- Although classified in the Table above, it is recommended that this particular layer be removed from below all foundations and surface beds. As this is generally a relatively thin, surface layer, this stipulation is not considered onerous.
- Assuming that the exposed shale or mudstone is not left for long periods to degrade excessively prior to the casting of foundations.

Table 9 below summarises the anticipated site class for each of the test pit excavations based on 'shallow' foundations. The information given assumes that the foundation level will be established around 0.5m to 0.6m below the current ground level. It is recommended that the surface layer of transported soils mantling the site be removed from below all foundations and surface beds.

Deeper foundation levels (in excess of 0.5m to 0.6m deep as qualified above), may encroach onto materials with a different foundation characteristic.

Table 9: Residential site classes according to test pit excavations

Site class	Applicable test pit numbers
R	2-1; 2-12; 2-13; 2-22; 2-24; 2-25; 2-26; 2-28; 2-29; 2-30; 2-32; 2-33; 2-34; 2-35; 2-37; 2-38; 2-40; 2-41; 2-42; 2-45; 2-48
H1	2-2; 2-3; 2-4; 2-5; 2-6; 2-7; 2-8; 2-9; 2-10; 2-11; 2-14; 2-15; 2-16; 2-17; 2-18; 2-19; 2-20; 2-21; 2-23; 2-27; 2-31; 2-36; 2-39; 2-43; 2-44; 2-46; 2-47;

The information contained in Table 9 is graphically illustrated in the site classes drawing contained in Appendix C.

7. RECOMMENDATIONS

7.1. Foundations for one to two storey structures

The recommended founding arrangements for one to two storey structures are based on the guidelines given in SAICE and IstructE (1995) for the various site classes that were identified.

7.1.1. Site class H1

Preparatory work:

- Remove the upper surface layer of transported soils from below all foundations and covering surface beds.
- Avoid dissimilar foundation conditions, i.e. ensure foundations are underlain by similar materials.
- Undertake appropriate compaction along the bases of the foundation excavations.
- Do not allow the exposed foundation soils to dry out prior to casting of foundation concrete. If required, artificially wet to moisture content as close as possible to optimum.

Recommended foundation system:

- 'Modified normal' construction consisting of:
 - Lightly reinforced strip footings,
 - Articulation joints at all internal/external doors and openings,
 - Light reinforcement in masonry,
 - Adequate site drainage and service/plumbing precautions.

7.1.2. Site class R

Preparatory work:

- Remove the upper surface layer of transported soils from below all foundations and covering surface beds.
- Excavate foundations onto at least very soft rock shale or dolerite.
- Avoid dissimilar foundation conditions, i.e. ensure foundations are underlain by similar materials.
- Thoroughly clean foundation excavations prior to the casting of concrete.

Cast foundation concrete as soon as possible after completion of excavations.

Recommended foundation system:

- 'Normal' construction consisting of:
 - Unreinforced strip, or slab-on-the-ground type foundations,
 - Adequate site drainage and service/plumbing precautions.

7.2. Allowable bearing capacities

All structures must be designed so as not to exceed the following, allowable bearing capacities: (Applicable to 600mm wide strip footings at least 500mm deep).

Upper surface layer of transported soils:
 NOT to be used as a founding layer.

Calcareous residual shale/mudstone:
 100kPa

• Very soft rock shale¹: 200kPa

• Soft rock or harder dolerite²: 650kPa

- 1 One third of 'average' UCS for very soft rock (0.7 to 3.0MPa), with factor of safety of 3.0.
- 2 One third of 'average' UCS for soft rock (3.0 to 10.0MPa), with factor of safety of 3.0.

7.3. Construction of surface beds and fills

7.3.1. Site class 'H1' area

It will be required to remove the upper, surface layer of transported soils over the entire footprint areas to be covered by surface beds and fills. The in-situ soils at this reduced level must be ripped to at least 150mm deep and re-compacted, at a moisture content close to optimum (OMC) and a minimum density of 90% Mod. AASHTO. The compacted base must NOT be allowed to dry out prior to the placement of fill and if required, must be artificially wetted. Fill must be placed in thin layers (typically 150mm thick), and each layer compacted to at least 93% Mod. AASHTO at OMC.

7.3.2. Site class 'R' area

It will be required to remove the upper, surface layer of transported soils over the entire footprint areas to be covered by surface beds and fills. The base must be established on at least very soft rock shale or dolerite. If required the top of the rockhead must be manually cleaned prior to the placement of fill. To prevent excessive degradation of the rockhead, especially in the case of shale, fill must be placed as soon as possible. Fill must be placed in thin layers (typically 150mm thick), and each layer compacted to at least 93% Mod. AASHTO at OMC.

7.4. Pavement layerworks

The following generic steps are recommended in the construction of the access roads.

- Remove all vegetation over the entire footprint area of the road to stockpile for later use.
- Remove the upper, surface layer of transported soils over the entire road footprint area.
- If the base of the resultant undercut excavation is situated within at least very soft rock or harder material, thoroughly clean the surface of the rockhead and place road layerworks directly onto rockhead. Avoid any traffic driving directly on the rockhead level as thus may break-down the very soft rock structure into a fine, powdery material, especially in the case of shale and/or mudstone. The shale/mudstone rockhead must be covered as soon as possible after exposing to the atmosphere as this material is prone to 'slaking'.
- If the base of the undercut excavation is situated within soil, rip the exposed, in-situ subgrade to a minimum depth of 150mm and re-compact to a density of at least 90% Mod AASHTO at a moisture content close to optimum.
- Subsequent layerworks must be placed on a moist (and not dry), compacted soil surface. If required the exposed surface must be artificially wetted to a moisture content near optimum.
- The following tentative foundation layering system can be considered but the final layout will be dependent on the type, speed and frequency of traffic that will use the access roads:
 - Place and compact a minimum 150mm thick layer of G9 material to form the *lower* selected subgrade layer. A minimum compaction specification of 93% Mod AASHTO density is recommended.

- Place and compact a minimum 150mm thick layer of G7 material to form the upper selected subgrade layer. A minimum compaction specification of 95% Mod AASHTO density is recommended.
- Place and compact the remainder of the road layerworks (subbase, base and surfacing), based on an analysis of the type and frequency of traffic that will use the road.
- The following surfacing options are recommended:
 - An asphalt application or concrete slab on a stabilised subbase layer.
 - A layer of sand on top of a stabilised subbase layer followed by the placement of interlocking paving blocks, contained between kerbs or other non-movable structures.

7.5. Sources of construction materials

Construction materials for use within roads and parking area layerworks, fill below surface beds and general fills can be chosen based on the information given in Section 5.6 above (strength and compaction characteristics). The following summarised recommendations are given:

- Very soft rock mudstone and its weathering products should NOT be used as a construction material.
- Very soft rock or harder shale formations are generally expected to comply with G6 to G7 quality and is deemed potentially suitable for use within lower and upper selected, subgrade layers as well as general fill material. Careful selection of material will be required to ensure that shale is in fact sourced and not mudstone, which is closely associated with shale. It may be considered to stabilise or treat shale material with a suitable stabilising agent in order to produce a stabilised subbase (C4) material. This operation must be assessed during the construction phase with appropriate laboratory testing.
- Soft rock or harder dolerite formations are expected to generally comply with G6 quality and hence can have varied applications as a construction material, both within road layerworks as well as fills. The primary problem foreseen with the use of this source is the excavatibility of the material, partly due to soft rock or harder formations that will be encountered near surface and/or the presence of abundant hard rock dolerite boulders.

8. REERENCES

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Weston DJ (1979) Expansive roadbed treatment for Southern Africa – Proc 4th Int. Conf. on Expansive soils - Denver, Colorado.

APPENDIX A SOIL PROFILES

TEST PIT NO. 2-1 Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 23 June 2009



Southern Geotechnical Engineering P.O. Box 1687 Brooklyn Square 0075 Tel: 012 430 2081

Client: Bigen Africa Services Coordinates: 25 Y0027641 X3172892

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1 – 0.2 – 0.3 –		TRANSPORTED SOILS Dry, reddish brown, MEDIUM DENSE, intact, clayey SAND		
0.4- 0.5- 0.6-		VERY SOFT ROCK SHALE Dry, light grey stained dark orange along bedding planes, highly weathered, fine-grained, bedded, very highly fractured, very soft rock		ntered
0.7- 0.8- 0.9-				Not encountered
1.0- 1.1- 1.2-				_
1.3- 1.4- 1.5- 1.6-			D. II	
1.6- 1.7- 1.8- 1.9-			Bulk	
2.0- 2.1- 2.2-				
2.3- 2.4- 2.5-				
2.6- 2.7				
2.8- 2.9- 3.0-				
3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Not yet refusal

Groundwater conditions: Not encountered General remarks 2: Slow rate of excavation at base

Base of test pit: 2.7m - excavation stopped General remarks 3:

Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 23 June 2009



Southern Geotechnical

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0075
Tel: 012 430 2081

Client: Bigen Africa Services Coordinates: 25 Y0028001 X3173066

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0 0.1 0.2 0.3 0.4 0.5	/ / / /	TRANSPORTED SOILS Slightly moist, orange brown, FIRM to STIFF, cracked, sandy to silty CLAY		þ
0.6- 0.7- 0.8-		CALCAREOUS RESIDUAL SHALE Slightly moist, light orange brown blotched white, LOOSE, slightly open-structured, silty to clayey SAND containing minor 'lenses' of soft, white, calcareous gravel.		Not encountered
1.1— 1.2— 1.3— 1.4—		RESIDUAL SHALE Light grey blotched dark grey and stained dark orange along bedding planes, highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale		
1.5— 1.6— 1.7— 1.8— 1.9—				
2.0 2.1				
2.1				
2.3-				
2.4-				
2.5-				
2.6-				
2.7-				
2.8-				
2.9				
3.0- 3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Slow rate of excavation at base

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 2.0m - near refusal **General remarks 3:** TEST PIT NO. 2-11 Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 23 June 2009



Southern Geotechnical Engineering P.O. Box 1687 Brooklyn Square 0075 Tel: 012 430 2081

Client: Bigen Africa Services Coordinates: 25 Y0028147 X3173150

SAMPLING Depth (m) **GROUND** EGEND. **DESCRIPTION** WATER **LEVEL** Current NGL 0.0 TRANSPORTED SOILS 0.1 -Dry, light brown, FIRM to STIFF, cracked, sandy CLAY to clayey 0.2 SAND 0.3 0.4 0.5 Not encountered 0.6 **CALCAREOUS RESIDUAL SHALE** Disturbed 0.7^{-} Dry, light orange brown blotched white and dark grey, MEDIUM 0.8 DENSE TO DENSE, silty to clayey SAND containing minor 'lenses' of soft, white, calcareous gravel and angular fragments of dark grey, 0.9 highly weathered mudstone. 1.0-1.1-1.2 1.3 1.4-1.5 1.6 1.7-1.8-1.9 2.0 2.1-2.2-2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.0 3.1

Excavation method: Test pit with Terex 820 TLB General remarks 1: Not yet refusal

Groundwater conditions: *Not encountered* General remarks 2:

Base of test pit: 2.7m - excavation stopped General remarks 3:

Logged by: PH Oosthuizen

Project: Lerato Park Phase 2

Date logged: 23 June 2009

Southern Geotechnical Engineering

Client: Bigen Africa Services

Coordinates: 25 Y0027992 X3173237

Engineering
P.O. Box 1687
Brooklyn Square
0075
Tel: 012 430 2081

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS		<u> </u>
0.2-		Slightly moist, dark reddish brown, MEDIUM DENSE, clayey SAND		tere
0.3-				Not encountered
0.4-	******) auc
0.5	++++++++++	SOFT ROCK DOLERITE		<u> </u>
0.6-		Dry, dark grey speckled black and interlaced white, moderately to highly weathered, medium grained, massive, highly fractured, soft		2
0.7-		rock dolerite		
0.8-				
0.9-				
1.0-				
1.1-				
1.2-				
1.3-				
1.4-				
1.5-				
1.6-				
1.7-				
1.0-				
2.0-				
2.1-				
2.2-				
2.3-				
2.4-				
2.5-				
2.6-				
2.7-				
2.8-				
2.9-				
3.0-				
3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Refuse on soft rock or harder dolerite

Groundwater conditions: *Not encountered* General remarks 2:

Base of test pit: 0.5m - refusal reached General remarks 3:

TEST PIT NO. 2-13 Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 23 June 2009



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0075
Tel: 012 430 2081

Client: Bigen Africa Services	Coordinates: 25 Y0027945 X3173368
Ciletti, bigeri Arrica Services	Coordinates. 25 1002/945 A51/5500

