

VOLUME 1
**REPORT ON A GEOTECHNICAL SURVEY ALONG PROPOSED
NEW SHANGONI GATE ACCESS ROUTE,
KRUGER NATIONAL PARK**



REPORT REF.: LL3391

BY: P.G. Hansmeyer *Pr. Sci. Nat.*

DATE: September 2019

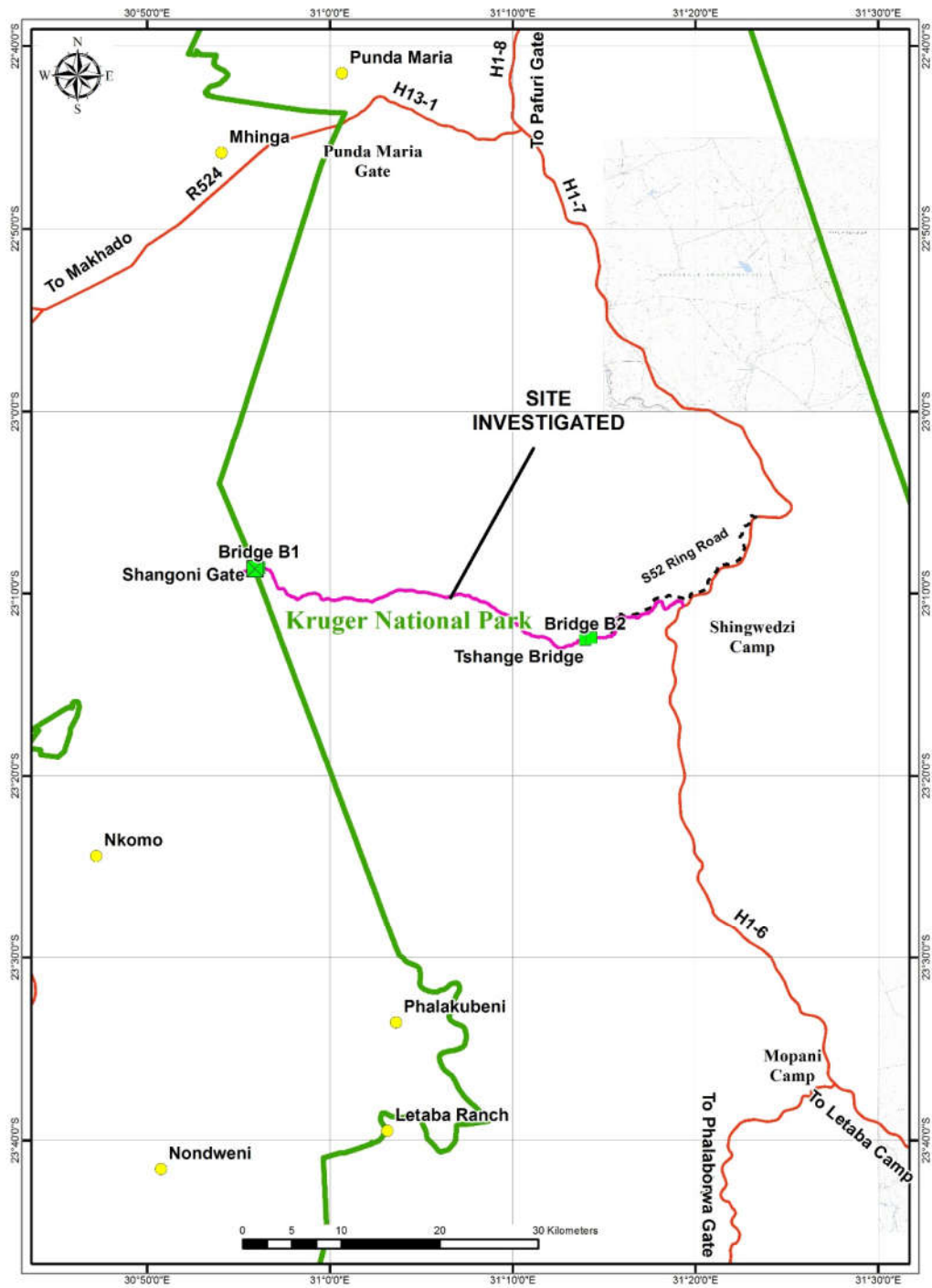


Figure 1. Locality Plan

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EXECUTIVE SUMMARY

The Kruger National Park (KNP) is in process of developing a new entrance gate and reception at the Shangoni Gate. The project also entails the upgrading of an existing 50km stretch of dirt road from the Shangoni Gate to the H1-6 tar road between the Mopani and Shingwedzi camps. In addition, three bridges and ninety eight culverts need to be constructed.

The investigation was carried out during the winter months and the field was dry and neither seepage nor surface run-off was recorded.

The existing road is to be broadened to 8m and the pavement structure will comprise subgrade, selected, subbase and base course layers with the latter stabilised, using 3% cement to achieve a C4 class cemented pavement layer.

The pavement layers are to be constructed with natural gravel and gravel-soils imported from 14 borrow pits along the entire route at 5km intervals. The borrow materials comply predominantly with G5, G6, G7 and G8 class pavement construction materials. Only the top 1m of borrow material is suitable for construction of the pavement layers, the deeper bedrock tends to be suitable for fill only. Although the borrow pits will eventually cover about 2ha of ground, they will be screened from the road by dense thickets of mopanie trees.

The imported pavement construction materials will predominantly comprise gneiss from eight borrow pits, the other seven borrow pits comprising three sources of schist, two gabbro with single borrow pits located on sandstone and basalt rock types. The imported material will have to be reworked to acceptable size to ensure the required particle size distribution.

Excavation of the road bed materials to design level will comprise a combination of soft, intermediate and hard excavation. It is presumed that DCP refusal level indicates hard rock which will require hard ripping and/or blasting.



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VOLUME 1

REPORT ON A GEOTECHNICAL SURVEY ALONG PROPOSED NEW SHANGONI GATE ACCESS ROUTE, KRUGER NATIONAL PARK

1. INTRODUCTION

The Kruger National Park (KNP) is in process of developing a new entrance gate and reception at the Shangoni Gate, near the Altein Village, Giyani area. The project also entails the upgrading of an existing 50km stretch of dirt road from the Shangoni Gate to the H1-6 tar road between Mopani and Shingwedzi camps. Three bridges are to be constructed – two over the Shingwedzi River and another over the Tshange River as well as ninety eight culverts. The route investigated is indicated on the Locality Plan, Figure 1 the beginning of the report.

The route is to follow the existing road alignment adjacent to the Shingwedzi River except for some short deviations that have to be constructed to cut out unnecessary loops, inclusive of a new section and a bridge to the Ranger's Camp located about 4km south of the Shangoni Gate. Tourist facilities that are planned include a rustic camp site, caravan park and picnic site which are to be located within a horseshoe bend of the Shingwedzi River downslope and in close proximity of the road.

It is understood that the existing road is to be broadened to 8m and depending on the site conditions, either the left – or the right shoulder will be incorporated. The pavement structure will comprise subgrade, sequentially followed by 150mm thick selected, subbase and base course layers with the latter stabilised to improve the load bearing qualities thereof. The pavement layers are to be constructed with natural gravel and gravel-soils imported from approved borrow pits scattered along the entire route at 5km intervals.

2. SCOPE OF WORK

2.1. Objectives & Approach of the Investigation

With reference to RFQ289203, Kruger National Park (KNP) requires a geotechnical survey which will entail several phases as follows: -

- Desk top study and on-site walk-and-drive-over surveys followed by reporting;
- Road centre line survey and borrow pit investigation;
- Founding condition for bridge structures B1, B2 and B3;
- Comprehensive reporting covering road centreline and borrow pit survey and bridge foundation conditions.

The purpose of the geotechnical investigation is to determine the sequence, thickness and extent of soil and rock types and groundwater conditions along the route, conduct in-situ field testing to assess soil characteristics and to obtain representative samples for laboratory testing.

The investigation will have a phased approach with Phase 1 comprising a walk- and drive over survey and a desk study with Phase 2 comprising the middle line soil survey and borrow pit investigations with Phase 3 the bridge investigations. At the time of writing the report, the bridge foundation investigations were incomplete and will be conducted at a later stage.

The report and appendices are presented as Volume 1 with Volume 2 containing three site maps of the route and another three indicating the existing and proposed borrow pit positions in relation to the route itself – refer to the Site Map Index, Figure 2A and Site Maps, Figures 2B – 2H, Volume 2.

2.2. Sources of Information

The following sources of information were consulted: -

- Geological map, Sheet 2330, Tzaneen (1986) to a scale of 1:250,000;
- Tinkers (2016) Kruger Park Map;
- Palaeontological Impact Assessment: Phase 1 Field Study by Envirolution Consulting, 13 May 2017.

3. SITE SOILS AND GEOLOGY

From the Shangoni Gate eastwards, the route is predominantly underlain by ancient gneissic and schistose type bedrocks intruded by numerous NE striking diabase dykes. Several outcrops of intrusive diabase, Timbavati gabbro and Goudplaas gneiss were observed along the route. The route also passes an interesting geological site at the well-known lookout point at Red Rocks on the S52 loop road where Letaba basalt, Goudplaas gneiss and Clarens sandstone contact zones are exposed in the river bed – refer to the Regional Geology, Figure 3, Volume 2.

Bridge B1 near the Shangoni Gate will found on a diabase dyke exposed in the river bed with bridges B2 and B3 founding on Timbavati gabbro with the final 2km up to the junction with

the H1-6 tar road comprising a thin band of Clarens sandstone followed by younger Letaba basalt.

Sandy alluvium covers the flood plains and stream beds of the non-perennial Shingwedzi - and Tshange Rivers with sandy colluvium blanketing the surrounding country side. Most of the diabase dykes are masked by reddish cover soils that can easily be identified in the field and on photographic images.

4. APPROACH TO BORROW PIT AND ROAD CENTRE LINE INVESTIGATION

4.1. General

A road centre line - and a borrow pit investigation were carried out along the existing 'ranger's road from the Shangoni Gate on the western boundary of the KNP up to the junction with the S52 'public' loop road, crossing both the Shingwedzi and Tshange Rivers, passing the Red Rocks view point and ending at the junction with the H1-6 tar road to Shingwedzi Camp – refer to the Site Map Index, Figure 2A and Site Maps, Figures 2B – 2D, Volume 2.

The existing and pre-selected borrow pit sites and centre line soil survey test pits were profiled and sampled by SGS-Matrolab (Pty) Ltd of Nelspruit, a SANAS accredited Civil Engineering Laboratory. Eighty seven Dynamic Cone Penetration tests (DCP's) were also carried out along the proposed route by SGS-Matrolab (Pty)Ltd. The fieldwork and laboratory test data are attached to the document as follows: -

TABLE 4.1.1 APPENDICES TO VOLUME 1

| Appendix | Data |
|----------|--|
| A | Road Profiles TP1 – TP5 |
| B | Borrow Pit Profiles E1 – E3 & BP1 – BP14 |
| C | Road soil sample test results & <i>Summary – Table A</i> |
| D | Borrow Pit soil sample test results & <i>Summary – Table B</i> |
| E | DCP Data & <i>Summary – Table C</i> |

4.2. Road Centre Line

Five test pits were excavated, profiled, photographed and sampled along the route centreline – refer to Site Maps 2B, 2C and 2D. The test pit sites were reinstated after completion of the field work.

4.3. Borrow Pit Investigation

To reduce the haul distances, fourteen borrow pit sites were selected in a 5km interval spacing along the route – refer to the Site Map Index, Figure 2A and Site Maps Figures 2E – 2H, Volume 2. The borrow pit localities were pre-determined and in order to comply with environmentally acceptable practices, the following aspects were taken into account, namely: -

- access;
- haul distance;
- bedrock geology and visibility.

Three existing borrow pits (E1, E2, and E3) located along the S52 gravel loop road from the H1-6 tar road junction to the low-level crossing of the Shingwedzi River some 12km westwards were also incorporated in the borrow pit investigation. The existing and proposed borrow pit sites were inspected, a number of test pits were excavated, sampled, photographed and the excavations were reinstated.

5. SOIL LABORATORY TESTING

Small, disturbed indicator samples and bulk CBR samples were selected during the profiling of the borrow pit - and centreline test pit excavations to confirm the in-field assessments of the engineering properties of the various representative soil horizons. The disturbed soil samples were submitted for road indicator tests (grading & Atterberg limits), compaction tests, initial cement demand and crushing strength of cemented materials. The field data was captured and the DCP information interpreted – refer to Appendices C, D & E. The summarized laboratory test data and DCP information are attached to the relevant appendices.

The following tests were carried out on the samples: -

- i) Road indicator tests comprising particle size distribution analysis, gradings and Atterberg limit tests. *These tests permit a basic classification of the soils and group them according to typical engineering properties.*
- ii) Compaction tests comprising Modified AASHTO moisture/density relationships and California Bearing Ratio Values. *These tests evaluate the compaction characteristics of the site soils and permit an evaluation of their suitability for use as construction materials.*
- iii) Initial Cement Demand tests. *These tests determine the initial lime consumption of the sample.*
- iv) Crushing Strength of Cemented Materials. *These tests determine the laboratory design strength of cemented materials obtained with not more than 5% by mass of stabilizer at the specified density and OMC.*

Notes:

- a) both Durabuild Lafrage CEM IVB-V 32.5N and road Cem 11/B-Lafrage 32.5N cement were used at 2.5% and 3.5% by mass of cement stabilizer;
- b) no tests (i.e. conductivity) were carried out to determine the solubility of mineral salts that may be deleterious to cemented pavement layers.

6. DYNAMIC PENETRATION TESTS

Eighty seven, 1m deep hand-held dynamic penetration tests (DCP's) were attempted in the road centreline and both road shoulders – refer to the Site Maps, Figures 2B, 2C and 2D, Volume 2 and Appendix E. An attempt was made to group the DCP data along the route in accordance with refusal depths and this information together with the inferred CBR and G-class data are indicated on Figures 2B – 2C as well.

The DCP or dynamic cone penetrometer in which a 60° cone with diameter of 20mm is driven into the soil by a 7.815kg weight dropped through 575mm. The results are expressed as millimetres penetrated per blow and refusal is achieved when 1mm penetration is recorded

after 10 blows. The DCP is most useful for estimating soil conditions during the design of shallow footings or for assessing subgrade soils for road design. A crude approximation of the in-situ inferred CBR values was also obtained. The DCP data was used to correlate the consistency of the site soils for the assessment of the CBR -values – refer to the summary attached to Appendix E.

The following aspects pertaining to the DCP test data should be noted: -

- i) shallow refusal ~0.5m was a common occurrence;
- ii) the combination of shallow refusal, the low in-situ moisture content and coarse fraction of the top soil and underlying residuum where $GM_{ave} > 2.0$, resulted in high inferred CBR values – usually in the order of $CBR_{DCP} \geq 3CBR_{lab}$.

7. GEO-ENVIRONMENTAL FACTORS

Poor subsurface drainage conditions along the route reflected by natural vegetation such as hydrophilic plants and hardpan ferricrete (associated with a seasonal water table) were not observed, ponding was absent and no seepage was recorded in the test pits, neither were any groundwater seeps observed and the non-perennial Tshange – and Shingwedzi River were also dry.

8. COMPACTIBILITY

Samples representing a range of soil types identified along the route and borrow pits were submitted for compaction tests, together with the grading characteristics and Atterberg limits – refer to the laboratory test results and summaries (Tables A & B) attached as Appendices C and D. The abovementioned materials comply with the requirements of the various pavement material classes which are also indicated on the Site Maps, Figures 2B – 2H, Volume 2. The bedrock types encountered along the route as well as the G - and C class pavement layers are tabled below.

The subgrade materials comprise basalt, sandstone, alluvium, gabbro, gneiss and schist. The five test pits that were excavated, profiled and sampled along the road centreline recorded G6 – G9 class pavement materials and C4 class cemented material using 3.5% cement stabiliser – refer to Table 8.1 below. More detailed information is indicated on the Site Maps 2C and 2D and a summary of the laboratory test data, Table A is attached to Appendix C of the report.

TABLE 8.1 SUMMARY OF SUBGRADE MATERIAL DATA

| Site Reference | Origin | G Class* Range | C Class* Range |
|----------------|-----------|----------------|------------------------------------|
| TP1 | Sandstone | G6 | |
| TP2 | Alluvium | G6, G9 | C4@3.5% CEM DB* |
| TP3 | Gabbro | G7 | |
| TP4 | Gneiss | G9 | |
| TP5 | Gneiss | G7 | |

DB* : Dura Build Lafarge CEM iv/B – V 32.5N

With regards to the crushing strength requirements for the cemented materials, two different types of cement were used and the target strengths for C3 and C4 class cemented materials were attempted using 2.5 and 3.5% by mass of stabilizer at the specified density and optimum moisture content of the soil samples. Several brickets with 2.5% cement stabilizer disintegrated whilst curing; however, cured samples with 3.5% cement stabilizer remained intact and no failures were recorded. The cured brickets were crushed, recording C2, C3 and C4 class cemented materials for both 2.5 and 3.5% cement stabiliser. No distinction could be made between lower or higher material strength capabilities recorded by the different cement stabilizer types used – refer to the detailed summarized data attached to Appendix D as well as Site Maps 2E – 2H, Volume 2 and Table 8.2 below. As indicated, singular borrow pits are located on basalt and sandstone with two borrow pits on gabbro, three borrow pits on schist with the balance of eight borrow sites on gneiss bedrock.

TABLE 8.2 SUMMARY OF BORROW PIT DATA

| Site Reference | Origin | G Class* Range | C Class* Range |
|-----------------|-------------------|----------------|-----------------------------|
| BPE1 (existing) | Letaba basalt | G9 | - |
| BPE2 (existing) | Clarens sandstone | G7 | - |
| BPE3 (existing) | Timbavati gabbro | G7 | - |
| BP1N | Goudplaas gneiss | G6,7 & 8 | - |
| BP3N | Timbavati gabbro | G7, G8 | C3 @2.5% & 3.5% CEM DB** |
| BP5N – BP9N | Goudplaas gneiss | G5, G6, G7 | C3 @3.5% CEM RC*** |
| BP10N & BP11N | Giyani schist | G6, G7 | <u>C3@3.5%</u> CEM RC*** |
| BP12N & BP13N | Goudplaas gneiss | G6, G8 | - |
| BP14N | Giyani schist | G6 – G10 | - |

Where: *Ref.1;

DB** ; Durabuild Lafarge CEM iv/B – V 32.5N

RC*** : Road CEM ii/B-L Lafarge 32.5N

EXISTING BORROW PITS: Of the existing borrow pit sites, only BPE1 located on Letaba basalt is in use, whilst BPE2 located on Clarens sandstone has seemingly been abandoned – most probably due to shallow, hard excavatable bedrock. The BPE1 borrow pit is only suitable for fill – mainly due to low CBR values imparted by the decomposed to highly weathered basalt. Borrow pit BPE3 is located on Timbavati gabbro which complies with G7 and G8 class pavement construction material – mainly due to high plasticity.

NEW BORROW PITS: These were denoted BP1N to BP14N of which eight are located mainly on Goudplaas gneiss – refer to Table 8.2 above.

Goudplaas Gneiss & Giyani Schist Borrow Pits: The sampled top gravelly section which extends from surface to an average depth of 1mbelow is generally present on borrow pit sites located at BP1N, BP5N – 13N and this horizon complies with G5 – G7 class pavement construction material; however, the underlying bedrock (>1m) is only suitable for fill (G9). The top gravelly soil reacts favourably with cement stabilizer and the addition of 3%CEM should ensure a C4 class cemented layer. Note that BP14N located on Giyani schist is only suitable for fill.

Timbavati Gabbro Borrow Pit: BP3N is located on Timbavati gabbro which is only suitable for G7 & G8 class pavement construction material; despite it's high plasticity, it reacts favourably with cement stabilizer and 3%CEM should ensure a C4 class cemented pavement layer.

BORROW PIT SIZES, LOCALITIES AND VOLUMES: It is understood that 20,000m³ of material has to be sourced from each borrow pit. As only the top 1m of good quality material can be used for the construction of the pavement layers, each borrow site will be some 2ha in size. The proposed borrow pit sites are located either up-or downslope from the road and at an approximate 5km interval, the sites are screened by thick stands of mopanie trees and should be invisible from the road.

9. EXCAVATABILITY

The five test pits that were excavated along the road centre line were not combined with DCP tests and a correlation between TLB excavation capabilities and DCP refusal depth is thus impossible.

For the purpose of this study, the refusal depths of the eighty seven DCP tests that were carried out (and summarized as Table C – see Appendix E) are therefore accepted as ‘hard rock’ and excavations deeper than recorded are expected to require a combination of intermediate excavation, heavy ripping and in some cases blasting – refer to Site Maps 2B, 2C & 2D.

10. CONCLUSIONS AND RECOMMENDATIONS

- The investigation was carried out during the winter months and the field was dry and neither seepage nor surface run-off was recorded. However, during the rainy season, the highly permeable, thin cover soils recharge rapidly resulting in the rebound of a shallow perched water table and subsequent discharge into streams and gullies that drain into the non-perennial Shingwedzi – and Tshange Rivers. Culverts, low-level crossings, bridge piers and abutments need to be protected against scour and good drainage is required to prevent erosion of road shoulder materials.
- Where virgin veld is incorporated in the left or right shoulders of the road, the top 0.2m containing roots will have to be cut to spoil; the underlying subgrade exposed at design level, is to be ripped and compacted to specification, sequentially followed by the various pavement layers. The final layer's load bearing qualities are to be improved by means of chemical stabilization, using 3% cement (either Durabuild or Road CEM) throughout which should provide a design strength for C4 Class cemented material with an unconfined compressive strength ranging between 0.75MPa and 1.5MPa – Ref.1. Mechanical stabilization (i.e. blending of materials) can also be used to compensate for shortcomings in the imported material, and can be achieved by reworking the particle size distribution to provide a better particle interlock by means of grid and smooth drum rolling.
- The pavement construction materials to be imported from the various borrow pits will predominantly consist of gneiss from eight borrow pits with, three sources of schist, two gabbro with singular borrow pits located on sandstone and basalt rock types. The imported materials will, due to its mineralogy and inherent structural characteristics comprise gravel -, cobble - and boulder size material that will have to be reworked to

smaller sized road material by means of grid rolling, followed by vibratory smooth drum rolling to achieve required design compaction.

- It is envisaged that the borrow pit sites will be some 2ha in size and will only be 1m deep. However where fill is required, the country rock >1m can be utilised.
- Excavation of the road bed materials to design level will comprise a combination of soft, intermediate and hard excavation. It is presumed that DCP refusal level indicates hard rock which will require hard ripping and/or blasting to excavate.

11. REFERENCES

REFERENCE 1: Guidelines for Road Construction Materials, TRH14:1985; Committee of State Road Authorities

12. APPENDICES

APPENDIX A – Road Profiles (TP 1 – 5)

APPENDIX B – Borrow Pit Profiles

APPENDIX C – Road Test Results & Summary

APPENDIX D – Borrow Pit Test Results and Summary

APPENDIX E – DCP Data and Summary

Annexure A

SGS**MATROLAB**

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 Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Centre Line Investigation
 Your ref: SK-P0098123
 Our ref: 1947
 Date Reported: 09/09/2019

TEST PIT NO.**1 RHS****GPS COORDINATES:****X-31022**

Sheet 2 of 2

2564052**NOTES**

PROFILED BY:
 G.T. van Rooyen

DATE PROFILED
 17/08/2019

EXCAVATED BY
 TLB

DATE EXCAVATED
 17/08/2019





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 Our ref: 1947
 Date Reported: 09/09/2019

TEST PIT NO. 2 RHS **GPS COORDINATES: X-26654**
 Sheet 1 of 2 **2566059**

NOTES

PROFILED BY:
 G.T. van Rooyen

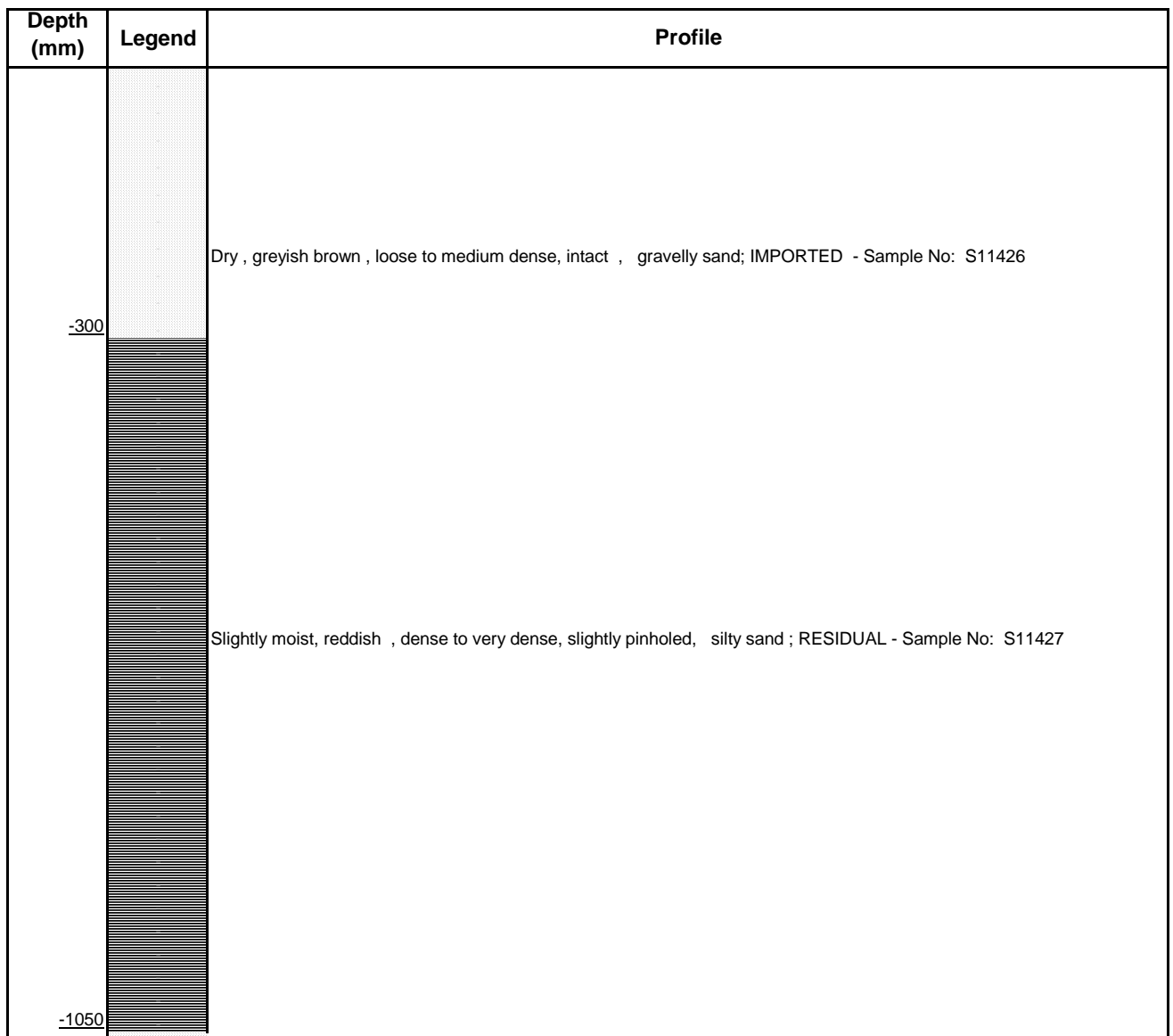
DATE PROFILED
 17/08/2019

- 1) No Refusal
- 2) No water seepage encountered
- 3) Fine Roots at 0 - 300 mm

EXCAVATED BY
 TLB

DATE EXCAVATED
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SOIL PROFILE



SAMPLING DATA

- 4) S11426 - Disturbed sample: Road Indicator & CBR
- 5) S11427 - Disturbed sample: Stabilization Design



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TEST PIT NO. 2 RHS **GPS COORDINATES:** X-26654
Sheet 2 of 2 2566059

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 Date Reported: 09/09/2019

TEST PIT NO. **3 CL** GPS COORDINATES: **X-20645**
 Sheet 1 of 2 **2567878**

PROFILED BY:
 G.T.van Rooyen

DATE PROFILED
 17/08/2019

- NOTES**
- 1) No Refusal
 - 2) No water seepage encountered
 - 3) Fine Roots at 0 - 100 mm

EXCAVATED BY
 TLB

DATE EXCAVATED
 17/08/2019

SOIL PROFILE

| Depth (mm) | Legend | Profile |
|------------|--------|--|
| -100 | | Dry, dark brown, med dense, intact, silty gravel; IMPORTED - Not sampled |
| | | Slightly moist, dusky red mottled white & orange, med dense to dense, intact, sandy gravel; RESIDUAL - Sample No: S11428 |
| -700 | | Slightly moist, dark yellowish orange, med dense to dense, intact, silty gravel; RESIDUAL - Not sampled |
| -1000 | | |

SAMPLING DATA

4) S11428 - Disturbed sample: Road Indicator & CBR



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TEST PIT NO. 3 CL **GPS COORDINATES: X-20645 2567878**

Sheet 2 of 2

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Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

TEST PIT NO. **4 RHS** GPS COORDINATES: **X-15750**
Sheet 1 of 2 **2564848**

NOTES

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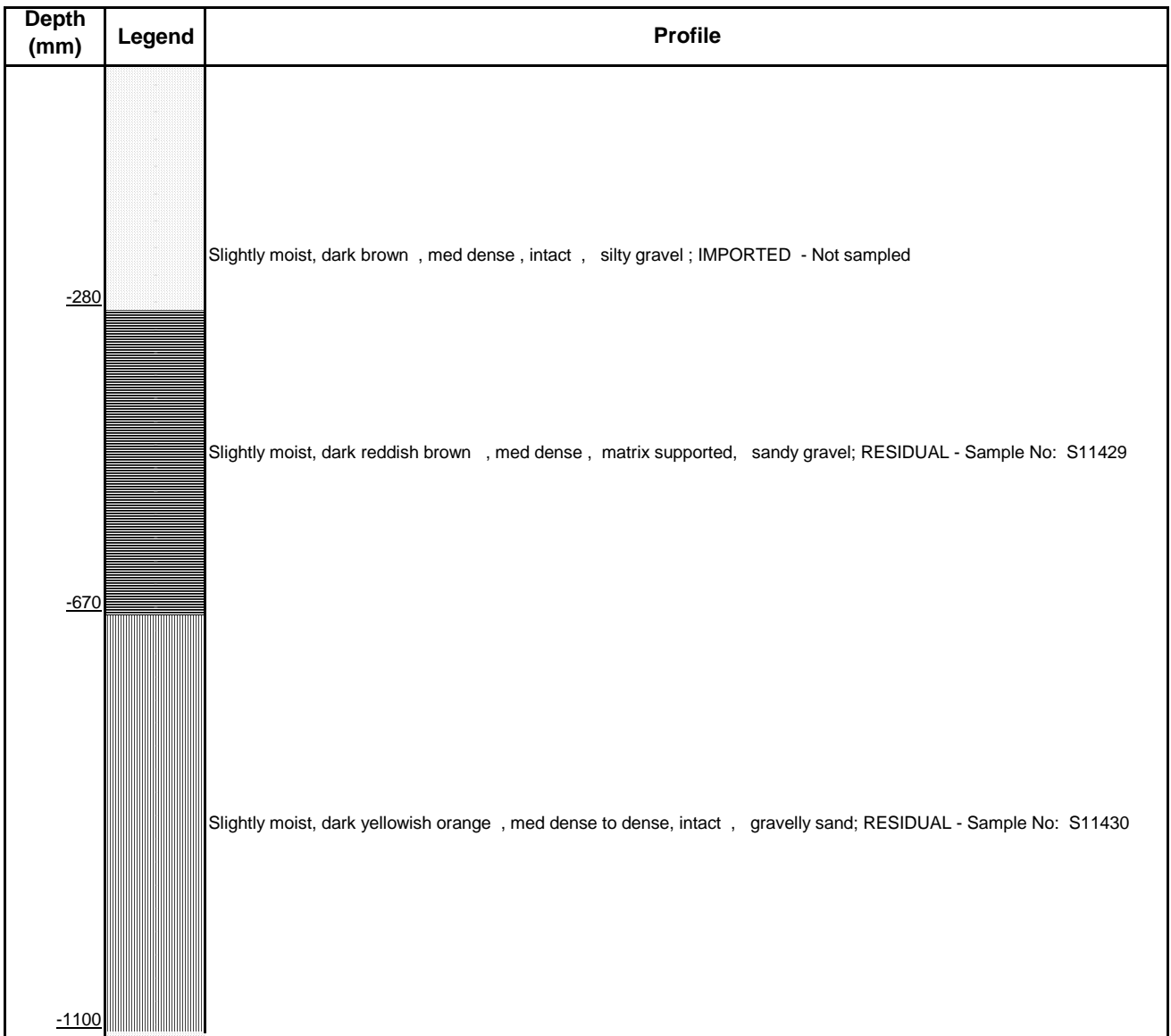
DATE PROFILED
17/08/2019

- 1) No Refusal
- 2) No water seepage encountered
- 3) Fine Roots at 0 - 280 mm

EXCAVATED BY
TLB

DATE EXCAVATED
17/08/2019

SOIL PROFILE



SAMPLING DATA

- 4) S11429 - Disturbed sample: Road Indicator
- 5) S11430 - Disturbed sample: Road Indicator & CBR

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Project: New Shangoni Gate - Centre Line Investigation
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 Our ref: 1947
 Date Reported: 09/09/2019

**TEST PIT NO. 4 RHS GPS COORDINATES: X-15750
 Sheet 2 of 2 2564848**

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Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

TEST PIT NO. 5 LHS
Sheet 1 of 2

GPS COORDINATES:

X-7135
2562747

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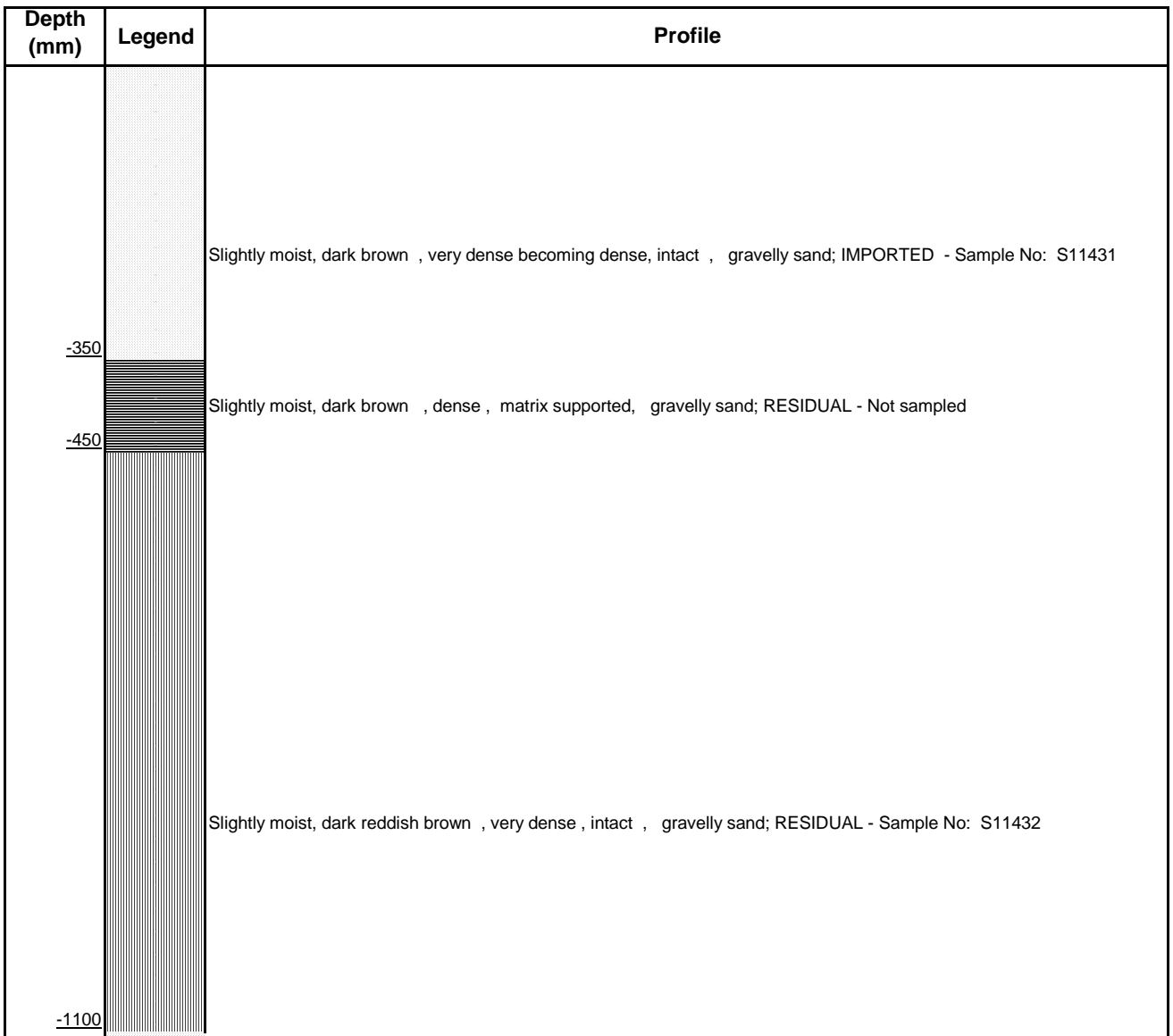
DATE PROFILED
17/08/2019

- 1) No Refusal
- 2) No water seepage encountered
- 3) Roots & Tree Roots at 0 - 350 mm

EXCAVATED BY
TLB

DATE EXCAVATED
17/08/2019

SOIL PROFILE



SAMPLING DATA

- 4) S11431 - Disturbed sample: Road Indicator
- 5) S11432 - Disturbed sample: Road Indicator & CBR



MATROLAB

9B Wilken Street
Rocky Drift
White River
1240
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Kruger Nat park (Skukuza)
Private Bag X402
Skukuza
1350
Attention: Mr.Ben Momberg

Project: New Shangoni Gate - Centre Line Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

TEST PIT NO. 5 LHS GPS COORDINATES: X-7135 2562747

Sheet 2 of 2

NOTES

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DATE PROFILED: 17/08/2019

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DATE EXCAVATED: 17/08/2019



Annexure B



MATROLAB

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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. E1 **TEST PIT NO.** 1 **GPS COORDINATES:** 23°10'41.30"S
Sheet 1 of 1 31°18'53.88"E

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
24/08/2019

NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
24/08/2019

- 1) No Refusal
- 2) No water seepage encountered
- 3) Roots & Tree Roots present in top 300mm

SOIL PROFILE

| Depth (mm) | Legend | Profile |
|------------|--------|---|
| -3000 | | Slightly moist, light brownish banded whitish Gneiss and pockets blackish weathered Basalt. |

SAMPLING DATA

4) S11464 - Disturbed sample: Road Indicator & CBR



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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. E2 **TEST PIT NO.** 1 **GPS COORDINATES:** 23°10'41.29"S
Sheet 1 of 2 31°18'2.41"E

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
24/08/2019

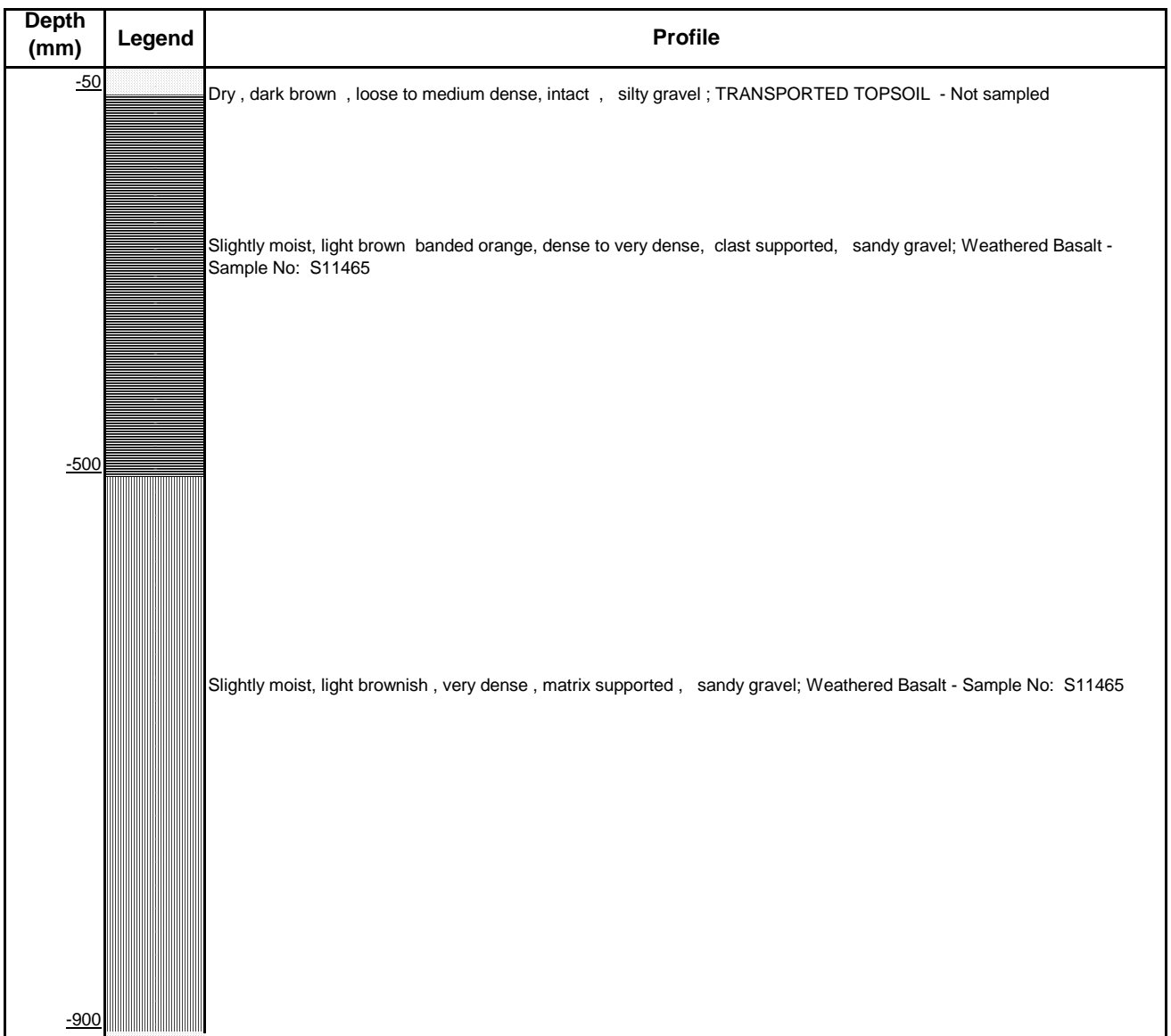
NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
24/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots & Tree Roots present in horizon

SOIL PROFILE



SAMPLING DATA

4) S11465 - Disturbed sample: Road Indicator & CBR
Layer 2 and 3



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Attention: Mr. Ben Momberg

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Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. E2 TEST PIT NO. 1 GPS COORDINATES: 23°10'41.29"S 31°18'2.41"E
Sheet 2 of 2

PROFILED BY: G.T.van Rooyen
DATE PROFILED: 24/08/2019

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DATE EXCAVATED: 24/08/2019





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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. E3 **TEST PIT NO.** 1 **GPS COORDINATES:** 23°12'38.72"S
Sheet 1 of 2 31°12'49.18"E

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
24/08/2019

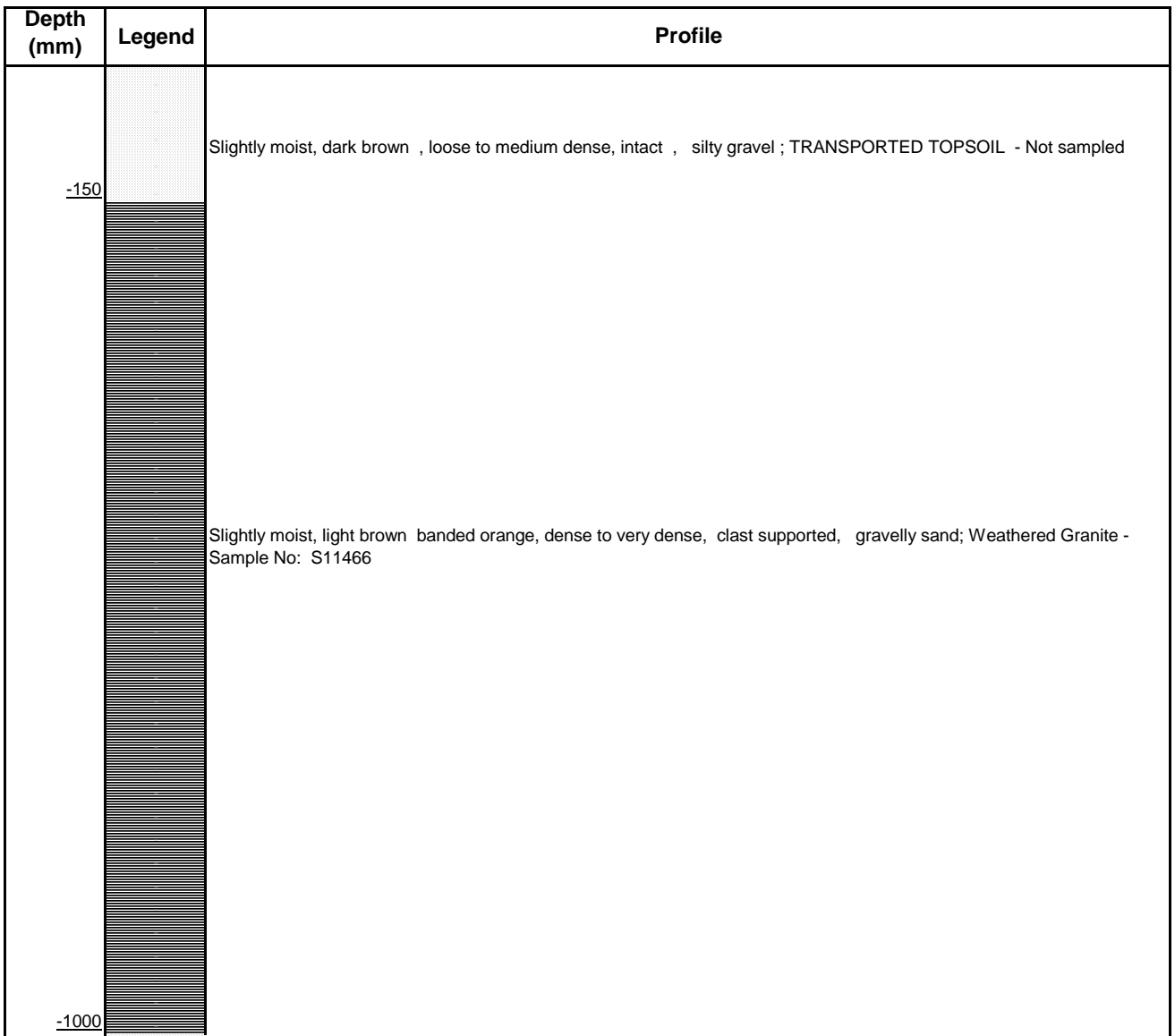
NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
24/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots & Tree Roots present in horizon at 0 - 150 mm

SOIL PROFILE



SAMPLING DATA

4) S11465 - Disturbed sample: Road Indicator & CBR
Layer 2 and 3



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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO.

E3

TEST PIT NO.

1

GPS COORDINATES:

23°12'38.72"S

Sheet 2 of 2

31°12'49.18"E

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
24/08/2019

EXCAVATED BY
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DATE EXCAVATED
24/08/2019





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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N1 **TEST PIT NO.** 1 **GPS COORDINATES:** 23°10'54.82"S
Sheet 1 of 2 31°17'42.13"E

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
24/08/2019

NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
24/08/2019

- 1) No Refusal
- 2) No water seepage encountered
- 3) Grass Roots at 0 - 50 mm

SOIL PROFILE

| Depth (mm) | Legend | Profile |
|------------|--------|--|
| -100 | | Dry, dark brown, loose to medium dense, intact, silty gravel; TRANSPORTED TOPSOIL - Not sampled |
| | | Dry, light reddish brown, dense to very dense, clast supported, gravelly sand; Weathered Granite - Sample No: S11467 |
| -1000 | | |

SAMPLING DATA

4) S11467 - Disturbed sample: Road Indicator & CBR

SGS**MATROLAB**

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 1350

Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation

Your ref: SK-P0098123

Our ref: 1947

Date Reported: 09/09/2019

BORROW PIT NO.

N1

TEST PIT NO.

1

GPS COORDINATES:

23°10'54.82"S

Sheet 2 of 2

31°17'42.13"E

PROFILED BY:

G.T. van Rooyen

DATE PROFILED

24/08/2019

EXCAVATED BY

TLB

DATE EXCAVATED

24/08/2019





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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N1 **TEST PIT NO.** 2 **GPS COORDINATES:** 23°10'54.89"S
Sheet 1 of 2 31°17'43.34"E

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
24/08/2019

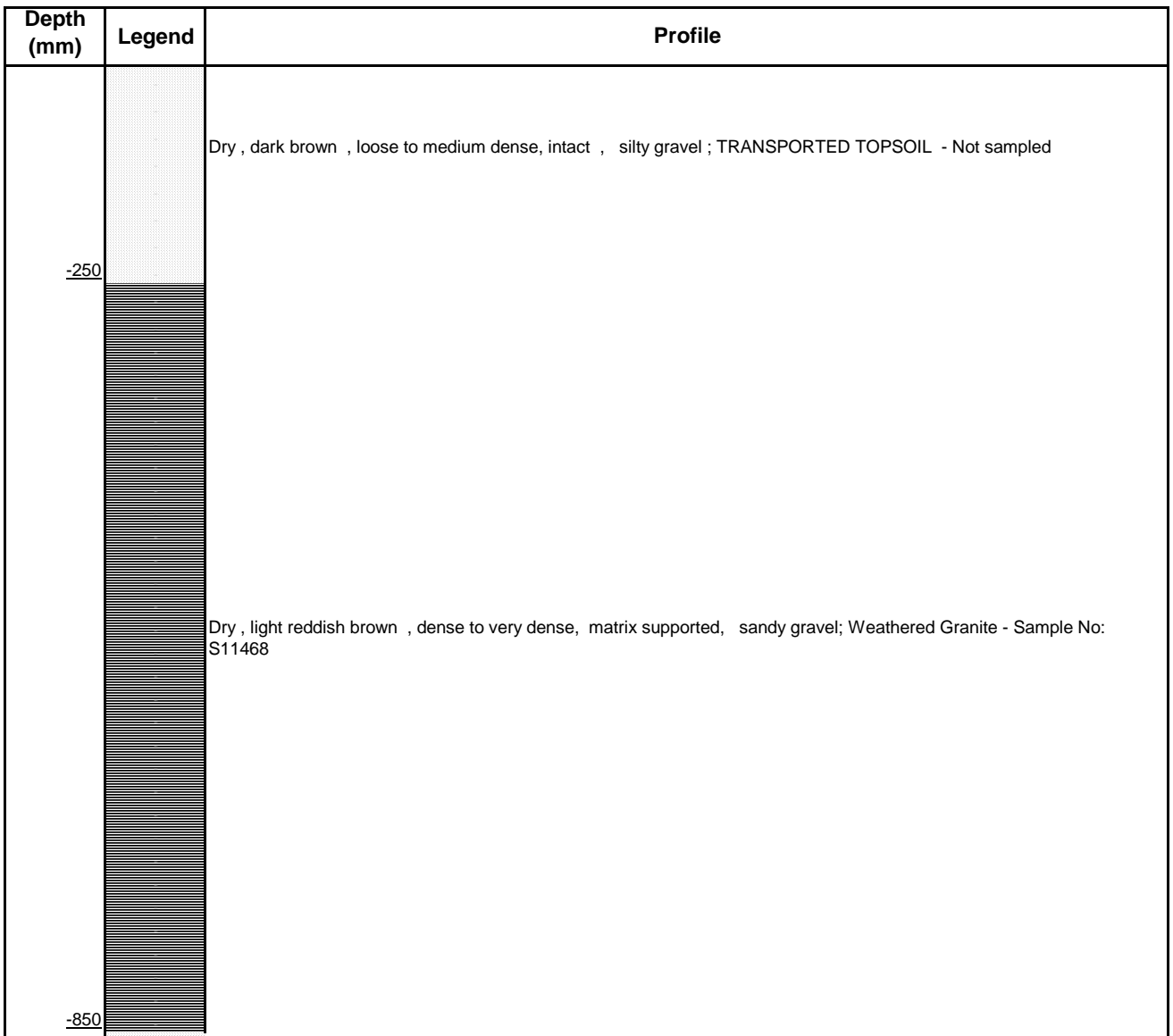
NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
24/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Grass Roots at 0 - 50 mm

SOIL PROFILE



SAMPLING DATA

4) S11468 - Disturbed sample: Road Indicator



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Attention: Mr.Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO.
Sheet 2 of 2

N1

TEST PIT NO. 2

GPS COORDINATES: 23°10'54.89"S
31°17'43.34"E

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
24/08/2019

EXCAVATED BY
TLB

DATE EXCAVATED
24/08/2019





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Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N1 **TEST PIT NO.** 3 **GPS COORDINATES:** 23°10'55.79"S
Sheet 1 of 2 31°17'42.41"E

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
24/08/2019

NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
24/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Grass Roots at 0 - 50 mm

SOIL PROFILE

| Depth (mm) | Legend | Profile |
|------------|--------|---|
| -150 | | Dry , dark brown , loose to medium dense, intact , silty gravel ; TRANSPORTED TOPSOIL - Not sampled |
| -1300 | | Dry , light reddish brown banded pinkish, dense to very dense, clast supported, sandy gravel; Weathered Granite - Sample No: S11469 |

SAMPLING DATA

4) S11469 - Disturbed sample: Road Indicator & CBR



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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO.
Sheet 2 of 2

N1

TEST PIT NO. 3

GPS COORDINATES: 23°10'55.79"S
31°17'42.41"E

PROFILED BY:
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DATE PROFILED
24/08/2019

EXCAVATED BY
TLB

DATE EXCAVATED
24/08/2019





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Kruger Nat park (Skukuza)
Private Bag X402
Skukuza
1350
Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N3 **TEST PIT NO.** 1 **GPS COORDINATES:** 23°12'40.11"S
Sheet 1 of 2 31°14'1.68"E

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
24/08/2019

NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
24/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Grass Roots at 0 - 50 mm

SOIL PROFILE

| Depth (mm) | Legend | Profile |
|------------|--------|---|
| -150 | | Moist, dark brown , loose to medium dense, intact , clayey sand ; TRANSPORTED TOPSOIL - Not sampled |
| -420 | | Moist, dark brown , dense , matrix supported, sandy gravel; Weathered Basalt - Sample No: S11470 |
| -600 | | Slightly moist, light brown , dense to very dense, clast supported , sandy gravel; Weathered Basalt - Sample No: S11470 |
| -1000 | | Slightly moist, light brown blotched orange and black , intact , sandy gravel; Weathered Basalt - Sample No: S11471 |

SAMPLING DATA

- 4) S11470 - Disturbed sample: Road Indicator & CBR
- 4) Layer 2 & 3
- 5) S11471 - Disturbed sample: Road Indicator



MATROLAB

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1350
Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N3 TEST PIT NO. 1 GPS COORDINATES: 23°12'40.11"S 31°14'1.68"E
Sheet 2 of 2

PROFILED BY: G.T.van Rooyen
DATE PROFILED: 24/08/2019

EXCAVATED BY: TLB
DATE EXCAVATED: 24/08/2019





MATROLAB

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Rocky Drift
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Kruger Nat park (Skukuza)
Private Bag X402
Skukuza
1350
Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N3 TEST PIT NO. 2 GPS COORDINATES: 23°12'37.10"S
Sheet 1 of 2 31°14'2.23"E

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
24/08/2019

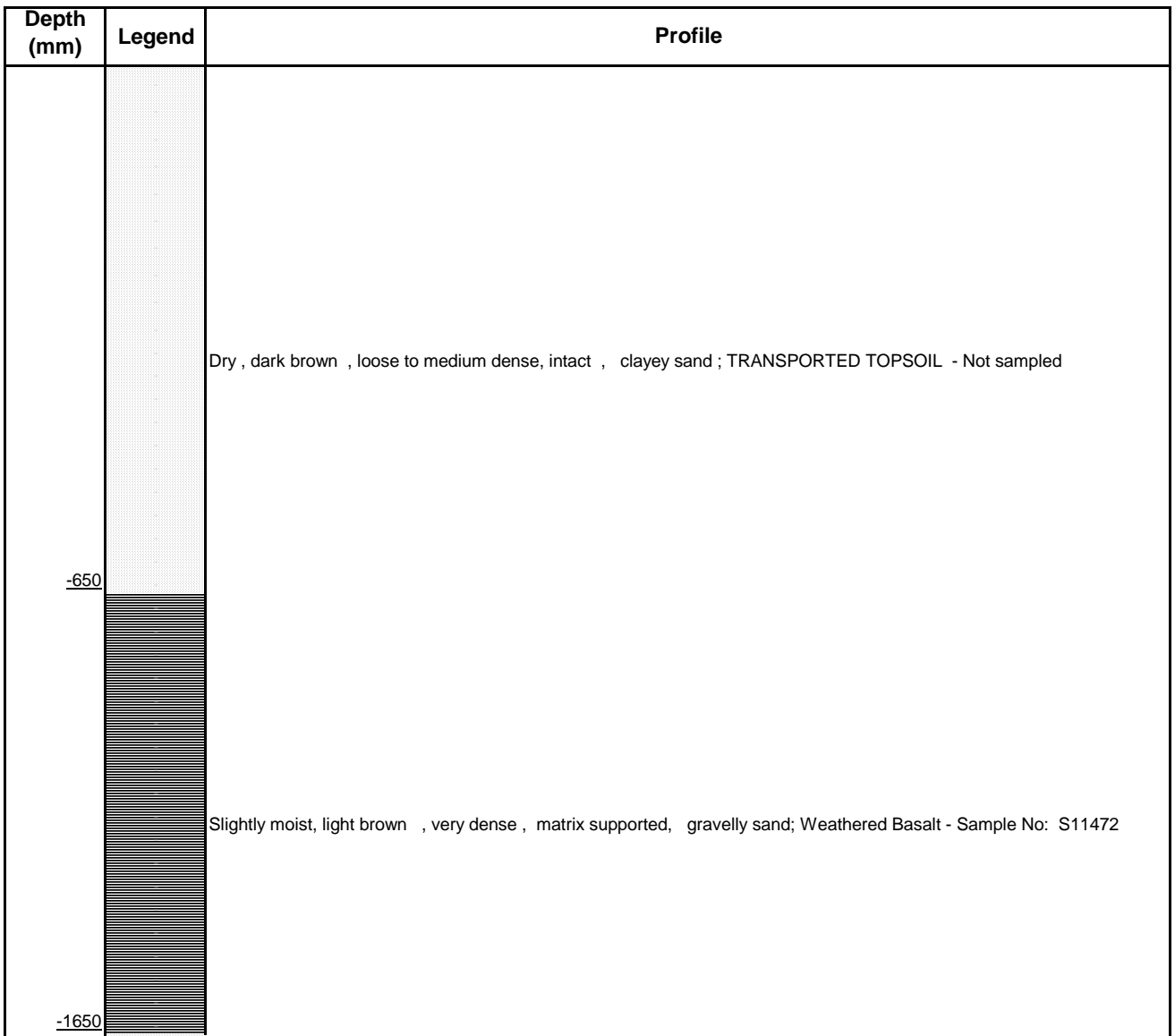
NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
24/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

4) S11472 - Disturbed sample: Stabilization Design



MATROLAB

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Kruger Nat park (Skukuza)
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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N3 TEST PIT NO. 2 GPS COORDINATES: 23°12'37.10"S 31°14'2.23"E
Sheet 2 of 2

PROFILED BY: G.T.van Rooyen
DATE PROFILED: 24/08/2019

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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N3 TEST PIT NO. 3 GPS COORDINATES: 23°12'38.41"S
Sheet 1 of 2 **31°14'0.31"E**

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
24/08/2019

NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
24/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE

| Depth (mm) | Legend | Profile |
|------------|--------|--|
| | | Dry, dark brown, loose to medium dense, intact, silty sand; TRANSPORTED TOPSOIL - Not sampled |
| -400 | | Slightly moist, light brown, very dense, matrix supported, gravelly sand; Weathered Basalt - Not sampled |
| -800 | | |

SAMPLING DATA

Kruger Nat park (Skukuza)
Private Bag X402
Skukuza
1350
Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO.**N3****TEST PIT NO.****3****GPS COORDINATES:**

23°12'38.41"S

Sheet 2 of 2

31°14'0.31"E

PROFILED BY:
G.T.van Rooyen**DATE PROFILED**
24/08/2019**EXCAVATED BY**
TLB**DATE EXCAVATED**
24/08/2019



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9B Wilken Street
Rocky Drift
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Kruger Nat park (Skukuza)
Private Bag X402
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1350
Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N5 TEST PIT NO. 1 GPS COORDINATES: 23°12'8.59"S 31°10'35.77"E
Sheet 1 of 2

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
24/08/2019

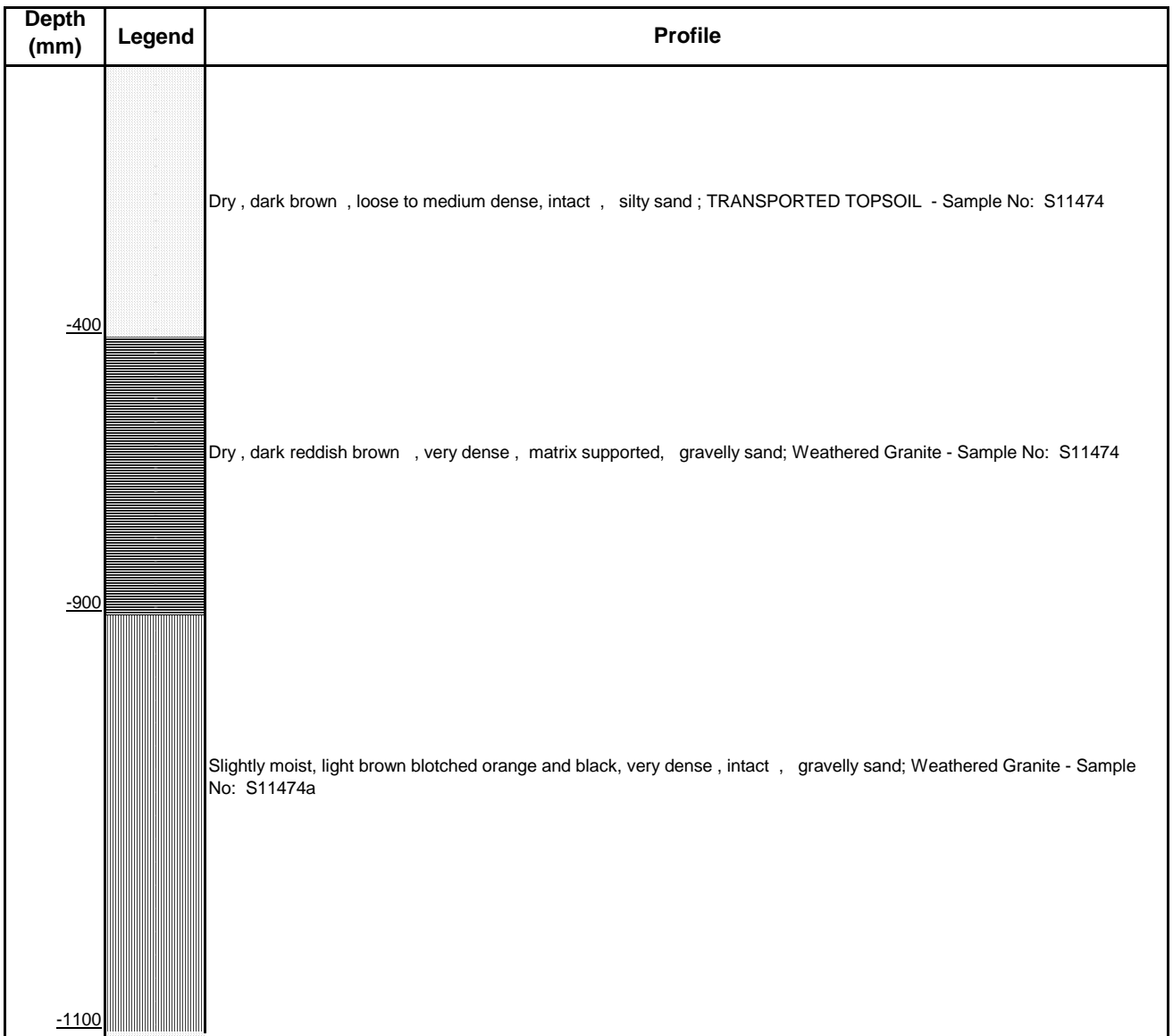
NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
24/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

- 4) S11474 - Disturbed sample: Road Indicator & CBR
- 4) Layer 1 & 2
- 5) S11474a - Disturbed sample: Road Indicator



MATROLAB

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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO.
Sheet 2 of 2

N5

TEST PIT NO. 1

GPS COORDINATES: 23°12'8.59"S
31°10'35.77"E

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
24/08/2019

EXCAVATED BY
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DATE EXCAVATED
24/08/2019





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Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N5 TEST PIT NO. 2 GPS COORDINATES: 23° 12' 9.54" S 31° 10' 36.30" E
Sheet 1 of 2

PROFILED BY:
G.T. van Rooyen

DATE PROFILED
24/08/2019

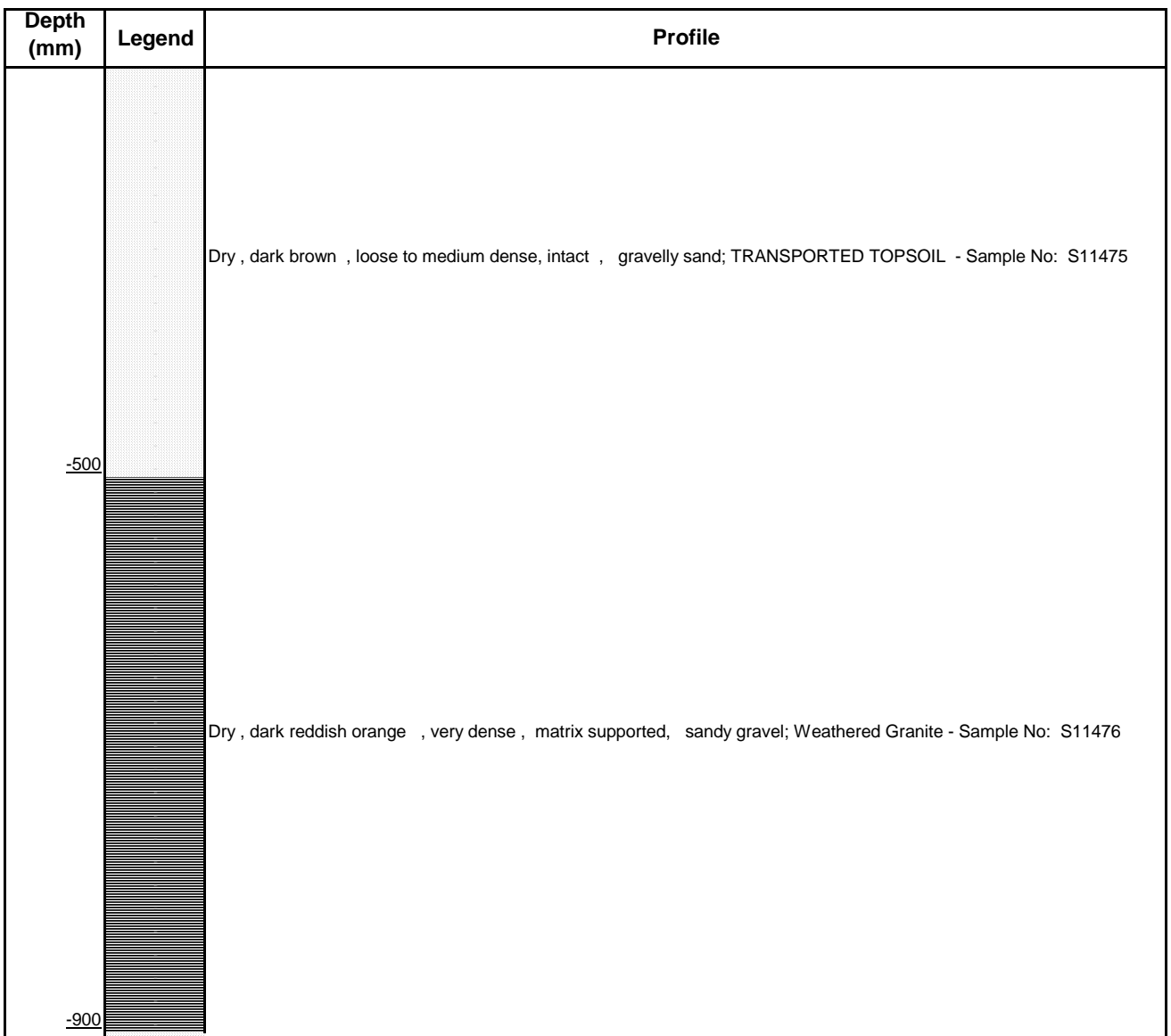
NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
24/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

- 4) S11475 - Disturbed sample: Road Indicator
- 5) S11476 - Disturbed sample: Road Indicator



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Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N5 TEST PIT NO. 2 GPS COORDINATES: 23° 12' 9.54" S 31° 10' 36.30" E
Sheet 2 of 2

PROFILED BY: G.T.van Rooyen
DATE PROFILED: 24/08/2019

EXCAVATED BY: TLB
DATE EXCAVATED: 24/08/2019





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Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N5 TEST PIT NO. 3 GPS COORDINATES: 23° 12' 7.92" S 31° 10' 35.00" E
Sheet 1 of 2

PROFILED BY:
G.T. van Rooyen

DATE PROFILED
24/08/2019

NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
24/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE

| Depth (mm) | Legend | Profile |
|------------|--------|---|
| | | Dry, dark brown, loose to medium dense, intact, silty sand; TRANSPORTED TOPSOIL - Not sampled |
| -300 | | |
| | | Dry, dark reddish brown, very dense, matrix supported, gravelly sand; Weathered Granite - Not sampled |
| -400 | | |

SAMPLING DATA

-
-



MATROLAB

9B Wilken Street
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Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO.

N5

TEST PIT NO.

3

GPS COORDINATES:

23° 12' 7.92" S

Sheet 2 of 2

31° 10' 35.00" E

PROFILED BY:
G.T.van Rooyen

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MATROLAB

9B Wilken Street
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1240
Tel: 013 758 1302

Postnet suite #62
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Kruger Nat park (Skukuza)
Private Bag X402
Skukuza
1350
Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N6 TEST PIT NO. 1 GPS COORDINATES: 23° 11' 12.08" S 31° 9' 31.72" E
Sheet 1 of 2

PROFILED BY:
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DATE PROFILED
24/08/2019

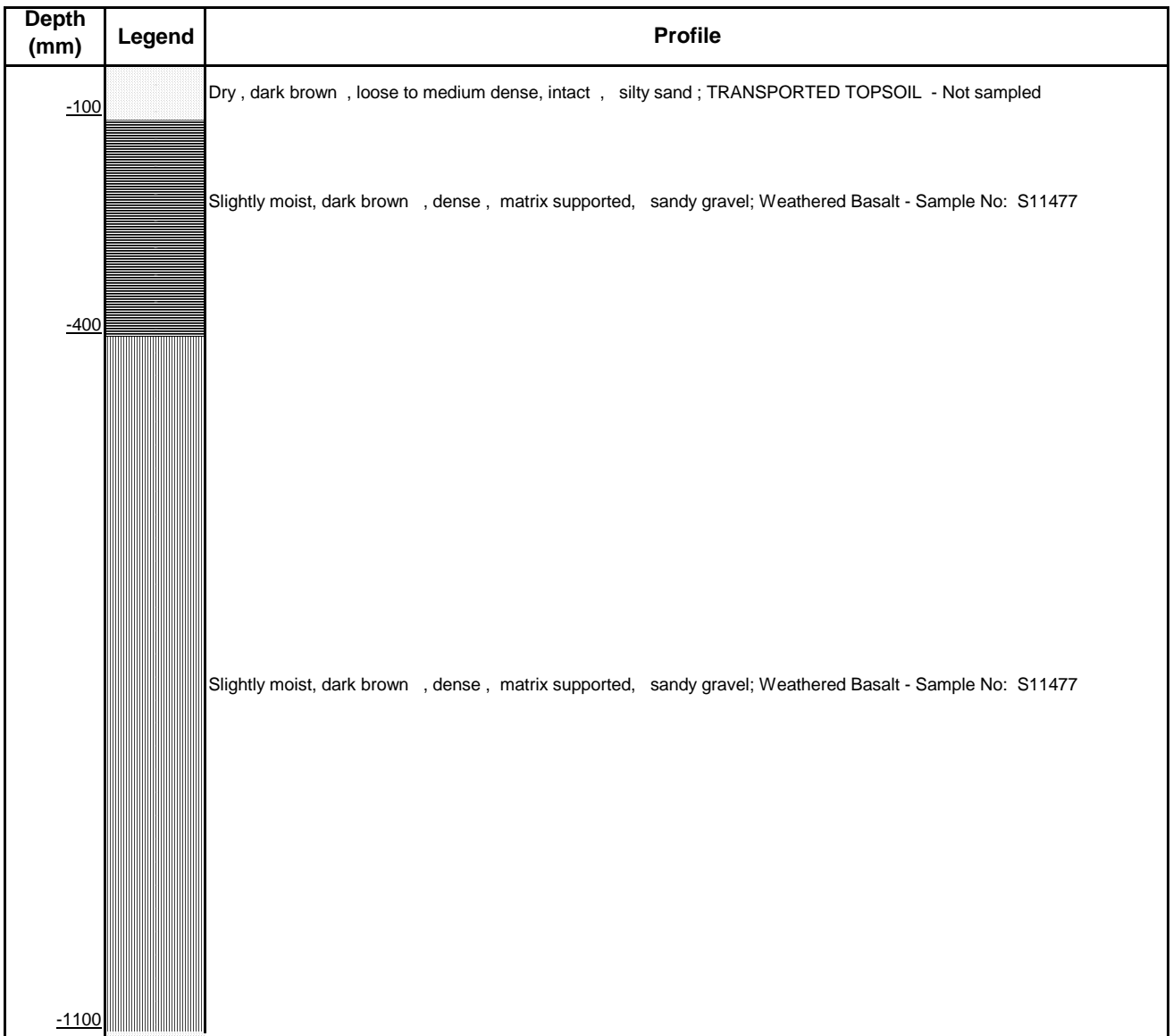
NOTES

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24/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

- 4) S11477 - Disturbed sample: Stabilization Design
- 4) Layer 2 & 3 50/50mix



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BORROW PIT NO. N6 TEST PIT NO. 1 GPS COORDINATES: 23° 11' 12.08" S 31° 9' 31.72" E
Sheet 2 of 2

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Date Reported: 09/09/2019

BORROW PIT NO. N6 TEST PIT NO. 2 GPS COORDINATES: 23° 11' 14.50" S 31° 9' 30.85" E
Sheet 1 of 2

PROFILED BY:
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24/08/2019

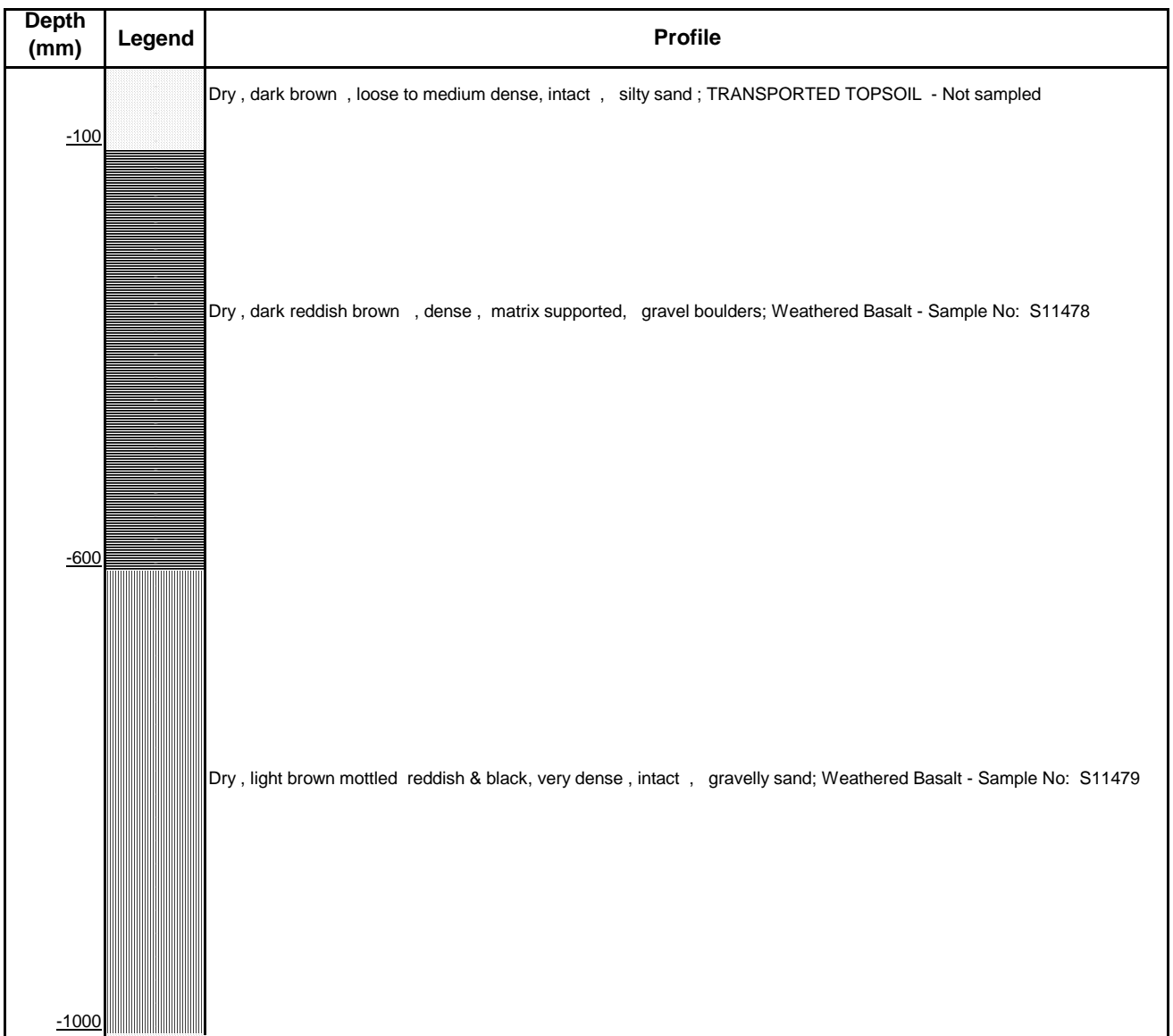
NOTES

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DATE EXCAVATED
24/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

- 4) S11478 - Disturbed sample: Road Indicator
- 5) S11479 - Disturbed sample: Road Indicator



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BORROW PIT NO.

N6

TEST PIT NO.

2

GPS COORDINATES:

23° 11' 14.50" S

Sheet 2 of 2

31° 9' 30.85" E

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Date Reported: 09/09/2019

BORROW PIT NO. N6 TEST PIT NO. 3 GPS COORDINATES: 23° 11' 12.59" S 31° 9' 28.87" E
Sheet 1 of 2

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NOTES

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24/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE

| Depth (mm) | Legend | Profile |
|------------|--------|---|
| -150 | | Dry, dark brown, loose to dense, intact, silty sand; TRANSPORTED TOPSOIL - Not sampled |
| -800 | | Dry, dark reddish brown, dense, matrix supported, gravelly sand; Weathered Basalt - Not sampled |
| -1600 | | Slightly moist, light brown, very dense, intact, silty sand; Weathered Basalt - Not sampled |

SAMPLING DATA



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BORROW PIT NO. N6

TEST PIT NO. 3

GPS COORDINATES: 23° 11' 12.59" S
31° 9' 28.87" E

Sheet 2 of 2

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24/08/2019





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Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N6 TEST PIT NO. 4 GPS COORDINATES: 23° 11' 10.90" S 31° 9' 29.66" E
Sheet 1 of 2

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23/08/2019

NOTES

EXCAVATED BY
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DATE EXCAVATED
23/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE

| Depth (mm) | Legend | Profile |
|------------|--------|--|
| -200 | | Dry, dark reddish brown, loose to medium dense, intact, silty sand; TRANSPORTED TOPSOIL - Not sampled |
| -1000 | | Slightly moist, dark brown blotched black, very dense, matrix supported, gravel boulders; Weathered Basalt - Sample No: S11480 |

SAMPLING DATA

4) S11480 - Disturbed sample: Road Indicator

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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation

Your ref: SK-P0098123

Our ref: 1947

Date Reported: 09/09/2019

BORROW PIT NO.

N6

TEST PIT NO.

4

GPS COORDINATES:

23° 11' 10.90" S

Sheet 2 of 2

31° 9' 29.66" E

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DATE EXCAVATED

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Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N7 **TEST PIT NO.** 1 **GPS COORDINATES:** 23° 10' 38.03" S
Sheet 1 of 2 31° 8' 38.26" E

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23/08/2019

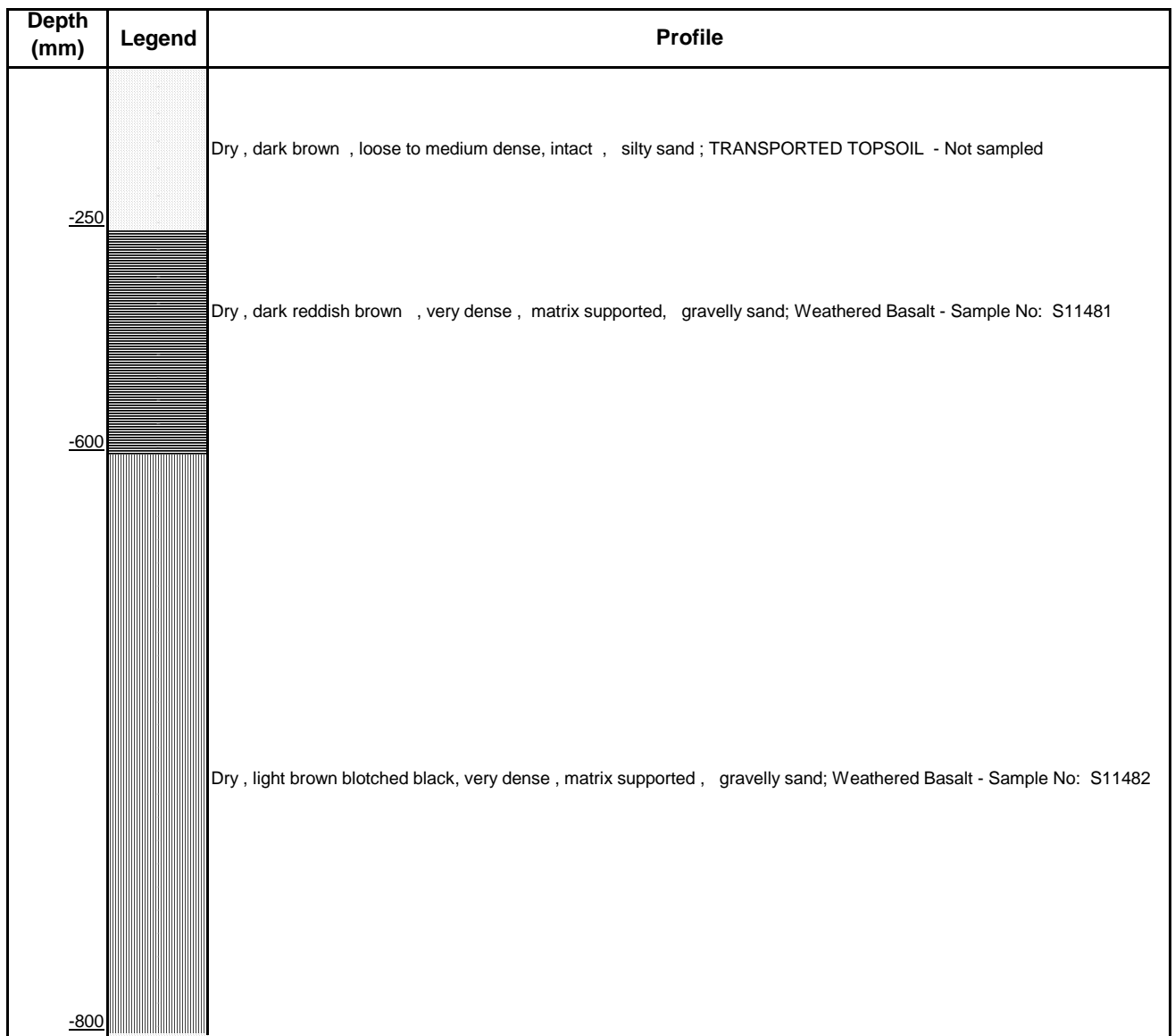
NOTES

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DATE EXCAVATED
23/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

- 4) S11481 - Disturbed sample: Road Indicator & CBR
- 5) S11482 - Disturbed sample: Road Indicator



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BORROW PIT NO. N7
Sheet 2 of 2

TEST PIT NO. 1

GPS COORDINATES: 23° 10' 38.03" S
31° 8' 38.26" E

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Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N7 **TEST PIT NO.** 2 **GPS COORDINATES:** 23° 10' 39.14" S
Sheet 1 of 2 31° 8' 40.02" E

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23/08/2019

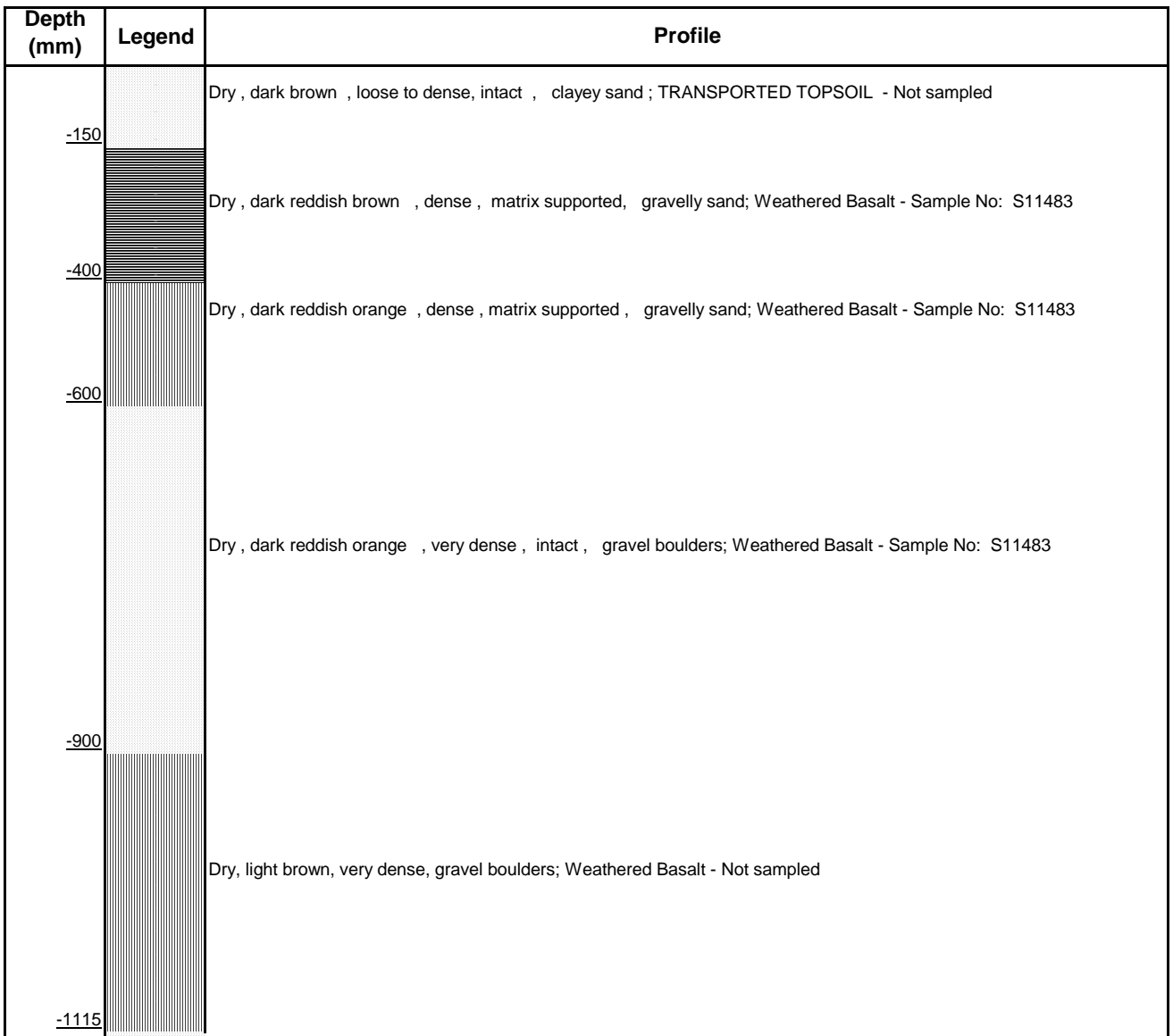
NOTES

EXCAVATED BY
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DATE EXCAVATED
23/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

- 4) S11483 - Disturbed sample: Road Indicator
- 4) Layer 2 - 4 (Combined)



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Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
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Date Reported: 09/09/2019

BORROW PIT NO.

N7

TEST PIT NO.

2

GPS COORDINATES:

23° 10' 39.14" S

Sheet 2 of 2

31° 8' 40.02" E

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Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N7 **TEST PIT NO.** 3 **GPS COORDINATES:** 23°10'39.60"S
Sheet 1 of 2 31° 8'40.95"E

PROFILED BY:
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23/08/2019

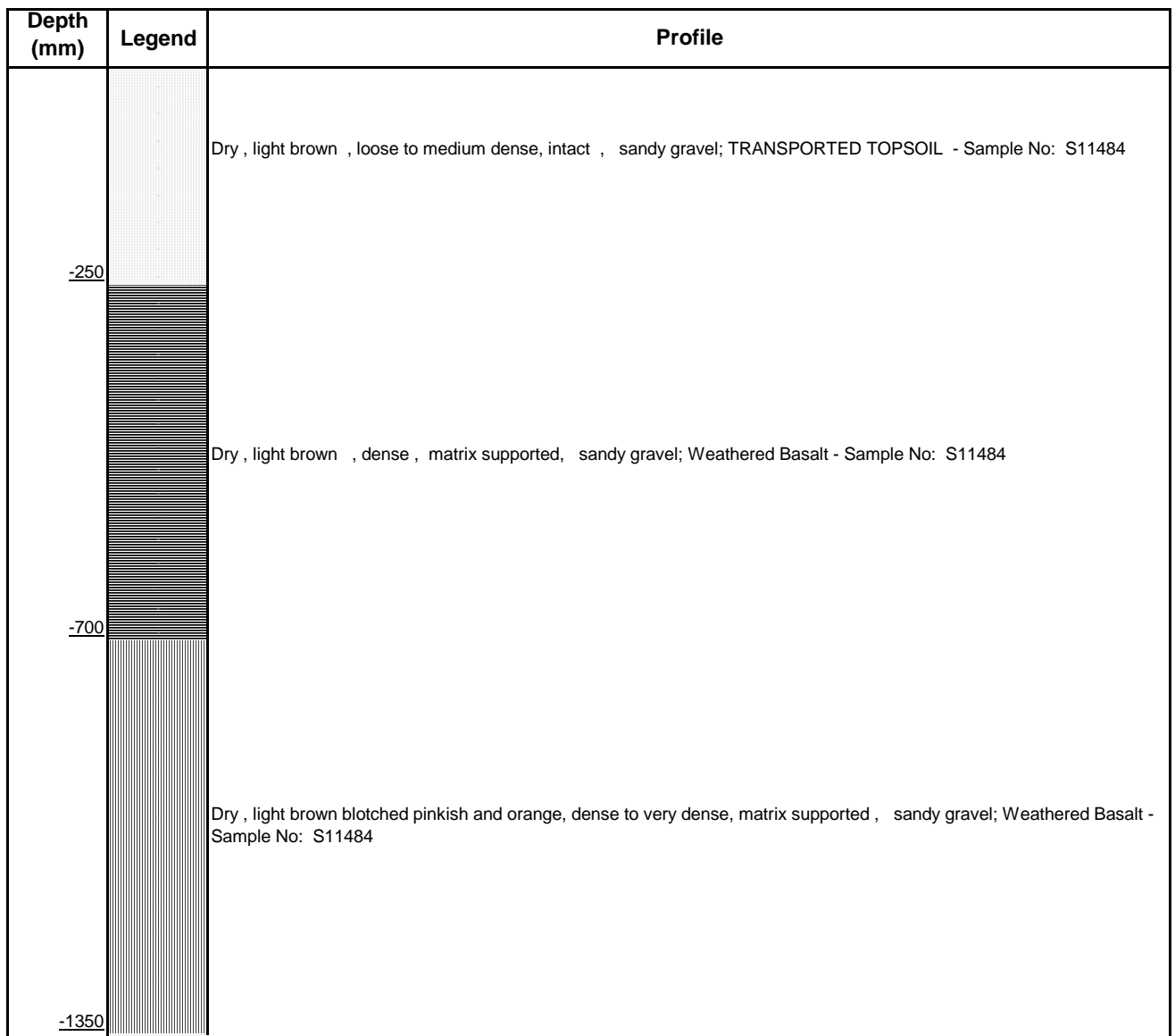
NOTES

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DATE EXCAVATED
23/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

- 4) S11484 - Disturbed sample: Road Indicator & CBR
- 4) Layer 1 - 3 (Combined)

Kruger Nat park (Skukuza)
Private Bag X402
Skukuza
1350

Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit
Investigation

Your ref: SK-P0098123

Our ref: 1947

Date Reported: 09/09/2019

BORROW PIT NO.

N7

TEST PIT NO.

3

GPS COORDINATES:

23°10'39.60"S

Sheet 2 of 2

31° 8'40.95"E

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Project: New Shangoni Gate - Borrow Pit Investigation
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Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N8

TEST PIT NO. 1

GPS COORDINATES: 23° 10' 11.93" S
31° 6' 52.37" E

Sheet 2 of 2

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BORROW PIT NO. N8 **TEST PIT NO.** 1 **GPS COORDINATES:** 23° 10' 11.93" S
Sheet 1 of 2 31° 6' 52.37" E

PROFILED BY:
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23/08/2019

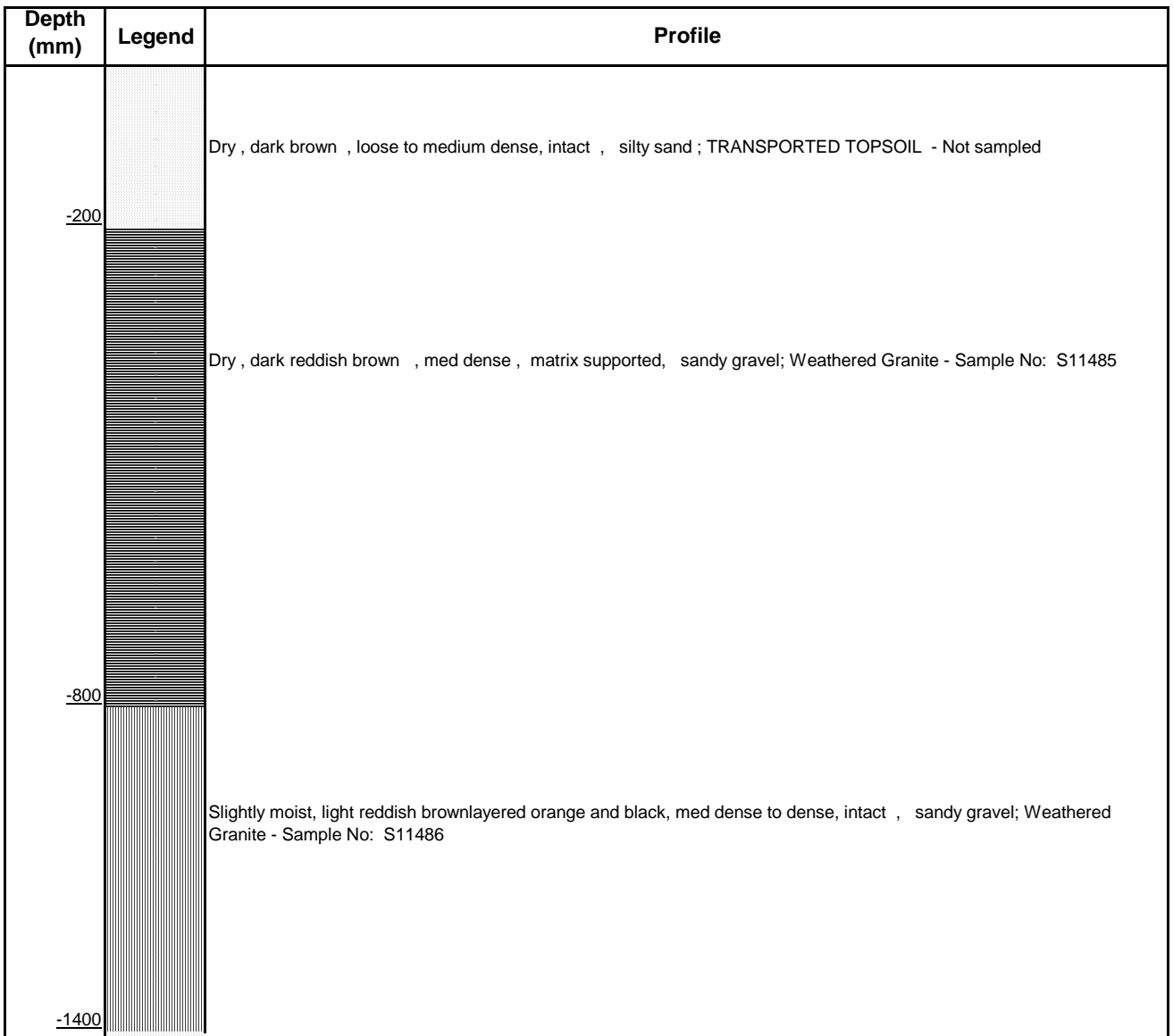
NOTES

EXCAVATED BY
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DATE EXCAVATED
23/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

- 4) S11485 - Disturbed sample: Road Indicator & CBR
- 5) S11486 - Disturbed sample: Road Indicator



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Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N8 TEST PIT NO. 2 GPS COORDINATES: 23° 10' 14.31" S 31° 6' 52.81" E
Sheet 1 of 2

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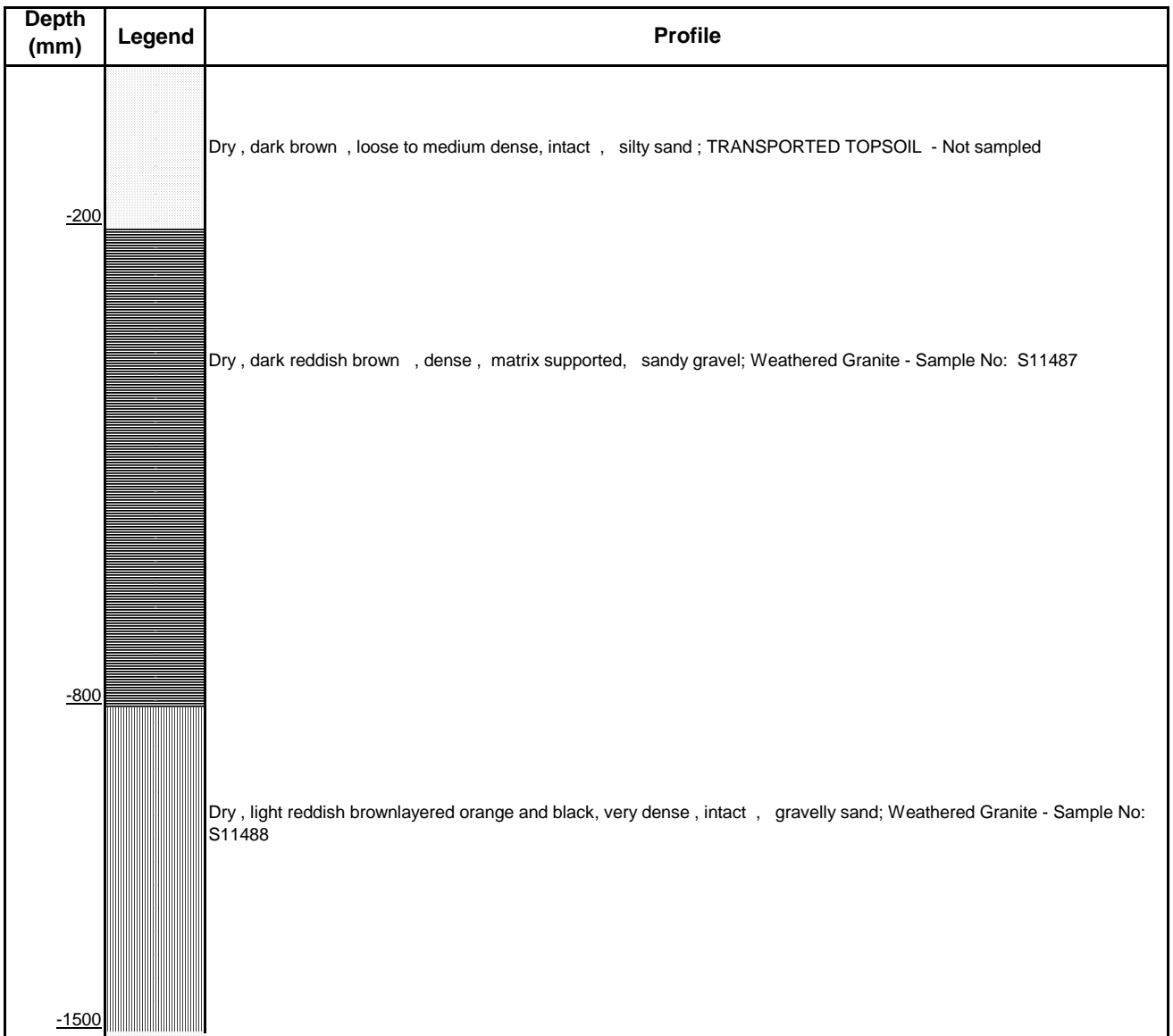
NOTES

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DATE EXCAVATED
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- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

- 4) S11487 - Disturbed sample: Road Indicator
- 5) S11488 - Disturbed sample: Road Indicator



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BORROW PIT NO.

N8

TEST PIT NO.

2

GPS COORDINATES:

23° 10' 14.31" S

Sheet 2 of 2

31° 6' 52.81" E

PROFILED BY:
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23/08/2019





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Date Reported: 09/09/2019

BORROW PIT NO. N8 TEST PIT NO. 3 GPS COORDINATES: 23° 10' 14.97" S 31° 6' 50.62" E
Sheet 1 of 2

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23/08/2019

NOTES

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DATE EXCAVATED
23/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE

| Depth (mm) | Legend | Profile |
|------------|--------|---|
| -150 | | Dry, dark brown, loose to dense, intact, clayey sand; TRANSPORTED TOPSOIL - Not sampled |
| -1000 | | Dry, dark reddish brown, loose to dense, matrix supported, silty gravel; Weathered Granite - Sample No: S11489 |
| -1600 | | Dry, light brown blotched brown, dense to very dense, intact, silty gravel; Weathered Granite - Sample No: S11489 |

SAMPLING DATA

- 4) S11489 - Disturbed sample: Road Indicator & CBR
- 4) Layer 2&3 mixed



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BORROW PIT NO. N8

TEST PIT NO. 3

GPS COORDINATES: 23° 10' 14.97" S
31° 6' 50.62" E

Sheet 2 of 2

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Date Reported: 09/09/2019

BORROW PIT NO. N8 TEST PIT NO. 4 GPS COORDINATES: 23° 10' 12.84" S 31° 6' 50.03" E
Sheet 1 of 2

PROFILED BY:
G.T.van Rooyen

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23/08/2019

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DATE EXCAVATED
23/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE

| Depth (mm) | Legend | Profile |
|------------|--------|--|
| -100 | | Dry , dark brown , loose to dense, intact , clayey sand ; TRANSPORTED TOPSOIL - Not sampled |
| -850 | | Dry , dark reddish brown , loose to dense, matrix supported, silty gravel ; Weathered Granite - Not sampled |
| -1300 | | Dry , light brown blotched brown, dense to very dense, intact , silty gravel ; Weathered Granite - Not sampled |

SAMPLING DATA



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Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N8

TEST PIT NO. 4

GPS COORDINATES: 23° 10' 12.84" S
31° 6' 50.03" E

Sheet 2 of 2

PROFILED BY:
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DATE PROFILED
23/08/2019

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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
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Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N9 TEST PIT NO. 2 **GPS COORDINATES:** 23° 10' 9.93" S
Sheet 1 of 2 31° 5' 18.87" E

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
23/08/2019

NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
23/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE

| Depth (mm) | Legend | Profile |
|------------|--------|--|
| -140 | | Dry, dark brown, loose to medium dense, intact, clayey sand; TRANSPORTED TOPSOIL - Not sampled |
| -1000 | | Dry, dark reddish brown, medium dense to dense, matrix to clast supported towards bottom of horizon, sandy gravel; Weathered Granite - Sample No: S11490 |
| -1100 | | Dry, light brown blotched white, very dense, silty gravel; Weathered Granite - Not sampled |

SAMPLING DATA

4) S11490 - Disturbed sample: Road Indicator & CBR

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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation

Your ref: SK-P0098123

Our ref: 1947

Date Reported: 09/09/2019

BORROW PIT NO.

N9

TEST PIT NO.

2

GPS COORDINATES:

23° 10' 9.93" S

Sheet 2 of 2

31° 5' 18.87" E

PROFILED BY:

G.T. van Rooyen

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23/08/2019

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MATROLAB

9B Wilken Street
Rocky Drift
White River
1240
Tel: 013 758 1302

Postnet suite #62
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Nelspruit
1200
gerrit.vanrooyen@sgs.com

Kruger Nat park (Skukuza)
Private Bag X402
Skukuza
1350
Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N9 TEST PIT NO. 3 GPS COORDINATES: 23° 10' 11.79" S 31° 5' 17.91" E
Sheet 1 of 2

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
23/08/2019

NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
23/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE

| Depth (mm) | Legend | Profile |
|------------|--------|---|
| -140 | | Dry, light brown, loose to medium dense, intact, silty sand; TRANSPORTED TOPSOIL - Not sampled |
| | | Dry, dark reddish brown layered light reddish/whitish, loose to medium dense, matrix supported, gravel; Weathered Granite - Sample No: S11491 |
| -1350 | | |

SAMPLING DATA

4) S11491 - Disturbed sample: Road Indicator & CBR

Kruger Nat park (Skukuza)
Private Bag X402
Skukuza
1350
Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N9 TEST PIT NO. 3 GPS COORDINATES: 23° 10' 11.79" S 31° 5' 17.91" E
Sheet 2 of 2

PROFILED BY: G.T.van Rooyen
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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N9 TEST PIT NO. 4 GPS COORDINATES: 23° 10' 11.32" S 31° 5' 15.48" E
Sheet 1 of 2

PROFILED BY:
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23/08/2019

NOTES

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DATE EXCAVATED
23/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE

| Depth (mm) | Legend | Profile |
|------------|--------|--|
| | | Dry, dark brown, loose to dense, intact, silty sand; TRANSPORTED TOPSOIL - Sample No: S11492 |
| -400 | | |
| | | Dry, dark reddish brown, loose to medium dense, matrix supported, gravel; Weathered Granite - Sample No: S11492 |
| -600 | | |
| | | Dry, dark reddish brown layered light reddish/whitish, dense to very dense, matrix supported, gravel boulders; Weathered Granite - Sample No: S11492 |
| -1500 | | |

SAMPLING DATA

- 4) S11492 - Disturbed sample: Road Indicator
- 4) Layers 1 - 3 (Mixed)



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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO.

N9

TEST PIT NO.

4

GPS COORDINATES:

23° 10' 11.32" S
31° 5' 15.48" E

Sheet 2 of 2

PROFILED BY:
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Attention: Mr. Ben Momborg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N10 **TEST PIT NO.** 1 **GPS COORDINATES:** 23° 10' 10.29" S
Sheet 1 of 2 31° 2' 39.89" E

PROFILED BY:
G.T. van Rooyen

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22/08/2019

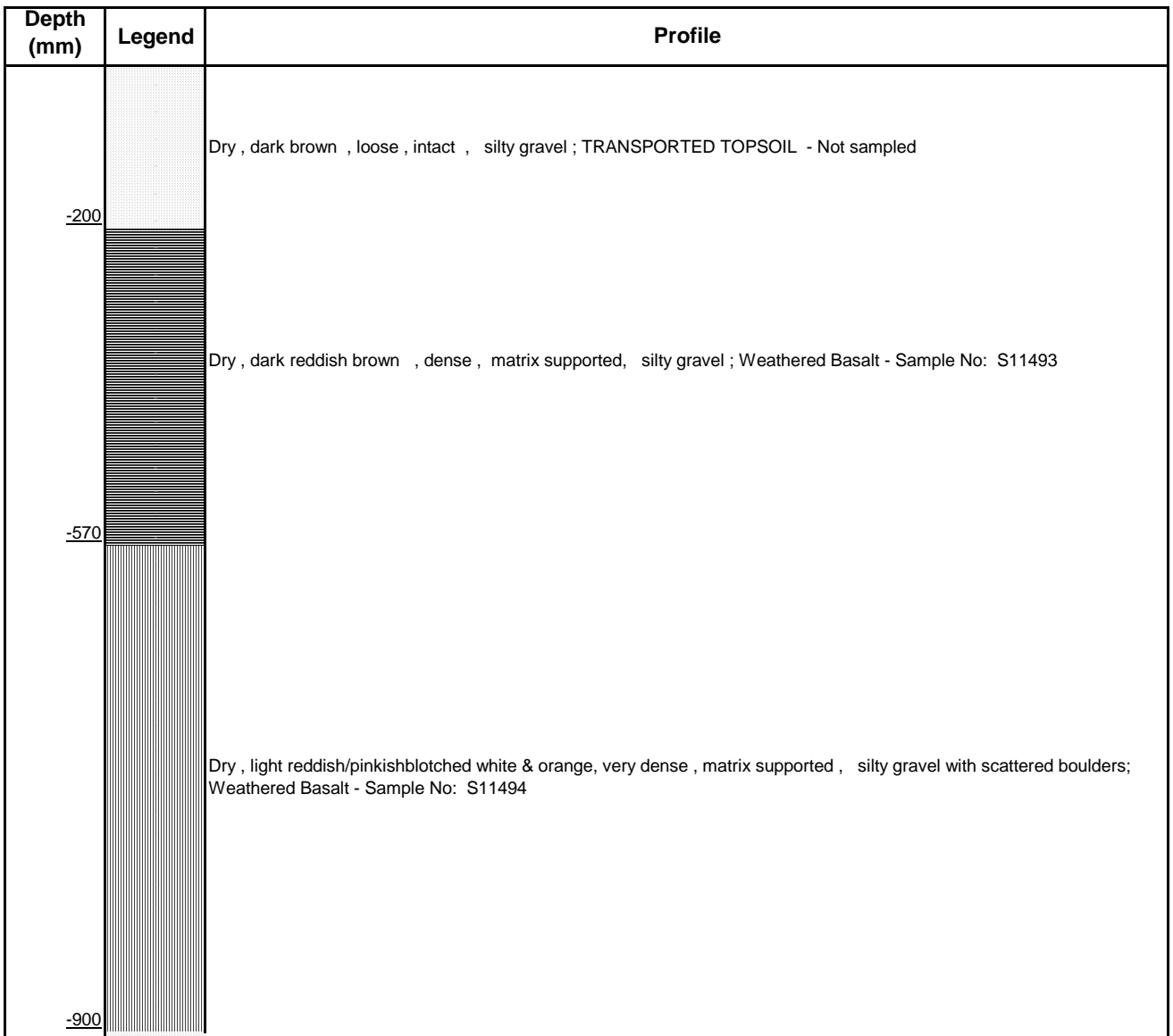
NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
22/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

- 4) S11493 - Disturbed sample: Road Indicator & CBR
- 5) S11494 - Disturbed sample: Road Indicator & CBR



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Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N10
Sheet 2 of 2

TEST PIT NO. 1

GPS COORDINATES: 23° 10' 10.29" S
31° 2' 39.89" E

PROFILED BY:
G.T.van Rooyen

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22/08/2019

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DATE EXCAVATED
22/08/2019





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Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N10 TEST PIT NO. 2 GPS COORDINATES: 23° 10' 10.42" S 31° 2' 38.28" E
Sheet 1 of 2

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
22/08/2019

NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
22/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE

| Depth (mm) | Legend | Profile |
|------------|--------|---|
| -150 | | Dry, dark brown, loose, intact, silty sand; TRANSPORTED TOPSOIL - Sample No: S11495 |
| -850 | | Dry, dark reddish brown, loose to dense, matrix supported, silty gravel; Weathered Basalt - Sample No: S11495 |
| -1300 | | Dry, reddish blotched grey, dense, matrix supported, gravel boulders; Weathered Basalt - Sample No: S11495 |
| -1800 | | Dry, light brown speckled orange and black, dense to very dense, intact, silty gravel; Weathered Basalt - Sample No: S11496 |

SAMPLING DATA

- 4) S11495 - Disturbed sample: Stabilization Design
- 4) Layers 1 - 3 (Mixed)
- 5) S11496 - Disturbed sample: Road Indicator



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Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
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Date Reported: 09/09/2019

BORROW PIT NO. N10 TEST PIT NO. 2 GPS COORDINATES: 23° 10' 10.42" S 31° 2' 38.28" E
Sheet 2 of 2

PROFILED BY: G.T.van Rooyen
DATE PROFILED: 22/08/2019

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DATE EXCAVATED: 22/08/2019





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Project: New Shangoni Gate - Borrow Pit Investigation
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Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N10 TEST PIT NO. 3 GPS COORDINATES: 23° 10' 7.65" S 31° 2' 38.55" E
Sheet 1 of 2

PROFILED BY:
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DATE PROFILED
22/08/2019

NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
22/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE

| Depth (mm) | Legend | Profile |
|------------|--------|---|
| -150 | | Dry, dark brown, loose, intact, silty sand; TRANSPORTED TOPSOIL - Not sampled |
| -1100 | | Dry, dark reddish brown, loose to dense, matrix supported, gravel boulders; Weathered Basalt - Not sampled |
| -1600 | | Dry, light brown speckled orange and black, dense to very dense, intact, silty gravel; Weathered Basalt - Not sampled |

SAMPLING DATA



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Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N10
Sheet 2 of 2

TEST PIT NO. 3

GPS COORDINATES: 23° 10' 7.65" S
31° 2' 38.55" E

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Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N10 TEST PIT NO. 4 GPS COORDINATES: 23° 10' 7.64" S 31° 2' 39.98" E
Sheet 1 of 2

PROFILED BY:
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DATE PROFILED
22/08/2019

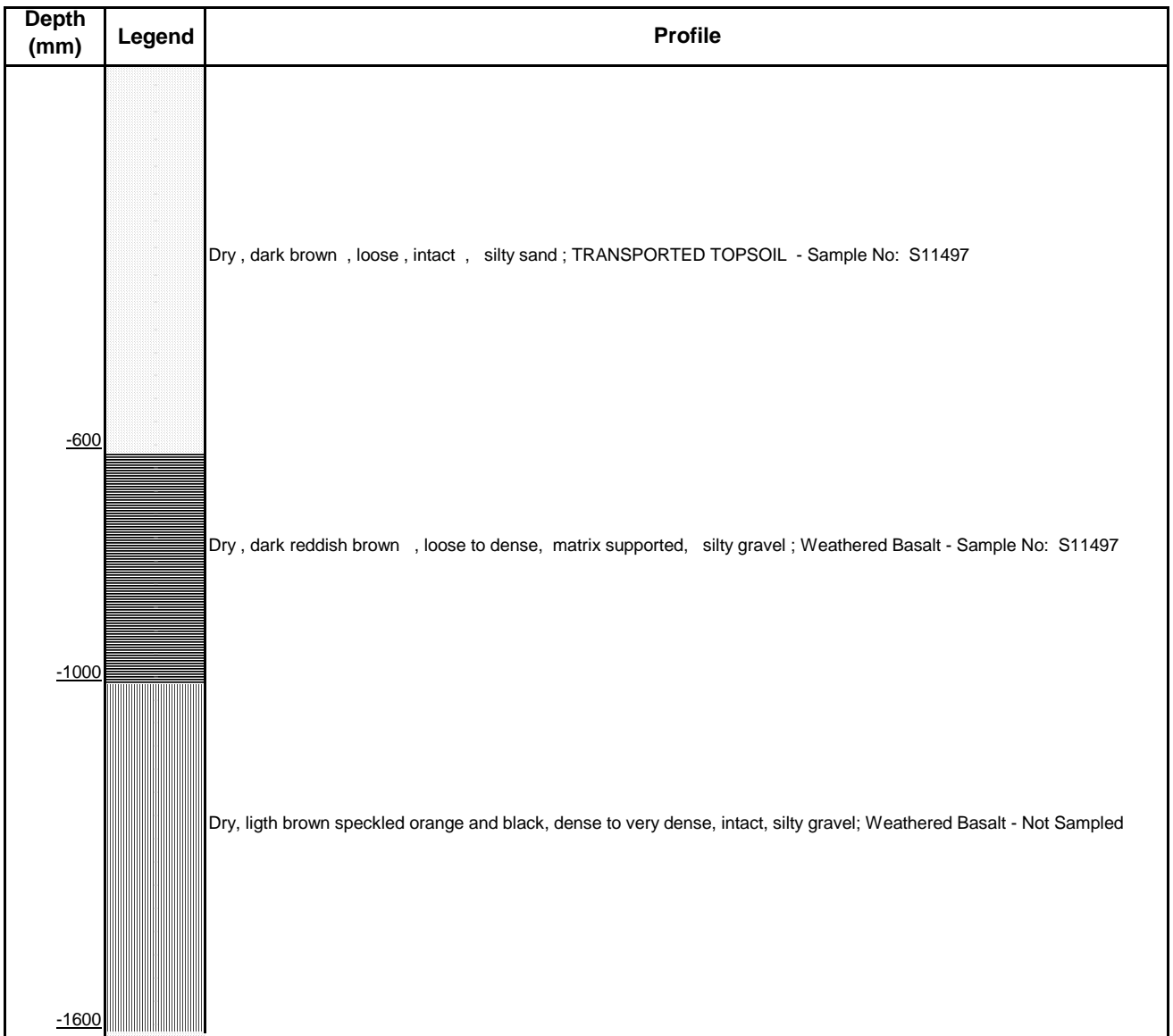
NOTES

EXCAVATED BY
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DATE EXCAVATED
22/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

- 4) S11497 - Disturbed sample: Road Indicator
- 4) Layers 1 - 2 (Mixed)



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Project: New Shangoni Gate - Borrow Pit Investigation
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Date Reported: 09/09/2019

BORROW PIT NO. N10 TEST PIT NO. 4 GPS COORDINATES: 23° 10' 7.64" S 31° 2' 39.98" E
Sheet 2 of 2

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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N11 **TEST PIT NO.** 1 **GPS COORDINATES:** 23° 10' 12.70" S
Sheet 1 of 2 31° 0' 55.80" E

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
22/08/2019

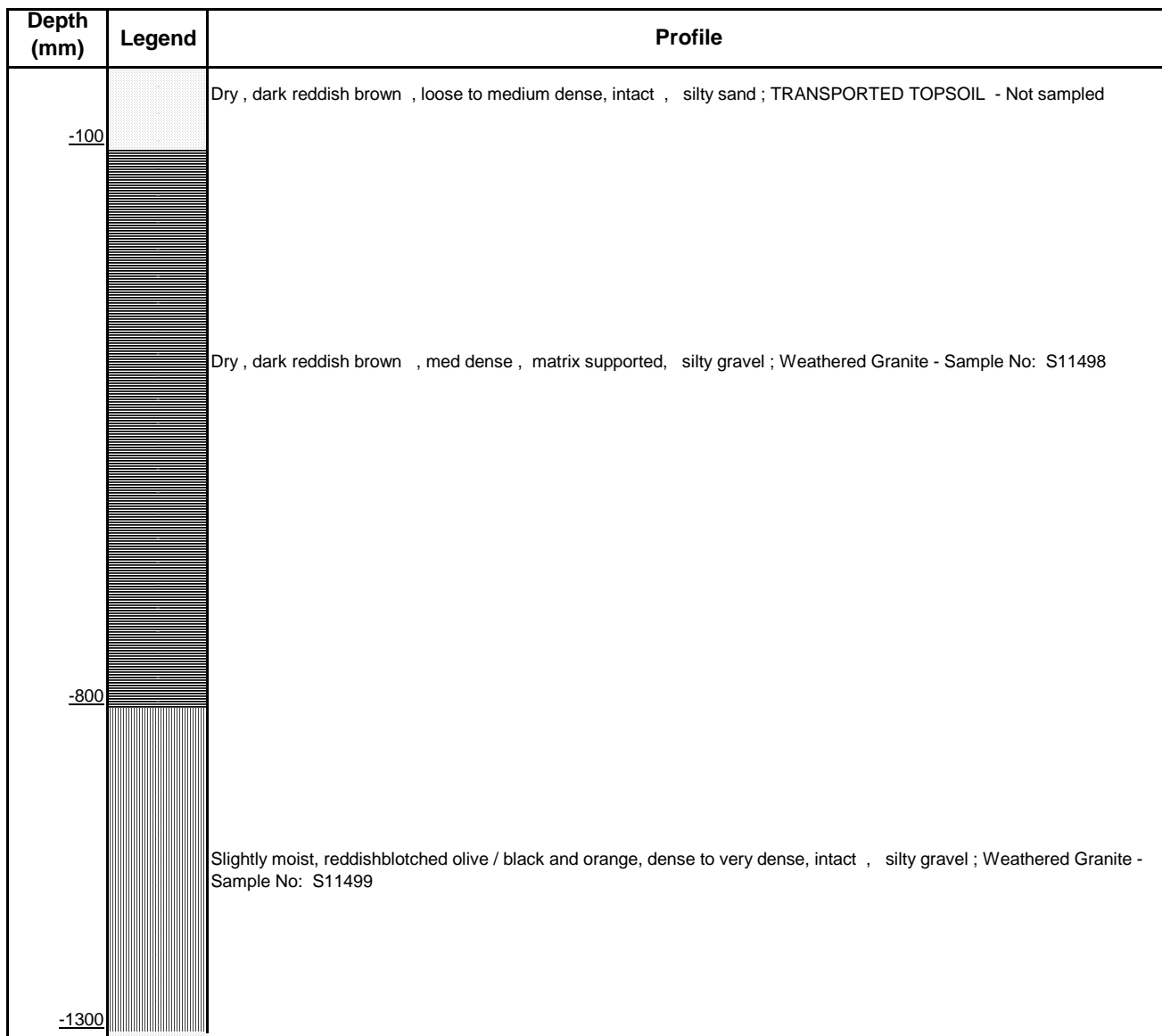
NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
22/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

- 4) S11498 - Disturbed sample: Road Indicator & CBR
- 5) S11499 - Disturbed sample: Road Indicator & CBR

SGS**MATROLAB**

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Kruger Nat park (Skukuza)
 Private Bag X402
 Skukuza
 1350

Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation

Your ref: SK-P0098123

Our ref: 1947

Date Reported: 09/09/2019

BORROW PIT NO.

