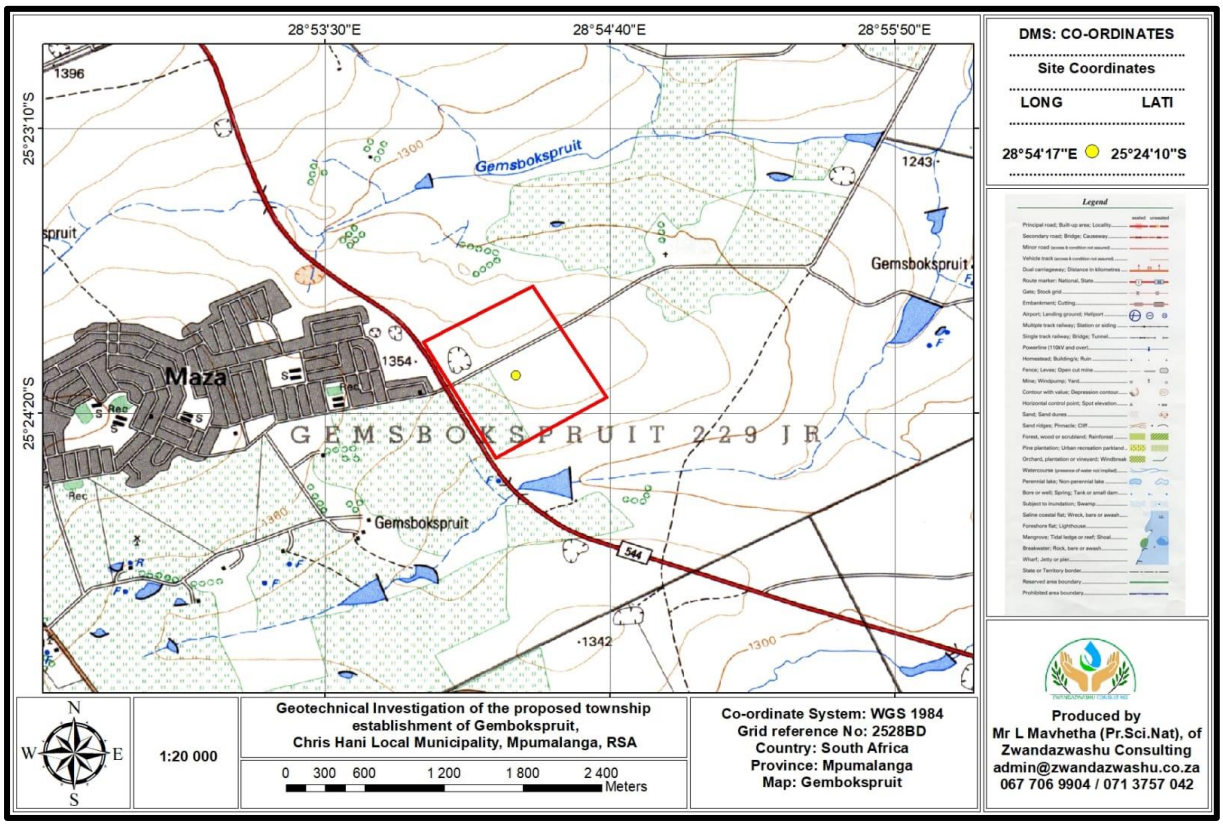


Figure 1: Locality map of the site

The proposed project land-use is follows as indicated in Figure 2:

- 61.95 Ha of residential area
- 2.07 Ha of public open space
- 0.34 Ha of Municipal
- 0.39 Ha of Light Industrial

- 2.52 Ha of business area
- 0.71 Ha designated for Place of worship
- 4.28 Ha designated for School/Crèche
- 23.46 will be covered with roads/streets

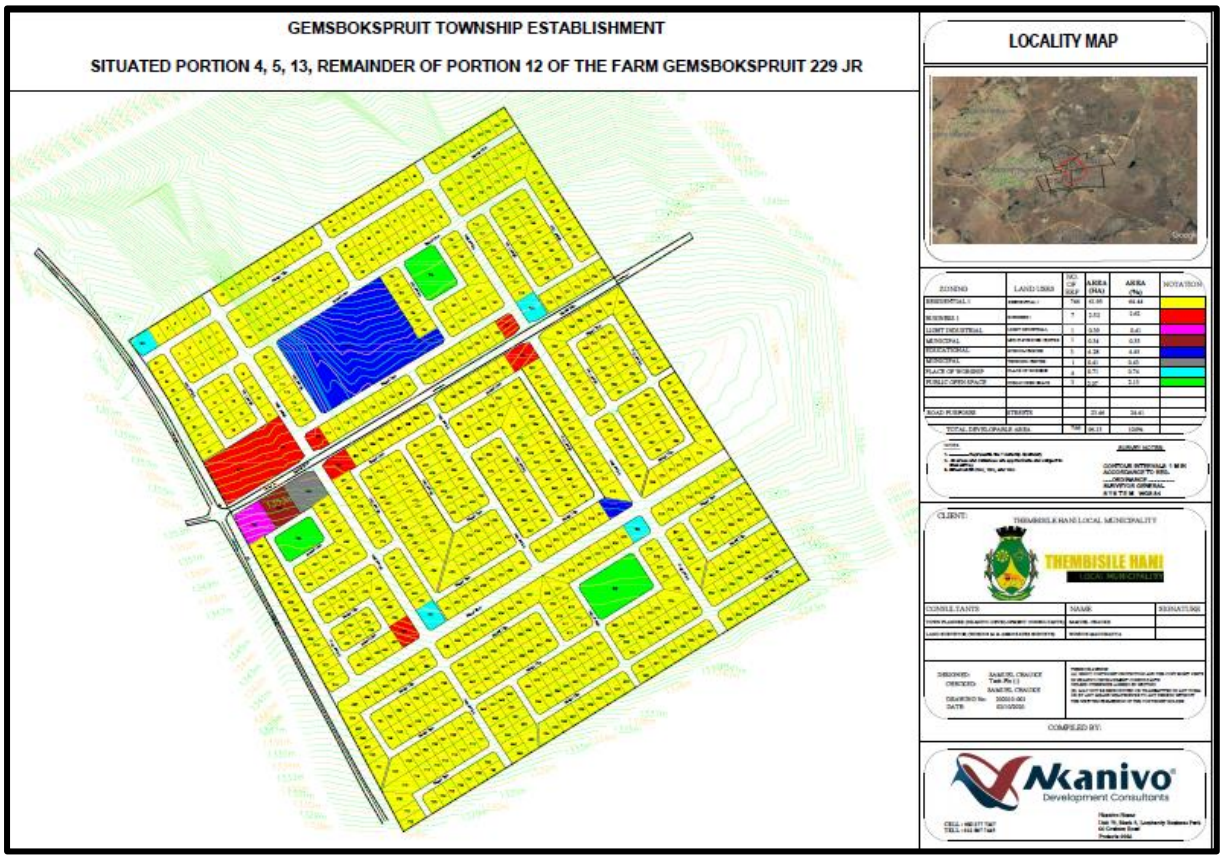


Figure 2: Layout Plan of the proposed development

4.2. Climate

The site under investigation is characterized by sunny summers with occasional thunder showers. Winters are mild, sunny dry days with crisp to cold nights with occasional frost occurring during winter seasons, Winds are typically fluctuating in a north-east direction and can reach maximum speed of >28km/h at certain times of the year (August to December). The site under investigation also experiences an average summer rainfall of approximately 114mm per month. Average annual temperature of the site is 17.3^{0}C. Frost is frequent to very frequent in the winter season, and can occur up to 13 days per year.

4.3. Land use

The area of interest for geotechnical investigation is used for grazing of domestic animals. Site is suited 30km south of Kwaggafontein, a township with a well-established residential area, schools, medical facilities and a shopping mall.

4.4. Topography

It was noted during site observation survey and actual geotechnical fieldwork procedures that the site topography is slightly steep from north to south direction. This was expected since the engineering geologist conducted geological and topographic analysis using ArcGISpro software prior site visit. It must also be noted that the layout plan of the proposed development as indicated in Figure 2 showed that the site is slightly steep. During the investigation the proposed site was accessible by a four-wheeled drive vehicle.

5. GEOLOGY

The site under investigation falls under the Lebowa granite suite of Bushveld complex. It must be noted that outcrops which were observed were outside the area under investigation. However those outcrops reveal the phaneritic texture granatoid rocks which are predominately composed of felsic minerals such as quartz, plagioclase feldspars and mafic (amphiboles and pyroxene) accessory minerals. Based on the physical properties of the rock samples and geological maps review of the site; the lithology of the site is to coarse grained granites. The site have thick layers residual sandy gravel at the upper layer and second layer respectively.

The geological map in figure 3 indicates the geological setting of the site and its surrounding.

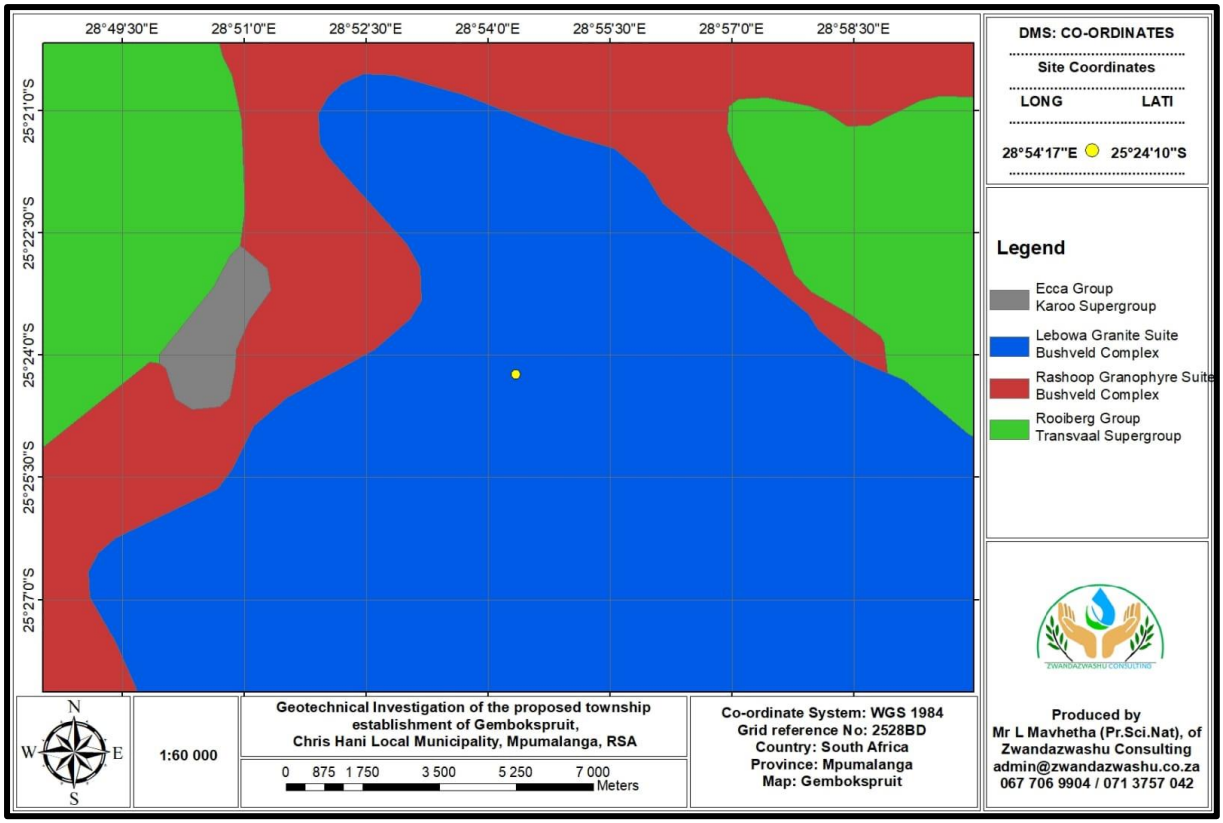


Figure 3: Geological setting of the site

6. SOIL PROFILE

Several soil strata that were encountered in the test pits during the field investigations are given below. Moreover, the summary of the test pit profiles is shown in Table 1.

Top soils

The topsoil is characterised by an upper stratum of sandy silt which have an average thickness of 0.37m in the range 0 to 0.65m below ground level. It is characterised by soils which can typically be described as “Slightly moist, greyish, intact,_Loose to Medium dense, ~Sandy Silt.”

Residual soils

Residual soil was encountered in all test pits except TP17, TP18, TP19, and TP20 with an average thickness of 0.93m in the range 0.25 to 2.7m below ground level.

These soils originate from the in-situ weathering of the Granite parent rock which is underlined which underlines the site. This stratum is typically described as “Moist, light brown, intact, _Dense, boulders, and ~ Sandy gravel”

Granite bedrock

The Granite parent rock underlies the residual sandy gravel soils and was encountered in all test pits. The Granite bedrock was slightly weathered and it can found at minimum depth of 0.5m and maximum depth of 2.8m.

The Granite grade varies with depth from slightly weathered medium hard rock to consolidated high strength bedrock from test pit to test pit.

Table 1: Summary of the test pit profiles

Test pits	Thickness of the layers			Water Seepage	End of hole	
	TOPSOIIL	RESIDUAL SOIL	BEDROCK		Depth (m)	Material
	Sandy silt	Sandy Gravel	Granite fragments			
TP 1	0-0.65m	0.65m – 2.7m	2.7m - 2.8m	None	2.8m	Sandy gravel
TP 2	0-0.46m	0.46m - 1.7m	1.7m - 1.8m	None	1.8m	Sandy gravel
TP 3	0-0.35m	0.3 m-1.2m	1.2 - 1.4m	None	1.4m	Sandy gravel
TP 4	0-0.4m	0.4m - 0.6m	0.6 - 1.6m	None	1.6m	Sandy gravel
TP 5	0-0.4m	0.4m - 1.4m	1.4 - 1.5m	None	1.5m	Sandy gravel
TP 6	0-0.5m	0.5m - 0.6m	0.6m- 1.7m	None	1.7m	Sandy gravel
TP 7	0-0.3m	0.3m – 0.55m	0.55m - 1.2m	None	1.2m	Sandy gravel
TP 8	0-0.4m	0.4m – 0.7m	0.7m – 0.9m	None	0.9m	Sandy gravel
TP 9	0-0.38m	0.38m – 0.6m	0.6m - 1.05m	None	1.05m	Sandy gravel
TP 10	0-0.3m	0.3m – 1m	1m – 1.1m	None	1.1m	Sandy gravel
TP 11	0-0.3m	0.3m – 0.8m	0.8m – 0.9m	None	0.9m	Sandy gravel
TP 12	0-0.4m	0.4m – 1.1m	1.1m - 1.3m	None	1.3m	Sandy gravel
TP 13	0-0.4m	0.4m - 1m	1m - 1.2m	None	1.2m	Sandy gravel
TP 14	0-0.28m	0.28 – 0.55m	0.55- 1m	None	1m	Sandy gravel
TP 15	0-0.3m	0.3m – 0.8m	0.8m – 0.9m	None	0.9m	Sandy gravel
TP 16	0-0.3m	0.3m - 1.2m	1.2m-1.3m	None	1.3m	Sandy gravel
TP 17	0-0.35m		0.35m- 0.6m	None	0.6m	Sandy gravel
TP 18	0-0.27m		0.27m - 0.5m	None	0.5m	Sandy gravel
TP 19	0-0.32m		0.32m-0.54m	None	0.54m	Sandy gravel
TP 20	0-0.3m		0.3m - 0.58m	None	0.58m	Sandy gravel
TP 21	0-0.33m	0.33 – 1.1m	1.1m – 1.4m	None	1.4m	Sandy gravel

TP 22	0-0.48m	0.48m – 0.7m	0.7m - 1.48m	None	1.48m	Sandy gravel
TP 23	0-0.48m	0.48m – 0.7m	0.7m - 1.48m	None	1.48m	Sandy gravel
TP 24	0-0.4m	0.4m – 0.7m	0.7m - 1.4m	None	1.4m	Sandy gravel
TP 25	0-0.25m	0.25m – 0.9m	0.9m - 1.1m	None	1.1m	Sandy gravel

7. METHOD OF INVESTIGATION

The fieldwork was undertaken on the 04 April 2021 and comprised of the following:

- Desktop study
- Walk over survey and pit excavation
- Test Pits
- Soil Sampling for laboratory tests purposes

7.1. Desktop Study

The desk study comprises the review of existing regional, site and surface information. Sources of information include:

- Topographic maps, geological data such as lithology of nearby rock outcrops, landforms and erosion patterns;
- Existing geotechnical reports prepared for areas in close proximity to the site;
- Data on seismic aspects, such as ground motion and liquefaction potential.

7.2. Field Mapping

A walk-over survey was carried out on the proposed site to obtain as much information as possible of the subsurface conditions from existing soil. A granite rock outcrops were identified during this investigation other field testing discussed below.

7.3. Inspection of Test Pits

The field investigation was conducted on the 09 April 2021. Based on the “Site Investigation Code of Practice” (SAICE Geotechnical Division, 2010), which provides standards for “acceptable engineering practice”, a total of 25 (Twenty Five) test pits were planned for the proposed development.

This chapter of the report describes the field work and activities that were conducted in order to assess the geotechnical conditions at the proposed site. Twenty Five (25) Test pits were

positioned using a hand held GPS and the position of the test pits is shown on figure 3. The method of investigation was based on a near surface investigation, to a maximum depth of 2.8 m below existing ground level using fly wheel TLB (Tractor-Loader-Backhoe) in order to obtain information on the subsurface soil; each pit was marked, photographed and profiled by a field engineering geologist in accordance with the current standard procedures proposed by Brink and Bruin (2002). The test pit photographs are presented in Appendix A of this report.

These included the following components:

- Excavation of 25 (Twenty Five) test pits with an aid of a fly wheel TLB (Tractor-Loader-Backhoe)
- Representative samples were retrieved from the test pits for laboratory testing at SANAS accredited laboratory.

Test pits were positioned using a hand held GPS, below is layout indicating the position of test pits on site.

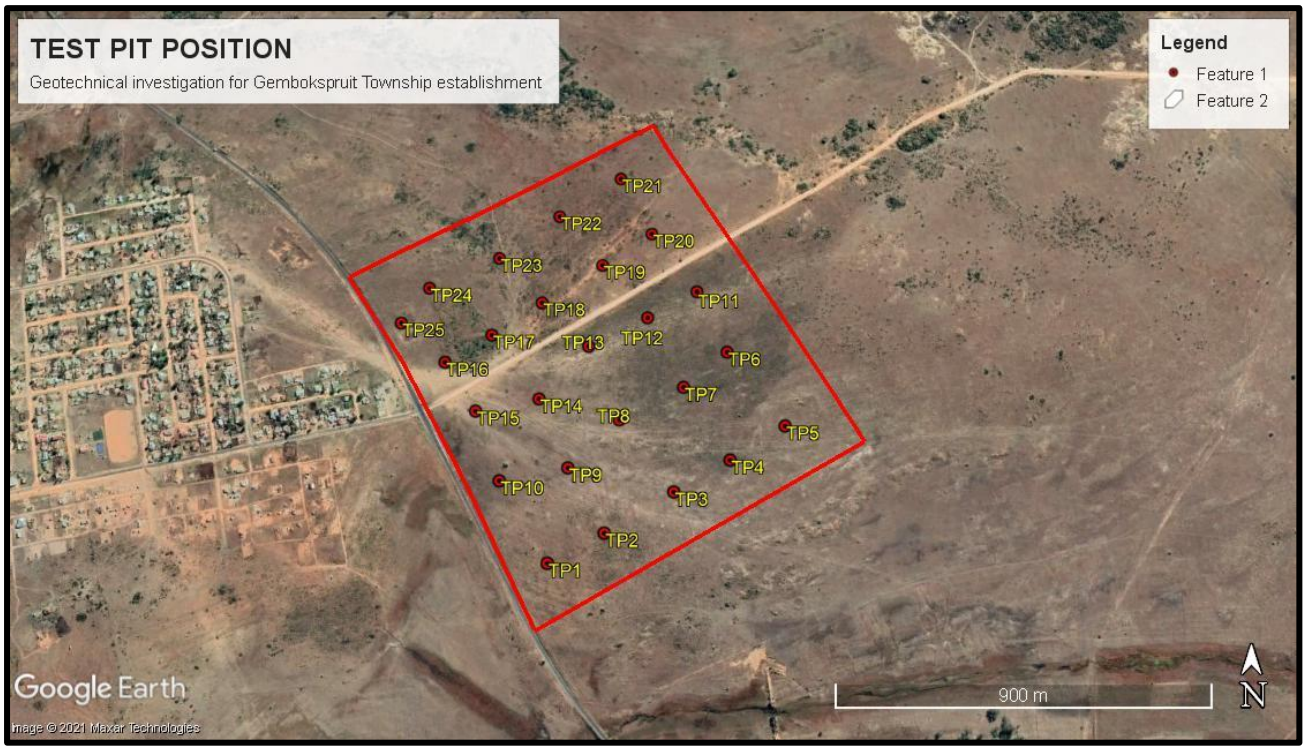


Figure 4: Test pit positions

8. LABORATORY RESULTS

The field work indicated a general homogeneity of the subsurface soils comprising moist, light brown, intact, dense, and Sandy gravel. Representative disturbed subsoil samples were retrieved from the inspection pits during the investigation and were taken to a SANAS Accredited laboratory for testing. These tests aid in assessing the behaviour of soils due to moisture changes particularly below foundations.

The following tests were conducted on soil samples taken during the field work phase by a suitable SANAS accredited soils laboratory (RoadLab, Germiston, JHB, and Gauteng Province)

Standard foundation indicator and CBR tests were conducted on disturbed soil samples in order to determine its composition, to evaluate the heave and compressibility potential of these soils, and to calculate the maximum heave and/or differential settlement that can be expected. The following tests were conducted for all four sites:

The following tests were conducted:

- 21 Atterberg Limits (plastic limit, liquid limit and plasticity index);
- 21 Grading analysis and;
- 5 MOD and 5 CBR,
- 3 pH and 3 Conductivity

The laboratory tests were conducted in order to assist with the classification, description, and delineation of homogenous zones. The results of the foundation indicator, MOD, CBR, pH and Conductivity tests are presented in Appendix B and are summarized in Table 2 and Table 3 respectively.

Table 2: Summary of the foundation indicator test results

Sample No.	HRB (AASHTO)	Depth (m)	Atterberg Limit			GM	Grading analysis (%)				Potential expansiveness
			LL %	LS %	PI %		Clay	Silt	Sand	Gravel	
TP01	A-2-4(0)	0.65-2.7	23	5.0	10	1.55	20.6	9.7	32.6	37.2	Low
TP02	A-2-4(0)	0.46-1.7	27	4.0	8	1.53	12.0	13.5	44.1	30.4	Low
TP03	A-2-4(0)	0.35-1.2	24	5.0	10	1.88	11.1	7.8	41.9	39.1	Low
TP04	A-2-4(0)	0.6-1.6	22	4.0	8	1.66	11.1	10.9	48.8	29.2	Low
TP05	A-2-4(0)	0.4-1.4	23	4.0	8	1.62	14.0	11.4	41.2	33.2	Low
TP06	A-1-b(0)	0.5-1.6	18	2.0	4	1.71	9.0	8.1	56.6	26.3	Low
TP07	A-1-b(0)	0.55-1.2	17	2.0	4	2.09	4.9	6.8	39.4	48.9	Low
TP08	A-1-b(0)	0.4-0.7	16	1.0	2	2.10	5.6	5.8	40.8	47.8	Low
TP09	A-1-b(0)	0.6-1.05	22	3.0	6	1.89	8.7	10.0	37.6	43.8	Low

TP10	A-1-b(0)	0.3-1.0	19	3.0	6	1.76	9.0	12.3	42.1	36.6	Low
TP11	A-1-b(0)	0.3-0.8	-	0.5	SP	2.08	4.3	6.6	40.3	48.8	Low
TP12	A-1-b(0)	0.4-1.1	18	2.0	4	1.80	7.9	8.4	47.1	36.6	Low
TP13	A-2-4(0)	0.4-1.0	24	4.0	8	2.00	7.2	8.3	37.0	47.4	Low
TP14	A-2-4(0)	0.55-1	26	4.0	8	1.96	8.6	8.0	36.4	47.0	Low
TP15	A-1-b(0)	0.3-1.4	23	3.0	6	2.00	8.9	5.8	39.5	45.8	Low
TP16	A-2-4(0)	0.3-1.2	17	3.0	7	2.01	8.1	7.9	33.7	50.2	Low
TP21	A-6(8)	0.33-1.1	31	8.0	16	0.66	29.8	24.3	33.9	12.0	Low
TP22	A-2-4(0)	0.7-1.48	25	5.0	10	1.42	21.2	11.8	37.1	29.8	Low
TP23	A-2-6(0)	0.6-1.4	28	7.0	14	1.64	17.2	8.2	43.9	30.6	Low
TP24	A-1-b(0)	0.7-1.4	21	3.0	6	1.79	11.7	8.5	39.4	40.5	Low

TP25	A-2-4(0)	0.25-0.9	27	5.0	10	2.22	6.7	6.2	28.6	58.5	Low

LL: Liquid Limit **PI**: Plasticity Index **LS:** Linear Shrinkage **GM:** Grading Modulus **SP:** Slightly-Plastic

Table 3: Summary of the CBR test results

Sample No.	HRB (AASHTO)	Depth (m)	CBR @						GM	Max. Swell (%)	OMC (%)	Max Dry Density (kg/m^3)	COLTO Classification
			90 %	93%	95%	97%	98%	100%					
TP5	A-2-4(d)	0.4-1.4	10	12	14	19	24	31	1.61	0.22	10.4	1988	G8
TP7	A-1-a(0)	0.55-1.2	10	18	26	38	47	69	2.09	0.17	9.0	2041	G6
TP14	A-2-4(0)	0.55-1	12	16	21	27	34	41	1.96	0.15	10.4	1990	G7
TP16	A-1-b(0)	0.3-1.2	16	20	23	27	30	34	2.01	0.10	7.0	2126	G7
TP24	A-2-4(0)	0.7-1.4	10	14	19	26	34	40	1.79	0.20	11.0	1924	G8

PI: Plasticity Index **GM:** Grading Modulus **OMC:** Optimum Moisture Content **CBR: California** Bearing Ratio

9. HYDROGEOLOGY

9.1. Drainage patterns

Natural ground water seepage was not encountered in any of the test pits and there is no indication of temporary perched water tables in the soil profile, not even at the contact between soil and bedrock. It is therefore expected that if temporary perched water was to at the site, it would occur at bedrock level and only after unusually prolonged and substantial rain. Groundwater seepage is not expected to be problematic at shallow depths on this site.

