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ERASMUS PARK TOWNSHIP DEVELOPMENT, PRETORIA
SUPPLEMENTARY DOLOMITE STABILITY ASSESSMENT ACROSS ZONE 2

TITLE	Erasmus Park Township Development, Pretoria Supplementary Dolomite Stability Assessment across Zone 2
CLIENT	Atterbury Property Fund Managers (Pty) Ltd
PREPARED BY	Verdi Consulting Engineers PO Box 13096 Vorna Valley 1686 Tel: +27 (87) 806 2880 Fax: +27 (86) 743 8174 Cell: +27 (82) 684 5621 E-mail: trevor@verdicon.co.za
DATE	January 2017
REFERENCE	V16/099 – 5324
PROJECT TEAM	Heather Davis – PrEng. Senior Geotechnical Engineer Riaan Jooste Engineering Geologist
STATUS	Draft – For Comment by CGS

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APPENDICES

1. INTRODUCTION

This report details the results of a supplementary dolomite stability investigation conducted by Verdi Consulting Engineers (Verdicon) for the proposed new township development located in Erasmus Park, Pretoria. The investigation was carried out as per an instruction received from Mr Hendri Gelderblom from DG Consulting Engineers on behalf of Atterbury Property Fund Managers (Pty) Ltd.

This investigation was triggered following a letter, Reference F3156.1 of 9 September 2016, submitted by the Council for Geoscience (CGS) to the Tshwane Metropolitan Municipality. This letter indicated that additional drilling would be required to further define the boundaries of the zones assigned during the previous dolomite stability assessment and near surface investigation conducted by Verdicon in 2016:

Report Title:	Erasmus Park Township Development, Pretoria Dolomite Stability Assessment and Near Surface Investigation Report
Report Reference:	V16/099 – 4832
Date:	July 2016

The July 2016 investigation comprised the excavation of test pits and the drilling of percussion boreholes across the site to supplement the information from previous investigations conducted by Knight Hall Hendry in 1991 and Dr BH Relly in 1973 and 1974. The positions of the test pits and percussion boreholes are indicated on **Drawing V16/099-01** presented in **Appendix A.**

In addition, the CGS commented that the drilling carried out in Zone 2, characterized by hardpan ferricrete with shale at depth, was considered insufficient to allow this area to be classified as Inherent Hazard Class (IHC) 1.

Verdicon recommended, in the June 2016 report, that additional footprint drilling should be carried out once the positions of the structures was known. However, the client is desirous that clarity as to the deeper conditions across Zone 2 be determined at this stage.

2. SITE DESCRIPTION

The site is located at Latitude 25°49'12.61"S and Longitude 28°14'43.80"E and is 57.66 hectares in size. The site is currently undeveloped and slopes to the west at approximately 10°. Several large trees and bushy areas are located along the southern, western and northern boundary. A small stream runs along the western boundary, flowing from the north west to the south east.

The site is bounded by the N1 Highway to the east, Leisure Bay Residential Estate to the south, Bayside Road and Van Ryneveld Avenue to the west and Solomon Mahlangu Drive to the north.

A locality plan is given in **Figure 1** with the site indicated by the red box. A general site layout is given in **Figure 2**.

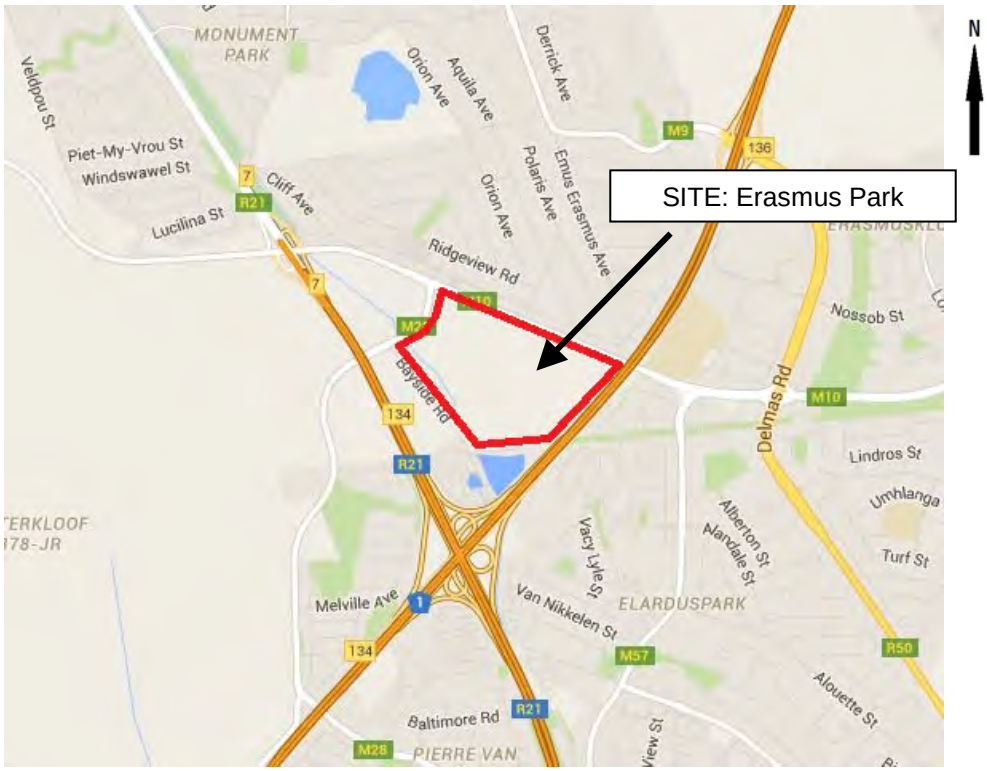

Figure 1: LOCALITY PLAN OF THE SITE

Figure 2: GENERAL SITE LAYOUT

3. REGIONAL GEOLOGY

According to the published 1:50 000 geological map, Sheet 2528CC Lyttelton, the site is underlain by shale locally with conglomerate, breccia and quartzite belonging to the Rooihoogte Formation (T3tS) of the Pretoria Group of the Transvaal Supergroup.

The boundary between the shale of the Rooihoogte formation and Chert and Chert Rubble belonging to the Malmani Sub Group (T2J) of the Chuniespoort Group, Transvaal Supergroup is located to the west of the site. However, this boundary is represented by a dashed line, indicating that the exact location is unknown. In addition, this boundary is highly irregular and some islands of chert and chert rubble from the Malmani Sub Group are located within the shale of the Rooihooghte Formation.

The regional geology is illustrated in **Figure 3**, with the proposed new township development indicated by the red square.

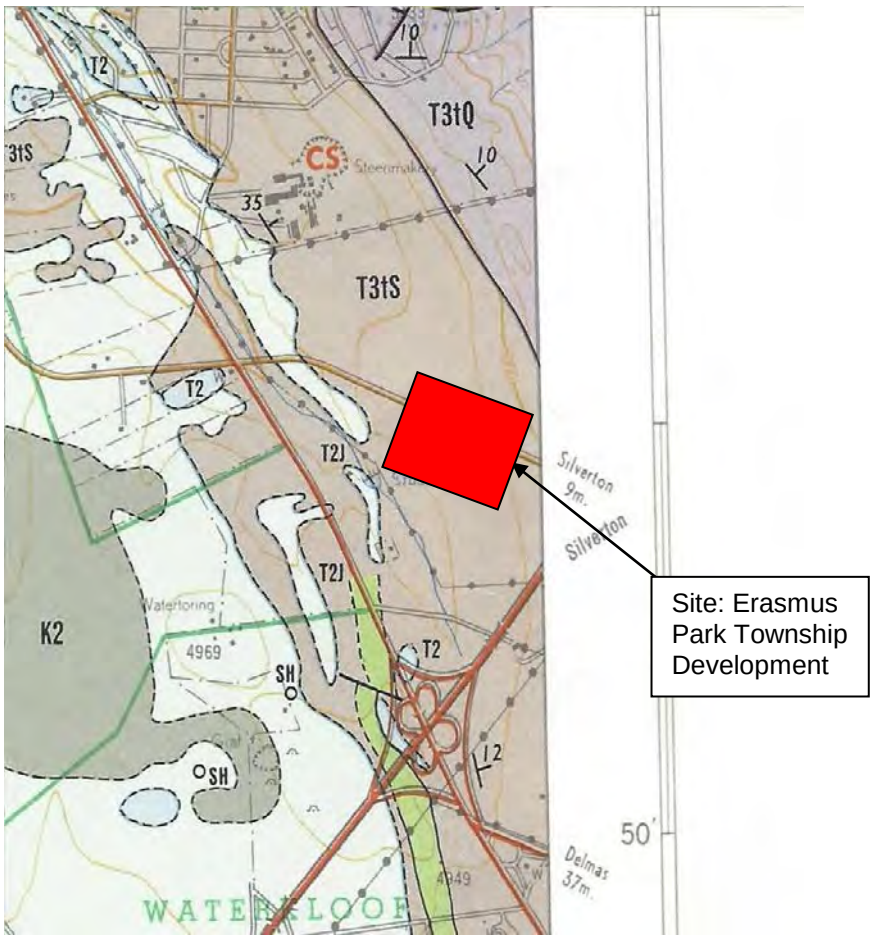

Figure 3: REGIONAL GEOLOGY

4. METHOD OF INVESTIGATION

During the previous investigation conducted by Verdicon, percussion boreholes VBH8 and VBH9, were drilled in Zone 2 where the tracked excavator and TLB could not penetrate the strongly cemented ferricrete. This was done in order to establish the condition of the material below the ferricrete.

Six additional and supplementary boreholes were drilled on 6 December 2016 in accordance with the requirements of SANS 1936-2, Table A-2, utilising normal percussion drilling.

All boreholes were drilled to a depth of 6m into dolomitic rock, or until at least 15m of competent non dolomitic rock has been proven or to a maximum depth of 60m. Chip samples were taken at 1.0m intervals and logged by a qualified engineering geologist in accordance with the current standard procedures proposed by Brink and Bruin (2002). All the holes were backfilled to within 2.0m of natural ground level and the remainder of the hole filled with concrete.

A schematic layout showing the position of the all the percussion boreholes drilled during the current and previous investigations across Zone 2 is given in **Appendix A** as drawing number V16/099-02.

5. RESULTS OF THE DOLOMITE STABILITY ASSESSMENT

The detailed profiles of the percussion boreholes drilled during the supplementary investigation are provided in **Appendix B** and the driller's logs in **Appendix C**. The percussion borehole profiles and test pits from the previous investigations, across Zone 2, are provided in **Appendix D** and **Appendix E** respectively**.**

5.1 In situ profile across Zone 2 – Ferricrete Zone

The test pit information relevant to Zone 2 is summarised in **Table 1** and the relevant borehole information is summarised in **Table 2.**

Relevant test pits:

Previous Verdicon investigation	-	*VTP7 to VTP12, VTP14, VTP18, and VTP21*
Knight Hall Hendri investigation	-	*TP11, TP12, TP15, TP16, TP21 to TP25, TP30 toTP33, TP36 to TP39, TP42 to TP49, TP55 and TP56.*

Relevant boreholes:

Previous Verdicon investigation	-	*VBH8 and VBH9*.
Supplementary Verdicon investigation	-	VBH18 to VBH20, VBH23 to VBH25

The area is blanketed with hillwash/colluvium that comprises loose to medium dense, occasionally pinholed, gravelly silty/clayey sand or soft to stiff, silty clay with minor ferricrete gravel concretions and

very soft rock shale gravel that extends to a depth of between 0.7m and 3.3m. Ferruginisation has occurred, with depth which has created some zones of interconnected cemented ferricrete towards the base.

The ferruginised hillwash grades into cemented to strongly cemented ferricrete that comprises dense, gravelly clayey sand with sandstone and shale gravel that extends to a depth of between 1.7m and 3.8m.

In VTP18, a pebble marker comprising loose clayey sand with gravel and cobbles was encountered above the hillwash material and extends to a depth of 1.1m. In TP12 and TP41 the hillwash material is underlain by a pebble marker that comprises coarse quartzite and chert gravel and cobbles with a firm to very stiff, clayey silty matrix that extends to a depth of between 2.0m and 2.9m.

Refusal and/or near refusal of the TLB occurred on the transition zone between the highly ferruginised and cemented ferricrete at a depth of between 0.7m and 3.1m, except for TP52, which was terminated at 3.1m in residual diabase. Refusal of the tracked excavator occurred in all of the currently excavated test pits on cemented to strongly cemented ferricrete at a depth of between 1.0m and 3.8m.

Slight groundwater seepage was encountered during the previous investigation only in TP11 and TP21 at a depth of between 1.3m and 2.25m. No groundwater was encountered in any of the test pits excavated during the current investigation. The sidewalls appeared stable and in-situ profiling was conducted in all of the test pits

The material encountered in the boreholes comprises silty sand transported material to a depth of between 1.0m to 2.0m. This is followed by strongly cemented ferricrete (hardpan ferricrete) to a depth of between 3.0m and 5.0m.

The strongly cemented ferricrete is directly underlain by very soft rock shale which is present from a depth of between 3.0m and 7.0m. The exception being VBH20 where very soft rock interlayered with soft rock and residual material was present from surface to a depth of 3.0m. This is underlain by soft rock. In the remainder of the boreholes, the very soft rock grades into soft rock and medium hard rock with depth.

In VBH18, soft to hard rock dolerite was encountered from a depth of 32.0m to 60.m.

Within the supplementary boreholes, at least 15m of shale rock has been proven. The exceptions were:-

- VBH24 where 13m of shale rock was proven
- VBH18 where 27m of shale and then 28m of dolerite were proven
- VBH19 where 57m of shale was proven.

No dolomite rock or dolomite residuum was encountered during this supplementary investigation.

Table 1: Summary of test pit profiles across Zone 2

Test Pit No	Hillwash/ Colluvium	Pebble Marker	Ferricrete	Residual shale	Very soft rock shale	Soft rock shale	Excavation depth	Groundwater
VTP7	0.0 – 2.1m	-	2.1 – 3.0m	-	-	-	Refusal at 3.0m on strongly cemented ferricrete.	None
VTP8	0.0 – 1.7m	-	-	1.7 – 4.0m Tending to ferricrete	-	-	Near refusal at 4.0m on stiff to very stiff ferruginised residual shale	None
VTP9	0.0 – 1.1m	-	1.1 – 3.5m	-	-	-	Refusal at 3.5m on strongly cemented ferricrete.	None
VTP10	0.0 – 1.6m	-	1.6 – 3.8m	-	-	-	Refusal at 3.8m on strongly cemented ferricrete	None
VTP11	0.0 – 1.7m	-	1.7 – 3.8m	-	-	-	Refusal at 3.8m on strongly cemented ferricrete	None
VTP12	0.0 – 1.5m	-	1.5 – 2.3m	-	-	-	Refusal at 2.3m on strongly cemented ferricrete	None
VTP14	0.0 – 1.1m	-	1.1 – 1.7m	-	-	-	Refusal at 1.7m on strongly cemented ferricrete	None
VTP18	1.1 – 3.3m	0.0 – 1.1m	-	-	-	-	Near refusal at 3.3m on ferruginised transported.	None
VTP21	0.0 – 1.4m	-	1.4 – 1.7m	-	-	-	Refusal at 1.7m on strongly cemented ferricrete.	None
TP11	0.0 – 2.25m	-	-	-	-	-	Refusal at 2.25m on hardpan ferricrete	Slight seepage from 2.25m
TP12	0.0 – 2.6m	2.6 -2.9m	-	-	-	-	Refusal at 2.9m on closely packed pebble marker	None
TP15	0.0 – 2.6m	-	-	-	-	-	Refusal at 2.6m on ferruginised hillwash tending to ferricrete	None

Table 1: Summary of test pit profiles across Zone 2 (continued)

Test Pit No	Hillwash/ Colluvium	Pebble Marker	Ferricrete	Residual shale	Very soft rock shale	Soft rock shale	Excavation depth	Groundwater
TP16	0.0 – 0.7m	-	-	-	-	-	Refusal at 0.7m on highly ferruginised hillwash tending to ferricrete	None
TP21	0.0 – 1.3m	-	-	-	-	-	Refusal at 1.3m on highly ferruginised hillwash tending to ferricrete	Slight seepage from 1.3m
TP22	0.0 – 2.9m	-	-	-	-	-	Near refusal at 2.9m on weakly cemented ferricrete	None
TP23	0.0 – 1.8m	-	-	-	-	-	Refusal at 1.8m on strongly cemented ferricrete	None
TP24	0.0 – 2.55m	-	-	-	-	-	Near refusal at 2.55m on ferruginised hillwash tending to ferricrete	None
TP25	0.0 – 2.1m	-	-	-	-	-	Refusal at 2.1m on ferruginised hillwash tending to ferricrete	None
TP30	0.0 – 3.0m	-	-	-	-	-	Near refusal at 3.0m on ferruginised hillwash	None
TP31	0.0 – 2.7m	-	-	-	-	-	Near refusal at 2.7m on ferruginised hillwash	None
TP32	0.0 – 3.0m	-	-	-	-	-	Near refusal at 3.0m on ferruginised hillwash tending to ferricrete	None
TP33	0.0 – 3.1m	-	-	-	-	-	Near refusal at 3.1m on ferruginised hillwash	None
TP36	0.0 – 2.8m	-	-	-	-	-	Refusal at 2.8m on very stiff ferruginised hillwash	None
TP37	0.0 – 2.0m	-	-	-	-	-	Refusal at 2.0m on very stiff ferruginised hillwash	None

Table 1: Summary of test pit profiles across Zone 2 (continued)

