GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Geotechnical Investigations
Hydrogeological Investigations
Geophysical Investigations
Dolomite Stability Investigations
NHBRC Classifications

GEVORKYAN GEOPHYSICS (PTY) LTD (2019/495181/07)
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LEVEL 1 BEE Supplier
CSD Reg. No.: MAAA0899450
Offices in South Africa (Pietermaritzburg and Johannesburg) and Russia (Moscow)

Ref: GG006-21.R01

Date: 18 July 2022

MABALENGWE ENGINEERS (PTY) LTD
34 Essex Terrace
Westville
3629

Attention: Mr T. Gigaba Email: tgigaba@mabalengwe.com

Dear Sir,

GEOTECHNICAL REPORT FOR THE PROPOSED MGANGENI HALL, NEAR KUMPONDO VILLAGE, KWAZULU-NATAL

1. TERMS OF APPOINTMENT

Mabalengwe Engineers (Pty) Ltd consulted with Gevorkyan Geophysics Pty Ltd regarding the proposed Mgangeni Hall.

A budget estimate to carry out a geotechnical investigation for the proposed development was submitted to Mabalengwe Engineers (Pty) Ltd for approval. The quote was formerly accepted by Mr T. Gigaba (Managing Director) of Mabalengwe Engineers (Pty) Ltd and a letter of appointment was issued via email to proceed with the investigation on 30 May 2022.

The following work has been proposed to be carried out:

- Hand tools excavated inspections pits.
- Dynamic cone penetration tests.
- Sampling of soil for laboratory testing.
- Geotechnical report.

This geotechnical report referenced GG006-21.R01 provides the results of the geotechnical investigation. Included in the report with be recommendations in terms of subgrade materials, foundations, slope stability, excavatability, earthworks, stormwater drainage, and material usage.

2. REFERENCE FOR GEOTECHNICAL INVESTIGATION

The services were carried out in accordance with geotechnical standards practiced by professionals 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 inspect 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 during time of investigation. Opinions are based on what was visible at the time the investigation was conducted.

3. EXISTING INFORMATION

The following information was used for the project:

i. A google kml file was issued by the Mabalengwe Engineers to Gevorkyan Geophysics (Pty) Ltd showing the layout of the proposed site.

ii. A regional geological map titled "*3030 Port Shepstone*", dated 1988 and prepared by the Council for Geoscience to a scale of 1:250 000.

iii. Low-resolution satellite imagery sourced from Google Earth (2022).

4. METHODOLOGY FOR SITE WORK

The field portion of the investigation was carried out on 01 June 2022 and comprised the following:

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

a. Test Pitting and Profiling

Approximately five test pits were excavated at selected points within the site perimeter.

The test pits have been designated by prefixes TP01 to TP05 and were excavated using hand tools to approximate refusal depths in the range 1.0m (TP01) to 1.1m (TP05) 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.

b. DCP Testing

DCP tests were carried out adjacent to each test pit and a total of five DCP tests were completed. The DCP tests have been designated by prefixes DCP01 to DCP06 and extended to approximate refusal depths in the range 0.9m (DCP02) to 1.4m (DCP05) begl. The DCP test results are given in Appendix B at the end of this report

The co-ordinates of the test pits were recorded using a handheld GPS device "*Garmin GPS Map 62*". Table 1 provide a summary of the test pit positions.

Table 1: Summary of Test Pit Information

TP	Latitude (South)	Longitude (East)	Elevation (mamsl)	Depth of TP (m begl)
TP01	30.237604	30.381436	694	1.0 Refusal
TP02	30.237974	30.381516	695	1.1 Refusal
TP03	30.237899	30.381885	690	1.1 Refusal
TP04	30.23809	30.382166	691	1.1 Refusal
TP05	30.237796	30.382338	686	1.1 Refusal

mamsl – metres above mean sea level m begl – metres below existing ground level

5. SITE DESCRIPTION

The site is located approximately 30 km northwest of Umzinto within a rural land setting. The latitude and longitude of the central portion of the site is 30.237899 South and 30.381885 East. The site is currently a vacant plot of land. The vegetation comprises grassed vegetables.

The locality of the site is shown in Figure 1, and indicative views are given in Photographs 2 and 3 with the general layout of the site given in Figure 2.