N11

TEST PIT NO.

1

GPS COORDINATES:

23° 10' 12.70" S

Sheet 2 of 2

31° 0' 55.80" E

PROFILED BY:

G.T. van Rooyen

DATE PROFILED

22/08/2019

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DATE EXCAVATED

22/08/2019





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Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N11 **TEST PIT NO.** 2 **GPS COORDINATES:** 23° 10' 13.30" S
Sheet 1 of 2 31° 0' 57.91" E

PROFILED BY:
G.T. van Rooyen

DATE PROFILED
22/08/2019

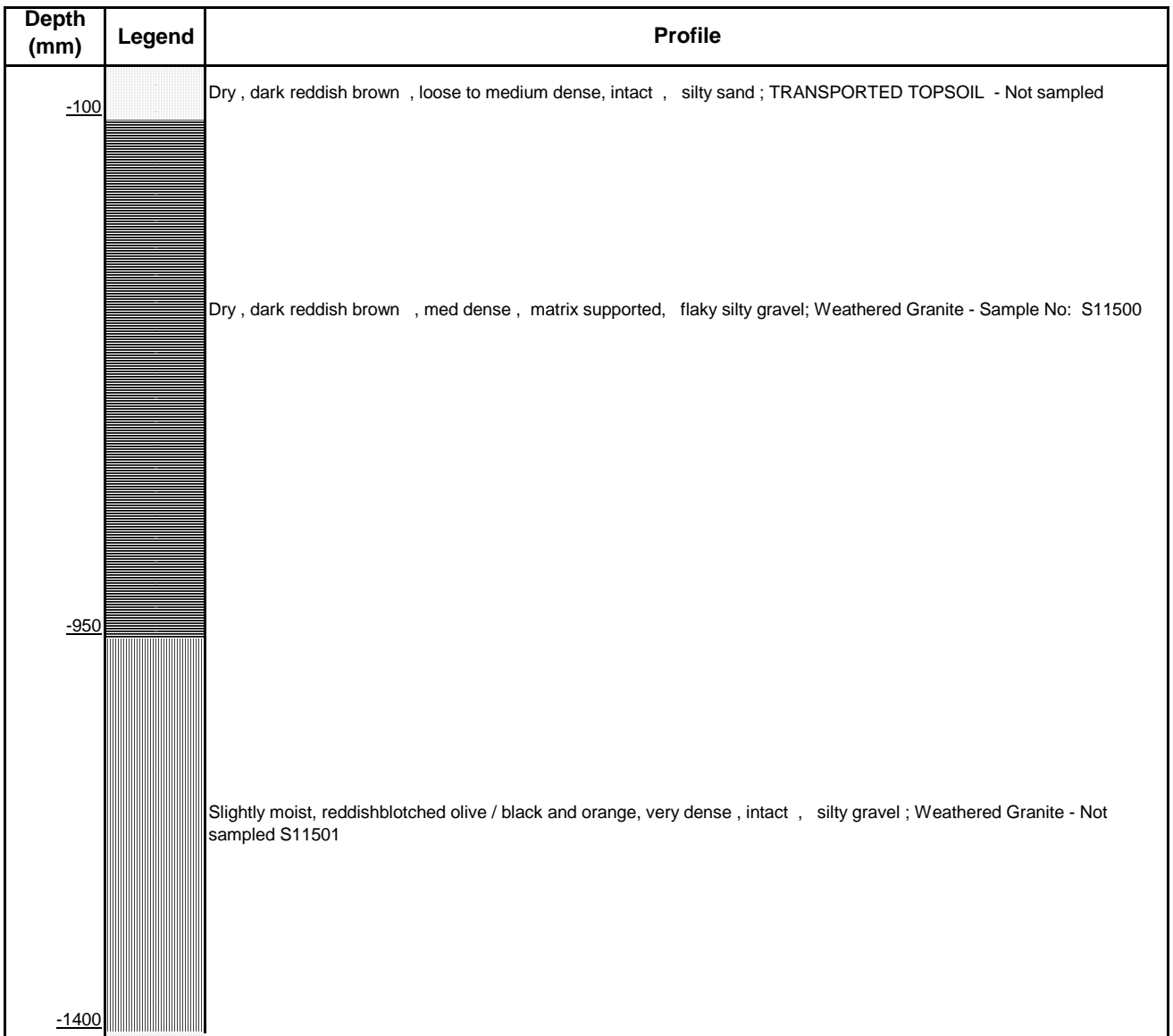
NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
22/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

- 4) S11500 - Disturbed sample: Road Indicator
- 5) S11501 - Disturbed sample: Road Indicator & CBR



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Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N11

TEST PIT NO. 2

GPS COORDINATES: 23° 10' 13.30" S
31° 0' 57.91" E

Sheet 2 of 2

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Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N11 **TEST PIT NO.** 3 **GPS COORDINATES:** 23° 10' 11.10" S
Sheet 1 of 2 31° 0' 56.79" E

PROFILED BY:
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22/08/2019

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- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE

| Depth (mm) | Legend | Profile |
|------------|--------|--|
| -80 | | Dry, dark reddish brown, loose to medium dense, intact, silty sand; TRANSPORTED TOPSOIL - Not sampled |
| | | Dry, dark reddish brown, med dense, matrix supported, silty gravel; Weathered Granite - Not sampled |
| -750 | | Dry, reddishblotched olive / black and orange, very dense, intact, silty gravel; Weathered Granite - Not sampled |
| -1250 | | |

SAMPLING DATA



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Rocky Drift
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BORROW PIT NO. N11

TEST PIT NO. 3

GPS COORDINATES: 23° 10' 11.10" S

31° 0' 56.79" E

Sheet 2 of 2

PROFILED BY:
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Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N12 **TEST PIT NO.** 1 **GPS COORDINATES:** 23° 10' 13.10" S
Sheet 1 of 2 30° 59' 20.19" E

PROFILED BY:
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DATE PROFILED
22/08/2019

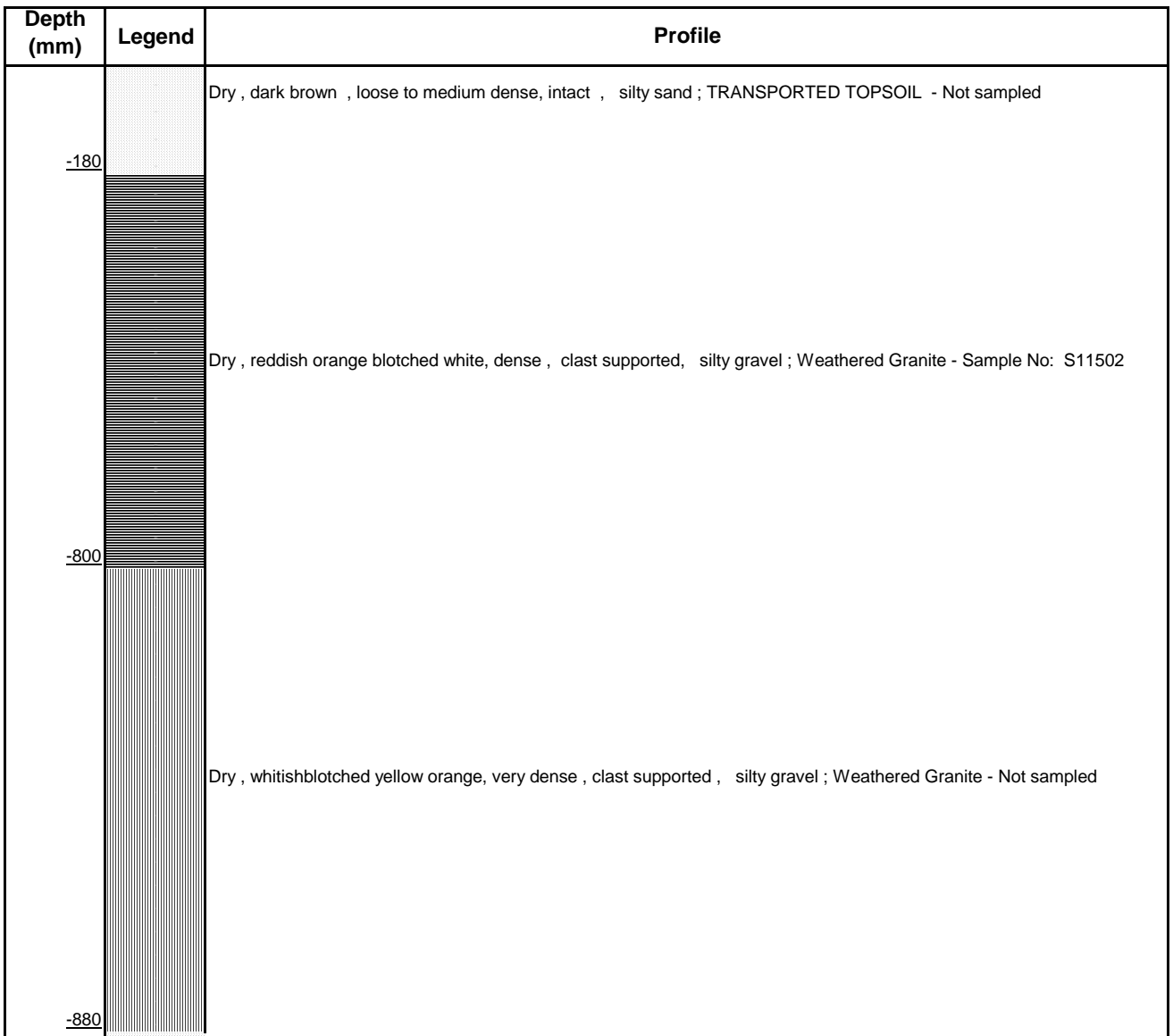
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- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

4) S11502 - Disturbed sample: Stabilization Design



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Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO.

N12

TEST PIT NO.

1

GPS COORDINATES:

23° 10' 13.10" S

30° 59' 20.19" E

Sheet 2 of 2

PROFILED BY:
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Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N12 **TEST PIT NO.** 2 **GPS COORDINATES:** 23° 10' 11.75" S
Sheet 1 of 2 30° 59' 18.48" E

PROFILED BY:
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22/08/2019

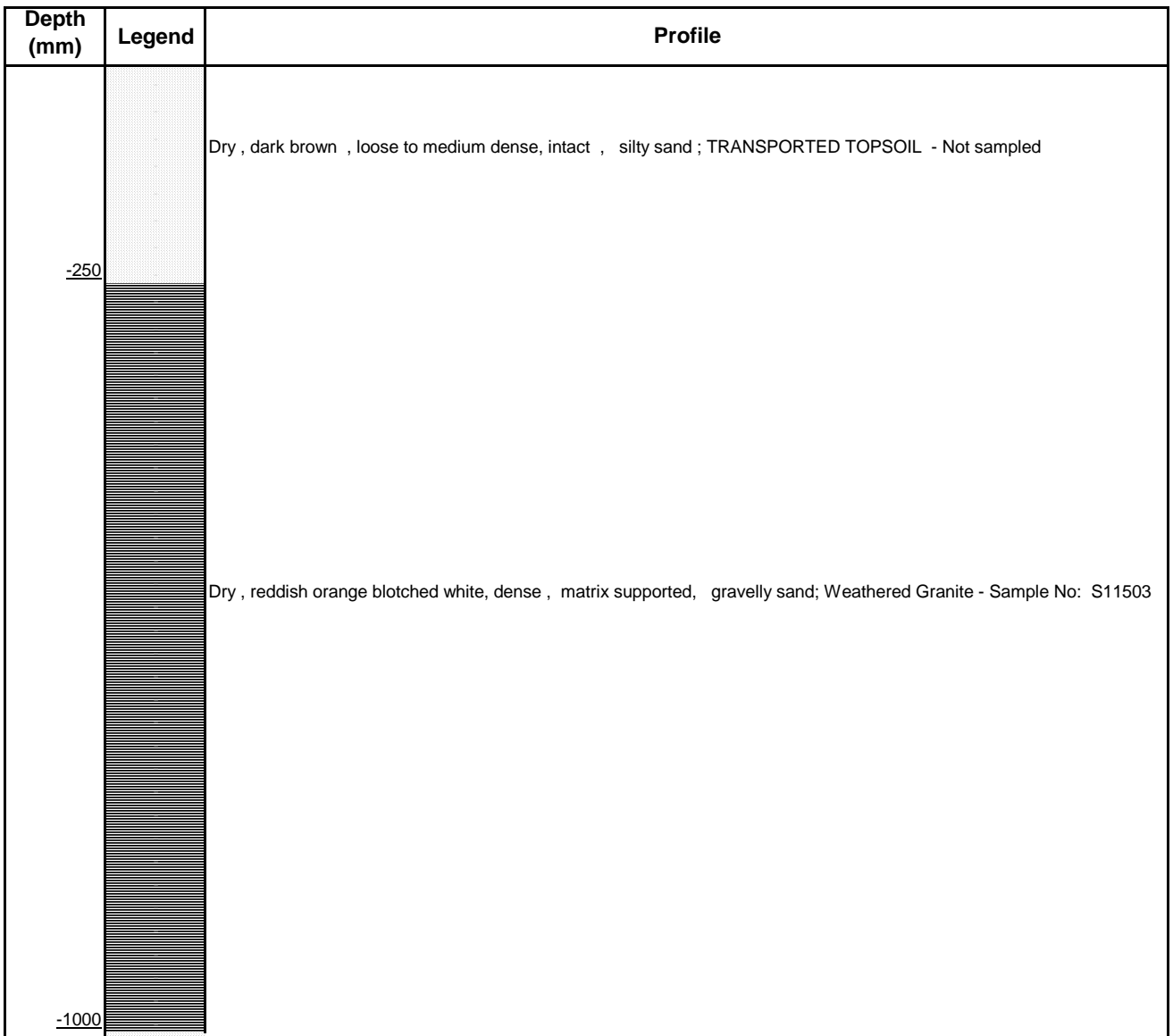
NOTES

EXCAVATED BY
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DATE EXCAVATED
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- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

4) S11503 - Disturbed sample: Road Indicator



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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
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Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N12 TEST PIT NO. 2 GPS COORDINATES: 23° 10' 11.75" S 30° 59' 18.48" E
Sheet 2 of 2

PROFILED BY: G.T.van Rooyen
DATE PROFILED: 22/08/2019

EXCAVATED BY: TLB
DATE EXCAVATED: 22/08/2019





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9B Wilken Street
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Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N12 **TEST PIT NO.** 3 **GPS COORDINATES:** 23° 10' 14.47" S
Sheet 1 of 2 30° 59' 18.20" E

PROFILED BY:
G.T. van Rooyen

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22/08/2019

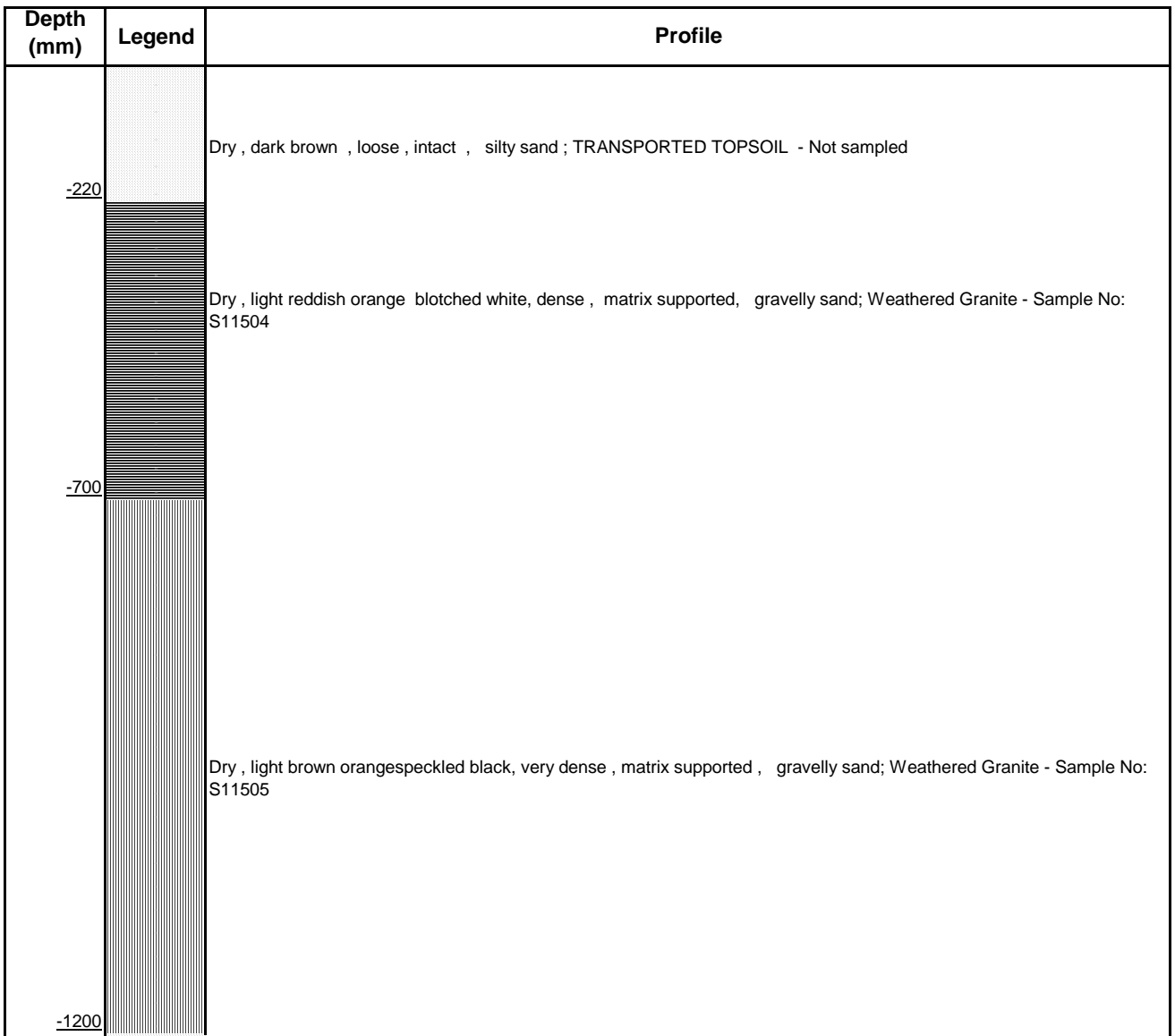
NOTES

EXCAVATED BY
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DATE EXCAVATED
22/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

- 4) S11504 - Disturbed sample: Road Indicator & CBR
- 5) S11505 - Disturbed sample: Road Indicator & CBR



MATROLAB

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Kruger Nat park (Skukuza)
Private Bag X402
Skukuza
1350
Attention: Mr.Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N12

TEST PIT NO. 3

GPS COORDINATES: 23° 10' 14.47" S
30° 59' 18.20" E

Sheet 2 of 2

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
22/08/2019

EXCAVATED BY
TLB

DATE EXCAVATED
22/08/2019





MATROLAB

9B Wilken Street
Rocky Drift
White River
1240
Tel: 013 758 1302

Postnet suite #62
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1200
gerrit.vanrooyen@sgs.com

Kruger Nat park (Skukuza)
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Skukuza
1350
Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N12 **TEST PIT NO.** 4 **GPS COORDINATES:** 23° 10' 14.49" S
Sheet 1 of 2 30° 59' 21.84" E

PROFILED BY:
G.T. van Rooyen

DATE PROFILED
22/08/2019

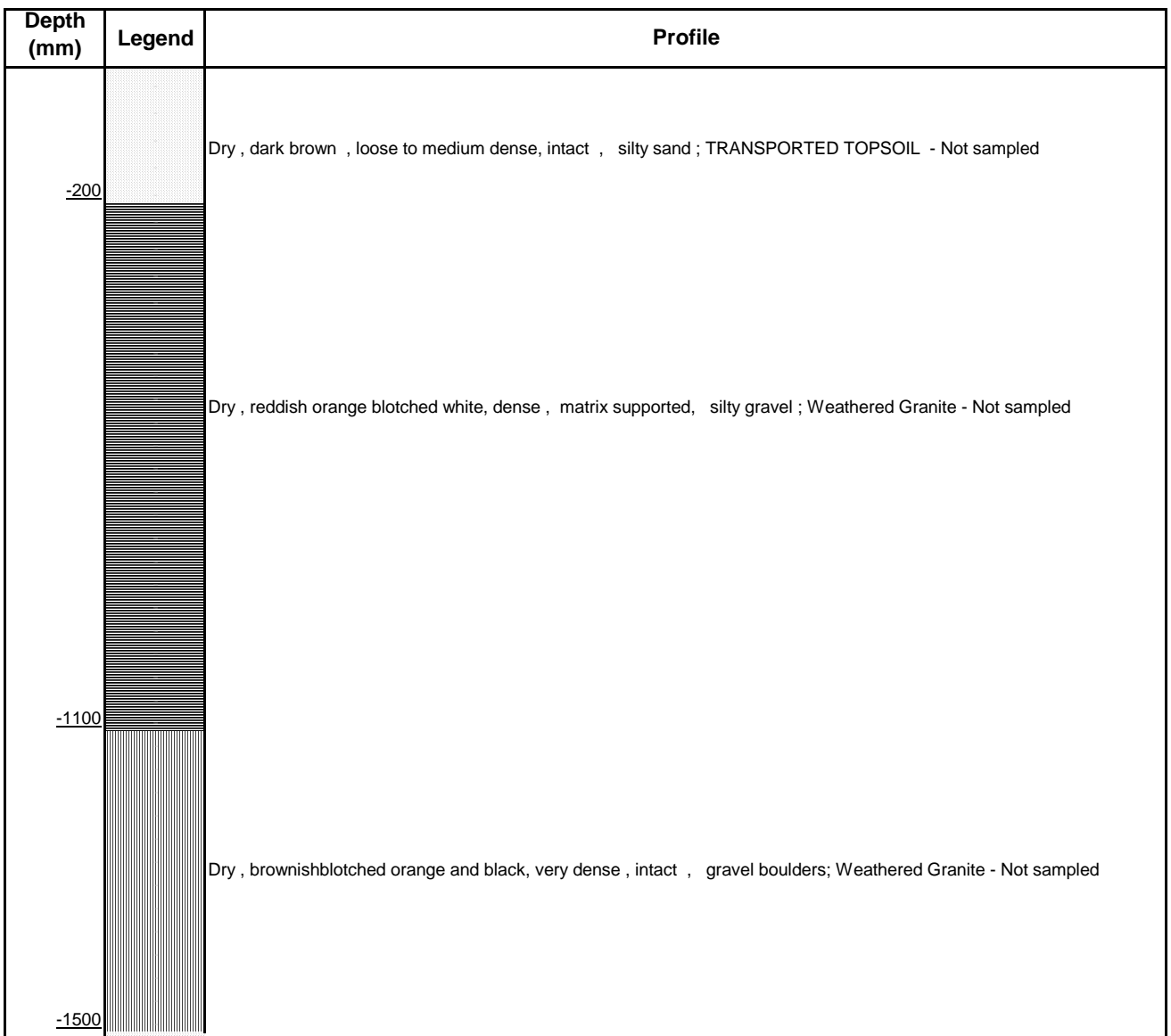
NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
22/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA



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Kruger Nat park (Skukuza)
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Skukuza
1350
Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N12 TEST PIT NO. 4 GPS COORDINATES: 23° 10' 14.49" S 30° 59' 21.84" E
Sheet 2 of 2

PROFILED BY: G.T.van Rooyen
DATE PROFILED: 22/08/2019

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1350
Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N13 **TEST PIT NO.** 1 **GPS COORDINATES:** 23° 10' 8.94" S
Sheet 1 of 2 30° 58' 15.72" E

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
22/08/2019

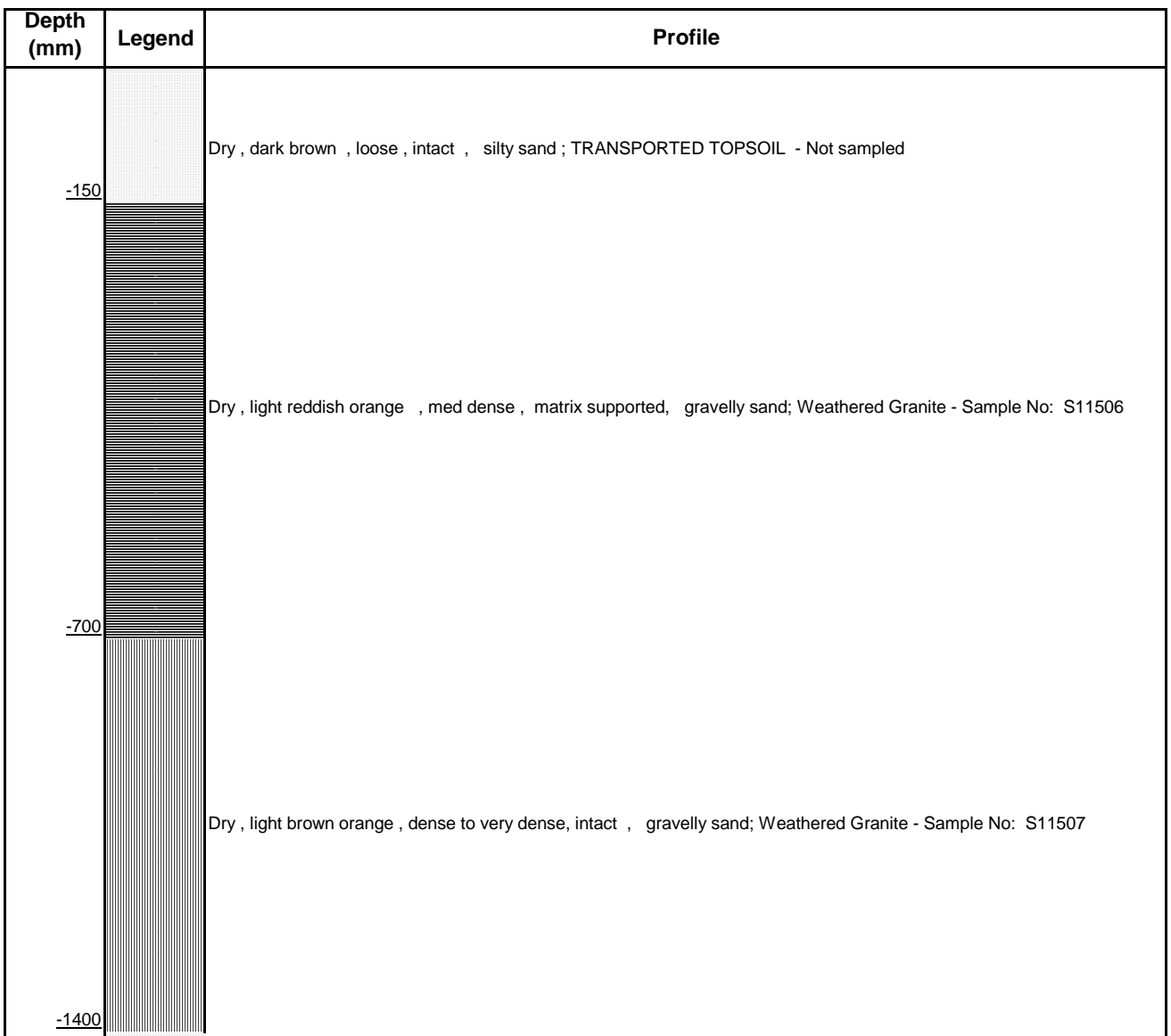
NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
22/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

- 4) S11506 - Disturbed sample: Road Indicator & CBR
- 5) S11507 - Disturbed sample: Road Indicator & CBR



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Private Bag X402
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1350
Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N13 TEST PIT NO. 1 GPS COORDINATES: 23° 10' 8.94" S 30° 58' 15.72" E
Sheet 2 of 2

PROFILED BY: G.T. van Rooyen
DATE PROFILED: 22/08/2019

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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N13 **TEST PIT NO.** 2 **GPS COORDINATES:** 23° 10' 7.66" S
Sheet 1 of 2 30° 58' 18.34" E

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
22/08/2019

NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
22/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE

| Depth (mm) | Legend | Profile |
|------------|--------|--|
| -80 | | Dry, dark brown, loose, intact, silty sand; TRANSPORTED TOPSOIL - Not sampled |
| | | Dry, light reddish orange, med dense, matrix supported, gravelly sand; Weathered Granite - Sample No: S11508 |
| -800 | | Dry, light brown orange, dense to very dense, intact, gravelly sand; Weathered Granite - Sample No: S11509 |
| -1500 | | |

SAMPLING DATA

- 4) S11508 - Disturbed sample: Road Indicator
- 5) S11509 - Disturbed sample: Road Indicator



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Skukuza
1350
Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO.

N13

TEST PIT NO.

2

GPS COORDINATES:

23° 10' 7.66" S

30° 58' 18.34" E

Sheet 2 of 2

PROFILED BY:
G.T. van Rooyen

DATE PROFILED
22/08/2019

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22/08/2019





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1350
Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N13 **TEST PIT NO.** 3 **GPS COORDINATES:** 23° 10' 5.68" S
Sheet 1 of 2 30° 58' 15.54" E

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
22/08/2019

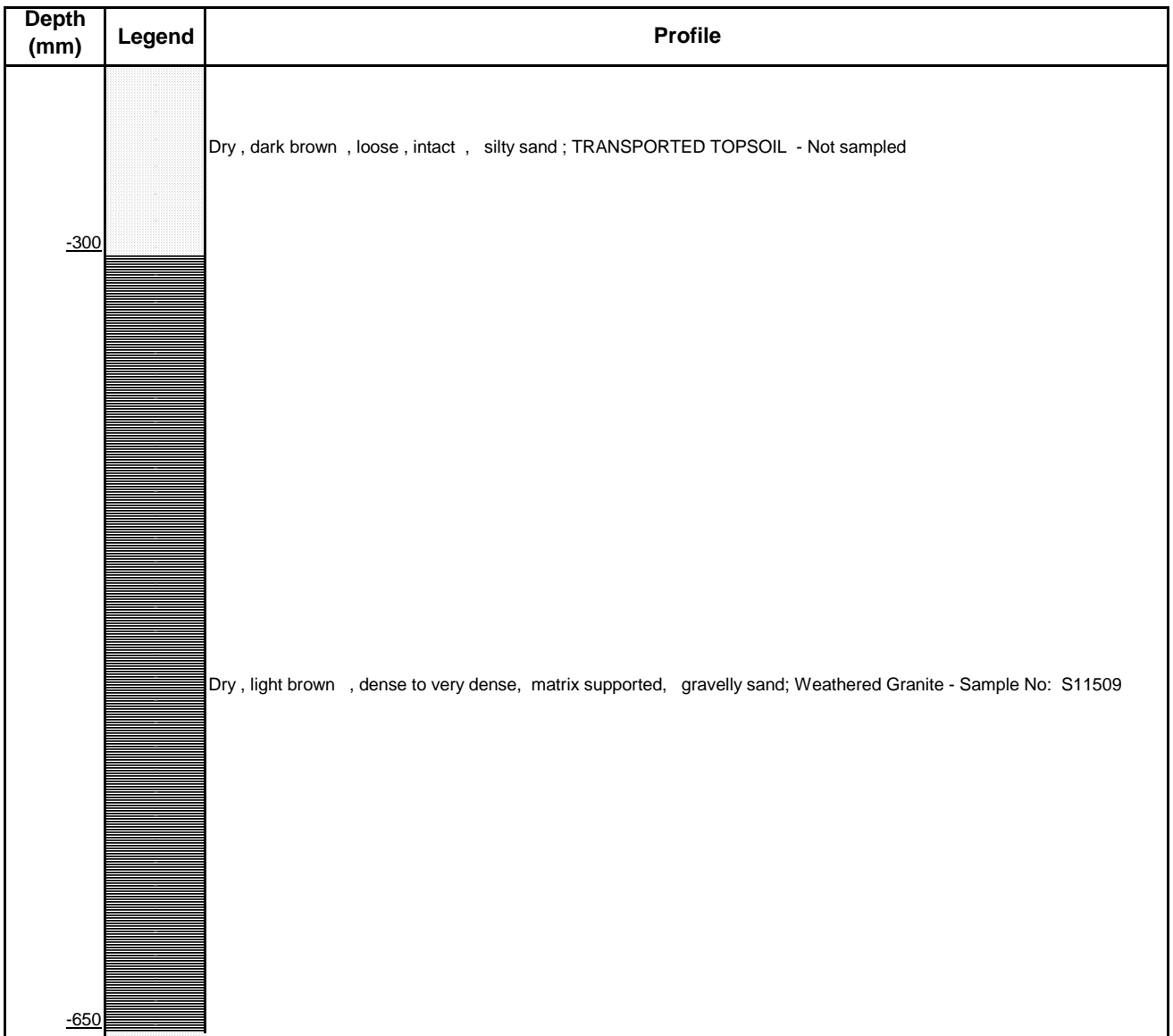
NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
22/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

4) S11509 - Disturbed sample: Road Indicator



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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO.
Sheet 2 of 2

N13

TEST PIT NO. 3

GPS COORDINATES: 23° 10' 5.68" S
30° 58' 15.54" E

PROFILED BY:
G.T. van Rooyen

DATE PROFILED
22/08/2019

EXCAVATED BY
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22/08/2019





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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N14 **TEST PIT NO.** 1 **GPS COORDINATES:** 23° 8' 53.70" S
Sheet 1 of 2 30° 56' 42.54" E

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
21/08/2019

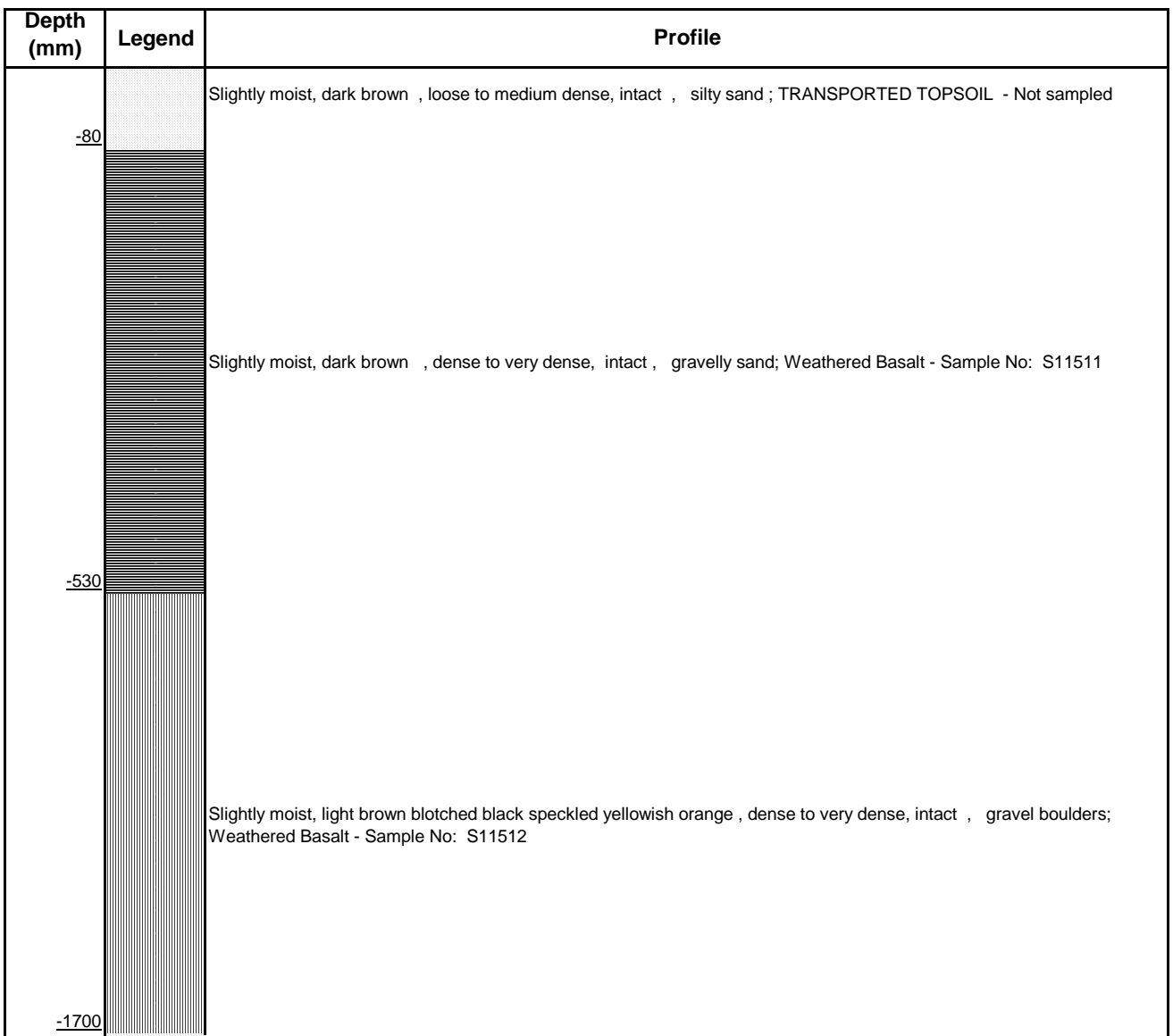
NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
21/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

- 4) S11511 - Disturbed sample: Road Indicator
- 5) S11512 - Disturbed sample: Road Indicator



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Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO.
Sheet 2 of 2

N14

TEST PIT NO. 1

GPS COORDINATES: 23° 8' 53.70" S
30° 56' 42.54" E

PROFILED BY:
G.T. van Rooyen

DATE PROFILED
21/08/2019

EXCAVATED BY
TLB

DATE EXCAVATED
21/08/2019





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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N14 **TEST PIT NO.** 3 **GPS COORDINATES:** 23° 8' 55.50" S
Sheet 1 of 2 30° 56' 44.90" E

PROFILED BY:
G.T. van Rooyen

DATE PROFILED
21/08/2019

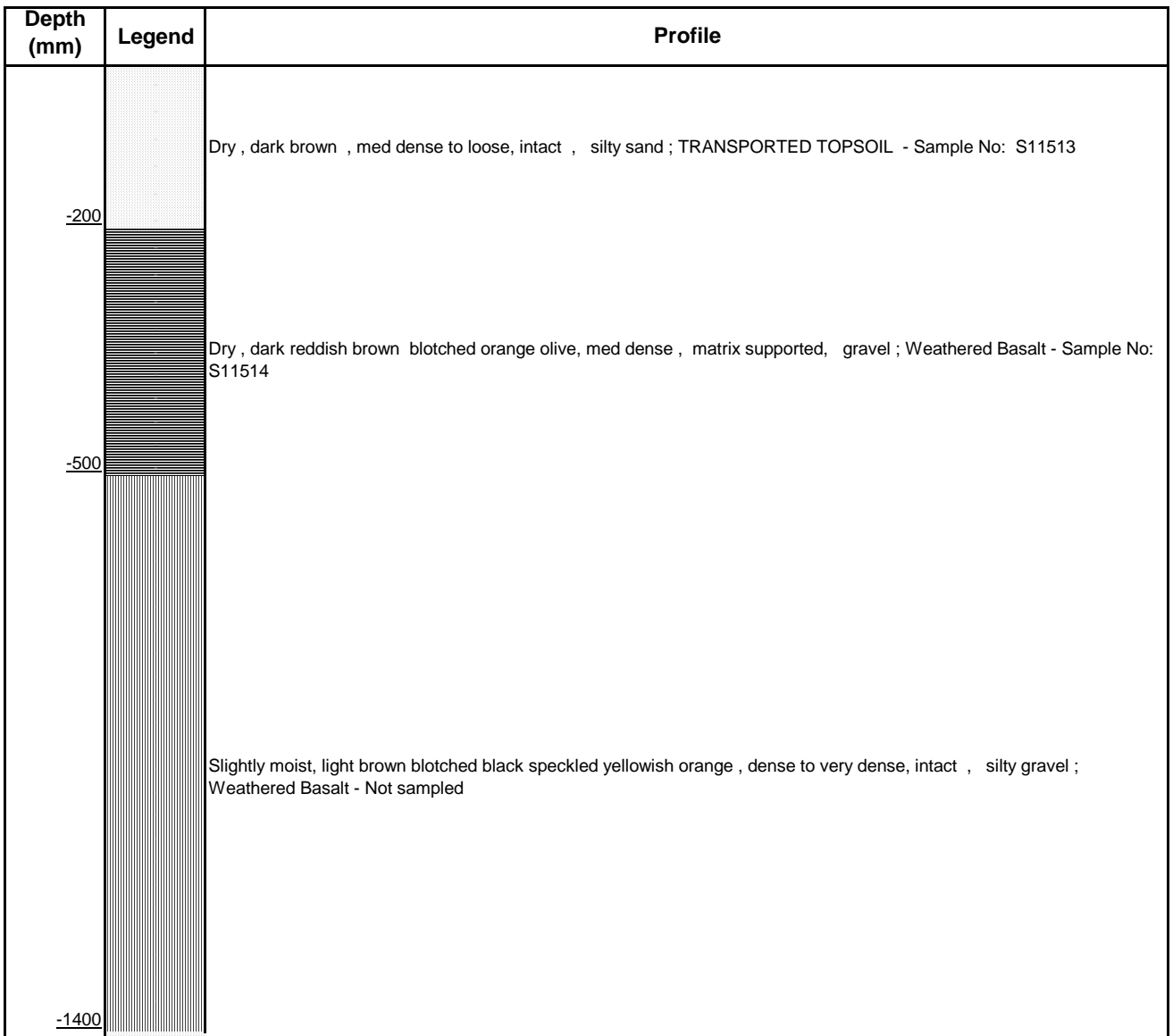
NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
21/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

- 4) S11513 - Disturbed sample: Road Indicator
- 5) S11514 - Disturbed sample: Road Indicator & CBR



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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO.
Sheet 2 of 2

N14

TEST PIT NO. 3

GPS COORDINATES: 23° 8' 55.50" S
30° 56' 44.90" E

PROFILED BY:
G.T. van Rooyen

DATE PROFILED
21/08/2019

EXCAVATED BY
TLB

DATE EXCAVATED
21/08/2019





MATROLAB

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Postnet suite #62
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Kruger Nat park (Skukuza)
Private Bag X402
Skukuza
1350
Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N14 TEST PIT NO. 4 GPS COORDINATES: 23° 8' 54.16" S 30° 56' 46.22" E
Sheet 1 of 2

PROFILED BY:
G.T. van Rooyen

DATE PROFILED
21/08/2019

NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
21/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE

| Depth (mm) | Legend | Profile |
|------------|--------|---|
| | | Dry, dark brown, loose to medium dense, intact, silty sand; TRANSPORTED TOPSOIL - Not sampled |
| -300 | | |
| | | Slightly moist, dark reddish brown, med dense, matrix supported, silty gravel; Weathered Basalt - Sample No: S11515 |
| -800 | | |
| | | Slightly moist, light brown, dense, matrix supported, gravelly sand; Weathered Basalt - Sample No: S11516 |
| -1100 | | |
| | | Slightly moist, olive, dense, intact, gravelly silt; Weathered Basalt - Sample No: S11517 |
| -2050 | | |

SAMPLING DATA

- 4) S11515 - Disturbed sample: Road Indicator
- 5) S11516 - Disturbed sample: Road Indicator
- 6) S11517 - Disturbed sample: Road Indicator



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Kruger Nat park (Skukuza)
Private Bag X402
Skukuza
1350
Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO.

N14

TEST PIT NO.

4

GPS COORDINATES:

23° 8' 54.16" S

Sheet 2 of 2

30° 56' 46.22" E

PROFILED BY:
G.T. van Rooyen

DATE PROFILED
21/08/2019

EXCAVATED BY
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DATE EXCAVATED
21/08/2019





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Kruger Nat park (Skukuza)
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1350
Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO. N14 TEST PIT NO. 5 GPS COORDINATES: 23° 8' 52.35" S 30° 56' 43.49" E
Sheet 1 of 2

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
21/08/2019

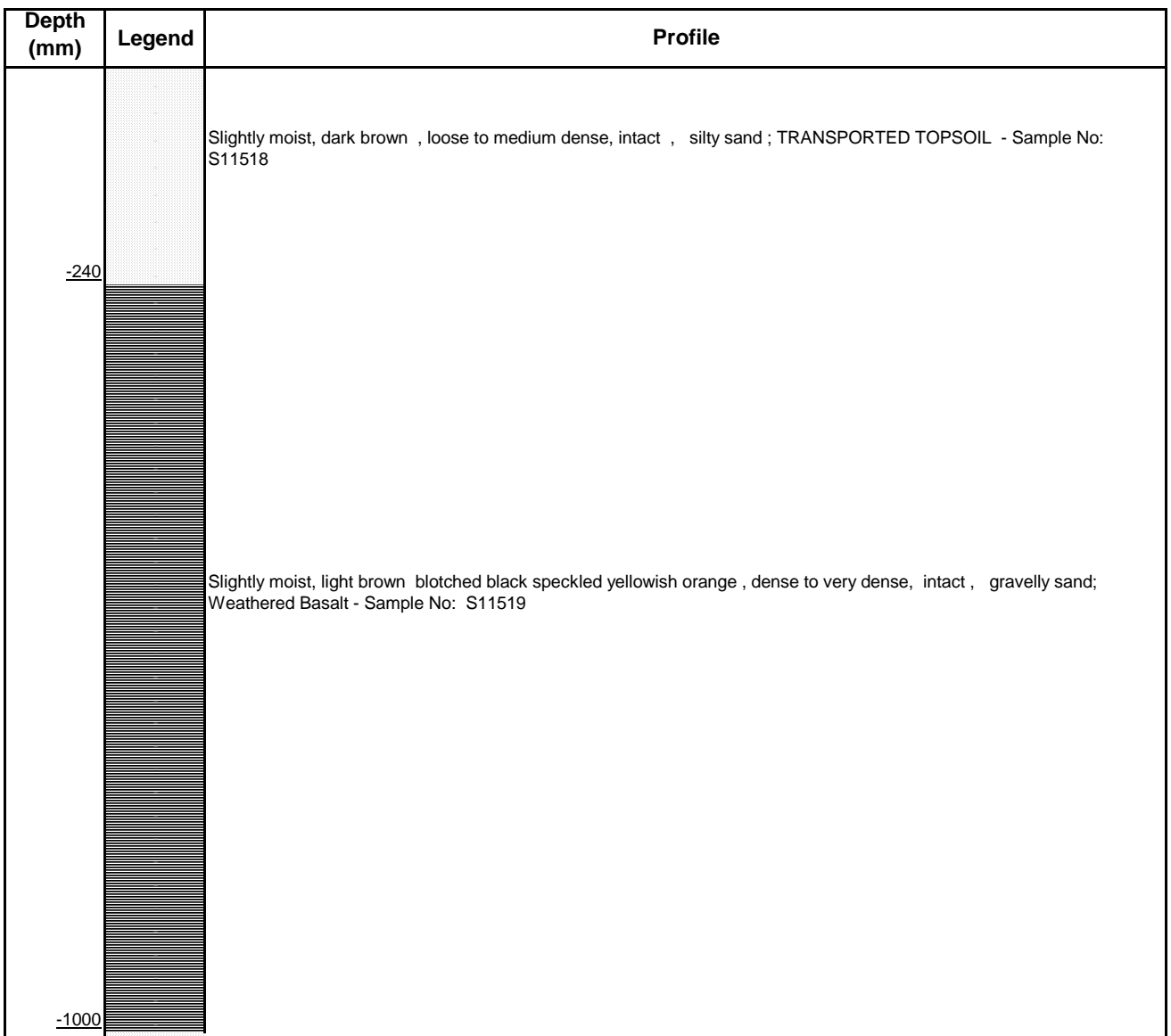
NOTES

EXCAVATED BY
TLB

DATE EXCAVATED
21/08/2019

- 1) Refusal
- 2) No water seepage encountered
- 3) Roots present in horizon

SOIL PROFILE



SAMPLING DATA

- 4) S11518 - Disturbed sample: Road Indicator & CBR
- 4) S11519 - Disturbed sample: Road Indicator & CBR



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Kruger Nat park (Skukuza)
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Skukuza
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Attention: Mr. Ben Momberg

Project: New Shangoni Gate - Borrow Pit Investigation
Your ref: SK-P0098123
Our ref: 1947
Date Reported: 09/09/2019

BORROW PIT NO.

N14

TEST PIT NO.

5

GPS COORDINATES:

23° 8' 52.35" S

30° 56' 43.49" E

Sheet 2 of 2

PROFILED BY:
G.T.van Rooyen

DATE PROFILED
21/08/2019

EXCAVATED BY
TLB

DATE EXCAVATED
21/08/2019



Annexure C

CLIENT : KRUGER NAT PARK (SKUKUZA)
ADDRESS : PRIVATE BAG X402
SKUKUZA
1350
ATTENTION : Mr Ben Momberg

OUR REF.: PL/31440

YOUR REF.: 1947

DATE : 13.09.2019

PROJECT : New Shangoni Gate

SGS MATROLAB

a SANAS Accredited Testing Laboratory, No. T0025

Tests marked * "Not SANAS Accredited" in this Report are not included in the
SANAS Schedule of Accreditation for the laboratory.

TEST REPORT / RESULTS

Sample/s: Sampled by : Client
Date Received / Sampled : 11.09.2019
Date Tested : 11-13.09.2019

Sampling method : By Client

Section / Position tested identified by : Client - Refer to Test Results

Number of pages in this Report : 6

General : Samples were delivered to Laboratory by client.

Opinions and interpretations expressed herein are outside the Scope of SANAS Accreditation.
Results only have bearing on the samples tested.
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256 Brander street, Jan Niemand Park, Pretoria.
 P.O. BOX 912387 SILVERTON 0127
 Tel. : 012-800 1299
 Fax. : 012-800 3034
 Email : lizette.brelting@sgs.com

TEST RESULTS

CLIENT: KRUGER NAT PARK (SKUKUZA)
 ADDRESS: PRIVATE BAG X402
 SKUKUZA
 1350
 Attention: Mr Ben Momberg

Project: New Shangoni Gate
 Your Ref: 1947
 Our Ref: PL/31440
 Date Reported: 13.09.2019

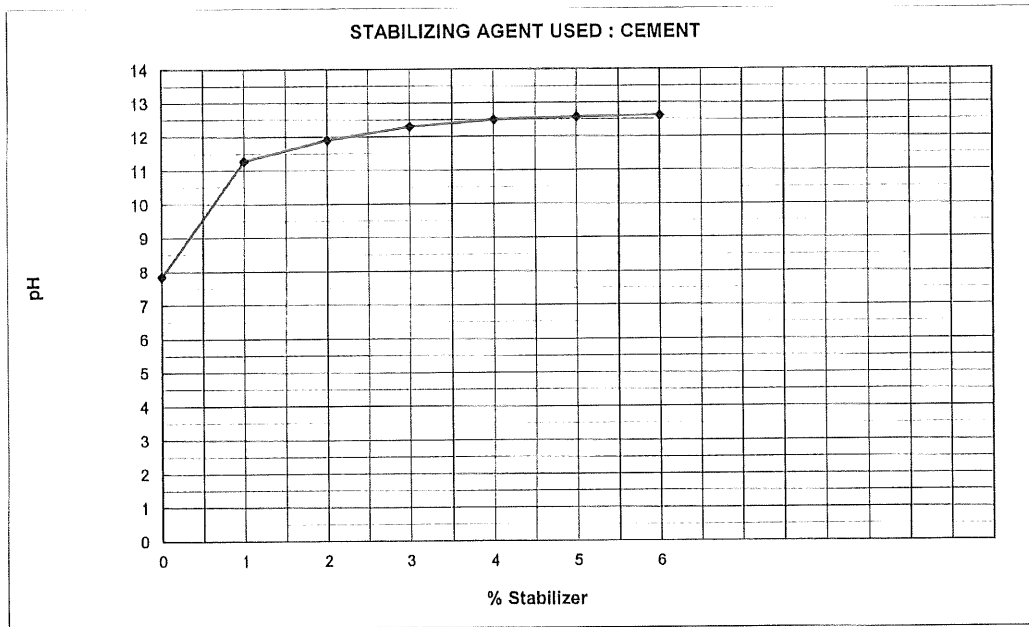
INITIAL CEMENT DEMAND

TEST METHOD: SANS 3001 - GR57:2014

Sample Number: A9/2731 (11427)

Description: Dark reddish brown,RHS,Hole 2 Layer 2 (300-1050)

| % Stabilizer | pH |
|--------------|-------|
| 0 | 7.86 |
| 1 | 11.28 |
| 2 | 11.90 |
| 3 | 12.30 |
| 4 | 12.51 |
| 5 | 12.58 |
| 6 | 12.63 |



REMARKS: After 1 Hour

Recommended Cement Demand: 3.0%

pH of Cement: 13.14
 Temp: 24.6°C
 Supplier: CLIENT
 Cement type: Lafarge Cen IV B-V 32.5N

Lizette Brelting
 for SGS Matrolab (Pty) Ltd. Technical Signatory: Lizette Brelting

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 Email : lizette.breiting@sgs.com

TEST RESULTS

CLIENT: KRUGER NAT PARK (SKUKUZA)
 ADDRESS: PRIVATE BAG X402
 SKUKUZA
 1350
 Attention: Mr Ben Momberg

Project: New Shangoni Gate
 Your Ref: 1947
 Our Ref: PL/31440a
 Date Reported: 13.09.2019

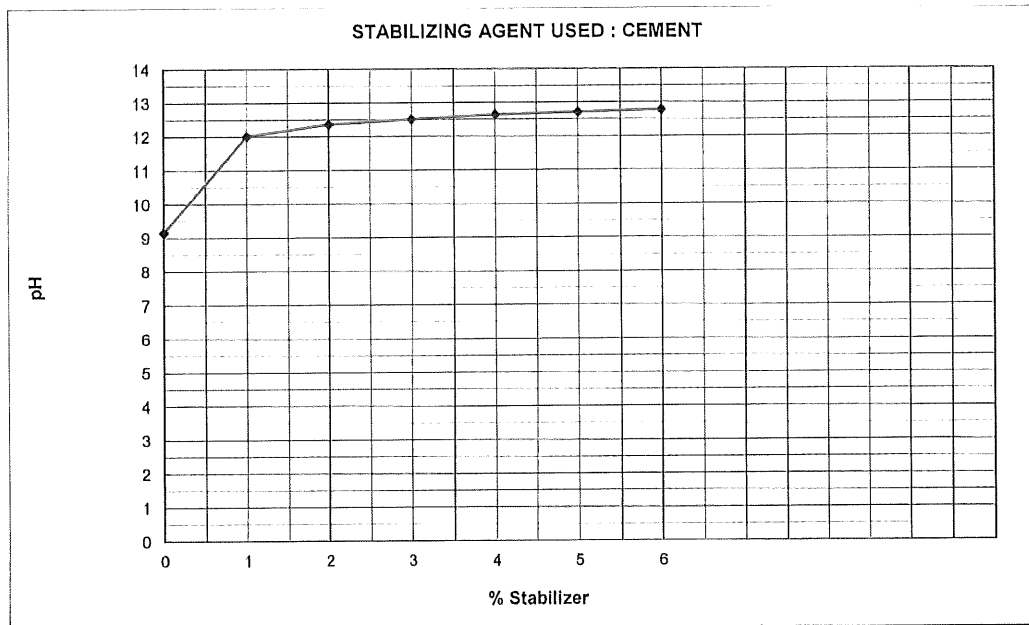
INITIAL CEMENT DEMAND

TEST METHOD: SANS 3001 - GR57:2014

Sample Number: A9/2732 (11472)

Description: Light brown,BP 3N,Hole 2 Layer 2 (650-1650)

| % Stabilizer | pH |
|--------------|-------|
| 0 | 9.17 |
| 1 | 12.02 |
| 2 | 12.37 |
| 3 | 12.52 |
| 4 | 12.65 |
| 5 | 12.72 |
| 6 | 12.79 |



REMARKS: After 1 Hour

Recommended Cement Demand: 2.0%

pH of Cement: 13.14
 Temp: 24.6°C
 Supplier : CLIENT
 Cement type: Lafarge Cen IV B-V 32.5N

Lizette Breiting
 for SGS Matrolab (Pty) Ltd. Technical Signatory: Lizette Breiting

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 Fax. : 012-800 3034
 Email : lizette.breiting@sgs.com

TEST RESULTS

CLIENT: KRUGER NAT PARK (SKUKUZA)
 ADDRESS: PRIVATE BAG X402
 SKUKUZA
 1350
 Attention: Mr Ben Momberg

Project: New Shangoni Gate
 Your Ref: 1947
 Our Ref: PL/31440b
 Date Reported: 13.09.2019

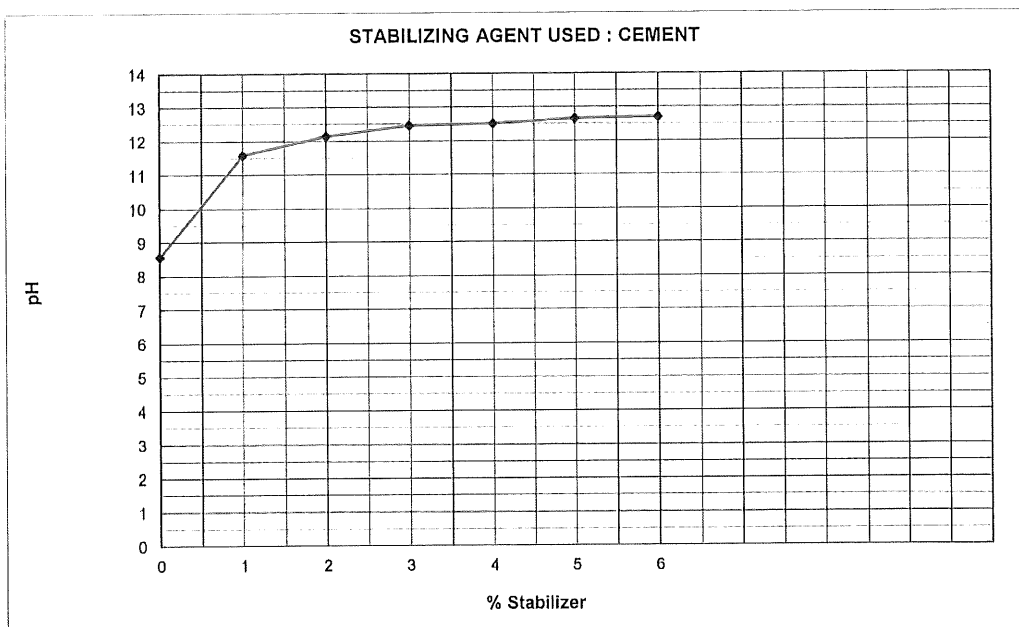
INITIAL CEMENT DEMAND

TEST METHOD: SANS 3001 - GR57:2014

Sample Number: A9/2733 (11477)

Description: Dark brown,BP 6N,Hole 1 Layer 2 & 6 (100-1100)

| % Stabilizer | pH |
|--------------|-------|
| 0 | 8.58 |
| 1 | 11.59 |
| 2 | 12.15 |
| 3 | 12.47 |
| 4 | 12.52 |
| 5 | 12.67 |
| 6 | 12.71 |



REMARKS: After 1 Hour

Recommended Cement Demand: 2.0%

pH of Cement: 13.14
 Temp: 24.6°C
 Supplier : CLIENT
 Cement type: Larfarge Cen IV B-V 32.5N

for SGS Matrolab (Pty) Ltd. Technical Signatory: Lizette Breiting

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 Reg No.: 2003/029180/07 - VAT Reg No.: 4040210587

256 Brander street, Jan Nlemand Park, Pretoria.
 P.O. BOX 912387 SILVERTON 0127
 Tel. : 012-800 1299
 Fax. : 012-800 3034
 Email : lizette.breiting@sgs.com

TEST RESULTS

CLIENT: KRUGER NAT PARK (SKUKUZA)
 ADDRESS: PRIVATE BAG X402
 SKUKUZA
 1350
 Attention: Mr Ben Momberg

Project: New Shangoni Gate
 Your Ref: 1947
 Our Ref: PL/31440c
 Date Reported: 13.09.2019

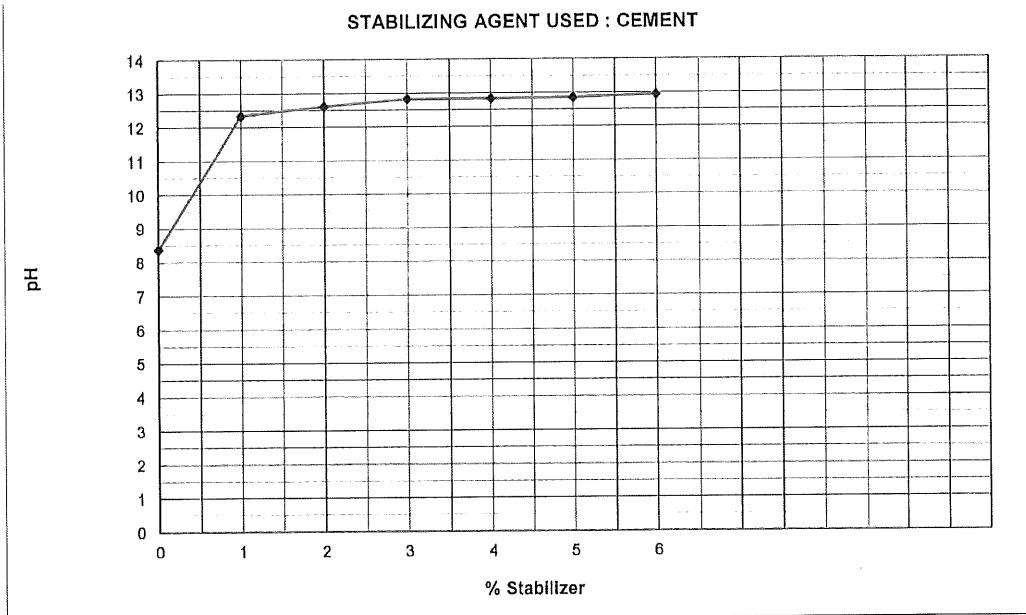
INITIAL CEMENT DEMAND

TEST METHOD: SANS 3001 - GR57:2014

Sample Number: A9/2734 (11485)

Description: Dark reddish brown,BP 8N,Hole 1 Layer 2 (200-800)

| % Stabilizer | pH |
|--------------|-------|
| 0 | 8.39 |
| 1 | 12.35 |
| 2 | 12.62 |
| 3 | 12.83 |
| 4 | 12.84 |
| 5 | 12.86 |
| 6 | 12.95 |



REMARKS: After 1 Hour

Recommended Cement Demand: 2.0%

pH of Cement: 13.14
 Temp: 24.6°C
 Supplier : CLIENT
 Cement type: Larfarge Cen IV B-V 32.5N

Lizette Breiting
 for SGS Matrolab (Pty) Ltd. Technical Signatory: Lizette Breiting

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MATROLAB



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 P.O. BOX 912387 SILVERTON 0127
 Tel. : 012-800 1299
 Fax. : 012-800 3034
 Email : lizette.brelting@sgs.com

TEST RESULTS

CLIENT: KRUGER NAT PARK (SKUKUZA)
 ADDRESS: PRIVATE BAG X402
 SKUKUZA
 1350
 Attention: Mr Ben Momberg

Project: New Shangoni Gate
 Your Ref: 1947
 Our Ref: PL/31440d
 Date Reported: 13.09.2019

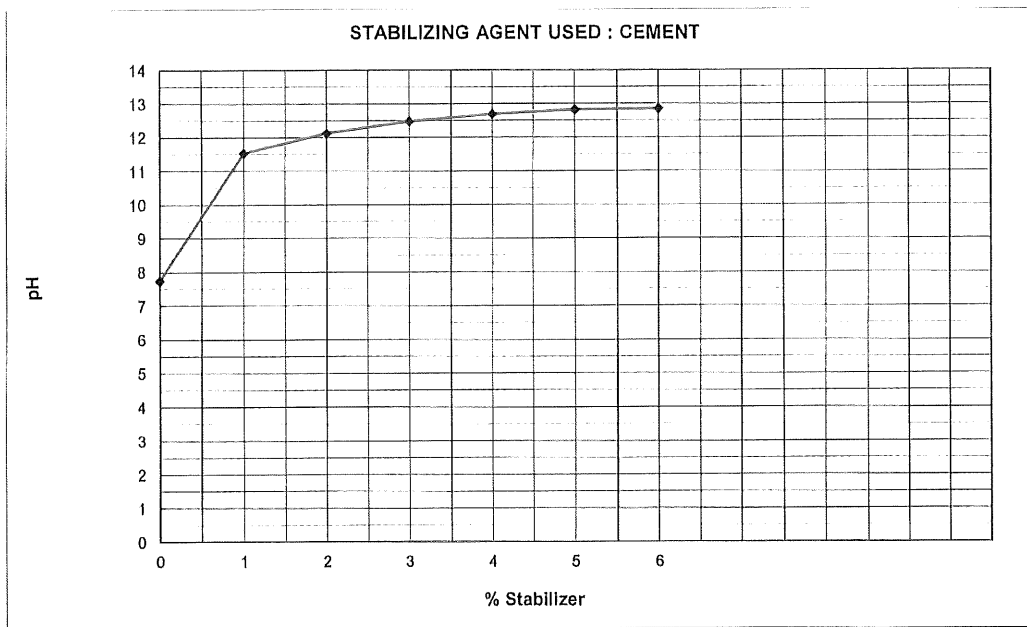
INITIAL CEMENT DEMAND

TEST METHOD: SANS 3001 - GR57:2014

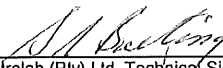
Sample Number: A9/2735 (11495)

Description: Dark reddish brown,BP 10N,Hole 2 Layer 1-3 (0-1300)

| % Stabilizer | pH |
|--------------|-------|
| 0 | 7.75 |
| 1 | 11.54 |
| 2 | 12.13 |
| 3 | 12.49 |
| 4 | 12.70 |
| 5 | 12.83 |
| 6 | 12.86 |



REMARKS: After 1 Hour
 Recommended Cement Demand: 2.0%
 pH of Cement: 13.14
 Temp: 24.6°C
 Supplier : CLIENT
 Cement type: Larfarge Cen IV B-V 32.5N


 for SGS Matrolab (Pty) Ltd. Technical Signatory: Lizette Breiting

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MATROLAB



SGS MATROLAB (PTY) LTD
- CIVIL ENGINEERING SERVICES -
Reg No.: 2003/029180/07 - VAT Reg No.: 4040210587

256 Brander street, Jan Niemand Park, Pretoria.
P.O. BOX 912387 SILVERTON 0127
Tel. : 012-800 1299
Fax. : 012-800 3034
Email : lizette.breiting@sgs.com

TEST RESULTS

CLIENT: KRUGER NAT PARK (SKUKUZA)
ADDRESS: PRIVATE BAG X402
SKUKUZA
1350
Attention: Mr Ben Momberg

Project: New Shangoni Gate
Your Ref: 1947
Our Ref: PL/31440e
Date Reported: 13.09.2019

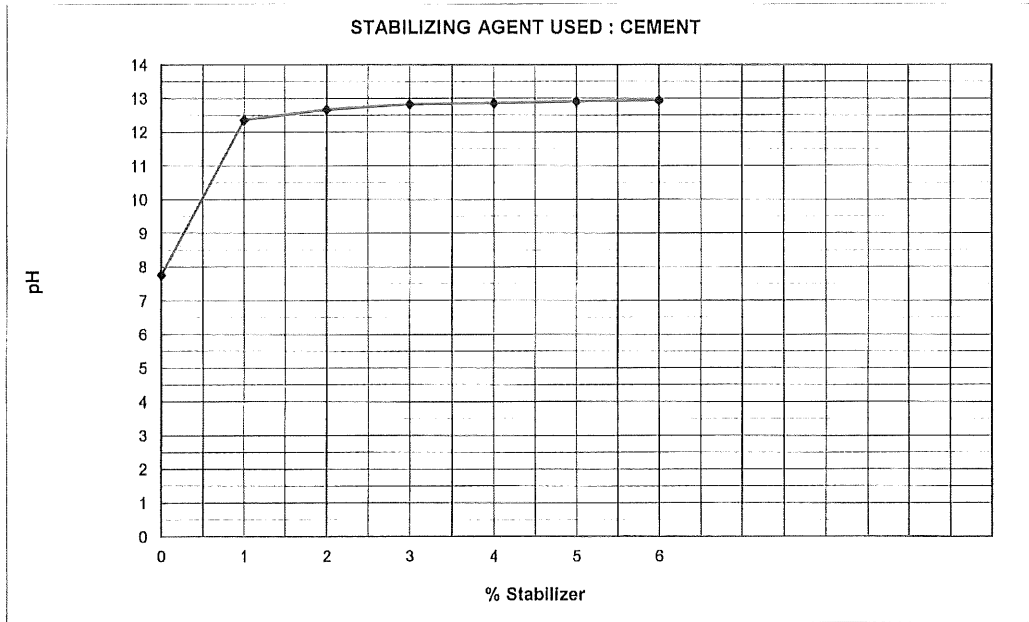
INITIAL CEMENT DEMAND

TEST METHOD: SANS 3001 - GR57:2014

Sample Number: A9/2736 (11502)

Description: Dark reddish orange,BP 12N,Hole 1 Layer 2 (180-800)

| % Stabilizer | pH |
|--------------|-------|
| 0 | 7.77 |
| 1 | 12.36 |
| 2 | 12.67 |
| 3 | 12.83 |
| 4 | 12.86 |
| 5 | 12.91 |
| 6 | 12.95 |



REMARKS: After 1 Hour

Recommended Cement Demand: 2.0%

pH of Cement: 13.14
Temp: 24.6°C
Supplier : CLIENT
Cement type: Larfarge Cen IV B-V 32.5N

for SGS Matrolab (Pty) Ltd. Technical Signatory: Lizette Breiting

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Ga
: Road Centre Line Soil Investigation
Your Ref : SK-PO098123
Our Ref : 1947/B/H
Date Reported : 16/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12,GR30,GR40)

| SAMPLE NO. | S11496 | S11497 | S11498 | S11499 |
|-----------------|------------------|----------------------|---------------------------|--------------------|
| HOLE NO. | 2 | 4 | 1 | 1 |
| ROAD NO. | - | - | - | - |
| DEPTH | 1300-1800 | 0-1000 | 100-800 | 800-1300 |
| CHAINAGE | BP 10 N | BP 10 N | BP 11 N | BP 11 N |
| LAYER TYPE | LAYER 4 | LAYER 1-2 | LAYER 2 | LAYER 3 |
| STABILISED WITH | - | - | NEAT | NEAT |
| SUPPLIER | - | - | - | - |
| CURING METHOD | - | - | - | - |
| DESCRIPTION | LIGHT BROWN SAND | REDDISH BROWN GRAVEL | DARK REDDISH BROWN GRAVEL | REDDISH OLIVE SAND |

SIEVE ANALYSIS (% PASSING)

| | | | | |
|----------|-----|-----|-----|-----|
| 100 mm | 100 | | | |
| 75 mm | 94 | 100 | | |
| 63 mm | 94 | 95 | 100 | |
| 50 mm | 91 | 93 | 90 | 100 |
| 37.5 mm | 83 | 88 | 82 | 92 |
| 28.0 mm | 81 | 81 | 72 | 88 |
| 20.0 mm | 74 | 74 | 65 | 84 |
| 14.0 mm | 73 | 66 | 55 | 74 |
| 5.0 mm | 68 | 52 | 41 | 57 |
| 2.0 mm | 64 | 46 | 37 | 45 |
| 0.425 mm | 49 | 37 | 28 | 24 |
| 0.075 mm | 8 | 13 | 16 | 11 |

SOIL MORTAR

| | | | | |
|-----------------------------|----|----|----|----|
| COARSE SAND <2.0mm >0.425mm | 23 | 20 | 24 | 47 |
| FINE SAND <0.425mm >0.075mm | 64 | 52 | 32 | 29 |
| MATERIAL <0.075mm | 13 | 28 | 44 | 24 |

CONSTANTS

| | | | | |
|----------------------------|----------|----------|----------|----------|
| GRADING MODULUS | 1.79 | 2.04 | 2.19 | 2.20 |
| PRA CLASSIFICATION | A-1-b(0) | A-2-4(0) | A-2-4(0) | A-2-4(0) |
| UNIFIED SOIL CLAS. | SP-SC | SC | GC | SP-SM-SC |
| COLTO CLASSIFICATION | | | G6 | G6 |
| TRH CLASSIFICATION | | | G7 | G6 |
| LIQUID LIMIT (%) | - | 25 | 24 | 23 |
| PLASTICITY INDEX (0.425mm) | NP | 7 | 9 | 7 |
| LINEAR SHRINKAGE (%) | 0.0 | 3.5 | 4.0 | 3.5 |

MOD AASHTO

| | | | | |
|--|--|--|------|------|
| MAXIMUM DRY DENSITY (kg/m ³) | | | 2195 | 2320 |
| OPTIMUM MOISTURE CONTENT(%) | | | 7.4 | 8.5 |
| MOULDING MOISTURE (%) | | | 7.7 | 8.3 |

| TYPE OF TEST | | | CBR | CBR |
|---------------------------|--|--|-----|-----|
| CBR-UCS @ 100% MOD AASHTO | | | 59 | 51 |
| CBR-UCS @ 98% MOD AASHTO | | | 45 | 44 |
| CBR-UCS @ 97% MOD AASHTO | | | 39 | 40 |
| CBR-UCS @ 95% MOD AASHTO | | | 29 | 34 |
| CBR-UCS @ 93% MOD AASHTO | | | 22 | 29 |
| CBR-UCS @ 90% MOD AASHTO | | | 14 | 23 |

CBR-UCS @ % MOD AASHTO derived from calculation.

| | | | | | | | | | | | |
|-----------------------------|--|--|--|--|--|------|------|------|------|------|------|
| % SWELL AT [MOD][NRB][PROC] | | | | | | 0.01 | 0.02 | 0.06 | 0.02 | 0.04 | 0.06 |
|-----------------------------|--|--|--|--|--|------|------|------|------|------|------|

Remarks :

FORM: A1

TEST RESULTS

| | |
|--|---|
| Kruger National Park Private Bag X 402 Skukuza 1350 Attention: Ben Momberg | Project : Geotechnical Survey Along Proposed New Shangoni Gate : Road Centre Line Soil Investigation Your Ref : SK-PO098123 Our Ref : 1947/M/A Date Reported : 16/09/2019 |
|--|---|

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12,GR30,GR40)

| SAMPLE NO. | S11424 | S11425 | S11426 |
|-----------------|--------------------------|----------------------------------|-----------------------------|
| HOLE NO. | 1 | 1 | 2 |
| ROAD NO. | - | - | - |
| DEPTH | 0-200 | 200-750 | 0-300 |
| CHAINAGE | RHS & Shoulder | RHS & Shoulder | RHS |
| LAYER TYPE | Layer 1 | Layer 2 | Layer 1 |
| STABILISED WITH | - | Neat | Neat |
| SUPPLIER | - | - | - |
| CURING METHOD | - | - | - |
| DESCRIPTION | Dark Brown Gravelly Sand | Dark Reddish Brown Gravelly Sand | Greyish Brown Gravelly Sand |

SIEVE ANALYSIS (% PASSING)

| Sieve Size | S11424 | S11425 | S11426 |
|------------|--------|--------|--------|
| 100 mm | | 100 | 100 |
| 75 mm | | 99 | 99 |
| 63 mm | | 97 | 99 |
| 50 mm | 100 | 91 | 97 |
| 37.5 mm | 97 | 82 | 96 |
| 28.0 mm | 96 | 53 | 91 |
| 20.0 mm | 94 | 42 | 82 |
| 14.0 mm | 79 | 32 | 58 |
| 5.0 mm | 68 | 9 | 20 |
| 2.0 mm | 54 | | |
| 0.425 mm | 18 | | |
| 0.075 mm | | | |

SOIL MORTAR

| Soil Mortar Type | S11424 | S11425 | S11426 |
|-----------------------------|--------|--------|--------|
| COARSE SAND <2.0mm >0.425mm | 21 | 24 | 29 |
| FINE SAND <0.425mm >0.075mm | 53 | 55 | 46 |
| MATERIAL <0.075mm | 26 | 21 | 25 |

CONSTANTS

| Parameter | S11424 | S11425 | S11426 |
|----------------------------|----------|----------|----------|
| GRADING MODULUS | 1.60 | 2.17 | 1.40 |
| PRA CLASSIFICATION | A-2-4(0) | A-1-b(0) | A-2-4(0) |
| UNIFIED SOIL CLAS. | SC | SP-SC | SC |
| COLTO CLASSIFICATION | | G6 | G6 |
| TRH CLASSIFICATION | | G6 | G6 |
| LIQUID LIMIT (%) | - | - | - |
| PLASTICITY INDEX (0.425mm) | NP | SP | SP |
| LINEAR SHRINKAGE (%) | 0.0 | 0.5 | 0.5 |

MOD AASHTO

| Parameter | S11424 | S11425 | S11426 |
|--|--------|--------|--------|
| MAXIMUM DRY DENSITY (kg/m ³) | | 2173 | 2032 |
| OPTIMUM MOISTURE CONTENT(%) | | 5.9 | 10.1 |
| MOULDING MOISTURE (%) | | 5.9 | 10.0 |

| TYPE OF TEST | CBR | CBR |
|---------------------------|-----|-----|
| CBR-UCS @ 100% MOD AASHTO | 46 | 98 |
| CBR-UCS @ 98% MOD AASHTO | 41 | 82 |
| CBR-UCS @ 97% MOD AASHTO | 39 | 75 |
| CBR-UCS @ 95% MOD AASHTO | 35 | 63 |
| CBR-UCS @ 93% MOD AASHTO | 32 | 53 |
| CBR-UCS @ 90% MOD AASHTO | 27 | 41 |

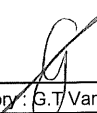
CBR-UCS @ % MOD AASHTO derived from calculation.

| % SWELL AT [MOD][NRB][PROC] | 0.02 | 0.05 | 0.08 | 0.00 | 0.02 | 0.03 |
|-----------------------------|------|------|------|------|------|------|
| | | | | | | |

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

Technical Signatory:  G.T. Van Rooyen / K.Z Mlambo

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 - CIVIL ENGINEERING SERVICES -
 Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587

a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

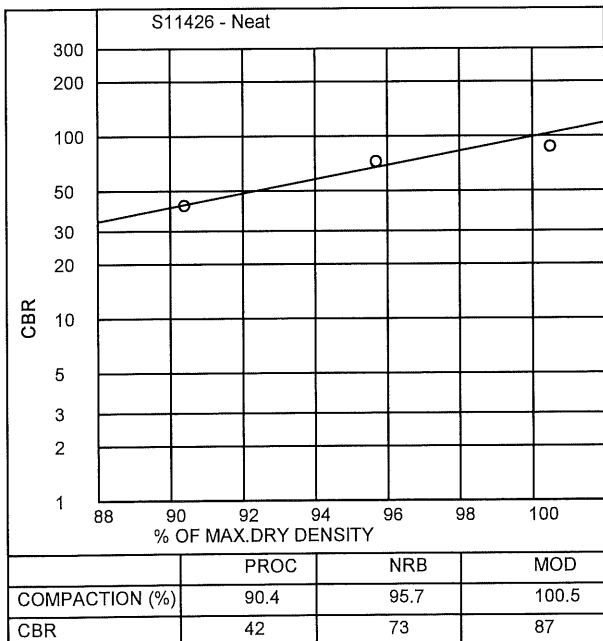
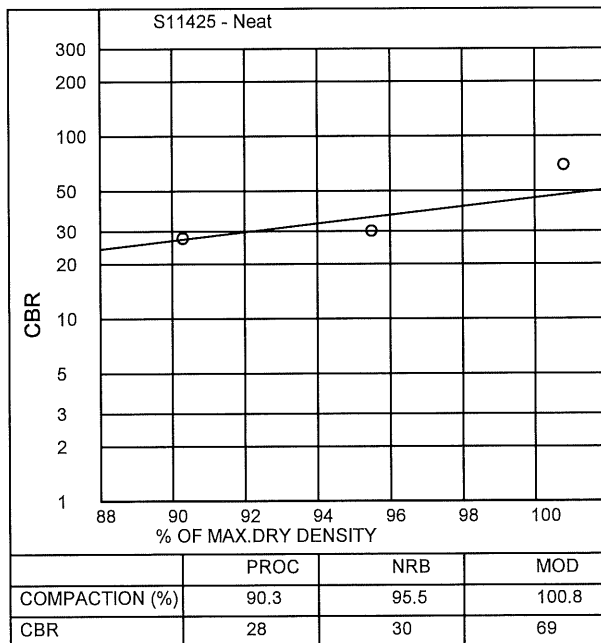
Tel. : 0137587302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Road Centre Line Soil Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/M/A
 Date Reported : 16/09/2019

CBR-UCS GRAPH/S (OPTIONAL INFORMATION)



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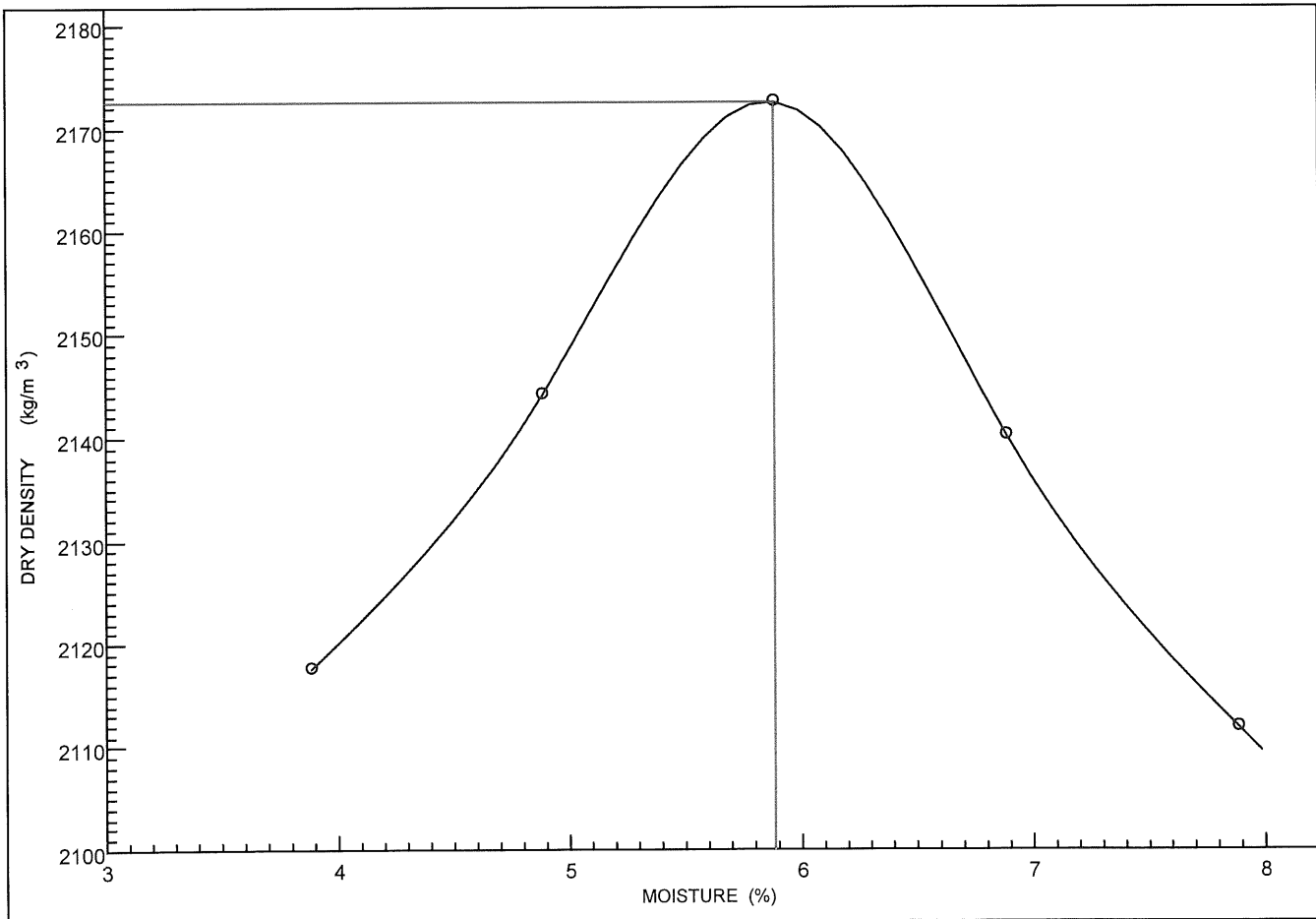
TEST RESULTS

| | |
|--|---|
| Kruger National Park Private Bag X 402 Skukuza 1350 Attention: Ben Momberg | Project : Geotechnical Survey Along Proposed New Shangoni Gate : Road Centre Line Soil Investigation Your Ref : SK-PO098123 Our Ref : 1947 Date Reported : 21/08/2019 |
|--|---|

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|---|------------------------|--------------------------------|
| Sample No.: S11425 | Hole No. : 1 | Depth (mm) : 200-750 |
| Origin : Layer 1 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Dark Reddish Brown | | |

| | | | | | | | | | |
|---|------------------------------|------|------|------|------|------|--|--|--|
| Optimum Moisture Content (%) : 5.9 Maximum Dry Density (kg/m ³) : 2173 | Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| | Moisture (%) | 3.9 | 4.9 | 5.9 | 6.9 | 7.9 | | | |
| | Density (kg/m ³) | 2118 | 2144 | 2173 | 2140 | 2112 | | | |



Remarks :

FORM: A7

4.4.0(SGS)(2016.08.31)

Technical Signatory : *G.T. Van Rooyen / K.Z. Mlambo*

3

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

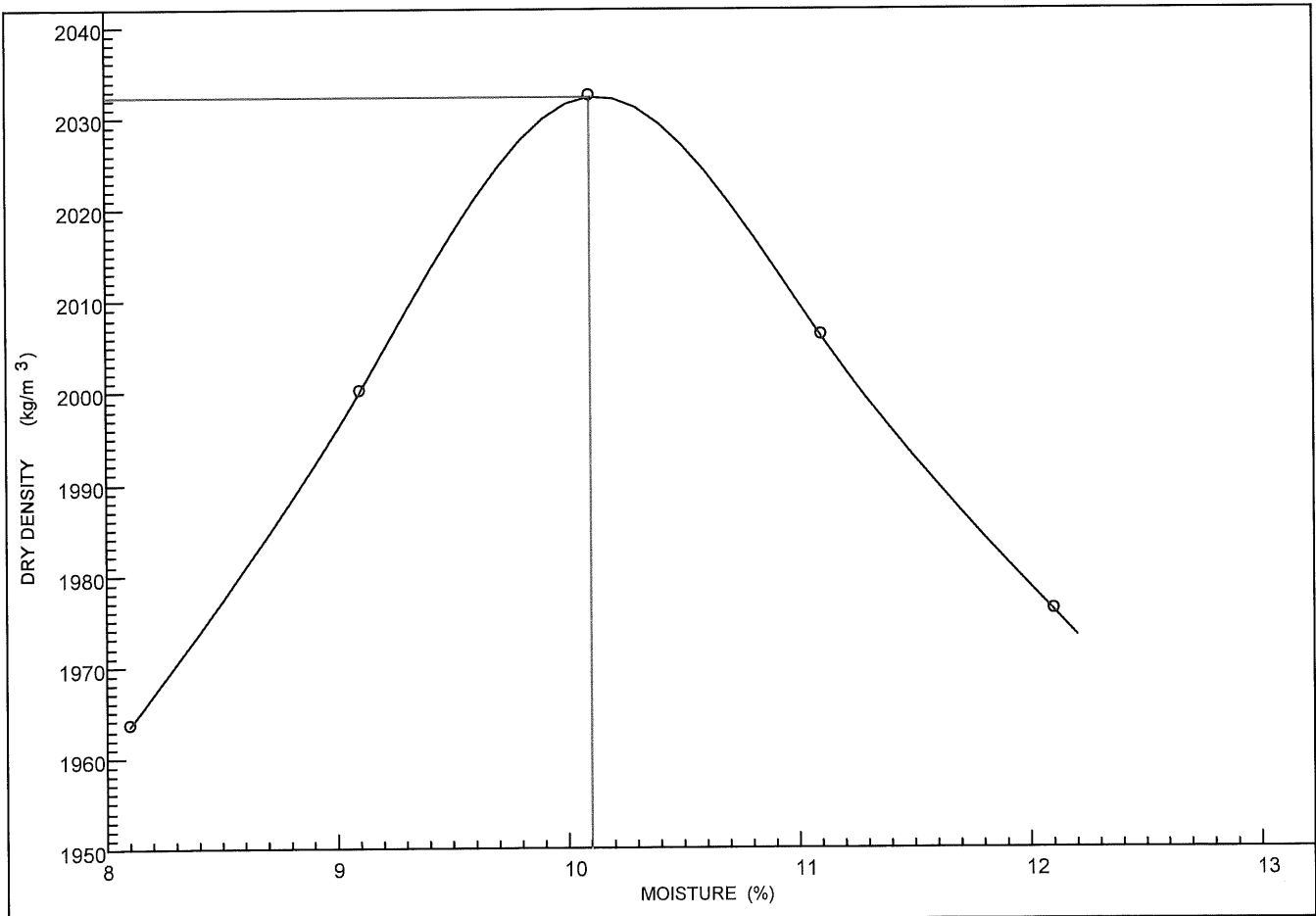
Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Road Centre Line Soil Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 16/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|--------------------------------------|------------------------|--------------------------------|
| Sample No.: S11426 | Hole No. : 2 | Depth (mm) : 0-300 |
| Origin : Layer 1 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Greyish Brown | | |

Optimum Moisture Content (%) : 10.1
 Maximum Dry Density (kg/m³) : 2032

| | | | | | | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| Moisture (%) | 8.1 | 9.1 | 10.1 | 11.1 | 12.1 | | | |
| Density (kg/m ³) | 1964 | 2000 | 2032 | 2006 | 1976 | | | |



Remarks :

FORM: A7

4.4.0(SGS)(2016.08.31)

Technical Signatory: G.T Van Rooyen / K.Z Mlambo

4

TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
: Road Centre Line Soil Investigation
Your Ref : SK-PO098123
Our Ref : 1947/M/B
Date Reported : 16/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12,GR30,GR40,GR53)

| SAMPLE NO. | S11427 | S11427 A | S11427 B |
|-----------------|------------------------|------------------------|------------------------|
| HOLE NO. | 2 | 2 | 2 |
| ROAD NO. | - | - | - |
| DEPTH | 300-1050 | 300-1050 | 300-1050 |
| CHAINAGE | RHS | RHS | RHS |
| LAYER TYPE | Layer 2 | Layer 2 | Layer 2 |
| STABILISED WITH | Neat | 2.5 % Cement | 3.5 % Cement |
| SUPPLIER | - | See Remarks | See Remarks |
| CURING METHOD | - | Rapid | Rapid |
| DESCRIPTION | Light Brown Silty Sand | Light Brown Silty Sand | Light Brown Silty Sand |

SIEVE ANALYSIS (% PASSING)

| Sieve Size | S11427 | S11427 A | S11427 B |
|------------|--------|----------|----------|
| 100 mm | | | |
| 75 mm | | | |
| 63 mm | | | |
| 50 mm | | | |
| 37.5 mm | | | |
| 28.0 mm | | | |
| 20.0 mm | | | |
| 14.0 mm | 100 | 100 | 100 |
| 5.0 mm | 99 | 99 | 99 |
| 2.0 mm | 98 | 98 | 98 |
| 0.425 mm | 84 | 84 | 84 |
| 0.075 mm | 26 | 26 | 26 |

SOIL MORTAR

| Material | S11427 | S11427 A | S11427 B |
|-----------------------------|--------|----------|----------|
| COARSE SAND <2.0mm >0.425mm | 14 | 14 | 14 |
| FINE SAND <0.425mm >0.075mm | 59 | 59 | 59 |
| MATERIAL <0.075mm | 27 | 27 | 27 |

CONSTANTS

| Property | S11427 | S11427 A | S11427 B |
|------------------------------|----------|----------|----------|
| GRADING MODULUS | 0.92 | 0.92 | 0.92 |
| PRA CLASSIFICATION | A-2-4(0) | A-2-4(0) | A-2-4(0) |
| UNIFIED SOIL CLAS. | SC | SC | SC |
| COLTO CLASSIFICATION | G9 | - | C4 |
| TRH CLASSIFICATION | - | - | C4 |
| TRH Class.(INSITU [93% 90%]) | G9 G10 | - | - |
| LIQUID LIMIT (%) | - | - | - |
| PLASTICITY INDEX (0.425mm) | NP | NP | NP |
| LINEAR SHRINKAGE (%) | 0.0 | 0.0 | 0.0 |

MOD AASHTO

| Property | S11427 | S11427 A | S11427 B |
|--|--------|----------|----------|
| MAXIMUM DRY DENSITY (kg/m ³) | 2033 | 2032 | 2032 |
| OPTIMUM MOISTURE CONTENT(%) | 10.1 | 9.2 | 9.2 |
| MOULDING MOISTURE (%) | 10.3 | 9.3 | 9.8 |

| TYPE OF TEST | CBR | UCS (MPa) | UCS (MPa) |
|---------------------------|-----|-----------|-----------|
| CBR-UCS @ 100% MOD AASHTO | 25 | 0.06 MPa. | 1.22 MPa. |
| CBR-UCS @ 98% MOD AASHTO | 19 | 0.06 MPa. | 1.03 MPa. |
| CBR-UCS @ 97% MOD AASHTO | 16 | 0.06 MPa. | 0.95 MPa. |
| CBR-UCS @ 95% MOD AASHTO | 12 | 0.06 MPa. | 0.81 MPa. |
| CBR-UCS @ 93% MOD AASHTO | 9.5 | 0.06 MPa. | 0.68 MPa. |
| CBR-UCS @ 90% MOD AASHTO | 6.3 | 0.06 MPa. | 0.53 MPa. |

CBR-UCS @ % MOD AASHTO derived from calculation.

| % SWELL AT [MOD][NRB][PROC] | 0.09 | 0.17 | 0.31 |
|-----------------------------|------|------|------|
| | | | |

DEVIATION FROM TEST METHOD: UCS reported to nearest 0.01 MPa.

Remarks : Dura Build Lafarge Cem IV/B-V 32.5 N
S11427 A - UCS Briquette Collapsed whilst submerged in water.

FORM: A1

4.4.0(SGS)(2016.08.31)

Technical Signatory : G.T. Van Rooyen / K.Z Mlambo

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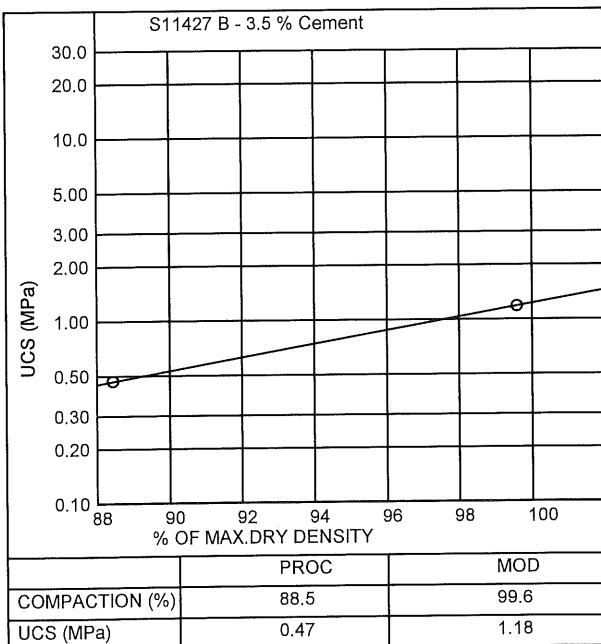
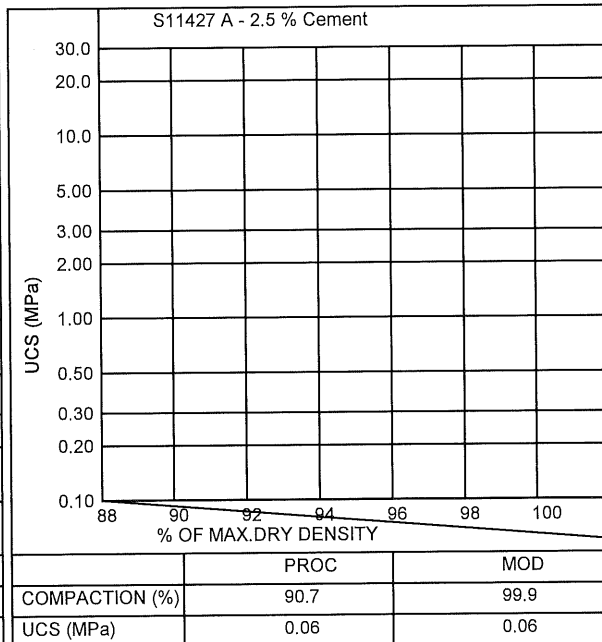
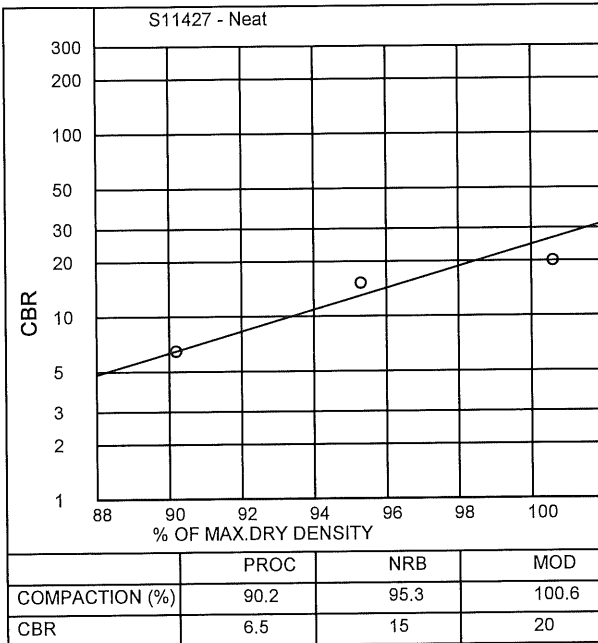
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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Road Centre Line Soil Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/M/B
 Date Reported : 16/09/2019

CBR-UCS GRAPH/S (OPTIONAL INFORMATION)



TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
: Road Centre Line Soil Investigation
Your Ref : SK-PO098123
Our Ref : 1947/M/B
Date Reported : 16/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, MOD AASHTO, UCS, ITS(SANS 3001:GR54)

| SAMPLE NO. | S11427 A | S11427 B | | |
|-----------------|---------------------------|---------------------------|--|--|
| HOLE NO. | 2 | 2 | | |
| ROAD NO. | - | - | | |
| DEPTH | 300-1050 | 300-1050 | | |
| CHAINAGE | RHS | RHS | | |
| LAYER TYPE | Layer 2 | Layer 2 | | |
| STABILISED WITH | 2.5 % Cement | 3.5 % Cement | | |
| SUPPLIER | See Remarks | See Remarks | | |
| CURING METHOD | Rapid | Rapid | | |
| DESCRIPTION | Light Brown Silty Sand | Light Brown Silty Sand | | |

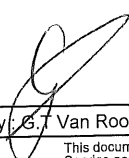
INDIRECT TENSILE STRENGTH

| | | | | |
|-------------------------------|----------------|----------------|--|--|
| 1. COMPACTION (%) : ITS (kPa) | 100.0 : 230.00 | 100.2 : 340.00 | | |
| 2. COMPACTION (%) : ITS (kPa) | 99.8 : 220.00 | 100.0 : 350.00 | | |
| 3. COMPACTION (%) : ITS (kPa) | | | | |
| AVERAGE COMP.(%) : ITS (kPa) | 99.9 : 220.00 | 100.1 : 340.00 | | |

Remarks :

FORM: D1

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Technical Signatory:  G.T Van Rooyen / K.Z Mlambo

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TEST RESULTS

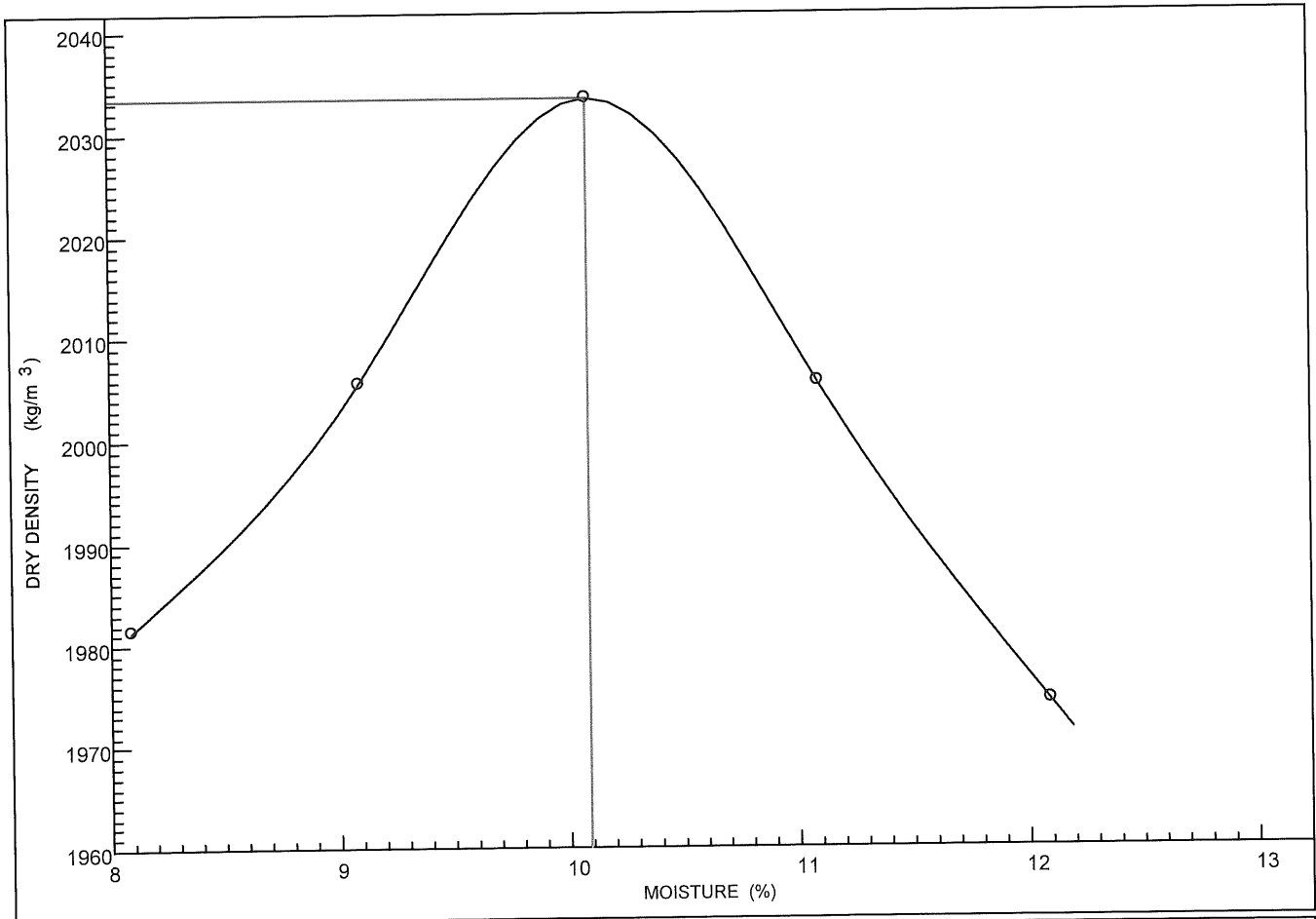
Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Road Centre Line Soil Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 21/08/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|---|------------------------|--------------------------------|
| Sample No.: S11427 | Hole No. : 2 | Depth (mm) : 300-1050 |
| Origin : Layer 2 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Dark Reddish Brown | | |

| | | | | | | | | | |
|--|------------------------------|------|------|------|------|------|--|--|--|
| Optimum Moisture Content (%) : 10.1 Maximum Dry Density (kg/m ³) : 2033 | Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| | Moisture (%) | 8.1 | 9.1 | 10.1 | 11.1 | 12.1 | | | |
| | Density (kg/m ³) | 1981 | 2006 | 2033 | 2006 | 1974 | | | |



Remarks :

FORM: A7

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 a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137587302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

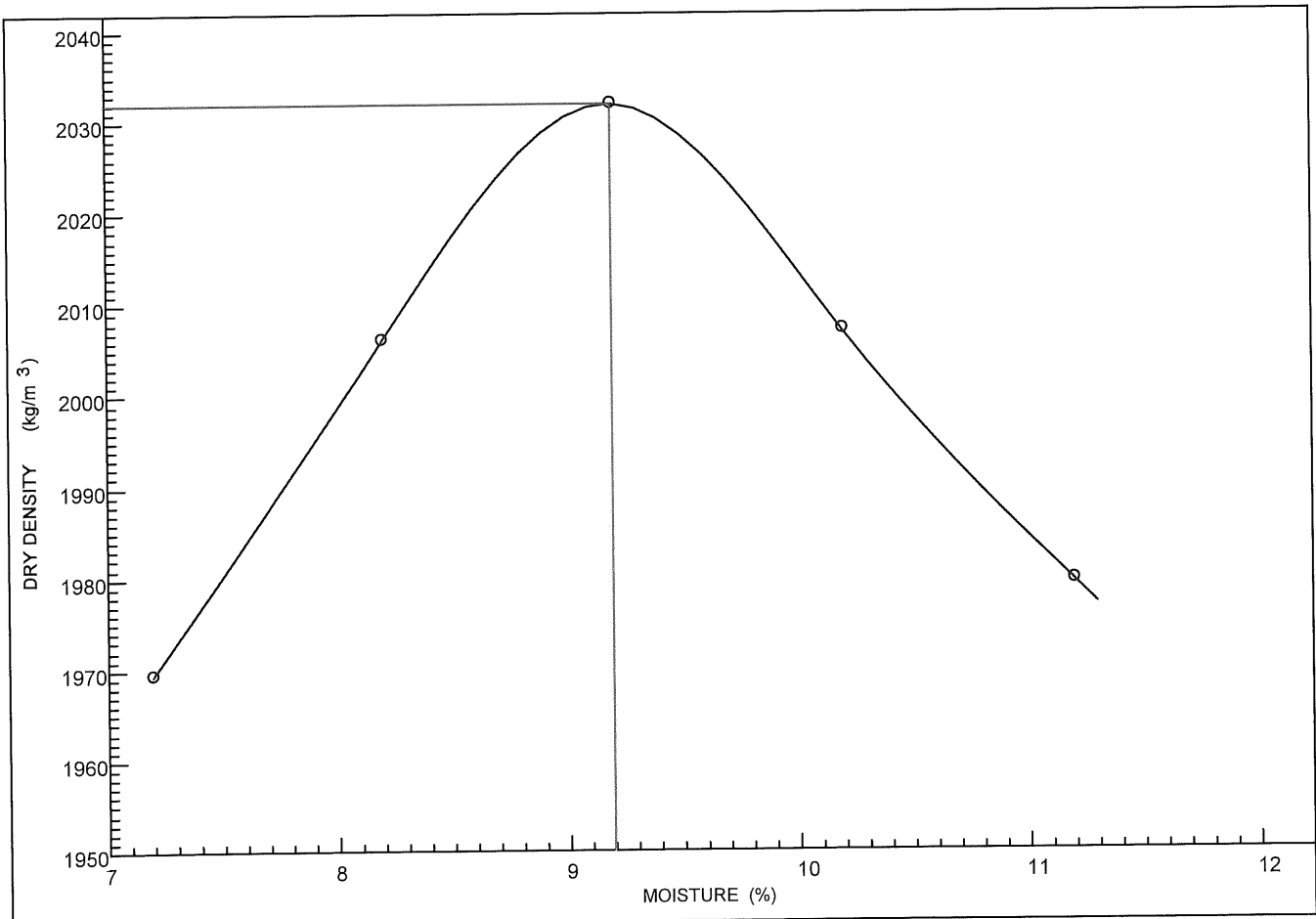
Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Road Centre Line Soil Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 16/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|---|--------------------------------|--------------------------------|
| Sample No.: S11427 A | Hole No. : 2 | Depth (mm) : 300-1050 |
| Origin : Layer 2 | Stabilized With : 2.5 % Cement | Compaction Energy : MOD AASHTO |
| Material Description : Dark Reddish Brown | | |

Optimum Moisture Content (%) : 9.2
 Maximum Dry Density (kg/m³) : 2032

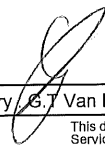
| | | | | | | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| Moisture (%) | 7.2 | 8.2 | 9.2 | 10.2 | 11.2 | | | |
| Density (kg/m ³) | 1969 | 2006 | 2032 | 2007 | 1980 | | | |



Remarks :

FORM: A7

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
: Road Centre Line Soil Investigation
Your Ref : SK-PO098123
Our Ref : 1947/M/C
Date Reported : 16/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12,GR30,GR40)

| SAMPLE NO. | S11428 | S11429 | S11430 | S11431 |
|-----------------|------------------------|---------------------------------|----------------------------------|--------------------------|
| HOLE NO. | 3 | 4 | 4 | 5 |
| ROAD NO. | - | - | - | - |
| DEPTH | 100-700 | 280-670 | 670-1100 | 0-350 |
| CHAINAGE | CL | RHS & Shoulder | RHS & Shoulder | LHS |
| LAYER TYPE | Layer 2 | Layer 2 | Layer 1 | Layer 1 |
| STABILISED WITH | Neat | - | Neat | - |
| SUPPLIER | - | - | - | - |
| CURING METHOD | - | - | - | - |
| DESCRIPTION | Dusky Red Sandy Gravel | Dark Reddish Brown Sandy Gravel | Dark Yellow Orange Gravelly Sand | Dark Brown Gravelly Sand |

SIEVE ANALYSIS (% PASSING)

| | | | | |
|----------|-----|-----|-----|-----|
| 100 mm | | | 100 | |
| 75 mm | | | 98 | |
| 63 mm | | 100 | 94 | |
| 50 mm | 100 | 92 | 87 | |
| 37.5 mm | 91 | 87 | 78 | 100 |
| 28.0 mm | 87 | 76 | 71 | 97 |
| 20.0 mm | 82 | 64 | 70 | 95 |
| 14.0 mm | 72 | 55 | 63 | 84 |
| 5.0 mm | 53 | 32 | 59 | 71 |
| 2.0 mm | 40 | 27 | 50 | 50 |
| 0.425 mm | 21 | 22 | 14 | 19 |
| 0.075 mm | 10 | 7 | | |

SOIL MORTAR

| | | | | |
|-----------------------------|----|----|----|----|
| COARSE SAND <2.0mm >0.425mm | 48 | 19 | 15 | 30 |
| FINE SAND <0.425mm >0.075mm | 28 | 56 | 61 | 44 |
| MATERIAL <0.075mm | 24 | 25 | 24 | 26 |

CONSTANTS

| | | | | |
|------------------------------|----------|----------|----------|----------|
| GRADING MODULUS | 2.29 | 2.44 | 1.77 | 1.60 |
| PRA CLASSIFICATION | A-2-4(0) | A-1-a(0) | A-1-b(0) | A-1-b(0) |
| UNIFIED SOIL CLAS. | SP-SM | GP-GC | SC | SM-SC |
| COLTO CLASSIFICATION | G7 | | G9 | |
| TRH CLASSIFICATION | G7 | | - | |
| TRH Class.(INSITU [93% 90%]) | - - | | G9 G9 | |
| LIQUID LIMIT (%) | 32 | 19 | - | 18 |
| PLASTICITY INDEX (0.425mm) | 8 | 4 | NP | 4 |
| LINEAR SHRINKAGE (%) | 4.0 | 1.5 | 0.0 | 2.0 |

MOD AASHTO

| | | | | |
|--|------|--|------|--|
| MAXIMUM DRY DENSITY (kg/m ³) | 2101 | | 2025 | |
| OPTIMUM MOISTURE CONTENT(%) | 7.5 | | 9.7 | |
| MOULDING MOISTURE (%) | 7.3 | | 9.4 | |

| TYPE OF TEST | CBR | | CBR | |
|---------------------------|-----|--|-----|--|
| CBR-UCS @ 100% MOD AASHTO | 47 | | 13 | |
| CBR-UCS @ 98% MOD AASHTO | 36 | | 12 | |
| CBR-UCS @ 97% MOD AASHTO | 31 | | 11 | |
| CBR-UCS @ 95% MOD AASHTO | 24 | | 10 | |
| CBR-UCS @ 93% MOD AASHTO | 18 | | 9.1 | |
| CBR-UCS @ 90% MOD AASHTO | 12 | | 7.8 | |

CBR-UCS @ % MOD AASHTO derived from calculation.

| | | | | | | | | | | |
|-----------------------------|------|------|------|--|--|------|------|------|--|--|
| % SWELL AT [MOD][NRB][PROC] | 0.06 | 0.17 | 0.23 | | | 0.09 | 0.31 | 0.52 | | |
|-----------------------------|------|------|------|--|--|------|------|------|--|--|

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

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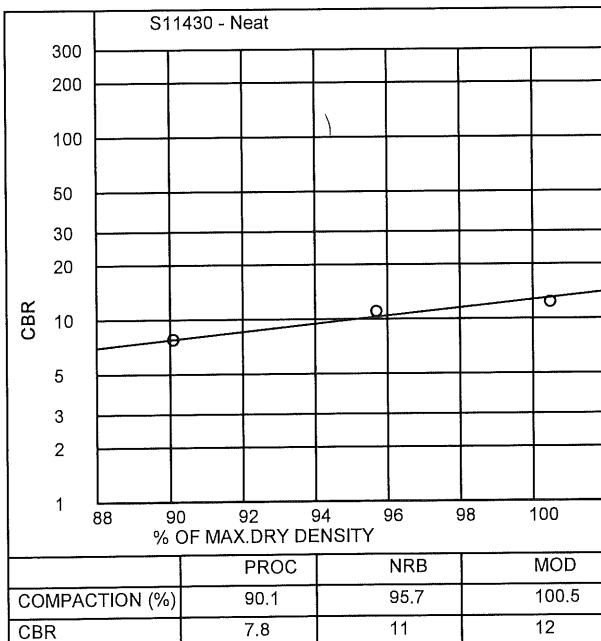
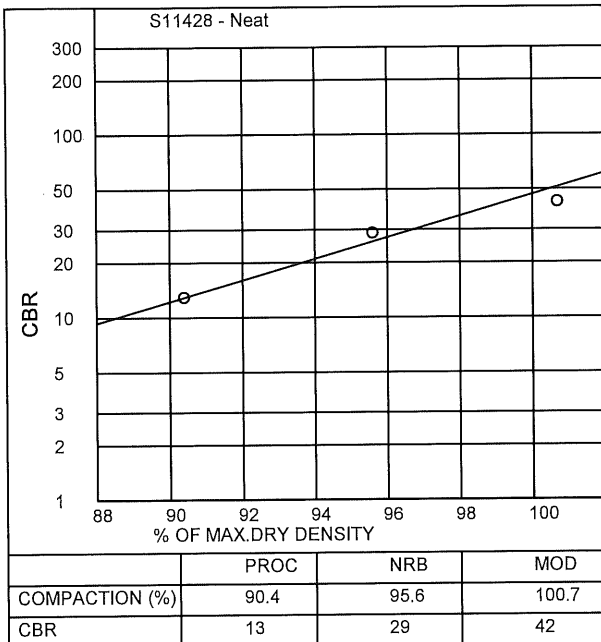
10

TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
: Road Centre Line Soil Investigation
Your Ref : SK-PO098123
Our Ref : 1947/M/C
Date Reported : 16/09/2019

CBR-UCS GRAPH/S (OPTIONAL INFORMATION)



TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

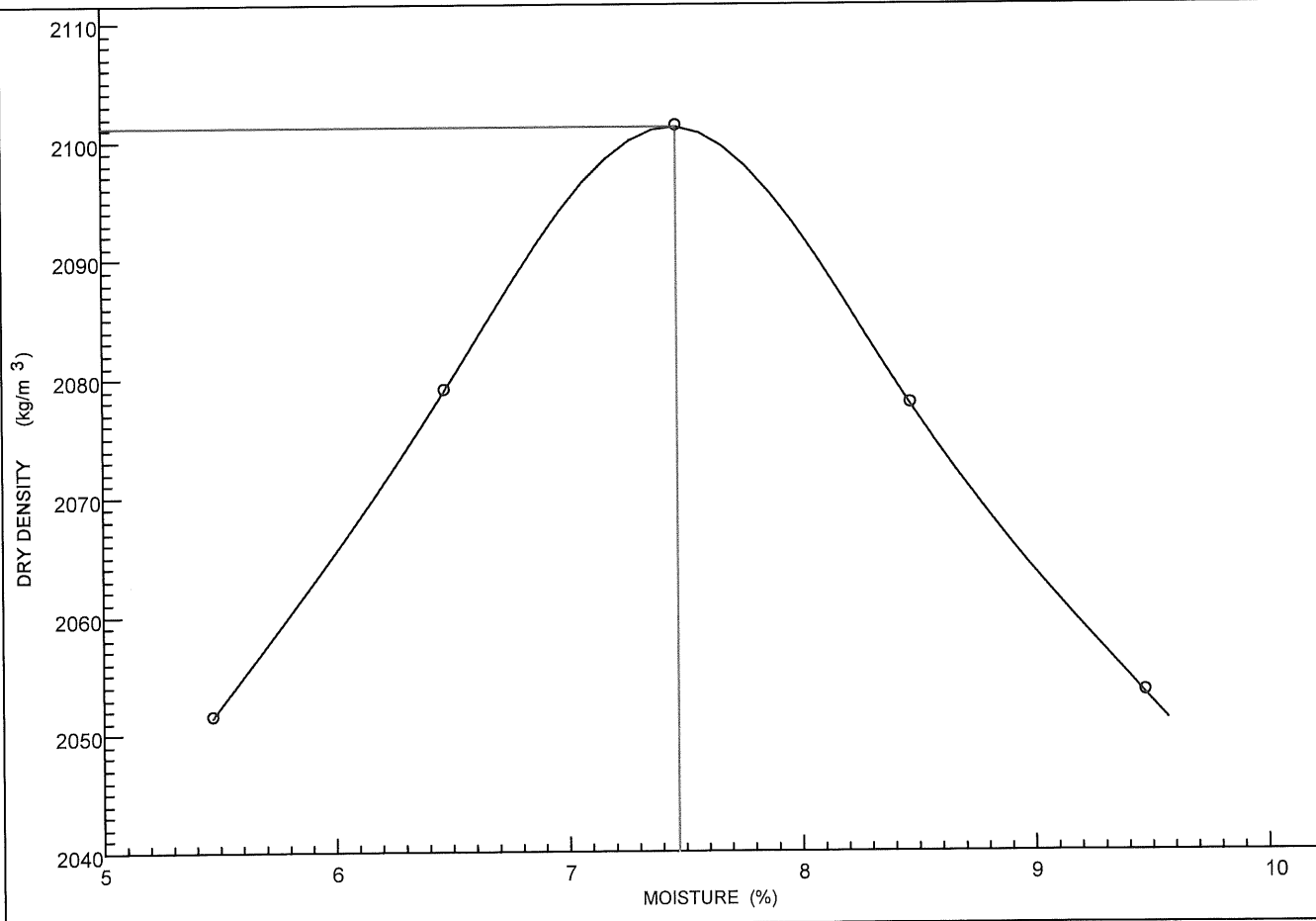
Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Road Centre Line Soil Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 21/08/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|----------------------------------|------------------------|--------------------------------|
| Sample No.: S11428 | Hole No. : 3 | Depth (mm) : 100-700 |
| Origin : Layer 2 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Dusky Red | | |

Optimum Moisture Content (%) : 7.5
 Maximum Dry Density (kg/m³) : 2101

| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Moisture (%) | 5.5 | 6.5 | 7.5 | 8.5 | 9.5 | | | |
| Density (kg/m ³) | 2051 | 2079 | 2101 | 2078 | 2053 | | | |



Remarks :

FORM: A7

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TEST RESULTS

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 1350
 Attention: Ben Momberg

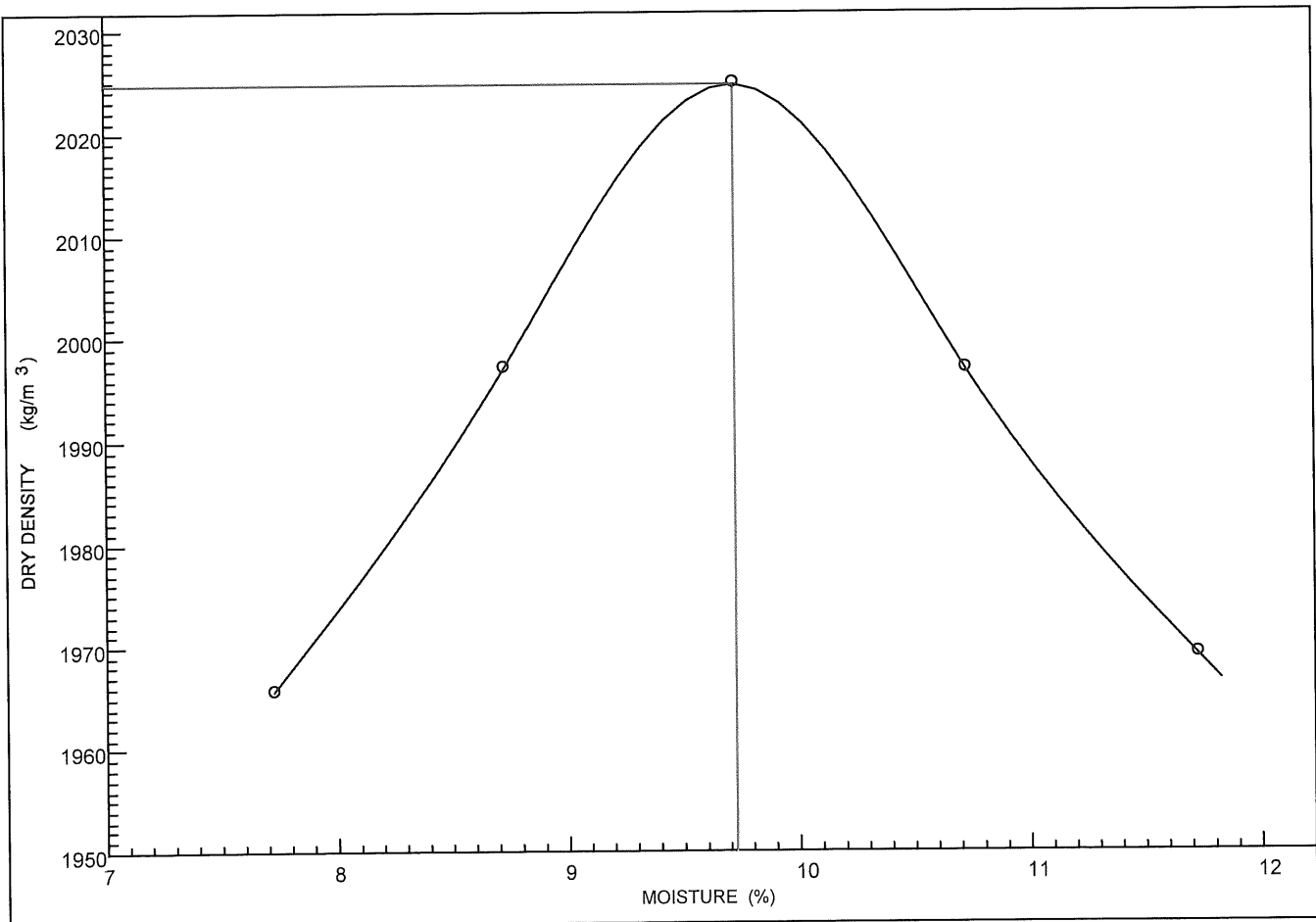
Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Road Centre Line Soil Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 21/08/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|---|------------------------|--------------------------------|
| Sample No.: S11430 | Hole No. : 4 | Depth (mm) : 670-1100 |
| Origin : Layer 1 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Dark Yellow Orange | | |

Optimum Moisture Content (%) : 9.7
 Maximum Dry Density (kg/m³) : 2025

| | | | | | | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| Moisture (%) | 7.7 | 8.7 | 9.7 | 10.7 | 11.7 | | | |
| Density (kg/m ³) | 1966 | 1997 | 2025 | 1997 | 1969 | | | |



Remarks :

FORM: A7

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TEST RESULTS

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 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Road Centre Line Soil Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/M/D
 Date Reported : 16/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12,GR30,GR40)

| | | | | |
|-----------------|-------------------------------------|--|--|--|
| SAMPLE NO. | S11432 | | | |
| HOLE NO. | 5 | | | |
| ROAD NO. | - | | | |
| DEPTH | 450-1100 | | | |
| CHAINAGE | RHS & Shoulder | | | |
| LAYER TYPE | Layer 3 | | | |
| STABILISED WITH | Neat | | | |
| SUPPLIER | - | | | |
| CURING METHOD | - | | | |
| DESCRIPTION | Dark Reddish Brown Gravelly Sand | | | |

SIEVE ANALYSIS (% PASSING)

| | | | | |
|----------|-----|--|--|--|
| 100 mm | 100 | | | |
| 75 mm | 98 | | | |
| 63 mm | 94 | | | |
| 50 mm | 91 | | | |
| 37.5 mm | 86 | | | |
| 28.0 mm | 80 | | | |
| 20.0 mm | 59 | | | |
| 14.0 mm | 27 | | | |
| 5.0 mm | 21 | | | |
| 2.0 mm | 15 | | | |
| 0.425 mm | | | | |
| 0.075 mm | | | | |

SOIL MORTAR

| | | | | |
|-----------------------------|----|--|--|--|
| COARSE SAND <2.0mm >0.425mm | 22 | | | |
| FINE SAND <0.425mm >0.075mm | 22 | | | |
| MATERIAL <0.075mm | 56 | | | |

CONSTANTS

| | | | | |
|------------------------------|----------|--|--|--|
| GRADING MODULUS | 2.37 | | | |
| PRA CLASSIFICATION | A-2-7(0) | | | |
| UNIFIED SOIL CLAS. | SM | | | |
| COLTO CLASSIFICATION | G7 | | | |
| TRH Class.(INSITU 93% 90%) | G8 G8 | | | |
| LIQUID LIMIT (%) | 49 | | | |
| PLASTICITY INDEX (0.425mm) | 13 | | | |
| LINEAR SHRINKAGE (%) | 6.5 | | | |

MOD AASHTO

| | | | | |
|--|------|--|--|--|
| MAXIMUM DRY DENSITY (kg/m ³) | 2102 | | | |
| OPTIMUM MOISTURE CONTENT(%) | 8.4 | | | |
| MOULDING MOISTURE (%) | 8.2 | | | |

| | | | | |
|---------------------------|-----|--|--|--|
| TYPE OF TEST | CBR | | | |
| CBR-UCS @ 100% MOD AASHTO | 32 | | | |
| CBR-UCS @ 98% MOD AASHTO | 28 | | | |
| CBR-UCS @ 97% MOD AASHTO | 25 | | | |
| CBR-UCS @ 95% MOD AASHTO | 22 | | | |
| CBR-UCS @ 93% MOD AASHTO | 19 | | | |
| CBR-UCS @ 90% MOD AASHTO | 15 | | | |

CBR-UCS @ % MOD AASHTO derived from calculation.

| | | | | | | | | | |
|-----------------------------|------|------|------|--|--|--|--|--|--|
| % SWELL AT [MOD][NRB][PROC] | 0.05 | 0.09 | 0.26 | | | | | | |
|-----------------------------|------|------|------|--|--|--|--|--|--|

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

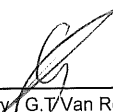
Technical Signatory:  G.T. Van Rooyen / K.Z. Mlambo

TABLE A: SUMMARY OF MIDDLE LINE TEST PIT LABORATORY TEST RESULTS

DB*: Dura Build Lafarge CEM iv/B – V 32.5N

| Site | Sample No. | TP No. | Depth (m) | USC | ORIGIN | GM | PI | % OMC | Mod. AASHTO Kg/m ³ | CBR @ 95% | UCS @ 95% KPa | G Class | C Class | Stab Agent |
|----------------|------------|--------|-----------|-------|-----------|------|----|-------|-------------------------------|-----------|---------------|---------|---------|---------------|
| RHS + Shoulder | S11424 | 1 | 0,0-0,2 | SC | Sandstone | 1,60 | NP | - | - | - | - | - | - | - |
| RHS + Shoulder | S11425 | 1 | 0,2-0,7 | SP-SC | Sandstone | 2,17 | SP | 5.9 | 2173 | 35 | - | G6 | - | - |
| RHS | S11426 | 2 | 0,0-0,3 | SC | Alluvium | 1,40 | SP | 10.1 | 2032 | 63 | - | G6 | - | - |
| RHS | S11427 | 2 | 0,3-1,05 | SC | Alluvium | 0,92 | NP | 10.1 | 2033 | 12 | - | G9 | - | Neat |
| | S11427A | 2 | 0,3-1,05 | SC | Alluvium | 0,92 | NP | 9.2 | 2033 | - | 60 | - | - | 2.5% cem DB* |
| | S11427B | 2 | 0,3-1,05 | SC | Alluvium | 0,92 | NP | 9.2 | 2033 | - | 810 | - | C4 | 3.5 % cem DB* |
| CL | S11428 | 3 | 0,1-0,7 | SP-SM | Gabbro | 2,29 | 8 | 7.5 | 2101 | 24 | - | G7 | - | - |
| RHS + Shoulder | S11429 | 4 | 0,28-0,67 | GP-GC | Gneiss | 2,44 | 4 | - | - | - | - | - | - | - |
| RHS + Shoulder | S11430 | 4 | 0,67-1,1 | SC | Gneiss | 1,77 | NP | 9.7 | 2025 | 10 | - | G9 | - | - |
| LHS | S11431 | 5 | 0,0-0,35 | SM-SC | Gneiss | 1,60 | 4 | - | - | - | - | - | - | - |
| RHS + Shoulder | S11432 | 5 | 0,45-1,1 | SM | Gneiss | 2,37 | 13 | 8.4 | 2102 | 22 | - | G7 | - | - |

Annexure D



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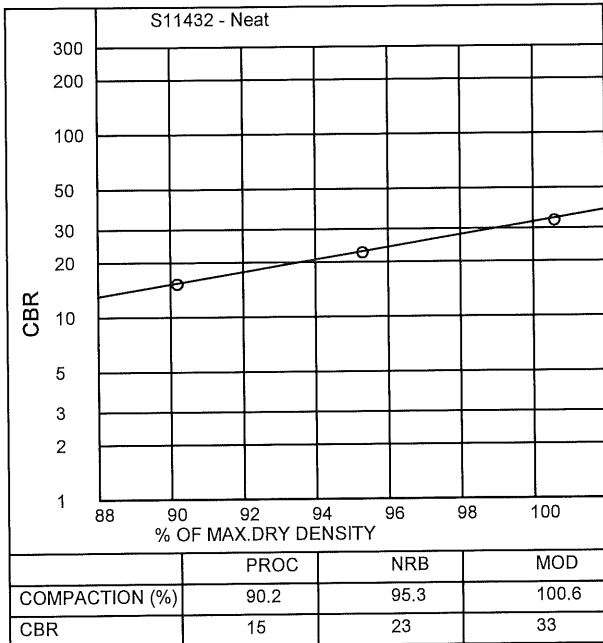
Tel. : 0137587302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Road Centre Line Soil Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/M/D
 Date Reported : 16/09/2019

CBR-UCS GRAPH/S (OPTIONAL INFORMATION)



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TEST RESULTS

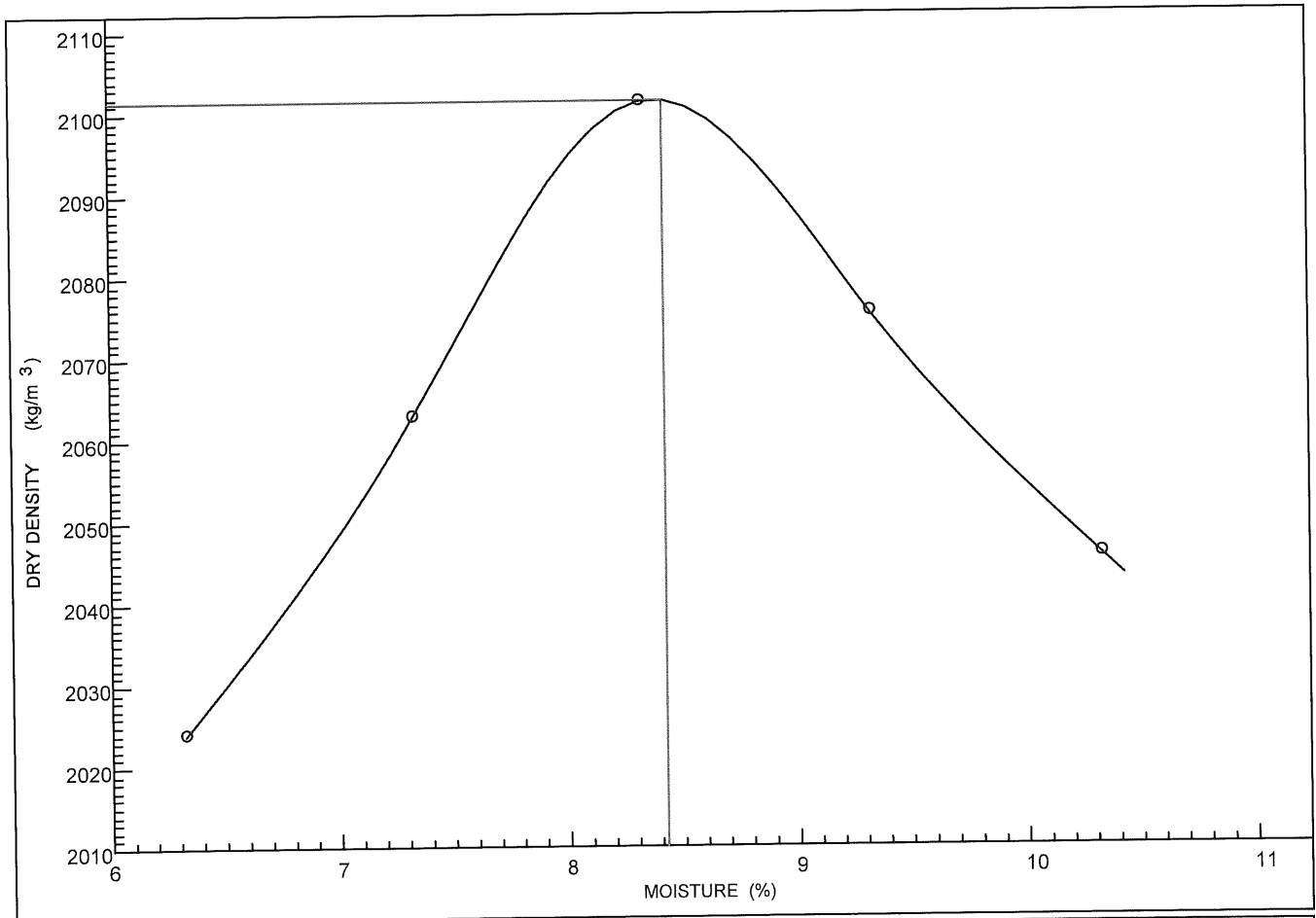
Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Road Centre Line Soil Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 21/08/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|---|------------------------|--------------------------------|
| Sample No.: S11432 | Hole No. : 5 | Depth (mm) : 450-110 |
| Origin : Layer 3 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Dark Reddish Brown | | |

| | | | | | | | | | |
|---|------------------------------|------|------|------|------|------|--|--|--|
| Optimum Moisture Content (%) : 8.4 Maximum Dry Density (kg/m ³) : 2102 | Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| | Moisture (%) | 6.3 | 7.3 | 8.3 | 9.3 | 10.3 | | | |
| | Density (kg/m ³) | 2024 | 2063 | 2101 | 2075 | 2046 | | | |



Remarks :

FORM: A7

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Technical Signatory : G.T. Van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
: Borrow Pit Investigation
Your Ref : SK-PO098123
Our Ref : 1947/M/E
Date Reported : 16/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12,GR30,GR40)

| SAMPLE NO. | S11464 | S11465 | S11466 | S11467 |
|-----------------|--------------------------------|--------------------------------|---------------------------------|-----------------------------------|
| HOLE NO. | 1 | 1 | 1 | 1 |
| ROAD NO. | - | - | - | - |
| DEPTH | 0-3000 | 50-900 | 0-1000 | 100-1000 |
| CHAINAGE | BP E1 | BP E2 | BP E3 | BP 1N |
| LAYER TYPE | Layer 1 | Layer 2 & 3 | Layer 1 & 2 | Layer 2 |
| STABILISED WITH | Neat | Neat | Neat | Neat |
| SUPPLIER | - | - | - | - |
| CURING METHOD | - | - | - | - |
| DESCRIPTION | Light Brown Olive Sandy Gravel | Light Brown Olive Sandy Gravel | Dark Brown Orange Gravelly Sand | Light Reddish Brown Gravelly Sand |

SIEVE ANALYSIS (% PASSING)

| Sieve Size | S11464 | S11465 | S11466 | S11467 |
|------------|--------|--------|--------|--------|
| 100 mm | 100 | 100 | 100 | 100 |
| 75 mm | 97 | 95 | 88 | 97 |
| 63 mm | 97 | 90 | 84 | 92 |
| 50 mm | 85 | 84 | 78 | 83 |
| 37.5 mm | 76 | 78 | 76 | 79 |
| 28.0 mm | 69 | 67 | 75 | 74 |
| 20.0 mm | 62 | 59 | 75 | 63 |
| 14.0 mm | 48 | 32 | 73 | 43 |
| 5.0 mm | 36 | 21 | 72 | 31 |
| 2.0 mm | 22 | 12 | 70 | 16 |
| 0.425 mm | 10 | 5 | 21 | 5 |
| 0.075 mm | | | | |

SOIL MORTAR

| Material | S11464 | S11465 | S11466 | S11467 |
|-----------------------------|--------|--------|--------|--------|
| COARSE SAND <2.0mm >0.425mm | 39 | 43 | 3 | 48 |
| FINE SAND <0.425mm >0.075mm | 33 | 33 | 68 | 35 |
| MATERIAL <0.075mm | 28 | 24 | 29 | 17 |

CONSTANTS

| Property | S11464 | S11465 | S11466 | S11467 |
|------------------------------|----------|----------|----------|----------|
| GRADING MODULUS | 2.32 | 2.62 | 1.37 | 2.48 |
| PRA CLASSIFICATION | A-1-a(0) | A-1-a(0) | A-2-4(0) | A-1-a(0) |
| UNIFIED SOIL CLAS. | GP-GM-GC | GP-GC | SC | GP-GC |
| COLTO CLASSIFICATION | G9 | G7 | G6 | G6 |
| TRH CLASSIFICATION | - | G7 | G7 | G7 |
| TRH Class.(INSITU [93% 90%]) | G9 G9 | - - | - - | - - |
| LIQUID LIMIT (%) | 21 | 20 | - | - |
| PLASTICITY INDEX (0.425mm) | 5 | 4 | NP | NP |
| LINEAR SHRINKAGE (%) | 2.0 | 2.0 | 0.0 | 0.0 |

MOD AASHTO

| Property | S11464 | S11465 | S11466 | S11467 |
|--|--------|--------|--------|--------|
| MAXIMUM DRY DENSITY (kg/m ³) | 1901 | 2187 | 2149 | 2091 |
| OPTIMUM MOISTURE CONTENT(%) | 12.7 | 7.7 | 6.6 | 5.6 |
| MOULDING MOISTURE (%) | 12.3 | 7.4 | 6.5 | 5.4 |

| TYPE OF TEST | CBR | CBR | CBR | CBR |
|---------------------------|-----|-----|-----|-----|
| CBR-UCS @ 100% MOD AASHTO | 13 | 61 | 109 | 75 |
| CBR-UCS @ 98% MOD AASHTO | 12 | 48 | 82 | 57 |
| CBR-UCS @ 97% MOD AASHTO | 11 | 42 | 71 | 50 |
| CBR-UCS @ 95% MOD AASHTO | 9.7 | 33 | 53 | 38 |
| CBR-UCS @ 93% MOD AASHTO | 8.6 | 26 | 40 | 29 |
| CBR-UCS @ 90% MOD AASHTO | 7.0 | 18 | 26 | 19 |

CBR-UCS @ % MOD AASHTO derived from calculation.

| % SWELL AT [MOD][NRB][PROC] | 0.14 | 0.43 | 0.96 | 0.02 | 0.05 | 0.12 | 0.01 | 0.02 | 0.03 | 0.02 | 0.05 | 0.10 |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | | | | | | | | | | | |

Remarks :

FORM: A1

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Technical Signatory: G.T Van Rooyen / K.Z Mlambo

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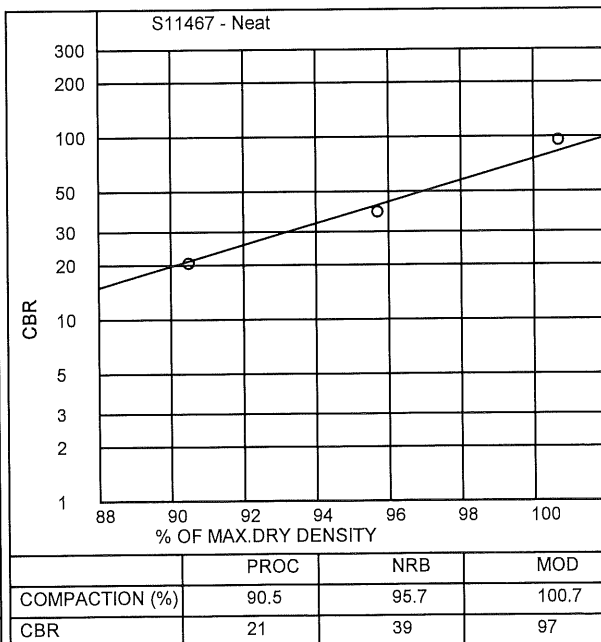
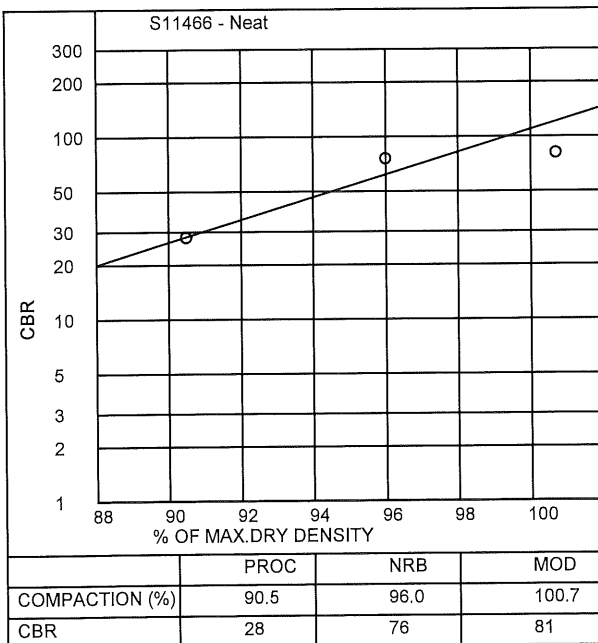
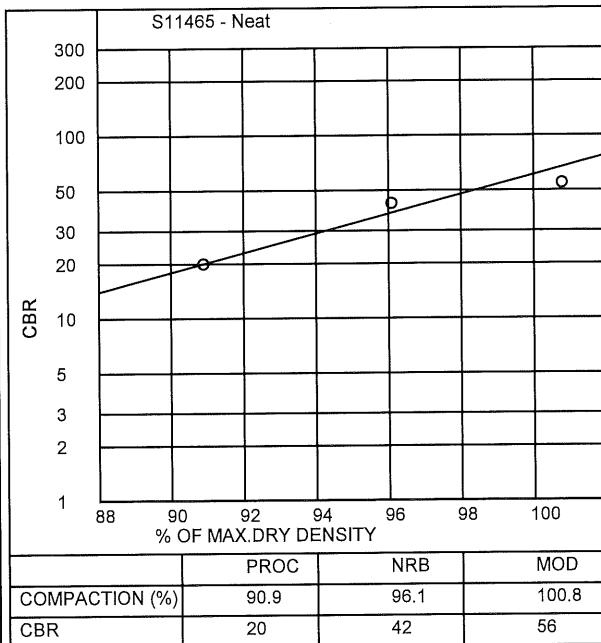
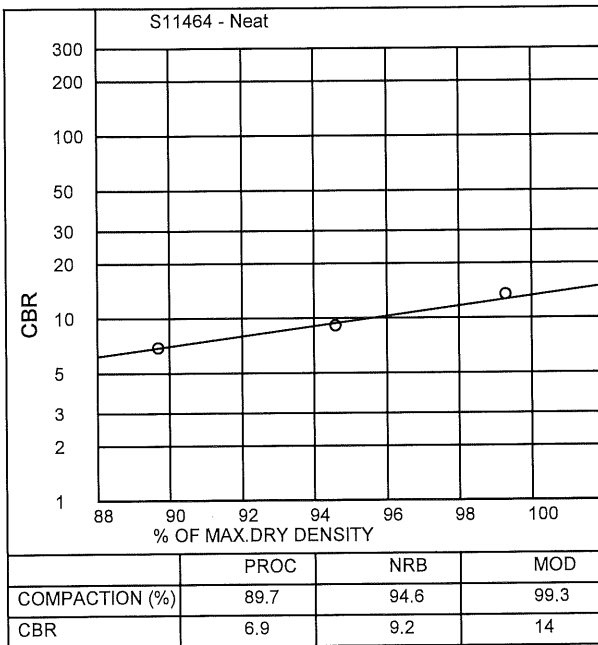
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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/M/E
 Date Reported : 16/09/2019

CBR-UCS GRAPH/S (OPTIONAL INFORMATION)



TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

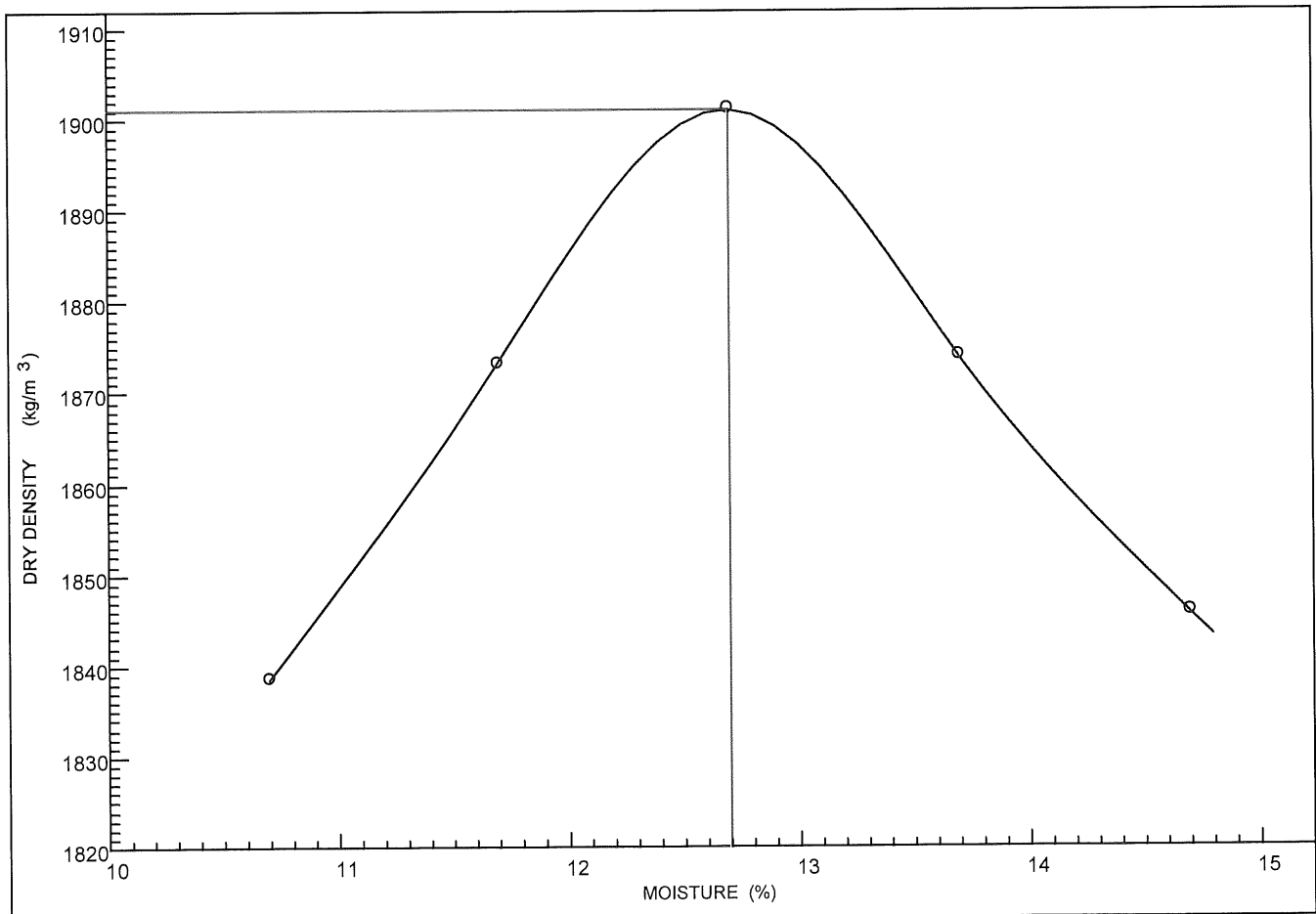
Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 02/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|------------------------------------|------------------------|--------------------------------|
| Sample No.: S11464 | Hole No. : 1 | Depth (mm) : 0-3000 |
| Origin : Layer 1 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Light Brown | | |

Optimum Moisture Content (%) : 12.7
 Maximum Dry Density (kg/m³) : 1901

| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Moisture (%) | 10.7 | 11.7 | 12.7 | 13.7 | 14.7 | | | |
| Density (kg/m ³) | 1839 | 1873 | 1901 | 1874 | 1846 | | | |



Remarks :

FORM: A7

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TEST RESULTS

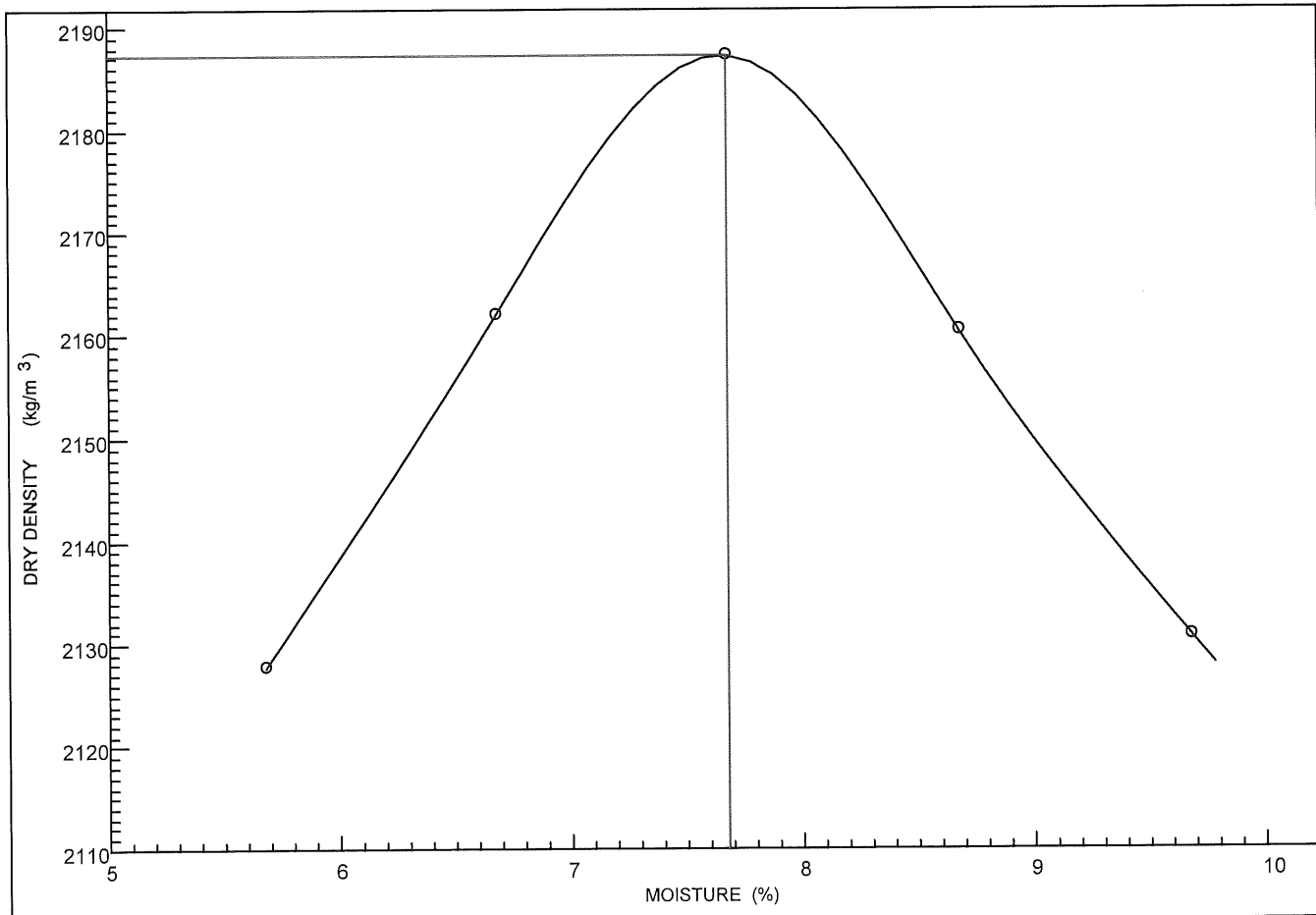
Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
: Borrow Pit Investigation
Your Ref : SK-PO098123
Our Ref : 1947
Date Reported : 07/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|--|------------------------|--------------------------------|
| Sample No.: S11465 | Hole No. : 1 | Depth (mm) : 50-900 |
| Origin : Layer 1 & 2 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Light Brown Olive | | |

| | | | | | | | | | |
|---|------------------------------|------|------|------|------|------|--|--|--|
| Optimum Moisture Content (%) : 7.7 Maximum Dry Density (kg/m ³) : 2187 | Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| | Moisture (%) | 5.7 | 6.7 | 7.7 | 8.7 | 9.7 | | | |
| | Density (kg/m ³) | 2128 | 2162 | 2187 | 2160 | 2131 | | | |



Remarks :

FORM: A7

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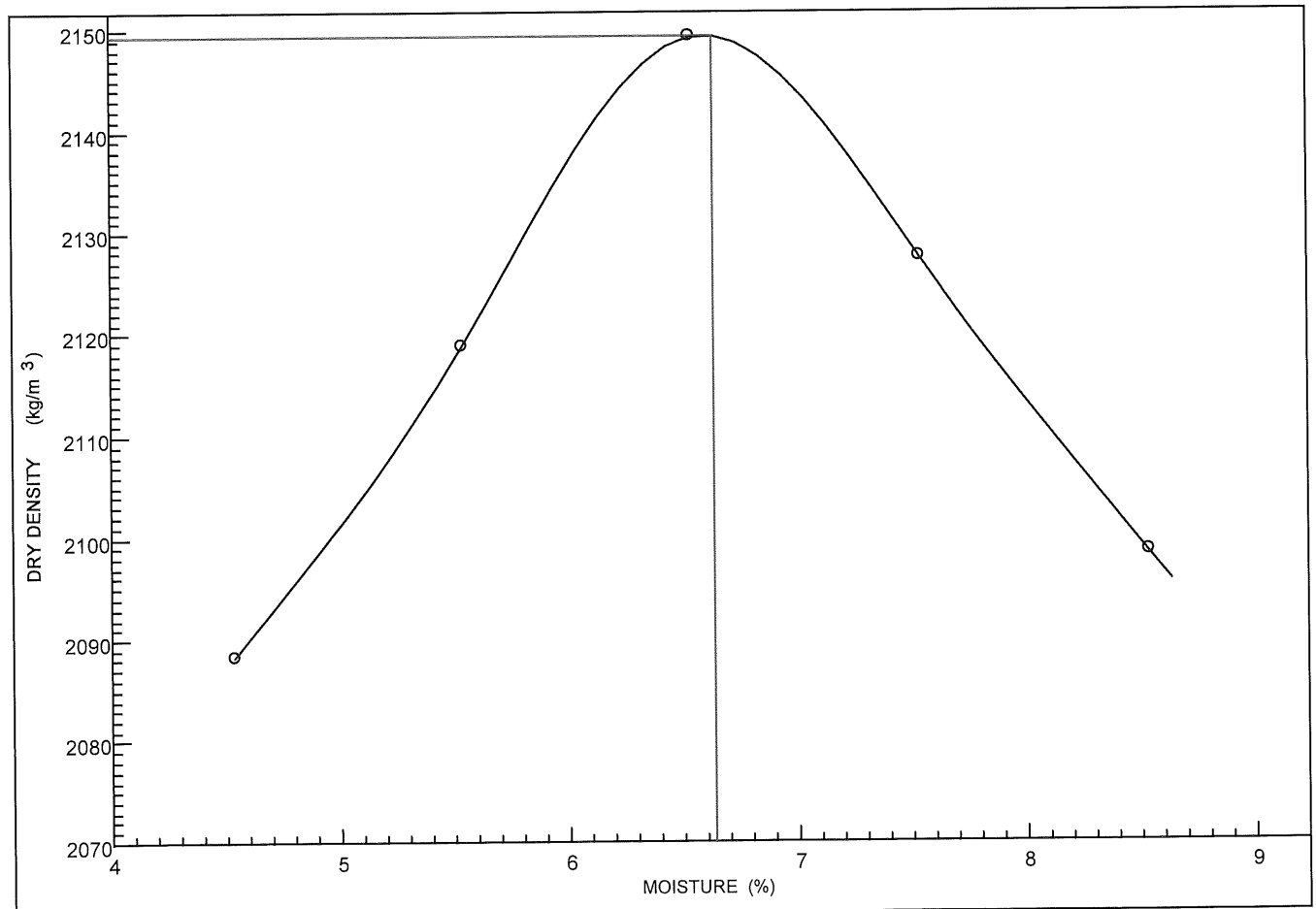
TEST RESULTS

| | | |
|--|---------------|--|
| Kruger National Park Private Bag X 402 Skukuza 1350 Attention: Ben Momberg | Project | : Geotechnical Survey Along Proposed New Shangoni Gate : Borrow Pit Investigation |
| | Your Ref | : SK-PO098123 |
| | Our Ref | : 1947 |
| | Date Reported | : 02/09/2019 |

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|--|------------------------|--------------------------------|
| Sample No.: S11466 | Hole No. : 1 | Depth (mm) : 0-1000 |
| Origin : Layer 1 & 2 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Dark Orange Brown | | |

| | | | | | | | | | |
|---|------------------------------|------|------|------|------|------|--|--|--|
| Optimum Moisture Content (%) : 6.6 Maximum Dry Density (kg/m ³) : 2149 | Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| | Moisture (%) | 4.5 | 5.5 | 6.5 | 7.5 | 8.5 | | | |
| | Density (kg/m ³) | 2088 | 2119 | 2149 | 2128 | 2098 | | | |



Remarks :

FORM: A7

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

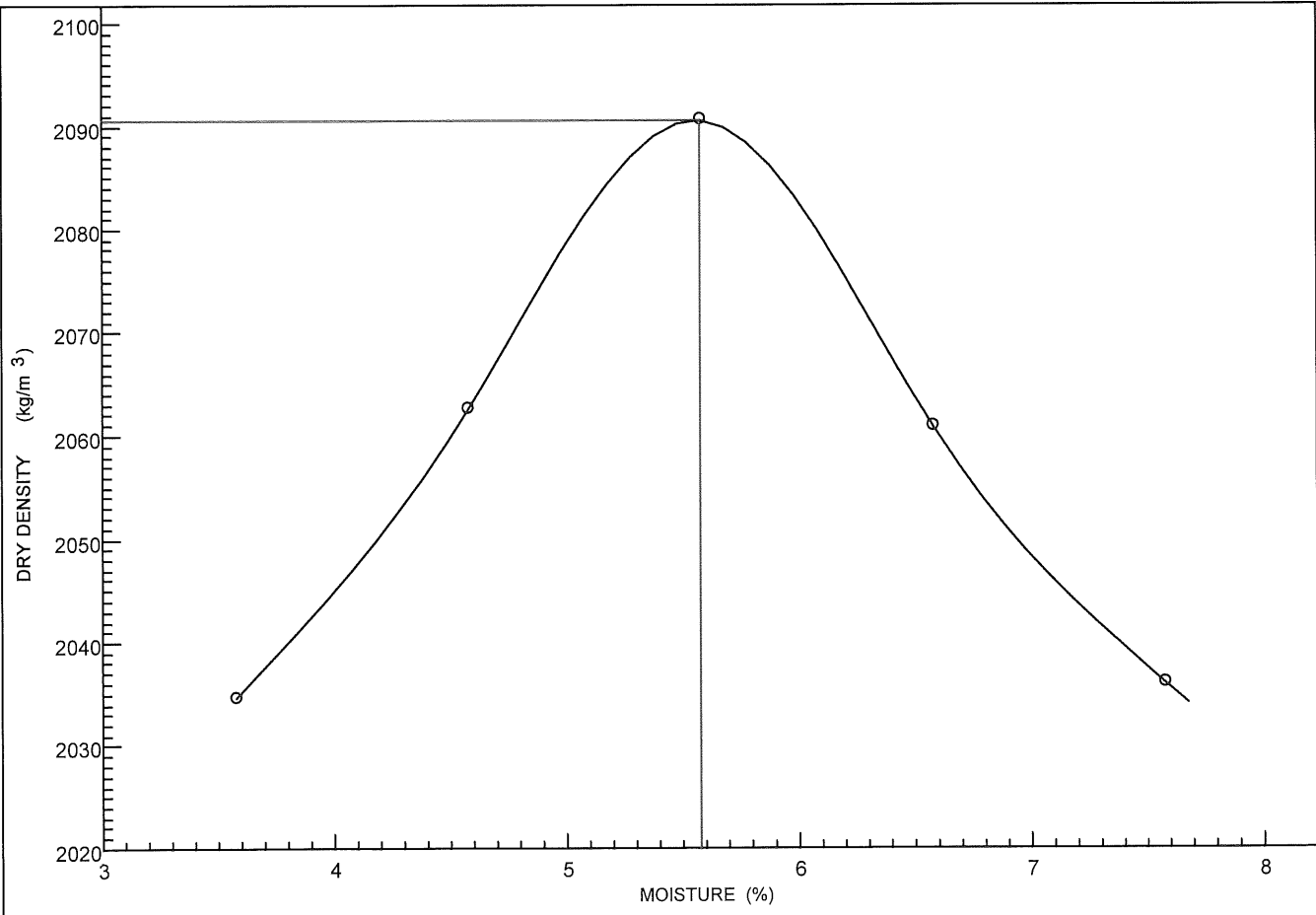
Project : Geotechnical Survey Along Proposed New Shangoni Gate
: Borrow Pit Investigation
Your Ref : SK-PO098123
Our Ref : 1947
Date Reported : 02/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|--|------------------------|--------------------------------|
| Sample No.: S11467 | Hole No. : 1 | Depth (mm) : 100-1000 |
| Origin : Layer 2 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Light Reddish Brown | | |

Optimum Moisture Content (%) : 5.6
Maximum Dry Density (kg/m³) : 2091

| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Moisture (%) | 3.6 | 4.6 | 5.6 | 6.6 | 7.6 | | | |
| Density (kg/m ³) | 2035 | 2063 | 2091 | 2061 | 2036 | | | |



Remarks :

FORM: A7

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
: Borrow Pit Investigation
Your Ref : SK-PO098123
Our Ref : 1947/M/F
Date Reported : 16/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12,GR30,GR40)

| SAMPLE NO. | S11468 | S11469 | S11470 | S11471 |
|-----------------|----------------------------------|----------------------------------|-------------------------|--------------------------|
| HOLE NO. | 2 | 3 | 1 | 1 |
| ROAD NO. | - | - | - | - |
| DEPTH | 250-850 | 150-1300 | 150-600 | 600-1000 |
| CHAINAGE | BP 1N | BP 1N | BP 3N | BP 3N |
| LAYER TYPE | Layer 2 | Layer 2 | Layer 2 & 3 | Layer 4 |
| STABILISED WITH | - | Neat | Neat | - |
| SUPPLIER | - | - | - | - |
| CURING METHOD | - | - | - | - |
| DESCRIPTION | Light Reddish Brown Sandy Gravel | Light Reddish Brown Sandy Gravel | Dark Brown Sandy Gravel | Light Brown Sandy Gravel |

SIEVE ANALYSIS (% PASSING)

| Sieve Size | S11468 | S11469 | S11470 | S11471 |
|------------|--------|--------|--------|--------|
| 100 mm | | | 100 | 100 |
| 75 mm | | | 96 | 93 |
| 63 mm | 100 | 100 | 96 | 91 |
| 50 mm | 96 | 92 | 87 | 79 |
| 37.5 mm | 94 | 89 | 72 | 70 |
| 28.0 mm | 91 | 83 | 57 | 64 |
| 20.0 mm | 88 | 79 | 50 | 60 |
| 14.0 mm | 79 | 74 | 39 | 54 |
| 5.0 mm | 50 | 40 | 28 | 39 |
| 2.0 mm | 32 | 23 | 24 | 26 |
| 0.425 mm | 16 | 11 | 17 | 12 |
| 0.075 mm | 7 | 4 | 9 | 11 |

SOIL MORTAR

| Soil Mortar Type | S11468 | S11469 | S11470 | S11471 |
|-----------------------------|--------|--------|--------|--------|
| COARSE SAND <2.0mm >0.425mm | 50 | 52 | 29 | 54 |
| FINE SAND <0.425mm >0.075mm | 28 | 30 | 33 | 4 |
| MATERIAL <0.075mm | 22 | 18 | 38 | 42 |

CONSTANTS

| Property | S11468 | S11469 | S11470 | S11471 |
|-------------------------------|----------|----------|----------|----------|
| GRADING MODULUS | 2.45 | 2.62 | 2.50 | 2.51 |
| PRA CLASSIFICATION | A-1-a(0) | A-1-a(0) | A-2-6(0) | A-2-6(0) |
| UNIFIED SOIL CLAS. | GP-GC | GP | GP-GC | GP-GC |
| COLTO CLASSIFICATION | | G8 | G7 | |
| TRH Class. (INSITU [93% 90%]) | | G8 G10 | G8 G8 | |
| LIQUID LIMIT (%) | - | - | 38 | 33 |
| PLASTICITY INDEX (0.425mm) | SP | NP | 15 | 13 |
| LINEAR SHRINKAGE (%) | 0.5 | 0.0 | 7.5 | 6.5 |

MOD AASHTO

| Property | S11468 | S11469 | S11470 | S11471 |
|--|--------|--------|--------|--------|
| MAXIMUM DRY DENSITY (kg/m ³) | | 2104 | 2152 | |
| OPTIMUM MOISTURE CONTENT(%) | | 8.6 | 9.9 | |
| MOULDING MOISTURE (%) | | 8.8 | 10.0 | |

| TYPE OF TEST | CBR | CBR | |
|---------------------------|-----|-----|--|
| CBR-UCS @ 100% MOD AASHTO | 31 | 30 | |
| CBR-UCS @ 98% MOD AASHTO | 23 | 25 | |
| CBR-UCS @ 97% MOD AASHTO | 19 | 23 | |
| CBR-UCS @ 95% MOD AASHTO | 14 | 19 | |
| CBR-UCS @ 93% MOD AASHTO | 10 | 16 | |
| CBR-UCS @ 90% MOD AASHTO | 6.5 | 12 | |

CBR-UCS @ % MOD AASHTO derived from calculation.

| % SWELL AT [MOD][NRB][PROC] | | | | | | | | | |
|-----------------------------|--|------|------|------|------|------|------|--|--|
| | | 0.06 | 0.16 | 0.34 | 0.04 | 0.06 | 0.12 | | |

Remarks :

FORM: A1

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Technical Signatory: Van Rooyen / K.Z Mlambo

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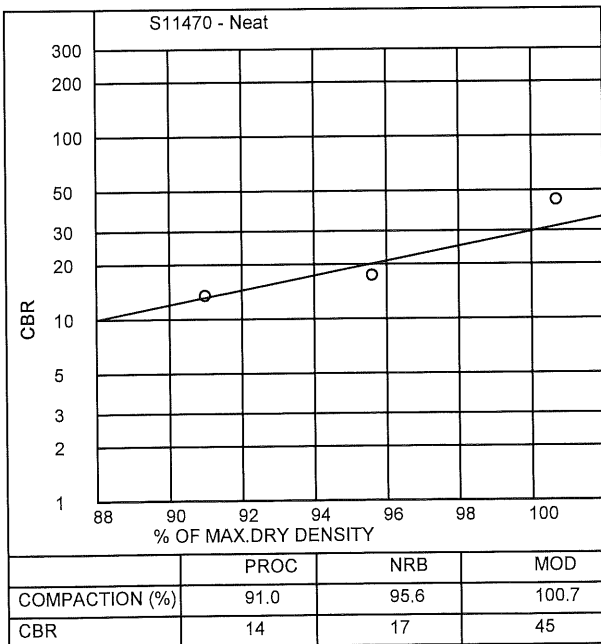
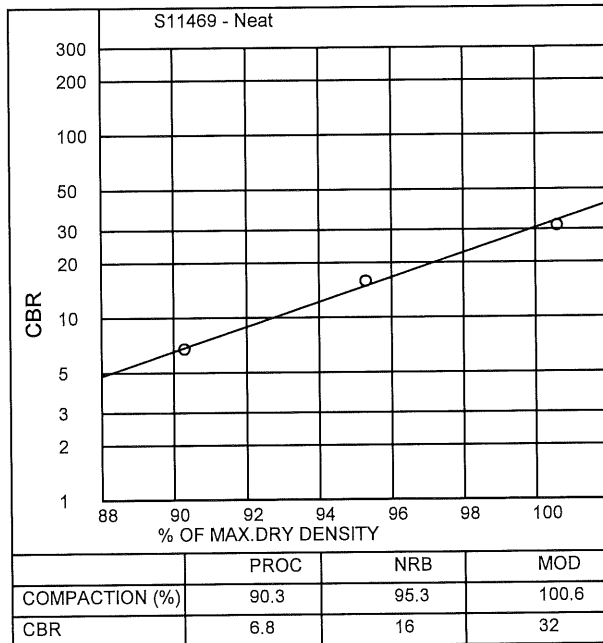
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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/M/F
 Date Reported : 16/09/2019

CBR-UCS GRAPH/S (OPTIONAL INFORMATION)





MATROLAB

SGS MATROLAB (PTY) LTD
 - CIVIL ENGINEERING SERVICES -
 Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587
 a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137587302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

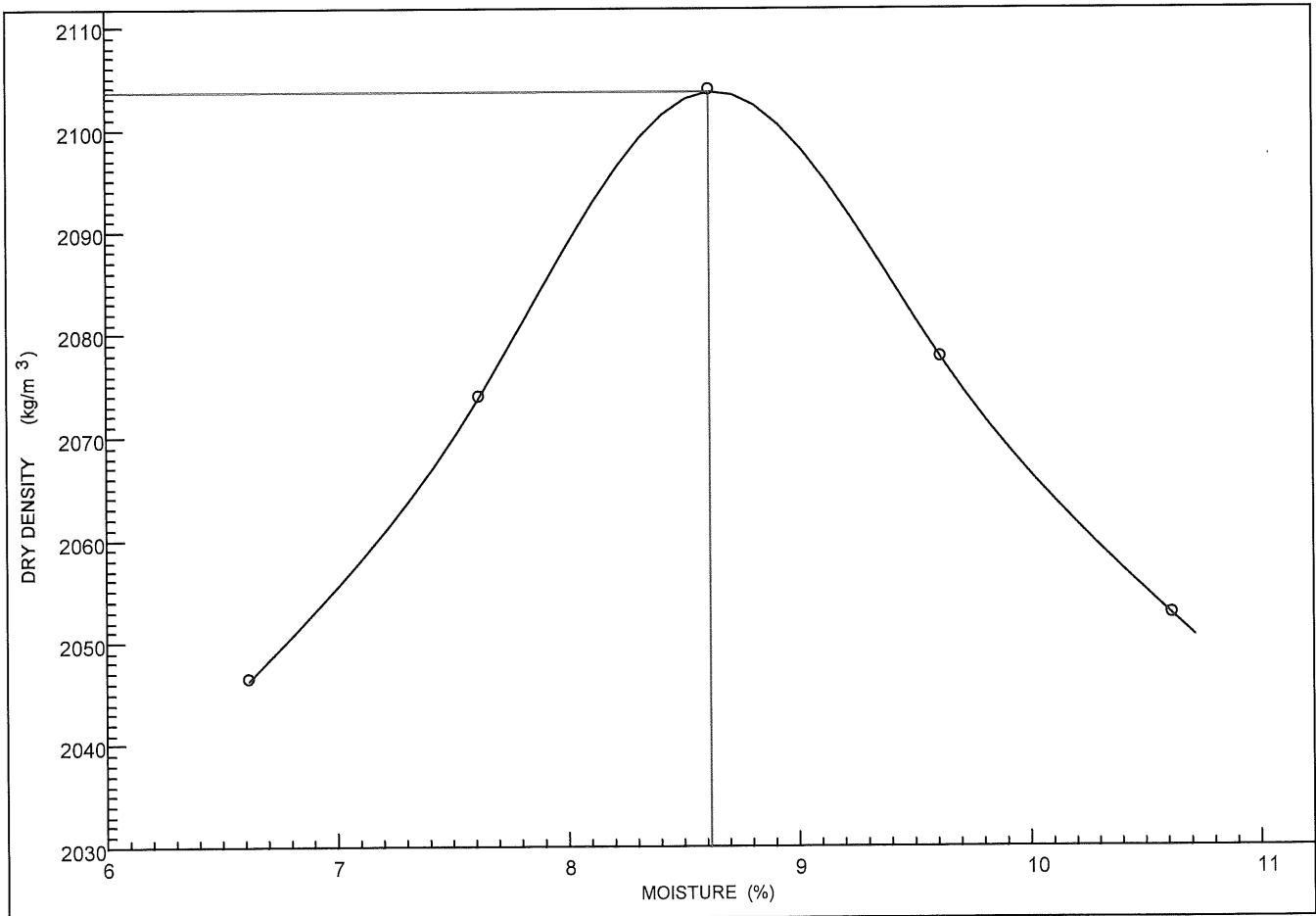
Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 07/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|--|------------------------|--------------------------------|
| Sample No.: S11469 | Hole No. : 3 | Depth (mm) : 150-1300 |
| Origin : Layer 2 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Light Reddish Brown | | |

Optimum Moisture Content (%) : 8.6
 Maximum Dry Density (kg/m³) : 2104

| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Moisture (%) | 6.6 | 7.6 | 8.6 | 9.6 | 10.6 | | | |
| Density (kg/m ³) | 2046 | 2074 | 2104 | 2078 | 2053 | | | |



Remarks :

FORM: A7

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TEST RESULTS

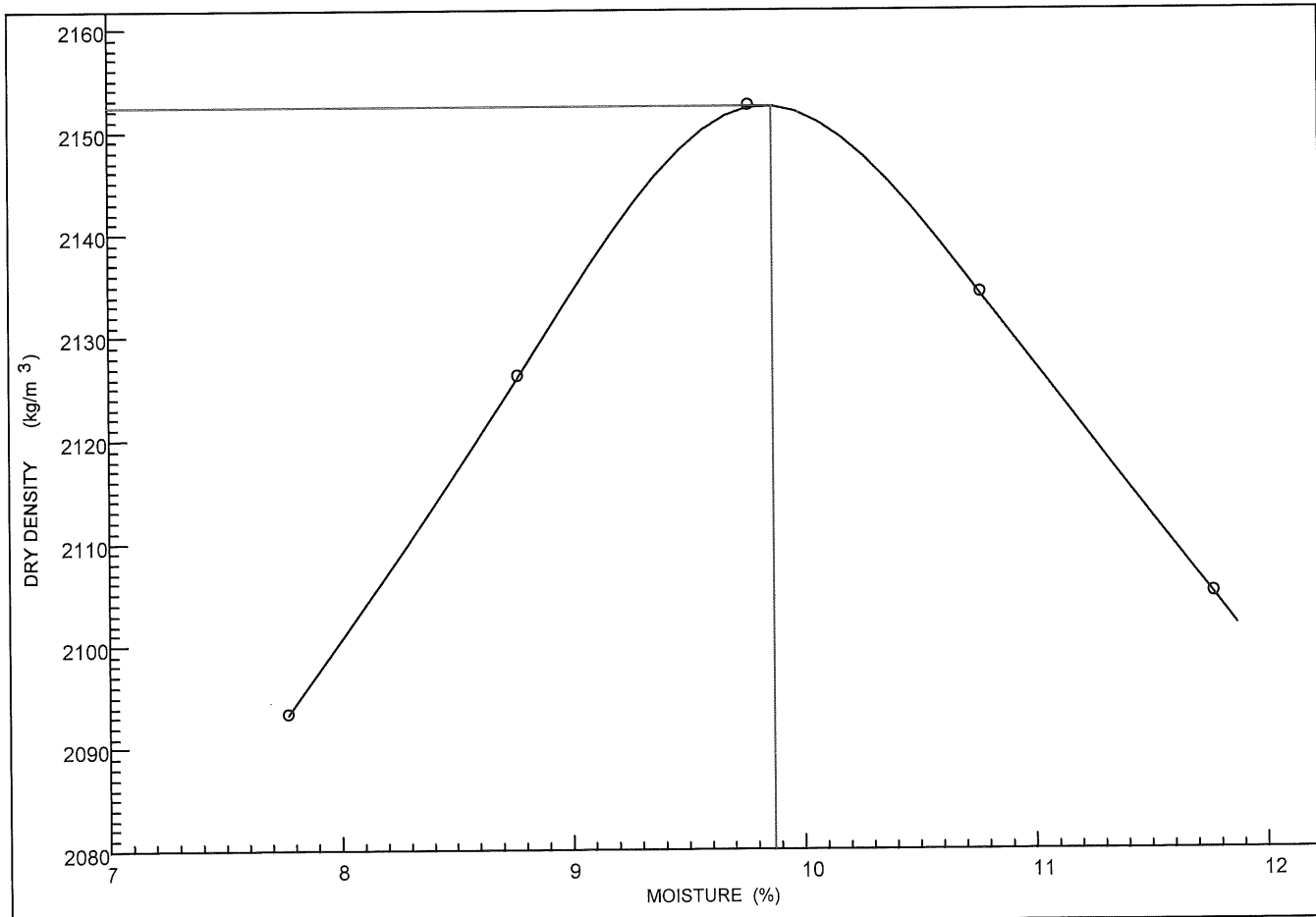
Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 02/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|-----------------------------------|------------------------|--------------------------------|
| Sample No.: S11470 | Hole No. : 1 | Depth (mm) : 150-600 |
| Origin : Layer 2 & 3 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Dark Brown | | |

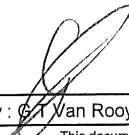
| | | | | | | | | | |
|---|------------------------------|------|------|------|------|------|--|--|--|
| Optimum Moisture Content (%) : 9.9 Maximum Dry Density (kg/m ³) : 2152 | Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| | Moisture (%) | 7.8 | 8.8 | 9.8 | 10.8 | 11.8 | | | |
| | Density (kg/m ³) | 2093 | 2126 | 2152 | 2134 | 2105 | | | |



Remarks :

FORM: A7

4.4.0(SGS)(2016.08.31)

Technical Signatory :  / K.Z Mlambo

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
: Borrow Pit Investigation
Your Ref : SK-PO098123
Our Ref : 1947/M/G
Date Reported : 17/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12,GR30,GR40,GR53)

| SAMPLE NO. | S11472 | S11472 A | S11472 B | |
|-----------------|---------------------------|---------------------------|---------------------------|--|
| HOLE NO. | 2 | 2 | 2 | |
| ROAD NO. | - | - | - | |
| DEPTH | 650-1650 | 650-1650 | 650-1650 | |
| CHAINAGE | BP 3N | BP 3N | BP 3N | |
| LAYER TYPE | Layer 2 | Layer 2 | Layer 2 | |
| STABILISED WITH | Neat | 2.5 % Cement | 3.5 % Cement | |
| SUPPLIER | - | See Remarks | See Remarks | |
| CURING METHOD | - | Rapid | Rapid | |
| DESCRIPTION | Light Brown Gravelly Sand | Light Brown Gravelly Sand | Light Brown Gravelly Sand | |

SIEVE ANALYSIS (% PASSING)

| Sieve Size | S11472 | S11472 A | S11472 B | |
|------------|--------|----------|----------|--|
| 100 mm | 100 | 100 | 100 | |
| 75 mm | 95 | 95 | 95 | |
| 63 mm | 92 | 92 | 92 | |
| 50 mm | 90 | 90 | 90 | |
| 37.5 mm | 89 | 89 | 89 | |
| 28.0 mm | 88 | 88 | 88 | |
| 20.0 mm | 84 | 84 | 84 | |
| 14.0 mm | 67 | 67 | 67 | |
| 5.0 mm | 39 | 39 | 39 | |
| 2.0 mm | 18 | 18 | 18 | |
| 0.425 mm | 12 | 12 | 12 | |
| 0.075 mm | | | | |

SOIL MORTAR

| Material | S11472 | S11472 A | S11472 B | |
|-----------------------------|--------|----------|----------|--|
| COARSE SAND <2.0mm >0.425mm | 54 | 54 | 54 | |
| FINE SAND <0.425mm >0.075mm | 15 | 15 | 15 | |
| MATERIAL <0.075mm | 31 | 31 | 31 | |

CONSTANTS

| Property | S11472 | S11472 A | S11472 B | |
|------------------------------|----------|----------|----------|--|
| GRADING MODULUS | 2.31 | 2.31 | 2.31 | |
| PRA CLASSIFICATION | A-2-7(0) | A-1-a(0) | A-1-a(0) | |
| UNIFIED SOIL CLAS. | SP-SC | SP-SM | SP-SC | |
| COLTO CLASSIFICATION | --- | C3 | C3 | |
| TRH CLASSIFICATION | - | C3 | C3 | |
| TRH Class.(INSITU [93% 90%]) | G8 G8 | | | |
| LIQUID LIMIT (%) | 44 | 31 | - | |
| PLASTICITY INDEX (0.425mm) | 19 | 5 | NP | |
| LINEAR SHRINKAGE (%) | 10.0 | 2.0 | 0.0 | |

MOD AASHTO

| Property | S11472 | S11472 A | S11472 B | |
|--|--------|----------|----------|--|
| MAXIMUM DRY DENSITY (kg/m ³) | 22 | 2237 | 2237 | |
| OPTIMUM MOISTURE CONTENT(%) | 10.5 | 7.6 | 7.6 | |
| MOULDING MOISTURE (%) | 10.2 | 7.6 | 7.8 | |

| TYPE OF TEST | CBR | UCS (MPa) | UCS (MPa) | |
|---------------------------|-----|-----------|-----------|--|
| CBR-UCS @ 100% MOD AASHTO | 48 | 1.70 MPa. | 2.41 MPa. | |
| CBR-UCS @ 98% MOD AASHTO | 36 | 1.34 MPa. | 1.91 MPa. | |
| CBR-UCS @ 97% MOD AASHTO | 31 | 1.19 MPa. | 1.70 MPa. | |
| CBR-UCS @ 95% MOD AASHTO | 24 | 0.93 MPa. | 1.35 MPa. | |
| CBR-UCS @ 93% MOD AASHTO | 18 | 0.73 MPa. | 1.07 MPa. | |
| CBR-UCS @ 90% MOD AASHTO | 12 | 0.51 MPa. | 0.76 MPa. | |

CBR-UCS @ % MOD AASHTO derived from calculation.

| % SWELL AT [MOD][NRB][PROC] | 0.04 | 0.07 | 0.17 | | | | | | |
|-----------------------------|------|------|------|--|--|--|--|--|--|
| | | | | | | | | | |

DEVIATION FROM TEST METHOD: UCS reported to nearest 0.01 MPa.

Remarks : Durabuild Lafarge Cem IV/B-V 32.5 N

FORM: A1

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Technical Signatory: G.T. Van Rooyen / K.Z Mlambo

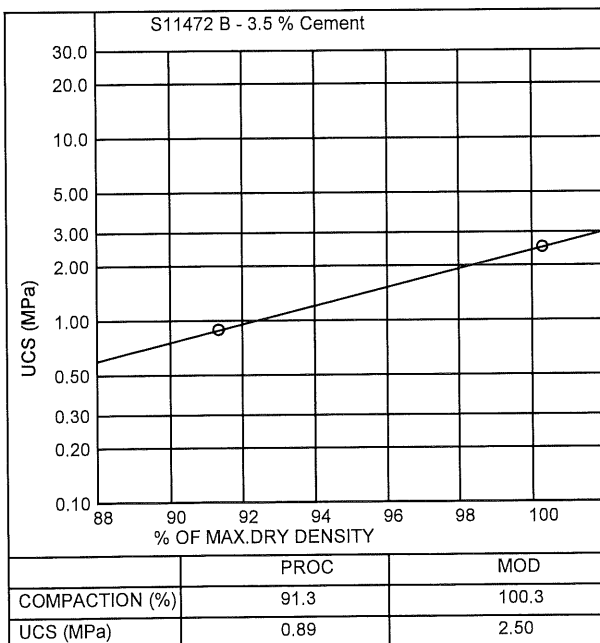
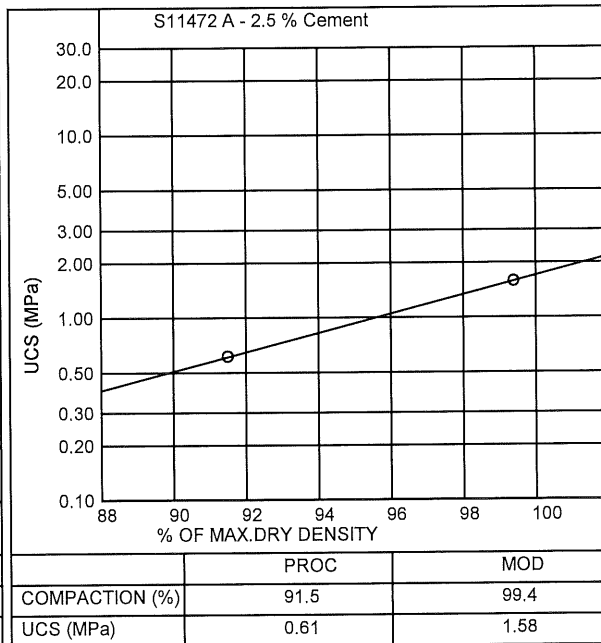
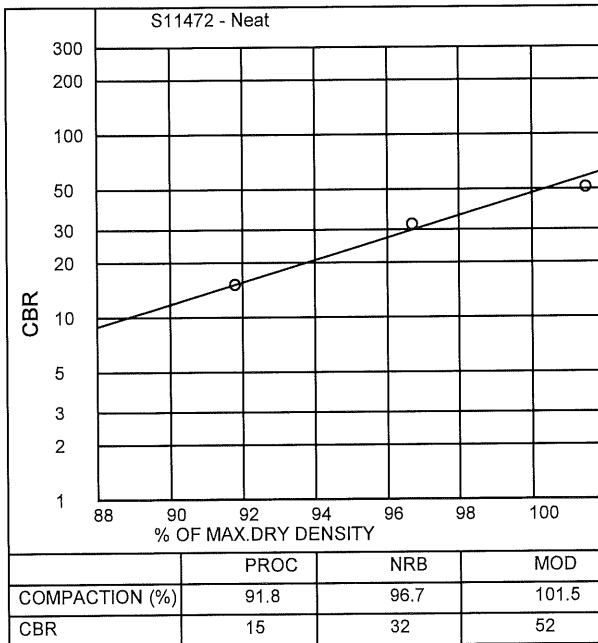
27

TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
: Borrow Pit Investigation
Your Ref : SK-PO098123
Our Ref : 1947/M/G
Date Reported : 17/09/2019

CBR-UCS GRAPH/S (OPTIONAL INFORMATION)



TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
: Borrow Pit Investigation
Your Ref : SK-PO098123
Our Ref : 1947/M/G
Date Reported : 17/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, MOD AASHTO, UCS, ITS(SANS 3001:GR54)

| SAMPLE NO. | S11472 A | S11472 B | | |
|-----------------|------------------------------|------------------------------|--|--|
| HOLE NO. | 2 | 2 | | |
| ROAD NO. | - | - | | |
| DEPTH | 650-1650 | 650-1650 | | |
| CHAINAGE | BP 3N | BP 3N | | |
| LAYER TYPE | Layer 2 | Layer 2 | | |
| STABILISED WITH | 2.5 % Cement | 3.5 % Cement | | |
| SUPPLIER | See Remarks | See Remarks | | |
| CURING METHOD | Rapid | Rapid | | |
| DESCRIPTION | Light Brown Gravelly Sand | Light Brown Gravelly Sand | | |

INDIRECT TENSILE STRENGTH

| | | | | |
|-------------------------------------|----------------------|----------------------|--|--|
| 1. COMPACTION (%) : ITS (kPa) | 99.6 : 310.00 | 100.0 : 360.00 | | |
| 2. COMPACTION (%) : ITS (kPa) | 99.6 : 290.00 | 99.7 : 420.00 | | |
| 3. COMPACTION (%) : ITS (kPa) | | | | |
| AVERAGE COMP.(%) : ITS (kPa) | 99.6 : 300.00 | 99.8 : 390.00 | | |

Remarks : Durabuild Lafarge Cem IV/B-V 32.5 N

FORM: D1

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Technical Signatory : G.T Van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

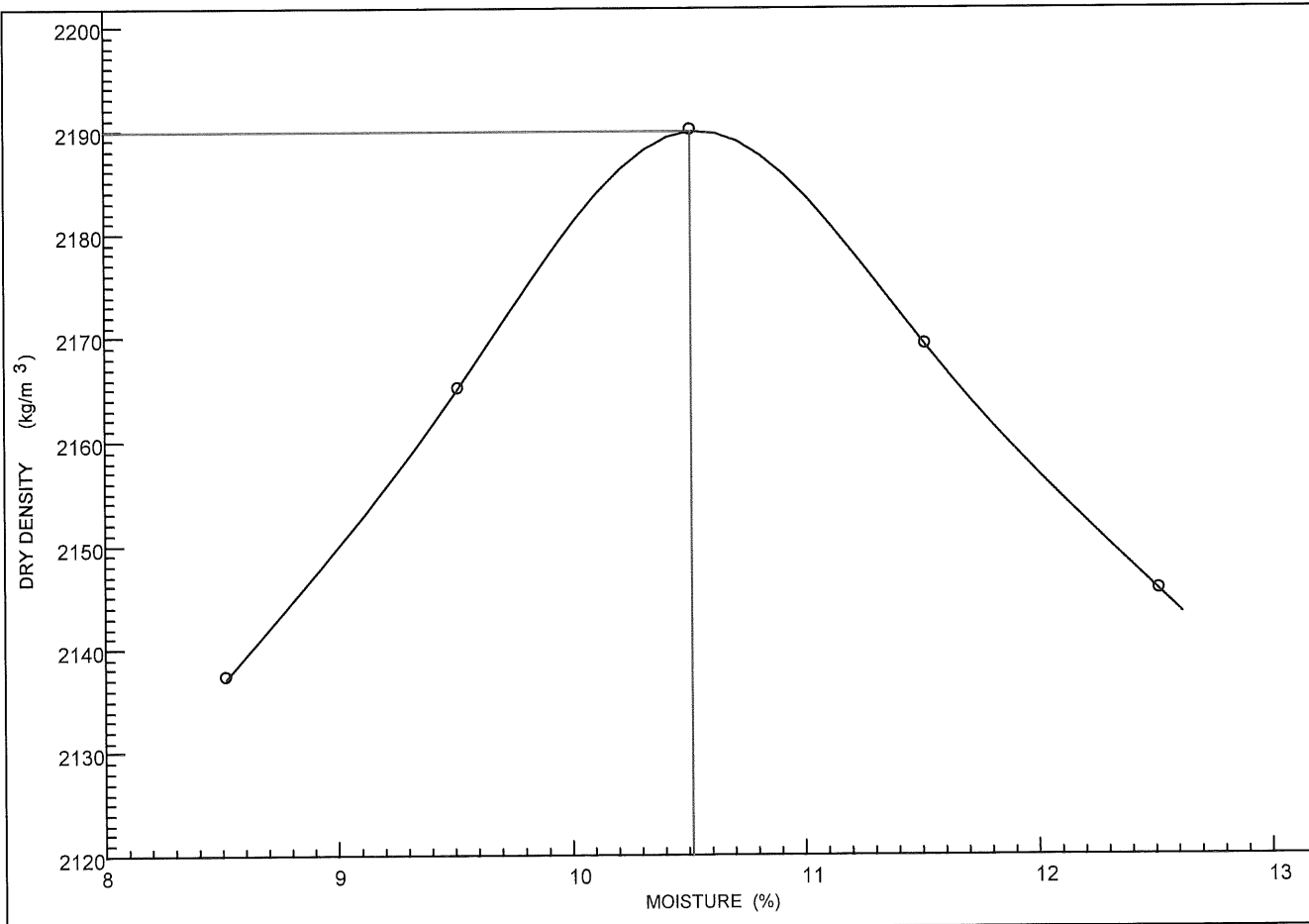
Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 07/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|------------------------------------|------------------------|--------------------------------|
| Sample No.: S11472 | Hole No. : 2 | Depth (mm) : 650-1650 |
| Origin : Layer 2 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Light Brown | | |

Optimum Moisture Content (%) : 10.5
 Maximum Dry Density (kg/m³) : 2190

| | | | | | | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| Moisture (%) | 8.5 | 9.5 | 10.5 | 11.5 | 12.5 | | | |
| Density (kg/m ³) | 2137 | 2165 | 2190 | 2169 | 2146 | | | |



Remarks :

FORM: A7

4.4.0(SGS)(2016.08.31)

Technical Signatory : G.T. Van Rooyen / K.Z Mlambo

30

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

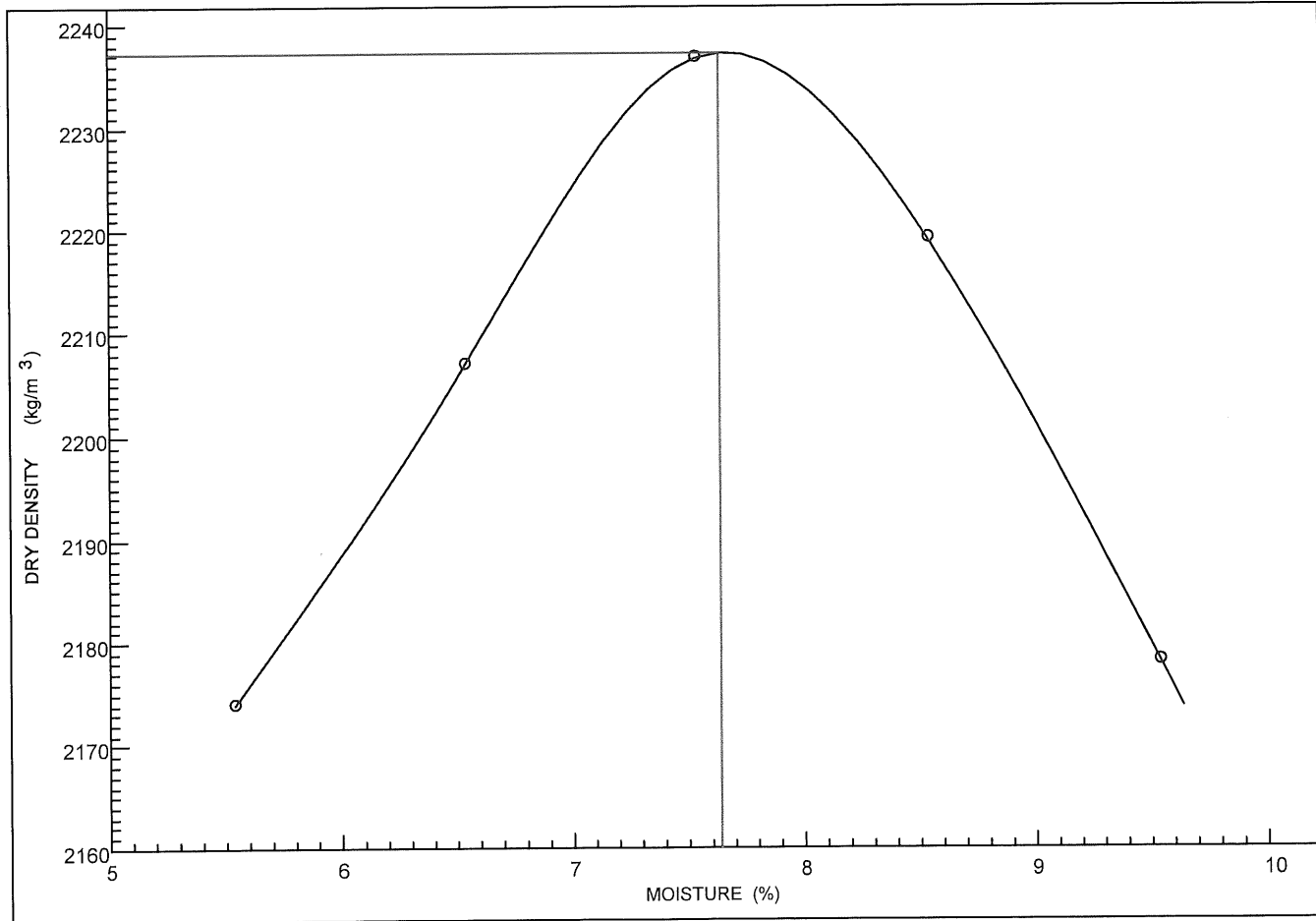
Project : Geotechnical Survey Along Proposed New Shangoni Ga
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 07/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|------------------------------------|--------------------------------|--------------------------------|
| Sample No.: S11472 A | Hole No. : 2 | Depth (mm) : 650-1650 |
| Origin : Layer 2 | Stabilized With : 2.5 % Cement | Compaction Energy : MOD AASHTO |
| Material Description : Light Brown | | |

Optimum Moisture Content (%) : 7.6
 Maximum Dry Density (kg/m³) : 2237

| | | | | | | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| Moisture (%) | 5.5 | 6.5 | 7.5 | 8.5 | 9.5 | | | |
| Density (kg/m ³) | 2174 | 2207 | 2237 | 2219 | 2178 | | | |



Remarks :

FORM: A7

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Technical Signatory: *G.T Van Rooyen / K.Z Mlambo*

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
: Borrow Pit Investigation
Your Ref : SK-PO098123
Our Ref : 1947/M/H
Date Reported : 17/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12,GR30,GR40)

| SAMPLE NO. | S11473 | S11474 | S11474 A | S11475 |
|-----------------|--------------------------|----------------------------------|---------------------------|--------------------------|
| HOLE NO. | 1 | 1 | 1 | 2 |
| ROAD NO. | - | - | - | - |
| DEPTH | 0-500 | 0-900 | 900-1100 | 0-500 |
| CHAINAGE | BP 4N | BP 5N | BP 5N | BP 5N |
| LAYER TYPE | Layer 1 | Layer 1 & 2 | Layer 1 & 2 | Layer 1 |
| STABILISED WITH | - | Neat | - | - |
| SUPPLIER | - | - | - | - |
| CURING METHOD | - | - | - | - |
| DESCRIPTION | Dark Brown Gravelly Sand | Dark Reddish Brown Gravelly Sand | Light Brown Gravelly Sand | Dark Brown Gravelly Sand |

SIEVE ANALYSIS (% PASSING)

| Sieve Size | S11473 | S11474 | S11474 A | S11475 |
|------------|--------|--------|----------|--------|
| 100 mm | | | 100 | 100 |
| 75 mm | | | 93 | 97 |
| 63 mm | | 100 | 84 | 97 |
| 50 mm | 100 | 99 | 74 | 94 |
| 37.5 mm | 98 | 87 | 67 | 89 |
| 28.0 mm | 94 | 82 | 61 | 85 |
| 20.0 mm | 88 | 78 | 53 | 78 |
| 14.0 mm | 76 | 74 | 47 | 69 |
| 5.0 mm | 35 | 51 | 35 | 48 |
| 2.0 mm | 21 | 35 | 24 | 40 |
| 0.425 mm | 13 | 22 | 11 | 27 |
| 0.075 mm | 4 | 9 | 4 | 12 |

SOIL MORTAR

| Material | S11473 | S11474 | S11474 A | S11475 |
|-----------------------------|--------|--------|----------|--------|
| COARSE SAND <2.0mm >0.425mm | 38 | 37 | 54 | 32 |
| FINE SAND <0.425mm >0.075mm | 43 | 37 | 29 | 38 |
| MATERIAL <0.075mm | 19 | 26 | 17 | 30 |

CONSTANTS

| Property | S11473 | S11474 | S11474 A | S11475 |
|----------------------------|----------|----------|----------|----------|
| GRADING MODULUS | 2.62 | 2.34 | 2.61 | 2.21 |
| PRA CLASSIFICATION | A-1-a(0) | A-1-a(0) | A-1-a(0) | A-1-a(0) |
| UNIFIED SOIL CLAS. | GP | SP-SC | GP | GP-GM-GC |
| COLTO CLASSIFICATION | | G5 | | |
| TRH CLASSIFICATION | | G5 | | |
| LIQUID LIMIT (%) | - | - | - | 22 |
| PLASTICITY INDEX (0.425mm) | NP | SP | SP | 6 |
| LINEAR SHRINKAGE (%) | 0.0 | 0.5 | 0.5 | 3.0 |

MOD AASHTO

| Property | S11473 | S11474 | S11474 A | S11475 |
|--|--------|--------|----------|--------|
| MAXIMUM DRY DENSITY (kg/m ³) | | 2172 | | |
| OPTIMUM MOISTURE CONTENT(%) | | 5.4 | | |
| MOULDING MOISTURE (%) | | 5.7 | | |

TYPE OF TEST

| Test Type | S11473 | S11474 | S11474 A | S11475 |
|---------------------------|--------|--------|----------|--------|
| CBR | | 120 | | |
| CBR-UCS @ 100% MOD AASHTO | | 82 | | |
| CBR-UCS @ 98% MOD AASHTO | | 68 | | |
| CBR-UCS @ 97% MOD AASHTO | | 47 | | |
| CBR-UCS @ 95% MOD AASHTO | | 33 | | |
| CBR-UCS @ 93% MOD AASHTO | | 19 | | |
| CBR-UCS @ 90% MOD AASHTO | | | | |

CBR-UCS @ % MOD AASHTO derived from calculation.

| % SWELL AT [MOD][NRB][PROC] | S11473 | S11474 | S11474 A | S11475 |
|-----------------------------|--------|--------|----------|--------|
| | | 0.10 | 0.02 | 0.04 |

Remarks :

FORM: A1

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Technical Signatory: G. T. Van Rooyen / K.Z Mlambo

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 a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River,1240

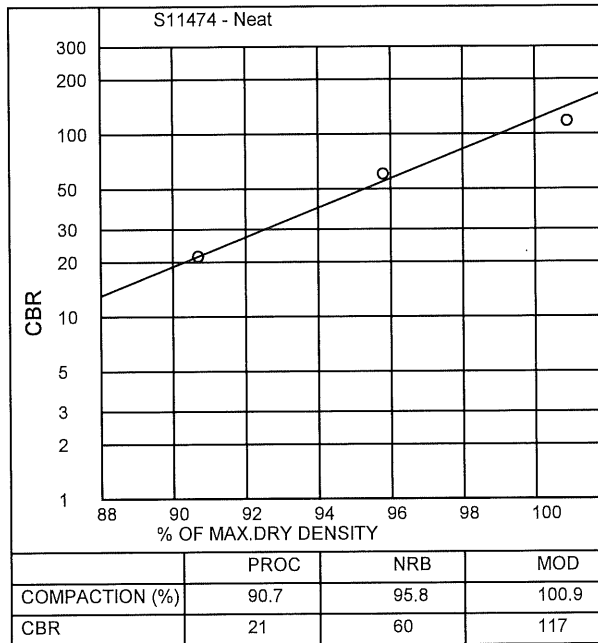
Tel. : 0137587302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/M/H
 Date Reported : 17/09/2019

CBR-UCS GRAPH/S (OPTIONAL INFORMATION)



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TEST RESULTS

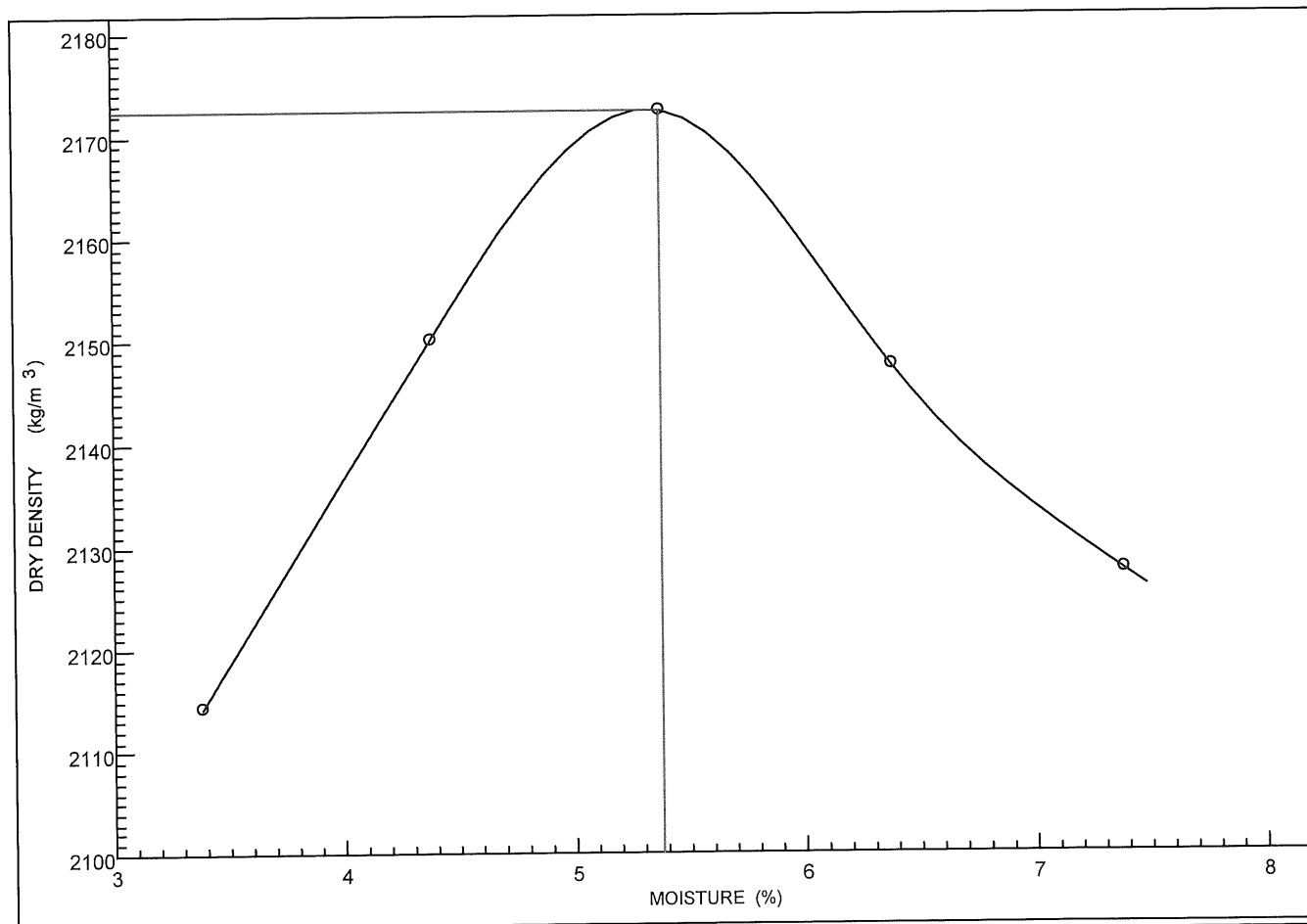
Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 05/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|---|------------------------|--------------------------------|
| Sample No.: S11474 | Hole No. : 1 | Depth (mm) : 0-900 |
| Origin : Layer 1 & 2 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Dark Reddish Brown | | |

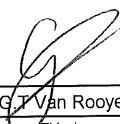
| | | | | | | | | | |
|---|------------------------------|------|------|------|------|------|--|--|--|
| Optimum Moisture Content (%) : 5.4 Maximum Dry Density (kg/m ³) : 2172 | Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| | Moisture (%) | 3.4 | 4.4 | 5.4 | 6.4 | 7.4 | | | |
| | Density (kg/m ³) | 2114 | 2150 | 2172 | 2147 | 2128 | | | |



Remarks :

FORM: A7

4.4.0(SGS)(2016.08.31)

Technical Signatory :  / K.Z Mlambo

TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
: Borrow Pit Investigation
Your Ref : SK-PO098123
Our Ref : 1947/M/I
Date Reported : 17/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12,GR30,GR40,GR53)

| SAMPLE NO. | S11476 | S11477 | S11477 A | S11477 B |
|-----------------|-------------------------------------|----------------------------|----------------------------|----------------------------|
| HOLE NO. | 2 | 1 | 1 | 1 |
| ROAD NO. | - | - | - | - |
| DEPTH | 500-900 | 100-1100 | 100-1100 | 100-1100 |
| CHAINAGE | BP 5N | BP 6N | BP 6N | BP 6N |
| LAYER TYPE | Layer 2 | Layer 2 & 3 | Layer 2 & 3 | Layer 2 & 3 |
| STABILISED WITH | - | Neat | 2.5% Cement | 3.5% Cement |
| SUPPLIER | - | - | See Remarks | See Remarks |
| CURING METHOD | - | - | Rapid | Rapid |
| DESCRIPTION | Dark Reddish Orange Sandy Gravel | Dark Brown Sandy Gravel | Dark Brown Sandy Gravel | Dark Brown Sandy Gravel |

| SIEVE ANALYSIS (% PASSING) | | | | |
|----------------------------|-----|-----|-----|-----|
| 100 mm | 100 | | | |
| 75 mm | 94 | | | |
| 63 mm | 90 | 100 | 100 | 100 |
| 50 mm | 90 | 92 | 92 | 92 |
| 37.5 mm | 87 | 80 | 80 | 80 |
| 28.0 mm | 74 | 72 | 72 | 72 |
| 20.0 mm | 74 | 61 | 61 | 61 |
| 14.0 mm | 63 | 50 | 50 | 50 |
| 5.0 mm | 32 | 35 | 35 | 35 |
| 2.0 mm | 20 | 30 | 30 | 30 |
| 0.425 mm | 10 | 19 | 19 | 19 |
| 0.075 mm | 5 | 8 | 8 | 8 |

| SOIL MORTAR | | | | |
|-----------------------------|----|----|----|----|
| COARSE SAND <2.0mm >0.425mm | 50 | 37 | 37 | 37 |
| FINE SAND <0.425mm >0.075mm | 25 | 37 | 37 | 37 |
| MATERIAL <0.075mm | 25 | 26 | 26 | 26 |

| CONSTANTS | | | | |
|----------------------------|----------|----------|----------|----------|
| GRADING MODULUS | 2.65 | 2.43 | 2.43 | 2.43 |
| PRA CLASSIFICATION | A-1-a(0) | A-1-a(0) | A-1-a(0) | A-1-a(0) |
| UNIFIED SOIL CLAS. | GP-GM-GC | GP-GM-GC | GP-GC | GP-GC |
| COLTO CLASSIFICATION | | G6 | - | C3 |
| TRH CLASSIFICATION | | G7 | - | C3 |
| LIQUID LIMIT (%) | 23 | 27 | - | - |
| PLASTICITY INDEX (0.425mm) | 5 | 6 | NP | NP |
| LINEAR SHRINKAGE (%) | 2.0 | 2.5 | 0.0 | 0.0 |

| MOD AASHTO | | | | |
|--|--|------|------|------|
| MAXIMUM DRY DENSITY (kg/m ³) | | 2220 | 2247 | 2247 |
| OPTIMUM MOISTURE CONTENT(%) | | 9.5 | 6.7 | 6.7 |
| MOULDING MOISTURE (%) | | 9.8 | 6.7 | 6.9 |

| TYPE OF TEST | CBR | UCS (MPa) | UCS (MPa) |
|---------------------------|-----|-----------|-----------|
| CBR-UCS @ 100% MOD AASHTO | 61 | 1.42 MPa. | 2.10 MPa. |
| CBR-UCS @ 98% MOD AASHTO | 45 | 1.16 MPa. | 1.74 MPa. |
| CBR-UCS @ 97% MOD AASHTO | 38 | 1.05 MPa. | 1.58 MPa. |
| CBR-UCS @ 95% MOD AASHTO | 28 | 0.87 MPa. | 1.31 MPa. |
| CBR-UCS @ 93% MOD AASHTO | 21 | 0.71 MPa. | 1.08 MPa. |
| CBR-UCS @ 90% MOD AASHTO | 13 | 0.53 MPa. | 0.82 MPa. |

| | | | | | | | | | | |
|--|--|--|------|------|------|--|--|--|--|--|
| CBR-UCS @ % MOD AASHTO derived from calculation. | | | | | | | | | | |
| % SWELL AT [MOD][NRB][PROC] | | | 0.02 | 0.06 | 0.11 | | | | | |

DEVIATION FROM TEST METHOD: UCS reported to nearest 0.01 MPa.

Remarks : Road Cem II/B-L Lafrage 32.5 N

FORM: A1

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Technical Signatory: G.T Van Rooyen / K.Z Mlambo

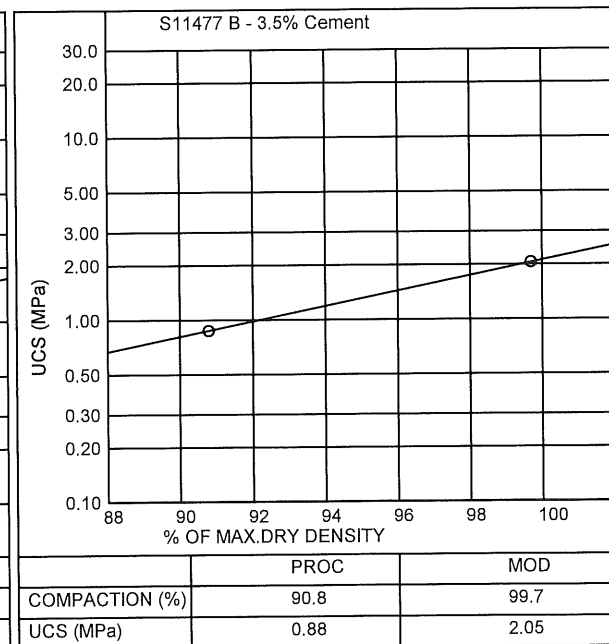
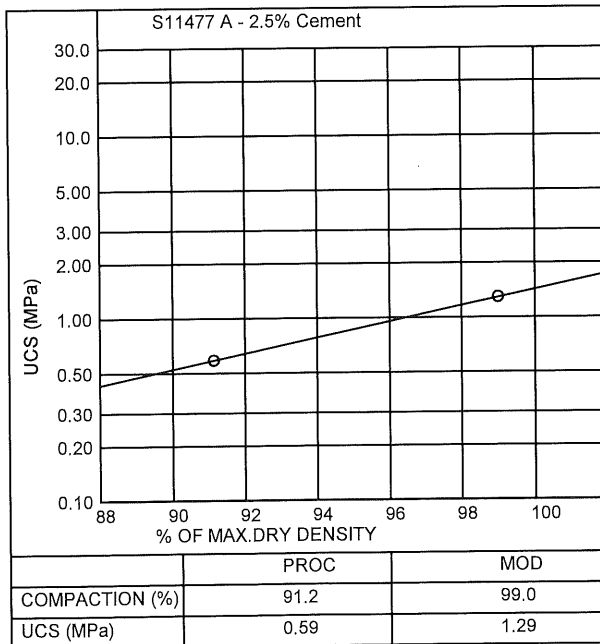
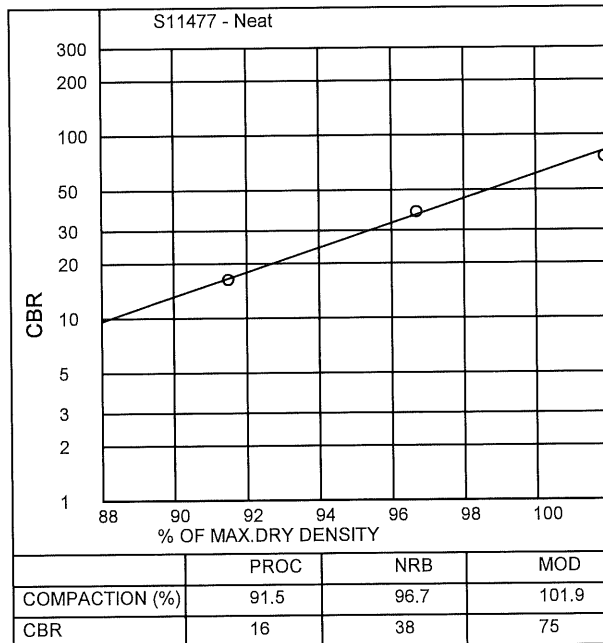
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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/M/I
 Date Reported : 17/09/2019

CBR-UCS GRAPH/S (OPTIONAL INFORMATION)



SGS MATROLAB (PTY) LTD
 - CIVIL ENGINEERING SERVICES -
 Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587

a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137587302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/M/I
 Date Reported : 17/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, MOD AASHTO, UCS, ITS(SANS 3001:GR54)

| | | | | |
|-----------------|----------------------------|-------------|--|--|
| SAMPLE NO. | S11477 A | S11477 B | | |
| HOLE NO. | 1 | 1 | | |
| ROAD NO. | - | - | | |
| DEPTH | 100-1100 | 100-1100 | | |
| CHAINAGE | BP 6N | BP 6N | | |
| LAYER TYPE | Layer 2 & 3 | Layer 2 & 3 | | |
| STABILISED WITH | 2.5% Cement | 3.5% Cement | | |
| SUPPLIER | See Remarks | See Remarks | | |
| CURING METHOD | Rapid | Rapid | | |
| DESCRIPTION | Dark Brown Sandy Gravel | Dark Brown | | |

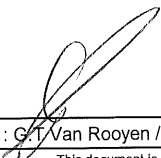
INDIRECT TENSILE STRENGTH

| | | | | |
|-------------------------------|---------------|---------------|--|--|
| 1. COMPACTION (%) : ITS (kPa) | 99.5 : 210.00 | 99.8 : 260.00 | | |
| 2. COMPACTION (%) : ITS (kPa) | 99.4 : 220.00 | 99.0 : 260.00 | | |
| 3. COMPACTION (%) : ITS (kPa) | | | | |
| AVERAGE COMP.(%) : ITS (kPa) | 99.5 : 220.00 | 99.4 : 260.00 | | |

Remarks : Road Cem II/B-L Lafrage 32.5 N

FORM: D1

4.4.0(SGS)(2016.08.31)

Technical Signatory :  / K.Z Mlambo

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

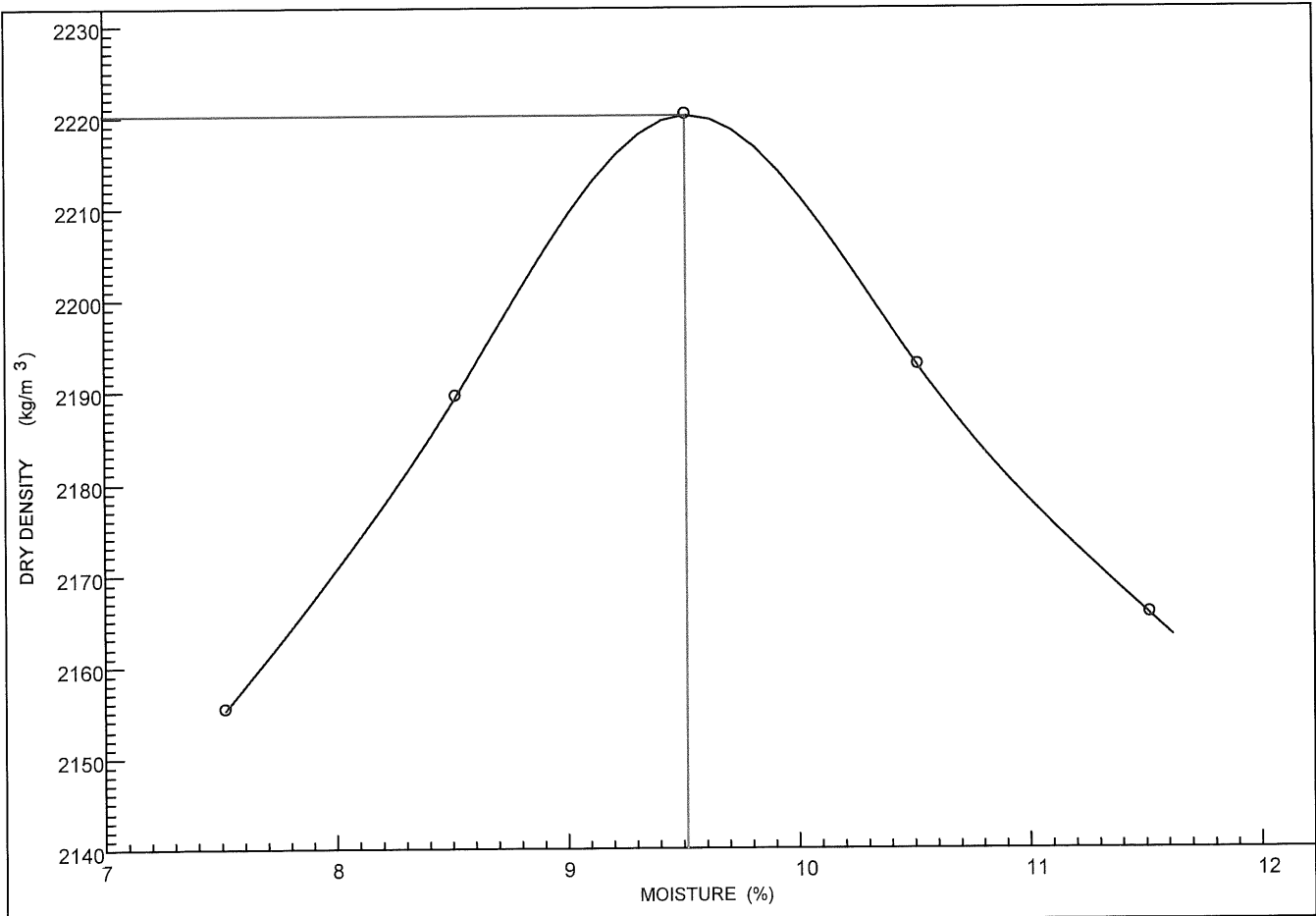
Project : Geotechnical Survey Along Proposed New Shangoni Gate
: Borrow Pit Investigation
Your Ref : SK-PO098123
Our Ref : 1947
Date Reported : 16/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|-----------------------------------|------------------------|--------------------------------|
| Sample No.: S11477 | Hole No. : 1 | Depth (mm) : 100-1100 |
| Origin : Layer 2 & 3 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Dark Brown | | |

Optimum Moisture Content (%) : 9.5
Maximum Dry Density (kg/m³) : 2220

| | | | | | | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| Moisture (%) | 7.5 | 8.5 | 9.5 | 10.5 | 11.5 | | | |
| Density (kg/m ³) | 2155 | 2189 | 2220 | 2193 | 2166 | | | |



Remarks :

FORM: A7

4.4.0(SGS)(2016.08.31)

Technical Signatory: G.T. Van Rooyen / K.Z. Mlambo

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9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137587302
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 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

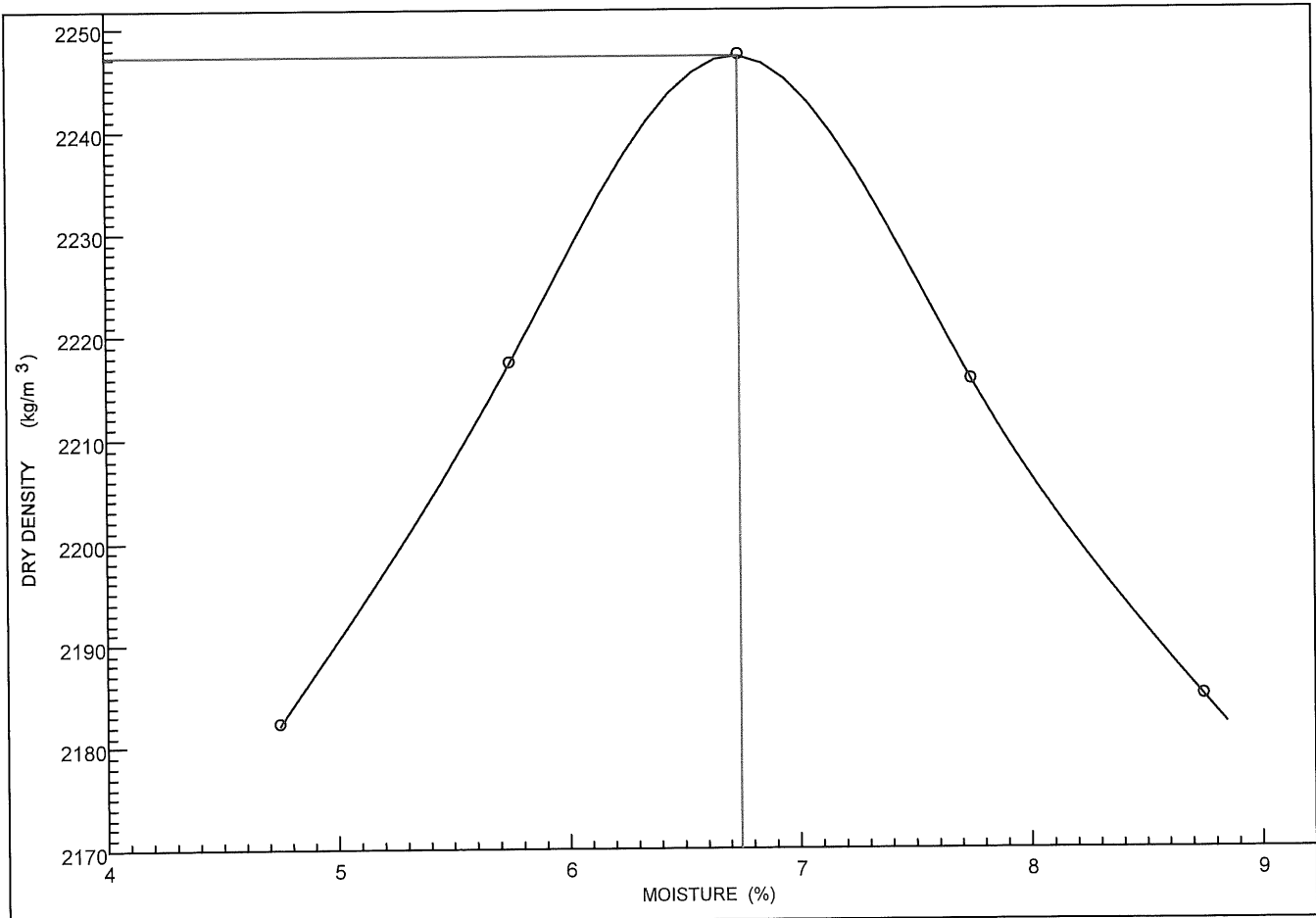
Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 16/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|-----------------------------------|--------------------------------|--------------------------------|
| Sample No.: S11477 A | Hole No. : 1 | Depth (mm) : 100-1100 |
| Origin : Layer 2 & 3 | Stabilized With : 2.5 % Cement | Compaction Energy : MOD AASHTO |
| Material Description : Dark Brown | | |

Optimum Moisture Content (%) : 6.7
 Maximum Dry Density (kg/m³) : 2247

| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Moisture (%) | 4.7 | 5.7 | 6.7 | 7.7 | 8.7 | | | |
| Density (kg/m ³) | 2182 | 2217 | 2247 | 2216 | 2185 | | | |



Remarks :

FORM: A7

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Technical Signatory: G.T Van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
: Borrow Pit Investigation
Your Ref : SK-PO098123
Our Ref : 1947/M/J
Date Reported : 17/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12,GR30,GR40)

| SAMPLE NO. | S11478 | S11479 | S11480 | S11481 |
|-----------------|----------------------------------|---------------------------|--------------------------|----------------------------------|
| HOLE NO. | 2 | 2 | 4 | 1 |
| ROAD NO. | - | - | - | - |
| DEPTH | 150-600 | 600-1000 | 200-1000 | 250-800 |
| CHAINAGE | BP 6N | BP 6N | BP 6N | BP 7N |
| LAYER TYPE | Layer 2 | Layer 3 | Layer 2 | Layer 2 & 3 |
| STABILISED WITH | - | - | - | - |
| SUPPLIER | - | - | - | - |
| CURING METHOD | - | - | - | - |
| DESCRIPTION | Dark Reddish Brown Gravelly Sand | Light Brown Gravelly Sand | Dark Brown Gravelly Sand | Dark Reddish Brown Gravelly Sand |

SIEVE ANALYSIS (% PASSING)

| Sieve Size | S11478 | S11479 | S11480 | S11481 |
|------------|--------|--------|--------|--------|
| 100 mm | 92 | | 100 | |
| 75 mm | 92 | | 86 | |
| 63 mm | 92 | 100 | 76 | 100 |
| 50 mm | 87 | 99 | 65 | 95 |
| 37.5 mm | 81 | 93 | 57 | 86 |
| 28.0 mm | 74 | 90 | 50 | 81 |
| 20.0 mm | 65 | 84 | 44 | 77 |
| 14.0 mm | 58 | 79 | 39 | 73 |
| 5.0 mm | 40 | 65 | 34 | 54 |
| 2.0 mm | 36 | 56 | 32 | 39 |
| 0.425 mm | 25 | 24 | 24 | 19 |
| 0.075 mm | 10 | 8 | 5 | 7 |

SOIL MORTAR

| Material | S11478 | S11479 | S11480 | S11481 |
|-----------------------------|--------|--------|--------|--------|
| COARSE SAND <2.0mm >0.425mm | 31 | 57 | 25 | 51 |
| FINE SAND <0.425mm >0.075mm | 42 | 29 | 59 | 31 |
| MATERIAL <0.075mm | 27 | 14 | 16 | 18 |

CONSTANTS

| Property | S11478 | S11479 | S11480 | S11481 |
|----------------------------|----------|----------|----------|----------|
| GRADING MODULUS | 2.29 | 2.12 | 2.39 | 2.35 |
| PRA CLASSIFICATION | A-1-a(0) | A-1-b(0) | A-1-a(0) | A-1-a(0) |
| UNIFIED SOIL CLAS. | GP-GM-GC | SP-SM-SC | GP-GC | SP-SC |
| COLTO CLASSIFICATION | | | | G5 |
| TRH CLASSIFICATION | | | | G5 |
| LIQUID LIMIT (%) | 22 | 22 | - | - |
| PLASTICITY INDEX (0.425mm) | 5 | 4 | NP | NP |
| LINEAR SHRINKAGE (%) | 2.5 | 2.0 | 0.0 | 0.0 |

MOD AASHTO

| Property | S11478 | S11479 | S11480 | S11481 |
|--|--------|--------|--------|--------|
| MAXIMUM DRY DENSITY (kg/m ³) | | | | 2131 |
| OPTIMUM MOISTURE CONTENT(%) | | | | 7.4 |
| MOULDING MOISTURE (%) | | | | 7.3 |

TYPE OF TEST

| Test Type | S11478 | S11479 | S11480 | S11481 |
|---------------------------|--------|--------|--------|--------|
| CBR | | | | 105 |
| CBR-UCS @ 100% MOD AASHTO | | | | 80 |
| CBR-UCS @ 98% MOD AASHTO | | | | 70 |
| CBR-UCS @ 97% MOD AASHTO | | | | 53 |
| CBR-UCS @ 95% MOD AASHTO | | | | 40 |
| CBR-UCS @ 93% MOD AASHTO | | | | 27 |

CBR-UCS @ % MOD AASHTO derived from calculation.

| % SWELL AT [MOD][NRB][PROC] | S11478 | S11479 | S11480 | S11481 |
|-----------------------------|--------|--------|--------|----------------|
| | | | | 0.02 0.03 0.05 |

Remarks :

FORM: A1

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Technical Signatory: G.T. Van Rooyen / K.Z Mlambo

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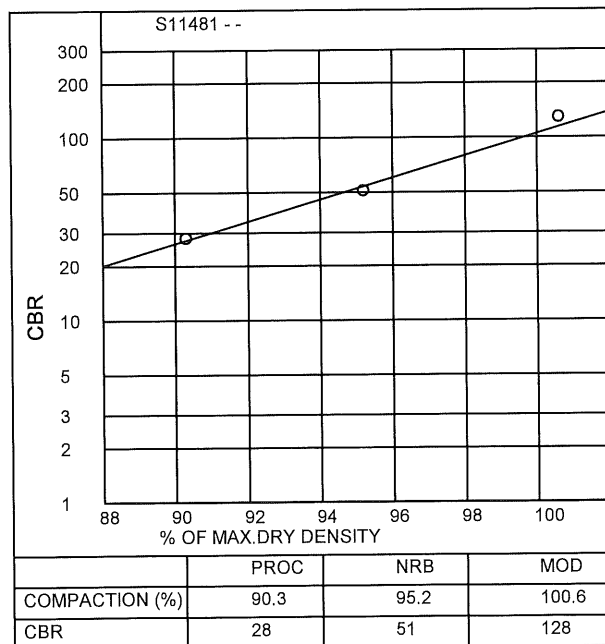
Tel. : 0137587302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/M/J
 Date Reported : 17/09/2019

CBR-UCS GRAPH/S (OPTIONAL INFORMATION)



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TEST RESULTS

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 Skukuza
 1350
 Attention: Ben Momberg

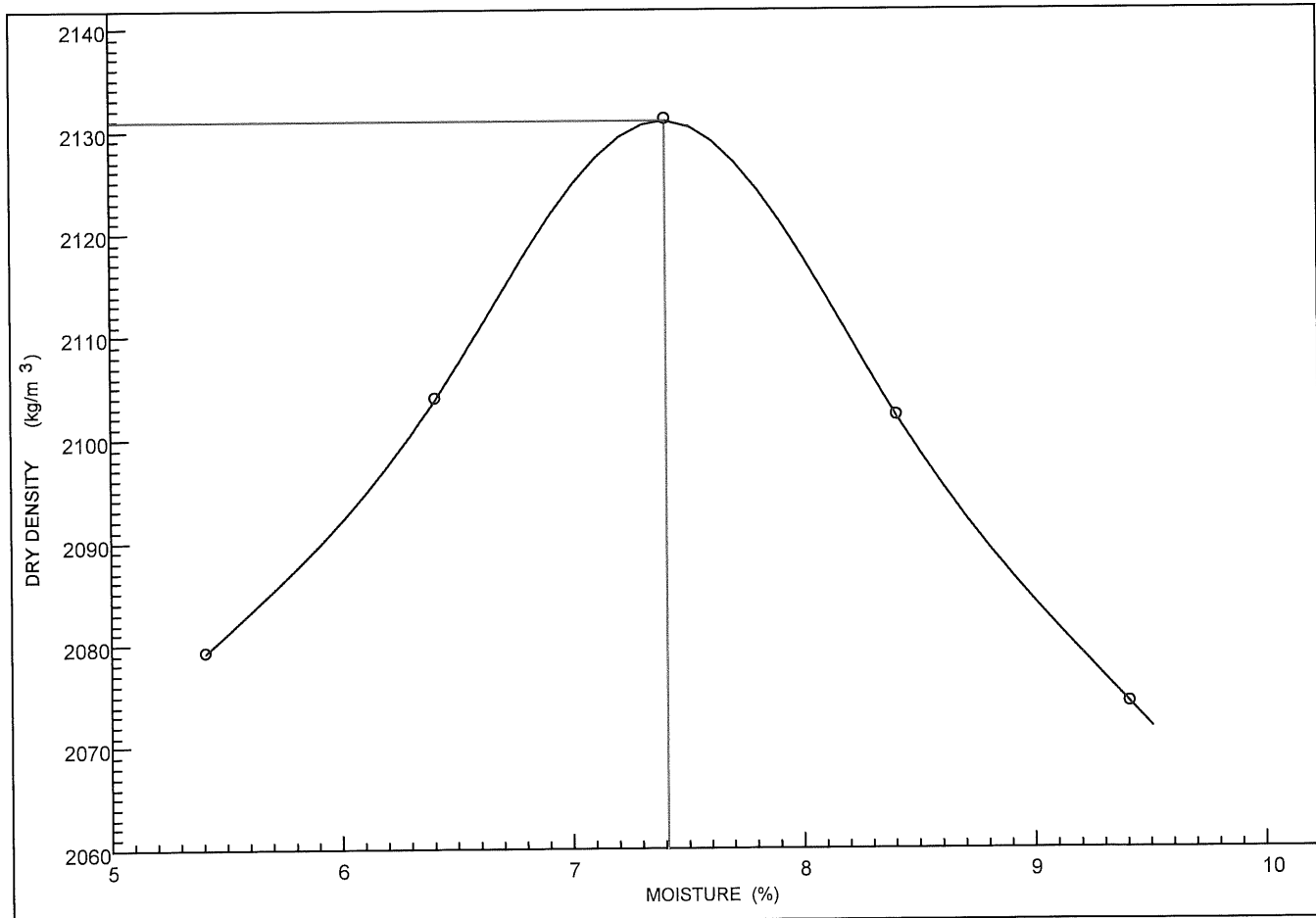
Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 02/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|---|------------------------|--------------------------------|
| Sample No.: S11481 | Hole No. : 1 | Depth (mm) : 250-800 |
| Origin : Layer 2 & 3 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Dark Reddish Brown | | |

Optimum Moisture Content (%) : 7.4
 Maximum Dry Density (kg/m³) : 2131

| | | | | | | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| Moisture (%) | 5.4 | 6.4 | 7.4 | 8.4 | 9.4 | | | |
| Density (kg/m ³) | 2079 | 2104 | 2131 | 2102 | 2074 | | | |



Remarks :

FORM: A7

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/M/J/2
 Date Reported : 17/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12)

| SAMPLE NO. | S11482 | S11483 | S11484 |
|-----------------|---------------------------|----------------------------------|-------------------------|
| HOLE NO. | 1 | 2 | 3 |
| ROAD NO. | - | - | - |
| DEPTH | 600-800 | 150-900 | 0-1350 |
| CHAINAGE | BP 7 N | BP 7 N | BP 7 N |
| LAYER TYPE | Layer 3 | Layer 2 - 4 | Layer 3 |
| STABILISED WITH | - | - | - |
| SUPPLIER | - | - | - |
| CURING METHOD | - | - | - |
| DESCRIPTION | Light Brown Gravelly Sand | Dark Reddish Brown Gravelly Sand | Dark Brown Sandy Gravel |

SIEVE ANALYSIS (% PASSING)

| Sieve Size | S11482 | S11483 | S11484 |
|------------|--------|--------|--------|
| 100 mm | 51 | 100 | |
| 75 mm | 51 | 90 | |
| 63 mm | 48 | 90 | 100 |
| 50 mm | 48 | 85 | 90 |
| 37.5 mm | 47 | 82 | 72 |
| 28.0 mm | 44 | 77 | 60 |
| 20.0 mm | 39 | 72 | 48 |
| 14.0 mm | 36 | 66 | 43 |
| 5.0 mm | 25 | 47 | 36 |
| 2.0 mm | 18 | 35 | 33 |
| 0.425 mm | 8 | 21 | 24 |
| 0.075 mm | 2 | 7 | 12 |

SOIL MORTAR

| Material | S11482 | S11483 | S11484 |
|-----------------------------|--------|--------|--------|
| COARSE SAND <2.0mm >0.425mm | 56 | 40 | 27 |
| FINE SAND <0.425mm >0.075mm | 33 | 40 | 36 |
| MATERIAL <0.075mm | 11 | 20 | 37 |


CONSTANTS

| Property | S11482 | S11483 | S11484 |
|----------------------------|----------|----------|----------|
| GRADING MODULUS | 2.72 | 2.37 | 2.31 |
| PRA CLASSIFICATION | A-1-a(0) | A-1-a(0) | A-2-6(0) |
| UNIFIED SOIL CLAS. | GP | GP-GC | GP-GC |
| LIQUID LIMIT (%) | - | 19 | 31 |
| PLASTICITY INDEX (0.425mm) | NP | 4 | 12 |
| LINEAR SHRINKAGE (%) | 0.0 | 2.0 | 6.0 |

Remarks :

FORM: A1

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
: Borrow Pit Investigation
Your Ref : SK-PO098123
Our Ref : 1947/M/K
Date Reported : 17/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12,GR30,GR40,GR53)

| SAMPLE NO. | S11485 | S11485 A | S11485 B |
|-----------------|---------------------------------|---------------------------------|---------------------------------|
| HOLE NO. | 1 | 1 | 1 |
| ROAD NO. | - | - | - |
| DEPTH | 200-800 | 200-800 | 200-800 |
| CHAINAGE | BP 8N | BP 8N | BP 8N |
| LAYER TYPE | Layer 2 | Layer 2 | Layer 2 |
| STABILISED WITH | Neat | 2.5 % Cement | 3.5 % Cement |
| SUPPLIER | - | See Remarks | See Remarks |
| CURING METHOD | - | Rapid | Rapid |
| DESCRIPTION | Dark Reddish Brown Sandy Gravel | Dark Reddish Brown Sandy Gravel | Dark Reddish Brown Sandy Gravel |

| SIEVE ANALYSIS (% PASSING) | | | | |
|----------------------------|-----|-----|-----|--|
| 100 mm | | | | |
| 75 mm | | | | |
| 63 mm | 100 | 100 | 100 | |
| 50 mm | 85 | 85 | 85 | |
| 37.5 mm | 80 | 80 | 80 | |
| 28.0 mm | 77 | 77 | 77 | |
| 20.0 mm | 72 | 72 | 72 | |
| 14.0 mm | 65 | 65 | 65 | |
| 5.0 mm | 39 | 39 | 39 | |
| 2.0 mm | 27 | 27 | 27 | |
| 0.425 mm | 15 | 15 | 15 | |
| 0.075 mm | 4 | 4 | 4 | |

| SOIL MORTAR | | | | |
|-----------------------------|----|----|----|--|
| COARSE SAND <2.0mm >0.425mm | 44 | 44 | 44 | |
| FINE SAND <0.425mm >0.075mm | 41 | 41 | 41 | |
| MATERIAL <0.075mm | 15 | 15 | 15 | |

| CONSTANTS | | | | |
|----------------------------|----------|----------|----------|--|
| GRADING MODULUS | 2.54 | 2.54 | 2.54 | |
| PRA CLASSIFICATION | A-1-a(0) | A-1-a(0) | A-1-a(0) | |
| UNIFIED SOIL CLAS. | GP | GP | GP | |
| COLTO CLASSIFICATION | G6 | - | - | |
| TRH CLASSIFICATION | G5 | C2 | C2 | |
| LIQUID LIMIT (%) | - | - | - | |
| PLASTICITY INDEX (0.425mm) | NP | NP | NP | |
| LINEAR SHRINKAGE (%) | 0.0 | 0.0 | 0.0 | |

| MOD AASHTO | | | | |
|--|------|------|------|--|
| MAXIMUM DRY DENSITY (kg/m ³) | 2140 | 2132 | 2132 | |
| OPTIMUM MOISTURE CONTENT(%) | 5.6 | 6.3 | 6.3 | |
| MOULDING MOISTURE (%) | 5.4 | 6.9 | 6.8 | |

| TYPE OF TEST | CBR | UCS (MPa) | UCS (MPa) |
|---------------------------|-----|-----------|-----------|
| CBR-UCS @ 100% MOD AASHTO | 133 | 3.88 MPa. | 3.75 MPa. |
| CBR-UCS @ 98% MOD AASHTO | 95 | 3.08 MPa. | 3.03 MPa. |
| CBR-UCS @ 97% MOD AASHTO | 80 | 2.74 MPa. | 2.72 MPa. |
| CBR-UCS @ 95% MOD AASHTO | 57 | 2.17 MPa. | 2.20 MPa. |
| CBR-UCS @ 93% MOD AASHTO | 41 | 1.72 MPa. | 1.78 MPa. |
| CBR-UCS @ 90% MOD AASHTO | 24 | 1.22 MPa. | 1.29 MPa. |

CBR-UCS @ % MOD AASHTO derived from calculation.

| | | | | | | | | | | |
|-----------------------------|------|------|------|--|--|--|--|--|--|--|
| % SWELL AT [MOD][NRB][PROC] | 0.00 | 0.02 | 0.04 | | | | | | | |
|-----------------------------|------|------|------|--|--|--|--|--|--|--|

DEVIATION FROM TEST METHOD: UCS reported to nearest 0.01 MPa.

