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CONSULTING EARTH SCIENTISTS

Geotechnical Investigations
Hydrogeological Investigations
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Dolomite Stability Investigations
NHBRC Classifications

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REPORT TO UKUZA CONSULTING ON THE RESULTS OF A GEOTECHNICAL INVESTIGATION FOR THE PROPOSED SAMORA MACHEL POLICE STATION ON ERF 9085 A, PORTION 8972, CAPE TOWN, WESTERN CAPE

GG001-24.R01
19 March 2024

Revision 1

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Ukuza Consulting

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MSc Geohydrology

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AASHTO	American Association of State Highway and Transportation
begl	Below existing ground level
CBR	California Bearing Ratio
DCP	Dynamic Cone Penetrometer Test
E	East
GM	grading modulus
IMC	insitu moisture content
kN/m²	kilonewtons per metre square
LL	liquid limit
LS	linear shrinkage
GG	Gevorkyan Geophysics Pty Ltd
m	metre (s)
MDD	maximum dry density
mm	millimetre
No.	number
N	North
OMC	optimum moisture content
PI	plasticity index
SANS	South African National Standards
S	South
TP	Test Pits
TRH	Technical Recommendations for Highways (1985)

Document Control and Approvals		
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Geotechnical Practitioner	**SACNASP No**	**Signature**
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1. TERMS OF REFERENCE FOR THE PROJECT

Gevorkyan Geophysics Pty Ltd (GG) was requested by Ukuza Consulting to carry out a geotechnical investigation for the proposed Samora Machel Police Station in Cape Town, Western Cape.

Gevorkyan Geophysics has proposed to carry out the following:

- Handtools excavated inspections pit.
- Dynamic cone penetration tests.
- Sampling of soil for further laboratory testing.
- Prepare a geotechnical report.

This geotechnical report referenced **GG001-24.R01** provides the results of the geotechnical investigation and provides recommendations in terms of subgrade materials, foundations, slope stability, excavatability, earthworks, stormwater drainage, and material usage.

2. CODES OF PRACTICE AND STANDARDS

The services were carried out in accordance to the current level of geotechnical standards practiced by professional in Southern Africa.

The document referenced for use is "*Site Investigation Code of Practice, 1st Edition, South African Institution of Civil Engineering – Geotechnical Division, January, 2010*"

The nature of geotechnical engineering is such that variations in soil conditions may occur even where sites seem to be consistent. Variations from what is reported here may become evident during construction and it is thus imperative that an appropriately qualified and experienced competent person inspects all critical stages of development including, but not limited to excavations, to ensure that conditions at variance with those predicted do not occur and to undertake an interpretation of the facts supplied in this report.

It is possible that certain indications of ground stability, contamination, or groundwater levels were latent or otherwise not visible. Opinions are based on what was visible at the time the investigation was conducted.

3. INFORMATION SOURCES

The following information was utilized for the project:

i. A regional geological map titled "*3318 Cape Town*", dated 1988 and prepared by the Council for Geoscience to a scale of 1:250 000.

ii. Low-resolution satellite imagery sourced from Google Earth (2024).

4. INVESTIGATION ACTIVITIES

The field portion of the investigation was carried out from 14th to 16th February 2024 and comprised the following:

a. Excavation of test pits.
b. CBR Dynamic Cone Penetrometer (DCP) testing.
c. Percoaltion Test.

4.1 Test Pitting and Profiling

Twenty-two test positions were investigated within the study area. The test positions have been designated by prefixes TP01 to TP22. The test pits were excavated by hand tools to approximate final depths in the range 0.15m to 2.8m below existing ground level (begl).

The test pits were profiled in accordance to the South African Geoterminology Guidelines (Brink and bruin, 2002). The test pit profiles are given in Appendix A at the end of this report.

4.2 DCP Testing

DCP tests were carried out adjacent to each test pit and a total of twenty-two DCP tests were completed. The DCP tests have been designated by prefixes DC01 to DC22 extended to approximate refusal/final depths in the range 0.1m to 2.0m begl. The DCP test results are given in Appendix B at the end of this report.

4.3 Percolation Test

A percolation test was carried out on site and is designated PT01 (TP19) and was done in accordance with SABS 0400 (1990) which is to determine subsoil percolation rates for the disposal of wastewater effluent by percolation methods.

5. DESCRIPTION OF THE STUDY AREA

The site is located in Cape Town, within a suburb of Weltevreden Valley North. The latitude and longitude of the central portion of the site is 34.01748 S and 18.57228 E. The site comprises an existing police station with prefabricated buildings and ablution facilities. Portions of the existing police station site are paved and remaining portions are covered by concrete. The western portion of the site comprises a vacant plot of land that is covered by grassed vegetation and is partially fenced off. Sophumelela Secondary school is located next to the site and forms the western most boundary.

Access to the site is along Oliver Tambo Drive and Bathandwa Mdingi Crescent which link to the M7.

The locality of the study area is shown in Figure 1 and site layout in Figure 2 with test pit positions.

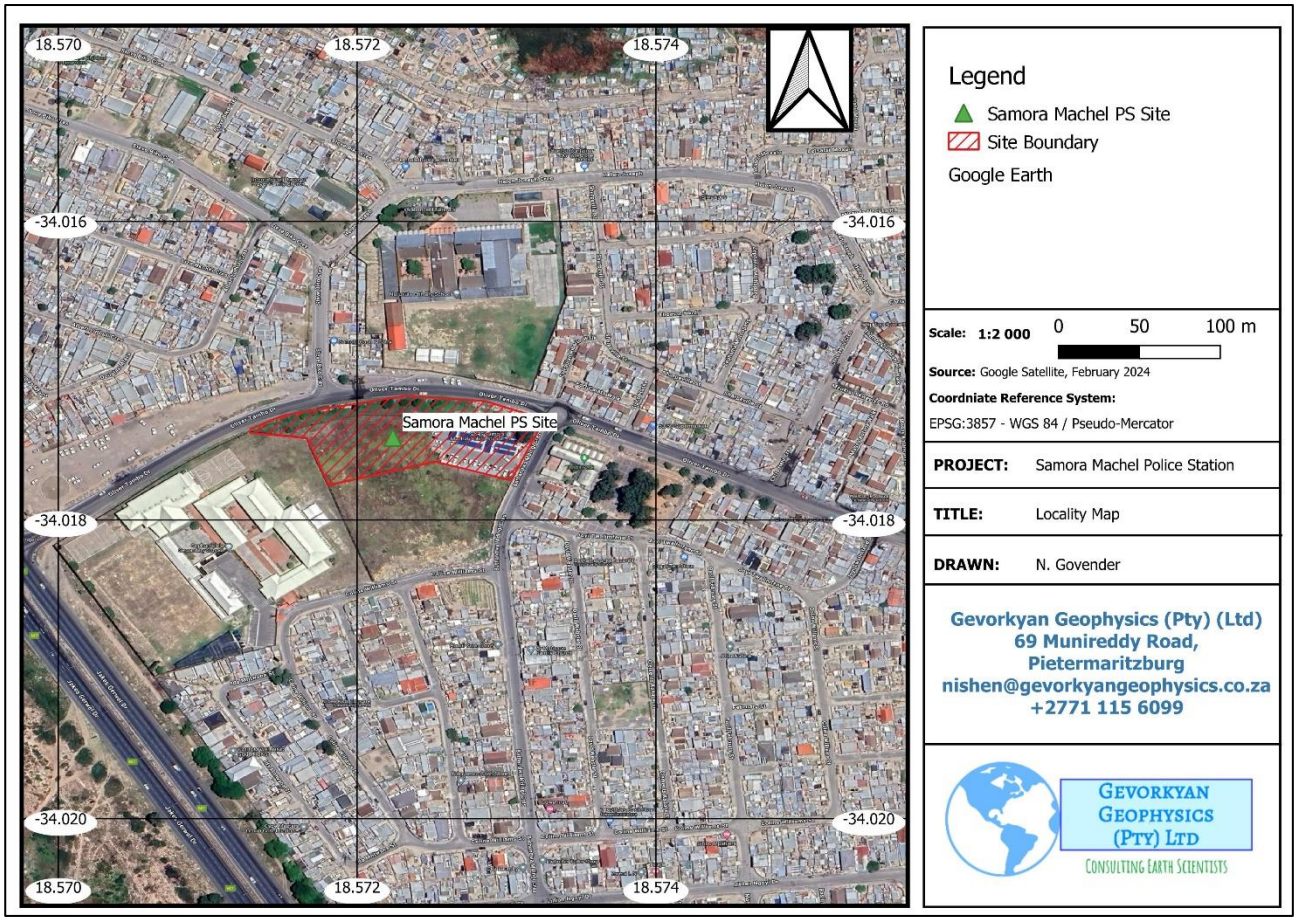

Figure 1: Locality of the site

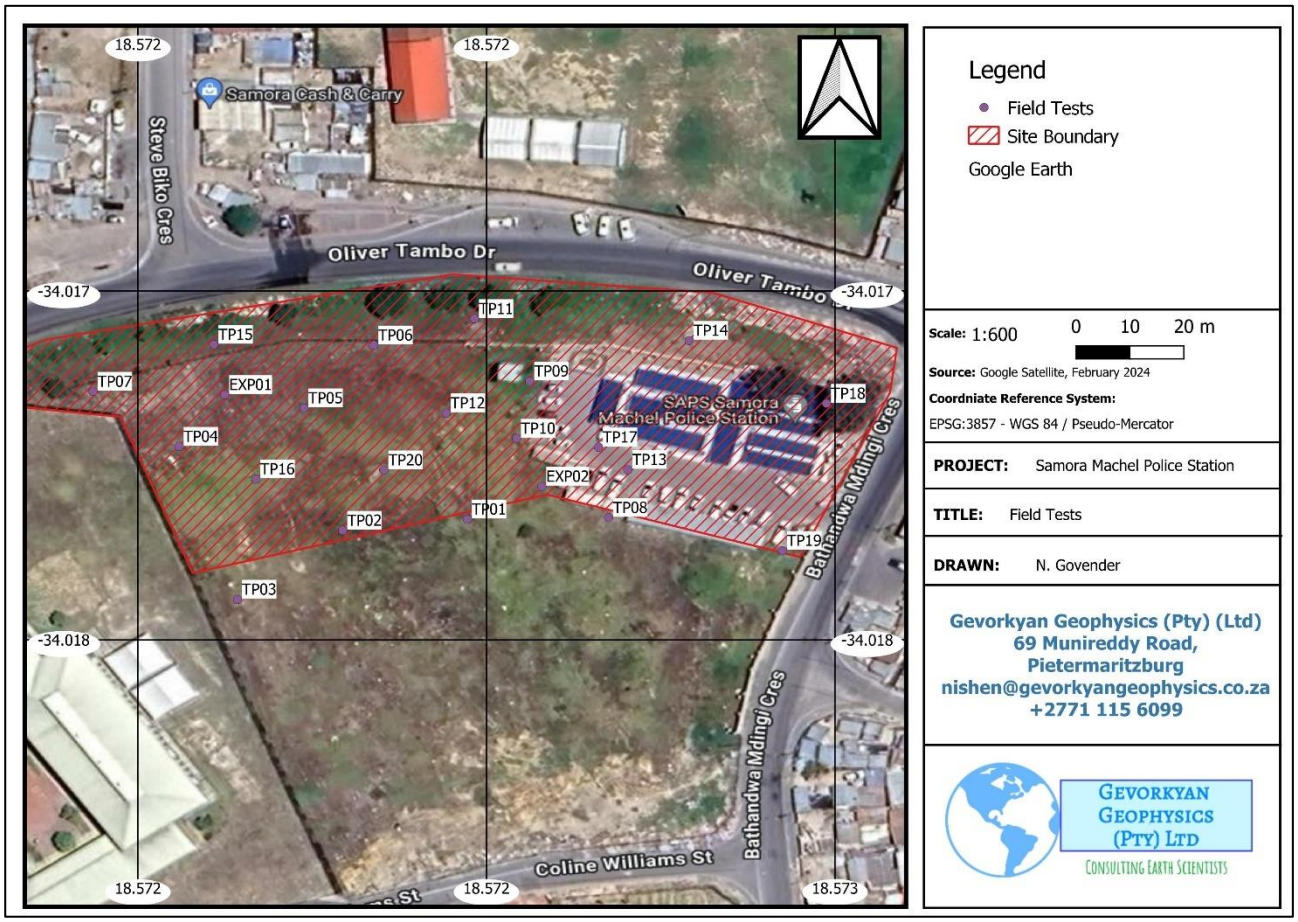

Figure 2: Location of Field Test Positions

Photographs 1 to 3 provide general views of the site.

