ANNEXURE F

- Site Investigations
- Slope Stability
- Rock Mechanics
- Soil Mechanics
- Foundations
- Borrow Pits and Materials
- Roads
- Groundwater
- NHBRC
- Geotechnical Instrumentation

Geotechnical Investigation for the proposed Empowerment Zone Development in Diepkloof, Gauteng: Preliminary Report

Client: Turning Point Project Management

Reference: 18-0975R01

Dated: 13 February 2019

GCS Geotechnical (Pty) Ltd
63 Wessels Street
Rivonia
Cell: +27 (0)82 567 1561
ninow@gcs-sa.biz
www.gcs-sa.biz

Geotechnical Investigation for the proposed Empowerment Zone Development in Diepkloof, Gauteng: Preliminary Report

Reference: 18-0975R01 **Date: 12 February 2019**

DOCUMENT ISSUE STATUS

Report Issue	Preliminary		
GCS Reference Number	GCS Ref: 18-0975R01		
Client Reference	Turning Point Project Management		
Title	Geotechnical Investigation for the proposed Empowerment Zone Development in Diepkloof, Gauteng: Preliminary Report		
	Name	**Signature**	**Date**
Author	Warren Kretzinger		13 February 2019
Document Reviewer	Nino Welland		19 February 2019
Director	Nino Welland		19 February 2019

LEGAL NOTICE

Geotechnical Investigation for the proposed Empowerment Zone Development in Diepkloof, Gauteng: Preliminary Report

Reference: 18-0975R01 **Date: 12 February 2019**

EXECUTIVE SUMMARY

This report presents the results of a geotechnical investigation for the proposed Diepkloof Empowerment Zone in Soweto, Gauteng Province, and presents the conclusions and recommendations for materials usage, excavations, foundations and earthworks.

The most important consideration in relation to the proposed development is the presence of potentially collapsible soils, and the almost ubiquitous presence shallow bedrock on site.

Based on the 1:250 000 Geological Map titled "2626 West-Rand (1986)", the site can be seen to be underlain by quartzite, conglomerate and shale of the Turffontein Subgroup, Central Rand Group of the Witwatersrand Supergroup.

On site, thin horizons of topsoil, hillwash and fill were noted to be overlying the residual sandstone and/or sandstone bedrock. In some instances sandstone bedrock was observed outcropping from surface.

Soft excavation in terms of SABS 1200: D may be anticipated to depths of between 0.35 and 1.6 m below natural ground level over the site, and intermediate to hard excavation and possible blasting may be anticipated below this depth, if required.

The site, as a whole, has been categorized into the following zones, according to NHBRC guidelines:

- ***Zone A – P***
- ***Zone B – C2***
- ***Zone C – C/R***
- ***Zone D – C1/R***
- ***Zone E – C2/R***
- ***Zone F - R***

Thus, the following foundation recommendations, and/or combinations of these, are suggested:

- *Normal construction.*
- *Stiffened strip foundations or stiffened raft foundations.*
- *Compaction of in-situ soils below individual footings.*
- *Deeper than normal strip foundations.*
- *Soil raft.*

It is assumed that the in-situ materials will be of a suitable quality for site road layerworks construction. Index and compaction testing will confirm this suitability for usage.

*Finally, the ground conditions described in this report refer specifically to those encountered at the test positions advanced on site. It is therefore possible that conditions at variance with those discussed above may be encountered elsewhere on the site. In this regard it is critical that material management be maintained continuously on site and that **GCS Geotechnical** carry out periodic inspections of the site during construction to ensure that any variation in the anticipated ground conditions can be assessed and revised recommendations subsequently provided in order to avoid unnecessary delays and expense. Furthermore it is important that the construction phase of the project be treated as an augmentation of the geotechnical investigation.*

Geotechnical Investigation for the proposed Empowerment Zone Development in Diepkloof, Gauteng: Preliminary Report

Reference: 18-0975R01 **Date: 12 February 2019**

Definitions and Abbreviations

Commercial:

GCS Geotechnical	GCS Geotechnical (Pty.) Ltd.

Technical:

CH	Chainage (metres)
mbgl	metres below ground level
masl	metres above sea level
NGL	Natural Ground Level
FL	Foundation Level
BH	Borehole
SPT	Standard Penetration Test
N	SPT N value (blows per 300 mm)
TLB	Tractor-mounted Loader Backhoe
TP	Test Pit
DCP	Dynamic Cone Penetrometer
EABC	Estimated Allowable Bearing Capacity
G1-G10	Standard classification of natural road building materials (TRH 14)
CBR	California Bearing Ratio
MDD	Maximum Dry Density (kg/m3)
MADD	Modified AASHTO Dry Density
OMC	Optimum moisture Content (%)
PI	Plasticity Index
LL	Liquid Limit
LS	Linear Shrinkage
RMR	Rock Mass Rating
GSI	Geological Strength Index
mi	Hoek-Brown Constant (origin & texture dependent)
RQD	Rock Quality Designation (%)
FF	Fracture frequency
UCS	Unconfined Compressive Strength (MPa)
C (c')	Cohesion (kPa) – total stress and (effective stress)
Φ (Φ')	Friction Angle (degrees) – total stress and (effective stress)
Kv	Modulus of Subgrade Reaction (MN/mm or kPa/mm)
CFA	Continuous Flight Auger (pile type)
DCI	Driven Cast In situ (pile type)
Cv	Coefficient of Consolidation (m2/yr)
Mv	Modulus of Compressibility (m2/MN)
MC1	Moisture Content Before Test (%)
MC2	Moisture Content After Test (%)
ρ	Dry Density (kg/m3)
VSR	Very soft rock
SR	Soft rock
MHR	Medium hard rock
HR	Hard rock
VHR	Very hard rock

Geotechnical Investigation for the proposed Empowerment Zone Development in Diepkloof, Gauteng: Preliminary Report

Reference: 18-0975R01 **Date: 12 February 2019**

1. INTRODUCTION & TERMS OF REFERENCE

At the request of Ms. Gugu Hlope of Turning Point Project Management (hereafter referred to as Turning Point), ***GCS Geotechnical*** (hereafter referred to as GCS) was asked to provide a proposal and cost estimate for the geotechnical investigation for the proposed Empowerment Zone Development in Diepkloof, Gauteng, which was sent through on 29 October 2018. The proposal was accepted and finalized on 11 December 2018, and fieldwork commenced on 5 February 2019.