10. GEOHAZARDS

10.1. Seismic activities

Seismic-hazard can be described as being the physical effects of an earthquake or earth tremor. Examples of such phenomenon include surface faulting, ground shaking and liquefaction (Kijko A et al, 2004). According to the published (Council for Geosciences) Seismic Hazard Identification Maps of South Africa, Site falls under an area with a 10 % probabilistic of >0.12g (peak ground acceleration) being exceeded in a 50 year period. The peak ground acceleration is the maximum acceleration of the ground shaking during an earthquake.

For masonry and concrete structures, a 4 to 5 Hz Spectral Acceleration is assumed. This natural frequency of the structure can give an indication of the spectral part of the earthquake motion time history that has the capacity to introduce energy into the structure. Spectral Acceleration (ARS – acceleration-response spectra) is the movement experienced by the structure during an earthquake / seismic event.

This phenomenon is known as resonance. Resonance is where the frequency of the applied harmonic force is consistent with the natural frequency of a vibrating body. At resonance, the vibrating body will exhibit the maximum amplitude of response displacement leading to extremely high structural distress similar to popular example of the Tacoma Narrows Bridge that was situated in Washington State, near Puget Sound. Therefore, frequencies far away - either lower or higher - from the natural frequency of the structure have little capability of damaging the structure.

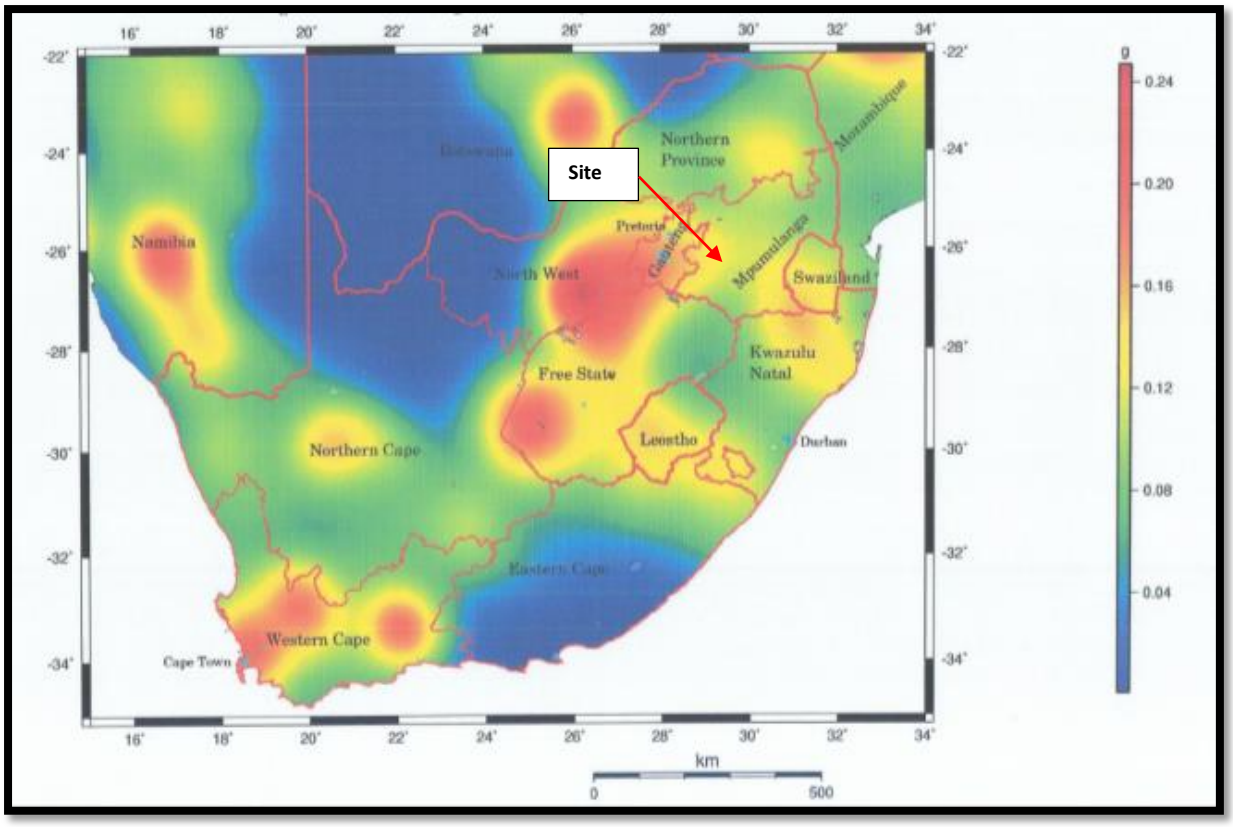


Figure 5: Seismic hazard map of South Africa

Seismic hazard maps of South Africa produced by Kijko (2003), show the site is situated in the area where the peak ground acceleration is greater than 10% probability of exceedance in a 50-year period is approximately 0.12 to 0.16g. This area is a low seismic hazard area and the construction materials to be used (gravel) are in harmony with the naturally occurring site conditions. As a result, no major problems are foreseen in this regard.

Two types of seismic activities occur in South Africa, namely:

- Regions of natural seismic activity (Zone I), and
- Regions of mining-induced and natural seismic activity (Zone II).

In accordance with the seismic hazard zones contained in SANS 10160-4 (2011), the site does not fall within neither Zone I nor Zone II, as shown in **Figure 6**.

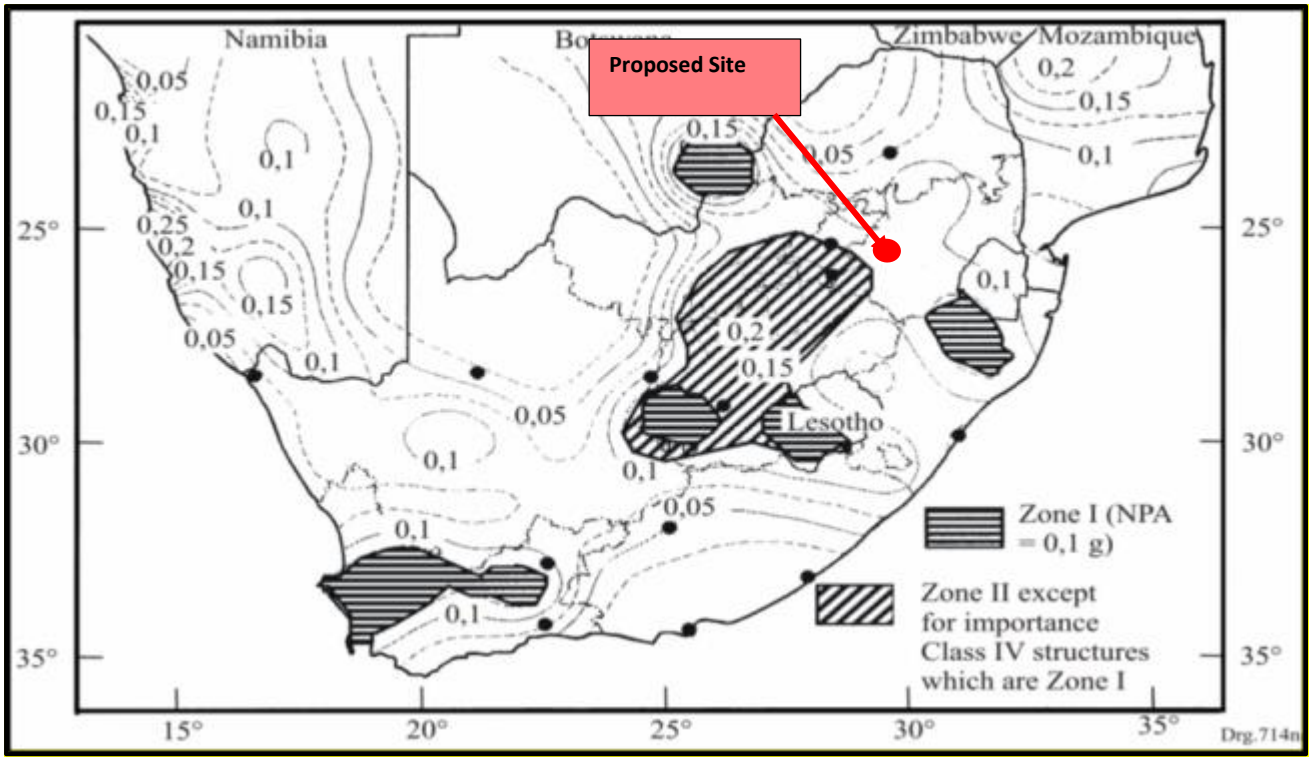


Figure 6: Siesmic Hazard Zones of South Africa (SANS 10160-4, 2011)

10.2. Ground subsidence

Subsidence occurs in areas with large underground cavities (natural occurring or anthropogenic) typically resulting from large scale shallow to very shallow mining and also from Dolomite/Limestone dissolution. It can also appear where high thickness of unconsolidated material exists.

This site showed no signs of previous subsidence occurrences. Furthermore, there is no evidence or record of active underground mining in the immediate vicinities that might cause drop in the ground water level thus triggering ground subsidence. The site is a not a dolomitic land, so it cannot be subject to doline formation. Information obtained from Council of Geoscience shows that the site is not underlain by dolomite rock at surface or at depth (<500m). The site is therefore not classified as dolomitic land and is not at risk in terms of dolomite related surface subsidence. Generally, soluble rock, such as limestone or dolomite was not found on the site and no instability associated with this rock type is anticipated.

10.3. Sinkhole formation

Similar to subsidence, sinkhole formation happens in areas with very large to extremely large underground cavities resulting from mining poorly designed shallow underground activities. Coal Mines in Mpumalanga Province and Gold Mines in Limpopo Province are typical examples of such calamity. Dissolution of dolomites or limestone over millions of

years also lead to cavity formations that might later manifest into sinkhole formation as evidenced very much so in Limpopo and Gauteng Provinces.

According to the research done, there are no records of wide shallow underground mining activities directly below this site. There is no dolomite or limestone underlying the site so the chances of dolomite related sinkhole formation are unlikely.

10.4. Landslides and mudslides

The probability of landslides and mudslides occurring at this area are rare. This is primarily due to the climatic conditions and composition of residual soil in this particular area. Also, this is primarily due to the low relief and slightly steep gradient of the area.

10.5. Volcanic activities

South Africa has seen its last volcanic activity approximately 65 million years ago during the massive historical eruption of the Drakensberg Lava forming the Basaltic Drakensberg Mountain Ranges that we see today. Recent studies showed no signs for the possibility of volcanic eruption in the foreseeable future

11. GEOTECHNICAL EVALUATION

This report focuses on the geotechnical site investigation aimed at determining various geotechnical properties of the near surface soil horizons in accordance with SAICE Code of Practice, SANS guidelines and NHBRC guidelines and the GFSH-2 document. Table 6 gives the basis of the soil site classification that was applied during the investigation and Table 7 gives the geotechnical classification for urban development

Table 4: Residential site class designations

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 gravelly soils	COMPRESSIBLE AND POTENTIALLY COLLAPSIBLE SOILS	<5,0 5,0-10 >10	75% 75% 75%	C C1 C2
Fine grained soils (clayey silts and clayey sands of low plasticity), sands, sandy and gravelly soils	COMPRESSIBLE SOIL	<10 10-20 >20	50% 50% 50%	S S1 S2
Contaminated soils, Controlled fill, Dolomitic areas, Landslip Land fill, Marshy areas Mine waste fill Mining subsidence Reclaimed areas Very soft silt/silty clays Uncontrolled fill	VARIABLE	VARIABLE		P

Table 5: Geotechnical Classification for Urban Development (GFSH-2 Document)

Geotechnical Sub-Area	Definition
1	Areas recommended or favorable for development
2	Areas where development can be considered with certain precautionary measures.
3	Areas that are not recommended for development

Geotechnical Classification for urban development for the whole site is geotechnical subarea 1

Other related engineering geological characteristics such as collapse settlement, compressibility, slope stability groundwater etc. were evaluated. The geotechnical properties relevant to the development are discussed below.

11.1. Expansive soils

Active/expansive soils are defined as fine grained soils (generally with high clay content) that change in volume in response to the change in moisture content. These soils may increase in volume (heave/swell) upon wetting and decrease in volume (shrink) upon drying out. These soils are classified as (H) according to the SAICE site classes. Depending on the severity of the predicted movement, expansive soils can be classified as H, H1, H2 or H3 (Table 4).

The site is predominately underlain by sandy gravel> sandy silt >with low content of clay. The laboratory results of all the samples analyzed exhibit a low potential expansiveness.

NB: The site cannot be classified with the soil site class H. the H class is not applicable for this site

11.2. Collapsible soils

Collapsible soils are defined as soils that have a potential for collapse and are commonly open textured with a high void ratio (Brink, 1985). These soils are typically silty sands, sands, sandy and gravelly soils commonly found in colluvial and aeolian sands. Soils which exhibit potentially collapsible characteristics are classified with the soil site class ‘C’ according to the SAICE site classification system (Table 4).

The soils encountered on the site typically comprise of sandy gravel with no visual open-textured structures such as voids and pinholes which indicate collapse potential. Due to the crumbly nature of the soils on site, undisturbed soil samples could not be retrieved for collapse potential testing. From the site observations it is anticipated that the site will exhibit low collapse potential. Therefore, the **site is classified as site class C** according to the GFSH-2 classification.

11.3. Compressible soils

Compressible soils are soils in which the bulk volume of the soil may gradually decrease with time when subjected to an applied load. These soils typically comprise fine grained soils such as clay, clayey sand and clayey silt with low plasticity, gravelly and sandy soil.

According to the SAICE soil site class these soils are denoted as class 'S' and may very (S, S1, S2) depending on the severity of the bulk volume change (Table 4).

The site is generally underlain by non-cohesive soils with low plasticity index. The laboratory results indicate that the samples have a low clay content and high gravel content.

The site cannot be classified with the soil site class S according to the SAICE site classification system.

11.4. Soil site classification

A review of the test pit data indicates that the site is generally underlained by sandy gravel and granite bedrock. The laboratory tests indicated that material underlying the site exhibits low potential expansiveness. The development potential has been broadly classified in terms of a Geotechnical Sub-Area 1 based on field observations/investigation (geological, hydrogeological, and geomorphological), and laboratory soil testing of soil samples. From the above discussion the site is classified into main soil area namely compressible and potential collapsible soils: According to COLTO the soil samples were classified as G6, G7 and G8. **The foundation design options as per SANS10400 H- NHBRC soil symbol is "R/C". The recommended Foundation types in accordance with** SANS 10400H- ***Modified normal / Reinforced Deep Strip Foundation***

11.5. Excavation Classification

The in-situ soils and slightly weathered granite bedrock were excavated to minimum depth of 0.5m and maximum depth of 2.8 m

Based on the test pits excavations, it is anticipated that site should classify as "soft excavation" until the start of granite bedrock (range of 0.5m to 2.8m), in accordance with SANS 1200 DA classification using similar plant as employed during this investigation. This means it can easily be removed by a tractor loader backhoe (TLB) of flywheel power >0.10 kW per mm of tined bucket width.

Allowance should be made for "intermediate to hard excavation" where deeper excavations are required from a depth 2.8m where there's a unweathered granite bedrock.

11.6. Stability of excavations sidewalls

It was noted during trail pit excavations that the sidewalls retain its initial condition without crumbling. This is a good indication for the behaviour of the materials; excavated ground must retain its stature vertically without unsupported.

For safety reasons, sidewalls of excavations deeper than 1.5 m should be battered back to 1:1 in dry conditions. Should oblique jointing or any seepage be noted, then the sidewalls may need to be battered at a much flatter gradient. This is only acceptable for excavation depths restricted to less than 3.0 m. All safety precautions should be adhered to. Should battering be deemed unpractical due to some site conditions, sidewalls should be supported by suitably designed shoring technique.

11.7. Construction material suitability

The aim of this geotechnical site investigation report was to determine the different engineering geological properties of the surface and subsurface soils in accordance with the GFSH–2 guidelines, NHBRC. The intention is to be able to recommend for the founding levels for the foundation design for the proposed township establishment. The soil was mainly composed of sandy gravel and granite bedrock; hence it was found to be of low plastic behaviour. This soil was classified as G6, G7 and G8 according to COLTO Classification. Furthermore, the materials are ideal for construction.

11.8. Construction Monitoring

It is recommended that all foundations be inspected by a competent person prior to placing any concrete, regular checks on the quality and compaction of the backfill to the terraces should be made.

12. CONCLUSION AND RECOMMENDATIONS

12.1. Foundations

It is important to note that foundation recommendations are based on the inspection of test pits, soil profiling, laboratory test result and the geotechnical evaluation described in this report. The following foundation types are provisionally recommended.

12.1.1. Foundations on residual soils

Residual soils were encountered at various, uneven depths with an average of 0.93m below the ground level.

Therefore, the recommended foundation type is a ***reinforced strip foundation***. Reinforcement should be designed by a competent person. The following construction procedures apply.

- All topsoil to be stripped to spoil;

- Foundation trenches for 500mm wide strip footing to be over-excavated to 1.0m wide by 1.3m deep below existing ground level;
- Excavation to be backfill with G6 quality material to a depth of 0.6m existing ground level; (material on site can be utilised as backfill material)
- G6 material to be compacted in 150mm thick layers to 93% Mod AASHTO density at –1% to +2% OMC;
- Strip footings 500mm wide and adequately reinforced should be constructed at a depth of 0.6m;
- The allowable bearing capacity should be limited to 150kPa on the engineered soil mattress;
- Articulation joints at some internal doors and all external doors;
- Light reinforcement in masonry;

12.2.2. Foundations on a slightly weathered Granite

The medium hard rock granite is encountered at a depth of 0.5m below existing ground level. The recommended foundation type is a ***normal strip foundation*** onto the medium hard rock granite. The following construction procedures apply:

- All topsoil to be stripped to spoil;
- Foundation excavation to the slightly weathered, medium hard rock at an average depth of 0.8m below existing ground level;
- The excavation onto the weathered Granite to be hand cleaned and all loose material to be removed;
- A concrete blinding to be cast to onto cleaned rock surface prior to casting foundations;
- The allowable bearing capacity should be limited to 300kPa on the weathered Granite bedrock.

13. REPORT PROVISIONS

This investigation is aimed at providing the engineers with an indication of the prevailing geological and geotechnical conditions in the study area, with reference to the proposed township establishment.

While every effort has been made during the fieldwork investigation to identify the various soil horizons, their problems and distribution, it is impossible to guarantee that isolated zones of varying material have not been missed. The investigation was, however, thorough and conditions are not expected to vary a great deal from that described in this report.

The engineers are, nevertheless, strongly urged to inspect all excavations to assure themselves that conditions are not at variance with those described in this report.

Please note:

- Test pits were backfilled after the field investigation but were not re-compacted.
- Some test pits positions occur within the footprints of proposed structures.
- The recommendations provided in this report are a final interpretive geotechnical report.

14. REFFERENCE

Brink, A.B.A and Bruin R.M.H, (2002). **Guidelines for soil and rock logging in South Africa**, Second Impression, Proceedings of the Geoterminology Workshop.

Brink A.B.A. **Engineering Geology of Southern Africa.** Volume 3. The Karoo Sequence. Building publications Pretoria. ISBN 0908423152

Committee of Land Transport Officials (COLTO), Draft TRH4:1996 **Structural Design of Flexible Pavements for Interurban and Rural Roads**.

Jennings J.E., Brink A.B.A. and Williams A.A.B. (1973) Revised **Guide to Soil Profiling for Civil Engineering Purposes in South Africa**. The Civil Engineer in South Africa, January 1973.

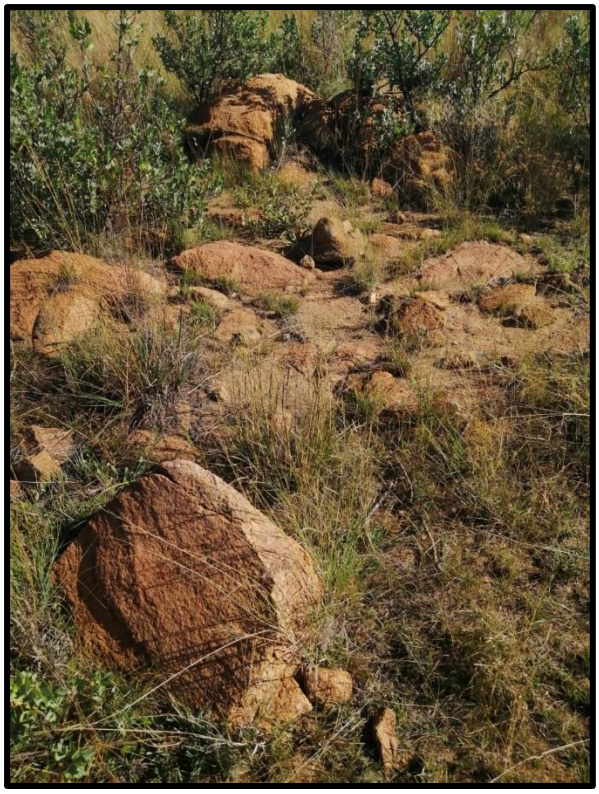
IH Braatveld, JP Everett, G Byrne, K Schwartz, EA Friedlaender, N Mackintosh and C Wetter. **A guide to practical Geotechnical Engineering in Southern Africa** by FRANKI

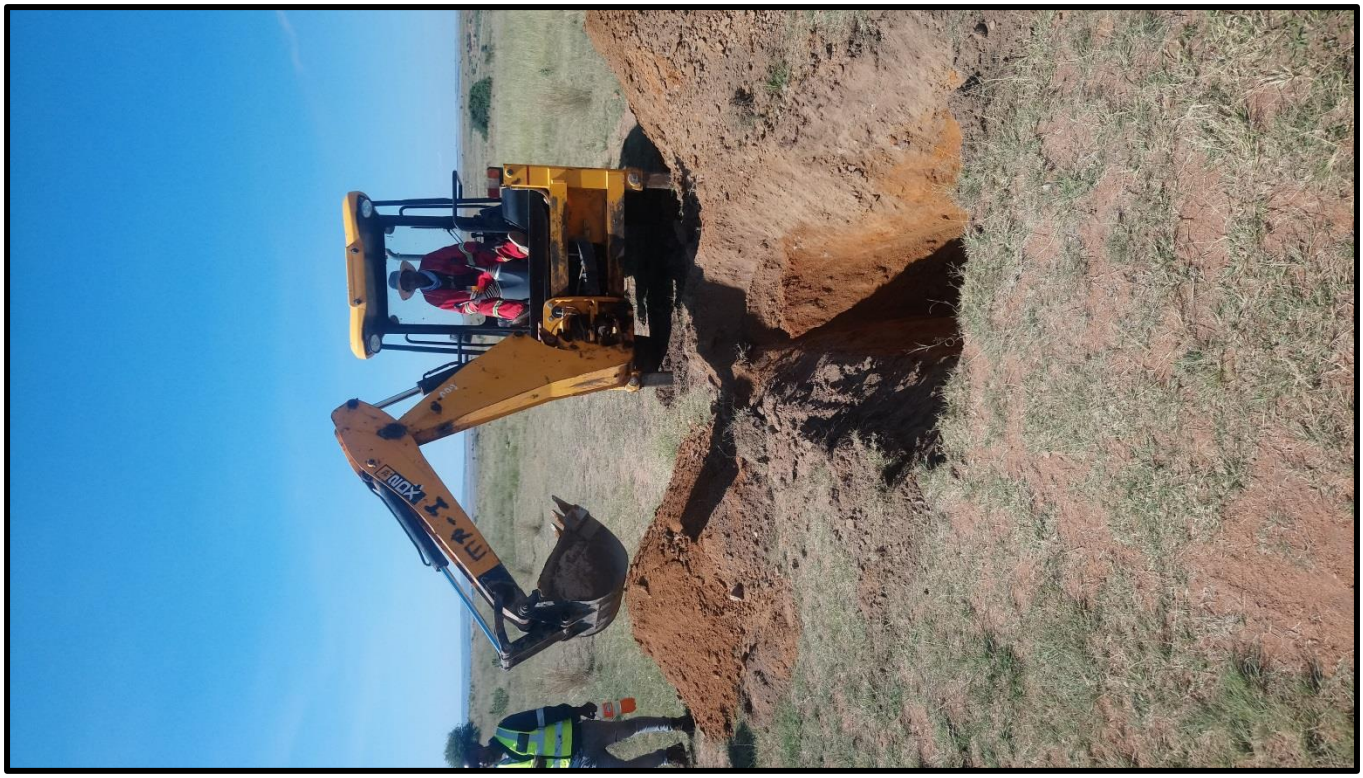
Partridge, T C, Wood, C K, and Brink, A B A, "**Geotechnical Constraints for Urban Development**". 1993

South African Institution of Civil Engineering (SAICE) – Geotechnical Division. **Site investigation code of practice**. 1st Ed, 2009.