Photograph 1: General view of the site

Photograph 2: General view of the site

Photograph 3: General view of the site

6. GENERAL GEOLOGY OF THE SITE

According to the regional geological map of the area "*3318 Cape Town*" (Refer to Figure 3), the area is underlain by Quaternary aged aeolian deposits which are generally sandy by nature. The police station site is inferred to be underlain by Witzand Formation unconsolidated white sand and calcareous dune sand.

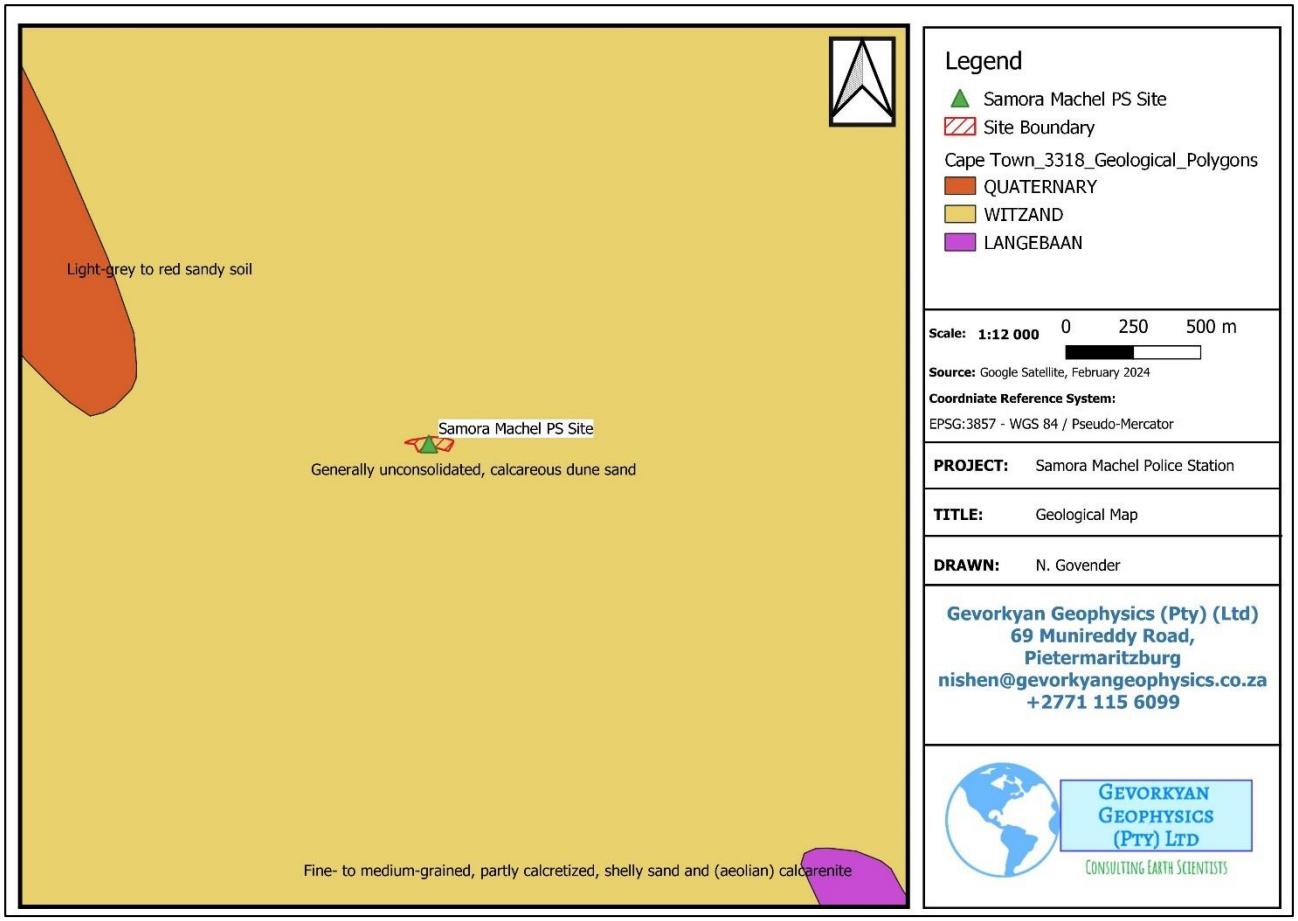

Figure 3: Geological Map of the study area "3318 Cape Town"

The positions investigated comprised Fill and aeolian soils.

The materials, in general, can be described as follows:

a) **Fill** – Material can be described as slightly moist, light to yellow brown, loose to medium dense to dense, fine to coarse grained, with gravel, rubble and boulders, clayey GRAVEL to gravelly SAND. The fill material varied across the site and detailed descriptions are given in the test pit profiles. The fill material generally extended to approximate depths in the range 0.2m to 2.0m begl.

b) **Aeolian Layer 1** – Material can be described as slightly moist to wet light brown to greyish brown, loose, fine grained, silty SAND.

c) **Aeolian Layer 2 (Lithified Dune Sands)** – Material can be described as slightly moist, yellowish to orange brown, medium dense to dense, fine grained, pinholed, silty SAND.

The aeolian material extended to approximate final depths in the range of 0.3m to 2.0m begl.

Based on information from previous studies in the area, the sandy materials extend to at least 20m begl.

Photographs of subsurface profiles observed in the test profiles are given in Photographs 4 to 6.

Photograph 4: Material Encountered in TP01

Photograph 5: Material Encountered in TP04

Photograph 6: Material Encountered in TP13

7. GROUNDWATER

Groundwater seepage was encountered on site at depths in the range 1.7m to 2.5m begl. This is the elevated groundwater condition that is known as a perched groundwater condition.

Table 1 below shows the groundwater level within each field test pit.

Table 1: Summary of Groundwater Levels in the test pits

Groundwater Levels in Field Tests		
Test Pit No.	**Water Level (mbegl)**	**Rate**
TP01	2.5	Moderate
TP06	2.1	Moderate
TP08	2.0	Moderate
TP09	1.7	Moderate
TP13	1.8	Moderate

It must be noted that groundwater activity is, however, generally expected across the entire site on an intermittent / periodic basis and is also likely to fluctuate as a result of seasonal rainfall patterns.

It is advised that a contingency amount be allocated in the construction bill for subsoil drainage, should this be required.

8. SOIL LABORATORY RESULTS

The following tests were carried out on insitu soil samples to determine the engineering properties:

i) Grading Analysis, Atterberg Limits.
ii) Moisture Content.
iii) CBR.
iv) Modified AASHTO.
v) Hydrometer.
vi) pH and Conductivity.

The results of the laboratory tests are given in Appendix C and summarized in Table 2.

Table 2: Summary of Results of Grading Analysis, Atterberg Limit Determinations, and material classifications

Sample No.	TP01	TP02	TP06	TP07	TP09
Depth (m).	2,0-2,8	0,4-1,2	0,55-2,1	0,3-0,7	0,6-2,0
Description of Sample	Aeolian	Fill	Aeolian	Aeolian	Aeolian
Classification	Jennings				
CLAY	5,00	9,00	8,00	6,00	4,00
SILT	9,00	16,00	16,00	8,00	6,00
SAND	86,00	69,00	76,00	86,00	90,00
GRAVEL	0,00	7,00	0,00	0,00	0,00
LL%	17,50	18,00	15,80	15,00	16,80
P.I.	NP	NP	NP	NP	NP
LS%	NP	NP	NP	NP	NP
Van Der Merwe Swell	Low	Low	Low	Low	Low
Clay Activity Index (AI)	0,00	0,00	0,00	0,00	0,00
Moisture Content (%)	9,90	3,60	13,20	5,40	8,50
GM	1,00	0,98	0,92	1,10	1,15
COLTO	-	Poorer than G10	Poorer than G10	-	-
USCS	SC	SC	SC	SC	SC
AASHTO	A-2-4	A-2-6	A-2-4	A-2-6	A-2-4
Degree of Corrosivity					
pH	7,9	8,00	8,2	8,1	8,2
EC (S/m)	0,0188	0,0173	0,0185	0,0173	0,0165
Resistivity (ohms/cm)	5319	5780	5405	5780	6061
Corrosivity	Moderately Corrosive	Moderately Corrosive	Moderately Corrosive	Moderately Corrosive	Moderately Corrosive

Corrosivity is calculated using the conductivity of the sample. The results are converted to Ohms for resistivity and corrosivity is determiend based on the wenner four pin method (ASTM G57 / SABS 0199-1985)

LL - Liquid Limit GM - Grading Modulus PI - Plasticity Index LS - Linear Shrinkage

SC – Unified Soil Classification A-2-6 - AASHTO Classification

9. DISCUSSION

9.1 Proposed Development

Information provided to Gevorkyan Geophysics indicates that development will be constructed across the site with single storey structures.

However, the design details are not known at present, and it is understood that foundation pressures between 50 kPa and 80 kPa (50 and 80 kN/m^2) are anticipated for the site but not greater than 100 kPa.

9.2 Site Stability

No signs of inherent ground instability such as slip scars, tension cracks or major sloughing of the mantle of transported soils were evident during the fieldwork. In addition, no known landslides were noted to occur on the site at the time of the investigation.

The site is generally considered to be stable, and the proposed development does not appear to pose a risk to the current stability. However, it is recommended that good sound engineering practices be carried out for the proposed development.

Areas of shallow groundwater conditions should be avoided as these are likely to increase foundation solution costs. There is a risk for an elevated groundwater condition on site and adequate engineering measures should be implemented to mitigate these hazards. It is strongly advised that subsurface drainage be implemented along weakly drained areas.

To maintain the stability of the site, it is imperative that adequate site drainage measures are implemented.

The soils on site are considered susceptible to erosion/sloughing by uncontrolled stormwater runoff and it is important that adequate erosion prevention controls are implemented at the site.

Although the site in general is classified as stable, documented inspections by a geotechnical professional should be carried out to confirm stability of excavations.

9.3 General Earthworks

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

Where possible, the lowering of ground levels is to be avoided to reduce the risk of encountering problematic shallow groundwater seepage anticipated to occur intermittently within 1.0m begl. Where this is not feasible, allowance is to be made for suitable subsoil drainage to engineer's detail.

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

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

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

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

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

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

Cut and fill heights greater than the heights and configurations specified above would need to be inspected and approved by an engineering geologist or geotechnical engineer.

Workers should not enter any excavations deeper than 1.5m that are not shored or battered back as described above, as sidewalls in the low strength soils resembling those encountered on site will be prone to collapse. All excavations must be inspected daily by a competent person and records must be kept. It remains the

responsibility of the Contractor/Developer to comply with the current requirements of the Occupational Health and Safety Act.

9.4 The Trechability/Excavatability on Site

The excavations have been assessed based on SANS 1200 (Latest version). Based on the results of the field investigation, it is inferred that the subsurface classifies as soft excavation down to the final depths of the field tests (TP and DCP results refers).

In such instances, it is considered that the material may be easily excavated by a tractor loader backhoe (TLB).

However, due to likely geological variations, such as boulders, cobbles, or medium dense layers it is also possible that intermediate to hard excavations may be encountered at a shallower depth. Therefore, a contingency amount is recommended in the construction budget.

9.5 Classification of Material and Recommended Usage

The subgrade materials underlying the existing site have been classified in terms of their suitability for use in construction based on field observations and laboratory testing.