Test Pit No	Hillwash/ Colluvium	Pebble Marker	Ferricrete	Residual shale	Very soft rock shale	Soft rock shale	Excavation depth	Groundwater
TP38	0.0 – 2.5m	-	-	-	-	-	Near refusal at 2.5m on stiff to very stiff ferruginised hillwash	None
TP39	0.0 – 1.5m	-	-	-	-	-	Refusal at 1.5m on very stiff highly ferruginised hillwash	None
TP42	0.0 – 1.7m	-	-	-	-	-	Refusal at 1.7m on ferruginised hillwash tending to ferricrete	None
TP43	0.0 – 2.2m	-	-	-	-	-	Refusal at 2.2m on stiff to very stiff hillwash	None
TP44	0.0 – 2.0m	-	-	-	-	-	Refusal at 2.0m on very stiff ferruginised hillwash	None
TP45	0.0 – 1.4m	-	-	-	-	-	Refusal at 1.4m on very stiff ferruginised hillwash	None
TP46	0.0 – 1.8m	-	-	-	-	-	Refusal at 1.8m on very stiff hillwash	None
TP47	0.0 – 1.5m	-	-	-	-	-	Refusal at 1.5m on very stiff hillwash	None
TP48	0.0 – 1.0m	-	-	-	-	-	Refusal at 1.0m on ferruginised hillwash tending to ferricrete	None
TP49	0.0 – 1.1m	-	-	-	-	-	Refusal at 1.0m on highly ferruginised hillwash	None
TP55	0.0 – 1.8m	-	-	-	-	-	Refusal at 1.8m on very stiff ferruginised hillwash	None
TP56	0.0 – 1.6m	-	-	-	-	-	Refusal at 1.6m on partially cemented and ferruginised hillwash	None

Table 2: Summary of borehole profile encountered across Zone 2

	BH No.	THICKNESS OF LAYERS (m)								Penetration Rate		Comment
		Transported Soil	Hard Pan Ferricrete	Shale					Dolerite			
				Very Soft Rock	Interbedded very soft rock and soft rock	Soft Rock	Soft to medium hard rock	Interlayered soft rock and residual material	Soft rock	Hard rock	Depth	Rate Min.sec/m	
Previous Investigation	VBH8	0-2	2-5	5-9							0-2 2-5 5-9	0.22-0.40 0.48-1.18 0.22-0.43	Good sample recovery and no air loss throughout the profile.
	VBH9	0-2	2-5	5-9							0-2 2-5 5-9	0.30-0.32 0.54-1.20 0.21-0.31	Good sample recovery and no air loss throughout the profile.
Current Supplementary Investigation	VBH18	0-1	1-5	5-13			13-22	22-32	32-46 55-60	46-55	0-1 1-5 5-13 13-22 22-32 32-46 46-55 55-60	0:18 0:40-0:54 0:19-0:36 0:35-1:20 0:12-0:19 0:40-2:33 4:00-4:41 0:55-1:45	Good sample recovery and no air loss throughout the profile.
	VBH19	0-1	1-3	3-33	33-43	43-60					0-1 1-3 3-33 33-43 43-60	0:17 0:23-0:30 0:16-0:34 0:27-0:44 0:29-0:47	Good sample recovery and no air loss throughout the profile.
	VBH20			0-3 Interlayered very soft rock and residual		3-20					0-3 3-20	0:41-0:55 0:40-0:58	Good sample recovery and no air loss throughout the profile.
	VBH23	0-1	1-3	3-20							0-1 1-3 3-20	0:18 0:30-0:41 0:17-0:46	Good sample recovery and no air loss throughout the profile.
	VBH24	0-1	1-7	7-20							0-1 1-7 7-20	0:29 0:36-0:50 0:18-0:30	Good sample recovery and no air loss throughout the profile.
	VBH25	0-1	1-3	3-20							0-1 1-3 3-20	0:29 0:36-0:41 0:20-0:43	Good sample recovery and no air loss throughout the profile.

6. DOLOMITE STABILITY ASSESSMENT

During the previous investigation conducted by Verdicon, a 20 ton excavator was unable to penetrate the strongly cemented ferricrete present across Zone 2. As a result, two percussion boreholes were drilled in **Zone 2**, and these two borehole profiles confirmed that the cemented ferricrete was underlain by shale rock.

Although the previous near surface investigation and dolomite stability assessment conducted across the site confirmed the presence of dolomitic residuum only in Zone 3, the CGS required additional verification of the absence of dolomitic residuum in the profile across Zone 2.

During the previous and supplementary investigations, no dolomitic residuum was encountered in any of the test pits or boreholes across Zone 2, and we deem this Zone to be classifiable as non-dolomitic land.

7. RECOMMENDATIONS

7.1. Founding Recommendations

It is understood that the proposed new township development will comprise a mixed use development with structures ranging from single storey to multi storey buildings and from residential to commercial use.

The investigations which have been carried out are of a regional or feasibility level rather than a structure specific or design level. As such a review of available information should take place for the development when the final layout is known. Site specific investigations may be required especially for heavily loaded structures.

ZONE 2 – FERRUGINISED HILLWASH AND FERRICRETRE

OPTION 1 - FOUND ON STRONGLY CEMENTED FERRICRETE

Foundations

- Found lightly loaded structures conventionally on the strongly cemented ferricrete present at a depth of between 0.5m and 1.5m.
- Bearing pressure of 350kPa is allowable on the strongly cemented ferricrete.
- Heavily loaded structures will need to be founded on the very soft to soft rock shale, indicated as being present below the ferricrete.
- All foundation trenches to be inspected to verify presence of rock and bearing capacity.
- Site drainage and plumbing/service precautions.

Floors

- **Either** cast directly onto rock where rock is present
- **Or** where soil is present,
  - Remove 450mm of material from below the floors.
  - Compact base of excavation to approximately 90% Modified AASHTO
  - Replace with G7, or better, material compacted in 150mm layers to 95% Modified AASHTO density at optimum moisture content up to the required founding level.
- Site drainage and plumbing/service precautions.

OPTION 2 – LIMITED REMOVAL AND REPLACEMENT

- Remove material below the individual foundations to a depth and width of 1.5x foundation width below the proposed foundation level or to the well cemented ferricrete.
- Compact in-situ material, to an approximately 90% Modified AASHTO.
- Replace with G7 quality material or better, compacted in 150mm layers to 95% Modified AASHTO density at optimum moisture content to the required founding level.
- Normal construction with reinforced spread footings and reinforcement in the masonry if required.
- Bearing pressures not to exceed 150kPa.
- Site drainage and plumbing/service precautions.

Floors

- Remove 450mm of the in-situ material.
- Compact the base, if in soil.
- Replace with G7 or better quality material compacted in 150mm layers to 95% Modified AASHTO density at optimum moisture content.

8. CONCLUDING REMARKS

It is recommended that all excavations for founding purposes should be checked by a qualified geotechnical engineer or engineering geologist to ensure that the required bearing pressures will be achieved and conditions at variance to those described herein are not present elsewhere on the site.

9. REFERENCES

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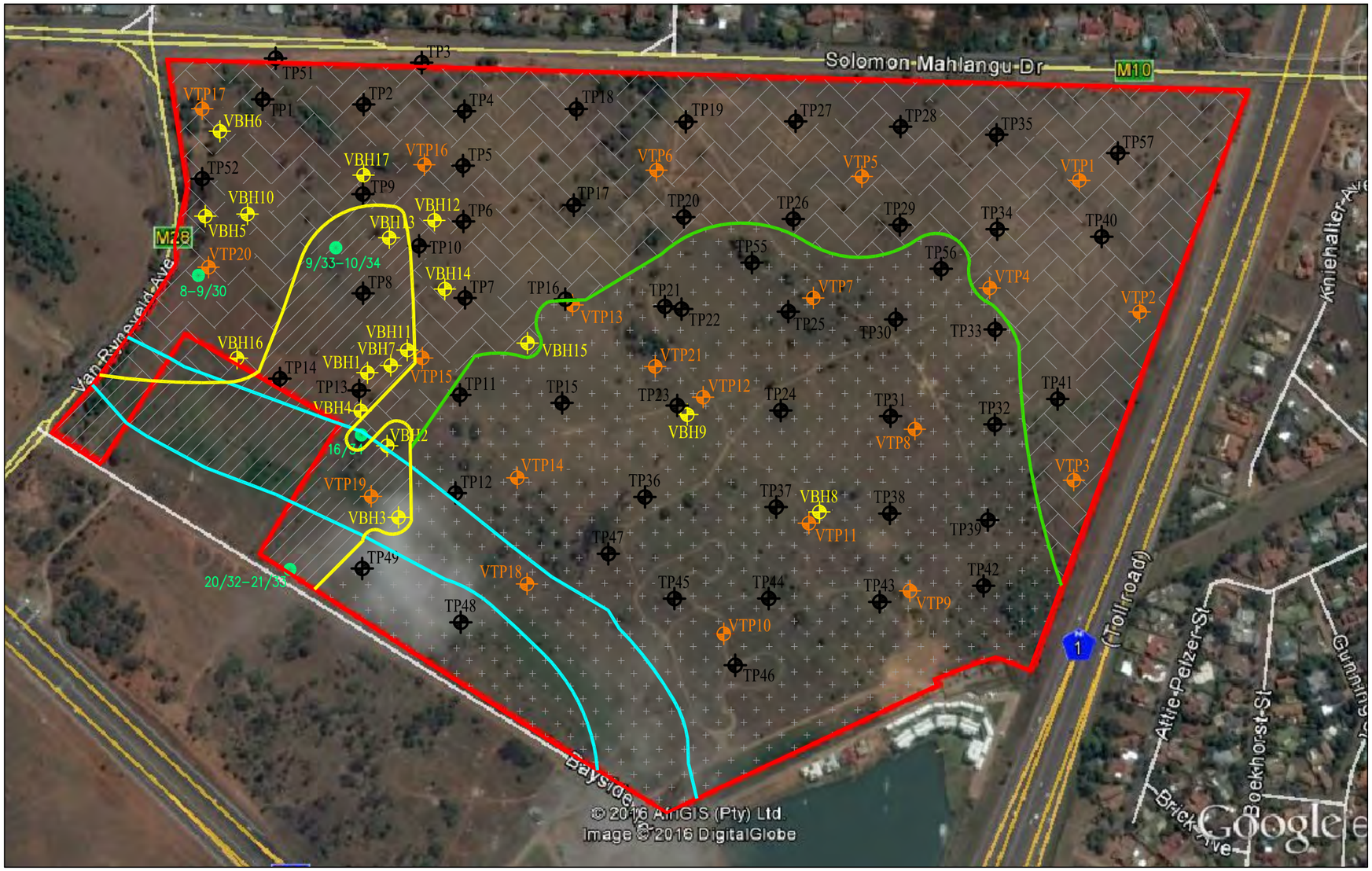
APPENDIX A

DRAWINGS

SYMBOL	DESCRIPTION
	AREA UNDER INVESTIGATION
	ZONE 1: SHALE PROFILE
	ZONE 2: FERRICRETE ZONE
	ZONE 3: DOLOMITIC LAND
TP	PREVIOUS INVESTIGATION TEST PITS
VTP	CURRENT INVESTIGATION TEST PITS
6/23	PREVIOUS INVESTIGATION BOREHOLES
VBH	CURRENT INVESTIGATION BOREHOLES
	50 YEAR FLOODLINE



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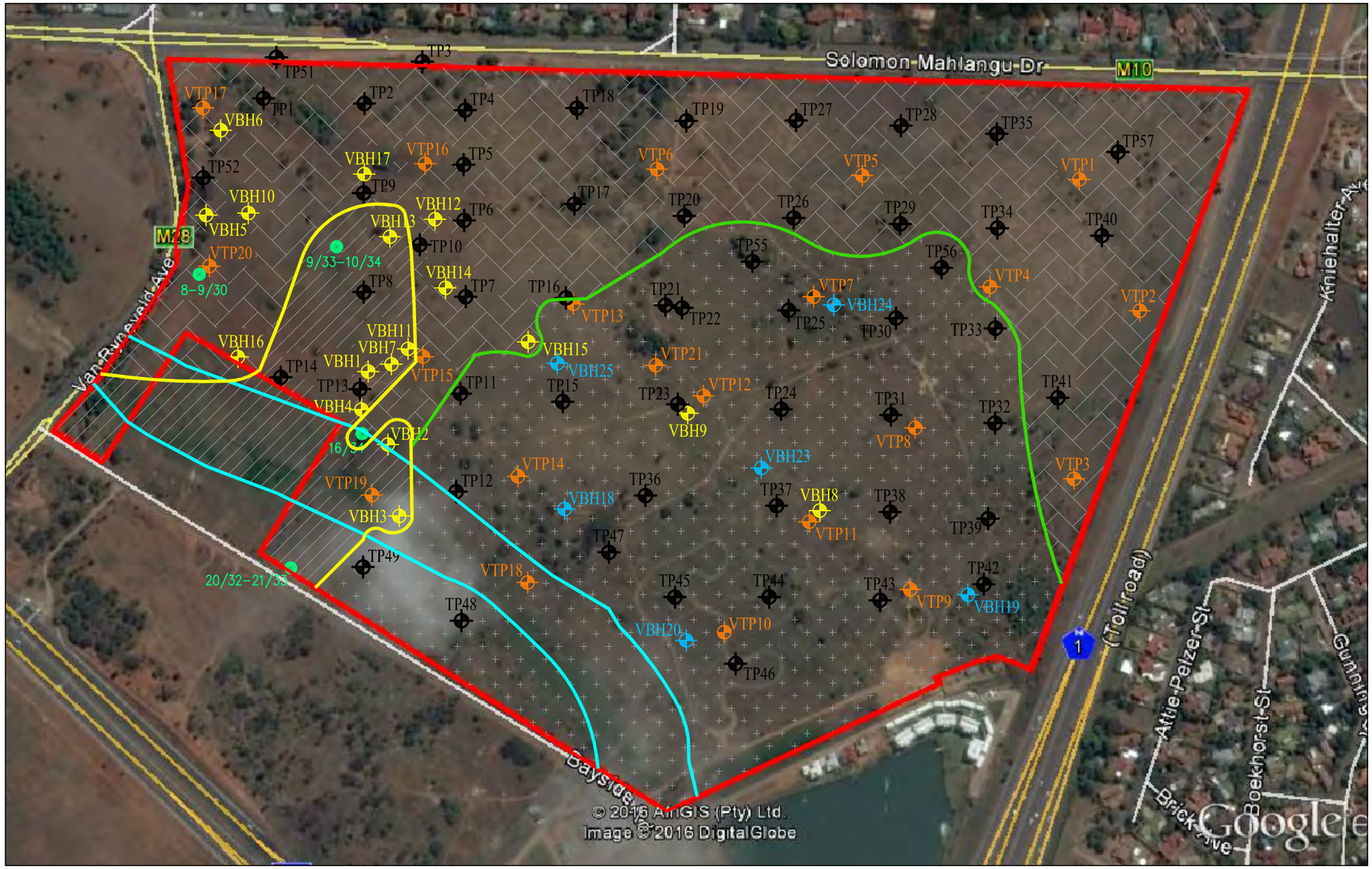
CLIENT: ATTERBURY PROPERTIES

PROJECT : ERASMUS PARK

TITLE: TEST PITS & BOREHOLES LAYOUT

DESIGNED	R JOOSTE	DATE 2017/02/09	SCALE NOT TO SCALE
DRAWN	P TODANKAR	SHEET SIZE A1	PROJECT NO. V16/099
CHECKED	H DAVIS	DRAWING NUMBER V16/099-01	

SYMBOL	DESCRIPTION
	AREA UNDER INVESTIGATION
	ZONE 1: SHALE PROFILE
	ZONE 2: FERRICRETE ZONE
	ZONE 3: DOLOMITIC LAND
TP	PREVIOUS INVESTIGATION TEST PITS
VTP	CURRENT INVESTIGATION TEST PITS
6/23	PREVIOUS INVESTIGATION BOREHOLES
VBH	PREVIOUS INVESTIGATION BOREHOLES
VBH	CURRENT INVESTIGATION BOREHOLES
	50 YEAR FLOODLINE



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CLIENT: ATTERBURY PROPERTIES

PROJECT : ERASMUS PARK

TITLE: TEST PITS & BOREHOLES LAYOUT

DESIGNED	R JOOSTE	DATE 2017/02/09	SCALE NOT TO SCALE
DRAWN	P TODANKAR	SHEET SIZE A1	PROJECT NO. V16/099
CHECKED	H DAVIS	DRAWING NUMBER V16/099–02	

APPENDIX B

PERCUSSION BOREHOLE PROFILES

SUPPLEMENTARY INVESTIGATION

Project Number: V16/099

Project Name: Erasmus Park *Date:* *06/12/2016*

Investigation: Supplementary Dolomite Stability *BH18* *Sheet 1 of 2*

PENETRATION TIME Min : Sec	AIR LOSS	SAMPLE RECOVERY	DEPTH (m)	DESCRIPTION	INTERPRETATION
0 : 18	None	Good		Dark greyish brown, clayey silty SAND	**Transported material**
0 : 40	None	Good			
0 : 54	None	Good		Orange brown, fine gravelly(2-4mm) silty SAND	**Cemented Ferricrete.**
0 : 46	None	Good			
0 : 48	None	Good	5,0		
0 : 24	None	Good		Greyish light pink brown, silty clay with minor sub angular very soft rock shale fragments(2-10mm)	**Very Soft Rock Shale.**
0 : 20	None	Good			
0 : 22	None	Good			
0 : 19	None	Good			
0 : 30	None	Good			
0 : 25	None	Good	10,0		
0 : 29	None	Good			
0 : 36	None	Good			
0 : 59	None	Good		Light grey brown, moderately weathered, baked shale fragments (5-30mm) with minor silty clay.	**Soft to Medium Hard Rock Baked Shale.**
0 : 51	None	Good	15,0		
0 : 54	None	Good			
1 : 20	None	Good			
0 : 52	None	Good			
0 : 54	None	Good			
0 : 57	None	Good	20,0		
0 : 54	None	Good			
0 : 35	None	Good			
0 : 14	None	Good		Dark brown, silty clay with abundant soft rock baked shale fragments (5-35mm).	**Interpreted as interlayered soft rock baked shale and residual shale.**
0 : 16	None	Good			
0 : 19	None	Good	25,0		
0 : 14	None	Good			
0 : 16	None	Good			
0 : 17	None	Good			
0 : 14	None	Good			
0 : 13	None	Good	30,0		
0 : 16	None	Good			
0 : 12	None	Good			
0 : 43	None	Good		Blueish dark grey, slightly weathered, medium hard rock dolerite gravel (5-30mm) with minor sandy clay.	**Soft Rock Dolerite.**
0 : 56	None	Good			
0 : 40	None	Good	35,0		
1 : 14	None	Good			
1 : 07	None	Good			
0 : 54	None	Good			
0 : 41	None	Good			
1 : 07	None	Good	40,0		
2 : 06	None	Good			
1 : 22	None	Good			
1 : 43	None	Good			
2 : 33	None	Good			
1 : 20	None	Good	45,0		