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1-		TRANSPORTED SOILS Slightly moist, dark reddish brown, MEDIUM DENSE, clayey SAND		
0.2- 0.3- 0.4- 0.5- 0.6- 0.7- 0.8- 0.9-		SOFT ROCK DOLERITE Dry, dark grey speckled black and interlaced white, moderately to highly weathered, medium grained, massive, highly fractured, soft rock dolerite	Bulk	Not encountered
1.1-	****			
1.3-				
1.4-				
1.5-				
1.6- 1.7-				
1.8-				
1.9-				
2.0-				
2.1-				
2.2-				
2.3-				
2.4-				
2.5- 2.6-				
2.7-				
2.8-				
2.9-				
3.0-				
3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Refuse on soft rock or harder dolerite

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 1.2m - refusal reached General remarks 3:

Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 23 June 2009



Southern Geotechnical Engineering P.O. Box 1687 Brooklyn Square 0075 Tel: 012 430 2081

Client: Bigen Africa Services Coordinates: 25 Y0028060 X3173462

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0 0.1- 0.2- 0.3-	<i>\(\)</i>	TRANSPORTED SOILS Dry, light brown, FIRM to STIFF, cracked, silty to sandy CLAY		red
0.4- 0.5- 0.6- 0.7- 0.8- 0.9-		CALCAREOUS RESIDUAL SHALE Dry, orange brown blotched white and dark grey, MEDIUM DENSE TO DENSE, silty to clayey SAND containing minor 'lenses' of white calcareous gravel and dark grey, highly weathered mudstone.		Not encountered
0.9 1.0				
1.1-			Disturbed	
1.2- 1.3-				
1.4- 1.5-	/ /			
1.6- 1.7- 1.8- 1.9-		RESIDUAL SHALE Slightly moist, dark orange blotched grey and white, STIFF, clayey SILT grading into highly fractured, highly weathered, very-fine grained shale		
2.0- 2.1-				
2.2- 2.3-				
2.4- 2.5- 2.6-	11			
2.7				
2.8-				
2.9-				
3.0- 3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Maximum reach; not yet refusal

Groundwater conditions: *Not encountered* General remarks 2:

Base of test pit: 2.7m - excavation stopped General remarks 3:

Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 23 June 2009



Southern Geotechnical Engineering
P.O. Box 1687
Brooklyn Square
0075
Tel: 012 430 2081

Client: Bigen Africa Services	Coordinates: 25 Y0028136 X3173307
Ciletti, Digeti Attica Services	Coolullates. 25 10020130 A5113001

			161.012 430 2001	
Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0 0.1 0.2 0.3 0.4	/ / / / / /	TRANSPORTED SOILS Dry, light brown, FIRM to STIFF, cracked, silty to sandy CLAY		ntered
0.4- 0.5- 0.6- 0.7- 0.8- 0.9- 1.0- 1.1- 1.2- 1.3-		CALCAREOUS RESIDUAL SHALE Dry, orange brown blotched white and dark grey, MEDIUM DENSE TO DENSE, silty to clayey SAND containing minor 'lenses' of white calcareous gravel and dark grey, highly weathered mudstone.		Not encountered
1.3- 1.4- 1.5- 1.6- 1.7- 1.8- 1.9- 2.0- 2.1- 2.2- 2.3- 2.4- 2.5- 2.6- 2.7-		RESIDUAL SHALE Slightly moist, dark orange blotched grey and white, STIFF, clayey SILT grading into highly fractured, highly weathered, very-fine grained shale		
2.8- 2.9- 3.0- 3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Maximum reach; not yet refusal

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 2.7m - excavation stopped **General remarks 3:** **TEST PIT NO. 2-16** Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 24 June 2009



Southern Geotechnical Engineering
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0075
Tel: 012 430 2081

Client: Bigen Africa Services	Coordinates: 25 Y0028279 X3173220

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1- 0.2-	<i>}</i>	TRANSPORTED SOILS Dry, brown, FIRM to STIFF, cracked, sandy CLAY to clayey SAND		pe.
0.3- 0.4-	J+		Disturbed	ınteı
0.5			_	וכסר
0.6-		CALCAREOUS RESIDUAL SHALE Dry, light orange brown blotched white and dark grey, DENSE to VERY DENSE, silty to clayey SAND containing minor 'lenses' of white calcareous gravel and dark grey, highly weathered shale/mudstone.		Not encountered
0.8-		calcareous graver and dark grey, nightly weathered shale/mudstone.	Disturbed	
1.0-				
1.1-	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
1.2-				
1.3- 1.4-				
1.5-				
1.6-				
1.7-				
1.8- 1.9-				
2.0-				
2.1-				
2.2-				
2.3-				
2.4 2.5-				
2.6-				
2.7-				
2.8-				
2.9-				
3.0-				
3.1				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Slow rate of excavation

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 2.4m - stopped; near refusal General remarks 3: **TEST PIT NO. 2-17** Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 24 June 2009



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0075
Tel: 012 430 2081

Client: Bigen Africa Services	Coordinates: 25 Y0028412 X3173286
Ciletti. Digeti Attica Services	C001u11ates. 23 10020412 A31/3200

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1 - 0.2 - 0.3 - 0.4 - 0.5 -	<i>/ / / / / / / / / / / / / / / / / / / </i>	TRANSPORTED SOILS Dry, brown, FIRM to STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.6- 0.7- 0.8- 0.9- 1.0- 1.1- 1.2-		CALCAREOUS RESIDUAL SHALE Dry, light orange brown blotched white and dark grey, DENSE to VERY DENSE, silty to clayey SAND containing minor 'lenses' of white calcareous gravel and dark grey, highly weathered shale/mudstone.		Not en
1.3- 1.4- 1.5- 1.6- 1.7- 1.8- 1.9-				
2.0- 2.1- 2.2- 2.3- 				
2.5- 2.6- 2.7- 2.8-				
2.9- 3.0- 3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Slow rate of excavation

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 2.4m - stopped; near refusal General remarks 3:

Logged by: PH Oosthuizen

Project: Lerato Park Phase 2

Date logged: 24 June 2009

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P.O. Box 1687
Brooklyn Square
0075
Tel: 012 430 2081

Client: Bigen Africa Services

Coordinates: 25 Y0028247 X3173377

			161. 012 430 2001	
Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1 – 0.2 – 0.3 – 0.4	<i>/</i> / / / / / / / / / / / / / / / / / /	TRANSPORTED SOILS Dry, light brown, STIFF, cracked, sandy CLAY to clayey SAND		ntered
0.4-	الرا		Disturbed	no;
0.6- 0.7- 0.8- 0.9- 1.0-		CALCAREOUS RESIDUAL SHALE Dry, light orange brown blotched white and dark grey, MEDIUM DENSE to DENSE, silty to clayey SAND containing minor 'lenses' of white calcareous gravel and dark grey, highly weathered shale/mudstone.	Bulk	Not encountered
1.1- 1.2- 1.3- 1.4- 1.5-				
1.6- 1.7- 1.8- 1.9- 2.0-				
2.1- 2.2- 2.3- 2.4-				
2.5- 2.6- 2.7				
2.8- 2.9- 3.0-				
3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1:

Groundwater conditions: *Not encountered* General remarks 2:

Base of test pit: 2.7m - stopped; maximum reach General remarks 3:

Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 24 June 2009



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P.O. Box 1687
Brooklyn Square
0075
Tel: 012 430 2081

Client: Bigen Africa Services	Coordinates: 25 Y0028292 X3173517

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1 – 0.2 – 0.3 – 0.4 – 0.5 –		TRANSPORTED SOILS Dry, light brown, STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.6- 0.7- 0.8- 0.9-		CALCAREOUS RESIDUAL SHALE Dry, light orange brown blotched white and dark grey, MEDIUM DENSE to DENSE, silty to clayey SAND containing minor 'lenses' of white calcareous gravel and dark grey, highly weathered shale/mudstone.		Not e
1.0- 1.1- 1.2- 1.3-				
1.4- 1.5- 1.6-				
1.7- 1.8- 1.9-				
2.0- 2.1- 2.2- 2.3-				
2.4- 2.5- 2.6-	/ /			
2.7 2.8- 2.9- 3.0-				
3.1-				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1:

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 2.7m - stopped; maximum reach General remarks 3:

TEST PIT NO. 2-2 Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 23 June 2009



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0075
Tel: 012 430 2081

Client: Bigen Africa Services Coordinates: 25 Y0027592 X3172995

			Tel: 012 430 2081	
Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1- 0.2- 0.3-		TRANSPORTED SOILS Dry to slightly moist, light brown, MEDIUM DENSE, slightly cracked, clayey SAND to sandy CLAY.		
0.4-			Disturbed	- o
0.5- 0.6- 0.7-		CALCAREOUS RESIDUAL SHALE/MUDSTONE Dry, light brown blotched white and dark grey, MEDIUM DENSE, intact, silty to clayey SAND containing minor 'lenses' of soft, white,		Not encountered
0.8-		calcareous gravel and minor 'lenses' of dark grey, highly to completely weathered, angular fragments of shale/mudstone	Disturbed	ot er
1.0-	1 1 1			Ž
1.1-	1 1 1			
1.2-				
1.3-				
1.4-	1.1			
1.5- 1.6-				
1.7-				
1.8-	1 1			
1.9-				
2.0-				
2.1-				
2.2- 2.3-				
2.4	1 1 1			
2.5-				
2.6-	1 1 1			
2.7	:::4:::4:::4::			
2.8-				
2.9- 3.0-				
3.0-				
L Ev	aavatia	in mothed: Tost nit with Torax 220 TLP. General remarks 1: Not yet refu	cal	

Excavation method: Test pit with Terex 820 TLB General remarks 1: Not yet refusal

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 2.7m - excavation stopped **General remarks 3:**

Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 24 June 2009



Southern Geotechnical

Engineering
P.O. Box 1687
Brooklyn Square
0075
Tel: 012 430 2081

nates: 25 Y0028218 X3173660
1

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0 0.1 0.2 0.3 0.4 0.5	<i>/</i> /	TRANSPORTED SOILS Dry, light brown, STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.6- 0.7- 0.8- 0.9- 1.0- 1.1- 1.2- 1.3- 1.4-		CALCAREOUS RESIDUAL SHALE Dry, light orange brown and white, MEDIUM DENSE, silty SAND containing abundant white calcareous gravel.	Disturbed	Not en
1.5- 1.6- 1.7- 1.8- 1.9- 2.0- 2.1- 2.2- 2.3- 2.4- 2.5- 2.6- 		RESIDUAL SHALE Same as above but containing minor 'pockets' of dark grey, highly weathered, highly fractured, shale/mudstone.		
2.8- 2.9- 3.0- 3.1-				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1:

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 2.7m - stopped; maximum reach General remarks 3:

TEST PIT NO. 2-21 Logged by: PH Oosthuizen

Client: Bigen Africa Services

Project: Lerato Park Phase 2 Date logged: 24 June 2009



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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1 – 0.2 – 0.3 – 0.4 –	*	TRANSPORTED SOILS Dry, light brown, STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.4	را عمرا		Disturbed	noo
0.6- 0.7- 0.8- 0.9- 1.0- 1.1- 1.2- 1.3- 1.4- 1.5-		CALCAREOUS RESIDUAL SHALE Dry, light orange brown and white, MEDIUM DENSE, silty SAND containing abundant white calcareous gravel.		Not en
1.6- 1.7- 1.8- 1.9- 2.0- 2.1- 2.2- 2.3- 2.4- 2.5- 2.6- - 2.8-		RESIDUAL SHALE Same as above but containing minor 'pockets' of dark grey, highly weathered, highly fractured, shale/mudstone.		
2.9- 3.0- 3.1-				

Coordinates: 25 Y0028105 X3173566

Excavation method: *Test pit with Terex 820 TLB* General remarks 1:

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 2.7m - stopped; maximum reach General remarks 3:

TEST PIT NO. 2-22 Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 24 June 2009



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Client: Bigen Africa Services Coordinates: 25 Y0027910 X3173585

			161.012 430 2001	
Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0- 0.1- 0.2-	<i> </i>	TRANSPORTED SOILS Dry, light brown, FIRM to STIFF, cracked, sandy CLAY to clayey SAND		pə
0.3- 0.4- 0.5- 0.6- 0.7- 0.8- 0.9- 1.0- 1.1- 1.2- 1.3- 1.4- 1.5- 1.6- 1.7- 1.8- 1.9-		VERY SOFT ROCK SHALE Dry, light and dark grey, highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale. Excavates as fine, angular shale fragments.	Bulk	Not encountered
2.0-				
2.1				
2.2- 2.3-				
2.4-				
2.5-	-			
2.6-	-			
2.7-	-			
2.8-				
2.9-	-			
3.0-	-			
3.1-	_			

Excavation method: Test pit with Terex 820 TLB General remarks 1: Slow rate of excavation

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 2.1m - near refusal **General remarks 3:**

Logged by: PH Oosthuizen

Project: Lerato Park Phase 2

Date logged: 24 June 2009

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Client: Bigen Africa Services Coordinates: 25 Y0027991 X3173691