The South African Bureau of Standard, **Standardised Specification of Civil Engineering Construction**, SABS 1200 D_1988

15. APPENDIX A: THE SITE PHOTOS





16. APPENDIX B: LABORATORY RESULTS

Roadlab Laboratories Pty Ltd

› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations

+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

Ref- 92/NKA001-01-0001/21 Date - 2021-04-10

Nkanivo Development Consultants

P.O 11948

Silver Lakes

Pretoria

Attention: Mr. L Mavhetha

Re: Gemboksprui – Foundation Indicator Test Results

Herewith please find attached the test results for the above-mentioned project as tested by Roadlab Laboratories.

Thank you

Kind Regards

Mr N Herbst / Mr R Potgieter

Technical Signatory / Manager

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

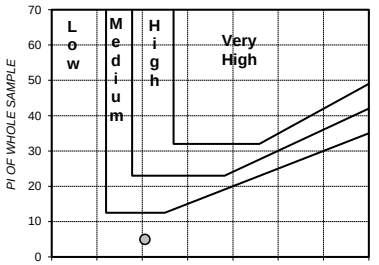
DATE RECEIVED : 2021-04-10
POSITION : TP 1
LAYER : 0.65 - 2.7
SAMPLE No. : S/8022
SAMPLE DESCRIPTION : Dark Red Orange Clayey Sandy Gravel

FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

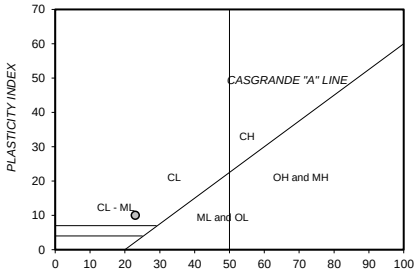
Weighted PI	5.0	Specifc Gravity	2.62

Sieve analysis Cumulative percentage passing (mm)	
100.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	99
20.0	97
14.0	97
5.00	92
2.000	63
0.425	50
0.250	45
0.150	41
0.075	33
50 µm	29
5 µm	24
2 µm	20.6

POTENTIAL EXPANSIVENES



PLASTICITY CHART



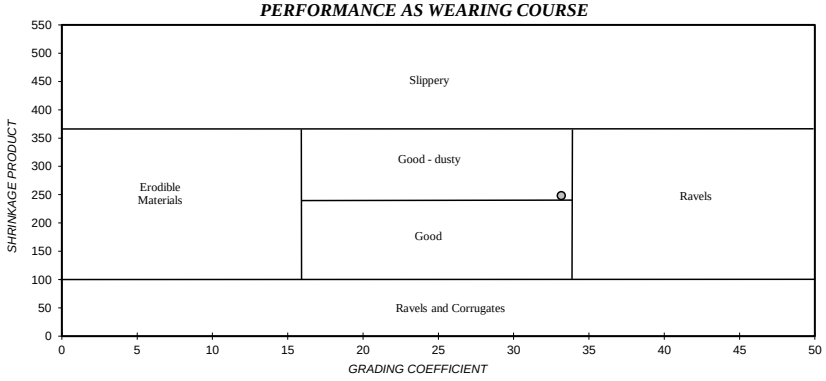
Soil Mortar Analysis % < 2.00mm	
2.000 - 0.425	21
0.425 - 0.250	7
0.250 - 0.150	7
0.150 - 0.075	13
< 0.075	52

Effective size	0.002
Uniformity Coefficient	830.8
Curvature Coefficient	1.0
Oversize Index	0.0
Shrinkage Product	248.0
Grading Coefficient	33.2
Grading modulus	1.55

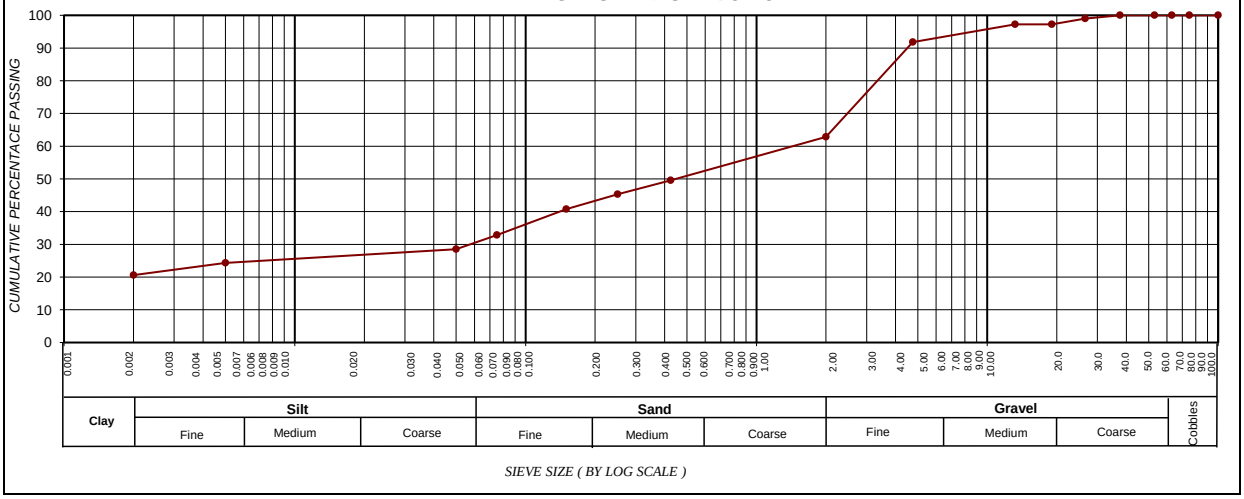
Atter-berg Limits	
Liquid Limit	23
Plasticity Index	10
Linear Shrinkage	5.0
PI < 0.075	14

Unified Soil Classification	SC
U.S. Highway Classification	A-2-4 (0)

PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



SIEVE SIZE (BY LOG SCALE)

CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
20.6	9.7	32.6	37.2

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

DATE RECEIVED : 2021-04-10
POSITION : TP 2
LAYER : 0.46 - 1.7
SAMPLE No. : S/8023
SAMPLE DESCRIPTION : Light Red Orange Clayey Silty Gravelly Sand

FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI	3.8	Specifc Gravity	2.59

Sieve analysis Cumulative percentage passing (mm)	
100.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	99
20.0	97
14.0	97
5.00	90
2.000	70
0.425	47
0.250	40
0.150	34
0.075	30
50 µm	23
5 µm	18
2 µm	12.0

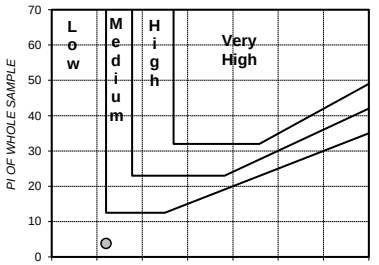
Soil Mortar Analysis % < 2.00mm	
2.000 - 0.425	32
0.425 - 0.250	11
0.250 - 0.150	9
0.150 - 0.075	6
< 0.075	43

Effective size	0.002
Uniformity Coefficient	659.3
Curvature Coefficient	2.4
Oversize Index	0.0
Shrinkage Product	189.9
Grading Coefficient	26.6
Grading modulus	1.53

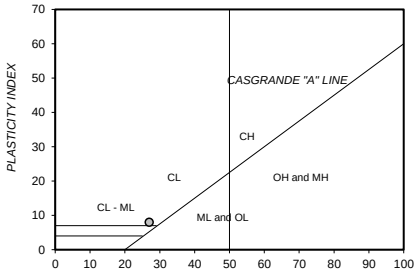
Atter-berg Limits	
Liquid Limit	27
Plasticity Index	8
Linear Shrinkage	4.0
PI < 0.075	12

Unified Soil Classification	SC
U.S. Highway Classification	A-2-4 (0)

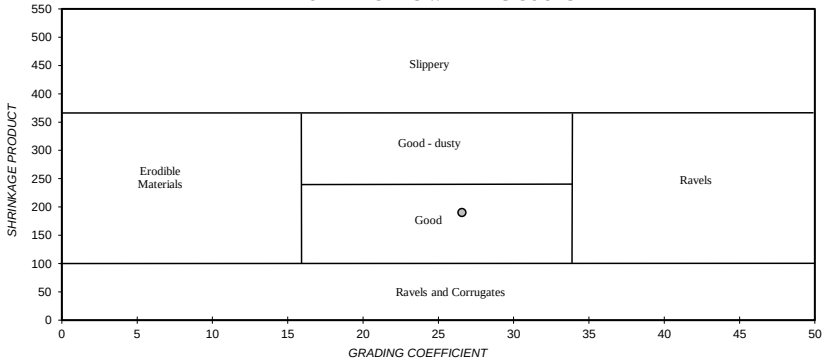
POTENTIAL EXPANSIVENES



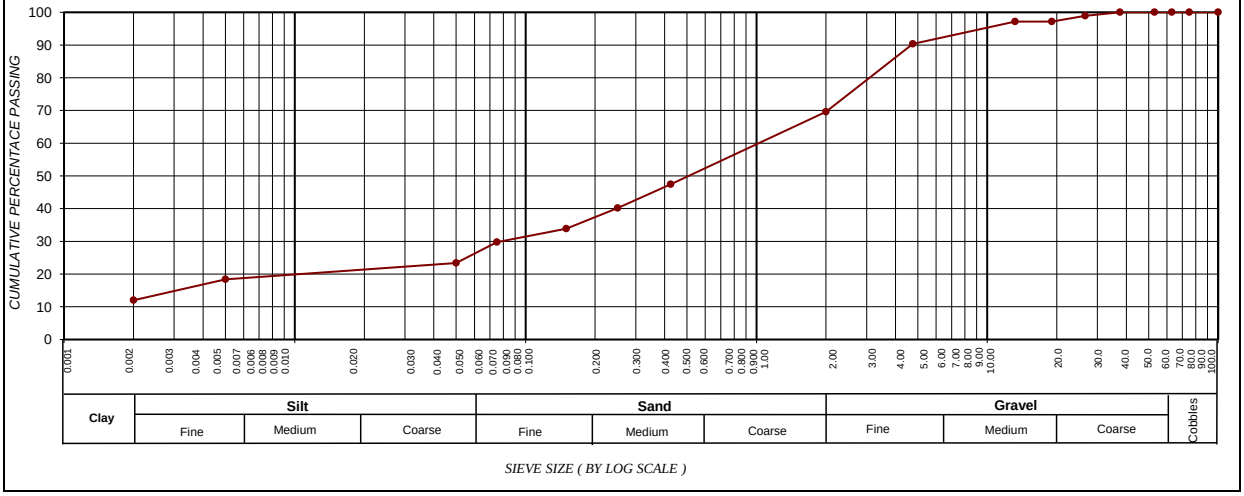
PLASTICITY CHART



PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
12.0	13.5	44.1	30.4

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

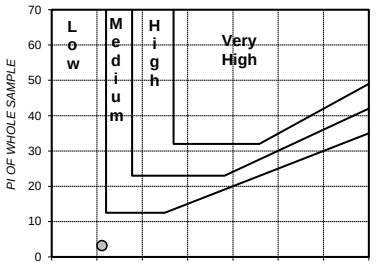
DATE RECEIVED : 2021-04-10
POSITION : TP 3
LAYER : 0.35 - 1.2
SAMPLE No. : S/8024
SAMPLE DESCRIPTION : Light Red Brown Clayey Gravelly Sand

FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

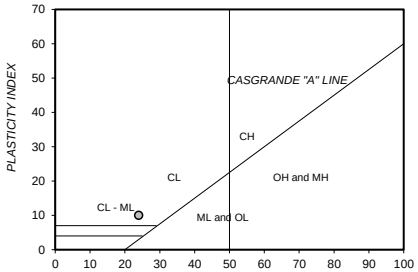
Weighted PI	3.2	Specifc Gravity	2.57

Sieve analysis Cumulative percentage passing (mm)	
100.0	100
75.0	100
63.0	100
50.0	99
37.5	94
28.0	91
20.0	85
14.0	85
5.00	80
2.000	61
0.425	32
0.250	26
0.150	22
0.075	19
50 µm	19
5 µm	15
2 µm	11.1

POTENTIAL EXPANSIVENES



PLASTICITY CHART



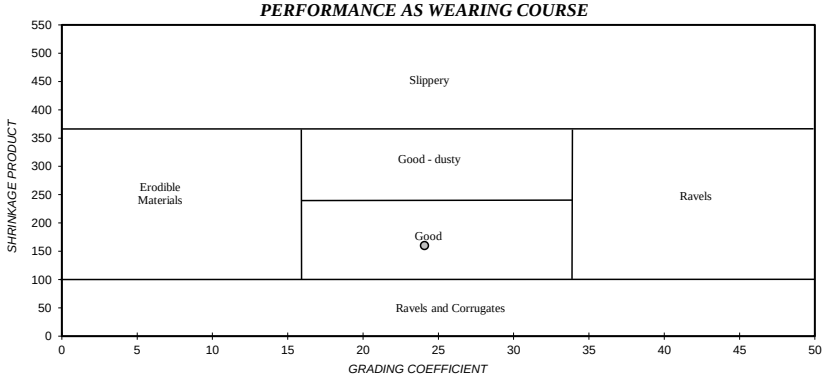
Soil Mortar Analysis % < 2.00mm	
2.000 - 0.425	47
0.425 - 0.250	10
0.250 - 0.150	6
0.150 - 0.075	5
< 0.075	31

Effective size	0.002
Uniformity Coefficient	976.3
Curvature Coefficient	34.7
Oversize Index	6.4
Shrinkage Product	159.8
Grading Coefficient	24.1
Grading modulus	1.88

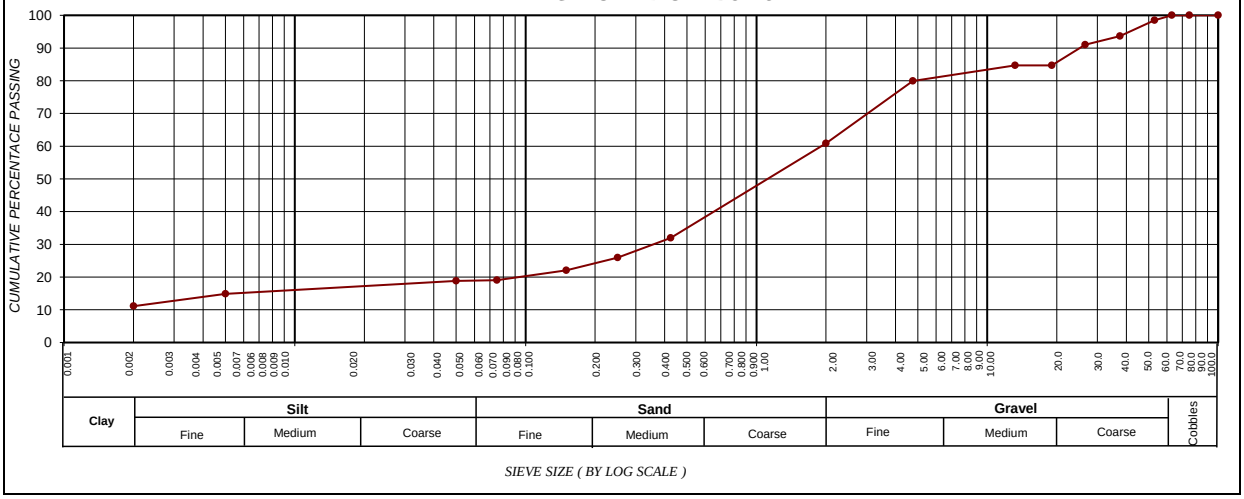
Atter-berg Limits	
Liquid Limit	24
Plasticity Index	10
Linear Shrinkage	5.0
PI < 0.075	16

Unified Soil Classification	SC
U.S. Highway Classification	A-2-4 (0)

PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
11.1	7.8	41.9	39.1

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

DATE RECEIVED : 2021-04-10
POSITION : TP 4
LAYER : 0.6 - 1.6
SAMPLE No. : S/8025
SAMPLE DESCRIPTION : Light Red Orange
Silty Clayey Gravelly Sand

FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI	3.2	Specifc Gravity	2.59

Sieve analysis Cumulative percentage passing (mm)	
100.0	100
75.0	100
63.0	100
50.0	100
37.5	96
28.0	89
20.0	81
14.0	81
5.00	80
2.000	71
0.425	40
0.250	34
0.150	29
0.075	24
50 µm	21
5 µm	15
2 µm	11.1

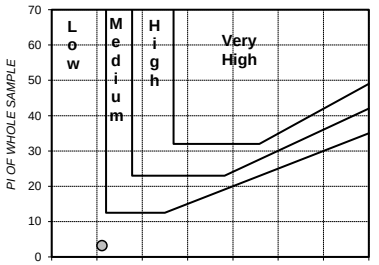
Soil Mortar Analysis % < 2.00mm	
2.000 - 0.425	44
0.425 - 0.250	8
0.250 - 0.150	7
0.150 - 0.075	8
< 0.075	34

Effective size	0.002
Uniformity Coefficient	728.4
Curvature Coefficient	9.5
Oversize Index	4.0
Shrinkage Product	158.0
Grading Coefficient	14.3
Grading modulus	1.66

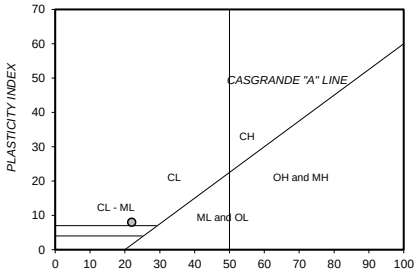
Atter-berg Limits	
Liquid Limit	22
Plasticity Index	8
Linear Shrinkage	4.0
PI < 0.075	12

Unified Soil Classification	SC
U.S. Highway Classification	A-2-4 (0)

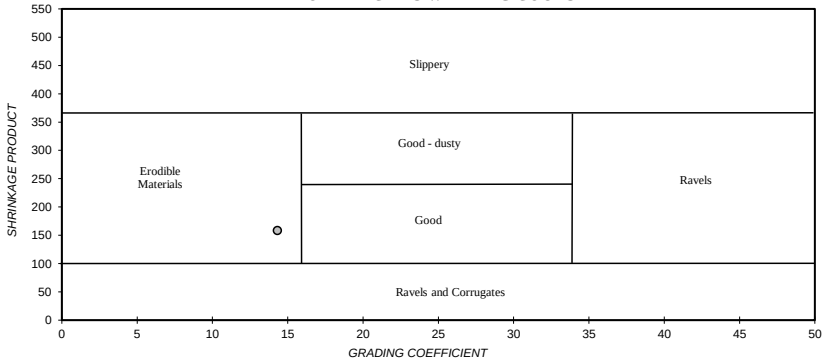
POTENTIAL EXPANSIVENES



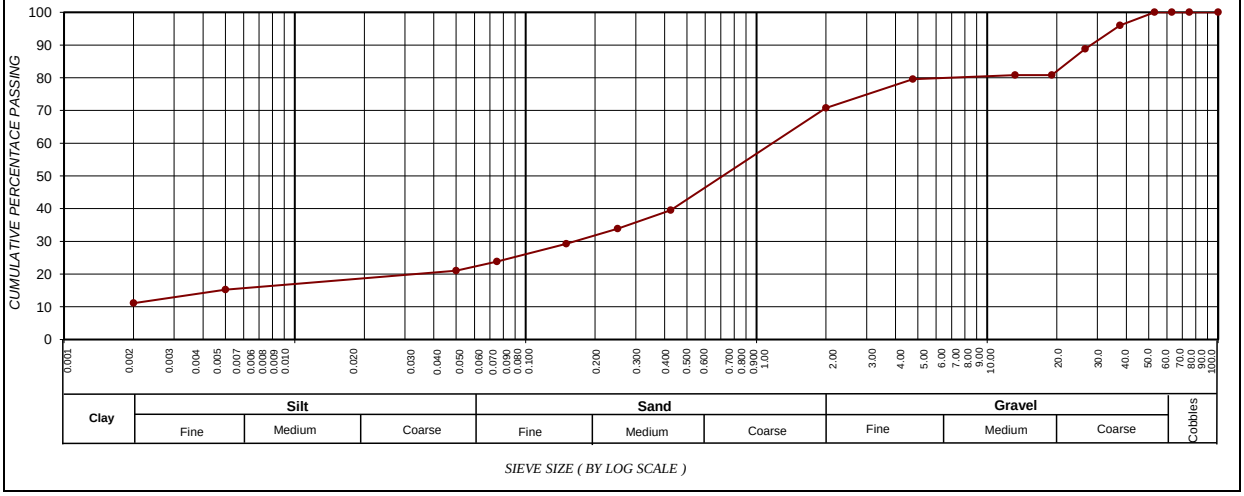
PLASTICITY CHART



PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



SIEVE SIZE (BY LOG SCALE)

CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
11.1	10.9	48.8	29.2

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

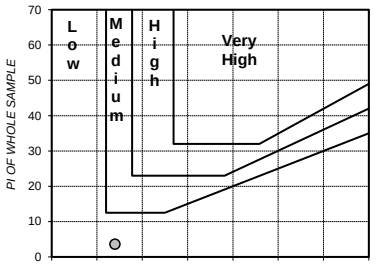
DATE RECEIVED : 2021-04-10
POSITION : TP 5
LAYER : 0.4 - 1.4
SAMPLE No. : S/8026
SAMPLE DESCRIPTION : Light Red Orange Silty Clayey Gravelly Sand

FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

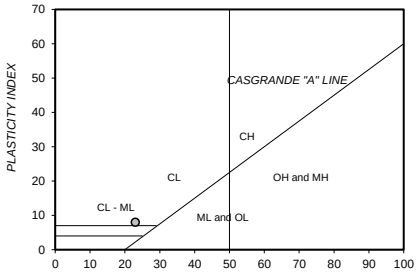
Weighted PI	3.6	Specifc Gravity	2.57

Sieve analysis Cumulative percentage passing (mm)	
100.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	100
5.00	98
2.000	67
0.425	45
0.250	38
0.150	33
0.075	27
50 µm	25
5 µm	19
2 µm	14.0