2. AVAILABLE INFORMATION

The following information was drawn upon for the purposes of the investigation:

- The 1:250 000 Geological Map titled *"2626 West Rand"* as compiled by the South African Geological Survey, 1986,
- Google Earth Site Location,
- Geotechnical Site Investigations for Housing Developments (GFSH2:2002),
- SABS 1200 D – Earthworks.

The table below shows the available published physiographical information on the site.

past, or having materials cut to fill the area directly to the east, where it appears that an embankment might have been built up.

The site is vegetated mostly in the north and northwestern quadrants by short grass and few small trees, while in the southern and eastern portions, medium to large trees were noted.

A central coordinate for the sites combined is:

26°15'47.29"S / 27°57'3.63"E

4. GEOLOGY

At a regional scale, based on the 1:250 000 Geological Map titled *"2626 West-Rand* (1986)", the site can be seen to be underlain by quartzite, conglomerate and shale of the Turffontein Subgroup, Central Rand Group of the Witwatersrand Supergroup.
On site a relatively thick horizon of hillwash was noted to be overlying the residual sandstone.

On a local scale, it was noted that the site was underlain by a thin layer of topsoil, hillwash or ferruginised hillwash in places, and occasionally by fill in the areas of large-scale excavations for cut to fill. For the most part these transported and emplaced horizons are underlain by residual sandstone, and weathered sandstone bedrock.

5. FIELDWORK

TLB-excavated test pits (hereafter referred to as TP's) were advanced on site, in order to ascertain and better understand the general engineering properties and parameters of the subsurface materials.

5.1 TLB-excavated Test Pits

Twenty eight TPs were excavated on the site in order to better understand the engineering properties of the subsurface soil / rock conditions.

The results of the TPs indicated termination depths ranging between 0.0 and 1.6 m below existing ground level, with an average depth of 0.68 m. The site proved mostly rather homogeneous with the main differences being the respective depths to sandstone bedrock, which occurred a lot shallower, even surficially, in some areas.

Table 2: Summary of Available Desk Study Information

Parameter	Value	Reference
Development	Empowerment Zone Development	Turning Point
Site coordinates	26°15'47.29"S / 27°57'3.63"E	Turning Point
Weinerts N-value	2-5	Weinert (1974)
Climatic Region	Moderate	TRH 2 (1978)
Rainfall	650-700 mm	2526 Johannesburg (1999) 1:500 000 scale
Temperature	0.5°C – 26.7°C	after DWAF (1986)
Evaporation	1650 mm	After DWAF (1986)
Water Balance	Deficit	Schulze (1985)
Weathering Type	Slight disintegration, moderate decomposition with frost action and very slight weathering	Fookes et al (1971)
Geology	Quartzite, conglomerate and shale, tillite and hornfels of the Turffontein Subgroup, Central Rand Group of the Witwatersrand Supergroup.	Geological Map Series: West Rand-2626 (1986) 1:250 000 scale
Soil Cover	Arenaceous sediments	Brink (1985)
Origin	Transported and residual	Brink (1985)
Topography	Variable Gradient	Garmap SA Topo & Rec 2012.1
Drainage	Not well defined	Garmap SA Topo & Rec 2012.1
Drainage Region	Quaternary Catchment: C22A	DWAF (1999)
Hydrogeology	0.5-2l; fractured	1:500 000 scale
Groundwater depth	Unknown	DWAF-WRC (1995)
Erodibility Index	9-15 (Intermediate)	WRC (1992)
Seismic Intensity	VI (MMS)	Fernandez et al (1972)
Liquefaction	Unlikely (<50 cm/s2)	Welland (2002)

3. SITE DESCRIPTION

The site, holistically, falls on Portion 159 Diepkloof, and is bounded in the north and northeast by Chris Hani Road (the M68), to the west by Chris Hani Baragwanath Hospital, to the south and southeast by the N1 Western Bypass.

Portion 159 covers a cumulative area of approximately 34 Ha, although the existing Soweto Empowerment Zone occupies approximately 5 Ha of this total area.

The site is bounded by a perimeter wall, with gates that are locked and bolted along the western and southern sides. Access to the site may be gained through the Soweto Empowerment Zone. The eastern portion of the site along Chris Hani Street has parts of the perimeter wall broken down.

The site gradient is quite variable with a slight decent towards to the north, and a steeper descent to the south towards the N1. Much of the southern and southwestern portion of the site has undergone large scale excavations, possibly having been used as a borrow pit in the