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0 0.1 0.2 0.3 0.4 0.5		TRANSPORTED SOILS Slightly moist, brown, FIRM to STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.6- 0.7-		CALCAREOUS RESIDUAL SHALE/MUDSTONE Dry, light orange brown blotched white and dark grey, MEDIUM DENSE TO DENSE, slightly cracked, clayey silt to silty CLAY with		Not end
0.8-		'lenses' of white, calcareous gravel and pockets of dark grey, weathered mudstone.	Disturbed	1
0.9- 1.0- 1.1- 1.2-				
1.3- 1.4- 1.5-				
1.6- 1.7- 1.8- 1.9-				
2.0-		VERY SOFT ROCK SHALE	-	
2.1- 2.2- 2.3-		Dry, dark grey blotched dark orange, highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale/mudstone.		
2.4-				
2.5-				
2.6-				
2.7				
2.8-				
2.9-				
3.0-				
3.1-				
			<u>'</u>	

Excavation method: Test pit with Terex 820 TLB General remarks 1: Maximum reach

Groundwater conditions: Not encountered General remarks 2:

General remarks 3: Base of test pit: 2.7m - stopped

Logged by: PH Oosthuizen

Project: Lerato Park Phase 2

Date logged: 24 June 2009

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Brooklyn Square
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Tel: 012 430 2081

Client: Bigen Africa Services	Coordinates: 25 Y0028171 X3173761
Ciletti. Digeti Atrica Services	Coolullates, 25 100201/1 A51/5/01

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0 0.1- 0.2- 0.3- 0.4-	<i>/ /</i> / / / / / / / / / / / / / / / / /	TRANSPORTED SOILS Slightly moist, dark reddish brown, FIRM to STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.5-			Disturbed	ဝို
0.6- 0.7- 0.8- 0.9-		VERY SOFT ROCK SHALE Dry, dark grey, highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale		Not er
1.0-				
1.1-				
1.2				
1.3-				
1.4-				
1.5-				
1.6-				
1.7-				
1.8-				
1.9-				
2.0-				
2.1-				
2.2-				
2.3-				
2.4-				
2.5-				
2.6-				
2.7- 2.8-				
2.8-				
3.0-				
3.0				
J.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Refuse on very soft rock shale

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 1.2m - refusal reached General remarks 3: **TEST PIT NO. 2-25** Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 24 June 2009



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Tel: 012 430 2081

Client: Bigen Africa Services Coordinates: 25 Y0028098 X3173902

			Tel: 012 430 2081	
Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0 0.1- 0.2-		TRANSPORTED SOILS Slightly moist, dark reddish brown, FIRM to STIFF, cracked, sandy CLAY to clayey SAND		
0.3-		VERY SOFT ROCK SHALE		ere
0.4- 0.5-		Dry, dark grey, highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale		Not encountered
0.6-			D. II.	i e
0.7-			Bulk	ž
0.8-				
0.9-				
1.0-				
1.1				
1.2- 1.3-				
1.4-				
1.5-	-			
1.6-	-			
1.7-				
1.8-				
1.9-				
2.0-				
2.1-				
2.2-				
2.3- 2.4-]			
2.4-				
2.6-				
2.7-				
2.8-				
2.9-				
3.0-	-			
3.1-				
		on mothod: Toot nit with Torox 220 TLP. Conoral remarks 1: Polyco on ve	any coft rook chala	

Excavation method: Test pit with Terex 820 TLB General remarks 1: Refuse on very soft rock shale

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 1.1m - refusal reached **General remarks 3:** **TEST PIT NO. 2-26** Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 24 June 2009



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Client: Bigen Africa Services Coordinates: 25 Y0028014 X3173803

			Tel: 012 430 2081	
Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0 0.1 0.2 0.3		TRANSPORTED SOILS Slightly moist, dark reddish brown, LOOSE, intact, slightly clayey SAND VERY SOFT ROCK SHALE		lered
0.4- 0.5- 0.6- 0.7-		Light grey stained dark orange along bedding planes, highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale. Excavates as large flat 'plates' of shale.		Not encountered
0.8- 0.9- 1.0-				
1.1- 1.2- 1.3- 1.4-				
1.5-				
1.6-	-			
1.7-	-			
1.8-				
1.9-				
2.0-	_			
2.1-	-			
2.2-	-			
2.3-	-			
2.4-	_			
2.5-				
2.6-	_			
2.7-	-			
2.8-				
2.9-	-			
3.0-	-			
3.1-	-			
	1			

Excavation method: Test pit with Terex 820 TLB General remarks 1: Slow rate of excavation

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 1.5m - near refusal **General remarks 3:**

Logged by: PH Oosthuizen **TEST PIT NO. 2-27**

Project: Lerato Park Phase 2 Date logged: 24 June 2009



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Client: Bigen Africa Services	Coordinates: 25 Y0027817 X3173770

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1 – 0.2 – 0.3 – 0.4 – 0.5 – 0.6 – 0.7 –		TRANSPORTED SOILS Slightly moist, dark brown, FIRM to STIFF, cracked, sandy to silty CLAY		Not encountered
0.8]		Disturbed	_
0.9- 1.0-		CALCAREOUS RESIDUAL SHALE Dry, orange brown blotched white, DENSE, intact, silty to clayey SAND with 'lenses' of white, calcareous gravel.		
1.1-	////		Disturbed	
1.2- 1.3- 1.4- 1.5- 1.6- 1.7- 1.8- 1.9- 2.0- 2.1- 2.2- 2.3- 2.4- 2.5- 2.6- 2.7-		VERY SOFT ROCK SHALE Light grey stained dark orange along bedding planes, completely to highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale with 'pockets' of white calcareous gravel. Excavates as fine angular 'chips' of shale.		
2.7 2.8- 2.9- 3.0- 3.1-				
3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Maximum reach; not yet refusal

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 2.7m - stopped General remarks 3: **TEST PIT NO. 2-28** Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 24 June 2009



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Tel: 012 430 2081

Client: Bigen Africa Services	Coordinates: 25 Y0027740 X3173894

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1- 0.2- 0.3-	<i>}</i>	TRANSPORTED SOILS Slightly moist, dark brown, FIRM to STIFF, slightly cracked, sandy CLAY to clayey SAND		red
0.4- 0.5- 0.6- 0.7- 0.8-		VERY SOFT ROCK SHALE Light grey stained dark orange along bedding planes, completely to highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale. Excavates as fine, angular 'chips' of shale.		Not encountered
0.9- 1.0- 1.1- 1.2-			Bulk	
1.3- 1.4- 1.5-				
1.7-				
1.8-				
1.9-				
2.0-				
2.1 – 2.2 –				
2.3-				
2.4-				
2.5-				
2.6-				
2.7-				
2.8-				
2.9- 3.0-				
3.1				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Slow rate of excavation

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 1.6m - near refusal reached **General remarks 3:**

Logged by: PH Oosthuizen

Project: Lerato Park Phase 2

Date logged: 24 June 2009

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Client: Bigen Africa Services

Coordinates: 25 Y0027898 X3173914

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1-		TRANSPORTED SOILS Slightly moist, dark reddish brown, LOOSE, slightly clayey SAND		
0.3- 0.4- 0.5- 0.6- 0.7- 0.8- 0.9- 1.0-		WEATHERED DOLERITE Slightly moist, dark grey speckled black and blotched white, highly weathered, highly fractured, soft rock dolerite interlaced with white, hard calcrete.		Not encountered
1.1- 1.2- 1.3- 1.4- 1.5-		VERY SOFT ROCK SHALE Dark grey stained dark orange along bedding planes, completely to highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale. Excavates as 'plates' of shale.		
1.6 1.7- 1.8- 1.9-				
2.0- 2.1-				
2.2-				
2.3-				
2.4-				
2.5-				
2.6- 2.7-				
2.8				
2.9-				
3.0-				
3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Slow rate of excavation

Groundwater conditions: Not encountered General remarks 2: Isolated dolerite boulders at surface.

Base of test pit: 1.6m - near refusal reached General remarks 3:

TEST PIT NO. 2-3 Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 23 June 2009



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Client: Bigen Africa Services	Coordinates: 25 Y0027632 X3173085

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1- 0.2- 0.3- 0.4- 0.5- 0.6-		TRANSPORTED SOILS Dry, light brown, MEDIUM DENSE, cracked, clayey SAND to sandy CLAY.		Not encountered
0.7-		CALCAREOUS RESIDUAL SHALE	Disturbed	000
0.8 - 0.9 - 1.0 - 1.1 - 1.2 - 1.3 - 1.4 - 1.5 - 1.6 -		Dry, light brown blotched white and dark grey, MEDIUM DENSE TO DENSE, intact, silty to clayey SAND containing minor 'lenses' of soft, white, calcareous gravel and minor 'lenses' of dark grey, highly to completely weathered, angular fragments of shale/mudstone.		Not e
1.7- 1.8- 1.9- 2.0- 2.1- 2.2- 2.3- 2.4- 2.5- 2.6 2.7-		RESIDUAL SHALE Dry, dark orange blotched dark grey, STIFF, clayey SILT containing abundant 'pockets' of angular, highly weathered, shale fragments.		
2.7 2.8- 2.9- 3.0-				
3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Not yet refusal

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 2.7m - excavation stopped General remarks 3:

Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 24 June 2009



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Brooklyn Square
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Tel: 012 430 2081

Client: Bigen Africa Services	Coordinates: 25 Y0028033 X3174016
Ciletit. Digeti Attica Services	C001u11ates, 25 10020055 A5117010

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS		
0.1		Slightly moist, dark reddish brown, LOOSE, slightly cracked, slightly clayey SAND		_
0.3-		VERY SOFT ROCK SHALE	1	erec
0.4-		Dark grey stained dark orange along bedding planes, completely to		unte
0.5-		highly weathered, very-fine grained, bedded, highly fractured, very		l oou
0.6-		soft rock to soft rock shale. Excavates as 'plates' of shale.		Not encountered
0.7-				ž
0.8-				
0.9-				
1.0				
1.1- 1.2-				
1.3-				
1.4-				
1.5-				
1.6-				
1.7-				
1.8-				
1.9-				
2.0-				
2.1-				
2.2-				
2.3- 2.4-				
2.4- 2.5-				
2.6-				
2.7-				
2.8-				
2.9-				
3.0-				
3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Slow rate of excavation

Groundwater conditions: *Not encountered* General remarks 2:

Base of test pit: 1.0m - near refusal reached General remarks 3:

Client: Bigen Africa Services

Logged by: PH Oosthuizen

Coordinates: 25 Y0027994 X3174141

Project: Lerato Park Phase 2 Date logged: 24 June 2009



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			161. 012 430 2061	
Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1 – 0.2 – 0.3 – 0.4 – 0.5 –		TRANSPORTED SOILS Moist, dark brown, FIRM TO STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.6- 0.7- 0.8-		CALCAREOUS RESIDUAL SHALE Slightly moist, light orange brown blotched white and dark grey, MEDIUM DENSE TO DENSE, silty to clayey SAND with 'lenses' of soft, white, calcareous gravel and completely to highly weathered shale/mudstone.	Disturbed	Not enc
0.9- 1.0- 1.1- 1.2- 1.3-		snaie/mudstone.	Distalloca	
1.4- 1.5- 1.6- 1.7-				
1.8- 1.9- 2.0- 2.1- 2.2-		VERY SOFT ROCK SHALE Dark grey stained dark orange along bedding planes, completely to highly weathered, very-fine grained, bedded, highly fractured, very soft rock to soft rock shale. Excavates as 'plates' of shale.		
2.3- 2.4- 2.5- 2.6				
2.7- 2.8- 2.9- 3.0-				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1:

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 2.6m - stopped; maximum reach General remarks 3:

TEST PIT NO. 2-32 Logg

Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 24 June 2009



Southern Geotechnical Engineering P.O. Box 1687 Brooklyn Square 0075 Tel: 012 430 2081

Client: Bigen Africa Services Coordinates: 25 Y0027840 X3174034

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL TRANSPORTED SOILS		
0.1- 0.2-		Slightly moist, dark orange brown, FIRM, slightly cracked, clayey SAND to sandy CLAY		pe
0.3- 0.4- 0.5- 0.6- 0.7- 0.8-		VERY SOFT ROCK SHALE Dark grey stained dark orange along bedding planes, completely to highly weathered, very-fine grained, bedded, highly fractured, very soft rock to soft rock shale. Excavates as 'plates' of shale.		Not encountered
0.9- 1.0-				
1.1- 1.2-				
1.3- 1.4-				
1.5 1.6-				
1.7-				
1.8-				
1.9-				
2.0-				
2.1- 2.2-				
2.2				
2.4-				
2.5-				
2.6-				
2.7-				
2.8-				
2.9-				
3.0- 3.1-				
J. 1 –				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Slow rate of excavation

Groundwater conditions: *Not encountered* General remarks 2:

Base of test pit: 1.5m - near refusal General remarks 3:

TEST PIT NO. 2-33 Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 24 June 2009