Remarks : 2.5% Cement Dura Build Lafrage Cem 11 B- V 32.5 N
3.5% Cement Dura Build Lafrage Cem 11 B- V 32.5 N

FORM: A1

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Technical Signatory : G.T Van Rooyen / K.Z Mlambo

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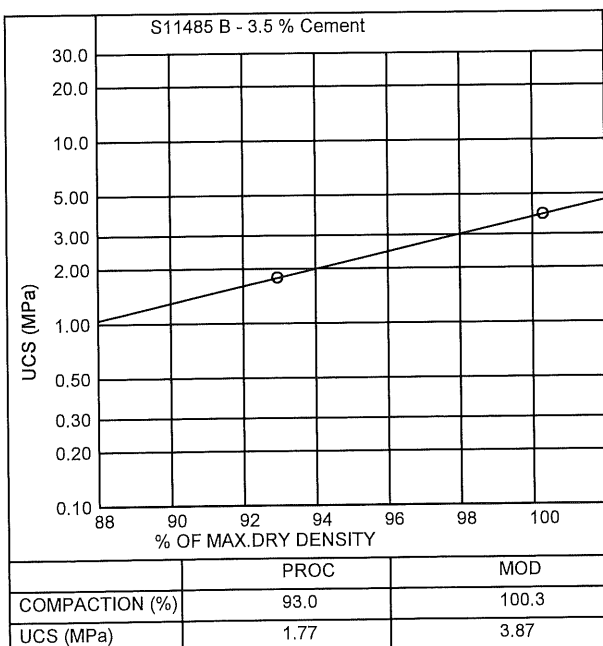
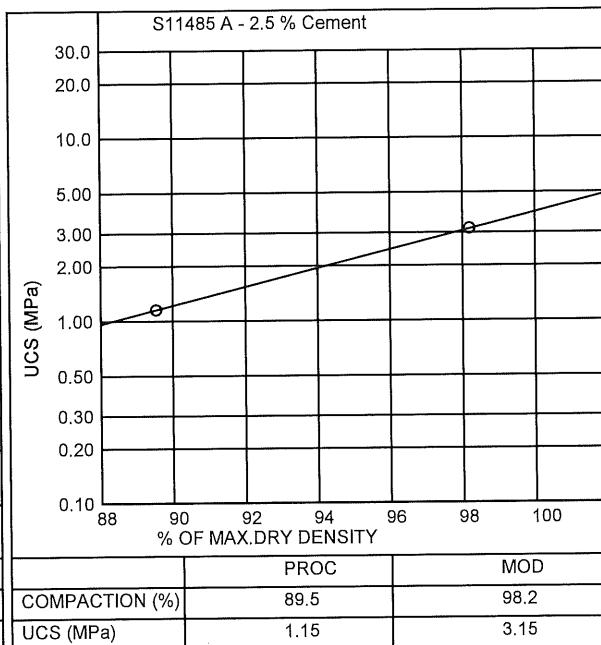
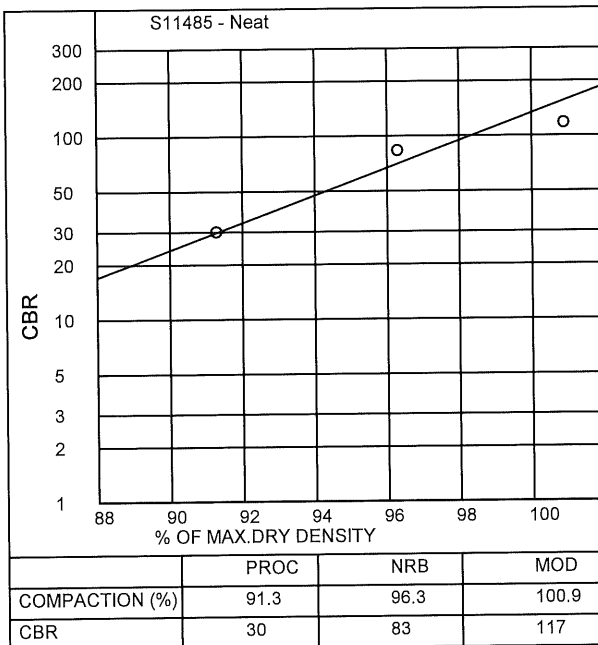
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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/M/K
 Date Reported : 17/09/2019

CBR-UCS GRAPH/S (OPTIONAL INFORMATION)



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 - CIVIL ENGINEERING SERVICES -
 Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587
a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137587302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/M/K
 Date Reported : 17/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, MOD AASHTO, UCS, ITS(SANS 3001:GR54)

| | | | | |
|-----------------|----------------------------------|----------------------------------|--|--|
| SAMPLE NO. | S11485 A | S11485 B | | |
| HOLE NO. | 1 | 1 | | |
| ROAD NO. | - | - | | |
| DEPTH | 200-800 | 200-800 | | |
| CHAINAGE | BP 8N | BP 8N | | |
| LAYER TYPE | Layer 2 | Layer 2 | | |
| STABILISED WITH | 2.5 % Cement | 3.5 % Cement | | |
| SUPPLIER | See Remarks | See Remarks | | |
| CURING METHOD | Rapid | Rapid | | |
| DESCRIPTION | Dark Reddish Bro Sandy Gravel | Dark Reddish Bro Sandy Gravel | | |

INDIRECT TENSILE STRENGTH

| | | | | |
|-------------------------------|---------------|---------------|--|--|
| 1. COMPACTION (%) : ITS (kPa) | 99.5 : 280.00 | 99.1 : 420.00 | | |
| 2. COMPACTION (%) : ITS (kPa) | 99.2 : 280.00 | 99.6 : 400.00 | | |
| 3. COMPACTION (%) : ITS (kPa) | | | | |
| AVERAGE COMP.(%) : ITS (kPa) | 99.3 : 280.00 | 99.3 : 410.00 | | |

Remarks :

FORM: D1

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 - CIVIL ENGINEERING SERVICES -
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 a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137587302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

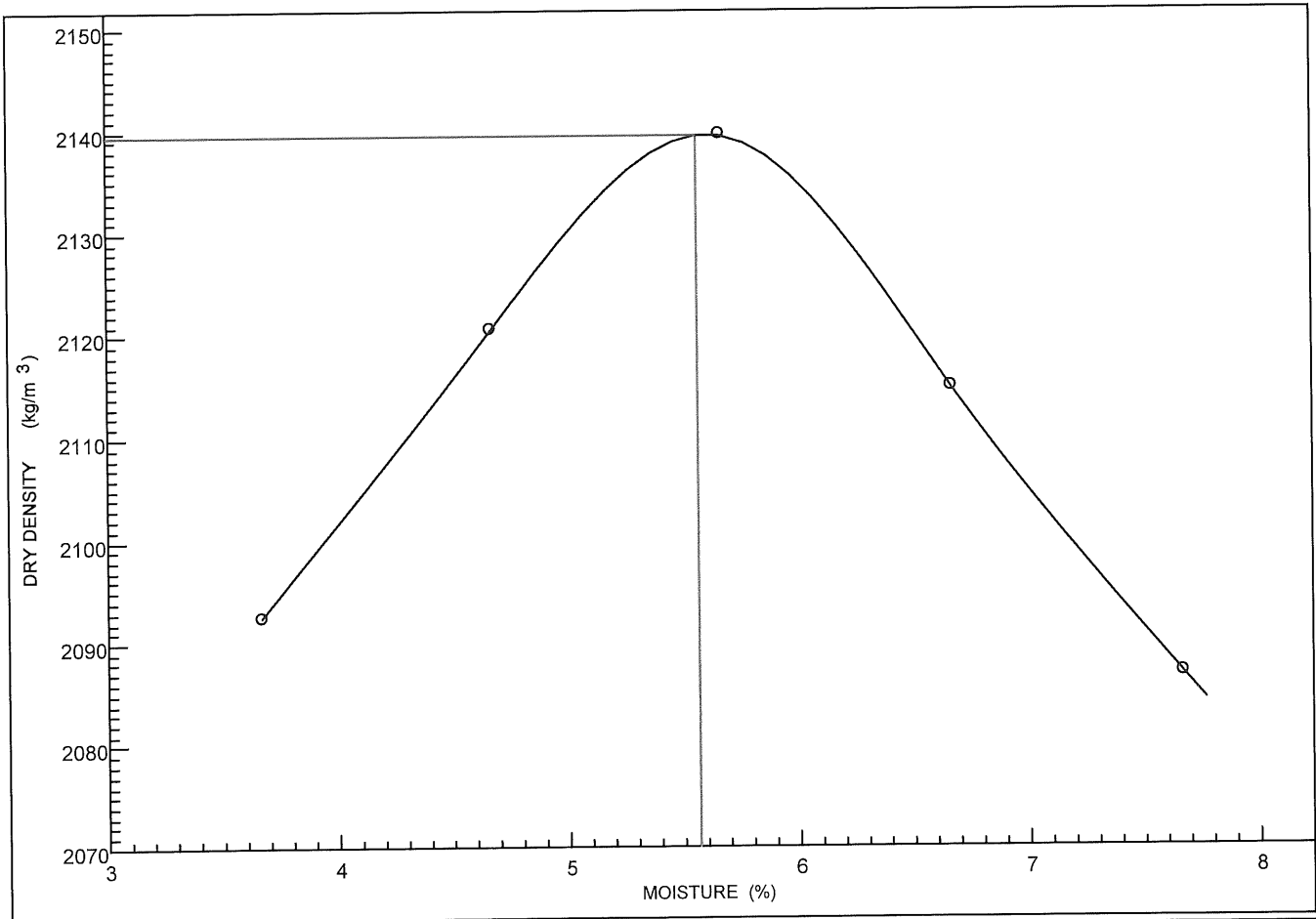
Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 16/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|---|------------------------|--------------------------------|
| Sample No.: S11485 | Hole No. : 1 | Depth (mm) : 200-800 |
| Origin : Layer 2 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Dark Reddish Brown | | |

Optimum Moisture Content (%) : 5.6
 Maximum Dry Density (kg/m³) : 2140

| | | | | | | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| Moisture (%) | 3.7 | 4.7 | 5.7 | 6.7 | 7.7 | | | |
| Density (kg/m ³) | 2093 | 2121 | 2139 | 2115 | 2087 | | | |



Remarks :

FORM: A7

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 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

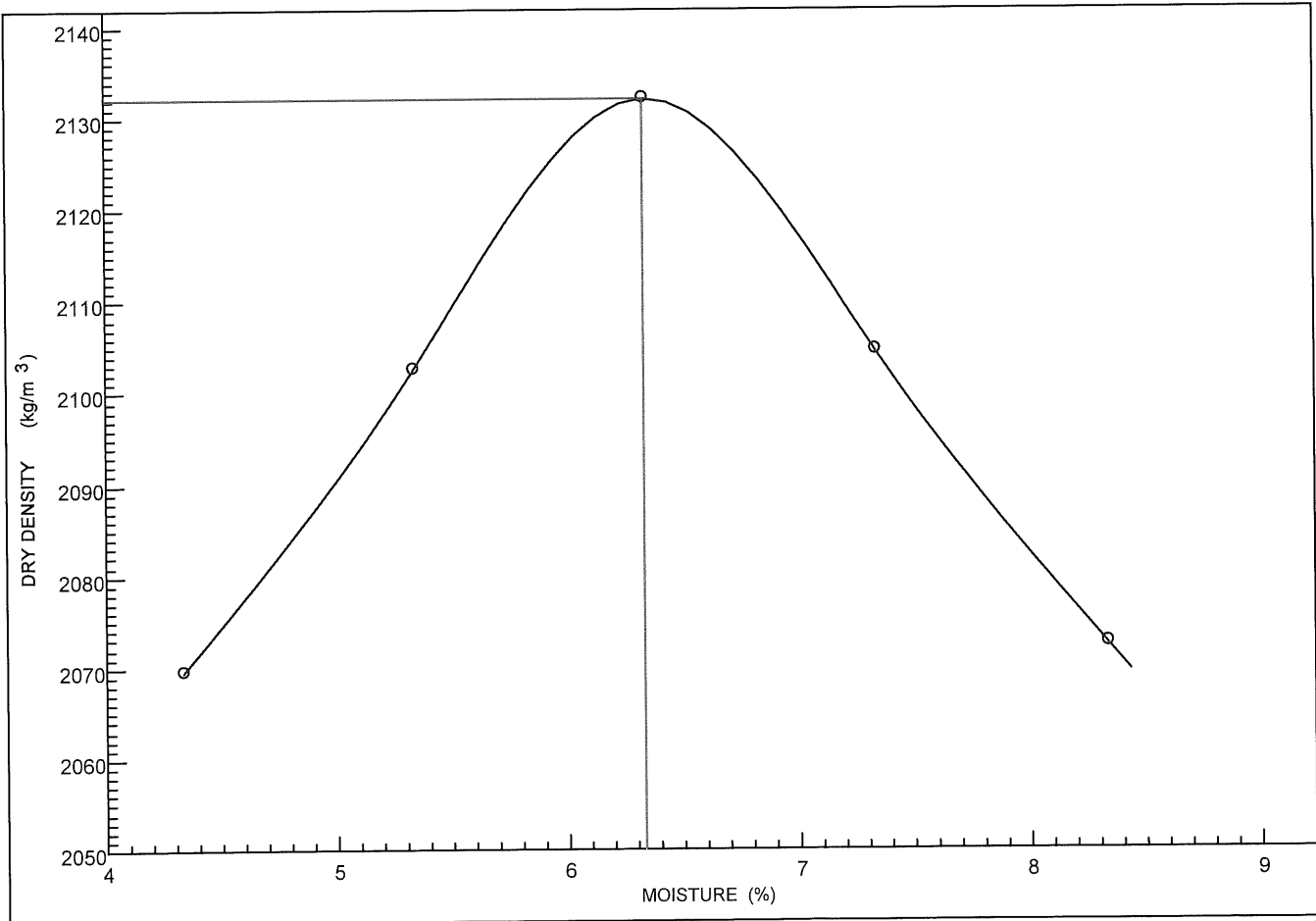
Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 16/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|---|--------------------------------|--------------------------------|
| Sample No.: S11485 A | Hole No. : 1 | Depth (mm) : 200-800 |
| Origin : Layer 2 | Stabilized With : 2.5 % Cement | Compaction Energy : MOD AASHTO |
| Material Description : Dark Reddish Brown | | |

Optimum Moisture Content (%) : 6.3
 Maximum Dry Density (kg/m³) : 2132

| | | | | | | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| Moisture (%) | 4.3 | 5.3 | 6.3 | 7.3 | 8.3 | | | |
| Density (kg/m ³) | 2070 | 2103 | 2132 | 2105 | 2072 | | | |



Remarks :

FORM: A7

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TEST RESULTS

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 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/M/L
 Date Reported : 17/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12)

| | | | | |
|-----------------|-------------------------------------|------------------------------------|--|--|
| SAMPLE NO. | S11486 | S11487 | | |
| HOLE NO. | 1 | 2 | | |
| ROAD NO. | - | - | | |
| DEPTH | 800-1400 | 200-800 | | |
| CHAINAGE | BP 8N | BP 8N | | |
| LAYER TYPE | Layer 3 | Layer 2 | | |
| STABILISED WITH | - | - | | |
| SUPPLIER | - | - | | |
| CURING METHOD | - | - | | |
| DESCRIPTION | Light Reddish Brown Sandy Gravel | Dark Reddish Brown Sandy Gravel | | |

| SIEVE ANALYSIS (% PASSING) | | | | |
|----------------------------|-----|-----|--|--|
| 100 mm | | 100 | | |
| 75 mm | | 96 | | |
| 63 mm | 100 | 96 | | |
| 50 mm | 88 | 90 | | |
| 37.5 mm | 77 | 86 | | |
| 28.0 mm | 69 | 82 | | |
| 20.0 mm | 60 | 76 | | |
| 14.0 mm | 56 | 68 | | |
| 5.0 mm | 42 | 46 | | |
| 2.0 mm | 32 | 32 | | |
| 0.425 mm | 16 | 18 | | |
| 0.075 mm | 5 | 6 | | |

| SOIL MORTAR | | | | |
|-----------------------------|----|----|--|--|
| COARSE SAND <2.0mm >0.425mm | 50 | 44 | | |
| FINE SAND <0.425mm >0.075mm | 34 | 38 | | |
| MATERIAL <0.075mm | 16 | 18 | | |

| CONSTANTS | | | | |
|----------------------------|----------|----------|--|--|
| GRADING MODULUS | 2.47 | 2.44 | | |
| PRA CLASSIFICATION | A-1-a(0) | A-1-a(0) | | |
| UNIFIED SOIL CLAS. | GP-GC | GP-GC | | |
| LIQUID LIMIT (%) | - | - | | |
| PLASTICITY INDEX (0.425mm) | NP | NP | | |
| LINEAR SHRINKAGE (%) | 0.0 | 0.0 | | |

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

Technical Signatory : G. Van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
: Road Centre Line Soil Investigation
Your Ref : SK-PO098123
Our Ref : 1947/B/E
Date Reported : 16/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12,GR30,GR40)

| SAMPLE NO. | S11488 | S11489 | S11490 | S11491 |
|-----------------|------------------------------|---------------------------|---------------------------|---------------------------|
| HOLE NO. | 2 | 3 | 2 | 3 |
| ROAD NO. | - | - | - | - |
| DEPTH | 800-1500 | 150-1600 | 140-1000 | 140-1350 |
| CHAINAGE | BP 8 N | BP 8 N | BP 9 N | BP 9 N |
| LAYER TYPE | 3 | 2 | 2 | 2 |
| STABILISED WITH | - | - | - | - |
| SUPPLIER | - | - | - | - |
| CURING METHOD | - | - | - | - |
| DESCRIPTION | BROWNISH ORANGE GRAVELY SAND | DARK REDDISH BROWN GRAVEL | DARK REDDISH BROWN GRAVEL | DARK REDDISH BROWN GRAVEL |

SIEVE ANALYSIS (% PASSING)

| Sieve Size | S11488 | S11489 | S11490 | S11491 |
|------------|--------|--------|--------|--------|
| 100 mm | 100 | 100 | 100 | 100 |
| 75 mm | 98 | 96 | 89 | 89 |
| 63 mm | 94 | 91 | 82 | 84 |
| 50 mm | 92 | 85 | 76 | 78 |
| 37.5 mm | 87 | 81 | 70 | 72 |
| 28.0 mm | 84 | 75 | 63 | 64 |
| 20.0 mm | 81 | 54 | 41 | 37 |
| 14.0 mm | 62 | 38 | 29 | 23 |
| 5.0 mm | 44 | 23 | 19 | 12 |
| 2.0 mm | 21 | 8 | 6 | 5 |
| 0.425 mm | 7 | | | |
| 0.075 mm | | | | |

SOIL MORTAR

| Material | S11488 | S11489 | S11490 | S11491 |
|-----------------------------|--------|--------|--------|--------|
| COARSE SAND <2.0mm >0.425mm | 52 | 39 | 34 | 48 |
| FINE SAND <0.425mm >0.075mm | 32 | 39 | 45 | 30 |
| MATERIAL <0.075mm | 16 | 22 | 21 | 22 |

CONSTANTS

| Property | S11488 | S11489 | S11490 | S11491 |
|----------------------------|----------|----------|----------|----------|
| GRADING MODULUS | 2.28 | 2.31 | 2.46 | 2.60 |
| PRA CLASSIFICATION | A-1-a(0) | A-1-a(0) | A-1-a(0) | A-1-a(0) |
| UNIFIED SOIL CLAS. | SP-SC | SP-SC | GP-GC | GP-GC |
| COLTO CLASSIFICATION | | G6 | G5 | G6 |
| TRH CLASSIFICATION | | G7 | G5 | G7 |
| LIQUID LIMIT (%) | - | - | - | - |
| PLASTICITY INDEX (0.425mm) | NP | NP | NP | NP |
| LINEAR SHRINKAGE (%) | 0.0 | 0.0 | 0.0 | 0.0 |

MOD AASHTO

| Property | S11488 | S11489 | S11490 | S11491 |
|--|--------|--------|--------|--------|
| MAXIMUM DRY DENSITY (kg/m ³) | | 2138 | 2186 | 2139 |
| OPTIMUM MOISTURE CONTENT(%) | | 6.4 | 6.3 | 6.3 |
| MOULDING MOISTURE (%) | | 6.7 | 6.5 | 6.4 |

| TYPE OF TEST | S11488 | S11489 | S11490 | S11491 |
|---------------------------|--------|--------|--------|--------|
| CBR | | 55 | 98 | 75 |
| CBR-UCS @ 100% MOD AASHTO | | 43 | 73 | 54 |
| CBR-UCS @ 98% MOD AASHTO | | 39 | 64 | 46 |
| CBR-UCS @ 97% MOD AASHTO | | 30 | 48 | 33 |
| CBR-UCS @ 95% MOD AASHTO | | 24 | 36 | 23 |
| CBR-UCS @ 93% MOD AASHTO | | 17 | 24 | 14 |
| CBR-UCS @ 90% MOD AASHTO | | | | |

CBR-UCS @ % MOD AASHTO derived from calculation.

| % SWELL AT [MOD][NRB][PROC] | 0.02 | 0.05 | 0.07 | 0.00 | 0.02 | 0.94 | 0.02 | 0.04 | 0.06 |
|-----------------------------|------|------|------|------|------|------|------|------|------|
| | | | | | | | | | |

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

Technical Signatory / G.T Van Rooyen / K.Z Mlambo

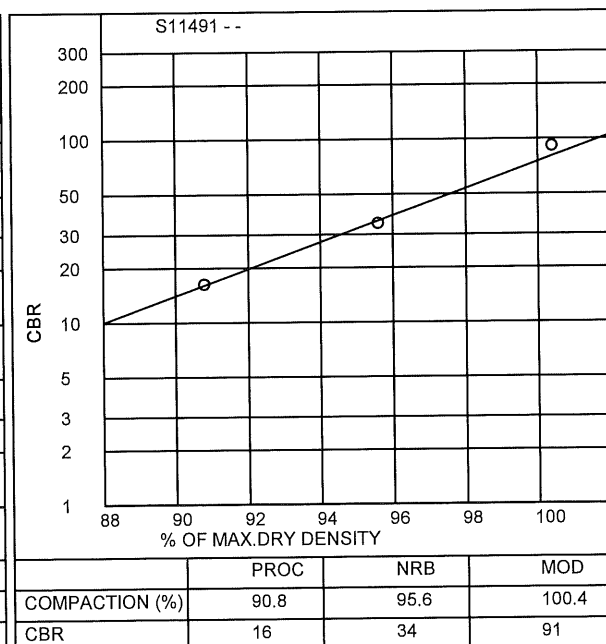
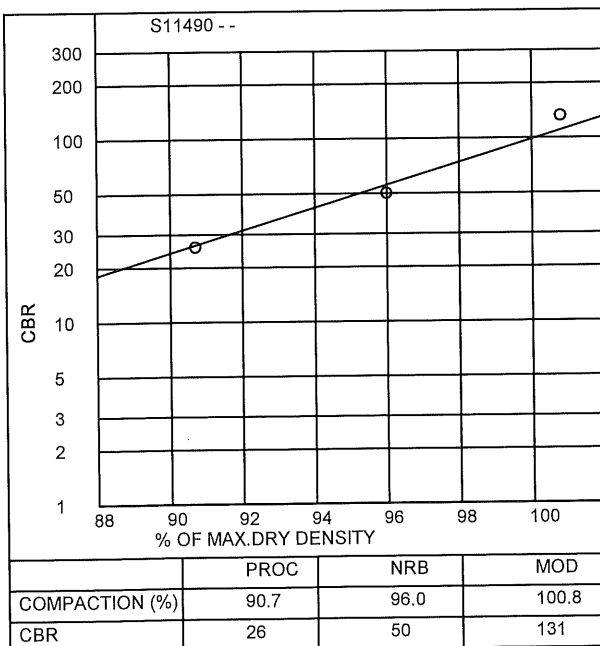
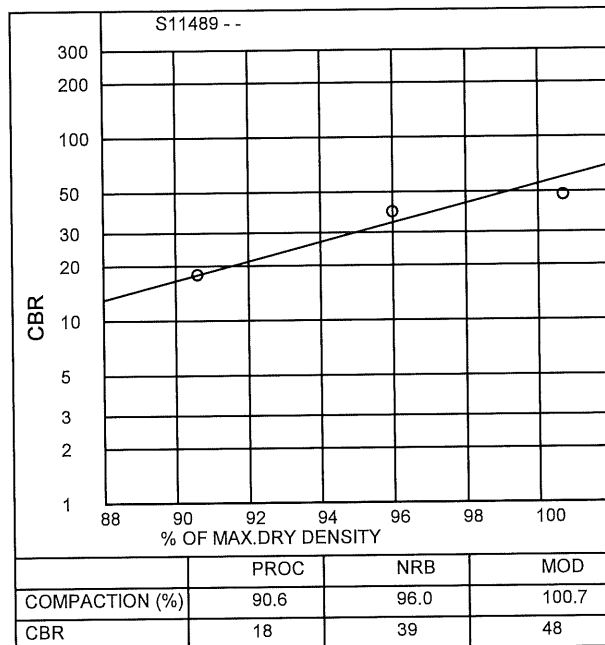
50

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Road Centre Line Soil Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/B/E
 Date Reported : 16/09/2019

CBR-UCS GRAPH/S (OPTIONAL INFORMATION)



TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

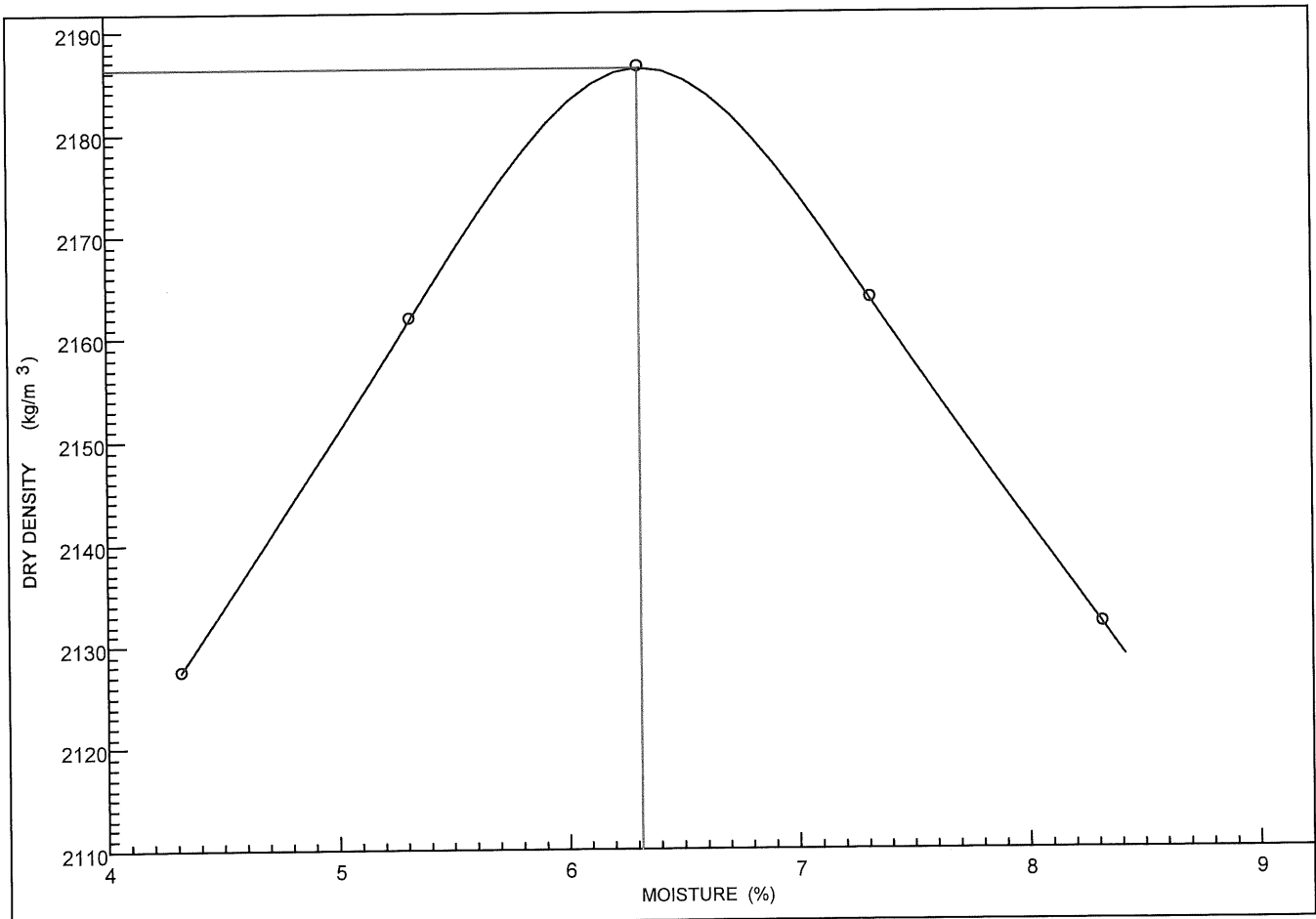
Project : See Remarks
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 02/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|---|------------------------|--------------------------------|
| Sample No.: S11490 | Hole No. : 2 | Depth (mm) : 140-1000 |
| Origin : Layer 2 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Dark Reddish Brown | | |

Optimum Moisture Content (%) : 6.3
 Maximum Dry Density (kg/m³) : 2186

| | | | | | | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| Moisture (%) | 4.3 | 5.3 | 6.3 | 7.3 | 8.3 | | | |
| Density (kg/m ³) | 2127 | 2162 | 2186 | 2164 | 2132 | | | |



Remarks : Geotechnical Survey Along Proposed New Shangonie Gate
 Access Route - Kruger National Park (Area-Shingwedzi River) -
 Road Centre Line Soil Investigation

FORM: A7

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Technical Signatory : G.T Van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

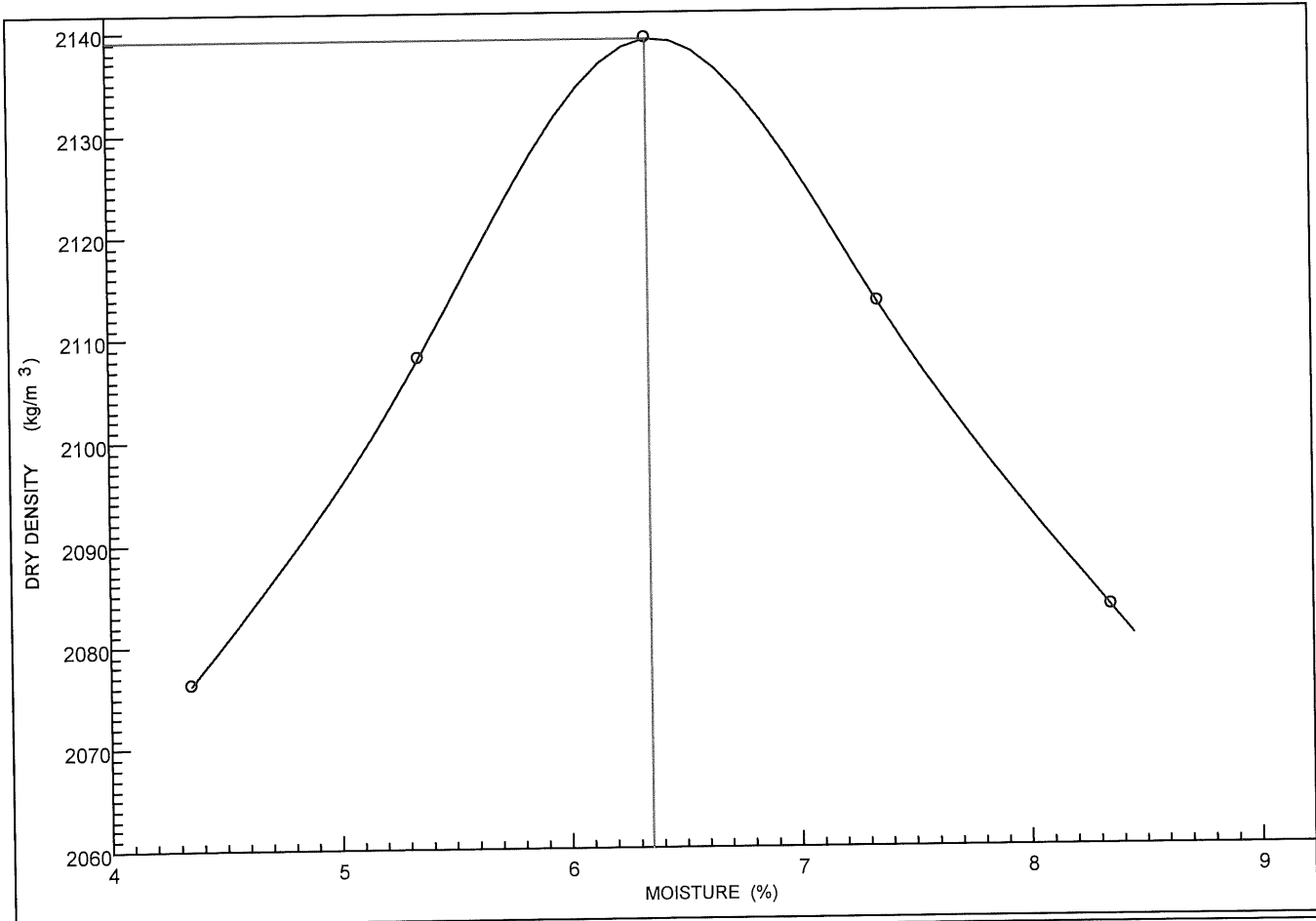
Project : See Remarks
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 07/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|---|------------------------|--------------------------------|
| Sample No.: S11491 | Hole No. : 3 | Depth (mm) : 140-1350 |
| Origin : Layer 2 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Dark Reddish Brown | | |

Optimum Moisture Content (%) : 6.3
 Maximum Dry Density (kg/m³) : 2139

| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Moisture (%) | 4.3 | 5.3 | 6.3 | 7.3 | 8.3 | | | |
| Density (kg/m ³) | 2076 | 2108 | 2139 | 2113 | 2083 | | | |



Remarks : Geotechnical Survey Along Proposed New Shangonie Gate
 Access Route - Kruger National Park (Area-Shingwedzi River) -
 Road Centre Line Soil Investigation

FORM: A7

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Technical Signatory : *G. Van Rooyen / K.Z Mlambo*

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
: Road Centre Line Soil Investigation
Your Ref : SK-PO098123
Our Ref : 1947/B/F
Date Reported : 16/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12,GR30,GR40)

| SAMPLE NO. | S11492 | S11493 | S11494 | |
|-----------------|---------------------------|----------------------|---------------------|--|
| HOLE NO. | 4 | 1 | 1 | |
| ROAD NO. | - | - | - | |
| DEPTH | 0-1500 | 200-570 | 570-900 | |
| CHAINAGE | BP 9 N | BP 10 N | BP 10 N | |
| LAYER TYPE | LAYER 1-3 | LAYER 2 | LAYER 3 | |
| STABILISED WITH | NEAT | NEAT | NEAT | |
| SUPPLIER | - | - | - | |
| CURING METHOD | - | - | - | |
| DESCRIPTION | DARK REDDISH BROWN GRAVEL | REDDISH BROWN GRAVEL | REDDISH PINK GRAVEL | |

| SIEVE ANALYSIS (% PASSING) | | | | |
|----------------------------|-----|-----|-----|--|
| 100 mm | | | | |
| 75 mm | | | 100 | |
| 63 mm | 100 | | 95 | |
| 50 mm | 97 | 100 | 90 | |
| 37.5 mm | 93 | 88 | 83 | |
| 28.0 mm | 91 | 82 | 76 | |
| 20.0 mm | 86 | 74 | 64 | |
| 14.0 mm | 79 | 63 | 52 | |
| 5.0 mm | 51 | 32 | 28 | |
| 2.0 mm | 35 | 21 | 18 | |
| 0.425 mm | 18 | 13 | 10 | |
| 0.075 mm | 7 | 5 | 4 | |

| SOIL MORTAR | | | | |
|-----------------------------|----|----|----|--|
| COARSE SAND <2.0mm >0.425mm | 49 | 38 | 44 | |
| FINE SAND <0.425mm >0.075mm | 31 | 38 | 33 | |
| MATERIAL <0.075mm | 20 | 24 | 23 | |

| CONSTANTS | | | | |
|----------------------------|----------|----------|----------|--|
| GRADING MODULUS | 2.40 | 2.61 | 2.68 | |
| PRA CLASSIFICATION | A-1-a(0) | A-1-a(0) | A-1-a(0) | |
| UNIFIED SOIL CLAS. | SP-SC | GP-GC | GP | |
| COLTO CLASSIFICATION | | G7 | G7 | |
| TRH CLASSIFICATION | | G6 | G7 | |
| LIQUID LIMIT (%) | - | 22 | 22 | |
| PLASTICITY INDEX (0.425mm) | NP | SP | 3 | |
| LINEAR SHRINKAGE (%) | 0.0 | 1.5 | 1.5 | |

| MOD AASHTO | | | | |
|--|--|------|------|--|
| MAXIMUM DRY DENSITY (kg/m ³) | | 2140 | 2083 | |
| OPTIMUM MOISTURE CONTENT(%) | | 6.3 | 6.3 | |
| MOULDING MOISTURE (%) | | 6.3 | 6.5 | |

| TYPE OF TEST | | CBR | CBR | |
|---------------------------|--|-----|-----|--|
| CBR-UCS @ 100% MOD AASHTO | | 47 | 86 | |
| CBR-UCS @ 98% MOD AASHTO | | 41 | 66 | |
| CBR-UCS @ 97% MOD AASHTO | | 38 | 58 | |
| CBR-UCS @ 95% MOD AASHTO | | 33 | 45 | |
| CBR-UCS @ 93% MOD AASHTO | | 29 | 34 | |
| CBR-UCS @ 90% MOD AASHTO | | 23 | 23 | |

CBR-UCS @ % MOD AASHTO derived from calculation.

| % SWELL AT [MOD][NRB][PROC] | | | | | | | | | | | |
|-----------------------------|--|--|------|------|------|------|------|------|--|--|--|
| | | | 0.03 | 0.06 | 0.07 | 0.02 | 0.03 | 0.04 | | | |

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

Technical Signatory: G. Van Rooyen / K.Z Mlambo

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 a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

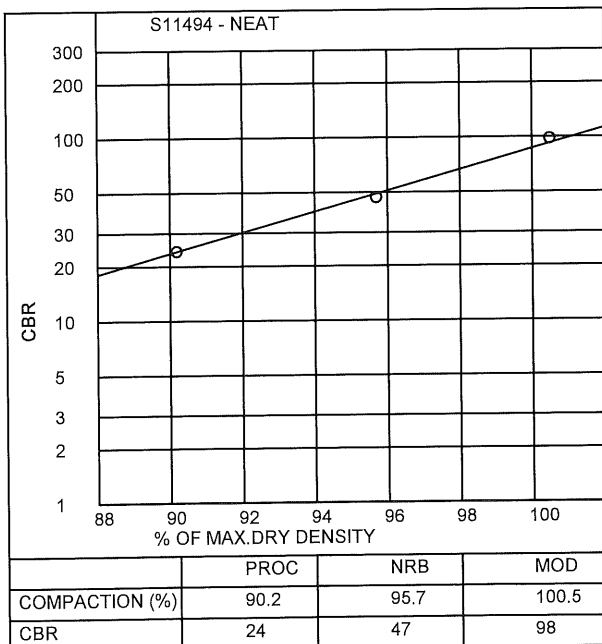
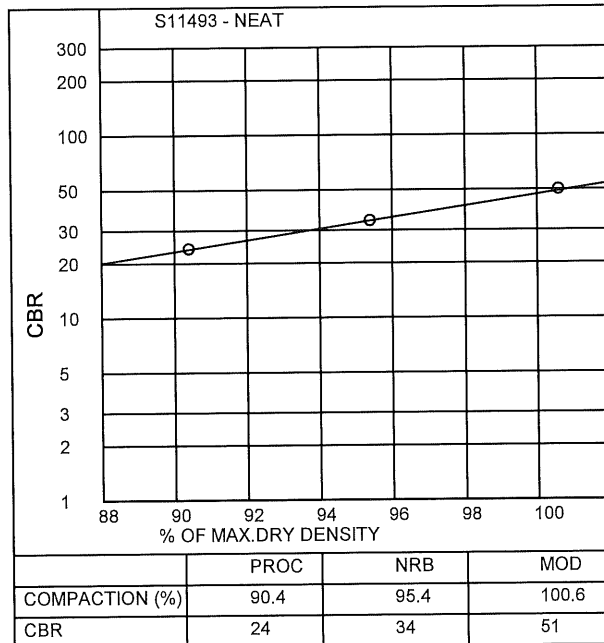
Tel. : 0137587302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Road Centre Line Soil Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/B/F
 Date Reported : 16/09/2019

CBR-UCS GRAPH/S (OPTIONAL INFORMATION)





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 a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137587302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

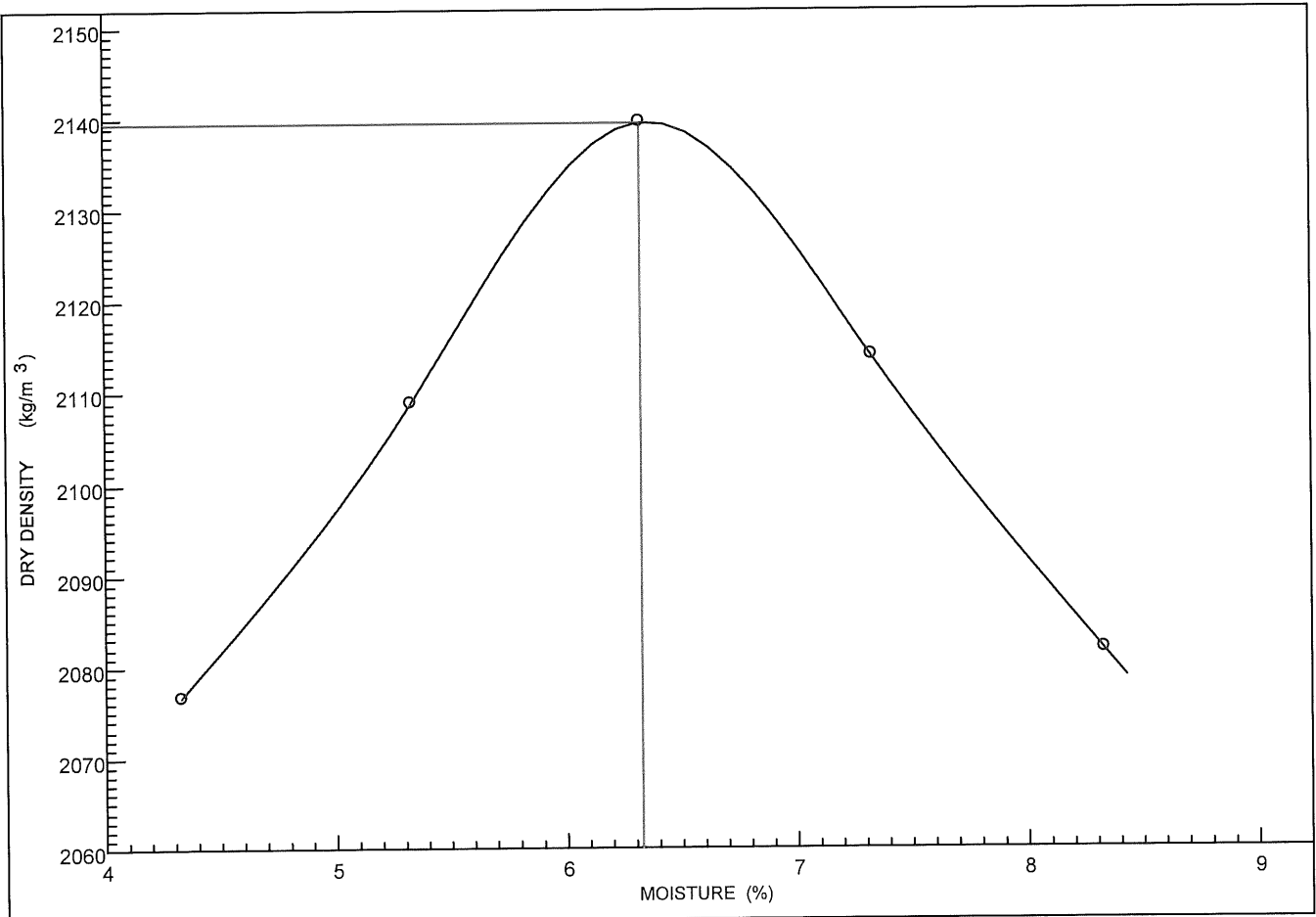
Project : See Remarks
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 05/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|--------------------------------------|------------------------|--------------------------------|
| Sample No.: S11493 | Hole No. : 1 | Depth (mm) : 200-570 |
| Origin : Layer 2 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Reddish Brown | | |

Optimum Moisture Content (%) : 6.3
 Maximum Dry Density (kg/m³) : 2140

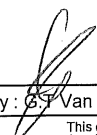
| | | | | | | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| Moisture (%) | 4.3 | 5.3 | 6.3 | 7.3 | 8.3 | | | |
| Density (kg/m ³) | 2077 | 2109 | 2140 | 2114 | 2082 | | | |



Remarks : Geotechnical Survey Along Proposed New Shangonie Gate
 Access Route - Kruger National Park (Area-Shingwedzi River) -
 Road Centre Line Soil Investigation

FORM: A7

4.4.0(SGS)(2016.08.31)

Technical Signatory :  Van Rooyen / K.Z Mlambo

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 a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137587302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogoo Maake

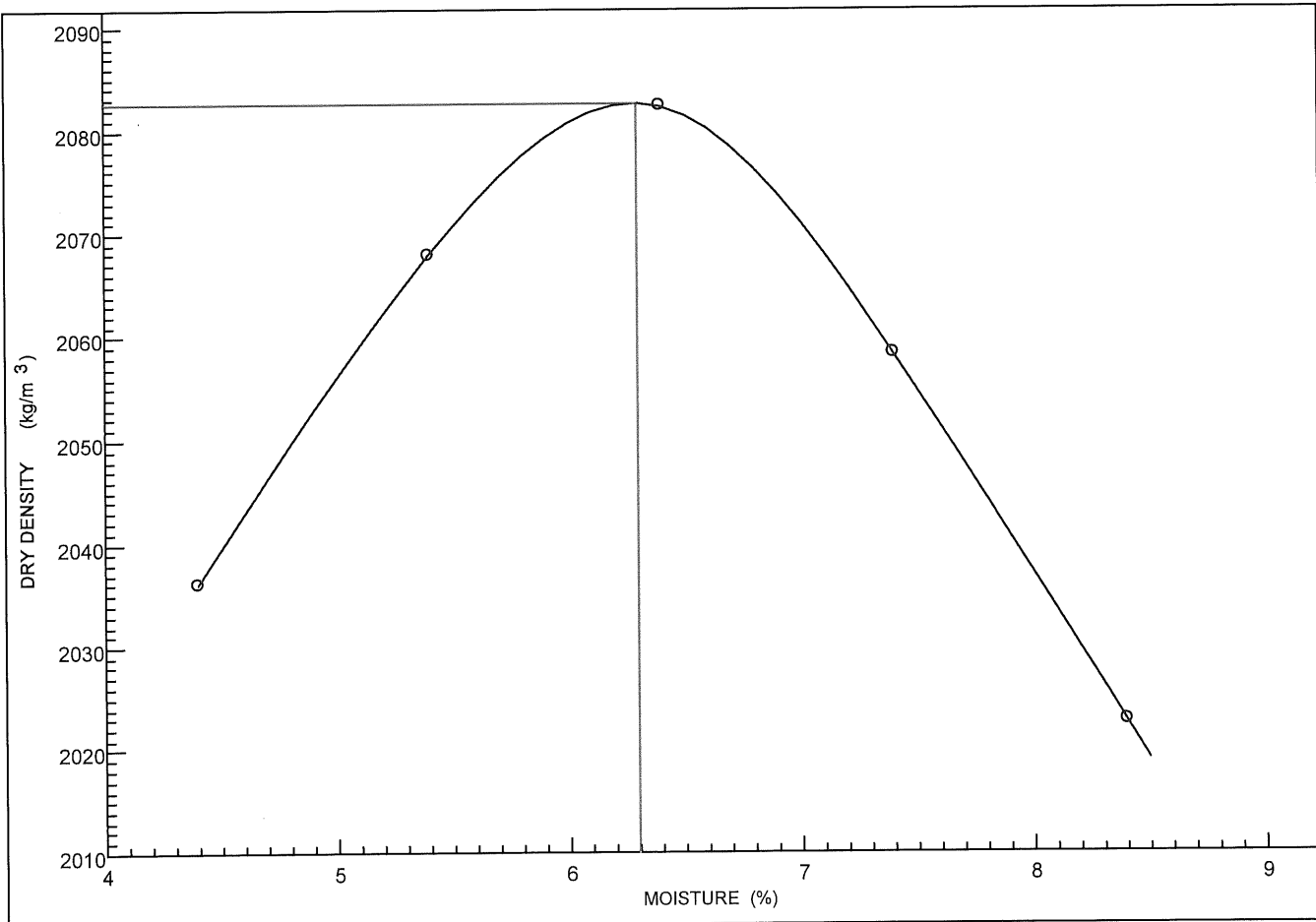
Project : See Remarks
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 05/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|-------------------------------------|------------------------|--------------------------------|
| Sample No.: S11494 | Hole No. : 1 | Depth (mm) : 570-900 |
| Origin : Layer 3 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Reddish Pink | | |

Optimum Moisture Content (%) : 6.3
 Maximum Dry Density (kg/m³) : 2083

| | | | | | | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| Moisture (%) | 4.4 | 5.4 | 6.4 | 7.4 | 8.4 | | | |
| Density (kg/m ³) | 2036 | 2068 | 2082 | 2058 | 2023 | | | |



Remarks : Geotechnical Survey Along Proposed New Shangonie Gate
 Access Route - Kruger National Park (Area-Shingwedzi River) -
 Road Centre Line Soil Investigation

FORM: A7

4.4.0(SGS)(2016.08.31)

Technical Signatory : G.T Van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Road Centre Line Soil Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/B/G
 Date Reported : 16/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12,GR30,GR40,GR53)

| SAMPLE NO. | S11495 | S11495 A | S11495 B |
|-----------------|---------------------------|---------------------------|---------------------------|
| HOLE NO. | 2 | 2 | 2 |
| ROAD NO. | - | - | - |
| DEPTH | 0-1300 | 0-1300 | 0-1300 |
| CHAINAGE | BP 10 N | BP 10 N | BP 10 B |
| LAYER TYPE | 1-3 | 1-3 | 1-3 |
| STABILISED WITH | NEAT | 2.5 % CEMENT | 3.5 % CEMENT |
| SUPPLIER | | SEE REMARKS | SEE REMARKS |
| CURING METHOD | | RAPID | RAPID |
| DESCRIPTION | DARK REDDISH BROWN GRAVEL | DARK REDDISH BROWN GRAVEL | DARK REDDISH BROWN GRAVEL |

| SIEVE ANALYSIS (% PASSING) | | | | |
|----------------------------|-----|-----|-----|--|
| 100 mm | 100 | 100 | 100 | |
| 75 mm | 98 | 98 | 98 | |
| 63 mm | 95 | 95 | 95 | |
| 50 mm | 88 | 88 | 88 | |
| 37.5 mm | 85 | 85 | 85 | |
| 28.0 mm | 82 | 82 | 82 | |
| 20.0 mm | 78 | 78 | 78 | |
| 14.0 mm | 58 | 58 | 58 | |
| 5.0 mm | 49 | 49 | 49 | |
| 2.0 mm | 39 | 39 | 39 | |
| 0.425 mm | 14 | 14 | 14 | |
| 0.075 mm | | | | |

| SOIL MORTAR | | | | |
|-----------------------------|----|----|----|--|
| COARSE SAND <2.0mm >0.425mm | 20 | 20 | 20 | |
| FINE SAND <0.425mm >0.075mm | 51 | 51 | 51 | |
| MATERIAL <0.075mm | 29 | 29 | 29 | |

| CONSTANTS | | | | |
|----------------------------|----------|----------|----------|--|
| GRADING MODULUS | 1.98 | 1.98 | 1.98 | |
| PRA CLASSIFICATION | A-1-b(0) | A-1-b(0) | A-1-b(0) | |
| UNIFIED SOIL CLAS. | SC | SC | SC | |
| COLTO CLASSIFICATION | G6 | - | C3 | |
| TRH CLASSIFICATION | G7 | - | C3 | |
| LIQUID LIMIT (%) | - | - | - | |
| PLASTICITY INDEX (0.425mm) | SP | NP | NP | |
| LINEAR SHRINKAGE (%) | 0.5 | 0.0 | 0.0 | |

| MOD AASHTO | | | | |
|--|------|------|------|--|
| MAXIMUM DRY DENSITY (kg/m ³) | 2074 | 2088 | 2088 | |
| OPTIMUM MOISTURE CONTENT(%) | 7.6 | 6.3 | 6.3 | |
| MOULDING MOISTURE (%) | 7.3 | 6.6 | 6.6 | |

| TYPE OF TEST | CBR | UCS (MPa) | UCS (MPa) |
|---------------------------|-----|-----------|-----------|
| CBR-UCS @ 100% MOD AASHTO | 71 | 1.36 MPa. | 2.15 MPa. |
| CBR-UCS @ 98% MOD AASHTO | 50 | 1.16 MPa. | 1.82 MPa. |
| CBR-UCS @ 97% MOD AASHTO | 42 | 1.07 MPa. | 1.68 MPa. |
| CBR-UCS @ 95% MOD AASHTO | 30 | 0.91 MPa. | 1.42 MPa. |
| CBR-UCS @ 93% MOD AASHTO | 22 | 0.77 MPa. | 1.20 MPa. |
| CBR-UCS @ 90% MOD AASHTO | 13 | 0.61 MPa. | 0.93 MPa. |

CBR-UCS @ % MOD AASHTO derived from calculation.

| | | | | | | | | | | |
|-----------------------------|------|------|------|--|--|--|--|--|--|--|
| % SWELL AT [MOD][NRB][PROC] | 0.02 | 0.05 | 0.09 | | | | | | | |
|-----------------------------|------|------|------|--|--|--|--|--|--|--|

DEVIATION FROM TEST METHOD: UCS reported to nearest 0.01 MPa.

Remarks : ROADCEM II B-L LAFARGE 32.5 N

FORM: A1

4.4.0(SGS)(2016.08.31)

Technical Signatory : G.T. Van Rooyen / K.Z Mlambo

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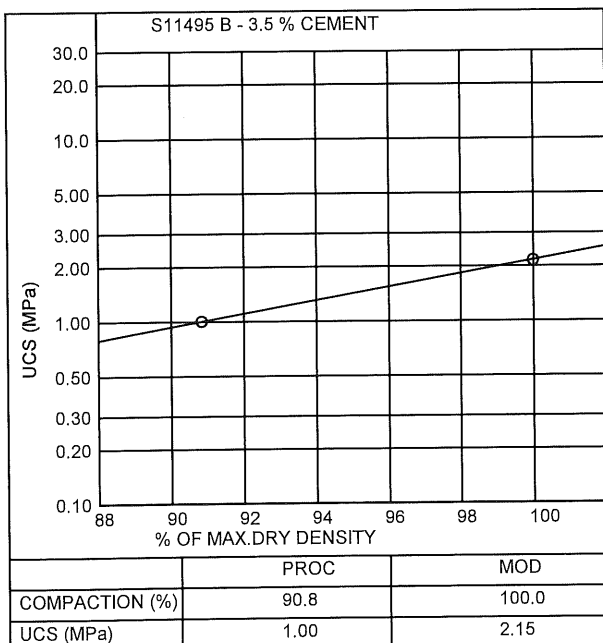
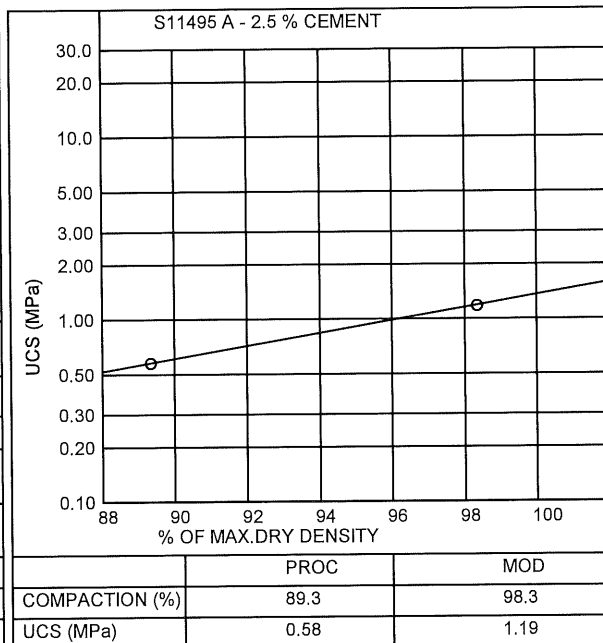
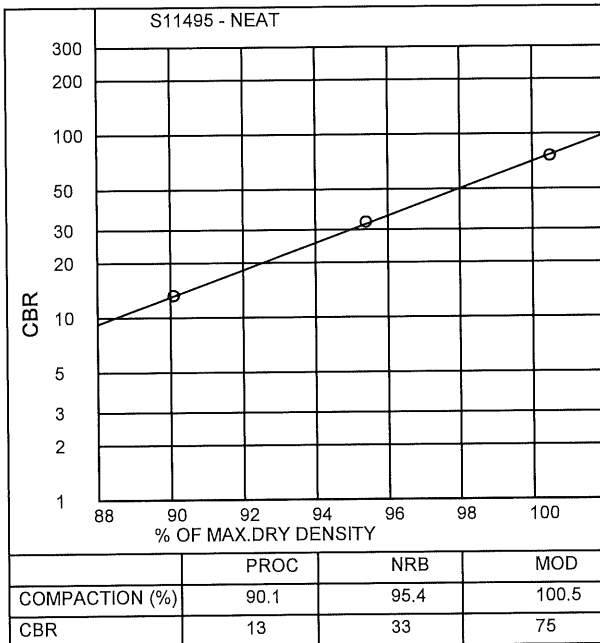
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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Road Centre Line Soil Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/B/G
 Date Reported : 16/09/2019

CBR-UCS GRAPH/S (OPTIONAL INFORMATION)



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9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137587302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

| | |
|--|---|
| Kruger National Park Private Bag X 402 Skukuza 1350 Attention: BEN MOMBERG | Project : Geotechnical Survey Along Proposed New Shangoni Gate : Road Centre Line Soil Investigation Your Ref : SK-PO098123 Our Ref : 1947/B/G Date Reported : 16/09/2019 |
|--|---|

SIEVE ANALYSIS, ATTERBERG LIMITS, MOD AASHTO, UCS, ITS(SANS 3001:GR54)

| | | | | |
|-----------------|-----------------|-----------------|--|--|
| SAMPLE NO. | S11495 A | S11495 B | | |
| HOLE NO. | 2 | 2 | | |
| ROAD NO. | - | - | | |
| DEPTH | 0-1300 | 0-1300 | | |
| CHAINAGE | BP 10 N | BP 10 N | | |
| LAYER TYPE | 1-3 | 1-3 | | |
| STABILISED WITH | 2.5 % CEMENT | 3.5 % CEMENT | | |
| SUPPLIER | SEE REMARKS | SEE REMARKS | | |
| CURING METHOD | RAPID | RAPID | | |
| DESCRIPTION | Dark Reddish Br | Dark Reddish Br | | |

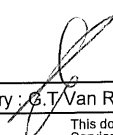
INDIRECT TENSILE STRENGTH

| | | | | |
|-------------------------------|---------------|---------------|--|--|
| 1. COMPACTION (%) : ITS (kPa) | 98.5 : 220.00 | 99.6 : 300.00 | | |
| 2. COMPACTION (%) : ITS (kPa) | 98.9 : 200.00 | 99.8 : 280.00 | | |
| 3. COMPACTION (%) : ITS (kPa) | | | | |
| AVERAGE COMP.(%) : ITS (kPa) | 98.7 : 210.00 | 99.7 : 290.00 | | |

Remarks : ROADCEM II B-L LAFARGE 32.5 N

FORM: D1

4.4.0(SGS)(2016.08.31)

Technical Signatory :  / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

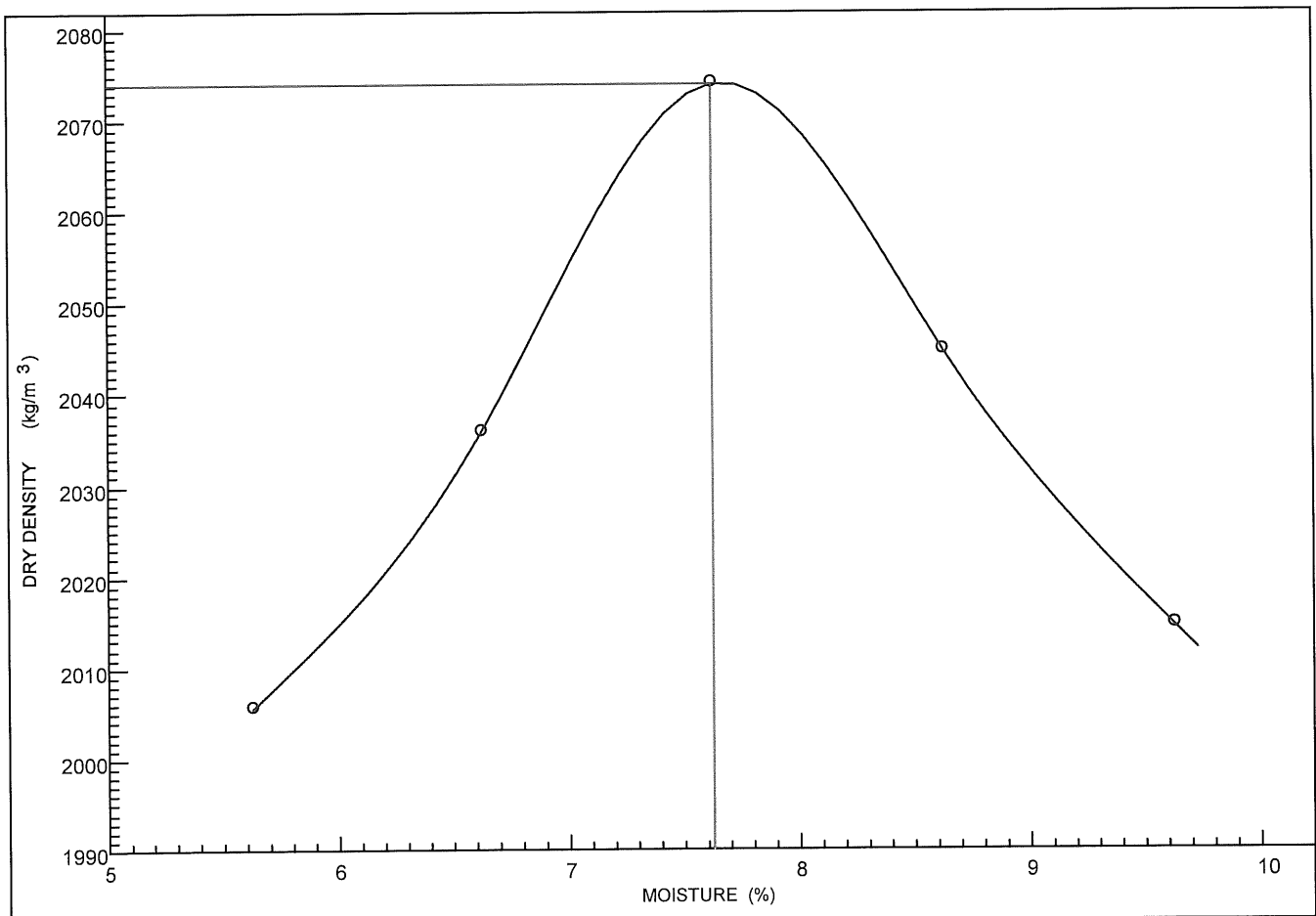
Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 16/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|---|------------------------|--------------------------------|
| Sample No.: S11495 | Hole No. : 2 | Depth (mm) : 0-1300 |
| Origin : Layer 1-3 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Dark Reddish Brown | | |

Optimum Moisture Content (%) : 7.6
 Maximum Dry Density (kg/m³) : 2074

| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Moisture (%) | 5.6 | 6.6 | 7.6 | 8.6 | 9.6 | | | |
| Density (kg/m ³) | 2006 | 2036 | 2074 | 2045 | 2015 | | | |



Remarks :

FORM: A7

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Technical Signatory : G.T Van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

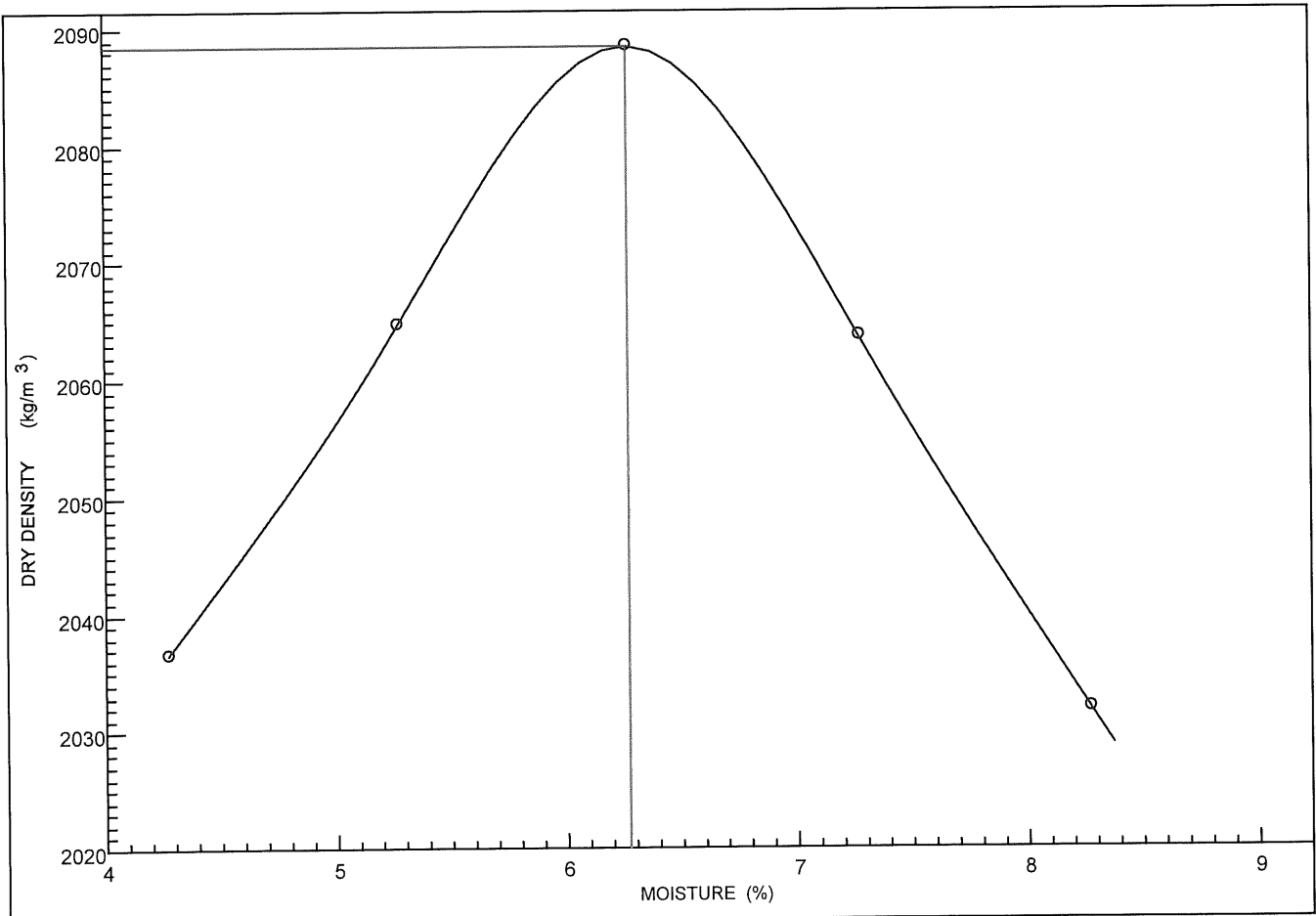
Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 16/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|---|--------------------------------|--------------------------------|
| Sample No.: S11495 A | Hole No. : 2 | Depth (mm) : 0-1300 |
| Origin : Layer 1-3 | Stabilized With : 2.5 % Cement | Compaction Energy : MOD AASHTO |
| Material Description : Dark Reddish Brown | | |

Optimum Moisture Content (%) : 6.3
 Maximum Dry Density (kg/m³) : 2088

| | | | | | | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| Moisture (%) | 4.3 | 5.3 | 6.3 | 7.3 | 8.3 | | | |
| Density (kg/m ³) | 2037 | 2065 | 2088 | 2064 | 2032 | | | |



Remarks :

FORM: A7

4.4.0(SGS)(2016.08.31)

Technical Signatory : G. Van Rooyen / K.Z Mlambo

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TEST RESULTS

| | |
|--|---|
| Kruger National Park Private Bag X 402 Skukuza 1350 Attention: Ben Momberg | Project : Geotechnical Survey Along Proposed New Shangoni Ga : Road Centre Line Soil Investigation Your Ref : SK-PO098123 Our Ref : 1947/B/H Date Reported : 16/09/2019 |
|--|---|

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12,GR30,GR40)

| SAMPLE NO. | S11496 | S11497 | S11498 | S11499 |
|-----------------|------------------|----------------------|---------------------------|--------------------|
| HOLE NO. | 2 | 4 | 1 | 3 |
| ROAD NO. | - | - | - | - |
| DEPTH | 1300-1800 | 0-1000 | 100-800 | 800-1300 |
| CHAINAGE | BP 10 N | BP 10 N | BP 11 N | BP 11 N |
| LAYER TYPE | LAYER 4 | LAYER 1-2 | LAYER 2 | LAYER 3 |
| STABILISED WITH | - | - | NEAT | NEAT |
| SUPPLIER | - | - | - | - |
| CURING METHOD | - | - | - | - |
| DESCRIPTION | LIGHT BROWN SAND | REDDISH BROWN GRAVEL | DARK REDDISH BROWN GRAVEL | REDDISH OLIVE SAND |

SIEVE ANALYSIS (% PASSING)

| Sieve Size | S11496 | S11497 | S11498 | S11499 |
|------------|--------|--------|--------|--------|
| 100 mm | 100 | 100 | 100 | 100 |
| 75 mm | 94 | 95 | 100 | 100 |
| 63 mm | 94 | 93 | 90 | 92 |
| 50 mm | 91 | 88 | 82 | 88 |
| 37.5 mm | 83 | 81 | 72 | 84 |
| 28.0 mm | 81 | 74 | 65 | 74 |
| 20.0 mm | 74 | 66 | 55 | 57 |
| 14.0 mm | 73 | 52 | 41 | 45 |
| 5.0 mm | 68 | 46 | 37 | 24 |
| 2.0 mm | 64 | 37 | 28 | 11 |
| 0.425 mm | 49 | 13 | 16 | |
| 0.075 mm | 8 | | | |

SOIL MORTAR

| Material | S11496 | S11497 | S11498 | S11499 |
|-----------------------------|--------|--------|--------|--------|
| COARSE SAND <2.0mm >0.425mm | 23 | 20 | 24 | 47 |
| FINE SAND <0.425mm >0.075mm | 64 | 52 | 32 | 29 |
| MATERIAL <0.075mm | 13 | 28 | 44 | 24 |

CONSTANTS

| Property | S11496 | S11497 | S11498 | S11499 |
|----------------------------|----------|----------|----------|----------|
| GRADING MODULUS | 1.79 | 2.04 | 2.19 | 2.20 |
| PRA CLASSIFICATION | A-1-b(0) | A-2-4(0) | A-2-4(0) | A-2-4(0) |
| UNIFIED SOIL CLAS. | SP-SC | SC | GC | SP-SM-SC |
| COLTO CLASSIFICATION | | | G6 | G6 |
| TRH CLASSIFICATION | | | G7 | G6 |
| LIQUID LIMIT (%) | - | 25 | 24 | 23 |
| PLASTICITY INDEX (0.425mm) | NP | 7 | 9 | 7 |
| LINEAR SHRINKAGE (%) | 0.0 | 3.5 | 4.0 | 3.5 |

MOD AASHTO

| Property | S11496 | S11497 | S11498 | S11499 |
|-----------------------------|--------|--------|--------|--------|
| MAXIMUM DRY DENSITY (kg/m³) | | | 2195 | 2320 |
| OPTIMUM MOISTURE CONTENT(%) | | | 7.4 | 8.5 |
| MOULDING MOISTURE (%) | | | 7.7 | 8.3 |

TYPE OF TEST

| Test Type | S11496 | S11497 | S11498 | S11499 |
|---------------------------|--------|--------|--------|--------|
| CBR-UCS @ 100% MOD AASHTO | | | 59 | 51 |
| CBR-UCS @ 98% MOD AASHTO | | | 45 | 44 |
| CBR-UCS @ 97% MOD AASHTO | | | 39 | 40 |
| CBR-UCS @ 95% MOD AASHTO | | | 29 | 34 |
| CBR-UCS @ 93% MOD AASHTO | | | 22 | 29 |
| CBR-UCS @ 90% MOD AASHTO | | | 14 | 23 |

CBR-UCS @ % MOD AASHTO derived from calculation.

| % SWELL AT [MOD][NRB][PROC] | 0.01 | 0.02 | 0.06 | 0.02 | 0.04 | 0.06 |
|-----------------------------|------|------|------|------|------|------|
| | | | | | | |

Remarks :

FORM: A1



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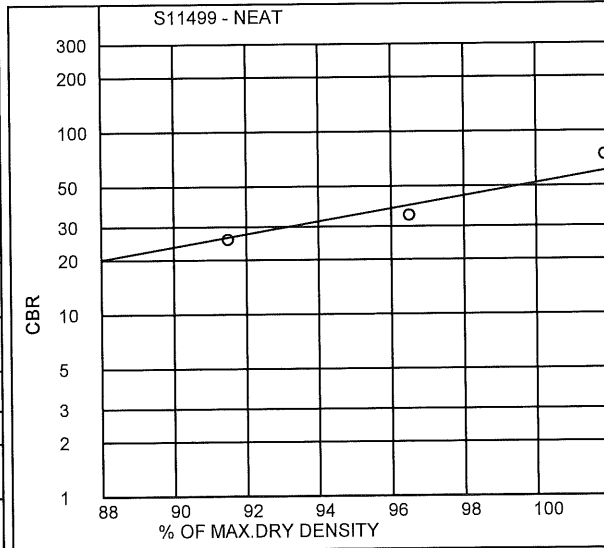
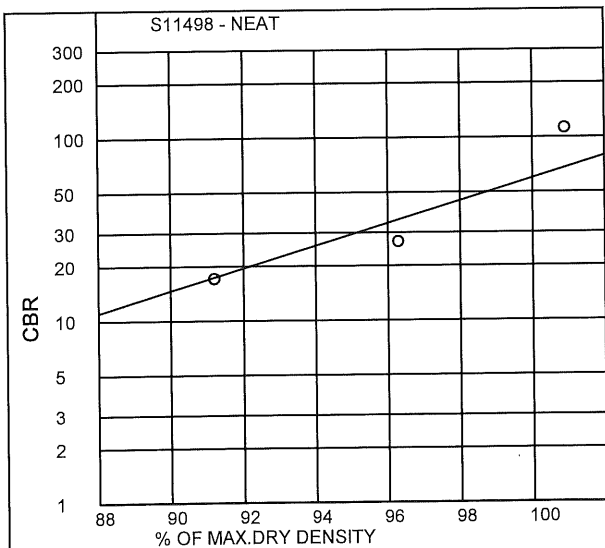
Tel. : 0137587302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Ga
 : Road Centre Line Soil Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/B/H
 Date Reported : 16/09/2019

CBR-UCS GRAPH/S (OPTIONAL INFORMATION)



| | PROC | NRB | MOD |
|----------------|------|------|-------|
| COMPACTION (%) | 91.2 | 96.3 | 100.9 |
| CBR | 17 | 27 | 111 |

| | PROC | NRB | MOD |
|----------------|------|------|-------|
| COMPACTION (%) | 91.5 | 96.5 | 101.9 |
| CBR | 26 | 35 | 75 |

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: BEN MOMBERG

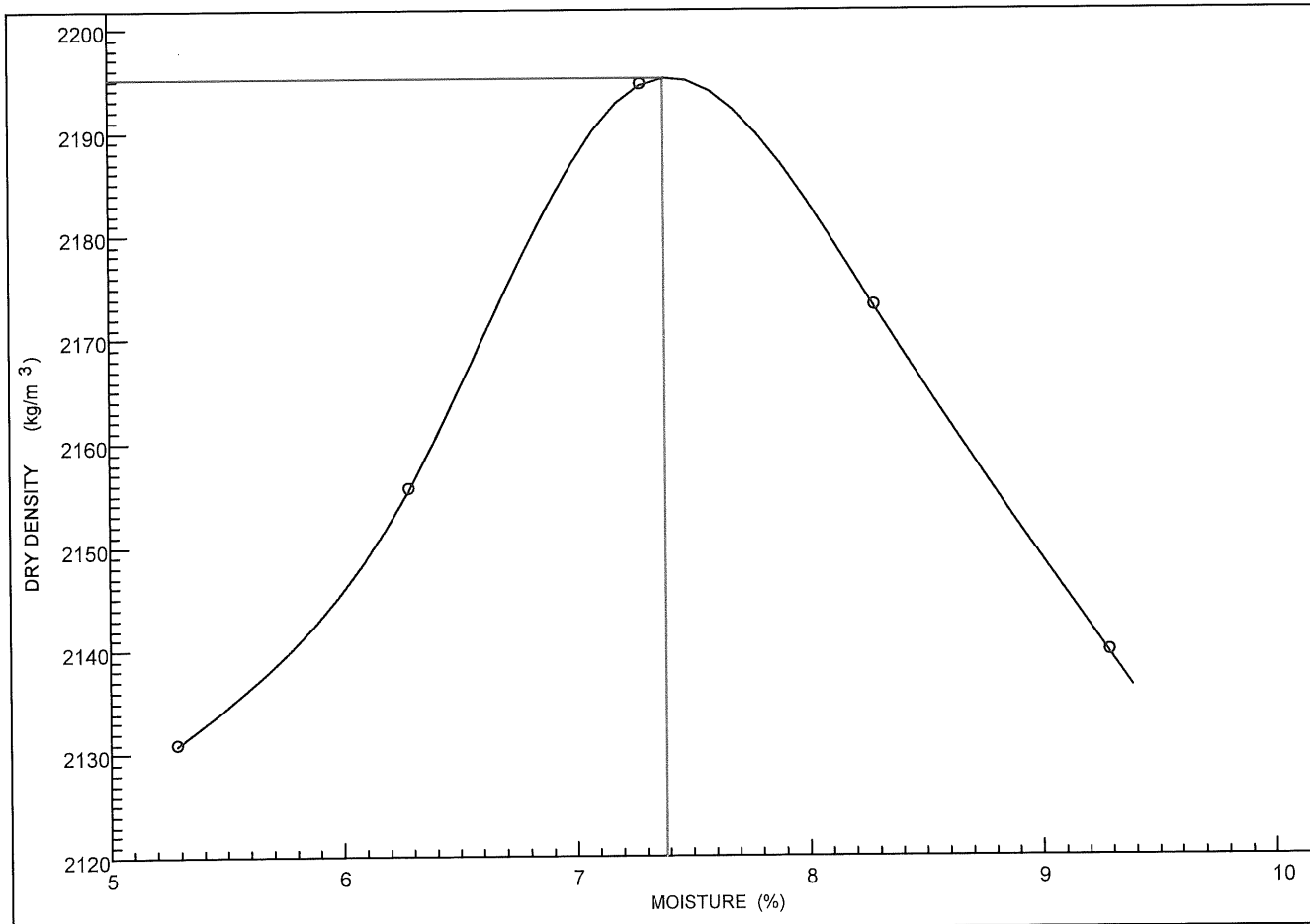
Project : See Remarks
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 05/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|---|------------------------|--------------------------------|
| Sample No.: S11498 | Hole No. : 1 | Depth (mm) : 100-800 |
| Origin : Layer 2 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Dark Reddish Brown | | |

Optimum Moisture Content (%) : 7.4
 Maximum Dry Density (kg/m³) : 2195

| | | | | | | | | |
|------------------------------|------|------|------|------|------|--|--|--|
| Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| Moisture (%) | 5.3 | 6.3 | 7.3 | 8.3 | 9.3 | | | |
| Density (kg/m ³) | 2131 | 2155 | 2194 | 2173 | 2140 | | | |



Remarks : Geotechnical Survey Along Proposed New Shangonie Gate
 Access Route - Kruger National Park (Area-Shingwedzi River) -
 Road Centre Line Soil Investigation

FORM: A7

4.4.0(SGS)(2016.08.31)

Technical Signatory : G. Van Rooyen / K.Z Mlambo

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TEST RESULTS

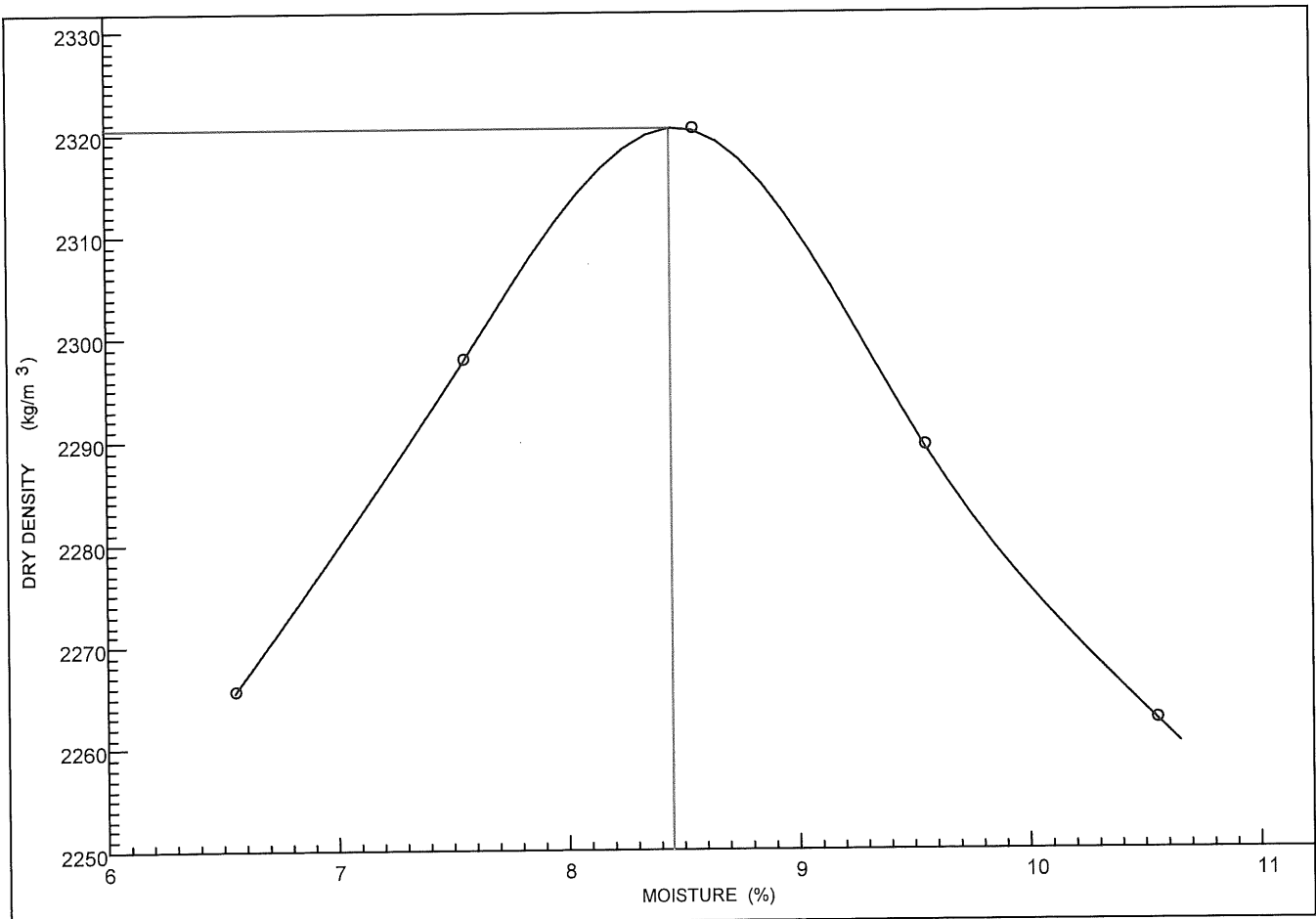
Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: BEN MOMBERG

Project : See Remarks
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 02/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|--------------------------------------|------------------------|--------------------------------|
| Sample No.: S11499 | Hole No. : 1 | Depth (mm) : 800-1300 |
| Origin : Layer 3 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Reddish Olive | | |

| | | | | | | | | | |
|---|------------------------------|------|------|------|------|------|--|--|--|
| Optimum Moisture Content (%) : 8.5 Maximum Dry Density (kg/m ³) : 2320 | Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| | Moisture (%) | 6.6 | 7.6 | 8.6 | 9.6 | 10.6 | | | |
| | Density (kg/m ³) | 2265 | 2298 | 2320 | 2289 | 2263 | | | |



Remarks : Geotechnical Survey Along Proposed New Shangonie Gate
 Access Route - Kruger National Park (Area-Shingwedzi River) -
 Road Centre Line Soil Investigation

FORM: A7

4.4.0(SGS)(2016.08.31)

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Road Centre Line Soil Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/B/I
 Date Reported : 16/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12)

| | | | | |
|-----------------|----------------------|----------------|--|--|
| SAMPLE NO. | S11500 | S11501 | | |
| HOLE NO. | 2 | 2 | | |
| ROAD NO. | - | - | | |
| DEPTH | 150-950 | 950-1400 | | |
| CHAINAGE | BP 11 N | BP 11 N | | |
| LAYER TYPE | LAYER 2 | LAYER 3 | | |
| STABILISED WITH | - | - | | |
| SUPPLIER | - | - | | |
| CURING METHOD | - | - | | |
| DESCRIPTION | REDDISH BROWN GRAVEL | OLIVE RED SAND | | |

SIEVE ANALYSIS (% PASSING)

| | | | | |
|----------|-----|-----|--|--|
| 100 mm | | | | |
| 75 mm | | | | |
| 63 mm | 100 | | | |
| 50 mm | 94 | | | |
| 37.5 mm | 77 | | | |
| 28.0 mm | 67 | | | |
| 20.0 mm | 57 | 100 | | |
| 14.0 mm | 49 | 98 | | |
| 5.0 mm | 33 | 84 | | |
| 2.0 mm | 30 | 68 | | |
| 0.425 mm | 25 | 41 | | |
| 0.075 mm | 10 | 14 | | |

SOIL MORTAR

| | | | | |
|-----------------------------|----|----|--|--|
| COARSE SAND <2.0mm >0.425mm | 17 | 40 | | |
| FINE SAND <0.425mm >0.075mm | 50 | 40 | | |
| MATERIAL <0.075mm | 33 | 20 | | |


CONSTANTS

| | | | | |
|----------------------------|----------|----------|--|--|
| GRADING MODULUS | 2.35 | 1.77 | | |
| PRA CLASSIFICATION | A-1-a(0) | A-1-b(0) | | |
| UNIFIED SOIL CLAS. | GP-GM-GC | SC | | |
| LIQUID LIMIT (%) | 22 | - | | |
| PLASTICITY INDEX (0.425mm) | 6 | SP | | |
| LINEAR SHRINKAGE (%) | 3.0 | 1.5 | | |

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Ga
: Road Centre Line Soil Investigation
Your Ref : SK-PO098123
Our Ref : 1947/B/J
Date Reported : 16/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(SANS 3001:GR1,GR10,GR12,GR30,GR40,GR53)

| SAMPLE NO. | S11502 | S11502 A | S11502 B |
|-----------------|-----------------------|----------------------------|----------------------------|
| HOLE NO. | 1 | 1 | 1 |
| ROAD NO. | - | - | - |
| DEPTH | 180-800 | 180-800 | 180-800 |
| CHAINAGE | BP 12 N | BP 12 N | BP 12 N |
| LAYER TYPE | LAYER 2 | LAYER 2 | LAYER 2 |
| STABILISED WITH | NEAT | 2.5% CEMENT | 3.5% CEMENT |
| SUPPLIER | - | SEE REMARKS | SEE REMARKS |
| CURING METHOD | - | RAPID | RAPID |
| DESCRIPTION | REDDISH ORANGE GRAVEL | DARK REDDISH ORANGE GRAVEL | DARK REDDISH ORANGE GRAVEL |

SIEVE ANALYSIS (% PASSING)

| Sieve Size | S11502 | S11502 A | S11502 B |
|------------|--------|----------|----------|
| 100 mm | 100 | 100 | 100 |
| 75 mm | 98 | 98 | 98 |
| 63 mm | 95 | 95 | 95 |
| 50 mm | 85 | 85 | 85 |
| 37.5 mm | 74 | 74 | 74 |
| 28.0 mm | 66 | 66 | 66 |
| 20.0 mm | 52 | 52 | 52 |
| 14.0 mm | 27 | 27 | 27 |
| 5.0 mm | 17 | 17 | 17 |
| 2.0 mm | 9 | 9 | 9 |
| 0.425 mm | 3 | 3 | 3 |
| 0.075 mm | | | |

SOIL MORTAR

| Material | S11502 | S11502 A | S11502 B |
|-----------------------------|--------|----------|----------|
| COARSE SAND <2.0mm >0.425mm | 47 | 47 | 47 |
| FINE SAND <0.425mm >0.075mm | 35 | 35 | 35 |
| MATERIAL <0.075mm | 18 | 18 | 18 |

CONSTANTS

| Property | S11502 | S11502 A | S11502 B |
|----------------------------|----------|----------|----------|
| GRADING MODULUS | 2.71 | 2.71 | 2.71 |
| PRA CLASSIFICATION | A-1-a(0) | A-1-a(0) | A-1-a(0) |
| UNIFIED SOIL CLAS. | GP | GP | GP |
| COLTO CLASSIFICATION | --- | - | - |
| TRH CLASSIFICATION | G7 | - | - |
| LIQUID LIMIT (%) | - | - | - |
| PLASTICITY INDEX (0.425mm) | SP | NP | NP |
| LINEAR SHRINKAGE (%) | 0.5 | 0.0 | 0.0 |

MOD AASHTO

| Property | S11502 | S11502 A | S11502 B |
|--|--------|----------|----------|
| MAXIMUM DRY DENSITY (kg/m ³) | 2072 | 2060 | 2060 |
| OPTIMUM MOISTURE CONTENT(%) | 6.2 | 6.5 | 6.5 |
| MOULDING MOISTURE (%) | 6.4 | 6.6 | 6.6 |

| TYPE OF TEST | CBR | UCS (MPa) | UCS (MPa) |
|---------------------------|-----|-----------|-----------|
| CBR-UCS @ 100% MOD AASHTO | 163 | 2.66 MPa. | 2.93 MPa. |
| CBR-UCS @ 98% MOD AASHTO | 106 | 2.29 MPa. | 2.50 MPa. |
| CBR-UCS @ 97% MOD AASHTO | 86 | 2.12 MPa. | 2.31 MPa. |
| CBR-UCS @ 95% MOD AASHTO | 56 | 1.82 MPa. | 1.97 MPa. |
| CBR-UCS @ 93% MOD AASHTO | 36 | 1.57 MPa. | 1.69 MPa. |
| CBR-UCS @ 90% MOD AASHTO | 19 | 1.25 MPa. | 1.33 MPa. |

CBR-UCS @ % MOD AASHTO derived from calculation.

| % SWELL AT [MOD][NRB][PROC] | 0.01 | 0.08 | 0.05 |
|-----------------------------|------|------|------|
| | | | |

DEVIATION FROM TEST METHOD: UCS reported to nearest 0.01 MPa.

Remarks : ROADCEM II B-L LAFARGE 35.2 N

FORM: A1

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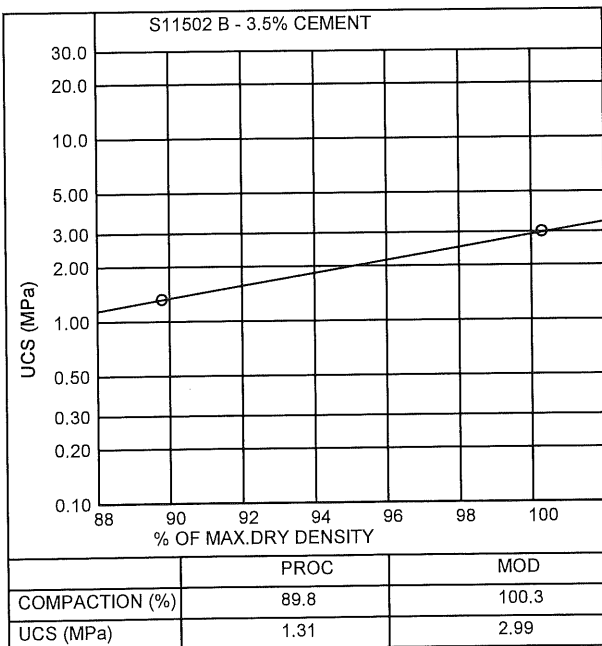
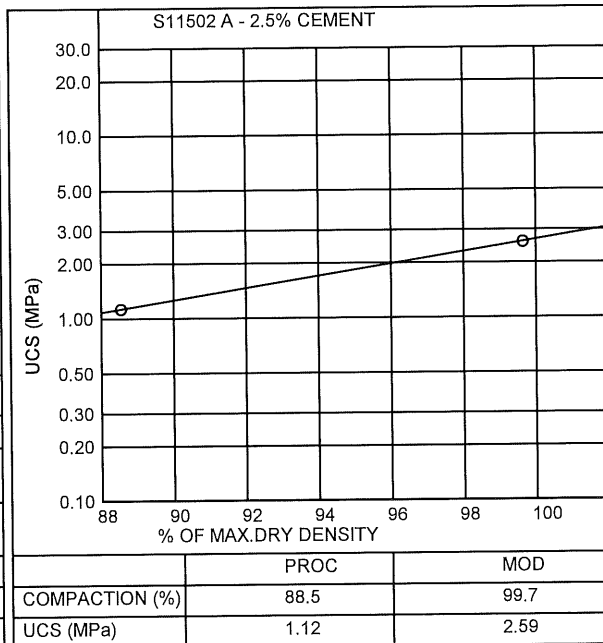
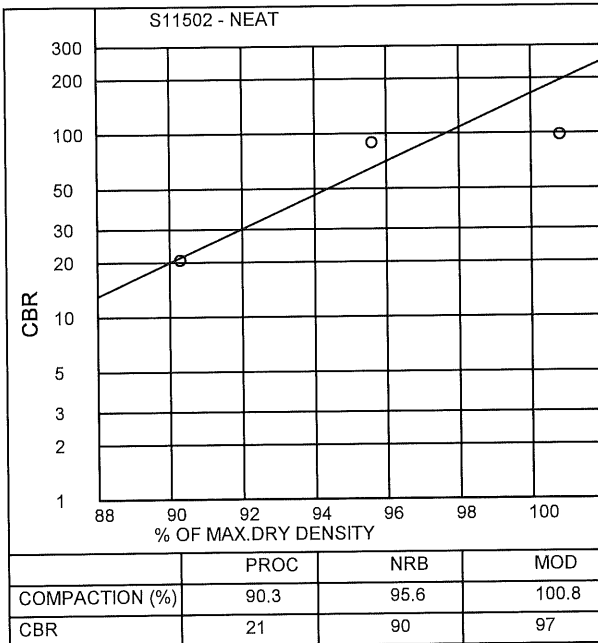
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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Ga
 : Road Centre Line Soil Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/B/J
 Date Reported : 16/09/2019

CBR-UCS GRAPH/S (OPTIONAL INFORMATION)



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9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137587302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

a SANAS Accredited Testing Laboratory, No. T0865

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: BEN MOMBERG

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Road Centre Line Soil Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947/B/J
 Date Reported : 16/09/2019

SIEVE ANALYSIS, ATTERBERG LIMITS, MOD AASHTO, UCS, ITS(SANS 3001:GR54)

| | | | | |
|-----------------|------------------------|------------------------|--|--|
| SAMPLE NO. | S11502 A | S11502 B | | |
| HOLE NO. | 1 | 1 | | |
| ROAD NO. | - | - | | |
| DEPTH | 180-800 | 180-800 | | |
| CHAINAGE | BP 12 N | BP 12 N | | |
| LAYER TYPE | 2 | 2 | | |
| STABILISED WITH | 2.5% CEMENT | 3.5% CEMENT | | |
| SUPPLIER | SEE REMARKS | SEE REMARKS | | |
| CURING METHOD | RAPID | RAPID | | |
| DESCRIPTION | DARK REDDISH OR GRAVEL | DARK REDDISH OR GRAVEL | | |


INDIRECT TENSILE STRENGTH

| | | | | |
|-------------------------------------|----------------------|-----------------------|--|--|
| 1. COMPACTION (%) : ITS (kPa) | 99.4 : 220.00 | 100.3 : 320.00 | | |
| 2. COMPACTION (%) : ITS (kPa) | | 100.1 : 310.00 | | |
| 3. COMPACTION (%) : ITS (kPa) | | | | |
| AVERAGE COMP.(%) : ITS (kPa) | 99.4 : 220.00 | 100.2 : 320.00 | | |

Remarks : ROADCEM II B-L LAFARGE 35.2 N

FORM: D1

4.4.0(SGS)(2016.08.31)

Technical Signatory :  G.T. Van Rooyen / K.Z Mlambo

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9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137587302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

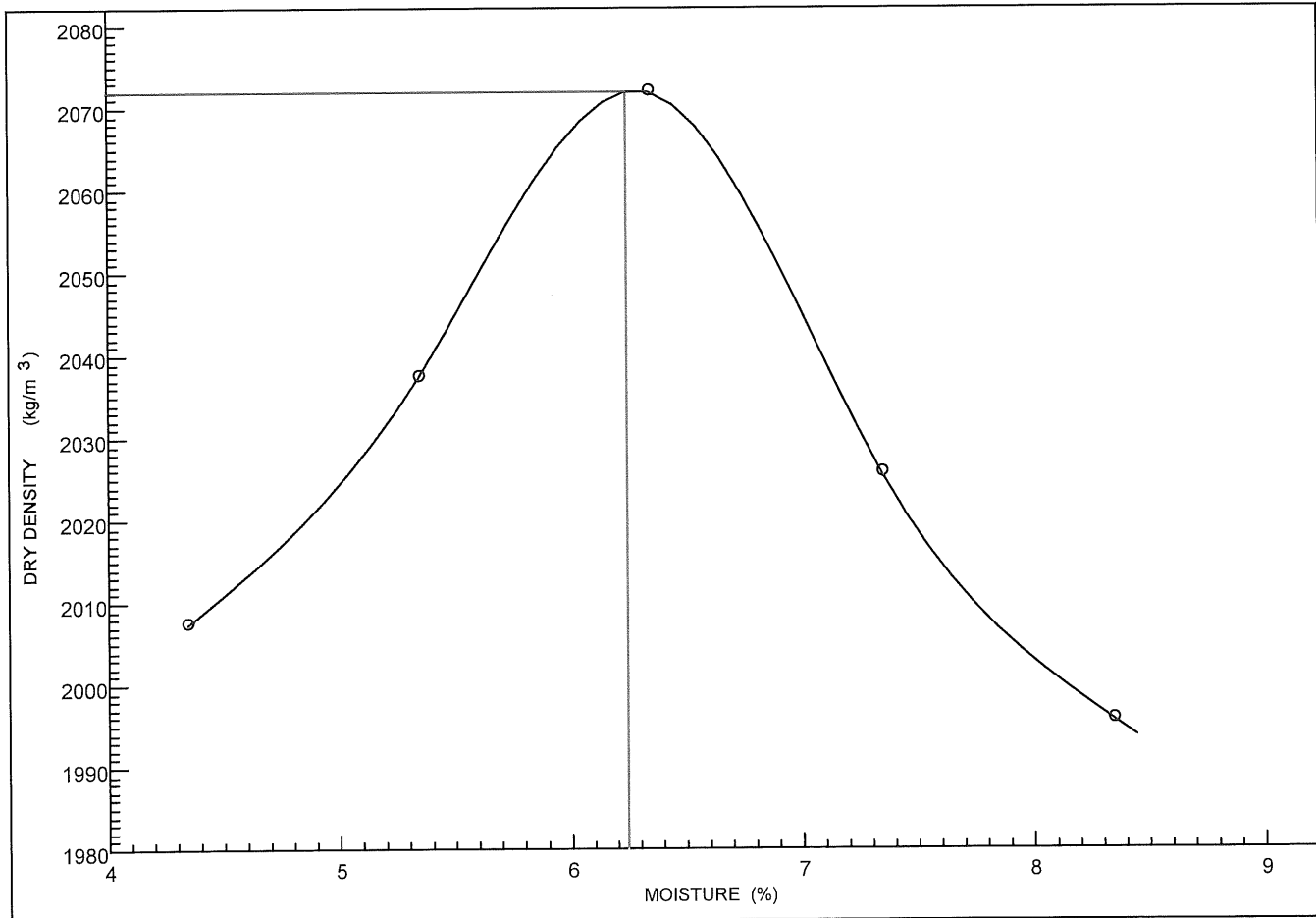
Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Ben Momberg

Project : Geotechnical Survey Along Proposed New Shangoni Gate
 : Borrow Pit Investigation
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 16/09/2019

MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

| | | |
|--|------------------------|--------------------------------|
| Sample No.: S11502 | Hole No. : 1 | Depth (mm) : 180-800 |
| Origin : Layer 2 | Stabilized With : Neat | Compaction Energy : MOD AASHTO |
| Material Description : Dark Reddish Orange | | |

| | | | | | | | | | |
|---|------------------------------|------|------|------|------|------|--|--|--|
| Optimum Moisture Content (%) : 6.2 Maximum Dry Density (kg/m ³) : 2072 | Point No. | 1 | 2 | 3 | 4 | 5 | | | |
| | Moisture (%) | 4.3 | 5.3 | 6.3 | 7.3 | 8.3 | | | |
| | Density (kg/m ³) | 2007 | 2037 | 2072 | 2026 | 1996 | | | |



Remarks :

FORM: A7

4.4.0(SGS)(2016.08.31)

Technical Signatory : G.J. Van Rooyen / K.Z Mlambo

72

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CLIENT : KRUGER NAT PARK (SKUKUZA)
ADDRESS : PRIVATE BAG X402
SKUKUZA
1350
ATTENTION : Mr Ben Momberg

OUR REF.: PL/31440

YOUR REF.: 1947

DATE : 13.09.2019

PROJECT : New Shangoni Gate

SGS MATROLAB

a SANAS Accredited Testing Laboratory, No. T0025

Tests marked * "Not SANAS Accredited" in this Report are not included in the
SANAS Schedule of Accreditation for the laboratory.

TEST REPORT / RESULTS

Sample/s: Sampled by : Client
Date Received / Sampled : 11.09.2019
Date Tested : 11-13.09.2019

Sampling method : By Client

Section / Position tested identified by : Client - Refer to Test Results

Number of pages in this Report : 6

General : Samples were delivered to Laboratory by client.