POTENTIAL EXPANSIVENES



PLASTICITY CHART



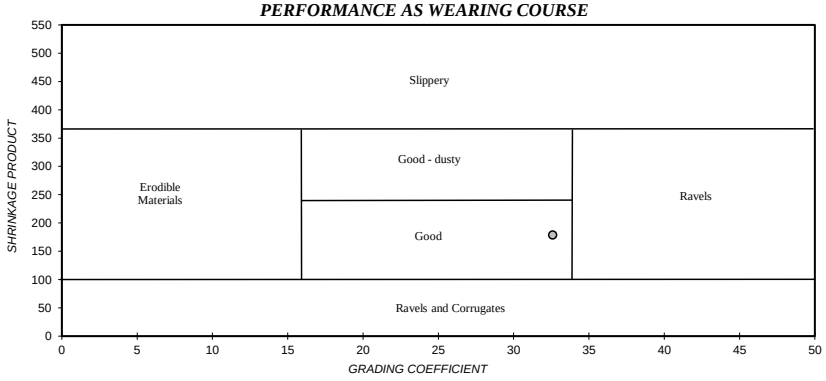
Soil Mortar Analysis % < 2.00mm	
2.000 - 0.425	33
0.425 - 0.250	10
0.250 - 0.150	7
0.150 - 0.075	9
< 0.075	40

Effective size	0.002
Uniformity Coefficient	763.2
Curvature Coefficient	4.2
Oversize Index	0.0
Shrinkage Product	178.7
Grading Coefficient	32.6
Grading modulus	1.62

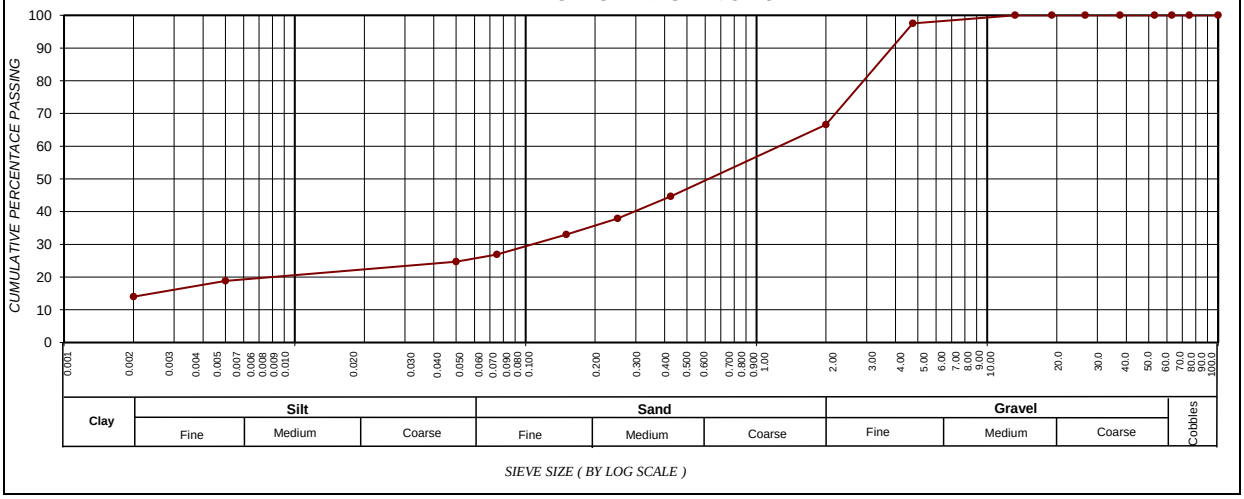
Atter-berg Limits	
Liquid Limit	23
Plasticity Index	8
Linear Shrinkage	4.0
PI < 0.075	12

Unified Soil Classification	SC
U.S. Highway Classification	A-2-4 (0)

PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



SIEVE SIZE (BY LOG SCALE)

CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
14.0	11.4	41.2	33.4

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

DATE RECEIVED : 2021-04-10
POSITION : TP 6
LAYER : 0.5 - 1.6m
SAMPLE No. : S/8027
SAMPLE DESCRIPTION : Light Red Brown Gravelly Sand

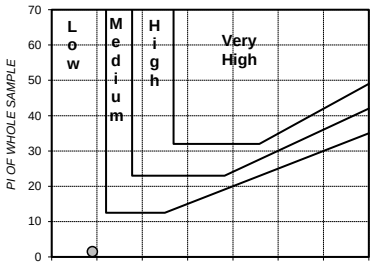
FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI	1.5	Specifc Gravity	2.57

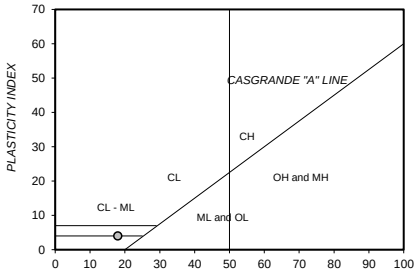
Sieve analysis Cumulative percentage passing (mm)

100.0	100
75.0	100
63.0	100
50.0	100
37.5	99
28.0	98
20.0	96
14.0	96
5.00	92
2.000	74
0.425	38
0.250	30
0.150	24
0.075	18
50 µm	16
5 µm	13
2 µm	9.0

POTENTIAL EXPANSIVENES



PLASTICITY CHART



Soil Mortar Analysis % < 2.00mm

2.000 - 0.425	49
0.425 - 0.250	10
0.250 - 0.150	8
0.150 - 0.075	9
< 0.075	24

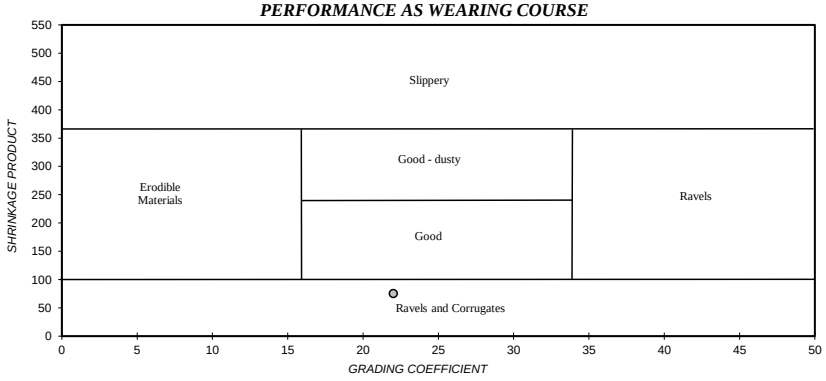
Effective size	0.003
Uniformity Coefficient	499.2
Curvature Coefficient	14.9
Oversize Index	1.0
Shrinkage Product	75.0
Grading Coefficient	22.0
Grading modulus	1.71

Atter-berg Limits

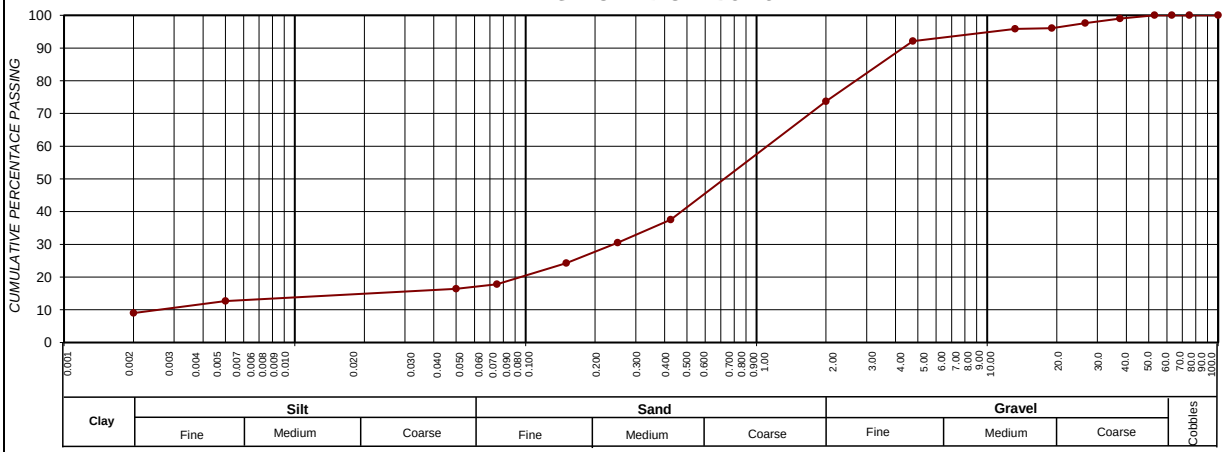
Liquid Limit	18
Plasticity Index	4
Linear Shrinkage	2.0
PI < 0.075	8

Unified Soil Classification	SM & SC
U.S. Highway Classification	A-1-b (0)

PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



SIEVE SIZE (BY LOG SCALE)

CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
9.0	8.1	56.6	26.3

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

DATE RECEIVED : 2021-04-10
POSITION : TP 7
LAYER : 0.55 - 1.2
SAMPLE No. : S/8028
SAMPLE DESCRIPTION : Light Yellow Orange Sandy Gravel

FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI	1.0	Specifc Gravity	2.57

Sieve analysis Cumulative percentage passing (mm)	
100.0	100
75.0	95
63.0	92
50.0	92
37.5	89
28.0	84
20.0	77
14.0	76
5.00	68
2.000	51
0.425	26
0.250	22
0.150	18
0.075	14
50 µm	11
5 µm	7
2 µm	4.9

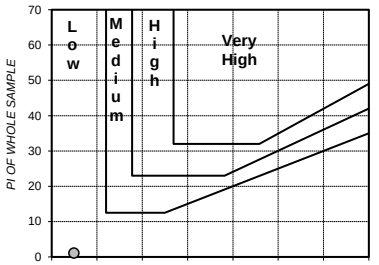
Soil Mortar Analysis % < 2.00mm	
2.000 - 0.425	49
0.425 - 0.250	8
0.250 - 0.150	8
0.150 - 0.075	8
< 0.075	27

Effective size	0.042
Uniformity Coefficient	85.9
Curvature Coefficient	3.0
Oversize Index	10.9
Shrinkage Product	52.4
Grading Coefficient	22.4
Grading modulus	2.09

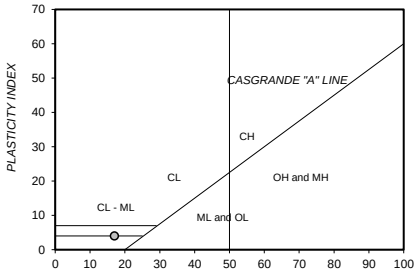
Atter-berg Limits	
Liquid Limit	17
Plasticity Index	4
Linear Shrinkage	2.0
PI < 0.075	10

Unified Soil Classification	SM & SC
U.S. Highway Classification	A-1-b (0)

POTENTIAL EXPANSIVENES

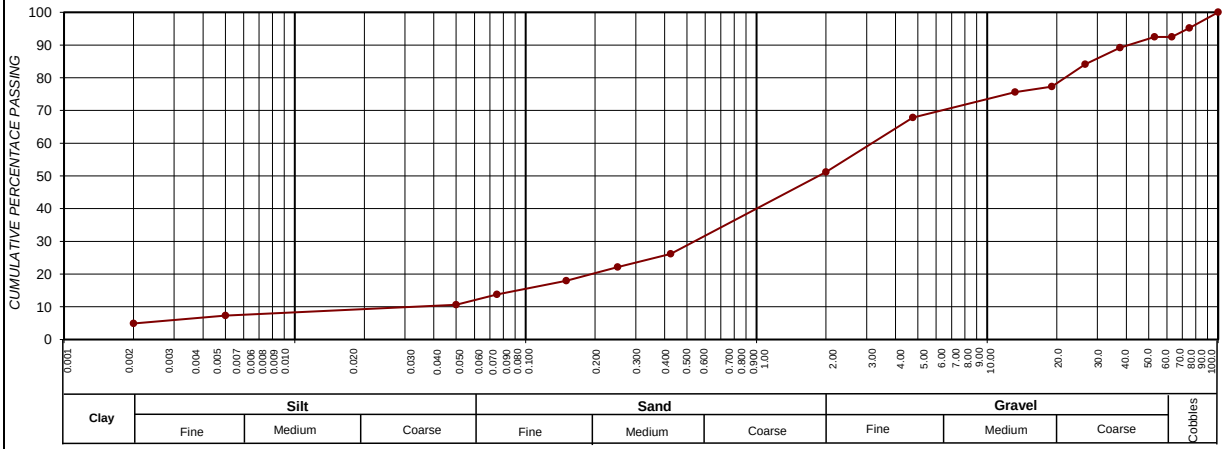


PLASTICITY CHART



PERFORMANCE AS WEARING COURSE

PARTICLE SIZE DISTRIBUTION



CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
4.9	6.8	39.4	48.9

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

DATE RECEIVED : 2021-04-10
POSITION : TP 8
LAYER : 0.4 - 0.7
SAMPLE No. : S/8029
SAMPLE DESCRIPTION : Light Red Brown Sandy Gravel

FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI	0.5	Specifc Gravity	2.58

Sieve analysis Cumulative percentage passing (mm)	
100.0	100
75.0	100
63.0	100
50.0	100
37.5	96
28.0	92
20.0	87
14.0	87
5.00	80
2.000	52
0.425	26
0.250	19
0.150	13
0.075	12
50 µm	9
5 µm	8
2 µm	5.6

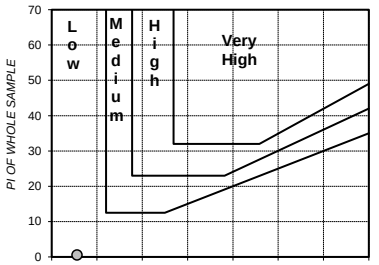
Soil Mortar Analysis % < 2.00mm	
2.000 - 0.425	51
0.425 - 0.250	13
0.250 - 0.150	11
0.150 - 0.075	9
< 0.075	17

Effective size	0.097
Uniformity Coefficient	29.6
Curvature Coefficient	1.7
Oversize Index	4.1
Shrinkage Product	25.5
Grading Coefficient	31.3
Grading modulus	2.10

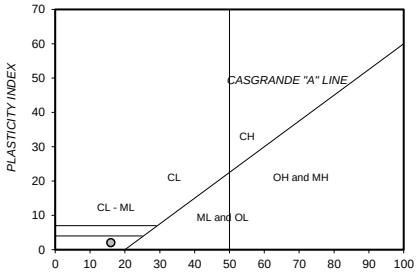
Atter-berg Limits	
Liquid Limit	16
Plasticity Index	2
Linear Shrinkage	1.0
PI < 0.075	6

Unified Soil Classification	SM
U.S. Highway Classification	A-1-b (0)

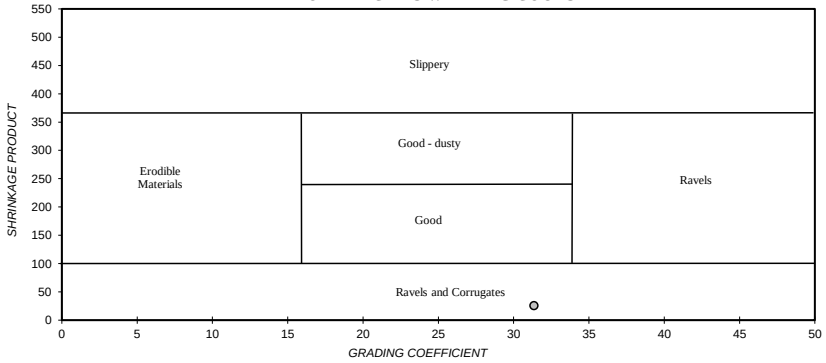
POTENTIAL EXPANSIVENES



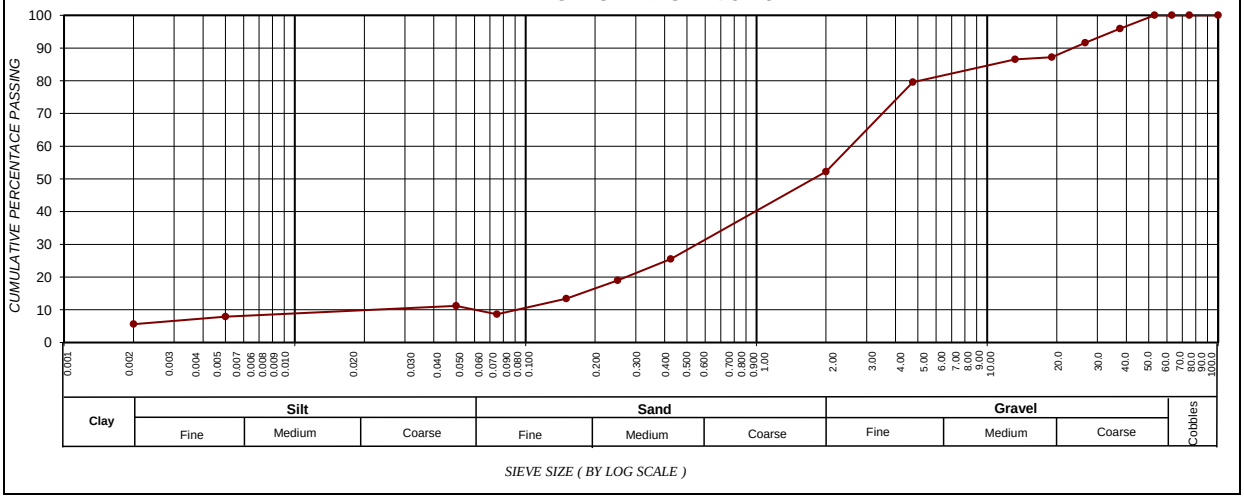
PLASTICITY CHART



PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



SIEVE SIZE (BY LOG SCALE)

CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
5.6	5.8	40.8	47.8

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

DATE RECEIVED : 2021-04-10
POSITION : TP 9
LAYER : 0.6 - 1.05
SAMPLE No. : S/8030
SAMPLE DESCRIPTION : Light Red Orange Sandy Gravel

FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI	**2.1**	**Specifc Gravity**	**2.60**

Sieve analysis Cumulative percentage passing (mm)

100.0	100
75.0	100
63.0	100
50.0	100
37.5	96
28.0	91
20.0	88
14.0	87
5.00	80
2.000	56
0.425	35
0.250	29
0.150	24
0.075	20
50 µm	18
5 µm	13
2 µm	8.7

Soil Mortar Analysis % < 2.00mm

2.000 - 0.425	38
0.425 - 0.250	11
0.250 - 0.150	9
0.150 - 0.075	6
< 0.075	36

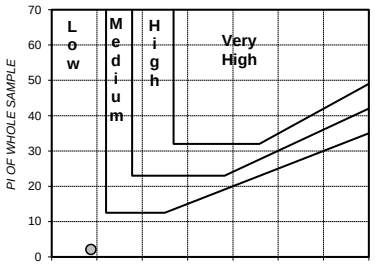
Effective size	0.003
Uniformity Coefficient	866.6
Curvature Coefficient	11.0
Oversize Index	4.2
Shrinkage Product	105.1
Grading Coefficient	28.0
Grading modulus	1.89

Atter-berg Limits

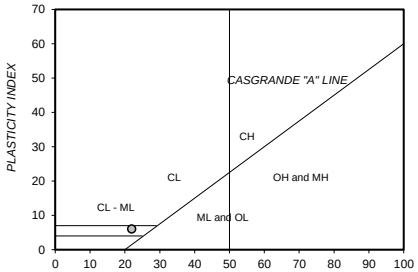
Liquid Limit	22
Plasticity Index	6
Linear Shrinkage	3.0
PI < 0.075	10

Unified Soil Classification	SM & SC
U.S. Highway Classification	A-1-b (0)

POTENTIAL EXPANSIVENES

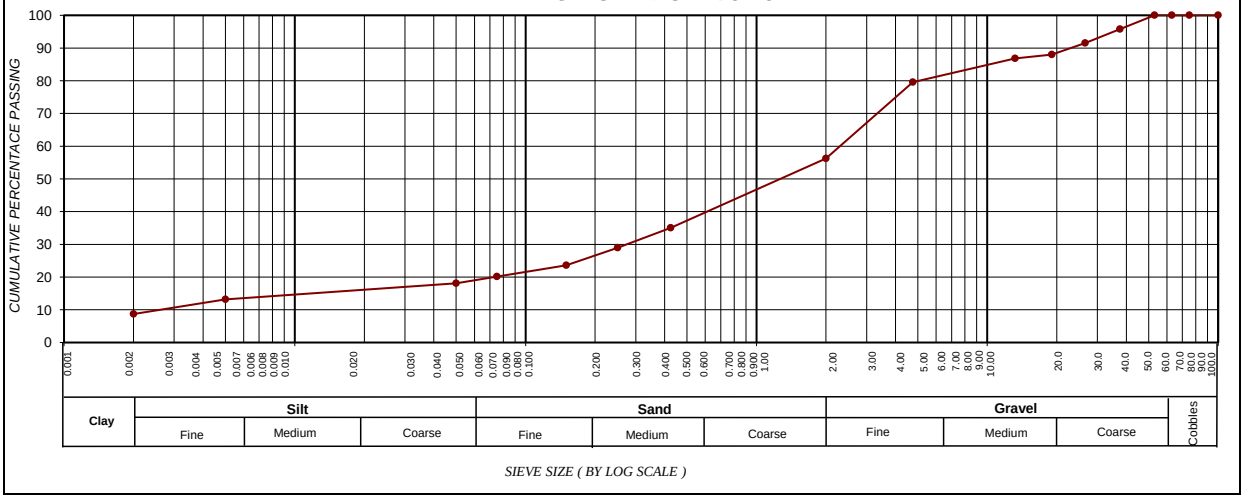


PLASTICITY CHART



PERFORMANCE AS WEARING COURSE

PARTICLE SIZE DISTRIBUTION



CLAY (%) (0.001-0.002)	**SILT (%) (0.002-0.060)**	**SAND (%) (0.060-2.00)**	**GRAVEL (%) (2.00-60.0)**
8.7	**10.0**	**37.6**	**43.8**

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

DATE RECEIVED : 2021-04-10
POSITION : TP 10
LAYER : 0.3 - 1.0
SAMPLE No. : S/8031
SAMPLE DESCRIPTION : Light Red Orange Silty Gravelly Sand

FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI	2.3	Specifc Gravity	2.63

Sieve analysis Cumulative percentage passing (mm)	
100.0	100
75.0	100
63.0	97
50.0	90
37.5	87
28.0	84
20.0	77
14.0	76
5.00	71
2.000	63
0.425	38
0.250	32
0.150	26
0.075	22
50 µm	21
5 µm	14
2 µm	9.0

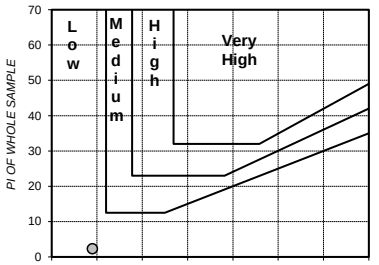
Soil Mortar Analysis % < 2.00mm	
2.000 - 0.425	40
0.425 - 0.250	10
0.250 - 0.150	9
0.150 - 0.075	6
< 0.075	35

Effective size	0.003
Uniformity Coefficient	687.8
Curvature Coefficient	10.7
Oversize Index	12.7
Shrinkage Product	114.7
Grading Coefficient	14.3
Grading modulus	1.76

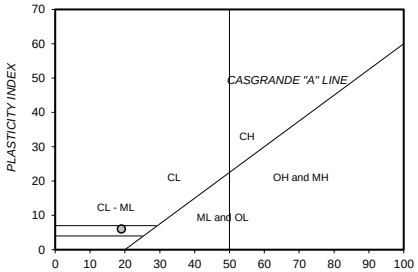
Atter-berg Limits	
Liquid Limit	19
Plasticity Index	6
Linear Shrinkage	3.0
PI < 0.075	10

Unified Soil Classification	SM & SC
U.S. Highway Classification	A-1-b (0)