Table 5.1a: Summary of Soil Layers in Test Pits

TP No.	Topsoil (m-m)	Fill (m-m)	Hillwash / Ferruginised Hillwash (m-m)	Residual Sandstone (m-m)	Weathered Sandstone (m-m)
1	0-0.3	-	0.3-0.7	0.7-0.9	0.9-1
2	0-0.2	-	-	0.2-0.7	0.7-0.9
3	0-0.25	-	-	0.25-0.55	0.55-0.75
4	0-0.2	-	0.2-0.5	0.5-1.1	1.1-1.2
5	0-0.3	-	0.3-0.6	0.6-0.9	0.9-1.2
6	0-0.4	-	0.4-0.55	0.55-0.8	0.8-0.95
7	0-0.2	-	0.2-0.45	0.45-1	1-1.6
8	0-0.4	-	-	0.4-0.55	0.55-0.65
9	0-0.2	-	0.2-0.5	0.5-0.9	0.9-1.1
10	0-0.25	-	0.25-0.5	0.6-0.8	0.8-0.85
11	0-0.3	-	0.3-0.6	0.6-1	1-1.1
12	0-0.4	-	0.4-0.7	0.7-1.1	1.1-1.3
13	0-0.2	-	-	-	0.2-0.22
14	0-0.4	-	-	-	0.4-0.42
15	0-0.2	-	-	-	0.2-0.21
16	-	-	-	-	Surficial
17	-	-	-	-	Surficial
18	-	-	-	-	Surficial
19	0-0.1	0.1-0.65	-	-	-
20	0-0.2	-	-	0.2-0.5	0.5-0.6
21	0-0.3	-	-	0.3-0.6	0.6-0.7
22	0-0.1	-	-	0.1-0.45	0.45-0.5
23	0-0.15	-	-	0.15-0.55	0.55-0.65
24	0-0.2	-	-	0.2-0.6	0.6-0.7
25	0-0.2	-	-	0.2-0.7	0.7-1
26	0-0.15	-	-	0.15-0.45	0.45-0.5
27	-	-	-	-	Surficial
28	0-0.15	-	-	0.15-0.35	-
Average Thickness (m)	0.21	0.02	0.09	0.25	0.11

Table 5.1b: Summary of Soil Profile over the Majority of the Site

Depth From (m)	Depth To (m)	Description	EABC (kPa)	Kv (kPa/mm)	E (MPa)	C' (kPa)	Φ' (deg)
Topsoil							
0	0.21	Dry to slightly moist grey brown mottled cream white LOOSE intact silty medium SAND with minor fine gravels and roots.	50	25	10-15	0-5	28-30
Fill							
0.21	0.23	Slightly moist yellow to orange brown LOOSE becoming VERY DENSE silty SAND with gravels and abundant interlocking COBBLES and BOULDERS.	50-300	25-100	10-35	0	28-45
Hillwash / Ferruginised Hillwash							
0.23	0.32	Slightly moist orange to yellow brown MEDIUM DENSE intact to pinholed, voided and possibly occasionally shattered silty gravelly SAND. Partially ferruginised in places.	100-150	40-55	15-25	0-5	30-35
Residual Sandstone							
0.32	0.57	Slightly moist pink to orange brown MEDIUM DENSE to DENSE intact medium to coarse-grained SAND with quartz gravels.	150-300	55-100	15-35	0	30-40
Weathered Sandstone							
0.57	0.68	Pink to grey brown highly to completely weathered fine to medium-grained closely jointed VERY SOFT to MEDIUM HARD ROCK.	300-500	100-200	35+	0	50+

EABC = estimated allowable bearing capacity (ignoring collapse potential)
Kv = modulus of subgrade reaction
E = elastic modulus
C' = cohesion (kPa)
Φ' (deg) = internal friction angle of soil
NB. It is important to note that the above layer thicknesses are an average across the site.

6. GROUNDWATER

No groundwater seepage occurred on site in any of the TPs during the time of the investigation, although during summer months and during times of prolonged or heavy rainfall it may be anticipated that a perched groundwater table may be present at relatively shallow depths over the site.

- ***Weathered Sandstone***
  The more weathered sandstone, where excavatable is assumed to qualify as **G5-G7** (*upper subbase to upper selected layers*) and may thus be re-used as such in foundation construction and layerworks.

- ***Composite Soils***
  This mixed layer of residual and weathered sandstone is assumed to qualify as **G5-G7** (*upper subbase to upper selected layers*) and may thus be re-used as such in foundation construction and layerworks.

8.2 NHBRC Classification

GCS Geotechnical has classified and zoned the site, to NHBRC standards, based on visual and tactile means coupled with general experience in similar geological environments, prior to laboratory results are available.

The main geotechnical constraints on site are the presence of potentially collapsible soils and the presence of shallow bedrock in places.

Assuming that the topsoil horizon, which ranges in thickness from 0.1 to 0.4 m, will be stripped and stockpiled for landscaping rather than founded upon, potential collapse settlement will only really be probable in the medium dense to dense hillwash and residual sandstone layers, with a CP assumed to range between 1 and 3%.

Site soils are assumed not to be potentially expansive, although this will be quantified once laboratory test results are made available.

In most instances weathered sandstone bedrock occurs at depths shallower than 1 m across the site. As a result, the site has been divided into Zones A-F, as seen below, and will be presented as a zoned Site Plan:

Table 8.2a: NHBRC Classification Zones

Zonation	NHBRC Classification	Respective TPs	Geotechnical Constraints
A	P	• 20	• Controlled Fill (Problematic).
B	C2	• 4 • 12	• Potential Collapse of >10 mm.
C	C/R	• 8	• Potential Collapse of 0-5 mm. • Shallow Bedrock.
D	C1/R	• 3 • 20-21 • 26 • 28	• Potential Collapse of 5-10 mm. • Shallow Bedrock.
E	C2/R	• 1-2 • 5-7 • 9-11 • 22-25	• Potential Collapse of >10 mm. • Shallow Bedrock.
F	R	• 13-18 • 27	• Shallow Bedrock.

8.3 Foundations

Based on the **NHBRC** site classification zones above, the following foundation recommendations, or combinations thereof, should be considered holistically for ***C2/R***:

- **Normal construction** in the areas of surficial or very shallow bedrock, which will encompass strip or pad foundations with associated site drainage.
- **Stiffened strip foundations or stiffened raft** comprising articulation joints with solid lightly reinforced masonry, fabric reinforcement in floor slabs, site drainage and plumbing precautions, and bearing pressures not to exceed 50 kPa.
- **Compaction of in-situ soils below individual footings** by removing in-situ materials to a depth of 1.5 times foundation width or to a competent soil horizon and replace with compacted material to a minimum of 93% MOD AASHTO and -1 to +2% OMC and with normal construction with lightly reinforced strip footings and light reinforcement in masonry.
- **Deeper than normal strip foundations** which comprises normal construction with drainage requirement, or founding directly onto a competent soil horizon below the collapsible layer.
- **Soil Raft** in the same way as compaction beneath individual footings, except beneath the entire footprint of the respective structure.