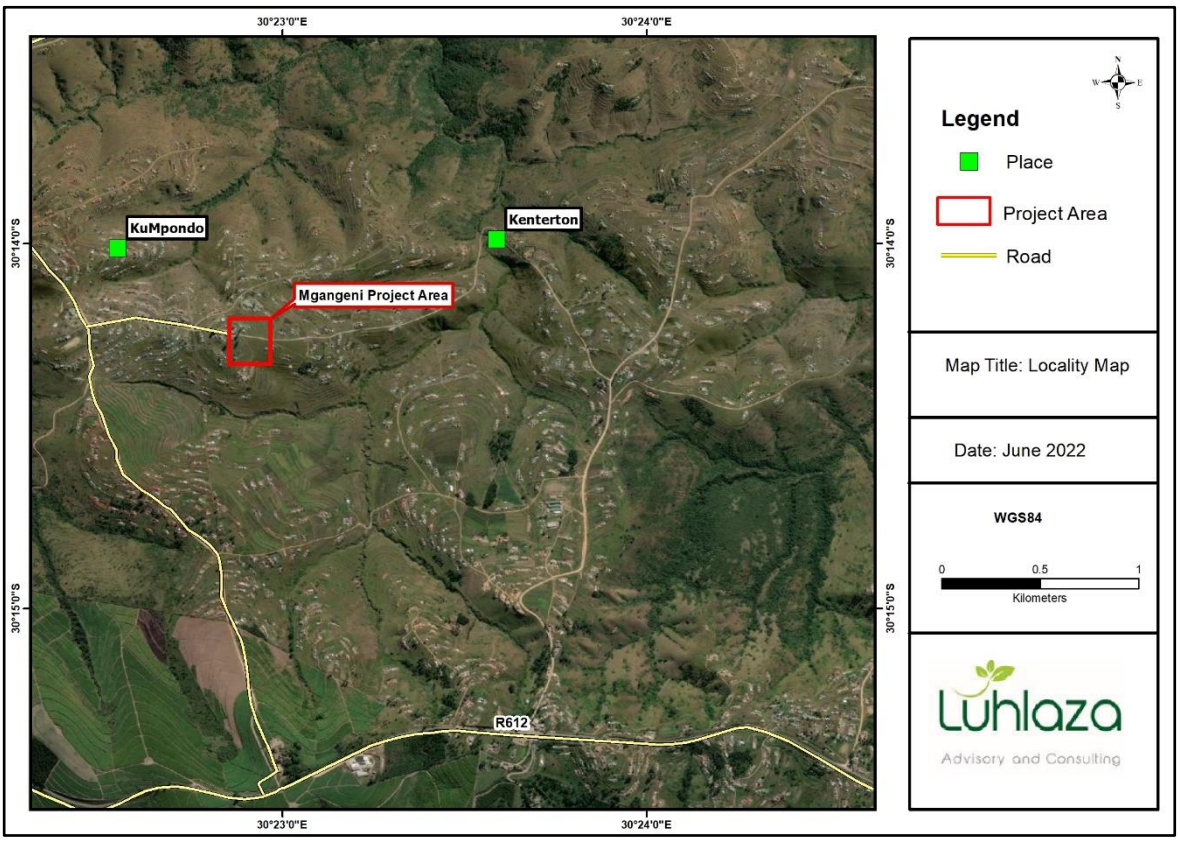

Figure 1: Locality of the site

Photograph 1: Indicative view of Sports Field Entrance

Photograph 2: Indicative view of the Sports Field

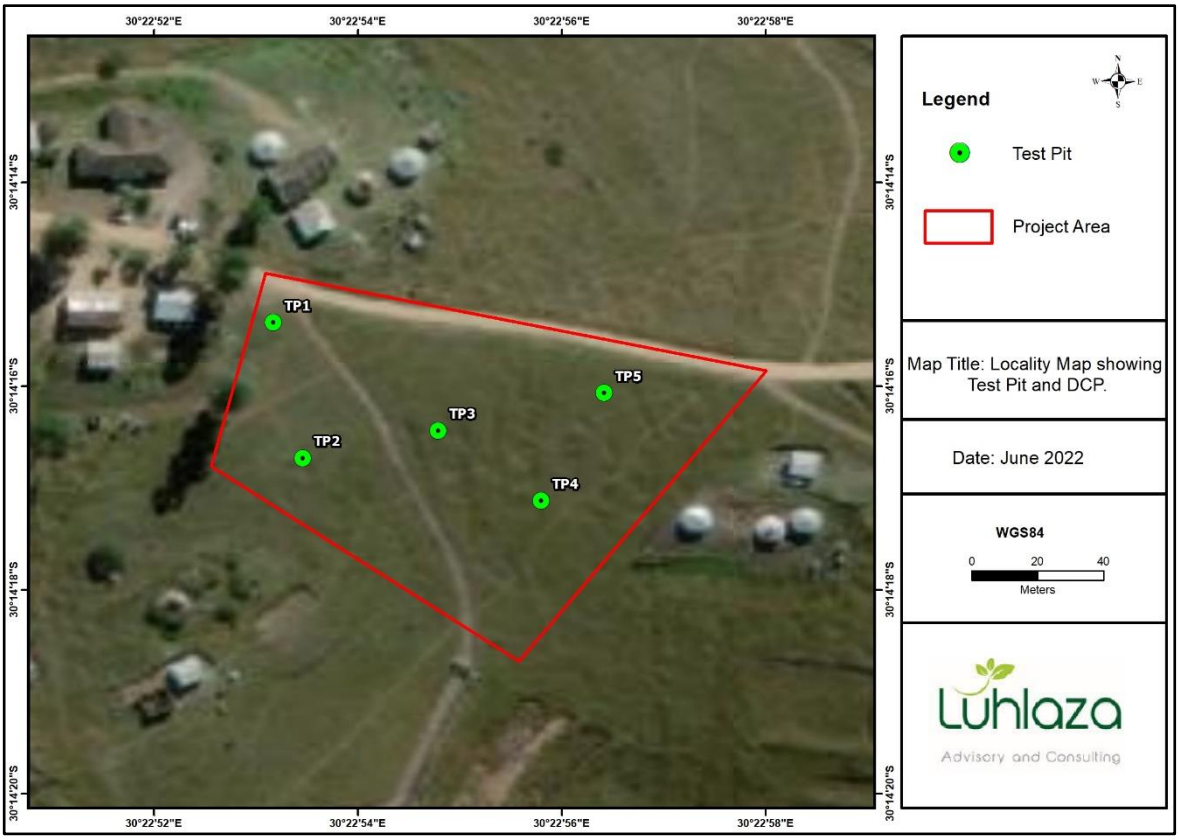

Figure 2: Locality of field test positions (Google Earth, 18 July 2022)

6. GEOLOGICAL AND SUBSOIL DESCRIPTION OF THE SITE

According to the Geological Map Sheet "*3030 Port Shepstone*" as shown in Figure 3, the site is underlain by granite and gneiss Mzumbe Gneiss Suite.

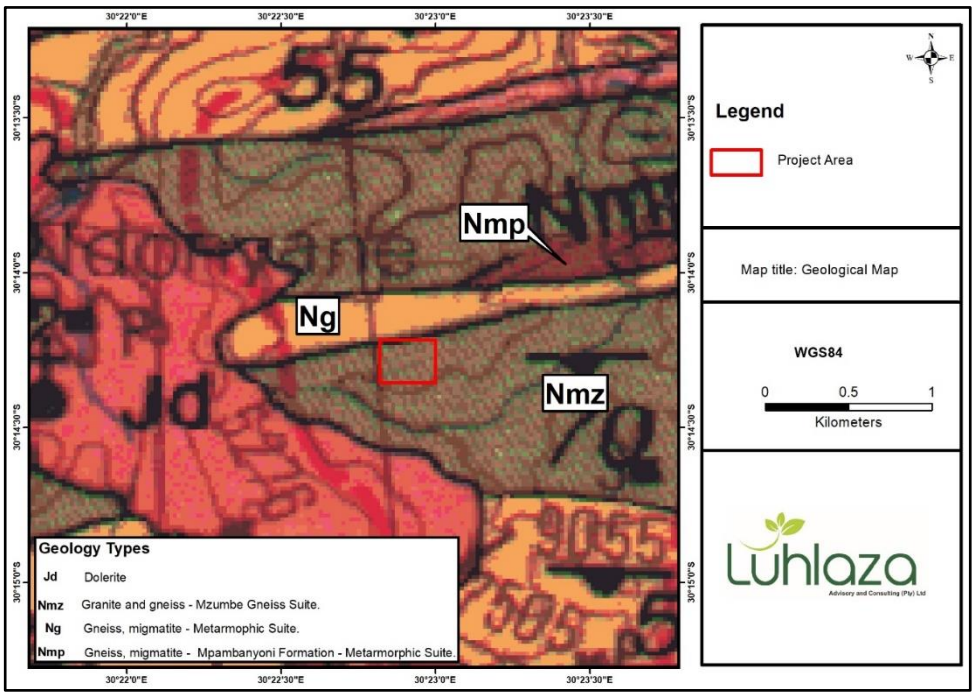

Figure 3: Geological Map of the study area "3030 Port Shepstone"

The positions investigated at the site comprised colluvium, residual material and weathered granite rock. Summarised descriptions are given below and detailed descriptions in the test pit profiles in Appendix A.