The laboratory results indicate that the samples do not classify as good subgrade material. All samples analysed are poorer than G10. Thus, material will need to be imported to the site.

The above should be used as a guideline only and should be confirmed by further testing on site during construction as part of process and acceptance control monitoring, prior to the material being considered for use in construction.

Further testing is only advised should the engineers want to utilize the materials on site for construction purposes.

9.6 General Subgrade Layerworks Guidelines

The design of the pavement layer works has not be finalized at time of reports and should be discussed with Gevorkyan Geophysics when available.

In terms of CBR % based on DCP results, due to the variation of materials on site, the best representation would be DCP 13. The fill material show CBR% ranging from 8% to 35%. The aeolian soils are more consistent with CBR% between 2% and 5%.

Refer to DCP results for pavement design information.

The following is a general guideline:

a) If materials that are considered to be poor in quality are encountered on site, the material will need to be undercut and replaced by suitable granular material meeting the design engineers' requirements.

b) Soils that meet the design engineers' requirements maybe ripped to the specified depth and recompacted to 93% Modified AASHTO maximum dry density to ±2% Optimum Moisture Content (OMC).

c) Should the subgrade comprise weathered bedrock, it is recommended that the weathered bedrock be ripped to a minimum depth as prescribed by the engineer and recompacted to at least 93 % Modified AASHTO dry density.

d) The pavement formation layer should be designed taking into account anticipated traffic loads, volumes and design life of the parking area and roads.

The COLTO and SANRAL documents are good guidelines to assist with the design of pavements.

9.7 Founding Characteristics of the Site

The founding conditions encountered on site are inferred to comprise the following:

a) Soils that are potentially collapsible by nature.

b) Loose materials that may experience excessive settlements.

c) Shallow groundwater seepage.

9.8 Bearing Capacity and Settlements for Subsurface Materials

The bearing capacity of the soils are based on the material type and DCP results. The following is given based on the available information and field testing at the site (guided by DCP and literature data as shown in Table 2):

- 0 to 2.0m – very loose to loose soils with approximately 29° shear strength.

Table 3: Strength of Soils based on Table 5.10 from Look, B, Handbook of Geotechnical Investigations and Designs (2007)

Table 5.10 Soil and rock parameters from DCP data.

Material	*Description*	*DCP – n (Blows/100 mm)*	*Strength*
Clays	V. Soft	0–1	$C_u = 0–12$ kPa
	Soft	1–2	$C_u = 12–25$ kPa
	Firm	2–3	$C_u = 25–50$ kPa
	Stiff	3–7	$C_u = 50–100$ kPa
	V. Stiff	7–12	$C_u = 100–200$ kPa
	Hard	>12	$C_u > 200$ kPa
Sands	V. Loose	0–1	$\phi < 30°$
	Loose	1–3	$\phi = 30–35°$
	Med dense	3–8	$\phi = 35–40°$
	Dense	8–15	$\phi = 40–45°$
	V. Dense	>15	$\phi > 45°$

Tables 3 and 4 below provide a summary of the bearing capacity of the soil and associated settlements. The analysis was done by a specialist programme developed by the Department of Geophysical Engineering at Istanbul University (updated 2009).

The bearing capacity calculations were done assuming foundations are placed at a depth of between 1.5m and 2.0m begl, a width of 1.0m and length of 1.0m. Based on the standard engineering practice a factor of safety (FOS) of 3 is best suited for all engineering designs and the bearing capacity of the soil at a depth of 1.5m should be restricted to between 40 kPa and 45 kPa (40 kN/m^2 and 45 kN/m^2) as shown in Table 3. Based on DCP results the bearing capacity of the aeolian soils should be approximately 25 kPa, there is a consensus with calculations and DCP results that the soils have a low bearing capacity.

Based on settlement calculations for each of the foundation pressures using various methods as shown and summarised in Table 4, average settlements are less than 25mm.

Table 4: Bearing Capacity of the Soil

Bearing Capacity of Soils (Terzaghi, 1943)	**Factor Of Safety (FOS)**	
	FOS = 2	**FOS = 3**
Foundation Type	**Bearing Capacity**	
Strip Foundation	60	40
Rectangular Foundation	59	40
Circular Foundation	55	37
Square Foundation	59	40
Bearing Capacity of Soils (Meyerhof, 1963)		
Bearing Capacity	64	46
Bearing capacity in kPa		

Table 5: Settlements of Soils

	Applied Pressure (kPa)		
	40	**60**	**80**
Method	**Immediate Settlement (mm)**		
Burland and Burbrigde (1985) (Immediate settlement Coarse Grained Soils)	3	5	10
Settlement Calculations (mm)			
Burland and Burbrigde (1985) (Flexible)	12	17	22
Burland and Burbrigde (1985) (Rigit)	8	12	15
Bowles (1977)	9	13	17
Meyerhof (1974)	11	17	22
Meyerhof (1965)	14	21	28
Terzaghi and Peck	9	13	17
Average	**10,50**	**15,50**	**20,17**

9.9 Foundation Solution

Based on the results of the geotechnical investigation, the soil on site cannot accommodate structures with loads greater than 45 kN/m^2 and thus it is recommended that ground improvement be carried out. The aeolian soils vary in consistency with depth and will lead to bearing capacity failure if foundations are placed on insitu soils.

Based on discussions with the engineer and the anticipated structural designs and anticipated foundation loads, it is recommended that all foundations be placed on improved ground.

Any structures founded on the site will require ground improvement. Ground improvement can accommodate for bearing pressures between 100 kPa to 150 kPa (100 kN/m^2 to 150 kN/m^2) but need to be adequately designed by an engineer.

The following methodology could be adopted as to guide budgeting, engineering design and construction:

a) Grub the site to remove soils with organic content.
b) Remove the insitu material to a depth and width of 1.5 times the width of foundation from the underside of the proposed foundation.
c) Backfill the excavation with suitable material of at least G6 or better quality.
d) The material is to be compacted in a maximum of 150mm layers to 95% Mod AASHTO density at -1% to +1% of OMC.
e) Foundations should not be embedded deeper than 1.0m below final platform level ensuring that there is at least 1.0m of engineered structural gravel as specified above beneath the footing foundation.
f) Provided the above is carried out, a maximum net allowable bearing pressure of 150kN/m^2 is considered applicable for spread or strip footing foundations.

For net permissible foundation pressures not greater than 150kN/m^2, foundations placed on improved ground developed as specified above is likely to experience total theoretical settlements between 10mm to 15mm, with differential settlement taken at 50% of total settlement.

The above ground improvement is only a guide and it is strongly recommended that a detailed design be carried out by a design-engineer and constructed to engineers detail.

The materials on site are also corrosive towards steel and concrete and this should be considered in the engineering designs.

It is a requirement that prior to casting any concrete in the foundation trenches, all loose material needs to be removed.

It is a requirement that all foundations are inspected and approved by a geotechnical specialist such as Gevorkyan Geophysics Pty Ltd.

All foundations will need to be designed strictly to engineers' detail and adequately reinforced taking into consideration the founding conditions of the site.

9.10 Drainage and Stormwater Guidelines

To maintain stability of the site, it is important to control the movement of both surface and groundwater.

Adequate drainage measures need to be implemented to prevent any ponding occurring within the site during and post construction.

Subsoil drainage is required on site due to the elevated groundwater condition.

All stormwater arising from the roof and paved areas are to be piped to either discharge off-site into a municipal stormwater connection facility, if available. If this is not available, the feasibility of piping all stormwater from the completed development into an on-site stormwater subsoil percolation disposal system to engineer's detail is to be confirmed in consultation with the geotechnical professional as part of a supplementary geotechnical investigation.

As good practice, to limit maintenance and to promote foundation stability, the finished ground surfaces should be graded away from the structures to facilitate drainage of surface water runoff rapidly and effectively away from the building perimeter.

The practice of flower beds adjacent to the building perimeter layout is likewise to be discouraged.

9.11 Percolation Results

The results of the percolation test are summarized in Table 6. The percolation test was done at the lowest point of the site.

Table 6: Summary of Percolation Test Results

Time (Minutes)	Drop in Water Level in mm
	PT1 (TP19)
0	300
5	195
10	150
15	125
20	100
25	70
30	0
35	-
Depth of percolation test (m begl)	0.7-1.0
Percolation rate – average time (minutes) for a 25 mm fall in test water level	5
Rate of application of effluent to subsoils (l/m^2 of soakpit wall area / day)	95

The soils evaluated are considered suitable in terms of the soil percolation rate for on-site disposal of stormwater by subsoil percolation as per requirements of SABS 0400 (1990).

10. CONCLUDING REMARKS

This report was prepared to assist with understanding the subsurface information for the site in terms of geotechnical properties.

The site is underlain by fill and aeolian soils.

Groundwater seepage was encountered on site and it is recommended that subsoil drainage be carried out across the site as the risk for groundwater interference is considered high.

All construction activities will need to be carried out strictly in accordance with SANS 1200 (current version).

The foundation designs are given in sections 9.7 to 9.9. It is strongly advised that all foundations are placed on improved ground.

The ground conditions given in this report refer specifically to the field tests carried out on site. It is therefore, quite possible that conditions at variance with those given in this report may be encountered elsewhere on site during construction.

The site is considered as stable for the development from a geotechnical perspective. There is no geotechnical issues towards the environment from the proposed development.

It is therefore recommended that a geotechnical practitioner be appointed to carry out periodic inspections during construction.

11. REFERENCES

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GEVORKYAN GEOPHYSICS (PTY) LTD

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APPENDIX A: TEST PIT PROFILES

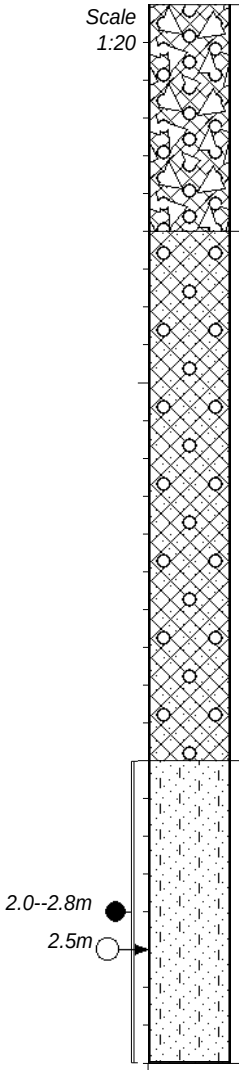
GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP01
Sheet 1 of 1

JOB NUMBER: GG001-24

Scale 1:20



0.00 Slightly moist, light yellowish brown, dense, fine grained, clayey GRAVEL with rubble and bricks - Fill.

0.60 Slightly moist, light brown, loose, fine grained with rock fragments, gravelly SAND - Fill.

2.00 Slightly moist to wet, light greyish brown, loose, fine grained, silty SAND - Aeolian.

2.80

NOTES

1) Final depth at 2.8m.
2) Auger penetration difficult through water seepage.
3) Sample at 2.0--2.8m.
4) Groundwater seepage at 2.5m.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender
TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024
DATE : 26/02/2024 19:58
TEXT : ..aMachel\Pits\GG00124.TXT

ELEVATION : 035
X-COORD : 18.57235
Y-COORD : -34.01766

HOLE No: TP01

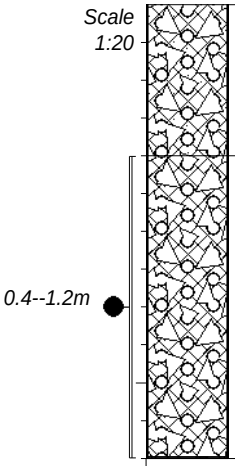
GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP02
Sheet 1 of 1

JOB NUMBER: GG001-24

Scale 1:20



0.00 Slightly moist, dark brown, dense, medium to coarse grained, sandy GRAVEL with rubble and bricks - Fill.

0.40 Slightly moist, yellowish brown, medium dense, medium to coarse grained with rubble, clayey GRAVEL - Fill.

1.20

NOTES

1) Refusal at 1.2m on fill.
2) Sample at 0.4--1.2m.
3) Groundwater seepage not encountered.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender
TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024
DATE : 26/02/2024 19:58
TEXT : ..aMAchel\Pits\GG00124.TXT

ELEVATION : 033
X-COORD : 18.57210
Y-COORD : -34.01767

HOLE No: TP02

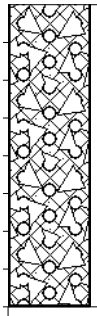
GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP03
Sheet 1 of 1

JOB NUMBER: GG001-24

Scale 1:20



0.00 Slightly moist, dark brown, dense, medium to coarse grained, sandy GRAVEL with rubble and bricks - Fill.

0.80

NOTES

1) Refusal at 0.8m on fill.