8.4 Excavatability & Earthworks

All materials on site classify as ***soft excavation*** (SABS 1200: D) to depths between 0.35 and 1.6 m, with an average refusal depth of 0.68 m. Beneath these depths, ***intermediate*** and possibly ***hard excavation*** with possible ***blasting*** should be anticipated if the need arises to excavate deeper for services trenches.

8.5 Roads

Materials are being assessed for their suitability in on-site road construction. It is assumed all materials on site will qualify as between G6 and G9, which will be suitable as road layerworks construction materials, however this will be quantified when laboratory results are made available. Index and compaction testing will confirm this suitability for usage.

8.6 Drainage

For the promotion of a stable site, with no soil movement-related issues, it is extremely important that suitable drainage, both surface and subsurface, be constructed so that no water ingress into the subsurface soils in and around foundation bases is possible. Drainage should be such that any rainfall is diverted to the nearest stormwater drainage system. Areas of potential pooling or damming of rainfall on site should be carefully designed and sloped so as the remove this water away from the foundations.

9. CONCLUSIONS & RECOMMENDATIONS

General

- This report presents the results of a geotechnical investigation for the proposed Diepkloof Empowerment Zone in Soweto, Gauteng Province, and presents the conclusions and recommendations for materials usage, excavations, foundations and earthworks.

- The most important consideration in relation to the proposed development is the presence of potentially collapsible soils, and the almost ubiquitous presence shallow bedrock on site.

Geology & Ground Conditions

- Based on the 1:250 000 Geological Map titled *"2626 West-Rand* (1986)", the site can be seen to be underlain by quartzite, conglomerate and shale of the Turffontein Subgroup, Central Rand Group of the Witwatersrand Supergroup.

On site, thin horizons of topsoil, hillwash and fill were noted to be overlying the residual sandstone and/or sandstone bedrock. In some instances sandstone bedrock was observed from surface.

Excavatability

- Soft excavation in terms of **SABS 1200: D** may be anticipated to depths of between 0.35 and 1.6 m below natural ground level over the site, and intermediate to hard excavation and possible blasting may be anticipated below this depth, if required.

Foundations

- The site, as a whole, has been categorized into the following zones, according to NHBRC standards:

  - **Zone A – P**
  - **Zone B – C2**
  - **Zone C – C/R**
  - **Zone D – C1/R**
  - **Zone E – C2/R**
  - **Zone F - R**

Thus, the following foundation recommendations, and/or combinations of these, are suggested:

- Normal construction.
- Stiffened strip foundations or stiffened raft foundations.
- Compaction of in-situ soils below individual footings.
- Deeper than normal strip foundations.
- Soil Raft.

Roads

- It is assumed that the in-situ materials will be of a suitable quality for site road layerworks construction. Index and compaction testing will confirm this suitability for usage.

Further Investigations

- Finally, the ground conditions described in this report refer specifically to those encountered at the test positions advanced on site. It is therefore possible that conditions at variance with those discussed above may be encountered elsewhere on the site. In this regard it is critical that material management be maintained continuously on site and that ***GCS Geotechnical*** carry out periodic inspections of the site during construction to ensure that any variation in the anticipated ground conditions can be assessed and revised recommendations subsequently provided in order to avoid unnecessary delays and expense. Furthermore it is important that the construction phase of the project be treated as an augmentation of the geotechnical investigation.

N Welland: Pr.Eng. / Pr.Sci.Nat

W Kretzinger: Pr.Sci.Nat

13 February 2019

For GCS Geotechnical (Pty) Ltd

ninow@gcs-sa.biz
www.gcs-sa.biz

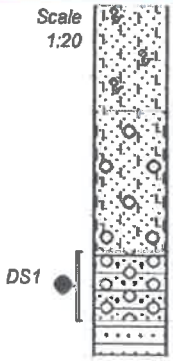
Appendix A
TLB-Excavated Trial Pit Profiles

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP01
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20



0.00 Slightly moist, grey brown mottled cream white, LOOSE, intact, silty medium SAND. Topsoil with roots.

0.30 Slightly moist, orange to yellow brown, MEDIUM DENSE, intact to pinholed and voided and shattered, silty gravelly SAND. Partially ferruginised Hillwash.

0.70 Slighly moist, pink to orange brown, MEDIUM DENSE to DENSE, intact, medium to coarse-grained SAND with quartz gravels. Residual Sandstone.

0.90 Pink to grey brown highly to completely weathered fine to medium-grained SOFT to MEDIUM HARD ROCK SANDSTONE BEDROCK.

1.00

NOTES

1) No Groundwater Seepage
2) No Sidewall Collapse
3) Final Depth: 1.0 m (refusal on weathered sandstone)
4) Samples taken: Disturbed Sample DS1 at 0.7–0.9 m (Bulk).

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET
DOCE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD
Y-COORD

HOLE No: TP01

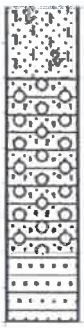
dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP02
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20



0.00 Dry to slightly moist, grey brown to brown mottled cream white, LOOSE, intact, silty medium SAND. Topsoil with roots.

0.20 Slighly moist, pink to orange and yellow brown, MEDIUM DENSE to DENSE, intact to pinholed, medium to coarse-grained SAND with quartz gravels. Residual Sandstone.

0.70 Pink to grey brown highly to completely weathered fine to medium-grained SOFT to MEDIUM HARD ROCK SANDSTONE BEDROCK.

0.90

NOTES

1) No Groundwater Seepage
2) No Sidewall Collapse
3) Final Depth: 0.90 m (refusal on weathered sandstone)
4) Samples taken: None.

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET

DOCE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD
Y-COORD

HOLE No: TP02

dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP03
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20

0.00 Dry to slightly moist, grey brown to brown mottled cream white, LOOSE, intact, silty medium SAND with minor fine gravels. Topsoil with roots.