Colluvial material at the site can be described as dark grey to black, silty CLAY that generally extended to approximate depths in the range 0.3m (TP01) to 0.5m (TP05) begl.

Residual Granite material can be described as dark grey to yellowish brown, clayey GRAVEL that was encountered in all test pits and extended to approximate depths in the range 0.6m (TP01) to 0.9m (TP03) begl.

Weathered Granite material can be described as a yellowish brown, highly weathered, coarse grained, highly fractured, soft rock and was encountered in all five test pits from approximate depths in the range 0.6m (TP01) to 0.9m (TP05) begl.

Photographs of subsurface profiles observed in the inspection pits are given in Photographs 3 to 5.

Photograph 3: Material Encountered in TP02

Photograph 4: Material Encountered in TP04

Photograph 5: Material Encountered in TP06

7. GROUNDWATER SEEPAGE ON SITE

During the investigation, groundwater seepage was not encountered in any of the test pits excavated on site. However, as the site is situated close to a tributary, the likeliness of an elevated groundwater condition is highly possible.

Based on experience in similar sites, it is advised that precautionary measures be implemented to counteract the potential groundwater activity.

Groundwater activity is anticipated to be elevated after periods of rainfall.

8. PROPOSED DEVELOPMENT

Information supplied by the engineer indicates that the proposed development will comprise of a single storey hall and associated parking areas. The anticipated bearing pressures are known to be less than 100 kPa.

Should the proposed designs be altered, Gevorkyan Geophysics (Pty) Ltd will need to review the recommendations given in this report, as the current recommendations will no longer be valid.

9. GEOTECHNICAL SITE EVALUATION IN TERMS OF STABILITY

The field investigation provides an indication that the site is relatively stable and suitable for the proposed development.

The recommendations given in this report should be followed for the above statement to be valid.

Precautionary measures amounting to no more than sound development practices appropriate to the site conditions were anticipated. The nature of the proposed development was used as the basis at the time of preparation of this report.

10. GENERAL EARTHWORKS GUIDELINES

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.

Cuts in highly weathered bedrock should not exceed gradients of 50°. Inspection of cuts in weathered bedrock by a competent engineering geologist or geotechnical engineer may indicate that the angle of cut batter slopes needs to be varied locally to promote stability of the site.

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.

11. GENERAL EXCAVATION GUIDELINES

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, 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.

12. GENERAL SUBGRADE LAYERWORKS GUIDELINES

The design of the pavement layer works has not be finalised at time of reports and should be discussed with Gevorkyan Geophysics (Pty) Ltd when available.

It is imperative that further laboratory testing be carried out on the in-situ material to confirm the material classification and potential usage.

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.

13. ANTICIPATED FOUNDING CONDITIONS FOR THE SINGLE STOREY STRUCTURES

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

a) Potentially collapsible soils

b) Shallow rock at depths less than 1.0m begl.

14. FOUNDATION SOLUTION

Based on the results of the geotechnical investigation, the most feasible option is to place all foundations on weathered granite rock.

Reinforced Footings on Weathered Granite Rock

Based on the results of the geotechnical investigation, bedrock was encountered across the study site at approximate depths ranging from 0.6m to 0.9m begl.

It is recommended that foundations be placed on the weathered granite rock where a maximum net allowable bearing capacity of 150 kN/m² to 200 kN/m² is considered applicable. All foundations need to be placed on the weathered granite rock, the depths are likely to variate on site. (Refer to test pit profiles for accurate information)

Total settlement is anticipated to be less than 5mm with differential settlement taken as 50% of total settlement.

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 engineer's detail and adequately reinforced taking into consideration the founding conditions of the site.

15. DRAINAGE AND STORMWATER GUIDELINES

In order 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.

On all road curves, the outer shoulder should be lined with upright kerbs to deflect water run-off back into the road stormwater system. Experience with the erodible soils indicates that unlined dish (half round) drains adjacent to the roads are virtually ineffective and will soon give way to the formation of large and deep dongas (erosion gulley). Subsequent damage of road prism can be expected.

The need for subsoil drainage will have to be assessed on site during construction in consultation with the geotechnical professional.

Owing to the highly erodible nature of the insitu soils on-site if subject to poor stormwater runoff controls, due caution is permanently required to prevent slope damage and property maintenance arising from erosion due to uncontrolled runoff of surface water, particularly during periods of strong rain.

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.

16. CONCLUDING COMMENTS

This geotechnical report provides a summary of the founding conditions for the proposed community hall.

The site is underlain by colluvial and residual material that is underlain by weathered granite rock.

Groundwater seepage was not encountered in any of the test pits excavated on site, however, due to the nature of the landform, it is considered that an elevated groundwater condition may occur particularly during the raining seasons. It is advised that a contingency plan be developed to manage the groundwater risk at the site.

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

The foundation solutions for the site as discussed in Section 14.

It is recommended that construction monitoring, forming part of a quality assurance, by a geotechnical specialist be carried out on site for early identification and mitigation of any subsurface issues that were not identified during the investigation.

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.

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

To this end, it is important that regular process control and acceptance control testing be carried out during road construction. Any change from the anticipated ground conditions could then be taken into account to avoid unnecessary expense.