Opinions and interpretations expressed herein are outside the Scope of SANAS Accreditation.
Results only have bearing on the samples tested.
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256 Brander street, Jan Niemand Park, Pretoria.
P.O. BOX 912387 SILVERTON 0127
Tel. : 012-800 1299
Fax. : 012-800 3034
Email : lizette.brelting@sgs.com

TEST RESULTS

CLIENT: KRUGER NAT PARK (SKUKUZA)
ADDRESS: PRIVATE BAG X402
SKUKUZA
1350
Attention: Mr Ben Momberg

Project: New Shangoni Gate
Your Ref: 1947
Our Ref: PL/31440
Date Reported: 13.09.2019

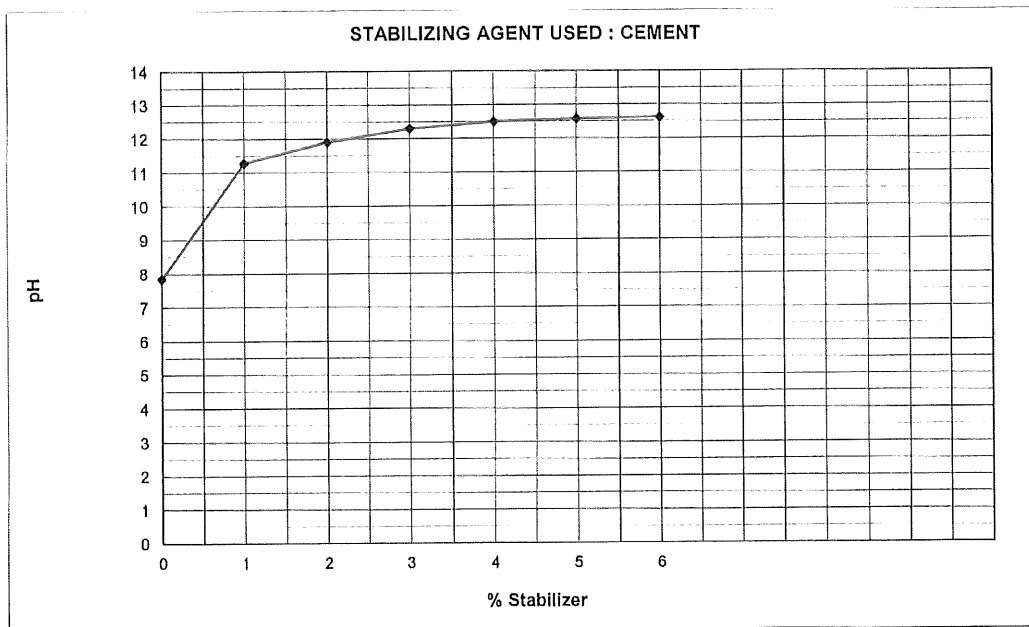
INITIAL CEMENT DEMAND

TEST METHOD: SANS 3001 - GR57:2014

Sample Number: A9/2731 (11427)

Description: Dark reddish brown,RHS,Hole 2 Layer 2 (300-1050)

| % Stabilizer | pH |
|--------------|-------|
| 0 | 7.86 |
| 1 | 11.28 |
| 2 | 11.90 |
| 3 | 12.30 |
| 4 | 12.51 |
| 5 | 12.58 |
| 6 | 12.63 |



REMARKS: After 1 Hour

Recommended Cement Demand: 3.0%

pH of Cement: 13.14
Temp: 24.6°C
Supplier: CLIENT
Cement type: Lafarge Cen IV B-V 32.5N


for SGS Matrolab (Pty) Ltd. Technical Signatory: Lizette Brelting

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TEST RESULTS

CLIENT: KRUGER NAT PARK (SKUKUZA)
 ADDRESS: PRIVATE BAG X402
 SKUKUZA
 1350
 Attention: Mr Ben Momberg

Project: New Shangoni Gate
 Your Ref: 1947
 Our Ref: PL/31440a
 Date Reported: 13.09.2019

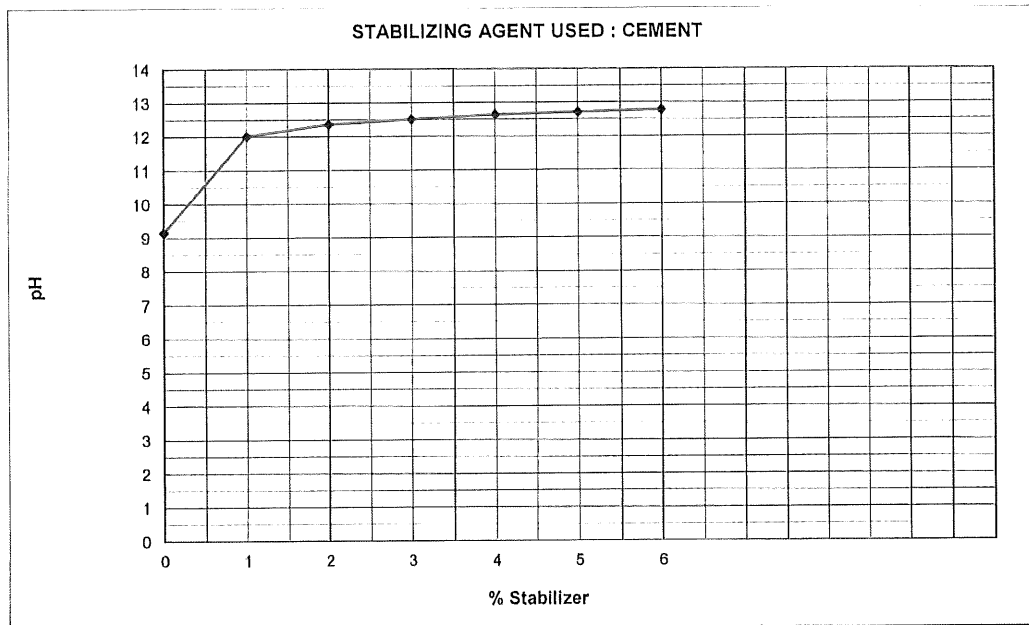
INITIAL CEMENT DEMAND

TEST METHOD: SANS 3001 - GR57:2014

Sample Number: A9/2732 (11472)

Description: Light brown,BP 3N,Hole 2 Layer 2 (650-1650)

| % Stabilizer | pH |
|--------------|-------|
| 0 | 9.17 |
| 1 | 12.02 |
| 2 | 12.37 |
| 3 | 12.52 |
| 4 | 12.65 |
| 5 | 12.72 |
| 6 | 12.79 |



REMARKS: After 1 Hour

Recommended Cement Demand: 2.0%

pH of Cement: 13.14
 Temp: 24.6°C
 Supplier : CLIENT
 Cement type: Lafarge Cen IV B-V 32.5N

Lizette Breiting
 for SGS Matrolab (Pty) Ltd. Technical Signatory: Lizette Breiting

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TEST RESULTS

CLIENT: KRUGER NAT PARK (SKUKUZA)
 ADDRESS: PRIVATE BAG X402
 SKUKUZA
 1350
 Attention: Mr Ben Momberg

Project: New Shangoni Gate
 Your Ref: 1947
 Our Ref: PL/31440b
 Date Reported: 13.09.2019

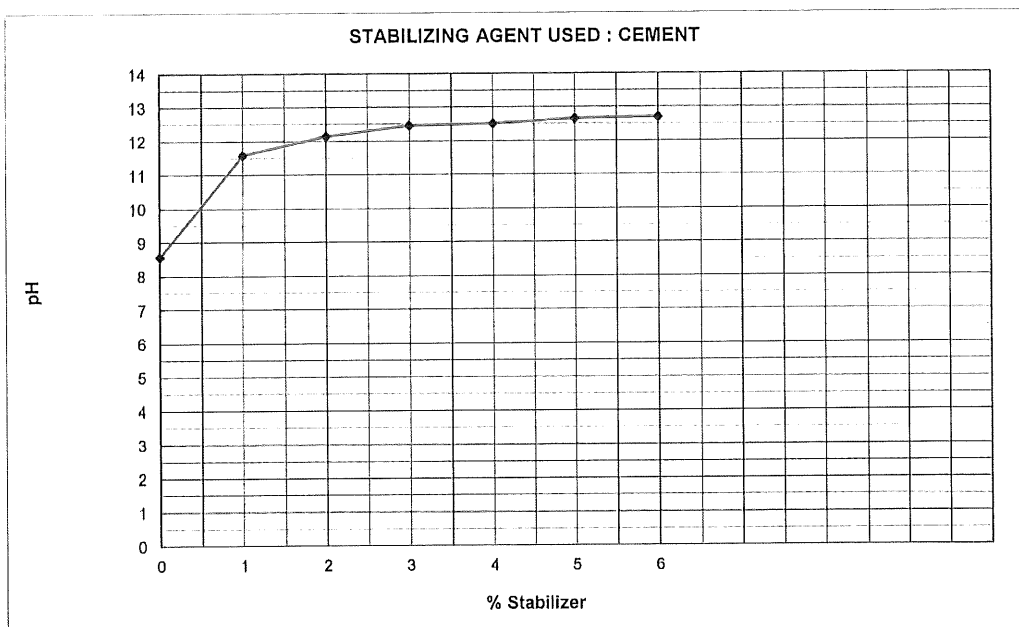
INITIAL CEMENT DEMAND

TEST METHOD: SANS 3001 - GR57:2014

Sample Number: A9/2733 (11477)

Description: Dark brown,BP 6N,Hole 1 Layer 2 & 6 (100-1100)

| % Stabilizer | pH |
|--------------|-------|
| 0 | 8.58 |
| 1 | 11.59 |
| 2 | 12.15 |
| 3 | 12.47 |
| 4 | 12.52 |
| 5 | 12.67 |
| 6 | 12.71 |



REMARKS: After 1 Hour

Recommended Cement Demand: 2.0%

pH of Cement: 13.14
 Temp: 24.6°C
 Supplier : CLIENT
 Cement type: Larfarge Cen IV B-V 32.5N

Lizette Breiting
 for SGS Matrolab (Pty) Ltd. Technical Signatory: Lizette Breiting

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Email : lizette.breiting@sgs.com

TEST RESULTS

CLIENT: KRUGER NAT PARK (SKUKUZA)
ADDRESS: PRIVATE BAG X402
SKUKUZA
1350
Attention: Mr Ben Momberg

Project: New Shangoni Gate
Your Ref: 1947
Our Ref: PL/31440c
Date Reported: 13.09.2019

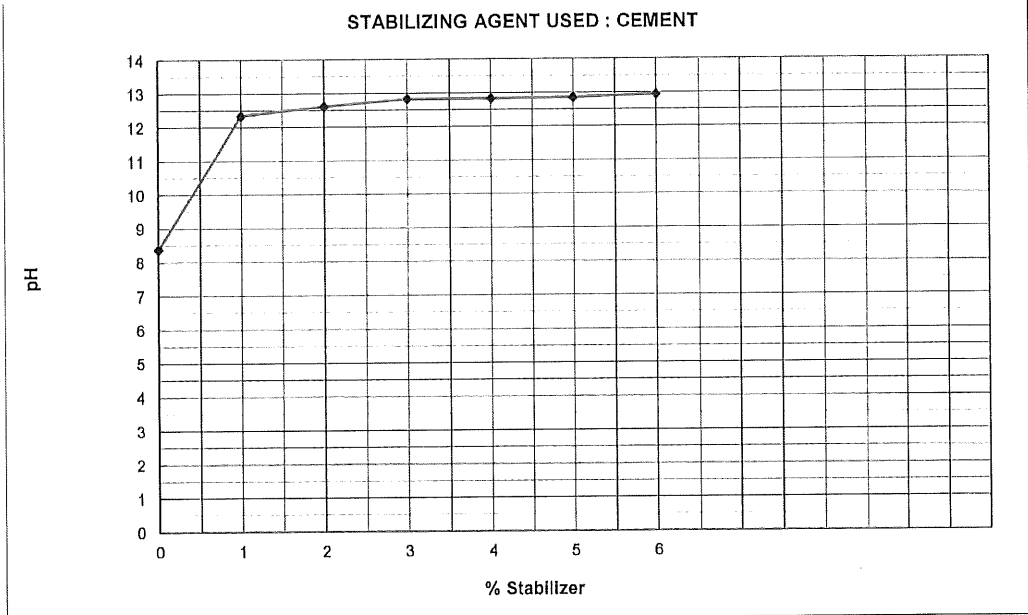
INITIAL CEMENT DEMAND

TEST METHOD: SANS 3001 - GR57:2014

Sample Number: A9/2734 (11485)

Description: Dark reddish brown, BP 8N, Hole 1 Layer 2 (200-800)

| % Stabilizer | pH |
|--------------|-------|
| 0 | 8.39 |
| 1 | 12.35 |
| 2 | 12.62 |
| 3 | 12.83 |
| 4 | 12.84 |
| 5 | 12.86 |
| 6 | 12.95 |



REMARKS: After 1 Hour

Recommended Cement Demand: 2.0%

pH of Cement: 13.14
Temp: 24.6°C
Supplier : CLIENT
Cement type: Larfarge Cen IV B-V 32.5N

Lizette Breiting
for SGS Matrolab (Pty) Ltd. Technical Signatory: Lizette Breiting

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TEST RESULTS

CLIENT: KRUGER NAT PARK (SKUKUZA)
 ADDRESS: PRIVATE BAG X402
 SKUKUZA
 1350
 Attention: Mr Ben Momberg

Project: New Shangoni Gate
 Your Ref: 1947
 Our Ref: PL/31440d
 Date Reported: 13.09.2019

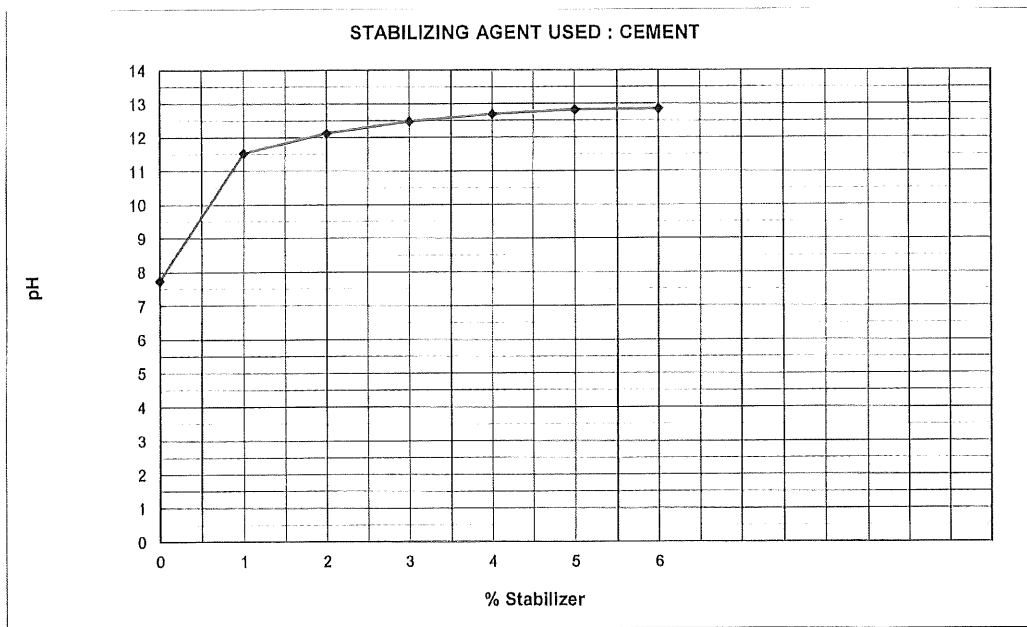
INITIAL CEMENT DEMAND

TEST METHOD: SANS 3001 - GR57:2014

Sample Number: A9/2735 (11495)

Description: Dark reddish brown,BP 10N,Hole 2 Layer 1-3 (0-1300)

| % Stabilizer | pH |
|--------------|-------|
| 0 | 7.75 |
| 1 | 11.54 |
| 2 | 12.13 |
| 3 | 12.49 |
| 4 | 12.70 |
| 5 | 12.83 |
| 6 | 12.86 |



REMARKS: After 1 Hour
 Recommended Cement Demand: 2.0%
 pH of Cement: 13.14
 Temp: 24.6°C
 Supplier : CLIENT
 Cement type: Larfarge Cen IV B-V 32.5N

Lizette Breiting
 for SGS Matrolab (Pty) Ltd. Technical Signatory: Lizette Breiting

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Tel. : 012-800 1299
Fax. : 012-800 3034
Email : lizette.breiting@sgs.com

TEST RESULTS

CLIENT: KRUGER NAT PARK (SKUKUZA)
ADDRESS: PRIVATE BAG X402
SKUKUZA
1350
Attention: Mr Ben Momberg

Project: New Shangoni Gate
Your Ref: 1947
Our Ref: PL/31440e
Date Reported: 13.09.2019

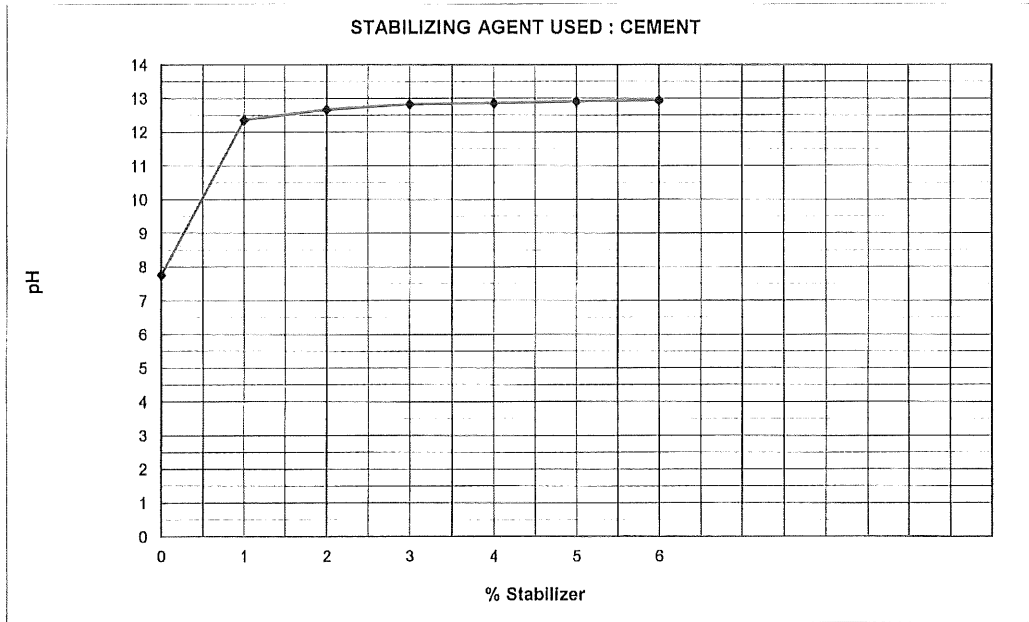
INITIAL CEMENT DEMAND

TEST METHOD: SANS 3001 - GR57:2014

Sample Number: A9/2736 (11502)

Description: Dark reddish orange,BP 12N,Hole 1 Layer 2 (180-800)

| % Stabilizer | pH |
|--------------|-------|
| 0 | 7.77 |
| 1 | 12.36 |
| 2 | 12.67 |
| 3 | 12.83 |
| 4 | 12.86 |
| 5 | 12.91 |
| 6 | 12.95 |



REMARKS: After 1 Hour

Recommended Cement Demand: 2.0%

pH of Cement: 13.14
Temp: 24.6°C
Supplier : CLIENT
Cement type: Larfarge Cen IV B-V 32.5N

for SGS Matrolab (Pty) Ltd. Technical Signatory: Lizette Breiting

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TABLE B: SUMMARY OF BORROW PIT TEST DATA

| Site | Sample No. | TP No. | Depth (m) | USC | ORIGIN | GM | PI | % OMC | Mod AASHTO Kg/m ³ | CBR @ 95% | UCS @ 95% KPa | G Class | C Class | Stab Agent |
|------|------------|--------|-----------|----------|-----------|------|----|-------|------------------------------|-----------|---------------|---------|---------|--------------|
| BPE1 | S11464 | 1 | 0,0-3,0 | GP-GM-GC | Basalt | 2,32 | 5 | 12.7 | 1901 | 10 | - | G9 | - | - |
| BPE2 | S11465 | 1 | 0,5-0,9 | GP-GC | Sandstone | 2,62 | 4 | 7.7 | 2187 | 33 | - | G7 | - | |
| BPE3 | S11466 | 1 | 0,0-1,0 | SC | Gabbro | 1,37 | NP | 6.6 | 2149 | 53 | - | G7 | - | |
| BP1N | S11467 | 1 | 0,1-1,0 | GP-GC | Gneiss | 2,48 | NP | 5.6 | 2091 | 38 | - | G6/7 | - | |
| BP1N | S11468 | 2 | 0,25-0,85 | GP-GC | Gneiss | 2,45 | SP | | - | | | | | |
| | S11469 | 3 | 0,15-1,3 | GP | Gneiss | 2,62 | NP | 8.6 | 2140 | 14 | - | G8 | - | - |
| BP3N | S11470 | 1 | 0,15-0,6 | GP-GC | Gabbro | 2,50 | 15 | 9.9 | 2152 | 19 | - | G7 | - | - |
| | S11471 | 1 | 0,6-1,0 | GP-GC | Gabbro | 2,51 | 13 | | - | - | - | - | - | - |
| BP3N | S11472 | 2 | 0,65-1,65 | SP-SC | Gabbro | 2,31 | 19 | 10.1 | 2237 | 24 | - | G8 | | Neat |
| | S11472A | 2 | 0,65-1,65 | SP-SM | Gabbro | 2,31 | 5 | 7.6 | 2237 | - | 930 | - | C3 | 2,5% cem DB* |
| | S11472B | 2 | 0,65-1,65 | SP-SC | Gabbro | 2,31 | NP | 7.6 | 2237 | - | 1350 | - | C3 | 3,5% cem DB* |
| BP4N | S11473 | 1 | 0,0-0,5 | GP | | 2,62 | NP | | - | | | | | |
| BP5N | S11474 | 1 | 0,0-0,9 | SP-SC | Gneiss | 2,34 | SP | 5.4 | 2172 | 47 | | G5 | - | Neat |
| | S11474A | 1 | 0,9-1,1 | GP | Gneiss | 2,61 | SP | | - | | | | | |
| | S11476 | 2 | 0,5-0,9 | GP-GM-GC | Gneiss | 2,65 | 5 | | - | | | | | |
| BP6N | S11477 | 1 | 0,1-1,1 | GP-GM-GC | Gneiss | 2,43 | 6 | 9.5 | 2220 | 28 | | G6/G7 | | Neat |
| BP6N | S11477A | 1 | 0,1-1,1 | GP-GC | Gneiss | 2,43 | NP | 6.7 | 2247 | - | 870 | | Disint. | 2.5% cem RC* |
| BP6N | S11477B | 1 | 0,1-1,1 | GP-GC | Gneiss | 2,43 | NP | 6.7 | 2247 | - | 1310 | | C3 | 3.5% cem RC* |
| BP6N | S11478 | 2 | 0,15-0,6 | GP-GM-GC | Gneiss | 2,29 | 5 | | - | | | | | |
| BP6N | S11479 | 2 | 0,6-1,0 | SP-SM-SC | Gneiss | 2,12 | 4 | | - | | | | | |
| BP6N | S11480 | 4 | 0,2-1,0 | GP-GC | Gneiss | 2,39 | NP | | - | | | | | |
| BP7N | S11481 | 1 | 0,25-0,8 | SP-SC | Gneiss | 2,35 | NP | 7.4 | 2131 | 53 | - | G5 | - | |
| BP7N | S11482 | 1 | 0,6-0,8 | GP | Gneiss | 2,72 | NP | | | | | | | |
| BP7N | S11483 | 2 | 0,15-0,9 | GP-GC | Gneiss | 2,37 | 4 | | | | | | | |
| BP7N | S11484 | 3 | 0,0-1,35 | GP-GC | Gneiss | 2,31 | 12 | | | | | | | |
| BP8N | S11485 | 1 | 0,2-0,8 | GP | Gneiss | 2,54 | NP | 5.6 | 2140 | 57 | | G5 | | Neat |
| BP8N | S11485A | 1 | 0,2-0,8 | GP | Gneiss | 2,54 | NP | 6.3 | 2132 | - | 2170 | | C2 | 2,5% cem DB* |
| BP8N | S11485B | 1 | 0,2-0,8 | GP | Gneiss | 2,54 | NP | 6.3 | 2132 | - | 2200 | | C2 | 3,5% cem DB* |

| Site | Sample No. | TP No. | Depth (m) | USC | ORIGIN | GM | PI | % OMC | Mod AASHTO Kg/m ³ | CBR @ 95% | UCS @ 95% KPa | G Class | C Class | Stab Agent |
|-------|------------|--------|-----------|----------|--------|------|----|-------|------------------------------|-----------|---------------|---------|---------|--------------|
| BP8N | S11486 | 1 | 0,8-1,4 | GP-GC | Gneiss | 2,47 | NP | | | | | | | |
| BP8N | S11487 | 2 | 0,2-0,8 | GP-GC | Gneiss | 2,44 | NP | | | | | | | |
| BP8N | S11488 | 2 | 0,8-1,5 | SP-SC | Gneiss | 2,28 | NP | | - | | | | | |
| BP8N | S11489 | 3 | 0,15-1,6 | SP-SC | Gneiss | 2,31 | NP | 6.4 | 2138 | 30 | | G7 | | |
| BP9N | S11490 | 2 | 0,14-1,0 | GP-GC | Gneiss | 2,46 | NP | 6.3 | 2186 | 48 | | G5 | | |
| BP9N | S11491 | 3 | 0,14-1,35 | GP-GC | Gneiss | 2,60 | NP | 6.3 | 2139 | 33 | | G6/G7 | | |
| BP9N | S11492 | 4 | 0,0-1,5 | SP-SC | Gneiss | 2,40 | NP | | - | - | - | - | - | - |
| BP10N | S11493 | 1 | 0,2-0,57 | GP-GC | Schist | 2,61 | SP | | 2140 | 33 | - | G6 | - | - |
| BP10N | S11494 | 1 | 0,57-1,0 | GP | Schist | 2,68 | 3 | | 2083 | 45 | - | G7 | - | - |
| BP10N | S11495 | 2 | 0,0-1,3 | SC | Schist | 1,98 | SP | 7.6 | 2074 | 30 | | G6 | | Neat |
| BP10N | S11495A | 2 | 0,0-1,3 | SC | Schist | 1,98 | NP | 6.3 | 2088 | | 910 | | - | 2,5% cem RC* |
| BP10N | S11495B | 2 | 0,0-1,3 | SC | Schist | 1,98 | NP | 6.3 | 2088 | | 1420 | | C3 | 3,5% cemRC* |
| BP10N | S11496 | 2 | 1,3-1,8 | SP-SC | Schist | 1,79 | NP | | - | | | | | |
| BP10N | S11497 | 4 | 0,0-1,0 | SC | Schist | 2,04 | 7 | | - | | | | | |
| BP11N | S11498 | 1 | 0,1-0,8 | GC | Schist | 2,19 | 9 | 7.4 | 2195 | 29 | | G6 | | |
| BP11N | S11499 | 3 | 0,8-1,3 | SP-SM-SC | Schist | 2,20 | 7 | 8.5 | 2320 | 34 | | G6 | | |
| BP11N | S11500 | 2 | 0,15-0,95 | GP-GM-GC | Schist | 2,35 | 6 | | | | | | | |
| BP11N | S11501 | 2 | 0,95-1,4 | SC | Schist | 1,77 | SP | | | | | | | |
| BP12N | S11502 | 1 | 0,18-0,8 | GP | Gneiss | 2,71 | SP | 6.2 | 2072 | 56 | - | G7 | - | |
| BP12N | S11502A | 1 | 0,18-0,8 | GP | Gneiss | 2,71 | NP | 6.5 | 2060 | - | 1820 | C3 | - | |
| BP12N | S11502B | 1 | 0,18-0,8 | GP | Gneiss | 2,71 | NP | 6.5 | 2060 | - | 1970 | C3 | - | |
| BP12N | S11503 | 2 | 0,25-1,0 | SP-SC | Gneiss | 2,21 | NP | | - | - | - | - | | |
| BP12N | S11504 | 3 | 0,22-0,7 | SP-SC | Gneiss | 2,28 | NP | 7.7 | 2000 | 30 | - | G6 | | |
| BP12N | S11505 | 3 | 0,7-1,2 | GP | Gneiss | 2,56 | NP | 7.4 | 2034 | 28 | - | G6 | | |
| BP13N | S11506 | 1 | 0,15-0,2 | SP-SC | Gneiss | 2,19 | NP | 6.2 | 2136 | 22 | - | G8 | | |
| BP13N | S11507 | 1 | 0,7-1,4 | SP-SC | Gneiss | 2,45 | NP | 6.1 | 2136 | 35 | - | G6 | | |
| BP13N | S11508 | 2 | 0,8-0,08 | SP-SC | Gneiss | 2,20 | NP | | - | - | - | - | | |
| BP13N | S11509 | 2 | 0,8-1,5 | GP | Gneiss | 2,48 | NP | | - | - | - | - | | |
| BP13N | S11510 | 3 | 0,3-0,65 | GP-GC | Gneiss | 2,46 | NP | | - | - | - | - | | |

| Site | Sample No. | TP No. | Depth (m) | USC | ORIGIN | GM | PI | % OMC | Mod AASHTO Kg/m ³ | CBR @ 95% | UCS @ 95% KPa | G Class | C Class | Stab Agent |
|-------|------------|--------|-----------|-------|--------|------|----|-------|------------------------------|-----------|---------------|---------|---------|------------|
| BP14N | S11511 | 1 | 0,08-0,53 | GC | Schist | 2,23 | 16 | | - | - | - | - | | |
| BP14N | S11512 | 1 | 0,53-1,7 | GP-GM | Schist | 2,34 | 11 | | - | - | - | - | | |
| BP14N | S11513 | 3 | 0,0-0,2 | CL | Schist | 0,65 | 15 | | - | - | - | - | | |
| BP14N | S11514 | 3 | 0,2-0,5 | GC | Schist | 2,24 | 10 | 6.6 | 2111 | 35 | - | G6 | | |
| BP14N | S11515 | 4 | 0,3-0,8 | SM | Schist | 1,78 | 12 | | - | - | - | - | | |
| BP14N | S11516 | 4 | 0,8-1,9 | SC | Schist | 1,61 | 10 | | - | - | - | - | | |
| BP14N | S11517 | 4 | 1,1-2,0 | SC | Schist | 1,78 | 4 | | - | - | - | - | | |
| BP14N | S11518 | 5 | 0,0-0,24 | SC | Schist | 2,14 | 13 | 8.4 | 2114 | 9 | - | G10 | | |
| BP14N | S11519 | 5 | 0,0-1,3 | GP-GC | Schist | 2,49 | 8 | 10.4 | 2205 | 19 | - | G8/G9 | | |

DB* : Dura Build Lafarge CEM iv/B – V 32.5N :

RC* : Road CEM 11/B – L Lafarge 32.5N

Annexure E

TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Tebogoo Maake

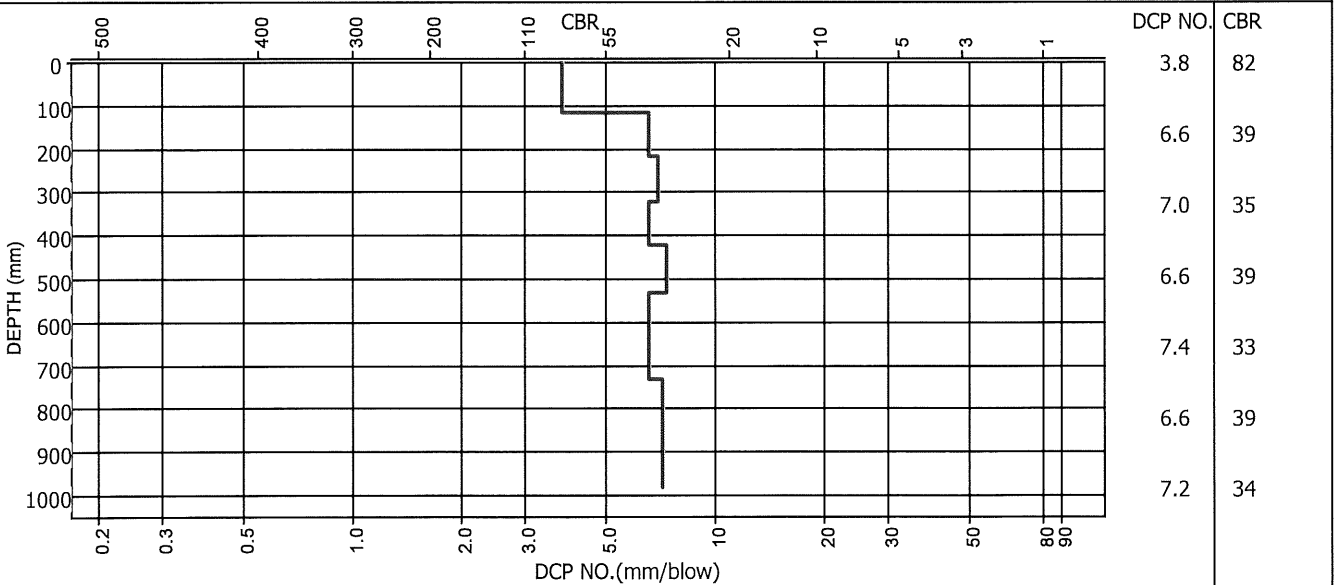
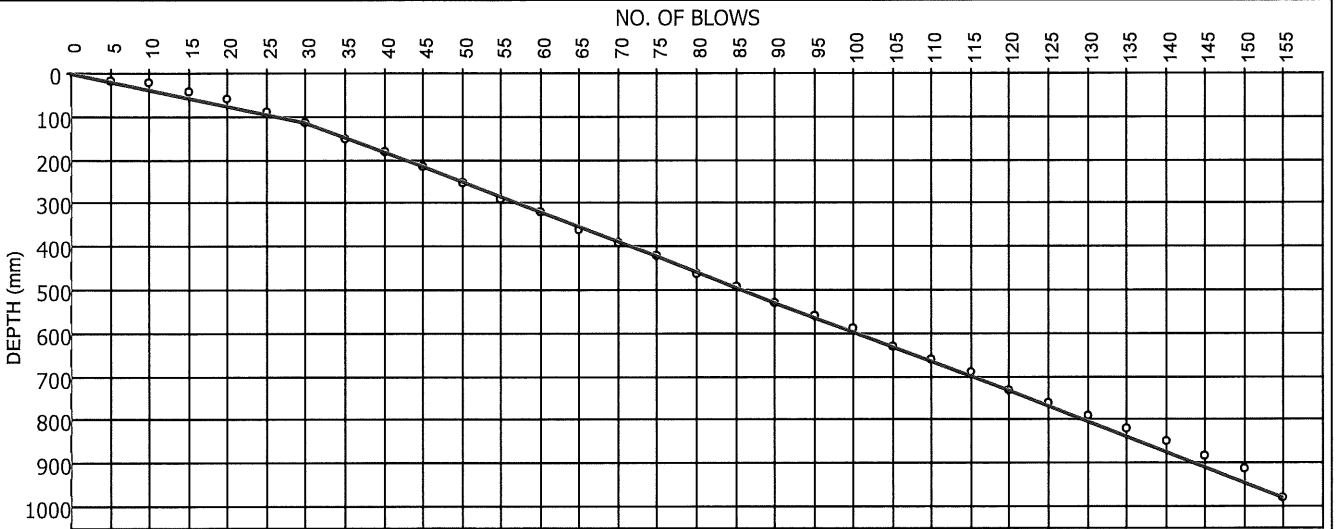
Project : Proposed New Shangoni Gate
: S/LHS 31 Y 032990 - X 2564406
Your Ref : SK-PO098123
Our Ref : 1947
Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 1 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 15 | 20 | 40 | 60 | 90 | 115 | 150 | 180 | 215 | 250 | 290 | 320 | 360 | 390 | 420 | 460 | 490 | 530 | 560 | 590 | 630 | 660 | 690 | 730 | 760 |
| CBR | 110 | 300 | 75 | 75 | 45 | 55 | 35 | 45 | 35 | 35 | 30 | 45 | 30 | 45 | 45 | 30 | 45 | 30 | 45 | 45 | 30 | 45 | 45 | 30 | 45 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | | | | | | | | | | | | | | | | | | | |
| DEPTH | 790 | 820 | 850 | 880 | 910 | 980 | | | | | | | | | | | | | | | | | | | |
| CBR | 45 | 45 | 45 | 45 | 45 | 15 | | | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

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Technical Signatory : G. van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Tebogo Maake

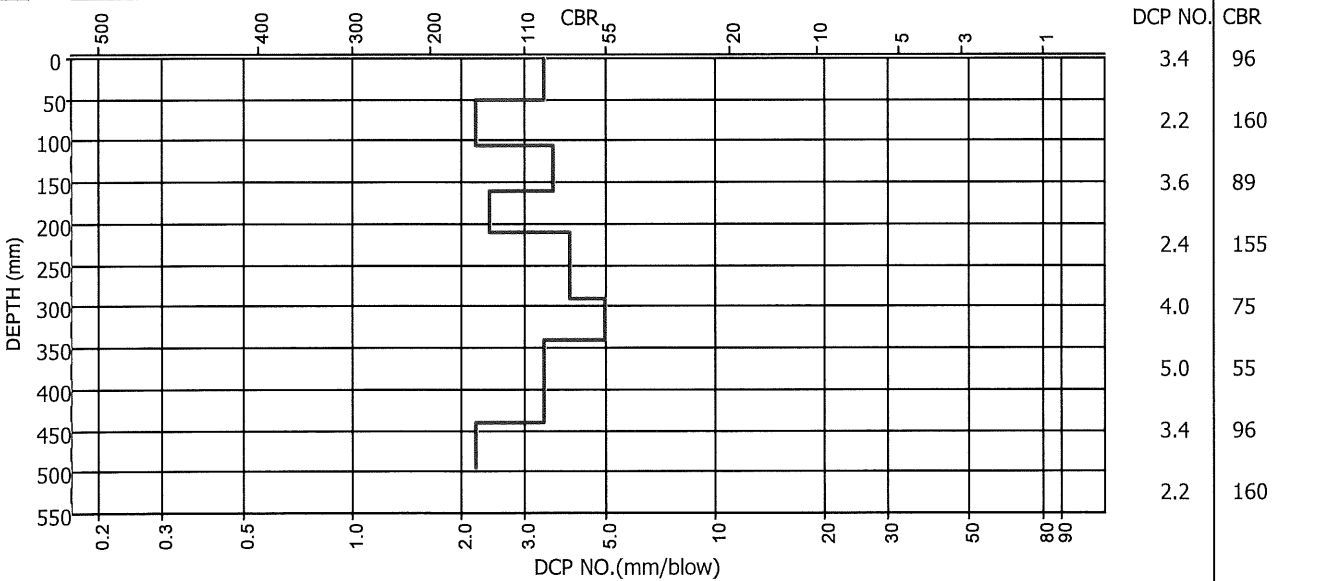
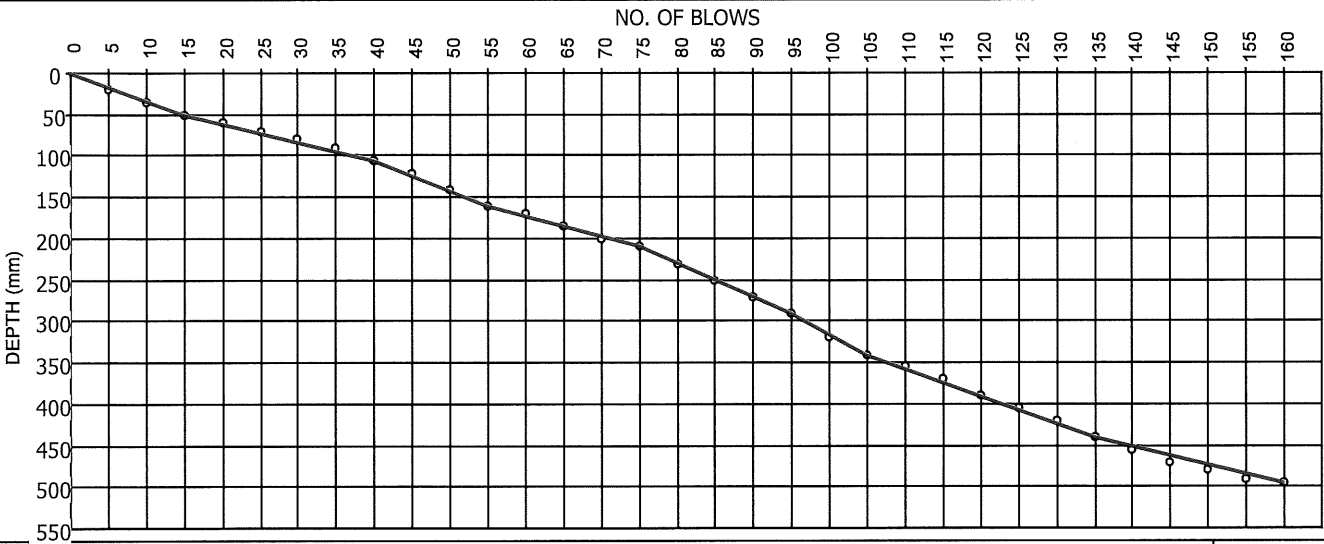
Project : Proposed New Shangoni Gate
: S/LHS 31 Y 031603 - X 2564503 (Refused)
Your Ref : SK-PO098123
Our Ref : 1947
Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 3 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 20 | 35 | 50 | 60 | 70 | 80 | 90 | 105 | 120 | 140 | 160 | 170 | 185 | 200 | 210 | 230 | 250 | 270 | 290 | 320 | 340 | 355 | 370 | 390 | 405 |
| CBR | 75 | 110 | 110 | 170 | 170 | 170 | 170 | 110 | 110 | 75 | 75 | 170 | 110 | 110 | 170 | 75 | 75 | 75 | 75 | 45 | 75 | 110 | 110 | 75 | 110 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | | | | | | | | | | | | | | | | | | |
| DEPTH | 420 | 440 | 455 | 470 | 480 | 490 | 495 | | | | | | | | | | | | | | | | | | |
| CBR | 110 | 75 | 110 | 110 | 170 | 170 | 300 | | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : GT van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogoa Maake

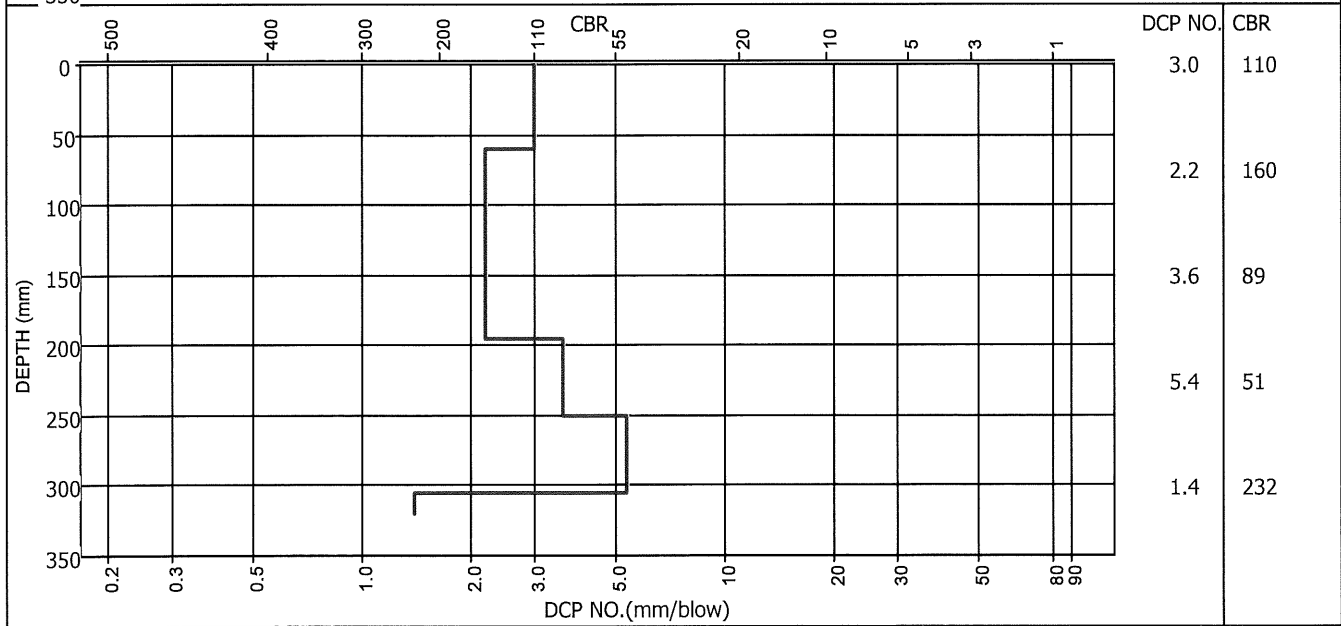
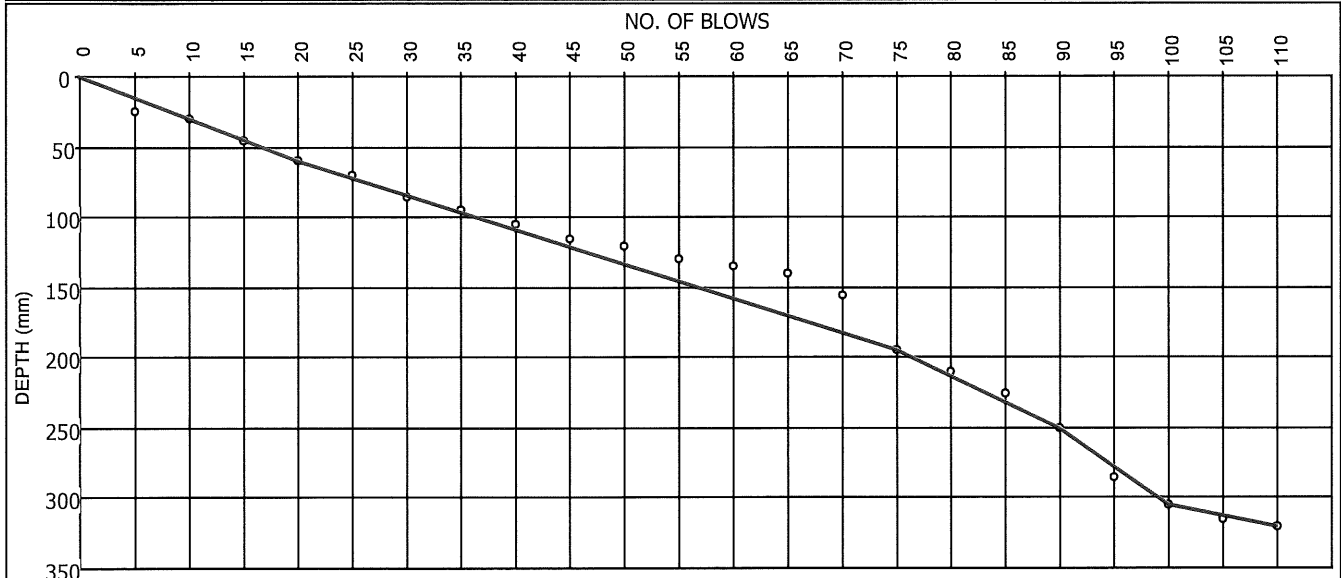
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 030366 - X 2564223 (Refused)
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 5 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | |
|-------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 |
| DEPTH | 25 | 30 | 45 | 60 | 70 | 85 | 95 | 105 | 115 | 120 | 130 | 135 | 140 | 155 | 195 | 210 | 225 | 250 | 285 | 305 | 315 | 320 |
| CBR | 55 | 300 | 110 | 110 | 170 | 110 | 170 | 170 | 170 | 300 | 170 | 300 | 300 | 110 | 30 | 110 | 110 | 55 | 35 | 75 | 170 | 300 |



Remarks :

FORM: ST6

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Technical Signatory : GT van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogoa Maake

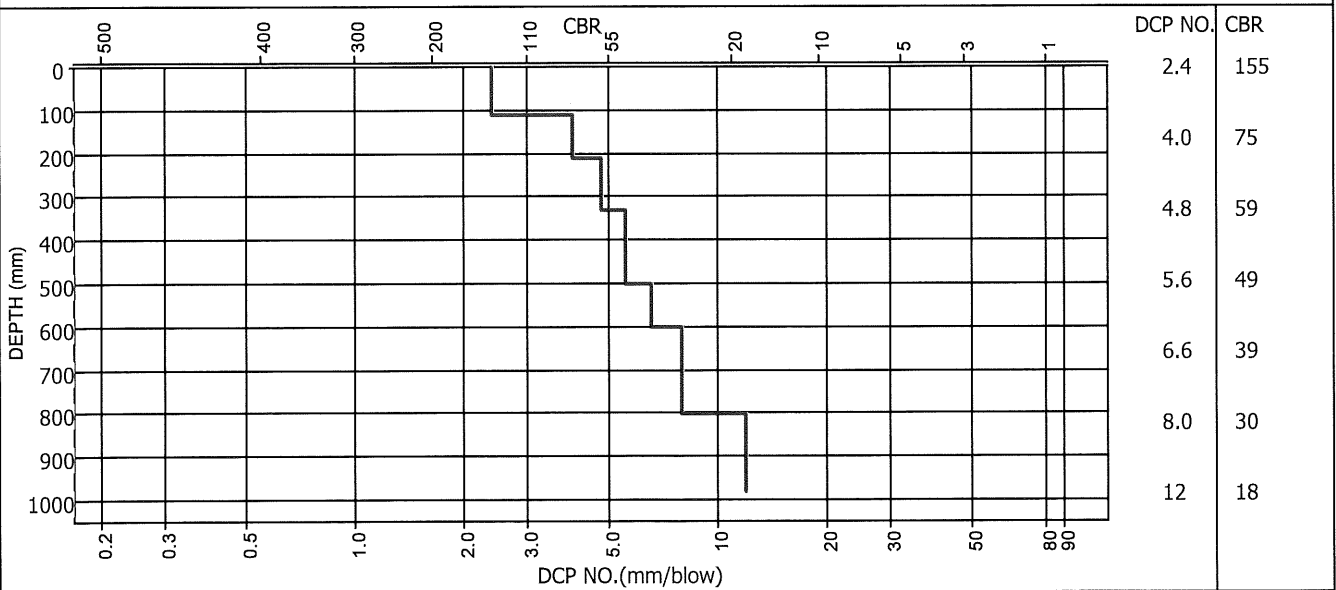
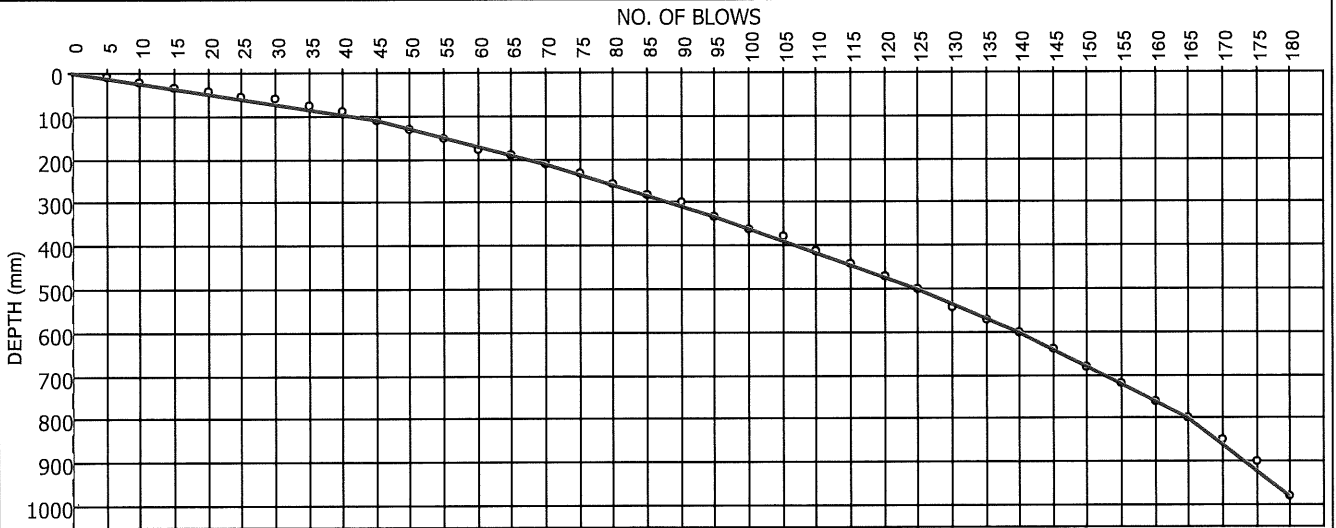
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 029773 - X 2564998
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 6 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 10 | 20 | 35 | 40 | 55 | 60 | 75 | 90 | 110 | 130 | 150 | 175 | 190 | 210 | 230 | 255 | 280 | 300 | 330 | 360 | 380 | 410 | 440 | 470 | 500 |
| CBR | 170 | 170 | 110 | 300 | 110 | 300 | 110 | 110 | 75 | 75 | 75 | 55 | 110 | 75 | 75 | 55 | 55 | 75 | 45 | 45 | 75 | 45 | 45 | 45 | 45 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | | | | | | | | | | | | | | |
| DEPTH | 540 | 570 | 600 | 640 | 680 | 720 | 760 | 800 | 850 | 900 | 980 | | | | | | | | | | | | | | |
| CBR | 30 | 45 | 45 | 30 | 30 | 30 | 30 | 30 | 22 | 22 | 13 | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogoa Maake

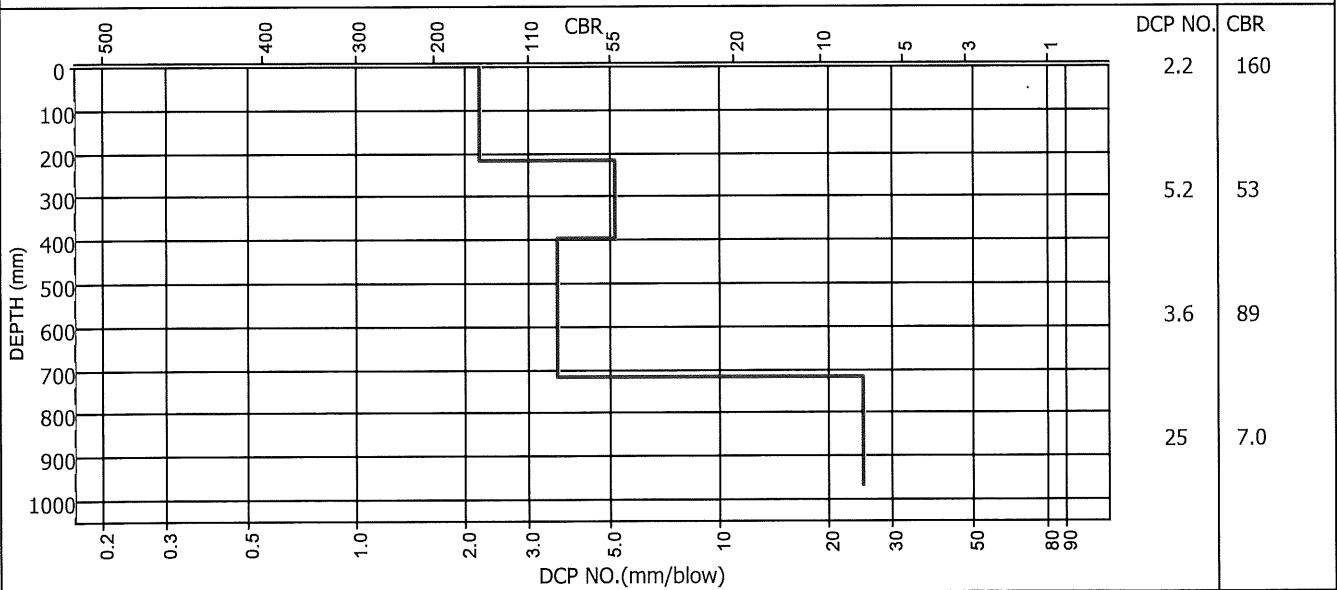
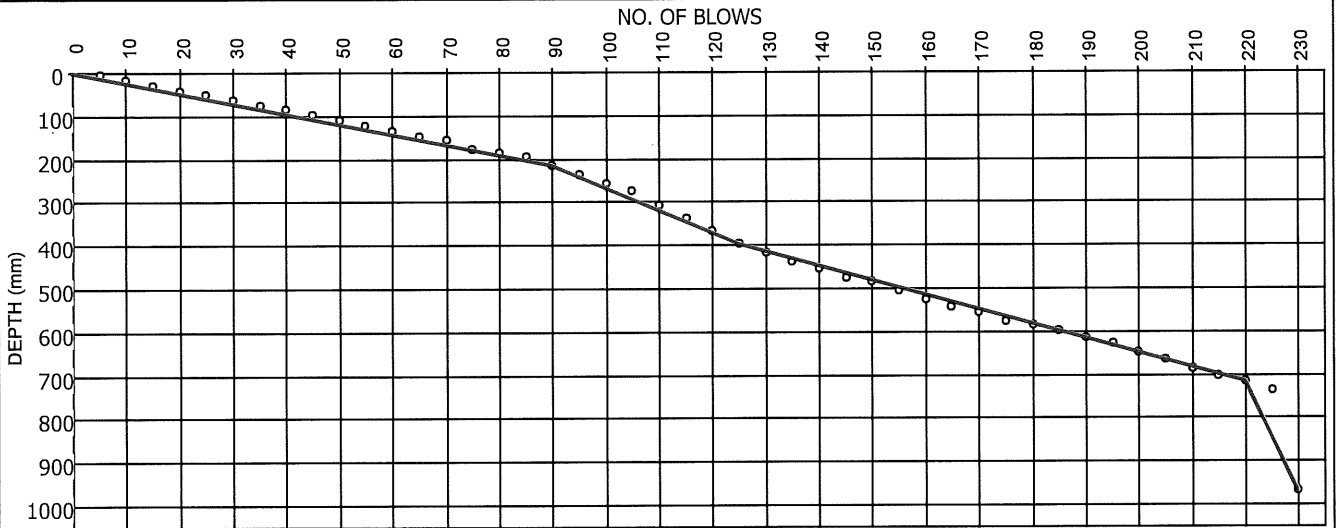
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 029005 - X 2565279
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 7 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 | |
| DEPTH | 5 | 15 | 30 | 40 | 50 | 65 | 75 | 85 | 95 | 110 | 120 | 135 | 145 | 155 | 170 | 175 | 185 | 195 | 215 | 235 | 255 | 275 | 305 | 335 | 365 | 395 |
| CBR | 300 | 170 | 110 | 170 | 170 | 110 | 170 | 170 | 170 | 110 | 170 | 110 | 170 | 170 | 75 | 170 | 170 | 75 | 75 | 75 | 75 | 45 | 45 | 45 | 45 | |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | | | | | |
| DEPTH | 415 | 435 | 455 | 475 | 485 | 505 | 525 | 540 | 555 | 575 | 585 | 595 | 615 | 625 | 645 | 665 | 685 | 700 | 715 | 735 | 965 | | | | | |
| CBR | 75 | 75 | 75 | 75 | 170 | 75 | 75 | 110 | 110 | 75 | 170 | 170 | 75 | 170 | 75 | 75 | 75 | 110 | 110 | 75 | 3 | | | | | |



Remarks :

FORM: ST6

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

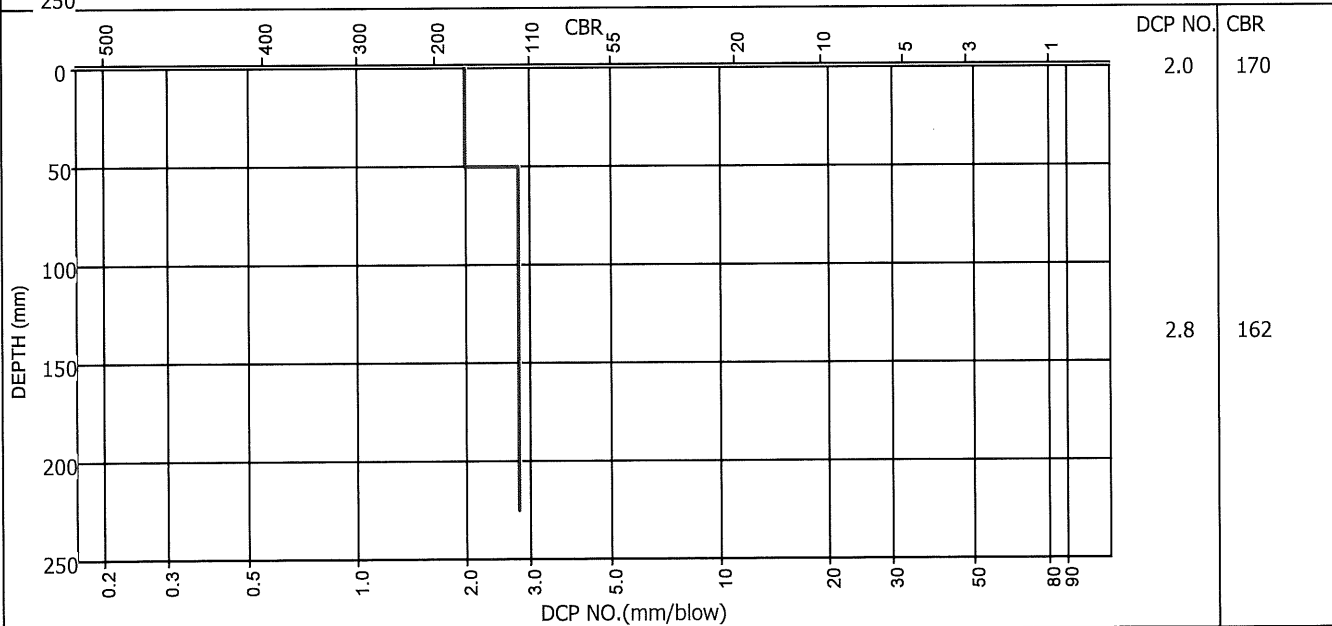
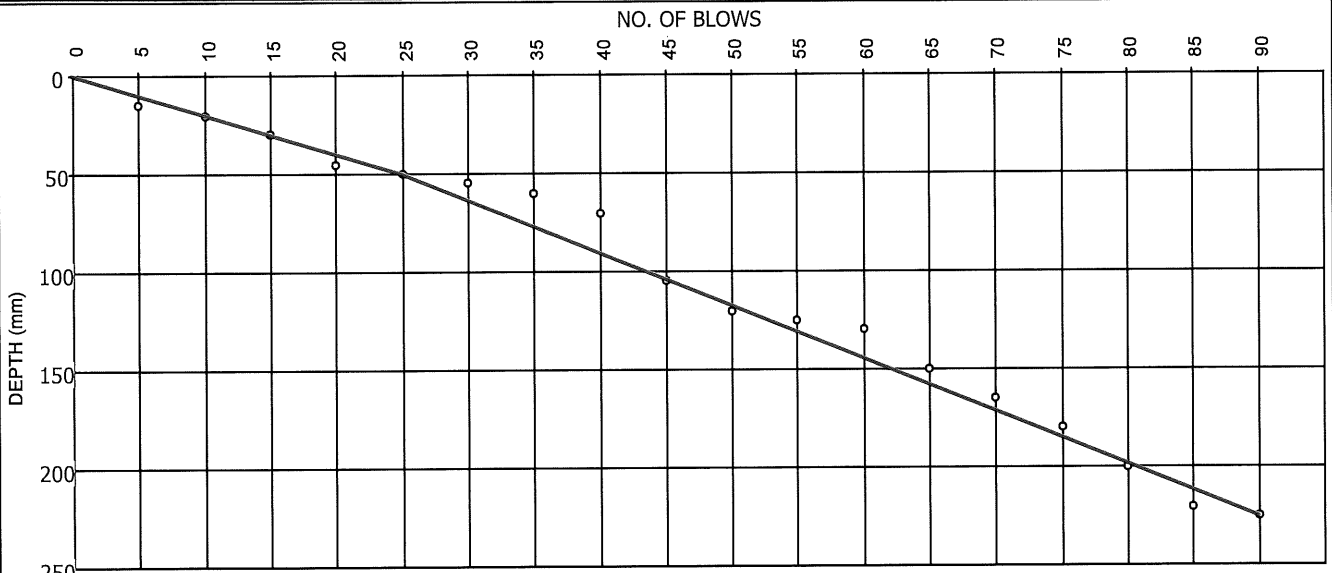
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 027135 - X 2565475
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 9 - LHS

INITIAL DEPTH (mm) : 0

| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| DEPTH | 15 | 20 | 30 | 45 | 50 | 55 | 60 | 70 | 105 | 120 | 125 | 130 | 150 | 165 | 180 | 200 | 220 | 225 |
| CBR | 110 | 300 | 170 | 110 | 300 | 300 | 300 | 170 | 35 | 110 | 300 | 300 | 75 | 110 | 110 | 75 | 75 | 300 |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : G. van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

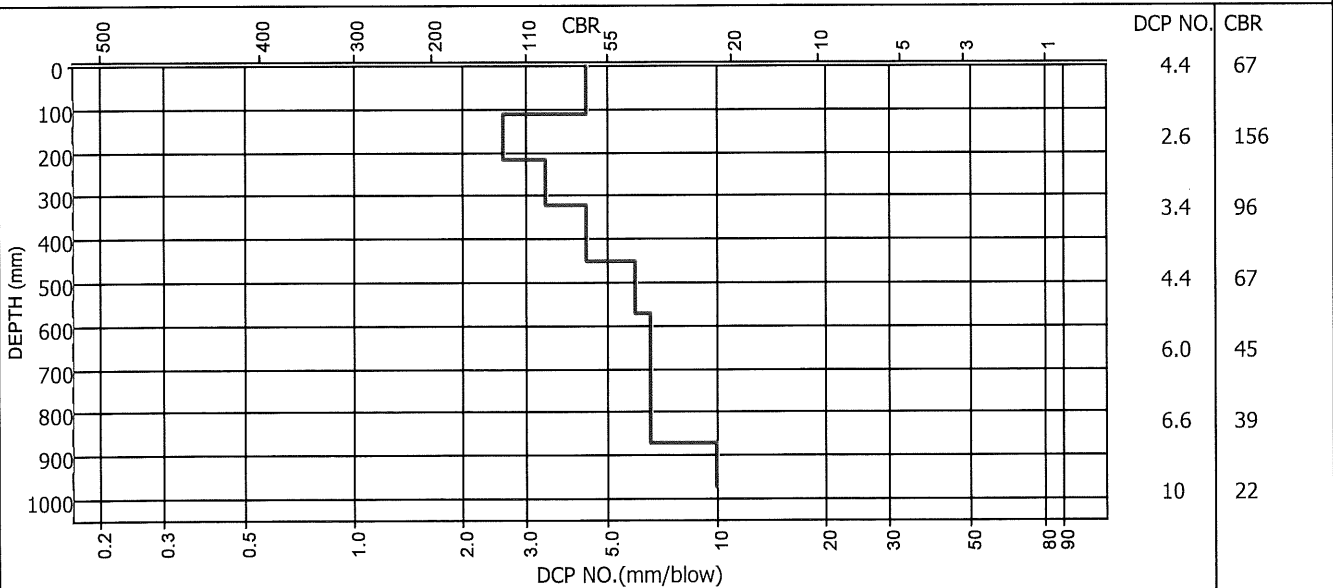
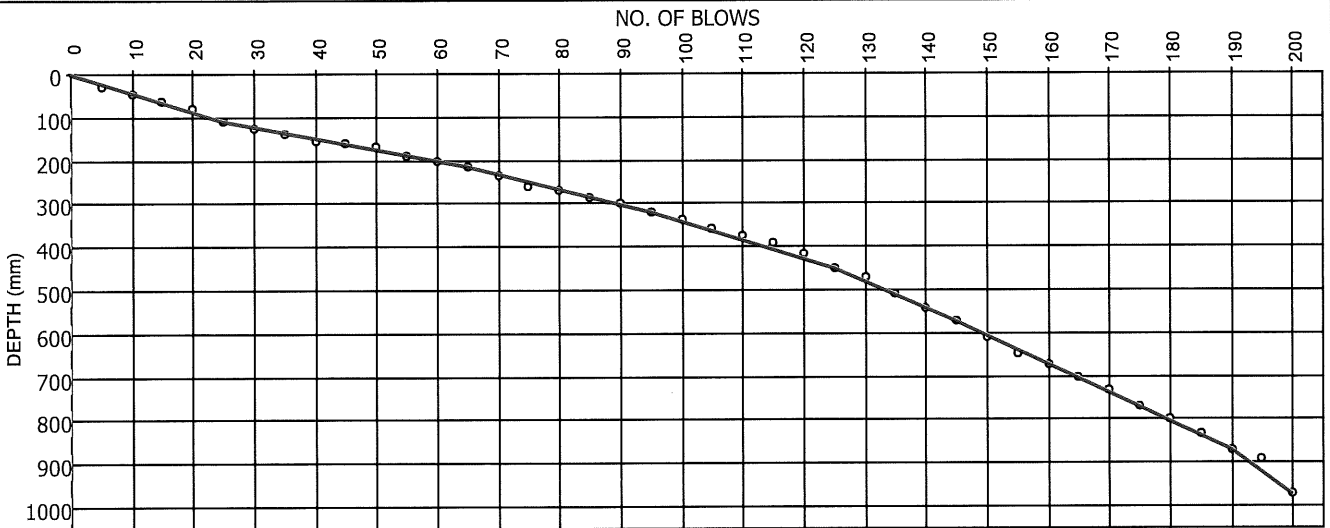
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 026651 - X 2566209
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 10 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 30 | 45 | 65 | 80 | 110 | 125 | 140 | 155 | 160 | 170 | 190 | 200 | 215 | 236 | 260 | 270 | 285 | 300 | 320 | 335 | 355 | 375 | 390 | 415 | 450 |
| CBR | 45 | 110 | 75 | 110 | 45 | 110 | 110 | 110 | 300 | 170 | 75 | 170 | 110 | 71 | 59 | 170 | 110 | 110 | 75 | 110 | 75 | 75 | 110 | 55 | 35 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | | | | | | | | | | |
| DEPTH | 470 | 510 | 540 | 570 | 610 | 645 | 670 | 700 | 730 | 770 | 800 | 830 | 870 | 890 | 970 | | | | | | | | | | |
| CBR | 75 | 30 | 45 | 45 | 30 | 35 | 55 | 45 | 45 | 30 | 45 | 45 | 30 | 75 | 13 | | | | | | | | | | |



Remarks :

FORM: ST6

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Technical Signatory : GT van Rooyen / K.Z Mlambo

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MATROLAB



SGS MATROLAB (PTY) LTD
 - CIVIL ENGINEERING SERVICES -
 Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587
 a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137581302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

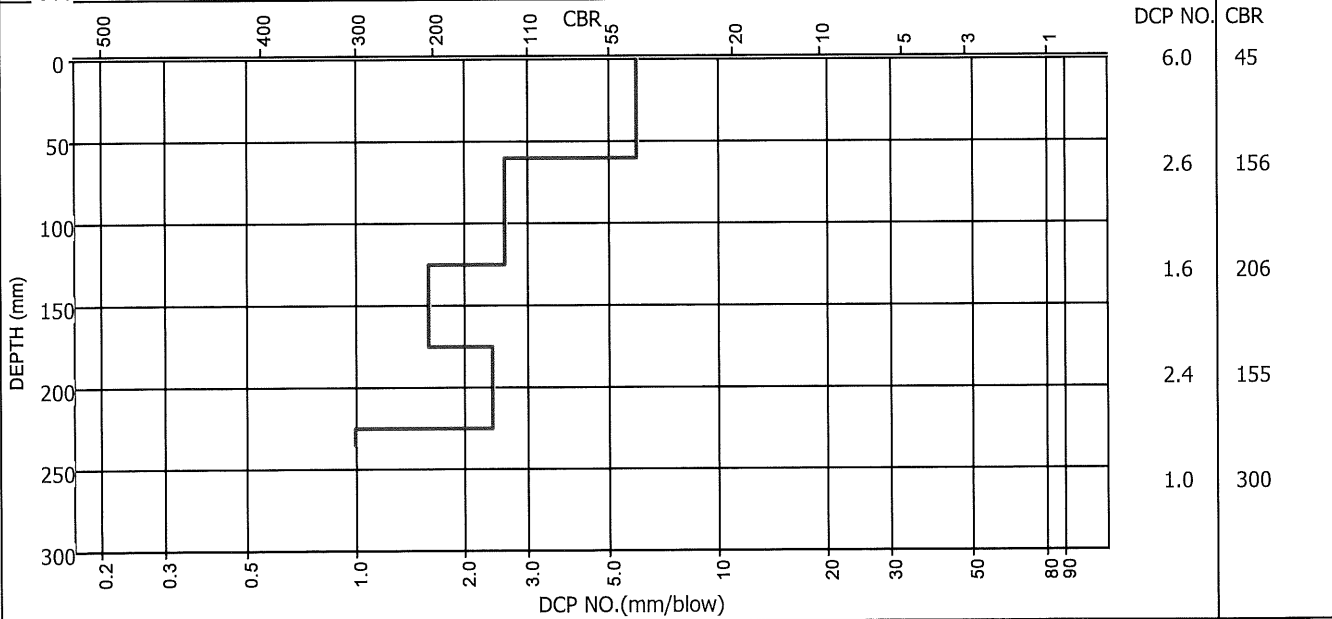
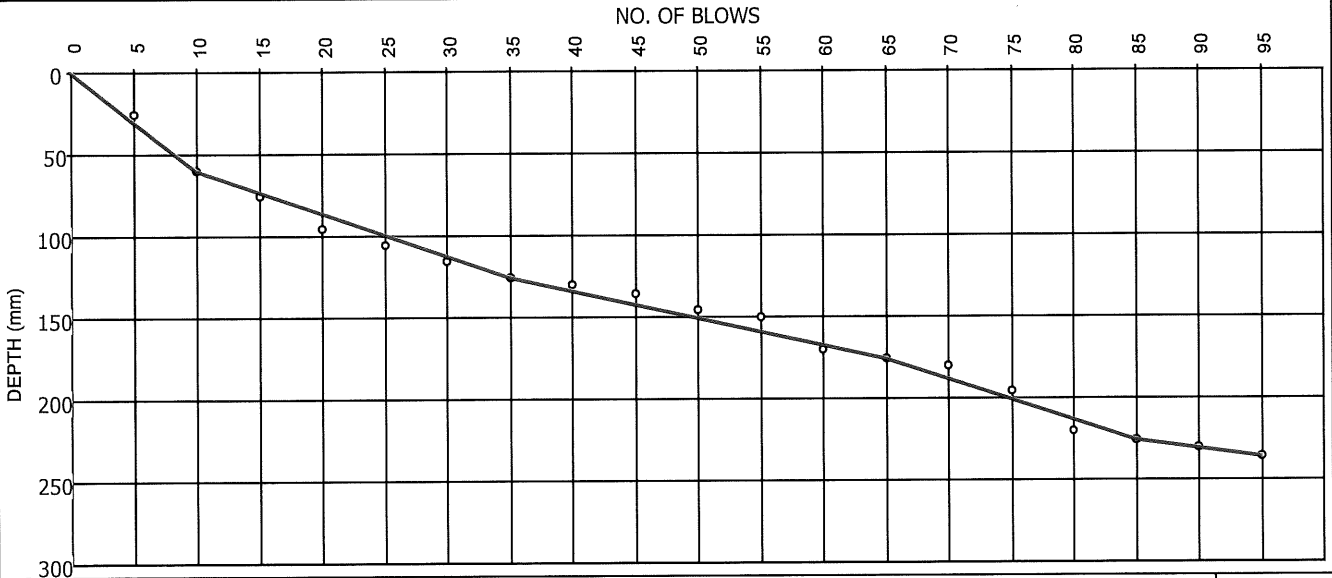
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 026540 - X 2567151 (Refused)
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 11 - LHS

INITIAL DEPTH (mm) : 0

| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 |
|-------|----|----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| DEPTH | 25 | 60 | 75 | 95 | 105 | 115 | 125 | 130 | 135 | 145 | 150 | 170 | 175 | 180 | 195 | 220 | 225 | 230 | 235 |
| CBR | 55 | 35 | 110 | 75 | 170 | 170 | 170 | 300 | 300 | 170 | 300 | 75 | 300 | 300 | 110 | 55 | 300 | 300 | 300 |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory: GT van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maaake

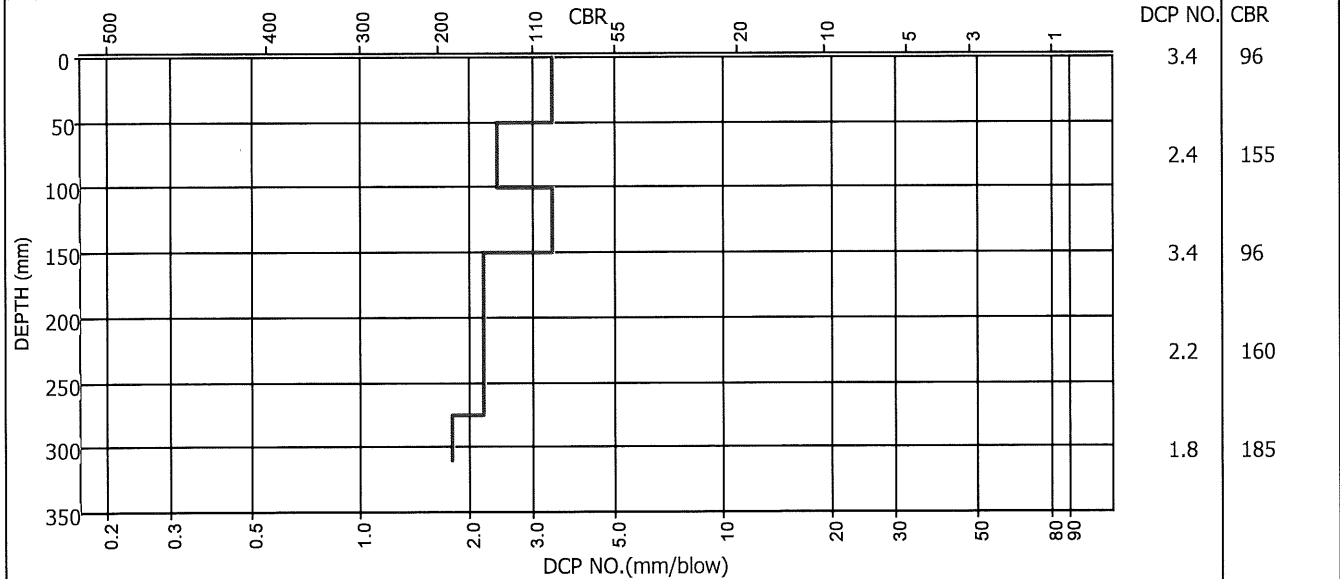
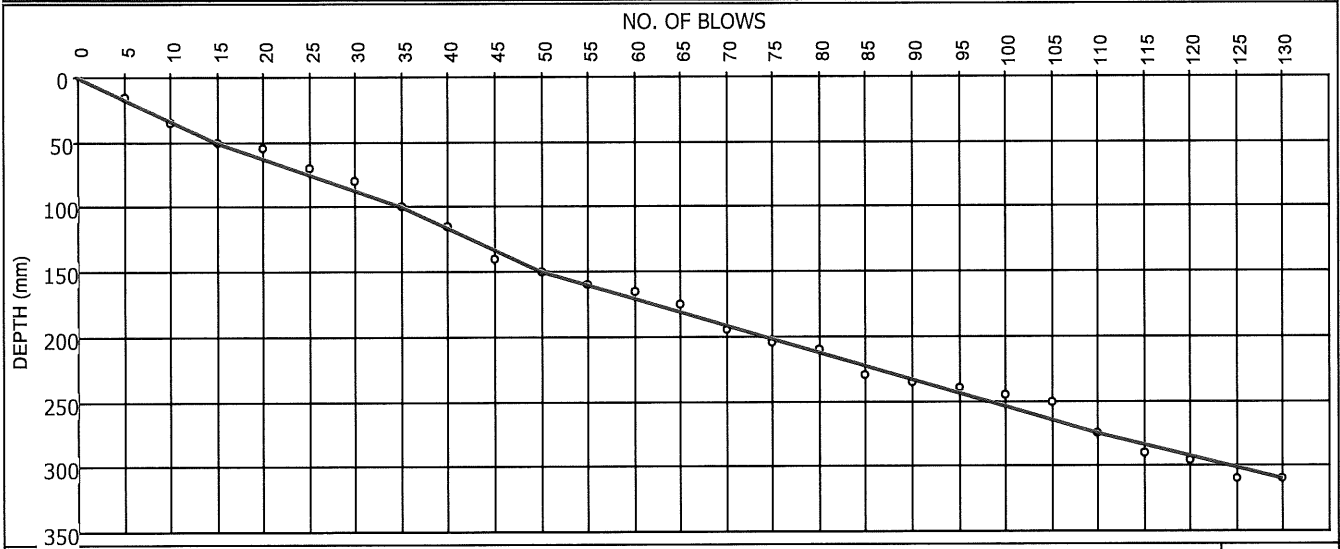
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 025593 - X 2567508
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 12 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 15 | 35 | 50 | 55 | 70 | 80 | 100 | 115 | 140 | 150 | 160 | 165 | 175 | 195 | 205 | 210 | 230 | 235 | 240 | 245 | 250 | 275 | 290 | 295 | 310 |
| CBR | 110 | 75 | 110 | 300 | 110 | 170 | 75 | 110 | 55 | 170 | 170 | 300 | 170 | 75 | 170 | 300 | 75 | 300 | 300 | 300 | 300 | 55 | 110 | 300 | 110 |
| BLOWS | 130 | | | | | | | | | | | | | | | | | | | | | | | | |
| DEPTH | 310 | | | | | | | | | | | | | | | | | | | | | | | | |
| CBR | 3000 | | | | | | | | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

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Technical Signatory : G. van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Tebogo Maake

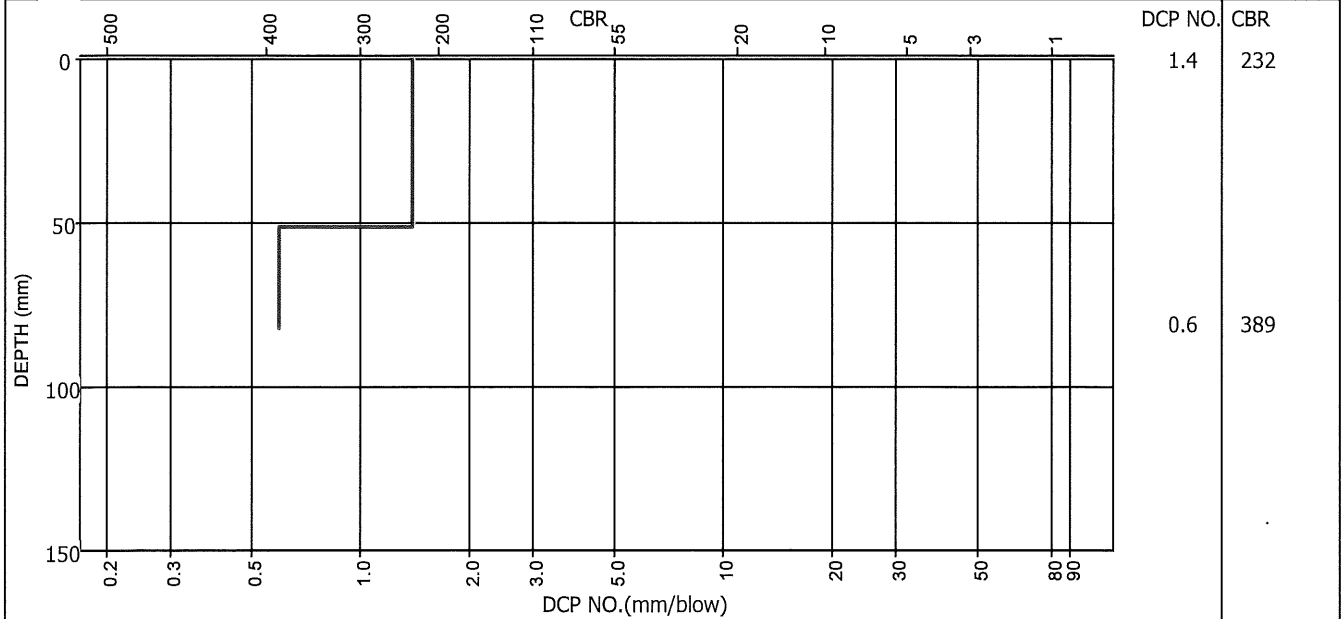
Project : Proposed New Shangoni Gate
: S 31 Y 023622 - X 2567711
Your Ref : SK-PO098123
Our Ref : 1947
Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 14 - S

INITIAL DEPTH (mm) : 0

| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| DEPTH | 15 | 25 | 30 | 35 | 40 | 45 | 51 | 53 | 55 | 59 | 65 | 70 | 73 | 75 | 77 | 79 | 81 | 82 |
| CBR | 110 | 170 | 300 | 300 | 300 | 300 | 263 | 442 | 442 | 342 | 263 | 300 | 389 | 442 | 442 | 442 | 442 | 500 |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : / K.Z Mlambo

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

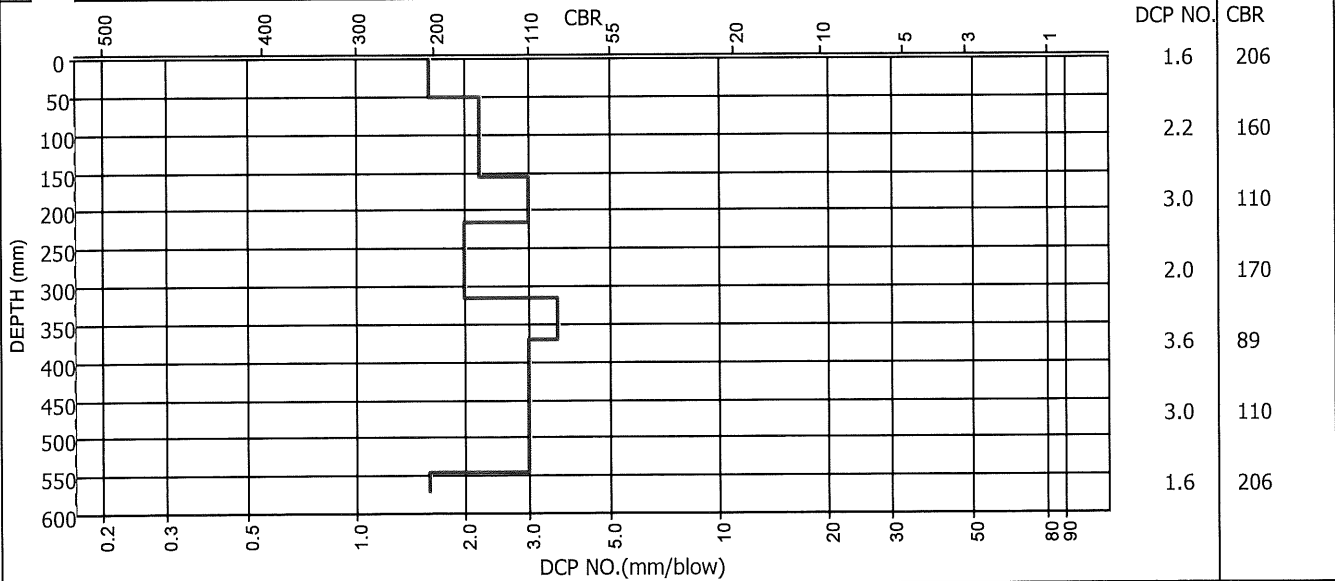
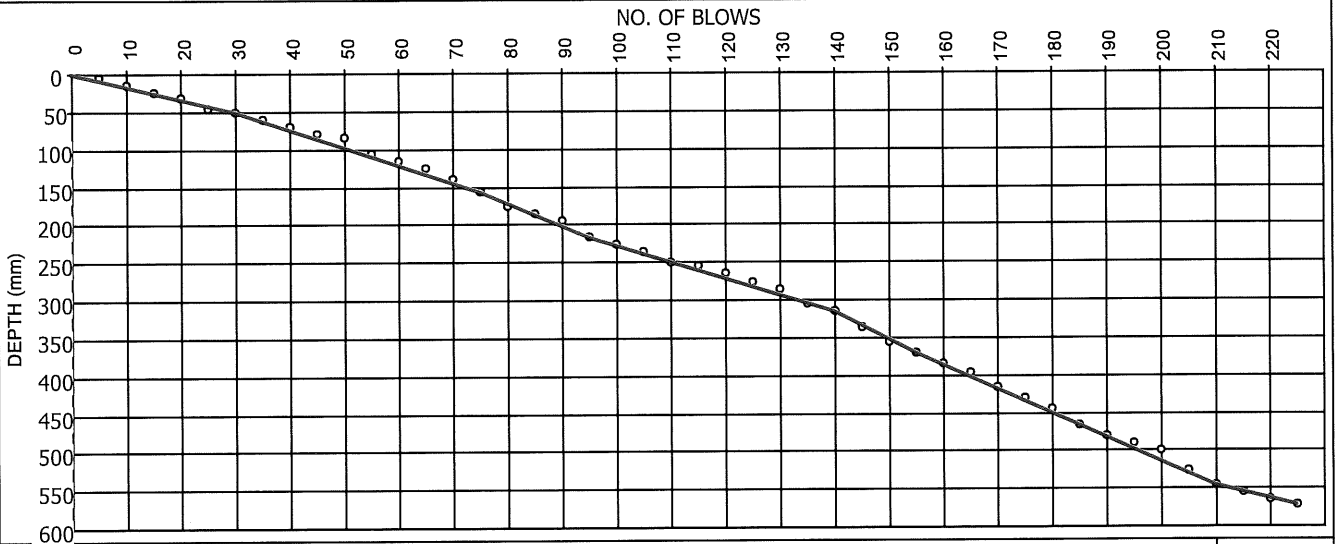
Project : Proposed New Shangoni Gate
 : R 31 Y 023414 - X 2567751
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 15 - R

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 5 | 15 | 25 | 30 | 45 | 50 | 60 | 70 | 80 | 85 | 105 | 115 | 125 | 140 | 155 | 175 | 185 | 195 | 215 | 225 | 235 | 250 | 255 | 265 | 275 |
| CBR | 300 | 170 | 170 | 300 | 110 | 300 | 170 | 170 | 170 | 300 | 75 | 170 | 170 | 110 | 110 | 75 | 170 | 170 | 75 | 170 | 170 | 110 | 300 | 170 | 170 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | | | | | |
| DEPTH | 285 | 305 | 315 | 335 | 355 | 370 | 385 | 395 | 415 | 430 | 445 | 465 | 480 | 490 | 500 | 525 | 545 | 555 | 565 | 570 | | | | | |
| CBR | 170 | 75 | 170 | 75 | 75 | 110 | 110 | 170 | 75 | 110 | 110 | 75 | 110 | 170 | 170 | 55 | 75 | 170 | 170 | 300 | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory: Gert van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

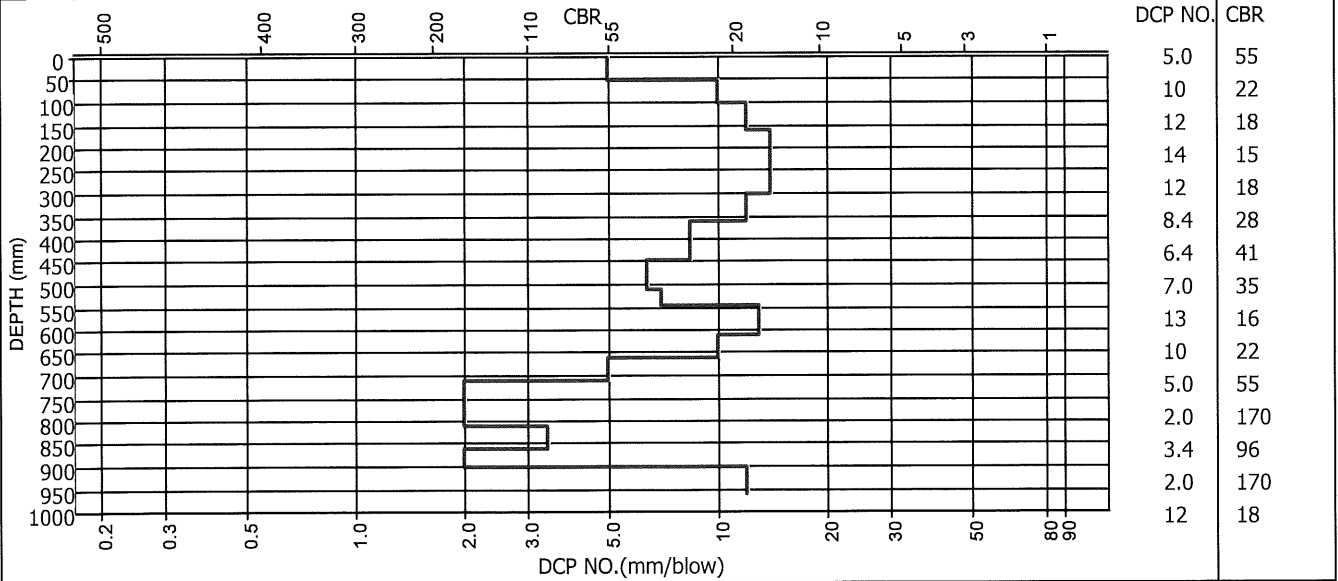
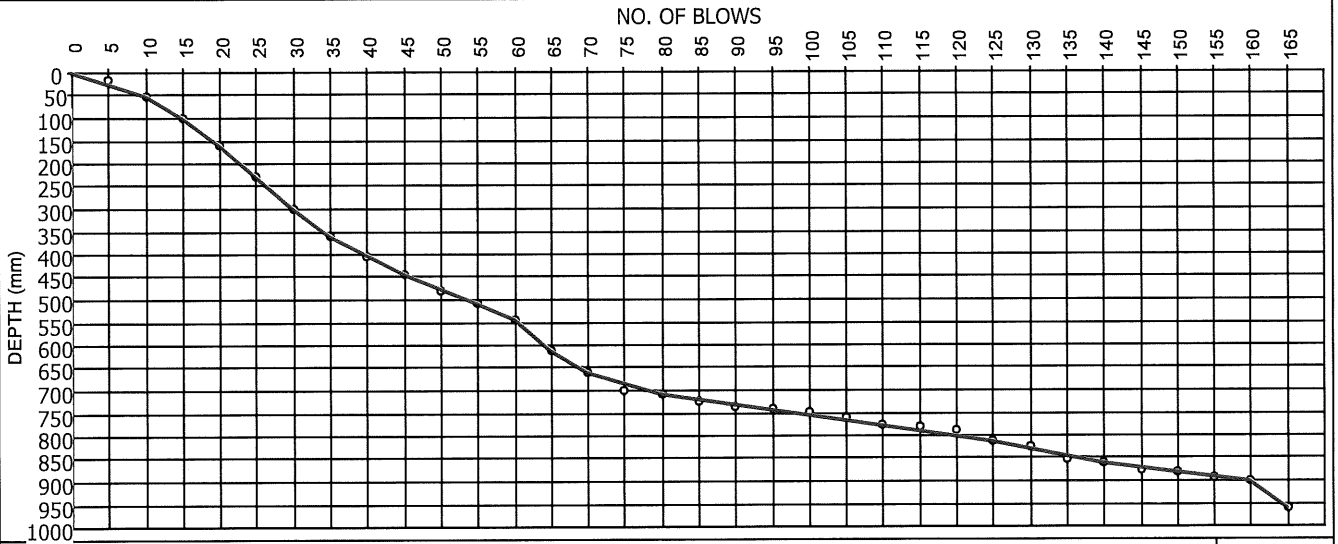
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 023069 - X 2568003
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 16 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 15 | 50 | 100 | 160 | 230 | 300 | 360 | 405 | 445 | 480 | 510 | 545 | 610 | 660 | 700 | 710 | 725 | 735 | 740 | 750 | 760 | 775 | 780 | 790 | 810 |
| CBR | 110 | 35 | 22 | 18 | 15 | 15 | 18 | 25 | 30 | 35 | 45 | 35 | 16 | 22 | 30 | 170 | 110 | 170 | 300 | 170 | 170 | 110 | 300 | 170 | 75 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | | | | | | | | | | | | | | | | | |
| DEPTH | 825 | 850 | 860 | 875 | 880 | 890 | 900 | 960 | | | | | | | | | | | | | | | | | |
| CBR | 110 | 55 | 170 | 110 | 300 | 170 | 170 | 18 | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory: / K.Z Mlambo

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 - CIVIL ENGINEERING SERVICES -
 Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137581302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

a SANAS Accredited Testing Laboratory, No. T0865

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

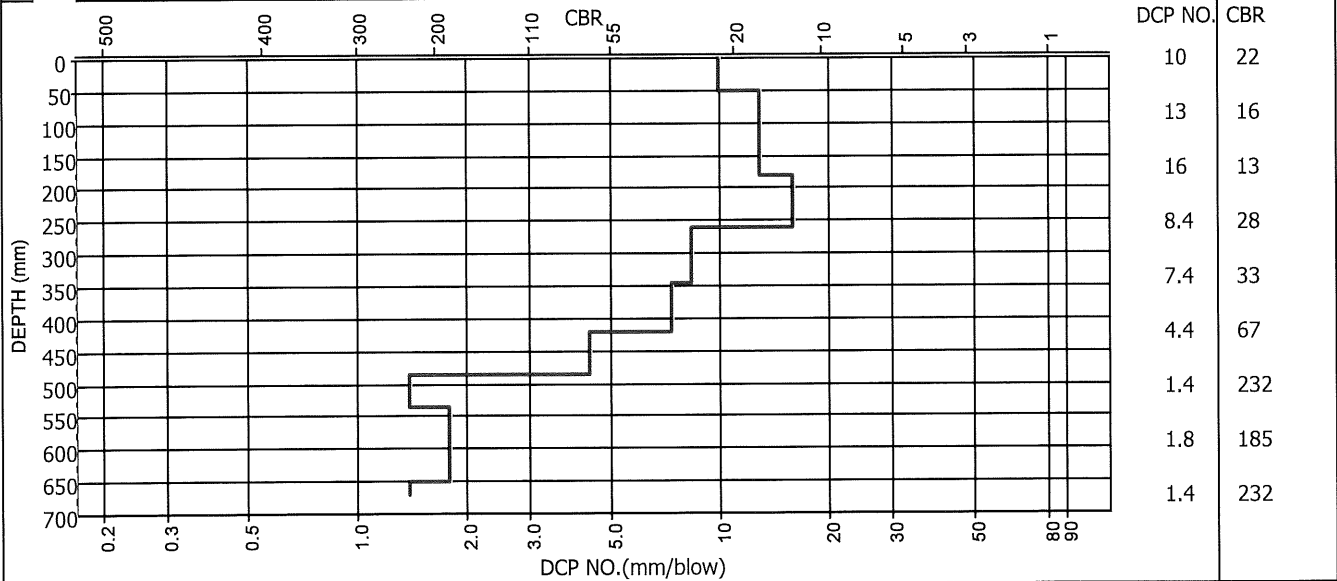
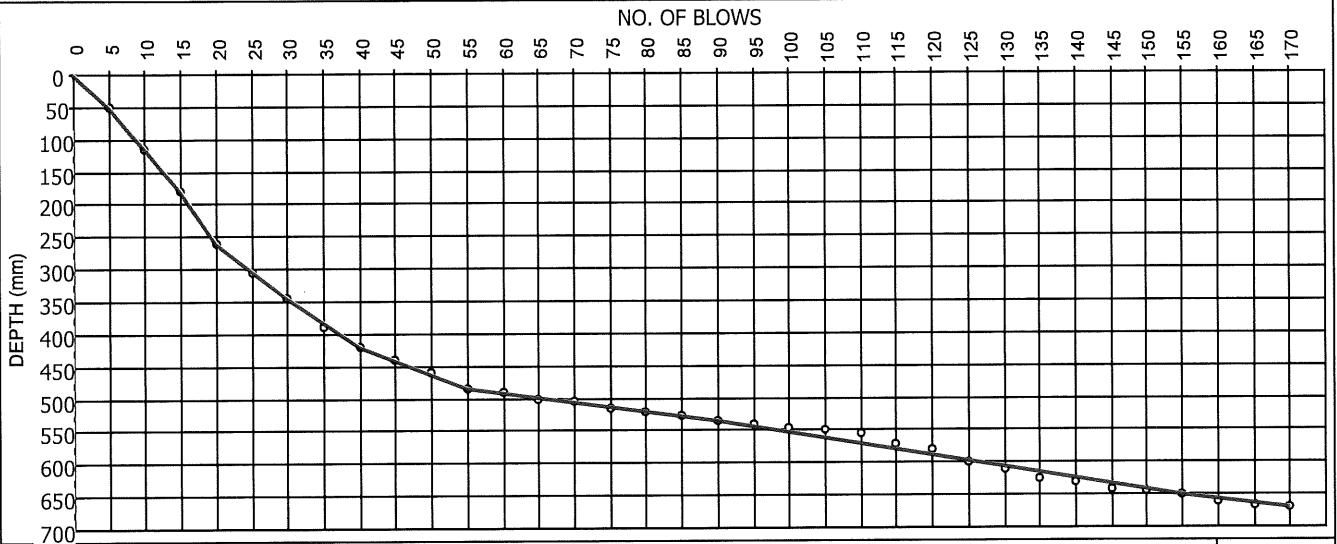
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 022726 - X 2568156
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 17 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 50 | 115 | 180 | 260 | 305 | 345 | 390 | 420 | 440 | 460 | 485 | 490 | 500 | 505 | 515 | 520 | 525 | 535 | 540 | 545 | 550 | 555 | 570 | 580 | 600 |
| CBR | 22 | 16 | 16 | 13 | 25 | 30 | 25 | 45 | 75 | 75 | 55 | 300 | 170 | 300 | 170 | 300 | 300 | 170 | 300 | 300 | 300 | 300 | 110 | 170 | 75 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | | | | | | | | | | | | | | | | |
| DEPTH | 610 | 625 | 630 | 640 | 645 | 650 | 660 | 665 | 670 | | | | | | | | | | | | | | | | |
| CBR | 170 | 110 | 300 | 170 | 300 | 300 | 170 | 300 | 300 | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

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Technical Signatory: G.T. van Rooyen / K.Z. Mlambo

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Tebogoo Maake

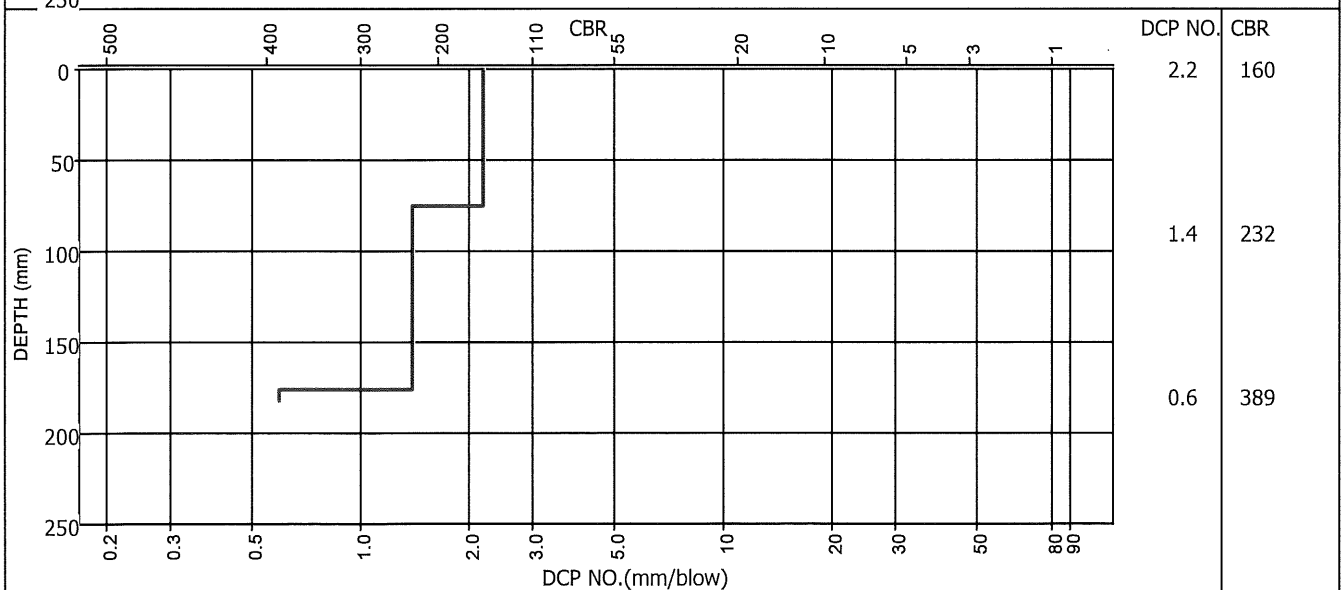
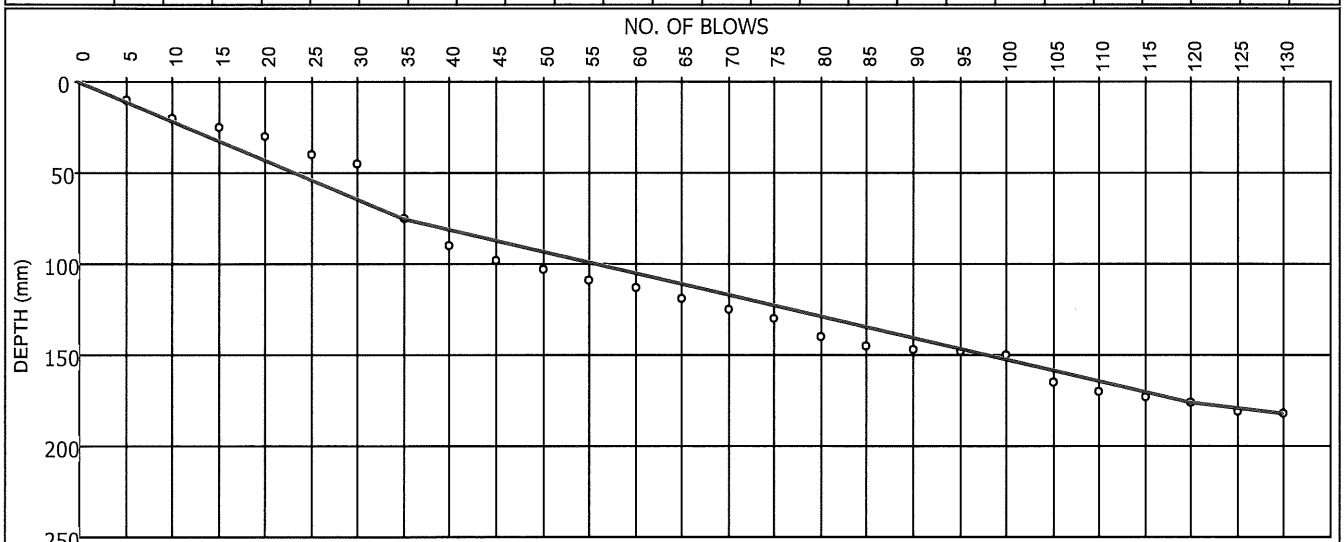
Project : Proposed New Shangoni Gate
: R/CL 31 Y 022374 - X 2568317
Your Ref : SK-PO098123
Our Ref : 1947
Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 18 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 10 | 20 | 25 | 30 | 40 | 45 | 75 | 90 | 98 | 103 | 109 | 113 | 119 | 125 | 130 | 140 | 145 | 147 | 148 | 150 | 165 | 170 | 173 | 176 | 181 |
| CBR | 170 | 170 | 300 | 300 | 170 | 300 | 45 | 110 | 206 | 300 | 263 | 342 | 263 | 263 | 300 | 170 | 300 | 442 | 500 | 442 | 110 | 300 | 389 | 389 | 300 |
| BLOWS | 130 | | | | | | | | | | | | | | | | | | | | | | | | |
| DEPTH | 182 | | | | | | | | | | | | | | | | | | | | | | | | |
| CBR | 500 | | | | | | | | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : G. van Rooyen / K.Z Mlambo

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maahe

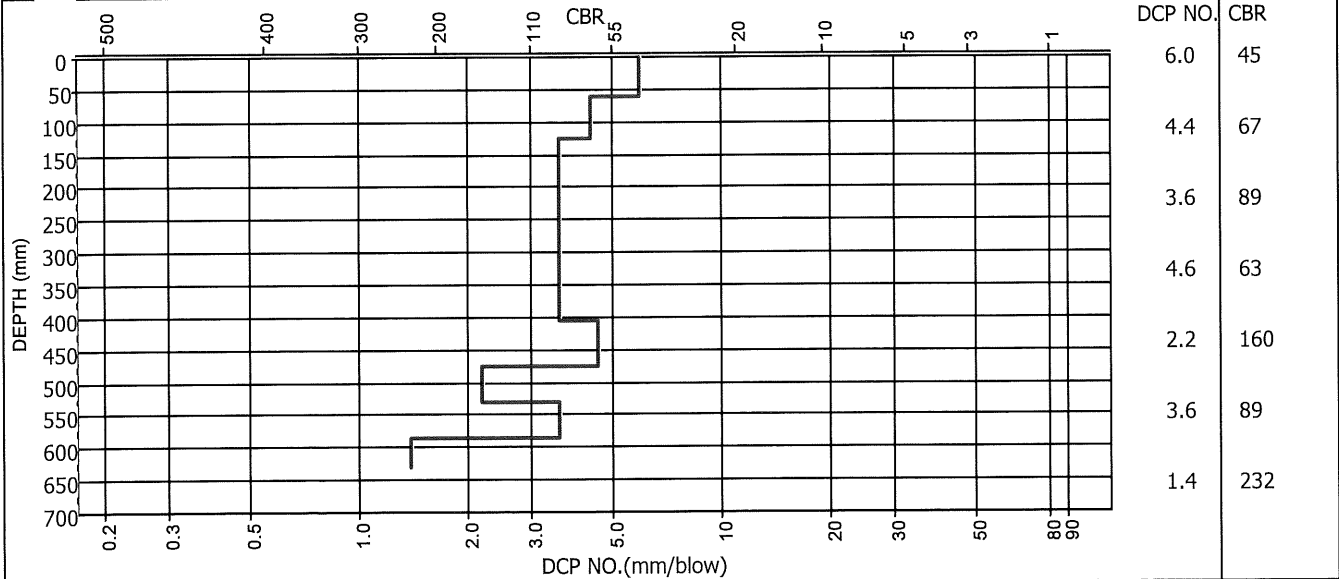
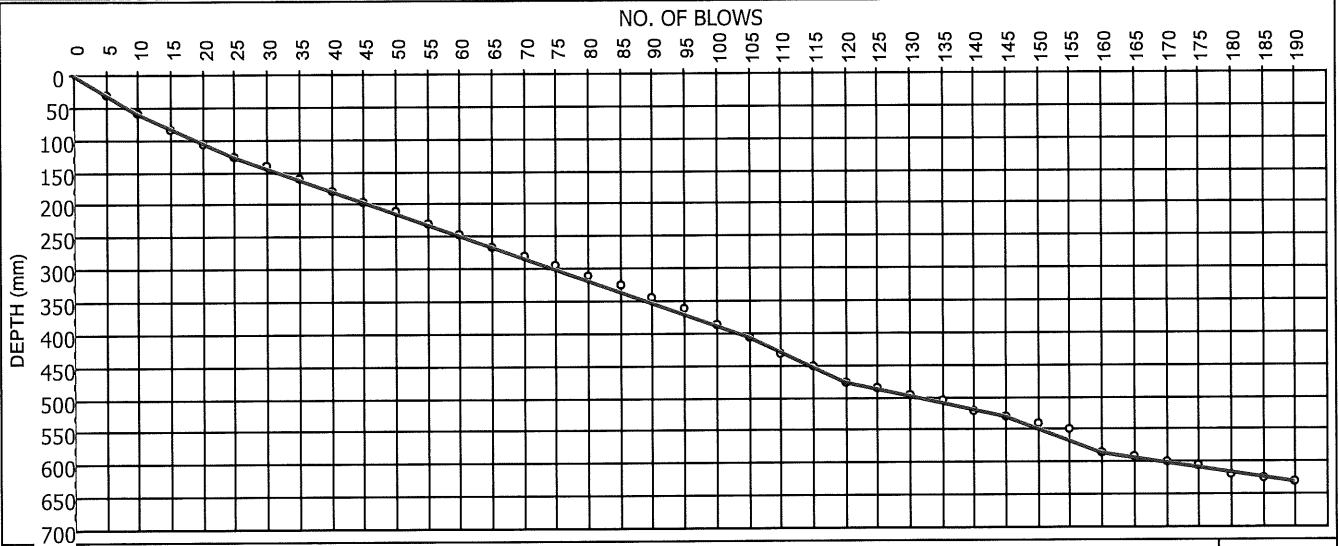
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 022361 - X 2568312
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 19 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 30 | 60 | 85 | 105 | 125 | 140 | 160 | 180 | 195 | 210 | 230 | 245 | 265 | 280 | 295 | 310 | 325 | 345 | 360 | 385 | 405 | 430 | 450 | 475 | 485 |
| CBR | 45 | 45 | 55 | 75 | 75 | 110 | 75 | 75 | 110 | 110 | 75 | 110 | 75 | 110 | 110 | 110 | 110 | 75 | 110 | 55 | 75 | 55 | 75 | 55 | 170 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | | | | | | | | | | | | |
| DEPTH | 495 | 505 | 520 | 530 | 540 | 550 | 585 | 590 | 600 | 605 | 620 | 625 | 630 | | | | | | | | | | | | |
| CBR | 170 | 170 | 110 | 170 | 170 | 170 | 35 | 300 | 170 | 300 | 110 | 300 | 300 | | | | | | | | | | | | |



Remarks :

FORM: ST6

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Technical Signatory : van Rooyen / K.Z Mlambo

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 a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137581302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

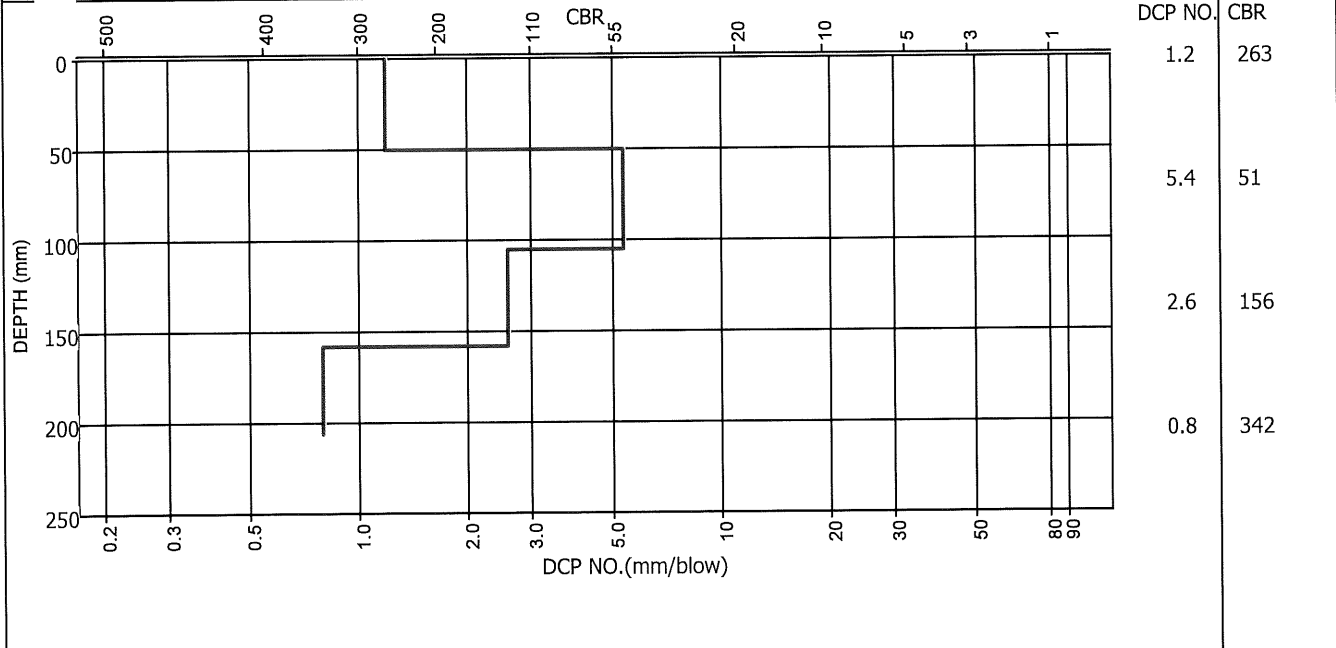
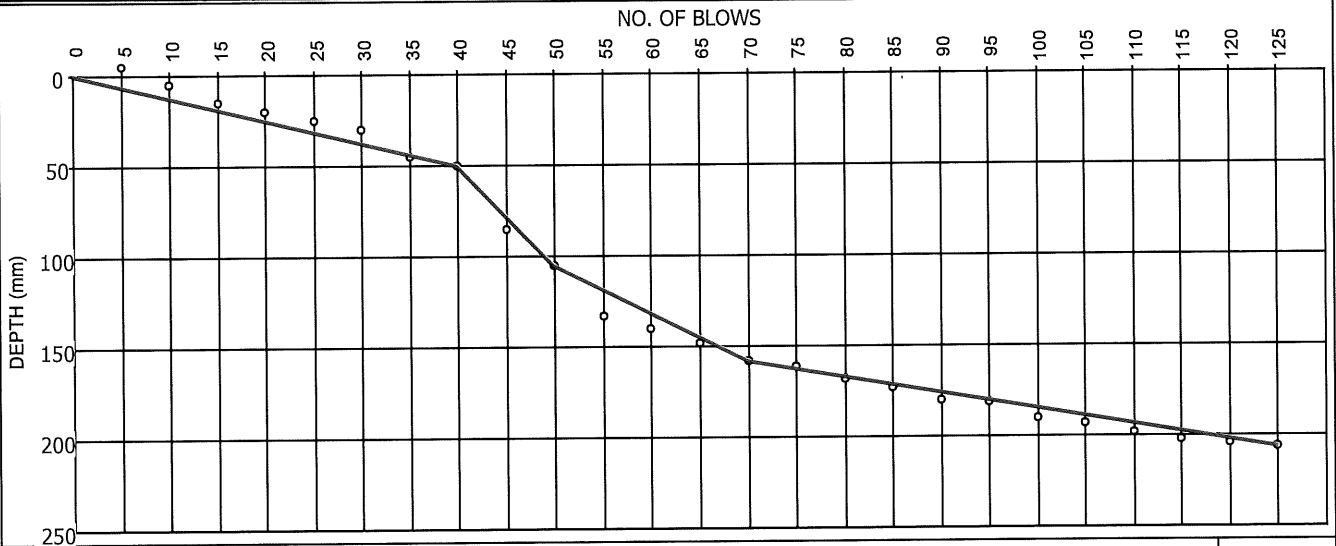
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 021826 - X 2568506
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 20 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 5 | 15 | 20 | 25 | 30 | 45 | 50 | 85 | 105 | 133 | 140 | 148 | 158 | 161 | 168 | 173 | 180 | 181 | 190 | 193 | 198 | 202 | 204 | 206 |
| CBR | 170 | 170 | 300 | 300 | 300 | 110 | 300 | 35 | 75 | 49 | 232 | 206 | 170 | 389 | 232 | 300 | 232 | 500 | 185 | 389 | 300 | 342 | 442 | 442 |



Remarks :

FORM: ST6

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Technical Signatory : / K.Z Mlambo

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a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137581302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

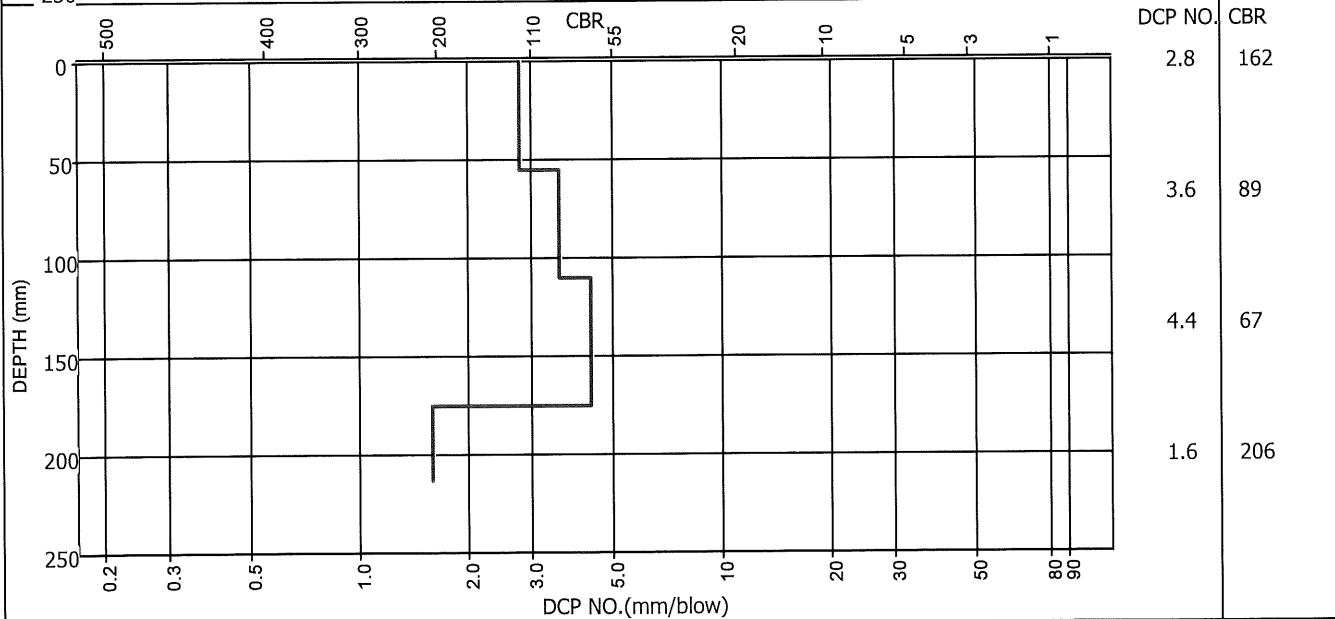
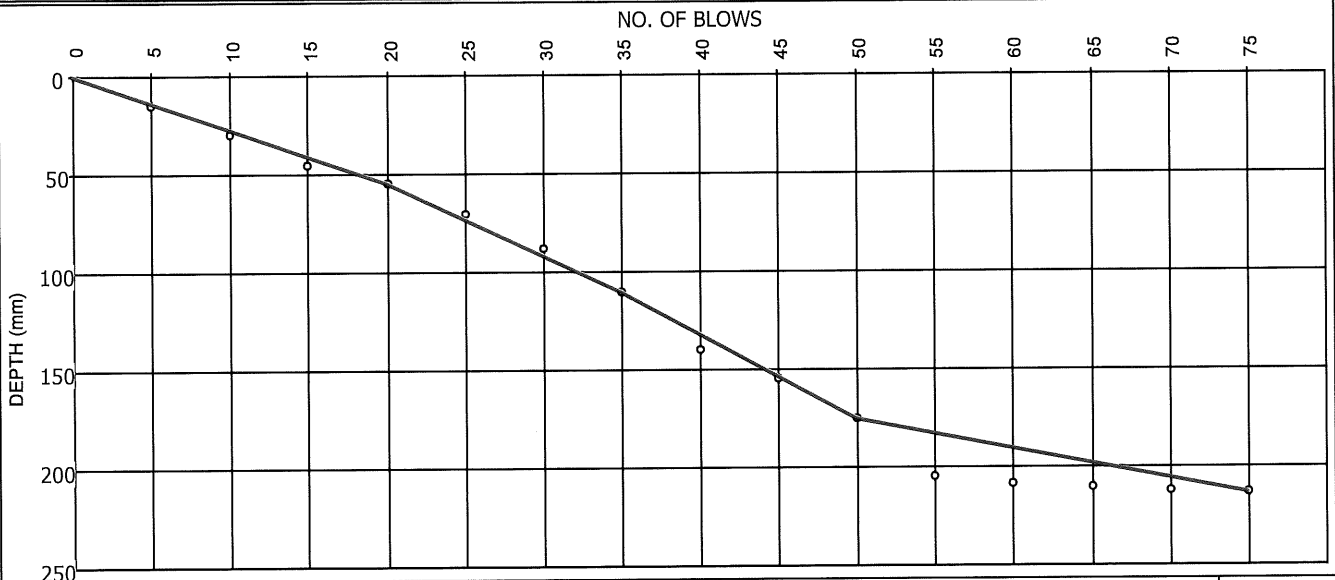
Project : Proposed New Shangoni Gate
 : R/RHS 31 Y 021200 - X 2568461
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 23 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | | | | | | | | | | | | | | | | |
| DEPTH | 15 | 30 | 45 | 55 | 70 | 88 | 110 | 140 | 155 | 175 | 205 | 208 | 210 | 212 | 213 | | | | | | | | | | | | | | | | |
| CBR | 110 | 110 | 110 | 170 | 110 | 89 | 67 | 45 | 110 | 75 | 45 | 389 | 442 | 442 | 500 | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : G.T. van Rooyen / K.Z. Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maahe

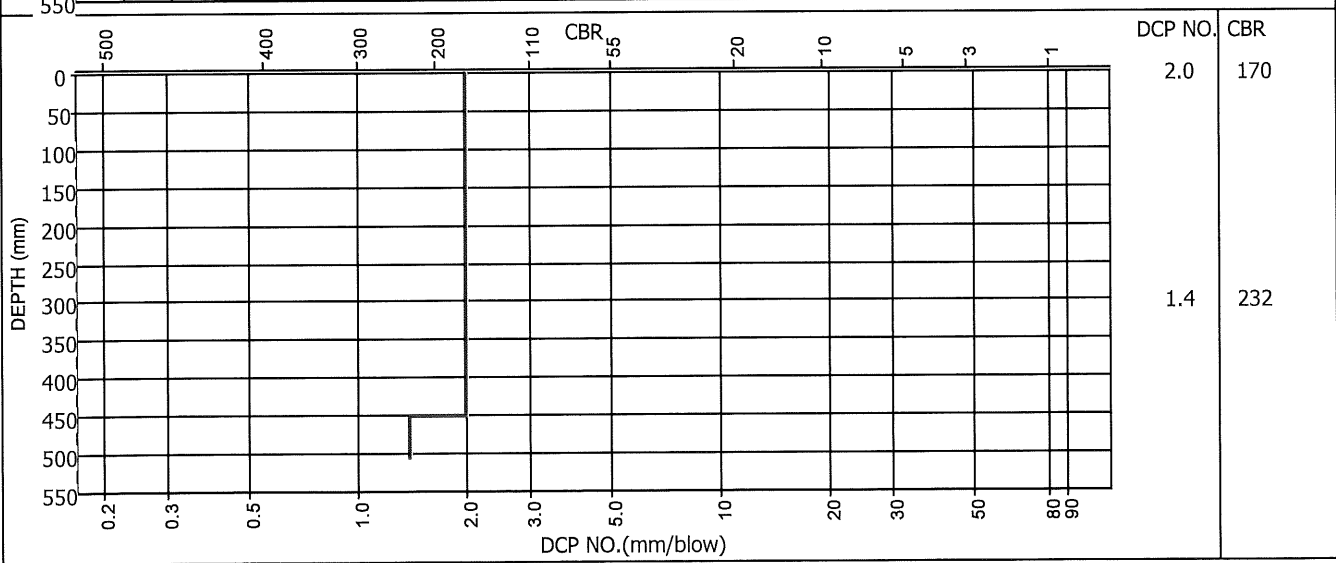
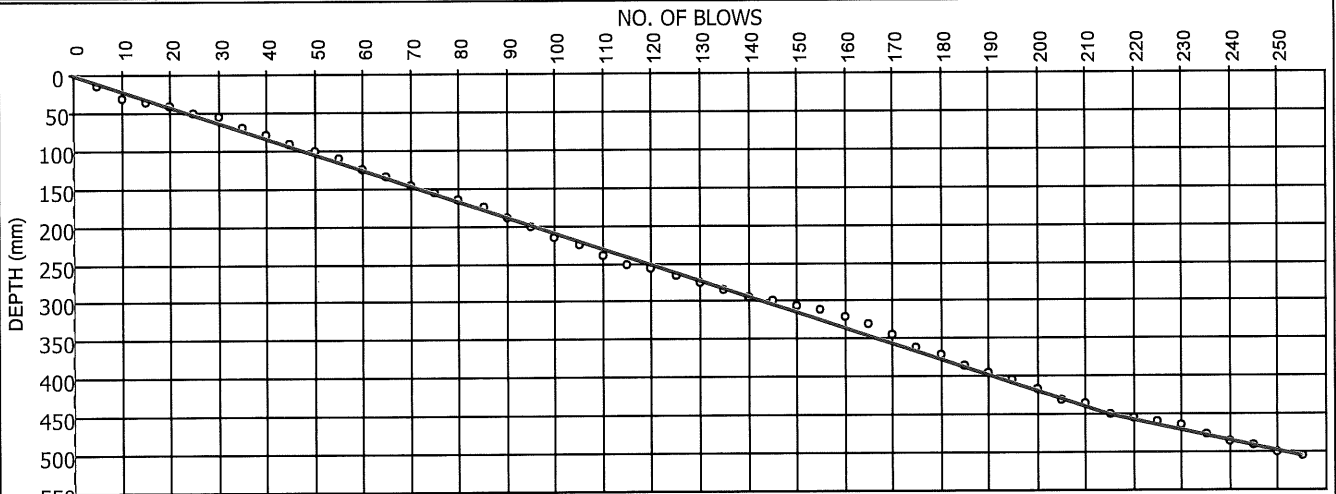
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 020737 - X 2567999
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 25 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 15 | 30 | 35 | 40 | 50 | 55 | 70 | 80 | 90 | 100 | 110 | 125 | 135 | 145 | 155 | 165 | 175 | 190 | 200 | 215 | 225 | 240 | 250 | 255 | 265 |
| CBR | 110 | 110 | 300 | 300 | 170 | 300 | 110 | 170 | 170 | 170 | 170 | 110 | 170 | 170 | 170 | 170 | 170 | 110 | 170 | 110 | 170 | 110 | 170 | 300 | 170 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | 245 | 250 |
| DEPTH | 275 | 285 | 295 | 300 | 305 | 310 | 320 | 330 | 345 | 360 | 370 | 385 | 395 | 405 | 415 | 430 | 435 | 450 | 455 | 460 | 465 | 475 | 485 | 490 | 500 |
| CBR | 170 | 170 | 170 | 300 | 300 | 300 | 170 | 170 | 110 | 110 | 170 | 110 | 170 | 170 | 170 | 110 | 300 | 110 | 300 | 300 | 300 | 170 | 170 | 300 | 170 |
| BLOWS | 255 | | | | | | | | | | | | | | | | | | | | | | | | |
| DEPTH | 505 | | | | | | | | | | | | | | | | | | | | | | | | |
| CBR | 300 | | | | | | | | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