0.25 Slightly moist, pink brown to orange brown, MEDIUM DENSE, pinholed, silty SAND. Residual Sandstone.

0.55 Orange brown highly to completely weathered fine to coarse-grained SOFT to MEDIUM HARD ROCK SANDSTONE BEDROCK.

0.75

NOTES

1) No Groundwater Seepage
2) No Sidewall Collapse
3) Final Depth: 0.75 m (refusal on weathered sandstone)
4) Samples taken: None.

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET

D0CE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD :
Y-COORD :

HOLE No: TP03

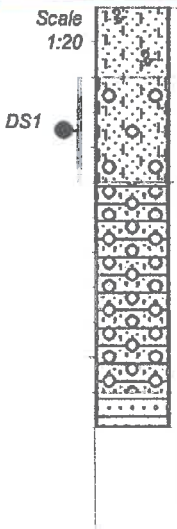
dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP04
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20



0.00 Slightly moist, grey brown mottled cream white, LOOSE, intact, silty medium SAND. Topsoil with roots.

0.20 Slightly moist, orange to yellow brown, MEDIUM DENSE, intact to pinholed and voided and shattered, silty gravelly SAND. Partially ferruginised Hillwash.

0.50 Slighly moist, pink to orange brown, MEDIUM DENSE to DENSE, intact, medium to coarse-grained SAND with quartz gravels. Residual Sandstone.

1.10 Pink to grey brown highly to completely weathered fine to medium-grained SOFT to MEDIUM HARD ROCK SANDSTONE BEDROCK.

1.20

NOTES

1) No Groundwater Seepage
2) No Sidewall Collapse
3) Final Depth: 1.20 m (refusal on weathered sandstone)
4) Samples taken: Disturbed sample DS1 at 0.2–0.5m (Bulk).

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET
D0CE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD :
Y-COORD :

HOLE No: TP04

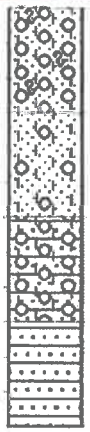
dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP05
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20



0.00 Dry, light to dark grey brown, LOOSE, intact to pinholed silty SAND with minor fine to coarse subangular to subrounded gravels and minor to abundant roots. Topsoil.

0.30 Slightly moist, orange to yellow brown, MEDIUM DENSE, intact to pinholed and voided and shattered, silty gravelly SAND. Hillwash.

0.60 Dry, dark grey to red brown, LOOSE to MEDIUM DENSE, shattered, silty friable GRAVEL. Residual Sandstone.

0.90 Pink to grey brown highly to completely weathered fine to medium-grained SOFT to MEDIUM HARD ROCK SANDSTONE BEDROCK.

1.20

NOTES

1) No Groundwater Seepage
2) No Sidewall Collapse
3) Final Depth: 1.20 m (refusal on weathered sandstone)
4) Samples taken: None

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET

D0CE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD :
Y-COORD :

HOLE No: TP05

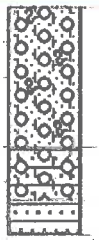
dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP08
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20



0.00 Dry , light to dark grey brown, LOOSE, intact to pinholed silty fine SAND with minor fine to coarse subangular to subrounded gravels and minor to abundant roots. Topsoil.

0.40 Dry to slightly moist, dark grey to red brown, LOOSE to MEDIUM DENSE, shattered, silty friable GRAVEL. Residual Sandstone.

0.55 Cream white highly to moderately weathered fine-grained closely jointed MEDIUM HARD ROCK. SANDSTONE BEDROCK.

0.65

NOTES

1) No Groundwater Seepage
2) No Sidewall Collapse
3) Final Depth: 0.65 m (refusal on weathered sandstone)
4) Samples taken: None

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET
D0CE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD :
Y-COORD :

HOLE No: TP08

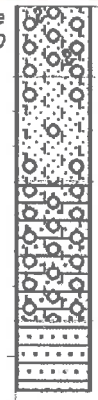
dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP09
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20



0.00 Dry to slightly moist, light to dark grey brown, LOOSE, intact to pinholed silty fine SAND with minor fine to coarse subangular to subrounded gravels and minor to abundant roots. Topsoil.

0.20 Slightly moist, orange to yellow brown, MEDIUM DENSE, intact to pinholed and voided and shattered, silty gravelly SAND. Hillwash.

0.50 Dry to slightly moist, dark grey to red brown, LOOSE to MEDIUM DENSE, shattered, silty friable GRAVEL. Residual Sandstone.

0.90 Cream white highly to moderately weathered fine-grained closely jointed MEDIUM HARD ROCK. SANDSTONE BEDROCK.

1.10

NOTES

1) No Groundwater Seepage
2) No Sidewall Collapse
3) Final Depth: 1.10 m (refusal on weathered sandstone)
4) Samples taken: None.

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET
DOCE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975Diepkloofl.ogs.ver.TXT

ELEVATION : N/A
X-COORD
Y-COORD

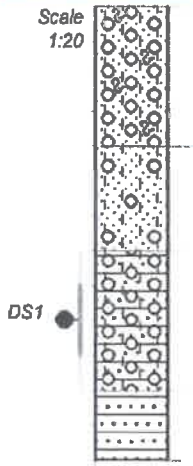
HOLE No: TP09

dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP12
Sheet 1 of 1

JOB NUMBER: 18.0975



0.00 Dry to slightly moist, light to dark grey brown, LOOSE, intact to pinholed silty fine SAND with minor fine to coarse subangular to subrounded gravels and minor to abundant roots. Topsoil.

0.40 Slightly moist, orange to yellow brown, MEDIUM DENSE, intact to pinholed and voided and shattered, silty gravelly SAND. Hillwash.

0.70 Dry to slightly moist, dark grey to red brown, MEDIUM DENSE, shattered, silty friable GRAVEL. Residual Sandstone.

1.10 Cream white completely to highly weathered fine-grained closely jointed VERY SOFT to SOFT ROCK. SANDSTONE BEDROCK.

1.30

NOTES

1) No Groundwater Seepage
2) No Sidewall Collapse
3) Final Depth: 1.30 m (refusal on weathered sandstone)
4) Samples taken: Disturbed Sample DS1 at 0.7–1.1 m (Bulk).