Yours faithfully,
For Gevorkyan Geophysics Pty Ltd

N. Govender Pr. Sci. Nat (400138/17)
Specialist Engineering Geologist

Enclosed: *Appendix A:* *Test Pit Logs*
Appendix B: *DCP Test Results*
Figure 2: *Site Plan Showing Test Pit Positions*
Figure 3: *Geological Map of the Study Area*

References

i. Brink, A. B. & Bruin, R. M., 2002. Guidelines for Soil and Rock Logging in South Africa. s.l., Association of Engineering Geologists, South African Institute Civil Engineering - Geotechnical Division, and South Africa Institute for Engineering and Environmental Geologists, p. 47.

ii. Committee of State Road Authorities, 1985. TRH14: Technical Recommendations for Highways - Guidelines for Road Construction Materials. Pretoria: Department of Transport.

iii. G. Byrne & A.D. Berry, 2008. A Guide to Practical Geotechnical Engineering in South Africa. s.l.: Franki.

iv. Google Earth, 2020. AfriGIS (Pty) Ltd. [Online] Available at: www.googlearth.com [Accessed 06 June 2020].

v. South African Bureau of Standards, 1990. SANS 1200 DA - Standardised Specification for Civil Engineering Construction - Earthworks (Small Works). s.l.: South African Bureau of Standards.

vi. South African Department of Labour, 1991. Occupational Health and Safety Amendment Act, No. 181 of 1993. s.l.: Department of Labour - South Africa

APPENDIX A: TEST PIT PROFILES

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Mbalengwe Engineers
Mngangeni Hall

HOLE No: TP01
Sheet 1 of 1

JOB NUMBER: GG006-22

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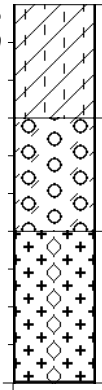

0.00	Slightly moist to moist, dark grey to black, soft to firm, fine grained, silty CLAY - COLLUVIUM.
0.30	Slightly moist to moist, dark grey to yelowish brown, loose to medium dense, fine to coarse grained, clayey GRAVEL - RESIDUAL GRANITE.
0.60	Yellowish brown, highly weathered, coarse grained, highly fractured, soft rock - GRANITE - MZUMBE GRANITE SUITE.
1.00	

NOTES

1) Refusal depth at 1.0m due to boulders.

CONTRACTOR :
MACHINE : Hand Pits
DRILLED BY :
PROFILED BY : Mabuela (Checked by Nishen)
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SETUP FILE : STANDARD.SET

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DATE :
DATE : 01 June 2022
DATE : 20/07/2022 15:39
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ELEVATION : 694
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Y-COORD : -30.237604

HOLE No: TP01

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Mbalengwe Engineers
Mngangeni Hall

HOLE No: TP02
Sheet 1 of 1

JOB NUMBER: GG006-22

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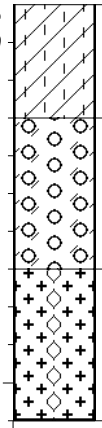

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0.30 Slightly moist to moist, dark grey to yelowish brown, loose to medium dense, fine to coarse grained, clayey GRAVEL - RESIDUAL GRANITE.

0.70 Yellowish brown, highly weathered, coarse grained, highly fractured, soft rock - GRANITE- MZUMBE GRANITE SUITE.

1.10

NOTES

1) Refusal depth at 1.1m

2) DCP Refused on soft rock.

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PROFILED BY : Mabuela (Checked by Nishen)
TYPE SET BY : N. Govender
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ELEVATION : 695
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Y-COORD : -30.237974

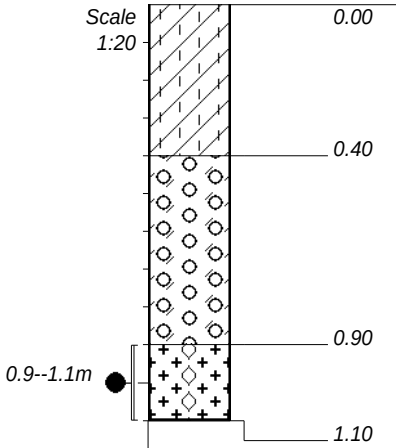
HOLE No: TP02

GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Mbalengwe Engineers
Mngangeni Hall

HOLE No: TP03
Sheet 1 of 1

JOB NUMBER: GG006-22



0.00	Slightly moist to moist, dark grey to black, soft to firm, fine grained, silty CLAY - COLLUVIUM.
0.40	Slightly moist to moist, dark grey to yelowish brown, loose to medium dense, fine to coarse grained, clayey GRAVEL - RESIDUAL GRANITE.
0.90	Yellowish brown, highly weathered, coarse grained, highly fractured, soft rock - GRANITE- MZUMBE GRANITE SUITE.
1.10	

NOTES

1) Refusal depth at 1.1m
2) DCP Refused at 1.5m on soft rock.
3) Sample bag at 0.9--1.1m.

CONTRACTOR :
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PROFILED BY : Mabuela (Checked by Nishen)

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DATE :
DATE : 01 June 2022

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GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Mbalengwe Engineers
Mngangeni Hall

HOLE No: TP04
Sheet 1 of 1

JOB NUMBER: GG006-22

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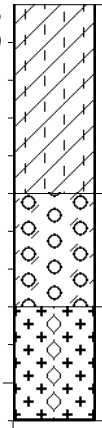

0.00 Slightly moist to moist, dark grey to black, soft to firm, fine grained, silty CLAY - COLLUVIUM.

0.50 Slightly moist to moist, dark grey to yelowish brown, loose to medium dense, fine to coarse grained, clayey GRAVEL - RESIDUAL GRANITE.

0.80 Yellowish brown, highly weathered, coarse grained, highly fractured, soft rock - GRANITE- MZUMBE GRANITE SUITE.

1.10

NOTES

1) Refusal depth at 1.1m.

2) DCP Refused at 1.4m on soft rock

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PROFILED BY : Mabuela (Checked by Nishen)

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DATE : 01 June 2022

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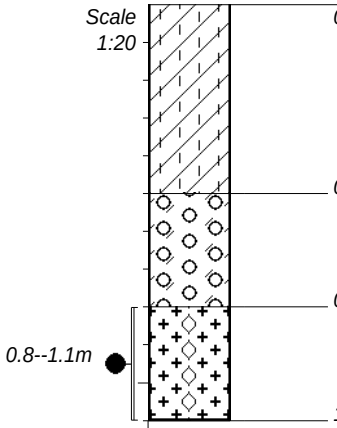
GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Mbalengwe Engineers
Mngangeni Hall

HOLE No: TP05
Sheet 1 of 1

JOB NUMBER: GG006-22



0.00 — Slightly moist to moist, dark grey to black, soft to firm, fine grained, silty CLAY - COLLUVIUM.

0.50 — Slightly moist to moist, dark grey to yelowish brown, loose to medium dense, fine to coarse grained, clayey GRAVEL - RESIDUAL GRANITE.

0.80 — Yellowish brown, highly weathered, coarse grained, highly fractured, soft rock - GRANITE- MZUMBE GRANITE SUITE.

1.10

NOTES

1) Refusal depth at 1.1m.
2) DCP Refused at 1.5m on soft rock.
3) Sample bag F at 0.8--1.1m.