2) Groundwater seepage not encountered.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender
TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024
DATE : 26/02/2024 19:58
TEXT : ..aMAchel\Pits\GG00124.TXT

ELEVATION : 032
X-COORD : 18.57190
Y-COORD : -34.01781

HOLE No: TP03

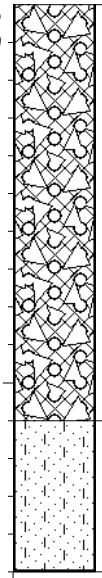
GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP04
Sheet 1 of 1

JOB NUMBER: GG001-24

Scale 1:20



0.00 Slightly moist, light to yellowish brown, dense, fine grained, clayey GRAVEL with rubble and bricks - Fill.

1.10 Slightly moist to wet, light greyish brown, loose, fine grained, silty SAND - Aeolian.

1.50

NOTES

1) Final depth at 1.5m.
2) Collapsing side walls.
3) Groundwater seepage not encountered.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender
TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024
DATE : 26/02/2024 19:58
TEXT : ..aMachel\Pits\GG00124.TXT

ELEVATION : 033
X-COORD : 18.57178
Y-COORD : -34.01751

HOLE No: TP04

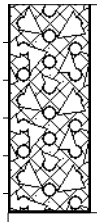
GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP05
Sheet 1 of 1

JOB NUMBER: GG001-24

Scale 1:20



0.00 Slightly moist, dark brown, dense, medium to coarse grained, sandy GRAVEL with rubble and bricks - Fill.

0.55

NOTES

1) Refusal at 0.55m on fill.

2) Groundwater seepage not encountered.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024

ELEVATION : 032
X-COORD : 18.57203
Y-COORD : -34.01743

HOLE No: TP05

TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

DATE : 26/02/2024 19:58
TEXT : ..aMAchel\Pits\GG00124.TXT

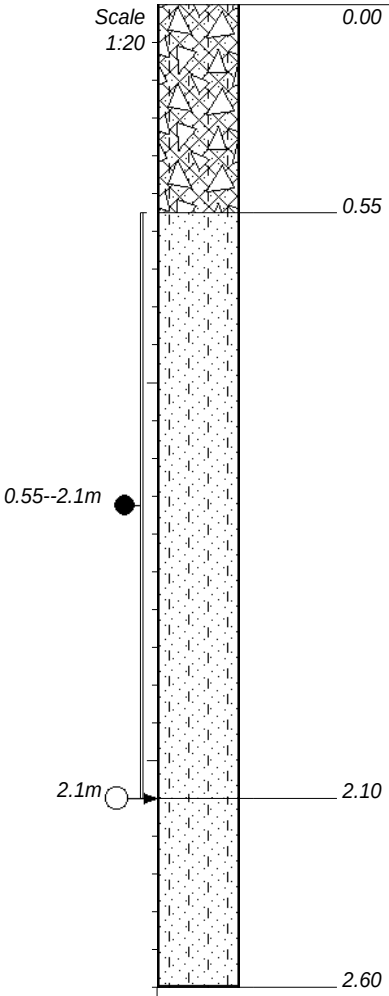
GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP06
Sheet 1 of 1

JOB NUMBER: GG001-24

Scale 1:20



0.00 Slightly moist, light greyish brown, loose, fine grained, silty SAND with rubble and bricks - Fill.

0.55 Slightly moist to moist, light to dark greyish brown, loose, fine grained, silty SAND - Aeolian.

2.10 Moist to wet, dark greyish brown, loose, fine grained, silty SAND - Aeolian.

2.60

NOTES

1) Final depth at 2.6m.
2) Auger penetration difficult through water seepage.
3) Sample at 0.55--2.1m.
4) Groundwater seepage at 2.1m.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender
TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024
DATE : 26/02/2024 19:58
TEXT : ..aMAchel\Pits\GG00124.TXT

ELEVATION : 039
X-COORD : 18.57217
Y-COORD : -34.01729

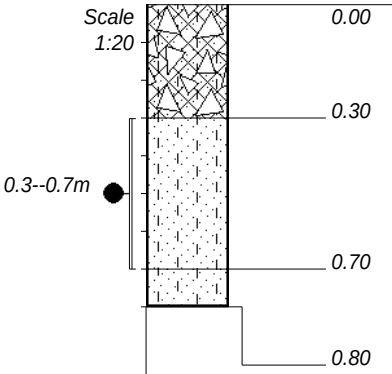
HOLE No: TP06

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP07
Sheet 1 of 1

JOB NUMBER: GG001-24



0.00 Slightly moist, light greyish brown, loose, fine grained, silty SAND with rubble and bricks - Fill.

0.30 Slightly moist to moist, light to dark greyish brown, loose, fine grained, silty SAND - Aeolian.

0.70 Slightly moist, yellowish brown, medium dense to dense, fine grained, silty SAND - Aeolian.

0.80

NOTES

1) Refusal at 0.8m on dense layer.

2) Sample at 0.3--0.7m.

3) Groundwater seepage not encountered.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender

TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024

DATE : 26/02/2024 19:58
TEXT : ..aMAchel\Pits\GG00124.TXT

ELEVATION : 033
X-COORD : 18.57160
Y-COORD : -34.01739

HOLE No: TP07

GEVORKYAN GEOPHYSICS (PTY) LTD
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Ukuza Consulting
Samora Machel Police Station

HOLE No: TP08
Sheet 1 of 1

JOB NUMBER: GG001-24

Scale 1:20

0.00 Slightly moist, light yellowish brown, dense, fine grained, clayey GRAVEL with rubble and bricks - Fill.

0.50 Slightly moist, light brown, loose, fine grained with rock fragments, gravelly SAND - Fill.

1.50 Slightly moist to wet, light greyish brown, loose, fine grained, silty SAND - Aeolian.

2.20

NOTES

1) Final depth at 2.2m.
2) Auger penetration difficult through water seepage.
3) Groundwater seepage at 2.0m.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender
TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024
DATE : 26/02/2024 19:58
TEXT : ..aMachel\Pits\GG00124.TXT

ELEVATION : 031
X-COORD : 18.57265
Y-COORD : -34.01764

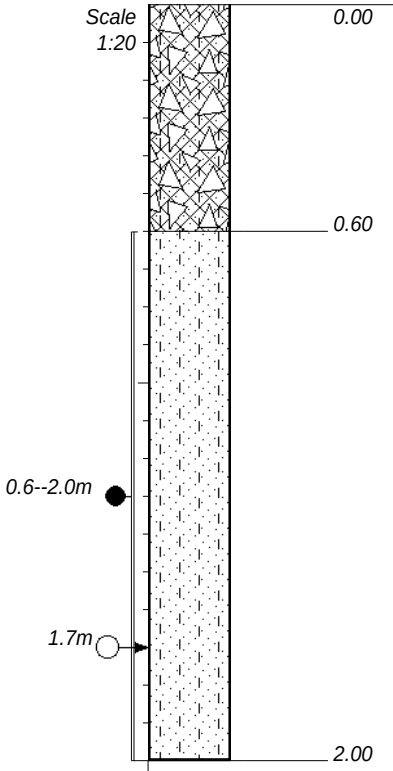
HOLE No: TP08

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP09
Sheet 1 of 1

JOB NUMBER: GG001-24



0.00 Slightly moist, dark brown, loose, fine grained, silty SAND with rubble - Fill.

0.60 Slightly moist to moist, dark greyish brown, loose, fine grained, silty SAND - Aeolian.

2.00

NOTES

1) Final depth at 2.0m.
2) Auger penetration difficult through water seepage.
3) Sample at 0.6--2.0m.
4) Groundwater seepage at 1.7m.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender
TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024
DATE : 26/02/2024 19:58
TEXT : ..aMAchel\Pits\GG00124.TXT

ELEVATION : 030
X-COORD : 18.57248
Y-COORD : -34.01737

HOLE No: TP09

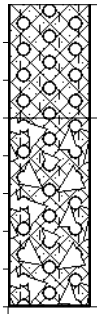
GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP10
Sheet 1 of 1

JOB NUMBER: GG001-24

Scale 1:20



0.00 Slightly moist, light grey, medium dense, fine grained, silty SAND with GRAVEL - Fill.

0.30 Slightly moist, orange brown, loose to medium dense, fine grained, silty SAND with gravel adn rubble - Fill.

0.80

NOTES

1) Refusal at 1.2m on fill.

2) Groundwater seepage not encountered.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender
TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024
DATE : 26/02/2024 19:58
TEXT : ..aMAchel\Pits\GG00124.TXT

ELEVATION : 035
X-COORD : 18.57246
Y-COORD : -34.01749

HOLE No: TP10

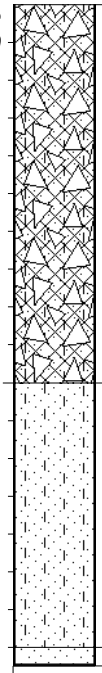
GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP11
Sheet 1 of 1

JOB NUMBER: GG001-24

Scale 1:20



0.00 Slightly moist, light grey, loose, fine grained, silty SAND with rubble - Fill.

1.00 Slightly moist, grey to dark brown, loose, fine grained, silty SAND - Aeolian.

1.70 Slightly moist, orange brown, dense, fine grained, SAND - Aeolian.

1.75

NOTES

1) Refusal at 1.75m on compacted sand layer.

2) Groundwater seepage not encountered.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender

TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024

DATE : 26/02/2024 19:58
TEXT : ..aMachel\Pits\GG00124.TXT

ELEVATION : 036
X-COORD : 18.57237
Y-COORD : -34.01725

HOLE No: TP11

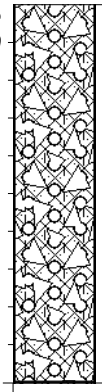
GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP12
Sheet 1 of 1

JOB NUMBER: GG001-24

Scale 1:20



0.00 Slightly moist, orange brown, medium dense, fine to coarse grained, silty SAND with gravel and rubble - Fill.

1.00

NOTES

1) Refusal at 1.0m on fill.

2) Groundwater seepage not encountered.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024

ELEVATION : 035
X-COORD : 18.57232
Y-COORD : -34.01744

HOLE No: TP12

TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

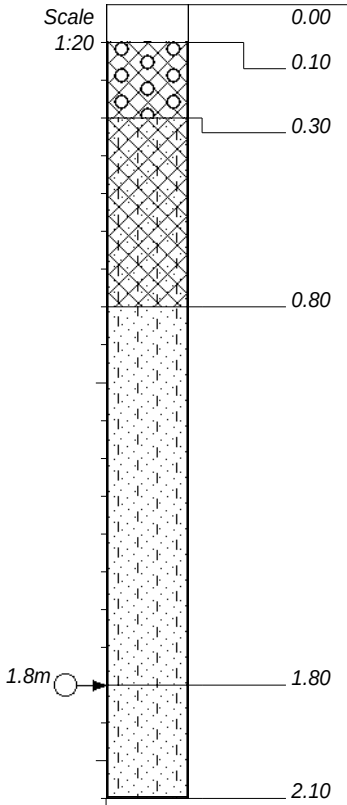
DATE : 26/02/2024 19:58
TEXT : ..aMAchel\Pits\GG00124.TXT

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP13
Sheet 1 of 1

JOB NUMBER: GG001-24



0.00 – 0.10: Paving Blocks.