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET

D0CE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD
Y-COORD

HOLE No: TP12

dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP13
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20

0.00 Dry to slightly moist, light to dark grey brown, LOOSE, intact to pinholed silty fine SAND with minor fine to coarse subangular to subrounded gravels and minor to abundant roots. Topsoil.

0.20 Cream white completely to highly weathered fine-grained closely jointed SOFT ROCK to MEDIUM HARD ROCK. SANDSTONE BEDROCK.

0.22

NOTES

1) No Groundwater Seepage.
2) No Sidewall Collapse.
3) Final Depth: 0.22 m (refusal on weathered sandstone).
4) Samples taken: None.

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET

D0CE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD
Y-COORD .

HOLE No: TP13

dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP14
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20

0.00 Dry to slightly moist, light to dark grey brown, LOOSE, intact to pinholed silty fine SAND with minor fine to coarse subangular to subrounded gravels and minor to abundant roots. Topsoil.

0.40 Cream white completely to highly weathered fine-grained closely jointed SOFT ROCK to MEDIUM HARD ROCK. SANDSTONE BEDROCK.

0.42

NOTES

1) No Groundwater Seepage.
2) No Sidewall Collapse.
3) Final Depth: 0.42 m (refusal on weathered sandstone).
4) Samples taken: None.

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET
D0CE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD :
Y-COORD :

HOLE No: TP14

dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP15
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20

0.00

Dry to slightly moist, light to dark grey brown, LOOSE, intact to pinholed silty fine SAND with minor fine to coarse subangular to subrounded gravels and minor to abundant roots. Topsoil.

0.20

Cream white completely to highly weathered fine-grained closely jointed SOFT ROCK to MEDIUM HARD ROCK. SANDSTONE BEDROCK.

0.21

NOTES

1) No Groundwater Seepage.
2) No Sidewall Collapse.
3) Final Depth: 0.20 m (refusal on weathered sandstone).
4) Samples taken: None.

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET
DOCE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD :
Y-COORD :

HOLE No: TP15

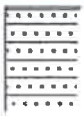
dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP16
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20



Surficial MEDIUM HARD ROCK. SANDSTONE BEDROCK.

NOTES

1) No Groundwater Seepage.
2) No Sidewall Collapse.
3) Final Depth: 0.0 m (refusal on weathered sandstone).
4) Samples taken: None.

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET
DOCE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD
Y-COORD :

HOLE No: TP16

dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP17
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20

Surficial MEDIUM HARD ROCK. SANDSTONE BEDROCK.

NOTES

1) No Groundwater Seepage.
2) No Sidewall Collapse.
3) Final Depth: 0.0 m (refusal on weathered sandstone).
4) Samples taken: None.

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET

D0CE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD
Y-COORD

HOLE No: TP17

dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP18
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20

Surficial MEDIUM HARD ROCK. SANDSTONE BEDROCK.

NOTES

1) No Groundwater Seepage.
2) No Sidewall Collapse.
3) Final Depth: 0.0 m (refusal on weathered sandstone).
4) Samples taken: None.

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET

D0CE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD :
Y-COORD :

HOLE No: TP18

dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP19
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20

0.00 Dry to slightly moist, light to dark grey brown, LOOSE, intact to pinholed silty fine SAND with minor fine to coarse subangular to subrounded gravels and minor to abundant roots. Topsoil.

0.10 Slightly moist yellow to orange brown LOOSE becoming VERY DENSE silty SAND with gravel and with abundant angular interlocking COBBLES and BOULDERS. Fill

0.65

NOTES

1) No Groundwater Seepage.
2) No Sidewall Collapse.
3) Final Depth: 0.65 m (refusal on boulder fill).
4) Samples taken: None.

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET

D0CE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD :
Y-COORD :

HOLE No: TP19

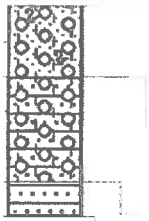
dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP20
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20



0.00 Dry to slightly moist, light to dark grey brown, LOOSE, intact to pinholed silty fine SAND with minor fine to coarse subangular to subrounded gravels and minor to abundant roots. Topsoil.

0.20 Dry to slightly moist, dark grey to red brown, MEDIUM DENSE, shattered, silty friable GRAVEL. Residual Sandstone.

0.50 Cream white completely to highly weathered fine-grained closely jointed VERY SOFT to SOFT ROCK. SANDSTONE BEDROCK.

0.60

NOTES

1) No Groundwater Seepage.
2) No Sidewall Collapse.
3) Final Depth: 0.60 m (refusal on weathered sandstone).
4) Samples taken: None.

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET
D0CE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD
Y-COORD .

HOLE No: TP20

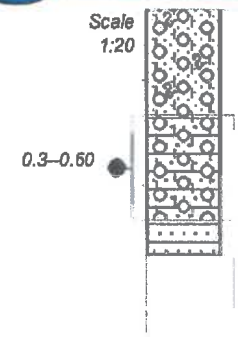
dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP21
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20



0.00 Dry to slightly moist, light to dark grey brown, LOOSE, intact to pinholed silty fine SAND with minor fine to coarse subangular to subrounded gravels and minor to abundant roots. Topsoil.

0.30 Dry to slightly moist, dark grey to red brown, MEDIUM DENSE, shattered, silty friable GRAVEL. Residual Sandstone.

0.60 Cream white completely to highly weathered fine-grained closely jointed VERY SOFT to SOFT ROCK. SANDSTONE BEDROCK.

0.70

NOTES

1) No Groundwater Seepage.
2) No Sidewall Collapse.
3) Final Depth: 0.70 m (refusal on weathered sandstone).
4) Samples taken: Disturbed Sample at 0.3--0.60 m.