CONTRACTOR :
MACHINE : Hand Pits
DRILLED BY :
PROFILED BY : Mabuela (Checked by Nishen)
TYPE SET BY : N. Govender
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GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Mbalengwe Engineers
Mngangeni Hall

LEGEND
Sheet 1 of 1

JOB NUMBER: GG006-22

	GRAVEL	{SA02}
	SILTY	{SA07}
	CLAY	{SA08}
	CLAYEY	{SA09}
	GRANITE	{SA17}{SA44}
Name	DISTURBED SAMPLE	{SA38}

CONTRACTOR :
MACHINE :
DRILLED BY :
PROFILED BY :

INCLINATION :
DIAM :
DATE :
DATE :

ELEVATION :
X-COORD :
Y-COORD :

TYPE SET BY : N. Govender
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LEGEND
SUMMARY OF SYMBOLS

APPENDIX B: DCP TEST RESULTS

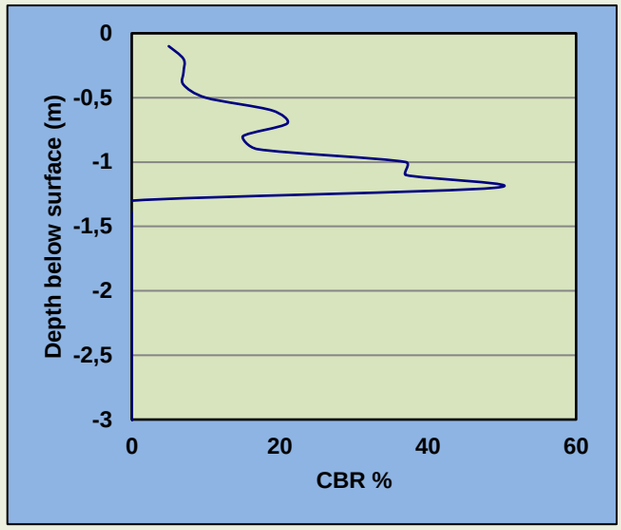
GEVORKYAN GEOPHYSICS (PTY) LTD

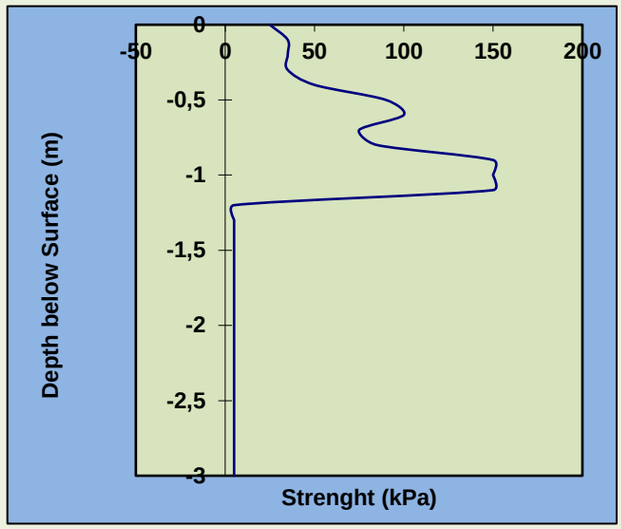
CONSULTING EARTH SCIENTISTS

Client Name	Mbalengwe Engineers
Reference:	GG006-22
Project:	Mngangeni Hall
Date:	01-06-2022
DCP No.:	DC 1
Final Depth:	*1.2 m*

The shear strength values are based on empirical calculations and should be used as a guide only

Depth (m)	Blows/ 0.1m	Inferred Consistency	Shear Strength
0			
0,1	3	Soft	25 kPa
0,2	4	Soft	35 kPa
0,3	4	Soft	35 kPa
0,4	4	Med.Dense	30 deg
0,5	6	Med.Dense	33 deg
0,6	11	Dense	36 deg
0,7	12	Dense	36 deg
0,8	9	Med.Dense	35 deg
0,9	10	Med.Dense	36 deg
1	20	Dense	38 deg
1,1	20	Dense	38 deg
1,2	25	Very Dense	38 deg
1.3	REF		





The results shown here are based on calculations using the DCP test. These are classified as indicative values and need to be verified by other testing methods.

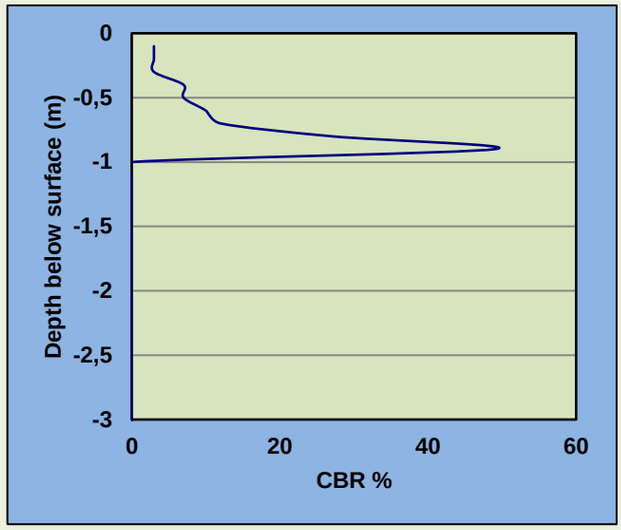
GEVORKYAN GEOPHYSICS (PTY) LTD

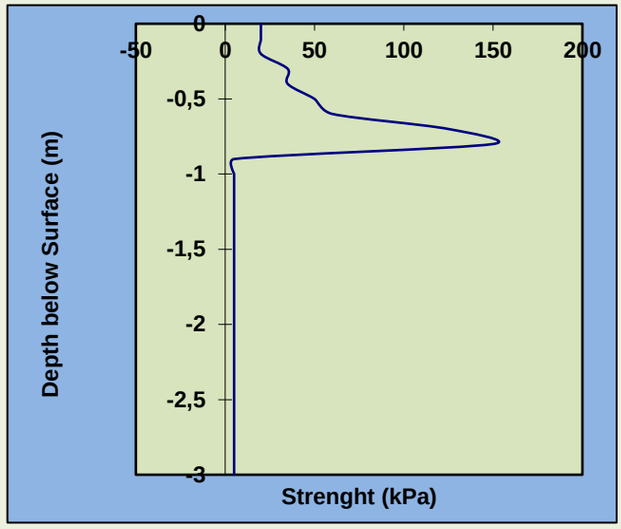
CONSULTING EARTH SCIENTISTS

Client Name	Mbalengwe Engineers
Reference:	GG006-22
Project:	Mngangeni Hall
Date:	01-06-2022
DCP No.:	DC 2
Final Depth:	*0.9 m*

The shear strength values are based on empirical calculations and should be used as a guide only

Depth (m)	Blows/ 0.1m	Inferred Consistency	Shear Strength
0			
0,1	2	Soft	20 kPa
0,2	2	Soft	20 kPa
0,3	2	Soft	20 kPa
0,4	4	Med.Dense	30 deg
0,5	4	Med.Dense	30 deg
0,6	6	Med.Dense	33 deg
0,7	7	Med.Dense	34 deg
0,8	15	Dense	37 deg
0,9	25	Very Dense	38 deg
1	REF		





The results shown here are based on calculations using the DCP test. These are classified as indicative values and need to be verified by other testing methods.