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0075
Tel: 012 430 2081

Client: Bigen Africa Services	Coordinates: 25 Y0027681 X3173998

Description SAMPLING	GROUND WATER LEVEL
0.0 Current NGL	
0.1 – Slightly moist, dark orange brown, FIRM, slightly cracked, clayey SAND to sandy CLAY	ntered
VERY SOFT ROCK SHALE Dark grey stained dark orange along bedding planes, completely to highly weathered, very-fine grained, bedded, highly fractured, very soft rock to soft rock shale. Excavates as fine 'chips' of dark grey shale.	Not encountered
0.9 1.0 1.1 1.2	
1.3— 1.4— 1.5—	
1.6————————————————————————————————————	
1.9-	
2.0- 2.1-	
2.1-	
2.3-	
2.4-	
2.5- 2.6-	
2.7-	
2.8-	
2.9-	
3.0- 3.1-	

Excavation method: Test pit with Terex 820 TLB General remarks 1: Slow rate of excavation

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 1.8m - near refusal **General remarks 3:**

Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 24 June 2009



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Brooklyn Square
0075
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Client: Bigen Africa Services	Coordinates: 25 Y0027608 X3174143

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0-		TRANSPORTED SOILS		
0.1-		Dry, dark reddish brown, FIRM, slightly cracked, clayey SAND to		
0.2-		sandy CLAY		eq
0.3-	++++++++	MEDIUM HARD ROCK OR HARDER DOLERITE) ter
0.4 0.5-		Dark grey speckled black and blotched white, highly weathered,		no
		medium to coarse grained, highly fractured, medium hard rock or harder dolerite interlaced with hard calcrete.		enc
0.6- 0.7-		That del dolente interiaced with rhard calcrete.		Not encountered
0.7-				
0.8-				
1.0-				
1.0-				
1.1-				
1.3-				
1.4-				
1.5-				
1.6-				
1.7-				
1.8-				
1.9-				
2.0-				
2.1-				
2.2-				
2.3-				
2.4-				
2.5-				
2.6-				
2.7-				
2.8-				
2.9-				
3.0-				
3.1				
<u> </u>				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Refuse on soft rock dolerite

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 0.4m - refusal reached General remarks 3: **TEST PIT NO. 2-35** Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 24 June 2009



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P.O. Box 1687
Brooklyn Square
0075
Tel: 012 430 2081

Client: Bigen Africa Services Coordinates: 25 Y0027785 X3174146

		Tel: 012 430 2081		
Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1 – 0.2 – 0.3 –		TRANSPORTED SOILS Dry, dark reddish brown, FIRM, slightly cracked, clayey SAND to sandy CLAY		red
0.5 - 0.4 - 0.5 - 0.6 - 0.7 - 0.8 - 0.9 - 1.1 - 1.2 - 1.3 - 1.5 - 1.6 - 1.7 - 1.8 -		VERY SOFT ROCK OR HARDER SHALE Dark grey stained dark orange along bedding planes, highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale.	Bulk	Not encountered
1.9-				
2.0- 2.1-				
2.1-				
2.3-				
2.4-				
2.5-				
2.6- 2.7-				
2.7				
2.9-				
3.0-				
3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Slow rate of excavation

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 1.9m - near refusal reached **General remarks 3:** **TEST PIT NO. 2-36** Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 23 June 2009



Southern Geotechnical Engineering P.O. Box 1687 Brooklyn Square 0075 Tel: 012 430 2081

Client: Bigen Africa Services	Coordinates: 25 Y0027899 X3174278

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0 0.1- 0.2- 0.3- 0.4-	/	TRANSPORTED SOILS Slightly moist, dark brown, FIRM, cracked, silty to sandy CLAY		Not encountered
0.4	ر بر		Disturbed	noo
0.6- 0.7- 0.8- 0.9-		CALCAREOUS RESIDUAL SHALE Slightly moist, orange brown blotched white and dark grey, MEDIUM DENSE, silty to clayey SAND containing minor 'lenses' of white calcareous gravel and dark grey, highly weathered mudstone.		Not en
1.0- 1.1-			Disturbed	
1.2- 1.3- 1.4- 1.5-				
1.6- 1.7- 1.8- 1.9- 2.0- 2.1-		RESIDUAL SHALE Slightly moist, dark orange blotched grey and white, STIFF, clayey SILT with 'pockets' of white, calcareous gravel grading into highly fractured, highly weathered, very-fine grained shale.		
2.2- 2.3- 2.4- 2.5- 2.6- 				
2.8- 2.9- 3.0- 3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Maximum reach; not yet refusal

Groundwater conditions: Not encountered General remarks 2:

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Project: Lerato Park Phase 2

Date logged: 24 June 2009

Client: Bigen Africa Services Coordinates: 25 Y0027712 X3174248



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			161.012 430 2001	
Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1 – 0.2 – 0.3 – 0.4 –		TRANSPORTED SOILS Slightly moist, dark brown, FIRM, slightly cracked, clayey SAND to sandy CLAY MEDIUM HARD ROCK OR HARDER DOLERITE Dark grey speckled black and blotched white, highly weathered,		Not encountered
0.5 0.6- 0.7-		medium to coarse grained, highly fractured, medium hard rock or harder dolerite interlaced with hard calcrete.		Not
0.8- 0.9- 1.0-				
1.1-				
1.2-				
1.3- 1.4-				
1.5-	-			
1.6-	_			
1.7-	_			
1.8-				
1.9-				
2.0- 2.1-				
2.1-				
2.3-				
2.4-	-			
2.5-	-			
2.6-	-			
2.7-				
2.8- 2.9-				
3.0-				
3.1-	-			

Excavation method: Test pit with Terex 820 TLB General remarks 1: Refuse on soft rock dolerite

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 0.5m - refusal reached General remarks 3: **TEST PIT NO. 2-38** Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 24 June 2009



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Client: Bigen Africa Services	Coordinates: 25 Y0027539 X3174258

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1 – 0.2 – 0.3 –		TRANSPORTED SOILS Slightly moist, dark brown, FIRM, slightly cracked, clayey SAND to sandy CLAY		ountered
0.4- 0.5- 0.6- 0.7-		VERY SOFT ROCK SHALE Dark grey stained dark orange along bedding planes, highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale/mudstone with occasional 'pockets' of white, calcareous gravel.		Not encountered
0.8- 0.9- 1.0- 1.1-				
1.2- 1.3- 1.4-				
1.5- 1.6- 1.7- 1.8-				
1.9- 2.0- 2.1-				
2.2 2.3 2.4				
2.5- 2.6-	-			
2.7- 2.8-	_			
2.9- 3.0- 3.1-				
3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Slow rate of excavation

Groundwater conditions: Not encountered General remarks 2:

General remarks 3: Base of test pit: 2.2m - near refusal

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Project: Lerato Park Phase 2

Date logged: 24 June 2009

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Client: Bigen Africa Services Coordinates: 25 Y0027633 X3174346

			_	
Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0 0.1 - 0.2 - 0.3 - 0.4 -		TRANSPORTED SOILS Slightly moist, dark brown, FIRM, slightly cracked, clayey SAND to sandy CLAY		ntered
0.5			Disturbed] no
0.5- 0.6- 0.7- 0.8- 0.9- 1.0- 1.1- 1.2- 1.3- 1.4-		CALCAREOUS RESIDUAL SHALE/MUDSTONE Slightly moist, orange brown blotched white, MEDIUM DENSE, silty to clayey SAND with 'pockets' of white calcareous gravel.		Not encountered
1.5- 1.6- 1.7- 1.8- 1.9- 2.0- 2.1- 2.2- 2.3- 2.4- 2.5- 2.6- 		VERY SOFT ROCK SHALE Dark grey stained dark orange along bedding planes, highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale.		
2.7 2.8- 2.9- 3.0- 3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Not yet refusal

Groundwater conditions: Not encountered General remarks 2:

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Project: Lerato Park Phase 2

Date logged: 23 June 2009

Client: Bigen Africa Services

Coordinates: 25 Y0027729 X3172974



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			161. 012 430 2081	
Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0 0.1 0.2 0.3 0.4 0.5	<i>X</i>	TRANSPORTED SOILS Dry, brown, STIFF, cracked, sandy CLAY to clayey SAND		þ
0.6-		CALCAREOUS RESIDUAL SHALE Dry, light brown blotched white, DENSE, intact, silty to clayey SAND		ıntere
0.7-		containing minor 'lenses' of soft, white, calcareous gravel.	Disturbed	co
0.8- 0.9- 1.0- 1.1- 1.2- 1.3- 1.4-			Disturbed	Not encountered
1.5- 1.6- 1.7- 1.8- 1.9- 2.0- 2.1- 2.2- 2.3- 2.4- 2.5- 2.6- 2.7-		RESIDUAL SHALE Slightly moist, dark orange blotched dark grey, STIFF, clayey SILT containing abundant, angular fragments of highly weathered shale/mudstone.	Bulk	
2.7 2.8- 2.9- 3.0- 3.1-	-			

Excavation method: Test pit with Terex 820 TLB General remarks 1: Not yet refusal

Groundwater conditions: *Not encountered* General remarks 2:

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Project: Lerato Park Phase 2 Date

Date logged: 24 June 2009

Client: Bigen Africa Services Coordinates: 25 Y0027810 X3174379



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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0 0.1 0.2 0.3 0.4 0.5		TRANSPORTED SOILS Slightly moist, dark reddish brown, FIRM, cracked, clayey SAND to sandy CLAY		Not encountered
0.5- 0.6- 0.7- 0.8- 0.9- 1.0- 1.1- 1.2- 1.3- 1.4- 1.5- 1.6- 1.7- 1.8- 2.0- 2.1- 2.2- 2.3- 2.4- 2.5- 2.6- 2.7-		VERY SOFT ROCK SHALE Light grey stained dark orange along bedding planes, highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale. Excavates as flat 'plates'.	Bulk	Not encou
2.8- 2.9- 3.0- 3.1-	-			

Excavation method: Test pit with Terex 820 TLB General remarks 1: Slow rate of excavation

Groundwater conditions: *Not encountered* General remarks 2:

Base of test pit: 2.5m - near refusal General remarks 3:

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Project: Lerato Park Phase 2

Date logged: 24 June 2009

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Client: Bigen Africa Services Cod

Coordinates: 25 Y0027797 X3174511

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1 – 0.2 – 0.3 –		TRANSPORTED SOILS Slightly moist, dark reddish brown, FIRM, cracked, clayey SAND to sandy CLAY		red
0.4- 0.5- 0.6-		SOFT ROCK OR HARDER DOLERITE Dark grey speckled black and blotched white, moderately weathered, medium to coarse grained, massive, highly fractured, soft rock or harder dolerite interlaced with hard calcrete.		Not encountered
0.7-				N N
0.8-				
0.9-				
1.0-				
1.1-				
1.2-				
1.3-				
1.4-				
1.5- 1.6-				
1.7-				
1.8-				
1.9-				
2.0-				
2.1-				
2.2-				
2.3-	-			
2.4-	-			
2.5-				
2.6-				
2.7-				
2.8-				
2.9-	1			
3.0-				
3.1-	1			

Excavation method: Test pit with Terex 820 TLB General remarks 1:

Groundwater conditions: *Not encountered* General remarks 2:

Base of test pit: 0.6m - refusal reached General remarks 3:

TEST PIT NO. 2-42 Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 24 June 2009



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Client: Bigen Africa Services	Coordinates: 25 Y0027676 X3174437
Ciletti. Digeti Attica Services	C0010111ates, 25 1002/0/0 A51/445/

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0 0.1 – 0.2 – 0.3 – 0.4 – 0.5 – 0.6 –		TRANSPORTED SOILS Slightly moist, dark reddish brown, FIRM, cracked, clayey SAND to sandy CLAY		Not encountered
0.7- 0.8- 0.9-		VERY SOFT ROCK SHALE Light grey stained dark orange along bedding planes, highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale. Excavates as flat 'plates'.		N
1.0- 1.1- 1.2- 1.3-				
1.4- 1.5- 1.6-				
1.7- 1.8- 1.9- 2.0-				
2.1- 2.2- 2.3-				
2.4-				
2.5 2.6				
2.7- 2.8-				
2.9- 3.0- 3.1-				
J. 1				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Slow rate of excavation

Groundwater conditions: Not encountered General remarks 2:

Base of test pit: 2.5m - near refusal General remarks 3:

Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 24 June 2009



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Client: Bigen Africa Services	Coordinates: 25 Y0027493 X3174429