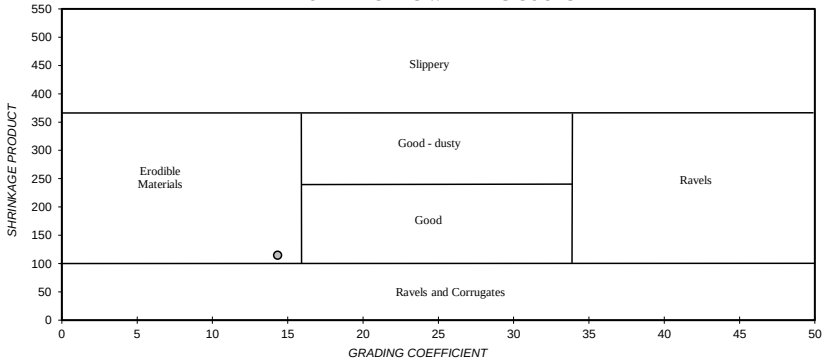
POTENTIAL EXPANSIVENES



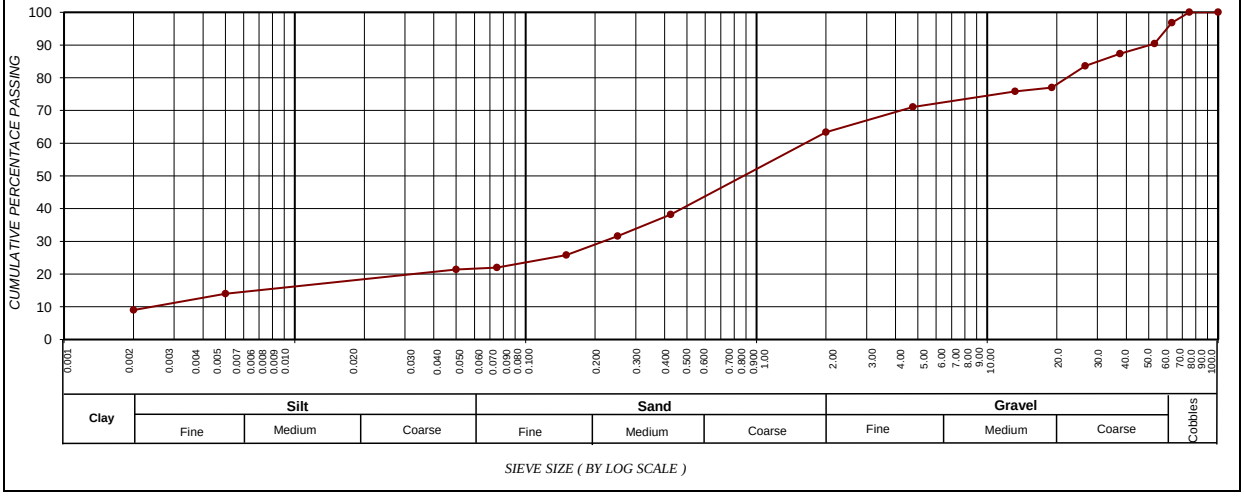
PLASTICITY CHART



PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



SIEVE SIZE (BY LOG SCALE)

CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
9.0	12.3	42.1	36.6

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

DATE RECEIVED : 2021-04-10
POSITION : TP 11
LAYER : 0.3 - 0.8
SAMPLE No. : S/8032
SAMPLE DESCRIPTION : Light Red Brown Sandy Gravel

FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI	-	Specifc Gravity	2.57

Sieve analysis Cumulative percentage passing (mm)	
100.0	100
75.0	100
63.0	100
50.0	96
37.5	88
28.0	85
20.0	83
14.0	82
5.00	76
2.000	51
0.425	29
0.250	21
0.150	18
0.075	12
50 µm	10
5 µm	7
2 µm	4.3

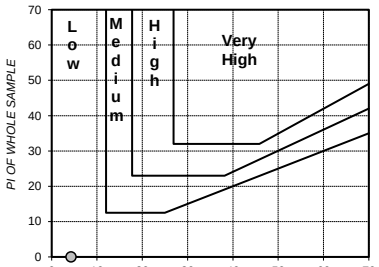
Soil Mortar Analysis % < 2.00mm	
2.000 - 0.425	44
0.425 - 0.250	15
0.250 - 0.150	7
0.150 - 0.075	11
< 0.075	23

Effective size	0.050
Uniformity Coefficient	61.3
Curvature Coefficient	1.6
Oversize Index	12.0
Shrinkage Product	14.5
Grading Coefficient	25.8
Grading modulus	2.08

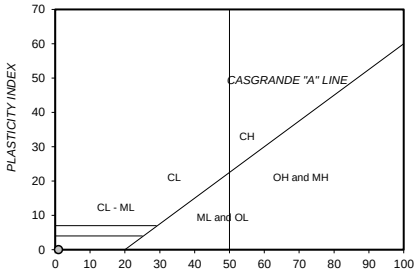
Atter-berg Limits	
Liquid Limit	-
Plasticity Index	SP
Linear Shrinkage	0.5
PI < 0.075	6

Unified Soil Classification	SM
U.S. Highway Classification	A-1-b (0)

POTENTIAL EXPANSIVENES

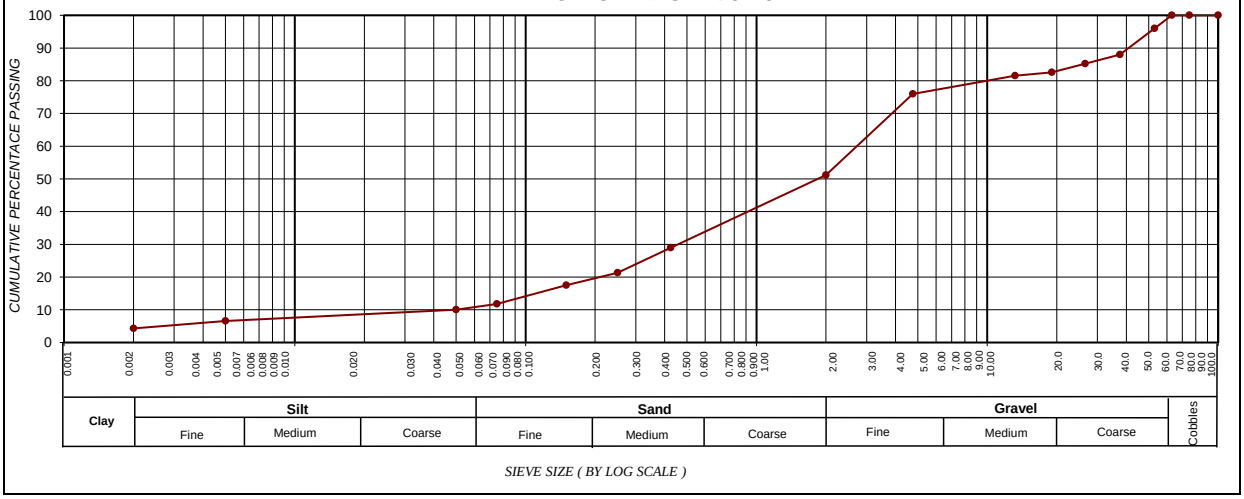


PLASTICITY CHART



PERFORMANCE AS WEARING COURSE

PARTICLE SIZE DISTRIBUTION



CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
4.3	6.6	40.3	48.8

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

DATE RECEIVED : 2021-04-10
POSITION : TP 12
LAYER : 0.4 - 1.1
SAMPLE No. : S/8033
SAMPLE DESCRIPTION : Light Red Orange Gravelly Sand

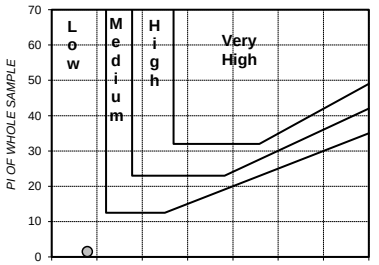
FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI	1.5	Specifc Gravity	2.59

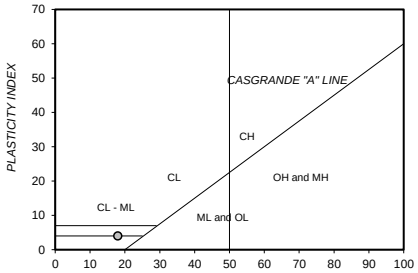
Sieve analysis Cumulative percentage passing (mm)

100.0	100
75.0	100
63.0	100
50.0	100
37.5	97
28.0	89
20.0	81
14.0	79
5.00	72
2.000	63
0.425	37
0.250	30
0.150	23
0.075	19
50 µm	15
5 µm	11
2 µm	7.9

POTENTIAL EXPANSIVENES



PLASTICITY CHART



Soil Mortar Analysis % < 2.00mm

2.000 - 0.425	41
0.425 - 0.250	11
0.250 - 0.150	10
0.150 - 0.075	7
< 0.075	30

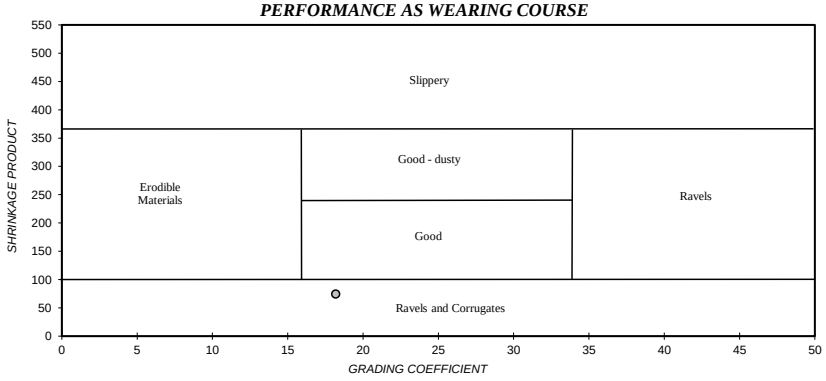
Effective size	0.004
Uniformity Coefficient	445.3
Curvature Coefficient	8.7
Oversize Index	3.0
Shrinkage Product	74.3
Grading Coefficient	18.2
Grading modulus	1.80

Atter-berg Limits

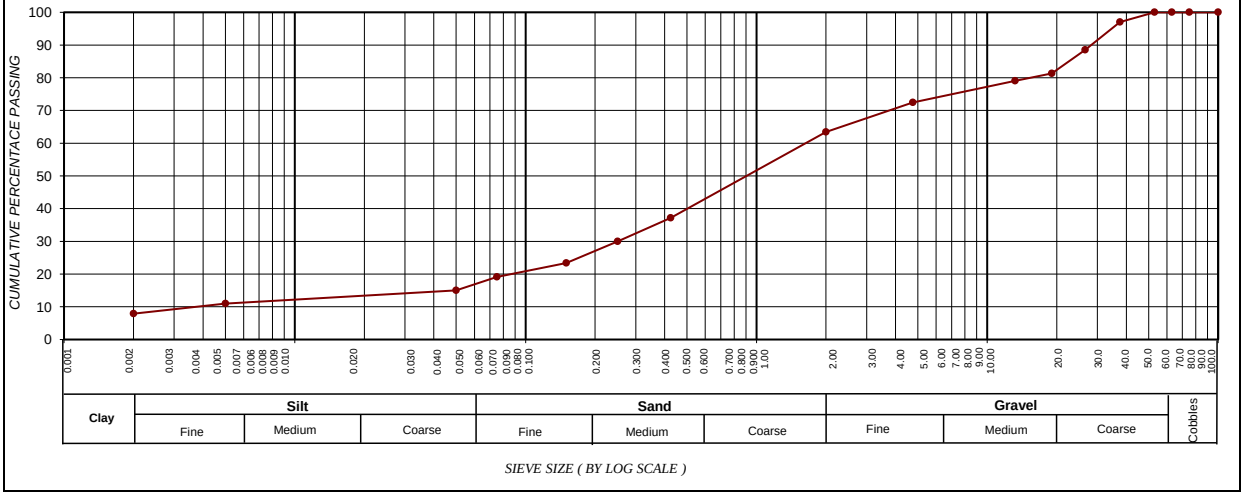
Liquid Limit	18
Plasticity Index	4
Linear Shrinkage	2.0
PI < 0.075	8

Unified Soil Classification	SM & SC
U.S. Highway Classification	A-1-b (0)

PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
7.9	8.4	47.1	36.6

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

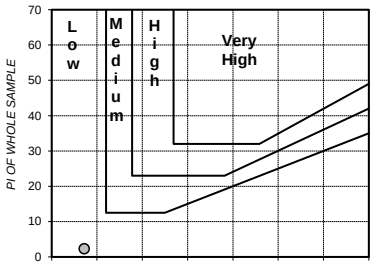
DATE RECEIVED : 2021-04-10
POSITION : TP 13
LAYER : 0.4 - 1.0
SAMPLE No. : S/8034
SAMPLE DESCRIPTION : Light Red Orange Sandy Gravel

FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

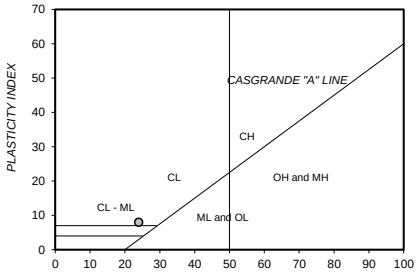
Weighted PI	2.3	Specifc Gravity	2.58

Sieve analysis Cumulative percentage passing (mm)	100.0	100
	75.0	100
	63.0	100
	50.0	98
	37.5	95
	28.0	91
	20.0	88
	14.0	86
	5.00	76
	2.000	53
	0.425	29
	0.250	25
	0.150	22
	0.075	18
	50 µm	14
	5 µm	11
	2 µm	7.2
Soil Mortar Analysis % < 2.00mm	2.000 - 0.425	45
	0.425 - 0.250	7
	0.250 - 0.150	6
	0.150 - 0.075	8
	< 0.075	33
Effective size		0.004
Uniformity Coefficient		685.7
Curvature Coefficient		19.0
Oversize Index		4.8
Shrinkage Product		115.8
Grading Coefficient		29.3
Grading modulus		2.00
Atter-berg Limits	Liquid Limit	24
	Plasticity Index	8
	Linear Shrinkage	4.0
	PI < 0.075	10
Unified Soil Classification		SC
U.S. Highway Classification		A-2-4 (0)

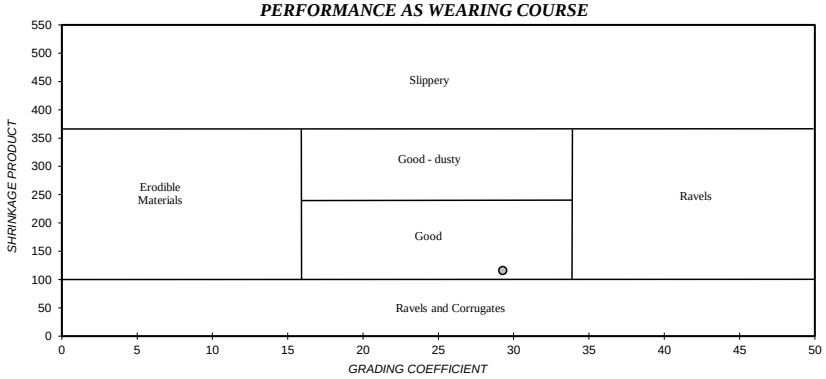
POTENTIAL EXPANSIVENES



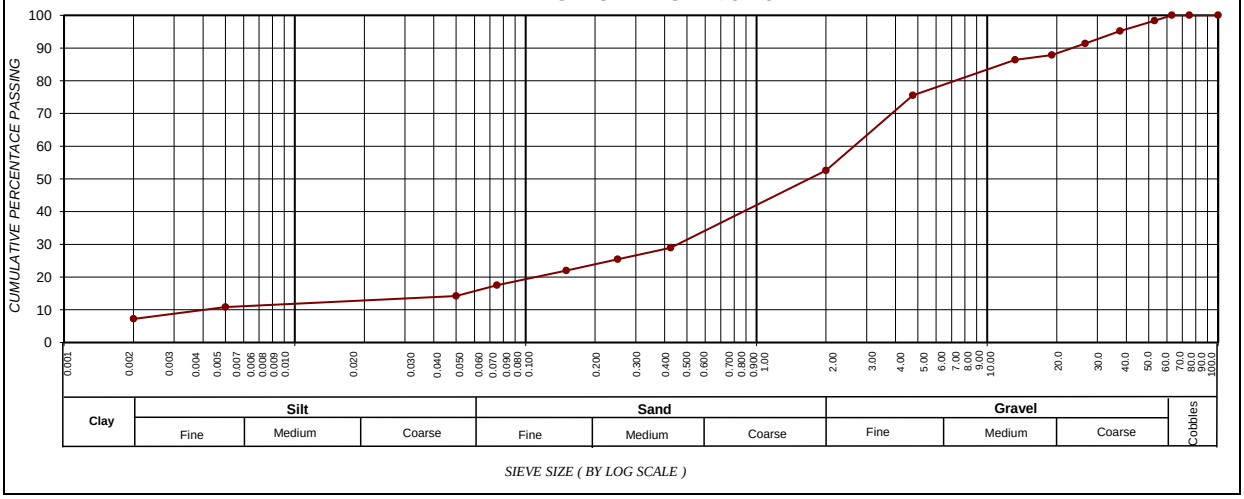
PLASTICITY CHART



PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



SIEVE SIZE (BY LOG SCALE)

CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
7.2	8.3	37.0	47.4

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

DATE RECEIVED : 2021-04-10
POSITION : TP 14
LAYER : 0.55 - 1
SAMPLE No. : S/8035
SAMPLE DESCRIPTION : Light Red Orange Sandy Gravel

FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI	**2.5**	**Specifc Gravity**	**2.59**

Sieve analysis Cumulative percentage passing (mm)	
100.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	95
20.0	83
14.0	77
5.00	69
2.000	53
0.425	32
0.250	27
0.150	24
0.075	19
50 µm	15
5 µm	12
2 µm	8.6

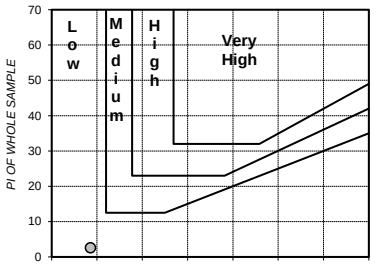
Soil Mortar Analysis % < 2.00mm	
2.000 - 0.425	40
0.425 - 0.250	8
0.250 - 0.150	7
0.150 - 0.075	8
< 0.075	37

Effective size	0.003
Uniformity Coefficient	1016.8
Curvature Coefficient	11.8
Oversize Index	0.0
Shrinkage Product	126.7
Grading Coefficient	28.7
Grading modulus	1.96

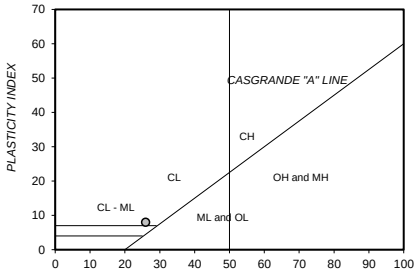
Atter-berg Limits	
Liquid Limit	26
Plasticity Index	8
Linear Shrinkage	4.0
PI < 0.075	16

Unified Soil Classification	SC
U.S. Highway Classification	A-2-4 (0)

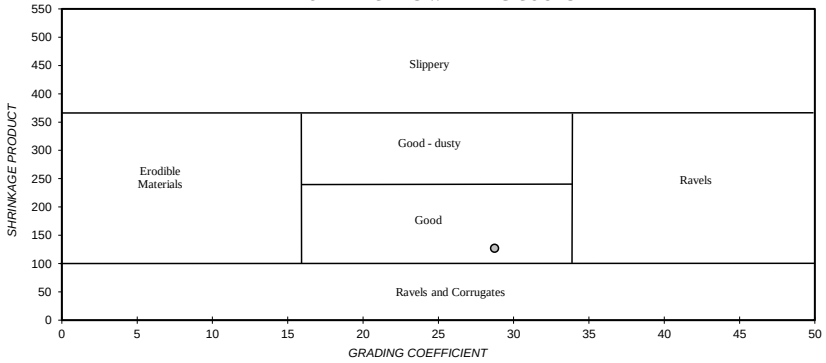
POTENTIAL EXPANSIVENES



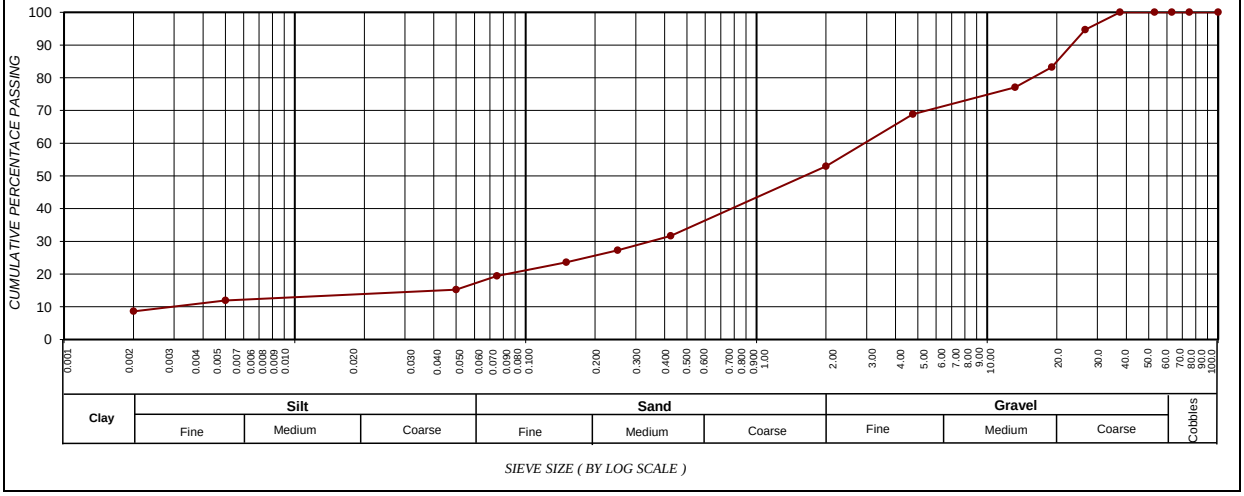
PLASTICITY CHART



PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
8.6	**8.0**	**36.4**	**47.0**

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

DATE RECEIVED : 2021-04-10
POSITION : TP 15
LAYER : 0.3 - 1.4
SAMPLE No. : S/8036
SAMPLE DESCRIPTION : Dark Red Brown Sandy Gravel

FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI	1.8	Specifc Gravity	2.58

Sieve analysis Cumulative percentage passing (mm)	
100.0	100
75.0	100
63.0	100
50.0	100
37.5	97
28.0	94
20.0	88
14.0	87
5.00	75
2.000	54
0.425	30
0.250	24
0.150	19
0.075	16
50 µm	14
5 µm	11
2 µm	8.9

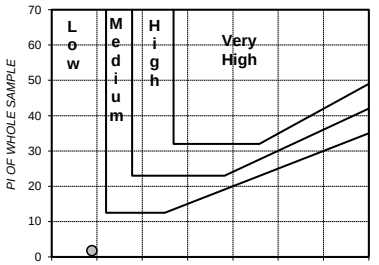
Soil Mortar Analysis % < 2.00mm	
2.000 - 0.425	46
0.425 - 0.250	11
0.250 - 0.150	8
0.150 - 0.075	6
< 0.075	29

Effective size	0.003
Uniformity Coefficient	820.0
Curvature Coefficient	21.3
Oversize Index	2.9
Shrinkage Product	88.7
Grading Coefficient	30.1
Grading modulus	2.00

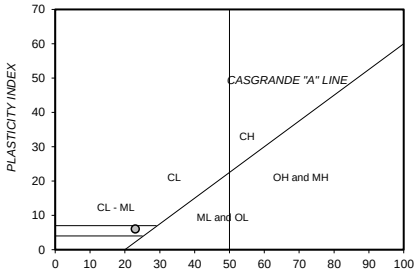
Atter-berg Limits	
Liquid Limit	23
Plasticity Index	6
Linear Shrinkage	3.0
PI < 0.075	10

Unified Soil Classification	SM & SC
U.S. Highway Classification	A-1-b (0)

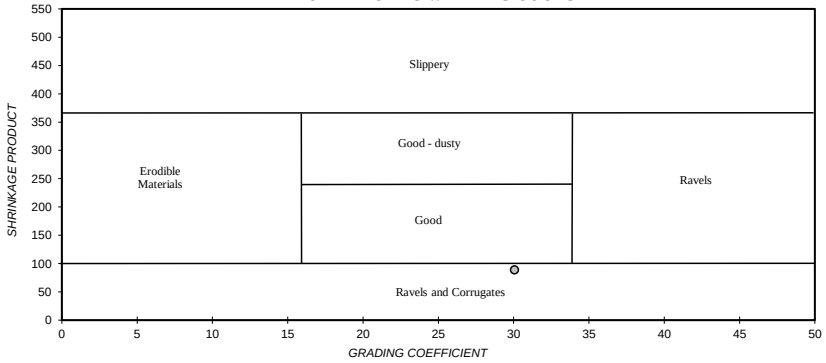
POTENTIAL EXPANSIVENES



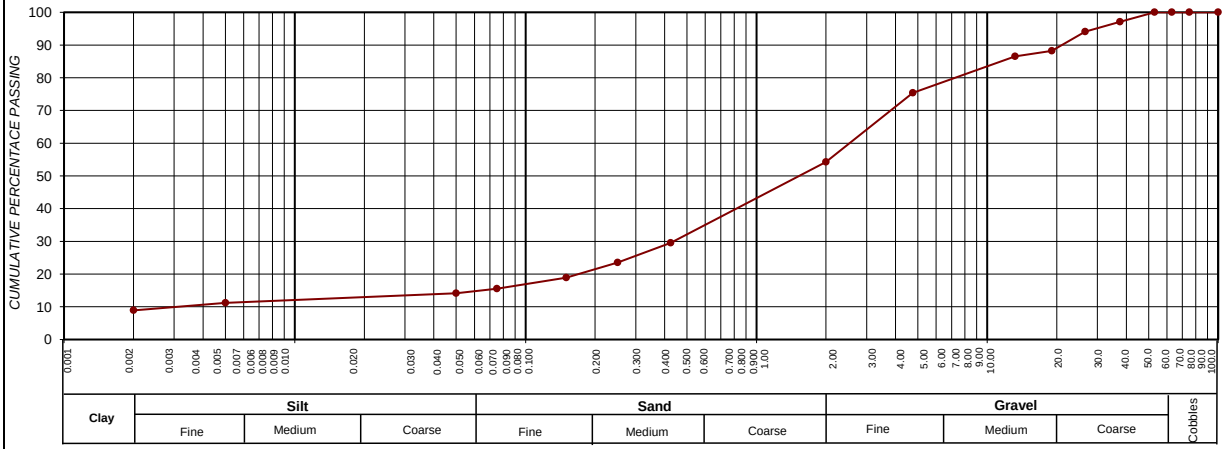
PLASTICITY CHART



PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



SIEVE SIZE (BY LOG SCALE)

CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
8.9	5.8	39.5	45.8

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

DATE RECEIVED : 2021-04-10
POSITION : TP 16
LAYER : 0.3 - 1.2
SAMPLE No. : S/8037
SAMPLE DESCRIPTION : Light Yellow Orange Sandy Gravel

FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI	**2.1**	**Specifc Gravity**	**2.62**

Sieve analysis Cumulative percentage passing (mm)	
100.0	100
75.0	100
63.0	100
50.0	97
37.5	94
28.0	89
20.0	81
14.0	78
5.00	70
2.000	50
0.425	32
0.250	27
0.150	23
0.075	17
50 µm	15
5 µm	11
2 µm	8.1

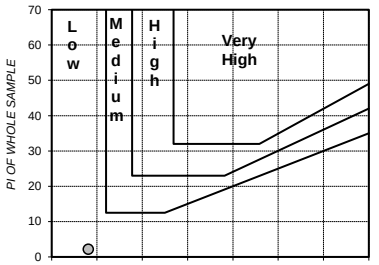
Soil Mortar Analysis % < 2.00mm	
2.000 - 0.425	35
0.425 - 0.250	10
0.250 - 0.150	9
0.150 - 0.075	11
< 0.075	35

Effective size	0.004
Uniformity Coefficient	931.2
Curvature Coefficient	8.8
Oversize Index	6.3
Shrinkage Product	97.3
Grading Coefficient	27.2
Grading modulus	2.01

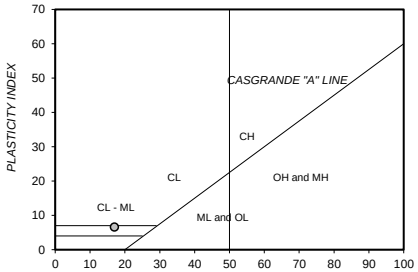
Atter-berg Limits	
Liquid Limit	17
Plasticity Index	7
Linear Shrinkage	3.0
PI < 0.075	12

Unified Soil Classification	SM & SC
U.S. Highway Classification	A-2-4 (0)

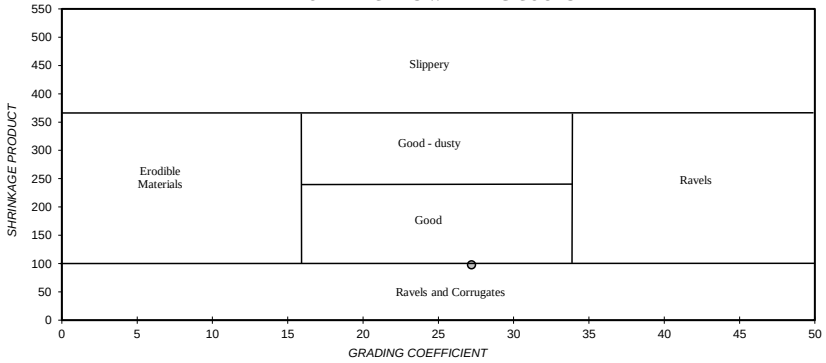
POTENTIAL EXPANSIVENES



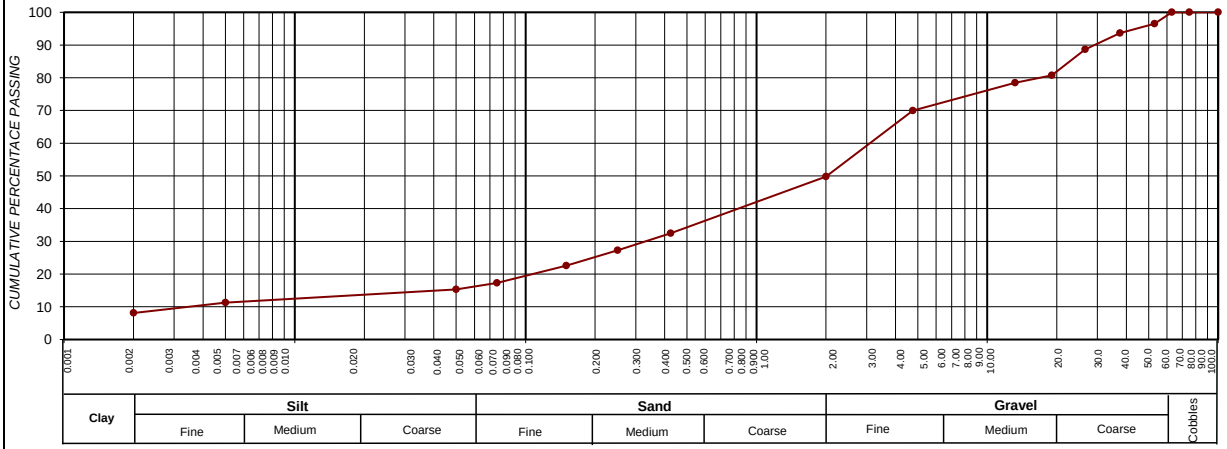
PLASTICITY CHART



PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



SIEVE SIZE (BY LOG SCALE)

CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
8.1	7.9	33.7	50.2

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

DATE RECEIVED : 2021-04-10
POSITION : TP 21
LAYER : 0.33 - 1.1
SAMPLE No. : S/8038
SAMPLE DESCRIPTION : Dark Red Orange Orange Gravelly Silty Clayey Sand

FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI	12.7	Specifc Gravity	2.60

Sieve analysis Cumulative percentage passing (mm)	
100.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	99
5.00	93
2.000	88
0.425	80
0.250	74
0.150	70
0.075	67
50 µm	48
5 µm	39
2 µm	29.8

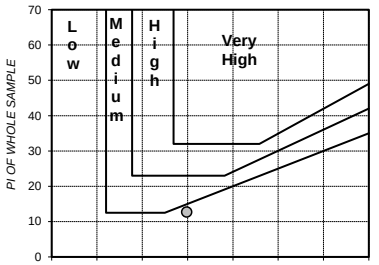
Soil Mortar Analysis % < 2.00mm	
2.000 - 0.425	10
0.425 - 0.250	7
0.250 - 0.150	5
0.150 - 0.075	4
< 0.075	76

Effective size	0.002
Uniformity Coefficient	33.0
Curvature Coefficient	0.0
Oversize Index	0.0
Shrinkage Product	636.1
Grading Coefficient	11.2
Grading modulus	0.66

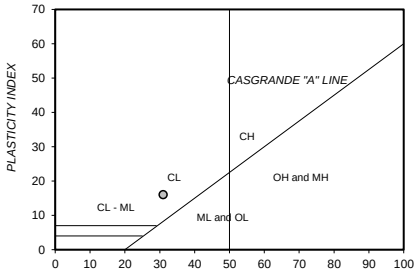
Atter-berg Limits	
Liquid Limit	31
Plasticity Index	16
Linear Shrinkage	8.0
PI < 0.075	22

Unified Soil Classification	CL
U.S. Highway Classification	A-6 (8)

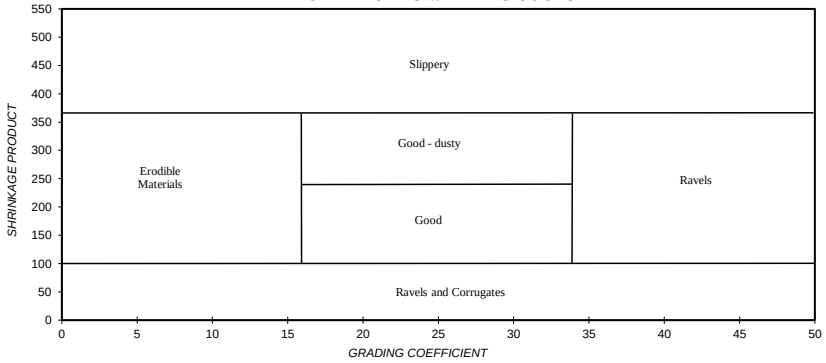
POTENTIAL EXPANSIVENES



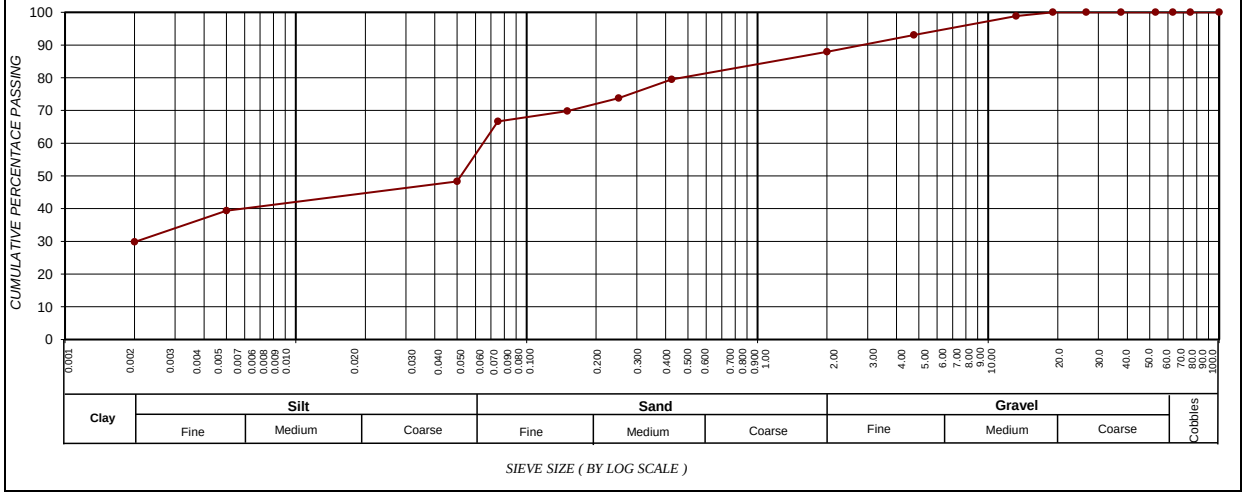
PLASTICITY CHART



PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
29.8	24.3	33.9	12.0

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

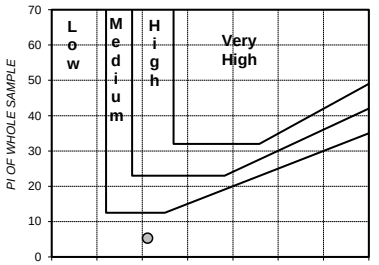
DATE RECEIVED : 2021-04-10
POSITION : TP 22
LAYER : 0.7 - 1.48
SAMPLE No. : S/8039
SAMPLE DESCRIPTION : Dark Red Orange Silty Clayey Gravelly Sand

FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

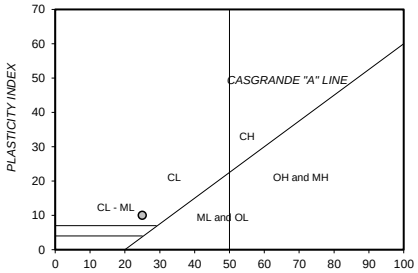
Weighted PI	**5.3**	**Specifc Gravity**	**2.64**

Sieve analysis Cumulative percentage passing (mm)	
100.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	95
14.0	93
5.00	78
2.000	70
0.425	53
0.250	46
0.150	41
0.075	35
50 µm	32
5 µm	27
2 µm	21.2

POTENTIAL EXPANSIVENES



PLASTICITY CHART



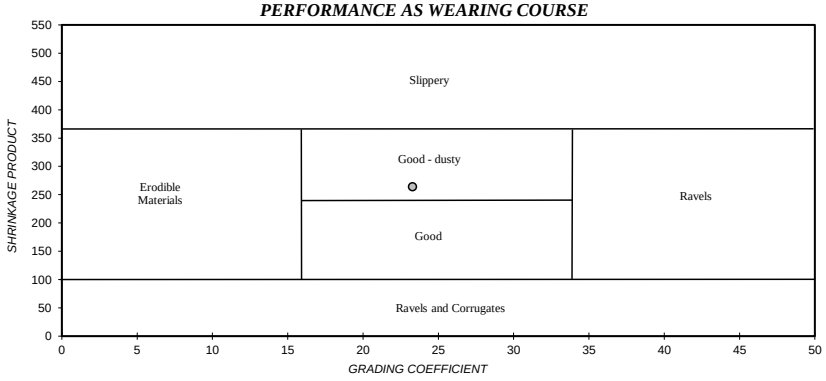
Soil Mortar Analysis % < 2.00mm	
2.000 - 0.425	25
0.425 - 0.250	10
0.250 - 0.150	7
0.150 - 0.075	9
< 0.075	49

Effective size	0.002
Uniformity Coefficient	539.8
Curvature Coefficient	0.5
Oversize Index	0.0
Shrinkage Product	263.8
Grading Coefficient	23.3
Grading modulus	1.42

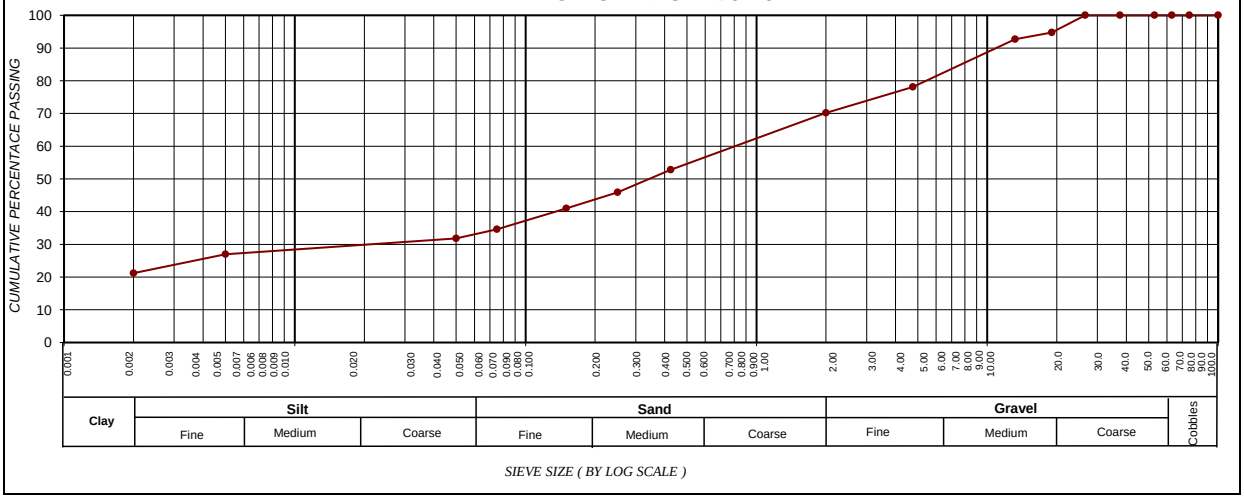
Atter-berg Limits	
Liquid Limit	25
Plasticity Index	10
Linear Shrinkage	5.0
PI < 0.075	14

Unified Soil Classification	SC
U.S. Highway Classification	A-2-4 (0)

PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
21.2	**11.8**	**37.1**	**29.8**

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

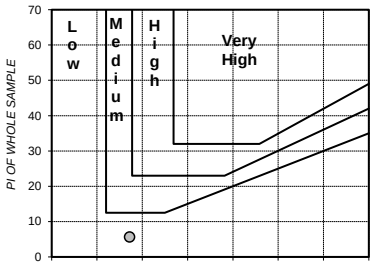
DATE RECEIVED : 2021-04-10
POSITION : TP 23
LAYER : 0.6 - 1.4
SAMPLE No. : S/8040
SAMPLE DESCRIPTION : Light Red Orange Clayey Gravelly Sand

FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

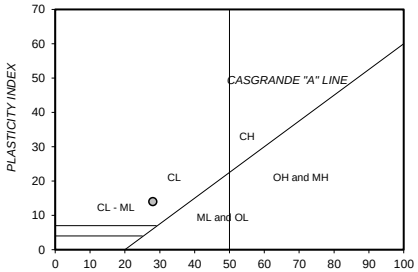
Weighted PI	**5.6**	**Specifc Gravity**	**2.58**

Sieve analysis Cumulative percentage passing (mm)	
100.0	100
75.0	100
63.0	100
50.0	98
37.5	94
28.0	89
20.0	86
14.0	86
5.00	84
2.000	69
0.425	40
0.250	37
0.150	32
0.075	26
50 µm	25
5 µm	22
2 µm	17.2

POTENTIAL EXPANSIVENES



PLASTICITY CHART



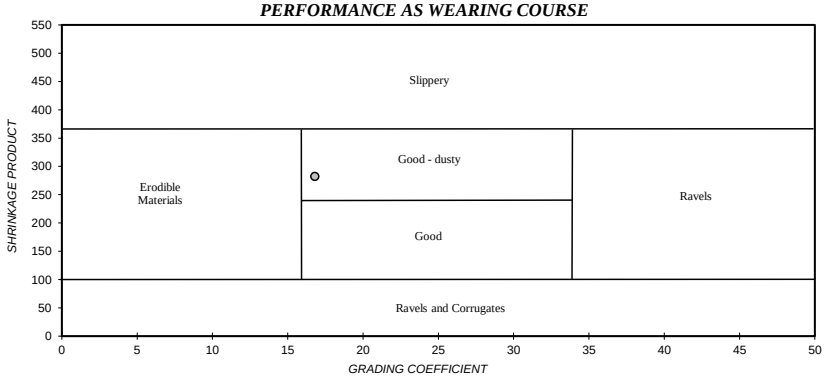
Soil Mortar Analysis % < 2.00mm	
2.000 - 0.425	42
0.425 - 0.250	5
0.250 - 0.150	6
0.150 - 0.075	9
< 0.075	38

Effective size	0.002
Uniformity Coefficient	746.0
Curvature Coefficient	4.9
Oversize Index	6.0
Shrinkage Product	282.2
Grading Coefficient	16.8
Grading modulus	1.64

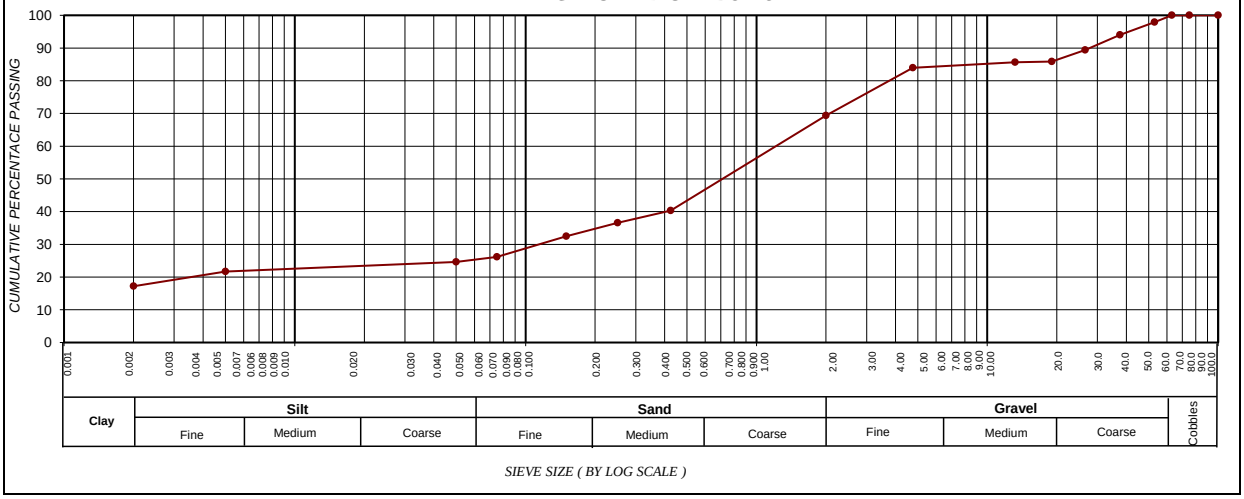
Atter-berg Limits	
Liquid Limit	28
Plasticity Index	14
Linear Shrinkage	7.0
PI < 0.075	18

Unified Soil Classification	SC
U.S. Highway Classification	A-2-6 (0)

PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



SIEVE SIZE (BY LOG SCALE)

CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
17.2	8.2	43.9	30.6

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

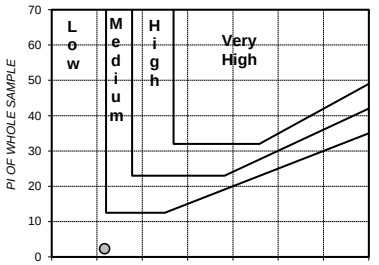
DATE RECEIVED : 2021-04-10
POSITION : TP 24
LAYER : 0.7 - 1.4
SAMPLE No. : S/8041
SAMPLE DESCRIPTION : Light Red Orange Clayey Sandy Gravel

FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

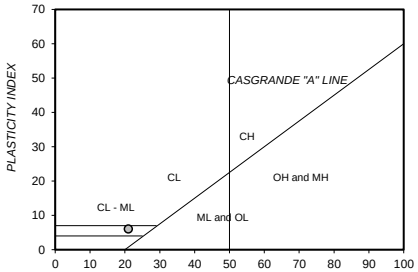
Weighted PI	2.3	Specifc Gravity	2.58

Sieve analysis Cumulative percentage passing (mm)	
100.0	100
75.0	100
63.0	92
50.0	87
37.5	85
28.0	81
20.0	78
14.0	77
5.00	71
2.000	60
0.425	39
0.250	34
0.150	29
0.075	23
50 µm	19
5 µm	15
2 µm	11.7

POTENTIAL EXPANSIVENES



PLASTICITY CHART



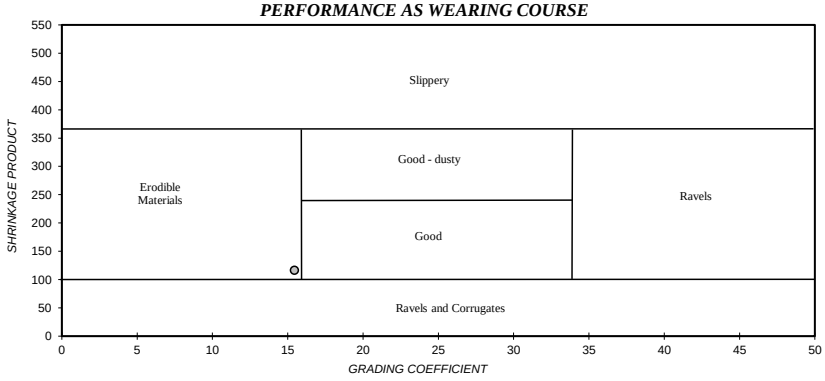
Soil Mortar Analysis % < 2.00mm	
2.000 - 0.425	35
0.425 - 0.250	8
0.250 - 0.150	8
0.150 - 0.075	10
< 0.075	39

Effective size	0.002
Uniformity Coefficient	1060.4
Curvature Coefficient	6.2
Oversize Index	15.0
Shrinkage Product	116.2
Grading Coefficient	15.4
Grading modulus	1.79