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET

D0CE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD
Y-COORD

HOLE No: TP21

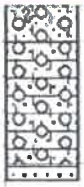
dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP22
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20



0.00 Dry to slightly moist, light to dark grey brown, LOOSE, intact to pinholed silty fine SAND with minor fine to coarse subangular to subrounded gravels and minor to abundant roots. Topsoil.

0.10 Dry to slightly moist, dark grey to red brown, MEDIUM DENSE, shattered, silty friable GRAVEL. Residual Sandstone.

0.45 Cream white completely to highly weathered fine-grained closely jointed VERY SOFT to SOFT ROCK. SANDSTONE BEDROCK.

0.50

NOTES

1) No Groundwater Seepage.
2) No Sidewall Collapse.
3) Final Depth: 0.50 m (refusal on weathered sandstone).
4) Samples taken: Disturbed Sample at 0.10--0.50 m (Bulk).

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET
D0CE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD :
Y-COORD :

HOLE No: TP22

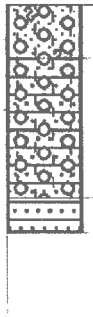
dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP23
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20



0.00 Dry to slightly moist, light to dark grey brown, LOOSE, intact to pinholed silty fine SAND with minor fine to coarse subangular to subrounded gravels and minor to abundant roots. Topsoil.

0.15 Dry to slightly moist, dark grey to red brown, MEDIUM DENSE, shattered, silty friable GRAVEL. Residual Sandstone.

0.55 Cream white completely to highly weathered fine-grained closely jointed VERY SOFT to SOFT ROCK. SANDSTONE BEDROCK.

0.65

NOTES

1) No Groundwater Seepage.
2) No Sidewall Collapse.
3) Final Depth: 0.65 m (refusal on weathered sandstone).
4) Samples taken: None.

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET
DOCE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD :
Y-COORD :

HOLE No: TP23

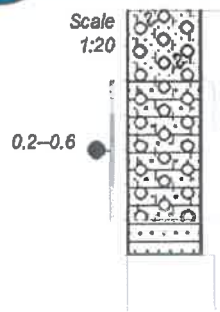
dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP24
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20



0.00 Dry to slightly moist, light to dark grey brown, LOOSE, intact to pinholed silty fine SAND with minor fine to coarse subangular to subrounded gravels and minor to abundant roots. Topsoil.

0.20 Dry to slightly moist, dark grey to red brown, MEDIUM DENSE, shattered, silty friable GRAVEL. Residual Sandstone.

0.60 Cream white completely to highly weathered fine-grained closely jointed VERY SOFT to SOFT ROCK. SANDSTONE BEDROCK.

0.70

NOTES

1) No Groundwater Seepage.
2) No Sidewall Collapse.
3) Final Depth: 0.70 m (refusal on weathered sandstone).
4) Samples taken: Disturbed Sample at 0.2--0.6 m.

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET
D0CE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD :
Y-COORD :

HOLE No: TP24

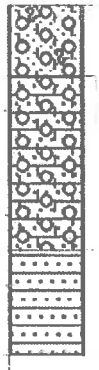
dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP25
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20



0.00 Dry to slightly moist, light to dark grey brown, LOOSE, intact to pinholed silty fine SAND with minor fine to coarse subangular to subrounded gravels and minor to abundant roots. Topsoil.

0.20 Dry to slightly moist, dark grey to red brown, MEDIUM DENSE, shattered, silty friable GRAVEL. Residual Sandstone.

0.70 Cream white completely to highly weathered fine-grained closely jointed VERY SOFT to SOFT ROCK. SANDSTONE BEDROCK.

1.00

NOTES

1) No Groundwater Seepage.
2) No Sidewall Collapse.
3) Final Depth: 1.0 m (refusal on weathered sandstone).
4) Samples taken: None.

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET
D0CE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD :
Y-COORD

HOLE No: TP25

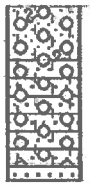
dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP26
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20



0.00 Dry to slightly moist, light to dark grey brown, LOOSE, intact to pinholed silty fine SAND with minor fine to coarse subangular to subrounded gravels and minor to abundant roots. Topsoil.

0.15 Dry to slightly moist, dark grey to red brown, MEDIUM DENSE, shattered, silty friable GRAVEL. Residual Sandstone.

0.45 Cream white completely to highly weathered fine-grained closely jointed VERY SOFT to SOFT ROCK. SANDSTONE BEDROCK.

0.50

NOTES

1) No Groundwater Seepage.
2) No Sidewall Collapse.
3) Final Depth: 0.50 m (refusal on weathered sandstone).
4) Samples taken: None.

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET

D0CE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD :
Y-COORD :

HOLE No: TP26

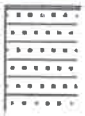
dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP27
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20



Surficial MEDIUM HARD ROCK, SANDSTONE BEDROCK.

NOTES

1) No Groundwater Seepage.
2) No Sidewall Collapse.
3) Final Depth: 0.50 m (refusal on weathered sandstone).
4) Samples taken: None.

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET
D0CE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD :
Y-COORD :

HOLE No: TP27

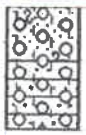
dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

HOLE No: TP28
Sheet 1 of 1

JOB NUMBER: 18.0975

Scale 1:20



0.00 Dry to slightly moist, light to dark grey brown, LOOSE, intact to pinholed silty fine SAND with minor fine to coarse subangular to subrounded gravels and minor to abundant roots. Topsoil.

0.15 Dry to slightly moist, dark grey to red brown, MEDIUM DENSE, shattered, silty friable GRAVEL. Residual Sandstone.

0.35

NOTES

1) No Groundwater Seepage.
2) No Sidewall Collapse.
3) Final Depth: 0.35 m (refusal on weathered sandstone).
4) Samples taken: None.