			Tel: 012 430 2081	
Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS		
0.1	٠	Slightly moist, dark reddish brown, FIRM to STIFF, cracked, clayey		
0.3-		SAND to sandy CLAY		red
0.4-				ınte
0.5-				COL
0.6-				Not encountered
0.7-		CALCAREOUS RESIDUAL SHALE	Disturbed	S S
0.8-		Slightly moist, light orange brown, DENSE TO VERY DENSE, silty to clayey SAND with minor 'pockets' of soft, white, calcareous gravel.		
0.9-	· f · · · · · · · f · ·	olayey of the with minor position of soft, white, baloar code graves.		
1.0-				
1.1-				
1.2-				
1.3-				
1.4-				
1.5-		DECIDITAL CHALE	_	
1.6-	111	RESIDUAL SHALE Slightly moist, dark orange blotched grey and white, STIFF, clayey		
1.7-	1/1	SILT with 'pockets' of white, calcareous gravel grading into highly		
1.8-		fractured, highly weathered, very-fine grained shale.		
1.9-	11.11			
2.0-	111			
2.1-				
2.2-				
2.3-	11.11			
2.4-	1111			
2.5-				
2.6				
2.7-				
2.8- 2.9-				
2.9 3.0				
3.0 3.1				
0.1				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Maximum reach; Not yet refusal

Groundwater conditions: Not encountered General remarks 2:

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Project: Lerato Park Phase 2 Date logged: 24 June 2009



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Client: Bigen Africa Services	Coordinates: 25 Y0027551 X3174504

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0 0.1- 0.2- 0.3- 0.4- 0.5-	/ / /	TRANSPORTED SOILS Slightly moist, dark reddish brown, FIRM to STIFF, cracked, clayey SAND to sandy CLAY		Not encountered
			Disturbed] Gu
0.6- 0.7- 0.8- 0.9- 1.0- 1.1- 1.2- 1.3- 1.4- 1.5-		CALCAREOUS RESIDUAL SHALE Slightly moist, light orange brown, DENSE TO VERY DENSE, silty to clayey SAND with minor 'pockets' of soft, white, calcareous gravel.		Not
1.6- 1.7- 1.8- 1.9- 2.0- 2.1- 2.2- 2.3- 2.4- 2.5- 2.6		RESIDUAL SHALE Slightly moist, dark orange blotched grey and white, STIFF, clayey SILT with 'pockets' of white, calcareous gravel grading into highly fractured, highly weathered, very-fine grained shale.		
2.7- 2.8- 2.9- 3.0- 3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Maximum reach; Not yet refusal

Groundwater conditions: Not encountered General remarks 2:

Client: Bigen Africa Services

Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date I

Date logged: 24 June 2009

Coordinates: 25 Y0027684 X3174542

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0 0.1- 0.2- 0.3-		TRANSPORTED SOILS Dry, brown, FIRM TO STIFF, cracked, sandy CLAY to clayey SAND		red
0.4- 0.5- 0.6- 0.7-		VERY SOFT ROCK SHALE Light grey stained dark orange along bedding planes, completely to highly weathered, very-fine grained, bedded, highly fractured, very soft rock to soft rock shale. Excavates as angular shale fragments.	Bulk	Not encountered
0.8- 0.9- 1.0-				
1.1				
1.2-	-			
1.3-				
1.4- 1.5-				
1.5- 1.6-				
1.7-				
1.7				
1.9-				
2.0-				
2.1-				
2.2-				
2.3-				
2.4-				
2.5-				
2.6-				
2.7-				
2.8-				
2.9-				
3.0-				
3.1-	1			

Excavation method: Test pit with Terex 820 TLB General remarks 1: Refuse on soft rock or harder shale

Groundwater conditions: *Not encountered* General remarks 2:

Base of test pit: 1.1m - refusal reached General remarks 3:

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Project: Lerato Park Phase 2

Date logged: 24 June 2009

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Client: Bigen Africa Services Coordinates: 25 Y0027587 X3174614

			Tel. 012 430 2061	
Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0		TRANSPORTED SOILS		
0.1-		Slightly moist, dark brown, STIFF, cracked, sandy CLAY to clayey		
0.2-		SAND		pə
0.3-				lter
0.4-				onu
0.5-			Disturbed	- ju
0.6-		CALCAREOUS RESIDUAL SHALE	Biotarboa	Not encountered
0.7-		Slightly moist, light orange brown, DENSE, intact, silty to clayey		Z
0.8-		SAND with minor 'pockets' of soft, white, calcareous gravel.		
0.9-				
1.0-				
1.1-				
1.2-		RESIDUAL SHALE	-	
1.3-	11 11	Slightly moist, dark grey slightly blotched white and dark orange,		
1.4-	1/1	STIFF, clayey SILT with 'pockets' of white, calcareous gravel grading		
1.5-		into highly fractured, highly weathered, very-fine grained shale.	Disturbed	-
1.6-	111		Disturbed	<u> </u>
1.7-	1/1			
1.8-				
1.9-	11,11			
2.0-	111			
2.1-				
2.2-				
2.3-	11 11			
2.4-	HH			
2.5-				
2.6-	11 11			
2.7				
2.8-				
2.9-				
3.0-				
3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Maximum reach; Not yet refusal

Groundwater conditions: *Not encountered* General remarks 2:

Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 24 June 2009



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Client: Bigen Africa Services Coordinates: 25 Y0027452 X3174574

			161. 012 430 2081	
Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0 0.1 0.2 0.3 0.4 0.5		TRANSPORTED SOILS Slightly moist, dark brown, STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
			Disturbed	enc
0.6- 0.7- 0.8- 0.9- 1.0- 1.1- 1.2-		CALCAREOUS RESIDUAL SHALE Slightly moist, light orange brown, DENSE, intact, silty to clayey SAND with minor 'pockets' of soft, white, calcareous gravel.		Not
		RESIDUAL SHALE	Disturbed	
1.3- 1.4- 1.5- 1.6- 1.7- 1.8- 1.9- 2.0- 2.1- 2.2- 2.3- 2.4- 2.5- 2.6		Slightly moist, dark grey blotched white and dark orange, STIFF, clayey SILT with 'pockets' of white, calcareous gravel grading into highly fractured, highly weathered, very-fine grained shale.		
2.7- 2.8-				
2.9-				
3.0- 3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Maximum reach; Not yet refusal

Groundwater conditions: Not encountered General remarks 2:

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Project: Lerato Park Phase 2

Date logged: 24 June 2009

Client: Bigen Africa Services Coordinates: 25 Y0027655 X3174611



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			Tel: 012 430 2081	
Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1 – 0.2 – 0.3 –		TRANSPORTED SOILS Slightly moist, reddish brown, LOOSE, clayey SAND to sandy CLAY		red
0.3	++++++++++	SOFT ROCK OR HARDER DOLERITE	Bulk	nte
0.5- 0.6-		Dark grey speckled black and blotched white, highly to moderately weathered, massive, medium to coarse grained, highly fractured, soft rock or harder dolerite interlaced with hard calcrete.		Not encountered
0.7-				
0.8-				
0.9-				
1.0-				
1.1-				
1.3-				
1.4-				
1.5-				
1.6-				
1.7-				
1.8-				
1.9-				
2.0-				
2.1-				
2.2-				
2.3-				
2.4-				
2.5-				
2.6-				
2.7-				
2.8-				
2.9-				
3.0-				
3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Refuse on soft rock or harder dolerite

Groundwater conditions: Not encountered General remarks 2: Surface boulders of hard rock dolerite

Base of test pit: 0.4m - refusal reached General remarks 3: in area.

Logged by: PH Oosthuizen **TEST PIT NO. 2-5**

Project: Lerato Park Phase 2 Date logged: 23 June 2009



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Client: Bigen Africa Services Coordinates: 25 Y0027874 X3172995

			161.012 430 2061	
Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0 0.1 0.2 0.3 0.4 0.5	X	TRANSPORTED SOILS Slightly moist, brown, STIFF, cracked, sandy CLAY to clayey SAND		- P6
0.6-			Disturbed	ere
0.6- 0.7- 0.8- 0.9- 1.0- 1.1- 1.2- 1.3- 1.4-		CALCAREOUS RESIDUAL SHALE Dry, light brown blotched white, DENSE, intact, silty to clayey SAND containing minor 'lenses' of soft, white, calcareous gravel. RESIDUAL SHALE		Not encountered
1.6- 1.7- 1.8- 1.9- 2.0- 2.1- 2.2- 2.3- 2.4- 2.5- 2.6- 		Slightly moist, dark orange blotched dark grey, STIFF, clayey SILT containing abundant, angular fragments of highly weathered shale/mudstone.		
2.8- 2.9- 3.0- 3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Not yet refusal

Groundwater conditions: Not encountered General remarks 2:

Logged by: PH Oosthuizen **TEST PIT NO. 2-6**

Project: Lerato Park Phase 2 Date logged: 23 June 2009



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Client: Bigen Africa Services	Coordinates: 25 Y0027767 X3173070

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0 0.1 0.2 0.3 0.4 0.5 0.6		TRANSPORTED SOILS Dry, brown, STIFF, cracked, sandy to silty CLAY		tered
0.7- 0.8- 0.9-		CALCAREOUS RESIDUAL SHALE Dry, light orange brown blotched white and dark grey, DENSE TO VERY DENSE, intact, silty to clayey SAND containing minor 'lenses' of soft, white, calcareous gravel and dark grey, angular fragments of mudstone.		Not encountered
1.0-	- 1 1 1 1 1 1	maatono.	Disturbed	1
1.2- 1.3- 1.4- 1.5-	-		_	
1.6- 1.7- 1.8- 1.9-		RESIDUAL SHALE Slightly moist, dark orange blotched dark grey, STIFF TO VERY STIFF, clayey SILT containing abundant, angular fragments of highly weathered shale/mudstone.		
2.0-	HH		Disturbed	
2.1 – 2.2 – 2.3 –			- 100011000	
2.4- 2.5-				
2.6-				
2.7 2.8-				
2.9-	-			
3.0-	_			
3.1-	-			

Excavation method: Test pit with Terex 820 TLB General remarks 1: Not yet refusal

Groundwater conditions: Not encountered General remarks 2:

TEST PIT NO. 2-7 Logged by: PH Oosthuizen

Client: Bigen Africa Services

Project: Lerato Park Phase 2 Date logged: 23 June 2009



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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1- 0.2- 0.3- 0.4- 0.5-	/ / / / / /	TRANSPORTED SOILS Dry, brown, STIFF, cracked, sandy to silty CLAY		pe
0.6			Disturbed	iter
0.7- 0.8- 0.9- 1.0-		CALCAREOUS RESIDUAL SHALE Dry, light orange brown blotched white and dark grey, DENSE TO VERY DENSE, intact, silty to clayey SAND containing minor 'lenses' of soft, white, calcareous gravel and dark grey, angular fragments of mudstone.		Not encountered
1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7		RESIDUAL SHALE Slightly moist, dark orange blotched dark grey, STIFF TO VERY STIFF, clayey SILT containing abundant, angular fragments of highly weathered shale/mudstone.		
2.8- 2.9- 3.0- 3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Not yet refusal

Groundwater conditions: Not encountered General remarks 2:

TEST PIT NO. 2-8 Logged by: PH Oosthuizen

Project: Lerato Park Phase 2 Date logged: 23 June 2009



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Client: Bigen Africa Services Coordinates: 25 Y0027786 X3173273

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1-		TRANSPORTED SOILS Dry, brown, STIFF, cracked, sandy to silty CLAY		
0.2				
0.4-				
0.5-		CALCAREOUS RESIDUAL SHALE	-	ered
0.6-	- 1 1 1	Dry, light orange brown blotched white and dark grey, DENSE TO		unte
0.7-		VERY DENSE, intact, silty to clayey SAND containing minor 'lenses' of soft, white, calcareous gravel and dark grey, angular fragments of		000
0.9		mudstone.		Not encountered
1.0-		RESIDUAL SHALE	-	
1.1-	11.1	Slightly moist, dark orange blotched dark grey and white, STIFF TO		
1.2- 1.3-	11/1	VERY STIFF, clayey SILT containing abundant, angular fragments of highly weathered shale/mudstone.	Disturbed	
1.4-	11/			
1.5-	11/1			
1.6-				
1.7- 1.8-				
1.9-				
2.0-	111			
2.1-	11.1			
2.2-	11/1		Disturbed	
2.4	11/			
2.5-				
2.6-				
2.7 2.8-				
2.9	_			
3.0-				
3.1-	-			

Excavation method: Test pit with Terex 820 TLB General remarks 1: Not yet refusal

Groundwater conditions: *Not encountered* General remarks 2:

Logged by: PH Oosthuizen **TEST PIT NO. 2-9**

Project: Lerato Park Phase 2 Date logged: 23 June 2009



Southern Geotechnical Engineering
P.O. Box 1687
Brooklyn Square
0075
Tel: 012 430 2081