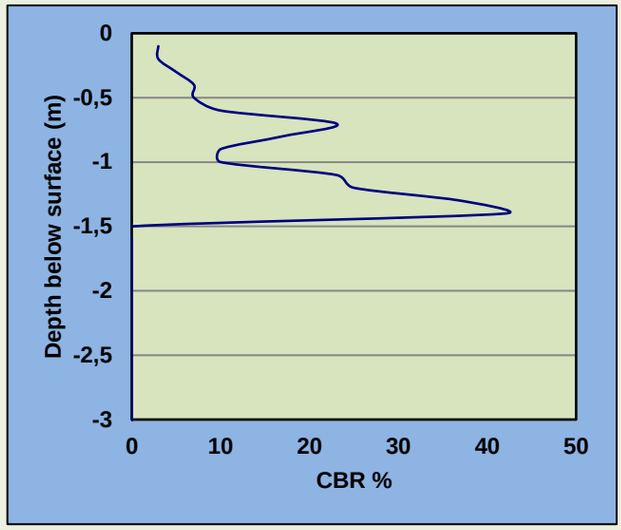
GEVORKYAN GEOPHYSICS (PTY) LTD

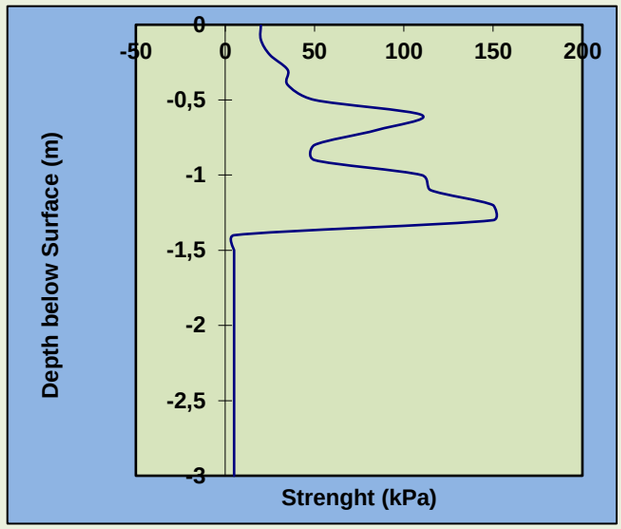
CONSULTING EARTH SCIENTISTS

Client Name	Mbalengwe Engineers
Reference:	GG006-22
Project:	Mngangeni Hall
Date:	01-06-2022
DCP No.:	DC 3
Final Depth:	*1.4 m*

The shear strength values are based on empirical calculations and should be used as a guide only

Depth (m)	Blows/ 0.1m	Inferred Consistency	Shear Strength
0			
0,1	2	Soft	20 kPa
0,2	2	Soft	20 kPa
0,3	3	Soft	25 kPa
0,4	4	Soft	35 kPa
0,5	4	Med.Dense	30 deg
0,6	6	Med.Dense	33 deg
0,7	13	Dense	37 deg
0,8	10	Med.Dense	36 deg
0,9	6	Med.Dense	33 deg
1	6	Med.Dense	33 deg
1,1	13	Dense	37 deg
1,2	14	Dense	37 deg
1,3	20	Dense	38 deg
1,4	22	Dense	38 deg
1.5	REF		





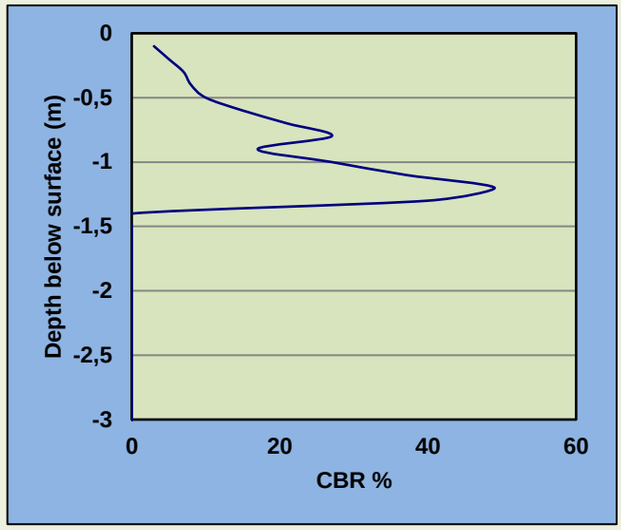
The results shown here are based on calculations using the DCP test. These are classified as indicative values and need to be verified by other testing methods.

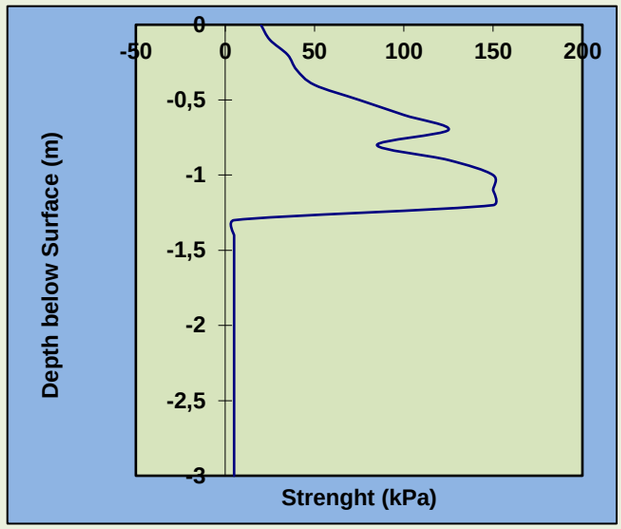
GEVORKYAN GEOPHYSICS (PTY) LTD
CONSULTING EARTH SCIENTISTS

Client Name	Mbalegwe Engineers
Reference:	GG006-22
Project:	Mngangeni Hall
Date:	01-06-2022
DCP No.:	DC 4
Final Depth:	*1.3 m*

The shear strength values are based on empirical calculations and should be used as a guide only

Depth (m)	Blows/ 0.1m	Inferred Consistency	Shear Strength
0			
0,1	2	Soft	20 kPa
0,2	3	Soft	25 kPa
0,3	4	Soft	35 kPa
0,4	5	Firm	40 kPa
0,5	6	Firm	50 kPa
0,6	9	Med.Dense	35 deg
0,7	12	Dense	36 deg
0,8	15	Dense	37 deg
0,9	10	Med.Dense	36 deg
1	15	Dense	37 deg
1,1	20	Dense	38 deg
1,2	25	Very Dense	38 deg
1,3	21	Dense	38 deg
1.4	REF		





The results shown here are based on calculations using the DCP test. These are classified as indicative values and need to be verified by other testing methods.