CONTRACTOR : N/A
MACHINE : TLB-excavator
DRILLED BY :
PROFILED BY : WK

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET
D0CE GCS Geotechnical

INCLINATION : Vertical
DIAM : N/A
DATE : 06/02/2019
DATE : 06/02/2019

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION : N/A
X-COORD :
Y-COORD

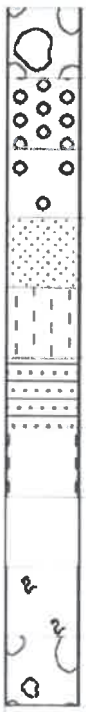
HOLE No: TP28

dotPLOT 7022 PBpH67

Client: Turning Point Project Management
Title: Diepkloof Ptn 159 Geotech

LEGEND
Sheet 1 of 1

JOB NUMBER: 18.0975



BOULDERS	{SA01}
GRAVELS/gravel	{SA02}
GRAVELLY	{SA03}
SAND	{SA04}
SILTY	{SA07}
SANDSTONE	{SA11}
PARTIALLY FERRUGINISED	{SA30}
DISTURBED SAMPLE	{SA38}
ROOTS	{SA40}
COBBLES	{SA58}

CONTRACTOR :
MACHINE :
DRILLED BY :
PROFILED BY :

TYPE SET BY : Warren Kretzinger
SETUP FILE : STANDARD.SET
D0CE GCS Geotechnical

INCLINATION :
DIAM :
DATE :
DATE :

DATE : 13/02/2019 09:44
TEXT : ..975DiepkloofLogs.ver.TXT

ELEVATION :
X-COORD :
Y-COORD :

LEGEND
SUMMARY OF SYMBOLS

dotPLOT 7022 PBpH67

Appendix B
Laboratory Test Results (Outstanding)

Figure 1
Site Plan

PTN 159 DIEPKLOOF - SITE PLAN

LEGEND

- Test Pits

Road Network

- National Route
- Main Road
- Secondary Road
- Street
- Site Boundary (Ptn. 159/319)

Data Sources:
Google Earth™ mapping service: 2019
Imagery Dates: 21/11/2018

0 25 50 100 Meters
SCALE: 1:3 500

FIGURE NO.:	-	MAP NUMBER:	19-0975-01
DRAWN BY:	A BROWER GIS TECHNICIAN	REVIEWED BY:	P CHETTY GIS SPECIALIST
DATUM: PROJECTION:	WGS84 GEOGRAPHIC	DATE:	06 FEBRUARY 2019
PROJECT:	PTN 159 DIEPKLOOF		
CLIENT:	TURNING POINT PM		

GCS

43 Wessel Road Woodmead
PO Box 2597 Rivonia 2128
South Africa

Tel: +27 (0) 11 803 5726
Fax: +27 (0) 11 803 5745
E-mail: jhb@gcs-sa.biz
www.gcs-sa.biz

PTN 159 DIEPKLOOF - NHBRC CLASSIFICATION

LEGEND

- Test Pits

Road Network

- National Route
- Main Road
- Secondary Road
- Street
- Site Boundary (159/319)

NHBRC Classification

- Zone A: P - Controlled Fill (Problematic)
- Zone B: C2 - Potentially Collapsible > 10 mm
- Zone C: C/R - Potentially Collapsible 0 - 5 mm / Shallow Rock
- Zone D: C1/R - Potentially Collapsible 5 - 10 mm / Shallow Rock
- Zone E: C2/R - Potentially Collapsible > 10 mm / Shallow Rock
- Zone F: R - Shallow Rock
- No Go Area

Data Sources:
Google Earth™ mapping service: 2019
Imagery Date: 21/11/2018
NHBRC Classes from Engineering Geologist (W.Kretzinger)

0 25 50 100 Meters
SCALE: 1:3 500

FIGURE NO.:	-	MAP NUMBER:	18-0973-03
DRAWN BY:	A BREWER GIS TECHNICIAN	REVIEWED BY:	P CHETTY GIS SPECIALIST
DATUM: PROJECTION:	WGS84 GEOGRAPHIC	DATE:	12 FEBRUARY 2019
PROJECT: CLIENT:	PTN 159 DIEPKLOOF TURNING POINT PM		

GCS

43 Wessel Road Rivonia
PO Box 2597 Rivonia 2128
South Africa

Tel: +27 (0) 11 803 5726
Fax: +27 (0) 11 803 5745
E-mail: jhb@gcs-sa.biz
www.gcs-sa.biz

Figure 2
Geological Plan

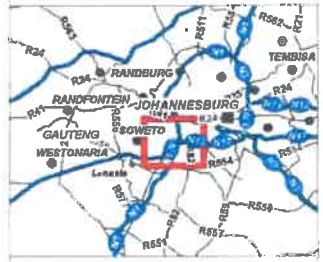
PTN 159 DIEPKLOOF - GEOLOGY

LEGEND

Rivers and Streams
- Non-Perennial
- Perennial

Road Network
- National Route
- Main Road
- Secondary Road
- Site Boundary (Ptn. 159/319)

Lithology
- Alluvium
- Syenite
- Diabase
- Quartzite, conglomerate, shale
- Rb - Shale
  Rjo - Quartzite, conglomerate
- Shale, Quartzite, conglomerate, amygdaloidal lava
- Dolomite, Chert
- Quartzite, conglomerate, shale



Data Sources:
Council for Geoscience
1:250 000 Geological Series: 2626,2628

0 0.5 1 2 Kilometers
SCALE: 1:50 000

FIGURE NO.:		MAP NUMBER:	PB-0975-02
DRAWN BY:	A BROWER GIS TECHNICIAN	REVIEWED BY:	F CHETTY GIS SPECIALIST
DATUM: / PROJECTION:	WGS84 / GEOGRAPHIC	DATE:	06 FEBRUARY 2019
PROJECT:	PTN 159 DIEPKLOOF		
CLIENT:	TURNING POINT PM		

GCS
43 Wessel Road Weshwood
PO Box 2597 Rivonia 2128
South Africa
Tel: +27 (0) 11 803 5726
Fax: +27 (0) 11 803 5745
E-mail: jhb@gcs-sa.biz
www.gcs-sa.biz