Client: Bigen Africa Services	Coordinates: 25 Y0027879 X3173159

			Tel: 012 430 2081	
Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.0 0.1 0.2 0.3 0.4 0.5 0.6		TRANSPORTED SOILS Dry, brown, STIFF, cracked, sandy to silty CLAY		ered
0.7- 0.8- 0.9-		CALCAREOUS RESIDUAL SHALE Dry, light orange brown blotched white and dark grey, DENSE TO VERY DENSE, intact, silty to clayey SAND containing minor 'lenses' of soft, white, calcareous gravel and dark grey, angular fragments of mudstone.		Not encountered
1.3- 1.4- 1.5- 1.6- 1.7- 1.8- 1.9-		RESIDUAL SHALE Slightly moist, dark orange blotched dark grey and white, STIFF TO VERY STIFF, clayey SILT containing abundant, angular fragments of highly weathered shale/mudstone.		
2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7			Bulk	
2.8- 2.9- 3.0- 3.1-				

Excavation method: Test pit with Terex 820 TLB General remarks 1: Not yet refusal

Groundwater conditions: Not encountered General remarks 2:

APPENDIX B LABORATORY TEST RESULTS





(EDMS) BEPERK GEOTEGNIESE DIENSTE (PTV) LIMITED GEOTECHNICAL SERVICES

SAASIL/SAACEL No. 208

1231, KIMBERLEY, 8300, SOUTH AFRICA, 3 Roper Street, Kimberley North, KIMBERLEY, 8301

CLIENT: Southern Geotechnical Engineering

P.O. Box 1687

Brooklyn Square

0075

2009-08-13 DATE:

REFERENCE: **SLN139**

DOCUMENT No.: 09/0848 - 0851

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NUMBER OF PAGES: 2

ATTENTION:

Pieter Oosthuizen

PROJECT:

Lerato Park Phase 2

TEST REPORT

SAMPLE RECEIVED:

Client

SAMPLE TESTED:

01/07/2009

SAMPLE TESTED BY:

S.TELEKELO

SAMPLE REPORTED BY:

S. Malan

SAMPLE METHOD:

BY CLIENT

DATE SAMPLED: **LOCATION SAMPLED:** UNKNOWN Lerato Park Phase 2

SAMPLE No.:

09/0848 - 0851

CLIENT REFERENCE:

Lerato Park Phase 2

TEST METHODS:

TMH1:A1,A2,A3,A5,A7 & A8

REMARKS:

SAMPLES BROUGHT IN BY CLIENT

NOTE: REPORT CONTINUES ON NEXT PAGE

SEE ATTACHED TABLE

(Technician / Technologist)

for: SIMLAB (PTY) LTD.

(Divisional Director)



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TRADING AS

REG. No. 1987/004282/07

SAASIL/SAACEL No. 208

🔟 123 I, KIMBERLEY, 8300, SOUTH AFRICA, 3 Roper Street, Kimberley North, KIMBERLEY, 830 I

-	**************************************	JES FROM PAGE 1	T.	OCUMENT No.: 09/0			Page 2 of 2
	F & PROJEC	JI:			eotechnical Engineering /	Lerato Park Phase 2	
	No. / KM	I design		2-1	2-4	2.6	2-9
	RIAL DEPTH			0.5-2.7	1.4-2.7	0.6-1.5	1.5-2.6
SAMPL	E / LAB. No			09/0848	09/0849	09/0850	09/0851
	l	MATERIAL DESCRIPTI	ON				
IN SITU	FIELD MOI	ISTURE (%)		11.8%	12.6%	8.7%	11.9%
-	O CLASSIF			A-2-7	A-7-5	A-7-6	A-7-6
UNIFIE	D SOIL CLA	SSIFICATION		GP/GC	sc	CL	СН
TRH14/	* COLTO CI	LASSIFICATION		G6	>G10	>G10	>G10
W F a		SIEVE ANALYS	SIS, PERCENTAGE	OF MATERIAL PASSING 0.	075MM SIEVE (TMH 1, Meti	10d A1 (a), A5 - % PASSI	
		63.0 mm		100			
		53.0 mm	TO THE RESIDENCE OF THE PARTY O	95			
		37.5 mm		91			
SIEVE ANALYSIS		26.5 mm		86	100		100
AL		19.0 mm		84	97		99
A	THE OWNER OF THE PERSON NAMED IN	13.2 mm		71	96	100	99
EVE		4.75 mm		42	95	98	95
S	2.00 mm 0.425 mm 0.075 mm			25	92	95	90
				12	83	88	81
				7	45	59	50
	0.002 mm			1	4	4	3
L 'AR	COARSE SAND			51	10	7	10
SOIL	FINE SAND		19	41	31	34	
Z	MATERIAL < 0.075 MM			30	49	62	56
		GRADING MODULU	JS (GM)	2.55	0.79	0.58	2.55
		Ph / CONDUCTIVIT	Y Sm ⁻¹				
		The state of the s	ATTERE	ERG LIMITS ANALYSIS (T	MH 1, Method A2, A3 & A4)	Control to Supply 15 (1997) (1997)	
		PASSING SIEVE	L.L	44	55	46	56
mm) >0	.425		P.I. / L.S.	17 / 9.18	25 / 13.25	25 / 13.2	28 / 13.17
OTENT	IAL EXPAN	ISIVENESS (mm)					
6 1225	M	AXIMUM DRY DENSIT	Y AND OPTIMUM M	OISTURE CONTENT, CALI	FORNIA BEARING RATIO A	NALYSIS (TMH 1, Metho	d A7 & A8)
	UNCO	NFINED COMPRESSIV	/E STRENGTH & INI	DIRECT TENSILE STRENG	TH OF STABILISED MATER	RIAL (TMH 1, Method A13	T, A14 & A16T)
7		MAX DRY DENSITY		1651	1813	1814	1872
<u>0</u>	MOD AASHTO	OPT MOISTURE (%	:)	21.9	13.2	13.1	13.5
Ž.	AS	COMP MOISTURE	The second secon	21.8	13.5	13	15.2
RM	00	DRY DENSITY (kg/r	m³)	1644	1803	1810	1872
	M	CBR (%) / *UCS/ITS	(Kpa)	49	2	3	4
SD		SWELL (%)		0.0	2.8	2.4	2.1
=	NRB	DRY DENSITY (kg/r	m ³)	1594	1725	1753	1814
SS	2	CBR (%) / *UCS/ITS	(Kpa)	42	1	1	2
CBR / UCS / ITS DETERMINATION	i r	MAX DRY DENSITY	THE RESIDENCE OF THE PARTY OF T	1481	1578	1607	1642
CB	PROC.	OPT MOISTURE (%)				TO LOCAL COLOR OF THE PROPERTY
	LL.	CBR (%)	THE STATE OF THE S	27	1	1	1 1
IIS		100%	70043 F00544 A000	50	2	3	4
181		98%		45	2	2	3
CBR/UCS/ITS	And the second second second second	95%	THE CONTROL OF THE CO	38	1	1	2
88	The state of the s	93%	ANTENNA DE DECINO	33	1	1	1
		90%	The second secon	28	1	1	1

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CLIENT:

Southern Geotechnical Engineering

P.O. Box 1687

Brooklyn Square

0075

DATE: 2009-08-13

REFERENCE: **SLN139**

DOCUMENT No.: 09/0852 - 0855

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NUMBER OF PAGES: 2

ATTENTION:

Pieter Oosthuizen

PROJECT:

Lerato Park Phase 2

TEST REPORT

SAMPLE RECEIVED:

Client

SAMPLE TESTED:

01/07/2009

SAMPLE TESTED BY :

S.TELEKELO

SAMPLE REPORTED BY:

S. Malan

SAMPLE METHOD:

BY CLIENT

DATE SAMPLED:

UNKNOWN

LOCATION SAMPLED:

Lerato Park Phase 2

SAMPLE No. :

09/0852 - 0855

CLIENT REFERENCE:

Lerato Park Phase 2

TEST METHODS:

TMH1:A1,A2,A3,A5,A7 & A8

REMARKS: SAMPLES BROUGHT IN BY CLIENT

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(Technician / Technologist)

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(Divisional Director)





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REG. No. 1987/004282/07

SAASIL/SAACEL No. 208

[第 1231, KIMBERLEY, 8300, SOUTH AFRICA, 3 Roper Street, Kimberley North, KIMBERLEY, 8301 雷 +27 (0) 53 832 2472. ※ 079 533 0544, ₺ +27 (0) 53 832 2472, ※ simkby@simlab.co.za

DOCUMENT No.: 09/0852 - 0855

Page 2 of

2

CLIENT & PRO.	JECT:		Southern Geo	technical Engineering / Lei	rato Park Phase 2	
HOLE No. / KM			2-13	2-18	2-22	2-25
MATERIAL DEF	PTH (mm)		0.2-1.2	0.5-1.5	0.2-2.1	0.2-1.1
SAMPLE / LAB.	. No.		09/0852	09/0853	09/0854	09/0855
	MATERIAL DESCRIPT	TION				
IN SITU FIELD I	MOISTURE (%)		3.5%	9.0%	7.7%	8.8%
AASHTO CLAS	SIFICATION		A-2-6	A-7-6	A-2-7	A-2-4
JNIFIED SOIL (CLASSIFICATION		sp/sc	sc	sc	GP/GC
TRH14/* COLTO	CLASSIFICATION		G6	>G10	G8	G7
14.4	SIEVE ANALY	SIS, PERCENTAGE OF	F MATERIAL PASSING 0.07	5MM SIEVE (TMH 1, Method	d A1 (a), A5 - % PASSING	
	63.0 mm					100
	53.0 mm		100		100	93
	37.5 mm		99		98	84
Sis	26.5 mm		95		95	78
SIEVE ANALYSIS	19.0 mm		88		89	74
A N	13.2 mm		78		87	64
SVE	4.75 mm		57	100	58	41
SE	2.00 mm		38	98	41	29
	0.425 mm	l .	15	93	26	17
	0.075 mm		8	43	15	11
	0.002 mm		1	8	2	1
AR AR	COARSE SAND		59	5	35	41
SOIL	FINE SAND		20	51	27	20
. S	MATERIAL <0.0	75 MM	21	44	37	38
	GRADING MODUL	.US (GM)	2.39	0.66	2.17	2.39
	Ph / CONDUCTIV	ITY Sm ⁻¹		WATER STREET		
		ATTERBI	ERG LIMITS ANALYSIS (TN	H 1, Method A2, A3 & A4)	Land and the second sec	Control of the Contro
TTERBER LIM	IITS PASSING SIEVE	L.L	33	46	52	36
mm) >0.425		P.I. / L.S.	14 / 1.45	23 / 12.32	22 / 11.9	10 / 4.01
OTENTIAL EX	PANSIVENESS (mm)					
	MAXIMUM DRY DENSI	TY AND OPTIMUM MC	DISTURE CONTENT, CALIF	ORNIA BEARING RATIO AN	ALYSIS (TMH 1, Method A	7 & A8)
<u>U1</u>	CONFINED COMPRESS	VE STRENGTH & IND	IRECT TENSILE STRENGT	H OF STABILISED MATERIA	AL (TMH 1, Method A13T, A	(14 & A16T)
	MAX DRY DENSIT	'Y (kg/m³)	2059	1841	1925	1777
SO CE	OPT MOISTURE (%)	9.9	13.8	12.6	14.5
NAT AS	COMP MOISTURE	E (%)	10	13.8	12.9	14.7
CBR / UCS / ITS DETERMINATION	DRY DENSITY (kg	/m³)	2012	1854	1921	1782
	CBR (%) / *UCS/IT	S (Kpa)	104	4	26	52
30 S	SWELL (%)		0.0	2.0	0.3	0.2
S/IT	DRY DENSITY (kg	/m³)	1925	1755	1891	1687
SO	CBR (%) / *UCS/IT	S (Kpa)	53	3	26	34
3/2	MAX DRY DENSIT	Y (kg/m³)	1825	1644	1795	1549
CBR/	OPT MOISTURE (%)				**************************************
Q.	CBR (%)		20	1	18	15
S	100%	W79704173A000924305000480000480000000000000000000000000	150	4	26	51
9	98%		109	3	26	43
2	95%	R WOOTEN OOLLI PAAREN DEEN KORKEEN DIE KROOKEN DIE KROOKEN AND 2006 DOE WAS DEEN EE	67	3	20	34
CBR/UCS/IIIS	93%		48	2	18	28

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Southern Geotechnical Engineering

P.O. Box 1687

Brooklyn Square

0075

DATE: 2009-08-13

REFERENCE:

SLN139

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ATTENTION:

Pieter Oosthuisen

PROJECT:

Lerato Park Phase 2

TEST REPORT

SAMPLE RECEIVED:

Client

SAMPLE TESTED:

01/07/2009

SAMPLE TESTED BY:

S.TELEKELO

SAMPLE REPORTED BY:

S Malan

SAMPLE METHOD:

BY CLIENT UNKNOWN

DATE SAMPLED: LOCATION SAMPLED:

Lerato Park Phase 2

SAMPLE No.:

09/0856 - 0859

CLIENT REFERENCE:

Lerato Park Phase 2

TEST METHODS:

TMH1:A1,A2,A3,A5,A7 & A8

REMARKS:

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(Divisional Director)



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(PTY) LIMITED GEOTECHNICAL SERVICES