0.10 – 0.30: Slightly moist, greyish brown, dense, coarse grained, GRAVEL - Fill.

0.30 – 0.80: Slightly moist, yellowish brown, medium dense, fine grained, silty SAND - Fill.

0.80 – 1.80: Slightly moist, yellowish brown, loose, fine grained, silty SAND - Aeolian.

1.80 – 2.10: Slightly moist to wet, dark grey, loose, fine grained, silty SAND - Aeolian.

NOTES

1) Refusal at 2.1m on compacted sand layer.

2) Groundwater seepage at 1.8m.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender

TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024

DATE : 26/02/2024 19:58
TEXT : ..aMAchel\Pits\GG00124.TXT

ELEVATION : 034
X-COORD : 18.57268
Y-COORD : -34.01755

HOLE No: TP13

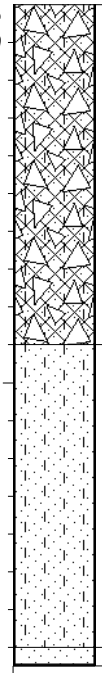
GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP14
Sheet 1 of 1

JOB NUMBER: GG001-24

Scale 1:20



0.00 Slightly moist, light grey, loose, fine grained, silty SAND with rubble - Fill.

0.90 Slightly moist, grey to dark brown, loose, fine grained, silty SAND - Aeolian.

1.70 Slightly moist, orange brown, dense, fine grained, SAND - Aeolian.

1.75

NOTES

1) Refusal at 1.75m on compacted sand layer.

2) Groundwater seepage not encountered.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender
TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024
DATE : 26/02/2024 19:58
TEXT : ..aMachel\Pits\GG00124.TXT

ELEVATION : 037
X-COORD : 18.57280
Y-COORD : -34.01729

HOLE No: TP14

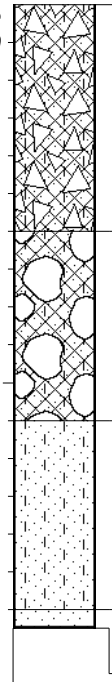
GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP15
Sheet 1 of 1

JOB NUMBER: GG001-24

Scale 1:20



0.00	Slightly moist, light greyish brown, medium dense, fine grained, silty SAND with rubble - Fill.
0.60	Slightly moist, light borwn, medium dense, fine grained, silty SAND with boulders - Fill.
1.10	Slightly moist, grey to dark brown, loose, fine grained, silty SAND - Aeolian.
1.60	Slightly moist, orange brown, dense, fine grained, SAND - Aeolian.
1.65	

NOTES

1) Refusal at 1.65m on compacted sand layer.

2) Groundwater seepage not encountered.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender

TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024

DATE : 26/02/2024 19:58
TEXT : ..aMachel\Pits\GG00124.TXT

ELEVATION : 037
X-COORD : 18.57185
Y-COORD : -34.01730

HOLE No: TP15

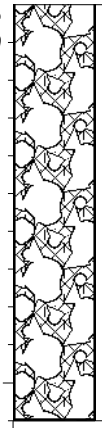
GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP16
Sheet 1 of 1

JOB NUMBER: GG001-24

Scale 1:20



0.00 Slightly moist, yellowish brown, loose to medium dense, fine to coarse grained with gravel and boulders and rubble, silty sandy GRAVEL - Fill.

1.10

NOTES

1) Refusal at 1.1m on fill.

2) Groundwater seepage not encountered.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender
TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024
DATE : 26/02/2024 19:58
TEXT : ..aMAchel\Pits\GG00124.TXT

ELEVATION : 036
X-COORD : 18.57193
Y-COORD : -34.01757

HOLE No: TP16

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP17
Sheet 1 of 1

JOB NUMBER: GG001-24

Scale 1:20

0.00 Slightly moist, light greyish brown, loose, fine grained, silty SAND - Fill.

0.15

NOTES

1) Refusal at 0.15m on concrete.

2) Groundwater seepage not encountered.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender

TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024

DATE : 26/02/2024 19:58
TEXT : ..aMAchel\Pits\GG00124.TXT

ELEVATION : 034
X-COORD : 18.57262
Y-COORD : -34.01751

HOLE No: TP17

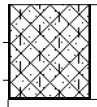
GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP18
Sheet 1 of 1

JOB NUMBER: GG001-24

Scale 1:20



0.00 Slightly moist, dark greyish brown, loose, fine grained, silty SAND - Fill.

0.25

NOTES

1) Refusal at 0.25m on boulder.

2) Groundwater seepage not encountered.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender
TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024
DATE : 26/02/2024 19:58
TEXT : ..aMAchel\Pits\GG00124.TXT

ELEVATION : 032
X-COORD : 18.57308
Y-COORD : -34.01742

HOLE No: TP18

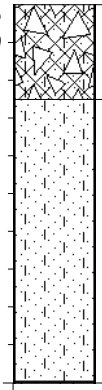
GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP19
Sheet 1 of 1

JOB NUMBER: GG001-24

Scale 1:20



0.00 Slightly moist, light grey, loose to medium dense, fine grained, silty SAND with rubble - Fill.

0.25 Slightly moist, greyish brown, loose, fine grained, silty SAND - Aeolian.

1.00

NOTES

1) Final depth at 1.0m.
2) Percolation test pit.
3) Groundwater seepage not encountered.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender
TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024
DATE : 26/02/2024 19:58
TEXT : ..aMAchel\Pits\GG00124.TXT

ELEVATION : 035
X-COORD : 18.57297
Y-COORD : -34.01768

HOLE No: TP19

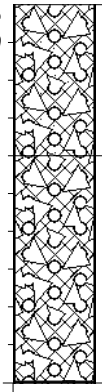
GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP20
Sheet 1 of 1

JOB NUMBER: GG001-24

Scale 1:20



0.00 Slightly moist, dark brown, dense, medium to coarse grained, sandy GRAVEL with rubble and bricks - Fill.

0.40 Slightly moist, yellowish brown, medium dense, medium to coarse grained with rubble, clayey GRAVEL - Fill.

1.00

NOTES

1) Refusal at 1.0m on fill.

2) Groundwater seepage not encountered.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender
TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024
DATE : 26/02/2024 19:58
TEXT : ..aMachel\Pits\GG00124.TXT

ELEVATION : 033
X-COORD : 18.57219
Y-COORD : -34.01755

HOLE No: TP20

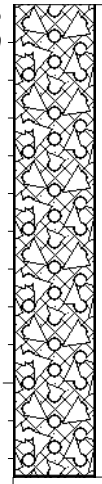
GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP21
Sheet 1 of 1

JOB NUMBER: GG001-24

Scale 1:20



0.00 Slightly moist, dark brown, dense, medium to coarse grained, sandy GRAVEL with rubble and bricks - Fill.

1.25

NOTES

1) FInal depth at 1.25m on fill.

2) Exposure on site.

3) Groundwater seepage not encountered.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender
TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024
DATE : 26/02/2024 19:58
TEXT : ..aMAchel\Pits\GG00124.TXT

ELEVATION : 034
X-COORD : 18.57187
Y-COORD : -34.01740

HOLE No: TP21

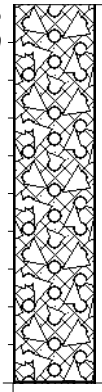
GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

HOLE No: TP22
Sheet 1 of 1

JOB NUMBER: GG001-24

Scale 1:20



0.00 Slightly moist, dark brown, dense, medium to coarse grained, sandy GRAVEL with rubble and bricks - Fill.

1.00

NOTES

1) FInal depth at 1.0m on fill.

2) Exposure on site.

3) Groundwater seepage not encountered.

CONTRACTOR :
MACHINE : Hand Tools
DRILLED BY :
PROFILED BY : N. Govender
TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM :
DATE : 14/02/2024
DATE : 14/02/2024
DATE : 26/02/2024 19:58
TEXT : ..aMAchel\Pits\GG00124.TXT

ELEVATION : 033
X-COORD : 18.57251
Y-COORD : -34.01759

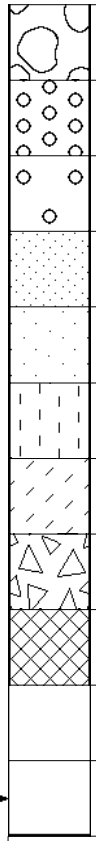
HOLE No: TP22

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Ukuza Consulting
Samora Machel Police Station

LEGEND
Sheet 1 of 1

JOB NUMBER: GG001-24



BOULDERS	{SA01}
GRAVEL	{SA02}
GRAVELLY	{SA03}
SAND	{SA04}
SANDY	{SA05}
SILTY	{SA07}
CLAYEY	{SA09}
RUBBLE	{SA31}
FILL	{SA32}
DISTURBED SAMPLE	{SA38}
WATER SEEPAGE/water strike	{CH50}

Name

10.5

CONTRACTOR :
MACHINE :
DRILLED BY :
PROFILED BY :

INCLINATION :
DIAM :
DATE :
DATE :

ELEVATION :
X-COORD :
Y-COORD :

TYPE SET BY : N. Govender
SETUP FILE : STANDARD.SET

DATE : 26/02/2024 19:58
TEXT : ..aMAchel\Pits\GG00124.TXT

LEGEND
SUMMARY OF SYMBOLS

GEVORKYAN GEOPHYSICS (PTY) LTD

CONSULTING EARTH SCIENTISTS

APPENDIX B: DCP Test Results

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	14-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	1
		Latitude:	34,01766
Location	Cape Town	**Longitude:**	18,57235

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	26	Very Dense	51	>150
0,2	40	Very Dense	>55	>150
	Ref			

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	14-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	2
		Latitude:	34,01767
Location	Cape Town	**Longitude:**	18,5721

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	8	Med.Dense	14	65
0,2	20	Dense	37	>150
0,3	21	Dense	40	>150
	Ref]			

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	14-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	3
		Latitude:	34,01781
Location	Cape Town	**Longitude:**	17,5719

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	23	Dense	44	>150
0,2	24	Dense	47	>150
0,3	25	Very Dense	49	>150
	Ref			

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	14-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	4
		Latitude:	34,01751
Location	Cape Town	**Longitude:**	18,57178

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	5	Med.Dense	8	40
0,2	12	Dense	21	100
0,3	11	Dense	19	90
0,4	10	Med.Dense	17	85
0,5	16	Dense	29	130
0,6	16	Dense	29	130
	Ref			

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	14-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	5
		Latitude:	34,01743
Location	Cape Town	**Longitude:**	18,57203

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	16	Dense	29	130
0,2	16	Dense	29	130
0,3	12	Dense	21	100
0,4	5	Med.Dense	8	40
0,5	4	Med.Dense	7	35
0,6	7	Med.Dense	12	60
0,7	6	Med.Dense	10	50
0,8	5	Med.Dense	8	40
0,9	6	Med.Dense	10	50
1	10	Med.Dense	17	85
1,1	17	Dense	31	140
	Ref			

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	14-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	6
		Latitude:	34,01729
Location	Cape Town	**Longitude:**	18,57217

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	9	Med.Dense	15	75
0,2	10	Med.Dense	17	85
0,3	9	Med.Dense	15	75
0,4	10	Med.Dense	17	85
0,5	10	Med.Dense	17	85
0,6	6	Med.Dense	10	50
0,7	6	Med.Dense	10	50
0,8	13	Dense	23	110
0,9	9	Med.Dense	15	75
1	7	Med.Dense	12	60
1,1	3	Loose	5	25
1,2	3	Loose	5	25
	Ref			

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	14-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	7
		Latitude:	34,01739
Location	Cape Town	**Longitude:**	18,5716

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	1	Very Loose	2	<20
0,2	4	Med.Dense	7	35
0,3	9	Med.Dense	15	75
0,4	11	Dense	19	90
0,5	11	Dense	19	90
0,6	12	Dense	21	100
	Ref			

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	14-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	8
		Latitude:	34,01764
Location	Cape Town	**Longitude:**	18,57265