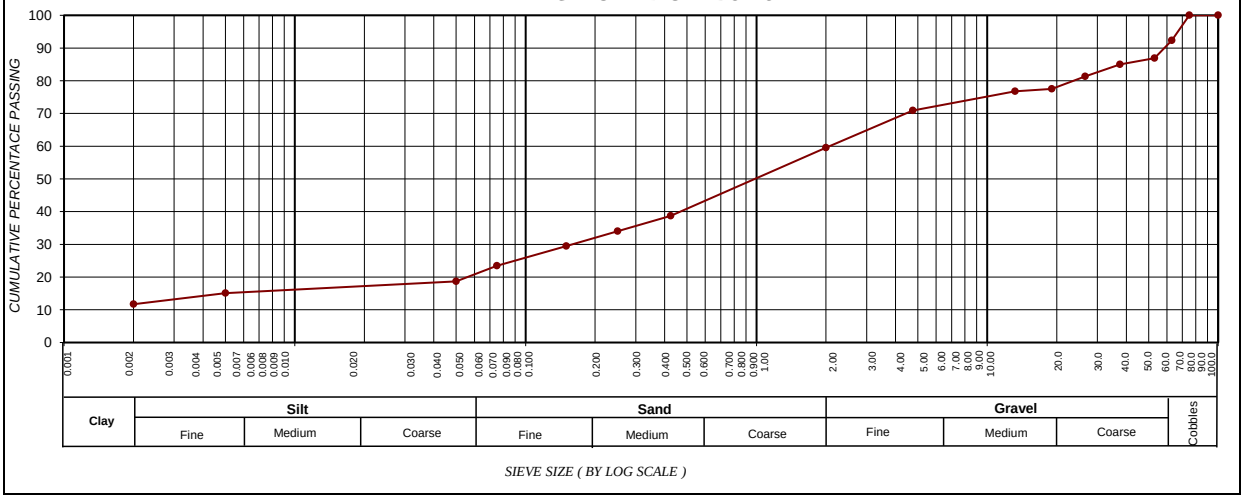
Atter-berg Limits	
Liquid Limit	21
Plasticity Index	6
Linear Shrinkage	3.0
PI < 0.075	10

Unified Soil Classification	SM & SC
U.S. Highway Classification	A-1-b (0)

PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
11.7	8.5	39.4	40.5

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

OUR REF : 92/NKA001-01-0001/21
CLIENT : Nkanivo Development Consultants
PROJECT : Gembokspruit
-

DATE RECEIVED : 2021-04-10
POSITION : TP 25
LAYER : 0.25 - 0.9
SAMPLE No. : S/8042
SAMPLE DESCRIPTION : Light Red Orange Sandy Gravel

FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI	2.2	Specifc Gravity	2.50

Sieve analysis Cumulative percentage passing (mm)

100.0	100
75.0	100
63.0	97
50.0	97
37.5	93
28.0	89
20.0	86
14.0	81
5.00	59
2.000	42
0.425	22
0.250	19
0.150	16
0.075	14
50 µm	12
5 µm	9
2 µm	6.7

Soil Mortar Analysis % < 2.00mm

2.000 - 0.425	46
0.425 - 0.250	8
0.250 - 0.150	7
0.150 - 0.075	6
< 0.075	34

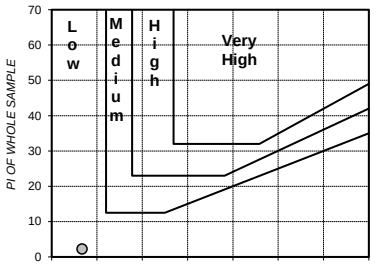
Effective size	0.014
Uniformity Coefficient	395.7
Curvature Coefficient	14.1
Oversize Index	6.5
Shrinkage Product	112.4
Grading Coefficient	28.1
Grading modulus	2.22

Atter-berg Limits

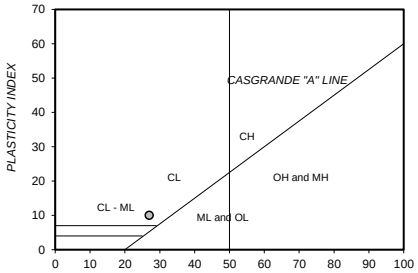
Liquid Limit	27
Plasticity Index	10
Linear Shrinkage	5.0
PI < 0.075	14

Unified Soil Classification	SC
U.S. Highway Classification	A-2-4 (0)

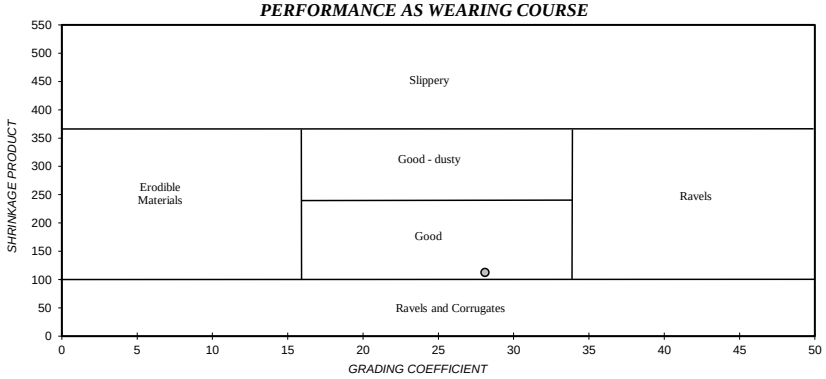
POTENTIAL EXPANSIVENES



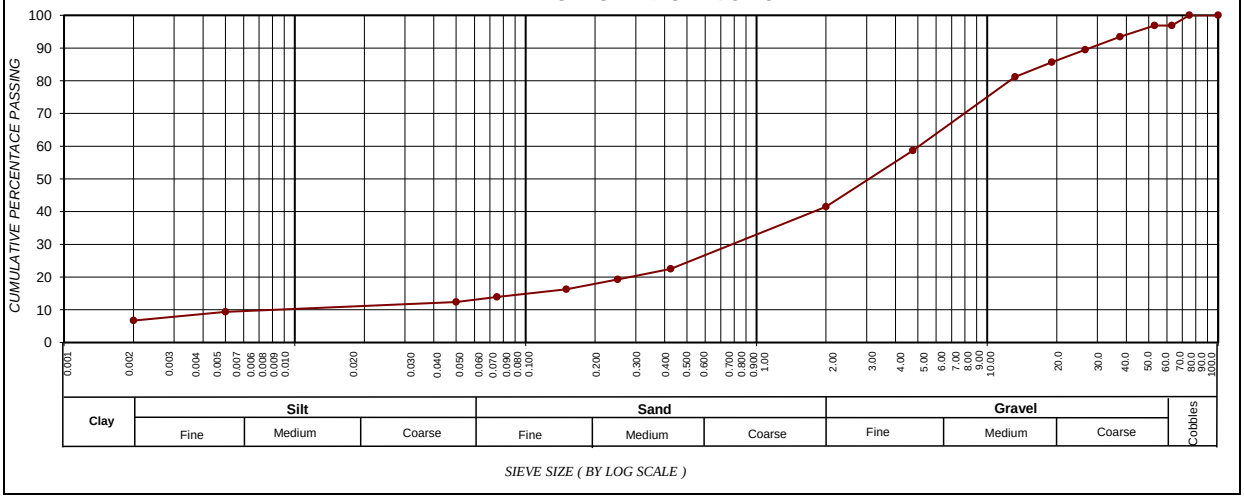
PLASTICITY CHART



PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
6.7	6.2	28.6	58.5

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

92/NKA001-01-0001/21 **RG 16376 / COD** Date - 2021-04-22

Nkanivo Development Consultants
P.O Box 11948
Silver Lakes
Pretoria

Attention: **Mr. L Mavhetha**

Dear Sir

Test Report : **GEMBOKSPRUIT - CBR TEST RESULTS**

Please find the attached test results for the sample/s as submitted to and tested by Roadlab (PTY)Ltd. In Primrose, Germiston.
The unambiguous description of the sample/s as received are as follows :

SAMPLE INFORMATION & PROPERTIES					
SAMPLE No.		21/S8026	21/S8028	21/S8035	21/S8037
CONTAINER USED FOR SAMPLING		Clients Bags	Clients Bags	Clients Bags	Clients Bags
SIZE / WEIGHT OF SAMPLE		±70kg's	±70kg's	±70kg's	±70kg's
MOISTURE CONDITION OF SAMPLE ON ARRIVAL		Slightly Moist	Slightly Moist	Slightly Moist	Slightly Moist
HOLE No. / Km. / CHAINAGE		TP 5	TP 7	TP 14	TP 16
ROAD No. OR NAME		N/A	N/A	N/A	N/A
LAYER TESTED / SAMPLED FROM		0.4-1.4	0.55-1.2	0.55-1	0.3-1.2
DATE SAMPLED		2021-04-10	2021-04-10	2021-04-10	2021-04-10
DATE RECEIVED		2021-04-10	2021-04-10	2021-04-10	2021-04-10
CLIENTS MARKING		None	None	None	None
DESCRIPTION OF SAMPLE (COLOUR & TYPE)		Light Red Orange Silty Clayey Gravelly Sand	Light Yellow Orange Sandy Gravel	Light Red Orange Sandy Gravel	Light Yelow Orange Sandy Gravel
GRADING ANALYSIS - % PASSING SIEVES (SANS : METHOD GR1:2010)					
SIEVE ANA - LYSIS (mm) **(SANS GR1:2010)**	75.0	100	95	100	100
	63.0	100	92	100	100
	50.0	100	92	100	97
	37.5	100	89	100	94
	28.0	100	84	95	89
	20.0	100	77	83	81
	14.0	98	75	77	78
	5.00	98	68	69	70
	2.00	67	51	53	50
	0.425	45	26	32	32
	0.075	27	14	19	17
SANS 3001 - PR5					
Soil Mortar		67	50	54	50
Coarse Sand		33	50	39	34
Fine Sand		27	24	24	30
Coarse Fine Sand		10	8	9	10
Medium Fine Sand		7	8	6	10
Fine Fine Sand		9	8	9	10
Silt & Clay		40	26	37	36
Coarse Sand Ratio		0.3	0.5	0.4	0.3
ATTERBERG LIMITS ANALYSIS (SANS : METHOD GR10 ; GR11)					
ATTERBERG LIMITS **(SANS GR10; GR11)**	LL%	23.0	17.0	26.0	17.0
	P.I.	8.0	4.0	8.0	6.6
	LS%	4.0	2.0	4.0	3.0
GM		1.61	2.09	1.96	2.01
CLASSIFI - CATION	H.R.B.*	A-2-4(d)	A-1-a(0)	A-2-4(0)	A-1-b(0)
	COLTO*	G8	G6	G7	G7
	T.R.H. 14*	G8	G7	G7	G7
CALIFORNIA BEARING RATIO (SANS : METHOD GR40) / UNCONFINED COMPRESSIVE STRENGTH (SANS : METHOD GR53) (ITS GR54)					
MOD AASHTO **(SANS GR30)**	OMC%	10.4	9.0	10.4	7.0
	MDD(KG/M^3)	1988	2041	1990	2126
	COMP MC %	10.4	9.2	10.6	7.0
	% SWELL	0.22	0.17	0.15	0.10
C.B.R. **(SANS GR40)**	100%	31	69	41	34
	98%	24	47	34	30
	97%	19	38	27	27
U.C.S. **(SANS GR53)**	95%	14	26	21	23
	93%	12	18	16	20
MPA	90%	10	10	12	16
MOD ITS : DRY (kPa) **(GR54)**		N/A	N/A	N/A	N/A
ITS @ 95% : DRY (kPa)		N/A	N/A	N/A	N/A
STABILISED WITH	IN LAB				
	ON SITE	Neat	Neat	Neat	Neat
TEST TYPE		CBR / FOUND IND	CBR / FOUND IND	CBR / FOUND IND	CBR / FOUND IND
SAMPLED BY		Client	Client	Client	Client
DELIVERED BY		Client	Client	Client	Client
SAMPLING METHOD		**TMH5 - MB1**	**TMH5 - MB1**	**TMH5 - MB1**	**TMH5 - MB1**
ENVIRONMENTAL CONDITION WHEN SAMPLED		Hot	Hot	Hot	Hot
REMARKS & NOTES		None	None	None	None

Kind Regards

Mr. N Herbst / Mr R Potgieter
TECHNICAL SIGNATORY / MANAGER

Remarks :
*Opinions & Interpretations are not included in our schedule of Accreditation
SANAS Accredited Laboratory No. T 0296
The samples were subjected to analysis according to SANS 3001
The results reported relate only to the sample tested
Further use of the above information is not the responsibility or liability of Roadlab
Documents may only be reproduced or published in their full context
Compiled By : Rehmat Ally

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

92/NKA001-01-0001/21 **RG 16376 / COD** Date - 2021-04-22

Nkanivo Development Consultants
P.O Box 11948
Silver Lakes
Pretoria

Attention: **Mr. L Mavhetha**

Dear Sir

Test Report : **GEMBOKSPRUIT - CBR TEST RESULTS**

Please find the attached test results for the sample/s as submitted to and tested by Roadlab (PTY)Ltd. In Primrose, Germiston.
The unambiguous description of the sample/s as received are as follows :

SAMPLE INFORMATION & PROPERTIES					
SAMPLE No.		21/S8041			
CONTAINER USED FOR SAMPLING		Clients Bags			
SIZE / WEIGHT OF SAMPLE		±70kg's			
MOISTURE CONDITION OF SAMPLE ON ARRIVAL		Slightly Moist			
HOLE No. / Km. / CHAINAGE		TP 24			
ROAD No. OR NAME		N/A			
LAYER TESTED / SAMPLED FROM		0.7-1.4			
DATE SAMPLED		2021-04-10			
DATE RECEIVED		2021-04-10			
CLIENTS MARKING		None			
DESCRIPTION OF SAMPLE (COLOUR & TYPE)		Light Red Orange Clayey Sandy Gravel			
GRADING ANALYSIS - % PASSING SIEVES (SANS : METHOD GR1:2010)					
SIEVE ANA - LYSIS (mm) **(SANS GR1:2010)**	75.0	100			
	63.0	92			
	50.0	87			
	37.5	85			
	28.0	81			
	20.0	78			
	14.0	77			
	5.00	71			
	2.00	60			
	0.425	39			
	0.075	23			
SANS 3001 - PR5					
Soil Mortar		59			
Coarse Sand		36			
Fine Sand		25			
Coarse Fine Sand		8			
Medium Fine Sand		7			
Fine Fine Sand		10			
Silt & Clay		39			
Coarse Sand Ratio		0.3			
ATTERBERG LIMITS ANALYSIS (SANS : METHOD GR10 ; GR11)					
ATTERBERG LIMITS **(SANS GR10; GR11)**	LL%	21.0			
	P.I.	6.0			
	LS%	3.0			
GM		1.79			
CLASSIFI - CATION	H.R.B.*	A-2-4(0)			
	COLTO*	G8			
	T.R.H. 14*	G8			
CALIFORNIA BEARING RATIO (SANS : METHOD GR40) / UNCONFINED COMPRESSIVE STRENGTH (SANS : METHOD GR53) (ITS GR54)					
MOD AASHTO **(SANS GR30)**	OMC%	11.0			
	MDD(KG/M^3)	1924			
	COMP MC %	11.0			
	% SWELL	0.20			
C.B.R. **(SANS GR40)**	100%	40			
	98%	34			
	97%	26			
U.C.S. **(SANS GR53)**	95%	19			
	93%	14			
MPA	90%	10			
MOD ITS : DRY (kPa) **(GR54)**		N/A			
ITS @ 95% : DRY (kPa)		N/A			
STABILISED WITH	IN LAB				
	ON SITE	Neat			
TEST TYPE		CBR / FOUND IND			
SAMPLED BY		Client			
DELIVERED BY		Client			
SAMPLING METHOD		**TMH5 - MB1**			
ENVIRONMENTAL CONDITION WHEN SAMPLED		Hot			
REMARKS & NOTES		None			

Kind Regards

Mr. N Herbst / Mr R Potgieter
TECHNICAL SIGNATORY / MANAGER

Remarks :
*Opinions & Interpretations are not included in our schedule of Accreditation
SANAS Accredited Laboratory No. T 0296
The samples were subjected to analysis according to SANS 3001
The results reported relate only to the sample tested
Further use of the above information is not the responsibility or liability of Roadlab
Documents may only be reproduced or published in their full context
Compiled By : Rehmat Ally

Roadlab Laboratories Pty Ltd
› Materials Testing
› Geotechnical & Road Investigations
› Mobile Lab Services
› Specialised Concrete & Forensic Investigations
+27 11 828 0279
info@roadlab.co.za
www.roadlab.co.za
207 Rietfontein Rd,
Germiston, JHB, 1400

Ref - 92/NKA001-01-0001/21 Job no- RG 16376 Date- 2021-04-23

Nkanivo Development Consultants
P.O.Box 11948
Silver Lakes
Pretoria

ATTENTION: **Mr. L Mavtetha**

Test Report : **GEMBOKSPRUIT - pH & CONDUCTIVITY TEST RESULTS**

Clients Marking: None
Sample Number: S/8026
Sample delivered to: Roadlab

Date Sampled: 2021/04/10
Date Received: 2021/04/10

Sample Number	Layer / Road :	Temperature (°C) : Conductivity	Conductivity (ms/m)	Temperature (°C) : pH	pH Value
S/8026	0.4-1.4	23.0	3.0	23.0	5.86
S/8035	0.55-1	23.0	1.0	23.0	5.67
S/8041	0.7-1.4	23.0	2.0	23.0	5.76
					PAGE

Kind Regards

Mr N Herbst / Mr R Potgieter
Technical Signatory / Manager

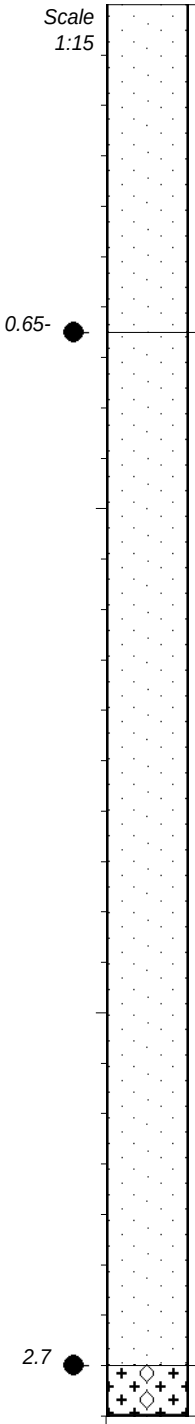
Remarks :
The samples were subjected to analysis according to TMH 1
The results reported relate only to the sample tested
Further use of the above information is not the responsibility or liability of Roadlab
Documents may only be reproduced or published in their full context
Compiled By : Rehmat Ally

17. APPENDIX C: SOIL PROFILES

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 01
Sheet 1 of 1

JOB NUMBER: 000



0.00 Slightly moist, greyish, intact, Loose to Medium dense, Sandy Silt. **TOPSOIL.**

0.65 Moist, light brown, intact, Medium dense, Sandy gravel. **RESIDUAL SOIL.**

2.70 Slightly weathered yellowish granite. **BEDROCK.**

2.80

NOTES

1) Roots inclusion from a depth of 0.0 - 0.48m
2) Stable side walls
3) No water seepage encountered
4) Refusal encountered at 2.8 m
5) Disturbed sample taken at 0.65- 2.7 m
6) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani
TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021
DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

ELEVATION : 1326m
X-COORD : 28°54'11.60"E
Y-COORD : 25°24'26.33"S

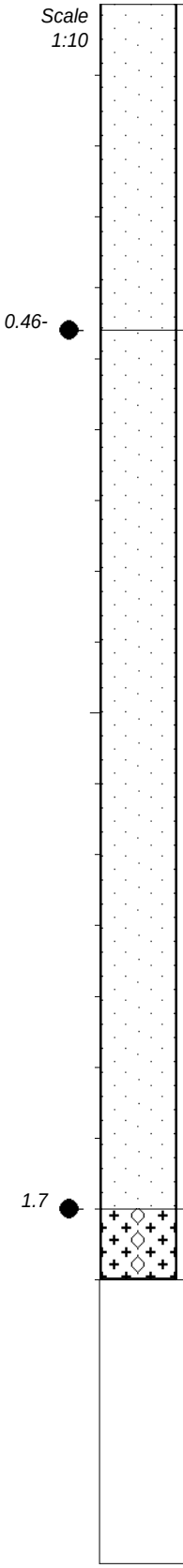
HOLE No: TP 01

dotPLOT 7022

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 02
Sheet 1 of 1

JOB NUMBER: 000



0.00 — Dry to Slightly moist, grey, intact, Medium dense, Sandy Silt. **TOPSOIL.**

0.46 — Moist, light brown, intact, Dense, Sandy gravel. **RESIDUAL SOIL.**

1.70 — Slightly weathered Granite. **BEDROCK.**

1.80

NOTES

1) Roots inclusion from a depth of 0.0 - 0.4m
2) Stable side walls
3) No water seepage encountered
4) Refusal encountered at 1.8 m
5) Disturbed sample taken at 0.46- 1.7 m
6) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021

ELEVATION : 1330m
X-COORD : 28°54'16.51"E
Y-COORD : 25°24'24"S

HOLE No: TP 02

TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

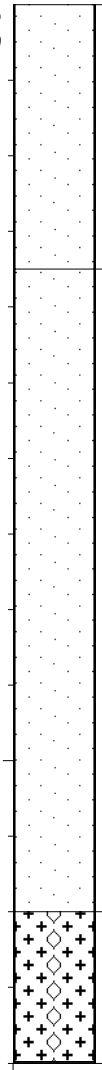
DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 03
Sheet 1 of 1

JOB NUMBER: 000

Scale 1:10



0.35-1.2m

0.00 Dry to Slightly moist, greyish, intact, Medium dense, Matrix supported, Sandy Silt. **TOPSOIL.**

0.35 Slightly moist, light brown, intact, Dense, Sandy gravel. **RESIDUAL SOIL.**

1.20 Yellowish weathered Granite. **BEDROCK.**

1.40

NOTES

1) Roots inclusion from a depth of 0.0 - 0.35m
2) Stable side walls
3) No water seepage encountered
4) Refusal encountered at 1.4 m
5) Disturbed sample taken at 0.35-1.2m
6) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021

ELEVATION : 1336m
X-COORD : 28°54'22.58"E
Y-COORD : 25°24'20.79"S

HOLE No: TP 03

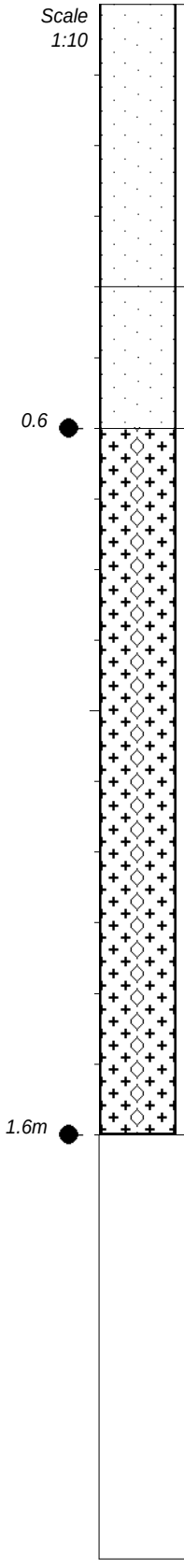
TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 04
Sheet 1 of 1

JOB NUMBER: 000



0.00 Dry, greyish, intact, Dense, Sandy Silt. **TOPSOIL.**

0.40 Slightly Moist, light brown, intact, Dense, Matrix supported, Sandy gravel. **RESIDUAL SOIL.**

0.60 Slightly weathered Granite. **BEDROCK.**

1.60

NOTES

1) Roots inclusion from a depth of 0 - 0.41m
2) Stable side walls
3) No water seepage encountered
4) Refusal encountered at 1.6 m
5) Disturbed sample taken at 0.6 - 1.6m
6) No Undisturbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani
TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021
DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

ELEVATION : 1338m
X-COORD : 28°54'27.55"E
Y-COORD : 25°24'18.27"S

HOLE No: TP 04

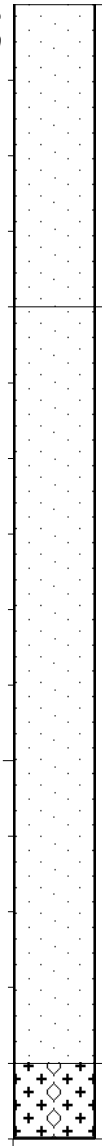
dotPLOT 7022

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 05
Sheet 1 of 1

JOB NUMBER: 000

Scale 1:10



0.00 Dry to Slightly moist, greyish, intact, Medium dense, Matrix supported, Sandy Silt. **TOPSOIL.**

0.4 *0.40* Slightly moist, light brown, intact, Dense, Sandy gravel. **RESIDUAL SOIL.**

1.4 *1.40* Yellowish weathered Granite. **BEDROCK.**

1.50

NOTES

1) Stable side walls
2) No water seepage encountered
3) No refusal encountered at 1.5 m
4) Disturbed sample taken at 0.4 - 1.4 m
5) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021