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LIENT	& PROJECT	•		Southern Geot	echnical Engineering / Le	rato Park Phase 2	O CONTROL OF CONTROL O
OLE N	o. / KM			2-28	2-31	2-35	2-40
ATERI	AL DEPTH (mm)		0.3-1.6	1.8-2.6	0.3-1.9	0.5-2.5
AMPLE	E / LAB. No.		Commence of the commence of th	09/0856	09/0857	09/0858	09/0859
	M	ATERIAL DESCRIPTI	ION				Marie Constitution of the
SITU	FIELD MOIS	TURE (%)		8.6%	11.8%	11.5%	10.9%
ASHTO	CLASSIFIC	ATION	en mentana akan akan mentana m	A-2-6	A-2-7	A-2-6	A-2-6
VIFIED	SOIL CLAS	SIFICATION		GP/GC	sw/sc	sp/sc	sp/sc
H14/*	COLTO CLA	ASSIFICATION		G7	G7	G7	G6
in landing		SIEVE ANALYS	SIS, PERCENTAGE OF	MATERIAL PASSING 0.07	5MM SIEVE (TMH 1, Metho	d A1 (a), A5 - % PASSING	
		63.0 mm	water the second		****	PARTICULAR DE LA CONTRACTION D	
ļ	53.0 mm						
" 0		37.5 mm		100		100	100
YSIE		26.5 mm		96	100	98	94
Z Z		19.0 mm	BOOK ON THE REAL PROPERTY OF THE PARTY OF TH	86	97	87	85
SIEVE ANALYSIS		13.2 mm		86	96	87	83
IEV!		4.75 mm		48	64	68	52
S		2.00 mm	- Marian	27	38	45	31
		0.425 mm		14	9	22	14
	0.075 mm			6	6	12	7
	0.002 mm		1	0	1	1	
MORTAR	COARSE SAND		47	75	52	55	
IORTA	FINE SAND		30	10	22	21	
2	MATERIAL <0.075 MM			22	15	26	24
		GRADING MODULI		2.52	2.47	2.21	2.52
7279258325		Ph / CONDUCTIVI	TY Sm ⁻¹				
		7 37 71.75.00.00.00.00	ATTERBE	RG LIMITS ANALYSIS (TM	H 1, Method A2, A3 & A4)		
TERB m) >0		PASSING SIEVE	L.L	39	52	39	38
			P.I. / L.S.	14 / 7.97	17 / 8.15	16 / 6.77	16 / 6.21
TENT	The second and the second seco	SIVENESS (mm)		energy of the second se			
						ALYSIS (TMH 1, Method A7	
	UNCON					AL (TMH 1, Method A13T, A	
z l	0	MAX DRY DENSIT		1871	1713	1719	1776
CBR/UCS/ITS DETERMINATION	SHT	OPT MOISTURE (%		13.5	18.6	17	15.9
Ž	AA	COMP MOISTURE		13.8	18.7	17.3	15.8
	MOD AASHTO	DRY DENSITY (kg/ CBR (%) / *UCS/ITS		1896	1690	1759	1780
	2	SWELL (%)	o (npa)	26 0.2	40	40	60
SE	m	DRY DENSITY (kg/	/m ³ \	1882	0.1 1606	0.1 1679	0.0
183	NRB	CBR (%) / *UCS/ITS	***************************************	30	30	32	1677 39
3		MAX DRY DENSIT	THE RESERVE OF THE PARTY OF THE	1801	1542	1590	1630
ŭ	PROC- TOR	OPT MOISTURE (%		1001	1342	1990	1030
0	Q F	CBR (%)		22	22	18	20
co l		100%		29	43	36	59
	TO THE PARTY OF TH	98%		25	38	33	51
3		**************************************		20	32	24	41
CBR/UCS/IITS	95%			17	28	19	27
œ l	93%			1 /			

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CLIENT:

Southern Geotechnical Engineering

P.O. Box 1687

Brooklyn Square

0075

DATE:

2009-08-11

REFERENCE:

SLN139

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ATTENTION:

Pieter Oosthuizen

PROJECT:

Lerato Park Phase 2

TEST REPORT

SAMPLE RECEIVED:

Client

SAMPLE TESTED:

01/07/2009

SAMPLE TESTED BY :

S.TELEKELO

SAMPLE REPORTED BY :

S. Malan

SAMPLE METHOD:

BY CLIENT

DATE SAMPLED: LOCATION SAMPLED:

UNKNOWN Lerato Park Phase 2

SAMPLE No. :

09/0860 - 0861

CLIENT REFERENCE:

Lerato Park Phase 2

TEST METHODS:

TMH1:A1,A2,A3,A5,A7 & A8

REMARKS:

SAMPLES BROUGHT IN BY CLIENT

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for : SIMLAB (PTY) LTD.

(Divisional Director)



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HANDEL DRYWEND AS

REG. No. 1987/004282/07

SAASIL/SAACEL No. 208

***PAG	E CONTINUI	ES FROM PAGE 1	DO	2 +2.7 DCUMENT No.: 09/08	360 - 0861	0544, (: +27 (0) 53 832 2472	2. ## simkby@sii Page 2 of	mlab.co.za
CLIENT	C& PROJEC	Т:	1000	Southern Geotechnical Engineering / Lerato Park Phase 2				
HOLE !	No. / KM			2-45	248		I	
MATER	RIAL DEPTH	(mm)		0.3-1.1	0.3-0.4			***************************************
SAMPL	E / LAB. No.			09/0860	09/0861			
	A	MATERIAL DESCRIPTI	ON					
IN SITU	FIELD MOIS	STURE (%)		7.4%	8.1%			
N .	O CLASSIFI			A-2-6	A-2-6		<u> </u>	
UNIFIE	D SOIL CLAS	SSIFICATION		GW/GC	GP/GC			
TRH14/	* COLTO CL	ASSIFICATION	**************************************	G6	G6	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
		SIEVE ANALYS	IS, PERCENTAGE O	MATERIAL PASSING 0.07		nd A1 (a) A5 . % PASSING	10.512.55	SENSON.
		63.0 mm		100		1		
		53.0 mm	MARKET THE STREET STREET, STRE	99	100			With the second
New York		37.5 mm		96	94			
SIS		26.5 mm		94	86			OR OR PHENODONIA STATE
SIEVE ANALYSIS		19.0 mm	TNR militarium and an annual an annual and an annual an an	90	79			
ANA		13.2 mm	**************************************	73	67			W
VE.		4.75 mm		46	44			NX N
SIE		2.00 mm		28	33		 	
		0.425 mm		10	25			
	0.075 mm			5	12		†	
	0.002 mm			1 0	1			***************************************
α	1	COARSE SAN	VD	66	25		<u> </u>	-
SOIL MORTAR		FINE SAND	THE PARTY OF THE P	15	39			XXXIII XXXIII X
S		MATERIAL <0.07					 	***************************************
	 	GRADING MODULI		20	35		 	
	 	Ph / CONDUCTIVIT		2.57	2.30			
	- 326555555646	PILI CONDUCTIVII			The Committee of the Co	Commence of the commence of th	100000000000000000000000000000000000000	
ATTEDI	DEDLIMITE	PASSING SIEVE		RG LIMITS ANALYSIS (TM			Transmitted Street	
(mm) >(PASSING SIEVE	L.L	36	32			
DOTEN	TIAL EVDAN	ISIVENESS (mm)	P.I. / L.S.	13 / 5.62	12 / 7.12		<u> </u>	
FOILN	Section 1		V AND ODTIME IN THE			The state of the s		
				ISTURE CONTENT, CALIF				
0.11.0362	T UNCO	MAX DRY DENSITY		RECT TENSILE STRENGT		IAL (TMH 1, Method A13T,	A14 & A16T)	
Z	0		VIII. C.	1871	2037			
4TIC	MOD AASHTO	OPT MOISTURE (%		14.3	10.6		ļ	
Ž	AA	COMP MOISTURE		14.5	10.6			
ERI	00	DRY DENSITY (kg/		1878	2017			
	A	CBR (%) / *UCS/ITS	(Npa)	60	73			
13	60	SWELL (%)	3,	0.0	0.1			Marie Contract of the Contract
SI	NRB	DRY DENSITY (kg/i		1803	1955			
CBR / UCS / ITS DETERMINATION		CBR (%) / *UCS/ITS		59	81			un come months and an annual comment
88	PROC-	MAX DRY DENSITY		1732	1871		_	National State of Sta
Ō	PR	OPT MOISTURE (%)]	- C				
10	 	[CBR (%)	MANUFACTURE CONTRACTOR	44	50		ļ	(W1275-51-75-75-75-75-75-75-75-75-75-75-75-75-75-
	-	100%		60	71			
CBR/UCS/IITS		98%		59	76			
		95%	TEX STATE PROCESSION AND THE PROPERTY OF THE P	53	72	The second secon		MULTIPLE AT THE PROPERTY AND ADDRESS.
ä		93%		45	57	The state of the s	-	Mary Mary Mary Mary Mary Mary Mary Mary
alessia estadas	90%			36	40	E. Carlotte		

Results reported relate only to the materials tested
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(EDMS) BEPERK GEOTEGNIESE DIENSTE (PTY) LIMITED **GEOTECHNICAL SERVICES**

HANDEL DRYWEND AS TRADING

REG. No. 1987/004282/07 SAASIL/SAACEL No. 208

231, KIMBERLEY, 8300, SOUTH AFRICA, 3 Roper Street, Kimberley North, KIMBERLEY, 8301

CLIENT:

Southern Geotechnical Engineering

P.O. Box 1687

Brooklyn Square

0075

2009-08-13 DATE:

REFERENCE:

SLN139

DOCUMENT No.: 09/0862-09/0865

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ATTENTION :

Pieter Oosthuizen

PROJECT:

Lerato Park Phase 2

TEST REPORT

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Client

SAMPLE TESTED:

2009/07/01

SAMPLE TESTED BY :

S.TELEKELO

SAMPLE REPORTED BY:

F.FONTERNEL

SAMPLE METHOD:

BY CLIENT

DATE SAMPLED:

UNKNOWN Lerato Park Phase 2

SAMPLE No.:

09/0862-09/0865

CLIENT REFERENCE:

LOCATION SAMPLED:

Lerato Park Phase 2

TEST METHODS:

TMH1:A1,A2,A3,A5,A7 & A8

REMARKS:

SAMPLES BROUGHT IN BY CLIENT

NOTE: REPORT CONTINUES ON NEXT PAGE

SEE ATTACHED TABLE

(Technician / Technologist)

for: SIMLAB (PTY) LTD.

(Divisional Director)



(EDMS) BEPERK GEOTEGNIESE DIENSTE
(PTY) LIMITED GEOTECHNICAL SERVICES

HANDEL DRYWEND AS
TRADING AS

REG. No. 1987/004282/07

SAASIL/SAACEL No. 208

LIEN	& PROJEC	T:		Southern Geo	otechnical Engineering / L	erato Park Phase 2	AND THE PARTY OF T
HOLE No. / KM				2 - 2	2 - 2	2 - 3	2 - 4
MATER	IAL DEPTH	(mm)		0.5	0.8	0.7	0.7
AMPL	E / LAB. No			09/0862	09/0863	09/0864	09/0865
	A	MATERIAL DESCRIPTION	ON				
SITU	FIELD MOI	STURE (%)		10.4%	10.3%	11.2%	10.4%
ASHT	O CLASSIFI	CATION		A-6	A-6	A-6	A-6
		SSIFICATION		SC	sc	CL	CL
RH14/	* COLTO CL	ASSIFICATION					
	1 1	SIEVE ANALYS	IS, PERCENTAGE (OF MATERIAL PASSING 0.0	75MM SIEVE (TMH 1, Meth	od A1 (a), A5 - % PASSIN	
		63.0 mm					
		53.0 mm					
S		37.5 mm	**************************************			2000	
YSI		26.5 mm			100		
SIEVE ANALYSIS		19.0 mm			99		
¥		13.2 mm			99	acceptance and accept	100
EVI	<u> </u>	4.75 mm		100	96	100	98
S		2.00 mm		98	94	99	96
	 	0.425 mm		91	85	92	84
	<u> </u>	0.075 mm		46	47	56	54
	0.002 mm		5	8	8	9	
ORTAR	COARSE SAND		7	10	7	12	
MORTAR	FINE SAND		46	41	36	32	
	MATERIAL <0.075 MM			46	50	57	56
		GRADING MODULU		0.65	0.74	0.53	0.65
1000	String of the st	Ph / CONDUCTIVITY	TO STATE OF THE ST	8.1 / 0.0054	8.13 / 0.0037	8.24 / 0.0053	8.17 / 0.0042
	All Control of the Co			BERG LIMITS ANALYSIS (TN	IH 1, Method A2, A3 & A4)		100 Miles (100 Miles (
1m) >(PASSING SIEVE	L.L	34	35	34	36
		ISIVENESS (mm)	P.I. / L.S.	14/7.74	15 / 8.94	18 / 10.1	19 / 10.11
JIEN	PORT OF THE PARTY		V 4.15 265-1101111			CONTROL CONTRO	
	LINICO	NEINED COMPRESSIO	CAND OPTIMUM M	OISTURE CONTENT, CALIF	ORNIA BEARING RATIO A	NALYSIS (TMH 1, Method	A7 & A8)
		MAX DRY DENSITY	CSTRENGTH & INI	DIRECT TENSILE STRENGT	H OF STABILISED MATER	IAL (TMH 1, Method A13T	, A14 & A16T)
O	2	OPT MOISTURE (%)					
AT	SH.	COMP MOISTURE (
2	A A	DRY DENSITY (kg/n	THE RESERVE OF THE PERSON OF T				
띮	MOD AASHTO	CBR (%) / *UCS/ITS	The state of the s				
	d=	SWELL (%)	(1.100)				
DE	n	DRY DENSITY (kg/n	n ³)				
ITS DE	to the same of the		THE REPORT OF THE PARTY OF THE				
SS/ITS DE	2	CBR (%) / *UCS/ITS (Kpa) MAX DRY DENSITY (kg/m³)				WOOD TO THE PROPERTY NAMED AND ADDRESS OF THE PARTY OF TH	
/UCS/ITS DE		MAX DRY DENSITY					
BR / UCS / ITS DE		MAX DRY DENSITY OPT MOISTURE (%)	1				
CBR/UCS/ITS DE	PROC- N	OPT MOISTURE (%)					
		OPT MOISTURE (%) CBR (%)					
		OPT MOISTURE (%) CBR (%) 100%)				
CBR / UCS / ITS DETERMINATION		OPT MOISTURE (%) CBR (%) 100% 98%					