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	7	Med.Dense	12	60
0,2	7	Med.Dense	12	60
0,3	7	Med.Dense	12	60
0,4	17	Dense	31	140
0,5	20	Dense	37	>150
0,6	22	Dense	42	>150
	Ref			

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	14-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	9
		Latitude:	34,01764
Location	Cape Town	**Longitude:**	18,57265

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	3	Loose	5	25
0,2	3	Loose	5	25
0,3	7	Med.Dense	12	60
0,4	6	Med.Dense	10	50
0,5	7	Med.Dense	12	60
0,6	10	Med.Dense	17	85
	Ref			

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	15-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	10
		Latitude:	34,01749
Location	Cape Town	**Longitude:**	18,57246

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	14	Dense	25	115
0,2	10	Med.Dense	17	85
0,3	11	Dense	19	90
0,4	11	Dense	19	90
0,5	13	Dense	23	110
0,6	9	Med.Dense	15	75
0,7	4	Med.Dense	7	35
0,8	4	Med.Dense	7	35
0,9	6	Med.Dense	10	50
	Ref			

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	15-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	11
		Latitude:	34,01725
Location	Cape Town	**Longitude:**	18,57237

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	9	Med.Dense	15	75
0,2	18	Dense	33	150
	Ref			

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	15-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	12
		Latitude:	34,01744
Location	Cape Town	**Longitude:**	18,57232

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	16	Dense	29	130
0,2	20	Dense	37	>150
	Ref			

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	15-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	13
		Latitude:	34,01755
Location	Cape Town	**Longitude:**	18,57268

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	10	Med.Dense	17	85
0,2	11	Dense	19	90
0,3	10	Med.Dense	17	85
0,4	6	Med.Dense	10	50
0,5	16	Dense	29	130
0,6	20	Dense	37	>150
0,7	20	Dense	37	>150
0,8	19	Dense	35	>150
0,9	13	Dense	23	110
1	10	Med.Dense	17	85
1,1	5	Med.Dense	8	40
1,2	75	V.V.Dense	>55	>300
1,3	3	Loose	5	25
1,4	3	Loose	5	25
1,5	2	Loose	3	20
1,6	2	Loose	3	20
1,7	1	Very Loose	2	<20
1,8	1	Very Loose	2	<20
1,9	1	Very Loose	2	<20
2	1	Very Loose	2	<20
	Ref (End)			

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	15-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	14
		Latitude:	34,01729
Location	Cape Town	**Longitude:**	18,5728

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	4	Med.Dense	7	35
0,2	10	Med.Dense	17	85
0,3	22	Dense	42	>150
0,4	25	Dense	49	>150
	Ref			

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	15-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	15
		Latitude:	34,0173
Location	Cape Town	**Longitude:**	18,57185

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	2	Loose	3	20
0,2	2	Loose	3	20
0,3	4	Med.Dense	7	35
0,4	4	Med.Dense	7	35
0,5	17	Dense	31	140
	Ref			

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	15-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	16
		Latitude:	34,01757
Location	Cape Town	**Longitude:**	18,57193

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	5	Med.Dense	8	40
0,2	5	Med.Dense	8	40
0,3	5	Med.Dense	8	40
0,4	4	Med.Dense	7	35
0,5	3	Loose	5	25
0,6	1	Very Loose	2	<20
0,7	0	V.V.Loose	<2	<5
0,8	1	Very Loose	2	<20
0,9	5	Med.Dense	8	40
1	3	Loose	5	25
1,1	1	Very Loose	2	<20
1,2	1	Very Loose	2	<20
1,3	11	Dense	19	90
1,4	8	Med.Dense	14	65
1,5	7	Med.Dense	12	60
1,6	10	Med.Dense	17	85
1,7	9	Med.Dense	15	75
1,8	10	Med.Dense	17	85
1,9	10	Med.Dense	17	85
	Ref (end)			

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	15-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	17
		Latitude:	34,01751
Location	Cape Town	**Longitude:**	18,57262

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	3 Ref	Loose	5	25

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	15-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	18
		Latitude:	34,01742
Location	Cape Town	**Longitude:**	18,57308

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	1	Very Loose	2	<20
0,2	2	Loose	3	20
0,3	4	Med.Dense	7	35
0,4	7	Med.Dense	12	60
0,5	3	Loose	5	25
0,6	4	Med.Dense	7	35
0,7	6	Med.Dense	10	50
0,8	20	Dense	37	>150
	Ref			

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	15-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	19
		Latitude:	34,01768
Location	Cape Town	**Longitude:**	18,57297

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	12	Dense	21	100
0,2	20	Dense	37	>150
	Ref			

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	15-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	20
		Latitude:	34,01755
Location	Cape Town	**Longitude:**	18,57251

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	15	Dense	27	125
0,2	12	Dense	21	100
0,3	13	Dense	23	110
	Ref			

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CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	15-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	21
		Latitude:	34,017408
Location	Cape Town	**Longitude:**	18,571874

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only. DC21 was done at the base of the exposure.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	8	Med.Dense	14	65
0,2	12	Dense	21	100
0,3	18	Dense	33	150
	Ref			

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CBR Dynamic Cone Penetrometer (DCP) Test

Project:	Samora Machel Police Station	**Date of Fieldwork :**	15-Feb-24
		Operator:	Nishen Govender
Project Reference:	GG001-24	**DCP No.:**	22
		Latitude:	34,01759
Location	Cape Town	**Longitude:**	18,57251

The calculations provided are based on empirical calculations and are approximate values. These are indicative guides only.

DEPTH metres below existing ground level	BLOWS per 100mm	INFERRED CONSISTENCY	CBR %	INFERRED NET ALLOWABLE BEARING PRESSURE (kPa)
0				
0,1	10	Med.Dense	17	85
0,2	9	Med.Dense	15	75
0,3	16	Dense	29	130
0,4	18	Dense	33	150
	Ref			

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APPENDIX C: LABORATORY TEST RESULTS

GEO-SOL EARTH CIVIL TESTING

Geotechnical Solutions (PTY) LTD
106 Francis Road – P.O. Box 303 - Ladysmith – KwaZulu Natal – 3370
Reg No. – K2011/115681/07 – Tax No.- 9127/374/18/0 – VAT No.- 4260 3033 28
Radiation Control – Authority No.- 2962/16/1430
Web – www.geo-sol.co.za – Tel – 0715608058 – 0726608445 - Email – projects@geo-sol.co.za

TEST REPORT: SANS 3001- GR1 - GR12

Client Name:	Gevorkyan Geophysics	**Ref:**	GG001-24
Area:	Cape Town	**Date Analysed:**	18/02/2024
Project Name:	Samora Machel	**Technical Signatory**	Richard Malungani
Attention:	Mr N Govender		

Sample No:		TP01	
Depth of Sample Taken (m):		2,0-2,8	
Material Class:		silty SAND	
Material Classification:		Aeolian	
Description of Sample		Light greyish brown, fine grained	
Sieve Analysis (mm)	**100,00**	100,00	
	75,00	100,00	
	37,50	100,00	
	26,50	100,00	
	19,00	100,00	
	13,20	100,00	
	4,75	100,00	
	2,00	100,00	
	0,43	74,60	
	0,25	30,00	
	0,15	17,00	
	0,075	14,00	
Hydrometer Analysis (mm)	**0,060**	5,15	
	0,050	5,15	
	0,004	3,98	
	0,002	3,72	
Classification		**RAW**	**%**
CLAY		5,152	5
SILT		8,848	9
SAND		86,000	86
GRAVEL		0,000	0
Atterberg Limit	**LL%**	17,50	
	P.I.	NP	
	LS%	NP	
	GM	1,11	
Classification	**AASHTO**	A-2-4	**TRH4**
	USCS	SC	Poorer than G10

Notes: Data Reported above relates to sample tested.

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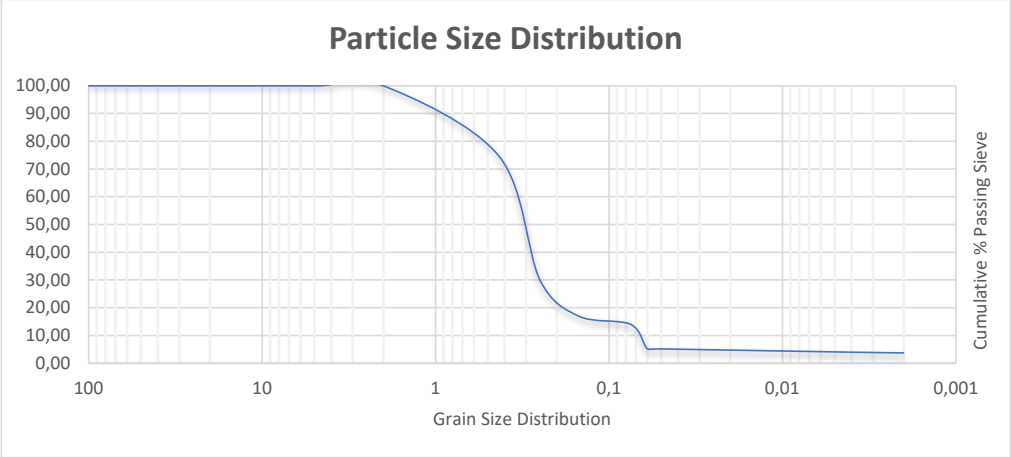
TEST REPORT: SANS 3001- GR1 - GR12

Client Name:	Gevorkyan Geophysics	**Ref:**	GG001-24
Client Address:	Cape Town	**Date Analysed:**	18/02/2024
Project Name:	Samora Machel	**Technical Signatory**	Richard Malungani
Attention:	Mr N Govender		

Excavation No.	TP01
Depth of Sample Taken:	2,0-2,8
Material Class:	silty SAND
Material Classification:	Aeolian
Description of Sample	Light greyish brown, fine grained



Clay Activity Index (AI)

		0-1,4	**Inactive Soils**
AI	0,00	**>1,4**	**Active Soils**

Natural Moisture Content

Dry Sample: 500g	**Container + Sample (Wet)**	655
	Container + Sample (Dry)	590
	Moisture %	9,9

PH - EC - TDS - Temp (°C)		**Potential Expansivity**	
pH	7,9	**Low**	x
EC (µS/cm)	188	**Medium**	
TDS (ppm)	69	**High**	
Temp (°C)	22,1	**Organic or Waste**	

Notes: Data Reported above relates to sample tested.

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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:	Gevorkyan Geophysics	**Ref:**	GG001-24
Area:	Cape Town	**Date Analysed:**	18/02/2024
Project Name:	Samora Machel	**Technical Signatory**	Richard Malungani
Attention:	Mr N Govender		

Sample No:		TP02	
Depth of Sample Taken (m):		0,4-1,2	
Material Class:		clayey sandy GRAVEL	
Material Classification:		Fill	
Description of Sample		Yellowish brown, coarse grained	
Sieve Analysis (mm)	**100,00**	100,00	
	75,00	100,00	
	37,50	100,00	
	26,50	100,00	
	19,00	100,00	
	13,20	100,00	
	4,75	97,73	
	2,00	93,47	
	0,43	84,38	
	0,25	47,73	
	0,15	36,36	
	0,075	24,15	
Hydrometer Analysis (mm)	**0,060**	9,37	
	0,050	8,51	
	0,004	6,86	
	0,002	6,42	
Classification		**RAW**	**%**
CLAY		8,511	9
SILT		15,637	16
SAND		69,318	69
GRAVEL		6,534	7
Atterberg Limit	**LL%**	18,00	
	P.I.	NP	
	LS%	NP	
	GM	0,98	
Classification	**AASHTO**	A-2-6	**TRH4**
	USCS	SC	Poorer than G10

Notes: Data Reported above relates to sample tested.