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Technical Signatory:

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Tebogo Maake

Project : Proposed New Shangoni Gate
: S/RHS 31 Y 020575 - X 2567784
Your Ref : SK-PO098123
Our Ref : 1947
Date Reported : 23/08/2019

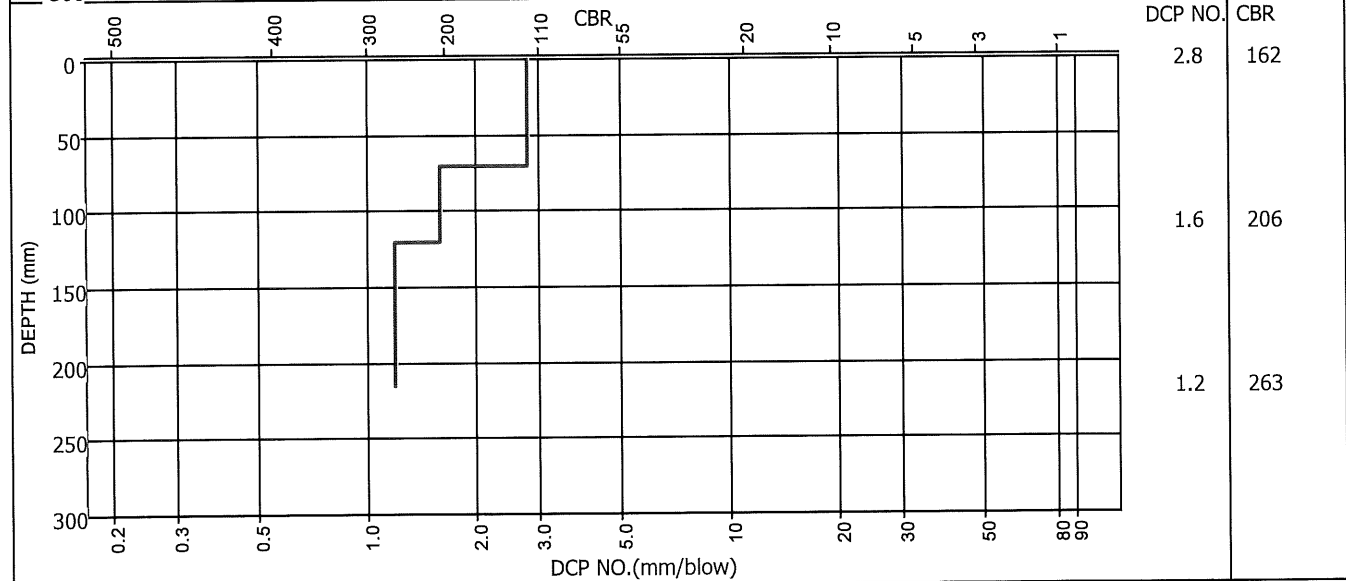
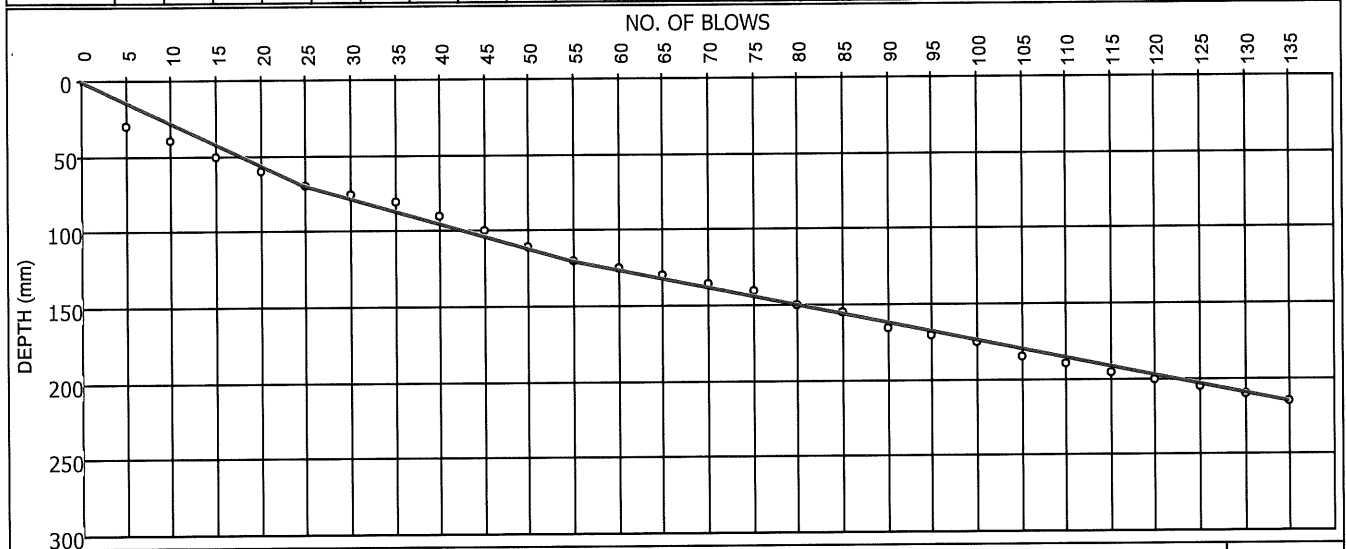
DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 26 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 30 | 40 | 50 | 60 | 70 | 75 | 80 | 90 | 100 | 110 | 120 | 125 | 130 | 135 | 140 | 150 | 155 | 165 | 170 | 175 | 185 | 190 | 195 | 200 | 205 |
| CBR | 45 | 170 | 170 | 170 | 170 | 300 | 300 | 170 | 170 | 170 | 170 | 300 | 300 | 300 | 300 | 170 | 300 | 170 | 300 | 300 | 170 | 300 | 300 | 300 | 300 |

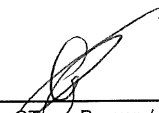
| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| BLOWS | 130 | 135 | | | | | | | | | | | | | | | | | | | | | | | |
| DEPTH | 210 | 215 | | | | | | | | | | | | | | | | | | | | | | | |
| CBR | 300 | 300 | | | | | | | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory :  / K.Z Mlambo

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MATROLAB



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 - CIVIL ENGINEERING SERVICES -
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 a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137581302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

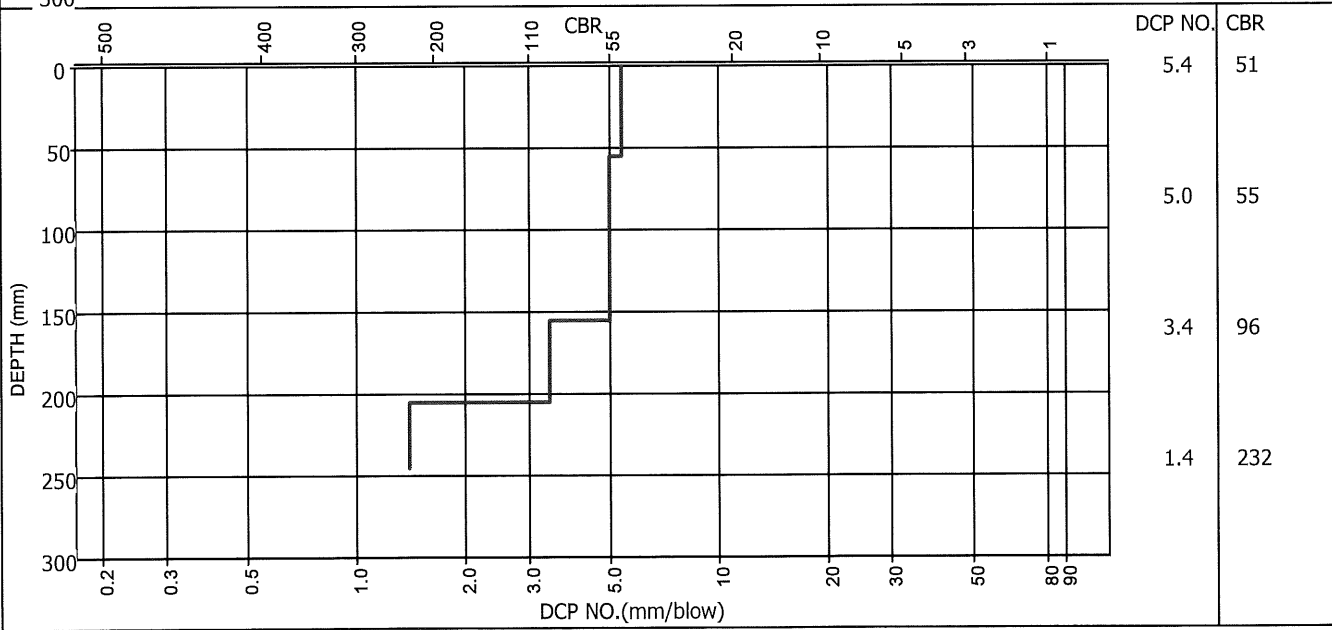
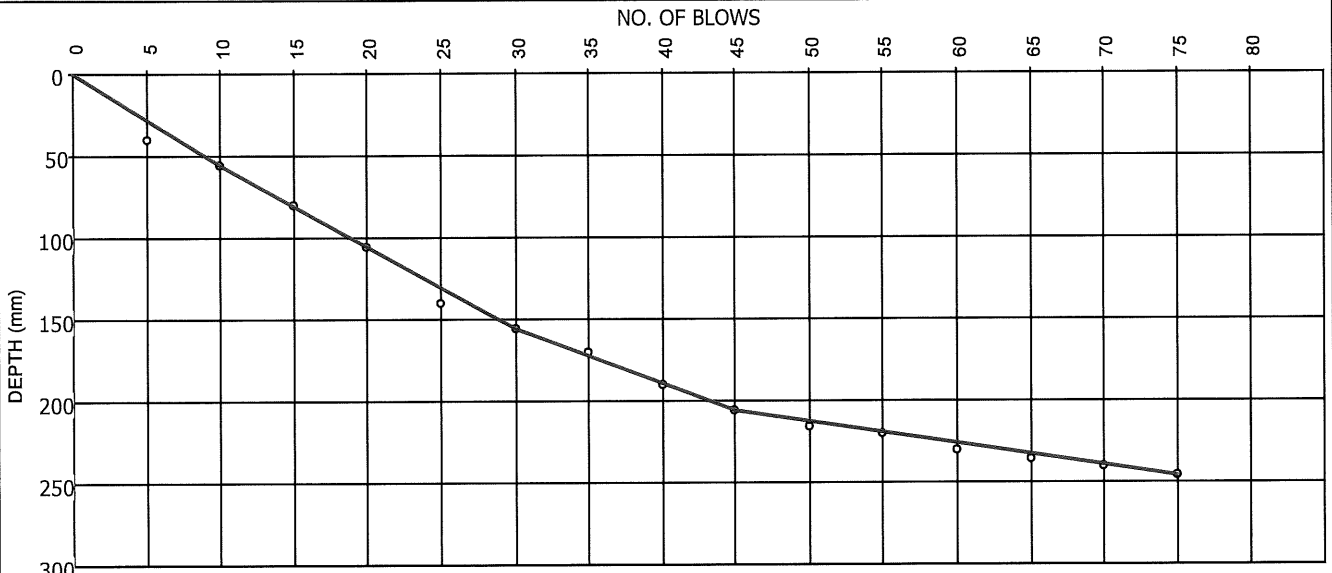
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 020247 - X 2567569
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 27 - LHS

INITIAL DEPTH (mm) : 0


| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | | | | | | | | | | | | | | | |
| DEPTH | 40 | 55 | 80 | 105 | 140 | 155 | 170 | 190 | 205 | 215 | 220 | 230 | 235 | 240 | 245 | | | | | | | | | | | | | | | |
| CBR | 30 | 110 | 55 | 55 | 35 | 110 | 110 | 75 | 110 | 170 | 300 | 170 | 300 | 300 | 300 | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory :  / K.Z Mlambo

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 - CIVIL ENGINEERING SERVICES -
 Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137581302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

a SANAS Accredited Testing Laboratory, No. T0865

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

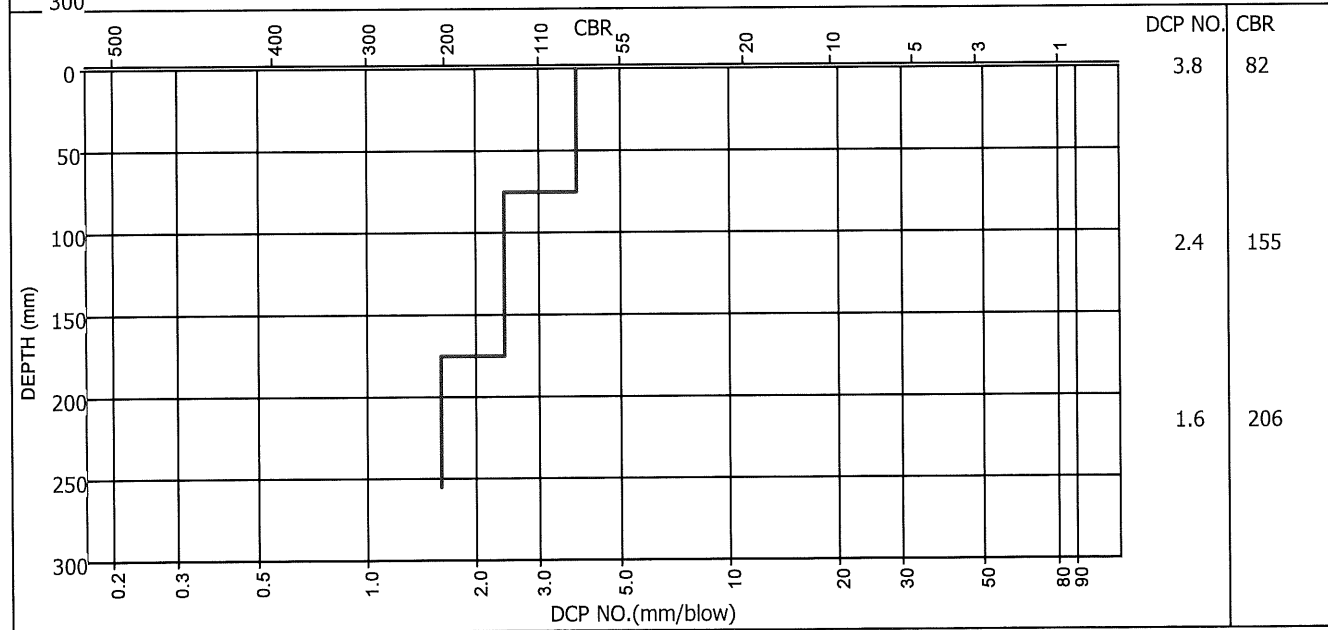
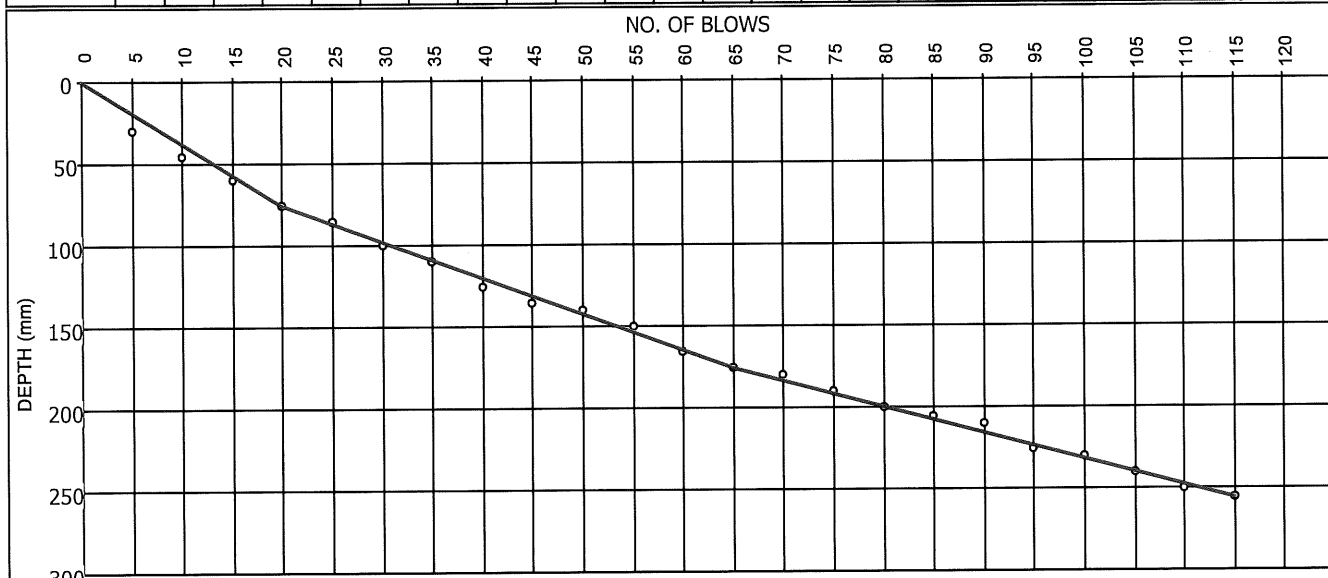
Project : Proposed New Shangoni Gate
 : S/CL 31 Y 019735 - X 2567422
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 28 - CL

INITIAL DEPTH (mm) : 0


| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | | |
|-------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| DEPTH | 30 | 45 | 60 | 75 | 85 | 100 | 110 | 125 | 135 | 140 | 150 | 165 | 175 | 180 | 190 | 200 | 205 | 210 | 225 | 230 | 240 | 250 | 255 | | |
| CBR | 45 | 110 | 110 | 110 | 170 | 110 | 170 | 110 | 170 | 300 | 170 | 110 | 170 | 300 | 170 | 170 | 300 | 300 | 110 | 300 | 170 | 170 | 300 | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory :  G.T. van Rooyen / K.Z Mlambo

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 - CIVIL ENGINEERING SERVICES -
 Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587

a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137581302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

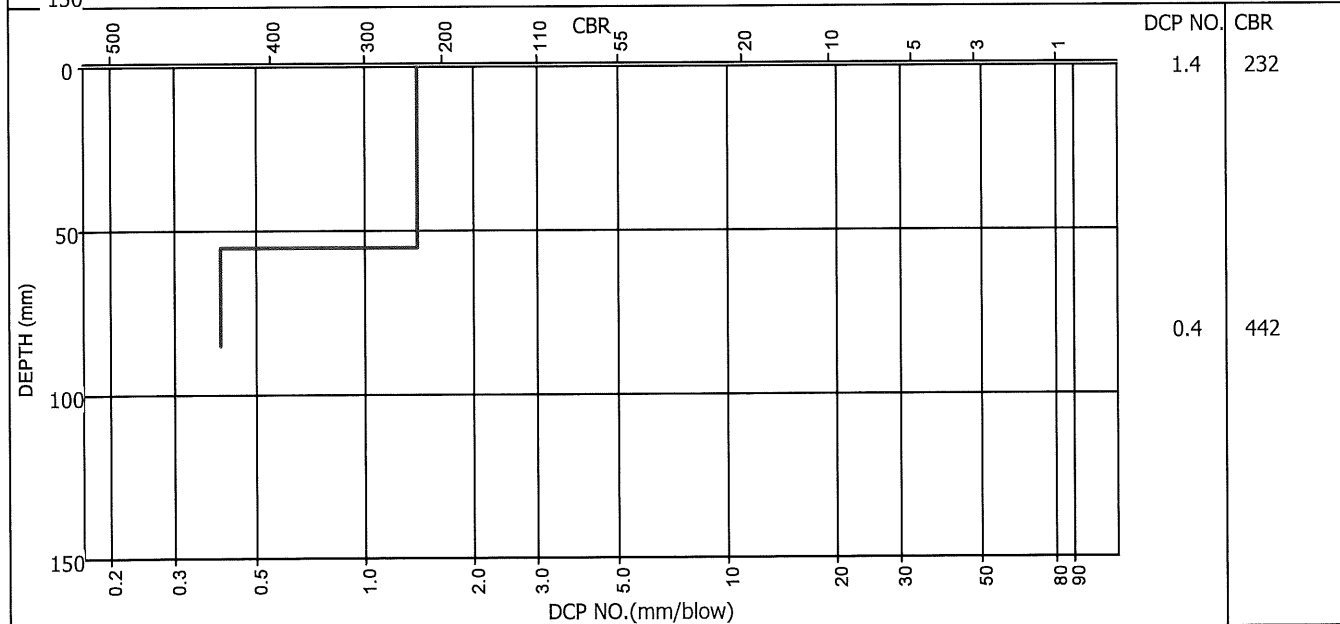
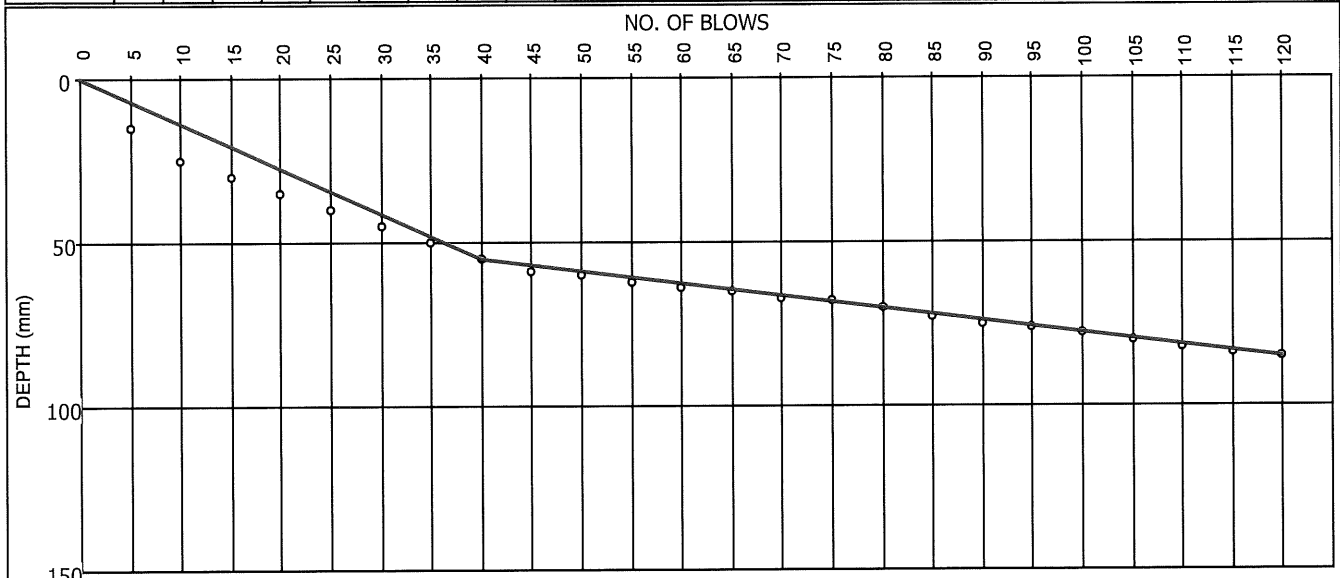
Project : Proposed New Shangoni Gate
 : R/CL 31 Y 019388 - X 2567440
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 29 - CL

INITIAL DEPTH (mm) : 0

| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| DEPTH | 15 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 59 | 60 | 62 | 64 | 65 | 67 | 68 | 70 | 73 | 75 | 76 | 78 | 80 | 82 | 84 | 85 |
| CBR | 110 | 170 | 300 | 300 | 300 | 300 | 300 | 300 | 342 | 500 | 442 | 442 | 500 | 442 | 500 | 442 | 389 | 442 | 500 | 442 | 442 | 442 | 442 | 500 |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Gerrit van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

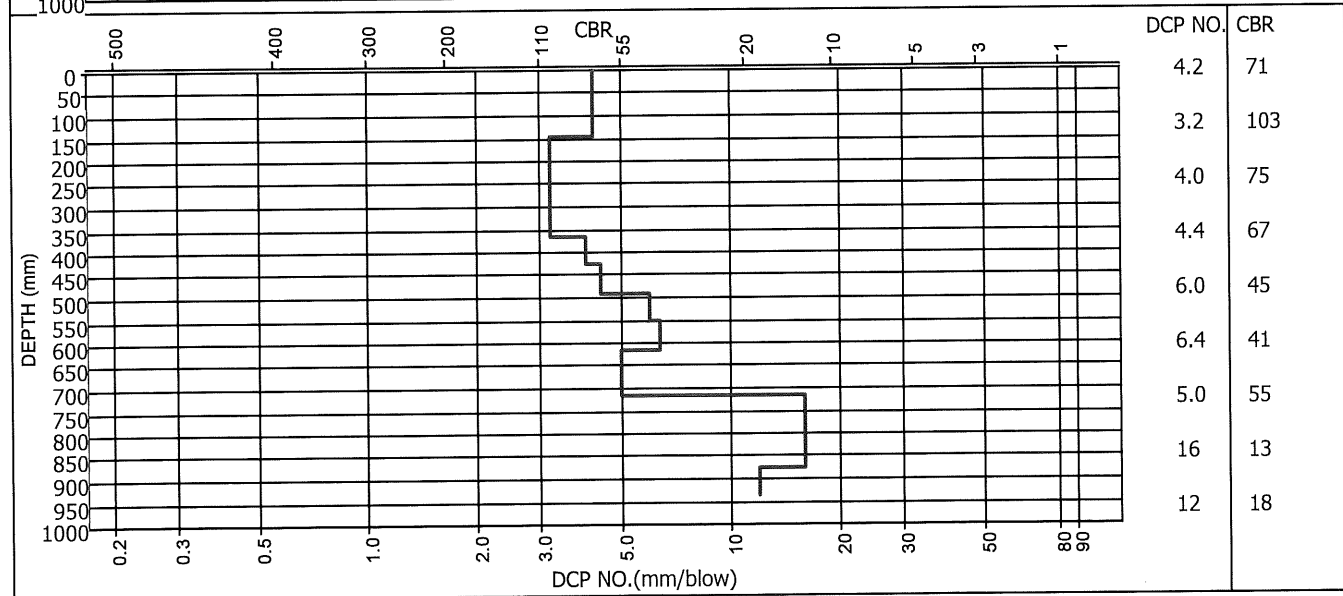
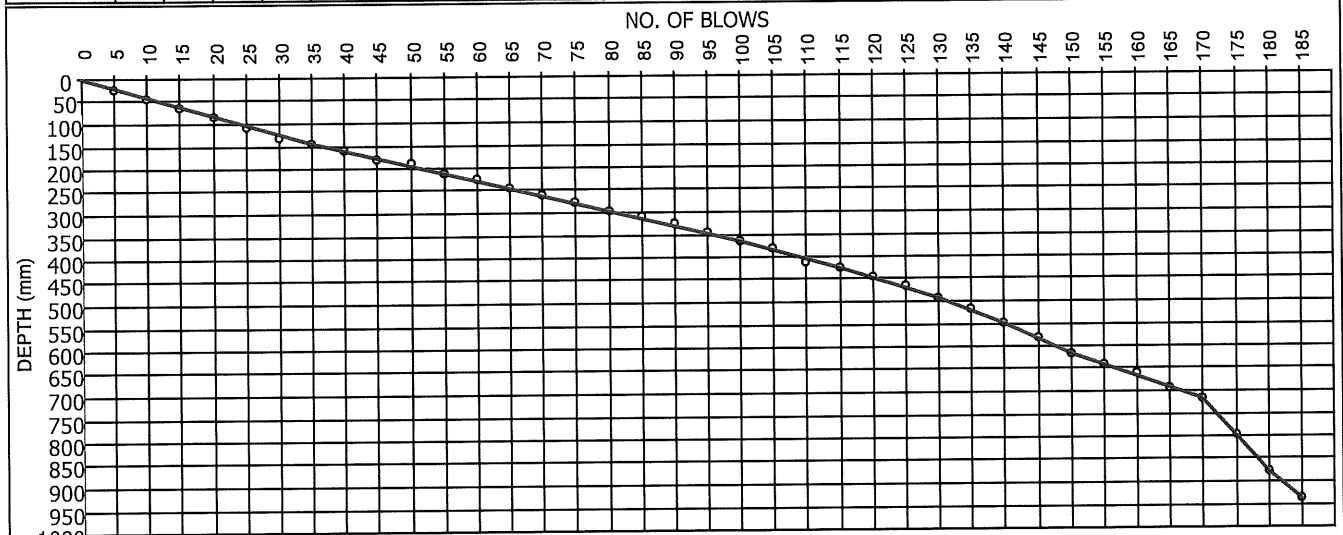
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 019380 - X 2567438
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 30 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 25 | 45 | 65 | 85 | 110 | 130 | 145 | 160 | 180 | 190 | 210 | 225 | 245 | 260 | 275 | 295 | 310 | 325 | 345 | 365 | 380 | 410 | 425 | 445 | 465 |
| CBR | 55 | 75 | 75 | 75 | 55 | 75 | 110 | 110 | 75 | 170 | 75 | 110 | 75 | 110 | 110 | 75 | 110 | 110 | 75 | 75 | 110 | 45 | 110 | 75 | 75 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | | | | | | | | | | | | | |
| DEPTH | 490 | 515 | 550 | 580 | 615 | 640 | 660 | 690 | 715 | 795 | 875 | 935 | | | | | | | | | | | | | |
| CBR | 55 | 55 | 35 | 45 | 35 | 55 | 75 | 45 | 55 | 13 | 13 | 18 | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : / K.Z Mlambo

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 - CIVIL ENGINEERING SERVICES -
 Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587
 a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137581302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

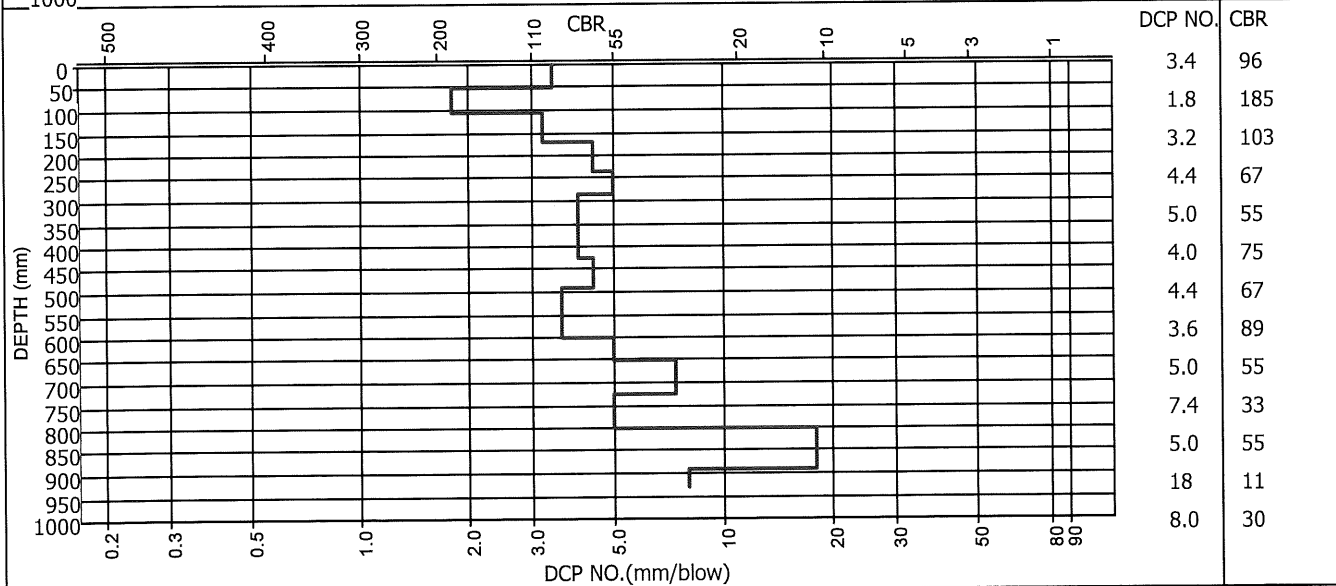
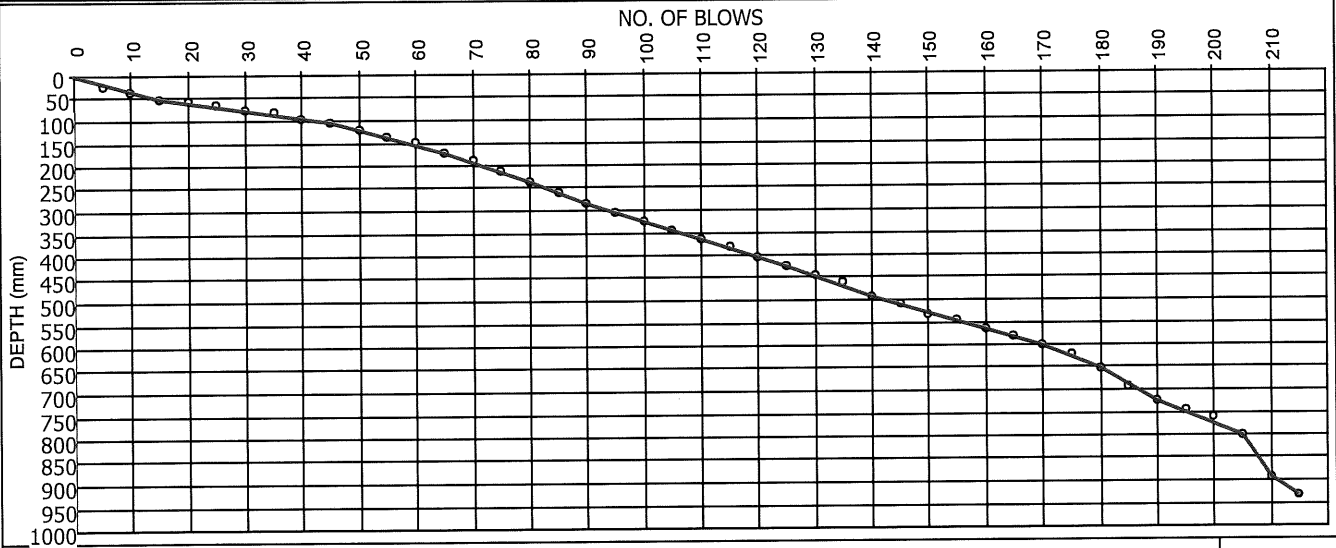
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 018839 - X 2567329
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 31 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 25 | 35 | 50 | 55 | 65 | 75 | 80 | 95 | 105 | 120 | 135 | 150 | 170 | 190 | 210 | 235 | 260 | 285 | 305 | 325 | 345 | 365 | 380 | 405 | 425 |
| CBR | 55 | 170 | 110 | 300 | 170 | 170 | 300 | 110 | 170 | 110 | 110 | 110 | 75 | 75 | 75 | 55 | 55 | 55 | 75 | 75 | 75 | 75 | 110 | 55 | 75 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | | | | | | | |
| DEPTH | 445 | 460 | 490 | 510 | 530 | 545 | 565 | 580 | 600 | 620 | 650 | 690 | 725 | 745 | 760 | 800 | 890 | 930 | | | | | | | |
| CBR | 75 | 110 | 45 | 75 | 75 | 110 | 75 | 110 | 75 | 75 | 45 | 30 | 35 | 75 | 110 | 30 | 11 | 30 | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory: GT van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

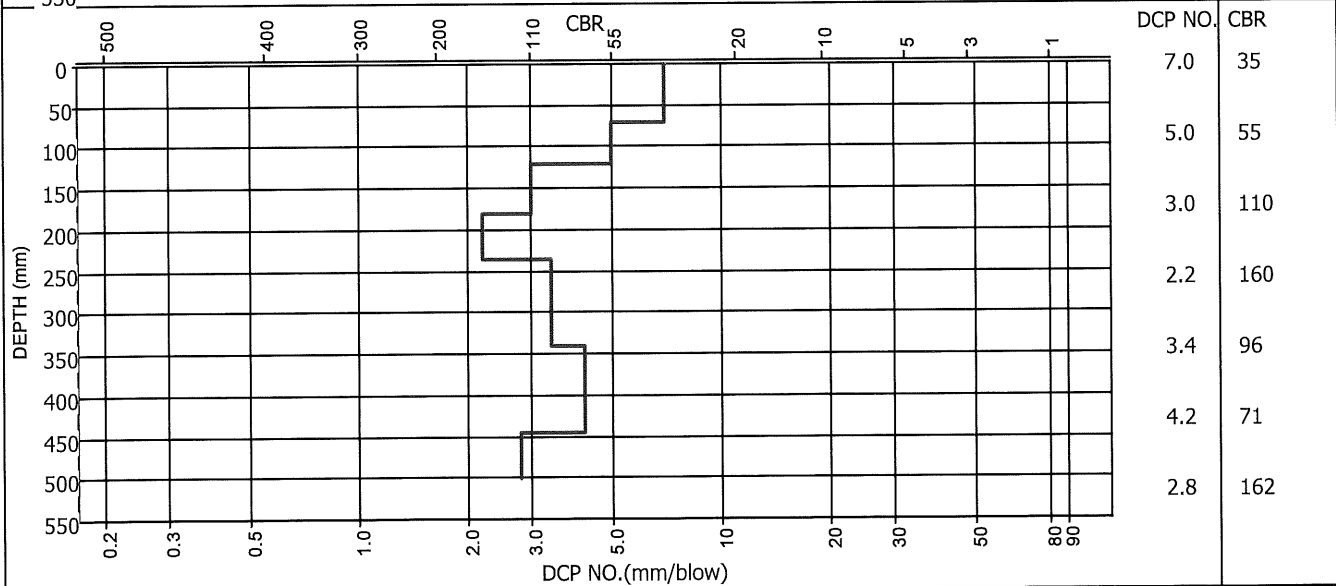
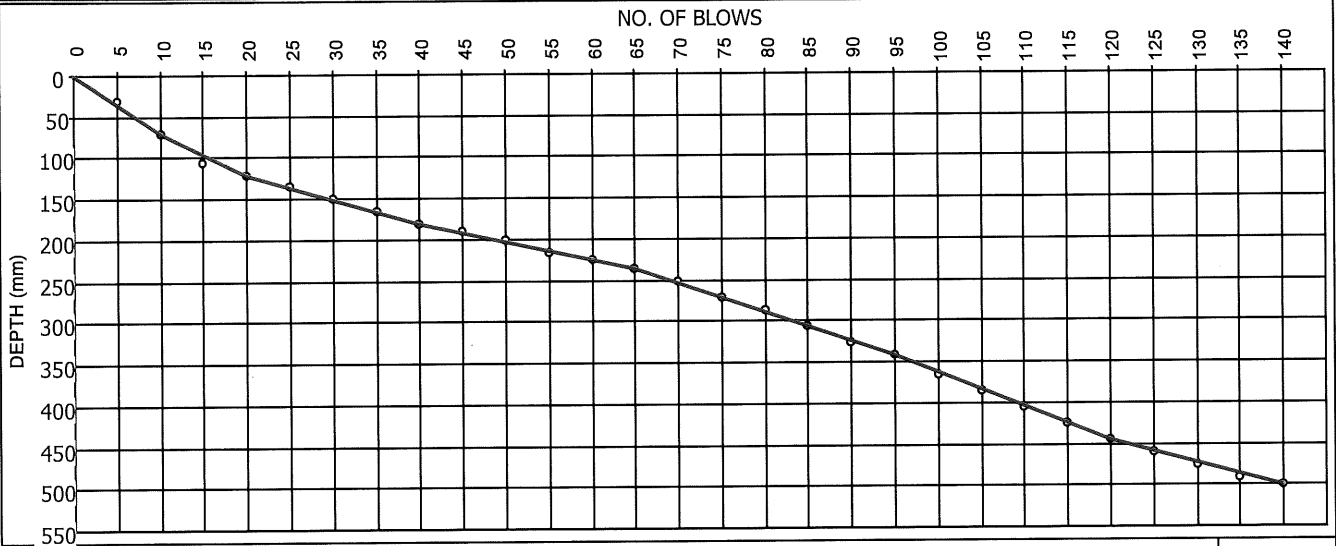
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 018535 - X 2567099
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 32 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 30 | 70 | 105 | 120 | 135 | 150 | 165 | 180 | 190 | 200 | 215 | 225 | 235 | 250 | 270 | 285 | 305 | 325 | 340 | 365 | 385 | 405 | 425 | 445 | 460 |
| CBR | 45 | 30 | 35 | 110 | 110 | 110 | 110 | 110 | 170 | 170 | 110 | 170 | 170 | 110 | 75 | 110 | 75 | 75 | 110 | 55 | 75 | 75 | 75 | 75 | 110 |
| BLOWS | 130 | 135 | 140 | | | | | | | | | | | | | | | | | | | | | | |
| DEPTH | 475 | 490 | 500 | | | | | | | | | | | | | | | | | | | | | | |
| CBR | 110 | 110 | 170 | | | | | | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory :

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

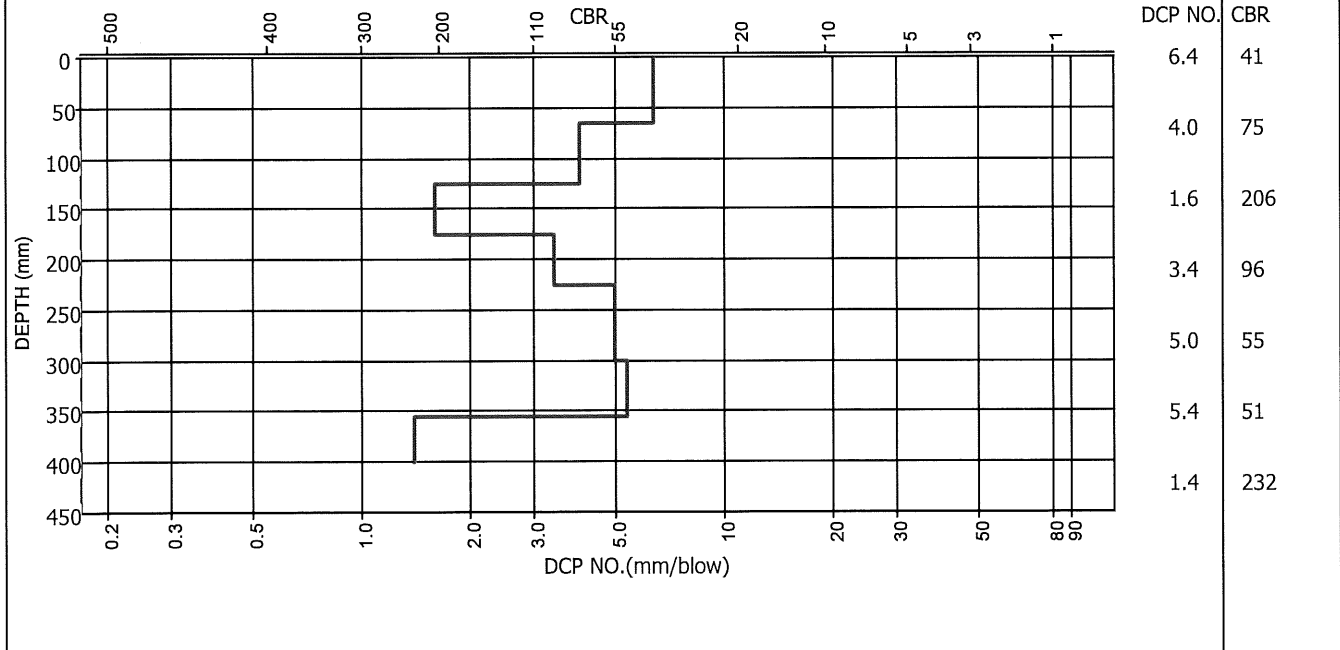
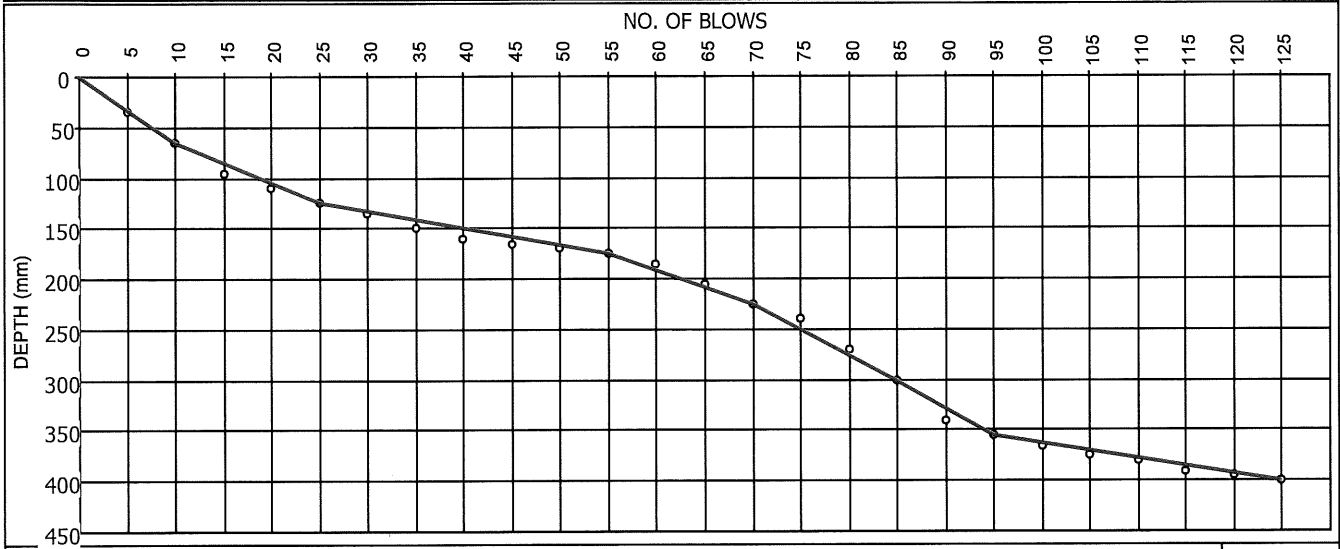
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 017844 - X 2566643
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 33 - RHS

INITIAL DEPTH (mm) : 0

| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
|-------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| DEPTH | 35 | 65 | 95 | 110 | 125 | 135 | 150 | 160 | 165 | 170 | 175 | 185 | 205 | 225 | 240 | 270 | 300 | 340 | 355 | 365 | 375 | 380 | 390 | 395 | 400 |
| CBR | 35 | 45 | 45 | 110 | 110 | 170 | 110 | 170 | 300 | 300 | 300 | 170 | 75 | 75 | 110 | 45 | 45 | 30 | 110 | 170 | 170 | 300 | 170 | 300 | 300 |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : G. van Rooyen / K.Z Mlambo

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

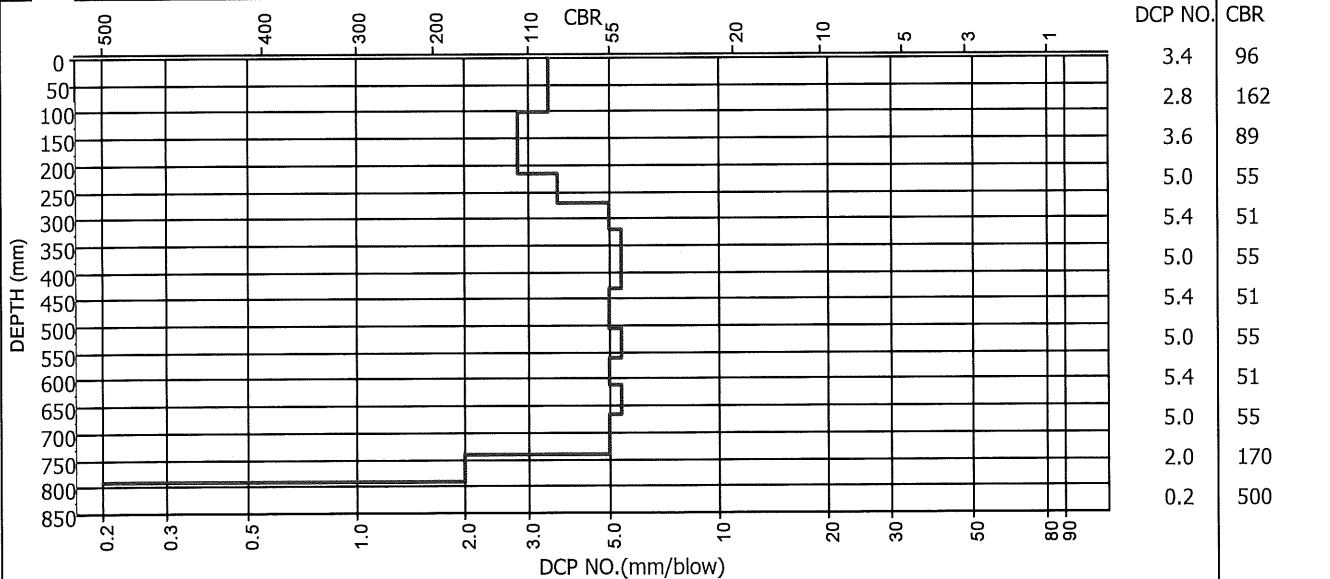
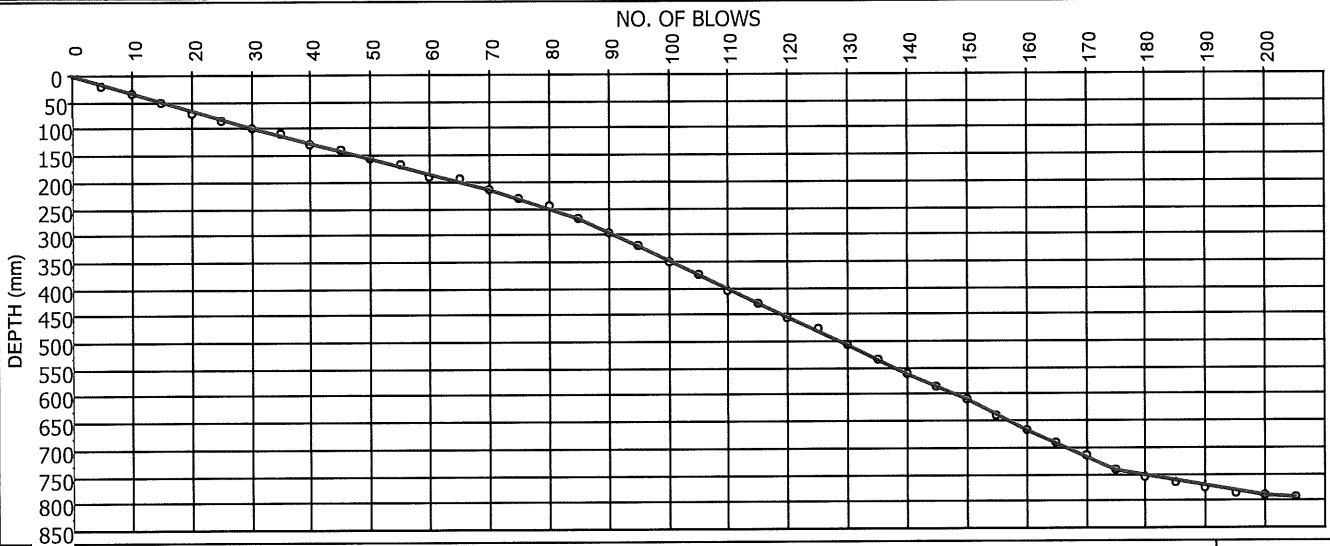
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 017395 - X 2566099
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 34 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 20 | 35 | 50 | 70 | 85 | 100 | 110 | 130 | 140 | 155 | 165 | 191 | 195 | 215 | 230 | 245 | 270 | 295 | 320 | 350 | 375 | 405 | 430 | 455 | 475 |
| CBR | 75 | 110 | 110 | 75 | 110 | 110 | 170 | 75 | 170 | 110 | 170 | 53 | 342 | 75 | 110 | 110 | 55 | 55 | 55 | 45 | 55 | 45 | 55 | 55 | 75 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | | | | | | | | | |
| DEPTH | 505 | 535 | 560 | 585 | 610 | 640 | 665 | 690 | 715 | 740 | 755 | 765 | 775 | 785 | 790 | 791 | | | | | | | | | |
| CBR | 45 | 45 | 55 | 55 | 55 | 45 | 55 | 55 | 55 | 55 | 110 | 170 | 170 | 170 | 300 | 500 | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory: G. van Rooyen / K.Z Mlambo

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 Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587
 a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137581302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

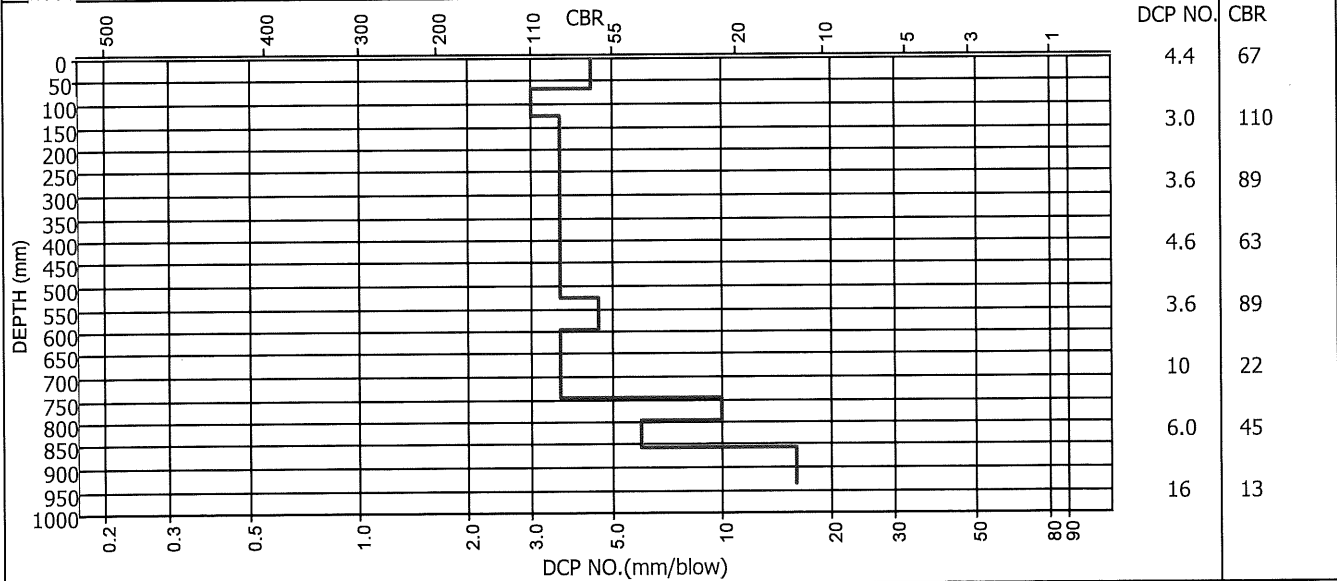
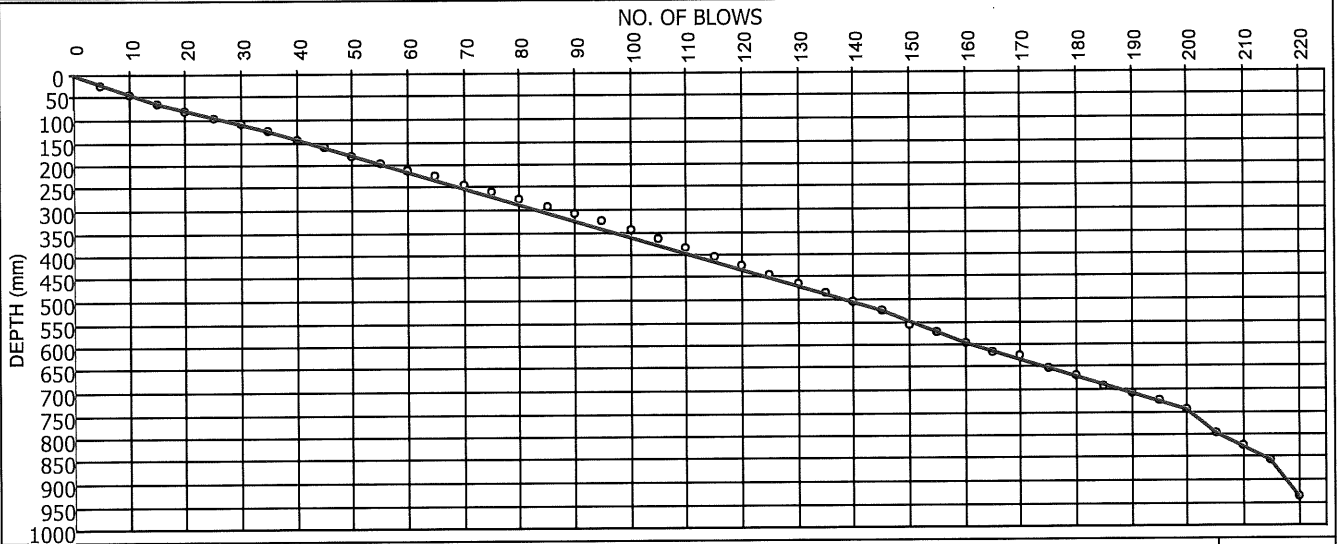
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 017032 - X 2565558
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 35 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 25 | 45 | 65 | 80 | 95 | 110 | 125 | 145 | 160 | 180 | 195 | 210 | 225 | 245 | 260 | 275 | 290 | 310 | 325 | 345 | 365 | 385 | 405 | 425 | 445 |
| CBR | 55 | 75 | 75 | 110 | 110 | 110 | 110 | 75 | 110 | 75 | 110 | 110 | 110 | 75 | 110 | 110 | 110 | 75 | 110 | 75 | 75 | 75 | 75 | 75 | 75 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 220 | | | | | |
| DEPTH | 465 | 485 | 505 | 525 | 555 | 570 | 595 | 615 | 625 | 650 | 670 | 690 | 710 | 725 | 745 | 795 | 825 | 855 | 935 | | | | | | |
| CBR | 75 | 75 | 75 | 75 | 45 | 110 | 55 | 75 | 170 | 55 | 75 | 75 | 75 | 110 | 75 | 22 | 45 | 45 | 13 | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory: G.T. van Rooyen / K.Z. Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maahe

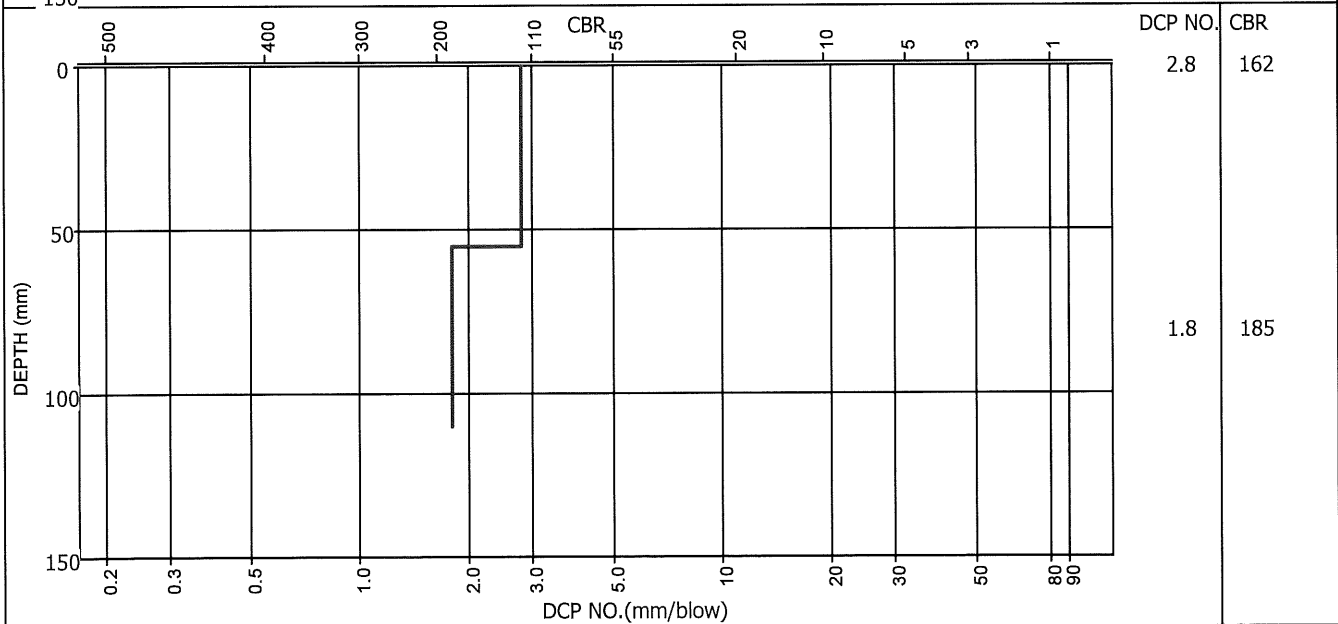
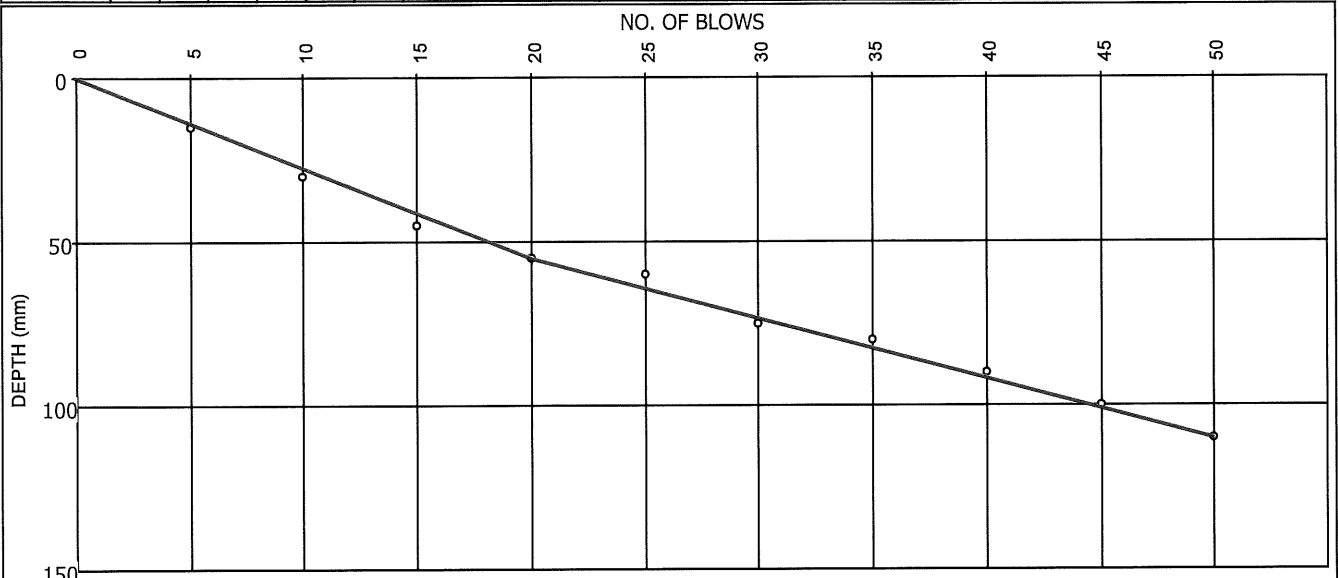
Project : Proposed New Shangoni Gate
 : R/CL 31 Y 016687 - X 2565316
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 36 - CL

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|--|--|--|--|--|--|--|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | | | | | | | | | | |
| DEPTH | 15 | 30 | 45 | 55 | 60 | 75 | 80 | 90 | 100 | 110 | | | | | | | | | | |
| CBR | 110 | 110 | 110 | 170 | 300 | 110 | 300 | 170 | 170 | 170 | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogoa Maake

Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 016424 - X 2565183
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

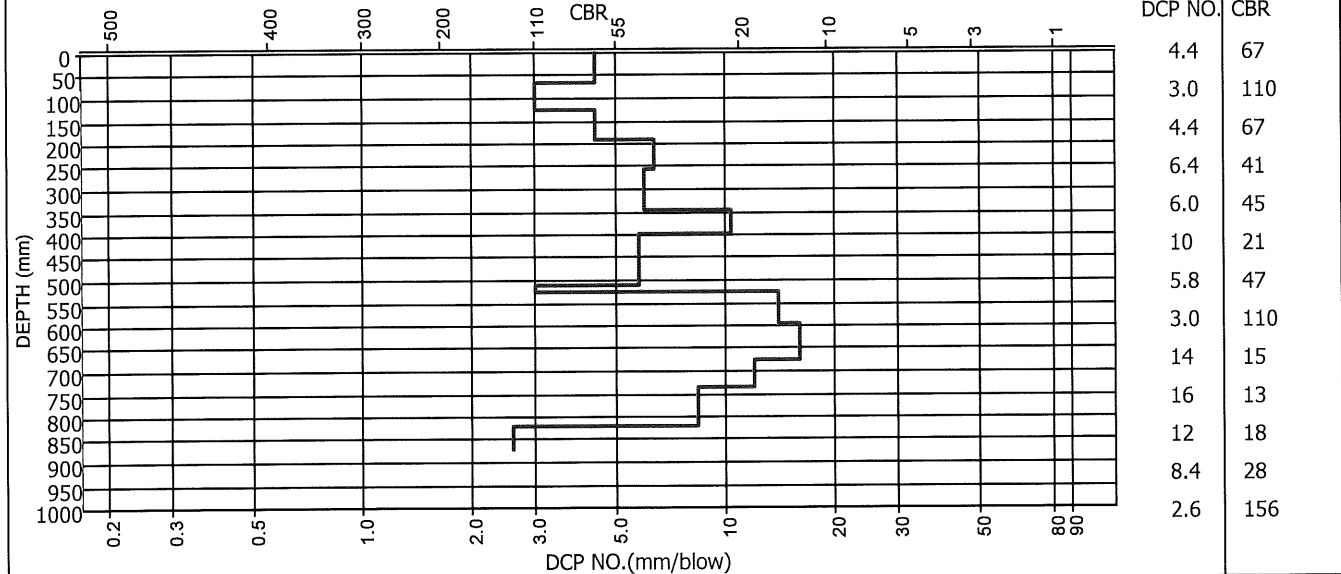
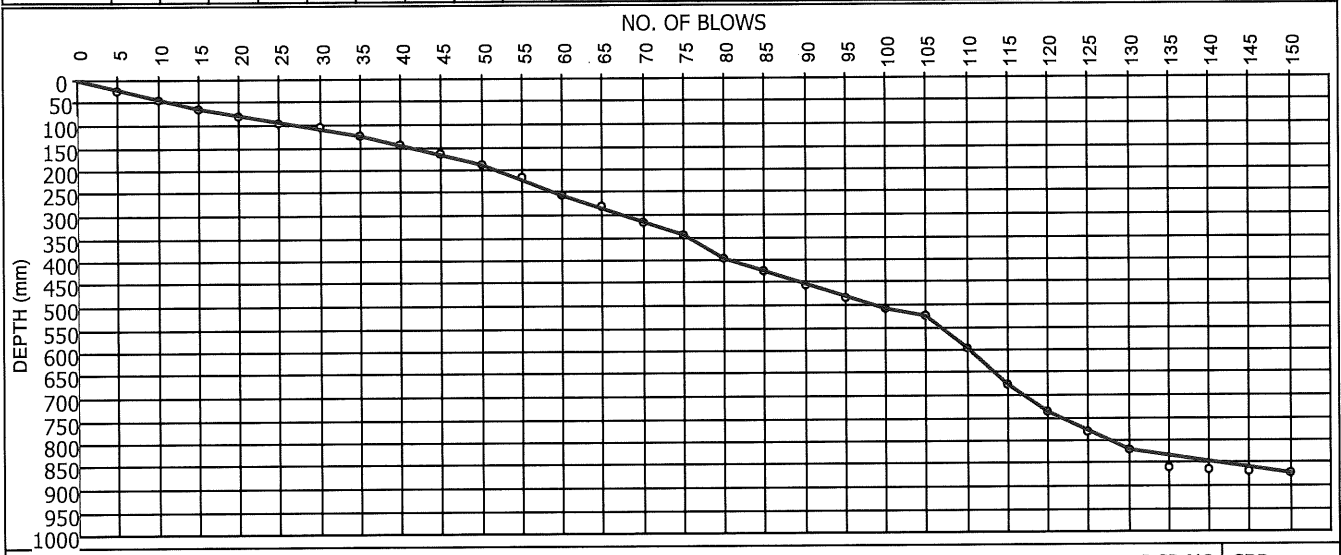
DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 38 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 25 | 45 | 65 | 80 | 95 | 105 | 125 | 145 | 165 | 190 | 215 | 255 | 280 | 315 | 345 | 397 | 425 | 455 | 485 | 510 | 525 | 595 | 675 | 735 | 780 |
| CBR | 55 | 75 | 75 | 110 | 110 | 170 | 75 | 75 | 75 | 55 | 55 | 30 | 55 | 35 | 45 | 21 | 49 | 45 | 45 | 55 | 110 | 15 | 13 | 18 | 25 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| BLOWS | 130 | 135 | 140 | 145 | 150 | | | | | | | | | | | | | | | | | | | | |
| DEPTH | 820 | 860 | 865 | 870 | 871 | | | | | | | | | | | | | | | | | | | | |
| CBR | 30 | 30 | 300 | 300 | 500 | | | | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : G.T. van Rooyen / K.Z. Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogoa Maake

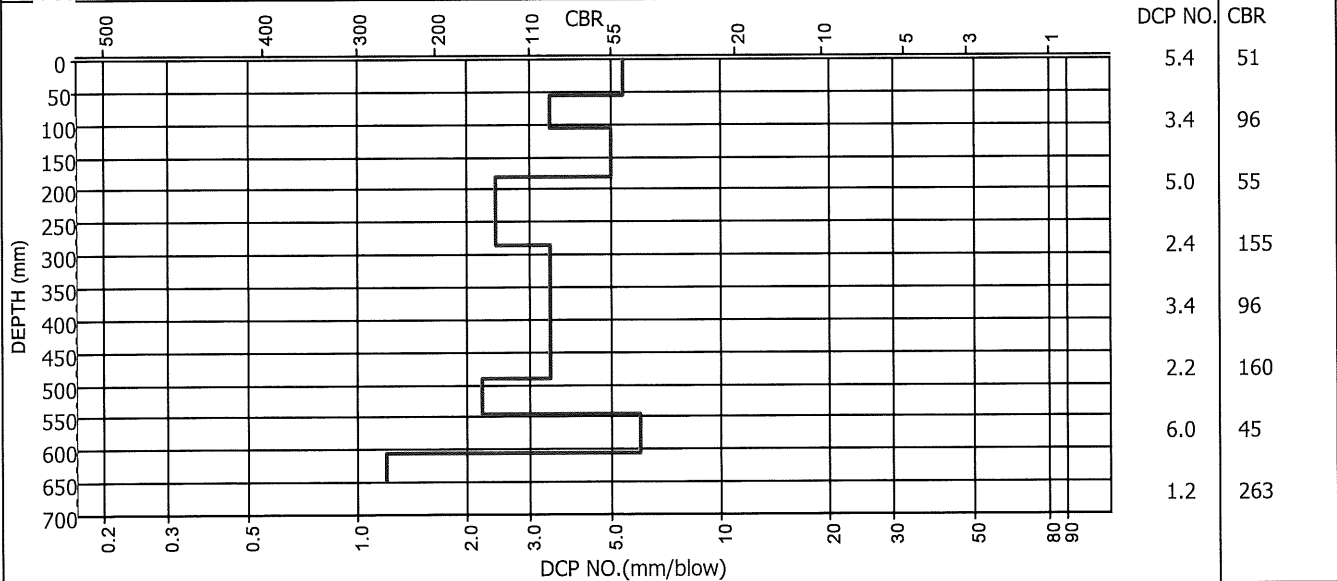
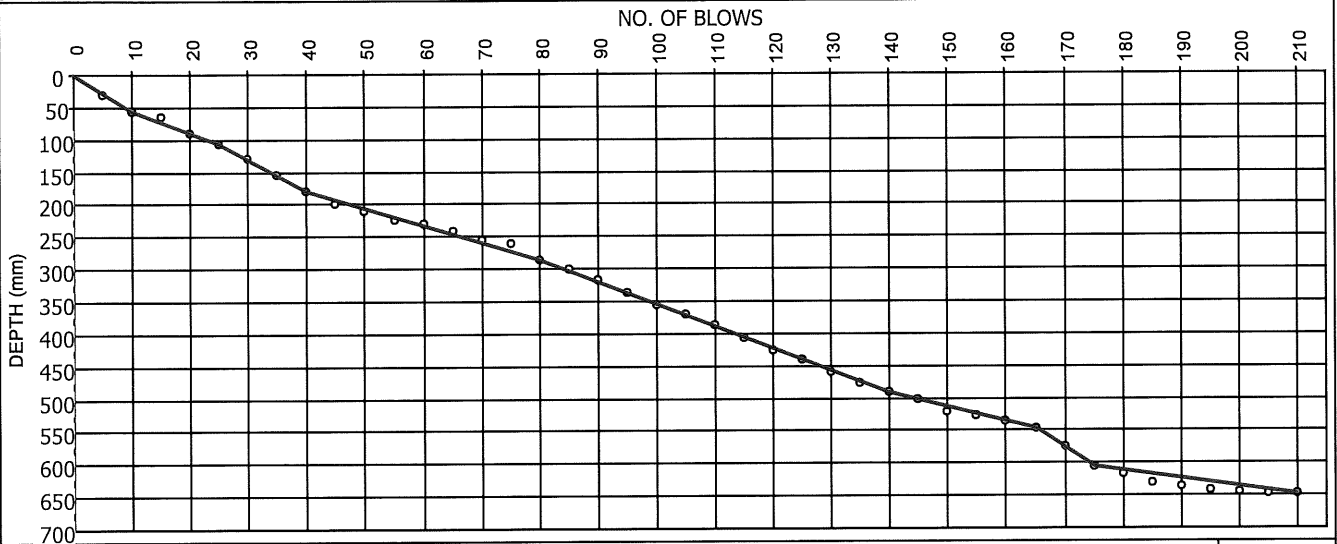
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 015927 - X 2564973
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 39 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 30 | 55 | 65 | 90 | 105 | 130 | 155 | 180 | 200 | 210 | 225 | 230 | 240 | 255 | 260 | 285 | 300 | 315 | 335 | 355 | 370 | 385 | 405 | 425 | 440 |
| CBR | 45 | 55 | 170 | 55 | 55 | 55 | 55 | 55 | 75 | 170 | 110 | 300 | 170 | 110 | 300 | 55 | 110 | 110 | 75 | 75 | 110 | 110 | 75 | 75 | 110 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | | | | | | | | |
| DEPTH | 460 | 475 | 490 | 500 | 520 | 525 | 535 | 545 | 575 | 605 | 615 | 630 | 635 | 642 | 645 | 646 | 647 | | | | | | | | |
| CBR | 75 | 110 | 110 | 170 | 75 | 300 | 170 | 170 | 45 | 45 | 170 | 110 | 300 | 232 | 389 | 500 | 500 | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory: Gerrit van Rooyen / K.Z Mlambo

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TEST RESULTS

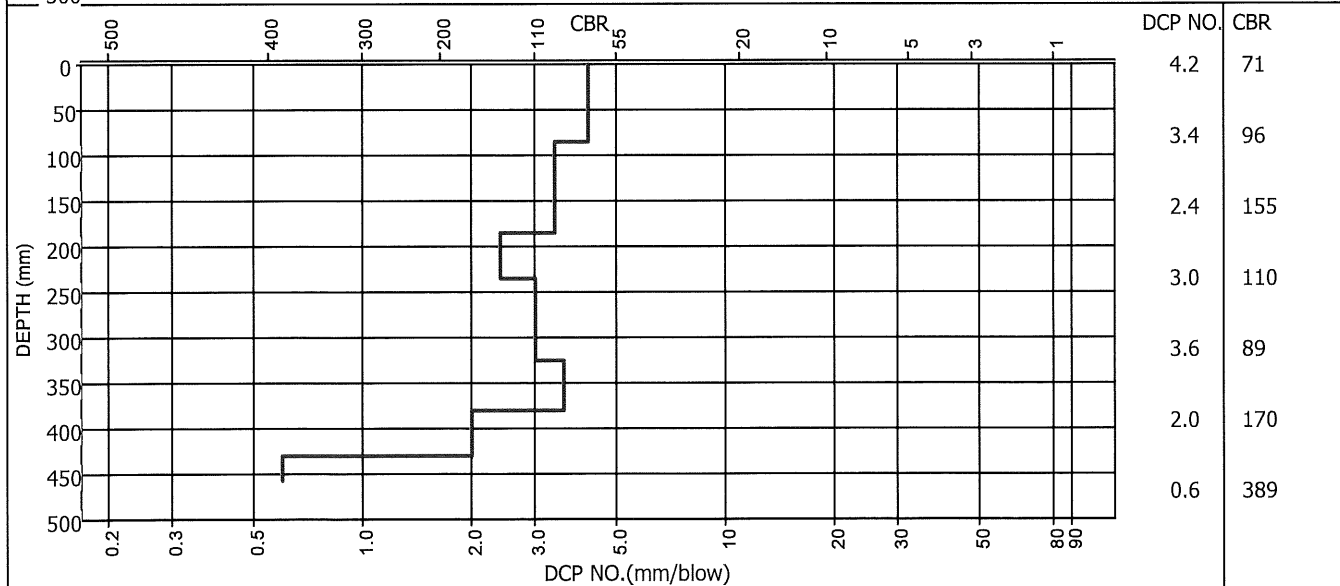
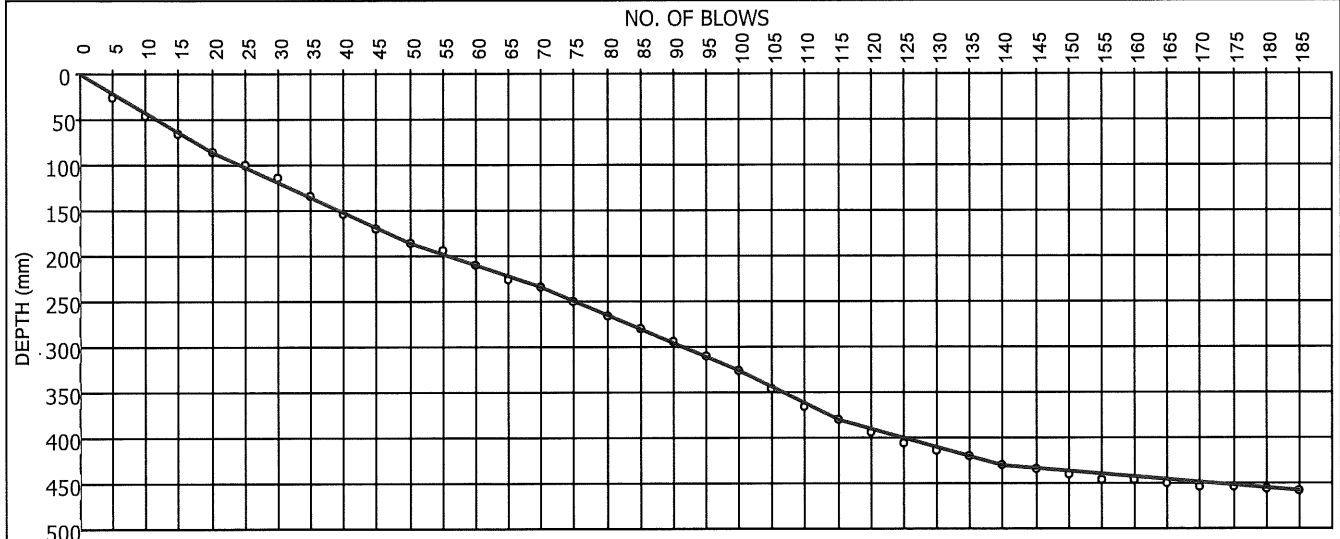
| | |
|---|---|
| Kruger National Park Private Bag X 402 Skukuza 1350 Attention: Tebogo Maake | Project : Proposed New Shangoni Gate : S/LHS 31 Y 015539 - X 2564728 Your Ref : SK-PO098123 Our Ref : 1947 Date Reported : 23/08/2019 |
|---|---|

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 40 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 25 | 45 | 65 | 85 | 100 | 115 | 135 | 155 | 170 | 185 | 195 | 210 | 225 | 235 | 250 | 265 | 280 | 295 | 310 | 325 | 345 | 365 | 380 | 395 | 405 |
| CBR | 55 | 75 | 75 | 75 | 110 | 110 | 75 | 75 | 110 | 110 | 170 | 170 | 110 | 170 | 110 | 110 | 110 | 110 | 110 | 110 | 75 | 75 | 110 | 110 | 170 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | | | | | | | | | | | | | |
| DEPTH | 415 | 420 | 430 | 435 | 440 | 445 | 446 | 451 | 453 | 455 | 456 | 457 | | | | | | | | | | | | | |
| CBR | 170 | 300 | 170 | 300 | 300 | 300 | 500 | 300 | 442 | 442 | 500 | 500 | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : GT van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

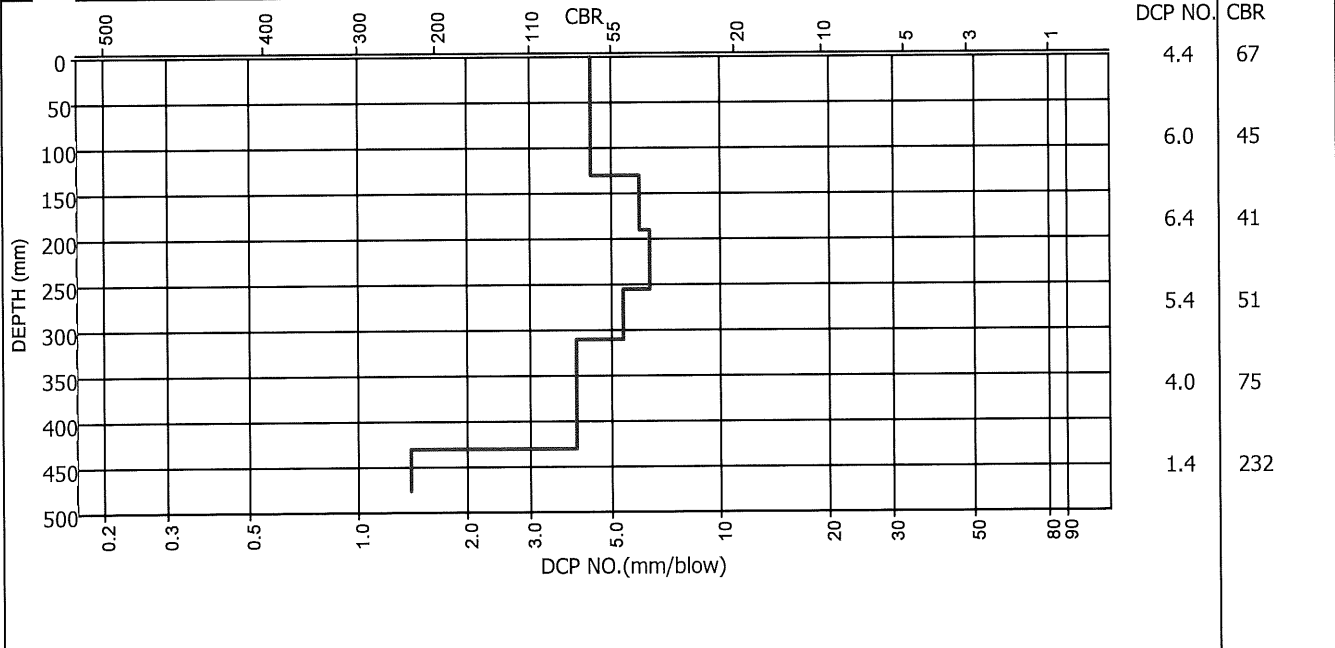
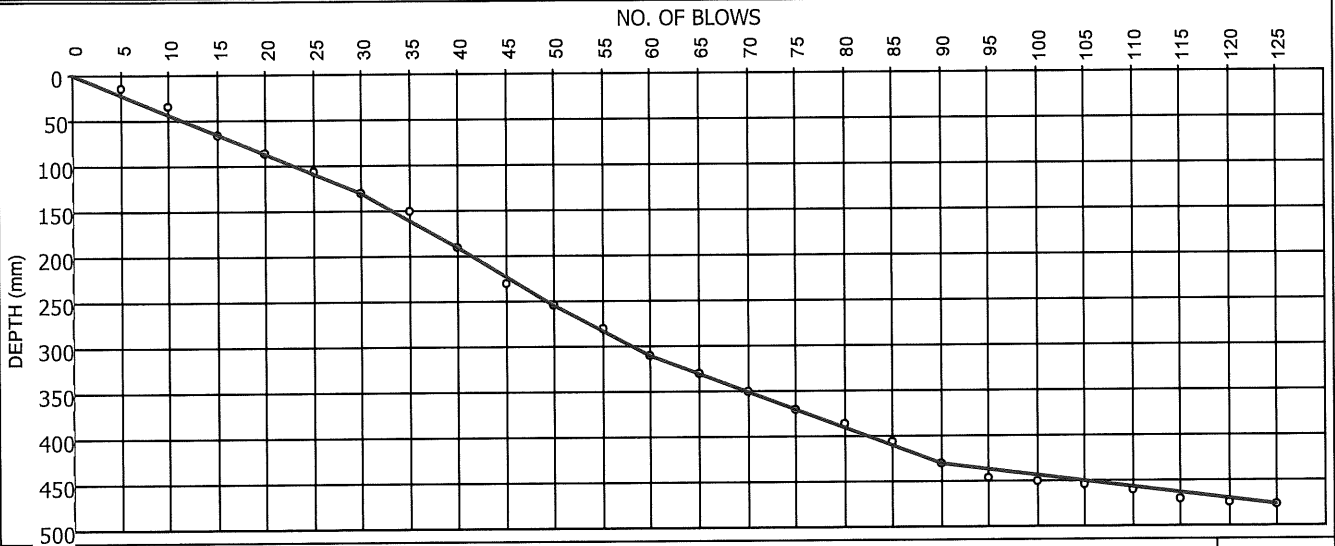
Project : Proposed New Shangoni Gate
 : R/CL 31 Y 015147 - X 2564400
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 41 - CL

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 15 | 35 | 65 | 85 | 105 | 130 | 150 | 190 | 230 | 255 | 280 | 310 | 330 | 350 | 370 | 385 | 405 | 430 | 445 | 450 | 455 | 460 | 470 | 475 | 476 |
| CBR | 110 | 75 | 45 | 75 | 75 | 55 | 75 | 30 | 30 | 55 | 55 | 45 | 75 | 75 | 75 | 110 | 75 | 55 | 110 | 300 | 300 | 300 | 170 | 300 | 500 |



Remarks :

FORM: ST6

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Technical Signatory: G. Van Rooyen / K.Z Mlambo

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 - CIVIL ENGINEERING SERVICES -
 Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587
 a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137581302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

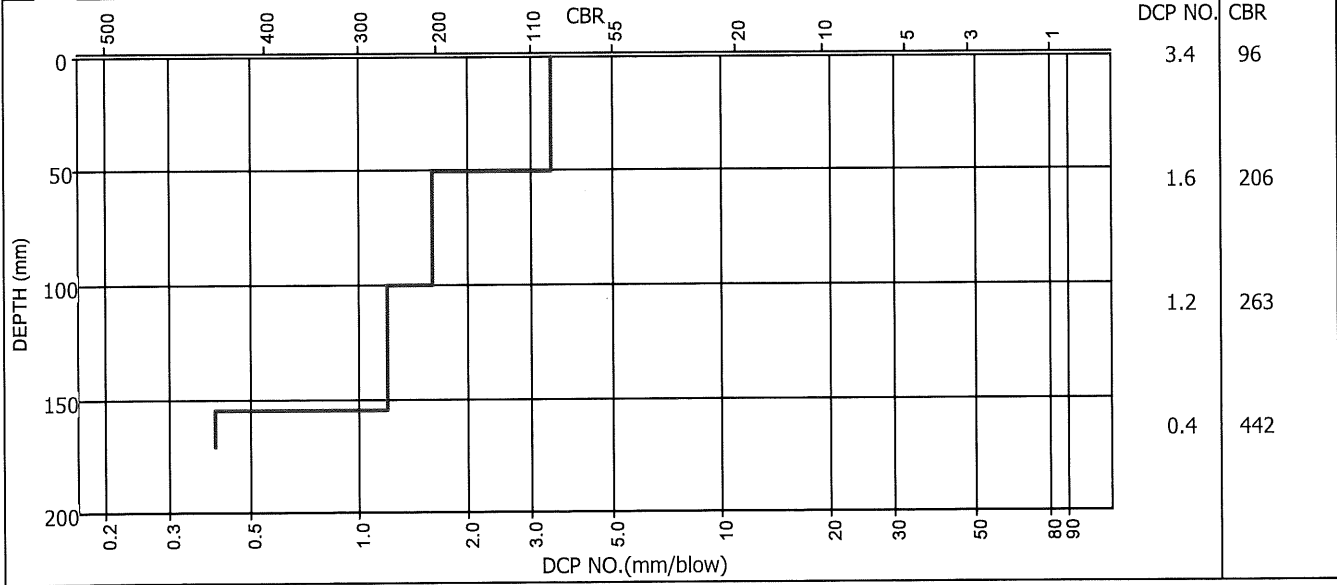
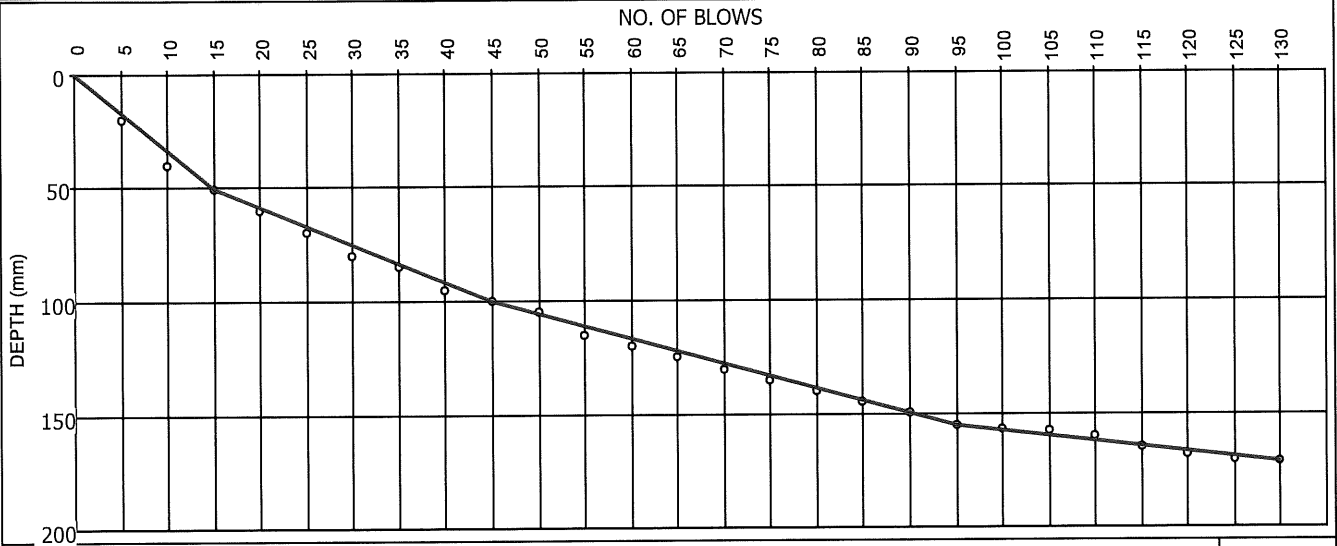
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 015148 - X 2564399
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 42 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 20 | 40 | 50 | 60 | 70 | 80 | 85 | 95 | 100 | 105 | 115 | 120 | 125 | 130 | 135 | 140 | 145 | 150 | 155 | 157 | 158 | 160 | 165 | 168 | 170 |
| CBR | 75 | 75 | 170 | 170 | 170 | 170 | 300 | 170 | 300 | 300 | 170 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 442 | 500 | 442 | 300 | 389 | 442 |
| BLOWS | 130 | | | | | | | | | | | | | | | | | | | | | | | | |
| DEPTH | 171 | | | | | | | | | | | | | | | | | | | | | | | | |
| CBR | 500 | | | | | | | | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : G.F. Van Rooyen / K.Z. Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

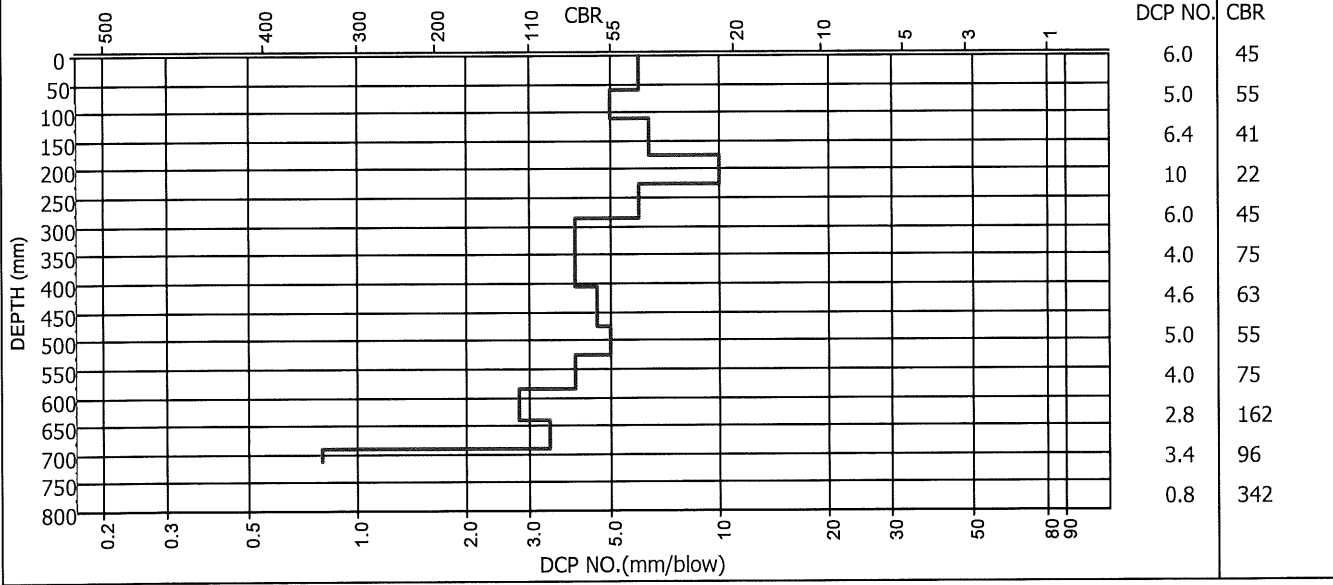
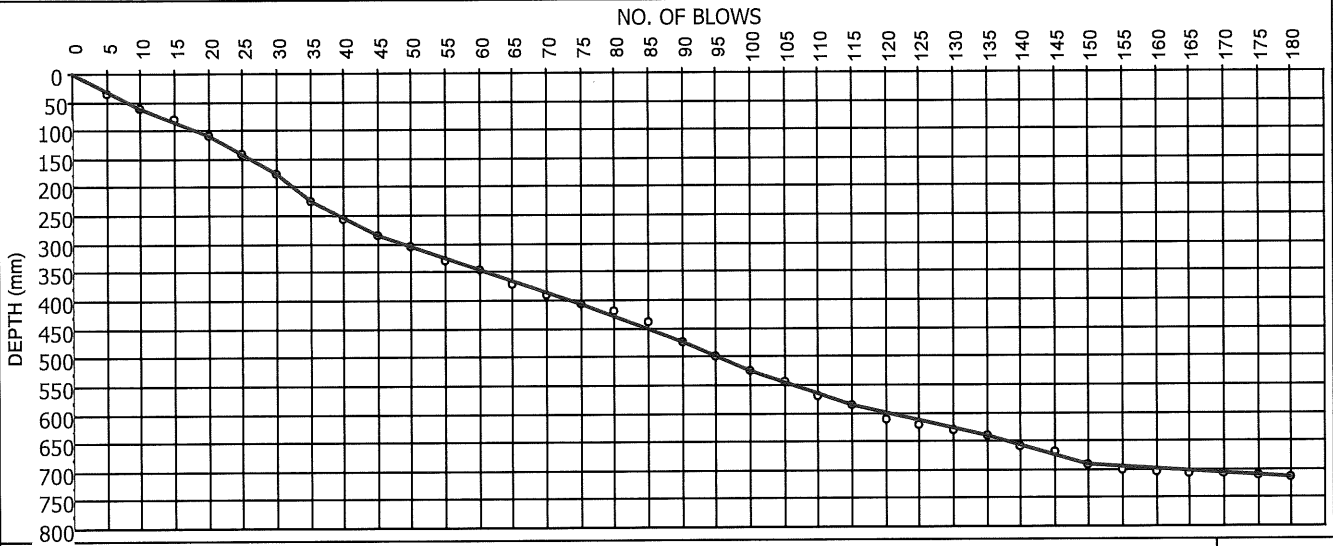
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 014751 - X 2564096
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 43 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 35 | 60 | 80 | 110 | 140 | 175 | 225 | 255 | 285 | 305 | 330 | 345 | 370 | 390 | 405 | 420 | 440 | 475 | 500 | 525 | 545 | 570 | 585 | 610 | 620 |
| CBR | 35 | 55 | 75 | 45 | 45 | 35 | 22 | 45 | 45 | 75 | 55 | 110 | 55 | 75 | 110 | 110 | 75 | 35 | 55 | 55 | 75 | 55 | 110 | 55 | 170 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | | | | | | | | | | | | | | |
| DEPTH | 630 | 640 | 660 | 670 | 690 | 700 | 705 | 706 | 707 | 711 | 712 | | | | | | | | | | | | | | |
| CBR | 170 | 170 | 75 | 170 | 75 | 170 | 300 | 500 | 500 | 342 | 500 | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

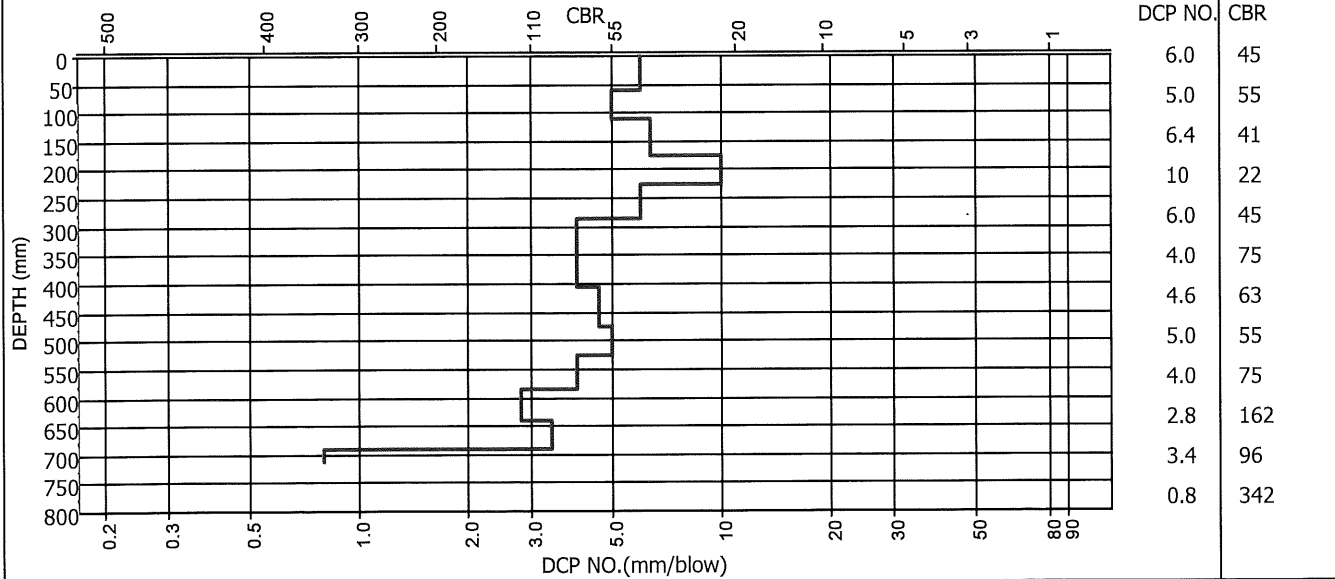
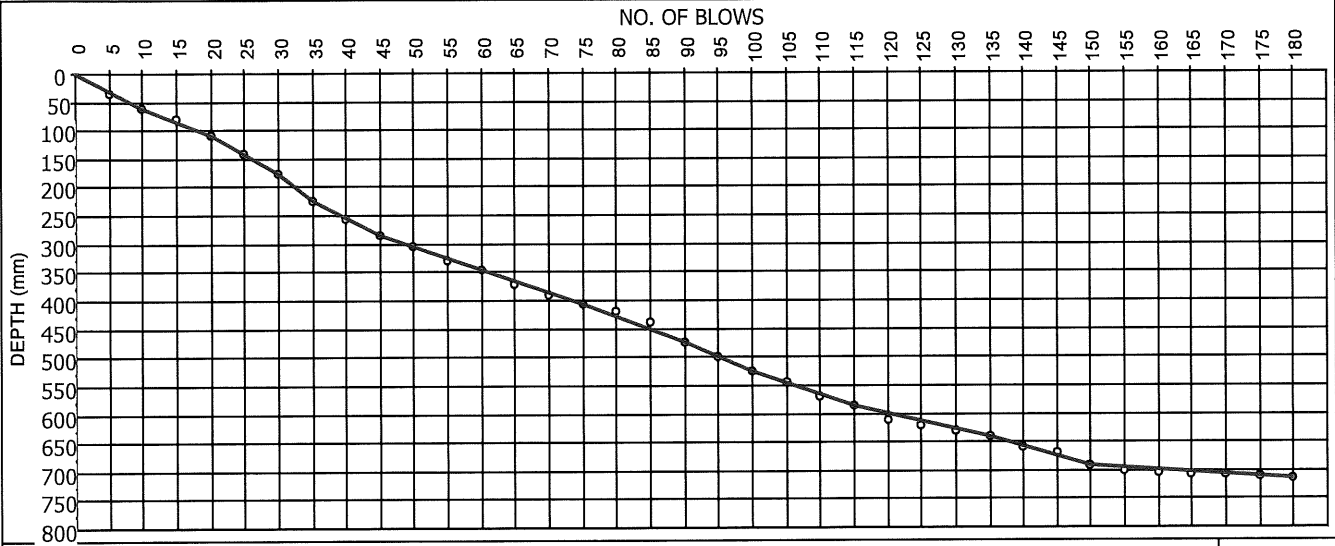
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 014751 - X 2564096
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 43 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 35 | 60 | 80 | 110 | 140 | 175 | 225 | 255 | 285 | 305 | 330 | 345 | 370 | 390 | 405 | 420 | 440 | 475 | 500 | 525 | 545 | 570 | 585 | 610 | 620 |
| CBR | 35 | 55 | 75 | 45 | 45 | 35 | 22 | 45 | 45 | 75 | 55 | 110 | 55 | 75 | 110 | 110 | 75 | 35 | 55 | 55 | 55 | 75 | 55 | 110 | 170 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | | | | | | | | | | | | | | |
| DEPTH | 630 | 640 | 660 | 670 | 690 | 700 | 705 | 706 | 707 | 711 | 712 | | | | | | | | | | | | | | |
| CBR | 170 | 170 | 75 | 170 | 75 | 170 | 300 | 500 | 500 | 342 | 500 | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : G. van Rooyen / K.Z Mlambo

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

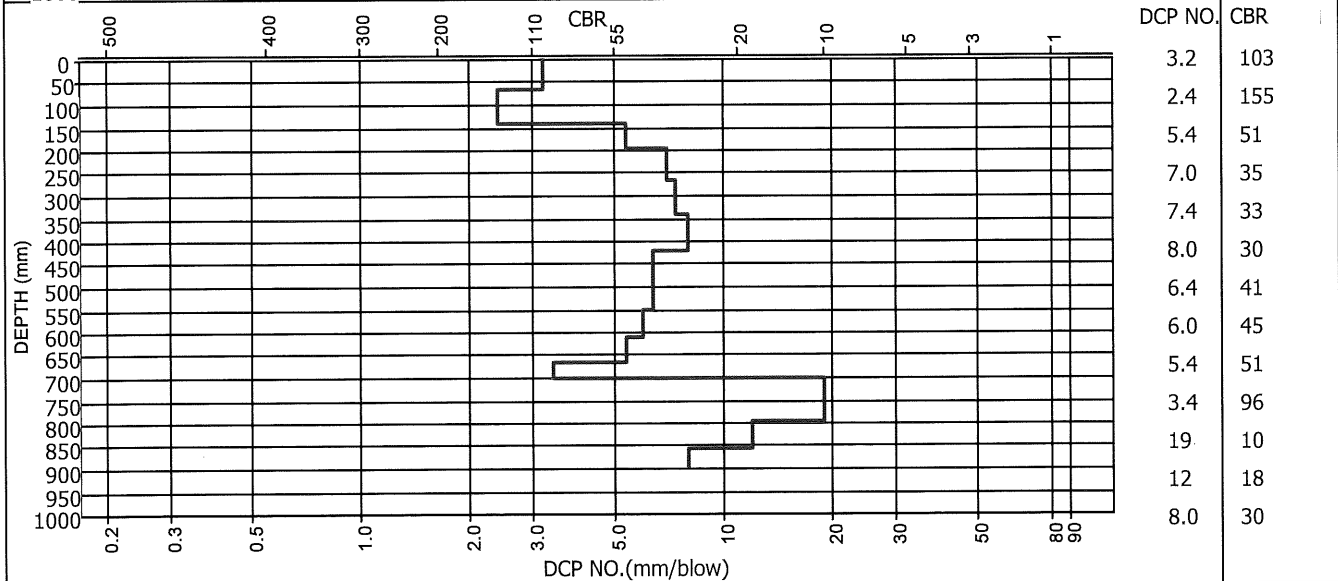
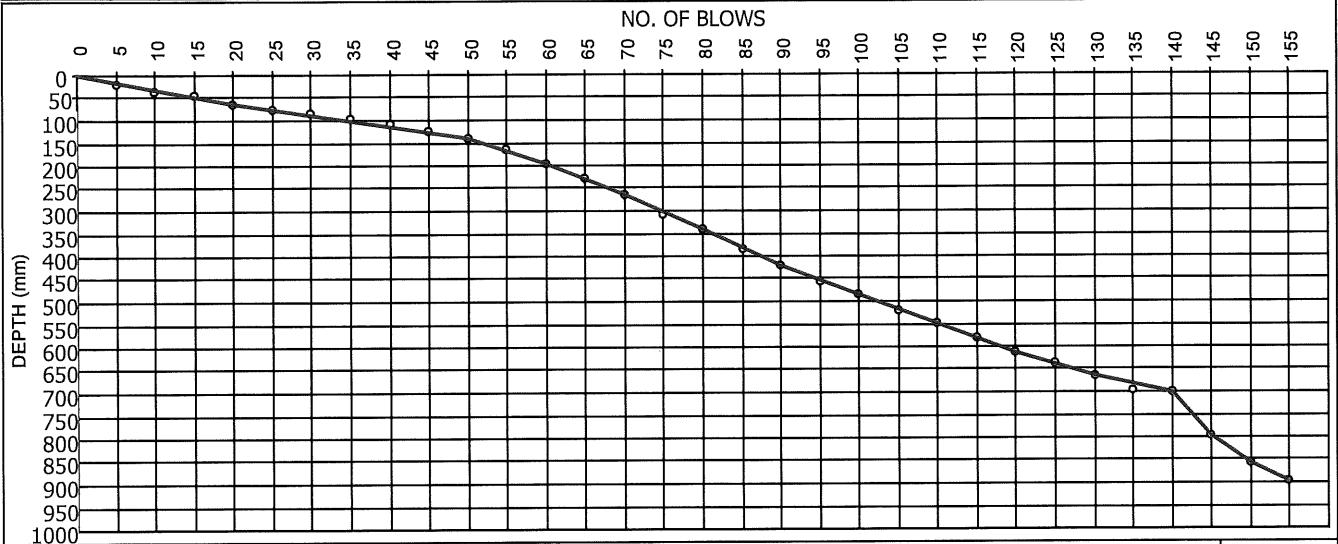
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 014357 - X 2563893
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 44 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 20 | 35 | 45 | 65 | 75 | 85 | 95 | 110 | 125 | 140 | 165 | 195 | 230 | 265 | 310 | 340 | 385 | 420 | 455 | 485 | 520 | 550 | 580 | 610 | 635 |
| CBR | 75 | 110 | 170 | 75 | 170 | 170 | 170 | 110 | 110 | 110 | 55 | 45 | 35 | 35 | 25 | 45 | 25 | 35 | 35 | 45 | 35 | 45 | 45 | 45 | 55 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | | | | | | | | | | | | | | | | | | | |
| DEPTH | 665 | 695 | 700 | 795 | 855 | 895 | | | | | | | | | | | | | | | | | | | |
| CBR | 45 | 45 | 300 | 10 | 18 | 30 | | | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maaake

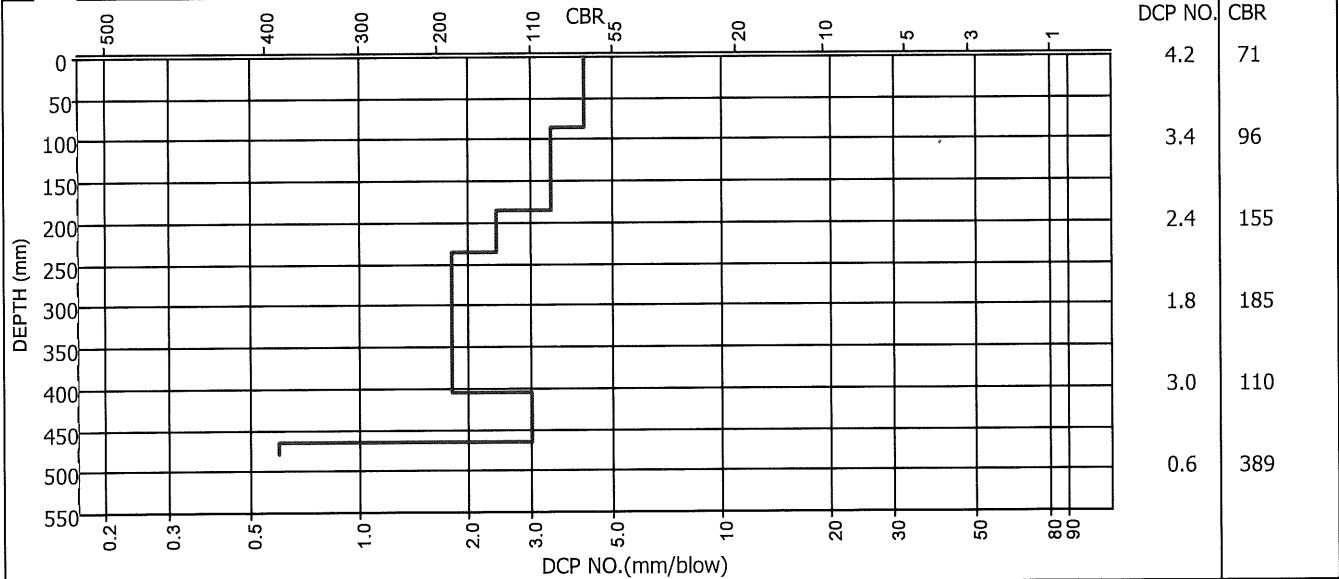
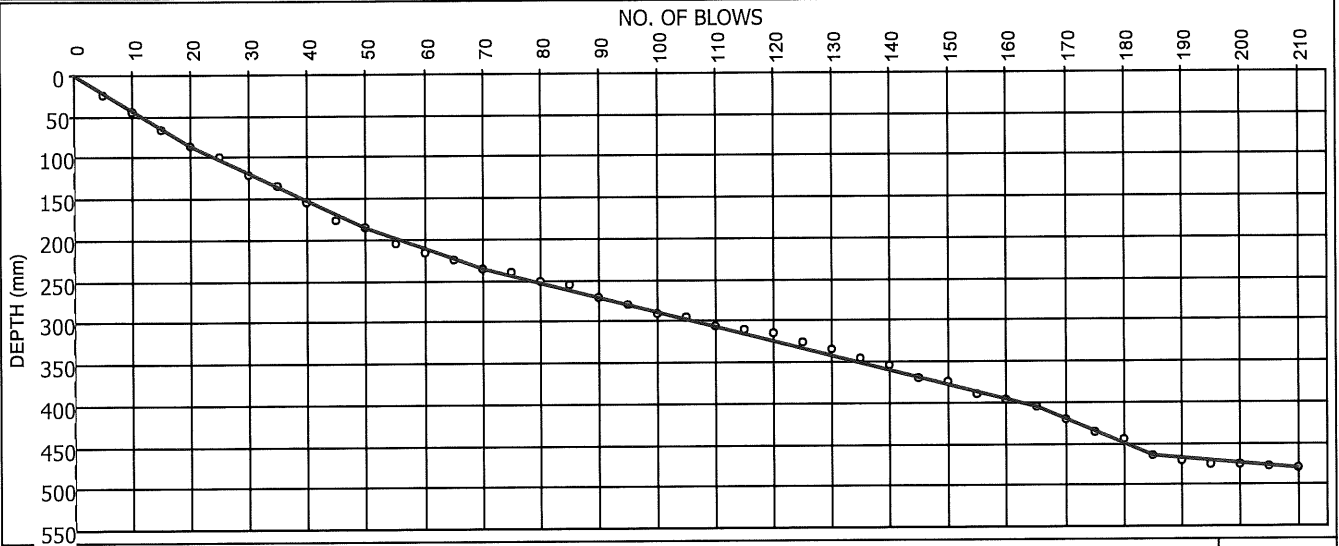
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 013890 - X 2563766
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 45 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 25 | 45 | 65 | 85 | 100 | 120 | 135 | 155 | 175 | 185 | 205 | 215 | 225 | 235 | 240 | 250 | 255 | 270 | 280 | 290 | 295 | 305 | 310 | 315 | 325 |
| CBR | 55 | 75 | 75 | 75 | 110 | 75 | 110 | 75 | 75 | 170 | 75 | 170 | 170 | 170 | 300 | 170 | 300 | 110 | 170 | 170 | 300 | 170 | 300 | 300 | 170 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | | | | | | | | |
| DEPTH | 335 | 345 | 355 | 370 | 375 | 390 | 395 | 405 | 420 | 435 | 445 | 465 | 470 | 475 | 476 | 477 | 479 | | | | | | | | |
| CBR | 170 | 170 | 170 | 110 | 300 | 110 | 300 | 170 | 110 | 110 | 170 | 75 | 300 | 300 | 500 | 500 | 442 | | | | | | | | |



Remarks :

FORM: ST6

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

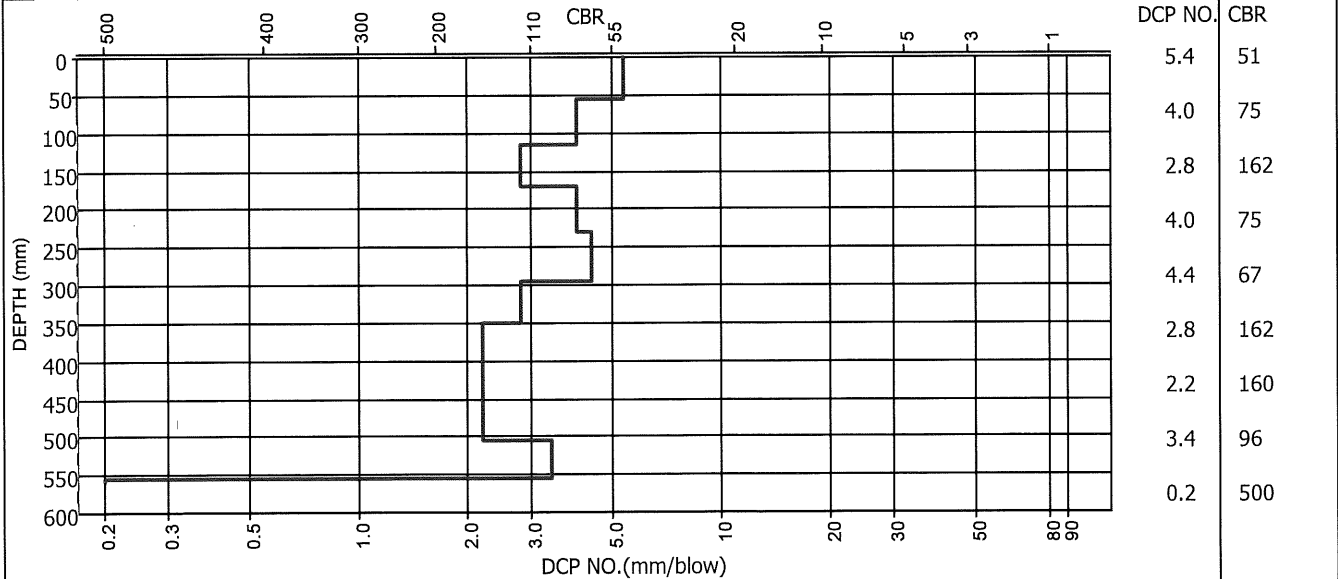
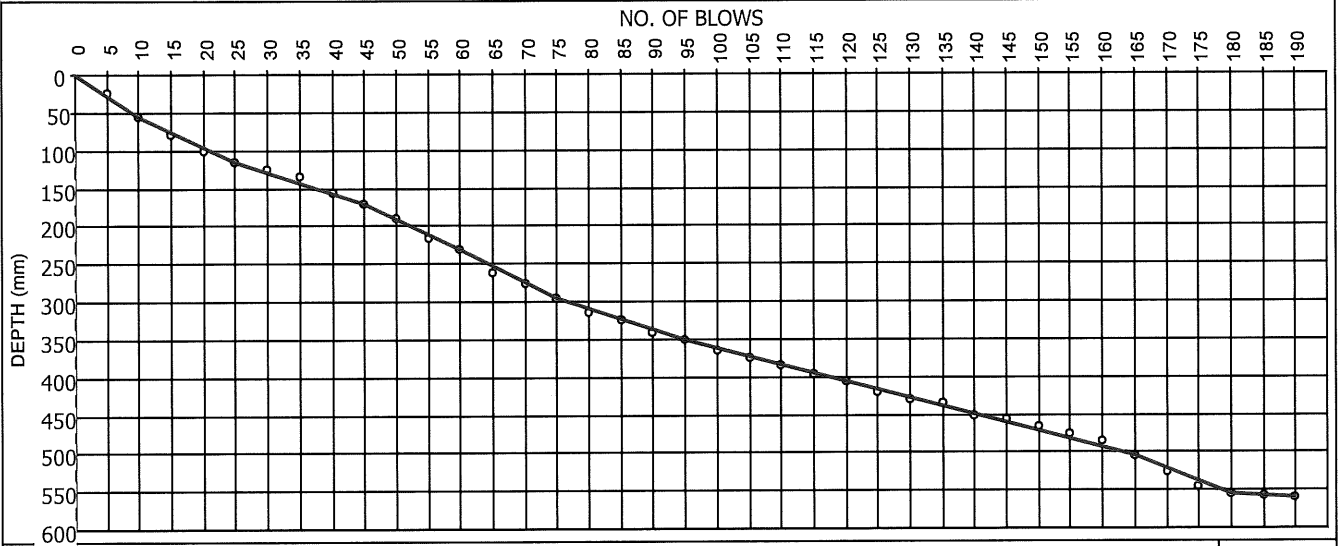
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 013508 - X 2562562
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 46 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 25 | 55 | 80 | 100 | 115 | 125 | 135 | 155 | 170 | 190 | 215 | 230 | 262 | 275 | 295 | 315 | 325 | 340 | 350 | 365 | 375 | 385 | 395 | 405 | 420 |
| CBR | 55 | 45 | 55 | 75 | 110 | 170 | 170 | 75 | 110 | 75 | 55 | 110 | 41 | 156 | 75 | 75 | 170 | 110 | 170 | 170 | 170 | 170 | 170 | 170 | 110 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | | | | | | | | | | | | |
| DEPTH | 430 | 435 | 450 | 455 | 465 | 475 | 485 | 505 | 525 | 545 | 555 | 557 | 558 | | | | | | | | | | | | |
| CBR | 170 | 300 | 110 | 300 | 170 | 170 | 170 | 75 | 75 | 75 | 170 | 442 | 500 | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