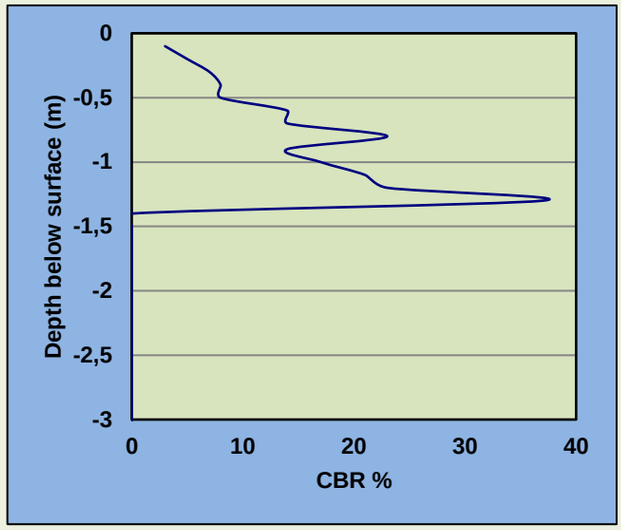
GEVORKYAN GEOPHYSICS (PTY) LTD

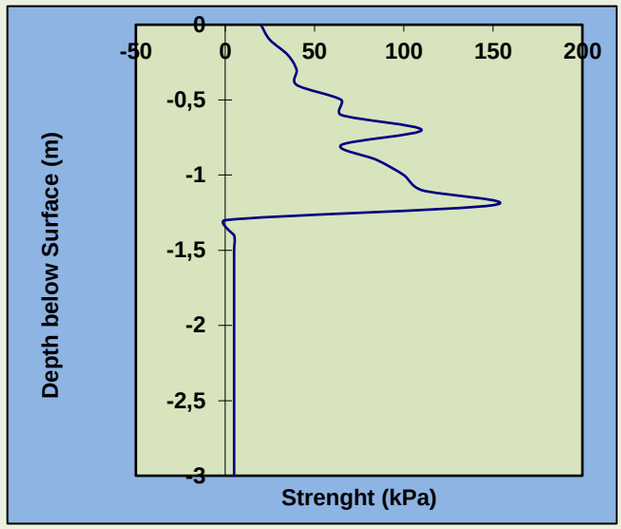
CONSULTING EARTH SCIENTISTS

Client Name	Mbalengwe Engineers
Reference:	GG006-22
Project:	Mngangeni Hall
Date:	01-06-2022
DCP No.:	DC 5
Final Depth:	*1.3 m*

The shear strength values are based on empirical calculations and should be used as a guide only

Depth (m)	Blows/ 0.1m	Inferred Consistency	Shear Strength
0			
0,1	2	Soft	20 kPa
0,2	3	Soft	25 kPa
0,3	4	Soft	35 kPa
0,4	5	Firm	40 kPa
0,5	5	Firm	40 kPa
0,6	8	Med.Dense	35 deg
0,7	8	Med.Dense	35 deg
0,8	13	Dense	37 deg
0,9	8	Med.Dense	35 deg
1	10	Med.Dense	36 deg
1,1	12	Dense	36 deg
1,2	13	Dense	37 deg
1,3	20	Dense	38 deg
1.4	15	Dense	38 deg
1.5	REF		





The results shown here are based on calculations using the DCP test. These are classified as indicative values and need to be verified by other testing methods.