Profiled by:	Riaan Jooste	Compressor	19 Bar	Coordinates	
Drilling Contractor	Hennie Erwee	Diameter	165 mm	x	
Drilling operator	Jack	Date drilled	06/12/2016	y	
		Date profiled	06/12/2016	z	

Project Number: V16/099

Project Name: Erasmus Park *Date:* *06/12/2016*

Investigation: Supplementary Dolomite Stability *BH18* *Sheet 2 of 2*

PENETRATION TIME (Min : Sec)	AIR LOSS	SAMPLE RECOVERY	DEPTH (m)	DESCRIPTION	INTERPRETATION
1 : 40	None	Good		**Same as above**	
4 : 10	None	Good		Blueish dark grey, slightly weathered hard rock sandy gravel.	**Hard Rock Dolerite.**
4 : 30	None	Good			
4 : 41	None	Good			
4 : 16	None	Good	50,0		
4 : 29	None	Good			
4 : 06	None	Good			
4 : 30	None	Good			
4 : 00	None	Good			
4 : 21	None	Good	55,0		
1 : 45	None	Good		Blueish dark grey, slightly weathered soft rock sandy gravel.	**Soft Rock Dolerite**
1 : 10	None	Good			
1 : 00	None	Good			
1 : 01	None	Good			
0 : 55	None	Good	60,0		
				Terminated at 60,0m	

Profiled by:	Riaan Jooste	Compressor	19 Bar	Coordinates
Drilling Contractor	Hennie Erwee	Diameter	165 mm	x
Drilling operator	Jack	Date drilled	06/12/2016	y
		Date profiled	06/12/2016	z

Project Number: V16/099

Project Name: Erasmus Park *Date:* *06/12/2016*

Investigation: Supplementary Dolomite Stability *BH19* *Sheet 1 of 2*

PENETRATION TIME Min : Sec	AIR LOSS	SAMPLE RECOVERY	DEPTH (m)	DESCRIPTION	INTERPRETATION
0 : 17	None	Good		Light brown, clayey silty SAND.	**Transported Material.**
0 : 23	None	Good			
0 : 30	None	Good		Orange brown, silty sand with minor rounded, ferricrete gravel concretions.	**Cemented Ferricrete.**
0 : 34	None	Good			
0 : 30	None	Good	5,0		
0 : 26	None	Good		Pinkish red brown, silty clay with minor highly weathered, very soft rock shale fragments (<4mm).	**Very Soft Rock Shale**
0 : 21	None	Good			
0 : 19	None	Good			
0 : 21	None	Good			
0 : 23	None	Good			
0 : 18	None	Good	10,0		
0 : 20	None	Good			
0 : 19	None	Good			
0 : 24	None	Good			
0 : 19	None	Good	15,0		
0 : 16	None	Good			
0 : 18	None	Good			
0 : 26	None	Good			
0 : 24	None	Good			
0 : 18	None	Good	20,0		
0 : 20	None	Good			
0 : 29	None	Good			
0 : 24	None	Good			
0 : 30	None	Good			
0 : 22	None	Good	25,0		
0 : 28	None	Good			
0 : 20	None	Good			
0 : 19	None	Good			
0 : 17	None	Good			
0 : 23	None	Good	30,0		
0 : 34	None	Good			
0 : 28	None	Good			
0 : 25	None	Good			
0 : 41	None	Good		Yellow pinkish brown, silty clay, with minor highly weathered, very soft to soft rock shale fragments (<5mm).	**Interbedded, very soft and soft rock shale.**
0 : 36	None	Good	35,0		
0 : 32	None	Good			
0 : 41	None	Good			
0 : 39	None	Good			
0 : 44	None	Good			
0 : 37	None	Good	40,0		
0 : 32	None	Good			
0 : 30	None	Good			
0 : 27	None	Good			
0 : 31	None	Good		Yellow pinkish brown, silty clay with abundant soft rock shale fragments (5-30mm).	**Soft Rock Shale.**
0 : 33	None	Good	45,0		

Profiled by:	Riaan Jooste	Compressor	19 Bar	Coordinates
Drilling Contractor	Hennie Erwee	Diameter	165 mm	x
Drilling operator	Jack	Date drilled	06/12/2016	y
		Date profiled	06/12/2016	z

Project Number: V16/099

Project Name: Erasmus Park *Date:* *06/12/2016*

Investigation: Supplementary Dolomite Stability *BH19* *Sheet 2 of 2*

PENETRATION TIME Min : Sec	AIR LOSS	SAMPLE RECOVERY	DEPTH (m)	DESCRIPTION	INTERPRETATION
0 : 35	None	Good		Same as above	
0 : 29	None	Good			
0 : 31	None	Good		Light red brown and grey brown, high to moderately weathered, soft rock shale gravel (5-15mm) with minor pinkish red brown silty clay.	**Soft Rock Shale.**
0 : 34	None	Good			
0 : 36	None	Good	50,0		
0 : 30	None	Good			
0 : 31	None	Good			
0 : 39	None	Good			
0 : 40	None	Good			
0 : 30	None	Good	55,0	Grey brown, high to moderately weathered, shale gravel (5-15mm) with minor grey brown, silty clay.	**Soft Rock Shale.**
0 : 29	None	Good			
0 : 36	None	Good			
0 : 47	None	Good			
0 : 35	None	Good			
0 : 40	None	Good	60,0	Terminated at 60,0m	

Profiled by:	Riaan Jooste	Compressor	19 Bar	Coordinates	
Drilling Contractor	Hennie Erwee	Diameter	165 mm	x	
Drilling operator	Jack	Date drilled	06/12/2016	y	
		Date profiled	06/12/2016	z	

Project Number: V16/099

Project Name: Erasmus Park *Date:* *06/12/2016*

Investigation: Supplementary Dolomite Stability *BH20* *Sheet 1 of 1*

PENETRATION TIME Min : Sec	AIR LOSS	SAMPLE RECOVERY	DEPTH (m)	DESCRIPTION	INTERPRETATION
0 : 41	None	Good		Red orange brown, silty clay with minor to abundant very soft rock shale gravel.	**Interpreted as interbedded residual shale and very soft rock shale.**
0 : 55	None	Good			
0 : 49	None	Good			
0 : 57	None	Good		Orange red brown, silty clay with trace amounts of fine very soft rock shale gravel (2mm).	**Soft Rock Shale.**
0 : 52	None	Good	5,0		
0 : 47	None	Good			
0 : 40	None	Good			
0 : 54	None	Good			
0 : 58	None	Good			
0 : 43	None	Good			
0 : 55	None	Good	10,0		
0 : 49	None	Good			
0 : 52	None	Good			
0 : 55	None	Good			
0 : 47	None	Good	15,0		
0 : 42	None	Good			
0 : 50	None	Good			
0 : 41	None	Good			
0 : 54	None	Good			
0 : 40	None	Good	20,0	Terminated at 20,0m due to 15.0m of competent overburden.	
			25,0		
			30,0		
			35,0		
			40,0		
			45,0		

Profiled by:	Riaan Jooste	Compressor	19 Bar	Coordinates	
Drilling Contractor	Hennie Erwee	Diameter	165 mm	x	
Drilling operator	Jack	Date drilled	06/12/2016	y	
		Date profiled	06/12/2016	z	

Project Number: V16/099

Project Name: Erasmus Park *Date:* *06/12/2016*

Investigation: Supplementary Dolomite Stability *BH23* *Sheet 1 of 1*

PENETRATION TIME Min : Sec	AIR LOSS	SAMPLE RECOVERY	DEPTH (m)	DESCRIPTION	INTERPRETATION
0 : 18	None	Good		Dark brown silty sand.	**Transported Material.**
0 : 30	None	Good		Orange brown, gravelly silty sand with the gravel being ferricrete concretions (2-8mm).	**Cemented Ferricrete.**
0 : 41	None	Good			
0 : 46	None	Good			
0 : 44	None	Good	5,0		
0 : 30	None	Good			
0 : 40	None	Good			
0 : 27	None	Good		Pinkish Purple, silty clay with minor very soft rock shale fragments.	**Very Soft Rock Shale.**
0 : 24	None	Good			
0 : 21	None	Good			
0 : 18	None	Good	10,0		
0 : 19	None	Good			
0 : 21	None	Good			
0 : 26	None	Good			
0 : 24	None	Good	15,0		
0 : 19	None	Good			
0 : 21	None	Good			
0 : 29	None	Good			
0 : 20	None	Good			
0 : 17	None	Good	20,0		
				Terminated at 20,0m due to 15.0m of competent overburden.	
			25,0		
			30,0		
			35,0		
			40,0		
			45,0		

Profiled by:	Riaan Jooste	Compressor	19 Bar	Coordinates
Drilling Contractor	Hennie Erwee	Diameter	165 mm	x
Drilling operator	Jack	Date drilled	06/12/2016	y
		Date profiled	06/12/2016	z

Project Number: V16/099

Project Name: Erasmus Park *Date:* *06/12/2016*

Investigation: Supplementary Dolomite Stability *BH24* *Sheet 1 of 1*

PENETRATION TIME Min : Sec	AIR LOSS	SAMPLE RECOVERY	DEPTH (m)	DESCRIPTION	INTERPRETATION
0 : 29	None	Good		Red brown, clayey silty sand.	**Transported Material.**
0 : 36	None	Good			
0 : 41	None	Good		Orange brown, silty sand with ferricrete gravel concretions.	**Cemented Ferricrete.**
0 : 49	None	Good			
0 : 44	None	Good	5,0		
0 : 46	None	Good		Yellow Brown, becoming pinkish purple, silty clay with with minor sub angular shale rock gravel (2-5mm).	**Very Soft Rock Shale.**
0 : 50	None	Good			
0 : 26	None	Good			
0 : 30	None	Good			
0 : 21	None	Good			
0 : 20	None	Good	10,0		
0 : 18	None	Good			
0 : 20	None	Good			
0 : 26	None	Good			
0 : 19	None	Good	15,0		
0 : 21	None	Good			
0 : 23	None	Good			
0 : 25	None	Good			
0 : 20	None	Good			
0 : 18	None	Good	20,0		
				Terminated at 20,0m due to 15.0m of competent overburden.	
			25,0		
			30,0		
			35,0		
			40,0		
			45,0		

Profiled by:	Riaan Jooste	Compressor	19 Bar	Coordinates
Drilling Contractor	Hennie Erwee	Diameter	165 mm	x
Drilling operator	Jack	Date drilled	06/12/2016	y
		Date profiled	06/12/2016	z

Project Number: V16/099

Project Name: Erasmus Park *Date:* *06/12/2016*

Investigation: Supplementary Dolomite Stability *BH25* *Sheet 1 of 1*

PENETRATION TIME Min : Sec	AIR LOSS	SAMPLE RECOVERY	DEPTH (m)	DESCRIPTION	INTERPRETATION
0 : 29	None	Good		Light brown, silty sand	**Transported Material.**
0 : 41	None	Good		Orange brown fine silty sand with minor ferricrete gravel concretions.	**Cemented Ferricrete.**
0 : 36	None	Good			
0 : 24	None	Good			
0 : 20	None	Good	5,0	Pinkish purple, silty clay with trace amounts of very soft rock gravel (2-4mm).	**Very Soft Rock Shale.**
0 : 30	None	Good			
0 : 28	None	Good			
0 : 24	None	Good			
0 : 31	None	Good		Grey brown with zones of purple, silty clay with minor to abundant sub angular shale rock fragments (2-10mm)	**Very Soft Rock Shale.**
0 : 26	None	Good			
0 : 32	None	Good	10,0		
0 : 29	None	Good			
0 : 24	None	Good			
0 : 26	None	Good			
0 : 24	None	Good	15,0		
0 : 22	None	Good			
0 : 29	None	Good			
0 : 43	None	Good			
0 : 36	None	Good			
0 : 38	None	Good	20,0	Terminated at 20,0m due to 15.0m of competent overburden.	
			25,0		
			30,0		
			35,0		
			40,0		
			45,0		

Profiled by:	Riaan Jooste	Compressor	19 Bar	Coordinates
Drilling Contractor	Hennie Erwee	Diameter	165 mm	x
Drilling operator	Jack	Date drilled	06/12/2016	y
		Date profiled	06/12/2016	z

APPENDIX C

DRILLERS LOGS

SUPPLEMENTARY INVESTIGATION

38697

SLAGBOORSTAAT
PERCUSSION BORE HOLE RECORD

Kliënt: VERDICON
Client:
Projek/Terrein: ERASMIAS PARK
Project/Site:
Gat Nr.:
Hole No.: VB418
Gatposisie:
Hole position:

Totale diepte: 60M
Total depth:
Voering - In en Uit (m):
Casing - In & Out (m):
Voering gelaat (m):
Casing installed (m):
Voering permanent beskadig (m):
Casing permanently damaged (m):

Datum: 06 DEC 2016
Date:
Lugdruk: 1400 kPA
Air pressure:
Lugvolume: 776 m3/min
Air capacity:
Beiteldeursnee (mm): 165mm
Bit diameter (mm):
Water aangetref (m):
Water struck (m):
Rusvlak (m):
Rest level (m):

Diepte Depth (m)	Penetrasie tyd Penetration time min: sek/m	Formasie Formation: Holte/Cavity	Baie sag/Very soft	Sag/Soft	Redelik hard/Fairly hard	Solied/Solid	Hamer tempo Hammer rate: Baie ongereeld/Very irregular	Ongereeld/Irregular	Gereeld/Regular	Lugverlies Air loss: Geen/None	Effens/Slightly	Medium	Totaal/Total	Water aangetref/found	Vog toestand Moisture condition: Nat/Wet	Klam/Moist	Droog/Dry	Gat val toe Hole collapsing	Voering Casing: Water aangewend/applied	Diepte geïnstalleer Depth installed	Monster herwinning Sample recovered: Goed/Good	Medium	Swak/Poor	Geen/None	OPMERKINGS/REMARKS (bv tipe materiaal/eg. type of material)
0-1	0:18		1,0						✓	✓						✓					✓				
1-2	0:40		1,0						✓	✓						✓					✓				
2-3	0:54		1,0						✓	✓						✓					✓				
3-4	0:46		1,0						✓	✓						✓					✓				
4-5	0:48		1,0						✓	✓						✓					✓				Shale.
5-6	0:34		1,0						✓	✓						✓					✓				〃
6-7	0:20		1,0						✓	✓						✓					✓				〃
7-8	0:22		1,0						✓	✓						✓					✓				〃
8-9	0:19		1,0						✓	✓						✓					✓				〃
9-10	0:30		1,0						✓	✓						✓					✓				〃
10-11	0:25		1,0						✓	✓						✓					✓				〃
11-12	0:29	0,4 0,6						✓		✓							✓				✓				Chert
12-13	0:36		1,0						✓	✓							✓				✓				〃
13-14	0:59		1,0						✓	✓							✓				✓				Siltstone
14-15	0:57		1,0						✓	✓							✓				✓				〃
15-16	0:54		1,0						✓	✓							✓				✓				〃
16-17	1:20	0,5 0,5							✓	✓							✓				✓				〃
17-18	0:52		1,0						✓	✓							✓				✓				〃
18-19	0:54		1,0						✓	✓							✓				✓				〃
19-20	0:57		1,0						✓	✓						✓					✓				〃
20-21	0:54		1,0						✓	✓						✓					✓				〃
21-22	0:35		1,0						✓	✓						✓					✓				〃
22-23	0:14	0,7 0,3						✓		✓						✓					✓				Shale & coal
23-24	0:16		1,0						✓	✓						✓					✓				〃
24-25	0:19		1,0						✓	✓						✓					✓				〃
25-26	0:14		1,0						✓	✓						✓					✓				〃
26-27	0:16		1,0						✓	✓						✓					✓				〃
27-28	0:17		1,0						✓	✓						✓					✓				〃
28-29	0:14		1,0						✓	✓						✓					✓				〃
29-30	0:13		1,0						✓	✓						✓					✓				〃

Opmerkings:
Remarks:

DATA BESKRYF DEUR: Paulos
DATA DESCRIPTION BY:
OPERATEUR: Jeek
OPERATOR:

BOORKONTRAKTEUR
DRILLING CONTRACTOR
Hennie Erwee

30069
Wonderboom Poort
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Fax: 086 503 9981
Cell: 082 553 9291

Hennie

Brits Drukkery L3187 *Tel: (012) 252 1370

38698

Kliënt: VERDICON
Client:
Projek/Terrein: ERASMAS PARK
Project/Site:
Gat Nr.: VBH18
Hole No.:
Gatposisie:
Hole position:

SLAGBOORSTAAT
PERCUSSION BORE HOLE RECORD

Totale diepte: 60m
Total depth:
Voering - In en Uit (m):
Casing - In & Out (m):
Voering gelaat (m):
Casing installed (m):
Voering permanent beskadig (m):
Casing permanently damaged (m):

Datum: 06 DEC 2016
Date:
Lugdruk: 900KPA
Air pressure:
Lugvolume: 7,6M3/MIN
Air capacity:
Beiteldeursnee (mm):
Bit diameter (mm): 165mm
Water aangetref (m):
Water struck (m):
Rusvlak (m):
Rest level (m):