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 - CIVIL ENGINEERING SERVICES -
 Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587
a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137581302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

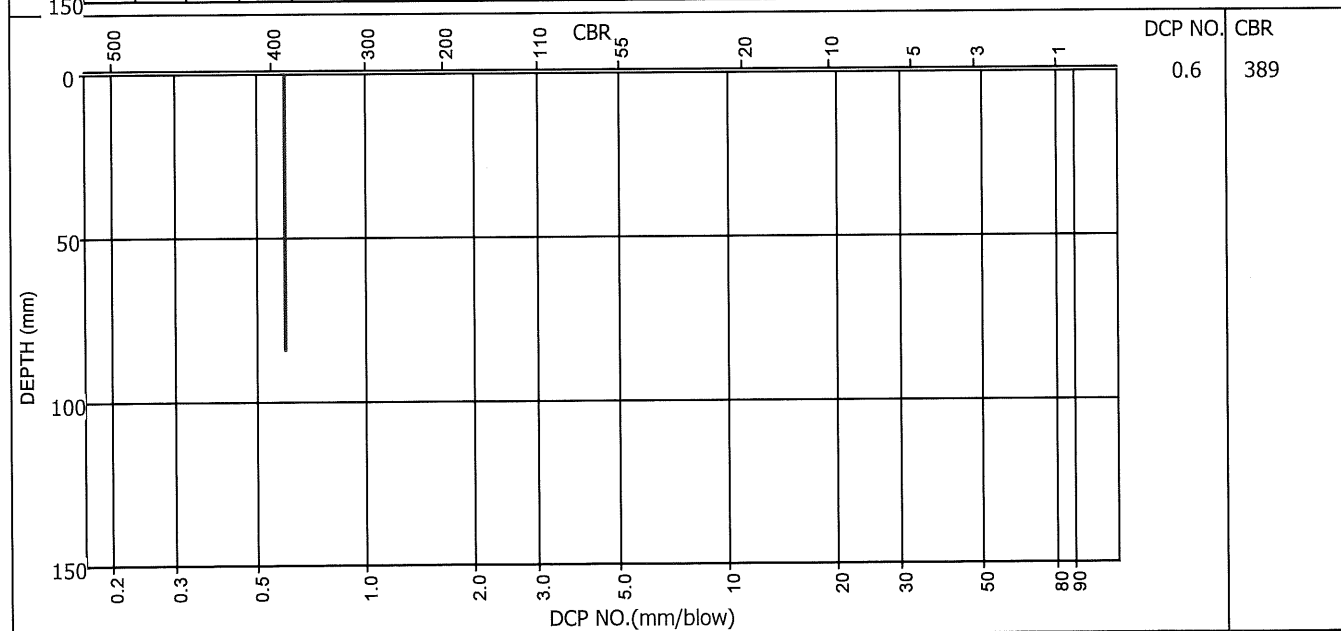
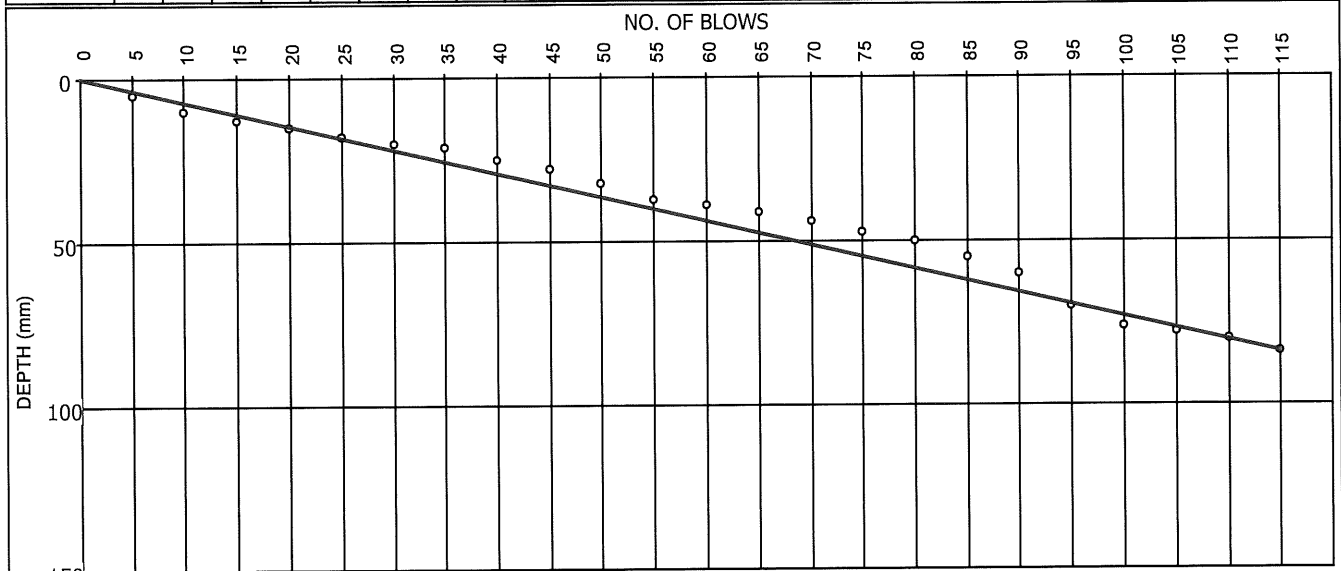
Project : Proposed New Shangoni Gate
 : R/CL 31 Y 013222 - X 2563471
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 47 - CL

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 |
| DEPTH | 5 | 10 | 13 | 15 | 18 | 20 | 21 | 25 | 28 | 32 | 37 | 39 | 41 | 44 | 47 | 50 | 55 | 60 | 70 | 76 | 78 | 80 | 84 |
| CBR | 300 | 300 | 389 | 442 | 389 | 442 | 500 | 342 | 389 | 342 | 300 | 442 | 442 | 389 | 389 | 389 | 300 | 300 | 170 | 263 | 442 | 442 | 342 |



DCP NO. 0.6
 CBR 389

Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : G. van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

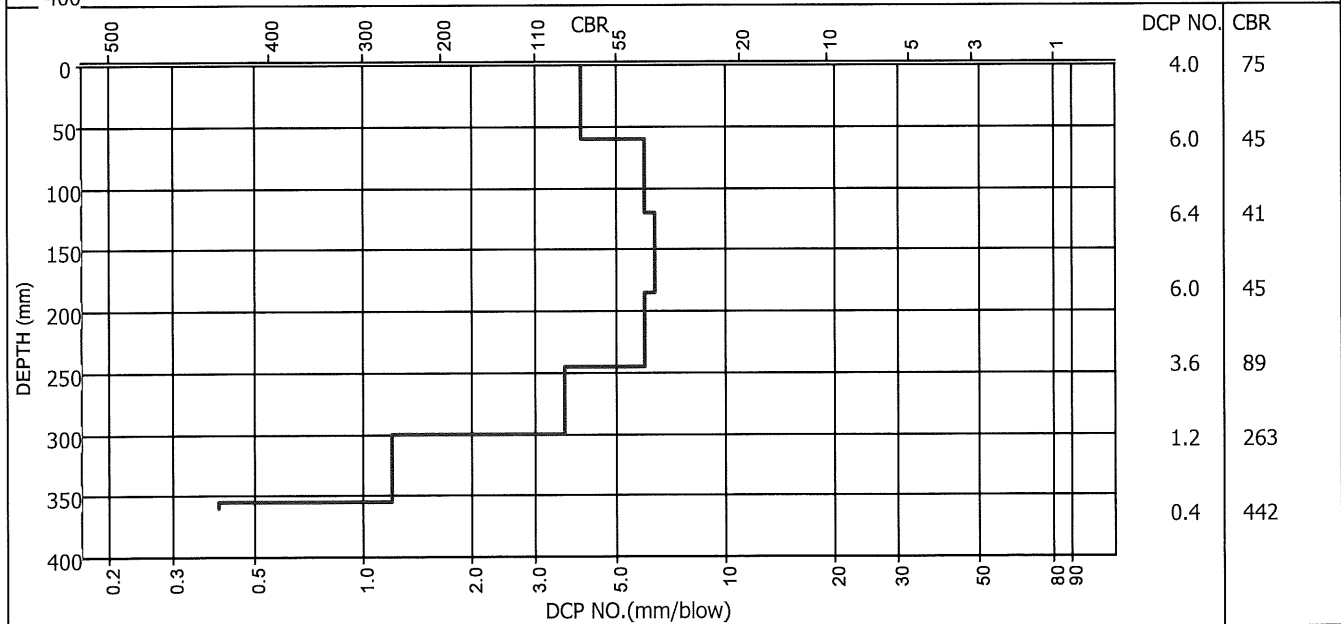
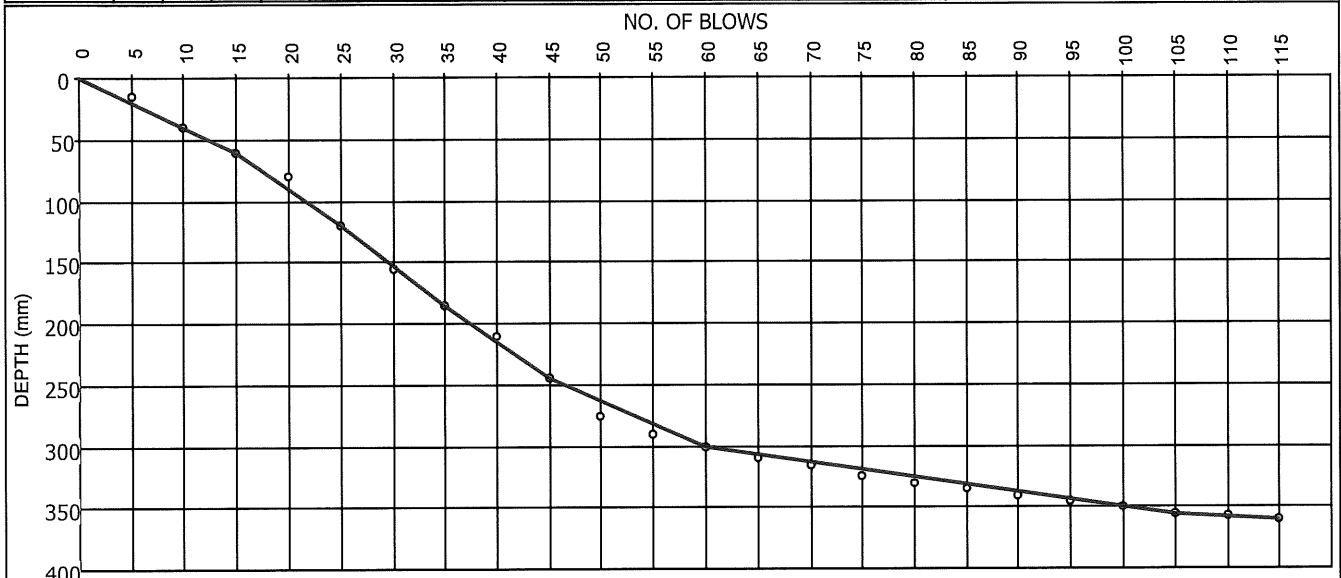
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 013224 - X 2563467
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 48 - RHS

INITIAL DEPTH (mm) : 0

| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | | |
|-------|-----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| DEPTH | 15 | 40 | 60 | 80 | 120 | 155 | 185 | 210 | 245 | 275 | 290 | 300 | 310 | 315 | 325 | 330 | 335 | 340 | 345 | 350 | 355 | 357 | 360 | | |
| CBR | 110 | 55 | 75 | 75 | 30 | 35 | 45 | 55 | 35 | 45 | 110 | 170 | 170 | 300 | 170 | 300 | 300 | 300 | 300 | 300 | 300 | 442 | 389 | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory: / K.Z Mlambo

SGS MATROLAB (PTY) LTD
 - CIVIL ENGINEERING SERVICES -
 Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587
 a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137581302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

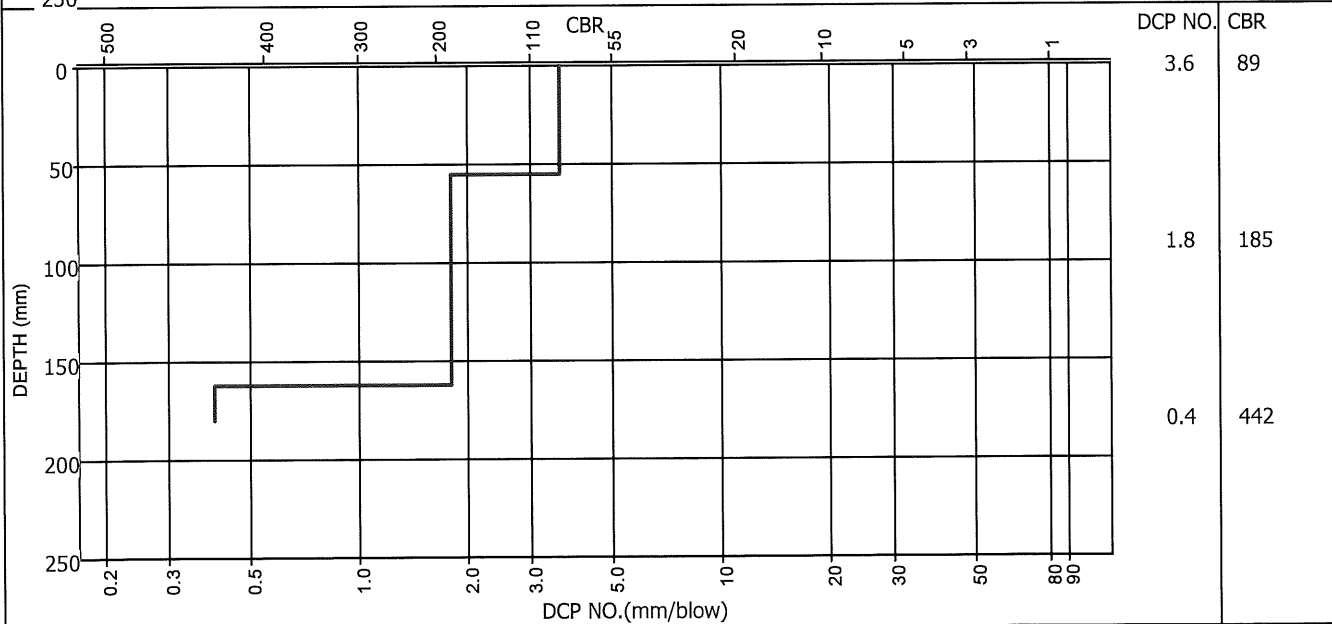
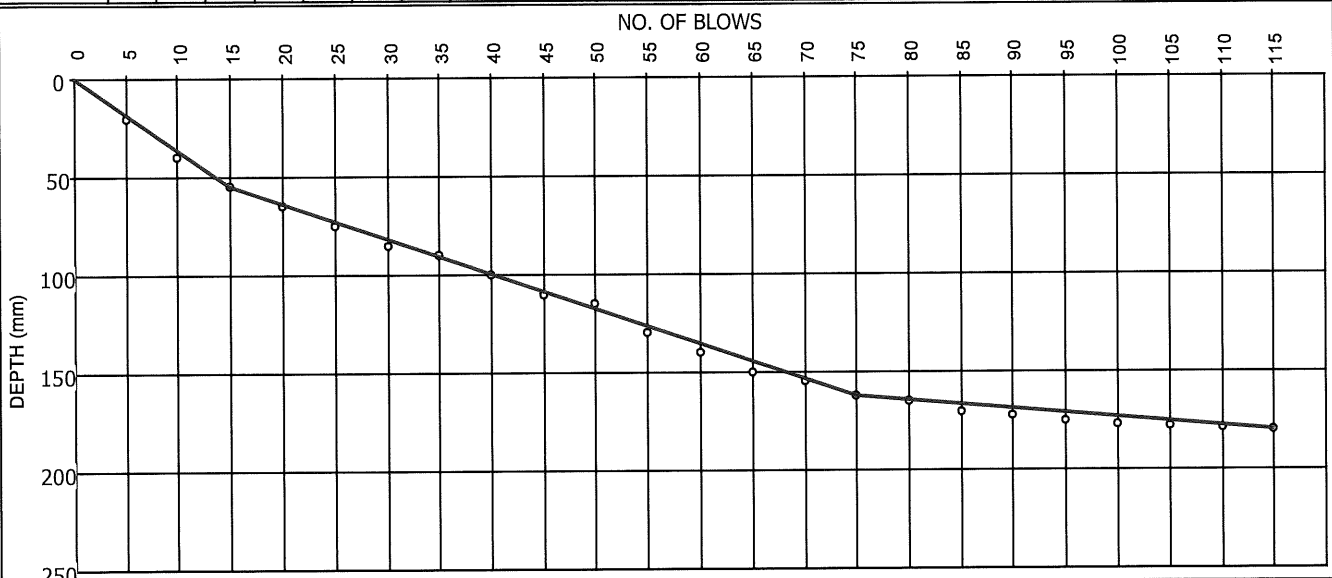
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 012106 - X 2563090
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 50 - RHS

INITIAL DEPTH (mm) : 0

| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 |
|-------|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| DEPTH | 20 | 40 | 55 | 65 | 75 | 85 | 90 | 100 | 110 | 115 | 130 | 140 | 150 | 155 | 162 | 165 | 170 | 172 | 175 | 177 | 178 | 179 | 180 |
| CBR | 75 | 75 | 110 | 170 | 170 | 170 | 300 | 170 | 170 | 300 | 110 | 170 | 170 | 300 | 232 | 389 | 300 | 442 | 389 | 442 | 500 | 500 | 500 |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Gerrit van Rooyen / K.Z Mlambo

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SGS MATROLAB (PTY) LTD
 - CIVIL ENGINEERING SERVICES -
 Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137581302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

a SANAS Accredited Testing Laboratory, No. T0865

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maahe

Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 011325 - X 2563308

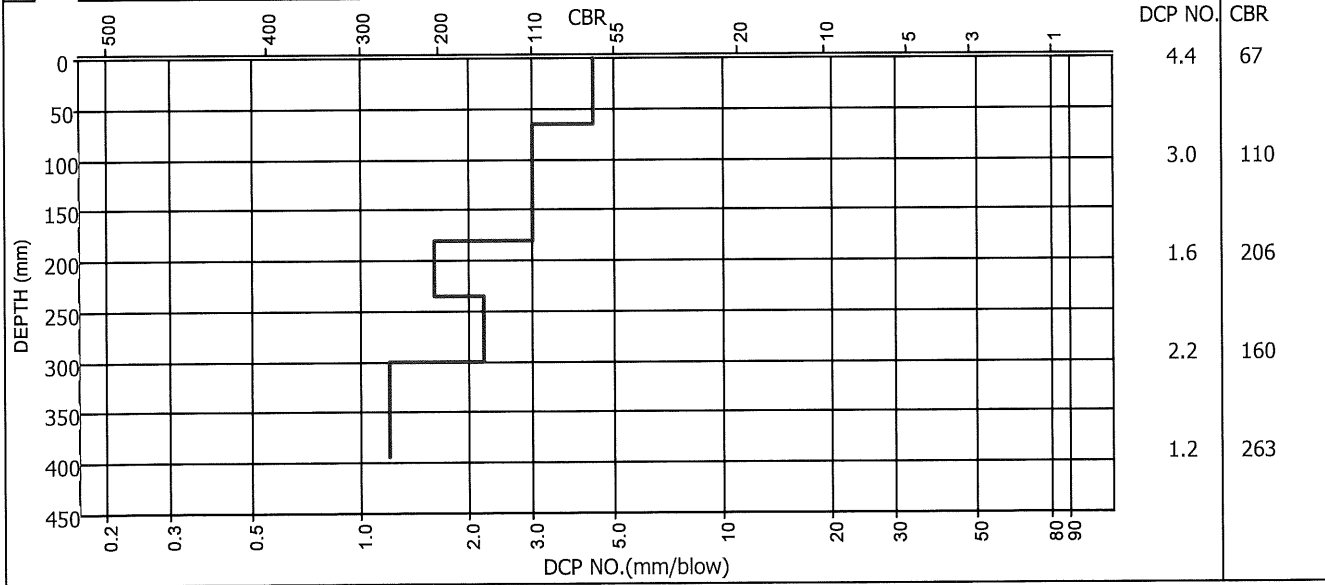
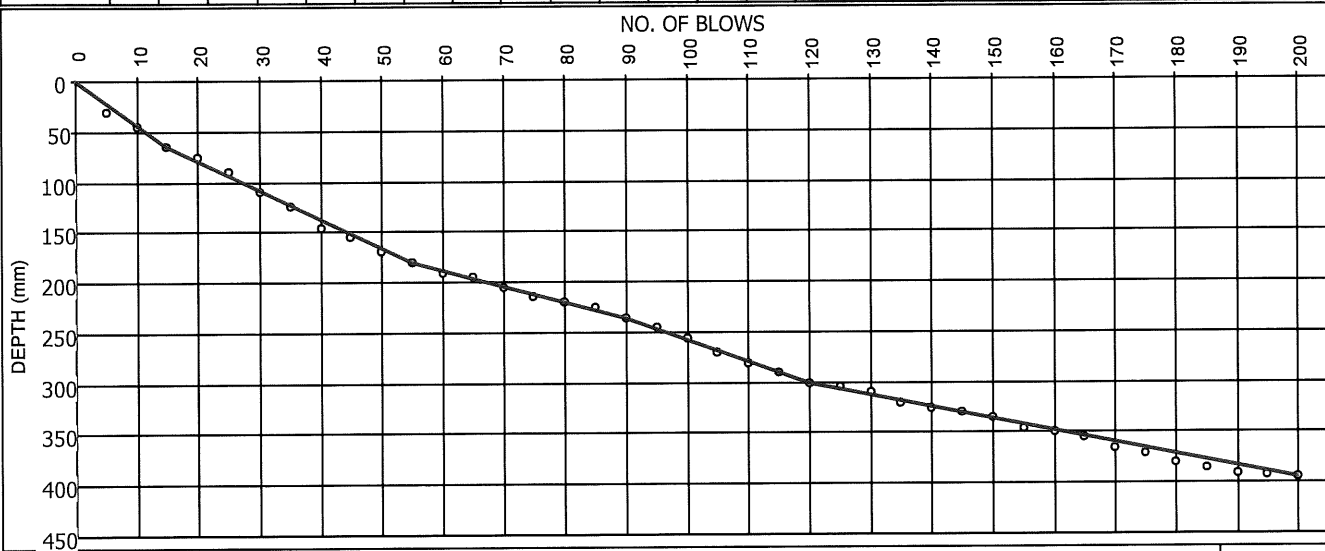
Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 51 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 30 | 45 | 65 | 75 | 90 | 110 | 125 | 145 | 155 | 170 | 180 | 190 | 195 | 205 | 215 | 220 | 225 | 235 | 245 | 255 | 270 | 280 | 290 | 300 | 305 |
| CBR | 45 | 110 | 75 | 170 | 110 | 75 | 110 | 75 | 170 | 110 | 170 | 170 | 300 | 170 | 170 | 300 | 300 | 170 | 170 | 170 | 110 | 170 | 170 | 170 | 300 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | | | | | | | | | | |
| DEPTH | 310 | 320 | 325 | 330 | 335 | 345 | 350 | 355 | 365 | 370 | 380 | 385 | 390 | 392 | 394 | | | | | | | | | | |
| CBR | 300 | 170 | 300 | 300 | 300 | 170 | 300 | 300 | 170 | 300 | 170 | 300 | 300 | 442 | 442 | | | | | | | | | | |



Remarks :

FORM: ST6

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Technical Signatory: G.T. van Rooyen / K.Z. Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

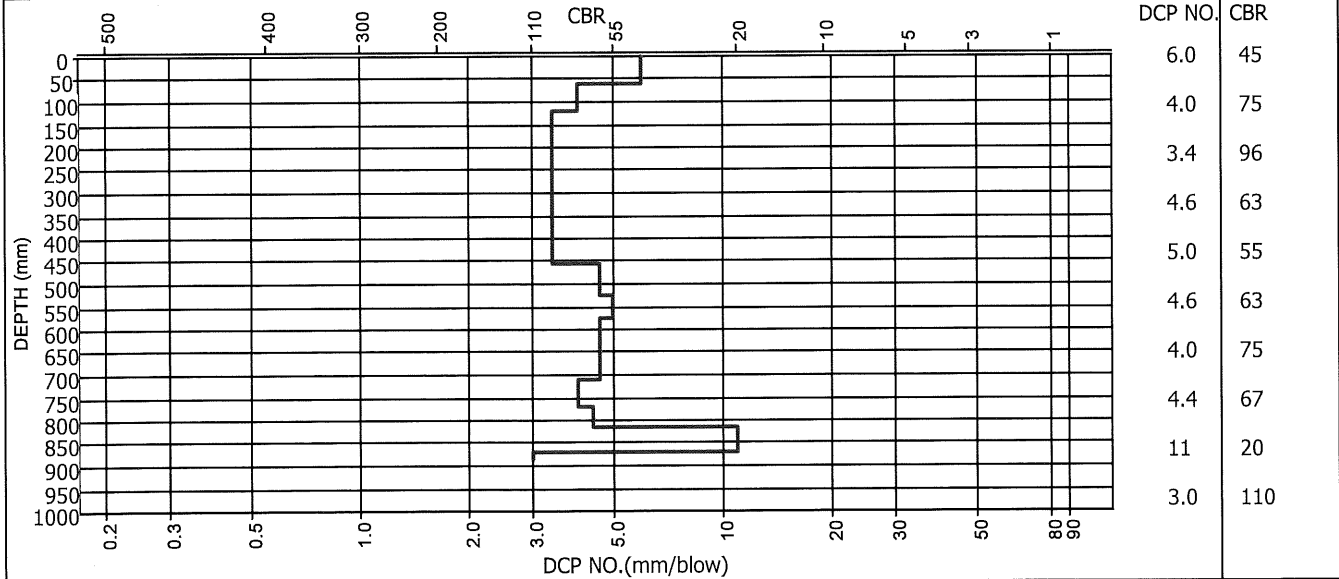
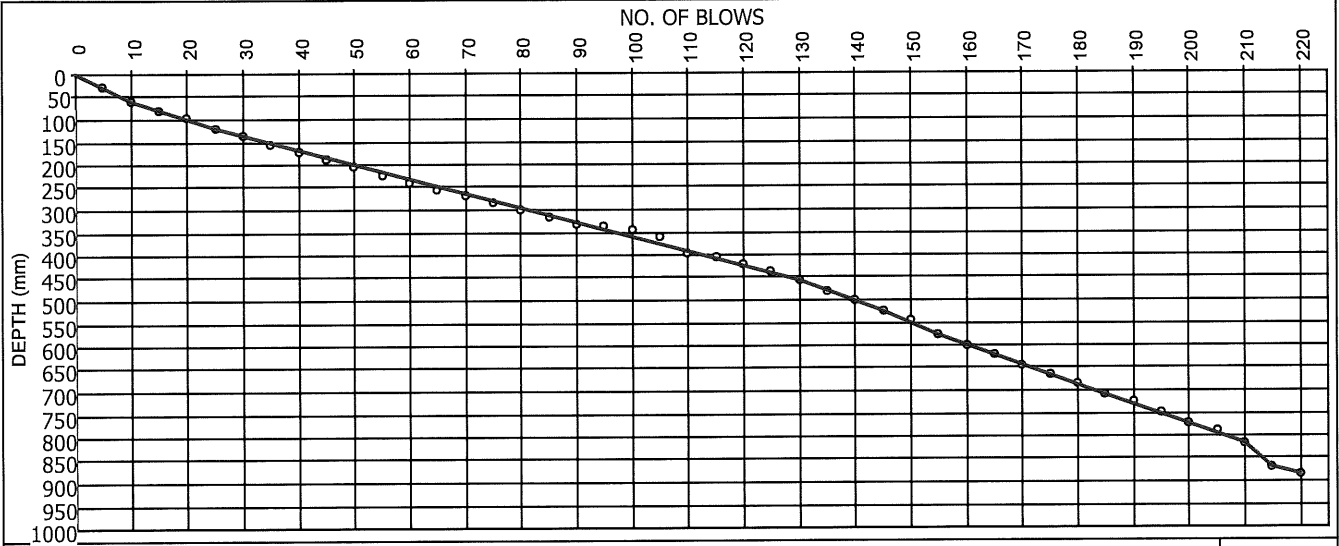
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 010898 - X 2563414
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 52 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 30 | 60 | 80 | 95 | 120 | 135 | 155 | 170 | 190 | 205 | 225 | 240 | 255 | 270 | 285 | 300 | 315 | 330 | 335 | 345 | 360 | 395 | 405 | 420 | 435 |
| CBR | 45 | 45 | 75 | 110 | 55 | 110 | 75 | 110 | 75 | 110 | 75 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 300 | 170 | 110 | 35 | 170 | 110 | 110 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | | | | | | |
| DEPTH | 455 | 480 | 500 | 525 | 545 | 575 | 600 | 620 | 645 | 665 | 685 | 710 | 725 | 750 | 770 | 790 | 815 | 870 | 885 | | | | | | |
| CBR | 75 | 55 | 75 | 55 | 75 | 45 | 55 | 75 | 55 | 75 | 75 | 55 | 110 | 55 | 75 | 75 | 55 | 20 | 110 | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

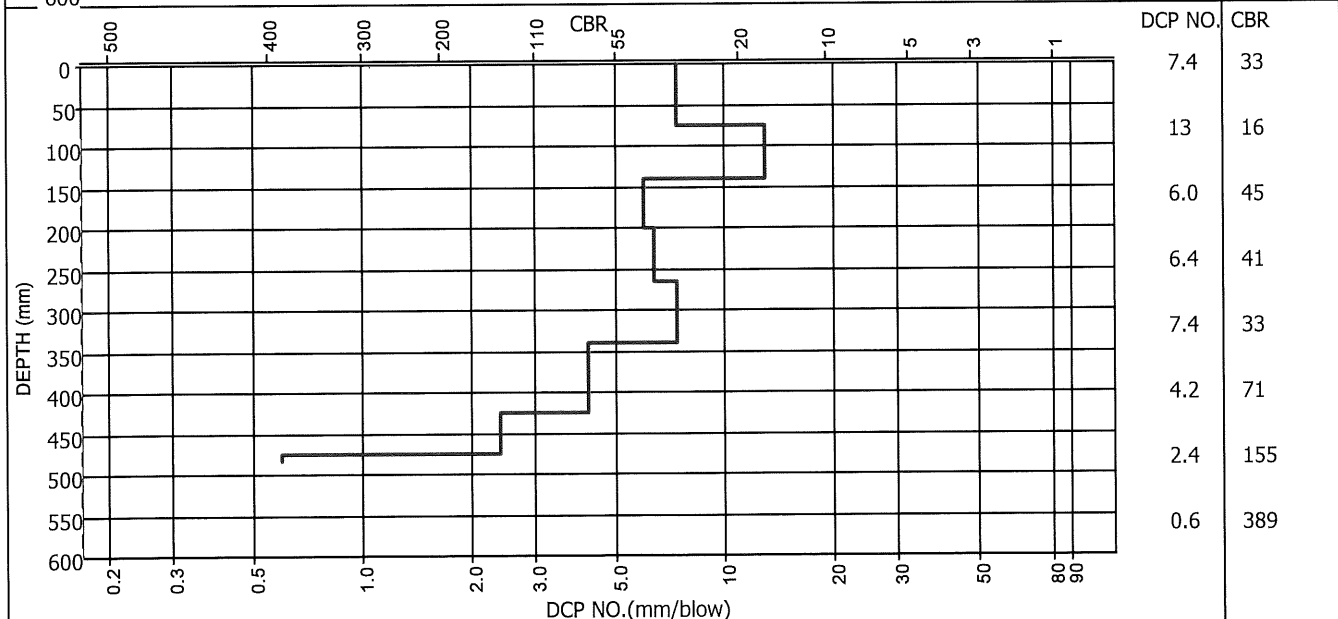
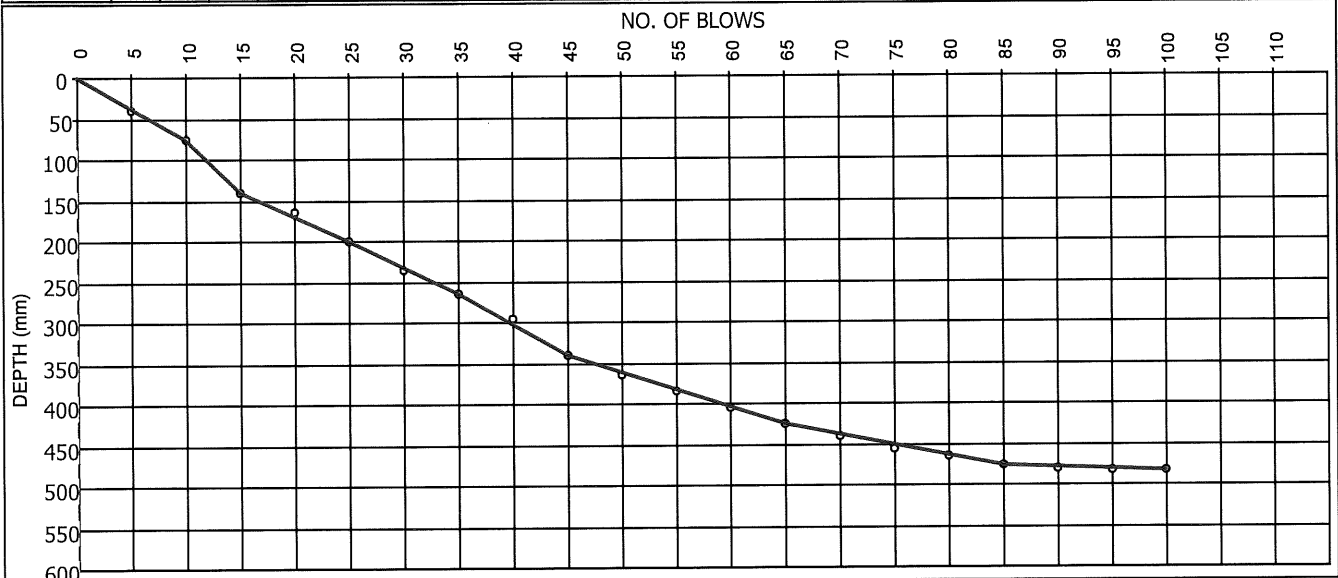
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 010418 - X 2563243
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 53 - LHS

INITIAL DEPTH (mm) : 0

| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | | | | | | | | | | | | | | | | | | |
|-------|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DEPTH | 40 | 75 | 140 | 165 | 200 | 235 | 265 | 295 | 340 | 365 | 385 | 405 | 425 | 440 | 455 | 465 | 475 | 480 | 482 | 483 | | | | | | | | | | | | | | | | | | |
| CBR | 30 | 35 | 16 | 55 | 35 | 35 | 45 | 45 | 25 | 55 | 75 | 75 | 75 | 110 | 110 | 170 | 170 | 300 | 442 | 500 | | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : DT van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

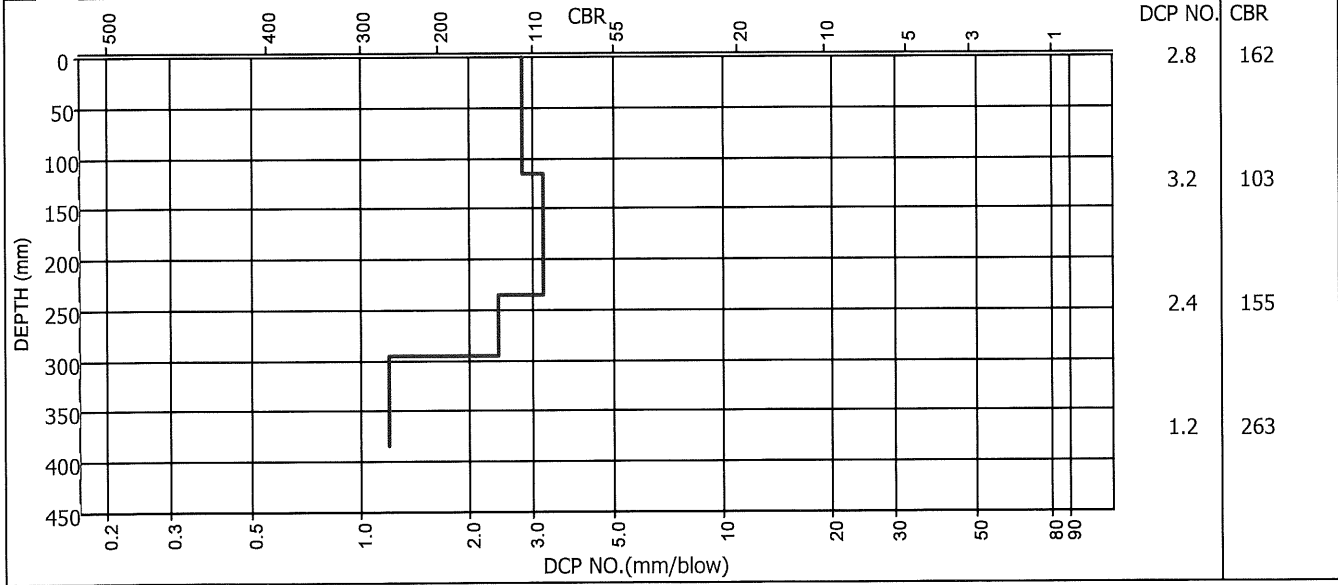
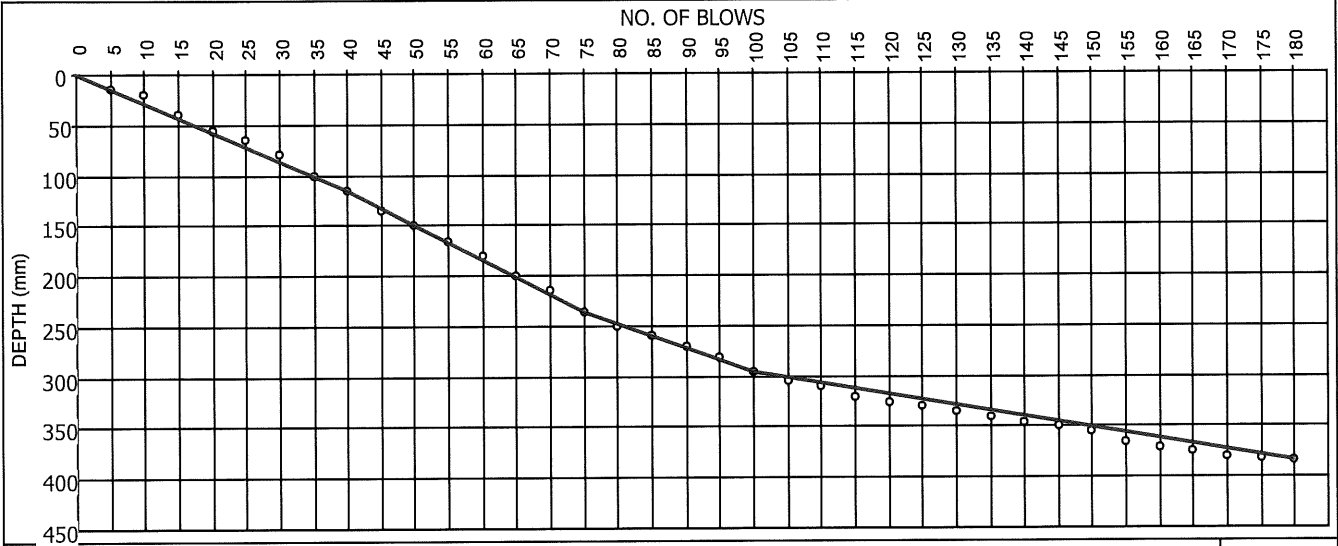
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 009547 - X 2563089
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 54 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 15 | 20 | 40 | 55 | 65 | 80 | 100 | 115 | 135 | 150 | 165 | 180 | 200 | 215 | 235 | 250 | 260 | 270 | 280 | 295 | 305 | 310 | 320 | 325 | 330 |
| CBR | 110 | 300 | 75 | 110 | 170 | 110 | 75 | 110 | 75 | 110 | 110 | 75 | 110 | 110 | 75 | 110 | 170 | 170 | 170 | 110 | 170 | 300 | 170 | 300 | 300 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | | | | | | | | | | | | | | |
| DEPTH | 335 | 340 | 345 | 350 | 355 | 365 | 370 | 375 | 380 | 382 | 384 | | | | | | | | | | | | | | |
| CBR | 300 | 300 | 300 | 300 | 300 | 170 | 300 | 300 | 300 | 442 | 442 | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

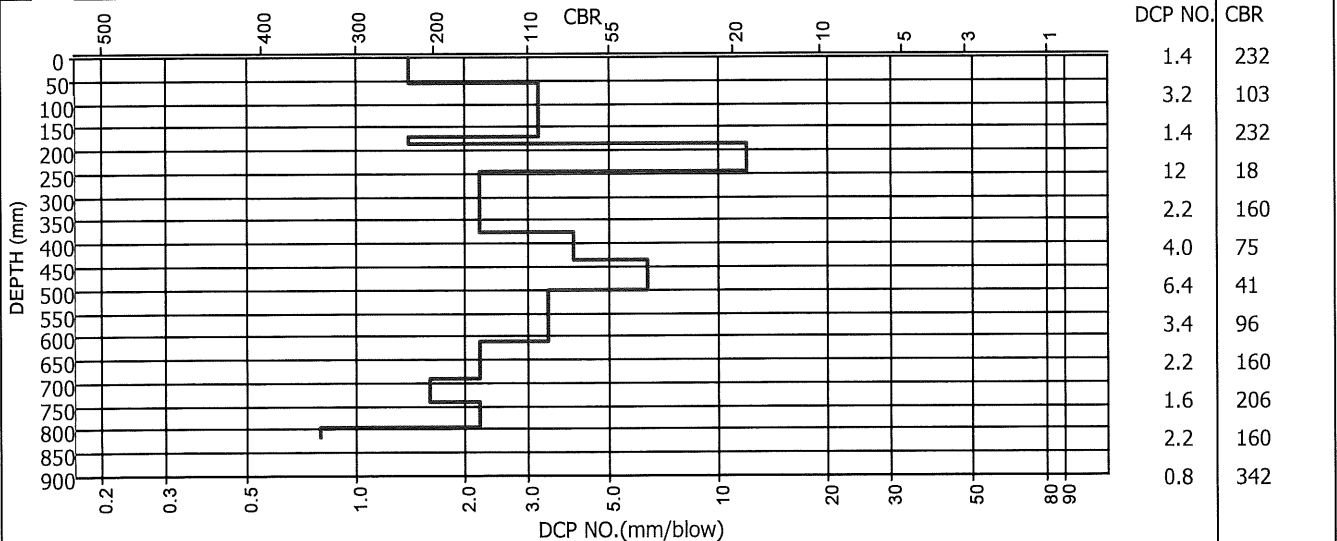
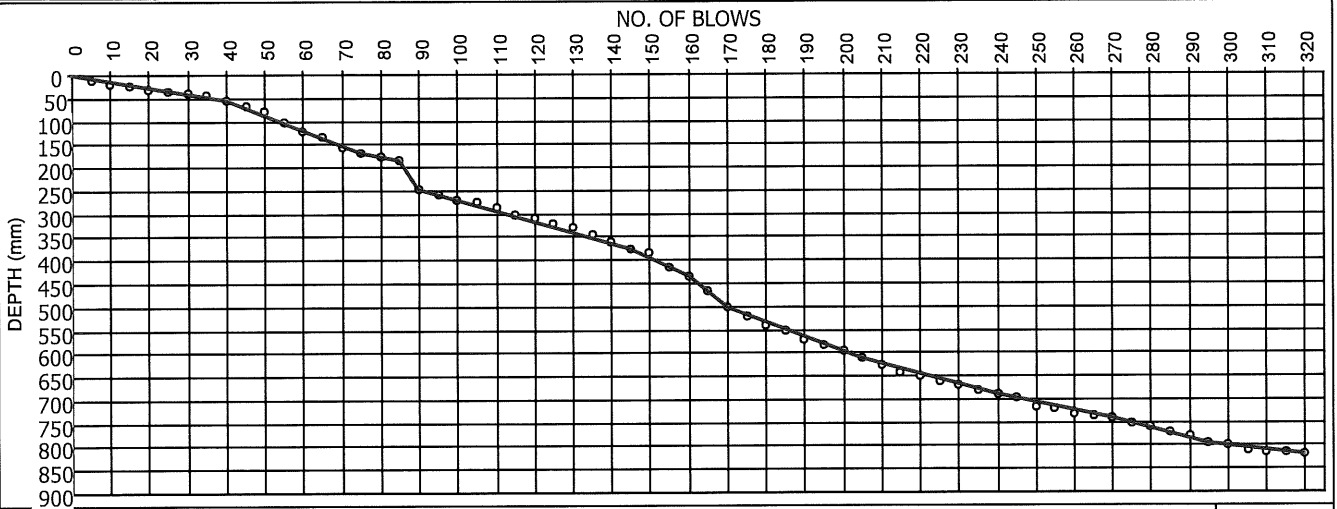
Project : Proposed New Shangoni Gate
 : R/CL 31 Y 009195 - X 2562978
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 55 - CL

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 10 | 20 | 25 | 30 | 35 | 40 | 45 | 55 | 65 | 80 | 100 | 120 | 135 | 155 | 170 | 175 | 185 | 245 | 260 | 270 | 275 | 285 | 300 | 310 | 320 |
| CBR | 170 | 170 | 300 | 300 | 300 | 300 | 300 | 170 | 170 | 110 | 75 | 75 | 110 | 75 | 110 | 300 | 170 | 110 | 110 | 170 | 300 | 170 | 110 | 110 | 170 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | 245 | 250 |
| DEPTH | 330 | 345 | 360 | 375 | 385 | 415 | 435 | 465 | 500 | 520 | 540 | 550 | 570 | 585 | 595 | 610 | 625 | 640 | 650 | 660 | 670 | 680 | 690 | 695 | 715 |
| CBR | 170 | 110 | 110 | 110 | 170 | 45 | 75 | 45 | 35 | 75 | 75 | 170 | 75 | 110 | 170 | 110 | 110 | 170 | 170 | 170 | 170 | 170 | 300 | 300 | 75 |
| BLOWS | 255 | 260 | 265 | 270 | 275 | 280 | 285 | 290 | 295 | 300 | 305 | 310 | 315 | 320 | | | | | | | | | | | |
| DEPTH | 720 | 730 | 735 | 740 | 750 | 760 | 770 | 780 | 795 | 800 | 810 | 813 | 814 | 816 | | | | | | | | | | | |
| CBR | 300 | 170 | 300 | 300 | 170 | 170 | 170 | 170 | 110 | 300 | 170 | 389 | 500 | 442 | | | | | | | | | | | |



Remarks :

FORM: ST6

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Technical Signatory : G. van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

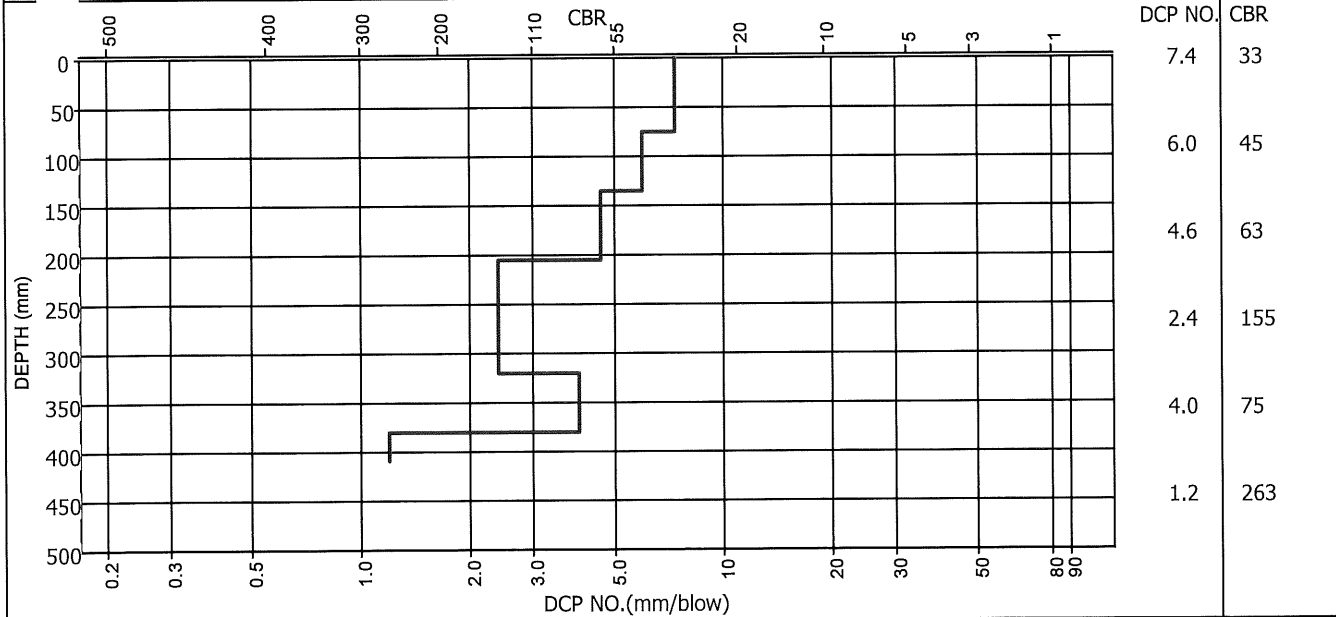
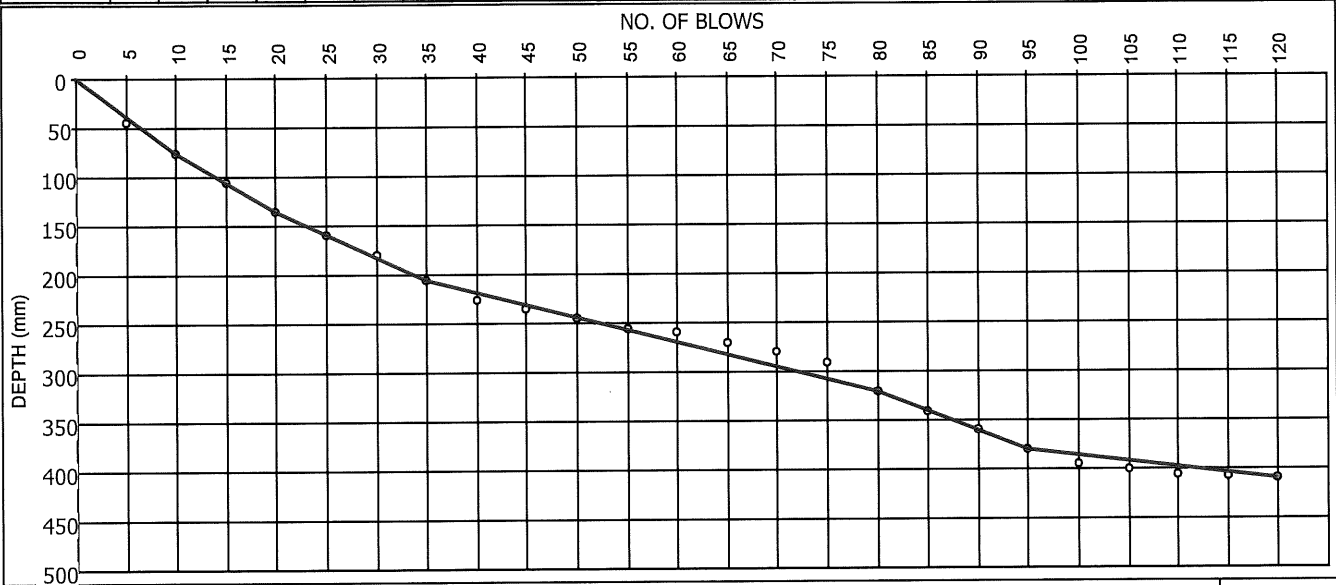
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 008673 - X 2562923
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 56 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 |
| DEPTH | 45 | 75 | 105 | 135 | 160 | 180 | 205 | 225 | 235 | 245 | 255 | 260 | 270 | 280 | 290 | 320 | 340 | 360 | 380 | 395 | 400 | 405 | 407 | 409 |
| CBR | 25 | 45 | 45 | 45 | 55 | 75 | 55 | 75 | 170 | 170 | 170 | 300 | 170 | 170 | 170 | 45 | 75 | 75 | 75 | 110 | 300 | 300 | 442 | 442 |



Remarks :

FORM: ST6

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

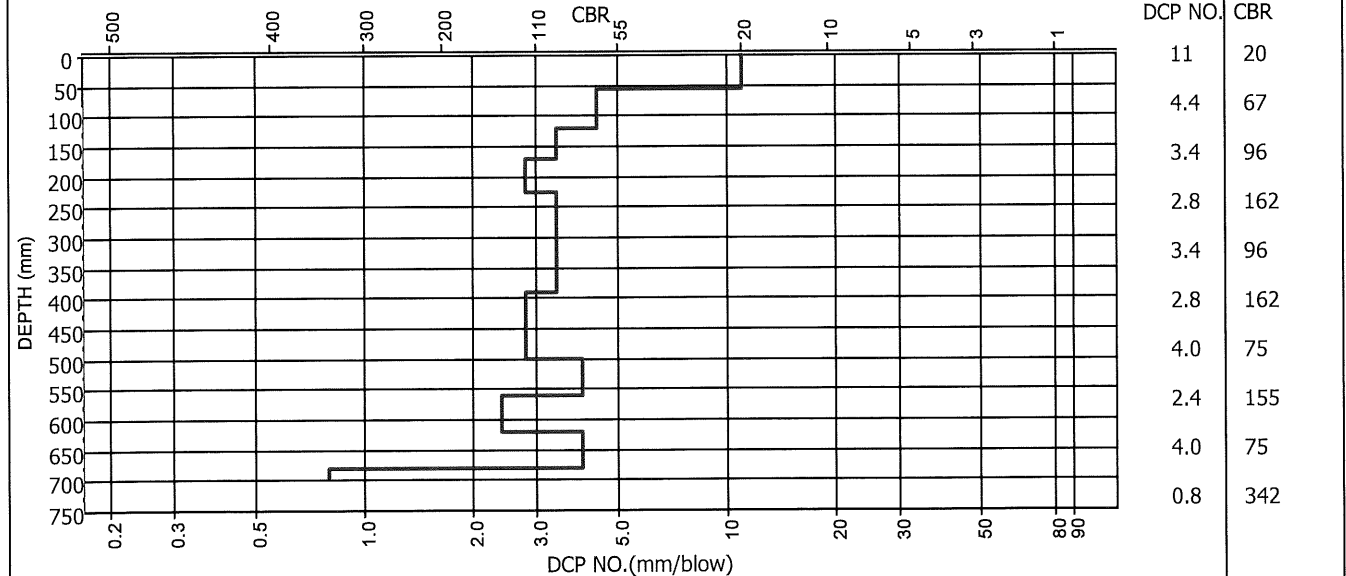
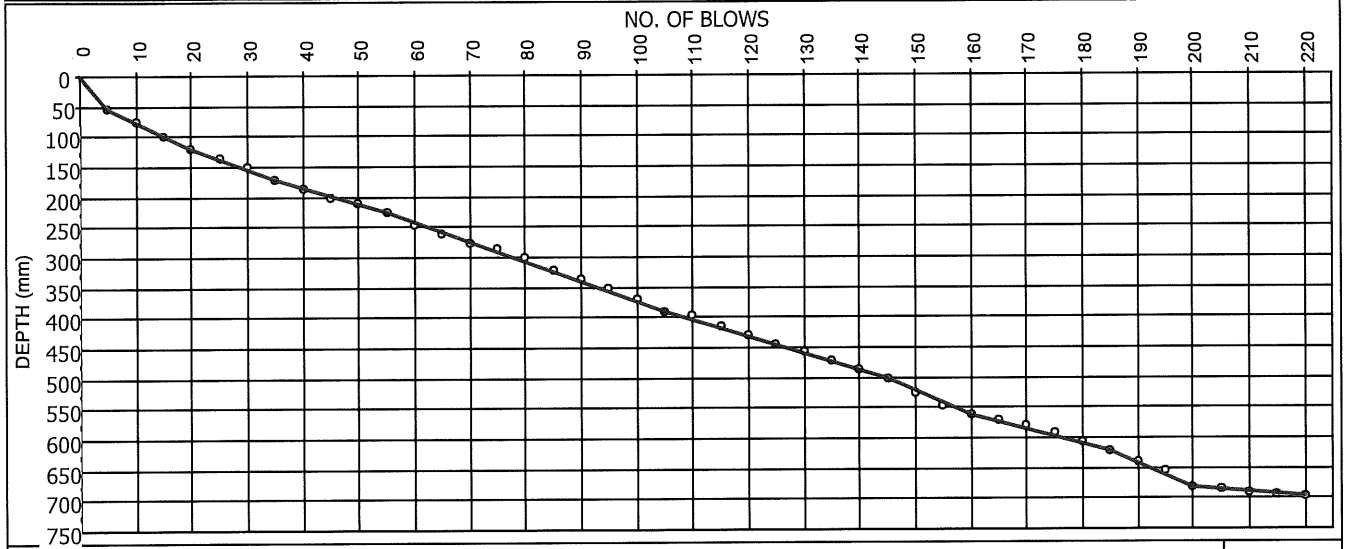
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 008235 - X 2562910
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 57 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 55 | 75 | 100 | 120 | 135 | 150 | 170 | 185 | 200 | 210 | 225 | 245 | 260 | 275 | 285 | 300 | 320 | 335 | 350 | 370 | 390 | 395 | 415 | 430 | 445 |
| CBR | 20 | 75 | 55 | 75 | 110 | 110 | 75 | 110 | 110 | 170 | 110 | 75 | 110 | 110 | 170 | 110 | 75 | 110 | 110 | 75 | 110 | 300 | 75 | 110 | 110 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | | | | | | |
| DEPTH | 455 | 470 | 485 | 500 | 525 | 545 | 560 | 570 | 580 | 590 | 605 | 620 | 640 | 655 | 680 | 685 | 690 | 693 | 695 | | | | | | |
| CBR | 170 | 110 | 110 | 110 | 55 | 75 | 110 | 170 | 170 | 170 | 110 | 110 | 75 | 110 | 55 | 300 | 300 | 389 | 442 | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory: G.T. van Rooyen / K.Z. Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

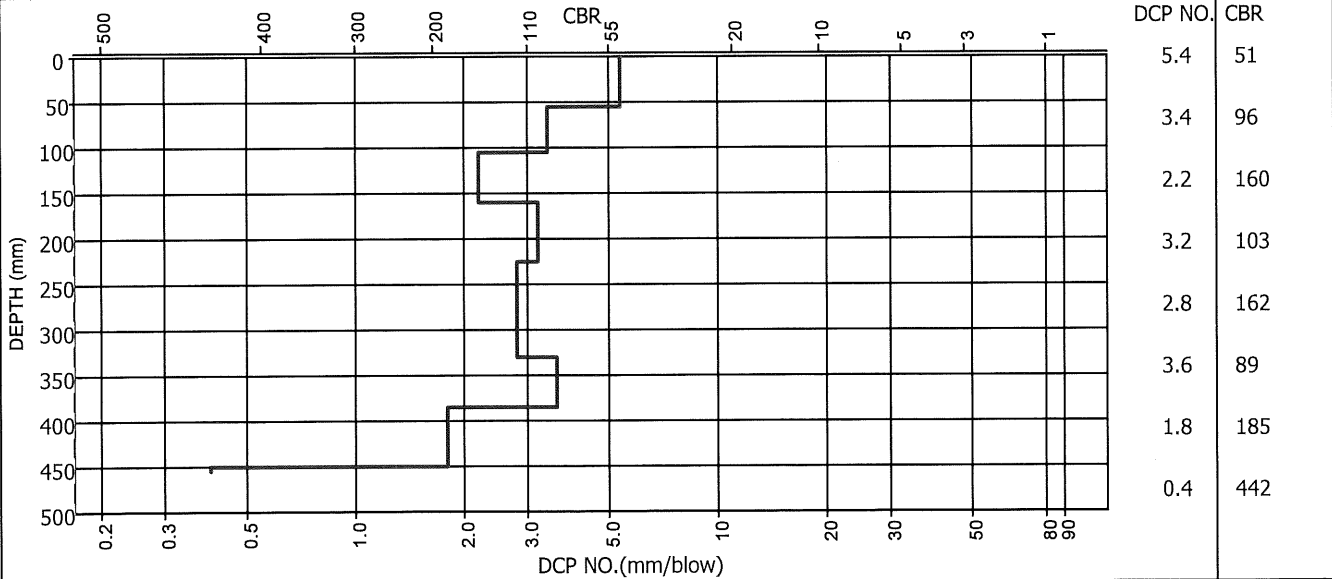
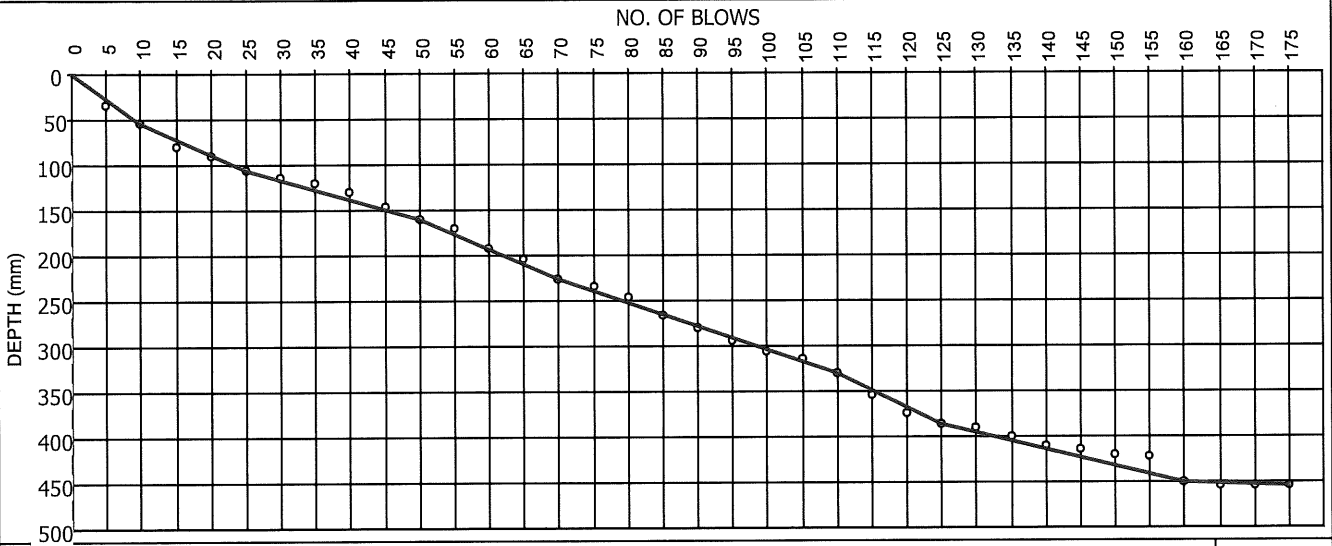
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 007699 - X 2562735
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 58 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 35 | 55 | 80 | 90 | 105 | 115 | 120 | 130 | 145 | 160 | 170 | 192 | 204 | 225 | 235 | 245 | 265 | 280 | 295 | 305 | 315 | 330 | 355 | 375 | 385 |
| CBR | 35 | 75 | 55 | 170 | 110 | 170 | 300 | 170 | 110 | 110 | 170 | 67 | 155 | 71 | 170 | 170 | 75 | 110 | 110 | 170 | 170 | 110 | 55 | 75 | 170 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | | | | | | | | | | | | | | | |
| DEPTH | 390 | 400 | 410 | 415 | 420 | 422 | 450 | 453 | 454 | 455 | | | | | | | | | | | | | | | |
| CBR | 300 | 170 | 170 | 300 | 300 | 442 | 49 | 389 | 500 | 500 | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : GT van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

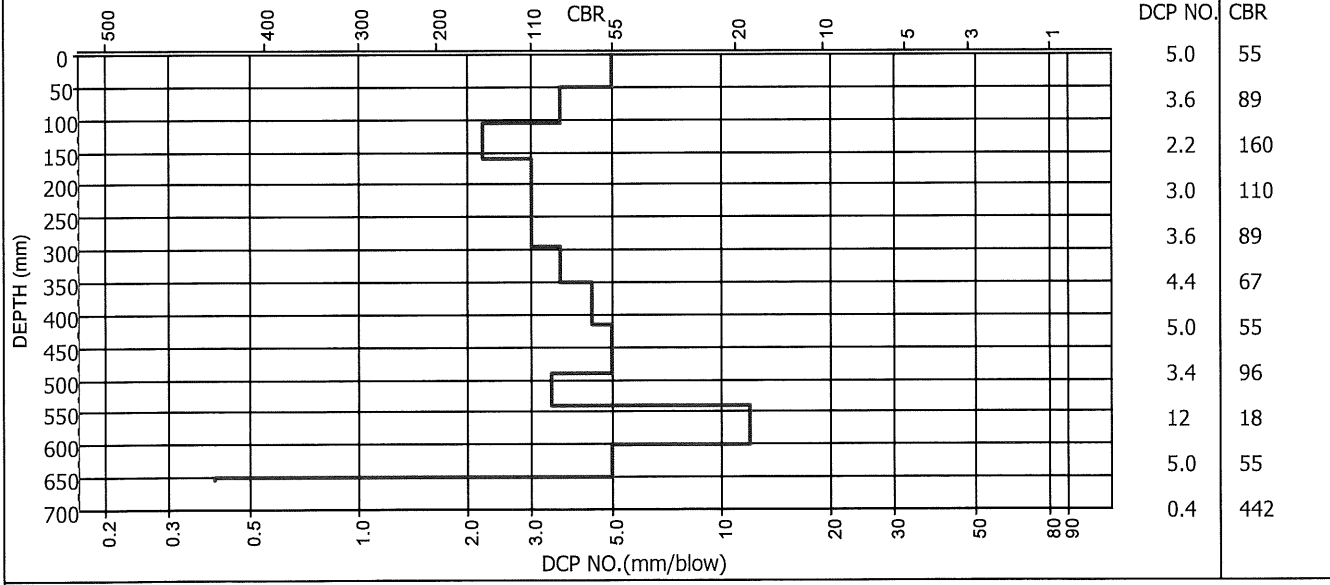
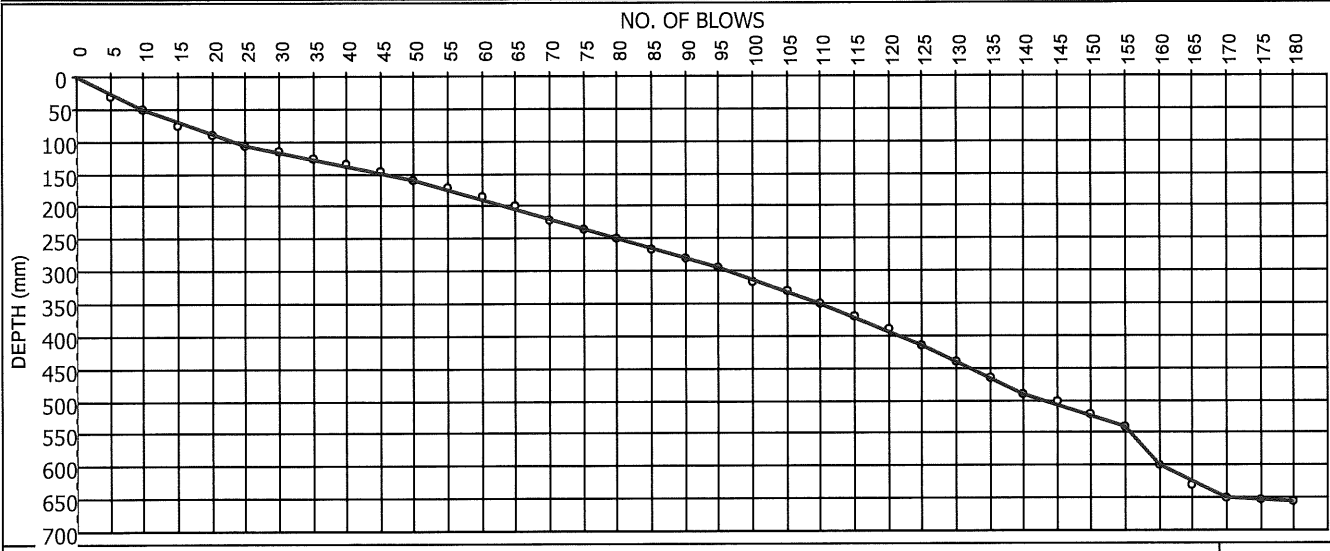
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 007248 - X 2562735
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 59 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 30 | 50 | 75 | 90 | 105 | 115 | 125 | 135 | 145 | 160 | 170 | 185 | 200 | 220 | 235 | 250 | 265 | 280 | 295 | 315 | 330 | 350 | 370 | 390 | 415 |
| CBR | 45 | 75 | 55 | 110 | 110 | 170 | 170 | 170 | 170 | 110 | 110 | 110 | 110 | 75 | 110 | 110 | 110 | 110 | 110 | 75 | 110 | 75 | 75 | 75 | 55 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | | | | | | | | | | | | | | |
| DEPTH | 440 | 465 | 490 | 500 | 520 | 540 | 600 | 630 | 650 | 652 | 654 | | | | | | | | | | | | | | |
| CBR | 55 | 55 | 55 | 170 | 75 | 75 | 18 | 45 | 75 | 442 | 442 | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Gerrit van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

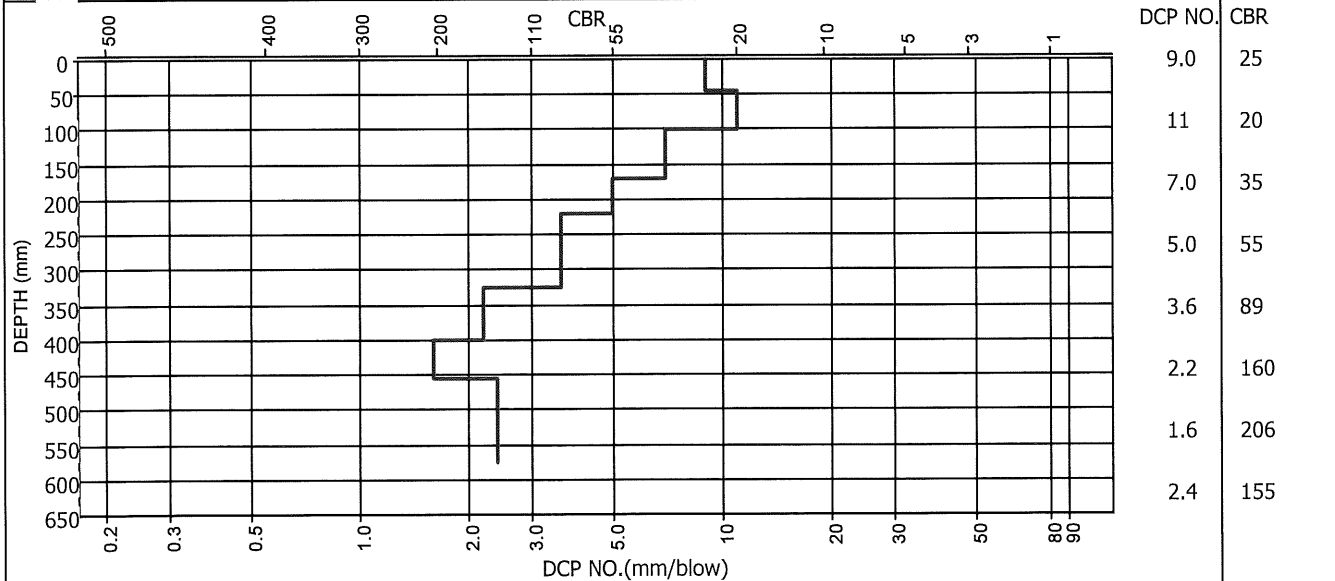
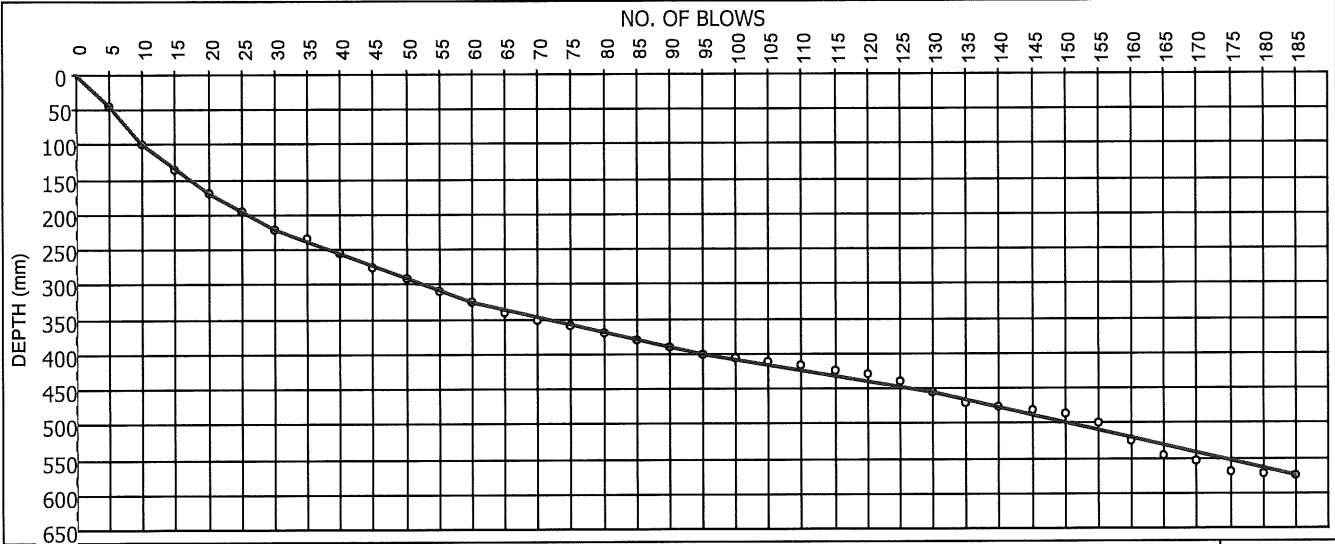
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 006896 - X 2562733
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 60 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 45 | 100 | 135 | 170 | 195 | 220 | 235 | 255 | 275 | 290 | 310 | 325 | 340 | 350 | 360 | 370 | 380 | 390 | 400 | 405 | 410 | 415 | 425 | 430 | 440 |
| CBR | 25 | 20 | 35 | 35 | 55 | 55 | 110 | 75 | 75 | 110 | 75 | 110 | 110 | 170 | 170 | 170 | 170 | 170 | 170 | 300 | 300 | 300 | 170 | 300 | 170 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | | | | | | | | | | | | | |
| DEPTH | 455 | 470 | 475 | 480 | 485 | 500 | 525 | 545 | 555 | 570 | 573 | 575 | | | | | | | | | | | | | |
| CBR | 110 | 110 | 300 | 300 | 300 | 110 | 55 | 75 | 170 | 110 | 389 | 442 | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : / K.Z Mlambo

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SGS MATROLAB (PTY) LTD
 - CIVIL ENGINEERING SERVICES -
 Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587
 a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137581302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogoo Maake

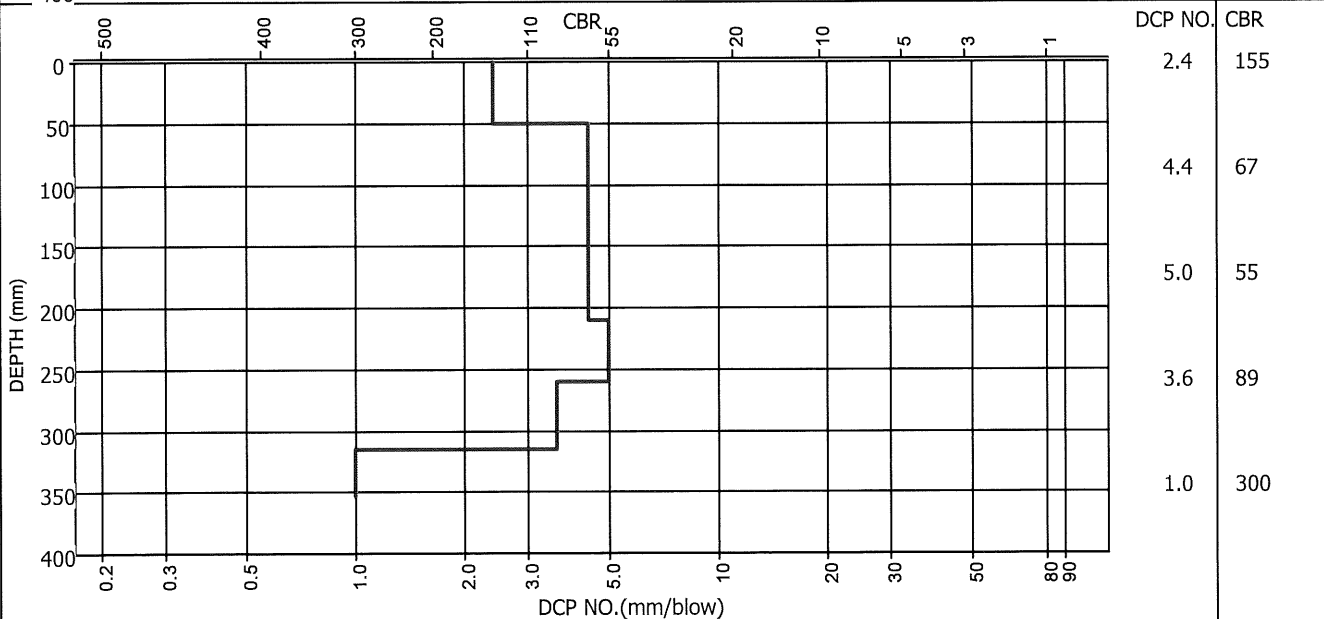
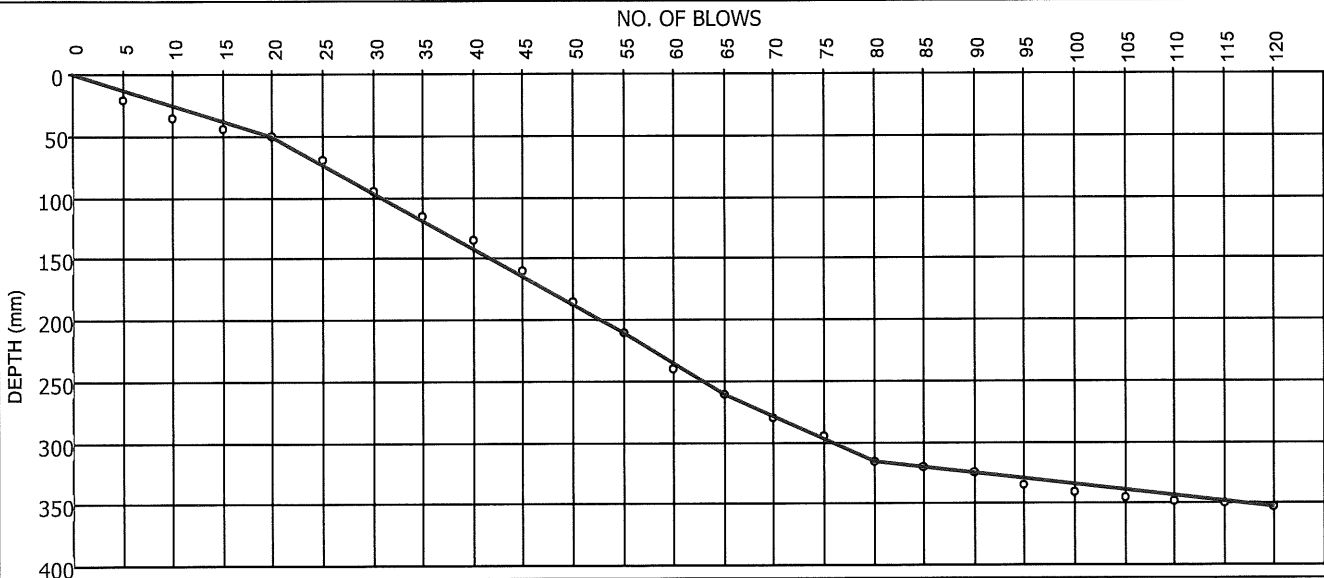
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 005330 - X 2563215
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 62 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|----|-----|-----|-----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 |
| DEPTH | 20 | 35 | 45 | 50 | 70 | 95 | 115 | 135 | 160 | 185 | 210 | 240 | 260 | 280 | 295 | 315 | 320 | 325 | 335 | 340 | 345 | 348 | 350 | 353 |
| CBR | 75 | 110 | 170 | 300 | 75 | 55 | 75 | 75 | 55 | 55 | 45 | 75 | 75 | 75 | 110 | 75 | 300 | 300 | 170 | 300 | 300 | 389 | 442 | 389 |



Remarks :

FORM: ST6

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Technical Signatory : / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

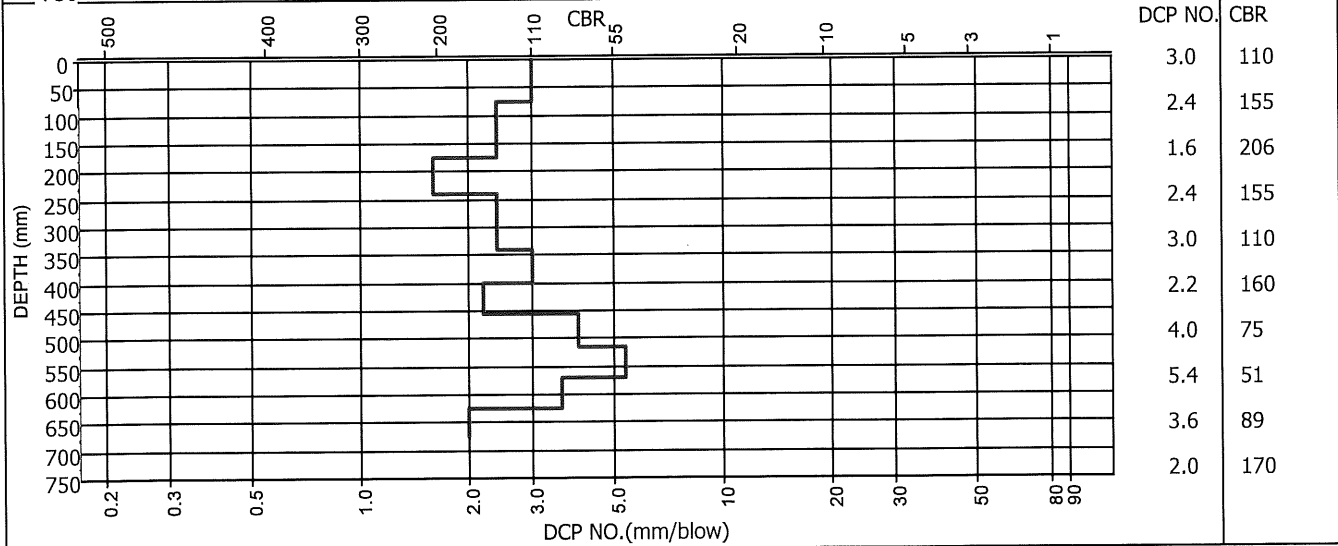
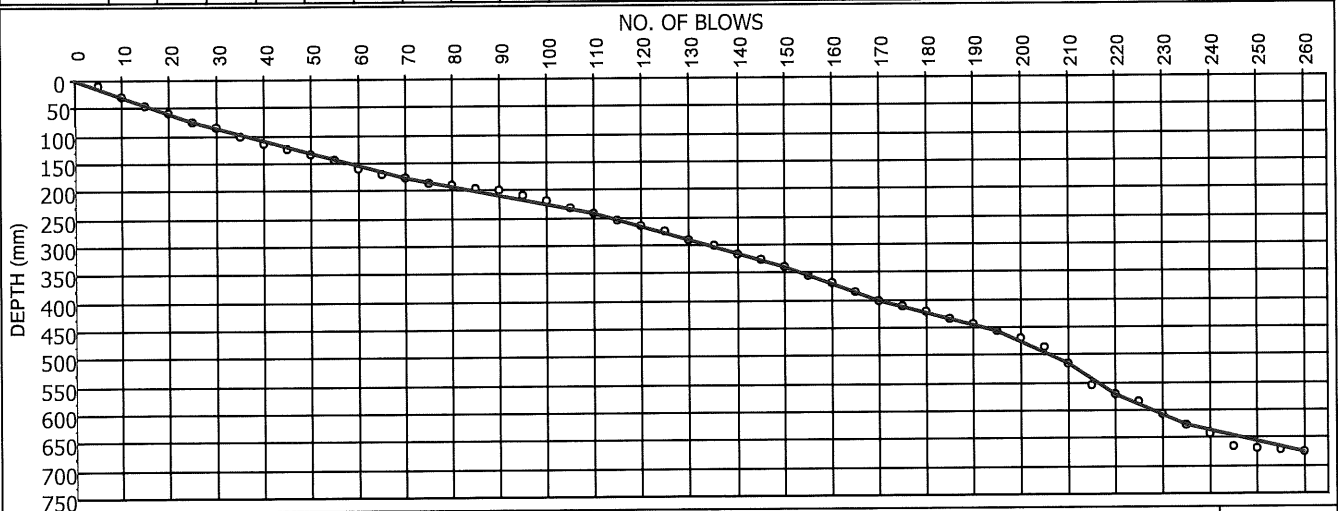
Project : Proposed New Shangoni Gate
 : R/CL 31 Y 004862 - X 2563423
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 63 - CL

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 10 | 30 | 45 | 60 | 75 | 85 | 100 | 115 | 125 | 135 | 145 | 160 | 170 | 175 | 185 | 190 | 195 | 200 | 210 | 220 | 230 | 240 | 255 | 265 | 275 |
| CBR | 170 | 75 | 110 | 110 | 110 | 170 | 110 | 110 | 170 | 170 | 170 | 110 | 170 | 300 | 170 | 300 | 300 | 300 | 170 | 170 | 170 | 170 | 110 | 170 | 170 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | 245 | 250 |
| DEPTH | 290 | 300 | 315 | 325 | 340 | 355 | 370 | 385 | 400 | 410 | 420 | 435 | 445 | 455 | 470 | 485 | 515 | 554 | 570 | 585 | 605 | 625 | 642 | 665 | 670 |
| CBR | 110 | 170 | 110 | 170 | 110 | 110 | 110 | 110 | 110 | 170 | 170 | 110 | 170 | 170 | 110 | 110 | 45 | 31 | 103 | 110 | 75 | 75 | 96 | 63 | 300 |
| BLOWS | 255 | 260 | | | | | | | | | | | | | | | | | | | | | | | |
| DEPTH | 673 | 675 | | | | | | | | | | | | | | | | | | | | | | | |
| CBR | 389 | 442 | | | | | | | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

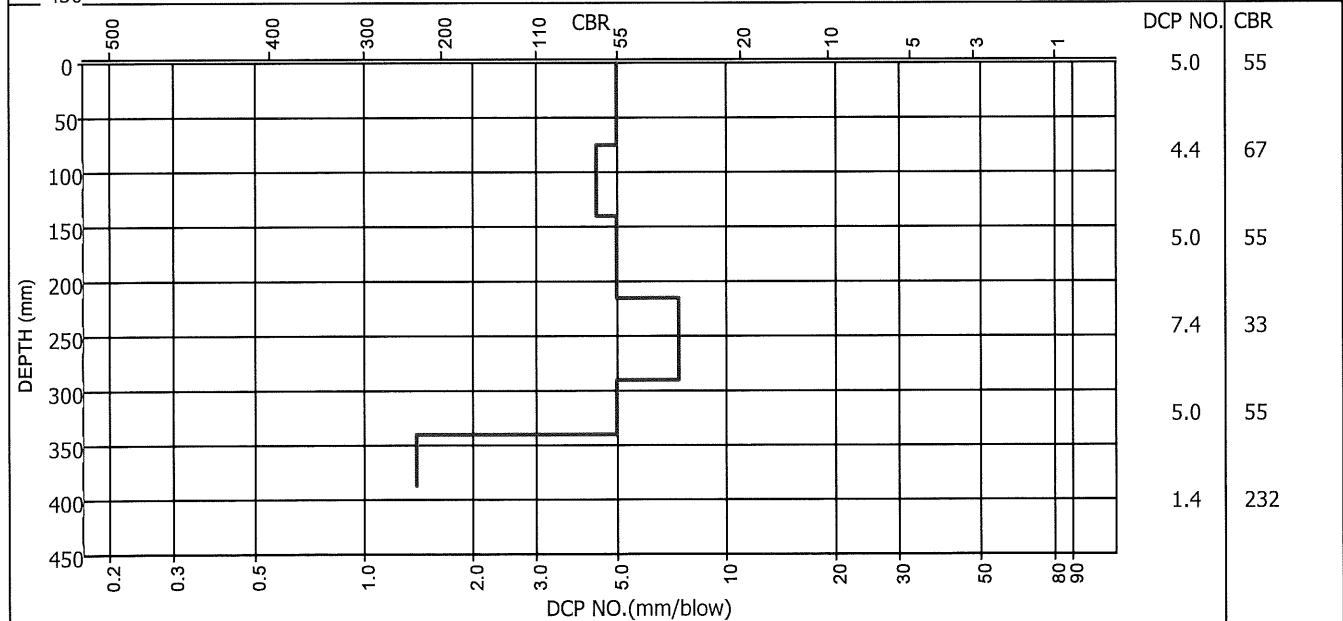
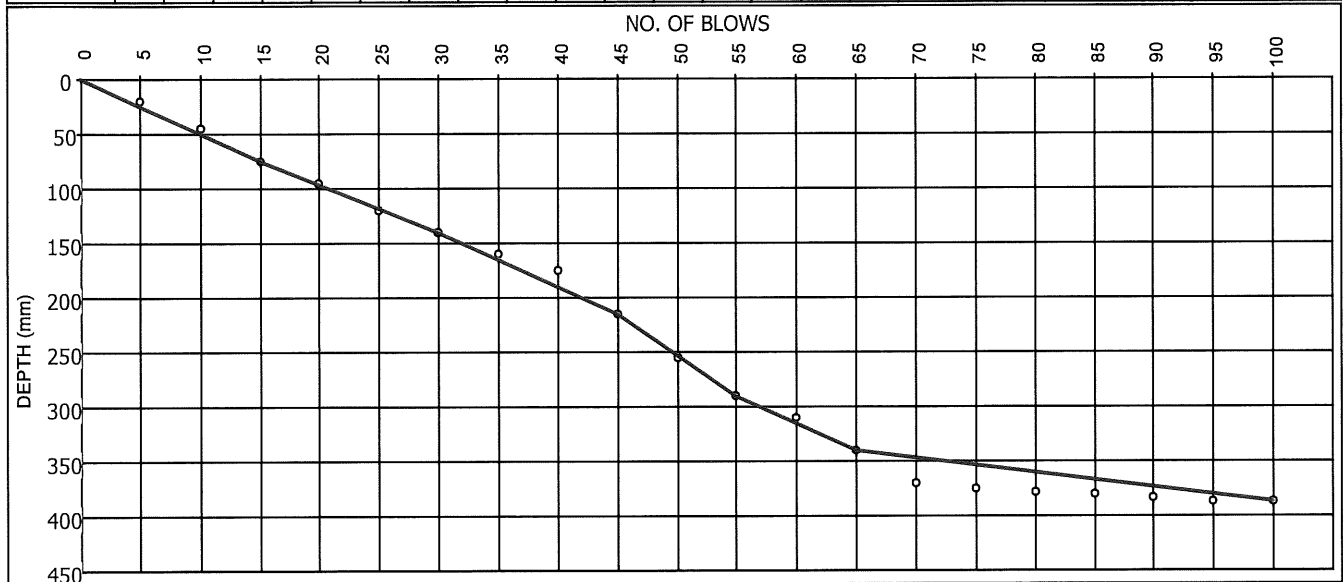
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 004262 - X 2563657
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 64 - LHS

INITIAL DEPTH (mm) : 0

| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
|-------|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| DEPTH | 20 | 45 | 75 | 95 | 120 | 140 | 160 | 175 | 215 | 255 | 290 | 310 | 340 | 370 | 375 | 378 | 380 | 383 | 386 | 387 |
| CBR | 75 | 55 | 45 | 75 | 55 | 75 | 75 | 110 | 30 | 30 | 35 | 75 | 45 | 45 | 300 | 389 | 442 | 389 | 389 | 500 |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 003631 - X 2563789
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

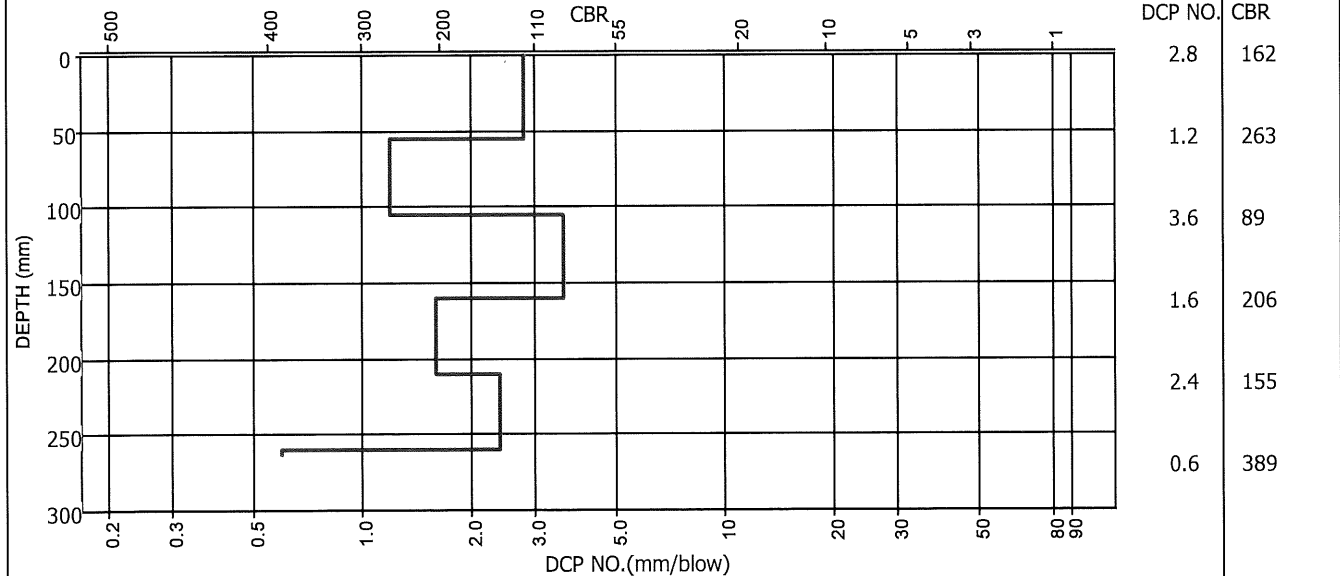
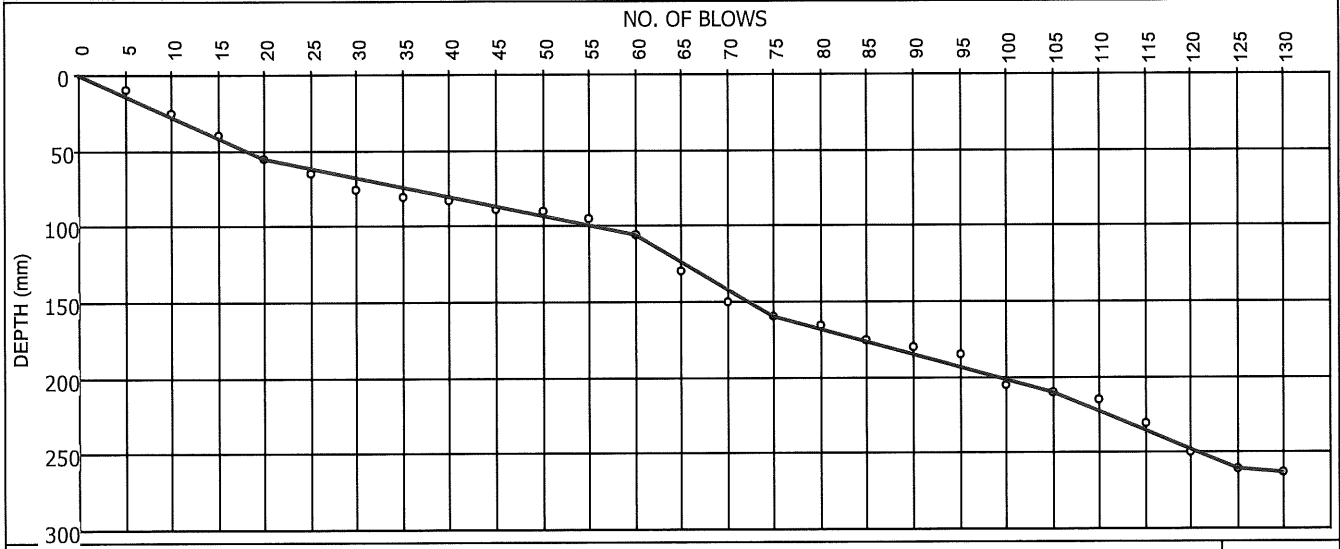
DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 65 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 10 | 25 | 40 | 55 | 65 | 75 | 80 | 83 | 89 | 90 | 95 | 105 | 130 | 150 | 160 | 165 | 175 | 180 | 185 | 205 | 210 | 215 | 230 | 250 | 260 |
| CBR | 170 | 110 | 110 | 110 | 170 | 170 | 300 | 389 | 263 | 500 | 300 | 170 | 55 | 75 | 170 | 300 | 170 | 300 | 300 | 75 | 300 | 300 | 110 | 75 | 170 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| BLOWS | 130 | | | | | | | | | | | | | | | | | | | | | | | | |
| DEPTH | 263 | | | | | | | | | | | | | | | | | | | | | | | | |
| CBR | 389 | | | | | | | | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : / K.Z Mlambo

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

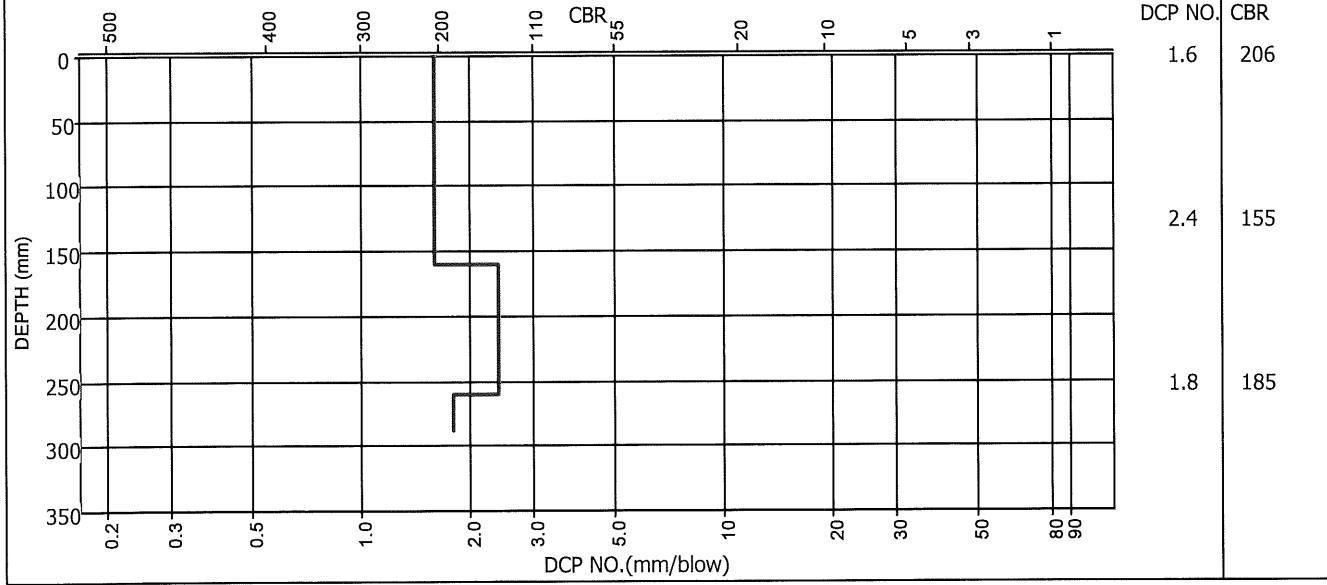
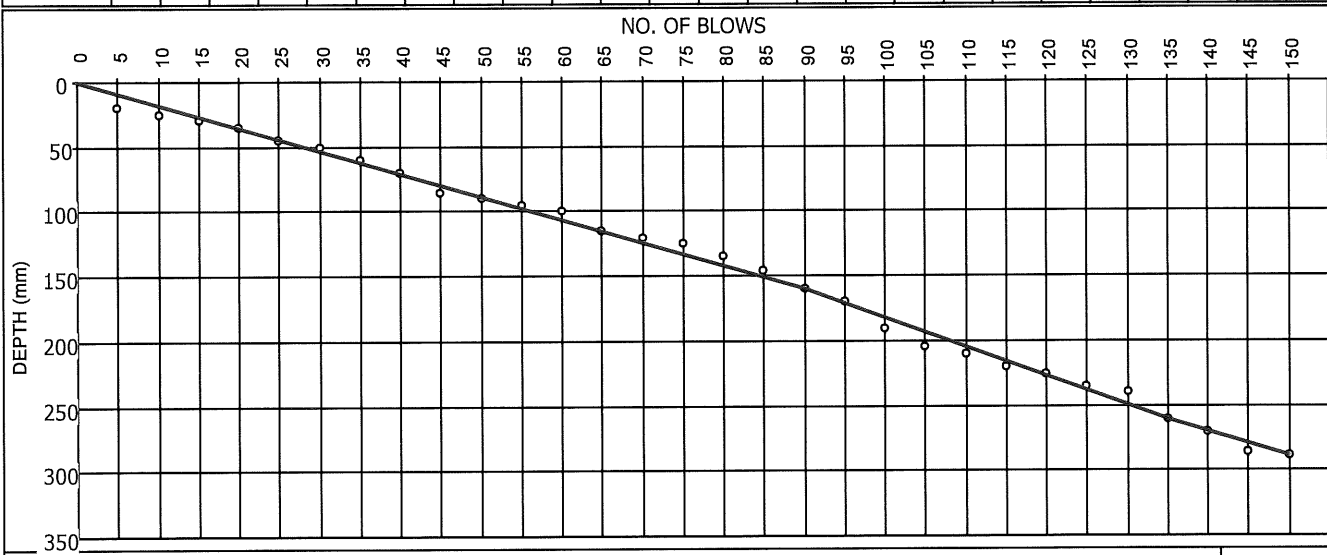
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 002762 - X 2563713
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 66 - LHS

INITIAL DEPTH (mm) : 0

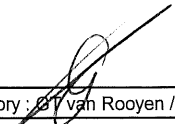
| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 20 | 25 | 30 | 35 | 45 | 50 | 60 | 70 | 85 | 90 | 95 | 100 | 115 | 120 | 125 | 135 | 145 | 160 | 170 | 190 | 205 | 210 | 220 | 225 | 235 |
| CBR | 75 | 300 | 300 | 300 | 170 | 300 | 170 | 170 | 110 | 300 | 300 | 300 | 110 | 300 | 300 | 170 | 170 | 110 | 170 | 75 | 110 | 300 | 170 | 300 | 170 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | | | | | | | | | | | | | | | | | | | | |
| DEPTH | 240 | 260 | 270 | 285 | 288 | | | | | | | | | | | | | | | | | | | | |
| CBR | 300 | 75 | 170 | 110 | 389 | | | | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Tebogoa Maake

Project : Proposed New Shangoni Gate
: S/RHS 31 Y 002105 - X 2563561

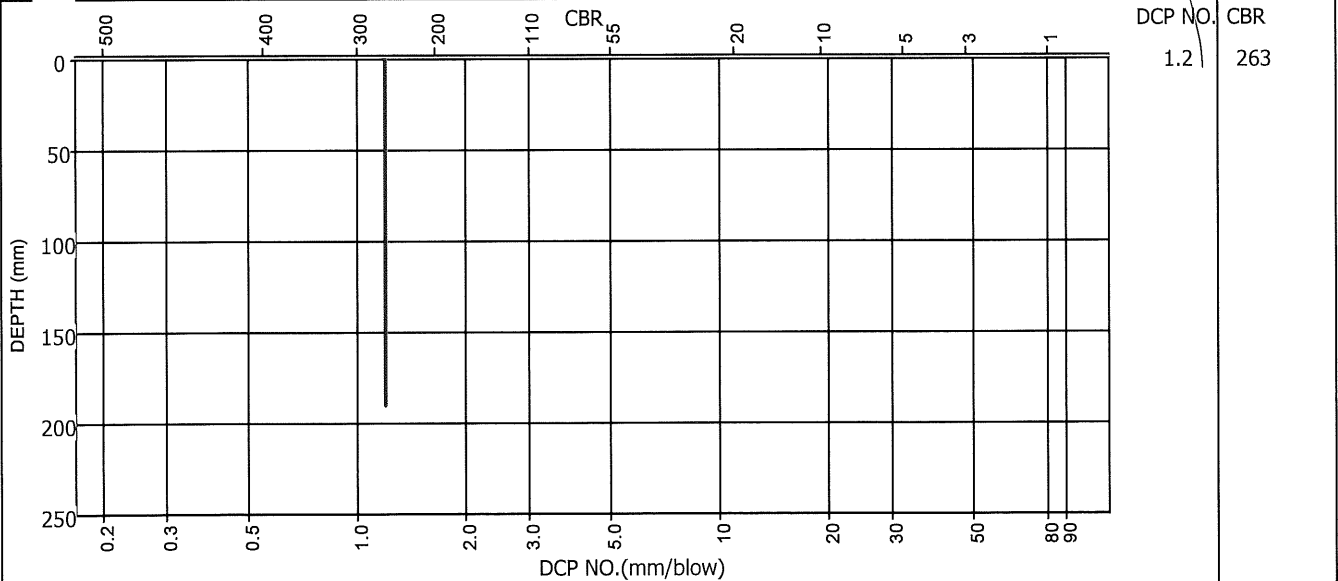
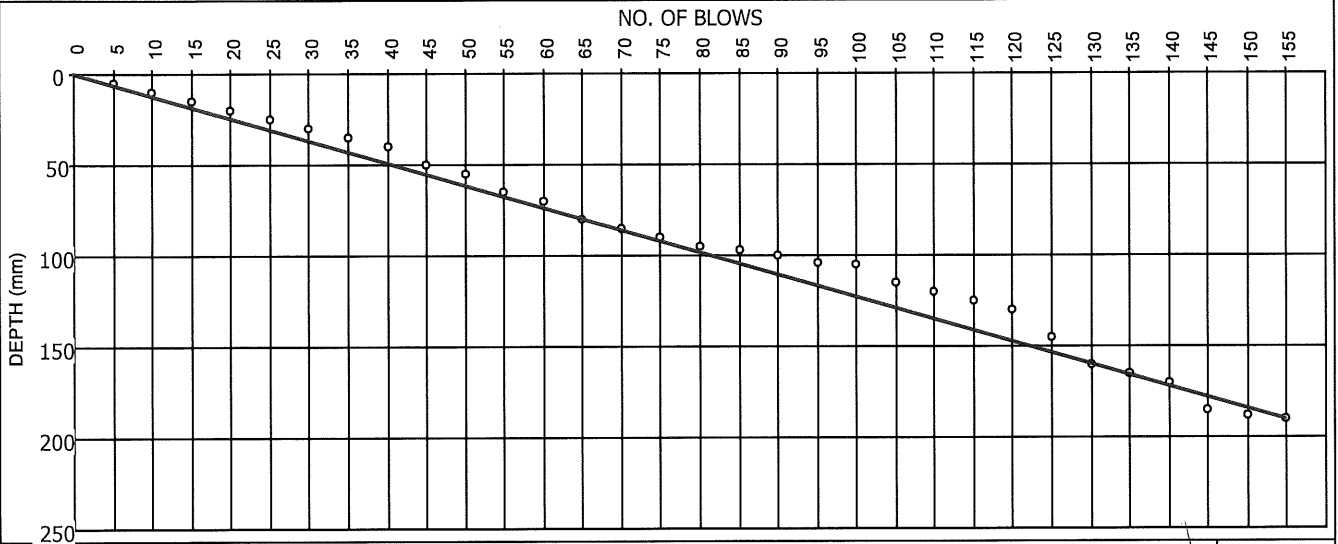
Your Ref : SK-PO098123
Our Ref : 1947
Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 67 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 50 | 55 | 65 | 70 | 80 | 85 | 90 | 95 | 97 | 100 | 104 | 105 | 115 | 120 | 125 | 130 | 145 |
| CBR | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 170 | 300 | 170 | 300 | 170 | 300 | 300 | 300 | 442 | 389 | 342 | 500 | 170 | 300 | 300 | 300 | 110 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | | | | | | | | | | | | | | | | | | | |
| DEPTH | 160 | 165 | 170 | 185 | 188 | 190 | | | | | | | | | | | | | | | | | | | |
| CBR | 110 | 300 | 300 | 110 | 389 | 442 | | | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : / K.Z Mlambo

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 - CIVIL ENGINEERING SERVICES -
 Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587
 a SANAS Accredited Testing Laboratory, No. T0865

9b Wilken Street, Rocky Drift, White River, 1240

Tel. : 0137581302
 Fax :
 Email : gerrit.vanrooyen@sgs.com

TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogoa Maake

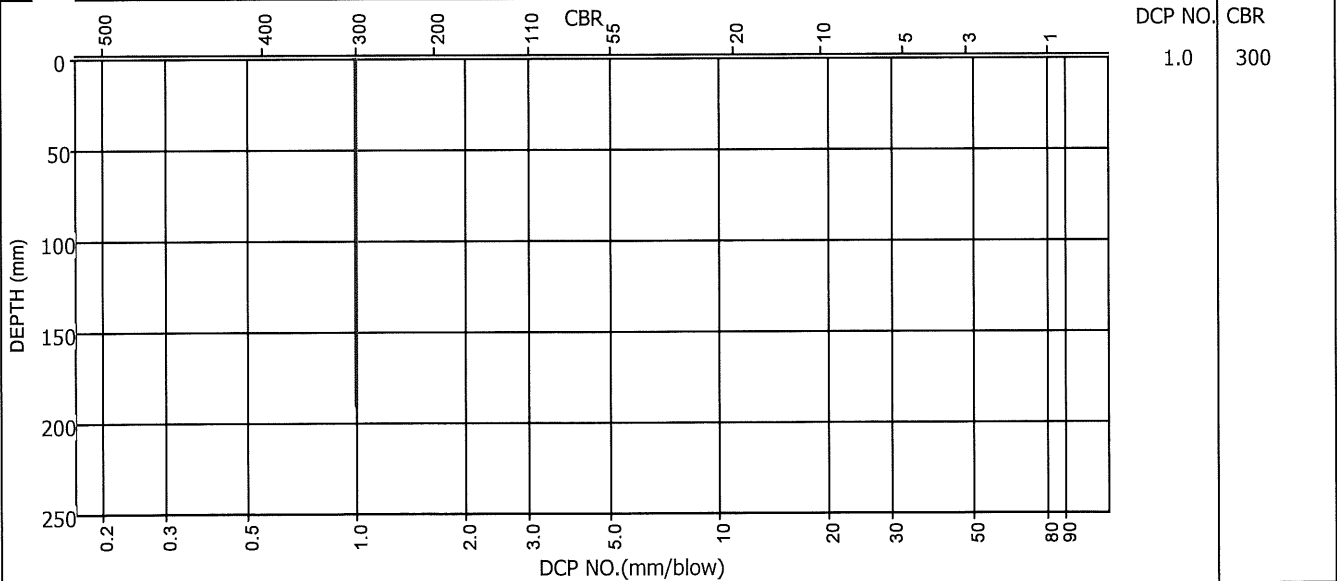
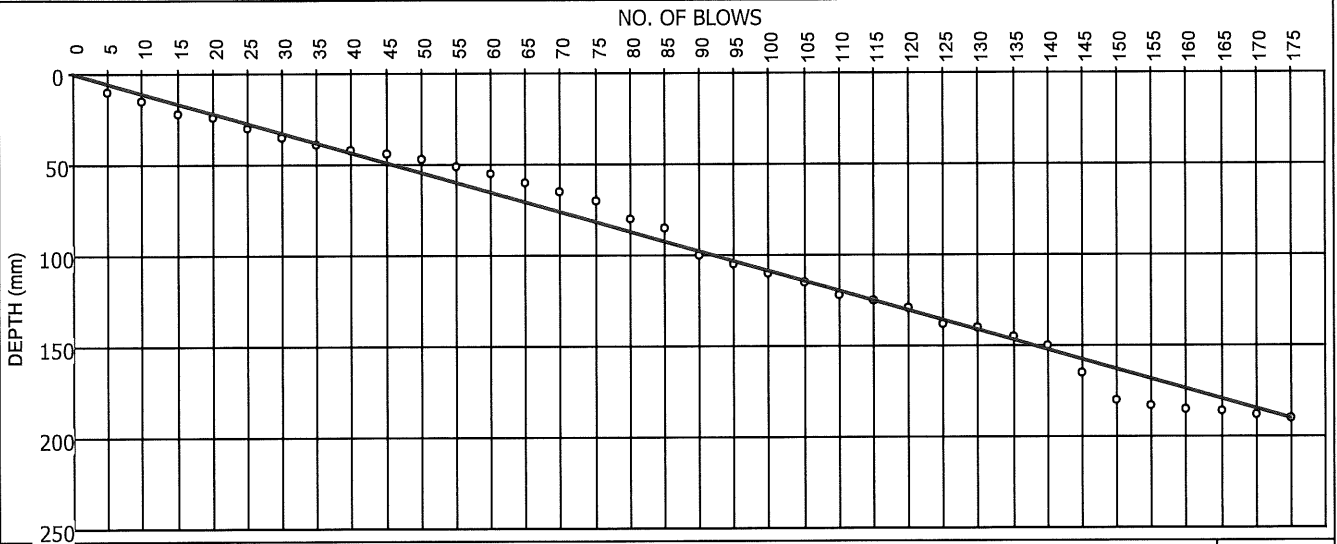
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 001139 - X 2563513
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 68 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 10 | 15 | 22 | 24 | 30 | 35 | 39 | 42 | 44 | 47 | 51 | 55 | 60 | 65 | 70 | 80 | 85 | 100 | 105 | 110 | 115 | 122 | 125 | 129 | 138 |
| CBR | 170 | 300 | 232 | 442 | 263 | 300 | 342 | 389 | 442 | 389 | 342 | 300 | 300 | 300 | 300 | 170 | 300 | 110 | 300 | 300 | 232 | 389 | 342 | 185 | |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | | | | | | | | | | | | | | | |
| DEPTH | 140 | 145 | 150 | 165 | 180 | 183 | 185 | 186 | 188 | 190 | | | | | | | | | | | | | | | |
| CBR | 442 | 300 | 300 | 110 | 110 | 389 | 442 | 500 | 442 | 442 | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogoa Maake

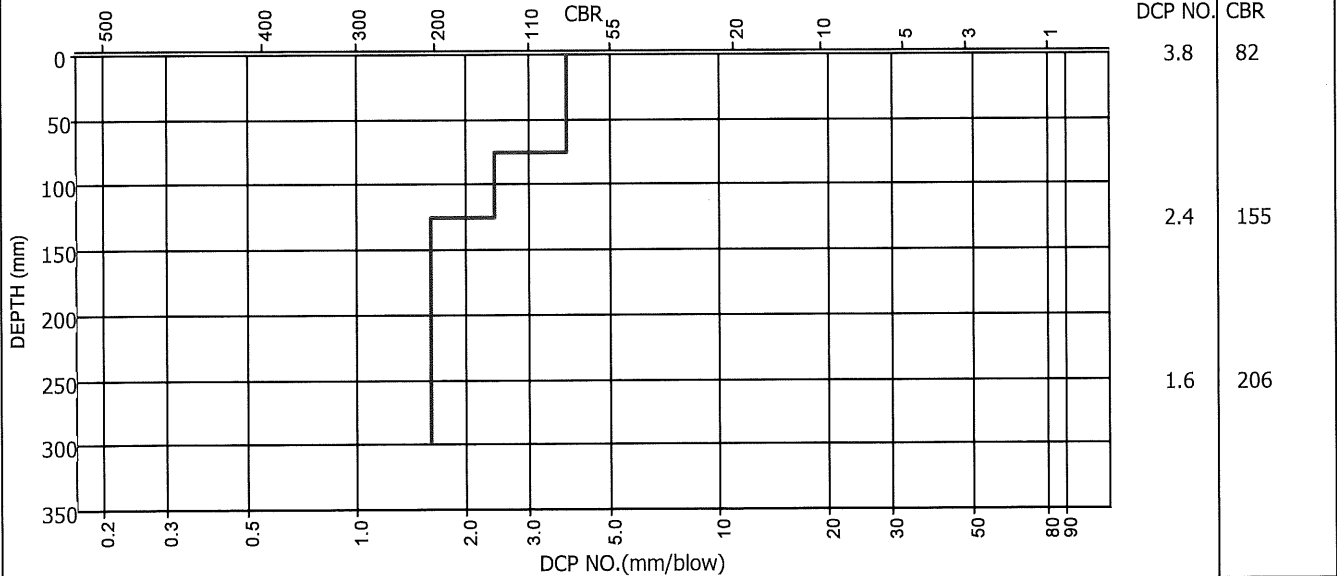
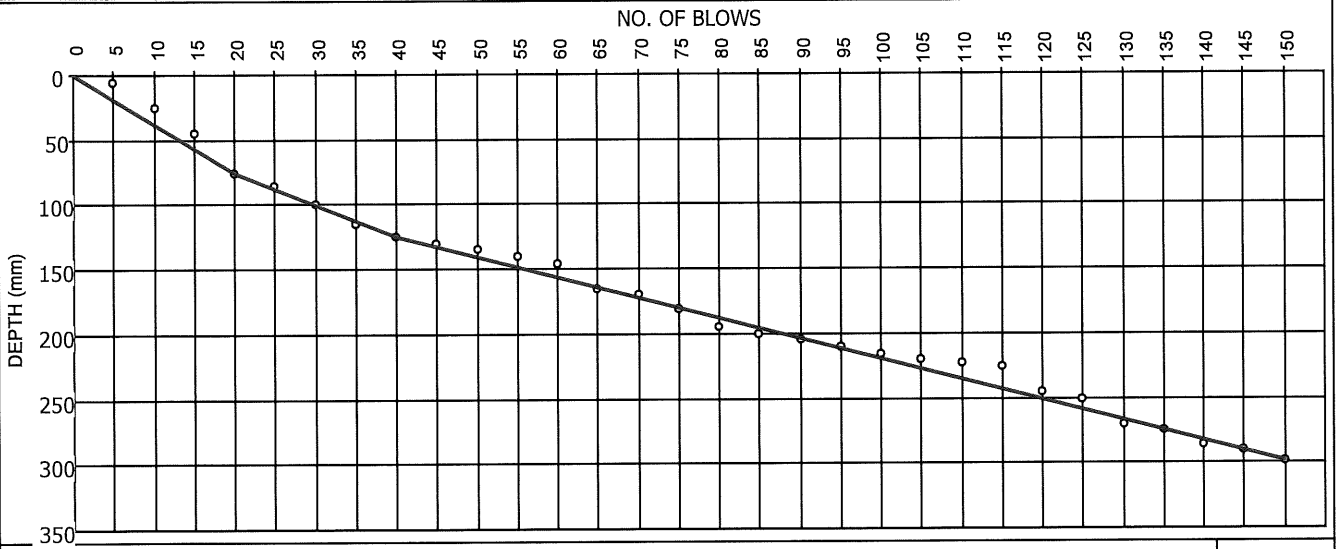
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 000503 - X 2563721
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 69 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 5 | 25 | 45 | 75 | 85 | 100 | 115 | 125 | 130 | 135 | 140 | 145 | 165 | 170 | 180 | 195 | 200 | 205 | 210 | 215 | 220 | 223 | 225 | 245 | 250 |
| CBR | 300 | 75 | 75 | 45 | 170 | 110 | 110 | 170 | 300 | 300 | 300 | 300 | 75 | 300 | 170 | 110 | 300 | 300 | 300 | 300 | 300 | 389 | 442 | 75 | 300 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | | | | | | | | | | | | | | | | | | | | |
| DEPTH | 270 | 275 | 285 | 290 | 298 | | | | | | | | | | | | | | | | | | | | |
| CBR | 75 | 300 | 170 | 300 | 206 | | | | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