(EDMS) BEPERK GEOTEGNIESE DIENSTE GEOTECHNICAL SERVICES

TRADING

SAASIL/SAACEL No. 208

1231, KIMBERLEY, 8300, SOUTH AFRICA, 3 Roper Street, Kimberley North, KIMBERLEY, 8301 2 +27 (0) 53 832 2472, 1 079 533 0544. € +27 (0) 53 832 2472, 1 simkby@simlab.co.za

CLIENT:

Southern Geotechnical Engineering

P.O. Box 1687

Brooklyn Square

0075

DATE: 2009-08-13

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Pieter Oosthuizen

PROJECT:

Lerato Park Phase 2

TEST REPORT

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SAMPLE TESTED BY :

S.TELEKELO

SAMPLE REPORTED BY:

F.FONTERNEL

SAMPLE METHOD:

BY CLIENT

DATE SAMPLED:

UNKNOWN

LOCATION SAMPLED:

Lerato Park Phase 2

SAMPLE No.:

09/0866-09/0870

CLIENT REFERENCE:

Lerato Park Phase 2

TEST METHODS:

TMH1:A1,A2,A3,A5,A7 & A8

REMARKS:

SAMPLES BROUGHT IN BY CLIENT

NOTE: REPORT CONTINUES ON NEXT PAGE

SEE ATTACHED TABLE

(Technician / Technologist)

for : SIMLAB (PTY) LTD.

(Divisional Director)



(EDMS) BEPERK GEOTEGNIESE DIENSTE AS
(PTY) LIMITED GEOTECHNICAL SERVICES TRADING AS

HANDEL DRYWEND AS

Kimatlab

REG. No. 1987/004282/07

SAASIL/SAACEL No. 208

□ 1231, KIMBERLEY, 8300, SOUTH AFRICA, 3 Roper Street, Kimberley North, KIMBERLEY, 8301 □ +27 (0) 53 832 2472, 1079 533 0544, (1+27 (0) 53 832 2472, 11 simkby@simlab.co.za

LIENT	「& PROJECT:		Southern Go	eotechnical Engineering /	Lerato Park Phase 2	
	No. / KM		2 - 5	2 - 6	2 - 7	2 - 8
	NAL DEPTH (mm)		0.5	2.0	0.5	0.2
AMPL	E / LAB. No.		09/0866	09/0868	09/0869	09/0870
- www.	MATERIAL DESCRIP	TION				03/06/70
SITU	FIELD MOISTURE (%)		15.6%	11.2%	11.5%	10.0%
	O CLASSIFICATION		A-7-6	A-7-6	A-7-6	A-7-6
	SOIL CLASSIFICATION	W. San	CL	CL	CL	SC SC
H14/	COLTO CLASSIFICATION				THE RESERVE THE PROPERTY OF TH	
	SIEVE ANAL'	SIS, PERCENTAGE	OF MATERIAL PASSING 0.	075MM SIEVE (TMH 1, Me	thod A1 (a), A5 - % PASSIN	G
	63.0 mm					
	53.0 mm	and a second of the second of			1	
S	37.5 mm					
2	26.5 mm					100
SIEVE ANALYSIS	19.0 mm					99
e U	13.2 mm		100	100		98
<u> </u>	4.75 mm		99	98	100	93
n	2.00 mm		97	94	99	82
	0.425 mm		87	76	95	60
	0.075 mm		54	67	70	44
~	0.002 mm		9	4	7	5
MORTAR	COARSE SAND		10	18	4	27
SOIL IORTA	FINE SAND		34	11	26	19
=	MATERIAL <0.075 MM		56	71	70	54
\dashv	GRADING MODUL		0.62	0.63	0.36	0.62
- 1	Ph / CONDUCTIVI	CO. ATTEMPT OF THE PERSON OF T	8.23 / 0.0085	8.05 / 0.027	7.75 / 0.0121	8.19 / 0.0134
EDD	ED LIMITO DA GOULO A		BERG LIMITS ANALYSIS (T	MH 1, Method A2, A3 & A4	The state of the s	1300
n) >0.	ER LIMITS PASSING SIEVE 425	L.L	43	47	44	43
	IAL EXPANSIVENESS (mm)	P.I. / L.S.	21 / 13.07	22 / 10.45	22 / 10.85	20 / 10.39
LIVE				Signatura and Signatura		
	UNCONCINED COMPAGE	IY AND OPTIMUM N	MOISTURE CONTENT, CALIF	ORNIA BEARING RATIO	ANALYSIS (TMH 1, Method	A7 & A8)
Ť	UNCONFINED COMPRESS	IVE STRENGTH & IN	DIRECT TENSILE STRENG	TH OF STABILISED MATE	RIAL (TMH 1, Method A13T	A14 & A16T)
	MAX DRY DENSIT		<u> </u>			*****
	COMP MOISTURE	W. Company of the Com			The state of the s	
	DRY DENSITY (kg					
1	OPT MOISTURE (* COMP MOISTURE DRY DENSITY (kg CBR (%) / *UCS/IT					MARKET THE PARTY OF THE PARTY O
	SWELL (%)	3 (Npa)			**************************************	
t		(m ³)	 	Parameter Committee Commit		
	DRY DENSITY (kg.	The same of the sa			EN HELPHANE LA CONTRACTOR OF THE PARTY OF TH	
	1				THE RESERVE THE PARTY OF THE PA	
	MAX DRY DENSIT		 			
	CBR (%)	~,	-			and the second s
	100%			And the second s		
F	98%	THE RESERVE OF THE PARTY OF THE				
1	95%					
1	- 10	ALCOHOLOGY CHARLES AND A CONTROL OF THE CONTROL OF	<u> </u>			THE RESIDENCE OF THE PARTY OF T
MODBLY (Administrational Commission of Commission) among	93%		3			
the Commission of the Commissi	93% 90%	THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN				44000000000000000000000000000000000000





(EDMS) BEPERK GEOTEGNIESE DIENSTE (PTY) LIMITED GEOTECHNICAL SERVICES

HANDEL DRYWEND AS

REG. No. 1987/004282/07

SAASIL/SAACEL No. 208

CLIENT: Southern Geotechnical Engineering

P.O. Box 1687

Brooklyn Square

0075

2009-08-13 DATE:

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Pieter Oosthuizen

PROJECT:

Lerato Park Phase 2

TEST REPORT

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Client

SAMPLE TESTED:

2009/07/01

SAMPLE TESTED BY:

S.TELEKELO

SAMPLE REPORTED BY:

F.FONTERNEL

SAMPLE METHOD: DATE SAMPLED:

BY CLIENT UNKNOWN

LOCATION SAMPLED:

Lerato Park Phase 2

SAMPLE No. :

09/0871-09/0874

CLIENT REFERENCE:

Lerato Park Phase 2

TEST METHODS:

TMH1:A1,A2,A3,A5,A7 & A8

REMARKS: SAMPLES BROUGHT IN BY CLIENT

NOTE: REPORT CONTINUES ON NEXT PAGE SEE ATTACHED TABLE

(Technician / Technologist)

for : SIMLAB (PTY) LTD.

(Divisional Director)

Results reported relate only to the materials tested





(EDMS) BEPERK GEOTEGNIESE DIENSTE (PTY) LIMITED GEOTECHNICAL SERVICES

HANDEL DRYWEND AS TRADING AS

REG. No. 1987/004282/07

SAASIL/SAACEL No. 208

LIENT	& PROJECT	:		Southern Ge	otechnical Engineering / I	erato Park Phase 2	A CONTRACTOR OF THE PARTY OF TH
HOLE No. / KM				2 - 8	2 - 14	2 - 16	2 - 16
TATER	IAL DEPTH (mm)		2.2	1.0	0.3	0.8
AMPL	E / LAB. No.			09/0871	09/0872	09/0873	09/0874
	MA	ATERIAL DESCRIPT	TION				and the second s
	FIELD MOIS			10.4%	8.9%	7.8%	8.0%
	O CLASSIFIC			A-7-6	A-7-6	A-6	A-6
NIFIE	SOIL CLAS	SIFICATION		CL	sc	SC	CL
RH14/	* COLTO CLA	SSIFICATION					
		SIEVE ANALY	SIS, PERCENTAGE (OF MATERIAL PASSING 0.	075MM SIEVE (TMH 1, Meth	od A1 (a), A5 - % PASSING	
		63.0 mm					
		53.0 mm			TO THE OWNER OF THE OWNER OWNER OF THE OWNER		
S		37.5 mm	THE RESIDENCE OF THE PARTY OF T		100		
SIEVE ANALYSIS	<u> </u>	26.5 mm			99		
ΑAL		19.0 mm		100	98		
Æ.		13.2 mm	es conjunction of the conjunctio	99	97		100
EVI		4.75 mm	enterinomonica (Waterino C. James	91	89		98
S	ļ	2.00 mm		84	78	100	97
	0.425 mm		60	60	99	83	
		0.075 mm		52	41	42	50
	0.002 mm		3	5	5	7	
MORTAR	COARSE SAND		28	23	0	14	
SOIL	FINE SAND		9	24	58	34	
Σ	MATERIAL <0.075 MM		63	52	42	51	
	GRADING MODULUS (GM)		1.04	1.21	0.59	1.04	
. Charge	BL Breet of Chronica	Ph / CONDUCTIVI	CONTROL OF THE STREET,	8.06 / 0.027	8.35 / 0.0049	8.65 / 0.0044	8.07 / 0.0066
			ATTERB	ERG LIMITS ANALYSIS (T	MH 1, Method A2, A3 & A4)	The property of the property o	POR A Charles (Property)
TERE m) >0		ASSING SIEVE	L.L	44	44	32	36
-			P.I. / L.S.	21/9.91	19 / 9.02	14 / 7.59	17 / 7.81
IENI		IVENESS (mm)		2.22 - 27.95			
	MA.	XIMUM DRY DENSI	TY AND OPTIMUM M	DISTURE CONTENT, CALI	FORNIA BEARING RATIO A	NALYSIS (TMH 1, Method A	7 & A8)
	UNGON			DIRECT TENSILE STRENG	TH OF STABILISED MATER	IAL (TMH 1, Method A13T, A	414 & A16T)
Z	0	MAX DRY DENSIT					
9	H	OPT MOISTURE (The state of the s				WWW.
Ž	AAS	COMP MOISTURE	The state of the s		W		
ER	MOD AASHTO	DRY DENSITY (kg					
DE I	2	CBR (%) / *UCS/IT	5 (Kpa)			CONTRACTOR AND	
2	AA	SWELL (%)	13\				The state of the s
	NRB	DRY DENSITY (kg					
3		CBR (%) / *UCS/IT				***************************************	***************************************
R	PROC.	MAX DRY DENSIT					
<u> </u>	P.R.	OPT MOISTURE (9	/0)				
S R	[CBK (%)						AWARIAN - AND
	100%						WANTED TO THE WANTED TO THE TOTAL OF THE TOT
	VI CONTRACTOR CONTRACT	0004	98%				
			TO MECONO INCLUDADO DE LOS TRANSPORTOS DE LA PROPERCIONA ANALAS.		Marian Company of the	the same of the sa	
R/UCS/ITS CBR/UCS/ITS DETERMINATION		95%					
CBR/UCS/ITS CBR/							