Diepte Depth (m)	Penetrasie tyd Penetration time min: sek/m	Formasie Formation: Holte/Cavity	Bale sag/Very soft	Sag/Soft	Redelik hard/Fairly hard	Solled/Solid	Hamer tempo Hammer rate: Bale ongereeld/Very irregular	Ongereeld/Irregular	Gereeld/Regular	Lugverlies Air loss: Geen/None	Effens/Slightly	Medium	Totaal/Total	Water aangetref/found	Vog toestand Moisture condition: Nat/Wet	Klam/Moist	Droog/Dry	Gat val toe Hole collapsing	Water aangewend/applied	Voering Casing: Diepte geïnstalleer Depth installed	Monster herwinning Sample recovered: Goed/Good	Medium	Swak/Poor	Geen/None	OPMERKINGS/REMARKS (bv tipe materiaal/eg. type of material)
0-1	0:16		40						✓	✓					✓						✓				Wad shale
1-2	0:12		40					✓		✓					✓						✓				〃
2-3	0:43		40						✓	✓					✓						✓				Dolerite 777
3-4	0:56		40						✓	✓					✓						✓				〃
4-5	0:40		40						✓	✓					✓						✓				〃
5-6	1:14		01	38				✓		✓					✓						✓				〃
6-7	1:07			40					✓	✓					✓						✓				〃
7-8	0:54		39	01					✓	✓					✓						✓				〃
8-9	0:41		40						✓	✓					✓						✓				〃
9-10	1:07		05	05					✓	✓					✓						✓				〃
10-11	1:06			40					✓	✓					✓						✓				〃
11-12	1:22			40					✓	✓					✓						✓				Quartsite
12-13	1:43			40					✓	✓					✓						✓				〃
13-14	2:33			40					✓	✓					✓						✓				〃
14-15	1:20			40					✓	✓					✓						✓				〃
15-16	1:40			40					✓	✓					✓						✓				〃
16-17	4:10			02	08			✓		✓					✓						✓				〃
17-18	4:30				40				✓	✓					✓						✓				Solid at 46,2m Quartsite
18-19	4:41				40				✓	✓					✓						✓				〃
19-20	4:16				40				✓	✓					✓						✓				〃
20-21	4:29				40				✓	✓					✓						✓				〃
21-22	4:06				40				✓	✓					✓						✓				〃
22-23	4:30				40				✓	✓					✓						✓				〃
23-24	4:00				40				✓	✓					✓						✓				〃
24-25	4:21				40				✓	✓					✓						✓				〃
25-26	1:45			96	04			✓		✓					✓						✓				Solid ga loss
26-27	1:10				40				✓	✓					✓						✓				Saxydolorite
27-28	1:00				40				✓	✓					✓						✓				〃
28-29	1:01				40				✓	✓					✓						✓				〃
29-30	0:55		06	04					✓	✓					✓						✓				〃

Opmerkings:
Remarks:

DATA BESKRYF DEUR: Paulos
DATA DESCRIPTION BY:

OPERATEUR: Jack
OPERATOR:

Brits Drukkery L3187 *Tel: (012) 252 1370

BOORKONTRAKTEUR
DRILLING CONTRACTOR
Hennie Erwee

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Hennie

38703

Kliënt: VERDICON
Client:
Projek/Terrein:
Project/Site: ERASMASPARK
Gat Nr.:
Hole No.: VB419
Gatposisie:
Hole position:

SLAGBOORSTAAT
PERCUSSION BORE HOLE RECORD

Totale diepte: 60m
Total depth:
Voering - In en Uit (m):
Casing - In & Out (m):
Voering gelaat (m):
Casing installed (m):
Voering permanent beskadig (m):
Casing permanently damaged (m):

Datum: 06 DEC 2016
Date:
Lugdruk: 1900 kPA Lugvolume: 276m³
Air pressure: Air capacity:
Beiteldeursnee (mm):
Bit diameter (mm):
Water aangetref (m):
Water struck (m):
Rusvlak (m):
Rest level (m):

Diepte Depth (m)	Penetrasie tyd Penetration time min: sek/ m	Formasie Formation					Hamer tempo Hammer rate			Lugverlies Air loss					Vog toestand Moisture condition			Gat val toe Hole collapsing		Voering Casing		Monster herwinning Sample recovered				OPMERKINGS/REMARKS (bv tipe materiaal/eg. type of material)
		Holte/Cavity	Baie sag/Very soft	Sag/Soft	Redelik hard/Fairly hard	Soliied/Solid	Baie ongereeld/Very irregular	Ongereeld/Irregular	Gereeld/Regular	Geen/None	Effens/Slightly	Medium	Totaal/Total	Water aangetreff/found	Nat/Wet	Klam/Moist	Droog/Dry		Water aangewend/applied	Diepte geïnstalleer Depth installed	Goed/Good	Medium	Swak/Poor	Geen/None	
0-1	0:17		10						✓	✓						✓					✓				
1-2	0:23		10						✓	✓						✓					✓				Clay
2-3	0:30		10						✓	✓						✓					✓				"
3-4	0:34		0496						✓	✓						✓					✓				"
4-5	0:30		10						✓	✓						✓					✓				Shale
5-6	0:26		10						✓	✓						✓					✓				"
6-7	0:21		10						✓	✓						✓					✓				"
7-8	0:19		10						✓	✓						✓					✓				"
8-9	0:21		10						✓	✓						✓					✓				"
9-10	0:23		10						✓							✓					✓				"
10-11	0:18		10						✓							✓					✓				"
11-12	0:20		10						✓							✓					✓				"
12-13	0:19		10						✓	✓						✓					✓				"
13-14	0:24		10						✓	✓						✓					✓				"
14-15	0:19		10						✓	✓						✓					✓				"
15-16	0:20		10						✓	✓						✓					✓				"
16-17	0:18		10						✓	✓						✓					✓				"
17-18	0:26		10						✓	✓						✓					✓				"
18-19	0:24		10						✓	✓						✓					✓				"
19-20	0:18		10						✓	✓						✓					✓				"
20-21	0:20		10						✓	✓						✓					✓				"
21-22	0:29		10						✓	✓						✓					✓				"
22-23	0:24		10						✓	✓						✓					✓				"
23-24	0:30		10						✓	✓						✓					✓				"
24-25	0:22		10						✓	✓						✓					✓				"
25-26	0:28		10						✓	✓						✓					✓				"
26-27	0:20		10						✓	✓						✓					✓				"
27-28	0:19		10						✓	✓						✓					✓				"
28-29	0:17		10						✓	✓						✓					✓				"
29-30	0:23		10						✓	✓						✓					✓				"

30

Opmerkings:
Remarks:

DATA BESKRYF DEUR: Pemlos
DATA DESCRIPTION BY:
OPERATEUR: Jenia
OPERATOR:

Brits Drukkery L3187 *Tel: (012) 252 1370

BOORKONTRAKTEUR
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Hennie Erwee

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Hennie

38704

Kliënt: VERDICON
Client:
Projek/Terrein: ERASMASPARK
Project/Site:
Gat Nr.:
Hole No.: VBH 19
Gatposisie:
Hole position:

SLAGBOORSTAAT
PERCUSSION BORE HOLE RECORD

Totale diepte:
Total depth: 40m
Voering - In en Uit (m):
Casing - In & Out (m):
Voering gelaat (m):
Casing installed (m):
Voering permanent beskadig (m):
Casing permanently damaged (m):

Datum: 06 DEC 2016
Date:
Lugdruk: 1900 KPA
Air pressure:
Lugvolume: 776 m³/min
Air capacity:
Beiteldeursnee (mm):
Bit diameter (mm): 165mm
Water aangetref (m):
Water struck (m):
Rusvlak (m):
Rest level (m):

Diepte Depth (m)	Penetrasie tyd Penetration time min: sek/m	Formasie Formation					Hamer tempo Hammer rate			Lugverlies Air loss					Vog toestand Moisture condition				Gat val toe Hole collapsing		Voering Casing		Monster herwinning Sample recovered				OPMERKINGS/REMARKS (bv tipe materiaal/eg. type of material)
		Holte/Cavity	Baie sag/Very soft	Sag/Soft	Redelik hard/Fairly hard	Soliet/Solid	Baie ongereeld/Very irregular	Ongereeld/Irregular	Gereeld/Regular	Geen/None	Effens/Slightly	Medium	Totaal/Total	Water aangetref/found	Nat/Wet	Klam/Moist	Droog/Dry		Water aangewend/applied	Diepte geïnstalleer Depth installed	Goed/Good	Medium	Swak/Poor	Geen/None	
0-1	0:31		1,0						✓	✓						✓					✓				Shale
1-2	0:28		1,0						✓	✓						✓					✓				"
2-3	0:25		1,0						✓	✓						✓					✓				"
3-4	0:41		1,0						✓	✓					✓						✓				"
4-5	0:36		1,0						✓	✓						✓					✓				"
5-6	0:32		1,0						✓	✓						✓					✓				"
6-7	0:41		1,0						✓	✓						✓					–				"
7-8	0:39		1,0						✓	✓					✓						✓				"
8-9	0:44		1,0						✓	✓					✓						✓				"
9-10	0:37		1,0						✓	✓					✓						✓				"
10-11	0:32		1,0						✓	✓					✓						✓				"
11-12	0:30		1,0						✓	✓					✓						✓				"
12-13	0:27		1,0						✓	✓					✓						✓				"
13-14	0:31		1,0						✓	✓					✓						✓				Dolorite
14-15	0:33		1,0						✓	✓					✓						✓				Sandstone
15-16	0:35		1,0						✓	✓					✓						✓				Chert
16-17	0:29		1,0						✓	✓					✓						✓				Shale
17-18	0:31		1,0						✓	✓					✓						✓				Shale
18-19	0:34		1,0						✓	✓					✓						✓				"
19-20	0:36		1,0						✓	✓					✓						✓				"
20-21	0:30		1,0						✓	✓					✓						✓				"
21-22	0:31		1,0						✓	✓					✓						✓				"
22-23	0:34		1,0						✓	✓					✓						✓				"
23-24	0:40		1,0						✓	✓					✓						✓				"
24-25	0:30		1,0						✓	✓					✓						✓				"
25-26	0:29		1,0						✓	✓					✓						✓				"
26-27	0:36		1,0						✓	✓					✓						✓				"
27-28	0:47		1,0						✓	✓					✓						✓				"
28-29	0:35		1,0						✓	✓					✓						✓				"
29-30	0:40		1,0						✓	✓					✓						✓				"

Opmerkings:
Remarks:

DATA BESKRYF DEUR: Pcussd
DATA DESCRIPTION BY:
OPERATEUR:
OPERATOR:

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Hennie

38702

Kliënt: VERGICOM
Client:
Projek/Terrein: ERASMUS PARK
Project/Site:
Gat Nr.: VB4 20
Hole No.:
Gatposisie:
Hole position:

SLAGBOORSTAAT
PERCUSSION BORE HOLE RECORD

Totale diepte: 20m
Total depth:
Voering - In en Uit (m):
Casing - In & Out (m):
Voering gelaat (m):
Casing installed (m):
Voering permanent beskadig (m):
Casing permanently damaged (m):

Datum: 06 DEC 2016
Date:
Lugdruk: 1900 kPA Lugvolume: 276m³/min
Air pressure: Air capacity:
Beitelduersnee (mm):
Bit diameter (mm): 165mm
Water aangetref (m):
Water struck (m):
Rusvlak (m):
Rest level (m):

Diepte Depth (m)	Penetrasie tyd Penetration time min: sek/m	Formasie Formation: Holte/Cavity	Baie sag/Very soft	Sag/Soft	Redelik hard/Fairly hard	Solied/Solid	Hamer tempo Hammer rate: Baie ongereeld/Very irregular	Ongereeld/Irregular	Gereeld/Regular	Lugverlies Air loss: Geen/None	Effens/Slightly	Medium	Totaal/Total	Vog toestand Moisture condition: Water aangetref/found	Nat/Wet	Klam/Moist	Droog/Dry	Gat val toe Hole collapsing	Water aangewend/applied	Voering Casing: Diepte geïnstalleer Depth installed	Monster herwinning Sample recovered: Goed/Good	Medium	Swak/Poor	Geen/None	OPMERKINGS/REMARKS (bv tipe materiaal/eg. type of material)
0-1	0:11		1,0						✓	✓							✓				✓				6c Sklim
1-2	0:55		1,0						✓	✓							✓				✓				clay
2-3	0:49		1,0						✓	✓						✓					✓				"
3-4	0:51		1,0						✓	✓						✓					✓				"
4-5	0:52		1,0						✓	✓						✓					✓				"
5-6	0:47		0,99					✓	✓							✓					✓				"
6-7	0:40		1,0						✓	✓						✓					✓				Shale
7-8	0:54		1,0						✓	✓				✓					✓		✓				"
8-9	0:58		1,0						✓	✓				✓					✓		✓				"
9-10	0:43		1,0						✓	✓				✓					✓		✓				"
10-11	0:55		1,0						✓	✓				✓					✓		✓				"
11-12	0:49		1,0						✓	✓				✓					✓		✓				"
12-13	0:52		1,0						✓	✓				✓					✓		✓				"
13-14	0:55		1,0						✓	✓				✓					✓		✓				"
14-15	0:47		1,0						✓	✓				✓					✓		✓				"
15-16	0:42		1,0						✓	✓				✓					✓		✓				"
16-17	0:50		1,0						✓	✓				✓					✓		✓				"
17-18	0:41		1,0						✓	✓				✓					✓		✓				"
18-19	0:54		1,0						✓	✓				✓					✓		✓				"
19-20	0:46		1,0						✓					✓					✓		✓				"
20-21	:																								
21-22	:																								
22-23	:																								
23-24	:																								
24-25	:																								
25-26	:																								
26-27	:																								
27-28	:																								
28-29	:																								
29-30	:																								

Opmerkings:
Remarks:

DATA BESKRYF DEUR: Paulos
DATA DESCRIPTION BY:
OPERATEUR: Jaco
OPERATOR:

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Hennie

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Kliënt: VERDICOM
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Projek/Terrein: ERASMASPARIS
Project/Site:
Gat Nr.:
Hole No.: VB4 23
Gatposisie:
Hole position:

SLAGBOORSTAAT
PERCUSSION BORE HOLE RECORD

Totale diepte: 20m
Total depth:
Voering - In en Uit (m):
Casing - In & Out (m):
Voering gelaat (m):
Casing installed (m):
Voering permanent beskadig (m):
Casing permanently damaged (m):

Datum: 06 DEC 2018
Date:
Lugdruk: 1900KPA
Air pressure:
Lugvolume: 276M3/min
Air capacity:
Beiteldeursnee (mm):
Bit diameter (mm): 165mm
Water aangetref (m):
Water struck (m):
Rusvlak (m):
Rest level (m):

Diepte Depth (m)	Penetrasie tyd Penetration time min: sek/m	Formasie Formation: Holte/Cavity	Baie sag/Very soft	Sag/Soft	Redelik hard/Fairly hard	Solled/Solid	Hamer tempo Hammer rate: Baie ongereeld/Very irregular	Ongereeld/Irregular	Gereeld/Regular	Lugverlies Air loss: Geen/None	Effens/Slightly	Medium	Totaal/Total	Water aangetreff/found	Vog toestand Moisture condition: Nat/Wet	Klam/Moist	Droog/Dry	Gat val toe Hole collapsing	Water aangewend/applied	Voering Casing: Diepte geïnstalleer Depth installed	Monster herwinning Sample recovered: Goed/Good	Medium	Swak/Poor	Geen/None	OPMERKINGS/REMARKS (bv tipe materiaal/eg. type of material)
0-1	0:18		1/0						✓	✓						✓					✓				
1-2	0:30		1/0						✓	✓						✓					✓				Clay.
2-3	0:41		1/0						✓	✓						✓					✓				〃
3-4	0:46		1/0					✓	✓							✓					✓				〃
4-5	0:44		1/0						✓	✓						✓					✓				Shale
5-6	0:30		1/0						✓	✓						✓					✓				〃
6-7	0:40		1/0						✓	✓						✓					✓				〃
7-8	0:27		1/0						✓	✓						✓					✓				〃
8-9	0:24		1/0						✓	✓						✓					✓				〃
9-10	0:21		1/0						✓	✓						✓					✓				〃
10-11	0:18		1/0						✓	✓						✓					✓				〃
11-12	0:19		1/0						✓	✓						✓					✓				〃
12-13	0:21		1/0						✓	✓						✓					✓				〃
13-14	0:26		1/0						✓	✓						✓					✓				〃
14-15	0:24		1/0						✓	✓						✓					✓				〃
15-16	0:19		1/0						✓	✓						✓					✓				〃
16-17	0:21		1/0						✓	✓						✓					✓				〃
17-18	0:29		1/0						✓	✓						✓					✓				〃
18-19	0:20		1/0						✓	✓						✓					✓				〃
19-20	0:17		1/0						✓	✓						✓					✓				〃
20-21	:																								
21-22	:																								
22-23	:																								
23-24	:																								
24-25	:																								
25-26	:																								
26-27	:																								
27-28	:																								
28-29	:																								
29-30	:																								

Opmerkings:
Remarks:

DATA BESKRYF DEUR: Pauluus
DATA DESCRIPTION BY:
OPERATEUR: Jerie
OPERATOR:

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Hennie

38700

Kliënt: VERIDICON
Client:
Projek/Terrein: ERASMAS PARK
Project/Site:
Gat Nr.: UH 24
Hole No.:
Gatposisie:
Hole position:

SLAGBOORSTAAT
PERCUSSION BORE HOLE RECORD

Totale diepte: 20m
Total depth:
Voering - In en Uit (m):
Casing - In & Out (m):
Voering gelaat (m):
Casing installed (m):
Voering permanent beskadig (m):
Casing permanently damaged (m):

Datum: 06 Dec 2016
Date:
Lugdruk: 1900KPA
Air pressure:
Lugvolume: 27.6m³/min
Air capacity
Beiteldeursnee (mm):
Bit diameter (mm): 165mm
Water aangetref (m):
Water struck (m):
Rusvlak (m):
Rest level (m):