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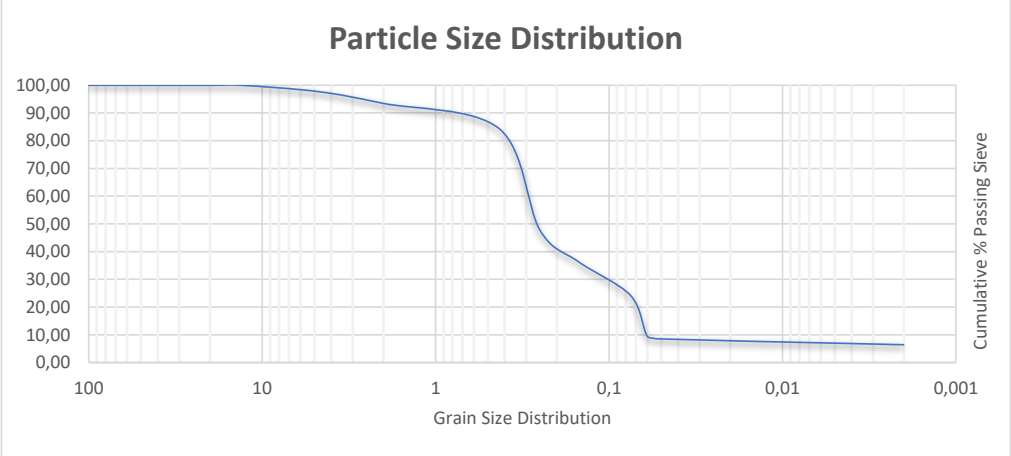
TEST REPORT: SANS 3001- GR1 - GR12

Client Name:	Gevorkyan Geophysics	**Ref:**	GG001-24
Client Address:	Cape Town	**Date Analysed:**	18/02/2024
Project Name:	Samora Machel	**Technical Signatory**	Richard Malungani
Attention:	Mr N Govender		

Excavation No.	TP02
Depth of Sample Taken:	0,4-1,2
Material Class:	clayey sandy GRAVEL
Material Classification:	Fill
Description of Sample	Yellowish brown, coarse grained



Clay Activity Index (AI)

		0-1,4	**Inactive Soils**
AI	0,00	**>1,4**	**Active Soils**

Natural Moisture Content

Dry Sample: 500g	**Container + Sample (Wet)**	612
	Container + Sample (Dry)	590
	Moisture %	3,6

PH - EC - TDS - Temp (°C)		**Potential Expansivity**	
pH	8	**Low**	x
EC (µS/cm)	172	**Medium**	
TDS (ppm)	67	**High**	
Temp (°C)	22,1	**Organic or Waste**	

Notes: Data Reported above relates to sample tested.

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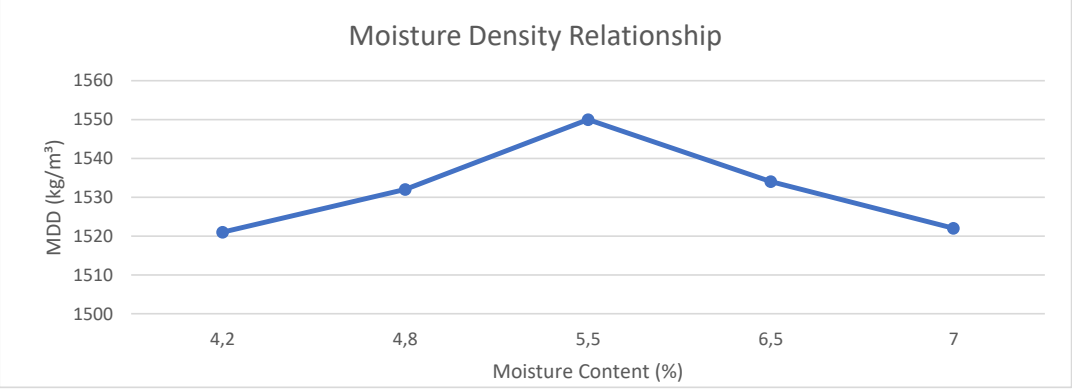
TEST REPORT: MOD AASHTO - SANS 3001 - GR31

Client Name:	Gevorkyan Geophysics	**Ref:**	GG001-24
Client Address:	Cape Town	**Date Analysed:**	18/02/2024
Project Name:	Samora Machel	**Technical Signatory**	Richard Malungani
Attention:	Mr N Govender		

Excavation No.	TP02
Depth of Sample Taken:	0,4-1,2
Material Class:	clayey sandy GRAVEL
Material Classification:	Fill
Description of Sample	Yellowish brown, coarse grained

TEST METHOD		**MOD AASHTO**
Mould No.	**Moisture (%)**	**Dry Density (kg/m³)**
1	4,2	1521
2	4,8	1532
3	5,5	1550
4	6,5	1534
5	7	1522

Optimum Moisture Content (%) (OMC)	**Maximum Dry density (kg/m³) (MDD)**
5,5	1550



Notes: Data Reported above relates to sample tested.

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TEST REPORT: CBR - SANS 3001 - GR40

Client Name:	Gevorkyan Geophysics	**Ref:**	GG001-24
Client Address:	Cape Town	**Date Analysed:**	2023/08/05
Project Name:	Samora Machel	**Technical Signatory**	Richard Malungani
Attention:	Mr N Govender		

Excavation No.	TP02
Depth of Sample Taken:	0,4-1,2
Material Class:	clayey sandy GRAVEL
Material Classification:	Fill
Description of Sample	Yellowish brown, coarse grained

Material Utilization - Earthworks Classification	
Group A - Granular Soils	X
Group B - Low Plasticity Soils	
Group C - High Plasticity Soils	
Group D - Durable Rock	
Group E - Degradable Rock	
Group F - Topsoil	
Group G - Organic Soils	

CBR Final Results	**CBR %**
CBR @ 100% Compaction	4
CBR @ 98% Compaction	3
CBR @ 97% Compaction	3
CBR @ 95% Compaction	2
CBR @ 93% Compaction	1
CBR @ 90% Compaction	1
Swell @ 100% Compaction	0

Classification	**TRH4**	**Poorer than G10**
Reference Tables - Structural Design of Pavements - TRH4 (1996)		
Max Size 2/3 Layer - Min CBR 3@93% - 90% Mod AASHTO	G10	Gravel/Soils
Max Size 2/3 Layer - PI<12 - Min CBR 7@93% - Swell <1,5%	G9	Gravel/Soils
Max Size 2/3 Layer - PI<12 - Min CBR 10@93% - Swell <1,5%	G8	Gravel/Soils
Max Size 2/3 Layer - PI<12 - Min CBR 15@93% - Swell <1,5%	G7	Gravel/Soils
Max Size 63mm - PI<12 - Min CBR 25@95% - Swell <1,0%	G6	Natural Gravel
Max Size 63mm - PI<10 - Min CBR 45@95% - Swell <0,5%	G5	Natural Gravel
Max Size 37,5mm - PI<6 - Min CBR 80@98% - Swell <0,2%	G4	Natural Gravel/Crushed
Max Size 37,5mm - PI<6 - 98-100% Mod AASHTO	G3	Dense Graded Crushed Stone
Max Size 37,5mm - PI<6 - 100-102% Mod AASHTO	G2	Dense Graded Crushed Stone
Max Size 37,5mm - PI<4	G1	Dense Graded Crushed Stone

Notes: Data Reported above relates to sample tested.

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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:	Gevorkyan Geophysics	**Ref:**	GG001-24
Area:	Cape Town	**Date Analysed:**	18/02/2024
Project Name:	Samora Machel	**Technical Signatory**	Richard Malungani
Attention:	Mr N Govender		

Sample No:		TP06	
Depth of Sample Taken (m):		0,55-2,1	
Material Class:		silty SAND	
Material Classification:		Aeolian	
Description of Sample		Dark greyish brown, fine grained	
Sieve Analysis (mm)	**100,00**	100,00	
	75,00	100,00	
	37,50	100,00	
	26,50	100,00	
	19,00	100,00	
	13,20	100,00	
	4,75	100,00	
	2,00	100,00	
	0,43	83,60	
	0,25	51,20	
	0,15	36,80	
	0,075	24,00	
Hydrometer Analysis (mm)	**0,060**	9,31	
	0,050	8,46	
	0,004	6,81	
	0,002	6,38	
Classification		**RAW**	**%**
CLAY		8,459	8
SILT		15,541	16
SAND		76,000	76
GRAVEL		0,000	0
Atterberg Limit	**LL%**	15,80	
	P.I.	NP	
	LS%	NP	
	GM	0,92	
Classification	**AASHTO**	A-2-4	**TRH4**
	USCS	SC	Poorer than G10

Notes: Data Reported above relates to sample tested.

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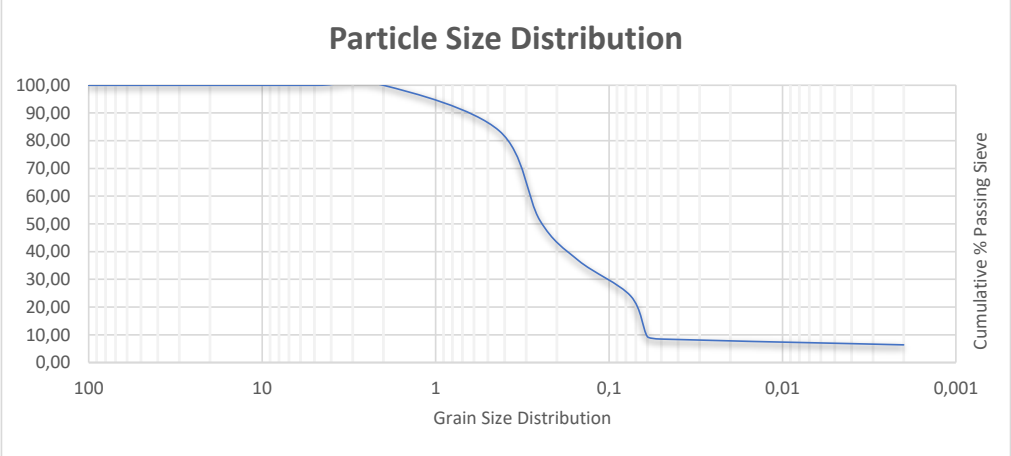
TEST REPORT: SANS 3001- GR1 - GR12

Client Name:	Gevorkyan Geophysics	**Ref:**	GG001-24
Client Address:	Cape Town	**Date Analysed:**	18/02/2024
Project Name:	Samora Machel	**Technical Signatory**	Richard Malungani
Attention:	Mr N Govender		

Excavation No.	TP06
Depth of Sample Taken:	0,55-2,1
Material Class:	silty SAND
Material Classification:	Aeolian
Description of Sample	Dark greyish brown, fine grained



Clay Activity Index (AI)

		0-1,4	**Inactive Soils**
AI	0,00	**>1,4**	**Active Soils**

Natural Moisture Content

	Container + Sample (Wet)	680
Dry Sample: 500g	**Container + Sample (Dry)**	590
	Moisture %	13,2

PH - EC - TDS - Temp (°C)		**Potential Expansivity**	
pH	8,2	**Low**	x
EC (µS/cm)	185	**Medium**	
TDS (ppm)	71	**High**	
Temp (°C)	22,1	**Organic or Waste**	

Notes: Data Reported above relates to sample tested.