FIGURE 2: FIELD TEST POSITIONS

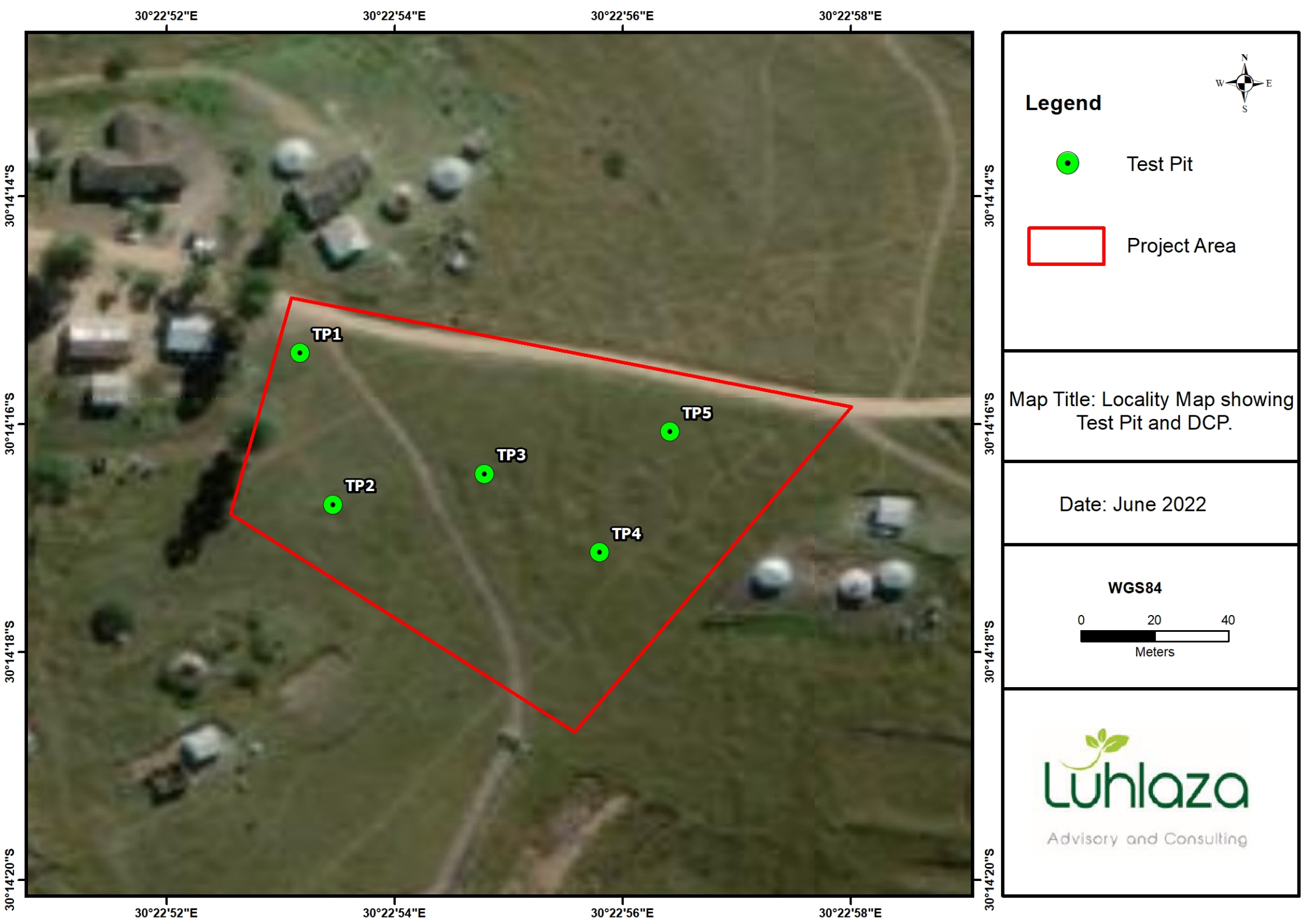
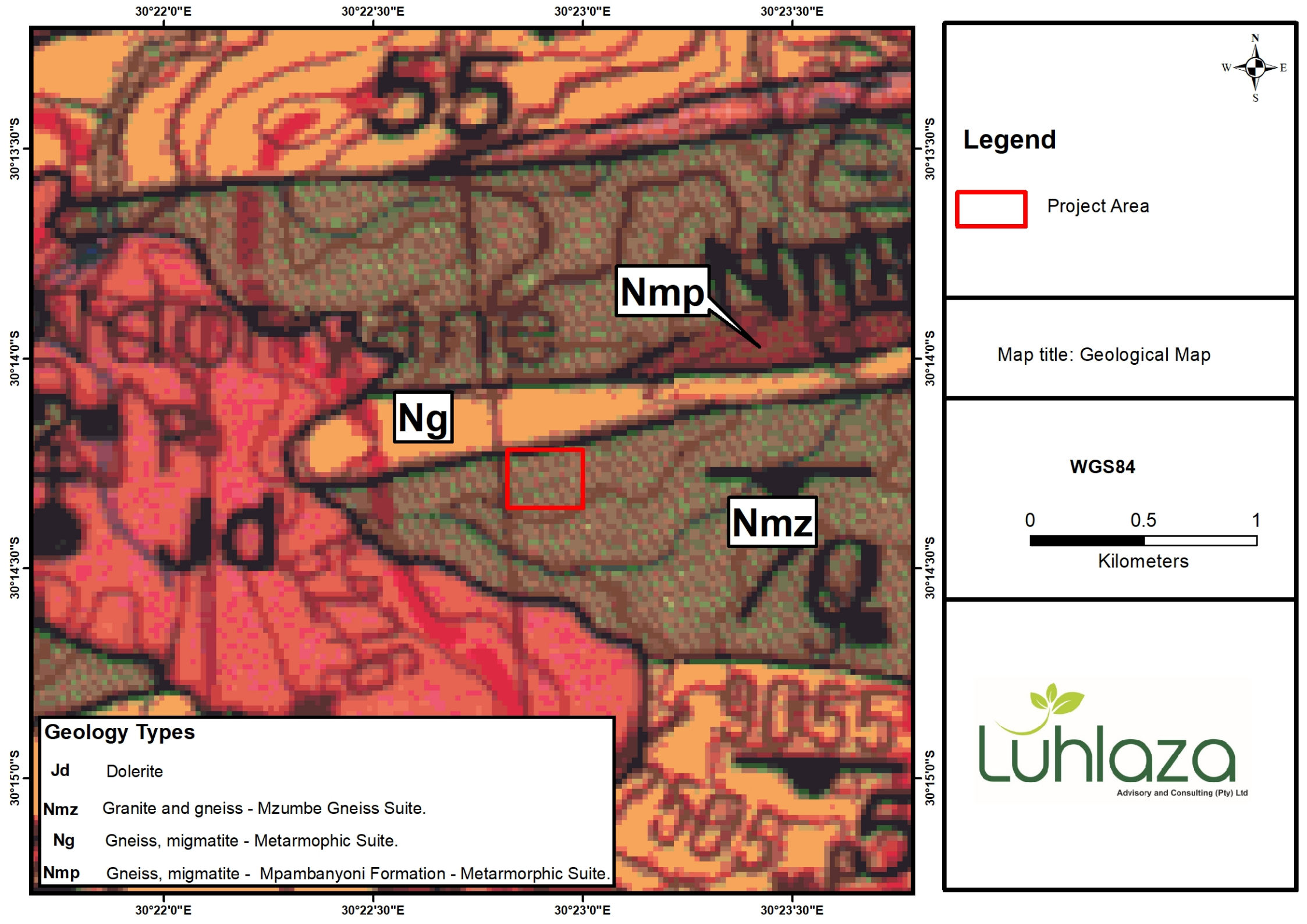

30°22'52"E
30°22'54"E
30°22'56"E
30°22'58"E
30°14'14"S
30°14'16"S
30°14'18"S
30°14'20"S
TP1
TP2
TP3
TP4
TP5
Legend
N
W
E
S
Test Pit
Project Area
Map Title: Locality Map showing Test Pit and DCP.
Date: June 2022
WGS84
0
20
40
Meters
Luhlaza
Advisory and Consulting

FIGURE 3: GENERAL GEOLOGY


30°22'0"E
30°22'30"E
30°23'0"E
30°23'30"E
30°13'30"S
30°14'0"S
30°14'30"S
30°15'0"S
55
Nmp
Ng
Jd
Nmz
Q
Geology Types
Jd Dolerite
Nmz Granite and gneiss - Mzumbe Gneiss Suite.
Ng Gneiss, migmatite - Metarmophic Suite.
Nmp Gneiss, migmatite - Mpambanyoni Formation - Metarmorphic Suite.
N
W
E
S
Legend
Project Area
Map title: Geological Map
WGS84
0
0.5
1
Kilometers
Luhlaza
Advisory and Consulting (Pty) Ltd