Diepte Depth (m)	Penetrasie tyd Penetration time min: sek/m	Formasie Formation: Holte/Cavity	Baie sag/Very soft	Sag/Soft	Redelik hard/Fairly hard	Solied/Solid	Hamer tempo Hammer rate: Baie ongereeld/Very irregular	Ongereeld/Irregular	Gereeld/Regular	Lugverlies Air loss: Geen/None	Effens/Slightly	Medium	Totaal/Total	Water aangetref/found	Vog toestand Moisture condition: Nat/Wet	Klam/Moist	Droog/Dry	Gat val toe Hole collapsing	Water aangewend/applied	Voering Casing: Diepte geïnstalleer Depth installed	Monster herwinning Sample recovered: Goed/Good	Medium	Swak/Poor	Geen/None	OPMERKINGS/REMARKS (bv tipe materiaal/eg. type of material)
0-1	0:29		1,0						✓	✓						✓					✓				
1-2	0:36		1,0						✓	✓						✓					✓				Clay
2-3	0:41		1,0						✓	✓						✓					✓				"
3-4	0:49		1,0						✓	✓						✓					✓				"
4-5	0:44		1,0						✓	✓						✓					✓				"
5-6	0:46		1,0						✓	✓						✓					✓				"
6-7	0:50		0,98					✓	✓	✓						✓					✓				"
7-8	0:26		1,0						✓	✓						✓					✓				"
8-9	0:30		1,0						✓	✓						✓					✓				Shale
9-10	0:31		1,0						✓	✓						✓					✓				"
10-11	0:30		1,0						✓	✓						✓					✓				"
11-12	0:18		1,0						✓	✓						✓					✓				"
12-13	0:20		1,0						✓	✓						✓					✓				"
13-14	0:26		1,0						✓	✓						✓					✓				"
14-15	0:19		1,0						✓	✓						✓					✓				"
15-16	0:24		1,0						✓	✓						✓					✓				"
16-17	0:24		1,0						✓	✓						✓					✓				"
17-18	0:25		1,0						✓	✓						✓					✓				"
18-19	0:20		1,0						✓	✓						✓					✓				"
19-20	0:18		1,0						✓	✓						✓					✓				"
20-21	:																								
21-22	:																								
22-23	:																								
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24-25	:																								
25-26	:																								
26-27	:																								
27-28	:																								
28-29	:																								
29-30	:																								

Opmerkings:
Remarks:

DATA BESKRYF DEUR: Pauline
DATA DESCRIPTION BY:
OPERATEUR: Jaek
OPERATOR:

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Hennie

38699

Kliënt: VERIDICON
Client:
Projek/Terrein: ERASMASPARK
Project/Site:
Gat Nr.: VB4 25
Hole No.:
Gatposisie:
Hole position:

SLAGBOORSTAAT
PERCUSSION BORE HOLE RECORD

Totale diepte: 20m
Total depth:
Voering - In en Uit (m):
Casing - In & Out (m):
Voering gelaat (m):
Casing installed (m):
Voering permanent beskadig (m):
Casing permanently damaged (m):

Datum: 06 DEC 2016
Date:
Lugdruk: 1400KPA
Air pressure:
Lugvolume: 276m³/m
Air capacity:
Beitelduursnee (mm):
Bit diameter (mm): 165mm
Water aangetref (m):
Water struck (m):
Rusvlak (m):
Rest level (m):

Diepte Depth (m)	Penetrasie tyd Penetration time min: sek/m	Formasie Formation: Holte/Cavity	Baie sag/Very soft	Sag/Soft	Redelik hard/Fairly hard	Solied/Solid	Hamer tempo Hammer rate: Baie ongereeld/Very irregular	Ongereeld/Irregular	Gereeld/Regular	Lugverlies Air loss: Geen/None	Effens/Slightly	Medium	Totaal/Total	Water aangetref/found	Vog toestand Moisture condition: Nat/Wet	Klam/Moist	Droog/Dry	Gat val toe Hole collapsing	Water aangewend/applied	Voering Casing: Diepte geïnstalleer Depth installed	Monster herwinning Sample recovered: Goed/Good	Medium	Swak/Poor	Geen/None	OPMERKINGS/REMARKS (bv tipe materiaal/eg. type of material)
0-1	0.29		40						✓	✓							✓				✓				Clay
1-2	0.41		40						✓	✓						✓					✓				"
2-3	0.36		40						✓	✓						✓					✓				Shale
3-4	0.34		40						✓	✓						✓					✓				"
4-5	0.20		40						✓	✓						✓					✓				"
5-6	0.30		40						✓	✓						✓					✓				"
6-7	0.28		40						✓	✓						✓					✓				"
7-8	0.34		40						✓	✓						✓					✓				"
8-9	0.31		40						✓	✓						✓					✓				"
9-10	0.26		40						✓	✓						✓					✓				"
10-11	0.32		40						✓	✓						✓					✓				"
11-12	0.29		40						✓	✓						✓					✓				"
12-13	0.34		40						✓	✓						✓					✓				"
13-14	0.26		40						✓	✓						✓					✓				"
14-15	0.34		40						✓	✓						✓					✓				"
15-16	0.32		40						✓	✓						✓					✓				"
16-17	0.29		40						✓	✓						✓					✓				"
17-18	0.43		40						✓	✓							✓				✓				"
18-19	0.36		40						✓	✓							✓				✓				"
19-20	0.38		40						✓	✓							✓				✓				"
20-21	:																								
21-22	:																								
22-23	:																								
23-24	:																								
24-25	:																								
25-26	:																								
26-27	:																								
27-28	:																								
28-29	:																								
29-30	:																								

Opmerkings:
Remarks:

DATA BESKRYF DEUR: Pamela
DATA DESCRIPTION BY:
OPERATEUR: Jenka
OPERATOR:

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Hennie

APPENDIX D

PERCUSSION BOREHOLE PROFILES

PREVIOUS INVESTIGATION

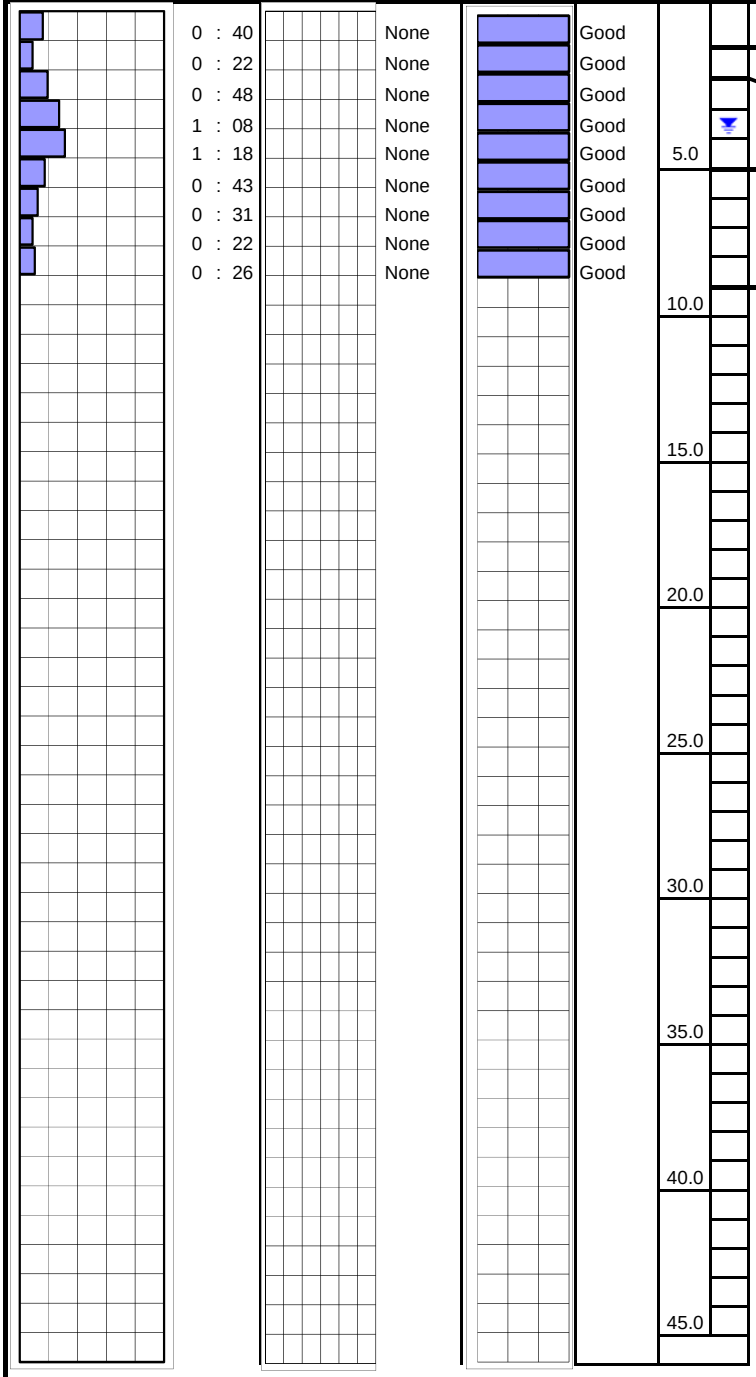
Project Number: V16/099

Project Name: Erasmus Park

Investigation: Dolomite Stability

BH No. VBH8

Sheet 1 of 1



PENETRATION TIME Min : Sec	AIR LOSS	SAMPLE RECOVERY	DEPTH (m)	DESCRIPTION	INTERPRETATION
0 : 40	None	Good		Light brown silty sand	TRANSPORTED SOIL
0 : 22	None	Good		Yellow brown sandy silty clay with gravel	FERRUGNISED TRANSPORTED SOIL
0 : 48	None	Good			
1 : 08	None	Good		Orange brown silty clay with subrounded gravel	HARDPAN FERRICRETE
1 : 18	None	Good	5.0		
0 : 43	None	Good		Purple red brown silty clay with shale gravel	VERY SOFT ROCK SHALE
0 : 31	None	Good			
0 : 22	None	Good			
0 : 26	None	Good			
			10.0	END OF BOREHOLE (Terminated at the required depth)	
			15.0		
			20.0		
			25.0		
			30.0		
			35.0		
			40.0		
			45.0		

Profiled by:	R Govender	Compressor	19Bar	Coordinates
Drilling Contractor	Hennie Erwee Boorkontrakteur	Diameter	165 mm	25°49'19.12"S
Drilling operator	William	Date drilled	3/5/2016	28°14'48.57"E
		Date profiled	3/5/2016	

Project Number: V16/099

Project Name: Erasmus Park

Investigation: Dolomite Stability

BH No. VBH9

Sheet 1 of 1

PENETRATION TIME Min : Sec	AIR LOSS	SAMPLE RECOVERY	DEPTH (m)	DESCRIPTION	INTERPRETATION
0 : 30	None	Good		Light brown to orange brown silty sand with ferricrete gravel	**TRANSPORTED SOIL**
0 : 32	None	Good			
1 : 20	None	Good		Orange brown silty sand with ferricrete nodules	**HARDPAN FERRICRETE**
0 : 54	None	Good			
0 : 58	None	Good	5.0		
0 : 31	None	Good		Purple red brown silty clay with minor angular grey gravel	**VERY SOFT ROCK SHALE**
0 : 29	None	Good			
0 : 21	None	Good		Light purple silty clay with angular grey fragments	**VERY SOFT ROCK SHALE**
0 : 27	None	Good	10.0		
			15.0	END OF BOREHOLE (Terminated at the required depth)	
			20.0		
			25.0		
			30.0		
			35.0		
			40.0		
			45.0		

Profiled by:	R Govender	Compressor	19Bar	Coordinates
Drilling Contractor	Hennie Erwee Boorkontrakteur	Diameter	165 mm	25°49'14.74"S
Drilling operator	William	Date drilled	3/5/2016	28°14'45.20"E
		Date profiled	3/5/2016	

39067

Kliënt: Verdicon
Client:
Projek/Terrein: Erasmus Park
Project/Site:
Gat Nr.: B18
Hole No.:
Gatposisie:
Hole position:

SLAGBOORSTAAT
PERCUSSION BORE HOLE RECORD

Totale diepte: 9M
Total depth:
Voering - In en Uit (m):
Casing - In & Out (m):
Voering gelaat (m):
Casing installed (m):
Voering permanent beskadig (m):
Casing permanently damaged (m):

Datum: 04-05-2016
Date:
Lugdruk: 1900 kPa Lugvolume: 7,6m³/m
Air pressure: Air capacity:
Beiteldeursnee (mm): 165mm
Bit diameter (mm):
Water aangetref (m):
Water struck (m):
Rusvlak (m):
Rest level (m):

Diepte Depth (m)	Penetrasie tyd Penetration time min: sek/m	Formasie Formation: Holte/Cavity	Baie sag/Very soft	Sag/Soft	Redelik hard/Fairly hard	Soliied/Solid	Hamer tempo Hammer rate: Baie ongereeld/Very irregular	Ongereeld/Irregular	Gereeld/Regular	Lugverlies Air loss: Geen/None	Effens/Slightly	Medium	Totaal/Total	Water aangetref/found	Vog toestand Moisture condition: Nat/Wet	Klam/Moist	Droog/Dry	Gat val toe Hole collapsing	Voering Casing: Water aangewend/applied	Diepte geïnstalleer Depth installed	Monster herwinning Sample recovered: Goed/Good	Medium	Swak/Poor	Geen/None	OPMERKINGS/REMARKS (bv tipe materiaal/eg. type of material)
0-1	040		1,0						✓	✓						✓	✓				✓				Klei
1-2	022		1,0						✓	✓						✓					✓				"
2-3	048		1,0						✓	✓						✓					✓				"
3-4	108		0,5	0,5				✓		✓						✓					✓				"
4-5	118			1,0					✓	✓						✓					✓				Klei
5-6	043		0,9	0,1				✓		✓						✓	✓				✓				Shale
6-7	031		1,0						✓	✓						✓	✓				✓				"
7-8	022		1,0						✓	✓						✓	✓				✓				"
8-9	026		1,0						✓	✓						✓	✓				✓				Shale
9-10	:																								
10-11	:																								
11-12	:																								
12-13	:																								
13-14	:																								
14-15	:																								
15-16	:																								
16-17	:																								
17-18	:																								
18-19	:																								
19-20	:																								
20-21	:																								
21-22	:																								
22-23	:																								
23-24	:																								
24-25	:																								
25-26	:																								
26-27	:																								
27-28	:																								
28-29	:																								
29-30	:																								

Opmerkings:
Remarks:

BOORKONTRAKTEUR
DRILLING CONTRACTOR
Hennie Erwee

✉ 30069
Wonderboom Poort
Pretoria 0033
Fax: 086 503 9981

39068

Kliënt: Verdicon
Client:
Projek/Terrein: Erasmus park
Project/Site:
Gat Nr.: BH9
Hole No.:
Gatposisie:
Hole position:

SLAGBOORSTAAT
PERCUSSION BORE HOLE RECORD

Totale diepte: 9M
Total depth:
Voering - In en Uit (m):
Casing - In & Out (m):
Voering gelaat (m):
Casing installed (m):
Voering permanent beskadig (m):
Casing permanently damaged (m):

Datum: 04-05-2016
Date:
Lugdruk:
Air pressure:
Lugvolume:
Air capacity:
Beiteldeursnee (mm):
Bit diameter (mm):
Water aangetref (m):
Water struck (m):
Rusvlak (m):
Rest level (m):

Diepte Depth (m)	Penetrasie tyd Penetration time min: sek/m	Formasie Formation: Holte/Cavity	Baie sag/Very soft	Sag/Soft	Redelik hard/Fairly hard	Sollied/Solid	Hamer tempo Hammer rate: Baie ongereeld/Very irregular	Ongereeld/Irregular	Gereeld/Regular	Lugverlies Air loss: Geen/None	Effens/Slightly	Medium	Totaal/Total	Water aangetref/found	Vog toestand Moisture condition: Nat/Wet	Klam/Moist	Droog/Dry	Gat val toe Hole collapsing	Water aangewend/applied	Voering Casing: Diepte geïnstalleer Depth installed	Monster herwinning Sample recovered: Goed/Good	Medium	Swak/Poor	Geen/None	OPMERKINGS/REMARKS (bv tipe materiaal/eg. type of material)
0-1	030		1,0						✓	✓							✓				✓				Klei
1-2	032		1,0						✓	✓							✓				✓				"
2-3	120		0,09					✓		✓							✓				✓				"
3-4	054		1,0						✓	✓							✓				✓				Klei
4-5	058		1,0						✓	✓							✓				✓				Shale
5-6	031		1,0						✓	✓							✓				✓				"
6-7	029		1,0						✓	✓							✓				✓				"
7-8	021		1,0						✓	✓							✓				✓				Chert in Shale
8-9	027		1,0						✓	✓							✓				✓				Shale
9-10	:																								
10-11	:																								
11-12	:																								
12-13	:																								
13-14	:																								
14-15	:																								
15-16	:																								
16-17	:																								
17-18	:																								
18-19	:																								
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23-24	:																								
24-25	:																								
25-26	:																								
26-27	:																								
27-28	:																								
28-29	:																								
29-30	:																								

Opmerkings:
Remarks:

BOORKONTRAKTEUR
DRILLING CONTRACTOR
Hennie Erwee

30069
Wonderboom Poort
Pretoria 0033
Fax: 086 503 9981

APPENDIX E

TEST PIT PROFILES

PREVIOUS INVESTIGATIONS

Project No: V16/099 VTP: 7

Project: Erasmus Park

Client: Atturbury Properties

Date: 2016/04/30

Profiled by: Riaan Jooste

VERDICON Consulting Engineers
353/2 Olifantsfontein Road, Glen Austin, Midrand
P O Box 13096, Vorna Valley, 1686
Tel: +27 (087) 806 2880
Cell: +27 (082) 684 5621
E-mail: trevor@verdicon.co.za