ELEVATION : 1343m
X-COORD : 28°54'32.46"E
Y-COORD : 25°24'15.54"S

HOLE No: TP 05

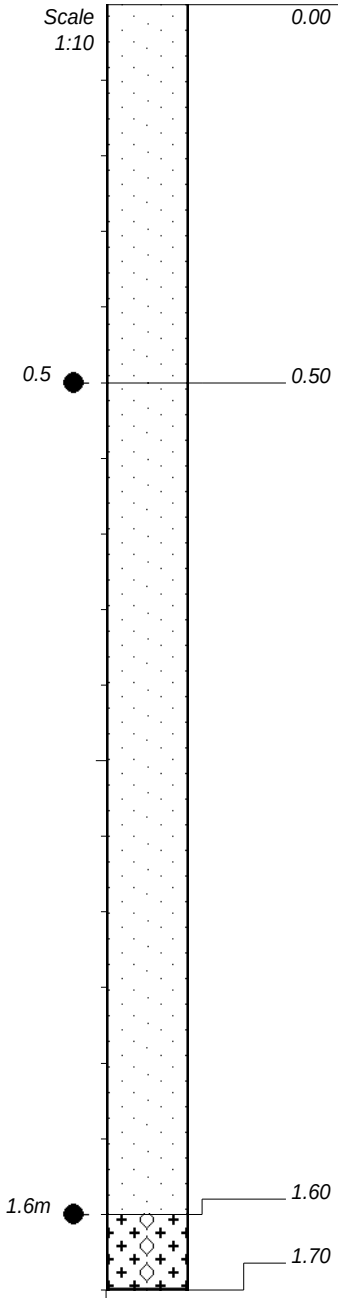
TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 06
Sheet 1 of 1

JOB NUMBER: 000



Dry to Slightly moist, grey, intact, Medium dense, Sandy Silt. **TOPSOIL.**

Moist, light brown, intact, Dense, Sandy gravel. **RESIDUAL SOIL.**

Slightly weathered Granite. **BEDROCK.**

NOTES

1) Roots inclusion from a depth of 0 - 0.45m
2) Stable side walls
3) No water seepage encountered
4) Refusal encountered at 1.7 m
5) Disturbed sample taken at 0.5 - 1.6m
6) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021

ELEVATION : 1349m
X-COORD : 28°54'27.41"E
Y-COORD : 25°24'9.51"S

HOLE No: TP 06

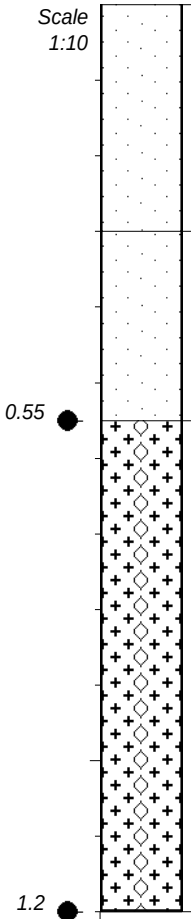
TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 07
Sheet 1 of 1

JOB NUMBER: 000



Dry, grey, intact, Dense, Sandy Silt. **TOPSOIL.**

Slightly moist, light brown, intact, Dense to very dense, Sandy gravel. **RESIDUAL SOIL.**

Yellowish slightly weathered Granite. **BEDROCK.**

NOTES

1) Roots inclusion from a depth of 0 - 0.38m
2) Stable side walls
3) No water seepage encountered
4) Refusal encountered at 1.2 m
5) Disturbed sample taken 0.55 - 1.2 m
6) No Undisturbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani
TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021
DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

ELEVATION : 1346m
X-COORD : 28°54'23.49"E
Y-COORD : 25°24'12.40"S

HOLE No: TP 07

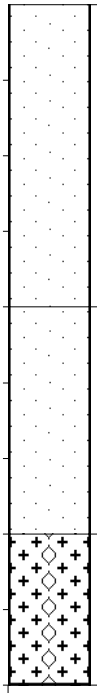
dotPLOT 7022

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 08
Sheet 1 of 1

JOB NUMBER: 000

Scale 1:10



0.00 Dry to Slightly moist, grey, intact, Medium dense, Sandy Silt. **TOPSOIL.**

0.4 *0.40* Moist, light brown, intact, Dense, Sandy gravel. **RESIDUAL SOIL.**

0.7 *0.70* Slightly weathered Granite. **BEDROCK.**

0.90

NOTES

1) Roots inclusion from a depth of 0 - 0.35m
2) Stable side walls
3) No water seepage encountered
4) Refusal encountered at 0.9 m
5) Disturbed sample taken at 0.4 - 0.7 m
6) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021

ELEVATION : 1342m
X-COORD : 28°54'17.78"E
Y-COORD : 25°24'15.03"S

HOLE No: TP 08

TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

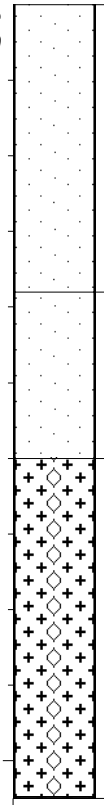
dotPLOT 7022

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 09
Sheet 1 of 1

JOB NUMBER: 000

Scale 1:10



0.00 Dry to Slightly moist, grey, intact, Medium dense, Sandy Silt. **TOPSOIL.**

0.38

Moist, light brown, intact, Dense, Sandy gravel. **RESIDUAL SOIL.**

0.6 *0.60*

Slightly weathered Granite. **BEDROCK.**

1.05 *1.05*

NOTES

1) Roots inclusion from a depth of 0 - 0.3m
2) Stable side walls
3) No water seepage encountered
4) Refusal encountered at 1.05 m
5) Disturbed sample taken at 0.6 - 1.05 m
6) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani
TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021
DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

ELEVATION : 1336m
X-COORD : 28°54'13.27"E
Y-COORD : 25°24'18.87"S

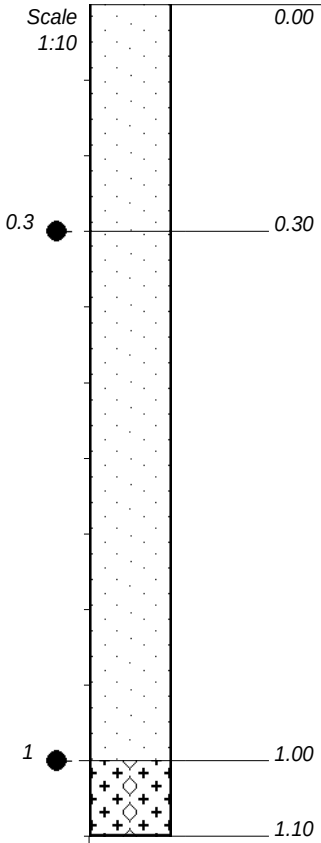
HOLE No: TP 09

dotPLOT 7022

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 10
Sheet 1 of 1

JOB NUMBER: 000



0.00 Dry, grey, intact, Dense, Sandy Silt. **TOPSOIL.**

0.30 Slightly Moist, brownish, intact, Dense, Sandy gravel. **RESIDUAL SOIL.**

1.00 Slightly weathered Granite. **BEDROCK.**

1.10

NOTES

1) Roots inclusion from a depth of 0 - 0.33m
2) Stable side walls
3) No water seepage encountered
4) Refusal encountered at 1.1 m
5) Disturbed sample taken at 0.3 - 1 m
6) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021

ELEVATION : 1348m
X-COORD : 28°54'7.26"E
Y-COORD : 25°24'19.88"S

HOLE No: TP 10

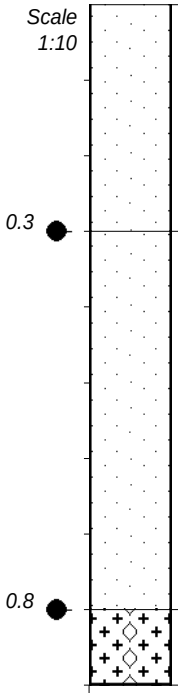
TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 11
Sheet 1 of 1

JOB NUMBER: 000



0.00 Dry to Slightly moist, grey, intact, Medium dense, Sandy Silt. **TOPSOIL.**

0.30 Moist, light brown, intact, Dense, boulders, Sandy gravel. **RESIDUAL SOIL.**

0.80 Slightly weathered Granite. **BEDROCK.**

0.90

NOTES

1) Roots inclusion from a depth of 0 - 0.32m
2) Stable side walls
3) No water seepage encountered
4) Refusal encountered at 0.9 m
5) Disturbed sample taken at 0.3 - 0.8 m
6) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani
TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021
DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

ELEVATION : 1346m
X-COORD : 28°54'24.76"E
Y-COORD : 25°24'4.39"S

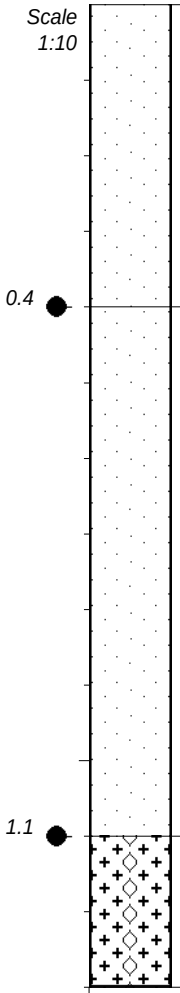
HOLE No: TP 11

dotPLOT 7022

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 12
Sheet 1 of 1

JOB NUMBER: 000



0.00 Dry to Slightly moist, grey, intact, Medium dense, Sandy Silt. **TOPSOIL.**

0.40 Moist, light brown, intact, Dense, boulders, Sandy gravel. **RESIDUAL SOIL.**

1.10 Slightly weathered Granite. **BEDROCK.**

1.30

NOTES

1) Stable side walls
2) No water seepage encountered
3) Refusal encountered at 1.3 m
4) Disturbed sample taken at 0.4 - 1.1 m
5) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021

ELEVATION : 1346m
X-COORD : 28°54'20.29"E
Y-COORD : 25°24'6.59"S

HOLE No: TP 12

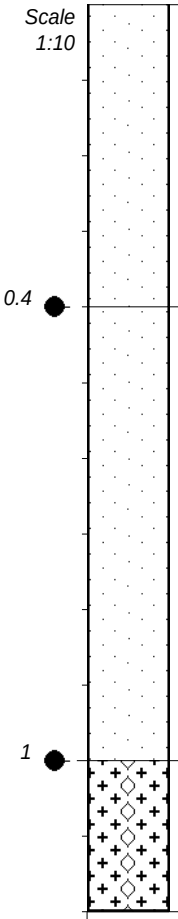
TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 13
Sheet 1 of 1

JOB NUMBER: 000



0.00 Dry to Slightly moist, grey, intact, Medium dense, Sandy Silt. **TOPSOIL.**

0.40 Moist, light brown, intact, Dense, boulders, Sandy gravel. **RESIDUAL SOIL.**

1.00 Slightly weathered Granite. **BEDROCK.**

1.20

NOTES

1) Roots inclusion from a depth of 0 - 0.33m
2) Stable side walls
3) No water seepage encountered
4) No refusal encountered at 1.2 m
5) Disturbed sample taken at 0.4 - 1 m
6) No Undisturbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani
TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021
DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

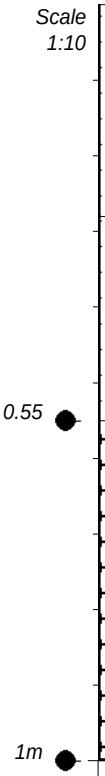
ELEVATION : 1344m
X-COORD : 28°54'14.99"E
Y-COORD : 25°24'8.97"S

HOLE No: TP 13

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 14
Sheet 1 of 1

JOB NUMBER: 000



0.00 — Slightly moist, greyish, intact, Medium dense, Matrix supported, Sandy Silt. **TOPSOIL.**

0.28 — Slightly moist to Moist, light brown, intact, Dense to very dense, Sandy gravel. **RESIDUAL SOIL.**

0.55 — Yellowish slightly weathered Granite. **BEDROCK.**

1.00

NOTES

1) Stable side walls
2) No water seepage encountered
3) Refusal encountered at 1 m
4) Disturbed sample taken at 0.55 - 1m
5) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani
TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021
DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

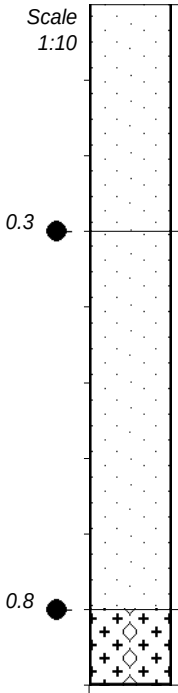
ELEVATION : 1340m
X-COORD : 28°54'10.62"E
Y-COORD : 25°24'13.30"S

HOLE No: TP 14

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 15
Sheet 1 of 1

JOB NUMBER: 000



0.00 Dry to Slightly moist, grey, intact, Medium dense, Sandy Silt. **TOPSOIL.**

0.30 Moist, light brown, intact, Dense, Sandy gravel. **RESIDUAL SOIL.**

0.80 Slightly weathered Granite. **BEDROCK.**

0.90

NOTES

1) Stable side walls
2) No water seepage encountered
3) Refusal encountered at 0.9 m
4) Disturbed sample taken at 0.3 - 0.8 m
5) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani
TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021
DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

ELEVATION : 1339m
X-COORD : 28°54'5.00"E
Y-COORD : 25°24'14.28"S

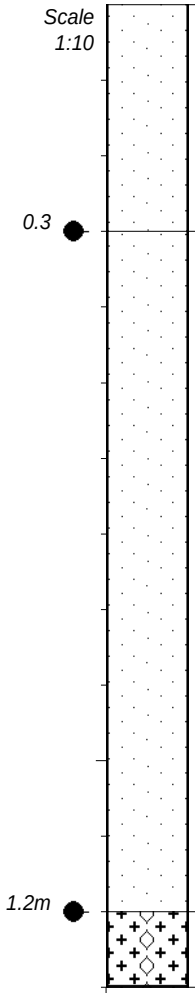
HOLE No: TP 15

dotPLOT 7022

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 16
Sheet 1 of 1

JOB NUMBER: 000



0.00 Dry to Slightly moist, grey, intact, Medium dense, Sandy Silt. **TOPSOIL.**

0.30 Moist, light brown, intact, Dense, Sandy gravel. **RESIDUAL SOIL.**

1.20 Slightly weathered Granite. **BEDROCK.**

1.30

NOTES

1) Stable side walls
2) No water seepage encountered
3) Refusal encountered at 1.3 m
4) Disturbed sample taken at 0.3 - 1.2m
5) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021

ELEVATION : 1344m
X-COORD : 28°54'2.13"E
Y-COORD : 25°24'10.29"S

HOLE No: TP 16

TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

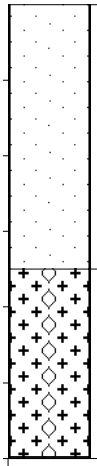
DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 17
Sheet 1 of 1

JOB NUMBER: 000

Scale 1:10



0.00 Slightly moist, light brown, intact, Medium Dense, Sandy Silt. **TOPSOIL.**

0.35 Slightly weathered hardrock granite. **BEDROCK.**

0.60

NOTES

1) Stable side walls
2) No water seepage encountered
3) Refusal encountered at 0.6 m
4) Disturbed sample taken
5) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani
TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021
DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

ELEVATION : 1343m
X-COORD : 28°54'6.25"E
Y-COORD : 25°24'8.01"S

HOLE No: TP 17

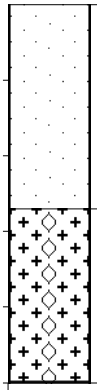
dotPLOT 7022

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 18
Sheet 1 of 1

JOB NUMBER: 000

Scale 1:10



0.00 Slightly moist, light brown, intact, Medium Dense, Sandy Silt. **TOPSOIL.**

0.27 Slightly weathered hardrock granite. **BEDROCK.**

0.50

NOTES

1) Stable side walls
2) No water seepage encountered
3) Refusal encountered at 0.5 m
4) No disturbed sample taken
5) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021

ELEVATION : 1341m
X-COORD : 28°54'10.70"E
Y-COORD : 25°24'5.26"S

HOLE No: TP 18

TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

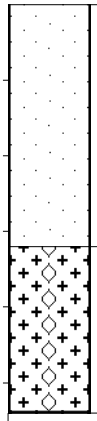
DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 19
Sheet 1 of 1

JOB NUMBER: 000

Scale 1:10



0.00 Slightly moist, light brown, intact, Medium Dense, Sandy Silt. **TOPSOIL.**

0.32 Slightly weathered hardrock granite. **BEDROCK.**

0.54

NOTES

1) Roots inclusion from a depth of 0 - 0.3m
2) Stable side walls
3) No water seepage encountered
4) Refusal encountered at 0.54 m
5) No Disturbed sample taken
6) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021

ELEVATION : 1338m
X-COORD : 28°54'16.16"E
Y-COORD : 25°24'2.02"S

HOLE No: TP 19

TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

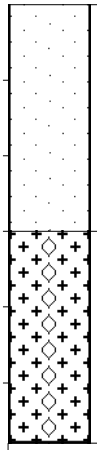
DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 20
Sheet 1 of 1

JOB NUMBER: 000

Scale 1:10



0.00 Slightly moist, light brown, intact, Medium Dense, Sandy Silt. **TOPSOIL.**

0.30 Slightly weathered hardrock granite. **BEDROCK.**

0.58

NOTES

1) Roots inclusion from a depth of 0 - 0.2m
2) Stable side walls
3) No water seepage encountered
4) Refusal encountered at 0.58 m
5) No disturbed sample taken
6) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021

ELEVATION : 1337m
X-COORD : 28°54'20.68"E
Y-COORD : 25°23'59.29"S

HOLE No: TP 20

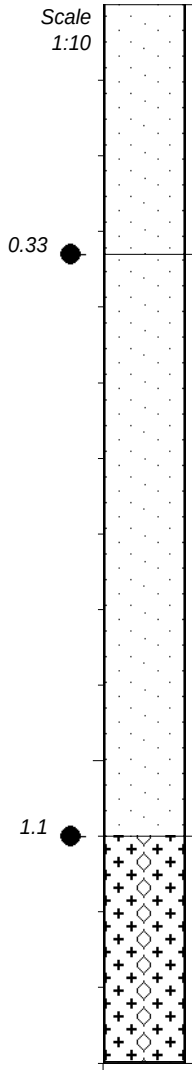
TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 21
Sheet 1 of 1

JOB NUMBER: 000



Slightly moist, grey, intact, Medium dense, Sandy Silt. **TOPSOIL.**

Moist, light brown, intact, Dense, Sandy gravel. **RESIDUAL SOIL.**

Slightly weathered Granite. **BEDROCK.**

NOTES

1) Roots inclusion from a depth of 0 - 0.4m
2) Stable side walls
3) No water seepage encountered
4) Refusal encountered at 1.4 m
5) Disturbed sample taken at 0.33 - 1.1 m
6) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021

ELEVATION : 1333m
X-COORD : 28°54'17.79"E
Y-COORD : 25°23'54.30"S

HOLE No: TP 21

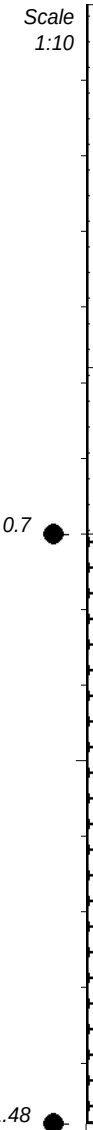
TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 22
Sheet 1 of 1

JOB NUMBER: 000



Scale 1:10

0.00 Dry to Slightly moist, grey, intact, Medium dense, Sandy Silt. **TOPSOIL.**

0.48 Moist, light brown, intact, Dense, Matrix supported, Sandy gravel. **RESIDUAL SOIL.**

0.7 *0.70* Slightly weathered Granite. **BEDROCK.**

1.48 *1.48*

NOTES

1) Roots inclusion from a depth of 0 - 0.43m
2) Stable side walls
3) No water seepage encountered
4) Refusal encountered at 1.48 m
5) Disturbed sample taken at 0.7 - 1.48 m
6) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021

ELEVATION : 1332m
X-COORD : 28°54'12.44"E
Y-COORD : 25°23'57.67"S

HOLE No: TP 22

TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

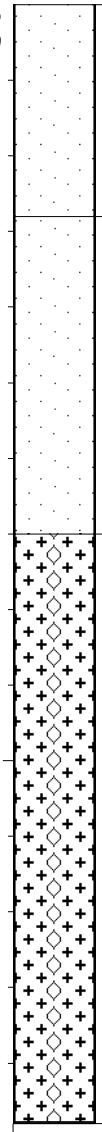
DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 23
Sheet 1 of 1

JOB NUMBER: 000

Scale 1:10



0.00 Slightly moist, grey, intact, Medium dense, Sandy Silt. **TOPSOIL.**

0.28 Moist, light brown, intact, Dense, Matrix supported, Sandy gravel. **RESIDUAL SOIL.**

0.7 *0.70* Yellowish slightly weathered Granite. **BEDROCK.**

1.48 *1.48*

NOTES

1) Roots inclusion from a depth of 0 - 0.44m
2) Stable side walls
3) No water seepage encountered
4) Refusal encountered at 1.48 m
5) Disturbed sample taken at 0.7 - 1.48 m
6) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani
TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021
DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

ELEVATION : 1336m
X-COORD : 28°54'6.71"E
Y-COORD : 25°24'1.41"S

HOLE No: TP 23

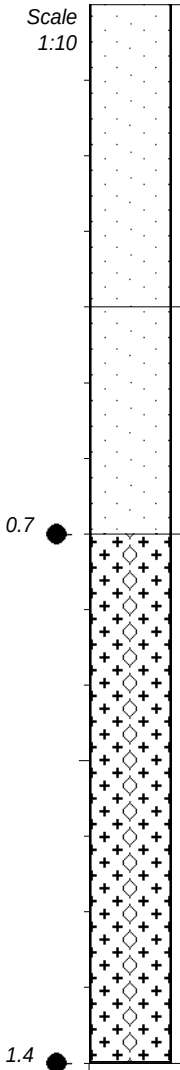
dotPLOT 7022

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 24
Sheet 1 of 1

JOB NUMBER: 000

Scale 1:10



0.00 Dry to Slightly moist, grey, intact, Medium dense, Sandy Silt. **TOPSOIL.**

0.40 Moist, light brown, intact, Dense, Matrix supported, Sandy gravel. **RESIDUAL SOIL.**

0.7 *0.70* Slightly weathered Granite. **BEDROCK.**

1.4 *1.40*

NOTES

1) Roots inclusion from a depth of 0 - 0.4m
2) Stable side walls
3) No water seepage encountered
4) Refusal encountered at 1.4 m
5) Disturbed sample taken at 0.7 - 1.4 m
6) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani
TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021
DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

ELEVATION : 1348m
X-COORD : 28°54'0.47"E
Y-COORD : 25°24'4.07"S

HOLE No: TP 24

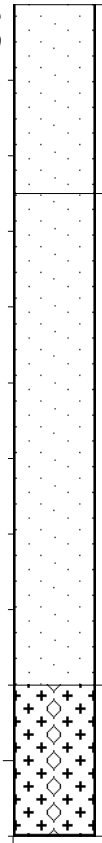
dotPLOT 7022

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

HOLE No: TP 25
Sheet 1 of 1

JOB NUMBER: 000

Scale 1:10



0.00 Dry, light brown, intact, Medium dense to dense, Sandy Silt. **TOPSOIL.**

0.25 *0.25*

Slightly Moist, light brown, intact, Dense, Matrix supported, Sandy gravel. **RESIDUAL SOIL.**

0.9 *0.90*

Slightly weathered Granite. **BEDROCK.**

1.10

NOTES

1) Roots inclusion from a depth of 0 - 0.4m
2) Stable side walls
3) No water seepage encountered
4) Refusal encountered at 1.1 m
5) Disturbed sample taken at 0.25 - 0.9 m
6) No Unditurbed sample taken

CONTRACTOR :
MACHINE : Tractor Loader Backhoe (TLB).
DRILLED BY :
PROFILED BY : Mavhetha Lavhelesani
TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : 0.7 m
DATE :
DATE : 09/04/2021
DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

ELEVATION : 1349m
X-COORD : 28°53'58.08"E
Y-COORD : 25°24'7.04"S

HOLE No: TP 25

dotPLOT 7022

Nkanivo Development Consultant
Phase 1 Near surface geotechnical investigation

LEGEND
Sheet 1 of 1

JOB NUMBER: 000

	SANDY	{SA05}
	GRANITE	{SA17}{SA44}
	DISTURBED SAMPLE	{SA38}

Name

CONTRACTOR :
MACHINE :
DRILLED BY :
PROFILED BY :

INCLINATION :
DIAM :
DATE :
DATE :

ELEVATION :
X-COORD :
Y-COORD :

TYPE SET BY : Mavhetha Lavhelesani
SETUP FILE : STANDARD.SET

DATE : 21/04/2021 15:06
TEXT : ..00\Examples\Examples.TXT

LEGEND
SUMMARY OF SYMBOLS

dotPLOT 7022