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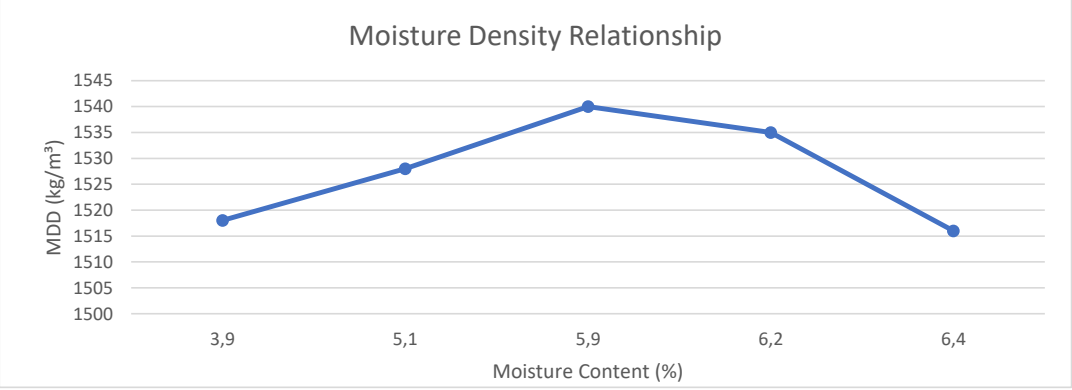
TEST REPORT: MOD AASHTO - SANS 3001 - GR31

Client Name:	Gevorkyan Geophysics	**Ref:**	GG001-24
Client Address:	Cape Town	**Date Analysed:**	18/02/2024
Project Name:	Samora Machel	**Technical Signatory**	Richard Malungani
Attention:	Mr N Govender		

Excavation No.	TP06
Depth of Sample Taken:	0,55-2,1
Material Class:	silty SAND
Material Classification:	Aeolian
Description of Sample	Dark greyish brown, fine grained

TEST METHOD		**MOD AASHTO**
Mould No.	**Moisture (%)**	**Dry Density (kg/m³)**
1	3,9	1518
2	5,1	1528
3	5,9	1540
4	6,2	1535
5	6,4	1516

Optimum Moisture Content (%) (OMC)	**Maximum Dry density (kg/m³) (MDD)**
5,9	1540



Notes: Data Reported above relates to sample tested.

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Web – www.geo-sol.co.za – Tel – 0715608058 – 0726608445 - Email – projects@geo-sol.co.za

TEST REPORT: CBR - SANS 3001 - GR40

Client Name:	Gevorkyan Geophysics	**Ref:**	GG001-24
Client Address:	Cape Town	**Date Analysed:**	2023/08/05
Project Name:	Samora Machel	**Technical Signatory**	Richard Malungani
Attention:	Mr N Govender		

Excavation No.	TP06
Depth of Sample Taken:	0,55-2,1
Material Class:	silty SAND
Material Classification:	Aeolian
Description of Sample	Dark greyish brown, fine grained

Material Utilization - Earthworks Classification	
Group A - Granular Soils	X
Group B - Low Plasticity Soils	
Group C - High Plasticity Soils	
Group D - Durable Rock	
Group E - Degradable Rock	
Group F - Topsoil	
Group G - Organic Soils	

CBR Final Results	**CBR %**
CBR @ 100% Compaction	3
CBR @ 98% Compaction	3
CBR @ 97% Compaction	3
CBR @ 95% Compaction	2
CBR @ 93% Compaction	2
CBR @ 90% Compaction	1
Swell @ 100% Compaction	0

Classification	**TRH4**	**Poorer than G10**
Reference Tables - Structural Design of Pavements - TRH4 (1996)		
Max Size 2/3 Layer - Min CBR 3@93% - 90% Mod AASHTO	G10	Gravel/Soils
Max Size 2/3 Layer - PI<12 - Min CBR 7@93% - Swell <1,5%	G9	Gravel/Soils
Max Size 2/3 Layer - PI<12 - Min CBR 10@93% - Swell <1,5%	G8	Gravel/Soils
Max Size 2/3 Layer - PI<12 - Min CBR 15@93% - Swell <1,5%	G7	Gravel/Soils
Max Size 63mm - PI<12 - Min CBR 25@95% - Swell <1,0%	G6	Natural Gravel
Max Size 63mm - PI<10 - Min CBR 45@95% - Swell <0,5%	G5	Natural Gravel
Max Size 37,5mm - PI<6 - Min CBR 80@98% - Swell <0,2%	G4	Natural Gravel/Crushed
Max Size 37,5mm - PI<6 - 98-100% Mod AASHTO	G3	Dense Graded Crushed Stone
Max Size 37,5mm - PI<6 - 100-102% Mod AASHTO	G2	Dense Graded Crushed Stone
Max Size 37,5mm - PI<4	G1	Dense Graded Crushed Stone

Notes: Data Reported above relates to sample tested.

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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:	Gevorkyan Geophysics	**Ref:**	GG001-24
Area:	Cape Town	**Date Analysed:**	18/02/2024
Project Name:	Samora Machel	**Technical Signatory**	Richard Malungani
Attention:	Mr N Govender		

Sample No:		TP07	
Depth of Sample Taken (m):		0,3-0,7	
Material Class:		silty SAND	
Material Classification:		Aeolian	
Description of Sample		Light greyish brown, fine grained	
Sieve Analysis (mm)	**100,00**	100,00	
	75,00	100,00	
	37,50	100,00	
	26,50	100,00	
	19,00	100,00	
	13,20	100,00	
	4,75	100,00	
	2,00	100,00	
	0,43	74,60	
	0,25	43,80	
	0,15	39,60	
	0,075	14,00	
Hydrometer Analysis (mm)	**0,060**	5,99	
	0,050	5,99	
	0,004	4,20	
	0,002	3,69	
Classification		**RAW**	**%**
CLAY		5,992	6
SILT		8,008	8
SAND		86,000	86
GRAVEL		0,000	0
Atterberg Limit	**LL%**	15,00	
	P.I.	NP	
	LS%	NP	
	GM	1,11	
Classification	**AASHTO**	A-2-6	**TRH4**
	USCS	SC	-

Notes: Data Reported above relates to sample tested.

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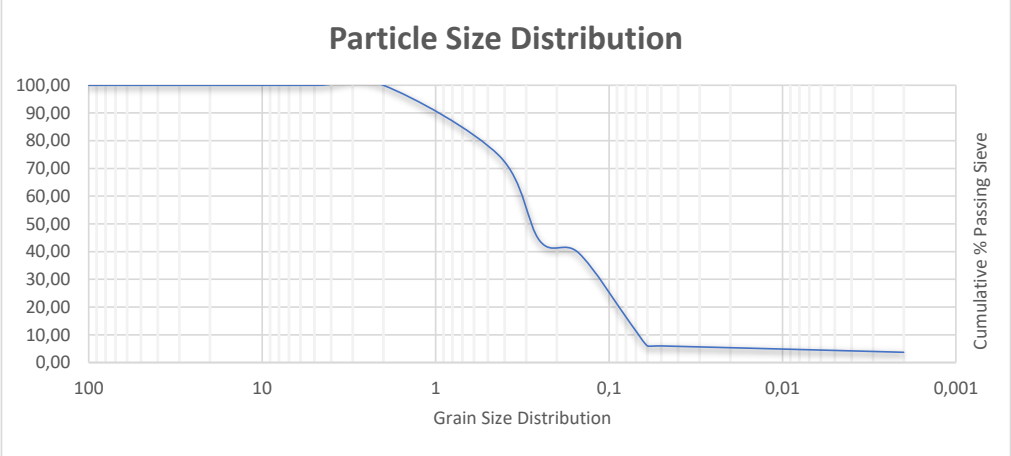
Radiation Control – Authority No.- 2962/16/1430
Web – www.geo-sol.co.za – Tel – 0715608058 – 0726608445 - Email – projects@geo-sol.co.za

TEST REPORT: SANS 3001- GR1 - GR12

Client Name:	Gevorkyan Geophysics	**Ref:**	GG001-24
Client Address:	Cape Town	**Date Analysed:**	18/02/2024
Project Name:	Samora Machel	**Technical Signatory**	Richard Malungani
Attention:	Mr N Govender		

Excavation No.	TP07
Depth of Sample Taken:	0,3-0,7
Material Class:	silty SAND
Material Classification:	Aeolian
Description of Sample	Light greyish brown, fine grained



Clay Activity Index (AI)

		0-1,4	**Inactive Soils**
AI	0,00	**>1,4**	**Active Soils**

Natural Moisture Content

Dry Sample: 500g	**Container + Sample (Wet)**	624
	Container + Sample (Dry)	590
	Moisture %	5,4

PH - EC - TDS - Temp (°C)		**Potential Expansivity**	
pH	8,1	**Low**	x
EC (µS/cm)	173	**Medium**	
TDS (ppm)	71	**High**	
Temp (°C)	22,1	**Organic or Waste**	

Notes: Data Reported above relates to sample tested.

GEO-SOL EARTH CIVIL TESTING

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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:	Gevorkyan Geophysics	**Ref:**	GG001-24
Area:	Cape Town	**Date Analysed:**	18/02/2024
Project Name:	Samora Machel	**Technical Signatory**	Richard Malungani
Attention:	Mr N Govender		

Sample No:		TP09	
Depth of Sample Taken (m):		0,6-20	
Material Class:		silty SAND	
Material Classification:		Aeolian	
Description of Sample		Light greyish brown, fine grained	
Sieve Analysis (mm)	**100,00**	100,00	
	75,00	100,00	
	37,50	100,00	
	26,50	100,00	
	19,00	100,00	
	13,20	100,00	
	4,75	100,00	
	2,00	100,00	
	0,43	75,20	
	0,25	45,40	
	0,15	37,40	
	0,075	9,80	
Hydrometer Analysis (mm)	**0,060**	4,19	
	0,050	4,19	
	0,004	2,94	
	0,002	2,58	
Classification		**RAW**	**%**
CLAY		4,194	4
SILT		5,606	6
SAND		90,200	90
GRAVEL		0,000	0
Atterberg Limit	**LL%**	16,80	
	P.I.	NP	
	LS%	NP	
	GM	1,15	
Classification	**AASHTO**	A-2-4	**TRH4**
	USCS	SC	-

Notes: Data Reported above relates to sample tested.

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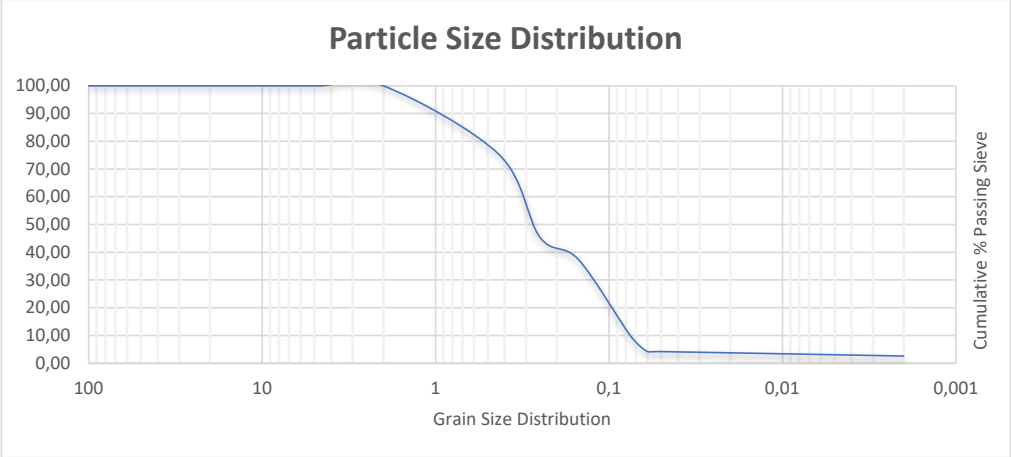
TEST REPORT: SANS 3001- GR1 - GR12

Client Name:	Gevorkyan Geophysics	**Ref:**	GG001-24
Client Address:	Cape Town	**Date Analysed:**	18/02/2024
Project Name:	Samora Machel	**Technical Signatory**	Richard Malungani
Attention:	Mr N Govender		

Excavation No.	TP09
Depth of Sample Taken:	0,6-20
Material Class:	silty SAND
Material Classification:	Aeolian
Description of Sample	Light greyish brown, fine grained



Clay Activity Index (AI)			
		0-1,4	**Inactive Soils**
AI	0,00	**>1,4**	**Active Soils**

Natural Moisture Content		
	Container + Sample (Wet)	645
Dry Sample: 500g	**Container + Sample (Dry)**	590
	Moisture %	8,5

PH - EC - TDS - Temp (°C)		**Potential Expansivity**	
pH	8,2	**Low**	x
EC (µS/cm)	165	**Medium**	
TDS (ppm)	76	**High**	
Temp (°C)	22,1	**Organic or Waste**	

Notes: Data Reported above relates to sample tested.