Depth (m)	Sampling	Ground water	Symbol	Description
0,5				Slightly moist, dark brown, loose, pinholed, gravelly silty SAND. **Transported Soil.**
1,0	D/U			Moist, red orange brown, loose, pinholed, fine sandy silty CLAY. **Transported Soil.**
1,5				Moist, orange brown mottled black, loose to medium dense, gravelly silty SAND **Ferruginised Transported Soil.**
2,0				Moist, orange brown mottled black, dense, pinholed, gravelly clayey SAND. **Cemented Ferricrete.**
2,5				
3,0				Refusal at 3.0m on strongly cemented ferricrete.
3,5				
4,0				
4,5				
5,0				

Excavation method: Hitachi Excavator

Note 1: No groundwater

Note 2: Stable sidewalls

Note 3: Profiled in-situ

Note 4: D = Disturbed Sample U = Undisturbed Sample

Coordinates: 25°49'12.61"S

Coordinates: 28°14'51.02"E

Elevation:

Sheet: 1 of 1

Project No: V16/099 VTP: 8

Project: Erasmus Park

Client: Atturbury Properties

Date: 2016/04/30

Profiled by: Riaan Jooste

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Cell: +27 (082) 684 5621
E-mail: trevor@verdicon.co.za

Depth (m)	Sampling	Ground water	Symbol	Description
0,5				Slightly moist, light brown, loose, silty SAND. **Transported Soil.**
1,0	D/U			Moist, yellow brown, firm, intact, gravelly silty CLAY. **Slightly Ferruginised Soil.**
1,5				
2,0				Moist, red brown mottled yellow brown, stiff, sandy CLAY with zones of cemented ferricrete. **Ferruginised Residual Shale tending to ferricrete.**
2,5				
3,0				
3,5				
4,0				Near refusal at 4.0m on residual shale tending to ferricrete.
4,5				
5,0				

Excavation method: Hitachi Excavator

Note 1: No groundwater

Note 2: Stable sidewalls

Note 3: Profiled in-situ

Note 4: D = Disturbed Sample U = Undisturbed Sample

Coordinates: 25°49'17.78"S

Coordinates: 28°14'52.74"E

Elevation:

Sheet: 1 of 1

Project No: V16/099 VTP: 9

Project: Erasmus Park

Client: Atturbury Properties

Date: 2016/04/30

Profiled by: Riaan Jooste

VERDICON Consulting Engineers
Rosen Office Park, 8 Invicta Road, Erand Gardens x49, Midrand
P O Box 13096, Vorna Valley, 1686
Tel: +27 (087) 806 2880
Cell: +27 (082) 684 5621
E-mail: trevor@verdicon.co.za

Depth (m)	Sampling	Ground water	Symbol	Description
0,5				Moist, yellow khaki brown, very soft, sandy clayey SILT with minor gravel. **Slightly Ferruginised Transported Soil.**
1,0				
1,5				Moist, red brown, mottled grey and yellow brown, dense, clayey gravelly SAND. **Cemented Ferricrete.**
2,0				
2,5				
3,0				
3,5				Moist to wet, red brown mottled grey and yellow brown, very dense, gravelly SAND with Hard Rock Sandstone cobbles. **Strongly Cemented Ferricrete.**
4,0				Refusal at 3.5m. Excavator started to struggle at 1.9m
4,5				
5,0				

Excavation method: Hitachi Zaxis 200 Excavator

Note 1: No groundwater

Note 2: Stable sidewalls

Note 3: Profiled in-situ

Note 4: D = Disturbed Sample U = Undisturbed Sample

Coordinates: 25°49'22.65"S

Coordinates: 28°14'50.53"E

Elevation:

Sheet: 1 of 1

Project No: V16/099 VTP: 10

Project: Erasmus Park

Client: Atturbury Properties

Date: 2016/04/30

Profiled by: Riaan Jooste

VERDICON Consulting Engineers
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E-mail: trevor@verdicon.co.za

Depth (m)	Sampling	Ground water	Symbol	Description
0,0				Slightly moist, light brown, loose, silty SAND. **Transported Soil.**
0,5				Moist, yellow brown, soft, intact, silty CLAY with trace amounts of gravel. **Slightly Ferruginised Transported Soil.**
1,0				Moist, yellow brown mottled red brown, soft to firm, intact, silty CLAY with minor gravel ferricrete nodules. **Ferruginised Transported Soil.**
1,5				Moist, orange yellow brown mottled black, dense, gravelly clayey SAND. **Cemented Ferricrete.**
2,0				
2,5				
3,0				
3,5				
3,8				Near refusal at 3.8m (very slow excavation).
4,0				
4,5				
5,0				

Excavation method: Hitachi Zaxis 200 Excavator

Note 1: No groundwater

Note 2: Stable sidewalls

Note 3: Profiled in-situ

Note 4: D = Disturbed Sample U = Undisturbed Sample

Coordinates: 25°49'21.78"S

Coordinates: 28°14'43.67"E

Elevation:

Sheet: 1 of 1

Project No: V16/099 VTP: 11

Project: Erasmus Park

Client: Atturbury Properties

Date: 2016/04/30

Profiled by: Riaan Jooste

VERDICON Consulting Engineers
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Cell: +27 (082) 684 5621
E-mail: trevor@verdicon.co.za

Depth (m)	Sampling	Ground water	Symbol	Description
0,5				Slightly moist, light brown, loose, silty SAND. **Transported Soil.**
1,0				Moist, yellow brown, soft, intact, silty CLAY with trace amounts of gravel. **Slightly Ferruginised Transported Soil.**
1,5				Moist, yellow brown mottled red brown, soft to firm, intact, clayey sandy silt with minor gravel ferricrete nodules. **Ferruginised Transported Soil.**
2,0	D			Moist, orange yellow brown mottled black, dense, gravelly clayey SAND. **Cemented Ferricrete.**
2,5				
3,0				
3,5				
4,0				Near refusal at 3.8m in (very slow excavation).
4,5				
5,0				

Excavation method: Hitachi Zaxis 200 Excavator

Note 1: No groundwater

Note 2: Stable sidewalls

Note 3: Profiled in-situ

Note 4: D = Disturbed Sample U = Undisturbed Sample

Coordinates: 25°49'19.40"S

Coordinates: 28°14'48.02"E

Elevation:

Sheet: 1 of 1

Project No: V16/099 VTP: 12

Project: Erasmus Park

Client: Atturbury Properties

Date: 2016/04/30

Profiled by: Riaan Jooste

VERDICON Consulting Engineers
Rosen Office Park, 8 Invicta Road, Erand Gardens x49, Midrand
P O Box 13096, Vorna Valley, 1686
Tel: +27 (087) 806 2880
Cell: +27 (082) 684 5621
E-mail: trevor@verdicon.co.za

Depth (m)	Sampling	Ground water	Symbol	Description
0,0				Slightly moist, light brown, loose, silty SAND. **Transported Soil.**
0,5				Moist, yellow brown mottled red brown, loose, pinholed, gravelly clayey SAND. **Ferruginised Transported Soil.**
1,0				
1,5				Moist, orange and yellow brown mottled black, dense, gravelly clayey SAND. **Cemented Ferricrete.**
2,0				
2,5				Refusal at 2.3m on strongly cemented ferricrete.
3,0				
3,5				
4,0				
4,5				
5,0				

Excavation method: Hitachi Zaxis 200 Excavator

Note 1: No groundwater

Note 2: Stable sidewalls

Note 3: Profiled in-situ

Note 4: D = Disturbed Sample U = Undisturbed Sample

Coordinates: 25°49'14.37"S

Coordinates: 28°14'46.03"E

Elevation:

Sheet: 1 of 1

Project No: V16/099 VTP: 14

Project: Erasmus Park

Client: Atturbury Properties

Date: 2016/04/30

Profiled by: Riaan Jooste

VERDICON Consulting Engineers
Rosen Office Park, 8 Invicta Road, Erand Gardens x49, Midrand
P O Box 13096, Vorna Valley, 1686
Tel: +27 (087) 806 2880
Cell: +27 (082) 684 5621
E-mail: trevor@verdicon.co.za

Depth (m)	Sampling	Ground water	Symbol	Description
0,0				Slightly moist, light brown, loose, silty SAND. **Transported Soil.**
0,5				Moist, yellow brown mottled red brown, loose, pinholed, gravelly clayey SAND. **Ferruginised Transported Soil.**
1,0				Moist, orange and yellow brown mottled black, dense, gravelly clayey SAND. **Cemented Ferricrete.**
1,5	D			Refusal at 1.7m on strongly cemented ferricrete.
2,0				
2,5				
3,0				
3,5				
4,0				
4,5				
5,0				

Excavation method: Hitachi Zaxis 200 Excavator

Note 1: No groundwater

Note 2: Stable sidewalls

Note 3: Profiled in-situ

Note 4: D = Disturbed Sample U = Undisturbed Sample

Coordinates: 25°49'15.29"S

Coordinates: 28°14'40.41"E

Elevation:

Sheet: 1 of 1

Project No: V16/099 VTP: 18

Project: Erasmus Park

Client: Atturbury Properties

Date: 2016/04/30

Profiled by: Riaan Jooste

VERDICON Consulting Engineers
Rosen Office Park, 8 Invicta Road, Erand Gardens x49, Midrand
P O Box 13096, Vorna Valley, 1686
Tel: +27 (087) 806 2880
Cell: +27 (082) 684 5621
E-mail: trevor@verdicon.co.za

Depth (m)	Sampling	Ground water	Symbol	Description
0,5				Slightly moist, brown, loose, clayey SAND with gravel and cobbles. **Pebble Marker Roots.**
1,0				
1,5				Slightly moist, olive brown blotched black, dense, sandy clayey GRAVEL. **Ferruginised Transported Material.**
2,0				
2,5				
3,0				
3,5				Near refusal at 3.3m.
4,0				
4,5				
5,0				

Excavation method: Hitachi Zaxis 200 Excavator

Note 1: No groundwater

Note 2: Stable sidewalls

Note 3: Profiled in-situ

Note 4: D = Disturbed Sample U = Undisturbed Sample

Coordinates: 25°49'18.01"S

Coordinates: 28°14'37.72"E

Elevation:

Sheet: 1 of 1

Project No: V16/099 VTP: 21

Project: Erasmus Park

Client: Atturbury Properties

Date: 2016/04/30

Profiled by: Riaan Jooste

VERDICON Consulting Engineers
Rosen Office Park, 8 Invicta Road, Erand Gardens x49, Midrand
P O Box 13096, Vorna Valley, 1686
Tel: +27 (087) 806 2880
Cell: +27 (082) 684 5621
E-mail: trevor@verdicon.co.za

Depth (m)	Sampling	Ground water	Symbol	Description
0				Slightly moist, grey, medium dense, gravelly silty SAND. **Topsoil.**
0,5				Slightly moist, yellow brown blotched black, loose, clayey SAND and gravel. **Ferruginised Transported Soil.**
1,0				
1,5				Yellow brown blotched black, dense, sandy GRAVEL. **Cemented Ferricrete.**
2,0				Refusal at 1.7m on Strongly cemented ferricrete.
2,5				
3,0				
3,5				
4,0				
4,5				
5,0				

Excavation method: Hitachi Zaxis 200 Excavator

Note 1: No groundwater

Note 2: Stable sidewalls

Note 3: Profiled in-situ

Note 4: D = Disturbed Sample U = Undisturbed Sample

Coordinates: 25°49'12.90"S

Coordinates: 28°14'44.80"E

Elevation:

Sheet: 1 of 1

KNIGHT HALL HENDRY & ASSOCIATES
GEOTECHNICAL ENGINEERS

SOIL PROFILE

CLIENT	SCOTT AND DE WAAL INC	PROFILE NUMBER	TP 11
PROJECT	ERASMUSPARK OFFICE PARK	PROJECT NUMBER	SW-85G

sample or test	depth m	legend	description
			Slightly moist, yellow brown (in profile yellow brown speckled orange), firm microshattered, SILTY CLAY with rare, coarse, medium and fine GRAVEL of FERRICRETE. **HILLWASH.**
	0,5		Slightly moist, yellow brown (in profile yellow brown mottled brown, speckled to mottled black), firm, microshattered (crumbly), SILTY CLAY matrix to angular to subangular, coarse, medium and fine GRAVEL of FERRICRETE (70%). **FERRUGINISED HILLWASH.**
	0,95		Slightly moist to moist, red brown (in profile red brown blotched, mottled black, orange and yellow), very stiff, open texture, cemented, FERRICRETE becoming very soft rock. **FERRUGINISED HILLWASH.**
▽	2,25		EOH : Refusal on very stiff to soft rock, HARDPAN FERRICRETE. **FERRUGINISED HILLWASH.**

Notes :

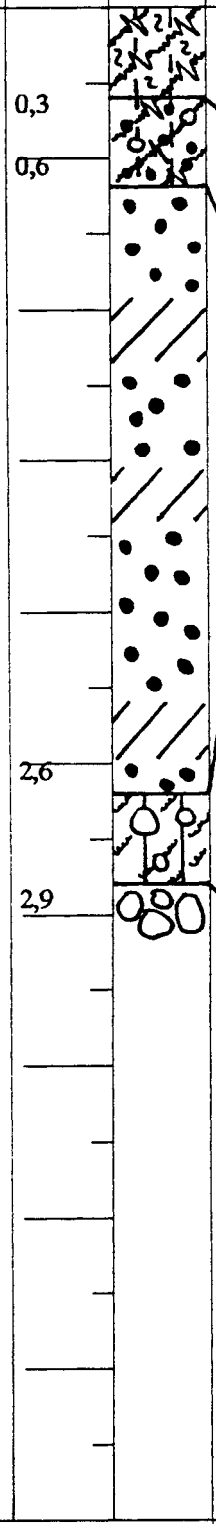
1. Rootlets to 1,4 m.
2. Clay filled voids in open texture of ferricrete (yellow brown, stiff to firm).
3. Seepage at 2,25 m.
4. Difficult to excavate below 2,25 m.

contractor COMTRON	ground level -	ground water SEEPAGE AT 2,25 m	depth of water in hole after ..... hours
machine CAT LTD	profiled by CMCK	end of hole refusal 2,25 m	size of hole TRENCH
date executed 30.1.91	date profiled 31.1.91	symbols ▽ seepage ▼ water table	■ undisturbed sample ● disturbed sample

KNIGHT HALL HENDRY & ASSOCIATES
GEOTECHNICAL ENGINEERS

SOIL PROFILE

CLIENT SCOTT AND DE WAAL INC	PROFILE NUMBER TP 12
PROJECT ERASMUSPARK OFFICE PARK	PROJECT NUMBER SW-85G



sample or test	depth m	description
	0,3	Slightly moist, dark grey brown (in profile dark grey brown), firm, microshattered, SILTY CLAY with abundant roots. **HILLWASH.**
	0,6	Slightly moist to moist, dark yellow brown (in profile yellow brown speckled red, black), firm, microshattered to slightly slickensided, SILTY CLAY matrix to fine and medium, subrounded GRAVEL (60%),(mainly FERRICRETE). **LIGHTLY FERRUGINISED HILLWASH.**
		Slightly moist, red brown (in profile red brown mottled black, yellow orange), stiff to very stiff, partially cemented, FERRICRETE with a slight open texture and CLAY filled voids. Nodules are hard and brittle. **HIGHLY FERRUGINISED HILLWASH.**
▽	2,6	Moist to wet, light brown (in profile pale buff brown), stiff to very stiff, fissured, CLAYEY SILT matrix to well rounded, coarse GRAVEL (80%) to COBBLES of QUARTZITE / CHERT. **GULLEYWASH/PEBBLE MARKER.**
	2,9	EOH : Refusal in PEBBLE MARKER zone (possibly large boulders).

NOTE :

1. Water level at 2,6 m.

contractor COMTRON	ground level -	ground water YES	depth of water in hole 2,6 m after 24 hours
machine CAT LTD	profiled by CMCK	end of hole refusal 2,9 m	size of hole TRENCH
date executed 30.1.91	date profiled 31.1.91	symbols ▽ seepage ▼ water table	■ undisturbed sample ● disturbed sample

KNIGHT HALL HENDRY & ASSOCIATES
GEOTECHNICAL ENGINEERS

SOIL PROFILE

CLIENT	SCOTT AND DE WAAL INC	PROFILE NUMBER	TP 15
PROJECT	ERASMUSPARK OFFICE PARK	PROJECT NUMBER	SW-85G

sample or test	depth m	legend	description
			Slightly moist, dark yellow brown (in profile yellow brown, mottled red below 0,4 m), firm to stiff with soft zones, microshattered, SILTY CLAY with abundant (30%), fine to medium GRAVEL. **LIGHTLY FERRUGINISED HILLWASH.**
	1,1		Slightly moist, red brown (in profile red brown mottled black and yellow), very stiff to stiff, partially cemented, SILTY CLAY to HARDPAN FERRICRETE. **HIGHLY FERRUGINISED HILLWASH.**
	2,6		EOH : Refusal on very stiff, partially cemented, highly FERRUGINISED HILLWASH tending towards soft rock with soft rock zones.