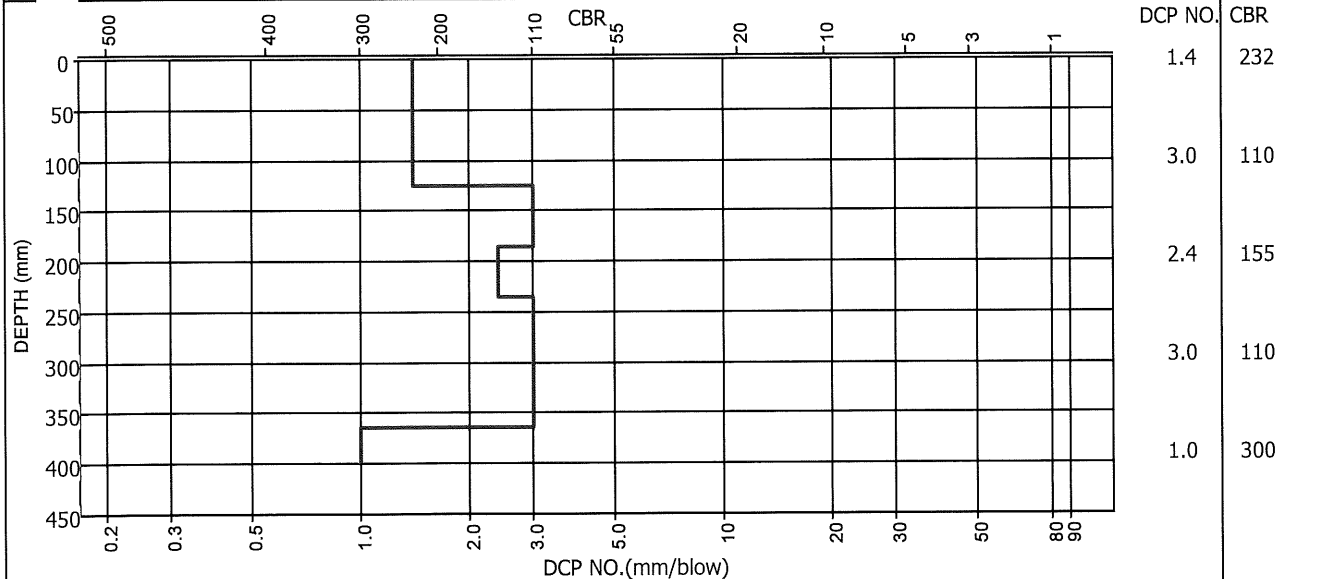
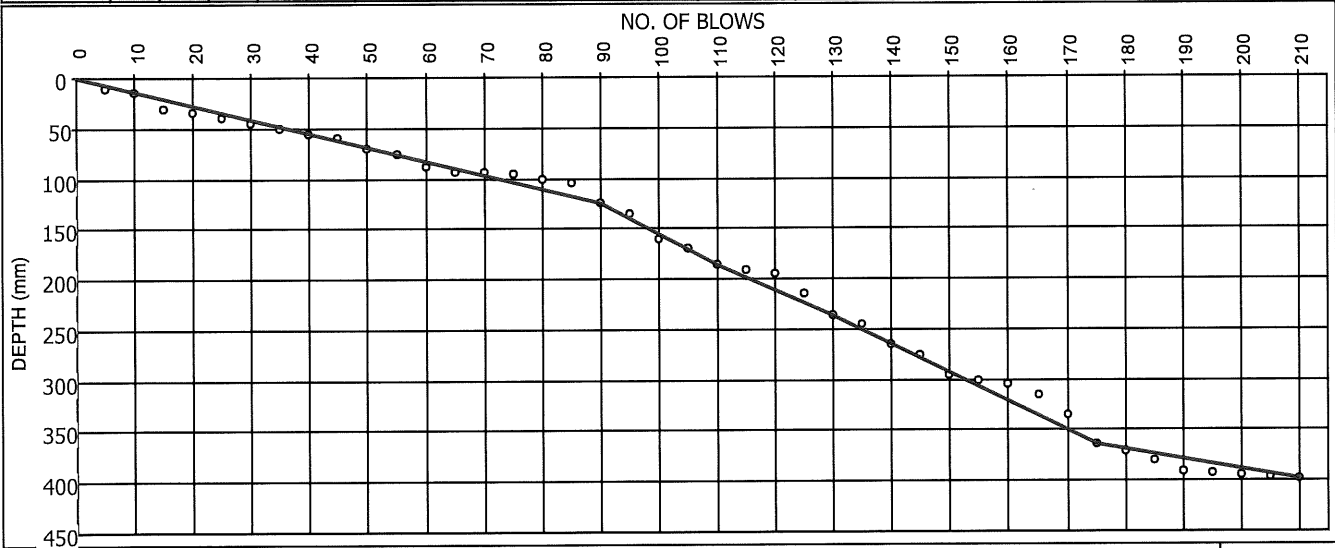
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 000760 - X 2563630
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 70 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 10 | 15 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 70 | 75 | 88 | 93 | 94 | 95 | 100 | 105 | 125 | 135 | 160 | 170 | 185 | 190 | 195 | 215 |
| CBR | 170 | 300 | 110 | 300 | 300 | 300 | 300 | 300 | 300 | 170 | 300 | 156 | 300 | 500 | 500 | 300 | 300 | 75 | 170 | 55 | 170 | 110 | 300 | 300 | 75 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | | | | | | | | |
| DEPTH | 235 | 245 | 265 | 275 | 295 | 300 | 305 | 315 | 335 | 364 | 370 | 380 | 390 | 393 | 395 | 396 | 398 | | | | | | | | |
| CBR | 75 | 170 | 75 | 170 | 75 | 300 | 300 | 170 | 75 | 47 | 263 | 170 | 170 | 389 | 442 | 500 | 442 | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : GT van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

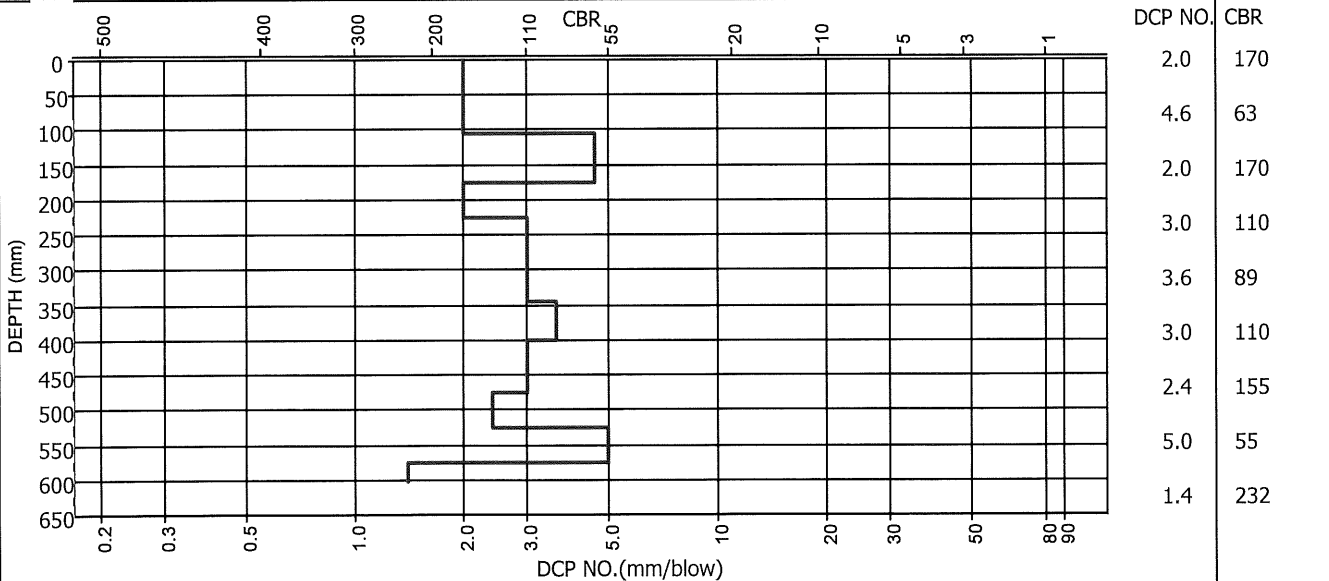
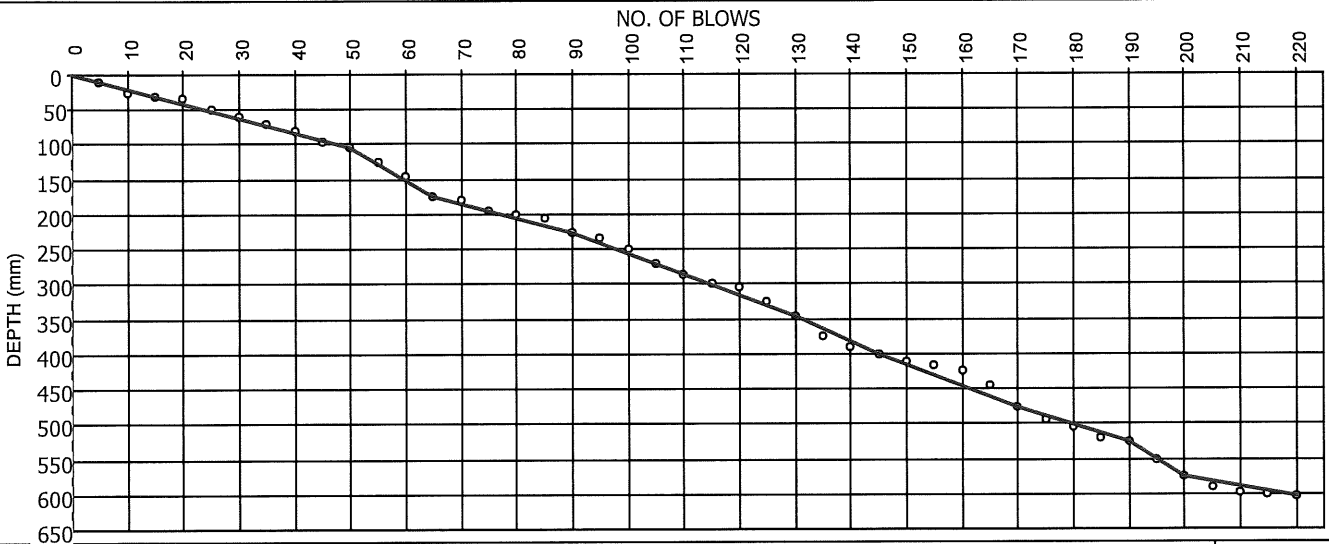
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 001471 - X 2563002
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 71 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 10 | 25 | 30 | 35 | 50 | 60 | 70 | 80 | 95 | 105 | 125 | 145 | 175 | 180 | 195 | 200 | 205 | 225 | 235 | 250 | 270 | 285 | 300 | 305 | 325 |
| CBR | 170 | 110 | 300 | 300 | 110 | 170 | 170 | 170 | 110 | 170 | 75 | 75 | 45 | 300 | 110 | 300 | 300 | 75 | 170 | 110 | 75 | 110 | 110 | 300 | 75 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | | | | | | |
| DEPTH | 345 | 375 | 390 | 400 | 410 | 415 | 425 | 445 | 475 | 495 | 505 | 519 | 525 | 550 | 575 | 590 | 598 | 600 | 602 | | | | | | |
| CBR | 75 | 45 | 110 | 170 | 170 | 300 | 170 | 75 | 45 | 75 | 170 | 162 | 263 | 55 | 55 | 110 | 206 | 442 | 442 | | | | | | |



Remarks :

FORM: ST6

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Technical Signatory : G. Van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

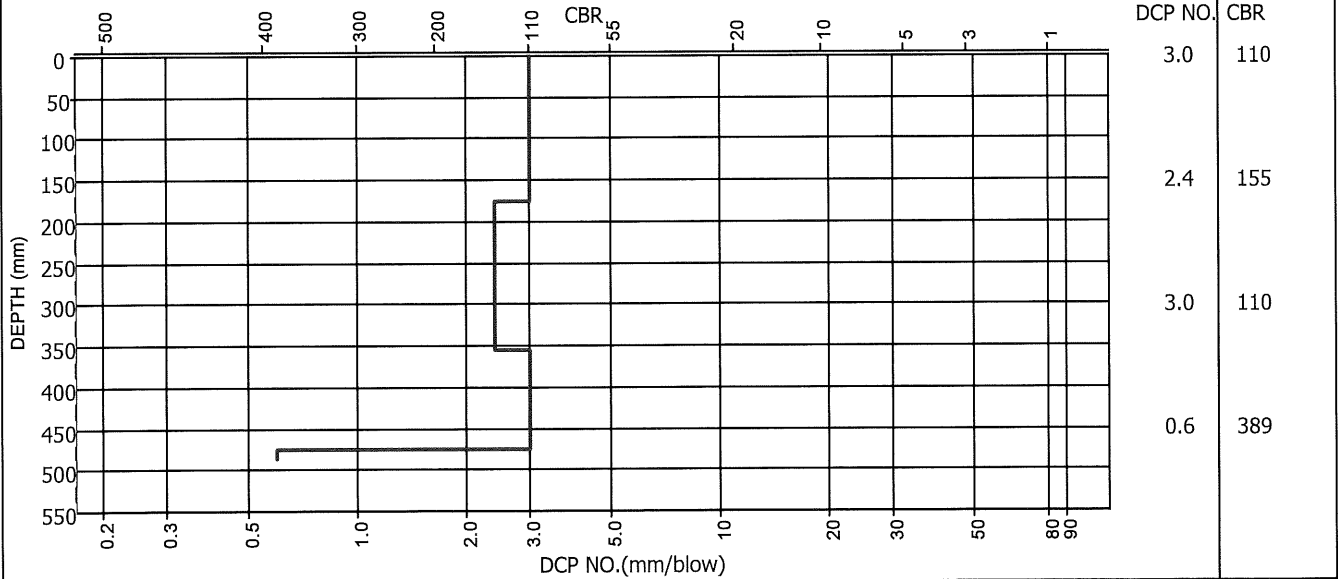
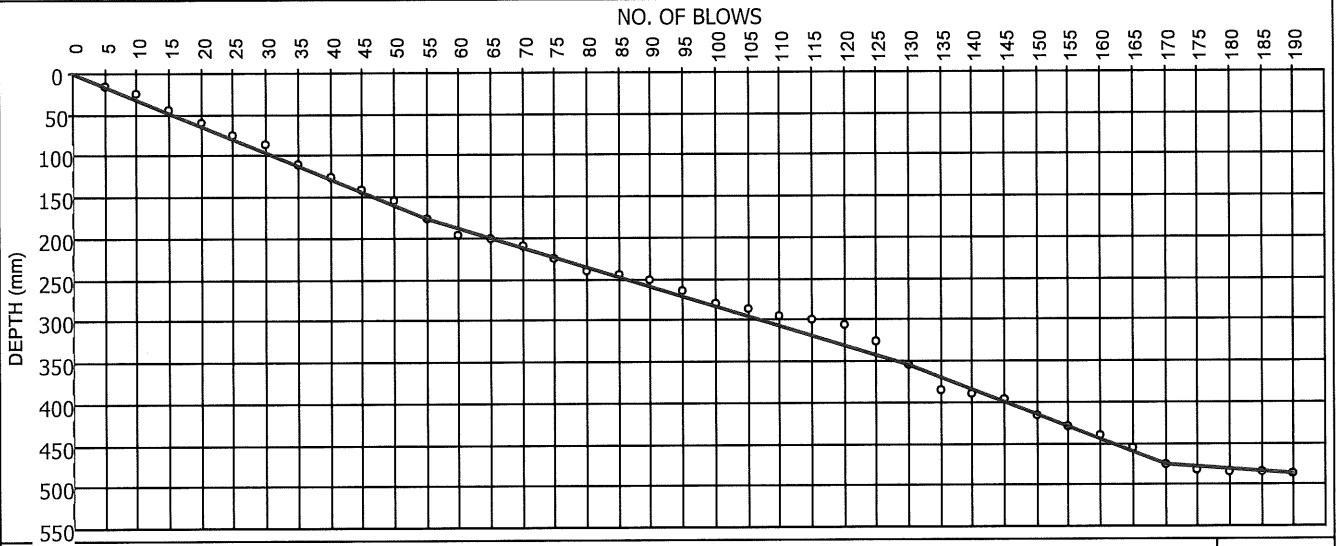
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 0002272 - X 2563190
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 72 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 15 | 25 | 45 | 60 | 75 | 85 | 110 | 125 | 140 | 155 | 175 | 195 | 200 | 210 | 225 | 240 | 245 | 250 | 265 | 280 | 285 | 295 | 300 | 305 | 325 |
| CBR | 110 | 170 | 75 | 110 | 110 | 170 | 55 | 110 | 110 | 110 | 75 | 75 | 300 | 170 | 110 | 110 | 300 | 300 | 110 | 110 | 300 | 170 | 300 | 300 | 75 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | | | | | | | | | | | | |
| DEPTH | 355 | 385 | 390 | 395 | 415 | 430 | 440 | 455 | 475 | 481 | 483 | 485 | 486 | | | | | | | | | | | | |
| CBR | 45 | 45 | 300 | 300 | 75 | 110 | 170 | 110 | 75 | 263 | 442 | 442 | 500 | | | | | | | | | | | | |



Remarks :

FORM: ST6

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Technical Signatory : / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

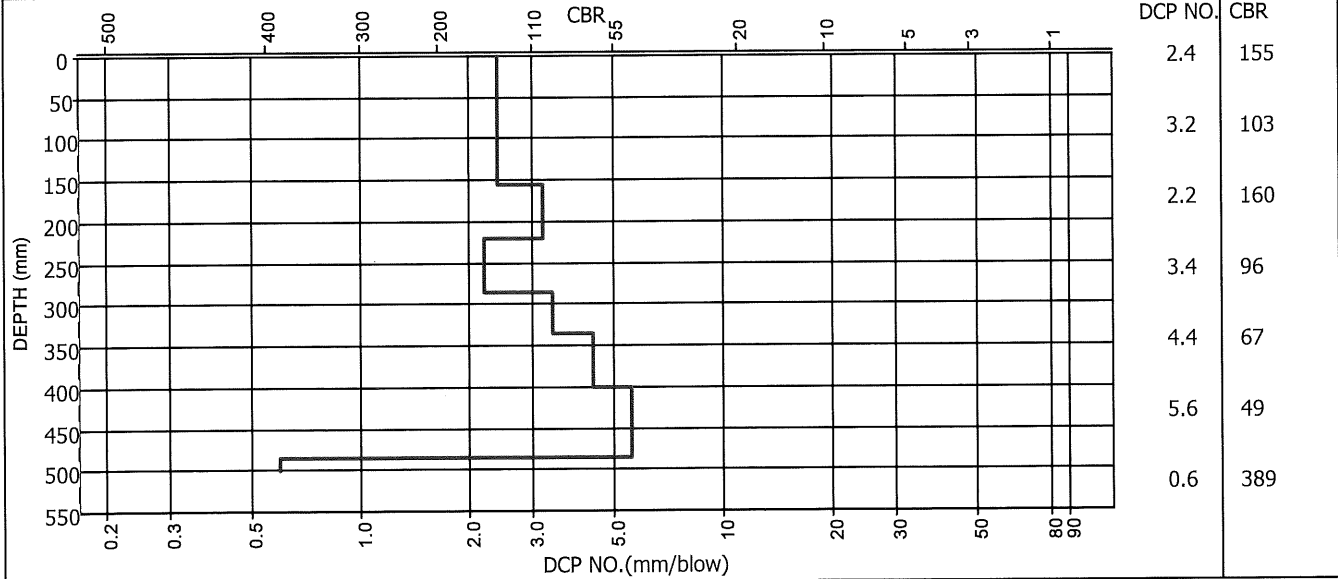
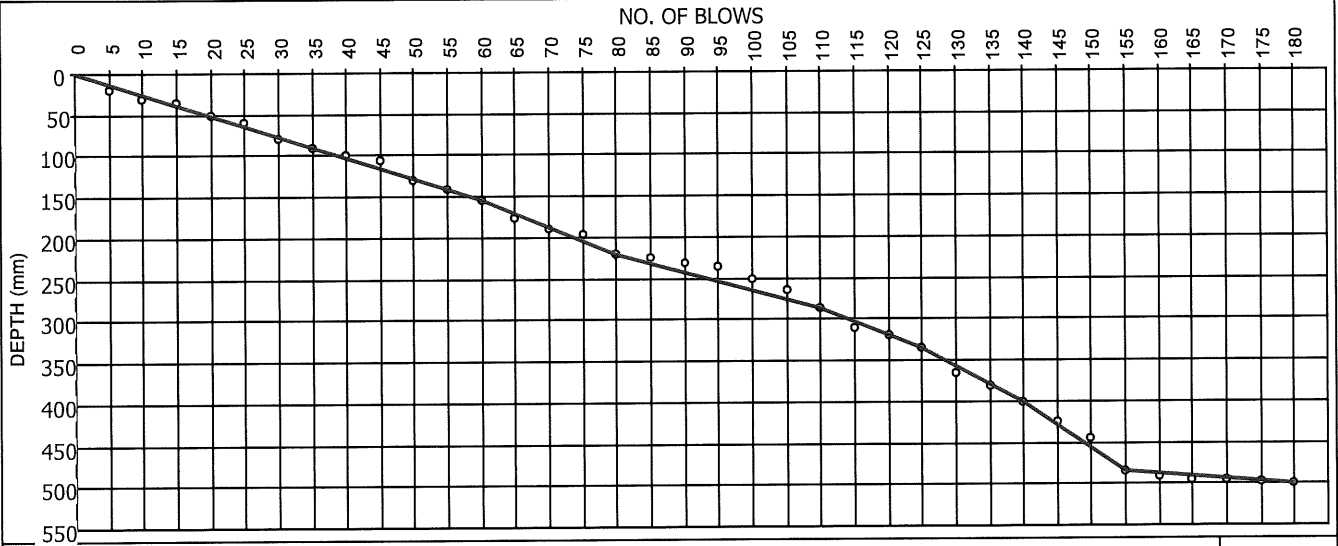
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 0002699 - X 2563415
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 74 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 20 | 30 | 35 | 50 | 60 | 80 | 90 | 100 | 105 | 130 | 140 | 155 | 175 | 190 | 195 | 220 | 225 | 230 | 235 | 250 | 265 | 285 | 310 | 320 | 335 |
| CBR | 75 | 170 | 300 | 110 | 170 | 75 | 170 | 170 | 300 | 55 | 170 | 110 | 75 | 110 | 300 | 55 | 300 | 300 | 300 | 110 | 110 | 75 | 55 | 170 | 110 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | | | | | | | | | | | | | | |
| DEPTH | 365 | 380 | 400 | 425 | 445 | 485 | 490 | 495 | 496 | 498 | 500 | | | | | | | | | | | | | | |
| CBR | 45 | 110 | 75 | 55 | 75 | 30 | 300 | 300 | 500 | 442 | 442 | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Tebogoa Maake

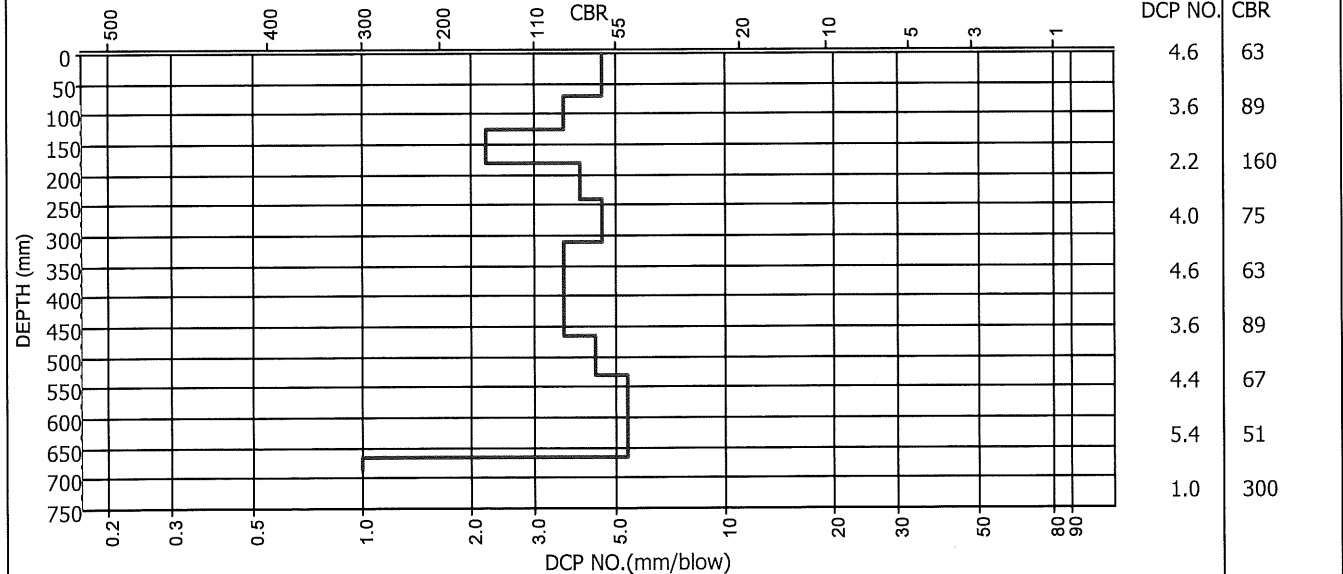
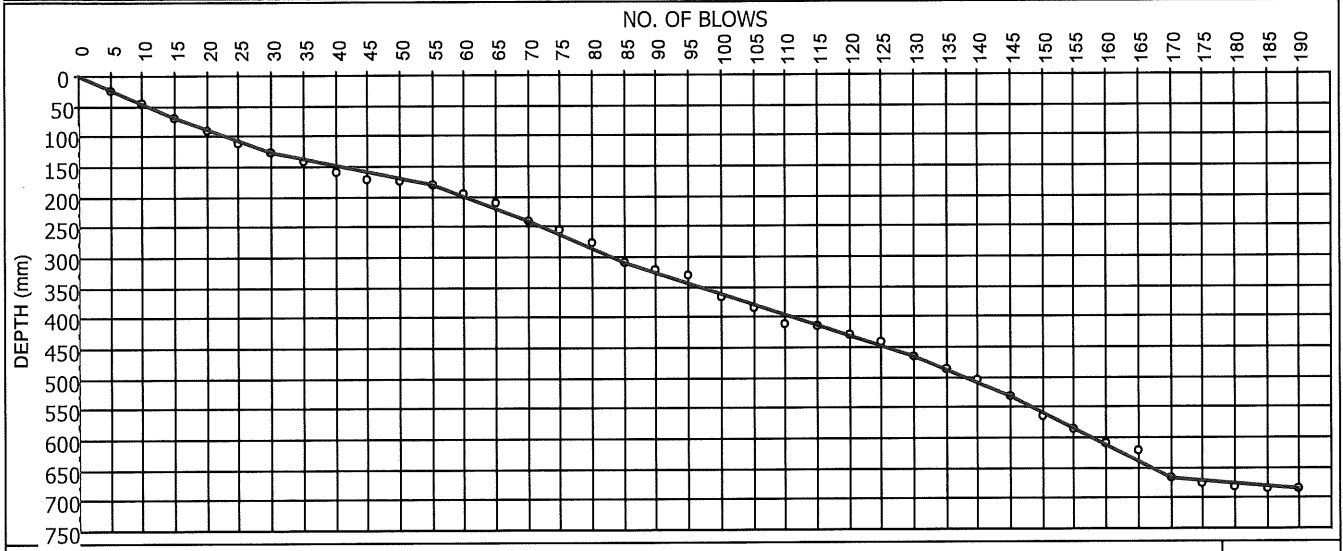
Project : Proposed New Shangoni Gate
: S/RHS 31 Y 0003101 - X 2563652
Your Ref : SK-PO098123
Our Ref : 1947
Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 75 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 25 | 45 | 70 | 90 | 110 | 125 | 140 | 160 | 170 | 173 | 180 | 195 | 210 | 240 | 255 | 275 | 310 | 320 | 330 | 365 | 385 | 410 | 415 | 430 | 440 |
| CBR | 55 | 75 | 55 | 75 | 75 | 110 | 110 | 75 | 170 | 389 | 232 | 110 | 110 | 45 | 110 | 75 | 35 | 170 | 170 | 35 | 75 | 55 | 300 | 110 | 170 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | | | | | | | | | | | | |
| DEPTH | 465 | 485 | 505 | 530 | 565 | 585 | 610 | 620 | 665 | 675 | 680 | 683 | 685 | | | | | | | | | | | | |
| CBR | 55 | 75 | 75 | 55 | 35 | 75 | 55 | 170 | 25 | 170 | 300 | 389 | 442 | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

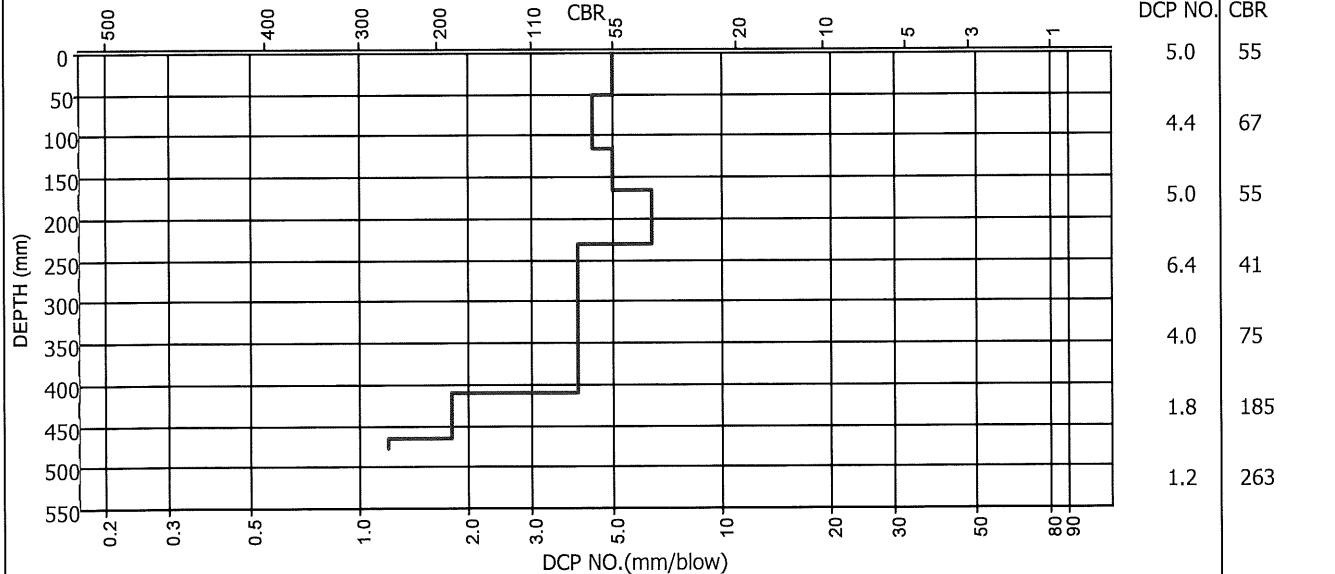
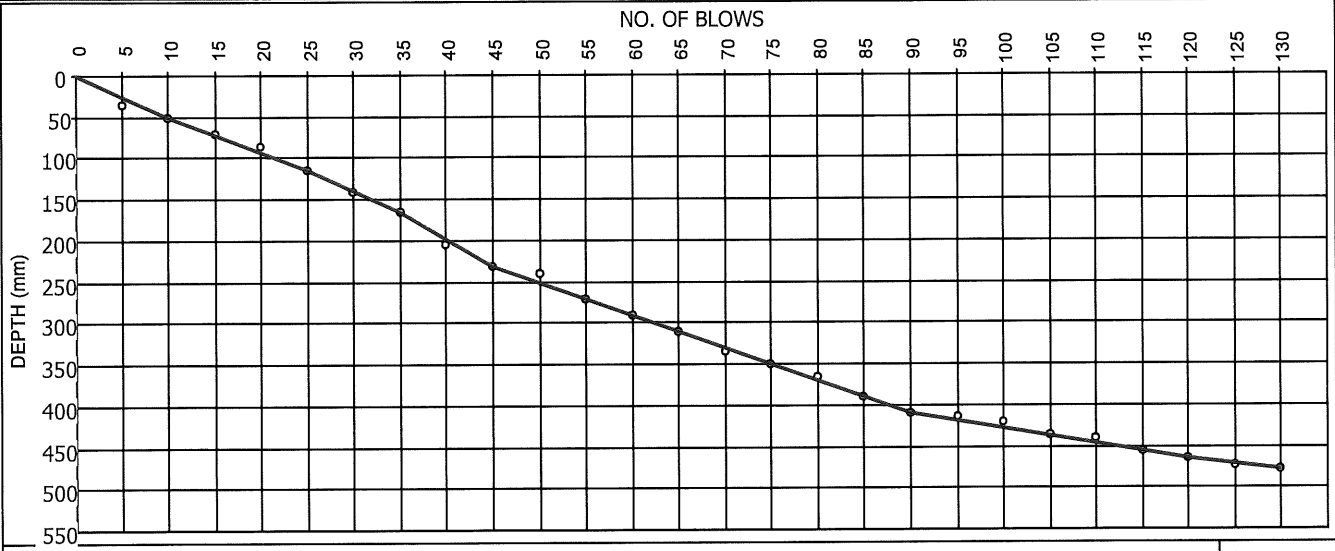
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 0003934 - X 2563163
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 76 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 35 | 50 | 70 | 85 | 115 | 140 | 165 | 205 | 230 | 240 | 270 | 290 | 310 | 335 | 350 | 365 | 390 | 410 | 414 | 420 | 435 | 440 | 455 | 465 | 473 |
| CBR | 35 | 110 | 75 | 110 | 45 | 55 | 55 | 30 | 55 | 170 | 45 | 75 | 75 | 55 | 110 | 110 | 55 | 75 | 342 | 263 | 110 | 300 | 110 | 170 | 206 |
| BLOWS | 130 | | | | | | | | | | | | | | | | | | | | | | | | |
| DEPTH | 477 | | | | | | | | | | | | | | | | | | | | | | | | |
| CBR | 342 | | | | | | | | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : G. van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Tebogo Maake

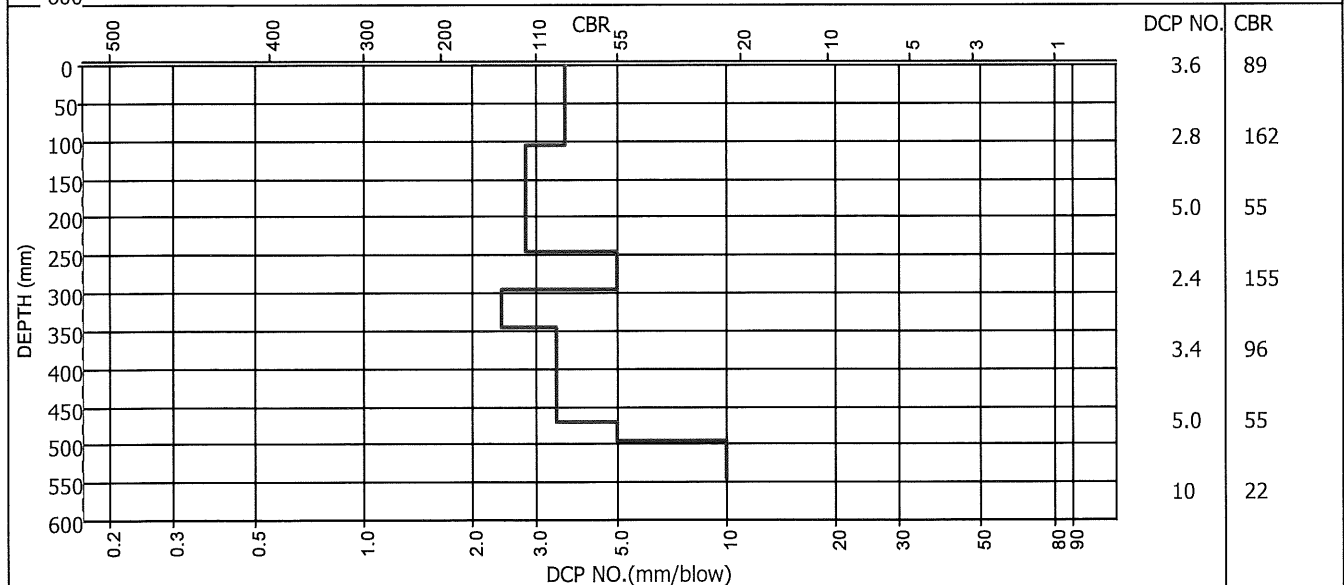
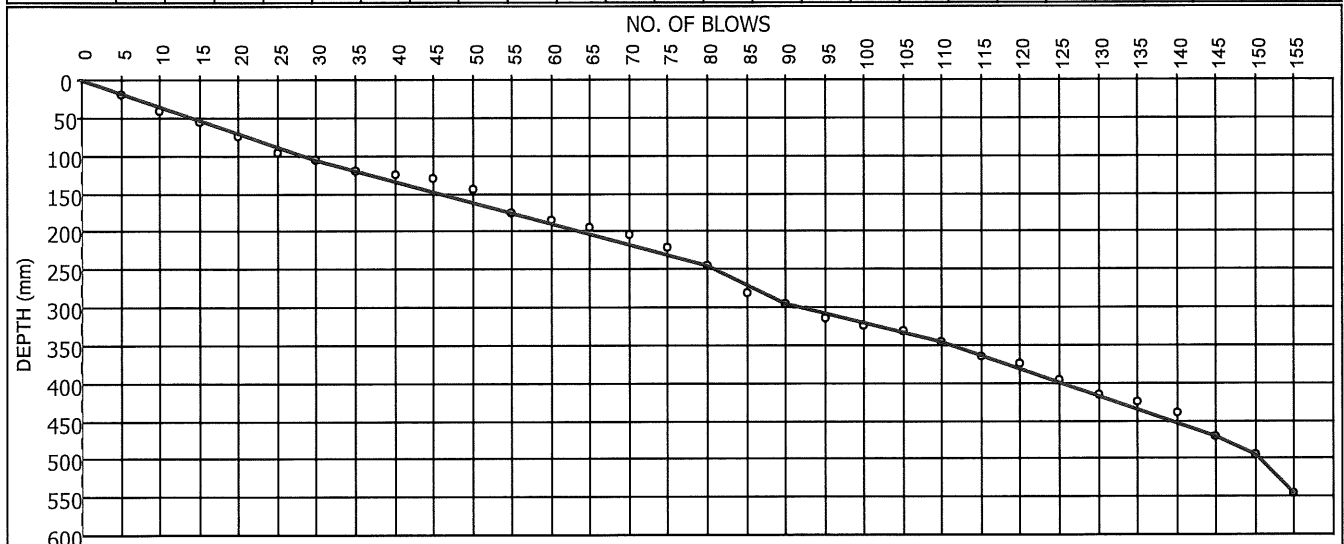
Project : Proposed New Shangoni Gate
: S/RHS 31 Y 0005814 - X 2563026
Your Ref : SK-PO098123
Our Ref : 1947
Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 77 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 20 | 40 | 55 | 75 | 95 | 105 | 120 | 125 | 130 | 145 | 175 | 185 | 195 | 205 | 220 | 245 | 280 | 295 | 315 | 325 | 330 | 345 | 365 | 375 | 395 |
| CBR | 75 | 75 | 110 | 75 | 75 | 170 | 110 | 300 | 300 | 110 | 45 | 170 | 170 | 170 | 110 | 55 | 35 | 110 | 75 | 170 | 300 | 110 | 75 | 170 | 75 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | | | | | | | | | | | | | | | | | | | |
| DEPTH | 415 | 425 | 440 | 470 | 495 | 545 | | | | | | | | | | | | | | | | | | | |
| CBR | 75 | 170 | 110 | 45 | 55 | 22 | | | | | | | | | | | | | | | | | | | |



Remarks :

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

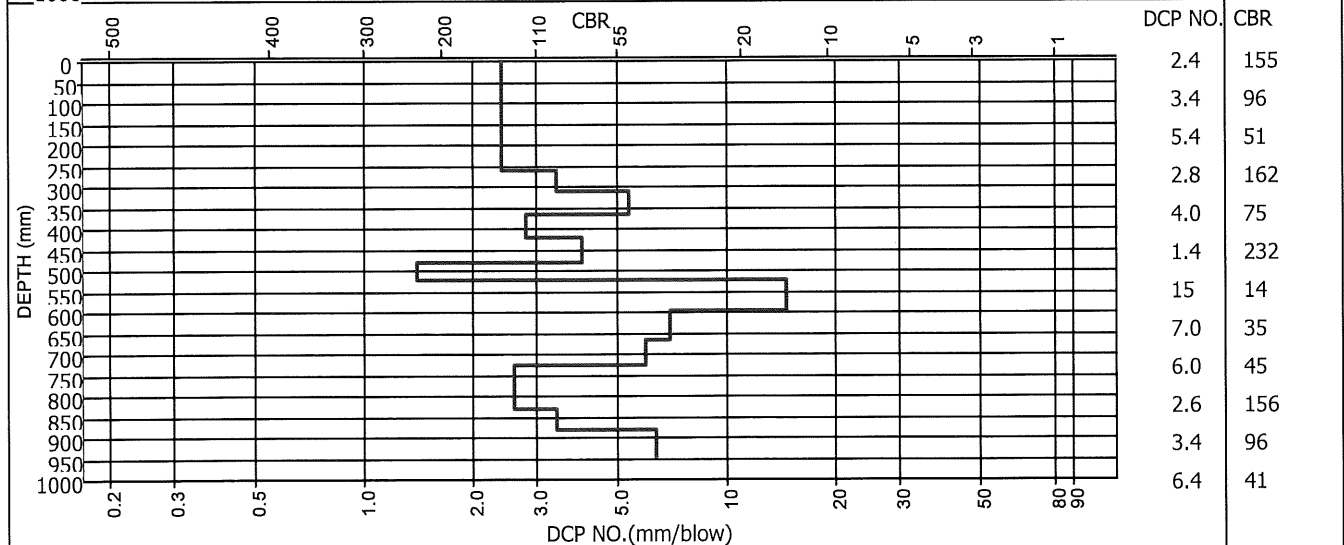
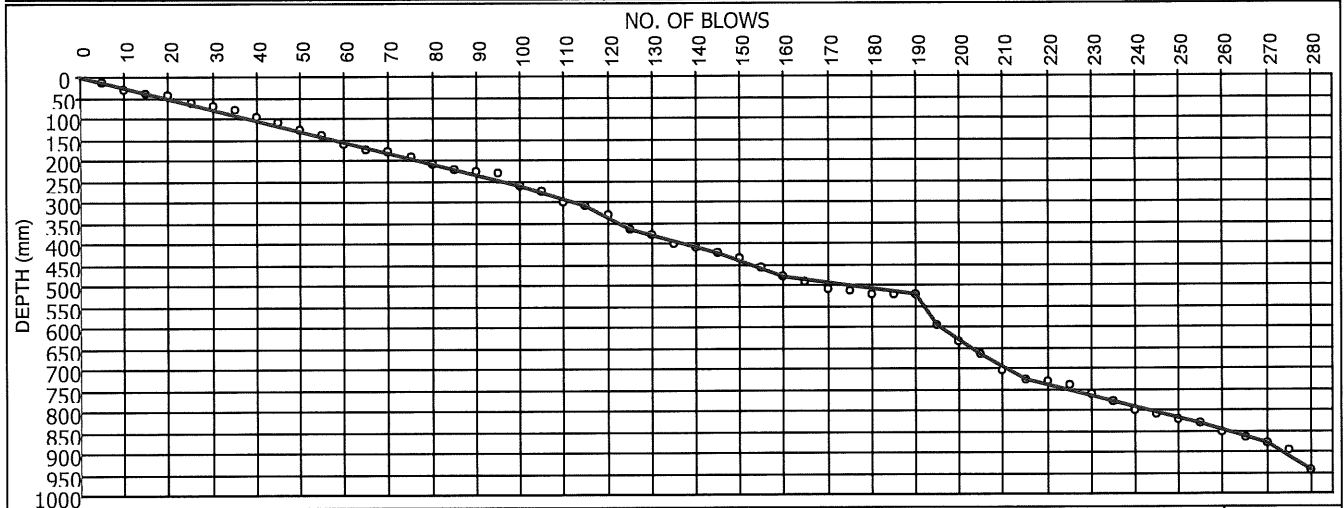
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 0005477 - X 2562122
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 78 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 240 | 255 | 270 | 285 | 300 | 315 | 330 | 345 | 360 | 375 |
| CBR | 110 | 110 | 170 | 300 | 110 | 170 | 170 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | 245 | 250 |
| DEPTH | 380 | 399 | 410 | 420 | 435 | 455 | 480 | 490 | 510 | 515 | 520 | 521 | 522 | 595 | 635 | 665 | 705 | 725 | 730 | 740 | 760 | 778 | 801 | 810 | 820 |
| CBR | 110 | 82 | 160 | 170 | 110 | 75 | 55 | 170 | 75 | 300 | 300 | 500 | 500 | 14 | 30 | 45 | 30 | 75 | 300 | 170 | 75 | 89 | 63 | 185 | 170 |
| BLOWS | 255 | 260 | 265 | 270 | 275 | 280 | | | | | | | | | | | | | | | | | | | |
| DEPTH | 830 | 850 | 865 | 880 | 895 | 945 | | | | | | | | | | | | | | | | | | | |
| CBR | 170 | 75 | 110 | 110 | 110 | 22 | | | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

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 issues defined therein.

TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Tebogoo Maake

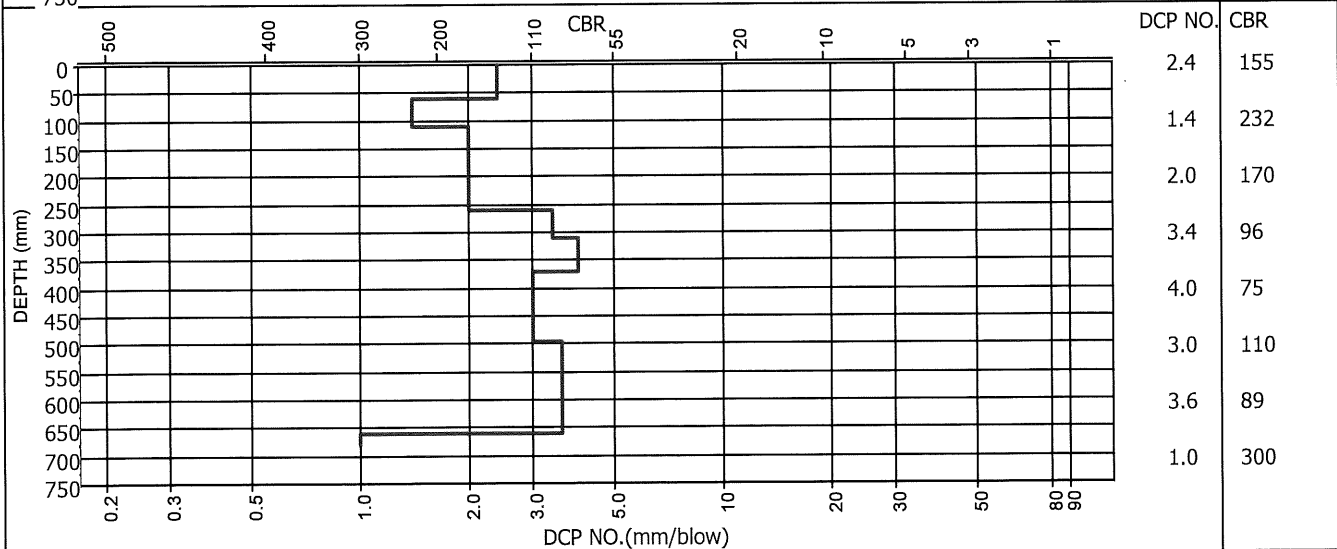
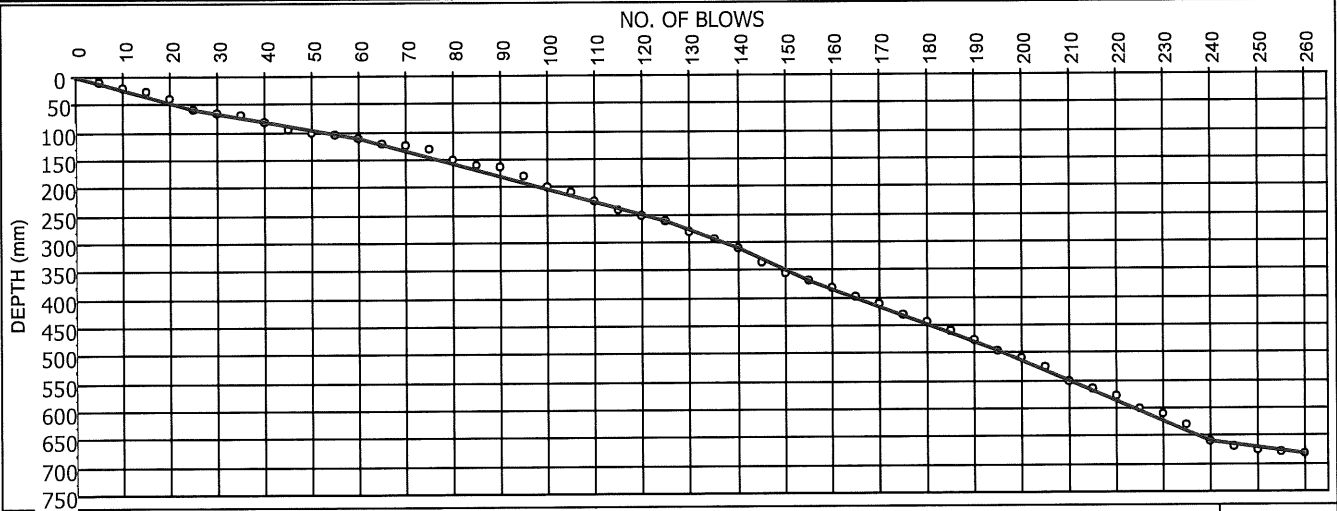
Project : Proposed New Shangoni Gate
: S/RHS 31 Y 0005983 - X 2560556
Your Ref : SK-PO098123
Our Ref : 1947
Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 80 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 10 | 20 | 25 | 40 | 60 | 65 | 70 | 80 | 95 | 100 | 105 | 110 | 120 | 125 | 130 | 150 | 160 | 164 | 180 | 200 | 210 | 225 | 240 | 250 | 260 |
| CBR | 170 | 170 | 300 | 110 | 75 | 300 | 300 | 170 | 110 | 300 | 300 | 300 | 170 | 300 | 300 | 75 | 342 | 103 | 75 | 75 | 170 | 110 | 110 | 170 | 170 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | 245 | 250 |
| DEPTH | 280 | 295 | 310 | 335 | 355 | 370 | 380 | 399 | 411 | 430 | 445 | 460 | 475 | 495 | 510 | 525 | 550 | 565 | 578 | 600 | 610 | 630 | 660 | 670 | 675 |
| CBR | 75 | 110 | 110 | 55 | 75 | 110 | 170 | 82 | 155 | 82 | 110 | 110 | 110 | 75 | 110 | 110 | 55 | 110 | 156 | 67 | 170 | 75 | 45 | 170 | 300 |
| BLOWS | 255 | 260 | | | | | | | | | | | | | | | | | | | | | | | |
| DEPTH | 678 | 680 | | | | | | | | | | | | | | | | | | | | | | | |
| CBR | 389 | 442 | | | | | | | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : G.T. van Rooyen / K.Z. Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogoo Maake

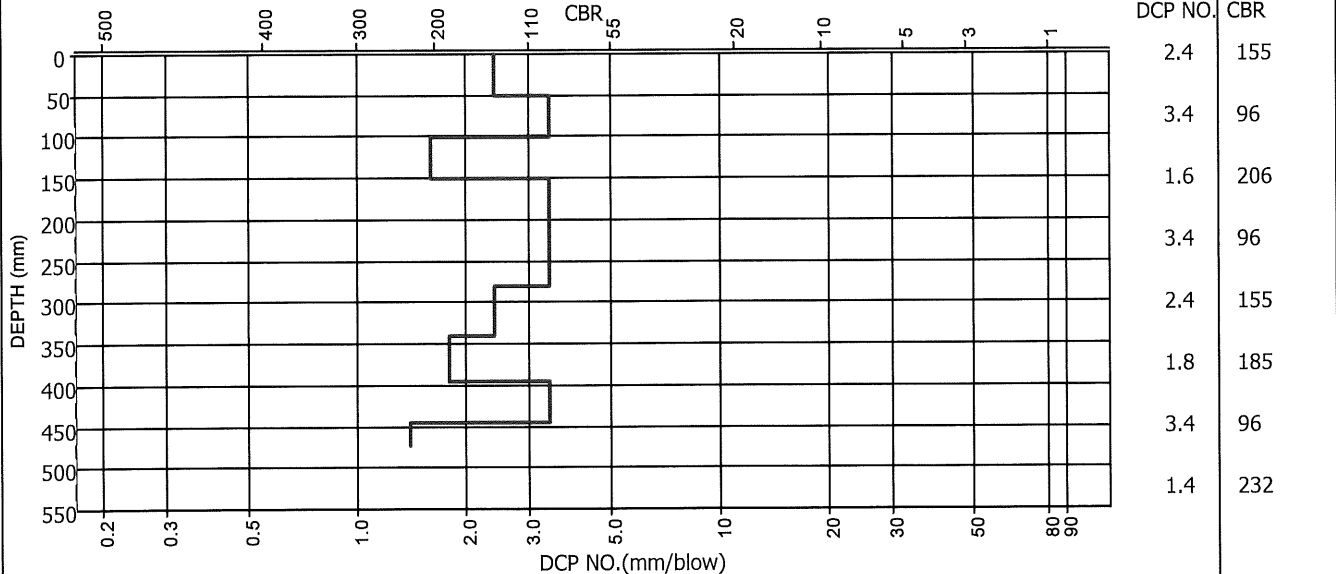
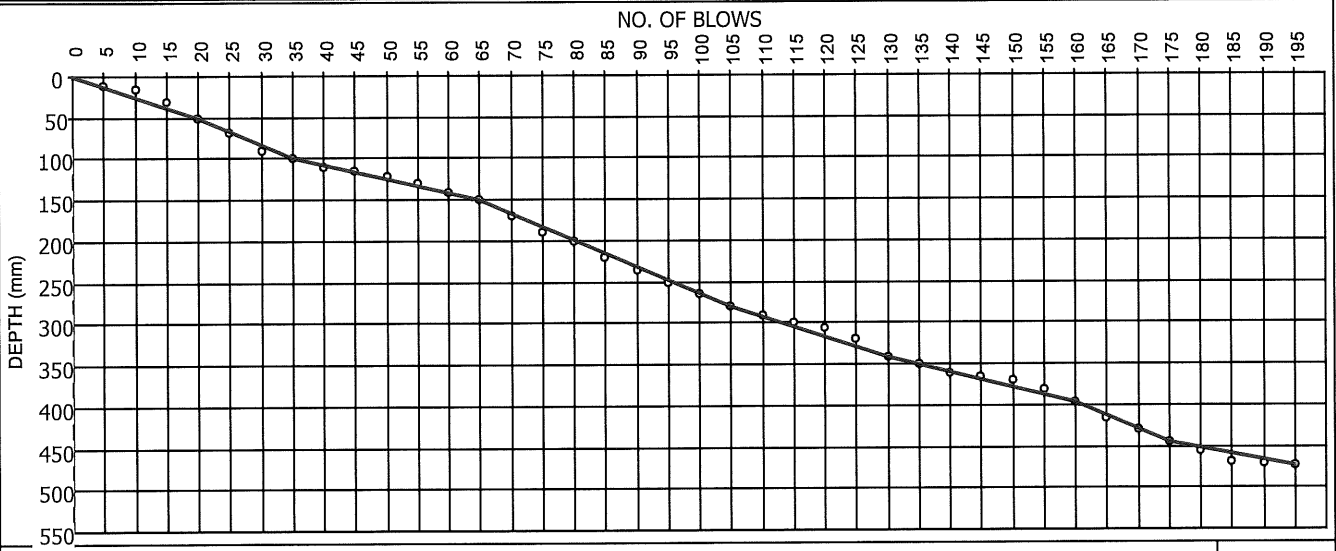
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 0006370 - X 2560406
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 81 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 10 | 15 | 30 | 50 | 68 | 90 | 100 | 110 | 115 | 120 | 130 | 140 | 150 | 170 | 190 | 201 | 220 | 235 | 250 | 265 | 280 | 290 | 300 | 305 | 320 |
| CBR | 170 | 300 | 110 | 75 | 89 | 67 | 170 | 170 | 300 | 300 | 170 | 170 | 170 | 75 | 75 | 160 | 82 | 110 | 110 | 110 | 110 | 170 | 170 | 300 | 110 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | | | | | | | | | | | |
| DEPTH | 340 | 350 | 360 | 365 | 370 | 380 | 395 | 415 | 430 | 445 | 455 | 468 | 470 | 473 | | | | | | | | | | | |
| CBR | 75 | 170 | 170 | 300 | 300 | 170 | 110 | 75 | 110 | 110 | 170 | 156 | 442 | 389 | | | | | | | | | | | |



Remarks :

FORM: ST6

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

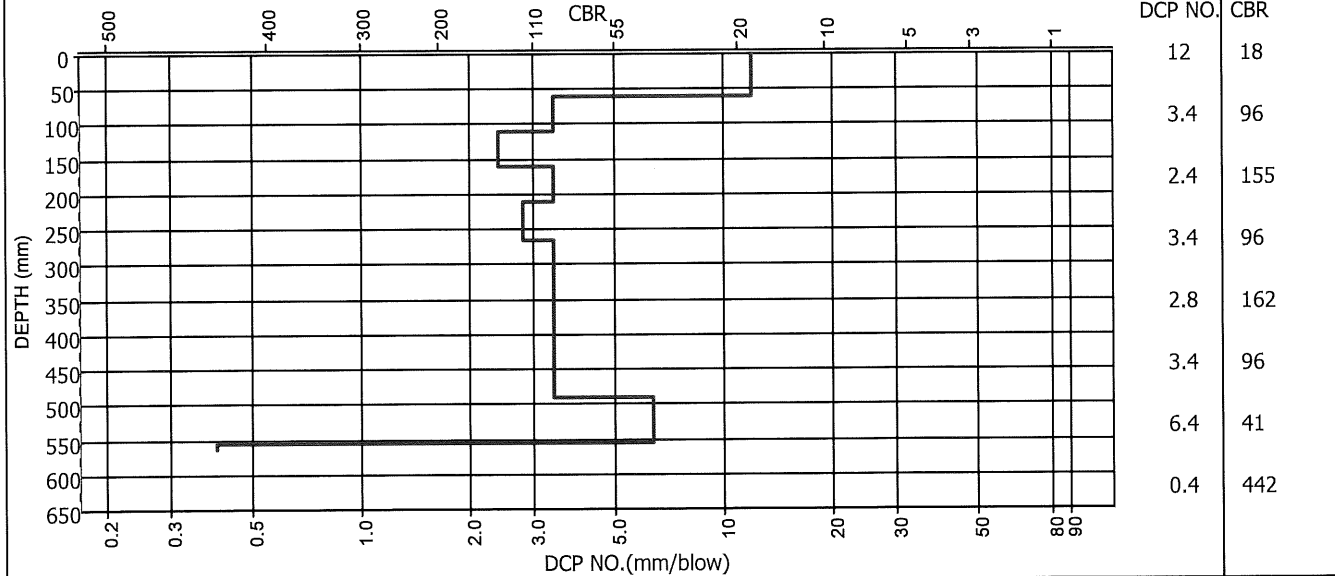
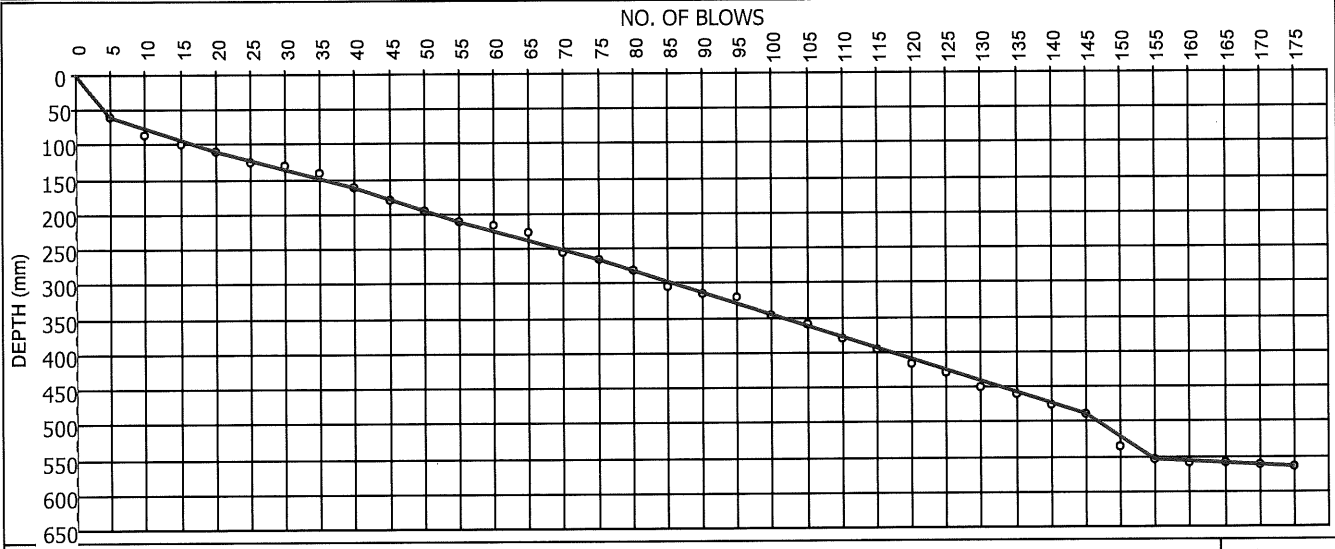
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 0006624 - X 2560240
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 82 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 60 | 85 | 100 | 110 | 125 | 130 | 140 | 160 | 180 | 195 | 210 | 215 | 225 | 255 | 265 | 280 | 305 | 315 | 320 | 345 | 360 | 380 | 395 | 415 | 430 |
| CBR | 18 | 55 | 110 | 170 | 110 | 300 | 170 | 75 | 75 | 110 | 300 | 170 | 45 | 170 | 110 | 55 | 170 | 300 | 55 | 110 | 75 | 110 | 75 | 110 | 110 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | | | | | | | | | | | | | | | |
| DEPTH | 450 | 460 | 475 | 490 | 535 | 555 | 558 | 560 | 561 | 563 | | | | | | | | | | | | | | | |
| CBR | 75 | 170 | 110 | 110 | 25 | 75 | 389 | 442 | 500 | 442 | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogoa Maake

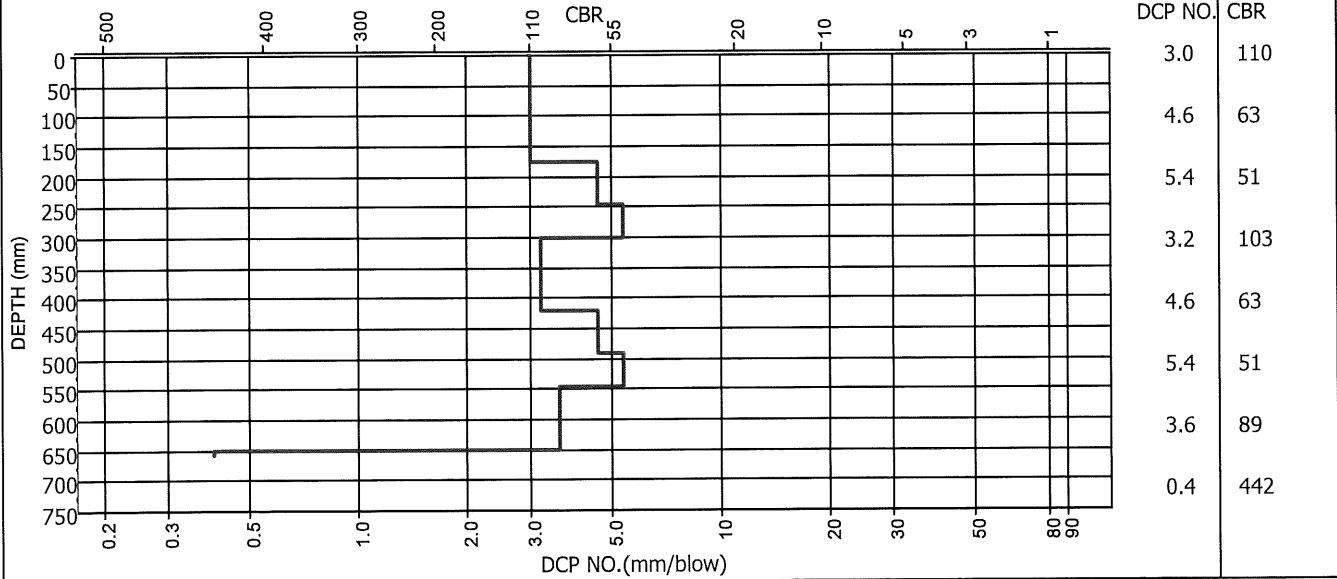
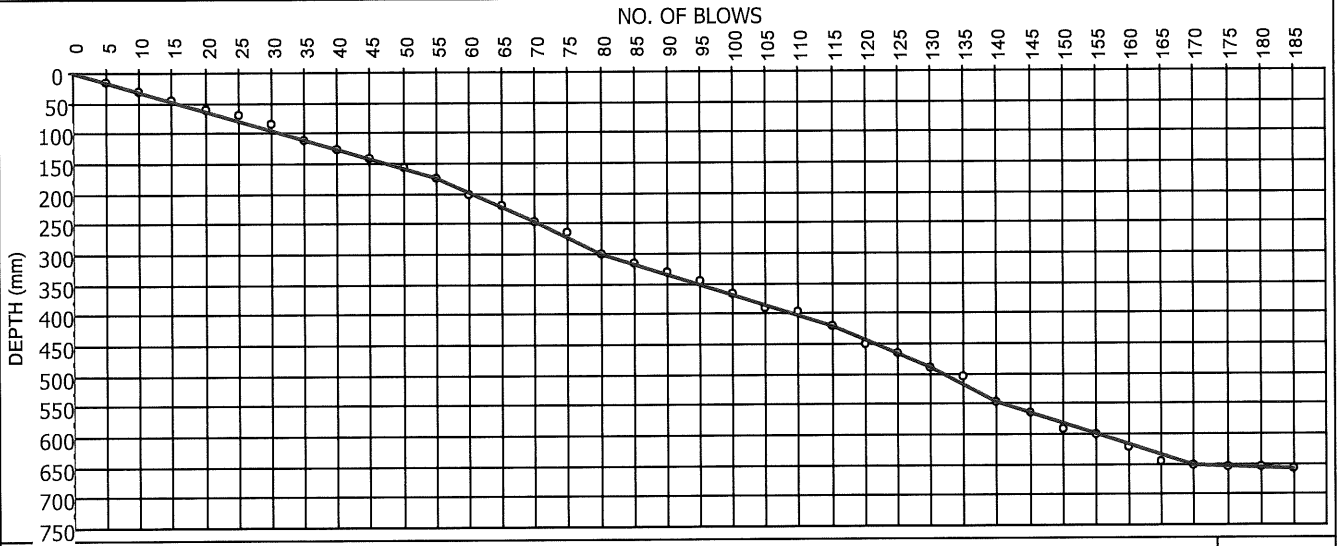
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 0007350 - X 2559552
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 84 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 240 | 255 | 270 | 285 | 300 | 315 | 330 | 345 | 360 | 375 |
| CBR | 110 | 110 | 110 | 110 | 170 | 110 | 55 | 110 | 110 | 110 | 75 | 55 | 75 | 55 | 75 | 35 | 110 | 110 | 110 | 75 | 55 | 300 | 395 | 420 | 465 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | | | | | | | | | | | | | |
| DEPTH | 490 | 505 | 545 | 565 | 590 | 600 | 620 | 645 | 650 | 653 | 655 | 657 | | | | | | | | | | | | | |
| CBR | 55 | 110 | 30 | 75 | 55 | 170 | 75 | 55 | 300 | 389 | 442 | 442 | | | | | | | | | | | | | |



Remarks :

FORM: ST6

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TEST RESULTS

Kruger National Park
Private Bag X 402
Skukuza
1350
Attention: Tebogo Maake

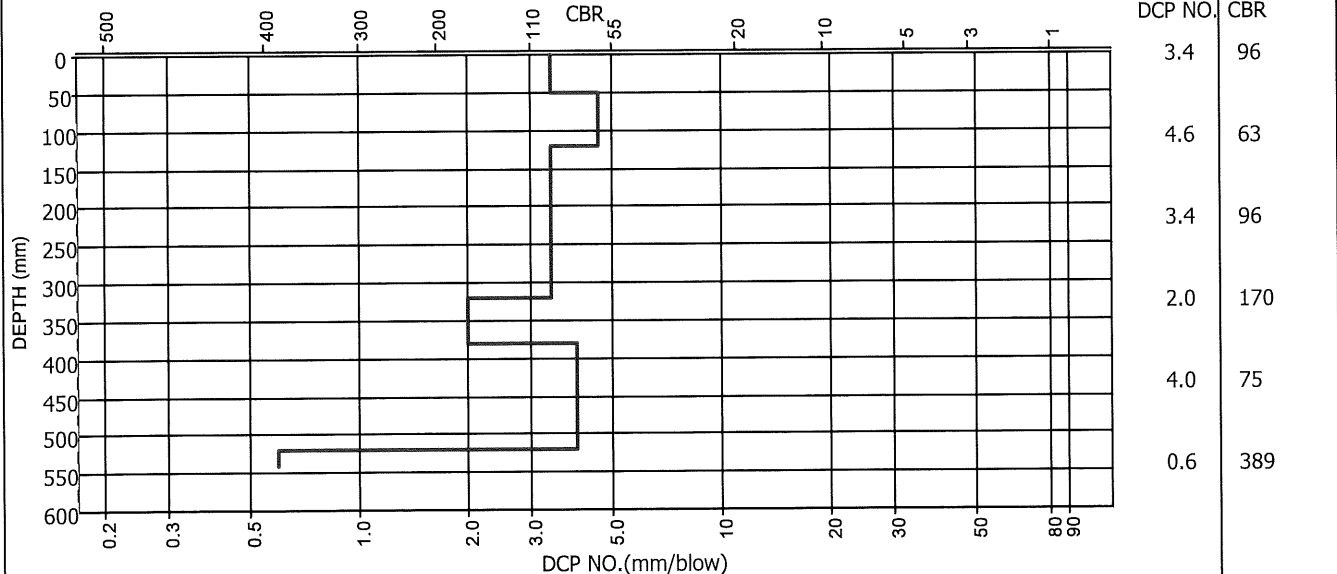
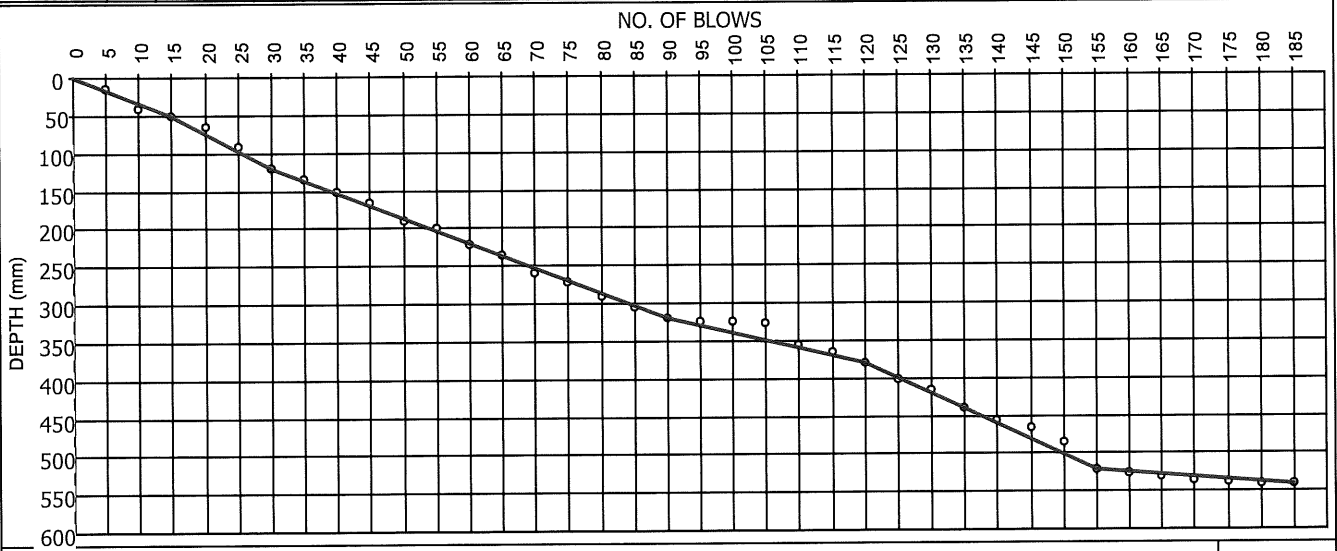
Project : Proposed New Shangoni Gate
: S/LHS 31 Y 0007521 - X 2559053
Your Ref : SK-PO098123
Our Ref : 1947
Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 85 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 15 | 40 | 50 | 65 | 90 | 120 | 135 | 150 | 165 | 190 | 200 | 220 | 235 | 260 | 270 | 290 | 305 | 320 | 323 | 325 | 327 | 355 | 365 | 380 | 400 |
| CBR | 110 | 55 | 170 | 110 | 55 | 45 | 110 | 110 | 110 | 55 | 75 | 110 | 55 | 170 | 75 | 110 | 110 | 389 | 442 | 442 | 49 | 170 | 110 | 75 | |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | | | | | | | | | | | | | |
| DEPTH | 415 | 440 | 455 | 465 | 485 | 520 | 525 | 530 | 535 | 537 | 539 | 541 | | | | | | | | | | | | | |
| CBR | 110 | 55 | 110 | 170 | 75 | 35 | 300 | 300 | 300 | 442 | 442 | 442 | | | | | | | | | | | | | |



Remarks :

FORM: ST6

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogoa Maake

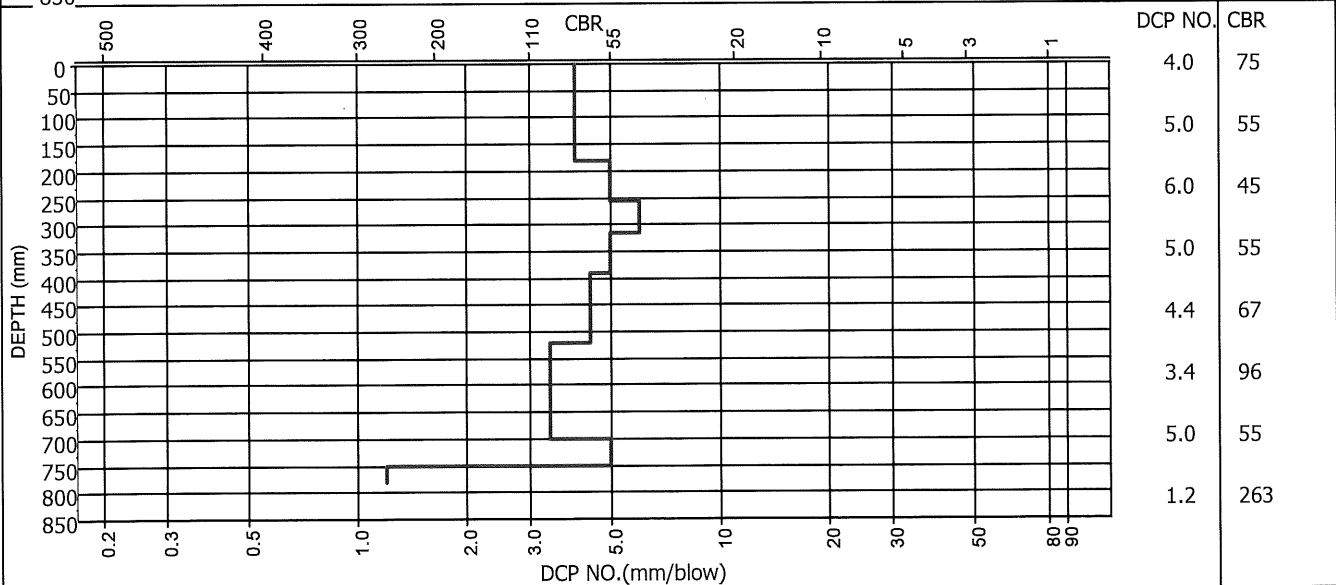
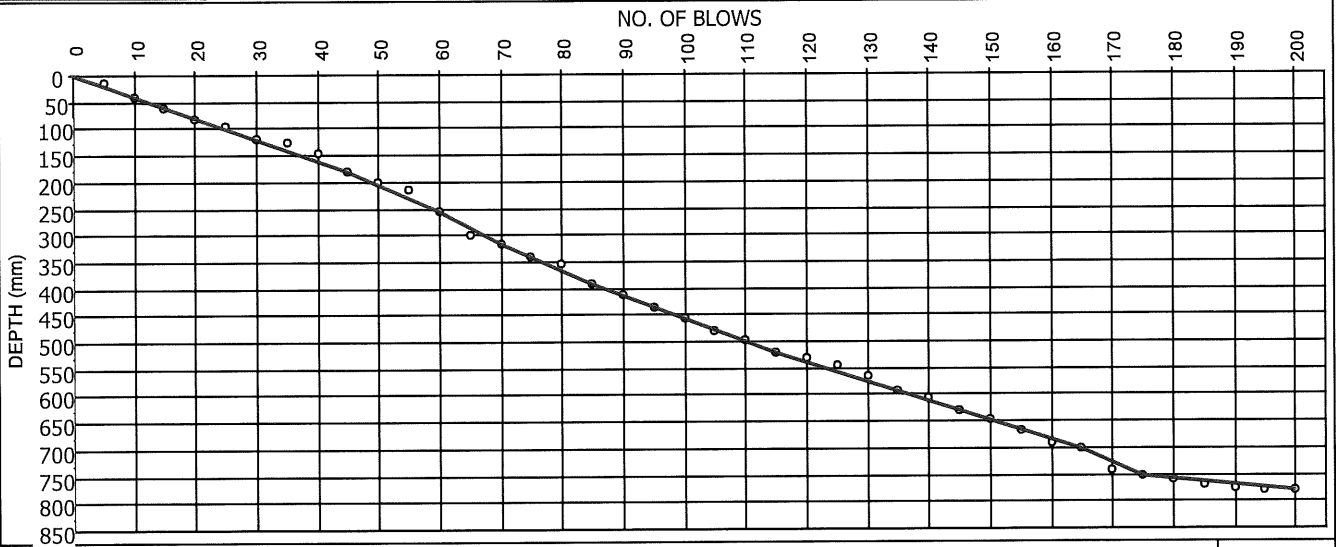
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 0007690 - X 2558621
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 86 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 15 | 40 | 60 | 80 | 95 | 120 | 125 | 145 | 180 | 200 | 215 | 255 | 300 | 315 | 340 | 355 | 390 | 410 | 435 | 455 | 480 | 495 | 520 | 530 | 545 |
| CBR | 110 | 55 | 75 | 75 | 110 | 55 | 300 | 75 | 35 | 75 | 110 | 30 | 25 | 110 | 55 | 110 | 35 | 75 | 55 | 75 | 55 | 110 | 55 | 170 | 110 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | | | | | | | | | | |
| DEPTH | 565 | 590 | 605 | 630 | 645 | 665 | 689 | 700 | 740 | 750 | 757 | 770 | 774 | 777 | 780 | | | | | | | | | | |
| CBR | 75 | 55 | 110 | 55 | 110 | 75 | 59 | 160 | 30 | 170 | 232 | 156 | 342 | 389 | 389 | | | | | | | | | | |



Remarks :

FORM: ST6

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

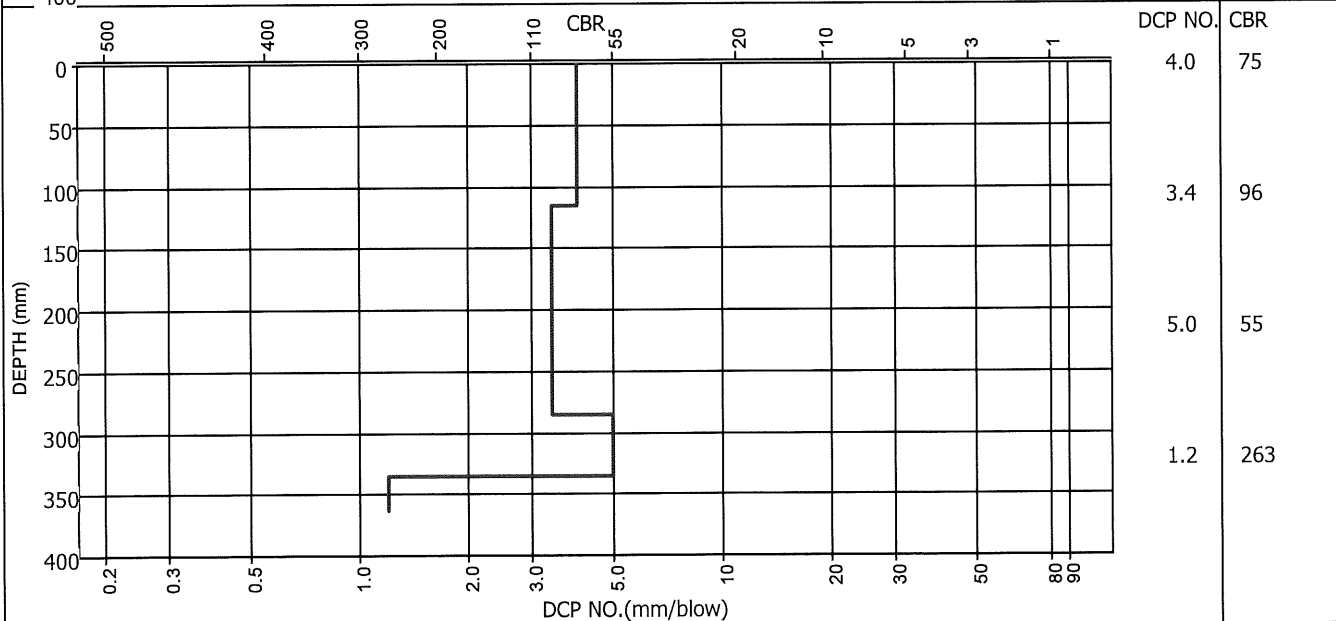
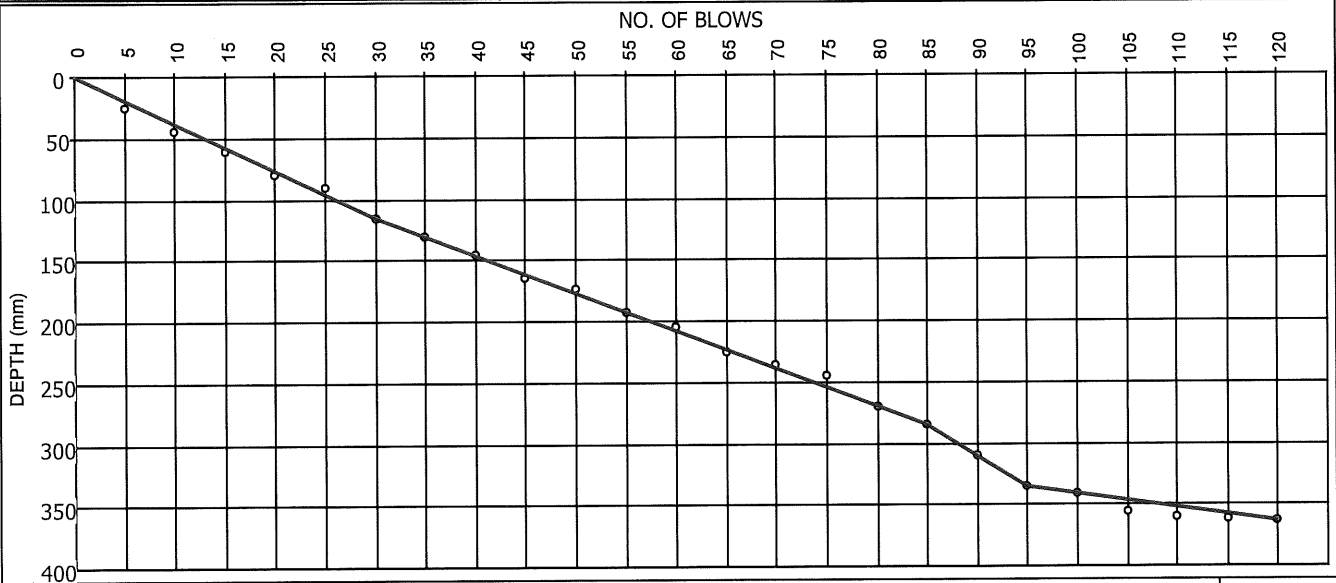
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 0007971 - X 2557896
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 87 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|----|----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 |
| DEPTH | 25 | 45 | 60 | 80 | 90 | 115 | 130 | 145 | 165 | 174 | 192 | 205 | 225 | 235 | 245 | 270 | 285 | 310 | 335 | 340 | 355 | 360 | 362 | 363 |
| CBR | 55 | 75 | 110 | 75 | 170 | 55 | 110 | 110 | 75 | 185 | 89 | 156 | 75 | 170 | 170 | 55 | 110 | 55 | 55 | 300 | 110 | 300 | 442 | 500 |



Remarks :

FORM: ST6

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Technical Signatory : G. van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogoa Maake

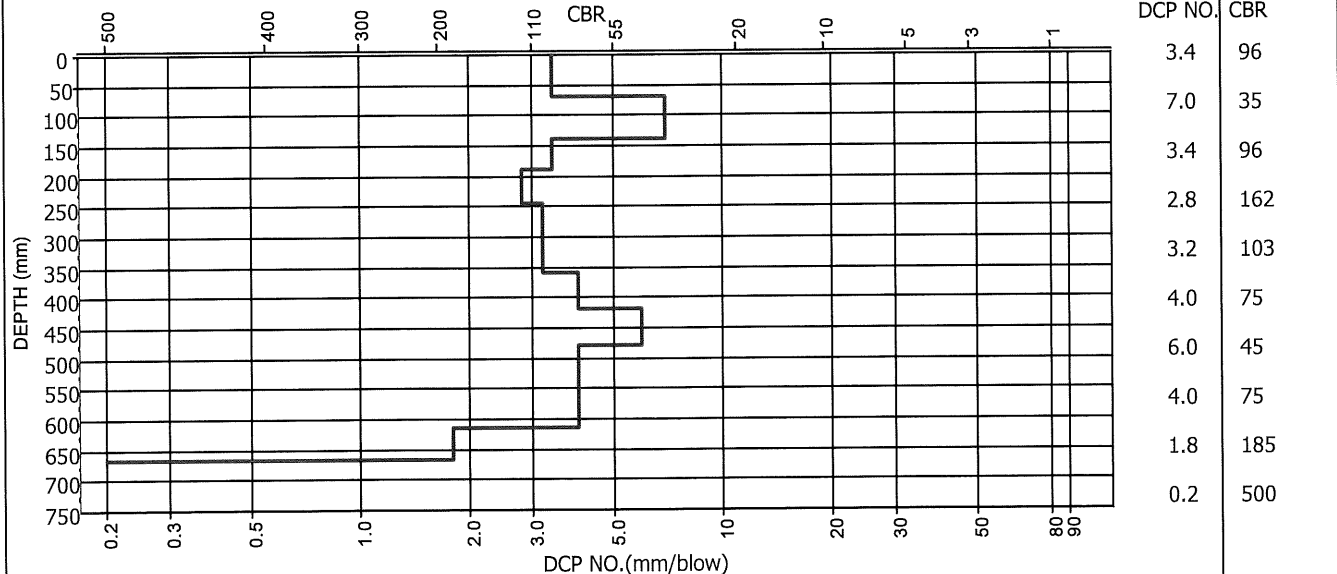
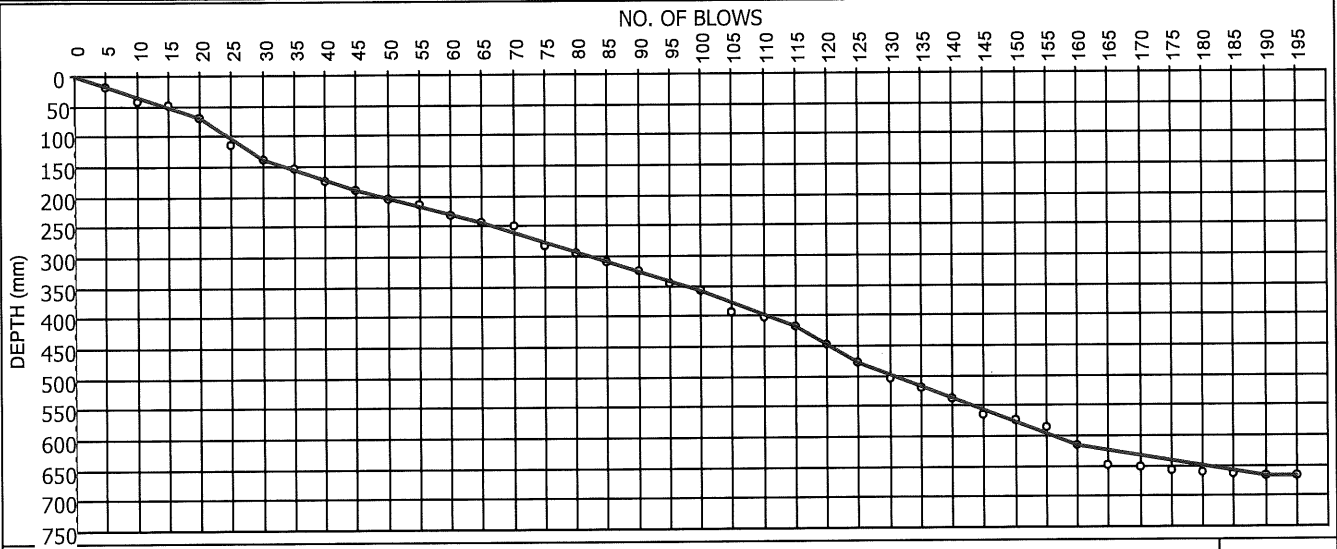
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 0008160 - X 2557411
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 88 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 18 | 43 | 48 | 68 | 113 | 138 | 153 | 173 | 188 | 203 | 213 | 230 | 244 | 250 | 283 | 293 | 308 | 323 | 346 | 358 | 393 | 403 | 418 | 448 | 478 |
| CBR | 89 | 55 | 300 | 75 | 25 | 55 | 110 | 75 | 110 | 110 | 170 | 96 | 162 | 263 | 39 | 170 | 110 | 110 | 63 | 155 | 35 | 170 | 110 | 45 | 45 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | | | | | | | | | | | |
| DEPTH | 503 | 518 | 538 | 563 | 573 | 584 | 614 | 648 | 651 | 658 | 661 | 663 | 666 | 667 | | | | | | | | | | | |
| CBR | 55 | 110 | 75 | 55 | 170 | 160 | 45 | 37 | 389 | 232 | 389 | 442 | 389 | 500 | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : GT van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

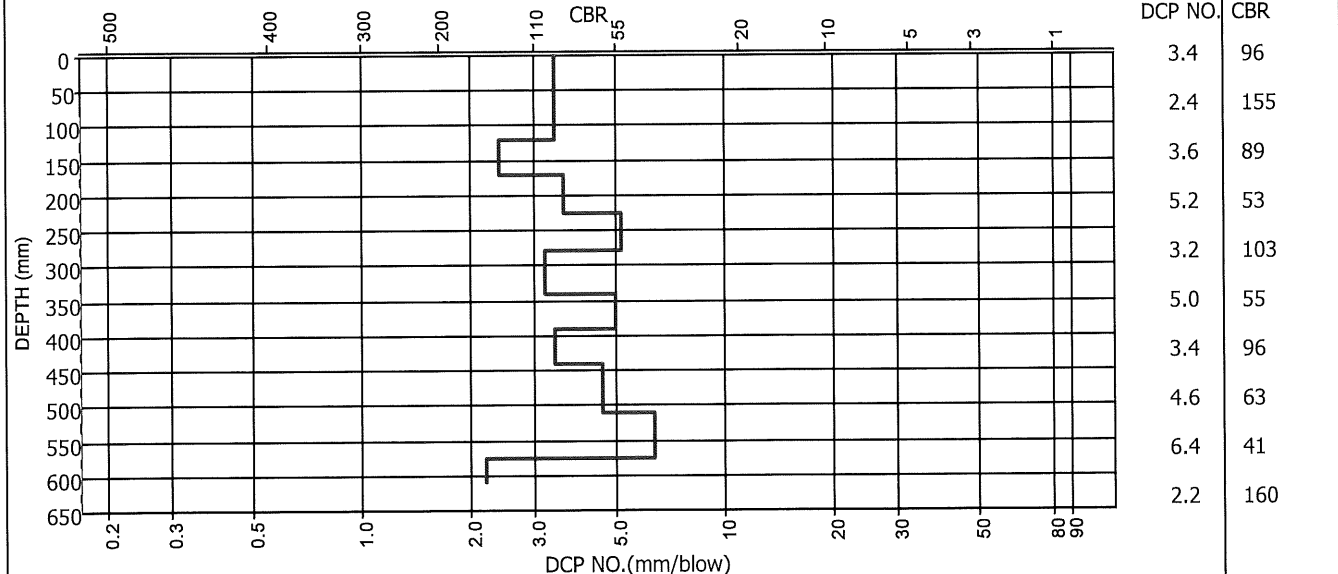
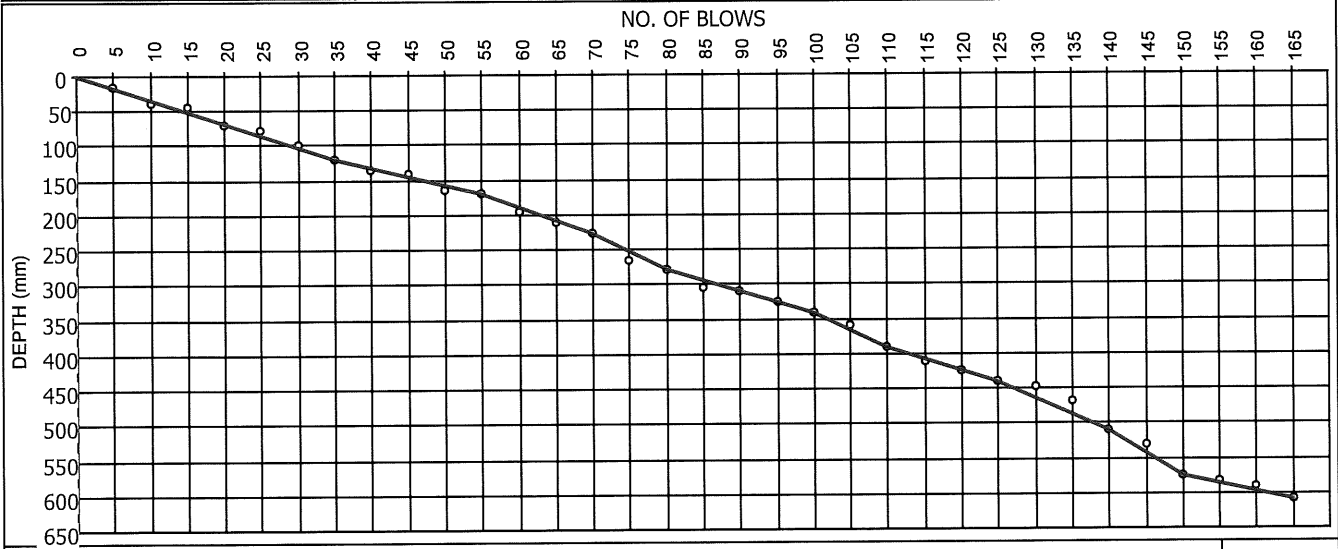
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 0008478 - X 2556594
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 89 - LHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 15 | 40 | 45 | 70 | 78 | 100 | 120 | 135 | 140 | 163 | 170 | 195 | 210 | 225 | 264 | 278 | 303 | 310 | 325 | 340 | 360 | 390 | 410 | 425 | 440 |
| CBR | 110 | 55 | 300 | 55 | 206 | 67 | 75 | 110 | 300 | 63 | 232 | 55 | 110 | 110 | 31 | 162 | 55 | 232 | 110 | 110 | 75 | 45 | 75 | 110 | 110 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | | | | | | | | | | | | | | | | | |
| DEPTH | 447 | 467 | 510 | 530 | 575 | 583 | 589 | 609 | | | | | | | | | | | | | | | | | |
| CBR | 232 | 75 | 27 | 75 | 25 | 206 | 263 | 75 | | | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

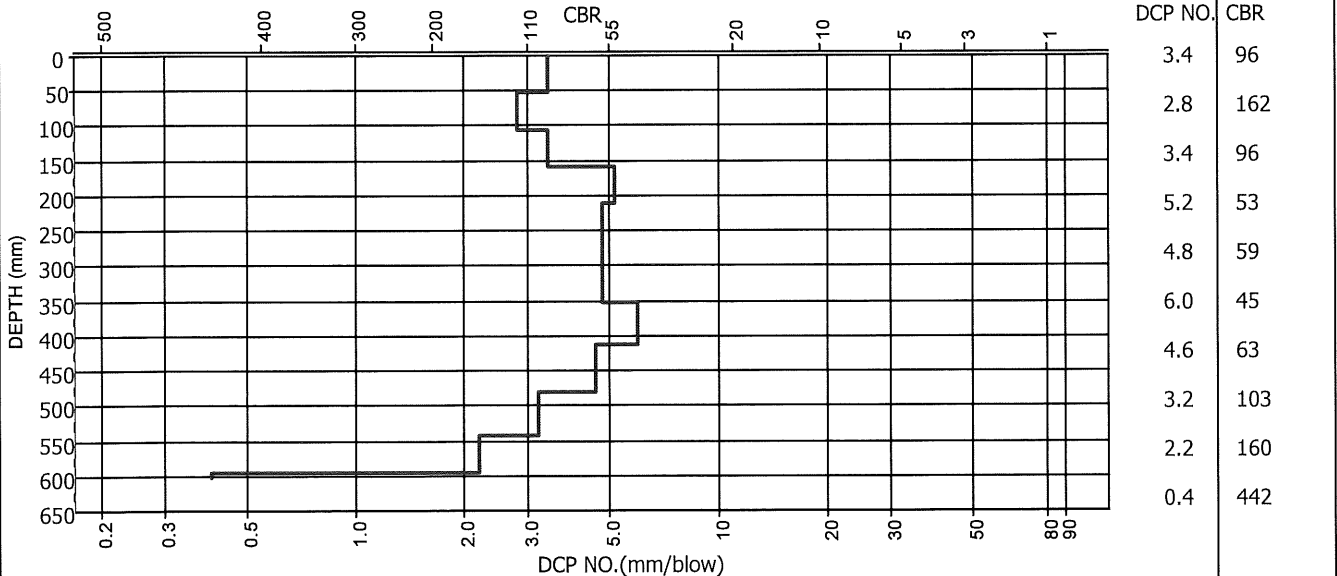
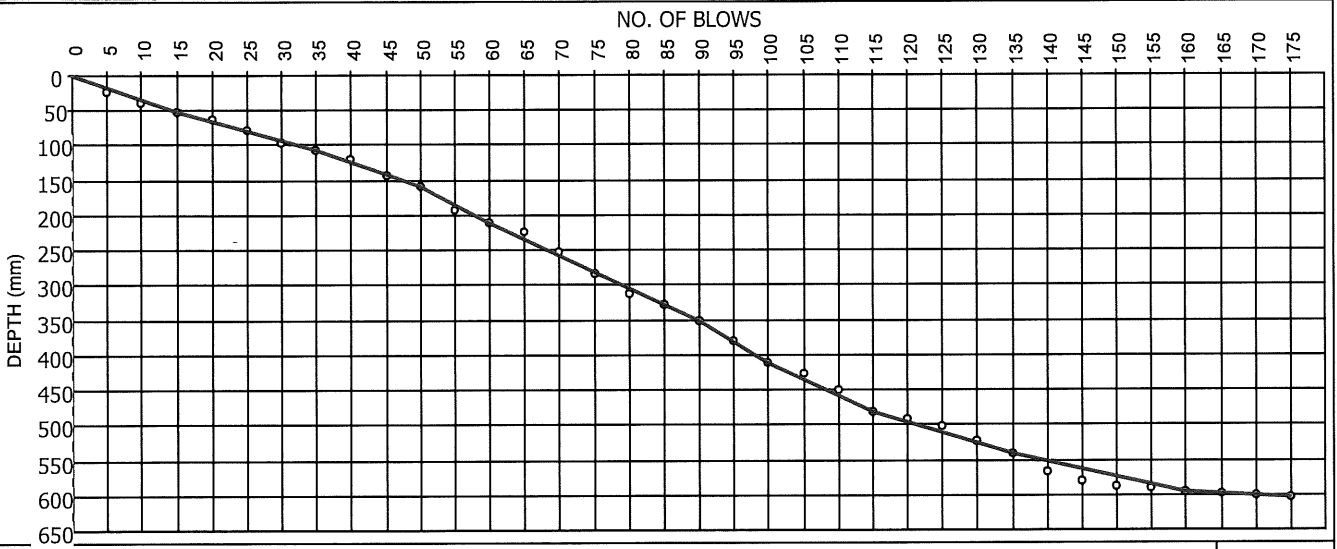
Project : Proposed New Shangoni Gate
 : S/RHS 31 Y 0023768 - X 2567696
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 92 - RHS

INITIAL DEPTH (mm) : 0

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| DEPTH | 23 | 38 | 52 | 63 | 78 | 97 | 106 | 120 | 143 | 158 | 193 | 210 | 223 | 252 | 283 | 313 | 328 | 352 | 380 | 412 | 426 | 451 | 480 | 491 | 503 |
| CBR | 63 | 110 | 162 | 160 | 110 | 82 | 185 | 162 | 63 | 110 | 35 | 96 | 156 | 47 | 43 | 45 | 110 | 59 | 49 | 41 | 162 | 55 | 47 | 160 | 155 |
| BLOWS | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | | | | | | | | | | | | | | | |
| DEPTH | 523 | 542 | 568 | 580 | 587 | 591 | 595 | 597 | 600 | 602 | | | | | | | | | | | | | | | |
| CBR | 75 | 82 | 53 | 155 | 232 | 342 | 342 | 442 | 389 | 442 | | | | | | | | | | | | | | | |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Gerrit van Rooyen / K.Z Mlambo

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TEST RESULTS

Kruger National Park
 Private Bag X 402
 Skukuza
 1350
 Attention: Tebogo Maake

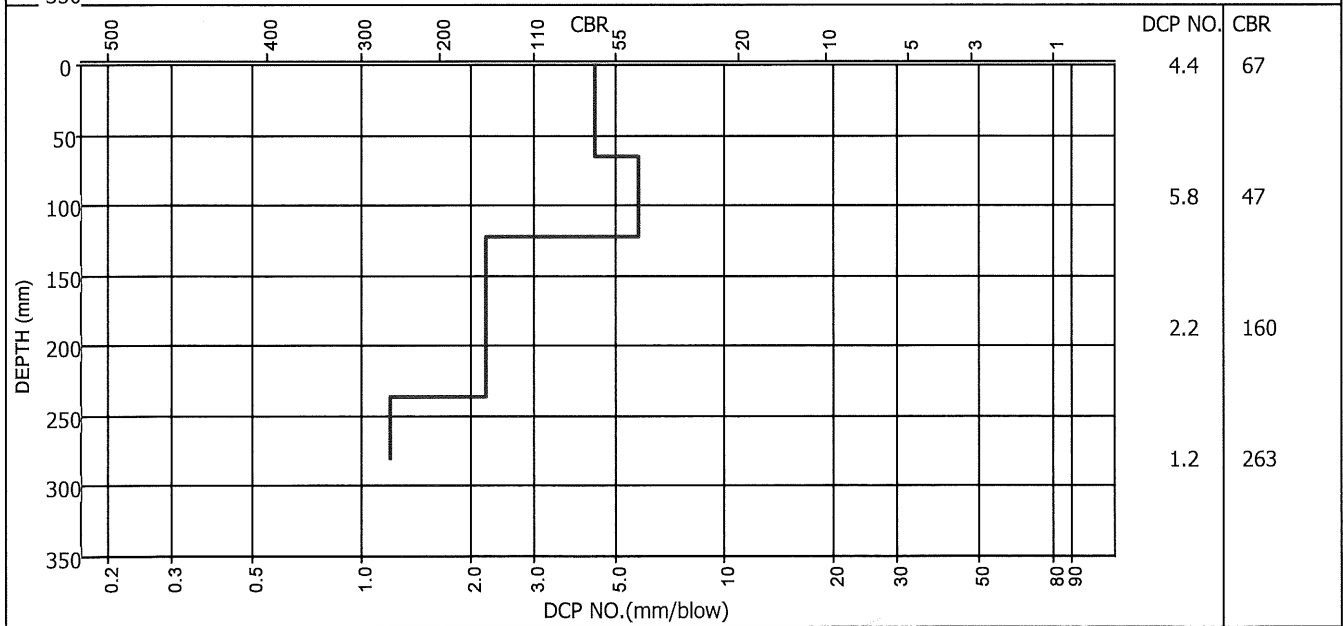
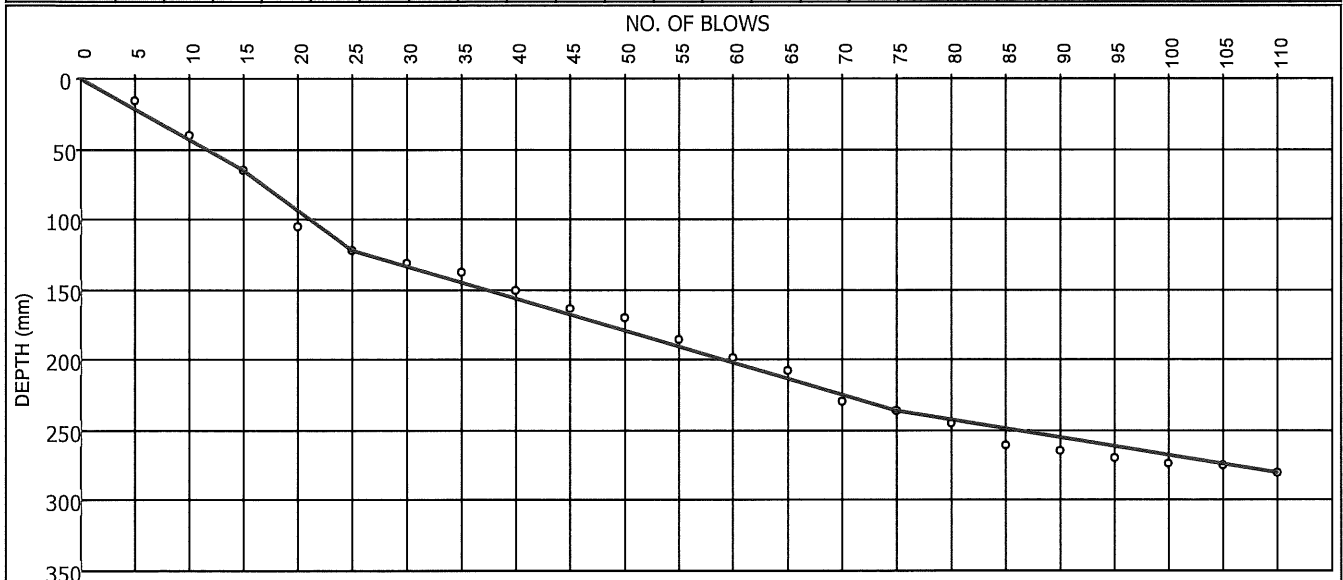
Project : Proposed New Shangoni Gate
 : S/LHS 31 Y 023964 - X 2567662
 Your Ref : SK-PO098123
 Our Ref : 1947
 Date Reported : 23/08/2019

DYNAMIC CONE PENETRATION TEST (TMH6-ST6)

TEST POSITION : S 11451 - DCP 93 - LHS

INITIAL DEPTH (mm) : 0

| BLOWS | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 |
|-------|-----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| DEPTH | 15 | 40 | 65 | 105 | 122 | 131 | 138 | 150 | 163 | 170 | 185 | 198 | 207 | 229 | 236 | 245 | 260 | 265 | 270 | 273 | 275 | 280 |
| CBR | 110 | 55 | 55 | 30 | 96 | 185 | 232 | 155 | 156 | 232 | 110 | 156 | 185 | 67 | 232 | 185 | 110 | 300 | 300 | 389 | 442 | 300 |



Remarks :

FORM: ST6

4.4.0(SGS)(2016.08.31)

Technical Signatory : ST van Rooyen / K.Z Mlambo

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LL3391 – SHONGONI

| DCP No. | Depth (m) | Ave CBR | Ave CBR @ 0,15m |
|----------------|------------------|----------------|----------------------------|
| DCP1 - LHS | 1,0 | 32 | 32 |
| DCP2 - RHS | 0,225 | 90 | 120 |
| DCP3 - LHS | 0,50 | 82 | 65 |
| DCP4 - RHS | 0,16 | 110 | 200 |
| DCP5 - LHS | 0,30 | 110 | 80 |
| DCP6 - RHS | 1,0 | 50 | 35 |
| DCP7 - LHS | 1,0 | 70 | 30 |
| DCP8 - RHS | 0,35 | 110 | 55 |
| DCP9 - LHS | 0,25 | 145 | 110 |
| DCP10 - RHS | 1,0 | 65 | 35 |
| DCP11 - LHS | 0,225 | 70 | 150 |
| DCP12 - RHS | 0,30 | 90 | 150 |
| DCP13 - RHS | 0,180 | 110 | 180 |
| DCP14 - S | 0,08 | 300 | 350 |
| DCP15 - RHS | 0,55 | 110 | 120 |
| DCP16 - RHS | 0,95 | 15 | 30 |
| DCP17 - LHS | 0,65 | 55 | 85 |
| DCP18 - RHS | 0,18 | 180 | 200 |
| DCP19 - RHS | 0,65 | 90 | 130 |
| DCP20 - RHS | 0,20 | 100 | 200 |
| DCP21 | | | |
| DCP22 - LHS | 0,22 | 90 | 110 |
| DCP23 - RHS | 0,22 | 110 | 130 |
| DCP24 - RHS | 0,30 | 80 | 110 |
| DCP25 - LHS | 0,50 | 180 | 180 |
| DCP26 - RHS | | 100 | 120 |
| DCP27 - LHS | | 100 | 120 |
| DCP28 - CL | 0,25 | 100 | 160 |
| DCP29 - CL | 0,80 | 200 | 200 |
| DCP30 | | | |
| DCP31 - LHS | 0,95 | 55 | 90 |
| DCP32 - RHS | 0,50 | 55 | 110 |
| DCP33 - RHS | 0,40 | 110 | 55 |
| DCP34 - LHS | 0,80 | 55 | 55 |
| DCP35 - RHS | 0,95 | 55 | 30 |
| DCP36 - CL | 0,10 | 110 | 160 |
| DCP37 - CL | 0,05 | > 200 | >200 |
| DCP38 - LHS | 0,90 | 60 | 30 |
| DCP39 - RHS | 0,65 | 80 | 55 |

| DCP No. | Depth (m) | Ave CBR | Ave CBR @ 0,15m |
|-------------|-----------|---------|-----------------|
| DCP40 - LHS | 0,45 | 110 | 110 |
| DCP41 - CL | 00,45 | 55 | 50 |
| DCP42 - RHS | 0,16 | 200 | 180 |
| DCP43 - LHS | 0,70 | 55 | 80 |
| DCP44 - RHS | 0,90 | 20 | 12 |
| DCP45 - LHS | 0,48 | 145 | 180 |
| DCP46 - RHS | 0,55 | 100 | 100 |
| DCP47 | | | |
| DCP48 - RHS | 0,35 | 55 | 125 |
| DCP49 - LHS | 0.01 | >100 | >100 |
| DCP50 - RHS | 0,15 | 140 | >200 |
| DCP51 - LHS | 0,40 | 110 | 140 |
| DCP52 - RHS | 0,90 | 55 | 55 |
| DCP53 - LHS | 0,45 | 45 | 75 |
| DCP54 - RHS | 0,375 | 110 | 150 |
| DCP55 - CL | 0,80 | 70 | 55 |
| DCP56 - LHS | 0,40 | 70 | 85 |
| DCP57 - RHS | 0,70 | 65 | 85 |
| DCP58 - LHS | 0,45 | 70 | 100 |
| DCP59 -RHS | 0,65 | 55 | 40 |
| DCP60 - LHS | 0,55 | 55 | 55 |
| DCP61 - RHS | 0,15 | 55 | 100 |
| DCP62 - LHS | 0,35 | 60 | 80 |
| DCP63 - CL | 0,65 | 80 | 110 |
| DCP64 | | | |
| DCP65 - RHS | 0,30 | 110 | 110 |
| DCP66 - LHS | 0,30 | 180 | 180 |
| DCP67 - RHS | 0,20 | 180 | 180 |
| DCP68 - LHS | 0,20 | 180 | 180 |
| DCP69 - RHS | 0,30 | 140 | 160 |
| | | | |
| DCP74 - RHS | 0,50 | 75 | 60 |
| DCP75 - LHS | 0,65 | 70 | 55 |
| DCP76 - RHS | 0,45 | 100 | 70 |
| DCP77 - LHS | 0,55 | 55 | 60 |
| DCP78 - RHS | 0,50 | 60 | 40 |
| DCP79 - LHS | 0,15 | 100 | 150 |
| DCP80 - RHS | 0,65 | 110 | 80 |
| DCP81 - LHS | 0,45 | 110 | 90 |
| DCP82 - RHS | 0,55 | 90 | 110 |
| DCP83 - LHS | 0,15 | 60 | >100 |

| DCP No. | Depth (m) | Ave CBR | Ave CBR @ 0,15m |
|----------------|------------------|----------------|----------------------------|
| DCP84 - RHS | 0,65 | 80 | 110 |
| DCP85 - LHS | 0,55 | 70 | 110 |
| DCP86 - RHS | 0,75 | 60 | 110 |

TABLE C: SUMMARY OF DCP FIELD DATA PAGE 1 of 2

| DCP No. | Depth (m) | Ave CBR | Ave CBR @ 0,15m |
|-------------|-----------|---------|-----------------|
| DCP1 - LHS | 1,0 | 32 | 32 |
| DCP2 - RHS | 0,225 | 90 | 120 |
| DCP3 - LHS | 0,50 | 82 | 65 |
| DCP4 - RHS | 0,16 | 110 | 200 |
| DCP5 - LHS | 0,30 | 110 | 80 |
| DCP6 - RHS | 1,0 | 50 | 35 |
| DCP7 - LHS | 1,0 | 70 | 30 |
| DCP8 - RHS | 0,35 | 110 | 55 |
| DCP9 - LHS | 0,25 | 145 | 110 |
| DCP10 - RHS | 1,0 | 65 | 35 |
| DCP11 - LHS | 0,225 | 70 | 150 |
| DCP12 - RHS | 0,30 | 90 | 150 |
| DCP13 - RHS | 0,180 | 110 | 180 |
| DCP14 - S | 0,08 | 300 | 350 |
| DCP15 - RHS | 0,55 | 110 | 120 |
| DCP16 - RHS | 0,95 | 15 | 30 |
| DCP17 - LHS | 0,65 | 55 | 85 |
| DCP18 - RHS | 0,18 | 180 | 200 |
| DCP19 - RHS | 0,65 | 90 | 130 |
| DCP20 - RHS | 0,20 | 100 | 200 |
| DCP21 | | | |
| DCP22 - LHS | 0,22 | 90 | 110 |
| DCP23 - RHS | 0,22 | 110 | 130 |
| DCP24 - RHS | 0,30 | 80 | 110 |
| DCP25 - LHS | 0,50 | 180 | 180 |
| DCP26 - RHS | | 100 | 120 |
| DCP27 - LHS | | 100 | 120 |
| DCP28 - CL | 0,25 | 100 | 160 |
| DCP29 - CL | 0,80 | 200 | 200 |
| DCP30 | | | |
| DCP31 - LHS | 0,95 | 55 | 90 |
| DCP32 - RHS | 0,50 | 55 | 110 |
| DCP33 - RHS | 0,40 | 110 | 55 |
| DCP34 - LHS | 0,80 | 55 | 55 |
| DCP35 - RHS | 0,95 | 55 | 30 |
| DCP36 - CL | 0,10 | 110 | 160 |
| DCP37 - CL | 0,05 | > 200 | >200 |
| DCP38 - LHS | 0,90 | 60 | 30 |
| DCP39 - RHS | 0,65 | 80 | 55 |
| DCP40 - LHS | 0,45 | 110 | 110 |
| DCP41 - CL | 00,45 | 55 | 50 |
| DCP42 - RHS | 0,16 | 200 | 180 |
| DCP43 - LHS | 0,70 | 55 | 80 |

| DCP No. | Depth (m) | Ave CBR | Ave CBR @ 0,15m |
|-------------|-----------|---------|-----------------|
| DCP44 - RHS | 0,90 | 20 | 12 |
| DCP45 - LHS | 0,48 | 145 | 180 |
| DCP46 - RHS | 0,55 | 100 | 100 |
| DCP47 | | | |
| DCP48 - RHS | 0,35 | 55 | 125 |
| DCP49 - LHS | 0.01 | >100 | >100 |
| DCP50 - RHS | 0,15 | 140 | >200 |
| DCP51 - LHS | 0,40 | 110 | 140 |
| DCP52 - RHS | 0,90 | 55 | 55 |
| DCP53 - LHS | 0,45 | 45 | 75 |
| DCP54 - RHS | 0,375 | 110 | 150 |
| DCP55 - CL | 0,80 | 70 | 55 |
| DCP56 - LHS | 0,40 | 70 | 85 |
| DCP57 - RHS | 0,70 | 65 | 85 |
| DCP58 - LHS | 0,45 | 70 | 100 |
| DCP59 - RHS | 0,65 | 55 | 40 |
| DCP60 - LHS | 0,55 | 55 | 55 |
| DCP61 - RHS | 0,15 | 55 | 100 |
| DCP62 - LHS | 0,35 | 60 | 80 |
| DCP63 - CL | 0,65 | 80 | 110 |
| DCP64 | | | |
| DCP65 - RHS | 0,30 | 110 | 110 |
| DCP66 - LHS | 0,30 | 180 | 180 |
| DCP67 - RHS | 0,20 | 180 | 180 |
| DCP68 - LHS | 0,20 | 180 | 180 |
| DCP69 - RHS | 0,30 | 140 | 160 |
| | | | |
| DCP74 - RHS | 0,50 | 75 | 60 |
| DCP75 - LHS | 0,65 | 70 | 55 |
| DCP76 - RHS | 0,45 | 100 | 70 |
| DCP77 - LHS | 0,55 | 55 | 60 |
| DCP78 - RHS | 0,50 | 60 | 40 |
| DCP79 - LHS | 0,15 | 100 | 150 |
| DCP80 - RHS | 0,65 | 110 | 80 |
| DCP81 - LHS | 0,45 | 110 | 90 |
| DCP82 - RHS | 0,55 | 90 | 110 |
| DCP83 - LHS | 0,15 | 60 | >100 |
| DCP84 - RHS | 0,65 | 80 | 110 |
| DCP85 - LHS | 0,55 | 70 | 110 |
| DCP86 - RHS | 0,75 | 60 | 110 |