Notes :

1. Roots to 1,2 m.
2. Difficult to excavate below 1,0 m - refusal probably on soft - very soft rock.
3. Dark grey zones to 0,2 m.
4. Dark purple, quartzite boulder at 0,9 m.
5. Gravel more abundant towards base.

contractor COMTRON	ground level -	ground water NIL	depth of water in hole - after ..... hours
machine CAT 426	profiled by CMCK	end of hole refusal 2,6 m	size of hole TRENCH
date executed 30.1.91	date profiled 31.1.91	symbols ▽ seepage ▼ water table	■ undisturbed sample ● disturbed sample

KNIGHT HALL HENDRY & ASSOCIATES
GEOTECHNICAL ENGINEERS

SOIL PROFILE

CLIENT: SCOTT AND DE WAAL INC	PROFILE NUMBER: TP 16
PROJECT: ERASMUSPARK OFFICE PARK	PROJECT NUMBER: SW-85G

sample or test	depth m	legend	description
	0,7		Slightly moist to dry, yellow brown (in profile light yellow brown), firm, fissured, SILTY CLAY with occasional subrounded, fine GRAVEL. **HILLWASH.**
			EOH : Refusal on brown (in profile mottled brown pale yellow brown, orange), soft rock, HARDPAN FERRICRETE with manganese lined voids. **HIGHLY FERRUGINISED HILLWASH.**

Notes :

1. Becoming 80 % gravel at 0,6 m with subrounded quartzite gravel.
2. Roots to 0,7 m
3. Ferricrete well developed, very difficult to excavate below 0,7 m.

contractor: COMTRON	ground level: -	ground water: NIL	depth of water in hole after ..... hours: -
machine: CAT 426	profiled by: CMCK	end of hole refusal: 0,7 m	size of hole: TRENCH
date executed: 30.1.91	date profiled: 31.01.91	symbols: ▽ seepage, ▼ water table	■ undisturbed sample, ● disturbed sample

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SOIL PROFILE

CLIENT: SCOTT AND DE WAAL INC	PROFILE NUMBER: TP 21
PROJECT: ERASMUSPARK OFFICE PARK	PROJECT NUMBER: SW-85G

sample or test	depth m	legend	description
			Slightly moist to moist, dark yellow brown (in profile yellow brown mottled orange), firm to soft, shattered to microshattered, SILTY CLAY with occasional, fine to medium, subrounded to rounded, FERRICRETE NODULES. **HILLWASH.**
▽	1,3		EOH : REFUSAL at 1,3 m on dark yellow brown (in profile yellow brown mottled red, brown, yellow, orange, black), very stiff, cemented, with CLAY filled open voids, HONEYCOMB FERRICRETE. **HIGHLY FERRUGINISED HILLWASH.**

Notes :

1. Seepage at 1,3 m. Abundant thick vegetation in vicinity suggests perched watertable.
2. Very difficult excavation below 1,3 m.
3. Abundant rubble around surface concrete, bricks etc.

contractor: COMTRON	ground level: -	ground water: YES	depth of water in hole 1,3 m after ..... hours
machine: CAT 426	profiled by: CMCK	end of hole refusal: 1,3 m	size of hole: TRENCH
date executed: 31.1.91	date profiled: 31.1.91	symbols: ▽ seepage, ▼ water table	■ undisturbed sample, ● disturbed sample

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SOIL PROFILE

CLIENT: SCOTT AND DE WAAL INC	PROFILE NUMBER: TP 22
PROJECT: ERASMUSPARK OFFICE PARK	PROJECT NUMBER: SW-85G

sample or test	depth m	legend	description
			Slightly moist, dark grey brown (in profile dark grey brown), firm, microshattered, SILTY CLAY. **HILLWASH.**
	0,3		Dry, yellow brown (in profile yellow brown mottled light orange), firm, microshattered, SILTY CLAY matrix to medium and fine, subrounded to well rounded GRAVELS (60 - 70%) of FERRICRETE NODULES. **LIGHTLY FERRUGINISED HILLWASH.**
	1,10		Slightly moist, red brown (in profile red brown blotched yellow brown, mottled black), very stiff with stiff pockets, partially cemented, probably fissured, SILTY CLAY, with sparse pink, completely weathered, fine grained, soft to hard rock, QUARTZITE COBBLES. **HIGHLY FERRUGINISED HILLWASH.**
	2,9		EOH : Near refusal on soft FERRICRETE with some BOULDERS.

Notes :

1. Large quartzite boulders at 2,8 m, could be close to pebble marker zone.
2. Difficult to excavate below 1,10 m.
3. Rootlets to 1,6 m.

contractor: COMTRON	ground level: -	ground water: NIL	depth of water in hole: - after ..... hours
machine: CAT 426	profiled by: CMCK	end of hole refusal: 2,9 m	size of hole: TRENCH
date executed: 31.1.91	date profiled: 31.1.91	symbols: ▽ seepage, ▼ water table	■ undisturbed sample, ● disturbed sample

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GEOTECHNICAL ENGINEERS

SOIL PROFILE

CLIENT: SCOTT AND DE WAAL INC	PROFILE NUMBER: TP 23
PROJECT: ERASMUSPARK OFFICE PARK	PROJECT NUMBER: SW-85G

sample or test	depth m	legend	description
			Slightly moist, yellow brown (in profile yellow brown), firm, microshattered, SILTY CLAY with abundant roots. **HILLWASH.**
	0,5		Slightly moist to dry, dark yellow brown (in profile dark yellow brown mottled red, orange), firm to stiff, microshattered to shattered, SILTY CLAY. **LIGHTLY FERRUGINISED HILLWASH** becoming very GRAVELLY below 1,1 m.
	1,7		Slightly moist, red brown (in profile red brown mottled red, orange, yellow, black), very stiff, highly cemented HONEYCOMB FERRICRETE with abundant (20%) voids, occasionally CLAY filled and manganese staining. **HIGHLY FERRUGINISED HILLWASH.**
	1,8		EOH : Refusal on highly cemented, HONEYCOMB FERRICRETE as above.

Notes :

1. Difficult to excavate below 1,7 m.
2. Rootlets to 1,4 m.

contractor: COMTRON	ground level: -	ground water: NIL	depth of water in hole: - after ..... hours
machine: CAT 426	profiled by: CMCK	end of hole refusal: 1,8 m	size of hole: TRENCH
date executed: 31.1.91	date profiled: 31.1.91	symbols: ▽ seepage, ▼ water table	■ undisturbed sample, ● disturbed sample

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SOIL PROFILE

CLIENT: SCOTT AND DE WAAL INC

PROFILE NUMBER: TP 24

PROJECT: ERASMUSPARK OFFICE PARK

PROJECT NUMBER: SW-85G

sample or test	depth m	legend	description
	0,3		Slightly moist to moist, grey brown (in profile grey brown), firm to soft, microshattered, SILTY CLAY with abundant rootlets. **HILLWASH.**
	1,3		Slightly moist to moist, light orange brown (in profile orange brown mottled pale red), firm to stiff, fissured, SILTY CLAY with occasional roots. **HILLWASH.**
▽	2,0		Moist to very moist, orange brown (in profile orange brown mottled pale red, speckled black), stiff, fissured, SILTY CLAY. **LIGHTLY FERRUGINISED HILLWASH.**
	2,55		Below 2,0 m becoming stiff to very stiff.
			EOH : Near refusal on very stiff, highly cemented, SILTY CLAY tending towards HONEYCOMB FERRICRETE of very soft rock consistency. 20 % Voids, occasionally CLAY filled are present. **HIGHLY FERRUGINISED HILLWASH.**

Notes :

1. Rainwater in bottom of pit to 2,0 m, up to 1,2 m during storm.
2. Difficult to excavate below 2,50 m.
3. Strength decreases when wet up.

contractor: COMTRON	ground level: -	ground water: YES	depth of water in hole after 24 hours: 2,0 m
machine: CAT 426	profiled by: CMCK	end of hole refusal: 2,55 m	size of hole: TRENCH
date executed: 31.1.91	date profiled: 01.02.91	symbols: ▽ seepage, ▼ water table	■ undisturbed sample, ● disturbed sample

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GEOTECHNICAL ENGINEERS

SOIL PROFILE

CLIENT: SCOTT AND DE WAAL INC

PROFILE NUMBER: TP 25

PROJECT: ERASMUSPARK OFFICE PARK

PROJECT NUMBER: SW-85G

sample or test	depth m	legend	description
			Slightly moist to moist, grey brown (in profile grey brown), firm, microshattered, SILTY CLAY. **HILLWASH.**
	0,4		Slightly moist, orange brown (in profile orange brown), firm, microshattered, SILTY CLAY with abundant, coarse GRAVELS and sparse COBBLES of pinkish red, completely weathered, fine grained, hard to soft rock, QUARTZITE **HILLWASH.**
■	1,3		Slightly moist, dark orange brown, (in profile orange brown mottled orange, red and yellow, speckled black), stiff to very stiff, fissured, SILTY CLAY. **FERRUGINISED HILLWASH.** Below 1,8 m becoming very stiff.
	2,1		EOH : Refusal on partly cemented, very stiff, ferruginised, SILTY CLAY tending to HARDPAN FERRICRETE. **HIGHLY FERRUGINISED HILLWASH.**

Notes :

1. Difficult to excavate below 1,8 m.
2. Roots to 1,6 m
3. Block sample at 1,3 m - 1,5 m.

contractor: COMTRON	ground level: -	ground water: NIL	depth of water in hole after ..... hours: -
machine: CAT 426	profiled by: CMCK	end of hole refusal: 2,1 m	size of hole: TRENCH
date executed: 31.01.91	date profiled: 01.02.91	symbols: ▽ seepage, ▼ water table	■ undisturbed sample, ● disturbed sample

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GEOTECHNICAL ENGINEERS

SOIL PROFILE

CLIENT: SCOTT AND DE WAAL INC	PROFILE NUMBER: TP 30
PROJECT: ERASMUSPARK OFFICE PARK	PROJECT NUMBER: SW-85G

sample or test	depth m	legend	description
	0,3		Slightly moist, grey brown (in profile grey brown), firm, microshattered, SILTY CLAY with frequent (10 %), fine, subrounded GRAVEL. **HILLWASH.**
▼	3,0		Moist to slightly moist, dark orange brown (in profile orange brown speckled black, red), firm to stiff with occasional very stiff pockets, microfissured, SILTY CLAY, with rare scattered purple, completely weathered, hard to soft rock, QUARTZITE COBBLES, fine and medium GRAVEL with voids. **HIGHLY FERRUGINISED HILLWASH.**
			EOH : Near refusal in very stiff, highly FERRUGINISED HILLWASH as above.

Notes :

1. Waterlevel at 2,8 m.
2. Below 2,8 m becoming very stiff with stiff pockets.
3. Difficult to excavate below 1,2 m.

contractor: COMTRON	ground level: -	ground water: YES	depth of water in hole - after ..... hours
machine: CAT 426	profiled by: CMCK	end of hole refusal: NEAR REFUSAL	size of hole: TRENCH
date executed: 31.01.91	date profiled: 04.02.91	symbols: ▽ seepage, ▼ water table	■ undisturbed sample, ● disturbed sample

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GEOTECHNICAL ENGINEERS

SOIL PROFILE

CLIENT: SCOTT AND DE WAAL INC	PROFILE NUMBER: TP 31
PROJECT: ERASMUSPARK OFFICE PARK	PROJECT NUMBER: SW-85G

sample or test	depth m	legend	description
			Moist, grey brown (in profile grey brown), firm, microshattered, SILTY CLAY. **HILLWASH.**
	0,40		Moist, dark orange brown (in profile orange brown mottled red, speckled black below 0,9 m), stiff to firm, microfissured, SILTY CLAY with frequent (20%), fine, subrounded GRAVEL with partly clay filled voids making up 5 % of the horizon. **FERRUGINISED HILLWASH**
			Below 1,2 m becoming stiff.
			Below 2,0 m becoming very stiff.
▼			
	2,7		EOH : Near refusal on very stiff, highly **FERRUGINISED HILLWASH.**
			Notes :
			1. Difficult to excavate below 2,0 m.
			2. Ferruginised material softens when wet.

contractor: COMTRON	ground level: -	ground water: YES	depth of water in hole after 24 hours: 1,8 m
machine: CAT 426	profiled by: CMCK	end of hole refusal: 2,7 m	size of hole: TRENCH
date executed: 31.01.91	date profiled: 01.02.91	symbols: ▽ seepage, ▼ water table	■ undisturbed sample, ● disturbed sample

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SOIL PROFILE

CLIENT: SCOTT AND DE WAAL INC	PROFILE NUMBER: TP 32
PROJECT: WATERKLOOF TOWNSHIP	PROJECT NUMBER: SW-85G

sample or test	depth m	legend	description
			Slightly moist to moist, grey brown (in profile grey brown), firm to stiff, microshattered, SILTY CLAY, **HILLWASH** with abundant pinhole voids.
	0,4		Slightly moist to moist, dark orange brown (in profile dark orange brown mottled yellow brown, speckled black), firm to stiff, microfissured, SILTY CLAY with scattered, coarse GRAVEL of purple, completely weathered, fine grained, hard rock, QUARTZITE at 1,5 m - 1,6 m. **HILLWASH.**
▼	1,75		Slightly moist to moist, dark orange brown (in profile dark orange brown, mottled yellow/red/black), stiff to very stiff, microshattered, SILTY CLAY with frequent (10%), fine to medium, GRAVEL and voids often CLAY filled or manganese lined. Makes up 15%. **FERRUGINISED HILLWASH.**
	3,0		EOH : Near refusal on very stiff, FERRUGINISED HILLWASH tending to FERRICRETE.

Notes :

1. Will be difficult to excavate below 1,75 m.
2. Rootlets to 1,75 m.

contractor: COMTRON	ground level: -	ground water: YES	depth of water in hole after 96 hours: 2,8 m
machine: CAT 426	profiled by: CMCK	end of hole refusal: 3,0 m	size of hole: TRENCH
date executed: 31.1.91	date profiled: 04.02.91	symbols: ▽ seepage, ▼ water table	■ undisturbed sample, ● disturbed sample

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GEOTECHNICAL ENGINEERS

SOIL PROFILE

CLIENT: SCOTT AND DE WAAL INC	PROFILE NUMBER: TP 33
PROJECT: WATERKLOOF TOWNSHIP	PROJECT NUMBER: SW-85G

sample or test	depth m	legend	description
			Slightly moist, light grey brown (in profile light grey brown to pale yellow brown), firm to stiff (where no vegetation), microfissured with elongated voids to 5 mm wide, SILTY CLAY. **HILLWASH.**
	0,4		Slightly moist to moist, red brown (in profile red brown mottled orange brown), stiff with firm pockets, microfissured, SILTY CLAY with sparse, coarse, subrounded GRAVEL of purple, completely weathered, fine-grained, hard rock, QUARTZITE. **HILLWASH.**
	1,0		Slightly moist to moist, light orange brown to yellow brown (in profile yellow brown mottled orange brown, speckled black), stiff, microfissured, SILTY CLAY with scattered, subrounded, GRAVEL. **FERRUGINISED HILLWASH.**
▼			Becoming stiff to very stiff, possibly below 2,0 m with large black, manganese blotches and abundant, CLAY filled to CLAY lined, anastomosing voids.
	3,1		EOH : Near refusal on stiff to very stiff, material as above, **FERRUGINISED HILLWASH.**

Notes :

1. Difficult to excavate below 1,8 m.
2. Waterlevel at 1,8 m.

contractor: COMTRON	ground level: -	ground water: YES	depth of water in hole after 96 hours: 1,8 m
machine: CAT 426	profiled by: CMCK	end of hole refusal: 3,1 m	size of hole: TRENCH
date executed: 31.1.91	date profiled: 04.02.91	symbols: ▽ seepage, ▼ water table	■ undisturbed sample, ● disturbed sample

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GEOTECHNICAL ENGINEERS

SOIL PROFILE

CLIENT: SCOTT AND DE WAAL INC	PROFILE NUMBER: TP 36
PROJECT: WATERKLOOF TOWNSHIP	PROJECT NUMBER: SW-85G

sample or test	depth m	legend	description
			Slightly moist, light grey brown (in profile grey brown), firm, microshattered, SILTY CLAY with abundant roots. **HILLWASH.**
	0,5		Slightly moist, dark orange brown (in profile dark orange brown mottled yellow brown), firm to stiff, microshattered, SILTY CLAY with sparse, scattered, subrounded to subangular, coarse, medium and fine GRAVEL of QUARTZ, QUARTZITE AND CHERT.
▼	1,3		Material possibly becoming stiff to very stiff below 1,5 m with black mottling, CLAY filled voids and sparse, small, subrounded, COBBLES and angular BOULDERS. **FERRUGINISED HILLWASH.**
	2,8		EOH : REFUSAL on very stiff, SILTY CLAY, **FERRUGINISED HILLWASH.**

Notes :

1. Moderately difficult to excavate below 2,0 m.
2. Consistent profile, hard to determine due to water.
3. Abundant bricks and ash scattered around ground surface.
4. Thick grass vegetation.
5. Waterlevel at 1,3 m.

contractor: COMTRON	ground level: -	ground water: YES	depth of water in hole after 72 hours: 1,3 m
machine: CAT 426	profiled by: CMCK	end of hole refusal: 2,8m	size of hole: TRENCH
date executed: 01.02.91	date profiled: 04.02.91	symbols: ▽ seepage, ▼ water table	■ undisturbed sample, ● disturbed sample

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GEOTECHNICAL ENGINEERS

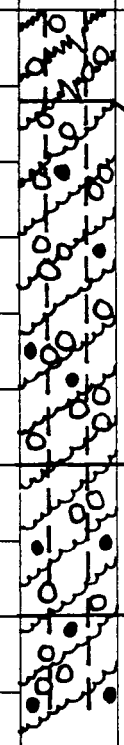
SOIL PROFILE

CLIENT: SCOTT AND DE WAAL INC

PROFILE NUMBER: TP 37

PROJECT: WATERKLOOF TOWNSHIP

PROJECT NUMBER: SW-85G



sample or test	depth m	description
		Slightly moist, grey brown (in profile grey brown) firm, microshattered, SILTY CLAY with sparse, fine to medium, subrounded, GRAVEL. **HILLWASH.**
	0,3	Slightly moist to moist, orange brown (in profile orange brown mottled yellow brown, speckled black), stiff to very stiff, microfissured, SILTY CLAY with sparse, fine to medium, subrounded, GRAVEL. **FERRUGINISED HILLWASH.**
▼	1,5	Below 1,5 m mottled black with abundant CLAY lined voids (often filled with roots).
	2,0	EOH : REFUSAL on very stiff, partly FERRUGINISED SILTY CLAY, **HILLWASH.**

Note :

1. Difficult to excavate below 1,5 m.

contractor: COMTRON	ground level: -	ground water: YES	depth of water in hole 1,5 m after 72 hours
machine: CAT 426	profiled by: CMCK	end of hole refusal: 2,0 m	size of hole: TRENCH
date executed: 01.02.91	date profiled: 04.02.91	symbols: ▽ seepage, ▼ water table	■ undisturbed sample, ● disturbed sample

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SOIL PROFILE

CLIENT: SCOTT AND DE WAAL INC	PROFILE NUMBER: TP 38
PROJECT: WATERKLOOF TOWNSHIP	PROJECT NUMBER: SW-85G

sample or test	depth m	legend	description
			Slightly moist to moist, grey brown (in profile grey brown), firm, microshattered, SILTY CLAY. **HILLWASH.**
	0,4		Moist, dark orange brown (in profile dark orange brown, blotched orange/black/red), firm to stiff, microfissured, SILTY CLAY. **FERRUGINISED HILLWASH.**
▼			Below 1,2 m dominantly stiff.
	2,5		EOH : Near refusal at 2,5 m in stiff to very stiff, FERRUGINISED HILLWASH.

Notes :

1. Difficult to excavate below 1,4 m due to very stiff material.

3. Waterlevel at 1,4 m.

contractor: COMTRON	ground level: -	ground water: YES	depth of water in hole after 2 hours: 1,4 m
machine: CAT 426	profiled by: CMCK	end of hole refusal: 2,5 m	size of hole: TRENCH
date executed: 01.02.91	date profiled: 01.02.91	symbols: ▽ seepage, ▼ water table	■ undisturbed sample, ● disturbed sample

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GEOTECHNICAL ENGINEERS

SOIL PROFILE

CLIENT: SCOTT AND DE WAAL INC

PROFILE NUMBER: TP 39

PROJECT: WATERKLOOF TOWNSHIP

PROJECT NUMBER: SW-85G

sample or test	depth m	legend	description
			Moist, dark yellow brown (in profile dark yellow brown mottled grey, red, orange), <u>firm</u> with <u>loose</u> pockets, microshattered, SILTY CLAY, with sparse, fine, subrounded, GRAVEL. **HILLWASH.**
	1,0		Moist, dark orange brown (in profile dark orange brown mottled light yellow brown, black), <u>stiff</u>, microfissured, SILTY CLAY. **FERRUGINISED HILLWASH** with 10 % voids often CLAY lined.
	1,5		EOH : REFUSAL on <u>very stiff</u>, highly ferruginised HILLWASH as above tending towards FERRICRETE.

Notes :

1. Will be difficult to excavate below 1,5 m - very stiff SILTY CLAY
2. Roots to 1,2 m.

contractor: COMTRON	ground level: -	ground water: NIL	depth of water in hole: - after ..... hours
machine: CAT 426	profiled by: CMCK	end of hole refusal: 1,5 m	size of hole: TRENCH
date executed: 01.02.91	date profiled: 01.02.91	symbols: ▽ seepage, ▼ water table	■ undisturbed sample, ● disturbed sample

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SOIL PROFILE

CLIENT: SCOTT AND DE WAAL INC	PROFILE NUMBER: TP 42
PROJECT: ERASMUSPARK OFFICE PARK	PROJECT NUMBER: SW-85G

sample or test	depth m	legend	description
	0,5		Moist, dark yellow grey (in profile dark yellow grey), firm, microshattered, SILTY CLAY. **HILLWASH.**
	1,1		Slightly moist, dark yellow brown (in profile dark yellow brown mottled light red brown), fine to stiff, microshattered, SILTY CLAY with abundant (20 %), fine to medium, subrounded GRAVEL. **HILLWASH.**
■	1,7		Dry to slightly moist, dark reddish brown (in profile dark red brown mottle orange, yellow, black), stiff to very stiff, microfissured, SILTY CLAY with occasional large COBBLES to BOULDERS of purple, completely weathered, hard to soft rock, QUARTZITE and abundant (20 %), coarse, medium and fine GRAVEL. **FERRUGINISED HILLWASH.**
			EOH : REFUSAL on very stiff, highly ferruginised SILTY CLAY. **HILLWASH** tending to HARDPAN FERRICRETE.

Notes :

1. Difficult to excavate below 1,7 m.
2. Roots to 1,2 m.
3. Disturbed samples taken from spoils.
4. Undisturbed sample taken at 1,3 m.

contractor: COMTRON	ground level: -	ground water: NIL	depth of water in hole: - after ..... hours
machine: CAT 426	profiled by: CMCK	end of hole refusal: 1,7 m	size of hole: TRENCH
date executed: 01.02.91	date profiled: 01.02.91	symbols: ▽ seepage, ▼ water table	■ undisturbed sample, ● disturbed sample

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SOIL PROFILE

CLIENT: SCOTT AND DE WAAL INC	PROFILE NUMBER: TP 43
PROJECT: ERASMUSPARK OFFICE PARK	PROJECT NUMBER: SW-85G

sample or test	depth m	legend	description
	0,6		Slightly moist, grey brown (in profile grey brown), firm, microshattered, SILTY CLAY with abundant roots. **HILLWASH.**
▼	2,2		Slightly moist, dark orange brown (in profile dark orange brown mottled red, yellow brown, speckled black), stiff, microshattered, SILTY CLAY with abundant voids, often CLAY filled or lined (with rootlets) and sparse, coarse, medium and fine, subrounded GRAVEL. **HILLWASH.**
			EOH : REFUSAL on stiff to very stiff material as above.

Notes :

1. Will be difficult to excavate below 2,0 m.
2. No residual material noted.
3. Rootlets below 1,2m.
4. Two types of voids noted;
   - Large clay lined up to 5 mm in diameter, often associated with rootlets.
   - Small pinhole sized voids, generally open.
5. Waterlevel at 1,2 m.

contractor: COMTRON	ground level: -	ground water: YES	depth of water in hole: 1,2 m after .....72..... hours
machine: CAT 426	profiled by: CMCK	end of hole refusal: 2,2 m	size of hole: TRENCH
date executed: 01.02.91	date profiled: 04.02.91	symbols: ▽ seepage, ▼ water table	■ undisturbed sample, ● disturbed sample

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SOIL PROFILE

CLIENT SCOTT AND DE WAAL INC	PROFILE NUMBER TP 44
PROJECT ERASMUSPARK OFFICE PARK	PROJECT NUMBER SW-85G

sample or test	depth m	legend	description
	0,5		Slightly moist, grey brown (in profile grey brown), firm, microshattered, CLAYEY SILT. **HILLWASH** with abundant roots.
	0,8		Slightly moist, red brown (in profile red brown mottled yellow brown), firm to stiff, microshattered, SILTY CLAY with abundant pinhole voids and abundant (20 %), fine to medium GRAVEL. **HILLWASH.**
			Slightly moist, light orange brown (in profile orange brown mottled grey, pale red brown, speckled black), stiff, microfissured, SILTY CLAY with abundant pinhole voids, large open voids, often clay lined and roots present. **FERRUGINISED HILLWASH.**
▼			Below 1,6 m becoming very stiff with large FERRUGINISED NODULES.
	2,0		EOH : REFUSAL on very stiff, partly cemented, SILTY CLAY. **FERRUGINISED HILLWASH.**

Notes :

1. Will be difficult to excavate below 1,6 m.
2. Rootlets to base of the hole.
3. Waterlevel at 1,9 m.

contractor COMTRON	ground level -	ground water YES	depth of water in hole 1,9 m after 72 hours
machine CAT 426	profiled by CMCK	end of hole refusal 2,0 m	size of hole TRENCH
date executed 01.02.91	date profiled 04.02.91	symbols ▽ seepage ▼ water table	■ undisturbed sample ● disturbed sample

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SOIL PROFILE

CLIENT	SCOTT AND DE WAAL INC	PROFILE NUMBER	TP 45
PROJECT	ERASMUSPARK OFFICE PARK	PROJECT NUMBER	SW-85G

sample or test	depth m	legend	description
	0,5		Slightly moist, grey brown (in profile grey brown), firm to stiff, microfissured, CLAYEY SILT with abundant roots. **HILLWASH.**
	1,4		Slightly moist, orange brown (in profile orange brown mottled red, orange yellow speckled black), stiff to very stiff, SILTY CLAY with occasional scattered, coarse, medium and fine GRAVEL. Abundant CLAY lined filled voids. **FERRUGINISED HILLWASH.**
			EOH : REFUSAL on very stiff, highly ferruginised, partially cemented HILLWASH.

Notes :

1. Will be difficult to excavate below 1,7 m.
2. Roots to 1,1 m.

contractor COMTRON	ground level -	ground water NIL	depth of water in hole - after ..... hours
machine CAT 426	profiled by CMCK	end of hole refusal 1,4 m	size of hole TRENCH
date executed 01.02.91	date profiled 04.02.91	symbols ▽ seepage ▼ water table	■ undisturbed sample ● disturbed sample

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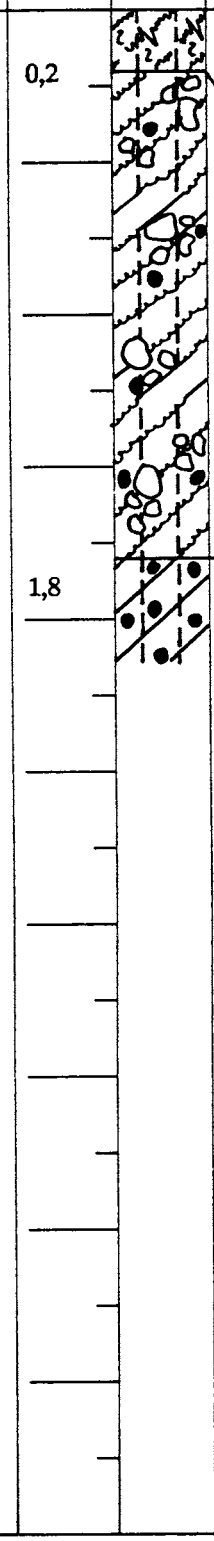
SOIL PROFILE

CLIENT	SCOTT AND DE WAAL INC	PROFILE NUMBER	TP 46
PROJECT	ERASMUSPARK OFFICE PARK	PROJECT NUMBER	SW-85G



sample or test	depth m	description
▼	0,2	Moist to very moist, grey brown (in profile grey brown), firm, microshattered, SILTY CLAY to CLAYEY SILT. **HILLWASH** with abundant roots.
		Moist to wet, orange brown (in profile orange brown mottled red yellow, orange, black), stiff to very stiff, microfissured, SILTY CLAY with abundant, large CLAY filled voids with sparse, subrounded, coarse and medium GRAVEL. **FERRUGINISED HILLWASH**
	1,8	EOH : REFUSAL on very stiff SILTY CLAY, highly ferruginised partially cemented, **HILLWASH.**

Notes :

1. Very high watertable, close to dam.
2. Probably a very deep transported profile.
3. Some laminations within the clays, appears bioturbated.
4. Probably difficult to excavate below 1,8 m.
5. Disturbed sample taken from spoils.

contractor COMTRON	ground level -	ground water YES	depth of water in hole 0,2 m after 72 hours
machine CAT 426	profiled by CMCK	end of hole refusal 1,8 m	size of hole TRENCH
date executed 01.02.91	date profiled 01.02.91	symbols ▽ seepage ▼ water table	■ undisturbed sample ● disturbed sample

KNIGHT HALL HENDRY & ASSOCIATES
GEOTECHNICAL ENGINEERS

SOIL PROFILE

CLIENT	SCOTT AND DE WAAL INC	PROFILE NUMBER	TP 47
PROJECT	ERASMUSPARK OFFICE PARK	PROJECT NUMBER	SW-85G

sample or test	depth m	legend	description
			Slightly moist, dark brown (in profile dark brown), <u>firm to loose</u>, microfissured, SILTY CLAY. **HILLWASH** with abundant roots.
	0,5		
			Slightly moist, dark orange brown (in profile orange brown mottled red/orange.brown/black), <u>stiff</u> fissured, SILTY CLAY. **HILLWASH** with sparse, scattered, coarse, medium and fine GRAVEL.
	1,3		
	1,5		Slightly moist. light orange brown (in profile orange brown mottled yellow brown, orange brown, black), <u>stiff to very stiff</u>, fissured, partially cemented, SILTY CLAY. **HILLWASH.**
			EOH : REFUSAL on <u>very stiff</u> material as above with abundant, ferricrete nodules and rootlets associated with CLAY filled voids.

Notes :

1. Very difficult to excavate below 1,5 m.
2. Roots to 1,5 m.

contractor COMTRON	ground level -	ground water NIL	depth of water in hole - after ..... hours
machine CAT 426	profiled by CMCK	end of hole refusal 1,5 m	size of hole TRENCH
date executed 05.02.91	date profiled 05.02.91	symbols ▽ seepage ▼ water table	■ undisturbed sample ● disturbed sample

KNIGHT HALL HENDRY & ASSOCIATES GEOTECHNICAL ENGINEERS	SOIL PROFILE
CLIENT SCOTT AND DE WAAL INC	PROFILE NUMBER TP 48
PROJECT ERASMUSPARK OFFICE PARK	PROJECT NUMBER SW-85G

sample or test	depth m	legend	description
			Slightly moist, red brown (in profile red brown), firm, microfissured, CLAYEY SILT with scattered, coarse, medium and fine GRAVEL. **HILLWASH.**
	1,0		EOH : REFUSAL on dark yellow brown (in profile yellow brown mottled yellow/brown/orange/black), very stiff, fissured, SILTY CLAY. **HIGHLY FERRUGINISED HILLWASH** tending to **HARDPAN.**

Notes :

1. Abundant bricks on surface.
2. Very difficult to excavate below 1,0 m.
3. Ferricrete outcrops on road to dam.

contractor COMTRON	ground level -	ground water -	depth of water in hole - after ..... hours
machine CAT 426	profiled by CMCK	end of hole refusal 1,0 m	size of hole TRENCH
date executed 05.02.91	date profiled 05.02.91	symbols ▽ seepage ▼ water table	■ undisturbed sample ● disturbed sample

KNIGHT HALL HENDRY & ASSOCIATES
GEOTECHNICAL ENGINEERS

SOIL PROFILE

CLIENT	SCOTT AND DE WAAL INC	PROFILE NUMBER	TP 49
PROJECT	ERASMUSPARK OFFICE PARK	PROJECT NUMBER	SW-85G

sample or test	depth m	legend	description
	0,3		Slightly moist, dark brown (in profile dark brown), firm, fissured, CLAYEY SILT. **HILLWASH** with abundant, coarse, medium and fine GRAVEL and COBBLES.
	1,1		Slightly moist, dark orange brown (in profile orange brown,mottled red/black), stiff to very stiff, fissured, SILTY CLAY. **HILLWASH** with occasional scattered, coarse, medium and fine GRAVEL.
			EOH : REFUSAL on very stiff material as above. **HIGHLY FERRUGINISED HILLWASH.**

Notes :

1. Brick piles on surface.
2. Difficult to excavate below 1,1 m.
3. Large disturbed sample taken from spoils.

contractor COMTRON	ground level -	ground water NIL	depth of water in hole - after ..... hours
machine CAT 426	profiled by CMCK	end of hole refusal 1,1 m	size of hole TRENCH
date executed 06.02.91	date profiled 06.02.91	symbols ▽ seepage ▼ water table	■ undisturbed sample ● disturbed sample

KNIGHT HALL HENDRY & ASSOCIATES
GEOTECHNICAL ENGINEERS

SOIL PROFILE

CLIENT	SCOTT AND DE WAAL INC	PROFILE NUMBER	TP 55
PROJECT	ERASMUSPARK OFFICE PARK	PROJECT NUMBER	SW-85G

sample or test	depth m	legend	description
			Dry, light grey brown (in profile grey brown), <u>firm to loose</u>, microshattered, CLAYEY SILT with abundant roots. **HILLWASH.**
	0,4		Dry to slightly moist, yellow brown (in profile yellow brown to orange brown), <u>firm to stiff</u>, fissured, SILTY CLAY with scattered, coarse, medium and fine, subrounded GRAVEL. **HILLWASH.** Below 1,0 m becomes blotched pale red.
	1,5		Dry, slightly moist, yellow orange brown (in profile yellow orange brown with red mottled and occasional black speckles), <u>stiff to very stiff</u>, fissured SILTY CLAY with sparse scattered, coarse, medium and fine, subrounded GRAVEL. **PARTIALLY FERRUGINISED \ HILLWASH.**
	1,8		EOH : REFUSAL on <u>very stiff</u> material as above, **PARTIALLY CEMENTED FERRUGINISED HILLWASH.**

Notes :

1. Roots to 1,1 m.
2. Difficult to excavate below 1,5 m.

contractor COMTRON	ground level -	ground water NIL	depth of water in hole - after ..... hours
machine CAT 426	profiled by CMCK	end of hole refusal 1,8 m	size of hole TRENCH
date executed 06.02.91	date profiled 06.02.91	symbols ▽ seepage ▼ water table	■ undisturbed sample ● disturbed sample

KNIGHT HALL HENDRY & ASSOCIATES GEOTECHNICAL ENGINEERS	SOIL PROFILE
CLIENT SCOTT AND DE WAAL INC	PROFILE NUMBER TP 56
PROJECT ERASMUSPARK OFFICE PARK	PROJECT NUMBER SW-85G

sample or test	depth m	legend	description
			Slightly moist, dark brown (in profile grey brown), firm to loose, shattered, CLAYEY SILT with abundant pinhole voids and rootlets. **HILLWASH.**
	0,6		Slightly moist, orange yellow brown (in profile orange yellow brown), stiff, fissured, SILTY CLAY with sparse scattered, coarse, medium and fine GRAVEL. **HILLWASH.**
	1,2		Slightly moist, light red brown (in profile light red brown mottled red brown/yellow brown, black), stiff to very stiff, fissured, SILTY CLAY. **PARTIALLY CEMENTED AND FERRUGINISED HILLWASH.**
	1,6		EOH : REFUSAL on similar material but very stiff.

Note :

1. Small disturbed sample taken.

contractor COMTRON	ground level -	ground water NIL	depth of water in hole - after .....-... hours
machine CAT 426	profiled by CMCK	end of hole refusal 1,6 m	size of hole TRENCH
date executed 06.02.91	date profiled 06.02.91	symbols ▽ seepage ▼ water table	■ undisturbed sample ● disturbed sample